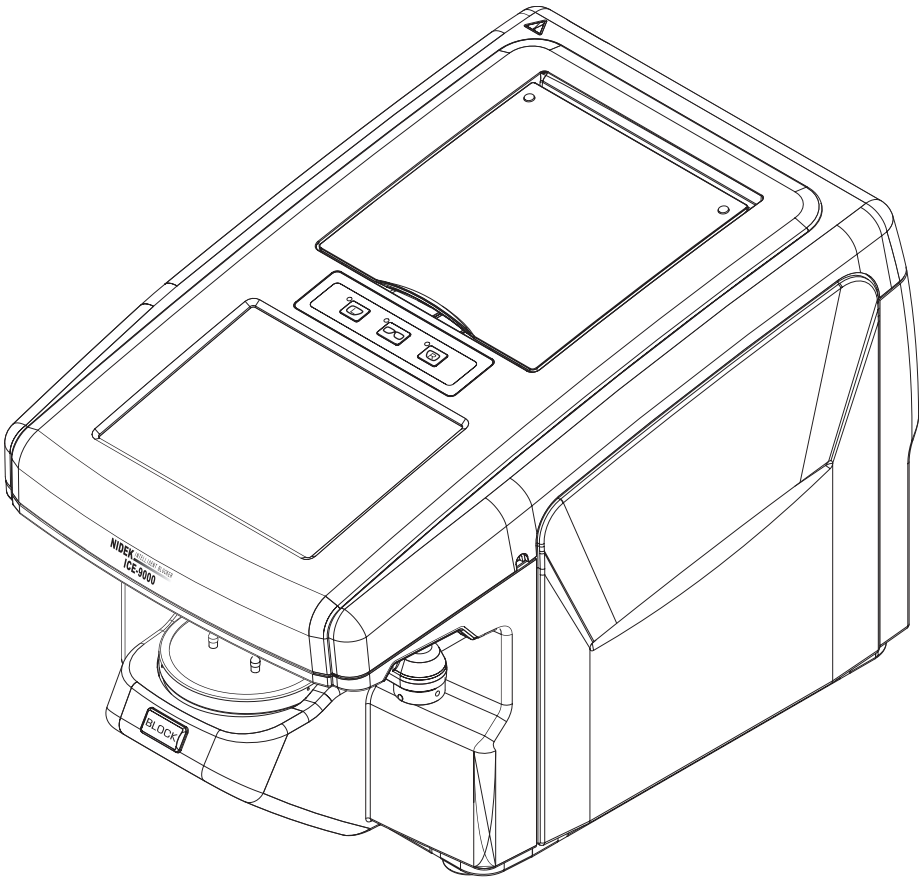
NIDEK

INTELLIGENT BLOCKER

Model ICE- 9000

SERVICE MANUAL



NIDEK CO., LTD.

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LCE4A*RDA001B/E

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§1 INTRODUCTION

This service manual contains service instructions for the NIDEK INTELLIGENT BLOCKER, ICE-9000.
This does not include technical descriptions for making eyeglass lenses.

For correct service, thorough understanding of the contents of this manual is required prior to the service.

Use this manual together with the ICE-9000 Operator's Manual and the ICE-9000 Parts List.

The specifications and design of this instrument are subject to change without notice for improvement. In the case of major changes, refer to the corresponding TECHNICAL BULLETIN issued in each occasion.

If the instrument cannot be repaired by repair operations in accordance with this Service Manual, please inform NIDEK of the Serial Number of the instrument, and details of the symptom.

§2 SAFETY

2.1 General precautions

- Only service persons who are accustomed to using the required tools and have a deep knowledge of this instrument are allowed to repair the instrument.
- Observe the procedures to perform the repair work. If not, accidents or failure of the instrument may result.
- When performing the maintenance work, turn OFF the power switch, and disconnect the power cord from the wall outlet unless the power needs to be ON.
- Never wipe the covers etc. using organic solvent such as a paint thinner. The surface may be ruined, and the appearance of the instrument will be impaired as a result.

2.2 Maintenance precautions

- In case of instrument malfunction, turn OFF the power switch after checking the symptom.
- Never drop parts or screws inside the instrument, nor bump it against surrounding objects.
- Prepare storage cases so as not to lose the removed screws or parts.
- Screw or unscrew the screws with proper tools.
- After loosing the screws fixed by a threadlocking adhesive, be sure to reapply the threadlocking adhesive to the screws when you tighten them again.
- After replacing parts, make sure that they are fixed securely before turning ON the power.
- If you notice strange odors or smoke being issued from the instrument, immediately turn OFF the instrument, disconnect the power cord from the outlet, and diagnose the cause. If the instrument is powered in abnormal conditions, fire, electric shock or total loss of the instrument may result.

- Refer to “8.1 Wiring diagram” and “8.2 Connectors and cables,” for checking cable breaks as described in “Troubleshooting”. In addition, check cables for the following:

  ① Connectors are connected and crimped securely.

  ② No contact failure occurs after re-connection of connectors.

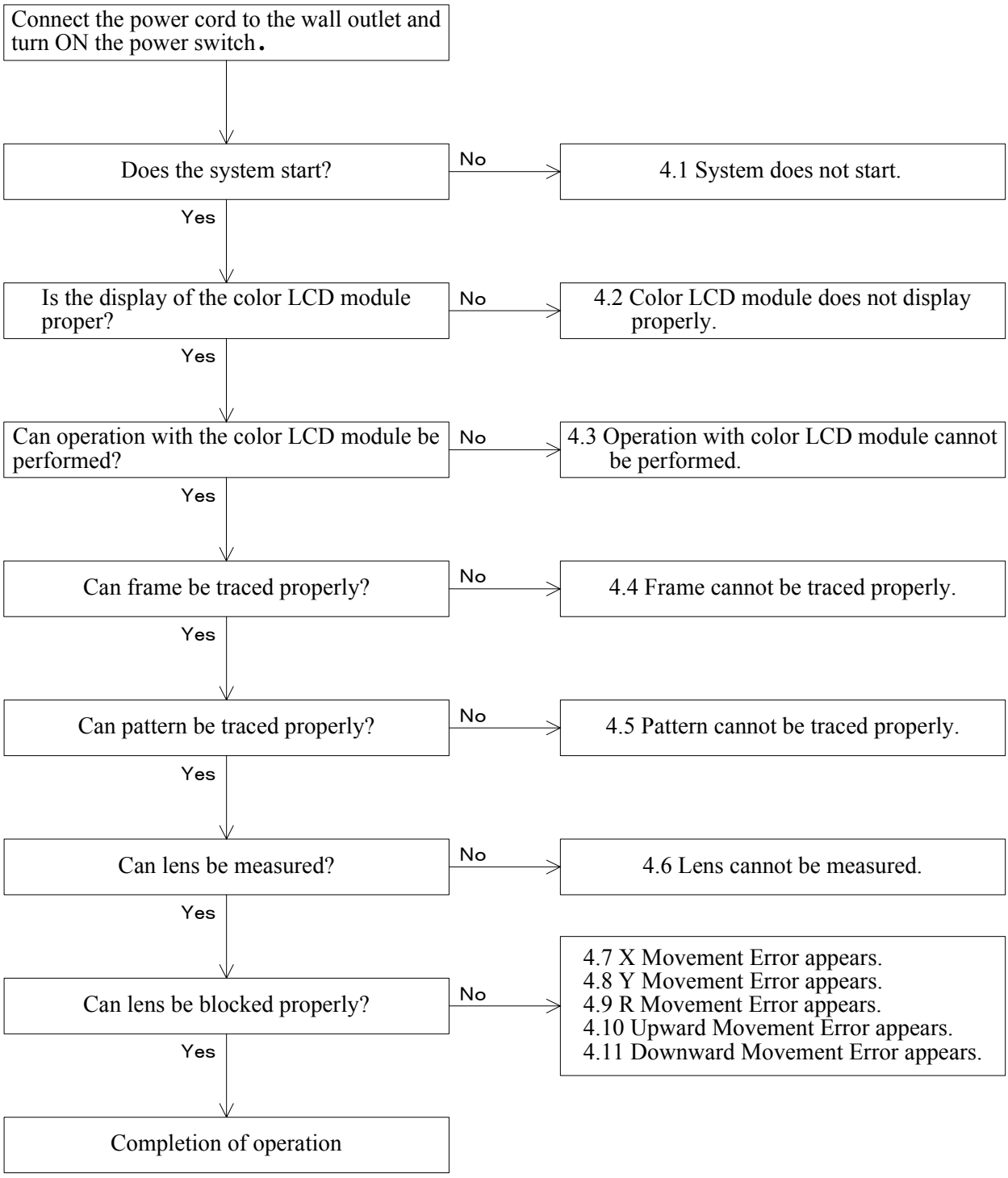
  ③ Cables are soldered properly.
- Do not pull the cables strongly. Cable breaks etc. may result.
- Never perform the maintenance work with wet hands. Electric shock or failure of the instrument may result.

2.3 Adjustment precautions

- Perform adjustment on a vibration-free, stable and level surface.
  A slanted floor or place subject to vibration will obstruct accurate adjustment.

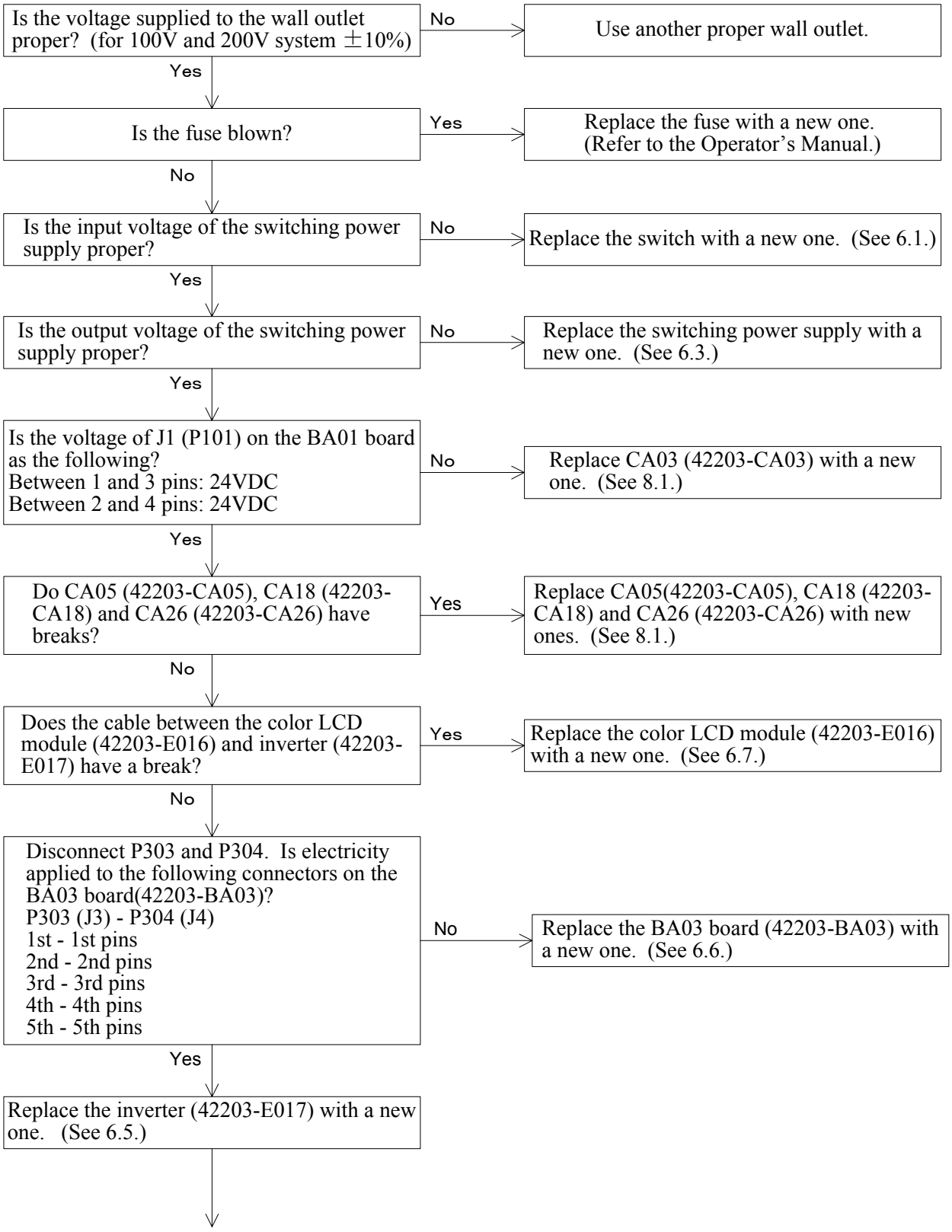
- Never use adjustment jigs for purposes not instructed in this manual.

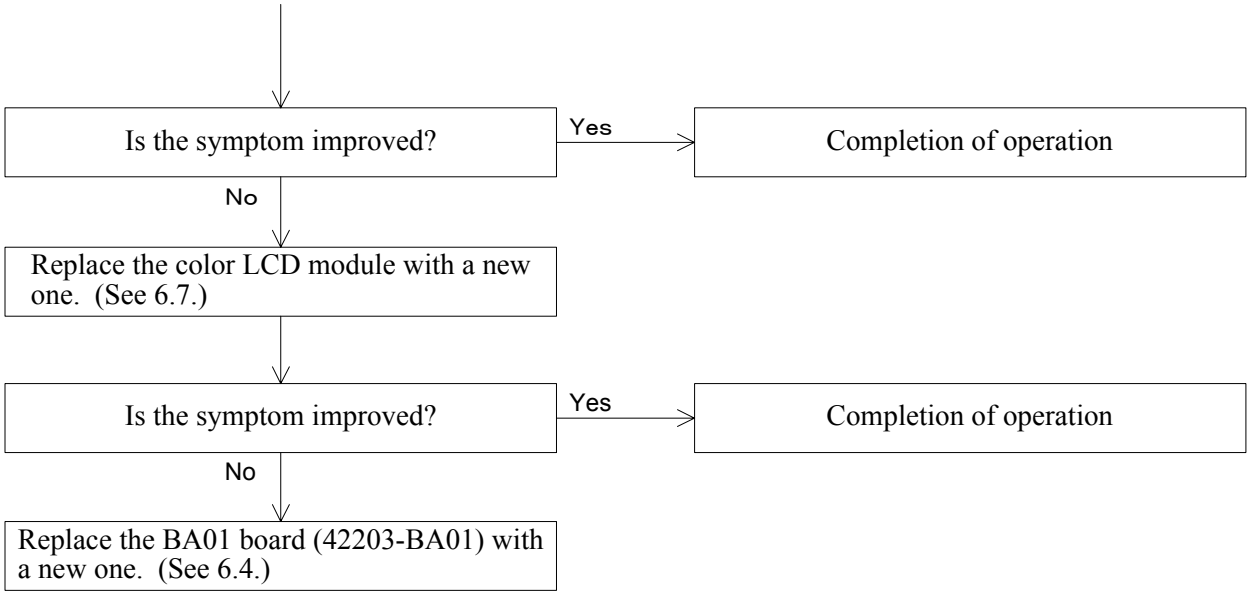
§3 TROUBLESHOOTING



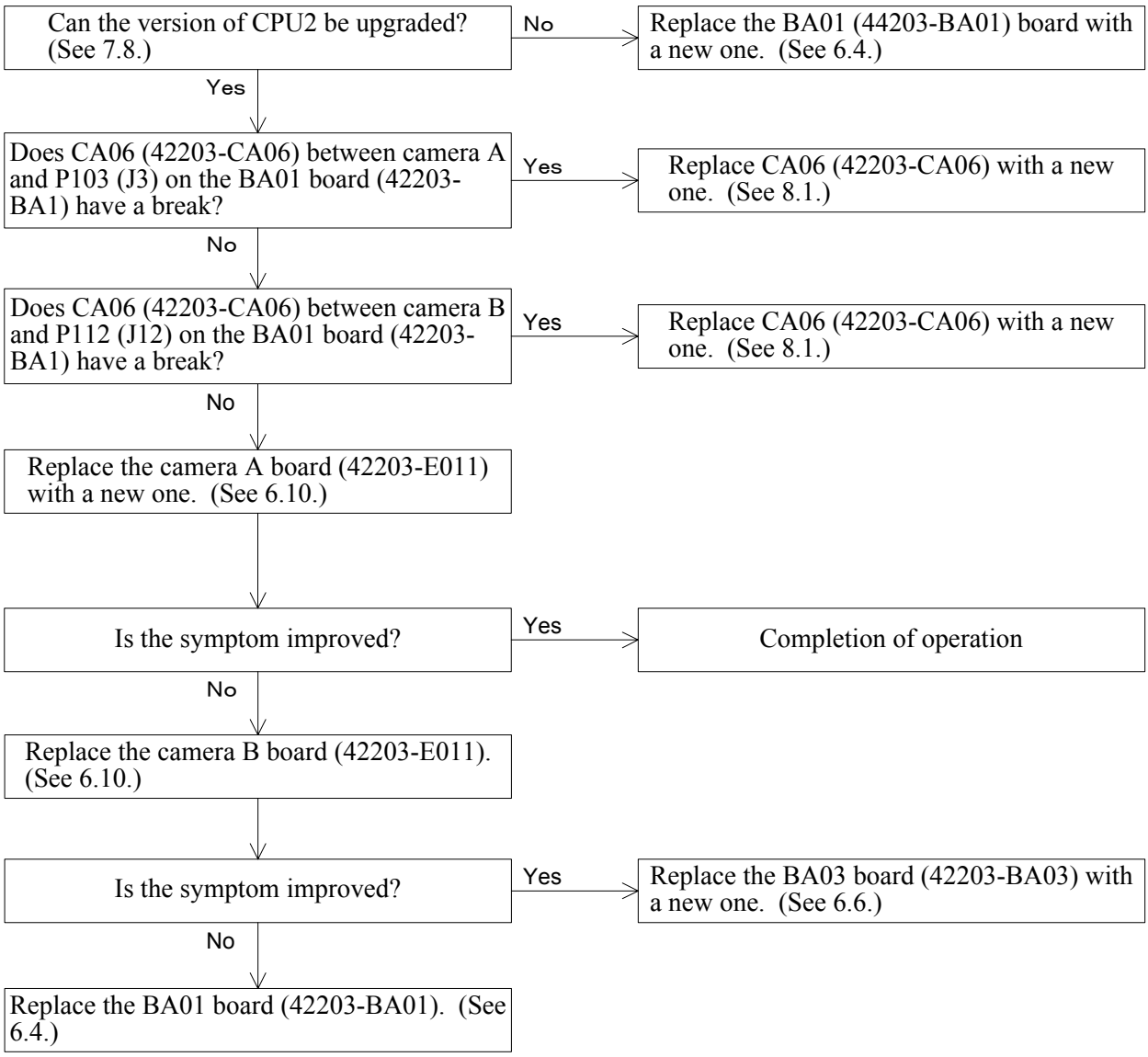
4.1 System does not start.

4.1.1 LCD display does not display anything.

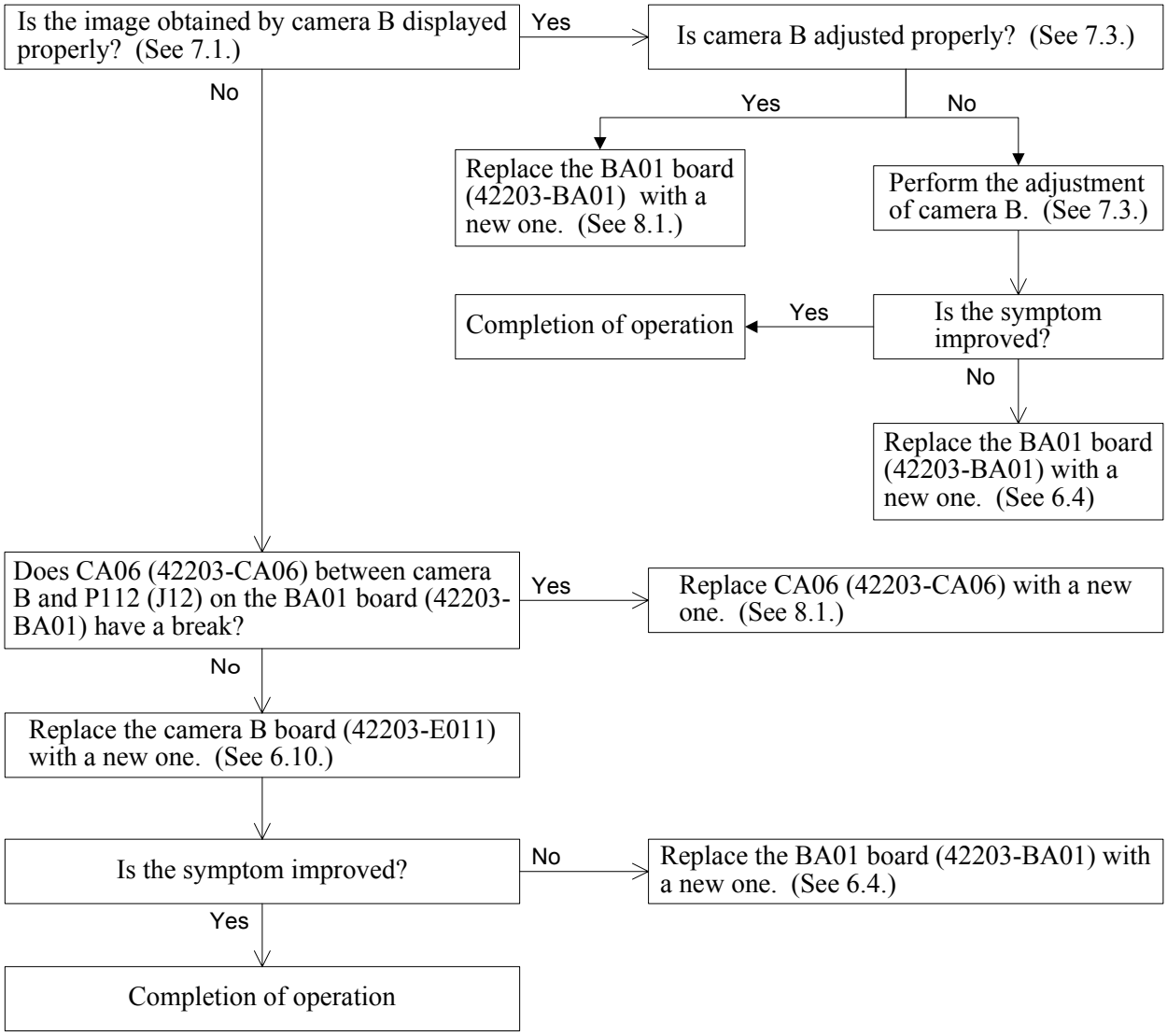



Is the symptom improved?
Yes
Completion of operation
No
Replace the color LCD module with a new one. (See 6.7.)
Is the symptom improved?
Yes
Completion of operation
No
Replace the BA01 board (42203-BA01) with a new one. (See 6.4.)

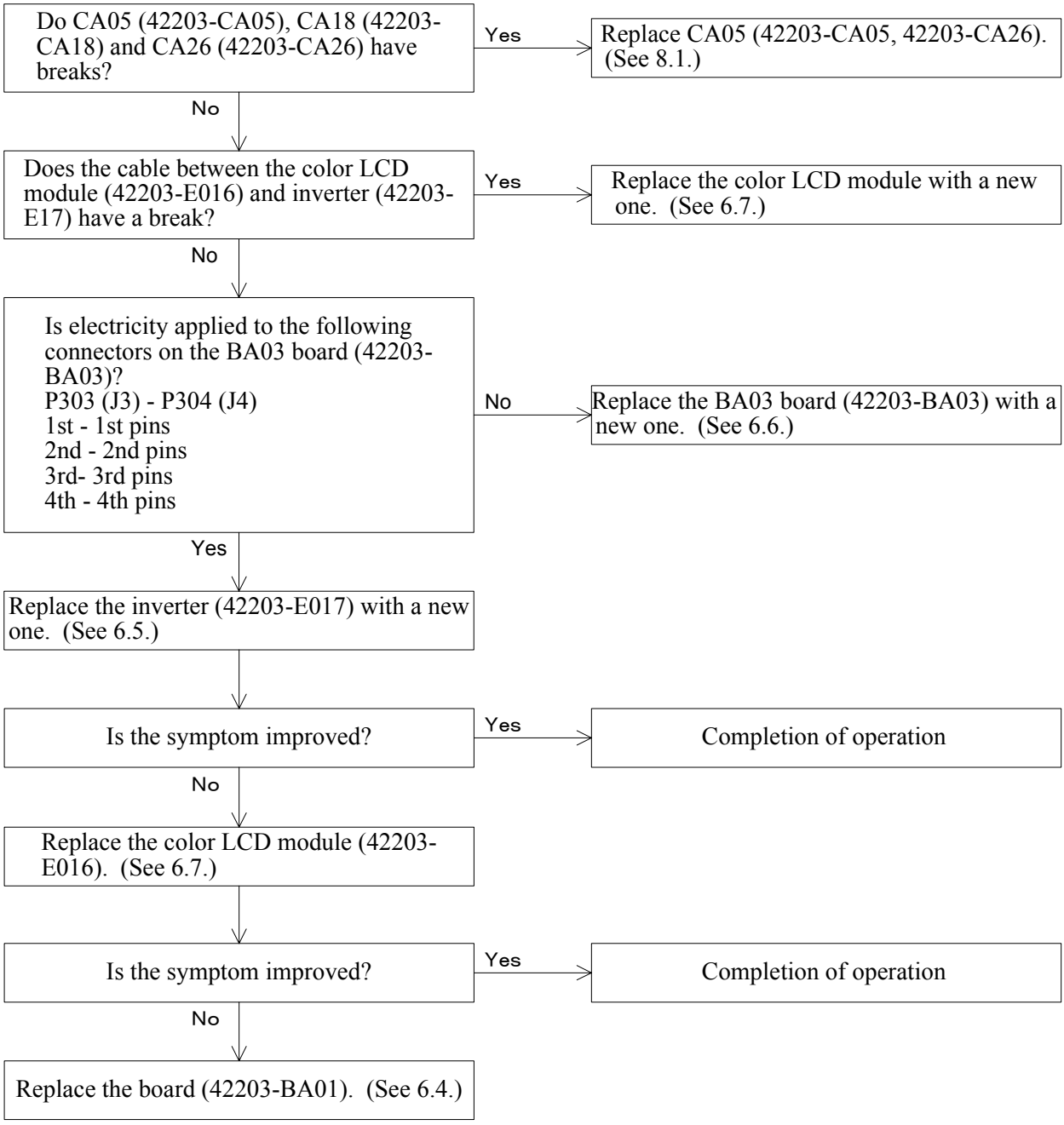
4.1.2 Initial screen remains displayed, and the Layout screen does not appear.



