VRA51701-R.3607.A

作成承認印	配布許可印
ニコン 映像カンパニー 品質保証部 GM	サービス 計画課 M

SUPER COOLSCAN 9000 ED

VRA51701

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

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CONTENTS

Specification

Media	Negatives and positives, in color and monochrome
35-mm film	1–2 strips of 1–6 frames. Up to 3 frames of 24 × 48 mm or 24 × 65 mm panorama film can be scanned with optional FH-869GR film holder.
35-mm slides	1–5 slides with mounts 1.0–3.2 mm thick.
Medium-format film	1–4 frames (6 × 4.5), 1–3 frames (6 × 6), or 1–2 frames (6 × 7, 6 × 8, or 6 × 9).
Medium-format slides	Slides with mounts 1.0–3.2 mm thick can be scanned with optional FH-869M film holder.
16-mm film	1–3 strips of 1–20 frames can be scanned with optional FH-816 film holder.
Glass microscope slides	1–3 prepared glass microscope slides (26 × 76 mm, 0.8–1.5 mm thick) can be scanned with optional FH-8G1 film holder.

Aperture/scan range	FH-835S	FH-835M	FH-869S, FH-869G						FH-816	FH-8G1
			6 × 4.5	6 × 6	6 × 7	6 × 8	6 × 9	5.9×8.2		
Aperture (mm)	25.4 × 37.5	37.5 × 25.6	56.9 × 42.5	56.9 × 56.9	56.9 × 70.0	56.9 × 77.5	56.9 × 83.7	56.9 × 83.7	15.0 × 21.48	46.02 × 24.0
Scan range (pixels)	4000 × 5904	5905 × 4032	8964 × 6696	8964 × 8964	8964 × 11016	8964 × 12204	8964 × 13176	8964 × 13176	2362 × 3384	7248 × 3780

Scanning system	Fixed optical, movable media, parallel single-pass scanning system
Light source	Red, Green, Blue, and Infrared (RGBIr) LEDs; slit light source with rod and disperser
Image sensor	10,000 pixel three-line monochrome linear CCD image sensor
Color separation	Performed by RGB LEDs
Optical resolution	Up to 4000 pixels per inch
Analog-to-digital (A/D) conversion	16 bits per color
Output	Full color or greyscale at 8 or 16 bits per channel
Focus	Auto and manual
Interface	IEEE 1394
Power consumption	27 W or less; 14 W or less in standby mode
Power supply	AC 100–240 V, 50/60 Hz
Operating environment	+10–+35 °C (+50–+95 °F) at a humidity of 20–60%
Size and weight	249 × 498.5 × 202 mm/9.8″ × 19.6″ × 8.0″ (W × H × D), 9 kg/19.8 lb (approx.)

Scanning time (Time to display image when Preview button is clicked, or when Scan button is clicked following preview. Times do not include autofocus or holder positioning.)*

With FH-835M 35-mm slide mount holder						
Scan Image Enhancer	ICE	ROC	GEM	DEE	Preview	Scan
Off	Off	Off	Off	Off	13 s	40 s
On	Off	Off	Off	Off	12 s	41 s
Off	On	Off	Off	Off	14 s	57 s
Off	Off	On	Off	Off	28 s	52 s
Off	Off	Off	On	Off	26 s	1 min 31 s
Off	Off	Off	Off	On	14 s	1 min 27 s
On	On	On	On	On	33 s	2 min 33 s
With FH-869S 120/220 film holder						
Scan Image Enhancer	ICE	ROC	GEM	DEE	Preview	Scan
Off	Off	Off	Off	Off	38 s	3 min 05 s
On	Off	Off	Off	Off	38 s	3 min 14 s
Off	On	Off	Off	Off	40 s	7 min 05 s
Off	Off	On	Off	Off	1 min 26 s	8 min 55 s
Off	Off	Off	On	Off	1 min 26 s	11 min 40 s
Off	Off	Off	Off	On†	38 s	2 min 20 s
On	On	On	On	Off	2 min 24 s	16 min 00 s

* Times for positive film scanned at input resolution of 4000 dpi (2000 dpi when FH-869S is used with Digital DEE) and bit depth of 16 bits (CMS on) using Nikon Scan 4 on Pentium 4 3.06 GHz FSB 533 MHz computer with 1 GB RAM, Windows XP Professional, IEEE 1394 interface, and 1024 × 768 display.

† Input resolution set to 2000 dpi

Supplied Film Holders

FH-835S 35-mm Strip Film Holder

Film	1–2 strips of 35-mm film, each with 1–6 frames
Size and weight	130 × 320 × 17 mm/5.1″ × 12.6″ × 0.7″ (W × H × D), 200 g/7.1 oz. (approx.)

FH-835M 35-mm Mounted Film Holder

Film	1–5 35-mm slides with mounts 1.0–3.2 mm thick and 49.0–50.8 mm wide
Size and weight	130 × 345 × 17 mm/5.1″ × 13.6″ × 0.7″ (W × H × D), 180 g/6.3 oz. (approx.)

FH-869S 120/220 Strip Film Holder

Film	Medium-format (120/220) film, 5.9 × 8.2 cm electron microscope film
6 × 4.5	1–4 frames
6 × 6	1–3 frames
6 × 7, 6 × 8, 6 × 9	1–2 frames
Size and weight	130 × 320 × 17 mm/5.1″ × 12.6″ × 0.7″ (W × H × D), 290 g/10.2 oz. (approx.)

Optional Film Holders

FH-869M 120/220 Mounted Film Holder

Film	One 6 × 4.5 or 6 × 6 slide and one 6 × 7, 6 × 8, or 6 × 9 slide
Size and weight	130 × 320 × 17 mm/5.1″ × 12.6″ × 0.7″ (W × H × D), 170 g/6.0 oz. (approx.)

FH-869G 120/220 Strip Film Holder with Glass

Film	Medium-format (120/220) film, 5.9 × 8.2 cm electron microscope film
6 × 4.5	1–4 frames
6 × 6	1–3 frames
6 × 7, 6 × 8, 6 × 9	1–2 frames
Size and weight	130 × 300 × 17 mm/5.1″ × 11.8″ × 0.7″ (W × H × D), 300 g/10.6 oz. (approx.)

FH-869GR Rotating 120/220 Strip Film Holder with Glass

Film	Medium-format (120/220) film, 5.9 × 8.2 cm electron microscope film, 35-mm panorama film with frame size of 24 × 48 mm or 24 × 65 mm
6 × 4.5	1–4 frames
6 × 6	1–3 frames
6 × 7, 6 × 8, 6 × 9	1–2 frames
Angle adjustment	±5°
Size and weight	130 × 320 × 17 mm/5.1″ × 12.6″ × 0.7″ (W × H × D), 330 g/11.6 oz. (approx.)

FH-816 16-mm Strip Film Holder

Film	1–3 strips of 16-mm film, each with 1–20 frames
Size and weight	130 × 375 × 17 mm/5.1″ × 14.8″ × 0.7″ (W × H × D), 250 g/8.8 oz. (approx.)

FH-8G1 Medical Holder

Media	1–3 prepared glass microscope slides
Slide	26 × 76 mm, 0.8–1.5 mm thick
Slide cover	25 × 60 mm with thickness of 0.18 mm or less
Total thickness	No more than 2 mm, including adhesive
Size and weight	130 × 345 × 17 mm/5.1″ × 13.6″ × 0.7″ (W × H × D), 190 g/6.7 oz. (approx.)

Disassembly

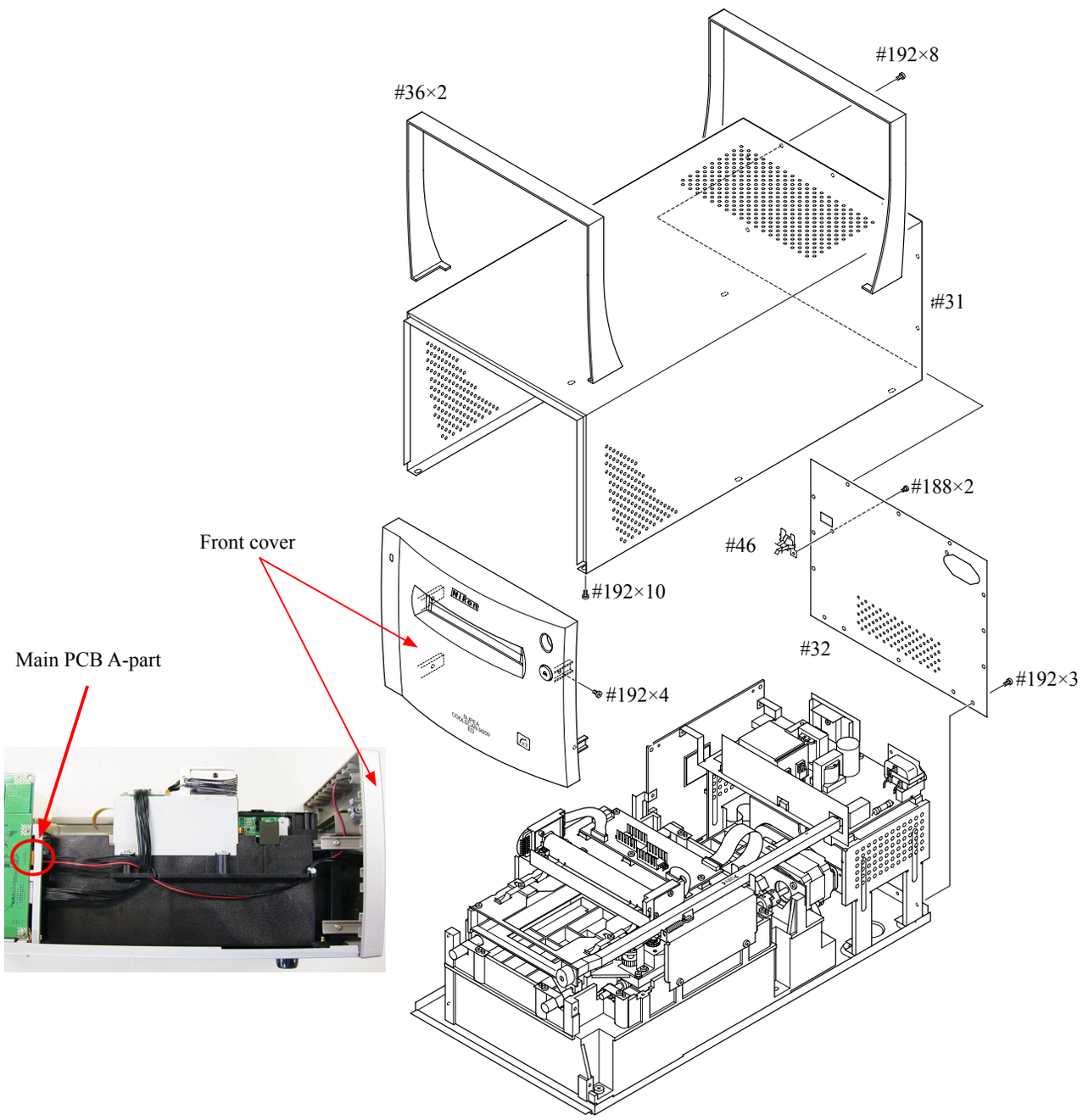
Notes: ① **Be sure to remove the power wire before disassembly.**

② **When disassembling, make sure to memorize the processing state of wires and FPCs, screws to be fixed and their types, etc.**

③ **Because ICs are easily damaged by static electricity, be sure to get yourself earthed/grounded when holding the main PCB and FPCs.**

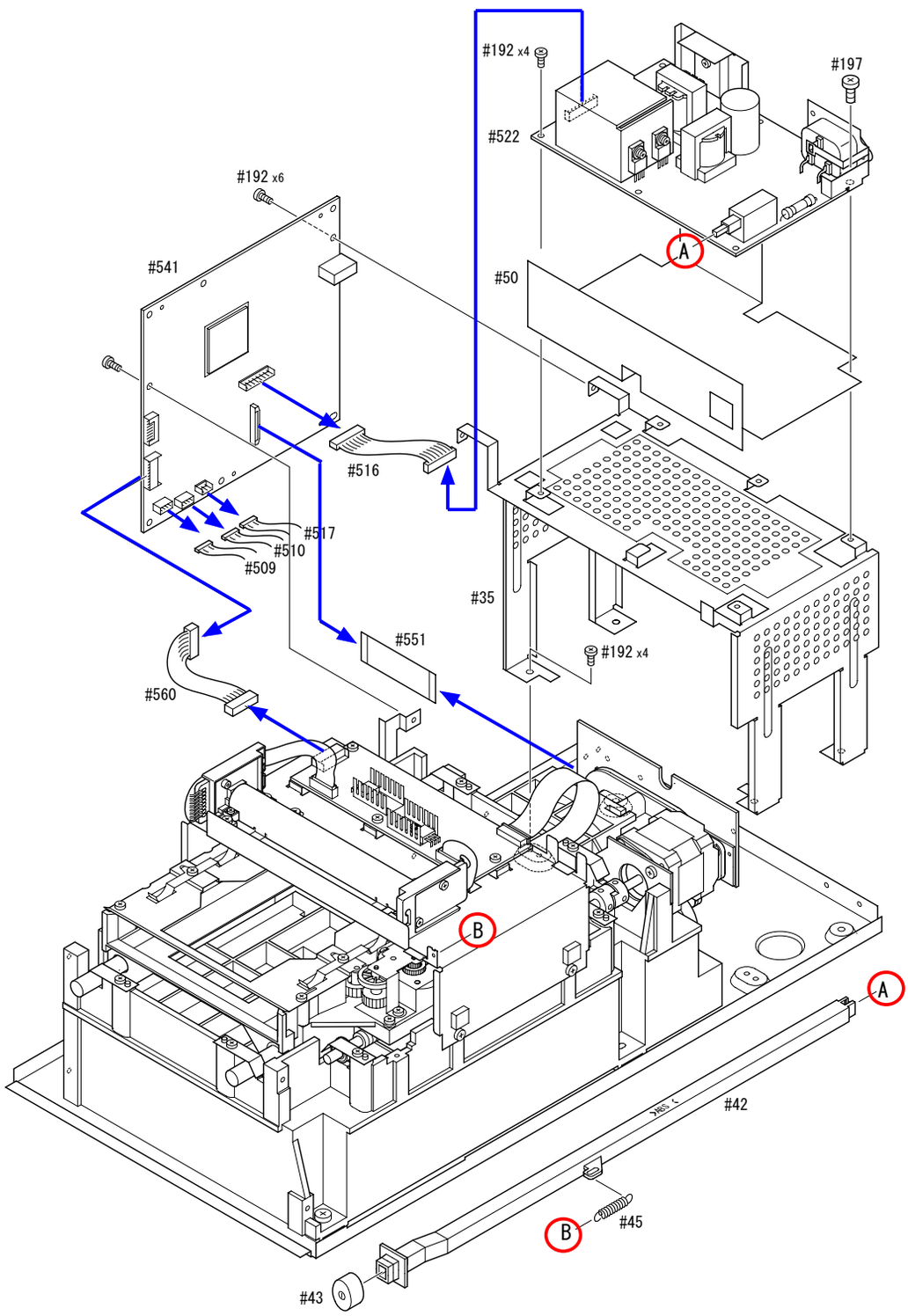
External cover

- Take out 8 screws at the back (#192) and 10 screws at the bottom (#192), then remove the side cover by sliding it. (Removing 2 rubbers (#36) is unnecessary except when they are replaced.)
- Remove the rear panel (#32) by taking out 3 screws (#192) and 2 screws (#188). The connector shield-plate (#46) comes off accordingly.
- Remove the connector on the main PCB A-part (which is connected from the front cover).
- Uncover the front cover by taking out 4 screws (#192).



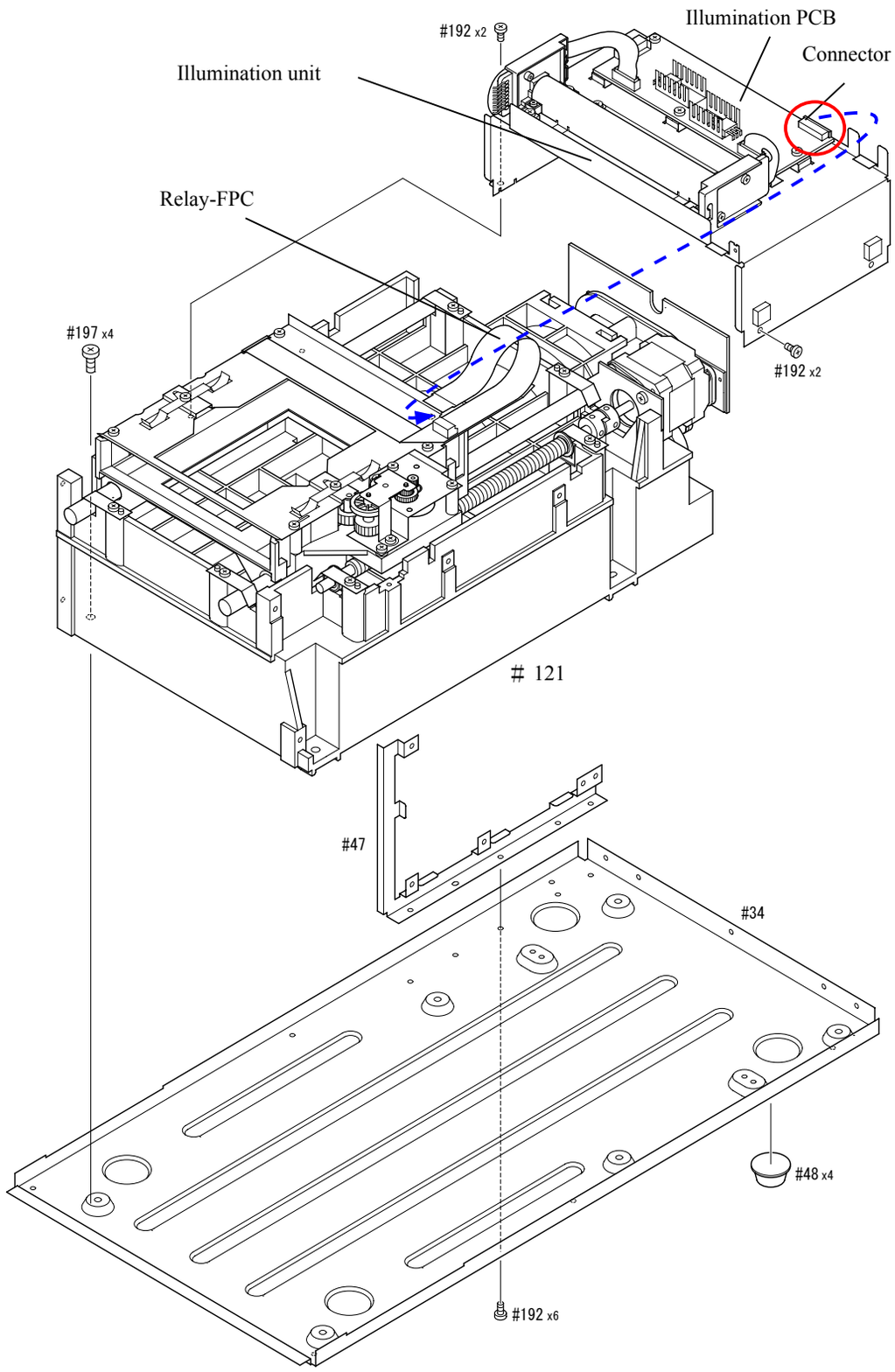
Main PCB, Power-PCB

- Remove the main PCB (#541) by taking out 6 screws (#192).
- Disconnect 6 connectors on the main PCB (#560, #551, #516, #509, #510, and #517), then remove the main PCB.
- Remove the spring (#45) and unhook the A-part of the power SW （#42).
- Remove the power-PCB (#522) and insulating sheet (#50) by taking out 1 screw (#197) and 4 screws (#192).
- Remove the power base (#35) by taking out 4 screws (#192).



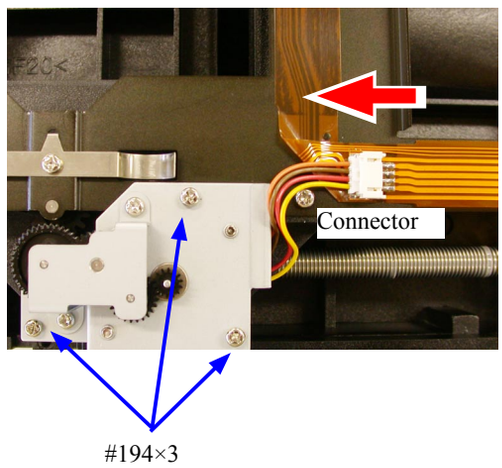
Illumination unit, Base unit

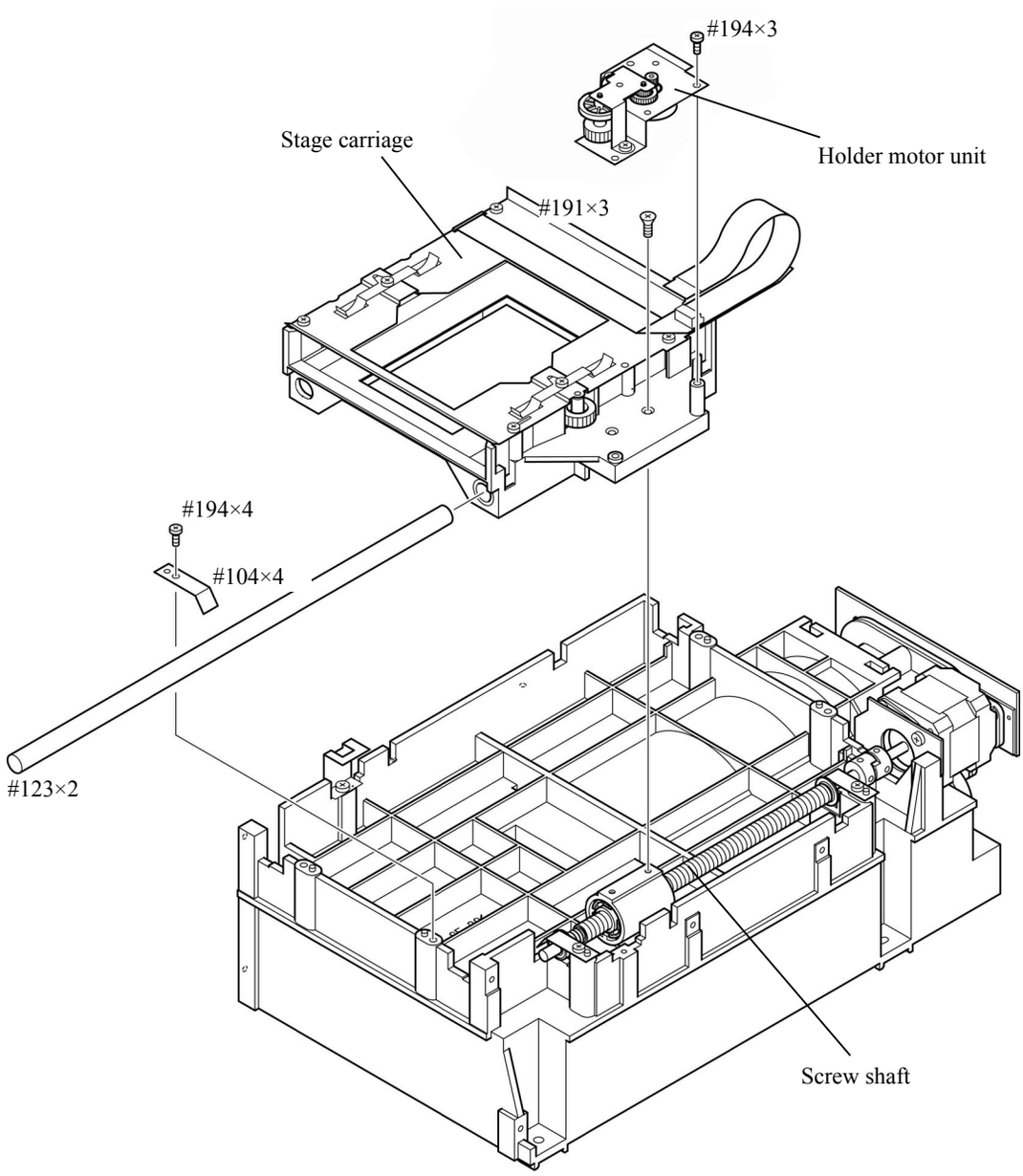
- Remove the relay-FPC from the connector of the illumination-PCB.
- Remove the illumination unit from the base unit (#121) by taking out 4 screws (#192).
- Remove the base unit from the bottom plate (#34) by taking out 4 screws (#197).
- Remove the PCB support-plate (#47) by taking out 6 screws (#192).



Stage carriage unit

- Disconnect the connector of the holder motor by pulling it in the direction indicated by the arrow.
- Remove the holder motor unit by taking out 3 screws (#194).
- Take out 4 screws (#194) and remove 4 retaining springs (#104).
- Take out 2 screws (#191) then the stage carriage comes off with 2 guide shafts (#123) attached.
- Pull out 2 guide shafts (#123).





Stage carriage lead screw

・ Loosen 4 screws of the coupling (#137).
・ Take out 2 screws (#192) and remove the SCAN motor unit.

＊ Note:

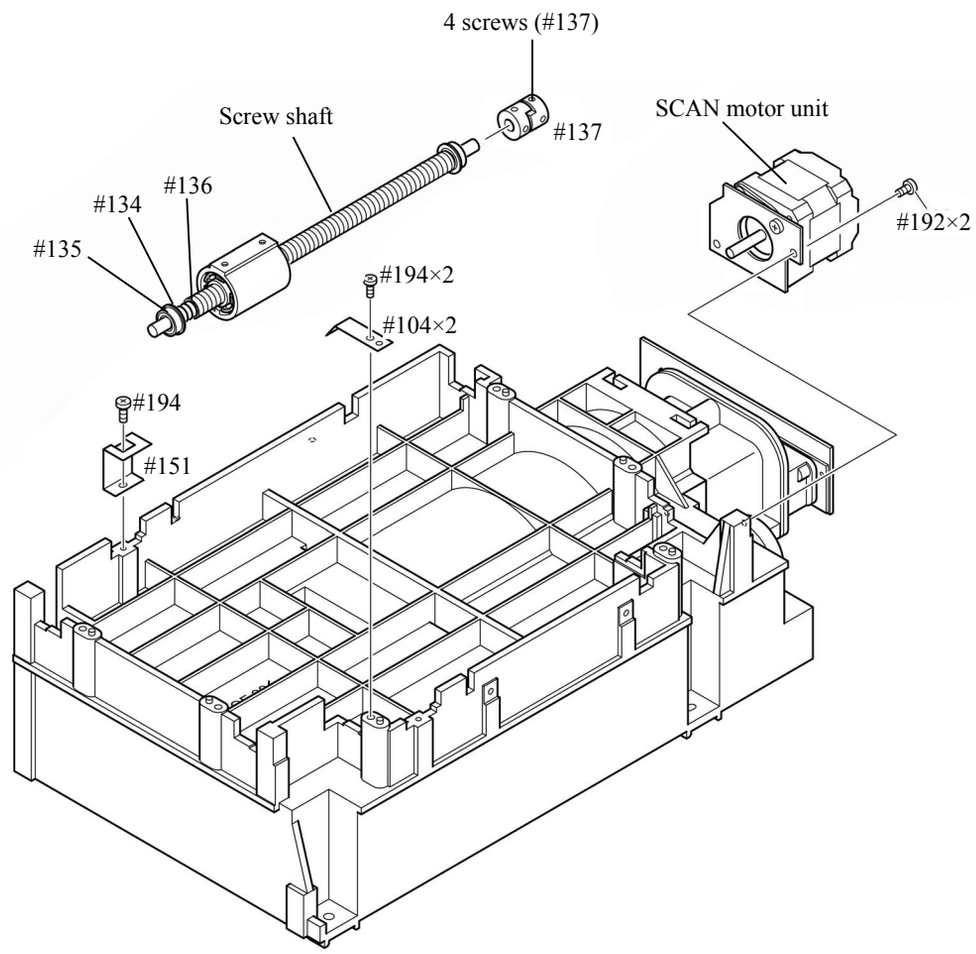
Whenever the SCAN motor unit is detached, reassemble the motor unit by using the SCAN motor assembling tool.

・ Take out 2 screws (#194) then remove 2 retaining springs (#104) and screw shaft.

＊ Note:

Remove the screw shaft with care because the bearing (#135), washer (#134) and spring (#136) jump out of the shaft.

・ Remove #151 by taking out the screw (#194).

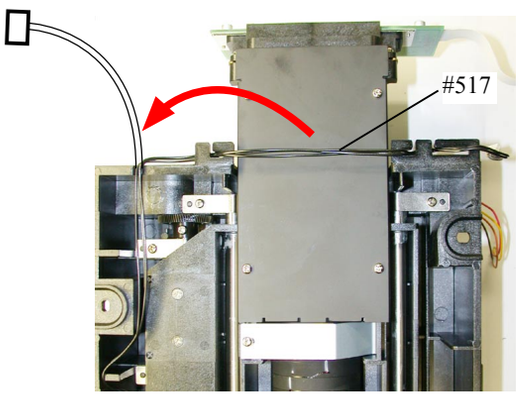


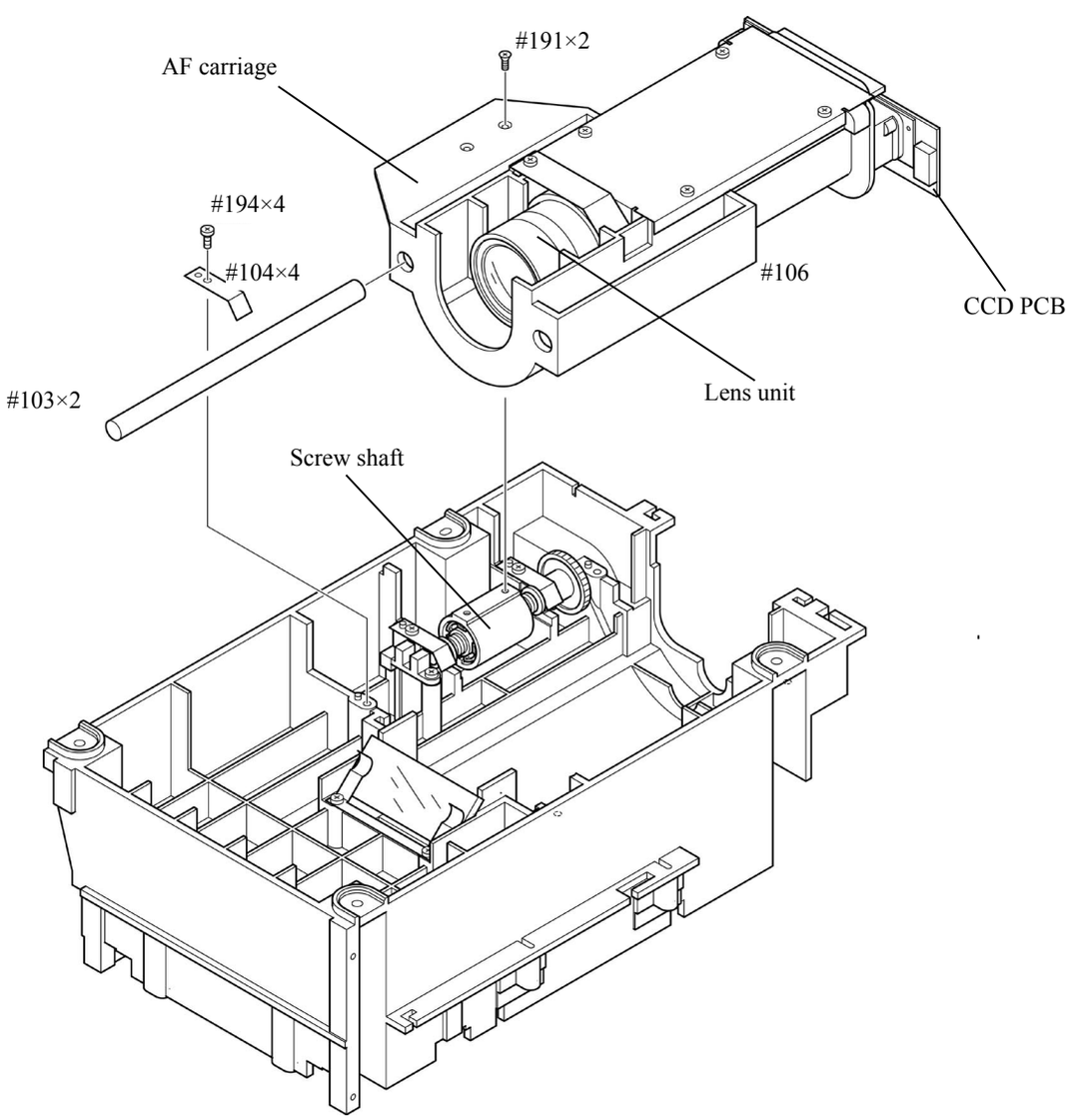
AF carridge unit

- Turn the base unit upside down for disassembly.
- Set aside the connector wire (#517) that is connected from the AF sensor by pulling it in the direction of the below arrow.
- Separate the screw shaft and AF carriage by taking out 2 screws (#191).
- Remove the AF carriage by taking out 4 screws (#194) and 4 retaining springs (#104).
- Pull out 2 guide shafts (#103).

＊ Note:

Whenever the lens unit and CCD PCB are disassembled or replaced from the AF carriage, the CCD adjustment is necessary.

