

**NIDEK**

**PATTERNLESS EDGER**

**Model LE-9000 Series**

**SERVICE MANUAL**

**Applicable models: LE-9000LX  
LE-9000SX  
LE-9000DX  
LE-9000EX**





## **NIDEK CO., LTD.**

**NIDEK CO., LTD.**  
(Manufacturer)

: 34-14, Maehama, Hiroishi-cho, Gamagori, Aichi 443-0038, Japan  
Telephone: (0533) 67-6611  
Facsimile: (0533) 67-6610

**NIDEK CO., LTD**  
(Tokyo Office)

: 6th Floor, Takahashi Bldg., No.2, 3-chome, Kanda-jinboucho  
Chiyoda-ku, Tokyo 101-0051, Japan  
Telephone: (03) 3288-0571  
Facsimile: (03) 3288-0570  
Telex: 2226647 NIDEK J

**NIDEK INCORPORATED**  
(United States Agent)

: 47651 Westinghouse Drive, Fremont, California 94539, U. S. A.  
Telephone: (510) 226-5700  
Facsimile: (510) 226-5750

**NIDEK SOCIETE ANONYME**  
(Authorized Representative)

: Europarc 13, rue Auguste Perret, 94042 CRETEIL, France  
Telephone: (01) 49 80 97 97  
Facsimile: (01) 49 80 32 08



# *Table of Contents*

	Page
<b>§1</b> INTRODUCTION .....	1-1
<b>§2</b> SAFETY PRECAUTIONS .....	2-1
2.1 General Precautions .....	2-1
2.2 Cautions for Cleaning .....	2-3
2.3 Replacing Consumable Parts .....	2-3
2.4 How to Read Troubleshooting .....	2-4
<b>§3</b> TROUBLESHOOTING .....	3-1
3.1 Malfunction at Power-up/ERROR Display .....	3-1
3.1.1 Error does not occur and the system does not work at all .....	3-1
3.1.2 ERROR 0104 occurs (voltage failure of edge end sensor) .....	3-2
3.1.3 Grinding is not complete although edge end sensor is adjusted .....	3-2
3.2 Display Malfunction .....	3-3
3.2.1 Display does not appear on screen .....	3-3
3.2.2 Display is partly chipped .....	3-3
3.2.3 Switch does not work .....	3-3
3.2.4 LED of switch does not illuminate .....	3-3
3.2.5 Display is lightly colored .....	3-3
3.3 Malfunction during Tracing .....	3-4
3.3.1 Stylus comes off during tracing .....	3-4
3.3.2 Pattern cannot be traced .....	3-4
3.4 Malfunction of Lens Measuring ASSY .....	3-5
3.4.1 Feeler stops halfway .....	3-5
3.4.2 Feeler does not measure front side after measuring rear side .....	3-5
3.4.3 Feeler does not contact with lens .....	3-5
3.4.4 Lens shape measurement is not performed .....	3-5
3.4.5 Size error occurs at measurement although lens is large enough .....	3-6
3.4.6 ERROR 0203 occurs .....	3-6
3.5 Malfunction during Grinding .....	3-7
3.5.1 Wheel does not turn .....	3-7
3.5.2 Water does not run/Water does not run smoothly .....	3-7
3.5.3 Water is not supplied to lens .....	3-7
3.5.4 Water leak .....	3-8
3.5.5 Abnormal sound is heard .....	3-8
3.5.6 Grinding takes much time/ Grinding is not complete .....	3-9
3.5.7 Improper bevel position in auto grinding .....	3-9
3.5.8 Bevel is rounded off .....	3-9
3.5.9 Size differs with right and left .....	3-9
3.5.10 Size is variant .....	3-9

	Page
3.5.11 Axis shift occurs .....	3-10
3.5.12 Corrosion occurs on internal parts (wheel etc.) .....	3-10
3.5.13 Lens is unpolished in polishing .....	3-11

<b>§4</b>	<b>REPLACEMENT PROCEDURES .....</b>	<b>4-1</b>
4.1	Removing the Cover ASSY (2000, 2A00) .....	4-1
4.1.1	Opening and closing the cover ASSY (2000, 2A00) .....	4-1
4.1.2	Removing the cover ASSY (2000, 2A00) .....	4-1
4.2	Removing the Rear Cover (M203) and Side Cover (M204, M205) .....	4-2
4.3	Replacing the Seesaw Switch (804-60-00099) .....	4-2
4.4	Replacing the Switching Power Supply (806-02-00085) .....	4-2
4.5	Replacing the BA01 Board .....	4-3
4.6	Replacing the BA02 Board .....	4-6
4.7	Replacing the BA03 Board .....	4-6
4.8	Replacing the BA04 Board .....	4-6
4.9	Replacing the LCD Display (E31) .....	4-7
4.10	Replacing the Wheel .....	4-8
4.11	Replacing the V belt (M162) .....	4-9
4.12	Replacing the Spindle ASSY (7000) .....	4-9
4.13	Replacing the Tracer ASSY (3000) .....	4-10
4.14	Replacing the BA11 Board .....	4-11
4.15	Updating the Tracer Program .....	4-13
4.16	Replacing the Feeler ASSY (4100) of the lens measuring ASSY .....	4-14
4.16.1	Replacing the old-type feeler ASSY .....	4-14
4.16.2	Replacing the new-type feeler ASSY .....	4-14
4.17	Replacing the Lens Measuring ASSY (4000) .....	4-15
4.18	Replacing the Groove and Safety Bevel ASSY (6000) .....	4-16
4.19	Replacing the Spindle ASSY (6600) of the Groove and Safety Bevel ASSY .....	4-16
4.20	Replacing the Grooving and SFB Wheels .....	4-16
4.21	Replacing the Wheel Motor Driver ASSY (1500/1800) .....	4-17
4.22	Replacing the Fuses .....	4-18
4.23	Replacing the Y Axis Motor (LE10SP-1 5410, Motor: LE-10A E036) .....	4-18

<b>§5</b>	<b>ADJUSTMENTS .....</b>	<b>5-1</b>
5.1	Size Adjustment .....	5-1
5.2	Bevel Position Adjustment .....	5-2
5.3	Axis Angle Adjustment .....	5-2
5.4	Polishing Adjustment .....	5-3
5.4.1	Polish level and Polish axis adjustment .....	5-3
5.4.2	Polish size adjustment .....	5-4

	Page
5.4.3 Plycarbonate polish finishing allowance adjustment .....	5-4
5.5 Groove and Safety Bevel Adjustments .....	5-5
5.5.1 Groove position adjustment and SFB wheel height adjustment .....	5-5
5.5.2 SFB wheel position adjustment in beveling .....	5-5
5.5.3 SFB wheel position adjustment in flat edging .....	5-6
5.5.4 Groove and safety bevel axis adjustment .....	5-6
5.6 Position Adjustment of the Edge End Sensor (CA47) .....	5-7
5.7 Groove and SFB ASSY (6000) Adjustment .....	5-8
5.7.1 Arm position adjustment of the groove and SFB ASSY (6000) .....	5-8
5.7.2 Edge end sensor (CA38) adjustment of the groove and SFB ASSY (6000) ...	5-10
5.8 Feeler (4100) Reference Position Adjustment .....	5-11
5.9 Feeler (4100) Initialization Position Adjustment .....	5-11
5.10 Adjustment of the Lens Measuring ASSY .....	5-12
5.10.1 Voltage adjustment of the lens measuring ASSY .....	5-12
5.10.2 Cover support (M290) position adjustment .....	5-13
5.10.3 Lens measurement axis adjustment .....	5-14
5.11 Initialization Position Adjustment of Y and $\theta$ axes .....	5-15
5.12 Size Calibration .....	5-16
5.13 Calibration of Lens Measuring ASSY .....	5-17
5.14 Calibration of the Groove and SFB ASSY .....	5-17
5.15 Auto Calibration of Tracer ASSY .....	5-18
5.15.1 Frame auto calibration .....	5-18
5.15.2 Pattern auto calibration .....	5-18
5.16 Torque Calibration of Tracer ASSY .....	5-18
5.17 Full-Calibration of Tracer ASSY .....	5-19
5.18 Clamp Switch (CA64) Position Adjustment .....	5-21
5.19 Y Axis Belt Tension Adjustment .....	5-22

<b>§6</b> WIRING DIAGRAM .....	<b>6-1</b>
6.1 Wiring Diagram (No.1) .....	6-1
6.2 Wiring Diagram (No.2) .....	6-2
6.3 Wiring Diagram (No.3) .....	6-3
6.4 Wiring Diagram (No.4) .....	6-4

<b>§7</b> MATERIAL .....	<b>7-1</b>
7.1 Special Key Operation .....	7-1
7.1.1 Reset of ground lens number .....	7-1
7.1.2 Recalling built-in $\phi$ 45 standard frame .....	7-2
7.1.3 Recalling built-in $\square$ 45 standard frame .....	7-2
7.1.4 Displaying the system setting mode screen .....	7-2

	Page
7.2 Error Code Table .....	7-3
7.3 Inverter Error Code Table .....	7-7
<b>§8 MAINTENANCE .....</b>	<b>8-1</b>
8.1 Tools .....	8-1
8.1.1 General tools .....	8-1
8.1.2 Consumables .....	8-1
8.1.3 Calibration jig list .....	8-2
8.2 Grease Application .....	8-3

# **§1 INTRODUCTION**

---

This service manual describes necessary information for performing after-service works of the NIDEK patternless lens edger LE-9000 Series.

Technical contents for producing eyeglass lenses are not contained in this manual.

In order to perform correct after-service, it is necessary to understand the contents of this manual thoroughly before working.

Use this service manual in combination together with each operator's manual of the LE-9000 Series.

Specifications and design are subject to change without notice for improvement. Technical bulletin (T.B.) is issued for important changes which are to be referred.

If the LE-9000 Series can not be repaired in accordance with the service manual, inform us of the serial number of LE-9000 Series and detailed symptoms of the malfunction.



# §2 SAFETY PRECAUTIONS

## 2.1 General Precautions

- Only the service persons who are accustomed to using tools, and have a deep knowledge of this instrument are allowed to repair the instrument.
- Proceed right work in accordance with the procedure.  
If not, accidents or failure of the instrument may result.
- When the instrument is moved, it should be carried by two or more persons. Otherwise, you may have a backache or fall down.
- When performing maintenance works, turn off the power switch, and disconnect the power cord from the wall outlet unless necessary.
- Never wipe the covers, etc. using a organic solvent such as a paint thinner.  
The surface may be ruined, and as a result, the appearance of the instrument will be impaired.

### <Maintenance precautions>

- In case of instrument malfunction, turn the power switch off after checking the symptom.
- Never drop parts or screws inside the instrument, nor bump them against the surrounding objects.
- Have storage cases ready so as not to lose the removed screws or parts.
- In screwing or unscrewing, use a proper tool for the screw.
- After loosening the screws fixed by a threadlocking adhesive, and tightening them again, be sure to apply the threadlocking adhesive to them.
- After replacing parts, make sure that they are fixed securely before turning on the power.
- If you observe strange odors or smoke being emitted from the instrument, immediately turn off the instrument and locate the causes after disconnecting the power cord from the wall-outlet.  
If the instrument is continuously powered under such abnormal conditions, a fire, electric shock or total loss of the instrument may result.
- Referring to “6. Wiring Diagram”, check cables for the following:
  1. Connectors are connected securely.
  2. No contact failure occurs after re-connection of connectors.
  3. Each cable does not have a brake (by using a digital multimeter).

- Avoid spraying water into the instrument.
  - Never work with wet hands.  
It may result in an electric shock or instrument malfunction.
- Do not exert excessive force to the stylus of the tracing unit.  
It may cause a deformation of the stylus or instrument malfunction.

#### <Adjustment precautions for grinding>

- Perform the grinding adjustment on a table or bench that is shock-free, vibration-free, level and stable.  
Otherwise, correct grinding adjustment can not be performed.
- Before grinding, select and specify a proper lens material to be ground.  
In case of improper selection of the lens material, the lens to be ground may break or grinding wheels may become damaged.
- Never fail to shut the soundproof cover while the wheels are turning.  
Otherwise, grinding splash may get in your eye and hurt it.
- While rotating wheels and V belt, never bring your hand or face near to them.  
It may hurt your hand and face.
- Replacement of the wheel must be done after cleaning the wheel and the wheel housing, wearing gloves to protect your hand from ground powder.
- After grinding a glass lens, chamfer each ground edge of the front and rear side of the lens.  
After grinding, glass lenses may have fine burrs. They may hurt your skin (only for type PC and type PL4).
- Do not use a calibration jig for other usage described in this manual.

#### <In wirings>

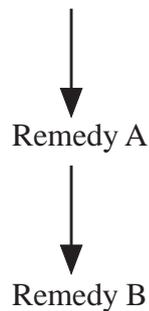
- Never fail to hold the power plug when disconnecting the power cord from the wall-outlet.  
Besides, be careful not to damage the power cord by putting heavy objects on it or crush it.  
It may result in a fire or electric shock.
- Wipe between the pins of the power plug periodically with a dry cloth.  
If the prongs are covered with dust and the dust takes up moisture, it may cause a short circuit or a fire.
- Be sure to plug the power cord into the wall-outlet securely.  
Powering on the instrument under insecure connection may cause a fire.



\* The life span of above wheel is referred to the guaranteed ground number of the lenses as a guide. However if any damages were given on the wheel by such improper operation mentioned below or using wheel under the special grinding conditions, it becomes shorter life span than guaranteed ground number.

## 2.4 How to Read Troubleshooting

- When two-line remedies are sandwiched by arrows as below, perform **Remedy A** in the upper line first, and check the instrument in action. If the problem cannot be solved yet, perform **Remedy B** in the lower line.

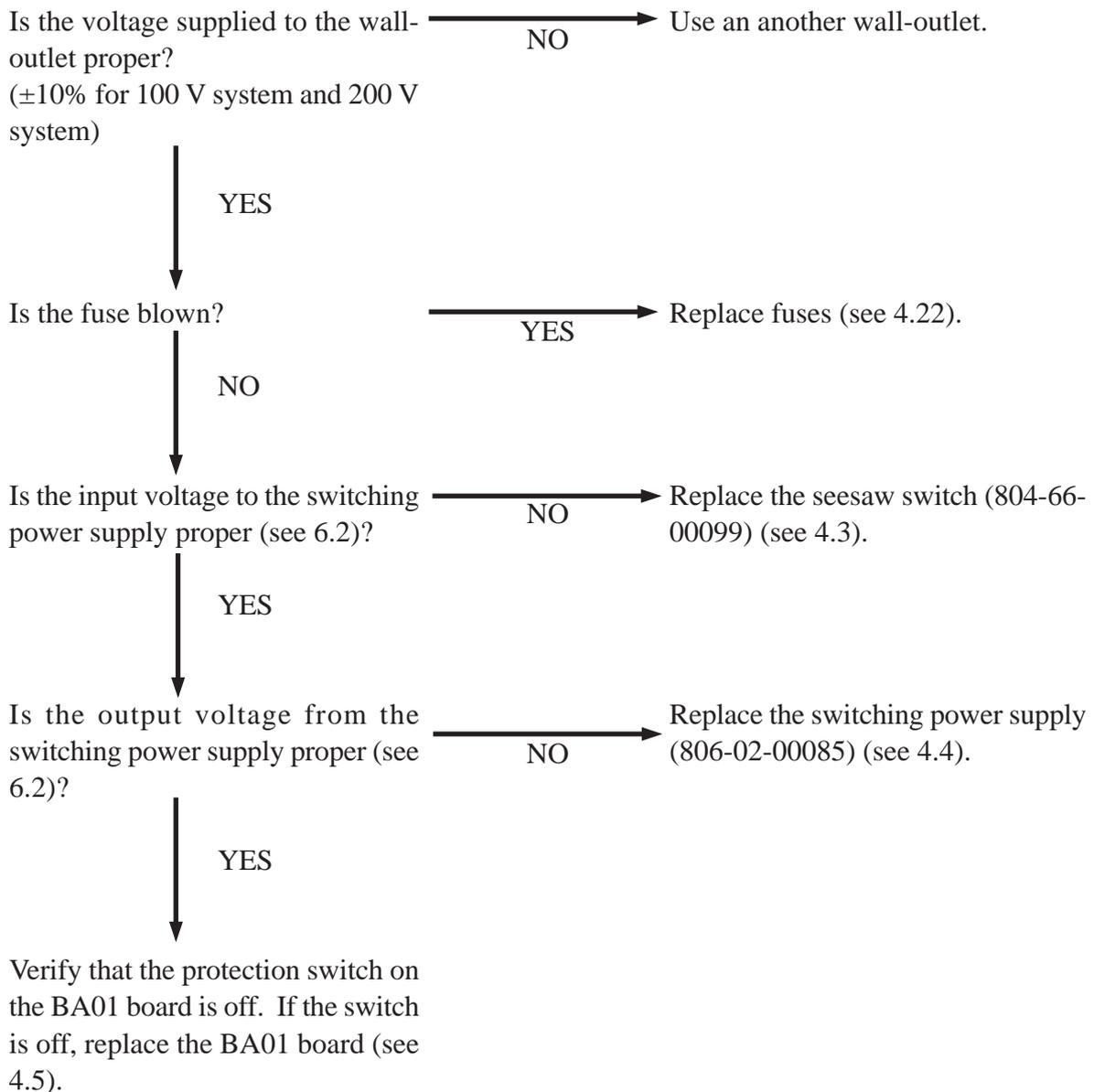


- When replacing cables or circuit boards, see “6. Wiring Diagram”.

## §3 TROUBLESHOOTING

### 3.1 Malfunction at Power-up/ERROR Display

#### 3.1.1 Error does not occur and the system does not work at all





### **3.1.2 ERROR 0104 occurs (voltage failure of edge end sensor)**

Verify the output voltage of the edge end sensor. If the voltage is not within  $1\pm 0.1$  V, adjust the output voltage of the edge end sensor (see 5.6).

### **3.1.3 Grinding is not complete although edge end sensor is adjusted**

Update the software to V 1.02 or later.

## 3.2 Display Malfunction

### 3.2.1 Display does not appear on screen

Adjust the contrast of the screen with the contrast control on the rear side of the main body (see the operator's manual).



Replace LCD (see 4.9).

### 3.2.2 Display is partly chipped

Replace LCD (see 4.9).

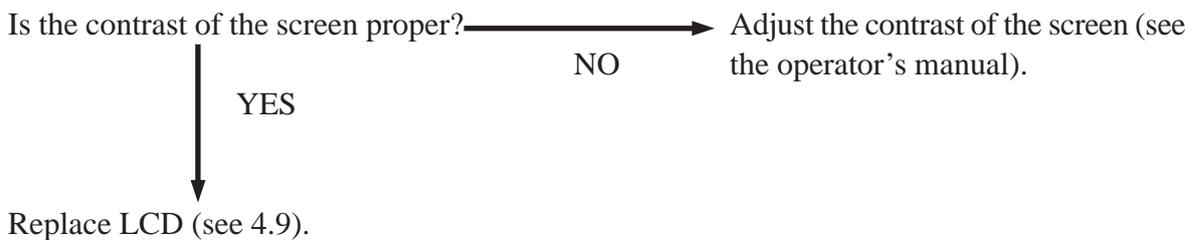
### 3.2.3 Switch does not work

Replace the switch board (see 4.6 - 4.8).

### 3.2.4 LED of switch does not illuminate

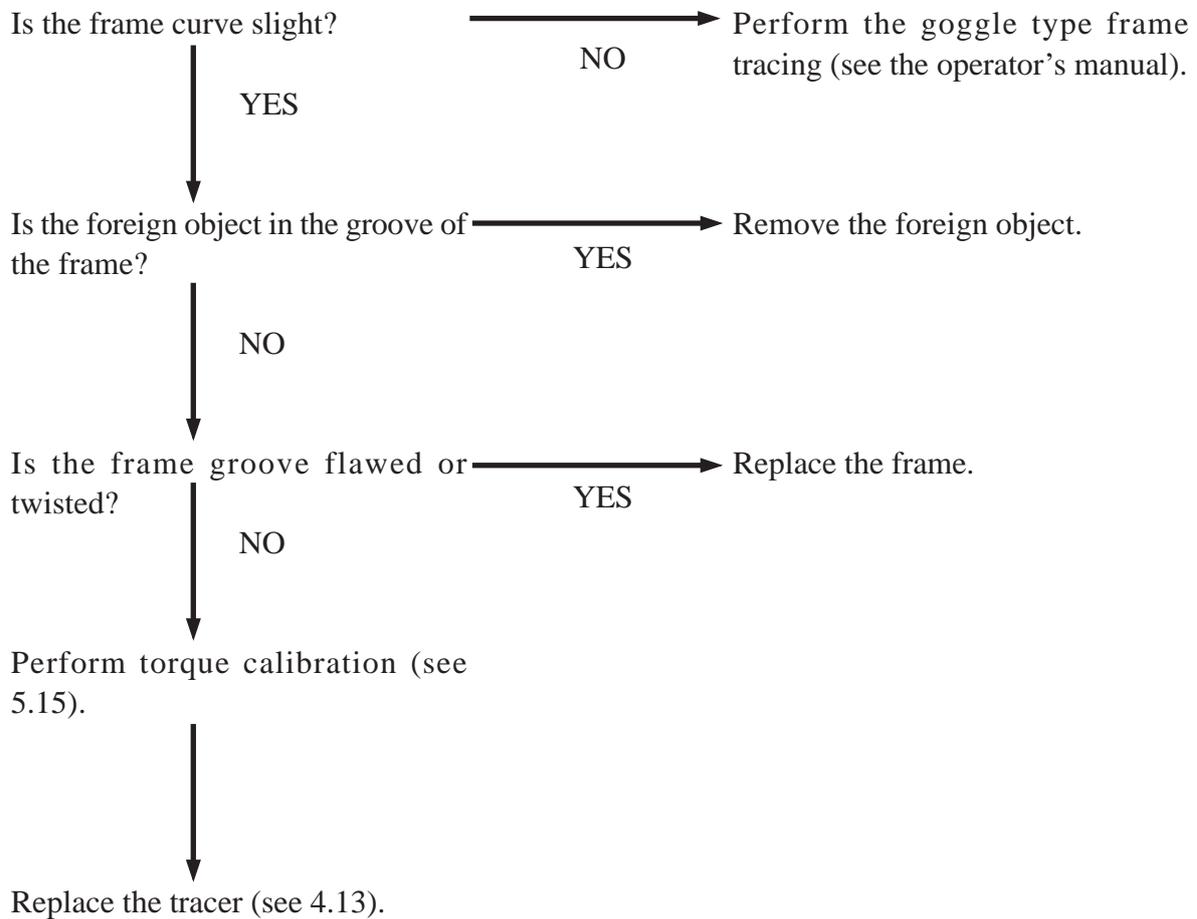
Replace the switch board (see 4.6 - 4.8).