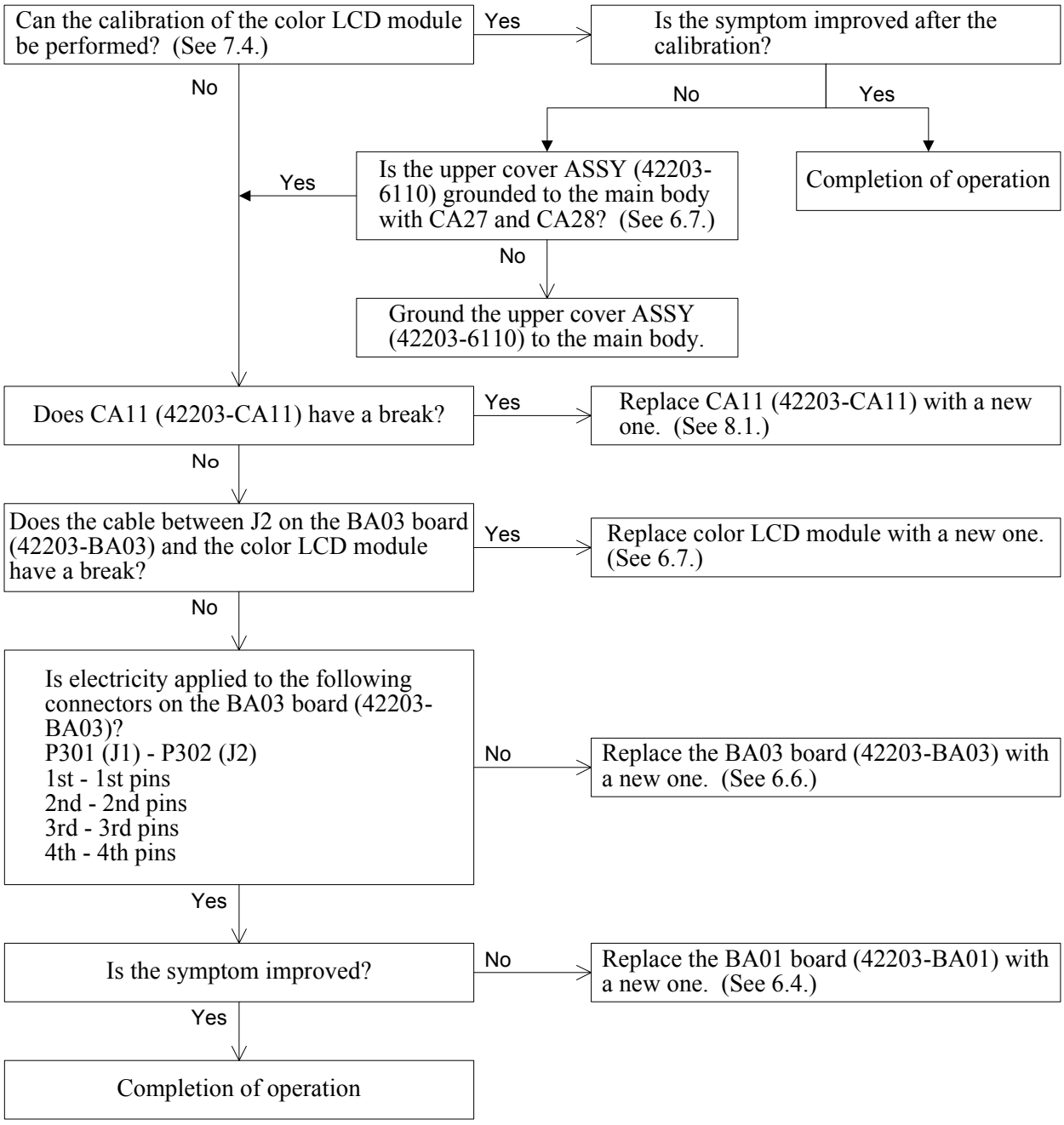
4.1.3 Image obtained by the CCD camera appears after the initial screen.



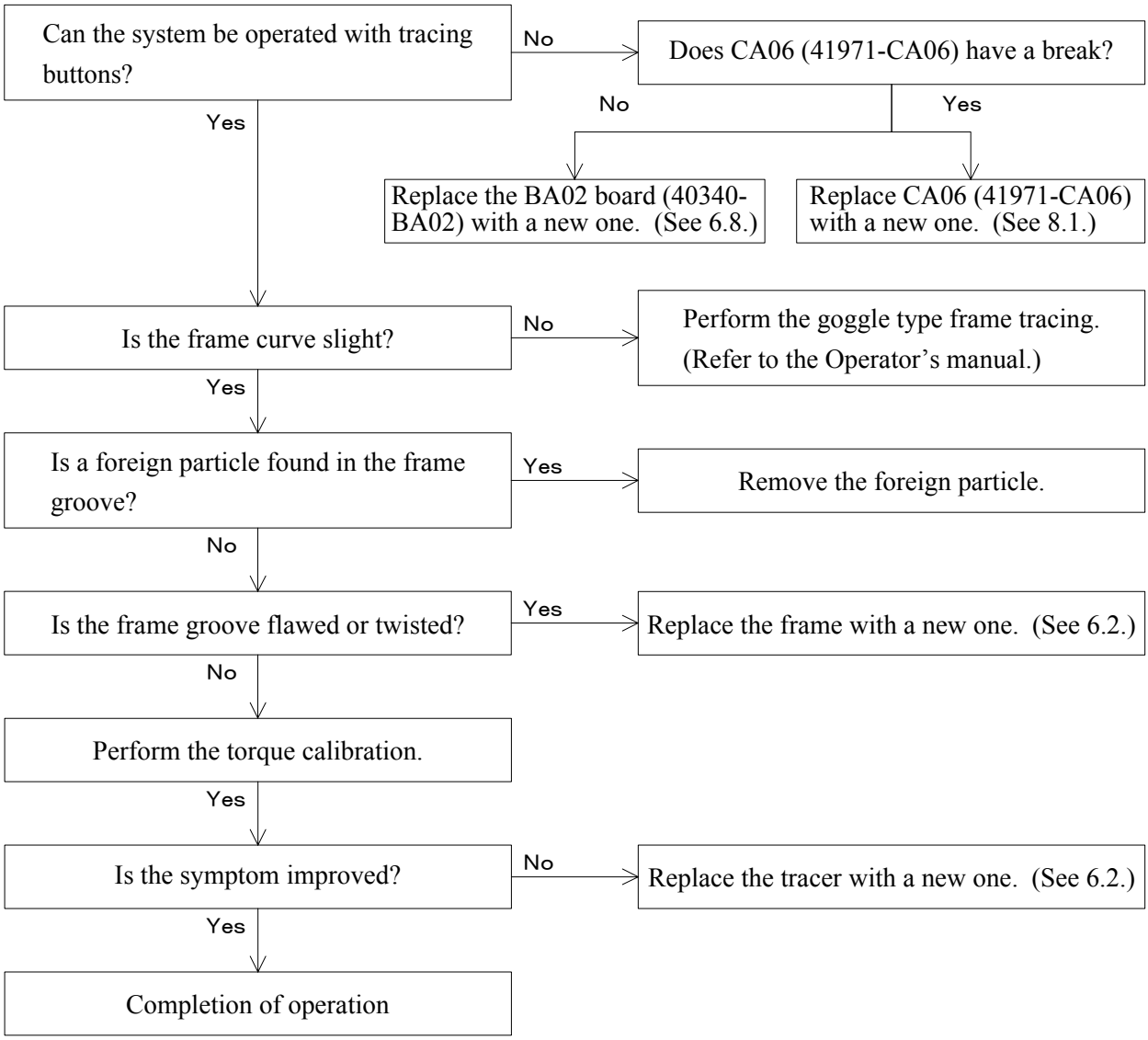
4.2 Display of the color LCD module is abnormal.



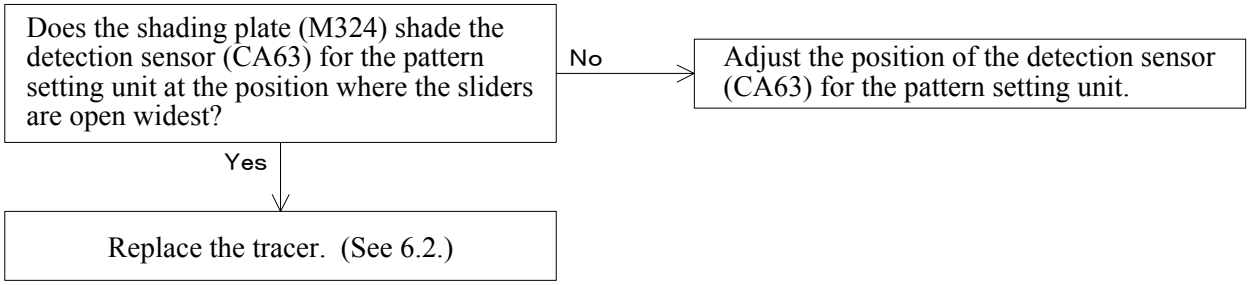
4.3 Operation with color LCD module cannot be performed.



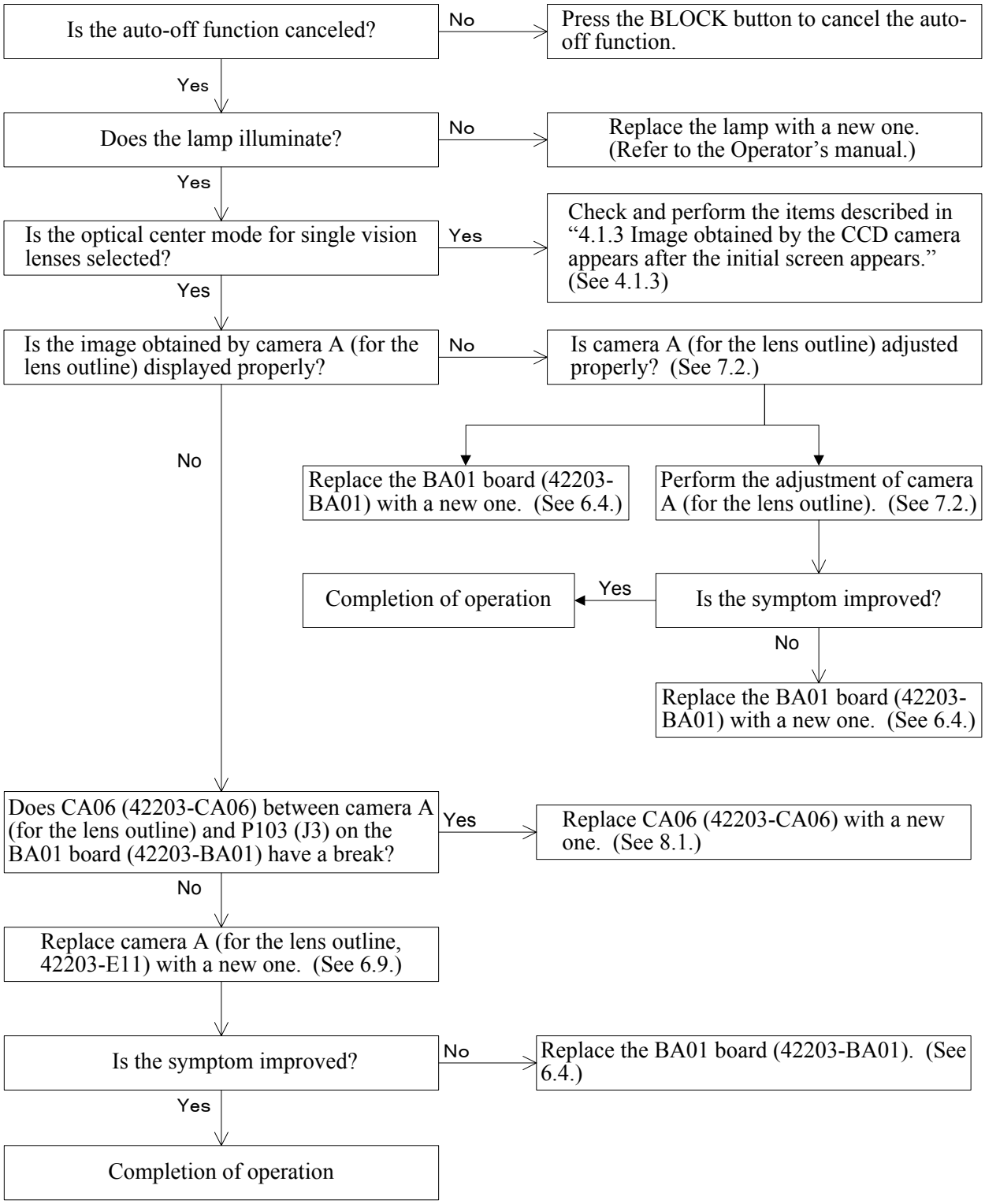
4.4 Frame cannot be traced properly.



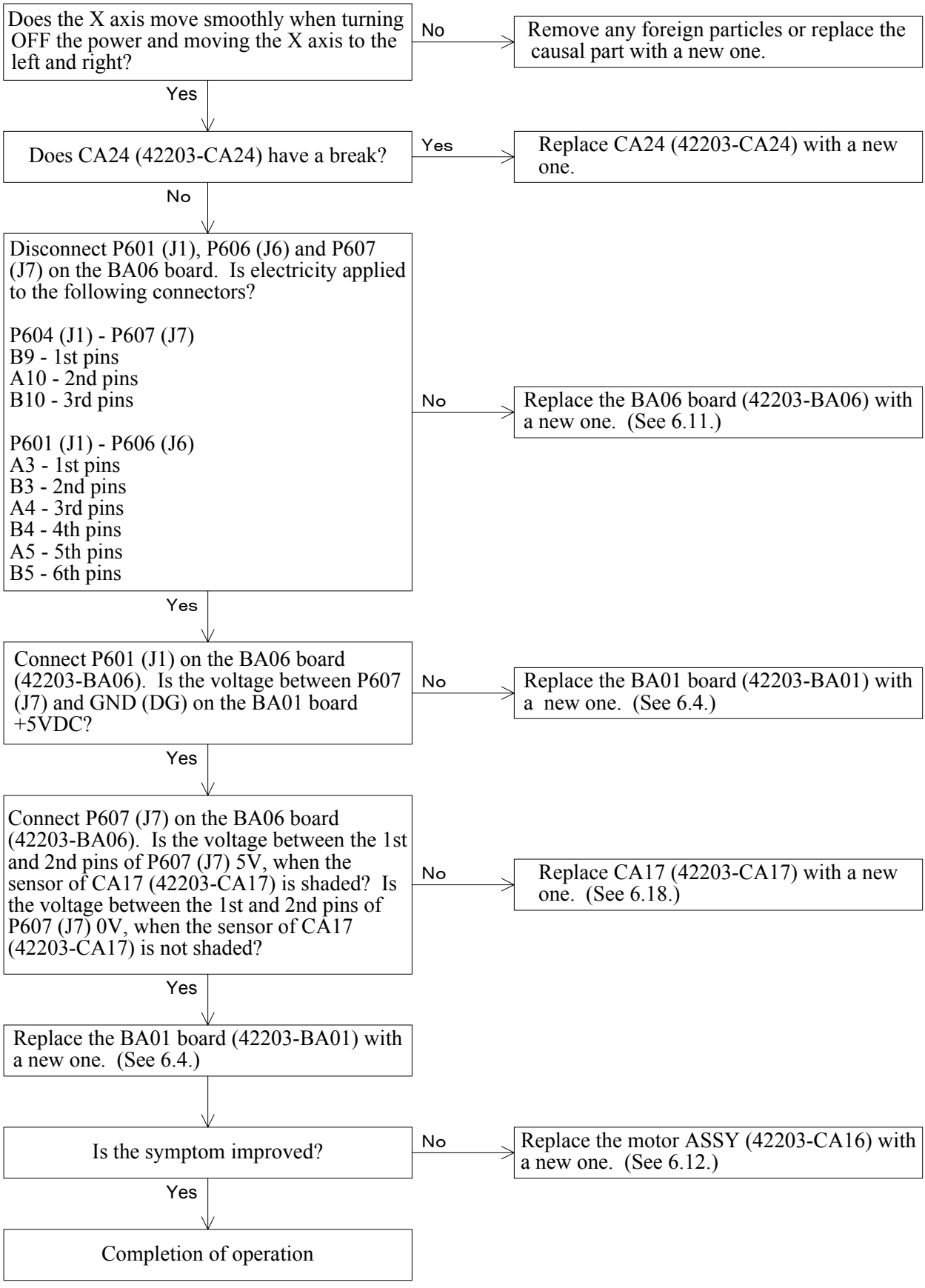
4.5 Pattern cannot be traced properly.



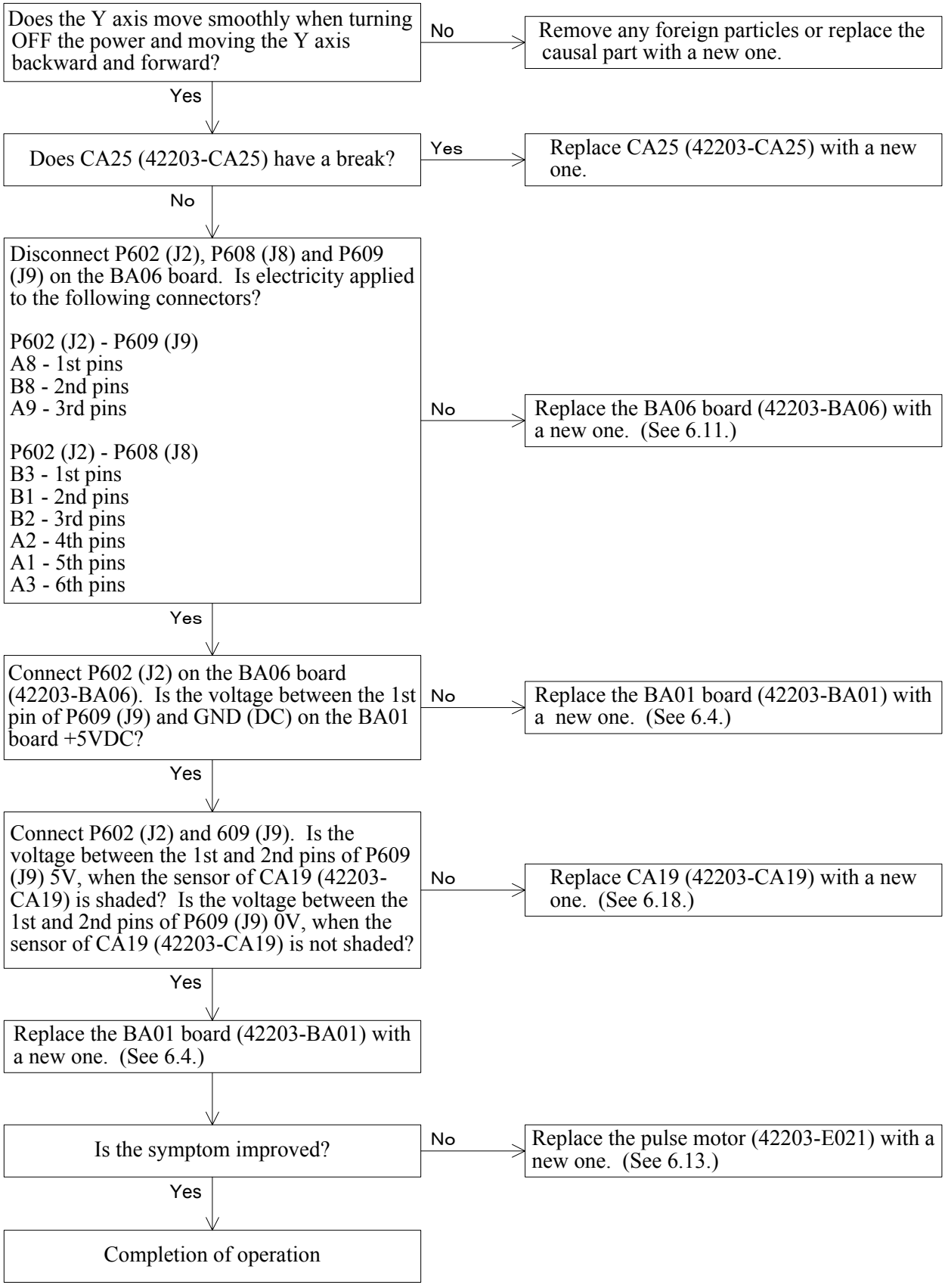
4.6 Lens cannot be measured.



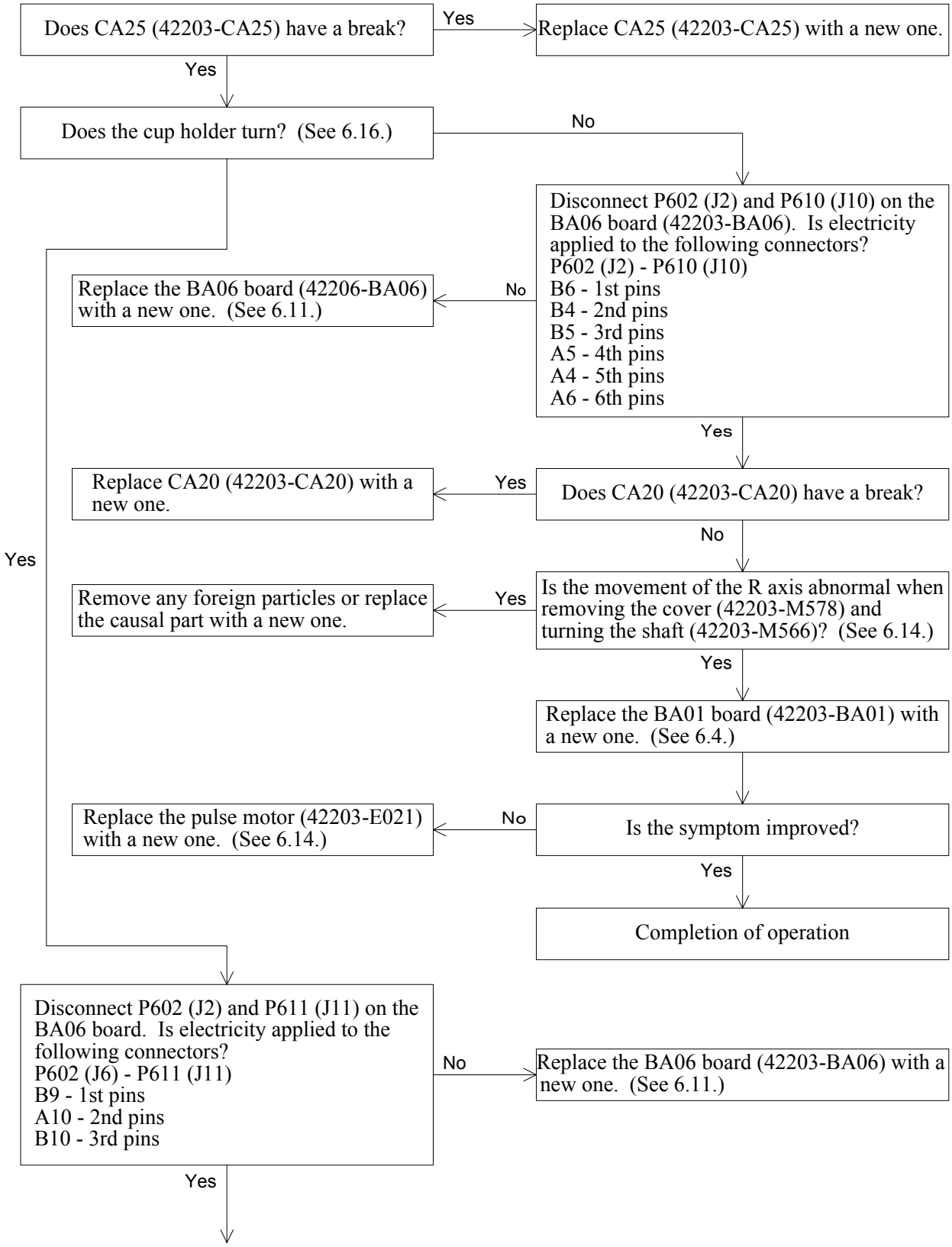
4.7 X Movement Error appears.