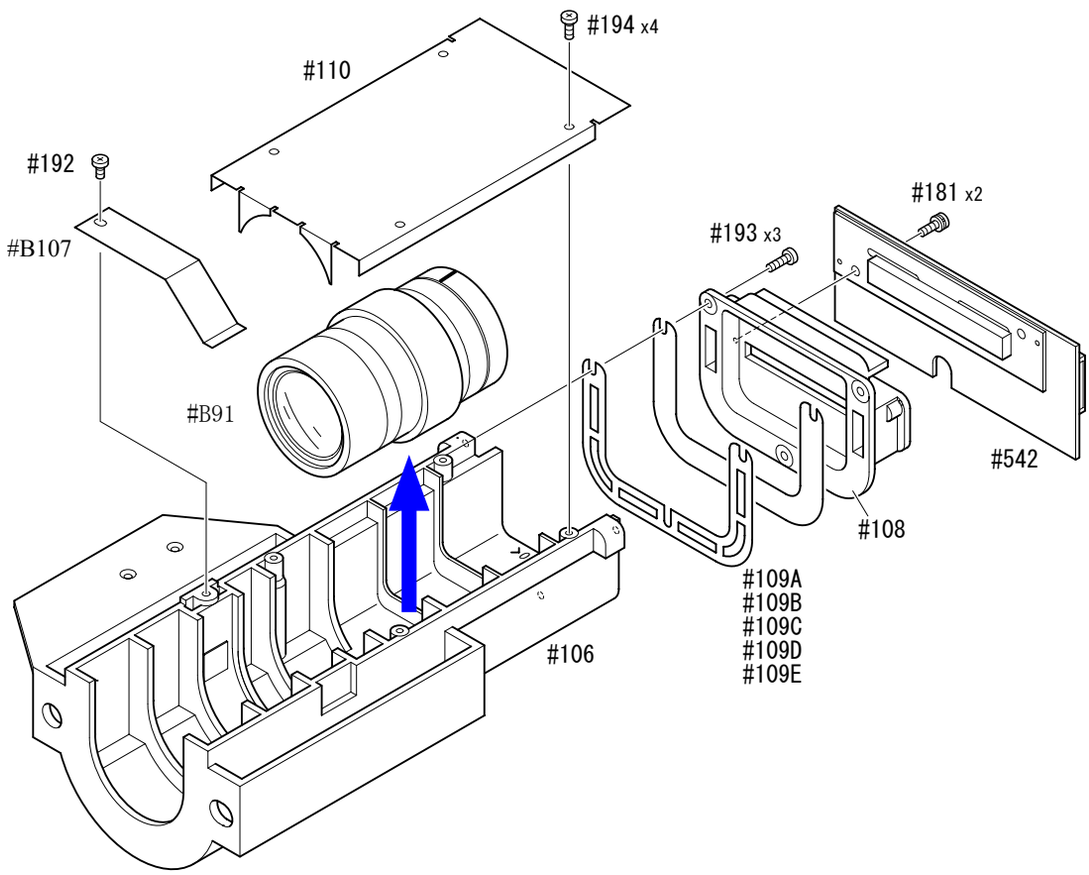




AF carriage unit

- Remove the light-shielding cover (#110) by taking out 4 screws (#194).
- Remove the CCD holder (#108) by taking out 3 screws (#193). The adjustment washers (#109A-G) come off accordingly.
- Remove the CCD unit (#542) from #108 by taking out 2 screws (#181).
- Remove the retaining plate (#B107) by taking out the screw (#192).
- Remove the lens unit (#B91) by lifting it in the direction indicated by the arrow.

＊ Note:
Whenever the lens unit (#B91) and the CCD holder (#108) and the CCD unit (#542) are disassembled or replaced, the CCD adjustment (ref. "Adjustment" chapter) is necessary.



Lead screw, AF motor, mirror unit

・ Remove the AF motor (#510) by taking out 2 screws (#192).

＊ Note:

Whenever the AF motor (#510) is disassembled or replaced, reassemble it by using the AF motor backlash adjustment tool.

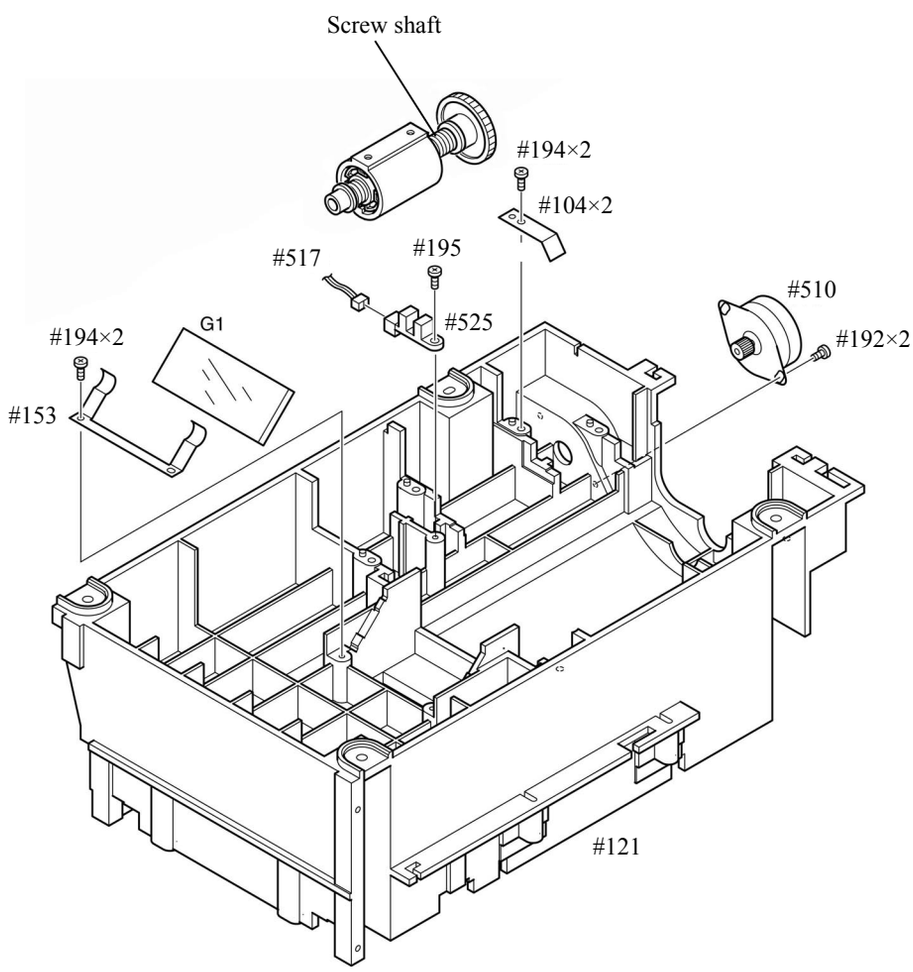
・ Remove the screw shaft by taking out 2 screws (#194) and 2 retaining springs (#104).

・ Remove the mirror G1 by taking out 2 screws (#194) and the spring (#153). (Be careful that the mirror G1 is glued.)

＊ Note:

Whenever the mirror G1 is disassembled or replaced from the base unit (#121), the CCD adjustment is necessary.

・ Remove the AF sensor unit (#525) by taking out the screw (#195).

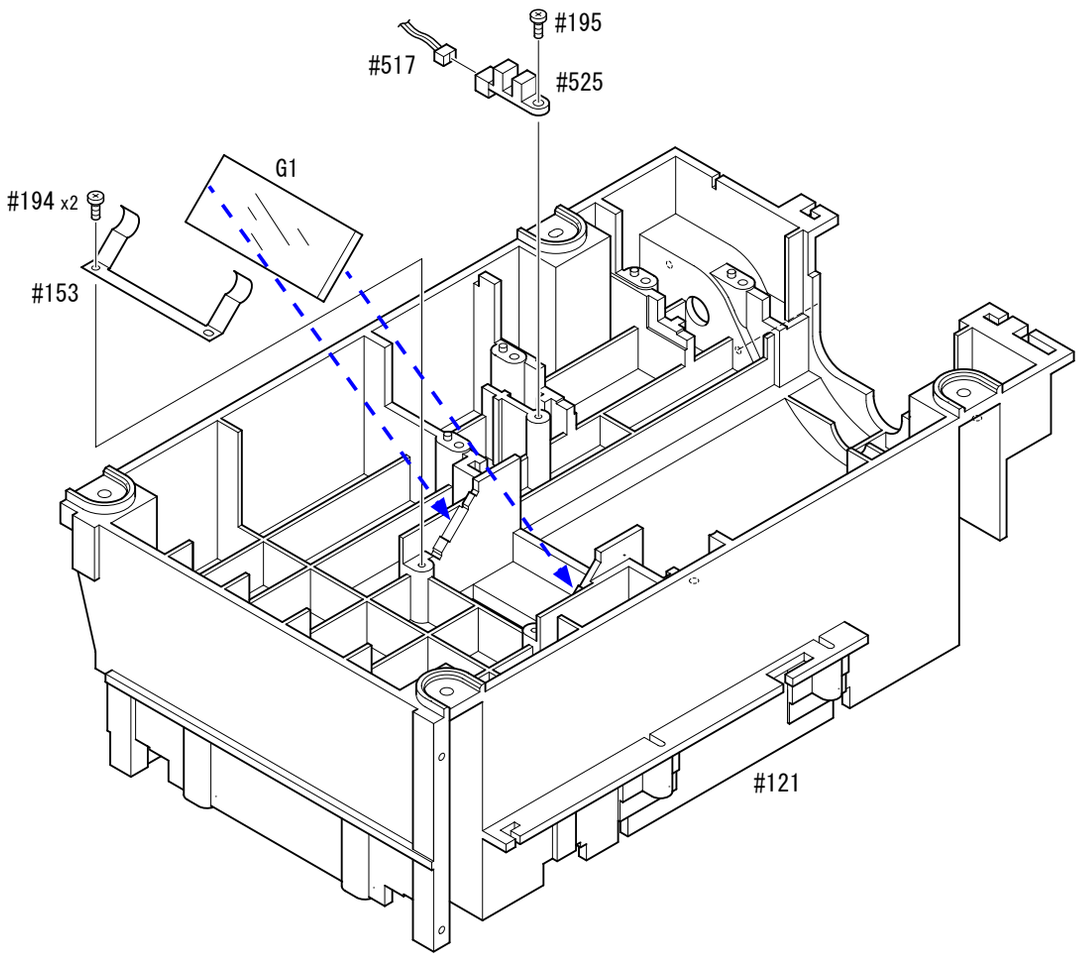


Assembly

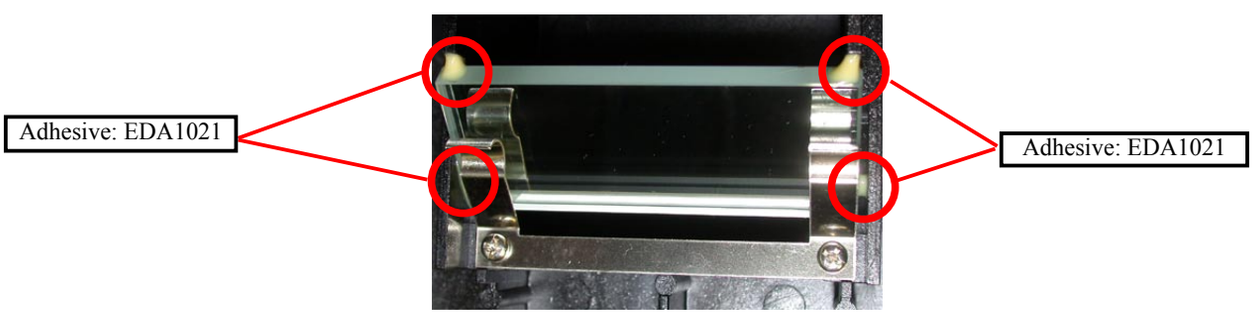
Mirror / AF sensor

- Fix the AF sensor (#525) with the screw (#195), and connect the cable (#517).

- Mount the mirror (#G1) on the base (#121), and fix it with the spring (#153) and 2 screws (#194).
  ＊ Note: Mount #G1 so that the mirroring side faces the base (#121).

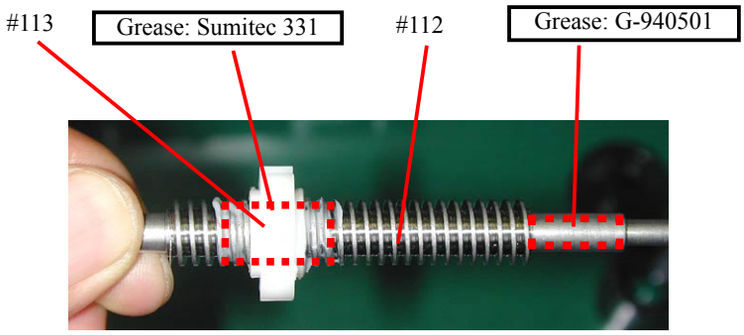


- Attach the mirror (#G1) and base (#121) at 4 parts (refer to below) with the adhesive (EDA1021), and leave it about 4 hours until the adhesive completely dries.

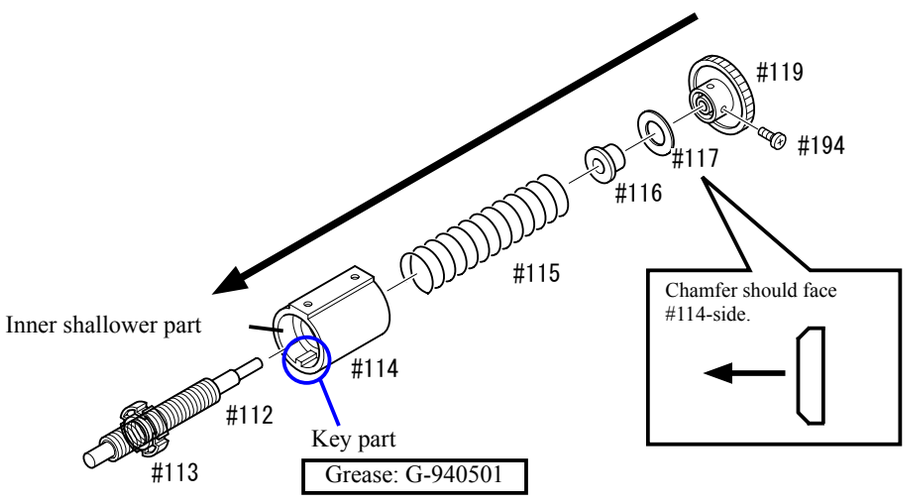


Assemble AF screw shaft

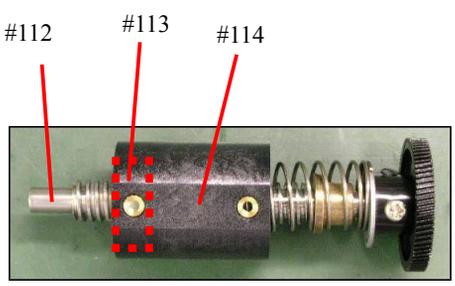
・ Apply the grease on the screw shaft (#112), and turn the nut (#113) on it until reaching the below position.



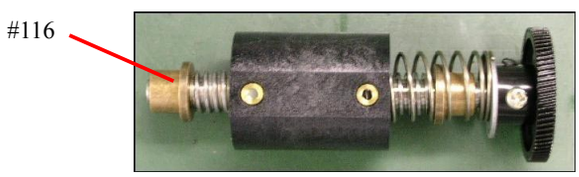
・Put #114, #115, #116, #117, and #119 in order into the screw shaft (#112), then fix them with the screw (#194).
(Apply the grease（G-94051) on the key part of the nut housing (#114), and assemble it with its inner shallower part facing #113-side.)



・Turn #113 until approximately the 5th pitch of the screw thread (#112) can be seen, then enter the key of #114 into the key groove of #113.



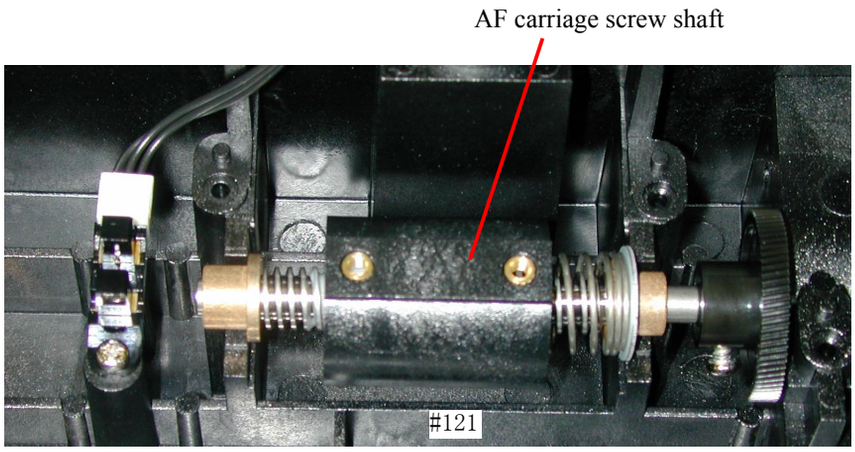
・ Insert #116.



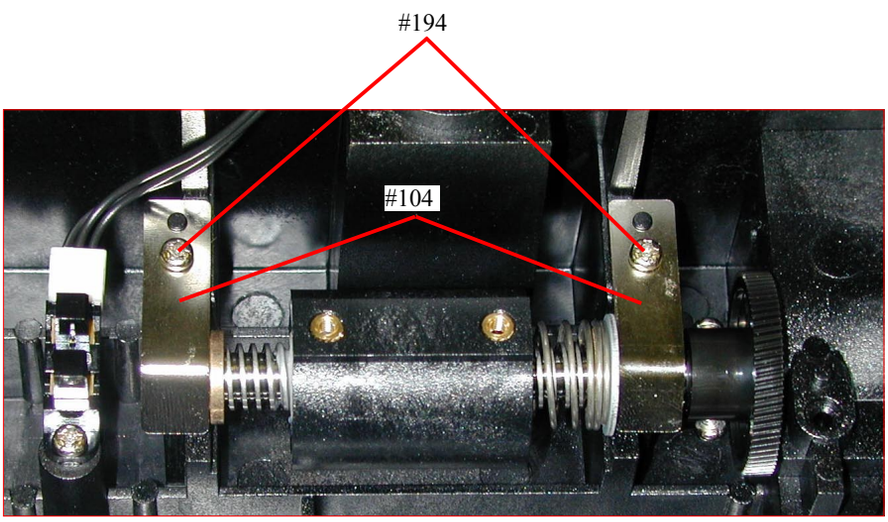
Complete AF screw shaft unit

Assemble AF screw shaft

・ Mount the AF screw shaft on the base (#121).



・ Attach 2 retaining springs (#104) with 2 screws (#194).



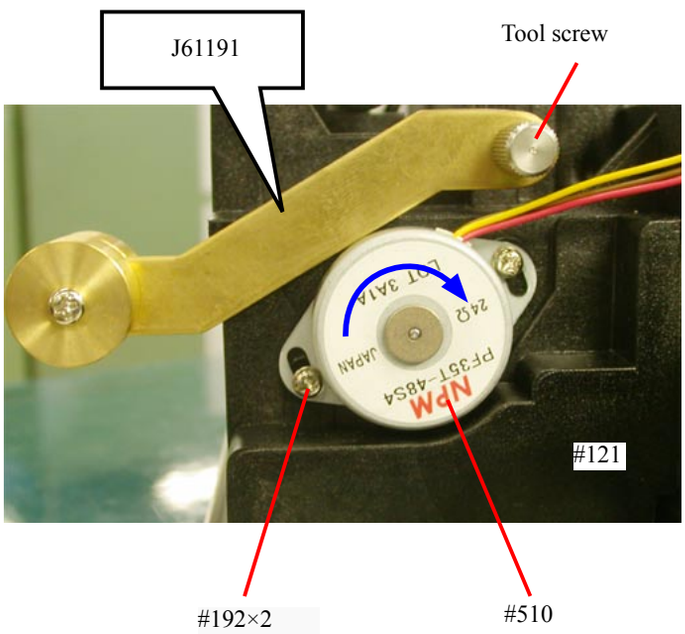
Assemble AF motor

- Return the base (#121) to the correct position.
- Attach the AF motor (#510) temporarily with 2 screws (#192).

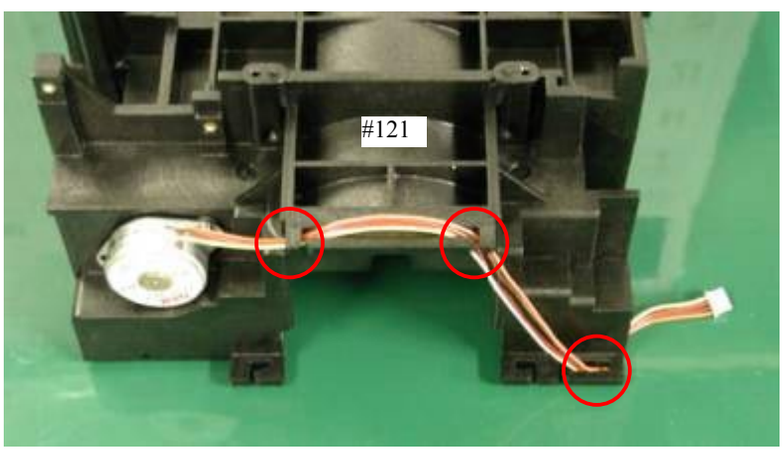
【Adjustment】 AF motor backlash adjustment

1) Attach the AF motor backlash adjustment tool (J61191) to the base (#121) with the tool screw.

2) Loosen 2 screws (#192) and turn the AF motor clockwise. Then unhand and tighten 2 screws (#192).
(The backlash adjustment is made by the weight of the tool（J61191).)



- After the AF motor is attached, perform wiring work.



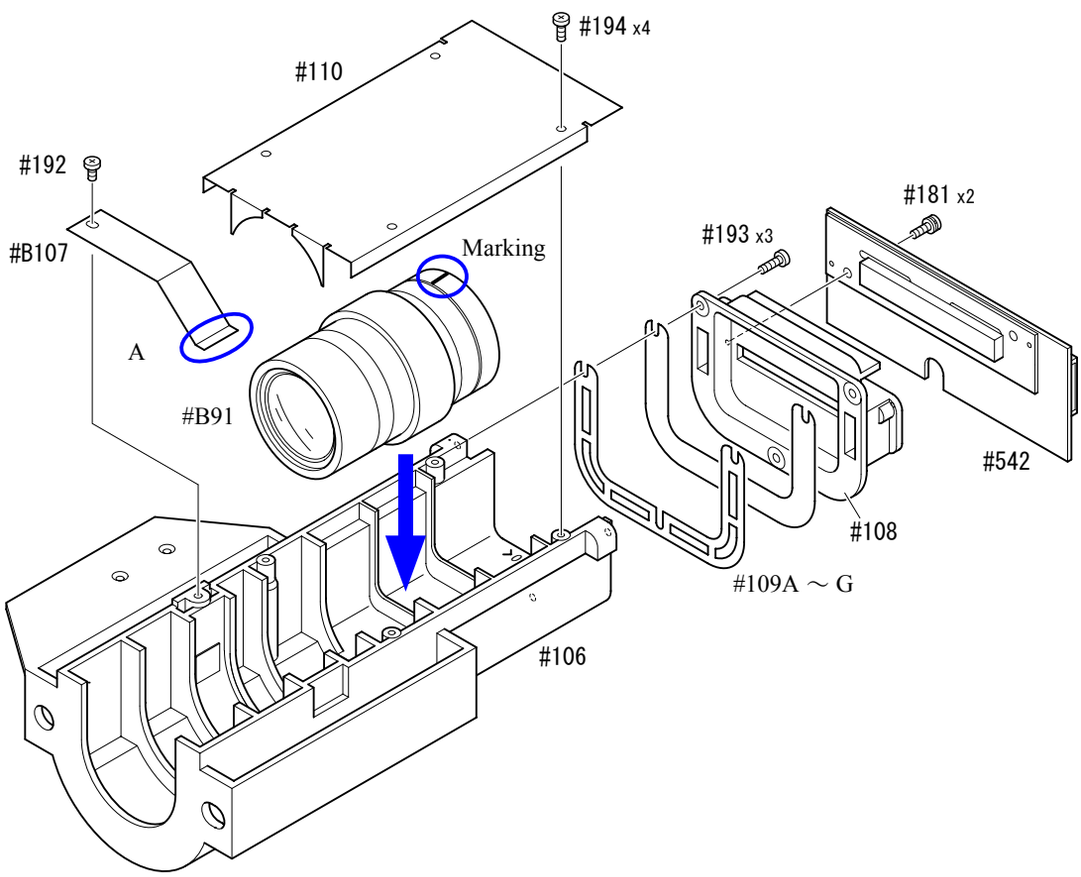
AF carriage unit

・Assemble the lens unit (#B91) into the AF carriage (#106), and hook the A part of the retaining plate (#B107) to the groove of #106. Then fix it with the screw (#192). （＊ Note: Assemble #B91 with its marking just upward.)

・ Attach the light-shielding cover (#110) with 4 screws (#194).

・ Attach the adjustment washers (#109A-G) and the CCD holder (#108) with 3 screws (#193).
（Initial value of the adjustment washer: 2 mm (109F×1)）

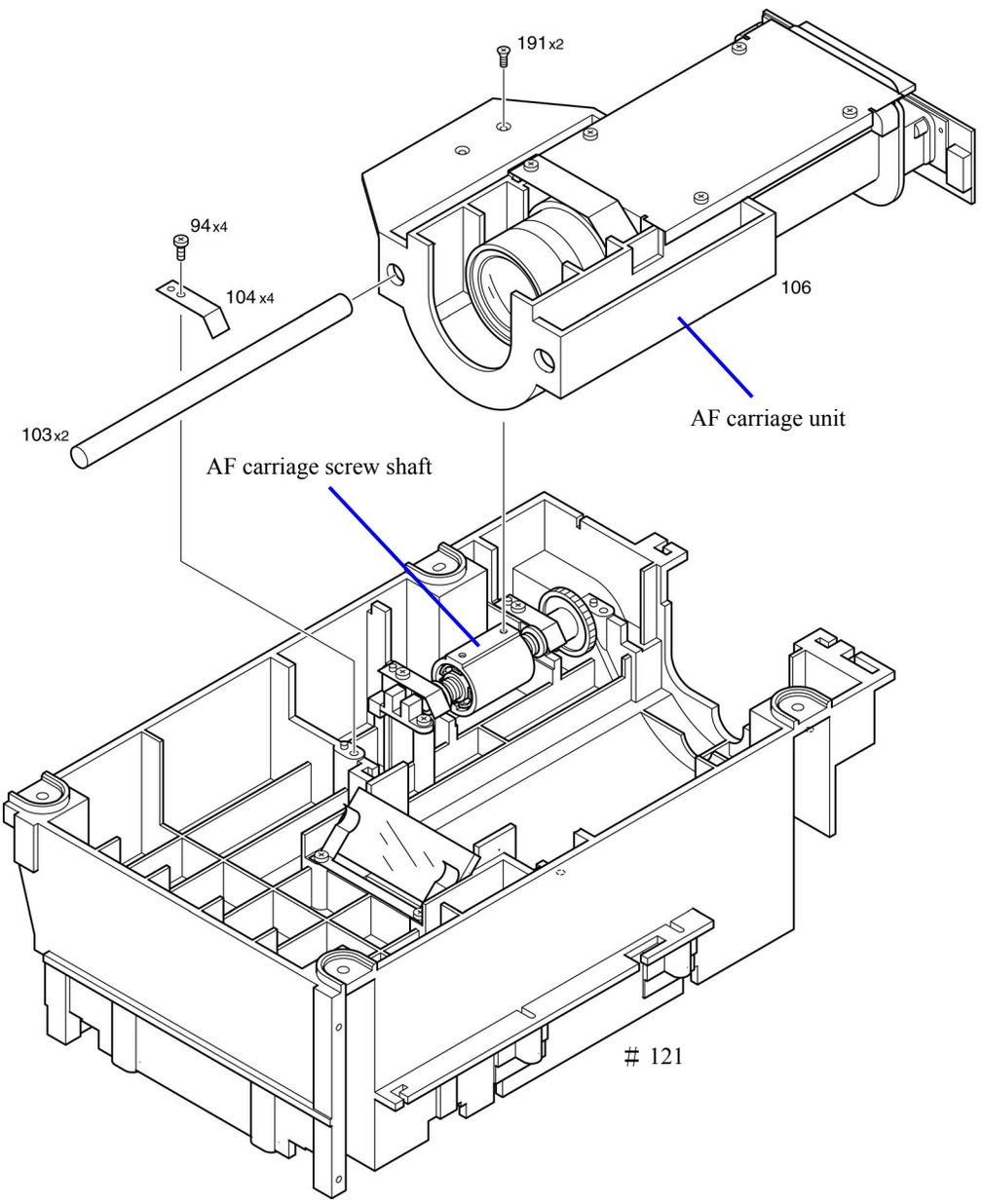
・ Attach the CCD unit (#542) with 2 screws (#181).



＊ Note: Whenever the lens unit (#B91), CCD holder (#108), and CCD unit (#542) are disassembled or replaced, the CCD adjustment (refer to "Adjustment" chapter) is necessary.

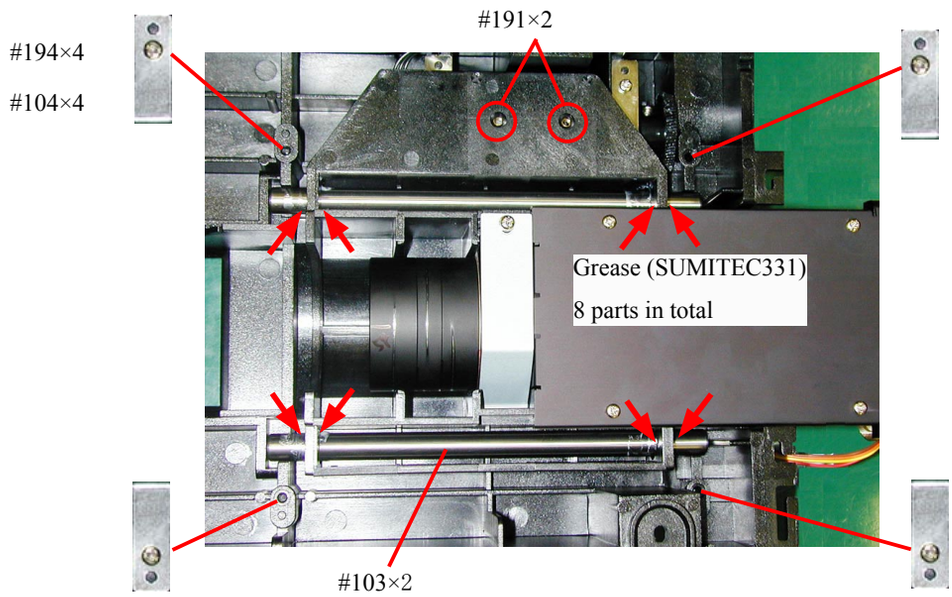
Assemble AF carriage unit

- Insert 2 guide shafts (#103) into #106.
- Turn the base (#121) upside down, and assemble the AF carriage unit.

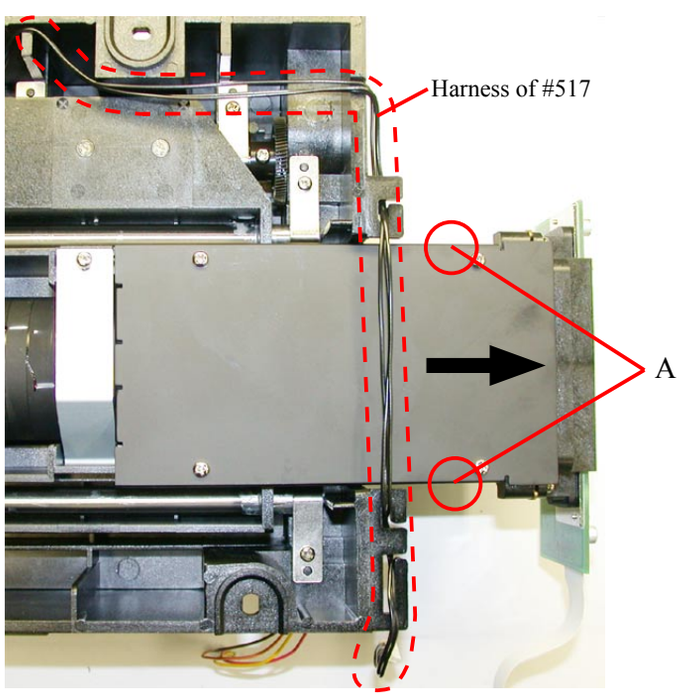


AF carriage unit connections

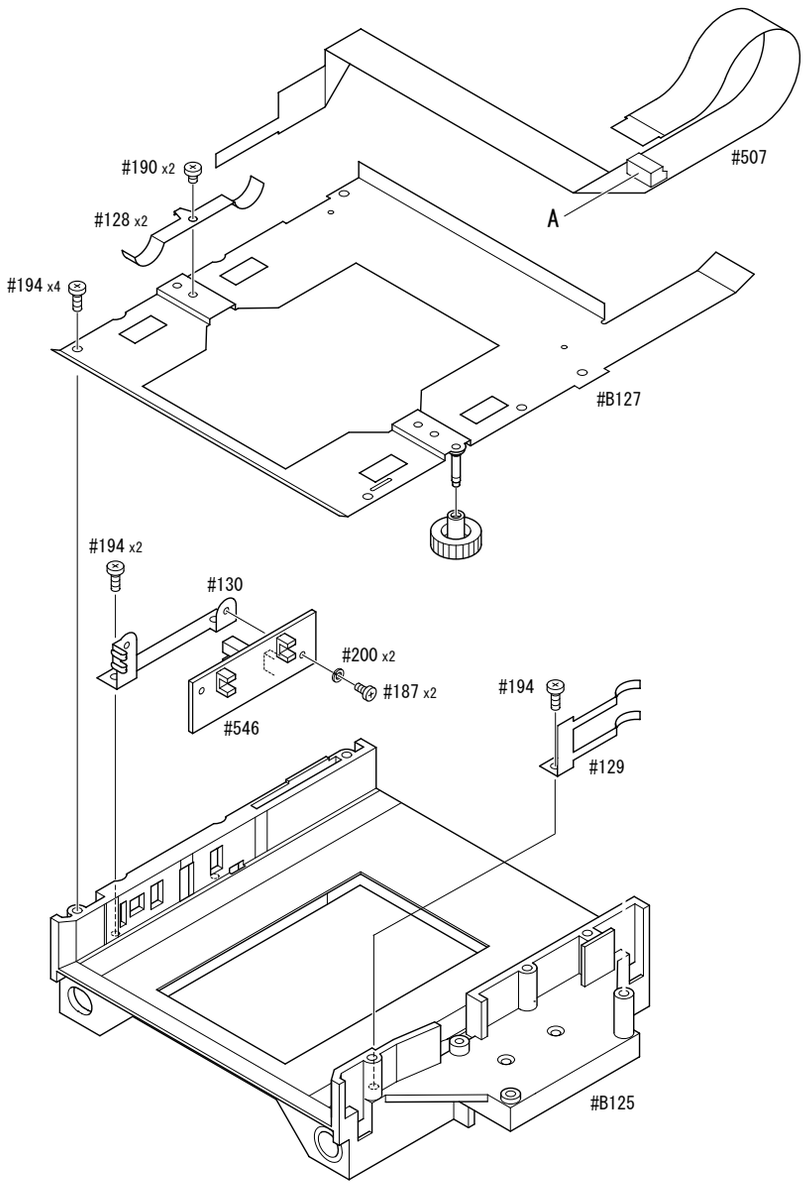
- Apply the grease (SUMITEC331) on 8 contact-parts of the guide shaft (#103) and the AF carriage holes.
- Fix 2 guide shafts (#103) with 4 retaining springs (#104) and 4 screws (#194).
- Connect the screw shaft and the AF carriage unit with 2 screws (#191).



