

**OLYMPUS RESEARCH MICROSCOPES**

**SERIES**

**BH2 (BHS)**

**REPAIR MANUAL**

**OLYMPUS**

## TO OLYMPUS MICROSCOPE SERVICING PERSONNEL

This manual has been published chiefly for providing repair procedures for the OLYMPUS System Microscope BHS, but is applicable also to the Models BHT and BHTU which are similar to the Model BHS in the internal construction of the main body. However, light sources of these models are different and specifically described in "Troubleshooting" contained in the last part of this manual.

The Series BH2 models feature a fine & coarse adjustment assembly of essentially the same design as that of the Series BH, except for a reduction gear unit which is attached to the rear of the arm in Series BH2.

BH2-BI/TR tubes are of the constant tube length design and are different in the internal mechanism from BH-BI/TR, though optical alignment procedures for the prisms are nearly the same. Further, adoption of the constant tube length design has made it possible to take micrographs with the focusing eyepiece inserted into the right side eyepiece sleeve of the observation tube, thereby introducing the necessity to adjust parfocality of observation tube and phototube.

In order to prevent trouble from occurring during shipment or long-term use, important immovable parts are fixed with cement and are particularly described at the steps of disassembly in this manual. Removing procedures are given for parts which are glued with adhesive agents of exceptionally high bonding force.

Prisms are glued with Araldite OT1028. When it is necessary to disassemble these prisms, cut off excessive cement with a razor blade (one-side edge) or knife edge before attempting disassembly. If the prisms cannot be disassembled even after removing excessive cement, heat the entire area of the cemented surface with a soldering iron or a similar tool.

In the descriptions contained in this manual, "right" and "left" are defined in the direction as seen by the microscopist sitting in the observing position through the microscope.

For cleaning lenses, a liquid mixture of alcohol (3) and ether (7) should be used. For details, reference should be made to "How to Clean the Microscope" which is available upon separate request.

### Requisites for repairs:

1. First of all, ascertain what parts of the microscope the user or owner of which wishes you to repair.
2. Never fail to check the entire function of the microscope before you commence its repair.
  - a) Find out what parts are defective and how much they are damaged.
  - b) Prior to repair, think of the best possible order to disassembling the defective parts in a most efficient way.
3. After completing the repair, check the functions of not only the re-assembled parts but also the entire microscope to make sure no defect should be left unremedied.
4. Be careful not to deform repair parts during the assembly, make it practice to use tools and jigs specified for purpose.
5. Make repairs promptly and accurately.

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## 1. REPAIR TOOLS AND GREASE

### 1-1 Regular Tools

OT0011	Set of screwdrivers (6 pcs.)
OT0015	Phillips screwdriver (medium size)
OT0016	Phillips screwdriver (large size)
OT0018	Screwdriver (large size)
OT0022	Adjustable spanner (flat tip)
OT0023	Handle of small size Phillips screwdriver, using OT1141
OT0035	Tweezers (special made)
OT0079	Pliers
OT0207	Allen wrench (width 2.5 mm)
OT0216	Set of Allen wrenches (8 pcs.)
OT0309	Tension gauge
OT0317	Thickness guage
OT1027	Alon Alpha (adhesive)
OT1028	Araldite (adhesive)
OT1126	Bellock (adhesive)
OT1131	Shellac (20 g) (adhesive)
OT1141	Phillips screwdriver tip, using OT0023
OT1144	Tension gauge

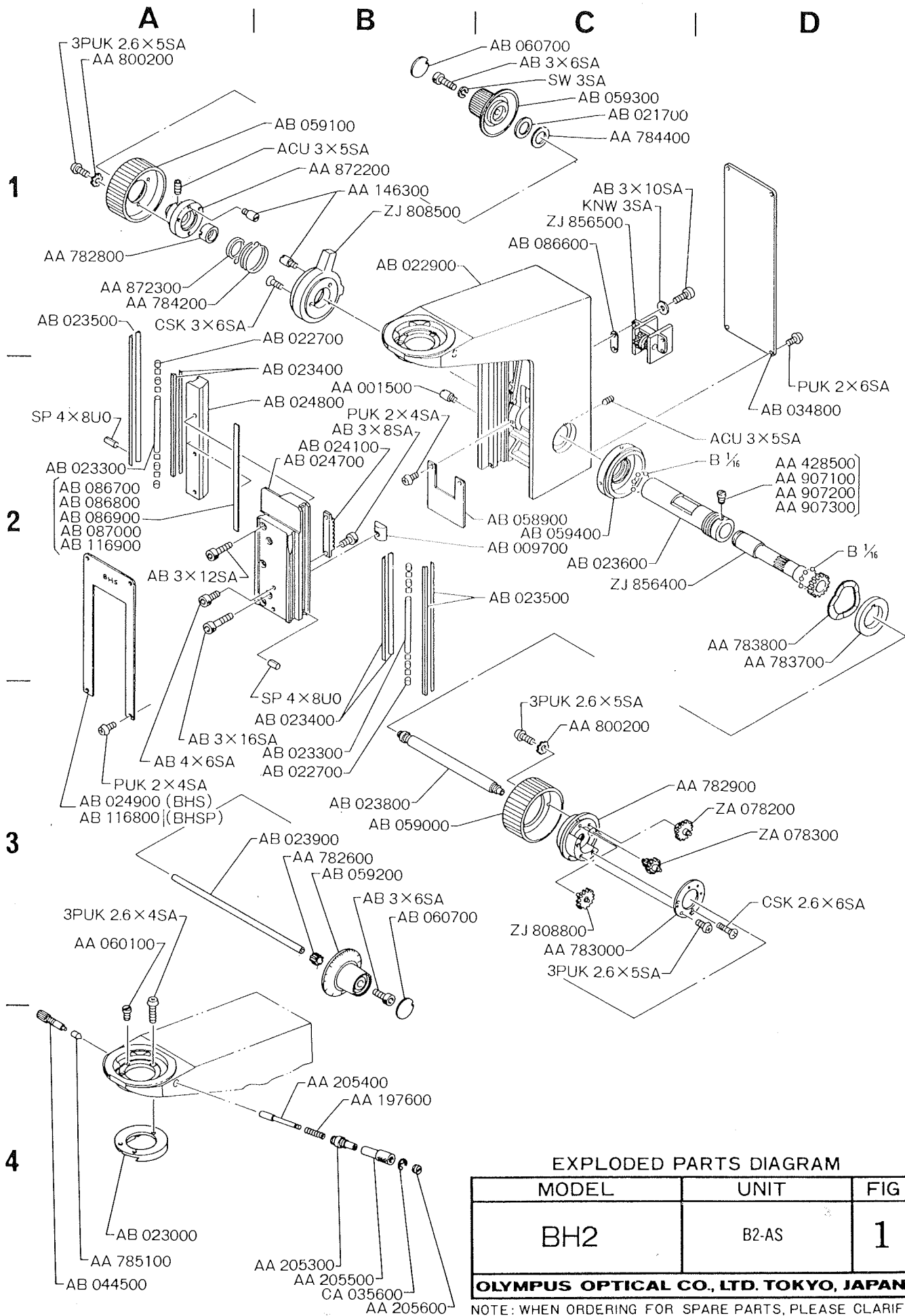
### 1-2 Grease

OT2006	50 g
OT2008	50 g
OT2012	50 g

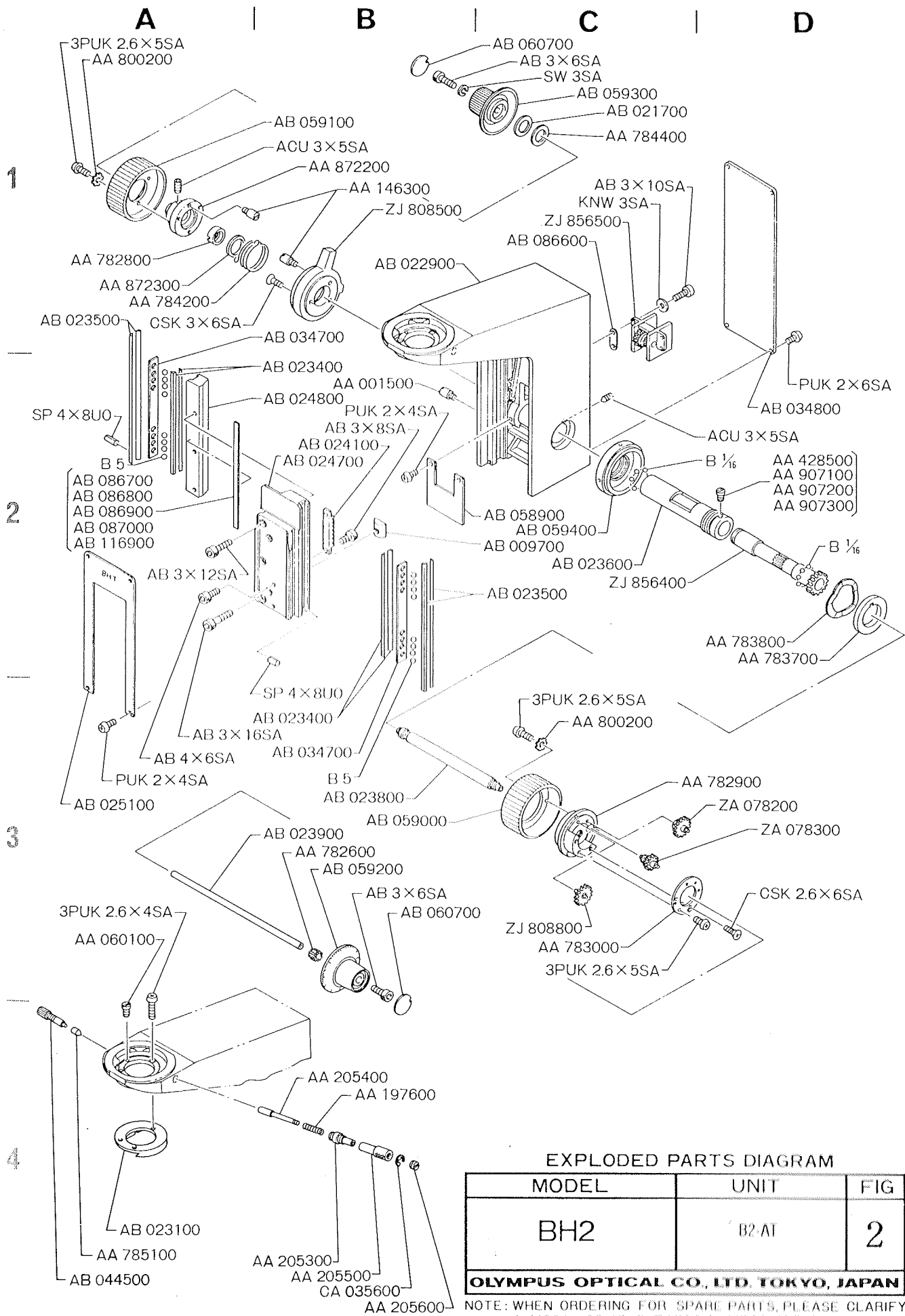
### 1-3 Special Tools

C-1	10X Eyepiece with cross hair
C-15	Focusing magnifier (PM-FT-36)
KKAA0077	Pin face wrench for tension adjustment nut AA007700
KKAA6458	Pin face wrench for nut of stage
KKAA7828	Pin face wrench for fine adjustment
KC-2010	Tool for holding gear
KN0004	Test plate for observation tube alignment (1/100 square)
KN0005	Centering objective for optical alignment of observation tube (for 160 mm)
KN0007	Standard objective for optical tube length alignment
KN0014	Centering objective for optical alignment of observation tube (for 200 mm)
KN0022	Special WF 10X for optical tube length alignment
KN0029	Special centering telescope
B-KN0003	Standard jig for mechanical tube length control
B-KC0026	Jig for receptacle balls
B-KC0027	Spoon for balls

B2KC0002	Pin hole tube for aligning optical axis of mirror
B2KC1003	Centering adapter
B2KC1006	Positioning jig for rack AB024100
B2KC0009	Block for checking sensitivity of fine adjustment
B2KC0010	Block for checking sensitivity of fine adjustment
B2KC0402	Jig for BI/TR tube prism alignment of BH2 series
B2KC1403	Alignment jig
B2KC0404	Positioning jig for prism ZA071000 of BH2-TR
B2KC0406	Jig for interpupillary distance at 62 mm of BH2-BI/TR
B2KC1408	Alignment jig for photo tube of BH2-TR
35WHK 10X	Finder eyepiece



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

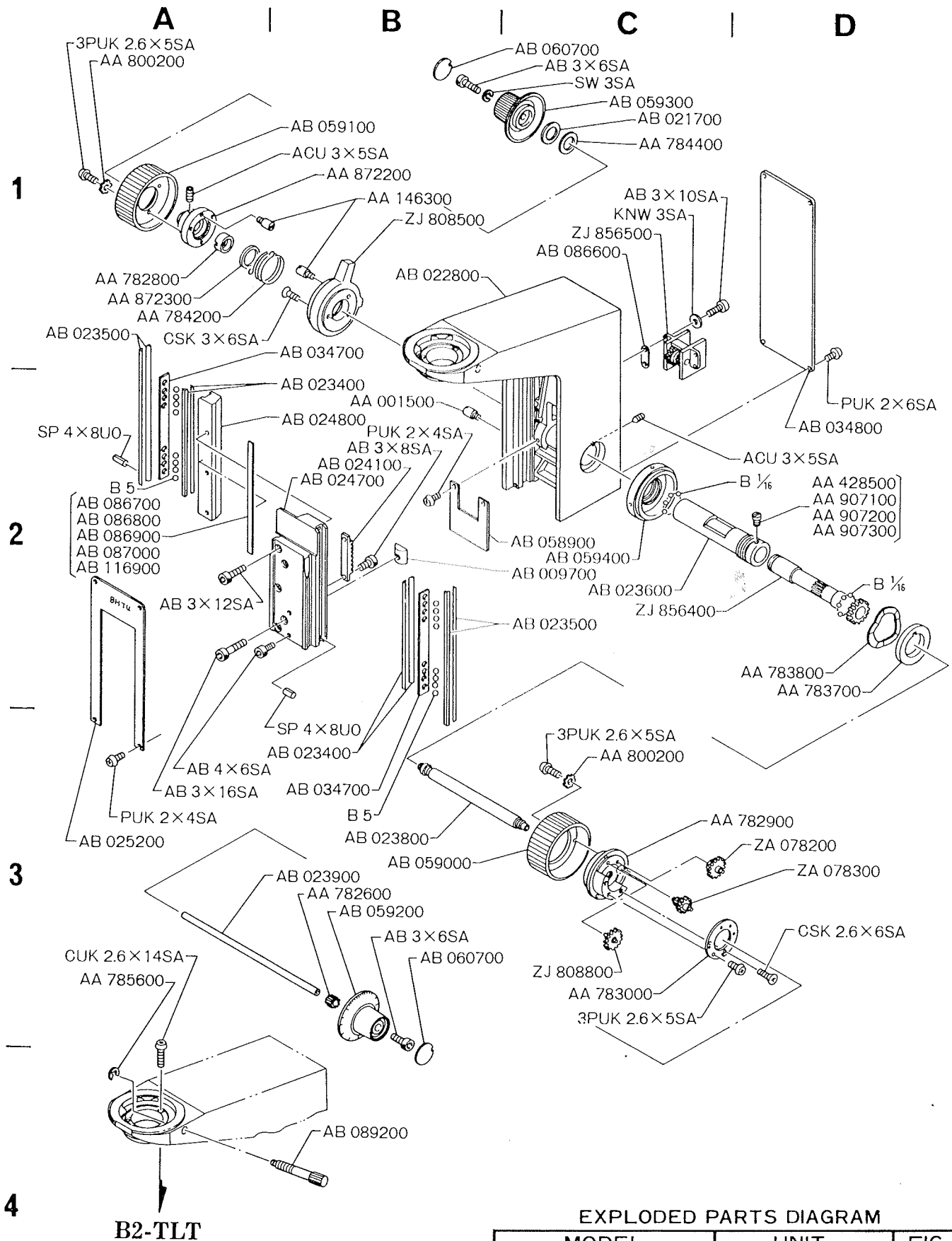


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-AT	2

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

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

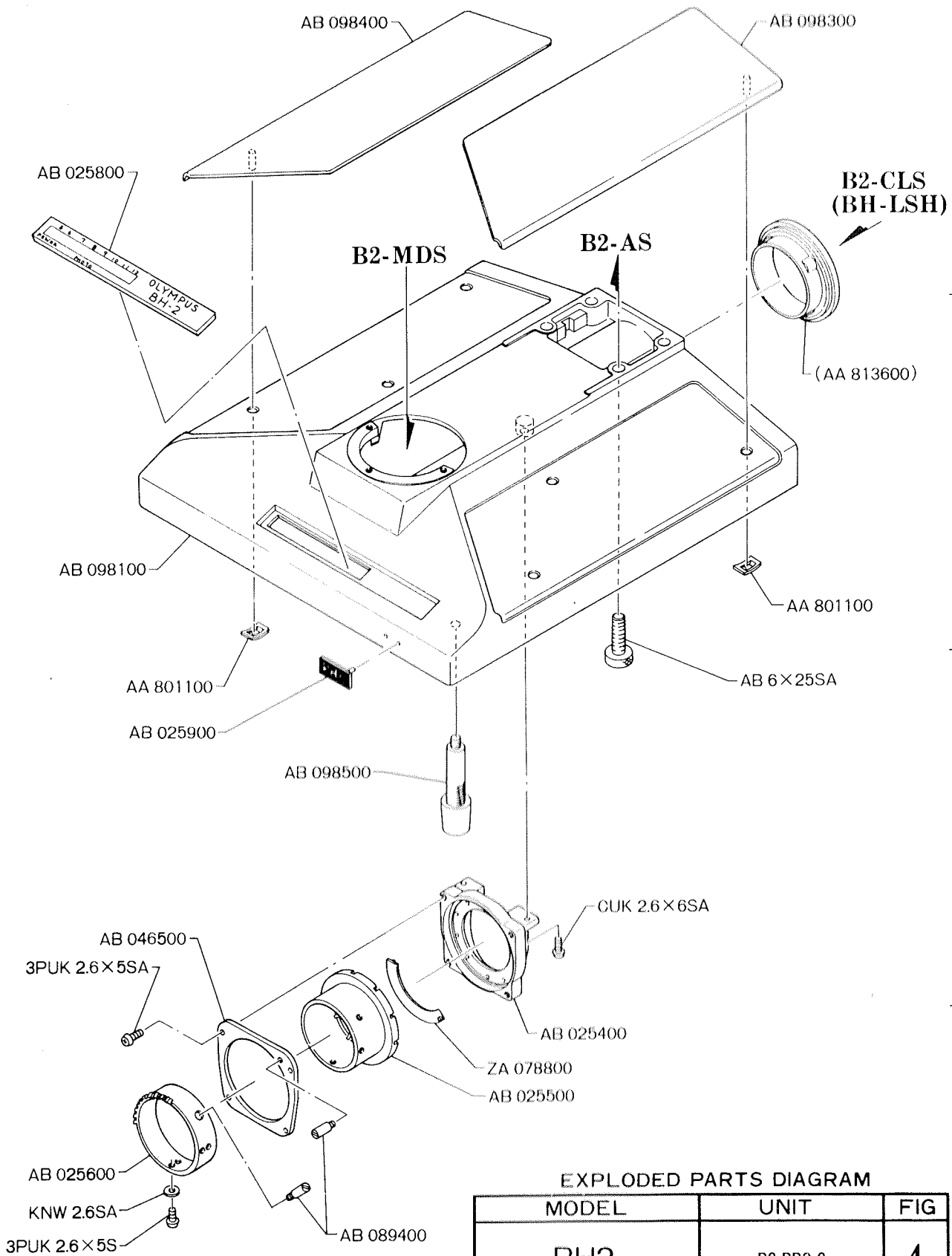


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-ATU	3
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

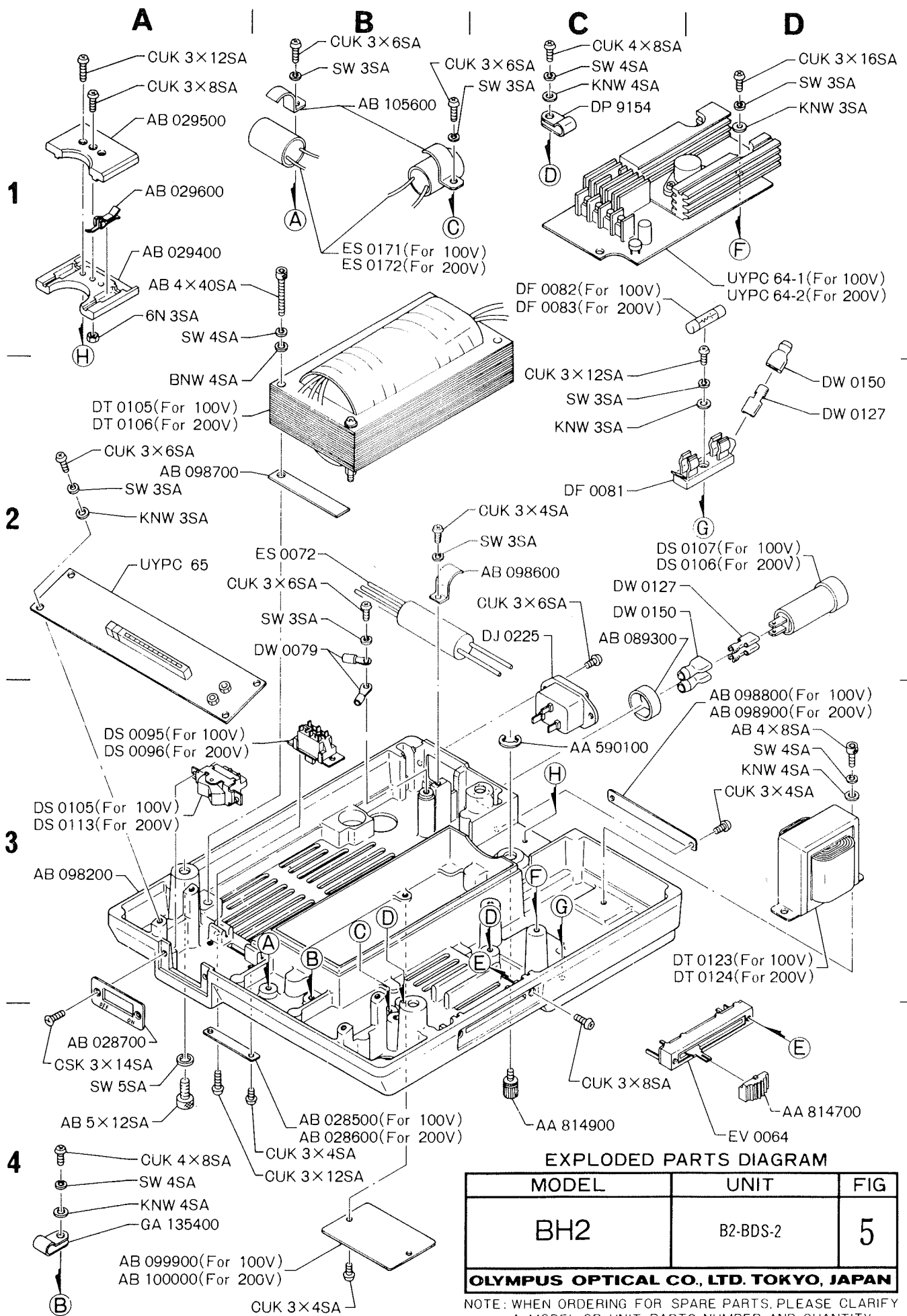
NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

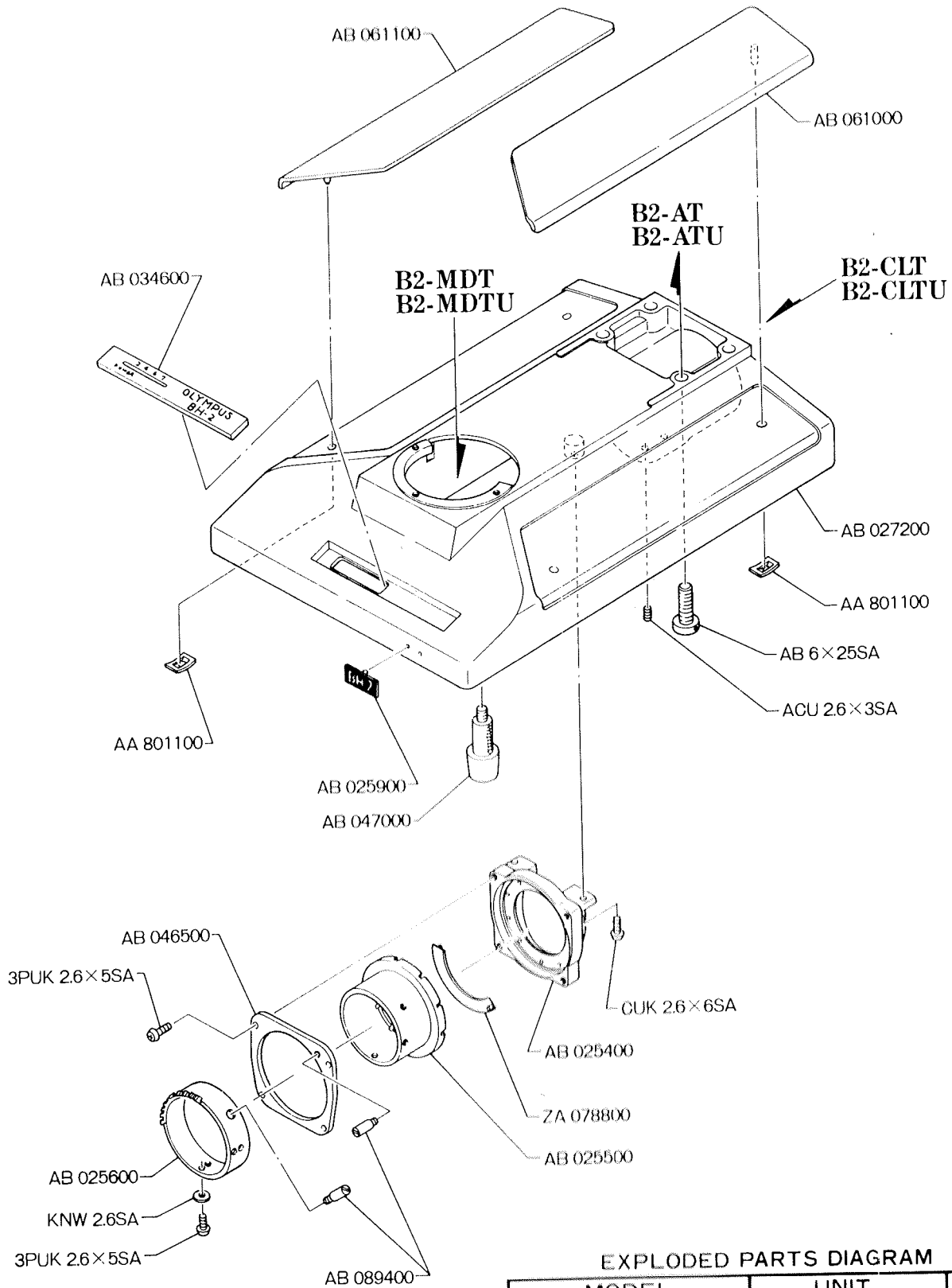


**A****B****C****D****1****2****3****4****EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-BBS-2	4
<b>OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN</b>		

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

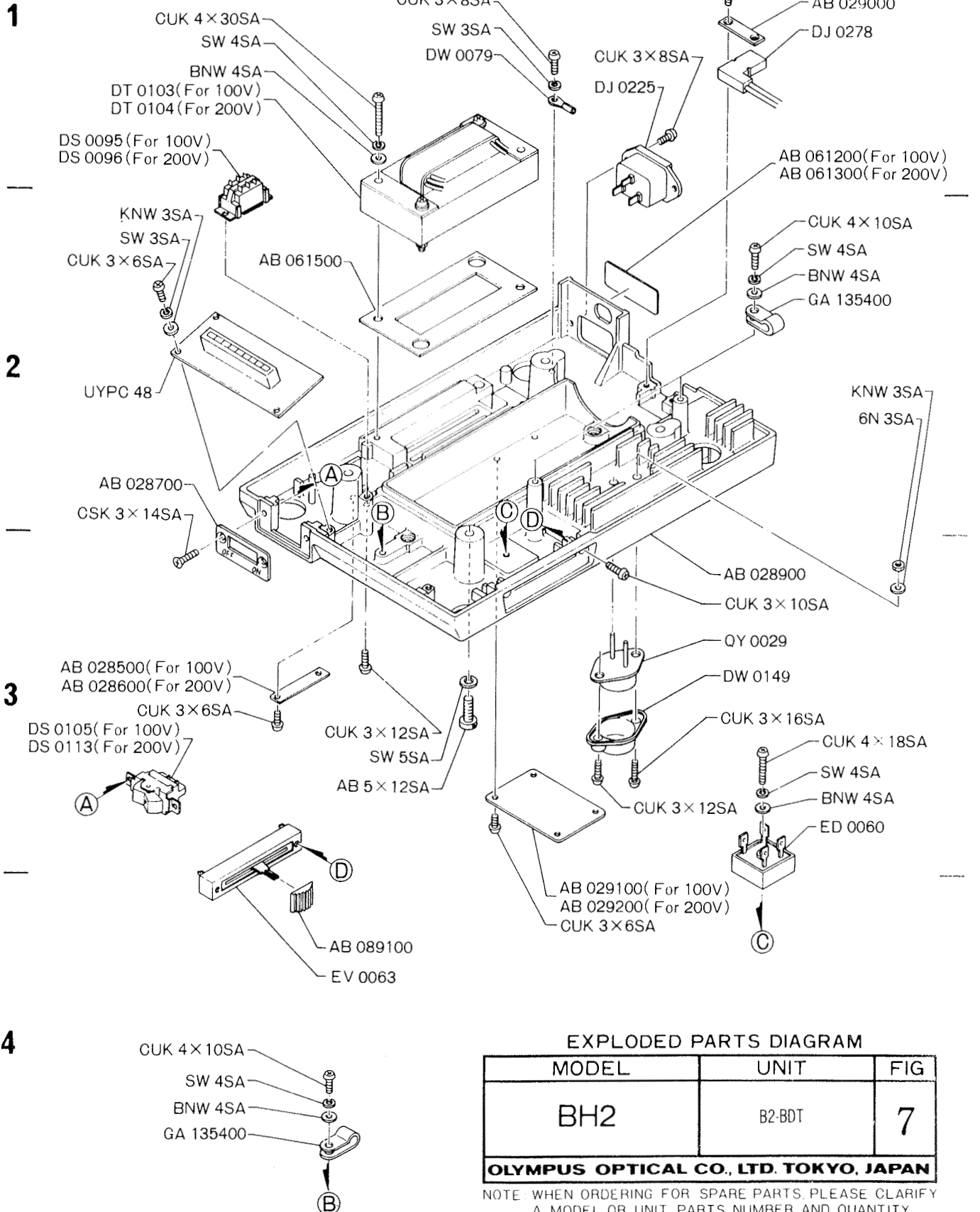


**A****B****C****D****1****2****3****4****EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-BBT	6

**OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN**

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

**A****B****C****D****EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-BDT	7
<b>OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN</b>		