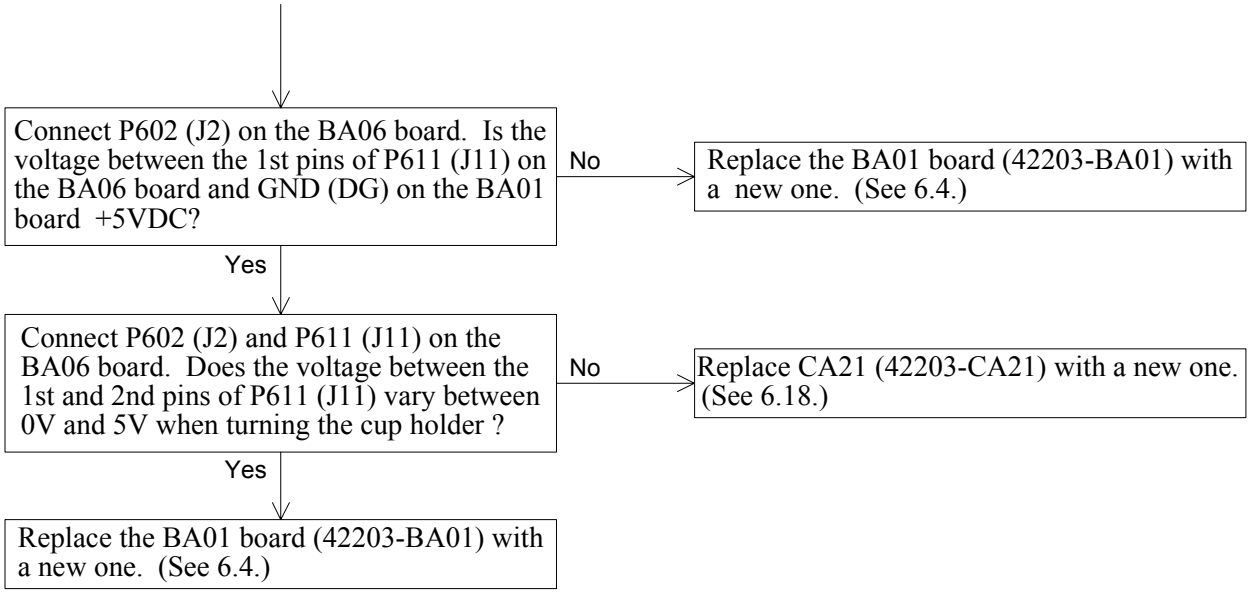


4.8 Y Movement Error appears.

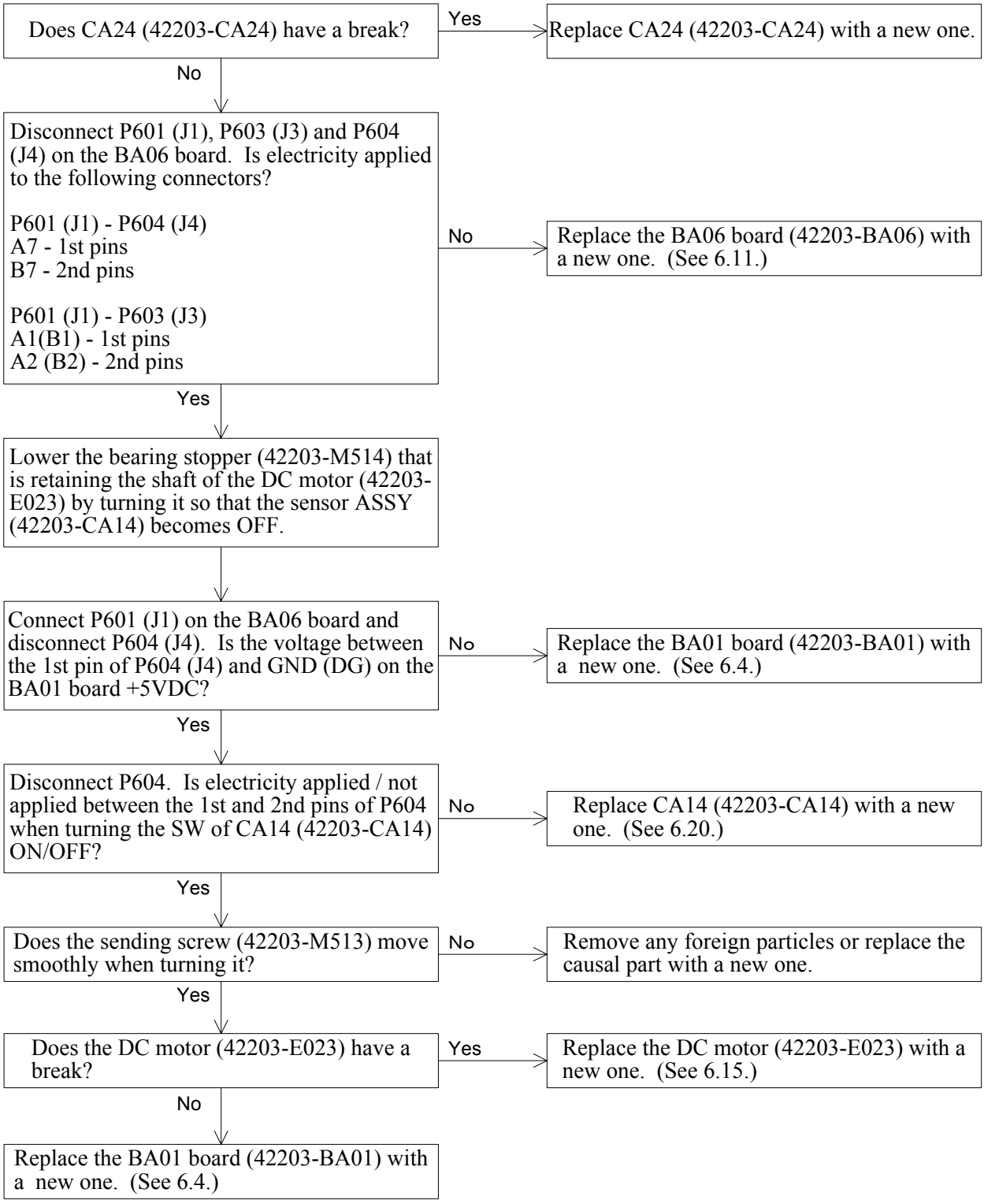


4.9 R Movement Error appears.

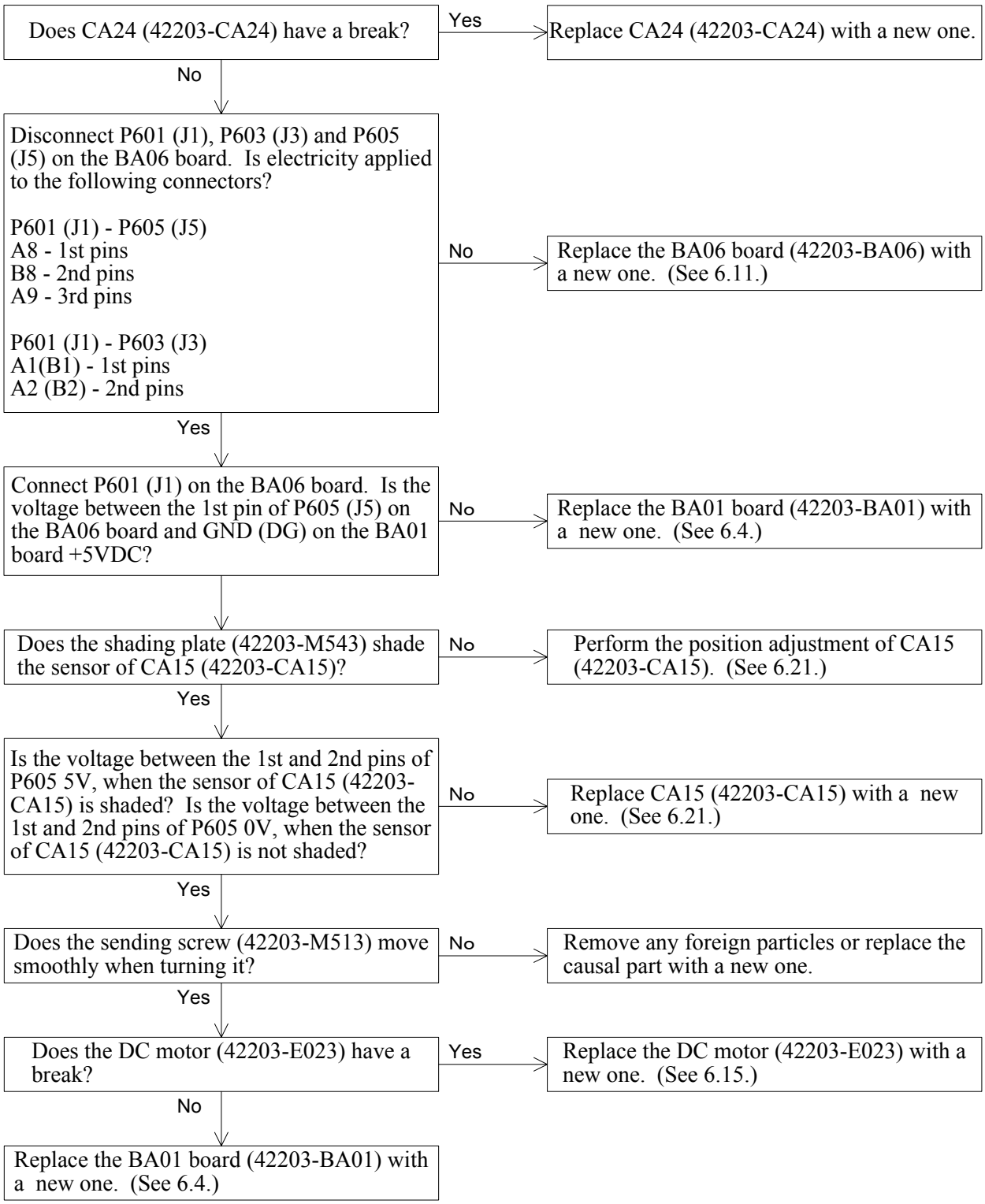



Connect P602 (J2) on the BA06 board. Is the voltage between the 1st pins of P611 (J11) on the BA06 board and GND (DG) on the BA01 board +5VDC?
No
Replace the BA01 board (42203-BA01) with a new one. (See 6.4.)
Yes
Connect P602 (J2) and P611 (J11) on the BA06 board. Does the voltage between the 1st and 2nd pins of P611 (J11) vary between 0V and 5V when turning the cup holder ?
No
Replace CA21 (42203-CA21) with a new one. (See 6.18.)
Yes
Replace the BA01 board (42203-BA01) with a new one. (See 6.4.)

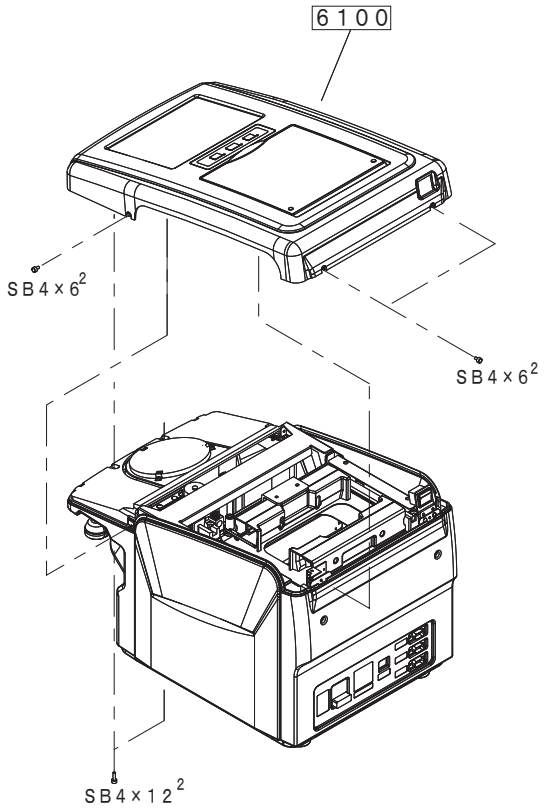
4.10 Upward Movement Error appears.



4.11 Downward Movement Error appears.



5.1 Removing covers



1. **Loosen SB4×6 (n=4) and unscrew SB4×12 (n=2).**

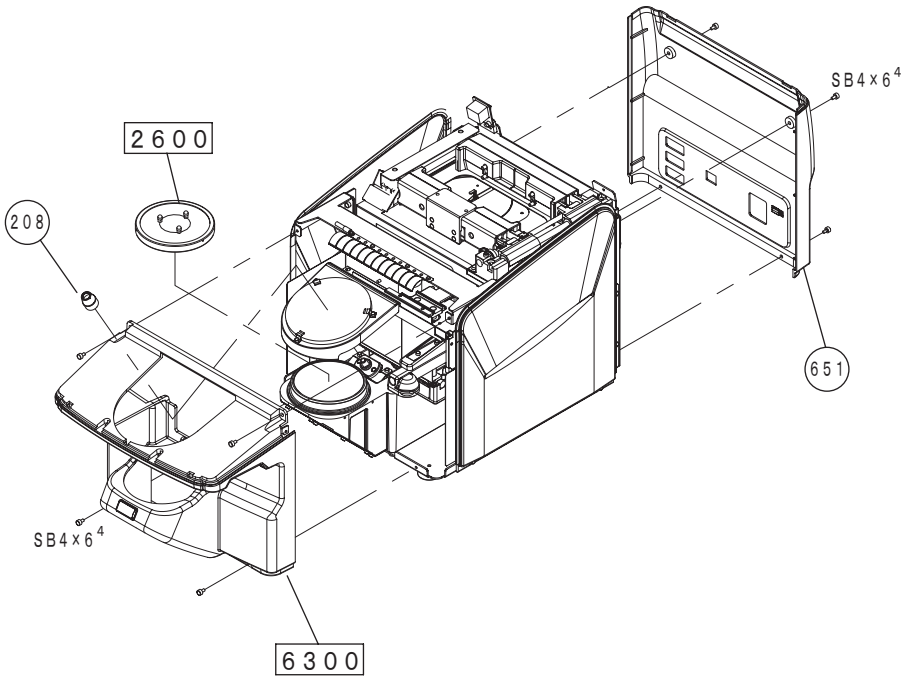
2. **Remove the top cover ASSY (6100) and disconnect P301 (J1) and P303 (J3) on the BA03 board. Disconnect the connector from CN1 of the color LCD module (42203-E016).**

3. **Remove the lamp cover (M208) and the lens table ASSY (42203-2600).**

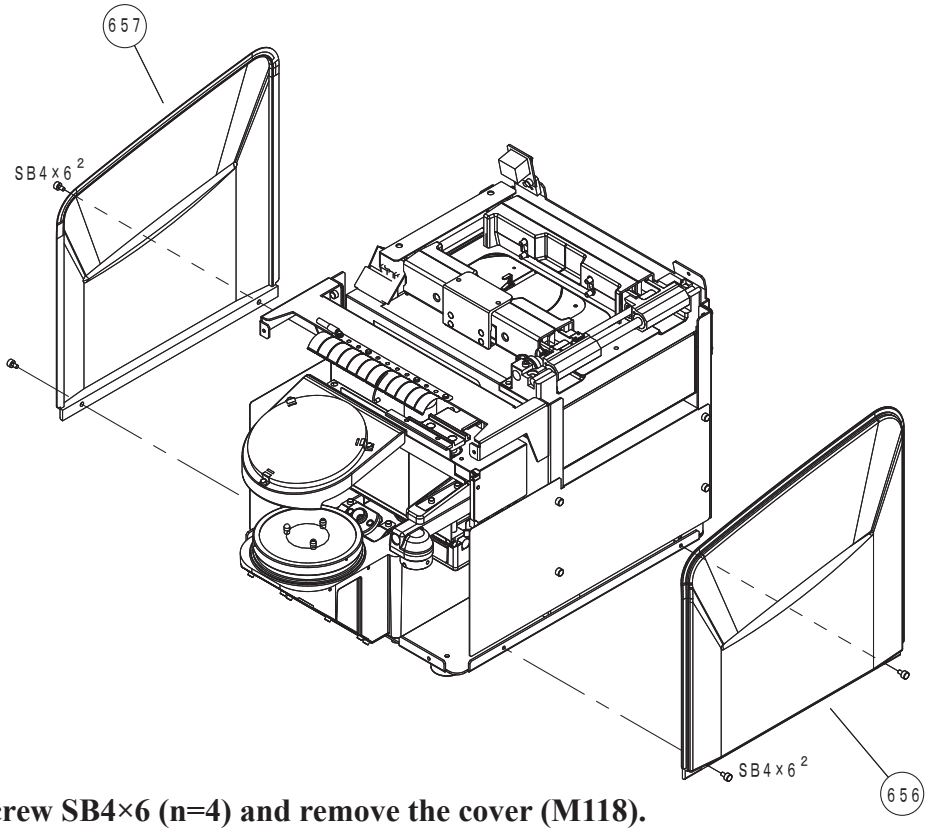
4. **Move the blocking ASSY to the center and unscrew SB4×6 (n=4) to remove the front cover ASSY (6300).**

5. **Disconnect the cable from P201 (J1) on the BA02 board (42203-BA02).**

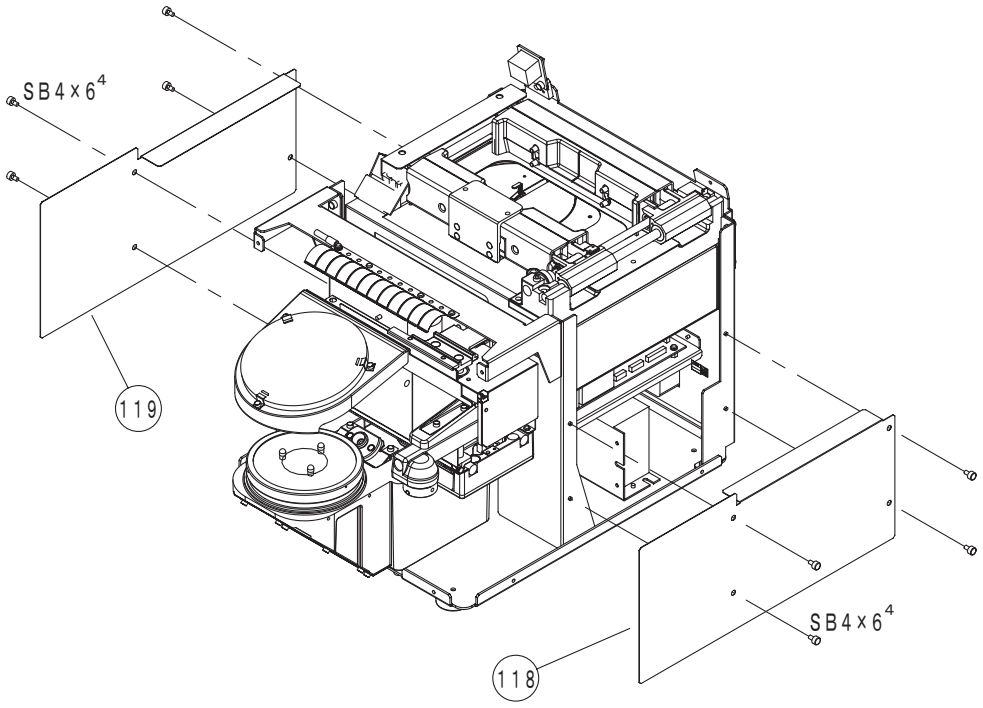
6. **Unscrew SB4×6 to remove the rear cover (M651/M641).**



7. Unscrew SB4×6 (n=2) and remove the right cover (M656/M646) .
8. Unscrew SB4×6 (n=2) and remove the left cover (M657/M647).



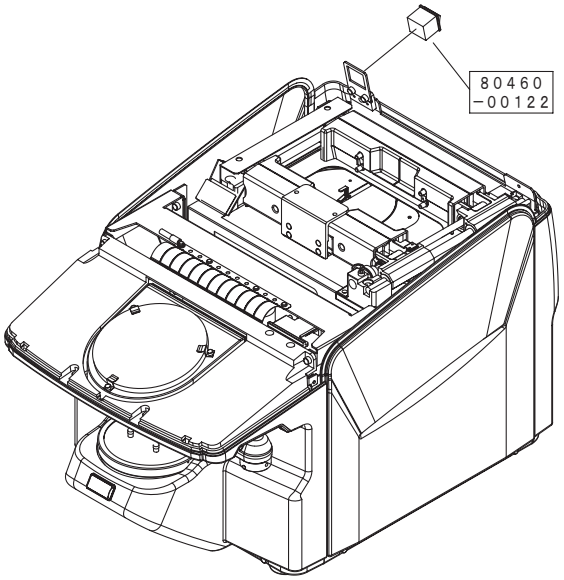
9. Unscrew SB4×6 (n=4) and remove the cover (M118).
10. Unscrew SB4×6 (n=4) and remove the cover (M119).



§6 REPLACEMENT PROCEDURES

6.1 Replacing the switch

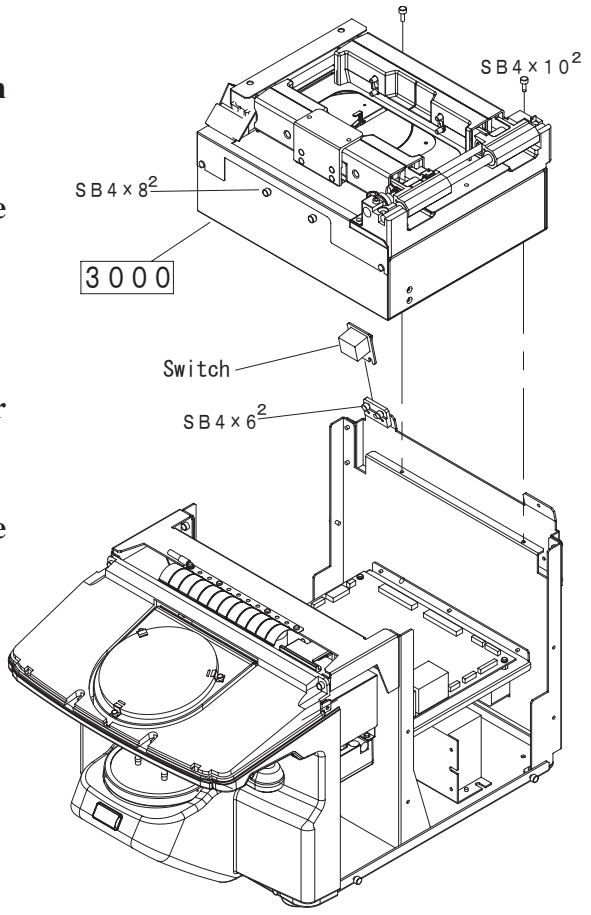
Parts to be replaced: switch (80460-00122)



1. **Remove the top cover ASSY (6100). (See 5.1.)**
2. **Disconnect the cables connected to the switch.**
3. **Replace the switch (80460-00122) with a new one.**
4. **Reassemble the removed parts in the reverse procedure.**

6.2 Replacing the tracer

Parts to be replaced: tracer ASSY (40340-3000)



1. **Remove the covers. (See 5.1.)**
2. **Unscrew FC3×6 (n=2) and remove the switch together with the switch holder.**
3. **Disconnect the connector P1502 (J2) on the board (40340-BA11) of the tracer ASSY.**
4. **Loosen SB4×8 (n=2).**
5. **Unscrew SB4×10 (n=2) and replace the tracer ASSY (40340-3000) with a new one.**
6. **Reassemble the removed parts in the reverse procedure.**

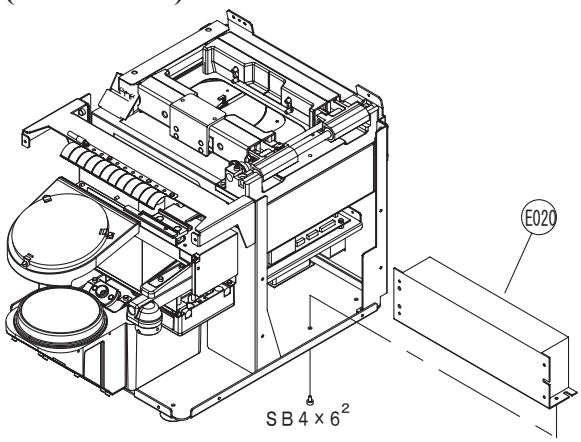
6.3 Replacing the switching power supply

Parts to be replaced: switching power supply (42203-E020)

1. Remove the covers. (See 5.1.)

2. Disconnect all the connectors assembled to the switching power supply (42203-E020).

3. Unscrew SB4×6 (n=2) and replace the switching power supply (42203-E020) with a new one.



6.4 Replacing the BA01 board

Parts to be replaced: BA01 board (42203-BA01)

1. Remove the tracer ASSY (40340-3000). (See 6.2.)

2. Disconnect all the connectors assembled to the BA01 board (42203-BA01).

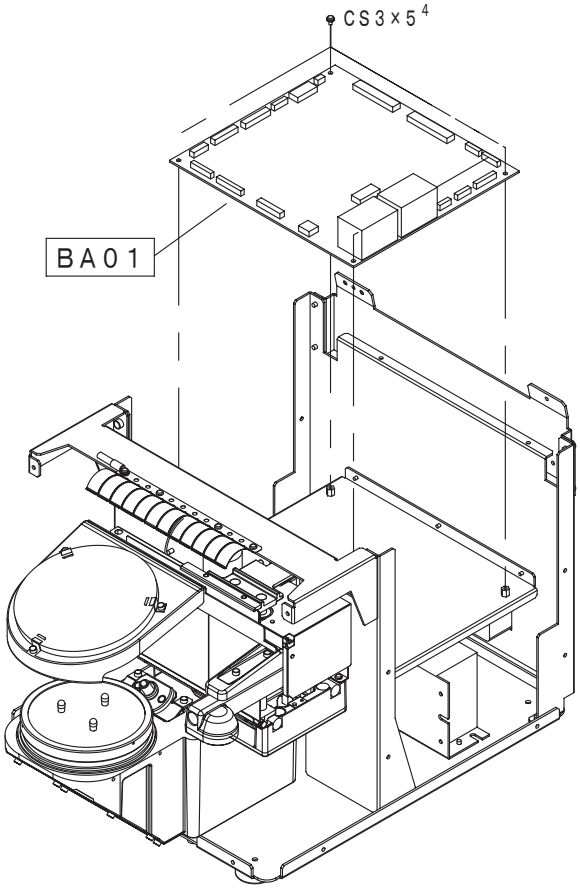
3. Unscrew CS3×5 (n=4) and replace the BA01 board (42203-BA01) with a new one.

4. Reassemble the removed parts in the reverse procedure.

5. Adjust the imaging position. (See 7.5.)

6. Adjust the spherical accuracy. (See 7.6.)

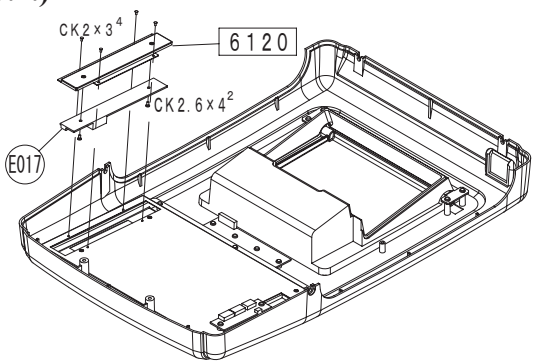
7. Adjust the blocking position. (See 7.7.)



6.5 Replacing the inverter

Parts to be replaced: inverter (42203-E017)

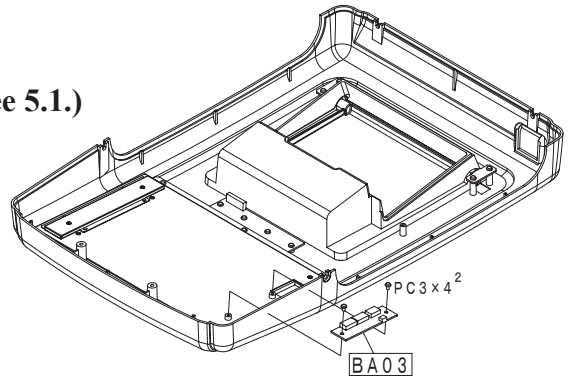
1. **Remove the top cover ASSY (42203-6100). (See 5.1.)**
2. **Disconnect all the connectors assembled to the inverter (42203-E017).**
3. **Unscrew CK2×3 (n=4) and remove the inverter ASSY (42203-6120).**
4. **Unscrew CK2.6×4 (n=2) and replace the inverter (42203-E017) with a new one.**
5. **Reassemble the removed parts in the reverse procedure.**



6.6 Replacing the BA03 board

Parts to be replaced: BA03 board (42203-BA03)

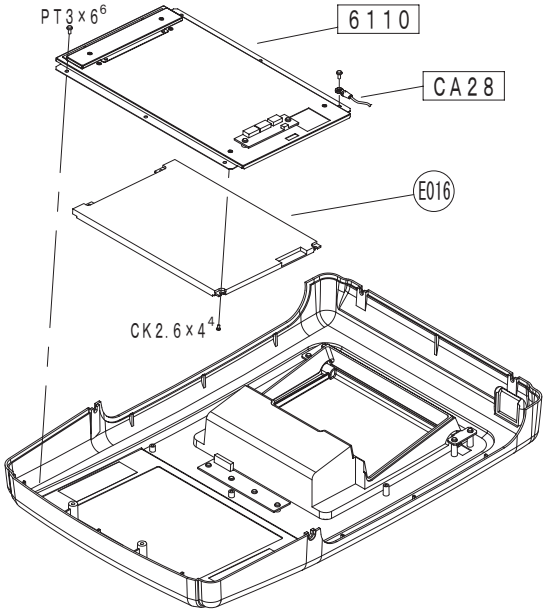
1. **Remove the top cover ASSY (42203-6100). (See 5.1.)**
2. **Disconnect all the connectors assembled to the BA03 board (42203-BA03).**
3. **Unscrew PC3×4 (n=2) and replace the BA03 board (42203-BA03) with a new one.**
4. **Reassemble the removed parts in the reverse procedure.**



6.7 Replacing the color LCD module

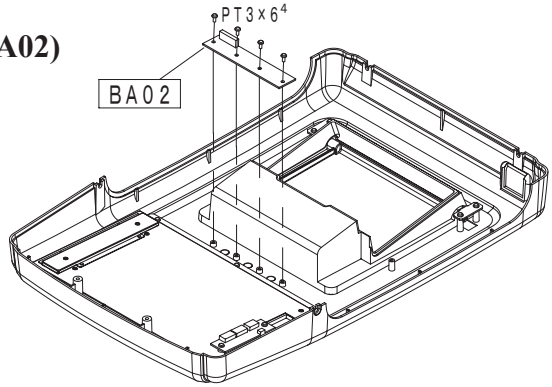
Parts to be replaced: color LCD module (42203-E016)

1. **Remove the top cover ASSY (42203-6100). (See 5.1.)**
2. **Unscrew PT3×6 (n=6) and remove the panel ASSY (42203-6110).**
3. **Disconnect all the connectors assembled to the color LCD module (42203-E016).**
4. **Unscrew CK2.6×4 (n=4) and remove the color LCD module (42203-E016).**
5. **Reassemble the removed parts in the reverse procedure.**
6. **Perform the calibration of the color LCD module. (See 7.4.)**



6.8 Replacing the BA02 board

Parts to be replaced: BA02 board (40340-BA02)



1. Remove the top cover (42203-6100). (See 5.1.)

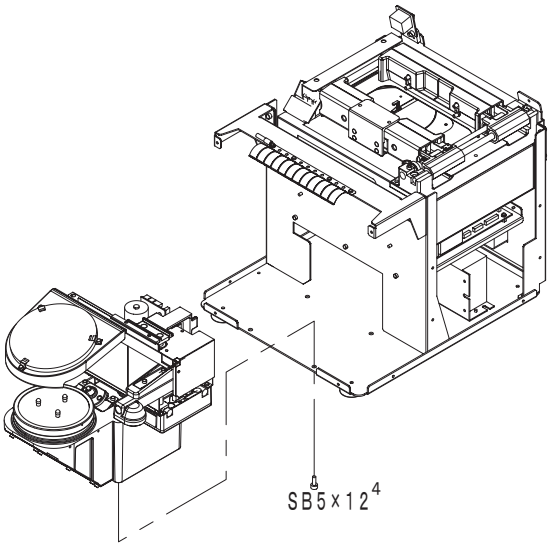
2. Disconnect all the connectors assembled to the BA02 board (40340-BA02).

