Mamiya ZM QUARTZ

REPAIR MANUAL

Mamiya
CAMERA CO., LTD.
TOKYO, JAPAN

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DISASSEMBLY

Please always refer to diagrams of the ZM parts catalog when dis. and reassembling.

1-1 Disassembly of front cover with mirror housing and view-finder unit

A. Unsolder the following eighteen leadwires

1. On main FPC board

a. Yellow, White and Orange Lws from Shutter unit ----- Three LWs

b. Yellow, Green and Purple LWs from Main change-over SW ----- Three LWs

c. Red LW from PCV-buzzer

d. Orange LW from Battery chamber

2. On hot shoe FPC plate

e. Brown or red LW from Shutter unit

f. Black LW from PCV buzzer

3. On main change-over switch plate

g. Gray or black LW from Shutter

4. On shutter release switch plate (TV-PC plate)

h. Black from Main change-over switch plate

5. On body bottom face

i. Gray, Green, Red, Orange, Black, Black LWs ----- Six LWs

B. Procedure for disassembly

Arabic numeral in a circle indicates the procedure of disassembly.

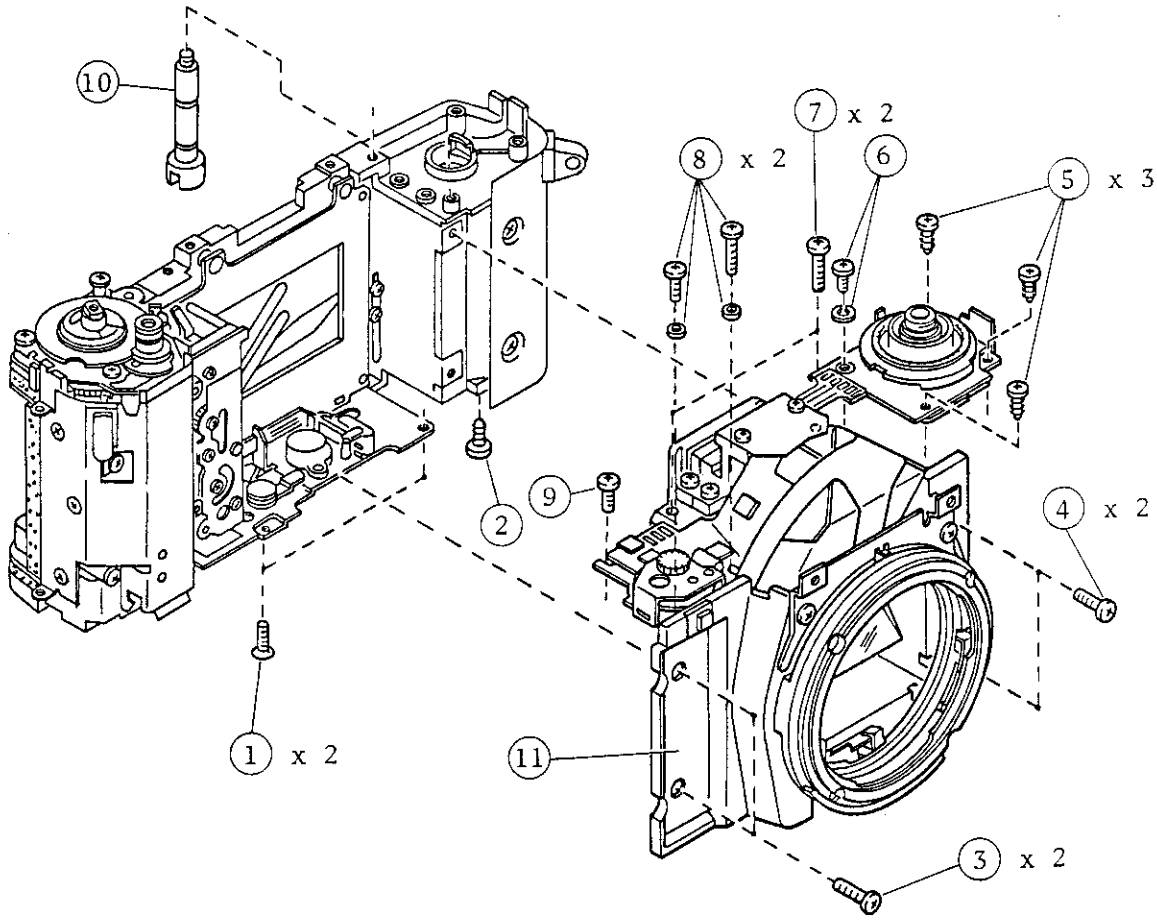


Fig. 1

2

INSTALLING, POSITIONING AND ADJUSTING

2-1 Installing top cover

A. Auto position for TV-dial

1. Set the (A) dot of the TV-gear as it will be right in front by turning it. (Fig. 2)

Note: Check that the only one LED will illuminate in the viewfinder in turning on the S1 SW.

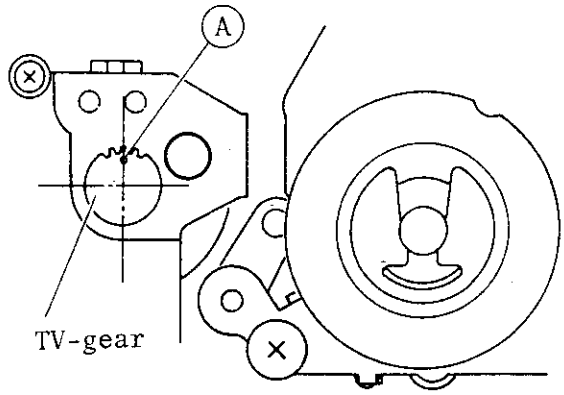


Fig. 2

B. Meshing position of TV-coupling gear (At Auto position)

1. Set the shutter dial of the top cover to "Auto". Then check the position of the (B) protrusion in backside of the top cover.

2. When the (B) is located as shown in Fig. 3, mesh the TV-coupling gear with the TV-gear as the U-shape notch of the TV-coupling gear faces right in front. (Fig. 4)

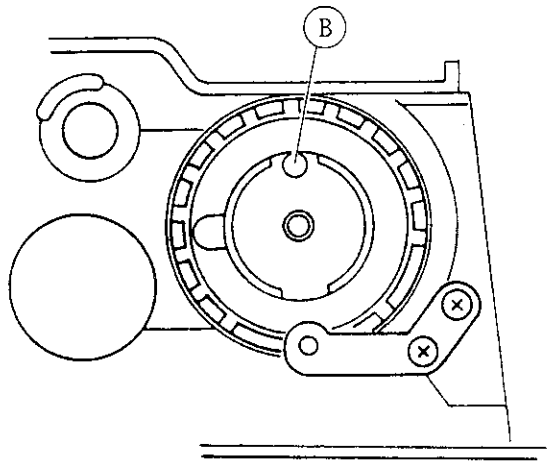


Fig. 3

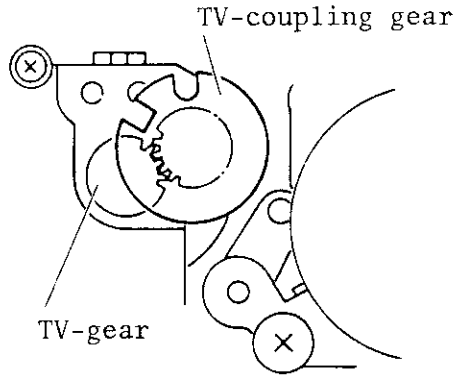


Fig. 4

Note: Be careful for the initial production top cover.
The (B) position at "Auto" will be located as shown in Fig. 5.
In this case mesh the TV-coupling gear with the TV-gear in facing the U-shape notch as shown in Fig. 6.

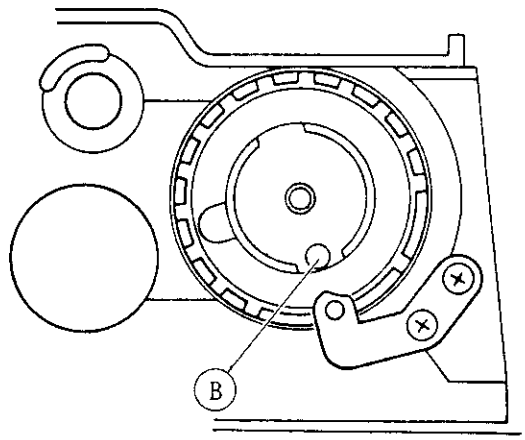


Fig. 5

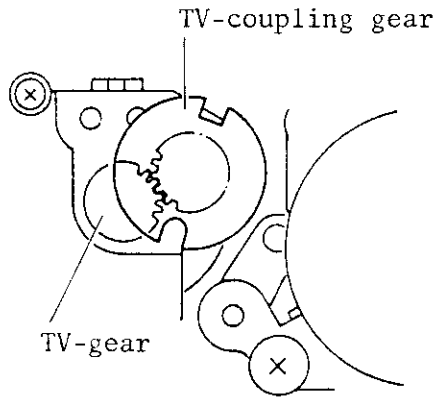


Fig. 6

3. Set the main change-over switch to "ON" position. (Fig. 7)

4. Put the top cover

Note: Do not pinch any leadwire.
Do not disengage the TV-coupling gear.

5. After tightening the fixing screws for the top cover, check the LED display in the viewfinder by turning the shutter speed dial clockwise and counter clockwise.
The LED display should correspond with indication of the shutter speed dial.

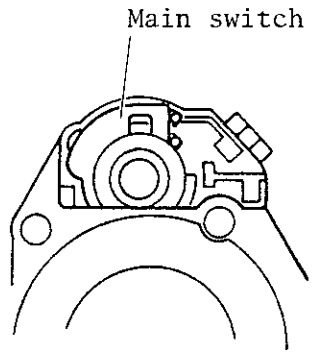


Fig. 7

6. If it does not correspond

a) Check and adjust the Auto-position upon referring to the above step #A and #B.

b) Mesh the TV-coupling gear by applying the other notch instead of the U-notch.

2-2 Adjustment of LED position in viewfinder

A. Check

Look in the viewfinder in facing the camera to bright sky or a fluorescent lamp and check the position of the LEDs.

1. Circle LEDs should not wane by edge of the finder frame, even if slightly.
2. The shutter speed indication figures and letters should not be covered by end of the LED-FPC.

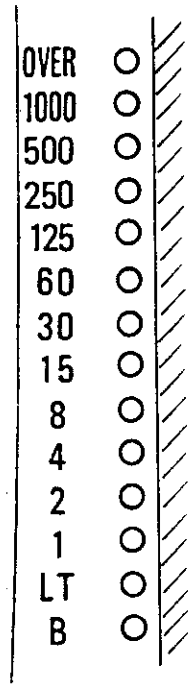


Fig. 8

B. Adjustment

1. Loosen the (A) two screws.
2. Adjustment is made by pulling or pushing the LED-FPC.
3. After adjusting tighten the two screws and apply DB-bond or some other adjesive to the line between the FPC and frame.

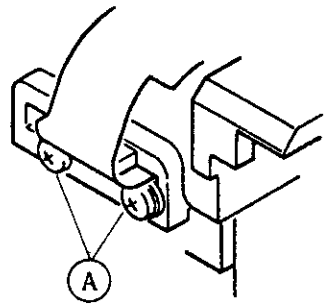


Fig. 9

2-3 F5-6 position of aperture arm

A. Engaging A-gear of A-PC plate

1. Confirm that the A-ring around the body bayonet ring has been returned completely by its spring tension..

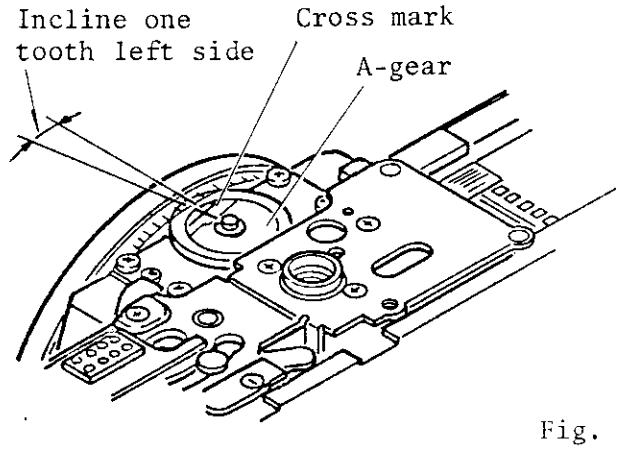


Fig. 10

2. Engage the A-gear with the A-ring as facing the cross mark in inclining one tooth left side from the center line.
   Then tighten the three fixing screws for the A-PC plate.

3. Attach the lens to the camera body and check smooth rotation of the A-gear by turning the lens aperture ring.

B. F5-6 position of aperture arm

B-1 Check and adjustment of the position by using EN-2 gauge.

1. Attach the EN-2 gauge to camera body.
2. Set the aperture ring to F5-6.
3. Release the mirror and keep it at top position.
4. Tip of the arm (A) should be within the F5-6 line width. (Fig. 12)

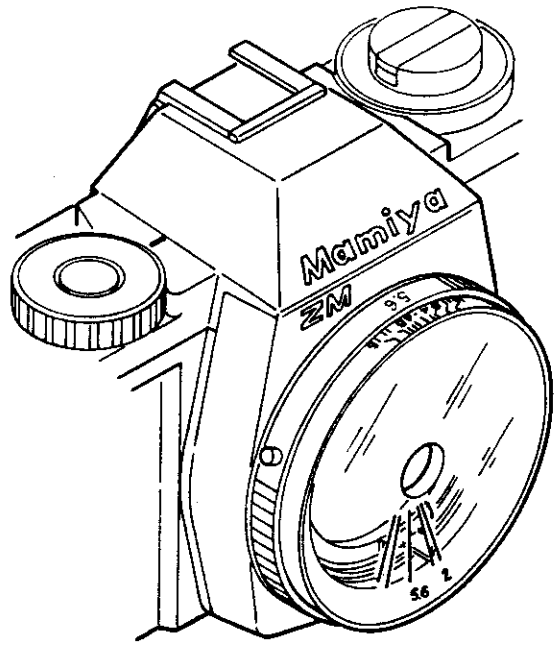


Fig. 11

B-2 Adjustment

Adjustment is made by moving the A-PC board after loosening its three screws. (Fig. 13)

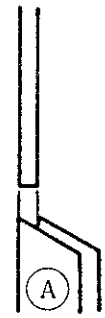


Fig. 12

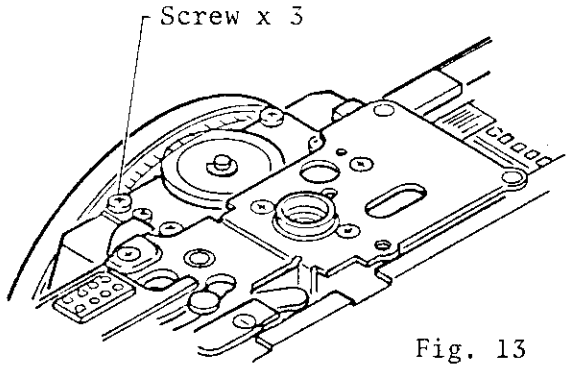


Fig. 13

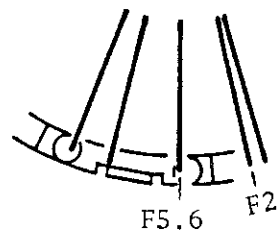


Fig. 14

2-4 Adjustment of release lever

1. Hold the film advance lever at maximum winding angle.
2. Insert the No. 5 screw driver into the (B) fork of the release lever and extend the fork by pushing the screw driver towards the lever (A).
3. Check

   The (A) lever should move slightly in condition with the above step #1 when being pushed in direction of the arrow. (Fig. 15)

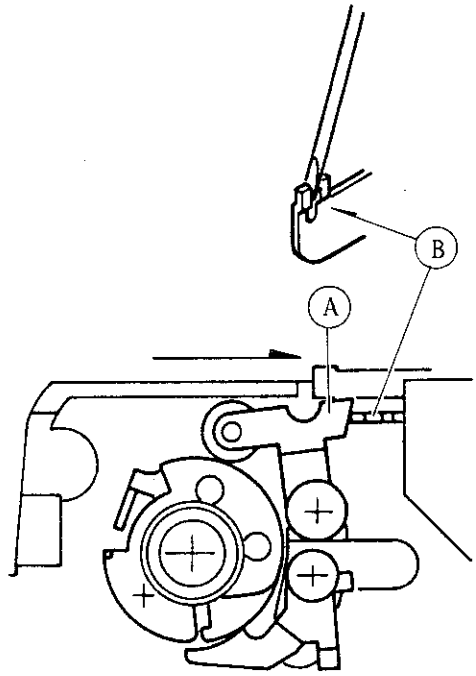


Fig. 15

4. Check of shutter release by the release lever.

a. Cock the shutter and mirror box by winding the film advance lever once.

b. Pull the film advance lever out until further winding is stopped by the (C) winding safety arm.

c. In the above condition, when the (B) release lever is pushed in direction of the arrow, the shutter should be released. (Fig. 16)

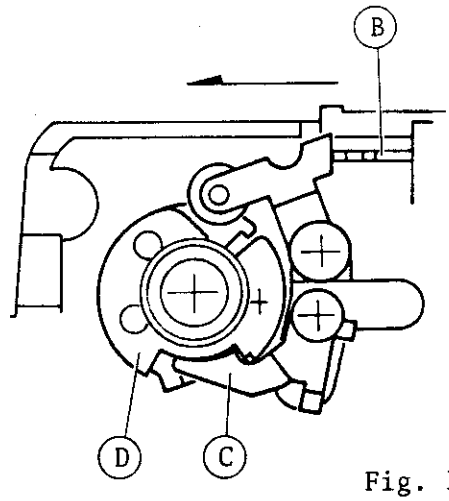


Fig. 16

2-5 Check and adjustment of BS103 switch

A. Check by ohmmeter

Connect the green and black leadwires from the BS103 switch with an ohmmeter and check ON/OFF function as follows;

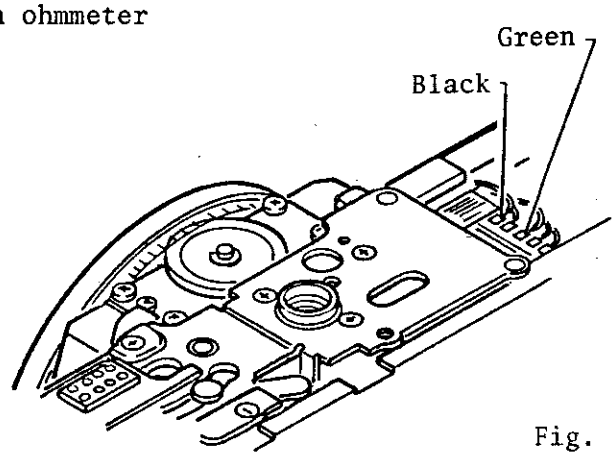


Fig. 17

1. ON

While the film advance lever is wound and returned, the BS103 switch should be maintained in a closed switch until the winding safety arm falls into the depression of the crank disk completely.

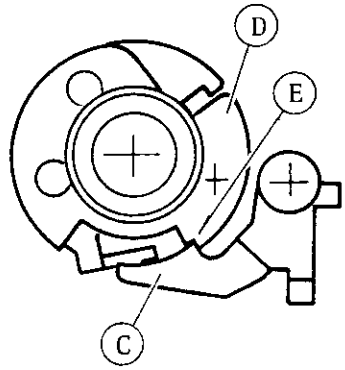


Fig. 18

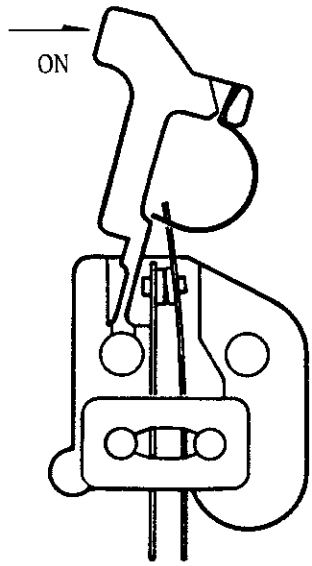


Fig. 19

2. OFF

Try to return the film advance lever slowly so as to check follows:

a. When the winding safety arm is engaged with the (E) notch of the crank disk, the BS103 switch should still be maintained in closed "ON". (Fig. 18, 19)

b. Further returning, when the safety arm reached to 0.5 mm distance from the bottom of the depression, the switch should be turned off. (Fig. 20, 21)

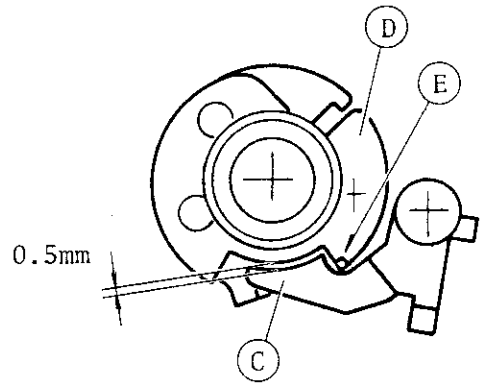


Fig. 20

B. Adjustment

1. Loosen the (F) fixing screw for the switch.

2. Insert a NO. 3 or 2 screw driver into the (F) hole and adjust the position of the switch base by the screw driver. (Fig. 22)

3. After adjusting tighten the (F) screw.

4. Recheck the ON/OFF switch function by the ohmmeter.

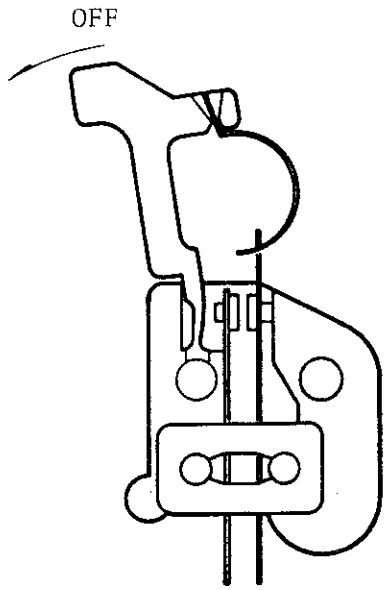


Fig. 21

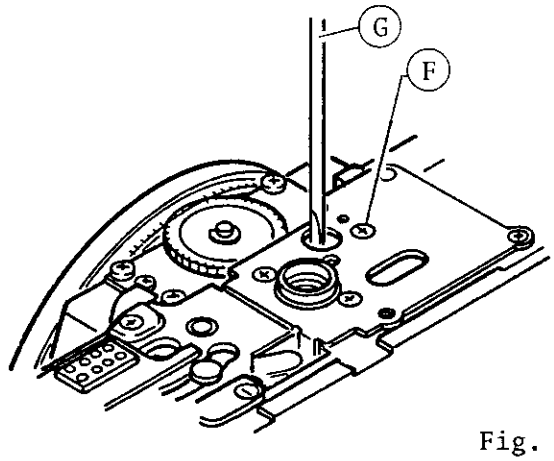


Fig. 22

C. Trouble shooting

Can not release the shutter when depressing the shutter release button.