### 3.2.5 Display is lightly colored

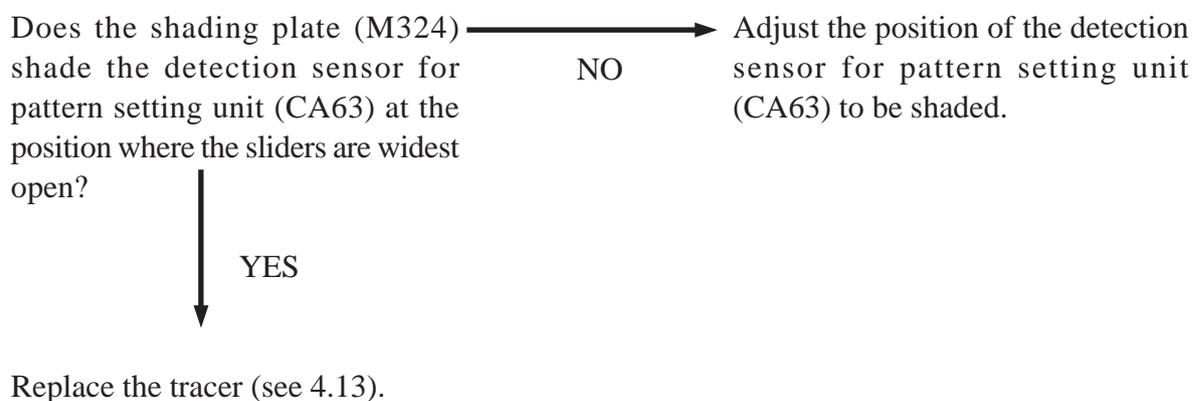


## 3.3 Malfunction during Tracing

### 3.3.1 Stylus comes off during tracing

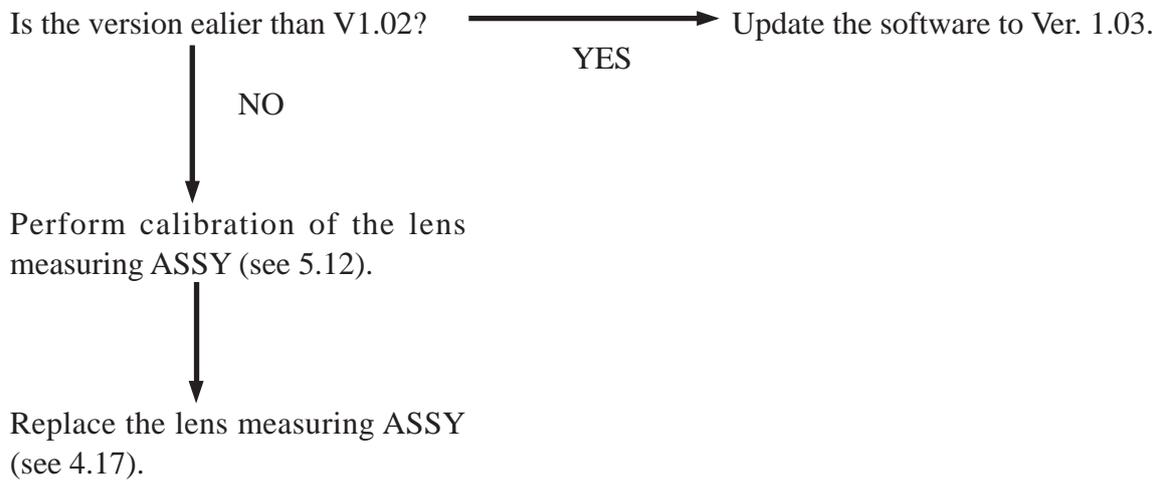


### 3.3.2 Pattern cannot be traced

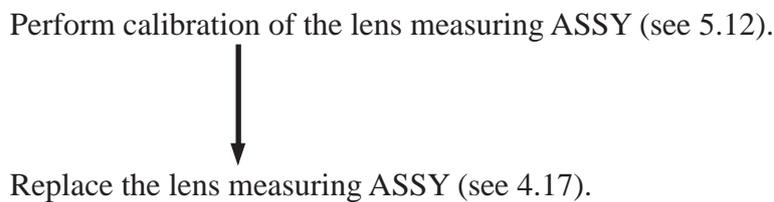


## 3.4 Malfunction of Lens Measuring ASSY

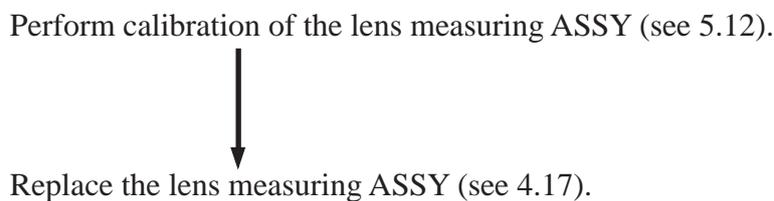
### 3.4.1 Feeler stops halfway



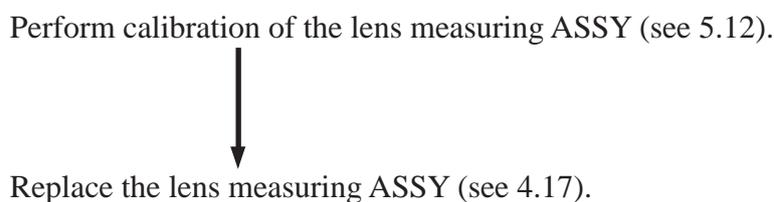
### 3.4.2 Feeler does not measure front side after measuring rear side



### 3.4.3 Feeler does not contact with lens

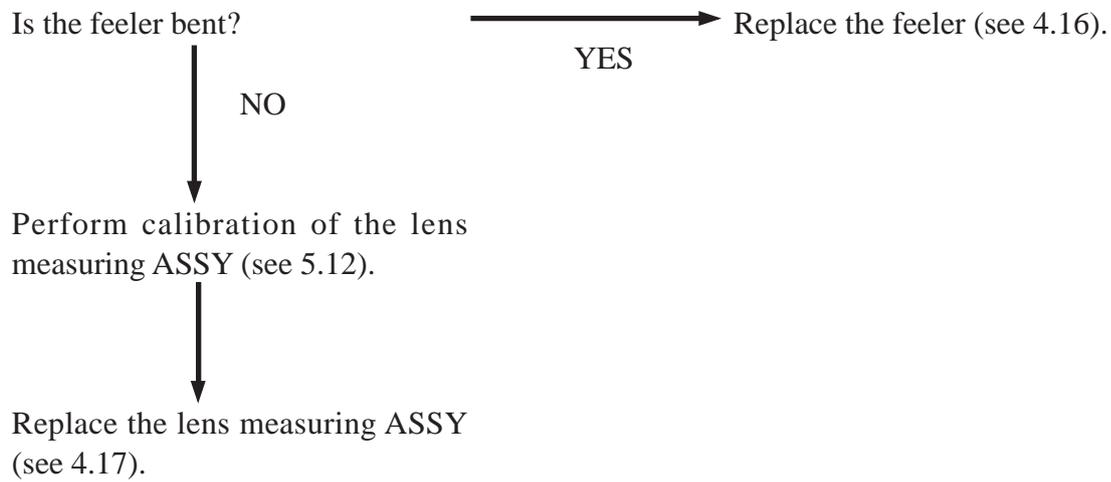


### 3.4.4 Lens shape measurement is not performed





### 3.4.5 Size error occurs at measurement although lens is large enough

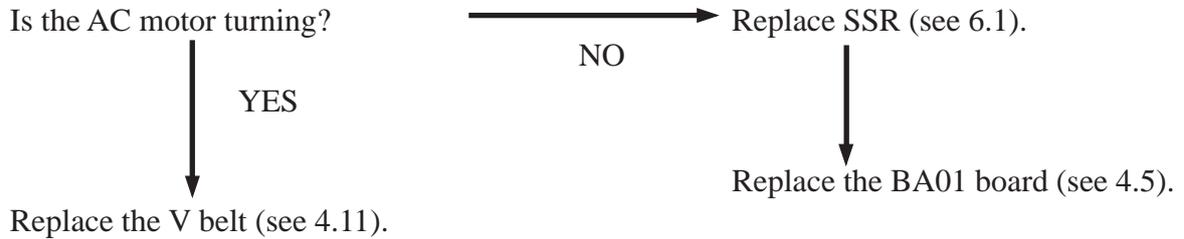


### 3.4.6 ERROR 0203 occurs

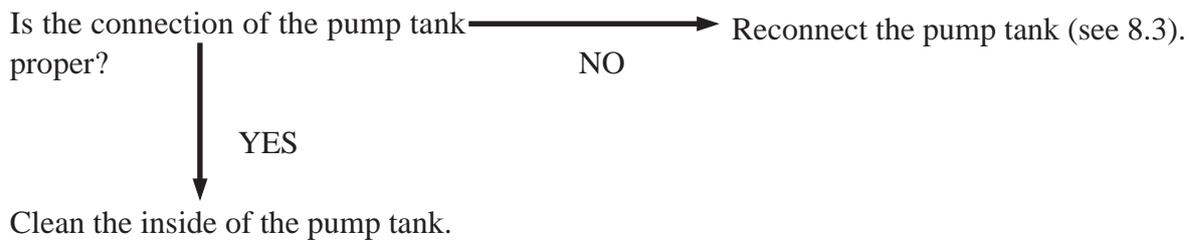
Replace the lens measuring ASSY due to encoder failure (see 4.17).

## 3.5 Malfunction during Grinding

### 3.5.1 Wheel does not turn



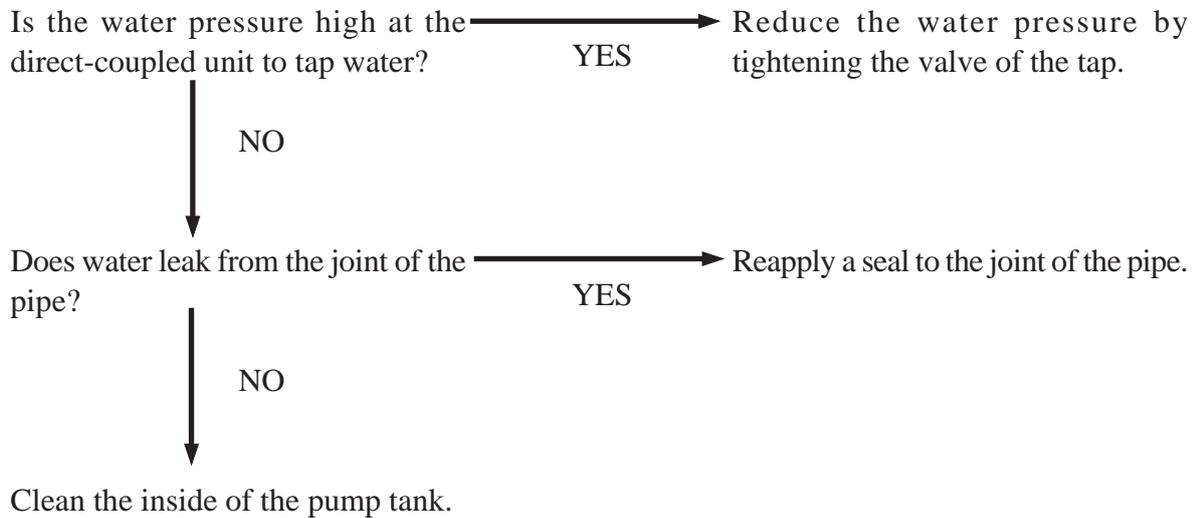
### 3.5.2 Water does not run/Water does not run smoothly



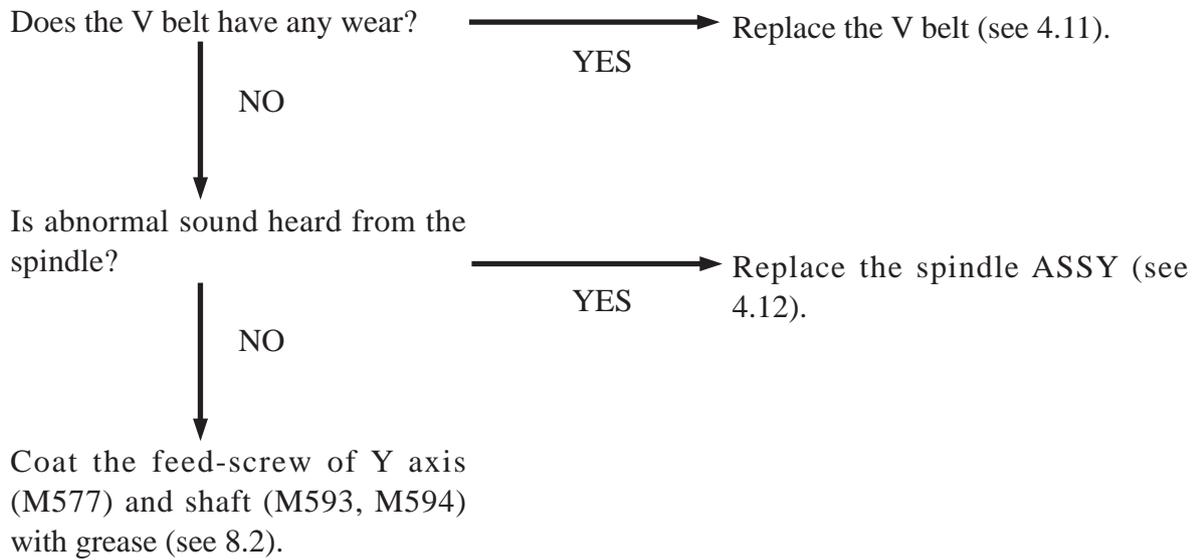
### 3.5.3 Water is not supplied to lens

Set the diffuser (M965). (This is applied to S/N 100320 or later.)  
 Remove the wheel and set the diffuser (M965) (see 4.10).

### 3.5.4 Water leak



### 3.5.5 Abnormal sound is heard



### **3.5.6 Grinding takes much time/ Grinding is not complete**

Perform wheel dressing (see the operator's manual).



Adjust the position of the edge end sensor (see 5.6).



Replace the wheel (see 4.10).

### **3.5.7 Improper bevel position in auto grinding**

Perform calibration of the lens measuring ASSY (see 5.12).



Replace the lens measuring ASSY (see 4.17).

### **3.5.8 Bevel is rounded off**

Replace the fine-grinding wheel (see 4.10).

### **3.5.9 Size differs with right and left**

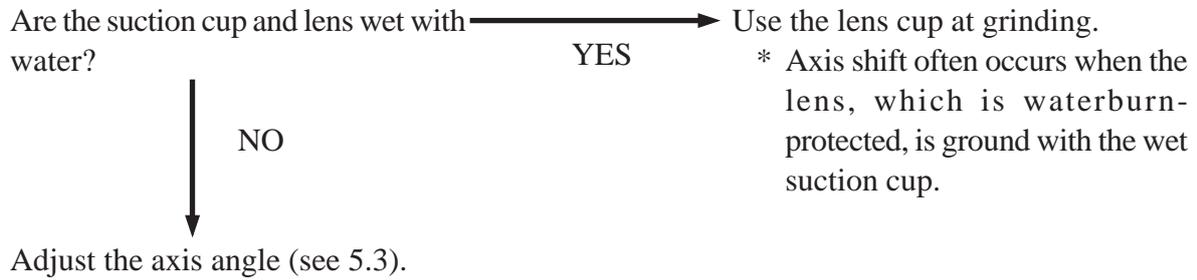
Update the software to Ver. 1.03 or later.

### **3.5.10 Size is variant**

Perform wheel dressing (see the operator's manual).



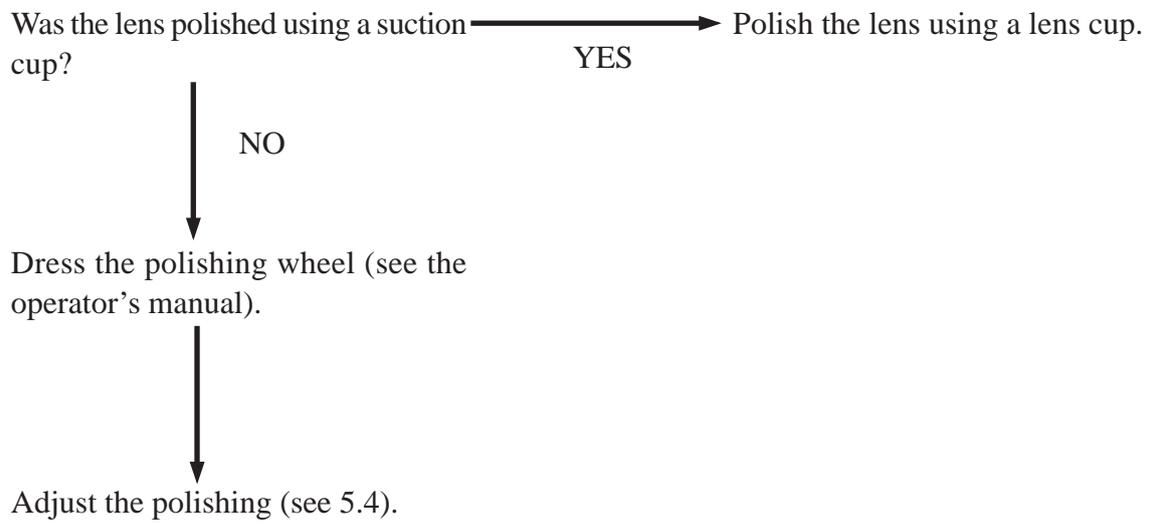
### 3.5.11 Axis shift occurs



### 3.5.12 Corrosion occurs on internal parts (wheel, etc.)

When water is drained directly to the channel, the gas may corrode the internal parts. If corrosion is found, use a pump tank.

### 3.5.13 Lens is unpolished in polishing





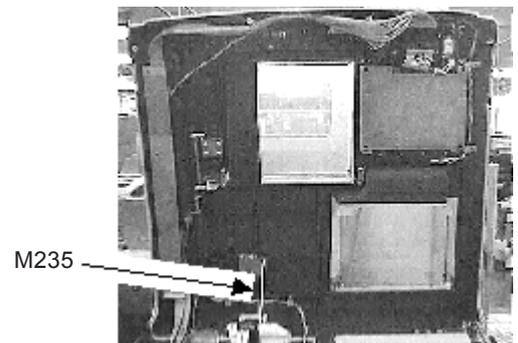
# §4 REPLACEMENT PROCEDURES

## 4.1 Removing the Cover ASSY (2000, 2A00)

### 4.1.1 Opening and closing the cover ASSY (2000, 2A00)

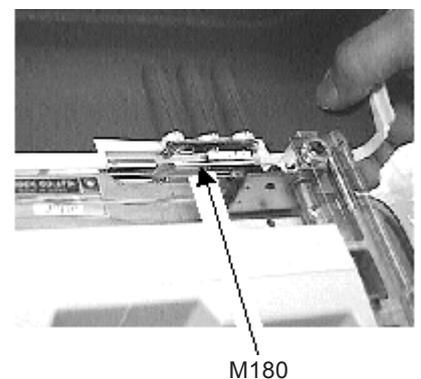
1. Unscrew SB4×10SUS (n=2), open the cover ASSY (2000, 2A00), and then lock it with a stay (M235).

Release the lock of the stay (M235), raising the cover to close the cover ASSY (2000, 2A00).



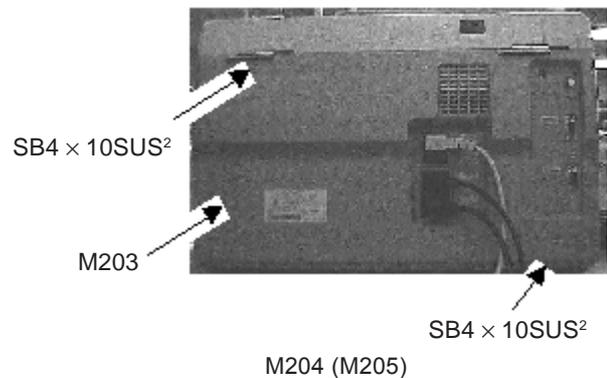
### 4.1.2 Removing the cover ASSY (2000, 2A00)

1. Open the cover ASSY (2000, 2A00)(see 4.1.1).
2. Disconnect the connector from J1 on the BA01 board and the connector from J7 on the BA11 board.
3. Remove the cover ASSY (2000, 2A00) from the hinge (M180), raising and sliding to right.  
\* To protect the surface of the removed cover ASSY from damage, put the book etc. under the cover ASSY.
4. Assemble the cover ASSY (2000, 2A00) in reverse order.