3. Unscrew PT3×6 (n=4) and replace the BA02 board (40340-BA02) with a new one.

4. Reassemble the removed parts in the reverse procedure.

6.9 Replacing the camera of the lens outline ASSY

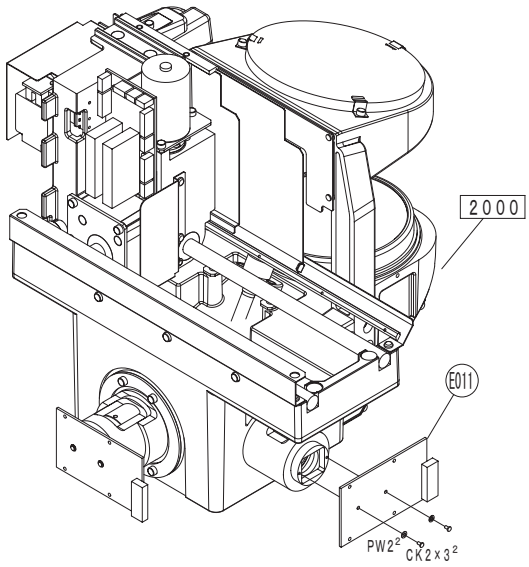
Parts to be replaced: camera (42203-E011)



1. Remove the covers. (See 5.1.)

2. Disconnect P113 (J13), P114 (J14) and all the connectors assembled to the BA01 board.

3. Unscrew SB5×12 (n=4) and remove the optical ASSY (42203-2000).



4. Unscrew CK2×3 and PW2 (n=4), and replace the camera (42203-E011) with a new one.

5. Reassemble the removed parts in the reverse procedure.

6. Adjust the camera to display the lens outline. (See 7.2.)

6.10 Replacing the camera of the grid image ASSY

Parts to be replaced: camera (42203-E011)

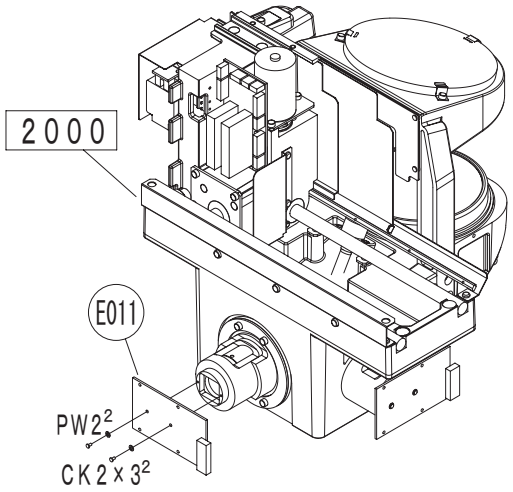
1. **Remove the covers. (See 5.1.)**

2. **Remove the optical ASSY (42203-2000). (See 6.9.)**

3. **Unscrew CK2×3 and PW2 (n=4), and replace the camera (42203-E011) with a new one.**

4. **Reassemble the removed parts in the reverse procedure.**

5. **Adjust the camera to measure the grid. (See 7.1 and 7.3)**



6. **Perform the fine adjustment of the imaging position. (See 7.5.)**

7. **Perform the adjustment of the spherical accuracy. (See 7.6.)**

8. **Perform the adjustment of the blocking position. (See7.7.)**

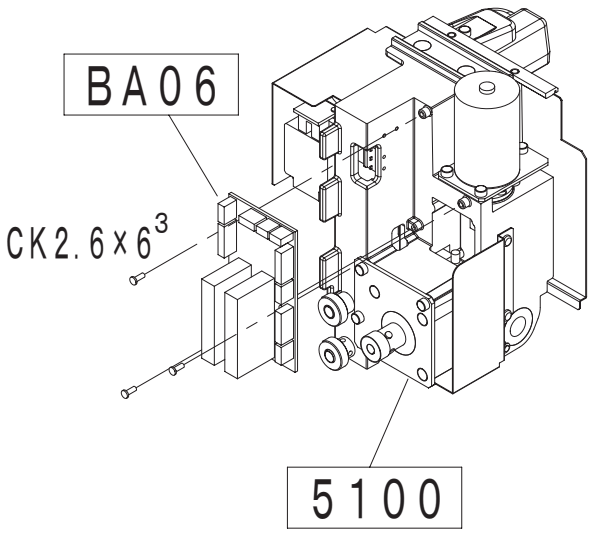
6.11 Replacing the BA06 board

Parts to be replaced: BA06 board (42203-BA06)

1. **Remove the optical ASSY (42203-2000). (See 6.9)**

2. **Disconnect all the connectors assembled to the BA06 board.**

3. **Unscrew CK2.6×6 (n=3) and replace the BA06 board (42203-BA06).**



6.12 Replacing the CA16 motor

Parts to be replaced: motor (42203-CA16)

1. **Remove the optical ASSY. (See 6.9.)**

2. **Unscrew FC5×18 (n=8) and PC3×6 (n=2), and remove the blocking ASSY (42203-5100) together with the shaft (42203-M276) and the rack (42203-M288).**

3. **Remove the shaft and the rack from the blocking ASSY.**

4. **Unscrew SB3×6 (n=3) and remove the CA16 motor (42203-CA16) together with the motor mount (4203-M521).**

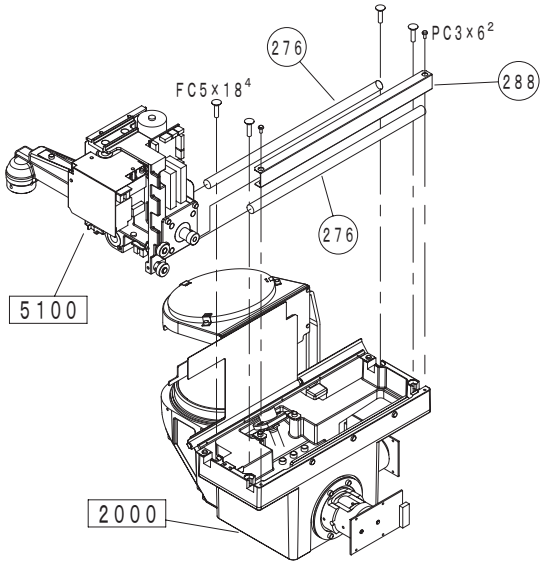
5. **Unscrew HH4×4 (n=2) and remove the pinion (42203-M522).**

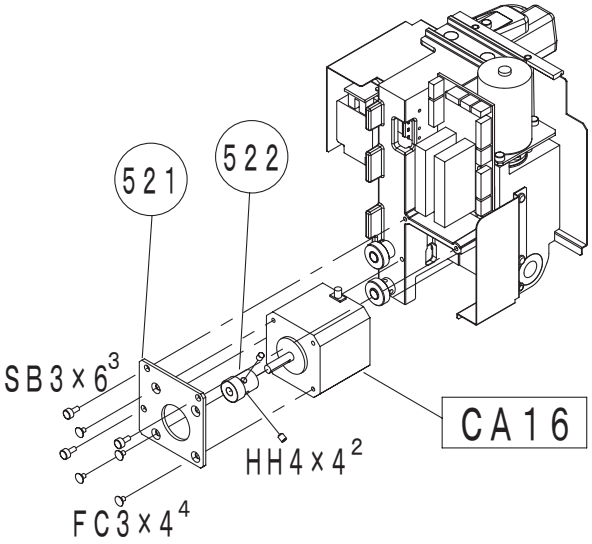
6. **Unscrew FC3×4 (n=4) and replace the CA16 motor (42203-CA16) with a new one.**

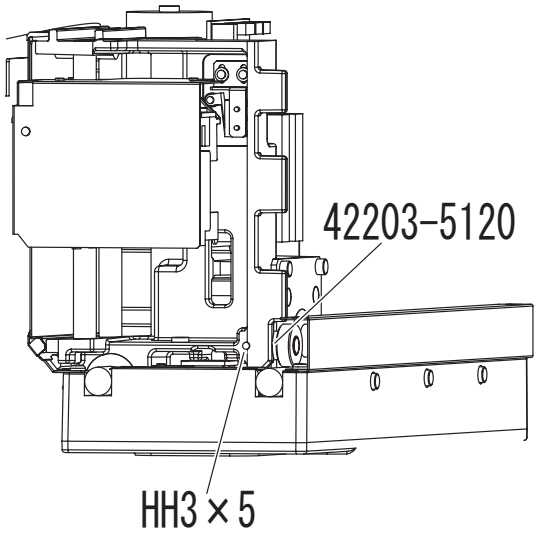
7. **Reassemble the removed parts in the reverse procedure.**

8. **Loosen HH3×5 and adjust the motor assembled position. Besides, adjust the engagement of the gear by rotating the shaft of the eccentric bearing ASSY so that the blocking ASSY (42203-5100) moves smoothly.**

9. **Perform the adjustment of the blocking position. (See 7.7.)**







6.13 Replacing the Y DRV. motor

Parts to be replaced: Y DRV. Motor (42203-E021)

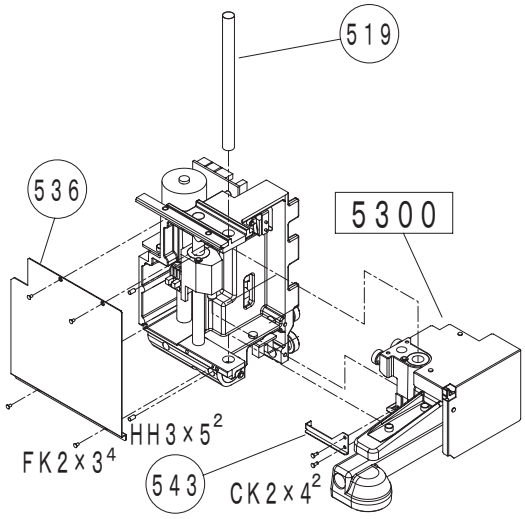
1. Remove the blocking ASSY (42203-5100). (See 6.12.)

2. Unscrew FK2×3 (n=4) and remove the cover (42203-M536).

3. Unscrew CK2×4 (n=2) and remove the interrupter (42203-M543).

4. Unscrew HH3×5 (n=2) and remove the shaft (42203-M519).

5. Remove the y-axis ASSY (42203-5300).



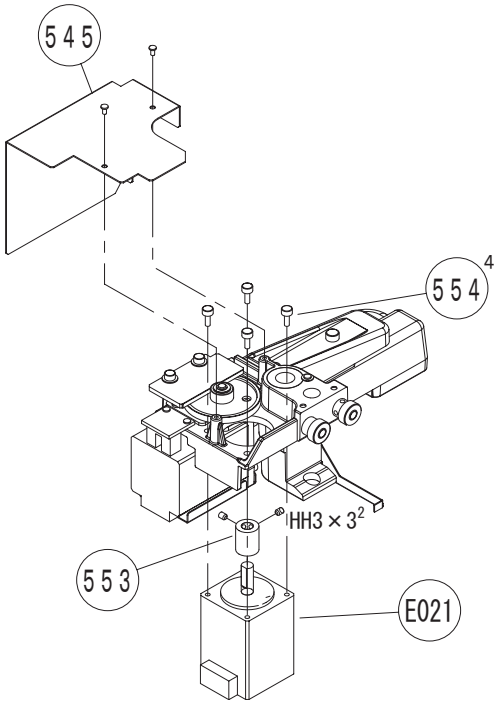
6. Unscrew CK2×3 (n=2) and remove the cover (42203-M545).

7. Unscrew the screws (42203-M554) and remove the motor (42203-E021).

8. Unscrew HH3×3 (n=2) and remove the motor gear (42203-M553). Replace the motor (42203-E021) with a new one.

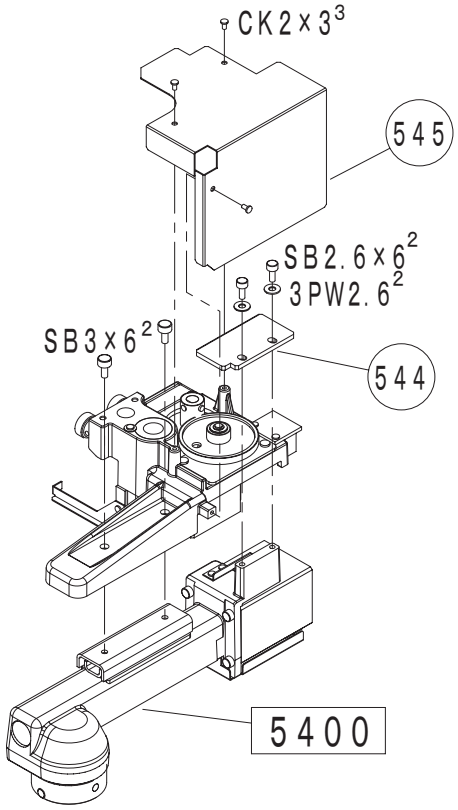
9. Reassemble the removed parts in the reverse procedure.
* Be sure to assemble the removed parts so that there is no allowance between the motor gear (42203-M553) and the idler gear (42203-M558).

10. Perform the adjustment of the blocking position. (See 7.7.)



6.14 Replacing the R DRV. motor

Parts to be replaced: R DRV. Motor (42203-E021)



1. **Remove the y-axis ASSY. (See 6.13.)**

2. **Unscrew CK2×3 (n=3) and remove the cover (42203-M545).**

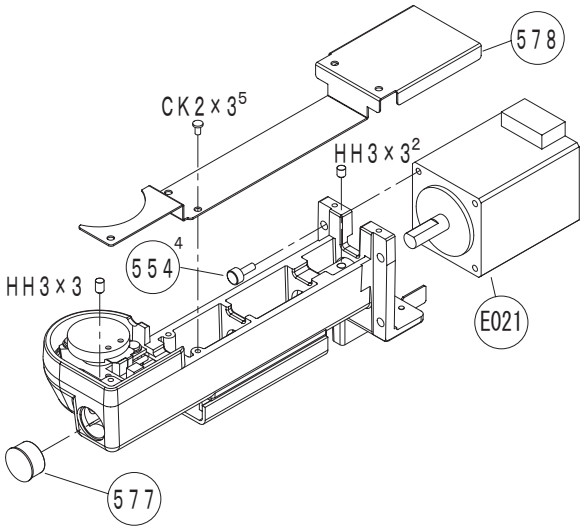
3. **Unscrew SB2.6×6 (n=2) and remove 3PW2.6 (n=2). Remove the Y rack (42203-M544).**

4. **Unscrew SB3×6 (n=2) and remove the θ axis ASSY.**

5. **Unscrew CK2×3 (n=5) and remove the cover (42203-M578).**

6. **Unscrew HH3×3 and remove the cap (42203-M577).**

7. **Insert a Phillips screwdriver into a hole where the cap was assembled and rotate the shaft to remove HH3×3 (n=2).**



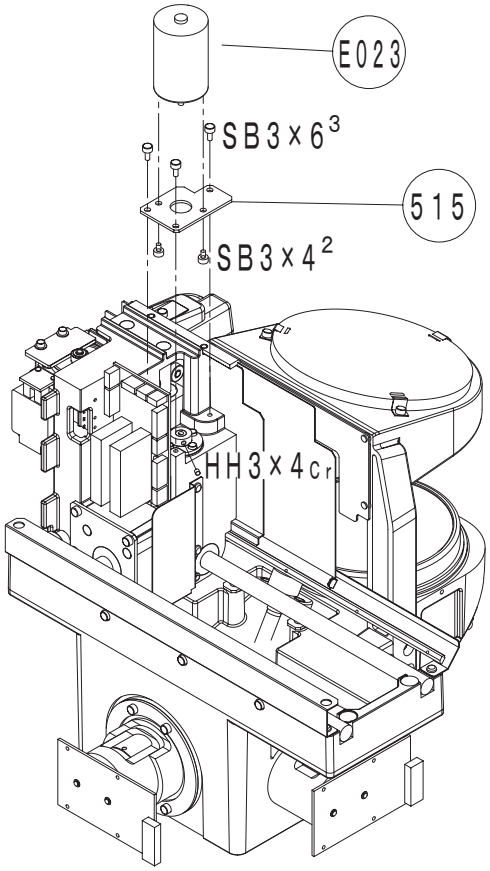
8. **Unscrew the screws (42203-M554) (n=2) and replace the R DRV. motor (42203-E021) with a new one.**

9. **Reassemble the removed parts in the reverse procedure.**
   * Be sure to assemble the removed parts so that there is no allowance between the motor gear (42203-M553) and the idler gear (42203-M558).

10. **Perform the adjustment of the blocking position. (See 7.7.)**

6.15 Replacing the DC motor (42203-E023)

Parts to be replaced: DC motor (42203-E023)



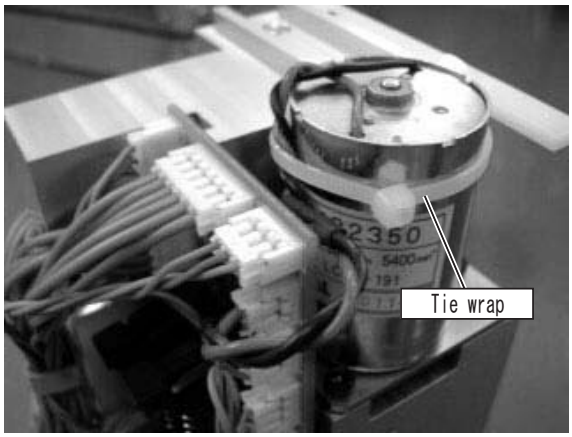
1. **Unscrew SB5×12 (n=4) and remove the optical ASSY (42203-2000). (See 6.9.)**

2. **Loosen only HH3×4Cr (n=1).**
   * Do not loosen HH3×3ZnBR (n=2).

3. **Unscrew SB3×6 (n=3) and remove the DC motor together with the motor mount (42203-M515).**

4. **Unscrew SB3×4 (n=2) and remove the DC motor (42203-E023).**

5. **Fix cables of the motor around the motor body with a tie wrap as in the right picture.**



6. **Reassemble the removed parts in the reverse procedure.**

7. **Rotate the shaft of the DC motor and verify that it rotates smoothly.**

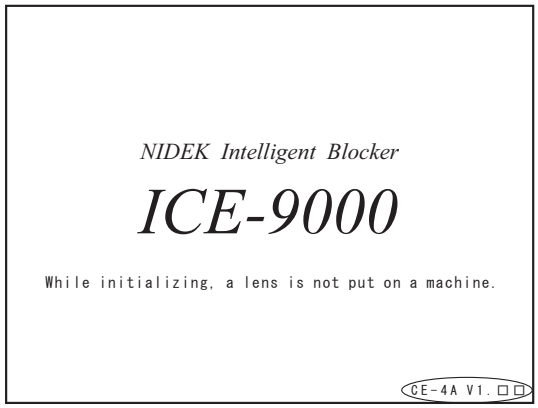
8. **Perform the adjustment of the blocking position. (See 7.7.)**

6.16 Replacing the cup holder ASSY

Parts to be replaced: **cup holder ASSY made by NIDEK (42203-5410)**
cup holder ASSY made by TOPCON (42203-5430)
cup holder ASSY made by WECO (42203-5440)

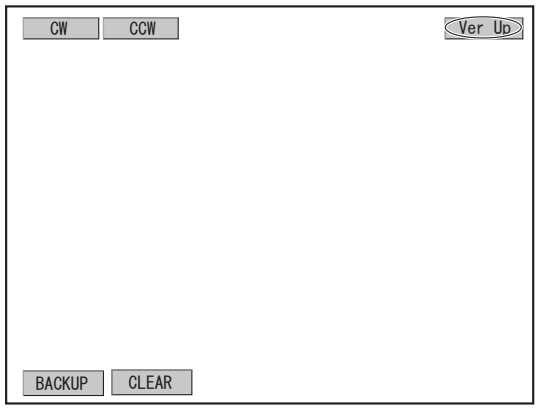
1. Turn ON the power switch to display the initial screen.

2. Touch the characters "CE-4A V1. □ □" of the software version on the screen.
* When the system responds by touching the characters, the white characters of the software version change to red.

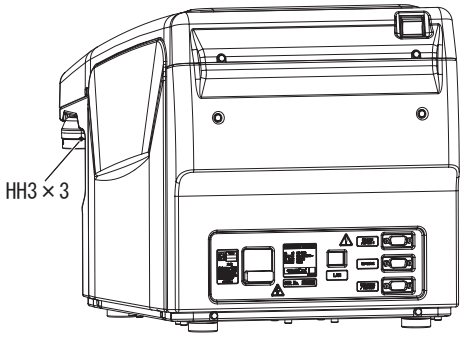


3. The screen for rotating the cup holder ASSY appears.

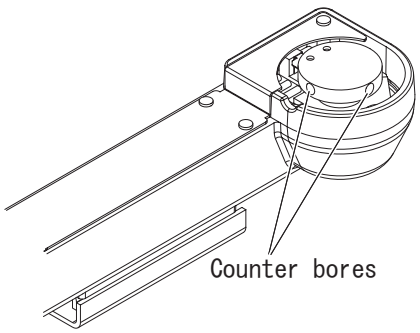
4. Touching the CW or CCW buttons at the upper left of the screen rotates the cup holder ASSY.
* Do not touch the CLEAR button at the lower left of the screen. It may clear the memory.



5. When the screen for rotating the cup holder ASSY is displayed, set the position of the cup holder ASSY as illustrated in the right picture. At the position, loosen HH3×3 (n=2) fixing the cup holder and replace the cup holder ASSY with a new one.

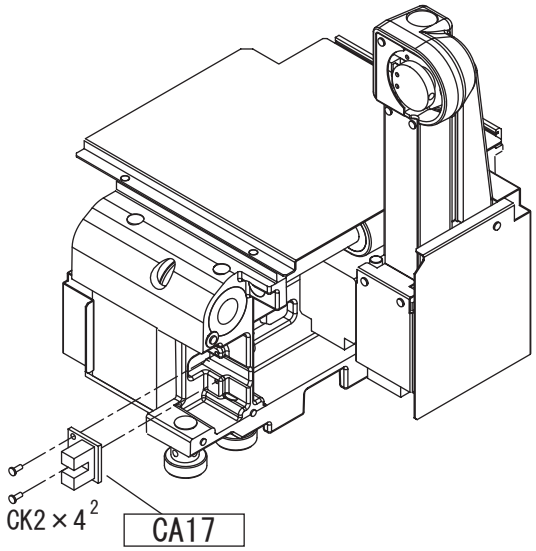


6. Fix HH3×3 (n=2) at the position of the counter bores as illustrated in the right picture when reassembling the cup holder ASSY.



6.17 Replacing CA17

Replacement parts: 42203-CA17

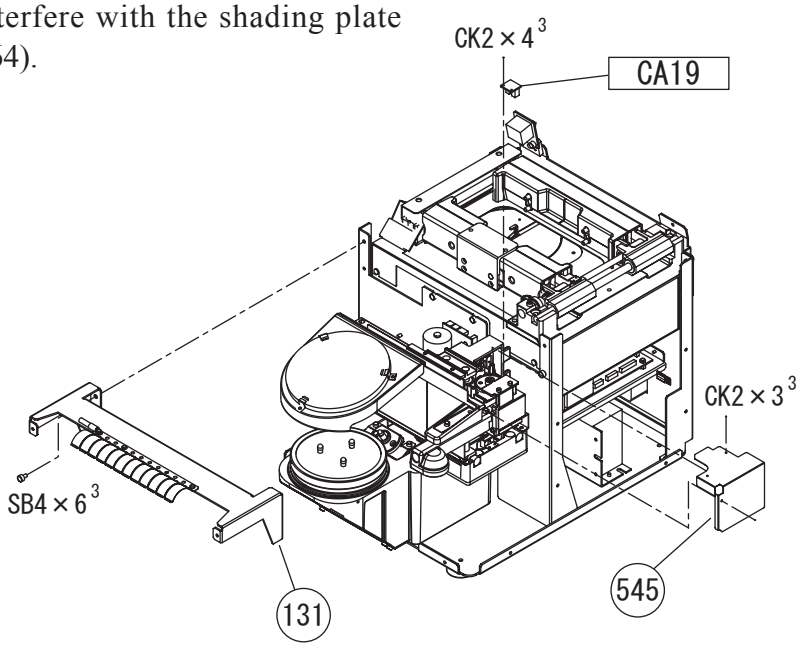


1. **Remove the covers. (See 5.1.)**
2. **Remove the blocking ASSY (42203-5100). (See 6.12.)**
3. **Disconnect P607 (J7) on the BA06 board.**
4. **Unscrew CK2×4 (n=2) and detach CA17 (42203-CA17).**
5. **Reassemble the parts in reverse order.**
   * Assemble the parts so that the sensor of CA17 does not interfere with the shading plate (42203-M273).

6.18 Replacing CA19

Replacement parts: 42203-CA19

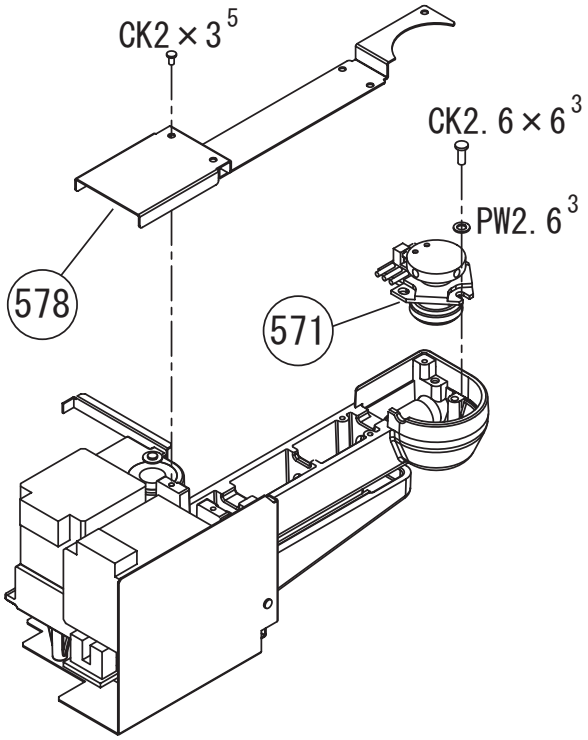
1. **Remove the covers. (See 5.1.)**
2. **Unscrew SB4×6 (n=3) and remove the fitting (42203-M131).**
3. **Unscrew CK2×4 (n=3) and remove the cover (42203-M545).**
4. **Unscrew CK2×4 (n=3) and detach CA19 (42203-CA19).**
5. **Reassemble the parts in reverse order.**
   * Assemble the parts so that the sensor of CA19 does not interfere with the shading plate (42203-M564).



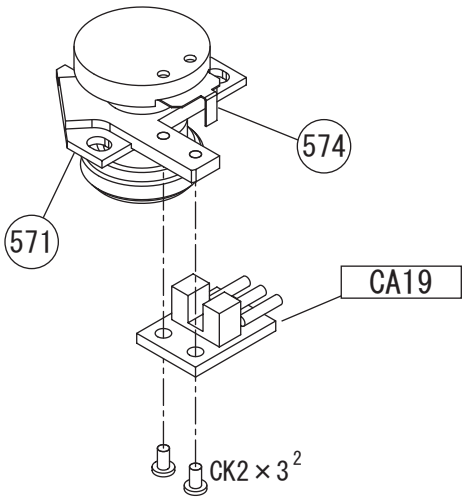
6.19 Replacing CA21

Replacement parts: 42203-CA21

1. **Remove the covers. (See 5.1.)**
2. **Remove the cup holder. (See 6.16.)**
3. **Unscrew CK2×3 (n=5) and remove the cover (42203-M578).**
4. **Disconnect P611 (J11) on the BA06 board (42203-BA06).**
5. **Unscrew CK2.6×6 and remove PW2.6 (n=3). Then, remove base θ (42203-M571) together with CA21.**

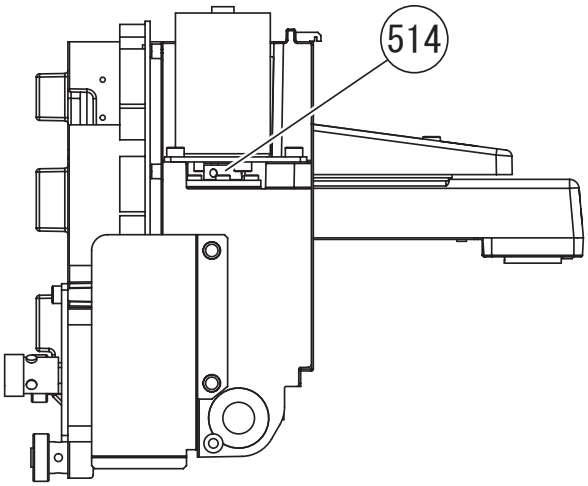


6. **Unscrew CK2×3 (n=2) and detach CA19 (42203-CA19).**
7. **Reassemble the parts in reverse order.**
   * Assemble the parts so that the sensor of CA21 does not interfere with the shading plate (42203-M574).
8. **Adjust the gear engagement by following the instructions below.**
   (1) Gently move base θ (42203-M571) toward the worm (42203-M568) and tighten CK2.6×6 (n=3) temporarily.
   (2) Insert a flat head screwdriver into the slot of the tip of the shaft (42203-M566) and turn the shaft one turn. Find the position where the movement of the worm is the most dull while the worm is turning one revolution.
   (3) Adjust the attached position of base θ so that there is no play at the position that was found in step (2), tighten CK2.6×6 (n=3) securely.
   (4) Turn the shaft as in step (2). Verfiy that the worm turns smoothly without backlash along the circumference.