Cause 1.

When the film advance lever is returned completely, the BS103 switch should be turned off.
However, the switch will be maintained closed condition without being turned off.
In this condition, when the shutter release button is depressed;

1) The LED in the viewfinder will illuminate.
2) A releasing signal for the R-Mg does not appear from IC2 when the S2 switch is turned on.

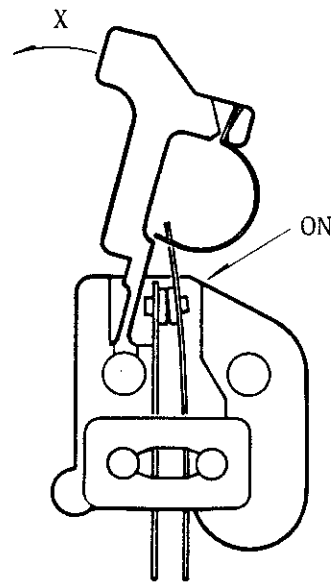


Fig. 23

Cause 2.

The BS103 switch function is OK.
You will notice appear of the releasing signal by the LED is put out when the S2 switch is turned on.
In this case weak spring tension of the (A) spring would cause for the shutter jam.

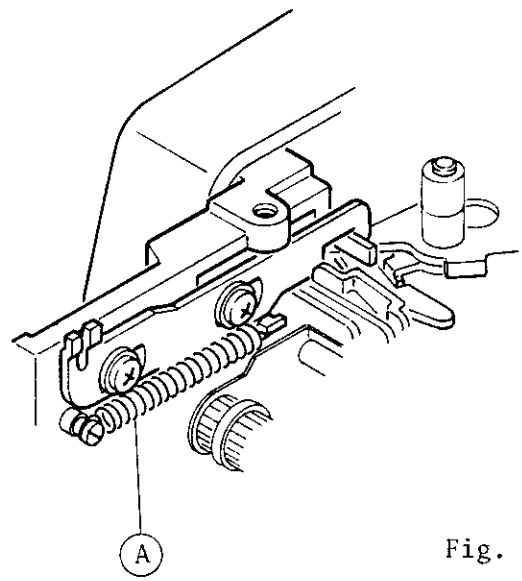


Fig. 24

Step 1.

Installing M1300-14951 leaf spring

1) Wind the film advance lever to turn off the BS103 switch.

2) Apply some adhesive to the shaded portion and install the leaf spring. (Fig. 25)

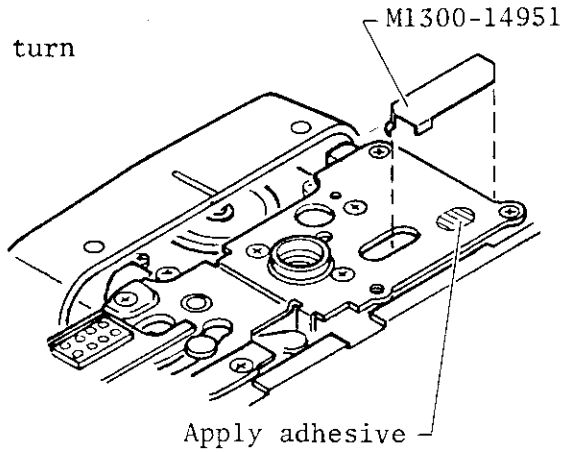


Fig. 25

Step 2.

Replacement of (A) release lever spring

1. Remove the M1300-1631T1 winder connector terminal. (Fig. 26)

2. Remove the (A) spring.

3. Slide the release lever in direction of the arrow. (Fig. 27)

4. Install the new spring (M1300-17332).

5. Check it by releasing the shutter several times.

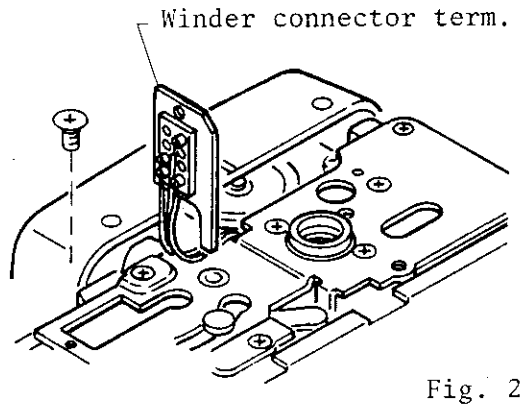


Fig. 26

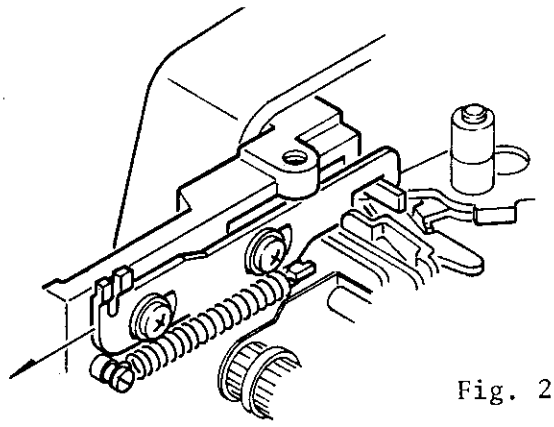


Fig. 27

Note: All cameras which have been shipped from URAWA Factory since NOV 1982 will bear the M1300-14951 leafe spring. It will be recognized by the Part Identification Number (P-ID NO.) which is 04 or lator P-ID NO. stamped in film chamber of the camera. The camera with 024 OR034 bears the leaf spring too. When stopping use of the leaf spring for any modification in the future, we are going to inform you soon.

2-6 Check and adjustment of AE, and manual shutter speed

A. Check and adjustment of AE

A-1 Check

1. Insert the battery cartridge into the camera body and attach the 50mm/F1.7 lens.
2. Set the aperture ring to F8 and the TV-gear to Auto position.
3. Set the main switch to "ON".
4. Set the ISO/ASA ring to 100.
5. Put the ZM-2 working top cover on the camera.
6. Check the K-value/1.3 and ISO/100 of the EE tester.
7. Set the camera to the EE-tester and check it by releasing the shutter.

A-2 Adjustment

Adjustment is made by carefully turning the VR5 AE level variable resistor.

B. Check of manual shutter speed

Check the shutter speed, 1/1000, 1/60 and 4 sec. by using the FL-400 type shutter speed tester.

AE mode

LV	LED	Buzzer	
12	60	No	± 1EV
9	8	1 Hz	
15	500	1 Hz	

ISO/100

Aperture/F.8

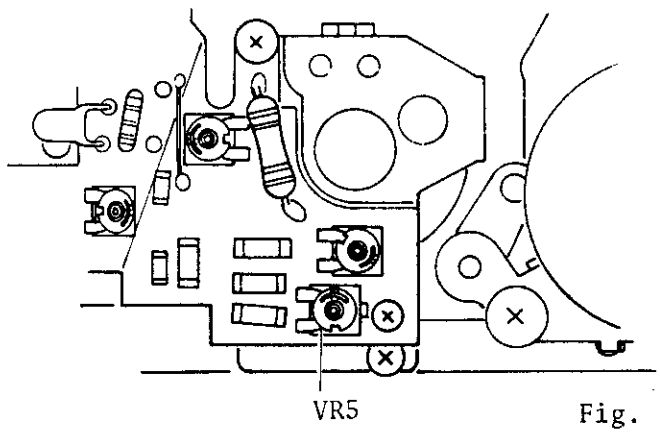
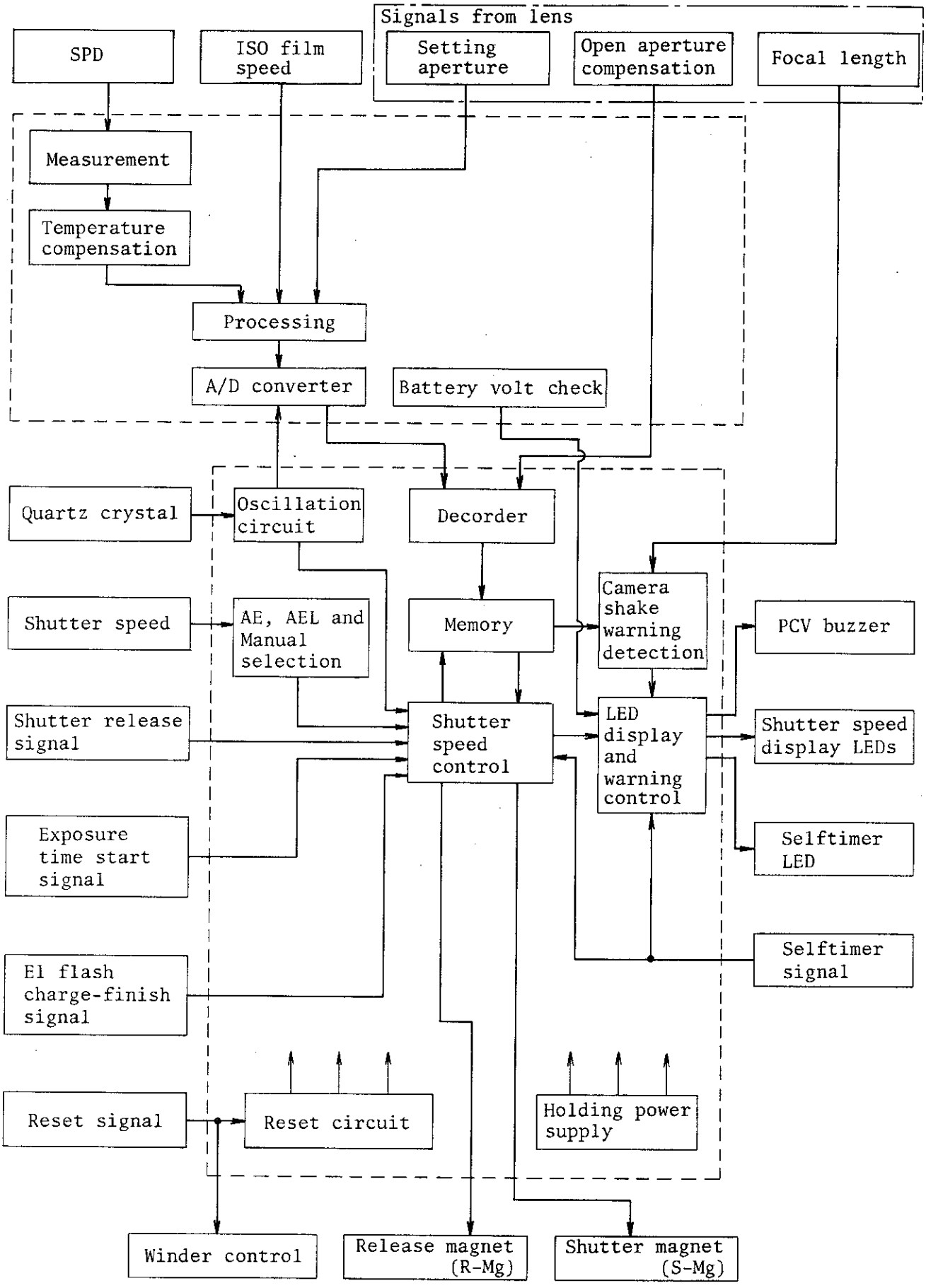


Fig. 28

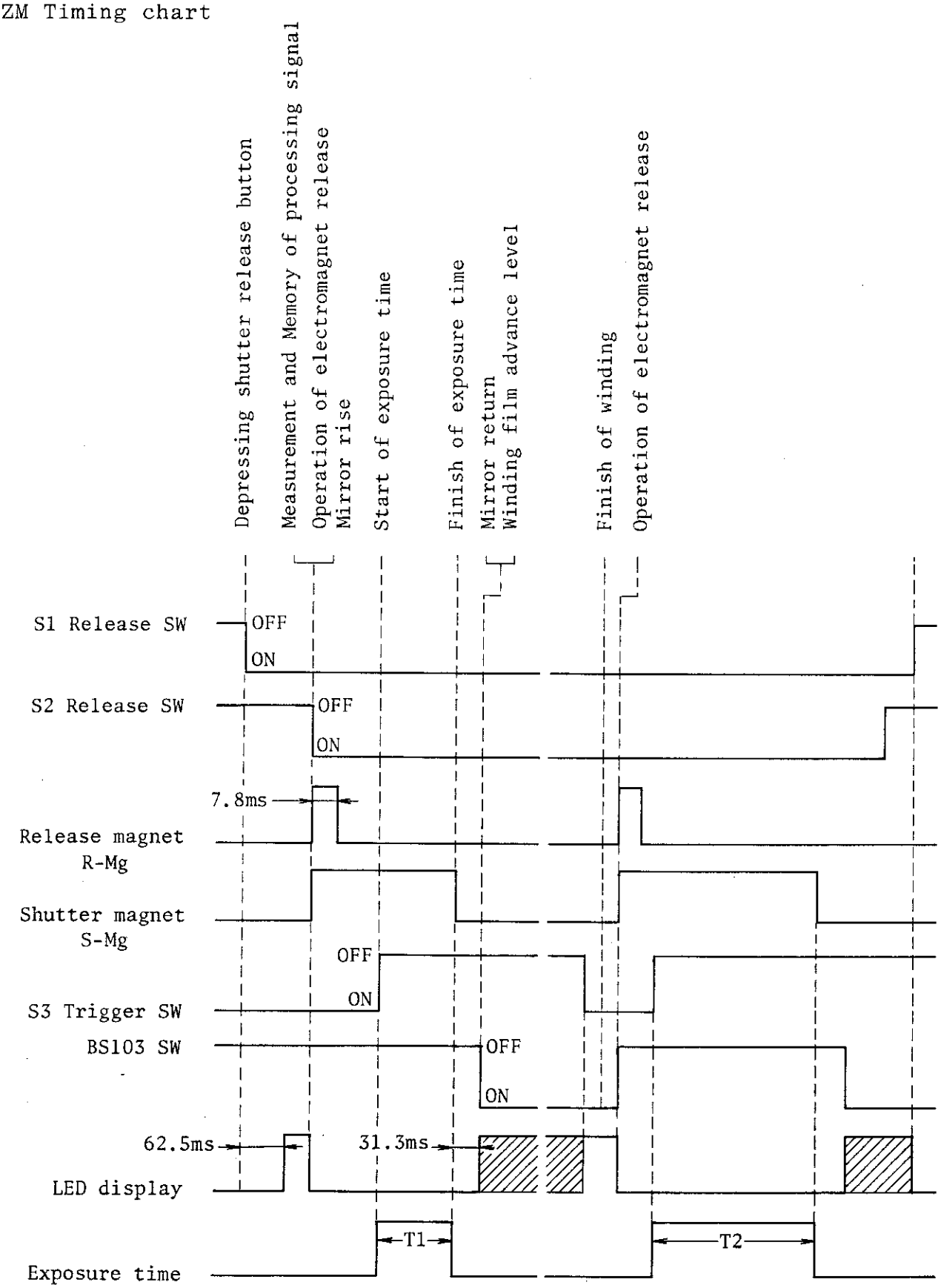
3

MECHATRONICS

ZM Operation diagram



ZM Timing chart



3-1 Outline of Mechatronics

1. Accumulating analog measurements (S1/ON)

   When the shutter release button is slightly depressed, the S1 switch is turned on.
   The circuit accumulates setting f/number, ISO-value, AVC (Lens maximum aperture value compensation) value and the subject brightness that is converted into an electronic signal by means of the SPD (Silicon Photo Diode) and IC1 (Bi-MOS IC) in a process analog.

2. A/D convertion and illumination of LED (S1/ON)

   The A/D (Analog/Digital) converter which works on by the pulse signal generating by the quartz oscilator converts the processed analog information into a digital information.
   This digital signal that is the proper exposure value goes into the decorder.
   Then the signal goes into the LED circuit to light up an LED.

3. Memory and R-Mg (S2/ON)

   When the S2 switch is turned on upon depressing the shutter release button further, the digitalized proper exposure signal is stored in the memory device in IC2.
   A signal will appear from the IC2 to feed current to the R-Mg circuit for 7.8 msec.
   The R-Mg which is the permanent magnet is momentarily neutralized. Simultaneously current flows into the shutter magnet circuit, so that the 2nd shutter blind is held.

4. Mirror rise and start of 1st shutter blind

When the R-Mg is neutralized momentarily, the (1) release lever is pulled in direction of the arrow by its spring tension. Therefore the (2) mirror latch is released and then the mirror rises up.
Continuously the (3) lever hits the 1st shutter blind start latch in the shutter unit (not shown in Fig. 29), so the 1st shutter blind runs.

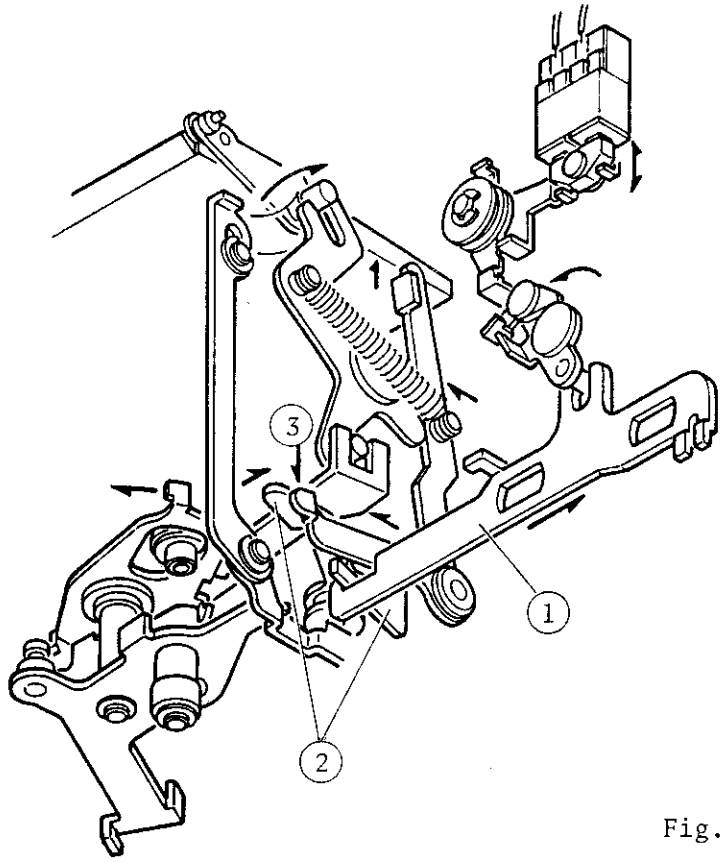


Fig. 29

5. Proper exposure time and LED display

Start of the 1st shutter blind turns off the S3 Trigger switch. By this switching the shutter exposure time control circuit begins to count the exposure time in corresponding with the given signal through the decoder.
When the exposure time count is finished, a signal from the IC2 goes into the S-Mg circuit to cut off current to the circuit. The S-Mg releases the 2nd shutter blind to close the shutter and then the proper exposure time is completed.
The LED display is locked in corresponding with the travelled shutter speed.

6. Mirror-return and circuit reset

When the 2nd shutter blind is closed, the (4) mirror-return rod is kicked by the (5) pin in shutter mechanism and the mirror returns to its viewing position.
Simultaneously the BS103 switch is turned on, so that every data in circuits are cleared for the next exposure sequence.

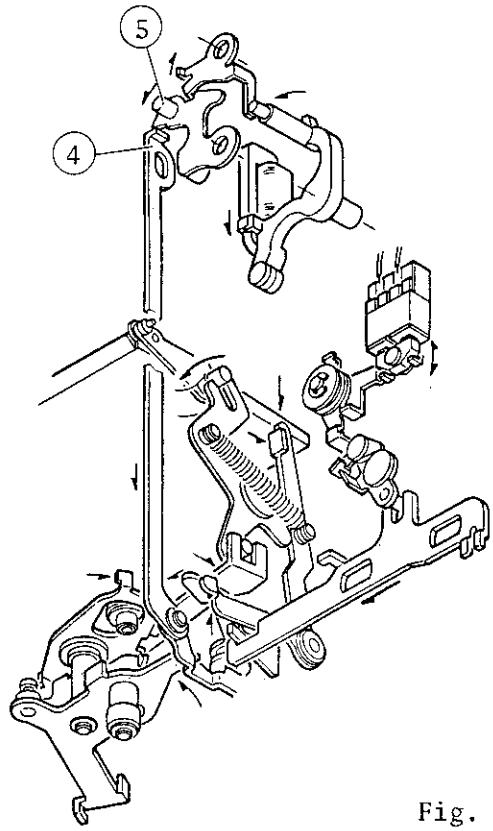


Fig. 30

7. Reset of LED display

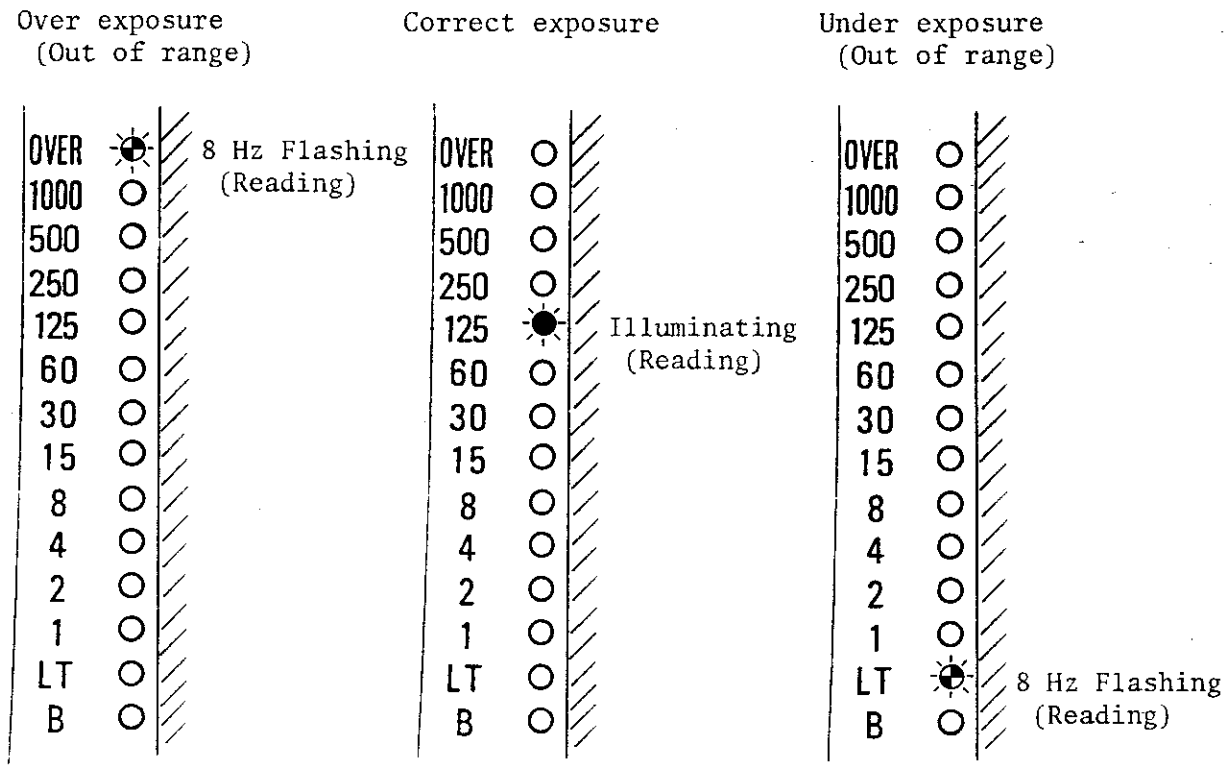
When the film advance lever approaches just before to the maximum winding position, the S3 Trigger switch is turned on and LED display which has been locked is reset for the next exposure sequence.
When the film advance lever is returned, the BS103 switch is turned off.
Then next shutter release can be possible.