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

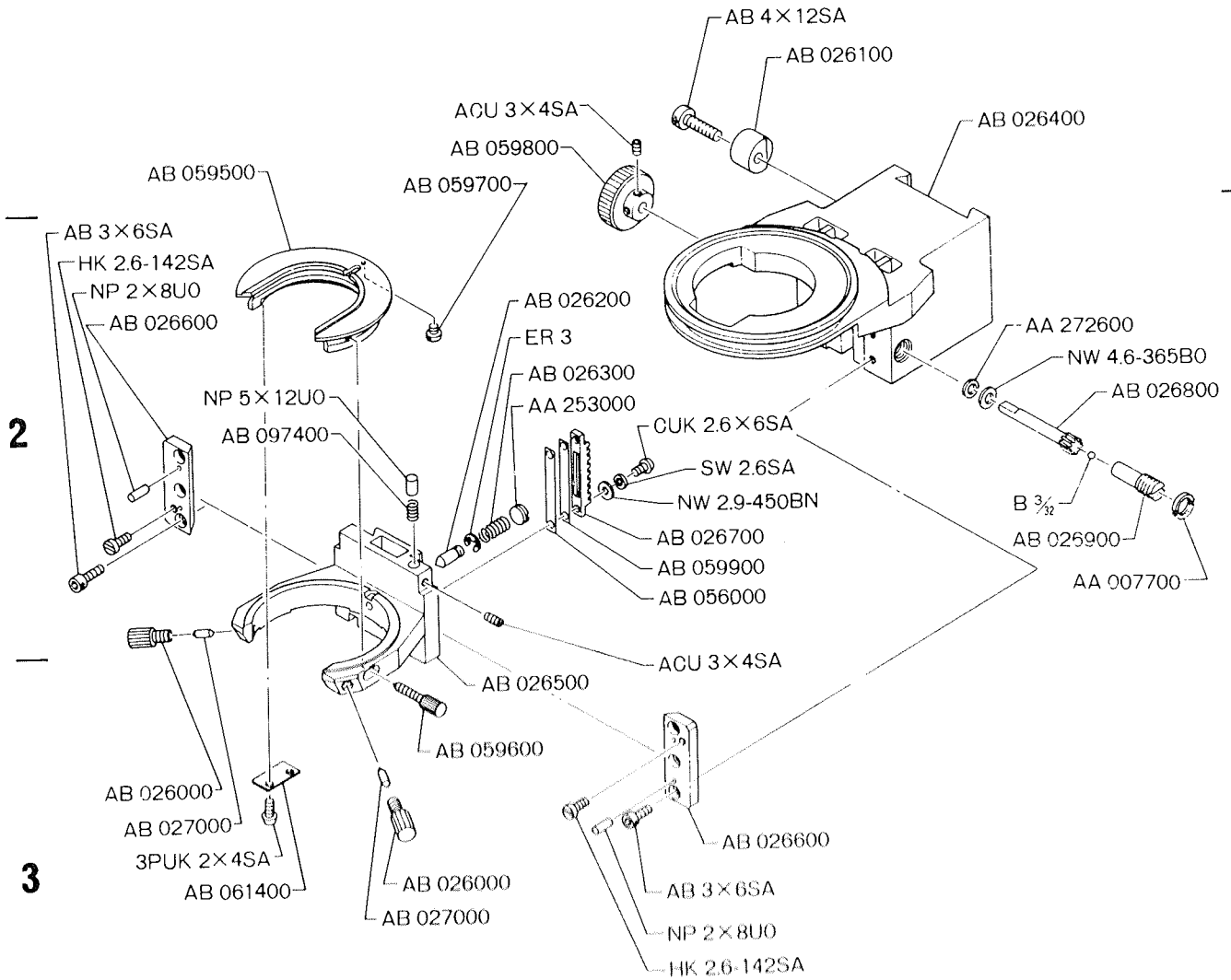
A

B

C

D

1



2

3

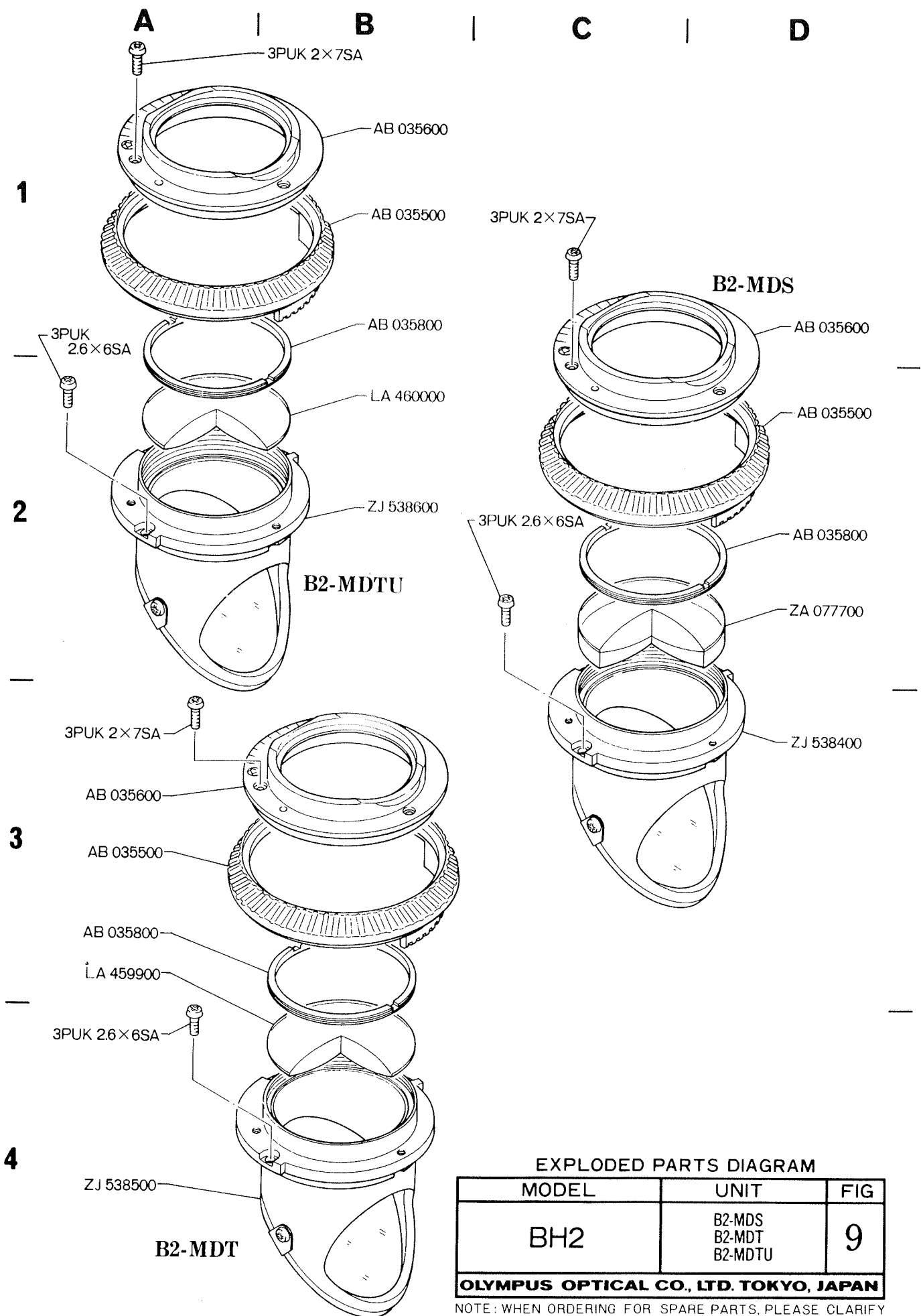
4

## EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-CH	8

**OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN**

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



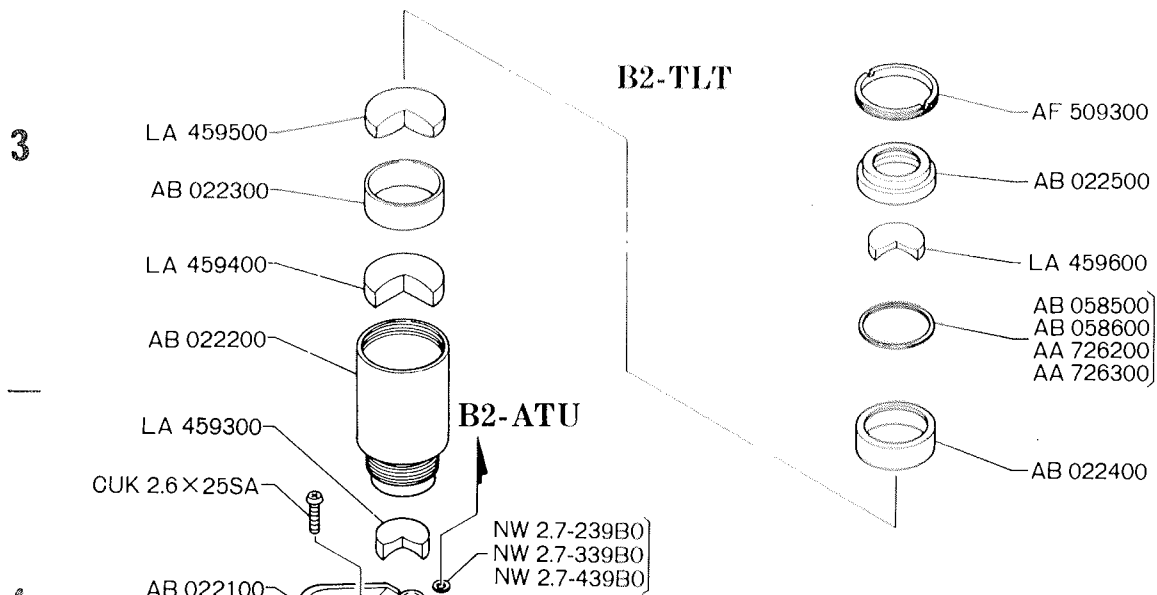
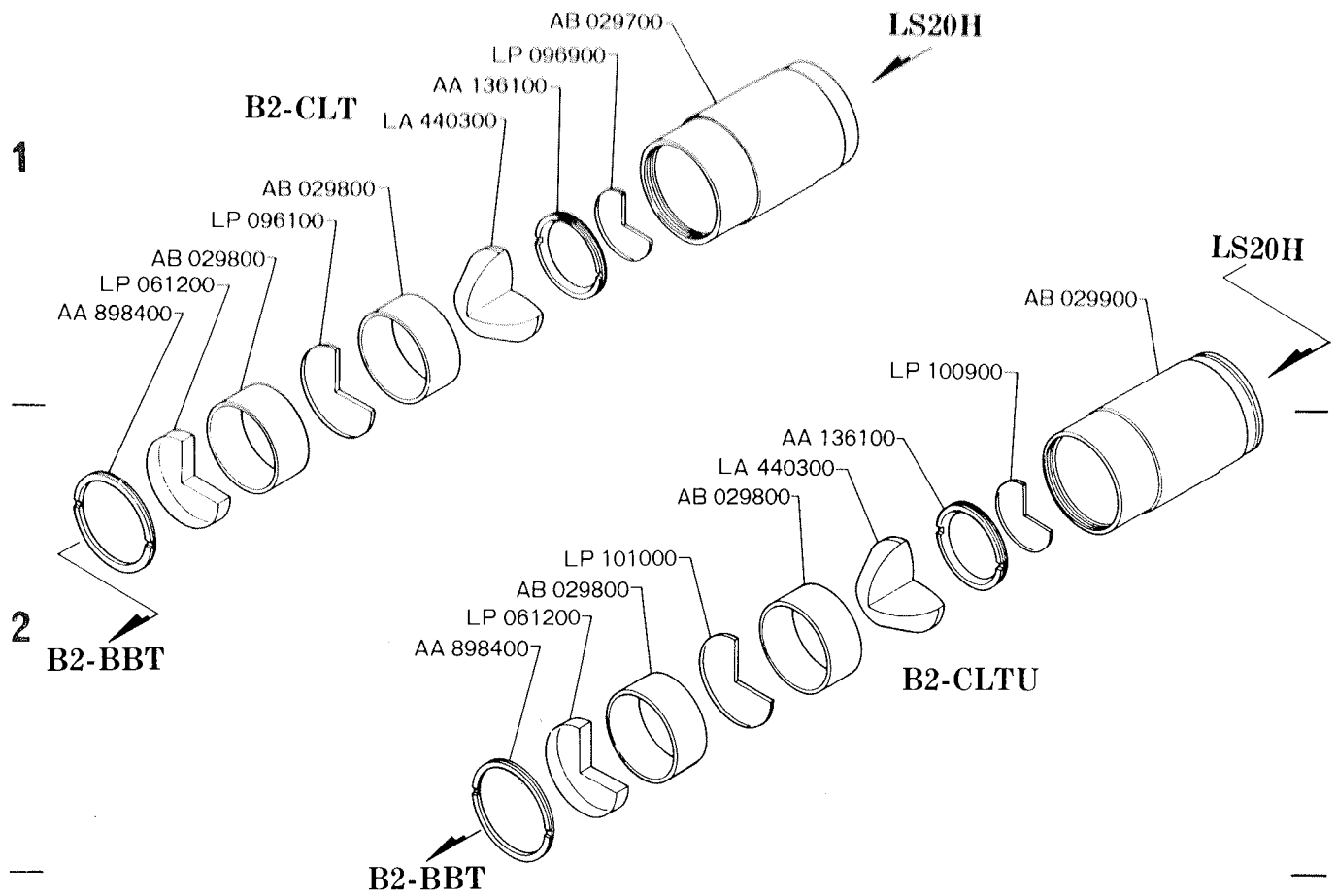
**EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-MDS B2-MDT B2-MDTU	9

**OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN**

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

A | B | C | D

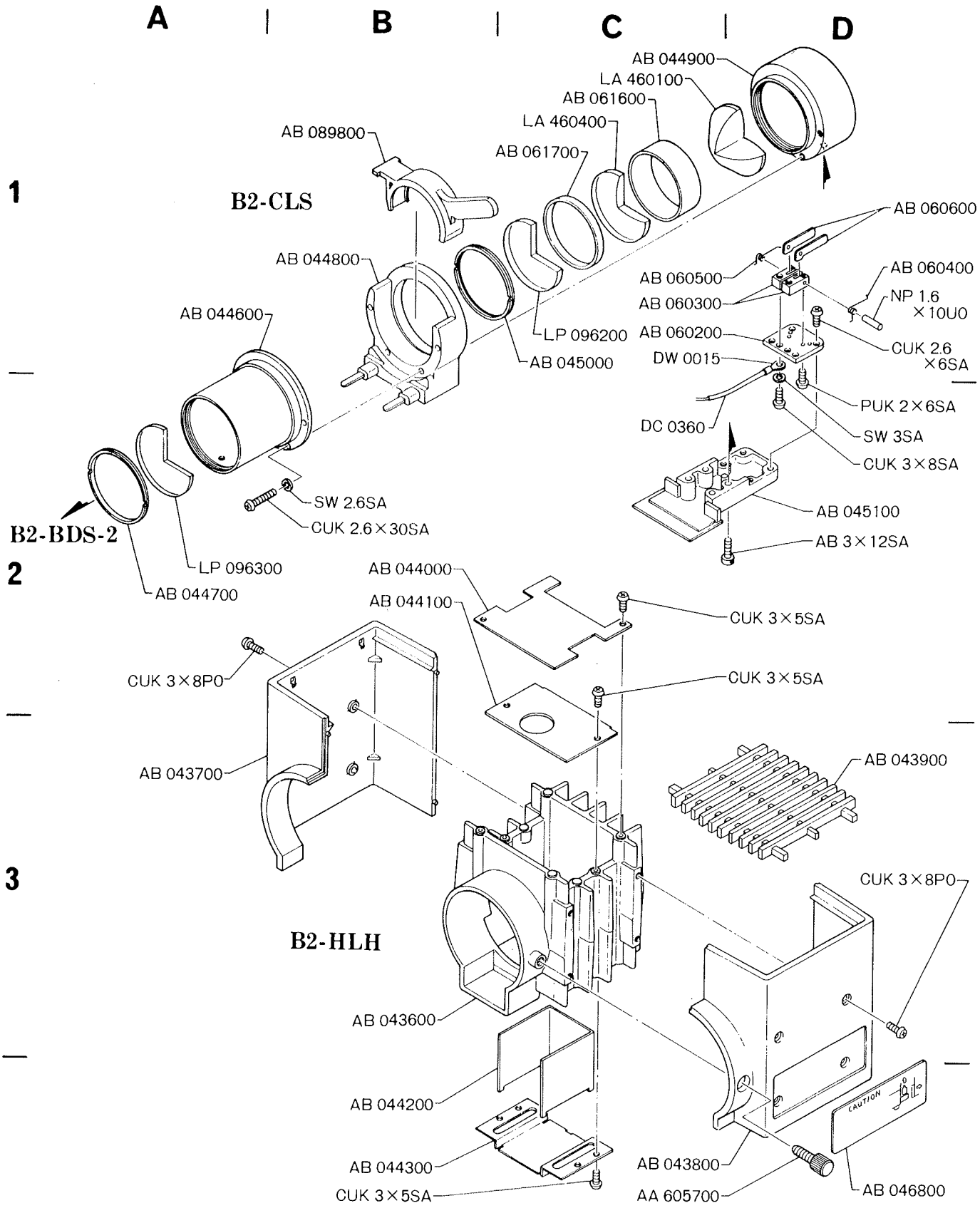


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-CLT B2-CLTU B2-TLT	10

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

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



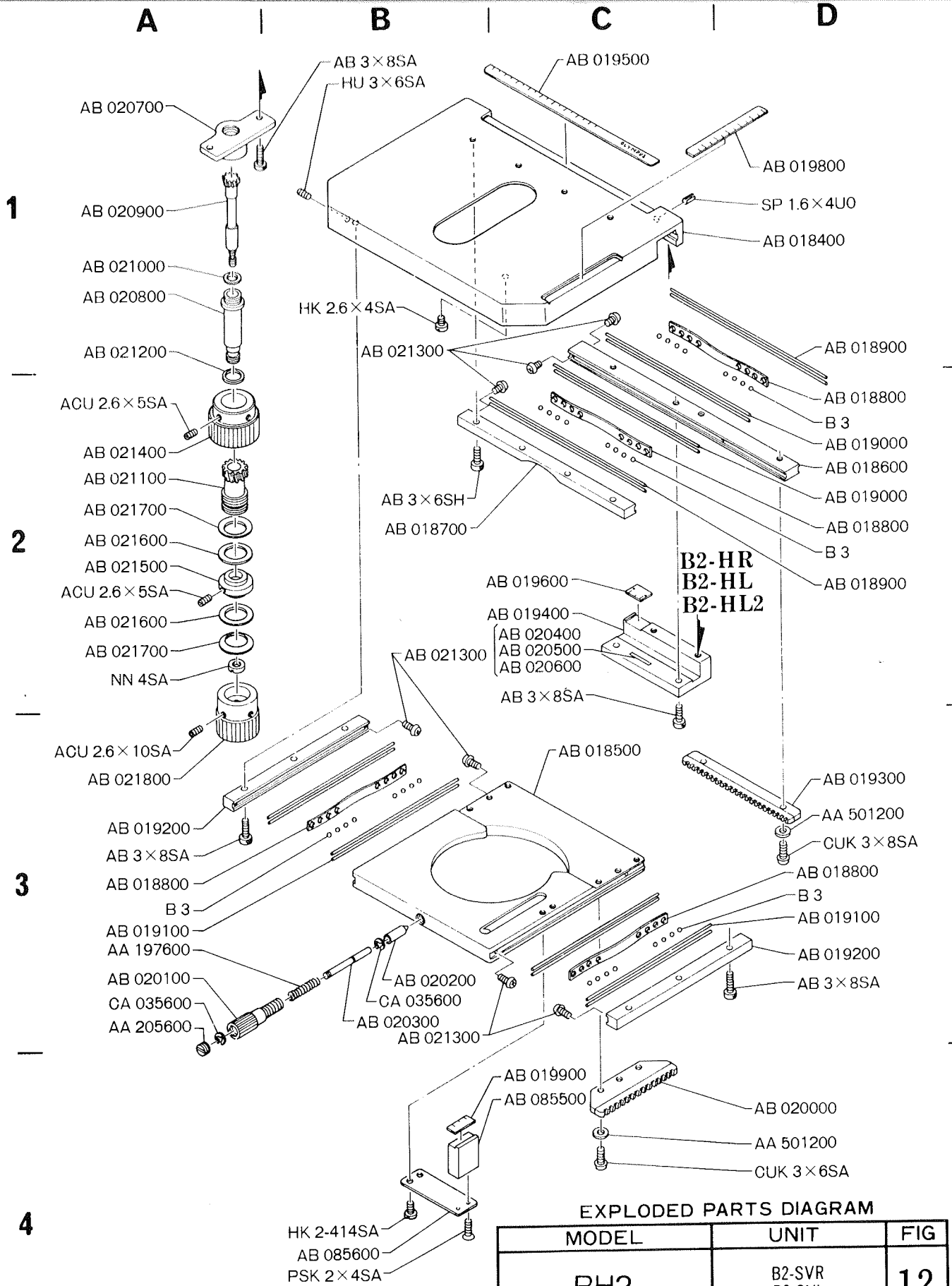
EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-CLS B2-HLH	11

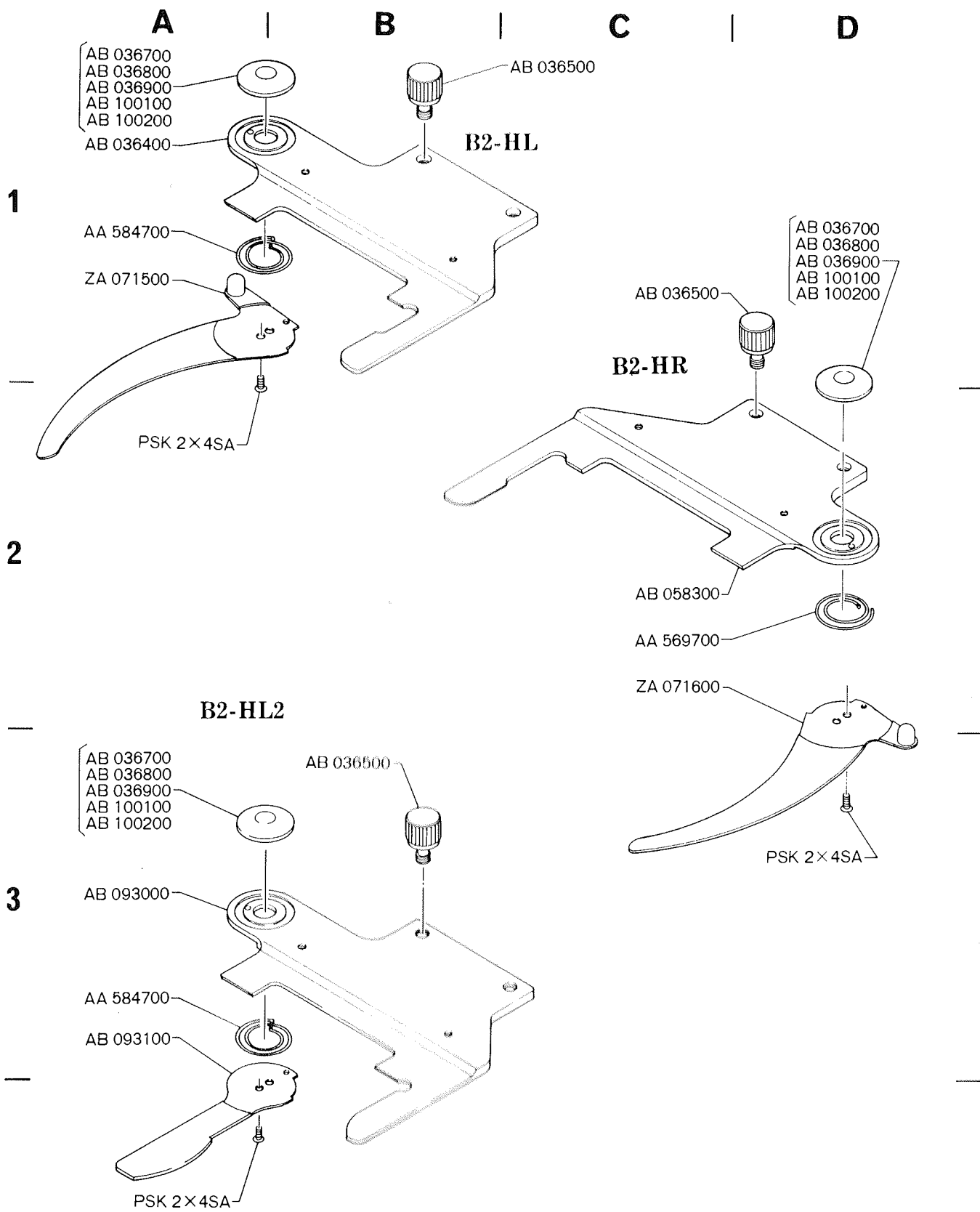
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

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





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



EXPLODED PARTS DIAGRAM

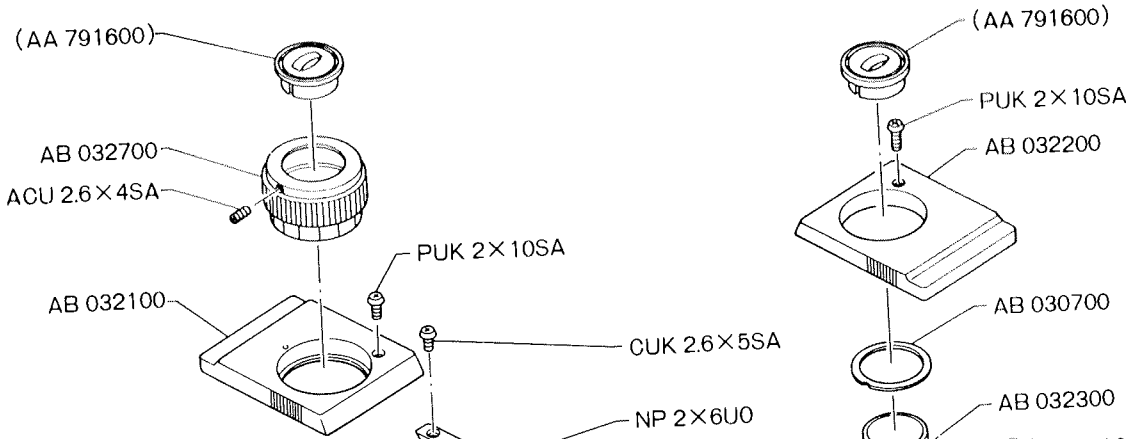
MODEL	UNIT	FIG
BH2	B2-HR B2-HL B2-HL2	13

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

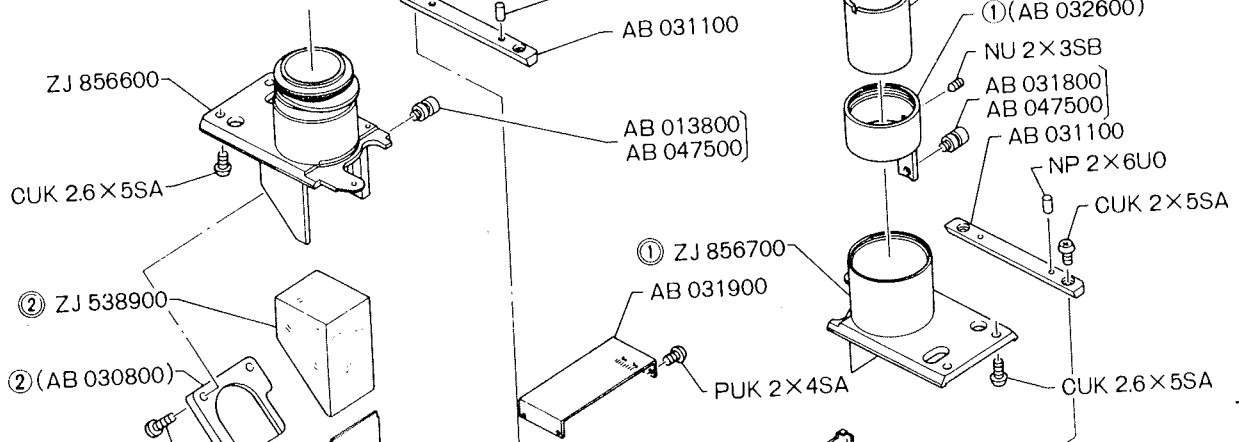
NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

A | B | C | D

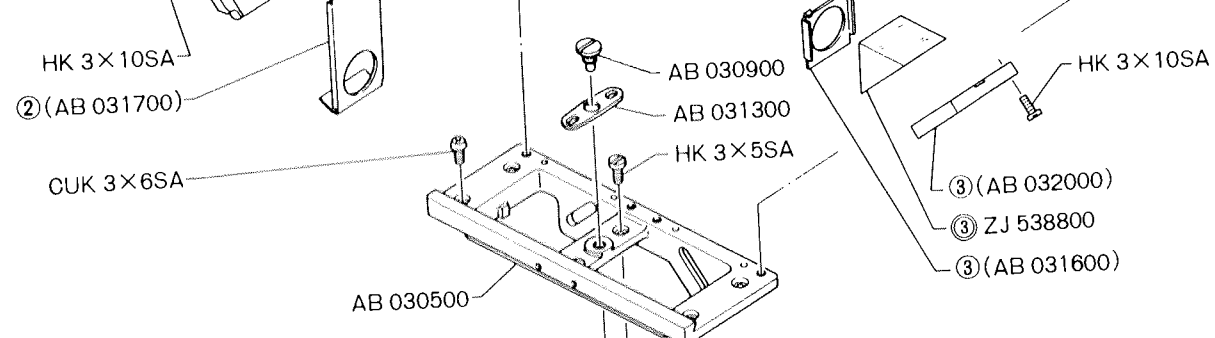
1



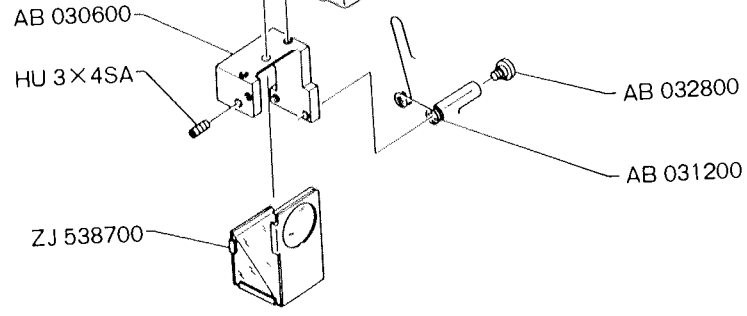
2



3



4

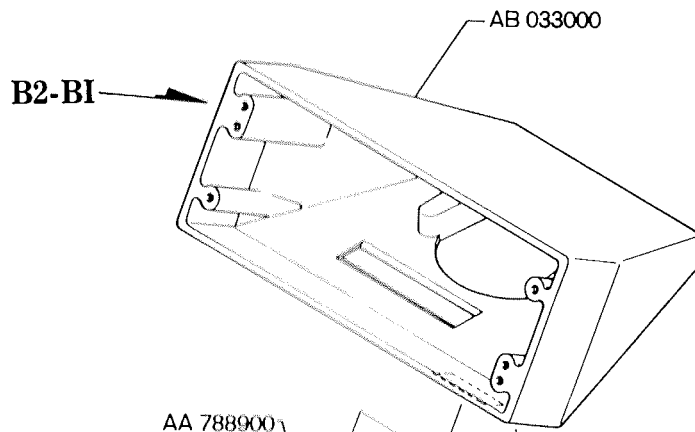
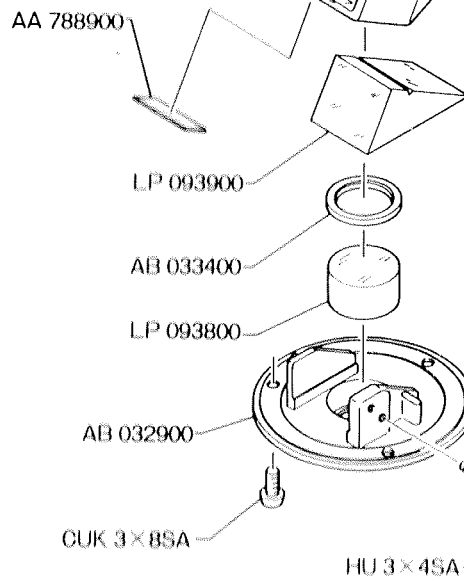


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-BI	14

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

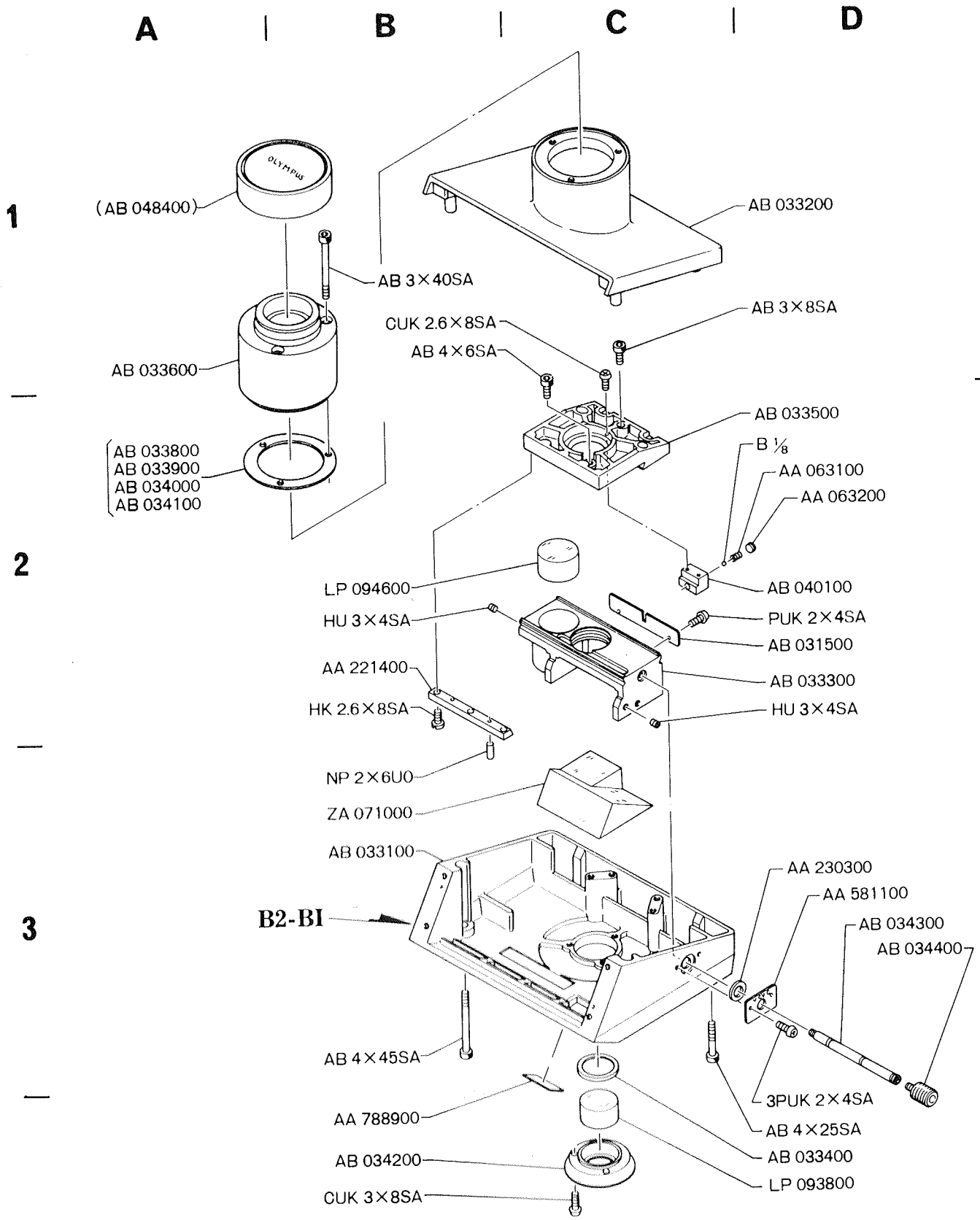
NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

**A****B****C****D****1****2****3****4****EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-BIC	15

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



**EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-TRC	16

**OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN**

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

A

B

C

D

1

B2-AAC

ZA 078100

AB 040200

LA 457100

AB 040300

2

ZA 078000

AB 040400

ZA 077900

AB 040500

ZA 078700

AB 040700

3

AB 040800

PUK 2×6SA

B2-CD

AB 045400

LA 457500

AB 045500

SA 023800

LA 457400

AB 045600

ZA 079400

AB 045800

AB 040800

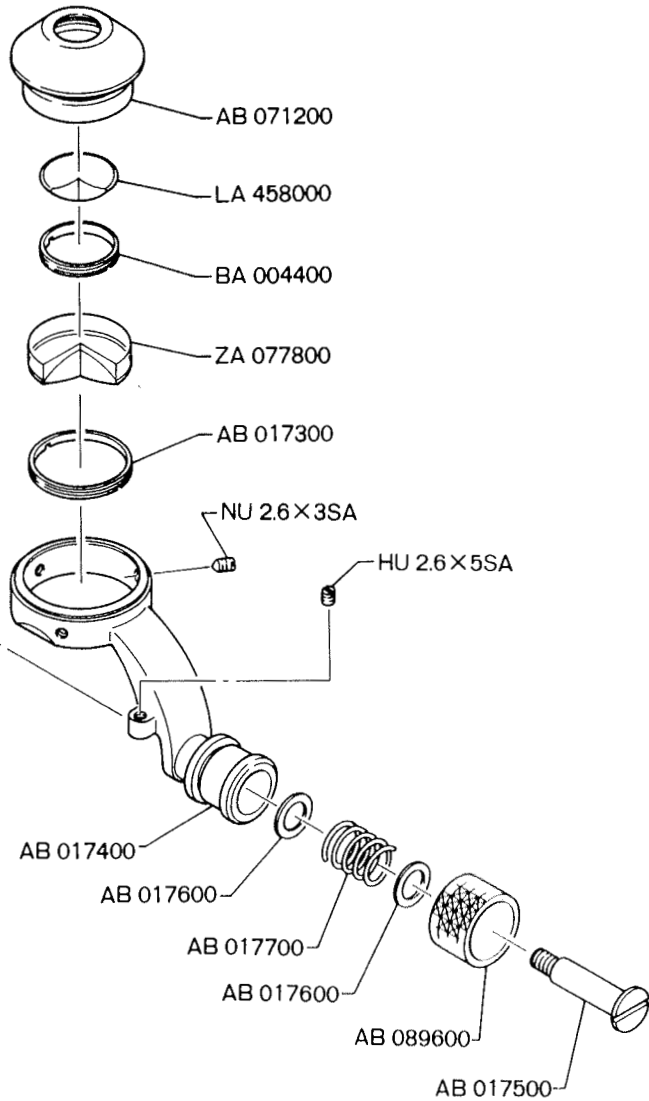
PUK 2×6SA

4

## EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-CD B2-AAC	17
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

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

**A****B****C****D****1****2****3****4****EXPLODED PARTS DIAGRAM**

MODEL	UNIT	FIG
BH2	B2-SC	18

**OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN**

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

### 3. DISASSEMBLY PROCEDURE FOR FINE & COARSE ADJUSTMENT UNIT OF BHS



Fig. 3-1

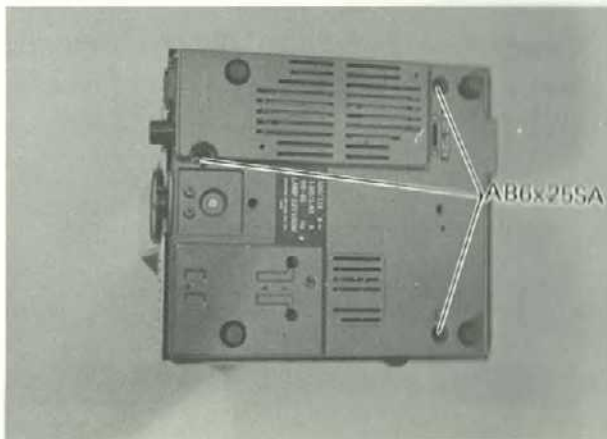


Fig. 3-2

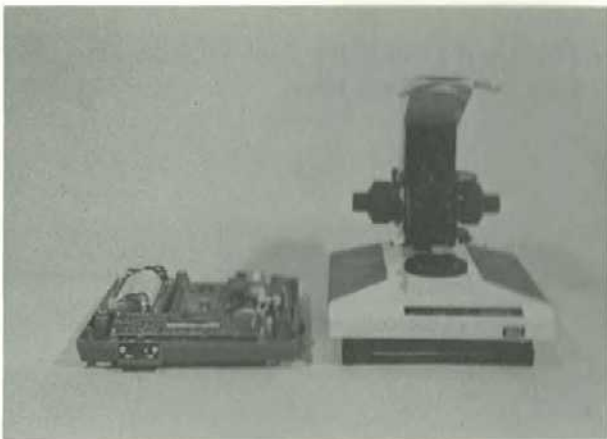


Fig. 3-3

3-1 Remove the Electrical Base plate from the Microscope Stand in the procedure given below:

3-1-1 Place the Microscope Stand upside down and remove three Screws AB6x25SA.

(See Fig. 3-2.)

3-1-2 While holding the Electrical Base plate by hand to prevent it from dropping down, reverse the Microscope Stand.

#### CAUTIONS.

- The Electrical Base plate is very heavy and must be handled carefully.
- While the Microscope Stand is placed upside down, it is dangerous to remove the Electrical Base plate which has protrusions comprising internal wiring, etc. Be sure to remove the base as outlined above.

3-1-3 While grasping the Arm by hand, remove the Microscope Stand upward.



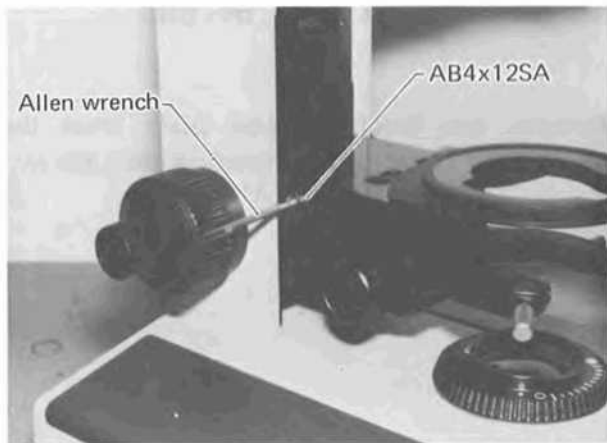


Fig. 3-4

3-2 Dismount the Condenser Holder (CH unit) from the Microscope Stand as follows:

- 3-2-1 With an Allen wrench, loosen Stopper AB4x12SA on the left side. (See Fig. 3-4.)
- 3-2-2 With the Coarse Adjustment Knob set at its lowest position, dismount the CH unit by gradually lifting it by hand.

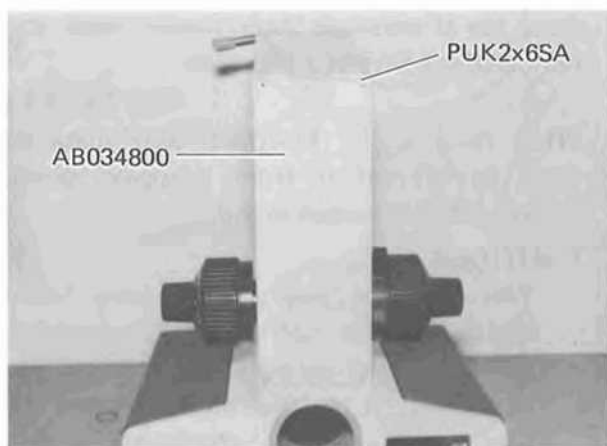


Fig. 3-5

3-3 Disassemble the Fine & Coarse Adjustment Unit.

- 3-3-1 Detach Rear Cover AB034800 by removing four Screws PUK2x6SA. (See Fig. 3-5.)

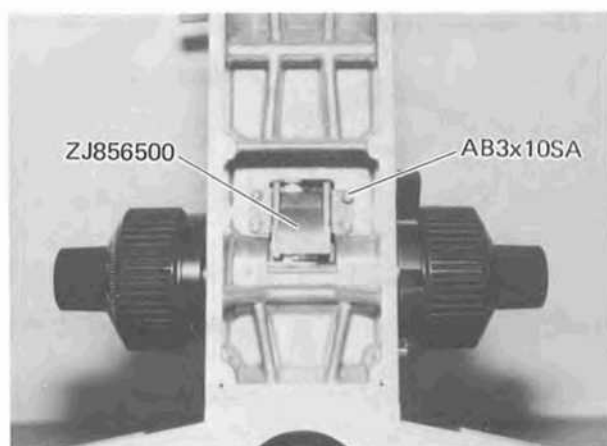


Fig. 3-6

- 3-3-2 Dismount Gear Unit ZJ856500 by removing four Screws AB3x10SA. (See Fig. 3-6.)