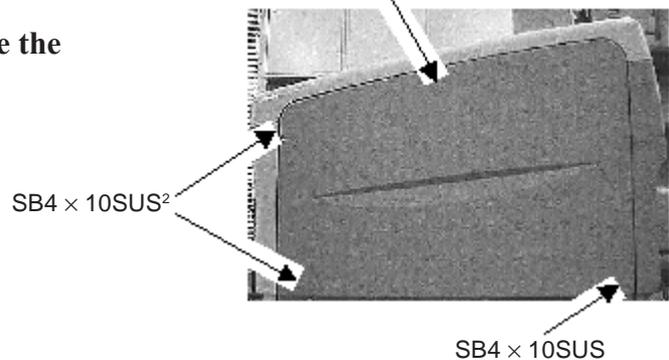


## 4.2 Removing the Rear Cover (M203) and Side Cover (M204, M205)

1. Unscrew SB4×10SUS (n=4) and remove the rear cover (M203).



2. Unscrew SB4×10SUS (n=3) and remove the side covers (M204, M205).



## 4.3 Replacing the Seesaw Switch (804-60-00099)

1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Disconnect all terminals from the seesaw switch (804-60-00099) using a flatblade screwdriver.
3. Remove the seesaw switch (804-60-00099) while pressing the lever.
4. Replace the seesaw switch (804-60-00099) with a new one and assemble the removed parts in reverse order.

## 4.4 Replacing the Switching Power Supply (806-02-00085)

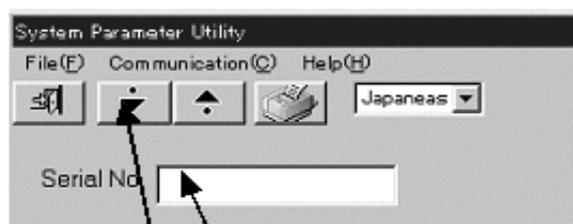
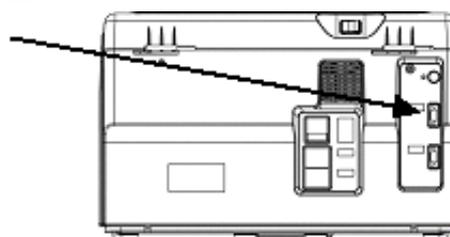
1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Remove the rear cover (M203) (see 4.2).
3. Disconnect all terminals from the terminal block of the switching power supply (806-02-00085).
4. Unscrew PC4×6Cr (n=3) and remove the switching power supply (806-02-00085).
5. Replace the switching power supply (806-02-00085) with a new one and assemble the removed parts in reverse order.

## 4.5 Replacing the BA01 Board

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the rear cover (M203) and side cover (M205) (see 4.2).
3. Save the internal parameters into the personal computer.

The purpose of this step is to minimize the readjustments required after the replacement of the BA01 board. Unless the internal parameter settings are saved and reset (if the following steps are omitted), it is necessary to adjust all the parameters.

- 1) Connect the RS-232C cross cable (LEDJ-10 40390-E006) between the PC/LAN connector on the LE-9000 and the COM1 port of the personal computer (40390-E001).
- 2) Turn on the power of the main body.
- 3) On the Parameter exchange mode screen of the LE-9000, set the 10) Ext. interface parameter to None.
- 4) Double-click the System Parameter Utility icon to start System Parameter Utility. After it is started, the window on the right appears.
- 5) Enter the serial number of the LE-9000 whose parameter settings will be backed up.
- 6) Click the Parameter backup button. The System Parameter Utility receives parameter setting data from the LE-9000 and saves it to the PC. The backed up data is saved with the "Serial No. + dat" file name in the folder including the System Parameter Utility.
- 7) Turn off the power of the LE-9000.

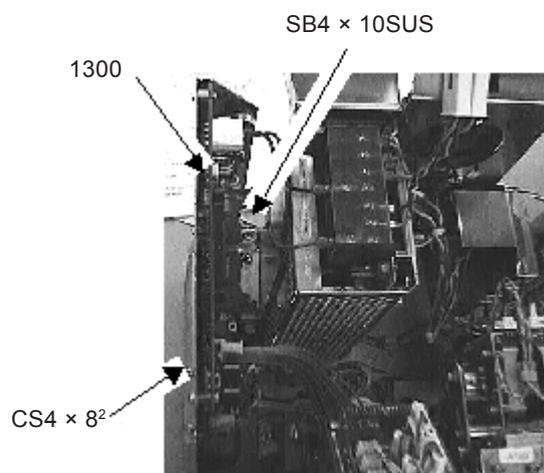


Enter a serial number.

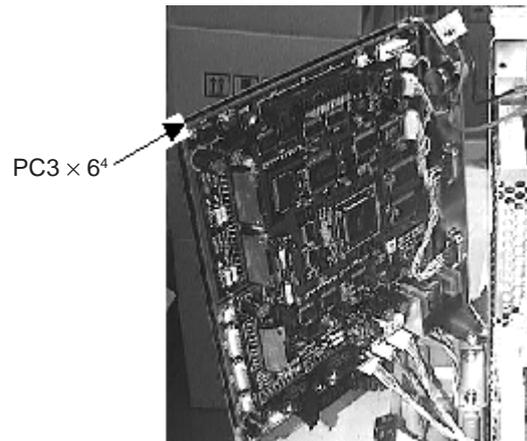
Parameter backup button

4. Unscrew CS4×8 (n=2) and loosen SB4×10SUS to remove the board ASSY (1300) and disconnect the connectors.

\* J1, J2, J4, J6 to J13,  
J15 to J17 (For Type SX only)



**5. Unscrew PC3×6 (n=4) and take off the BA01 board.**

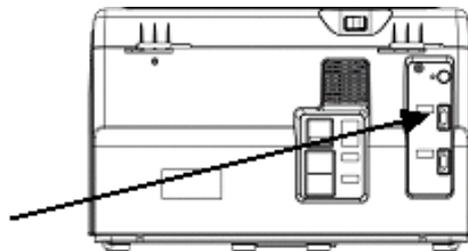


**6. Replace the BA01 board with a new one and assemble the board in the reverse order of removal.**

**7. Write a program.**

7.1) When using a personal computer (PC):

- 1) Connect the RS-232C cross cable (LEDJ-10 40390-E006) between the PC/LAN connector on the LE-9000 and the COM1 port of the PC (40390-E001).
- 2) Slide protect switch SW1 on the BA01 board to the ON position to disable write protection.
- 3) Turn on the LE-9000. The display panel displays nothing. In addition, the LE-9000 is not initialized.
- 4) Start the Flash Writer PRO.
- 5) Select the Open command from the File menu and designate a program file (e.g. LE10\_Master\_V108\_11. mot) to be written.
- 6) The dialog informs you that downloading of the program will be started. Click the OK button. The window indicating the progress of writing is displayed.
- 7) Writing is completed in about 8 minutes. The progress window is closed. If the writing of the program failed, any warning message is displayed.
- 8) Exit Flash Writer PRO.
- 9) Disconnect the RS-232C cross cable.
- 10) Slide the SW1 on the BA01 board of the LE-9000 back to the FWP position.
- 11) Attach the covers of the main body (see 4.1.1).
- 12) Turn on the LE-9000 and press the MENU button twice to check the version No.

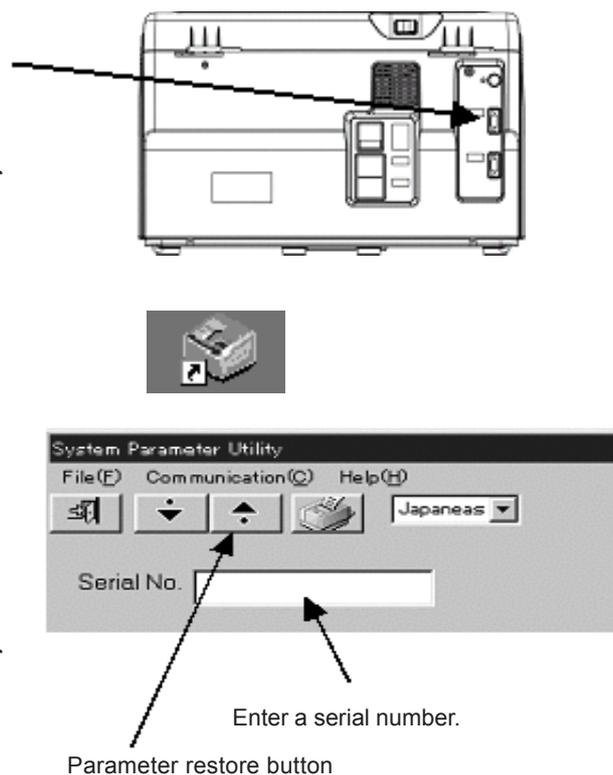


## 7.2) When using the FZ Recorder (40390-E007):

- 1) Connect the RS-232C cross cable between the PC/LAN connector on the LE-9000 and the FZ recorder.
- 2) Slide SW1 on the BA01 board to the ON position to disable write protection.
- 3) Slide the LOAD/PROGRAM selector of the FZ Recorder to PROGRAM.
- 4) Turn on the FZ Recorder.
- 5) Turn on the LE-9000. The display panel displays nothing. In addition, the LE-9000 is not initialized.
- 6) Press the START switch of the FZ Recorder. The START LED is illuminated.
- 7) Writing is completed in about 6 minutes. When the writing of the program is completed successfully, the START LED goes out.
- 8) Turn off the LE-9000 and FZ Recorder.
- 9) Disconnect the RS-232C cross cable.
- 10) Slide the SW1 on the BA01 board of the LE-9000 to the FWP position.
- 11) Attach the covers of the main body and screw them.
- 12) Turn on the LE-9000 and press the MENU button twice to check the version No.

**8. Transfer the internal parameter settings.**

- 1) Connect the RS-232C cross cable (LEDJ-10 40390-E006) between the COM1 port on the personal computer (40390-E001).
- 2) Turn on the main body.
- 3) On the Parameter exchange mode screen of the LE-9000, set the 10) Ext. interface parameter to None.
- 4) Double-click the System Parameter Utility icon to start it.
- 5) Enter a serial number of the LE-9000 whose parameter settings have been backed up in the PC.
- 6) Click the parameter restore button.  
The parameter settings of the LE-9000 saved in the personal computer are transferred to the LE-9000 and restored.
- 7) On the Parameter exchange mode screen of the LE-9000, reset the 10) Ext. interface parameter setting to the original one.
- 8) Turn off the main body.



## 4.6 Replacing the BA02 Board

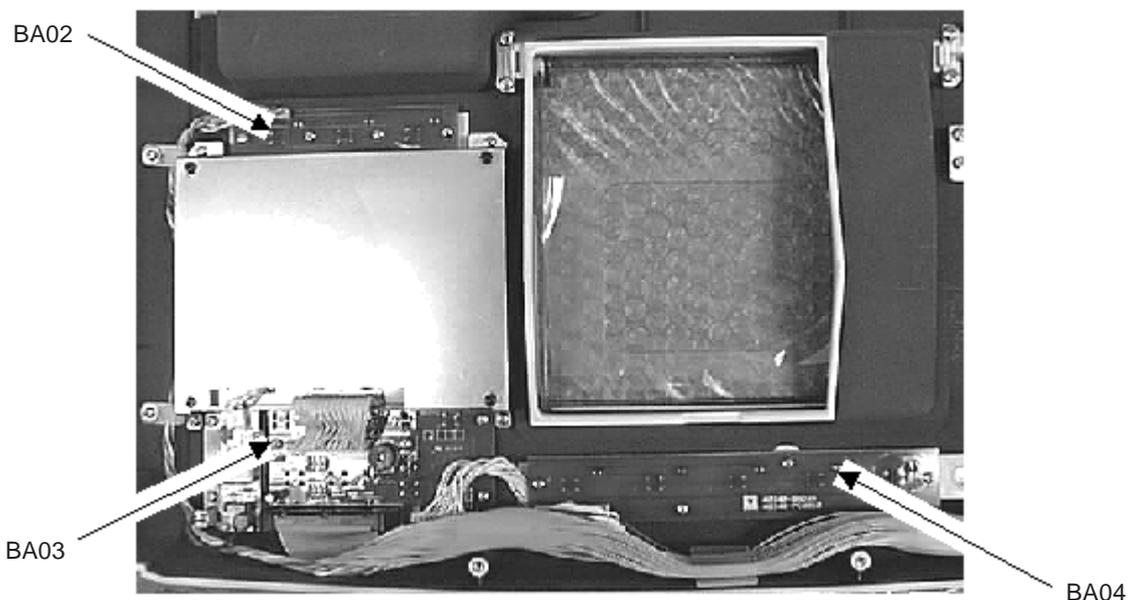
1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Disconnect the connector on the BA02 board.
3. Unscrew P tight screws (M47)(n=4) and take off the BA02 board.
4. Replace the BA02 board with a new one and assemble the removed parts in reverse order.

## 4.7 Replacing the BA03 Board

1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Disconnect the connector on the BA03 board and the connector on the inverter board.
3. Unscrew P tight screws (M47)(n=6) and take off the BA03 board.
4. Unscrew PC2×12 (n=2) and take off the inverter board.
5. Replace the BA03 board with a new one and assemble the removed parts in reverse order.

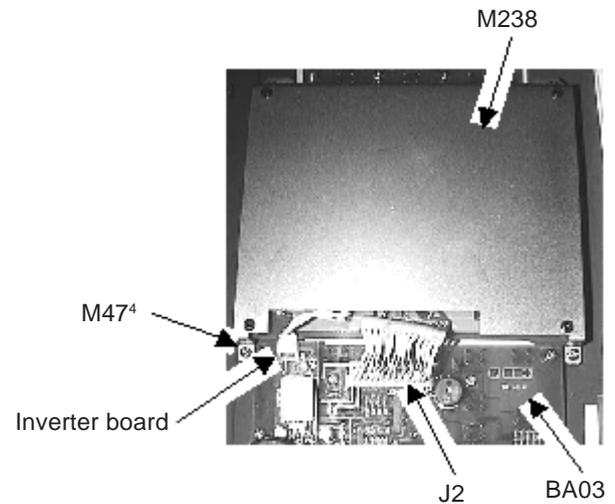
## 4.8 Replacing the BA04 Board

1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Disconnect the connector on the BA04 board.
3. Unscrew P tight screws (M47)(n=4) and take off the BA04 board.
4. Replace the BA04 board with a new one and assemble the removed parts in reverse order.



## 4.9 Replacing the LCD Display (E31)

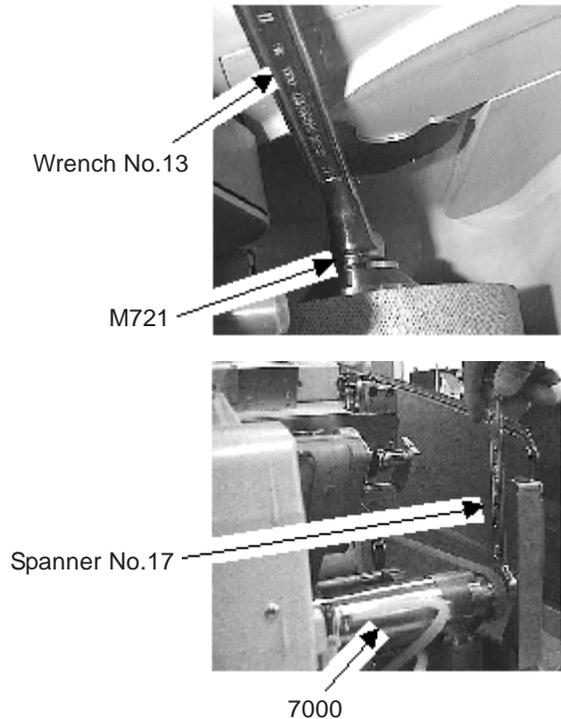
1. Remove the cover ASSY (2000, 2A00) (see 4.1.2).
2. Disconnect the connector from J2 on the BA03 board and the connector on the inverter board.
3. Unscrew P tight screws (M47)(n=4) and take off the display holder (M238).



4. Unscrew PC3×4 (n=4) and take off the LCD display (E31) from the display holder (M238).
5. Replace the LCD display (E31) with a new one and assemble the removed parts in reverse order.

## 4.10 Replacing the Wheel

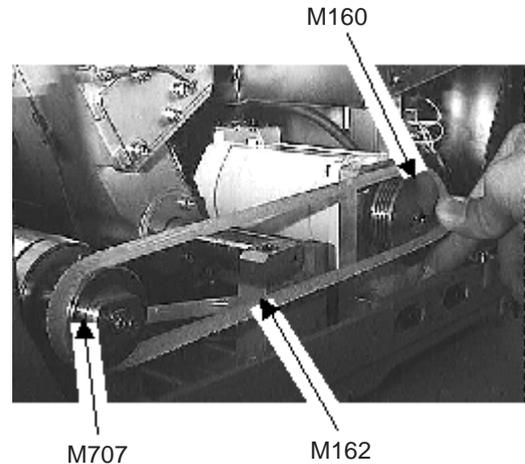
1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Unbolt the hex head bolt (M722) and remove the wheel holder (M721).
  - \* Use the wrench No. 13 and the spanner No. 17.



3. Take off the wheel.
4. Coat the spindle (7000) and the inside of the new wheel with grease.
5. Replace the wheel with a new one and assemble the removed parts in reverse order.
  - \* Set the inscription on the side of the wheel to the left toward the instrument.
  - \* Set the arrow on the wheel for polycarbonate lens to the wheel rotation direction.
  - \* See the operator's manual for the positioning of the wheels.
  - \* After assembling, perform the following adjustments.
    - 1) Bevel position adjustment (see 5.2).
    - 2) Size adjustment (see 5.1).

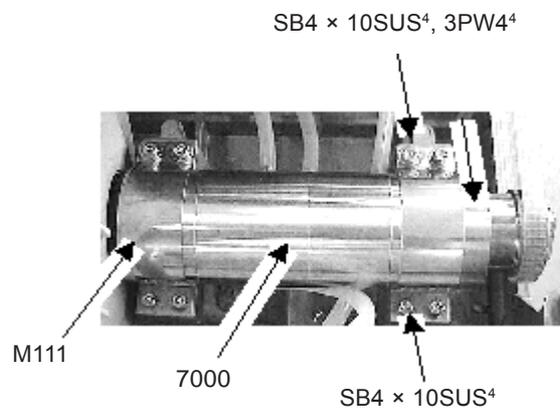
## 4.11 Replacing the V belt (M162)

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the side cover (M204) (see 4.2).
3. Take off the V belt (M162) while turning the spindle ASSY (7000).
  - \* When turning the wheel etc., protect your hand by wearing gloves, etc.
4. Put the new V belt (M162) on the small pulley (M160) of the motor ASSY (1400).
5. Put the other side of the V belt (M162) on the small pulley (M707) of the spindle ASSY (7000) while turning the wheel.



## 4.12 Replacing the Spindle ASSY (7000)

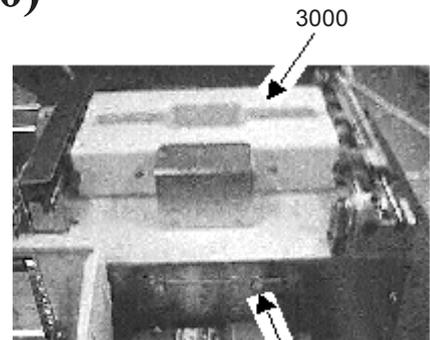
1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the side cover (M204) (see 4.2).
3. Take off the wheel (see 4.10).
4. Take off the V belt (M162) (see 4.11).
5. Pull out the spindle ASSY (7000) to right, loosening SB4×10SUS (n=8) and 3PW4 (n=4) which hold the band (M111)(n=2) and the washer (M113)(n=2).
  - \* Be careful not to drop screws.
  - \* Pull out the spindle ASSY (7000) to right while raising to remove from the positioning pin (M112).



6. Replace the spindle ASSY (7000) with a new one, aligning with the positioning pin (M112) and assemble the removed parts in reverse order.
  - \* After assembling, perform the following adjustments.
    - 1) Bevel position adjustment (see 5.2).
    - 2) Size adjustment (see 5.1).

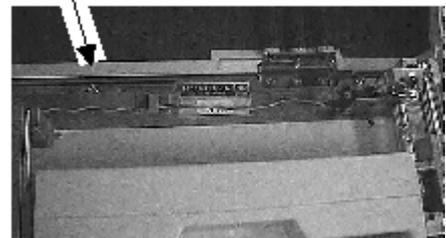
## 4.13 Replacing the Tracer ASSY (3000)

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Disconnect the connector from J2 on the BA15 board.
3. Loosen SB4×8SUS (n=2) at front, unscrew SB4×8SUS (n=2) at back, and then remove the tracer ASSY (3000) while raising.



SB4 × 8 SUS<sup>2</sup>

SB4 × 8 SUS<sup>2</sup>



4. Replace the tracer ASSY (3000) with a new one and assemble the removed parts in reverse order.

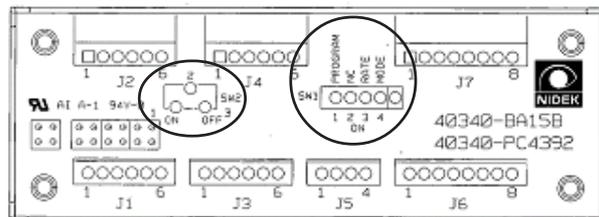
\* Check DIP switches on the BA15 board of the tracer ASSY and set them as instructed in the table below.