8. AEL (AE-lock) and continuous sequence photography

When the shutter speed dial to "AEL" position, the exposure reading is stored 125 ms later upon turning on the S1 switch. All photographs in the continuous sequence photography will be exposed at the first setting exposure value (aperture and shutter speed).

3-2 LED display in viewfinder

1. When the shutter speed dial is set to "Auto" or "AEL":

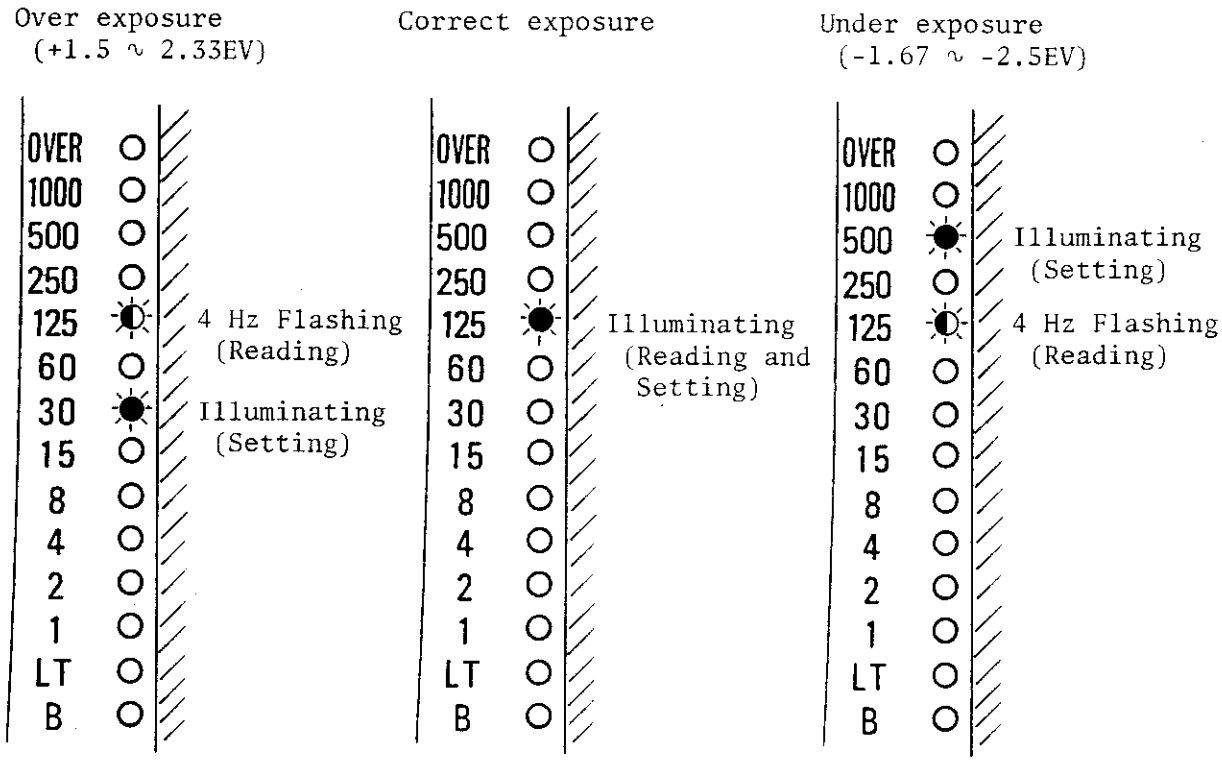


a. The "Over" LED flashes and the buzzer sounds at 8 Hz to indicate overexposure.

b. The "LT" LED flashes and the buzzer sounds at 8 Hz to indicate underexposure.

c. If any of the shutter speed LEDs flash at 2 Hz and the PCV buzzer sounds, this is an indication that the batteries are low and should be replaced.

2. When shutter speed dial is set to manual mode:

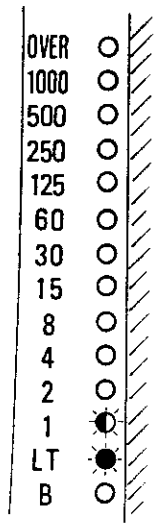


a. An LED flashes at 4 Hz to indicate the appropriate shutter speed for the aperture setting. The exposure should be adjusted on this basis.

b. If the set LED flashes at 2 Hz, this indicates that the battery voltage is under 2.3 volt and should be replaced.

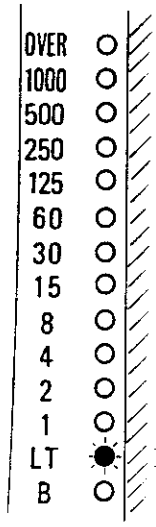
Note: The PCV buzzer does not sound at the manual mode.

Over exposure
(+0.5 ∿ +1.33EV)



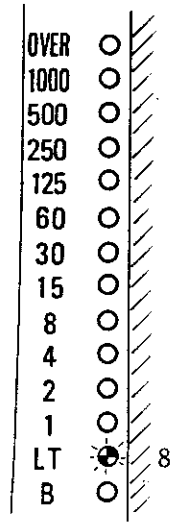
4 Hz Flashing
(Reading)
Illuminating
(Setting at
2 sec)

Correct exposure



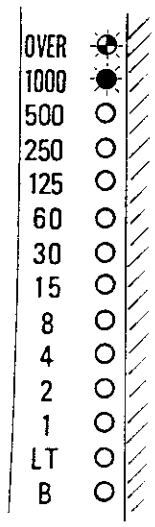
Illuminating
(Setting and
Reading)

Under exposure
(Over -1.17EV)



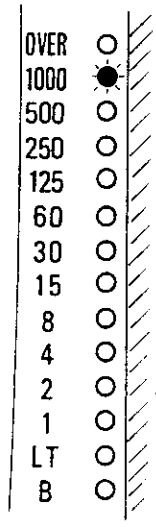
8 Hz Flashing
(Reading and
Setting)

Over exposure
(Over +0.17EV)



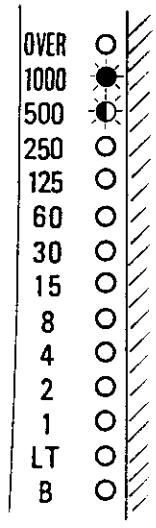
8 Hz Flashing
(Reading)
Illuminating
(Setting)

Correct exposure



Illuminating
(Reading and
Setting)

Under exposure
(-0.67 ∿ -1.5EV)



Illuminating
(Setting)
4 Hz Flashing
(Reading)

c. When the reading LED illuminates at "Over" or "LT", the LED flashes at 8 Hz.

d. If the set LED flashes at 2 Hz, this indicates that the battery voltage is under 2.3 volt and should be replaced.

3. EF mode, with Mamiyalite ZE or MZ

a. At "Auto" or AEL mode:
The LED display will shift automatically to 1/60 sec. as soon as the flash is fully charged.

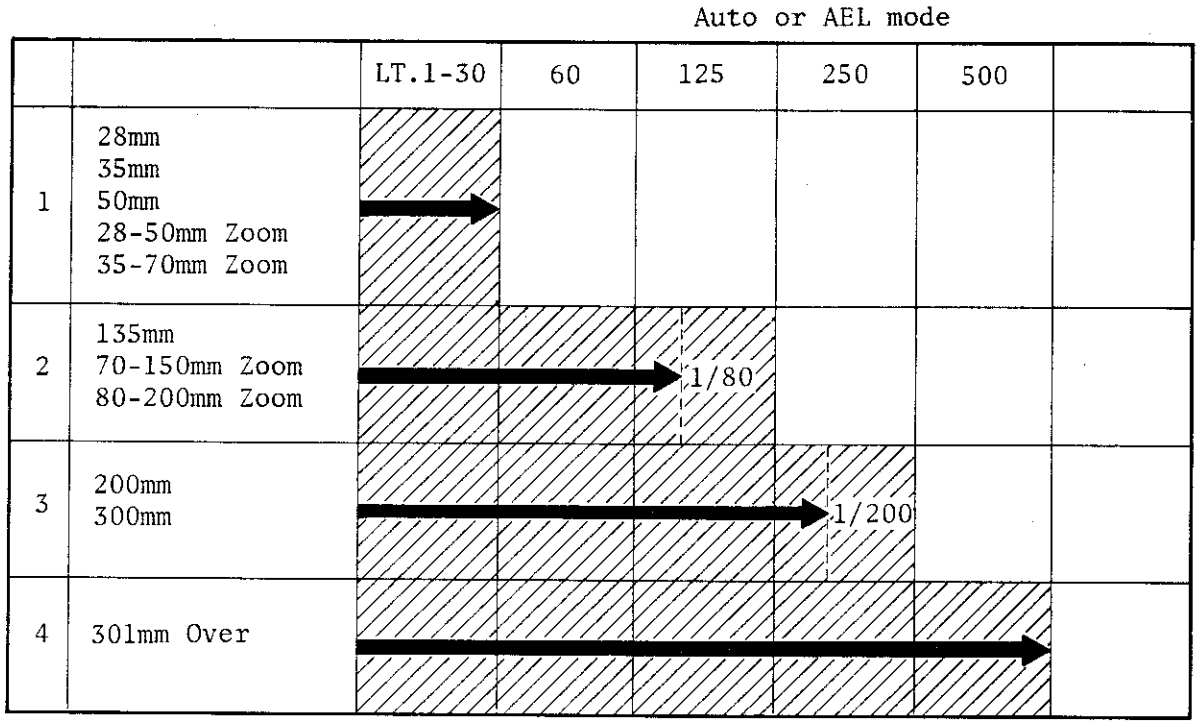
b. At manual mode:

1) When the shutter speed dial is set between 1/1000 and 1/125 sec., the LED display will shift automatically to 1/60 sec. as soon as the flash is fully charged.

2) When the dial is set between 1/60 and 2 sec., the shutter will be released at the selected speed.

3-3 Threshold of camera shake warning based on the focal length of the lens

When the shutter speed automatically selected by the camera in the "Auto" and "AEL" modes is too slow for hand-held shooting, the PCV buzzer will sound at 1 Hz warning you.



Note: As threshold of hand-held shooting will be 1/80 ^{sec} for the above #2 group lenses, the buzzer will not sound always at 1/125 ^{sec}.

3-4 Each switch function

Switch		ON/OFF	Function · Remarks
Power supply SW S0		ON	1) Current flows into only quartz oscillator circuit. [1 μA]
		OFF	2) Shutter release is electrically locked.
EL-Mg Release	S1 SW	ON	1) 1st trip of shutter release button 2) Measurement, process and Illumination of LED
	S2 SW	ON	3) 2nd trip of shutter release button 4) Start of operation 5) S-Mg - Energized
Trigger SW S3		OFF	1) Start of exposure time 2) Reset of LED display 3) S3 is in shutter unit.
BS103 SW S4		ON	1) Reset of Circuit 2) Start of Winder
		OFF	3) Shutter release - possible
Selftimer SW S5		ON	1) Operation of selftimer at S2-ON
Power times SW S6		ON	1) S6 - In IC2 2) With manual shutter speed settings, the LED remains lit for 10 seconds after the S1 is turned on and then turned off.

3-5 Variable resistors

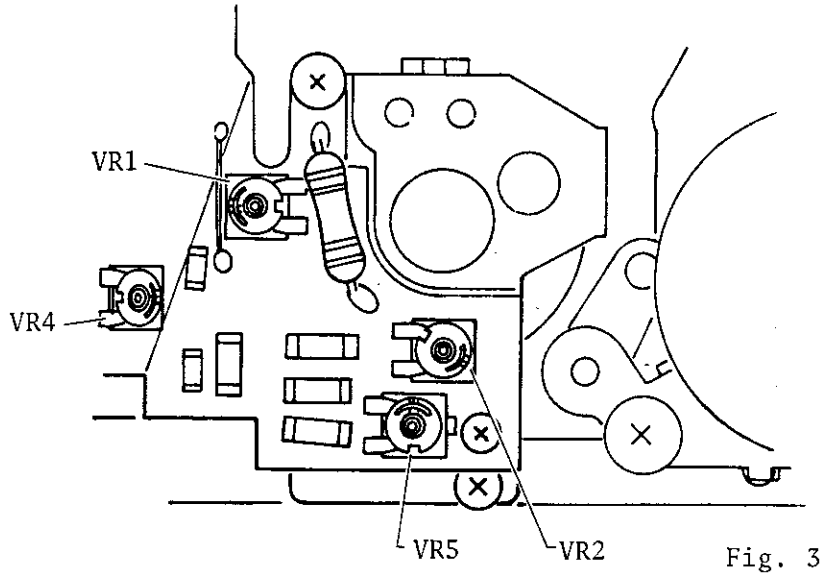


Fig. 31

1. VR1 : VBS Step voltage for brightness signal
   (Factory adjustment)
2. VR2 : VK Reference voltage for input signal for ISO, f-number etc.
   (Factory adjustment)
3. VR4 : VAD A/D Conversion reference voltage
   (Factory adjustment)
4. VR5 : For Shutter speed adjustment
   * Correspond the shutter speed signal voltage with shutter speed time.

3-6 Check of reference voltage

		Connection of DCV tester		Output	Adjust by
		(+)Red term	(-)Black		
1	Reference volt. Vg	IC1-42 pin	GRND	1.15 ∿ 1.45 [V]	
2	Operation standard VR	VR-term. on STV PC plate	GRND	1.0 ∿ 1.20 [V]	
3	Input signal standard VK	VK-term on STV pc plate	VR-term	153 ± 5 [mV]	VR2
4	A/D conversion standard VAD	VAD-term	VR-term	288 ± 5 [mV]	VR4

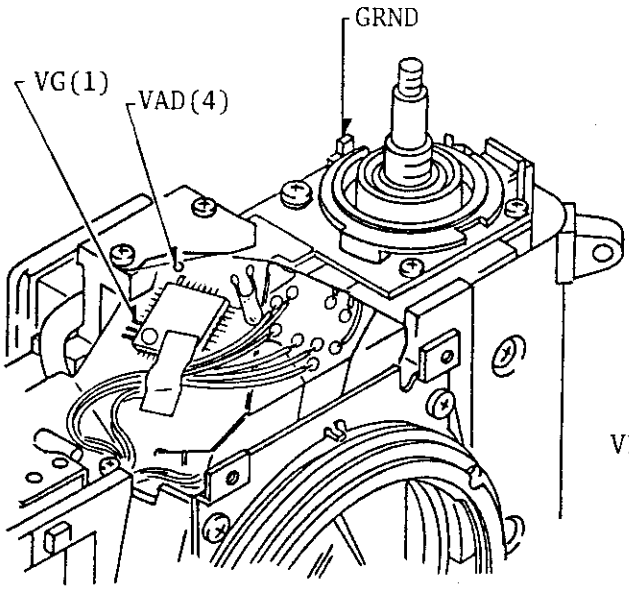


Fig. 32

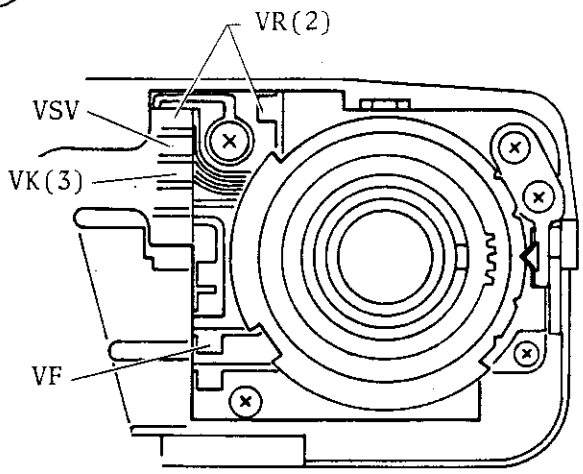


Fig. 33

3-7 Check of output signal

1. Output volt for brightness (VBV)

DCV-Tester
(+) Red-term ---- BVB or VBM (See Fig. 34)
(-) Black-term -- VR

[mV] Approx.

EV	VBV-Output	VBM-Output
15	-106	+106
14	-124	+124
12	-160	+160
9	-214	+214
7	-250	+250

Temp = 25°C
18mV/Per EV

2. Output volt for A-PC plate resistance (VF)

DCV-Tester
(+) Red-term ---- VF (See Fig. 35)
(-) Black-term -- VR

[mv] approx.

Aperture	VF-Output
16	135
5.6	81
1.7	18

With f1.7 lens

Note: Based on VK 153mV
18mV/Per EV

3. VSV output voltage for SV PC plate resistance

(+) Red-term ---- VSV (See Fig. 35)

DCV-Tester

(-) Black-term -- VR

[mV] Approx.

ISO	SVS-Output
50	112.5
100	94.5
200	76.5
400	58.5

Note: Based on VK voltage
153 mV
18mV/Per EV

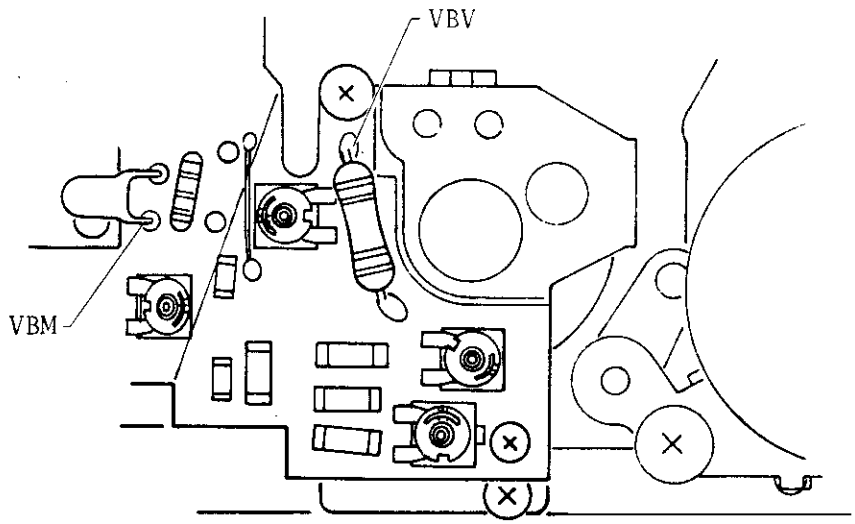


Fig. 34

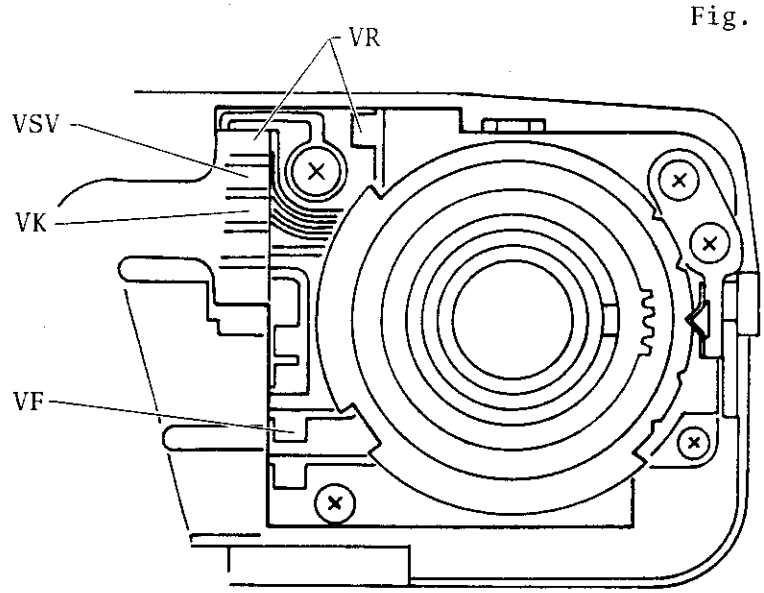


Fig. 35

3-8 Check of shutter circuit

	DCV-Tester connect.		
	(+) Red-term	(-)Black	
S-Mg	White LW point from S-Mg	GRND	1) Before releasing shutter --- 3 V 2) While shutter operates --- 0 V (Check it in slow shutter)
Trigger SW S3	Yellow LW point from Trigger SW	GRND	1) After winding --- 0 V 2) After releasing shutter --- 1.2 V (With Digital Tester)

Note: Please refer to the wiring diagram for white and yellow leadwire points on the FPC board.