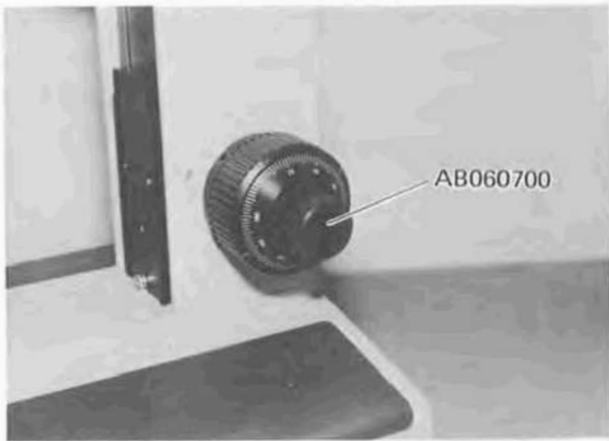


Fig. 3-7

- 3-3-3 Remove Plates AB060700 from the right and left Fine Adjustment Knobs. For this purpose, preliminarily pour several drops of alcohol/ether mixture through the notches and then remove the plates forcibly with a Tweezers.

(See Fig. 3-7.)



Fig. 3-8

- 3-3-4 Remove the Fine Adjustment Knobs in the following manner:

a) Remove Screws AB3x6SA from the right and left Fine Adjustment Knobs by using Allen wrench. (See Fig. 3-8.)

b) Pull out both Fine Adjustment Knobs.

(See Fig. 3-8.)

Left Knob AB059300

Right Knob AB059200 is equipped with Gear AA782600 and Shaft AB023900.

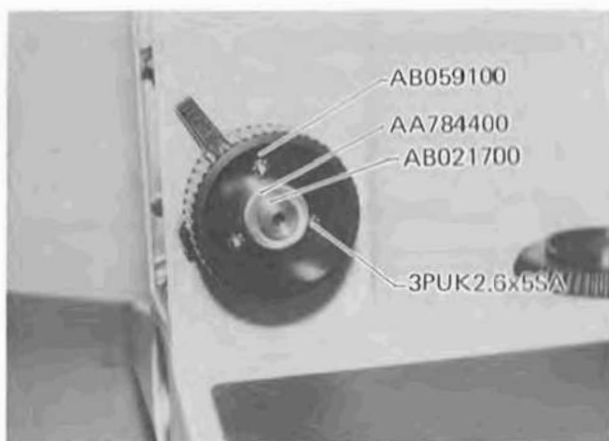


Fig. 3-9

- 3-3-5 By removing three Screws 3PUK2.6x5SA, detach left Coarse Adjustment Knob AB059100.

a) Remove Spring Washer AB021700.

b) Remove Plastic Washer AA784400.

(See Fig. 3-9.)

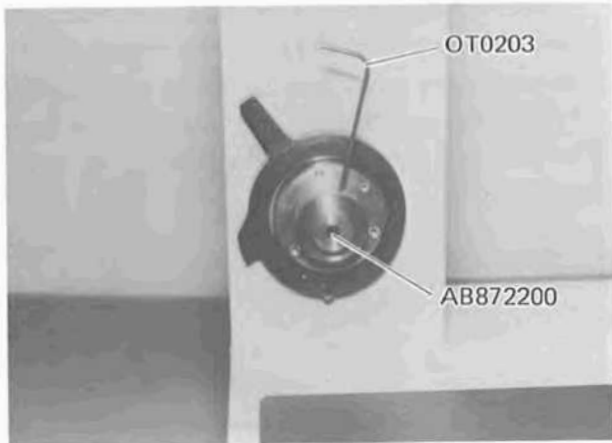


Fig. 3-10

3-3-6 Prepare to detach Fine Drive Shaft Mount AA872200 after loosening two Screws ACU3x5SA. (See Fig. 3-10.)

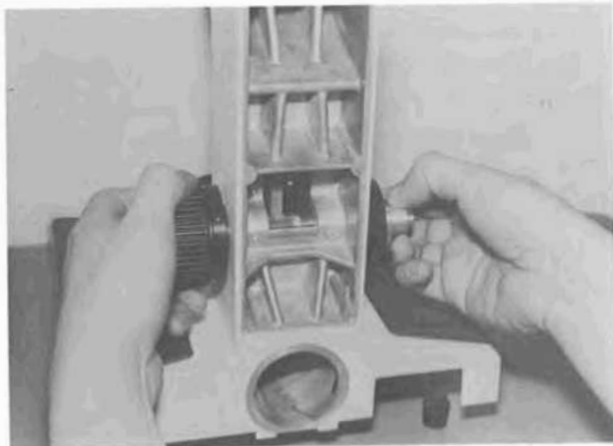


Fig. 3-11

3-3-7 While holding the Fine Drive Shaft Mount, remove the right Adjustment Knob by turning it counterclockwise.

(See Fig. 3-11.)

**NOTE:**

For holding the Fine Drive Shaft Mount, use a rubber sheet or pliers.



Fig. 3-12

3-3-8 Remove Spring AA784200. (See Fig. 3-12.)

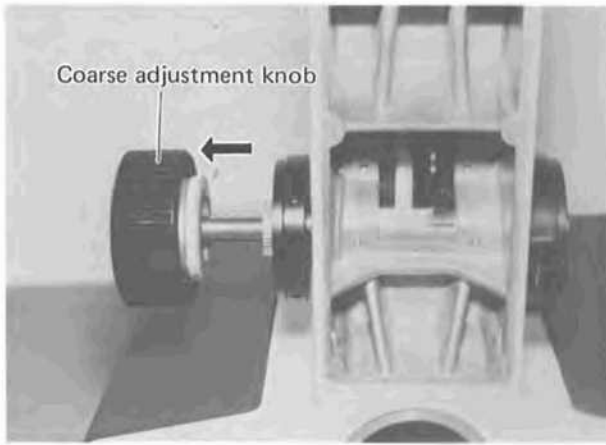


Fig. 3-13

3-3-9 Extract the right Coarse Adjustment Knob in the direction indicated by arrow in Fig. 3-13.

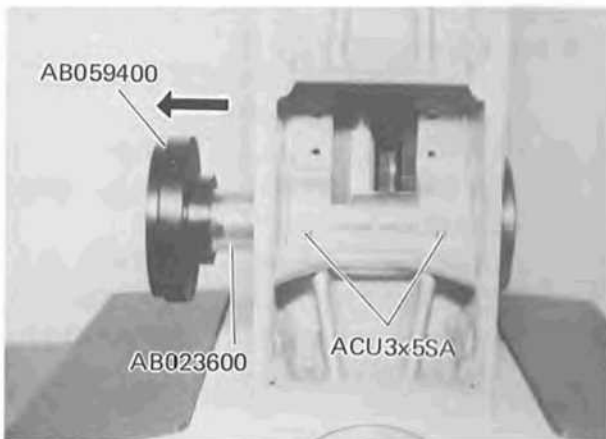


Fig. 3-14

3-3-10 Dismount Pinion Mount AB023600.

a) Remove two Screws ACU3x5SA.

(See Fig. 3-14.)

b) Extract Pinion Mount in the direction indicated by arrow in Fig. 3-14.

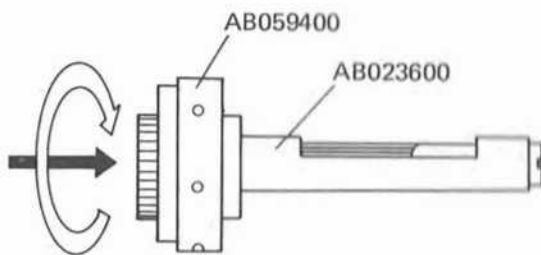


Fig. 3-15

3-3-11 Disassemble Pinion Mount in the sequence given below.

a) Remove Tension Knob AB059400 by turning it counterclockwise as seen in the direction indicated by arrow in Fig. 3-15.

b) Remove Washer AA783700 and Spring AA783800.

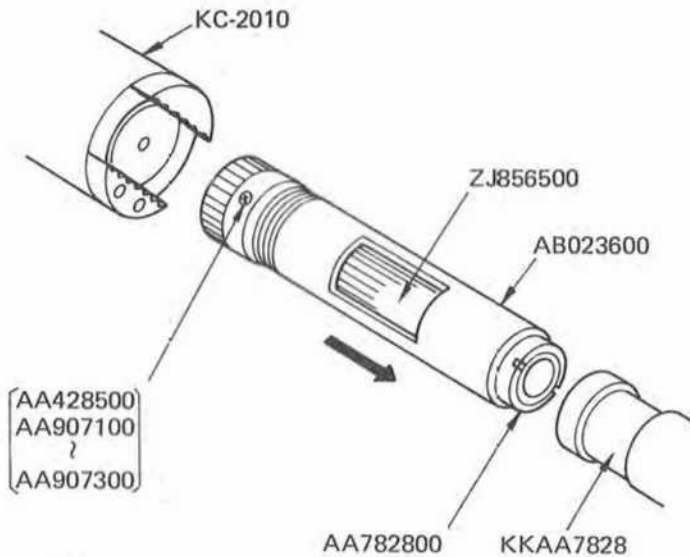


Fig. 3-16

- c) Remove Nut AA782800 by using Tools KC-2010 and KCAA7828.  
(See Fig. 3-16.)

**NOTE:**

The Nut is fixed with Adhesive.

- d) Extract Pinion Mount AB023600 in the direction indicated by arrow in Fig. 3-16. Balls B1/16 are removed together.  
e) Remove Screw AA428500.  
(See Fig. 3-16.)

**NOTE:**

The Screw is fixed with Adhesive.

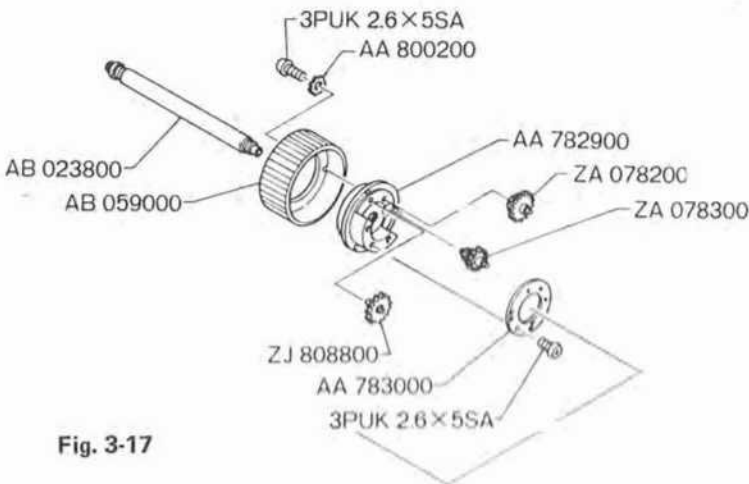


Fig. 3-17

3-3-12 Disassemble right Coarse Adjustment Knob in the following sequence:

- a) By removing three Screws 3PUK2.6x5SA, detach Knob AB059400.  
b) By removing Screws 3PUK2.6x5SA and two Screws SK2.6x5SA, detach Plate AA783000.  
c) Remove gear assembly ZJ808800, ZA-078200 and ZA078300.

(See Fig. 3-17.)

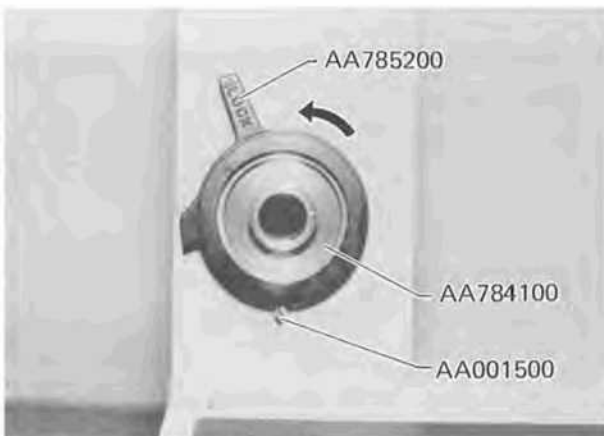


Fig. 3-18

3-4 Disassemble Stopper ZJ808500 as follows.

- 3-4-1 Remove Stopper Screw AA001500.  
3-4-2 Remove Knob AA785200 by turning it in the direction indicated by arrow in Fig. 3-18.  
3-4-3 Remove Ring AA784100. (See Fig. 3-18.)

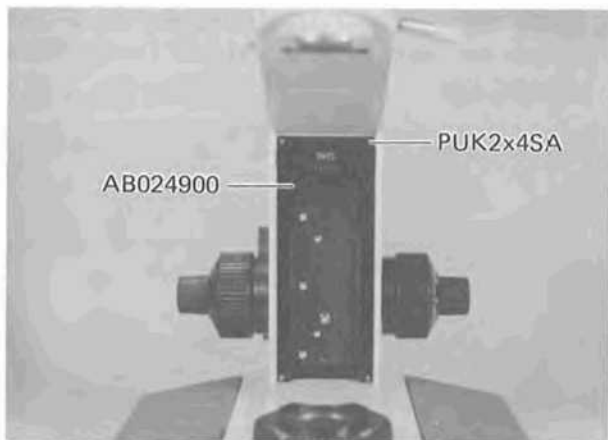


Fig. 3-19

3-5 Disassemble Coarse Adjustment Guide as follows:

3-5-1 Detach Cover AB024900 from the front side of Arm by removing four Screws PUK2x4SA. (See Fig. 3-19.)

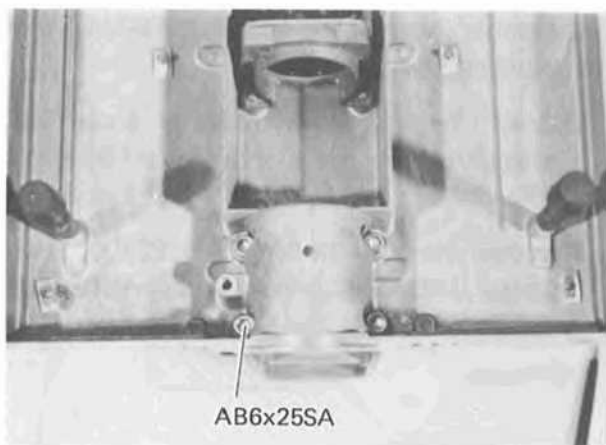


Fig. 3-20

3-5-2 Detach the Arm from the Base by removing four Screws AB6x25SA. (See Fig. 3-20.)

**NOTE:**

For removing the Screws, place the Microscope Stand on its side. In this case, however, take care not to drop the Arm since it has no Knock Pin fitted into the base.

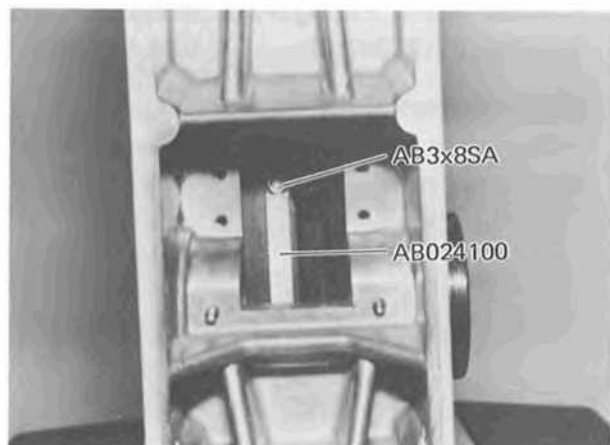


Fig. 3-21

3-5-3 After placing the Arm on its side, dismount Rack AB024100 by removing two Screws AB3x8SA. (See Fig. 3-21.)

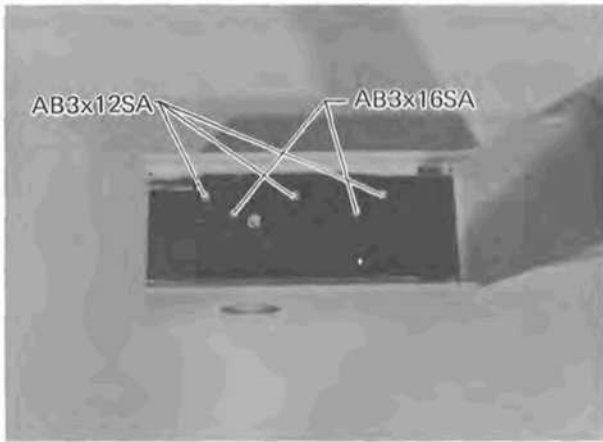


Fig. 3-22

3-5-4 Sufficiently loosen two Screws AB3x16SA which are used to attach Guide Fixing Piece AB009700. (See Fig. 3-22.)

3-5-5 Loosen four Screws AB3x12SA sufficiently. (See Fig. 3-22.)

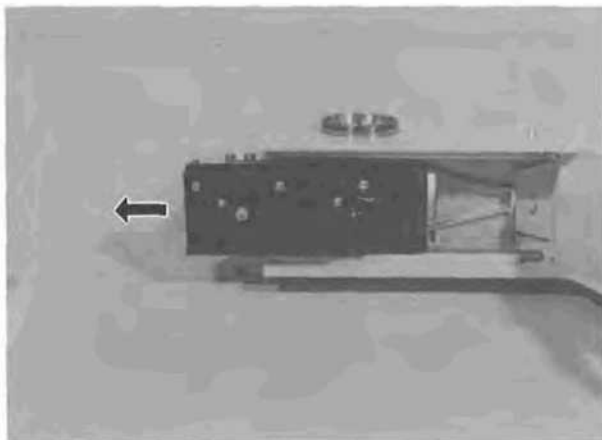


Fig. 3-23

3-6 Disassemble Inner Ball Guide Unit AB024700 in the sequence given below:

3-6-1 Extract the entire assembly of Inner Ball Guide unit in the direction indicated by arrow in Fig. 3-23. (See Fig. 3-23.)

3-6-2 Remove sixteen Rollers AB022700, two Spacers AB023300, four Wires AB023400 and four Wires AB023500. (See Fig. 3-23.)

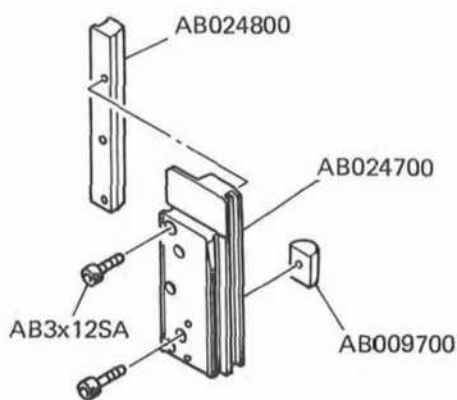


Fig. 3-24

3-6-3 Remove Guide Fixing Piece AB009700 and Ball Guide AB024800. (See Fig. 3-24.)

3-6-4 Wash each part with gasoline or xylol. After washing, wipe off gasoline or xylol completely with a piece of dry cloth.

#### 4. ASSEMBLY PROCEDURE FOR FINE & COARSE ADJUSTMENT UNIT OF BHS

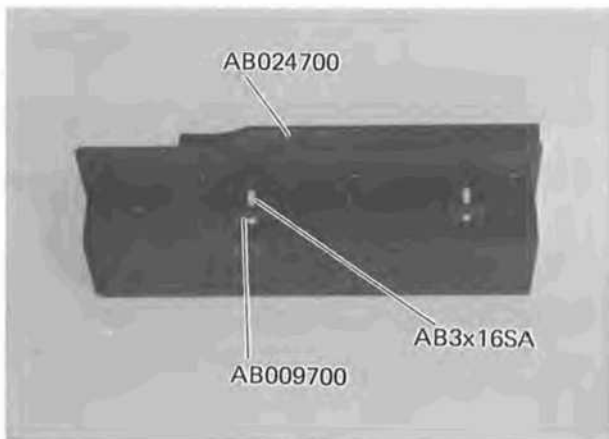


Fig. 4-1

4-1 Assembly of Coarse & Fine Adjustment Guide Unit.

4-1-1 Assemble Guide Fixing Piece AB009700 with Inner Ball Guide AB024700 by tightening two Screws AB3x16SA. (See Fig. 4-1.)

**NOTE:**

The Screws should be tightened temporarily to such a degree that they will not drop from the Guide Fixing Piece.

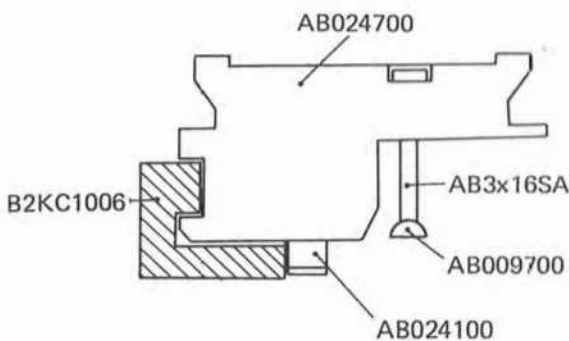


Fig. 4-2

4-1-2 Assemble Rack AB024100 with Inner Ball Guide AB024700.

For this purpose, attach positioning Jig B2KC1006 to Inner Ball Guide AB024700 as shown in Fig. 4-2, press Rack AB024100 from the right side to the Jig and fix it by tightening two Screws AB3x8SA.

(See Fig. 4-2.)

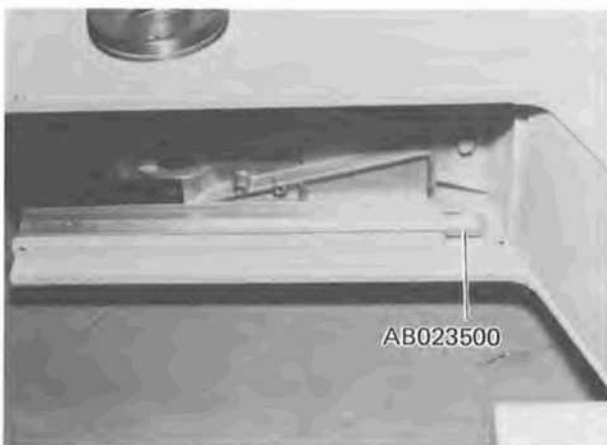


Fig. 4-3

4-1-3 Assemble four Wire Guides AB023500 into the guide groove of Arm AB022900.

**NOTE:**

After applying Grease OT2008 onto each surface of the Wire Guides, stretch and clamp them into the guide groove. (All the wire guides should be coated with Grease and set in this manner.) (See Fig. 4-3.)

**CAUTION:**

Make sure that the Wire Guides are not bent, scratched or nicked, which may cause malfunction.



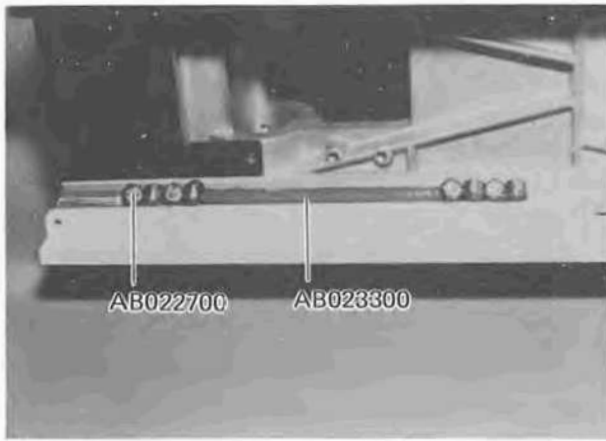


Fig. 4-4

4-1-4 Assemble Spacer AB023300 and Rollers AB022700 (lower side only).

**NOTES:**

1. Apply a thin layers of Grease OT2008 to the Rollers and Spacer respectively.
2. Arrange the Rollers in alternate directions as shown in Fig. 4-4 and place the Spacer at the center. (See Fig. 4-4.)

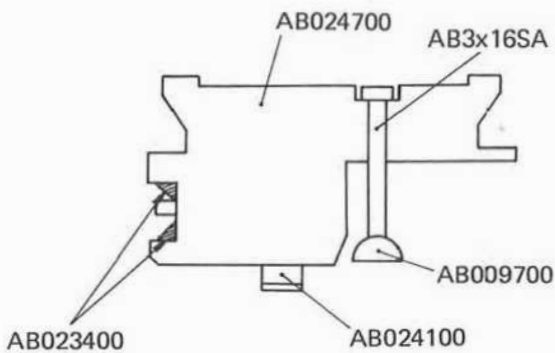


Fig. 4-5

4-1-5 Assemble Wire guides AB023400 with the Inner Ball Guide.

**NOTE:**

The Wires should be assembled by the same procedure as that for assembling them with the Arm. (See Fig. 4-5.)

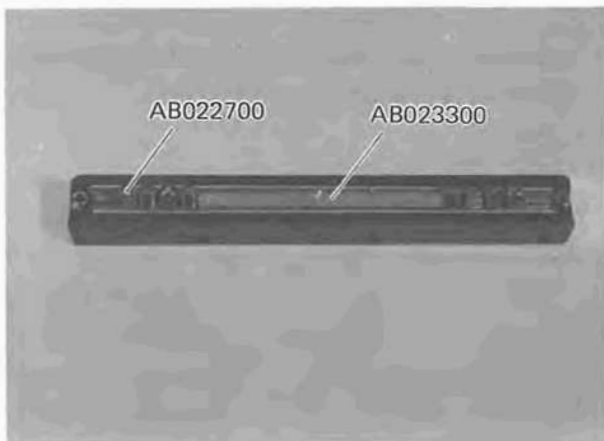


Fig. 4-6

4-1-6 Mount two Wire Guides AB023400, eight Rollers AB022700 and Spacer AB023300 on Ball Guide AB024800. (See Fig. 4-6.)

**NOTE:**

Assembling procedure is the same as that for assembly with the Arm.

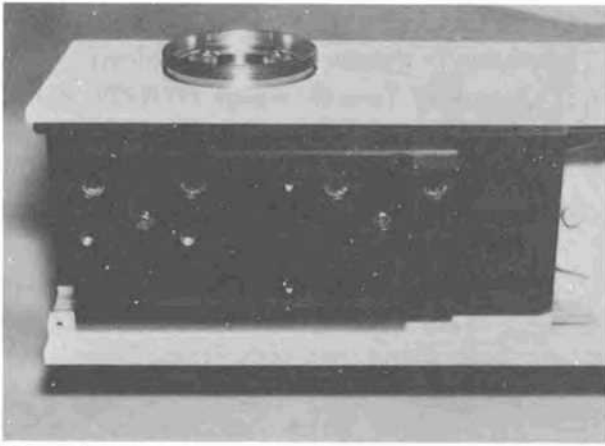


Fig. 4-7

- 4-1-7 Mount the Inner Guide (Fig. 4-5) on the Arm (Fig. 4-4). (See Fig. 4-7.)

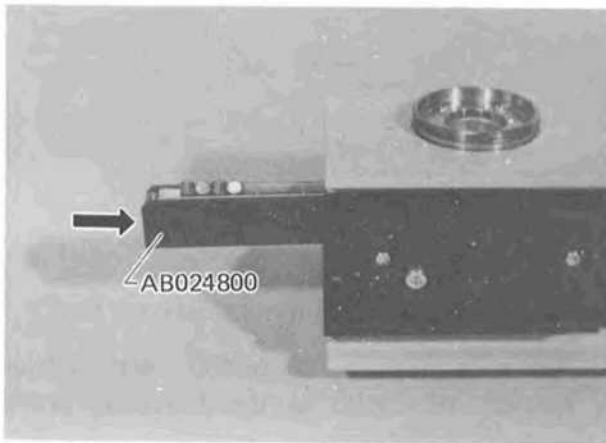


Fig. 4-8

- 4-1-8 Assemble Ball Guide (Fig. 4-6) in the following manner:

- Push in the Ball Guide and assemble it in position. (See Fig. 4-8.)
- If the Ball Guide is too tight loosen Screw AB3x16SA which is used for the Guide Fixing Piece.
- By tightening two Screws AB3x16SA, clamp the Guide Fixing Piece to such a degree that the Ball Guide is free from play.

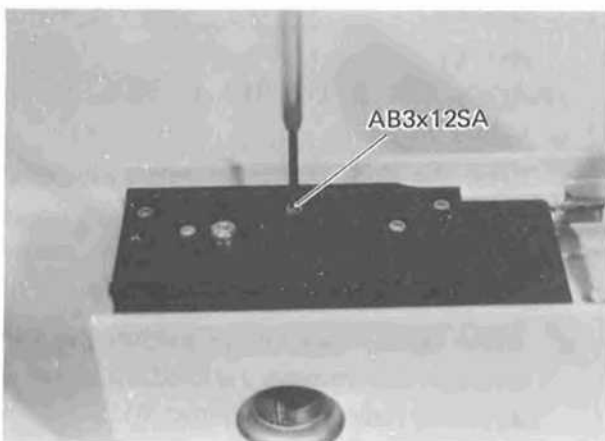


Fig. 4-9

- 4-1-9 Fix Ball Guide AB024800 and Inner Ball Guide AB024700 by tightening four Screws AB3x12SA. (See Fig. 4-9.)



Fig. 4-10

STANDARD for sliding force: 80 ~ 120 g

4-1-10 Check and adjust the Ball Guide for its proper operation in the sequence given below:

- a) By using Tension Gauge OT0309, check the Ball Guide for force required to slide it easily. (See Fig. 4-10.)
- b) If the force is weaker than specified adjust as follows:
  - (1) After loosening four Screws AB3x12SA, tighten two Screws AB3x16SA to clamp the Guide Fixing Piece.
  - (2) Tighten four Screws AB3x12SA.
  - (3) Measure force required for sliding the Ball guide once again.
- c) If the force is stronger than specified, reduce clamping force for the Guide Fixing Piece referring to b) above.
- d) Check the Ball Guide for its proper operation.

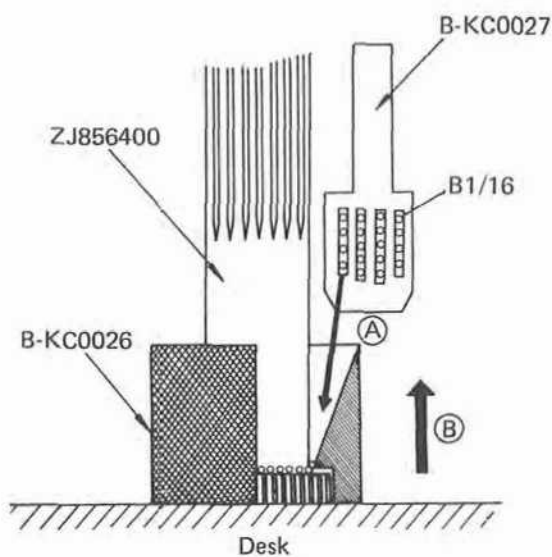


Fig. 4-11

#### 4-2 Assembly of Coarse & Fine Adjustment Knobs

4-2-1 Assemble Pinion ZJ856400 with Pinion Mount AB023600 in the following procedure.

- a) Place Pinion ZJ856400 on Jig B-KC0026. (See Fig. 4-11.)
- b) Insert 30 Balls B1/16 in Jig B-KC0027 (30 balls can be arranged with no gaps in the grooves.) (See Fig. 4-11.)

**NOTE:**

Apply Grease OT2012 to Balls B1/16 before insertion.

- c) Drop the Balls in the direction indicated by arrow (A) by pushing them with tip of a Tweezers and arrange them neatly around the Pinion. (See Fig. 4-11.)
- d) While taking care not to disturb the Ball arrangement, remove Jig B-KC0026 in the direction indicated by arrow (B). (See Fig. 4-11.)

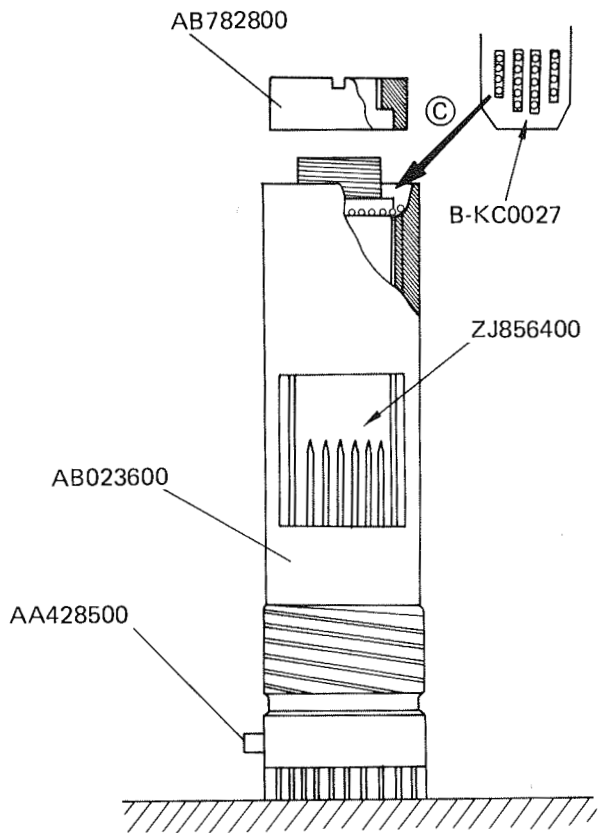


Fig. 4-12

- e) Assemble Pinion Holder AB023600 in position. (See Fig. 4-12.)

**NOTE:**

Take care not to disturb the Ball arrangement.

- f) Drop the Balls in the direction (C), similar to steps b) and c) above. (See Fig. 4-12.)  
 g) Tighten Nut AA782800 to Pinion ZJ-856400 to eliminate thrust play.

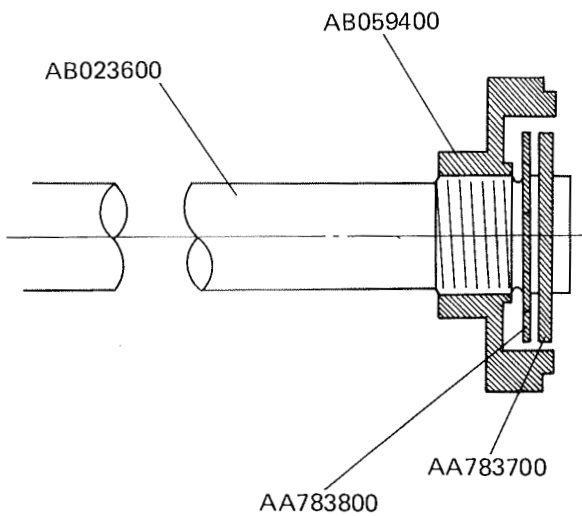


Fig. 4-13

- 4-2-2 Assemble Tension Adjusting Knob AB059400 with Pinion Mount AB023600. (See Fig. 4-13.)

**NOTE:**

Apply Grease OT2006 to the thread surface.

- 4-2-3 Assemble Spring AA783800 and Washer AA783700 in position. (See Fig. 4-13.)

**NOTE:**

Apply Grease OT2006 to contact surfaces.

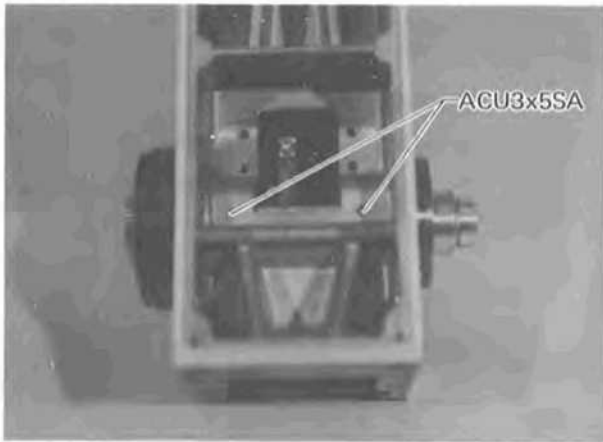


Fig. 4-14

- 4-2-4 Assemble the Pinion Mount Unit with the Arm by tightening two Screws ACU3x5SA.  
(See Fig. 4-14.)

**NOTE:**

Cement the Screws with Adhesive OT1131.

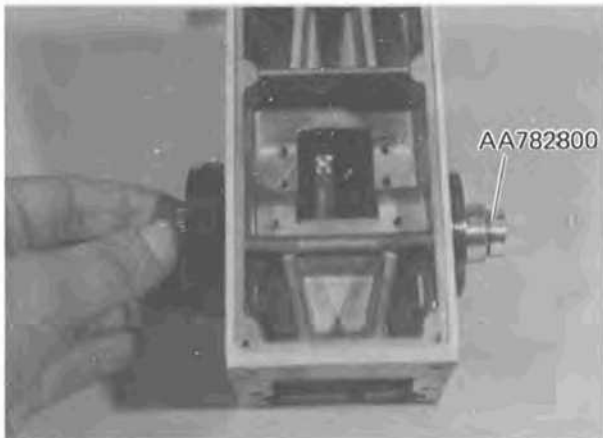


Fig. 4-15

- 4-2-5 Adjust Pinion ZJ856400 as follows:  
a) While turning Pinion ZJ856400 by hand adjust tightness condition of Nut AA-782800 until the Pinion is free from uneven rotation or thrust play.  
(See Fig. 4-15.)

**NOTE:**

Torque required to turn the Pinion:  
Approx. 5 g (rotatable very lightly)

- b) For preventing Nut AA782800 from loosening, apply Adhesive OT1027 at three points on the threads of the Nut AA782800 and Pinion ZJ856400.  
(See Fig. 4-16.)

