TW ZOOM 105 FCA13001

ZoomTouch 800 FCA13101

TW ZOOM 105 WORLD TIME FCA13201

ZoomTouch 800 WORLD TIME FCA13301

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

Printed in Japan January 1992

Specifications

Specifications

1. Outline

Model: Nikon TWZoom 105 (FCA13001).
Nikon TWZoom 105 World Time (FCA 13201).
Nikon Zoom Touch 800 (FCA13101).
Nikon Zoom Touch 800 World Time (FCA13301).

Main features:
A full-automatic lens shutter camera with zoom optics:

1) Motor-driven electric zoom system with 3x zoom ratio (37-105mm f/3.7-9.9).
2) Lens protection cover.
3) Zoom viewfinder and zoom flash.
4) 3-mode zooming: Continuous zoom; Continuous zoom shooting, and image-size selector.
5) Wide-area-passive AF with AF illuminator allowing close-up photography up to 80cm in the entire zoom range.
6) Forced infinity driving.
7) Focus tracking.
8) Spot AF.
9) Manual focus setting.
10) Digital distance indication.
11) Frame skip function.
12) Flash pre-firing mode with machine learning.
13) Speedlight with automatic back-light correction function.
14) Data back with world clock function featuring 11-mode imprinting including alphabet (for models with date function).

2. Specifications

Type of camera:	35mm full-automatic lens shutter camera with zoom optics.
Picture format:	24mm x 36mm.
Usable film:	Cartridge-packed film with DX code.
Lens:	
1) Focal distance:	37mm(Wide)-105mm(Tele) (nominal value).
2) F-number:	f/3.7 - 9.9
3) Lens construction:	9 elements in eight groups (3x zoom ratio)
4) Shooting distance:	0.8m to infinity (in the entire zoom range).
5) Zooming:	Double-helicoid (front lens group)
6) Lens driving amount:	W: 6.55mm, T: 52.8mm.
7) Focusing mechanism:	Front lens group helicoid feeding method.
8) Amount of focus driving:	1.846mm (maximum).

Autofocus:

1) Type:	Electrical triangle focusing by wide area passive method; with AF illuminator; capable of focus tracking, forced infinity driving and spot focusing.
2) Autofocus lock:	Activated by pressing the shutter release button slightly. (S1 is ON)

Exposure control:

1) Shutter:	Programmed lens shutter: also serves as diaphragm blade.
2) Sensor module:	Two-segment SPD.
3) Metering range: (ISO 100)	W: EV4 ~ 15, T: EV7 ~ 17 (nominal value).
4) Flash:	AF linked electronic flashmatic fires while shutter is opening.
• Guide No.:	W: 17 ~ T: 21 (at ISO 100).
• Charging time:	Approx. 3.5 sec.

Viewfinder:

1) Type:	Real image zoom finder.
2) Lens construction:	Seven elements in six groups; prism and mirror.
3) Ratio of viewfield/ magnification:	Approx. 85% W: 0.45x — T: 1.18x (at 3m distance).
4) Diopter:	-1DP/+0.5DP (selectable).

Film advance:

1) Method:	Electric spool drive system.
2) Blank exposure:	
• Normal blank exposure:	Performed when the camera back is closed; completed after advancing four frames.
• Special blank exposure:	Random or programmed number of frames are advanced after the normal blank exposure is carried out. (Frame skip mode)

LCD display:

(1) LCD indications on camera body:

1) Frame counter (frame number/EL error warning/measured distance/ self-timer set time/exposure correction value).
2) Flash mode
3) Lens barrel driving abnormal stop warning
4) Self-timer/two-shot self-timer mode
5) Image-size/focus tracking AF mode
6) Zooming/continuous shooting mode
7) Battery exhaustion warning
8) Exposure compensation mode
9) Special blank exposure mode
10) Forced infinity driving mode

11) Wide AF/spot AF
12) Zoom bar

(2) Data back: Multi-mode date indication (y/m/d, d/hr/min, letters, m/d/y, d/m/y, y/m/d/hr/min, d/hr/min/letters, y/m/d/letters, m/d/y/hr/min, d/m/y/hr/min) corresponding to 24 areas around the world; capable of day light saving time setting.

External terminal: Communication terminal for tools (also serves as a DB terminal.)

Accessory mount:
1) Camera strap eyelet.
2) Tripod socket.

Power source: 6V lithium battery pack (Panasonic CR-P2 or Duracell 223A); CR2025 x 2 (for data back only)

Dimensions: 152(W) x 81.3(L) x 74.5(D) mm (AF model)
152(W) x 81.3(L) x 78.4(D) mm (World Time model)

Weight:
- AF model: 500g (without battery pack).
- World Time model: 520g (without battery pack; battery for date included).

Functions

Blank exposure: Starts in approx.400ms when the camera back is closed (BBS is turned OFF); stops when four frames are advanced without exposure.

Blank exposure error: Automatically stops when the film is not advanced due to idling of the spool motor. (Absence of FSS input is detected in 2.4 seconds)

LCD indications during blank exposure operation:
1) In process: Indicator blinks at 2Hz.
2) Completion: "1" is shown on the frame counter for six seconds. Then, all LCD indicators go out if no operation is performed.
3) Blank exposure error: "E" blinks at 2Hz for six seconds. Then, all LCD indicators go out if no operation is performed.
4) No film: "E" blinks at 2Hz for six seconds. Then, all LCD indicators go out if no operation is performed.
5) Camera back open: All LCD indicators go out.

Frame skipping: In addition to the normal four frame blank exposure mentioned above, the following two frame skip modes are available:

1) Random SKP mode (manual skip mode):
   Frame number to be skipped is set manually.
2) Programmed SKP mode (auto skip mode):
   Film is skipped automatically to the programmed frame if the following conditions are satisfied:
   - Film loaded before last was rewound before reaching its end of roll.
   - The previous ISO value had changed from the one before last.
   - The present ISO value is different from the previous one.

Note:
In both skip modes, one more frame is always advanced than the number shown on the frame counter when the skip operation is completed (to prevent frame overlap).

Shutter pre-release switch:
Following operations are carried out when this switch is operated:

(1) When turned ON:
1) Battery check.
2) Metering.
3) Autofocus (focus lock; distance warning; distance indication).
4) Viewfinder LED lights up/blinks/goes out.
5) Flash monitor oscillation (when ambient light is insufficient).
6) Flash charging completion monitor (shutter release is locked when flash is not fully charged when ambient light is insufficient; yet oscillation continues.)
7) Prohibition of inputs by other switches.

(2) When turned OFF:
1) The viewfinder LED goes out.
2) Flash oscillation is completed when the flash is fully charged or charging timer is up.

Autofocus:

(1) Distance measurement: Processed and controlled by analyzing the phase difference of subject images which converged on the multi-divided segment SPD through different optical paths.
(2) Focusing: The front lens group helicoid is driven by a dedicated stepping motor.
(3) Number of steps: 60 steps (in entire zoom zone).
(4) AF illuminator: Illuminates light automatically in BV2 or low-contrast conditions.
(5) Distance warning: Green LED blinks if the subject is within the closest focal distance, or out of the range specified in SB mode.

(6) Focusing mode:
1) Wide AF: Uses entire focus zone inside the viewfinder.
2) Spot AF: Uses central one-third of the zone used in the Wide AF.
3) Forced infinity: The lens barrel is fixed on infinity (step 1) regardless of subject distance.
4) Focus tracking: While the pre-release switch (S1) is ON, distance measurement is repeated intermittently. Based on this information, when the S2 is ON the subject distance is calculated for exposure, and the lens barrel is driven to the target zone.

(7) Distance indication: When the pre-release switch is ON, measured subject distance is indicated on the LCD counter. Either meters or feet indication can be selected except in focus tracking mode.

(8) Signal absence process (average step):
In cases where no AF signal can be detected (i.e.low contrast, out of range of the AF illuminator in low light conditions), the lens barrel is driven to the average step based on the AF driving history.

AF related indications:

Display Mode	Green LED	LCD	
		Mode mark	Distance indication
Wide AF	Lights up/ blinks at 2Hz	WIDE AF	Yes
Absent signal	Blinks at 8Hz.	No	Distance corresponding to average step.
Focus tracking	Lights up/ blinks.	Image-size lights up in order.	No
Forced infinity	Lights up.	Mountain	88
Spot AF	Lights up/ blinks at 2Hz.	SPOT AF	Yes

Correspondence between indicated distance and step:

Indicated distance		Driving	Indicated distance		Driving
m	feet	Step	m	feet	Step
88	88	1	1.6	5.3	29
20	66	3	1.5	4.9	31
10	33	4	1.4	4.6	33
8	26	6	1.3	4.3	36
5	16	9	1.2	3.9	40
4	13	12	1.1	3.6	44
3	10	15	1.0	3.3	50
2.5	8	18	0.9	3	56
2	7	23	0.8	2.6	60
1.8	6	26	-	-	-

Manual focus:

(1) Setting: When RSS is ON for three seconds, MF setting mode is selected. Focus distance is set with ZSW.

(2) Display: In MF setting mode, "0.8m" (2.6 ft.) shown on the frame counter blinks. In this state, AF mode mark on the LCD display goes out.

(3) Operation: When S1 is turned ON, the set distance is displayed and the green LED lights up. By turning ON ISS, MF setting mode and fixed mode are interchanged with each other.

(4) Release: Turn RSS ON for three seconds, open the camera back, replace the batteries, or turn MSW off.

Metering & exposure mode: Based on the central/peripheral brightness output (central: CBV, peripheral: RBV) supplied by the two-segment SPD, exposure control, flash firing determination and back-light detection are performed.

(1) Exposure metering range: BV-2 ~ 12

(2) Back-light detection: Back-light is detected when the difference of brightness between the central and peripheral areas is 0.875EV.

(3) DX code:

Setting	1	2	3	4	ISO range
64	L	L			50, 64, 80
100	L		L		25, 32, 40, 100, 125, 160, non DX
200	L	L	L		200, 250, 320
400	L			L	400, 500, 640
1000	L	L		L	800, 1000, 1250
1600	L		L	L	1600, 2000, 2500
3200	L	L	L	L	3200 or more.

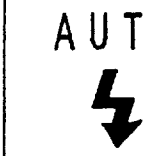
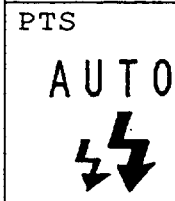
Speedlight:

(1) Oscillation:

1) Starts: when S1 is turned ON if the speedlight is not charged; when S1 is turned OFF if film is advanced after firing.

2) Impossible: when advancing film; when film rewinding is completed; during zooming; during metering or focusing.

Operations in each mode:

LCD display	Operation	Back-light correction	Shutter speed
AUTO 	• SB or back-light correction mode is selected automatically. • If distance is approx.5.7m or more when taking back-lit subject exposure is controlled in AE mode. • In focus tracking mode, exposure is detected by the distance measured just after S1 is turned on.	Firing timing is controlled at -1EV for the FM calculation value.	1/70 sec.
PTS 	• Common to AUTO mode except pre-firing. • LED blinks in unusual manner to indicate pre-firing.	Same as AUTO.	1/70 sec.
Firing pro-hibition 	• Flash can not be fired regardless of the brightness of subject. (AE control mode)		1 sec.
Forced firing 	Same as AUTO mode except following two points: • Flash always fires regard-less of the brightness of subject. • Firing timing is control-led at -1EV for the FM cal-culation value either in AE or in back-light correction mode.	Same as AUTO.	1/70 sec.
Slow synchro 	• Same as AUTO mode except flash control. • Longer shutter speed (1/4 sec.) is selected auto-matically when brightness is within the range of SB mode condition.	Same as AUTO.	1/4 sec.

Low-brightness standard value in SB mode:

Zone	Standard EV	Zone	Standard EV	Zone	Standard EV
1	13.000	9	12.000	17	10.000
2	12.875	10	11.875	18	10.875
3	12.750	11	11.750	19	10.750
4	12.625	12	11.625	20	10.625
5	12.500	13	11.500	21	10.500
6	12.375	14	11.375	22	10.375
7	12.250	15	11.250	23	10.250
8	12.125	16	11.125	24	10.125

(2) Too-far-warning:
If either one of the below conditions is satisfied in SB mode, subject is out of flash shooting distance range. The green LED blinks to indicate under-exposure.
* In focus tracking mode, this function does not work.

ISO range	64 - 200	400 - 3200
Step range to be warned.	Step 1 - 8 (5.06m or farther).	Step 1 - 4 (9.5m or farther).

(3) Continuous firing prohibition:
When the flash has been fired specified number of times during continuous firing mode, oscillation is prohibited for a fixed period to prevent overheating.

Viewfinder internal LED indication:

	Red LED		Green LED	
Lighting up	Flash firing ready		Focusing OK	
Blinking	4Hz	Charging insufficient warning.	2Hz	Too-close-warning. Too-far-warning
	Unusual blinking	PTS ready.	8Hz	Disabled focusing warning.
Gone out	Flash never fired.		Battery error.	

Film advance/rewind operation:
(1) Advancing:
When a free sprocket signal is detected, film advances one frame. (8 pulses/one frame)

(2) Rewinding:
1) Auto U-turn:
If no sprocket signal is detected within approximately 2.4 seconds after releasing shutter, or the frame counter counts up to 37, film loaded is rewound automatically.

2) Manual U-turn:
When MUS is ON for 0.3 second manually, film loaded can be rewound from the present frame.
3) Lens barrel reset:
Either in manual or auto film rewind mode, film rewind starts when the lens barrel has been driven to reset position. If the lens barrel is stopped abnormally on its way to the reset position, film rewind starts at that time.
4) Rewind latch and latch release:
When rewinding a film, rewinding status is latched; however, rewinding can be interrupted and restarted by operation of the main switch .
5) Post-rewind processes:
When film rewind is completed, the film advance/rewind motor rotates in normal direction for 0.15 seconds to release the film rewind fork. On the LCD display, "E" indication blinks and all input operations become impossible.

* In either auto or manual U-turn mode, film rewind is completed leaving the film tongue outside the film cartridge.

Self-timer:
(1) LED indication:
1) When the self-timer or two-shot self-timer is activated for the first shooting, the LED lights comes on for seven seconds and blinks for three seconds at 4Hz.
2) When the self-timer or two-shot self-timer is activated for the second shooting, the LED lights comes on for two seconds and blinks for three seconds at 4Hz.
* Depending on the firing conditions, LED light-up duration may become three seconds longer.
(2) Adjustment of self-timer duration:
To adjust the self-timer set time, turn MOS button ON for three seconds to enter into the time adjustment mode. The time can be adjusted in 5 second increments from 5 to 30 seconds using the zoom lever.

Zoom functions:
(1) Continuous shooting/zoom continuous shooting:
1) Continuous shooting:
As long as S2 is ON, shutter is released continuously at the same focal length.
2) Zoom continuous shooting:
If the lens barrel is at the Tele end, the lens barrel is driven to the Wide end. Otherwise, it is driven to the Wide end first, then driven to the Tele end. Driving stops at 37mm, 70mm, and 105mm respectively and shooting is carried out at each stop. After shooting three frames, this mode is reset.
3) Metering & focusing:
Whenever film advance is completed both AE and AF functions are locked.

(2) Image-size selector:
Once the three possible shooting magnifications (full/half/up) are set, the focal length is automatically adjusted for the magnification when S1 is turned ON according to the measured subject distance.

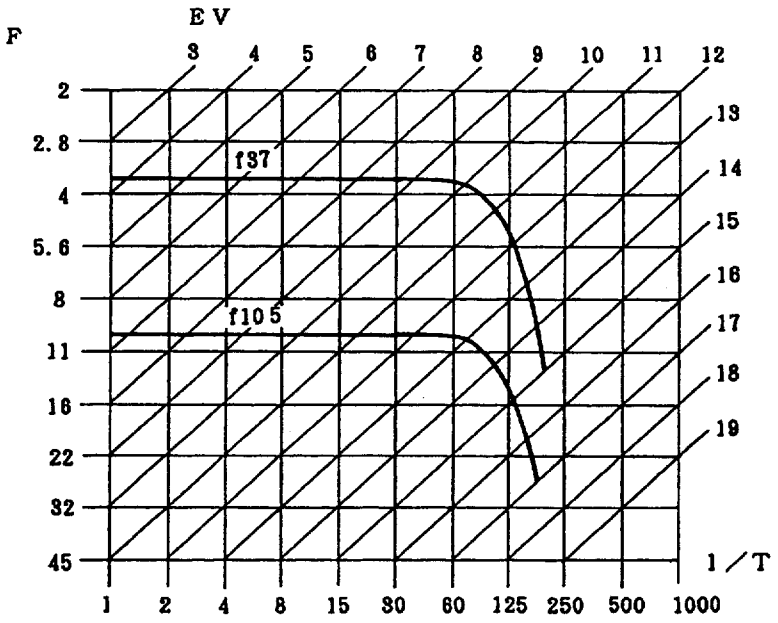
*If neither of these magnifications is realized, even when the lens barrel reaches either Wide or Tele end, shutter release will be permitted at the end.

Subject distance and zoom zone:

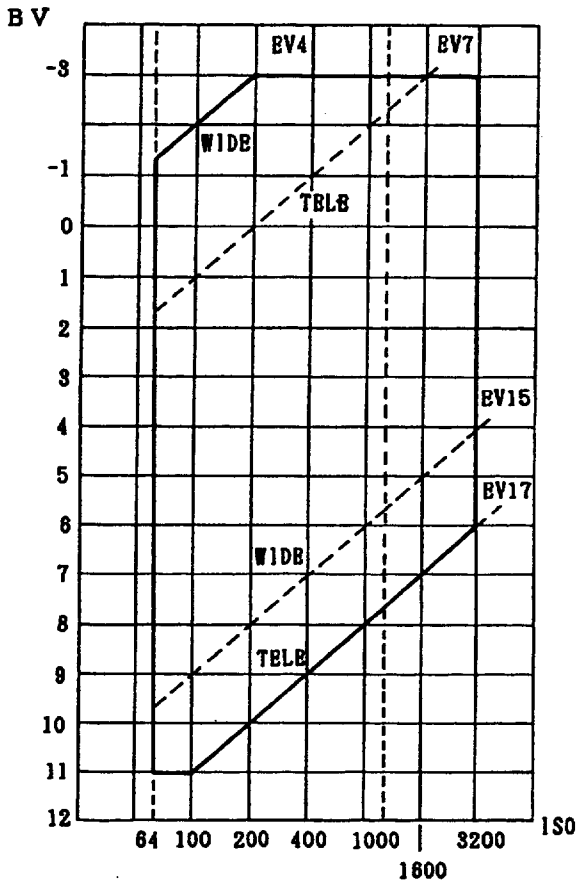
1/125x		1/60x		1/30x	
					
Full		Half		Up	
Distance step	Zone	Distance step	Zone	Distance step	Zone
1 ~ 3	1	1 ~ 8	1	1 ~ 16	1
4	4	9 ~ 10	6	17 ~ 19	4
5 ~ 6	10	11 ~ 12	11	20 ~ 22	8
7 ~ 8	18	13 ~ 15	15	23 ~ 25	11
9 ~ 11	24	16 ~ 18	19	26 ~ 29	14
12 ~ 60	24	19 ~ 21	23	30 ~ 33	17
		22 ~ 60	24	34 ~ 37	20
				38 ~ 43	23
				44 ~ 60	24

*The magnifications above are not exact.

AE program chart:



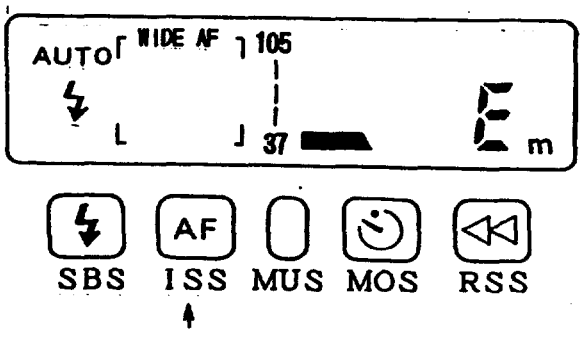
AE range chart:



Manual inspection mode

1. Manual inspection mode input procedure:

1) Turn the power ON. The lens barrel stops at other than RESET position and LCD is lit.
2) Turn ISS (AF button) ON, then immediately afterward, turn ZUS (zoom-up switch) and S1 (pre-release switch) ON. Keep these three switches ON for nine seconds.

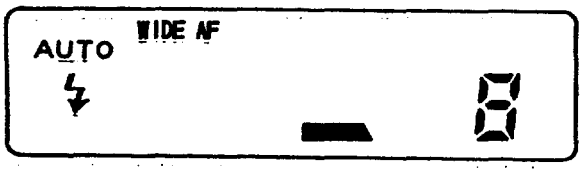


Turn ISS ON.

Turn the pre-release switch (S1) ON.

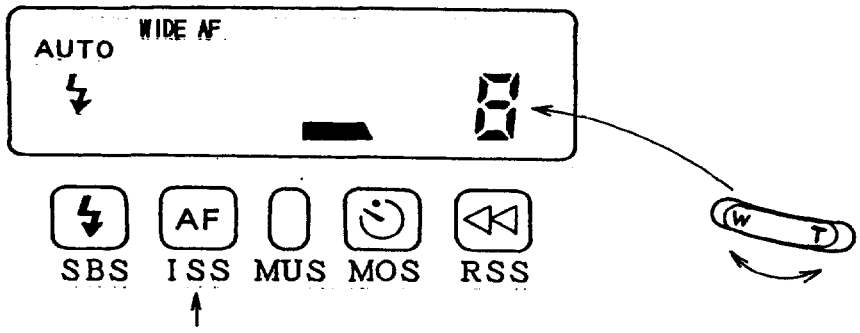
Turn ZUS ("T" side of zoom switch) ON.

3) During the initial manual inspection mode, the zone indicator, distance indicator (m/ft) and AF indication frame go out; frame counter is "0".



2. Command selection and switch/data setting

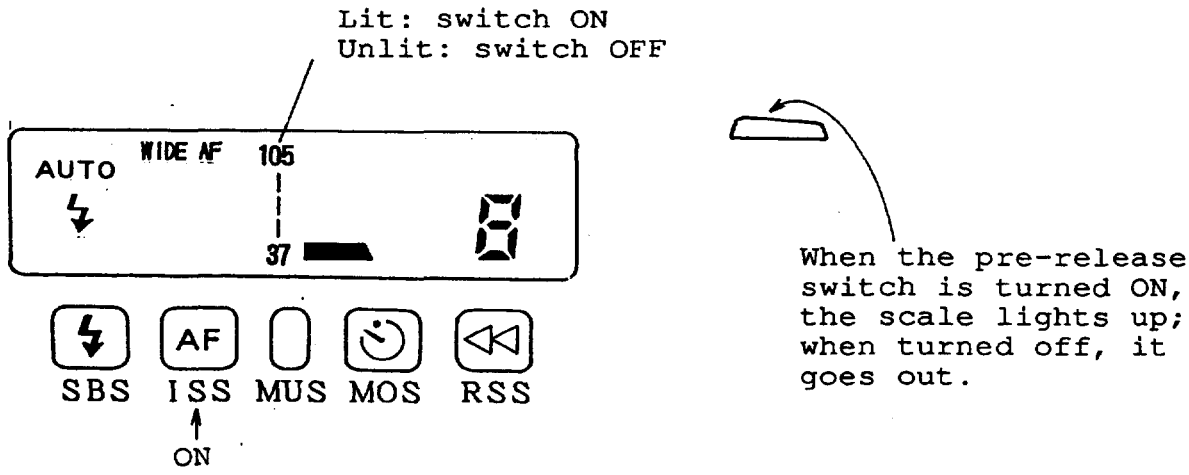
1) In manual inspection mode, turn ISS ON again for three seconds.
2) Turn ZSW to either the "W" or "T" side while keeping ISS ON. Then, a number corresponding to each command is indicated on the frame counter. This number shows the command currently selected.
   The current switch setting is indicated by the scale of the lens barrel zone indicator being lit, or, unlit. When the command to execute is selected, turn ZSW OFF while keeping ISS ON.



ON for three seconds.

"W" side to count down.
"T" side to count up.

3) Turn S1 ON while ISS is ON. The scale of the zone indicator (lit until now) goes out. This indicates the changeover of switch of current command.



4) When READ command of either AF step, ISO value, AE value or EV value is selected, the selected data is indicated on the frame counter.
   * By repeating the above process while remaining ISS ON, multiple commands can be set simultaneously.

3. Releasing manual inspection mode:

Manual inspection mode is released in the following cases:

- When the lens barrel is driven to the reset position by MSW (main switch) operation.
- When the timer duration (three minutes) is up.

Inspection command table:

No.	Command	Switch	Indication	Contents
0	Bulb permission	OFF	No	Prohibits bulb mode.
		ON		Permits bulb mode.
1	Bulb	OFF	No	Normal shutter release.
		ON		Bulb exposure is carried out when S2 is turned ON if bulb permission is selected.
2	READ of AE value	OFF	C.EV	C.EV and R.EV values are indicated by the AE process when S1 is turned ON.
		ON	R.EV	
3	AF step value	OFF	Step (1 ~ 60)	Indicates AF step value just before shutter release.
		ON		Indicates AF step value just before shutter release or setting step value set manually.
4	ISO value	OFF	DIN (19 ~ 36)	Reads out and indicates the present ISO value.
		ON		Reads out and indicates the present ISO value or the value set manually.
5	Step zoom	OFF	Zone (1 ~ 24)	Reads out and indicates the present lens barrel zone value.
		ON		Drives the lens barrel at every zone; indicates zone value when completed.
6	READ of AF value	OFF	m/ft.	Indicates measured distance when S1 is turned ON.
		ON	Step (1 ~ 60)	Indicates AF step value when S1 is turned ON.
7	READ of EV value	OFF	EV	Indicates EV value which drives shutter.
		ON		

Note on the above table:

1) Switch is OFF when the scale of the lens barrel zone indicator goes out, ON when lit. During initial manual inspection mode, switch is kept OFF.
2) Items in indication column are the values shown on the frame counter when S1 is turned ON.

4. Operations executed by each command in manual inspection mode:

(1) Shutter bulb (command No. 0.1):
 a. When S2 is turned ON, bulb exposure is carried out.
 b. To close the shutter, turn S2 ON again.

(2) AE value readout (command No. 2):
 a. When either S1 or S2 is turned ON while aiming the unit toward subject, results of the AE process (CEV, REV) are stored in RAM.
 CEV and REV are calculated by adding ISO value and exposure compensation value to the results of the metering.
 b. AE value is indicated in CEV and REV. (Refer to Table 1.)

(3) AF step readout (command number 3):
 a. When either S1 or S2 is turned ON while aiming the unit toward subject, result of the AF process (AF step) is stored in RAM.
 b. The step value can be set arbitrarily by operating S1 and ZSW.

(4) Setting of DIN value readout (command No. 4):
 a. When used with exposure compensation, DIN value is limited to ISO 25 ~ ISO 3200.
 b. The DIN value can be set arbitrarily by operating S1 and ZSW. (Refer to Table 2.)

(5) Lens barrel zone readout and step zooming (command No. 5):
When ZSW is turned ON, the lens barrel is driven outward/inward by one zone and stops. Then the present zone value is indicated. If ZSW remains ON for another 500ms, the lens barrel will be driven to next zone.

(6) READ of AF step value (command No. 6):
When S1 is turned ON, step value is indicated. This step value is not yet compensated, calculated with the distance measured when S1 is turned on. This indication is not carried out in focus tracking mode.

(7) READ of EV value (command No. 7):
When either S1 or S2 is turned on while aiming the unit toward subject, the result of the AE process (EV value) is stored in the RAM. Then READ of EV value command is selected to readout the EV value.
This EV value is attained by performing the high- and low-brightness limit process and zone difference value to the original EV value calculated from REV and CEV. Shutter is actually opened/closed with this EV value. (Refer to Table 1.)

DISASSEMBLING

1. Disassembling to rear body and lens barrel unit

2. Rear body

3. Lens helicoid

DISASSEMBLING

Note: ① Remove batterise before disassembling.

② When disassembling, pay attention to the wire arrangement and mounting positions and types of screws to be removed.

③ Be sure you are grounded when holding main FPC because static electricity exerts serious adverse effects on ICs.

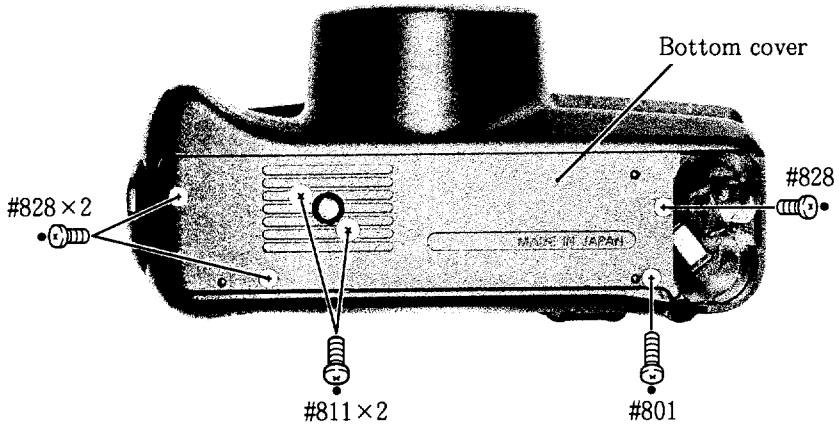
④ The " ● " mark on the screws indicates they are tap-tight screws.

⑤ The tone of pictures may be different from actual one. Make sure of the shape of parts when disassembling and reassembling.

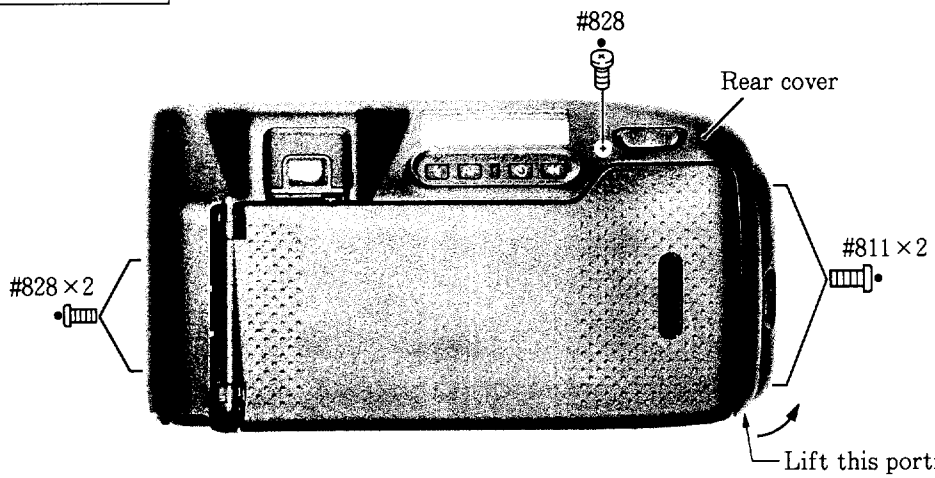
⑥ When removing gears, make sure to distinguish the front and back sides.

1. DISASSEMBLING TO REAR BODY AND LENS BARREL UNIT

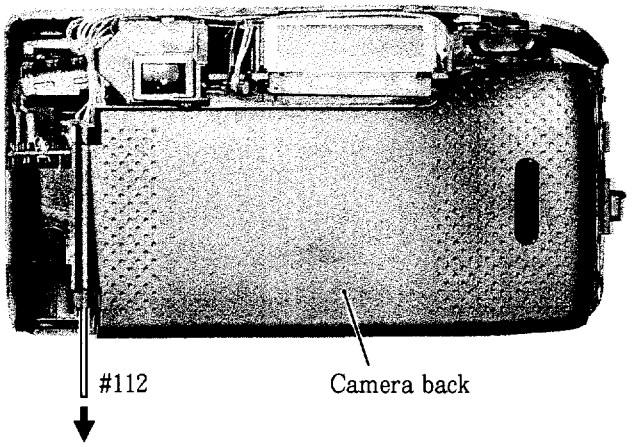
BOTTOM COVER



REAR COVER



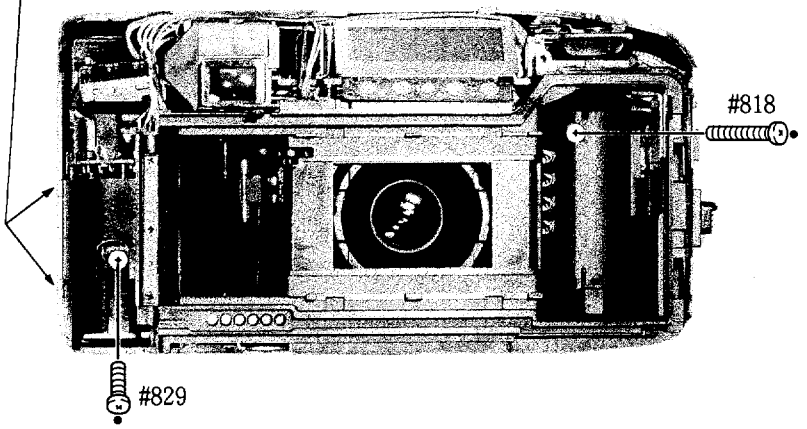
CAMERA BACK



- Pull out the back door shaft #112 to remove the back door.

FRONT COVER

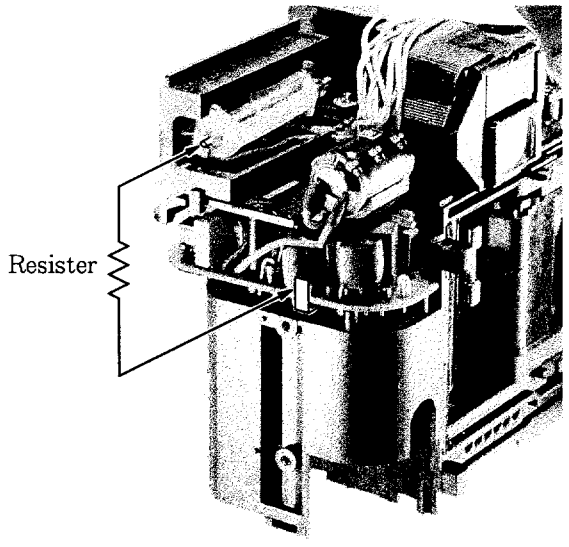
Remove the hinged two portions between the front cover and the body.



- When removing the front cover, the shutter release button and light-baffle ring are simultaneously removed.

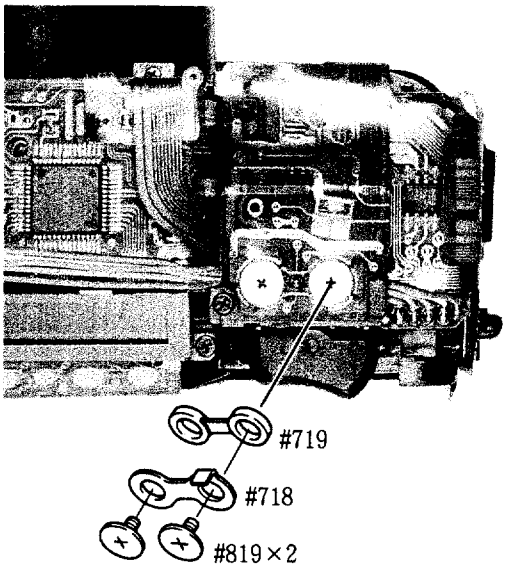
Note: Be careful not to bend the power SW brush when removing the front cover.

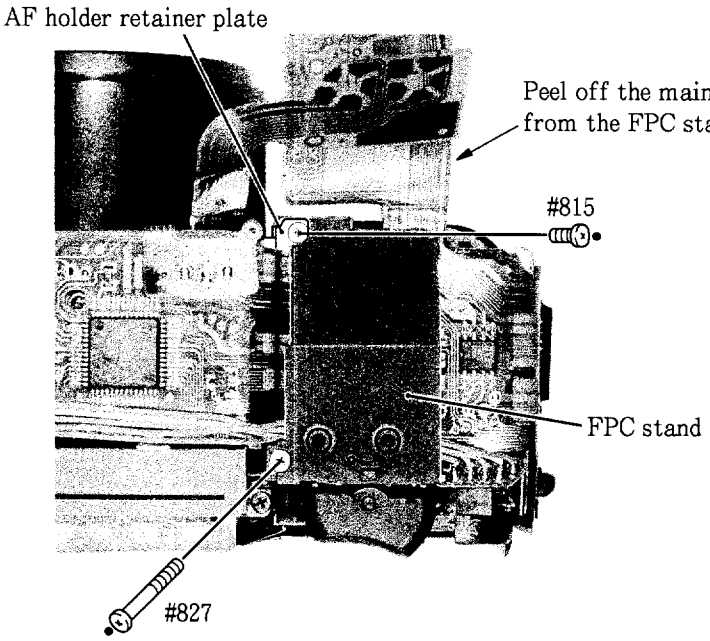
DISCHARGING OF THE MAIN CONDENSER



- Discharge the main condenser between the positive electrode (+) of the Xe tube and the negative contact (−) of battery.
- Use 2KΩ／5W resister to discharged.

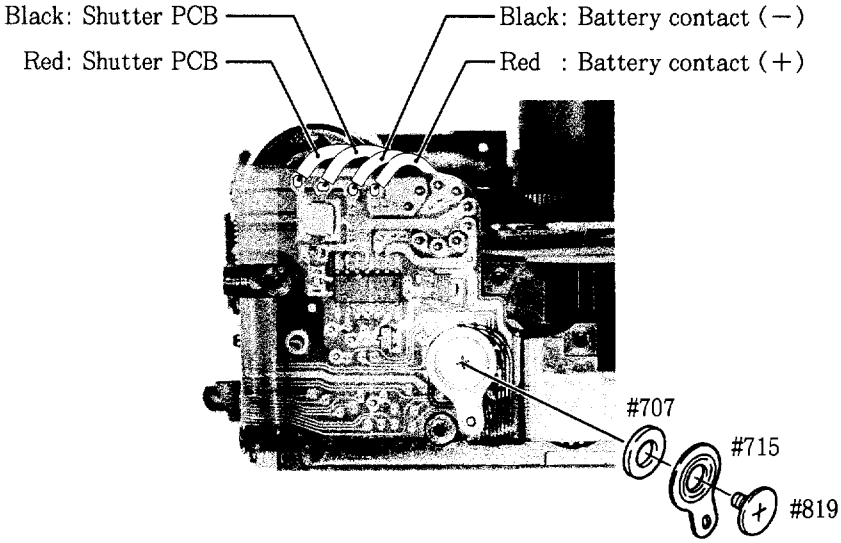
REMOVING PRESS-CONTACT, FPC STAND



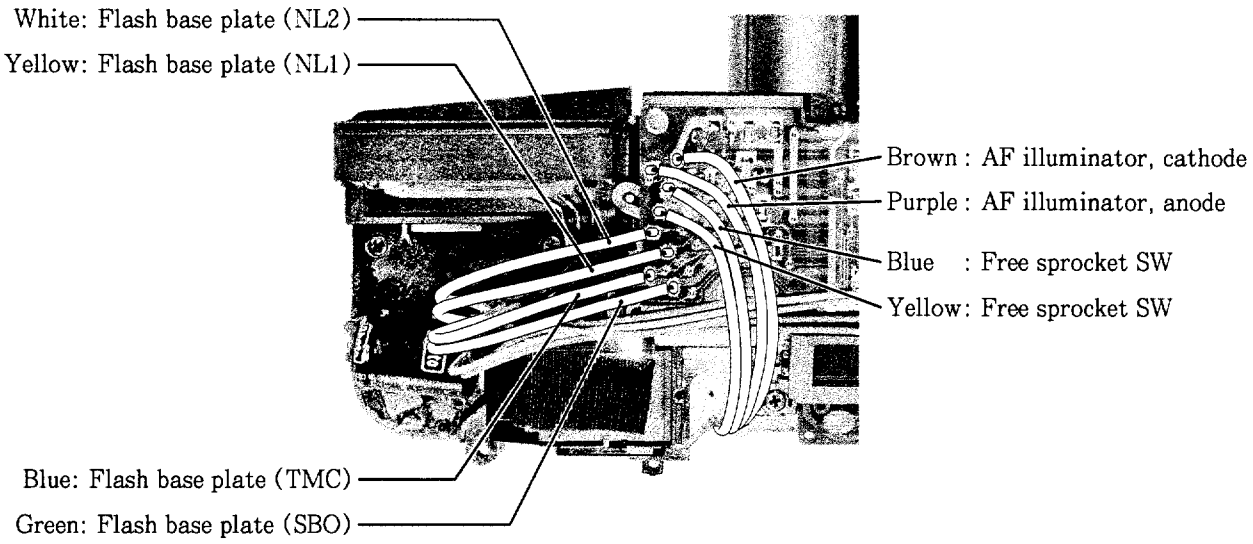


MAIN FPC

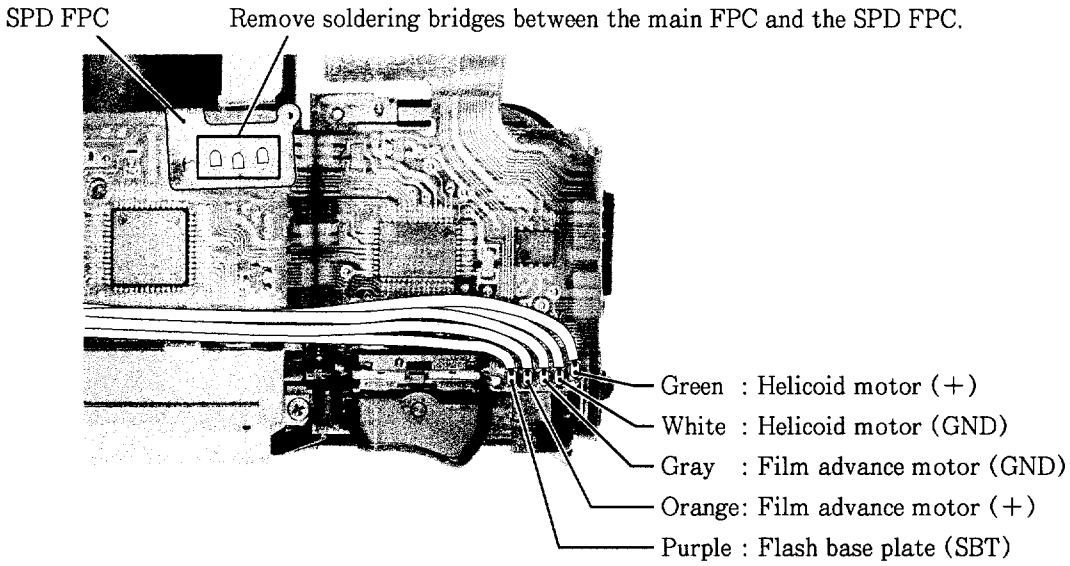
1. Removing the grip side bottom wires and press-contact



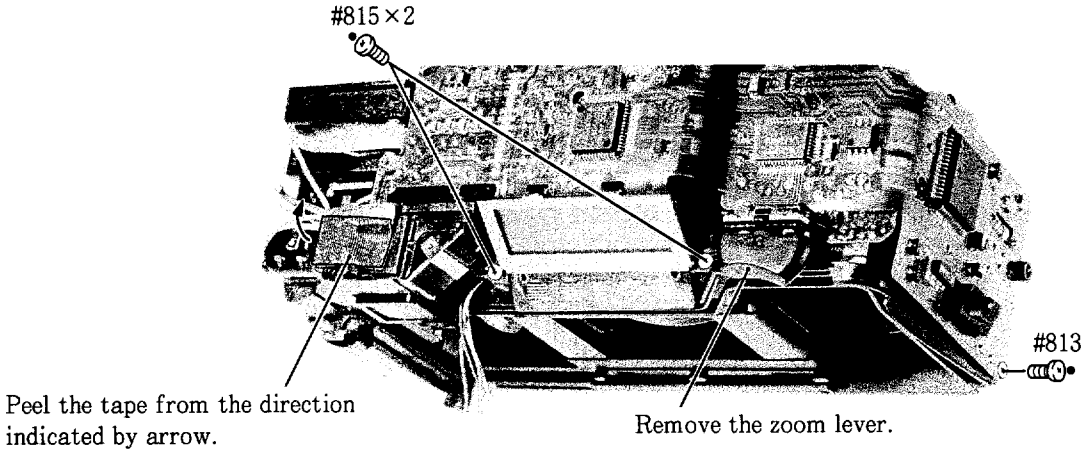
2. Removing wires on the top of the flash side



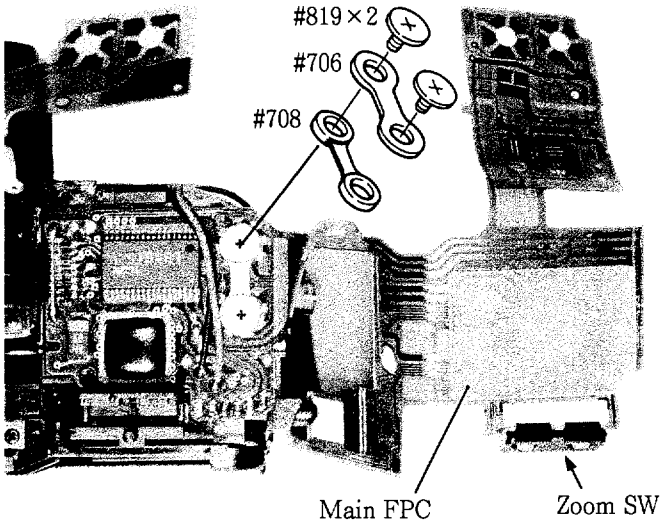
3. Removing wires on the top of the grip side



4. Removing screws

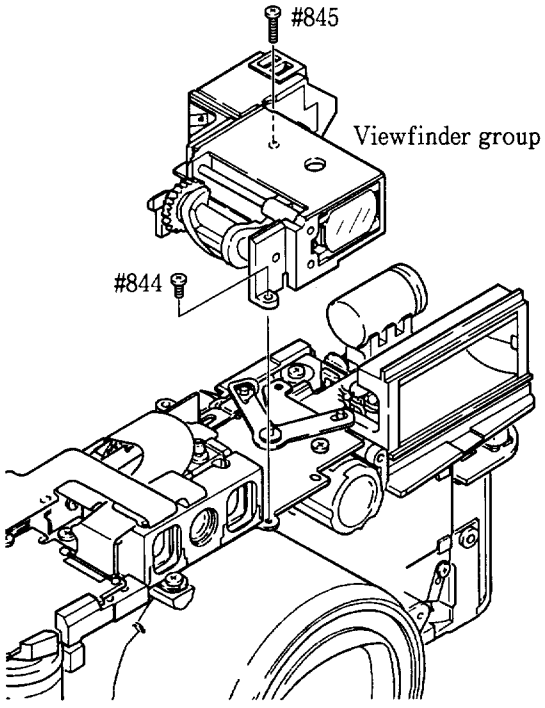


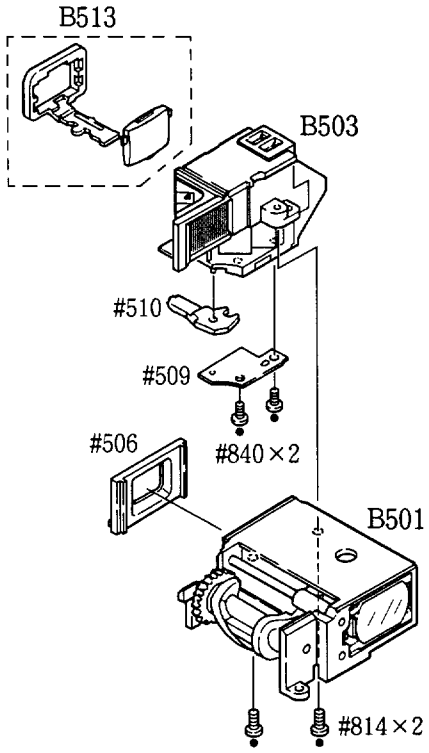
5. Removing press-contact



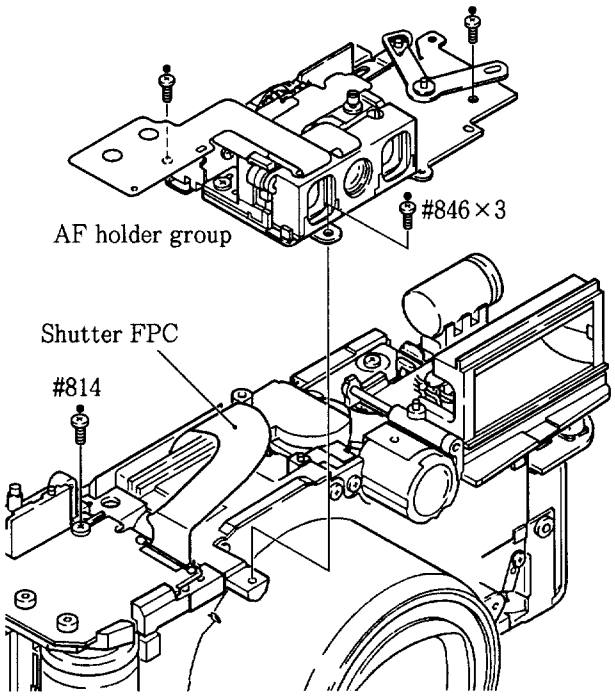
- Remove the zoom SW from the body, then carefully separate the main FPC from the body.
- Remove the press-contact and take out the main FPC from the body.

