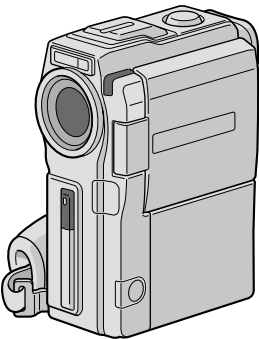


# JVC

# SERVICE MANUAL

## DIGITAL VIDEO CAMERA

# GR-DVX8EG/EK/DVX9EG/EK /DVX10EG/EK



### SPECIFICATIONS *(The specifications shown pertain specifically to the model GR-DVX9EG/EK/DVX10EG/EK)*

Camcorder	
<b>For General</b>	
Power supply	: DC 6.3 V  (Using AC Power Adapter/Charger) DC 7.2 V  (Using battery pack)
Power consumption	
LCD monitor off, viewfinder on	
GR-DVX10	: Approx. 4.9 W
GR-DVX9	: Approx. 4.6 W
LCD monitor on, viewfinder off	
GR-DVX10	: Approx. 5.8 W
GR-DVX9	: Approx. 5.5 W
Dimensions (W x H x D)	: 51 mm x 125 mm x 97 mm (with the LCD monitor closed and the viewfinder pushed back in)
Weight	: Approx. 515 g (without cassette, MultiMediaCard and battery) Approx. 590 g (incl. cassette, MultiMediaCard and battery)
Operating temperature	: 0°C to 40°C
Operating humidity	: 35% to 80%
Storage temperature	: -20°C to 50°C
Pickup	: 1/4" CCD (Progressive Scan)
Lens	: F 1.8, f = 3.8 mm to 38 mm, 10:1 power zoom lens
Filter diameter	: ø27 mm
LCD monitor	: 2.5" diagonally measured, LCD panel/TFT active matrix system
Viewfinder	: Electronic viewfinder with 0.44" colour LCD
Speaker	: Monaural
<b>For Digital Video Camera</b>	
Format	: DV format (SD mode)
Signal format	: PAL standard
Recording/Playback format	: Video: Digital component recording 48 kHz 2-channel (16-bit) Audio: PCM digital recording, 32 kHz 4-channel (12-bit), 48 kHz 2-channel (16-bit)
Cassette	: Mini DV cassette
Tape speed	: SP: 18.8 mm/s LP: 12.5 mm/s
Maximum recording time (using 80 min. cassette)	: SP: 80 min. LP: 120 min.
<b>For Digital Still Camera</b>	
Storage media	: MultiMediaCard
Compression system	: JPEG (compatible)
File size	: 2 modes (XGA: 1024 x 768 pixels/VGA: 640 x 480 pixels)
Picture quality	: 2 modes (FINE/STANDARD)
Approximate number of storable images (with the provided MultiMediaCard [8 MB], with Sound Effects pre-stored)	
FINE	: 46 (VGA), 21 (XGA)
STANDARD	: 133 (VGA), 64 (XGA)
(with an optional MultiMediaCard [4 MB])	
FINE	: 26 (VGA), 12 (XGA)
STANDARD	: 76 (VGA), 36 (XGA)

(with an optional MultiMediaCard [8 MB])  
FINE : 54 (VGA), 24 (XGA)  
STANDARD : 155 (VGA), 75 (XGA)

**For Connectors**

Video output : 1 V (p-p), 75 Ω, analogue  
Audio output : 300 mV (rms), 1 kΩ, analogue, stereo  
DV :  
  Input/output (GR-DVX10 only) : 4-pin, IEEE 1394 compliant  
  Output (GR-DVX9 only) : 4-pin, IEEE 1394 compliant  
Headphone output : ø3.5 mm, stereo

#### AC Power Adapter/Charger AA-V51EG or AA-V51EK

Power requirement : AC 110 V to 240 V~, 50 Hz/60 Hz  
Power consumption : 23 W  
Output :  
  Charge : DC 7.2 V , 0.77 A  
  VTR : DC 6.3 V , 1.8 A  
Dimensions (W x H x D) : 68 mm x 45 mm x 110 mm  
Weight :  
  AA-V51EG : Approx. 255 g  
  AA-V51EK : Approx. 330 g

#### Docking Station CU-V502E

**For General**

Dimensions (W x H x D) : 55 mm x 36 mm x 107 mm  
Weight : Approx. 89.9 g

**For Connectors**

S :  
  Output : Y : 1 V (p-p), 75 Ω, analogue  
          C : 0.29 V (p-p), 75 Ω, analogue  
  Input (GR-DVX10 only) : Y : 0.8 V (p-p) – 1.2 V (p-p), 75 Ω, analogue  
                              C : 0.2 V (p-p) – 0.4 V (p-p), 75 Ω, analogue

VIDEO :  
  Video output : 1 V (p-p), 75 Ω, analogue  
  Video input (GR-DVX10 only) : 0.8 V (p-p) – 1.2 V (p-p), 75 Ω, analogue  
AUDIO :  
  Audio output : 300 mV (rms), 1 kΩ, analogue, stereo  
  Audio input (GR-DVX10 only) : 300 mV (rms), 50 kΩ, analogue, stereo  
  LIP (EDIT) : ø3.5 mm, 4-pole, mini-head jack (compatible with RC-5325 plug)  
  PC (DIGITAL STILL) : ø2.5 mm, 3-pole  
  External microphone input : 506 μV (rms), high impedance unbalanced with ø3.5 mm (stereo)  
  PRINTER : For an optional video printer equipped with a PRINT DATA connector

*Specifications shown are for SP mode unless otherwise indicated. E & O.E. Design and specifications subject to change without notice.*



VICTOR COMPANY OF JAPAN, LIMITED  
VIDEO DIVISION

S40894

GR-DVX8EG/EK/DVX9EG/EK/DVX10EG/EK

No. 86575

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The following table lists the differing points between Models GR-DVX8EG/EK, GR-DVX9EG/EK and GR-DVX10EG/EK in this series.

	GR-DVX8EG	GR-DVX8EK	GR-DVX9EG	GR-DVX9EK	GR-DVX10EG	GR-DVX10EK
FLASH	NOT USED		USED			
DSC MODE	NOT USED		USED			
DUAL MODE	NOT USED		USED			
DIGITAL SOUND	NOT USED		USED			
MULTI MEDIA CARD	NOT USED		PROVIDE			
ANALOG VIDEO INPUT	NOT USED				USED	
DV IN/OUT	OUT ONLY				IN/OUT	
DOCKING STATION	CU-V503E		CU-V502E			
AC POWER ADAPTER	AA-V51EG	AA-V51EK	AA-V51EG	AA-V51EK	AA-V51EG	AA-V51EK

# Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## ● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the  $\triangle$  symbol and shaded (■) parts are critical for safety.  
Replace only with specified part numbers.

**Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.**

3. Fuse replacement caution notice.  
Caution for continued protection against fire hazard.  
Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:  
1) Wires covered with PVC tubing  
2) Double insulated wires  
3) High voltage leads

5. Use specified insulating materials for hazardous live parts.  
Note especially:  
1) Insulation Tape      3) Spacers      5) Barrier  
2) PVC tubing      4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

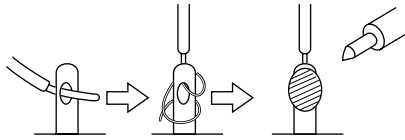


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

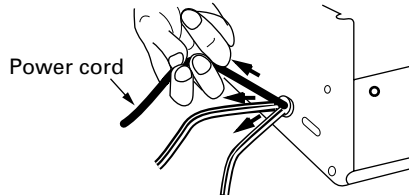


Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)  
In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1) **Connector part number** : E03830-001

2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.

3) **Replacement procedure**

(1) Remove the old connector by cutting the wires at a point close to the connector.

Important : Do not reuse a connector (discard it).

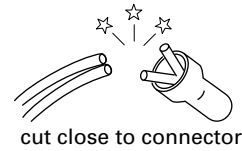


Fig.3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

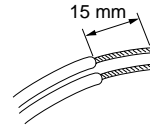


Fig.4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

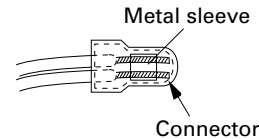


Fig.5

(4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.



Fig.6

(5) Check the four points noted in Fig.7.

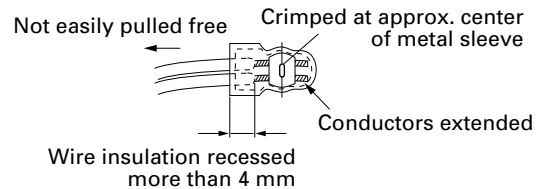


Fig.7

## ● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

### 1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

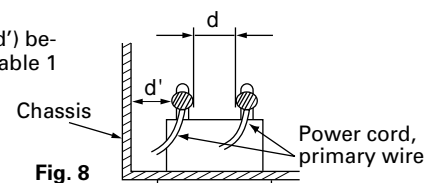


Fig. 8

### 4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

**Measuring Method :** (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

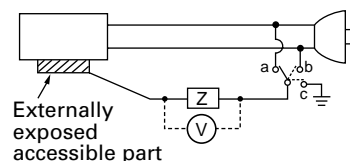


Fig. 9

### 5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

**Measuring Method:**

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

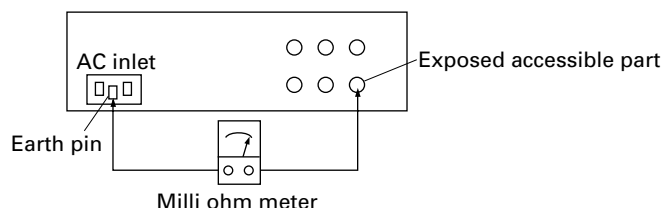


Fig. 10

#### Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$R \geq 1 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
100 to 240 V			AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	USA & Canada	$1 \text{ M}\Omega \leq R \leq 12 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3.2 \text{ mm}$
110 to 130 V	Europe & Australia	$R \geq 10 \text{ M}\Omega/500 \text{ V DC}$	AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
200 to 240 V			AC 1.5 kV 1 minute (Class I)	$d' \geq 8 \text{ mm (Power cord)}$ $d' \geq 6 \text{ mm (Primary wire)}$

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	$1 \text{ k}\Omega$	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F}$ in parallel with $1.5 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	$2 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
		$50 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 2 Leakage current specifications for each region

**Note:** These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

# SECTION 1 DISASSEMBLY

## 1.1 BEFORE ASSEMBLY AND DISASSEMBLY

### 1.1.1 Precautions

1. Be sure to remove the power supply unit prior to mounting and soldering of parts.
2. When removing a component part that needs to disconnect the connector and to remove the screw for removing itself, first disconnect the connecting wire from the connector and then remove the screw beforehand.
3. When connecting and disconnecting the connectors, be careful not to damage the wire.
4. Carefully remove and handle the part to which some spacer or shield is attached for reinforcement or insulation.
5. When replacing chip parts (especially IC parts), desolder completely first (to prevent peeling of the pattern).
6. Tighten screws properly during the procedures.  
Unless specified otherwise, tighten screws at a torque of 0.078N·m (0.8kgf·cm).