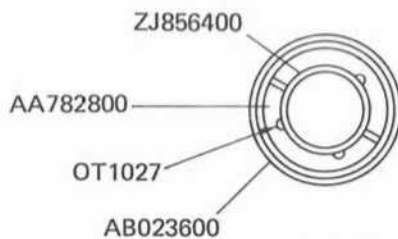


Fig. 4-16

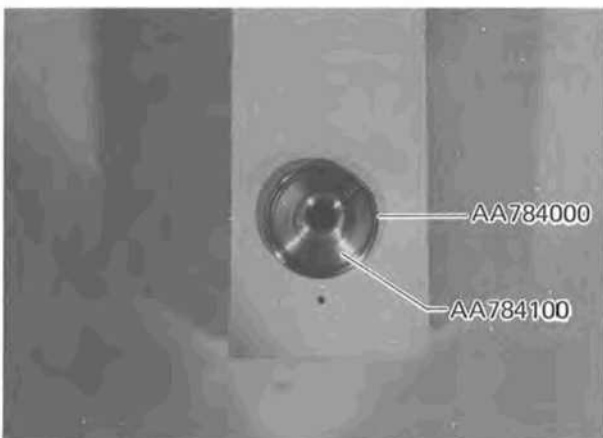


Fig. 4-17

- 4-2-6 Fit Ring AA784100 attached to Lock Knob ZJ808500 into Outer Ring AA784000 in the following manner:

- a) Carefully wipe Ring AA784100 until it is free from grease or contaminant.  
b) Also clean the inside of Outer Ring AA784000 into which Ring AA784100 is to be fitted.  
(See Fig. 4-17.)

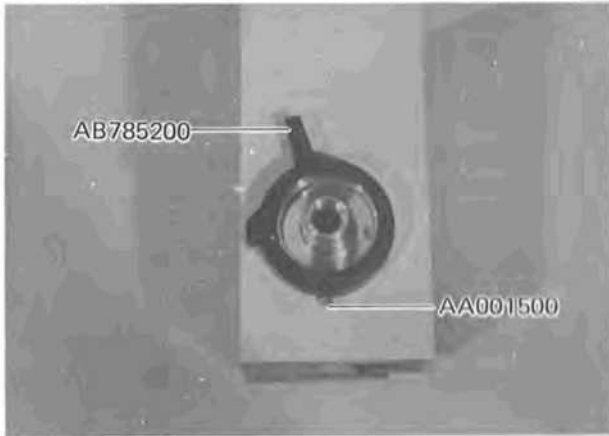


Fig. 4-18

- 4-2-7 Assemble Lock Knob AA785200 in position. For this purpose, apply a thin coat of Grease OT2006 to the thread and turn the Lock Knob clockwise as far as it will go. (See Fig. 4-18.)
- 4-2-8 Assemble Stopper AA001500 in position. (See Fig. 4-18.)

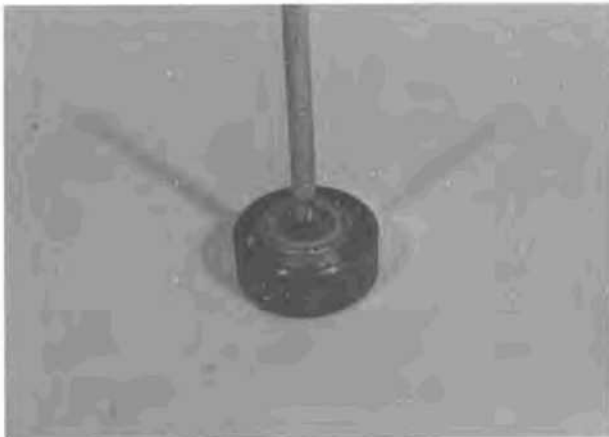


Fig. 4-19

- 4-2-9 Assemble Gear Mount AA782900 as follows:
- Assemble Shaft AB023800 with Gear Mount AA782900 by threading shaft into mount.

**NOTE:**

Apply Adhesive OT1028 (Araldite) to the thread.

- Assemble Gear Units ZA078200, ZJ-078300, ZJ808800 and Plate AA783000 by tightening Screw 3PUK2.6x5SA and two Screws SK2.6x5SA. (See Fig. 4-19.)

**NOTE:**

Apply Grease OT2012 to the shaft of each gear unit.

- 4-2-10 Assemble Coarse Adjustment Knob AB059000 together with three Washers AA800200 by tightening three Screws 3PUK2.6x5SA.

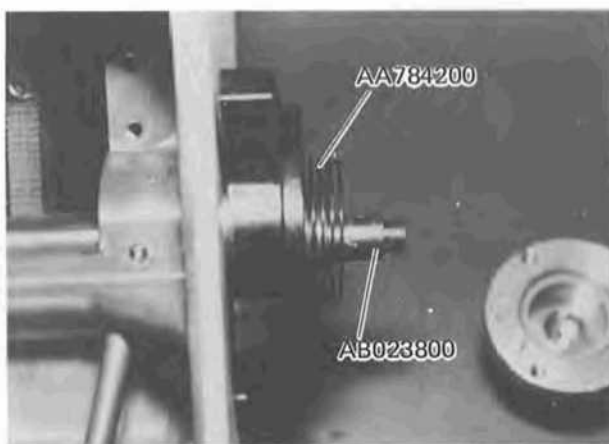


Fig. 4-20

- 4-2-11 Insert Shaft AB023800 of the Coarse Adjustment Knob (Fig. 4-19) from the right side into Pinion ZJ856400 which is attached to the Microscope Stand. (See Fig. 4-20.)
- 4-2-12 Hook Screw AA146300 located on Ring AA784100 into the circular portion at the end of Spring AA784200. (See Fig. 4-20.)

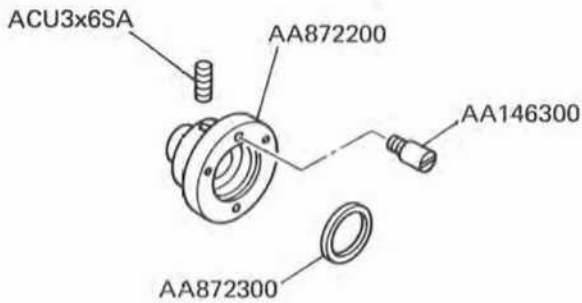


Fig. 4-21

4-2-13 Assemble Fine Drive Shaft Mount AA872200 as follows:

- a) Apply Adhesive OT1126 to the thread of Screw AA146300 and screw it into Fine Drive Shaft Mount.
- b) After applying Grease OT2008 to Washer AA872300, fit it in position.
- c) Temporarily assemble two Screws ACU3x6SA to such a degree that they do not protrude inside Fine Drive Shaft Mount AA872200. (See Fig. 14-21.)



Fig. 4-22

4-2-14 Place Fine Drive Shaft Mount AA872200 in position as follows:

- a) Fit Screw AA146300 located on Fine Drive Shaft Mount AA872200 into the circular portion at the other end of Spring AA784200 (as shown in Fig. 4-20). While depressing the Fine Drive Shaft Mount lightly toward the Microscope Stand, turn it one rotation clockwise. (See Fig. 4-22.)

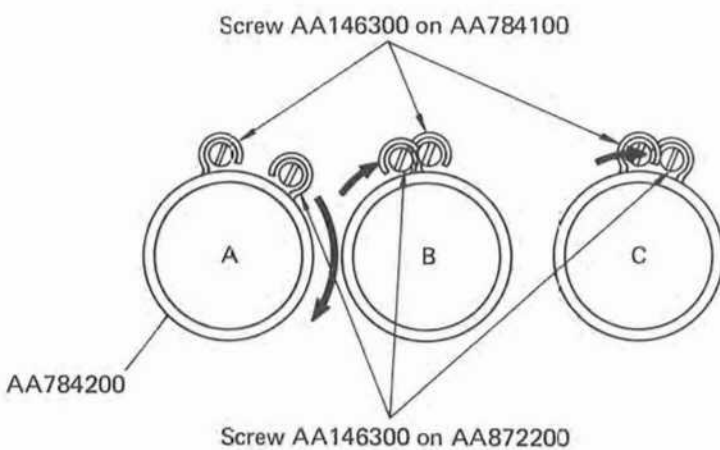


Fig. 4-23

Then the two Screws AA146300 are brought into contact with each other. While keeping Fine Drive Shaft Mount AA872200 a little apart from the Microscope Stand, move Screw AA146300 over the other screws. (These steps are illustrated as A → B → C in Fig. 4-23.)

After one screw rotated over the other, depress the Fine Drive Shaft Mount lightly onto the Microscope Stand once again. (See Fig. 4-23.)

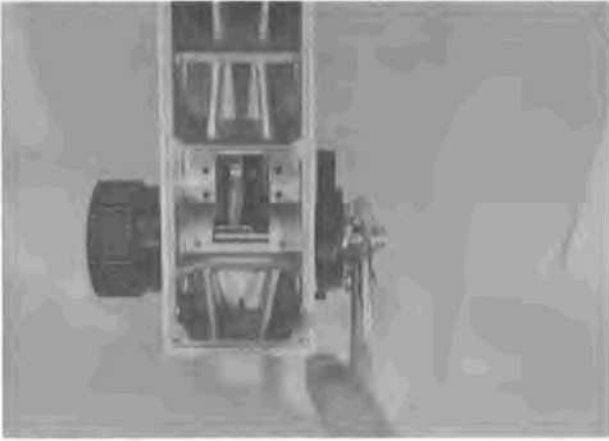


Fig. 4-24

- b) While depressing Fine Drive Shaft Mount AA872200 lightly onto the Microscope Stand, clamp it by turning Coarse Adjustment Knob AB05900 clockwise.

For final clamping of the Fine Drive Shaft Mount, tighten the knob firmly while holding the Fine Drive Shaft Mount with pliers. (See Fig. 4-24.)

**CAUTION:**

Be sure to keep Gear ZA078300 engaged with Pinion ZJ856400 in turning Coarse Adjustment Knob AB059000, otherwise malfunction may be caused.

- c) Firmly tighten two Screws ACU3x5SA which are temporarily assembled on Fine Drive Shaft Mount AA872200.
- d) Make sure that the Coarse Adjustment Knob turn smoothly and Lock Knob ZJ808500 is normally operative.

**NOTE:**

To check the Lock Knob for its normal operation, proceed as follows:

Set the Lock Knob in its locking condition. Turn the right Coarse Adjustment Knob half a rotation in the counter-clockwise direction. The Lock Knob should normally make a clicking sound upon releasing it. Then, set the Lock Knob in its locking condition. By turning the right Coarse Adjustment Knob clockwise; make sure that it is locked. If the Lock Knob is not operating normally, repeat steps 4-2-6 and 4-2-14 above once again.



Fig. 4-25

- 4-2-15 Assemble left Coarse Adjustment Knob AB059100 together with three Washers AA800200 by tightening three Screws 3PUK 2.6x5SA. (See Fig. 4-25.)

- 4-2-16 After applying Grease OT2008 to Washer AA784400, place it in position. (See Fig. 4-25.)



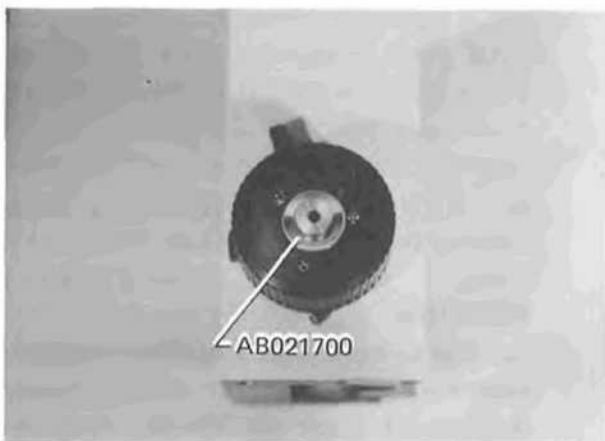


Fig. 4-26

4-2-17 Place Spring Washer AB021700 in position after applying Grease OT2008.

(See Fig. 4-26.)

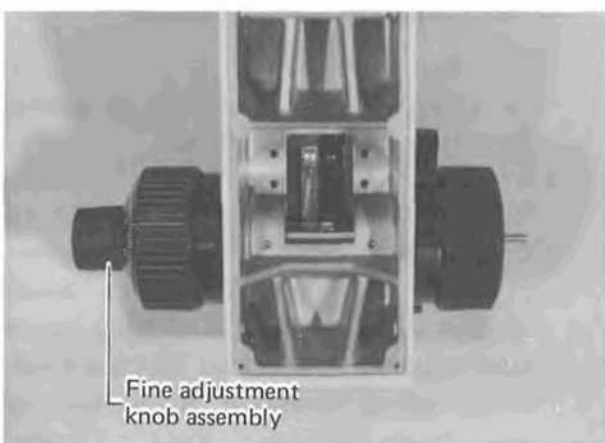


Fig. 4-27

4-2-18 Assemble the right Fine Adjustment Knob AB069200 together with the following parts:

Gear AA782600

Shaft AB023900

Screw AB3x6SA

Insert Shaft AB023900 into Shaft AB023800.

(See Fig. 4-27.)

4-2-19 Assemble left Fine Adjustment Knob AB059300 in position. Fix the right and left Fine Adjustment Knobs by tightening Screws AB3x6SA. (See Fig. 3-8.)

**NOTE:**

Apply Adhesive OT1026 to threads of Screws AB3x6SA beforehand.

4-2-20 Check the Fine Adjustment Knobs for their normal rotation.

- a) If the Fine Adjustment Knobs do not rotate smoothly, check the parts (gears and related parts, shafts, bearings and washers) for injury or contamination.
- b) If the Fine Adjustment Knobs have play on the thrust side, Spring Washer of AB021700 is ineffective. Adjust curvature of Spring Washer.

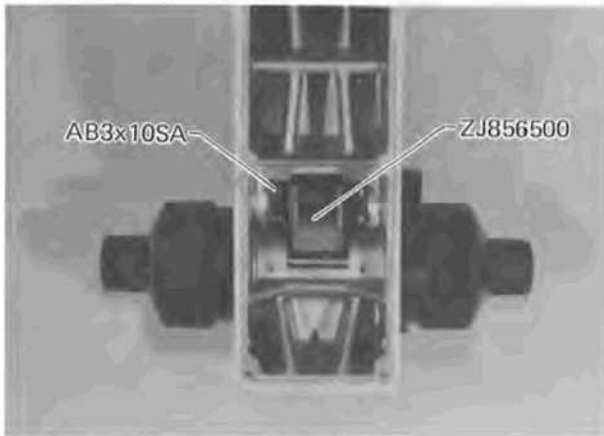


Fig. 4-28

4-2-21 Assemble Gear Unit ZJ856500 as follows:

- a) Temporarily assemble Gear Unit ZJ-856500 with four Screws AB3x10SA.

(See Fig. 4-28.)

**NOTE:**

Washers KNW3SA and AB086600 used before disassembly should be reused for assembly.

- b) Loosen four Screws AB3x10SA of Gear Unit ZJ856500 slightly and press down Gear Unit ZJ856500, then raise it upward by approx. 0.5mm and finally tighten four Screws AB3x10SA. (This raise is necessary to compensate for the backlash between the teeth of Gear Unit and Rack, Pinion.)

**NOTE:**

Be careful not to assemble Gear Unit in oblique position to Arm.

- c) Check the Fine & Coarse Adjustment Knobs for their normal operations. If the Knobs do not rotate smoothly or evenly, repeat step b) above once again.
- d) After the Knobs have been adjusted properly, apply Adhesive OT1131 to four Screws AB3x10SA.

4-2-22 Assemble Rear Cover AB034800 by tightening four Screws PUK2x6SA. (See Fig. 3-5.)

4-2-23 Assemble Plates AB060700 to the right and left Fine Adjustment Knobs.

## 5. DISASSEMBLY PROCEDURE FOR BASE UNIT

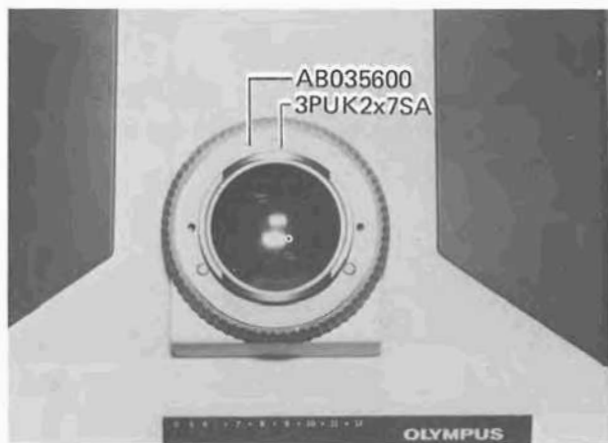


Fig. 5-1

5-1 Remove Light Exit Assembly as follows:

5-1-1 Detach Filter Mount AB035600 by removing three Screws 3PUK2x7SA. (See Fig. 5-1.)

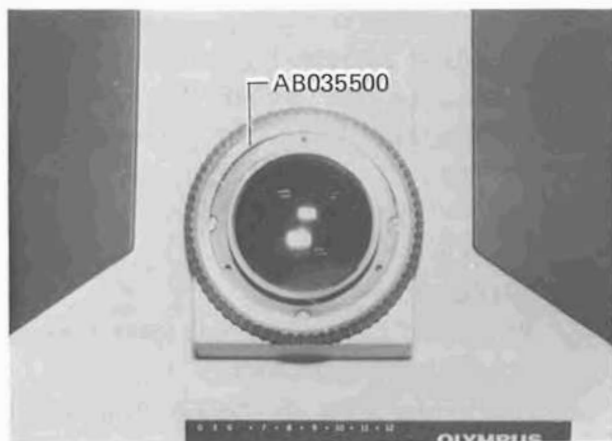


Fig. 5-2

5-1-2 Remove Knurled Ring AB035500.

(See Fig. 5-2.)

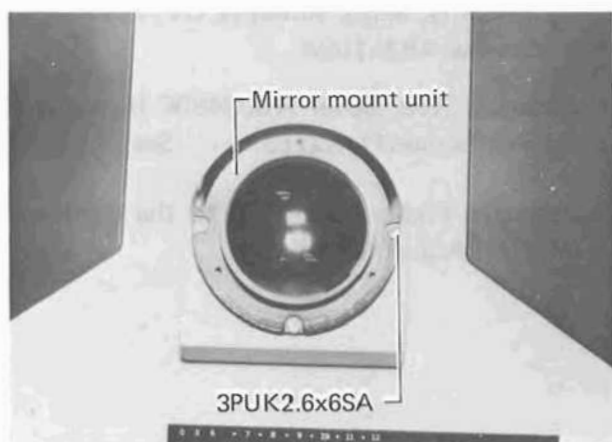


Fig. 5-3

5-1-3 Detach Mirror Mount Unit ZJ538400 by removing three Screws 3PUK2.6x6SA.

(See Fig. 5-3.)

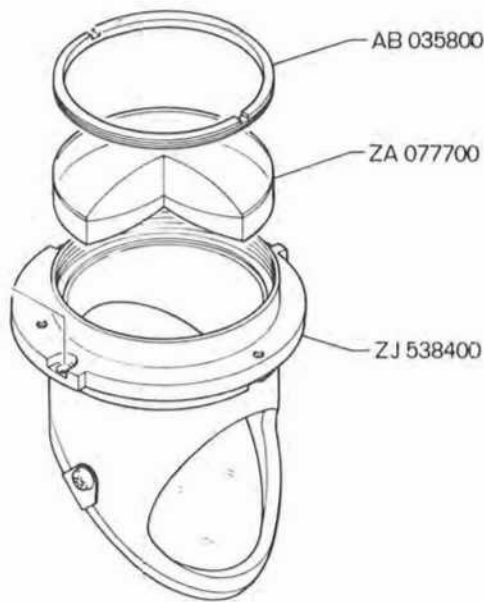


Fig. 5-4

5-1-4 Disassemble the Light Exit Unit:

- a) Remove Lens Retainer AB035800 by using Adjustable Spanner OT0022.
- b) Remove Lens ZA077700. (See Fig. 5-4.)

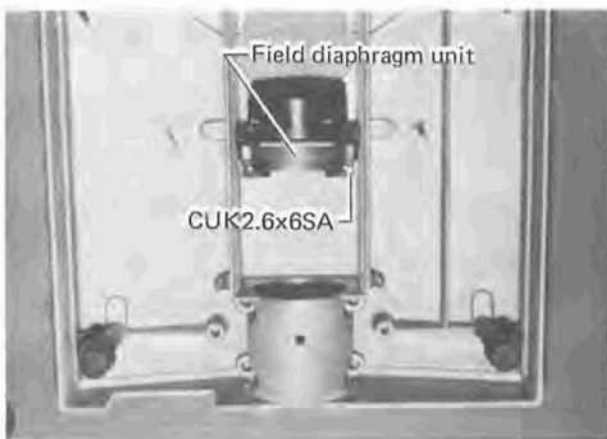


Fig. 5-5

5-2 Disassemble the Field Diaphragm Unit as follows:

- 5-2-1 By removing two Screws CUK2.6x6SA, detach the Field Diaphragm from the Base. (See Fig. 5-5.)

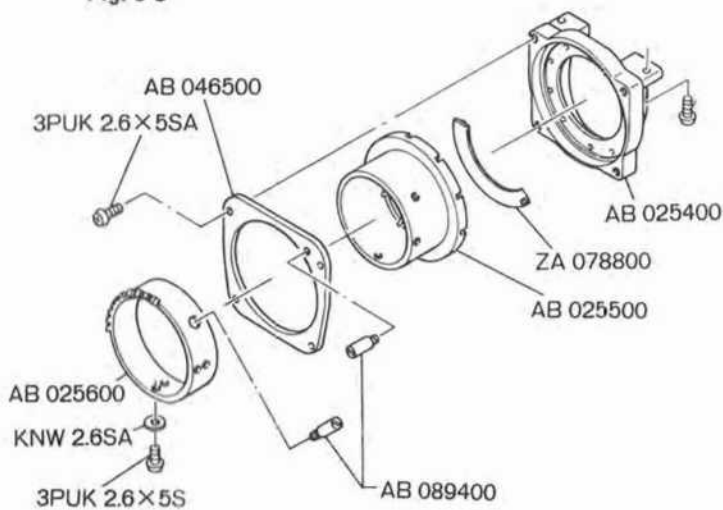


Fig. 5-6

- 5-2-2 Detach Circular Rack AB025600 by removing Screw 3PUK2.6x5SA. (See Fig. 5-6.)

- 5-2-3 Detach Plate AB046500 by removing four Screws 3PUK2.6x5SA. (See Fig. 5-6.)

- 5-2-4 Remove Rotary Frame AB025500. (See Fig. 5-6.)

- 5-2-5 Remove Diaphragm Blades ZA078800. (See Fig. 5-6.)

## 6. ASSEMBLY PROCEDURE FOR BASE UNIT

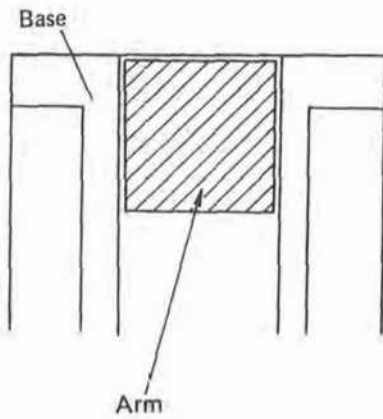


Fig. 6-1

### 6-1 Assemble the Arm with the Base Unit.

#### NOTES:

1. The Arm should be mounted precisely so as not to degrade appearance. (See Fig. 6-1.)
2. Screws must be tightened firmly so that the Arm will not come loose.

### 6-2 Assemble the Field Diaphragm Unit in accordance with the procedure given below:

#### 6-2-1 Assemble Diaphragm Blades ZA078800 with Diaphragm Frame AB025400. (See Fig. 5-6.)

#### 6-2-2 Assemble Rotary Frame AB025500 in position. (See Fig. 5-6.)

#### 6-2-3 Position Plate AB046500 by tightening four Screws 3PUK2.6x5SA. (See Fig. 5-6.)

#### NOTE:

Check the Diaphragm Blades for normal operation.

#### 6-2-4 Assemble Circular Rack AB025600 in position by tightening Screw 3PUK2.6x5SA. (See Fig. 5-6.)

### 6-3 Mount the Field Diaphragm Unit onto the Base by using two Screws CUK2.6x6SA, temporarily.

#### 6-3-1 Bring down Microscope Stand on its front as shown in Fig. 6-2.

#### NOTE:

Recommended to apply soft cloth or some other packing material between Nosepiece and desk surface.

- a) Insert Centering Adapter B2KC1003 into the illuminator insertion port at the back of Microscope Base.
- b) Looking through Special Centering Telescope KN0029, rotate its front lens portion (helicoid) to focus on the cross hairs.
- c) Insert KN0029 into B2KC1003 and stop down the Field Diaphragm all the way.
- d) Slide the front lens portion of KN0029 back and forth until the image of the Field Diaphragm is brought into focus.

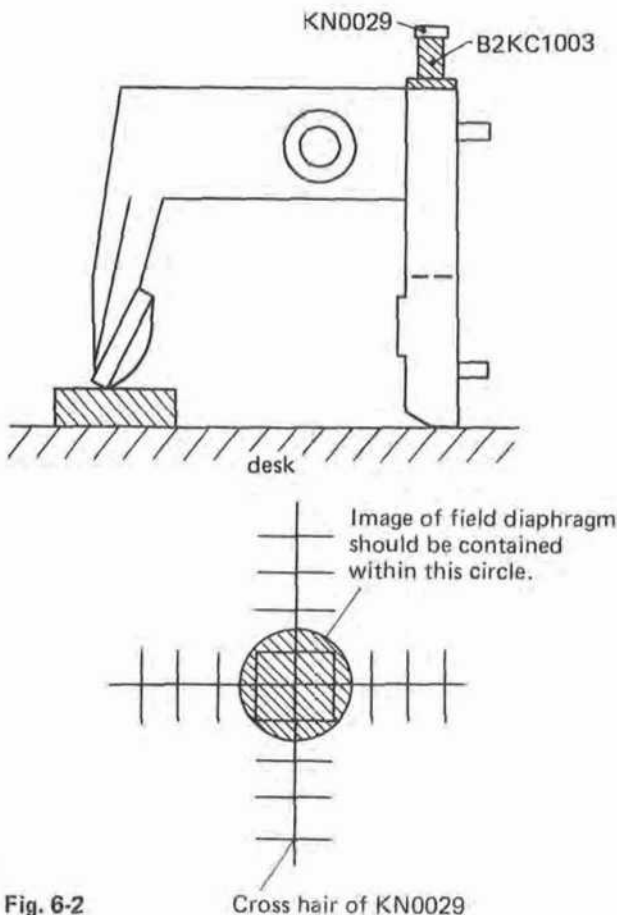


Fig. 6-2

- e) Loosen two Screws of Field Diaphragm Unit slightly and move it laterally until the image of the Field Diaphragm is correctly centered concentric with the cross hairs of KN0029.  
STANDARD: Within 1.5 divisions on the scale of KN0029.
- f) Tighten two Screws CUK2.6x6SA.



Fig. 6-3

6-4 Assemble the Light Exit Unit in the procedure given below:

- 6-4-1 Assemble Lens ZA077700 in Mirror Mount Unit ZJ538400. (See Fig. 602.)
- 6-4-2 Clamp the Lens Retainer AB035800 with OT0022. (See Fig. 6-3.)

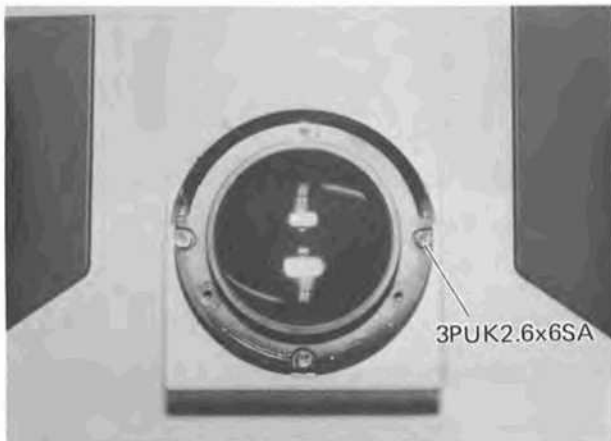


Fig. 6-4

6-5 Mount the Light Exit Unit on the Base by using three Screws 3PUK2.6x6SA. (See Fig. 6-4.)

**NOTE:**

It is recommended to perform overall adjustment in this condition. (refer to 9-1)

6-5 Assemble Knurled Ring AB035500 in position. (See Fig. 6-5.)

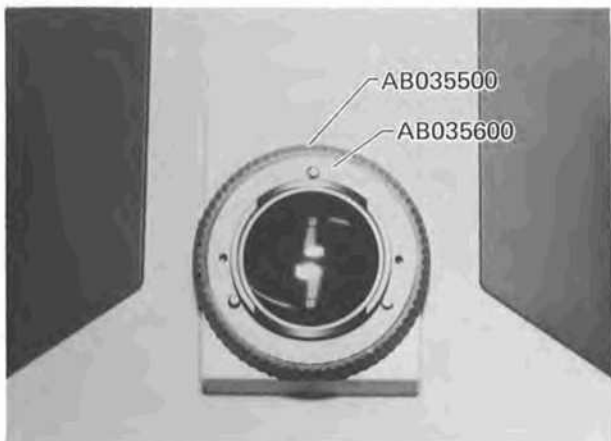


Fig. 6-5

6-6 Assemble Filter Mount AB035600 in position with Screw 3PUK2x7SA. (See Fig. 6-5.)

6-6-1 Check the Field Diaphragm Unit for its working range and graduations.

6-6-2 If the graduations are miscalibrated, adjust engagement between Rotary Ring AB035500 and teeth of Circular Rack AB025600.

## 7. DISASSEMBLY PROCEDURE FOR BH2-CH



Fig. 7-1

7-1 Disassemble the Stage Mount in the following manner:

7-1-1 Remove Stopper HK2.6x4SA.

Stopper HK2.6x4SA can be uncovered by lowering the Condenser Holder.

(See Fig. 7-1.)

7-1-2 Remove the Condenser Holder by lowering it.

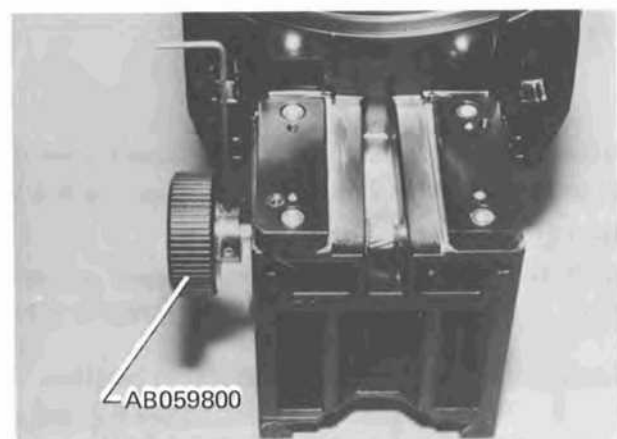


Fig. 7-2

7-1-3 Detach Knob AB059800 by removing Screw ACU2.6x4SA. (See Fig. 7-2.)

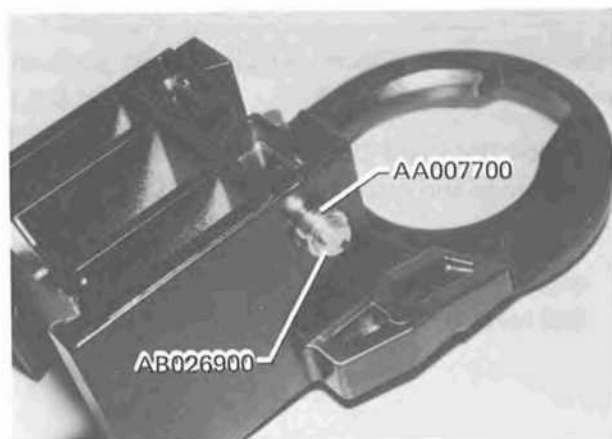


Fig. 7-3

7-1-4 Remove Nut AA007700 by using Tool KKAA-0077. (See Fig. 7-3.)

7-1-5 Remove Tension Screw AB026900.

(See Fig. 7-3.)

7-1-6 Remove Ball B3/32, Pinion AB026800 and Washer AA272600.

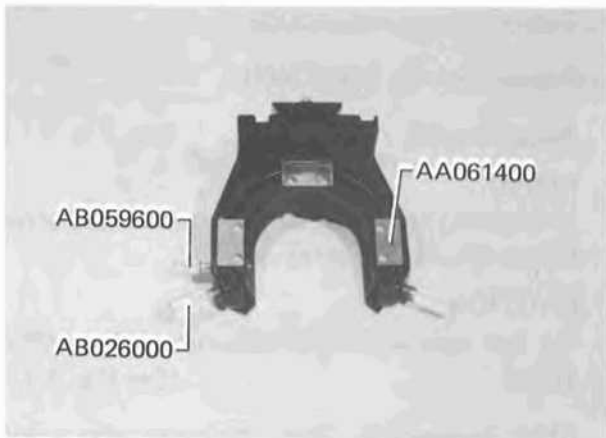


Fig. 7-4

7-2 Disassemble the Condenser Holder in the following procedures:

7-2-1 Remove Condenser Clamping Knob AB-059600.

7-2-2 Remove two Centering Knobs AB026000.

7-2-3 Detach three Plates AB061400 by removing six Screws 3PUK2x4SA. (See Fig. 7-4.)



Fig. 7-5

7-2-4 Remove Condenser Mount AB059000.

(See Fig. 7-5.)

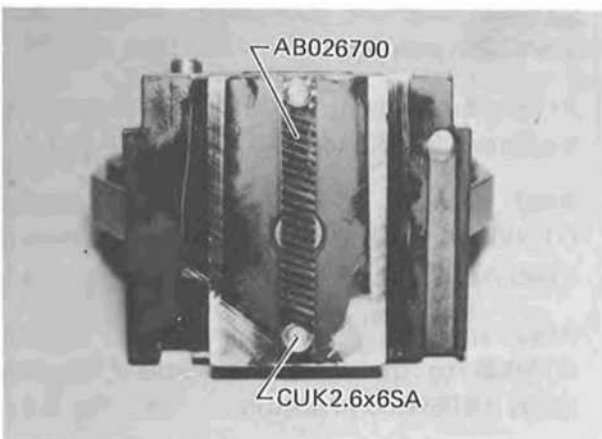


Fig. 7-6

7-2-5 Dismount Rack AB026700 by removing two Screws CUK2.6x6SA. (See Fig. 7-6.)

Two Washers SW2.6SA and two Washers NW2.9-450BN are removed together with the Rack.



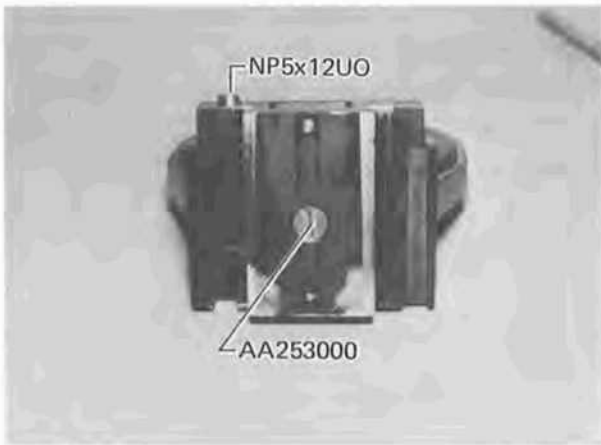


Fig. 7-7

- 7-2-6 Remove Screw AA253000.
- 7-2-7 Remove Spring AA097400.
- 7-2-8 Remove Shaft AB026200. (See Fig. 7-7.)

**NOTE:**

The Spring and Shaft can be dismantled after Screw AA253000 is removed.

**CAUTION:**

Do not remove Height Adjustment Pin NP5x12UO. (See Fig. 7-7.)

- 7-2-9 After disassembly, Wash the parts with xylol or gasoline to remove grease. Then, wipe off xylol or gasoline completely with a piece of dry cloth.

## 8. ASSEMBLY PROCEDURE FOR BH2-CH

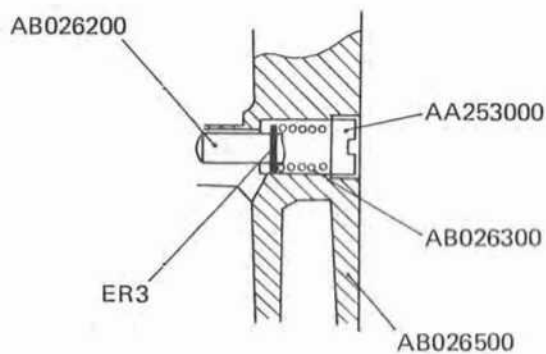


Fig. 8-1

- 8-1 Assemble the Condenser Holder Unit as per the procedure below:
  - 8-1-1 After applying Grease OT2008, assemble Shaft AB026200 in position. (See Fig. 8-1.)
  - 8-1-2 After applying Grease OT2008, assemble Spring AB026300 in position. (See Fig. 8-1.)
  - 8-1-3 Tighten Screw AA253000 in position. (See Fig. 8-1.)
  - 8-1-4 After applying Grease OT2008 to the slide surface, assemble Condenser Mount AB059500 in position. (See Fig. 7-5.)
  - 8-1-5 Attach three Plates AB061400 by tightening six Screws 3PUK3x4SA. (See Fig. 7-4.)
  - 8-1-6 After applying a small amount of Grease OT2006 to the thread, assemble Centering Knob AB026000 in position. (See Fig. 7-4.)
  - 8-1-7 After applying a small amount of Grease OT2006 to the thread, assemble Clamping Knob AB059600 in position. (See Fig. 7-4.)
  - 8-1-8 Check operation by manipulating the Centering Knob.
  - 8-1-9 Assemble Rack AB026700 in position by tightening two Screws CUK2.6x6SA. (See Fig. 7-6.)