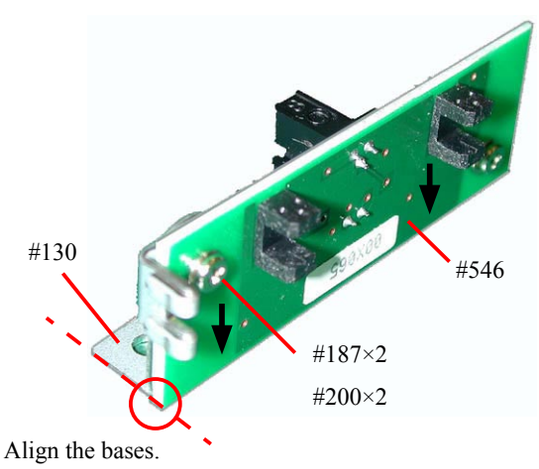
- Take A parts between forefinger and thumb, and pull it in the direction indicated by the arrow. Check if the AF carriage unit moves back smoothly when it is released.
- Put the harness of #517 in position.



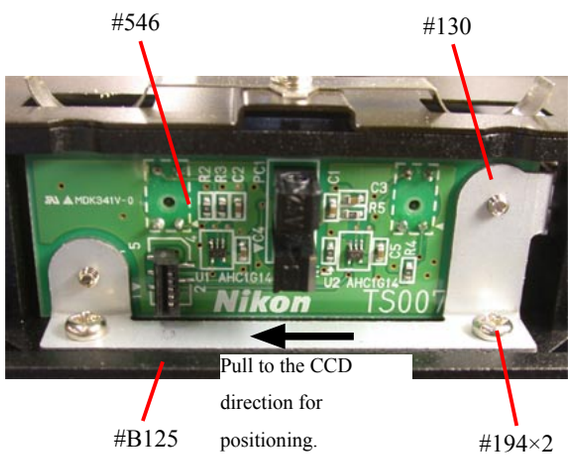
Stage carriage



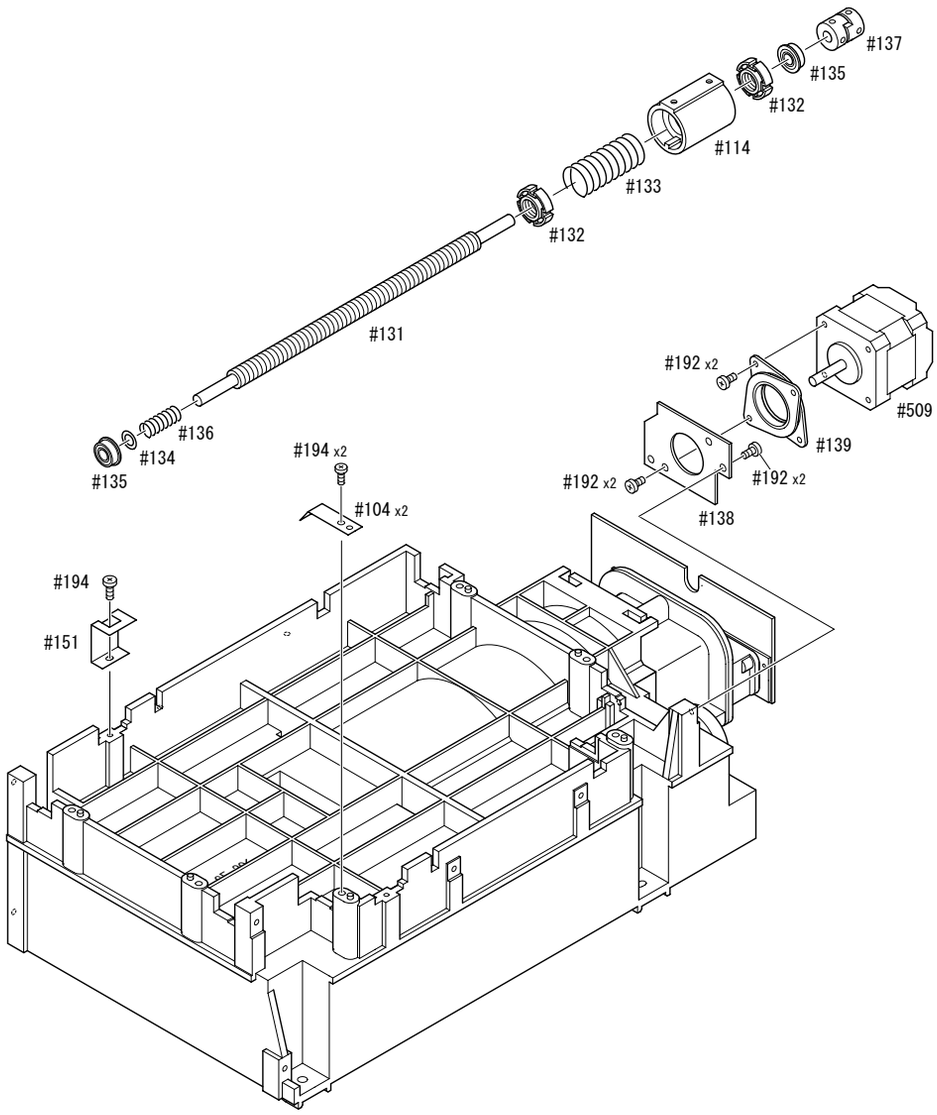
- Attach the sensor PCB (#546) on the PCB fix plate (#130) with 2 screws (#187) and 2 washers (#200).
  (Assemble the PCB fix plate and sensor PCB by aligning their bases.)
- Attach the PCB fix plate (#130) on the stage carriage (#B125) with 2 screws (#194).
  (Assemble by pulling to the CCD direction for positioning.)



Align the bases.

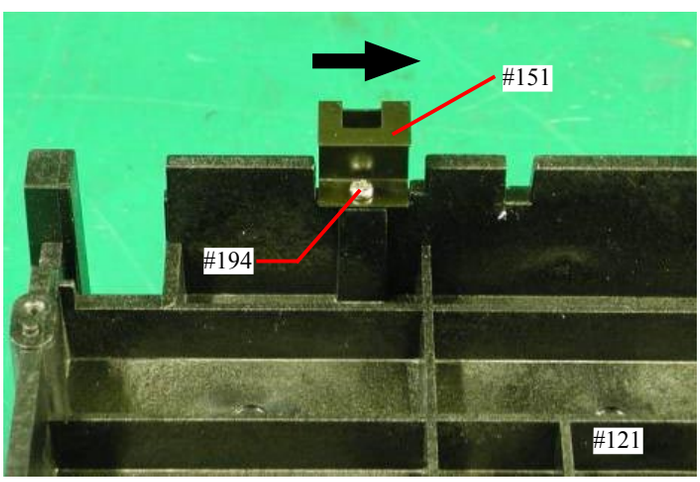


Stage carriage screw shaft unit



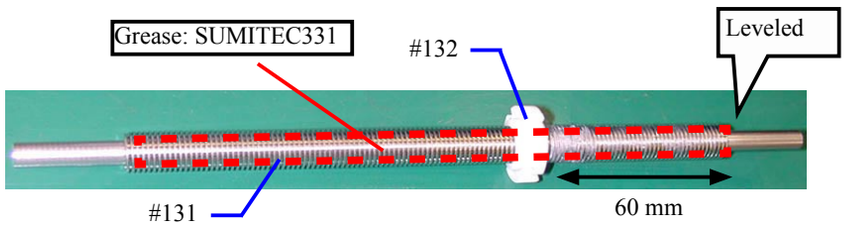
・ Attach the start-position plate (#151) on the base (#121) with the screw (#194).
（Assemble by pulling to the CCD direction for positioning.）

CCD-side

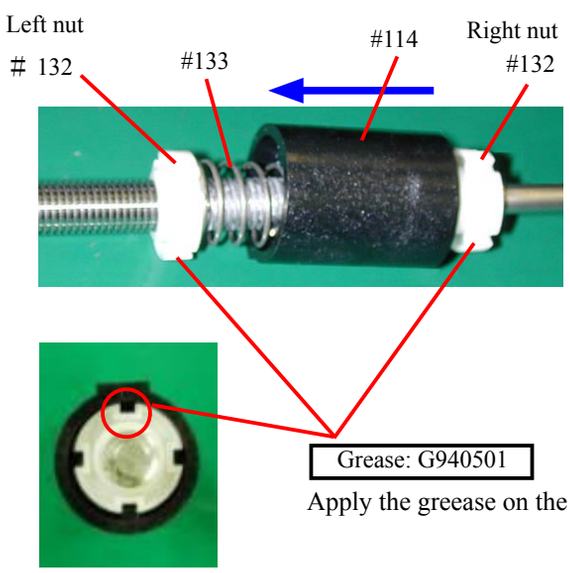


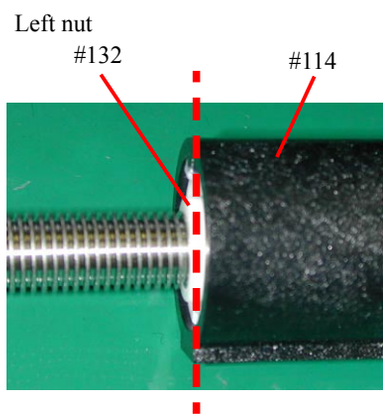
Assemble Screw shaft

- Apply the grease （SUMITEC331) to the screw thread of the screw shaft (#131) overall.
- Assemble the nut (#132) as shown in the below position.



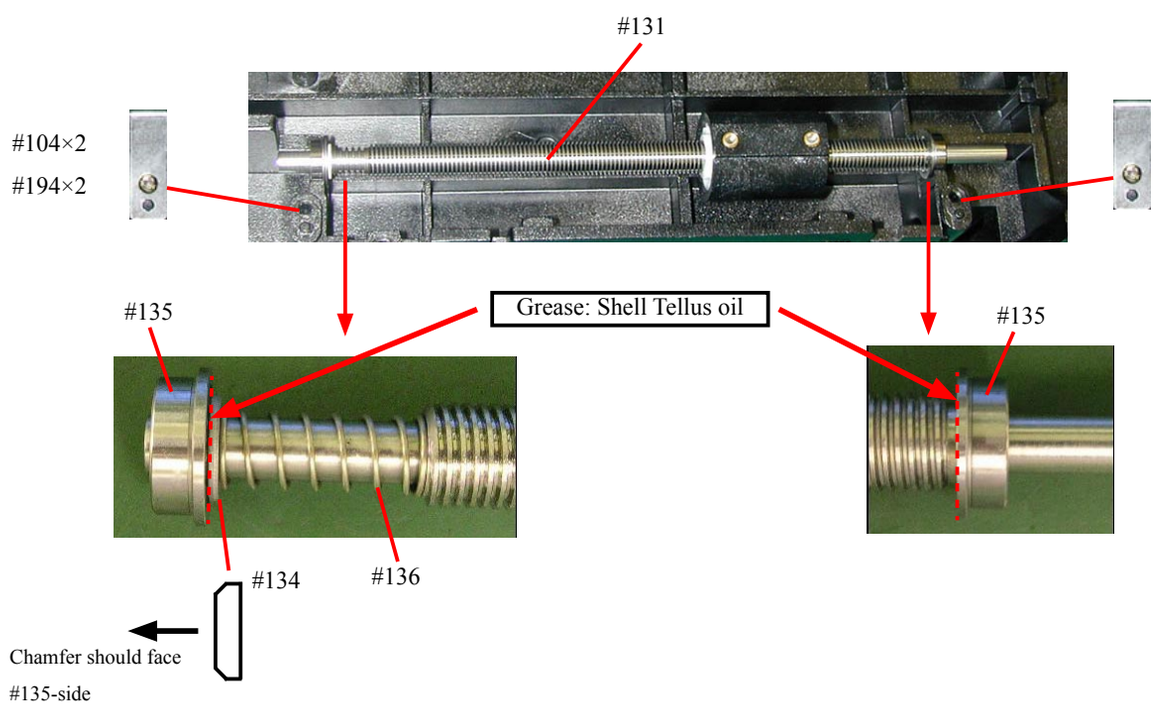
- Assemble in order the spring (#133), nut housing (#114) (by putting from its inner deeper part), and nut (#132) into the screw shaft (#131).
- Screw in the right nut (#132) so that the left edge of the nut housing (#114) and right nut (#132) are aligned on the same face.





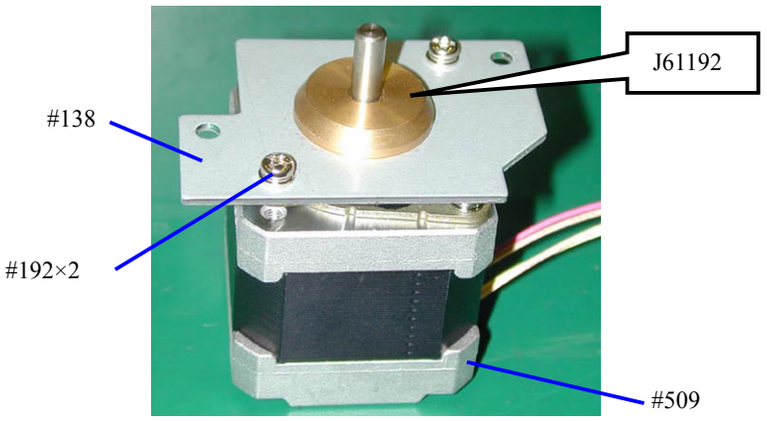
Apply the greease on the both sides of #114 that engage #132.

- Assemble the spring (#136), washer (#134), and 2 bearings (#135) into the screw shaft (#131). Then compress the spring to put on the base (#121), and fix it with 2 retaining springs (#104) and 2 screws (#194).

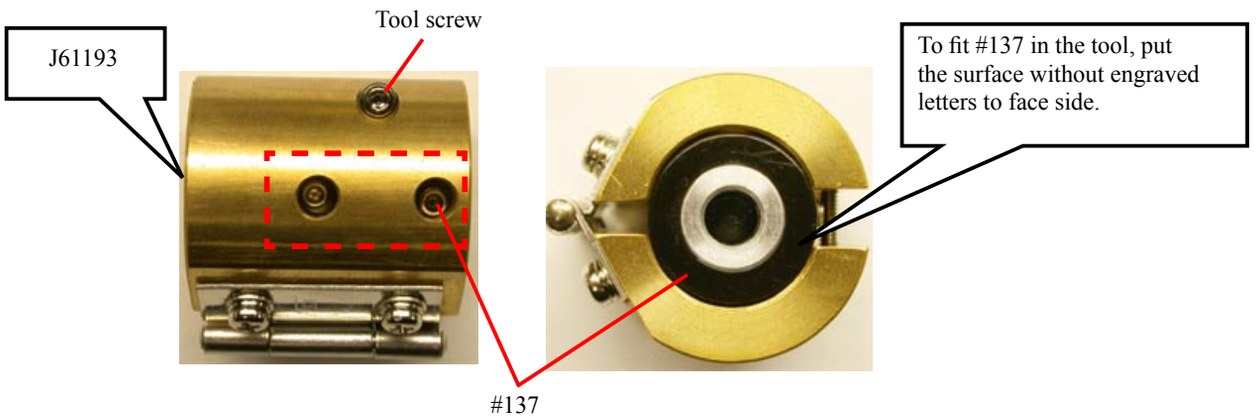


Procedure for mounting SCAN motor unit

① With the SCAN motor assembly tool (J61192), attach the SCAN motor (#509) to the motor base plate (#138) with 2 screws (#192).



② With the SCAN motor adjustment tool (J61193), fit the coupling (#137) in it and tighten the tool screw by the Hexagonal wrench 1.5mm (J92122).



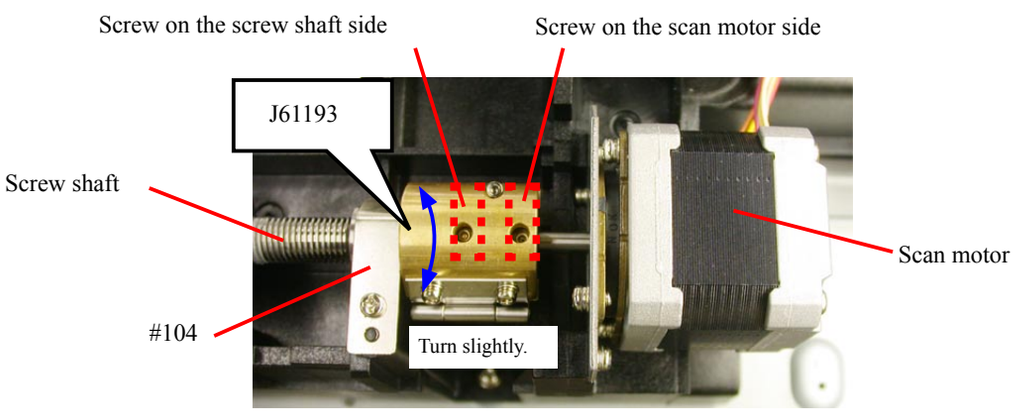
③ Attach the coupling that is set in the tool to the screw shaft.

④ Attach the SCAN motor unit temporarily with 2 screws. Then turn the tool (J61193) slightly to find the position where the shaft on the scan motor side does not turn. At this position, tighten 2 screws of the SCAN motor unit.

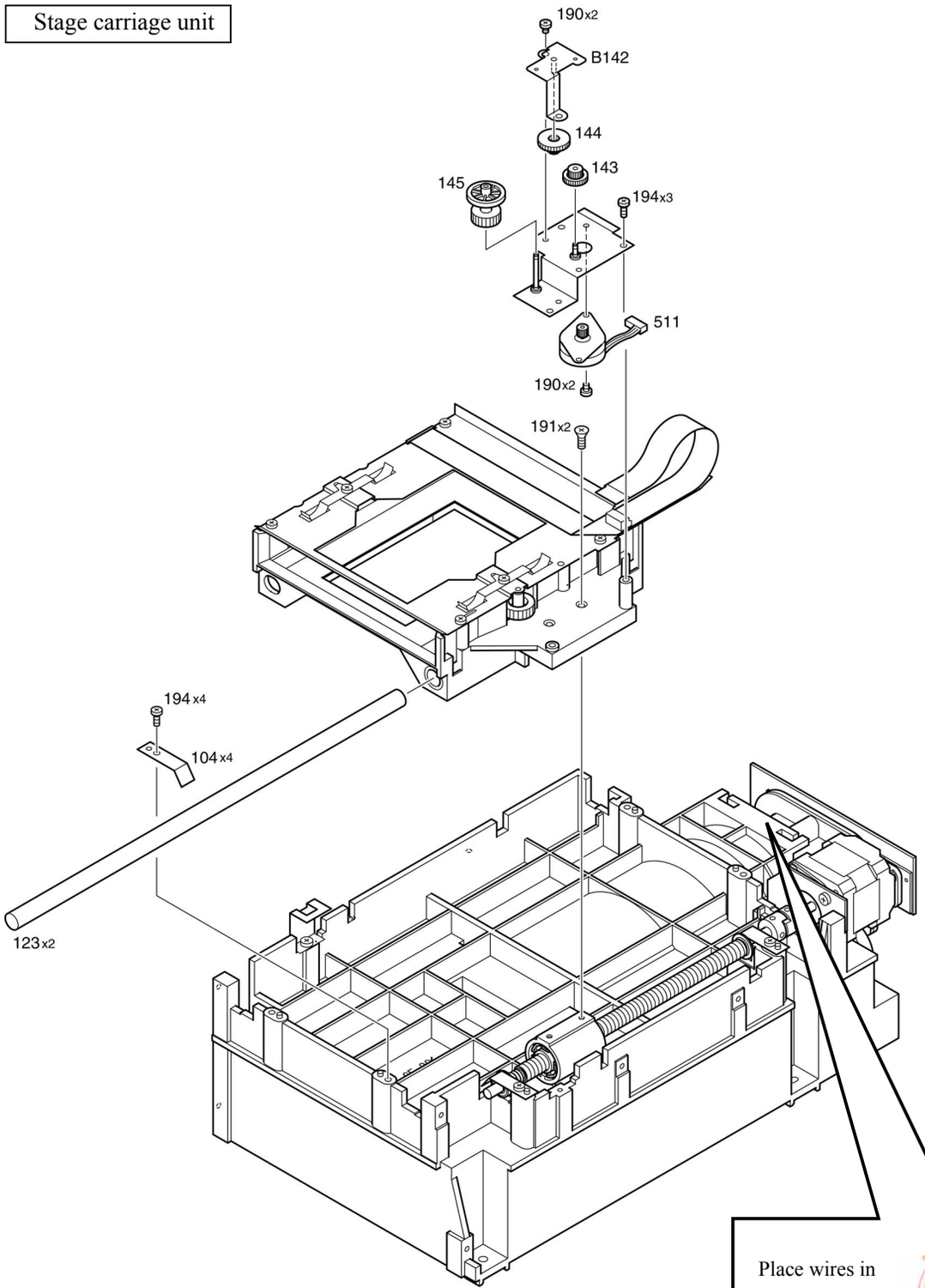
⑤ With the tool（J61193) being attached on #104, tighten equally 2 screws (#137) on the scan motor side.

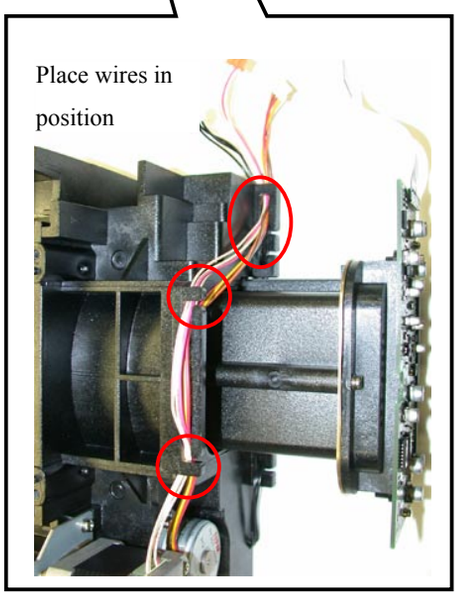
⑥ Remove the tool (J61193).

⑦ Tighten equally 2 screws (#137) on the screw shaft side.

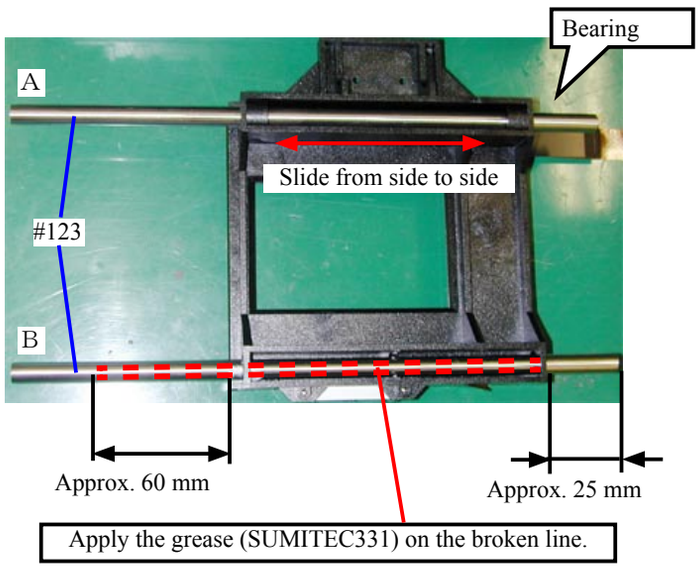


Stage carriage unit

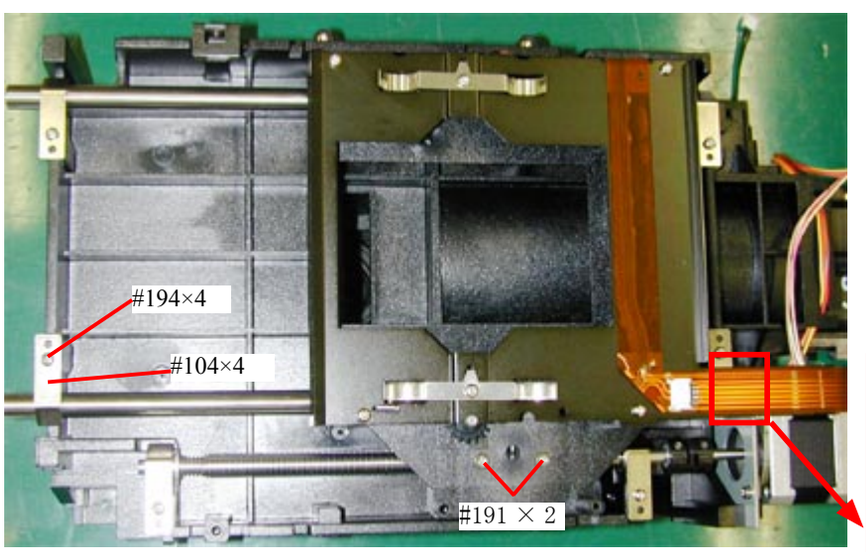


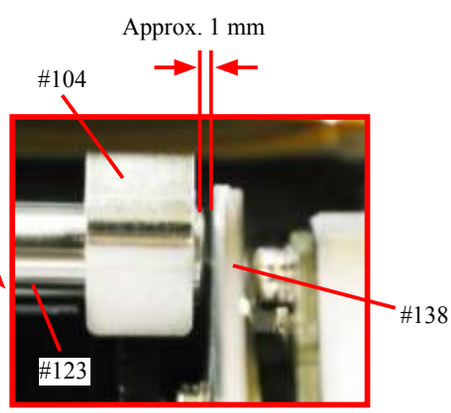


- Pass 2 guide shafts (#123) through the hole of the stage carriage unit.
- Slide the guide shaft (#123) of A side from side to side until the bearing fits smoothly.
- Apply the grease (SUMITEC331) on the guide shaft (#123) of B side.



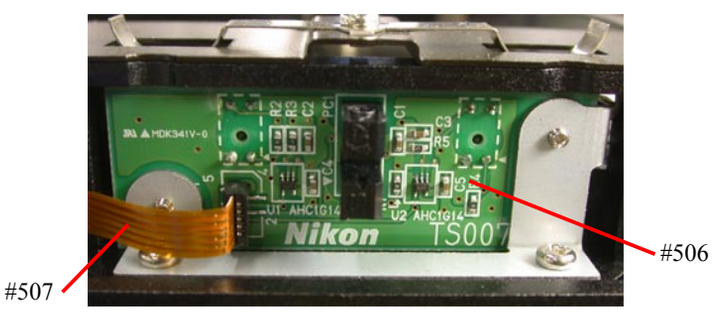
- Assemble the stage carriage unit into the base, and fix 2 guide shafts (#123) with 4 retaining springs (#104) and 4 screws (#194) at 4 positions.
- Connect the screw shaft housing unit and the stage carriage unit with 2 screws (#191).





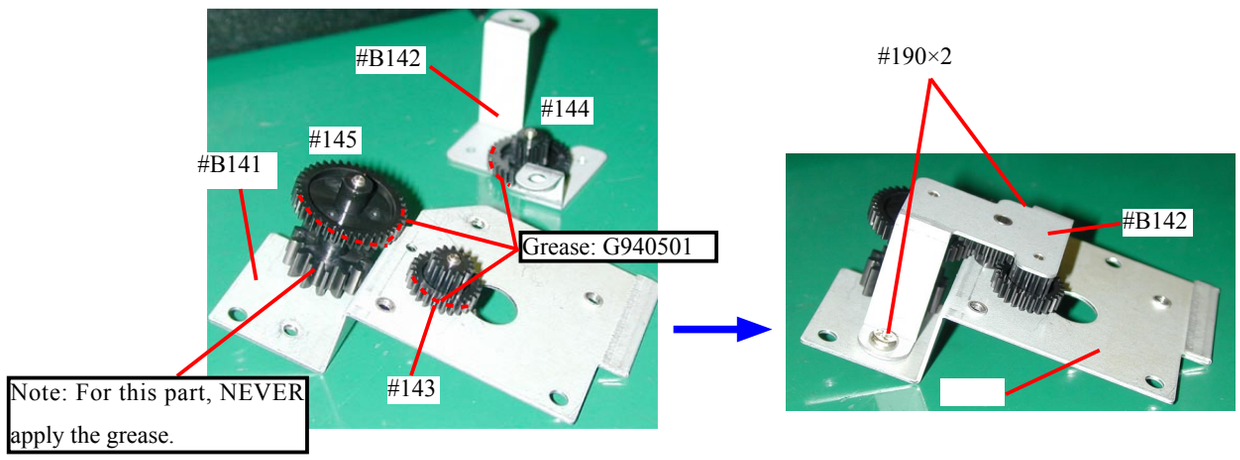
There should be approx. 1-mm clearance between the guide shaft (#123) and motor mount (#138).

- Connect the relay FPC (#507) to the connector of the sensor PCB (#506).

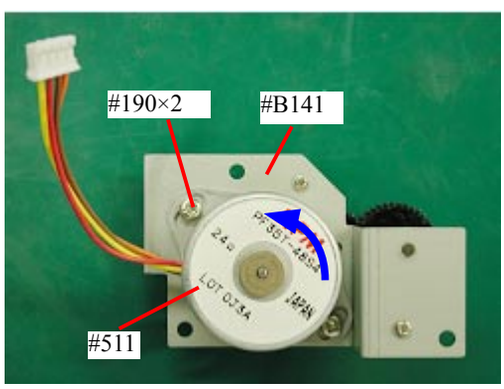


Holder motor unit

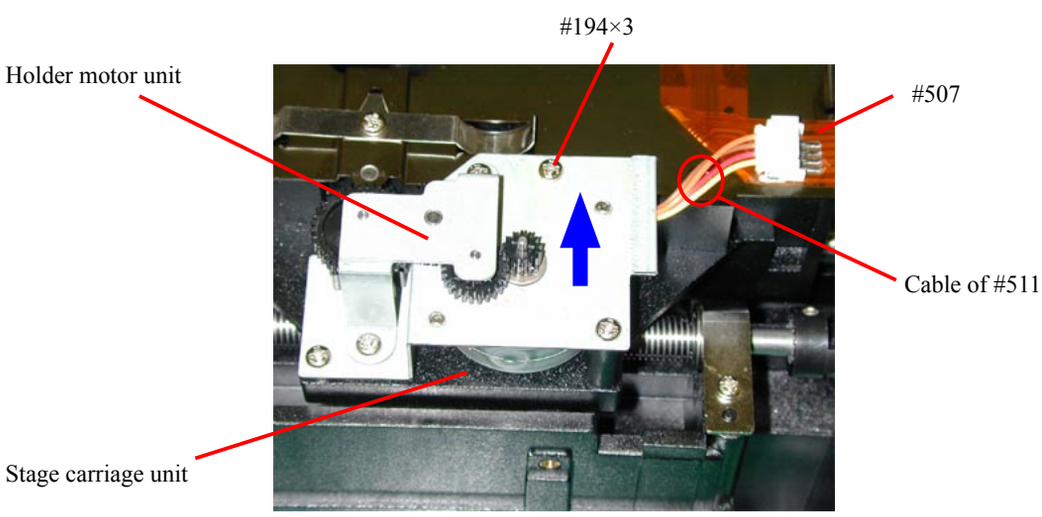
- Put #143 and #145 on the motor base plate (#B141), and put #144 on the gear base plate (#B142). Then apply the grease (G940501) on the periphery of the larger gear.
- Attach #B142 to #B141 with 2 screws (#190).