### 1.1.2 Assembly and disassembly

STEP No.	PART	Fig No.	POINT	NOTE
①	DECK OPE ASSY	Fig.1-3-1	2(S①), (L①) ☆CN A	-
②	FRONT COVER ASSY		(S②a), (S②b), 2(S②c), (S②d) (S②e), (S②f), (L②) ☆CN B	-

(1) (2) (3) (4) (5)

(1) Indicate the disassembly steps. When assembling, perform in the reverse order of these steps. This number corresponds to the number in the disassembly diagram.

(2) Indicates the name of disassembly/assembly parts.

(3) Indicates the number in the disassembly diagram.

(4) Indicates parts and points such as screws, washers, springs which must be removed during disassembly/assembly.

Symbol Name, Point

S Screw

L Lock, Pawl, Hook

SD Soldering

☆ (Others) Connector, Cover, Bracket, etc.

(Example)

- 2 (S1): Remove the two screws (S1) for removing the part 1.
- CN A : Disconnect the connector A.
- SD1 : Unsolder at the point SD1.

(5) Precautions on disassembly/assembly.

### 1.1.3 Destination of connectors

**Note:** Three kinds of double-arrows in connection tables respectively show kinds of connector/wires.

↔ : Wire

⇔ : Flat wire

↔ : Board to Board connector

[Example]

CONN. No.	CONNECTOR				Pin No.
①	DECK OPE ASSY	-	↔	AUDIO VF CN803	6

### 1.1.4 Disconnection of Connectors (Wires)

Connector

Pull both ends of the connector in the arrow direction, remove the lock and disconnect the flat wire.

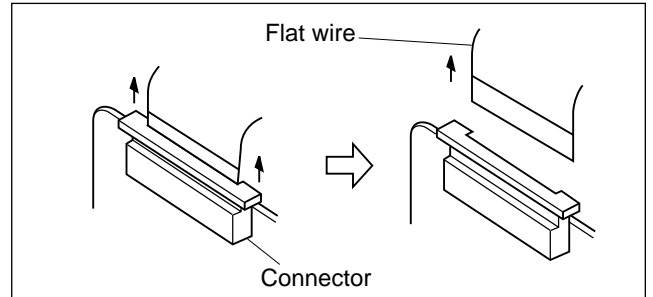


Fig. 1-1-1 Connector 1

Extend the locks in the direction of the arrow for unlocking and then pull out the wire. After removing the wire, immediately restore the locks to their original positions because the locks are apt to come off the connector.

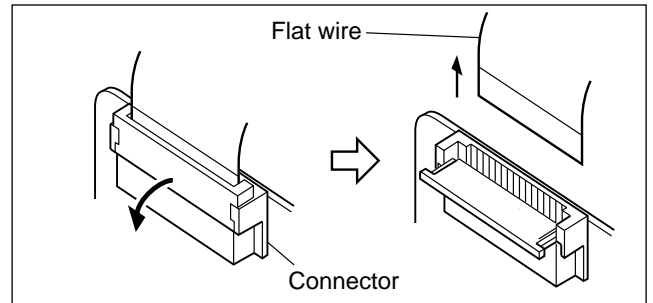


Fig. 1-1-2 Connector 2

B-B connector

Pull the board by both the sides in the direction of the arrow for disconnecting the B-B connector

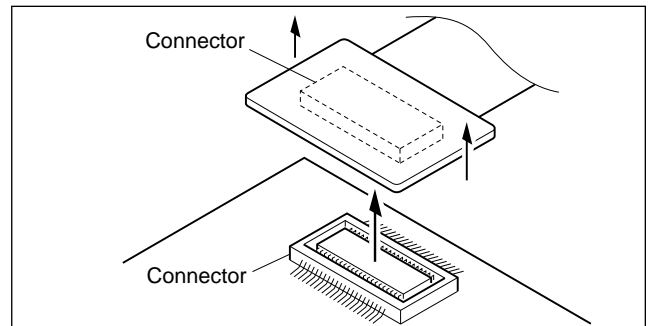


Fig. 1-1-3 Connector 3

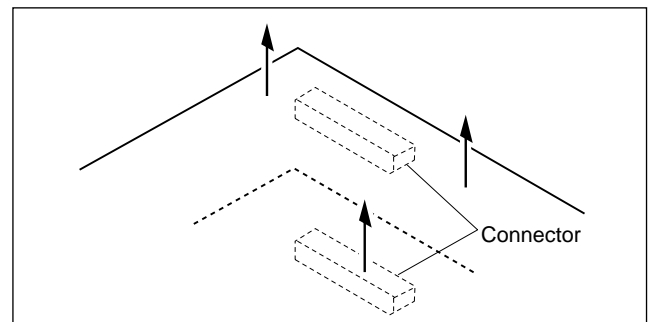


Fig. 1-1-4 Connector 4

## 1.2 JIGS AND TOOLS REQUIRED FOR DISASSEMBLY, ASSEMBLY AND ADJUSTMENT

### 1.2.1 Tools required for adjustments

1	Torque Driver YTU94088	2	Bit YTU94088-003	3	Tweezers P-895	4	Chip IC Replacement Jig PTS40844-2
							
5	Connector Extractor YTU94036A	6	Guide Driver YTU94148A	7	Adjustment Driver YTU94028	8	Slit Washer Installation Jig YTU94121A
							
9	Power Supply Jig YTU94060A	10	Jig Connector Cable YTU93091B	11	Extension connector YTU94145A	12	PC Cable QAM0099-002
							
13	Alignment Tape MC-2	14	Service Support System YTU94057-48	15	INF Adjustment Lens YTU92001B	16	INF Adjustment Lens Holder YTU94087
							
17	Camera Stand YTU93079	18	Light box Assembly YTU93096A	19	Gray Scale Chart YTU94133A	20	Color Bar Chart YTU94133C
							
21	Soldering Kit YTU96016C	22	Cleaning Cloth KSMM-01				
							

Table 1-2-1

Table 1-2-1

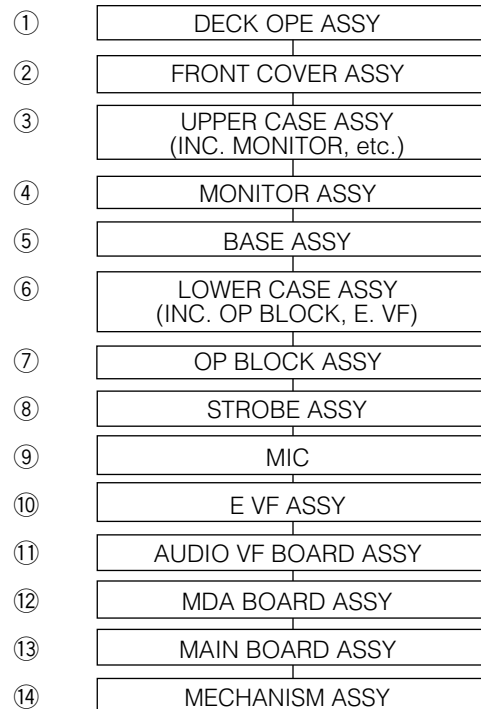
1. Torque driver  
Be sure to use to fastening the mechanism and exterior parts because those parts must strictly be controlled for tightening torque.
2. Bit  
This bit is slightly longer than those set in conventional torque drivers.
3. Tweezers  
To be used for removing and installing parts and wires.
4. Chip IC replacement jig  
To be used for adjustment of the camera system.
5. Connector extractor  
To be used to release the connector.
6. Guide driver  
To be used to turn the guide roller to adjustment of the linearity of playback envelope.
7. Adjustment driver  
To be used for adjustment.

8. Slit washer installation jig  
To be used to install slit washers.
9. Power supply jig  
To be used for power supply to the set when the exclusive DC power cord is not used. Carefully use this jig, especially not to damage the battery terminal (+/-).
10. Jig connector cable  
Connected to CN1010 of the main board and used for electrical adjustment, etc.
11. Extension connector  
Connect this extension connector to the connector of the jig connector cable for extending the cable connector.  
**Note:** *For supplying the power through the coupler by removing the cover (for jig), use this extension connector double for connecting the jig connector cable.*
12. PC cable  
To be used to connect the VideoMovie and a personal computer with each other when a personal computer is used for adjustment.
13. Alignment tape  
To be used for check and adjustment of interchangeability of the mechanism.
14. Service support system  
To be used for adjustment with a personal computer.
15. INF adjustment lens  
To be used for adjustment of the camera system.
16. INF adjustment lens holder  
To be used together with the camera stand for operating the VideoMovie in the stripped-down condition such as the status without the exterior parts or for using commodities that are not yet conformable to the interchangeable ring.
17. Camera stand  
To be used together with the INF adjustment lens holder.
18. Light box assembly  
To be used for adjustment of the camera system.
19. Gray scale chart (for Light box assembly)  
To be used for adjustment of the camera system.
20. Color bar chart (for Light box assembly)  
To be used for adjustment of the camera system.
21. Soldering kit  
Thin head is made so that it can be inserted into small spaces.
22. Cleaning cloth  
Recommended cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.