VIEWFINDER GROUP



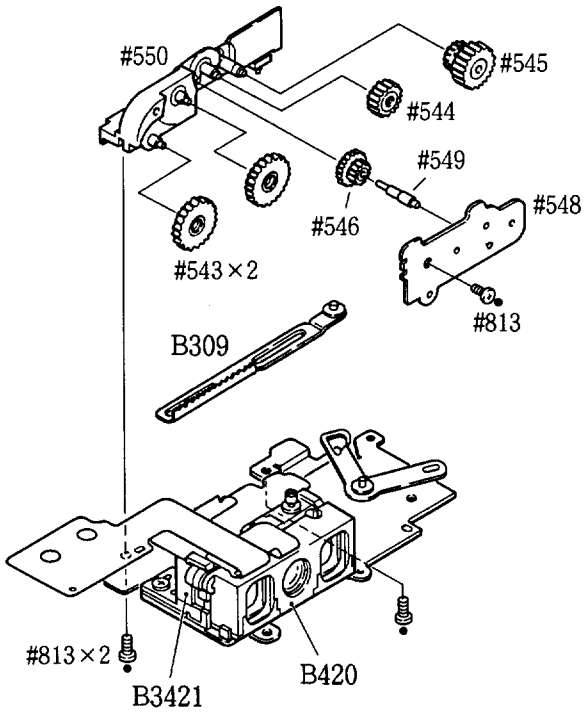


AF HOLDER GROUP



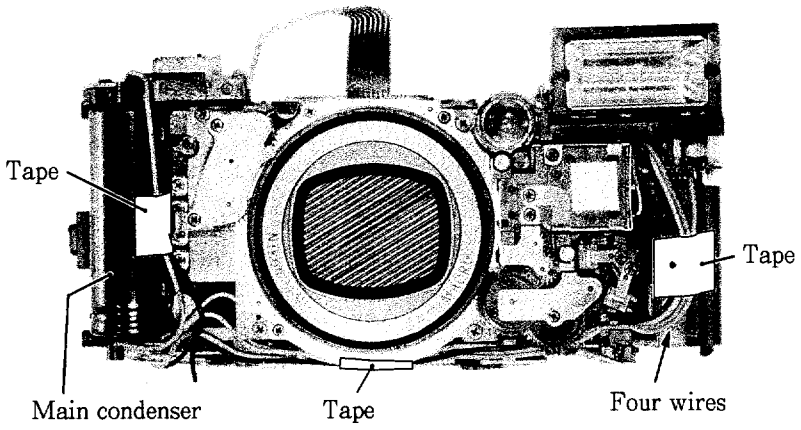
Note: Take care not to damage the shuter FPC, for the shutter FPC is attached to the AF holder group with double-coated adhesive tape.

COUPLING GEAR GROUP

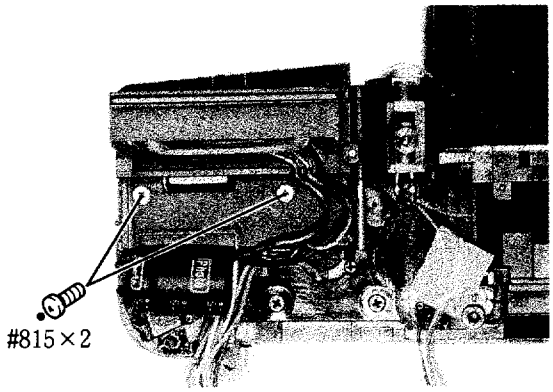


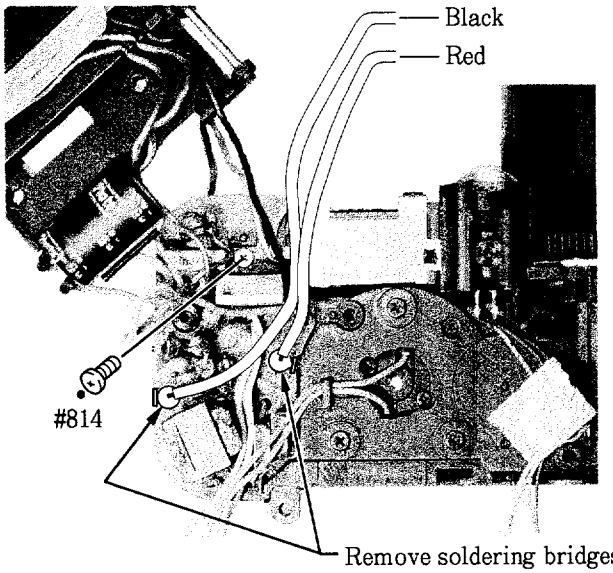
*Do not remove the B3421 and theB420 unless absolutely necessary, or AF adjustment becomes necessary.

MAIN CONDENSER, FLASH GROUP, FLASH BASE PLATE



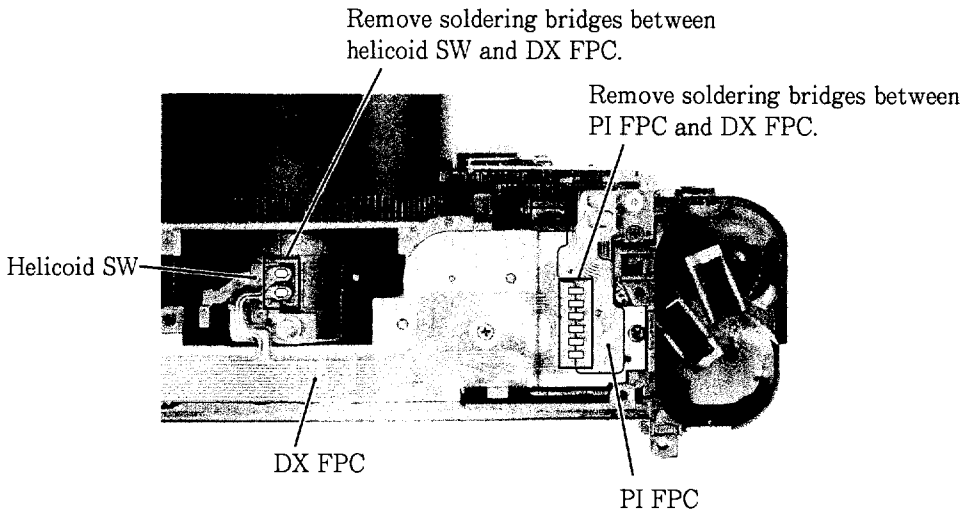
- Peel off adhesive tapes used for making arrangement of wires.
- Take out the main condenser from the body.
- Pull out the four wires connected to the flash base plate from the body.

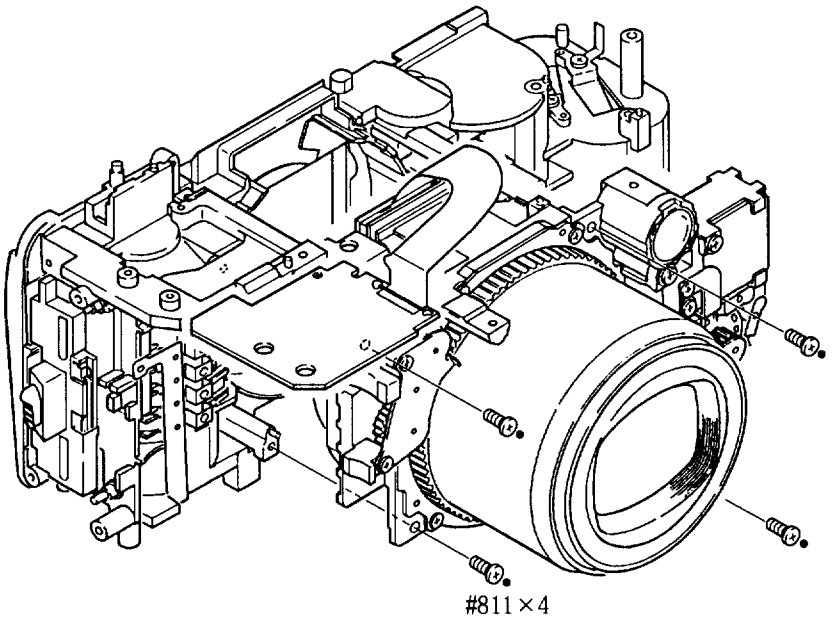




- Remove the flash base plate, and the insulating plate #304 will be found underneath.

REMOVING LENS BARREL UNIT

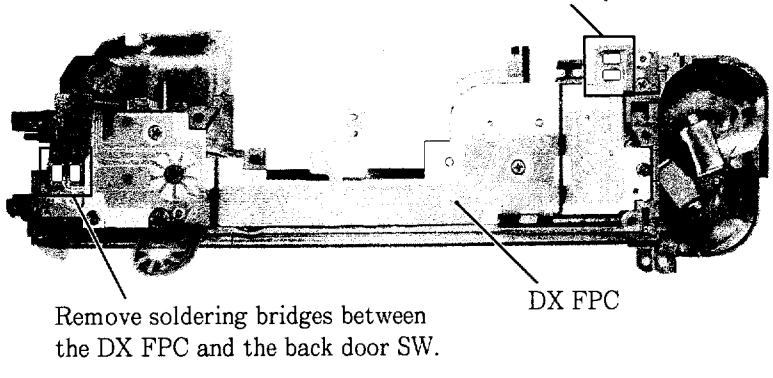


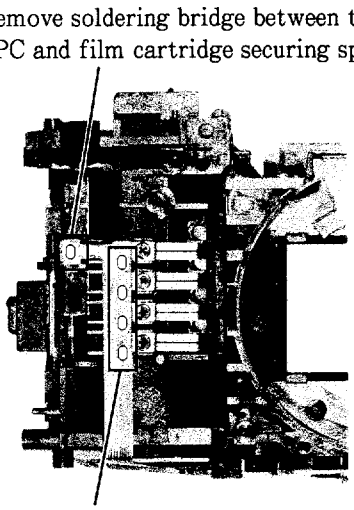


- Remove lens barrel unit while being careful about wires and FPC.

2. REAR BODY

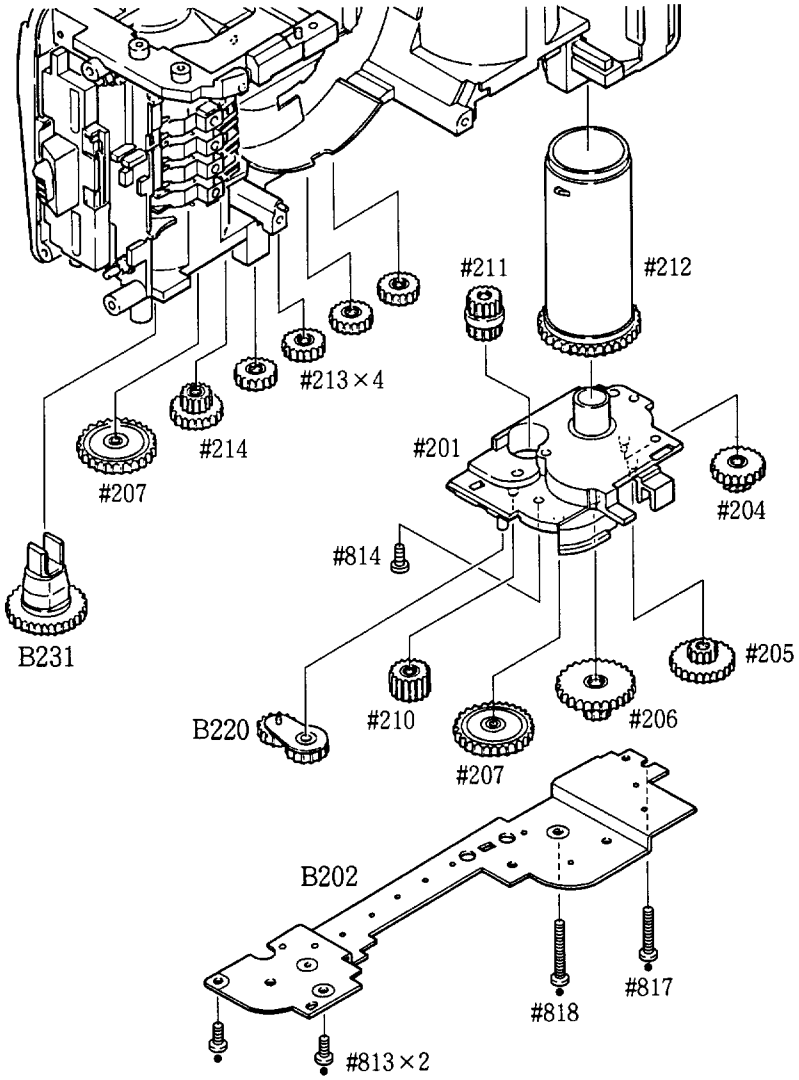
DX FPC



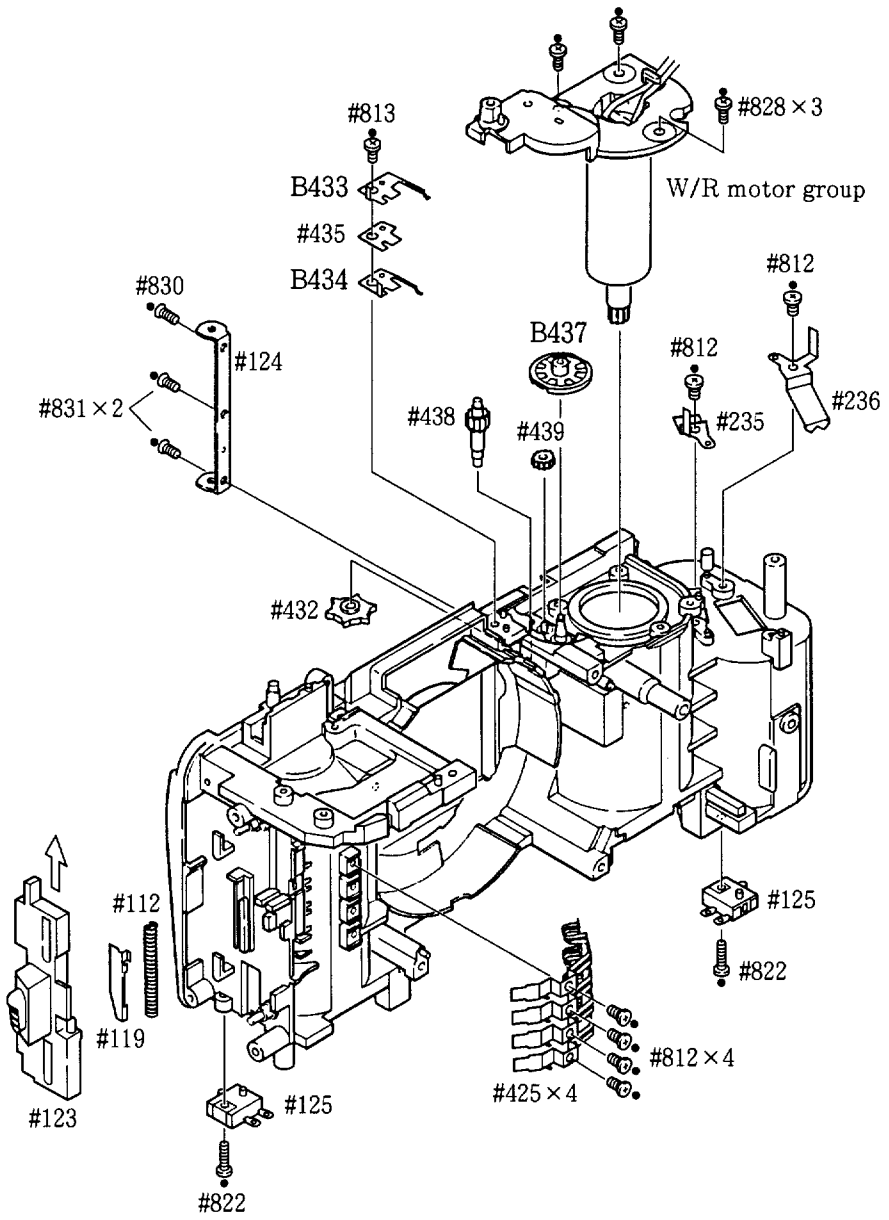


Note: Take care not to damage the DX FPC by peeling it off forcibly, because it is attached with double-coated adhesive tape.

W/R GEAR GROUP



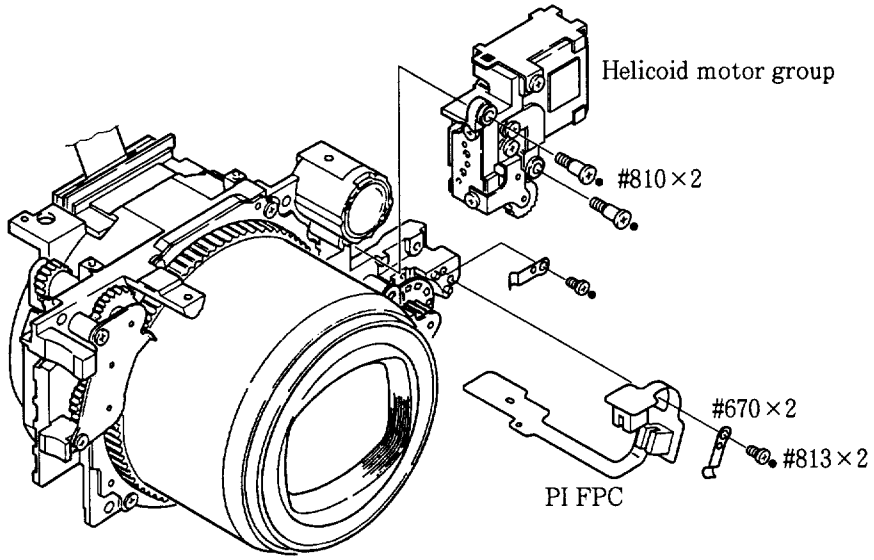
W/R MOTOR GROUP, SMALL PARTS OF REAR BODY



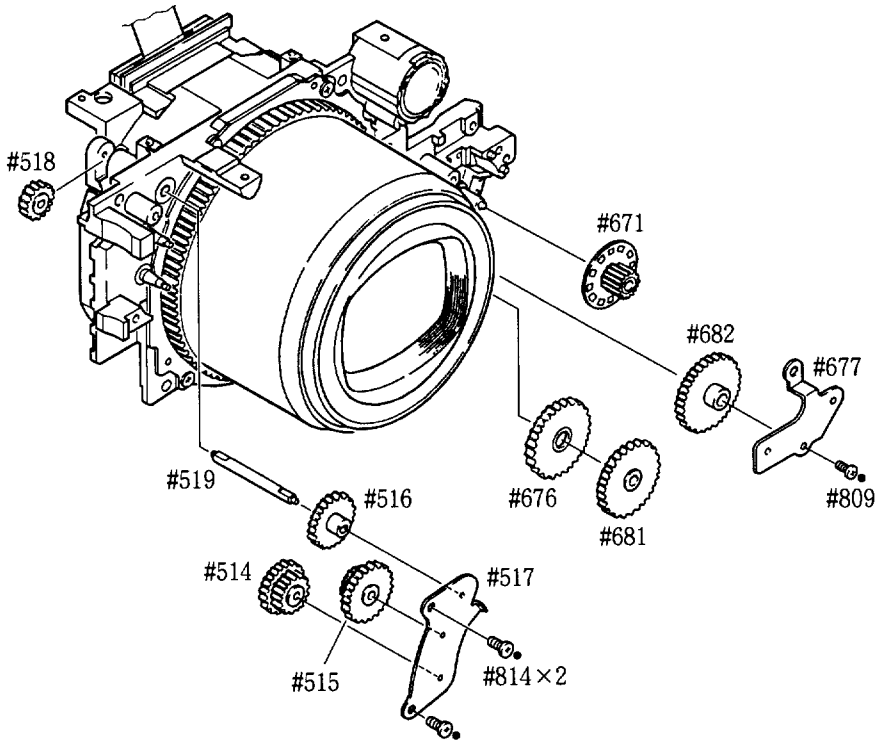
*Remove the camera back open/close mold #123 by sliding it in the direction indicated by the arrow.

3. LENS HELICOID

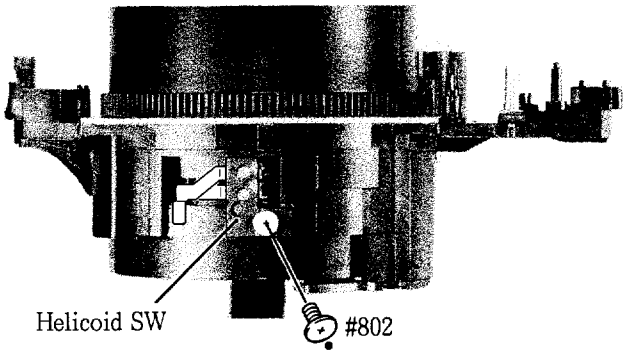
HELICOID MOTOR GROUP, PI FPC



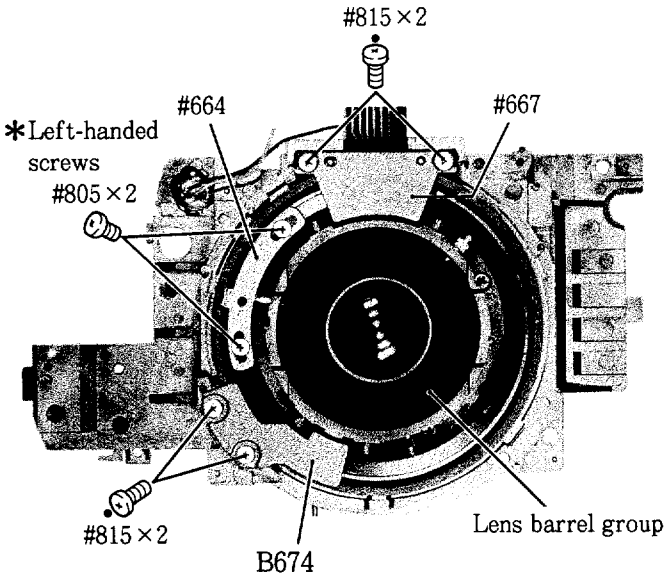
JOINT GEAR GROUP



HELICOID SW



LENS BARREL GROUP



- Remove the linear key #667, lower side key B674 and adjustment clutch #664.

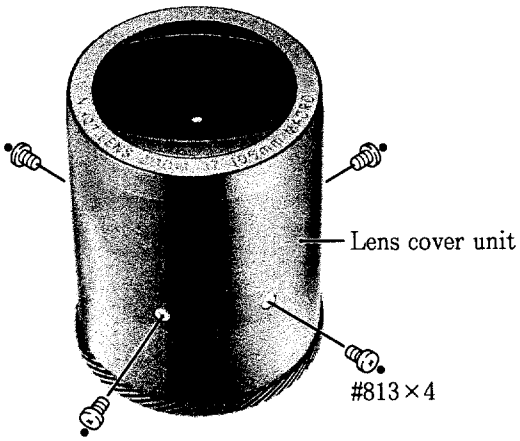
Note:

① Take care not to damage the FPC, for the linear key #667 is attached to the shutter FPC.
No need to peel the linear key #667 and the shutter FPC.

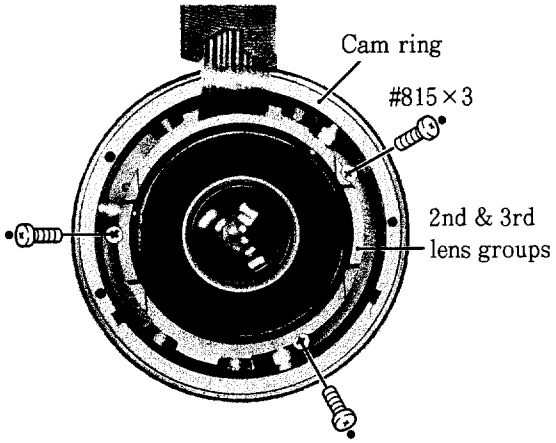
② #885×2 are left-handed screws.

- Remove the lens barrel group by rotating counter-clockwise.

LENS COVER UNIT



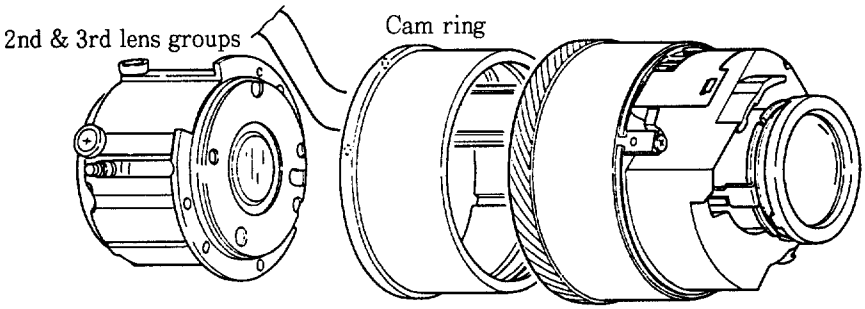
2nd & 3rd LENS GROUPS, CAM RING



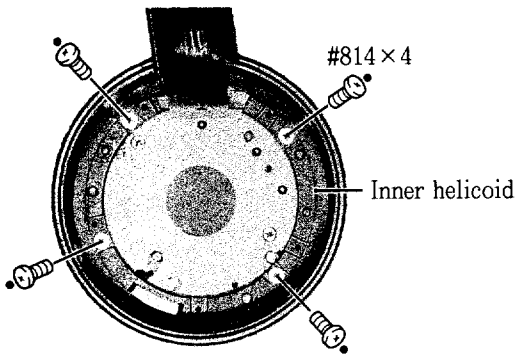
① Remove screws #815×3.

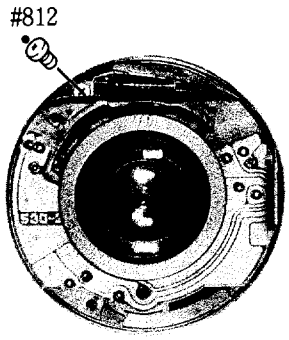
② Rotate the cam ring clockwise until it stops at the stopper to remove the 2nd & 3rd lens groups.

③ Remove the cam ring.

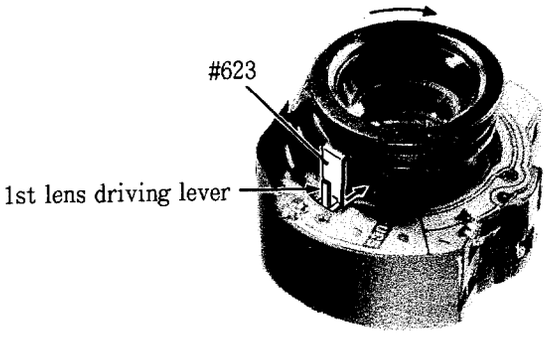


INNER HELICOID

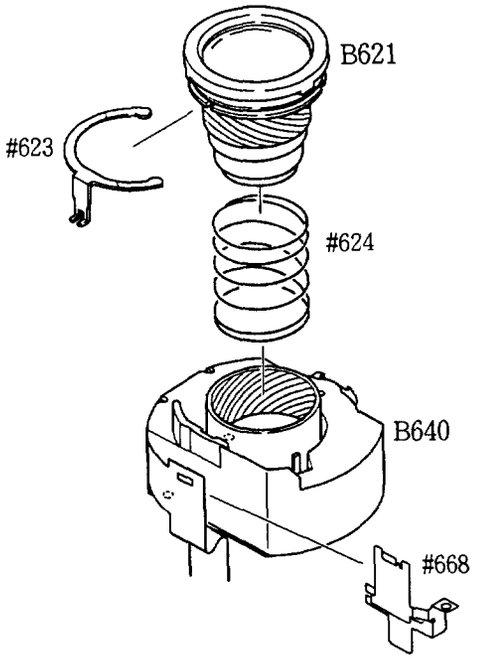




1st LENS GROUP UNIT



● Set the 1st lens driving lever free by bending the focus ring #623 inside. Remove the 1st lens group unit B621 clockwise.



● Remove the focus ring #623 after dissolving adhesive (Screw Lock) using alcohol.

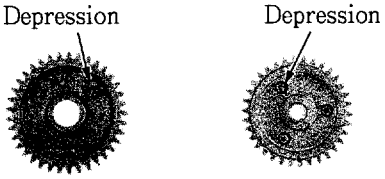
＊Use a new focus ring #623 when assembling in place of bend one.

ASSEMBLING／ADJUSTMENT

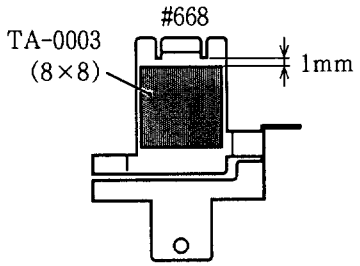
ASSEMBLING／ADJUSTMENT

＊Supplement to assembling

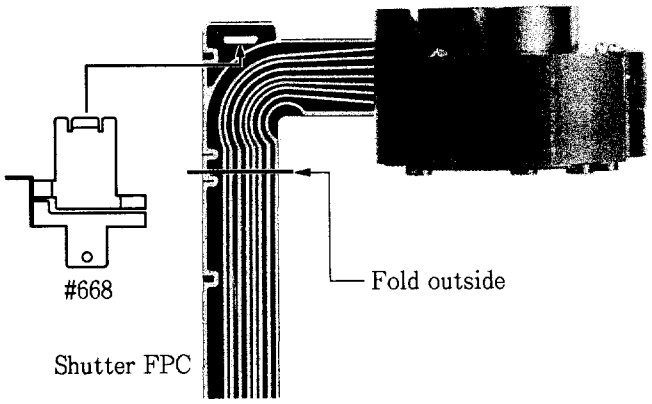
- Make sure to remove adhesive (Screw Lock) stuck to the parts.
- When mounting flat gears with depression on both sides, face the surface with a deep depression up, and face the surface with depression up if flat gears with depression on one side.



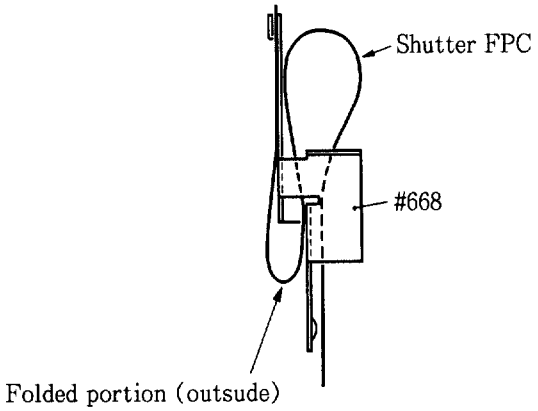
FPC RETAINER #668



- Paste double-coated adhesive tape to the FPC retainer #668. (See the figure on the left.)



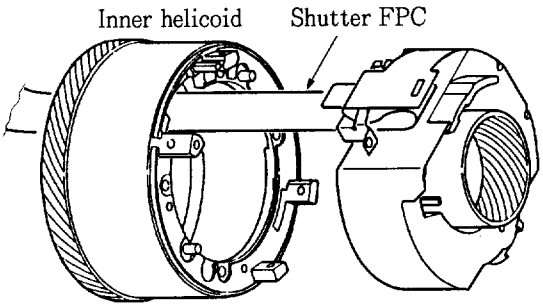
- Bend the shutter FPC at the location indicated in the picture on the left.
- Attach the FPC retainer #668 to the shutter FPC.

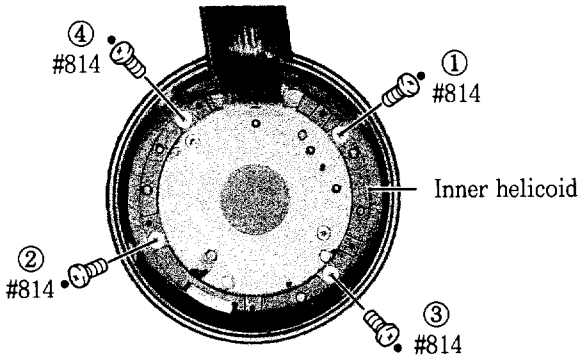


- As shown in the figure on the left, pass the shutter FPC through the FPC retainer #668.

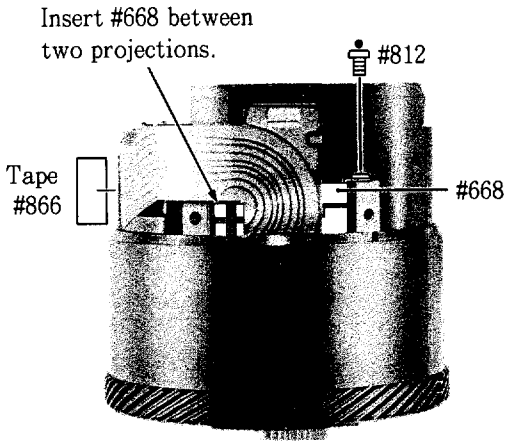
  Note: Make sure that the folded portion (outside) of the shutter FPC comes to the position indicated in the figure, or the lens cover cannot be closed when the lens cover unit is mounted.

INNER HELICOID



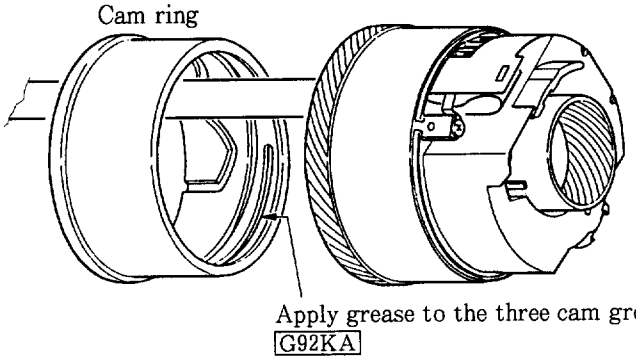


- Fasten the screws #814 in the order of ①→②→③→④.

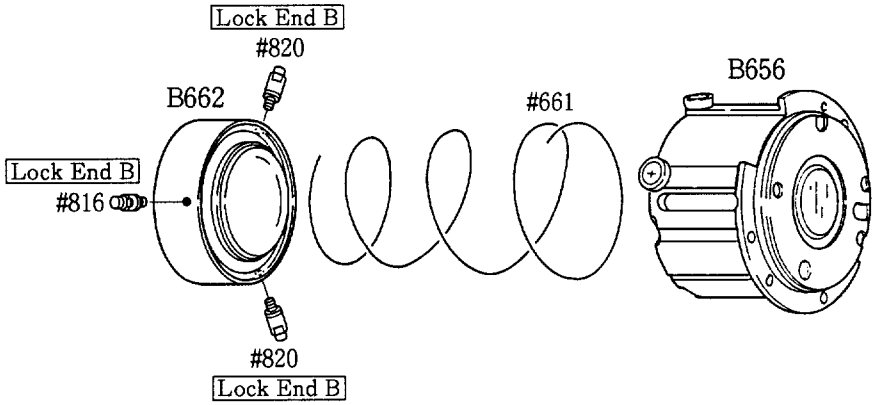


- Attach the FPC retainer #668 with screw #812 as shown in the picture.
- Secure the shutter FPC with adhesive tape #866.

CAM RING

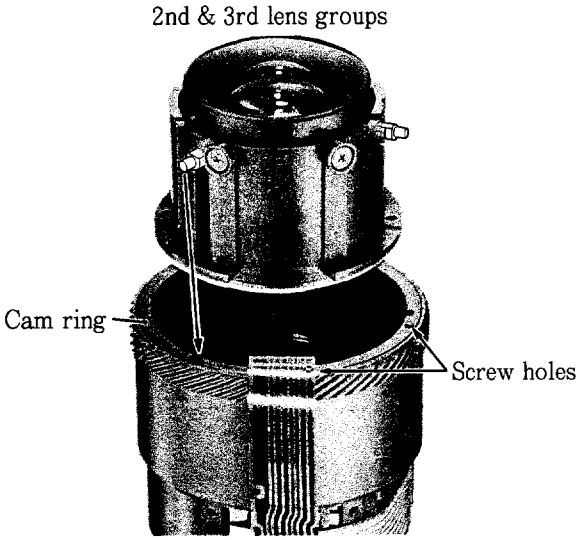


2nd & 3rd LENS GROUPS



- Attach the cam pin #816 and #820 × 2 after attaching the spring #661 and the 3rd lens group unit B662 to the 2nd lens group unit B656.

  Note: The cam pin #816 must be attached to the location as shown in the figure.



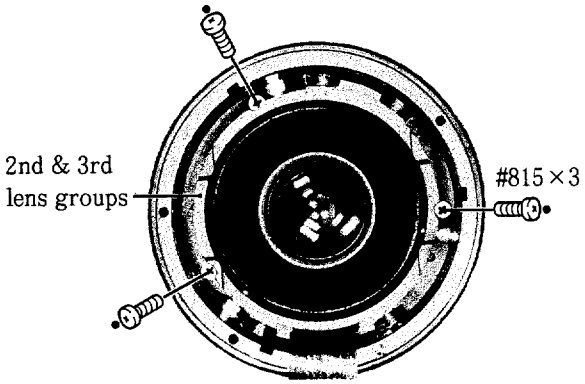
① Rotate the cam ring to set two screw holes for attaching adjustment clutch at the locations as shown in the picture.

② Mount the 2nd & 3rd lens groups at the location as shown in the picture.

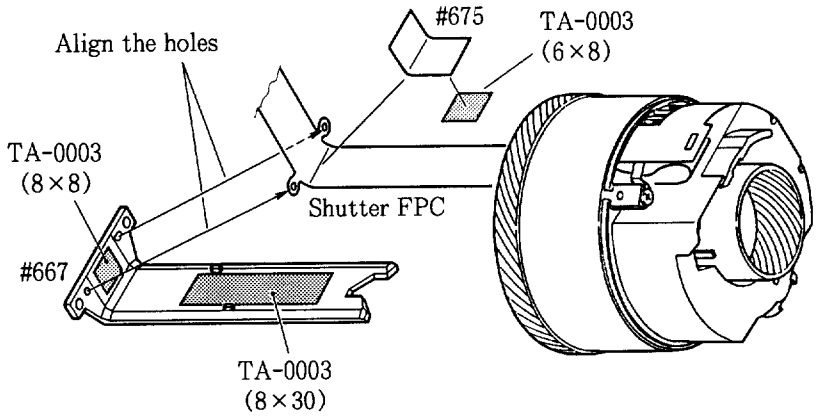
③ Push the 3rd lens group inside.

④ Rotate the cam ring counterclockwise until it stops.

⑤ Secure the 2nd & 3rd lens groups with screws #815 × 3.

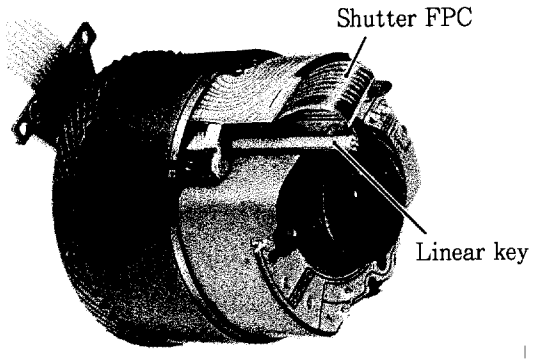


LINEAR KEY, FPC REINFORCEMENT PLATE



① Align the small holes of the linear key #667 with the holes of the shutter FPC. Paste the linear key to the shutter FPC.

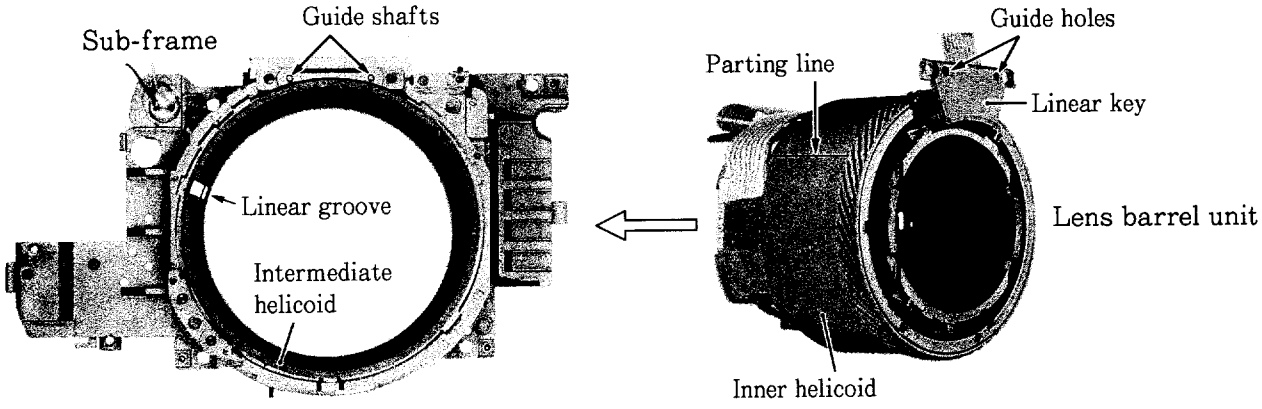
② Paste the FPC reinforcement plate #675 to the corner of the shutter FPC.



③ Insert the linear key in the lens barrel unit.

Inspection: Check to be sure that the shutter FPC is viewed as shown in the picutre on the left.

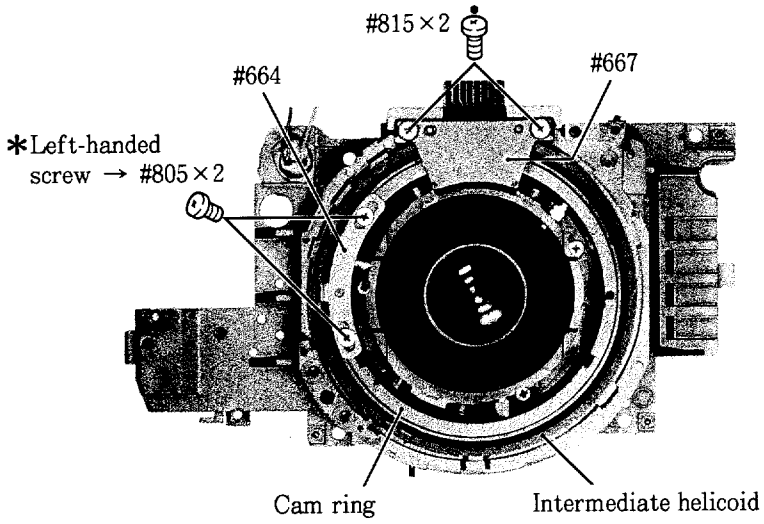
MOUNTING THE LENS BARREL UNIT



① Set the linear groove of the intermediate helicoid as shown in the picture above left.

② Align the inner helicoid parting line as shown in the picture and the intremediate helicoid linear groove to mount the lens barrel unit. Rotate the lens barrel unit clockwise slightly to align the sub-frame guide shafts and the guide holes.

Note: The shutter FPC guide holes must also be aligned to the sub-frame guide shafts.

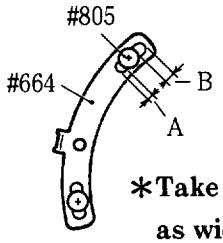


③ Attach the linear key #667 with screws #815×2.

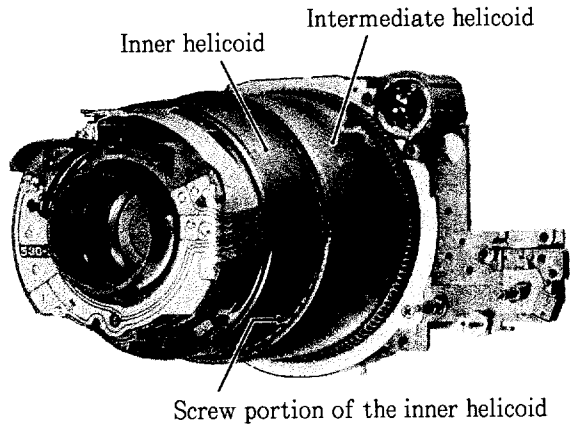
④ Insert the projected portion of the adjustment clutch #664 into the linear groove of the intermediate helicoid. Rotate the cam ring clockwise to align the adjustment clutch holes with screw holes. Mount the adjustment clutch #664 with screws #805×2.

Note:

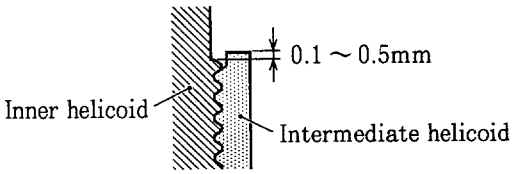
- #805×2 are left-handed screws.
- Fasten screws #805×2 in the way as shown in the figure below.

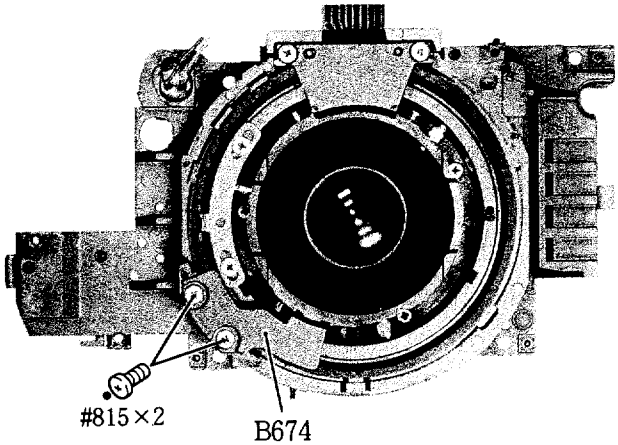


✱Take the width of "B" twice as wide as that of "A".



⑤ Checking the mounting locations of the lens barrel unit:
Rotate the intermediate helicoid to move the lens barrel unit forward fully. Make sure that the screw portion of the inner helicoid is lower than that of the intermediate helicoid by 0.1 to 0.5mm.

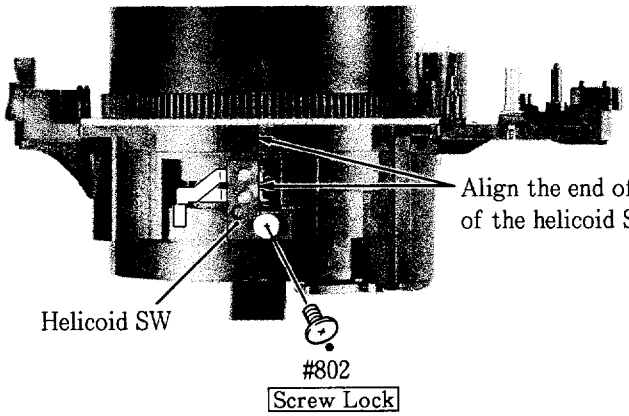




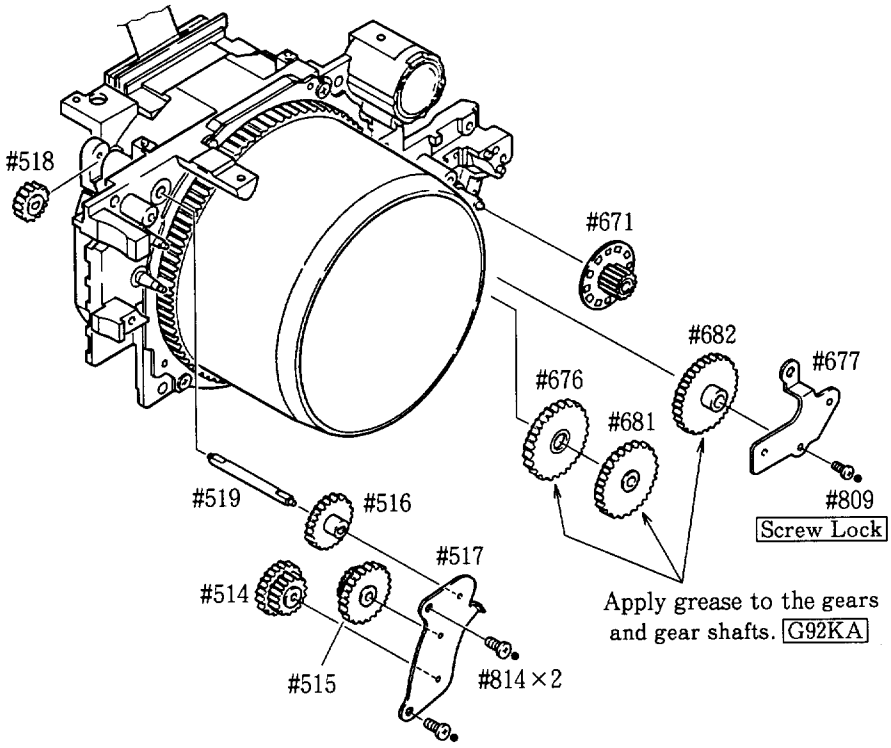
⑥ Mount the lower side key B674 with screws #815×2.

Inspection: Rotate the intermediate helicoid to check the operation.
If not operating properly, adjust the mounting position of the lower key B674.