### ■ DIP SW standard settings

Model	SW1	SW2
<b>LE-9000</b> Built-in tracing unit	1: OFF 2: OFF 3: ON 4: OFF	OFF
《Ref.》 LT-900	MEGANET specs. STD specs. DVI specs.	1: OFF 2: OFF 3: OFF 4: OFF
	LAB specs.	1: OFF 2: OFF 3: ON 4: OFF

### ■ DIP SW settings

SW	Label	Description
SW1	1: PROGRAM	Set to ON when writing a program.
	2: NC	Not connected. Not used.
	3: RATE	For setting the baud rate for the COM1 port. * Baud rate for the main body of the LE-9000 Set this SW in agreement with the parameter setting of [Tracer]. OFF: 9600BPS ON: 38400BPS
	4: MODE	For setting the adjustment mode. Ordinarily, set to OFF.
SW2	-	This SW is for setting a power supply of 5V to the COM1 port. Set to ON when connecting a communication device such as the SI-30, FA-10 or FA-11 to a communication port.

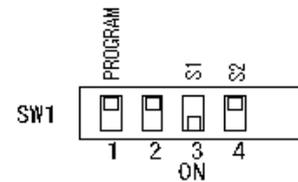


- \* After assembling, perform the following adjustments.
- 1) Torque calibration of the tracer ASSY (see 5.15).
  - 2) Auto calibration of the tracer ASSY (see 5.14).

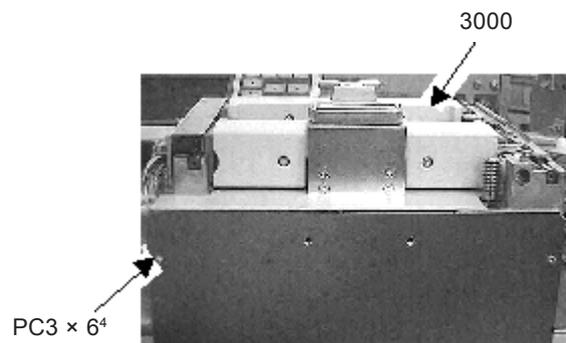
## 4.14 Replacing the BA11 Board

1. **Open the cover ASSY (2000, 2A00) (see 4.1.1).**
2. **Save the internal parameter settings in the PC.**

- 1) Set the S2 switch of DIP SW 1 on the BA15 board to ON position (to DOWN).
- 2) Connect the interface cable (40390-CA01) to J4 on the BA15 board and to COM1 port of the PC (40390-E001).
- 3) Turn on the power of the main body.
- 4) Double-click  to start Trace Utility. After start, the right window appears.
- 5) Click [Receive] - [Parameter].
- 6) The Input Serial Number window appears, so input the serial number and click "OK".
- 7) If the data is saved properly, the "Send Command A0H. Command A1H Received. Succeeded to save the parameter." message appears on the screen.
- 8) Turn off the power of the main body.



3. **Remove the tracer ASSY (see 4.13).**
4. **Unscrew PC3×6 (n=4) and remove the lower cover (M496).**

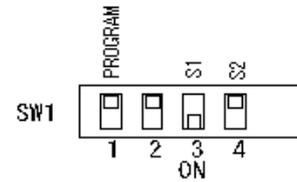


5. **Disconnect the connectors from J2 to J12 on the BA11 board.**
6. **Unscrew PC3×6 (n=4) and take off the BA11 board.**
7. **Replace the BA11 board with a new one and assemble the removed parts in reverse order of disassembly.**

**8. Write the program.**

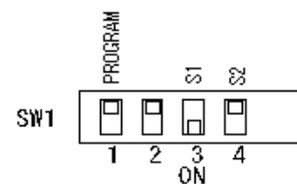
## 8.1) When using a PC:

- 1) Set Switch 1 (PROGRAM switch) of switchpack SW1 on the BA15 board to the ON position (to DOWN).
- 2) Connect the interface cable (40390-CA01) to J4 on the BA15 board and to the COM1 port of the PC (40390-E001).
- 3) Turn on the LE-9000.
- 4) Start the Flash Writer PRO.
- 5) Select the Open command from the File menu and designate a file (e.g. Le10\_Tracer\_V201.mot) to be written on.
- 6) The dialog informs you that downloading of the program is started. Click the OK button. The window indicating the progress of writing is displayed.
- 7) Writing is completed in about 3 minutes. The progress window is closed. If the writing of the program failed, any warning message is displayed.
- 8) Exit Flash Writer PRO.
- 9) Turn off the LE-9000.
- 10) Set Switch 1 (PROGRAM switch) on the BA15 board of the LE-9000 to the OFF position (to UP).
- 11) Attach the covers of the main body (see 4.1.1).
- 12) Turn on the LE-9000 and press the MENU button twice to check the version No.



## 8.2) When using the FZ-RECORDER (40390-E007):

- 1) Set Switch 1 (PROGRAM switch) of switchpack SW1 on the BA15 board to the ON position (to DOWN).
- 2) Connect the interface cable (40390-CA01) to J4 on the BA15 board and to the FZ-Recorder (40390-E007).
- 3) Slide the LOAD/PROGRAM selector of the FZ Recorder (40390-E007) to PROGRAM.
- 4) Turn on the FZ Recorder (40390-E007).
- 5) Turn on the LE-9000.
- 6) Press the START switch of the FZ Recorder (40390-E007). The START LED is illuminated while communication is performed properly.
- 7) After making sure that the START LED goes out, turn off the main body of the LE-9000 and FZ-Recorder (40390-E007).
- 8) Set Switch 1 (PROGRAM switch) on the BA15 board to the OFF position (to UP).



**9. Transfer the internal parameter settings.**

- 1) Connect the interface cable (40390-CA01) to J4 on the BA15 board and to COM 1 port of the personal computer (40390-E001).
- 2) Turn on the main body.
- 3) Click [Send] - [Parameter].
- 4) Input the serial number.
- 5) Electric sound is heard from the tracer and the internal parameter settings are transferred.
- 6) Turn off the main body.
- 7) Disconnect the interface cable (40390-CA01).
- 8) Set the S2 switch of DIP SW 1 on the BA15 board to the OFF position (to UP).

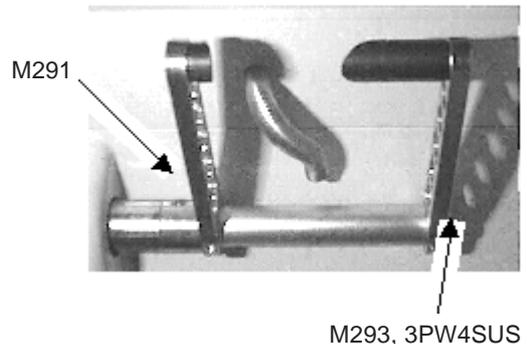
## 4.15 Updating the Tracer Program

1. See step 8 of “4.14”.
2. Perform torque calibration (see 5.15).
3. Perform auto calibration using the calibration jigs (LEDJ-10 M301 and LEDJ-6 M002) (see 5.14).

## 4.16 Replacing the Feeler ASSY (4100) of the lens measuring ASSY

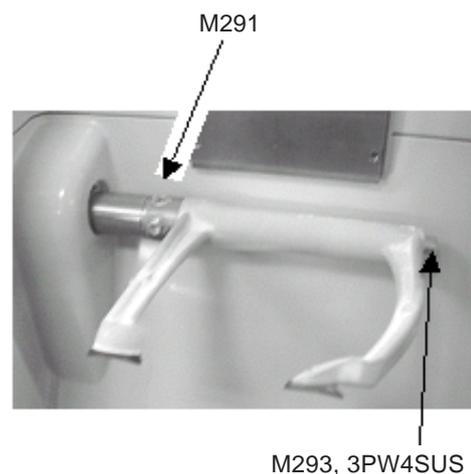
### 4.16.1 Replacing the old-type feeler ASSY

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Loosen HH4×3SUS (M291)(n=2).
3. Unscrew SB4×70 (M293) and 3PW4SUS and then remove the feeler ASSY (4100).
4. Assemble the new or removed feeler ASSY (4100) in the reverse order of removal.
  - \* After assembling, perform the following adjustments.
    - 1) Feeler reference position adjustment (see 5.8).
    - 2) Feeler initialization position adjustment (see 5.9).
5. Attach the cover ASSY (2000, 2A00) (see 4.1.1).
6. Perform calibration of the lens measuring ASSY (see 5.11).



### 4.16.2 Replacing the new-type feeler ASSY

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Unscrew HH4×3SUS (M291) (n=2).
3. Unscrew SB4×70 (M293) and 3PW4SUS and remove the feeler ASSY (4100).
4. Assemble the new or removed feeler ASSY (4100) in the reverse order of removal.
  - \* After assembling, perform the following adjustments.
    - 1) Feeler reference position adjustment (see 5.8).
    - 2) Feeler initialization position adjustment (see 5.9).
5. Attach the cover ASSY (2000, 2A00) (see 4.1.1).
6. Perform calibration of the lens measuring ASSY (see 5.11).

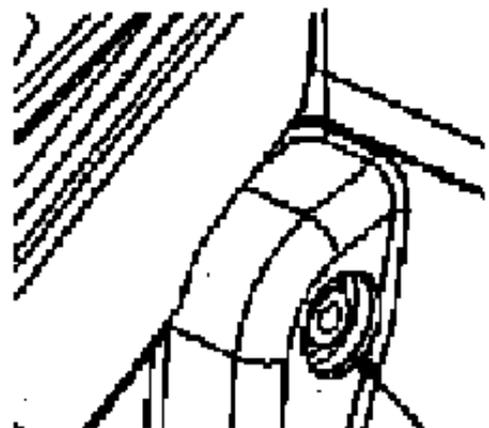
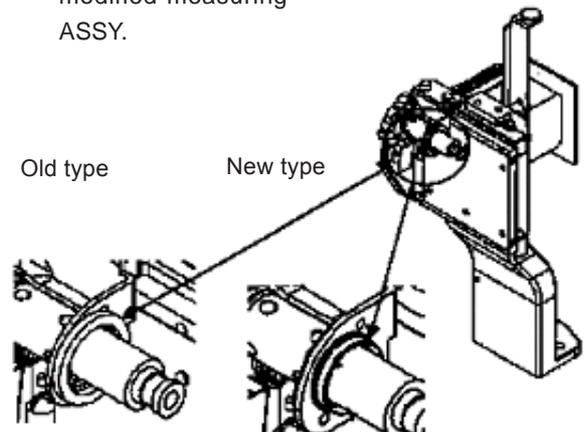
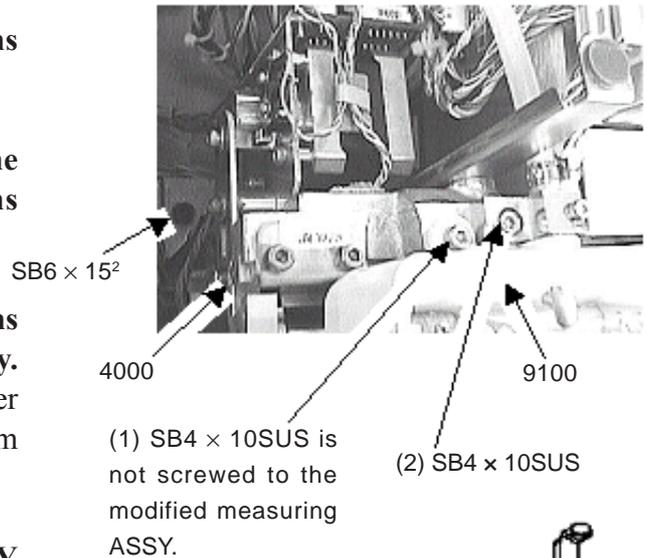


## 4.17 Replacing the Lens Measuring ASSY (4000)

1. Remove the feeler ASSY (4100) of the lens measuring ASSY (see 4.16).
2. Unscrew SB4×10SUS (n=1 or 2) fixing the grinding chamber ASSY (9000) and lens measuring ASSY (4000).
3. Unscrew SB6×15 (n=2) and take out the lens measuring ASSY (4000) from the main body.  
\* Two spacers (M112) are attached to the lower area of the lens measuring ASSY. Attach them to the base (M001).
4. Assemble the new lens measuring ASSY (4000) in the reverse order of disassembly.

SB4×10SUS (1) is not used in the new-type lens measuring ASSY (Modified lens measuring ASSY as a countermeasure against grinding waste deposited in a clearance between the feeler shaft and grinding unit) as shown on the right. In the modified lens measuring ASSY, attach the lower of the

When assembling the modified lens measuring ASSY, insert the metal sleeve of the lens measuring unit into the hole of the feeler shaft of the grinding unit as shown on the right.

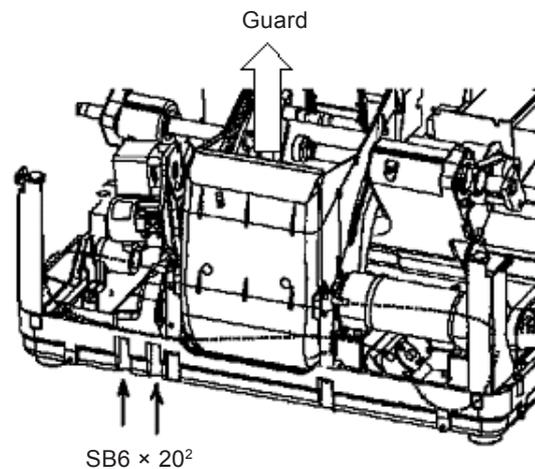


5. Assemble the new or removed feeler ASSY (4100) in the reverse order of disassembly. (See 4.16.)  
\* After assembling, perform the following adjustments.
  - 1) Feeler reference position adjustment (see 5.8).
  - 2) Feeler initialization position adjustment (see 5.9).
6. Attach the cover ASSY (2000, 2A00) (see 4.1.1).
7. Perform calibration of the lens measuring ASSY (see 5.11).

## 4.18 Replacing the Groove and Safety Bevel ASSY (6000)

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the guard (M931).
3. Disconnect relay connectors (CN03, CN04 and CN05) of the wiring of the groove and safety bevel ASSY (6000).
4. From the bottom of the base (M001), unscrew SB 6×20 (n=2) fixing the groove and safety bevel ASSY to remove it from the main body.

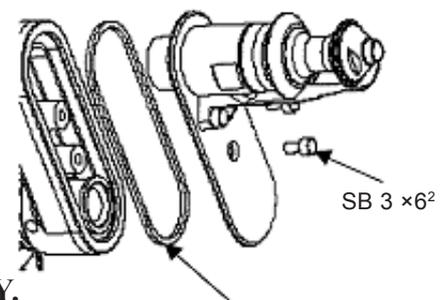
\* Two spacers (M112) are attached to the lower area of the groove and safety bevel ASSY. Attach them to the base (M001).



5. Assemble the new groove and safety bevel ASSY (6000) in the reverse order of disassembly.
6. Attach the cover ASSY (2000, 2A00) (see 4.1.1).
7. Adjust the position of the arm of the groove and SFB ASSY (see 5.7).
8. Perform calibration of the groove and SFB ASSY (see 5.14).
9. Perform groove and safety bevel adjustments (see 5.5).

## 4.19 Replacing the Spindle ASSY (6600) of the Groove and Safety Bevel ASSY

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the guard (M931).
3. Lower the arm of the groove and SFB ASSY.
4. Unscrew SB 3×6 (n=2) as shown on the right.
5. Replace the spindle ASSY (6600) of the groove and SFB ASSY.
6. Adjust the position of the arm of the groove and SFB ASSY (see 5.7).
7. Perform calibration of the groove and SFB ASSY (see 5.14).
8. Perform groove and safety bevel adjustments (see 5.5).

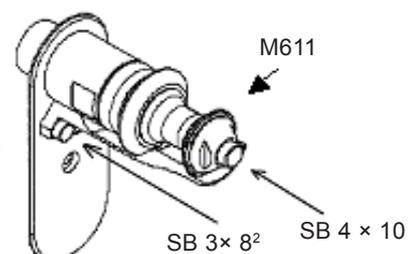


## 4.20 Replacing the Grooving and SFB Wheels

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Unscrew SB 3×8 (n=2) to remove the wheel cover.
3. Unscrew SB 4×10 while applying wrench No.10 to the notches of the wheel holder (M611).
4. Assemble the SFB wheel and wheel cover in the reverse order of removal.

\* The inscription on the SFB wheel should direct to the right side of the figure.

5. Perform calibration of the groove and SFB ASSY (see 5.14).
6. Perform groove and safety bevel adjustments (see 5.5).



## 4.21 Replacing the Wheel Motor Driver ASSY (1500/1800)

\* 1500: For 100V, 1800: For 200V

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Take out the tracer ASSY (3000) (see 4.13).
3. Unscrew CS4×8 (n=2) to remove the driver ASSY (1500/1800).
4. Attach the new driver ASSY (1500/1800) in the reverse order of disassembly.

\* After attaching the new driver ASSY, set the driver as instructed below.

1) Turn on the power switch.

2) Press  and make sure that “00” is displayed on the LED.

3) Set parameter 00.

Press  to set the parameter to “0” with  or .

4) Select parameter 01.

Press  to set the parameter to “1” with  or .

5) Set parameter 01.

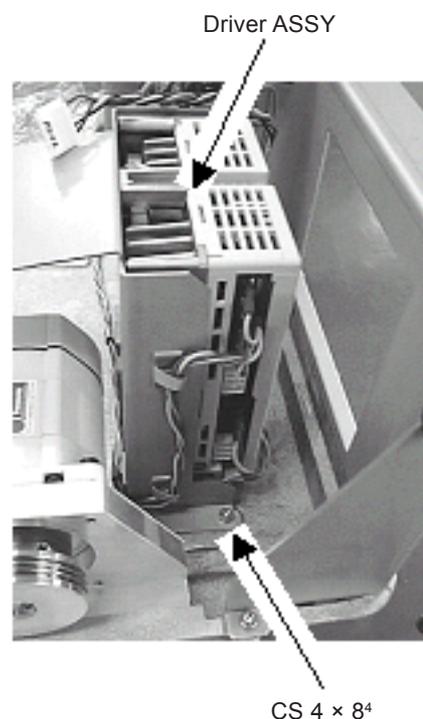
Press  to set the parameter to “1000” with  or .

6) In the same manner as steps 4) and 5), set parameters 02 to 26 as shown in the table below:

No.	Parameter setting	No.	Parameter setting
0	0	11	Trip
1	1000	12	0. – r
2	2000	13	3000
3	3000	15	NO
4	BOTH	21	150
5	PnL	22	10
6	1	23	2
7	3	24	2
8	r – F	25	YES
9	STEP	26	4
10	STEP		

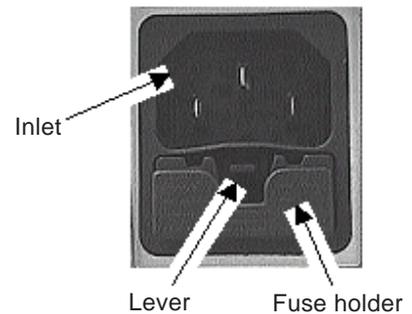
7) Press . When CAU is displayed on the LED, turn off the main body.

\* Turn on the main body after LED has turned off.



## 4.22 Replacing the Fuses

1. Disconnect the power cord from the inlet.
2. Take out the fuse holder while pressing the lever under the inlet.
3. Remove fuses (804-02-02037).
4. Replace fuses with new ones (804-02-02037) and assemble the removed parts in reverse order.



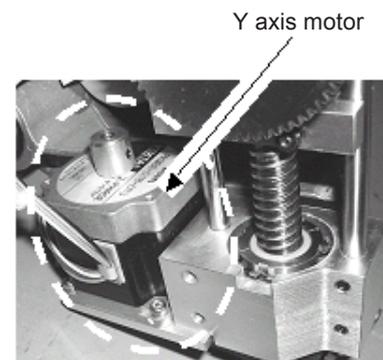
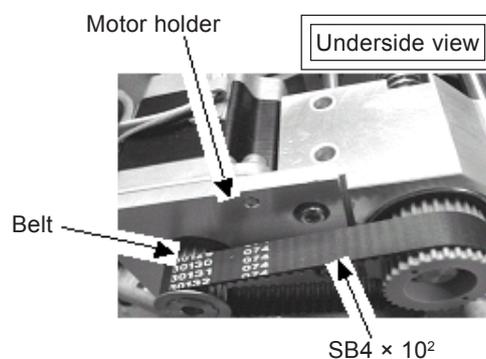
## 4.23 Replacing the Y Axis Motor (LE10SP-1 5410, Motor: LE-10A E036)

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the side cover (M205) (see 4.2).
3. Unscrew SB 4×8 (n=2) and remove the two nylon cable ties securing the feedwater pipe on the left (attached to poles (M131) in front of the grinding unit).
  - \* Because the feedwater pipe easily bents, avoid touching it during the replacement work. When touching the feedwater pipe, to prevent it from being bent, handle the feedwater pipe so that the curvature of a bent part in the feedwater pipe is not smaller than that of the originally curved part.
4. Unscrew SB 4×10 (n=2) to remove M176 (cover holder L) standing at the left front corner of the base.
5. Replace the Y axis motor.

### 5.1) Replacing the Y axis motor (LE10SP-1 5410):

- 1) Unscrew SB 4×10 (n=2) securing the motor holder for the Y axis motor from the underneath and remove the Y axis motor and belt (M596).

\* As for the wiring of the cables from the Y axis motor, follow the instruction in step 1) on the next page.