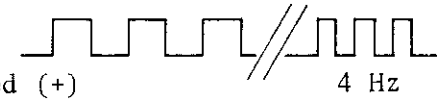
Trouble shooting

1) If the S-Mg is defective, slow shutter speed will be faster.
2) If the yellow leadwire of the Trigger SW is not insulated well, shutter will be always open upon releasing shutter.
3) If the trigger SW is not turned on after winding, releasing shutter will be impossible.

3-9 Check of selftimer circuit and R-Mg

1. Selftimer circuit

Main SW:ST S1:ON

DCV-Tester connect.		Output
(+) Red term	(-) Black	
Red LW point from PCV buzzer	GRND	Buzzer  Red (+) 4 Hz 2 Hz (8 sec) (Last 2 sec)

Note: Please refer to the wiring diagram for the red leadwire point on FPC board.

Trouble shooting

1) Selftimer operates and releasing shutter is possible, but the PCV buzzer does not sound.
   * Check short circuit of the red leadwire.

2) Selftimer does not operate.
   * Check contact efficiency of the selftimer-switch brush.

2. Check of R-Mg unit

(+) Red-term ---- Pink LW

Ohmtester

(-) Black-term -- Blue LW

The tester should indicate approximately 20 Ω.

Trouble shooting

If the tester indicates ∞Ω, no continuity, the R-Mg should be replace with new one for its coil broken.

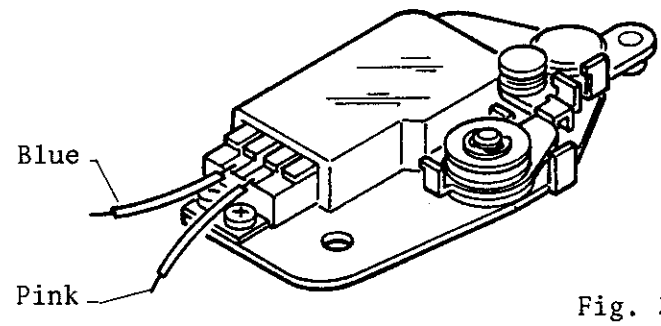


Fig. 36

3-10 Battery-check voltage and power cunsumption

A. Battery-check voltage

A-1 In case of setting shutter speed dial to "Auto" or "AEL";
If the batteries capacity falls below 2.3 Volt, any of the shutter speed LEDs will flash at 2 Hz and the PCV buzzer will sound.

A-2 In case of setting shutter speed dial to "M";
If the batteries capacity falls bellow 2.3 Volt, any of the LEDs will flash at 2 Hz, but the buzzer will not sound.

B. Power consumption for circuit

1. Wire the ZM-3 dummy battery, Tester and 3 Volt Power supply as shown in Fig. 37.

2. Insert the dummy battery into battery chamber of the the camera body.

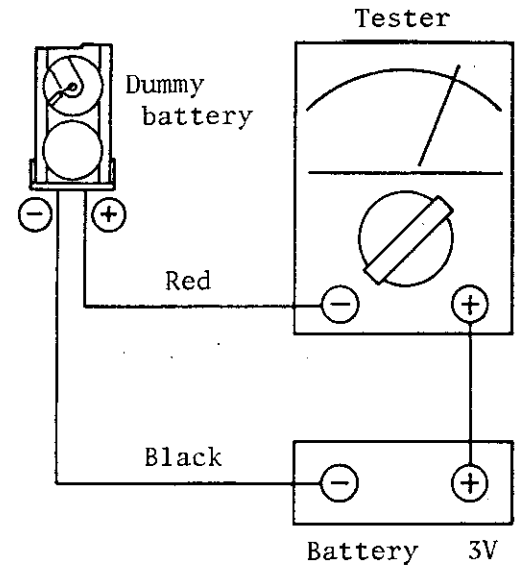


Fig. 37

3. Power consumption should be as follows;

S0:ON

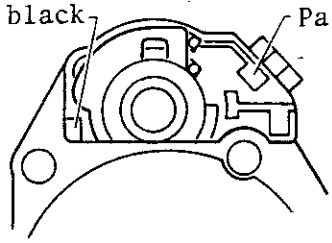
S1 SW	Power consumption
OFF	Under 10 μA, Current flows only quartz oscilation circuit.
ON	Under 10 mA, LED illuminates

4

TROUBLE SHOOTING

4-1 LED does not illuminate when S1 is turned on

Orange LW point on PFC board ═ GRND
Output: Approx. 3.0V

1	Poor contact efficiency of the batteries	Strengthen leaf spring for battery chamber.
2	Short circuit of orange LW.	
	Main change-over SW ---- Poor contact or dirty surface of PC plate	Gray or black, Pale blue  Fig. 38 Orange LW point Pale blue LW and Gray LW point Output: Approx. 3.0V
4	Gray or black LW from shutter ---- Cold solder or broken.	

Purple LW point on FPC ═ GRND
Output: Approx. 3.0V
When S1 is turned on, it should be ON.

5	Looseness of fixing screws of TV-PC plate a. If (A) screw is loose, 3.0V output will not appear. It will cause for dim LED or nonillumination. b. Check also looseness of (B) and (C) screws.

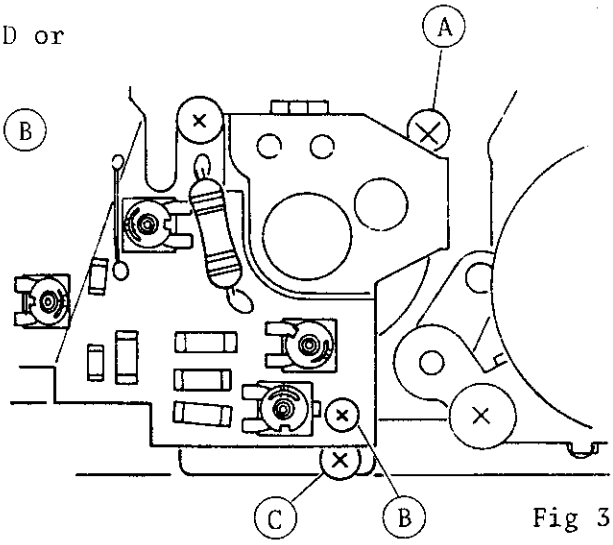
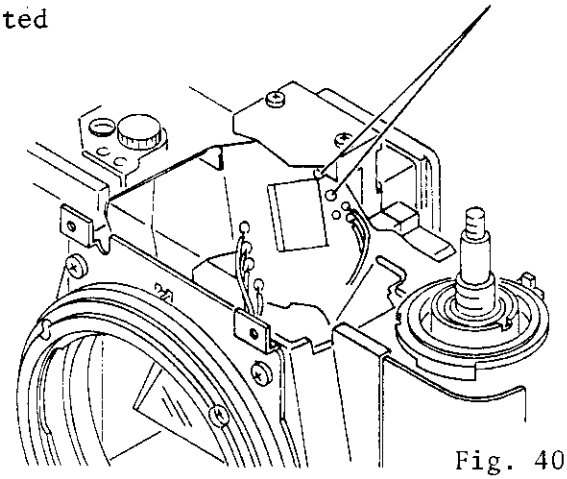


Fig 39

6	Contact efficiency of S1 SW.
	When the two points are connected with tweezers as shown in Fig. 40, every LEDs including S-T LED illuminate, but LEDs do not illuminate with S1 SW turned on without connecting the two points.  Fig. 40
7	IC2-44 and 45 pins --- Cold solder
8	QZ --- Cold solder or defective

4-2 Shutter runs in only faster speed like 1/400 sec.

(But LED lights up at setting shutter speed.)

S1 ON	White LW point from S-Mg ═══ GRND Output: Approx. 3.0V It will be 0V upon releasing shutter.	
1	Orange and White LWs --- Cold solder	When the shutter is released in grounding white LW point, shutter should open.
2	S-Mg coil --- Broken	
3	Red LW and Orange LW --- Short	
4	TR5 --- Cold solder or defect	

4-3 Shutter always opens just like "Bulb".

S1 ON	White LW point from S-Mg ═ GRND Output: Approx. 3.0V
1	White LW --- Short
2	Yellow LW point from trigger ═ GRND Approx. 1.3V output should appear upon releasing shutter.
3	Yellow LW --- Short
4	Trigger SW function --- Malfunction
5	Shutter unit --- Malfunction

4-4 Shutter runs when S1 switch is turned on.

S1. 2 OFF	Green LW point on FPC board ═ GRND Output: Approx. 3.0V
1	Green LW --- Short, Green and Black LW on CR-PC plate --- Short
2	Green and Purple LWs --- Short
3	Contacts of S1 and S2 and CR SW contacts --- short
4	IC2-34, 35 pins --- Short

4-5 Shutter does not operate, but LED puts out when S2 SW is turned on.

<table>
<tr><td>S1
ON</td><td colspan="2">Blue LW point ═ GRND
Output: Approx. 3.0V</td></tr>
<tr><td>1</td><td colspan="2">R-Mg coil --- Broken, See Text 3-9∿2</td></tr>
<tr><td>2</td><td>Pink and Blue LWs
--- Cold solder or
broken</td><td rowspan="2">Try to release shutter in grounding blue LW.
If shutter runs, they will be OK.</td></tr>
<tr><td>3</td><td>C6 (47 μF), R13 (1 KΩ)
--- Cold solder or defe
defect</td></tr>
<tr><td>4</td><td colspan="2">DB contact and shutter unit --- Short</td></tr>
<tr><td>5</td><td colspan="2">TR4, R14 (1 KΩ) --- Cold solder or defect</td></tr>
</table>

4-6 Shutter does not operate and LED does not put out when S2 SW is turned on.

S1 ON	Yellow LW point from Trigger ═ GRND Output: After winding 0V
1	Trigger SW --- Poor contact efficiency
2	Yellow LW --- Cold solder or broken
3	BS103 SW. --- Not turned off after winding (See Text 2-5)

4-7 Manual shutter speed is inaccurate.

PT (Power Timer) does not operate.

<table>
<tr><td>S1
ON</td><td colspan="2">IC2-40 pin ═══ GRND
Output: 0V at "M" mode
: Over 1V at "Auto" or "AEL"</td></tr>
<tr><td>1</td><td colspan="2">IC2-40 pin --- Cold solder</td></tr>
<tr><td>2</td><td>TV-PC plate --- Dirty</td><td rowspan="3">Wipe surface of PT-pattern with mixture (alcohol and ether).</td></tr>
<tr><td>3</td><td>Brush --- Contact efficiency</td></tr>
<tr><td>4</td><td>TV-PC plate --- Defect</td></tr>
<tr><td>5</td><td>IC2-36 ∿ 39 pin
--- Cold soldering</td><td>If the shutter speed is accurate at "Auto" mode, they will be no problem.</td></tr>
</table>

Note: Wipe and clean up surface of each pattern with the mixture.

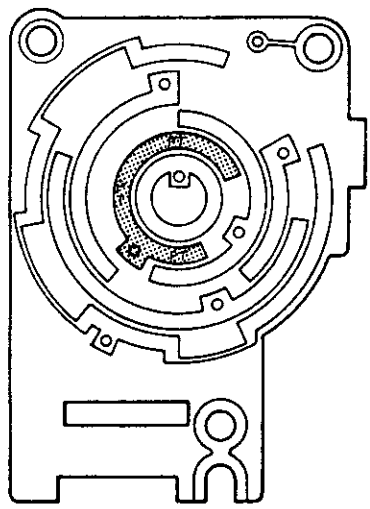


Fig. 41

4-8 Adjusting AE is impossible

* 50 mm/F1.7 lens, ISO/100, LV12, f5.6

S1 ON	Check VK output 153 ± 5 [mV] in referring to Text "3-6∿3".	
1	IC1-42 pin ═ GRND Output: Approx. 1.27V	Cold solder?
2	IC1-41 pin ═ GRND Output: Approx. 1.0 ∿ 1.2V	VR2 and R3 --- Cold solder?
3	Check VR output 1.2 ∿ 1.2V in referring to Text "3-6∿2".	IC1-40 pin --- Cold solder?
4	IC1-37 pin, R21 and R4 --- Cold solder	
S1 ON	Check VBV output Approx. -150 ∿ -170 [mV] by referring to Text "3-7∿1".	
5	IC1-8 and 10 pin --- Cold solder	
6	SPD --- Cold solder or defect	
7	Check VBM output approx. 150 ∿ 170 [mV] by referring to Text "3-7∿1".	
8	Try to adjust by VR1	
9	R1 and R2 --- Defect	
S1 ON	VR5-A term. ═ VR Output: Approx. 40 ∿ 80 mV upon turning VR5	
10	R7 and R8 --- Cold solder or defect	
11	VR5 --- Defect Replace VR5	

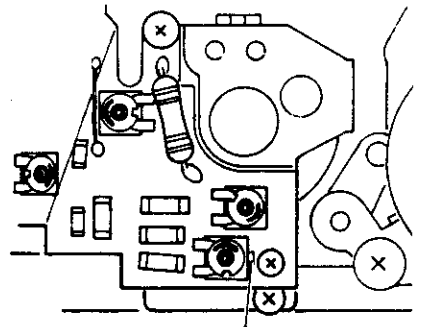


Fig. 42

S1 ON	Check VSV output approx. 85 ∿ 105 [mV] by referring to Text "3-7∿3".
12	SV-PC plate --- Defect
S1 ON	Check VF output approx. 68 ∿ 88 [mV]
13	A-PC plate --- Defect

4-9 It does not compensate maximum aperture value

S1 ON	Lens signal transmitting pin 11 pin ═ 10 pin 9 pin ═ 10 pin Output: Approx. 1.3V over
1	Springs of pins --- Broken or dirty FPC pattern --- Dirty
2	IC2-31 and 33 pin --- Cold solder

4-10 Camera shake warning device does not operate

S1 ON	Lens signal transmitting pin 6 pin ═ 7 pin 8 pin ═ 7 pin Output: Approx. 1.3V over
1	Spring of pin --- Broken or dirty FPC pattern --- Dirty
2	IC2-29 and 31 pin --- Cold solder

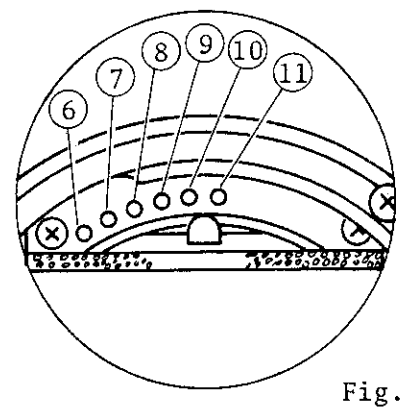


Fig. 43

4-11 When camera shake warning buzzer sounds, three LEDs will illuminate at once

1	Keep red LW of PCV buzzer away from folded FPC belt for SPD.

4-12 LED illuminates without pressing S1 SW

S1 OFF	Purple LW point ═ GRND Output : Approx. 3.0V
1	Purple LW --- Short
2	Contact of CR SW or S1, S2 SW --- Short

4-13 LED does not change when ISO or aperture ring is turned.

1	Is not TV plate set to "AEL" position?
2	TV-plate brush --- Damaged TV-plate pattern --- Dirty
3	Check VF and VSV output by referring to Text "3-7∿2, 3-7∿3".

4-14 Batteries capacity is OK, but otherwise LED flashes at 2 Hz.

When its voltage drops to 2.3 volt, LED does not illuminate

S1 ON	Check VR output 1.0 ∿ 1.2 [V] by referring to Text "3-6∿2".	
1	VR2 and R3 (10 KΩ) --- Cold solder or broken	Adjustment of VK output is required after replacing VR2.
2	IC1-30 pin --- Cold solder	

4-15 LED will not shift to 1/60 sec as soon as the Mamiyalite is fully charged.

S1 ON	Hot shoe charge signal term ═ GRND Output: Approx. 1.3V over
1	Hot shoe charge-signal pin and hot shoe FPC --- Poor contact efficiency
2	Hot shoe earth plate and hot shoe FOC plate --- Poor contact efficiency
S1	Brown LW point ═ Black LW point Output: Approx. 1.3V over
2	Brown and black LW --- Cold solder or broken
	IC2-11 pin --- Cold solder

4-16 LED flashes at only "OVER or LT"

S1 ON	IC1-6pin or 25 pin ═ GRND Output: Approx. 3.0V
1	R9 (5.1 KΩ), TR1, IC2-19 pin --- Cold solder or defect
S1 ON	IC2-42 pin ═ GRND Output: Approx. 1.25V
2	Looseness of fixing screw for FPC board
3	IC1-39, 17 pin --- Cold solder
4	C4 --- Defect

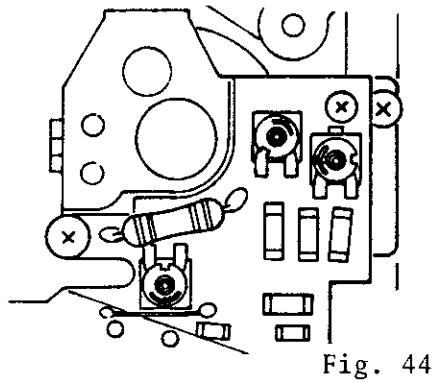
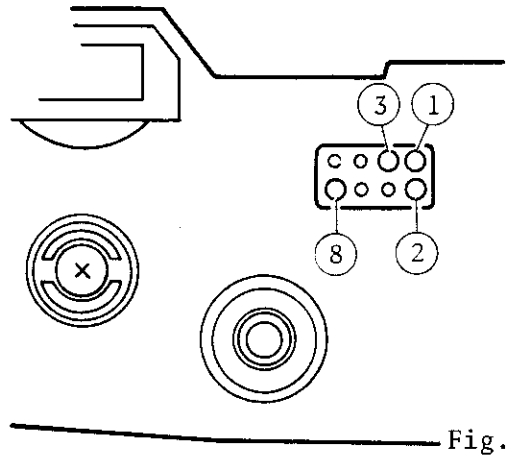


Fig. 44

S1 ON	Check VR and VK output by referring to Text "3-6∿2" and "3-6∿3".
5	VR2, R3, R4 and R21 --- Cold solder or defect
6	White LW point and black LW point on SV-PC plate --- Short
7	IC1-37, 38 and 40 pin --- Cold solder
S1 ON	Check VSV-ISO 100 output Approx. 94.5 mV by referring to Text "3-7∿3".
8	SV-PC plate brush --- Poor contact efficiency SV-PC plate --- Defect
S1 ON	Check VF output approx. 81 [mV] of F5.6 by referring to Text "3-7∿2".
9	A-PC plate brush --- Poor contact efficiency
10	White, Green and Yellow LWs --- Cold solder or broken

S1 ON	IC1-23 pin ═ VR Output: Approx. 40 ∿ 80 [mV]
11	R7, R8 and VR5 --- Cold solder or defect
S1 ON	Check VBV and VBM output for EV12 by referring to Text "3-7∿1".
12	SPD --- Defect
13	IC1-8 and 9 pin --- Cold solder
14	R1, R2 and VR1 --- Cold solder or defect
15	IC1-4 and 5 pin --- Cold solder
S1 ON	Check VAD output 288 ± 5 [mV] by referring to Text "3-6∿4"
16	VR4, R6 and R5 --- Cold solder
17	IC1-33, 34, 29, 28, 27, 26, 24 pin IC2-16, 17 pin and C5 --- Cold solder

4-17 Winder does not operate

1	Check BS103 SW. function by referring to Text "2-5".
2	Check it by using a DCV texter in releasing the shutter as follows; Connection of DCV test term (+) Red (-) Black 1, 2, 3 — 8 : Tester indicator does not move. 8 — 1, 2, 3 : Indicator moves slightly.  Fig. 45
3	Red, orange and black LWs for winder connector --- Cold solder or broken
4	TR6, R19 and D2 --- Defect

4-18 Battery capacity drops quickly

1	Check power consumption for circuit by referring to Text "3-10∿13".
2	Orange, pink, blue and white --- Short
3	TR1 ∿ 5, C6 and C13 --- Defect

4-19 Selftimer does not operate and also S-T LED does not illuminate

S1 ON	Yellow LW point on FPC ═ GRND When main change-over SW is shifted to S-T --- 0V ON --- Approx. 1.3V
1	Main SW. plate --- Dirty
2	Yellow LW --- Cold solder or broken
3	IC2-8 pin --- Cold solder
4	TR2 and R12 --- Defect

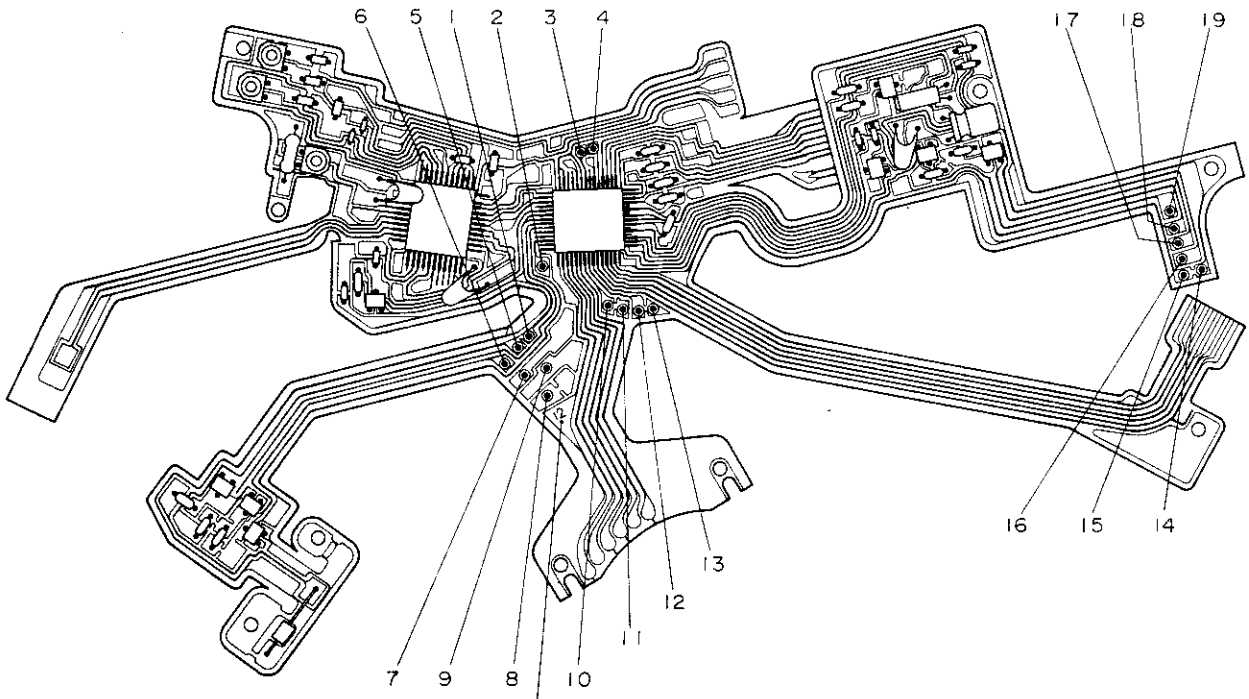
4-20 PCV buzzer does not sound

1	Check selftimer circuit by referring to Text "3-9∿1".
2	R10 (10 KΩ), R11 (100Ω) --- Cold solder or defect
3	Red LW. from PCV buzzer --- Short or broken Black
4	TR3 --- Defect
5	Hot shoe FPC --- Broken
6	Looseness of SV-PC plate fixing screw
7	PCV buzzer --- Defect