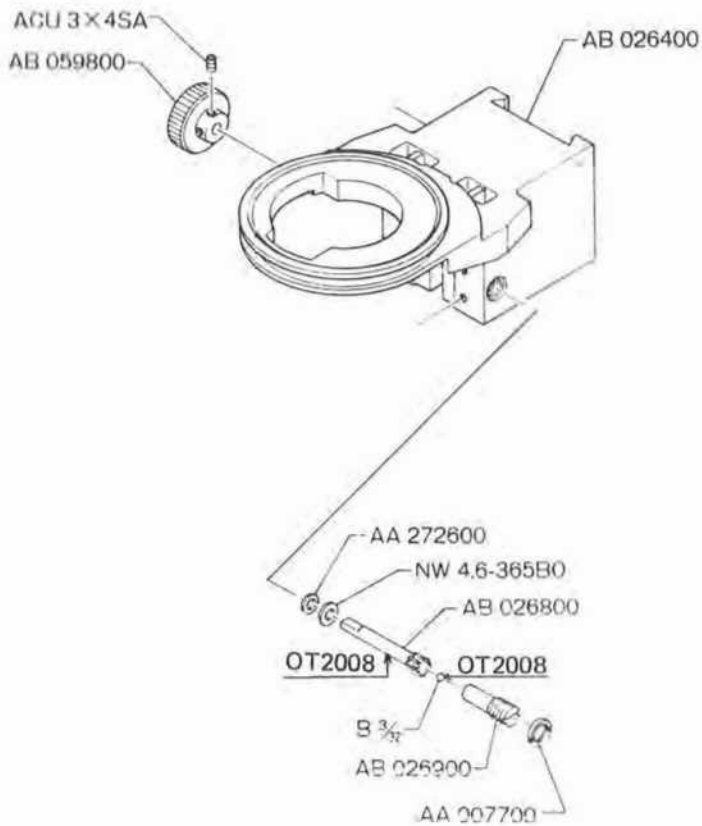


Fig. 8-2

## 8-2 Assemble the Stage Mount Unit as follows:

8-2-1 With Washers AA272600, NW4.6-265B0 and Balls B3/32 placed on Pinion AB026800, assemble it in Stage Mount Unit AB026400.

### NOTE:

Apply Grease OT2008 to the parts indicated by arrows. (See Fig. 8-2.)

8-2-2 Assemble Tension Screw AB026900 in position.

8-2-3 Assemble Nut AA007700 in position by using Tool KKAA0077.

8-2-4 Assemble Knob AB059800 in position. For this purpose, fit the Pinion Shaft into the hole formed in the Knob and tighten two Screws ACU3x4SA firmly. (See Fig. 8-2.)

8-2-5 Check Pinion for its operation and adjust it if required.

a) When the Pinion rotates too lightly or has thrust play:

Loosen AA007700.

↓

Tighten AB026900.

↓

Tighten AA007700.

b) When the Pinion rotates too heavily:

Loosen AA007700.

↓

Loosen AB026900.

↓

Tighten AA007700.

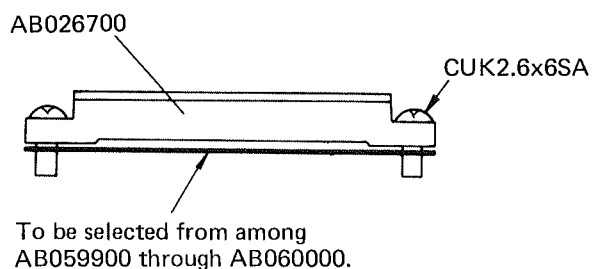


Fig. 8-3

8-3 Assemble Stage Mount Unit with Condenser Holder Unit as follows:

8-3-1 Assemble Stage Mount Unit AB026400 with Condenser Holder Unit AB026500.

(See Fig. 7-1.)

8-3-2 Check Condenser Holder Unit for its vertical motion and adjust if required.

a) When the rack has play:  
Place Washers AB059900 ~ AB060000 under the Rack. (See Fig. 8-3.)

b) When Rack creaks or moves too heavily:  
Remove Washers AB059900 ~ AB060000 or replace them with thinner ones.

(See Fig. 8-3.)

## 9. OVERALL ASSEMBLY AND ADJUSTMENT OF BHS-F

Optical axis of illumination system  
STANDARD: Within 1 division on the scale  
of KN0029

9-1 Check and optical alignment of illumination system

9-1-1 Place the following Jigs on the Microscope Stand as shown in Fig. 9-1:.

B2KC0002: Pinhole tube  
B2KC1003: Centering adapter  
KN0029: Special centering telescope

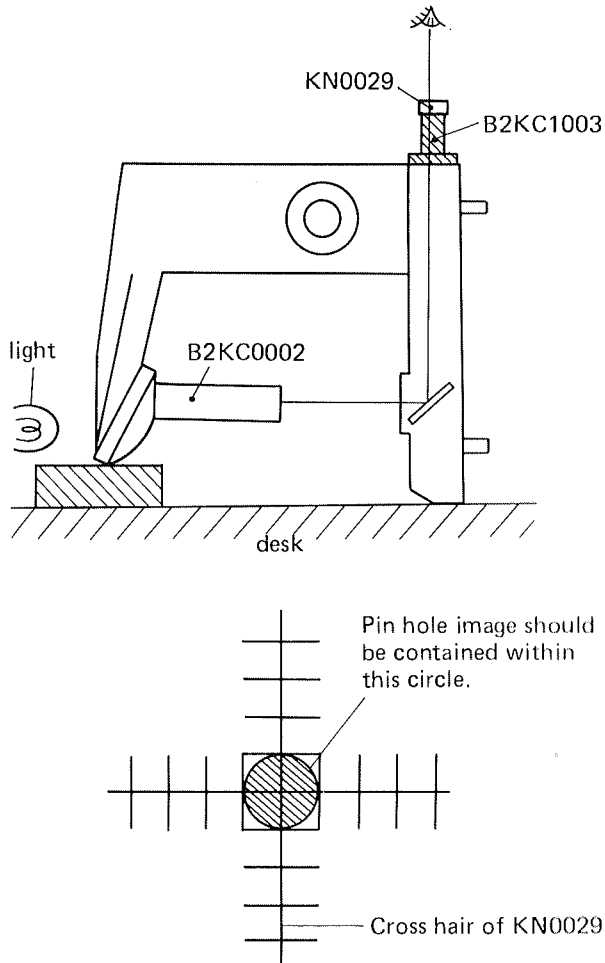


Fig. 9-1

9-1-2 Bring down Microscope Stand on its front as shown in Fig. 9-1. Recommended to apply soft cloth or some other packing material between Nosepiece and desk surface.

9-1-3 Looking through Special Centering Telescope KN0029, rotate its front lens portion (helicoid) to focus on the cross hairs.

9-1-4 Slide the front lens portion of KN0029 back and forth to focus on the Pin Hole of B2-KC0002.

STANDARD: 1 division of cross hairs of KN0029.

a) If the STANDARD is not met (deviation exceeds 1 divisions), adjust position of the Light Exit Unit.

b) After loosening Screws 3PUK2.6x6SA on Mirror Mount Unit ZJ538400, adjust the pinhole image within 1 division on the cross hair of KN0029.

Tighten Screws 3PUK2.6x6SA.

9-2 Assemble the Electrical Base with Microscope Stand by tightening three Srews AB6x25SA.

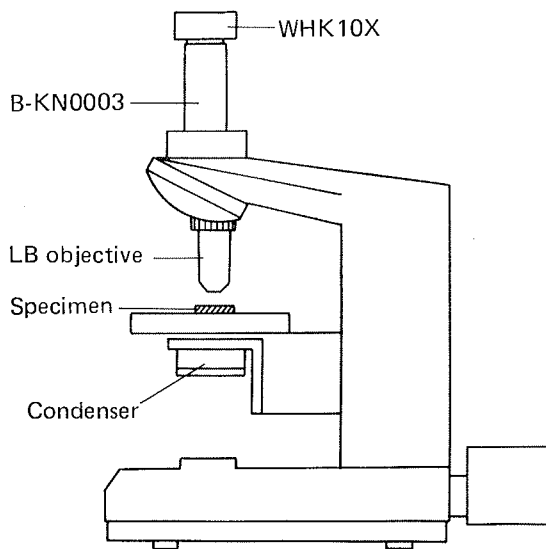


Fig. 9-2

9-3 Check and adjustment of Fine Adjustment sensitivity

9-3-1 Use the following jigs on the Microscope Standard as shown in Fig. 9-2:

B-KN0003: Standard jig for tube length LB40x objective

WHK10X or WK10x

Condenser

Ordinary specimen

Fine adjustment sensitivity

STANDARD: Within  $4\mu$  (within 2 divisions on knob scale)

**NOTE:**

If no B-KN0003 is available use any observation tube instead.

### 9-3-2 Checking procedure

- a) Bring the instrument in focus on the specimen. Read indication on the scale of the Fine Adjustment Knob.
- b) Turn the Fine Adjustment Knob  $20\mu$  (10 divisions) in either direction, and then return it until the instrument is brought in focus on the specimen. In this condition, read indication on the scale of the Fine Adjustment Knob. The difference of the readings obtained in steps a) and b) must be within 2 divisions.
- c) Check fine adjustment sensitivity by turning the knob in the directions reverse to those selected in steps a) and b) above.

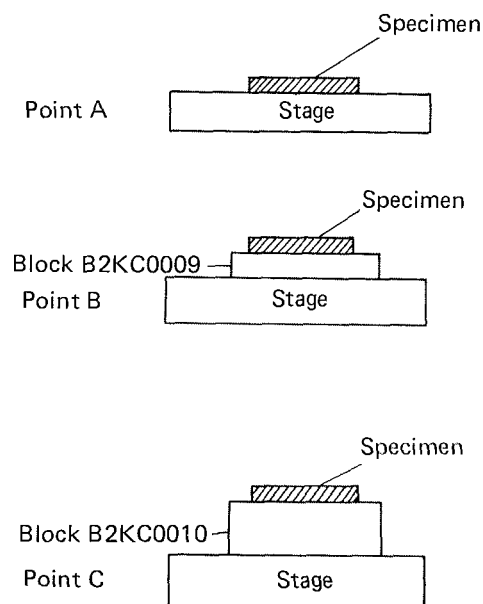


Fig. 9-3

- 9-3-3 Check fine adjustment sensitivity by repeating steps a), b) and c) above at three points A, B and C specified in Fig. 9-3. (At points B and C, a block is placed between the specimen and stage to change height of stage.)

(See Fig. 9-3)

- 9-3-4 If the STANDARD is not met, change setting of Gear Unit ZJ856500.

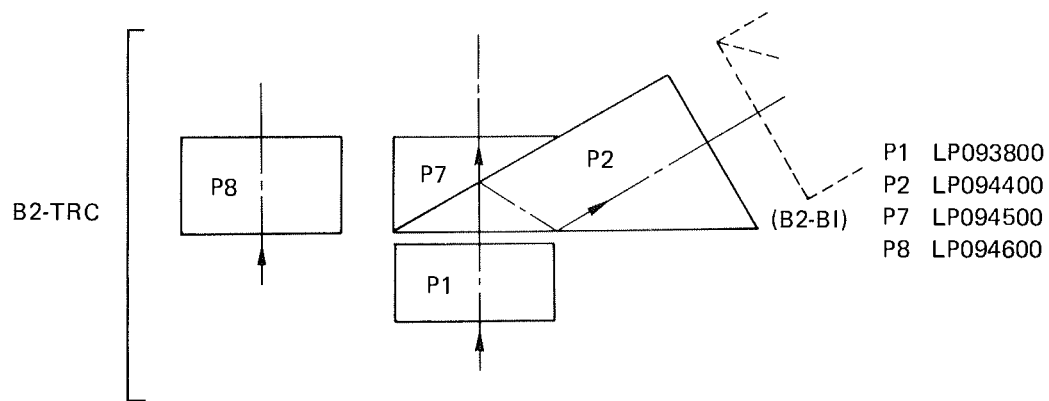
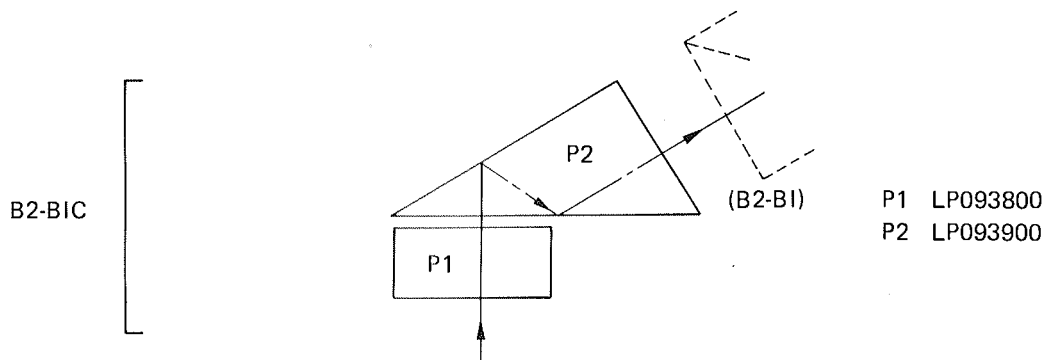
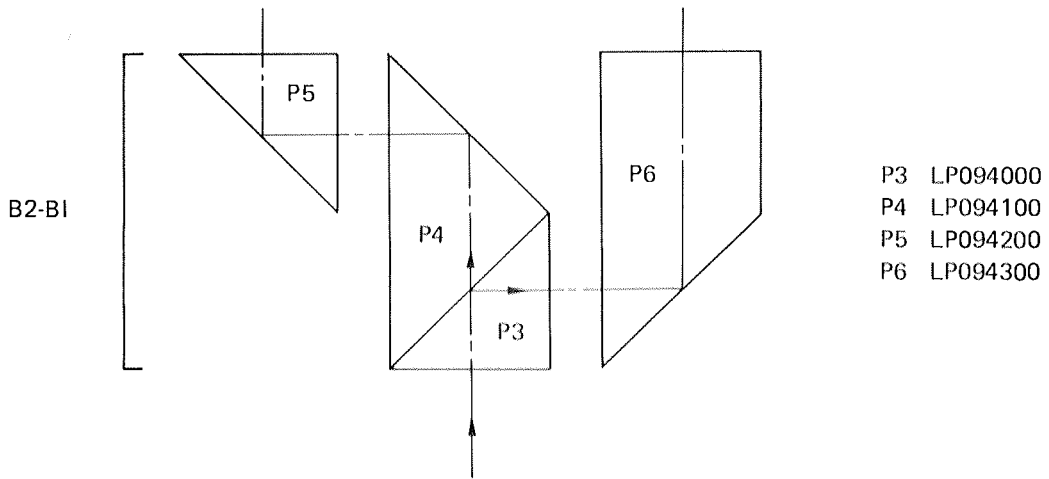
(See Fig. 4-28)

- 9-3-5 If the STANDARD cannot be met by adjusting Gear Unit ZJ856500, proceed as follows:

- a) Check the Gear and Shaft for engagement and play in the Coarse Adjustment Knob.  
(See 4-2-9)
- b) Check the Ball Guide assembly for settings of the Wires and Rollers as well as its operation.  
(See 4-2-9)

# OPTICAL PATH DIAGRAMS OF BH2-BI AND BH2-TR

BH2-BI designates the combination of B2-BI unit and B2-BIC unit  
 BH2-TR designates the combination of B2-BI unit and B2-TRC unit



## 10. DISASSEMBLY PROCEDURE FOR BH2-BI

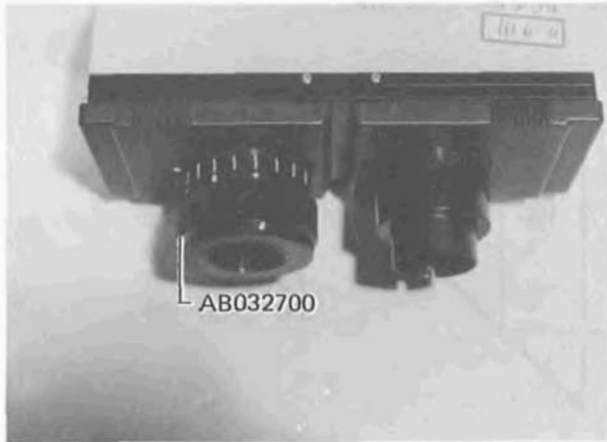


Fig. 10-1

10-1 Disassemble BH2-BI into B2-BIC Unit and B2-BI Unit as per the procedure given below:

10-1-1 Detach Diopter Ring AB032700 by removing three Screws ACU2.6x4SA. (See Fig. 10-1)



Fig. 10-2

10-1-2 Disassemble Finger Rest L AB032100 and Finger Rest R AB032200 by removing Screw PUK2x10SA (from each finger rest) and two Screws CUK2.6x5SA (from each finger rest). (See Fig. 10-2)

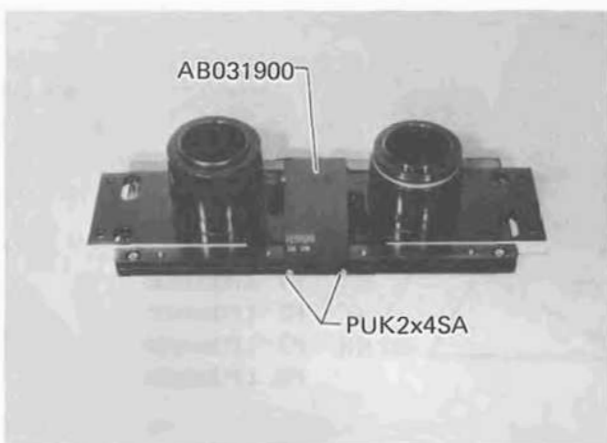


Fig. 10-3

10-1-3 Detach Graduated Plate AB031900 by removing four Screws PUK2x4SA. (See Fig. 10-3)

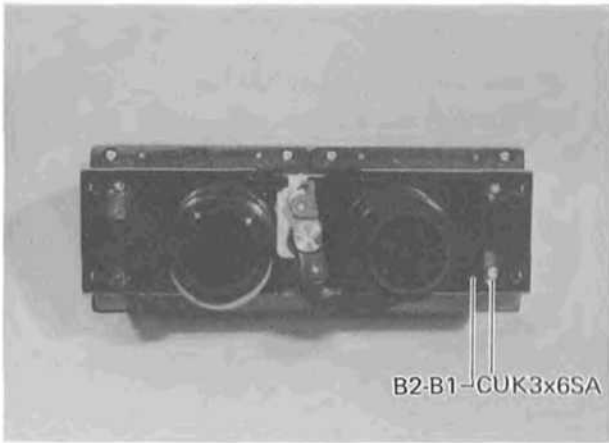


Fig. 10-4

10-1-4 Disassemble B2-BI Unit from B2-BIC Unit by removing four Screws CUK3x6SA.

(See Fig. 10-4)

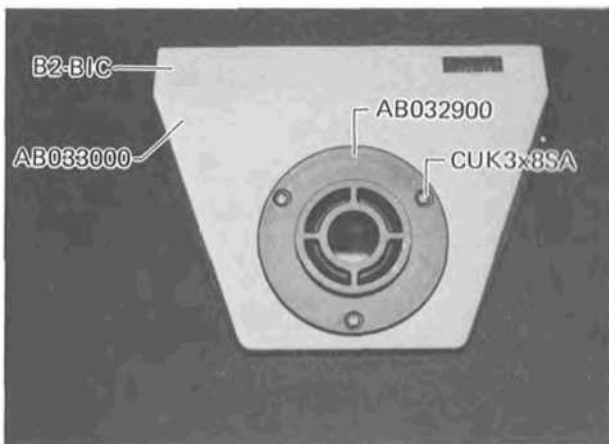


Fig. 10-5

10-2 Disassemble B2-BIC Unit as follows:

10-2-1 Disassemble Prism Mount AB032900 from Body AB033000 by removing three Screws CUK3x8SA. (See Fig. 10-5)

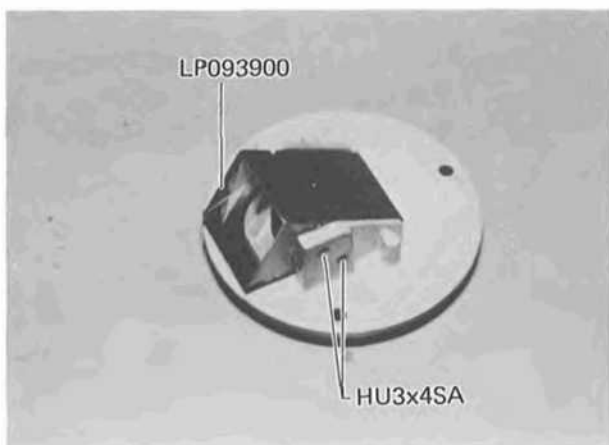


Fig. 10-6

10-2-2 Remove P2 LP093900 from Prism Mount AB032900:

- a) After loosening two Screws HU3x4SA, remove the Adhesive OT1028 (Araldite). (See Fig. 10-6)



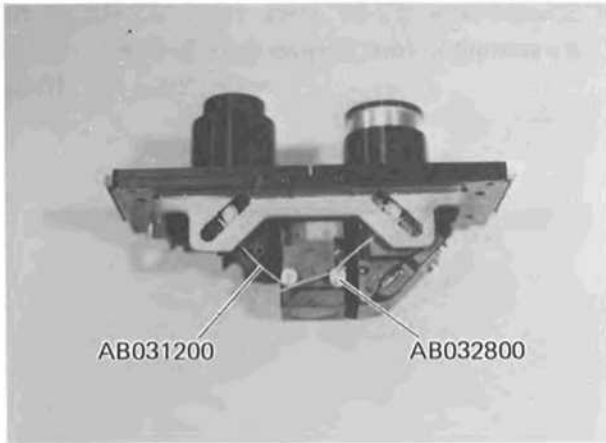


Fig. 10-7

10-3 Disassemble B2-BI Unit as follows:

10-3-1 Remove Spring AB031200 from the constant tube length device:

- a) Remove Spring Hanger AB032800.
- b) Remove Spring AB031200 from each Key AB031800. (See Fig. 10-7)

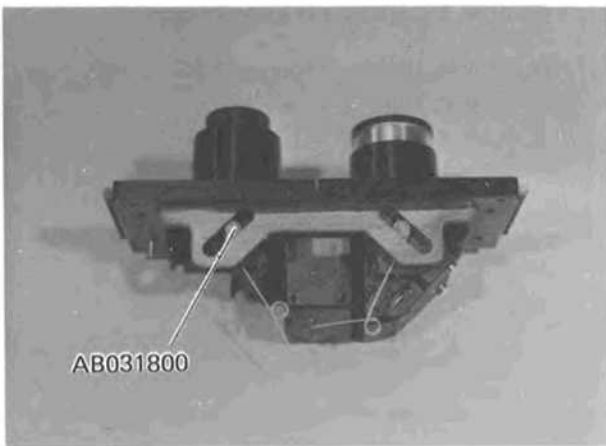


Fig. 10-8

10-3-2 Remove two Keys AB031800. (See Fig. 10-8)

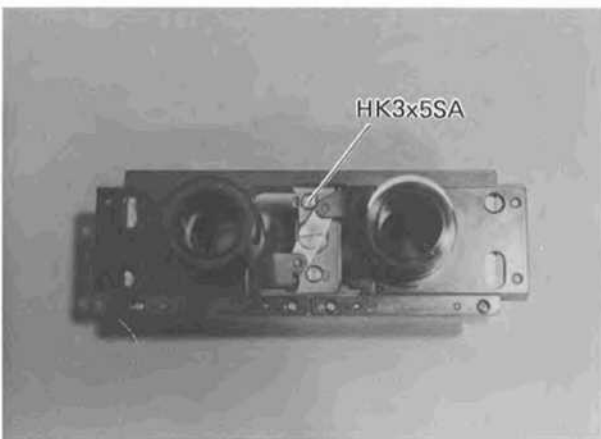


Fig. 10-9

10-3-3 Remove Prisms P3 and P4:

- a) Prism Mount and Prisms P3, P4 ZJ538700 can be disassembled by removing two Screws HK3x5SA. (See Fig. 10-9)
- b) Do not remove Prism P3, P4 from Prism mount.

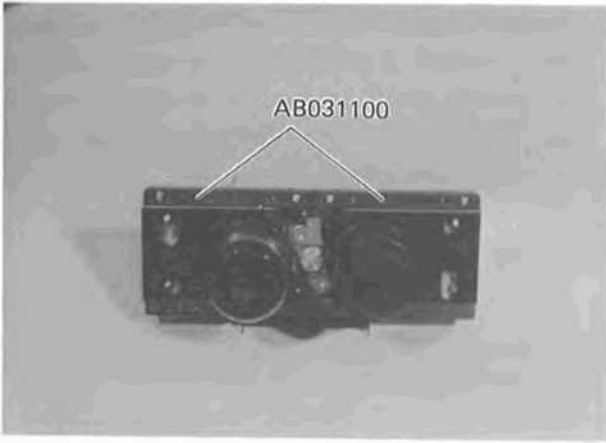


Fig. 10-10

10-3-4 Dismount Dovetail (left) and Dovetail (right) AB031100 by removing two Screws CUK2x5SA. (See Fig. 10-10)

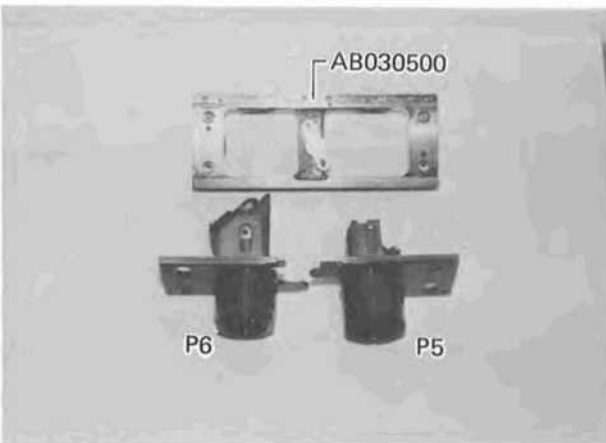


Fig. 10-11

a) Now, Prisms P5 and P6 can be disassembled.

P5 (ZJ856700, ZJ538800)

P6 (ZJ856600, ZJ538900)

(See Fig. 10-11)

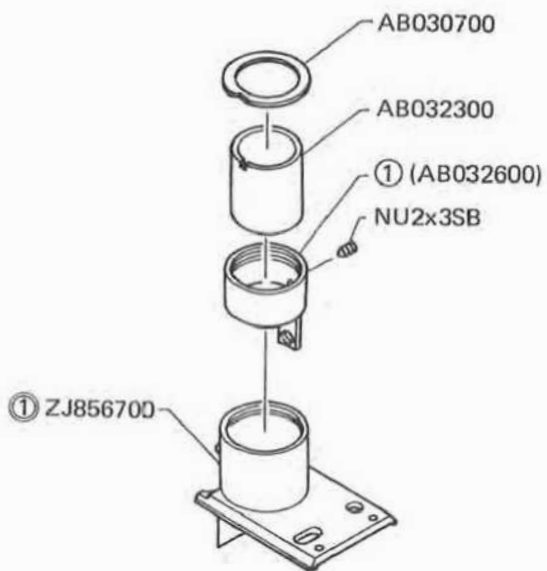


Fig. 10-12

10-3-5 Remove Prism Mount ZJ538800 from right side Dovetail ZJ856700 by removing two Screws HK3x10SA.

(See Fig. 10-12)

10-3-6 Remove Prism Mount ZJ538900 from left side Dovetail ZJ856600 by removing two Screws HK3x10SA. (See Fig. 10-12)



10-3-7 Detach Circular Cover AB030700 from right side Dovetail ZJ856700. It can be dislodged by placing small amount of solvent through the notch and then forcibly extracting it with a tweezers or a similar tool.

(See Fig. 10-13)

10-3-8 Extract Inner Tube AB032600.

10-3-9 Remove Sleeve R AB032300 from Inner Tube AB032600 as follows:

- a) Remove Screw NU2x3SB.
- b) Remove Adhesive by heating it as shown in Fig. 10-13.

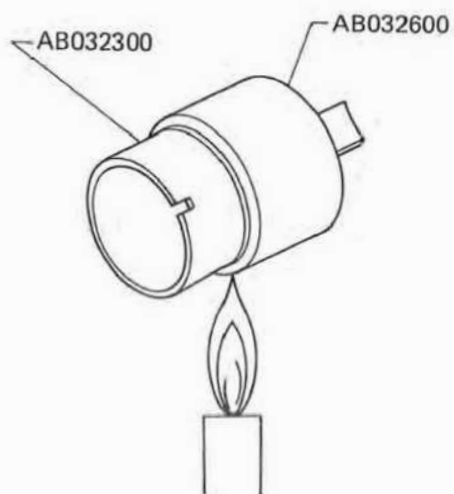


Fig. 10-13

## 11. ASSEMBLY PROCEDURE FOR BH2-BI



Fig. 11-1

### 11-1 Assembling procedure for B2-BI Unit

11-1-1 Assemble Prism Mount ZJ538800 with right side Dovetail ZJ856700 by using two Screws HK3x10SA and Adhesive OT1131.

(See Fig. 11-1)



Fig. 11-2

11-1-2 Assemble Prism Mount ZJ538900 with left side Dovetail ZJ856600 by using two Screws HK3x10SA and Adhesive OT1131.

(See Fig. 11-2)

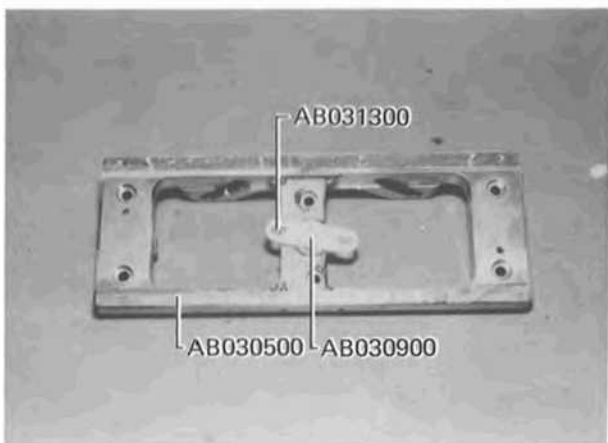


Fig. 11-3

11-1-3 Assemble Lever AB031300 and Shaft AB030900 with Base Dovetail AB030500.  
(See Fig. 11-3)

a) Apply Grease OT2008 to the Lever and Shaft.



Fig. 11-4

11-1-4 Assemble left and right side Dovetails in position respectively.

(See Fig. 11-4)

- a) Apply Grease OT2008 to the sliding surfaces of the Dovetails.

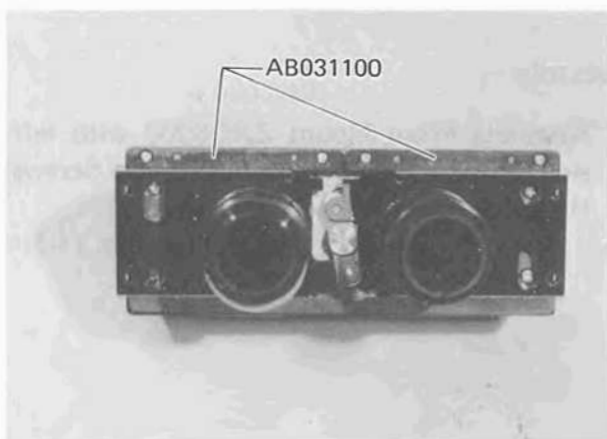


Fig. 11-5

11-1-5 Assemble two Dovetails AB031100 by using two Screws CUK2.6x5SA for each.

(See Fig. 11-5)

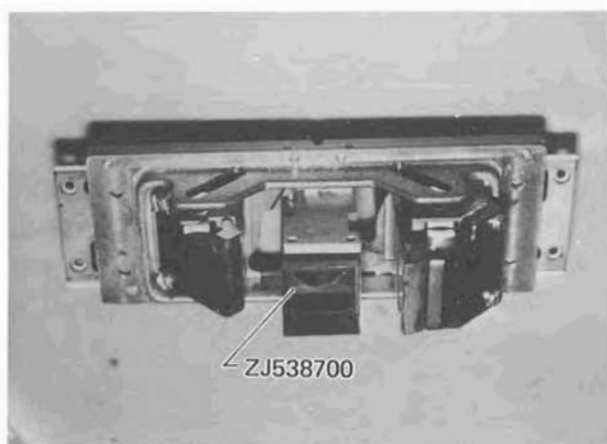
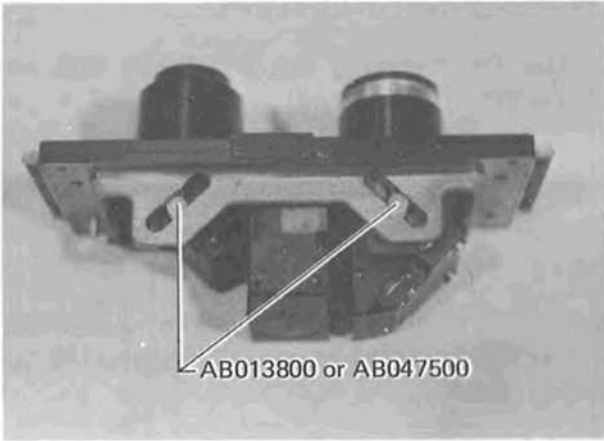


Fig. 11-6

11-1-6 Move the two dovetails and check for smooth operation.

11-1-7 Temporarily clamp the Prism assembly of P3 and P4 ZJ538700 with two Screws HK3x5SA.

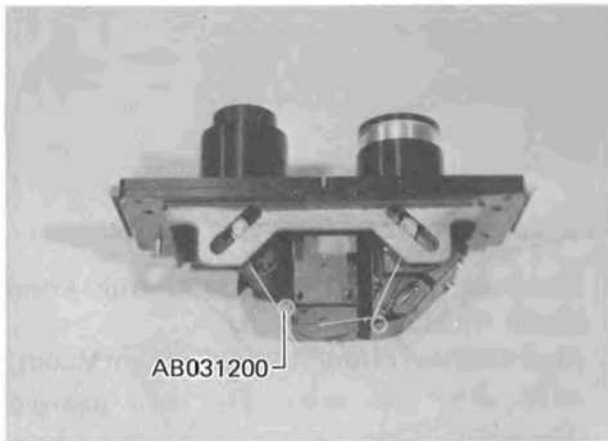
(See Fig. 11-6)



**Fig. 11-7**

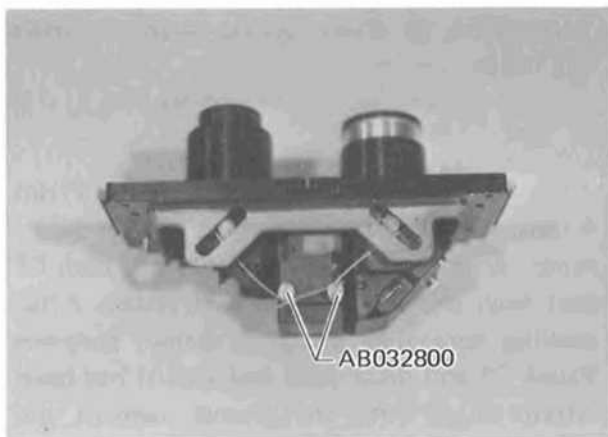
11-1-8 Assemble Key AB047500 or AB013800 in position. (See Fig. 11-7)

11-1-9 Check movement of keys in their slots for play or friction. Select smaller or larger diameter keys to achieve smooth operation. (See Fig. 11-7)



**Fig. 11-8**

11-1-10 Assemble Spring AB031200 in position. (See Fig. 11-8)



**Fig. 11-9**

11-1-11 Hold the Spring Hangers AB0328000. (See Fig. 11-9)

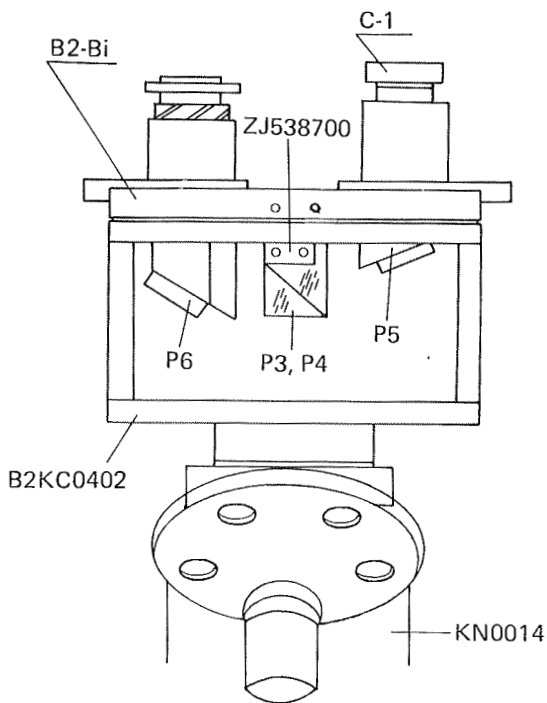


Fig. 11-10

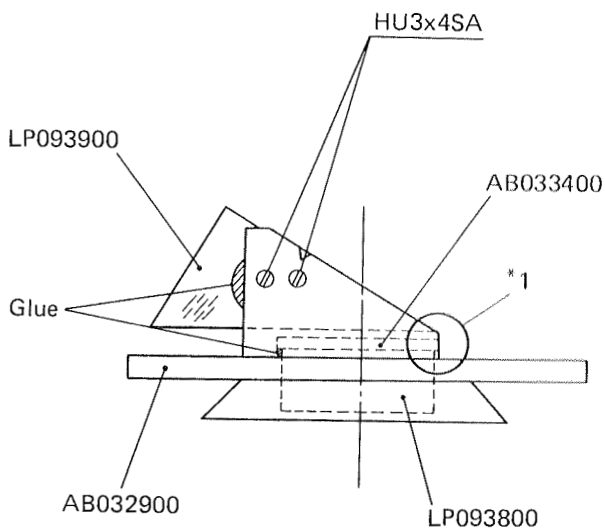


Fig. 11-11

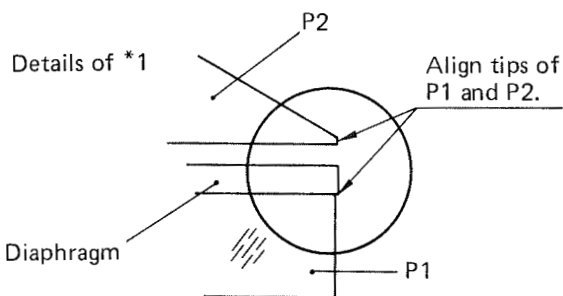


Fig. 11-12

## 11-2 Optical alignment of B2-BI unit

11-2-1 Use the following Jigs and B2-BI unit on the Microscope Stand.

