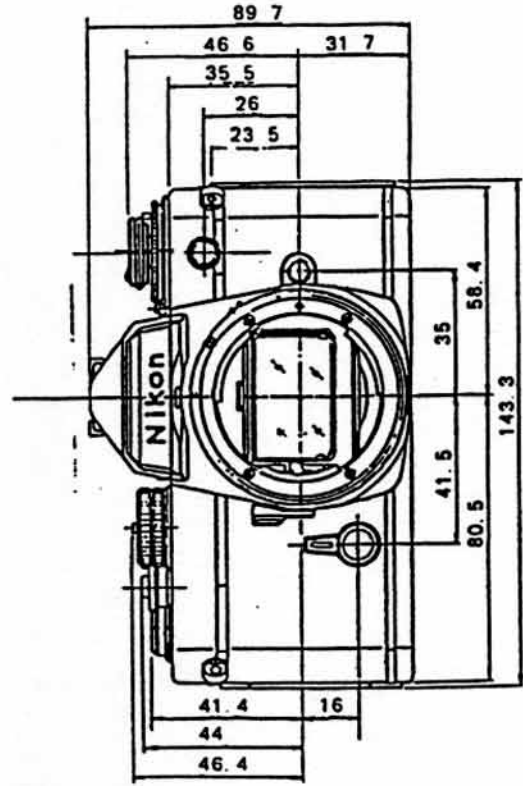
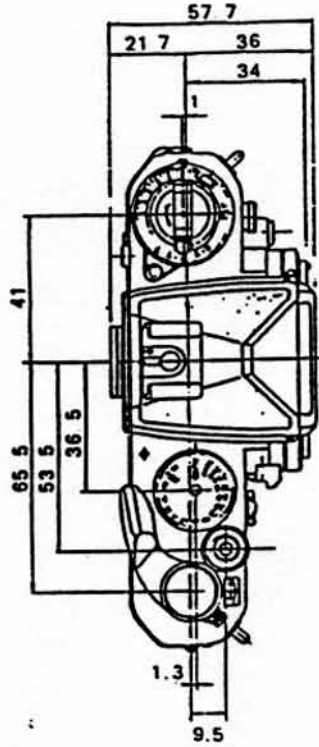


Nikon FE . . .

REPAIR MANUAL

WITH NIKON FE-2

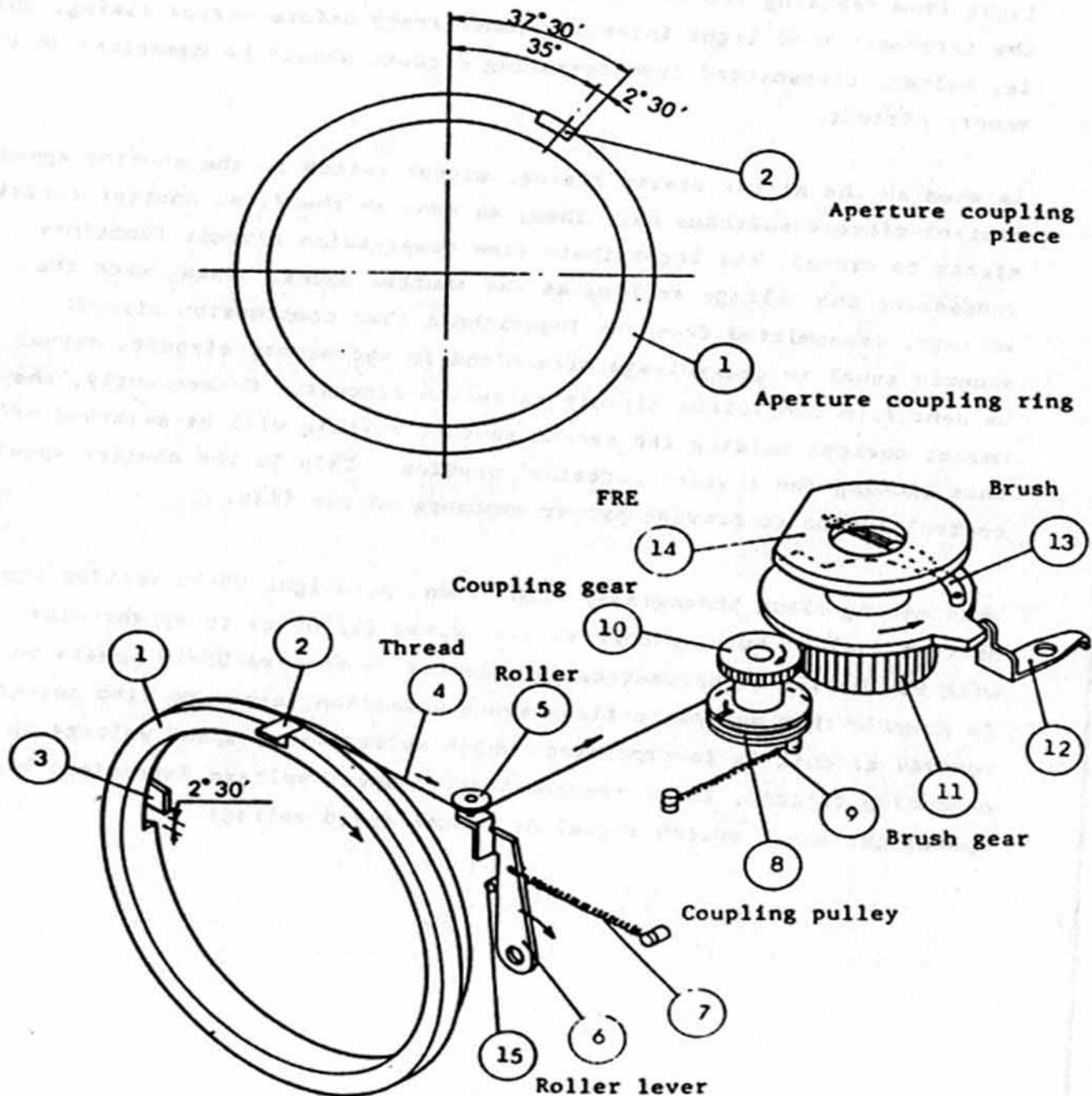


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(2) Meter coupling system

Nikon FE's meter coupling system, same as that of Nikon FM or Nikon EL2, ensures the automatic maximum aperture indexing as soon as an AI-type Nikkor lens is mounted on the camera.



When the lens is mounted onto the camera body without pressing back aperture Coupling Piece ②, lens' meter coupling ridge contacts aperture Coupling Piece ②. Thread ④, fixed onto aperture Coupling ring ① at one end and onto Coupling pulley ⑧ incorporated with Coupling gear ⑩ on the other end, is pulled by Spring ⑨ on Coupling pulley ⑧ so as to rotate ① clockwise.

Coupling gear ⑩ engages with Brush gear ⑪ on which Brush A ⑬ is installed, and Brush A ⑬ contacts FRE ⑭.

The rotation of Brush gear ⑪ to the arrow direction is stopped by Brush gear stopper ⑫ where Brush gear ⑪ engages with Brush gear stopper ⑫. Roller ⑤ is installed free to rotate on Roller lever ⑥ which is pulled by Roller lever spring ⑦ of smaller tension than that of Spring ⑨.

When lens dismounted, Aperture coupling ring ① rotates back to the arrow direction pulled by thread ④ via Spring ⑨ and Coupling pulley ⑧. When the right end of Aperture coupling piece ② locates at 35 degrees from the camera's vertical center line, Brush gear ⑪ engages with Brush gear stopper ⑫ and stops, simultaneously stopping Coupling gear ⑩ and Coupling pulley ⑧.

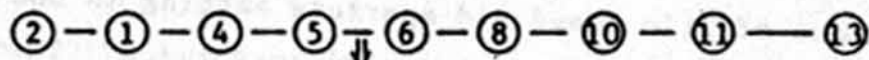
At this stage, however, there still remains a clearance of $2^{\circ}30'$ (corresponding to $1/3$ stop) between Aperture coupling ring ① and Coupling ring stopper ③, and thus Aperture coupling ring ① will further rotate to the arrow direction pulled by Roller lever spring ⑦ via ⑥⑤ and ④.

When the lens is mounted, as soon as ① starts to rotate, ⑥ fitted with ⑦ rotates $2^{\circ}30'$ until ⑥ comes in contact with ⑮. Further rotation of ① will rotate ⑪ and ⑬ via ④, ⑧ and ⑩, thus charging the electrical resistance of FRE ⑭.

Aperture coupling piece ② contacts lens' meter coupling ridge at a position of $37^{\circ}30'$ in case of f1.2 or f1.4 lens set at maximum aperture, while ② contacts at a position of 35° in case of lenses of wider maximum aperture such as f1.8.

Operational sequences

lens' aperture ring



Compensation of $1/3$ stop

(4) Exposure Control Circuitry System

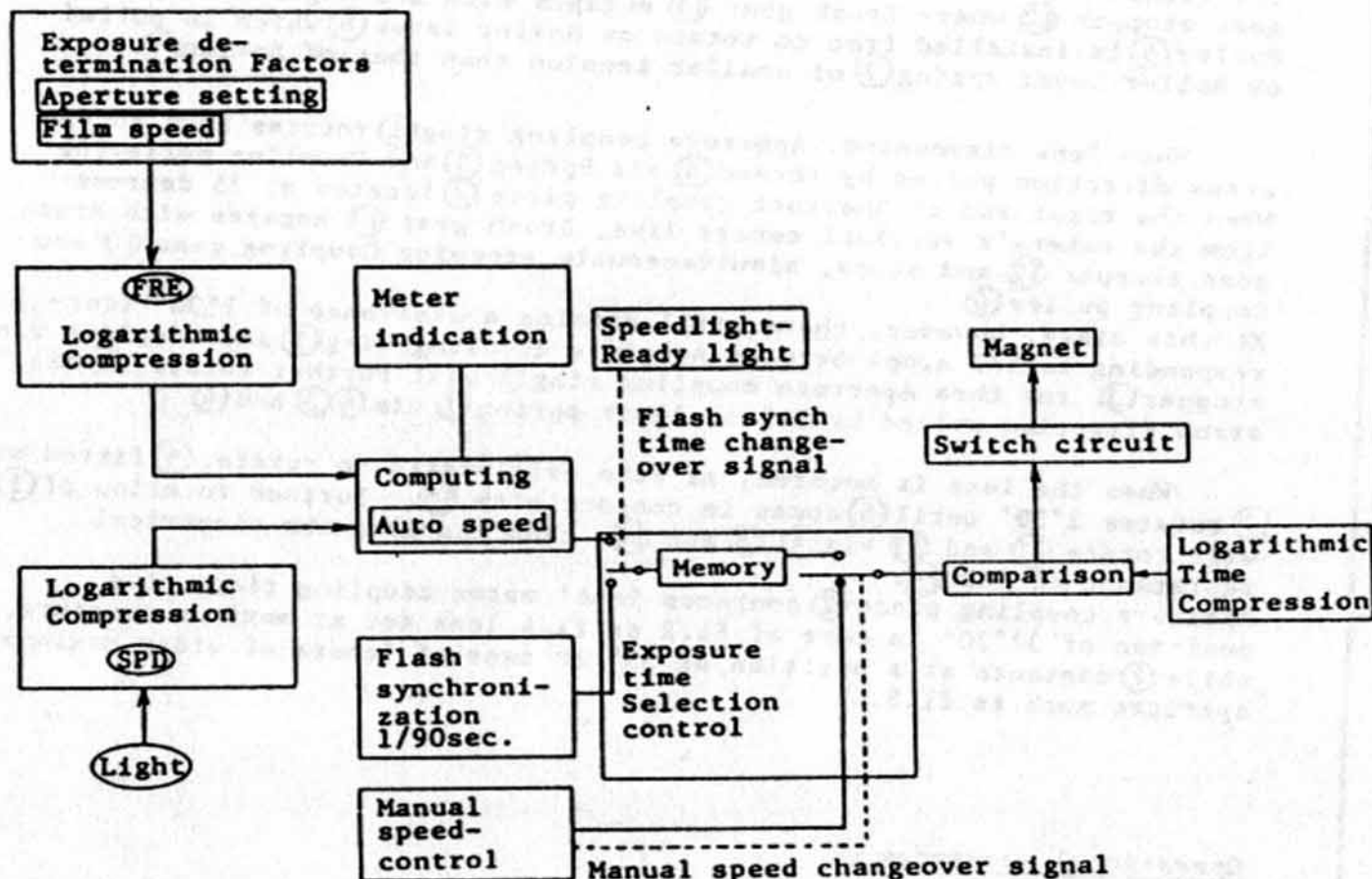


fig.1

First, the informations of film speed and aperture setting in use will be transmitted to FRE and registered as a change of resistance. Then, the resistance will be logarithmically compressed to a voltage change. The other information of light intensity will be registered as photo electric current by silicone photo Diode (SPD) positioned in the optical path in the viewfinder. The photo electric current will be also logarithmically compressed to a voltage change corresponding to the current. The voltages in two logarithmic compression circuits will be transmitted to computing circuit, where the voltage corresponding to the shutter speed for proper exposure will be determined. Consequently, meter needle swings indicating the shutter speed selected inside the viewfinder.

These circuits will be switched on by pulling out film-advance lever to a stand-off position, uncovering a red dot. In case of extremely low brightness out of the measurable range, the voltage, logarithmically compressed from photo electric current, will be detected by "Low-brightness standard voltage" in computing circuit, and the meter needle will swing into the "B" zone, thus warning the brightness to be out of the measurable range.

When the shutter release button is depressed, the mirror starts to rise. While the Mirror rising, the optical path will be cut, thus preventing the light from reaching SPD in the optical path in the viewfinder. Therefore, the information of light intensity immediately before mirror rising, that is, voltage transmitted from computing circuit should be memorized in the memory circuit.

As soon as the mirror starts rising, mirror switch in the shutter speed control circuit switches on. Then, as soon as the first shutter curtain starts to travel, the logarithmic time compression circuit functions, condensing the voltage as long as the shutter opens. Then, when the voltage, transmitted from the logarithmic time compression circuit amounts equal to the voltage determined in the memory circuit, signal will be sent from comparison circuit to switch circuit. Consequently, the magnet current holding the second shutter curtain will be switched off, thus closing the shutter curtains' opening. This is the shutter speed control system to provide proper exposure on the film.

When making flash photography with Nikon speedlight SB-10 setting the shutter dial at Auto, proper shutter speed (1/90sec) to synchronize with SB-10 will be automatically selected as soon as SB-10 powers on. To provide this automatic flash synchronization, exposure time selection control circuit is incorporated, which selects auto-speed voltage in computing circuit, flash-synchronization-speed voltage determined by speedlight power switch signal or manual speed voltage.

Exposure time selection control circuit

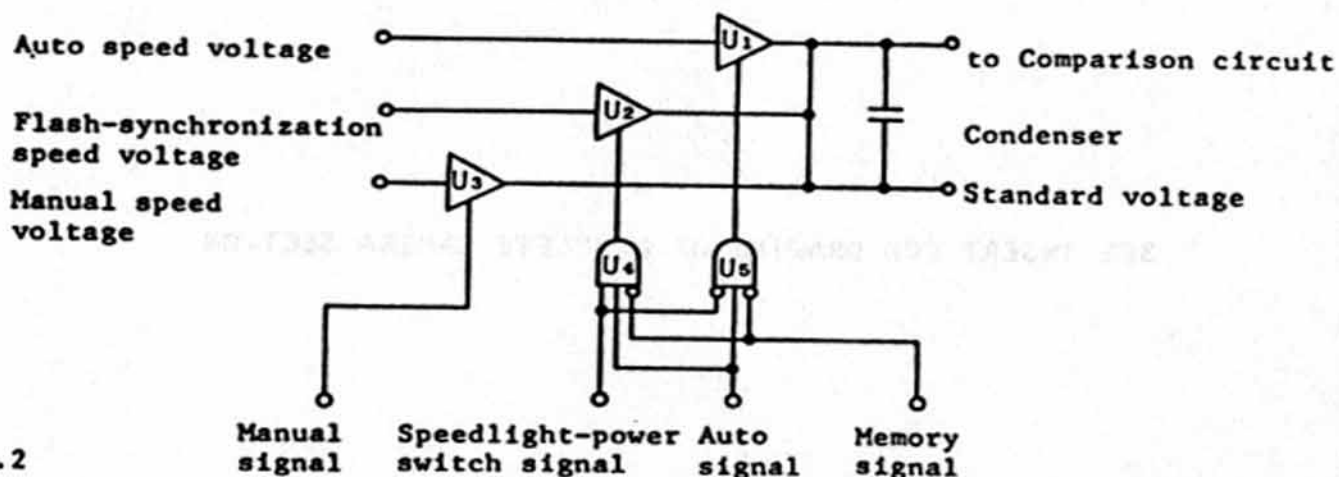


fig.2

U1, U2 and U3, analogue switches, functions as buffer amplifier when control terminal is high, and perform switch functioning to make the output impedance infinity when control terminal is low. U4 and U5 are AND circuits.

Therefore, as illustrated in Figure 2, Auto speed voltage, flash synchronization speed voltage or Manual speed voltage will be selected by auto signal, speedlight power switch signal or manual signal respectively, and transmitted to comparison circuit. Note that Auto speed voltage and flash synchronization speed voltage will be memorized into condenser by memory signal immediately before mirror rising or memory-lock operation.

Further, with this circuit incorporated, ready light LED glows on and off to warn if the shutter dial is set at the non-synchronizing manual speed. This warning system is possible by inputting the manual shutter speed signal of $1/1000 - 1/250$ sec. which does not synchronize with AND circuit, and the oscillator of 2 Hz. Inputting the both will turn ON and OFF a transistor and let the ready light LED glows on and off. At the slower Manual speed than $1/250$ sec., transistor turns off, thus turning the LED on to indicate proper synchronization.

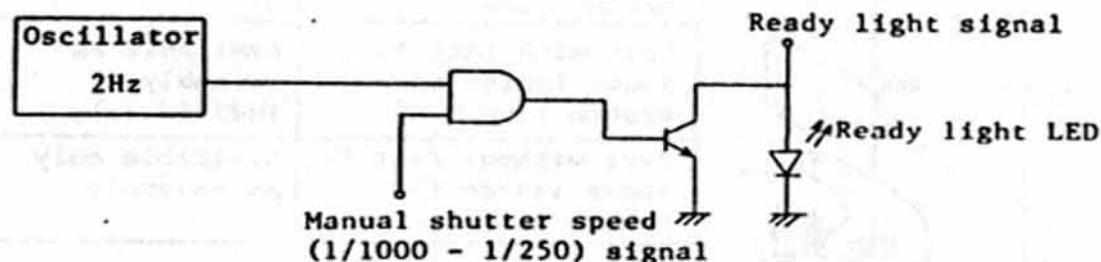


fig.3

Battery check system

To enable the aforementioned exposure control, battery check system is incorporated as illustrated in Figure 4.

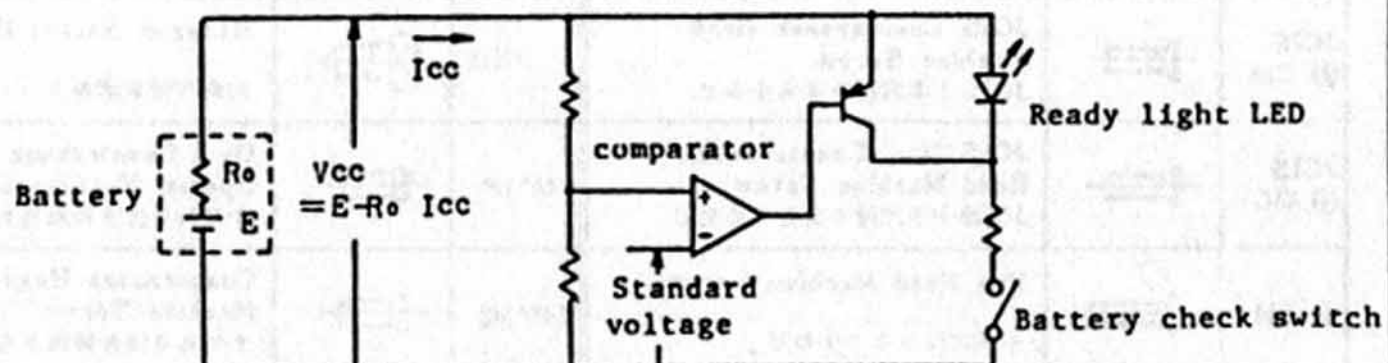



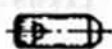

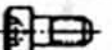








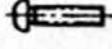
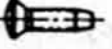
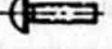

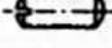






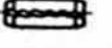

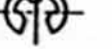
fig. 4

When battery is drained out, battery check switch turns on, thus extinguishing ready light LED. To ensure the LED extinguishment, transistor connected to the LED will be turned on and consumption current (I_{cc}) will be increased. As a result, the voltage determined by I_{cc} and inner resistance of battery (R_o) will be accordingly increased, thus providing hysteresis with V_{cc} and ensuring the positive extinguishment of ready light LED.

Current consumption	Metering exposure (EV9, ASA100, F5.6)	approx. 2mA
	Shutter running (Room temperature 3V)	approx. 12mA
Checker-off voltage	2.25 \pm 0.15V	

MARKS IN THE PARTS LIST 記号説明

(1) Standard mechanical elements 標準機械要素

Mark 記号	Shape 形状	Name 名称	Mark 記号	Shape 形状	Name 名称
JCIS ⊕ PM		JCIS Pan Head Machine Screw JCIS十字穴付きなべ小ねじ	HS		Hexagon Socket Head Set Screw 六角穴付き止めねじ
JCIS ⊕ CM		JCIS Countersunk Head Machine Screw JCIS十字穴付きさら小ねじ	HSB		Hexagon Socket Head Bolt 六角穴付きボルト
JCIS ⊕ OCM		JCIS Oval Countersunk Head Machine Screw JCIS十字穴付き丸さら小ねじ	(45°)P		Oval Countersunk Head Special Machine Screw すりわり付き特殊丸さら小ねじ
⊕ PM		Pan Head Machine Screw 十字穴付きなべ小ねじ	(45°)Q		Countersunk Head Special Machine Screw すりわり付き特殊さら小ねじ
⊕ CM		Countersunk Head Machine Screw 十字穴付きさら小ねじ	⊕ PTB		Pan Head Tapping Screw Type B 十字穴付きなべタップピンねじB
⊕ OCM		Oval Countersunk Head Machine Screw 十字穴付き丸さら小ねじ	⊕ CTB		Countersunk Head Tapping Screw Type B 十字穴付きさらタップピンねじB
⊕ RM		Round Head Machine Screw 十字穴付き丸小ねじ	⊕ OCTB		Oval Countersunk Head Tapping Screw Type B 十字穴付き丸さらタップピンねじB
⊕ TM		Truss Head Machine Screw 十字穴付きトラス小ねじ	⊕ PT		Pan Head Tapping Screw 十字穴付きなべタップピンねじ
SR		Set Screw Round Point すりわり付き止めねじ丸さき	⊕ CT		Countersunk Head Tapping Screw 十字穴付きさらタップピンねじ
SC		Set Screw Cone Point すりわり付き止めねじとがりさき	⊕ OCT		Oval Countersunk Head Tapping Screw 十字穴付き丸さらタップピンねじ
SH		Set Screw Half Point すりわり付き止めねじくぼみさき	N		Hexagon Nut 六角ナット
TP		Taper Pin テーパピン	SPP		Spring Pin スプリングピン
STP		Straight Pin 平行ピン	E		E-ring E型止め輪

SEE INSERT FOR DRAWING OF COMPLETE CAMERA SECTION

- Note:**
- 1) Parts in the explosion drawings are shown in the facing page as 35FB parts or as P33FB parts.
 - 2) Be sure to fill the part order form, respectively for 35FB parts and for P33FB parts.
 - 3) Parts in the Part List of this section are available as individual parts or as assembly.

How to use explosion drawings:

Part-Classification	Term of Supply	Mark
Part with Part No., shown outside the broken line	Available as individual part	○
Part without Part No., shown outside the broken line	Not available as repair part	×
Part with Part No., shown inside the broken line	Available as assembly or individually	○△
Part without Part No., shown inside the broken line	Available only as assembly	△

P3 Assembly No. (component parts shown inside the broken line)

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 67	H シュー Hot-shoe contact		35FB P3	巻上レバー Wind-up lever	(Black)
68	シューバネ Shoe spring	(Black)			
78	ペンタ革 Penta cover leatherette		P33FB		
84	アースラグ板 Earth lug plate		P33FB 69	押し接点 Upper shoe switch contact	
95	LED 遮光板 LED light baffle		70	受け接点 Lower shoe switch contact	
403	レバー押えねじ Wind-up lever screw	(Black)	71	D カラー Collar	
468	リリース扣飾り環 Release button ring		72	接点座環 Contact washer	
469	かぶせリリース環 Release ring		73	沖 針 Switch plunger	
491	多重摺りツマミ Multi-exposure knob		74	シュー座金 Shoe washer	
493A B, C	多重摺りシート Multi-exposure sheet, A, B, C		402	巻上レバー用皮 Wind-up lever leatherette	
503-1	枚数計窓 Frame-counter window		406	レバー戻しバネ Film-advance lever returning spring	
575	飾り環 Cover ring	(Black)	470	リリース内筒 Release inner tube	
577	飾り環座金 Cover ring washer		495	指めて Wind-up lever knob	
639	止め輪 Snap ring		535A	リリース扣 Release button	
873	シュービス (73) Hot-shoe		535B	リリースガイドビス Release guide screw	
944A	Jプリント板ゴム J print rubber		803	カバービス JCIS ⊕ PM 1.7x3 Type(1) Screw	(Black)
			832	小ねじ JCIS ⊕ PM 2x4.5 Type(1) Screw	
C	上蓋部 Top cover	(Black)			
C1	シュー座モールド Hot-shoe mould		C4	接眼窓 Eyepiece ring	
C6	レディライトプリント板 Ready-light printed circuit				

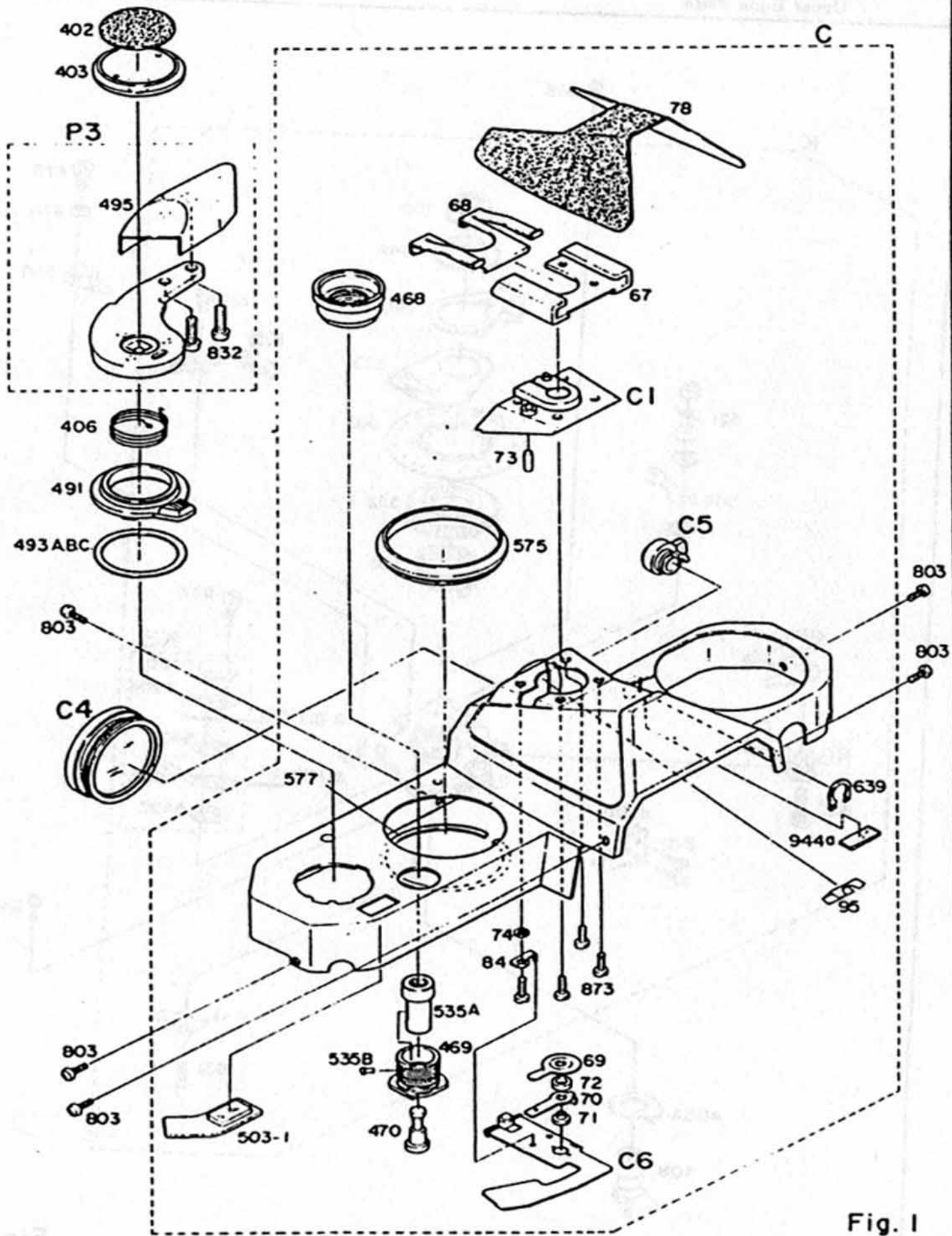


Fig. 1

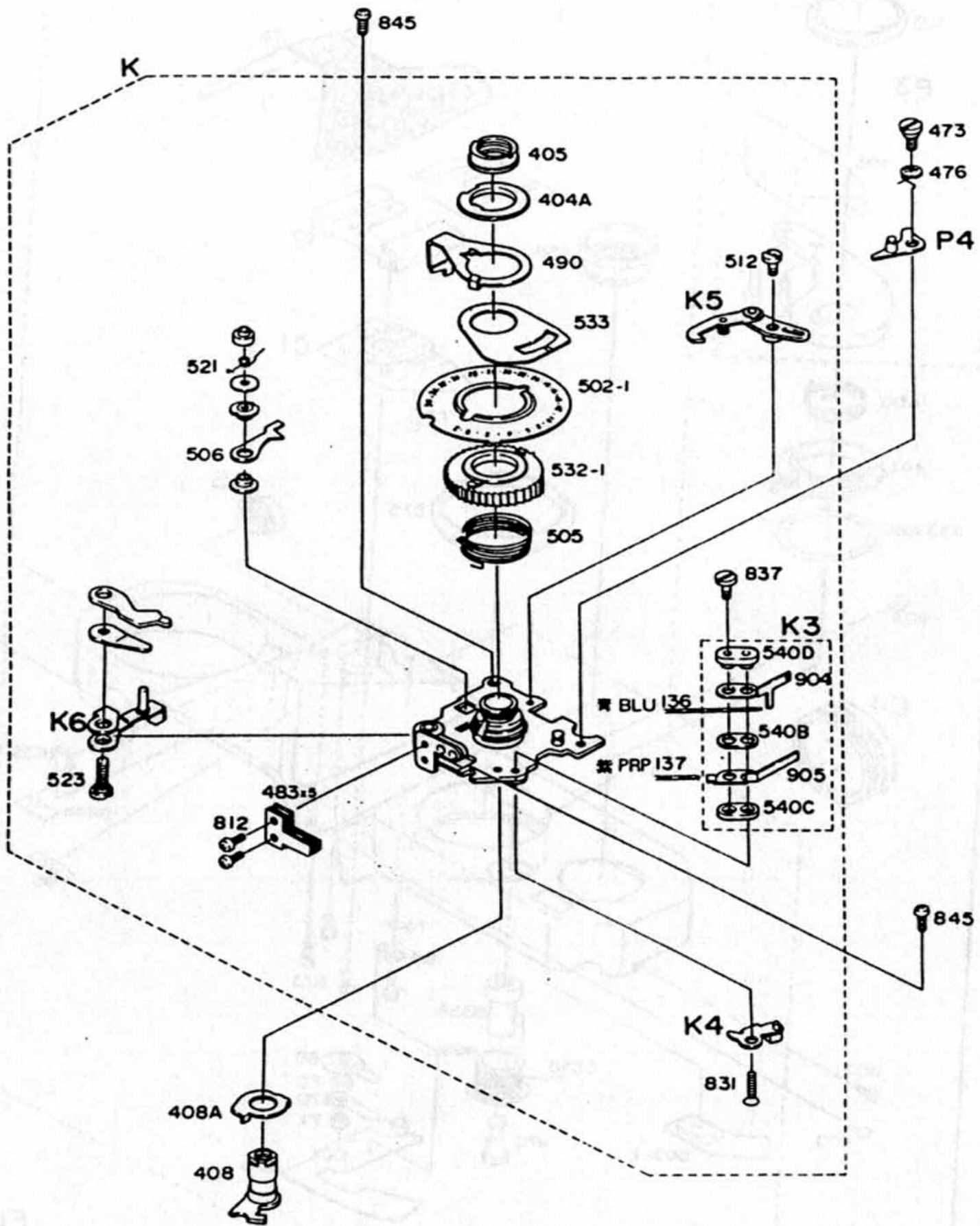


Fig. 2

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 136	MD スイッチコード Lead wire, MD switch		P33FB		
137	後幕シグナルコード B Lead wire B, second curtain signal		P33FB 405	レバー軸ナット Lever axle nut	
404A	枚数計押え板 Counter retaining ring		408	巻上軸 Film advance shaft	
476	スイッチ制限バネ Switch stopper spring		408A	スプロケット制限除板 Sprocket stopper release plate	
490	多重撮り連結レバー Multi-exposure lever		473	スイッチ制限軸 MD switch stopper axle	
540B C, D	MD スイッチ絶縁板 B, C, D MD switch insulation Plate B, C, D		483	クリックレバーバネ Click lever spring	
837	MD スイッチ取付ビス MD switch screw		502-1	枚数計 Frame-counter dial	
904	MD スイッチ接片 A MD switch contact A		505	カウンターバネ Counter spring	
905	MD スイッチ接片 B MD switch contact B		506	止爪 Ratchet claw	
			512	送り爪レバー軸 Advance claw lever axle	
			521	零戻しバネ Resetting spring	
K	上地板 Upper base plate		523	零戻しレバー軸 Counter reset lever axle	
K3	MD スイッチ MD switch		532-1	ラチエット Ratchet	
K4	スイッチレバー Lever switch		533	指標板 Frame-counter index	
P4	スイッチ制限 Switch lock lever		812	小ねじ JCIS [⊗] PM 1.7x2.2 Type(1) Screw	
			831	MD スイッチビス JCIS [⊗] CM 1.4x4 Screw	
			845	巻戻し軸受けビス JCIS [⊗] PM 2x3 Type(1) Screw	
			K5	送り爪レバー Advance lever	
			K6	零戻しレバー Counter reverse lever	

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 126	レバースイッチコード Lead wire Lever switch		P33FB 897A B, C	巻上ギヤワッシャー Washer	
135	マグネットプラスコード Lead wire, magnet ⊕				
A11	下地板 Lower base plate				
			A9	スプール軸 Spool shaft	
			A12	スプロストッパー Sprocket stopper	
P33FB			A18	巻上ギヤ Wind up gear	
P33FB 412	三羽根爪押えバネ Charge cam claw retaining spring				
413	巻上げカム Film advance cam				
450	スプロストッパー戻しバネ Sprocket stopper returning spring				
487	主スイッチ片 A Lever switch contact A				
488	" B Lever switch contact B				
496	スプロ制限板バネ Sprocket stopper spring				
534	スイッチ押え板 Claw release pin				
540A	MDスイッチ絶縁板 MD switch insulation plate A				
815	巻上軸ビス Film-advance shaft screw (left handed)				
819	小わじ JCIS® PH 1.4x3 Type(3) Screw				
835	下地板取付ビス B Lower base plate screw				
888	スプロストッパービス Sprocket stopper screw				

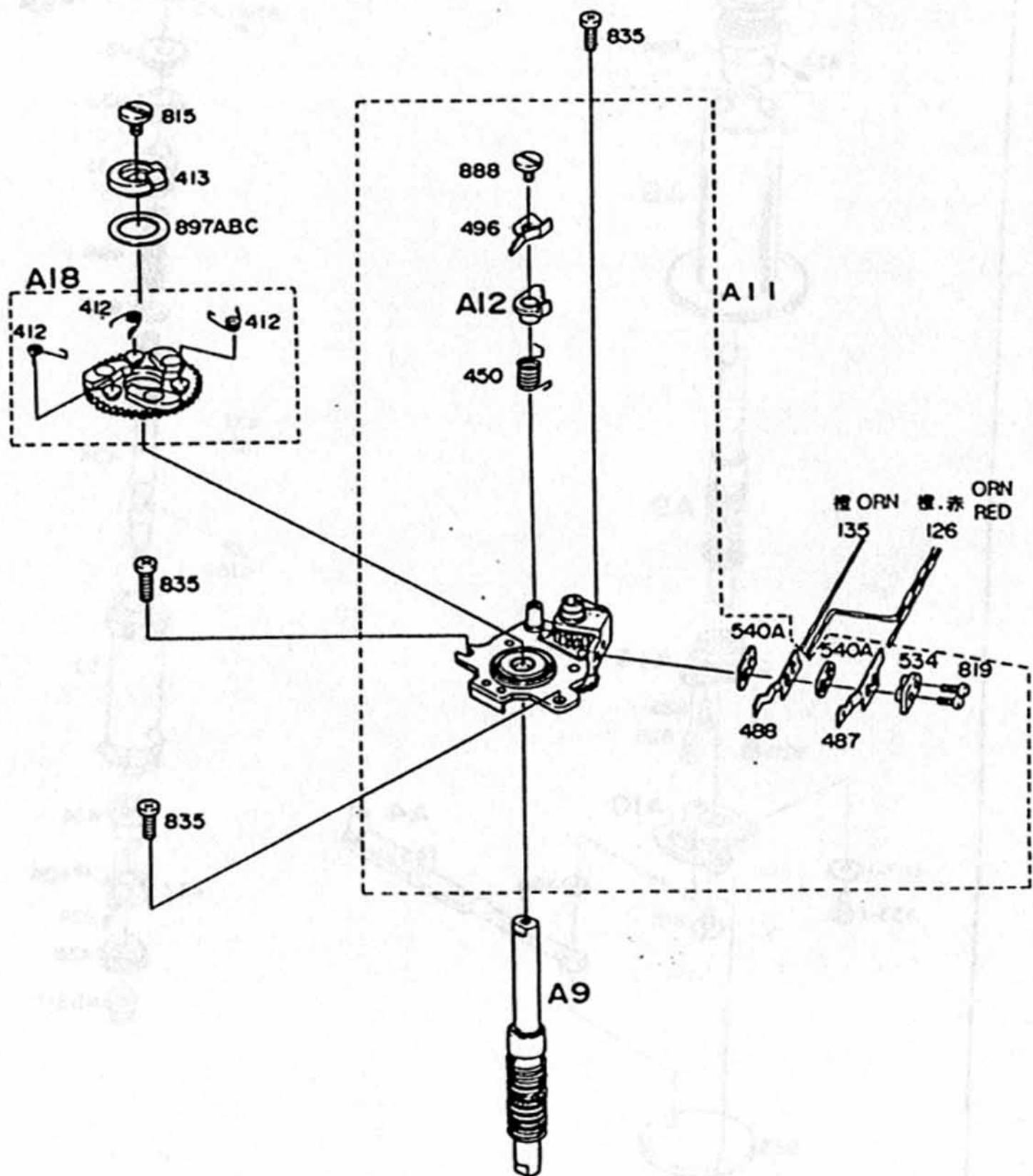


Fig. 3

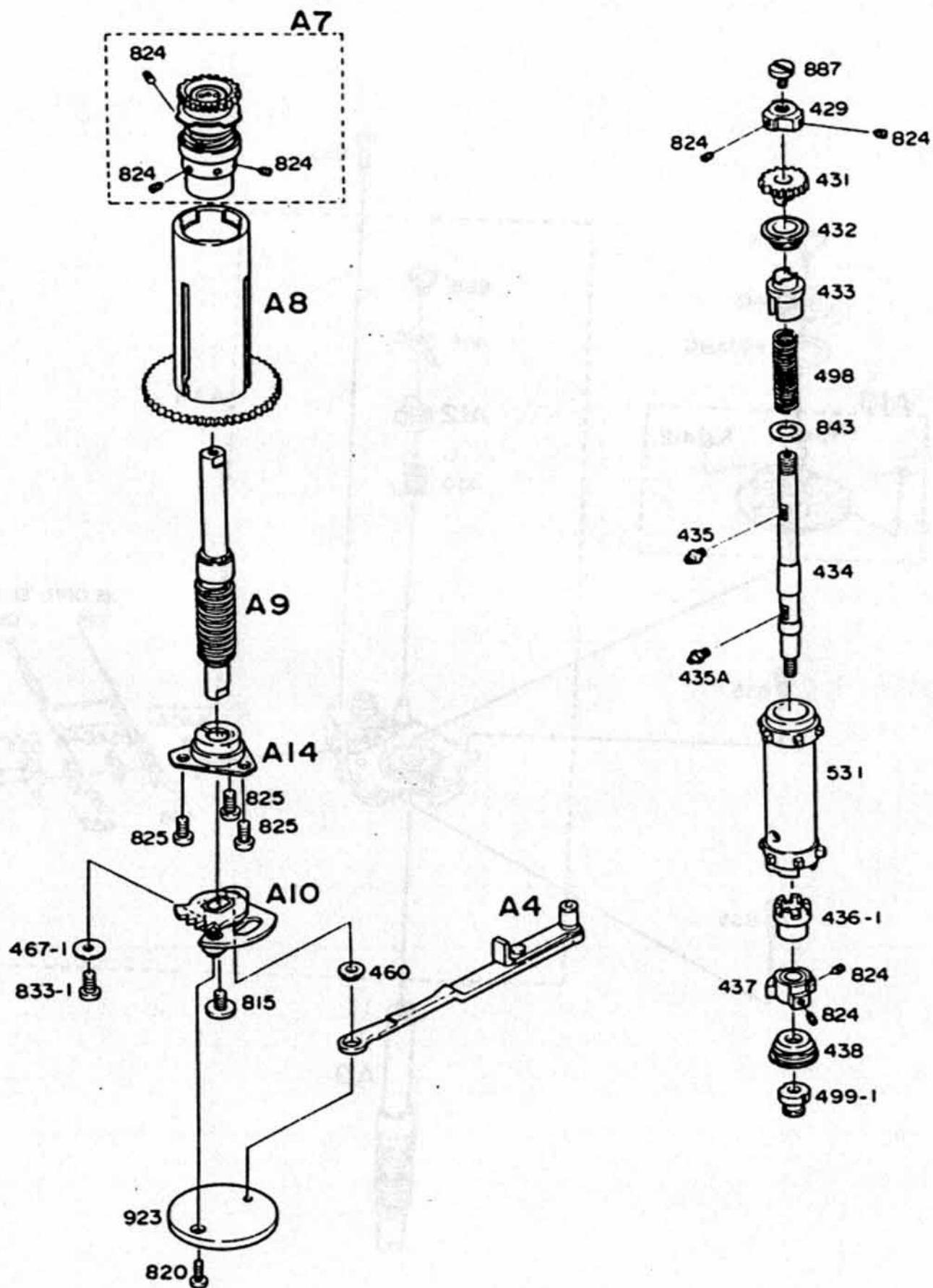


Fig. 4

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB			P33FB 824	ギヤセットビス Gear set screw	
			825	メタルビス JCIS \oplus PH 2x2.5 Type(1)	
			833-1	ゆるみ止めビス Set screw	
P33FB			843	スプロケットパネ受座金 Washer	
P33FB 429	スプロケット制限カム Sprocket stopper cam		887	スプロケット左わじ Sprocket screw (left handed)	
431	スプロ上ギヤ Sprocket upper gear		923	モーターカップリング Motor coupling	
432	スプロケット軸受 Sprocket shaft bearing				
433	スプロケットカラー Sprocket collar				
434	スプロケット軸 Sprocket shaft		A4	シャッターチャージレバー Shutter charge lever	
435A	スプロケットビス A Sprocket screw A		A7	スプール上ギヤ Spool upper gear	
436-1	スプロケットローラー A Sprocket roller A		A8	スプール Spool	
437	スプロカラー Aナット Sprocket collar A nut		A9	スプール軸 Spool shaft	
438	スプロ軸受 Sprocket shaft bearing		A10	セットカム Set cam	
460	ピットカムカラー Rewind button		A14	スプール軸受ケース Spool shaft bearing case	
467-1	ゆるみ止めカラー Anti-reversing claw shaft				
498	スプロケットばね Sprocket spring				
499-1	スプロケット軸カラー B Sprocket shaft collar B				
531	スプロケット Sprocket				
815	巻上軸ビス Film-advance shaft screw (left handed)				
820	カップリングビス Coupling screw				