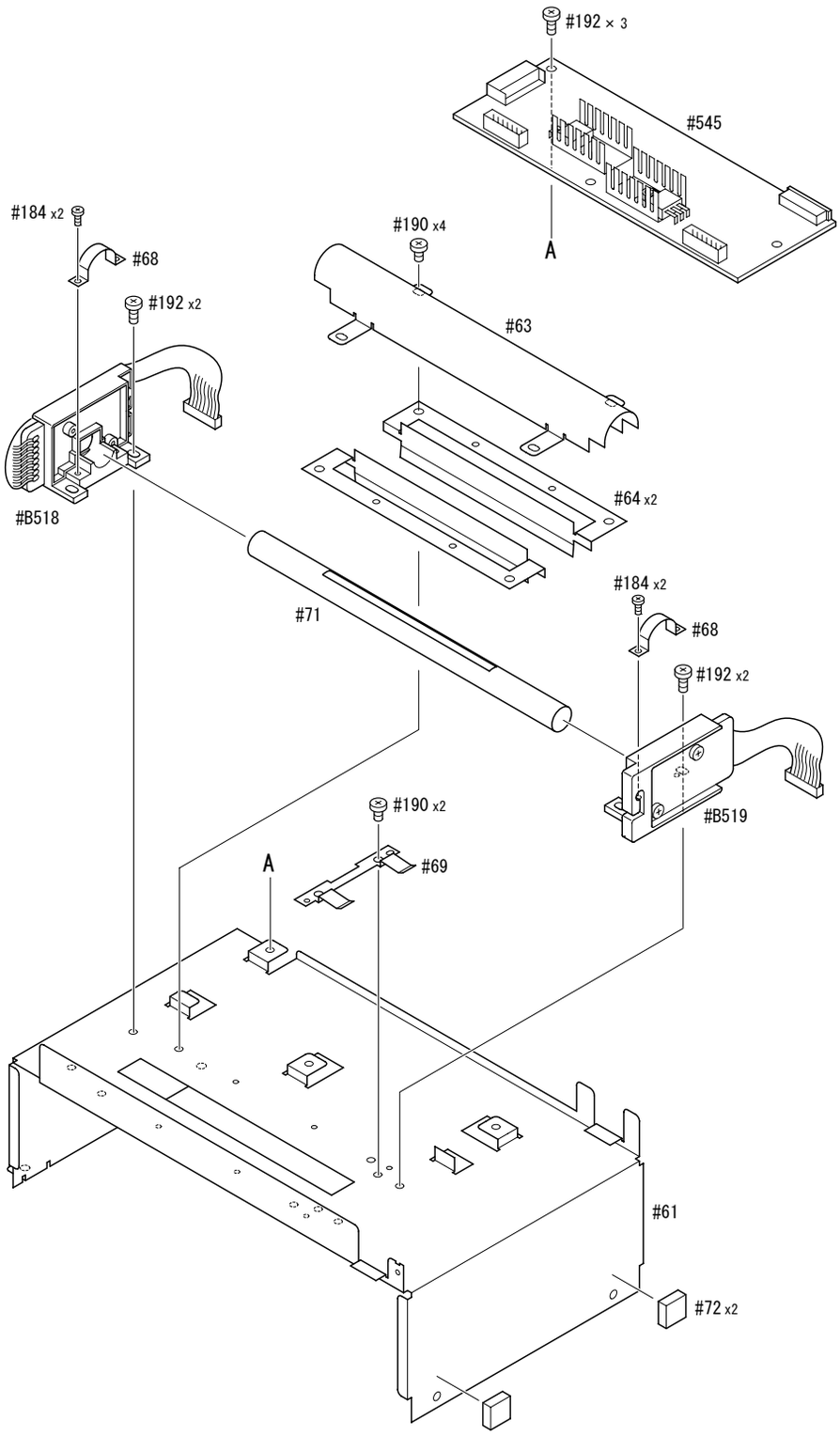
- Attach the holder motor (#511) on the motor base plate (#B141) with 2 screws (#190).
  Position by turning counterclockwise and attach them with 2 screws (#190).



- Attach the holder motor unit on the stage carriage unit with 3 screws (#194).
  (Assemble them by pulling in the direction indicated by the arrow for positioning.)
- Connect the cable of the holder motor (#511) to the connector of the relay FPC (#507).



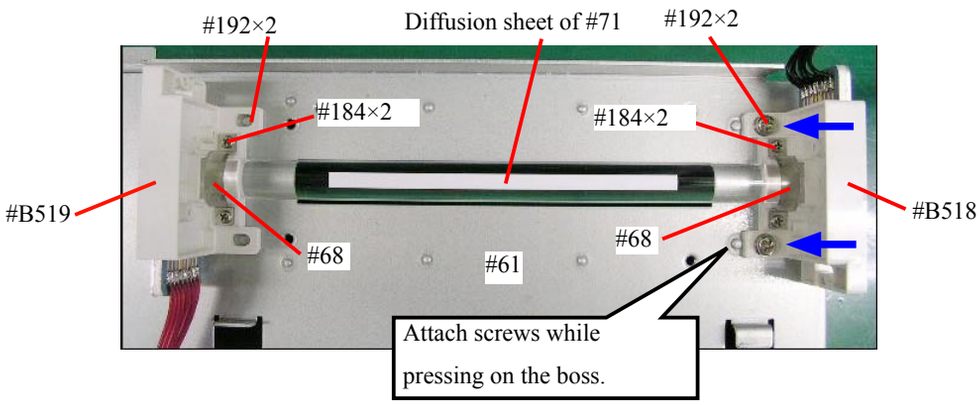
Illumination unit



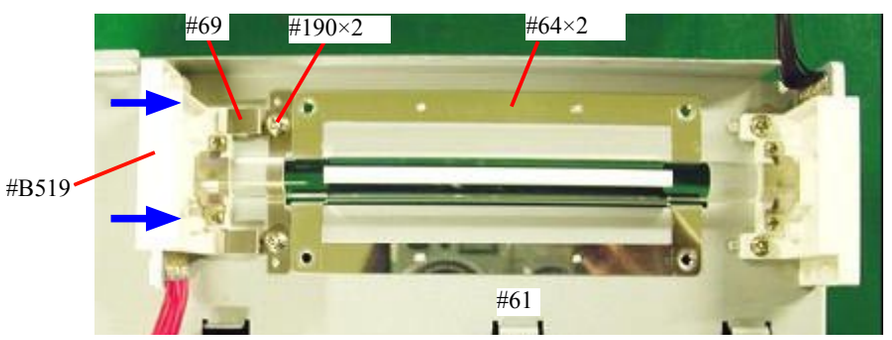
Assemble Illumination unit

- While pressing #B518 slightly on the boss of the illumination base (#61), attach 2 screws (#192).
- Put the rod lens (#71) between #B518 and #B519, and fix it with 2 retaining springs (#68) and 4 screws (#184).

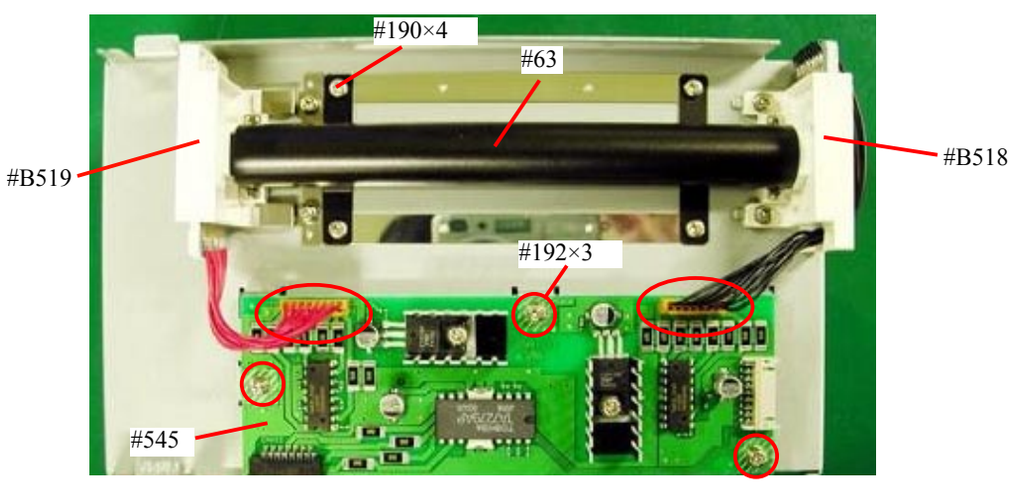
＊ Note: Place the rod lens (#71) so that the diffusion sheet on it turns just upward. Wear gloves to avoid getting the rod lens stained by fingerprint, etc.



- Assemble 2 pcs. of #64 into #61. (Handle #64 with care because it is easily deformed. Also avoid getting them stained by fingerprint, etc.)
- While pressing #B519 in the direction of arrow for positioning, attach the retaining spring (#69) with 2 screws (#192).

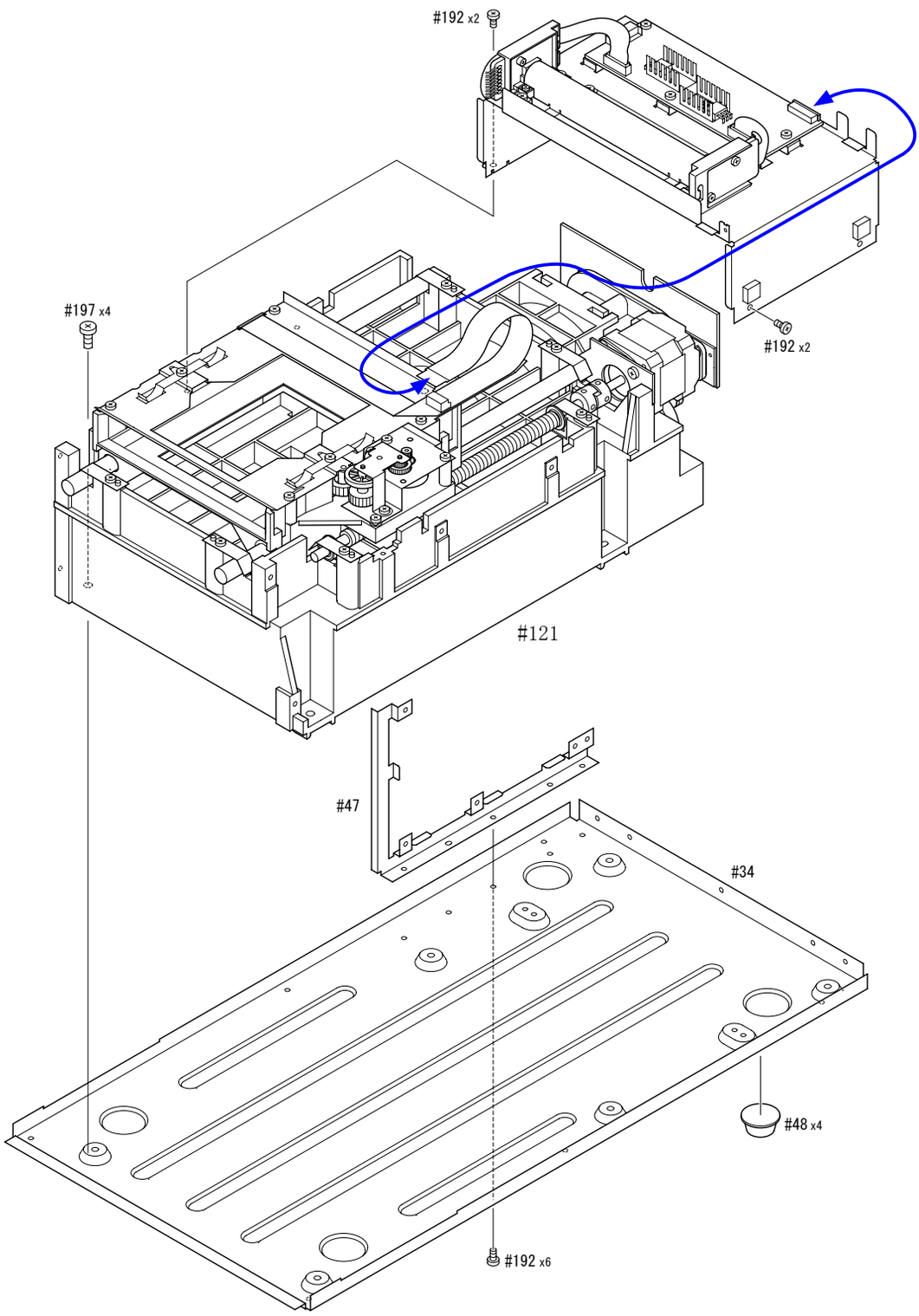


- Attach the cover (#63) with 4 screws (#190).
- Attach the illumination-PCB (#545) with 3 screws (#192).
- Connect 2 cables of #B519 and #B518 to 2 connectors of the illumination PCB (#545).



Base unit

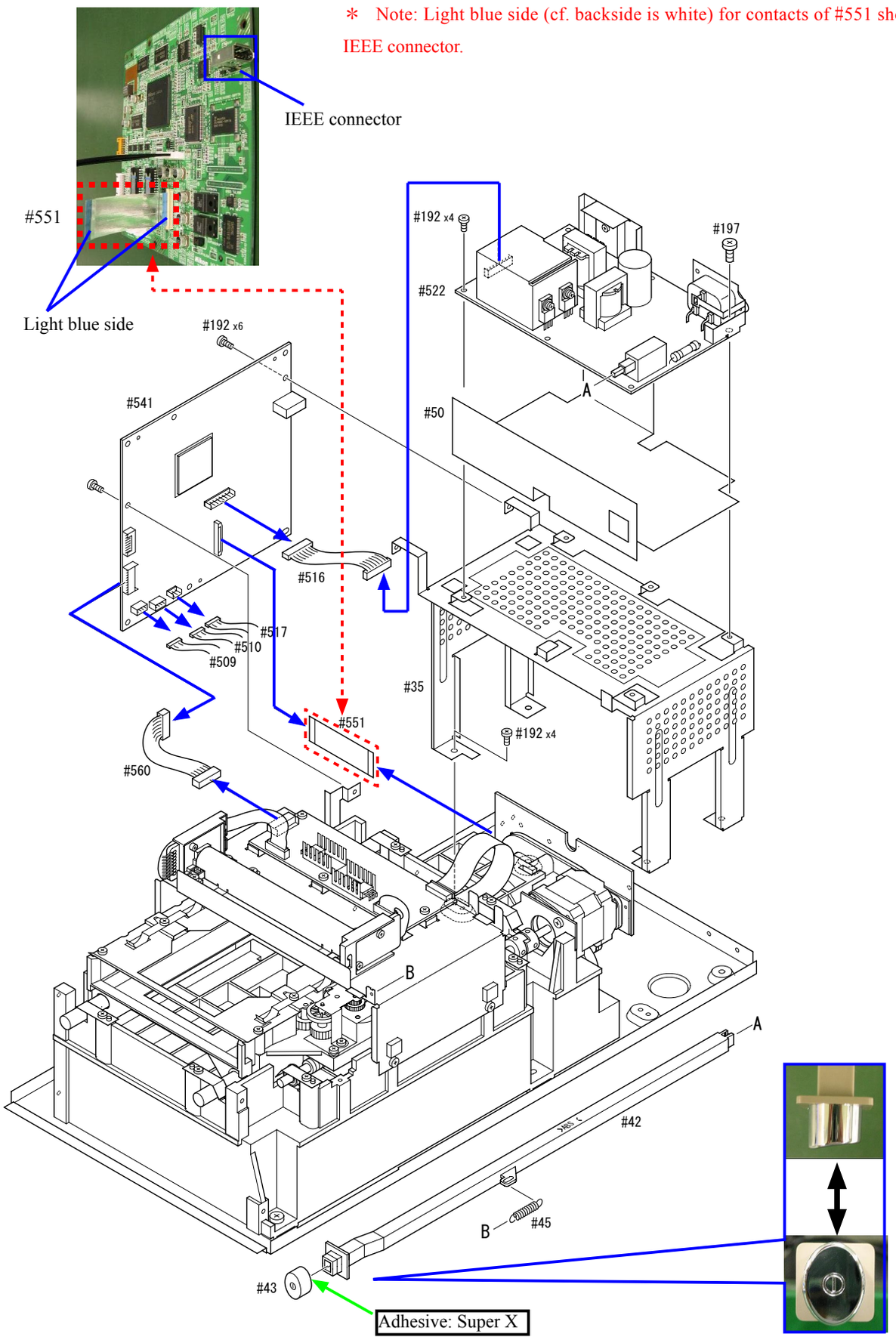
- Attach the base unit (#121) on the bottom plate (#34) with 4 screws (#197).
- Attach the illumination unit on the base unit with 4 screws (#192).
- Connect the relay FPC connector to the connector of the illumination PCB.
- Attach the PCB-support plate (#47) with 6 screws (#192).
- Attach 4 foot rubber (#48) on the bottom plate (#34).



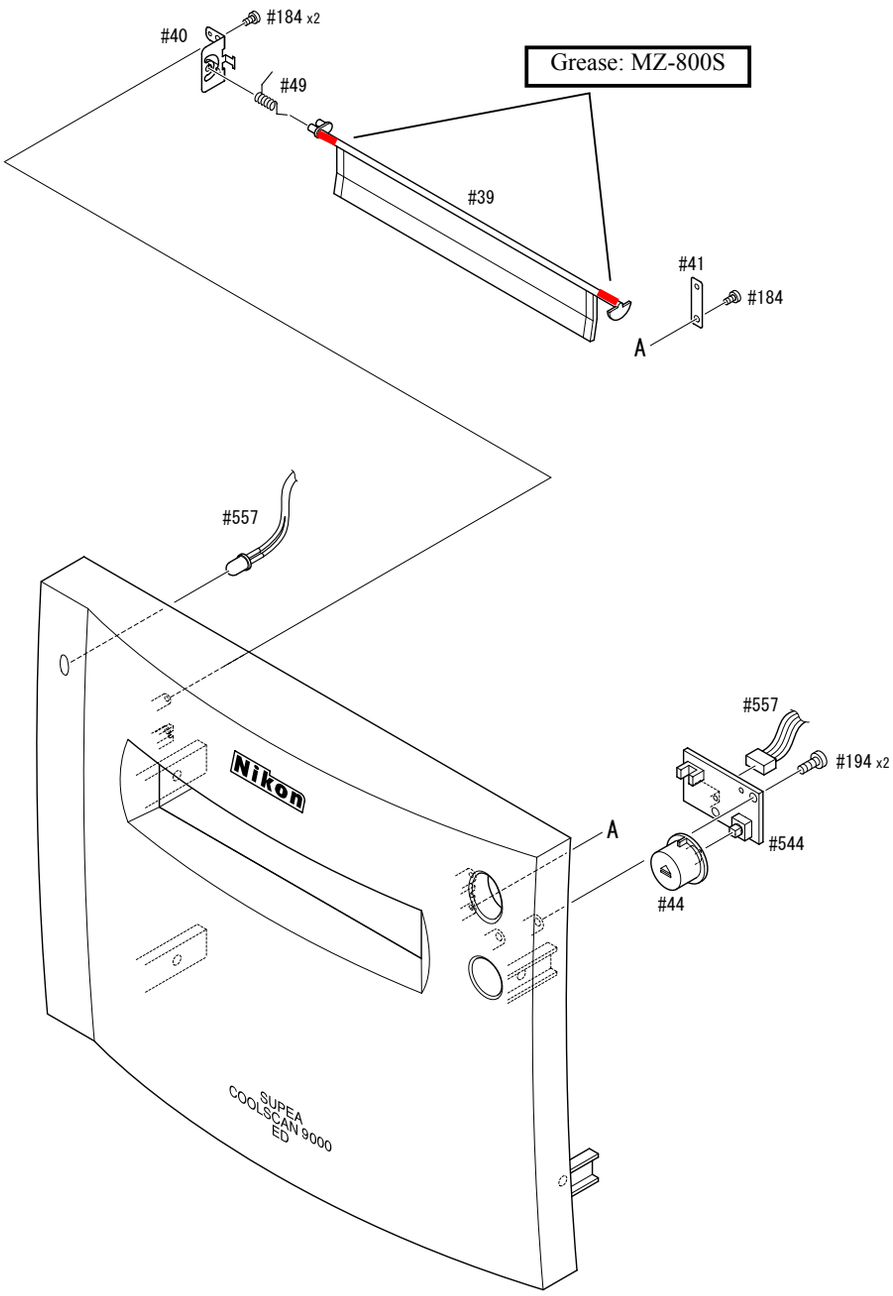
Main PCB / Power unit

- Attach the power base (#35) with 4 screws (#192).
- Attach the insulating sheet (#50) and the power PCB (#522) with 4 screws (#192) and #197.
- Connect each connector (#560, #509, #510, #517, #516, and #551), and attach the main PCB (#541) with 6 screws (#192).
- Attach the power SW (#42) and hook the spring (#45).

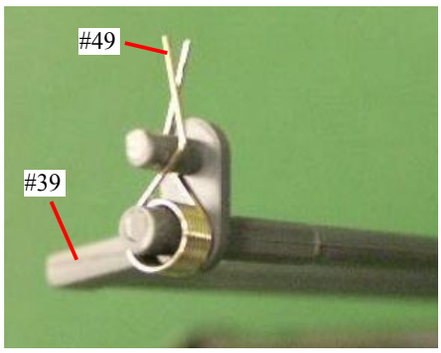
＊ Note: Light blue side (cf. backside is white) for contacts of #551 should face the IEEE connector.



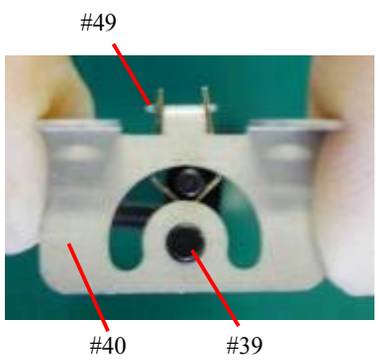
Front panel


#40
#184 x2
#49
Grease: MZ-800S
#39
#41
#184
A
#557
#557
#194 x2
#544
A
#44
Nikon
SUPER
COOLSCAN 9000
ED

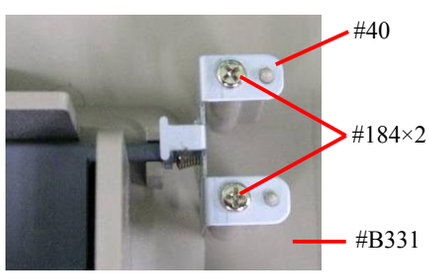
・ Hook the spring (#49) to the door (#39).



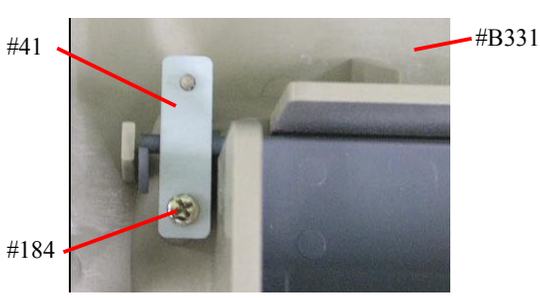
・ Hook the spring (#49) to the door fix plate L (#40), and engage them in the door (#39).



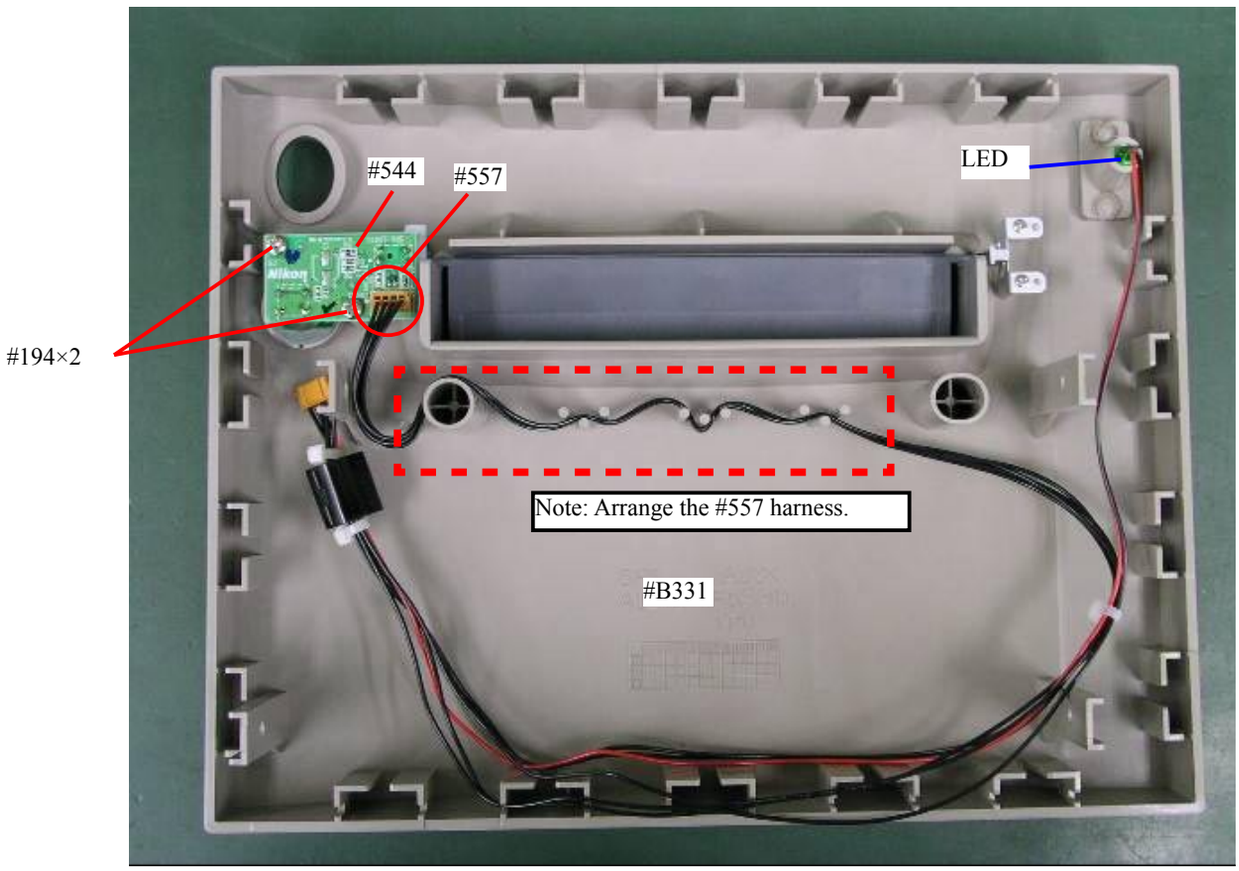
・ Attach teh door fix plate L (#40) on the front panel (#B331) with with 2 screws (#184).



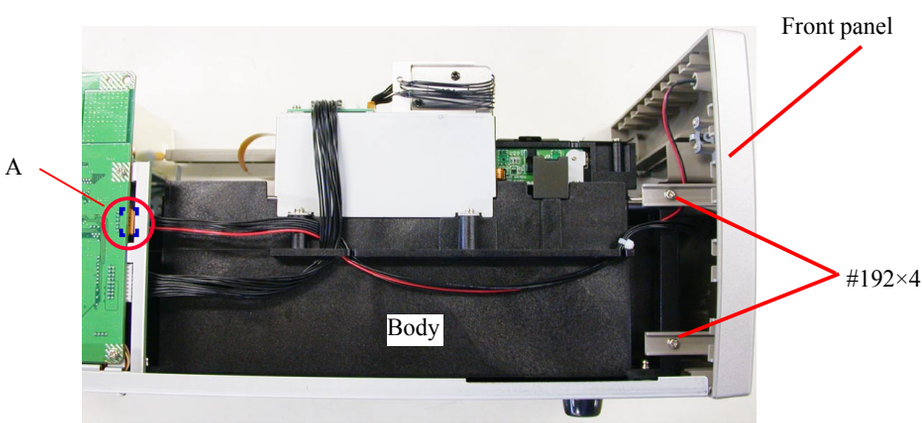
・ On the oppposite side, fix the door fix plate R (#41) with the screw (#184).



- Assemble the eject button (#44) and attach the eject PCB (#544) with 2 screws (#194).
- Connect the connector of #557 to #544, and also connect the LED to #B331, and arrange the harness of #557.

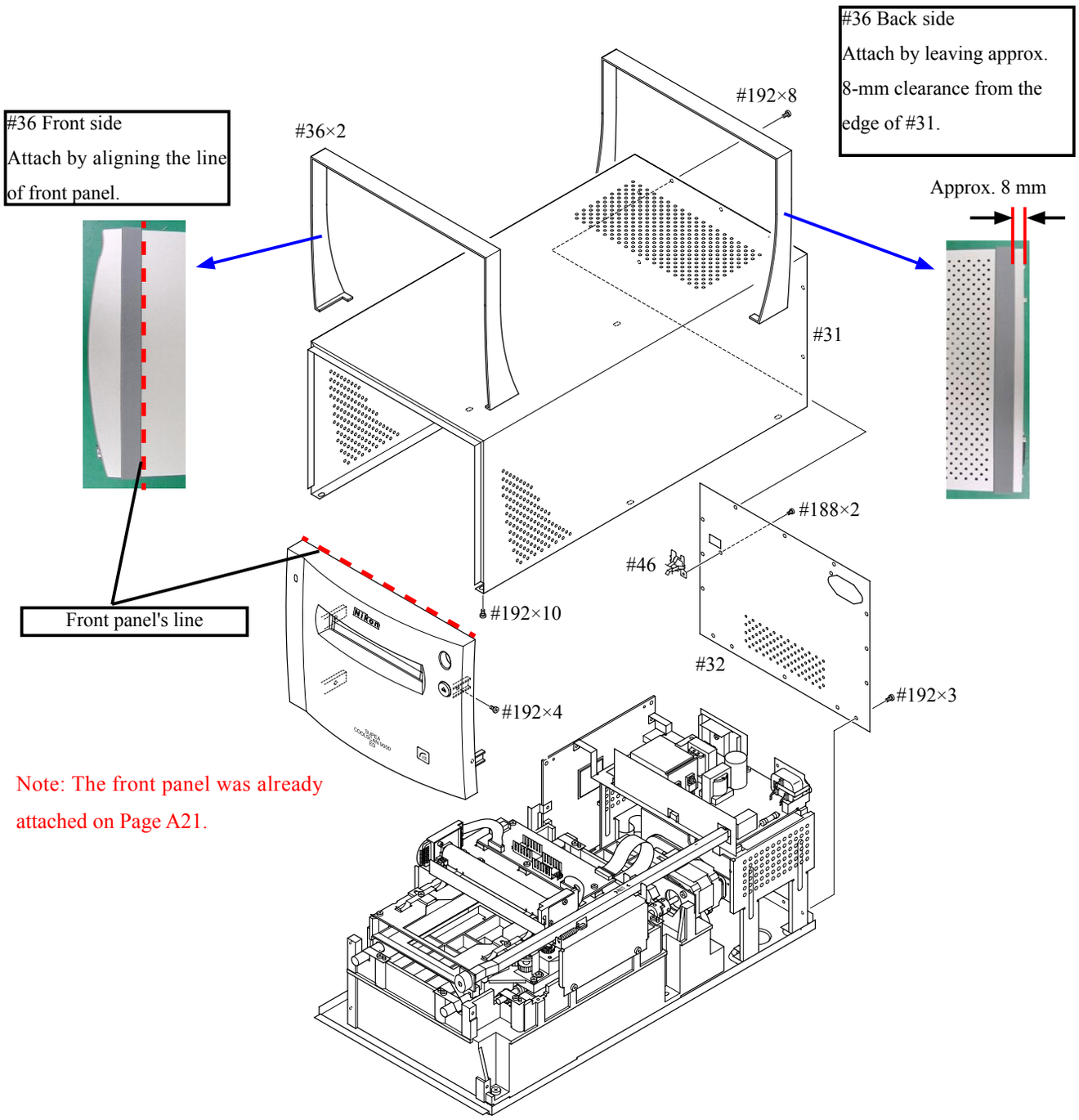


- Attach the front panel with 4 screws (#192).
- Connect the harness of the connector #557 (that is connected from the front panel) to the A-part of the main PCB, while arranging the harness of the connector.



＊ Note: In case of necessity of the CCD adjustment, before attaching the cover, etc as shown on the next page, make an adjustment on Page A23 - A27.

External view



Note: The front panel was already attached on Page A21.

- Insert the shield plate (#46) into the IEEE connector part.
- Fix the rear panel (#32) with 3 screws (#192) and 2 screws (#188).
- Attach the side cover (#31) with 8 screws at back (#192) and 10 screws at the bottom (#192).

Adjustment

CCD Adjustment

・Adjust the CCD Adjustment, whenever the CCD unit, mirror or lens units are disassembled or replaced.
・The CCD adjustment consists of 3 adjustments of: magnification, CCD position adjustment, and AF adjustment.
・By using the CCD adjustment software, scan the glass chart inserted in the main body, then adjust the CCD unit mounting position or adjust the thickness of adjustable washers by checking the display on screen of the software.

【Tools】

・DOS/V PC
・IEEE1394 board (Use the product of package as it is.)
・IEEE1394 cable (Use the product of package as it is.)
・CCD adjustment software (J65051)
・Adjustment/inspection glass chart (J61190)

【Hardware requirements】

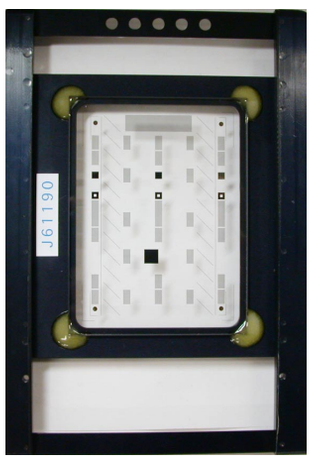
・Windows2000
・Japanese/English OS
・CPU Pentium700MHz or more
・RAM 512MB or more

< Preparation >

・Decompress the compressed file “J65051.zip”, and store files in any folder.

・Connect LS-9000ED to PC and turn the power ON.

・Insert the adjustment and inspection glass chart.