B2KC0402: Jig for prism alignment

KN0014: Centering objective (200mm)

C-1: 10x eyepiece with cross hair

(See Fig. 11-10)

11-2-2 Adjust position of Prism Mount ZJ538700 taking Prism assembly of P5 and P6 as standard.

11-2-3 If B2-BI unit cannot be centered properly, fit tin foil between the Prism assembly and Prism Mount.

## 11-3 Assembling procedure for B2-BIC Unit

11-3-1 Assemble Prism P1 LP093800 with Prism Mount AB032900:

After inserting Prism P1 into the Prism Mount, make sure that prism has been inserted completely. Then cement it at three points with Adhesive OT1028.

11-3-2 Assemble diaphragm AB033400 with Prism P1:

Press diaphragm evenly against prism P1 and cement it at three points with Adhesive OT1028.

(See Fig. 11-11)

11-3-3 Assemble Prism P2 LP093900 with Prism Mount AB032900:

Align tip of Prism P2 with that of Prism P1 and then cement them to each other. After making sure that no gaps remain between Prism P2 and diaphragm and that it has been fitted snugly into the groove, cement the diaphragm at two points with Adhesive OT1028.

(See Fig. 11-12)

Tighten two Screws HU3x4SA.

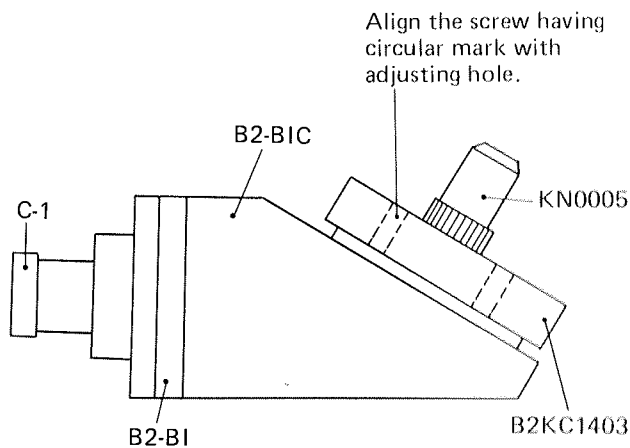


Fig. 11-13

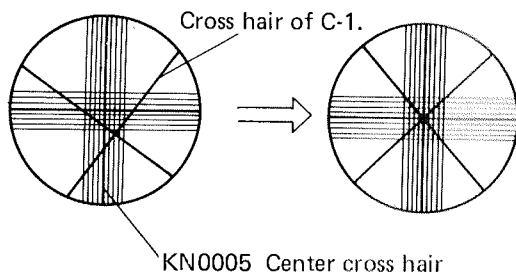


Fig. 11-14

#### 11-3-4 Center Prism Mount AB032900:

- a) Assemble the following Jigs and B2-BIC, B2-BI units as shown in Fig. 11-13:  
 B2KC1403: Alignment Jig  
 KN0005: Centering objective  
 C-1: 10x eyepiece with cross hair  
 (See Fig. 11-13)

#### 11-3-5 Assemble procedure for BH2-BI

- a) Assemble B2-BI Unit to B2-BIC Unit with four Screws CUK3x6SA.

**NOTE:**

These two Units should be aligned flush with each other at their adjoining edges.

- b) When Alignment Jig B2KC1403 is attached to BH2-BI, three adjusting holes in B2KC1403 should be aligned with three Screws CUK3x8SA in Prism Mount AB032900 of BH2-BI.
- c) Insert Eyepiece 10X with Cross Hairs C-1 into the right eyepiece sleeve.
- d) By using the adjusting holes of the alignment jig, adjust position of the Prism Mount AB032900 until the cross hair of C-1 intersects with the center of the center cross hair.

(See Fig. 11-13 and Fig. 11-14)

- e) If centration is impossible by adjusting position of the Prism Mount, check Prism P2 for its assembly. (See Fig. 11-11)
- f) If P2 has no defect, adjust mounting positions of both B2-BI Unit and B2-BIC Unit.
- g) Insert C-1 into left Eyepiece sleeve, and check that the deviation of the left eyepiece axis is within two divisions, if any, from the right eyepiece axis.

#### 11-4-1 Assemble Graduated Plate AB031900 by using four Screws PUK2x4SA.

(See Fig. 10-3)

#### 11-4-2 Assemble Finger Rest L AB032100 with Finger Rest R AB032200 by using Screw PUK2x10SA and two Screws CUK2.6x5SA for each Finger Rest. (See Fig. 10-2)

#### 11-4-3 Temporarily Clamp Diopter Ring AB032700 by using three Screws ACU2.6x4SA.

(See Fig. 10-1)



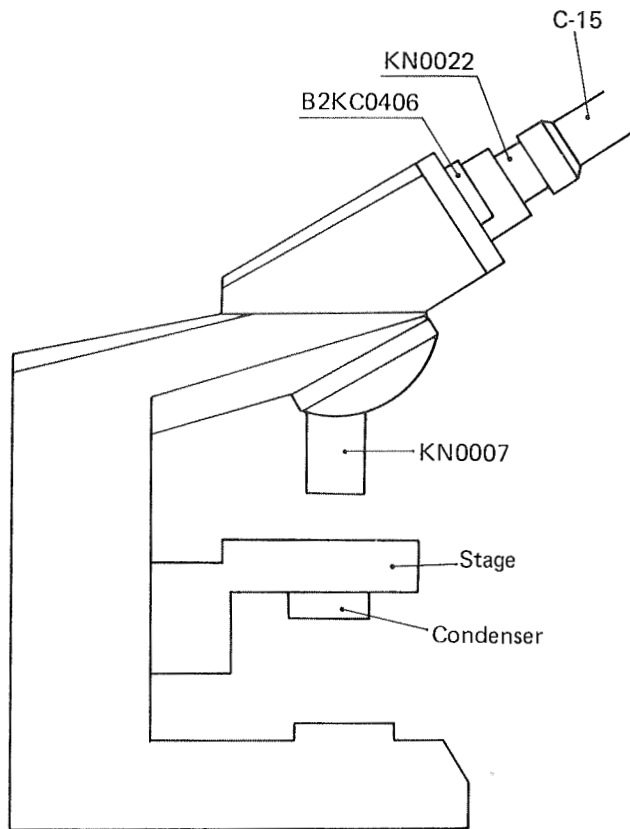


Fig. 11-15

11-5 Adjustment of mechanical tube length

11-5-1 Adjust mechanical tube length of the right side eyepiece sleeve

a) Use the following Jigs and BH2-BI Unit on the Microscope Stand:

B2KC0406: Interpupillary distance jig

KN0007: Standard objective

KN0022: Special WF10x

C-15: Focusing magnifier

(See Fig. 11-15)

b) Set scale of KN0022 at O, or red line.

(See Fig. 11-22)

c) Looking through the C-15, move the front lens portion in or out until an object 1,000 mm away from the C-15 is brought into focus. (See Fig. 11-16)

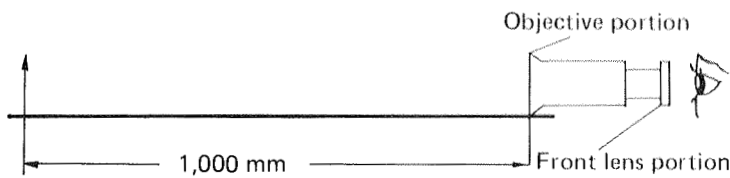


Fig. 11-16

d) Bring the specimen of KN0007 into focus by adjusting longitudinal position of Sleeve AB032300.

e) With the specimen in focus fix Sleeve AB032300 and Inner Tube AB032600.

(1) Bond with Adhesive OT1027 at one point.

(2) Bond with Adhesive OT1028 at three points. (See Fig. 11-17)

f) Assemble Circular Cover AB030700 in position.

Bond with Adhesive OT1028 at two or three points.

(See Fig. 11-17)

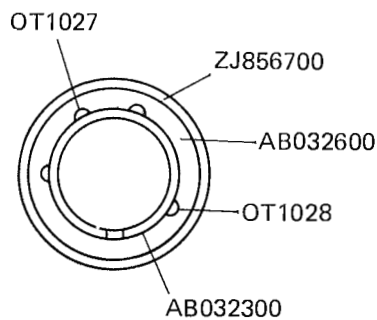


Fig. 11-17

- 11-5-2 Adjust left side tube length:
- After focusing on the right side, put KN-0022 and C-15 into the left side sleeve.
  - Taking tube length on the right side as standard, turn Diopter Ring AB032700 in either direction to bring the specimen into focus.
  - Loosen Set screw ACU2.6x4SA on Diopter Ring AB032700. Turn the Diopter Ring only until the index of the Finger Rest L indicates O on the Diopter Ring. Then fix the Diopter Ring by tightening Set screw ACU2.6x4SA.

11-6 Overall check

- 11-6-1 Deviation of parcentration for right and left optical axes  
 STANDARD (image formation plane of objective): 0.2

- a) Use the following Jigs on the Microscope Stand:

Centering objective: KN0005  
 10x eyepiece with cross hair: C-1

- b) Place C-1 in the right and left eyepiece sleeve and make sure that the cross hair of C-1 is within 3 divisions of the center cross hair of KN0005.

(See Fig. 11-18)

- c) If this STANDARD is not met, repeat the adjustment in step 11-2 above.
- d) When the right and left optical axes are within 3 divisions of the center cross hair of KN0005, take the one nearer the center cross hair as standard and adjust the other within 2 divisions on KN0005.

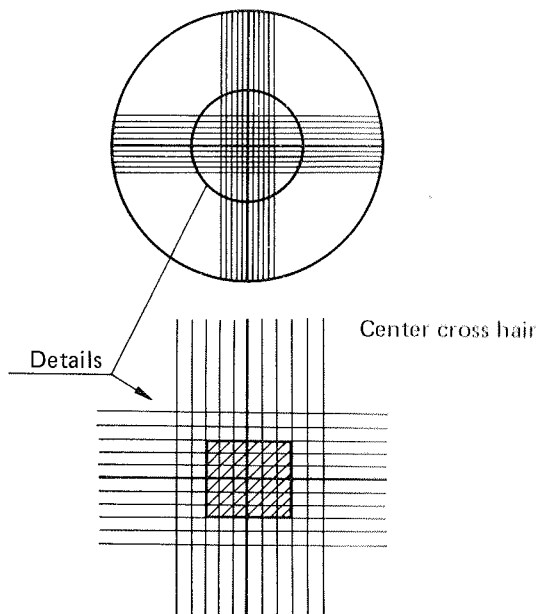


Fig. 11-18

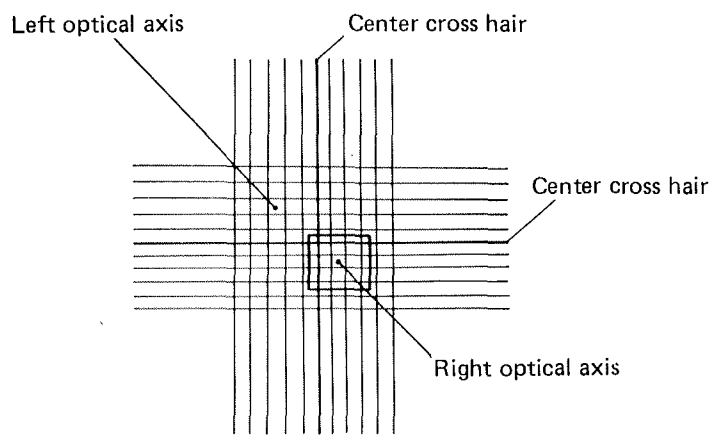


Fig. 11-19

e) When the right and left optical axes are compared with each other in Fig. 11-19, for example, the right optical axis is nearer the center cross hair on KN0005. In this case, the left optical axis must therefore be adjusted within 2 divisions of the right optical axis on the scale of KN0005 (within the black enclosure). (See Fig. 11-19)

The left optical axis should (1) ideally be matched with the right optical axis or (2) be within 2 divisions at the upper left corner inside the black enclosure. Position of the left optical axis within 2 divisions at the lower right corner of the black enclosure is the least desirable, although the specification is met. Adjust the left optical axis as close to the center cross hair on KN0005 in condition (1) or (2) described above, if possible.

f) If the right and left optical axes cannot be adjusted within 2 divisions of the center cross hair on the scale of KN0005, repeat adjustment in step 11-2 above.

#### 11-6-2 Image shift by adjustment of interpupillary distance

Image formation plane of objective: Within 0.1

a) Place the following Jigs on the Microscope Stand:

Centering objective: KN0005  
10x eyepiece with cross hair: C-1

b) Put C-1 into the right side eyepiece sleeve. With the interpupillary distance set at the minimum, check the 10x eyepiece for location of its cross hair on the scale of KN0005. Then, increase interpupillary distance to maximum and read shift of the cross hair image (on the scale of KN0005).

STANDARD: Within 1 division

c) Put C-1 into the left eyepiece sleeve and check image of the cross hair in the identical manner.

d) If the STANDARD is not met, repeat adjustment in step 11-3 above. (Especially take care not to leave gap between the Prism and Prism Mount.)

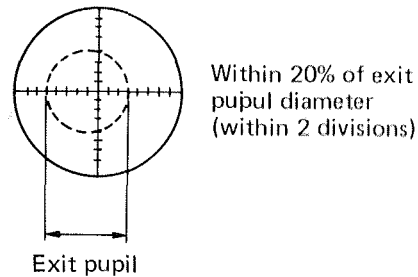


Fig. 11-20

11-6-3 Eccentricity of exit pupil of objective (within 20%)

- a) Put Special Eyepiece KN0029 into the right Eyepiece Sleeve and place the Objective 10x in the optical path. Check the exit pupil of the objective for its eccentricity from the cross hair on KN0029. It must be within 2 divisions on KN0029.

(See Fig. 11-20)

- b) Put KN0029 into the left side Eyepiece Sleeve and check eccentricity in the identical manner.

- c) If eccentricity exceeds 2 divisions, repeat adjustment in step 11-2 above.

**NOTE:**

Make sure not to leave gap between the Prism Mount.

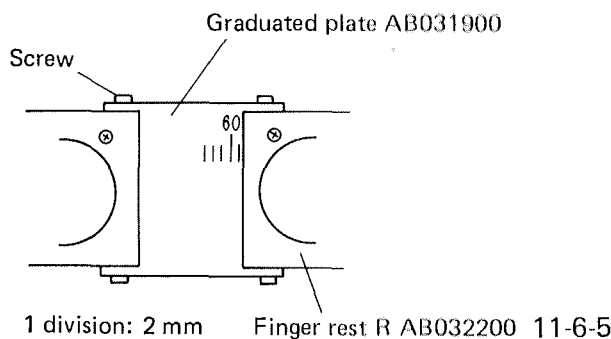


Fig. 11-21

11-6-4 Position for interpupillary distance of 62mm ( $62 \pm 1\text{mm}$ )

- a) By using Jig B2KC0406, read left side position of Finger Rest R AB032200 on the Graduated Plate. The reading must be  $62 \pm 1\text{mm}$ . (See Fig. 11-21)

- b) If the STANDARD is not met, adjust positions of Finger Rest R AB032200 and Graduated Plate AB031900.

11-6-5 Adjustable range of interpupillary distance (at least 55mm ~ 75mm)

- a) The Finger Rests R and L must not be brought into contact with each other when the interpupillary distance is set at minimum separation.

- b) Light must not leak from between the Graduated Plate and Finger Rest R with interpupillary distance set at maximum.

11-6-6 Check of tube length

- a) Jigs to be used:

Special WF 10x: KN0022

Standard objective: KN0007

- b) Attach KN0007 to the revolving nosepiece and rotate the scale on KN0022 of the O, or Red line position. (See Fig. 11-22)

Insert KN0022 into the right side eyepiece Sleeve. If image is blurred while interpupillary distance is increased from the minimum to the maximum, turn the Front lens portion of KN0022 to bring the scale in KN0007 into focus.

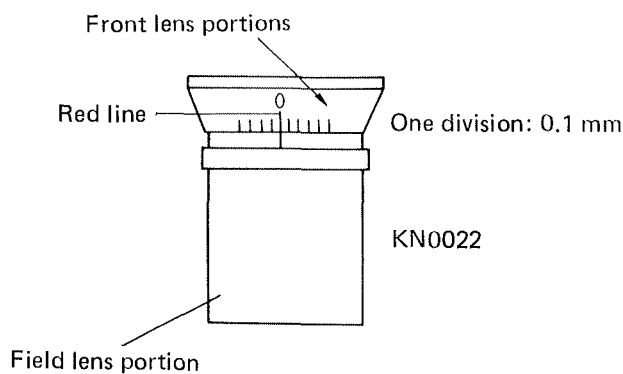


Fig. 11-22

STANDARD: Within 0.5 division (on scale of KN0022)

- c) If the above STANDARD is not met, repeat adjustment as per step 11-5 above.

11-6-7 Difference in portrusion between right and left eyepiece sleeves

STANDARD: Within 1mm

- a) Jigs to be used:

Special WF10x: KN0022

Standard objective: KN0007

Focusing magnifier: C-15

- b) Set the scale of KN0022 at O, or Red line position and insert it into the right side Eyepiece Sleeve. Adjustment of C-15, refer to 11-5-1 c).

- c) Place C-15 over KN0022 and check to see if the specimen of KN0007 is properly focused through C-15.

- d) If the specimen of KN0007 is not focused properly, turn the front lens portion of KN0022 to bring the specimen into focus.

- e) Insert KN0022 and C-15 into the left side eyepiece sleeve.

- f) If the specimen of KN0007 is not properly focused, turn Diopter Ring AB032700 to bring it into focus.

- g) After removing the eyepiece, measure distances from Finger Rest L AB032100 and Finger Rest R AB032200 respectively to the sleeve tip (by using slide calipers). Difference in the measured distances must be within 1mm between the right and left sides.

- h) If the STANDARD is not met, repeat adjustment in step 11-2 above and check once again. (See Fig. 11-23)

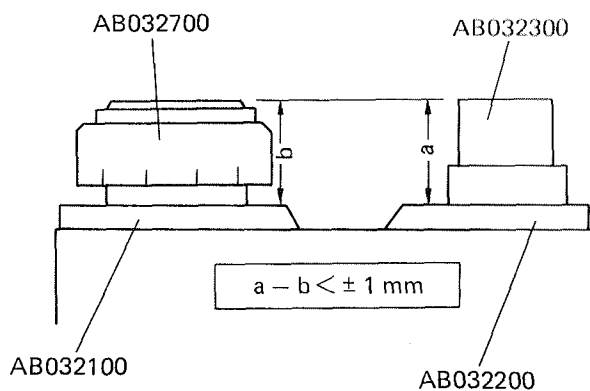


Fig. 11-23

## 12. DISASSEMBLY PROCEDURE FOR BH2-TR

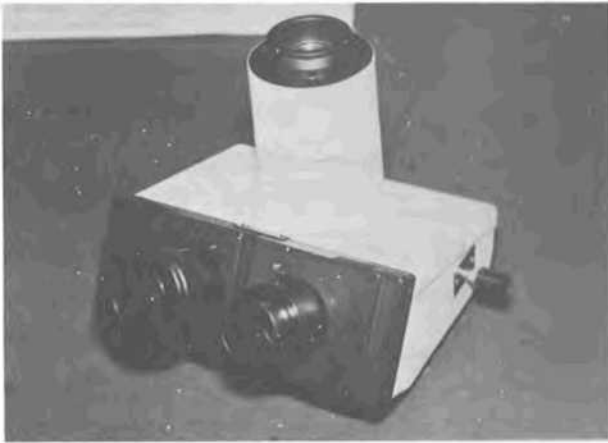


Fig. 12-1

12-1 Disassemble BH2-TR into B2-TRC unit and B2-BI unit.

For disassembly procedure, refer to 10-1-1 to 10-1-4.



Fig. 12-2

12-1-1 Detach Cover AB033200 by removing two Screws AB4x45SA and two Screws AB4x25SA. (See Fig. 12-2)

12-2 Disassemble B2-TRC unit as per the following procedures:

12-2-1 Remove light path Selector Shaft AB034300. The Shaft is screwed in and fixed with a small amount of Adhesive. Grasp the Shaft with a rubber sheet or similar material and unscrew it.

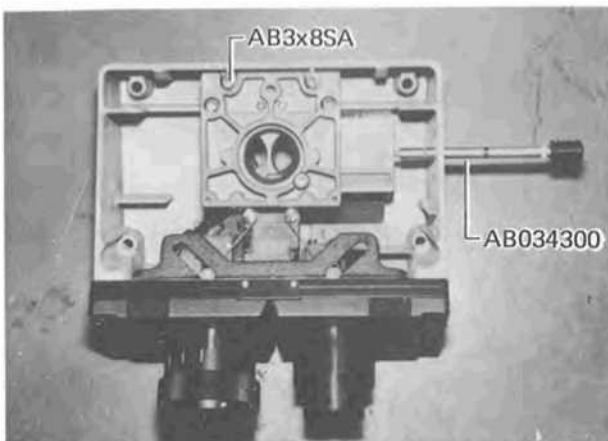
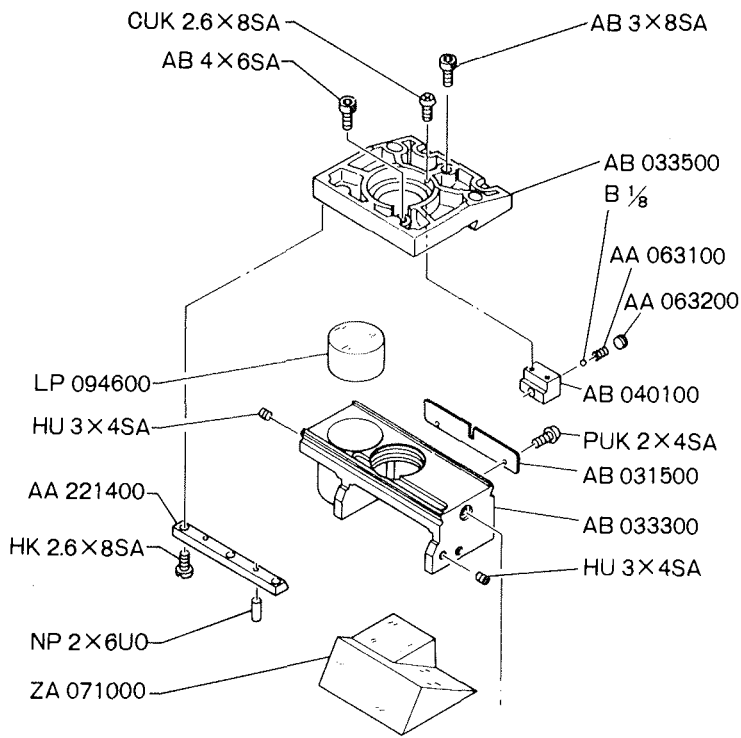


Fig. 12-3

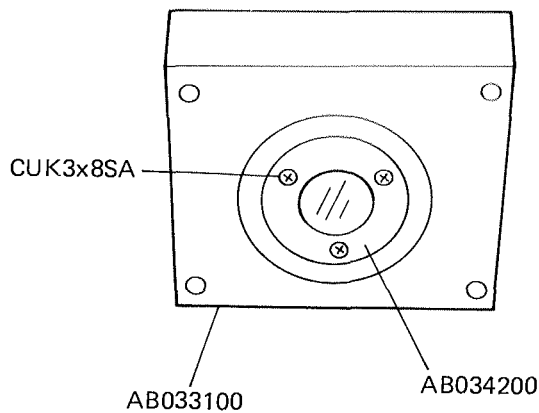
12-2-2 Dismount Dovetail AB033500 by removing four Screws AB3x8SA.

(See Fig. 12-3)



- 12-2-3 Remove Click Stop Assembly by removing Screw AA063200. Spring AA063100 and Ball B1/8 are removed together with the Screw.  
(See Fig. 12-4)
- 12-2-4 Remove Stopper AB4x6SA.  
(See Fig. 12-4)
- 12-2-5 Remove Prism Mount AB033300.  
(See Fig. 12-4)
- 12-2-6 Detach P8 LP094600 from Prism Mount AB033300 by removing Screw HU3x4SA.  
(See Fig. 12-4)
- 12-2-7 Detach Prism ZA071000 from Prism Mount AB033300 by removing two Screws HU3x4SA.  
(See Fig. 12-4)

Fig. 12-4



- 12-2-8 Detach Circular Dovetail AB034200 from Body AB033100 by removing three Screw CUK3x8SA.  
(See Fig. 12-5)
- 12-3 Disassemble B2-BI Unit.
- 12-3-1 For disassembly procedure, refer to 10-3 (Disassembly procedure for BH2-BI).

Fig. 12-5

### 13. ASSEMBLY PROCEDURE FOR BH2-TR

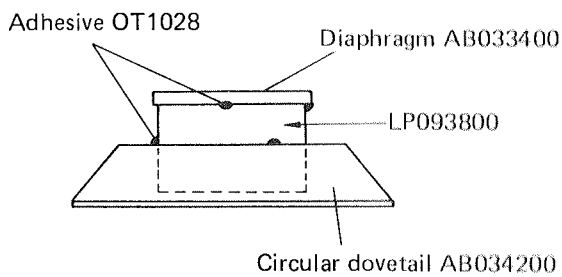


Fig. 13-1

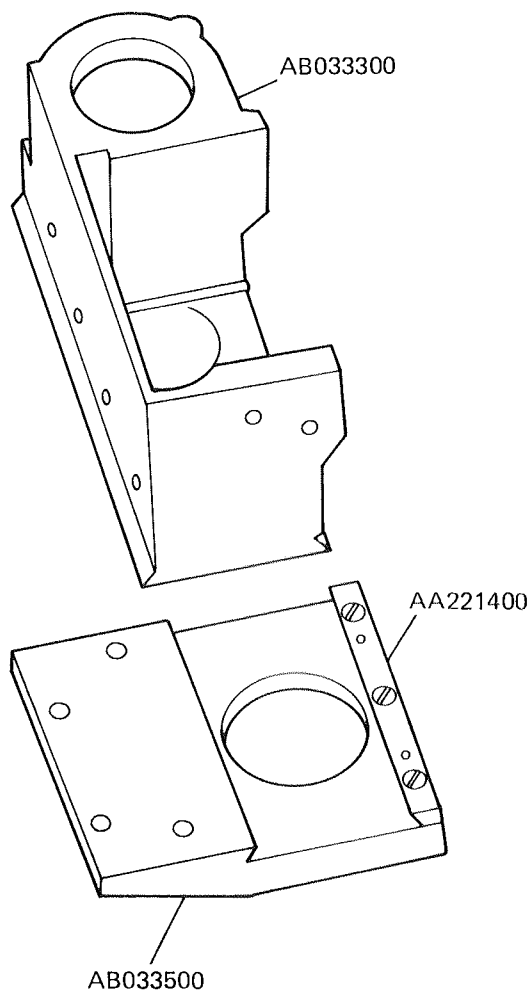


Fig. 13-2

#### 13-1 Assembly procedure for B2-BI unit

For assembly procedure for B2-BI unit, refer to 11-1.

For optical alignment procedure, refer to 11-2.

#### 13-2 Assembly procedure for B2-TRC Unit

13-2-1 Assemble P1 LP093800 into Circular Dovetail AB034200 by applying Adhesive OT1028 at three points.

(See Fig. 13-1)

13-2-2 Assemble Diaphragm AB033400 in position by applying Adhesive OT1028 at three points.

(See Fig. 13-1)

#### NOTES:

1. P1 and the Diaphragm should be in flat contact.
2. The Adhesive should be applied after placing P1 and the Diaphragm in position respectively.
3. Cement prism and diaphragm together with 3 dabs of adhesive.

13-2-3 Temporarily assemble Circular Dovetail unit on Body AB033100 with three Screws CUK3x8SA.

13-2-4 Assemble light path selector unit in position in the procedures given below:

- a) Assemble Dovetail AA221400 with Dovetail AB033500 by tightening two Screws HK2.6x8SA.
- b) Assemble Prism Mount AB033300 with Dovetail AB033500 (apply Grease OT-2008). (See Fig. 13-2)
- c) Assemble Stopper AB4x6SA with Dovetail AB033500.
- d) Assemble Plate AB031500 with Prism Mount AB033300 by tightening four Screws PUK2x4SA.
- e) Assemble Click Mount AB040100 with Dovetail AB033500 by tightening two Screws CUK2.6x8SA.
- f) Assemble Ball B1/8, Spring AA063100 and Screw AA063200 to Click Mount AB040100.

#### NOTES:

Apply Grease OT2008 to the Ball before inserting it in position.



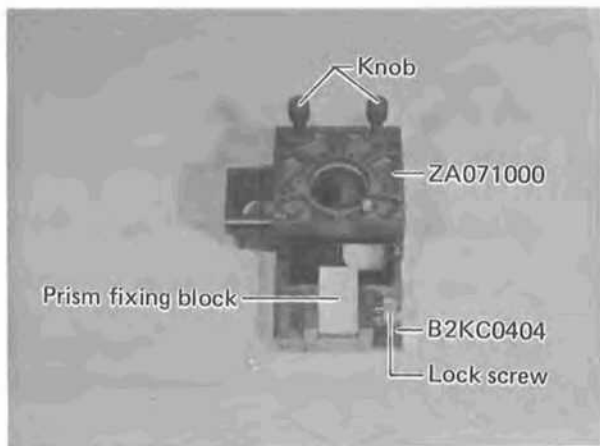


Fig. 13-3

- g) Adjust operation of the click by moving screw AA063200 in or out.
- h) After placing Prism Mount AB033300 and Dovetail AB033500 on Positioning Jig B2KC0404, clamp them by tightening the two knobs located on the Jig.
- i) Insert Prism ZA071000 into Prism Mount AB033300. After turning the Prism Clamp located on the Jig to the prism side, push the Prism into the Prism Mount and tighten the lock screw on the Jig.
- j) Tighten two Screws HU3x4SA located on the Prism Mount.
- k) Remove the Prism Mount unit from the Jig and apply a small amount of Adhesive OT1028 at four points (same place where Adhesive was applied before disassembly).
- l) Assemble Prism LP094600 as per following:

- (1) Drop Prism LP094600 into the Prism Mount.
- (2) Apply Adhesive Agent OT1131 to the tip of Screws HU3x4SA and then tighten the screws.  
Remove Jig B2KC0404. After confirming tightened condition, apply Shellac OT1131 to each screw.
- (3) Assemble the light path selector unit with Body AB033100 by using four Screws AB3x8SA.

(See Fig. 13-4)

- (4) Assemble Knob AB034400 with Shaft AB034300 (apply Adhesive OT1126).
- (5) Assemble Shaft AB034300 with the Body (apply Adhesive OT1126).

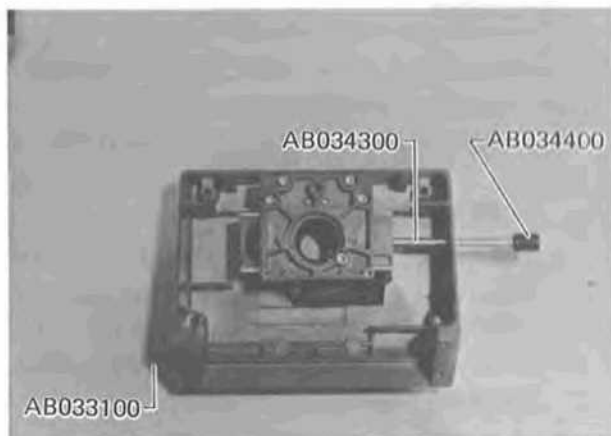


Fig. 13-4

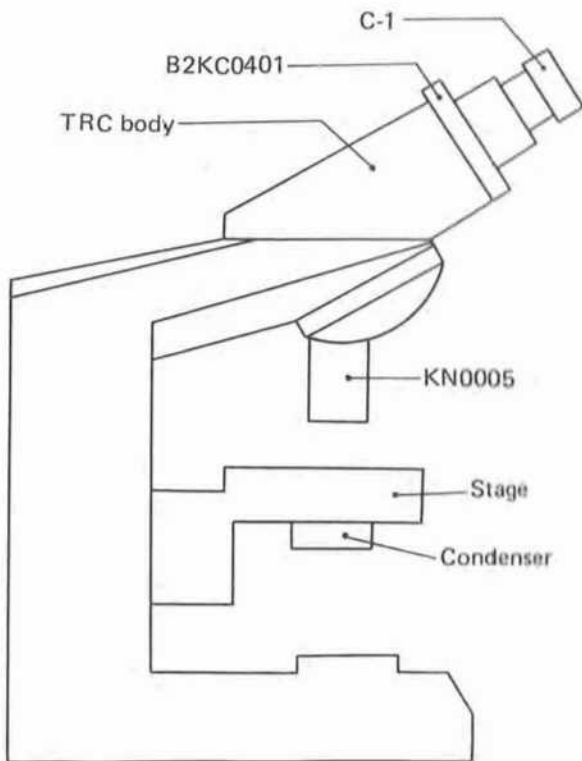


Fig. 13-5

13-3 Center the prism in the following procedures:  
Assemble the following Jigs, and B2-BI, B2-TRC Units on the Microscope Stand.

Standard objective: KN0005  
10x eyepiece with cross hair: C-1  
(See Fig. 13-5)

**NOTE:**

Assemble B2-BI Unit with B2-TRC Unit, refer to 11-3-5 a).

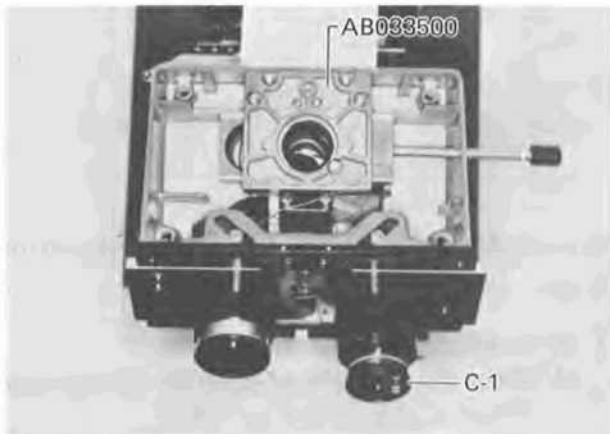


Fig. 13-6

13-3-1 Insert C-1 to right side Eyepiece sleeve.

13-3-2 Adjust position of Dovetail AB033500 until C-1 is centered with the center cross hair on KN0005. (See Fig. 13-6)

13-3-3 Check Shaft AB034300 movement. If it shows too much friction, adjust position of Cover AA581100.

13-3-4 When optical alignment is impossible, check Prism ZA071000 and Circular Dovetail AB-034200 for their positions.

13-3-5 Insert C-1 into left Eyepiece sleeve, and check that the deviation of the left eyepiece axis is within two divisions, if any, from the right eyepiece axis.

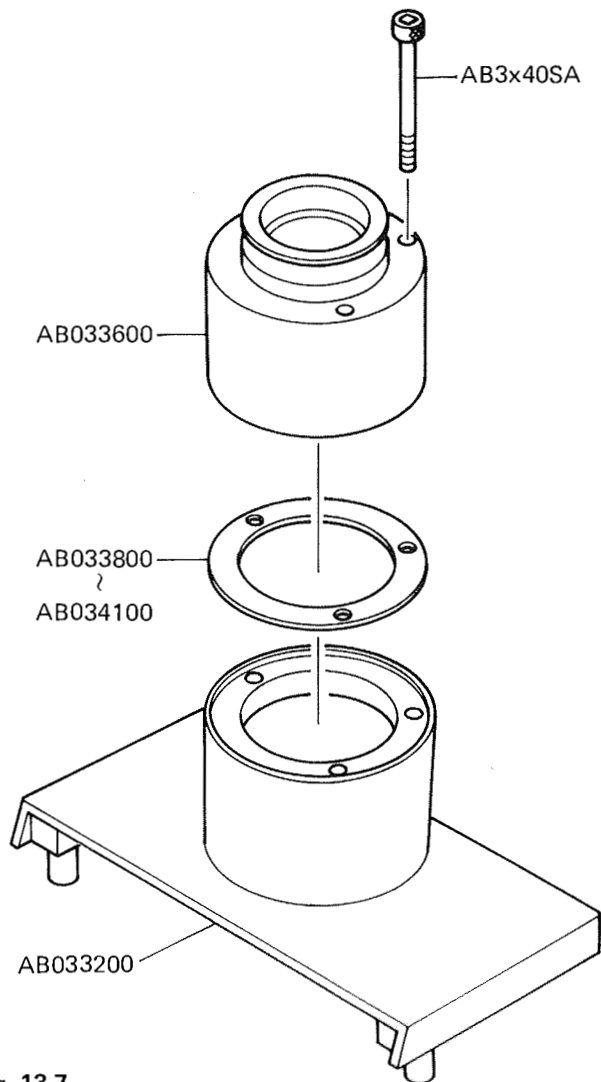


Fig. 13-7

#### 13-4 Adjust tube length B2-BI Unit

For the procedure to adjust tube length, refer to 11-5.

#### 13-5 Assemble the Phototube Unit in the procedure given below:

13-5-1 Assemble Washers (to be selected from among AB033800 through AB034100) and Mount AB033600 with Cover AB033200 by using three Screws AB3x40SA.

(See Fig. 13-7)

13-5-2 Assemble the Phototube Unit with the body by using two Screws AB4x45SA and two Screws AB4x25SA.