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 131	管制部コード A Lead wire A, Shutter speed control				
132	管制部コード B Lead wire B, Shutter speed control				
541A	シャッターダイヤル管 Shutter dial tube				
541B	シャッター目盛板 Shutter speed scale				
541D	ボタン飾り座 Set screw				
898	Sダイヤル基板ビス Shutter dial screw				
R	管制部 Shutter speed control				

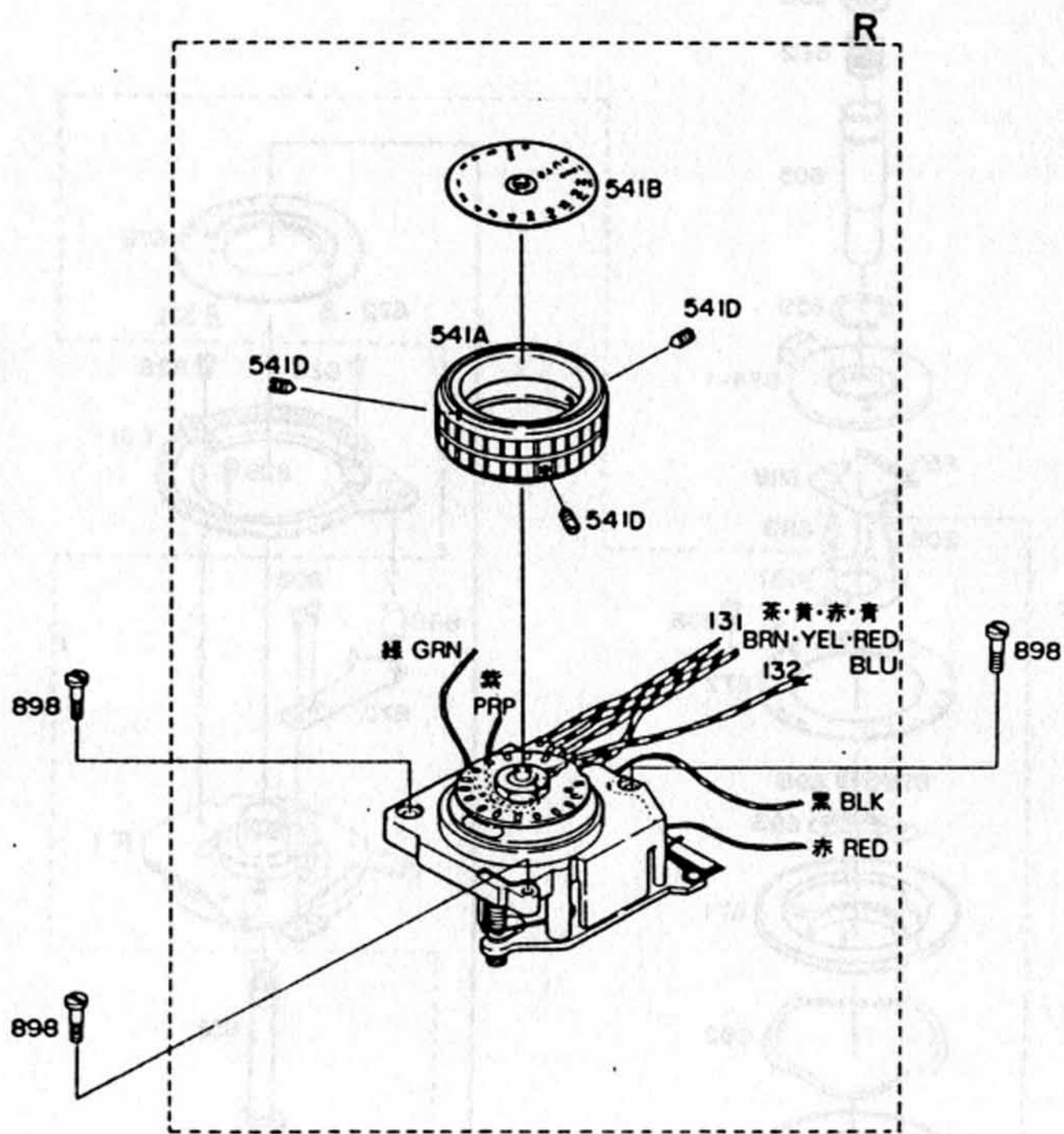


Fig. 5

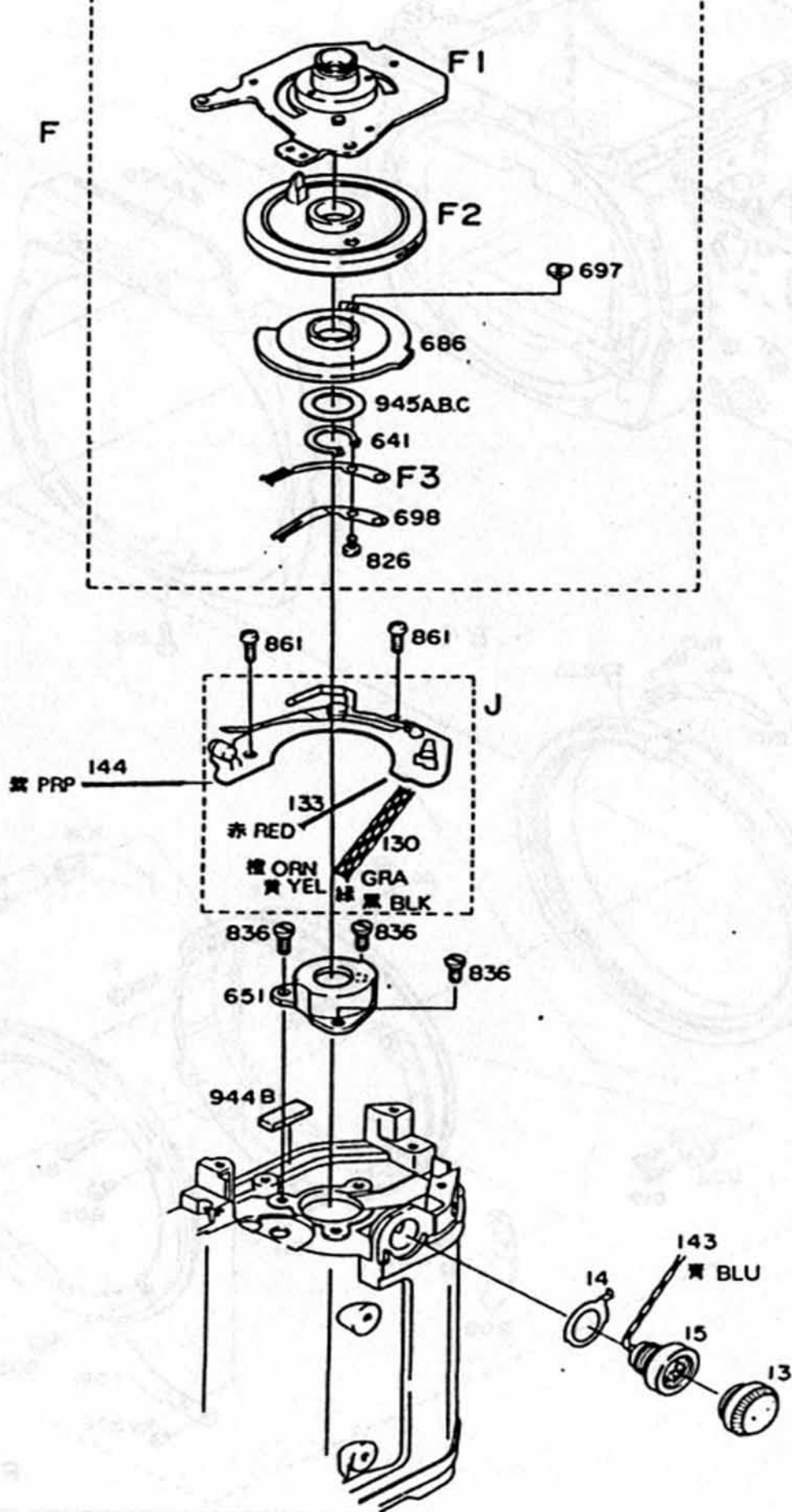


Fig. 6

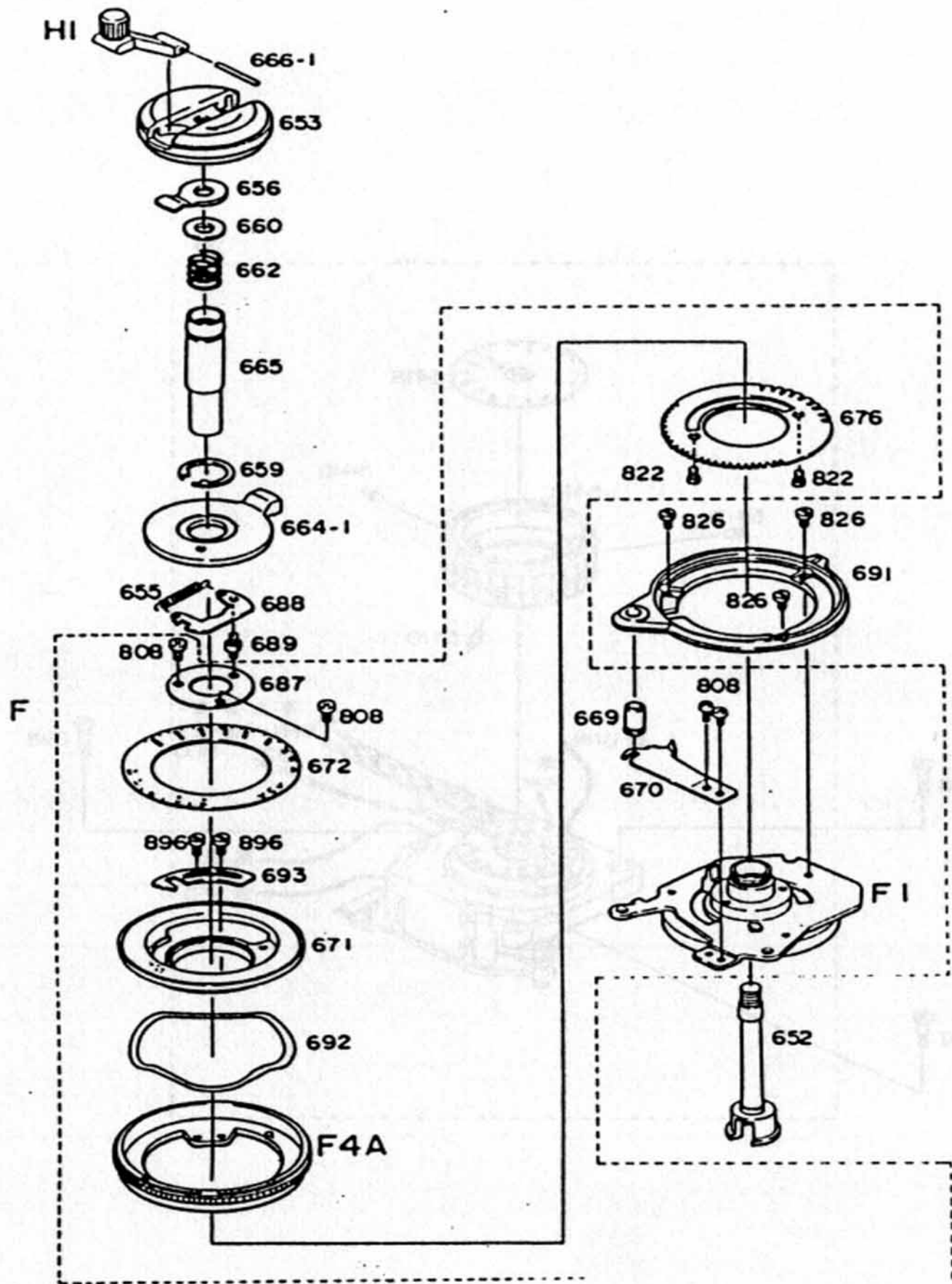


Fig. 7

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 652	巻戻軸 Rewind shaft		35FB 826	ブラシ板ビス Brush screw	
653	巻戻しノブ Rewind knob		896	運動板取付ビス Aperture coupling plate screw	
655	巻戻し軸受け板用バネ Spring				
659	開閉ノブ押えグリップ Cover latch retaining clip				
660	巻戻軸座金 Rewind shaft washer		F	FRE 部 FRE	
662	フリクションバネ Friction spring		F1	ASA ダイアル基板 ASA dial mount	
664-1	開閉ノブ O.C. knob		F4A	ASA ダイアル ASA dial	
665	巻戻軸ガイド Rewind shaft guide		H1	巻戻しレバー Rewind crank	
669	ASA クリック釦 ASA click button				
670	ASA クリックバネ ASA click spring				
671	ASA 目盛貼付環 ASA dial base disk		P33FB		
672	ASA 目盛板 ASA dial		P33FB 656	レバー受バネ Rewind crank spring	
676	ASA クリック板 ASA click plate		666-1	巻戻しレバー軸 Rewind crank shaft	
687	目盛貼付環押え板 ASA dial base disk		822	ASA 目盛貼付環制限 ASA-dial base disk stopper	
688	開閉ロックレバー Rewind knob lock lever				
689	ロックレバー軸 Knob lock lever shaft				
691	ASA ダイアル受座 ASA dial mount				
692	露出補正バネ Exposure correction spring				
693	ASA 運動板 ASA coupler				
808	抵抗器回転軸 FRE shaft screw				

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 14	ターミナルアース板 Terminal earth plate		35FB J	FRE プリント板 Printed circuit	
130	PREコード Lead wire, FRE				
133	プラスコード A Lead wire A		P33FB		
143	シンクロコード B Lead wire B, synch		P33FB 13	ターミナルキャップ Terminal cap	
144	チエッカーコード Lead wire, checker		15	シンクロソケット Synch socket	
641	止め輪 Snap ring				
651	巻戻軸受 Rewind shaft bearing				
686	ブラシギヤ Brush gear				
697	ブラシナット Brush nut				
698	滑動ブラシ B Sliding brush B				
826	ブラシビス Brush screw				
836	巻戻し軸受ビス Rewind shaft bearing screw				
861	PREプリント板ビス FRE printed board screw				
944B	Jプリント板ゴム J print rubber				
F	FRE 部 FRE				
F1	ASAダイヤル基板 ASA dial mount				
F2	PRE 環 FRE ring				
F3	ブラシ A Brush A				

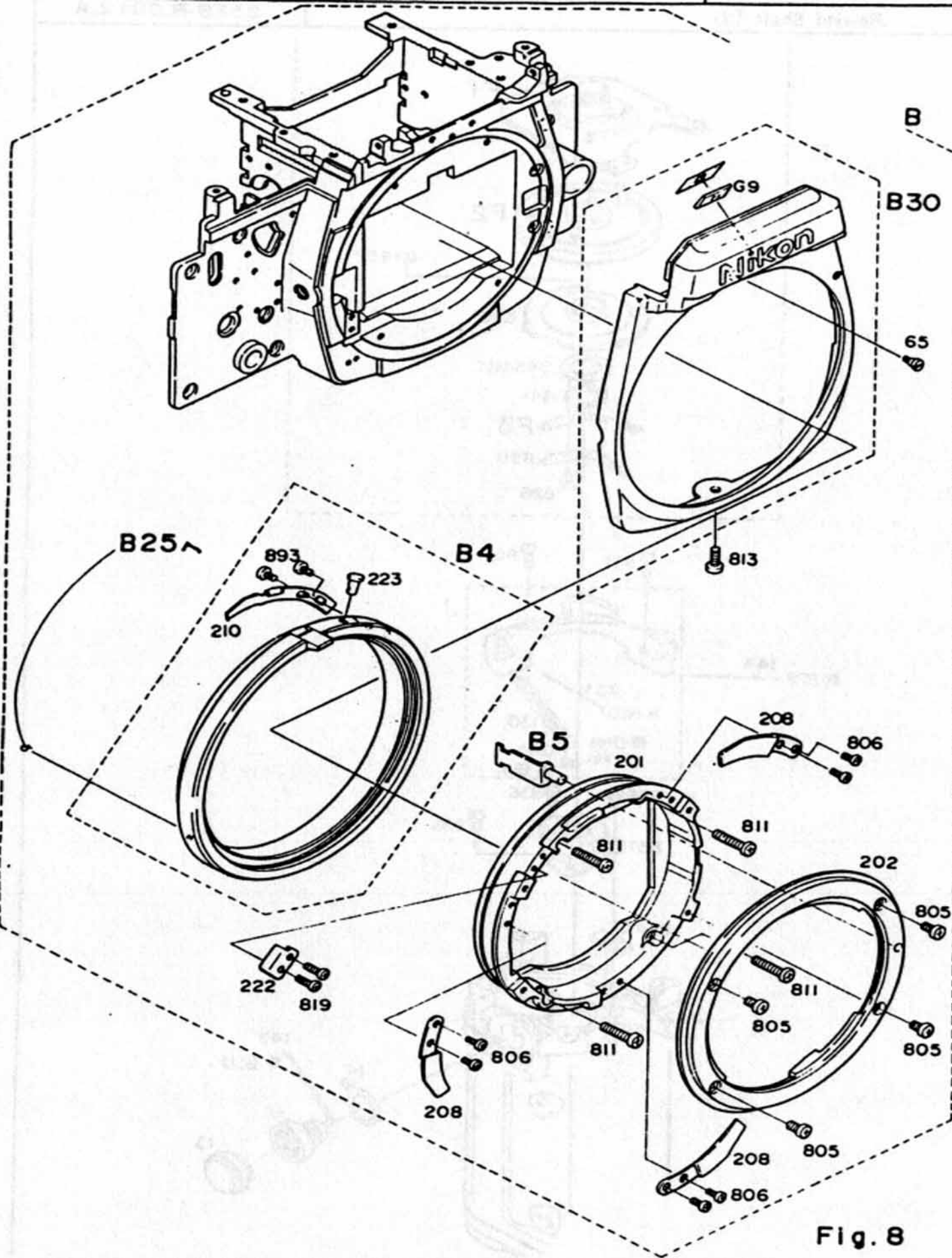


Fig. 8

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 201	マウント台 Bayonet mount		P33FB 893	絞り連動片パネビス Aperture coupling piece screw	
222	連動環回転制限 Coupling ring stopper				
G9	レンズ Lens				
			B5	脱レバー Lens release lever	
B	前板 Front plate				
B4	絞り連動環 Aperture coupling ring				
B30	前カバー銘板 Front cover	(Black)			
P33FB					
P33FB 65	前カバー用段ビス Front cover screw	(Black)			
202	バヨネット環 Bayonet				
208	バヨネットパネ Bayonet spring				
210	絞り連動片パネ Coupling piece spring				
223	連動片パネボタン Coupling piece spring button				
805	バヨネット止ビス Bayonet set screw				
806	小ねじ JCIS ⊕ PM 1.7x1.8 Type(1) Screw				
811	バヨネット台ビス Bayonet mount screw				
813	前カバービス Front cover screw	(Black)			
814	小ねじ JCIS ⊕ PM 1.4x3 Type(3) Screw				

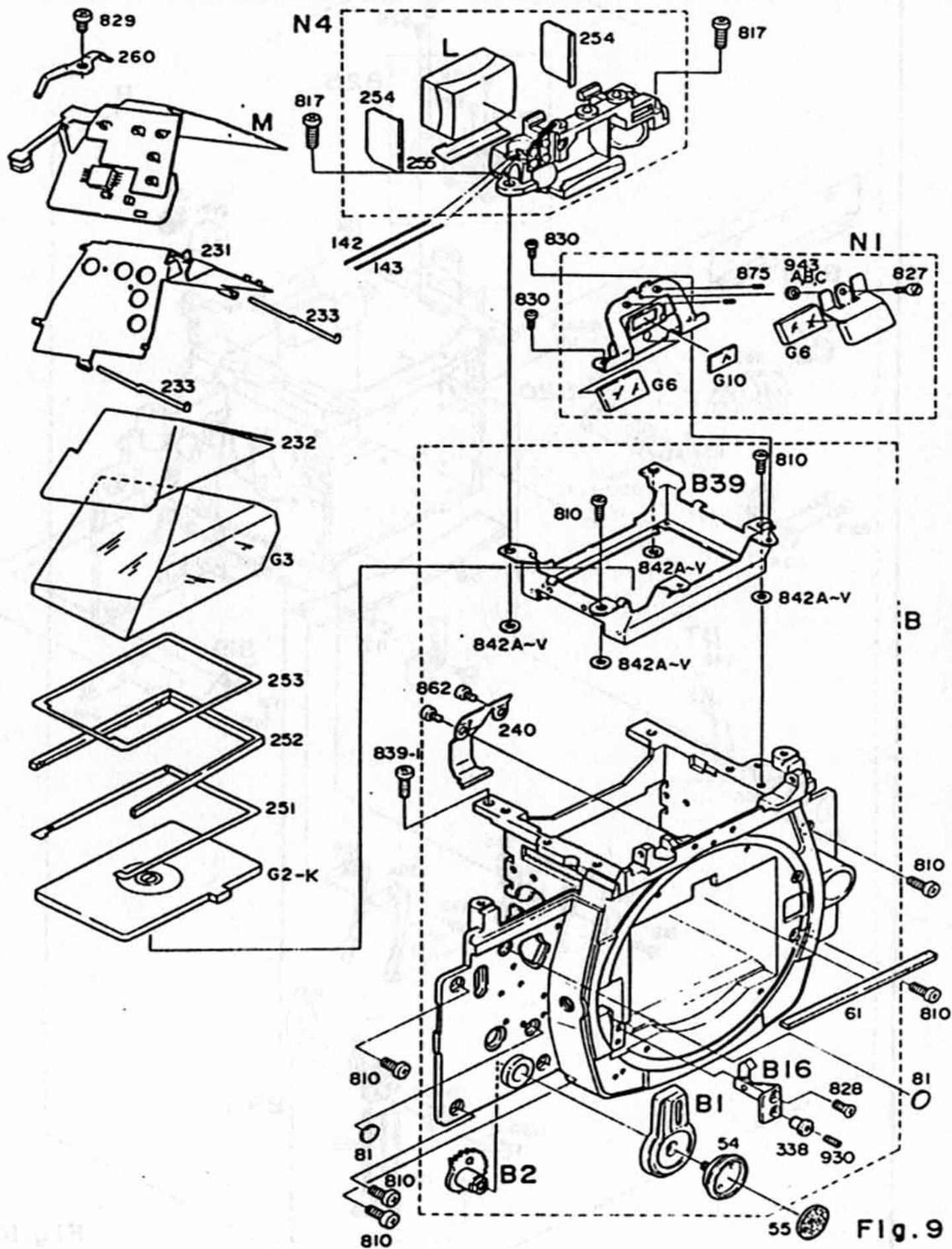


Fig. 9

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 61	ミラーアップ受けモルト Mirror-up buffer		35FB G2-K	フレネル Kタイプ Fresnel screen K type	
81	前板孔カバー Front plate hole lid		G10	レンズ Lens	
142	シンクロコード A Lead wire A, synch				
143	シンクロコード B Lead wire B, synch				
231	ペンタ押え板 Prism retaining plate		B	前板 Front plate	(Black)
233	プリズム押えバネ Prism retainer spring		B2	セルフ起動ギヤ Self-timer gear	
240	スクリーンロックバネ Screen lock spring		B16	45° ストッパー 45° stopper	
251	視野枠 Finder field frame		B39	プリズムボックス Prism box	
252	間隙棒 Spacer		L	接眼レンズ Eyepiece lens	
253	プリズム絞り板 Prism mask		M	IC プリント板 IC printed circuit	
254	接眼構遮光板 Light baffle		N1	ミラー保持基板 Mirror retaining base plate	
260	SPD プリント板押え SPD printed board retainer		N4	接眼器ールドメザネ Eyepiece mold	
338	45° ストッパー座止ビス 45° stopper base screw				
827	ブラシ連動ギヤビス Brush coupling gear screw				
828	小ねじ JCIS [⊕] CM 2x2.5 Type(1) Screw		P33FB		
839-1	小ねじ JCIS [⊕] PM 1.7x4.5 Type(3) Screw		54	セルフレバービス Self-timer lever screw	(Black)
862	小ねじ JCIS [⊕] PM 1.7x1.5 Type(1) Screw		55	セルフレバー用 Leatherette	
930	ミラースイッチ調整ビス Mirror switch adjusting screw		232	プリズム押えシート Prism retainer	
943A	ミラー調整用 Washer		255	接眼レンズ押え板 Eyepiece retainer	
943B	ミラー調整用 Washer		810	前板取付ビス Front plate screw	

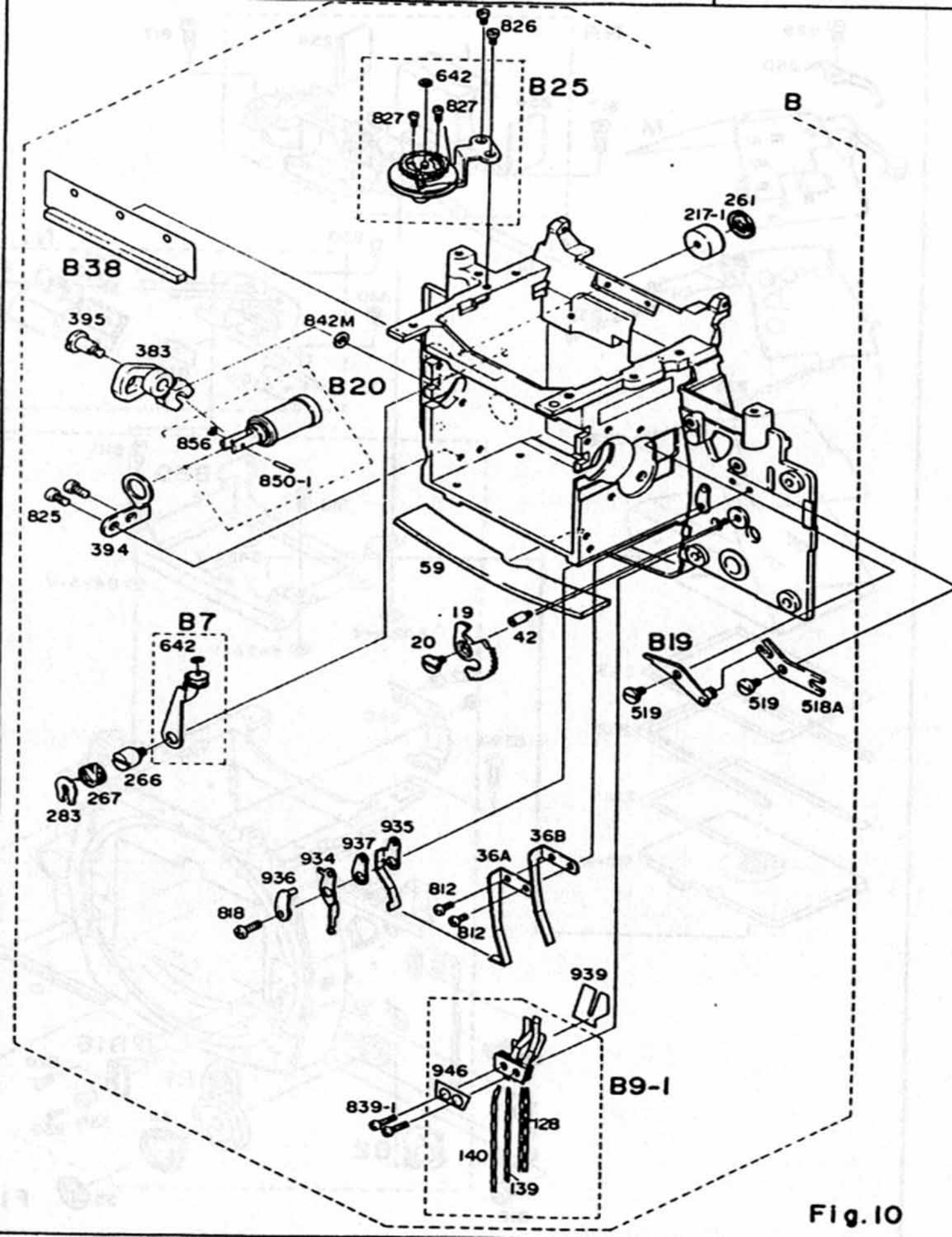


Fig. 10

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 19	セルフ連動ギヤ B Self-timer gear B		35FB 936	メモリースイッチ絶縁板A Memory switch insulator A	
20	セルフ連動軸 Self-timer coupler		937	メモリースイッチ絶縁板B Memory switch insulator B	
36A	メモリースイッチバネ A Memory switch spring A		939	絶縁ルミラー Front plate insulator	
36B	メモリースイッチバネ B Memory switch spring B		946	ミラースイッチ押え板 Mirror switch retainer	
42	セルフギヤ制限 Self-timer gear stopper				
128	シャッタースイッチコード Lead wire, shutter switch		B7	運動コロ Roller lever	
139	メモリーロックコード Lead wire, memory lock		B9-1	ミラースイッチ Mirror switch	
140	ミラースイッチコード Lead wire, mirror switch		B19	リリースリバー Release lever	
266	コロレバー軸 Roller lever axle		B25	ブラシ連動ギヤ Brush coupling gear	
267	コロレバーバネ Roller lever spring		B38	ミラーボックス遮光板 Mirror box light-shield plate	
283	G リング G ring				
518A	シーソーレバー Seesaw lever		P33FB		
519	リリースレバー軸 Release lever axle		P33FB 59	ミラーボックス下部モルト Mirror box bottom buffer	
642	E-リング E-ring		217-1	着脱ボタン Lens release button	
818	小ねじ JCIS® PH 1.7x3 Type(3) Screw		261	レンズ着脱ボタン墊 Lens release button pad	
826	ブラシ板ビス Brush screw		383	エアダンパー駆動レバー Air damper lever	
827	ブラシ連動ギヤビス Brush coupling gear screw		394	エアダンパーホルダー Air damper holder	
839-1	小ねじ JCIS® PH 1.7x4.5 Type(3) Screw		395	エアダンパー駆動レバー 止めビス Air damper lever screw	
934	メモリースイッチ A Memory lock switch A		812	小ねじ JCIS® PH 1.7x2.2 Type(1) Screw	
935	メモリースイッチ B Memory lock switch B		825	小ねじ JCIS® PH 2x2.5 Type(1) Screw	

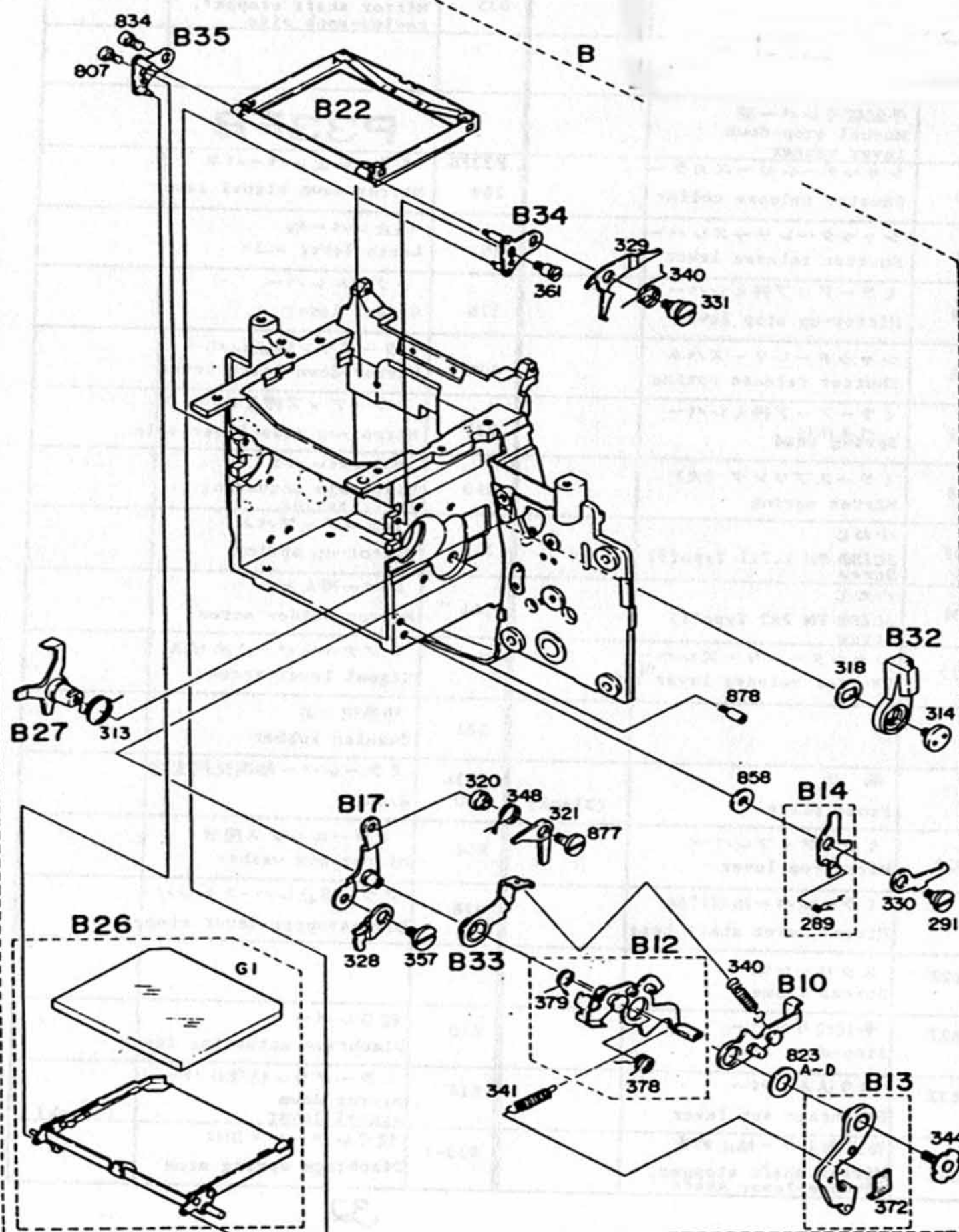


Fig. 11

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 313	手動絞りレバーバネ Manual stop-down lever spring		35FB B35	巻戻し側ミラー軸止め板 Mirror shaft stopper, rewind-knob side	
314	絞りレバービス Diaphragm actuating lever screw				
318	手動絞りレバー座 Manual stop-down lever washer		P33FB		
320	シャッターリリースカラー Shutter release collar		P33FB 289	ミラー係止レバーバネ Mirror-down signal lever	
321	シャッターリリースレバー Shutter release lever		291	係止レバー軸 Latch lever axle	
329	ミラーアップ押えレバー Mirror-up stop lever		328	シグナルレバー Signal lever	
348	シャッターリリースバネ Shutter release spring		330	ミラーダウン係止レバー Mirror-down latch lever	
361	ミラーアップ押えレバー バネ掛け Spring stud		331	ミラーアップ押えレバー軸 Mirror-up stop lever axle	
378	ミラースプリング (大) Mirror spring		340	絞りレバーバネ Diaphragm actuating lever spring	
807	小ねじ JCIS \oplus PM 1.7x2 Type(3) Screw		341	ミラーアップバネ Mirror-up spring	
834	小ねじ JCIS \oplus PM 2x2 Type(1) Screw		344	レバー押えビス Mirror holder screw	
877	シャッターリリースレバー 軸 Shutter release lever axle		357	シグナルレバー止めビス Signal lever screw	
			372	防振用ゴム Cushion rubber	
B	前板 Front plate	(Black)	823A - D	ミラーレバー軸調整用座金 Washer	
B12	ミラーアップレバー Mirror-up lever		858	ミラーボックス座板 Mirror box washer	
B17	ミラーレバー軸取付板 Mirror lever shaft base		878	ダウン係止レバーストッパー Down-stopper lever stopper	
B22	スクリーン枠 Screen frame				
B27	手動絞りレバー Stop-down lever		B10	絞りレバー Diaphragm actuating lever	
B32	絞り込みレバー Diaphragm set lever		B14	ミラーダウン信号レバー Mirror down signal lever	(Black)
B34	巻上側ミラー軸止め板 Mirror shaft stopper, advance-lever shaft		B33-1	絞りレバーバネ掛け Diaphragm spring stud	

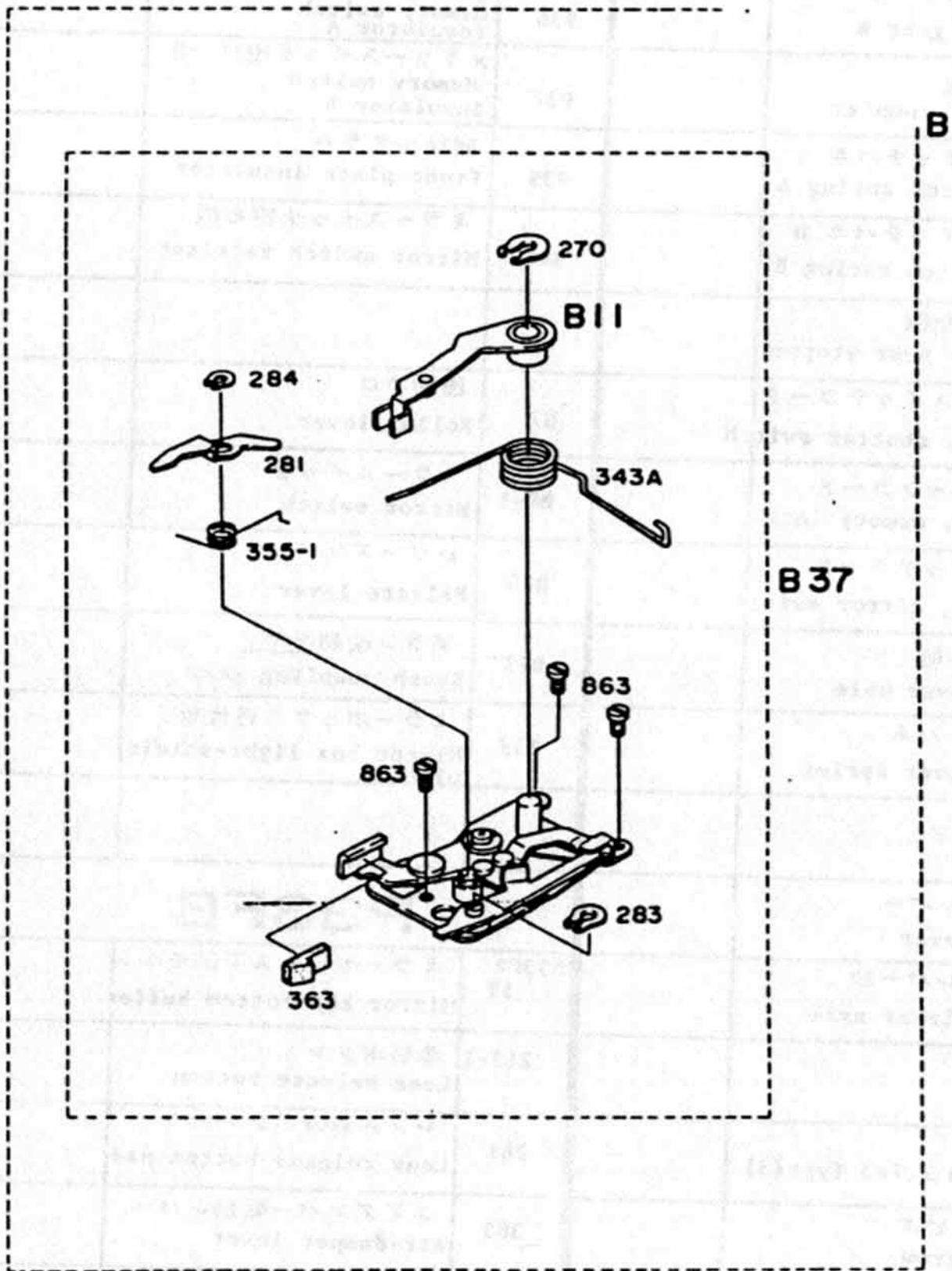


Fig. 12

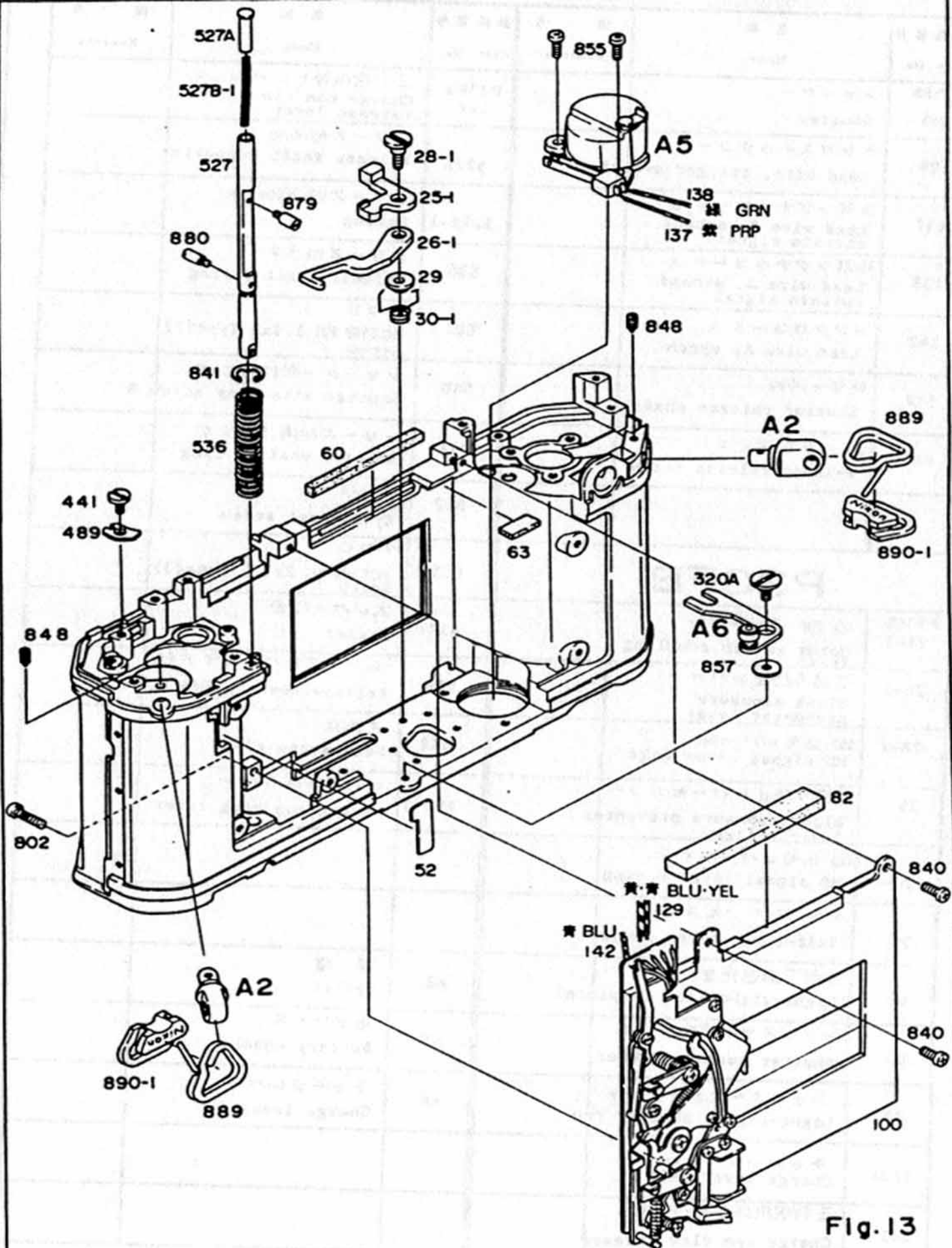


Fig.13

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 100	シャッター Shutter		P33FB 489	三羽爪外しレバー Charge cam claw release lever	
129	トリガスイッチコード Lead wire, trigger switch		527A	リリース軸補助 Release shaft supporter	
137	後幕シグナルコード B Lead wire B, second curtain signal		527B-1	リリース軸補助バネ Spring	
138	後幕シグナルコード A Lead wire A, second curtain signal		536	リリース軸バネ Release shaft spring	
142	シンクロコード A Lead wire A, synch		802	小ねじ JCIS⊕ PM 1.7x3 Type(1) Screw	
527	リリース軸 Shutter release shaft		840	シャッター取付ねじ B Shutter attaching screw B	
880	Bレバー解除ビス B-lever release screw		841	リリース軸用 Eリング Release shaft E ring	
			848	つり環ビス Eyelet set screw	
P33FB			855	小ねじ JCIS⊕ PM 2x3.5 Type(3) Screw	
P33FB 25-1	MD・SW 連動レバー Motor switch coupling lever		857	大レバー座金 Washer	
26-1	空撮り防止レバー Blank exposure preventer lever		879	リリースレバーガイド軸 Release lever guide pin	
28-1	MD 信号レバー軸 MD signal lever axle		889	三角環 Neck-strap ring	
29	空撮り防止レバー軸カラー Blank exposure preventer lever collar		890-1	三角環保護カバー Neck-strap ring cover	
30-1	MD 信号レバーバネ MD signal lever spring				
54	セルフレバービス Self-timer lever screw				
60	接眼下部遮光モルト Light-tight (for eyepiece)		A2	耳環 Eyelet	
63	シャッター羽根受けゴム Shutter curtain rubber		A5	電池ケース Battery chamber	
82	シャッター上遮光モルト Light-tight, shutter top		A6	チャージレバー Charge lever	
320A	チャージレバー軸 Charge lever axle				
441	三羽爪外しレバー軸 Charge cam claw release lever axle				