EPC TYPE 12 WIRING DIAGRAM

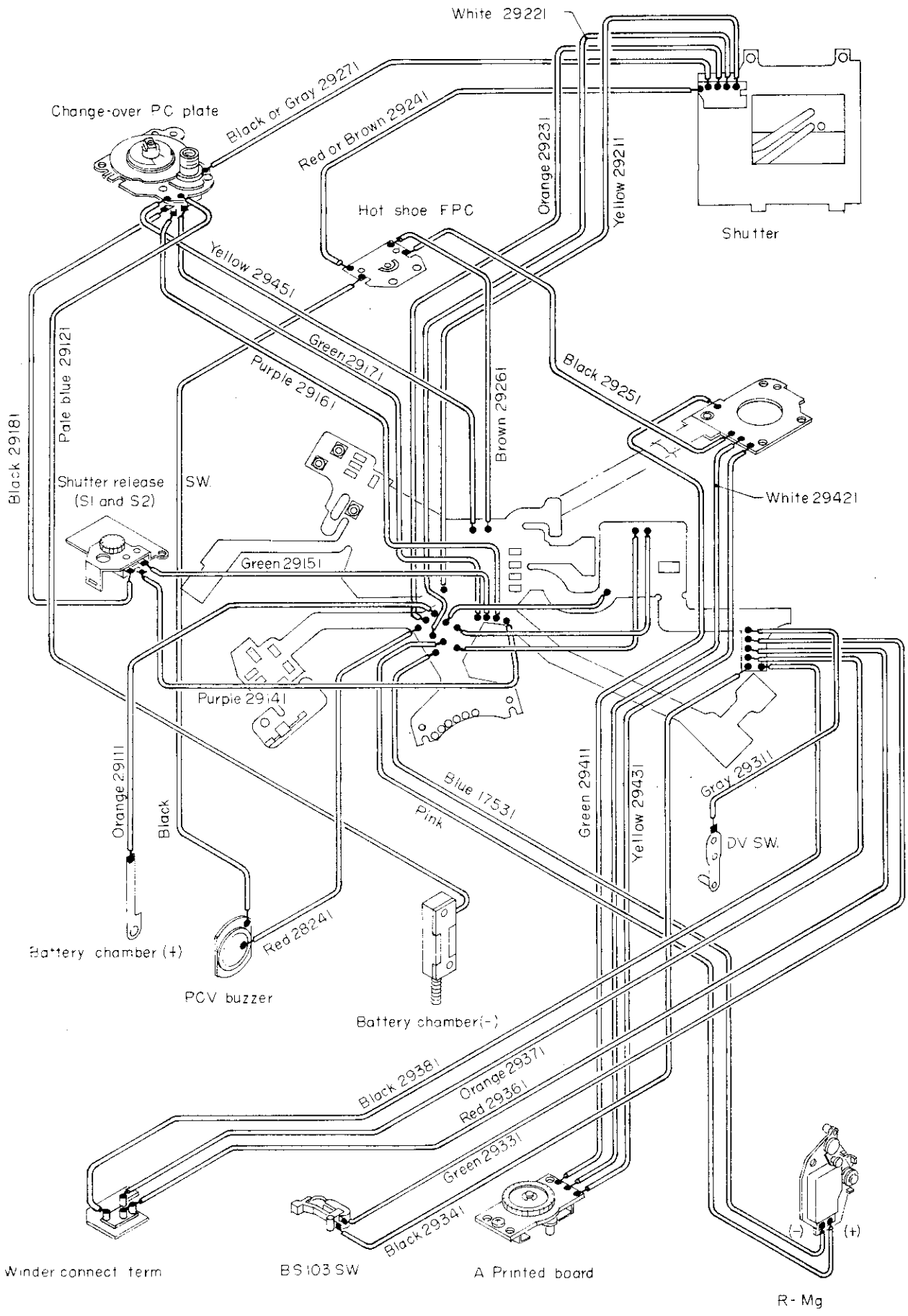
Type 12 wiring diagram

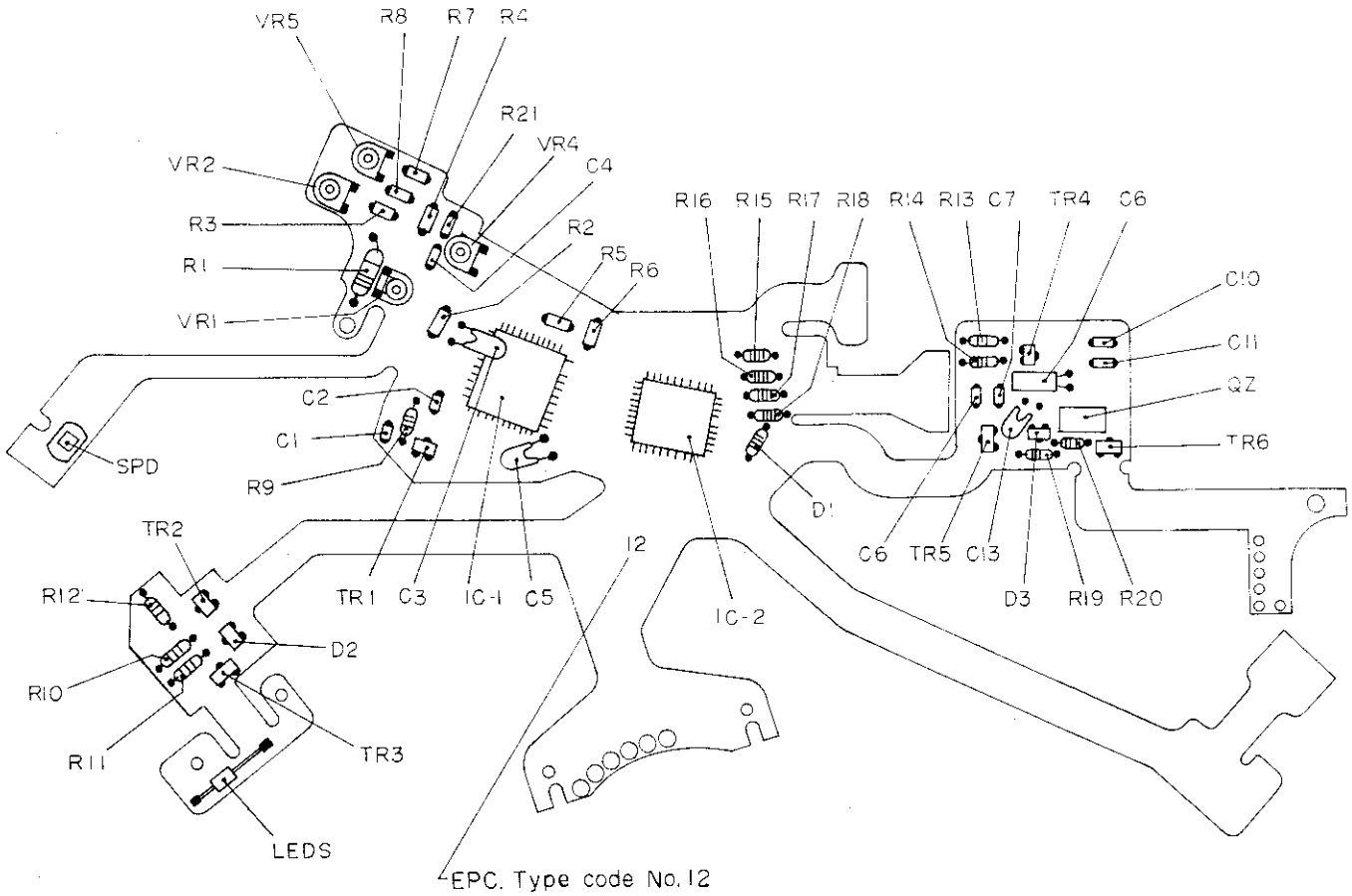
1 Orange – Shutter Mg (+)
2 Yellow – Shutter trigger
3 Yellow – Change over pc plate
4 Brown – Hot shoe FPC
5 Orange – Battery chamber (+)
6 Red – PCV buzzer
7 White – Shutter Mg (–)
8 Blue – R – Mg (–)
9 Pink – R – Mg (+)
10 Green – Change – over S2
11 Green – Shutter release S2
12 Purple – Change – over S1
13 Purple – Shutter release S1
14 Black – Winder connect term
15 Black – BS 103 winder SW
16 Orange – Winder connect term
17 Red – Winder connect term
18 Green – BS 103 winder SW
19 Gray – DV. SW.



FPC · Type code NO 12

ZM Electro circuit diagram (Type 12)





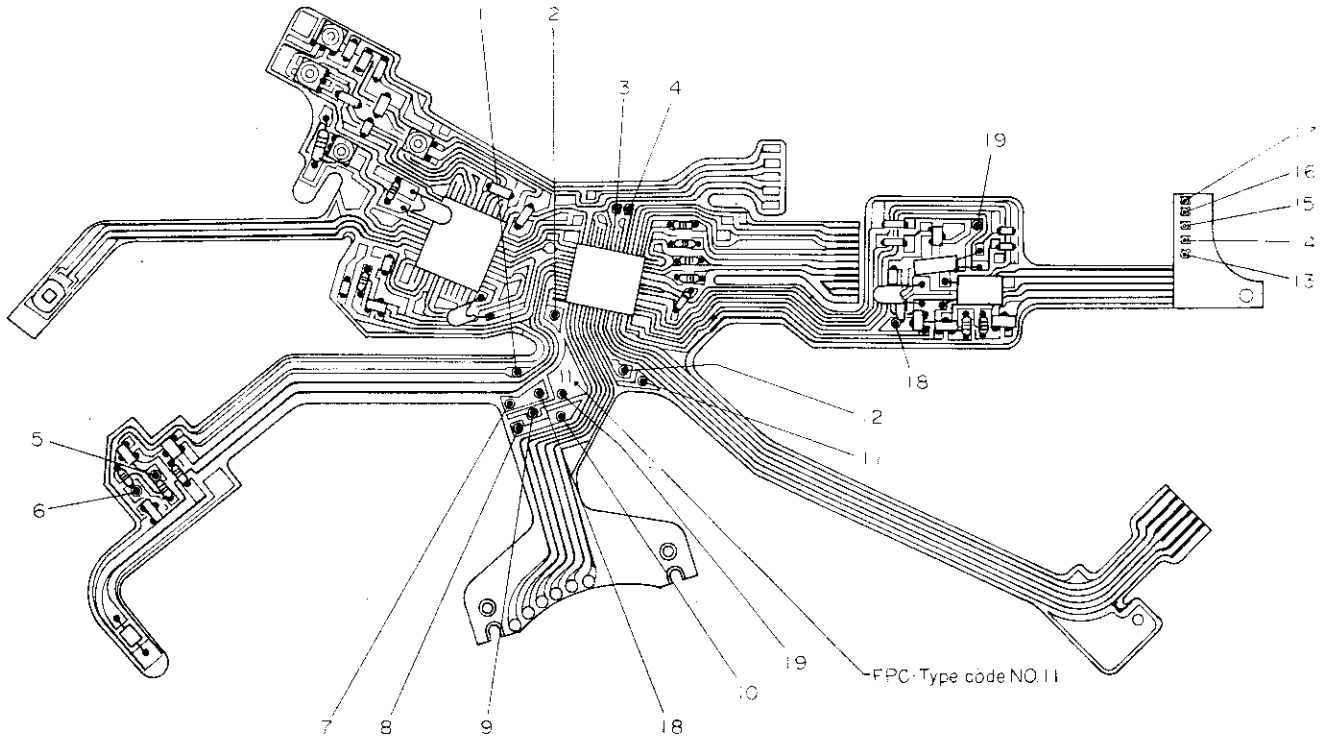
EPC. Type code No. 12

EPC TYPE 11 WIRING DIAGRAM

Type 11 wiring diagram

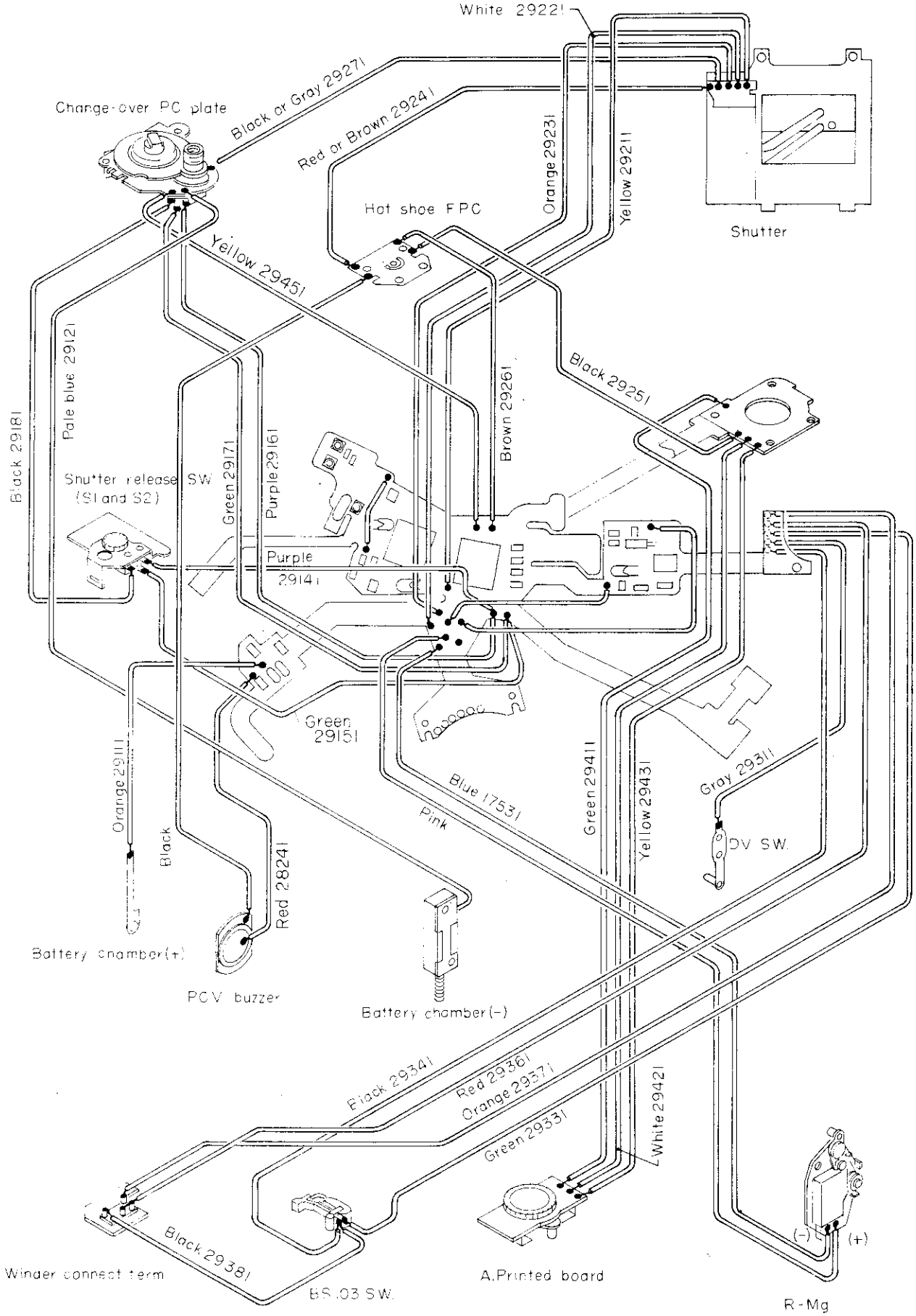
1 Orange - Shutter Mg (+)
2 Yellow - Shutter trigger
3 Yellow - Change - over pc plate
4 Brown - Hot shoe F P C
5 Orange - Battery chamber (+)
6 Red - PCV buzzer
7 White - Shutter Mg (-)
8 Blue - R - Mg (-)
9 Pink - R - Mg (+)
10 Vacancy
11 Green - Shutter release S2 / Change - over pc S2
12 Purple - Shutter release S1 / Change - over pc S1
13 Black - BS103 winder SW
14 Gray - DV. SW
15 Green - BS103 winder SW
16 Red - Winder connect term
17 Orange - Winder connect term
18 - 18
19 - 19

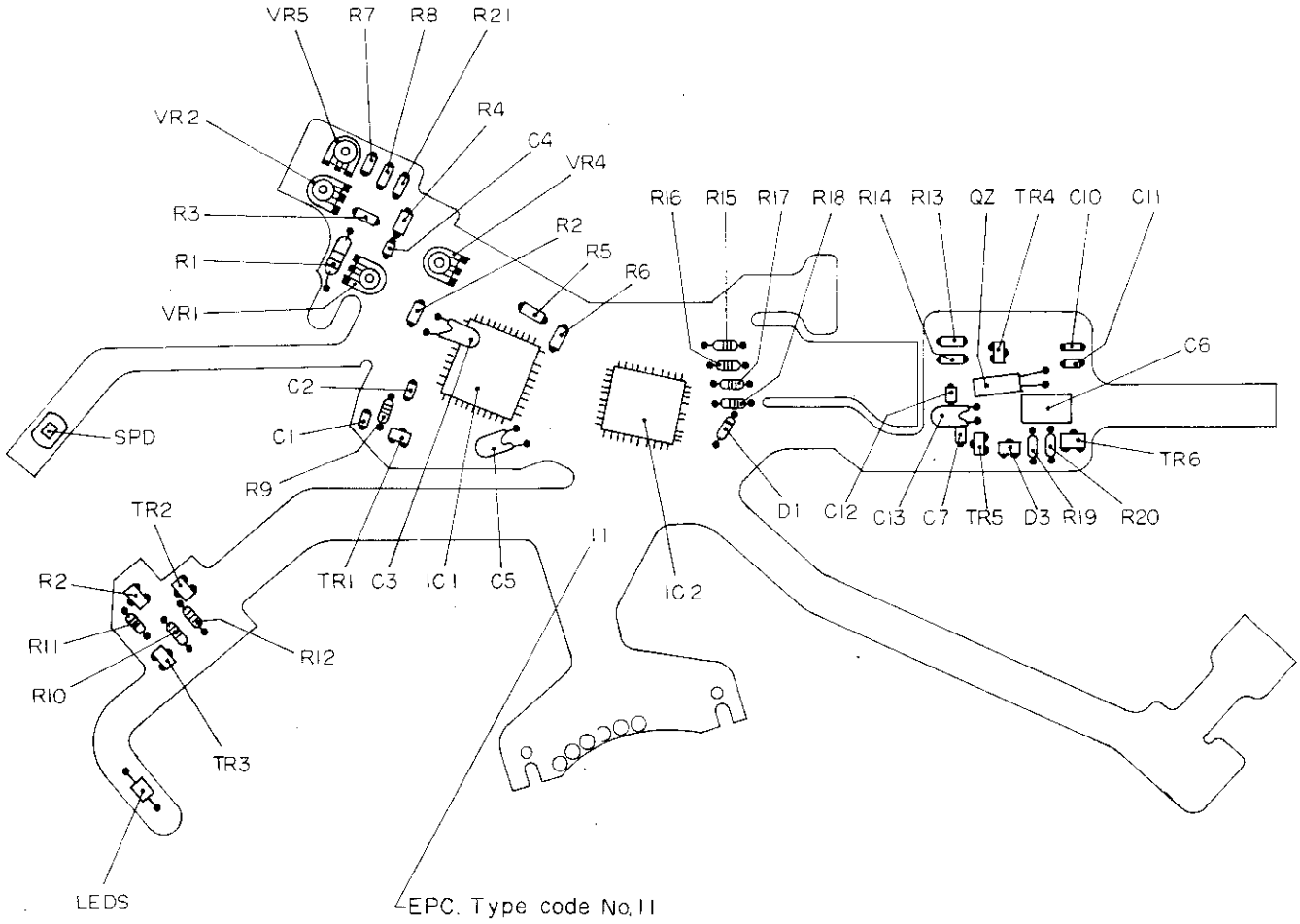
19 - 19



140 - 000

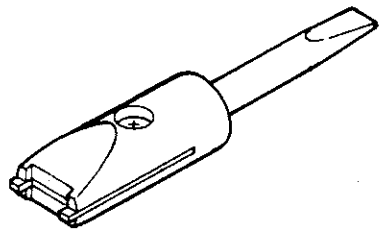
ZM Electro circuit diagram (Type II)



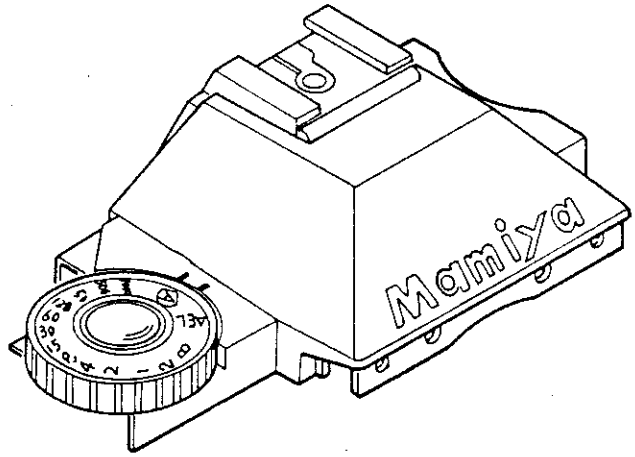

VR5
R7
R8
R21
VR2
R4
C4
VR4
R3
R2
R5
R1
R6
VR1
R16
R15
R17
R18
R14
R13
QZ
TR4
C10
C11
C6
C2
SPD
C1
TR6
R9
D1
C12
C13
C7
TR5
D3
R19
R20
TR2
R2
TR1
C3
IC1
C5
IC2
R11
R12
R10
TR3
LEDS
EPC. Type code No.11