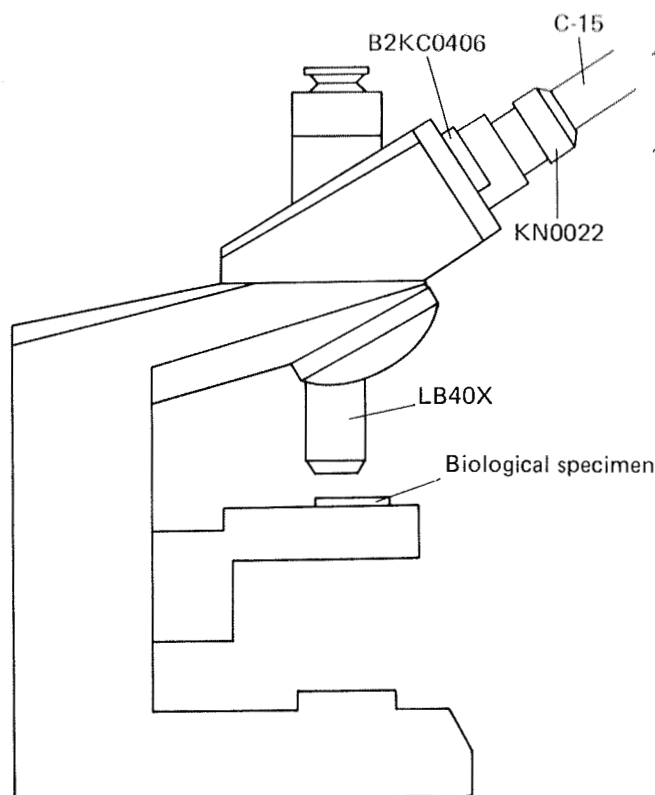


Fig. 13-8

#### 13-6 Optical alignment and parfocality alignment for Phototube Unit

##### 13-6-1 Parfocality alignment

- a) Place the following Jigs on the Microscope Stand as shown in Fig. 13-8:
  - B2KC0406: Interpupillary distance jig
  - KN0022: Special WF10x
  - C-15: Focusing magnifier
- Biological specimen
- LB40x objective
- b) Carry out steps b) and c) of 11-5-1 (given for BH2-BI)
- c) Bring the specimen into focus by turning the Fine Adjustment Knob.
- d) Place KN0022 and C-15 into the Phototube.
- e) Move the front lens portion of KN0022 until the specimen is brought into focus and read indication on the scale.

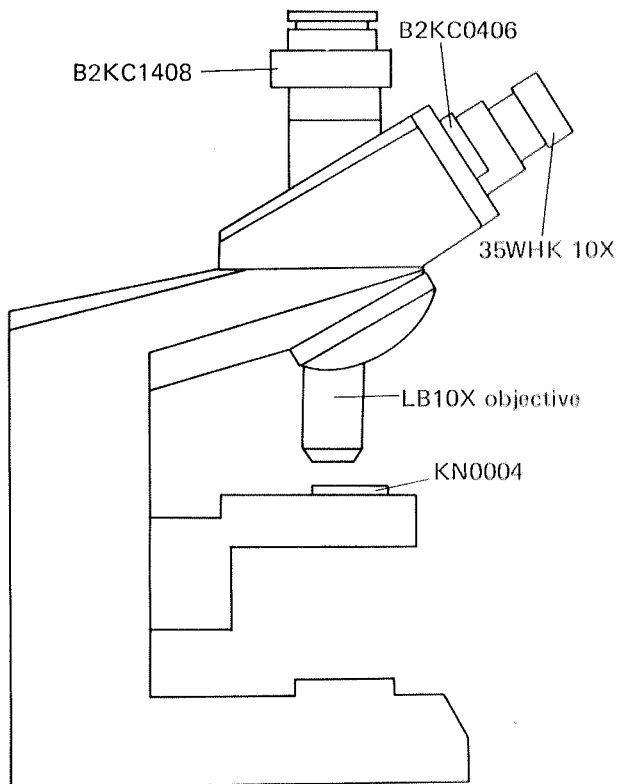


Fig. 13-9

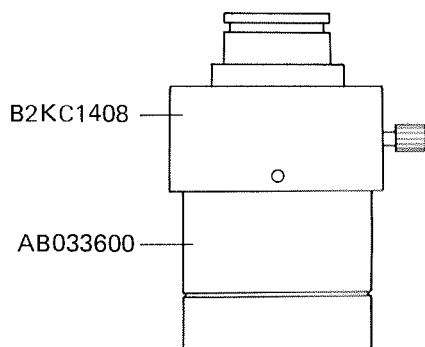


Fig. 13-10

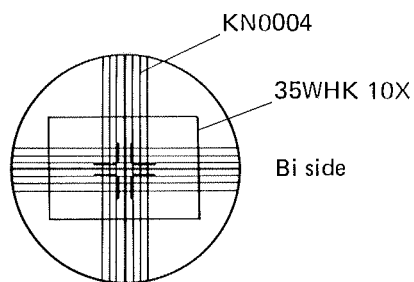


Fig. 13-11

- f) If deviation exceeds 1 division on the scale of KN0022, adjust Washers (selected from among AB033800 through AB034100) for proper focusing.  
 STANDARD:  
 0.1mm on the phototube side taking the right side of BI as STANDARD (Within  $\pm 1$  division on the scale of KN0022).

#### 13-6-2 Optical alignment

- a) Place BH2-TR and the following Jigs on the Microscope Stand as shown in Fig. 13-9:  
 B2KC0406: Interpupillary distance jig  
 B2KC1048: Alignment jig  
 KN0004: Test plate  
 35WHK 10x: Focusing eyepiece  
 LB10xobjective.

(See Fig. 13-9)

- b) Clamp B2KC1408 on Phototube AB033600 with mark "•" on the latter matched with mark "o" on the former.  
 (See Fig. 13-10)  
 Rotate the front lens portion of Alignment Jig B2KC1408 until the image of the cross hairs is brought into focus.

- c) Insert 35WHK10x into the right side Eye-piece Sleeve of BI unit. Shift KN0004 on the stage until the center cross hair of KN0004 is aligned with the double cross hair of 35WHK10x.

(See Fig. 13-11)

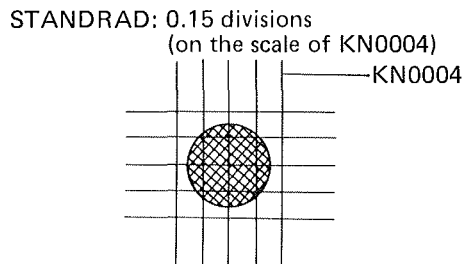


Fig. 13-12

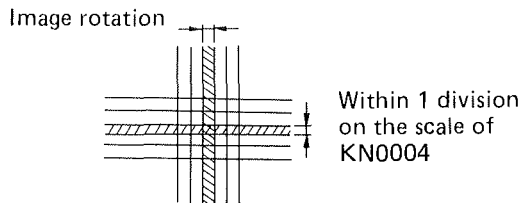


Fig. 13-13

- d) Correct point centration and image rotation of B2KC1408 on the Phototube side by adjusting position of Phototube AB033600.

**NOTES:**

1. The center should be adjusted within 1.5 divisions on the scale of KN0004. (See Fig. 13-12)

2. Image rotation should be corrected within 1 division on the scale of KN0004. (See Fig. 13-13)

13-7 Overall Checks

13-7-1 Checks on BI side.

Refer to 11-6 given for BH2-BI unit.

13-7-2 Checks on Phototube side

a) Eccentricity

Within 0.15 on the Phototube side taking the right side of BI unit as standard.

Refer to Fig. 13-12 (allowable decentration).

b) Image rotation with regard to the right side of BI unit Refer to Fig. 13-13 (allowable rotation).

c) Parfocality

Within  $\pm 0.1$ mm taking the right side of BI unit as standard.

Refer to Fig. 13-7.

**NOTE:**

For readjustment procedures of the individual items, reference should be made to 13-1 through 13-6 (assembly procedures).

## 14. DISASSEMBLY PROCEDURE FOR BH2-SV

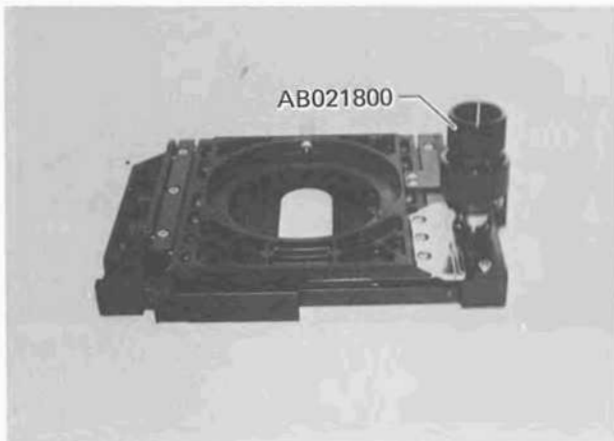


Fig. 14-1

14-1 Disassemble the Vertical Control Knob Unit in the procedure given below:

14-1-1 Remove Knob AB021800 by loosening two Screws ACU2.6x10SA and then turning the Knob counterclockwise.

(See Fig. 14-1)

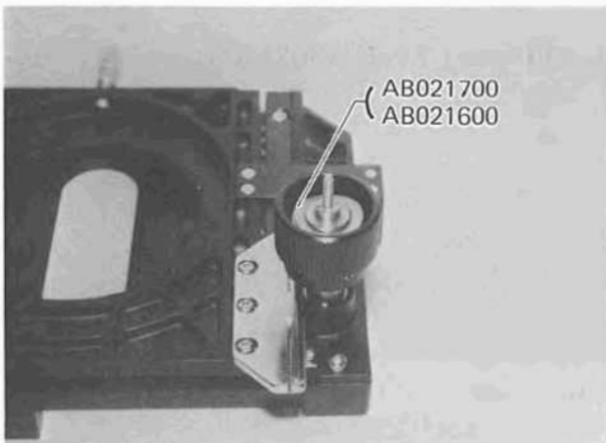


Fig. 14-2

14-1-2 Remove Spring AB021700 and Plastic Washer AB021600. (See Fig. 14-2)

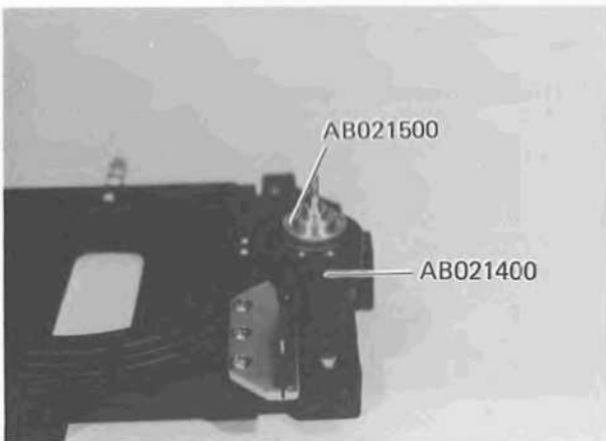


Fig. 14-3

14-1-3 Loosen two Screws ACU2.6x5SA on Knob AB021400 and then remove it by turning clockwise. (See Fig. 14-3)

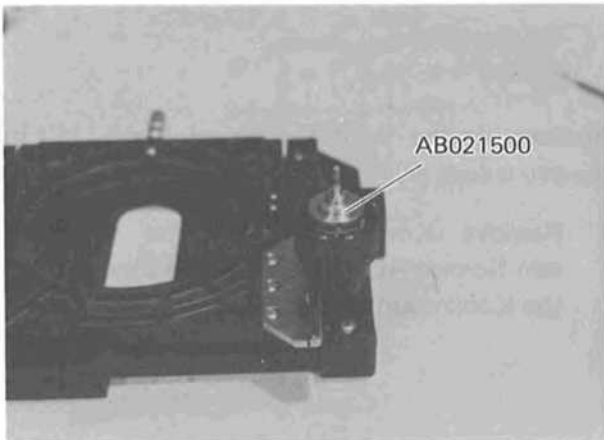


Fig. 14-4

- 14-1-4 Loosen Screw ACU2.6x5SA on Nut AB-021500 and then remove nut by turning counterclockwise.

(See Fig. 14-4)

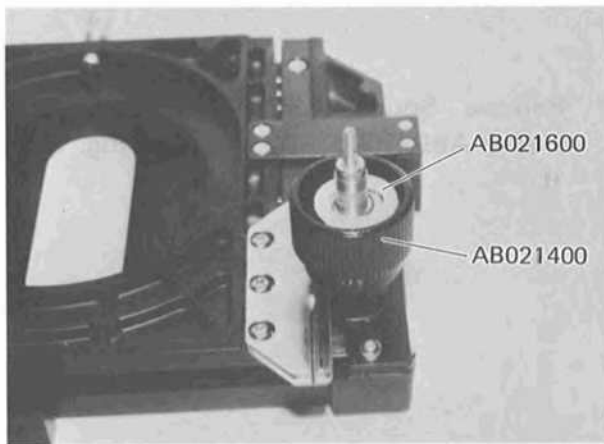


Fig. 14-5

- 14-1-5 Remove Plastic Washer AB021600 and Spring AB021700.

(See Fig. 14-5)

- 14-1-6 Dismount Knob AB021400 and Pinion AB-021100.

(See Fig. 14-5)

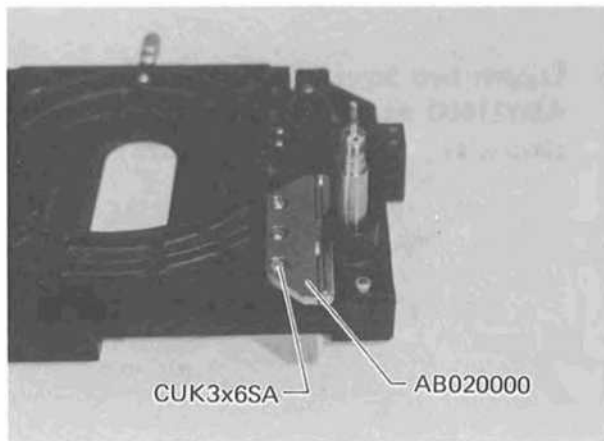


Fig. 14-6

- 14-1-7 Detach Vertical Rack AB020000 by removing three Screws CUK3x6SA.

(See Fig. 14-6)

- 14-1-8 Remove Plastic Washer AB021200.

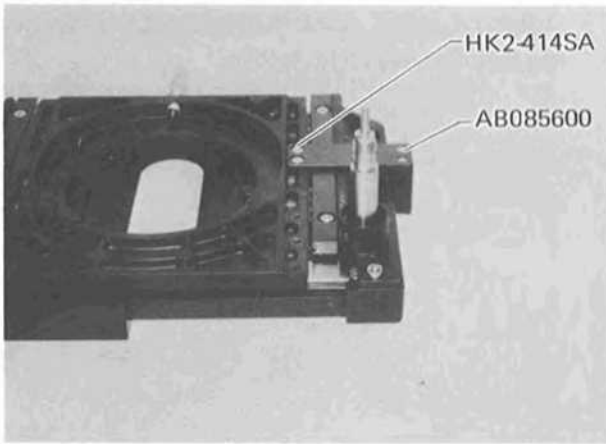


Fig. 14-7

14-1-9 Dismount Vernier Scale Mount by removing two Screws HK2-414SA.

(See Fig. 14-7)

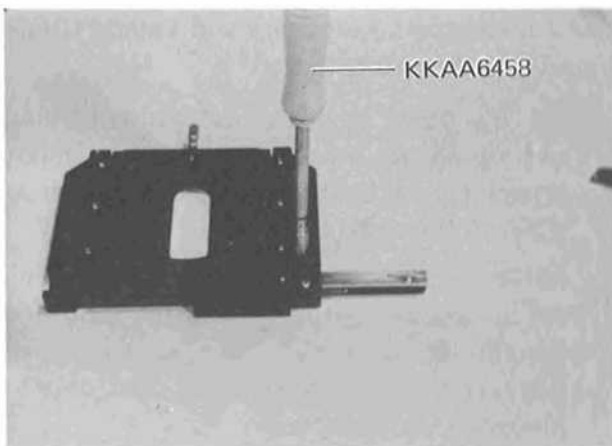


Fig. 14-8

14-1-10 Remove Nut NN4SA by using Tool KKAA-6458.

(See Fig. 14-8)

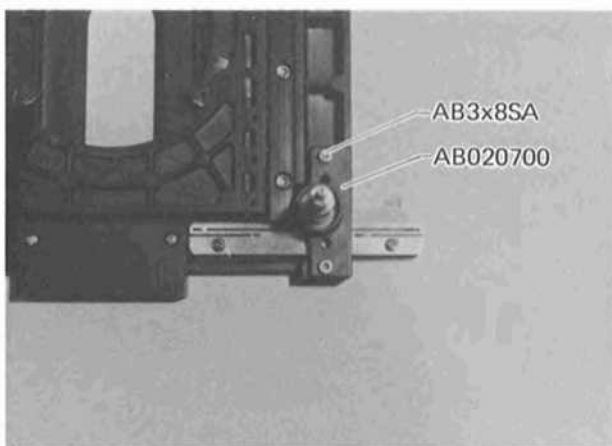


Fig. 14-9

14-1-11 Dismount Knob Mount AB020700 by removing two Screws AB3x8SA.

(See Fig. 14-9 )

14-1-12 Remove Pinion AB020900 from Knob Mount AB020700.



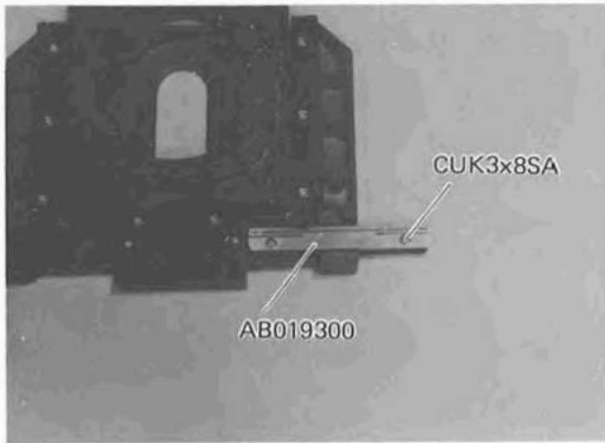


Fig. 14-10

14-1-13 Detach Lateral Rack AB019300 by removing two Screws CUK3x8SA.

(See Fig. 14-10)



Fig. 14-11

14-2 Disassemble the Lower Stage and Lateral Guide in the following procedures:

14-2-1 Set the Stage against a box or something else, good to support the Stage without scratching the Stage surface, in a manner as shown in Fig. 14-11.

**NOTE:**

No particular Jig is implied in the following description, although a special Jig, called Support Frame B2KC0505, is used only in photo for your reference.

(See Fig. 14-11)

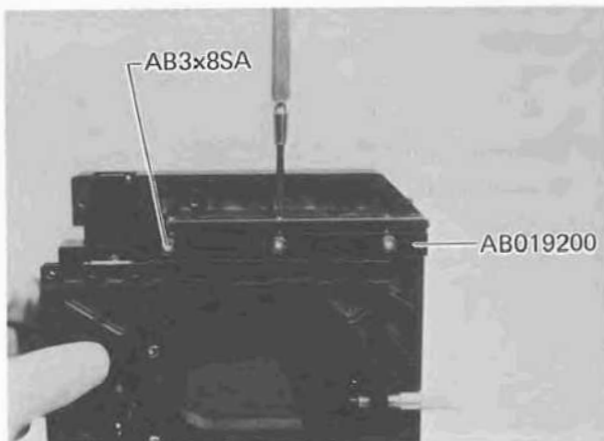


Fig. 14-12

14-2-2 Loosen three adjusting Screws HU3x6SA.  
(See Fig 14-12)

14-2-3 Dismount Vertical Guide AB019200 by removing three Screws AB3x8SA.  
(See Fig. 14-12)

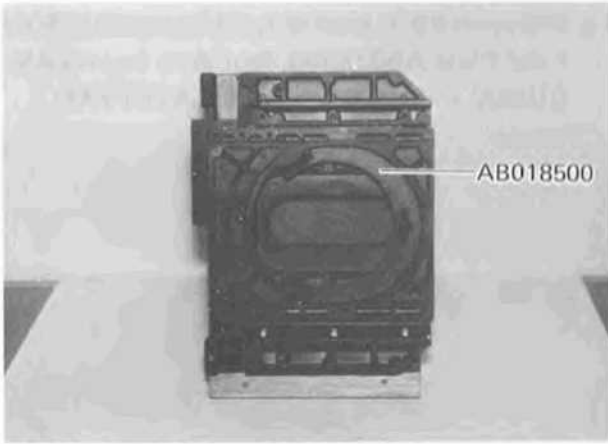


Fig. 14-13

14-2-4 Remove eight Balls B3, Casing AB018800 and four Wire Guide AB019100.

(See Fig 14-13)

14-2-5 Dismount Lower Stage AB018500.

(See Fig. 14-13)

14-2-6 Remove eight Balls B3, Casing AB018800 and four Wire Guides AB019100.

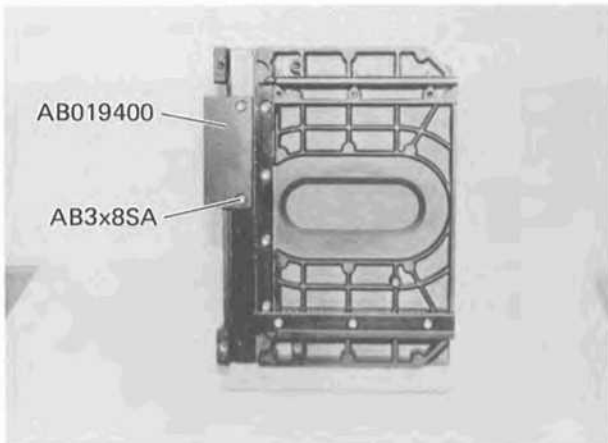


Fig. 14-14

14-2-7 Dismount Clip Holder AB019400 by removing two Screws AB3x8SA.

(See Fig. 14-14)

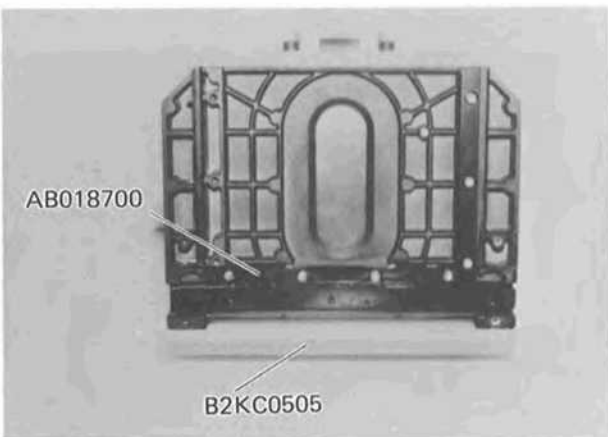


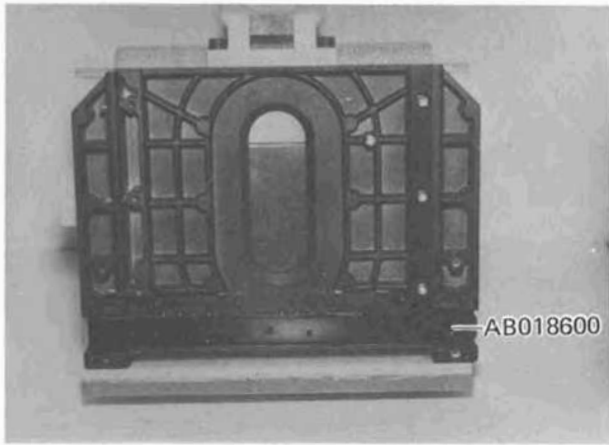
Fig. 14-15

14-2-8 Set up the Stage in a manner as shown in Fig. 14-15.

(See Fig. 14-15)

14-2-9 Dismount Lateral Guide AB018700 by removing four Screws AB3x6SH.

(See Fig. 14-15)



**Fig. 14-16**

14-2-10 Remove eight Balls B3, Casing AB018800, Feed Plate AB018600, four Wire Guides AB018900 and four Wire Guides AB019000.

## 15. ASSEMBLY PROCEDURE FOR BH2-SV

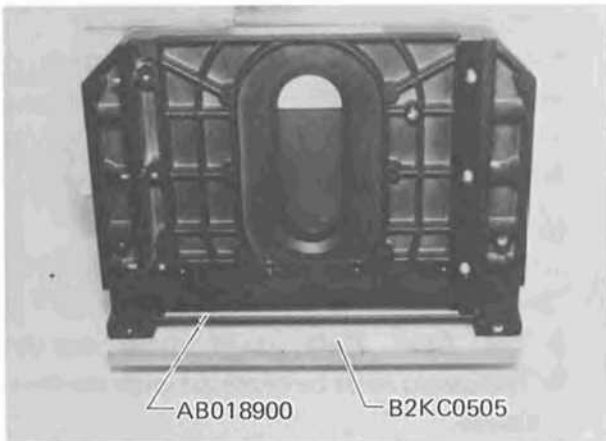


Fig. 15-1



Fig. 15-2

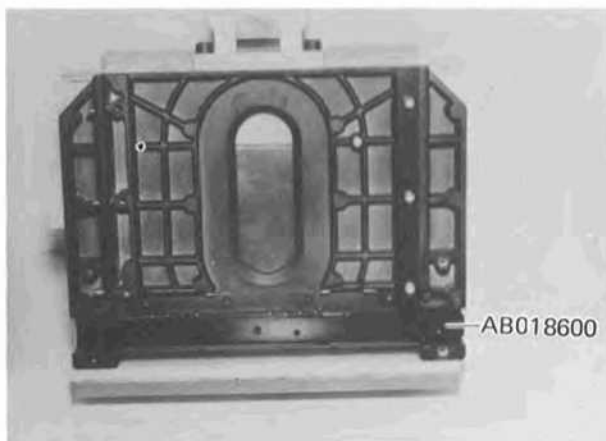


Fig. 15-3

### 15-1 Assembly of Lateral Ball Guide Unit

15-1-1 Set up the Stage in a manner as shown in Fig. 15-1. (See Fig. 15-1)

15-1-2 Mount two Wire Guides AB018900. (See Fig. 15-1)

15-1-3 Mount Casing AB018800 and eight Balls B3 which are preliminarily coated with Grease OT2008. (See Fig. 15-2)

15-1-4 Place two Wire Guides AB019000 on Feed Plate AB018600 and mount them. (See Fig. 15-3)

15-1-5 Mount two Wire Guides AB019000.

15-1-6 Mount Casing AB018800.

15-1-7 Mount eight Balls B3 which are preliminarily applied with Grease OT2008. (See Fig. 15-3)

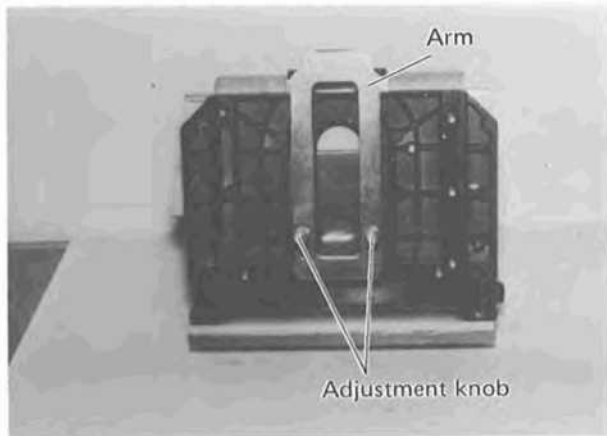


Fig. 15-4

15-1-8 Put two Wire Guides AB018900 on Lateral Guide AB018700 and assemble them temporarily by using four Screws AB3x6SH.  
(See Fig. 15-4)

15-1-9 Pressing down Lateral Guide AB018700 with two fingers, retighten four Screws AB3x6SH. Check the movements of Lateral Guide according to steps in NOTE below:

**NOTES:**

1. The Feed Plate must move smoothly without friction or play.
2. The Feed Plate must move lightly.
3. The casing must be centered with the Wire Guide.

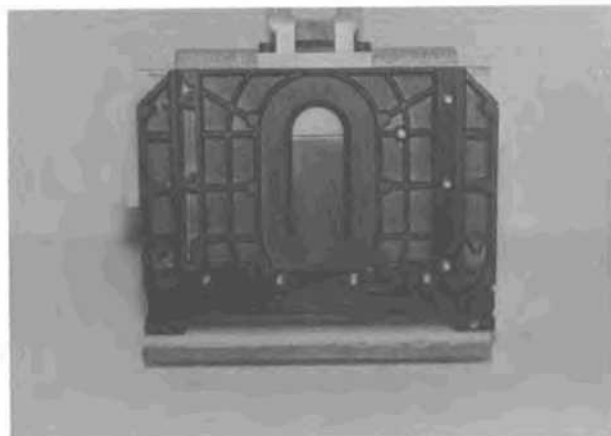


Fig. 15-5

15-1-10 Apply Adhesive OT1028 at three or four points on Lateral Guide AB018700 and Upper Stage.  
(See Fig. 15-5)

- a) Apply Shellac OT1131 to four Screws AB3x6SH to prevent them from loosening.  
(See Fig. 15-5)

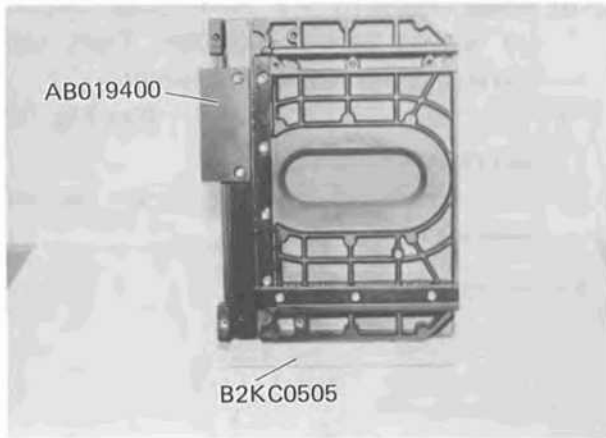


Fig. 15-6

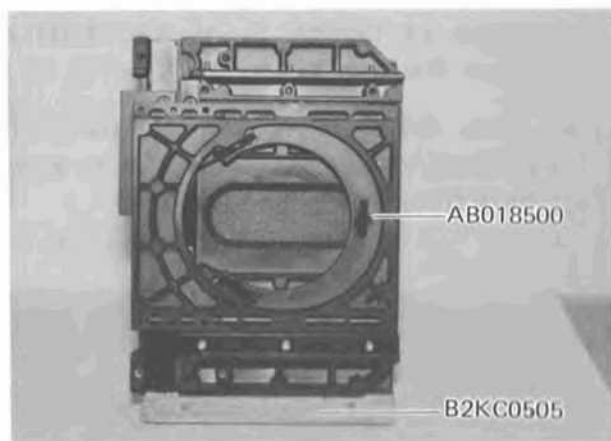


Fig. 15-7



Fig. 15-8

## 15-2 Assembly of Vertical Ball Guide unit

15-2-1 Set up the Upper Stage Unit as shown in Fig. 15-6.

15-2-2 Temporarily assemble Clip Holder AB-019400. (See Fig. 15-6)

15-2-3 Mount Wire Guide AB019100.

15-2-4 Place Casing AB018800 at the center of Wire Guide AB019100.

15-2-5 Apply Grease OT2008 to eight Balls B3 and mount them in position.

15-2-6 Attach Wire Guide AB019100 to Lower Stage AB018500 and clamp. (See Fig. 15-7)

15-2-7 Place Casing AB018800 at the center of Wire Guide AB019100.

15-2-8 Apply Grease OT2008 to eight Balls B3 and mount them on the Casing.

15-2-9 Place Wire Guide AB019100 on Vertical Guide AB019200 and assemble them temporarily. (See Fig. 15-8)

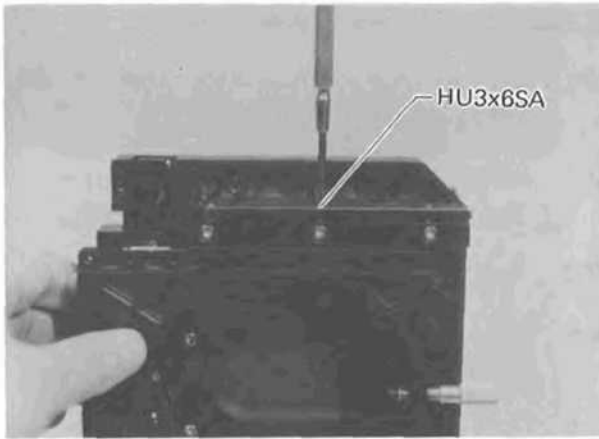


Fig. 15-9

15-2-10 While operating the Lower Stage, adjust it by turning Screw HU3x6SA. Then, clamp Vertical Guide AB019200 firmly.

(See Fig. 15-9)

**NOTES:**

The Lower Stage must move smoothly, without friction and play.

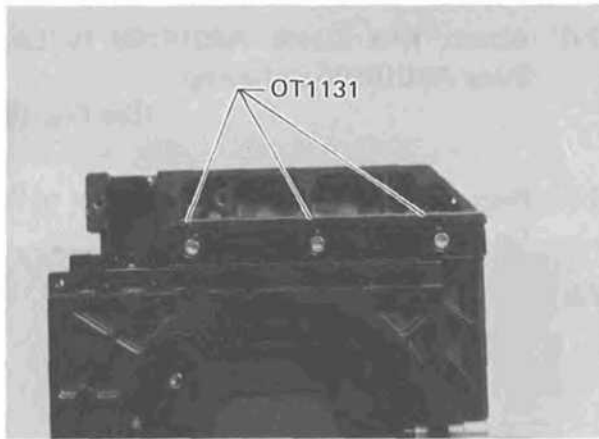


Fig. 15-10

15-2-11 Apply Adhesive OT1028 at three or four points on Vertical Guide AB019200 and Upper Stage.

(See Fig. 15-10)

15-2-12 Apply Shellac OT1131 to adjusting Screw HU3x6SA and Screw AB3x8SA to prevent them from loosening.

(See Fig.15-10)

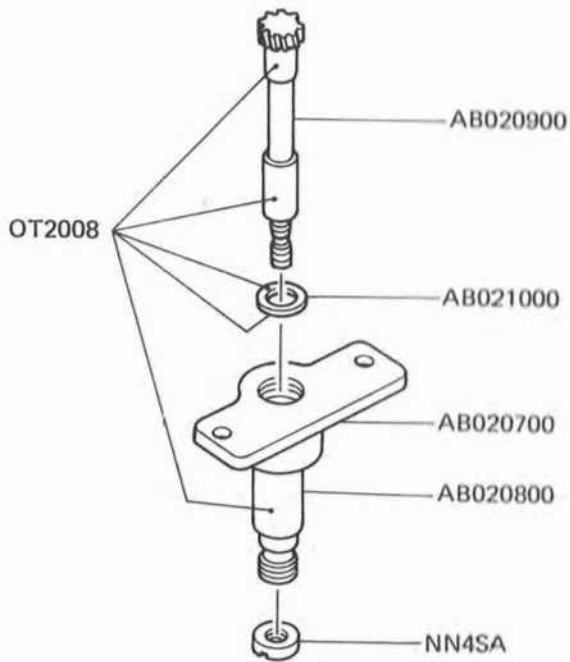


Fig. 15-11

15-3 Assemble the Vertical Control Knob unit as per the following:

15-3-1 Assemble the Knob Mount:

- a) Apply Grease OT2008 to each sliding surface.
- b) Assemble Washer AB021000 with Pinion AB020900.
- c) Temporarily assemble Nut NN4SA.

(See Fig. 15-11)

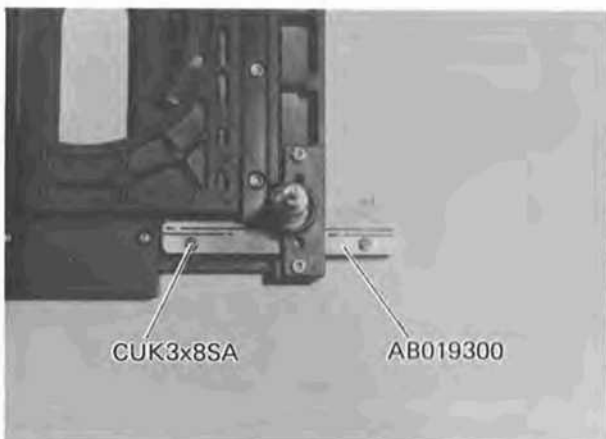


Fig. 15-12

15-3-2 Assemble the Knob Mount assembly with the stage:

- a) Apply a small amount of Adhesive OT-1127 to Screws AB3x8SA and tighten it.
- b) Position the Knob Mount assembly so as to be parallel with the side of the stage.

(See Fig. 15-12)

15-3-3 Temporarily assemble Lateral Rack AB-019300 by using two Screws CUK3x8SA.

(See Fig. 15-12)

**NOTE:**

The Lateral Rack must operate smooth with no thrust play.

15-3-4 Finally Tighten Nut NN4SA by using Tool KK6458.

**NOTE:**

The lateral rack must operate smoothly with no lateral play.



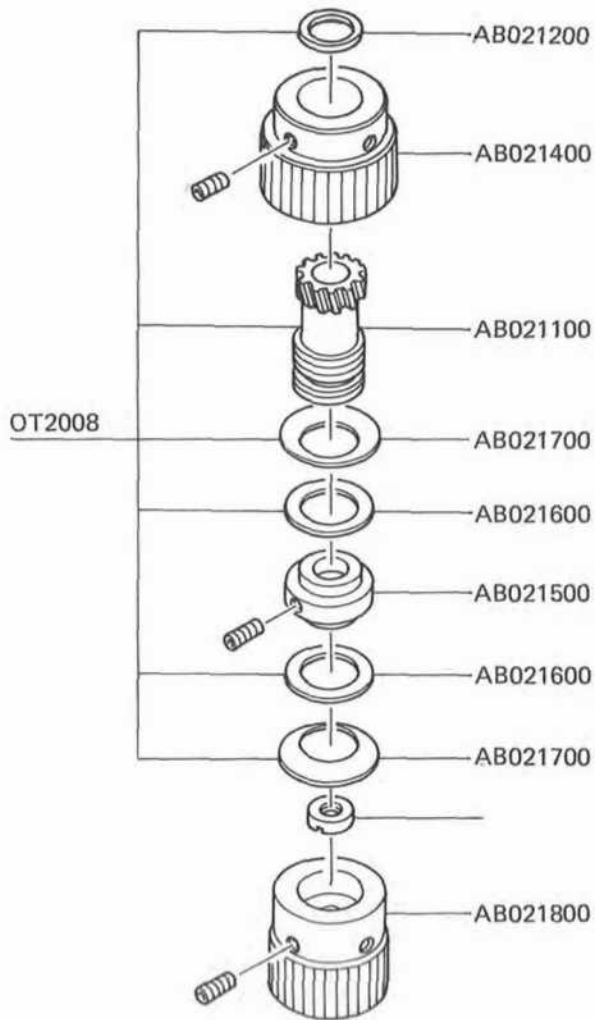


Fig. 15-13

- 15-3-5 Assemble Washer AB021200.
- 15-3-6 Mount Knob AB021400.
- 15-3-7 Assemble Pinion AB021100 in position.
- 15-3-8 Mount Washer AB021700 in position.
- 15-3-9 Mount Washer AB021600 in position.
- 15-3-10 Assemble Nut AB021500 in position by using Screw ACU2.6x5SA.
- 15-3-11 Mount Washer AB021600 in position.
- 15-3-12 Mount Washer AB021700 in position.
- 15-3-13 Assemble Knob AB021800 by using two Screws ACU2.6x10SA.  
(See Fig. 15-13)
- 15-3-14 Temporarily assemble Vertical Rack AB-020000 in position.
- 15-3-15 Temporarily assemble Vertical Vernier AB-019900.