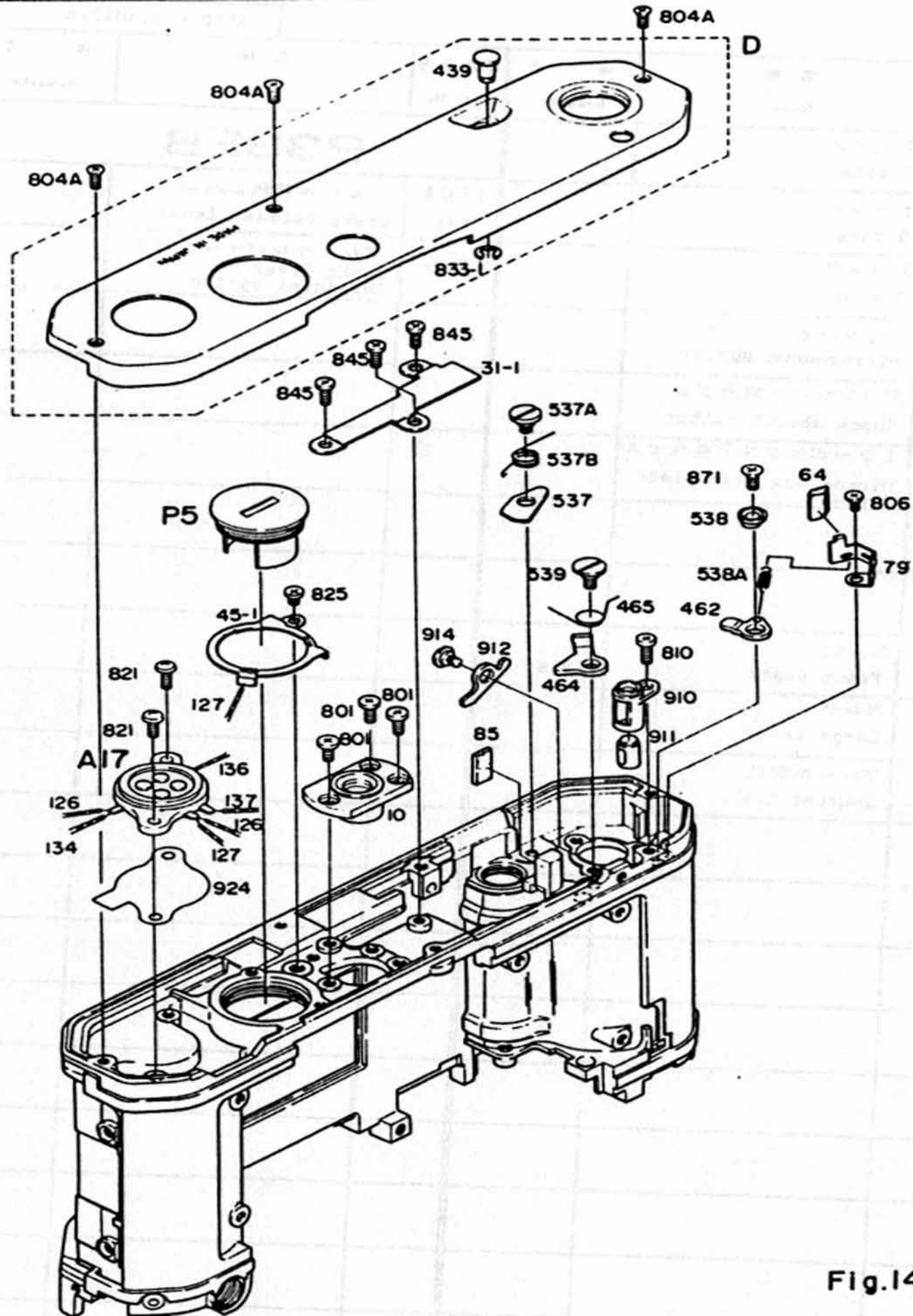


Fig.14

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 79	緩衝板 Shock absorb plate		P33FB 538	振り子偏心軸 Pendulum eccentric axle	
126	レバースイッチコード Lead wire, lever switch		538A	振り子バネ Pendulum spring	
127	電源コード Lead wire, power source		539	ロックレバー軸 Lock lever axle	
134	プラスコード B Lead wire B		801	小ねじ JCIS \oplus PM 2x3 Type(3) Screw	
136	MD スイッチコード Lead wire, MD switch		804A	小ねじ JCIS \oplus CM 1.7x2.5 Type(1) Screw	
137	後扉シグナルコード B Lead wire B		806	小ねじ JCIS \oplus PM 1.7x1.8 Type(1) Screw	
			810	前板取付ビス Front plate screw	
P33FB			821	小ねじ JCIS \oplus PM 2x4 Type(3) Screw	
P33FB 10	三脚座 Trippod socket		825	小ねじ JCIS \oplus PM 2x2.5 Type(1) Screw	
31-1	底部押え板 Retaining plate, bottom		833-1	ゆるみ止めビス Set screw	
45-1	電池アース接片 Battery chamber earth contact		845	小ねじ JCIS \oplus PM 2x3 Type(1) Screw	
64	緩衝ゴム Shock absorb rubber A		871	小ねじ JCIS \oplus CM 2x4.5 Type(3) Screw	
85	シャッターチャージレバー 受けゴム Charge lever base rubber		910	MD 軸受 MD shaft bearing	
439	巻戻釦 Rewind button		911	MD 軸 MD shaft	
462	振り子 Pendulum		912	MD シーソーレバー MD seesaw lever	
464	ロックレバー Lock lever		914	MD シーソーレバー軸 Seesaw lever axle	
465	ロックレバーバネ Lock lever spring		924	絶縁シート Insulating seat	
517	偏心軸軸受 Eccentric shaft bearing		A11	下地板 Lower base plate	
537A	AR レバー軸 AR lever axle		D	底蓋 Bottom plate	
537B	AR レバーバネ AR lever spring		P5	電池キャップ Battery chamber cap	

E1

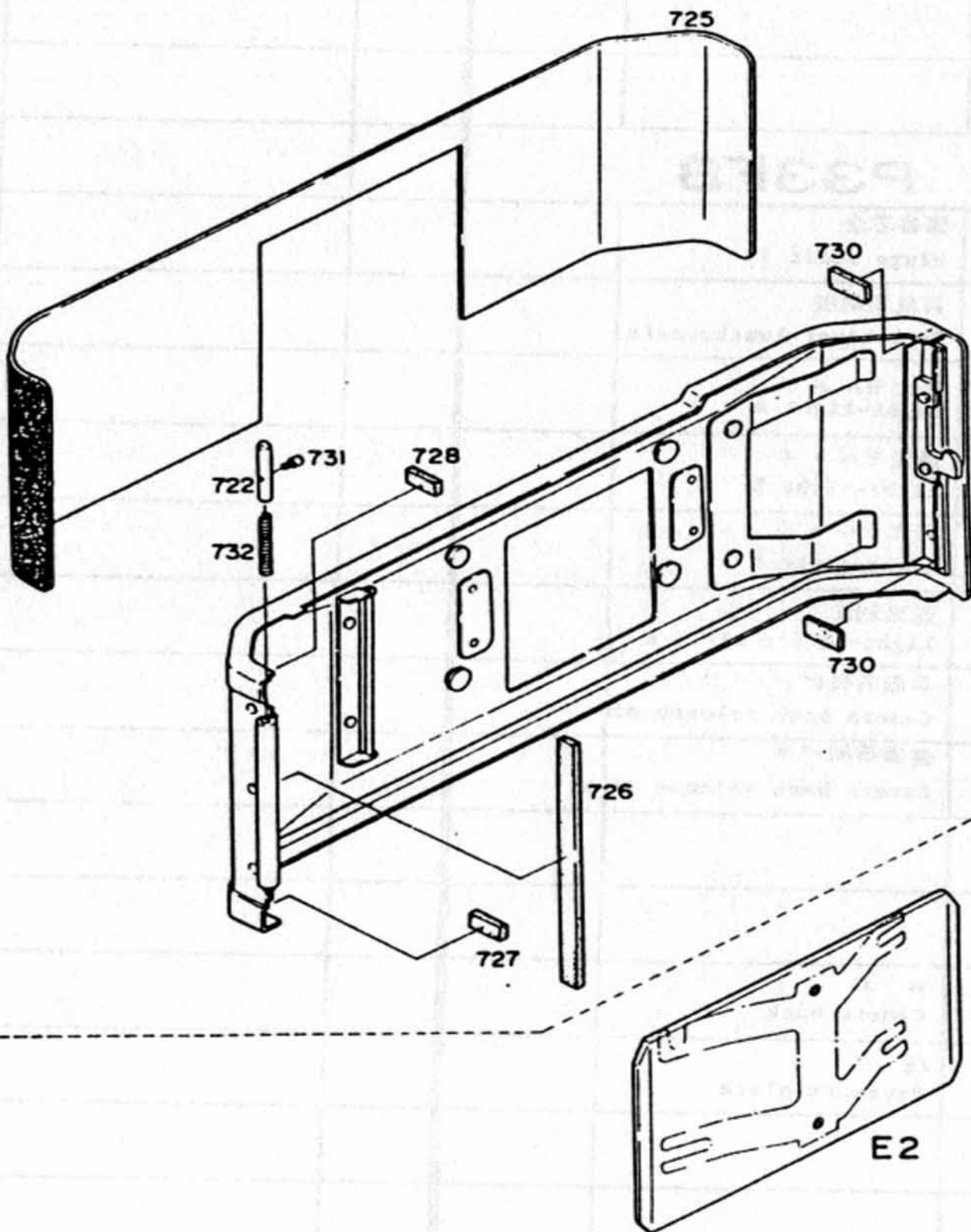


Fig. 15

Part No.	Name	Remarks	Part No.	Name	Remarks
35FB					
P33FB					
P33FB 722	蝶番芯金 Hinge shaft B				
725	裏蓋用貼皮 Back cover leatherette				
726	遮光モルト A Light-tight A				
727	遮光モルト B Light-tight B				
728	遮光モルト C Light-tight C				
730	遮光別珍 Light-baffle cloth B				
731	裏蓋着脱ピン Camera back release pin				
732	裏蓋着脱バネ Camera back release ring				
E1	背蓋 Camera back				
E2	圧板 Pressure plate				

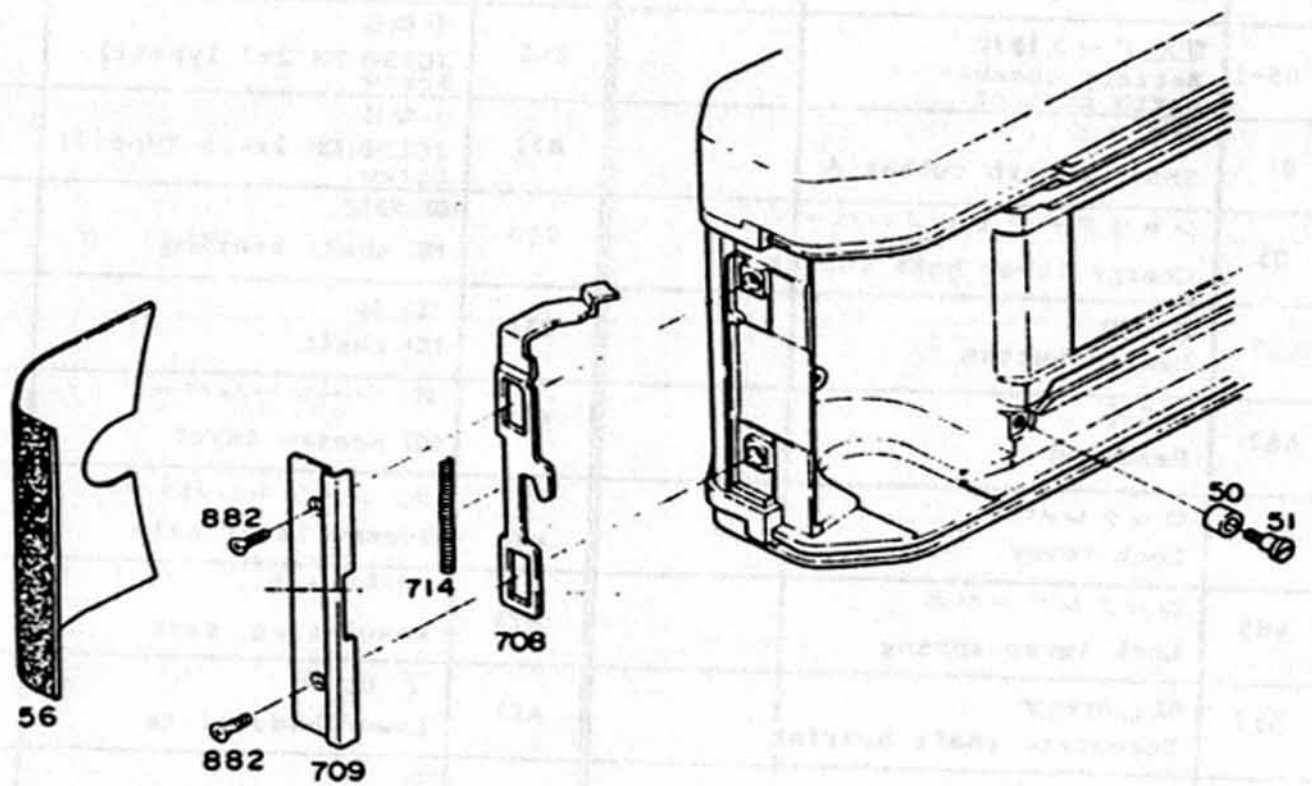
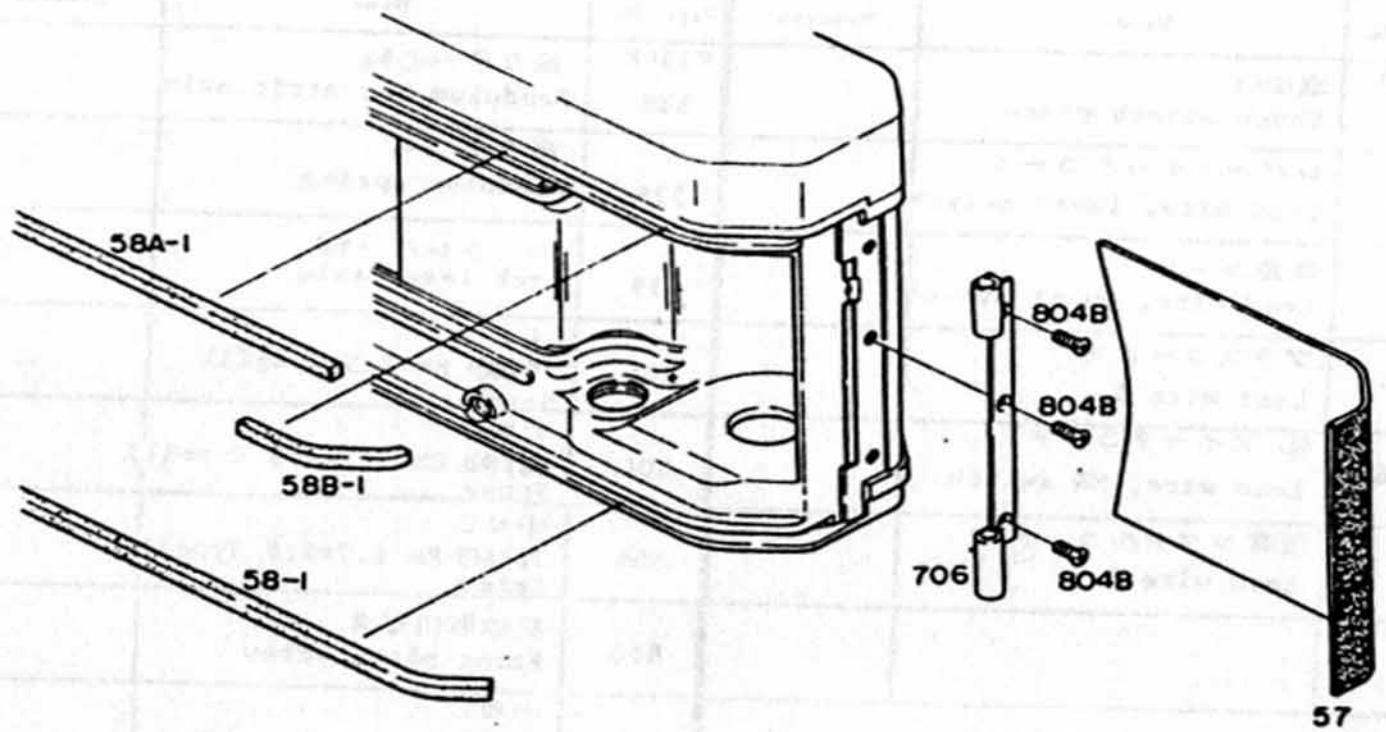
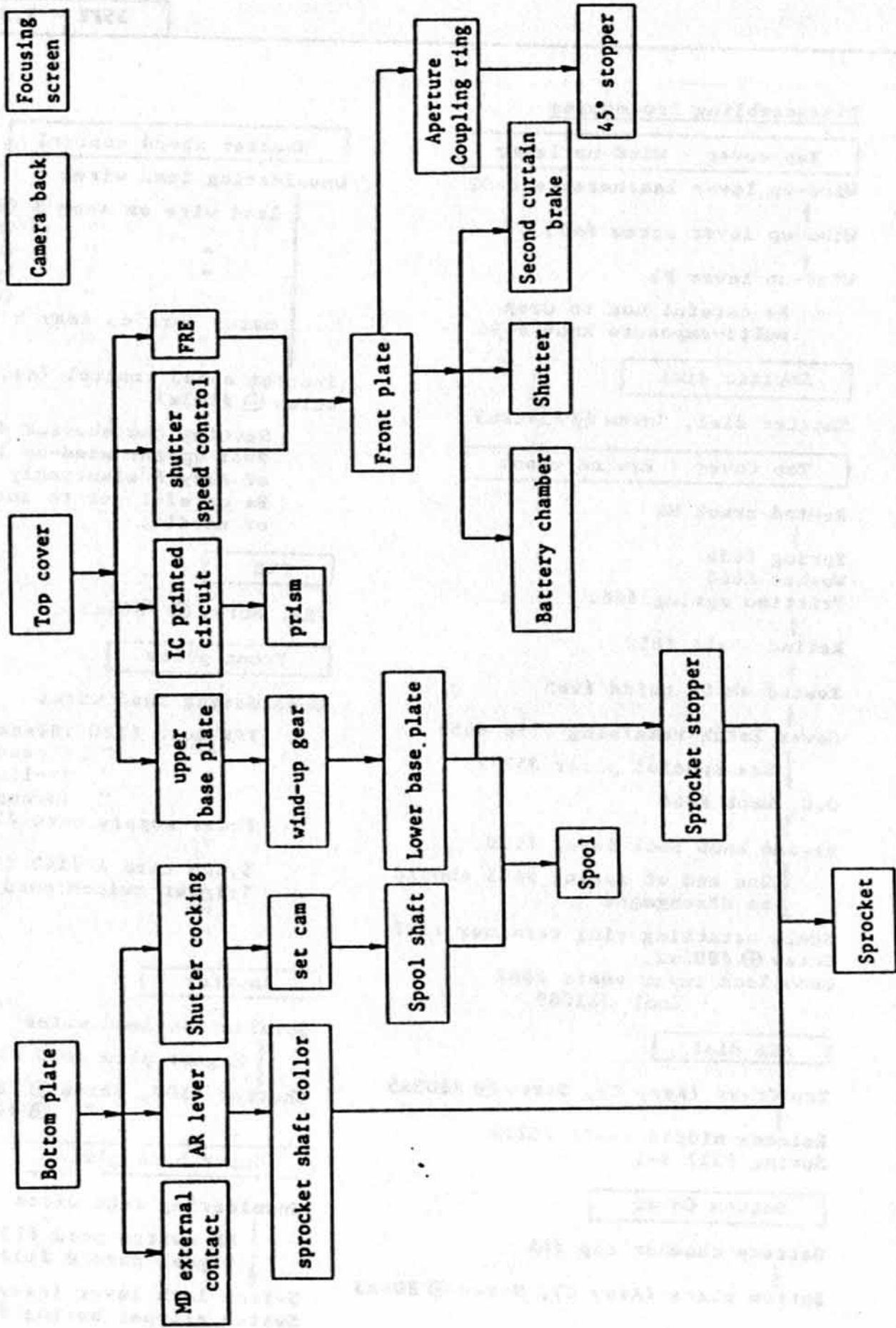


Fig. 16

部品番号 Part No.	名称 Name	備考 Remarks	部品番号 Part No.	名称 Name	備考 Remarks
35FB 56	ボディ擬革 A Vinyle leatherette A				
57	ボディ擬革 B Vinyle leatherette B				
706	裏蓋蝶番 A Camera back hinge A				
708	止め爪 B Latch B				
P33FB					
P33FB 50	ローラー Roller				
51	ローラー軸 Roller shaft				
58-1	溝用モルトブレン Light-tight (for groove)				
58A-1	上溝用モルトブレン A Light-tight A				
58B-1	上溝用モルトブレン B Light-tight B				
709	止め爪カバー Latch cover				
714	止め爪バネ Latch spring				
804B	小わじ JCIS [⊗] CM 1.7x2.5 Type(1) Screw				
882	小わじ JCIS [⊗] CM 1.7x3 Type(1) Screw				

Disassembling procedures chart



Disassembling Procedures

Top cover - Wind-up lever

Wind-up lever leatherette #402

↓
Wind-up lever screw #403

↓
Wind-up lever P3

Be careful not to drop
multi-exposure knob #491

Shutter dial

Shutter dial, Screw ⊖ #541Dx3

Top Cover - Rewind crank

Rewind crank H1

↓
Spring #656

Washer #660

Friction spring #662

↓
Rewind shaft #652

↓
Rewind shaft guide #665

↓
Cover latch retaining clip #659

Use special plier J5272

↓
O.C. knob #664

↓
Rewind knob lock lever #688

One end of spring #655 should
be disengaged

↓
Scale attaching ring retainer #687

Screw ⊕ #808x2,

knob lock lever shaft #689

Tool J11089

ASA dial

Top Cover (Assy C), Screw ⊕ #803x5

↓
Release middle shaft #527A

Spring #527 B-1

Bottom Cover

Battery chamber cap #44

↓
Bottom plate (Assy D), Screw ⊕ 804x3

Shutter speed control

Unsoldering lead wires

lead wire on Assy R (Blue) #131
" " (Brown) "
" " (Purple) "
" " (yellow) "
" " (white) #132
meter cord on Assy R (Red)
" " (Black)

↓
Shutter speed control (R),
Screw ⊖ #893x3

Setting the shutter dial at B,
pull up the wind-up lever side
of Assy R slantingly to remove R
Be careful not to scratch T-film
or needle.

FRE

FRE, Screw ⊕ #861x3

Front plate

Unsoldering lead wires

FRE cord #130 (Black)
" " (Green)
" " (Yellow)
" " (Orange)
Power supply cord #127 (Orange)
" " (Black)
Synch cord A #142 (Blue)
Trigger switch cord #129 (yellow)
" (Blue)
" (Green)

Shutter

Unsoldering lead wires

↓ Magnet plus cord #135 (Orange)
Shutter #100, Screw ⊕ #802
" ⊕ #840x2

Upper base plate

Unsoldering lead wires

↓ MD switch cord #136 (Blue)
Signal cord B #137 (Purple)
Switch lock lever (Assy P4)
Switch stopper spring #476
Screw ⊖ #473
↓
Upper base plate (Assy K),
Screw ⊕ #845x2

**Wind-up gear, Charge cam claw
release lever**

Screw (left-handed) ⊖ #815
↓
Sprocket stopper spring #496,
Screw ⊖ #888-1
↓
Wind-up gear A18, To be removed
Advance cam #413 together

Lower base plate

Unsoldering lead wires
↓
Lever switch cord #126 (Red)
" #126 (Orange)
Magnet plus cord #135 (Orange)
↓
Lower base plate (Assy A11)
Screw ⊕ #835x5
↓
Spool upper gear (Assy A7)
Be careful not to drop
ball bearing

Spool

Motor coupling #923, Screw ⊕ #820
↓
Retaining plate #31-1,
Screw ⊕ #809x3
↓
Shutter charge lever (Assy A4)
Set cam collar #460
↓
Screw #833-1, Collar #467-1
↓
Set cam (Assy A10),
Screw ⊖ #815 (left-handed)
↓
Spool shaft bearing case (Assy A14)
↓
Spool shaft (Assy A9)
↓
Spool (Assy A8)

Sprocket

Sprocket screw (left-handed) #887
↓
Sprocket stopper cam #429
Screw ⊖ #824x2
↓
Sprocket upper gear #431
↓
Sprocket shaft collar B #499-1
(left-handed), Tool J11129-1
↓
Sprocket screw A #435A
Should be removed through the
hole in sprocket #435 while
pressing up sprocket shaft
#434. Be careful not to drop
#435A inside #435.
↓
Sprocket collar A nut #437
↓
Tool J11127
↓
Sprocket

IC printed circuit

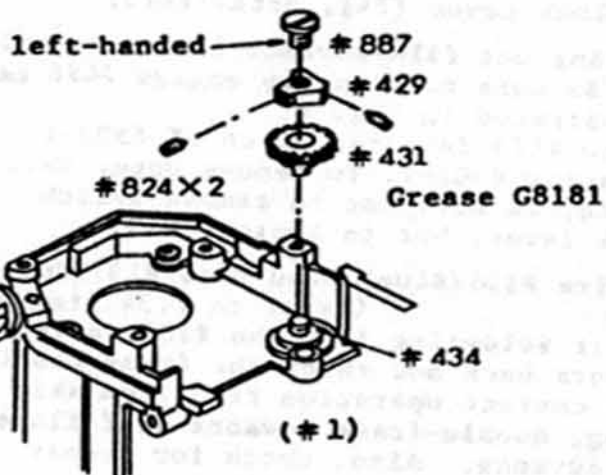
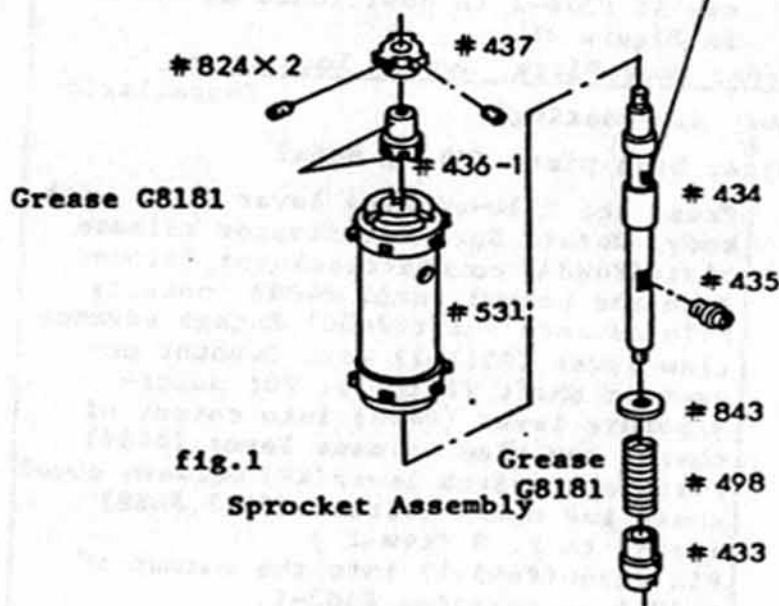
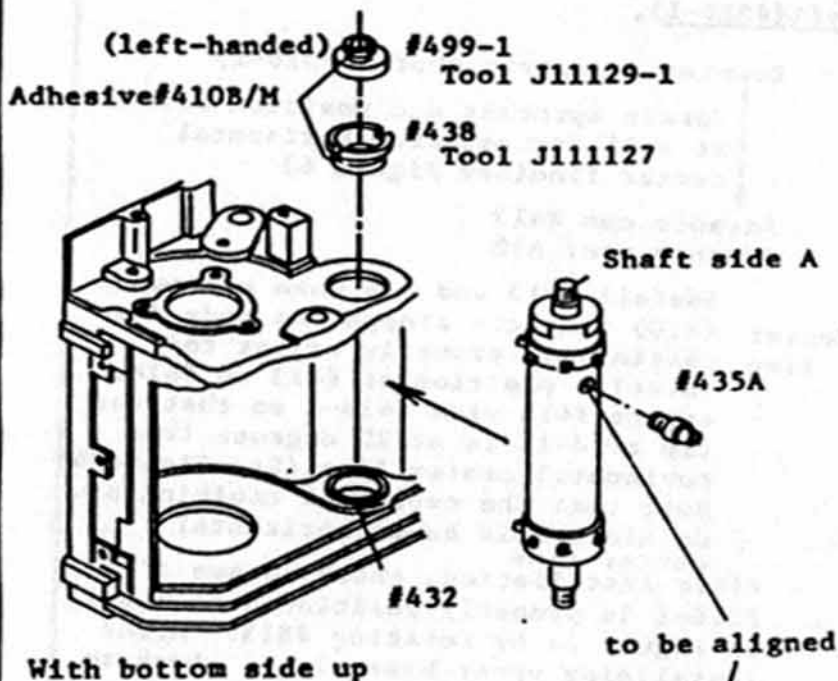
Unsoldering lead wires
↓
Mirror switch cord #140 (Grey)
Shutter switch cord #128 (Orange)
" #128 (Pink)
↓
Prism retaining spring #233x2
↓
Eyepiece mold (Assy N4)
Screw ⊕ #817x2
↓
Be careful not to drop
washer #842
↓
Prism G3

Aperture coupling ring

Bayonet #202, Screw ⊕ #805x4
↓
Bayonet spring #208x2
(on lens-release pin side)
Screw ⊕ #806x4
↓
Coupling ring stopper #222,
Screw ⊕ #189x2
↓
Bayonet mount #201, Screw ⊕ #811x4
↓
Aperture coupling ring (Assy A4)
Thread #269

- Be careful not to tighten the knot of #269.
- Be careful for #269 not to be wound into B25 after disassembling front plate (B).

1. Sprocket Installation



Body die-casting (#1)

Sprocket Assembly

Pre-assemble the sprocket parts, referring to Figure 1 and details below.

Insert the sprocket side A into body. Pulling up sprocket, locate opposite side into #432.

Sprocket shaft bearing #438

Sprocket screw #435A

Align each hole in #531 and in #434 to properly install #435A.

Sprocket shaft collar-B (#499-1)
(left-handed thread)

Sprocket Assembly

Sprocket shaft #434

Washer #843

Sprocket spring #498

Sprocket screw #435

Install the above parts as a unit into sprocket.

Sprocket #531

Sprocket collar #433

Sprocket collar A #436

Sprocket collar A nut #437

Temporarily fix #437 onto #436 with two screws (#824) before mounting the unit onto #531.

For positioning of Sprocket teeth; refer to (page 9)

2. Sprocket upper gear and sprocket stopper cam Installation

Sprocket upper gear #431

Sprocket stopper cam #429

Screw #429 onto #434, being careful for #434 not to protrude above #429.

For positioning of #429, refer to page 9

Screw #887, left handed

3. Spool Installation

Body die-casting #1

↓
Spool A8

↓
Spool shaft A9

↓
Spool shaft bearing case A14

↓
Insert the tip of #529 into the slot of A14, then secure with three screws (#825) (see figure 2)

↓
Set cam A10

↓
Turn A9 one clockwise rotation, then install A10.

↓
Screw ⊖ #815 (left-handed) Collar (#467-1)
⊖ #833-1 (left-handed)

↓
Make sure if Set Cam A10 properly returns

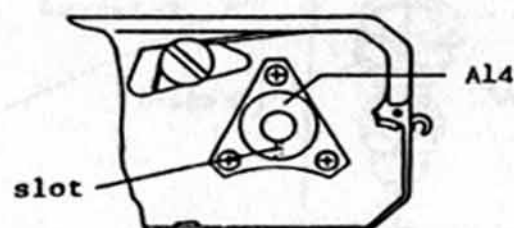
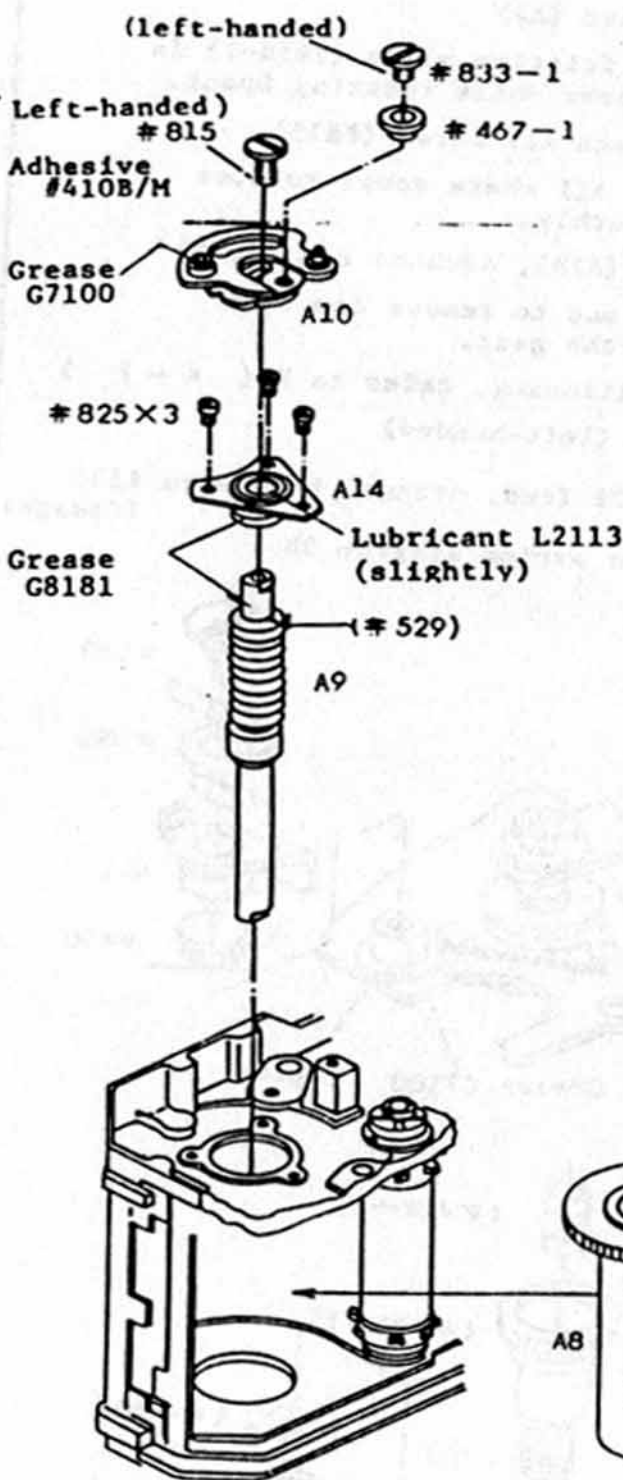


fig.2

A14 Positioning

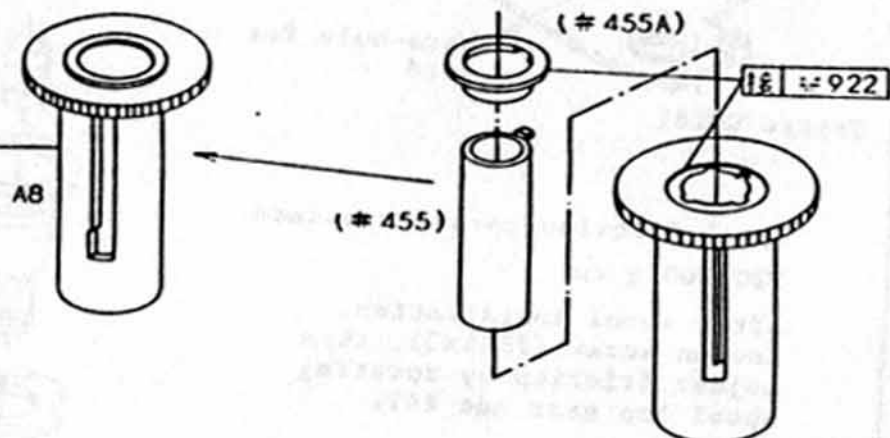
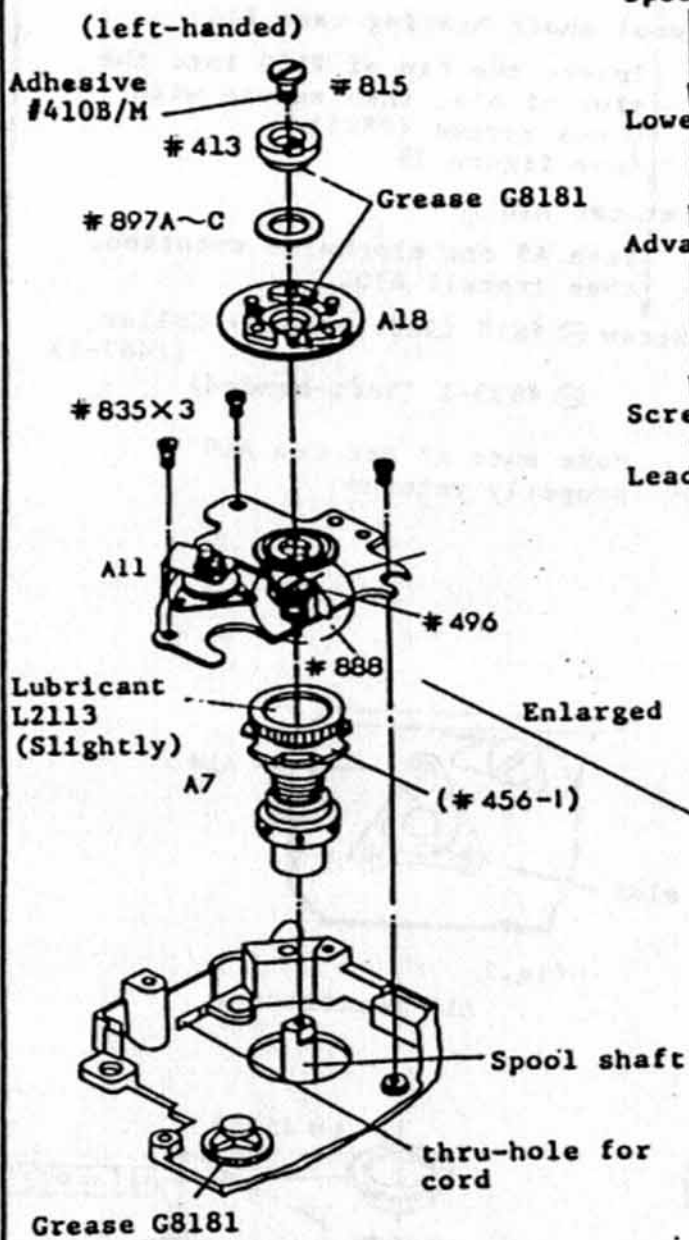


fig.3

A8 Exploded

4. Spool Upper Gear, Lower Base Plate, Advance Gear Installation



Spool upper gear (A7)

Position friction plate (#456-1) in Spool groove while rotating Spool.

Lower base plate All Screw (#835)

Position All where spool rotates most smoothly.

Advance gear (A18), Advance cam (#413)

Be sure not to remove cam from claw on the gear.

For positioning, refer to P. (4 - 7)

Screw ⊖ #815 (left-handed)

Lead wire #126 (red, orange) Lead wire #135 (Orange)

Refer to wiring diagram 38 (P. 38)

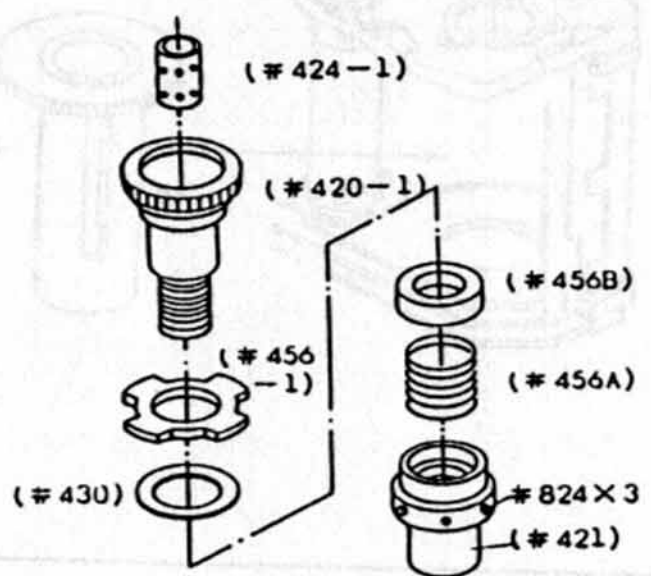
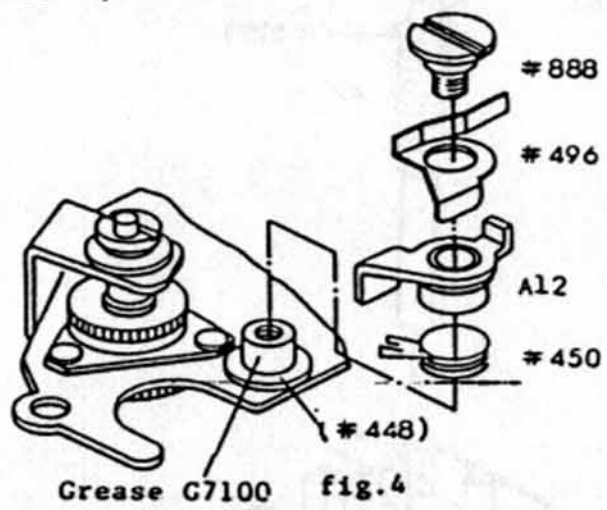
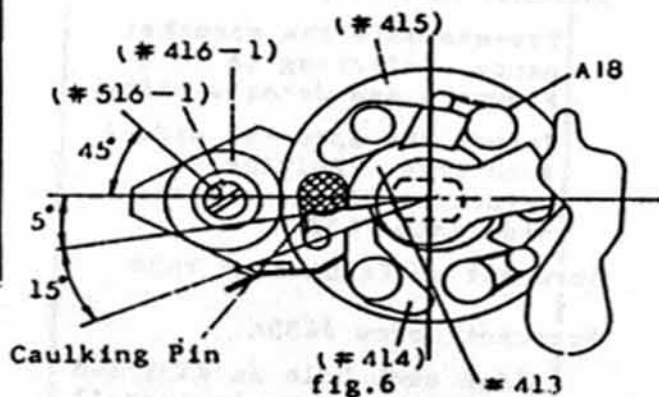


fig.5 A7 Exploded

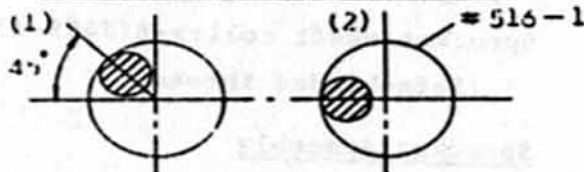
Spool Friction torque standard
220-260 g.cm

After spool installation,
loosen screw (#824x3), then
adjust friction by rotating
spool top gear nut #421

5. Positioning of Counter Eccentric Shaft(#516-1), Advance Gear A18, Advance Cam #413



Eccentric shaft positioning



Set cam contacting stopper

Film-advance completed condition with upper base plate installed

Counter eccentric shaft (#516-1)

Rotate sprocket and position #516-1 at a 45 degrees from horizontal center line (See Figure 6)

Advance cam #413
Advance gear A18

Center line

Install #413 and A18 when set cam (A10) contacts stopper on body die-casting. To properly adjust the relative position of #413 to #414, engage #415 with #416-1 so that the tip of #414 is at 20 degrees from horizontal center line. (See Figure 6) Note that the center of caulking pin on A18 should be on horizontal center line

After installation, check to see if #516-1 is properly positioned as shown in Figure 7a by rotating #815. After installing upper base plate, check to see if #516-1 is positioned as shown in Figure 7b.