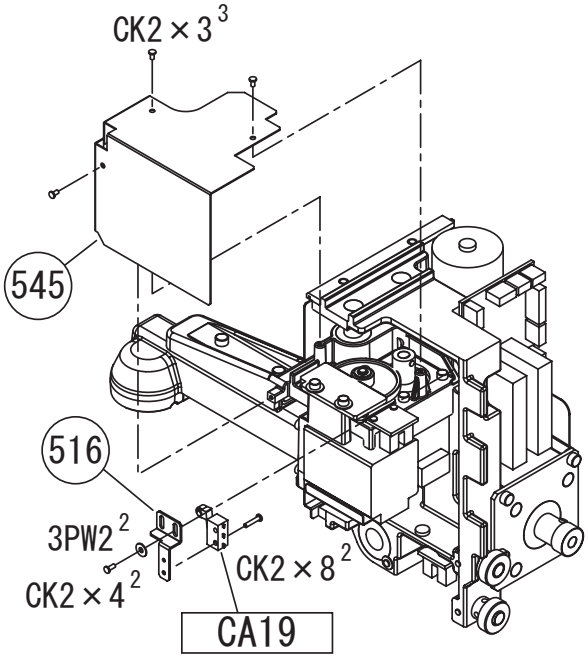


6.20 Replacing CA14

Replacement parts: 42203-CA14



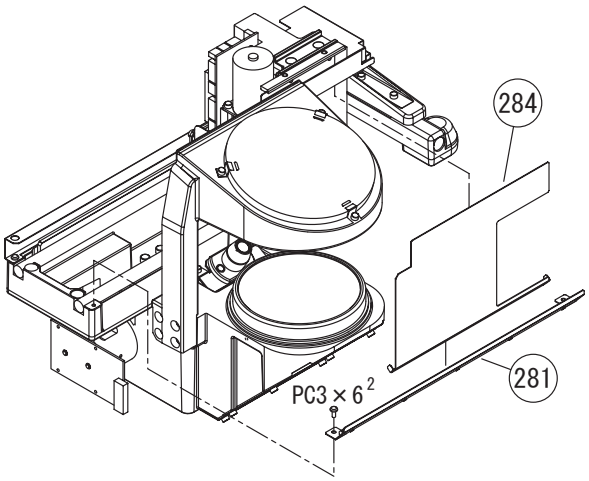
1. **Remove the covers. (See 5.1.)**
2. **Unscrew CK2×4 (n=3) and remove the cover (42203-M545).**
3. **Turn the bearing stopper (42203-M514) retaining the shaft of the DC motor (42203-E023) so that CA14 becomes OFF.**
4. **Disconnect P604 (J4) on the BA06 board (42203-BA06).**
5. **Unscrew CK2×4 and remove 3PW2 (n=2). Then, remove CA14 (42203-CA14) together with the switch holder (42203-M516).**
6. **Reassemble the parts in reverse order.**
   * Turn the bearing stopper (42203-M514) retaining the shaft of the DC motor (42203-E023) to verify that CA14 becomes ON.



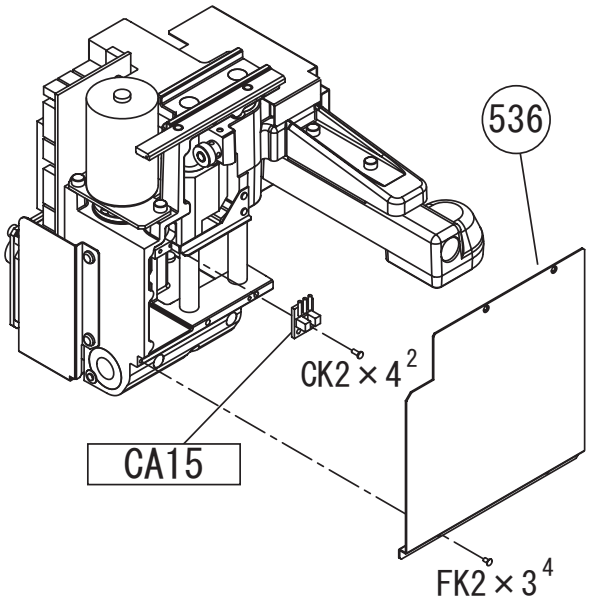
6.21 Replacing CA15

Replacement parts: 42203-CA15

1. **Remove the covers. (See 5.1.)**
2. **Unscrew PC3×6 (n=2) and remove guide A (42203-M281).**
3. **Remove the slide cover (42203-M284).**



4. **Unscrew FK2×4 (n=4) and remove the cover (42203-M536).**
5. **Disconnect P605 (J6) on the BA06 board.**
6. **Unscrew CK2×4 (n=2) and detach CA15.**
7. **Reassemble the parts in reverse order.**
   * Assemble the parts so that the sensor of CA15 does not interfere with the shading plate (42203-M543).
   * Verify that the shading plate shades the sensor when lifting the arm upward, and that it transmits the sensor when returning the arm as it was.

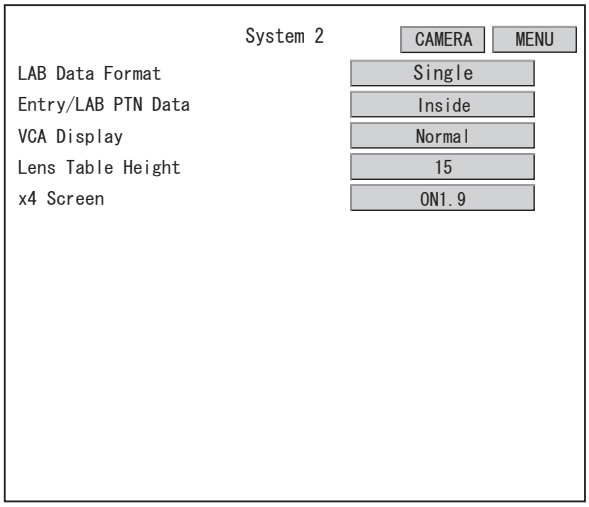


6.22 Changing the lens table

* The following procedures are necessary when the lens table with the pins of 10mm is changed to the one with the pins of 15mm.
* Observe the order of steps 1 to 4.
* Step 5 can be performed in any step.

1. Replace the lens table.

2. Change the "Lens Table Height" parameter on the System 2 screen to "15".
Follow the instructions below to display the System 2 screen.
(1) Turn ON the power of the main body.
(2) Press the MENU button at the upper right of the Layout screen once to display the Parameter 1 screen.
(3) Hold down the MENU button on the Parameter 1 screen for a few seconds to display the System 1 screen.
(4) Press the MENU button at the upper right of the System 1 screen to display the System screen.



3. Perform the light calibration. (See step 1 in 7.6.)

4. Perform the adjustment of SPH. (See step 2 in 7.6.)

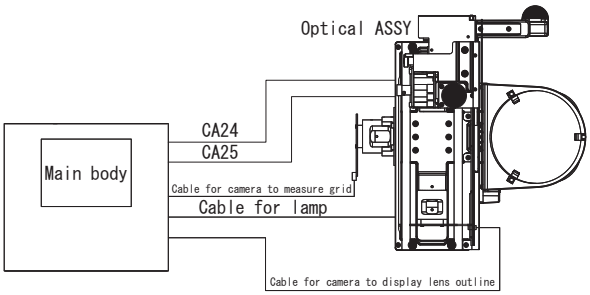
5. Change the AXIS correction on the System 1 screen from "1.9" to "2.2".

§7 ADJUSTMENT

7.1 Temporary adjustment of the camera (B) to measure the grid

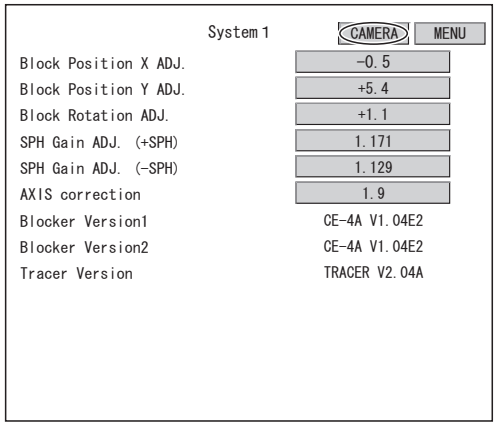
7.1.1. Preparation

1. Connect the optical ASSY (42203-2000) to the main body as illustrated in the right picture.
* Be sure that the power of the main body is turned OFF.

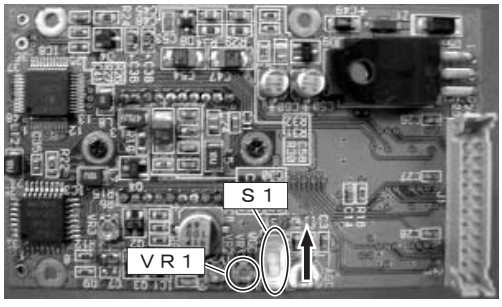


7.1.2 Sensitivity adjustment (manual gain)

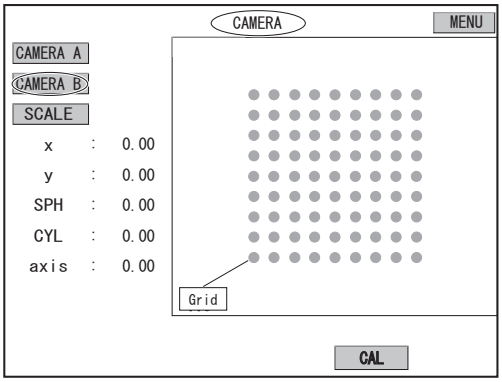
1. Turn ON the power of the main body to display the CAMERA screen (see the picture at the lower right of this page) and touch the CAMERA B button.
* In case that the Layout screen appears when turning ON the power, follow the steps described below to display the CAMERA screen.
(1) Press the MENU button at the upper right of the screen to display the Parameter 1 screen.
(2) Hold down the MENU button at the upper right of the Parameter 1 screen for a moment to display the System 1 screen.
(3) Press the MENU button at the upper right of the screen twice to display the CAMERA screen.



2. Set the DIP switch (S1) of the camera to the upper position (manual gain).

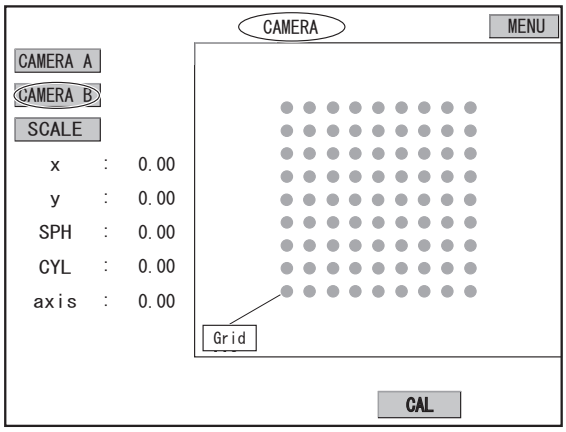


3. Adjust the VR1 of the camera so that the grid appears on the image area.
* Be sure to use a ceramic screwdriver for adjusting the volume.



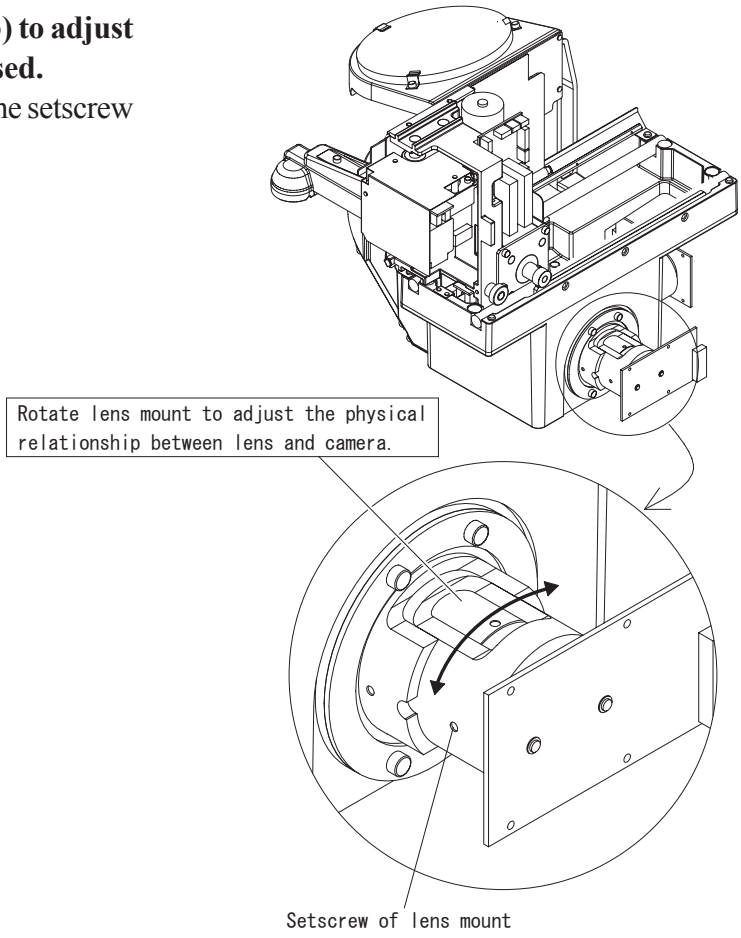
7.1.3 Focus adjustment

1. **Display the CAMERA screen and press the CAMERA B button.**



2. **Loosen the set screw (HH3×3) fixed to the lens mount (42203-M233) of the grid image ASSY (42203-2300).**

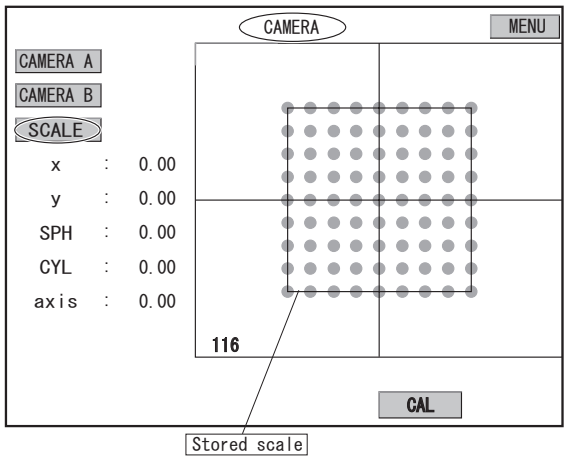
3. **Rotate the lens mount (42203-M233) to adjust its position so that the grid is focused.**
   * After adjusting the position, screw the setscrew of the lens mount temporarily.



7.1.4 Adjustment of the imaging position

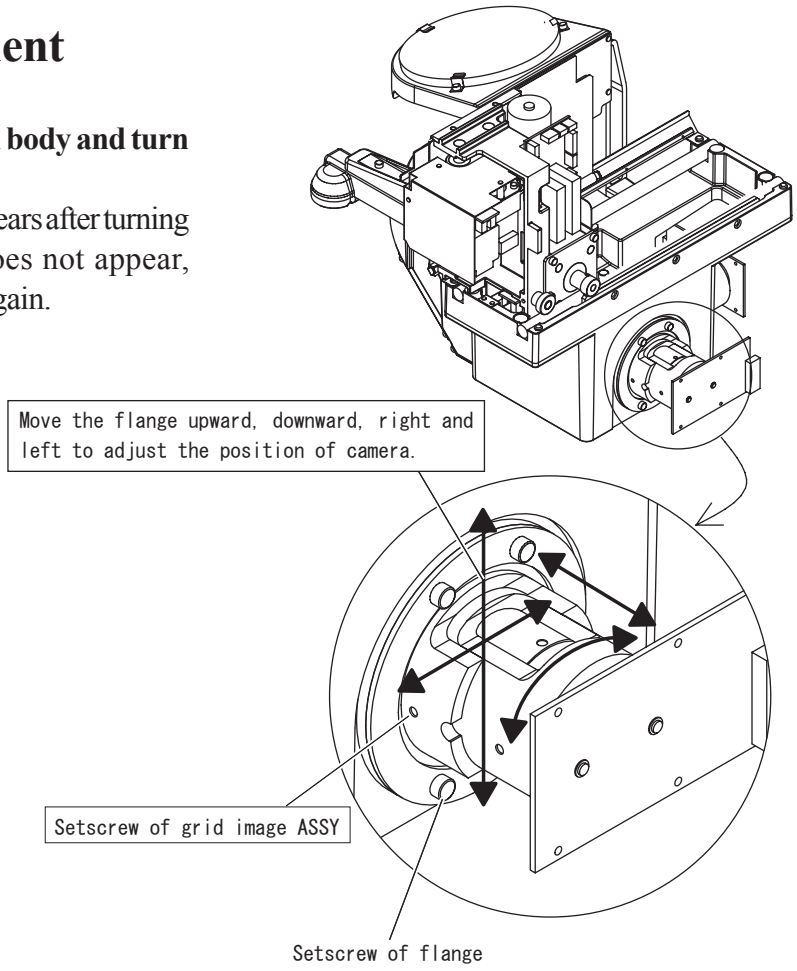
1. **Loosen the setscrews (SB3×10) (n=4) fixed to the flange of the grid image ASSY (42203-2300).**

2. **Adjust the fixed position of the flange (42203-M236) so that the stored scale coincides with the grid.**
   * Loosen the setscrew of the grid image ASSY and adjust the rotating direction and the position backward and forward so that the grid coincides horizontally and vertically with the stored scale on the screen. At the same time, verify that the grid is focused.
   * After the adjustment, screw the loosened setscrews temporarily.



7.1.5 After the adjustment

1. **Turn OFF the power of the main body and turn it ON again.**
   * Verify that the Layout screen appears after turning OFF the power. When it does not appear, perform the adjustment once again.



7.2 Adjustment of the camera (A) to display lens outline

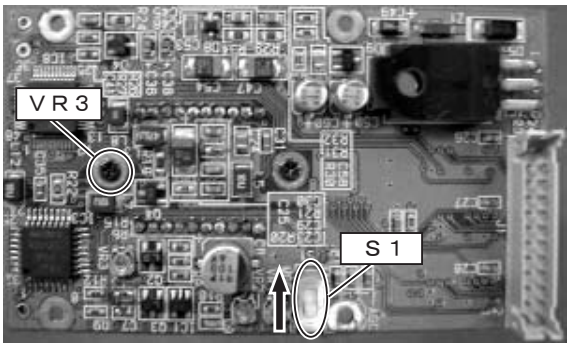
7.2.1 Sensitivity adjustment (lightness)

1. Turn ON the power of the main body to display the CAMERA screen (see the picture at the lower right of this page) and press the CAMERA A button.

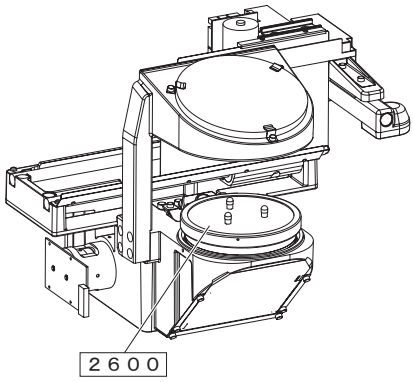
* In case that the Layout screen appears when turning ON the power, follow the steps described below to display the CAMERA screen.

1) Press the MENU button at the upper right of the screen to display the Parameter 1 screen.
2) Hold down the MENU button at the upper right of the Parameter 1 screen for a moment to display the System 1 screen.
3) Press the MENU button at the upper right of the screen twice to display the CAMERA screen.

2. Set the DIP switch (S1) of the camera to the upper position (manual gain).

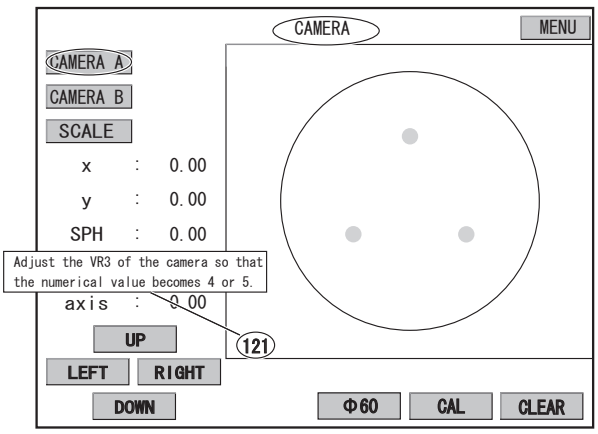


3. Shade the lens table ASSY (42203-2600).



4. Adjust the VR3 of the camera so that the numerical value at the lower left of the image area becomes 4 or 5.

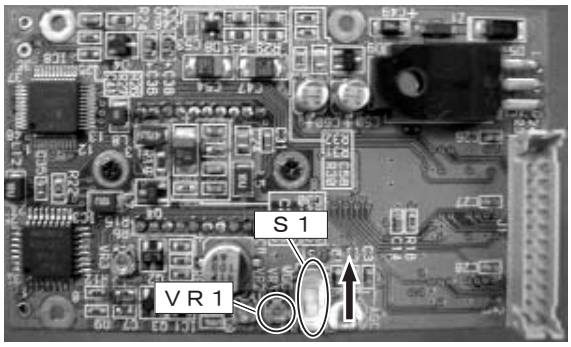
* Be sure to use a ceramic screwdriver for adjusting the volume.



7.2.2 Sensitivity adjustment (manual gain)

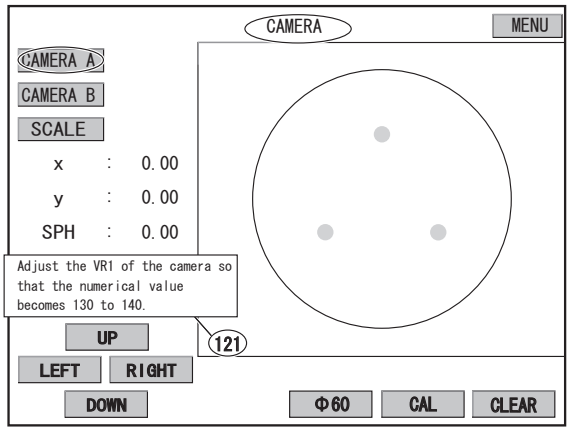
1. Remove the shading cover from the lens table.

2. Set the DIP switch (S1) to the upper position (manual gain).



3. Adjust the VR1 of the camera so that the numerical value at the lower left of the image area becomes 130 to 140.

* Be sure to use a ceramic screwdriver for adjusting the volume.

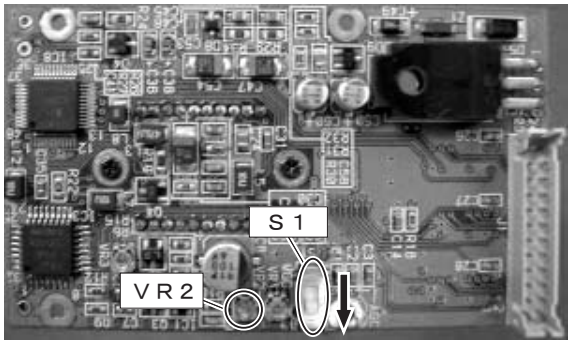


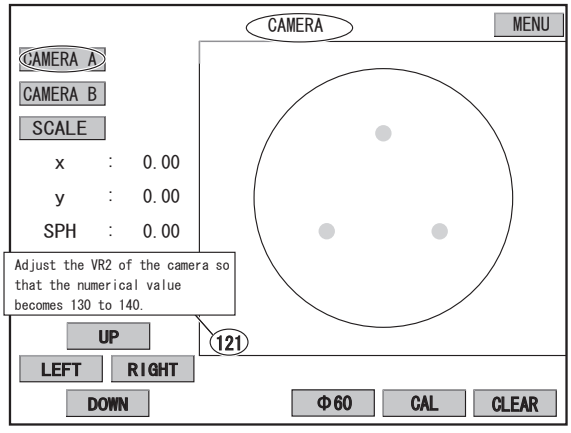
7.2.3 Sensitivity adjustment (AGC gain)

1. Set the DIP switch (S1) to the lower position (AGC gain).

2. Adjust the VR2 of the camera so that the numerical value at the lower left of the pictured image area becomes 130 to 140.

* Be sure to use a ceramic screwdriver for adjusting the volume.





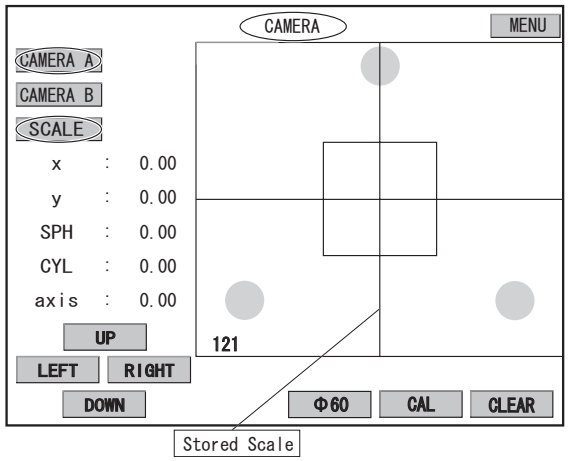
7.2.4 Temporary adjustment of focus

1. **Display the CAMERA screen and press the CAMERA A button to be selected.**

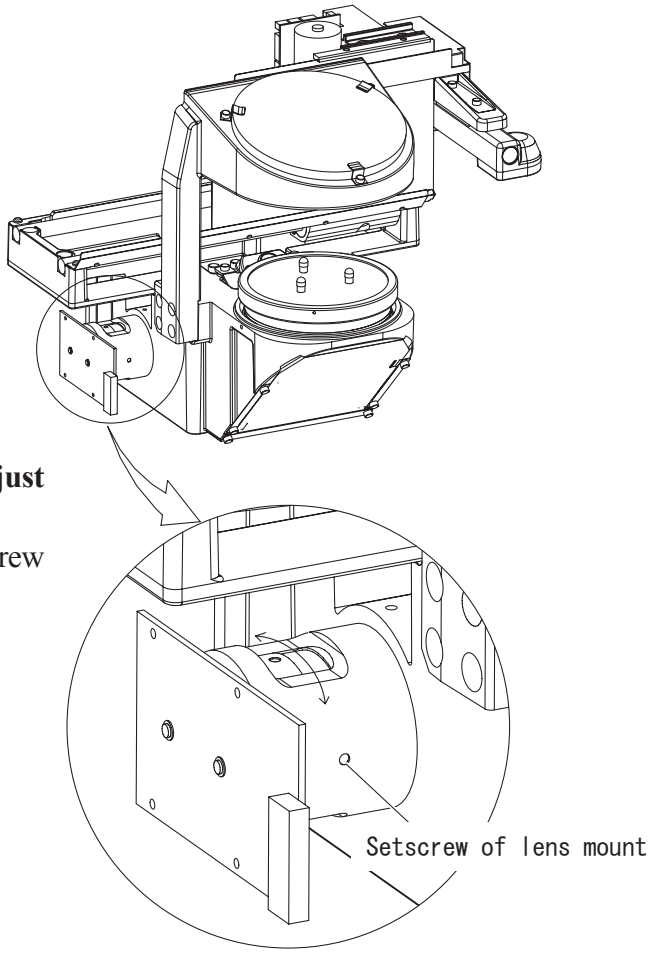
2. **Hold down the CLEAR button at the lower right of the screen for a moment to clear the initial value memorized in a board.**

3. **Press the SCALE button at the left of the screen to display the stored scale.**

4. **Press the BLOCK button of the jig to change the normal image to the double magnification image.**



5. **Loosen the setscrew (HH3×3) fixed to the lens mount (42203-M243) of the lens outline ASSY (42203-2400).**

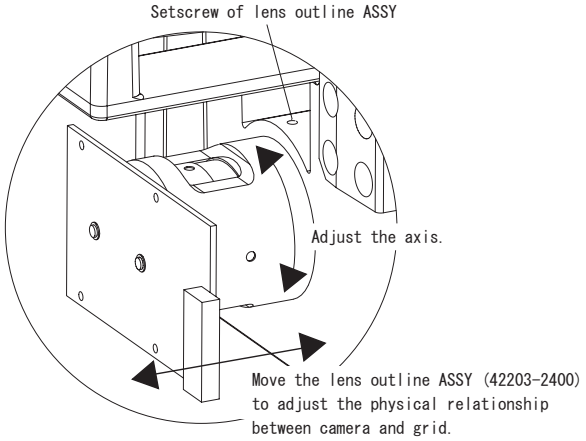


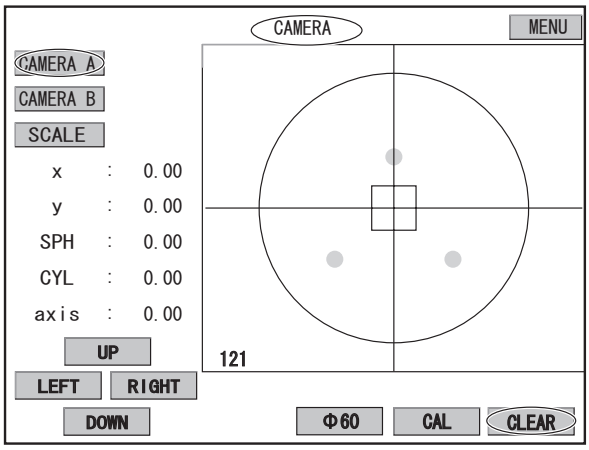
6. **Rotate the lens mount (42203-M243) to adjust its position so that the grid is focused.**
   * After adjusting the position, screw the setscrew of the lens mount temporarily.