HELICOID SW



JOINT GEARS GROUP



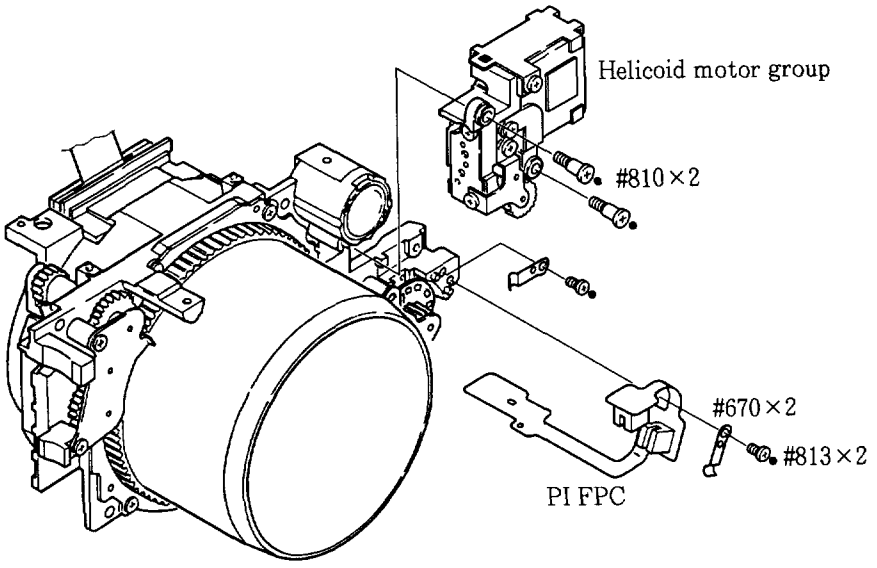
- Mounting order of the viewfinder gear group

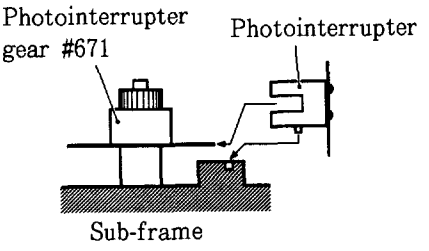
Gear #518
↓
Shaft #519
↓
Gear #516
↓
Gear #514
↓
Gear#515
↓
Gear retainer plate A #517
↓
Screws #814×2

- Mounting order of the lens barrel gear group

Gear #676
↓
Gear #671
↓
Gear #682
↓
Gear #681
↓
Gear retainer plate B #677
↓
Screw #809

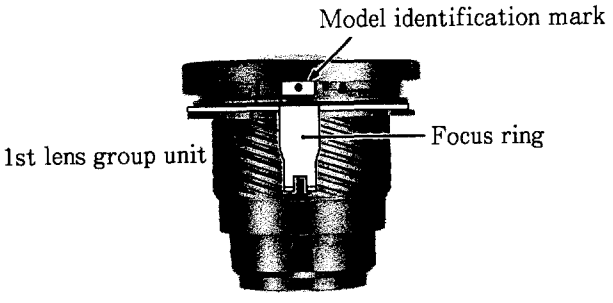
HELICOID MOTOR GROUP, PI FPC

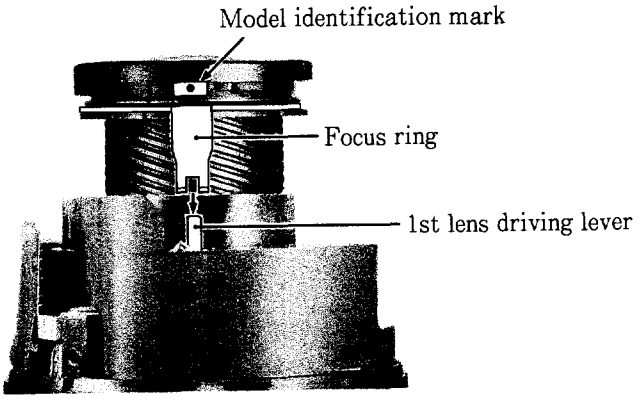


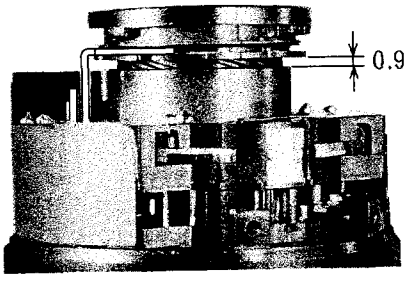


- Insert the projection of the Photointerrupter into the hollow of the sub-frame. Attach the Photointerrupters with the retaining plates #670×2 and screws #813×2.

1st LENS GROUP UNIT







① Align the model identification mark with the fork of focus ring to mount the focus ring on the 1st lens group unit.

＊Two model identification marks (⊡ or ⊡⊡) are available.

② Mount the 1st lens group energize spring #661.

③ Align the model identification mark with the location of the 1st lens driving lever to mount the 1st lens group unit.

④ Hold the focus ring with your finger not to let it rotates, and screw in the 1st lens group unit counter-clockwise until it stops.

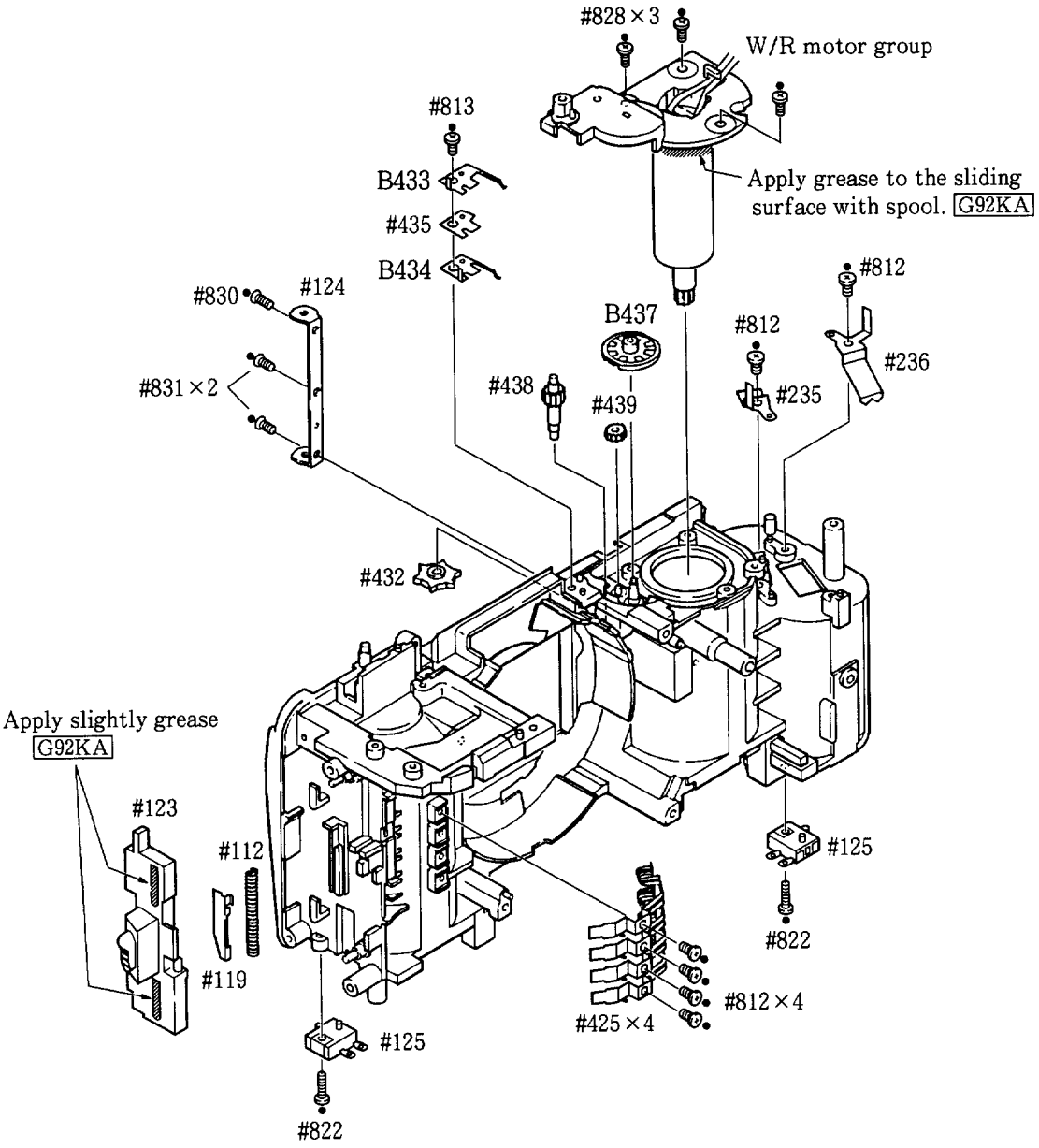
Note: Check to be sure that the 1st lens driving lever should be in the fork of the focus ring.

⑤ Rotate the 1st lens group unit clockwise to adjust the opening as shown in the picture will be 0.9 to 1.0mm.

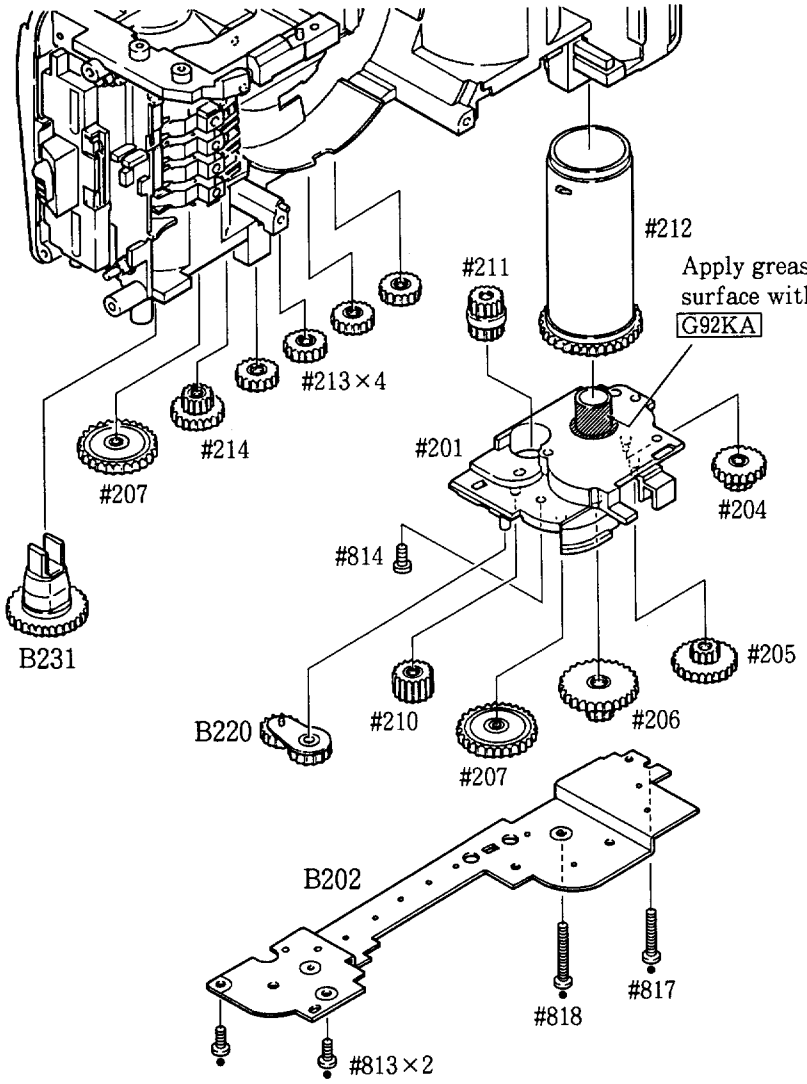
＊The above opening setting makes adjustment much easier.

W/R MOTOR GROUP, SMALL PARTS OF REAR BODY

● Mount the free sprocket #432 in the way as the bearing hole "○" facing up.

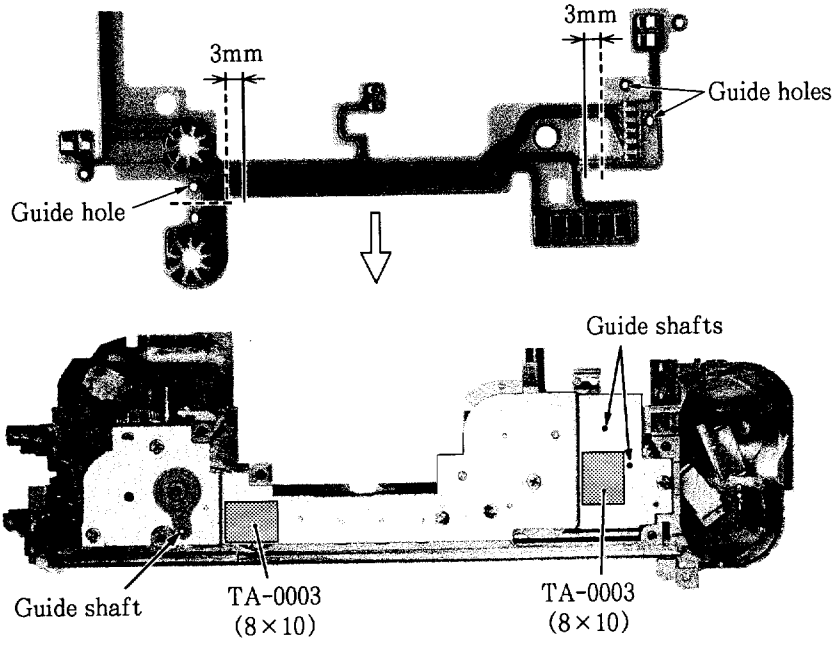


W/R GEAR GROUP



- Apply slightly grease G92KA to each gear and gear shaft.

DX FPC



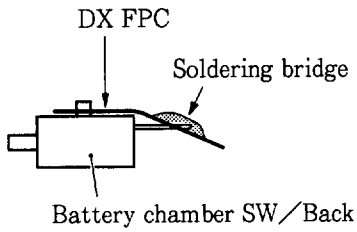
① Fold DX FPC at the locations indicated by lines:

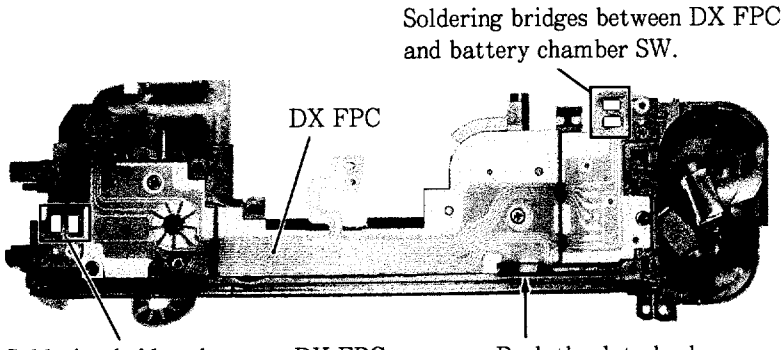
—— : Fold outside

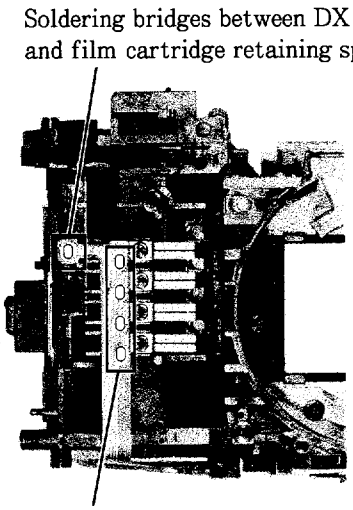
---- : Fold inside

② Paste two double-coated adhesive tapes (TA-0003) on the MM base plate.

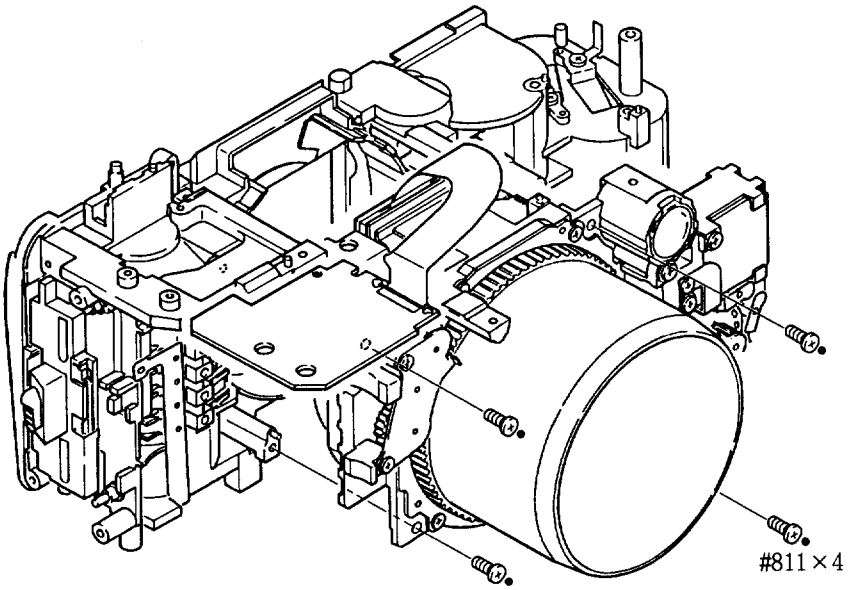
③ Align the guide holes with the guide shafts to paste the DX FPC.



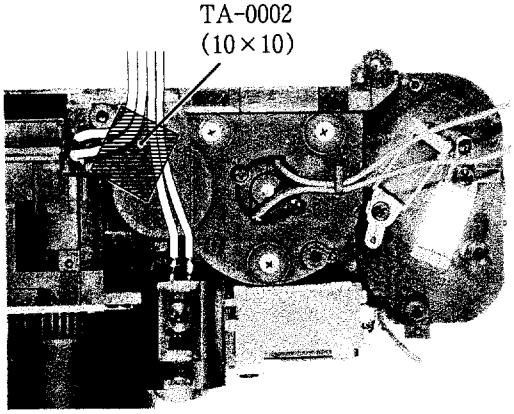




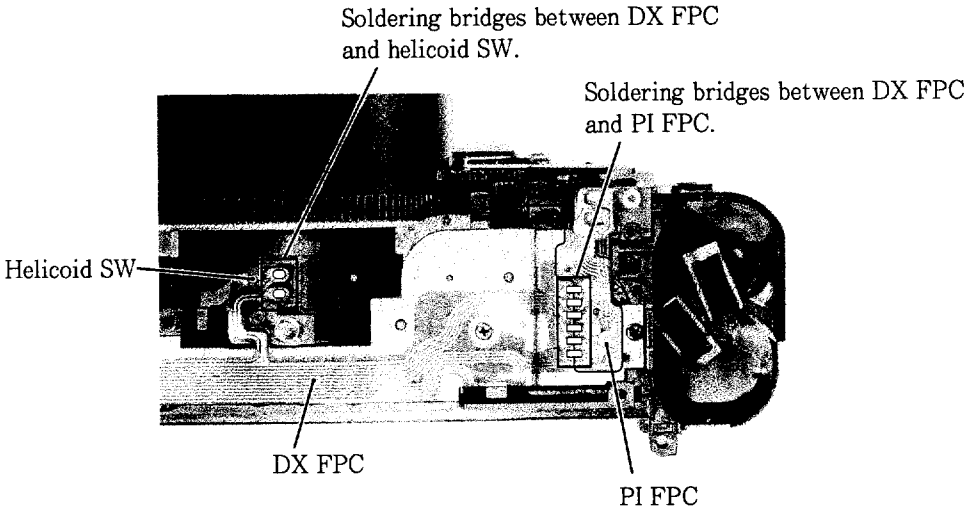
ALIGNING OF REAR BODY AND LENS BARREL UNIT



- Take care not to damage FPCs and wires.

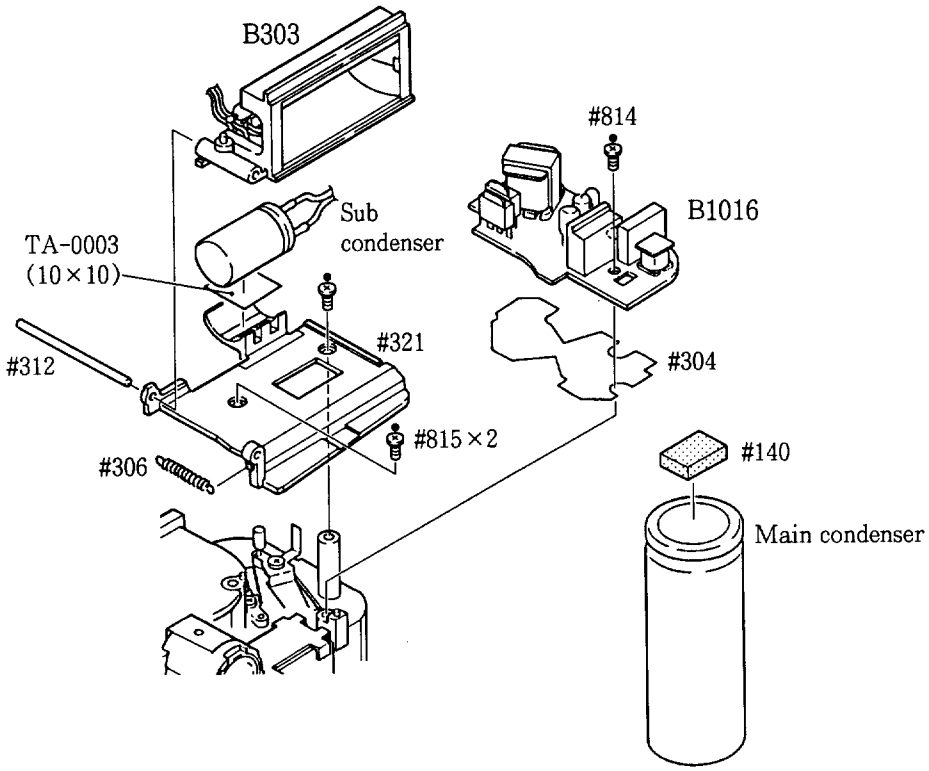


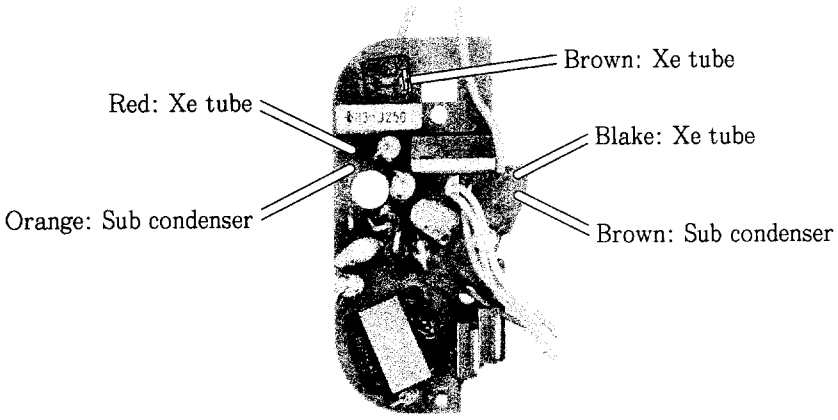
- Arrange free sprocket SW wires and AF illuminator wires as shown in the picture and paste adhesive tape (TA-0002) on them.



FLASH BASE PLATE, FLASH GROUP, MAIN CONDENSER

Note: Refer to next page for details on assembling.

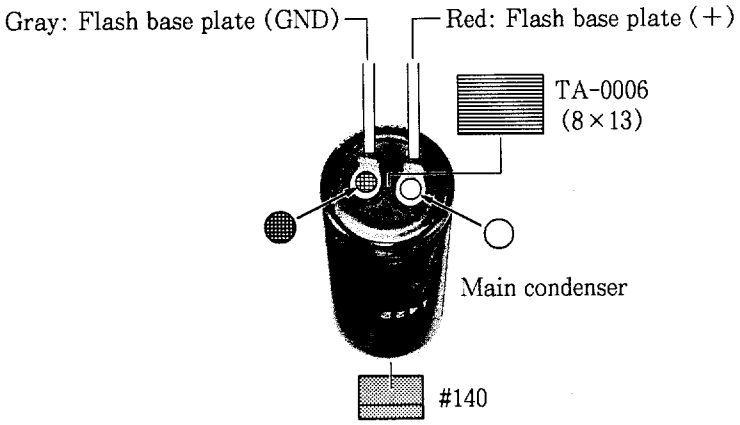




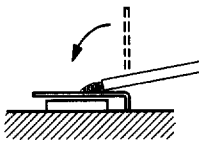
Flash base plate

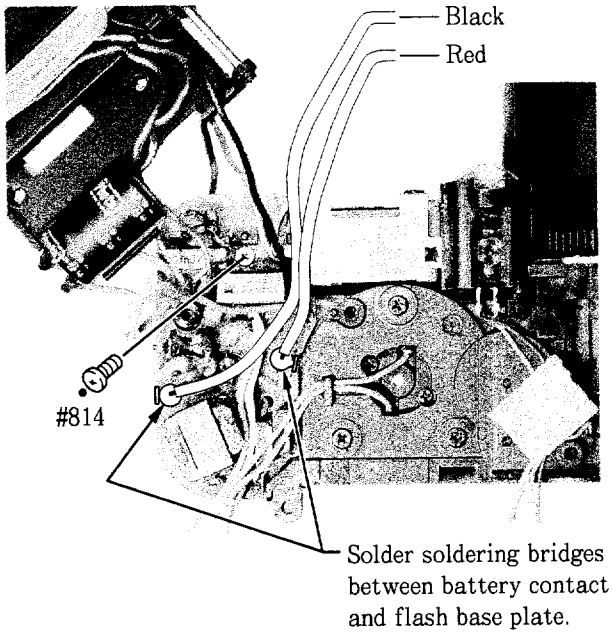
- Solder three wires from the Xe tube and two wires from the sub condenser to the flash base plate.

  Note: Solder four wires (except a brown one) from the Xe tube to the rear by passing the wires through the front side.

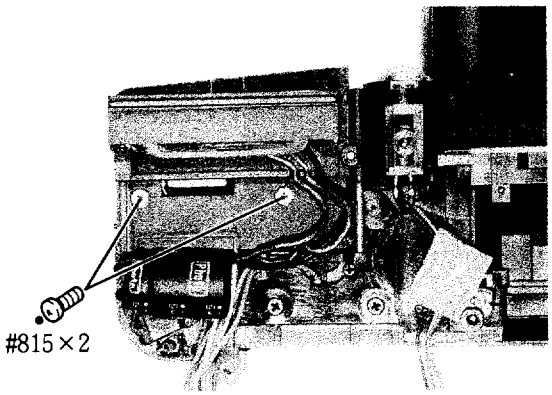


- Solder two wires from the flash base plate to the main condenser.
- Bend the terminal of the main condenser as shown in the figure below.



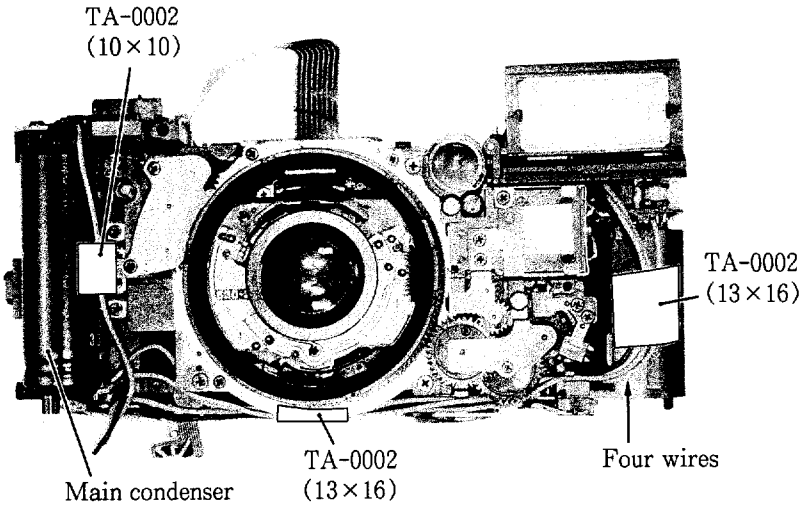


- Insert the insulating plate #304, and then attach the flash base plate.



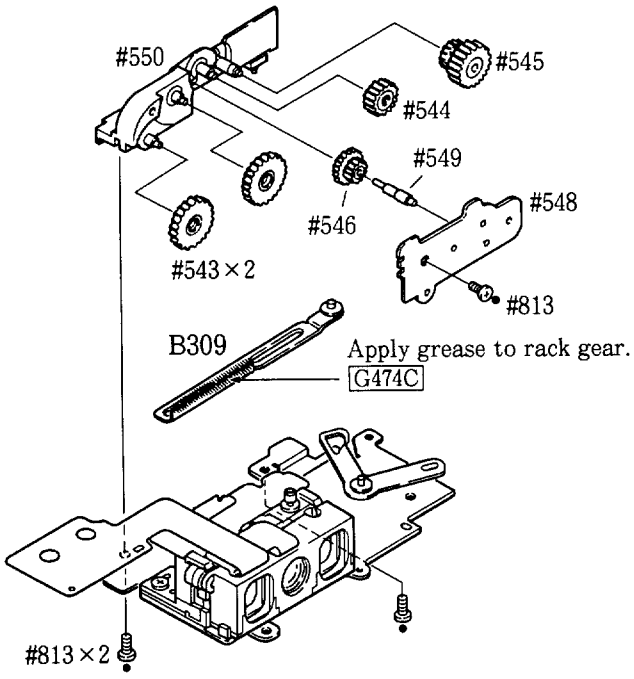
Two wires from helicoid motor.
Two wires from film advance motor.
Four wires from flash base plate.

- Attach the flash group with screws #815×2.



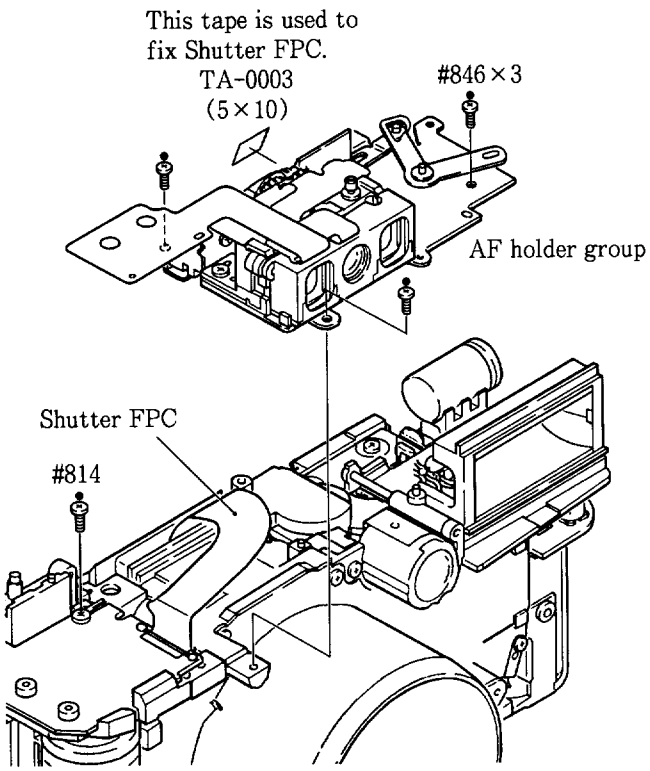
- Attach the main condenser to the body.
- Arrange four wires from the flash base plate as shown in the picture.
- Paste three adhesive tapes.

COUPLING GEAR GROUP



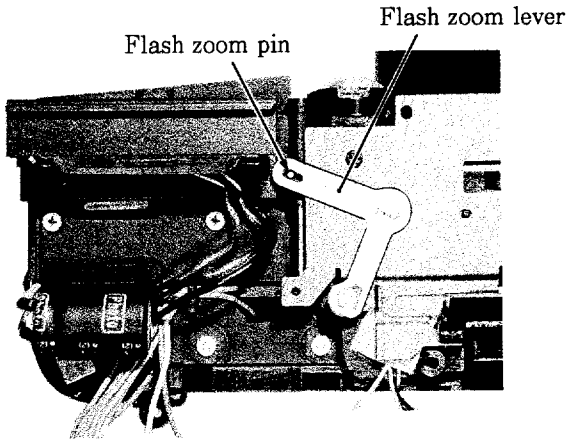
- Apply slightly grease SLD-12 to gears #543×2, #544 and #545.

AF HOLDER GROUP



① Set the lens barrel to the lowest position.

② Align the flash zoom pin with the hole of the flash zoom lever, and mount the AF holder group.

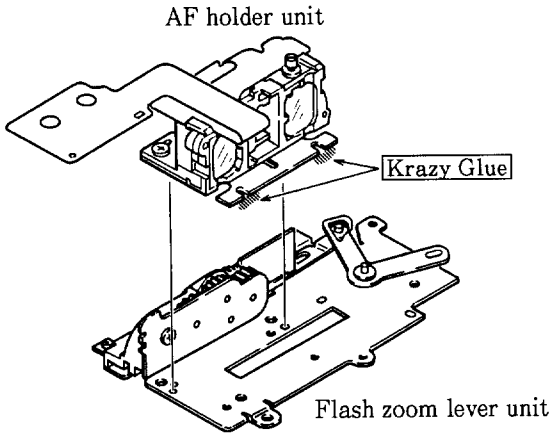


③ Secure the AF holder group with screws #846×3.

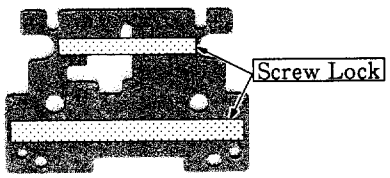
AF HOLDER UNIT, AF HOLDER COVER UNIT

＊Notes on mounting the AF holder unit

After mounting the flash zoom lever unit with the coupling gear group on the body, mount the AF holder unit. After having mounted it, make an inspection of AF accuracy.

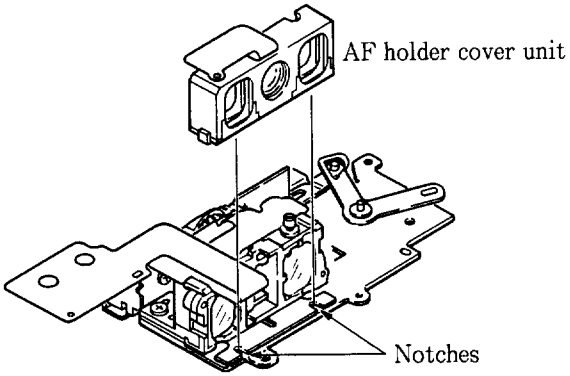


① Apply Screw Lock (adhesive) to the back of the AF holder unit.

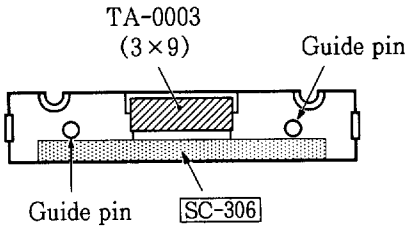


② Align the holes of the flash zoom lever unit with the pins of the AF holder unit, attach the AF holder unit.

③ Spread slightly of adhesive (Krazy Glue) to the locations shown in the figure.

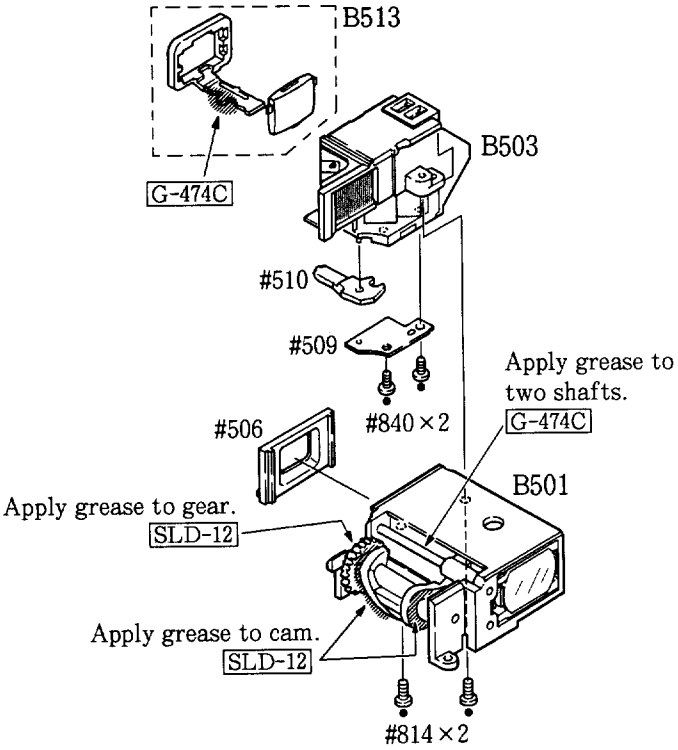


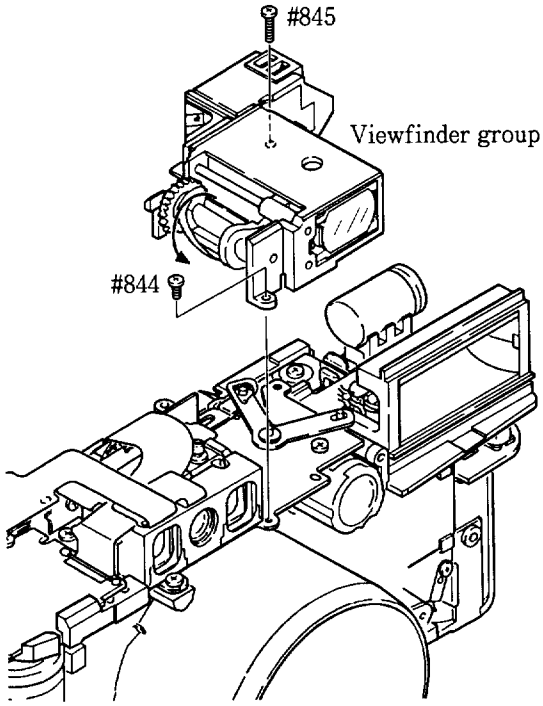
④ Paste double-coated adhesive tape and apply SC-306 (adhesive) to the back of the AF holder cover unit.

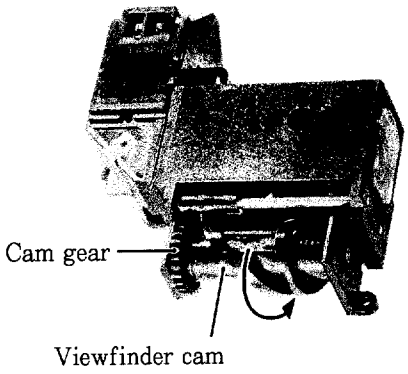


⑤ Align the notches with the guide pins of the AF holder cover unit, and attach the AF holder cover unit.

VIEWFINDER GROUP







① Set the lens barrel to the lowest position.

② Rotate the viewfinder cam in the direction indicated by the arrow until it stops as shown in the picture on the left. (Viewfinder is in WIDE mode.) In this state, mount the viewfinder group while aligning the coupling gear group with the cam gear.

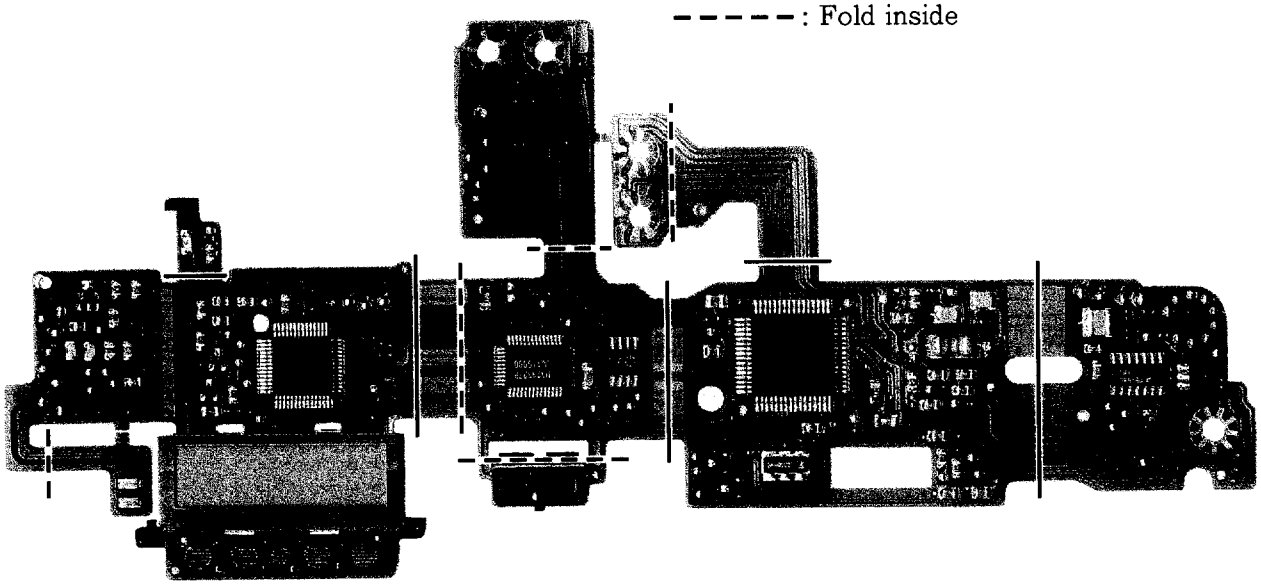
③ Secure the viewfinder group with screws #844 and #845.

MAIN FPC

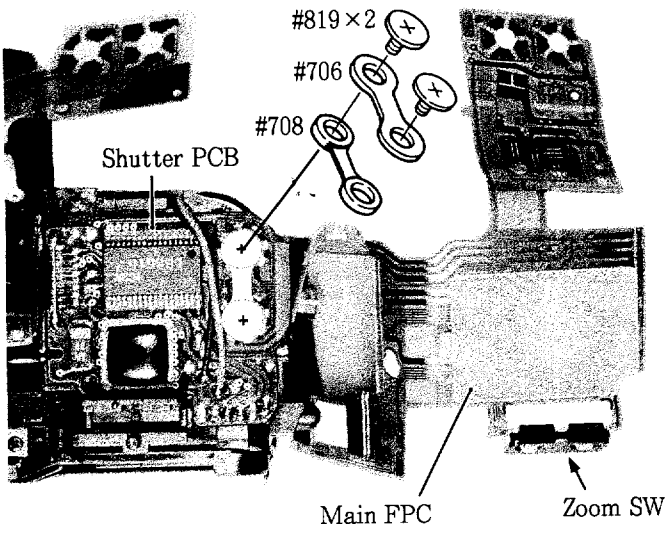
1. Bending of main FPC

——— : Fold outside

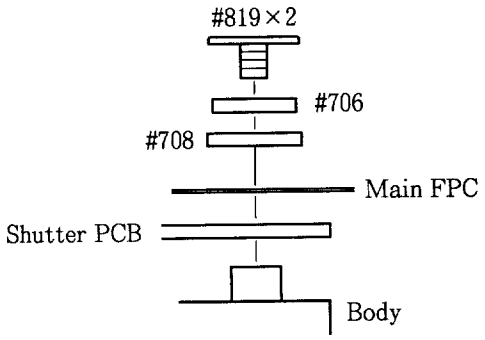
– – – – : Fold inside



2. Press-contact between the main FPC and the shutter PCB

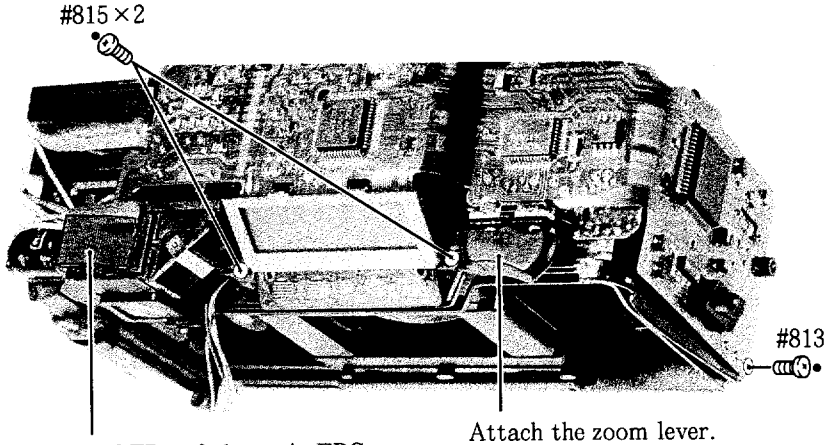


- Clean press-contact patterns of the main FPC and shutter PCB with alcohol.
- Structure of press-contacts

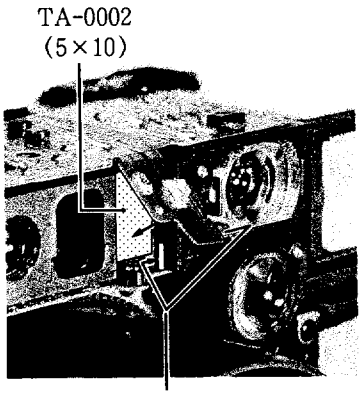


- Attach the zoom SW to the body.

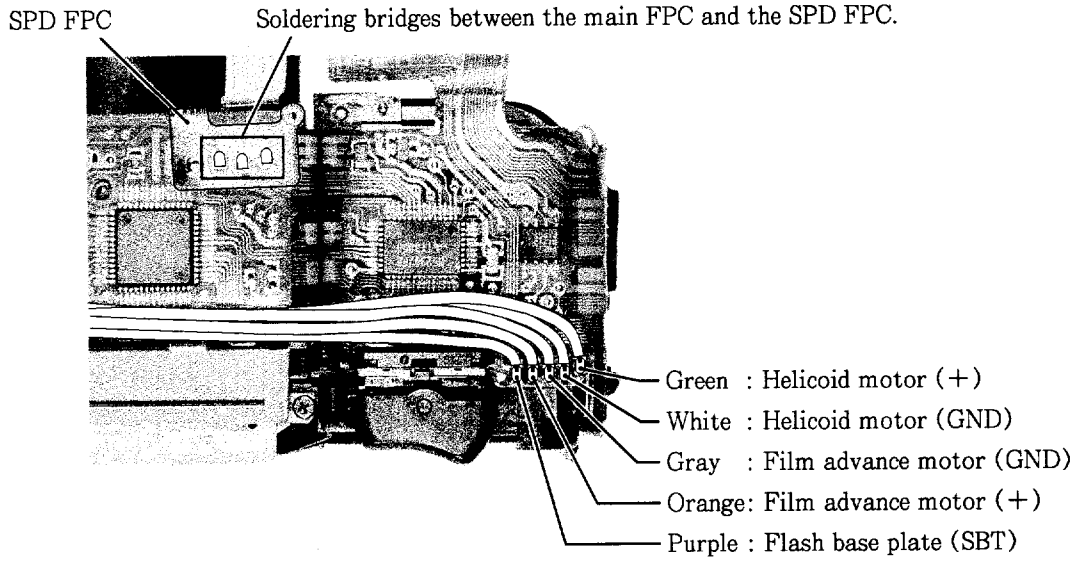
3. Attach screws



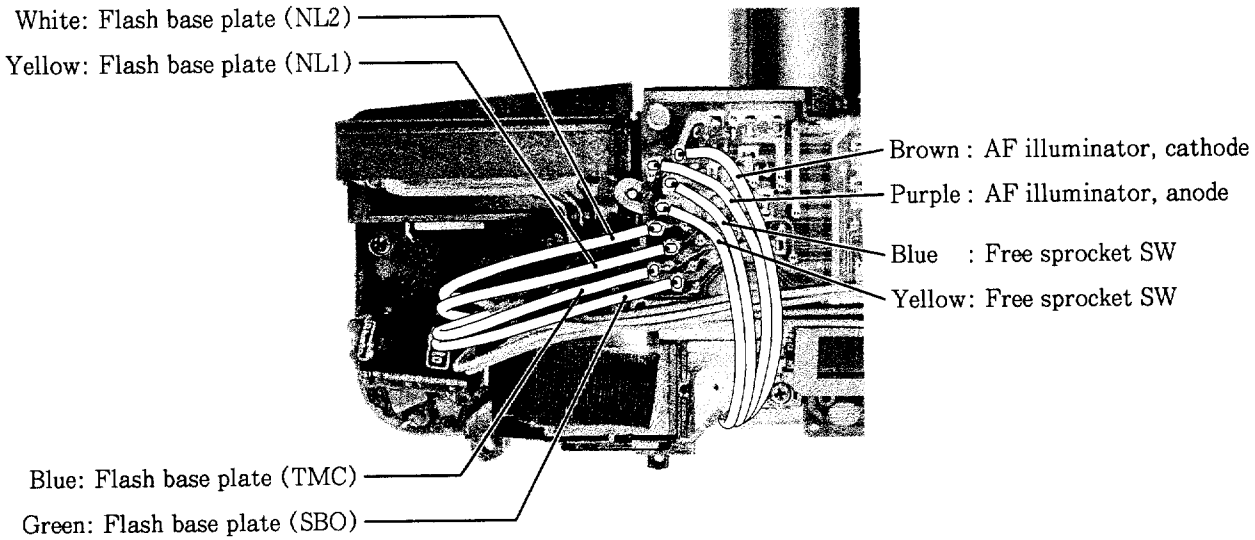
● Mount the self LED portion of the main FPC as shown in the picture below.