6. Upper Base Plate, Switch Lock Lever

Body die-casting#1

Installation

Upper base plate (K), ⊕ 845x2

Press the film-advance lever flush with body. Rotate Sprocket stopper release plate (#408A) counterclockwise (viewed from the below) until #408A contacts Film advance shaft (#408). Engage advance claw lever (#511-1) with Counter eccentric shaft (#516-1). Put multi-exposure lever (#490) into cutout of charge cam claw release lever (#489) Positions switch lever (K4) between spool shaft and meter switches (#487, #488) (Refer to P. 8 item 7)
Fix Screw (#845-1) into the cutout of #502-1 by rotating #502-1.

Switch Lock Lever (P4), Screw (#473)

Pulling out film-advance lever, install P4. Be sure to properly engage #476 as illustrated in Fig. 8.
Screw #473 into the notch of #502-1 rotating #502-1. To remove Upper Base Plate, be sure not to remove Switch Lock lever, but to loosen #473.

Lead wire #136 (Blue), Lead wire #137 (Purple) (Refer to P.34 item 38)

After soldering #136 and #137, attach camera back and check the frame counter for correct operation free from skipping, double-frame advance or failure of advance. Also, check for proper resetting.

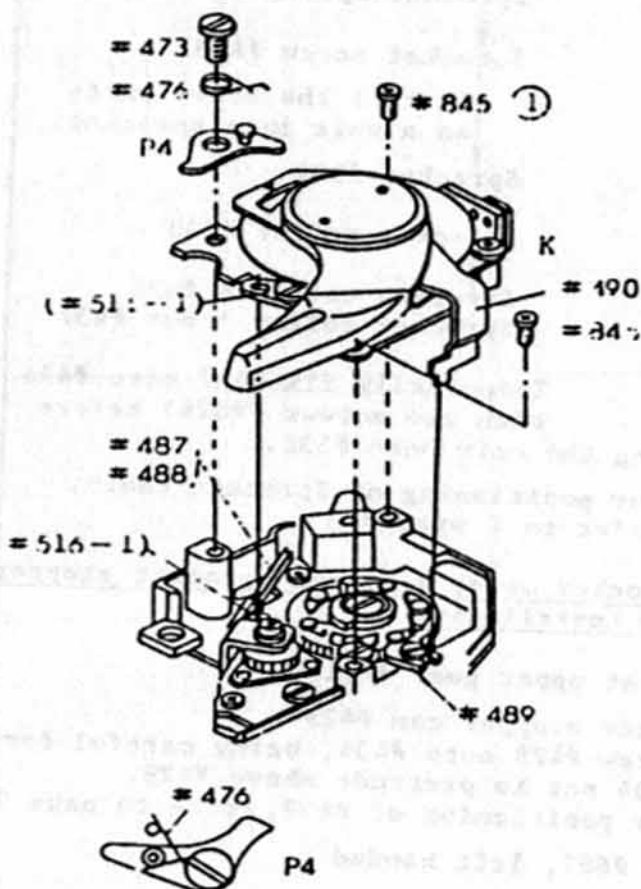


fig.8. Spring(#476) Installation

7. Frame Counter Dial Installation

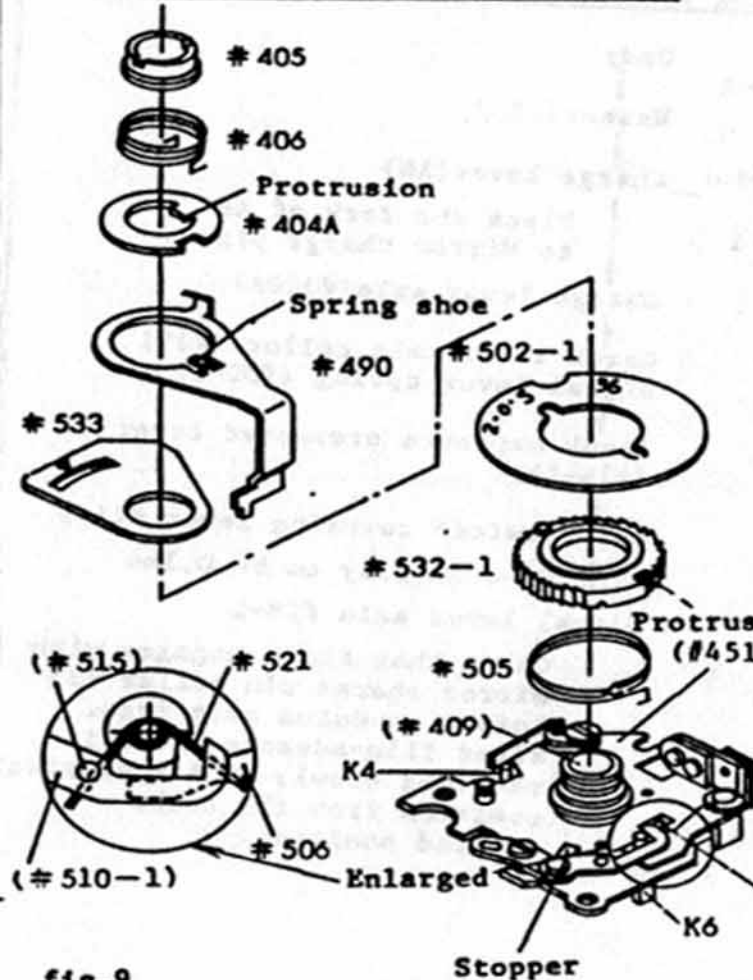


fig.9

Spring(#521) Installation

8. Film Advance Lever Installation

Sprocket release plate(#408A)

Film advance shaft #408

Position referring to Fig.10

Film advance lever (P3)

Install #406 on P3 and turn P3 one full turn counterclockwise.

Wind-up lever screw #403

Check film advance lever for smooth operation.

Thrust play to be 0.13mm or less.

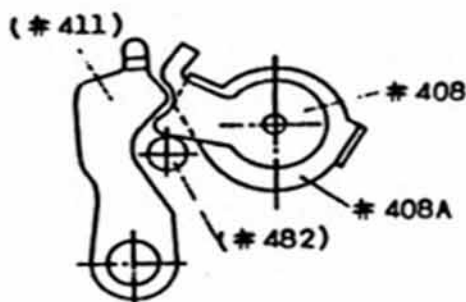


fig.10 Upper Base Plate(Bottom view)

Spring(#505)

Install one end into spring hanging hole on the upper base plate(#451)

Ratchet(#532-1)

Install the other end of #505, turn #532-1 one turn clockwise and return #532-1 to the stopper.

Frame counter dial(#502-1)

Align the cut with the protrusions on #532-1 with "S" positioned toward bayonet.

Frame-counter index(#533), Multi-exposure lever(#490), Counter retaining ring(#404A)

Fit the protrusion of #404A in the cut of #409

Lever axle nut(#405)

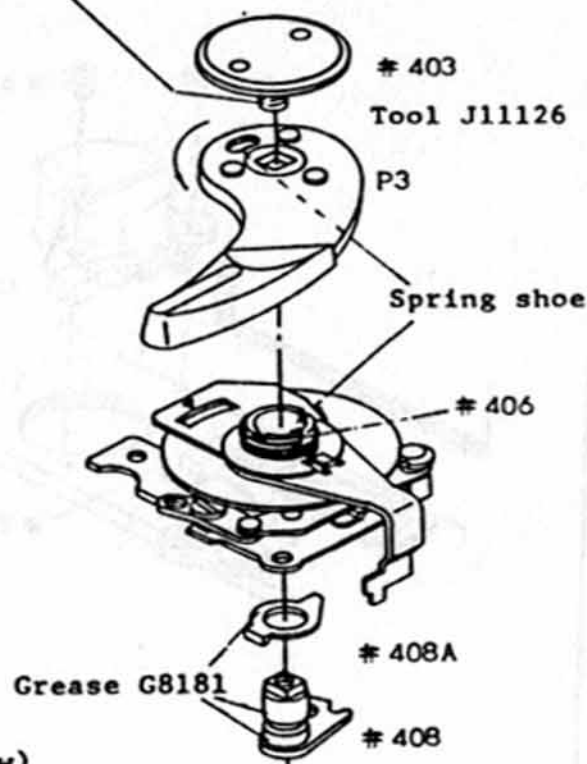
Align index "V" of #533 with "S" of #502-1, then tighten #405.

Check to ensure smooth rotation of #502-1

Spring(#406)

Engage #406 onto spring shoe on #490

After installing Upper Cover, apply adhesive #410S/L.



9. Sprocket Stopper Positioning

Set sprocket teeth positioning gauge (J18064) onto body-aperture frame and holding film-advance lever fully stroked, measure the sprocket play on the scale of J18064. The play to be within 0.8mm.

Repeat the measurement three times in the same manner to make sure the proper operation of #429 at each area shown.

Adjust the play by rotating #429 after loosening #887 (left-handed) and #824. (Refer to Fig.11 and 12)

Be sure to provide 0.1 to 0.2mm clearance between #429 and #434 on positioning.

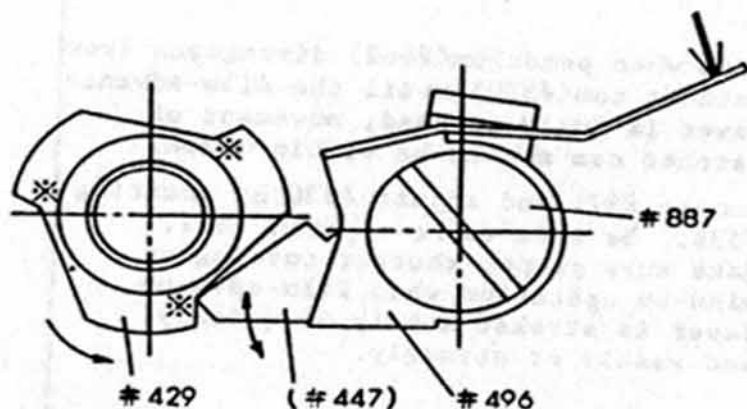


fig.11

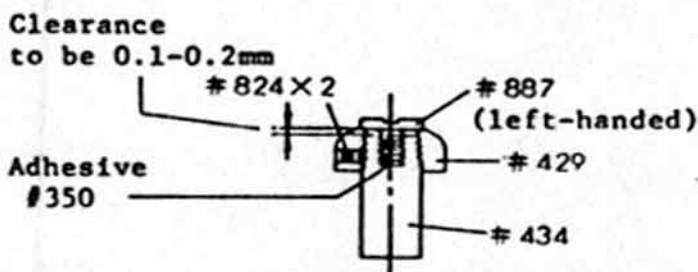


fig.12 Cross section of Sprocket shaft

Sprocket Positioning

Check to see if end of the sprocket teeth comes to the position as depicted in Fig.13, with film-advance lever stroked by pressing the sprocket slightly by finger.

If improperly positioned, return the film-advance lever to the stand-off position. Then, applying a slight finger pressure on the lever, adjust #429 after loosening two screws(#824). See Figure 14.

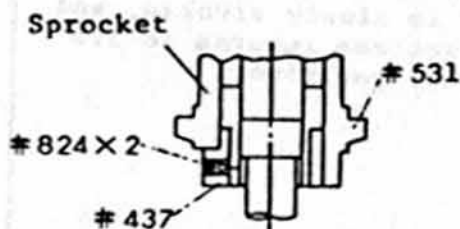


fig.14

Cross section of lower part of sprocket

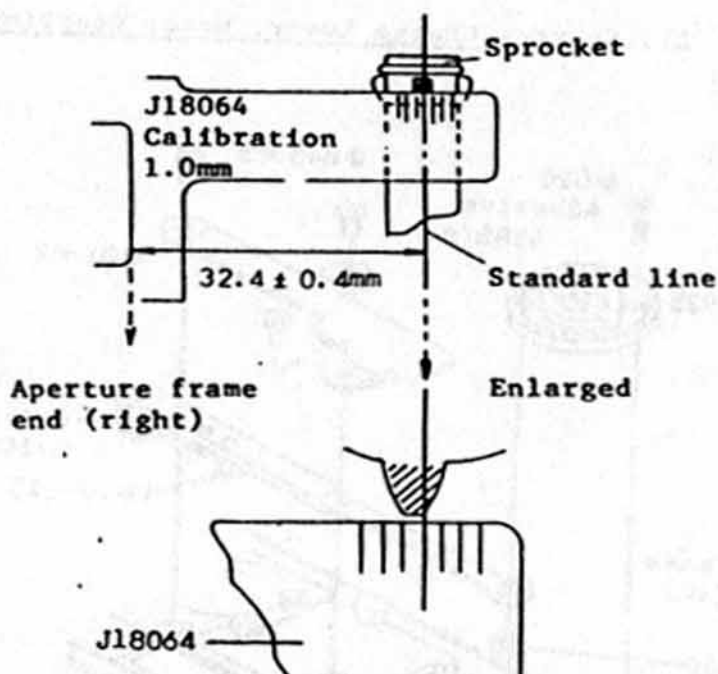


fig.13 the right tip of sprocket teeth to be on the standard line.

Measurement with J18064

10. Ratchet Cam, Pendulum Adjustment

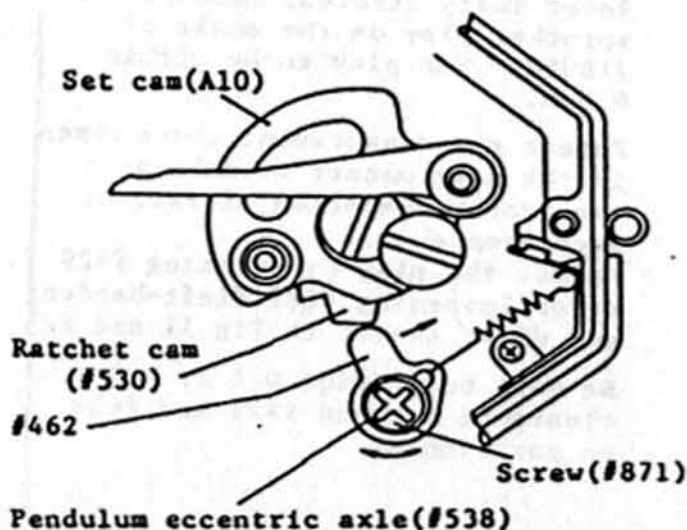
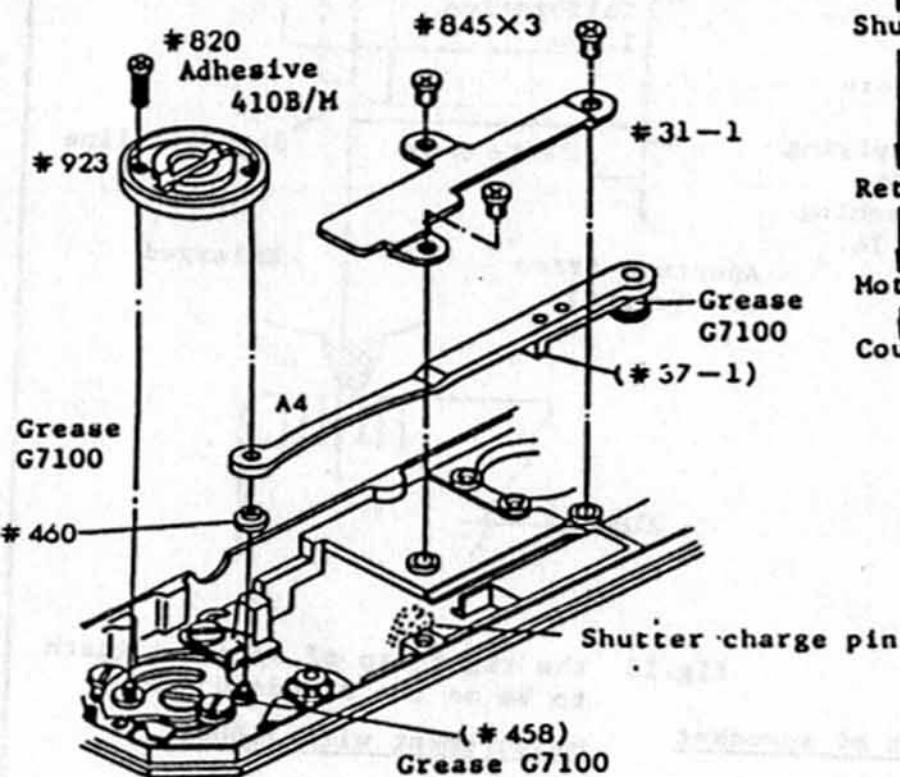


fig.14. Bottom view of wind-up mechanism

From when pendulum(#462) disengages from Ratchet cam(#530) until the film-advance lever is fully stroked, movement of ratchet cam should be within 0.2mm.

Loosen #871 and adjust #530 by rotating #538. Be sure to re-tighten #871. Make sure proper shutter cocking or wind-up operation when film-advance lever is stroked slowly or quickly, and weakly or strongly.

11. Shutter Charge Lever, Motor Coupling Installation



Set cam collar (#460)

Shutter charge lever (A4)

Fitting A4 onto #460, position #37-1 at right side of shutter charge pin.

Retaining plate(#31-1)

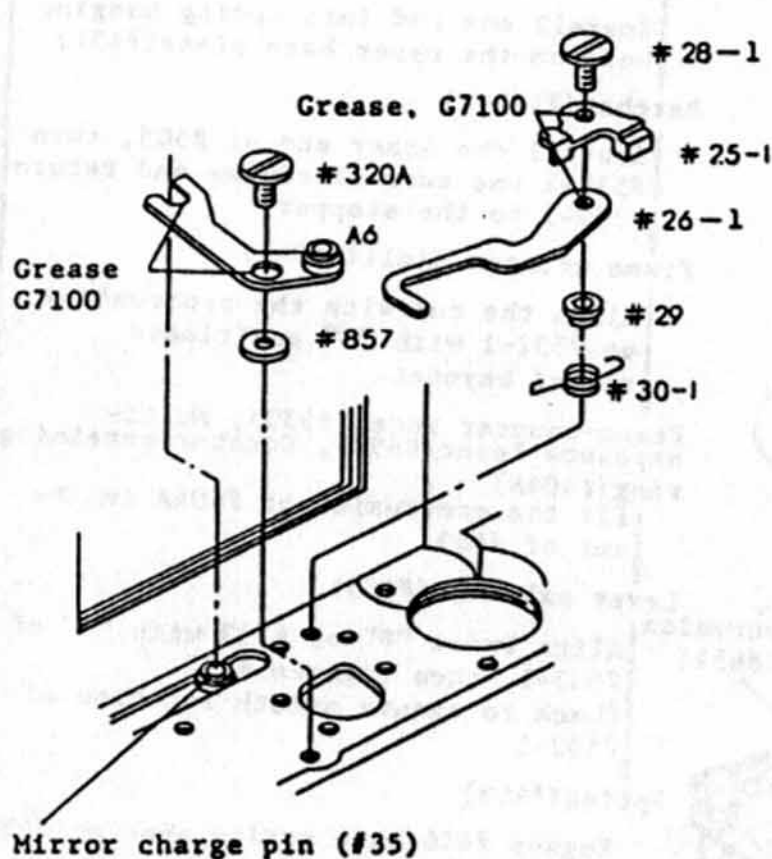
Screw ⊕ #845x3

Motor Coupling(#923)

Coupling screw(#820)

Check that shutter cocks certainly when film-advance lever is slowly stroked, and that set cam returns to its original position.

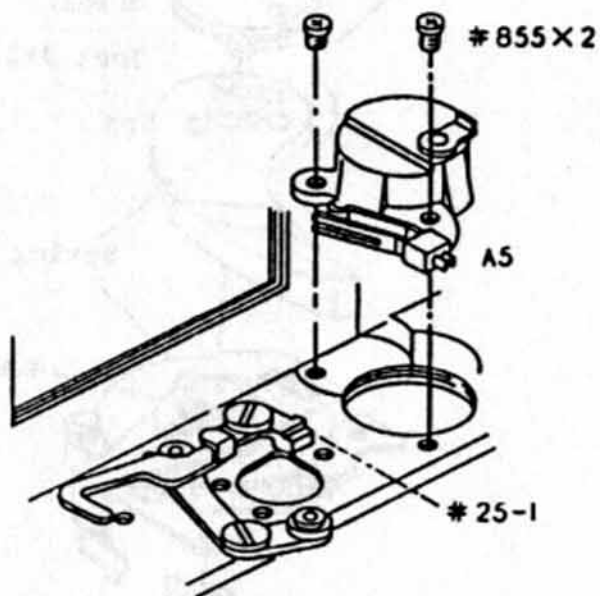
12. Charge lever, Motor Switch Coupling lever Installation



Body
↓
Washer (#857)
↓
Charge lever (A6)
↓
Place the fork of A6
to Mirror charge pin
↓
Charge lever axle (#320A)
↓
Check lever axle collar (#29)
Signal lever spring (#30-1)
↓
Blank exposure preventer lever
(#26-1)
↓
Motor switch coupling lever #25-1
↓
Up-down play to be 0.1mm
Signal lever axle #28-1

Check that #26-1 engages with
Mirror charge pin collar #35
before pendulum gets free.
after film-advance lever is
returned slowly to its original
position from the fully
struck position.

Battery Case Installation



Body
↓
Battery case (A5) Screw (#855)

For MD winding switch adjustment,
refer to (page 12)

Check MD winding switch not in
contact with body die-casting.

13. Charge lever, MD take-up switch Adjustment

fig.15 MD take-up switch Operation

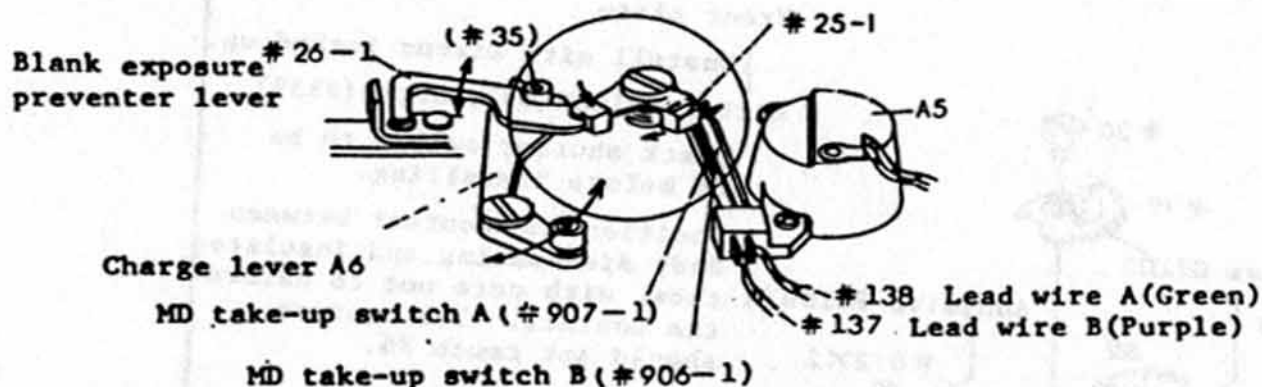
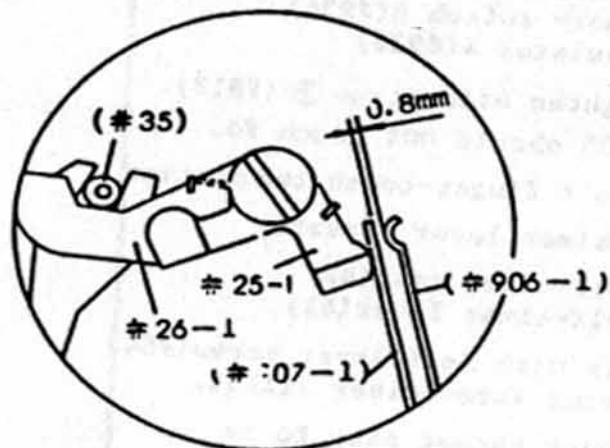


Fig.16 Film-advance completed.....MD Winding Switch turned OFF.

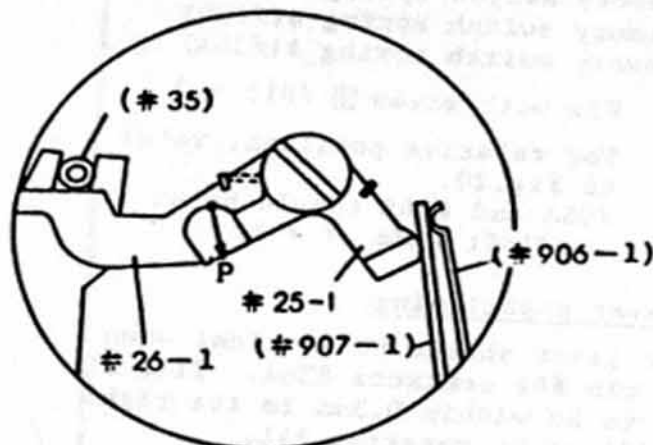


Check by gently operating A3 to ensure that #26-1 is pushed by #907-1 and contact against #35.

Bend #907-1 to a proper contact pressure

The clearance between #906-1 and #907-1 to be 0.8mm, adjustable by bending #906-1.

Fig.17 During film-advance operation...MD Winding Switch to be ON.



Check that MD winding switch is on.

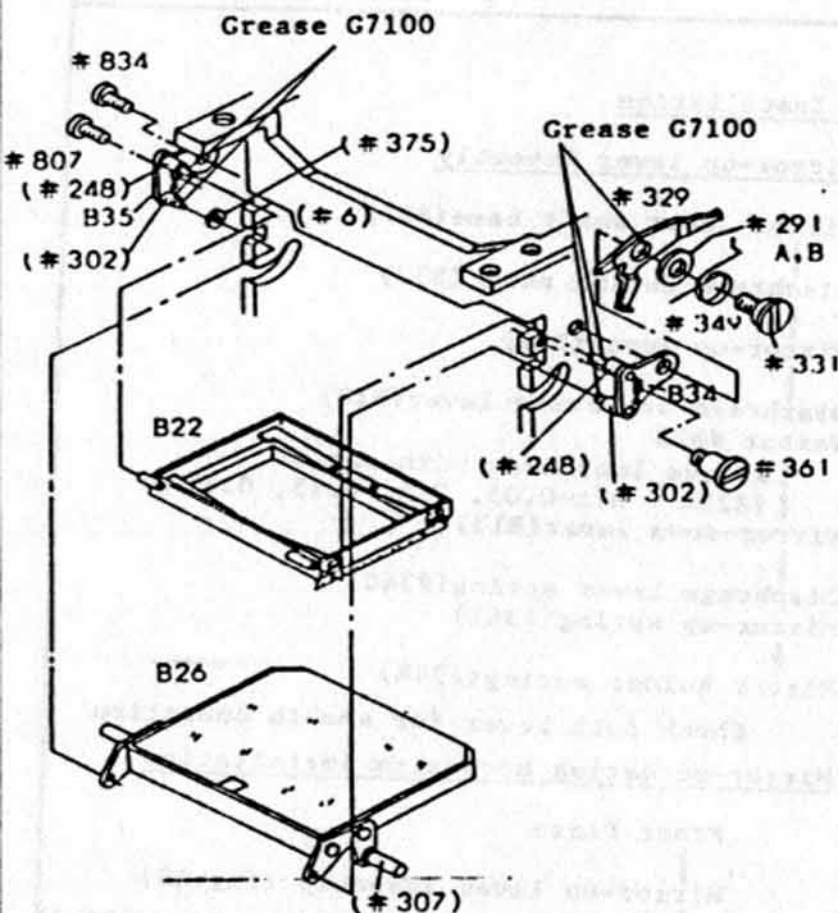
Set J5018 at P point (See figure 17) and measure spring pressure when #26-1 disengages from #35;

Spring pressure to be 75 to 100g

Adjust spring pressure by bending either #907-1 or #906-1

fig.17

14. Front Plate (Screen Frame, Mirror Holder, Diaphragm set lever) Installation



Front plate(#6)

Screen Frame(B22)

Mirror shaft stopper; rewind knob side(B35)

Insert #248 into the tube of B22 then tighten with screw ⊕ (#807) temporarily.

Mirror holder(B26)

Install washer(#375) into Mirror holder shaft(#302). then install B 26 by aligning #302 into the hole of B26

Mirror shaft stopper, advance-lever side(B34)

Insert #248 into the tube of B22 then tighten with screw ⊖ (#361)

Mirror-up stop lever (#329)

Mirror-up stop lever spring(#349)

Screw(#331)

#329 is secured with washer (#291A, B).

Position #361 and #331 on top of oval hole in B34.

For spring installation, refer to the left-below illustratin.

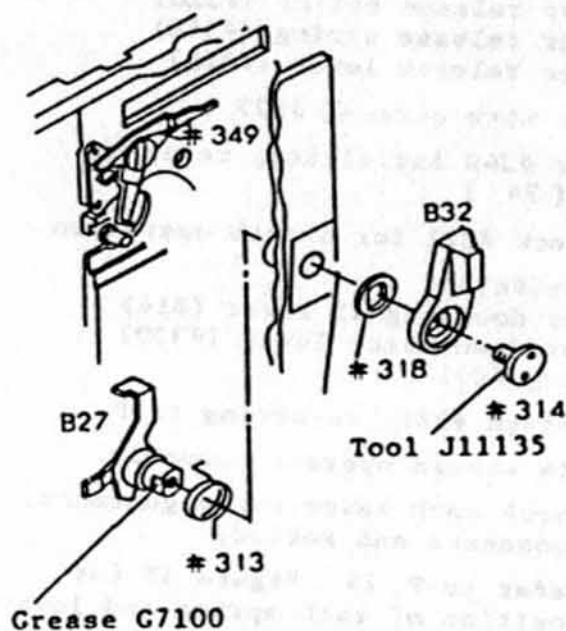
Screw(#834)

Both #807 and #834 to be positioned on top of oval hole in B35

Check that Screen frame(B22) surely drops of itself.

When screen lock spring(#240) is pulled and that B22 is locked firmly by #240.

For screen lock spring, refer to (page 30) Check Mirror holder B26 for smooth operation



Front plate(#6)

Stop-down lever spring(#313)

Stop-down lever(B27)

#313 installation illustrated in Fig.18.

Stop-down lever washer(#318)

Diaphragm set lever(B32)

Install the both onto B27

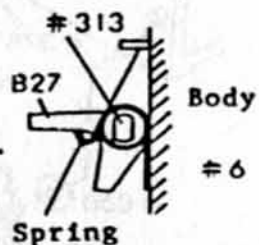
Screw(#314)

Check Diaphragm set lever.

Check Diaphragm set lever for smooth operation.

Thrust play of the lever

to be within 0.2mm.



Spring Installation

fig.18 #313 Installation

15. Front Plate (Mirror-up lever) Installation

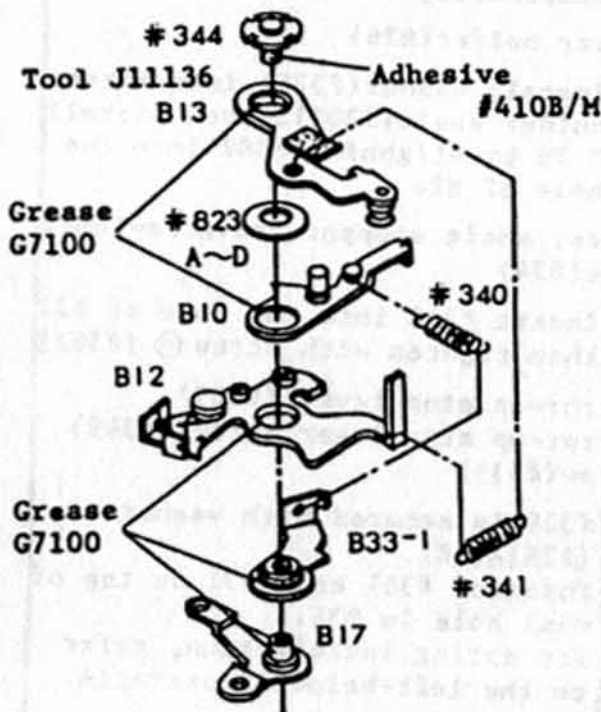


fig.19 Mirror-up lever Assembly

Mirror-up lever Assembly

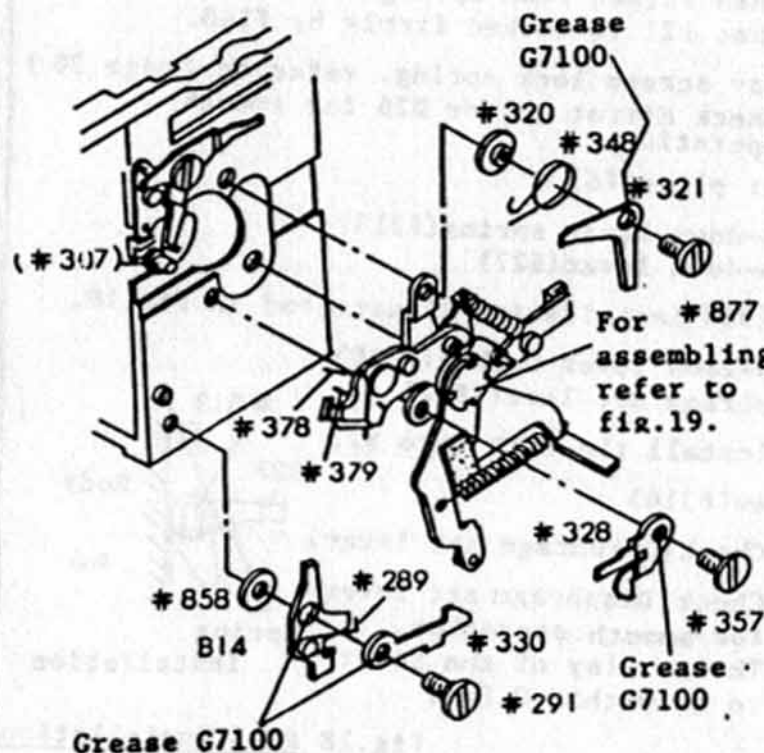
Mirror lever shaft base (B17)
 ↓
 Diaphragm spring stud (B33)
 ↓
 Mirror-up lever (B12)
 ↓
 Diaphragm actuating lever (B10)
 Washer #823
 ↓ Remove looseness with one of
 #823A - D ($t=0.05, 0.1, 0.15, 0.2$)
 Mirror-down lever (B13)
 ↓
 Diaphragm lever spring (#340)
 Mirror-up spring (#341)
 ↓
 Mirror holder spring (#344)

Check each lever for smooth operation

Mirror-actuating mechanism installation

Front Plate

Mirror-up lever assembly (fig.19)
 ↓
 Install #378 and #379 on Pin A (#307)
 Signal lever (#328)
 ↓
 Tighten with screw ⊖ #357.
 Check that #328 operates smoothly.
 Shutter release collar (#320)
 Shutter release spring (#348)
 Shutter release lever (#321)
 ↓
 Fix with screw ⊖ #877
 For #348 installing, refer to P. (24)
 Check #321 for smooth operation
 Washer (#858)
 Mirror down signal lever (B14)
 Mirror-down latch lever (#330)
 Screw ⊖ #291
 Engage #289, referring to P
 B14 should operate smoothly.
 Check each lever for engagement,
 looseness and motion.
 Refer to P. 24 Figure 37 for
 position of each spring and lever.



Front plate (Mirror Box), Wind-up side

16. Mirror Switch, Memory Switch, Self-timer lever installation

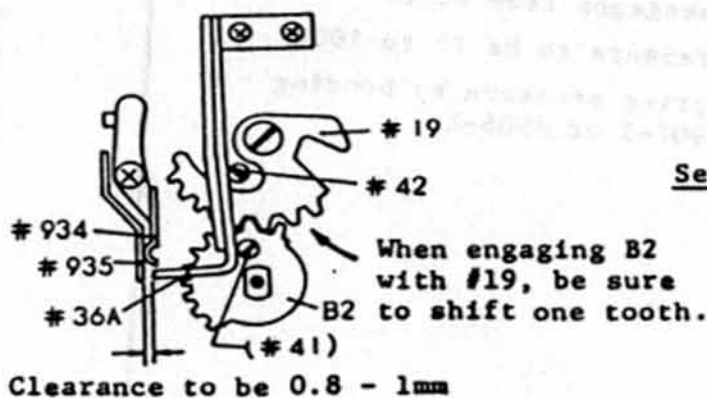
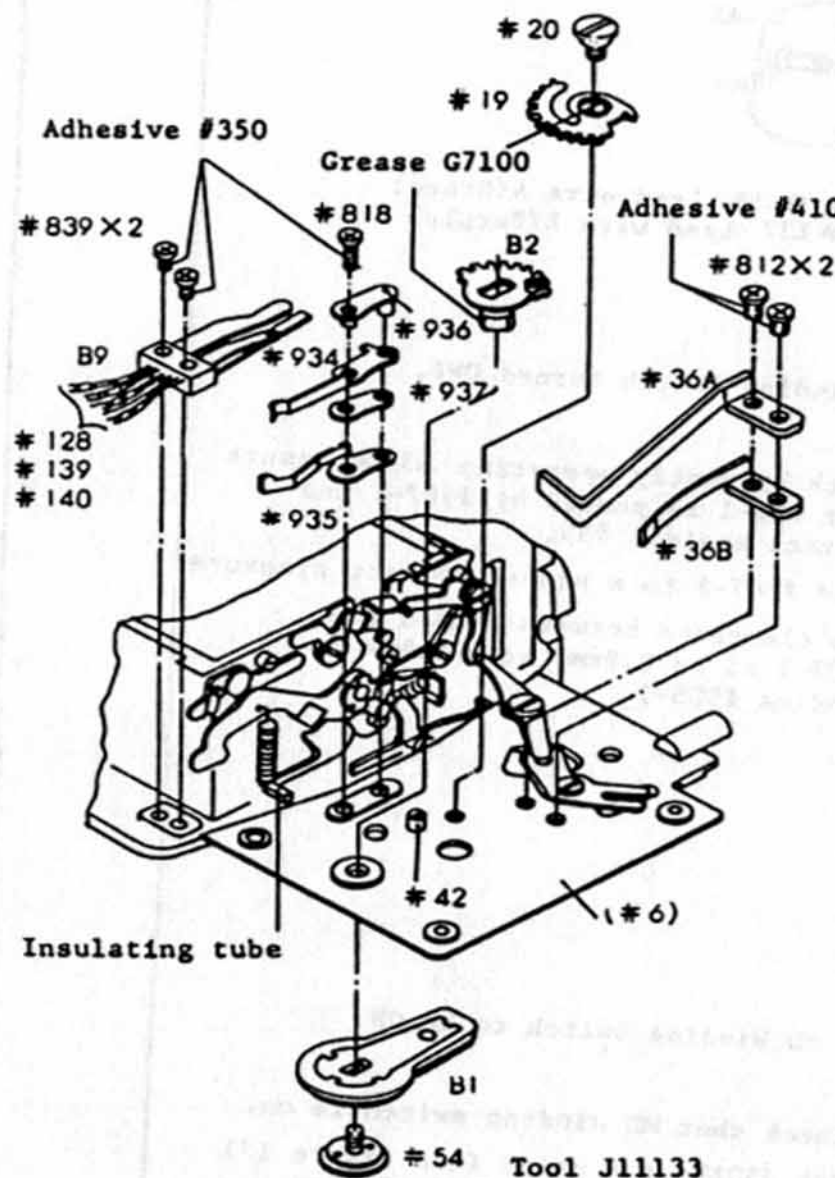


fig.20 Self-timer gear

Front plate

↓ Install with mirror locked up.
Mirror switch(B9), Screw(#839)

Check shutter switch to be ON before installing.

Position the contact between Body die-casting and insulator tube, with care not to deform the contact. The contact should not touch #6.

Front plate

↓ Memory switch assembly

Memory switch B(#935)
Insulator B(#937)
Memory switch A(#934)
Insulator A(#936)

Tighten with screw ⊕ (#818).
#935 should not touch #6.

↓ Don't finger-touch the contact

Self-timer lever assembly

Self-timer gear(B2)
Self-timer lever(B1)

Fix with Self-lever screw(#54) using screwdriver J11133.

Check thrust play to be within 0.15

Self-timer gear B(#19), Screw (#20)

↓ For the engagement with B2, refer to fig.20.

Memory switch spring
Memory switch spring B(#36B)
Memory switch spring A(#36A)

Fix with screw ⊕ #812 x 2

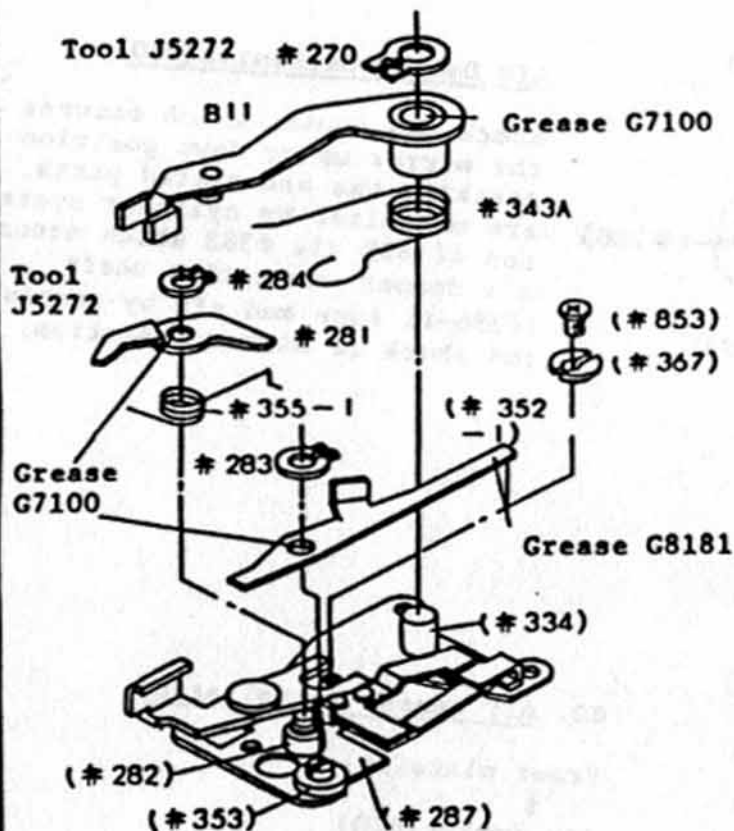
For relative position, refer to fig.20.

#36A and #36B should be at the left side of #41.

Self-timer lever positioning

Self-timer lever should be vertical when Eccentric pin #41 contacts #36A. Tilt of the lever to be within 0.5mm to the right or left. Adjust by rotating #41. Check the clearance between 36A and #935 to be 0.8 to 1.0mm. #935 should detach from #934 midway in turning self-timer lever toward memory-lock direction. Contact pressure of #935 to be 15g or more.

17. Front Plate (Mirror Charge lever, Down lever, Shutter brake) Installation



Mirror box base plate (#287)

Down lever eccentric axle (#367)

Screw ⊕ #853

MD signal middle lever (#352-1)

Install into #353, then secure with G ring (#283), rounded edge below as depicted in fig.21.

Check the play of the tip of #352-1 to be within 0.5mm. If excessive, adjust by pressing down #283. Check for smooth operation.

Spring (#355)

Brake release lever (#281)

Install both parts onto brake release shaft (#282) and fix with #284. Install #284 and spring (#355-1) as depicted in fig.21.

The protrusion of #352-1 should not interfere with #284 when #352-1 gets into brake.

Check the play of the tip of #281 to be within 0.3mm.

Mirror-down spring (#343A)

Mirror charge lever (B11)

Install both parts onto Mirror charge lever axle (#334) and fix with #270. As for #343A installing, refer to fig.21. To tighten loose B11, pull down #270

Detaching Power of Mirror Charge Lever (B11)

The power when B11 detaches from shock absorb rubber (#363) to be 180 to 220gms.

Measure the power with J15019 at the station 1 in fig.21, pulling in the arrow direction.