7.2.5 Magnification adjustment

1. **Loosen the setscrew (HH3×4) of the lens outline ASSY (42203-2400).**
2. **Adjust the axis (for adjustment of the rotating direction of camera A) of the lens outline ASSY (42203-2400) so that the grid coincides with the scale on the screen horizontally and vertically, and fix it temporarily**

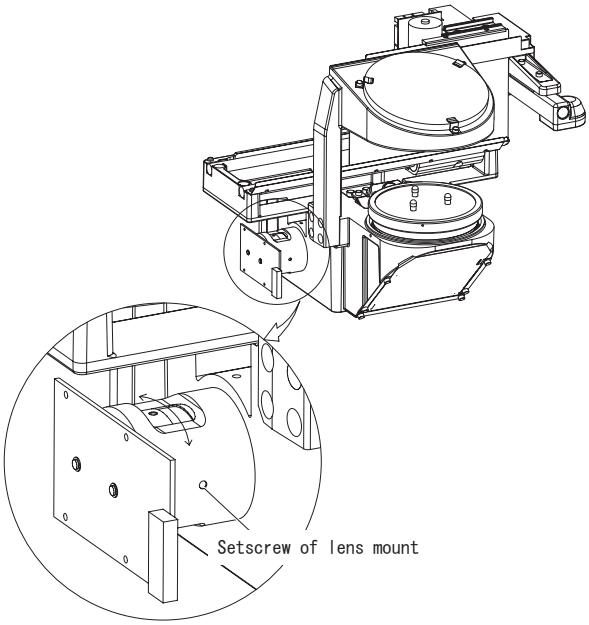
3. **Press the BLOCK button to change the normal image to the double magnification image.**
4. **Place the jig scale (CEDJ-1 M022) on the lens table so that a cross line of the jig coincides with the grid horizontally and vertically.**
5. **Loosen the setscrew (HH3×4) of the lens outline ASSY (42203-2400).**
6. **Move the lens outline ASSY (4203-2400) back and forth to adjust its position so that a circle of the scale on the screen coincides with a periphery edge of the jig on the lens table, and fix it temporarily.**
   * If the jig scale (CEDJ-1 M022) is not available, simply adjust its position so that the center of the grid coincides with the one of the scale on the screen.





7.2.6 Focus adjustment

1. **Loosen the setscrew (HH3×3) fixed to the lens mount (42203-M243) of the lens outline ASSY (42203-2000).**
2. **Rotate the lens mount (42203-M243) to adjust its position so that the grid is focused.**
3. **Adjust the position of the lens mount optimally by performing adjustment procedures described in "7.2.5 Magnification Adjustment" and "7.2.6 Focus Adjustment" repeatedly.**
   * After the adjustment, fully tighten the setscrews of the lens mount and the lens outline ASSY (42203-2400).



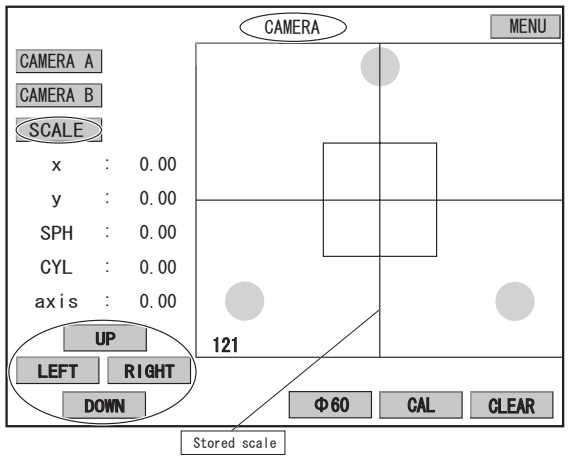
7.2.7 Adjustment of imaging position

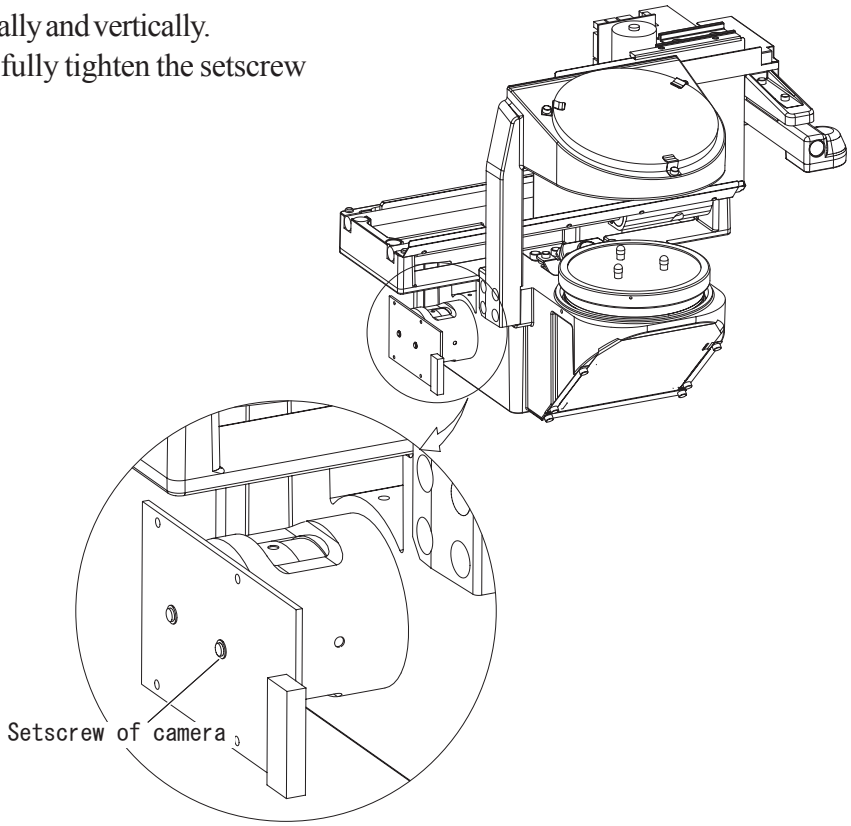
1. Press the UP, DOWN, LEFT and RIGHT buttons at the lower left of the screen to match the center of the stored scale with the one of the grid, and verify that the imaging position of camera is within adjustable range in the software.

2. When the imaging position of camera is not within adjustable range in the software, loosen the setscrew of camera and adjust the fixed position of the camera so that the imaging position of camera locates near the center.

* Be sure to adjust the rotating direction of camera so that the stored scale on the screen coincides with the grid horizontally and vertically.

* After the adjustment, fully tighten the setscrew of camera.





7.2.8 Checking the Sensitivity Adjustments

1. Check the adjusted numerical value at the lower left of the image by following the procedures described in "7.2.1 Sensitivity Adjustment (Lightness)", "7.2.2 Sensitivity Adjustment (Manual Gain)" and "7.2.3 Sensitivity Adjustment (AGC Gain)".

* When the adjusted numerical value is out of proper range, perform the adjustment again.

7.3 Adjustment of the camera (B) to measure the grid

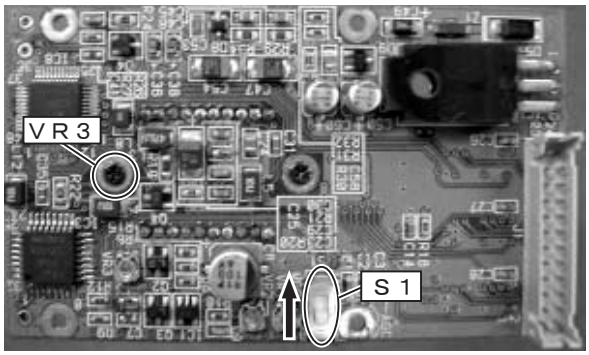
7.3.1 Preparation

1. Connect the optical ASSY (42203-2000) to the main body. (See 7.1.)
* Be sure that the power of main body is turned OFF.

7.3.2 Sensitivity adjustment

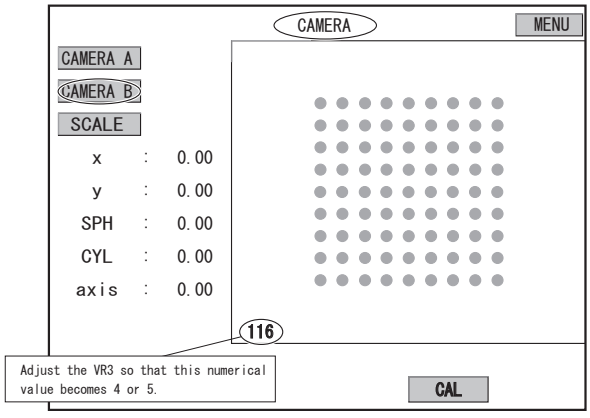
1. Turn ON the power of the main body to display the CAMERA screen and press the CAMERA B button.
* In case that the Layout screen appears when turning ON the power, follow the steps described below to display the CAMERA screen.
(1) Press the MENU button at the upper right of the screen to display the Parameter 1 screen.
(2) Hold down the MENU button at the upper right of the Parameter 1 screen for a moment to display the System 1 screen.
(3) Press the MENU button at the upper right of the screen twice to display the CAMERA screen.

2. Set the DIP switch (S1) of the camera to the upper position (manual gain).



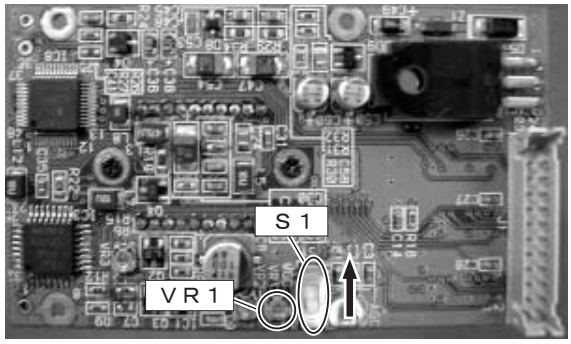
3. Shade the lens table.

4. Adjust the VR3 of the camera so that the numerical value at the lower left of the image becomes 4 or 5.
* Be sure to use a ceramic screwdriver for adjusting the volume.



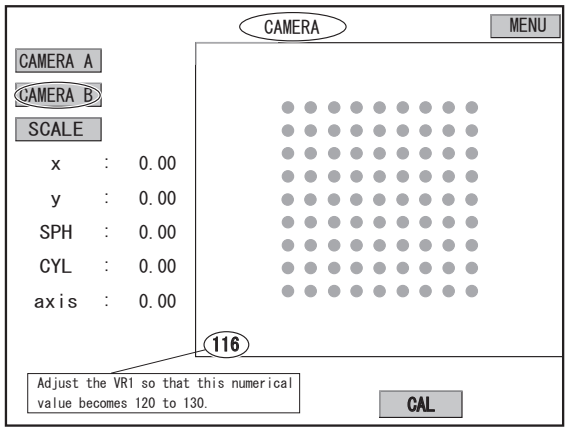
7.3.3 Sensitivity adjustment (manual gain)

1. Set the DIP switch (S1) to the upper position (manual gain).



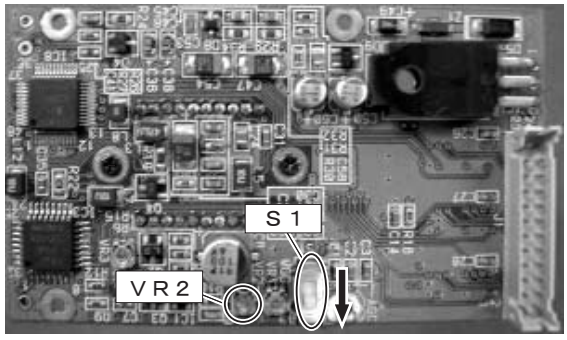
2. Adjust the VR1 of the camera so that the numerical value at the lower left of the image area becomes 120 to 130.

* Be sure to use a ceramic screwdriver for adjusting the volume.



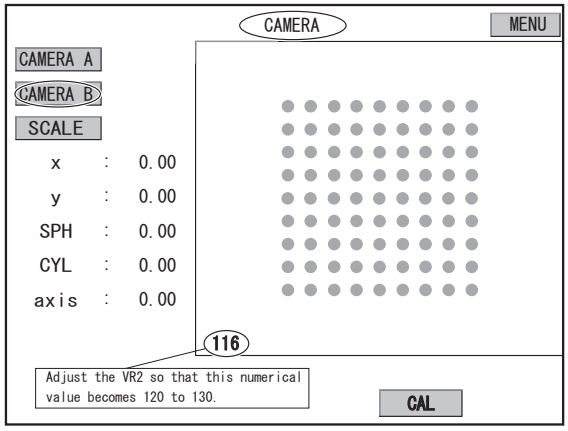
7.3.4 Sensitivity adjustment (AGC gain)

1. Set the DIP switch (S1) to the lower position (AGC gain).



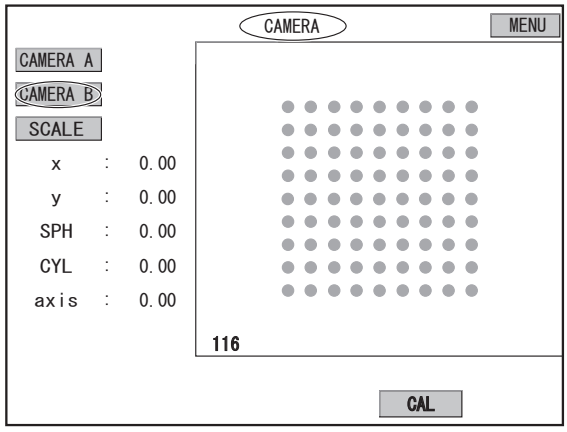
2. Adjust the VR2 of the camera so that the numerical value at the lower left of the pictured image area becomes 120 to 130.

* Be sure to use a ceramic screwdriver for adjusting the volume.



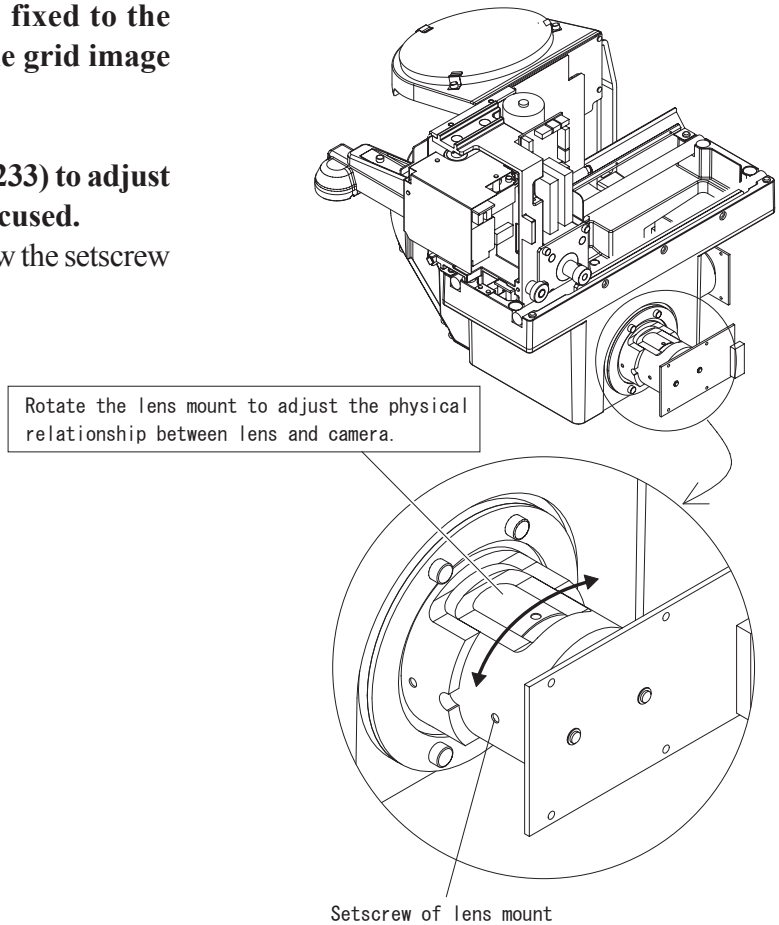
7.3.5 Temporary adjustment of focus

1. **Display the CAMERA screen and press the CAMERA B button to be selected.**



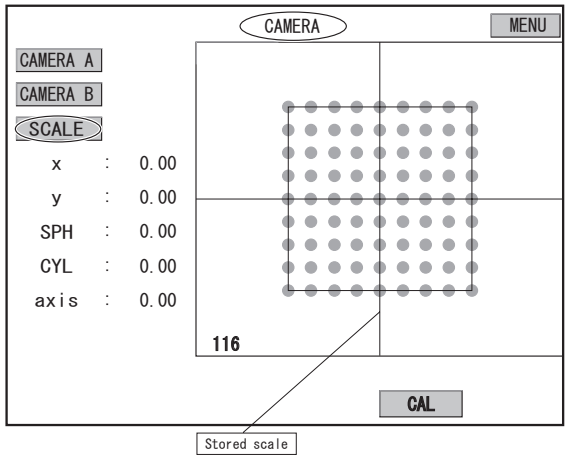
2. **Loosen the setscrew (HH3×3) fixed to the lens mount (42203-M233) of the grid image ASSY (42203-2300).**

3. **Rotate the lens mount (42203-M233) to adjust its position so that the grid is focused.**
   * After adjusting the position, screw the setscrew of the lens mount temporarily.



7.3.6 Magnification adjustment

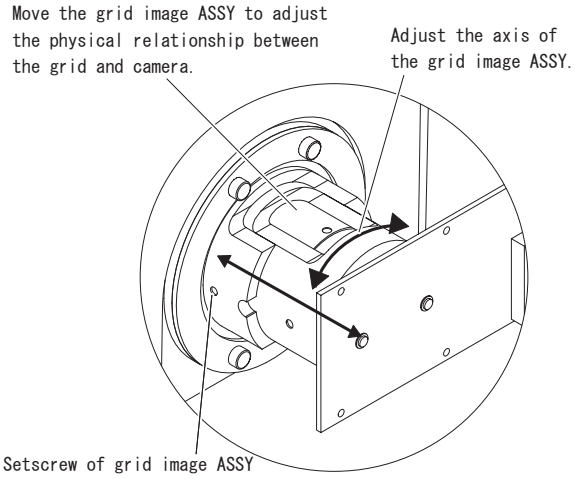
1. Press the SCALE button at the left of the screen to display the stored scale.



2. Loosen the setscrew (HH3×4) of the grid image ASSY (42203-2300).

3. Adjust the axis (for adjustment of the rotating direction of camera B) of the lens outline ASSY (42203-2400) so that the grid coincides with the scale on the screen horizontally and vertically, and fix it temporarily

4. Move the grid image ASSY (4203-2300) back and forth to adjust its position so that the edge of scale coincides in length with the outermost edge of grid.
* Be sure to perform both adjustment procedures in steps 3 and 4 at the same time.



7.3.7 Focus adjustment

1. Loosen the setscrew (HH3×3) fixed to the lens mount (42203-M233) of the grid image ASSY (42203-2300). (See "7.3.5 Temporary Adjustment of Focus.")

2. Rotate the lens mount (42203-M233) to a adjust its position so that the grid is focused. (See "7.3.5 Temporary Adjustment of Focus.")

3. Adjust the position of the lens mount optimally by performing adjustment procedures described in "7.3.6 Magnification Adjustment" and "7.3.7 Focus Adjustment" repeatedly.
* After the adjustment, fully tighten the setscrew of the lens mount.

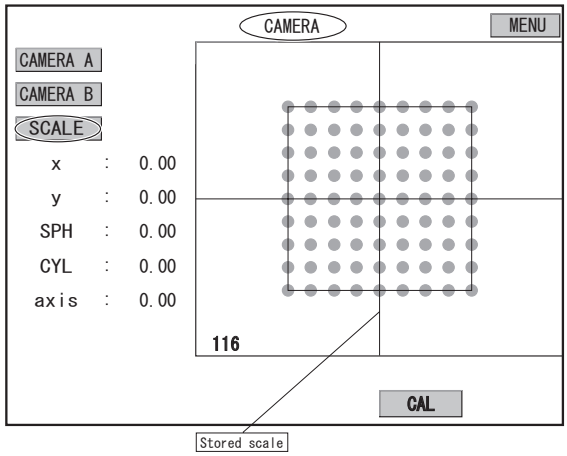
7.3.8 Adjustment of imaging position

1. Loosen the setscrew (SB3×10) (n=4) fixed to the flange (42203-M236) of the grid image ASSY (42203-2300).

2. Adjust the fixed position of the flange (42203-M236) so that the center of the stored scale coincides with the one of the grid.

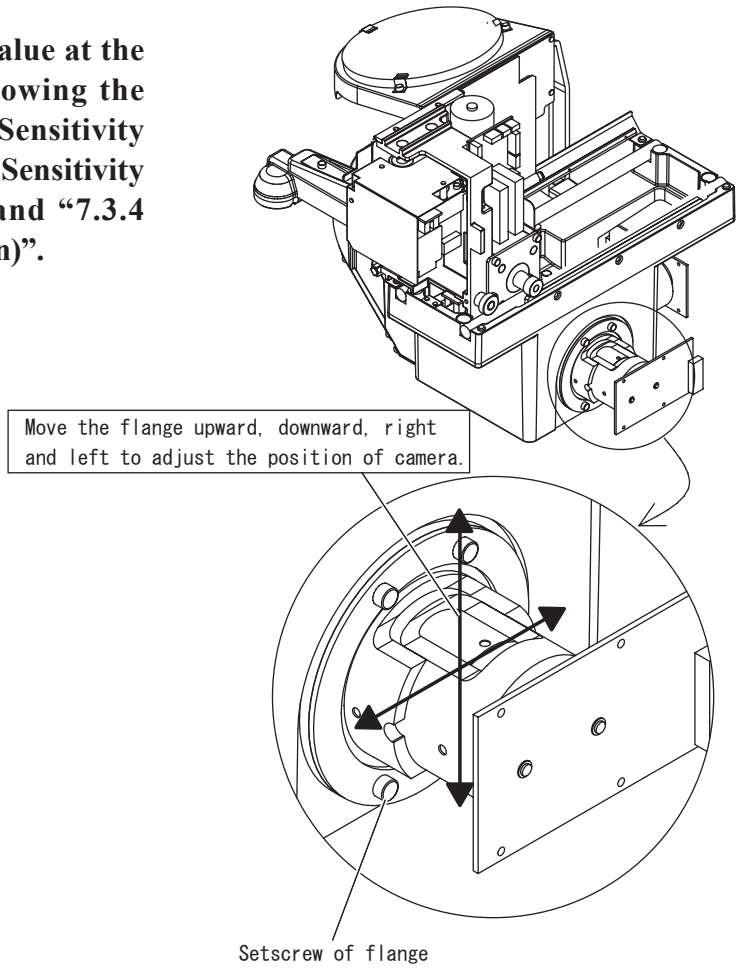
* Be sure to adjust the rotating direction by using allowance of flange so that the stored scale on the screen coincides with the grid horizontally and vertically.

* After the adjustment, fully tighten the setscrew of flange.



7.3.9 Checking the sensitivity adjustments

1. Check the adjusted numerical value at the lower left of the image by following the procedures described in "7.3.2 Sensitivity Adjustment (Lightness)", "7.3.3 Sensitivity Adjustment (Manual Gain)" and "7.3.4 Sensitivity Adjustment (AGC Gain)".



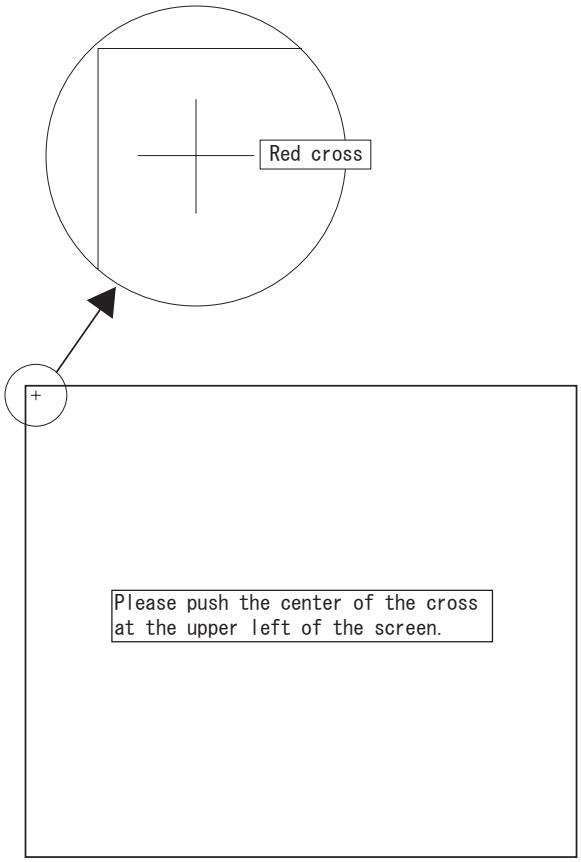
7.4 Calibration of color LCD module

1. **While holding down the BLOCK button, turn ON the power of main body to display the screen for calibration of the color LCD module.**

2. **Touch the center of the red cross at the upper left of the screen with a tip of the tie wrap (T-18R).**

3. **After the red cross responds, another red cross appears at the upper right of the screen. Touch the center of the red cross with a tip of the tie wrap (T-18R). Touch the center of the red cross which appears at the lower left and at the lower right of the screen sequently.**

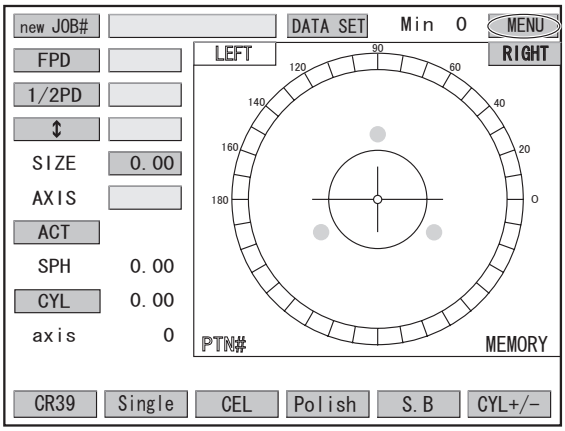
4. **After all four red crosses respond, the startup screen appears and the initialization starts.**



7.5 Fine adjustment of the imaging position

1. Turn ON the power of the main body to display the Layout screen.

2. Press the MENU button at the upper right of the screen to display the Parameter 1 screen.



3. Hold down the MENU button at the upper right of the Parameter 1 screen for a moment to display the System 1 screen.

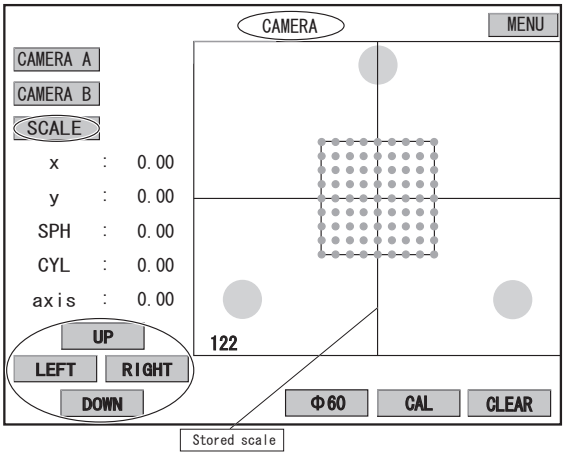
4. Press the MENU button at the upper right of the screen twice and press the CAMERA A button.