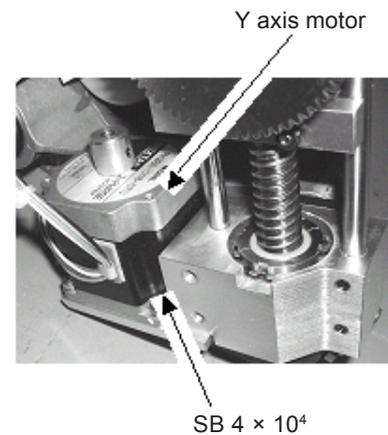


- 2) Replace with the new Y axis motor ASSY (LE10SP-1 5410) and attach it in the reverse order of disassembly.
  - \* Make sure that the cables from the Y axis motor are wired as shown in step 3) on the next page.
  - \* After assembling the Y axis motor, perform the following adjustment.
    - 1) Tension adjustment of Y axis belt (see 5.19).

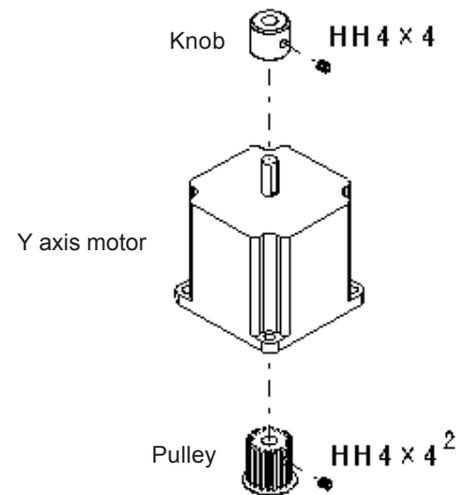
### 5.2) Replacing the Y axis motor (E036):

- 1) Unscrew SB 4×10 (n=4) securing the Y axis motor to remove the Y axis motor and belt (M596).

\* The cables from the Y axis motor are secured to the main body of the carriage with the nylon cable ties. Remove the cable ties and cut tie wraps tying the cables to the BA05 board together. After releasing the cables, disconnect connectors from the BA05 board. (If the metal cover is assembled to the BA05 board, remove the metal cover before connecting or disconnecting connectors.)



- 2) Unscrew HH4×4 (n=3) to remove the knob (M599) assembled to the Y axis motor and pulley (M595 and M540: caulked).



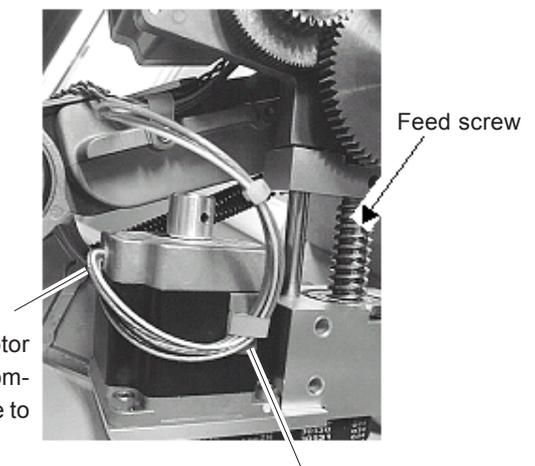
- 3) Replace with the new Y axis motor (E036) and assemble it in the reverse order of disassembly.

\* Assemble the knob and pulley by applying the HH screws to the chamfered surface of the motor shaft.

\* Wire the cables from the Y axis motor as shown in the picture. After that, secure the cables with metal cable ties (K-103G) to the Y axis motor.

\* After assembling the Y axis motor, perform the following adjustment.

- 1) Tension adjustment of Y axis belt (see 5.19).



Assemble the Y axis motor so that the cables are coming from the opposite side to the feed screw.

After wiping the soiling off the side surface of the motor with a mixed solvent (50% ethyl alcohol and 50% ethanol), attach the metal cable ties as shown.



# §5 ADJUSTMENTS

## 5.1 Size Adjustment

**1. Preparation: Write down the settings of the Size preset parameters on the Parameter exchange mode screen and set all these parameters to 0 in advance.**

**2. Display the built-in  $\phi 45$  standard frame data.**

**3. Perform beveling and flat edging of plastic lens.**

Use the lens of CR39, -3 to -5D or so.

**4. Measure the diameter of the ground lens and set the parameter so that the diameter becomes  $\phi 45.00 \pm 0.05$  mm for beveling and  $\phi 45.00 \pm 0.10$  mm for flat edging.**

[Adjustment parameter of beveling size]

1) Press .

2) Align the cursor to "Size adjustment" and press .

3) Input the compensation value into "Finish Size (PLA, bevel)".

\* When the finished diameter is  $\phi 46$ , input -1.00.

[Adjustment parameter of flat edging size]

1) Press .

2) Align the cursor to "Size adjustment" and press .

3) Input the compensation value into "Finish Size (PLA, flat)".

**5. In the same manner, perform size adjustment of polycarbonate lenses.**

[Adjustment parameter of polycarbonate lens size]

"Finish Size (PC, bevel)"

"Finish Size (PC, flat)"

**6. In the same manner, perform size adjustment of glass lenses.**

[Adjustment parameter of glass lens size]

"Finish Size (GLS, bevel)"

"Finish Size (GLS, flat)"

**7. In the same manner, perform size adjustment of high index plastic lenses.**

[Adjustment parameter of high index lens size]

"Finish Size (HPL, bevel)"

"Finish Size (HPL, flat)"

**8. Frame changing size may vary depending on the subtle difference between groove shape of frame and bevel shape of ground lens even when the size adjustment from steps 3 to 6 is performed.**

In such a case, perform size adjustment by changing "Size preset" on the Parameter exchange mode display.

## 5.2 Bevel Position Adjustment

1. Display the built-in  $\phi 45$  standard frame data.
2. Perform guided beveling (5 : 5) and check the bevel position.
3. Change the parameter so that the bevel is positioned at the center of the edge.

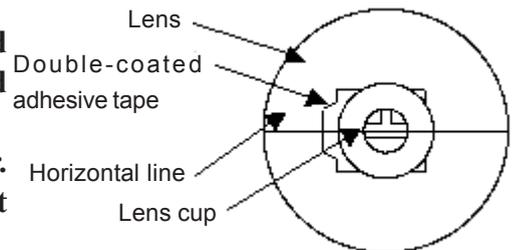
[Adjustment parameter of bevel position]

- 1) Press .
- 2) Align the cursor to “Bevel adjustment” and press .
- 3) Input the compensation value into “Bevel constant”.

\* To move the bevel position to lens front, input the minus value.

## 5.3 Axis Angle Adjustment

1. Display the built-in  $\square 45$  standard frame data.
2. Draw a horizontal line on the plastic lens center with a cutter.
3. Block the lens with a lens cup (using a double-coated adhesive tape) aligning the horizontal line and then grind the lens.
4. Measure the axis of the ground lens with a graph paper.
5. Change the parameter so that the horizontal line is not tilted.



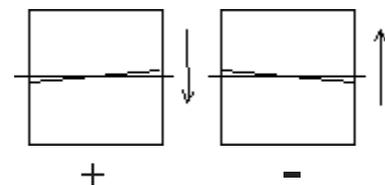
[Adjustment parameter of bevel axis]

- 1) Press .
- 2) Align the cursor to “AXIS adjustment” and press .
- 3) Input the compensation value into “PLA AXS const. (bevel)”.

\* When the horizontal line is tilted to the upper right viewed from the lens front, input the plus value.

[Adjustment parameter of flat axis]

- 1) Press .
- 2) Align the cursor to “AXIS adjustment” and press .
- 3) Input the compensation value into “PLA AXS const. (flat)”.



6. In the same manner, adjust the axis of polycarbonate lens.

[Adjustment parameter of polycarbonate lens axis]

“PC AXS const. (bevel)”

“PC AXS const. (flat)”

7. In the same manner, adjust the axis of glass lens.

(Ordinarily, the following parameters should be set to the same values as the “PLA AXS const. (bevel)” and “PLA AXS const. (flat)” parameters. Adjust the following parameter settings if an axis shift resulted with the same parameter settings as those for plastic lenses.)

[Adjustment parameter of glass lens axis]

“GLS AXS const. (bevel)”

“GLS AXS const. (flat)”

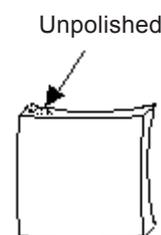
## 5.4 Polishing Adjustment

### 5.4.1 Polish level and Polish axis adjustment

1. Press .
2. Align the cursor to “Size adjustment” and press .
3. Set “Polish wheel size” to +1.20.  
However, set to 0.00 for type PLB and type PLB-2R.
4. Display the built-in  45 standard frame data.
5. Perform flat edge polishing.
6. When the lens is partly unpolished, change the parameter.

[Adjustment parameter of polish axis]

- 1) Press .
- 2) Align the cursor to “AXIS adjustment” and press .
- 3) Input the compensation value into “POL AXS const. (flat)”.  
\* When the upper left of the lens edge is not polished as the right figure shows, input the plus value (+0.50 or so as a guide).



7. When the unpolished amount is the same between left edge and right edge, increase the polishing amount (Polish level).

[Adjustment parameter of polish level]

- 1) Press .
- 2) Align the cursor to “Size adjustment” and press .
- 3) Input the compensation value into “Polish level (PLA)” and “Polish level (PC)”.  
\* To increase the polishing amount, input a plus value.  
\* If the Polish level parameter is set to + 0.50 or higher (as a guide), the corners of the polished lens will be rounded. Set the Polish level parameter to + 3.0.  
\* If the unpolished part is still found when the Polish level parameter is set to +0.30, the polishing performance may have been reduced, so dress the polishing wheel.

## 5.4.2 Polish size adjustment

1. Display the built-in  $\phi 45$  standard frame data.
2. Perform flat edge polishing.
3. Measure the diameter of the ground lens and change the parameter so that the diameter becomes  $\phi 45.0$  to  $\phi 45.1$  mm.

[Adjustment parameter of polish level]

- 1) Press .
- 2) Align the cursor to "Size adjustment" and press .
- 3) Input the compensation value into "Polish Size (PLA, flat)", "Polish Size (PC, flat)" and "Polish Size (HPL, flat)".

\* When the finish size is  $\phi 45.5$  mm, input -0.50.

## 5.4.3 Polycarbonate polish finishing allowance adjustment

1. Press .
2. Align the cursor to "Size adjustment" and press .
3. Record the value of "Polish level (PC, flat)".
4. Set "Polish level (PC, flat)" to 0.00.
5. Set "Polish Differential (PC)" to 0.00.
6. Display the built-in  $\phi 45$  standard frame data.
7. Change the parameter so that the lens is slightly polished.  
[Adjustment parameter of polycarbonate polish finishing allowance]
  - 1) Press .
  - 2) Align the cursor to "Size adjustment" and press .
  - 3) Input the compensation value into "Polish Differential (PC)".

\* To increase the polishing amount at dry polishing, input the plus value.
8. Add +0.20 to the value of "Polish Differential (PC)" adjusted in step 7.
9. Input the recorded value into "Polish level (PC, flat)".

## 5.5 Groove and Safety Bevel Adjustments

### 5.5.1 Groove position adjustment and SFB wheel height adjustment

1. Display the built-in  $\phi 45$  standard frame data.
2. Perform guided grooving (5:5, depth: 0.00) of CR39, -3 to -5D lens.
3. Change the parameter so that the groove is positioned at the center of the lens edge.  
[Adjustment parameter of groove position]
  - 1) Press .
  - 2) Align the cursor to "Groove & SFB adjustment" and press .
  - 3) Input the compensation value into "Groove Position".
    - \* To move the groove position to lens front, input the minus value.
4. Change the parameter so that the lens is slightly grooved (groove depth 0.1 mm or less).  
[Adjustment parameter of groove depth]
  - 1) Press .
  - 2) Align the cursor to "Groove & SFB adjustment" and press .
  - 3) Input the compensation value into "SFB Wheel Height".
    - \* To make a shallow groove depth, input the minus value.
    - \* When the parameter "Groove & SFB adjustment" is changed, perform adjustment of groove and safety bevel again.

### 5.5.2 SFB wheel position adjustment in beveling

1. Display the built-in  $\phi 45$  standard frame data.
2. Press .
3. Align the cursor to "Groove & SFB adjustment" and press .
4. Record the value of "SFB Width (bevel, front)" and "SFB Width (bevel, rear)".
5. Set "SFB Width (bevel, front)" and "SFB Width (bevel, rear)" to 0.00.
6. Set "Safety Bevel Mode" to F&R.
7. With a lens of CR39, -3 to -5D, perform guided beveling (5:5) and safety beveling.
8. Change the parameter so that the safety bevel is slightly made (safety bevel width 0.1 mm or less).  
[Adjustment parameter of SFB wheel position in beveling]
  - 1) Press .
  - 2) Align the cursor to "Groove & SFB adjustment" and press .
  - 3) Input the compensation value into "SFB Wheel Pos. (BVL, F)" and "SFB Wheel Pos. (BVL, R)".
    - \* To reduce the safety bevel width, input the minus value.
9. Input the recorded value into "SFB Width (bevel, front)" and "SFB Width (bevel, rear)".

### 5.5.3 SFB wheel position adjustment in flat edging

1. Display the built-in  $\phi 45$  standard frame data.
2. Press .
3. Align the cursor to “Groove & SFB adjustment” and press .
4. Record the value of “SFB Width (flat, front)” and “SFB Width (flat, rear)”.
5. Set “SFB Width (flat, front)” and “SFB Width (flat, front)” to 0.00.
6. Set “Safety Bevel Mode” to F&R.
7. With a lens of CR39, -3 to -5D, perform guided flat edging and safety beveling.
8. Change the parameter so that the safety bevel is slightly made (safety bevel width 0.1 mm or less).  
[Adjustment parameter of SFB wheel position in flat edging]
  - 1) Press .
  - 2) Align the cursor to “Groove & SFB adjustment” and press .
  - 3) Input the compensation value into “SFB Wheel Pos. (FLT, F)” and “SFB Wheel Pos. (FLT, R)”.

\* To reduce the safety bevel width, input the minus value.
9. Input the recorded value into “SFB Width (flat, front)” and “SFB Width (flat, rear)”.

### 5.5.4 Groove and safety bevel axis adjustment

1. Display the built-in  $\square 45$  standard frame data.
2. Perform guided grooving (depth: 0.00) and safety beveling.
3. Change the parameter so that the groove depth is made evenly in circumference.  
[Axis adjustment of groove and safety bevel]
  - 1) Press .
  - 2) Align the cursor to “AXIS ADJUSTMENT” and press .
  - 3) PLA GROOVE AXS const  
This parameter is for adjusting the axis angle of the grooved plastic or glass lenses.
  - 4) PLA SFB AXS const  
This parameter is for adjusting the axis angle of the chamfered plastic or glass lenses.
  - 5) PC GROOVE AXS const  
This parameter is for adjusting the axis angle of the grooved polycarbonate lenses.
  - 6) PC SFB AXS const  
This parameter is for adjusting the axis angle of the chamfered polycarbonate lenses.

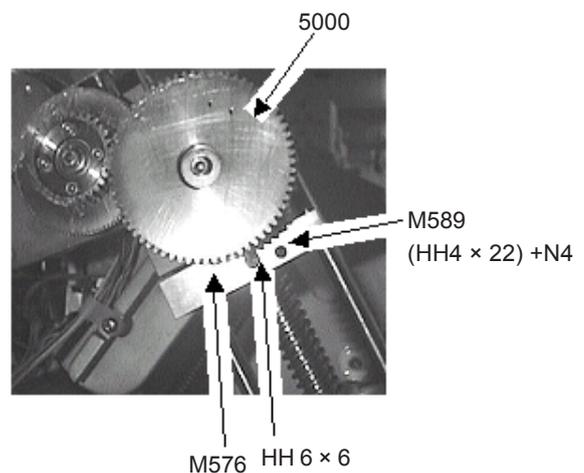
\* When the lens upper right is deeper viewed from the lens front, input a minus value.

## 5.6 Position Adjustment of the Edge End Sensor (CA47)

1. Turn the power on while holding down .
2. Align the cursor to **EDGE SENSOR VOLTAGE** with  or .
3. Press .



4. Open the cover ASSY (2000, 2A00) (see 4.1.1).
5. Remove the left side cover (M205) (see 4.2).
6. Loosen M589 (HH 4×22) and N4 pressing the shading plate (M578).
7. After verifying that M589 (HH 4×22) is not pressing the shading plate (M578), raise or lower M576 by loosening HH 6×6 so that the MAIN value on the display panel is about 2000 to 3000 mV.
8. Adjust the position of the shading plate (M578) so that the MAIN value becomes  $1000 \pm 100$  [mV] by pushing the shading plate with M589 (HH 4×22) and N4.



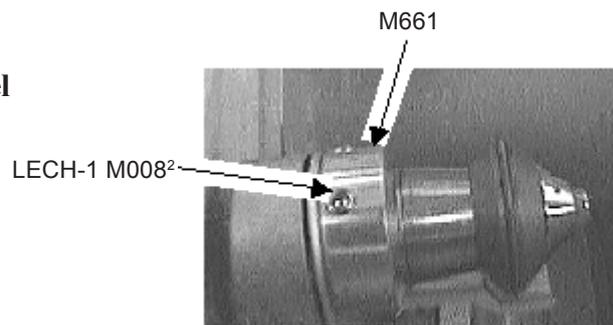
- \* Turn the pulse motor (E36) of the Y axis ASSY (5400) by hand to slightly lower the carriage ASSY (5000), and verify that the shading plate (M578) does not interfere with the sensor when the chucking shaft is slowly moved up or down by hand.
  - \* Verify that the MAIN value is increased to 4800 mV or higher when the chucking shaft is raised by hand.
9. After the adjustment, assemble the removed parts in reverse order of disassembly.

## 5.7 Groove and SFB ASSY (6000) Adjustment

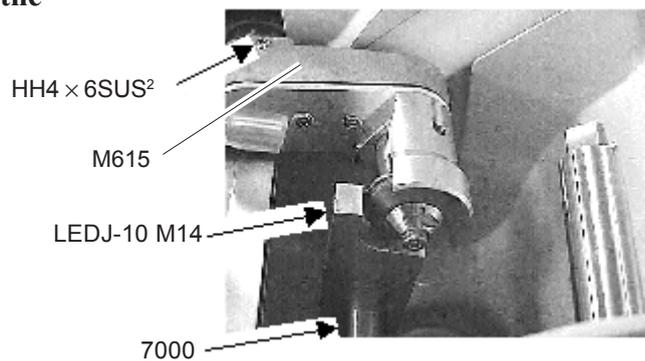
### 5.7.1 Arm position adjustment of the groove and SFB ASSY (6000)

#### <1> Old-type groove and SFB ASSY

1. Remove the wheel. (See 4.10.)
2. Loosen LECH-1 M008 (n=2) fixing the wheel cover (M661).



3. Set the calibration jig (LEDJ-10 M14) on the spindle (M705).



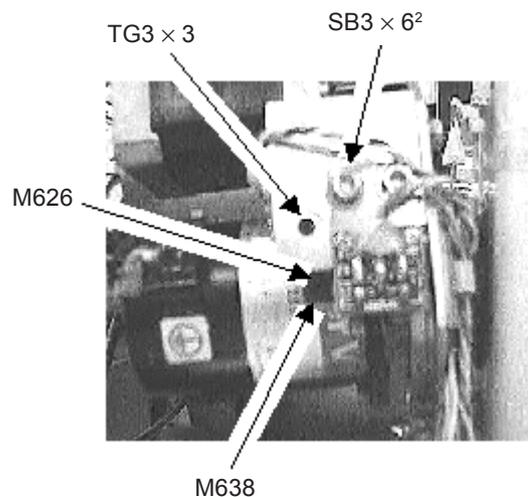
4. Turn the DC motor (CA34) with hand to make the plunger (M626) contact the plate (M638).

In the case of the black plunger (M626):

Tighten TG3×3 temporarily so that the plunger (M626) comes out about 3 mm from the plunger holder (M630).

In the case of the silver plunger (6290):

Tighten TG3×3 temporarily so that the plunger (6290) comes out about 7 mm from the plunger holder (M630).

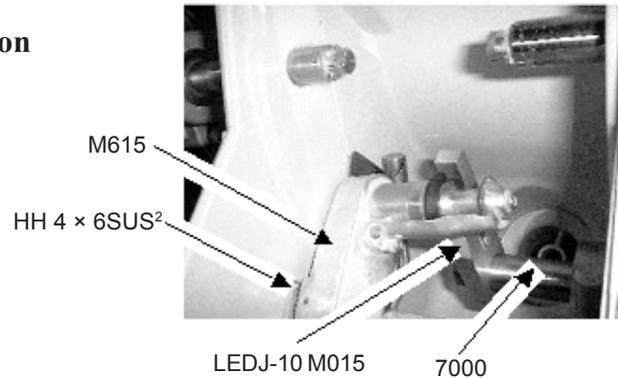


5. Loosen HH4×6SUS (n=2) fixing the arm (M615) and then tighten HH4×6SUS (n=2) where the SFB wheel contacts the calibration jig (LEDJ-10 M14).

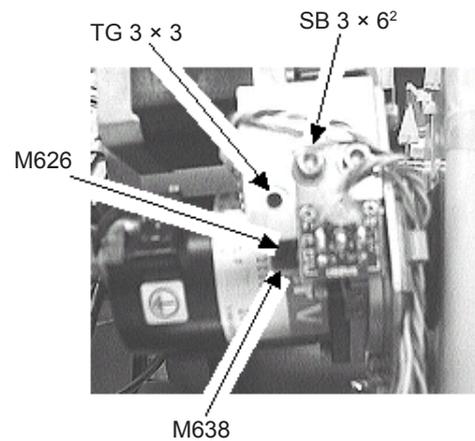
6. Adjust the plunger (M626) until the SFB wheel is not pushed against the jig and becomes stable, and fix the plunger (M626) with TG3×3 when moving the calibration jig (LEDJ-10 M14) back and forth.