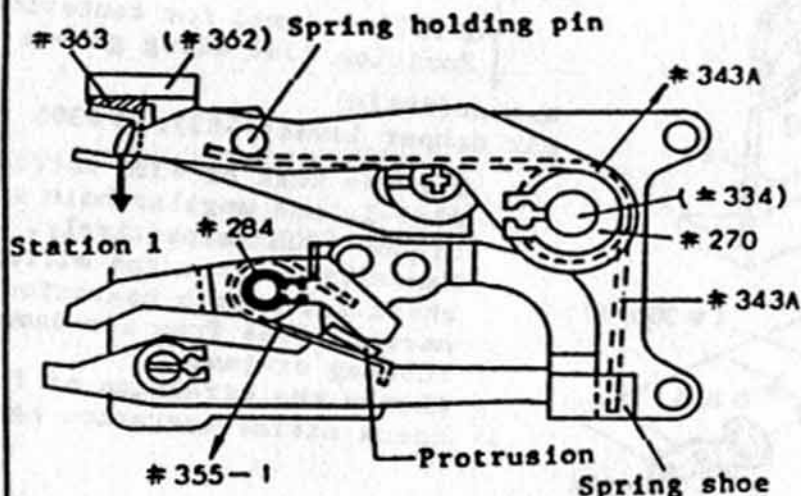
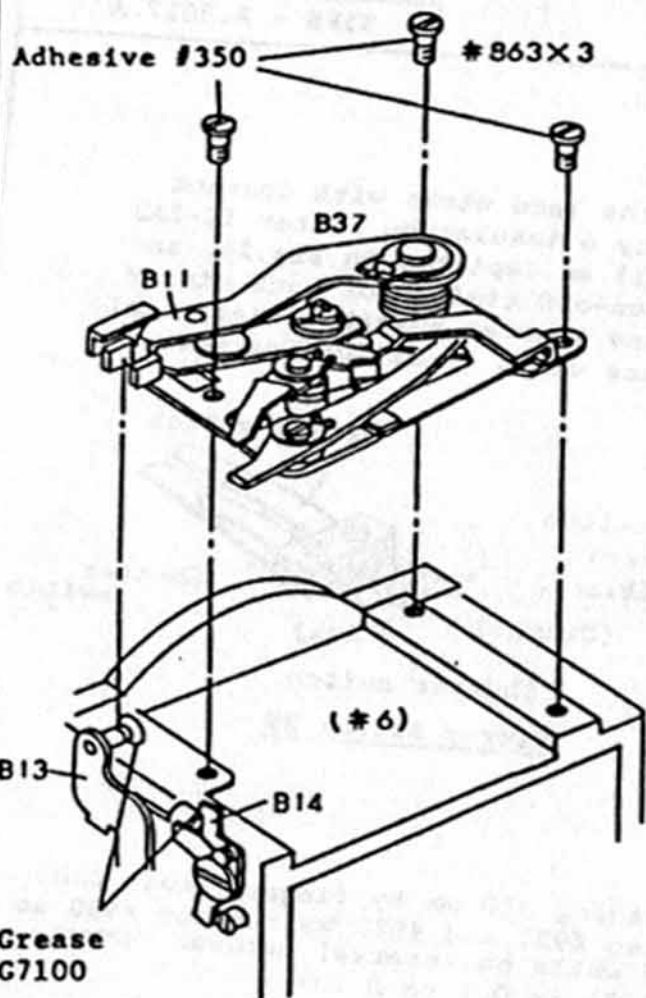


fig.21 Shutter brake assembly

18. Shutter Brake B37 Installation



Front plate #6

Shutter brake B37

Put #352-1 between Brake spring base #285-1 and Brake spring #286-1. Set Mirror-down lever B13 at down position, then engage with the fork of Mirror charge lever. (B11).

Fix with three screws (#863).

To position #352-1, pull out #352-1 from the brake spring and let #352-1 contact B14, then rotate #353 (see fig.22) until 1.0mm space is obtained between the tip of #352-1 and the bottom edge of #6.

Charge the mirror by B11, then release by B19 to check proper mirror-up operation

Set mirror at the down position by #328 and check a proper shutter brake operation.

Also check that shutter brake can be released by #281.

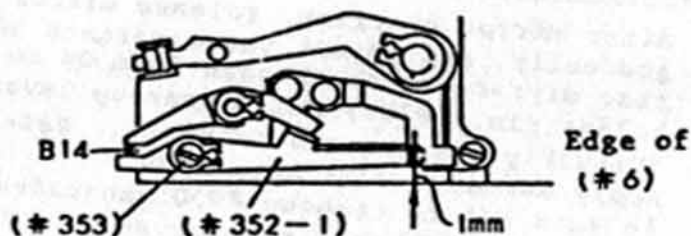


fig.22 MD signal middle lever(#352-1) positioning

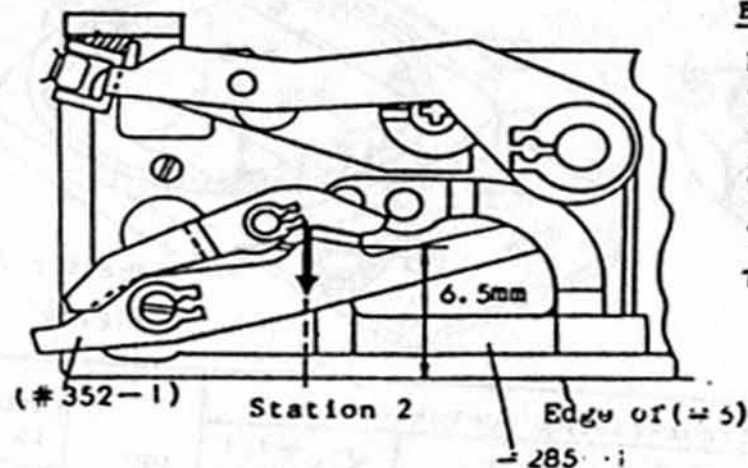


fig.23 Brake power measurement

Brake Power for Signal Middle Lever

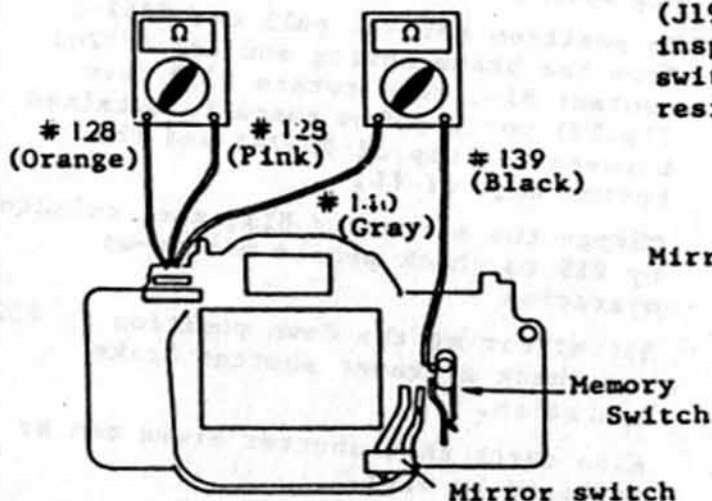
Measure the brake power with J15019, pulling in the arrow direction at the station 2 where the bending edge of #352-1 locates 6.5mm up from the bottom edge of base plate (See fig.23)

The brake power to be $200g \pm 50g$

To adjust brake power, bend #284-1.

19. Mirror-switch adjustment

J19028-1



Connect the lead wires with Contact efficiency & insulation tester IE-2A2 (J19028-1) as depicted in fig.24, and inspect on-off timings of both mirror switch and shutter switch. Electrical resistance of B9 to be 10MΩ or more.

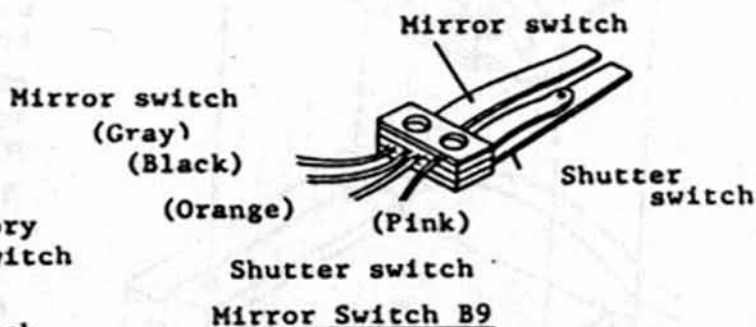


fig.24

Switch ON-OFF Timing

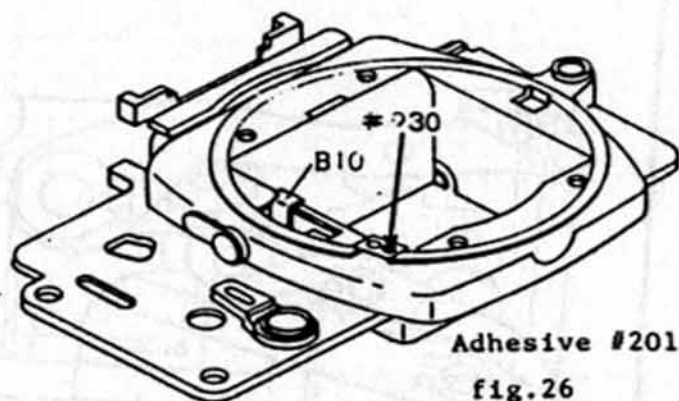
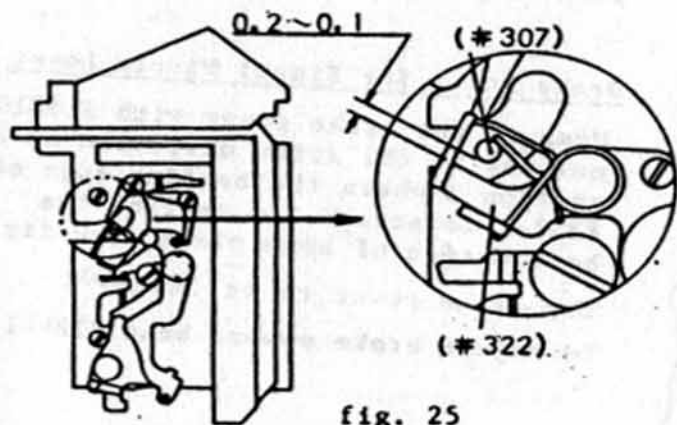
After mirror charging, release mirror pressing B10 up by finger. lower B10 gradually, and adjust the clearance between #927 and #928 by turning #930 so that mirror switch changes from ON to OFF while on interval between Mirror holder pin A(#307) and Mirror-up lever(#322) is 0.2 to 0.1mm.

(Visually inspect the interval. Refer to fig.25. 26)

Apply adhesive #201 onto #930.

Be sure not to tighten #930 excessively.

Visually check that shutter switch changes from OFF to ON while #307 is shifting up 1.1mm away from its contacting point with #322 (no clearance between the two) (See the chart below)



Position of Mirror	Switch	During mirror-rising operation				up-position	return to down-position
		-0.2 (#322)	-0.2 (#307)	0	+1.1		
Mirror Switch	ON	ON	OFF	OFF	ON	ON	
Shutter Switch		OFF	OFF	ON	ON	OFF	

20. Air Damper installation

Air Damper Mechanism(B20)

Shock and sound, which occurs at the mirror up or down position striking the associated parts, are minimized by cylinder operation of B20 via #383 which actuates air damper connecting shaft (#386-1) fore and aft by receiving the shock of mirror operation.

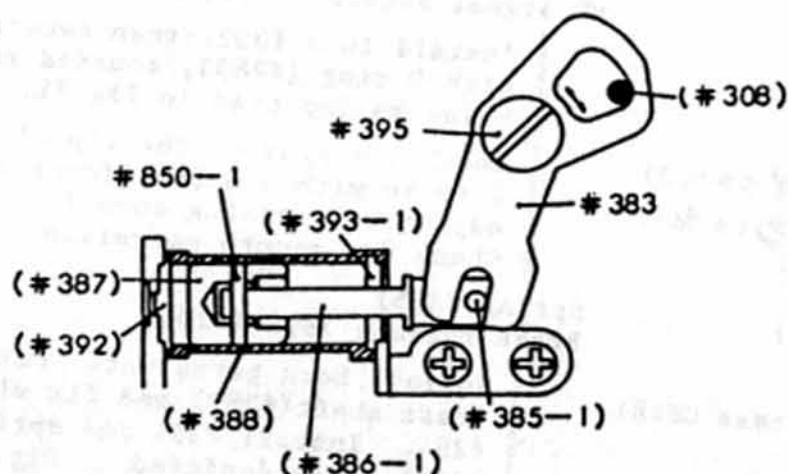


fig.27 Structure of Air Damper

20. Air Damper Installation

Front plate(#6)

Air damper(B20)

Put #385-1 into #386-1 and fix with #856 as illustrated. Install #397, #393 and #387 in order onto #386-1, then insert #850-1 into #386-1 through #387 aligning two holes.

Insert the above assembly into #388, using care not to drop #850-1.

Air damper holder(#394)

⊕ #825x2 (used for centering)
Position #388 along groove of #6

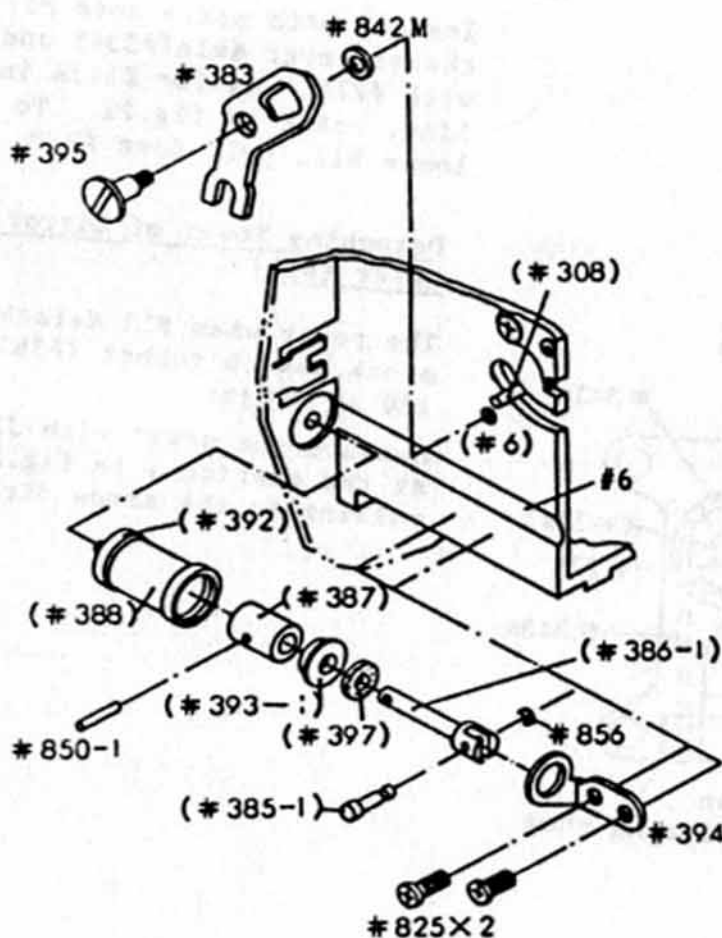
Washer(#842M)

Air damper lever(#383), ⊖ #395

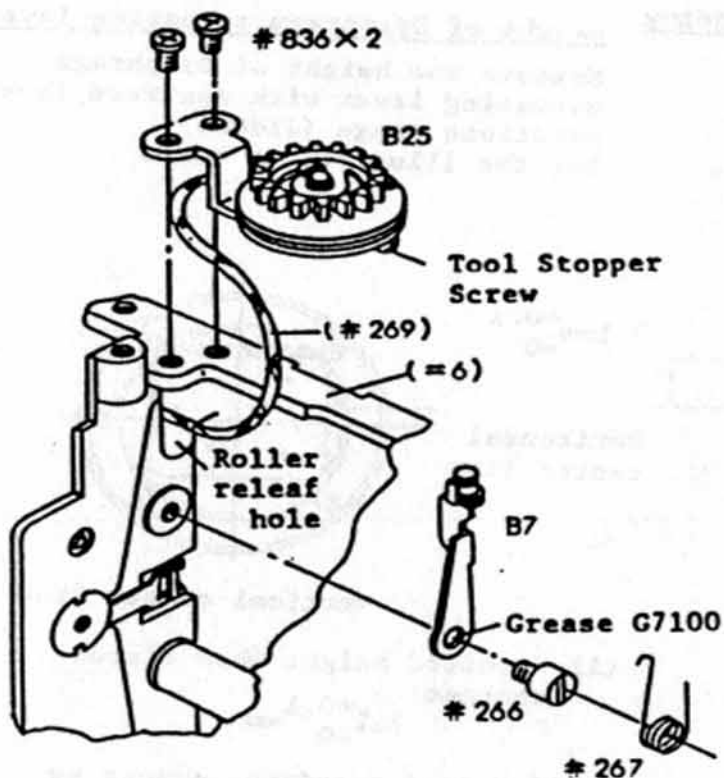
Put the fork of #383 astride #385-1, and angular hole of #383 around #308 respectively.

Manually operate the mirror and check for smooth operation of mirror, free from air damper's rubbing or jam.

Change the direction of #6 and check mirror operation again.



21. Roller lever(B7), Brush coupling gear(B25) Installation



Front plate(#6); rewind-side

Front plate #6

Roller lever B7, Screw(#266)

B7 should not interfere with #6 due to excessive back-and-forth play

Roller lever spring(#267)

Refer to fig.28 for spring installation.

Brush coulnine gear(B25)

Before installing. inspect for smooth operation and no abnormal sound of spring.

Pass thread #269 through roller releaf hole on #6. usine care not to reduce the rine of 2mm dia at the end of #269

Install #269 between Roller(#262) and thread retainine plate(#264). (See fig.28)

⊕ #836x2

Be sure not to remove tool stopper screw before Bayonet #202 is installed.

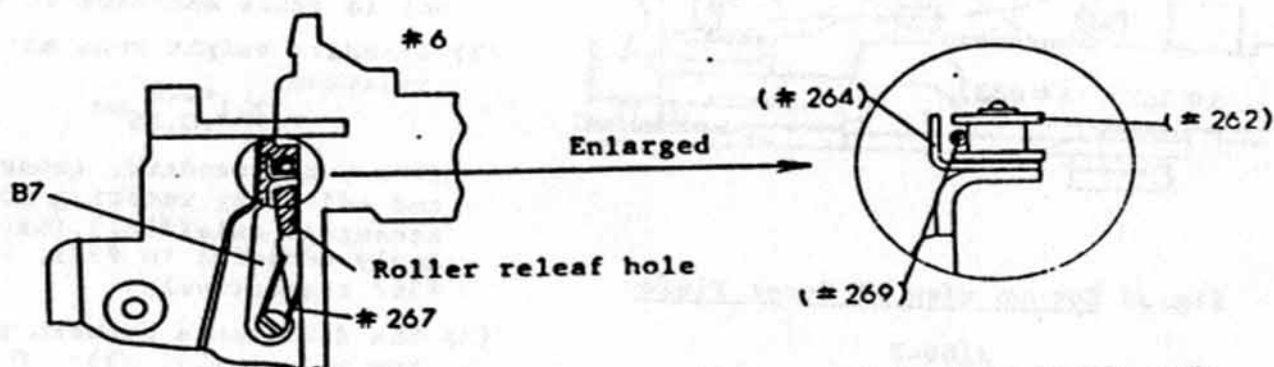


fig.28 Back view of Front plate #6; rewind-side

Thread(#269) knotting

If #269 is unknotted, knot as depicted in fig.29, using care to tighten the knot securely.

The length of #269, from the cut in pulley on B25 to the knot to be 116 ± 0.5 mm

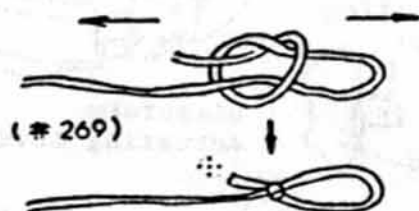
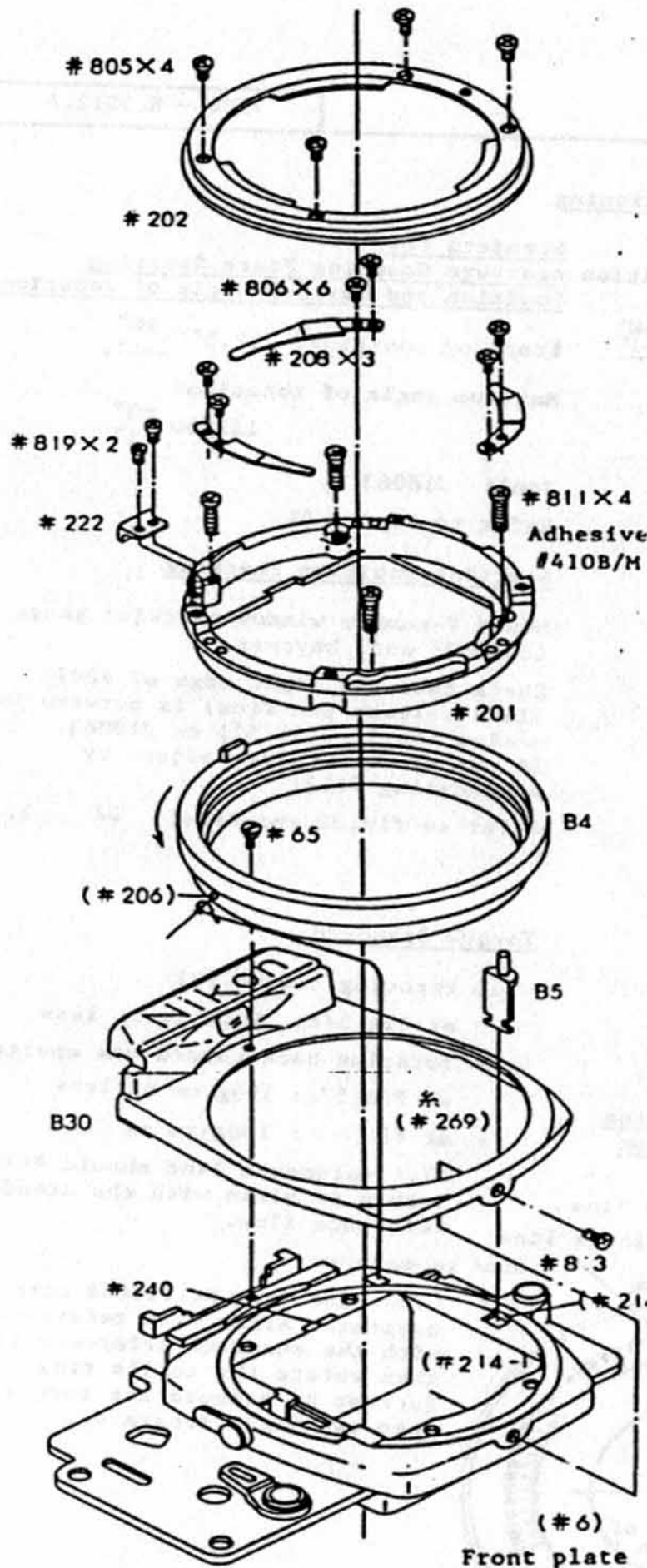


fig.29 #269 knotting



22. Bayonet Installation

Front plate(#6)

Front cover(B30): ⊕ #813x1
⊖ # 65x1

Aperture coupling ring(B4),
Lens release lever(B5)

Insert B5 into fork of #214-1
Install Thread(#269) securely
into the groove of thread
supporting pin(#206).

Bayonet mount(#201) ⊕ #811x4

Use care not to catch thread
Temporarily loose fit with
screw

Coupling ring stopper(#222) ⊕ #819 x 2

Turn B to the position where
#222 can fit in B4, and hold
with finger

Screw (⊕ #811)x4

Secure #201 tightly where B4
rotates most smoothly

Bayonet spring(#208), ⊕ #806x6

Position #208 flush with outer
circumference of #201 or at
least 0.2mm inside.

Bayonet #202, ⊕ #805x4

Check B4 for smooth rotation

Remove tool stopper screw
(See fig.30)

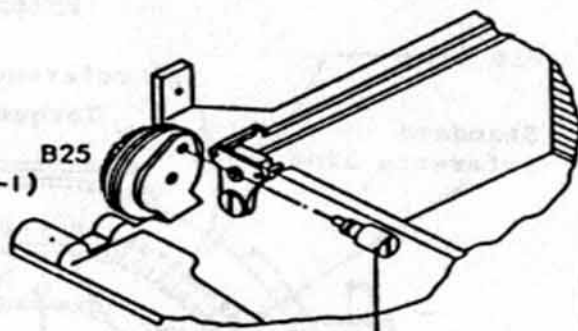


fig.30 Tool Stopper Screw

23. Aperture Coupling Piece Positioning

Rotation limit position

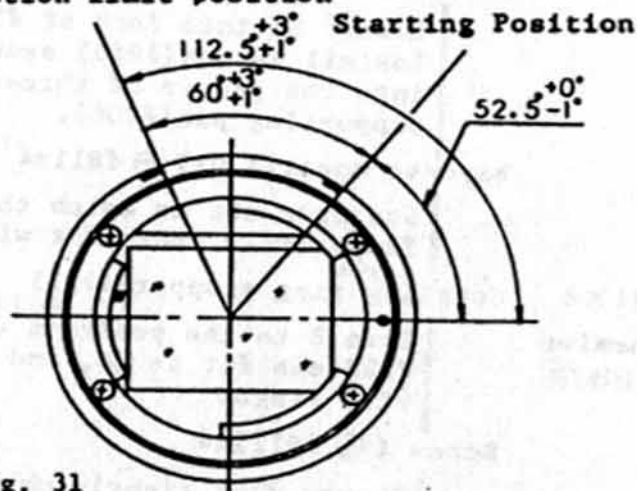


fig. 31

Positioning standard of aperture coupling ring

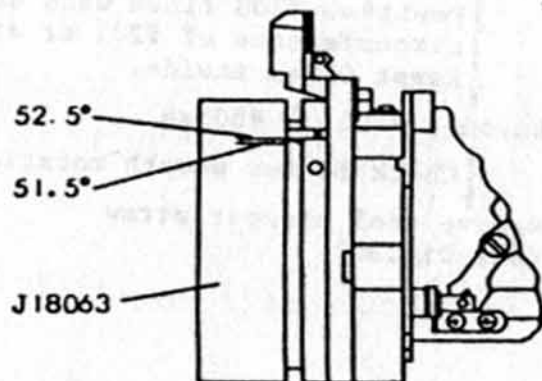
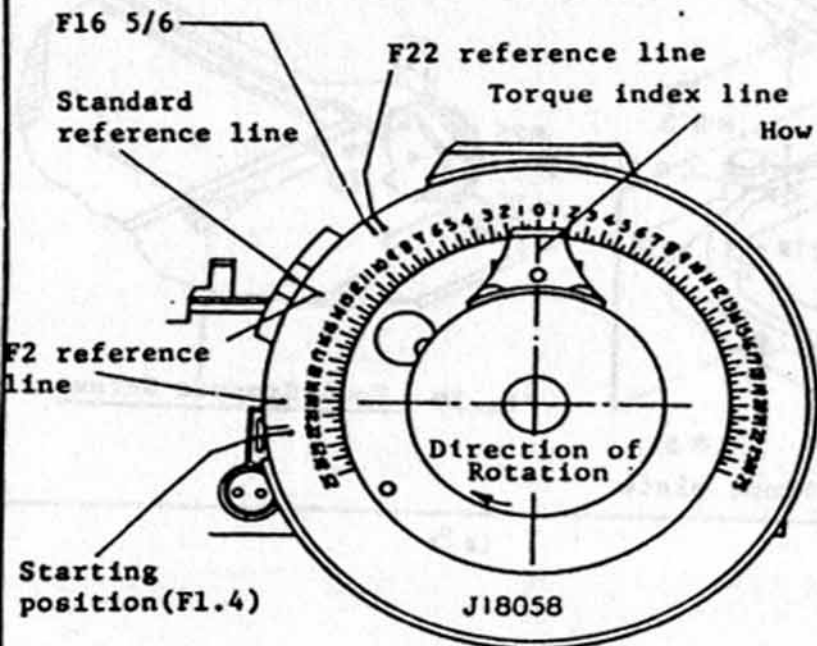


fig. 32

Aperture coupling piece starting position



Standard for

Aperture Coupling Piece Starting Position and Maximum Angle of Rotation

Starting position: $52.5^{\circ} \begin{matrix} +0^{\circ} \\ -1^{\circ} \end{matrix}$

Maximum angle of rotation: $112.50 \begin{matrix} +3^{\circ} \\ +1^{\circ} \end{matrix}$

Tool: J18063

Refer to Figure 31

Starting position checking

Mount F-number window checking gauge (J18063) onto bayonet.

Check that the right edge of #209 (lens release pin-side) is between two scales (52.5° & 51.5°) on J18063. If out of the scales, adjust by dislocating #222.

Refer to fig.32 and Page(22).

Torque Standard

When rotating toward F22

at F16 5/6: 950g.cm or less

When rotating back toward max aperture

at F16 5/6: 350g.cm or less

at F2 : 100g.cm or less

F1.4 reference line should surely return to align with the standard reference line.

How to measure

Mount the tool No. J18058 onto the bayonet. Align each reference line with the standard reference line, then rotate the tool's ring further to measure the torque when two lines separate.

24. Diaphragm actuating lever positioning

Clearance
to be 0.2mm

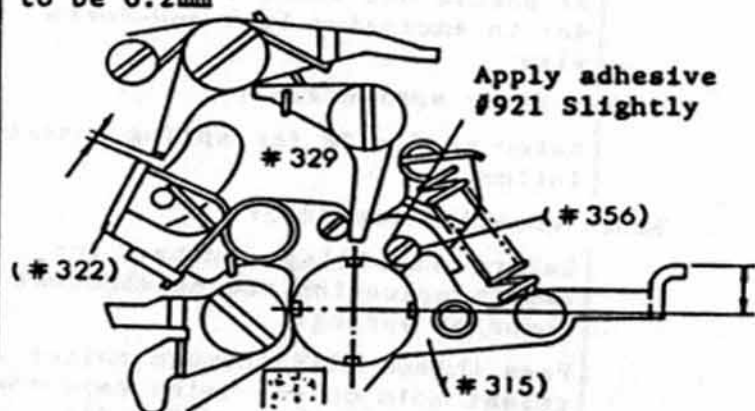


fig.34 Side View of Front Plate;
Wind-up side

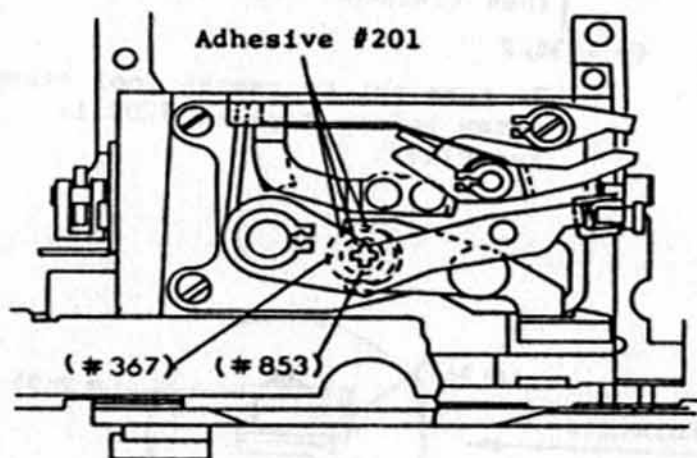


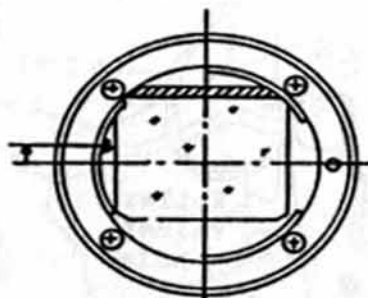
fig.35 Bottom view of Front Plate

Height of Diaphragm actuating lever

Measure the height of Diaphragm actuating lever with Aperture lever positions gauge (J18004)
See the illustration below

$3.1^{+0.1}_{-0}$ mm

Horizontal
center line



Vertical center line

- (1) Standard height when mirror charged

$3.1^{+0.1}_{-0}$ mm

If out of standard, adjust by rotating Eccentric pin #356
(See fig.34)

After adjustment, slightly apply adhesive #921 to #356. Use care not to exude adhesive to #315

- (2) Standard height when mirror released

$3.1^{+0.4}_{+0.15}$ mm

If out of standard, loosen #853 and adjust by rotating Down lever eccentric axle (#367). (See fig.35) Apply adhesive to #353, #362, and #367 respectively.

- (3) The difference between the above two values (1), (2): 0.15mm or more

Be sure to provide 0.2mm clearance between Mirror-up lever (#322) and Mirror-up stop lever (#329) in normal mirror down position.
See fig.34.

Position of Diaphragm actuating lever

Check the distance from vertical center line and the depth from bayonet surface with Aperture lever depth gauge J18042 (See fig.36)

The tip of diaphragm actuating lever should contact the "stop" side of J18042, and should not contact with "go" side.

Adjust the lever position by bending Diaphragm actuating lever.

J18042

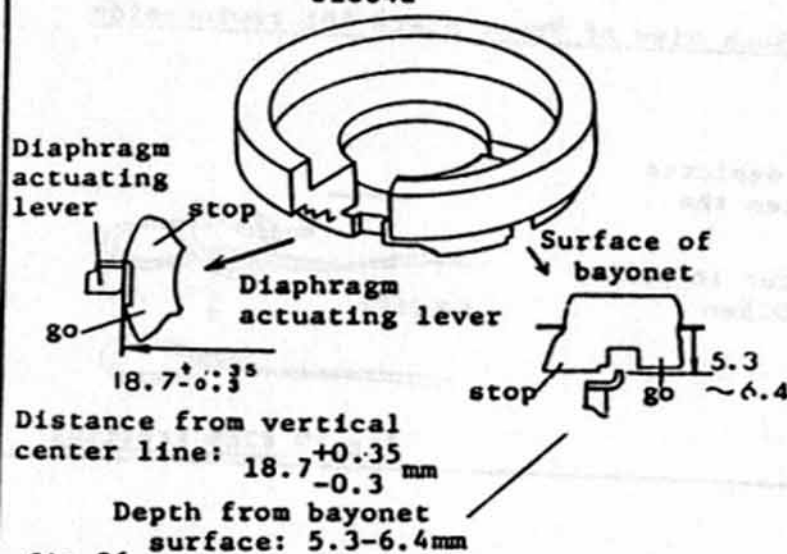


fig.36

25. Front Plate Installation

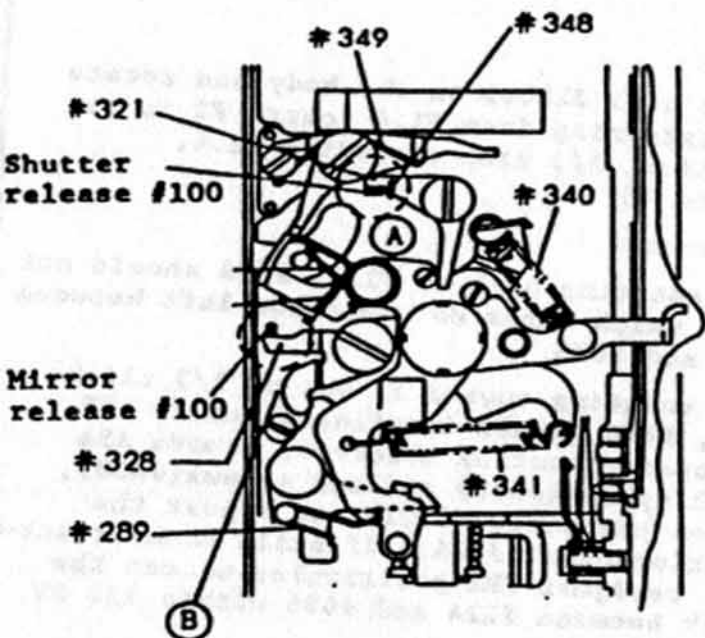


fig.37 Front plate, Mirror box side

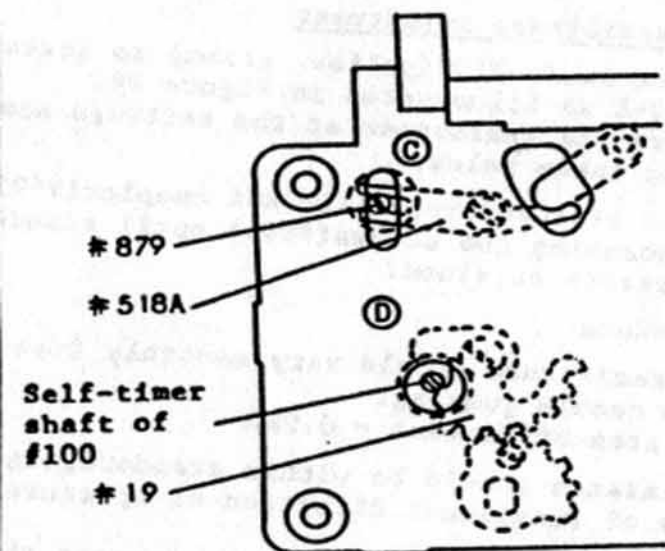


fig.38 Front plate, self-timer side

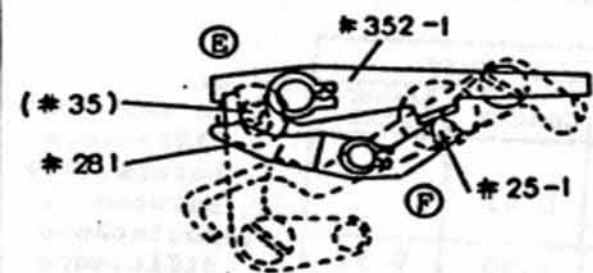


fig.39 Front plate, body bottom

Body

Cock the shutter, release the blank exposure prevention lever and set the film-advance lever halfway in the winding direction before front plate installation.

Front plate

Charge the reflex mirror

Install Front plate, being careful to ensure proper engagement at the areas (A, B, C, D, E, F) specified in Figure 37, 38, 39.

Engagement

- A (Shutter release lever (#321)
Shutter release of #100)
- B (Signal lever (#328)
Mirror release of #100)
- C (Release lever guide pin (#879)
Sea-saw lever (#518A))
- D (Self-timer gear B (#19)
Self-timer shaft of #100)
- E (Brake release lever (#281)
Mirror charge pin collar (#35))
- F (Motor switch coupling lever (#25-1)
MD signal middle lever (#352-1))

Press front plate in the arrow direction in Fig.40, and secure with six screws (#810x5, #817x1) in the sequence shown in Figure 40.

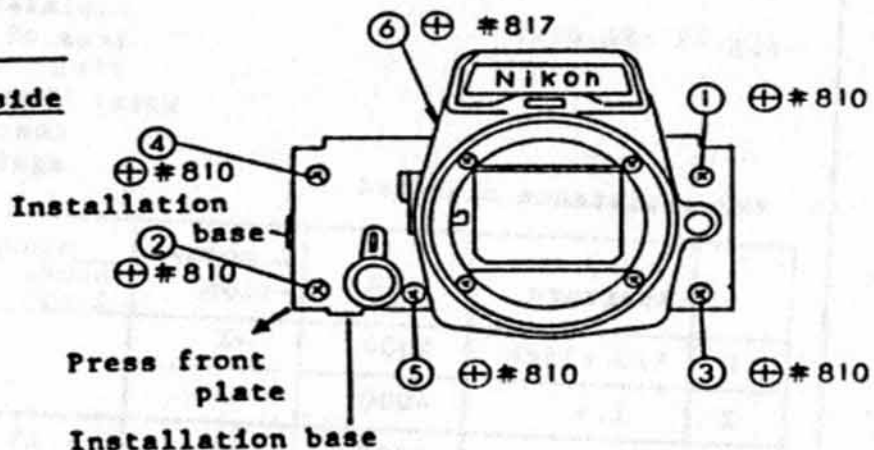


fig.40 Screw tightening sequences ① - ⑥

26. Mirror Position to Release Shutter

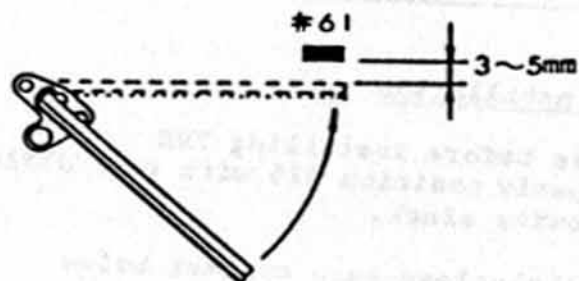


fig.40

Clearance of 3 - 5mm should be left between mirror buffer #61 and the mirror in the highest position to release shutter. (See Figure 40)

Be careful not to scratch or leave finger prints on the mirror

Adjust the mirror position by activating shutter release lever (#321) up and down with eccentric pin (#356).

(See Figure 41)

Apply adhesive on #356, being careful not to exude the adhesive on #321.

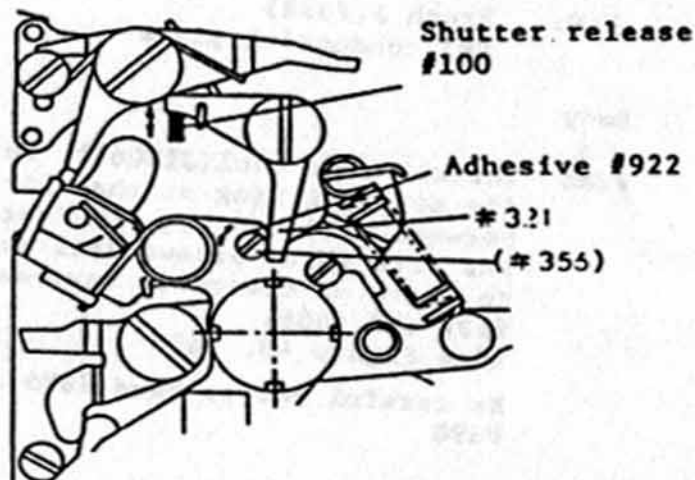


fig.41 Front plate, film-advance lever side

- (a) looseness: within 1.0mm
- (b) Inclination: within 0.5mm

27. Inspections after Front Plate Installation

Body Back Distance Check:

Tools: J18001-1, J19004

Standard: $46.67 \pm 0.02\text{mm}$ (at outer rails)

Self-Timer Lever Operation Check:

8 - 14 sec. delay: Adjust with eccentric pin shown in Figure 42.

Cancellation: Cancellable when the lever is returned to the position ready for memory lock operation

Lever looseness: Within 1.0mm
(See Figure 42)

Blank exposure prevention lever check:

Inspect #26 and A3 for proper operation through tripod screw mounting hole.

Mirror charge check:

Attach the tool (J18065), set its aperture setting to F16 and wind the film-advance lever several times, fast or slowly; mirror should be surely charged regardless of winding speed.

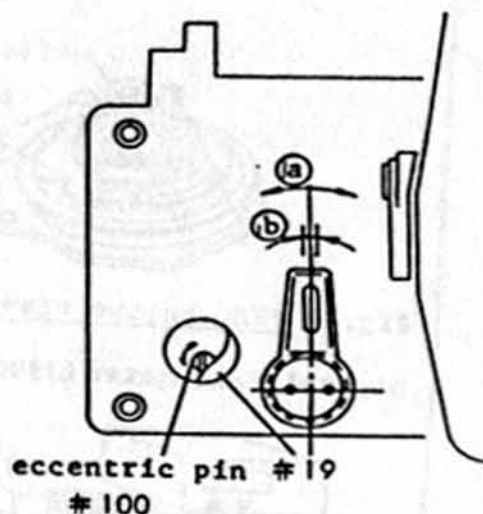


fig.42

Cares before installing FRE
Properly position B25 with tool J15146,
removing slack.

Alcohol-clean each contact below

Body: Brush A(#685)
FRE Printed Circuit(J)

FRE: Brush B(#698)
FRE conducting plate

Body

FRE: Install lens tool(J18065), set
its aperture ring at the click
between F1.4 and F2, and install
FRE with three screws #861 so as
to leave no clearance between
#631 and #686.
(See Figure 43, 45)

Be careful not to bend #685 and
#698

Check Points

Rotating the aperture ring of
J18065, inspect the gear slack
between #224 and #686 to be
within 1/6 EV (0.15k) deviation
with tester J9003-1. If
excessive, shift FRE position
until allowable slack obtained.
If still excessive, readjust the
B25 positioning.

Brush A(#685) should contact
#684 at the middle of the
circumference of #684

#631 and #678 should not contact
each other. (See Figure 45)

Roller lever(B7) should not move
before #686 contacts #631.
Inspect through access hole in
Fig.44.