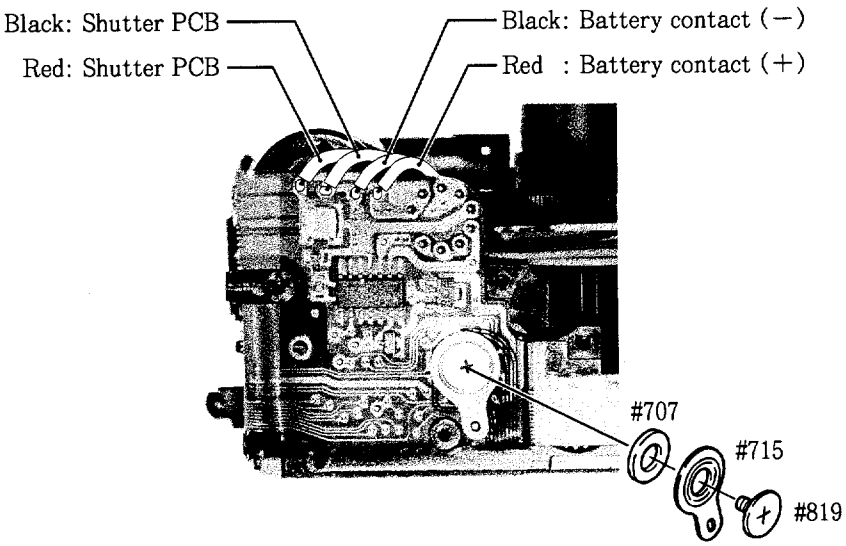
4. Soldering wires on the upper side of the hand grip



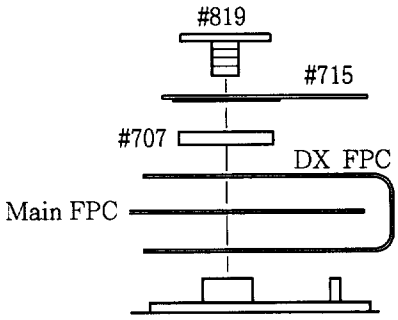
5. Soldering wires on the upper side of the flash



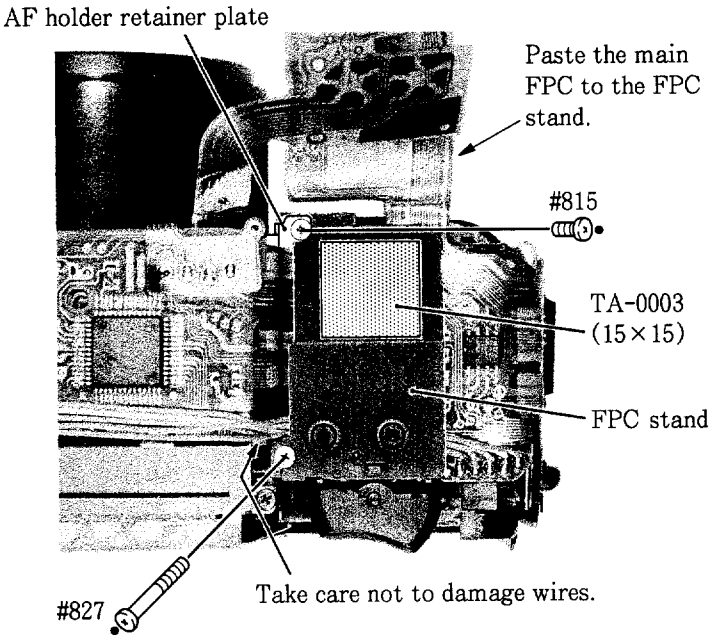
6. Soldering wires on the bottom of the hand grip and press-contact



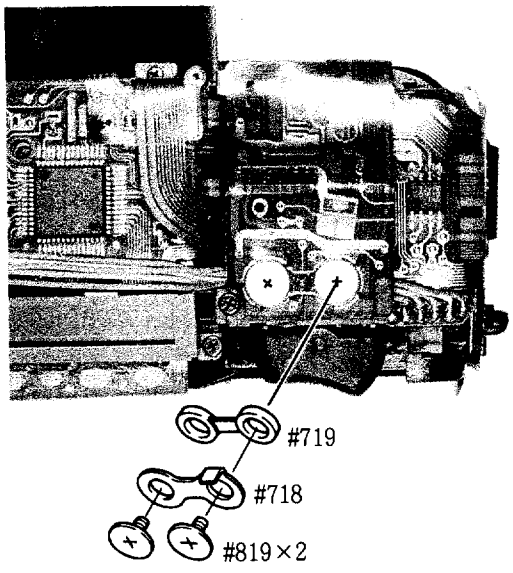
● Structure of press-contact



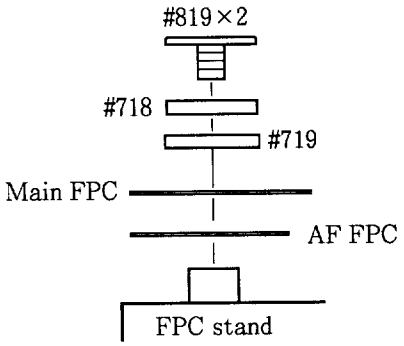
FPC STAND, AF HOLDER RETAINER PLATE, PRESS-CONTACT



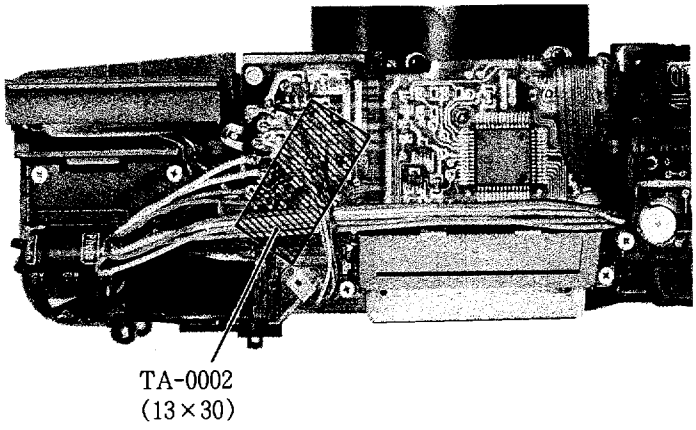
● Do not forget to attach the AF holder retainer plate.



● Structure of press-contact

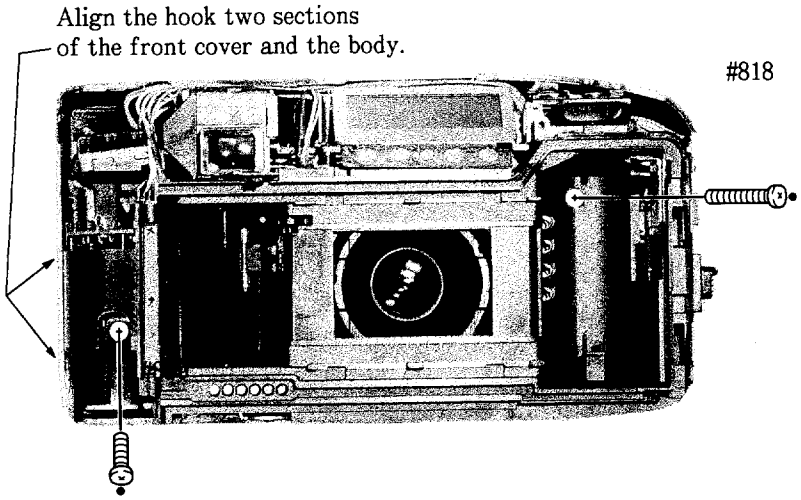


ARRANGE WIRES



- Arrange wires as shown in the picture on the left, and paste adhesive tape (TA-0002).

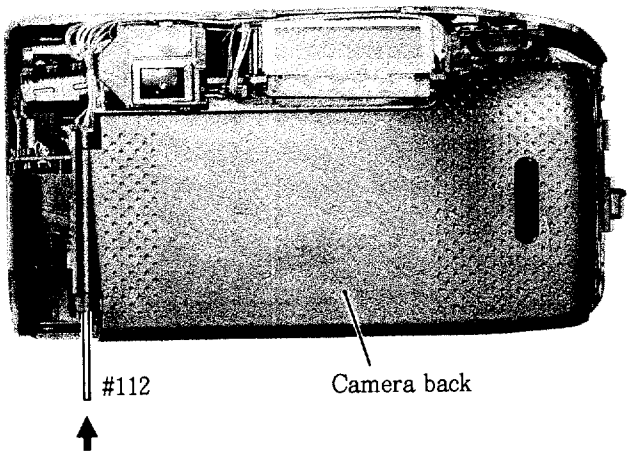
FRONT COVER



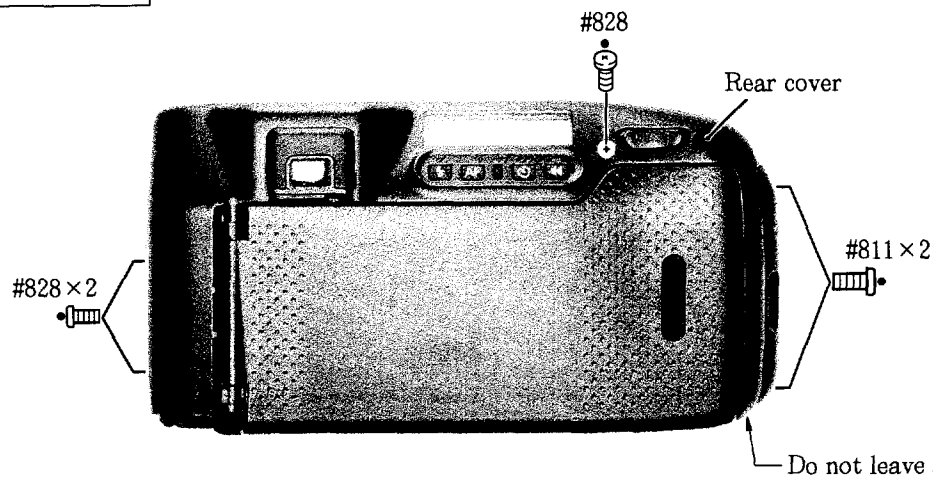
- Attach the shutter release button and light-baffle ring to the front cover, and mount the front cover.

Note: When mounting the front cover, do not bend the power SW brush.

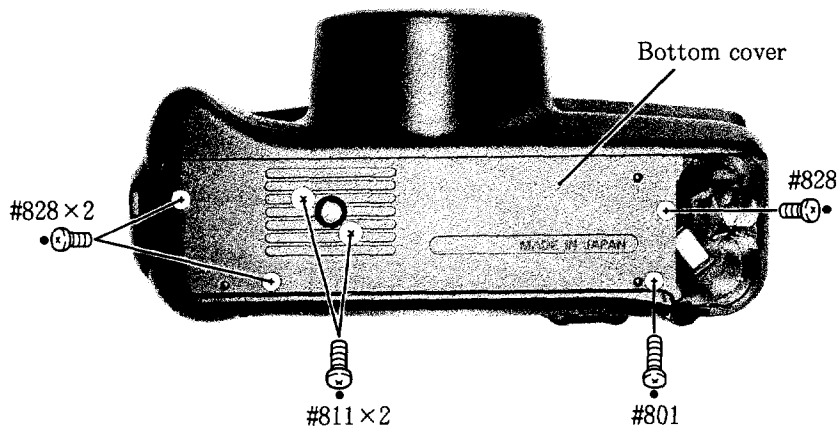
CAMERA BACK



REAR COVER



BOTTOM COVER



CHECKING CAMERA OPERATION AND INSPECTION

1. When installing batteries in the camera and attaching the battery chamber cover, all LCD indicators should appear for an instant.
2. When closing the camera back (turning the camera back SW is OFF), LCD indicators should appear, and "E" sign should appear in the frame counter after advancing four blank exposures.
3. When turning ON the main SW, the lens barrel should move forward from RESET to WIDE position.
4. When operating the zoom button, the lens barrel should move and the flash head operate properly and viewfinder power vary, accordingly.
5. When lightly press the shutter release button, shooting distance should appear on the LCD and LED indicators in the viewfinder blink.
6. When fully depress shutter release button, shutter should be released.

Note: If the camera does not work properly when the power is turned ON, remove the batteries or turn OFF the power.

ADJUSTMENT

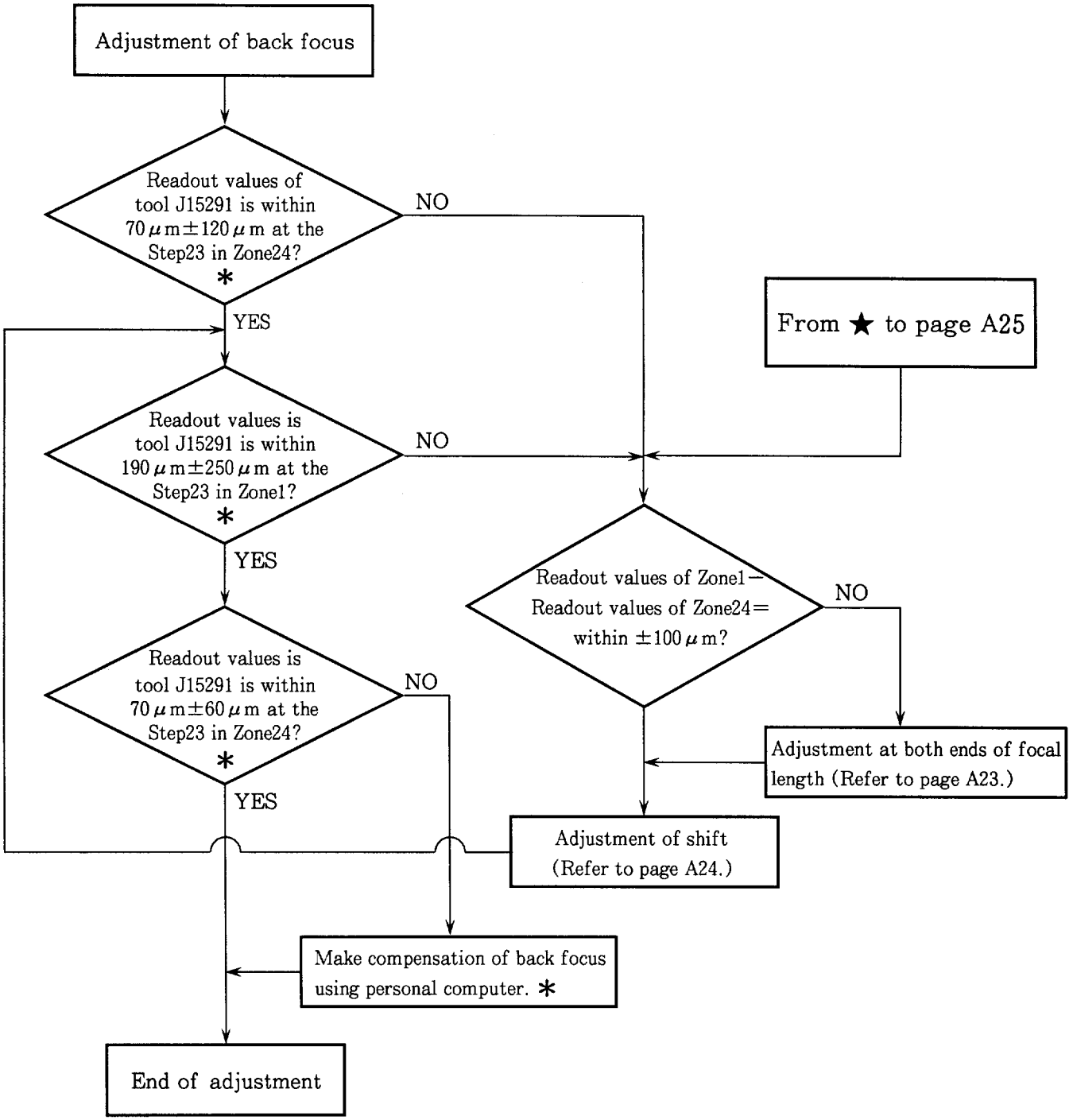
● Contents

1. Adjustment of back focus
   ① Adjustment at both ends of focal length
   ② Adjustment of shift
2. Adjustment of tele-mecha-lock
3. Adjustment of AE accuracy
4. Adjustment of AF accuracy
5. Adjustment of battery check voltage

● Tools

1. J19019: Collimator (24LT－2DTS, f＝193.5mm)
2. J15278: Connector relay box
3. J15291: Adjusting stand
4. J18292: Data back contact connector tool
5. J18221: AF adjustment chart A
6. J18222: AF adjustment chart B
7. J18223: Checking and adjustment programs
8. NEC PC-9800 series personal computer
9. Camera back substitute tool (Self-made; Sets camera in the same condition as when camera back is closed)

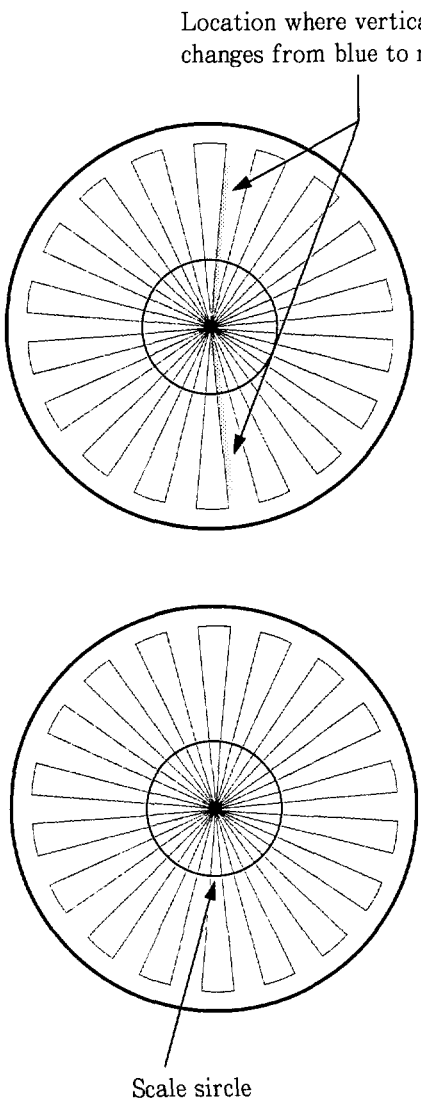
ADJUSTMENT OF BACK FOCUS



*: Refer to "Supplement compensation of back focus" to page A26.

1. Adjustment at both ends of focal length

Standard:
The difference between the Step23 in Zone24 (Wide end) and the Step23 in Zone1 (Tele ends) is within ±100 μm.



① Rotate the objective lens of the collimator (J19019) to set the scale to −19.34mm (minus 193.4 calibration).
＊Do not rotate the objective lens afterward.

② Set the scale of the FFD adjustment micro stand (J15291) to "0".
＊Refer to the specifications in the "Tool" section for the method of setting.

③ Set the camera to Zone24 (Wide end) and Bulb in accord with Step23 in manual inspection mode.
＊Refer to "Manual inspection mode" in the operation manual for the method of seting.

④ Rotate the spindle of the tool J15291 to focus the collimator and readout the value of the tool J15291.
Focus the collimator when the screen color of the collimator changes from blue to red. (See the figure on the left.)

⑤ Set the camera to Zone1 (Tele end), and to Bulb at the Step23 in manual inspection mode. Focus the collimator and readout value of the tool J15291.
Focus is made at the in-focus position in the scale circle on the collimator.

⑥ If the difference between Zone24 (Wide end) and Zone1 (Tele end) is more than 100 μm, set the value of the tool J15921 to one calculated from the following equation.

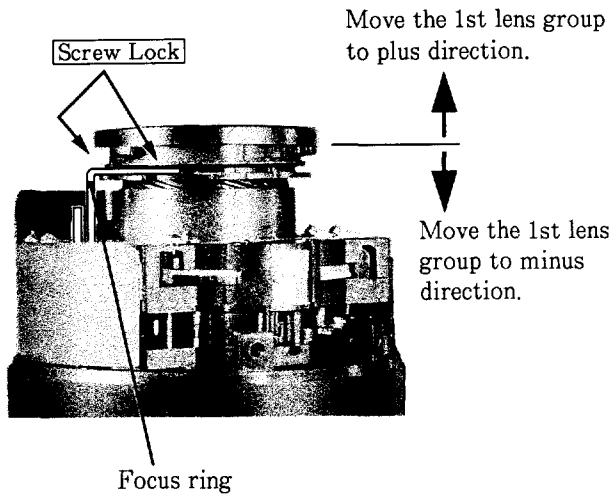
$$B = 1.16 \times (W - T + 120) + W$$

where

B: Set position of the tool J15291 (μm)

W: Readout value of Zone24 (μm)

T: Readout value of Zone1 (μm)



⑦ Set the camera Zone1 (Tele end), rotate the 1st lens group unit to focus the collimator.

＊If the calculated value is negative, move foreard the 1st lens group unit. If the value is positive, move back the 1st lens group unit.

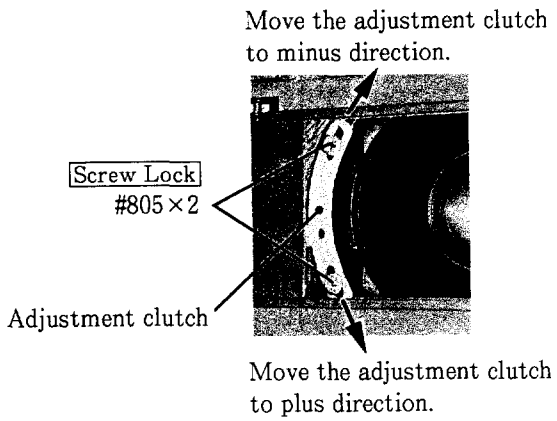
⑧ Recheck the values at Tele end and Wide end positions. If these values are out of standard, repeat steps ⑤ to ⑦.

⑨ After adjustment, secure the focus ring with the Screw Lock (two portions).

⑩ Attach the lens cover unit with screws #813×4.

＊As the above adjustment at both ends of focal length are easily made by using the adjustment software, make adjustments as indicated.

2. Adjustment of shift



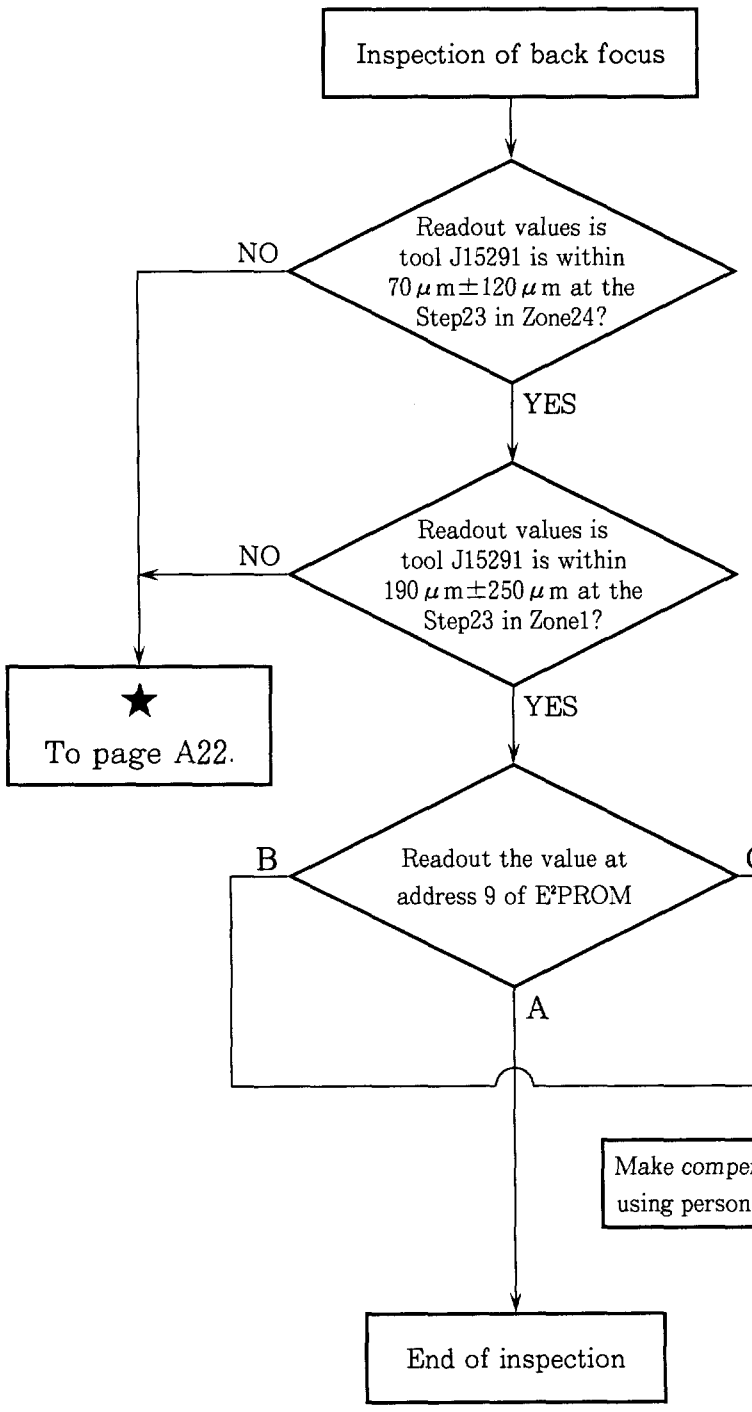
① Readout the value of Step23 in Zone24 (Wide end).

Standard value: 70 μm±90 μm
(−20 μm to +160 μm)

② If out of the standard range, move the adjustment clutch to adjust.

＊When all adjustment of back focus have been completed, secure screws #805×2 with Screw Lock (adhesive).

3. Inspection of back focus



Value at address 9 of E²PROM

	Upper	Lower
A	0	0
B	0	30
C	255	225

✻: Refer to "Supplement compensation of back focus" to page A26.

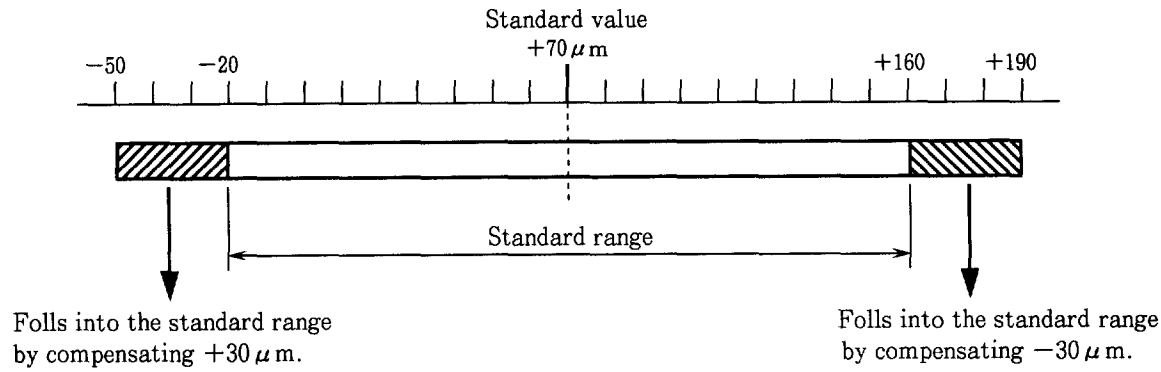
4. Supplement explanation of back focus

(1) Compensation of back focus

***Standard value of back focus**

Step23 in Zone24 (Wide end): 70 μm±90 μm (−20 μm to +160 μm)

The above figures are the standard value of back focus. If the camera body has a back focus value of 70 μm±120 μm (−50 μm to +190 μm), it can be compensated by writing a compensation value of +30 or −30 into the address 9 of E²PROM. (The value will fall into the standard range by software compensation.)

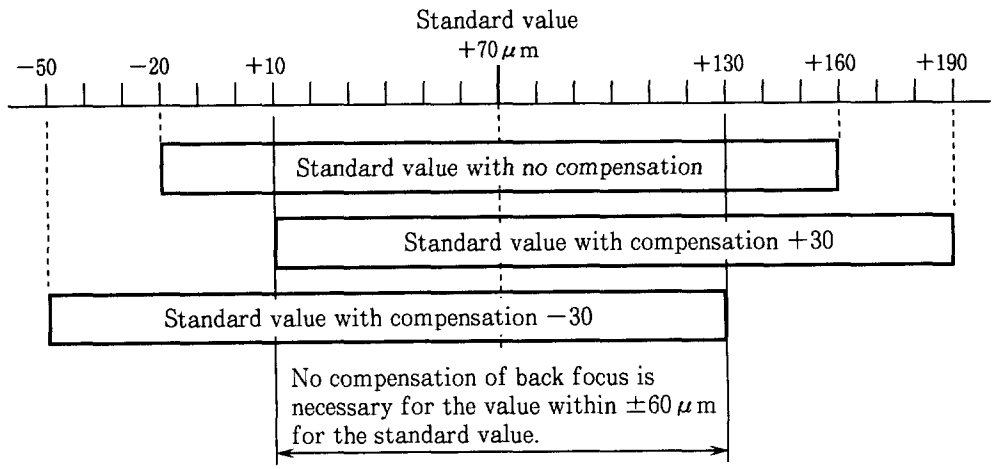


If the body has a back focus value of +91 μm to +120 μm for the standard value of 70 μm, write a compensation value of −30 μm into the E²PROM. If it has −91 μm to −120 μm for the standard value, write a compensation value of +30 μm into the E²PROM.

This is the outline for compensarion of back focus.

(2) Customer services for compensation of back focus

It is not easy to tell whether or not cameras received from customers for repair have received compensation of back focus. You are not required to take compensation of back focus for the body with the value within ±60 μm for the standard value of 70 μm. If the body has +61 μm to +120 μm or −61 μm to −120 μm values, compensate these values by adjustment software "5. Compensation of back focus" using a personal computer.



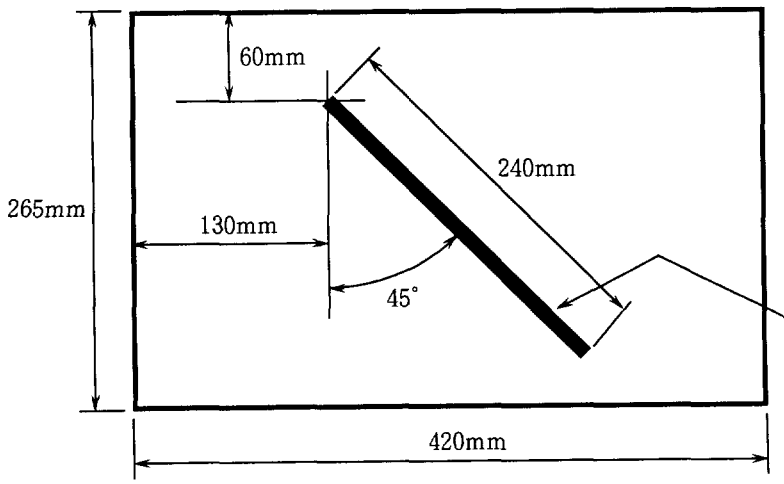
(3) Compensation of back focus using a personal computer

You can find out whether or not the body is correctly adjusted by reading out the value at the address 9 of E²PROM using a personal computer.

	Value at address 9 of E²PROM		Compensation value (μm)	Standard value (μm)
	Upper	Lower		
A	0	0	0	70±90 (−20 ～ +160)
B	0	3 0	+3 0	70^{+60}_{-120} (−50 ～ +130)
C	2 5 5	2 2 5	−3 0	70^{+120}_{-60} (+10 ～ +190)

ADJUSTMENT OF TELE-MECHA-LOCK, ADJUSTMENT OF AE ACCURACY, ADJUSTMENT OF AF ACCURACY, ADJUSTMENT OF BATTERY CHACK VOLTAGE

- Make each inspection and adjustment as indicated on the computer display.
- When making phase difference inspections while making AF adjustments, first prepare a following board.



*Use an A3-size white paper bard.

*The brightness difference between white and black should be more than 2EV.

Line width: 7mm

When replacing a part listed below, some adjustment and inspection may be required

Parts replaced \ Item to be check and adjusted			Adjustment and inspection of back focus		Adjustment of tele-mecha lock	Adjustment of battery check voltage	Adjustment of AE accuracy	Adjustment of AF accuracy
			Adjustment at both ends of focal length	Adjustment of shift				
Assembly	Main FPC				○		○	○
	Shutter	Assembly	○	○	○		○	○
		PCB						○
		FPC	○	○	○			○
	AF base plate						○	○
	SPD base plate						○	○
	Helicoid SW				○			○
Part	CPU (U1)						○	○
	PA IC (U2)					○	○	○
	E²PROM (U5)			○	○	○	○	○
	LCD Dr (U3)							○
	DC/DC converter (U6)							○
	Reg (U7)							○
	Photo interrupter (PI)							○
	AF illuminator (LED)			○				○

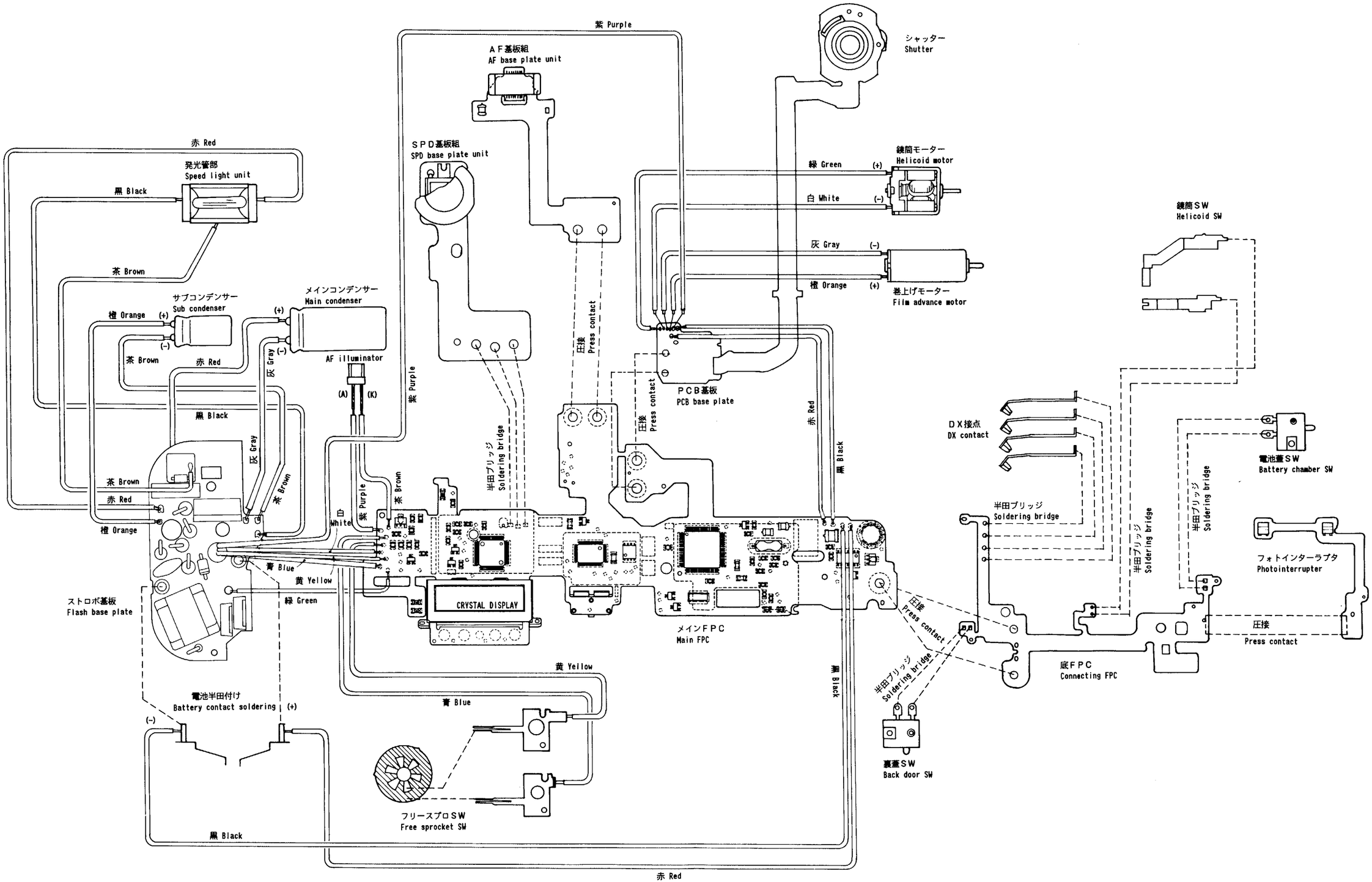
Note: ① Always make inspection of back focus when the lens barrel assmbly is removed.

② Make adjustment of battery check voltage when replacing PA IC and E²PROM.