### 1.3 DISASSEMBLY/ASSEMBLY OF CABINET PARTS AND BOARD ASSEMBLY

#### 1.3.1 Disassembly flow chart

This flowchart indicates the disassembly step for the cabinet parts and board assembly in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in reverse order.



### 1.3.2 Disassembly method (I)

STEP No.	PART	Fig No.	POINT	NOTE
①	DECK OPE ASSY	Fig. 1-3-1	2(S①), (L①) ☆CN ①	—
②	FRONT COVER ASSY		(S②a), (S②b), 2(S②c), (S②d) (S②e), (S②f), (L②) COVER (DV), STUD (HOOK) ☆CN ②	—
③	U. CASE ASSY (Inc. MONITOR ASSY)	Fig. 1-3-2a	2(S③a), (S③b), 2(S③c), 3(S③d) LOCK (MONITOR) ☆CN ③, ④, ⑤ (CN ③ : DVX9,10 ONLY)	NOTE③a NOTE③b
④	MONITOR ASSY	Fig. 1-3-2b	(S④a), (S④b)	NOTE④
⑤	BASE ASSY	Fig. 1-3-3	(S⑤a), (S⑤b), (S⑤c) ☆CN ⑥	—
⑥	L. CASE ASSY	Fig. 1-3-4	6(S⑥) ☆CN ⑦, ⑧, ⑨, ⑪, ⑫, ⑬, ⑭, ⑮ (CN ⑥, ⑫ : DVX9,10 ONLY)	NOTE⑥a NOTE⑥b NOTE⑥c
⑦	OP BLOCK ASSY	Fig. 1-3-5	(S⑦)	NOTE⑦a NOTE⑦b
⑧	STROBE ASSY (DVX9,10 ONLY)	Fig. 1-3-6	(S⑧)	NOTE⑧
⑨	MIC	Fig. 1-3-7	(L⑨) ☆CN ⑩	NOTE⑨
⑩	E VF ASSY	Fig. 1-3-8	(S⑩a), (S⑩b), (S⑩c), 2(L⑩a) (L⑩b), BRACKET (TOP) ☆CN ⑪	NOTE⑩a NOTE⑩b NOTE⑩c
⑪	AUDIO VF BOARD ASSY	Fig. 1-3-9	2(S⑪a), (S⑪b), 2(L⑪) ☆CN ⑫	—
⑫	MDA BOARD ASSY	Fig. 1-3-10	(S⑫) ☆CN ⑬, ⑭, ⑮, ⑯, ⑰	NOTE⑫a NOTE⑫b
⑬	MAIN BOARD ASSY		(S⑬a), (S⑬b), (L⑬) SHIELD PLATE ☆CN ⑱, ⑲	NOTE⑬
⑭	MECHANISM ASSY		2(S⑭a), (S⑭b), 2(L⑭) BRACKET (MECHA)	—

Table 1-3-2

CONN. No.	CONNECTOR				Pin No.
①	DECK OPE ASSY	—	⇔	AUDIO VF CN803	6
②	JACK	CN901	⇔	MAIN CN1008	16
③	MDA	CN207	⇔	SUB OPE ASSY —	7
④	MAIN	CN1004	↔	W/B SENS —	3
⑤	MAIN	CN1007	⇔	MONITOR CN7501	45/39
⑥	MAIN	CN1014	⇔	MULTI PIN —	33
⑦	MDA	CN208	⇔	MMC CN601	14
⑧	MDA	CN205	⇔	OP BLOCK ASSY —	24
⑨	MAIN	CN1009	↔	EJECT SW —	2
⑩	MAIN	CN1011	⇔	STROBE CN6501	12
⑪	MAIN	CN1003	⇔	CCD —	20
⑫	MAIN	CN1016	↔	AUDIO VF CN801	100
⑬	MAIN	CN1017	↔	CCD CN5203	2
⑭	AUDIO VF	CN804	↔	MIC —	5
⑮	VF BL	CN501	⇔	AUDIO VF CN805	20
⑯	AUDIO VF	CN802	↔	CAMERA OPE UNIT —	12
⑰	MAIN	CN1002	↔	MDA CN206	80
⑱	MDA	CN202	⇔	DRUM MOTOR —	11
⑲	MDA	CN201	⇔	LOADING MOTOTR —	6
⑳	MDA	CN203	⇔	CAPSTAN MOTOR —	18
㉑	MDA	CN204	⇔	SENSOR —	15
㉒	MAIN	CN1005	⇔	ROTARY ENCODER —	6
㉓	MAIN	CN1001	⇔	HEAD —	8

Table 1-3-3

**Note③a:** When removing, be careful not to break the wire.

**Note③b:** When removing, be careful not to damage any part.  
On removing, slightly open the front side so as to shift it from the frame.

**Note④:** For disassembling method, refer to Fig. 1-4-1.

**Note⑥a:** When removing, be careful not to break the wire.

**Note⑥b:** Remove the board assembly (MAIN/MDA) and mechanism assembly together.

**Note⑥c:** When installing, arrange the wire between the OP block assembly and VF assembly.

**Note⑦a:** When removing, be careful neither to break the wire nor to damage any part.

**Note⑦b:** For disassembling method, refer to Fig. 1-6-1.

**Note⑧:** Be careful not to get an electric shock during the work.

**Note⑨:** When reassembling, carefully arrange the wire.

**Note⑩a:** When disassembling/reassembling, be careful not to damage any part.

**Note⑩b:** When reassembling, set the bracket (top) as the VF unit is pulled out, and secure the installation in order of (L⑩a) and (L⑩b).

**Note⑩c:** For disassembling method, refer to Fig. 1-5-1.

**Note⑫a:** When disconnecting the connector, carefully handle the FPC on the top of the connector.

**Note⑫b:** Disconnect the connector ⑮ last, because it is positioned inside.

**Note⑬:** When reassembling, carefully locate the FPC so that it is sandwiched between the mechanism assembly and MAIN board assembly.