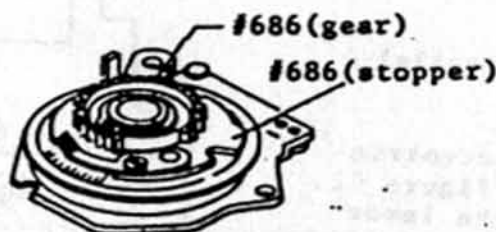
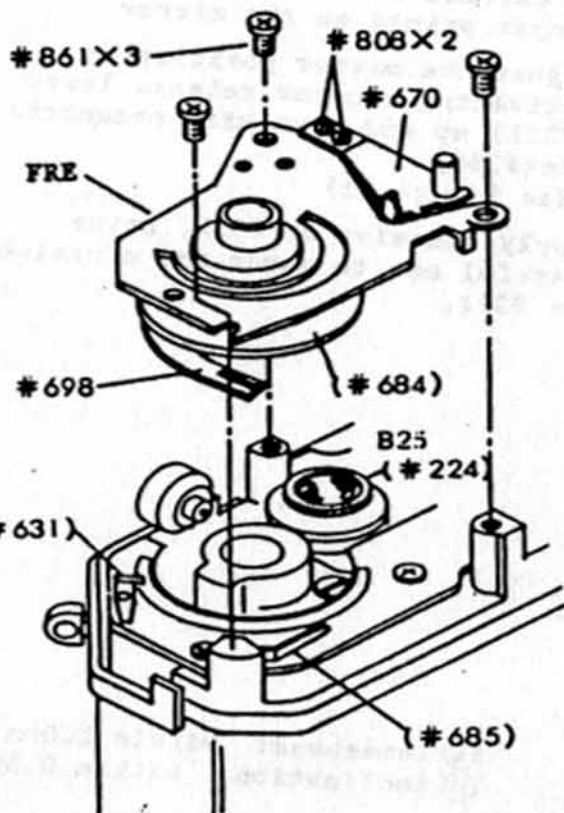


fig.43 FRE, bottom view

Digital Volt-Meter (J9003-1)

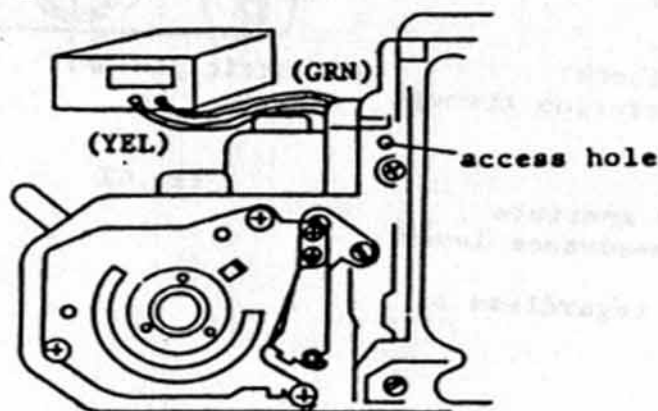


fig.44 Body, rewind-knob side

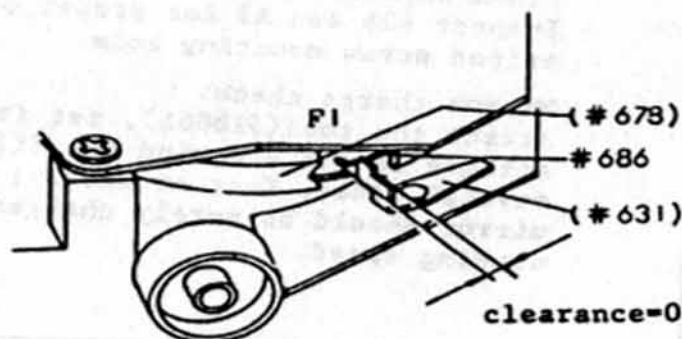
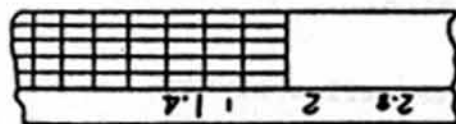


fig.45 Synch terminal

29. FRE Positioning

Aperture ring of J18065



F2 F1.4

Brush gear (#686) should move instantly #686 should not move

fig.46 1/3 stop click(F1.4 1/3)

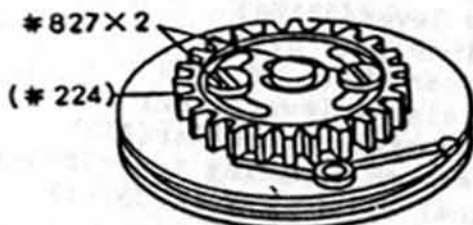


fig.47 Brass coupling pulley

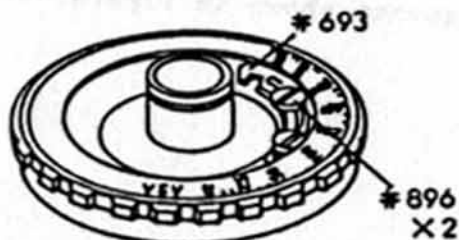


fig.48 ASA dial

Body

Mount the tool J18065 on the body and rotate the aperture ring from F1.4 toward F2 to set to the click, 1/3 stop exceeding F1.4. See Figure 46

Check Points

When rotating back to F1.4, #686 should not move, which means no clearance left between #631 and #686

When rotating toward F2 out of 1/3 click stop, #686 should immediately move. If improper operation observed, remove ASA click spring(#670) and two screws(#808), loosen two screws(#827) and adjust the positioning of #224. If still unsatisfactory, readjust FRE positioning to set the slack between #224 and #686 within 1/6 EV deviation.

30. FRE Resistance Adjustment

Connect leads #130(yellow, green) to tester J19003-1 as illustrated in Figure 44. Measure the resistance at the settings shown in the table below.

If out of standard, slide ASA coupler(#693) by loosening two screws(#896) until standard resistance obtained.

Check Points

FRE resistance should vary smoothly free from needle jumping. One stop difference = 0.9k Ω

Resistance should be within standard, regardless of rotational direction of aperture ring

Note: When changing ASA setting, depress the checker switch so as not to contact against FRE.

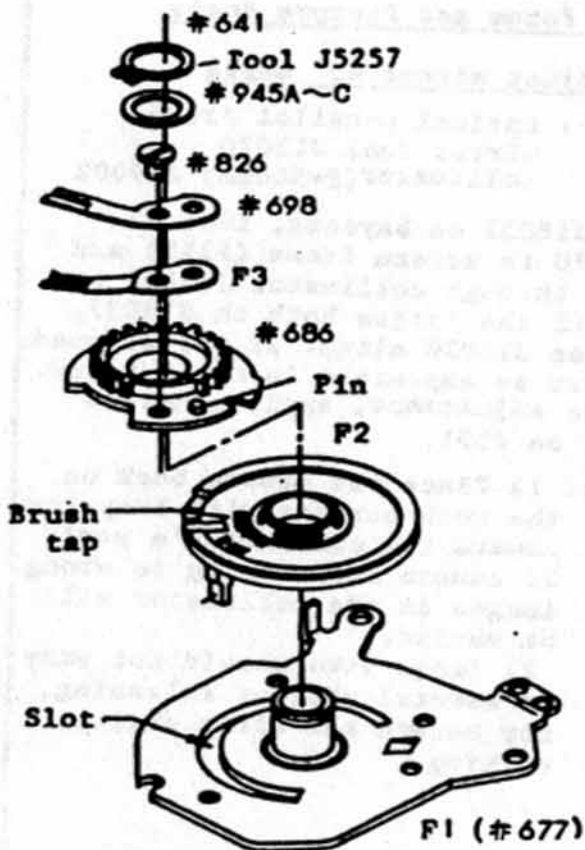
FRE resistance standard

	Aperture	ASA	Compensation	Standard (k Ω)		
				upper limit	Center	Lower limit
1	1/3 click	4000	-1			
2	1.4	4000	-1		0.45	
3	2	4000	-1	1.15	1.05	0.95
4	5.6	4000	-1	4.2	3.75	3.3
5	5.6	100	0	10.4	9.45	8.4
6	2.2	12	+2	< ∞	16.65	14.9

Note:

- 1) No resistance difference permissible between 1 & 2
- 2) Resistance difference between 2 & 3 to be 0.6 \pm 0.1k Ω

31. FRE Installation



To Install Brush

ASA dial mount (F1)

FRE ring (F2)

Be careful not to directly touch FRE pattern
Clean the tapped area with a mixture of
alcohol and ether

Brush gear (#686) Washer (#945 A, B, C)

Snap ring (#641)

#686 should rotate smoothly by adjusting with
one of #945A, B, C

Brush A (F3), Brush B (#698) Screw (#826)

Set #698 on top of F3 and install both
together, aligning the holes with pin on
#686

All of six wires of F3 should firmly
contact on taps of F2. (Ref. Figure 49)

Two contact plates of #698 should not
disengage from FRE printed circuit (J)

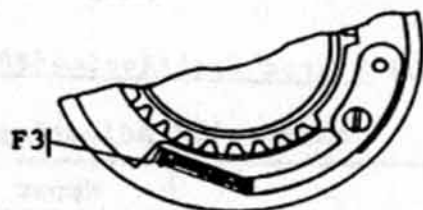
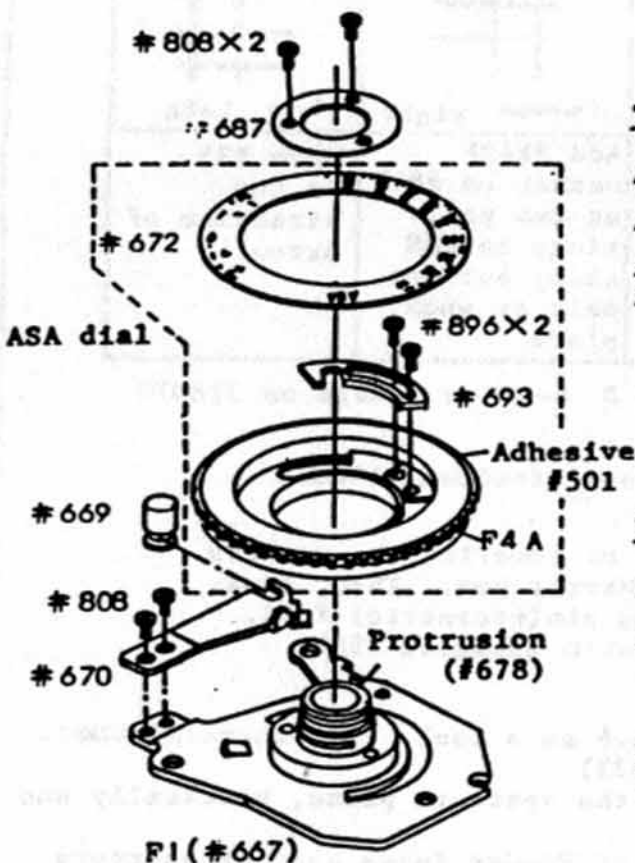


fig.49 F3 position



To Install ASA dial (#672)

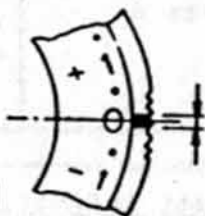
ASA dial (F4A)

ASA coupler (#693), Screw (#896x2)

ASA dial (#672),

Adhesive #501

Setting ASA click plate
(#676) at the center
click, fix #672 with
its "0" setting aligned
with the index.



To install ASA dial (F4)

ASA dial mount (F1)

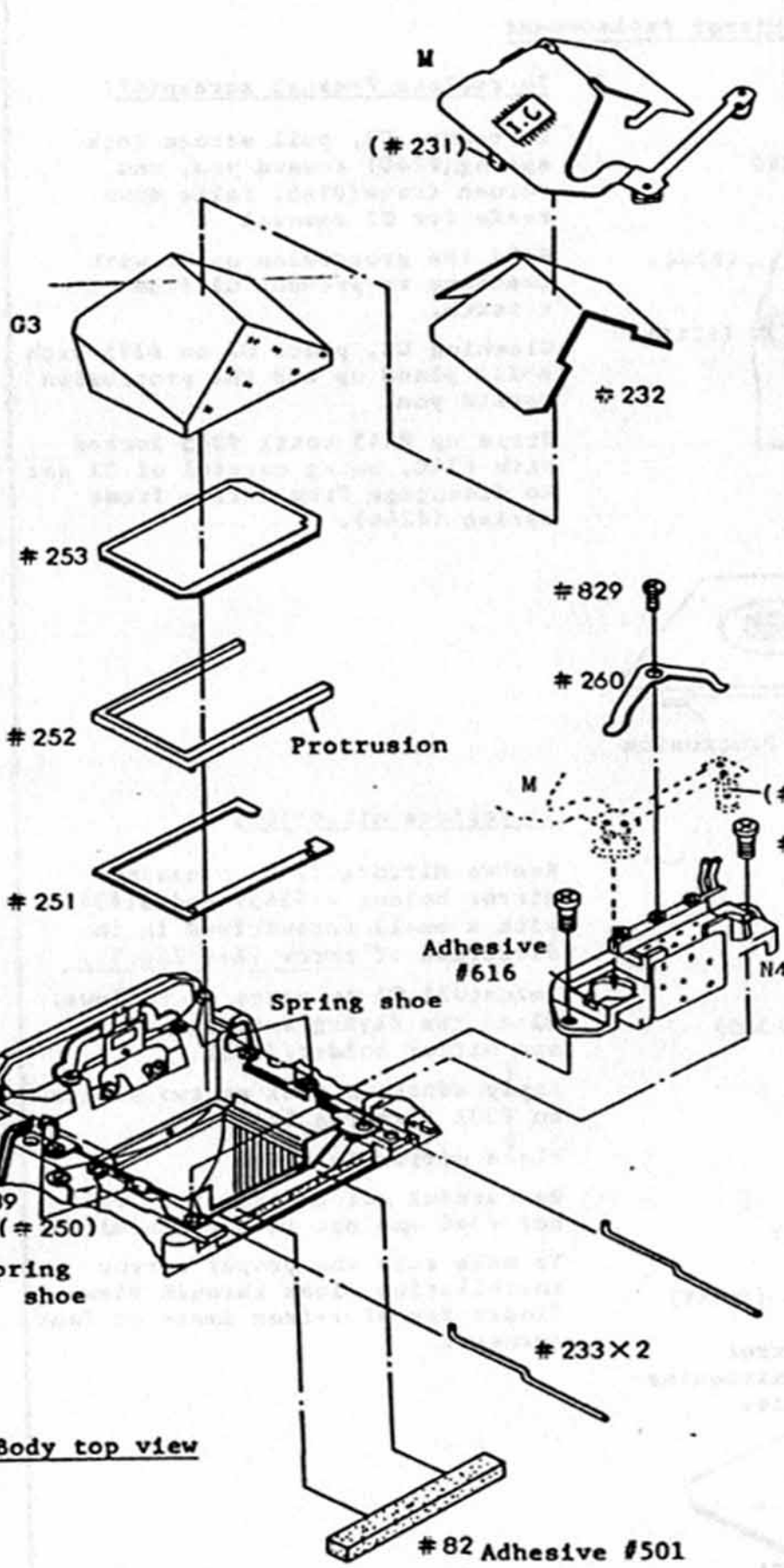
ASA dial (F4A), #896x2, #693, #672

Protrusion on #678 to be aligned with the
slot in #693

Scale attaching ring retainer (#687),
Screw (#808x2)

Inspect #687 for smooth rotation

32. Installation of Pentagonal Prism, Eyepiece and IC Printed Circuit

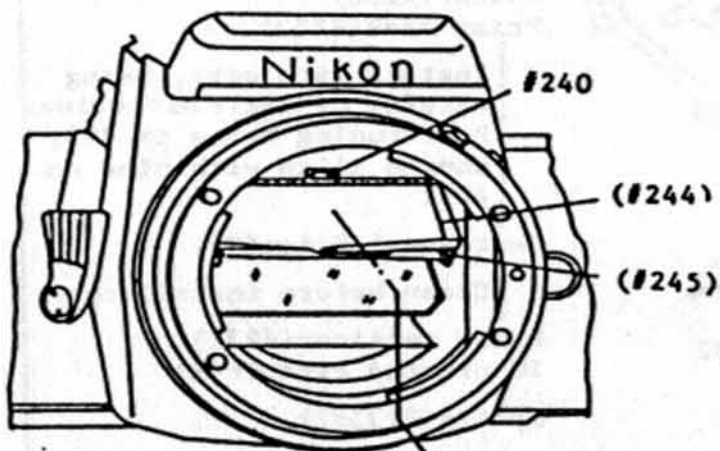


Prism box(B39)
 ↓
 Finder field frame(#251)
 Spacer(#252)
 Prism mask(#253)
 ↓
 Install each part, being careful of their direction. Positioning holes in #251 should align with pins on #252
 ↓
 Pentagonal Prism(G3)
 ↓
 Clean before installing
 Prism retainer(#232)
 IC printed circuit(M)
 ↓
 Spring(#233x2)
 Engage the spring in following sequences.
 Eyepiece-side spring shoes of #250
 ↓
 Prism-retaining plate(#231)
 ↓
 Bayonet-side spring shoes of (#250)
 Be careful not to scratch the prism.

Prism box(#250) of Front Plate(#6)
 ↓
 light-tight(#82)
 ↓
 Eyepiece mold(N4), Screw(#817)
 ↓
 Clean the prism-side surface of eyepiece lens
 ↓
 Photo diode(#258x2)
 ↓
 Fit into holes in N4
 ↓
 SPD printed board retainer (#260)
 ↓
 Screw(#829)
 ↓
 Apply adhesive at the cut in N4 to secure #258 on N4

Body top view

33. Fresnel Screen and Mirror replacement



To replace Fresnel screen(G2)

To remove G2, pull screen lock spring(#240) toward you, and screen frame(#245) falls down, ready for G2 removal

Hold the protrusion on G2 with tweezers to prevent G2 from scratch.

Cleaning G2, place G2 on #245 with split plane up and the protrusion toward you.

Press up #245 until #245 locked with #240, being careful of G2 not to disengage from screen frame spring (#244).

to be bent

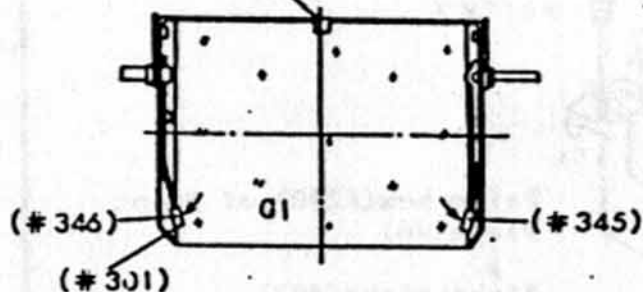


fig.51 Mirror holder B26

To replace mirror(G1)

Remove Mirror(G1) by pressing mirror holder A(#345) and B(#346) with a small screwdriver in the direction of arrow (See Fig.51).

Reinstall G1 in place as follows. Clean the faying surfaces of G1 and mirror holder(#301)

Apply adhesive #501 at two places on #301 (See Fig.52)

Place mirror in place

Be careful not to transform #345 nor #346 and not to scratch mirror

To make sure the proper mirror installation, look through view-finder for blur-free image at four corners.

Adhesive #501:
2mm off the
wall

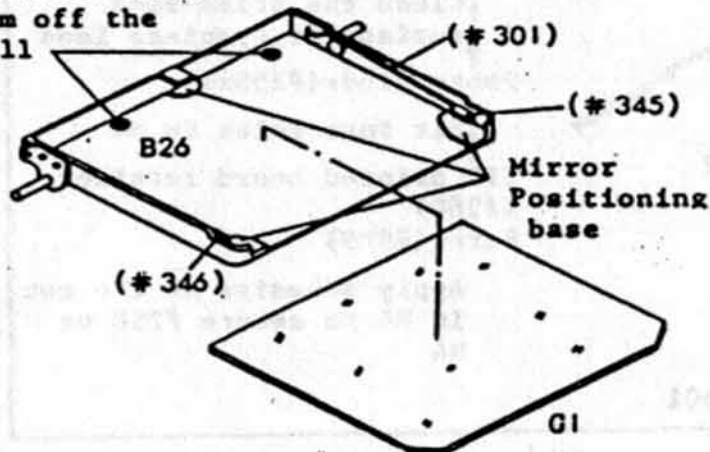
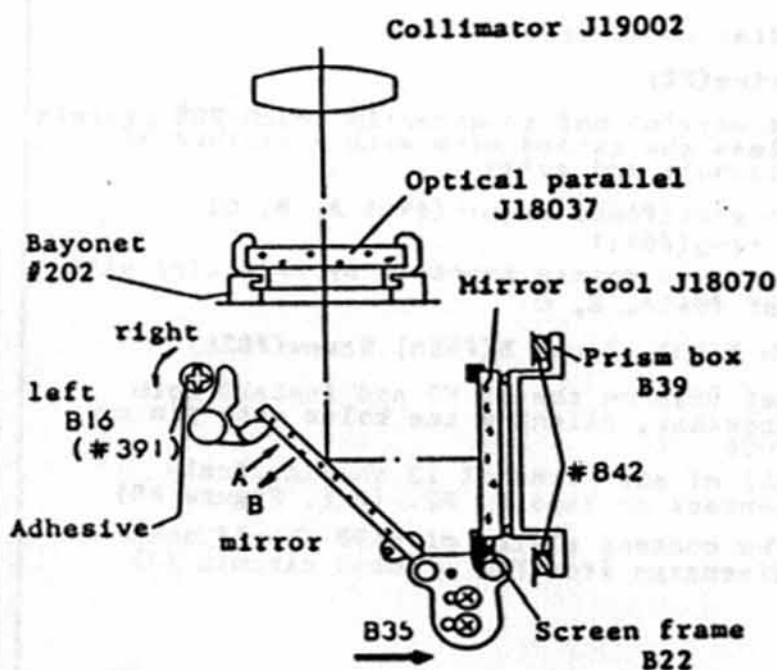


fig.52 Mirror replacement

34. Adjustment of Mirror 45° angle, Infinity focus and Picture Angle



To adjust mirror 45° angle

Tools: Optical parallel J18037
 mirror tool J18070
 Collimator(f=500mm) J19002

Set J18037 on bayonet, install J18070 in screen frame (#245) and look through collimator J19002 to see if the images both on J18037, and on J18070 align. If not aligned, adjust as explained in table below. After adjustment, apply adhesive #501 on #391.

Note: 1) Place the camera back on the work surface with body top toward the collimator's post. If camera positioning is wrong, images in the collimator will be varied.
 2) Image view should not vary in several shutter releasing, nor before and after shutter cocking.

fig.35 Mirror positioning(FRE-side view)

Mirror 45° Adjusting Table:

	Upper	Lower	Left	Right
— Image A — Image B	 down	 up	 right	 left
How to align Image B on Image A	Rotate #391 clockwise, and mirror moves in B direction	Rotate #391 counterclockwise, and mirror moves in A direction	Add #842F washer to #842 at two positions on FRE side, but one only at each place	Move B35 in the direction of arrow

Image A —: Image on J18037, Image B — : Image on J18070

To adjust infinity(∞) focus

Tools: Lens tool 50mm F2(J18010), Collimator f=600mm(J19001)
 Standard: Within 30"

Coarse-adjust the focus by evenly raising or lowering the washers (#842A - U) located at four places under Mirror box. Then, fine-adjust the focus with Mirror 45 adjusting pin(eccentric) #391. After adjustment, be sure to secure #391 with adhesive #501.

To adjust picture angle

Tools: Appropriate standard lens 50mm F1.4 as a tool. Test chart(J18006).
 Stage, Focusing screen tool (J18033)
 Standard: Paralax . . . Within 0.5mm in the aperture plane, vertically and horizontally.

Finder view . . . Inclination of Finder image against aperture plane to be within 1°30'.

35. F-number window positioning

Attaching F-number window check gauge J18063 onto camera body, check and adjust the Position of F-number window.

Standard

Sideway position: Within 5mm dia of split-image spot

Height above screen: $H = 0.3 - 1.5h$

View of frame on: Within F-number window J18063

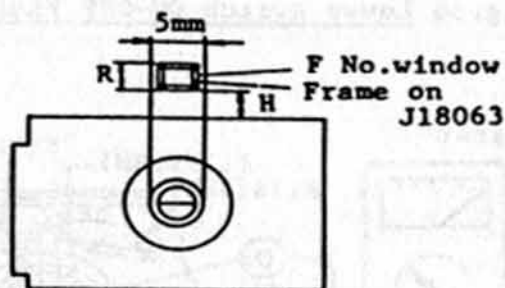
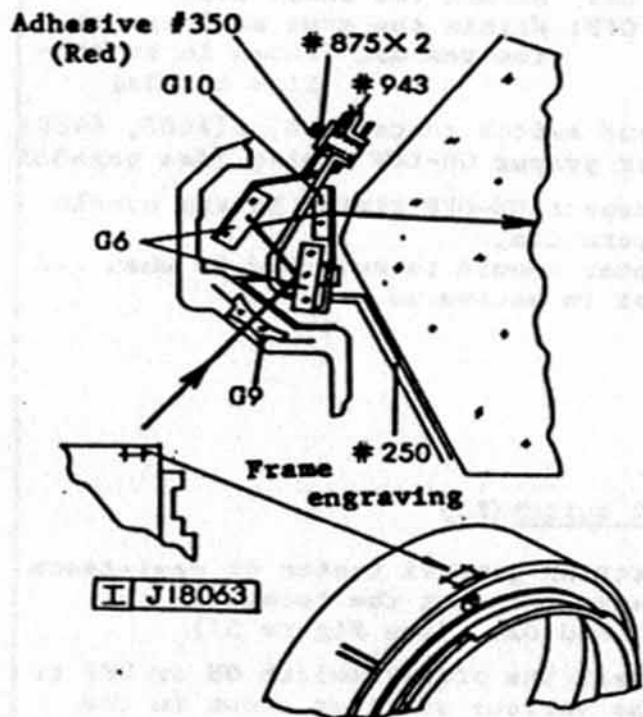
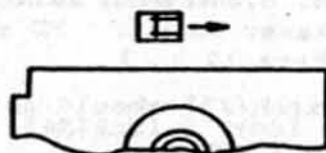


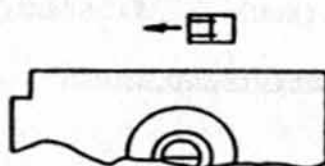
fig.54 F No. window positioning

How to adjust

- 1) by adjusting prism box (#250) to shift the window in the direction of arrow

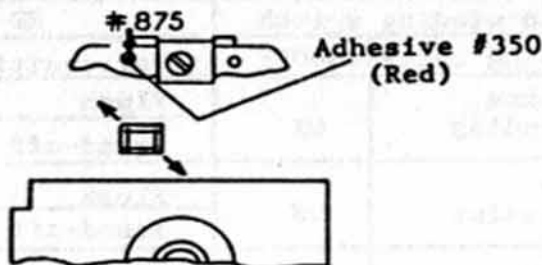
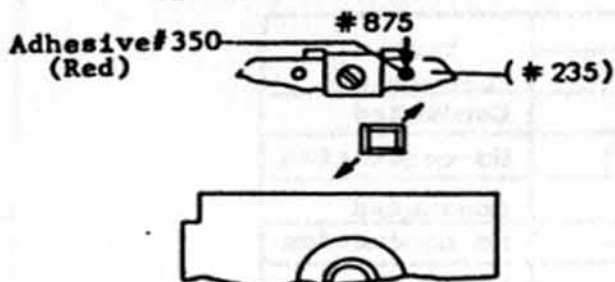


move #250 to the right

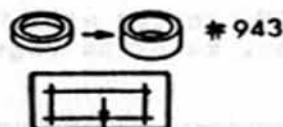


move #250 to the left

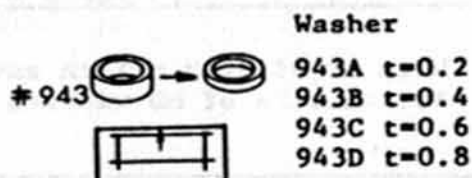
- 2) by adjusting screw (#875) to shift the window and the frame in the direction of arrow



- 3) by changing washer (#943A - D) to shift the frame on J18063



Use thicker washer to move the frame upward



Use thinner washer to move the frame downward

Washer

943A $t=0.2$
 943B $t=0.4$
 943C $t=0.6$
 943D $t=0.8$

36. Shutter Speed Control(R) Installation

Body

Shutter Speed Control(R)

Set the shutter dial to "B", install Assy No.R in place so that shutter "B" Lever enters into the "B" change-over cam hole, and secure R with three screws (#893) aligning shutter speed film with screen frame. Fig.55) (See fig. 55)
Be careful not to scratch film nor to bend the needle.

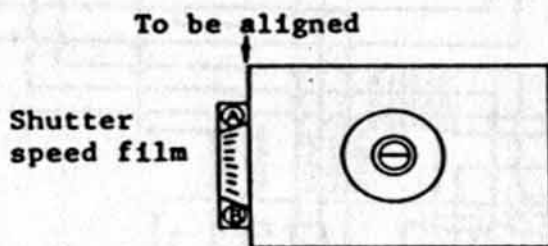
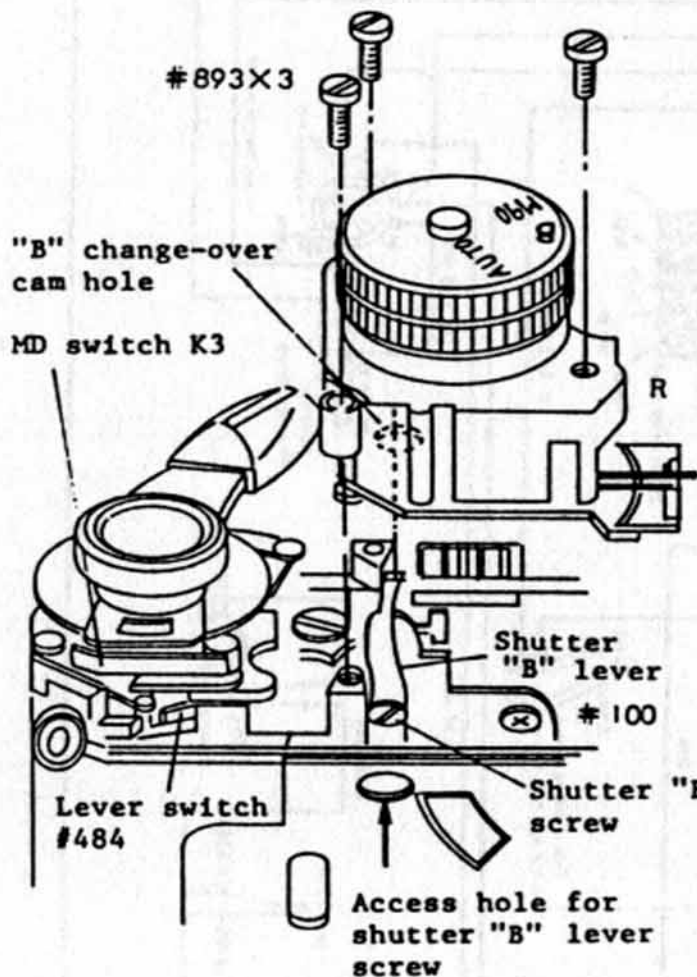


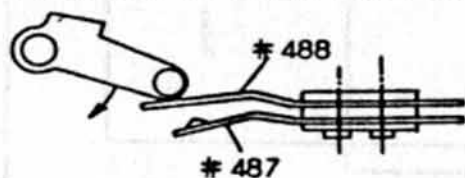
fig.55 Shutter speed film positioning

37. Mechanical Shutter Speed (B, M90) Adjustment

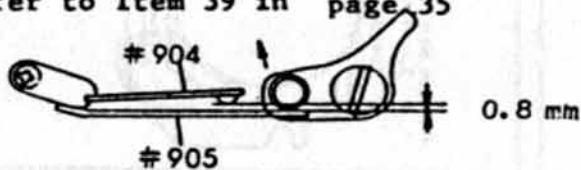
Adjust shutter "B" lever position through an access hole. Then, rotate shutter dial (Auto - M90 - B, B - M90 - Auto) to confirm proper change-over between M90 and B settings.

Lever switch · MD switch

For details of check and adjustment, refer to Item 39 in page 35



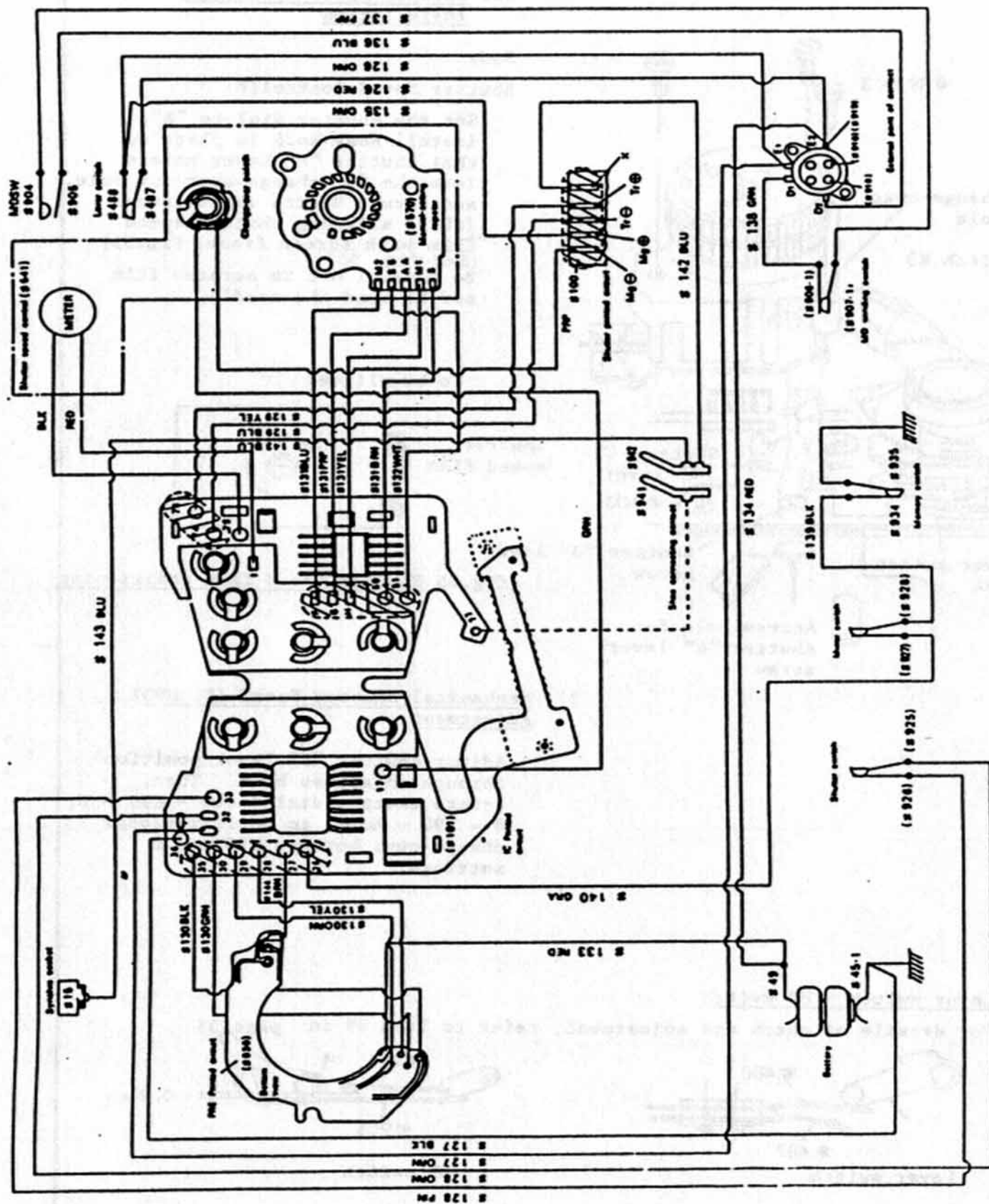
Lever switch



MD switch

Use Soldering iron with earth.
Solder in cloth-gloves.
Apply insulation coating at the area shaded
in the diagram

Soldering Material:
Solder CCS
Flux L-35



39. Lever Switch · MD switch check/
Adjustment Lever Switch(K4)

ON-OFF position standard:

ON: Within red index dot

OFF: Within the area as large as the red dot (shown in broken-line circle)

Bend switch contacts A, B(#487, #488) for proper ON-OFF timing (See page 33)

Inspect ON-OFF timing by the needle operation.

Meter should be switched ON when red dot is uncovered.

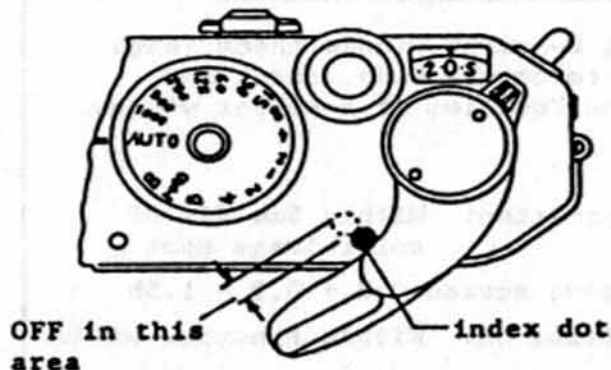


fig.56 Lever switch ON-OFF timing

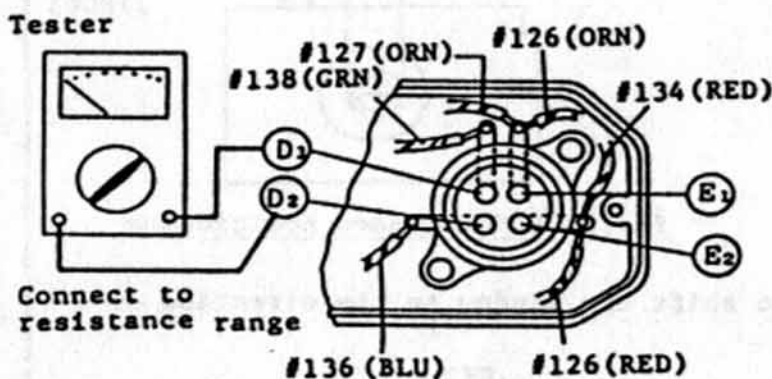


fig.57 MD switch conduction check

MD switch(K3)

Setting general tester at resistance range, connect the terminals to D1 and D2. (See Figure 57)

Check the proper switch ON or OFF at the various settings shown in the table below from conduction into the tester.

Perform ON-OFF adjustment by bending MD switch contacts A, B(#904, #905). Contacts' interval between the two to be approx. 0.8mm when switched OFF. (See Lever switch · MD switch section on Page 33)

Note: MD switch(K3) should switch ON after lever switch(K4) switched OFF.

Before MD switch ON, there should be a time where K3 and K4 are OFF.

MD switch · Lever switch ON-OFF position

MD winding switch		MD switch		Tester Conduction
winding cycle	ON-OFF	Lever position	ON-OFF	
before winding	ON	Flush	ON	Conducted
		Stand-off	OFF	No conduction
Now winding	ON	Flush	ON	Conducted
		Stand-off	OFF	No conduction
Winding finished	OFF	Flush	ON	No conduction
		Stand-off	OFF	No conduction

Note: When MD winding switch and MD switch are ON, tester will be conducted. For details of MD winding switch adjustment, refer to Page

40. Shutter/Meter Accuracy Adjustment

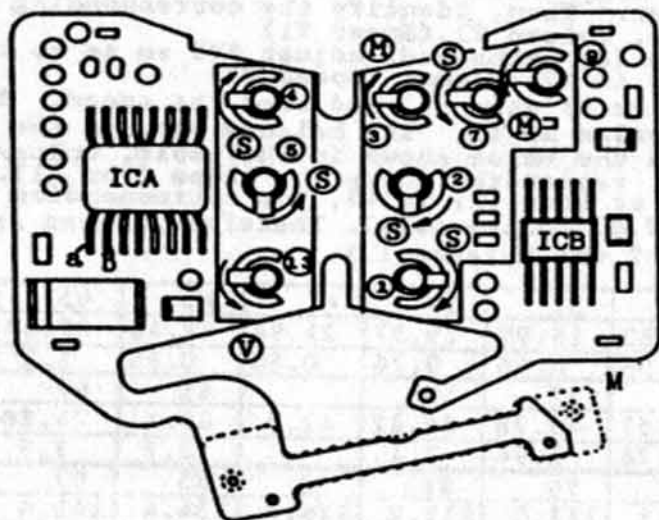


Fig.58 LC printed circuit

Marks:

Encircled No.: shows the number of variable resistor

Encircled alphabet

S : Variable resistor for shutter speed adjustment

M: Variable resistor for meter needle swing adjustment

V : Variable resistor for voltage adjustment

Arrows:

Show the directions to slow the shutter speed, to enlarge the needle swing or to lower the voltage.

e.g.: Ⓢ

Shutter speed can be lengthened by rotating the resistor.

Note:As a rule, when IC printed circuit is subassembled, its off-set adjustment and Auto- adjustment are performed. Thus, adjust in the sequences shown below (1) - (7) only when malfunctions observed.

Tools:

Digital Volt-meter: Input impedance to be at least 1000M Ω
Resolution power to be at most 10mV

Shutter tester (J19022-1)

Tool lens for J19022-1, 50mm F1.4

Special Top cover for brightness adjustment (J15145)

Insulated screw driver (J15135)

1). OFF set Voltage Adjustment

Potential at ICA terminals a, b to be equal

Potential Difference standard: $|a-b| < 0.5\text{mV}$

Measurement: Setting at EV14, measure the voltage between Body(-) and terminal a, and the voltage between Body and terminal b with Digital volt meter(J9003-1). (See fig. 58)

Note: Before measurement, remove anti-humidity silicone coating on terminals a, b with xylol.

Adjustment: Made by rotating variable resistor Ⓜ.

Voltage change by RV Ⓜ is larger at terminal a than terminal b, therefore, adjust the voltage at terminal a to be equal with the voltage at terminal b.

2). Automatic Shutter Speed Control Adjustment

When set at ASA100 and F16, shutter speed at EV9 should be 32 times as slow as that at EV14

Standard: 31.5 - 32.4 times

Adjustment: Made by rotating RV Ⓢ. Shutter speed change by RV Ⓢ is larger at EV9 than at EV14, therefore, if shutter speed at EV9 is 32-times or more slower than that at EV14, rotate RV Ⓢ clockwise.

3) FRE γ Adjustment

Shutter speeds between the two settings' combination (a) (b) should be equal.

- a) ASA12, compensation +1, F5.6, EV14
- b) ASA3200, Compensation -1, F5.6, EV4

Standard: Shutter speed difference 0.96 - 1.039 times each other

Adjustment: Made by rotating RV ⑤. Shutter speed change is larger at settings (1) than settings (2), therefore rotate RV ⑤ clockwise if shutter speed at settings(1) is slower than that at (2).

4) Automatic Shutter Speed Control Level Adjustment

Made by rotating RV ④. At ASA100, F5.6 and EV9, shutter speed should be 1/15 sec.

Standard shutter speed: 60.2 - 64.9ms (1/15)

5) Manual Shutter Speed Control γ Adjustment

Shutter speed at 1/2sec.(Manual) should be 32 times as slow as that at 1/60sec.(Manual).

Standard: 31.5 - 32.4 times

Adjustment: Made by rotating RV ②. Shutter speed change by RV ② is larger at slower settings. Therefore, if shutter speed at 1/2sec. is 32-times or less slower than that at 1/60sec, rotate RV ② clockwise.

6) Manual Shutter Speed Control Level Adjustment

Inspect shutter speeds at the settings of 1/125sec., 1/60sec., 1/2sec., 8sec. to be within standard. If out of standard, adjust by rotating RV ③

Standard:	1/125sec.	8.67 - 9.61ms	1/2sec.	467 - 535ms
	1/50sec.14.6 - 16.7ms	8sec.	7000 - 9000ms

7) Meter Level/ γ Adjustment

a) Meter level Adjustment

At ASA200, F5.6 and EV14, the meter needle should point to the 1sec. setting. or at ASA200, F5.6 and EV9. the needle should point to the 1/30sec. setting. If not, adjust by rotating RV ③

b) Meter γ Adjustment

At ASA200, F5.6 and EV14, the meter needle should point to the 1/1000sec. setting. If not, adjust by rotating RV ⑨.

Note: Adjustment by RV ③ or RV ⑨ affects the meter level or meter γ each other. Therefore, one is adjusted, be sure to inspect the other.

Meter needle swing by rotation of RV ⑨ is larger at EV14 than at EV4. Therefore, adjust RV ⑨ so that the needle at EV14 will point as the needle at EV4 points, showing the similar deviation if any.