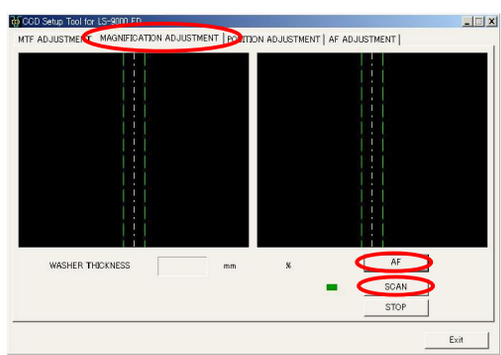


Direction for insertion

1. Magnification adjustment

① Double-click on the file "CCD Setup Tool.exe" to start the adjustment software.

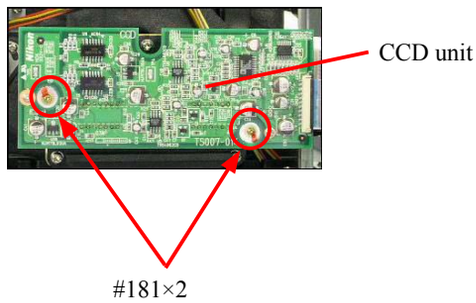
② Click "MAGNIFICATION ADJUSTMENT".



③ Click "AF" to operate AF.

④ Click "SCAN" to read the waveform.

⑤ Loosen the screw (#181) and slide the CCD unit so that the drop in waveform can be viewed almost in the middle of both screens. Then attach it with screws temporarily.

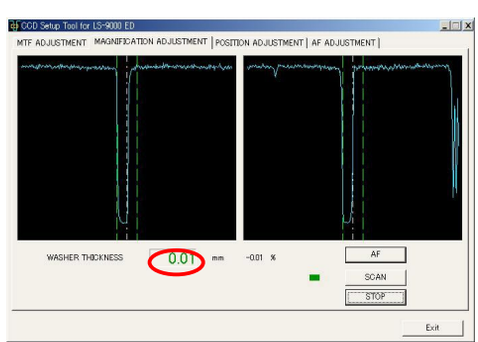


⑥ Click "STOP".

In case WASHER THICKNESS shows red, loosen 3 screws of AF carriage unit (#193) and adjust the washers (#109A - G) by changing the thickness based on the figure shown.

e.g. Increase the thickness of washer by 0.95mm.

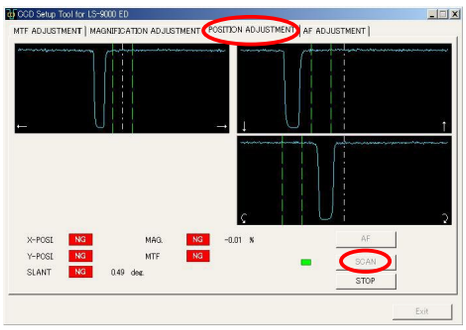
⑦ Repeat ③ - ⑥ until "WASHER THICKNESS" shows green (±0.02 or under).



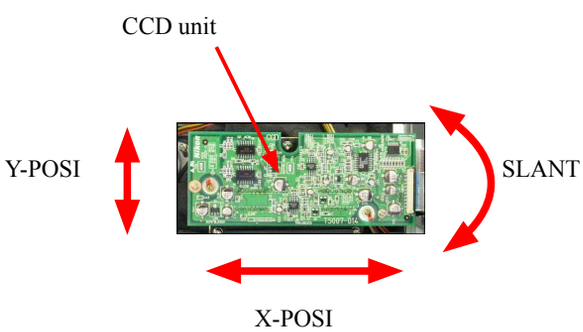
2. CCD position adjustment

Click "POSITION ADJUSTMENT" to open the screen for the CCD mounting position adjustment.

Click "SCAN" to read the waveform.



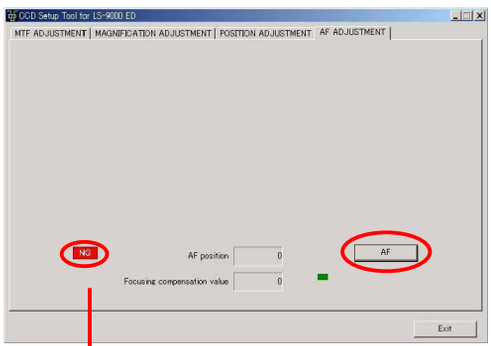
Loosen the screw (#181) and adjust so that the white dotted line is in the middle, parallel to green parallel lines and also in the middle of the vertical dip of blue waveform on each 3 screen (i.e. X-POSI, Y-POSI, and SLANT). Then attach the CCD unit with the screw at the position where the lower-left 3 lamps of screen show "OK (green)".



Click "STOP". If the lower-left 5 lamps of screen show "NG (red)", make a readjustment. If all 5 lamps show "OK (green)", click "AF ADJUTMENT".

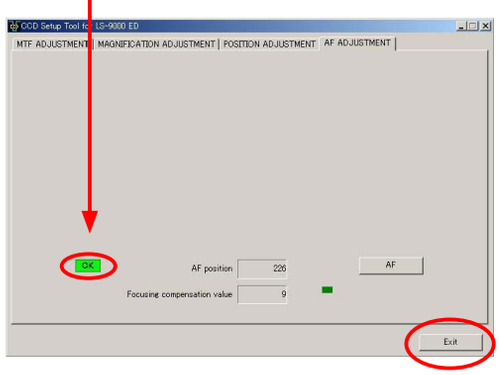
3. AF adjustment

① Click "AF".



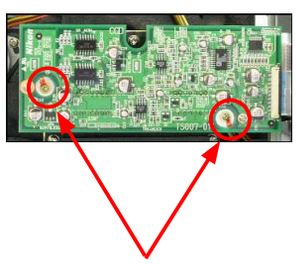
② When the lower-left lamp of screen changes from "NG (red)" to "OK (green)", click "EXIT".

※ In case of NG, click "AF" again. But if the lamp still shows NG after repeating this several times, it is considered as defective.



③ Press Eject button to take out the glass chart.
Then turn the power OFF.

④ Fix the screw (#181) with Screw Lock.



#181×2

Adhesive:Screw lock

How to use Inspection Software

1. Purpose

This software is used when LS-9000ED is disassembled or its parts are replaced or inspections are made.

2. Preparation (tools required)

- DOS/V PC
- IEEE1394 board (Use the product of package as it is.)
- IEEE1394 cable (Use the product of package as it is.)
- Glass chart for adjustment and inspection (J61190)
- Positive film chart (J61189); Insert this into FH-835M
- IR pass filter (J63088); Insert this into FH-835M
- LS-9000ED inspection software (J65049A: Japanese, J65049B: English)
- Holder FH-835M (Use the product of package as it is.)

【Hardware requirements】

- Windows2000
- Japanese/English OS
- CPU Pentium700MHz or more
- RAM 512MB or more

3. Inspection details

* Initialization

- Check the firmware version.

* Illumination irregularity

- Check for the raw data of the CCD with shading OFF in the standard range.

* Shading

- Check for the read-in data of the CCD waveform with shading ON in the standard range.

* Noise inspection

- By performing prescanning operation, check if the operating sound has no problem.

* Mechanical precision

- Scanning position accuracy

  Get the central position (average values of x, y) of each alignment mark at 4 positions, then comparing them with set values, check the deviation of image scanning position (shading).

・Main/Sub-scan perpendicularity
Get the angles (between the main scanning and sub-scanning) at 3 alignment marks (upper-left, upper-right, lower-right), then comparing them with set values, check the slant of the main scanning line.

・Magnification
Get the magnification of optical system based on the distance between 2 alignment marks of the main scanning direction.

・Aspect ratio
Get the aspect ratio of the image based on the distance between 2 alignment marks of the sub scanning direction.

・Color registration
Check the color deviation on the image.

・MTF
Check the resolving power based on the contrast of the resolution pattern image.

・Flare
Check dust of optical system.

* Inspect AF focusing accuracy/position
Check the AF focusing accuracy/position.

*IR pass filter
・Check the leak rate of unnecessary light that is included in R-LED.
Whenever the main PCB or parts of optical system are replaced, it is necessary to rewrite the compensation data.

* Color reproduction (positive)
・Read the positive macbeth chart by scanner, and check the color reproduction of each color.

* Log record
・As for the log numbers, the number of times for scanning, for AF operations, for thumb nails, for initialization, for adapter replacements, the types of adapters, sense data and error details, they are all stored in the flash memory on the main PCB.
When the main PCB is replaced, it is necessary to write the above data.

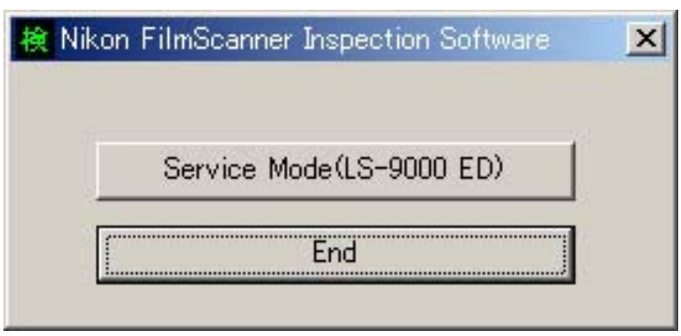
*WB recording time
・As a measure against dust on the mirror, the WB time at shipment is stored in the flash memory on the main PCB. In case the WB time, which was calculated by the usual WB measurement, exceeds specified rate compared with the stored WB time at shipment, errors occur.
When the main PCB or parts of optical system is replaced, it is necessary to rewrite the WB data.

4. How to inspect

4-1. Start up the service software.

・Decompress the compressed file “J65049B.zip”, and store files in any folder.
・Connect LS-9000ED to PC and turn the power ON.
・Insert the adjustment and inspection glass chart.
・Double-click the file "S100Sv.exe” to start the inspection software.

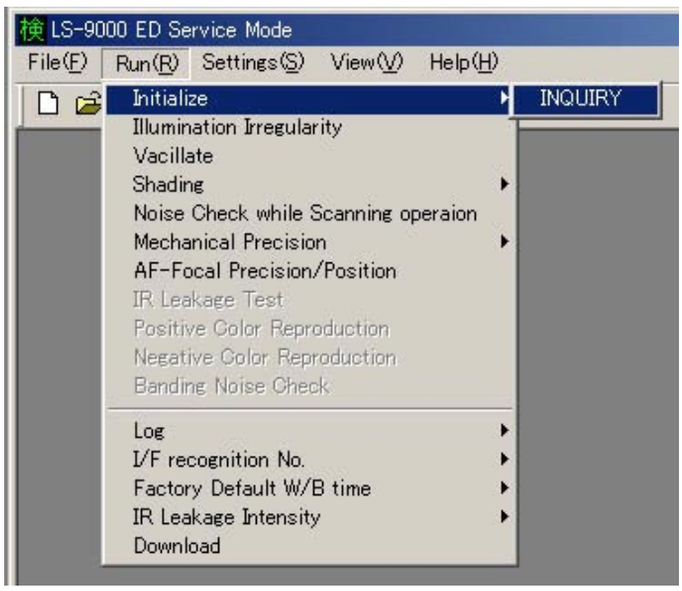
・Click "Service mode".



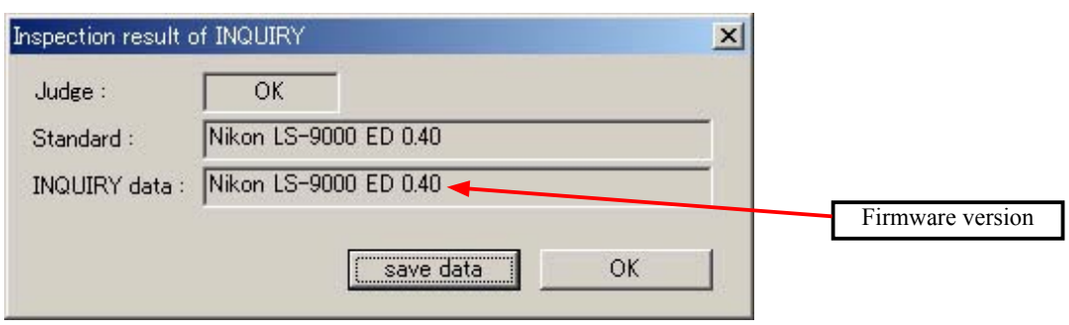
4-2. Procedure for inspection

＊ Check the firmware version

Select "Run" on the main menu, then choose "Initialize" and "INQUIRY" from the pulldown menus, in order to check the firmware version.



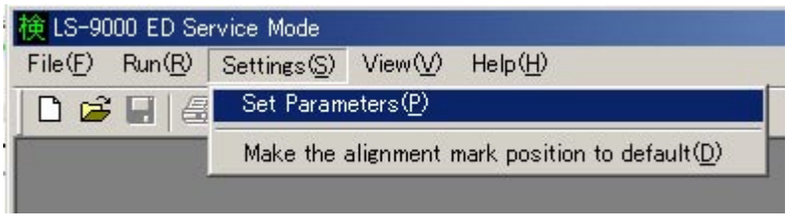
Press "OK" after the check.



Procedure for Firmware upgrading

① Save the firmware in any folder.

② Select "Setting" on the main menu, and choose "Set Parameters" from the pulldown menu.

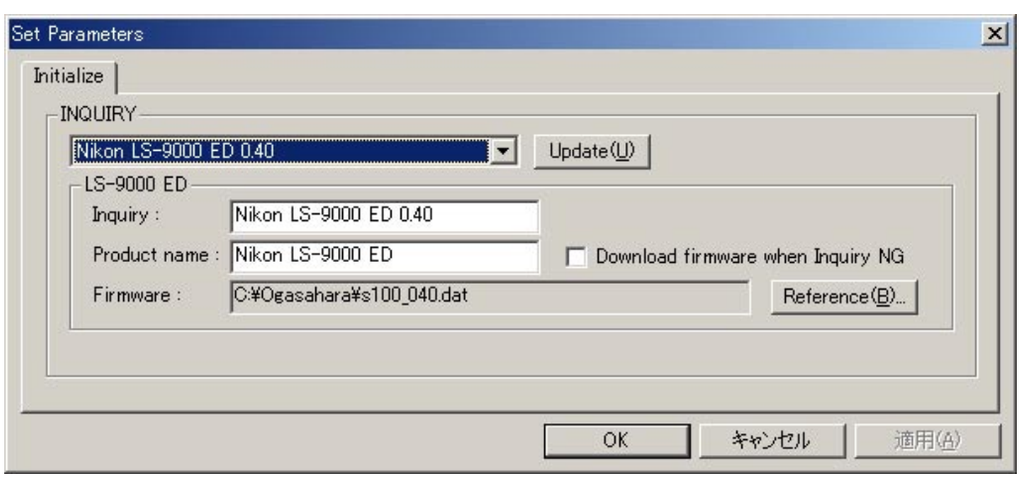


③ Click "Reference" to designate the folder where the firmware was saved in ① .

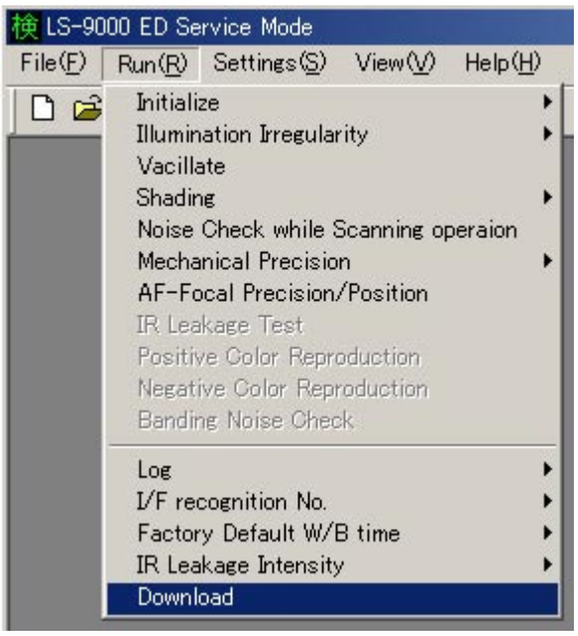
④ Write the firmware name in "Inquiry:".

⑤ Click "Apply".

⑥ Click "OK".

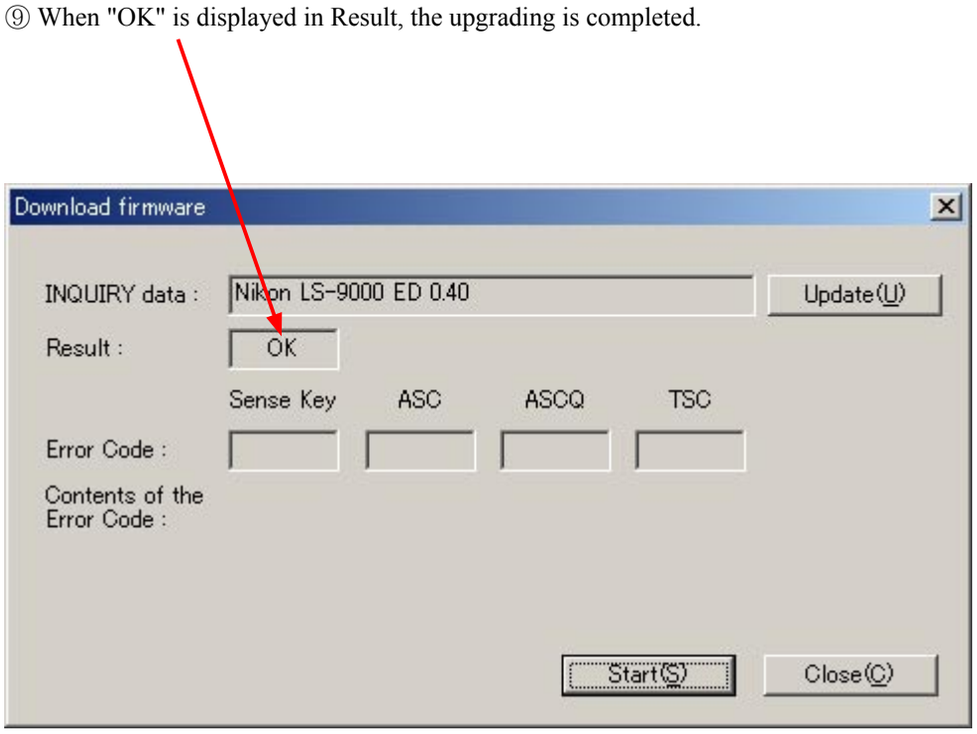


⑦ Select "Run" on the main menu, and choose "Download" from the pulldown menu.



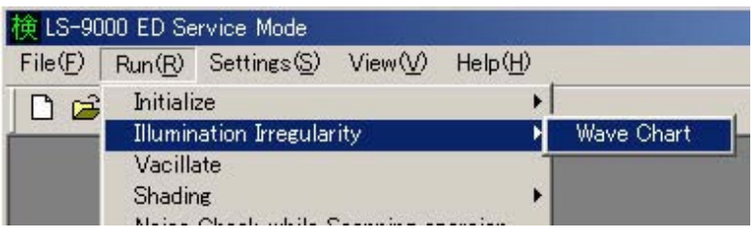
⑧ Click "Start" to upgrade the firmware.

⑨ When "OK" is displayed in Result, the upgrading is completed.

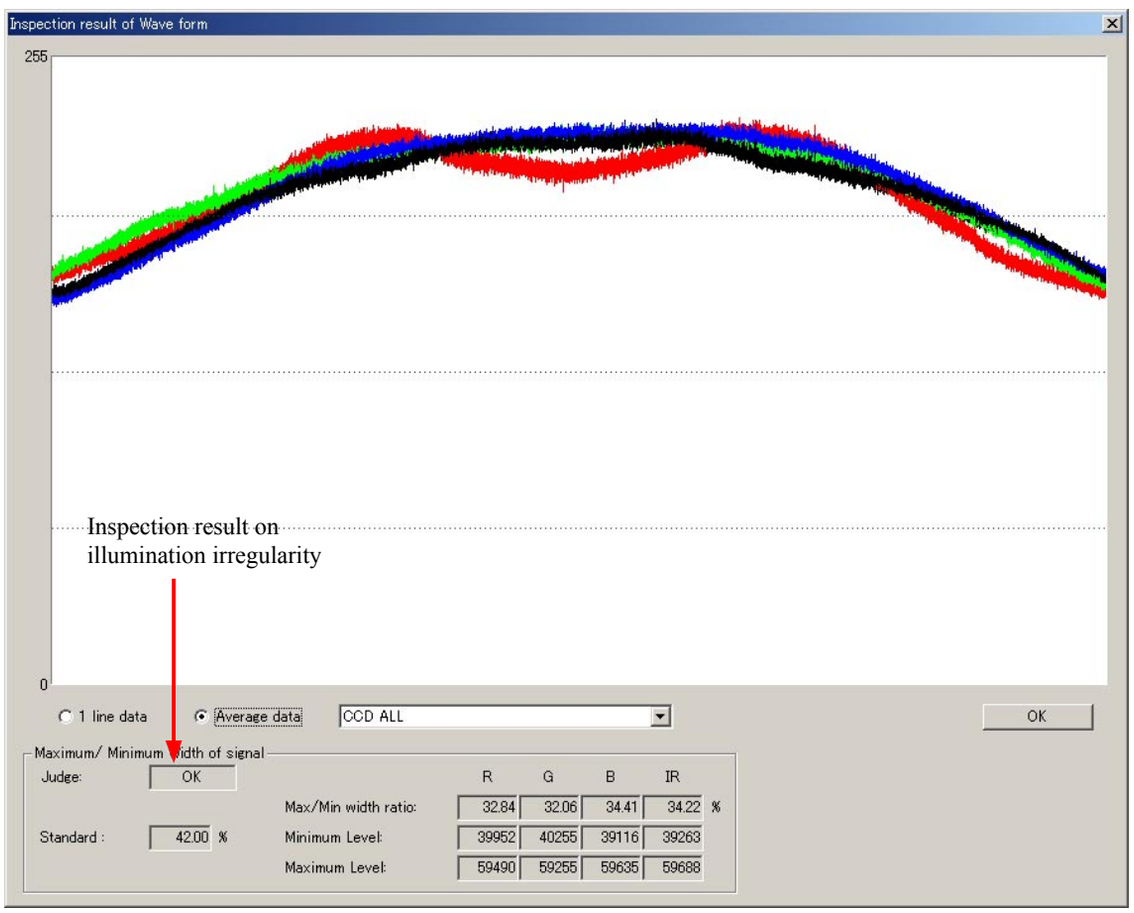


＊ Illumination irregularity

・Select "Run" on the main menu and choose "Illumination Irregularity" from the pulldown menu.



・Check if there is no problem with R, G, B,I waveforms.



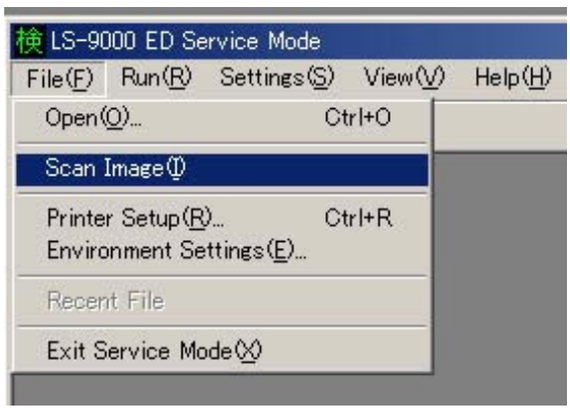
Inspection result on Illumination irregularity

In the above screen, the CCD sensor addresses are allocated on the horizontal axis. If foreign matter such as dust enters between the LED illuminator and CCD sensor, the waveform of the address shifts significantly downward, so dust, etc, can be recognized by visual check. Illumination irregularity: Standard 42% or less

In case of NG, clean the optical system.

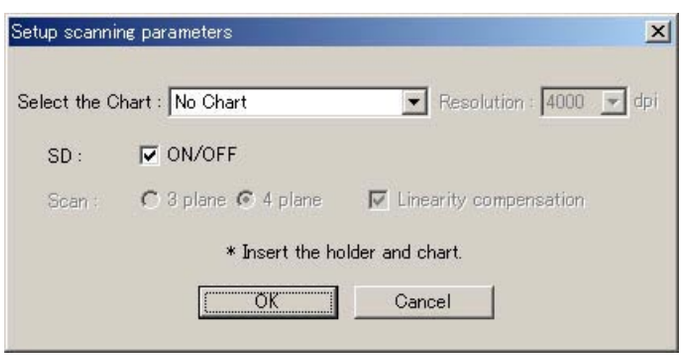
＊ Shading （check the shading ON data）

・Select "File" on the main menu and choose "Scan Image" from the pulldown menu.

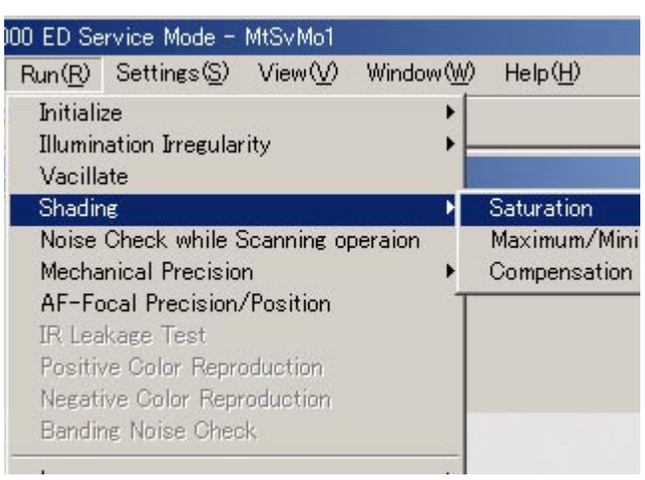


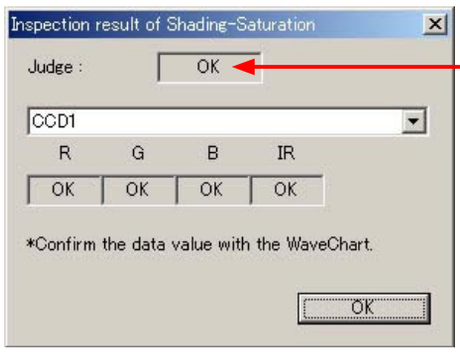
・In "Select the Chart", choose "No chart" and tick the box of "ON/OFF" of SD. Then click "OK".

・The scanning starts automatically.



・Select "Run" on the main menu, then choose "Shading" and "Saturation" from the pulldown menus.

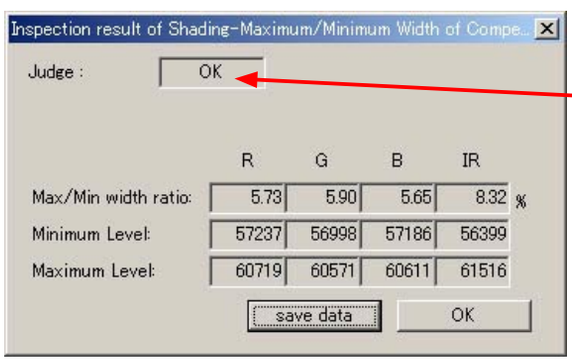




Inspection result on saturation

・Click "OK".

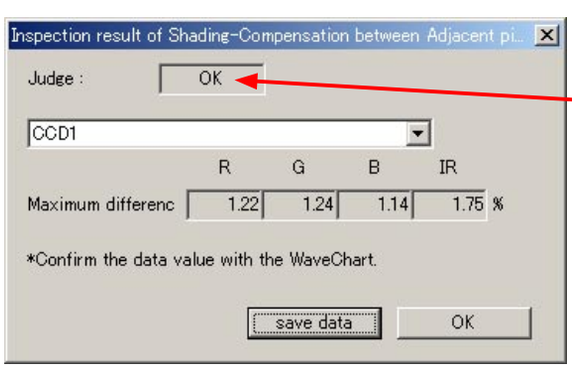
・Select "Run" on the main menu, then choose "Shading" and "Maximum/minimum width of compensation" from the pulldown menus.



Inspection result on Maximum/minimum width of compensation

・Click "OK".

・Select "Run" on the main menu, then choose "Shading" and "Compensation between Adjacent pixels" from the pulldown menus.



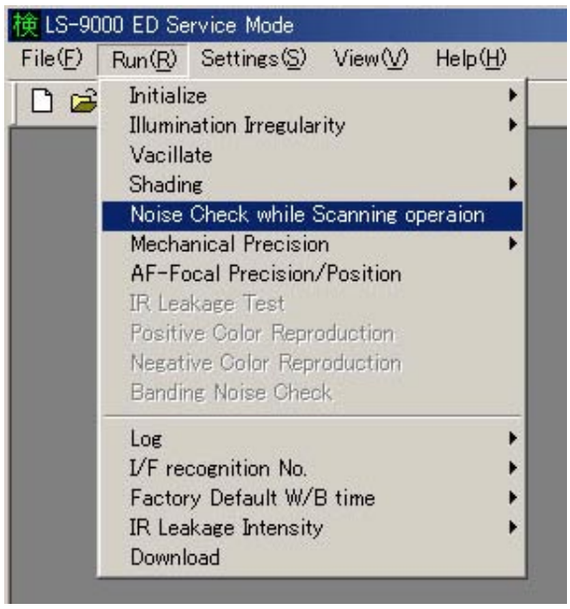
Inspection result on Compensation between adjacent pixels

・Click "OK".

In case of NG:
The shading ON data is compensated based on the "Illumination irregularity (Shading OFF)" to correct the CCD irregularity. If the inspection result is "NG", it is considered that the accuracy of "Illumination irregularity" is not within standard or there is problem with the shading compensation circuit on the main PCB. In the first case, clean the optical system and check the illumination irregularity. In the other case, replace the main PCB.

＊ Noise inspection

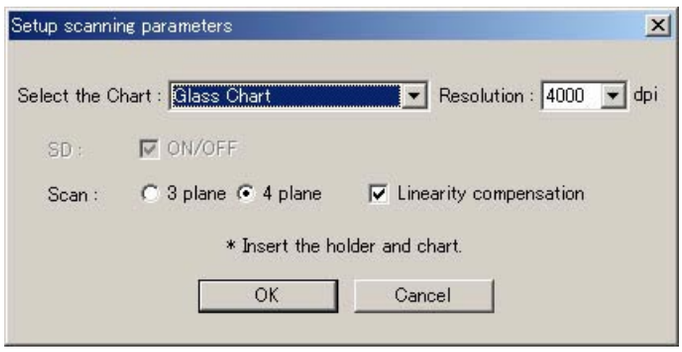
・Select "Run" and choose "Noise Check While Scanning operation" from the pulldown menu.



・When "OK" is pressed, the scanning starts automatically. Check if there is no problem with the operating sounds during scanning.

＊ Mechanical precision inspection

・Select "File" on the main menu, and choose "Scan Image" from the pulldown menu. Then choose “Glass chart” and "4000dpi" for resolution . When "OK" is clicked, the scanning starts.



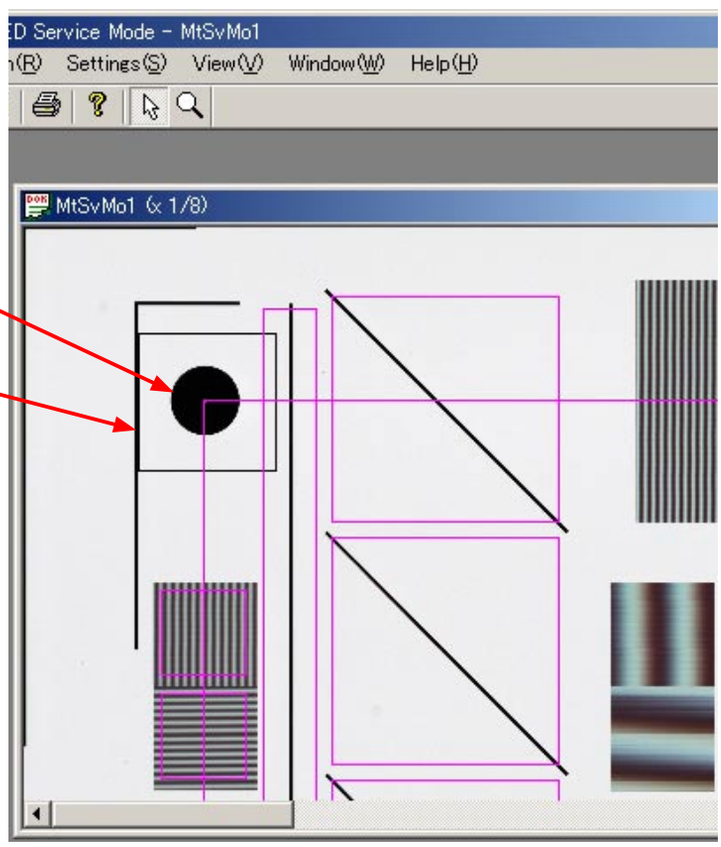
・When the scanned image of the chart is displayed on the monitor, drag the alignment detection frame (black square frame) at 4 corners with the mouse for adjustment so that the alignment mark (black circle) can be placed enough inside this frame.

The position that was adjusted once is automatically stored in the initial file. So unless the film slips significantly from the mount nor the scanning position of the scanner largely changes, it is NOT necessary to make an adjustment afterwards.

Alignment mark

Alignment detection frame

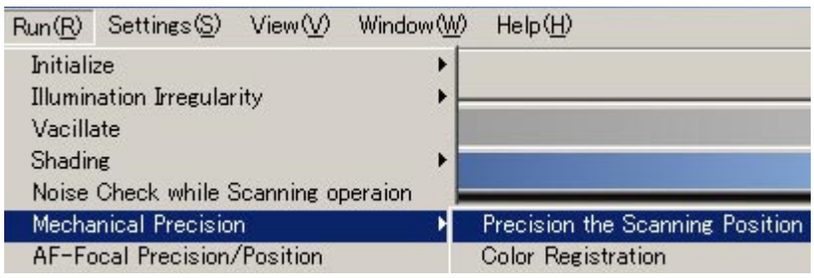
Adjust so that the alignment mark (black circles) can be placed enough inside the alignment detection frame (black square frame). Be sure to make this adjustment at 4 corners of the chart.