## <2> New-type groove and SFB ASSY

1. Remove the wheel (see 4.10).
2. Set the calibration jig (LEDJ-10 M015) on the spindle shaft (7000).



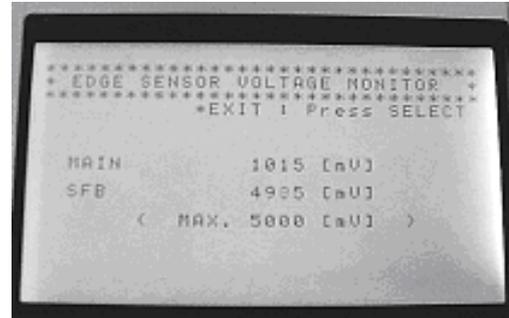
3. Turn the DC motor (CA34) by hand to make the plunger (6290) contact the plate (M638). Tighten TG3×3 temporarily so that the plunger (6290) comes out about 7 mm from the plunger holder (M630).



4. Loosen HH4×6SUS (n=2) fixing the arm (M615) and then tighten HH4×6SUS (n=2) where the SFB wheel contacts the calibration jig (LEDJ-10 M015).
5. Adjust the plunger (6290) until the SFB wheel is not pushed against the jig (LEDJ-10 M015) and becomes stable, and fix the plunger (6290) with TG3×3 when moving the calibration jig (LEDJ-10 M015) back and forth.

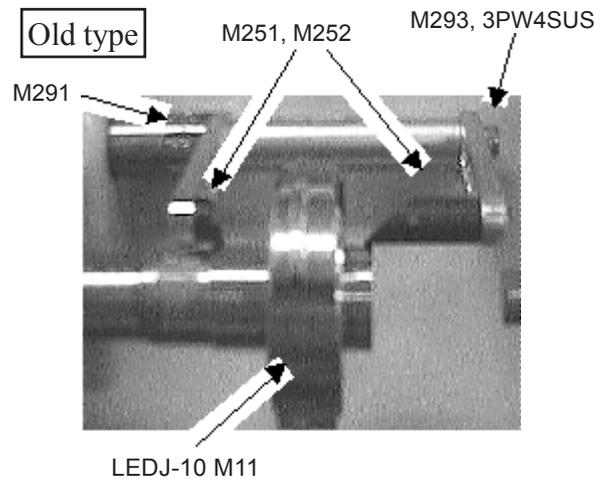
## 5.7.2 Edge end sensor (CA38) adjustment of the groove and SFB ASSY (6000)

1. Remove the jig (LEDJ-10 M14 or LEDJ-10 M15).
2. Turn the power on while holding down .
3. Align the cursor to EDGE SENSOR VOLTAGE with  or .
4. Press  and check the SFB voltage.
5. Turn the arm of the groove and SFB ASSY toward the inside.
  - \* Check that the plunger is in contact with the plate (M638).
6. Loosen SB3×6 (n=2) fixing the plate (M649), move the plate (M649) up or down so that the SFB voltage is  $4200 \pm 200$  mV and tighten SB3×6 (n=2).

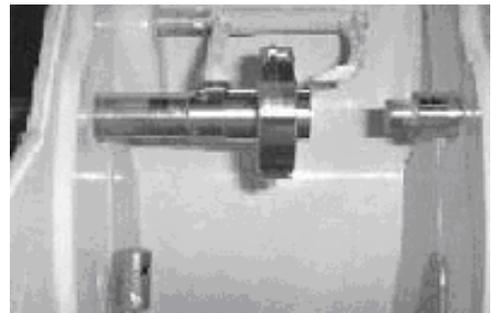


## 5.8 Feeler (4100) Reference Position Adjustment

1. Remove the lens adapter with a hex driver (M041).
2. Instead of the cup holder, set the calibration jig (LEDJ-10 M11), aligning the groove of the jig to the pin of the shaft. Insert the set screw fully, facing it up and then tighten the set screw securely.
3. Loosen HH4×3SUS (M291)(n=2), SB4×70 (M293) and 3PW4SUS.
4. Tighten HH4×3SUS (M291)(n=2), SB4×70 (M293) and 3PW4SUS at the position where the feeler tips (M251, M252) contact the calibration jig (LEDJ-10 M11).

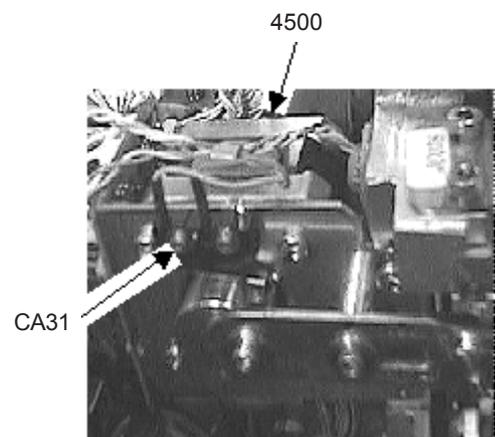


New type



## 5.9 Feeler (4100) Initialization Position Adjustment

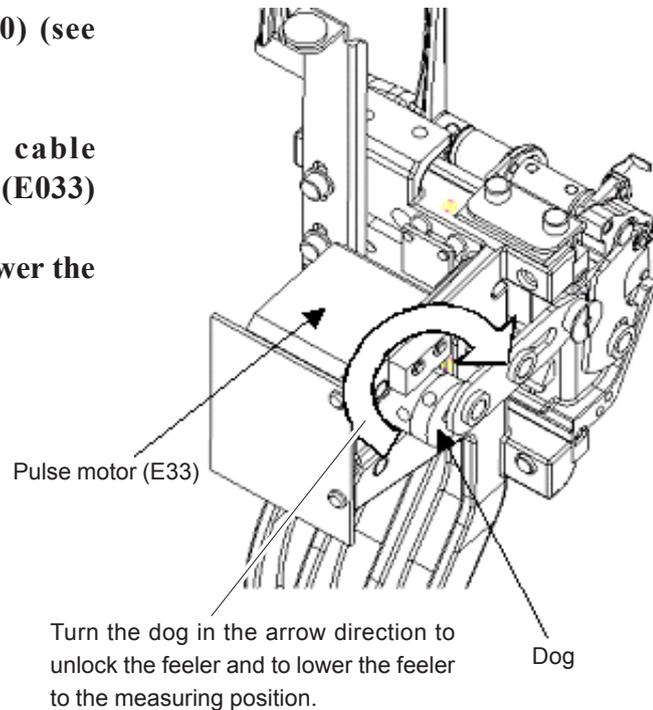
1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. When the power is turned off, adjust the position of the initialization sensor (CA31) by moving the motor ASSY (4500), paying attention not to drop the feeler ASSY (4100). If the adjustment cannot be performed by moving the motor ASSY (4500), move the initialization sensor (CA31).



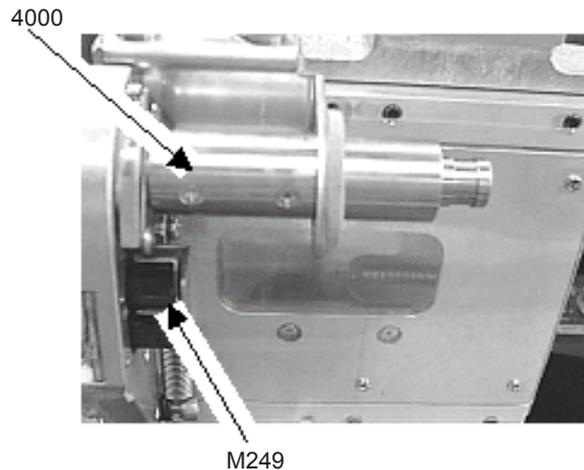
## 5.10 Adjustment of the Lens Measuring ASSY

### 5.10.1 Voltage adjustment of the lens measuring ASSY

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Turn on the main body.
3. After initialization, disconnect cable connector P602 of the pulse motor (E033) from J2 of the BA06 board.
4. Turn the dog counterclockwise to lower the feelers to the measuring position.

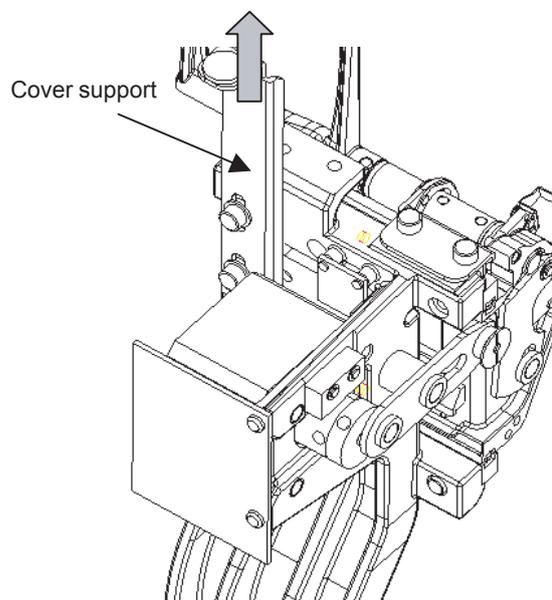


5. Connect + of a multimeter to 2-pin (red) of J5 on the BA06 board and connect - to GND on the BA01 board.
6. Adjust the position of the shading plate (M249) so that the tester shows 0.7 to 0.9V.
7. Close the cover ASSY (2000, 2A00) (see 4.1.1).



## 5.10.2 Cover support (M290) position adjustment

- 1) Open the cover ASSY (2000, 2A00) (see 4.1.1).
- 2) Remove the rear cover (M203) (see 4.2).
- 3) Loosen SB4×10 (n=2) that fix the cover support (M290).
- 4) With the cover ASSY (2000, 2A00) closed, tighten SB4×10 (n=2) while pressing the cover support against the cover ASSY (as shown in the direction of the arrow).
- 5) Attach the rear cover (M203) (see 4.2).
- 6) Close the cover ASSY (2000, 2A00) (see 4.1.1).



## 5.10.3 Lens measurement axis adjustment

### 1. Grind a lens under the following conditions.

**Lens:** Plastic (CR39)

**Layout:** Use 45 built-in data (FPD: 70.00, PD: 70.00, Nylor).

**Size:** +5.00

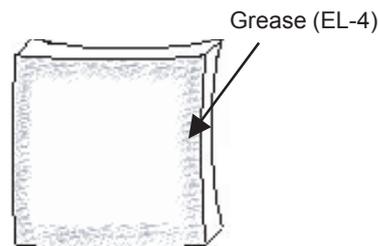
**Cup:** Use double-coated adhesive tape.

### 2. Prepare for measurement.

1) Remove the lens processed in step 1 from the instrument and wipe the water off the lens.

\* Do not remove the lens cup blocked on the lens until the measurement axis has been adjusted.

2) Apply grease (EL-4) or baby powder 5 mm inside of the outer edge (both front and rear sides).



### 3. Measure the track of the lens measurement.

1) Measure the lens on which grease was applied in step 2 again after changing the conditions as follows.

Size: + 5.00 ⇒ 0.00

Layout: Nylor ⇒ Metal, Guide

2) Press the stop key after lens measurement to return the chuck axis to the original position.

3) Check visually that **the lens edge and the measured track are parallel**. If not, change the parameter by the following procedure (see step 4 below).

\* Check the inner line of the track.

4) Remove the grease from the tip of the feeler.

### 4. When the lens edge and the measured track are not parallel, change the parameter value.

1) Turn the power off.

2) Turn the power on while holding the SELECT key to place the instrument into SYSTEM SETTING MODE.

3) Align → to PARAMETER SETTING and then press .

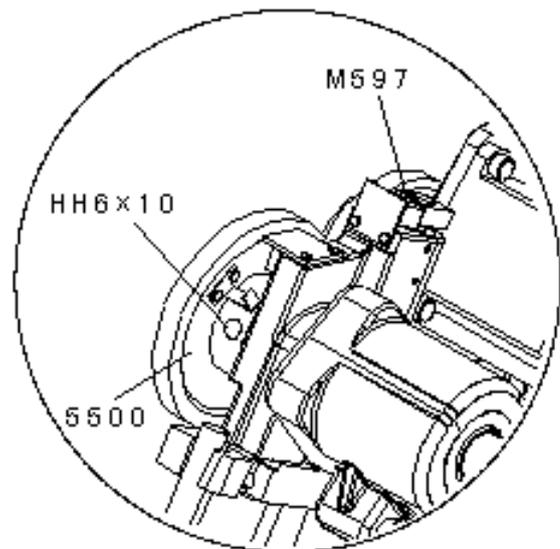
4) Align → to Measure Axis Front or Measure Axis Rear and then press  and change the parameter value.

\* When the track is tilted to the upper right against the lens edge, increase the value. When the track is tilted to the lower right, decrease the value.

\* The parameter value is changed in increments of  $\pm 0.25$ .

## 5.11 Initialization Position Adjustment of Y and $\theta$ axes

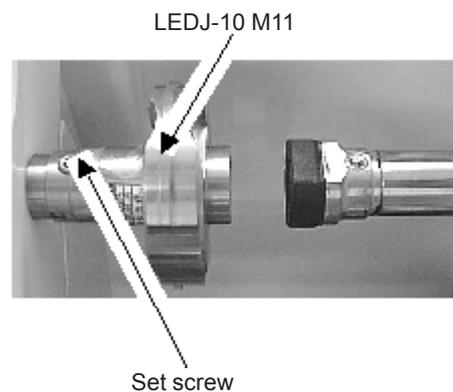
1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the left side cover (M205) (see 4.2).
3. Remove the wheel (see 4.10).
4. Remove the adapter and lens clamp.
5. Turn on the main body and turn it off just after it is initialized.
6. Put the end of the circular hole of the jig (LEDJ10 M012) on the shaft of the spindle ASSY (7000).
7. Put the end of the cutout of the jig (LEDJ10 M012) on the left chucking shaft.
8. If the jig cannot be put on the left chucking shaft, follow the steps below to perform adjustment.
  - 1) Loosen HH6×10 of the gear ASSY (5500).
  - 2) Turn the main body on and turn it off just after initialization.
  - 3) Direct the cutout of the chucking shaft upward and put the jig on the left chucking shaft.
    - \* To turn the chucking shaft, turn the left chucking shaft.
    - \* If the jig cannot be put on the left chucking shaft smoothly, adjust the shading plate (M597) of the Y axis ASSY (5400).
  - 4) Remove the jig from the chucking shaft.
  - 5) Turn on the main body and turn it off just after initialization.
    - \* Make sure that the jig is put on the left chucking shaft smoothly. If not, go back to step 3) and readjust the position of the shading plate.
  - 6) On the condition that the jig is put on the left chucking shaft and spindle shaft, fully tighten HH6×10 of the gear ASSY (5500).
  - 7) In the same manner as steps 4) and 5), check that the jig can be put on the chucking shaft smoothly.



## 5.12 Size Calibration

**Caution:** Perform the following size calibration after adjusting position of the edge end sensor (see 5.6). If the calibration is performed prior to the position adjustment of the edge end sensor, the calibration cannot be completed successfully, or an error in size of finished lenses may result.

1. Turn the power on while holding down .
2. Align the cursor to “CALIBRATION” with  or  and press .
3. Remove the lens adapter with a hex driver (M041).
4. Instead of the lens adapter, set the calibration jig (LEDJ-10 M11), aligning the groove of the jig to the pin of the shaft. Insert the set screw fully, facing it up and then tighten the set screw securely.
5. Press .
6. The jig (LEDJ-10 M011) is lowered over the wheel and size calibration is performed.
7. After the calibration is complete, remove the calibration jig (LEDJ-10 M11).
8. Set the adapter.



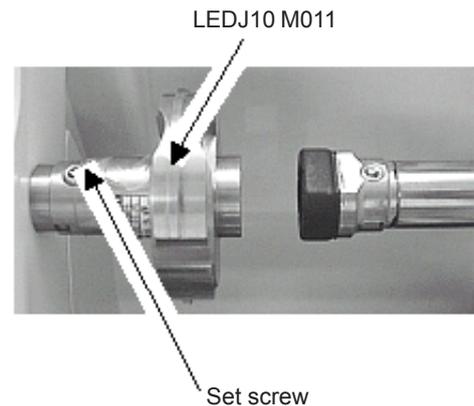
NOTE: For the lens edgers with Master software Ver.1.04 or later factory-installed, an error in size of finished lenses caused during transportation should be compensated by performing size calibration. When installing an updated program of earlier than Ver.1.04, never perform size calibration. If the size calibration is performed by mistake, an error in size may not be compensated fully; in such cases, follow the steps below to manually check the size of finished lenses and adjust an error in size.

- 1) If the Size preset (PLA, MTL) parameter is set to a value other than zero on the Parameter exchange mode screen, write down the value and temporality set them to zero.
- 2) Grind a plastic lens using built-in  $\phi 45$  standard frame data (see 7.1.2).
- 3) If there is an error in size of the finished lens, reset the Master Size parameter of Parameter Setting on the System Setting Mode screen (see 7.1.4) to adjust finished lenses in size. Never adjust the error in size by resetting parameters other than the Master Size parameter.
- 4) Reset the Size preset (PLA, MTL) parameter set in step 1) back to the original setting.

## 5.13 Calibration of Lens Measuring ASSY

**Caution:** Perform the following calibration of the lens measuring ASSY after adjusting position of the edge end sensor (see 5.6). If the calibration is performed prior to the position adjustment of the edge end sensor, the calibration cannot be completed successfully, or an error in size of finished lenses may result.

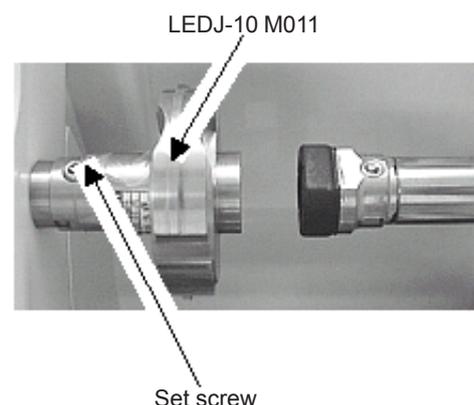
1. Turn the power on while holding down .
2. Align the cursor to “CALIBRATION” with  or  and press .
3. Remove the lens adapter with a hex driver (M041).
4. Instead of the lens adapter, set the calibration jig, aligning the groove of the jig (LEDJ-10 M11) to the pin of the shaft. Insert the set screw fully, facing it up and then tighten the set screw securely.
5. Press .
6. The feeler of the lens measuring ASSY is lowered and the calibration is started.
7. After the calibration is complete, remove the calibration jig (LEDJ-10 M11).
8. Set the adapter.



## 5.14 Calibration of the Groove and SFB ASSY

**Caution:** Perform the following calibration of the groove and SFB ASSY after adjusting the edge end sensor (see 5.7).

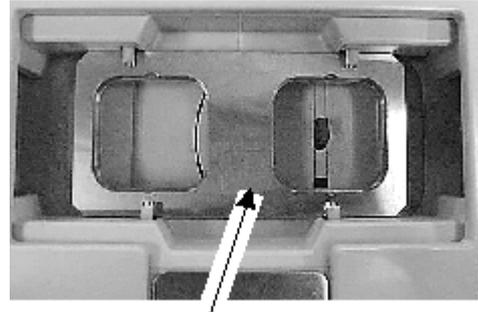
1. Display the System Setting Mode screen (see 7.1.4).
2. Align the cursor to “CALIBRATION” with  or  and press .
3. Remove the adapter with a hex driver (M041).
4. Instead of the adapter, set the calibration jig, aligning the groove of the jig (LEDJ-10 M11) to the pin of the shaft. Insert the set screw fully, facing it up and then tighten the set screw securely.
5. Press .
6. The SFB wheel is lowered and the calibration is started.
7. After the calibration is complete, remove the calibration jig (LEDJ-10 M011).
8. Set the adapter.



## 5.15 Auto Calibration of Tracer ASSY

### 5.15.1 Frame auto calibration

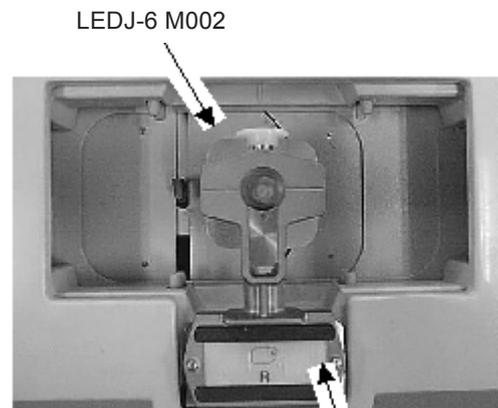
1. Set the calibration jig (LEDJ-10 M301) as shown on the right.
2. Press  while holding down .
3. After checking to see that the LED of  blinks, press .



LEDJ-10 M301

### 5.15.2 Pattern auto calibration

1. Set the calibration jig (LEDJ-6 M002) onto the pattern setting unit as shown on the right.  
\* Use the provided pattern setting unit.
2. Press  while holding down .
3. After checking to see that the LED of  blinks, press .



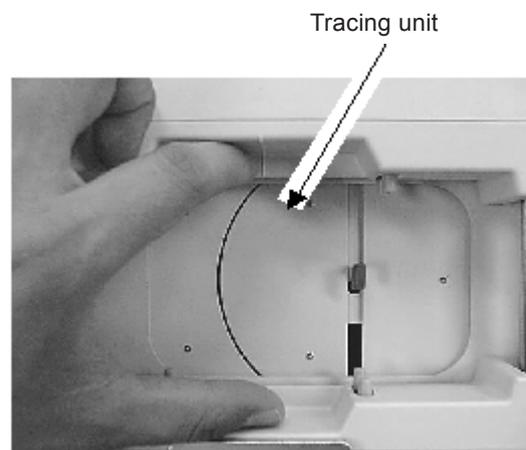
LEDJ-6 M002

Pattern tracing unit

- \* When the auto calibration is completed successfully, the lens edger produces a short beep.
- \* If the lens edger produces several short beeps, the auto calibration failed. The measured data may go out of tolerance. It is necessary to check the internal structure of the tracing unit.