8) Shutter Speed Check

a) Automatic shutter speed setting

Sequence Check	F No.			Standard		
				Lower limit	Standard	Upper limit
1	5.6	100	9	44.2	62.5	88.4
2			14	1.38	1.95	2.76
3	16	25		44.2	62.5	88.4
4				1414	2000	2828
5	2	400	9	1.38	1.95	2.76
6			4	44.2	62.5	88.4
7	5.4	100		1414	2000	2828

b) Manual Shutter Speed Setting

Speed setting	Standard		
	Lower limit	Standard	Upper limit
1000	0.68	0.98	1.41
125	7.81	7.81	11.2
15	49.0	62.5	79.7
1	785	1000	1275
8	6277	8000	10190

9) Speedlight-coupling mechanism check

Tool: Speedlight-substitute tool (J15147)

a) Auto shutter speed setting:

Mounting J15147 and setting at ASA 100, F5.6 and EV9, shutter speed should be;

1/90 sec.

b) Manual shutter speed setting:

When set at 1/250 sec. or higher setting with J15147 mounted, the ready light should continuously turn ON and OFF.

Meter Accuracy Check

ASA	F No.	EV	Needle points
100	8	4	4
100	4	14	1000

10) Memory Check

- a) Set at ASA 100, F5.6 and EV9, and measure the shutter speed at Auto
- b) At the above settings, make the memory-lock operation. While changing exposure value (EV) from EV9 to EV14, measure the Auto shutter speed and compare the values with the values obtained without memory-lock operation. Extreme difference not permitted between the two.

41 FRE γ Adjustment by use of Reference Table

- 1) Adjust RV 5 to get shutter speed of 62.5 ± 1.1 ms at the settings of ASA12, exposure compensation setting +2, F5.6 and EV14.
- 2) Set the camera at ASA 3200, compensation 0, F5.6 and EV4, and read the shutter speed from the tester. Then, identify the corresponding speed in the FRE γ Adjustment Table, column T1. (Speed T1)
- 3) Keeping the settings of step (2) unchanged, adjust RV5 so as to change the speed in T1 to the speed in T2 column. (Speed T2)
- 4) Set the camera at the settings of step (1) and read the speed. Then, compare the value with the value in T2. The balance between the two should be within the value shown in the value shown in the table, column Balance. If out of the balance value, repeat the adjusting steps from (1).
e.g.: If Speed T1 obtained at step (2) is 45, the corresponding T2 speed FRE γ Adjustment Table is 27.67(Follow down). Therefore, speed at Step (4) should be 27.67 ± 1.1 because of the balance 1.1.

T1	29	31	33	35	37	39	41	43	45	47
T2	9.27	10.95	12.79	14.83	16.99	19.37	21.94	24.46	27.67	30.81
Balance	0.36	0.43	0.5	0.58	0.66	0.76	0.86	0.96	1.1	1.2
T1	49	51	53	55	57	50		65	67	69
T2	34.17	37.74	41.53	45.57	49.76	54.22	62.5	69.1	74.38	80.02
Balance	1.33	1.47	1.62	1.78	1.94	2.1		2.7	2.9	3.12
T1	71	73	75	77	79	81	83	85	87	89
T2	85.91	92.05	98.36	105.1	112.0	119.2	126.7	134.4	142.4	150.7
Balance	3.35	3.59	3.84	4.1	4.37	4.65	4.94	5.24	5.55	5.88
T1	91	93	95	97	99	101	103	105	107	109
T2	159.2	168.1	177.3	186.6	196.3	206.3	216.7	227.3	238.2	249.4
Balance	6.2	6.55	6.9	7.28	7.7	8.05	8.45	8.86	9.3	9.73
T1	111	113	115	117	119	121	123	125	127	129
T2	260.9	272.8	284.9	297.4	310.2	323.4	336.8	350.5	364.7	379.2
Balance	10.2	10.6	11.1	11.6	12.1	12.6	13.13	13.67	14.22	14.79

42 Manual Speed γ Adjustment

- 1) Adjust RV 2 so as to get 15.6 ± 1 ms at 1/60sec. manual setting
- 2) Set at 1/2sec. setting and read the shutter speed from the tester. Then, identify the corresponding speed in the Table below, column T1. (Speed T1)
- 3) Keep setting at 1/2sec., and adjust RV 2 so as to change the speed in T1 to that in T2 column. (Speed T2)
- 4) Setting at 1/60 sec. manual speed, read the speed. The speed should be within the value shown in the Table, Column T2/32(T2 speed + 32).
If out of the value of T2/32 column, repeat the steps from (1).
e.g. If Speed T1 obtained at step (2) is 420, the corresponding T2 speed is 580. Therefore, the speed at step (4) should be 18.1 ± 0.7 ms.

Manual speed γ Adjustment Table

T1	350	360	370	380	390	400	410	420	430	440
T2	670	655	640	630	615	600	590	580	570	560
T2/32	20.9 ± 0.8	20.5 ± 0.8	20 ± 0.8	19.68 ± 0.8	19.22 ± 0.8	18.75 ± 0.7	18.43 ± 0.7	18.1 ± 0.7	17.8 ± 0.7	17.5 ± 0.7
T1	450	460	470	480	490		510	520	530	540
T2	550	540	530	520	510		495	490	483	475
T2/32	17.18 ± 0.7	16.88 ± 0.7	16.56 ± 0.6	16.24 ± 0.6	15.94 ± 0.6	500	15.47 ± 0.6	15.31 ± 0.6	15.09 ± 0.6	14.8 ± 0.6
T1	550	560	570	580	590	600	610	620	630	640
T2	470	460	455	450	445	440	430	425	420	415
T2/32	14.7 ± 0.6	14.38 ± 0.6	14.22 ± 0.5	14.06 ± 0.5	13.9 ± 0.5	13.75 ± 0.5	13.43 ± 0.5	13.28 ± 0.5	13.12 ± 0.5	12.97 ± 0.5
T1	650	660	670	680	690	700	710	720	730	740
T2	410	405	400	395	390	388	385	380	375	372
T2/32	12.8 ± 0.5	12.66 ± 0.5	12.5 ± 0.5	12.34 ± 0.5	12.19 ± 0.5	12.13 ± 0.5	12.03 ± 0.5	11.87 ± 0.5	11.72 ± 0.5	11.62 ± 0.5
T1	750	760	770	780	790	800				
T2	368	365	360	355	350	347				
T2/32	11.5 ± 0.5	11.41 ± 0.5	11.25 ± 0.5	11.1 ± 0.5	110.9 ± 0.5	10.8 ± 0.5				

43. Shutter release - Hot-shoe Contact Inspection

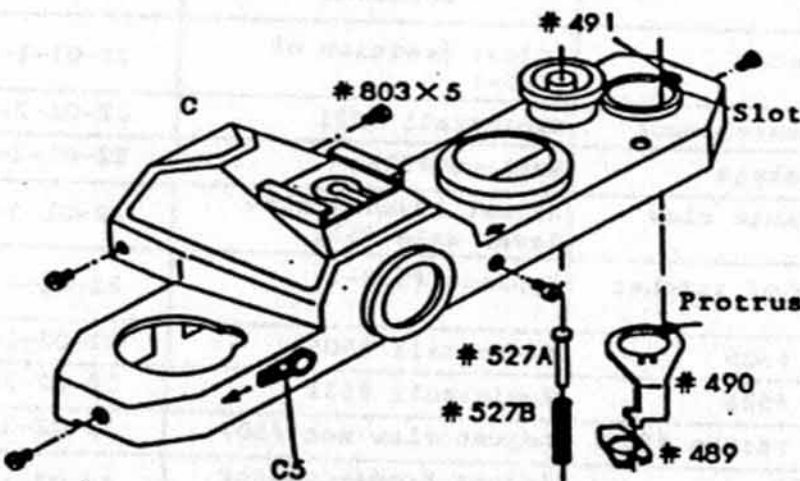


fig.59 Top cover Installation

Top Cover (Assy C) Installation

Body
 ↓
 Spring(#527 B-1)
 Release middle shaft(#527A)
 ↓
 Top cover (C), Screw(#803x5)

Charge cam claw release lever (#489) should couple with Multi-exposure lever(#490).

Protrusion on #490 should engage into the cut of multi-exposure knob(#491)

Install checker lever.(C5) positioning the lever as illustrated in Figure 59

Be careful not to damage the cover of lead wires.

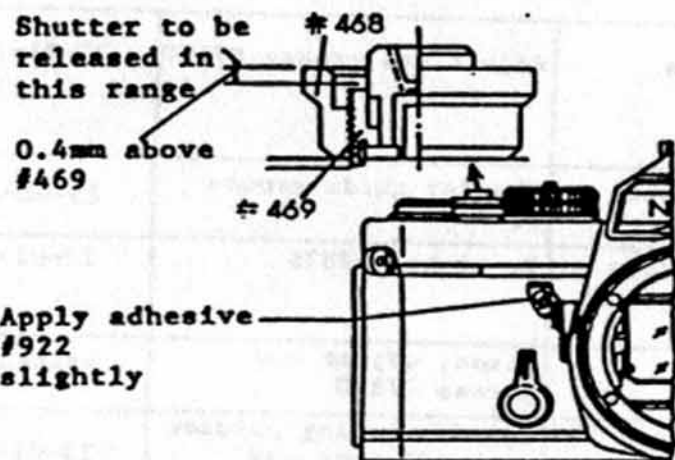


fig.60 Release button stroke

Shutter Release Timing

Shutter release button stroke:
 $2.7 \pm 0.3 \text{ mm}$

Shutter should be released when release button depressed within the depth below #468 down to 0.4mm above #469. The button's stroke is 1.7mm.

Tool: Micrometer J18002

Release stroke adjustment is possible by eccentric pin(#519A)

Hot-shoe contact inspection

Check with tool J15147 ready light(#94), Auto-set shutter speed, X contact conduction. Ready light ON/OFF

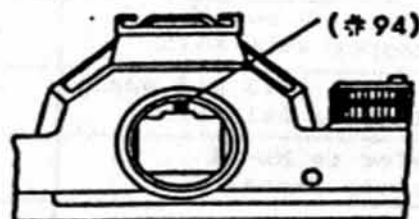


fig.61 Ready light

Shutter Speed dial	Ready light
Auto	ON
1/1000 - 1/250sec.	OFF
1/125 - B	ON

When ready light glows, auto-shutter speed should be automatically controlled to 1/90sec, regardless of the shutter speed indication inside the viewfinder. X contact conduction is observed by the illumination of LED on J15147. Be careful not to release shutter with high-voltage insulation tester connected.

Trouble	Cause		Solution	Code No.	
Film-advance lever fails to return	Spool shaft spring (#529)	Disengagement	Re-install #529	21-01-1-1	
		Breakage	Replace spool shaft (A9)	21-01-1-2	
	Interference between pendulum #462 and ratchet cam (A10)		Adjust the positions of #538, #871 or both	21-01-2-1	
Idle film-advance operation	Improper movement of charge cam claw (#414)		Replace set cam (A10)	21-02-1-1	
	Inoperative blank exposure preventer lever (#26-1)		Adjust #26-1	21-02-2-1	
	Claw spring #412	Disengagement	Re-install #412	21-02-3-1	
		Breakage	Replace #412	21-02-3-2	
	Sprocket screw (#435) comes off		Supplement ⊖ #435	21-02-4-1	
	Spring #406	Disengagement	Re-install #406	21-02-5-1	
Breakage		Replace #406	21-02-5-2		
Broken Film advance shaft (#408)		Replace #408	21-02-6-1		
Inoperative multiple exposures	Inoperative charge cam claw release lever #489		Engage Multi-exposure lever #490 with #489	21-03-1-1	
	Foreign material enters into camera body.		Remove foreign material	21-04-1-1	
	Defective shutter #100		Replace #100	21-04-2-1	
	Stick of Blank exposure preventer lever #26-1		Adjust Motor switch coupling lever #25-1	21-04-3-1	
	Stick of Pendulum #462 in set cam A10		Adjust Rendulm eccentric axle #538 and #871	21-04-4-1	
Inoperative film-advance lever	Lock lever #464 fails to return	Disengagement of Lock lever spring #465	Re-install #465	21-04-5-1	
		Broken #465	Replace #465	21-04-5-2	
	#464 rubs with #1 and #539		Adjust and lubricate L 2113	21-04-5-3	
	Catch of Sprocket stopper A12	A12 rubs against associated parts		Adjust #447 and #888 then lubricate L 2113	21-04-6-1
		Disengagement of spring #450		Re-install #450	21-04-6-2
		Broken #450		Replace #450	21-04-6-3
	Shutter release shaft #527 fails to return due to defective Release shaft spring #536		Re-install Release shaft E-ring #841	21-04-7-1	
MD Shaft #911 fails to return		Clean and lubricate L 2113	21-04-8-1		
		Replace #911	21-04-8-2		
Inoperative Anti-reversing	Screw #871 loosened		Adjust position of Pendulum eccentric axle #538	21-05-1-1	
	Pendulum spring #538A	Disengagement	Re-install #538A	21-05-2-1	
		Breakage	Replace #538A	21-05-2-2	

Trouble	Cause		Solution	Code No.
Inoperative sprocket Anti-reversing	Improper movement of Anti-reversing claw A #443 and B #444		Adjust #443 and #444	21-06-1-1
			Replace Lower base plate A11	21-06-1-2
	Weak Anti-reversing claw spring #445		Adjust #445	21-06-2-1
			Replace Lower base plate A11	21-06-2-2
Excessive play of sprocket or Uneven frame-to-frame space	Incorrect position of sprocket stopper cam #429	Incorrect positioning	Adjust position of #429	21-07-1-1
		Loose Gear set screw #824	Adjust position of #429	21-07-1-2
	Sprocket stopper #447 bant		Adjust #447	21-07-2-1
			Replace sprocket stopper A12	21-07-2-2
	Broken sprocket stopper spring #496		Replace #496	21-07-3-1
Overlapped exposures	Pendulum #462 is released from Ratchet cam #530 too early		Adjust position of Pendulum eccentric axle #538	21-08-1-1
	Excessive play of sprocket		Refer to code No. (21-07-1-1)-(21-07-3-1)	21-08-2-1
	Weak spool tension		Adjust tension (220 - 260g)	21-08-3-1
Failure to cock shutter	Defective shutter #100		Replace #100	21-09-1-1
	Loose caulking of shutter charge lever A4		Replace A4	21-09-2-1
Failure to charge mirror	Loose caulking of charge lever A6		Replace A6	21-10-1-1
	Poor engagement of Mirror-down latch lever #330 and Mirror-down lever B13.		Adjust #330	21-10-2-1
			Replace #330	21-10-2-2
			Replace B13	21-10-2-3
	Spring #289	Disengagement	Re-install #289	21-10-3-1
		Breakage	Replace #289	21-10-3-2
Bent tip of Mirror charge lever B11		Replace B11	21-10-4-1	
Excessive play of Film-advance lever	Loose Wind-up lever screw #403		Re-tighten #403	21-11-1-1
Abnormal sound during film-advance operation				21-12-1-1

2. Frame Counter Mechanism Trouble

35Fb - R.30Y2.A

Trouble	Cause	Solution	Code No.	
Failure of frame counter advance	Improper position of Counter eccentric shaft #516-1	Adjust position of #516-1	22-01-1-1	
	Spring #521	Disengagement	Re-install #521	22-01-2-1
		Breakage	Replace #521	22-01-2-2
	Improper movement of advance claw #510-1	Adjust advance claw lever axle #512	22-01-3-1	
Incorrect shape of teeth of ratchet #532-1	Replace #532-1	22-01-4-1		
Inoperative counter resetting	Disengagement of spring #505	Re-install #505	22-02-1-1	
	Disengagement of spring #521	Re-install #521	22-02-2-1	
	Failure of ratchet claw return #506	Adjust claw nut #507	22-02-3-1	
Disaligned Index	Loose lever axle nut #405	Adjust Frame-counter index #533 and #405	22-03-1-1	

3. Shutter Release Mechanism Trouble

Unsmooth shutter button operation	Shutter release shaft #527 rubs against Body die-casting #1	Adjust and grease G7100	23-01-1-1	
	Release lever guide pin #879 rubs against body die-casting #1	Chamfer guide groove of #1	23-01-2-1	
	Loose release lever guide pin #879	Re-tighten #879	23-01-3-1	
	Release button rubs against Release ring #469	Clean, adjust and grease G7100	23-01-4-1	
	Mirror-up lever B12 rubs against Mirror-up stop lever #329	Grind engaging portion with oilstone and grease G7100	23-01-5-1	
Incorrect shutter release timing	Incorrect position of Eccentric pin #519A	Adjust position of #519A	23-02-1-1	
Failure of Shutter release button depression	Lock lever #464 fails to return	Adjust movement of #464	23-03-1-1	
	Broken lock lever spring #465	Replace #465	23-03-2-1	
	Switch lock lever P4 fails to disengage from shutter release shaft #527	Disengagement of spring #476	Re-install #476	23-03-3-1
		Broken #476	Replace #476	23-03-3-2
	P4 rubs against #473	Adjust MD switch stopper axle #473	23-03-3-3	
Unable to release shutter with motor drive	Release connecting screw #913 comes off	Install #913 and apply adhesive #410 B/M	23-04-1-1	
	Defective Motor Drive	Refer to MD-11 Repair Manual		

4. Shutter Mechanism Trouble

35FB - R.3012.A

Trouble	Cause	Solution	Code No.	
Incorrect shutter speed	Defective shutter #100	Replace #100	24-01-1-1	
	Electrical circuitry trouble	Refer to electrical troubleshooting		
Shutter curtain jam during film advance	Defective shutter #100	Replace #100	24-02-1-1	
Shutter rear curtain fails to return	Too tight Brake spring (#286-1)	Replace shutter brake B37	24-03-1-1	
Inoperative 'B' setting	Incorrect position of shutter 'B' lever eccentric screw of #100	Adjust position of eccentric screw	24-04-1-1	
	Improper movement of shutter 'B' lever	Lever bent	Adjust #100	24-04-2-1
			Replace #100	24-04-2-2
		Poor Eccentric axle caulking	Replace #100	24-04-2-3
	Defective shutter #100	Replace #100	24-04-3-1	
Shutter curtain fails to open at M90	Defective shutter #100	Replace #100	24-05-1-1	
Incorrect shutter speed at M90	Defective shutter #100	Replace #100	24-06-1-1	
Shutter speed sometimes becomes 'B' at M90	Incorrect position of shutter 'B' lever eccentric screw of #100	Adjust #100	24-07-1-1	

5. Self-timer Mechanism Trouble

Unable to cock self-timer	Defective self-timer	Replace shutter #100	25-01-1-1	
Self-timer stops halfway	Self-gear assembly	Dust	Clean self-gear assembly	25-02-1-1
		Defective	Replace shutter #100	25-02-1-2
Unable to cancel setting	Incorrect position of self-timer shaft eccentric screw	Adjust position of Eccentric screw	25-03-1-1	
	Defective self-timer	Replace shutter #100	25-03-2-1	

6. Flash Synchronization Trouble

35FB - R.3012.A

Trouble	Cause		Solution	Code No.
Poor synchronization	Incorrect X contact clearance of #100		Adjust contact clearance	26-01-1-1
			Replace #100	26-01-1-2
	Incorrect shutter speed at M90	Poor adjustment of Shutter 'B' lever eccentric screw	Adjust position of shutter 'B' lever eccentric screw	26-01-2-1
		Defective shutter #100	Replace #100	26-01-2-2
Failure of flash output on hot-shoe contact	Defective sync socket #15		Replace #15	26-02-1-1
	X contact of #100	Incorrect clearance	Adjust clearance	26-02-2-1
			Replace #100	26-02-2-2
		Contamination or dust	Clean contact	26-02-2-3
	Lead wire A #142 Lead wire B #143	Disconnection	Replace #142 or #143	26-02-3-1
		Disengagement	Re-solder	26-02-3-2
	Incorrect clearance between upper shoe switch contact #69 and Lower shoe switch contact #70	Bend of #69 or #70	Adjust clearance between #69 and #70	26-02-4-1
		Loose nut #76	Re-tighten #76	26-02-4-2
Poor insulation	Defective sync. socket #15		Replace #15	26-03-1-1
	Lead wire A #142 Lead wire B #143	Broken vinyl cover	Replace #142 or #143	26-03-2-1
		Poor soldering	Re-solder	26-03-2-2
	Defective Hot-shoe mould (C1)		Replace C1	26-03-3-1
	Defective Ready-light printed circuit C6		Replace C6	26-03-4-1

7. Lens Mount Mechanism Trouble

Unable to release lens	Inoperative lens release lever B5		Clean and grease G7100	27-01-1-1
Excessively tight or loose lens releasing	Bayonet spring #208 x 3	Excessive spring pressure	Adjust bending of #208	27-02-1-1
		Weak spring pressure	" "	27-02-2-1
	Defective bayonet #202		Replace #202	27-02-2-1

Trouble	Cause		Solution	Code No.
Unsmooth Aperture Coupling ring operation	Incorrect position of Bayonet mount #201		Re-locate #201 to provide smooth operation of B4	23-01-1-1
	Improper combination of Bayonet mount #201 and Aperture coupling ring B4		Change parts combination for proper match	28-01-2-1
	Improper engagement of Brush coupling gear B25		Adjust position of B25 Replace B25	28-01-3-1 28-01-3-2
	Tread #269	Disengaged from Roller lever B7	Re-install #269 Check position of Thread retaining plate #264	28-01-4-1
		Poor knot	Re-knot #269 Replace B25	28-01-4-2 28-01-4-3
	Incorrect shape of Brush gear teeth #686		Replace #686	28-01-5-1
	Poor engagement of Brush gear #686 with Brush coupling gear B25		Adjust play between #686 and B25	28-01-6-1
	Brush B #698 disengages from FRE printed circuit J		Adjust position of #698	28-01-7-1
	Defective spring #694 of B25	Insufficient spring pressure	Replace B25	28-01-8-1
		Broken #694	Replace B25	28-01-8-2
	Uneven rotation of FRE		Adjust FRE rotation Replace FRE ring F2	28-01-9-1 28-01-9-2
Coupling ring fails to couple with FRE	Thread (269)	Sanpped	Replace Brush coupling gear B25	28-02-1-1
		Disengagement	Re-knot #269	28-02-1-2
	Replace B25		28-02-1-3	
Excessive play of Aperture coupling piece	Coupling Piece Spring	Bend	Adjust bending of #210	28-03-1-1
		Incorrect position	Adjust position of #210	28-03-1-2
Unable to release Aperture coupling piece	Calking of Aperture coupling piece #209 comes off		Replace Aperture coupling ring B4	28-04-1-1
Incorrect Maximum Aperture (Fl.4) compensation	Incorrect setting position of Brush coupling gear B25		Adjust position of coupling gear #224	28-05-1-1
	Improper movement of Roller lever B7		Adjust movement of B7 Replace B7	28-05-2-1 28-05-2-2
	Roller lever spring #267	Disengagement	Re-install #267	28-05-3-1
		Breakage	Replace #267	28-05-3-2

9. Diaphragm Actuating Lever Trouble

35FB - R.3012.A

Trouble	Cause		Solution	Code No.
Inoperative Diaphragm actuating lever	Diaphragm lever spring #340	Disengagement	Re-install #340	29-01-1-1
		Breakage	Replace #340	29-01-1-2
Failure to open to maximum aperture	Incorrect height of Diaphragm actuating lever B10, with shutter cocked		Adjust height to be 3.1 +1 -0 by Eccentric pin #356	29-02-1-1
Shutter is released while stroking film advance lever with lens mounted	Insufficient difference of height of B10 between before shutter cocking and after shutter releasing.		After releasing shutter adjust Down lever eccentric axle #367 Difference to be 0.15mm or more	29-03-1-1
Incorrect height of Diaphragm actuating lever, with shutter cocked	Shock absorb rubber #363 comes off		Affix #363 with adhesive #501	29-04-1-1

10. Reflex-Mirror Mechanism Trouble

Abnormal mirror sound	Inoperative Air damper B20		Replace B20	30-01-1-1
	Cushion rubber #372 comes off		Affix #372 with adhesive #501	30-01-2-1
	Incorrect spring pressure of Brake spring #286-1		Replace B37	30-01-3-1
	Excessive play between Mirror holder B26 and Mirror G1	Defective Mirror holder A #345 or B #346	Replace B26	30-01-4-1
G1 comes off		Affix G with adhesive #501	30-01-4-2	
Incorrect position of Mirror	Incorrect angle of Mirror holder A #345 and B #346		Adjust #345 and #346	30-02-1-1
			Replace Mirror holder B26	30-02-1-2
Too early or late mirror-rising	Incorrect position of Eccentric pin #356		Adjust #356	30-03-1-1
Mirror stops midway during operation	Air damper B20 jams	Contamination	Clean B20	30-04-1-1
		Rust	Replace B20	30-04-1-2
Shift of Mirror position dependent on camera holding	Mirror spring (s) #379	Insufficient spring pressure	Replace #379	30-05-1-1
		Breakage	Replace #379	30-05-1-2

11. Viewfinder Mechanism Trouble

35FB - R.3012.A

Trouble	Cause	Solution	Code No.	
Improper infinity focusing	Improper movement of 45° stopper B16	Adjust B16	31-01-1-1	
		Replace B16	31-01-1-2	
	Excessive play between Mirror holder B26 and Mirror G1	Defective Mirror holder A #345 and B #346	Adjust #345 and #346	31-01-2-1
			Replace B26	31-01-2-2
		G1 comes off	Affix G1 with adhesive #501	31-01-2-3
	Deformation of Mirror holder B26	Deformed Mirror holder #301	Replace B26	31-01-3-2
		Loose calking of pin A #307	Replace B26	31-01-3-2
Loose calking of pin B #308		Replace B26	31-01-3-3	
Incorrect picture format	Incorrect mirror angle	Adjust 45° stopper B16	31-02-1-1	
	Incorrect position of Prism box B39	Adjust position of B39	31-02-2-1	
Poor viewing	Fresnel screen G2	Distortion	Replace G2	31-03-1-1
		Poor installation	Adjust G2 installation	31-03-1-2
	Incorrect position of Prism box B39	Adjust height of B39	31-03-2-1	
	Incorrect mirror angle	Adjust 45° stopper B16	31-03-3-1	
Fresnellens prone to come off	Insufficient spring pressure of screen lock spring #240	Adjust #240	31-04-1-1	
Incorrect position of T-film	Incorrect position of shutter speed control R	Adjust position of R	31-05-1-1	
Incorrect position of lens aperture indication window	Poor adjustment of Reflex Mirror G6	Adjust G6	31-06-1-1	
	Poor adjustment of G10	Adjust G10	31-06-2-1	
	Incorrect position of Prism box B39	Adjust position of B39	31-06-3-1	
Incorrect position of green needle		Adjust R	31-07-1-2	
		Replace R	31-07-1-2	
Poor focusing	Improper infinite focusing	Refer to Code No. (31-01-1-1)-(31-01-3-3)		
	Incorrect flange back	Adjustment	31-08-1-1	
Aluminum plating separation on penta prism		Replace G3	31-09-1-1	
Dust or contamination in viewfinder		Clean	31-10-1-1	
Scratch on fresnel screen		Replace G2	31-11-1-1	

12. Exposure meter Mechanism Trouble

35FB - R.3012.A

Trouble	Cause		Solution	Code No.
Meter needle fails to swing	MD external contact pin (E1) and (E2) fail to be ON	Poor contacts between Lever switch contact A #487 and B #488	Clean #487 and #488	32-01-1-1
			Adjust clearance between #487 and #488	32-01-1-2
		Poor contact of Battery chamber A5	Clean contact of A5	32-01-1-3
	Lead wire #126	Disconnection	Replace #126	32-01-1-5
		Unsoldered	Re-solder	32-01-1-6
	Meter needle fails to operate when MD external contact pin (E1) and (E2) is ON	Defective electrical circuitry	Refer to Electrical Trouble shooting	
Defective only when motor drive mounted	MD's switch fails to be ON	Refer to MD repair manual		
Meter switch fails to be OFF	MD external contact pin (E1) and (E2) fail to be OFF	Lever switch contact A #487 touches B #488	Adjust clearance between #487 and #488	32-02-1-1
		Lead wire #126	Short circuit	Replace #126
	Poor soldering		Re-solder	32-02-1-3
	Defective only when motor drive mounted	MD's switch fails to be OFF	Refer to MD Repair Manual	

13. Memory Lock Mechanism Trouble

Inoperative memory lock	Memory switch fails to be OFF	Adjust by bending Memory switch #934	33-01-1-1
	Defective electrical circuitry	Refer to Electrical Trouble shooting	

14. ASA Setting Mechanism Trouble

35FB - R.3012.A

Trouble	Cause		Solution	Code No.
Unsmooth rotation of ASA film speed ring	Tight rotation of FRE(F2)		Adjust and clean FRE ring F2	34-01-1-1
			Replace FRE ring F2	34-01-1-2
Unable to change ASA setting	Protrusion of ASA click spring #670 does not disengage from ASA click plate #676		Adjust bending of #670	34-02-1-1
Unable to lock ASA setting	Protrusion of ASA click spring #670 does not fit into the cut-out of ASA click plate #676		Adjust bending of #670	34-03-1-1
	Loose ASA dial #672		Secure knob lock lever shaft #689 with screw ⊕ #802	34-03-2-1
Disaligned ASA index	ASA dial #672 comes off		Affix #672 with adhesive #501	34-04-1-1
Unsmooth rotation of Exposure correction ring	Exposure correction spring #692	Insufficient spring pressure	Adjust #692	34-05-1-1
		Contamination	Clean #692	34-05-1-2
	Unsmooth rotation of FRE ring F2		Adjust and clean F2	34-05-2-1
			Replace F2	34-05-2-2
Unable to compensate exposure	Broken Exposure correction click pin #695		Replace ASA dial F4	34-06-1-1

15. Rewinding Mechanism Trouble

Unsmooth rewinding	Creak of Rewind shaft #652 and Release shaft guide #665		Clean #652 and #665 and grease G7100	35-01-1-1
			Replace #652	35-01-1-2
			Replace #665	35-01-1-3
Inoperative camera back latch release	Spring #655	Disengagement	Re-install #652	35-02-1-1
		Breakage	Replace #665	35-02-1-2
Difficult to lift up rewind knob when opening camera back	Improper movement of Latch B #708		Clean contact of #708	35-03-1-1
Inoperative Film rewind button	AR lever #537	Improper movement	Adjust #537	35-04-1-1
		Disengagement of AR lever spring #537B	Re-install #537B	35-04-1-2
		Broken AR lever spring #537B	Replace #537B	35-04-1-3

16. Battery Consumption Trouble

35FB - R.3012.A

Trouble	Cause	Solution	Code No.
Poor insulation between MD external contact pin (E1) and (E2)	Lever switch contact A #487 touches B #488	Adjust clearance between #487 and #488	36-01-1-1
	Vinyl cover of Lead wire #126(Orange) (Red) is broken and comes in contact with Body die-casting	Replace #126	36-01-2-1
	Poor soldering of Lead wire #126	Re-solder #126	36-01-3-1
	Defective electrical mechanism	Refer to electrical trouble shooting	

17. MD External Contact Pin Mechanism Trouble

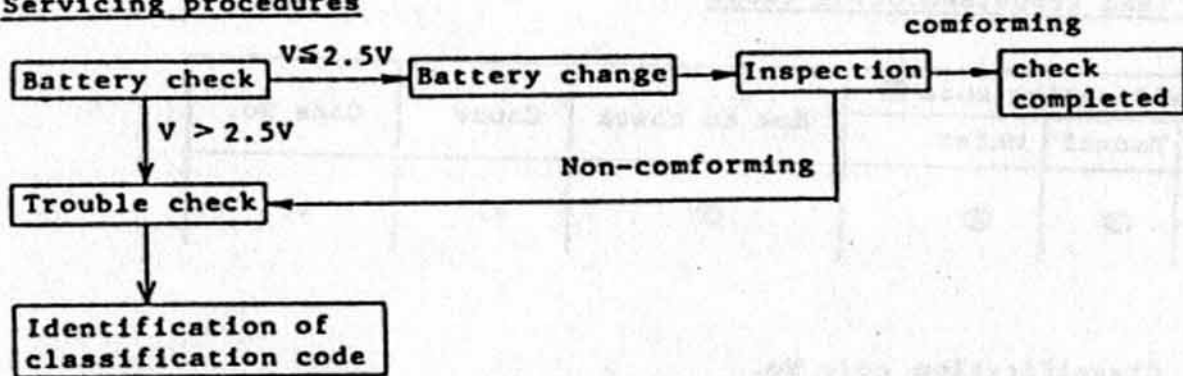
Failure to operate with motor drive	Poor conduction between MD external contact pin (E1) and (E2)	Poor contact of MD terminal pin	Clean and adjust	37-01-1-1
		Poor contact between MD take-up switch A(#906-1) and B(#907-1)	Clean #906-1 and #907-1	37-01-2-1
			Adjust clearance between #906-1 and #907-1	37-01-2-2
			Replace Battery chamber A5	37-01-2-3
		Poor contact of MD switch K3	Clean #904 and #905	37-01-3-1
			Adjust clearance between #904 and #905	37-01-3-2
		Poor operation of switch lock lever P4	Adjust P4	37-01-4-1
			Replace P4	37-01-4-2
	Switch stopper spring #476 of P4 disengaged or broken	Re-install #476	37-01-4-3	
		Replace #476	37-01-4-4	
	Disconnection or poor soldering of Lead wire (#136, #137, #138)	Replace #136, #137, #138	37-01-5-1	
		Re-solder #136, #137, #138	37-01-5-2	
	MD external contact pin (E1) and (E2) fail to be OFF	Soldered portion of MD switch K3 contacts upper base plate K	Re-solder	37-02-1-1
		MD take-up switch A #906-1 and B #907-1 contact body die-casting	Adjust bending of #906-1 and #907-1	37-02-2-1
Replace Battery chamber A5			37-02-2-2	
Short-circuit between Lead wire (#136, #137, #138) and Body die-casting due to breakage of vinyl cover	Replace #136, #137, #138	37-02-3-1		
Camera body only operative	Defective motor drive	Refer to MD repair manual		

18. Exterior Parts Trouble

35FB - R.3012.A

Trouble	Cause	Solution	Code No.
Camera back loosened	Defective Light-tight #58-1	Replace #58-1, #58A-1 and #58B-1	38-01-1-1
	" " #58A-1 " " #58B-1		
	Defective camera back E1	Replace E1	38-01-2-1
Loose shutter dial ring	Defective click of shutter speed control R	Replace R	38-02-1-1
Disengagement of eyelet	Eyelet set screw #848 falls off	Install #848	38-03-1-1
Scratch or crack		Replacement	38-04-1-1

1. Servicing procedures



Auto	Manual	Meter.	Classification code	page
normal	normal	normal	000	
normal	normal	ABNORMAL	001	
normal	ABNORMAL	normal	010	
normal	ABNORMAL	ABNORMAL	011	
ABNORMAL	normal	normal	100	
ABNORMAL	normal	ABNORMAL	101	
ABNORMAL	ABNORMAL	normal	110	
ABNORMAL	ABNORMAL	ABNORMAL	111	

Troubleshooting Table

Check & Adjustment

Repair completed

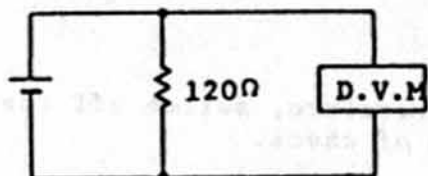
Note: Classification code is represented by three figures. The first figure from the left represents the normal or abnormal condition of Auto setting. The middle figure is for the condition of manual setting, and the last figure for the condition of meter needle indication. If the operation is normal, "0" will be given in the corresponding place, and "1" if abnormal.



e.g. Auto Manual Meter
 ↓ ↓ ↓
 Normal Abnormal Normal
 0 1 0

→ thus classification code is 010

Battery check



$V < 2.5V$: conforming
 $V \geq 2.5V$: Nonconforming

D.V.M: Digital Volt meter

How to check the trouble

Use power source box (J19024) and Battery tool (J15148).
 Unless otherwise specified, check at the settings of ASA100 and F5.6.

2. How to read troubleshooting table

Classification code ①			How to check	Cause	Code No.
Auto	Manual	Meter			
②	③	④	⑤	⑥	⑦

- ①: Classification code No.
- ②,③,④: Malfunctioning conditions given in these column.
If normal, the columns left blank.
- ⑤: Malfunctioning conditions except at Auto, Manual and Meter.
Left blank if additional phenomena not found.
- ⑥: Cause of the malfunctioning conditions
- ⑦: Code No. to refer to the cause

Marks and Terminology

- #101 ①: Terminal No. ① on IC printed circuit
- #108 ①: Terminal No. ① on Resistor block B(#108)
- #630 ⑦: Terminal No. ⑦ on FRE printed circuit (#630)
- #100 (Tr +): Terminal (Tr +) on shutter printed circuit (#100)
- #570 AA: Terminal AA on manual printed circuit (#570)

Lever switch ON: By pulling out the film-advance lever to stand-off position.

Trigger switch ON: By turning the film-advance lever.

Shutter switch ON: Switches on while mirror is rising. To facilitate the check by keeping the switch ON, set the self-timer and depress the shutter release button, holding the mirror with finger to allow the mirror to gently rise.

Icc: Current at Power source

Standard Icc

With lever switch ON: Approx. 1 - 2.5mA

With Trigger switch ON: Approx. 1 - 2.5mA

With Shutter switch ON: Approx. 12 - 20mA

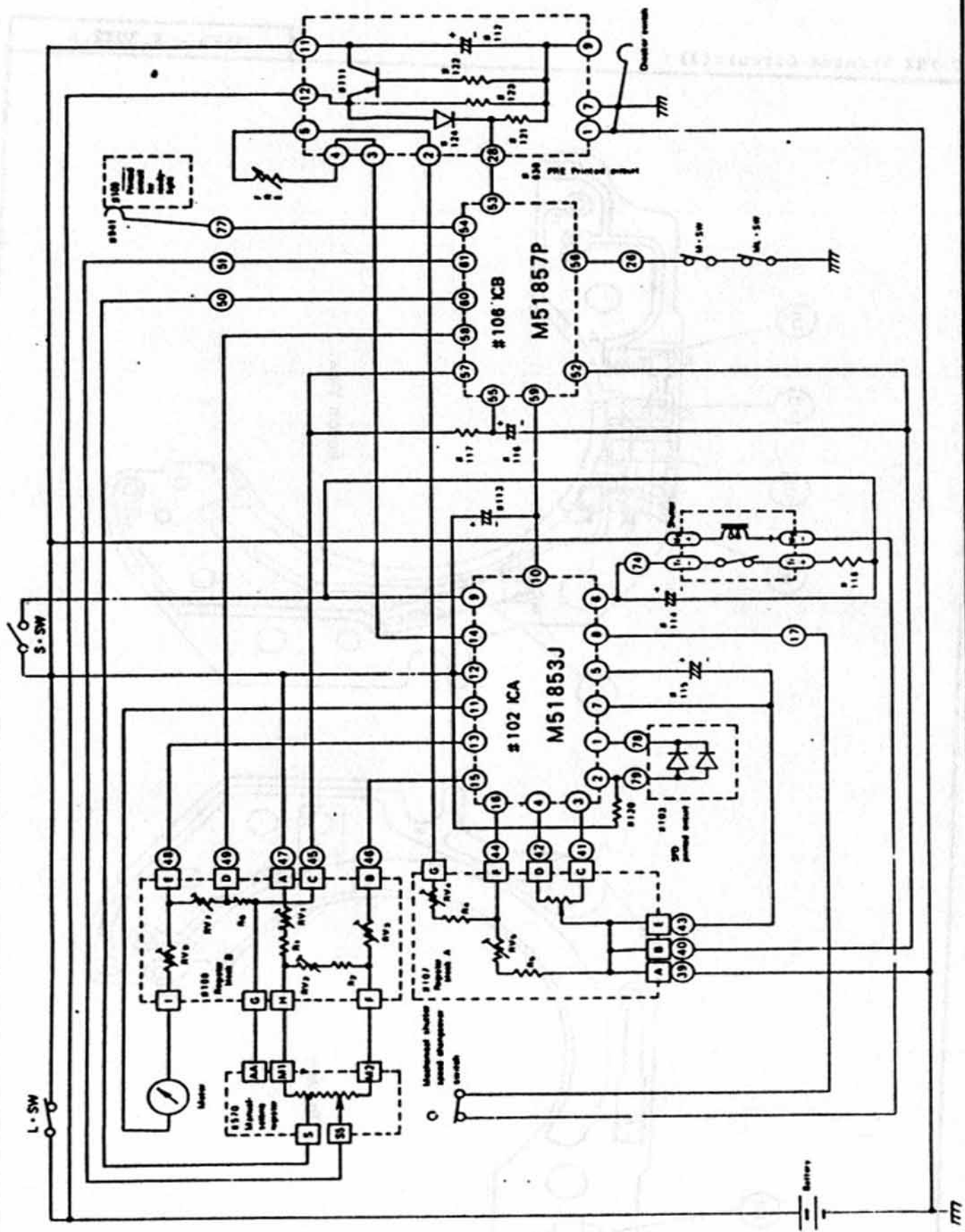
Note: Extremely large Icc may damage the IC. Therefore, switch off the power source immediately after completion of check.