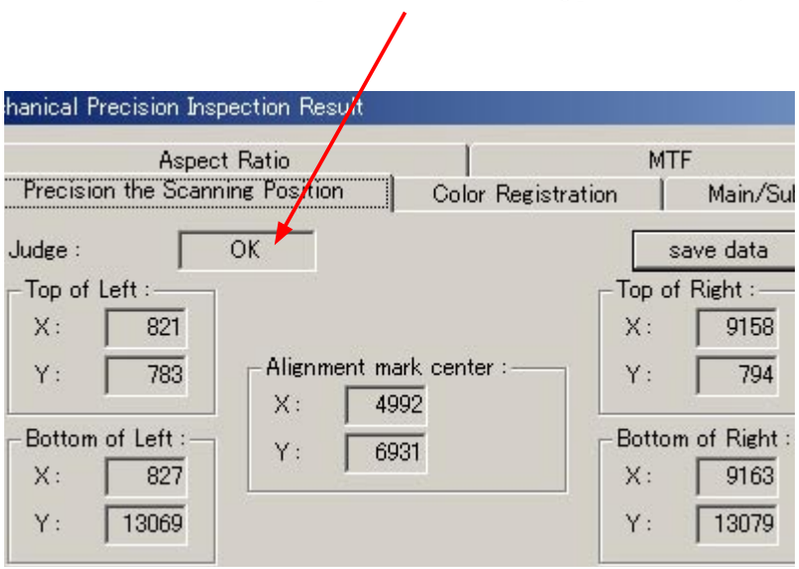
・Scanning position accuracy

Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Precision the Scanning Position" from the pulldown menus.

In case of NG: Readjust the alignment mark.



Inspection result on scanning position accuracy

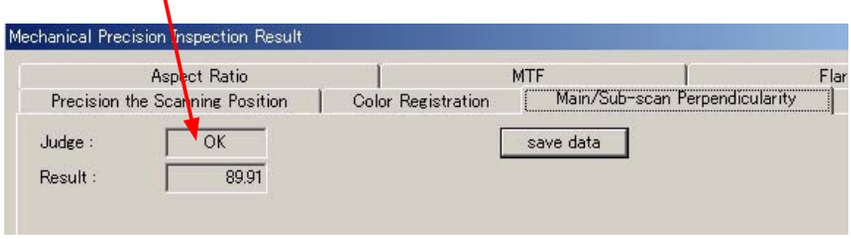


・Main/Sub-scan perpendicularity

Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Main/Sub-scan Perpendicularity" from the pulldown menus.

In case of NG: Inspect the stage carriage and CCD.

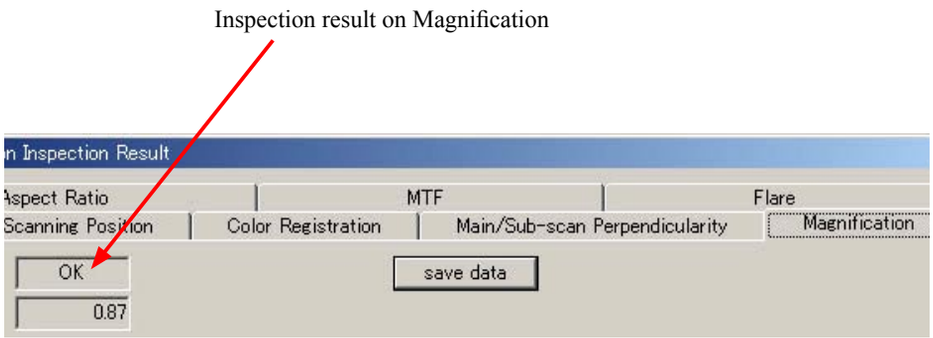
Inspection result on Main/Sub-scan perpendicularity



・Magnification

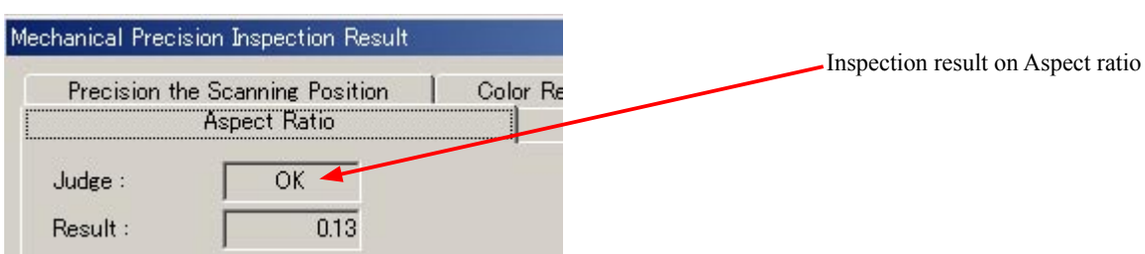
Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Magnification" from the pulldown menus.

In case of NG: Adjust the CCD.



・Aspect ratio

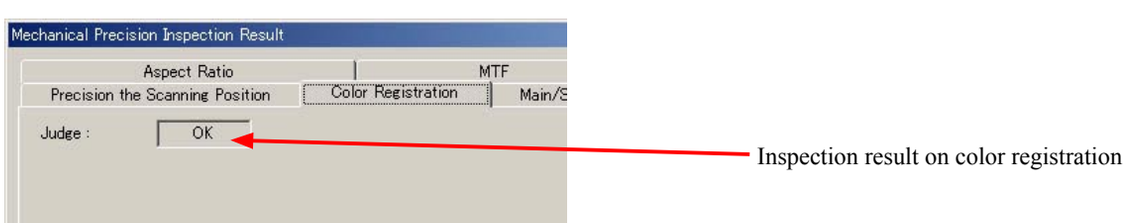
Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Aspect Ratio" from the pulldown menus. In case of NG: Inspect the carriage advance mechanism.



・Color registration

Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Color Registration" from the pulldown menus.

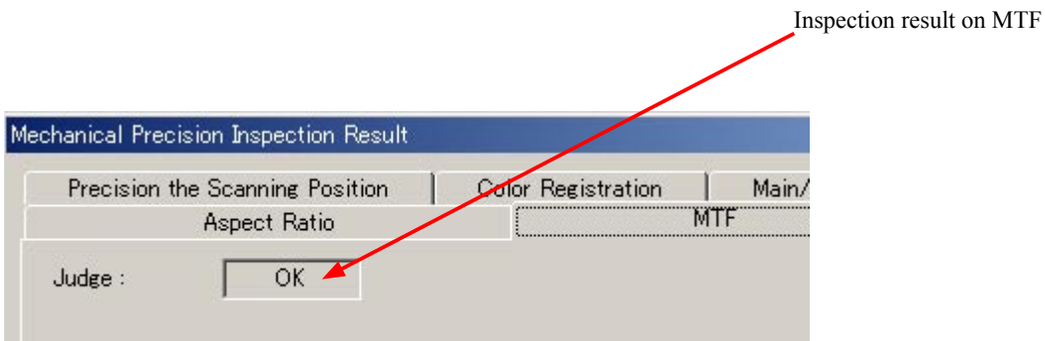
In case of NG: Clean the optical system and inspect the carriage advance mechanism.



・MTF

Select "Run" on the main menu, then choose "Mechanical Precision Test" and "MTF" from the pulldown menus.

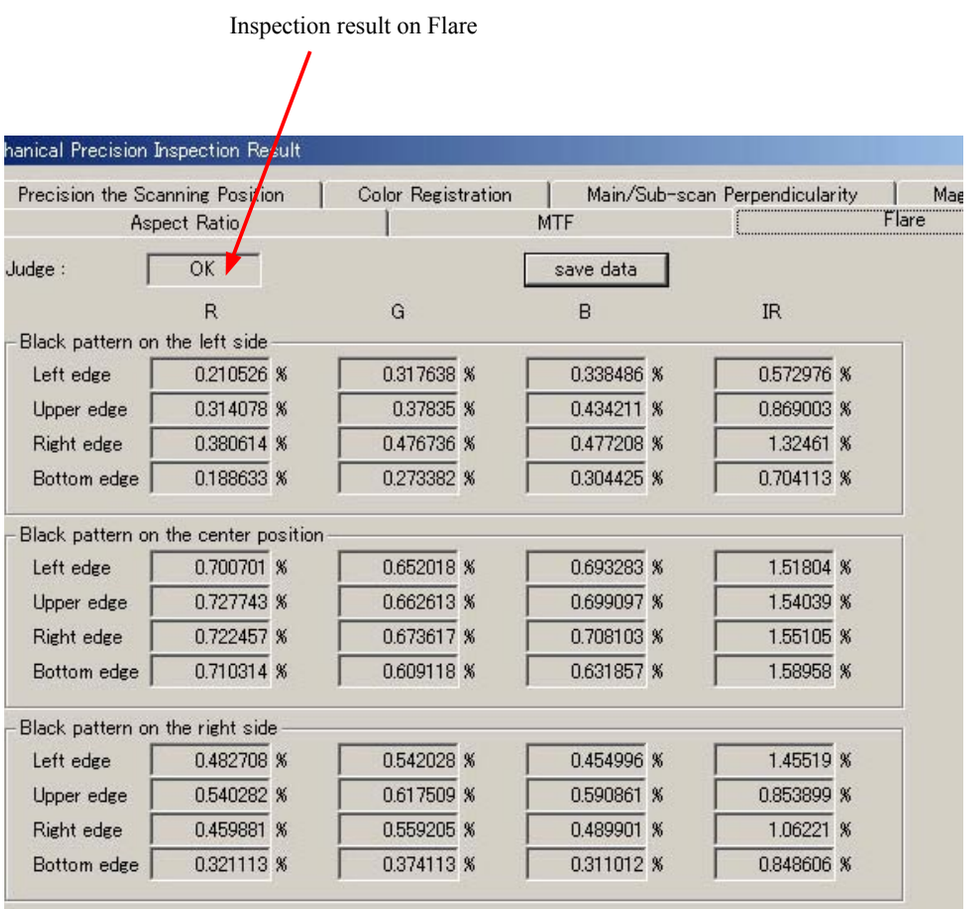
In case of NG: Clean the optical system and inspect the AF mechanism unit.



・Flare

Select "Run" on the main menu, then choose "Mechanical Precision Test" and "Flare" from the pulldown menus.

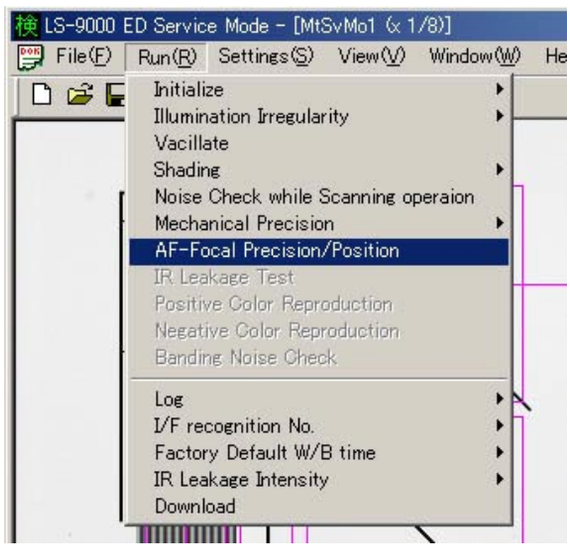
In case of NG: Clean the optical system and inspect the AF mechanism unit.



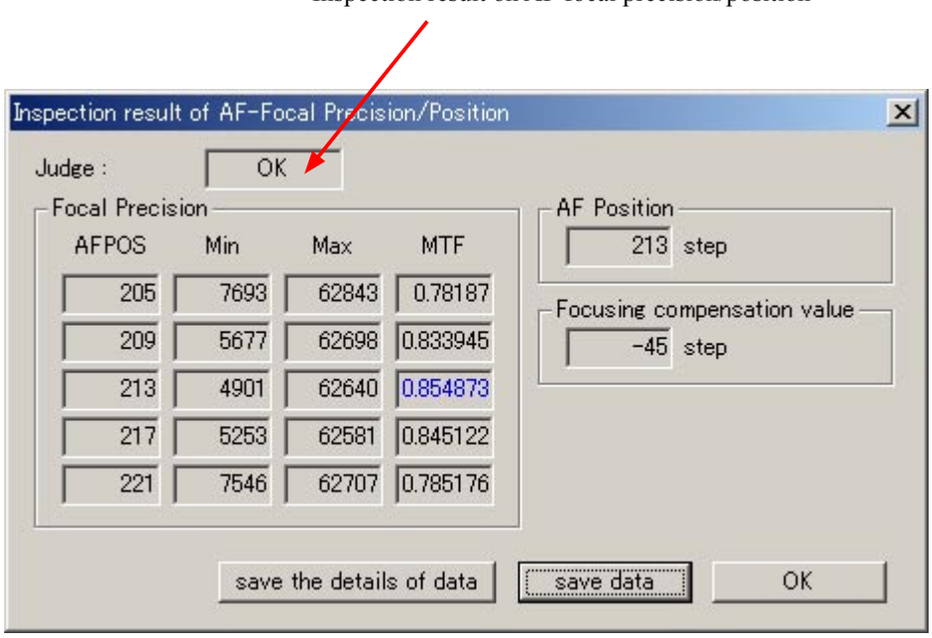
＊ Inspection on AF focal precision/position

Select "Run" on the main menu, and choose "AF-Focal Precision/Position" from the pulldown menu. Then, the AF operates automatically.

In case of NG: Clean the optical system and inspect the AF mechanism unit.



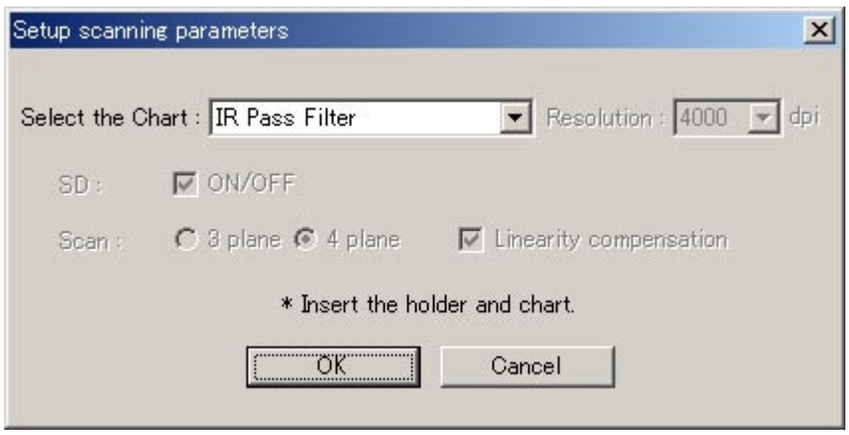
Inspection result on AF focal precision/position



＊ IR pass filter

Select "File" on the main menu and choose "Scan Image" from the pulldown menu. Then select "IR Pass Filter" and click "OK".

Attention: Errors may occur, so do NOT insert the chart (holder) into the scanner at this stage !



Insert the chart (holder) into the scanner, after above is indicated.

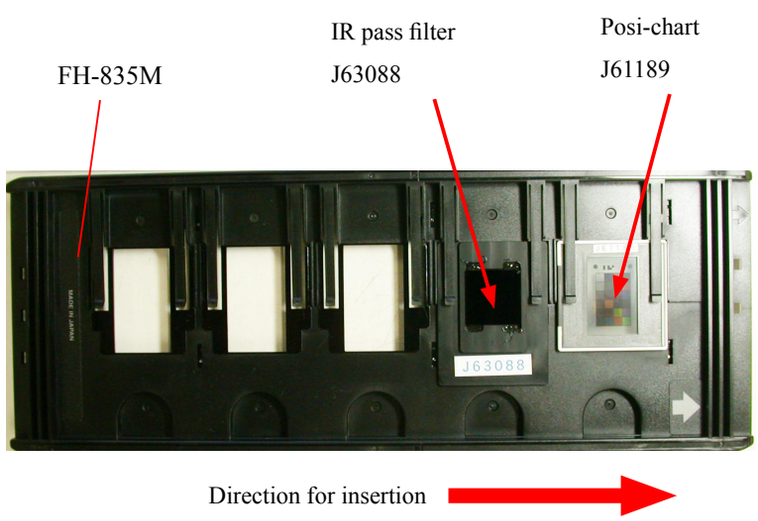
When "OK" is clicked, the scanning starts.

＊ Chart - Use the holder FH-835M (Use the product of package as it is.)

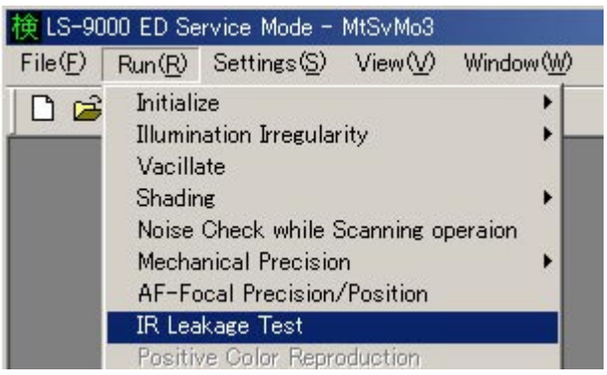
Insert the posi-chart (J61189) into the 1st frame of FH-835M

Insert the IR pass filter (J63088) into the 2nd frame of FH-835M

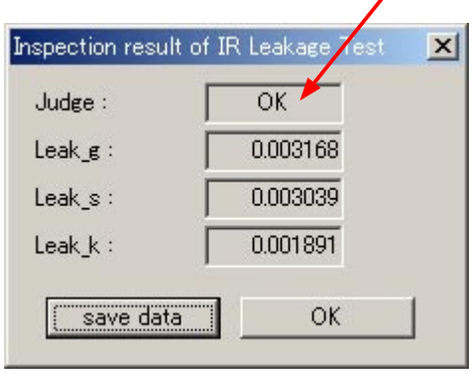
Note : Be sure to insert the chart at the right position in the right order.



Select "Run" on the main menu, and "IR Leakage Test" (IR pass filter) from the pulldown menu.



Inspection result on IR pass filter



In case of NG: LED malfunction should be considered.

Note: In case the main PCB or parts of the optical system are replaced;

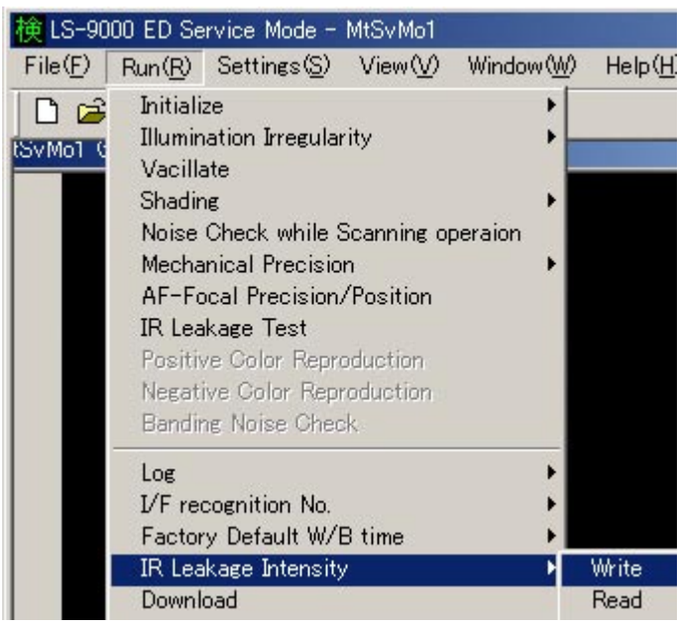
After replacing the parts, perform the above "IR Leakage Test" (IR pass filter). Record each data of inspection result (Leak_g・Leak_s・Leak_k), then rewrite the compensation data according to the instruction of the next page.

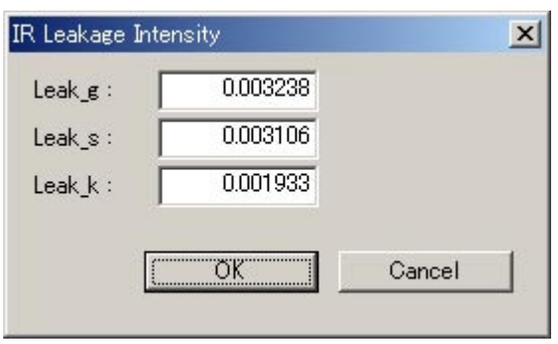
＊ Rewrite IR pass filter compensation data

When the main PCB or parts of optical system are replaced, rewrite the compensation data according to the following instrucition.

① After replacing parts, perform "IR Leakage Test" (IR pass filter) from page A22 to A23. Record each data on inspection results (Leak_g・Leak_s・Leak_k).

② Select "Run" on the main menu, then choose "IR Leakage Intensity" and "Write" from the pulldown menus.





③ Input each data (Leak_g・Leak_s・Leak_k) that was recorded in ①, then click "OK".

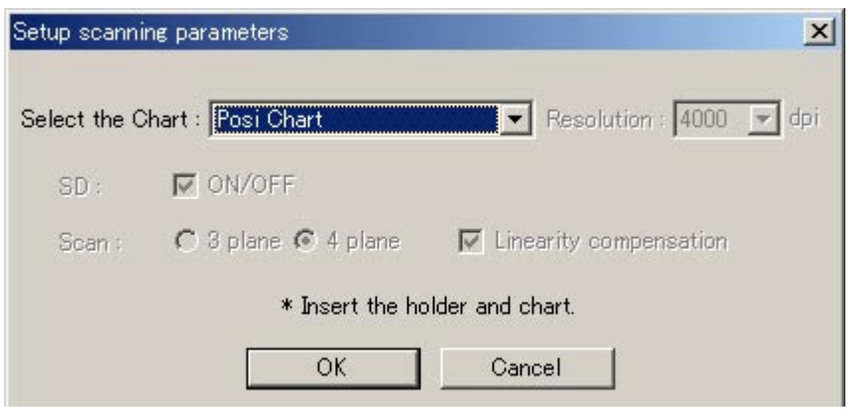
③ Click "OK".

④ After completing writing, click "OK" to go back to the main menu.

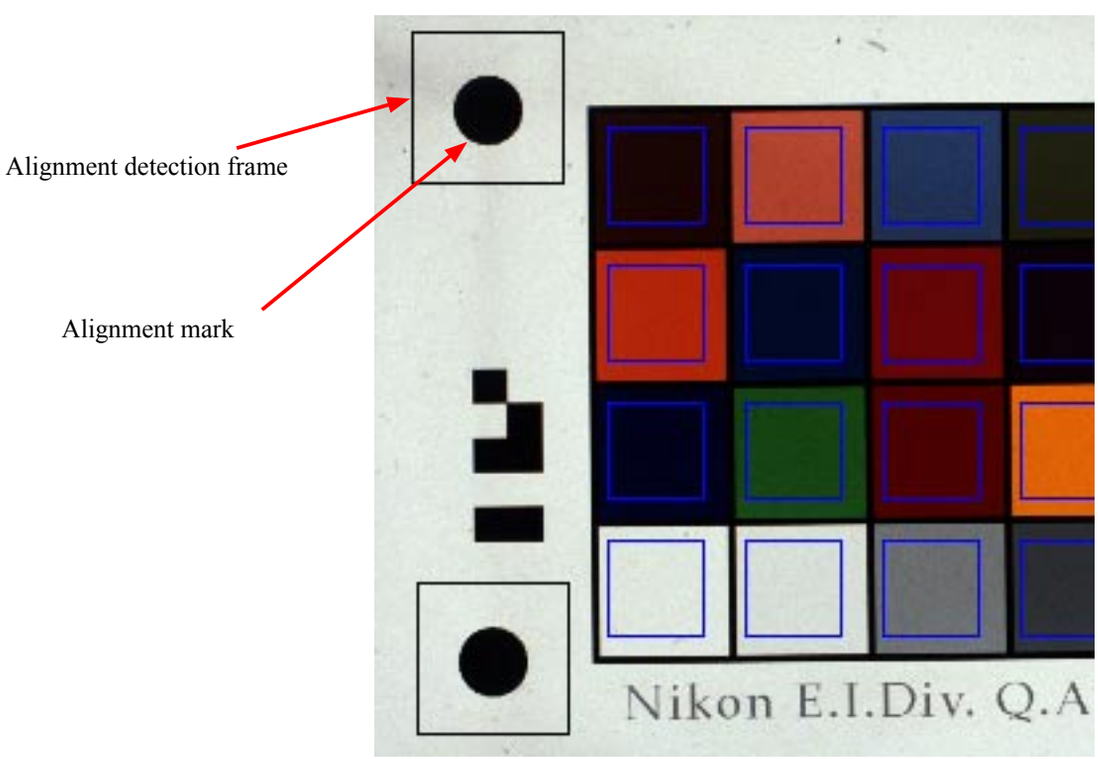
＊ Color reproduction (positive)

Select "File" on the main menu, and "Scan Image" from the pulldown menu. Then, choose "PosiChart" and click "OK".

The scanning starts automatically.

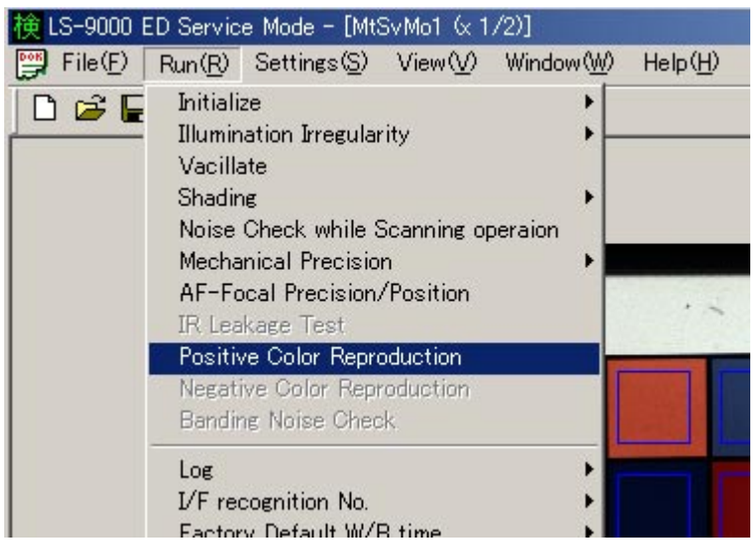


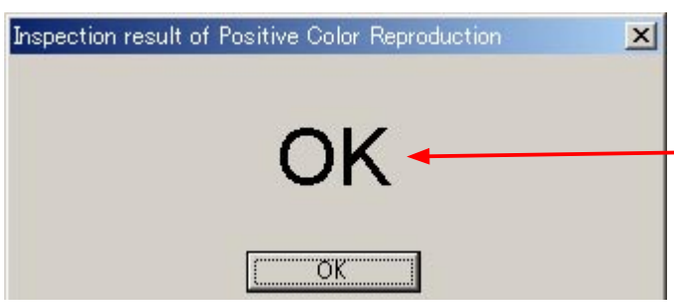
When the scanned image is displayed on the monitor, drag the alignment detection frame (black square frame) with the mouse for adjustment so that the alignment mark (black circle) can be placed enough inside this frame.（Adjust the upper-left and lower-left alignment marks.



Select "Run" on the main menu, and "Positive Color Reproduction" from the pulldown menu.

In case of NG: Clean the chart and inspect the optical system.





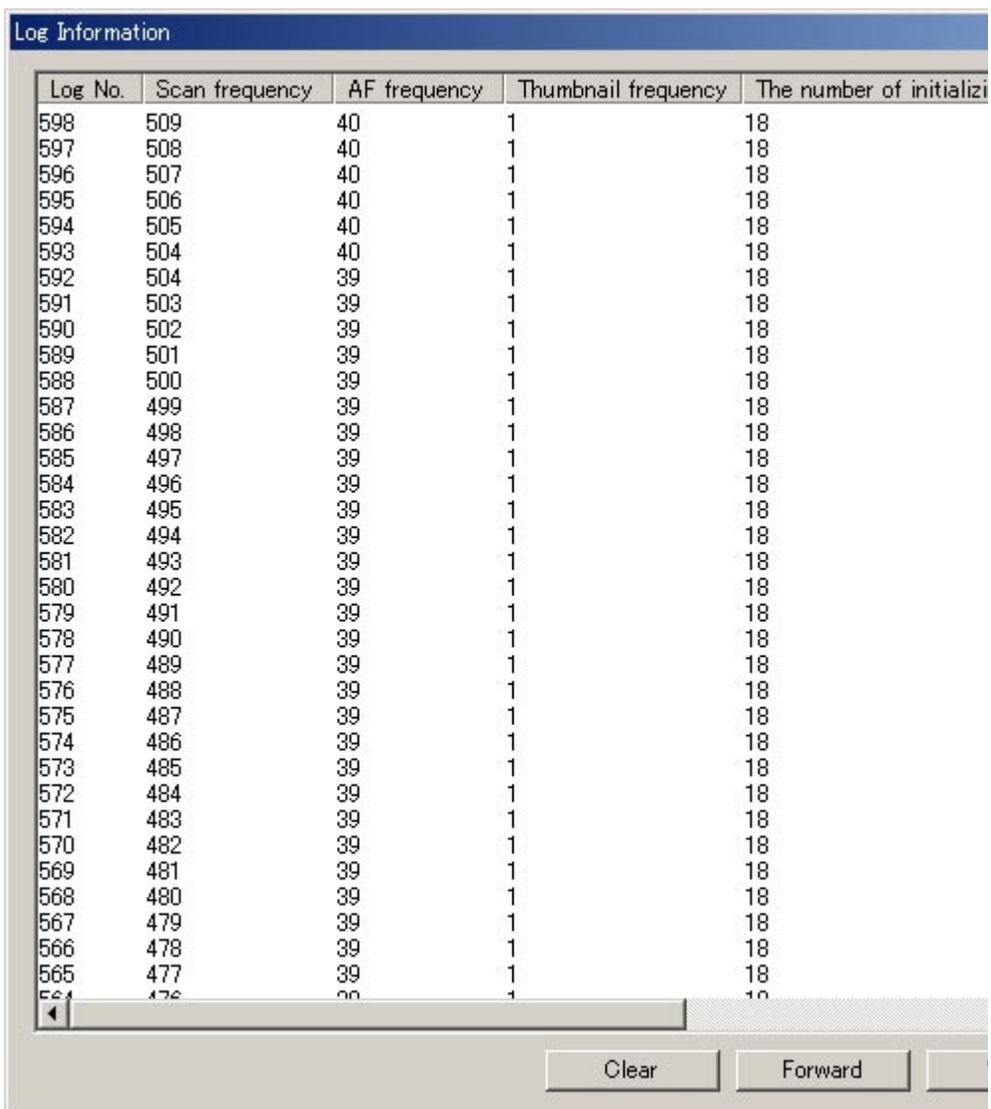
Inspection result on Positive color reproduction

＊ Log

Select "Run" on the main menu, then choose "Log", "Load" and "Scanner". The log data is automatically indicated.

When "Run", "Log", "Load" and "File" are selected, the saved log data is called up.

When "Log" and "Clear" are selected, the log data in the flash memory on the main PCB is cleared.



Clear - - -The log data in the flash memory on the main PCB is cleared/deleted.

Write- - -The saved log data is written in the flash memory.

Save - - -The log data is saved.