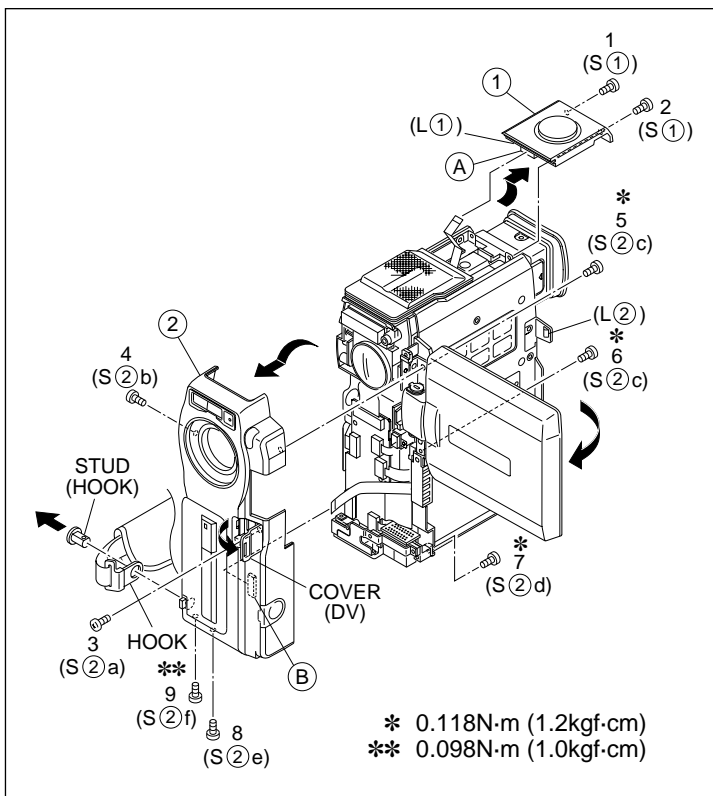


Fig. 1-3-1

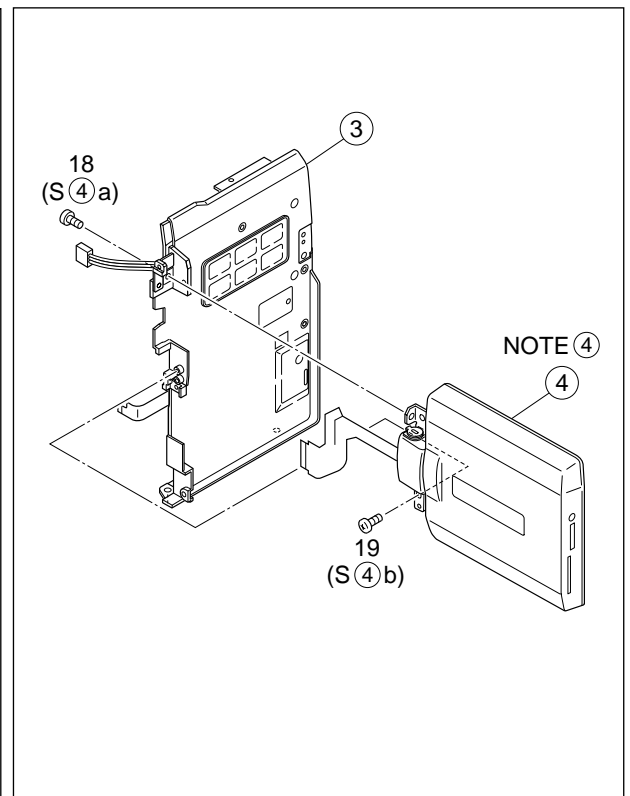


Fig. 1-3-2b

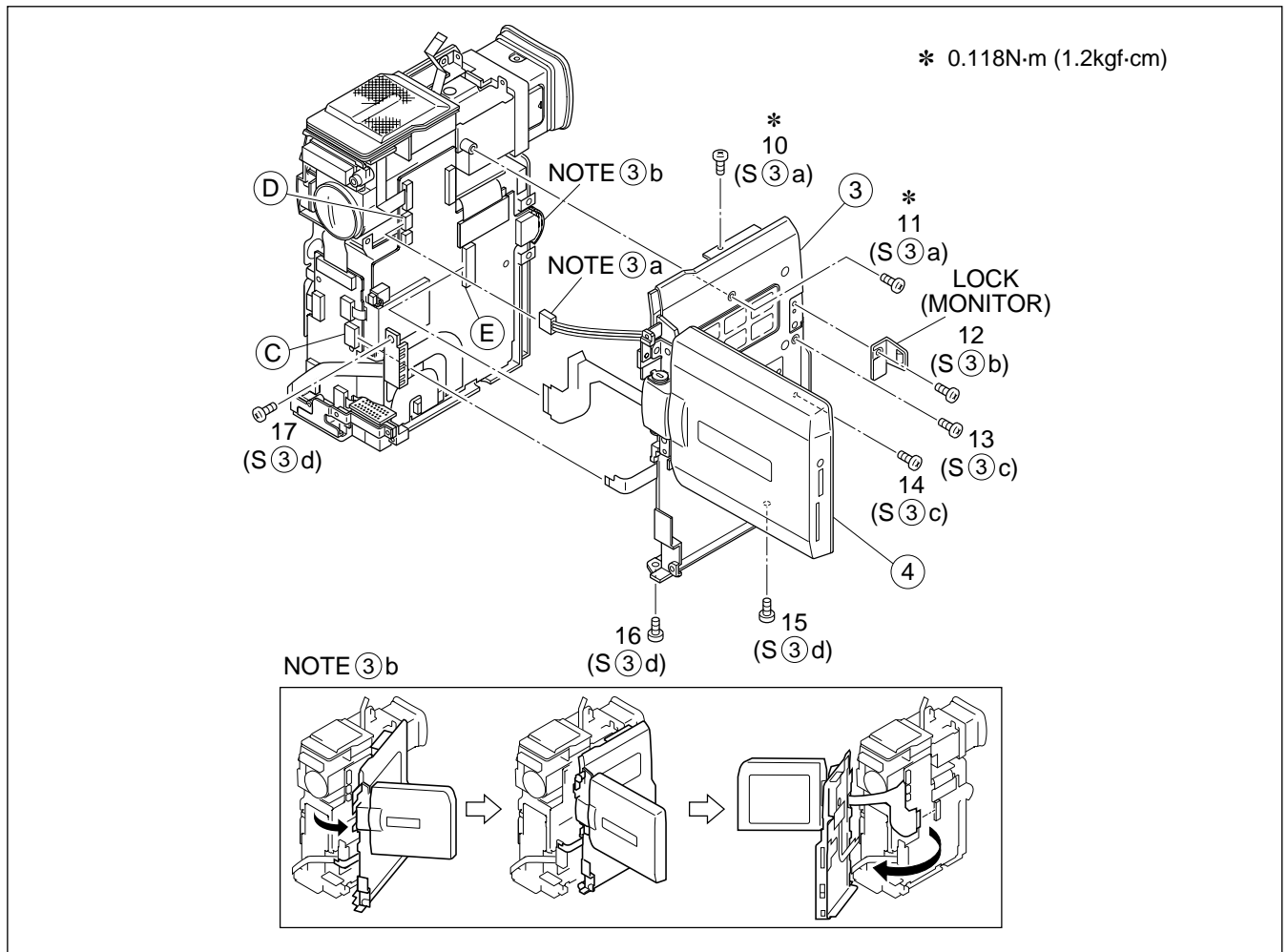


Fig. 1-3-2a

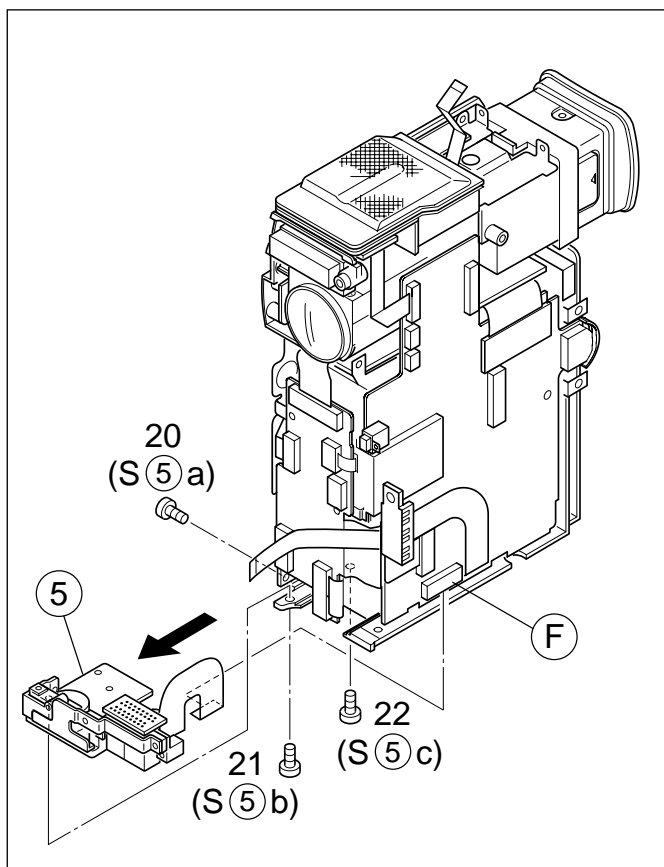


Fig. 1-3-3

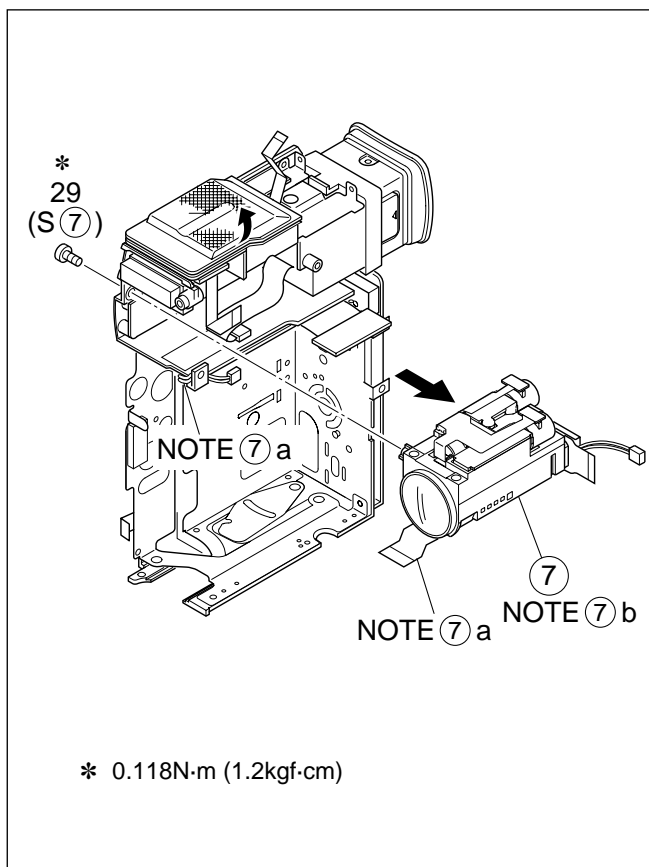


Fig. 1-3-5

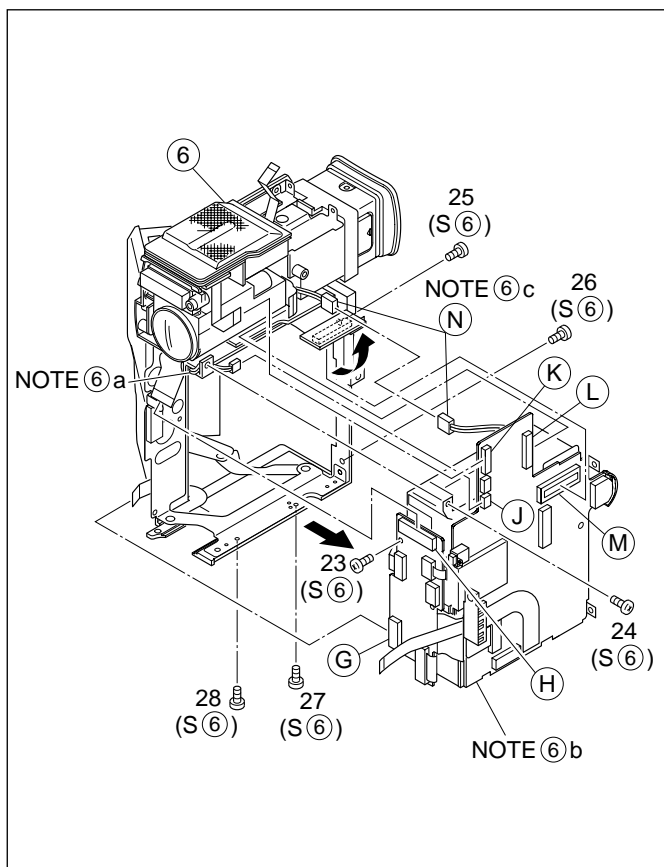


Fig. 1-3-4

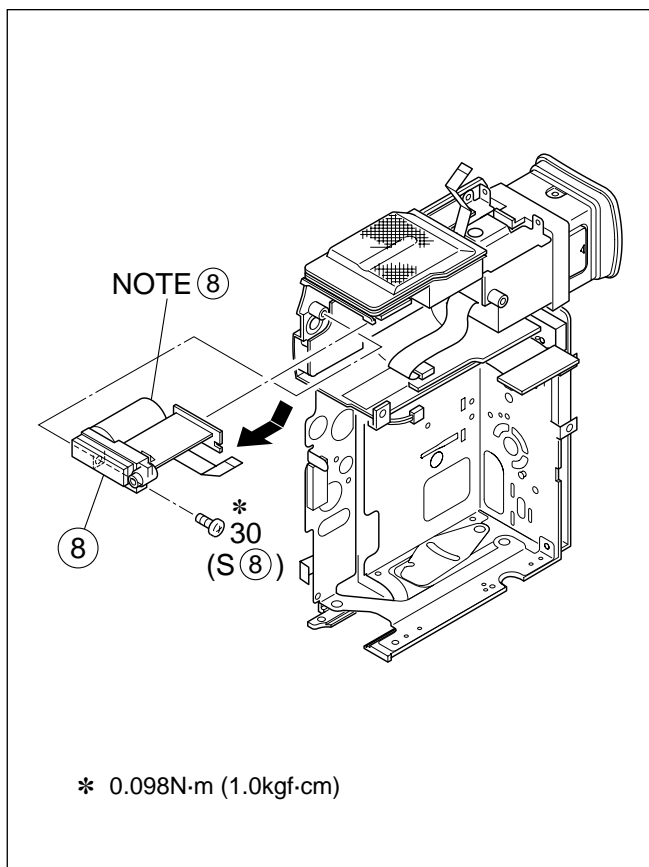


Fig. 1-3-6

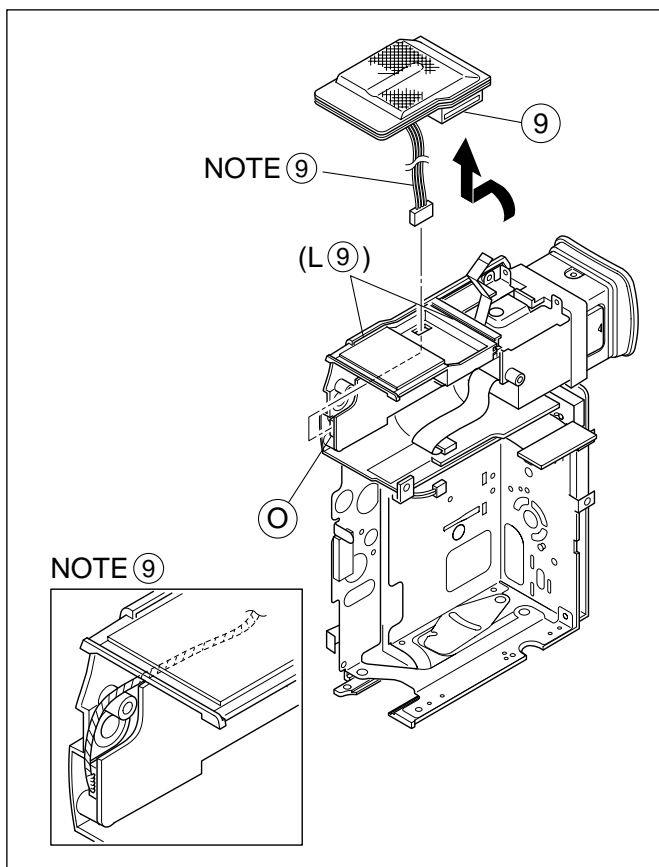


Fig. 1-3-7

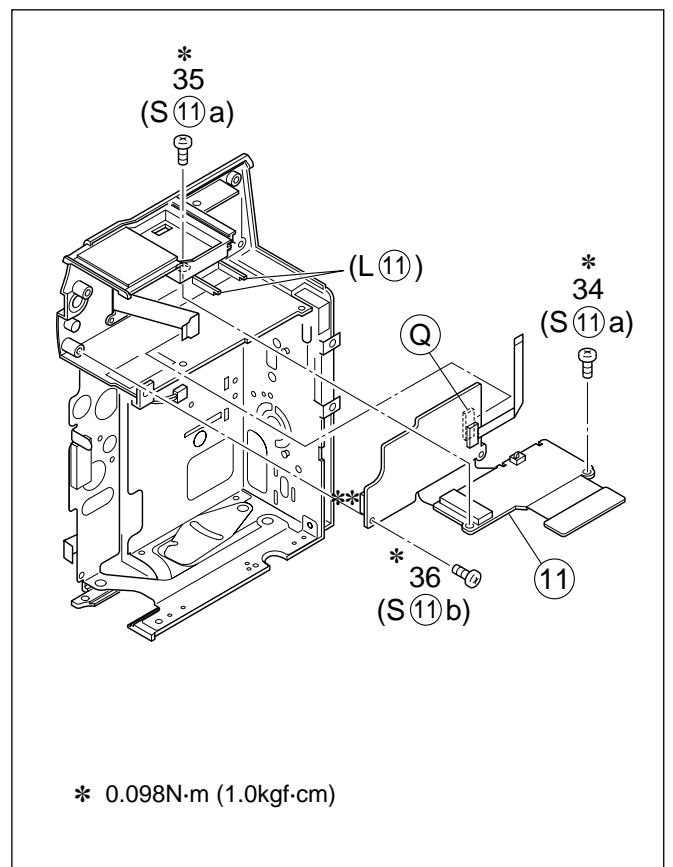


Fig. 1-3-9

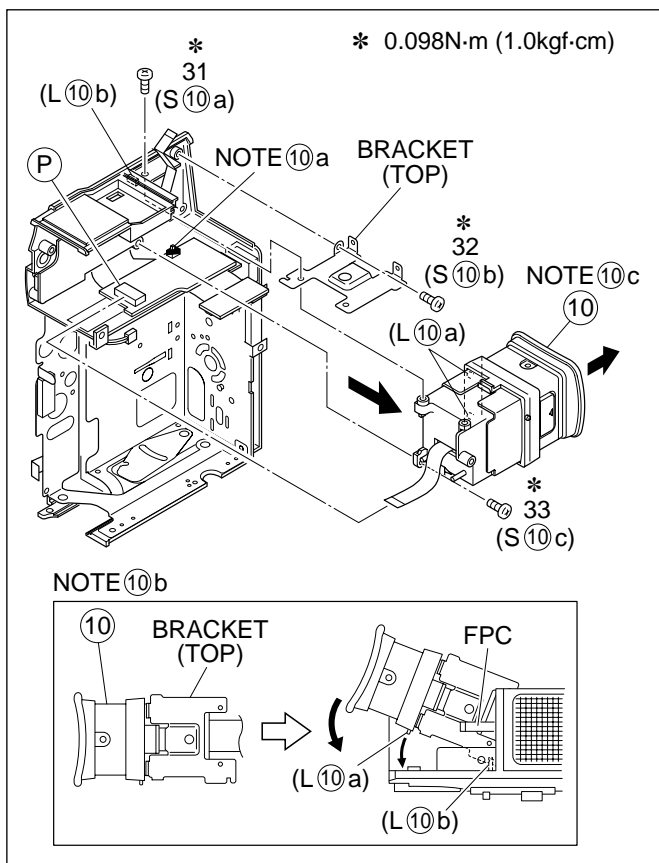


Fig. 1-3-8

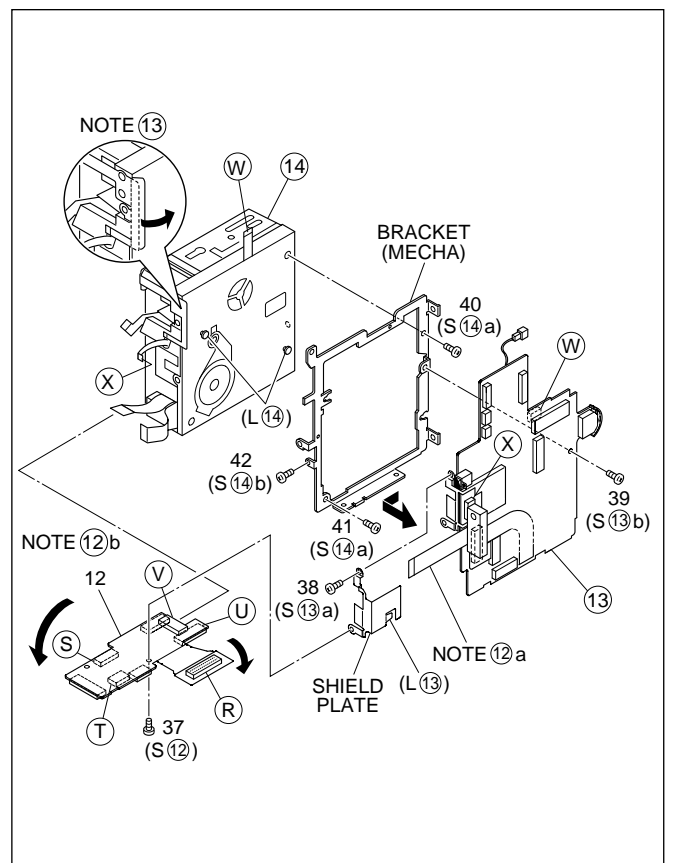


Fig. 1-3-10

## 1.4 DISASSEMBLY OF ④ MONITOR ASSEMBLY

### 1.4.1 ④ Monitor assembly/Hinge assembly

1. Remove the four screws (1-4). While opening the monitor cover assembly as shown by the arrow, release the two hooks (L④a, L④b) from engagement and remove the monitor cover assembly.
2. Remove the parts out of the monitor case assembly and unlock the connector (Y). While raising the hinge assembly upwards, get the two hooks (L④c, L④d) disengaged and disconnect the FPC by pulling it out. Then, remove the hinge assembly.

**Note④a:** When removing the parts out of the monitor case assembly, be very careful not to damage the FPC and parts.

3. Disconnect FPC from the connector (Z) and then remove the MONITOR board assembly and backlight.

**Note④b:** Remove the MONITOR board assembly and backlight together unless it is needed to separate them from each other for part replacement, etc., because the two are soldered to each other.

4. Remove the LCD module.

### 1.4.2 Hinge assembly

1. Remove the two screws (5, 6). While releasing the two hooks (L④f, L④g) from engagement, remove the hinge cover (U).

**Note④c:** Be careful not to lose any part during the above-mentioned process.

2. Draw the FPC assembly out of the hinge cover (L) and then remove the FPC assembly from the hinge assembly.

**Note④d:** When reassembling, wind the FPC assembly around the hinge assembly by three turns and a half.

Be careful not to break the FPC wire during the work.