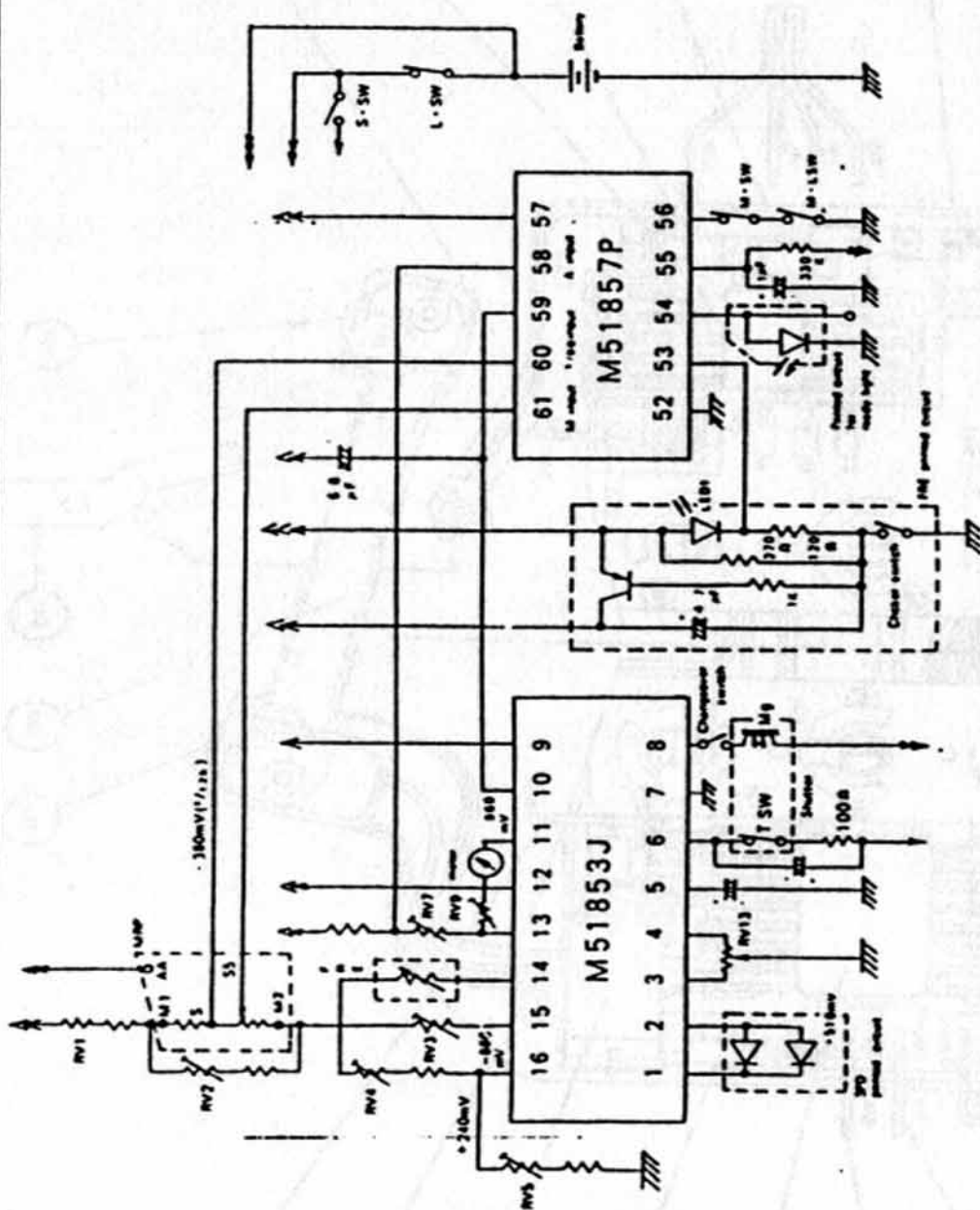
3. Switches

Description	Abbreviation	Position
Lever switch	L. sw	Lower base plate
Mirror switch	M. Sw	Front plate
Shutter switch	S. Sw	Front plate
Trigger switch	Tr. Sw	Shutter
Second curtain switch		Battery chamber
Synch switch		Shutter
MD switch	MD Sw	Upper base plate
Memory lock switch	ML Sw	Front plate
Mech. speed changeover switch		Shutter speed control
Checker switch		FRE Printed circuit

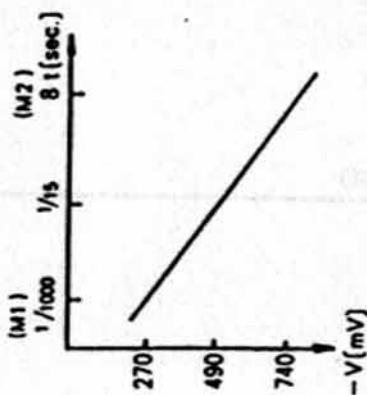
Switch Operation

Camera operation	Film-advance lever pulled out	Film-advance starts	Film-advance finished	Shutter button pushed	Mirror-up starts	Shutter-release starts	Mirror-up finished	1st curtain starts	1st curtain travel finished	2nd curtain starts	2nd curtain travel finished	Mirror-down starts	Mirror-down finished	Film-advance lever pressed back
	L. Sw M. Sw S. Sw Tr. Sw 2nd curtain Sw Synch. Sw MD. Sw ML Sw. Mech. speed change-over switch Checker switch	ON												
		OFF												
				ON										
				OFF								ON		
								ON		OFF				
														ON
														OFF when memory lock lever pressed toward the lens
														OFF at "B" and M90
														ON when checker lever lowered





Voltage/Shutter speed relation
(determined at computing
circuit)

**M51853 J:**

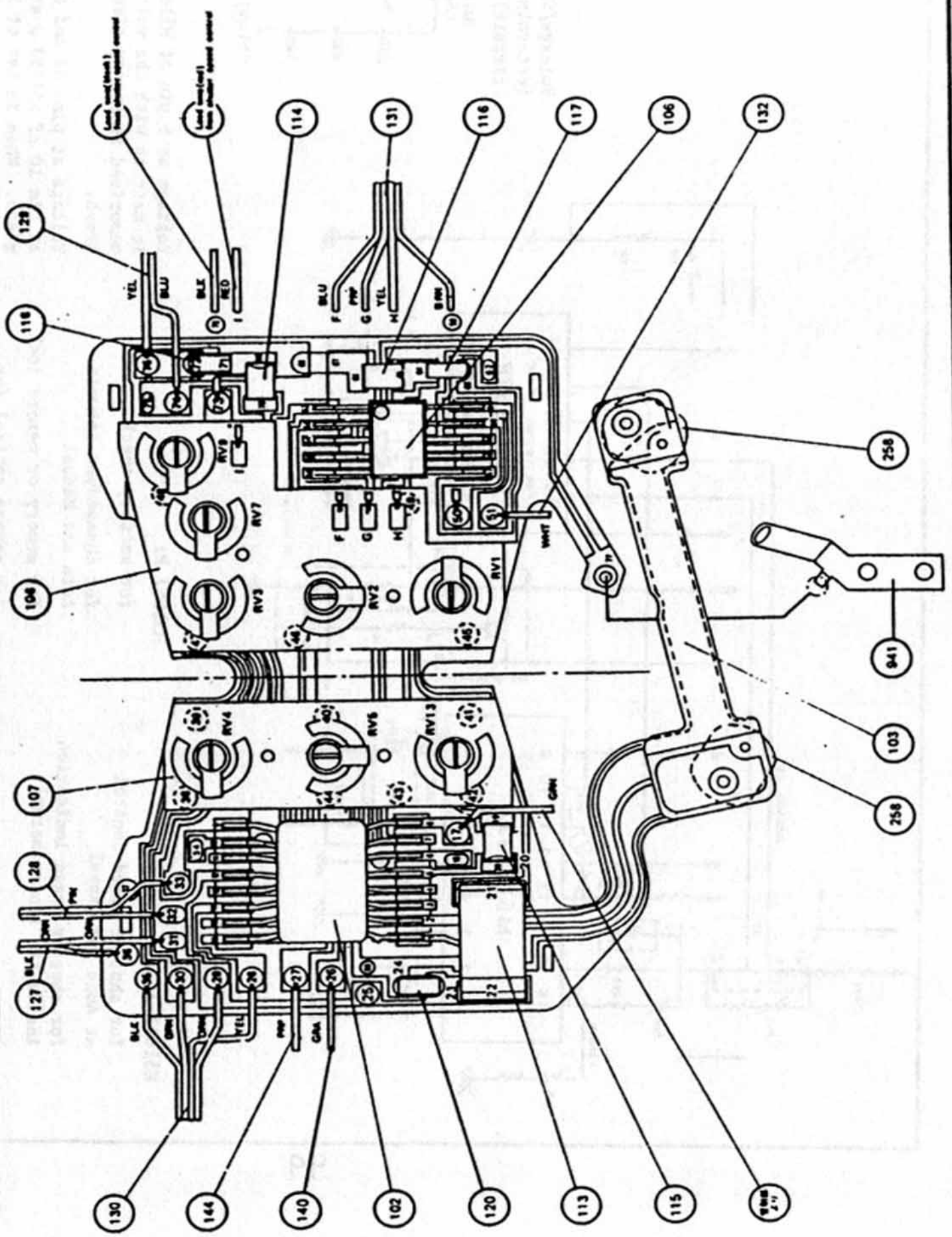
- for shutter speed control at Auto and Manual
- for shutter speed indication inside the finder(meter)

M51857 P:

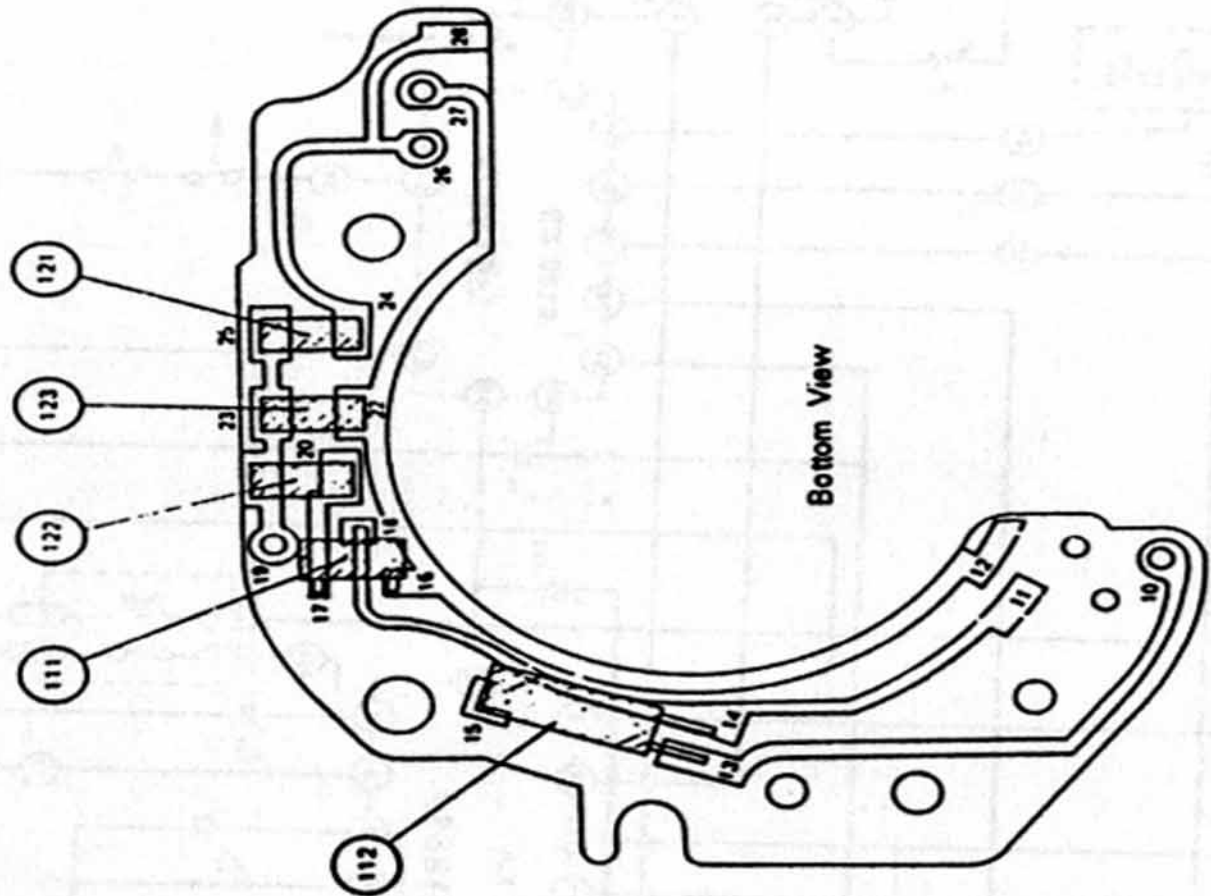
- for battery check
- for changeover between Auto and Manual
- for memory or memory lock
- for camera control for proper SB-10 operation

Voltage at 6 pin of M51853 J varies until it matches with the voltage(shutter speed) memorized in memory circuit as shown in the graph.

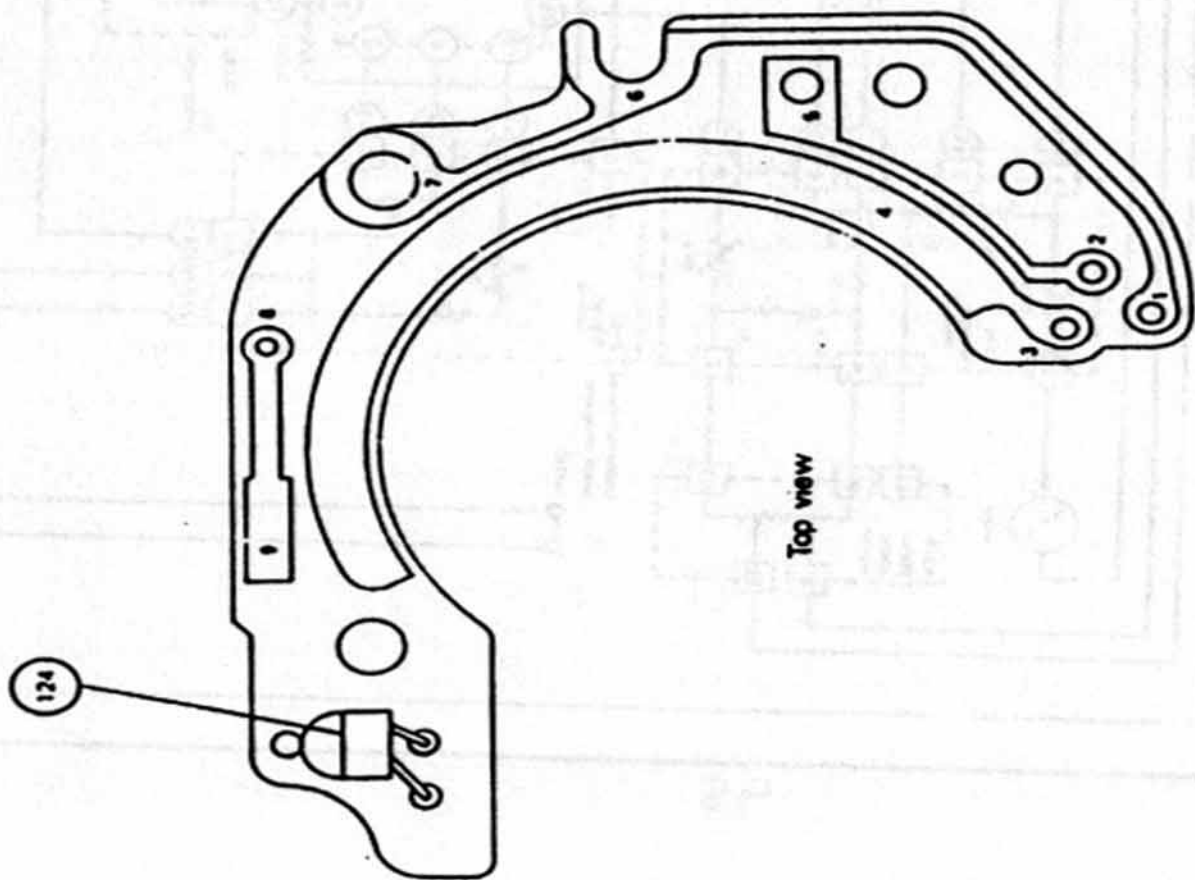
Voltage at pins 59 and 61 of M51857 P, and at pin 10 of M51853 J are traceable from the graph. When in use of SB-10 at Auto, voltage of approx. - 400mV(1/90)



Bottom View



Top view



Classification Codes: 000			How to check	Cause	Code No.
Auto	Manual	Meter			
			Failure of memory lock	Memory Lock cord, Black (#139) shorts to body	000-01-1
				Memory lock switch (#934) shorts to body	000-01-2
				Switch (#934) does not switch OFF	000-01-3
				Mirror switch (#928) shorts to body	000-01-4
			With Trigger switch ON Icc of Approx. 15mA	Short between Orange and Pink shutter switch cords (#128)	000-02-1
				Short between terminals ⑫ and ⑬ or between ⑫ and ⑬ on #101	000-02-2
				Self-timer switch does not switch off	000-02-3
			with shutter switch ON Icc of 40-45mA current flows	Short between (Tr) and (X) on #100	000-03-1
			with lever switch OFF, Icc of Approx. 2mA Too fast battery consumption	Lever switch does not switch OFF	000-04-1
				Short between Red and Orange cords (#126)	000-04-2
				Short between terminals ① and ② on #630	000-04-3
			with lever switch OFF, Icc of Approx. 10mA or extremely large Icc. Too fast battery consumption checker always glow on or is broken	Checker cord, Purple (#144) shorts to body	000-05-1
			with checker switch ON, needle jumps down to B-M zone limit	Resistor C (#120) unsoldered between terminals ③ and ④ on #101	000-06-1
			Failure of checker LED illumination	Lead wire A, Red (#133)	000-07-1
				Cord, Red (#133) unsoldered from #49 or #630 ②	000-07-2
				Checker resistor A (#121) unsoldered between ④ and ⑤ on #630	000-07-3
				Checker LED (#124) unsoldered from ⑥ or ⑦ on #630	000-07-4
				Short between ⑦ and ⑧ on #630	000-07-5
			With checker switch ON LED glows down to Vcc of approx. 1.5V With lever switch ON Normal Vcc	Checker resistor B (#122) unsoldered between ⑩ and ⑪ on #630	000-08-1
				Base of transistor (#111) unsoldered from #630 ⑬	000-08-2
				Emitter of #111 unsoldered from #630 ⑭	000-08-3
				Corrector of #111 unsoldered from #630 ⑮	000-08-4

Classification Code: 000			How to check	Cause	Code No.
Auto	Manual	Meter			
			With checker switch ON, LED glows down to Vcc of approx. 1.5V	FRE cord, Orange (#130) broken	000-09-1
				#130 (Orange) unsoldered from #101 (2) or #630 (1)	000-09-2
				Checker cord, purple (#144) broken	000-09-3
				#144 (Purple) unsoldered from #101 (2) or #630 (2)	000-09-4
			By use of SB-10, Auto speed becomes Time. If set at manual speed, Ready-light turns on and off	Shutter speed control cord A Brown (#131) broken	000-10-1
				#131 (Brown) unsoldered from #101 (6) or #570 (5)	000-10-2
			By use of SB-10, Ready-light fails to turn ON, and Auto speed does not become 1/90 sec.	Shoe connecting contact A (#941) shorts to body	000-11-1
				Poor contact of #941	000-11-2
				Signal contact (#77) in poor contact	000-11-3
			SB-10 does not flash	Synch cord A, Blue (#142) broken	000-12-1
				#142 (Blue) unsoldered from #100 (X) or shoe connecting contact B (#942)	000-12-2
				Synch cord B, Blue (#143) broken	000-12-3
				#143 (Blue) unsoldered from shoe connecting contact B (#942) or synch socket (#15)	000-12-4
				Poor contact of #942	000-12-5
				Upper and lower shoe switch contact (#69, #70) does not switch ON	000-12-6
				X contact on #100 does not switch ON	000-12-7
				Synch contact (#75) in poor contact	000-12-8
			Immediately when SB-10 charged, continuous flash output occurs	Synch cord A, Blue (#142) shorts to body	000-13-1
				Synch cord B, Blue (#143) shorts to body	000-13-2
				Shoe connecting contact B (#942) shorts to body	000-13-3
				Lower shoe switch contact (#70) shorts to body	000-13-4
				X contact on #100 does not turn OFF	000-13-5
				#100 (X) shorts to body	000-13-6
			When SB-10 connected to synch socket, electric shock occurs at synch contact	Upper and lower shoe switch contact (#69, #70) does not switch OFF	000-14-1

Classification Code: 001			How to check	Cause	Code No.
Auto	Manual	Meter			
		No meter needle swing		Meter cord, Red on shutter speed control(R) broken	001-01-1
				Meter cord, Red on R unsoldered from #108 ①	001-01-2
				Meter cord, Black on R broken	001-01-3
				Meter cord Black on R unsoldered from #101 ②	001-01-4
				Meter coil on R broken	001-01-5
		With lever switch OFF, needle swings	With lever switch OFF, ICC of approx. 2mA	Lower switch does not turn OFF	001-02-1
				Lever switch cords(#126) short between Red and Orange	001-02-2
				Short between terminals ① and ② on #630	001-02-3
			With lever switch OFF, ICC of Approx. 10mA or extremely large ICC. Checker LED always glows or is broken	Checker cord, Purple(#144) shorts to body	001-03-1

Classification Code: 010			How to check	Cause	Code No.
Auto	Manual	Meter			
	Becomes Auto speed		With SB-10 attached, warning lamp does not glow at Manual high speed	Short between terminals ① and ② on #101	010-01-1
				Short between AA and SS on #570	010-01-2

Classification Codes: 011			How to check	Cause	Code No.
Auto	Manual	Meter			
	Time	Needle jumps up to the A-zone limit	With SB-10 attached, warning lamp does not glow at manual high speed. Auto and manual settings become Time	Shutter speed control cord A, yellow (#131) broken	011-01-1
				#131(yellow) unsoldered from #108 (H) or #570 (H)	011-01-2
		Needle swings Approx 8 steps toward A-zone	By use of SB-10, warning lamp does not glow at manual high speed at Auto, approx. 1.4mS	Pattern of manual printed circuit(#570) broken between S and M	011-02-1
			By use of SB-10, warning lamp does not glow at certain speed down to 1/250sec. at manual high speed. At Auto, Time	Pattern of #570 broken between S and M	011-03-1
Failure of shutter opening		Needle jumps down to B-M zone limit		Short between #101 (S) and #101 (S)	011-04-1
		Needle swings approx. 8 steps toward B-M zone			
Auto	Needle jumps down to B-M zone limit		By use of SB-10, warning lamp does not glow at Manual high speed. AT Auto, failure of shutter opening;	Short between Purple wire and Blue one of #131 cord A	011-05-1
				Short between #108 (C) and #108 (F)	011-05-2
				Short between #101 (L) and #101 (L) or between #101 (S) and #101 (L)	011-05-3
	Needle swings 7 steps or more toward B-M zone		By use of SB-10, warning lamp does not glow at Manual high speed. At Auto, approx. 1.4mS.	Short between #101 (S) and #101 (L)	011-06-1
				Short between #570 (S) and #570 (AA)	011-06-2
Every setting becomes 1/1000sec.	Needle jumps up to A-zone limit	By use of SB-10, warning lamp does not glow at Manual high speed. At Auto, approx. 1.4mS	Shutter speed control cord A, Blue(#131) broken	011-07-1	
			#131(Blue) cord unsoldered from #108 (F) or #570 (M)	011-07-2	
	Needle jumps down to B-M zone limit		Short between #108 (F) and RV (L)	011-07-3	
	Needle swings 12 steps toward B-M zone				
Normal at 1/1000sec. and 8sec. only	Needle jumps down to B-M zone limit			Short between #570 (M) and #570 (S)	011-08-1
	At Auto or Bulb, the faster the speed, the more the needle swings toward B-M zone				

Classification Code: 011			How to check	Cause	Code No.
Auto	Manual	Water			
	Normal at 1/1000sec. and 1/125sec. only	Needle swings approx. 1 - 8 steps toward B-M zone		Short between #101 (S) and #101 (S)	011-09-1
	At higher speed above certain speed, 1/1000. At lower speed below certain speed, Time	Needle jumps up to A-zone limit or Needle swings approx. 8 steps toward A-zone	By use of SB-10, warning lamp does not glow at Manual high speed. At Auto, approx. 1.4mS	Pattern of #570 broken between (S) and (M2)	011-10-1
			By use of SB-10, warning lamp does not glow at certain speed down to 1/250sec. At Auto, Time	Pattern of #570 broken between (S) and (M1)	011-11-1
	At higher speed above certain speed, 1/1000sec. At lower speed below certain speed, slower speed than normal (8sec. becomes 3sec.)	Needle swings approx. 1.3 steps toward B-M zone	By use of SB-10, warning lamp does not glow at Manual high speed. At Auto, approx. 1.4mS	Shutter speed control cord A (#131) short between a Brown and a yellow cord	011-12-1
				Short between #570 (S) and #570 (M1)	011-12-2
	At higher speed above certain speed, same as Auto. At lower speed below certain speed, failure of shutter opening, or extremely high speed	Needle jumps down to B-M zone limit Needle swings approx. 7 or 8 steps toward B-M zone		Short between #101 (S) and #101 (S)	011-13-1
				Shutter speed control cord A (#131) short between a yellow and a purple cord	011-13-2
				Short between #108 (C) and #180 (B)	011-13-3
				Short between #570 (M1) and #570 (AA)	011-13-4

Classification Code: 100			How to check	Cause	Code No.			
Auto	Manual	Meter						
			Failure of memory lock	Mirror switch cord, Grey (#140) shorts to body	100-01-1			
				Mirror switch A(#927) shorts to body	100-01-2			
				Mirror switch A(927) does not switch OFF	100-01-3			
			Even in use of SB-10, Auto speed becomes Time				Memory lock cord, Black (#139) broken	100-02-1
							#139(Black) unsoldered from memory switch A(#934) or mirror switch B(#928)	100-02-2
							Mirror switch cord, Grey(#140) broken	100-02-3
							#140 cord(Grey) unsoldered from #101 ② or Mirror switch A(#927)	100-02-4
							Mirror switch does not turn ON	100-02-5
							Memory switch A(#934) does not turn ON	100-02-6
							With lever switch OFF, Icc becomes extremely large or approx. 10mA. Checker LED always glows or breaks. Faster battery consumption	100-03-1
							Shutter speed control cord A, Purple (#131) broken	100-04-1
			Slower speed			Failure of memory lock	#131 cord (Purple) unsoldered from #108 ① or #570 AA	100-04-2
							Mirror switch cord, Grey(#140) shorts to body	100-05-1
Mirror switch shorts body	100-05-2							
Erratic speed			Even with SB-10 used, Auto speed becomes Time	Mirror switch does not turn OFF	100-05-3			
				Memory lock cord, Black (#139) broken	100-06-1			
				#139 cord (Black) unsoldered from memory switch A(#934) or mirror switch B(#928)	100-06-2			
				Mirror switch cord, Grey(#140) broken	100-06-3			
				#140 cord(Grey) unsoldered from #101 ② or mirror switch A(927)	100-06-4			
				Mirror switch does not switch ON	100-06-5			
A few steps slower speed				Memory switch (#934) does not turn ON	100-06-6			
				Short between #108 ① and RV ⑦	100-07-1			

Classification Code: 101			How to check	Cause	Code No.
Auto	Manual	Meter			
		Needle jumps down to B-M zone limit	With lever switch ON lcc becomes approx 30mA	Meter cord, Red on shutter speed control broken	101-01-1
				Short between #101 (29) and #101 (30)	101-07-1
		Needle jumps up to A-zone limit	With lever switch ON, lcc becomes approx. 30mA	Meter cord, Black on shutter speed control shorts to body	101-03-1
Shutter does not open		Needle jumps up to A-zone limit		Short between #101 (6) and #101 (10)	101-04-1
				FRE cord #130 short between a yellow and a Green cord	101-04-2
				Short between #630 (3) and #632 (2) or between #630 (3) and #630 (4)	101-04-3
				Short between #101 (16) and #101 (28)	101-04-4
A few steps longer speed		Needle swings 1/3 step toward A-zone than normal		Short between #108 (1) and RV (7)	101-05-1
Extraordinary speed		Needle jumps up to A-zone limit	With shutter switch ON lcc becomes approx. 16mA	Short between #101 (7) and #101 (20)	101-06-1
At EV4, approx 1/1000		Needle swings approx. ten steps toward A-zone	Auto speed varies by rotation of FRE Auto speed does not vary by rotation of FRE	Short between #101 (6) and #101 (10)	101-07-1
				FRE cord #130 shorts between a yellow and a Green cord	101-08-1
				Short between #630 (2) and #630 (1) or between #630 (2) and #630 (6)	101-08-2
Extraordinary speed		No Needle swing	With lever switch ON, extremely large lcc. With checker switch ON, extremely large lcc. No LED illumination	Short between #101 (29) and #101 (26)	101-09-1

Classification Code: 110			How to check	Cause	Code No.			
Auto	Manual	Meter						
Time	Time		With lever switch ON, lcc of approx. 15mA. At M90 or Bulb. Time	Mech. speed changeover switch cord, purple, on shutter speed control shorts to body	110-01-1			
				#100 (Mg) shorts to body	110-01-2			
			With lever switch ON, lcc of approx. 15mA	Changeover switch cord, green, on shutter speed control shorts to body	110-02-1			
				Short between #101 (7) and #101 (13)	110-02-2			
				Short between #100 (Mg) and #100 (Tr)	110-02-3			
			In use of S8-10, warning lamp does not light at manual high speed				Shutter speed control cord B, White (#132) broken	110-03-1
							#132 cord (White) unsoldered from #101 (5) or #570 (E)	110-03-2
							Trigger switch does not switch OFF	110-04-1
							Trigger switch cord (#129) shorts between a yellow and a blue cord	110-04-2
							Short between #101 (24), (23) and #101 (23), (29)	110-04-3
							Short between #100 (Tr) and #100 (Tr)	110-04-4

Classification Code: 110			How to check	Cause	Code No.
Auto	Manual	Meter			
Failure of shutter opening	Failure of shutter opening		With trigger switch ON, lcc of approx. 35mA	Trigger switch cord, Blue(#129) shorts to body	110-05-1
				#100 (Tr-) shorts to body	110-05-2
			With shutter switch ON, extremely large lcc	Shutter switch (#926) shorts to body	110-06-1
				Shutter switch cord, Pink(#128) shorts to body	110-06-2
			With shutter switch ON, lcc of approx. 100mA	Short between #100 (Hg+) and #100 (Hg-)	110-07-1
			With shutter switch ON, lcc of approx. 35mA	#100 (Tr+) shorts to body	110-08-1
				Trigger switch cord, yellow (#129) shorts to body	110-08-2
			With shutter switch ON, lcc of approx. 3-5mA	Short between #101 (13) and #101 (14), or between #101 (13) and #101 (14)	110-09-1
				Magnet coil of #100 broken	110-09-2
				Mech. speed changeover switch cord, purple, on shutter speed control broken	110-09-3
				Mech. speed changeover switch cord (Purple) unsoldered from #100 (Hg-)	110-09-4
				Mech. speed changeover switch cord (Green) on shutter speed control broken	110-09-5
				Mech. speed changeover switch cord (Green) on shutter speed control unsoldered from #101 (17)	110-09-6
			lcc when shutter switch switched ON is same as lcc when lever switch switched ON	Shutter switch cord, Orange (#128) broken	110-10-1
				#128 cord (Orange) unsoldered from #101 (17) or shutter switch A(#925)	110-10-2
				Shutter switch cord, Pink (#128) broken	110-10-3
				#128 cord (Pink) unsoldered from #101 (17) or shutter switch B(#926)	110-10-4
				Shutter switch does not switch ON	110-10-5
				Trigger switch does not switch ON	110-10-6
				Trigger switch cord, yellow (#129) broken	110-10-7
#129 cord (yellow) unsoldered from #101 (16) or #100 (Tr+)	110-10-8				
Trigger switch cord, Blue(#129) broken	110-10-9				
#129 cord (Blue) unsoldered from #101 (16) or #100 (Tr-)	110-10-0				

Classification Code: 111

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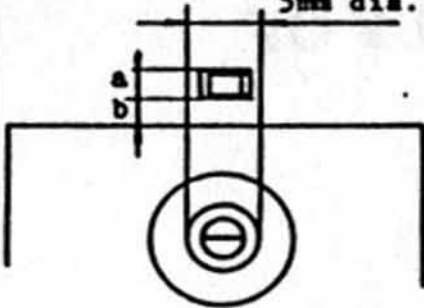
Classification Code: 111			How to check	Cause	Code No.	
Auto	Manual	Meter				
Failure of shutter opening	Failure of shutter opening	No needle swing	With lever switch OFF, extremely large Icc	Lever switch cord, Red(#126) shorts to body	111-01-1	
				Plus cord A, Red(#133) shorts to body	111-01-2	
				Plus cord B, Red(#134) shorts to body	111-01-3	
				Lever switch (#487) shorts to body	111-01-4	
				Battery contact B ⊕ (#49) shorts to body	111-01-5	
				MD external contact lug(#919) shorts to body	111-01-6	
			With lever switch ON, extremely large Icc (Measure the Icc by disconnecting power supply cord, orange (#127) from #101 J1)	No resistance (0Ω) between #127 and body	Lever switch cord, Orange(#126) shorts to body	111-02-1
					Power source cord, Orange(#127) shorts to body	111-02-2
					Magnet plus cord, Orange(#135) shorts to body	111-02-3
					Lever switch (#488) shorts to body	111-02-4
					#100 (M+) shorts to body	111-02-5
					Power supply cord(#127) shorts between a Orange and a black cord	111-02-6
			With lever switch ON, extremely large Icc. No resistance (0Ω) between #101 J1 and body		Shutter switch cord, Orange(#128) shorts to body	111-03-1
					FRE cord, Orange (#130) shorts to body	111-03-2
					Shutter speed control cord, purple (#131) shorts to body	111-03-3
					#570 AA shorts to body	111-03-4
					Shutter switch (#925) shorts to body	111-03-5
					Short between #101 ①, ② and #101 ③, ④	111-03-6
			No Icc observed. Checker LED does not illuminate		Power supply cord, Black(#127) broken	111-04-1
					#127 cord, Black(#127) unsoldered from #101 ⑥ or Battery chamber earth contact (#45-1)	111-04-2
					Battery plus contact B(#49) in poor contact	111-04-3
					Battery earth contact (#45-1) in poor contact	111-04-4
			No Icc observed		Lever switch cord, Red(#126) broken	111-05-1
					#126 cord(Red) unsoldered from Lever switch (#487) and MD external contact lug (#919)	111-05-2
Lever switch cord, Orange (#126) broken	111-05-3					

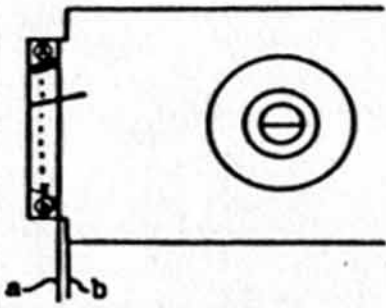
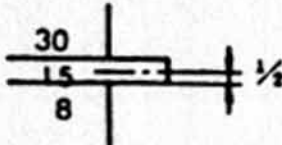
Classification Code: 111			How to check	Cause	Code No.
Auto	Manual	Meter			
Failure of shutter opening	Failure of shutter opening	No needle swing		Lever switch cord, Orange(#126) unsoldered from Lever switch (#488) or external contact lug (#919)	111-05-4
				Power source cord, Orange(#127) broken	111-05-5
				#127 cord (Orange) unsoldered from #101 (1) or the contact lug (#919)	111-05-6
				Plus cord B, Red (#134) broken	111-05-7
				#134 cord (Red) unsoldered from battery contact B (49) or the external contact lug (#919)	111-05-8
				Lever switch does not turn ON	111-05-9
		Needle jumps up to A-zone limit	With lever switch ON, lcc of approx. 10mA	Short between #101 (7) and #101 (8), or between #101 (3) and #101 (4)	111-06-1
		Needle swings toward A-zone away from normal position			
		Needle swings approx. one step toward B-zone away from normal position	With lever switch ON, lcc of approx. 5mA. With trigger switch ON lcc of approx. 8mA.	Short between #101 (7) and #101 (6) or between #101 (7) and #101 (8)	111-07-1
		Needle jumps up to A-zone limit			
No needle swing	With lever switch ON, extremely large lcc (at auto speed) With lever switch ON, normal lcc (at manual)	Shutter speed control cord B, White(#132) shorts to body #570 (5) shorts to body	111-08-1		
			111-08-2		
			Unsoldering FRE cords, yellow and green(#130), from IC printed circuit measure the resistance. If infinity value detected, one of the causes to the right considerable Normal value: approx. 9.45 K at ASA 100, F5.6	Yellow or Green FRE cord (#130) broken	111-09-1
				Sliding brush A(#685) in poor contact	111-09-2
				Brush A(#682) in poor contact	111-09-3
				Sliding brush B(#698) in poor contact	111-09-4
				Sliding brush A(#685) unsoldered from #630 (3)	111-09-5
				FRE(#680) unsoldered from FRE conducting plate(#684)	111-09-6
				FRE cord, yellow (#130) unsoldered from #630 (3)	111-09-7
				FRE cord, green(#130) unsoldered from #630 (2)	111-09-8
				FRE cord, yellow(#130) unsoldered from #101 (2)	111-10-1

Classification Codes: 111			How to check	Cause	Code No.				
Auto	Manual	Meter							
Time	Time	Needle jumps down to B-M zone limit		FRE cord, Green(#130) unsoldered from #101 ⑩	111-10-2				
				Short between #101 ⑩ and one of #101 ②, ③, ④	111-10-3				
				Short between #101 ⑦ and #101 ⑧	111-10-4				
				Short between #101 ⑩ and one of #101 ②, ③	111-10-5				
				Short between #101 ④ and one of #101 ①, ②	111-10-6				
				Short between #101 ② and #101 ③	111-10-7				
				Short between Green and Yellow FRE cord(#130)	111-10-8				
				Extraordinary speed	Time	Needle jumps up to A-zone limit	<p>With SB-10 used, manual high speed warning lamp does not glow. Both at Auto and Manual, Time</p> <p>When SB-10 used, warning lamp glows properly at Manual high speed. At Auto and Manual, Time 1 - 2mA higher Icc than normal</p> <p>When SB-10 used, warning lamp glows properly at Manual high speed. At Auto and Manual, Time (Normal Icc)</p>	Shutter speed control cord, Yellow(#131) shorts to body	111-11-1
#570 ④ shorts to body	111-11-2								
Shutter speed control cord, Brown (#131) shorts to body	111-12-1								
#570 ⑤ shorts to body	111-12-2								
FRE cord, Green(#130) shorts to body	111-12-3								
FRE conducting plate (#684) shorts to body	111-12-4								
Sliding brush A(#685) shorts to body	111-12-5								
FRE cord (#130) shorts between a Green and a Black cord	111-12-6								
Short between #101 ⑩ and #101 ③	111-12-7								
Short between #630 ① and #630 ②	111-12-8								
Shutter speed control cord, Blue(#131) shorts to body	111-13-1								
#570 ④ shorts to body	111-13-2								
FRE cord, Yellow (#130) shorts to body	111-13-3								
Brush A(#682) or Brush mount (#683)	111-13-4								
Sliding brush B(#698) shorts to body	111-13-5								
Short between one of #630 ①, ② and one of ③, ④	111-13-6								
Short between one of #630 ⑤, ⑦ and #698 brush, B	111-13-7								
Short between #630 ⑥ and checker switch (#633)	111-13-8								
1/4 - 1EV longer speed than normal		Needle jumps up to A-zone limit by 5 steps with lever switch on, and 7 steps with Trigger switch ON	With shutter switch ON Icc of approx. 30mA					Short between #101 ⑩ and #101 ③	111-14-1
								Short between #101 ⑦ and #101 ②	111-14-2
High speed slower than normal Low speed, normal		Needle jumps up to A-zone limit	With shutter switch ON Icc of approx. 16mA					Short between #101 ⑦ and #101 ⑩	111-15-1

INSPECTION STANDARD FOR REPAIR

Item	Position	Subject	Tool		
Wind-up & Shutter release Mechanism	Wind-up lever	Wind-up torque: Within 1.5kg.cm (No film loaded) Within 4.5kg.cm (Film loaded)	Torque meter		
	Spool	Spool friction: 200 - 260g	J15003		
	Sprocket	Sprocket slack (at wind-up limit): within 0.8mm at top of tooth	J18064		
	Wind-up coupling	Wind-up angle at start: -1° - $+2^{\circ}$ at wound-up: 132° - 138° Wind-up torque: Equal to or less than the torque on wind-up lever.	Torque meter		
	Rewind button	To be set at the position pushed 2.7mm above bottom cover surface	Vernier		
	Rewind crank	Friction torque when no film loaded: 25 - 40g.cm	J5018		
	Shutter release button	Shutter-release force: 240 - 400g	J5019		
		Full Stroke: 2.7 \pm 0.3mm	J18002		
		Release stroke: Shutter should be released when the button depressed below #468 down to 0.4mm above #469 (Button's stroke: Approx. 1.7mm)			
	MD releasing shaft	Shaft protrusion height: $0.7^{+0.3}_{-0.2}$ mm	Vernier		
Shaft-actuating power 500g or less		Vernier			
Shaft's height to release shutter above bottom plate surface: 3.4mm or less		Vernier			
Shutter Accuracy	Exposure time	Shutter speed setting (or theoretical speed)	Allowance (ms)	J19022-1 When in use of different model from J19022-1: Auto Measure between EV14 and EV15. 1/1000, 4, 8sec.: \pm 0.65EV 1/500 - 2sec.: \pm 0.5EV MANUAL 1/1000 - 1/250 sec.: \pm 0.525EV 1/125: \pm 0.525EV -0 EV 1/60 - 8sec.: \pm 0.35EV	
		Standard			Auto
	1000	0.98	0.62- 1.54		0.68- 1.41
	500	1.95	1.38- 2.76		1.36- 2.81
	250	3.91	2.76- 5.53		2.72- 5.63
	125	7.81	5.53- 11.0		7.81- 11.2
	60	15.6	11.0 - 22.1		12.2 - 19.9
	30	31.3	22.1 - 44.3		24.6 - 39.9
	15	62.5	44.2 - 88.4		49.0 - 79.7
	8	125	88.4 - 177		98.1 - 159
	4	250	174 - 354		196 - 319
	2	500	354 - 707		392 - 637
	1	1000	707 - 1414		785 - 1275
	2	2000	1414 - 2828		1569 - 2549
	4	4000	2549 - 6277		3138 - 5098
8	8000	5098 - 12553	6277 - 10190		

Item	Position	Subject	Tool												
Shutter Accuracy	Shutter speed difference	Shutter speed difference between the adjacent settings: 1/1000 - 1/125sec.: 1.2 - 3.4 times 1/60 - 8sec: 1.4 - 2.8 times	J19022-1												
	Uneven exposures (in one frame)	Allowable exposure difference: Max. 0.25EV among the values measured at Start(S), Center(C) and End(E), setting to 1/1000sec.	J19033												
	Uneven exposures (among frames)	When measured at Auto-speed 1/15sec., ASA100, F5.6 and LV9 five times, the speed deviation should be within 10ms.	J19022-1												
	Self-timer	Can be set for 8 - 14sec. delay Setting "Cancellable" by manually rotating back self-timer lever to the memory-lock position.	Stop-watch												
	X contact	Time lag: 0.3 - 1.0ms (Full open: 2.2ms or more)	J19008-1												
Contact efficiency: 70% or more (specified 1ms, 2.5ms)		J19028-1													
Insulation: 30MΩ or higher															
Exposure meter accuracy	Needle indication accuracy	ASA100 compensation 0 <table border="1"> <thead> <tr> <th>cd/m²</th> <th>EV</th> <th>F No.</th> <th>Meter needle indication</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>4</td> <td>F8</td> <td>To be within the range of the center "0" of the digit 1000</td> </tr> <tr> <td>2040</td> <td>14</td> <td>F4</td> <td>To be within the range of "4"</td> </tr> </tbody> </table> <p>In case of the other combinations of the settings, meter needle should be within the range of the digit to show theoretical speed.</p>	cd/m ²	EV	F No.	Meter needle indication	2	4	F8	To be within the range of the center "0" of the digit 1000	2040	14	F4	To be within the range of "4"	J19022-1 J18041-1
	cd/m ²	EV	F No.	Meter needle indication											
	2	4	F8	To be within the range of the center "0" of the digit 1000											
	2040	14	F4	To be within the range of "4"											
Meter needle Starting position	With lever switch OFF, the needle should be locked above the center of B-M zone.	Visual Inspection													
Infinity () coincidence	Coincidence: ±30" Conspicuous blurs should not be visible at four corners of the viewfinder.	J19001 J18010													
Parallax	Parallax: Within 0.5mm vertically and horizontal														
Frame coverage	At least 93% vertically and horizontally at the center of the viewfinder	J18006													
Viewfield frame	Inclination: within 1°30'	Lens: 50mmf1.4													
F No. window position	<p>Within 5mm dia.</p>  <p><u>F No. window position</u> Sideways: Within 5mm dia. of split-image spot Height: $b=0.3a-1.5a$ <u>Position of frame on J18063</u> Within the F No. window</p> <p>The window's inclination should not be conspicuous</p>	J18063 Visual inspection													

Item	Position	Subject	Tool
Finder accuracy	Shutter speed film position	 <p>The film and (a) and finder frame end (b) should be aligned within an allowable interval of max. 0.2mm. (a) should not exceed (b). Vertical deviation of the film not allowed.</p>	Visual inspection
	Green needle and speed indication digit alignment	<p>Meter needle should overlay at least half of the height of speed digits or letter (A, B, M). Be sure to check at click position.</p> 	Visual inspection
Lens mount	Aperture coupling lever	Height: $3.1^{+0.1}_{-0}$ mm (after shutter cocking) 3.5mm or less (Before shutter cocking) Height difference between after and before shutter cocking: 0.15mm or more	J18004
		Stroke: 7.1mm or more	
		Power to depress the lever: 90 - 120g at 3.1mm height	J18003
	Aperture coupling ring	Start position 52.5^{+0}_{-1} °	J18063
		Max. rotation angle 112.5^{+3}_{-1} °	J18058
		Rotation torque Min. aperture direction $950\text{g}\cdot\text{cm}$ Max. aperture direction 100 - 350g·cm	J18058
Back focus	Flange back dimension $46.67 \pm 0.2\text{mm}$	J18001-1	
	Parallelism allowance within 0.02mm		
	Height difference between outer and inner rails $0.23 \pm 0.02\text{mm}$		
Others	Battery checker	Lowest voltage for illumination: 2.25 ± 0.15 (with lever switch ON)	J19024
	Ready light	Shutter dial setting LED	J15147
		Auto ON 1/1000 - 1/250 (Manual) OFF 1/125 - B (Manual) ON	
	Pressure plate	Flatness within 0.02mm	

FE-2 SUPPLEMENT

Physically and construction-wise, the Nikon FE-2 is very similar to the Nikon FE. The primary difference is that the FE-2 shutter speed is faster than the older FE. It's speed is 4 milliseconds and the synch strobe is 1/250 sec. The faster speed is due to much thinner blades. In all other aspects, the FE-2 shutter is identical to the Nikon FE's Copal shutter as depicted in this manual. Care should be taken with the FE-2 shutter as it is easily damaged. Otherwise, THIS MANUAL SHOULD BE CONSIDERED AS A COMPLETE GUIDE FOR ANY DISSASSEMBLY, REPAIR AND REASSEMBLY OF THE NIKON FE AND FE-2 CAMERAS.