ZM TOOL LIST

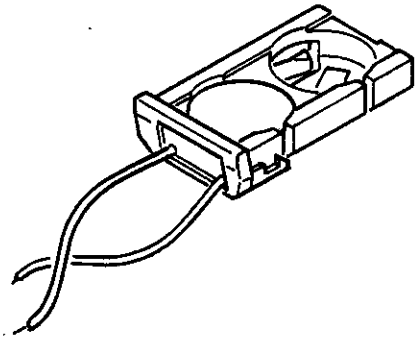
ZM-1 Spanner for main SW. nut (M1300-15431)



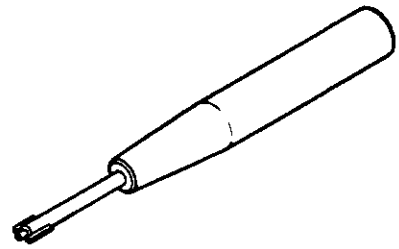
ZM-2 Working top cover



ZM-3 Dummy battery

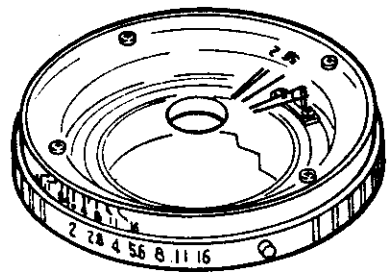


ZEX-5 Adjusting driver for VR

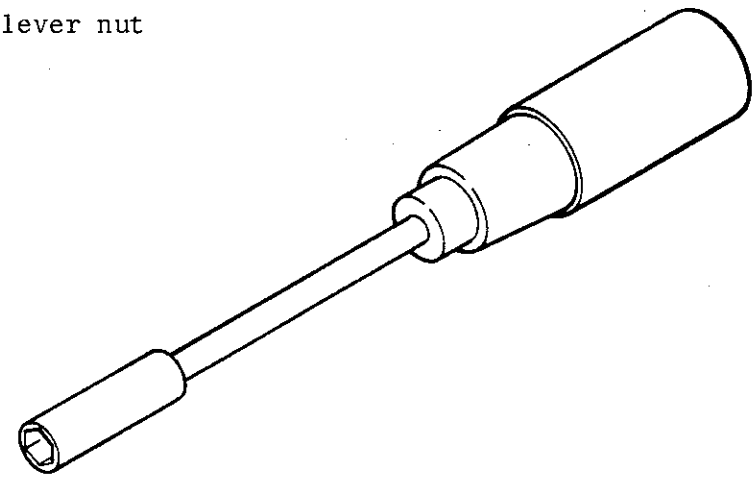


EN-2 Aperture arm position gauge

For checking and adjusting for the aperture arm aperture arm



EN-6 Spanner for film advance lever nut

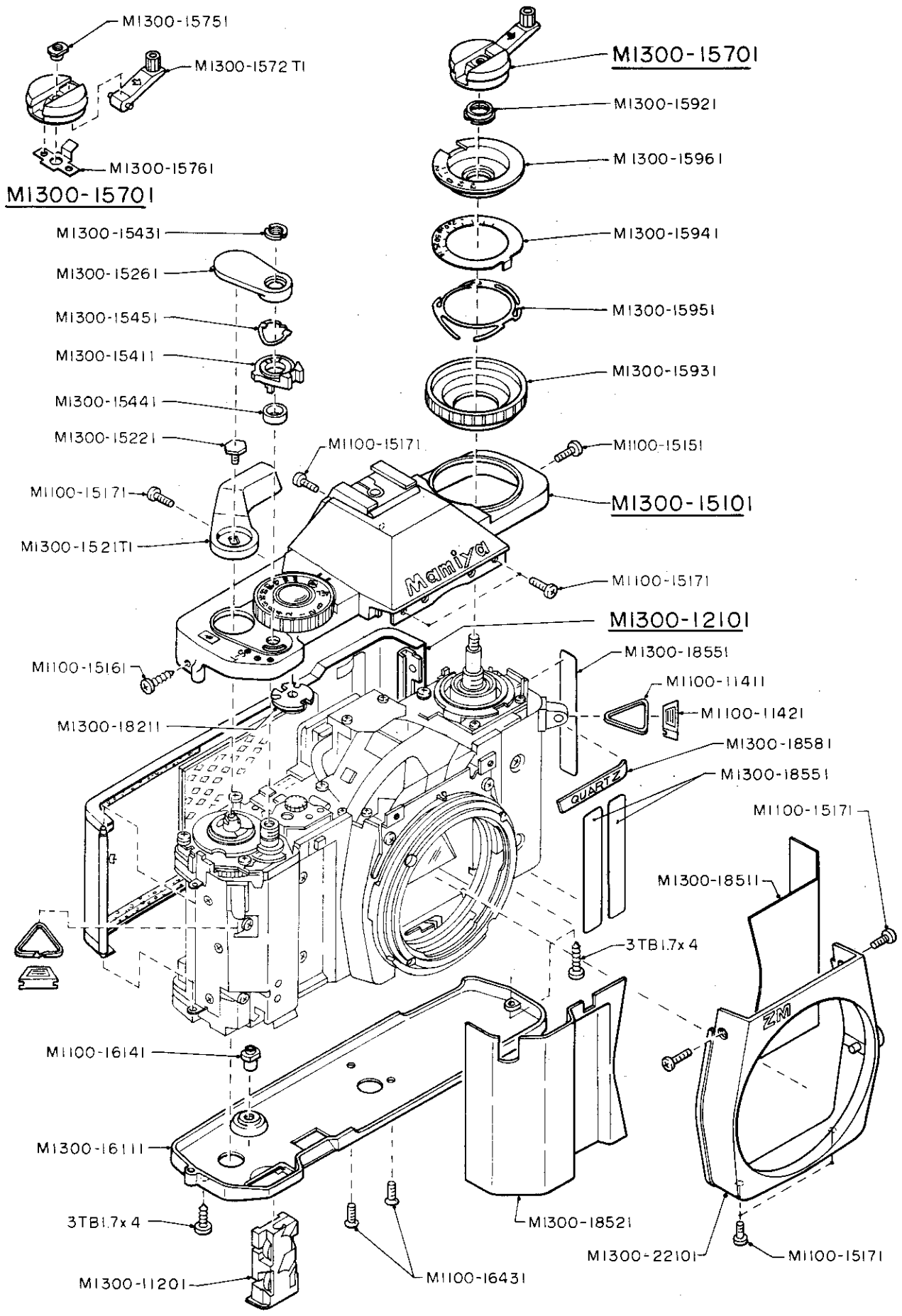


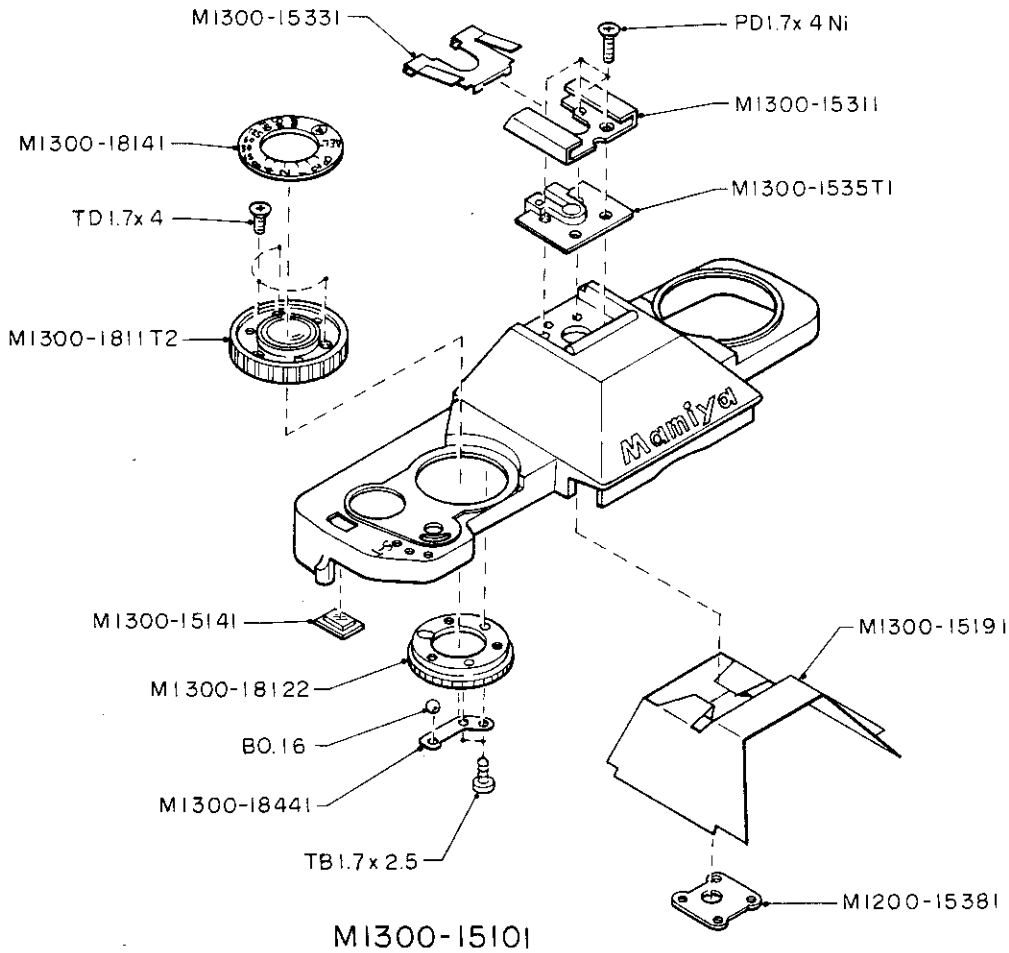
Mamiya ZM QUARTZ

PARTS CATALOG

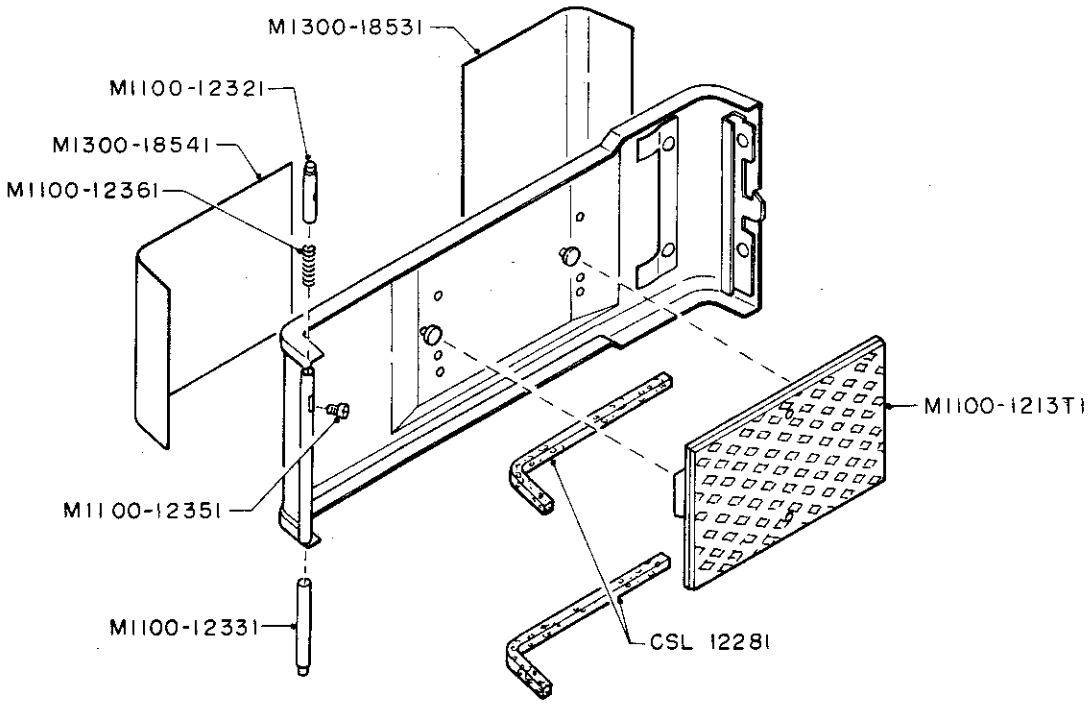
Mamiya
CAMERA CO., LTD.
TOKYO, JAPAN

P.C.82-11-ZM

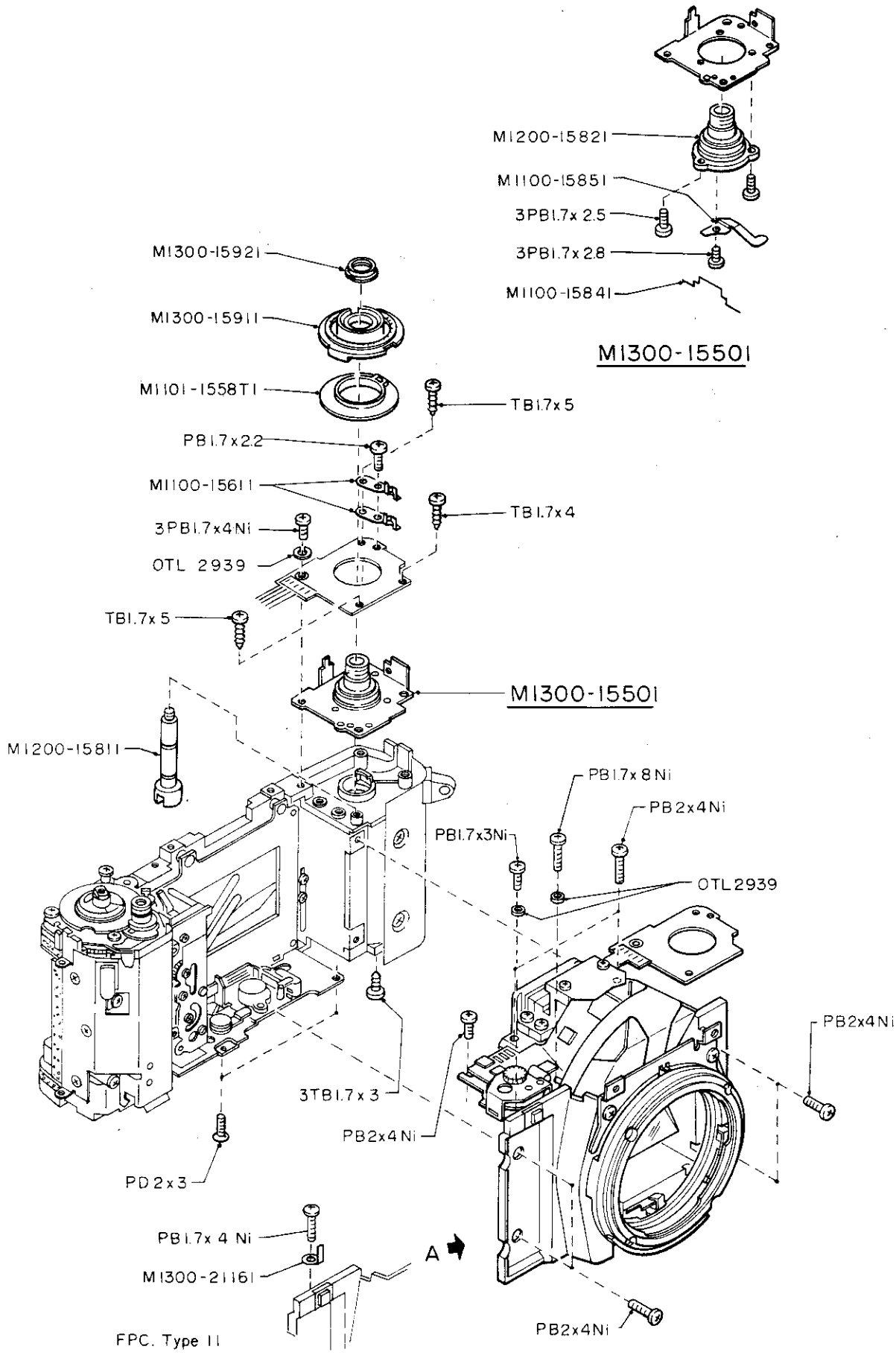

M1300-15751
M1300-15721
M1300-15761
M1300-15701
M1300-15701
M1300-15921
M1300-15961
M1300-15941
M1300-15951
M1300-15931
M1300-15431
M1300-15261
M1300-15451
M1300-15411
M1300-15441
M1300-15221
M1100-15171
M1100-15151
M1100-15171
M1300-15101
M1300-1521TI
M1100-15171
M1300-12101
M1100-15161
M1300-18551
M1100-11411
M1100-11421
M1300-18211
M1300-18581
M1300-18551
QUARTZ
M1100-15171
M1300-18511
3TB1.7x4
M1100-16141
M1300-16111
3TB1.7x4
M1300-18521
M1300-22101
M1100-15171
M1300-11201
M1100-16431

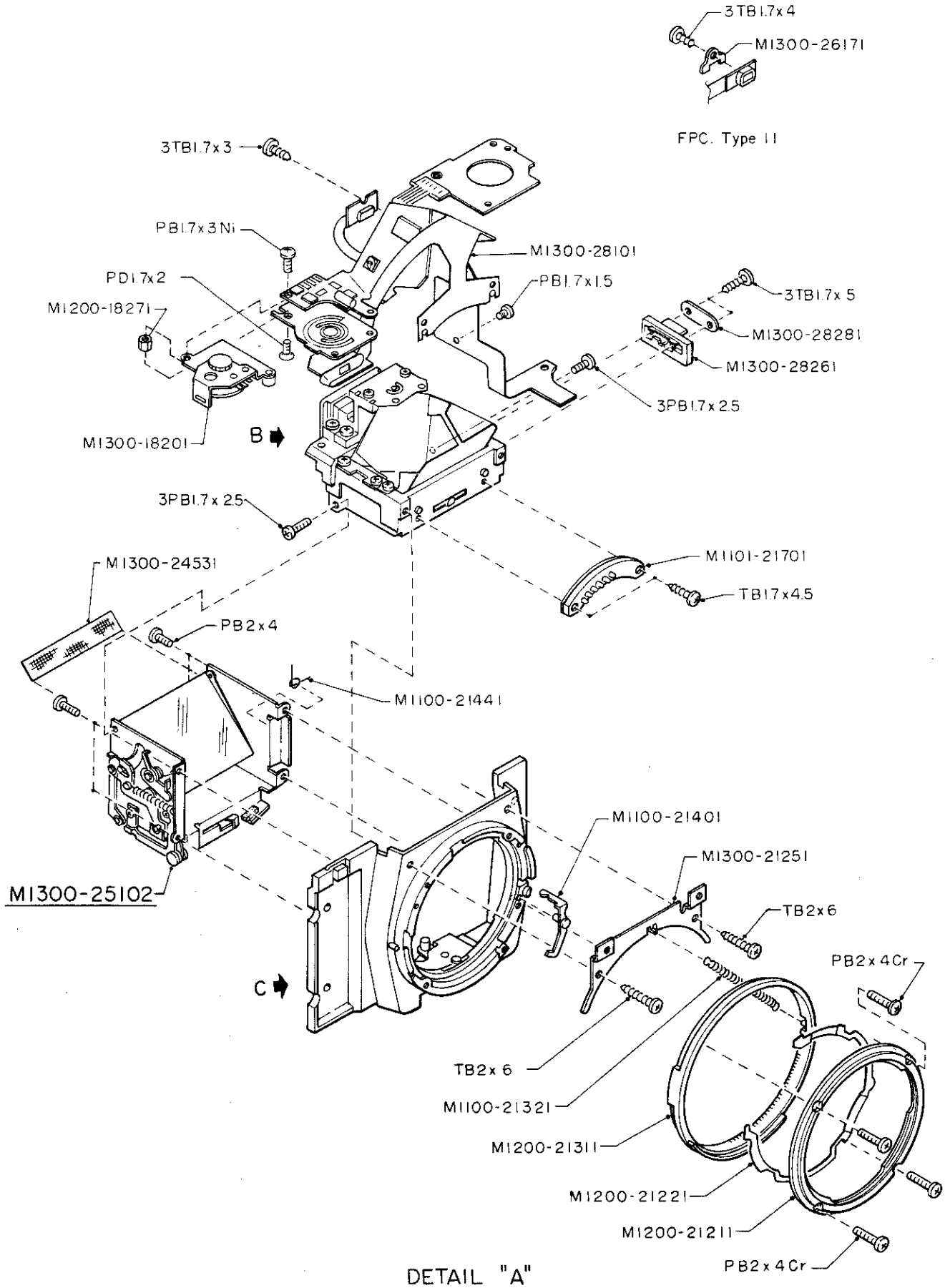


M1300-15101

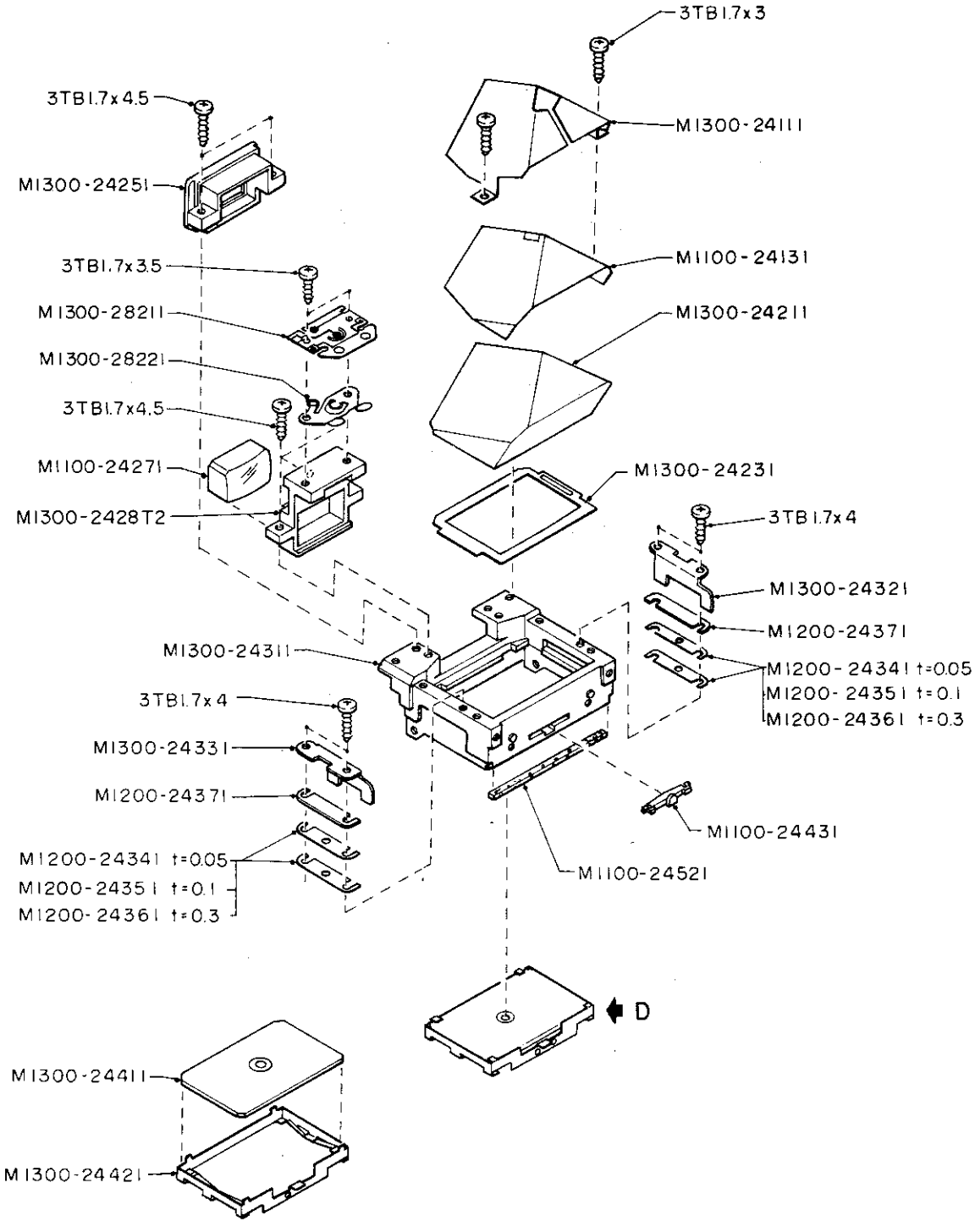


M1300-12101


M1200-15821
M1100-15851
3PB1.7x 2.5
3PB1.7x 2.8
M1100-15841
M1300-15501
M1300-15921
M1300-15911
M1101-1558T1
TB1.7x5
PB1.7x2.2
M1100-15611
TB1.7x4
3PB1.7x4Ni
OTL 2939
TB1.7x5
M1300-15501
M1200-15811
PB1.7x8Ni
PB2x4Ni
PB1.7x3Ni
OTL2939
PB2x4Ni
3TB1.7x3
PB2x4Ni
PD2x3
PB1.7x 4 Ni
M1300-21161
A
FPC. Type 11
PB2x4Ni