5. Press the BLOCK button to change the normal image to the double magnification image.

6. Hold down the CLEAR button at the lower right of the Camera screen for a moment to clear the initial values stored in the board.

7. Press the SCALE button at the left of the screen to display the stored scale.

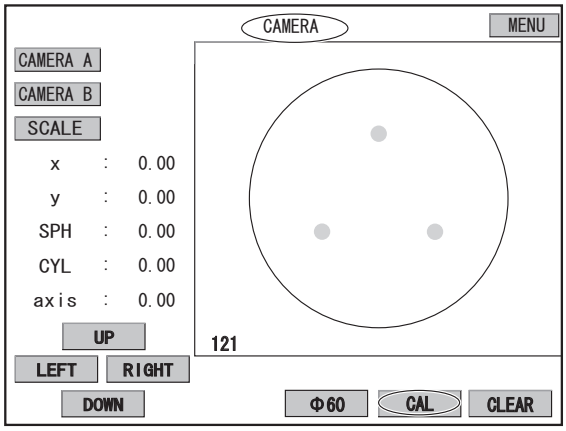
8. Touch the UP, DOWN, LEFT and RIGHT buttons at the left of the screen to coincide the center of the stored scale with the one of the grid.



9. Hold down the MENU button at the upper right of the screen for a moment to go back to the Layout screen.

7.6 Adjustment of SPH accuracy

7.6.1 Light calibration



1. Hold down the CAL button on the CAMERA screen for a moment to display the screen for the light calibration.

2. Place the jig lens (CEMJ-2G001) of SPH +10D on the lens table so that its optical center coincides with the center of lens table. (Values of X and Y should be within ±0.3.)

3. Hold down the CAL button for a moment to start the calibration.

4. After verifying that the calibration of +10D completes properly, perform the calibration of -10D by following the same procedures in steps 2 and 3.
* Be sure to use the jig lens (CEMJ-2G004) of SPH -10D for the calibration.

5. After the calibration completes, press the MENU button to go back to the CAMERA screen.

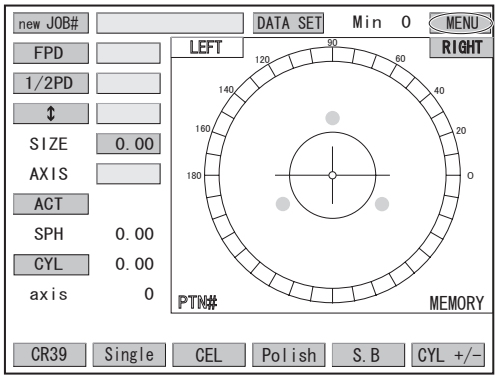
7.6.2 Adjustment of SPH

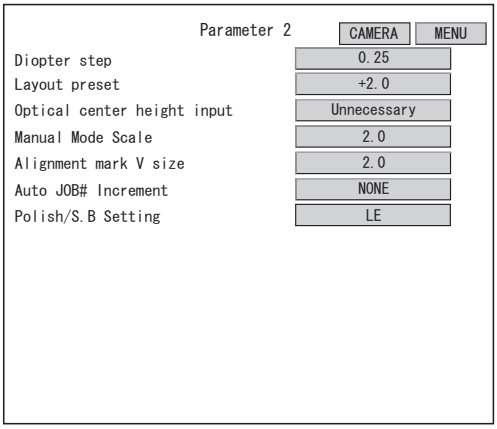
1. Press the MENU button at the upper right of the Layout screen to display the Parameter 1 screen.

2. Press the MENU button at the upper right of the Parameter 1 screen to display the Parameter 2 screen.

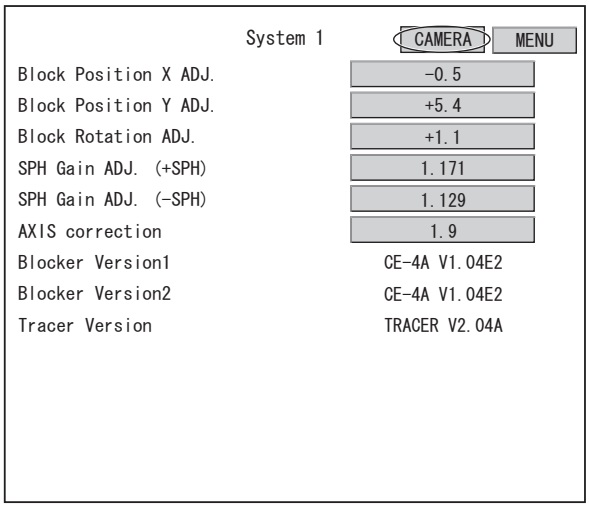
3. Set the "Diopter step" to "0.01" on the Parameter 2 screen.

4. Hold down the MENU button at the upper right of the Parameter 2 screen for a moment to display the System 1 screen.





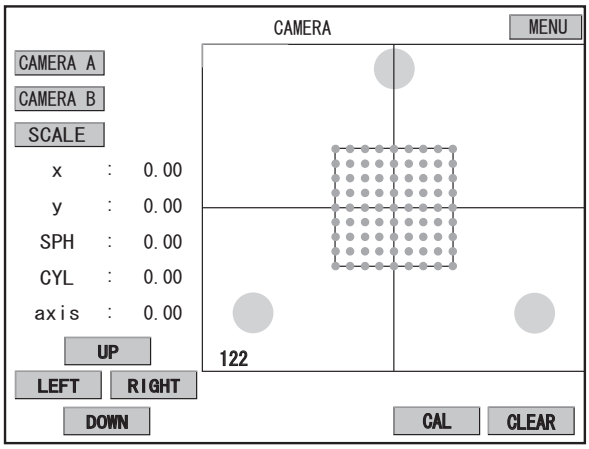
5. Press the CAMERA button at the upper right of the System 1 screen to display the CAMERA screen.



6. Measure the jig lenses (CEMJ-2G001 and CEMJ-2G004) of SPH +10D and -10D. Check the difference between the SPH indicated at the left of the screen and the actual measured SPH of jig lens.

7. Press the MENU button at the upper right of the CAMERA screen to display the System 1 screen.

8. According to the measured values in step 6, input proper values for parameters on the System 1 screen by referring to the table below. Go back to the Initial screen after inputting proper values.



Parameters	To change SPH value	Value to be input
SPH Gain ADJ. (+SPH)	Increase an absolute value	+
	Decrease an absolute value	−
SPH Gain ADJ. (−SPH)	Increase an absolute value	+
	Decrease an absolute value	−

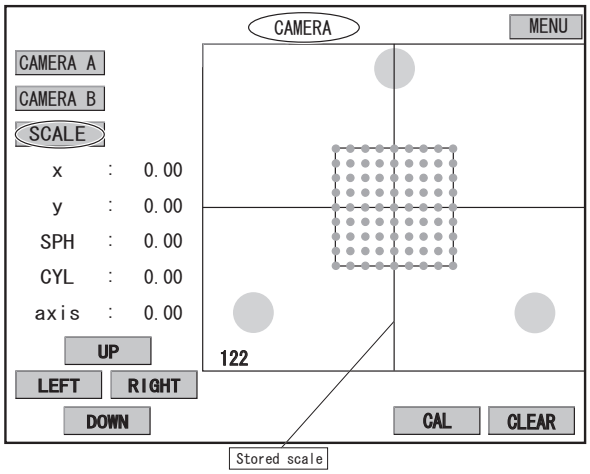
7. Perform step 4 to check the difference between the SPH indicated at the left of the screen and the actual measured SPH of the jig lens.

* When the SPH indicated on the screen differs from the actual measured SPH, perform steps 5 to 7.

8. Perform steps 4 to 7 repeatedly until the difference becomes within ±0.1D. When there is no difference, set the "Diopter step" to "0.25" on the Parameter 2 screen.

7.7 Adjustment of blocking position

1. **Make sure that the CAMERA screen is displayed. Press the BLOCK button on the front cover of the main body to change the normal image to the double magnification image.**



2. **Press the SCALE button at the left of the screen to display the stored scale on the screen.**

3. **Place the jig scale (CEDJ-1 022) on the lens table so that the cross line of the grid coincides with the one of the stored scale.**

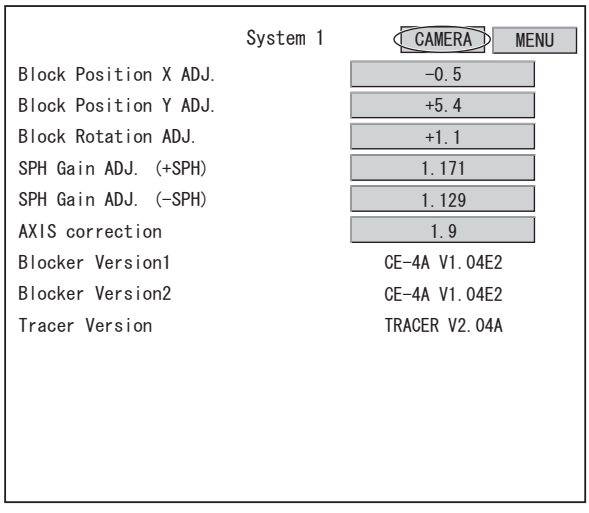
4. **Affix double-coated adhesive tape on the back of the jig cup which is used to check the blocking function, and put the cup to the cup holder.**

* Parts No. of the jig cup which is used to check the blocking function

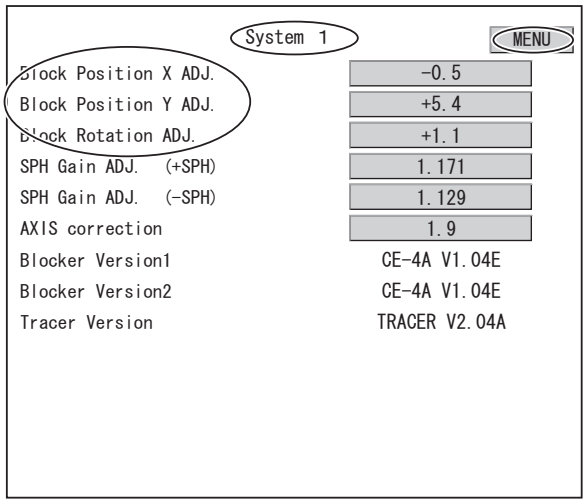
Maker of Cup	Parts No. of the Jig
NIDEK	CEDJ－2 M301
TOPCON	CEDJ－2 M302
FOMAP	CEDJ－2 M303
WECO	CEDJ－2 M304

5. **Hold down the BLOCK button for a moment to start blocking, and check the difference (in X-axis, Y-axis and rotating direction) between the center of the jig cup and the one of the jig scale (CEDJ-1 022) by visual observation.**

6. **Press the MENU button at the left of the screen to display the System 1 screen.**



7. According to the measured values in step 5, input proper values for parameters on the System 1 screen in 0.1 steps, and press the MENU button twice to go back to the CAMERA screen.



Parameters	To change the blocking position	Value to be input
Block Position X ADJ.	To the left	+
	To the right	−
Block Position Y ADJ.	Downward	+
	Upward	−
Block Rotation ADJ.	CCW	+
	CW	−

8. Perform steps 1 to 5 and check the difference (in X-axis, Y-axis and rotating direction) between the center of the jig cup and the one of the jig scale (CEDJ-1 022) by visual observation again.

* When a difference is found, perform steps 6 to 8.

9. Perform steps 1 to 8 repeatedly until there is no difference, and hold down the MENU button at the upper right of the System 1, System 2 or CAMERA screen for a moment to display the Layout screen.

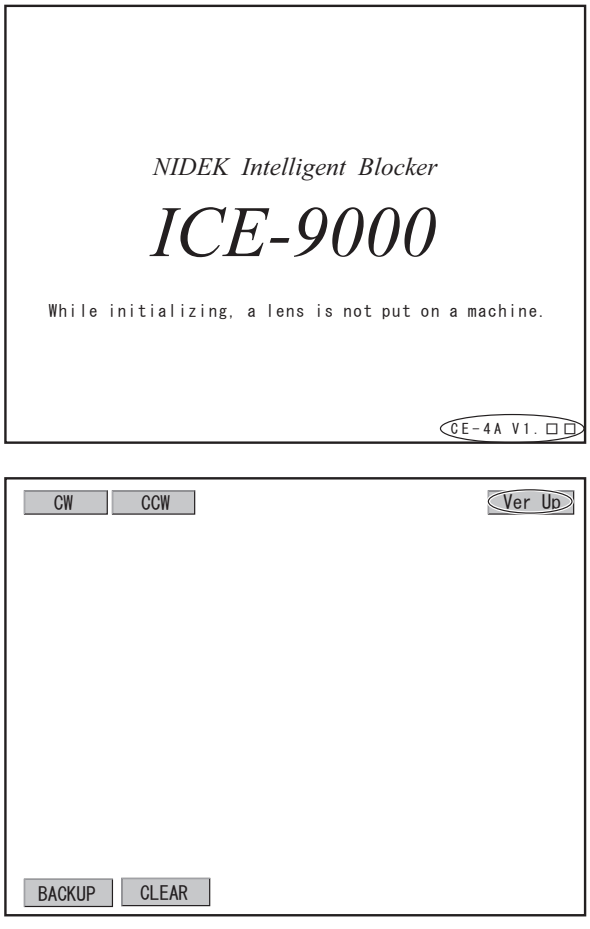
7. 8 Updating the version of software

7.8.1 Updating CPU1

1. Connect the RS-232C port of the PC and the Edger2 port of ICE-9000 with the RS232C cable (crossing cable).
2. Start the updating software (I9KDL.EXE) for installing the updated ICE-9000 software on the PC.
3. Select “ce-4a” and then select “Connect” from the started I9KDL software.
4. Turn ON the ICE-9000.
5. When the ICE-9000 is turned ON, I9KDL displays “Connect”.
6. Select the “File” menu and then select “Write” from I9KDL and designate new ICE-9000 software.
7. Designation of new software to be installed triggers the overwriting of the software automatically.
8. When the overwriting is completed, I9KDL displays the “Program write complete” message. Updating the CPU1 is completed.

7.8.2 Updating CPU2

1. Turn ON the ICE-9000 and press the version No. at the lower right of the screen while the startup screen is displayed.
2. When the version No. is pressed, the MAINTENANCE screen is displayed.
3. Press the “Ver Up” button at the upper right of the screen.
4. When the “Ver Up” button is pressed, the “Do you want to write software in CPU2? Write/ Cancel” message appears. Select the “Write” option.
5. When “Write” is selected, the installation progress bar and “Don’t turn off the power switch.” message appear.
   * Never turn the ICE-9000 OFF while the message is displayed.
   * If the ICE-9000 is shut down while updating the CPU2, replacing a circuit board will be required.
6. When the progress bar and message disappear, updating CPU2 is completed.



7.9 Backing up and restoring data in the JOB/PW memory

* The software for updating (I9KDL2.EXE) is necessary for storing and writing the JOB/PW data.

7.9.1 Connection and setting methods

1. **Connect the Edger 2 connector of the ICE-9000 and serial port of the PC with the RS-232C cable.**
2. **Start I9KDL2.EXE software on the PC.**
3. **Select the port from the menu of I9KDL2 and select the number of the used COM port.**
4. **Select "Data," "Select," and "ice-9000" from the menu of I9KDL2.**
5. **Turn ON the power of the ICE-9000.**
6. **Press the version No. at the lower right of the screen while the title screen of the ICE-9000 is displayed.**
7. **When the version No. is pressed, the screen with several buttons located in four corners is displayed.**
8. **Press the "BACKUP" button at the lower left of the screen.**
9. **When the "BACKUP" button is pressed, the "DATA BACKUP MODE Cancel" message is displayed.**

7.9.2 Backing up data in the JOB/PTN memory

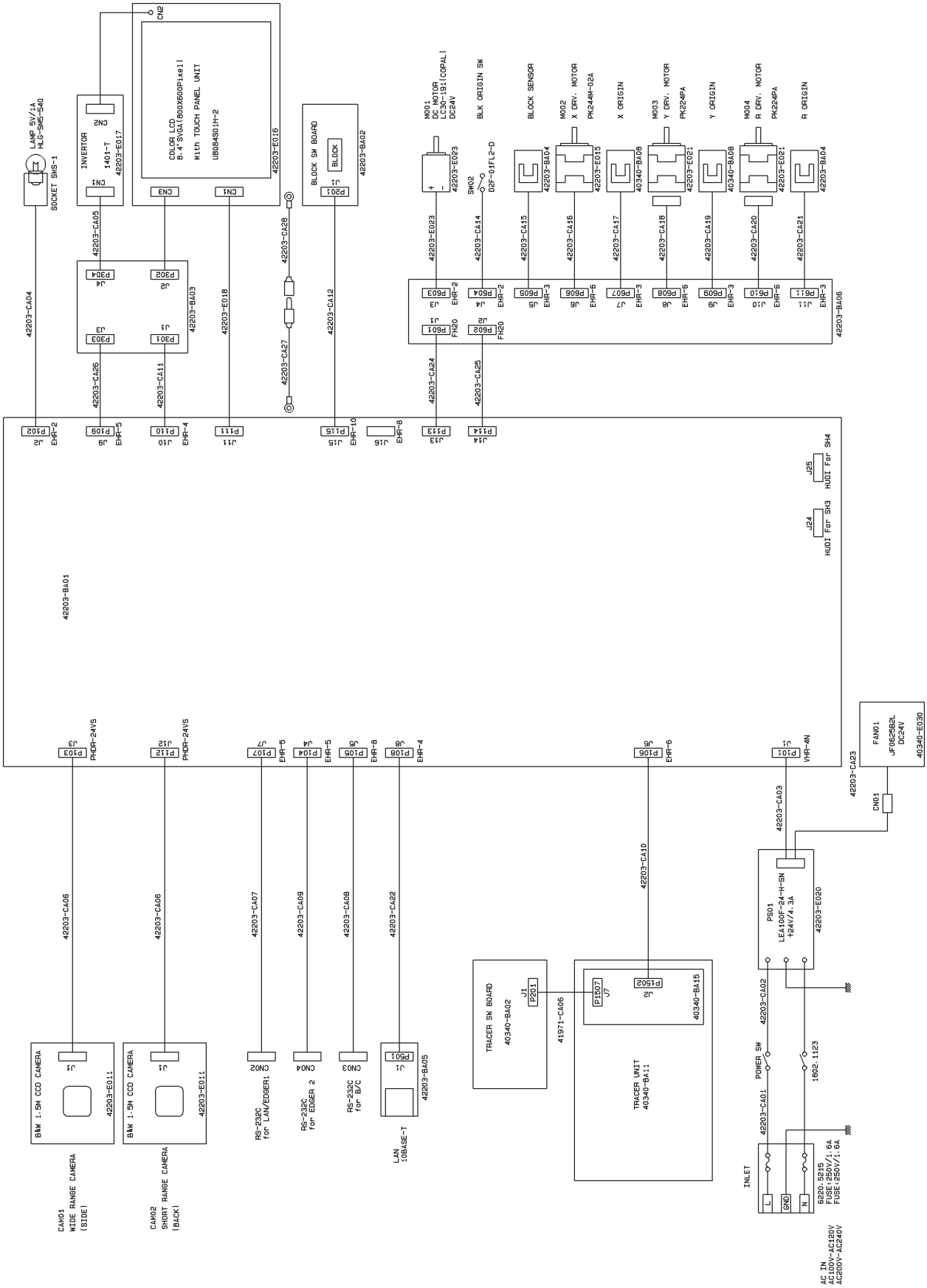
1. **Connect the ICE-9000 and PC. (See 7.9.1.)**
2. **Select "Data" and "JOB (PTN) DATA backup" from the menu of I9KDL2.**
3. **When the above command is selected, the dialog box is displayed encouraging the operator to enter the name of the file to which data is backed up.**
4. **Enter a file name and press the Save button.**
5. **When the Save button is pressed, the "JOB (PTN) Data backup start" message is displayed and the backup process is started.**
6. **When the "JOB (PTN) Data backup complete" message is displayed, the backup process has been completed.**
7. **Turn ON the ICE-9000 again.**

7.9.3 Restoring data in the JOB/PTN memory

1. Connect the ICE-9000 and PC. (See 7.9.1.)
2. Select “Data” and “JOB (PTN) Data send” from the menu of I9KDL2.
3. When the above command is selected, the dialog box is displayed encouraging the operator to select a desired file.
4. Select a file in which data is saved and press the Open button.
5. When the Open button is pressed, the “JOB (PTN) Data write” message is displayed and the restore process is started.
6. When the “JOB (PTN) Data write compete” message is displayed, the restore process has been completed.
7. Turn ON the ICE-9000 again.

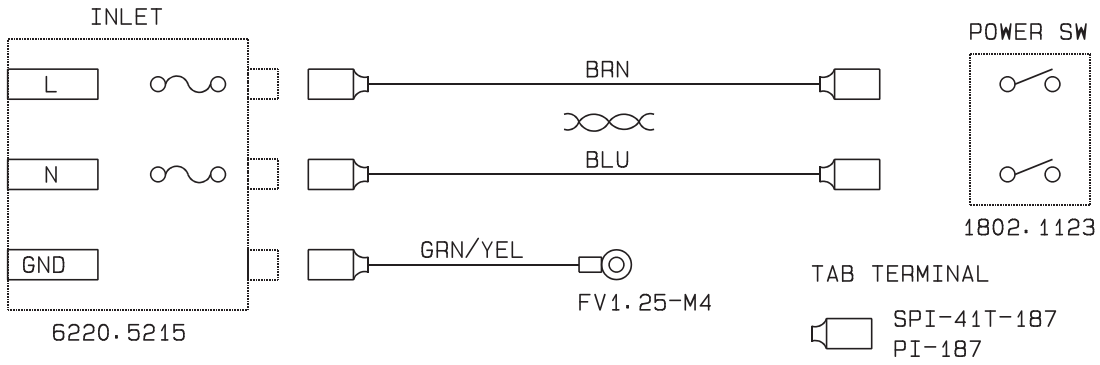
§8 REFERENCES

8.1 Wiring diagram



8.2 Connectors and cables

42203-CA01



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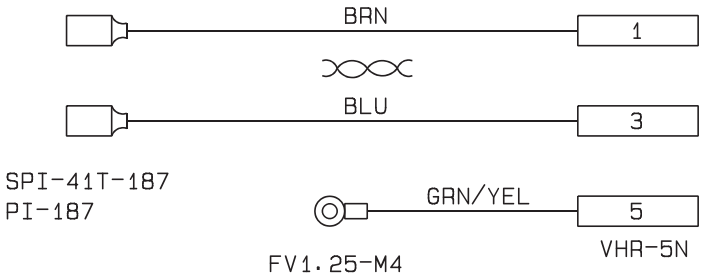

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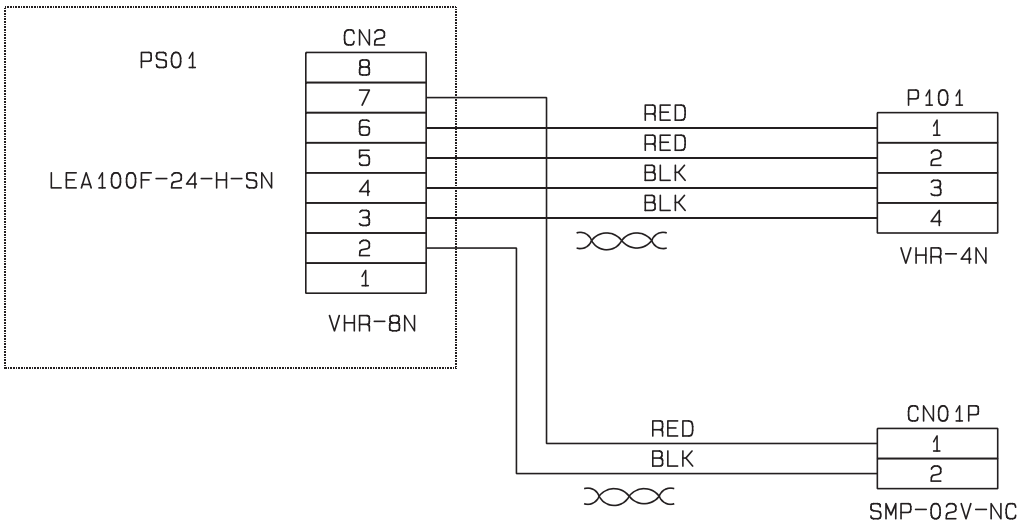

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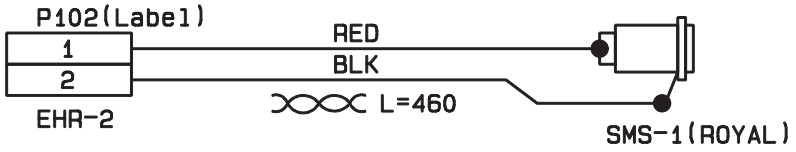

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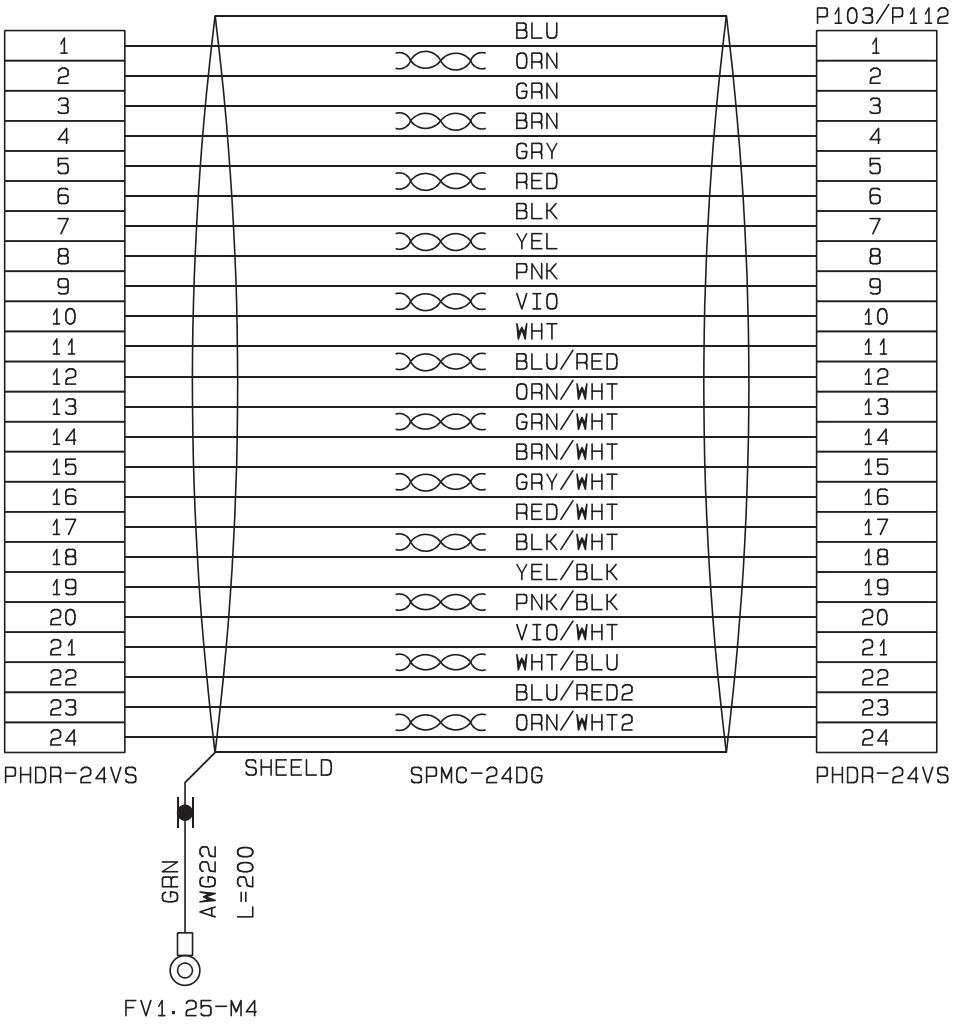