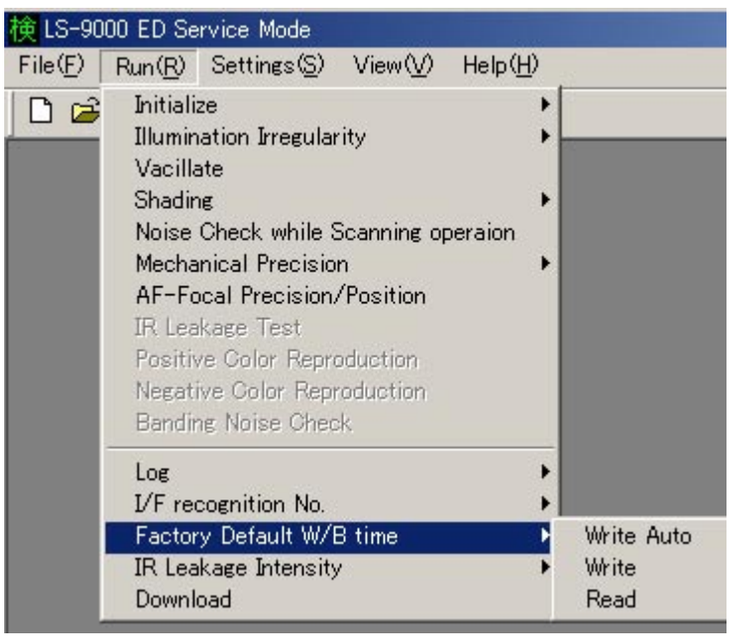
＊ WB time

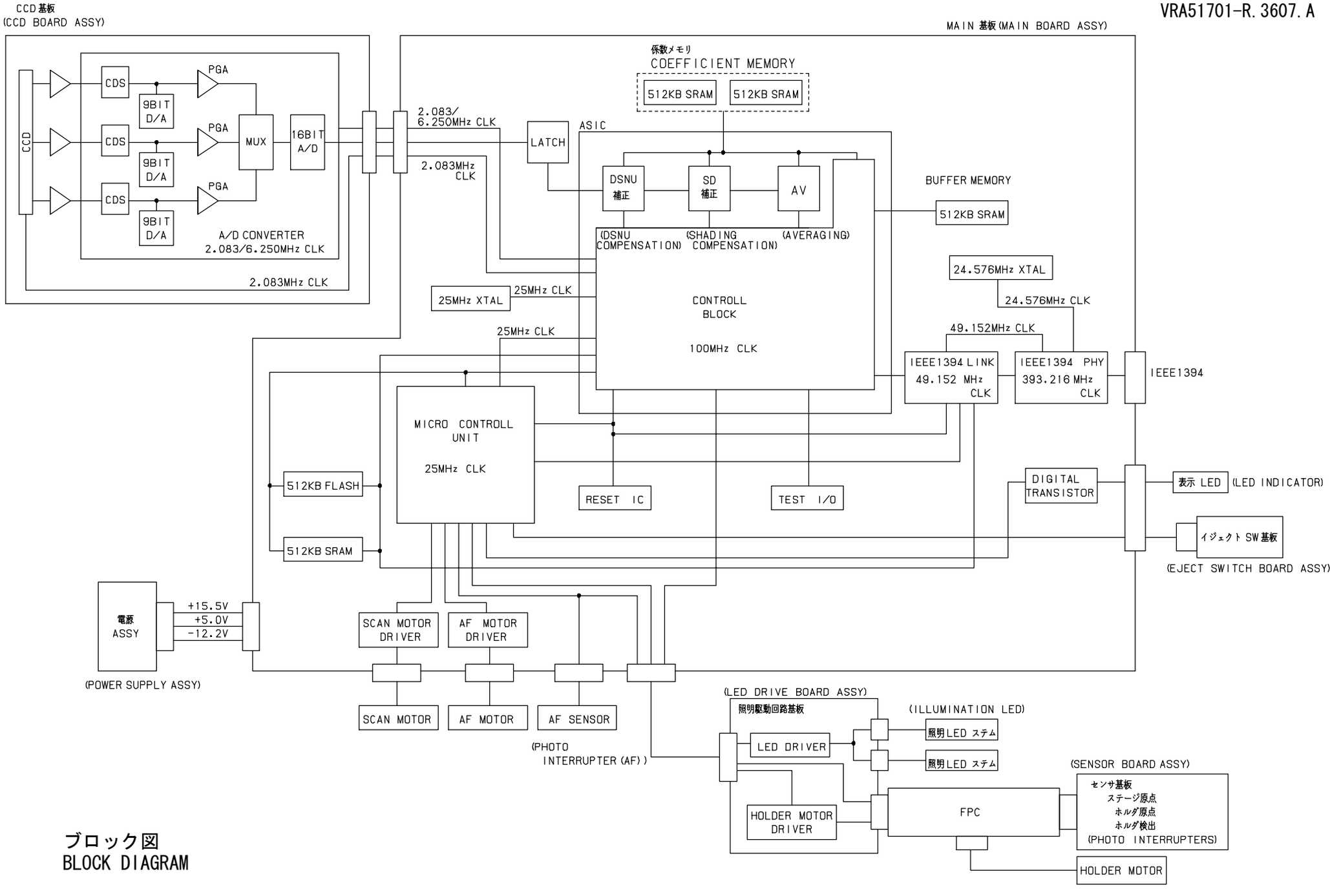
Select "Run" on the main menu, and "Factory Default W/B time" (WB time) from the pulldown menu.

Write Auto: The current WB data is written in the flash memory of the main PCB.
（Perform this when the LED is replaced or parts of optical system is cleaned.）

Write: The WB data is written. When the main PCB unit is replaced, be sure to copy the WB data, then write each data after the replacement.

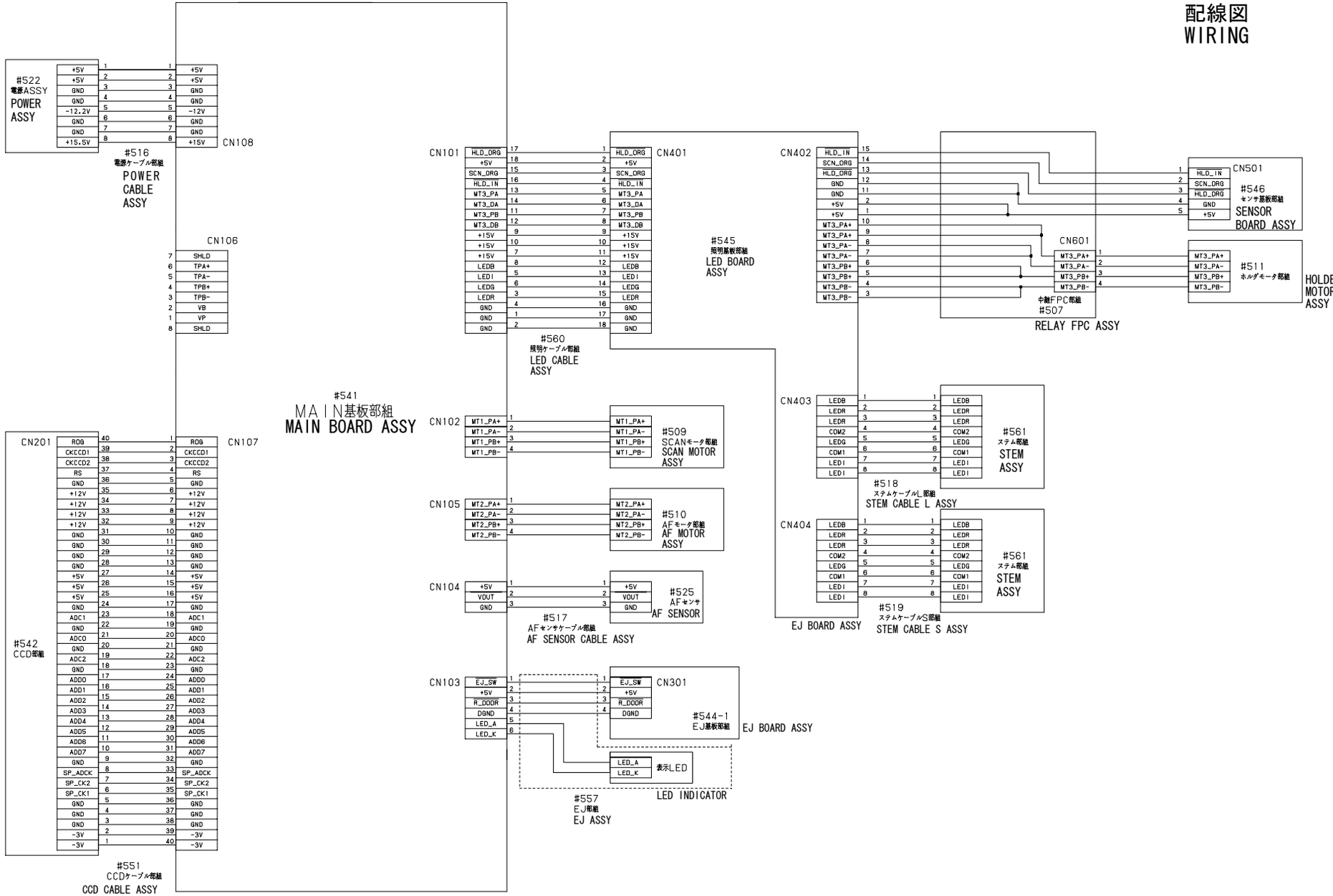
Read: The WB data that was written in the flash memory is read.
（i.e. WB data at shipment or when the LED is replaced for repairs or when the optical system is cleaned.）





ブロック図
BLOCK DIAGRAM

配線図
WIRING


#522
電源ASSY
POWER
ASSY
+5V
+5V
GND
GND
-12.2V
GND
GND
+15.5V
#516
電源ケーブル部組
POWER
CABLE
ASSY
CN108
CN106
SHLD
TPA+
TPA-
TPB+
TPB-
VB
VP
SHLD
#541
MAIN基板部組
MAIN BOARD ASSY
CN201
ROG
CKCCD1
CKCCD2
RS
GND
+12V
ADC1
ADCO
ADC2
ADD0
ADD1
ADD2
ADD3
ADD4
ADD5
ADD6
ADD7
SP_ADCK
SP_CK2
SP_CK1
-3V
#542
CCD部組
CN107
#551
CCDケーブル部組
CCD CABLE ASSY
CN101
HLD_ORG
+5V
SCN_ORG
HLD_IN
MT3_PA
MT3_DA
MT3_PB
MT3_DB
+15V
LEDB
LEDI
LEDG
LEDR
GND
CN401
#560
照明ケーブル部組
LED CABLE
ASSY
#545
照明基板部組
LED BOARD
ASSY
CN402
CN601
中継FPC部組
#507
RELAY FPC ASSY
CN501
#546
センサ基板部組
SENSOR
BOARD ASSY
#511
ホルダモータ部組
HOLDER
MOTOR
ASSY
CN102
MT1_PA+
MT1_PA-
MT1_PB+
MT1_PB-
#509
SCANモータ部組
SCAN MOTOR
ASSY
CN105
MT2_PA+
MT2_PA-
MT2_PB+
MT2_PB-
#510
AFモータ部組
AF MOTOR
ASSY
CN104
+5V
VOUT
GND
#525
AFセンサ
AF SENSOR
#517
AFセンサケーブル部組
AF SENSOR CABLE ASSY
CN103
EJ_SW
+5V
R_DOOR
DGND
LED_A
LED_K
CN301
#544-1
EJ基板部組
EJ BOARD ASSY
表示LED
LED INDICATOR
#557
EJ部組
EJ ASSY
CN403
CN404
#561
ステム部組
STEM
ASSY
#518
ステムケーブルL部組
STEM CABLE L ASSY
#519
ステムケーブルS部組
STEM CABLE S ASSY
EJ BOARD ASSY

Inspection Standard

1. Illumination

・Illumination irregularity:

When no compensation is made (in shipping), the range calculated based on the max. and min. values should be 42% or less.

49.98% or less (compensationable range)

・Shading compensation:

Shading value of each RGBI with respect to the outputs should be 10% or less.

・Adjacent pixels compensation:

Difference in adjacent pixels of each RGBI should be 5% or less.

・Uneven brightness in black areas:

44 db or more for each RGBI

・Light volume:

The following conditions of WB time for RGBI should be met.

Conditions	WB time
RGBI only	WBR, WBG, WBB, WBI ＞ 30μs
Color Positive: 3 colors	WBR×1.995 ＋ WBG×1.995 ＋ WBB×1.995 ＜ 20.7
Color Positive: 4 colors	WBR×1.995 ＋ WBG×1.995 ＋ WBB×1.995 ＋ WBI×1.122/2 ＜ 26.3
Color Negative: 3 colors	WBR×1.995 ＋ WBG×3.981 ＋ WBB×7.943 ＜ 48.3
Color Negative: 4 colors	WBR×1.995 ＋ WBG×3.981 ＋ WBB×7.943 ＋ WBI×1.175/2 ＜ 53.6

2. AF (Autofocus)

・AF range:

4.5 mm or more

・AF original position accuracy:

Reference value ± 47 step

・AF alignment position:

The difference between AF position and MTF peak position should be ± 1 point or less

・AF repeat accuracy:

± 1 point or less for the same film at the same designated position

・AF time / AF scanning time:

Standard: The time taken for successful AF at one try including stage moving time should be as follows:

135 film (of both mount and strip films): 21 seconds or less (120 film 6×9): 26 seconds or less

3. Scanning

・Scanning misalignment:

Body only (except adapters)

Main scannig direction: ± 0.2 mm or less ・Sub-scanning direction: ± 0.4 mm or less

When the body and holder are used (except the turning holder)

Main scannig direction: ± 0.4 mm or less ・Sub-scanning direction: ± 0.6 mm or less

When the turning holer is used

Main scannig direction: ± 0.5 mm or less ・Sub-scanning direction: ± 0.7 mm or less

・Trimming misalignment:

1 pixel or less in the preview screen

・Main scanning magnification:

± 0.2 % or less

・Horizontal to vertical ratio (Aspect ratio):

± 2 % or less

・Main/sub-scan perpendicularity:

90° ± 0.2°

・Sub-scan parallelism:

Total area

3 pixels or less

Between adjacent pixels

0.6 pixel or less

Small area

1 pixel or less within any continuous 200 lines in the sub-scanning direction.

・Diagonal line feeding accuracy:

Between adjacent pixels

0.8 pixel or less

Small area

1.7 pixels or less within any continuous 200 lines in the sub-scanning direction.

・Repeating accuracy:

Misalignment caused when main-scanning and preview scanning are repeated should be 1 pixel or less.

4. Image quality performance 1

・Total resolving power (MTF):

RGB-color

MTF of 35 lines/mm chart area should be 20% or more

IR-color

MTF of 17.5 line/mm chart area should be 20% or more

・Color registration:

Among RGB

1 pixel or less

IR-color

Scanning misalignment from RGB image should be 4 pixels or less

・Flare:

Data spread in black-and-white boundary areas should be 3.92% (10/255 LSB) or less

・Ghost (image):

Data spread in black areas should be 3.92% (10/255 LSB) or less

5. Scanning time

・ Prescan preview time (When Standard PC is used):

Standard Positive film	135 film (of both mount and strip films): 23 seconds or less
	120 film (6×9）: 43 seconds or less
High concentrated film	135 film (of both mount and strip films): 64 seconds or less
	120 film (6×9）: 132 seconds or less

・Main scanning time:

135 film: 10 seconds or less

120 film: 60 seconds or less

・Thumbnail time:

20 seconds or less (in case of 83 dpi)(1356 frames × 2 strip）

・Batch scanning time:

22 minutes or less

6. Image quality performance 2

・Negative film reproducible density range

Under conditions of CMS off, γ=1, and 16 bits, output images should be scanned within the range from the min. value is (0) to max. value (65535) of RGB.

・Gradation sequence

The film with up to 4.2 density should be scanned accurately within ±0.1 of the difference between the output density and ideal density.

Indistinctive tone jump

・Density expressible range:

4.2 or more

・Prescan reproducibility

The color variation of 24-patch Lab should be ΔE4 or less. (Reference value: average of 5-times scanning)

・Drift

Just after power is applied and after operation lasts 30 minutes, the color difference ΔE of the scanned image of the same chart should be 5 or less on average and 10 or less at a maximum. The shading standard should be met.

・Streaking

No streaks in both main- and sub-scanning directions.

Not as distinctive as LS-8000

・Grain roughness

Indistinctive. No significant difference from the traditional models.

・Irregular color

Color difference (ΔE) should be 5 or less.

・Influence of outside light

No influence

7. Operating sounds

No significant abnormal sounds with 55-dB or less at a 1-m distance away.

8. Status indication

BUSY: 0.635Hz ± 1% of blinking frequency

ERROR: 5Hz ± 1% of blinking frequency

9. Force to attach/remove

・Force to attach/remove holder

Force to attach 9.8 N (1.0 kgf) or less

Force to remove 9.8 N （1.0 kgf) or less

10. Electric power consumption

AC100V/50・60Hz

0.33A or less

20W or less

AC240V/50・60Hz

0.22A or less

20W or less

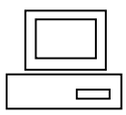
工　具・TOOLS

★：新規設定工具・NEW　TOOL

工具番号 Tool No.	名　称 Name of tool	備　考 Others
J61190 	ｶﾞﾗｽﾁｬｰﾄ Glass chart	LS-8000 共通 For LS-8000
J61191 	AF ﾓｰﾀｰ調整工具 AF motor adjustment tool	LS-8000 共通 For LS-8000
J61192 	SCAN ﾓｰﾀｰ組立工具 SCAN motor assembly tool	LS-8000 共通 For LS-8000
J61193 	SCAN ﾓｰﾀｰ芯だし工具 SCAN motor adjustment tool	LS-8000 共通 For LS-8000
J61189 	ﾎﾟｼﾞﾌｨﾙﾑﾁｬｰﾄ Positive film chart	LS-8000/5000/4000 共通 For LS-8000/5000/4000
★ J63088 	IR ﾊﾟｽﾌｨﾙﾀｰ IR pass filter	LS-5000 共通 For LS-5000
★ J65051 	CCD 調整ｿﾌﾄ Software for CCD adjustment	IBM 3.5 inches
★ J65049A 	LS-9000 ｻｰﾋﾞｽｿﾌﾄ Windows（日本語版） LS-9000 service software (J)	IBM 3.5 inches
★ J65049B 	LS-9000 ｻｰﾋﾞｽｿﾌﾄ Windows（英語版） LS-9000 service software (E)	IBM 3.5 inches

工　具・TOOLS

★：新規設定工具・NEW　TOOL

工具番号 Tool No.	名　称 Name of tool	備　考 Others
	パーソナルコンピュータ Personal computer	汎用品 RJ is Not available
	IEEE1394　ボード IEEE1394　board	製品同梱品 Supplied accesory with the product
	IEEE1394　ケーブル IEEE1394　cable	製品同梱品 Supplied accesory with the product
★ S-219 	グリース　G940501（ｽﾐﾃｯｸ219） Grease　G940501（SUMITEC　219）	NET = 100g
J67033 	グリース　ｽﾐﾃｯｸ331 Grease　SUMITEC　331	NET = 180g
★ SHELL56 	グリース　シェルテラスオイル56 Grease Shell Tellus Oil 56	
	セメダインスーパーX CEMEDINE　SUPER X	
T92122 	ヘクスキー　1.5mm Hex　key　1.5mm	

作成承認印	配布許可印
ニコン 映像カンパニー 品質保証部 GM	サービス 計画課 M

SUPER COOLSCAN 9000 ED

VRA51701

PARTS LIST
修 理 部 品 表

Nikon | NIKON CORPORATION
Tokyo, Japan

Printed in Japan March 2004

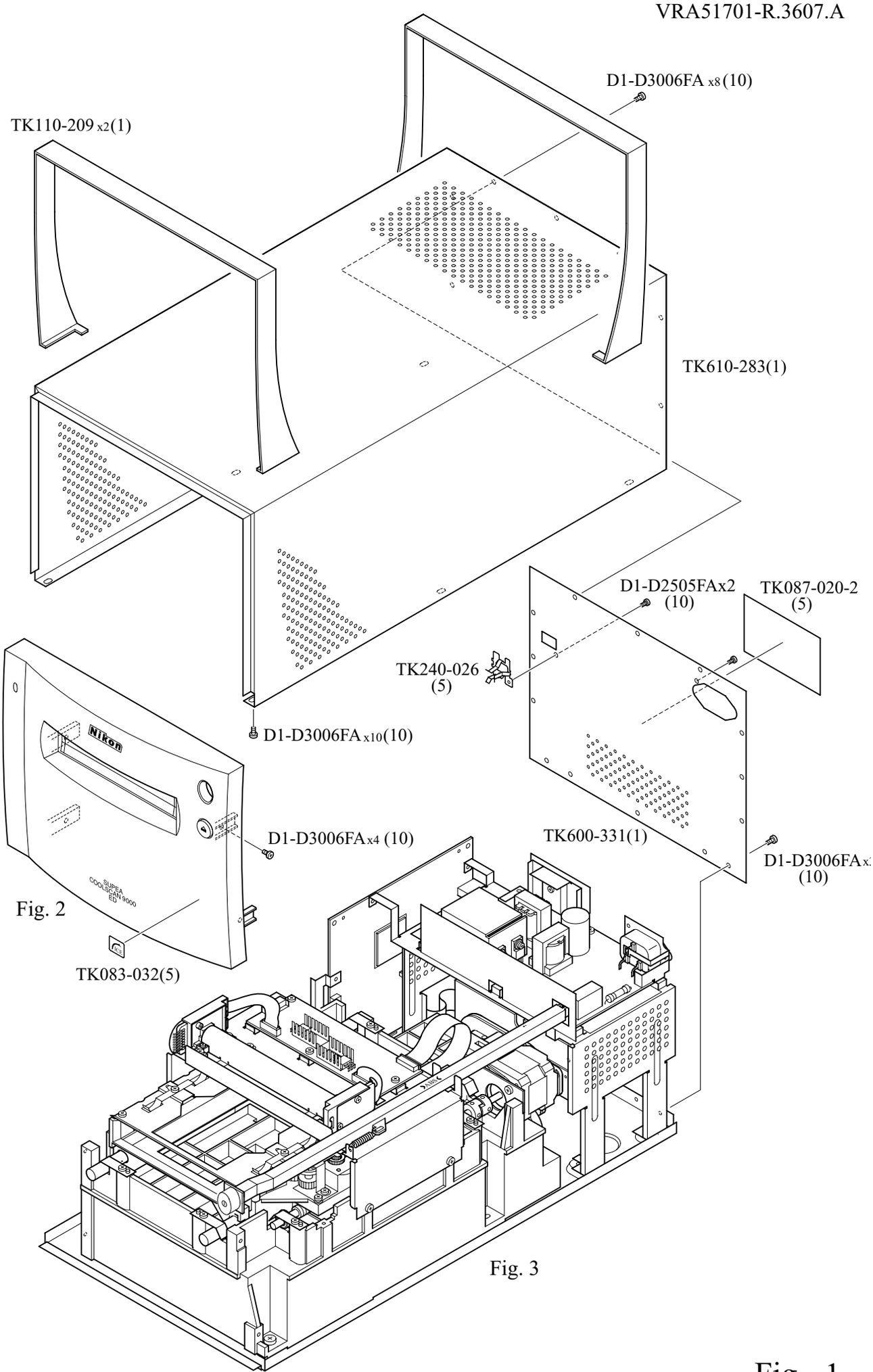


Fig. 2

Fig. 3

Fig. 1

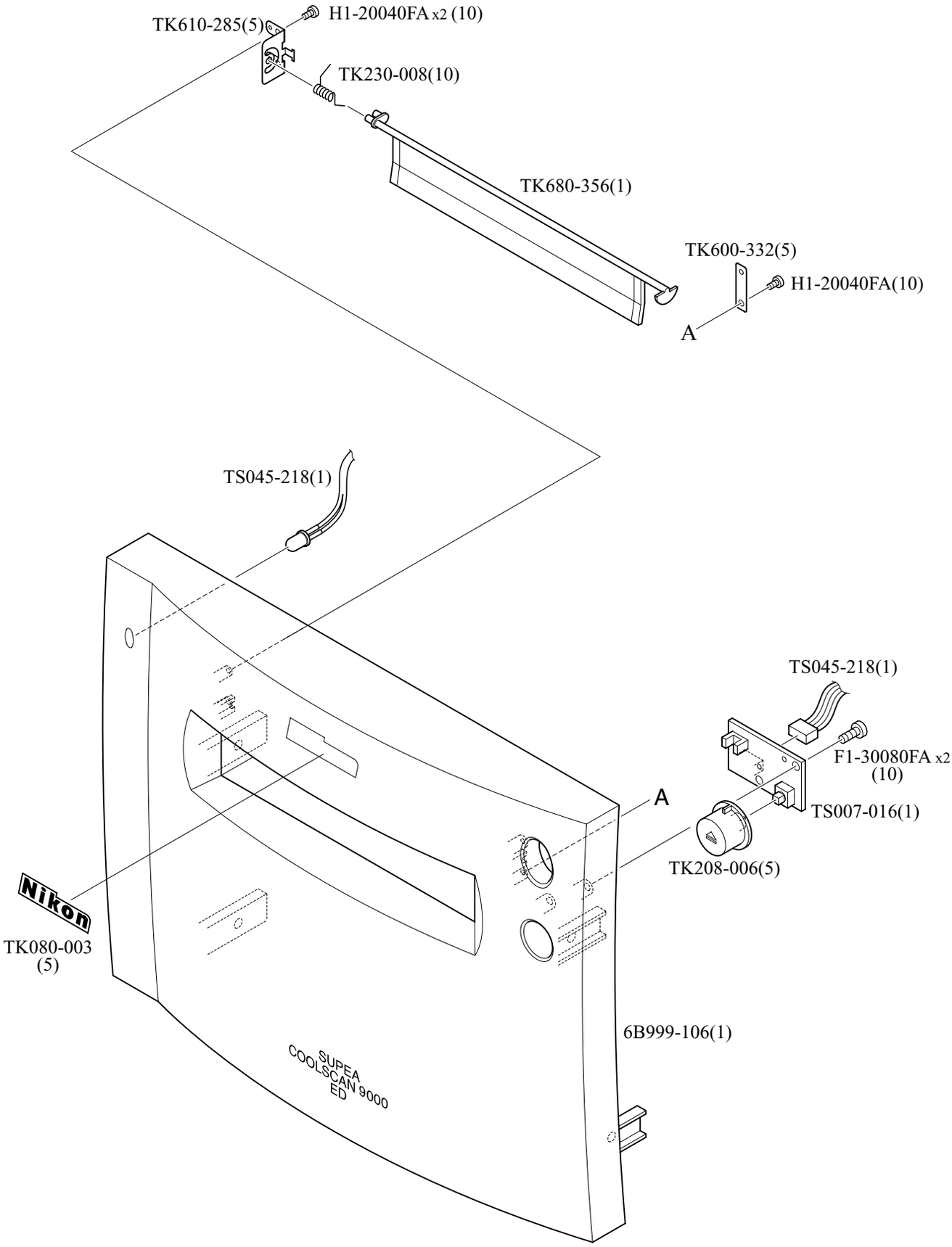
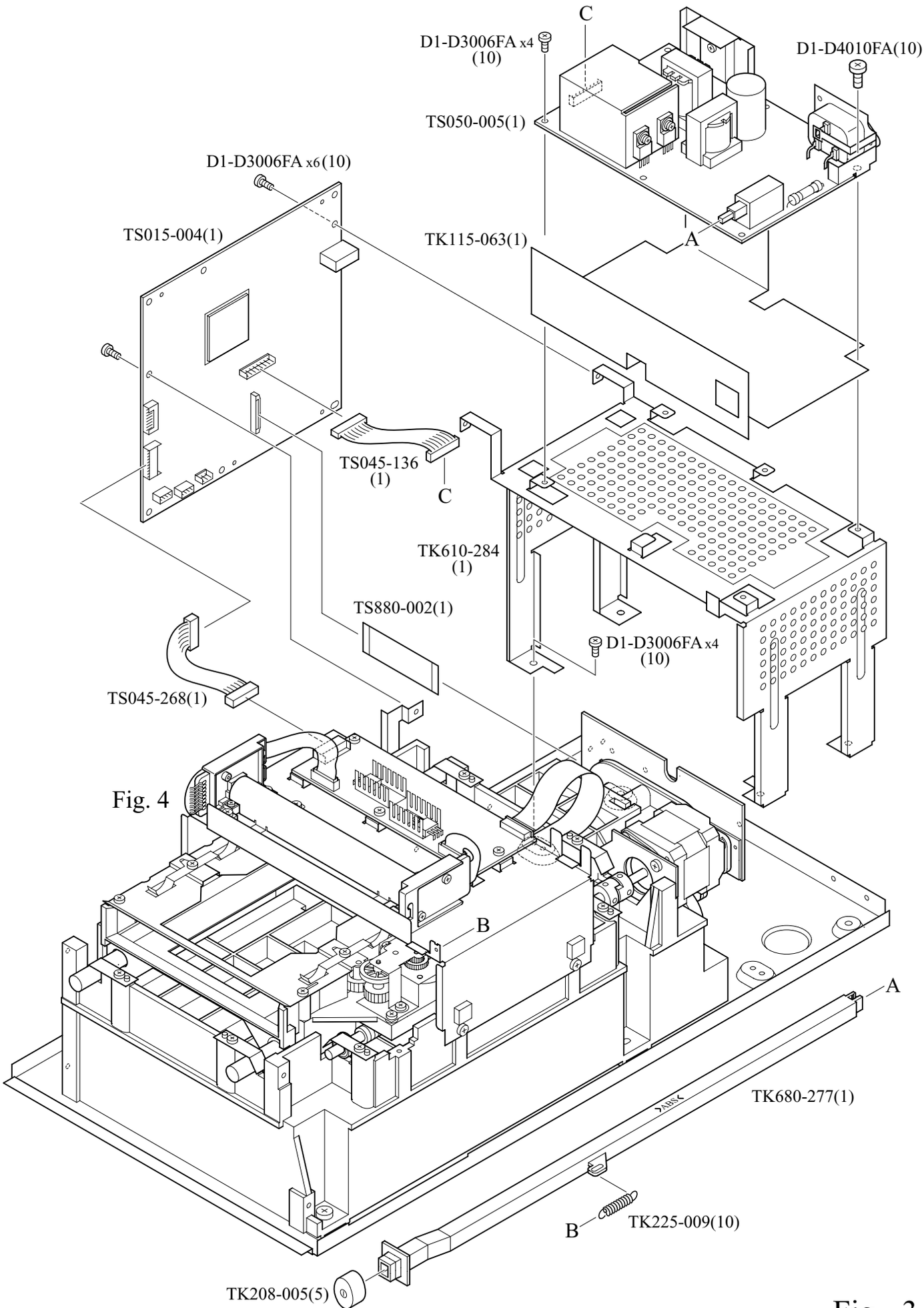

TK610-285(5)
H1-20040FA x2 (10)
TK230-008(10)
TK680-356(1)
TK600-332(5)
H1-20040FA(10)
A
TS045-218(1)
TS045-218(1)
F1-30080FA x2
(10)
A
TS007-016(1)
TK208-006(5)
Nikon
TK080-003
(5)
6B999-106(1)
SUPER
COOLSCAN 9000
ED

Fig. 2


C
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(10)
D1-D4010FA(10)
TS050-005(1)
D1-D3006FA x6 (10)
TS015-004(1)
TK115-063(1)
A
TS045-136
(1)
C
TK610-284
(1)
TS880-002(1)
D1-D3006FA x4
(10)
TS045-268(1)
B
A
TK680-277(1)
B
TK225-009(10)
TK208-005(5)

Fig. 4

Fig. 3

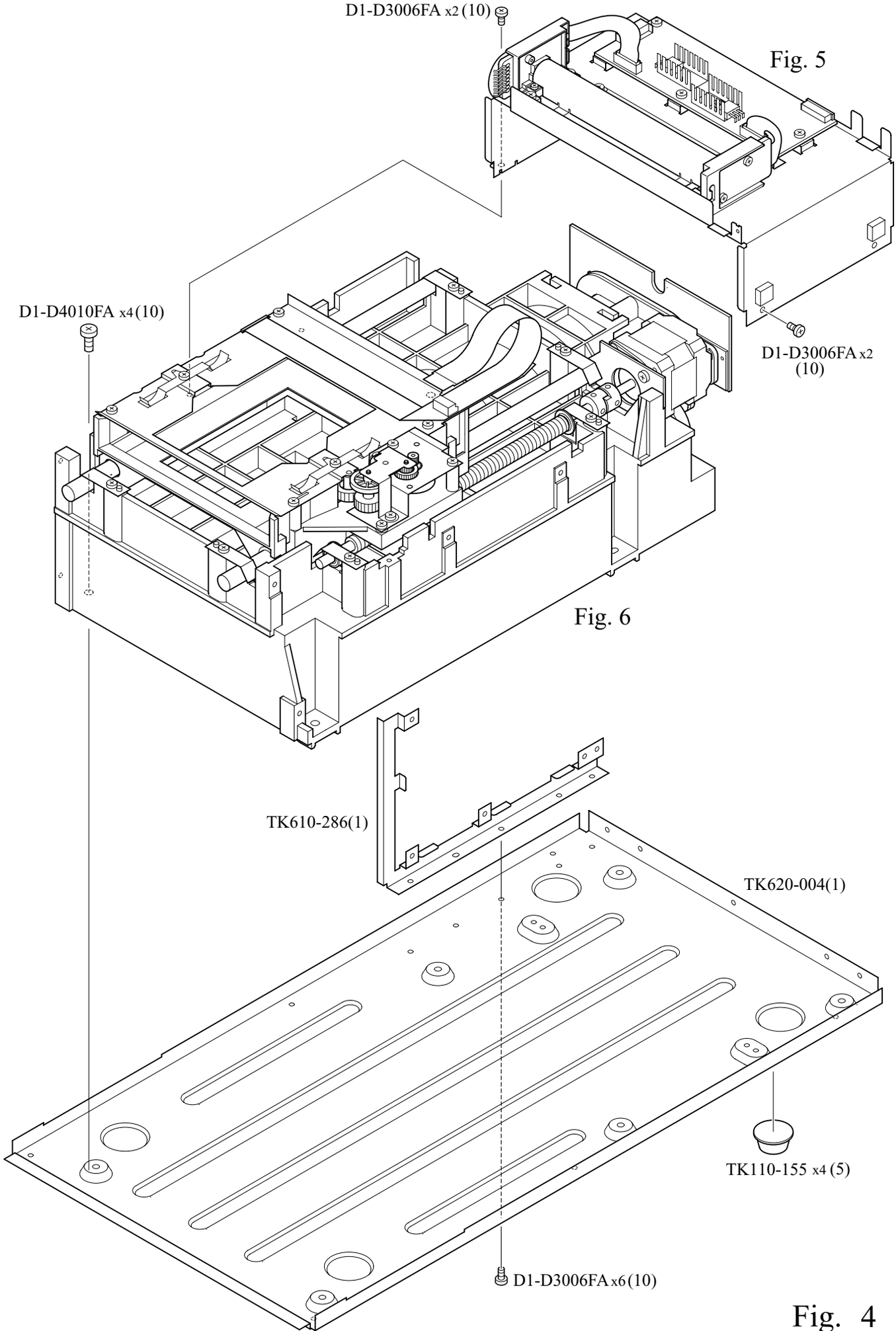


Fig. 5

Fig. 6

Fig. 4

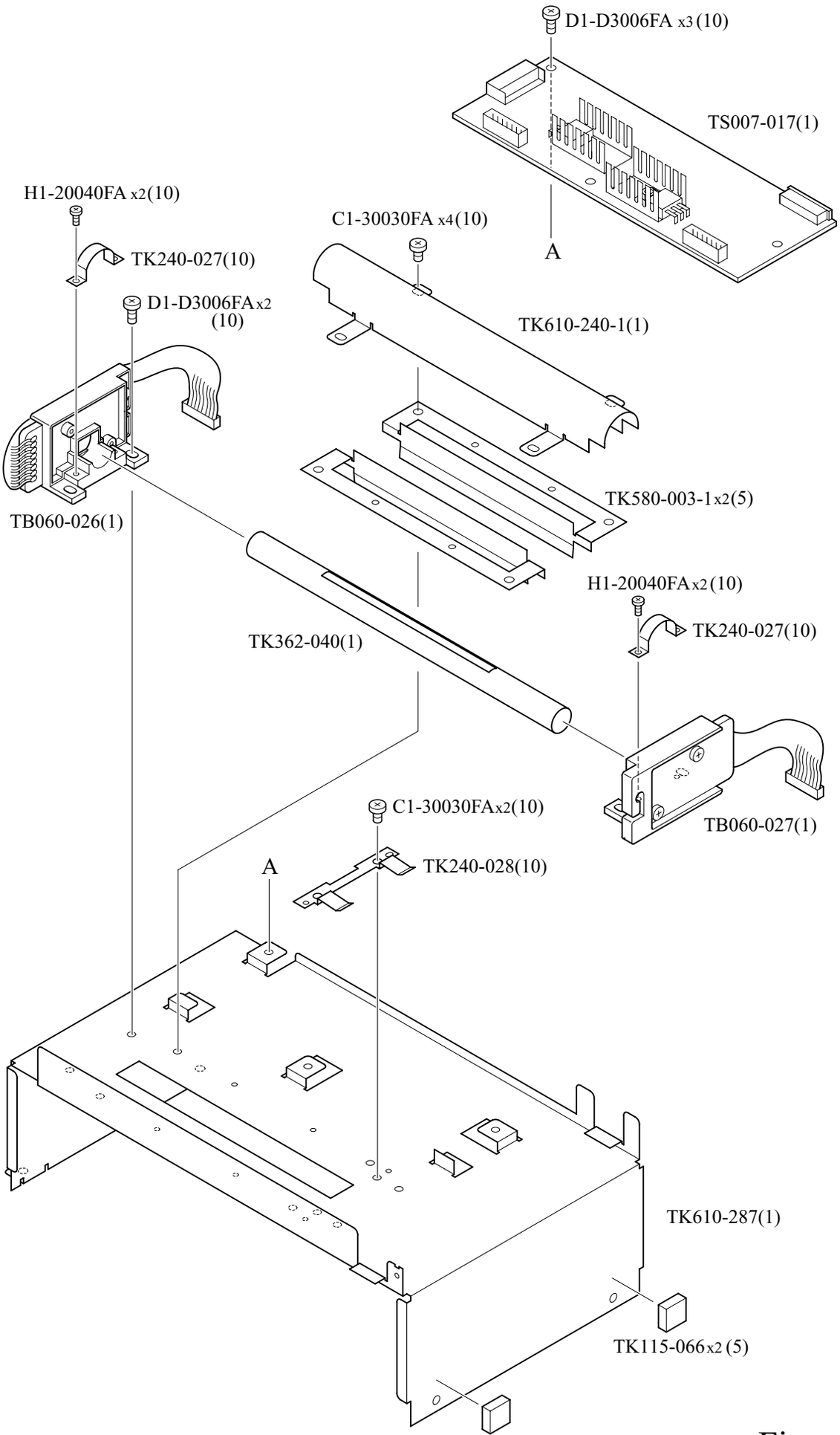

D1-D3006FA x3 (10)
TS007-017(1)
A
H1-20040FA x2(10)
C1-30030FA x4(10)
TK240-027(10)
D1-D3006FA x2
(10)
TK610-240-1(1)
TK580-003-1 x2(5)
TB060-026(1)
H1-20040FA x2 (10)
TK362-040(1)
TK240-027(10)
TB060-027(1)
C1-30030FA x2(10)
A
TK240-028(10)
TK610-287(1)
TK115-066 x2 (5)