## 5.16 Torque Calibration of Tracer ASSY

1. Turn the power on while holding down  and  simultaneously.
2. After verifying that LED of  blinks, open and hold the sliders of the tracing unit fully with fingers and press .

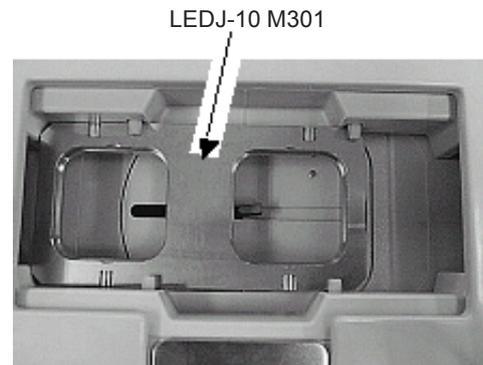


Tracing unit

- \* After performing the torque calibration, perform auto calibration.

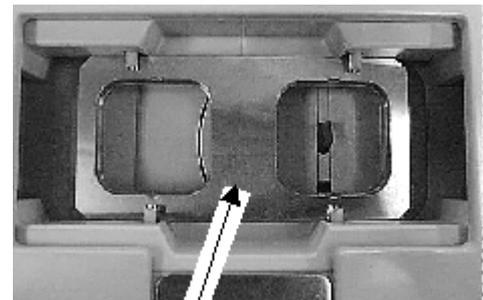
## 5.17 Full-Calibration of Tracer ASSY

1. Set the calibration jig (LEDJ-10 M301) by making its left end contact the left side of the tracing unit as shown on the right.



2. Turn the power on while holding down , , and  simultaneously.
3. Verify that LED of  blinks and press .

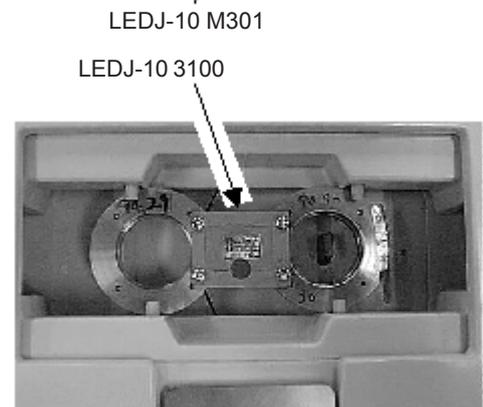
4. After tracing, verify that LED of  blinks and set the calibration jig (LEDJ-10 M301) in the center of the tracing unit as shown on the right.



5. Press .

6. After tracing, verify that the LED of  blinks and set the calibration jig (LEDJ-10 3100) as shown on the right.

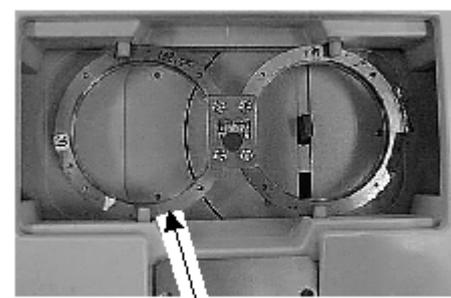
\* Set the jig in the center of the tracing unit as much a possible because the set position of the calibration jig affects frame gain adjustment.



7. Press .

8. After tracing, verify that the LED of  blinks and set the calibration jig (LEDJ-10 3300) as shown.

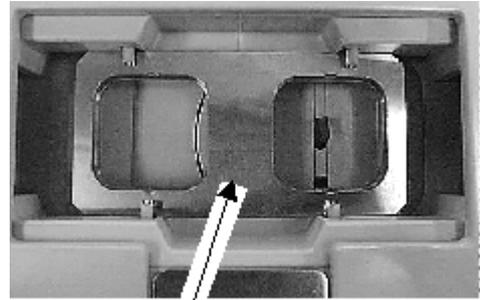
\* Set the jig in the center of the tracing unit as much a possible because the set position of the calibration jig affects frame gain adjustment.



LEDJ-10 3300

9. Press .

10. After tracing, verify that the LED of  blinks and set the calibration jig (LEDJ-10 M301) in the center of the tracing unit as shown on the right.

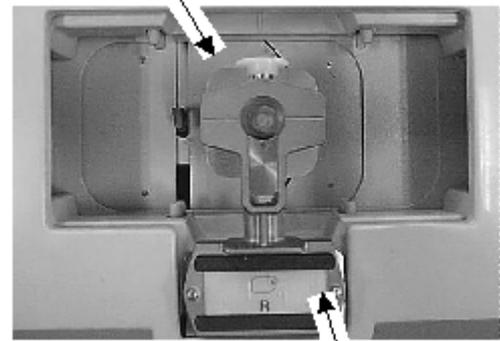


LEDJ-10 M301

11. Press .

12. After tracing, verify that the LED of , , and  blinks in turn and set the calibration jig (LEDJ-6 M002) onto the pattern tracing unit and set it as shown on the right.

LEDJ-6 M002



Pattern setting unit

13. Press .

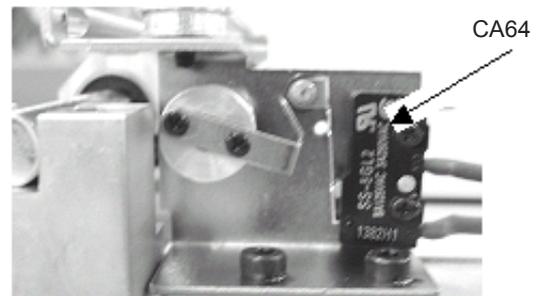
14. When the calibration is completed successfully, the lens edger produces a short beep. If the lens edger produces a long beep, the calibration failed. It is probable that measured data involves an error or malfunction occurred. It is necessary to check the internal structure of the tracing unit.

## 5.18 Clamp Switch (CA64) Position Adjustment

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the tracer ASSY (3000) (see 4.13).
3. Unscrew PC3×6 (n=4) and remove the lower cover (M496).
4. Verify the range in which the upper and lower sliders move smoothly by turning the worm gear (82030-D104A) and stop the worm gear in the middle of the movable range.



5. Adjust the position of the micro switch (CA64) so that the switch is turned on at the position where the worm gear is stopped.
6. After the adjustment, assemble the removed parts in reverse order.



## 5.19 Y Axis Belt Tension Adjustment

1. Open the cover ASSY (2000, 2A00) (see 4.1.1).
2. Remove the left side cover (M205) (see 4.2).
3. Unscrew SB 4×8 (n=2) and remove the two nylon cable ties securing the feedwater pipe on the left (attached to a pole in front of the grinding unit).
  - \* Because the feedwater pipe easily bents, avoid touching it during the replacement work. When touching the feedwater pipe, to prevent it from being bent, handle the feedwater pipe so that the curvature of a bent part in the feedwater pipe is not smaller than that of the originally curved part.
4. Unscrew SB 4×10 (n=2) to remove M176 (cover holder L) standing at the left front corner of the base.
5. While checking the Y axis belt for tension, turn the pulley of the Y axis motor one to one and half turn and stop the pulley when the tension of the belt becomes the tightest. (The purpose of this step is to adjust the tension of the belt using the following jig on the condition that the belt is the tightest.)

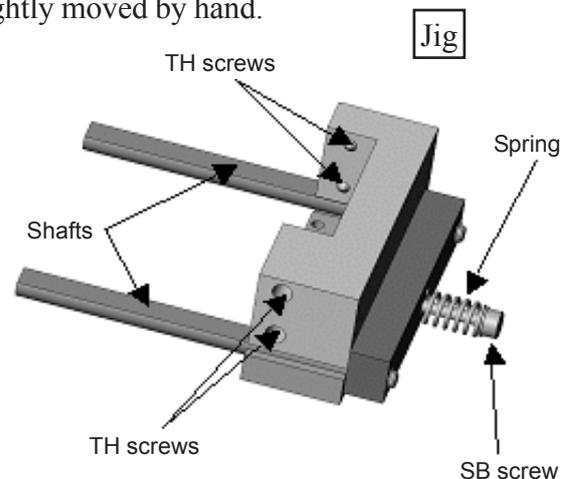
6. Turn SB4×10 (n=2) fixing the Y axis motor about 90° to loosen the screws.

\* Loosen the screws until the Y axis motor is slightly moved by hand.

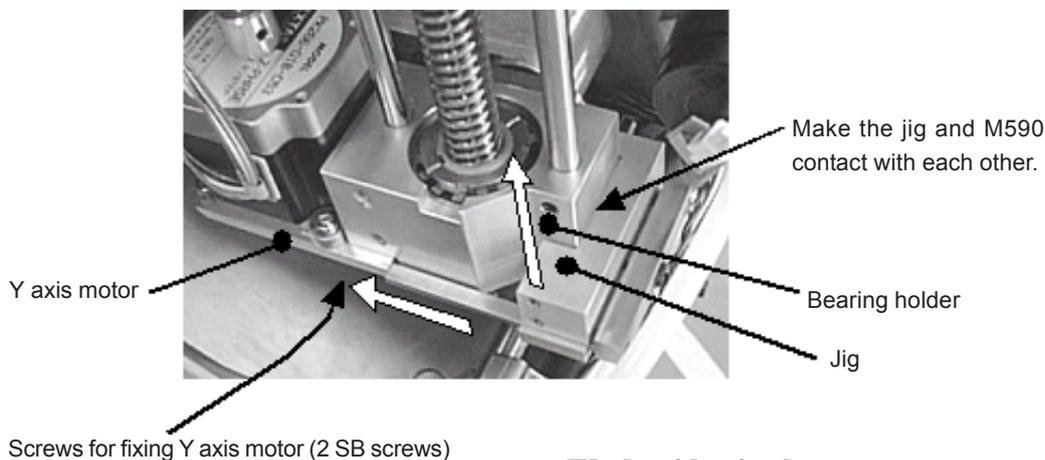
7. After removing the SB screw and spring from the jig (LEMJ-10 1072 (Jig for adjusting the tension of the timing belt)), attach the jig to the bearing holder (M590).

\* Fit the jig to the bearing holder and fix the jig with the two TH screws from the left.

\* Move the jig fully backward and upward in the directions shown by the white arrows so that the jig is in contact with the bottom and front surfaces of the bearing holder.



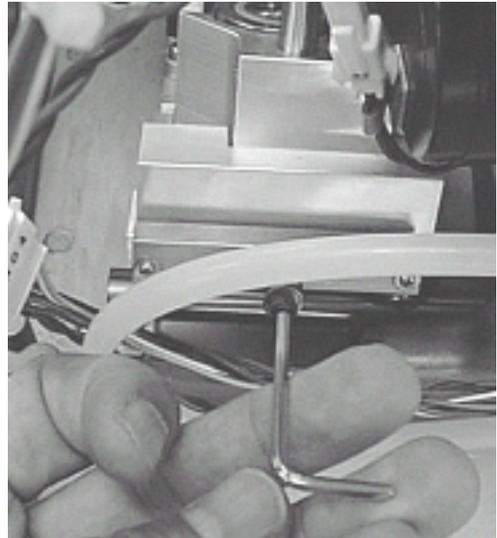
Method of attaching the jig



[Underside view]

- 8. After measuring the total length of the uncompressed spring of the jig with the scale or vernier caliper, gently screw the removed SB screw together with the spring into the jig.**
- 9. Insert the hexagonal wrench into the SB screw of the jig, and tighten the SB screw until the length of the spring measured in step 8 is reduced by 3 to 3.5 mm.**

<e.g.> If the spring is 12.5 mm in length, tighten the SB screw until the spring is reduced to 9 to 9.5 mm in length.

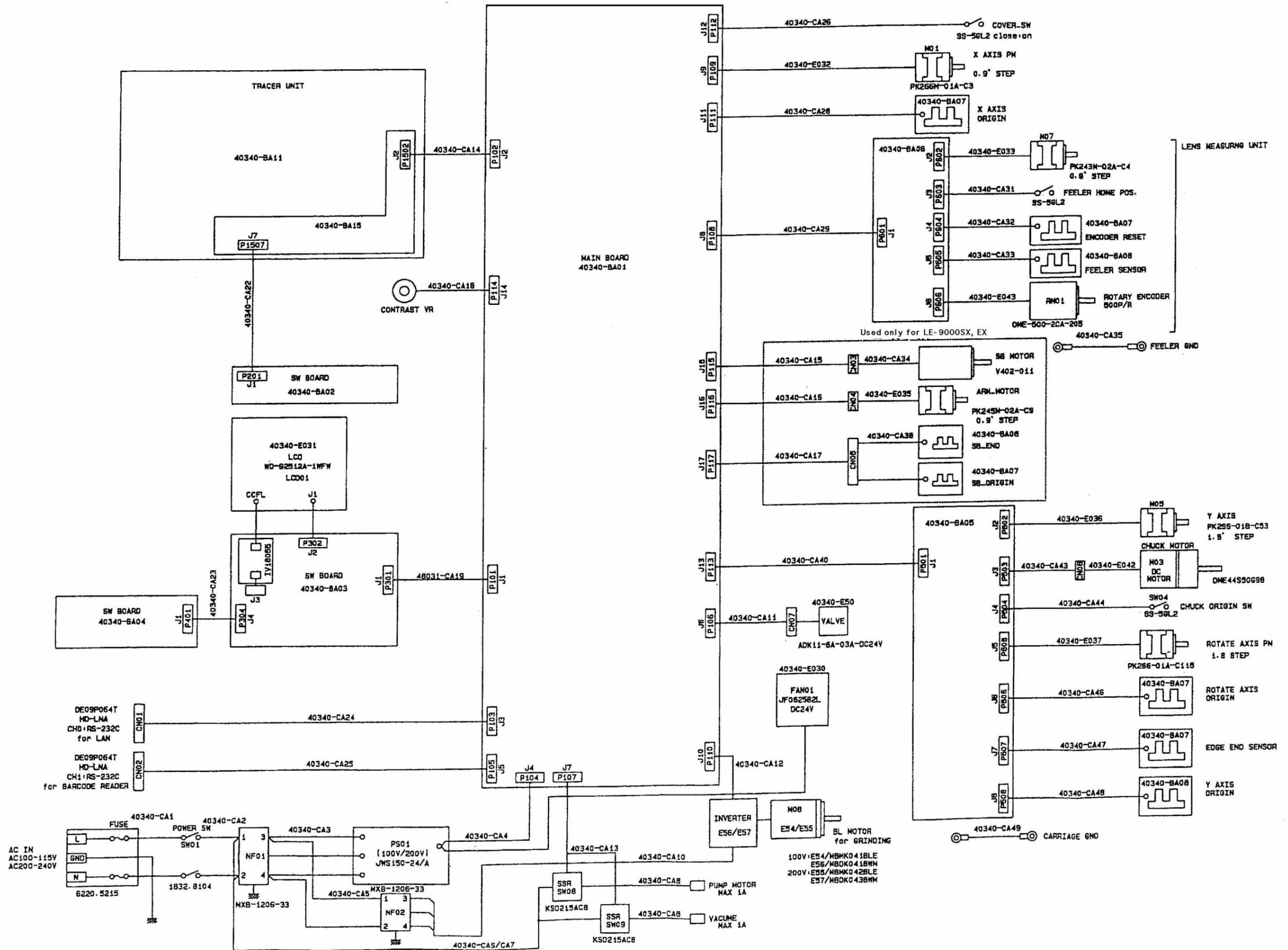


- 10. Retighten SB4×10 (n=2) loosened in step 6 to fix the Y axis motor.**
- 11. Loosen the SB screws of the jig so that the spring is not compressed.**
- 12. Remove the jig in the reverse order of step 7.**
- 13. Attach the removed parts in reverse order of steps 1 to 4.**