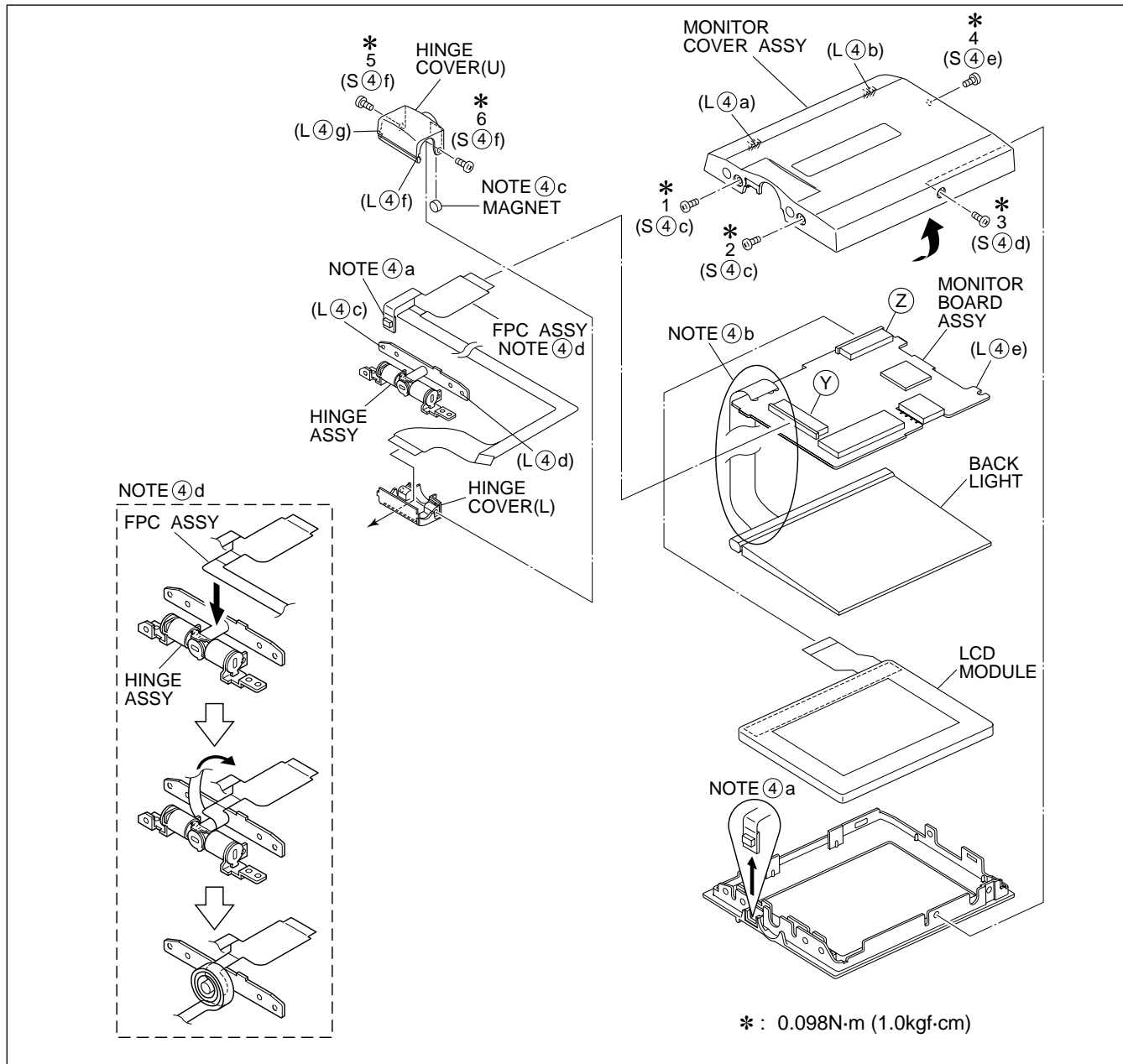


Fig. 1-4-1

## 1.5 DISASSEMBLY OF ⑩ E VF ASSEMBLY

### 1.5.1 ⑩ E VF assembly

**Note⑤a:** When disassembling the E VF assembly, remove the frame (VF) from the case assembly depending on the situation.

**Note⑤b:** Be very careful not to get the inside of the VF soiled or dusty during and after disassembling the E VF assembly.

**Note⑤c:** After the screw having the loose-proof tip was once removed from the E VF assembly, don't reuse it.

1. Remove the eyecup and pull out the guide (VF).
2. Draw the frame (VF) out of the case assembly.

#### <Case assembly>

3. Remove the screw (1) first and then lever (VF).
4. Remove the three screws (2-4) and draw out the eyepiece

sub assembly.

#### <Frame (VF)>

5. Remove the screw (5) first and then LCD module/holder (LCD).

**Note⑤d:** Pay heed to the FFC not to damage it during the removing work.

6. Get the two hooks (L⑤a, L⑤b) disengaged and then remove the holder (LCD).

**Note⑤e:** Carefully proceed with the above-mentioned work not to damage any part.

7. Disconnect the connector (a) and remove the LCD module.

**Note⑤f:** Pay heed the parts not to damage any thing.

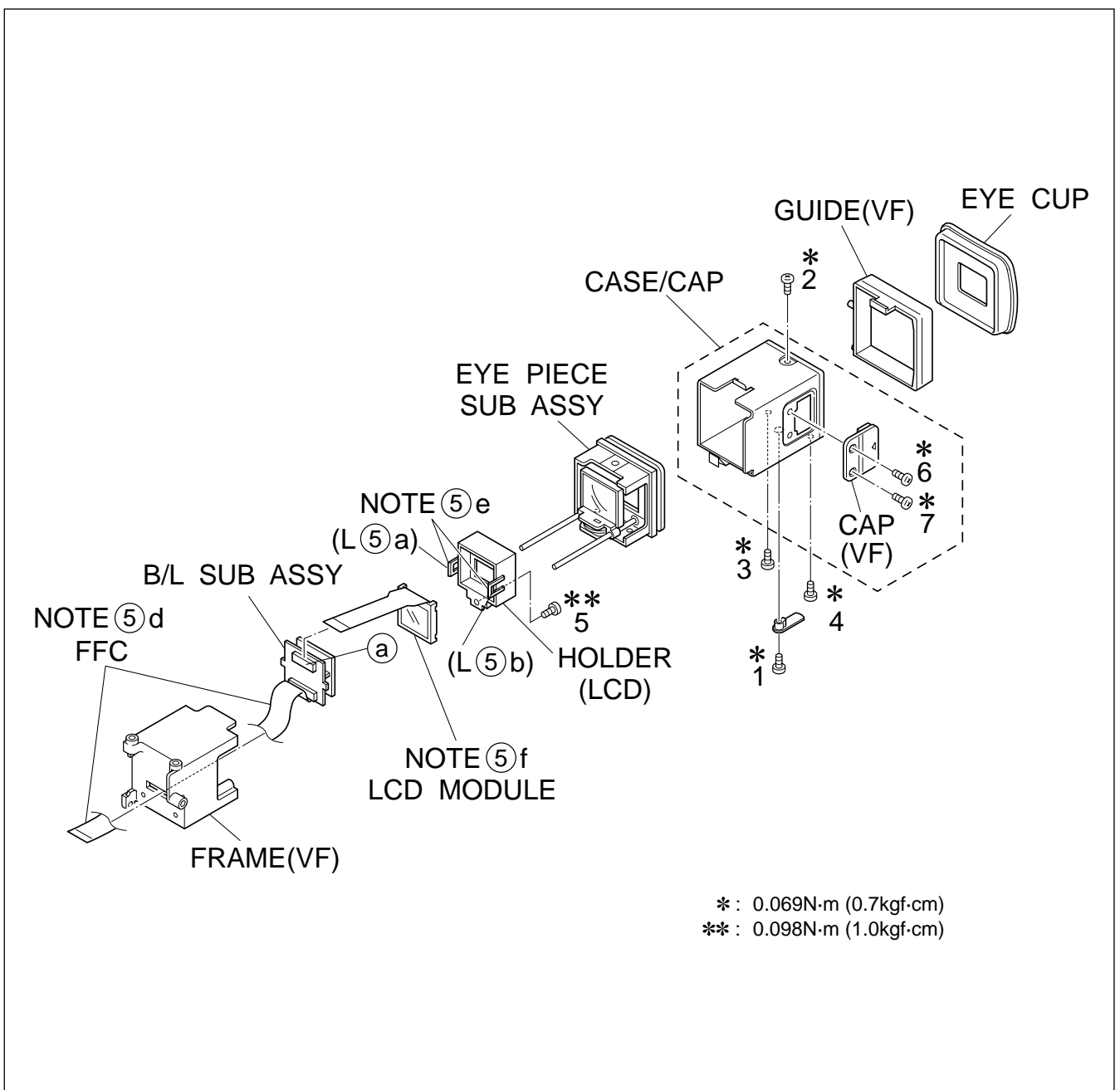


Fig. 1-5-1

## 1.6 DISASSEMBLY OF ⑦ OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY

### 1.6.1 Precautions

1. Carefully handle the CCD image sensor, optical LPF, lens, etc. during the disassembly work. Pay the most careful attention to the surface of those parts not to get it soiled, scratched or dusty. If some of those surfaces gets soiled with fingerprints, etc., wipe it out with silicone paper, clean chamois, cleaning cloth or the like.
2. The new CCD image sensor is occasionally shipped from the factory as a protection seal is applied onto its transparent glass. If so, leave the protection seal as it is and remove it just before installing the CCD image sensor in the OP block assembly.

### 1.6.2 How to remove OP block assembly and CCD board assembly

1. Unsolder at the two points (SD1) and remove the shield case.
2. Unsolder at the sixteen points (SD2) and remove the CCD board assembly.
3. Remove the two screws (1, 2) and then remove the CCD base assembly.