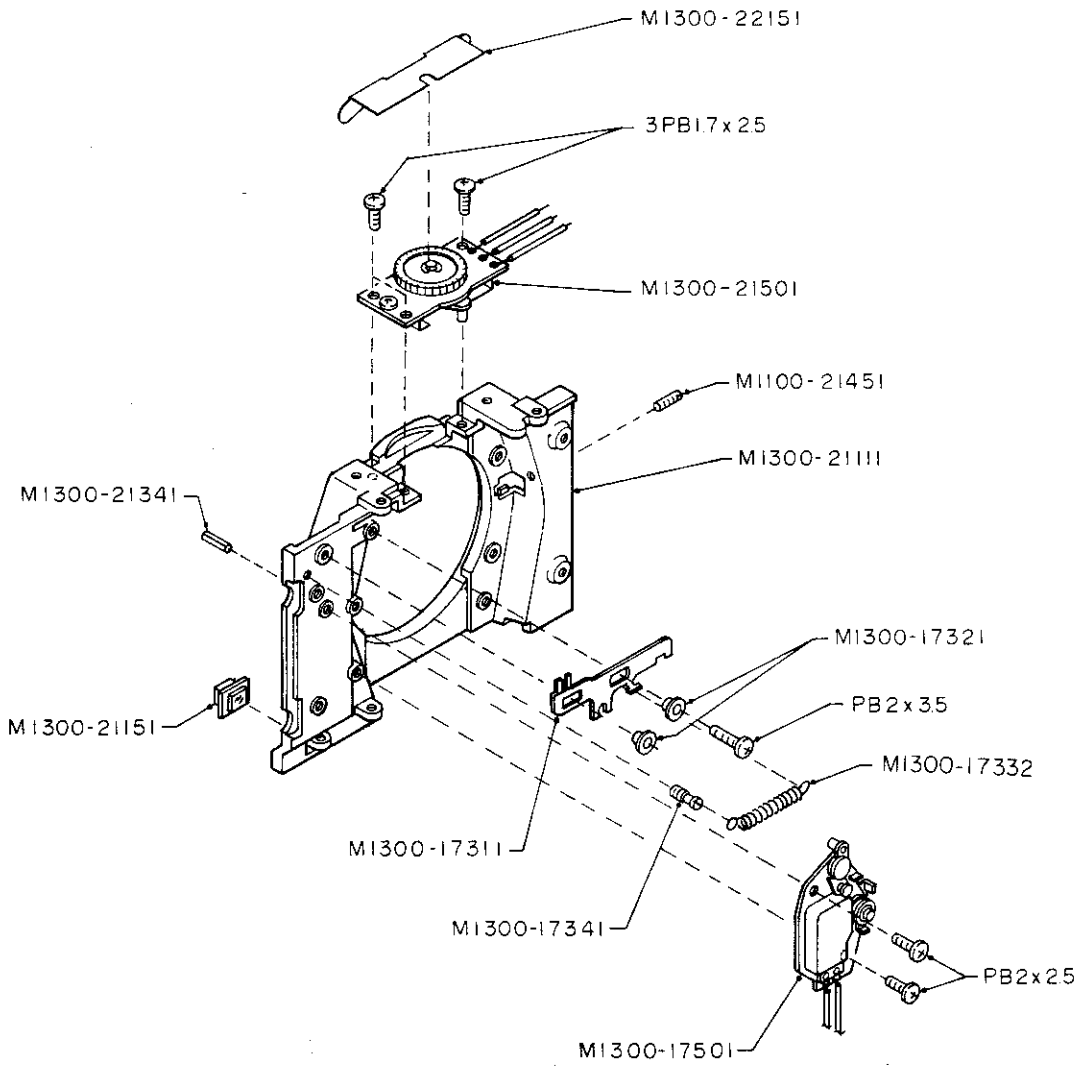

3TB1.7x4
M1300-26171
FPC. Type II
3TB1.7x3
PB1.7x3Ni
M1300-28101
PD1.7x2
PB1.7x1.5
3TB1.7x5
M1200-18271
M1300-28281
M1300-28261
3PB1.7x2.5
M1300-18201
B
3PB1.7x2.5
M1101-21701
TB1.7x4.5
M1300-24531
PB2x4
M1100-21441
M1100-21401
M1300-21251
TB2x6
M1300-25102
C
PB2x4Cr
TB2x6
M1100-21321
M1200-21311
M1200-21221
M1200-21211
PB2x4Cr

DETAIL "A"

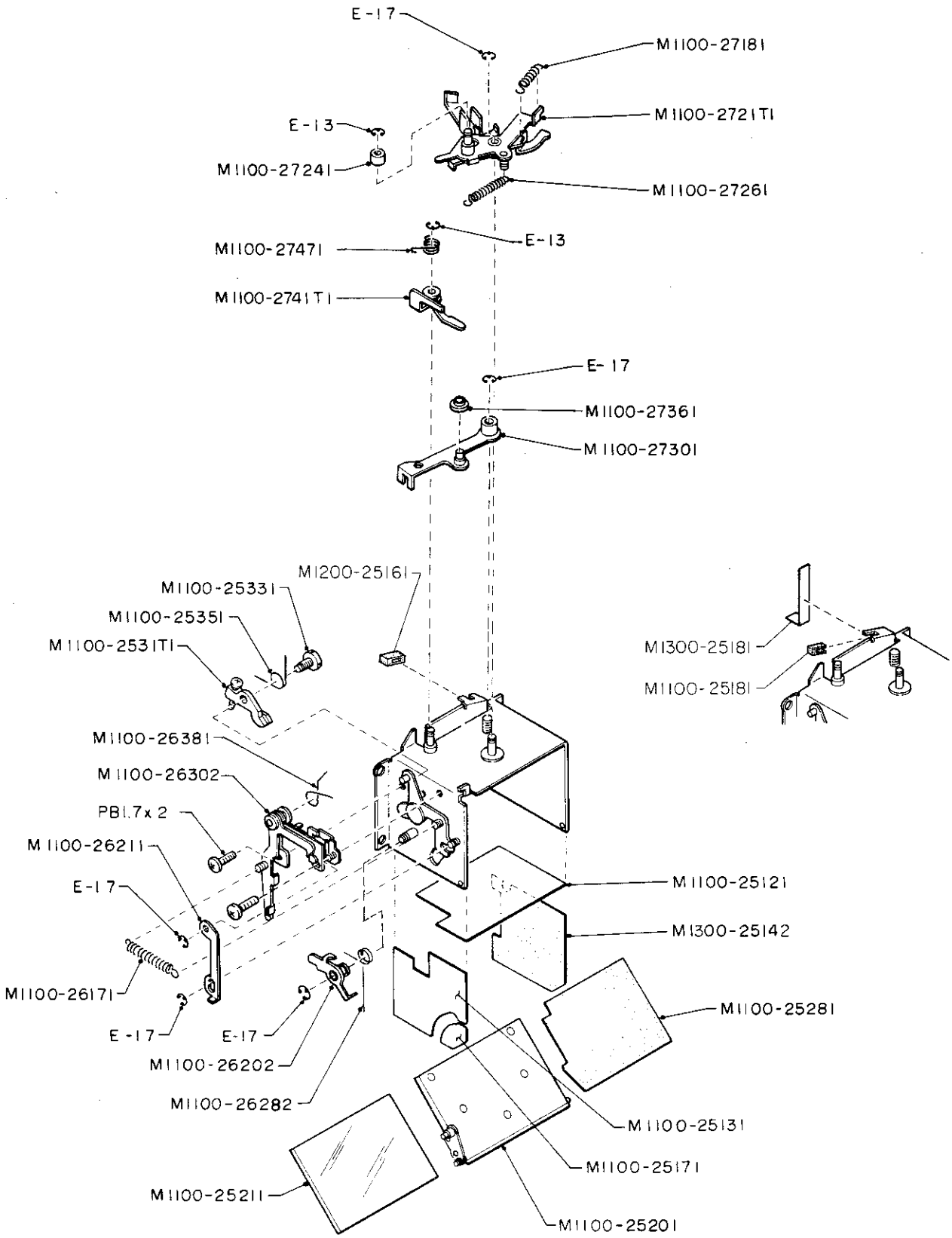


DETAIL "D"

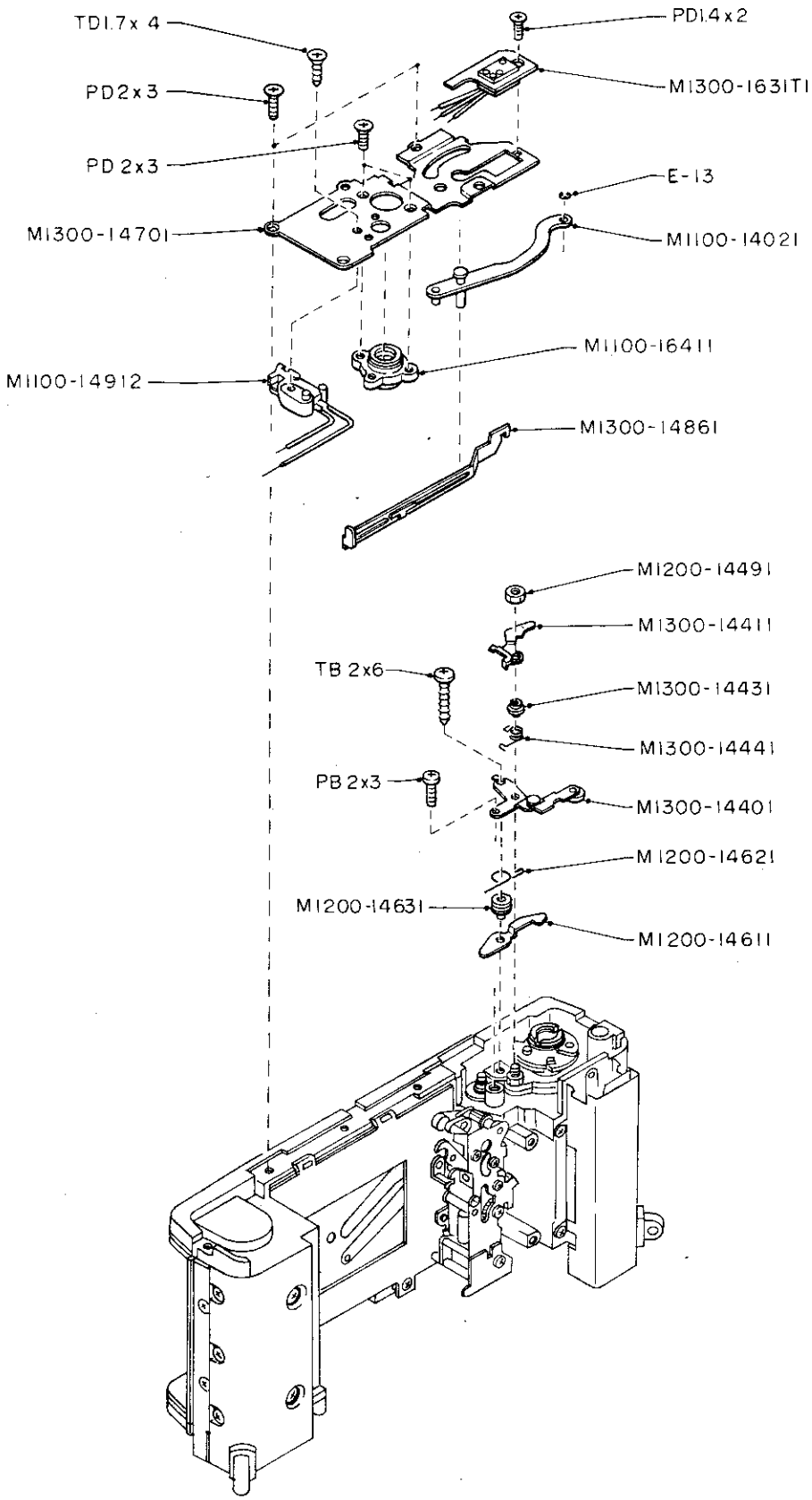
DETAIL "B"

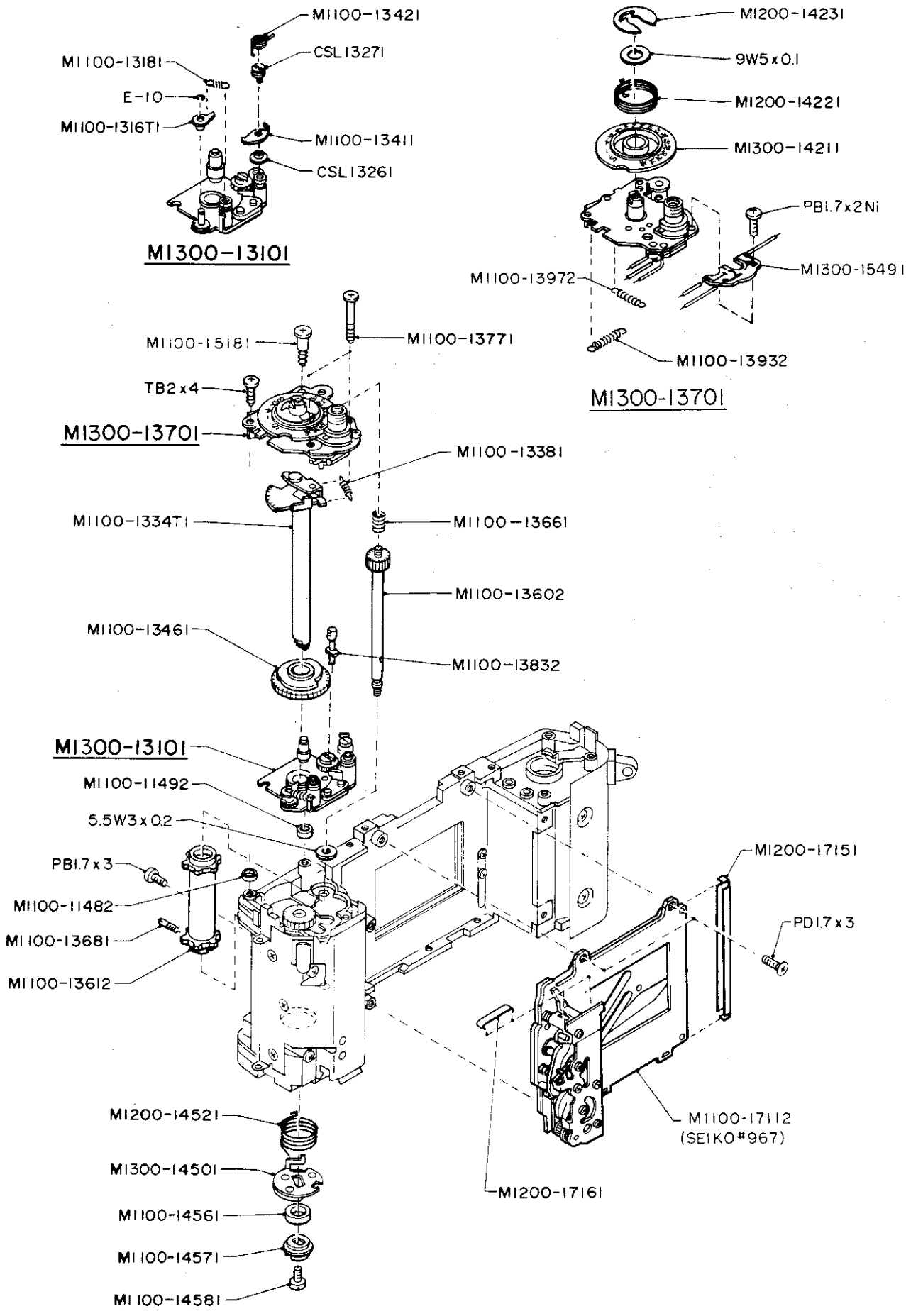

M1300-22151
3PB1.7x25
M1300-21501
M1100-21451
M1300-21111
M1300-21341
M1300-17321
PB2x3.5
M1300-21151
M1300-17332
M1300-17311
M1300-17341
PB2x2.5
M1300-17501

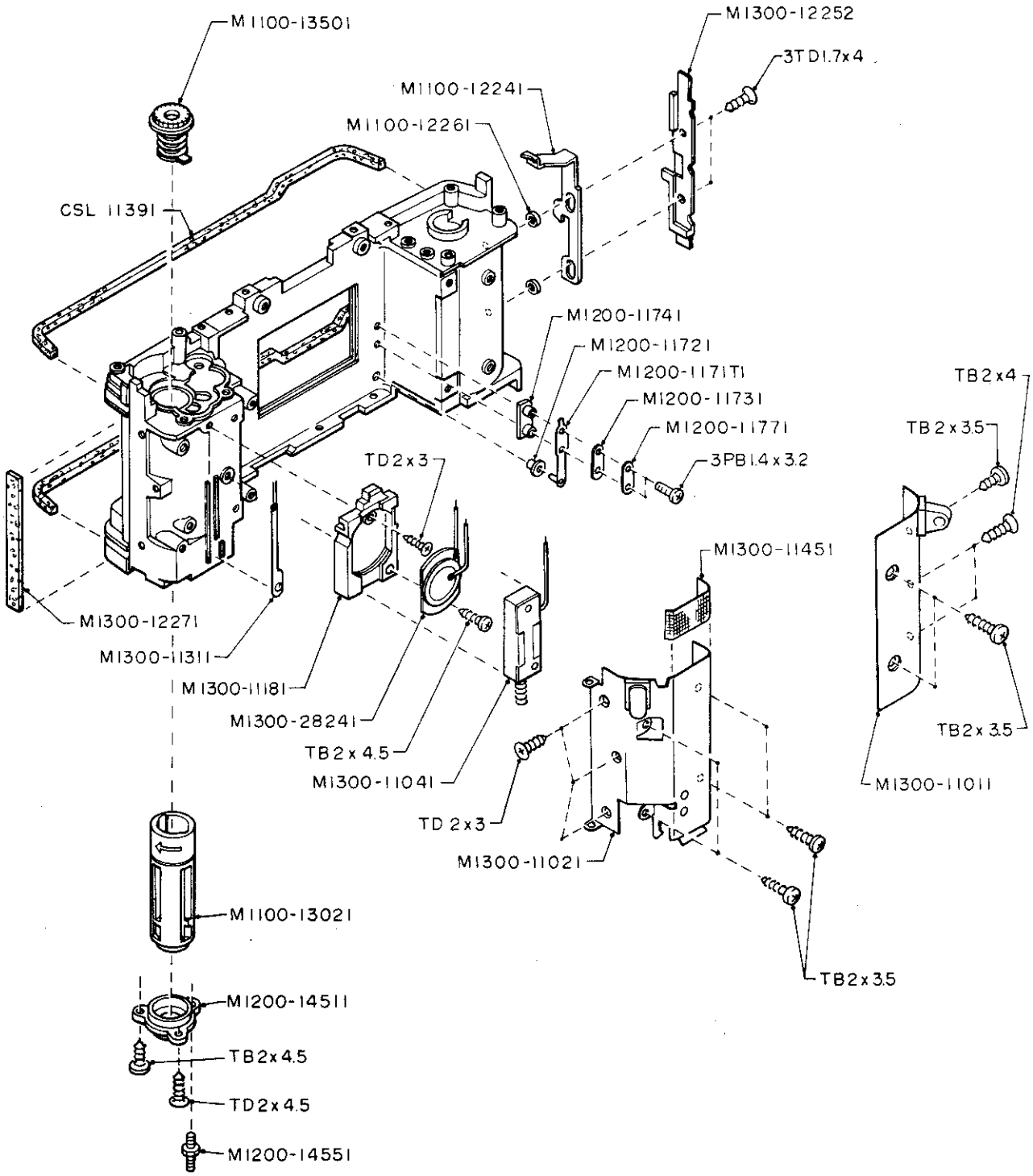
DETAIL "C"