電 気 編

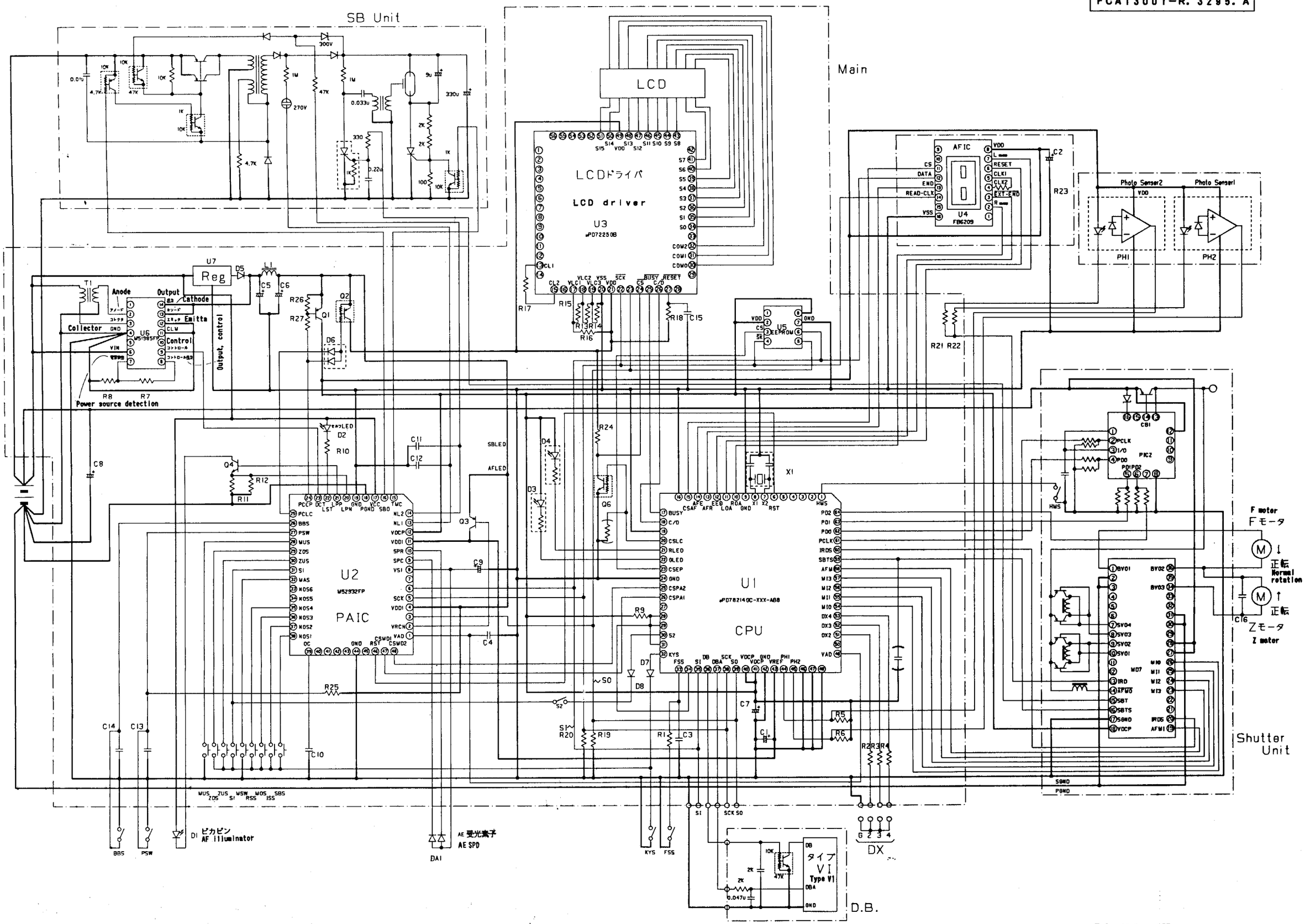
ELECTRIC CIRCUIT

1. 実体配線図 WIRING DIAGRAM

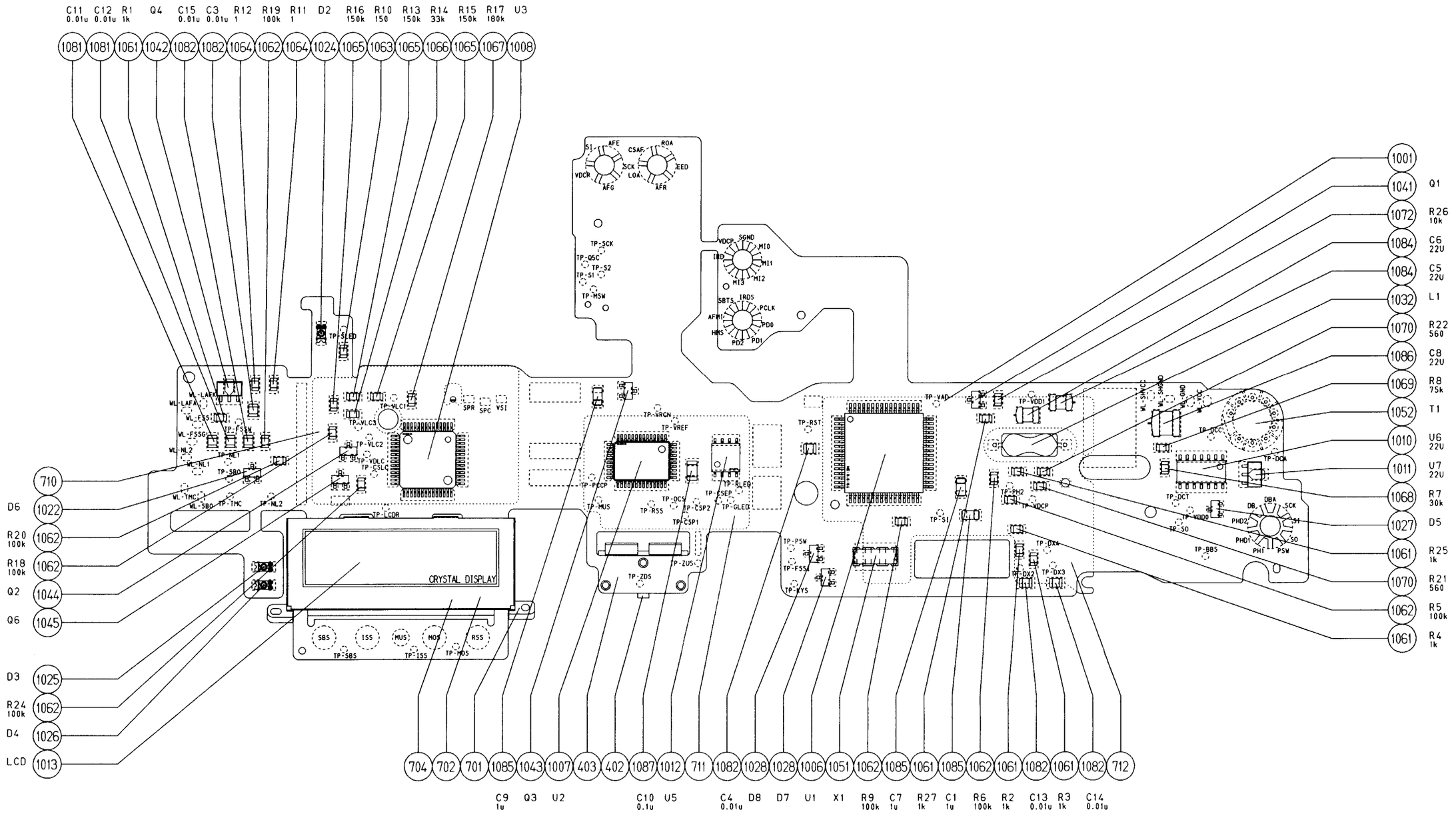


2. 回路図 CIRCUIT DIAGRAM

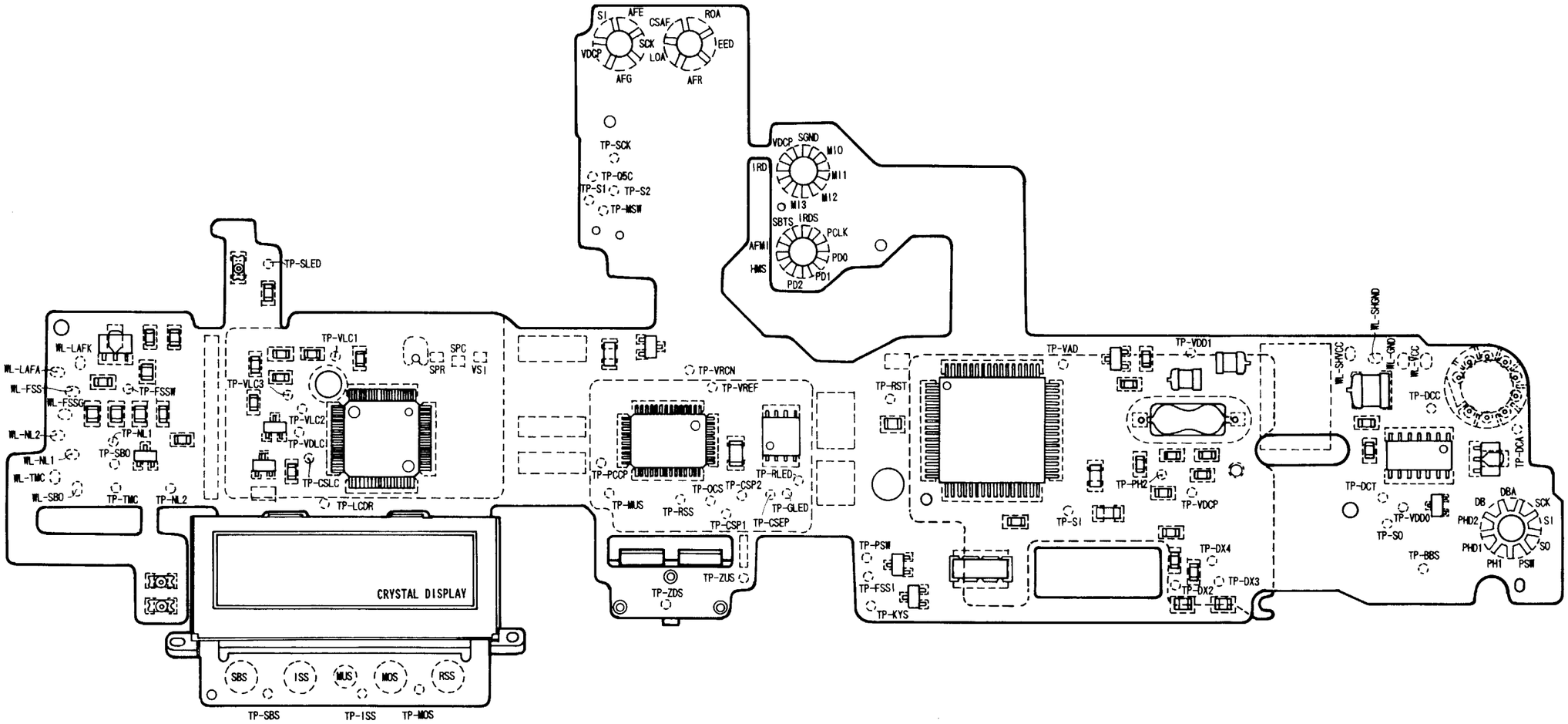
FCA13001-R. 3295. A



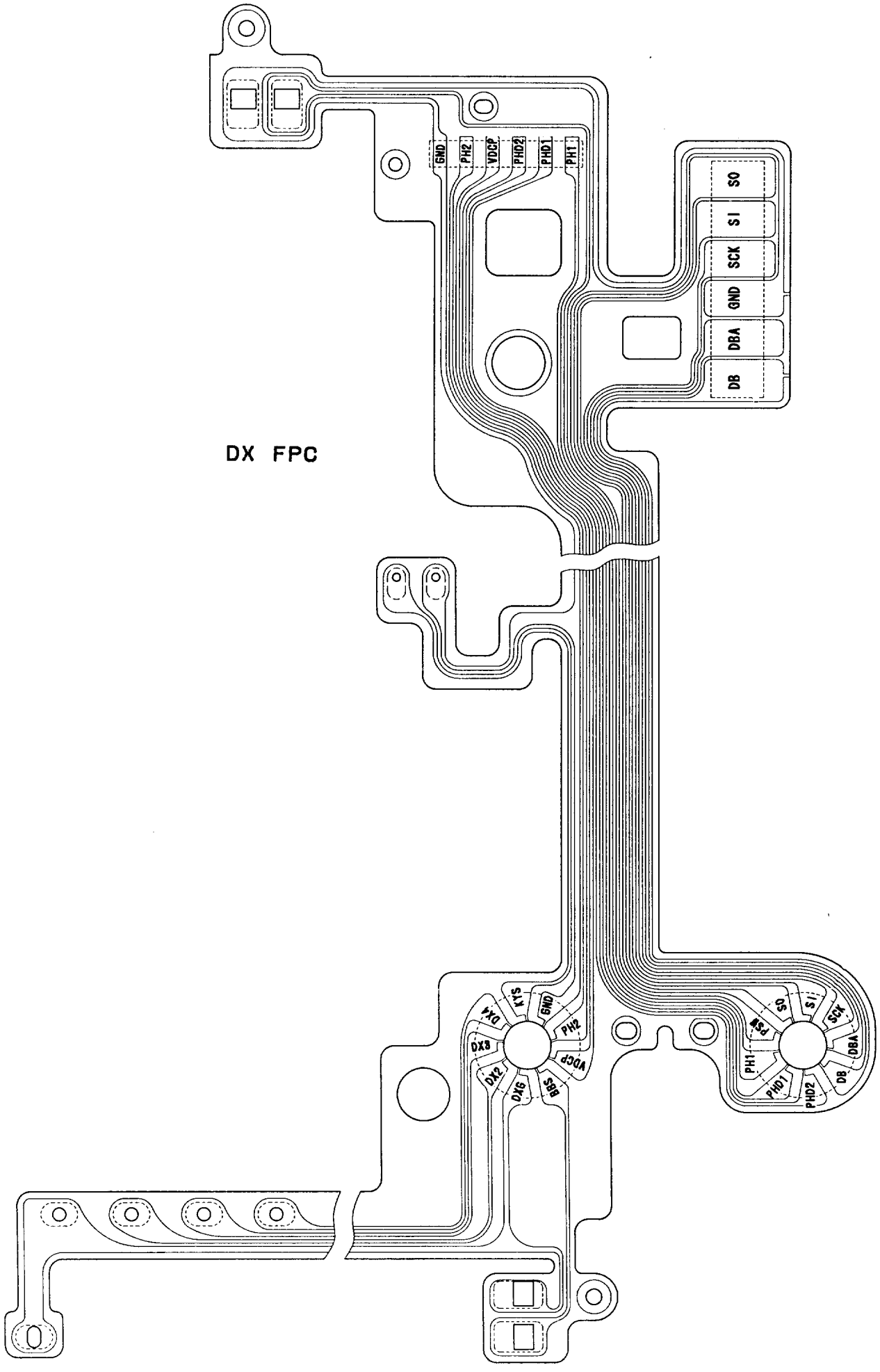
3. 電気部品配置図 CIRCUITRY PARTS LOCATIONS



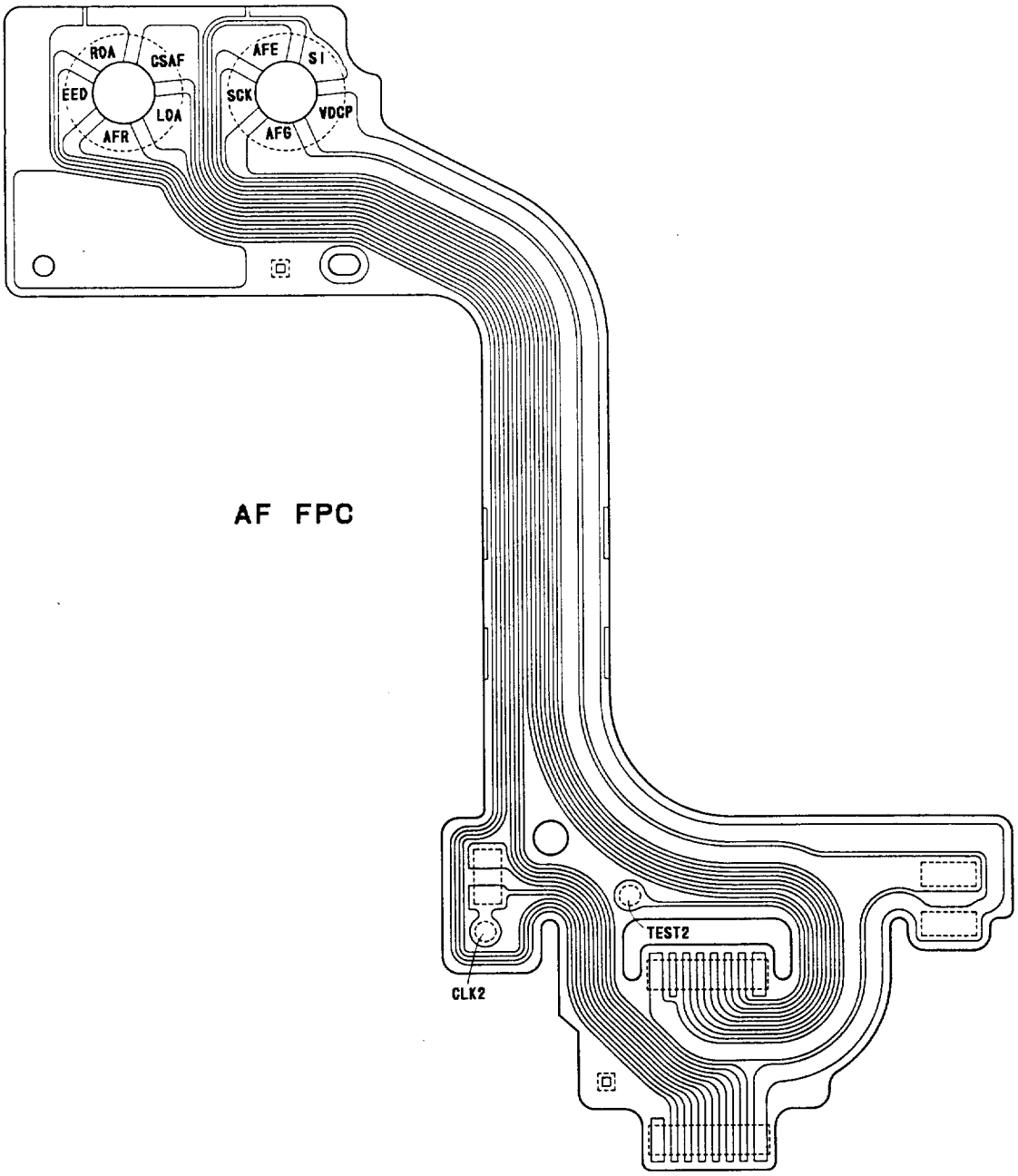
4. チェックランド図 CHECKING LANDS



5. FPC

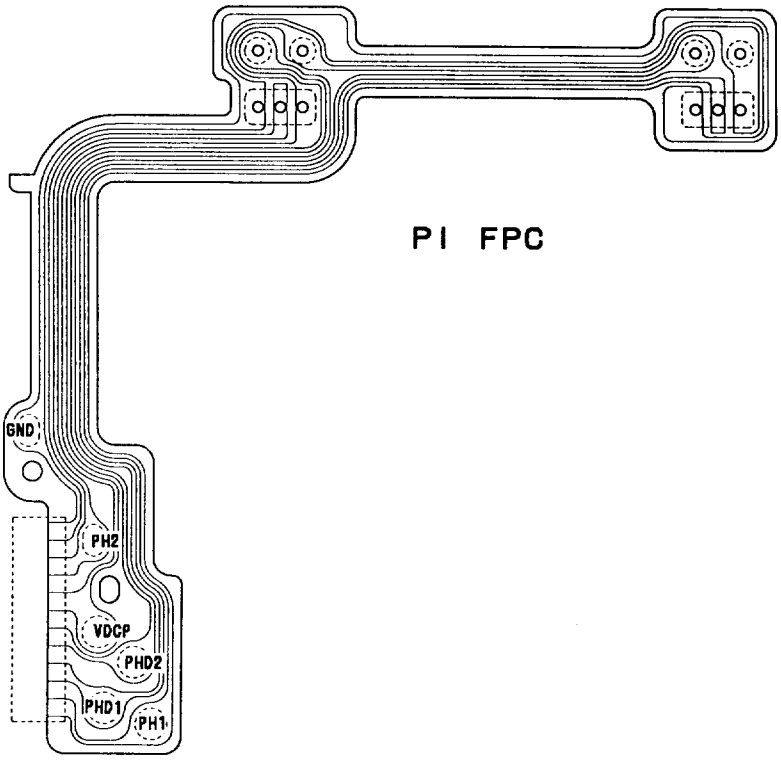

GND
PH2
VDCP
PHD2
PHD1
PH1
SO
SI
SCK
GND
DBA
DB
DX FPC
DX4
KYS
GND
PH2
DX3
VDCP
DX2
DX5
BBS
PSW
SO
SI
SCK
DBA
DB
PHD2
PHD1
PH1

FCA13001-R. 3295. A

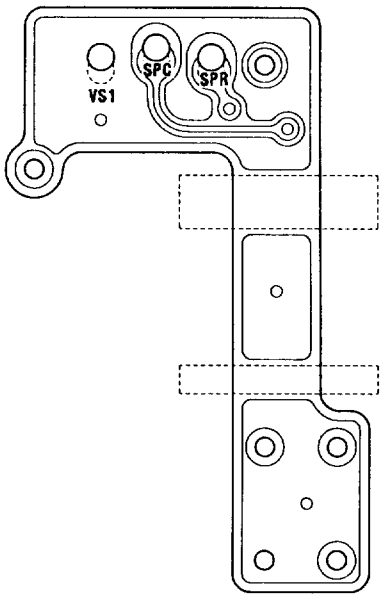


AF FPC

FCA13001-R. 3295. A

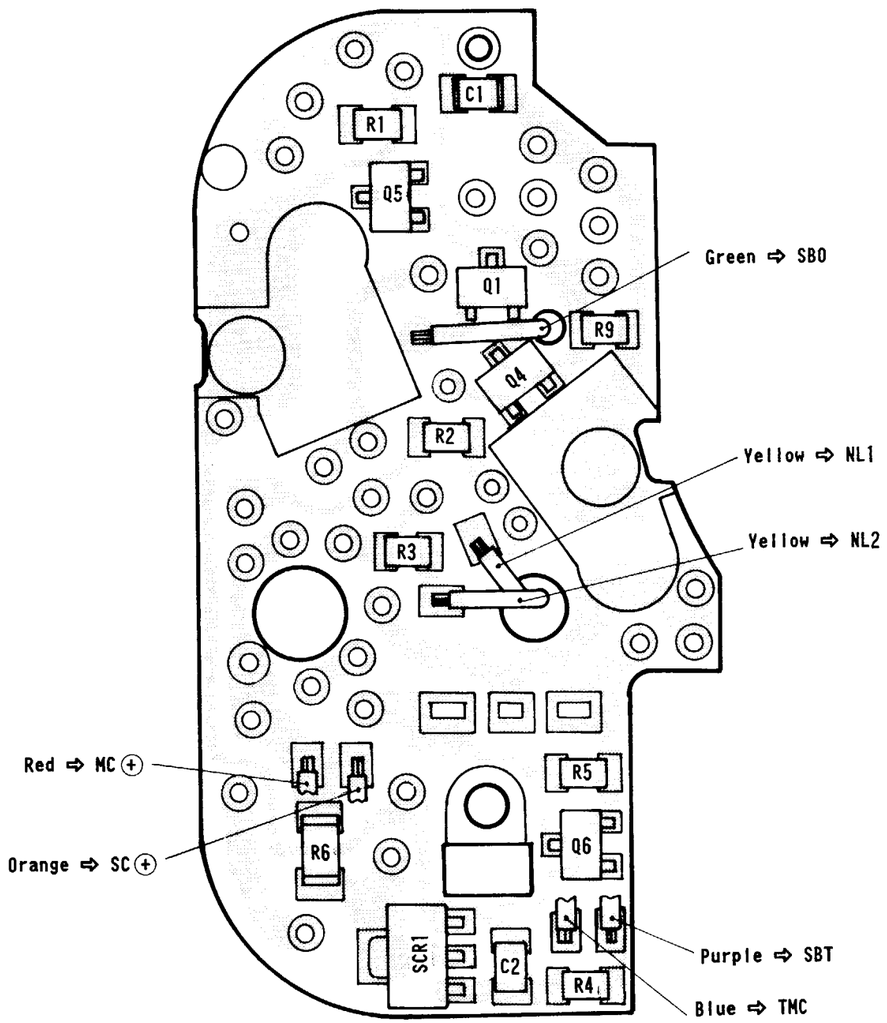


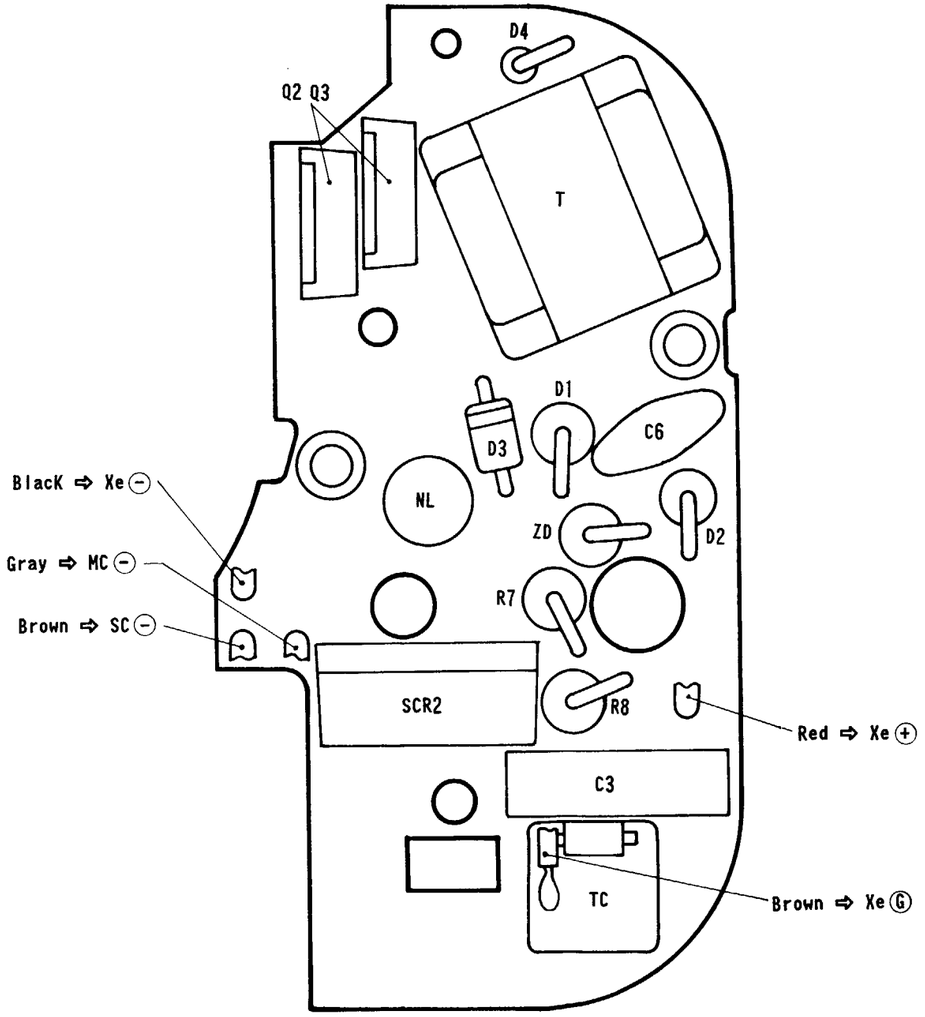
PI FPC



AE FPC

6. SB基板図 FLASH BASE PLATE



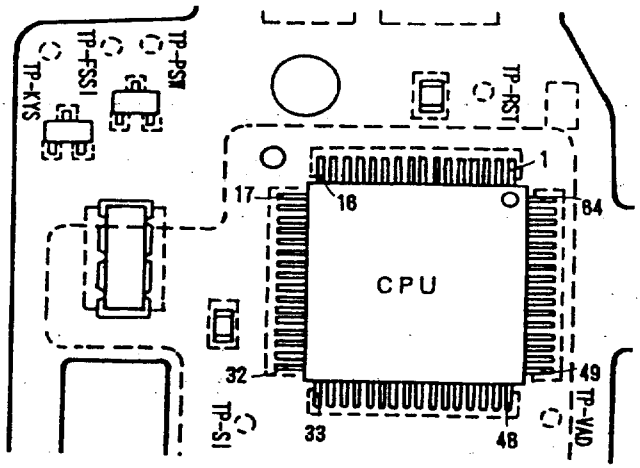


Q1	DTA143XK	D1	ES01F	R1	MCR10±5% 4.7KΩ	R7	F50XJ202	C1	MCH215C103K 0.01 μF
Q2 Q3	2SB1412P or 2SB1412Q	D2	S5688G	R2	MCR10±5% 1MΩ	R8	F50XJ202	C2	MCH215F473Z 0.047μF
		D3	1SS133-HJ	R3	MCR10±5% 47KΩ	R9	MCR10±5% 10KΩ	C3	B325206-B3333-J 0.033μF WV
Q4	DYC114YK	D4	1SS133	R4	MCR10±5% 330Ω			C6	DE0405B101K 2KV 100PF
Q5	DTD113ZK	T	S-563	R5	MCR10±5% 100Ω	ZD	1AZ300Z	SCR1	URSF05G49-1P
Q6	DTC113ZK	TC	KP-58	R6	MCR18±5% 1MΩ	NL	270V	SCR2	S6744 or CR12BM

7. IC pins table

CPU

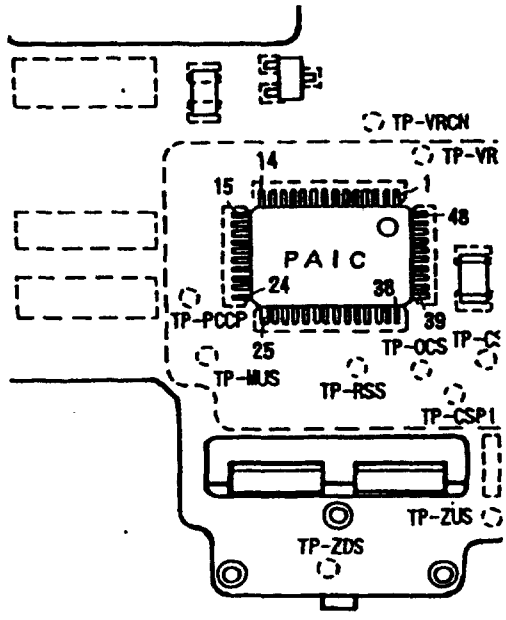
Pin No.	Signal	Connection	I/O	Function
1	HSW	Home switch	IN	Confirms the mechanical initial position of shutter
2	-	----	-	Opened.
3	-	----	-	
4	-	----	-	
5	-	----	-	
6	RST	PAIC	IN	Starts CPU operation by changing signal voltage from L to H. (L: Reset, H: Release reset)
7	X2	Oscillator		Oscillator
8	X1	Oscillator		
9	GND	----	-	
10	ROA	AFIC	IN	OR/AND output of AFIC right sensor array
11	LOA	AFIC	IN	OR/AND output of AFIC left sensor array
12	EED	AFIC	OUT	Sensor operation forced stop signal (L: active)
13	AFR	AFIC	OUT	AFIC reset terminal (H: active)
14	AFE	AFIC	IN	END signal (H when operation is completed)
15	CSAF	AFIC	OUT	AFIC chip selection terminal (H: active)
16	-	----	-	Opened.
17	BUSY	LCD driver	IN	Serial data input to LCD driver prohibition/ permission signal (L:Prohibition, H:Permission)
18	COD	LCD driver	OUT	Serial data distinction terminal (L:Data, H:Command)
19	-	----	-	Opened.
20	CSLC	LCD driver	OUT	LCD driver chip selection terminal (H: active)
21	RLED	RLED	OUT	SBLED control terminal (L: active)
22	GLED	GLED	OUT	AFLED control terminal (L: active)
23	CSEP	EEPROM	OUT	EEPROM chip selection terminal (H: active)
24	GND	----	-	
25	CSPA2	PAIC	OUT	Address of serial signal to PAIC (L:1st byte, H:2nd byte)
26	CSPA1	PAIC	OUT	Chip selection terminal of PAIC (H: active)
27	-	----	-	Opened.
28	-	----	-	
29	-	----	-	
30	S2	Release switch	IN	Release signal input terminal
31	-	----	-	Opened.
32	KYS	Lens barrel switch	IN	Lens barrel signal input terminal
33	PSS	Free sprocket	IN	Free sprocket signal input terminal
34	-	----	-	Opened.
35	SI	Miscellaneous	IN	Serial data (command, serial) input terminal



Pin No.	Signal	Connection	I/O	Function
36	DB	DB contact	OUT	Imprinting signal output terminal (H: active)
37	DBA	DB contact	IN	Full data imprinting discrimination signal
38	SCK	Miscellaneous	OUT	Clock terminal
39	SO	Miscellaneous	OUT	Serial data (command, serial) output terminal
40	VDCP	----	-	CPU power input terminal
41	VDCP	----	-	CPU power input terminal
42	GND	----	-	
43	VREP	PAIC	IN	Reference voltage input terminal for A/D converter
44	PH1	Photo-sensor	IN	Photo-interrupter 1 output terminal
45	PH2	Photo-sensor	IN	Photo-interrupter 2 output terminal
46	-	----	-	Opened.
47	-	----	-	
48	-	----	-	
49	VAD	PAIC	IN	Analog voltage input terminal for A/D converter
50	-	----	-	Opened.
51	DX2	DX contact	IN	DX2 contact input terminal
52	DX3	DX contact	IN	DX3 contact input terminal
53	DX4	DX contact	IN	DX4 contact input terminal
54	M10	MDIC	OUT	Control signal for stepping motor, lens barrel driving motor & film advance motor
55	M11	MDIC	OUT	Control signal for stepping motor, lens barrel driving motor & film advance motor
56	M12	MDIC	OUT	Control signal for stepping motor, lens barrel driving motor & film advance motor
57	M13	MDIC	OUT	Control signal for stepping motor, lens barrel driving motor & film advance motor
58	AFMI	MDIC	OUT	AF magnet control signal (H: Magnet ON)
59	SBTS	MDIC	OUT	Flash trigger control signal (L: active)
60	IRDS	MDIC	OUT	Flash side control signal of photo-interrupter (H: active)
61	PCLK	PIC2	OUT	Stepping motor driving voltage control signal
62	PD0	PIC2	OUT	Stepping motor driving voltage control signal
63	PD1	PIC2	OUT	Stepping motor driving voltage control signal
64	PD2	PIC2	OUT	Stepping motor driving voltage control signal

PAIC

Pin No.	Signal	Connection	I/O	Function
1	VAD	CPU	OUT	Analog voltage output terminal for A/D converter
2	VRCN	Q3	OUT	VREF control terminal
3	SO	Miscellaneous	IN	Serial data (command, serial) output terminal
4	VDD1	----	IN	Regulated voltage input terminal
5	SCK	Miscellaneous	IN	Clock terminal
6	SI	Miscellaneous	OUT	Serial data (command, serial) output terminal
7	-	----	-	Opened.
8	VS1	SPD, C9	OUT	T proportional reference voltage
9	SPC	SPD	IN	Central photosensor photoelectric current input terminal
10	SPR	SPD	IN	Peripheral photosensor photoelectric current input terminal
11	VREF	CPU, Q3	OUT	Reference voltage for A/D converter
12	VDCP	Q1	IN	CPU power supply
13	NL1	SB, C12	IN	Flash charged/non-charged discrimination signal input terminal
14	NL2	SB, C11	IN	Flash overcharging prevention signal input terminal
15	TMC	SB	OUT	Flash flash mode control signal
16	SBO	SB	OUT	Flash charging control signal
17	VCC	----	-	Battery voltage
18	GND	----	-	
19	GND	----	-	
20	LPN	R11, 12Q4	IN	AF illuminator driving current monitor terminal
21	LPP	Q4	OUT	AF illuminator control terminal
22	LST	R10	OUT	Self-timer LED control terminal
23	DCT	DC/DC	OUT	DC/DC converter control terminal
24	PCCP	R27, D6	OUT	CPU power supply control terminal
25	PCLC	D6	OUT	LCD driver power supply control terminal
26	BBS	Camera back switch	IN	Camera back switch signal input terminal
27	PSW	Battery chamber lid switch	IN	Battery chamber lid switch signal input terminal
28	MUS	Film rewind switch	IN	Manual film rewind switch signal input terminal
29	ZUS	Zoom-up switch	IN	Zoom-up switch signal input terminal
30	ZDS	Zoom-down switch	IN	Zoom-down switch signal input terminal
31	S1	Pre-release switch	IN	Pre-release switch signal input terminal
32	MAS	Main switch		Main switch signal input terminal
33	-	----	-	
34	-	----	-	Opened.
35	RSS	Continuous shooting switch	IN	Continuous shooting switch signal input terminal
36	MOS	Mode switch	IN	Mode switch signal input terminal

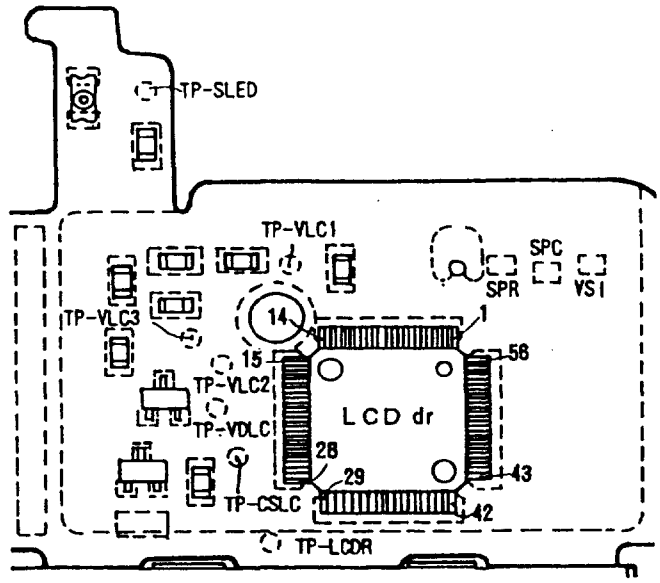


Pin No.	Signal	Connection	I/O	Function
37	ISS	Image size	IN	Image size switch signal input terminal
38	SBS	SB switch	IN	Flash switch signal input terminal
39	OS	C10	I/O	Oscillation circuit for timer
40	-	----	-	Opened.
41	-	----	-	
42	-	----	-	
43	-	----	-	
44	GND	----	-	
45	-	----	-	Opened.
46	RST	CPU	OUT	Starts CPU operation by changing signal voltage from L to H. (L: Reset, H: Release reset)
47	CSMD1	CPU	IN	PAIC chip selection terminal
48	CSMD2	CPU	IN	PAIC chip selection terminal

LCD driver

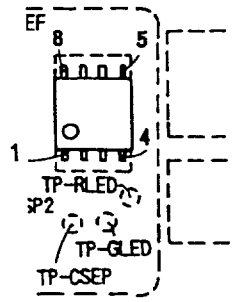
Pin No.	Signal	Connection	I/O	Function
1		Un-used		
2		Un-used		
3		Un-used		
4		Un-used		
5		Un-used		
6		Un-used		
7		Un-used		
8		Un-used		
9		Un-used		
10		Un-used		
11		Un-used		
12		Un-used		
13	CL1	R17	IN	Internal clock oscillation terminal
14		Un-used		
15	CL2	R17	IN	Internal clock oscillation terminal
16		Un-used		
17	VLC1	R15/R16		LCD driving power supply terminal
18	VLC2	R13/R15		LCD driving power supply terminal
19	VLC3	R13/R14		LCD driving power supply terminal
20	GND	----		
21	VDLC	----		LCD driver power input terminal
22	SCK	CPU	IN	Clock terminal
23	SO	CPU	IN	Serial data (command, serial) output terminal
24	CS	CPU	IN	LCD driver chip selection terminal (H: active)
25	BUSY	CPU	OUT	Serial data input to LCD driver prohibition/ permission signal (L: Prohibition,H: Permission)
26	CDD	CPU	IN	Serial data distinction signal (L:Data,H:Command)
27	RESET	R15/R16	IN	Reset terminal (L: active)
28		Un-used		
29		Un-used		
30	COM0	LCD	OUT	Common drive signal terminal
31	COM1	LCD	OUT	Common drive signal terminal
32	COM2	LCD	OUT	Common drive signal terminal
33		Un-used	IN	Segment drive signal terminal
34	S0	LCD	IN	Segment drive signal terminal
35	S1	LCD	IN	Segment drive signal terminal
36	S2	LCD	IN	Segment drive signal terminal
37	S3	LCD	IN	Segment drive signal terminal

FAA13001 - R.3295.A



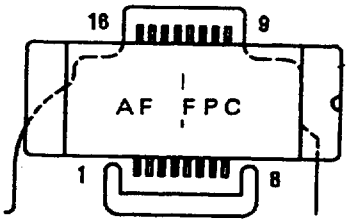
Pin No.	Signal	Connection	I/O	Function
38	S4	LCD	IN	Segment drive signal terminal
39	S5	LCD	IN	Segment drive signal terminal
40	S6	LCD	IN	Segment drive signal terminal
41	S7	LCD	IN	Segment drive signal terminal
42		Un-used		
43	S8	LCD	IN	Segment drive signal terminal
44	S9	LCD	IN	Segment drive signal terminal
45	S10	LCD	IN	Segment drive signal terminal
46	S11	LCD	IN	Segment drive signal terminal
47	S12	LCD	IN	Segment drive signal terminal
48	S13	LCD	IN	Segment drive signal terminal
49	GND	----		
50	S14	LCD	IN	Segment drive signal terminal
51	S15	LCD	IN	Segment drive signal terminal
52		Un-used		
53		Un-used		
54		Un-used		
55		Un-used		
56		Un-used		

EEPROM



Pin No.	Signal	Connection	I/O	Function
1		Un-used		
2	VDCP	----	-	EEPROM power input terminal
3	CSEP	CPU	IN	EEPROM chip selection terminal (H: active)
4	SCK	CPU	IN	Clock terminal
5	S0	CPU	IN	Serial data (command, serial) input terminal
6	S1	CPU	OUT	Serial data (command, serial) output terminal
7	GND	----	-	
8	VDSP	----	-	EEPROM power input terminal

AFIC



Pin No.	Signal	Connection	I/O	Function
1		Un-used		
2	ROA	CPU	OUT	Right sensor array OR/AND output
3	EED	CPU	IN	Sensor operation forced stop signal (L: active)
4	CLK2	R23	IN	Oscillator external resistor attaching terminal
5	CLK1	R23	IN	Oscillator external resistor attaching terminal
6	AFR	CPU	IN	Reset terminal (H: active)
7	LOA	CPU	OUT	Left sensor array OR/AND output
8	VDCP	----	-	AFIC power input terminal
9		Un-used		
10		Un-used		
11	CSAF	CPU	IN	Chip selection terminal (H: active)
12	SI	CPU	OUT	Serial data (command, serial) input terminal
13	AFE	CPU	OUT	END signal (H when operation is completed)
14	SCK	CPU	IN	Clock terminal
15		Un-used		
16	GND	----	-	

8. EEPROM value

Address, type of data		Data		Upper	Lower
0	(0H)	For production stage			
1	(1H)	For production stage			
2	(2H) adjustment	OFFSEE (OFFSET value)		8	00
3	(3H) adjustment	AFAS0@ (AFγ correction value)		19	24
4	(4H) adjustment	AFAS1@ (AFγ correction value)		19	24
5	(5H) adjustment	AFAS2@ (AFγ correction value)		19	24
6	(6H) adjustment	AFBS0@ (AF shift correction value)		10	00
7	(7H) adjustment	AFSB1@ (AF shift correction value)		10	00
8	(8H) adjustment	AFBS2@ (AF shift correction value)		10	00
9	(9H) adjustment	AFBF (AF Bf adjustment value)		00	00
10	(AH) fixed	AFTX (for AF adjustment)		1	54
11	(BH) fixed	LIMSLO (for focusing)		00	30
12	(CH) fixed	LIMCOR (for focusing)		00	138
13	(DH) fixed	LIMCBS (for focusing)		1	153
14	(BH) fixed	AFBAK (for AF adjustment)		6	102
15	(FH) fixed	AFSBH (for AF control)		00	00
16	(10H) var.A	AFDEST (STEP average value)		00	80
17	(11H) adjustment	BETAC (BV calculation γ value)	GMMAC (BV calculation β value)	128	128
18	(12H) adjustment	BETAR (BV calculation γ value)	GMMAR (V calculation β value)	128	128
19	(13H) adjustment	VBC2 (BC 3.7V adjustment)	VBC1 (BC 4.1V adjustment)	114	126
20	(14H) adjustment	KYSP@ (Lens barrel reset adjusting pulse number)		4	35
21	(15H) var.A	EPF1 (Sequence control flag 1)	EPF0 (sequence control flag 0)	00	00
22	(16H) var.A	EPF3 (Sequence control flag 3)	EPF2 (Sequence control flag 2)	00	00
23	(17H) var.A	SATUE (Shutter release number)		00	00
24	(18H) var.B	KPLSE2 (Lens barrel pulse counter)			
25	(19H) var.B	RWCNTE2 (FSS pulse counter)			
26	(1AH) var.B	MKSWE2 (Manual inspection mode)	FCNT (Film counter)		
27	(1BH) var.B	ISOB (Previous ISO value)	ISOA (ISO value before last)		
28	(ICH) var.B	FMEB (Previous counted number)	FMEA (Counted number before last)		
29	(1DH) var.B	ISSM (ISS setting)	SBSM (SBS setting)		
30	(1EH) var.B	RSSM (RSS setting)	MOSM (MOS setting)		

Address, type of data		Data		Upper	Lower
31	(1FH) var.B	ISSM2 (ISS setting retreat)	SBSM2 (SBS setting retreat)		
32	(20H) var.B	SFTMR (Self-timer interval)	RHSEI (Exposure correction value)		
33	(21H) var.B	MFM (Manual focus step)	SKCNT (Skip counter)		
34	(22H) var.B	SBCNT (Number of continuous flashing)	TUCNT (Pre-release timer counter)		
35	(23H) var.B	PALTB (932 latch B)	PALTA (932 latch A)		
36	(24H) var.B		PALTC (932 latch C)		
37	(25B) fixed	VS25 (Flash adjustment value VS1)		00	102
38	(26H) fixed	BRCN (Lens barrel control CN)	BRV (Lens barrel control V)	1	167
39	(27H) fixed	BRB1 (Lens barrel control B1)	BRB2 (Lens barrel control B2)	62	42
40	(28H) fixed	BRC (Lens barrel control C)	BRH (Lens barrel control H)	10	55
41	(29H) fixed	AFONG0@ (AF correction value γ)		255	224
42	(2AH) fixed	AFONG1@ (AF correction value γ1)		255	224
43	(2BH) fixed	AFONG2@ (AF correction value γ2)		255	224
44	(2CH) fixed	AFONS0@ (AF correction value shift)		00	00
45	(2DH) fixed	AFONS1@ (AF correction value shift 1)		00	00
46	(2EH) fixed	AFONS2@ (AF correction value shift 2)		00	00
47	(2FH) adjustment	AFON0@ (For AF adjustment)		1	144
48	(30H) adjustment	AFOND0@ (For AF adjustment)		00	20
49	(31H) fixed	WSELF (Two-shot self-timer shutter speed for 2nd shot)		19	13
50	(32H) fixed	Z24 (Wide end pulse number)		3	190
51	(33H) fixed	Z1 (Tele end pulse number)		00	26
52	(34H)	Un-used			
53	(35H)	Un-used			
54	(36H)	Un-used			
56	(37H)	Un-used			
57	(38H)	For production stage			
58	(39H)	For production stage			
59	(3AH)	For production stage			
60	(3BH)	For production stage			
61	(3CH)	For production stage			
62	(3DH)	For production stage			
63	(3EH)	For production stage			
64	(3FH)	For production stage			

Notes for above tables:

1. Variation:
   - Adjustment value (adjustment) : Data written during camera adjustment.
   - Fixed value (fixed) : Data in which a fixed value is to be written.
   - Variable A (var.A) : Data which varies depending on camera operation. Retained regardless of battery replacement.
   - Variable B (var.B) : Data which varies depending on camera operation. Lost by battery replacement.

* Both upper and lower values are decimal numbers.

2. Data used in production stage have no definitive value. They have no influence on camera operation.

3. Data of address 10 (AH) varies depending on the version of CPU.

	Upper	Lower
R version or earlier	1	26
T version or later	1	54

9. Circuit description

1. Block diagram

The circuit construction of the TWZoom 105 basically consists of the following blocks:

1) Shutter unit
2) Main control unit (Main FPC unit)
3) Speedlight unit (SB unit)
4) Camera body (Internal switch group)
5) AF unit
6) AE unit
7) Lens barrel detection unit
[8) Data back module (DB camera back)]

(1) Control unit
The control unit consists of: CPU, PAIC, LCD driver, EEPROM, DC/DC converter, regulated voltage IC, and other circuit parts.
The CPU is a general-purpose 8-bit CPU, featuring 16k byte ROM, 512 byte RAM and 12MHz clock frequency. This CPU controls the sequences operation of the camera.
When the power-on reset switch is turned on, the PAIC works to control the power supply to the CPU, speedlight oscillation driving, IRED driving, etc.
The LCD driver controls the LCD.

(2) Shutter unit
The shutter unit consists of: the power system driving circuit, stepping motor, etc. The power system driving circuit controls stepping motor driving, film motor driving, lens barrel motor driving, AFMg driving, etc.
This unit is controlled by data sent from the CPU.

(3) Speedlight unit
The speedlight unit consists of: the flash head, oscillation circuit, and primary and secondary voltage circuits.
Operation of this unit is controlled by the CPU through the PIC in the shutter unit, or the PAIC in the main control unit.

(4) Camera body
This refers to operation switches and status switches in the camera body.

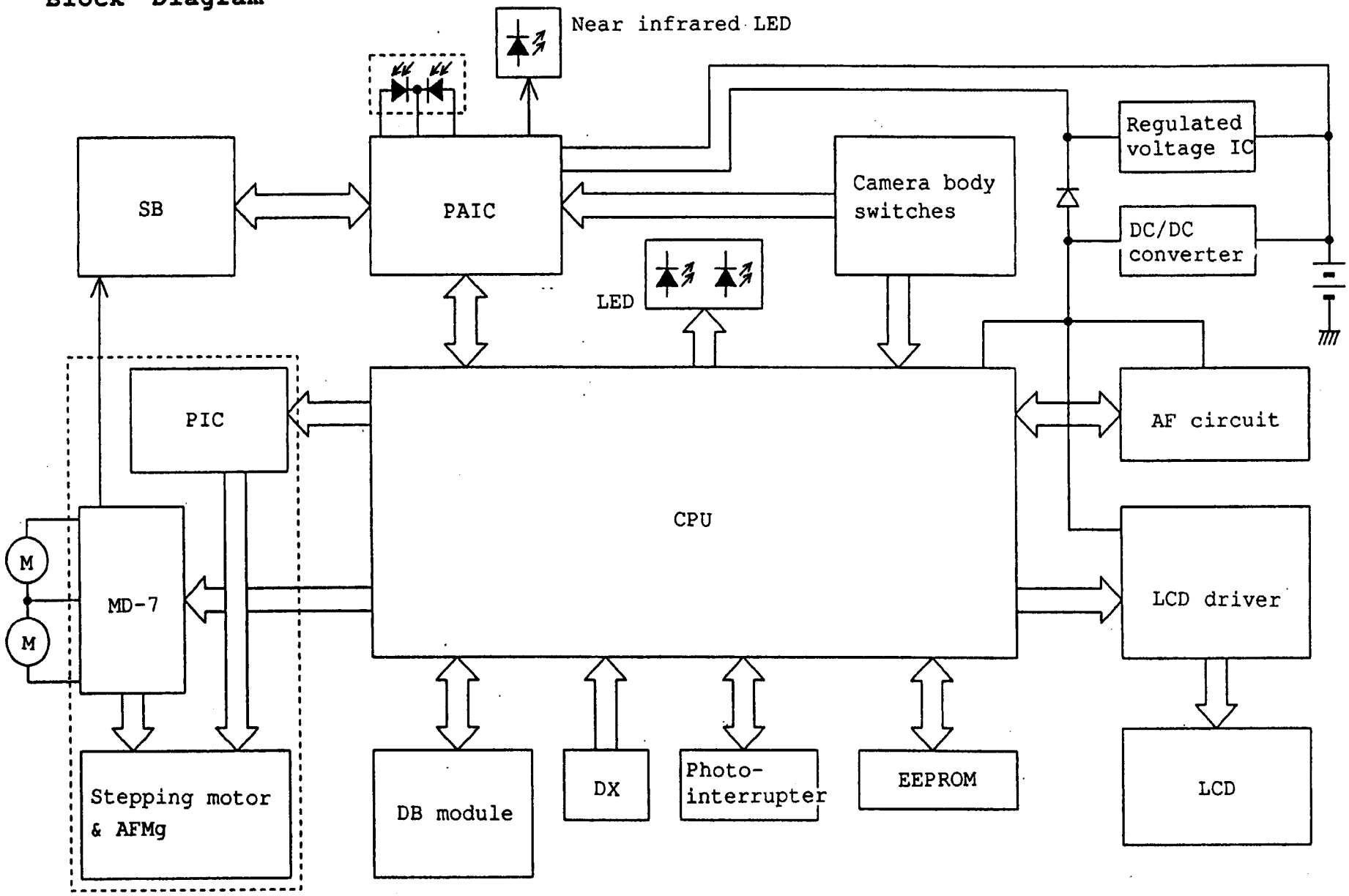
(5) AF unit
The AF unit consists of the AFIC and other elements.

(6) AE unit
The AE unit consists of the AEIC.

(7) Lens barrel detection unit
The lens barrel detection unit consists of the photo-interrupter which generates pulses as the lens barrel is driven.

(8) Data back module
The data back module is incorporated into the camera back. Imprinting signals are sent from the CPU in the main control unit.

Block Diagram



2. Sequence description (software system)

(1) Installing battery/closing battery chamber lid; (data initializing)

This camera features one-way power supply system accepting a lithium battery pack only with no power backup system. Therefore, all data in the system except those of the EEPROM are initialized when replacing batteries.

1) When the battery is installed and voltage is applied to the circuit, the PAIC is activated. The PAIC enters into wait state until the battery chamber lid switch (PSW) is turned OFF.

2) When the battery chamber lid is closed, the PSW is switched OFF. Along with this change, the PAIC activates the DC/DC converter to supply power to the CPU. Then, the CPU starts the initializing routine.

3) Data initialization is carried out in the following order:
   a) Necessary initial data are stored into the RAM in the CPU.
   b) Clear the necessary areas in the EEPROM.
   c) LCD driver is initialized.
   d) Shutter close is confirmed.
   e) All LCD indicators are displayed.
   f) If the unit was rewinding a film or making blank exposures before the PSW is turned on, each operation proceeds.
   g) If film is loaded, the camera advances one frame.
   h) If the lens barrel is extended, it is driven to the reset position.

4) During initialization, when the following unexpected events occur:
   a) Film advance operation stops at end of roll while advancing film.
   b) Driving operation stops when resetting the lens barrel.

process will enter into each processing routine to deal with them.

5) When initialization is executed, the system goes into wait state to save power. During this state, all LCD indicators go out.

(2) Main switch sequence

The main switch is only a momentary switch, it can not turn the power ON/OFF. Turning on this switch drives the lens barrel from Reset to Wide position.

1) When the main switch is turned on, the CPU starts the input routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
   After this, the other routines occur in the following order:
   a) LCD driver is initialized (only when the lens barrel is driven to Tele position).
   b) Process holds for 50ms.
   c) Reconfirm MSW is on.
   d) Confirm camera back is closed.
   e) Data are transferred to the LCD driver.
   f) Lens barrel position is detected. If it is in reset position, it is driven to Wide position, if it is in any other position, it is driven to reset position.
   g) When the lens barrel is driven to reset, the process is completed as soon as the MSW is turned off by clearing set modes.
   h) When the lens barrel is driven to wide position, charging of the speedlight starts. As soon as the MSW is turned off, the process is complete.
2) If the system detects any unexpected events, the process explained in this section (2) will enter into the appropriate processing routine and deal with these events.

(3) Camera back operation

The state (open/close) of the camera back is linked to the camera back switch (BBS). The BBS is ON when the camera back is opened, and OFF when it is closed. Therefore, three camera back states can be recognized; "open -> close", "close -> open", and "open."

1) When opening the camera back, that is when the BBS phase is changed from OFF to ON, the CPU starts the power-on reset routine.
   The following main processes then happen after checking the change in the state of the BBS:
   a) Process holds for 300ms.
   b) Starting latch is reset.
   c) Flags and data are cleared.
   d) LCD driver is initialized and indication data are transferred.
   e) Check to see if camera back is closed or opened.
   f) If the camera back is open, the lens barrel is driven to reset position and the frame counter is cleared.
   g) The LCDs go off when all power-on reset switches are turned off. Then, necessary data are written on the EEPROM and the process is complete.
2) When closing the camera back, (BBS phase is changed from ON to OFF), the CPU performs the power-on reset routine. Then, the following main processes start after checking the BBS state:
   * Steps a) to e) are same as those mentioned above.

f) If the camera back is closed, the skip mode is checked (whether AUTO or MANUAL). If in AUTO mode, skip frame numbers are set.
g) Soff signal is sent to the DB.
h) If the lens barrel is extended, it is driven to reset position.
i) The frame counter is cleared.
j) Confirm that shutter is closed.
k) The process is completed by making four blank exposure.

3) When the camera back is opened, any power-on reset operation can not be activated.

(4) Zoom switch sequence

The zoom buttons are seesaw-type switches, designed so that either one of the two switches pushed is always on.
The two zoom switches (the zoom-up switch and the zoom-down switch) basically control the zooming of the lens barrel. Yet, their actual functions vary depending on the zoom mode selected. This is described as following:

1) Continuous zoom

In this mode, zoom operation is carried out in the most basic way. When the zoom-up switch is turned on, the lens barrel is driven to Tele continuously. It stops when the switch is turned OFF.
Lens barrel is driven to Wide direction if the zoom-down switch is turned on.
When one of the zoom switches is turned on, the CPU starts the power-on reset routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
After this, the following routines are carried out in order:
a) LCD driver is initialized.
b) Process holds for 50ms.
c) Recheck that zoom switch is ON.
d) If it is in neither skip mode nor manual focus mode, zooming starts.
e) After the lens barrel position is set, the lens barrel is driven.
f) Process is completed when the zoom switches are turned off.

2) Zoom continuous shooting

In this mode, the lens barrel is always driven from either the Tele or the Wide end. Therefore, zoom switches in this mode can be used for setting the start position of the lens barrel driving, and works as a Tele/Wide changeover switch.
When one of the zoom switches is turned on, the CPU starts the power-on reset routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
After this, the other routines succeed in following order:
* Steps a) to d) are same as those mentioned in 1) above.
e) After setting the lens barrel position (Tele/Wide end), the lens barrel is driven to this position.
f) Process is completed when the zoom switches are turned off.

3) Zoom operation in skip mode
In skip mode, the set data of the frame number to be skipped are shifted.
When one of the zoom switches is turned on, the CPU starts the power-on reset routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
After this, the following routines are carried out in the following order:
* Steps a) to c) are same as those mentioned in 1) above.
d) Skip mode is recognized.
e) While the zoom switch is being on, set data are shifted every 500ms.
The process is completed when the zoom switch is turned off.

4) Zoom operation in manual focus mode
In manual focus mode, focusing step setting data are shifted.
When one of the zoom switches is turned on, the CPU starts the power-on reset routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
After this, the following routines are carried out in the following order:
* Steps a) to c) are same as those mentioned in 1) above.
d) Manual focus mode is recognized.
e) While zoom switch is being on, set data are shifted every 500ms. The process is completed as soon as the zoom switch is turned off.

(5) Manual U turn switch sequence
As one of the power-on reset switches, turning on this switch activates the same power-on reset routine as other switches in terms of software. However, it will not activate the film rewind function if film is not loaded.
When this switch is turned on, the CPU starts the power-on reset routine. This routine is common whether this switch is turned on during wait state or when the pre-release timer is functioning.
After this, the following routines are carried out in the following order:
a) LCD driver is initialized.
b) Operation holds for 300ms.
c) Manual U turn switch ON is rechecked.
d) The camera back is closed. If opened, the process is completed when the manual U turn switch is turned off.
e) All data are transferred to the LCD driver.
f) All FSS pulse counters are checked to see that they are not set to "0".
g) The lens barrel is driven to reset.
If the camera back is opened during this process, process enters into camera back routine.
h) Check to see that shutter is closed.
If the shutter is not closed, process enters into end routine.
i) Film is rewound.
j) Operation is completed when the manual U turn switch is turned off.