**Note⑥a:** Carefully remove the CCD base assembly, because the space rubber and optical LPF may be removed together with the CCD image sensor.

**Note⑥b:** When replacing the CCD image sensor, don't replace it individually but replace the CCD base assembly in whole with a new one.

### 1.6.3 How to install OP block assembly and CCD board assembly

1. Install the optical LPF with the space rubber fitted to its CCD side in the OP block assembly.
2. Paying heed to the space rubber not to get it to come off the setting position, install the CCD base assembly in place and fasten it together with the space rubber with the two screws (1, 2).
3. Set the CCD board assembly in the CCD base assembly, and fasten it by soldering at the fourteen points (SD2).
4. Install the shield case and fasten it by soldering at the two points (SD1).

### 1.6.4 Replacement of service parts

Service parts to be supplied for the OP block assembly are as follows.

When replacing a part, be very careful not to get the FPC wire broken or damaged by soldering (overheating).

1. Focus motor
2. Zoom motor
3. Iris motor unit

**Note⑥c:** When soldering the FPC wire of the focus motor or zoom motor during the replacement work, be sure to keep the tip of a soldering iron approximately 1 mm above the terminal.

**Note⑥d:** The iris motor unit includes one FPC assembly and two sensors.

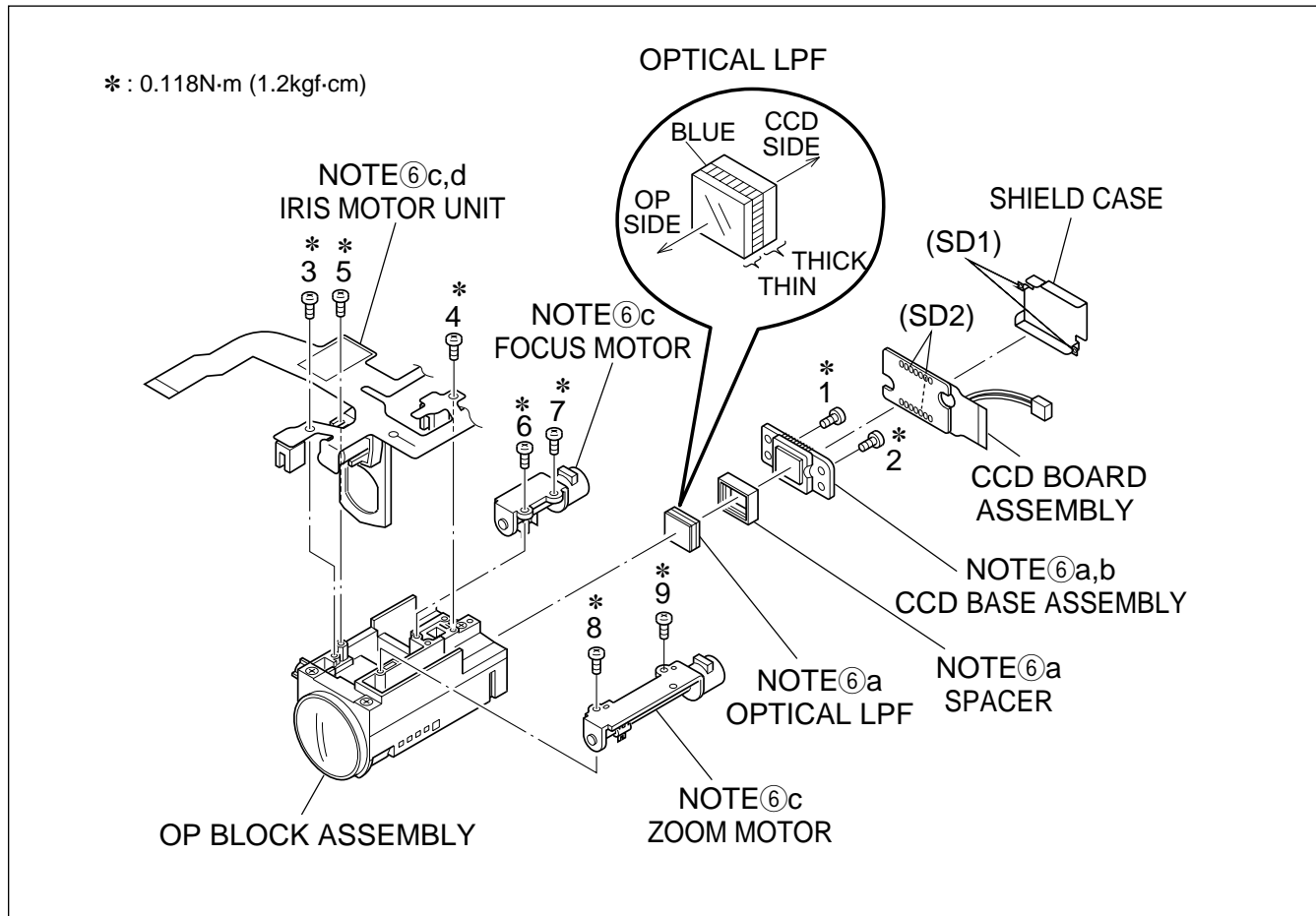


Fig. 1-6-1

## 1.7 HOW TO TAKE OUT CASSETTE TAPE MANUALLY

### 1.7.1 How to remove cassette tape manually from the set

If the cassette tape is not ejected from the cassette housing because of some electric trouble, it can be removed from the set by the temporary measure that is to turn the loading motor forcibly as mentioned below.

Through the removing work, pay heed to the exterior parts such as the covers, etc. as well as to the cassette tape to get nothing damaged.

#### <Procedure>

1. Disconnect the power supply (battery or DC cord) from the set.
2. Dismantle the deck ope assy, front cover assembly referring to the section 1 (page 1-4, 1-5).

**Note:** *When and after dismantling the front assembly, pay careful attention to the internal components such as the OP block assembly (lens), battery terminal, etc. that are exposed after the front assembly is removed.*

3. Open the cassette cover assembly completely and hold it open through the work.
4. Supply 3 V DC to the terminals (electrodes) on the top of the loading motor to slide the slide deck assembly to the front side, and stop the power supply when both the pole bases are positioned in the unloading status inside the tape. Since the tape remains as it is not wound up at that time, pay careful attention to the tape

not to damage it and not to soil it with grease, etc. If unloading operation is continued after both the pole bases return to their respective positions inside the tape, the mechanism enters the eject mode and the cassette housing assembly is lifted up. If it occurs, the pulled-out tape may be caught in the cassette lid and the tape may be resultingly damaged.

5. Turn the center gear assembly with a sharp-pointed thing (chip IC replacing jig, etc.) in the direction of the arrow to wind up the tape. Carefully turn the center gear assembly not to damage the tape.

If the tape cannot be wound up by turning the center gear assembly, it is thinkable that the idler arm assembly is positioned not to engage with the reel disk assembly. If so, shift the mechanism mode so that the idler arm assembly is correctly engaged with the reel disk assembly. After fine adjusting the engagement, try to wind up the tape in the same manner once more.

In such the event, it is recommended to shift the idler arm assembly slightly in the loading direction.

6. After confirming that the tape is completely wound up, proceed with unloading operation until the mechanism enters the eject mode. Then, take the cassette tape out of the cassette housing.
7. After removing the cassette tape, check to see if the manually wound part of the tape is not soiled with grease, etc. At the same time, check the mechanism assembly, particularly the tape transport system, whether there is something abnormal or not.