E-17
M1100-27181
E-13
M1100-27211
M1100-27241
M1100-27261
M1100-27471
E-13
M1100-27411
E-17
M1100-27361
M1100-27301
M1200-25161
M1100-25331
M1100-25351
M1100-25311
M1300-25181
M1100-25181
M1100-26381
M1100-26302
PB1.7x2
M1100-26211
E-17
M1100-25121
M1300-25142
M1100-26171
E-17
E-17
M1100-25281
M1100-26202
M1100-26282
M1100-25131
M1100-25171
M1100-25211
M1100-25201

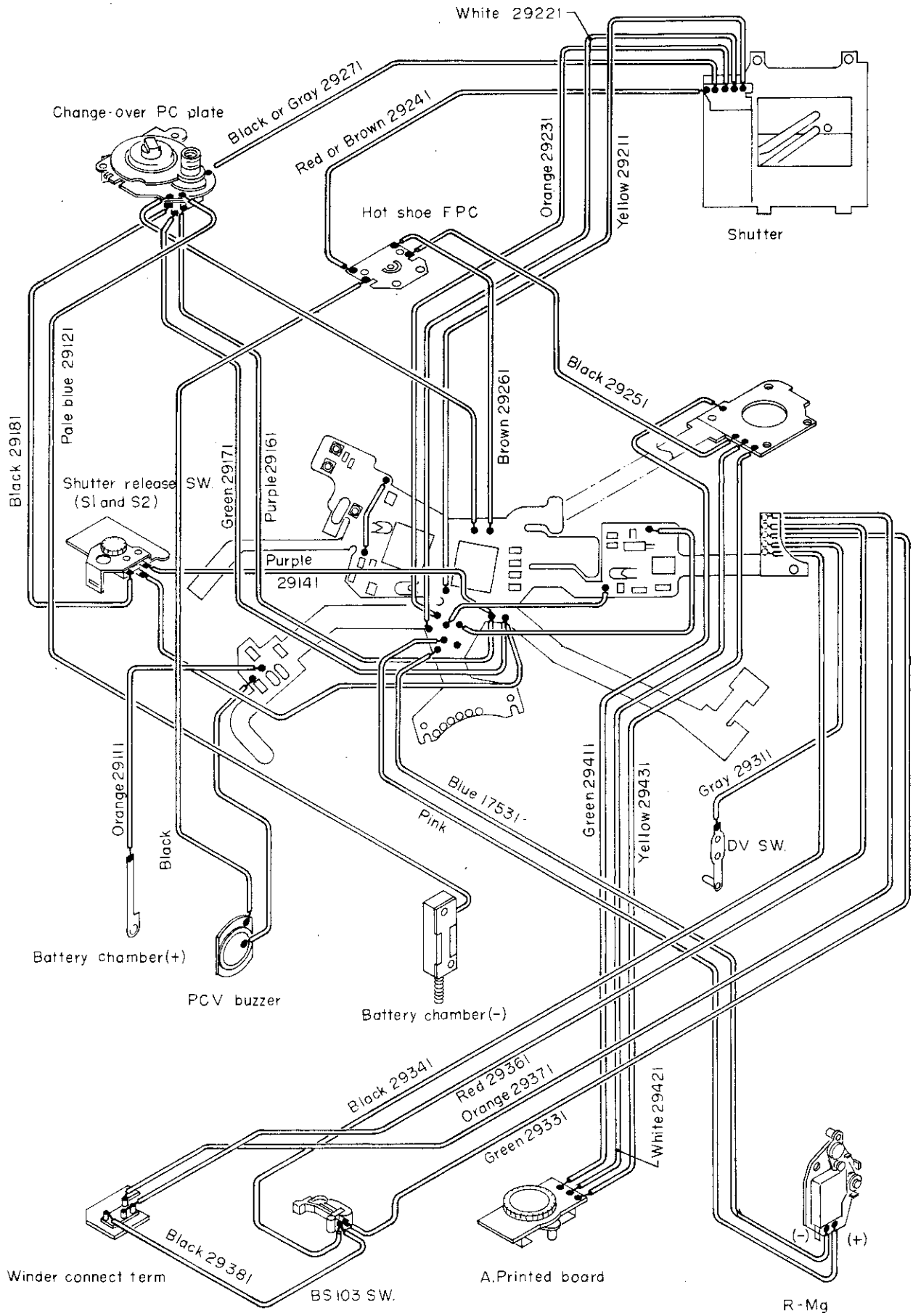
M1300-25102


TD1.7x 4
PD1.4x2
PD2x3
M1300-1631T1
PD 2x3
E-13
M1300-14701
M1100-14021
M1100-16411
M1100-14912
M1300-14861
M1200-14491
M1300-14411
TB 2x6
M1300-14431
M1300-14441
PB 2x3
M1300-14401
M1200-14621
M1200-14631
M1200-14611

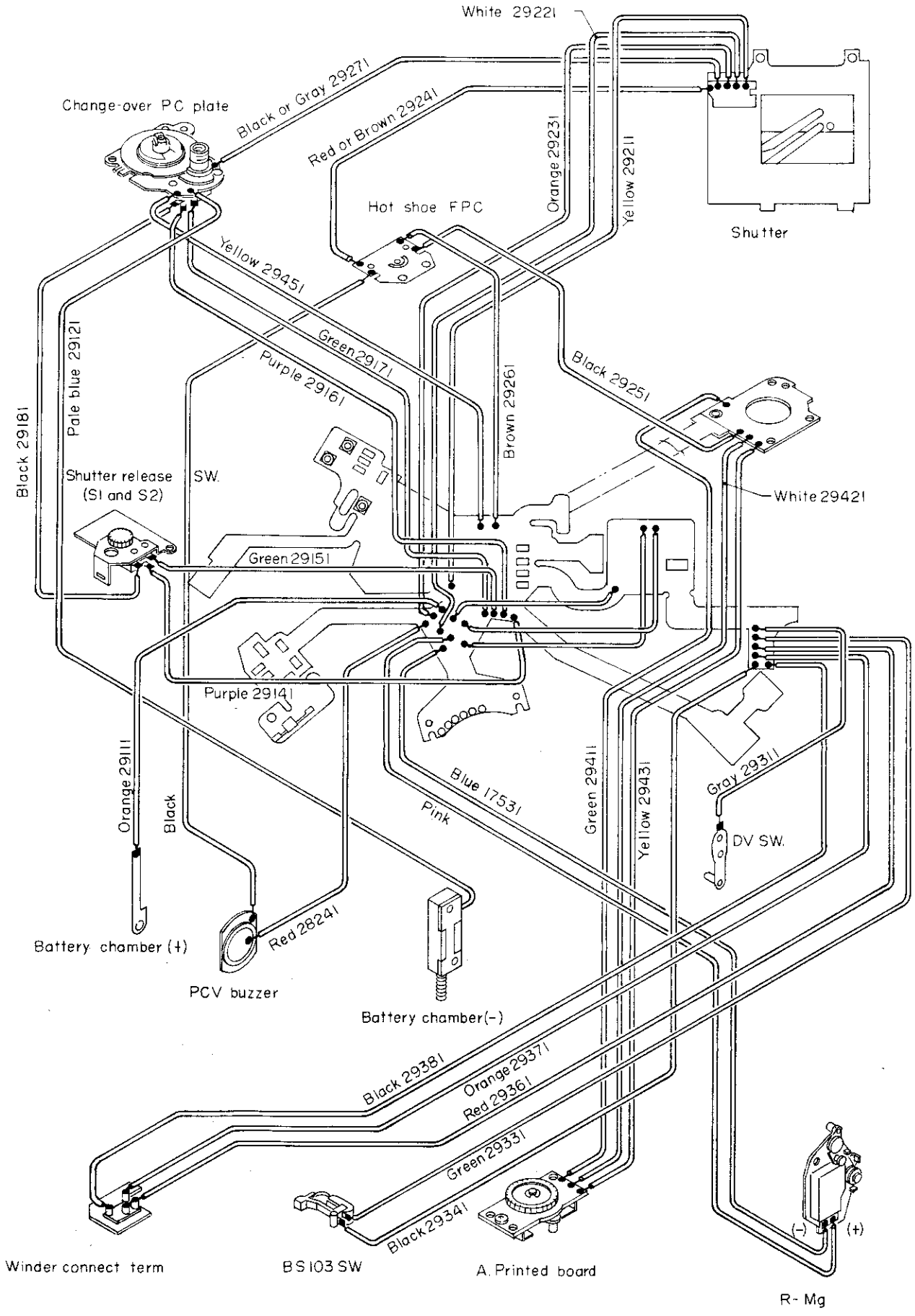

M1100-13421
CSL1327I
M1100-13181
E-10
M1100-1316TI
M1100-13411
CSL1326I
M1300-13101
M1200-14231
9W5x0.1
M1200-14221
M1300-14211
PB1.7x2Ni
M1300-15491
M1100-13972
M1100-13932
M1300-13701
M1100-15181
M1100-13771
TB2x4
M1300-13701
M1100-13381
M1100-1334TI
M1100-13661
M1100-13602
M1100-13461
M1100-13832
M1300-13101
M1100-11492
5.5W3x0.2
PB1.7x3
M1100-11482
M1100-13681
M1100-13612
M1200-17151
PD1.7x3
M1100-17112
(SEIKO#967)
M1200-17161
M1200-14521
M1300-14501
M1100-14561
M1100-14571
M1100-14581


M1100-13501
M1300-12252
3TD1.7x4
M1100-12241
M1100-12261
CSL 11391
M1200-11741
M1200-11721
M1200-11711
M1200-11731
M1200-11771
3PB1.4x3.2
TB2x4
TB2x3.5
TD2x3
M1300-11451
M1300-12271
M1300-11311
M1300-11181
M1300-28241
TB2x4.5
M1300-11041
TD2x3
M1300-11021
TB2x3.5
TB2x3.5
M1300-11011
M1100-13021
M1200-14511
TB2x4.5
TD2x4.5
M1200-14551

ZM Electro circuit diagram (Type II)



ZM Electro circuit diagram (Type 12)



Parts No.	Description	Pcs.	Ref. Page
M1300-11011	Side panel R	1	10
M1300-11021	Side panel L	1	10
M1300-11041	Battery chamber	1	10
M1300-11181	Buzzer holder	1	10
M1300-11201	Battery cartridge	1	1
M1300-11311	B contact	1	10
M1300-11451	Curtain	1	10
M1300-12101	Back cover	1	1
M1300-12252	Cover	1	10
M1300-12271	Sealing strip	1	10
M1300-13101	Winding base plate unit	1	9
M1300-13701	Film counter base unit	1	9
M1300-14211	Exposure counter	1	9
M1300-14401	Safety winding device	1	8
M1300-14411	Safety winding arm	1	8
M1300-14431	Hub	1	8
M1300-14441	Spring	1	8
M1300-14501	Crank disk	1	9
M1300-14701	Bottom base plate unit	1	8
M1300-14861	Winding stop slide	1	8
M1300-15101	Top cover unit	1	1
M1300-15141	Window cover	1	2
M1300-15191	Insulation cover	1	2
M1300-1521T1	Film advance lever	1	1
M1300-15221	Screw	1	1
M1300-15261	Cover	1	1
M1300-15311	Hot-shoe	1	2
M1300-15331	Inner cover	1	2
M1300-1535T1	Insulation base	1	2
M1300-15411	Selecter SW.	1	1
M1300-15431	Nut	1	1
M1300-15441	Collar	1	1
M1300-15451	Click	1	1
M1300-15491	Change-over P.C. plate	1	9
M1300-15501	SV base plate	1	3

Parts No.	Description	Pcs.	Ref. Page
M1300-15701	Film rewind knob unit	1	1
M1300-1572T1	Rewind lever	1	1
M1300-15751	Nut	1	1
M1300-15761	Leaf spring	1	1
M1300-15911	CV disk	1	3
M1300-15921	Nut	2	1,3
M1300-15931	Film speed dial	1	1
M1300-15941	Film speed scale	1	1
M1300-15951	Spring	1	1
M1300-15961	Exposure scale	1	1
M1300-16111	Bottom cover	1	1
M1300-1631T1	Winder electrical contacts	1	8
M1300-17311	Release lever	1	6
M1300-17321	Hub	2	6
M1300-17332	Spring	1	6
M1300-17341	Anchor	1	6
M1300-17501	Self-timer unit	1	6
M1300-1811T2	Shutter speed dial	1	2
M1300-18122	Inner sp dial	1	2
M1300-18141	Shutter speed scale	1	2
M1300-18201	TV P.C. unit	1	4
M1300-18211	S gear	1	1
M1300-18441	Click plate	1	2
M1300-18511	Leatherette A	1	1
M1300-18521	Leatherette B	1	1
M1300-18531	Leatherette C	1	2
M1300-18541	Leatherette D	1	2
M1300-18551	Plate	1	1
M1300-18581	Name plate	1	1
M1300-21111	Front housing	1	6
M1300-21151	Cover	1	6
M1300-21251	Cover plate	1	4
M1300-21341	Roll pin (1.2øx5)	1	6
M1300-21501	A print board	1	6
M1300-22101	Apron	1	1

Parts No.	Description	Pcs.	Ref. Page
M1300-22151	A cover	1	6
M1300-24111	Prism roof	1	5
M1300-24211	Penta prism	1	5
M1300-24231	Mask	1	5
M1300-24251	Eyepiece frame A	1	5
M1300-2428T2	Eyepiece frame B	1	5
M1300-24311	Focusing screen frame	1	5
M1300-24321	Holder (R)	1	5
M1300-24331	Holder (L)	1	5
M1300-24411	Fresnel lens	1	5
M1300-24421	Fresnel lens frame	1	5
M1300-24531	Curtain	1	4
M1300-25102	Mirror housing unit	1	4
M1300-25142	R.A. leatherette	1	7
M1300-25181	Plate	1	7
M1300-28101	F.P.C. board	1	4
M1300-28211	Signal pc board	1	5
M1300-28221	Leaf spring	1	5
M1300-28241	Buzzer	1	10
M1300-28261	LED holder	1	4
M1300-28281	Fitting plate	1	4
M1100-11411	Strap loop	2	1
M1100-11421	Filling	2	1
M1100-11482	Ring	1	9
M1100-11492	Ring	1	9
M1100-1213T1	Pressure plate	1	2
M1100-12241	Latch	1	10
M1100-12261	Collar	2	10
M1100-12321	Hinge shaft (U)	1	2
M1100-12331	Hinge shaft (L)	1	2
M1100-12351	Screw	1	2
M1100-12361	Spring	1	2
M1100-13021	Film take-up spool	1	10
M1100-1316T1	Pawl	1	9
M1100-13181	Spring	1	9

Parts No.	Description	Pcs.	Ref. Page
M1100-1334T1	Winding shaft	1	9
M1100-13381	Spring	1	9
M1100-13411	Pawl	1	9
M1100-13421	Spring	1	9
M1100-13461	Winding gear	1	9
M1100-13501	Spool gear	1	10
M1100-13602	Sprocket shaft	1	9
M1100-13612	Sprocket	1	9
M1100-13661	Spring	1	9
M1100-13681	Screw	1	9
M1100-13771	Screw	2	9
M1100-13832	Advance cam	1	9
M1100-13932	Spring	1	9
M1100-13972	Spring	1	9
M1100-14021	Connector	1	8
M1100-14561	Collar	1	9
M1100-14571	Coupler	1	9
M1100-14581	Screw	1	9
M1100-14912	BS 103 Winding switch	1	8
M1100-15151	Screw (PB1.7x4)	1	1
M1100-15161	Screw (TB1.7x3.5)	1	1
M1100-15171	Screw (PB1.7x3)	8	1
M1100-15181	Screw	1	9
M1100-15611	Click spring	2	3
M1100-15841	Spring	1	3
M1100-15851	Leaf spring	1	3
M1100-16141	Rewind button	1	1
M1100-16411	Tripod socket	1	8
M1100-16431	Screw (PD2x4.5)	2	1
M1100-17112	SEIKO SHUTTER type #967	1	9
M1100-21321	Spring	1	4
M1100-21401	Lens lock lever	1	4
M1100-21441	Spring	1	4
M1100-21451	Screw	1	6
M1100-24131	Paper	1	5

Parts No.	Description	Pcs.	Ref. Page
M1100-24271	Eyepiece lens	1	5
M1100-24431	Release pawl	1	5
M1100-24521	Sealing strip	1	5
M1100-25121	R.A. leatherette A	1	7
M1100-25131	R.A. leatherette B	1	7
M1100-25171	R.A. leatherette C	1	7
M1100-25201	Mirror holder	1	7
M1100-25211	Mirror	1	7
M1100-25281	R.A. leatherette D	1	7
M1100-2531T1	M regulator	1	7
M1100-25331	Screw	1	7
M1100-25351	Spring	1	7
M1100-26171	Spring	1	7
M1100-26202	Latch	1	7
M1100-26211	M return rod	1	7
M1100-26282	Spring	1	7
M1100-26302	Latch lever unit	1	7
M1100-26381	Spring	1	7
M1100-27181	Spring	1	7
M1100-2721T1	M charge lever unit	1	7
M1100-27241	Collar	1	7
M1100-27261	Spring	1	7
M1100-27301	M raising lever	1	7
M1100-27361	Roller	1	7
M1100-2741T1	Latch	1	7
M1100-27471	Spring	1	7
M1101-1558T1	SV middle disk	1	3
M1101-21701	6 Signal pins housing unit	1	4
M1200-1171T1	Databack contact	1	10
M1200-11721	Insulation hub	1	10
M1200-11731	Insulation plate A	1	10
M1200-11741	Insulation plate B	1	10
M1200-11771	Washer	1	10
M1200-14221	Spring	1	9
M1200-14231	Fitting ring	1	9

Parts No.	Description	Pcs.	Ref. Page
M1200-14491	Nut	1	8
M1200-14511	Bearing	1	10
M1200-14521	Spring	1	9
M1200-14551	Shaft	1	10
M1200-14611	Clutch lever	1	8
M1200-14621	Spring	1	8
M1200-14631	Hub	1	8
M1200-15381	Retaining	1	2
M1200-15811	Rewind shaft	1	3
M1200-15821	Hub	1	3
M1200-17151	Fixing plate A	1	9
M1200-17161	Fixing plate B	1	9
M1200-18271	Column	1	4
M1200-21211	Bayonet ring	1	4
M1200-21221	Leaf spring	1	4
M1200-21311	Aperture value ring	1	4
M1200-24341	Washer t=0.05	0 to 4	5
M1200-24351	Washer t=0.1	0 to 4	5
M1200-24361	Washer t=0.3	0 to 4	5
M1200-24371	Washer t=0.5	0 to 4	5
M1200-25161	Damper	1	7
CSL 11391	Sealing strip A	1	10
CSL 12281	Sealing strip B	2	2
CSL 13261	Eccentric collar	1	9
CSL 13271	Stud screw	1	9
OTL 2939	Washer	3	3
PB1.7x1.5	Screw for M1300-28101	1	4
PB1.7x2	Screw for M1100-26302	2	7
PB1.7x2Ni	Screw for M1300-15491	1	9
PB1.7x2.2	Screw for M1300-28101	1	3
PB1.7x3	Screw for M1100-17112	1	11
PB1.7x3Ni	Screw for M1300-18201	1	4
	for M1300-28101	1	3
PB1.7x8Ni	Screw for M1300-18201	1	3
PB2x2.5	Screw for M1300-17501	2	6

Parts No.	Description	Pcs.	Ref. Page
PB2x3	Screw for M1300-14401	1	8
PB2x3.5	Screw for M1300-17311	2	6
PB2x4Cr	Screw for M1200-21211	4	4
PB2x4Ni	Screw for M1300-21111	4	3
	for M1300-24311	2	3
PB2x4	Screw for M1300-25101	4	4
3PB1.4x3.2	Screw for M1200-11771	2	10
3PB1.7x2.5	Screw for M1200-15821	2	3
	for M1300-21501	3	6
	for M1300-24311	2	4
3PB1.7x2.8	Screw for M1100-15851	1	3
3PB1.7x4Ni	Screw for M1300-15501	1	3
PD1.4x2	Screw for M1300-1631T1	1	8
PD1.7x2	Screw for M1300-18201	1	4
PD1.7x3	Screw for M1100-17112	2	9
PD1.7x4Ni	Screw for M1300-15311	4	2
PD2x3	Screw for M1300-14701	4	3,8
	for M1300-16411	2	8
TB1.7x2.5	Screw for M1300-18441	2	2
TB1.7x4	Screw for M1300-15501	1	3
TB1.7x4.5	Screw for M1101-21701	2	4
TB1.7x5	Screw for M1101-15501	1	3
TB2x3.5	Screw for M1300-11011	3	10
	for M1300-11021	4	10
TB2x4	Screw for M1300-13701	1	9
TB2x4.5	Screw for M1300-11181	1	10
	for M1200-14511	2	10
TB2x6	Screw for M1300-14401	1	8
	for M1300-21251	2	4
3TB1.7x3	Screw for M1300-24111	2	5
3TB1.7x3	Screw for M1300-28101	2	3,4
3TB1.7x3.5	Screw for M1300-28211	2	5
3TB1.7x4	Screw for M1300-16111	2	1
	for M1300-24321	2	5
	for M1300-24331	2	5

Parts No.	Description	Pcs.	Ref. Page
3TB1.7x4.5	Screw for M1300-24251	2	5
	for M1300-2428T2	2	5
3TB1.7x5	Screw for M1300-28281	2	4
TD1.7x4	Screw for M1300-14912	1	8
	for M1300-1811T2	3	2
TD2x3	Screw for M1300-11181	1	10
	for M1300-11021	4	10
TD2x4	Screw for M1300-11011	2	10
TD2x4.5	Screw for M1200-14511	1	10
3TD1.7x4	Screw for M1300-12252	2	10
B0.16	Steel ball	1	2
E-10	E-ring	1	9
E-13	E-ring	3	7,8
E-17	E-ring	5	7
5.5W3x0.2	Washer	1	9
9W5x0.2	Washer	1	9
	F.P.C. Type 11		
M1300-21161	Lug plate	1	3
M1300-26131	Fitting plate	1	4
PB1.7x4Ni	Screw for M1300-21161	1	3
3TB1.7x4	Screw for M1300-26131	1	4