(6) Shooting sequence

Turning on the pre-release switch (S1), like the zoom switch, will start power-on reset operation only if the lens barrel is not in reset position due to the hardware construction. After checking that the pre-release switch is ON, the process proceeds to the main routine:

a) LCD driver is initialized.
b) Recheck that pre-release switch is ON.
c) Display data are transferred to the LCD.
d) In skip mode, process enters into skip advance process.
e) Shooting preparation processes:
   1) Zoom continuous shooting frame counter, AF step adjusted flag, and shooting step memory are cleared.
   2) In manual focus mode, set to AF step. AF step is cleared in any mode other than AF step setting mode for manual inspection.
   3) In bulb mode, the bulb flag is set.
f) The latch of the AE is released to initialize the AE circuits.
g) Son signal is sent to the DB.
h) Metering is executed. Then, BV calculation and ABLC calculation are performed.
i) Performing focusing.
j) Determining target zone.
k) AE is calculated.
l) If flash is required, the speedlight is checked.
   If it is not yet charged, the process is suspended and speedlight charging starts. The process is completed when S1 is turned off.
   If flash is not fired, or the speedlight is charged, LED lights up.
m) If flash is fired, the FM is calculated.
n) The focusing result is displayed on the LCD.
o) If the present zone and target zone are different, the lens barrel is driven.
p) When the film release switch (S2) is ON in self-timer mode, set time is counted, when set time is up, the lens is driven. Otherwise, the AF lens is driven immediately.
q) In pre-firing mode, pre-firing is carried out three times after AF lens driving.
r) Shutter is released and the AF lens is driven to reset.
s) Numbers of AF steps and shutter release operation are written into the EEPROM.
t) If film is loaded, data imprint signal is output and the film is advanced. In full-data mode, film is advanced halfway (4 pulses) at first. Then the second data imprint signal is transmitted and the remaining half (4 pulses) of the film is advanced.
u) When film advance operation is completed, the present mode is determined. If the camera is in double self-timer mode or continuous shooting mode, shooting routine is repeated.
v) Process is completed when the pre-release switch is turned off. If necessary, speedlight charging starts to complete the processing.

(7) Function switch sequence

As in the case of the zoom switches, turning on the function switches (continuous shooting switch, mode switch, image size switch, speedlight switch) starts the power-on reset operation only when the lens barrel is not in reset position due to the hardware construction.

After checking that the function switch is ON, the the main routines start:

a) Operation holds for 10ms.
b) Check to see if either one of the function switches is ON.
c) Recheck LCD is ON.
d) Mode corresponding to the activated function switch is shifted by one.
e) The function switch is checked by being turned on for three seconds. If it is turned off within three seconds, the process stops here.
f) Advanced mode is set when the function switch remains ON for 3 sec.
g) When the zoom switch is turned on while keeping the function switch ON in advanced mode, the data corresponding to the function switch are set.
h) When the function switch is turned off, set mode and data are determined and the process is completed.

(8) Skip advance sequence

After checking that the pre-release switch is ON and that skip mode is active, the main routines start:

a) Process waits until the shutter release switch (S2) is turned ON. If the pre-release switch (S1) is turned off, the process stops here.
b) When the shutter release switch is turned on, the shutter is checked to be sure that it is closed.
c) Skip mode is cleared.
d) Film advances (skip feeding) after setting frame numbers specified.
e) Process is completed when the pre-release switch is turned off.

(9) Malfunction sequence

This system is designed presuming the following malfunctions:

1) Lens barrel stops abnormally:
If it is impossible to drive the lens barrel due to external force, the power supply to the driving motor is shut off and the error display appears.
The lens barrel is driven to reset when the next power-on reset routine is carried out.
Error is detected by detecting the phase changes of the photo-interrupter. (Detection time: 1 second).
Message: LCD blinks (at 2Hz).
2) Detection of abnormal film rewind operation:
If the free sprocket input signal is not output during film rewinding (as broken film), the power supply to the film rewind motor is shut off and the error display appears. Process is suspended until the camera back is opened.
Error is detected by detecting the changes of free sprocket input signal. (Detection time: 1.6 seconds).
Message: LCD number blinks (at 2Hz).
3) Malfunctions of shutter mechanism
If an abnormality in lens driving or of the sector open/close operation is detected, all LCD indicators go out and operation stops.
Error is detected by home switch.
Message: All LCD indicators go out.

3. Functions of each unit

(1) Control unit

[Sequence control]

Software of CPU in the control unit controls the whole operation of the camera. When any of the power-on reset switches: battery chamber lid switch (PSW), camera back switch (BBS), main switch (MSW), zoom-up switch (ZUS), zoom-down switch (ZDS), manual U turn switch (MUS), speedlight switch (SBS), mode switch (MOS), image-sizer switch (ISS), or pre-release switch (S1)) is turned on, the connected PAIC activates the DC/DC converter. Then, the DC/DC converter generates a regulated voltage and supplies it to the CPU, activating the CPU and its software. The software controls the operation according to the power-on reset switch turned on by exchanging data with the PAIC.

Functions of the PAIC and the CPU are shown below:

- PAIC:
  1) Activates regulated voltage circuit when power-on reset switch is turned ON.
  2) Specifies power-on reset.
  3) Controls metering circuit.
  4) Drives the near infrared LED.
  5) Controls speedlight charging and oscillating.
  6) Transfers serial data to CPU.
  7) Controls shutter pre-release timer.
- CPU:
  1) Controls each sequence.
  2) Transfers serial data to PAIC.
  3) Transfers serial data to EEPROM.
  4) Transfers serial data to AFIC.
  5) Controls shutter operation.
  6) Controls LCD driver (LCD display driving control),
  7) Controls data back.
  8) Controls lens barrel driving.
  9) Controls film advance driving.
  10) Controls shooting mode setting.
  11) Controls ABLC calculation.
  12) Controls focusing calculations.

[Power voltage control]

The system is powered by 6V lithium battery pack but the CPU, EEPROM, AFIC and LCD driver are controlled by 5V power supply.

The DC/DC converter and the three-terminal regulator supply a 5V power controlled by signals from the PAIC.

[Battery check]

A battery check is always performed when the power-on reset switch is turned on. First, the software determines the timing of the check. Then, the MD-7 in the shutter unit (controlled by signals from the CPU) supplies loading power to the stepping motor and voltage is checked by the PAIC.

The result of this check is sent to the CPU through serial communication.

The battery check is carried out in two steps:

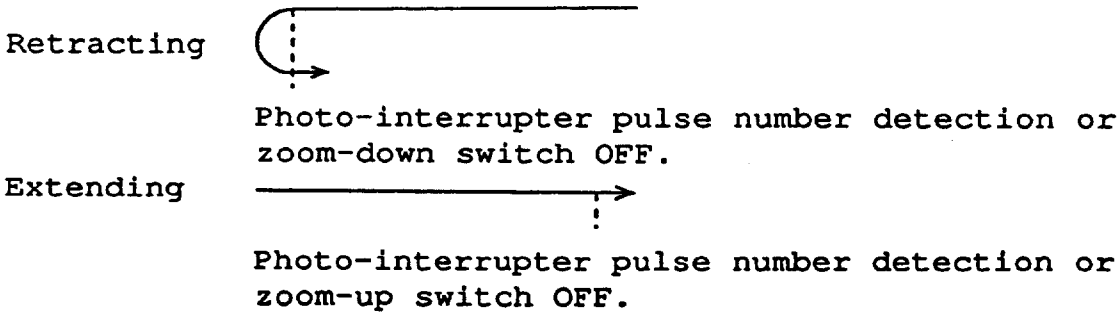
- 1st step (VBC1:Precaution): LCD battery mark blinks.
- 2nd step (VBC2:Caution): LCD goes off.

[Metering]
Metering is done with a two-segment SPD, basically the same as with the Zoom 35-70. However, this unit has ABLC (Automatic Back-Light Correction) using the above 2-segment SPD. At first, photocurrent generated by the SPD is converted to voltage. Then, the A/D converter in the CPU receives the converted voltage to calculate brightness.

[Focusing]
Focusing is performed by AF passive method using phase detection element. Through the data exchange between the CPU and the AFIC, focusing calculations are performed according to the programmed algorithm.

[Lens barrel driving control]
The lens barrel driving motor is controlled by the IC (MD-7) in the shutter unit. However, it is the CPU software which transmits the signal to the MD-7 and actually controls the driving of the lens barrel such as direction control and stop, etc.

- Basic lens barrel driving consists of the following:
  Reset<->Wide driving by turning on the main switch.
  Outward driving by turning on the zoom-up switch.
  Inward driving by turning on the zoom-down switch.
  In addition, turning on the pre-release switch drives the lens barrel for zoom continuous shooting and image-size selector shooting.
- Lens barrel driving is stopped by detecting the pulse number of the photo-interrupter or by turning off the lens barrel switch or zoom switch. The former method is adopted in all cases except lens barrel driving in continuous zoom by the zoom switch and reset driving by the main switch.
- The standard extension driving method is adopted to control the stop of the lens barrel drive to eliminate position error due to backlash caused by the lens construction.



Note: When stopping, the lens is secured by blocking the reverse current.

[Motor driving control]
The CPU performs drive control of the stepping motor, film advance/rewind motor and lens barrel motor by transmitting parallel signals to the MDIC (MD-7) on the shutter base plate.

Motor control signal and motor status:

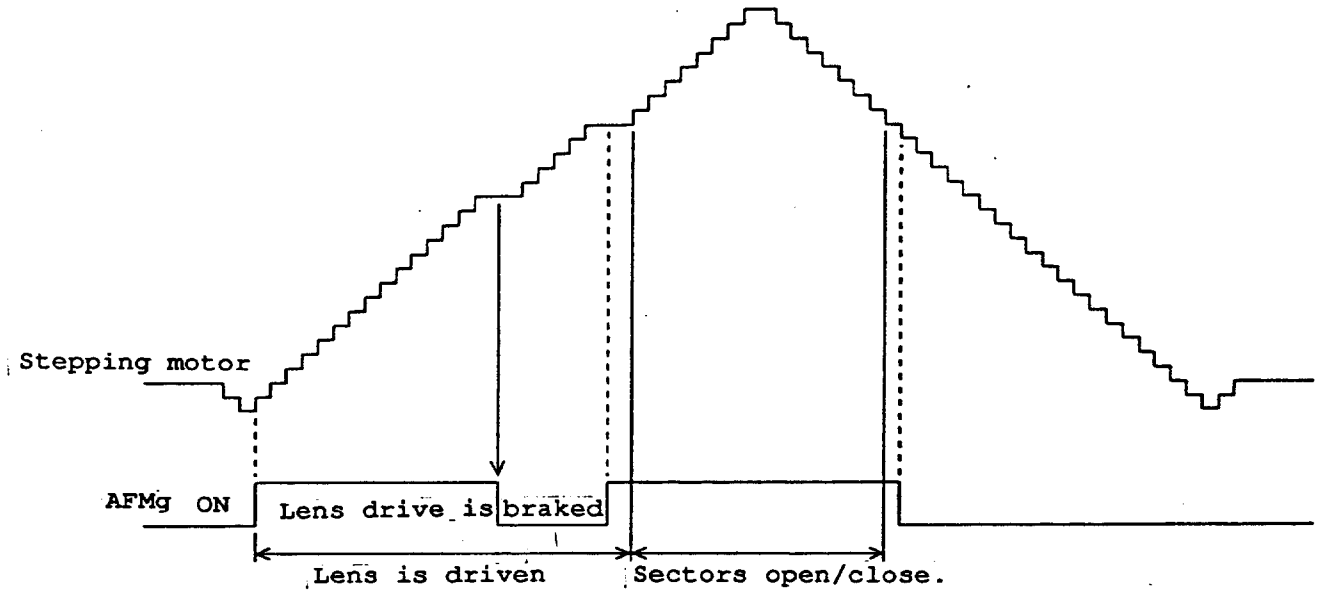
Motor status		M10	M11	M12	M13
Standing-by		**	L	L	L
		L	**	**	H
Film motors	Normal	L	L	H	L
	Reversed	L	H	L	L
	Braked	L	H	H	L
Lens barrel motor	Normal	H	L	H	L
	Reversed	H	H	L	L
	Braked	H	H	H	L
Shutter		H	L	L	H
		H	L	H	H
		H	H	L	H
		H	H	H	H

[Shooting mode setting]
Shooting modes are set by switches near the LCD panel on the right upper side of the camera unit. By turning on the appropriate switches, changeover of the following modes is accomplished. These switches send signals directly to the PAIC:
1) Flash mode
2) AF mode
3) Self-timer mode
4) Continuous shooting mode
PAIC and CPU software to which the serial data are transferred control the changeover to be done cyclically.

[ABLC calculation control]
As already mentioned in "Shooting sequence", the ABLC (Automatic Back-Light Correction) process in metering is carried out in the CPU.
In ABLC, the PAIC and the CPU process the central and peripheral brightness, focusing data and ISO data supplied by the two-segment SPD. Then the following calculations are performed:
1) Low brightness detection.
2) Back-light detection.
3) Flash firing specification derived from items 1) and 2) above.
4) Exposure aperture value specification.
As a result of above calculations, either of the following four modes is selected:
Zone 1: Front-light AE mode.
Zone 2: Low brightness flash firing mode.
Zone 3: Back-light flash firing mode.
Zone 4: Back-light remote mode.

[LCD display driving control]
LCD panel on the upper side of the camera unit displays most of the shooting information. Those indications are controlled by the output from the LCD driver.
LCD is of the 1/3 duty, 1/3 bias dynamic driving type. Information displayed is controlled by the CPU software.

(2) Shutter unit
[Lens/sector driving control]
The shutter unit of this unit is of such a construction that the stepping motor drives the lens for focus adjustments and the sectors to open and close exposure control are based on the measured distance to the subject. (Basically the same construction as the TWZoom 35-80.) At first the stepping motor drives the lens barrel. Then, the sectors are driven to be opened/closed. When the lens is driven to the target zone, the stepping motor is braked by degaussing AFMg.



(3) Speedlight unit

The speedlight unit is incorporated in the camera unit above the battery chamber. The circuit of this unit is designed to accelerate the charging of the high guide number speedlight by making the most of the lithium batteries. Also, to prevent overcharging, an internal charging stop function and an overcharging prevention signal output function are incorporated. The CPU controls the speedlight unit by transmitting trigger signals through the MDIC (MD-7) in the shutter unit and other signals through the PAIC in the control unit. Listed below are the contacts through which these control signals are output and their functions:

SBO : Oscillation control.
Low level charging.
Trig. : Firing control.
Firing at Hi level.
TMC : Flash mode selection control .
Pre-firing at Hi level/normal firing at Lo level.
NL1 : Charging completion signal.
Output current at 270V typ.
(level 0.6V).
NL2 : Overcharging prevention signal.
Output current at 310V typ.
(level 0.6V).

(4) Camera body

Table of switches

No.	Name	Abbr.	Category	Input	Function
1	Main switch	MSW	Power-on reset switch	PAIC	Momentary switch. Lens barrel reset->Wide/ Tele~Wide->reset driving
2	Pre-release switch	S1	Power-on reset switch	PAIC	Metering, focusing operation
3	Zoom-up switch	ZUS	Power-on reset switch	PAIC	Lens barrel Wide->Tele driving
4	Zoom-down switch	ZDS	Power-on reset switch	PAIC	Lens barrel Tele->Wide driving
5	Manual U turn switch	MUS	Power-on reset switch	PAIC	Manual film rewind operation
6	Battery chamber lid switch	PSW	Power-on reset switch	PAIC	Battery chamber lid open/ close detection (open:ON, close:OFF), LCD driver initialization
7	Camera back switch	BBS	Power-on reset switch	PAIC	Camera back open/close detection (open:ON, close:OFF)
8	Mode switch	MOS	Function switch	PAIC	Shooting mode control (Normal/self-timer mode selection, etc.)
9	Flash switch	SBS	Function switch	PAIC	Speedlight flash mode control
10	Continuous shooting switch	RSS	Function switch	PAIC	Continuous shooting mode control
11	Image size switch	ISS	Function switch	PAIC	Image size selection control

12	Release switch	S2		CPU	Starting shutter release
13	Free sprocket switch	FSS		CPU	Free sprocket interlocking (8 pulses/frame)
14	Lens barrel switch	KYS		CPU	Lens barrel reset detection
15	Photointerrupter 1	PH1		CPU	Lens barrel position detection
16	Photointerrupter 2	PH2		CPU	Lens barrel position detection
17	Home switch	HMS		CPU	Sector monitoring

(5) AF unit
External light triangle focusing method is adopted for focusing. AF unit measures the distance through serial communication with the CPU in the control unit.

(6) AE unit
AE unit has a two-segment SPD, and controls the AE process circuit in the PAIC connected to the SPD under the control of the CPU.

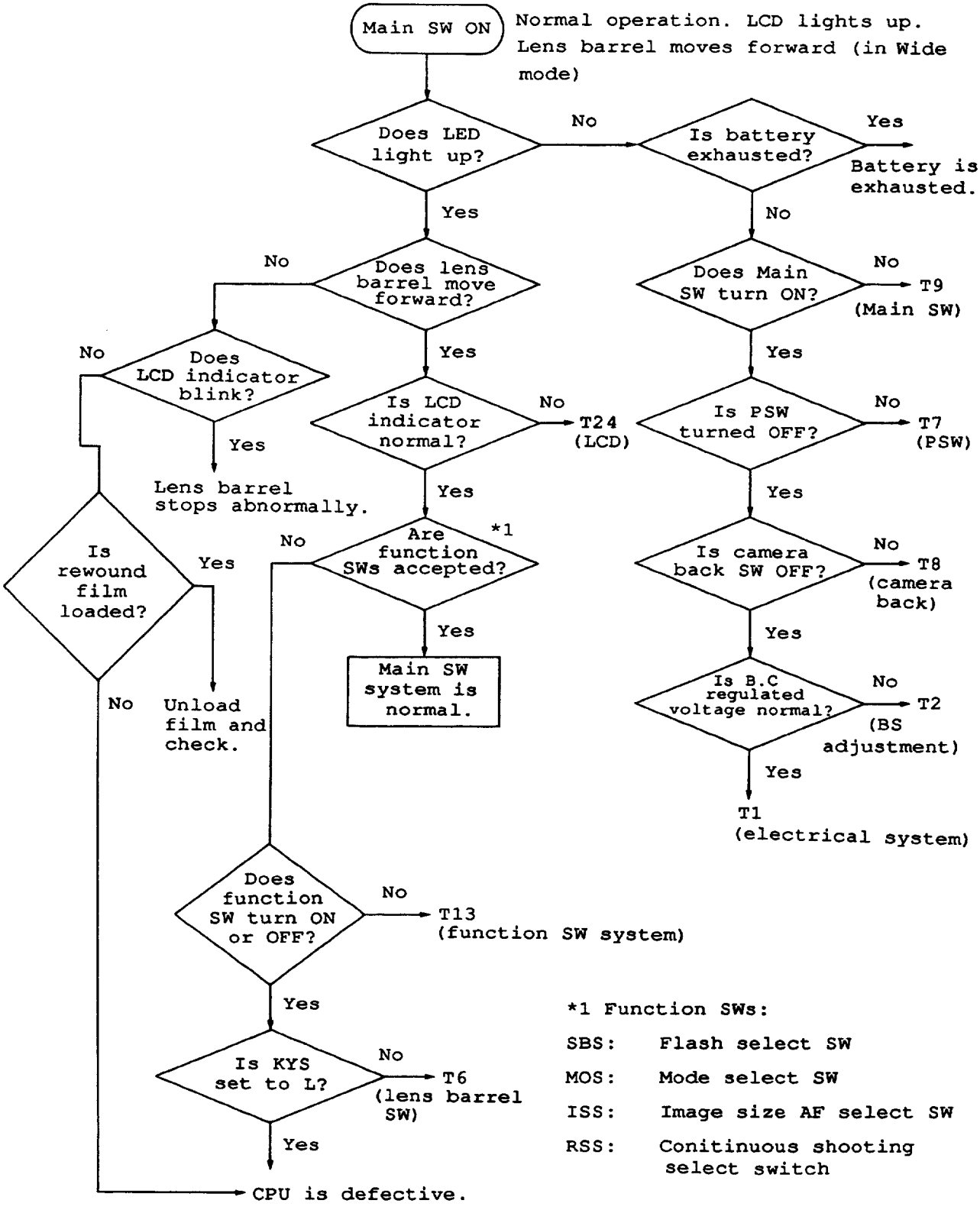
(7) Lens barrel detection unit
As the lens barrel is driven, the photo-interrupter generates pulse signals. The CPU counts the number of pulses and detects the amount and direction of the lens driven.

(8) Data back module
The CPU transmits signals through three terminals: DB signal, DBA signal and GND signal.
The CPU transmits pulse length corresponding to the film speed of the film loaded through the DB signal. The CPU also recognizes the imprinting (whether normal or full data) by detecting the output of the DBA signal from the data back module.

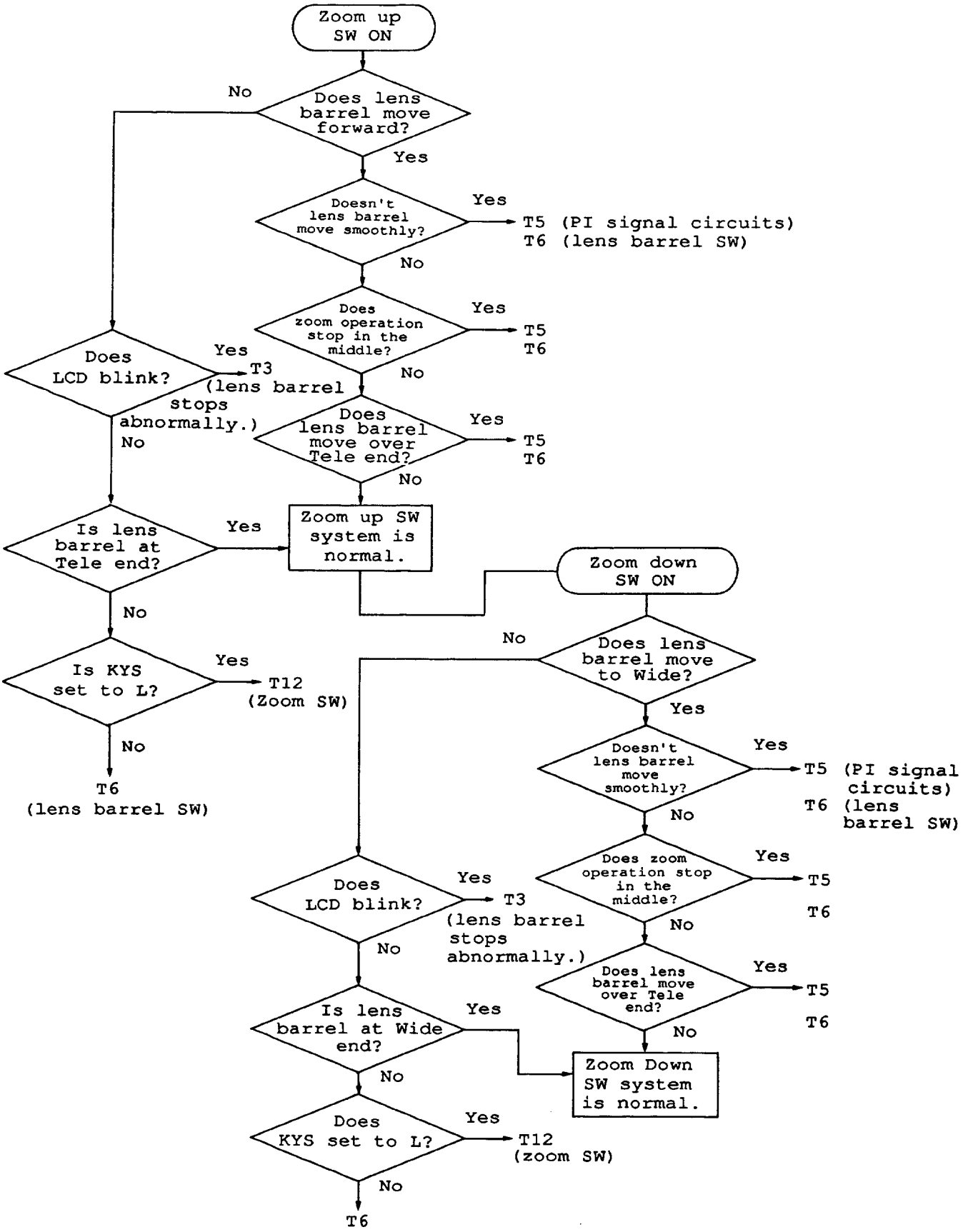
Phenomenon and cause of troubles

Troubleshooting

1. Malfunction when main SW is turned ON.

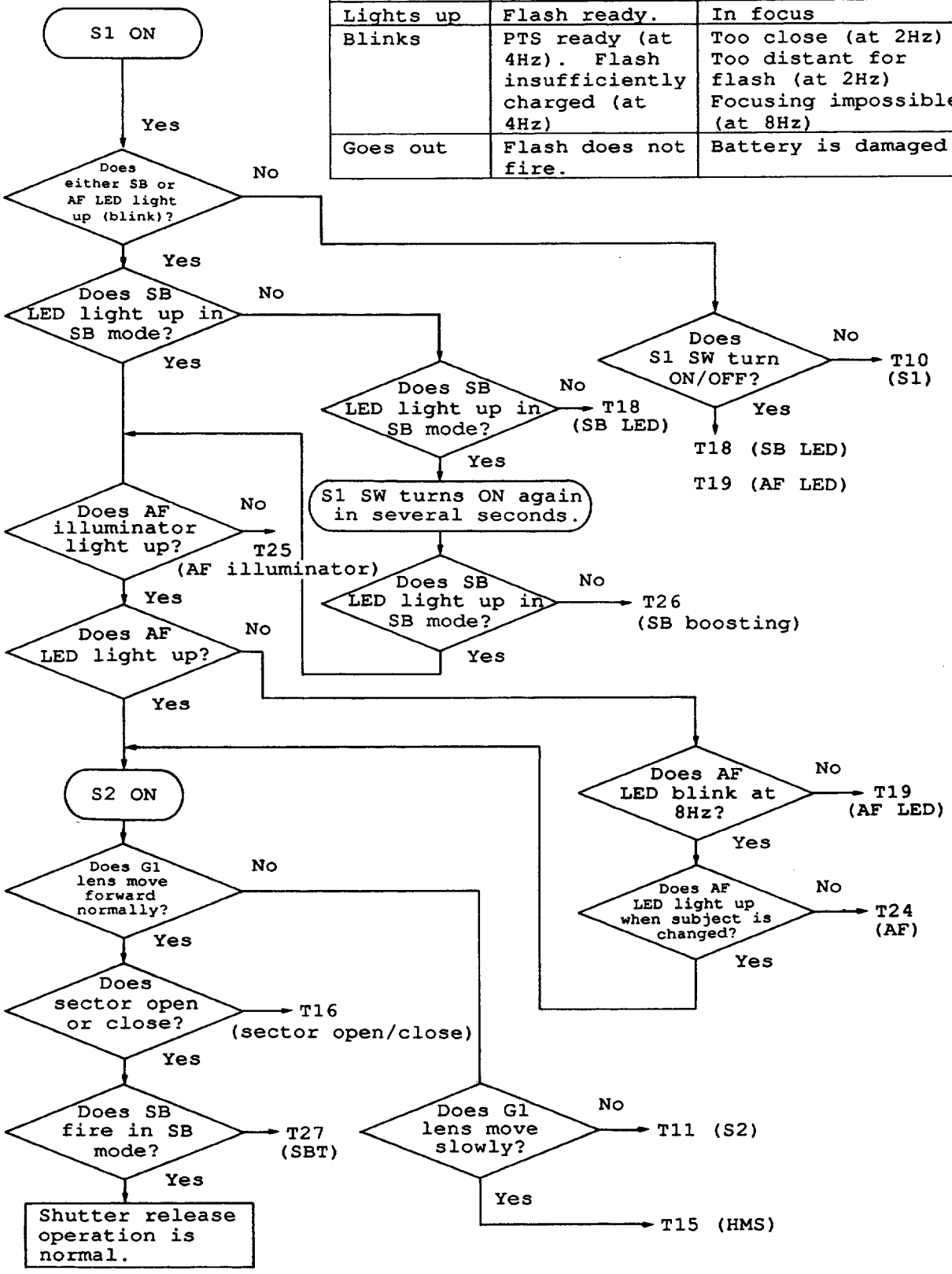


2. **Defective zoom operation** Normal (W to T): Zoom up and down.



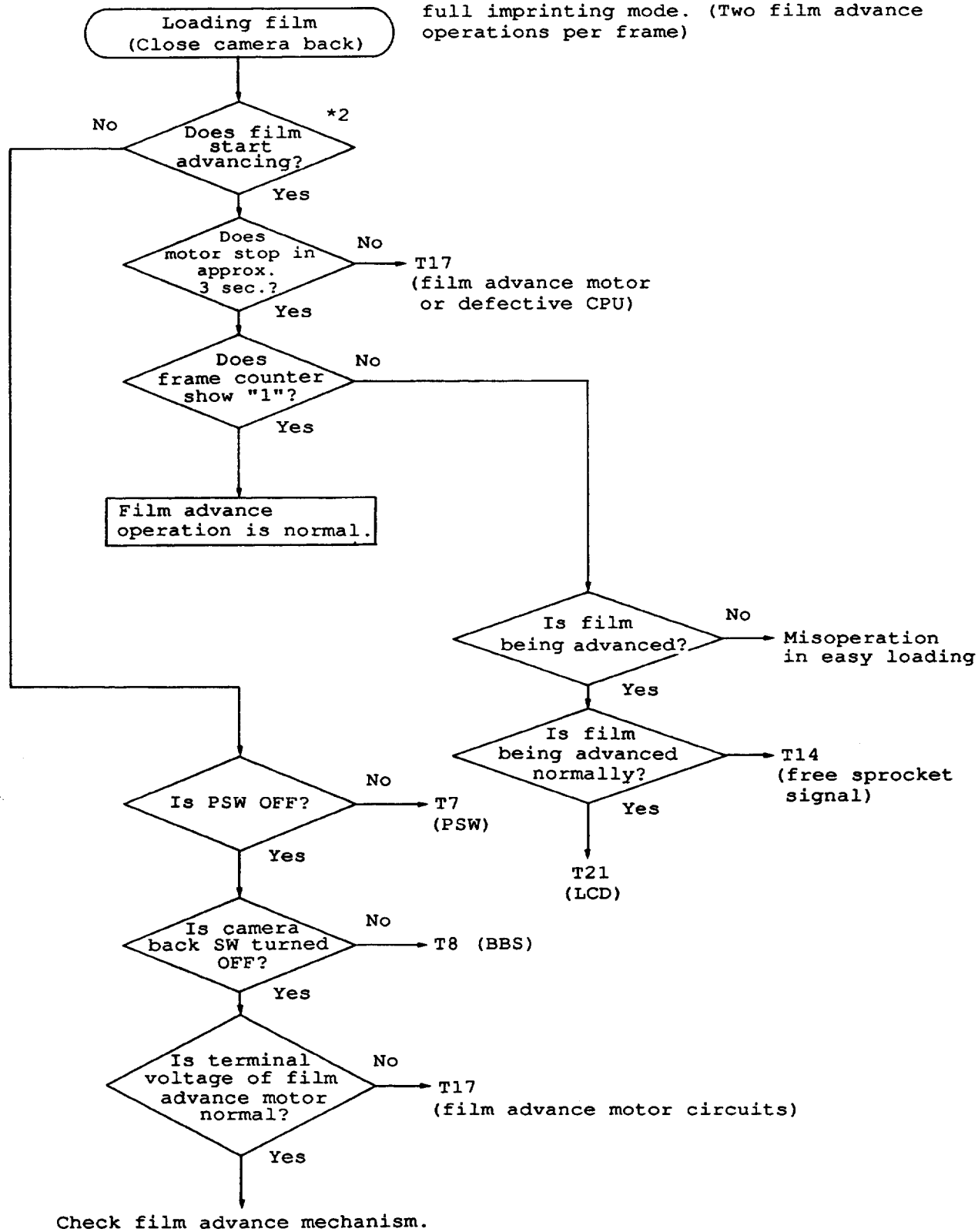
3. Defective shutter release operation

	Red LED	Green LED
Lights up	Flash ready.	In focus
Blinks	PTS ready (at 4Hz). Flash insufficiently charged (at 4Hz)	Too close (at 2Hz) Too distant for flash (at 2Hz) Focusing impossible (at 8Hz)
Goes out	Flash does not fire.	Battery is damaged.

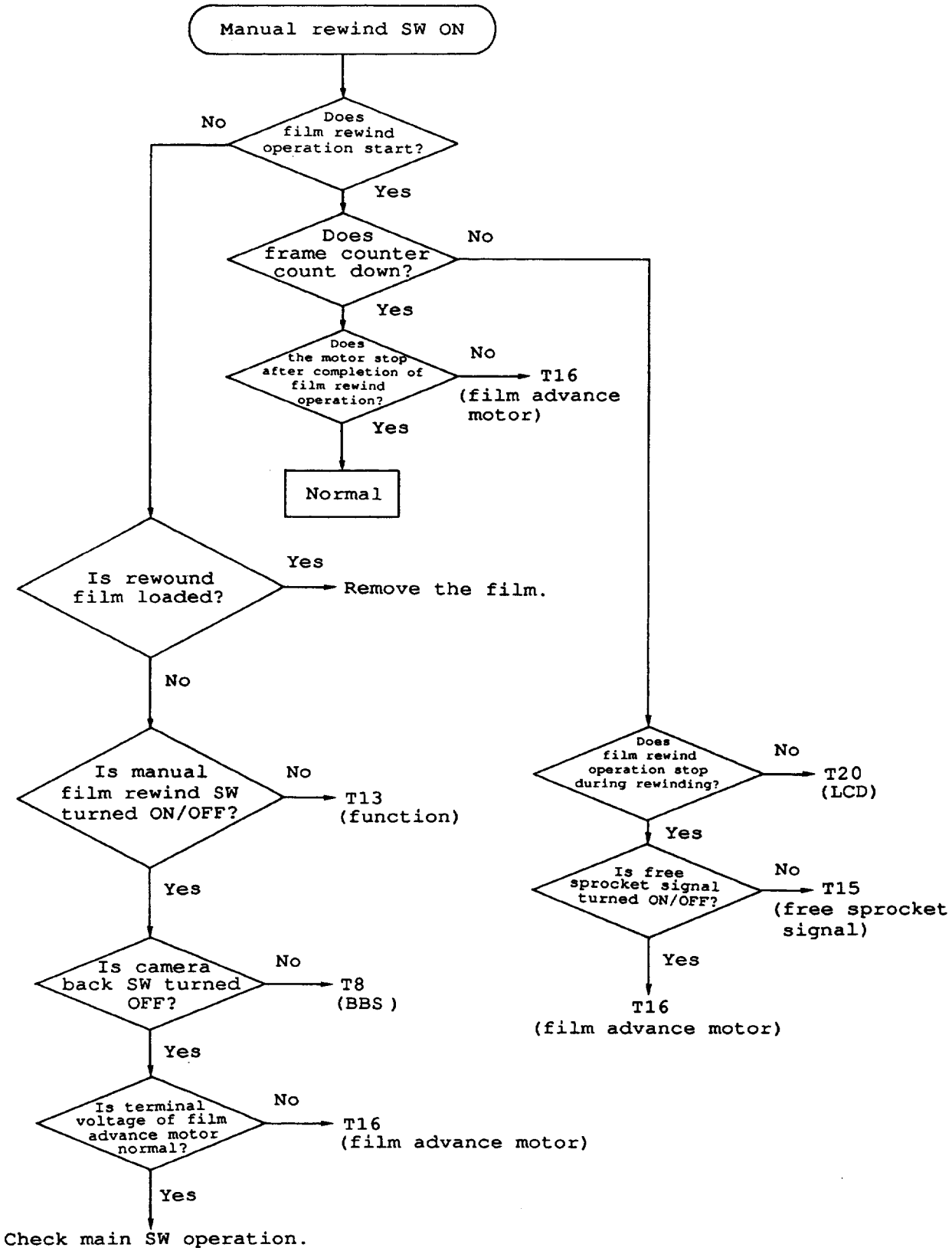


4. Defective film advance operation

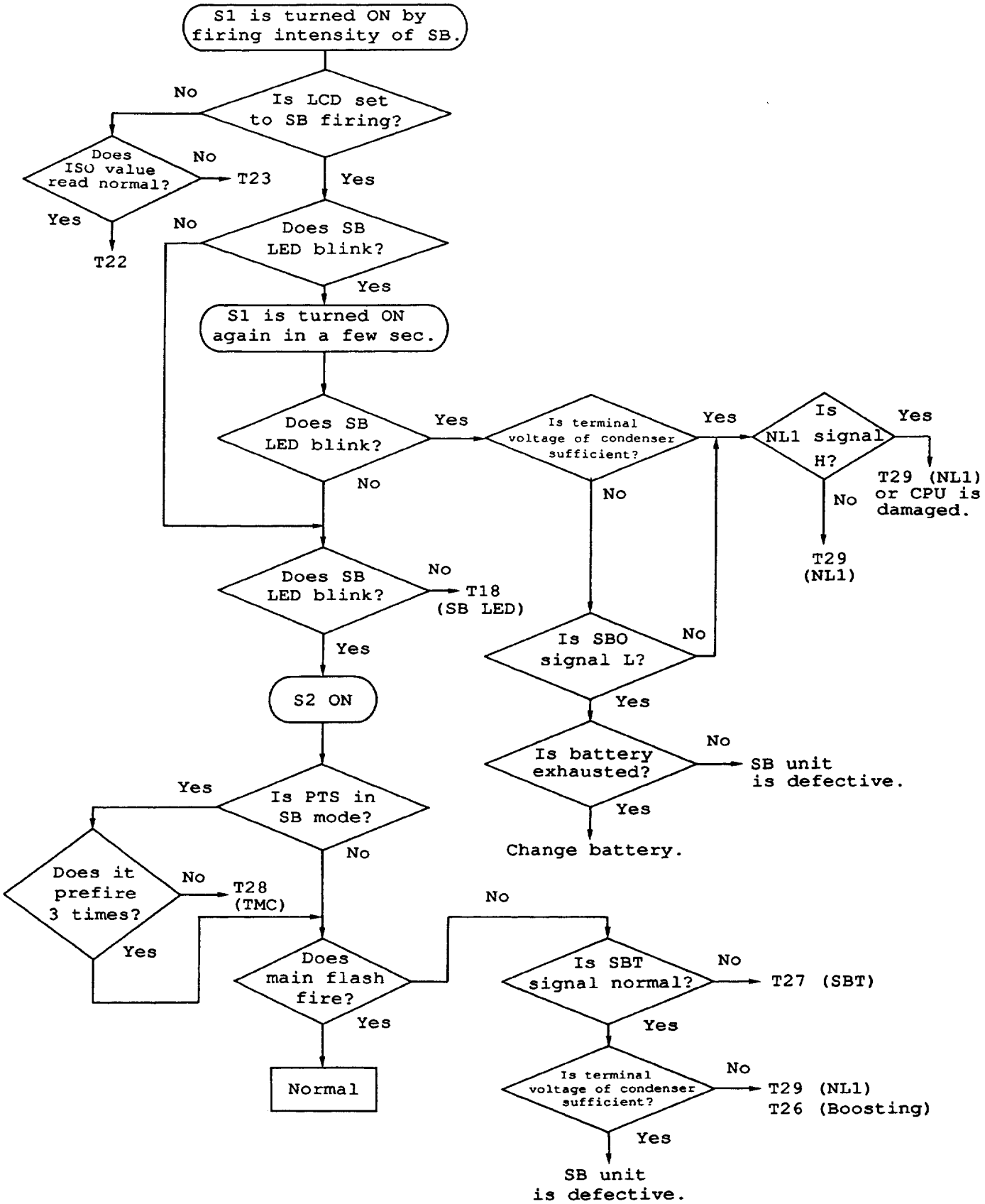
*2 Film is advanced intermittently when body fitted with a data back is set to full imprinting mode. (Two film advance operations per frame)



5. Defective film rewind operation



6. Defective speedlight operation (boosting, firing)



7. Cause of troubles

T1 Electrical system
1. Wiring or soldering between battery contacts and main FPC is defective.
2. DC-DCIC (U6) on main FPC, regulator IC (U7), diode (D5, D6), coil (L1), transistors (Q1, Q2), resisters (R7, R8, R26, R27) are poorly soldered.

T2 Defective battery check (BC)
1. BC adjusted value is defective. (EEPROM address 13H)
2. PAIC (U2) on main FPC is defective. VAD patterns are broken.

T3 Lens barrel stops abnormally.
1. Photo interrupter signal is defective. (See T5.)
2. Lens barrel SW is defective. (See T6.)
3. Lens barrel motor is defective. (See T4.)
4. Lens barrel reset position adjustment pulse value is defective (EEPROM address 14H)
5. Lens barrel motor pinion gear is missing.
6. Lens barrel driving gears are broken.
7. Foreign matter is present in helicoid and gear components.

T4 Defective lens barrel motor.
1. Power supply wiring or soldering between main FPC and FPC chassis is defective.
2. Patterns between MI0 and M13 on main FPC are broken.
3. Poor press contact between main FPC and shutter base plate.
4. MDIC (MD7) on shutter base plate is defective.
5. Wiring or soldering between shutter base plate and lens barrel motor is defective.
6. Defective lens barrel motor

T5 Defective photo interrupter (PI) signal circuits.
1. Mounting positions of PI and parts are defective and poorly soldered.
2. Poor press contact between main FPC and shutter base plate.
3. Soldering between PIFPC and bottom FPC is poor. Press contact between bottom FPC and main FPC is poor.
4. Patterns among PIFPC, bottom FPC, and IRDS, IRD, PHD1, PHD2, PH1, PH2, VDD, SGND on main FPC are broken.
5. Parts (R5, R6, R21, and R22) on main FPC are poorly soldered.
6. MDIC (MD7) on shutter base plate is defective.

T6 Defective lens barrel SW (KYS).
1. Discontinuity due to contamination and deformation in KYS.
2. Setting and deformation of KYS, irregularity of sliding surfaces and chattering due to lack of lubrication

3. KYS and bottom FPC are poorly soldered.
4. Poor press contact between bottom FPC and main FPC
5. Patterns between bottom FPC and KYS and SGND on main FPC are broken.
6. Diode (D7) is poorly soldered onto main FPC.

T7 Defective battery cover SW (PSW).
1. Defective PSW parts
2. PSW is poorly soldered onto bottom FPC.
3. Poor press contact between bottom FPC and main FPC.
4. Patterns between bottom FPC and PSW, SGND on main FPC are broken.
5. PAIC (U2) on main FPC is defective.

T8 Defective camera back SW (BBS).
1. BBS parts are defective.
2. BBS is poorly soldered onto bottom FPC.
3. Poor press contact between bottom FPC and main FPC.
4. Patterns between bottom FPC and BBS and SGND on main FPC are broken.
5. PAIC (U2) on main FPC is defective.

T9 Defective main SW (MSW).
1. MSW brush has poor contact.
2. Patterns of MSW and SGND on main FPC are broken or short-circuited.
3. PAIC (U2) on main FPC is defective.

T10 Defective shutter prerelease SW (S1).
1. Conductive rubber of S1 has poor contact.
2. Patterns of S1 and SGND on main FPC are broken.
3. PAIC (U2) on main FPC is defective.
4. Discontinuity of KYS

T11 Defective shutter release SW (S2).
1. Conductive rubber of S2 has poor contact.
2. Patterns of S1 and SGND on main FPC are broken.
3. PAIC (U2) on main FPC and diode (D8) are defective.
4. Discontinuity of S1
5. Discontinuity of KYS

T12 Defective zoom SWs (ZUS, ZDS).
1. Conductive rubber of ZUS and ZDS has poor contact.
2. Patterns of ZUS, ZDS and SGND on main FPC are broken.
3. PAIC (U2) on main FPC is defective.
4. Discontinuity of KYS

T13 Defective function SWs (SBS, ISS, MOS, RSS, MUS).
1. Conductive rubber function SW has poor contact.
2. Patterns of SBS, ISS, MOS, RSS, MUS on main FPC are broken.
3. PAIC (U2) on main FPC is defective.
4. Discontinuity of KYS

T14 Defective free sprocket signal (FSS) circuits.
1. Free sprocket brushes and patterns have poor contact.
2. Wiring or soldering between free sprocket brush and main FPC are defective.
3. Patterns of FSS, SGND on main FPC are defective.
4. Resistor (R1) and condenser (C3) on main FPC are poorly soldered.

T15 Defective home SW (shutter HMS).
1. Poor press contact between main FPC and shutter base plate.
2. Patterns of HMS on main FPC are broken.
3. Shutter unit is defective.
   Contact spring of HMS is detached.
   Defective HMS signal due to irregular movement of G1 lens.
   Patterns of shutter FPC are broken.
   Soldering between shutter FPC and shutter base plate is poor.

T16 Defective sector open/close (shutter)
1. Poor press contact between main FPC and shutter base plate.
2. Patterns of M10 to H13 on main FPC are broken.
3. Shutter unit is defective.
   Patterns of shutter FPC are broken.
   Soldering between shutter FPC and shutter base plate is poor.
   MDIC (MD7) on shutter base plate is defective.
   Shutter mechanism is defective.

T17 Defective film advance motor circuits
1. Power supply wiring or soldering between main FPC and shutter base plate is defective.
2. Patterns of M10 to M13 on main FPC are broken.
3. Poor press contact between main FPC and shutter base plate.
4. MDIC (MD7) on shutter base plate is defective.
5. Wiring or soldering between shutter base plate and film advance motor is defective.
6. Film advance motor is defective.

T18 Defective flash (SB) LED
1. SB LED (D4) parts are poorly soldered.
2. Patterns of RLED on main FPC are broken.

T19 Defective AF LED
1. AFLED (D3) parts are poorly soldered.
2. Patterns of GLED on main FPC are broken.

T20 Defective self-timer LED
1. Self-timer LED (D2), resistor (R10), PAIC (U2) parts are poorly soldered.
2. Patterns of LST on main FPC is broken.

T21 Defective LCD
1. Poor press contact between LCD parts and main FPC.
2. Patterns of main FPC are broken.
3. LCD driver IC (U3), transistors (Q2, Q6), diode (D6), resistors (R13 to R18, R24), condenser (C15) parts are poorly soldered.

T22 Defective AE system
1. Photosensor (DA1) parts are poorly soldered. (Mounting direction is wrong.)
2. Soldering between AEFPC and main FPC is poor.
3. Patterns of SPR, SPC, VS1, VAD between AEFPC and main FPC are broken.
4. PAIC (U2) is defective.

T23 Defective DX contacts
1. Poor contact between DX contacts due to deformation.
2. Soldering between DX contacts and bottom FPC is poor.
3. Poor press contact between bottom FPC and main FPC.
4. Patterns of DX2 to DX4, and SGND between bottom FPC and main FPC are broken.
5. Resistors (R2 to R4) are poorly soldered.

T24 Defective AF system
1. AFIC (U4) on AFFPC, resistor (R23) parts are poorly soldered.
2. Poor press contact between AFFPC and main FPC.
3. Patterns between AFFPC and main FPC are broken.
4. Optical system of AF unit (B3421) is defective.

T25 Defective AF illuminator
1. Parts, wiring or soldering of near infrared LED (D1) are defective.
2. PAIC (U2), transistor (Q4), resistors (R11, R12) parts or soldering are defective.
3. Patterns of VCC, LPN, LPP, PGND on main FPC are broken.

T26 Defective flash boosting circuits
1. Soldering between battery contacts and power supply of SB unit is defective.
2. Wiring and soldering of SB condensers (main condenser and sub condenser) are defective.
3. Defective SBO signal circuits
   SBO patterns of main FPC are broken.
   Wiring and soldering between main FPC and SB unit are defective.
   PAIC (U2) on main FPC is defective.
4. SB unit is defective.

T27 Flash firing trigger (SBT) circuits are defective.
1. SBTS patterns on main FPC are broken.
2. Poor press contact between main FPC and shutter base plate.
3. Wiring and soldering between shutter base plate and SB unit are defective.
4. MDIC (MD7) on shutter base plate is defective.
5. SB unit is defective.

T28 Defective flash firing selector (TMC) circuits
1. TMC patterns on main FPC are broken.
2. Wiring and soldering between main FPC and SB unit are defective.
3. PAIC (U2) on main FPC is defective.
4. SB unit is defective.

T29 Defective flash charging status signal (NL1, NL2)
1. Patterns of NL1, NL2 on main FPC are broken.
2. Wiring and soldering between main FPC and SB unit are defective.
3. Condensers (C11, C12) on main FPC and soldering are defective.
4. PAIC (U2) on main FPC is defective.
5. SB unit is defective.