Fig. 5

Fig. 7

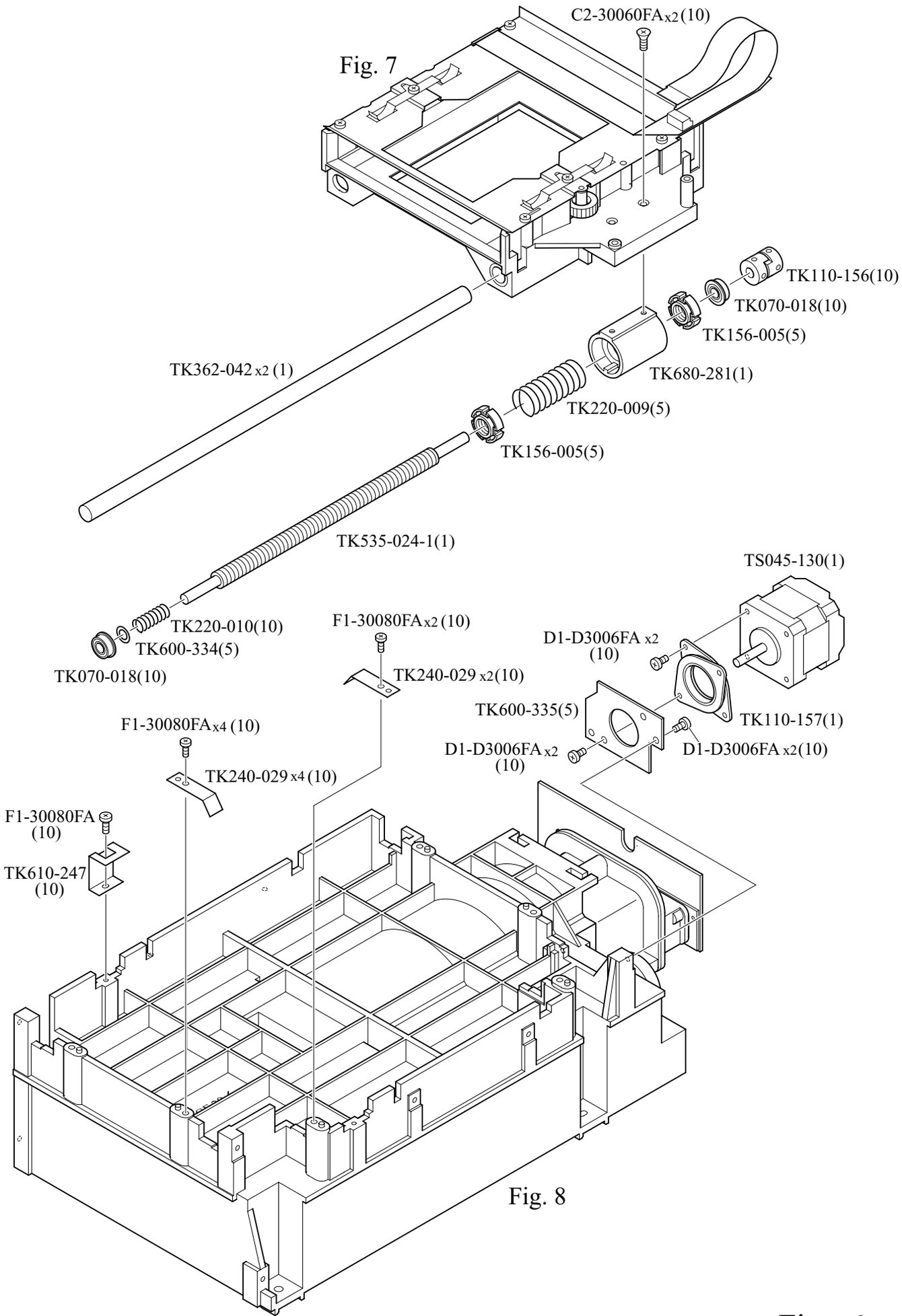
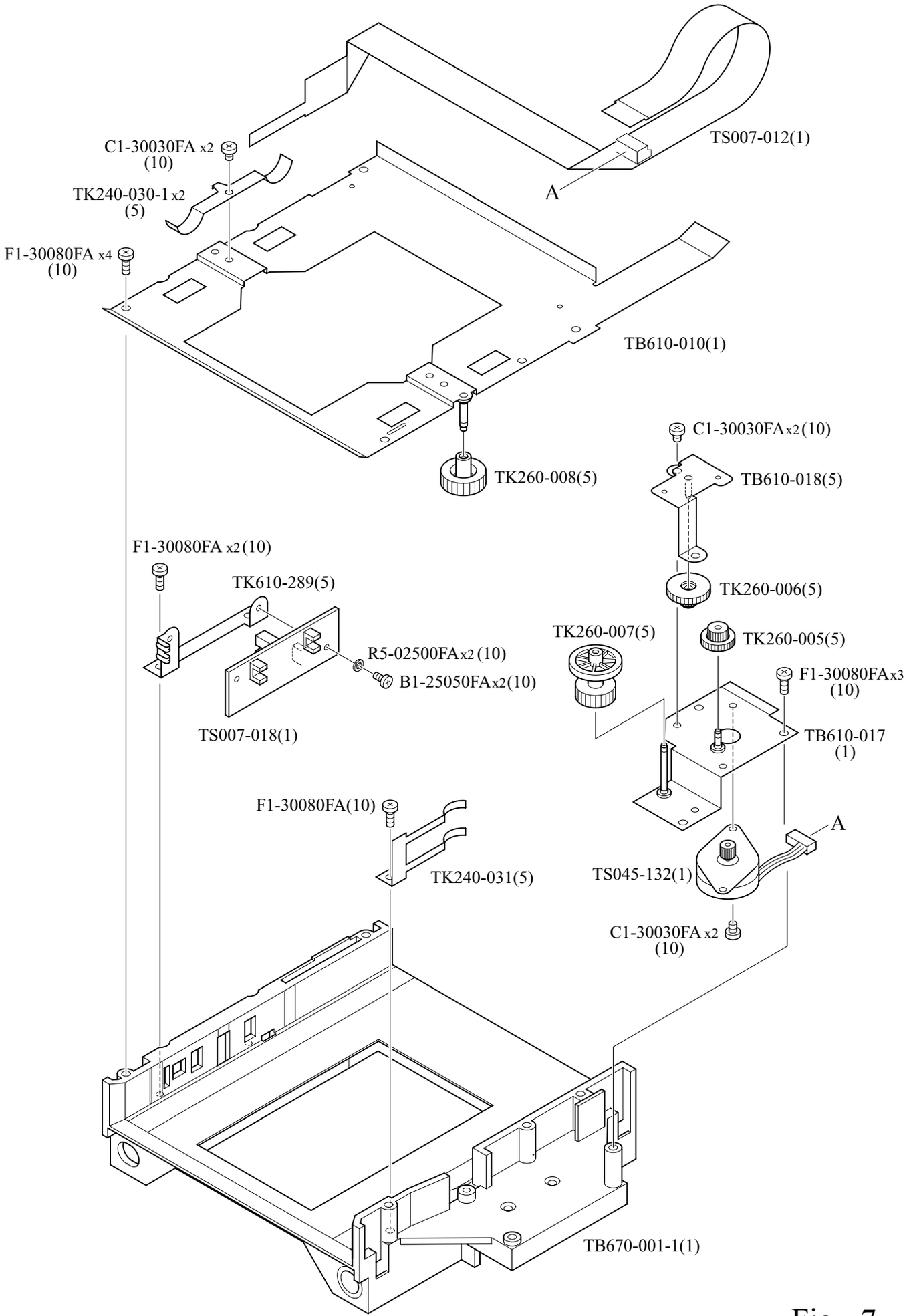


Fig. 8

Fig. 6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TK240-030-1 x2
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F1-30080FA x4
(10)
TS007-012(1)
A
TB610-010(1)
TK260-008(5)
C1-30030FAx2(10)
TB610-018(5)
TK260-006(5)
TK260-007(5)
TK260-005(5)
F1-30080FAx3
(10)
TB610-017
(1)
F1-30080FA x2(10)
TK610-289(5)
R5-02500FAx2(10)
B1-25050FAx2(10)
TS007-018(1)
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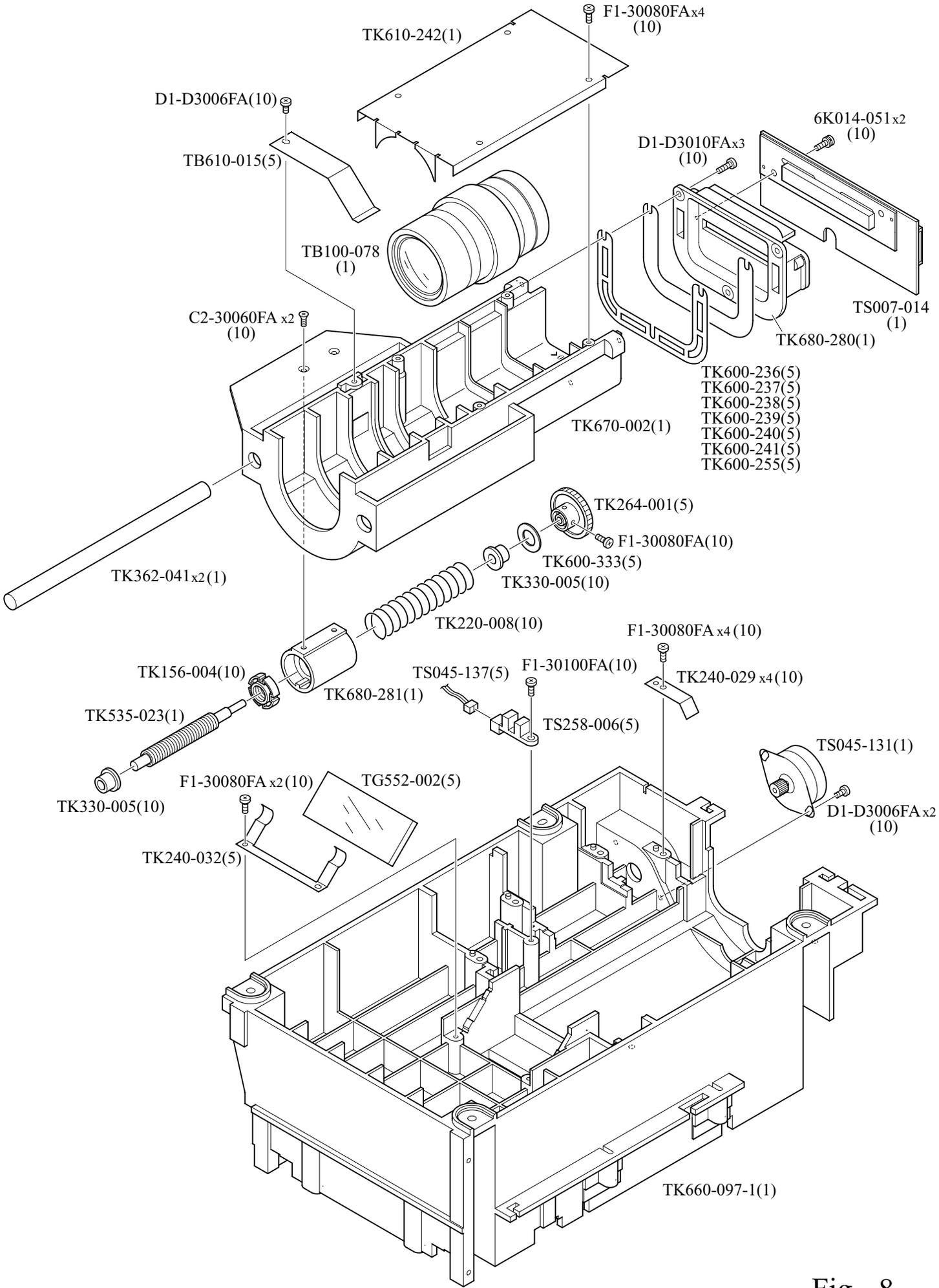
TB670-001-1(1)

Fig. 7


F1-30080FA x4
(10)
TK610-242(1)
D1-D3006FA(10)
TB610-015(5)
6K014-051 x2
(10)
D1-D3010FA x3
(10)
TB100-078
(1)
TS007-014
(1)
TK680-280(1)
C2-30060FA x2
(10)
TK600-236(5)
TK600-237(5)
TK600-238(5)
TK600-239(5)
TK600-240(5)
TK600-241(5)
TK600-255(5)
TK670-002(1)
TK264-001(5)
F1-30080FA(10)
TK600-333(5)
TK330-005(10)
TK362-041 x2 (1)
TK220-008(10)
F1-30080FA x4 (10)
TK156-004(10)
TS045-137(5)
F1-30100FA(10)
TK240-029 x4 (10)
TK680-281(1)
TK535-023(1)
TS258-006(5)
TS045-131(1)
F1-30080FA x2 (10)
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D1-D3006FA x2
(10)
TK330-005(10)
TK240-032(5)
TK660-097-1(1)

Fig. 8

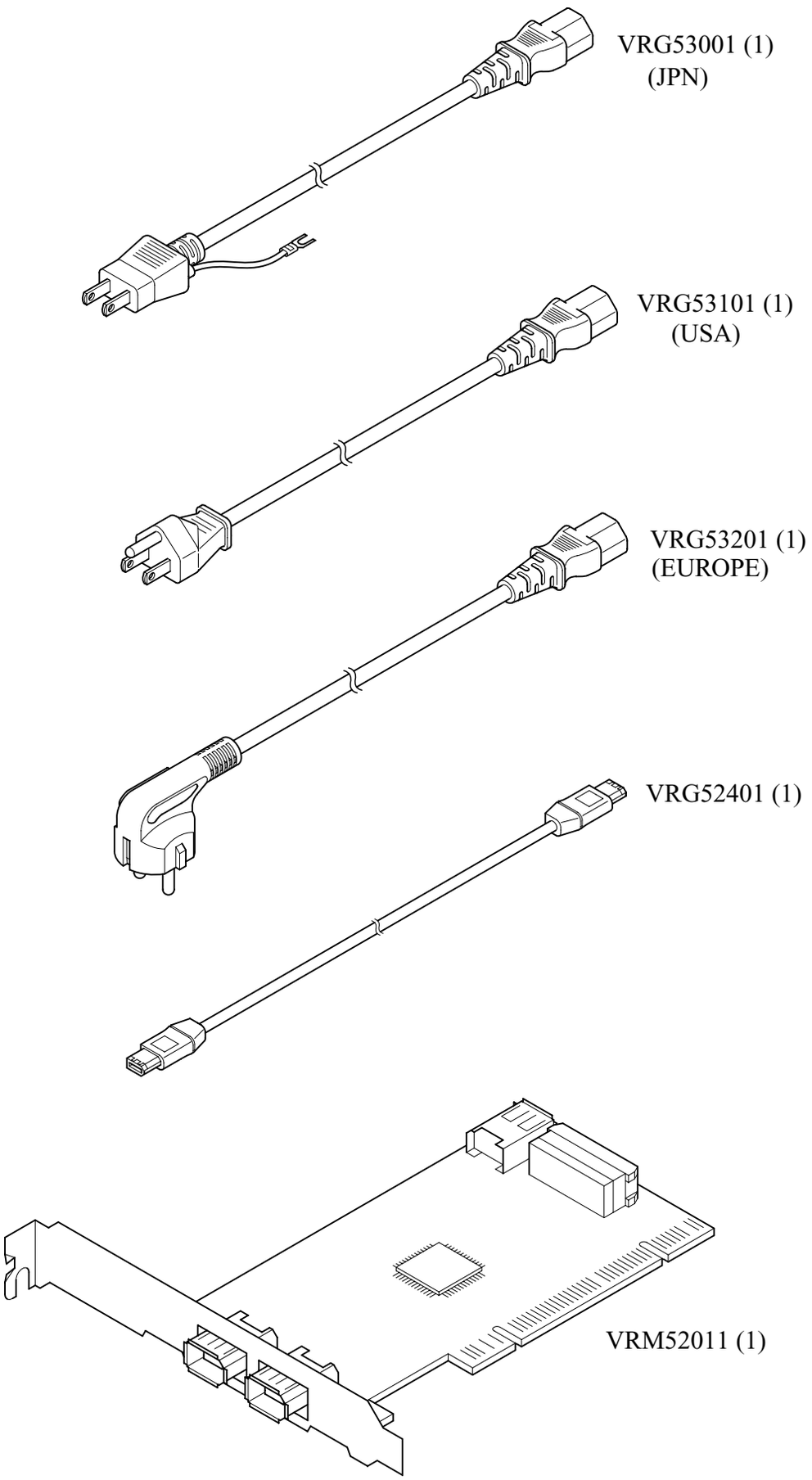
VRG53001 (1)
(JPN)
VRG53101 (1)
(USA)
VRG53201 (1)
(EUROPE)
VRG52401 (1)
VRM52011 (1)

Fig. 9

Parts List

LS9000

VRA51701-R.3607.A

Part Number	Part Code	名　　称	Part Name	Pcs, /Unit	fig No.	Main Assembly	Term of Deliver	Q'ty/ Order	Remarks
6B999-106	(6B999-106)	フロントパネル部組	FRONT PANEL UNIT	1	2		○	1	
＊6K014-051	(6K014-051)	小ネジ	SCREW	2	8		○	10	
＊B1-25050FA	(B1-25050FA)	小ネジ	SCREW	2	7		○	10	
＊C1-30030FA	(C1-30030FA)	小ネジ	SCREW	12	5,7		○	10	
＊C2-30060FA	(C2-30060FA)	小ネジ	SCREW	4	6,8		○	10	
＊D1-D2505FA	(D1-D2505FA)	小ネジ	SCREW	2	1		○	10	
＊D1-D3006FA	(D1-D3006FA)	小ネジ	SCREW	55	1,3,4, 5,6,8		○	10	
＊D1-D3010FA	(D1-D3010FA)	小ネジ	SCREW	3	8		○	10	
＊D1-D4010FA	(D1-D4010FA)	小ネジ	SCREW	5	3,4		○	10	
＊F1-30080FA	(F1-30080FA)	小ネジ	SCREW	32	2,6,7 ,8		○	10	
F1-30100FA	(F1-30100FA)	小ネジ	SCREW	1	8		○	10	
＊H1-20040FA	(H1-20040FA)	小ネジ	SCREW	7	2,5		○	10	
＊R5-02500FA	(R5-02500FA)	ワッシャー	WASHER	2	7		○	10	
TB060-026	(TB060-026)	ステムＬ部組	STEM L UNIT	1	5		○	1	
TB060-027	(TB060-027)	ステムＳ部組	STEM S UNIT	1	5		○	1	
TB100-078	(TB100-078)	レンズ部組	LENS UNIT	1	8		○	1	
＊TB610-010	(TB610-010)	ステージキャリッジ天板部組	STAGE CARRIAGE UPPER UNIT	1	7		○	1	

Part Number	Part Code	名　　称	Part Name	Pcs, /Unit	fig No.	Main Assembly	Term of Deliver	Q'ty/ Order	Remarks
TB610-015	(TB610-015)	レンズ押え板部組	LENS RETAINER UNIT	1	8		○	5	
TB610-017	(TB610-017)	ホルダーモーターベース板部組	HOLDER MOTOR BASE UNIT	1	7		○	1	
TB610-018	(TB610-018)	ホルダーギアベース部組	HOLDER GEAR BASE UNIT	1	7		○	5	
＊TB670-001-1	(TB670-001)	ステージキャリッジ部組	STAGE CARRIAGE BASE UNIT	1	7		○	1	
＊TG552-002	(TG552-002)	ミラー	MIRROR	1	8		○	5	
＊TK070-018	(TK070-018)	軸受	BEARING	2	6		○	10	
TK080-003	(TK080-003)	ＮＩＫＯＮ銘板	NIKON NAME PLATE	1	2		○	5	
TK083-032	(TK083-032)	フロントカバーシール	FRONT COVER SEAL	1	1		○	5	
TK087-020-2	(TK087-020)	定格銘板　S/No.	RATING PLATE S/No.	1	1		○	5	
＊TK110-155	(TK110-155)	ゴム足	RUBBER STAND	4	4		○	5	
＊TK110-156	(TK110-156)	カップリング	COUPLING	1	6		○	10	
＊TK110-157	(TK110-157)	モータマウント	MOTOR MOUNT	1	6		○	1	
TK110-209	(TK110-209)	ゴムカバー	RUBBER COVER	2	1		○	1	
＊TK115-063	(TK115-063)	電源部絶縁板	POWER SUPPLY SHIELD PLATE	1	3		○	1	
TK115-066	(TK115-066)	緩衝シート	BUFFER SHEET	2	5		○	5	
＊TK156-004	(TK156-004)	ＡＦキャリッジ送りナット	AF CARRIAGE NUT	1	8		○	10	
＊TK156-005	(TK156-005)	Ｓキャリッジ送りナット	S CARRIAGE NUT	2	6		○	5	

Part Number	Part Code	名　　称	Part Name	Pcs, /Unit	fig No.	Main Assembly	Term of Deliver	Q'ty/ Order	Remarks
TK208-005	(TK208-005)	電源スイッチボタン	POWER SW BUTTON	1	3		○	5	
TK208-006	(TK208-006)	ＥＪボタン	EJ BUTTON	1	2		○	5	
＊TK220-008	(TK220-008)	送りナットガタ取りばね	SPRING	1	8		○	10	
＊TK220-009	(TK220-009)	送りナット予圧ばね	SPRING	1	6		○	5	
＊TK220-010	(TK220-010)	送りナット予圧ばね	SPRING	1	6		○	10	
＊TK225-009	(TK225-009)	スイッチ引張ばね	SPRING	1	3		○	10	
＊TK230-008	(TK230-008)	ねじりばね	SPRING	1	2		○	10	
＊TK240-026	(TK240-026)	コネクタシールド板	CONNECTOR SHIELD PLATE	1	1		○	5	
＊TK240-027	(TK240-027)	レンズ押えばね	LENS RETAINING SPRING	2	5		○	10	
＊TK240-028	(TK240-028)	ホルダー押えばね	HOLDER RETAINING SPRING	1	5		○	10	
＊TK240-029	(TK240-029)	シャフト＆軸受押えばね	SPRING	12	6,8		○	10	
＊TK240-030-1	(TK240-030)	ホルダー押えばね（上）	SPRING	2	7		○	5	
＊TK240-031	(TK240-031)	ホルダー押えばね（横）	SPRING	1	7		○	5	
＊TK240-032	(TK240-032)	ミラー押えばね	SPRING	1	8		○	5	
＊TK260-005	(TK260-005)	ホルダー送り減速ギア　1	REDUCING GEAR 1	1	7		○	5	
＊TK260-006	(TK260-006)	ホルダー送り減速ギア　2	REDUCING GEAR 2	1	7		○	5	
＊TK260-007	(TK260-007)	ホルダー送り減速ギア　3	REDUCING GEAR 3	1	7		○	5	

Part Number	Part Code	名　　称	Part Name	Pcs, /Unit	fig No.	Main Assembly	Term of Deliver	Q'ty/ Order	Remarks
＊TK260-008	(TK260-008)	ホルダー送りギア	HOLDER GEAR	1	7		○	5	
＊TK264-001	(TK264-001)	送りねじ減速ギア	CONNECTING GEAR	1	8		○	5	
＊TK330-005	(TK330-005)	含油軸受け	BEARING	2	8		○	10	
＊TK362-040	(TK362-040)	ロッドレンズ	ROD LENS	1	5		○	1	
＊TK362-041	(TK362-041)	ＡＦガイドシャフト	AF GUIDE SHAFT	2	8		○	1	
＊TK362-042	(TK362-042)	ステージガイドシャフト	STAGE GUIDE SHAFT	2	6		○	1	
＊TK535-023	(TK535-023)	ＡＦキャリッジ送りねじ	AF CARRIAGE SCREW SHAFT	1	8		○	1	
＊TK535-024-1	(TK535-024)	Ｓキャリッジ送りねじ	S CARRIAGE SCREW SHAFT	1	6		○	1	
TK580-003-1	(TK580-003)	反射板	REFLECTION PLATE	2	5		○	5	
＊TK600-236	(TK600-236)	調整座金Ａ（Ｔ＝０．０５）	WASHER A (T=0.05)	0-1	8		○	5	
＊TK600-237	(TK600-237)	調整座金Ｂ（Ｔ＝０．１）	WASHER B (T=0.1)	0-1	8		○	5	
＊TK600-238	(TK600-238)	調整座金Ｃ（Ｔ＝０．３）	WASHER C (T=0.3)	0-1	8		○	5	
＊TK600-239	(TK600-239)	調整座金Ｄ（Ｔ＝０．５）	WASHER D (T=0.5)	0-1	8		○	5	
＊TK600-240	(TK600-240)	調整座金Ｅ（Ｔ＝１）	WASHER E (T=1)	0-1	8		○	5	
＊TK600-241	(TK600-241)	調整座金Ｆ（Ｔ＝２）	WASHER F (T=2)	0-1	8		○	5	
TK600-255	(TK600-255)	調整座金Ｇ（Ｔ＝０．０７）	WASHER G (T=0.07)	0-1	8		○	5	
TK600-331	(TK600-331)	リアパネル	REAR PANEL	1	1		○	1	

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TK600-332	(TK600-332)	ドア固定板Ｒ	DOOR FIXED PLATE R	1	2		○	5	
TK600-333	(TK600-333)	ガタ取りばね制限板	PLATE	1	8		○	5	
TK600-334	(TK600-334)	ワッシャー	WASHER	1	6		○	5	
TK600-335	(TK600-335)	キャリッジ送りモーターベース板	BASE PLATE	1	6		○	5	
＊TK610-240-1	(TK610-240)	カバー	COVER	1	5		○	1	
＊TK610-242	(TK610-242)	迷光防止カバー	NEEDLESS ILLUMINATION CUT COVER	1	8		○	1	
＊TK610-247	(TK610-247)	原点板	START POSITION PLATE	1	6		○	10	
TK610-283	(TK610-283)	カバー	COVER	1	1		○	1	
TK610-284	(TK610-284)	電源ベース	POWER SUPPLY BASE	1	3		○	1	
TK610-285	(TK610-285)	ドア固定板Ｌ	DOOR FIXED PLATE L	1	2		○	5	
TK610-286	(TK610-286)	基板取付け板	SUPPORT PLATE	1	4		○	1	
TK610-287	(TK610-287)	照明ベース	ILLUMINATION BASE	1	5		○	1	
TK610-289	(TK610-289)	センサー基板固定板	SENSOR PCB MOUNT PLATE	1	7		○	5	
TK620-004	(TK620-004)	底板	BOTTOM PLATE	1	4		○	1	
＊TK660-097-1	(TK660-097)	ＰＭベース	PM BASE	1	8		○	1	
＊TK670-002	(TK670-002)	ＡＦキャリッジ	AF CARRIAGE	1	8		○	1	
＊TK680-277	(TK680-277)	電源スイッチ	SWITCH AC POWER	1	3		○	1	

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Part Number	Part Code	名　　称	Part Name	Pcs, /Unit	fig No.	Main Assembly	Term of Deliver	Q'ty/ Order	Remarks
＊TK680-280	(TK680-280)	ＣＣＤホルダ	CCD HOLDER	1	8		○	1	
＊TK680-281	(TK680-281)	送りナットハウジング	AF CARRIAGE NUT HOUSING	2	6,8		○	1	
TK680-356	(TK680-356)	ドア	DOOR	1	2		○	1	
＊TS007-012	(TS007-012)	中継ＦＰＣ部組	RELAY FPC UNIT	1	7		○	1	
TS007-014	(TS007-014)	ＣＣＤ部組	IMAGE SENSOR UNIT	1	8		○	1	
TS007-016	(TS007-016)	ＥＪ基板部組	EJ PCB UNIT	1	2		○	1	
TS007-017	(TS007-017)	照明基板部組	ILLUMINATION PCB UNIT	1	5		○	1	
TS007-018	(TS007-018)	センサ基板部組	SENSOR PCB UNIT	1	7		○	1	
TS015-004	(TS015-004)	ＭＡＩＮ基板部組	MAIN P.C.B. UNIT	1	3		○	1	
＊TS045-130	(TS045-130)	ＳＣＡＮモータ部組	SCAN MOTOR UNIT	1	6		○	1	
＊TS045-131	(TS045-131)	ＡＦモータ部組	AF MOTOR UNIT	1	8		○	1	
＊TS045-132	(TS045-132)	ホルダモータ部組	HOLDER MOTOR UNIT	1	7		○	1	
＊TS045-136	(TS045-136)	電源ケーブル部組	POWER SUPPLY CABLE UNIT	1	3		○	1	
＊TS045-137	(TS045-137)	ＡＦセンサケーブル部組	AF SENSOR CABLE UNIT	1	8		○	5	
TS045-218	(TS045-218)	ＥＪ部組	EJ UNIT	1	2		○	1	
TS045-268	(TS045-268)	照明ケーブル部組	ILLUMINATION CABLE UNIT	1	3		○	1	
＊TS050-005	(TS050-005)	電源部組	POWER SUPPLY	1	3		○	1	

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＊TS258-006	(TS258-006)	ＡＦセンサ	AF SENSOR	1	8		○	5	
TS880-002	(TS880-002)	ＣＣＤケーブル部組	IMAGE SENSOR CABLE UNIT	1	3		○	1	
＊VRG52401	(VRG52401)	ＩＥＥＥ１３９４ケーブル(SC-LS1)	IEEE1394 CABLE(SC-LS1)	1	9		○	1	
＊VRG53001	(VRG53001)	電源コード　PW-51(JPN)	POWER SUPPLY CORD PW-51(JPN)	0-1	9		○	1	
＊VRG53101	(VRG53101)	電源コード　PW-52(USA)	POWER SUPPLY CORD PW-52(USA)	0-1	9		○	1	
＊VRG53201	(VRG53201)	電源コード　PW-53(EUROPE)	POWER SUPPLY CORD PW-53(EUROPE)	0-1	9		○	1	
VRM52011	(VRM52011)	ＩＥＥＥ１３９４　Ｉ／Ｆボード	IEEE1394 I/F BOARD	1	9		○	1	