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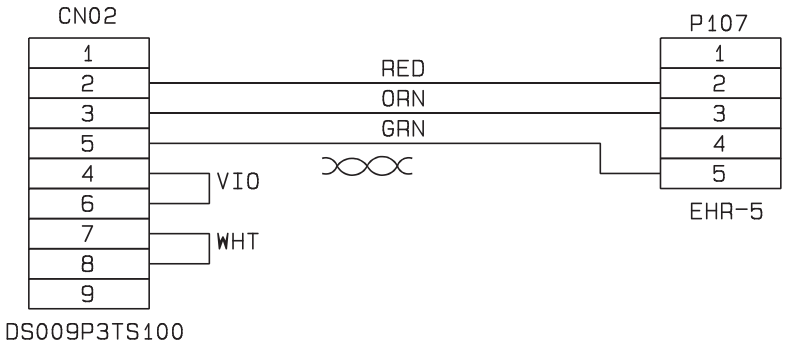

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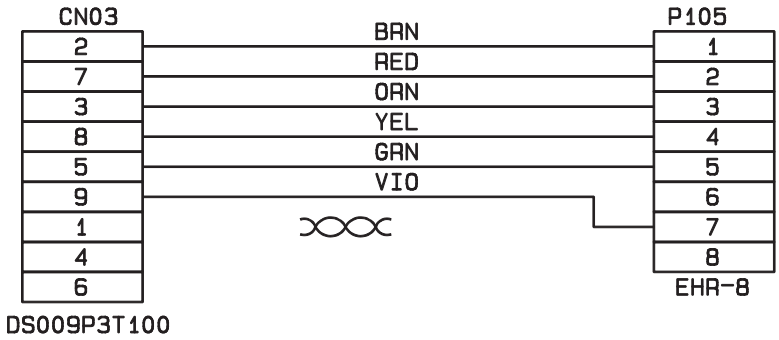

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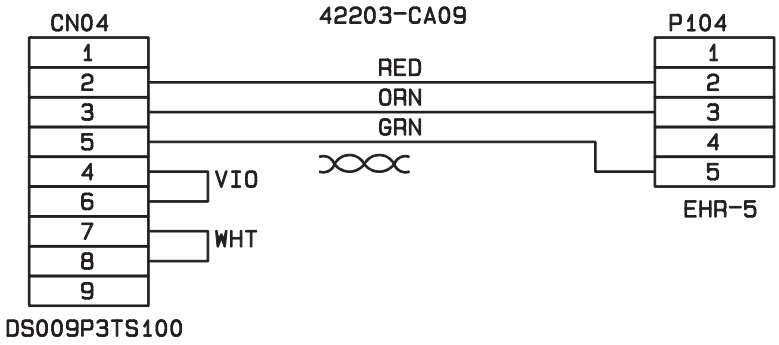

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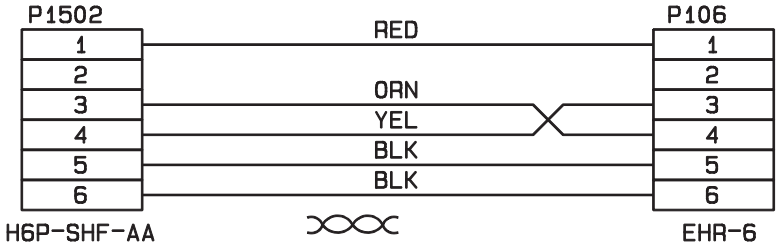

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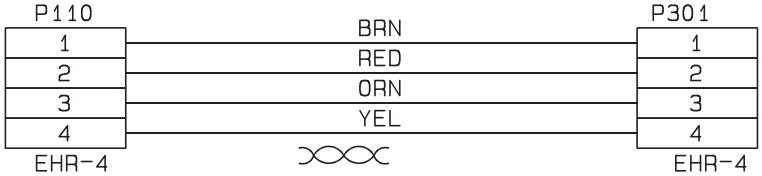

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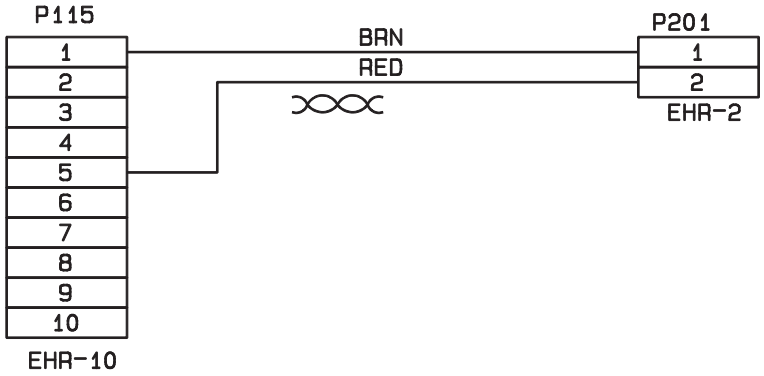

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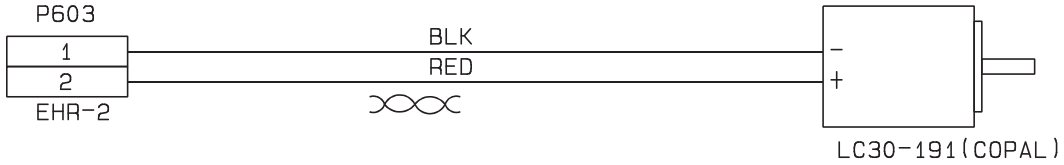

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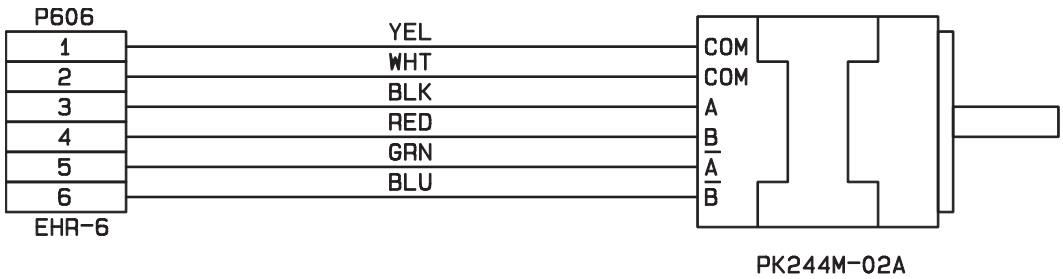

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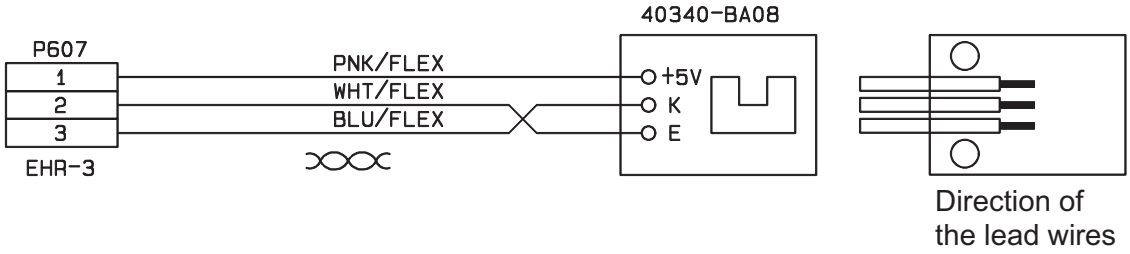

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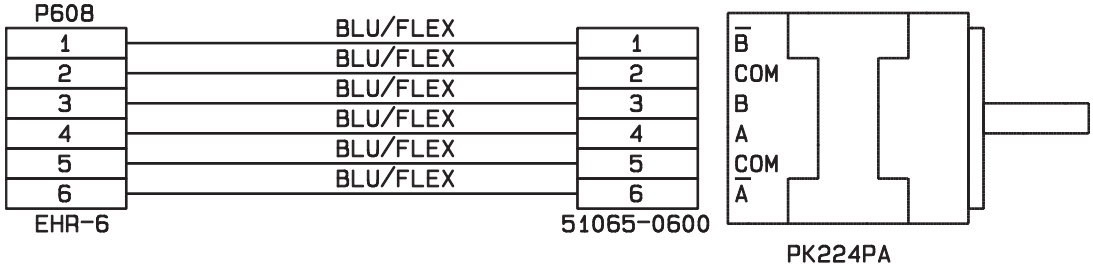

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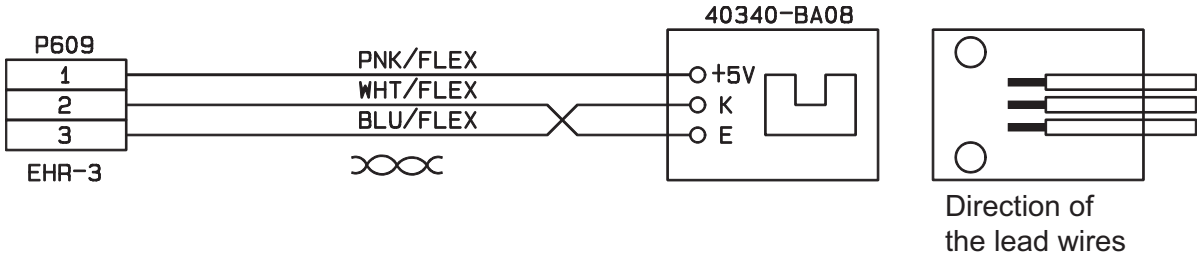

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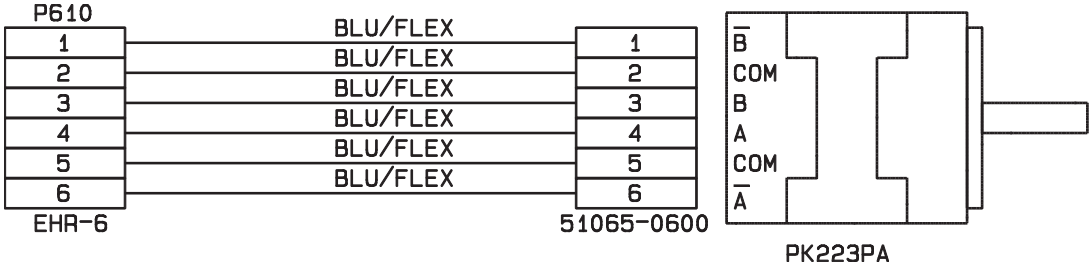

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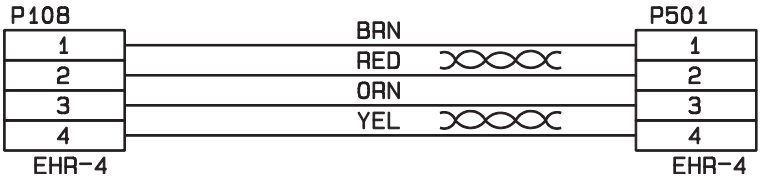

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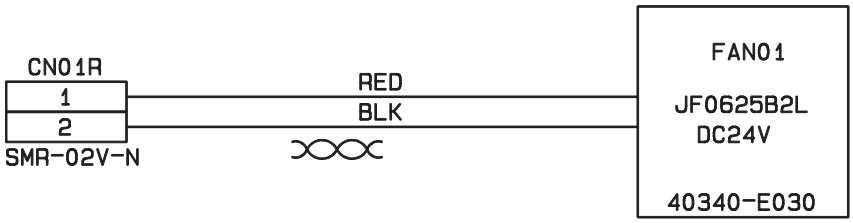

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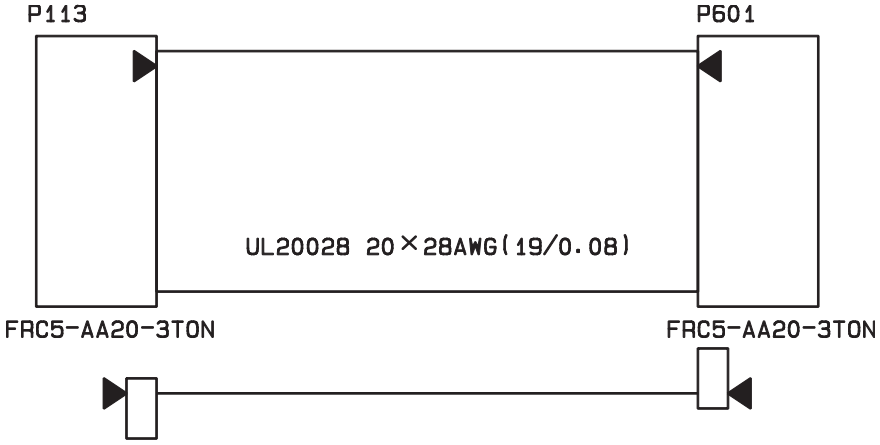

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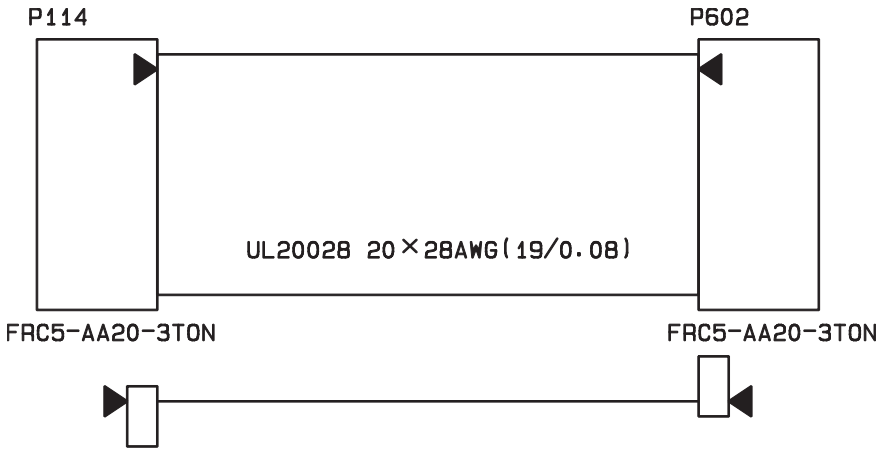

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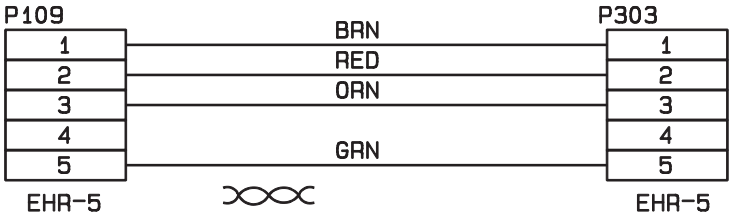

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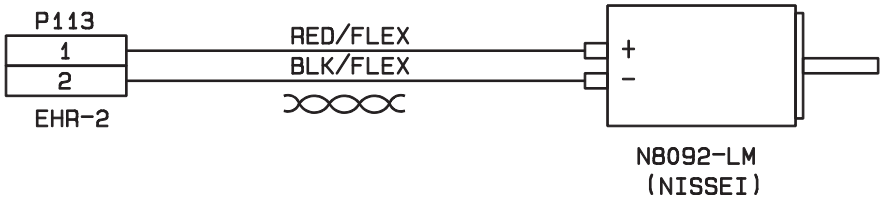

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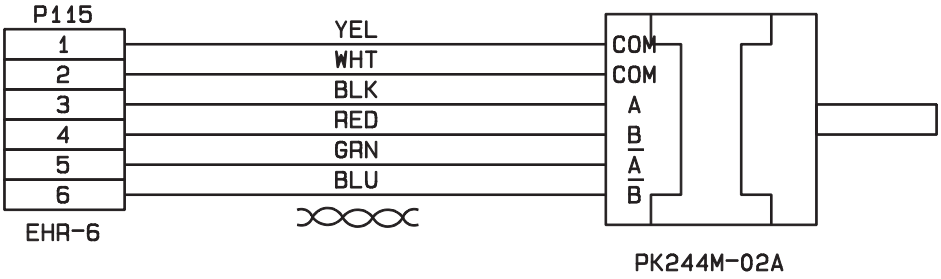
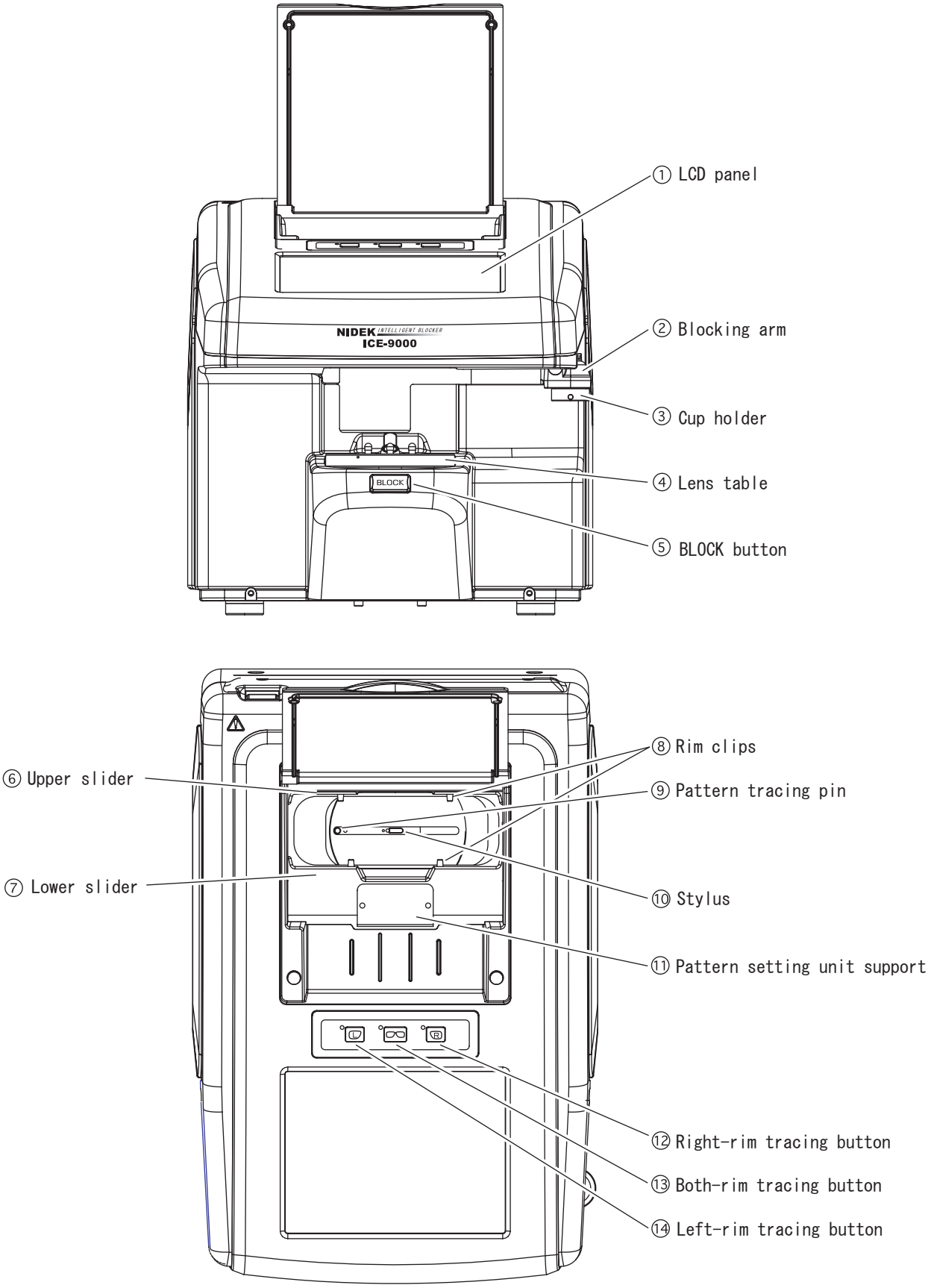
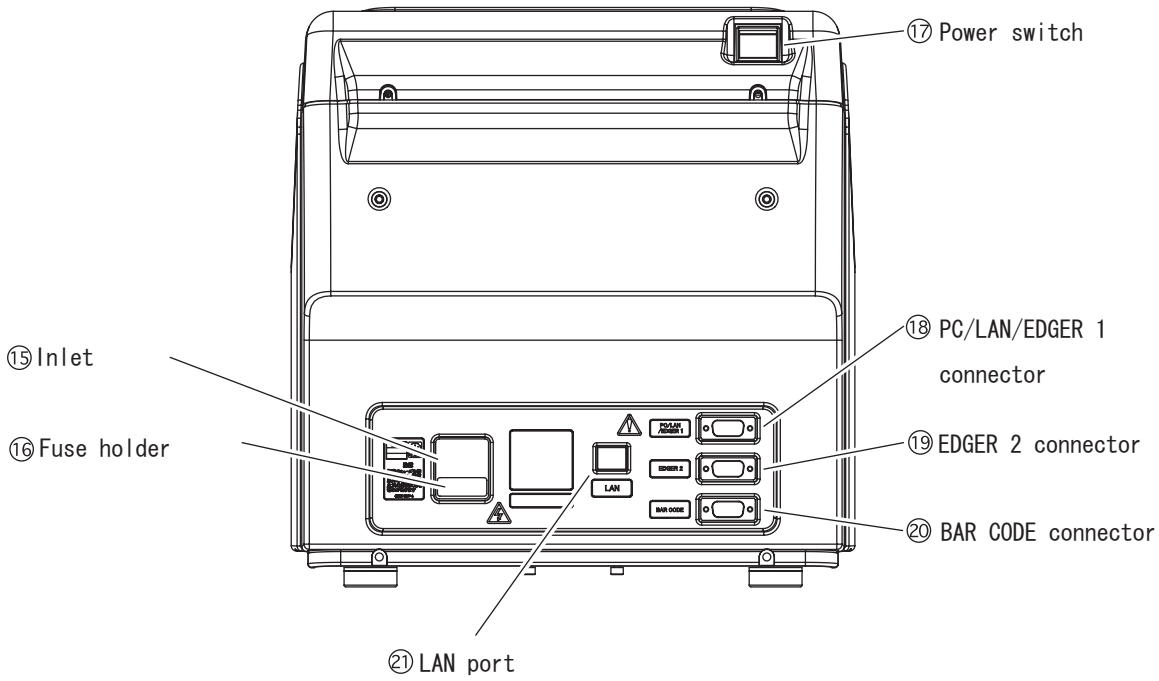
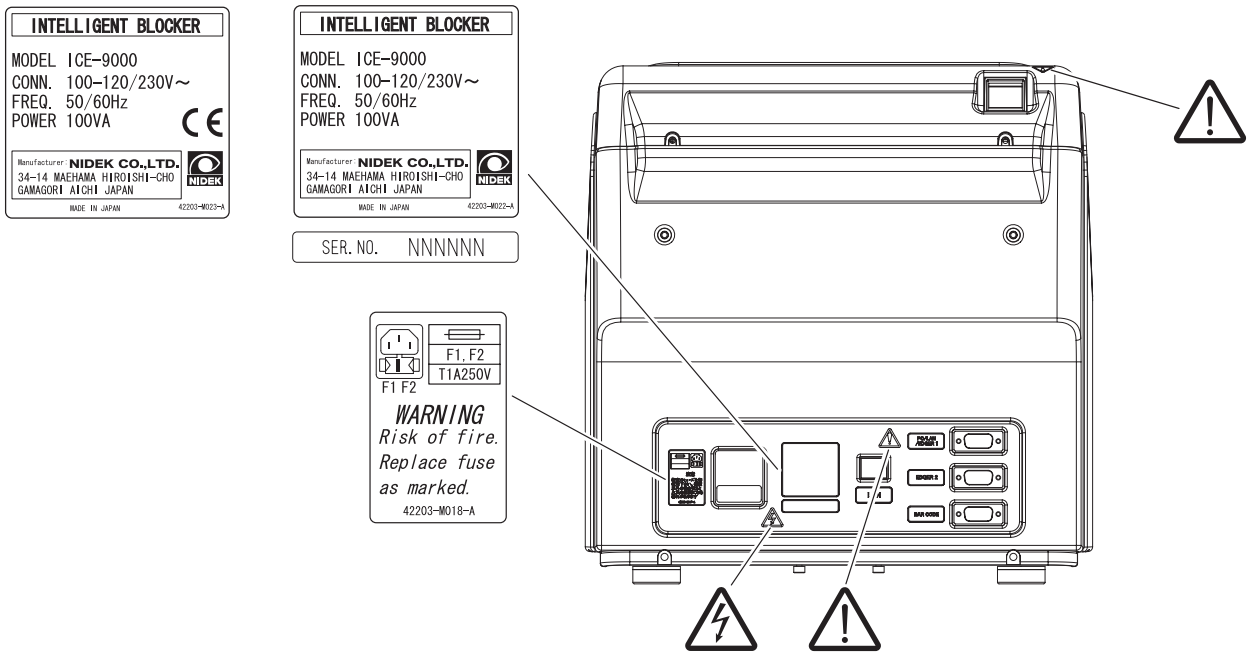


8.3 Configuration




⑰ Power switch
⑱ PC/LAN/EDGER 1 connector
⑲ EDGER 2 connector
⑳ BAR CODE connector
⑮ Inlet
⑯ Fuse holder
㉑ LAN port

8.4 Labels


INTELLIGENT BLOCKER
MODEL ICE-9000
CONN. 100-120/230V~
FREQ. 50/60Hz
POWER 100VA
Manufacturer NIDEK CO.,LTD.
34-14 MAEHAMA HIROISHI-CHO
GAMAGORI AICHI JAPAN
MADE IN JAPAN
42203-M023-A
INTELLIGENT BLOCKER
MODEL ICE-9000
CONN. 100-120/230V~
FREQ. 50/60Hz
POWER 100VA
Manufacturer NIDEK CO.,LTD.
34-14 MAEHAMA HIROISHI-CHO
GAMAGORI AICHI JAPAN
MADE IN JAPAN
42203-M022-A
SER.NO. NNNNNN
F1,F2
T1A250V
F1 F2
WARNING
Risk of fire.
Replace fuse
as marked.
42203-M018-A

8.5 Jigs and tools

- Jig for adjusting camera
- Jig scale
- Jig lens (SPH +10D and SPH -10D)
- Jig cup (NIDEK/TOPCON/FOMAP/WECO)
- Set of flathead screwdrivers
- Set of Phillips screwdrivers
- Penlight
- Blower
- Wooden stick
- Hexagon wrench
- Needle-nose pliers
- Nipper
- Wire stripper
- Soldering iron
- Forceps
- Set of precision screwdrivers
- Industrial screwdriver
- Multimeter
- Lens cleaning paper
- Alcoholic solution
- Thread locking adhesive
- Thermal contracting tube
- Japanese special paper (Ganpi-shi)
- Solder

* Specifications and design are subject to change without notice for improvement.

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