FCA13001-R. 3295. A

INSPECTION STANDARD FOR REPAIR & TOOLS

CONDITION FOR INSPECTION

Normal temperature: 20±5 ° C (Relative humidity: 65±20%)

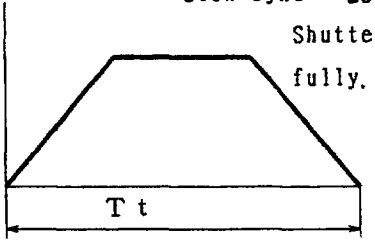
Power source: 6.0±0.03V, 2A or more at 1.0Ω load

Light source: Surface light source 2856° K

K coefficient: 1.3

[1] INSPECTION STANDARD

FCA13001-R. 3295. A

<table>
<tr><th></th><th>ITEM</th><th>STANDARD</th><th>TOOLS</th></tr>
<tr><td>FRAMES</td><td>Frame-to-frame space</td><td>0.5mm ~3.5mm</td><td>Slide calipers
Scale
Film</td></tr>
<tr><td></td><td>Frame position</td><td>Over 0.2mm between film perforation and frame.
Inclination of frame is less than 0.1mm.</td><td></td></tr>
<tr><td>SHUTTER</td><td>AE accuracy</td><td>Inspection result should meet the following conditions. (ISO 100)
<table>
<tr><th>Exposure value</th><th>Allowance</th><th>Exposure variation</th><th>Difference of each BV</th></tr>
<tr><td>4≦BV≦15</td><td>±1.0BV</td><td>0.9BV</td><td rowspan="2">Not to be inverted</td></tr>
<tr><td>15＜BV≦16</td><td>±1.3BV</td><td>1.2BV</td></tr>
</table>
Allowance: Range of the values inspected five times
Exposure variation: Difference between min. and max. values inspected five times
Difference of each BV: Difference between average value of each BV inspected five times
※ When film speed is other than ISO 100, allowance and exposure variation are widened by 0.125BV, respectively.</td><td>EF-511N
DC regulated power supply</td></tr>
<tr><td></td><td>AE voltage characteristics</td><td>Exposure difference is within 0.3BV when measured with regilar voltage (7.0V) and minimum operating voltage at LV12 with ISO 100 film speed setting.</td><td>Digital multi-meter</td></tr>
<tr><td></td><td>Shutter operation in bright codition</td><td>Shutter should open at LV17 with ISO 1600 film speed setting.</td><td></td></tr>
<tr><td></td><td>Exposure limit for flash photography</td><td>Fire flash in darkness and measure exposure time.
Tt＝14.3ms±6ms
Slow sync = 250ms ±50ms
Shutter should open fully.
 
</td><td></td></tr>
<tr><td></td><td>Adjustment of tester</td><td>Settings: ISO 100, K=1.3, LV9
Set lens to Wide position, open shutter sector and then set camera to tester.
Under above condition, set tester's switch to "CAL" and adjust tester with variable resistor so that indication will be +1.20BV.</td><td>AE tester</td></tr>
</table>

FCA13001-R. 3295. A

<table>
<tr><th></th><th>ITEM</th><th>ATANDARD</th><th>TOOLS</th></tr>
<tr><td rowspan="2">OPERATIONAL SWITCHS, BUTTONS, ETC.</td><td>Mid-roll rewind button</td><td>Tension to turn on: 200g±50g
Stroke to turn on: 0.6±0.3mm
(Height from edge of hole)</td><td rowspan="2">Dial gauge</td></tr>
<tr><td>Camera back open lever</td><td>Stroke to open: 1.5mm ±0.3mm
Whole stroke: 2.0mm (for reference)
Tension to open: 350±100g
Tension to close: 1000±500g</td></tr>
<tr><td rowspan="5">CONTACTS, SPRINGS, PRESSURE PLATE, FILM ARMS, ETC.</td><td>Battery chamber</td><td>Tension of contact(+) : 150g or more
(at 3.5mm from ceiling of battery chamber)
Tension of contact (-): 150g or more
(at 3.5mm from ceiling of battery chamber)</td><td rowspan="4">Dial gauge
Tension gauge</td></tr>
<tr><td>Film cartridge spring</td><td>Tension: 350g ±50g
(when held by 1.3mm from body)</td></tr>
<tr><td>DX contacts</td><td>Tension: 43g±20g
Height $1.4\ ^{+0.35}_{-0.15}$mm
Measure tension when depressing contacts until their height is 1.0mm.</td></tr>
<tr><td>Preesure plate</td><td>Height = 3.0±0.2mm
(From inside surface of camera back)
Flatness: 0.05 mm or less
Tension of spring: 400±100g
(When depressed by 0.8mm)</td><td rowspan="3"></td></tr>
<tr><td>Film arm 1
(camera back side)</td><td>Tension 40±15g
(When depressed by 0.4mm)</td></tr>
<tr><td rowspan="3">MOTOR</td><td>Film arm 2</td><td>Tension: 85 ±15g
(When starting to move)</td></tr>
<tr><td>Film advance</td><td><table><tr><th></th><th>Operating time</th><th>Current</th></tr><tr><td>Without film</td><td>With in 0.8 sec</td><td>500mA or less</td></tr></table></td><td>Film Oscilloscope</td></tr>
<tr><td>Film rewind</td><td><table><tr><th></th><th>Operating time</th><th>Current</th></tr><tr><td>Film end detection</td><td>3.0±0.5 sec</td><td>0.9A or less</td></tr><tr><td>Film rewind</td><td>Within 30 sec</td><td>400mA or less</td></tr></table></td><td></td></tr>
<tr><td>Lenstravelling</td><td><table><tr><th></th><th>Operating time</th><th>Current</th></tr><tr><td>Reset → Wide</td><td>Within 0.8 sec</td><td>700mA or less</td></tr><tr><td>Wide → Tele</td><td>Within 2.2 sec</td><td></td></tr></table></td><td></td></tr>
</table>

<table>
<tr><th></th><th>ITEM</th><th>STANDARD</th><th>TOOLS</th></tr>
<tr><td rowspan="4">AF
ACCURACY</td><td>AF sensor ACCURACY</td><td>ΔStep = ± 1 Step
Δ Area = 2 step or less
ΔLR = 4 Step or less
Measure at distance = 1.2m</td><td rowspan="4">Brightness box

AF adjustment

chart.</td></tr>
<tr><td>AF illuminator change over level</td><td>BV - 3 or less.</td></tr>
<tr><td>Distance-too-close warning</td><td>Green LED indicator in viewfinder blinks when distance is 80cm±2cm.</td></tr>
<tr><td>Distance-too-far warning</td><td>Green LED indicator in viewfinder blinks when distance exceeds that assigned to steps when flash fires at low brightness.
ISO 200 Step 8 ~ or more
ISO 400 Step 4 ~ or more</td></tr>
<tr><td>BACK FOCUS</td><td>Back focus</td><td>Set adjustment focus stand on film guide rail ans set lens to step 23.
Wide setting: 70±90μm
Tele setting: 190±250 μm</td><td rowspan="2">Collimator
(J19019)
Adjustment
focus stand
(J15291)</td></tr>
<tr><td>Difference between T and W</td><td>Value for T is within ±100 μm compared with that for W.</td></tr>
<tr><td rowspan="4">OPERATIONAL SWITCHS, BUTTONS, ETC.</td><td>Main SW</td><td><table><tr><th></th><th>Stroke</th><th>Tension</th></tr><tr><td>Start</td><td></td><td>100g</td></tr><tr><td>ON position</td><td>1.0 ±0.3mm</td><td>170g ±50g</td></tr><tr><td>Whole stroke</td><td>(2.0mm)</td><td>143g ±20g</td></tr></table></td><td>Dial gauge
Tension gauge</td></tr>
<tr><td>Shutter release button</td><td><table><tr><th></th><th>Reference</th><th>Stroke</th><th>Tension</th></tr><tr><td>A) Pre-release (S1 ON)</td><td>Height in free state</td><td>0.8±0.3mm</td><td>120g ±20g</td></tr><tr><td>B) Release (S2 ON)</td><td>-ditto-</td><td>1.1±0.3mm</td><td>350g ±50g</td></tr><tr><td>C) Difference between A) & B)</td><td></td><td>0.3±0.1mm</td><td>-------</td></tr></table></td><td></td></tr>
<tr><td>Zoom button</td><td>Measure tension and stroke at the position 7mm apart from the center of turning.
Tension to turn on: 300 $^{+100}_{-0}$ g
Strike to turn on: 0.5±0.3mm</td><td></td></tr>
<tr><td>Function buttons</td><td>Tension to turn on: 200 ±50g
Stroke to turn on: 0.6±0.3mm</td><td></td></tr>
</table>

FCA13001-R. 3295. A

ITEM	STANDARD	TOOLS
Focusing accuracy		Tape measure Personal computer AF adjustment chart

AF ACCURACY

Step	Distance (m)	Switching point (m)	Amount G1 lens move out mm	LCD display m	LCD display ft	Step	Distance (m)	Switching point (m)	Amount G1 lens move out mm	LCD display m	LCD display ft
1	44.000	28.914	0.0293	∞88	∞88	31	1.465	1.443	0.9530	1.5	4.9
2	21.537	17.165	0.0601	20 / ∞88	66 / ∞88	32	1.423	1.402	0.9838	1.4	4.6
3	14.281	12.225	0.0909			33	1.383	1.364	1.0146		
4	10.696	9.504	0.1217	10	33	34	1.346	1.328	1.0454	1.3	4.3
5	8.559	7.782	0.1525	8	26	35	1.310	1.293	1.0762		
6	7.140	6.593	0.1833			36	1.227	1.261	1.1070		
7	6.129	5.724	0.2141	5	16	37	1.246	1.230	1.1378	1.2	3.9
8	5.373	5.060	0.2448			38	1.216	1.201	1.1686		
9	4.786	4.537	0.2756			39	1.188	1.174	1.1994		
10	4.316	4.114	0.3064	4	13	40	1.161	1.148	1.2302		
11	3.932	3.764	0.3372			41	1.135	1.123	1.2610	1.1	3.6
12	3.613	3.471	0.3680			42	1.111	1.099	1.2918		
13	3.343	3.222	0.3988	3	10	43	1.088	1.076	1.3225		
14	3.111	3.007	0.4296			44	1.067	1.055	1.3533		
15	2.911	2.819	0.4604			45	1.045	1.034	1.3481	1.0	3.3
16	2.735	2.655	0.4912	2.5	8	46	1.024	1.014	1.4149		
17	2.581	2.509	0.5220			47	1.005	0.995	1.4457		
18	2.443	2.380	0.5528			48	0.986	0.977	1.4765		
19	2.320	2.263	0.5835	2	7	49	0.969	0.960	1.5073		
20	2.210	2.158	0.6143			50	0.952	0.943	1.5381		
21	2.110	2.063	0.6451			51	0.935	0.927	1.5689	0.9	3
22	2.019	1.976	0.6759			52	0.919	0.911	1.5997		
23	1.936	1.897	0.7067			53	0.904	0.897	1.6305		
24	1.860	1.824	0.7375	1.8	6	54	0.890	0.882	1.6612		
25	1.790	1.757	0.7683			55	0.876	0.868	1.6920		
26	1.725	1.694	0.7991			56	0.862	0.855	1.7228		
27	1.665	1.637	0.8299	1.6	5.3	57	0.849	0.842	1.7536	0.8	2.6
28	1.610	1.583	0.8607			58	0.836	0.830	1.7844		
29	1.558	1.533	0.8915			59	0.824	0.818	1.8152		
30	1.510	1.487	0.9223	1.5	4.9	60	0.812		1.8460		
31	(1.465)										

FCA13001−R. 3295. A

<table>
<tr><th></th><th>ITEM</th><th>STANDARD</th><th>TOOLS</th></tr>
<tr><td rowspan="5">FLASH</td><td>Flash level</td><td>Wide: EV 10.125 ±1.0EV
Tele: 13.000±1.0EV
(ISO 100)</td><td rowspan="4">Brightness box
Brightness meter
Flash meter
Tape measure
Standard reflector paper</td></tr>
<tr><td>Guide number</td><td>Wide: 17±0.4EV
Tele: 21±0.4EV
(ISO 100 distance 2m)
PTS
Wide: 0.8 or over
Tele: 1.1 or over</td></tr>
<tr><td>Recycling time</td><td>3.5 sec or shorter</td></tr>
<tr><td>Light distribution feature</td><td>Measure light at following points.
Difference from center should be within 1.0EV.
<table>
<tr><th></th><th>Top</th><th>Bottom</th><th>Left</th><th>Right</th></tr>
<tr><td>Wide</td><td>20°</td><td>22°</td><td>28°</td><td>30°</td></tr>
<tr><td>Tele</td><td>7°</td><td>10°</td><td>10°</td><td>12°</td></tr>
</table>
Remarkable unevenness is not to be found.</td></tr>
<tr><td>Color temperature</td><td>5,500 + 300° K</td><td>Color temperature meter</td></tr>
<tr><td rowspan="4">VIEW-
FINDER</td><td>Diopter</td><td>− side =-1.0±1.0 dpt
+ side =+0.5±1.0 dpt</td><td>Diopter telescope</td></tr>
<tr><td>Viewfinder coverage</td><td>
<table>
<tr><th></th><th>Vertucally</th><th>Horizontally</th></tr>
<tr><td>Wide:</td><td>84% ± 3%</td><td>88% ± 3%</td></tr>
<tr><td>Tele:</td><td>88% ±3%</td><td>89% ± 3%</td></tr>
</table>
(Measure at distance W: 3m T:3m)</td><td>Viewfield chart

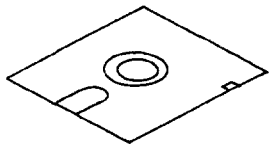
Film Scale</td></tr>
<tr><td>Parallax</td><td>
<table>
<tr><th></th><th>Vertucally</th><th>Horizontally</th></tr>
<tr><td>Wide:</td><td>± 1.5mm</td><td>± 1.5mm</td></tr>
<tr><td>Tele:</td><td>+1.2mm</td><td>± 1.5mm</td></tr>
</table>
Measure at distance W:2m, T:3m</td><td></td></tr>
<tr><td>Magnification</td><td>Wide: 0.45X
Tele: 1.18X</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

FCA13001-R. 3295. A

	ITEM	STANDARD	TOOLS
OTHERS	Self-timer	(Time in set) ±1 sec	Stop watch
	LCD activating duration	180 ±2 sec	
	Battery check voltage	4.1 ±0.15V Measure voltage when battery power indicator is displayed. Do not connect resistor (1Ω) with DC regulated power supply.	DC regulated power supply Digital multi-meter
	Pre-release current	30mmA or less	
	Standby current	10μA or less when main SW is off.	
	Clearance on external surface	0.3mm or less	

[2] TOOLS

1. Special tool

Tool No.	Name	Illustration	Class	Remarks
J18223	TW Zoom 105 inspection & adjustment program		A	
J18221	AF adjustment chart (A)			
J18222	AF adjustment chart (B)			

2. Major general tools and testers

Tool No.	Name	Specifications
----	Slide calipers	
J5134	Torque driver	
J9001-5	DC regulated power supply	0-18V, 2A (MODEL 526)
J9006-6	Digital multimeter	Model 3200
J15291	Tool for adjusting focus stand	
J19019	Collimator	24LT-2DTS, f=193.5mm
J19036	Multi shutter tester	BF-511N

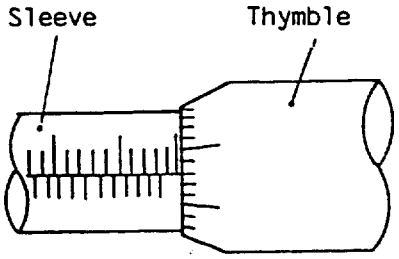
SERVICE DEPT. PHOTO PRODUCTS DIV. NIKON CORPORATION	TOOL INSTRUCTION MANUAL	JANUARY 1992
J15291	FFD FINE ADJUSTMENT BASE	

1. Name of Tool: FFD Fine Adjustment Base

2. The tool to be used for:

   Back Focusing inspection and adjustment

3. How to read the scale of the micrometer:



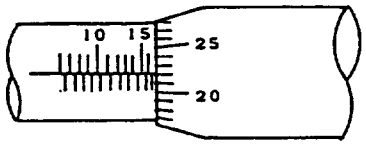
* An upper scale on the sleeve indicates 1mm each, and an lower scale inidcates 0.5mm.

* An scale on the thimble indicates 0.01mm, and it moves 0.05mm every one round.

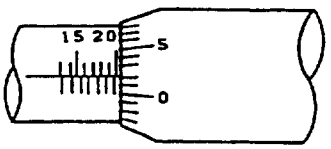
* Caution: When read the scale, please look at the scale front ways correctly so as not to produce the reading difference due to parallax.

* When read out the scale, read the scale on sleeve first, and then add the scale value of the thymble to it.

Examples)



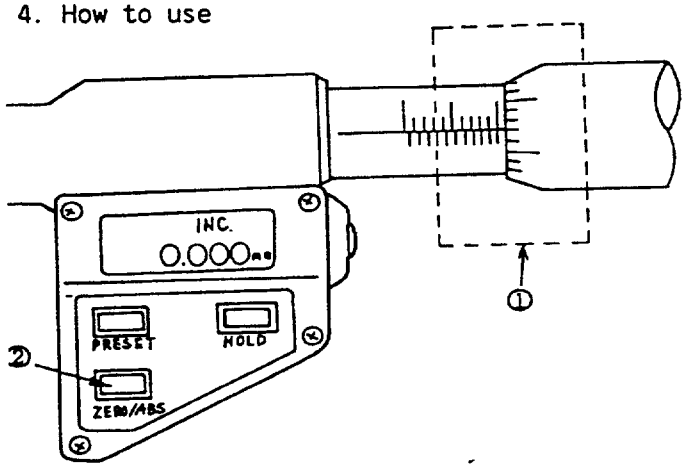
Sleeve	16.50 mm
+ Thymble	0.22 mm
	16.72 mm



Sleeve	20.50 mm
+ Thymble	0.02 mm
	20.52 mm

J15291 FFD FINE ADJUSTMENT BASE

4. How to use



1) Fix the scale of micrometer to the standard.

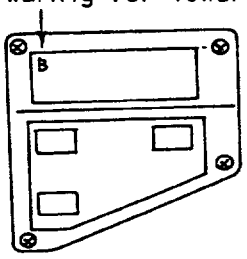
Caution)
The standard value of J15291 is not general, but the value written on the tool is the standard of that tool.

2) Push the button [ZERO/ABS] to show the LCD indication as per the left sketch.

* Please note that you need not to operate other buttons since they have no means for the adjustment process.

5. Replacement of battery

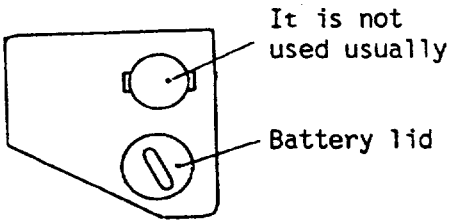
B: Warnig for lowered voltage:



* When the capital B is indicated on upper left side of the LCD window, please replace the battery at once.

Caution)
When remove the battery, the standard value is reset. Please fix it again after install the new battery.

As for further details, please refer to the adjusting article stated in the instruction manual for TW Zoom 105.



Back side of Display part

* The bettery to be used:
The battery SR44 is generally recommended for your use.

FCA13001-R. 3295. B

作成承認印	配布許可印
ニコンカメラサービス部 GM	

TW ZOOM 105 FCA13001

ZoomTouch 800 FCA13101

TW ZOOM 105 WORLD TIME FCA13201

ZoomTouch 800 WORLD TIME FCA13301

PARTS LIST (REVISED-1)

修 理 部 品 表 (改 訂-1)

Nikon | NIKON CORPORATION
Tokyo, Japan

Feb. 17. 1994

Printed in Japan February

FCA13001—R. 3295. A

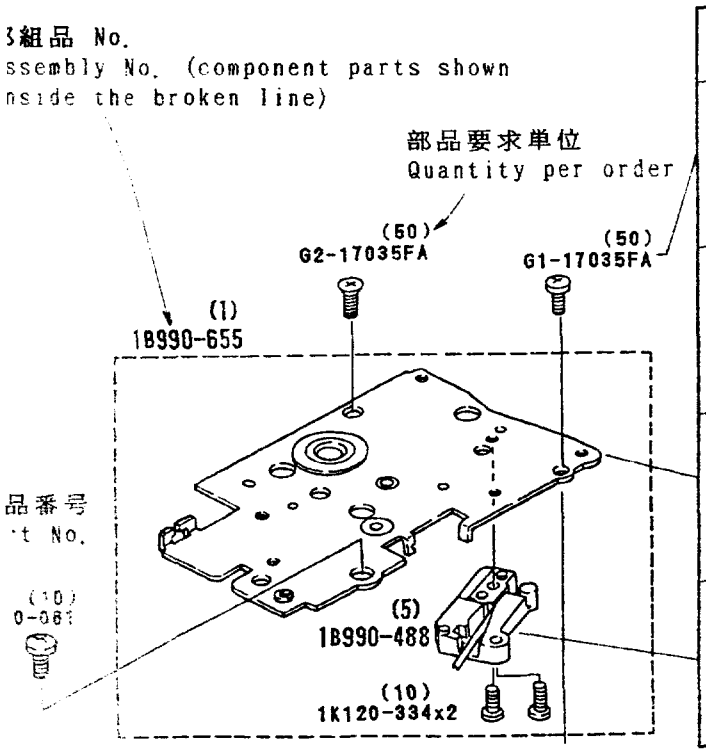
〔１〕 展開図

〔２〕 部品表

[1] Exploded Drawings

[2] Parts List

展開図の見方　How to use explosion drawings



項　目 Part Classification	販売区分 Term of Supply	記号 Mark
破線外で部番の入っているもの Part with Part No., shown outside the broken line	単部品で要求できるもの Avilable as individual part	○
破線外で部番のないもの Part without Part No., shown outside the broken line	修理部品と考えないもの Not available as repair part	×
破線内で部番のないもの Part without Part No., shown inside the broken line.	部組品でなければで要求できないもの Avilable only as assembly.	△
破線内で部番の入っているもの Part with Part No., shown inside the broken line	単部品でも部組品でも要求できるもの Avilable as assembly or individually	○△

本体部・W／Rモーター部・フリースポロ部・DX接点部

FCA13001-R.3295.A

MAIN FRAME, W/R MOTOR UNIT, FSS SPORO UNIT, DX CONTACT UNIT

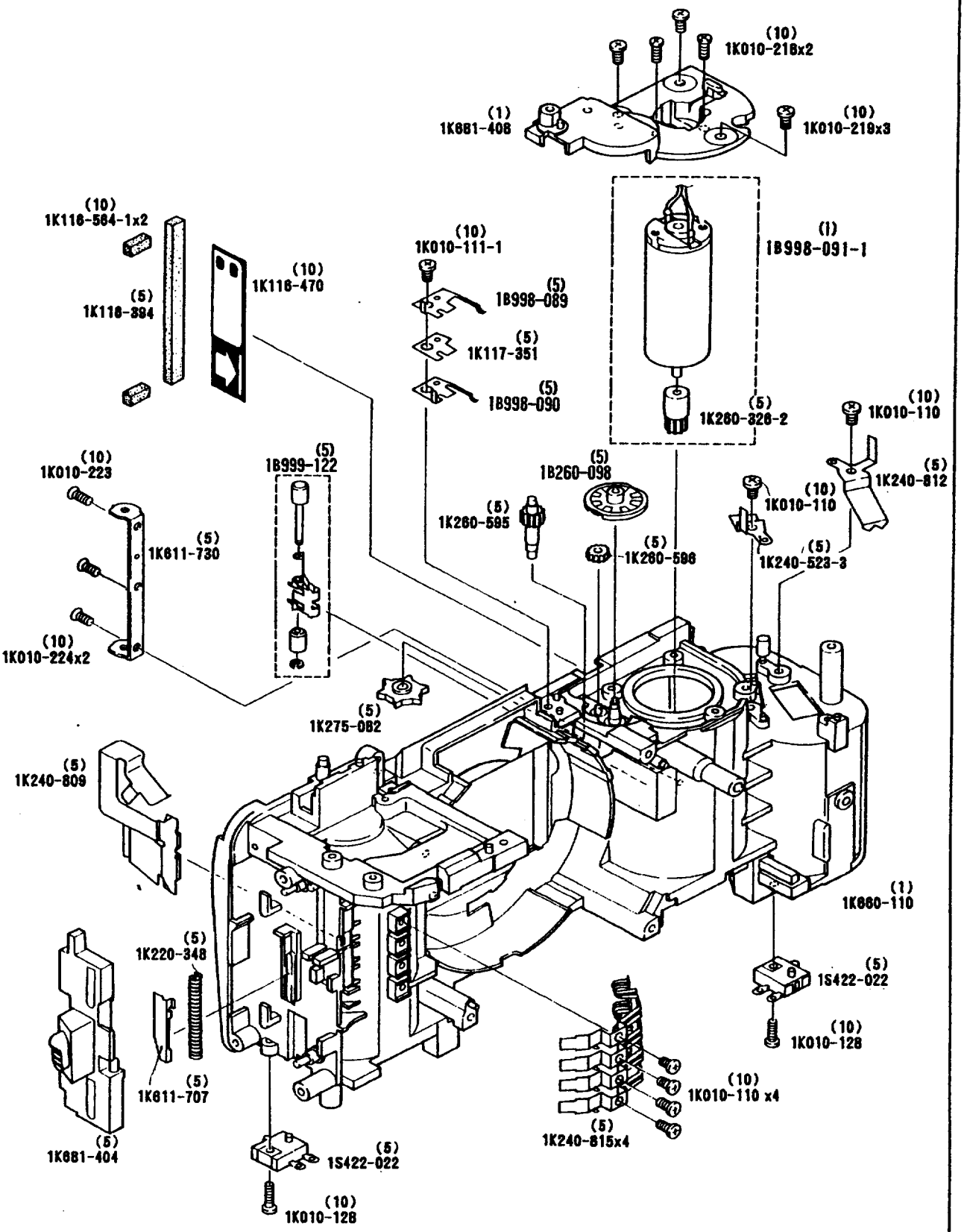


Fig. 1

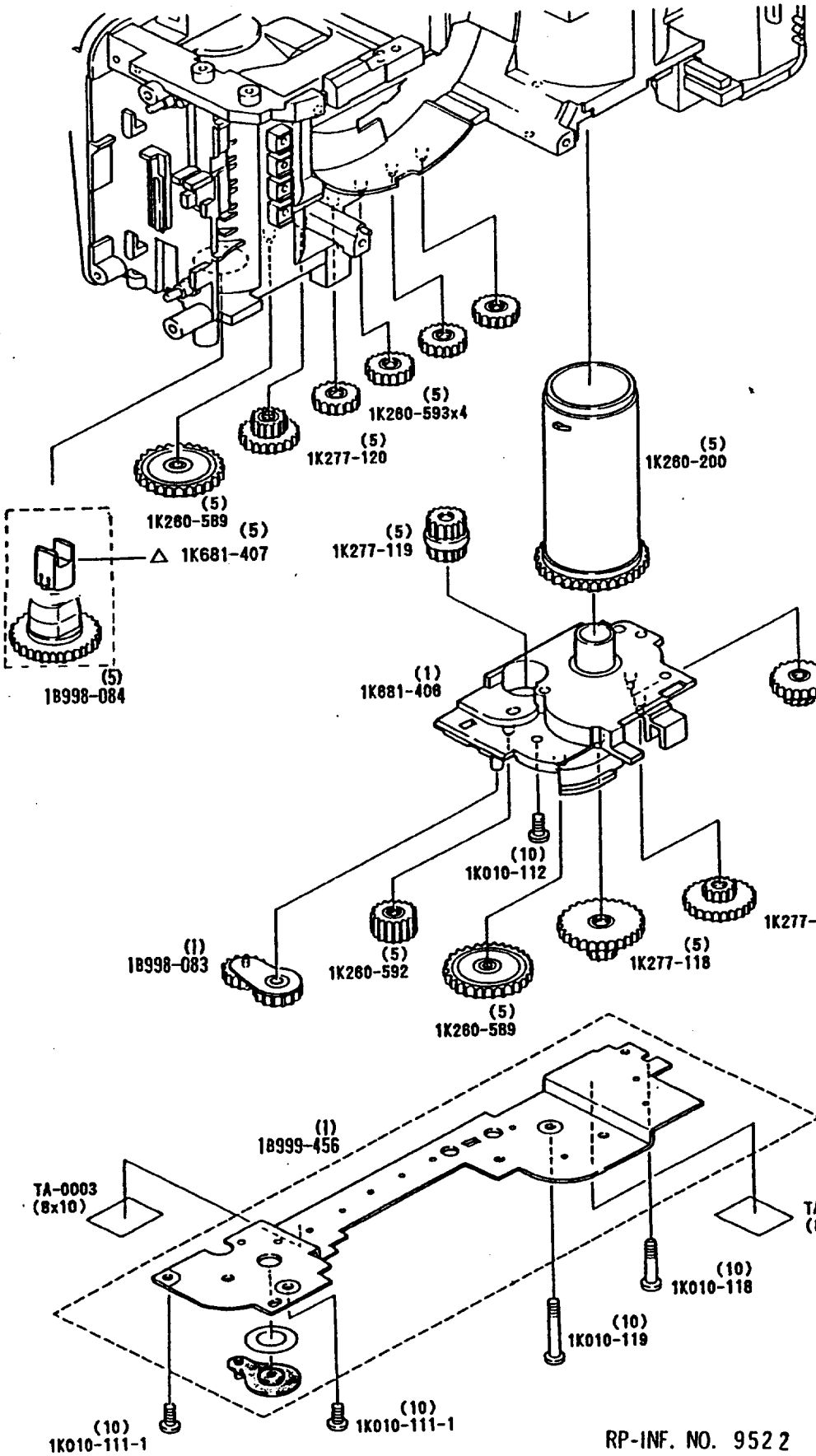


Fig. 2

RP-INF. NO. 9522

MAR. 3.1995

Change page(差し替え) △×1

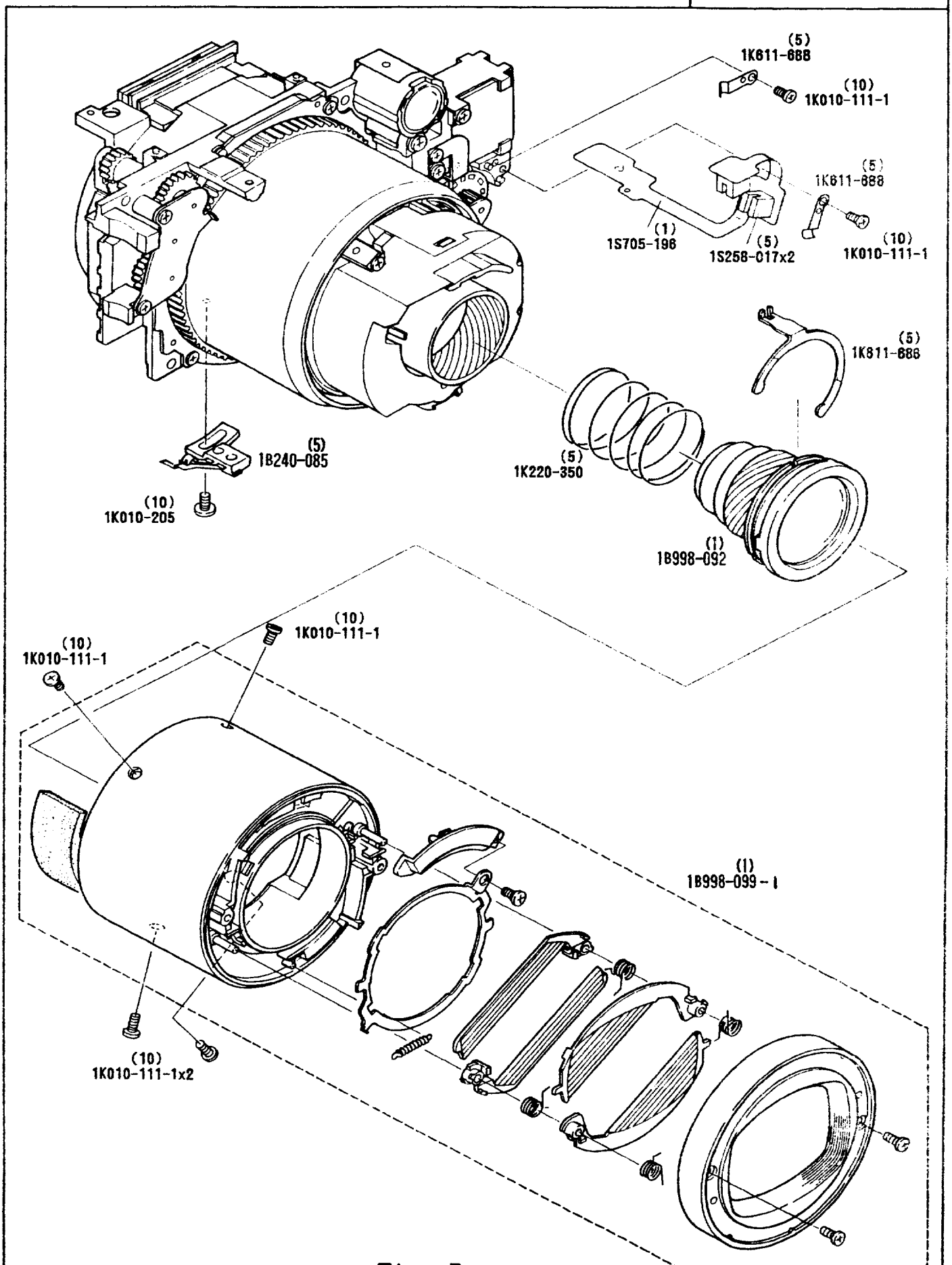

(5)
1K611-688
(10)
1K010-111-1
(5)
1K611-688
(1)
1S705-196
(5)
1S258-017x2
(10)
1K010-111-1
(5)
1K611-686
(5)
1K220-350
(1)
1B998-092
(5)
1B240-085
(10)
1K010-205
(10)
1K010-111-1
(10)
1K010-111-1
(1)
1B998-099-1
(10)
1K010-111-1x2

Fig. 5

FCA13001-R.3295.A

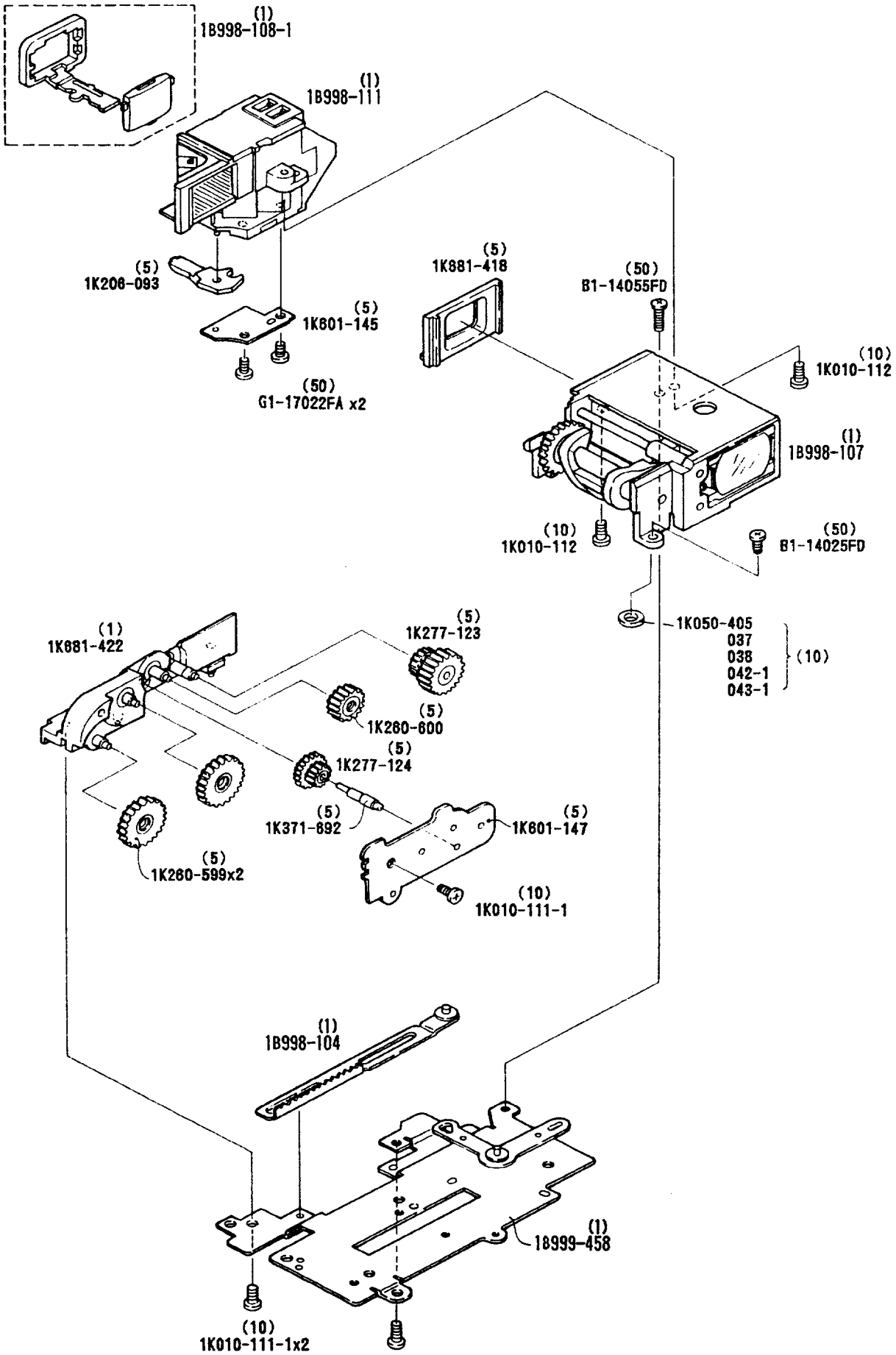


Fig. 6

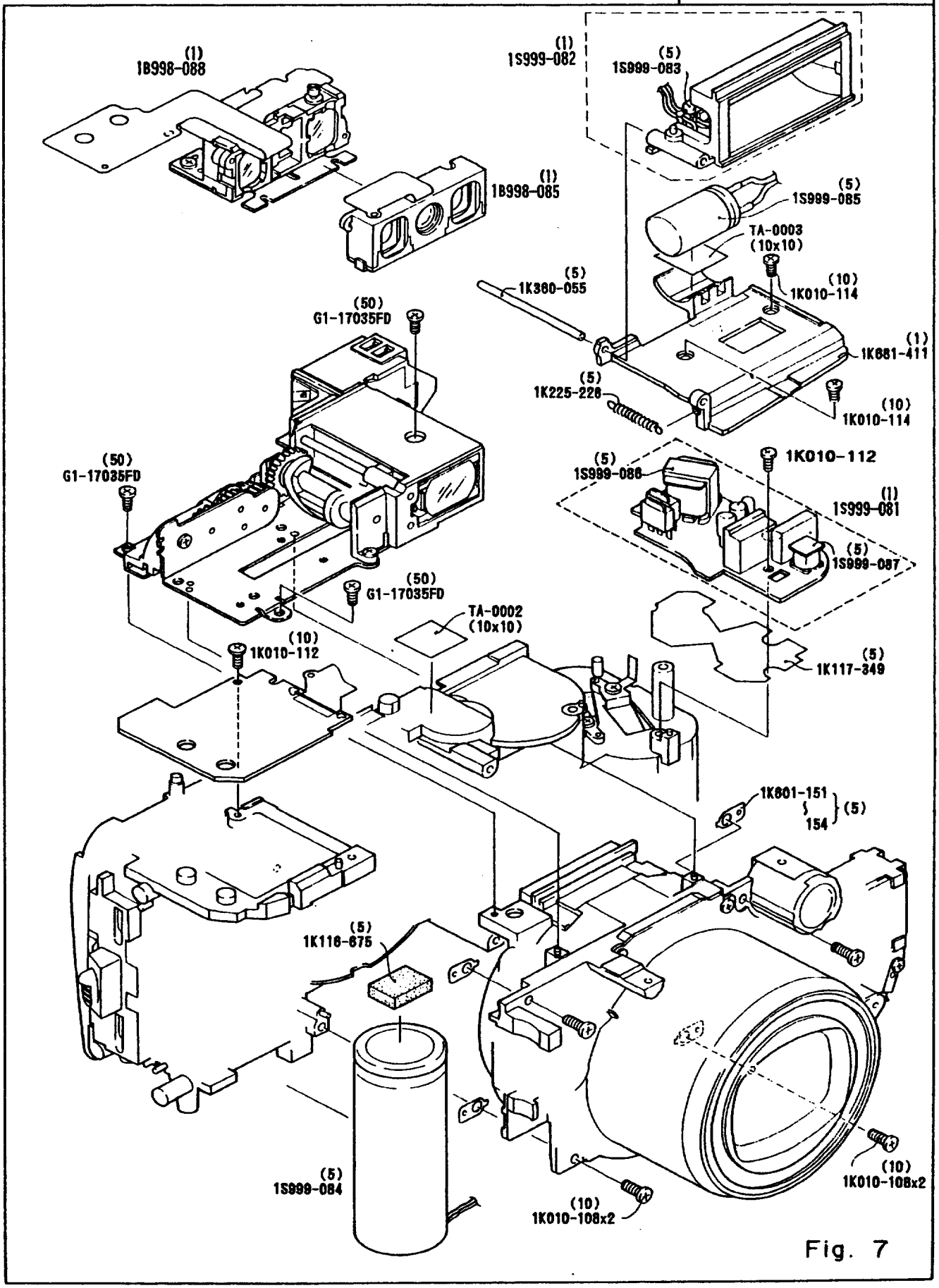
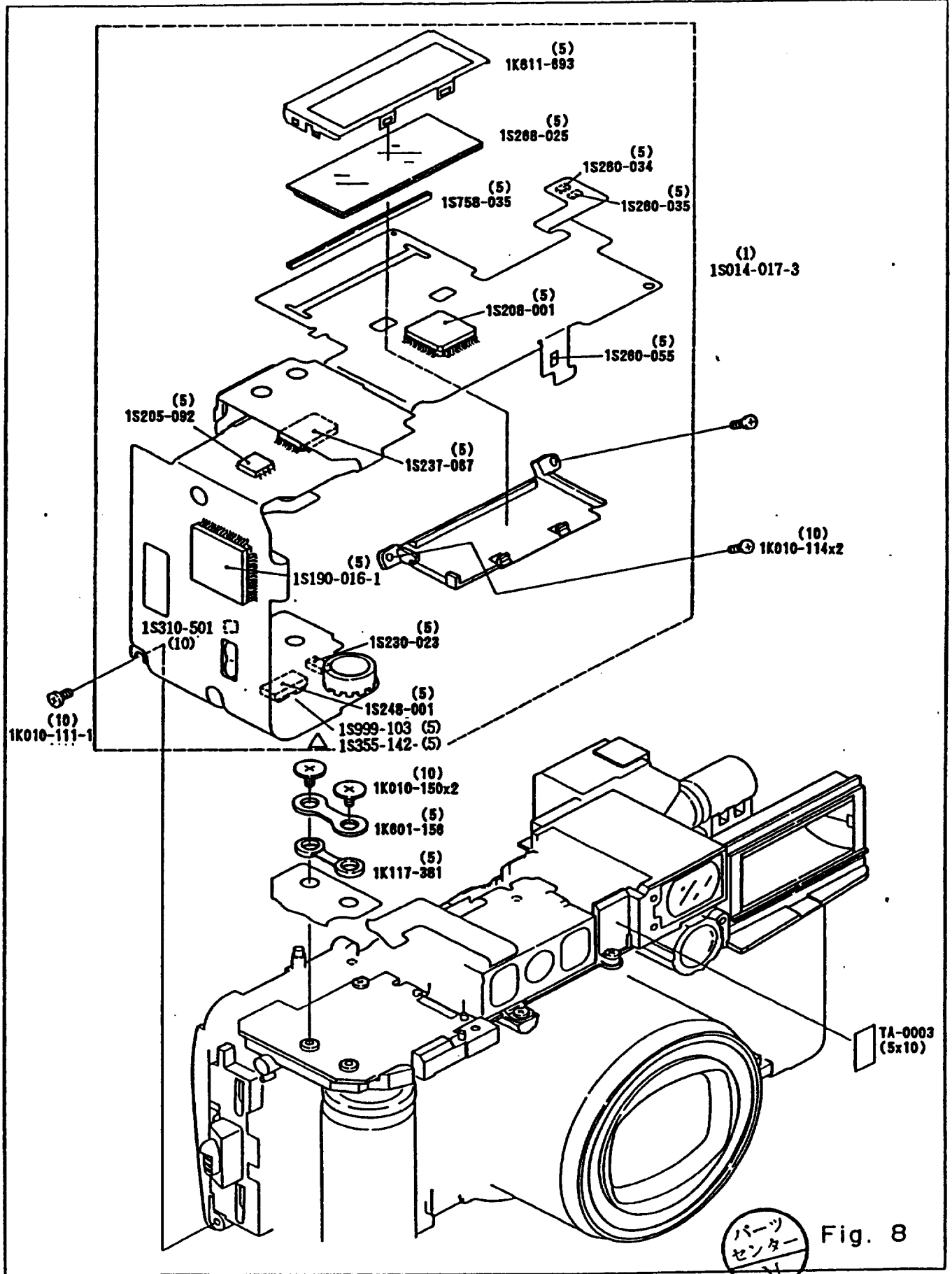

(1)
1B998-088
(1)
1S999-082
(5)
1S999-083
(1)
1B998-085
(5)
1S999-085
TA-0003
(10x10)
(5)
1K360-055
(10)
1K010-114
(50)
G1-17035FD
(1)
1K881-411
(5)
1K225-228
(10)
1K010-114
(50)
G1-17035FD
(5)
1S999-086
1K010-112
(1)
1S999-081
(5)
1S999-087
(50)
G1-17035FD
TA-0002
(10x10)
(10)
1K010-112
(5)
1K117-349
1K801-151
154
(5)
(5)
1K116-675
(5)
1S999-084
(10)
1K010-108x2
(10)
1K010-108x2

Fig. 7

FCA13001-R.3295.A



パーツセンター

Fig. 8

Change page (差し替え) △×1

AUG.31.1994

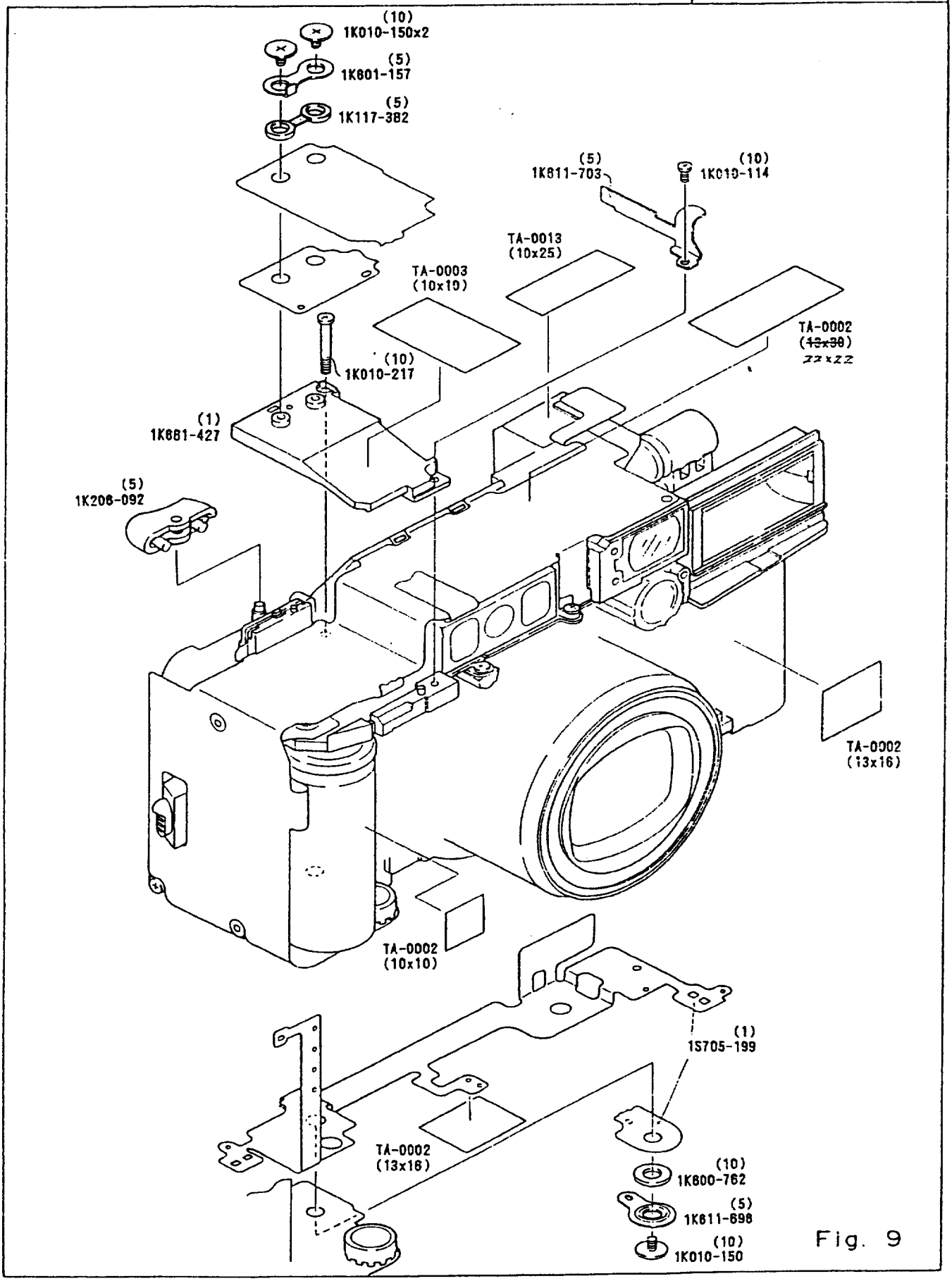

(10)
1K010-150x2
(5)
1K601-157
(5)
1K117-382
(5)
1K811-703
(10)
1K010-114
TA-0013
(10x25)
TA-0003
(10x10)
TA-0002
(13x30)
(10)
1K010-217
(1)
1K681-427
(5)
1K206-092
TA-0002
(13x16)
TA-0002
(10x10)
(1)
1S705-199
TA-0002
(13x16)
(10)
1K600-762
(5)
1K611-698
(10)
1K010-150