**NOTE:**

Preliminarily apply Grease OT2008 to Washers and Pinion Shaft.



Fig. 15-14

15-4 Overall adjustment

15-4-1 Adjustment of Lateral Travel.

- a) Engage Pinion AB020900 with Lateral Rack AB019300.

**NOTE:**

Adjust position of the Rack so as to assure smooth motion without friction, play or unevenness the entire range.

- b) Adjust motion of the Rack:

Place the stage on the Microscope Stand.  
(See Fig. 15-14)

When motion is too heavy:

- (1) Loosen two Setscrews ACU2.6x10SA on Knob AB021800.
- (2) Turn Knob AB021800 counterclockwise and tighten two Screws ACU2.6x10SA.

When motion is too light:

- (1) Adjust by turning Knob AB021800 clockwise.

Measuring moving force with Tension Gauge OT1144.

(See Fig. 15-14)

STANDARD: 50 ~ 120 g

- c) After motion has been adjusted, engage the Pinion once again and check the Rack for smooth motion.

STANDARD

- Abnormal friction or play cannot be felt by hand.
- The rack is free from paly or "rolling".

NOTE:

If the Rack does not operate smoothly, repeat steps a) through c) above.

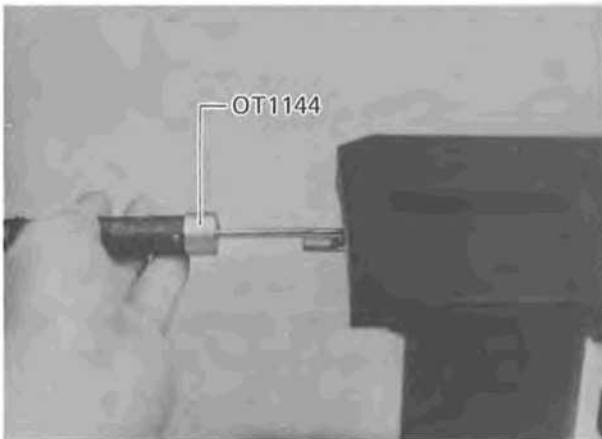


Fig. 15-15

#### 15-4-2 Adjustment of Vertical Travel

Adjust Vertical Travel in a manner quite similar to that for adjusting lateral travel.

(See Fig. 15-15)

Measure moving force with Tension Gauge OT1144.

STANDARD: 200 ~ 300 g

Moving condition: Same as that for lateral travel.



Fig.15-16

#### 15-4-3 Adjustment of Specimen Holder

- a) Place the stage on the Microscope Stand.
- b) Put Specimen Holder BH2-HR or BH2-HL on the stage.
- c) Measure the gap between the specimen holder and stage with Thickness Gauge OT0317. (See Fig. 15-16)

STANDARD:  $0.3 \pm 0.1$ mm

NOTE:

A special stage base and standard specimen holder are used in Fig. 15-16.

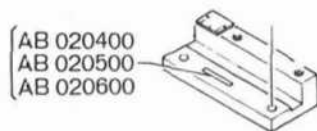


Fig. 15-17

- d) If the STANDARD is not met
- (1) When gap is wider than specified  
Adjust by inserting Spacer (AB0204 ~ AB0206) between Specimen Holder and stage.  
(See Fig. 15-17)
  - (2) If gap is narrower than specified  
remove Spacer. If it is still impossible to meet the STANDARD, replace the Specimen Holder with a new one.  
(See Fig. 15-17)

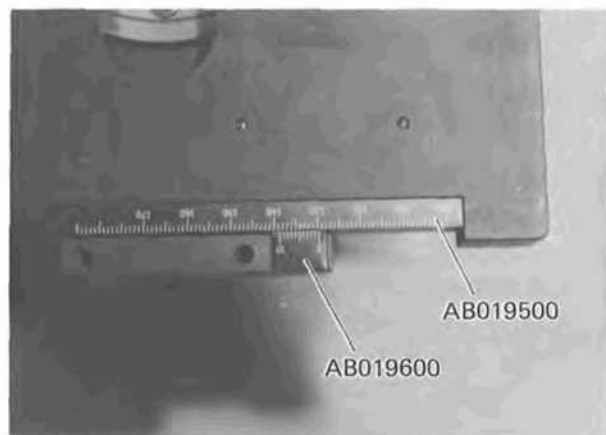


Fig. 15-18

- e) Adjust gap between Lateral Scale AB-019500 and Lateral Vernier AB019600.  
(See Fig. 15-18)
- (1) Adjust position of Clip Holder AB-019400.
  - (2) If the gap cannot be adjusted properly, detach lateral set it once again.  
STANDARD: 0.05 ~ 0.2mm



Fig. 15-19

- 15-4-4 Adjust gap between Vertical Scale AB-019800 and Vertical Vernier AB019900.  
(See Fig. 15-19)
- a) Adjust position of Plate AB085600.
  - b) If the gap cannot be adjusted properly, detach Lateral Vernier AB019900 and set it once again.  
STANDARD: 0.05 ~ 0.2mm

## 16. DISASSEMBLY AND ASSEMBLY PROCEDURES FOR BH2-HR

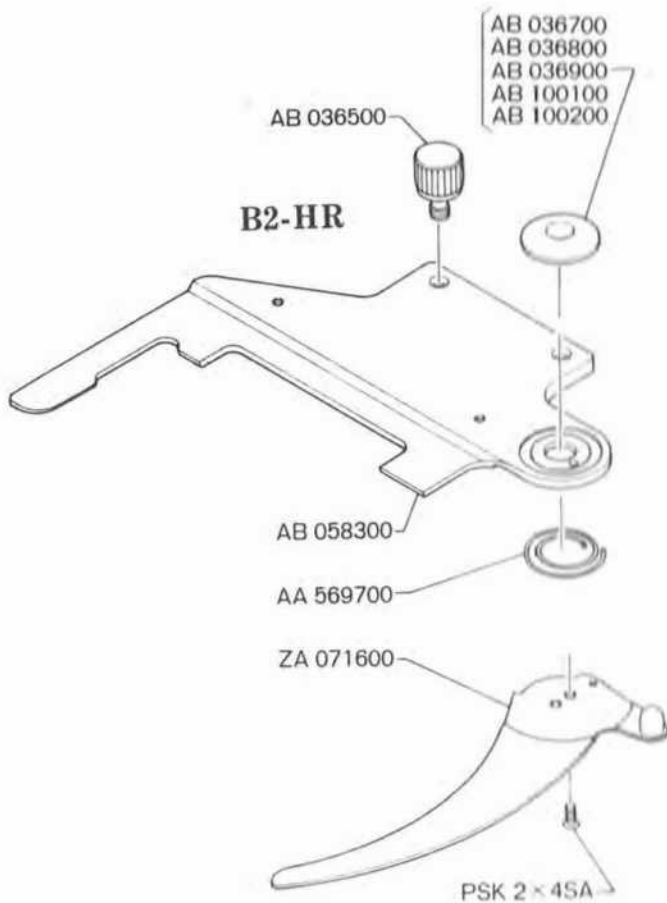


Fig. 16-1

### 16-1 Disassembly procedure (for BH2-HR)

(See Fig. 16-1)

16-1-1 Remove two Knobs AB036500.

16-1-2 Remove Clip ZA071600 (ZA071500 for BH2-HL)

- a) Remove two Screws PSK2x4SA.
- b) Remove Spiral Spring AA569700 (AA-584700 for BH2-HL)
- c) Remove Pin AB036700, AA036900.

### 16-2 Assembly procedure (for BH2-HR)

(See Fig. 16-1)

16-2-1 Attach Pin AB036700 ~ AB036900 to Holder AB058300.

16-2-2 Assemble Spiral Spring AA569700 and Clip ZA071600 in position by using two Screws PSK2x4SA.

16-2-3 If vertical play or friction is caused between Holder AB058300 and Clip ZA071600, select the pins AB036700 ~ AB036900 adequately.

16-2-4 Place Knobs AB036500 in position.

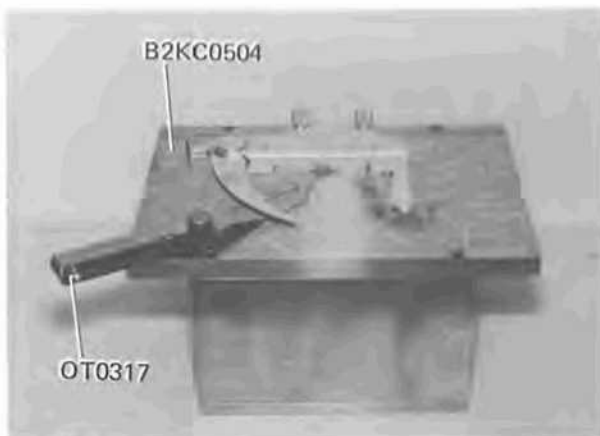


Fig. 16-2

16-2-5 Check gap between the top surface of the stage and Clip ZA071600 as follows:

- a) Clamp Specimen Holder B2-HR (HL) on the stage. Measure the gap between the top surface of the stage and Clip ZA071600 with Thickness Gauge OT0317.

(See Fig. 16-2)

STANDARD: 0.2 ~ 0.4mm

- b) If the STANDARD is not met, bend the clip for adjustment or replace the part with a new one.

#### NOTE:

A stage designed exclusively for adjustment is used in Fig. 16-2.

## 17. DESASSEMBLY PROCEDURE FOR BH2-AAC



Fig. 17-1

### 17-1 Disassembly of Diaphragm Unit

17-1-1 Dismount Circular Dovetail AB040800 by removing three Screws PUK2x6SA.

17-1-2 Remove Diaphragm Ring AB040700.

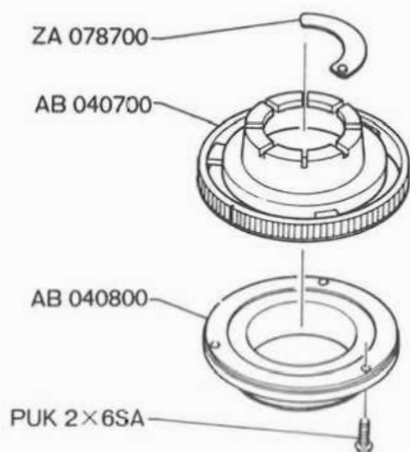


Fig. 17-2

17-1-3 Remove eight Diaphragm Blades ZA078700.  
(See Fig. 17-2)

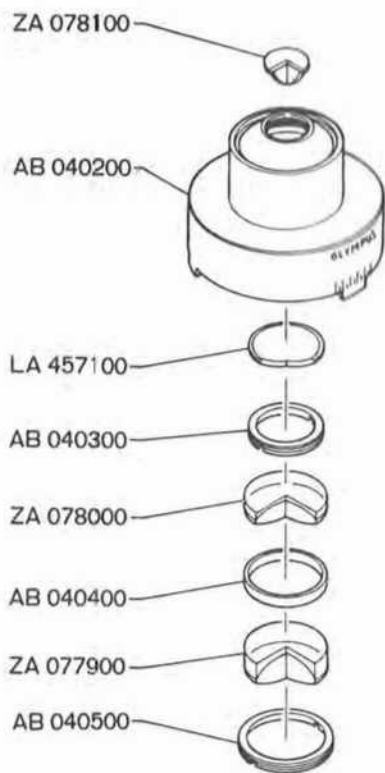


Fig. 17-3

## 17-2 Disassembly of Lens Unit

17-2-1 Remove Retainer AB040500 by using Adjustable Spanner OT0022.

17-2-2 Remove Lens ZA077900.

17-2-3 Remove Spacer AB040400.

17-2-4 Remove Lens ZA078000.

17-2-5 Remove Retainer AB040300 by using Adjustable Spanner OT0022.

17-2-6 Remove Lens ZA078100.

(See Fig. 17-3)

### NOTES:

1. Lens ZA078100 should not be removed unless it must be replaced with a new one.
2. Lens ZA078100 is cemented to Condenser Frame AB040200 and extreme care must be taken when removing it.

## 18. ASSEMBLY PROCEDURE FOR BH2-AAC

18-1 Assemble Front Lens ZA078100 with Condenser Body AB040200 as follows:

(See Fig. 18-1)

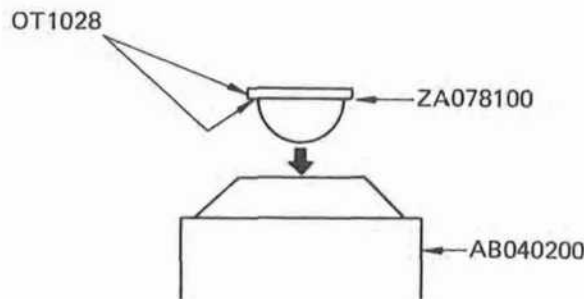


Fig. 18-1

18-1-1 Apply Adhesive OT1028 to Front Lens ZA078100 and put in Condenser Body AB040200.

- a) Apply the Adhesive to the entire circumference since it serves also as sealing between the Condenser Body and Lens.
- b) Wipe off excessive Adhesive.

18-1-2 Place the Condenser Body upside down and let it dry for 24 hours.

18-2 Assemble Lens LA457100 in position.

Tighten Retainer AB040300 by using Adjustable Spanner OT0022. (See Fig. 17-3)

18-3 Put Lens ZA078000 in position.

(See Fig. 17-3)

18-4 Put Spacer AB040400 in position.

(See Fig. 17-3)

18-5 Put Lens ZA077900 in position.

(See Fig. 17-3)

18-6 Assemble Retainer AB040500 in position by using Adjustable Spanner OT0022.

(See Fig. 17-3)

18-7 Assemble eight Diaphragm Blades ZA078700 in position.

### NOTE:

For assembly, the Blades should be placed in the cage in a clockwise sequence, as shown in Fig. 18-2.

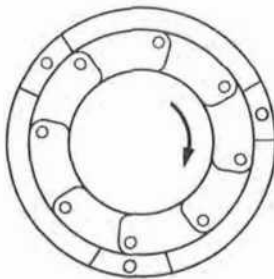


Fig. 18-2

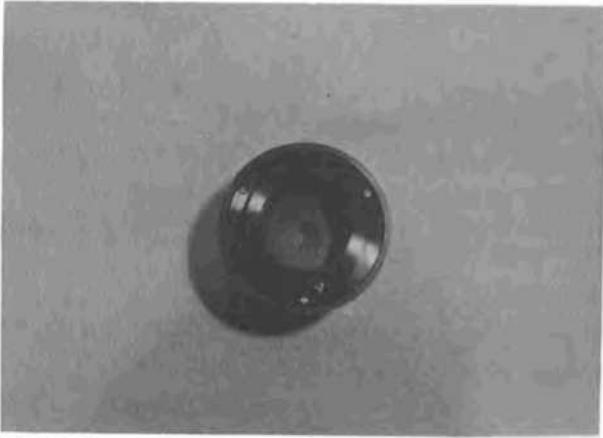


Fig. 18-3

18-8 Assemble Diaphragm Ring AB040700 in position.

**NOTE:**

When the Diaphragm is stopped down, its diameter should be about 1mm.

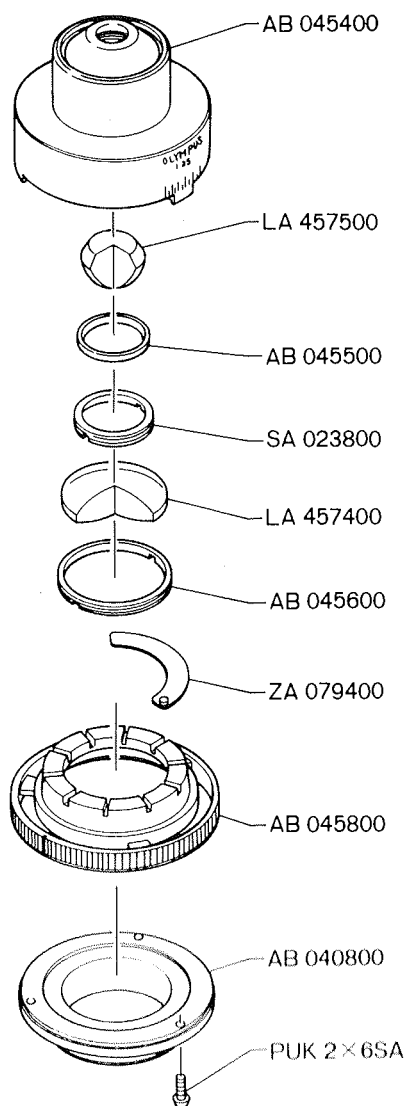
(See Fig. 18-3)

18-9 Assemble Circular Dovetail AB040800 by using three Screws PUK2x6SA.

18-10 Check BH2-AAC for its proper operation.



## 19. DISASSEMBLY AND ASSEMBLY PROCEDURE FOR BH2-CD



### 19-1 Disassembling procedure

Procedures for disassembly BH2-CD are quite similar to those for disassembly BH2-AAC.

(See Fig. 19-1)

### 19-2 Assembling procedure

Procedures for assembly BH2-CD are quite similar to those for assembly BH2-AAC.

(See Fig. 19-1)

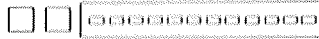
Fig. 19-1

## 20. CHECK SHEET FOR POWER SUPPLY B-BDS-2

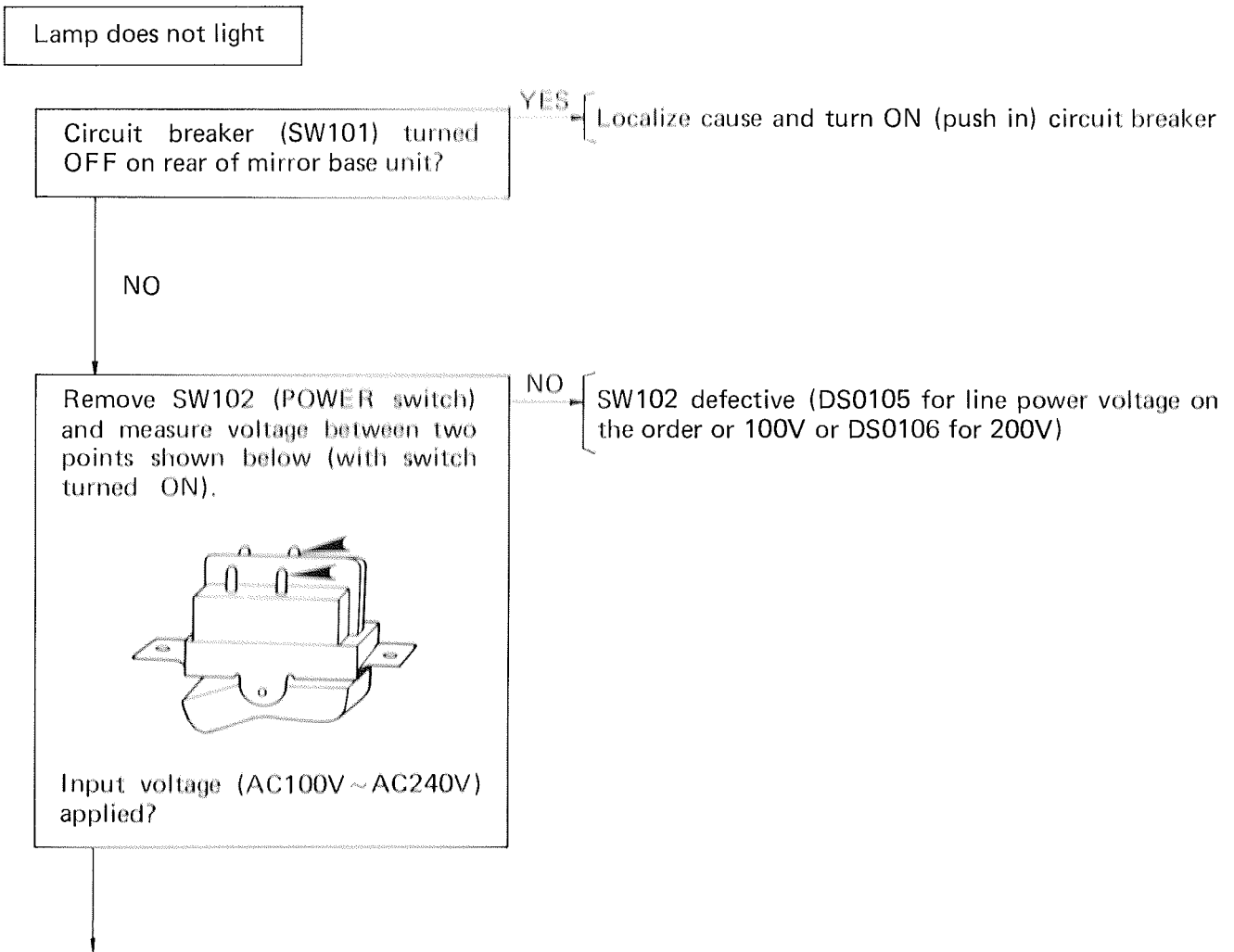
**NOTE:** For circuitry and connection, refer to the attached diagrams.

### 1. Check Standard

Check Item	Specification	Check Procedure and Condition
(1) Maximum output	11.7 ± 0.05V	Measuring point: Lamp socket, house Measuring instrument: Thermocouple type class 0.5 or higher
(2) Minimum output	3V or less	Same as (1) above.
(3) LED lighting voltage	Let us designate LEDs as a, b and c in the left-right direction. a: Always lit (pilot) b: Lit at 4.5 ± 0.3V c: Lit at each segment lighting voltage $\begin{matrix} +2\% \\ -8\% \end{matrix}$	Same as (1) above. Voltages at check points for C shall be 6, 8, 10 and 12V.



### 2. Troubleshooting Flow Chart



YES

Turn OFF SW102 and check electrical continuity between the two points in the same procedures.

NO

- SW103 defective (DS0095 for line power voltage on the order of 100V or DS0096 for 200V)
- F101 (built in fuse) blown (DE0082 for line power voltage on the order of 100V or DF0083 for 200V)
- Primary wiring of T102 (main transformer) broken (DT0123 for line power voltage on the order of 100V or DT0124 for 200V)

YES

Check connector pins for applied voltages:

- (1) AC 7V across pins No. 3 and No. 5 on J301 (with mark "J1") of UYPC64?
- (2) AC 100V or 115V (AC 220V or 240V) across pins No. 1 and No. 2 on J301 (with mark "J1") of UYPC56?

NO

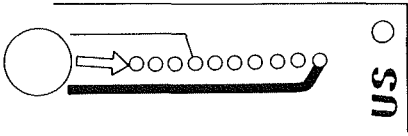
- (1) When AC 7V is not applied:  
Secondary winding of T102 broken
- (2) When AC 100 ~ 240V is not applied:  
Primary winding of T101 broken (DT0105 for line power voltage on the order of 100V or DT0106 for 200V)

YES

UYPC64 or UYPC65 defective  
LEDs do not glow

Check connector pins for applied voltages:

- (1) AC 30V across pins No. 6 and No. 8 on J201 (J1) or UYPC-65?



The diagram shows a horizontal row of seven circular pins. A lamp symbol is connected to the first pin on the left. The letters 'US' are printed vertically to the right of the pins.

- (2) AC 0 ~ 12V (lamp voltage) across pins No. 9 and No. 10 on J201 (J1) or UYPC65?

NO

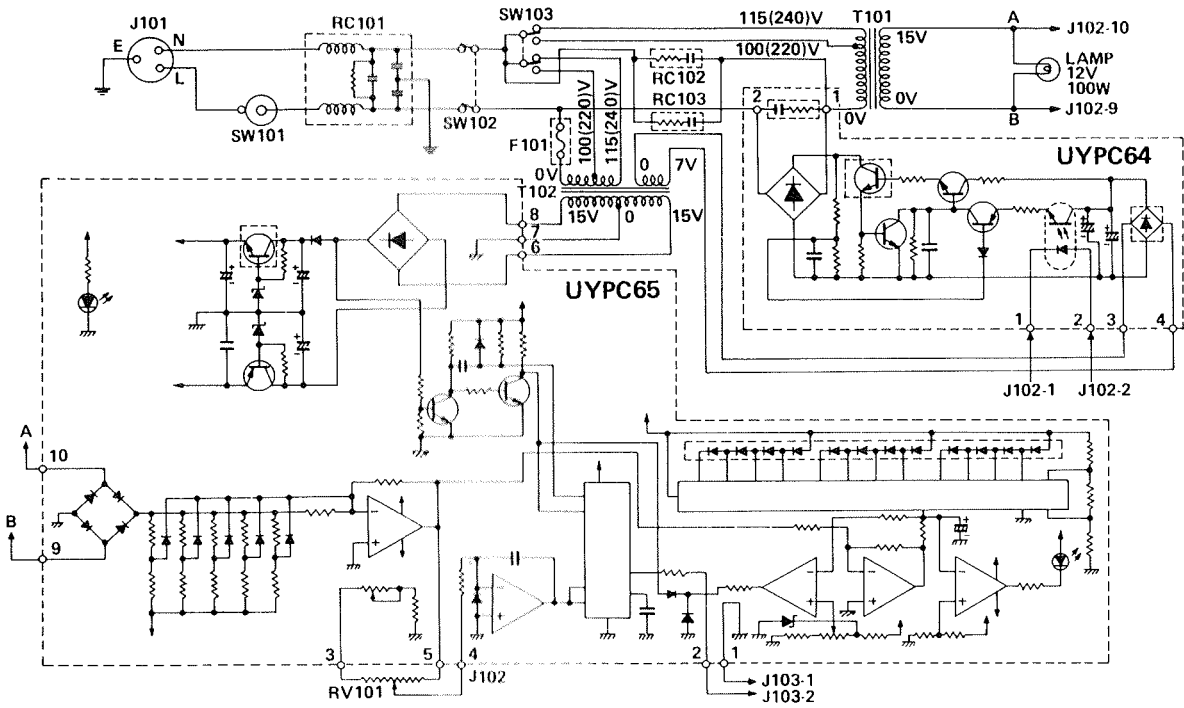
- (1) When AC 30V is not applied:  
Secondary winding of T102 broken
- (2) When AC 0 ~ 12V is not applied:
  - See "Lamp does not light" above.
  - Lamp cord wire broken

YES

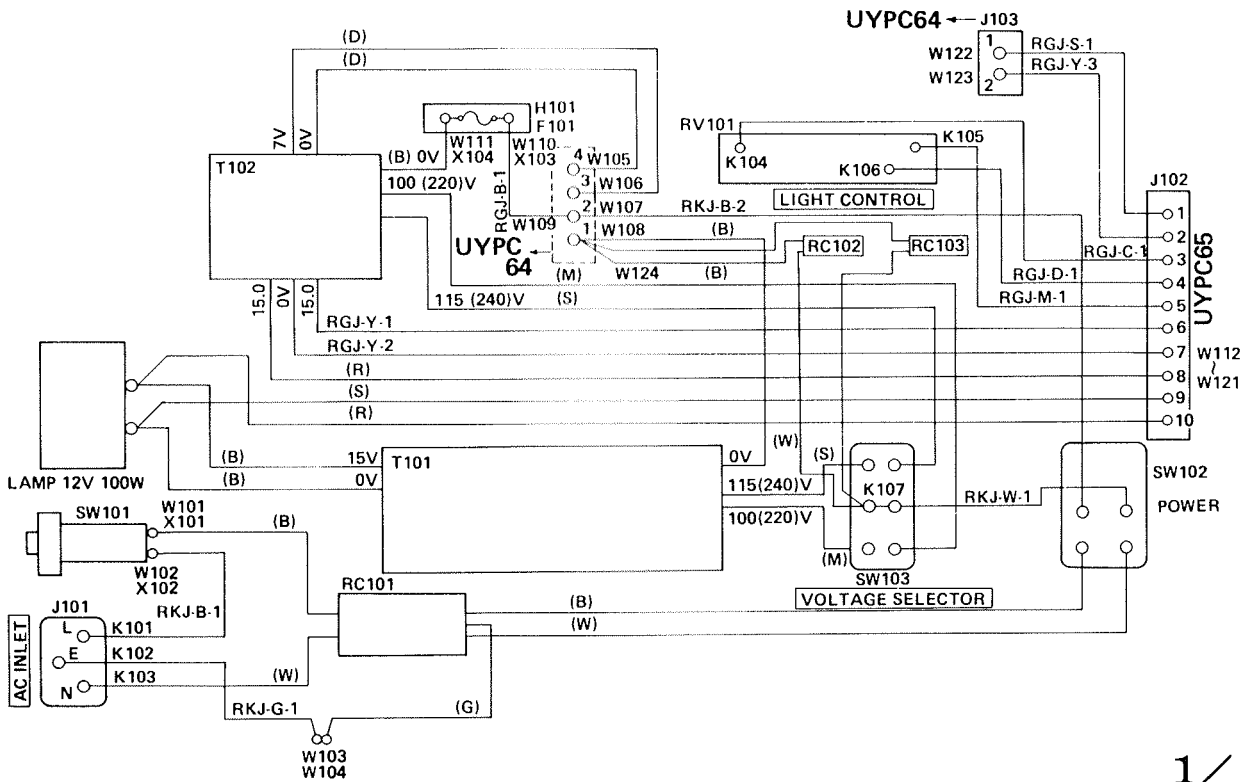
UYPC65 defective

# 21. ELECTRIC CIRCUIT DIAGRAM

## CIRCUIT DIAGRAM

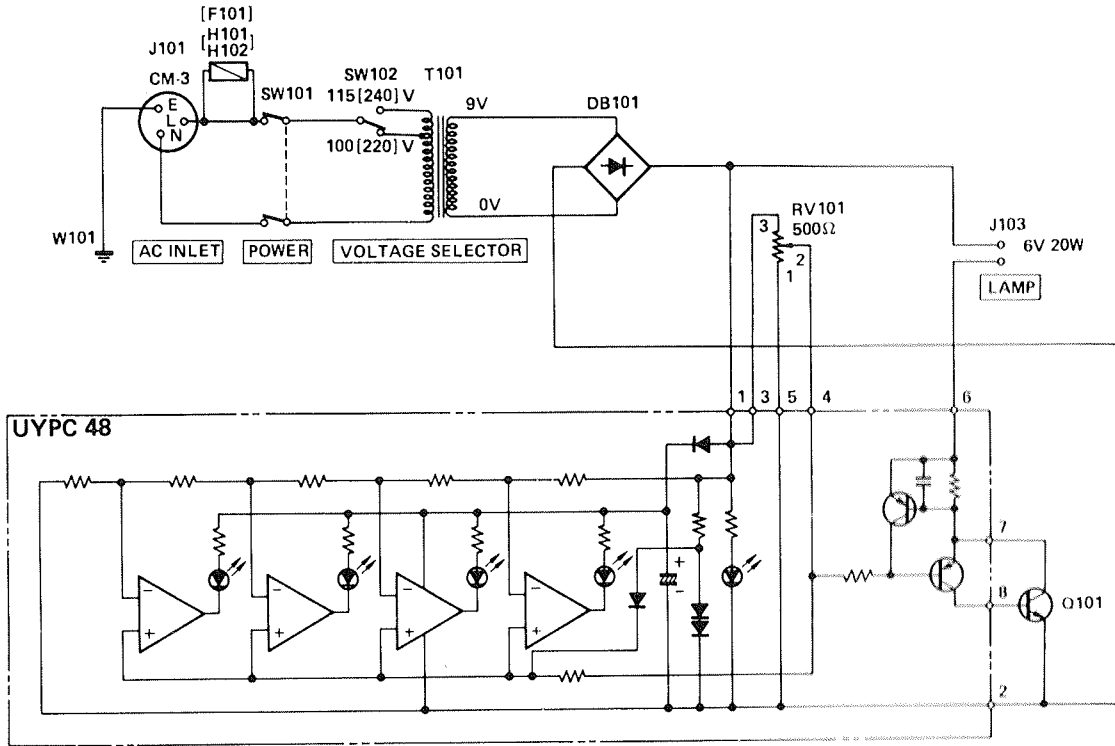


## CONNECTING DIAGRAM

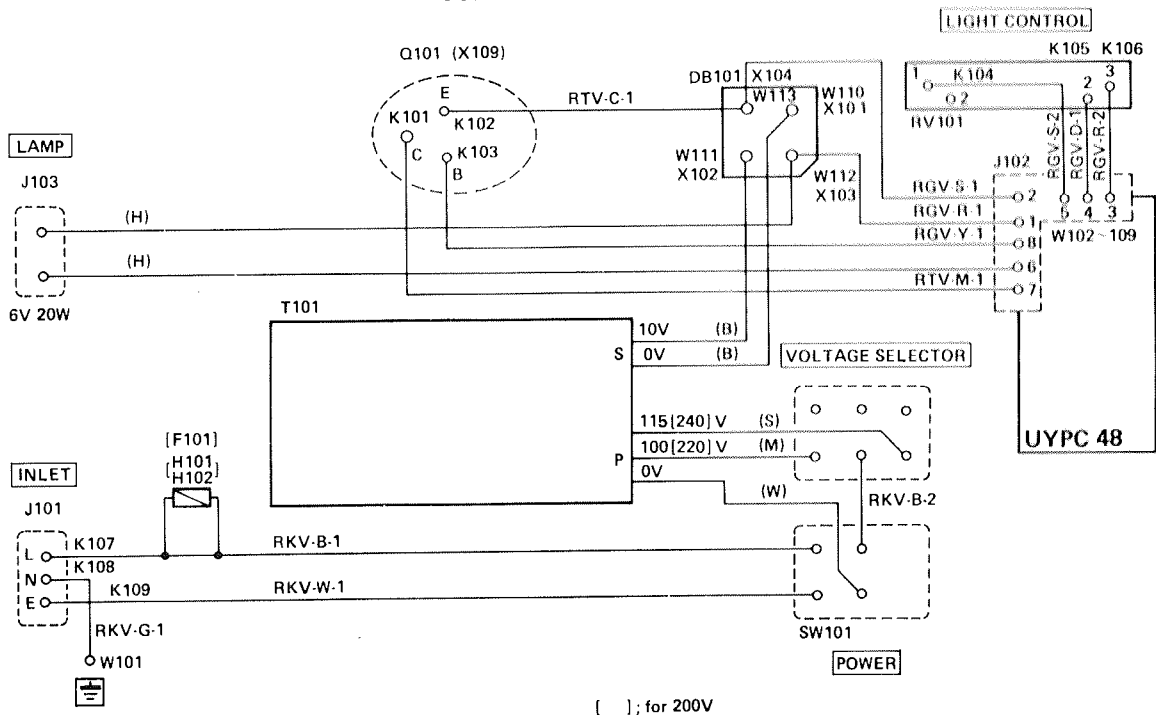


B2-BDS2-EL  $\frac{1}{1}$

CIRCUIT DIAGRAM



CONNECTING DIAGRAM



[ ] ; for 200V

B2-BDT-EL 1/1  
②

E R R A T A

PAGE	ITEM NO.	LINE(S)/PARA.	INCORRECT	CORRECTED
24	Fig. 3-10		<u>AB</u> 872200	<u>AA</u> 872200
26	Fig. 3-16		ZJ856 <u>5</u> 00	ZJ856 <u>4</u> 00
26	3-3-12, b)	2nd line	SK2.6x <u>5</u> SA	<u>CSK</u> 2.6x <u>6</u> SA
35	4-2-9, b)	1st line	<u>ZJ</u> -078300	<u>ZA</u> 078300
35	4-2-9, b)	last line	SK2.6x <u>5</u> SA	<u>CSK</u> 2.6x <u>6</u> SA
59	Fig. 11-8		AB031200	AB050800
59	Fig. 11-8		the other spring	AB031200
59	11-1-10	1st line	AB031200 in position	<u>AB031200 &amp; AB050800</u> in position
65	Fig. 11-20	2nd line	pup <u>u</u> l diameter	pup <u>i</u> l diameter
65	Fig. 11-20		(with in 2 divisions)	delete
65	11-6-3, a)	last line	within <u>2 divisions</u>	within <u>20%</u> on
65	11-6-3, a)	1st line	exceeds <u>2 divisions</u> ,	exceeds <u>20%</u> ,
86	Fig. 15-13		AB021700	AA795500
86	Fig. 15-13		AB021600	AA795400
86	Fig. 15-13		AB0021500	AA795600
86	15-3-8	1st line	AB021700	AA795500
86	15-3-9	1st line	AB021600	AA795400
86	15-3-10	1st line	AB021500	AA795600
86	15-3-10	2nd line	ACU <u>2.6</u> x5SA	ACU <u>2</u> x5SA
86	15-3-11	1st line	AB021600	AA795400
86	15-3-12	1st line	AB021700	AA985500
32	4-1-10, a)	last line	it <u>c</u> asily	it <u>e</u> asily
32	Fig. 4-12		<u>AB</u> 782800	<u>AA</u> 782800
37	4-2-14, c)	2nd line	temp <u>a</u> rarily	temp <u>o</u> rarily
43	6-3-1, e)	2nd line	l <u>e</u> terally	l <u>a</u> terally
64	11-6-1, e)	9th line	<u>e</u> deally	<u>i</u> deally
69	13-2-2, 2	last line	re <u>p</u> ectively	re <u>s</u> pectively
96	right side para.	3rd line	<u>DE</u> 0082	<u>DF</u> 0082

**Progress  
through  
Precision**

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