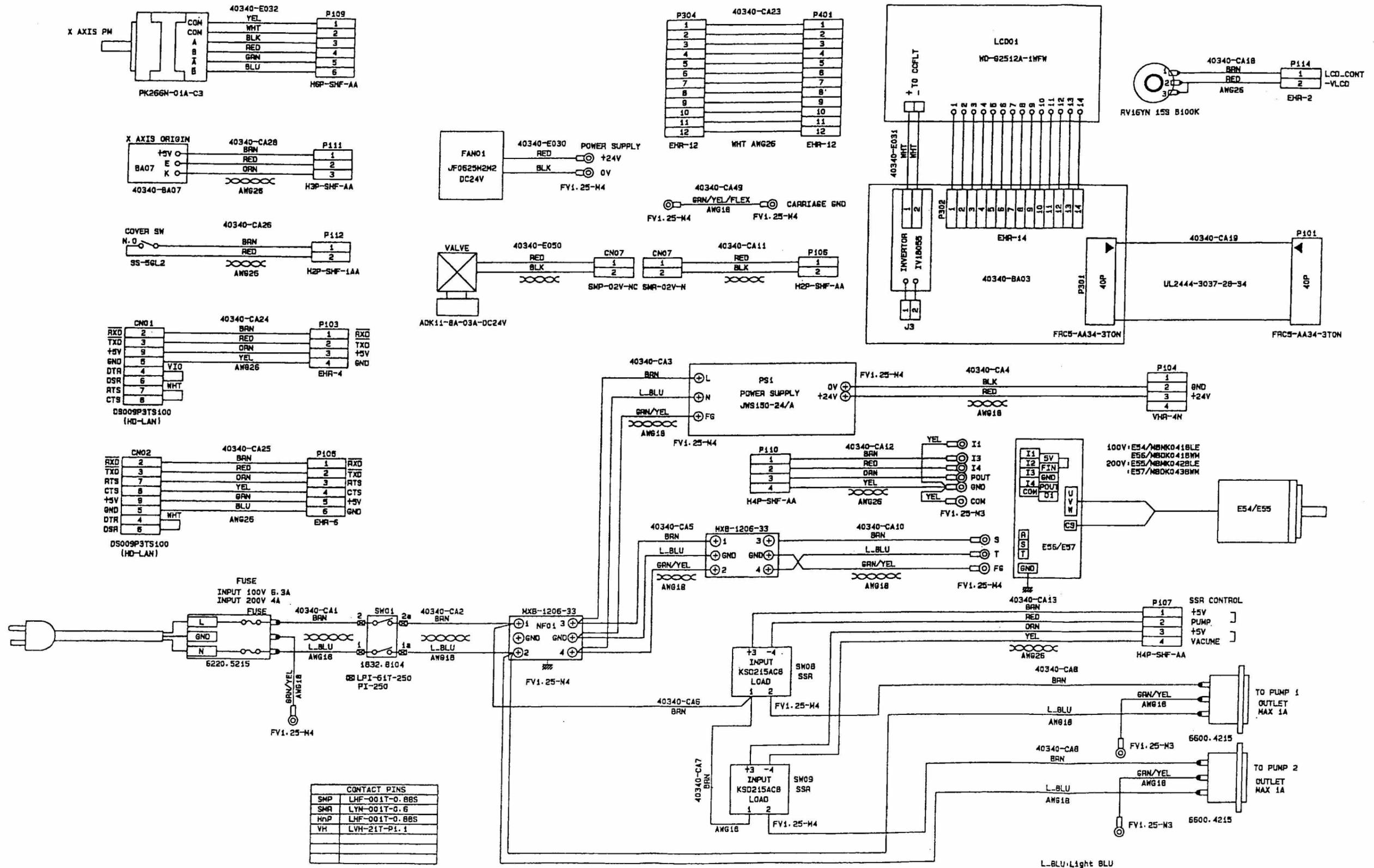


# §6 WIRING DIAGRAM

## 6.1 Wiring Diagram (No.1)

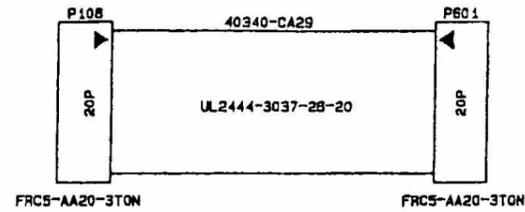


## 6.2 Wiring Diagram (No.2)



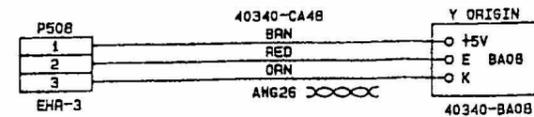
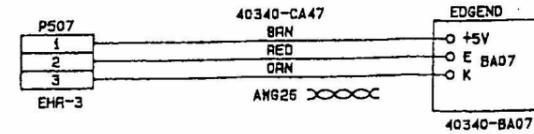
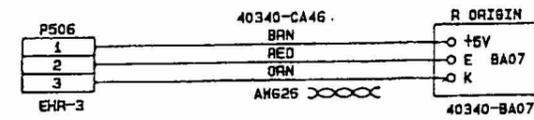
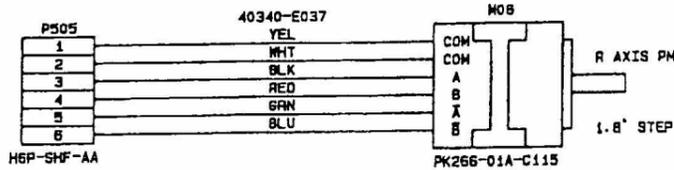
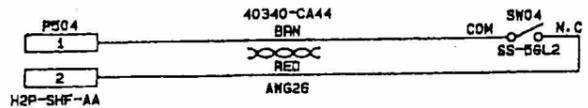
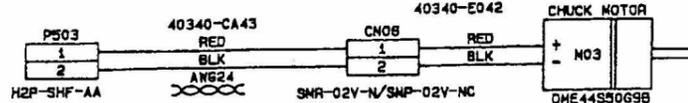
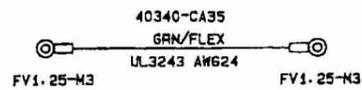
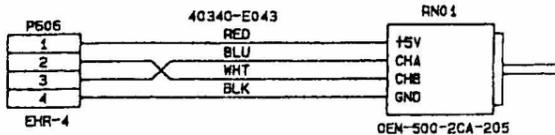
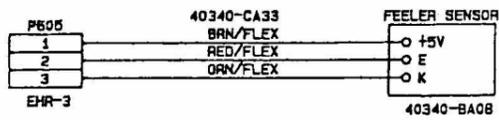
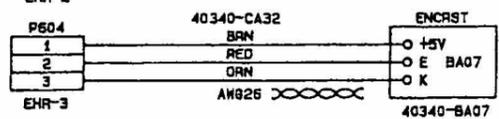
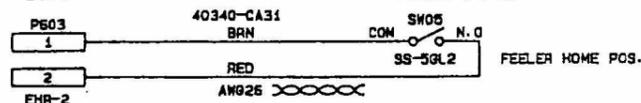
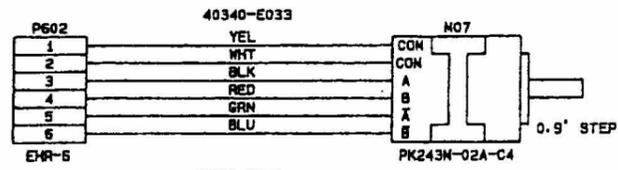
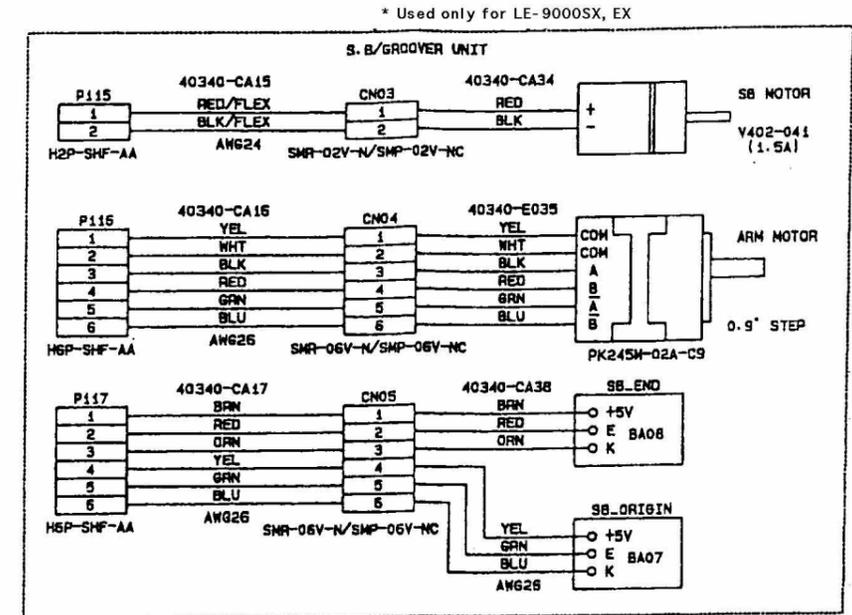
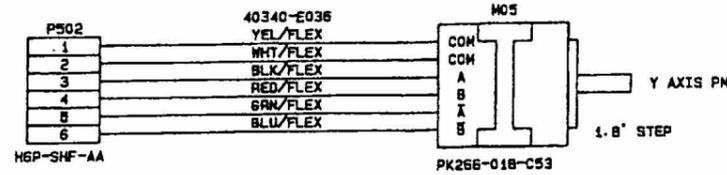
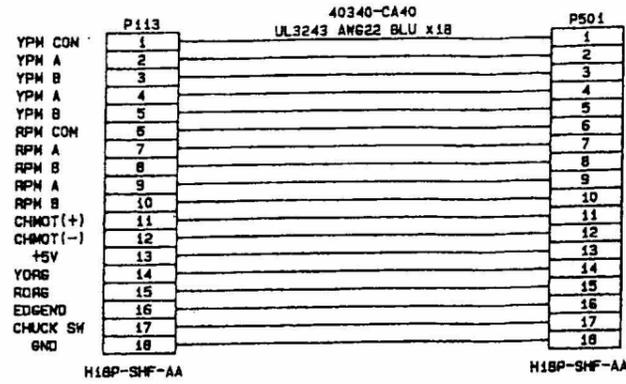
L-BLU, Light BLU

### 6.3 Wiring Diagram (No.3)

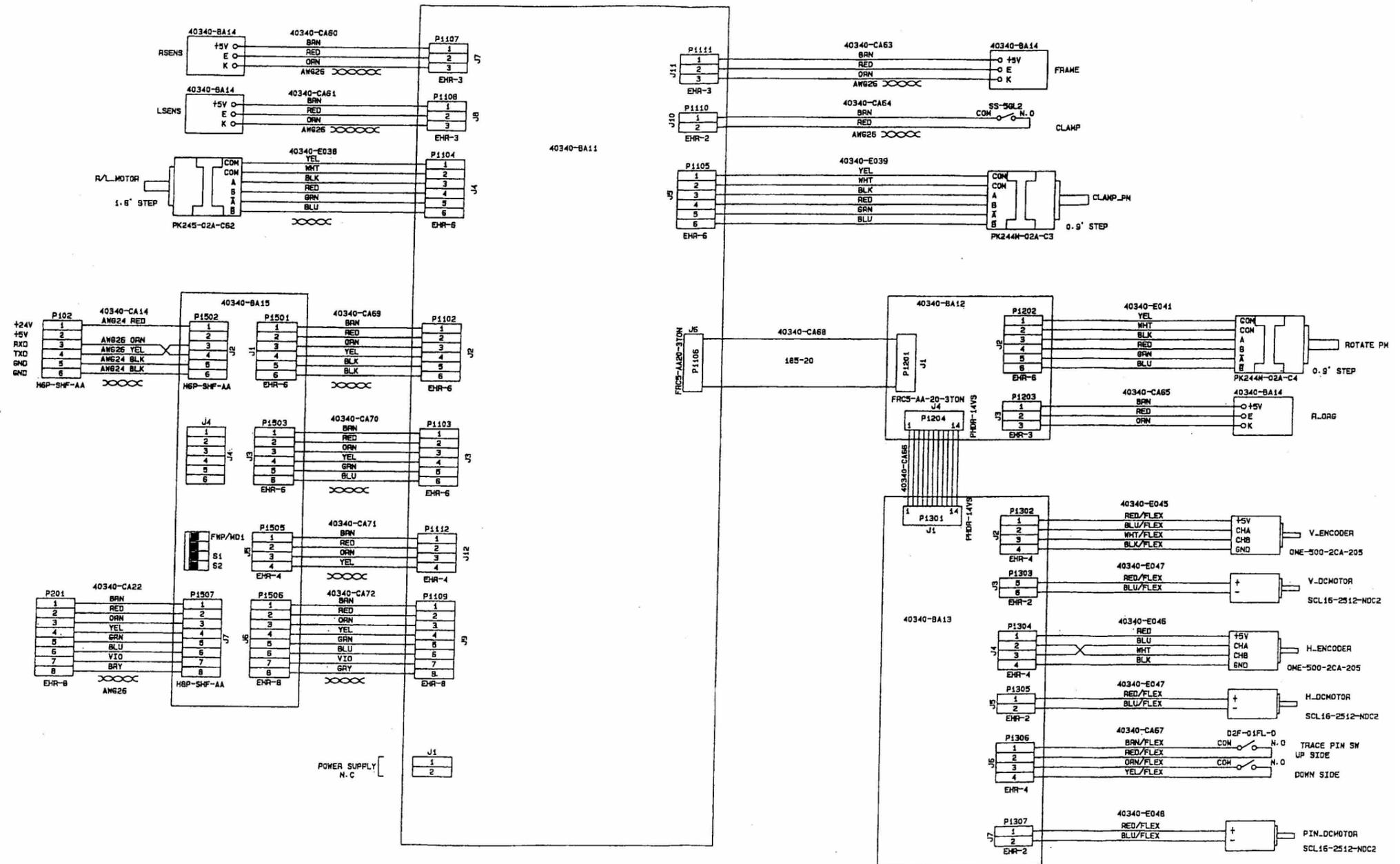


40340-CA29 SIGNAL TABLE

PIN No.	SIGNALS
A1	ENC_CHA
B1	ENC_CHB
A2	ENCRST
B2	F_ORIG
A3	F_SENS
B3	NC
A4	+5V
B4	+5V
A5	GND
B5	GND
A6	+24V
B6	+24V
A7	MPM A
B7	MPM A
A8	MPM B
B8	MPM B
A9	MPM A
B9	MPM A
A10	MPM B
B10	MPM B



# 6.4 Wiring Diagram (No.4)



# §7 MATERIAL

## 7.1 Special Key Operation

The following key operation can be performed for maintenance and adjustment.

- \* The special key operation should not be available for general use since it may cause confusion at maintenance or adjustment.

### 7.1.1 Reset of ground lens number

- \* Put the system from “MENU” screen into “Process counter” screen and perform the following operation.

<Reset of glass lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of plastic lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of polycarbonate lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of polished lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of grooved lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of front SFB lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.

<Reset of rear SFB lens ground number>

- Press  while holding down .
- \* “Process counter” display will be reset a few seconds after the keys are released.



## 7.1.2 Recalling built-in $\phi$ 45 standard frame

- Press  while holding down . When the keys are released, built-in  $\phi$  45 standard frame data will be recalled and displayed on the screen.
- \* If the tracer is not connected, grinding can be done. When any abnormal condition is encountered in size adjustment/check, bevel position adjustment/check, or check of ground lens size, etc., this function is used to judge either tracer or main body has the problem.

## 7.1.3 Recalling built-in 45 standard frame

<Reset of glass-ground number>

- Press  while holding down . When the key is released, built-in  45 standard frame data is recalled and displayed on the screen.
- \* If the tracer is not connected, grinding can be done. When any abnormal condition is encountered in axis check, this function is used to judge either tracer or main body has the problem.

## 7.1.4 Displaying the system setting mode screen

- Turn on the lens edger while holding down . Only the tracer is initialized. The display panel displays SYSTEM SETTING MODE. The System Setting Mode screen allows service persons to set working conditions of each individual unit of the LE-9000. The parameter setting mode is unknown to general users. The parameters changeable in this mode are factory-set according to the destination. Before changing the parameter settings during maintenance, thoroughly understand functions assigned to the parameters.

## 7.2 Error Code Table

[Description, cause and solution of each error]

Error code	Description	Cause	Suggested action
0001	Grinding data transmission error	Poor connection of cable	Check the cable from the RS-232C connector and peripheral devices for secure connection.
0002	Grinding data reception error	Poor connection of cable, or use of specific personal computers which output incompatible signals	(1) Check the cable from the RS-232C connector and peripheral devices for secure connection. (2) Install the software of Ver.1.09E18 or later.
0104	Voltage failure of edge end sensor	Abnormal edge end sensor	See 3.1.2.
0201	The feelers cannot be initialized.	The feelers moved to a position where they cannot be initialized.	(1) According to on-screen messages, raise the feelers by hand, move them to the center of the grinding unit, and press the START button. If the feelers cannot be moved to the center, turn the lens edger off. After moving the lens chucking shaft laterally, move the feelers to the center. (2) Adjust the position of the microswitch. (See 5.9.)
0202	Lens measuring ASSY error	Abnormally high sensor voltage when the feelers are lowered	(1) Check the feelers for malfunction while they are moving up and down and to the right and left. (2) Adjust the voltage of the lens measuring ASSY. (See 5.10.) (3) Perform the calibration of the lens measuring ASSY. (See 5.13.)
0204	After the measurement of the rear surface of the lens, the front surface of the lens cannot be measured.	The feelers have popped up during the shape measurement of the front surface of the lens. The feelers are caught because of a difference in level during the shape measurement of the front surface of the lens.	(1) Install the software of Ver.1.04 or later. (2) During the shape measurement of the front surface of the lens, gently press the lens from above while the feelers are measuring the front surface of the lens.

0205	Abnormal data for lens measurement or measured result of the lens	The feelers were pressed more strongly against the rear surface of the thick lens whose rear surface is sharply warped. An encoder pulse count becomes negative.	(1) Install the software of Ver.1.02 or later. (2) Check the feelers for damage such as bend etc.
0206	The firstly obtained data in lens shape measurement is abnormal.	The feelers detected a difference in level on the lens. The feelers come off during lens shape measurement.	(1) Install the software of Ver.1.02 or later. (2) The feelers malfunction. Clean the clearance between the shaft of the feelers and hole in the grinding unit. (3) Check the wire of the lens measuring ASSY for a break. (4) Check the connectors connected to a board in the lens measuring ASSY for secure connection.
0207	There is a disparity between the data at the starting point and at the end point in lens shape measurement.	Abnormal measured data of the lens	Check if the feelers are attached securely (with no play).
0208	While the rear surface of the lens is measured, the feelers are positioned beyond its measurable range.	The lens is excessively thick or sharply warped. The feelers are bent.	(1) Check the feelers for damage such as bend etc. (2) Perform the calibration of the lens measuring ASSY.
0209	While the front surface of the lens is measured, the feelers are positioned beyond its measurable range.	The lens is excessively thick or sharply warped. The feelers are bent.	(1) Check the feelers for damage such as bend etc. (2) Perform the calibration of the lens measuring ASSY.
0301	Abnormal Y axis data for grinding	Abnormal traced data	Perform frame tracing again.
0302	Abnormal X axis data for grinding	Abnormal measured data of the lens	Press the START button to measure lens shape again.

0401	Initialization error of X, Y, and $\theta$ axis motors	X, Y and $\theta$ motor errors (0402, 0403, and 0404) occurred coincidentally.	Perform the suggested action against errors 0402,0403, and 0404.
0402	Initialization error of X axis motor	The carriage is secured with screws to avoid shock or vibration during transportation. When the screws are unscrewed, the carriage moved to a position where it cannot be initialized.	(1) Install the software of Ver.1.02 or later. (2) According to the on-screen instructions, press the START button to perform initialization properly.
0403	Initialization error of Y axis motor	Y axis does not operate properly because of a sensor, board or motor failure.	(1) Install the software of Ver.1.02 or later. (2) Check the Y axis motor for any faulty in cables or internal motor shaft.
0404	Initialization error of $\theta$ axis motor	$\theta$ axis does not operate properly because of a sensor, board or motor failure.	Check the origin sensor for $\theta$ axis for deposition of grease or foreign particles.
0405	Initialization error of X and Y axis motors	The X and Y axis motor errors 0402 and 0403 occurred coincidentally.	Perform the suggested action against errors 0402 and 0403.
0406	Initialization error of X and $\theta$ axis motors	The X and $\theta$ axis motor errors 0402 and 0404 occurred coincidentally.	Perform the suggested action against errors 0402 and 0404.
0407	Initialization error of Y and $\theta$ axis motors	The Y and $\theta$ axis motor errors 0403 and 0404 occurred coincidentally.	Perform the suggested action against errors 0403 and 0404.
0408	Initialization error of F axis motor	Abnormal pulse motor for moving the feelers up or down	(1) Install the software of Ver.1.09 or later. (2) Press the START button to clear the error screen. After moving the feelers to the center of the grinding unit, turn on the lens edger again. (3) Adjust the position of the microswitch. (See 5.9.)
0501	The chucking motor does not run.	The chucking shaft cannot be returned to its original position within a certain time interval.	(1) Install the software of Ver.1.04 or later. (2) Check the right chucking shaft for any failure such as falling of parts. (3) Check the right chucking shaft and pulley for $\theta$ rotation for smooth operation.

0601	Abnormal motor of the groove and SFB ASSY (overcurrent)	A current that is higher than the rated one passed through the motor of the groove and SFB ASSY.	(1) Install the software of Ver.1.04 or later. (2) Check the groove and safety bevel spindle of the groove and SFB ASSY for smooth rotation.
0602	Abnormal initialization of the groove and SFB ASSY	The arm cannot move normally because of a sensor, board or motor failure.	Check the origin sensor for deposition of grease or foreign particles.
0603	Edge end sensor error of the groove and SFB ASSY -	The edge end sensor voltage is 1.0 V or less at the initial position.	(1) Adjust the edge end sensor. (See 5.7.2.) (2) Replace the sensor.
0604	Abnormal attached position of the edge end sensor of the groove and SFB ASSY	There was a disparity between the sensor voltage and actual amount of travel of the arm during SFB calibration.	It is probable that when the arm is lowered, the shading plate gets away from the sensor. Adjust the position of the sensor.
0801	CPU false interrupt error	BA01 board failure	Replace the BA01 board. (See 4.5.)
0802	CPU address error	BA01 board failure	Replace the BA01 board. (See 4.5.)
0803	CPU DMA bus error	BA01 board failure	Replace the BA01 board. (See 4.5.)
0900	EEPROM writing error	BA01 board failure	Replace the BA01 board. (See 4.5.)
0901	The Rough Size parameter settings are out of a specified range.	BA01 board failure The parameter settings are out of a specified range.	Replace the BA01 board. (See 4.5.) Check the corresponding parameter settings.
0902	The Size preset parameter settings are out of a specified range.	BA01 board failure The parameter settings are out of a specified range.	Replace the BA01 board. (See 4.5.) Check the corresponding parameter settings.
0903	The Bevel constant parameter setting is out of a specified range.	BA01 board failure The parameter setting is out of a specified range.	Replace the BA01 board. (See 4.5.) Check the corresponding parameter setting.
0904	The settings of the parameters related to wheel position are out of a specified range.	BA01 board failure The parameter settings are out of a specified range.	Replace the BA01 board. (See 4.5.) Check the corresponding parameter settings.
0905	Frame memory verification error	BA01 board failure	Replace the BA01 board. (See 4.5.)
0906	Frame memory CRC check error	BA01 board failure	Replace the BA01 board. (See 4.5.)

## 7.3 Inverter Error Code Table

### [Description, cause and solution of each error]

Error code	Description	Cause	Suggested action
L	Under voltage warning instantaneous interruption protection	For AC 200 V, the output is interrupted when DC voltage of the converter becomes approx. 200 V or less since it is considered as instantaneous interruption. For AC 100 V, the output is interrupted when DC voltage of the converter becomes approx. 100 V or less since it is considered as instantaneous interruption. For AC 200 V, the control circuit is reset when DC voltage becomes approx. 150 V or less. For AC 100 V, the control circuit is reset when DC voltage becomes approx. 75 V or less.	Check the cabling and power supply condition.
O.C.	Overcurrent breakage	The output current of the converter has exceeded the current value set to the inverter.	Check the rotation of the spindle. If the rotation is not smooth, replace the spindle.
0.U.	Regeneration overvoltage breakage	For AC 200 V, the direct voltage of the converter has become DC400V or more. For AC 100 V, the direct voltage of the converter has become DC200V or more.	Deceleration time may not be set to proper time. Check if the inverter parameter is set to proper value (see 4.21).
Thr	Overload breakage	When the motor current continues to flow with 100% or more, it is considered as overload.	Check the rotation of the spindle. If the rotation is not smooth, replace the spindle.
E-OS	Overspeed detection	When the rotation speed exceeds 1.5 times of the upper speed, it is considered as overspeed.	Check if cable is not broken.
E-CS	Sensor failure protection	Sensor signal failure has been detected.	Check if cable is not broken.
Err	CPU error	Control microcomputer failure has been detected.	Replace the inverter (see 4.21).
CAV	Self-check blockage	A parameter has been changed.	This is not failure. Turn the power off. After error message disappears, turn the power on again.
E.roT	Rotation failure detection	At the set speed, motor rotation failure has been detected.	Check if cable is not broken.

### [Checking method of error history]

- The past error history is stored in parameters 16 to 20 of the inverter (16 is the latest). See 4.21 for setting parameters of the inverter. In the same manner, the error history can be checked.



# §8 MAINTENANCE

## 8.1 Tools

### 8.1.1 General tools

The necessary tools in the repair operations described in this manual are as follows:

\* Use the tools which are fit for the screw head for screwing or unscrewing.

#### Tool name

- Phillips screwdriver
- Phillips screwdriver with magnet
- Stubby Phillips style screwdriver
- Precision Phillips screwdriver set
- Flatblade screwdriver
- Precision flatblade screwdriver set
- Ball hex driver
- Hex driver set
- Hex wrench set
- Nipper
- Needle nose pliers
- Tweezers
- Wire stripper
- Hand lap C-type
- Soldering iron (20 - 30W)
- Cleaner for soldering iron tip
- Multimeter
- Vernier calipers

### 8.1.2 Consumables

The necessary consumables in the repair works described in this manual are as follows:

Article name	Model No.	Supplier
• Rubber bond	G17-50	Konishi bond
• Threadlocking adhesive	TB1401-200	Three bond
• Solder with resin	KR19-08	Nihon almit
• Gasket	1211	Three bond
• Grease	SEALUB S-14	NOK fluber
• Grease	NIPPECO LLP	Nihon koyu
• Grease	PERMABLE	Nihon koyu
• Lubricating oil	CRC-5-56	Kure kogyo
• Alcoholic solution (50% ethyl alcohol and 50% ethanol)		

\* Above listed goods have been used in NIDEK factories, equivalent ones can be used as substitute.



### **8.1.3 Calibration jig list**

\* A set of jig LEDJ-10 (40340)

\* Never use this set for other usage described in this manual.

## 8.2 Grease Application