Fig. 9

FCA 13001-R.3295.A

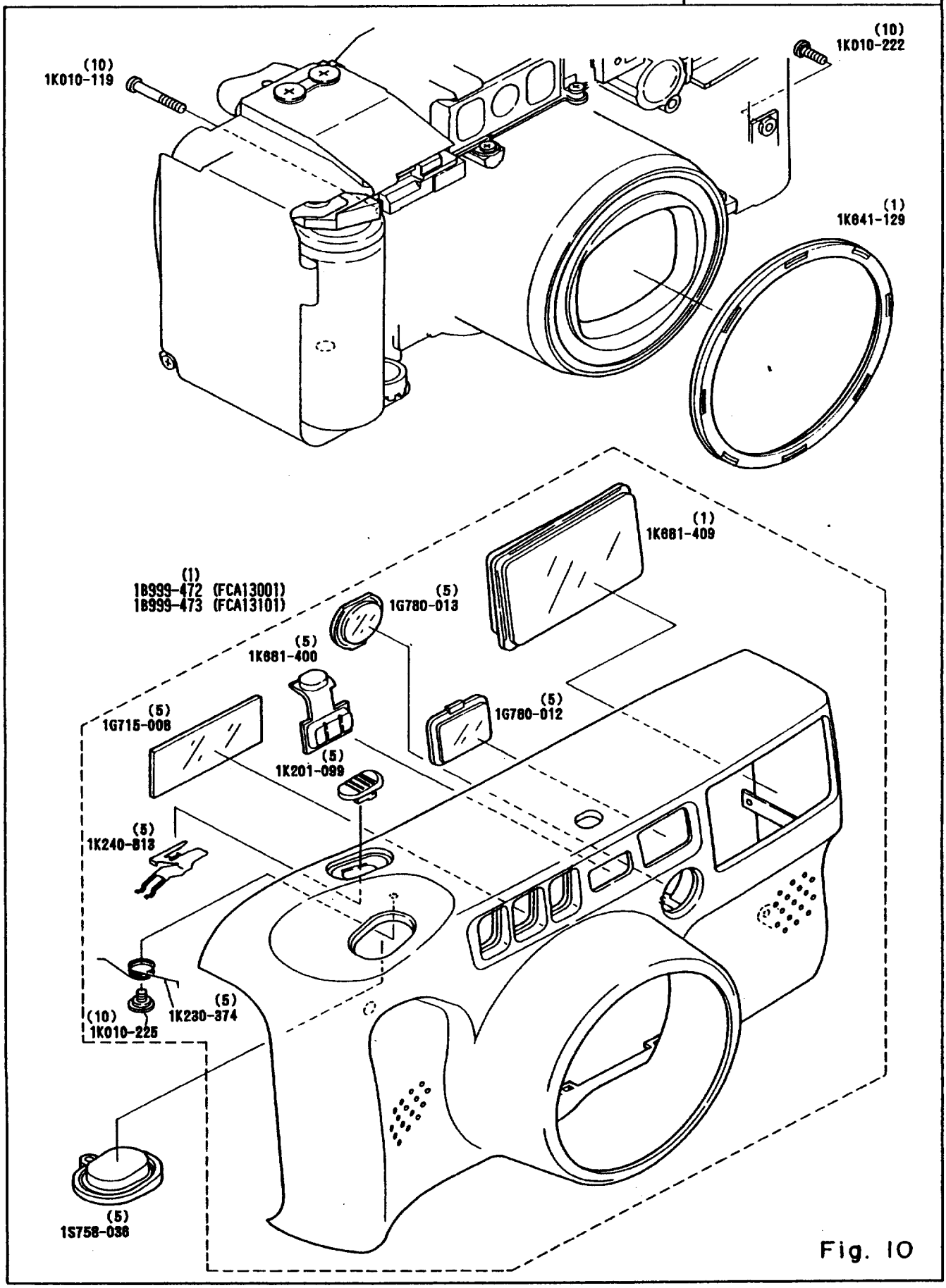


Fig. 10

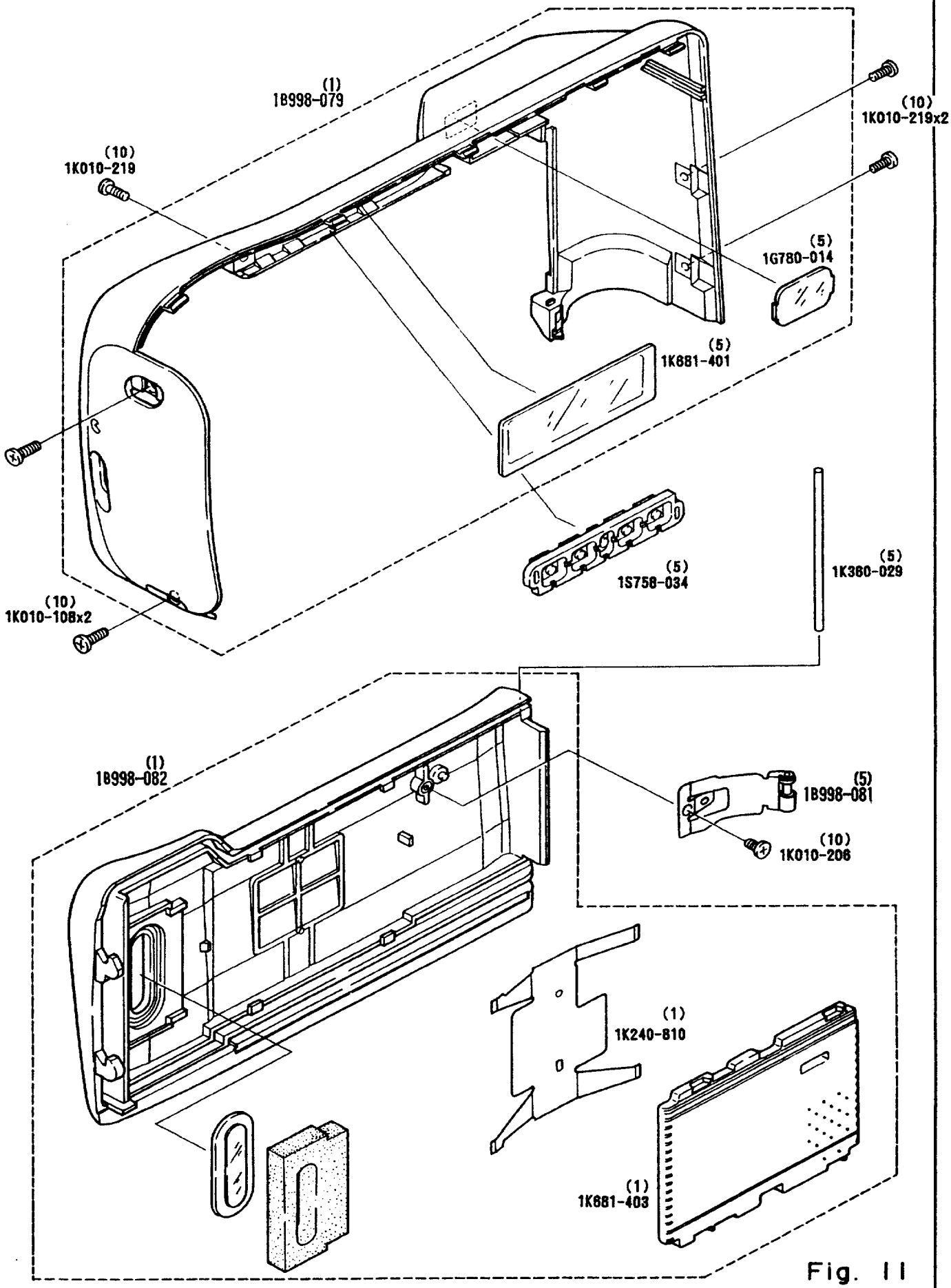

(1)
18998-079
(10)
1K010-219x2
(10)
1K010-219
(5)
1G780-014
(5)
1K681-401
(5)
1S758-034
(5)
1K360-029
(10)
1K010-108x2
(1)
18998-082
(5)
18998-081
(10)
1K010-206
(1)
1K240-810
(1)
1K681-403

Fig. 11

底カバー部・電池蓋部 BOTTOM COVER, BATTERY CHAMBER LID

FCA13001-R3295.A

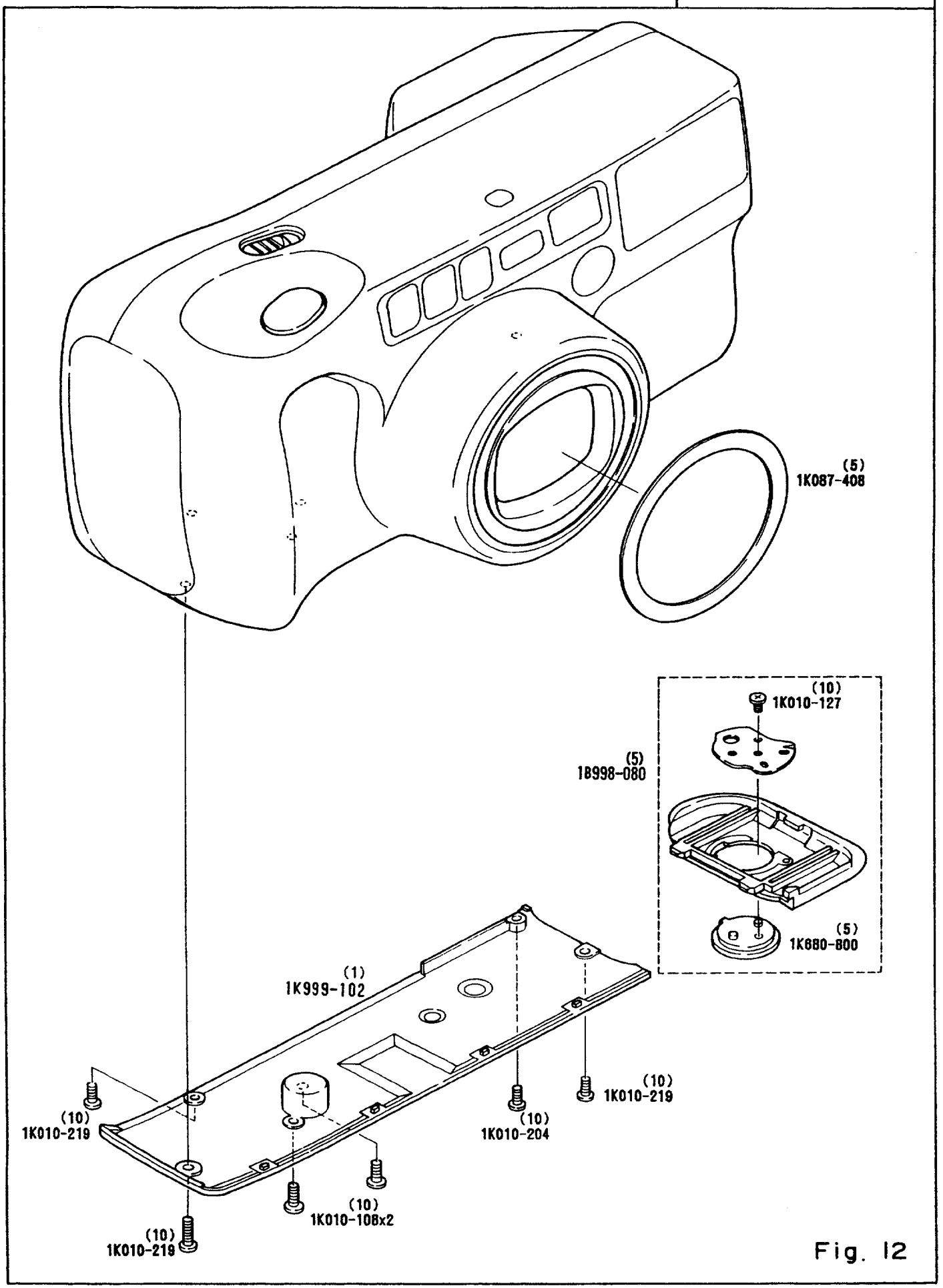
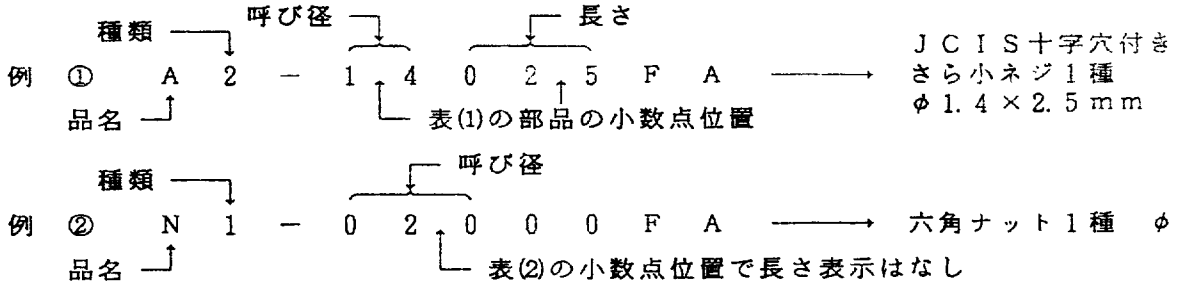


Fig. 12

記号説明　MARKS IN THE PARTS LIST

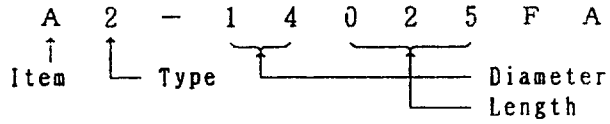
(1) 機械標準品

下の表に示す機械標準品の部品番号は品名、種類、呼び径、長さを示しています。



(1) Standard mechanical parts
Reference Number in the Parts List

A. Screw ・Pin



B. Nut ・Washer・Snap ring

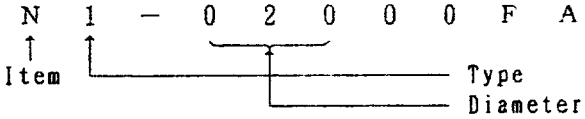


表 1

品名 Item		種類 Type	
ＪＣＩＳ 十字穴付き小ねじ１種 Cross-point screw 1	A	なべ Pan	1
		さら Countersunk	2
		丸さら Oval	3
ＪＣＩＳ 十字穴付き小ねじ３種 Cross-point screw 3	B	なべ Pan	1
		さら Countersunk	2
		丸さら Oval	3
十字穴付き小ねじ Cross-point screw	C	なべ Pan	1
		さら Countersunk	2
		丸さら Oval	3
		トラス Trus	4
十字穴付きタップタイタイトねじＢ型 Cross-point tapped screw B	F	なべ Pan	1
		さら Countersunk	2
十字穴付きタップタイタイトねじＢ型１種 Cross-point tapped screw B1	G	なべ Pan	1
		さら Countersunk	2
		丸さら Oval	3
十字穴付きタップタイタイトねじＢ型３種 Cross-point tapped screw B3	H	なべ Pan	1
		さら Countersunk	2
		丸さら Oval	3

品名 Item		種類 Type	
すりわり付き止めねじ Splitted set screw	K	丸先 Round point	1
		とがり先 Cone point	2
		くぼみ先 Half point	3
六角穴付き止めねじ Hexagon socket head set screw	L	とがり先 Cone point	2
		くぼみ先 Half point	3
		平先 Normal	4
六角穴付きボルト Hexagon socket head bolt	M		1
		M2, M2.6	2
平行ピン Straight pin	P		1
		ステンレス Stainless steel	5
テーパーピン Taper pin			2
スプリングピン Spring cotter		一般用 Normal	3
		軽荷重用 Light	4

表 2

品名 Item		種類 Type	
六角ナット Hexagon nut	K	１種 Type 1	1
		１種 Type 3	3
平座金 Washer	R	小形丸	1
		みがき丸	2
ばね座金 Spring washer			5
Ｅ型止め環 E-snap ring	S	Ｅ型 Type E	1
		Ｇ型 Type G	2
		GS型 Type GS	3

(2) 販売区分欄 The term of sale colum

記　号 Mark	説　明　Explanation	
○	Can be Supplied individually	単独部品として販売するもの
△	Not supplied individually but only as subassembly.	部組品でなければ販売しないもの
○△	Supplied either as part or subassembly	単独部品でも部組品でも販売するもの
×	Not considered as repair part	修理部品と考えないもの
※	Should be sent to the factory if the repair needed.	単体では交換できないので、組む場合に工場での加工が必要なもの
⊠	Delivered as a product from the sales department (i.e., not supplied as repair part)	商品として販売店で販売しているもの（修理部品扱いはしない）

(3) 備考欄 The remarks colum

F-601M	Part number used in common	共通部品番号
(Blue ×125mm)	Lead wire (color × length)	コードの色と長さ
53F-2013 (FM-780028)	Technical information ref. number (number in parenthesis; English edition)	製品技術資料No. （ ）内は英文
(2.1×3.8 ×0.07)	Washer (internal diameter × external diameter×thickness)	ワッシャー（内径×外径×厚さ）
(Black)	Black-finished parts	黒部品
(d=0.2)	Diameter of wire	線型＝0.2
(t= 1)	Thickness	厚さ＝1
Rev.	Revision	訂正
Add.	Addition	追加
Dis.	Discontinuation	廃止
OLD	Parts of the intial design	旧部品
◆	Limited part	ＲＰ限定出庫部品
RP-9001	Repair part information No.	ＲＰ情報Ｎｏ.
R1.., D1..., W1... C1.., Q1..., P1...	Abbreviation for electronic part	電気部品記号
TA-0003	Number (TA-****) are order numbers of adhesive tape. (For the order of adhesive tape, the number 1K***-*** is not use).	接着テープ要求部番（1K***-*** では部品要求できません。）
W-0056BE	Number (W-0056BE) are order numbers of Lead wire. (For the order of Lead wire, the number 1K***-*** is not use).	リードワイア要求部番（1S***-*** では部品要求できません。）

＊ VERSATILE PART

＊ 既出部品

Apart maked with this pentagonal symblo is used commonly in the arcitecture of other products. That is called "VERSATILE PART". Note that every part, bearing new part number of eleven places, will turn into a VERSATILE PART when it is used in the design of future product.

部品表 Parts List　　TW Zoom 105　　FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1G715-008	G31	AE. AF窓 AE. AF window	1	1B999-472	10	○△		5
1G780-012	G28	FD窓 Finder window	1	1B999-472	10	○△		5
1G780-013	G29	AF補助光窓 AF irrumination window	1	1B999-472	10	○△		5
1G780-014	G30	接眼保護窓 Eyepiece protection window	1	1B998-079-1	11	○△		5
*1K010-108	811	Screw	8		7, 11 12	○	FCA09002	10
*1K010-110	812	Screw	7		1, 3	○	FCA09002	10
*1K010-111-1 (1K010-111)	813	Screw	18	1B999-469	1, 2 4~6 8	○△	FCA09002	10
*1K010-112	814	Screw	13	1B999-469	2, 3 4, 6 7	○△	FCA09002	10
*1K010-114	815	Screw	18	1B998-099	3, 8 7, 9	○△	FCA09002	10
*1K010-118	817	Screw	1		2	○	FCA09002	10
*1K010-119	818	Screw	3		2, 10	○	FCA09002	10
*1K010-127	823	電池蓋押さえ止めネジ Screw (Battery chamber)	1	1B998-080	1	○△	FCA07001	10
*1K010-128	822	Screw	2		1	○	FCA09002	10
*1K010-150	819	圧接ネジ Screw (Press-contact)	5		8, 9	○	FAA22052	10
*1K010-204	801	Screw	1		12	○	FAA26051	10

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K010-205	802	鏡筒SW止めネジ Screw (Barrel SW)	1		5	○		10
1K010-206	803	フィルム押さえ止めネジ Screw (Film retainer)	1	1B998-082	11	○△		10
1K010-217	827	Screw	1		9	○		10
1K010-218	821	Screw	2		1	○		10
1K010-219	828	Screw	9		1, 11 12	○		10
1K010-221	810	Screw	2		4	○		10
1K010-222	829	Screw	1		10	○		10
1K010-223	830	Screw	1		1	○		10
1K010-224	831	Screw	2		1	○		10
1K010-225	824	メインSWネジ Screw (Main SW)	1	1B999-472	10	○△		10
*1K050-037	533B	FD調整ワッシャー t=0.2 Finder adjustment washer t=0.2	0-4			○		10
*1K050-038	533C	FD調整ワッシャー t=0.3 Finder adjustment washer t=0.3	0-4			○		10
*1K050-040-1 (1K050-040)	533D	FD調整ワッシャー t=0.5 Finder adjustment washer t=0.5	0-4			○		10
*1K050-042-1 (1K050-042)	533E	FD調整ワッシャー t=0.7 Finder adjustment washer t=0.7	0-4			○		10

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K050-405	533A	FD調整ワッシャー t =0.15 Finder adjustment washer t=0.15	0-4			○		10
1K087-408	689	銘板 Name plate	1		4	○		5
1K116-394	114	防塵モルトA Dust protect sponge A	1		1	○		5
*1K116-470	133	フィルム先端シール Label, film load position	1		1	○	FCA09002	10
*1K116-564-1 (1K116-564)	137	遮光モルトB Light-baffle sponge B	2		1	○	FCA09002	10
*1K116-675	140	メインコンモルト 7 ×10 Main condenser sponge 7×10	1		7	○	FCA09002	5
1K117-349	304	SB絶縁板 Insulation plate	1		7	○		5
1K117-351	435	FSS絶縁板 Insulation plate	1		1	○		5
1K117-354	698	S遮光シート Light-baffle seet (shutter)	1		3	○		5
1K117-359	851	両面テープ 8 ×10 Double-sided adhesive tape	2		2	×	TA-0003	1 roll
1K117-361	853	両面テープ 10×10 Double-sided adhesive tape	1		7	×	TA-0003	1 roll
1K117-362	854	両面テープ 15×15 Double-sided adhesive tape	1		9	×	TA-0003	1 roll
1K117-363	855	両面テープ 5 ×10 Double-sided adhesive tape	1		8	×	TA-0003	1 roll
1K117-364	861	ポリエステルフィルム 13×16 Plastic tape	2		9	×	TA-0002	1 roll

差し替え Change page

Feb. 13. 1992

部品表 Parts List

FCA13001−R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K117-366	863	ポリエステルフィルム 10×10 Plastic tape	2		7, 9	×	TA-0002	1 roll
1K117-368	865	ポリエステルフィルム 13×30 Plastic tape	1		9	×	TA-0002	1 roll
1K117-370	867	アセテートテープ 10×25 Acetate cloth tape	1		9	×	TA-0013	1 seet
1K117-369	866	片面接着テープ 15×10 Adhesive tape	1		3	×		10
1K117-372	870	両面テープ 8 ×30 Double-sided adhesive tape	1		3	×	TA-0003	1 roll
1K117-373	871	両面テープ 8 ×8 Double-sided adhesive tape	2		3	×	TA-0003	1 roll
1K117-374	872	両面テープ 10 ×6 Double-sided adhesive tape	2		3	×	TA-0003	1 roll
1K117-375	873	両面テープ 8 ×6 Double-sided adhesive tape	1		3	×	TA-0003	1 roll
1K117-381	708	圧接ゴムA Press-contact rubber A	1		8	○		5
1K117-382	719	圧接ゴムB Press-contact rubber B	1		9	○		5
1K117-426	641	防振ゴム Vibration proof rubber	2	1B999-469	4	○△		5
1K120-358	805	クラッチネジ Clutch screw	2		3	○		10
1K120-359	809	Screw	1		4	○		10
1K130-500	816	カムピン Cam pin	1		3	○		5
1K130-501	820	カムピン Cam pin	2		3	○		5
1K201-099	411	メインSWノブ Main SW knob	1	1B999-472	10	○△		5
1K206-092	139	ズームレバー Zoom lever	1		1	○		5

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K206-093	510	視度補正レバー Visibility correction lever	1	1B998-111-1	6	○△		5
1K220-348	112	裏蓋鍵バネ Lock key spring	1		1	○		5
1K220-350	624	1群付勢バネ Spring, 1st lens group	1		5	○		5
1K220-351	661	3群付勢バネ Spring, 3rd lens group	1		3	○		5
1K225-226	306	SBバネ Speed light spring	1		7	○		5
1K230-374	414	メインSWバネ Main SW spring	1	1B999-472	10	○△		5
※1K240-523-3 (1K240-523)	235	電池接片A Battery contact A	1		1	○	FCA09002	5
1K240-809	104	パトローネ押さえ Patorone retainer	1		1	○		5
1K240-810		圧板バネ Pressure plate spring	1	1B999-082	11	○△		5
1K240-812	236	電池接片B Battery contact B	1		1	○		5
1K240-813	413	メインSWブラシ Main SW contact	1	1B999-472	10	○△		5
1K240-815	425	DX接片 DX contact	4		1	○		5
※1K260-200	212	スプール Spool	1		2	○	FCA09002	5
1K260-326-2	203	モーターピニオンギア Motor pinion gear	1	1B998-091-1	1	○△		5
1K260-589	207	ギア8.27 Gear 8.27	2		2	○		5
1K260-592	210	ギア11 Gear 11	1		2	○		5

差替え Change page

Feb. 13. 1992

部品表 Parts List

FCA13001−R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K260-593	213	ギア21. 22. 23. 24 Gear 21.22.23.24	4		2	○		5
1K260-595	438	FSSギア FSS gear	1		1	○		5
1K260-596	439	FSSアイドルギア FSS idle gear	1		1	○		5
1K260-597	516	Fギア5 F gear 5	1		4	○		5
1K260-598	518	Fギア6 F gear 6	1		4	○		5
1K260-599	543	Fギア7. 8 F gear 7.8	2		6	○		5
1K260-600	544	Fギア9 F gear 9	1		6	○		5
1K260-602	637	Lギア4 L gear 4	1	1B999-469	4	○△		5
1K260-603	671	フォトインタラプターギア Photo interrupter gear	1		4	○		5
1K260-604	676	Lギア15 L gear 15	1		4	○		5
1K275-082	432	フリースプロケット Free sprocket	1		1	○		5
1K277-055-1	204	ギア2−3 Gear 2-3	1		2	○		5
1K277-117	205	ギア4−5 Gear 4-5	1		2	○		5
1K277-118	206	ギア6−7 Gear 6-7	1		2	○		5
1K277-119	211	ギア12−13 Gear 12-13	1		2	○		5

部品表 Parts List

FCA13001−R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K277-120	214	ギア25−26 Gear 25-26	1		2	○		5
1K277-121	514	Fギア1−2 F gear 1-2	1		4	○		5
1K277-122	515	Fギア3−4 F gear 3-4	1		4	○		5
1K277-123	545	Fギア10−11 F gear 10-11	1		6	○		5
1K277-124	546	Fギア12−13 F gear 12-13	1		6	○		5
1K277-125	638	Lギア5−6 L gear 5-6	1	1B999-469	4	○△		5
1K277-126	639	Lギア7−8 L gear 7-8	1	1B999-469	4	○△		5
1K277-127	680	Lギア4−5 L gear 4-5	1	1B999-469	4	○△		5
1K277-128	681	Lギア11−12 L gear 11-12	1		4	○		5
1K277-129	682	Lギア13−14 L gear 13-14	1		4	○		5
1K277-130	679	Lギア2−3 L gear 2-3	1	1B999-469	4	○△		5
1K302-063	655	3群カム環 3rd lens group cam ring	1		3	○		5
*1K360-029	122	裏蓋軸 Back door shaft	1		11	○	FCA09002	5
1K360-055	312	ガイド軸 Guide shaft	1		7	○		5
1K371-691	519	Fギア伝達軸 Transmission shaft	1		4	○		5

部品表 Parts List

FCA13001−R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K371-692	549	Fギア軸 Finder gear shaft	1		6	○		5
1K437-198	667	直進キー Linear key	1		3	○		5
1K535-406	654	中間ヘリコイド Intermediate helicoid	1		3	○		1
1K535-407	660	内ヘリコイド Inner helicoid	1		3	○		1
※1K600-762	707	圧接ゴム Press-contact rubber	1		9	○	FAA22052	10
1K601-145	509	視度補正板 Visibility correction plate	1	1B998-111-1	6	○△		5
1K601-146	517	Fギア押さえ板A F gear retainer plate A	1		4	○		5
1K601-147	548	Fギア押さえ板B F gear retainer plate B	1		6	○		5
1K601-149	652	中間ヘリコイド押さえ Intermediate helicoid retainer	1		3	○		5
1K601-150	664	調整クラッチ Clutch	1		3	○		5
1K601-151	699A	BF調整ワッシャー t=0.05 Adjustment washer t=0.05	0-4		7	○		5
1K601-152	699B	BF調整ワッシャー t=0.1 Adjustment washer t=0.1	0-4		7	○		5
1K601-153	699C	BF調整ワッシャー t=0.15 Adjustment washer t=0.15	0-4		7	○		5
1K601-154	699D	BF調整ワッシャー t=0.2 Adjustment washer t=0.2	0-4		7	○		5
1K601-156	706	圧接板 Press-contact plate	1		8	○		5

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K601-157	718	圧接板B Press-contact plate B	1		9	○		5
1K611-686	623	フォーカスリング Focus ring	1		5	○		5
1K611-687	668	FPC押さえ FPC retainer	1		3	○		5
1K611-688	670	フォトインタラプター押さえ Photo interrupter retainer	2		5	○		5
1K611-689	675	FPC補強板 FPC support plate	1		3	○		5
1K611-690	677	モーターギア押さえ板 Gear retainer plate	1		4	○		5
1K611-693	702	LCD押さえ LCD retainer	1	1S014-017	8	○△		5
1K611-696	715	DXFPC圧接板 Press-contact plate (DX FPC)	1		9	○		5
1K611-703	547	AFホルダー押さえ AF holder retainer	1		9	○		5
1K611-707	119	裏蓋バネ保護板 Lock key spring protection plate	1		1	○		5
1K611-730	124	補強板 Protection plate	1		1	○		5
1K641-129	653	カーテン Curtain	1		10	○		1
1K660-110	131	本体 Main frame	1		1	○		1
*1K680-800	126	ロックボタン Lock button	1	1B998-080	12	○△	PCA07001	5
1K681-400	102	セルフ窓 Self-timer window	1	1B998-078-1	10	○△		5

部品表 Parts List

FCA13001-R. 3295. B

	部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
	1K681-401	106	LCD窓 LCD window	1	1B998-079-1	11	○△		5
	1K681-403	115	圧板 Pressure plate spring	1	1B998-082	11 13	○△		1
	1K681-404	123	裏蓋開閉モールド Lock key	1		1	○		5
	1K681-406	201	巻き上げ基板 Winding base plate	1		2	○		1
△	1K681-407		巻き戻しフォーク Rewind fork	1	1B998-084	2	○△	RP-9522 サ技No. 95-05	5
	1K681-408	244	W/Rモーター基板 W/R motor PCB	1	1B998-091-1	1	○△	RP-93E9	1
	1K681-409	302	ディフューザー Diffuser	1	1B998-472	10	○△		1
	1K681-411	321	SBスライド台 Speed light slide plate	1		7	○		1
	1K681-418	506	ファインダーフレーム Finder frame	1		6	○		5
	1K681-422	550	Fギア台 Finder gear plate	1		6	○		1
	1K681-425-1	691	バリアレバー Lens cover lever	1	1B998-099-1	5	○△	RP-9251 「製技92F-1008参照」	5
	1K681-427	705	FPC台 FPC base plate	1		9	○		1
	1K999-102	150	底カバー Bottom cover	1		12	○	NO 5000001～	1
	~~1S190-016~~ 1S190-016-1	1006	CPU. IC (μPD78214GC-572-AB8) CPU IC	1	1S014-017	8	○△	RP-9238 「製技92F-2016参照」	5
	1S205-092	1012	EEPROM. IC (S-2919CIF10) EEPROM IC	1	1S014-017	8	○△		5
	*1S208-001	1008	LCDドライバIC (μPD7225GB-3B7) LCD dr. IC	1	1S014-017	8	○△	FAA28051 FAB02001	5
	1S230-023	1011	定電圧IC (S-81237-AG-RE-T1) Reg. IC	1	1S014-017	8	○△		5

Change page (差し替え) △×1

RP-INF. NO. 9522

MAR. 3. 1995

パーツセンター

部品表 Parts List

FCA13001-R. 3295. B

	部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
	1S237-067	1007	PA. IC (M52932) PA. IC	1	1S014-017	8	○△		5
	1S248-001	1010	DC/DC. IC (M51985FP) DC/DC. IC	1	1S014-017	8	○△		5
	1S258-017	1031	フォトインタラプター (ON1413A) Photo interrupter	2		5	○		5
	*1S260-034	1026	SB. LED SB. LED	1	1S014-017	8	○△	PCA12001	5
	*1S260-035	1025	AF. LED AF. LED	1	1S014-017	8	○△	PCA12001	5
	1S260-054	1023	AF補助光用LED AF illumination LED	1	1B999-457	3	○△		5
	1S260-055	1024	セルフLED Self LED	1	1S014-017	8	○△		5
	1S268-025	1013	LCD LCD	1	1S014-017	8	○△		5
	1S310-501		チップ抵抗 Resister	1	1S014-017	8	○△	RP-9380	10
△	1S355-142		コンデンサー Condenser	2		8	○	RP-9449 1S999-103 使用コンデンサーの単部品	5
	*1S422-022	125	電池室SW. 裏蓋SW Battery SW. Back door SW	2		1	○	PCA09002	5
	1S705-196	1002	P. I FPC P. I FPC	1		5	○		1
	1S705-199	1005	DX. FPC DX. FPC	1		9	○		1
	1S731-010	724	ラグ板 Lug plate	1		7	○	RP-9251 「製技92F-2031参照」	5
	1S758-034	703	ファンクションSW Function SW	1		11	○		5
	1S758-035	704	エラスティックコネクター Elastic connector	1	1S014-017	8	○△		5
	1S758-036	709	レリーズボタン Release button	1		10	○		5

Change page (差替え) △×1

AUG. 31. 1994

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1S810-999-1	1093	Lead wire (Orage l=167)	1	1B998-091-1		×	W-0080OR	1 roll
1S811-001	1094	Lead wire (Gray l=164)	1	1B998-091-1		×	W-0080GY	1 roll
1S811-457	1091	Lead wire (Red l=195)	1			×	W-0108RE	1 roll
1S811-458	1092	Lead wire (Black l=205)	1			×	W-0108BK	1 roll
1S811-461	1095	Lead wire (Green l=185)	1			×	W-0080GN	1 roll
1S811-462	1096	Lead wire (White l=175)	1			×	W-0080WH	1 roll
1S811-463	1097	Lead wire (Red l=105)	1			×	W-0108RE	1 roll
1S811-464	1098	Lead wire (Black l=105)	1			×	W-0108BK	1 roll
1S811-465	1099	Lead wire (Yellow l=68)	1	1B998-090		×	W-0056YE	1 roll
1S811-466	1100	Lead wire (Blue l=68)	1	1B998-089		×	W-0056BE	1 roll
1S811-467	1101	Lead wire (Purple l=75)	1			×	W-0056PU	1 roll
1S811-468	1102	Lead wire (Brown l=80)	1			×	W-0056BN	1 roll

部品表 Parts List

FCA13001-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1S999-083		Xe管 Xenon-lamp	1	1S999-082	7	○△		5
1S999-084		メインコンデンサ Main condenser	1		7	○		5
1S999-085		サブコンデンサ Sab condenser	1		7	○		5
1S999-086		発振トランス (S-563) Transformer (S-563)	1	1S999-081	7	○△		5
1S999-087		トリガーコイル (KP-58) Trigger coil (KP-58)	1	1S999-081	7	○△		5
1S999-088	843	シャッターFPC Shutter FPC	1	1S999-095	3	○△		1
B1-14022FD	842	Screw	3			○		50
B1-14025FD	844	Screw	1		6	○		50
B1-14055FD	845	Screw	1		6	○		50
G1-17022FA	840	Screw	2	1B998-111-1	6	○△		50
G1-17035FD	846	Screw	3		7	○		50

差し替え Change page

Feb. 13. 1992

部組品表 Assembly List

FCA13001−R. 3295. A

部組番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	大部組品番号 Main assembly No.	参照図番 Fig. No.	備考 Remarks	要求単位 Order Unit Q'ty
1B240-085	B650	鏡筒SW部組 Barrel SW unit	1		5		5
1B260-098	B437	FSSパターン板部組 FSS base plate	1		1		5
1B998-079-1	B105	後カバー部組 Rear cover unit	1		11		1
1B998-080	B107	電池蓋部組 Battery chamber lid	1		12		5
1B998-081-1	B117	フィルム押さえ板部組 Back door side film roller unit	1	1B998-082	11 13		5
1B998-082	B108	裏蓋 Back door unit	1		11		1
1B998-083	B220	遊星ギア部組 Planetary gear unit	1		2		1
1B998-084	B231	巻き戻しフォーク部組 Rewind fork unit	1		2		5
1B998-085	B420	AFホルダーカバー部組 AF holder cover unit	1		7		1
1B998-088-1	B3421	AFホルダー部組 AF holder unit	1		7		1
1B998-089	B433	FSS接片A部組 FSS contact unit A	1		1		5
1B998-090	B434	FSS接片B部組 FSS contact unit B	1		1		5
1B998-091-1	B1015	W/Rモーター部組 W/R motor unit	1		1		1
1B998-092	B621	1群レンズ室部組 1st lens group unit	1		5		1

部組品表 Assembly List

FCA13001-R. 3295. A

部組番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	大部組品番号 Main assembly No.	参照図番 Fig. No.	備考 Remarks	要求単位 Order Unit Q'ty
1B998-094	B656	2群レンズ室部組 2nd lens group unit	1		3		1
1B998-095	B662	3群レンズ室部組 3rd lens group unit	1		3		1
1B998-099	B685	バリア鏡筒部組 Lens cover unit	1		5		1
1B998-104	B309	SB駆動板部組 SB driving plate	1		6		1
1B998-107	B501	F1群部組 Finder 1st group	1		6		1
1B998-108-1	B513	接眼レンズ Eyepiece lens unit	1		6		1
1B998-111-1	B503	F2群部組 Finder 2nd group	1		6		1
1B999-122-1	B241	フィルム押さえ部組 Body side film roller unit	1		1		5
1B999-456	B202	ファインダー駆動ギア部組 **MM Base plate**	1		2		1
1B999-457	B651	サブフレーム Sub frame	1		3		1
1B999-458	B552	SBズームレバー部組 SB zoom lever unit	1		6		1
1B999-468		下側キー Lower key	1		3		5
1B999-469		鏡筒モーター組 Helicoid motor unit	1		4		1

部組品表 Assembly List

FCA13001-R. 3295. A

部組番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	大部組品番号 Main assembly No.	参照図番 Fig. No.	備考 Remarks	要求単位 Order Unit Q'ty
1B999-472	B101	前カバー部組 Front cover unit 105	1		10		1
1B999-473	B101	前カバー部組（USA用） Front cover unit (USA) 900	1		10		1
1B999-499		シャッターメカ部 Mech. unit for shutter	1		3		1
1S014-017	B3001	メインFPC部組 Main F.P.C	1		8		1
1S999-081	B1016	スピードライト基板部組 Speed light base plate	1		7		1
1S999-082	B303	発光部 Speed light unit	1		7		1
1S999-091		シャッター基板 Shutter PCB	1	1S999-095	3		1
1S999-095		基板. FPC組 PCB. FPC unit	1		3		1

FCA13201-R. 3295. A

Data Back

SPECIFICATIONS

(1) System: Auto date imprint function with built-in quartz digital clock and LCD display

(2) Film speed: Auto film speed setting with DX-coded film (3 steps)

	ISO 100 or faster	ISO 200	ISO 400 or faster
Duration of imprint signal (X)	69 ms	39 ms	33 ms
Duration of lamp illumination (La)	57.5 ms	27.5 ms	21.5 ms

(3) Imprint data

1) World time mode
Auto adjustment of time difference for the world's 24 areas by selecting the area codes (1 to 24). DST (daylight saving time) adjustment is also available.

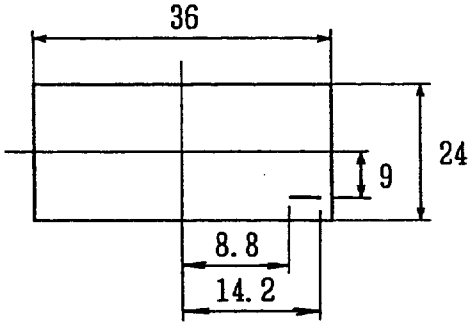
2) Character mode
Alphanumeric character imprinting (maximum of three) is possible. Alphabet and numeric character modes alternately change.

3) Full-data imprint mode
Press the "Full" button to input full data. Two items can arbitrarily be imprint on the designated position on the frame.

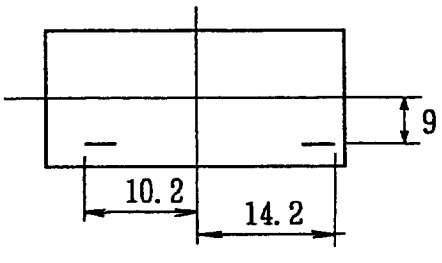
Initialization	Normal imprint	Full-data imprint mode		
		First imprint	Second imprint	Result
Year/Month/Day	Year/Month/Day	Hour/Minute	Year/Month/Day	Year/Month/Day/ Hour/Minute
Day/Hour/ Minute	Day/Hour/ Minute	Hour/Minute	Year/Month/Day	Year/Month/Day/ Hour/Minute
Character	Character	Character	Day/Hour/ Minute	Day/Hour/Minute/ Character
		Character	Year/Month/Day	Year/Month/Day/ Character
OFF	———	———	———	———
Month/Day/Year	Month/Day/Year	Hour/Minute	Month/Day/Year	Month/Day/Hour/ Minute
Day/Month/Year	Day/Month/Year	Hour/Minute	Day/Month/Year	Day/Month/Year/ Hour/Minute

Imprint position

Normal imprint



Full-data imprint



HOW TO CHECK DATA IMPRINTING

1. Judgement of data imprinting signal

Output of data imprinting signal can be confirmed by the tester.
1) Open the camera back.
2) Turn off camera back switch.
3) Select the DC 0.1-10V range of the tester and connect the tester with GND and D2 contacts.
4) If the signal is output, the needle of the tester moves for an instant when the shutter is released.

2. Imprint timing check

Make the measurement in the same method as 1. using the oscilloscope instead of the tester.
Imprint time is selected out of three steps according to the film speed in set.

3. Inspection of imprinting

1) Open the camera back.
2) Turn off camera back switch.
3) Attach mending tape on the data imprinting window of the pressure plate.
4) Connect GND of camera body and GND pin of camera back.
(Do not solder at either end.)
5) Connect D2 port of camera body and D2 pin of camera back.
(Do not solder at either end.)
6) Release the shutter and then inspect the data imprinted on the mending tape using a magnifying glass.
Imprinted data is reversed and should be the same as displayed.

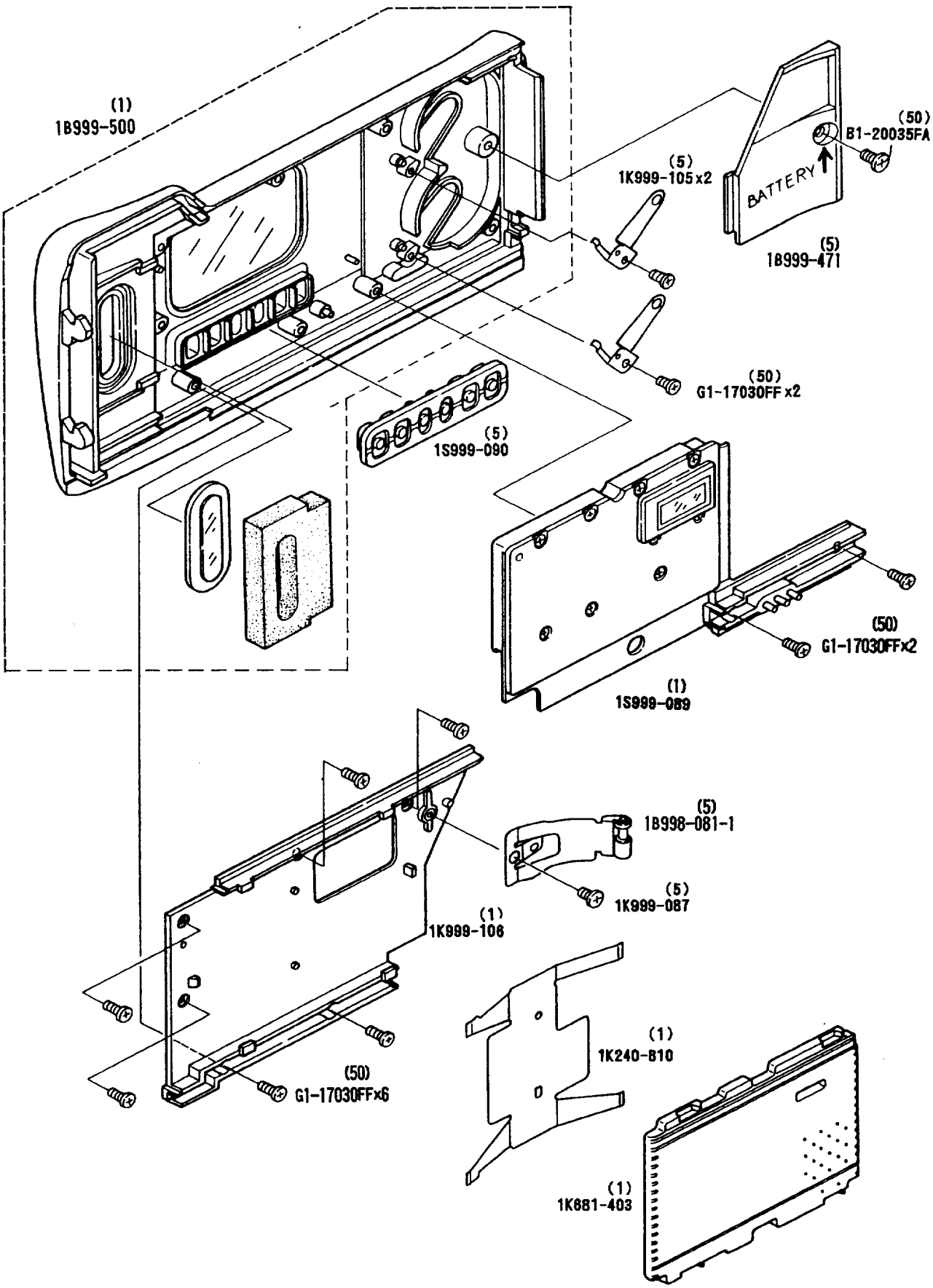

(1)
1B999-500
(50)
B1-20035FA
(5)
1K999-105x2
BATTERY
(5)
1B999-471
(50)
G1-17030FFx2
(5)
1S999-090
(50)
G1-17030FFx2
(1)
1S999-089
(5)
1B998-081-1
(5)
1K999-087
(1)
1K999-108
(50)
G1-17030FFx6
(1)
1K240-810
(1)
1K681-403

Fig. 13

部品表 Parts List　　TW Zoom 105 World Time　　FCA13201-R. 3295. A

部品番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	部組品番号 Assembly	参照図番 Fig. No.	販売区分 Class. of Salability	備考 Remarks	要求単位 Order Unit Q'ty
1K681-403	115	圧板 Pressure plate	1		13	○		1
1K999-087		フィルム押さえネジ Screw	1		13	○		5
1K999-103		底カバー Bottom cover	1		13	○	NO 4000001～	1
1K999-105		電池接片 Battery contact	2		13	○		5
1K999-106		ウチ蓋 Inner cover	1		13	○		1
1S999-090		ファンクションSW Function SW	1		13	○		5
1K240-810		圧板バネ Plessure plate spring	1		13	○	Common to FCA13001	5
B1-20035FA		電池蓋ネジ Screw	1		13	○		50
G1-17030FF		Screw	10		13	○		50

差し替え Change page

Feb. 13. 1922

部組品表 Assembly List

FCA13201-R. 3295. A

部組番号 Part No.	補助番号 Ckt No.	名称 Name	1台分個数 Q'ty Per Unit	大部組品番号 Main assembly No.	参照図番 Fig. No.	備考 Remarks	要求単位 Order Unit Q'ty
B999-500		DB裏蓋 DB back door	1		13		1
ıB998-081-1	B117	フィルム押さえ板部組 Back door side film roller unit	1		13	Common to FCA13001	5
1B999-471		電池蓋 Battery chamber unit	1		13		5
1S999-089		DBモジュール Data back module	1		13		1

し替え Change page

Feb 13. 1992