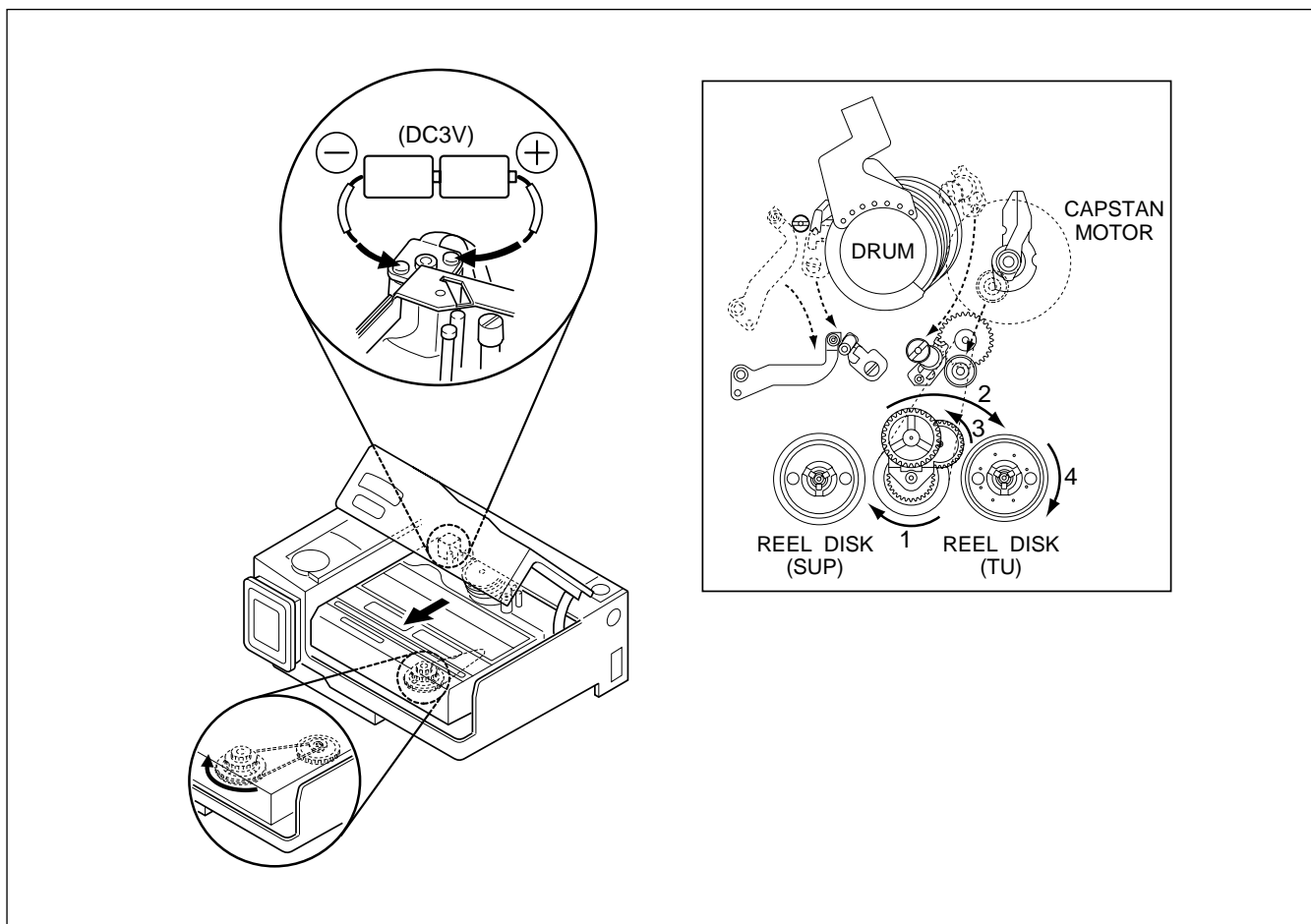


Fig. 1-7-1

Symbol No.	→	①	②							③							④		⑤									
Removing order of screw	→	1	2	3	4	5	6	7	8	9																		
Place to stick screw	→		*																		*	*						
Reference drawing	→	Fig. 1-3-1																			Fig. 1-3-2a					Fig. 1-3-2b		Fig. 1-3-3
Screw tightening torque	→	I	I	I	II	II	II	II	I	III	II	II	I	I	I	I	I	I	IV	I								

Symbol No.	→													
Removing order of screw	→	23	24	25	26	27	28	⑦	⑧	⑨	⑩	⑪	⑫	⑬
Place to stick screw	→													
Reference drawing	→	Fig. 1-3-4							Fig. 1-3-5	Fig. 1-3-6	Fig. 1-3-7	Fig. 1-3-8	Fig. 1-3-9	Fig. 1-3-10
Screw tightening torque	→	I							II	III	—	III	III	I

Symbol No.	→	⑭	
Removing order of screw	→	40	41 42
Place to stick screw	→		
Reference drawing	→	Fig. 1-3-10	
Screw tightening torque	→	I	

④ MONITOR ASSY	
1 2 3 4 5 6	→
* *	→
Fig. 1-4-1	→
III	→

⑦ OP BLOCK ASSY								
1	2	3	4	5	6	7	8	9
→	Removing order of screw							
→	Place to stick screw							
→	Reference drawing							
→	Screw tightening torque							
Fig. 1-6-1								
II								

⑩ E VF ASSY									
1	2	3	4	5	6	7			
→ Removing order of screw									
→ Place to stick screw									
→ Reference drawing									
→ Screw tightening torque									
V	V	V	V	V	III	V	V	V	V

^  
NOTE  
v

- |    |     |   |                            |
|----|-----|---|----------------------------|
| 1) | * : | Don't reuse the screw, because screw lock bond was applied to them. |                            |
| 2) |     | Pay careful attention to tightening torque for each screw.          |                            |
|    | I   | : 0.078N·m (0.8kgf·cm)  | II : 0.118N·m (1.2kgf·cm)  |
|    | IV  | : 0.198N·m (2.0kgf·cm)  | V : 0.069N·m (0.7kgf·cm)   |
|    |     |   | III : 0.098N·m (1.0kgf·cm) |

Table 1-8-1



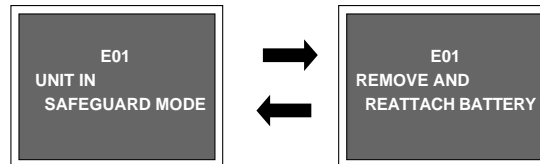
## 1.9 EMERGENCY DISPLAY

Whenever some abnormal signal is input to the syscon CPU, an error number (E01, as an example) is displayed on the LCD monitor or (in the electronic view finder).

In every error status, such the message as shown below alternately appear over and over.

- In an emergency mode, all operations except turning on/off the POWER switch are ineffectual.

Example (in case of the error number E01):



LCD display	Emergency mode	Details	Possible cause
E01	LOADING	In the case the encoder position is not shifted to the next point though the loading motor has rotated in the loading direction for 4 seconds or more. This error is defined as [E01].	<ol style="list-style-type: none"> <li>The mechanism is locked during mode shift.</li> <li>The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift.</li> <li>No power is supplied to the loading MDA.</li> </ol>
E02	UNLOADING	In the case the encoder position is not shifted to the next point though the loading motor has rotated in the unloading direction for 4 seconds or more. This error is defined as [E02].	<ol style="list-style-type: none"> <li>The mechanism is locked during mode shift.</li> <li>The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift.</li> </ol>
E03	TU & SUP REEL FG	In the case no REEL FG is produced for 4 seconds or more in the capstan rotation mode after loading was complete, the mechanism mode is shifted to STOP with the pinch roller set off. This error is defined as [E03]. However, no REEL EMG is detected in the SLOW/STILL mode.	<ol style="list-style-type: none"> <li>The idler gear does not engage with the reel disk well.</li> <li>Though the idler gear and reel disk are engaged with each other, the tape is not wound because of overload to the mechanism.</li> <li>No FG pulse is output from the reel sensor.</li> <li>No power is supplied to the reel sensor.</li> <li>Tape transport operation takes place with a cassette having no tape inside.</li> <li>The tape slackens and no pulse is produced until the slack is taken up and the tape comes into the normal status.</li> </ol>
E04	DRUM FG	In the case there is no DRUM FG input in the drum rotation mode for 4 seconds or more. This error is defined as [E04], and the mechanism mode is shifted to STOP with the pinch roller set off.	<ol style="list-style-type: none"> <li>The drum cannot be started or drum rotation is stopped because tape transport load is too high.               <ol style="list-style-type: none"> <li>Tape tension is extremely high.</li> <li>The tape is damaged or soiled with grease, etc.</li> </ol> </li> <li>The DRUM FG signal is not received by the syscon CPU.               <ol style="list-style-type: none"> <li>Disconnection in the middle of the signal line.</li> <li>Failure of the DRUM FG pulse generator (hall element).</li> </ol> </li> <li>No drum control voltage is supplied to the MDA.</li> <li>No power is supplied to the DRUM MDA.</li> </ol>
E05	—	—	—
E06	CAPSTAN FG	In the case no CAPSTAN FG is produced in the capstan rotation mode for 2 seconds or more. This error is defined as [E06], and the mechanism mode is shifted to STOP with the pinch roller set off. However, no CAPSTAN EMG is detected in the STILL/FF/REW mode.	<ol style="list-style-type: none"> <li>The CAPSTAN FG signal is not received by the syscon CPU.               <ol style="list-style-type: none"> <li>Disconnection in the middle of the signal line.</li> <li>Failure of the CAPSTAN FG pulse generator (MR element).</li> </ol> </li> <li>No capstan control voltage is supplied to the MDA.</li> <li>No power is supplied to the CAPSTAN MDA.</li> <li>The capstan cannot be started or capstan rotation is stopped because tape transport load is too high.               <ol style="list-style-type: none"> <li>Tape tension is extremely high. (Mechanical locking)</li> <li>The tape is damaged or soiled with grease, etc. (Tape tangling occurs, etc.)</li> </ol> </li> </ol>

(DVC\_03)

Table 1-9-1

## SECTION 2

### MECHANISM ADJUSTMENT

#### 2.1 PRELIMINARY REMARKS ON ADJUSTMENT AND REPAIR

##### 2.1.1 Precautions

1. When fastening parts, pay careful attention to the tightening torque of each screw. Unless otherwise specified, tighten a screw with the torque of 0.039 N·m (0.4 kgf·cm).
2. Be sure to disconnect the set from the power supply before fastening and soldering parts.
3. When disconnecting/connecting wires, be careful not to get them and their connectors damaged. (Refer to the Section 1.)
4. When replacing parts, be very careful neither to damage other parts nor to fit wrong parts by mistake.

##### 2.1.2 Notes on procedure for disassembly/assembly

The disassembling procedure table (Table 2-2-2 on page 2-5, a part of the table is shown below for reference) shows the procedure to disassemble/reassemble mechanism parts. Carefully read the following explanation before starting actual disassembling/reassembling work. The item numbers (circled numbers) in the following explanation correspond to those appearing under respective columns of the table.

- (1) Circled numbers appearing in this column indicate the order to remove parts. When reassembling, follow these numbers in the reverse order. Circled numbers in this column correspond to those appearing in drawings of this section.
- (2) This column shows part names corresponding to circled numbers in the left column.
- (3) The symbol (T or B) appearing in this column shows the side which the objective part is mounted on.  
T = the upper side, B = the lower side
- (4) Symbols appearing in this column indicate drawing numbers.

- (5) This column indicates parts and points such as screws, washers, springs, and others to be removed/fitted for disassembling/reassembling the mechanism. Besides such the parts, this column occasionally indicates working points.

P = Spring

W = Washer

S = Screw

\* = Lock (L), soldering (SD), shield, connector (CN), etc.

- Example
- Remove (W1) = Washer W1.
  - \* Remove the solder at (SD1) = Point SD1.
  - \* Disconnect (A) = Connector (A).

- (6) Numbers in this column represent the numbers of notes in the text. For example, "1" means "Note 1". (For parts that need phase adjustment after reassembling, refer to "2.2.7 Check and adjustment of mechanism phase".)

- (7) This column indicates required after-disassembling/-reassembling work such as phase adjustment or mechanism adjustment.

Step	Part Name		Fig.	Point	Note	Remarks
(A)	Cassette housing assembly	T	Fig. 2-2-12	3(S1),(L1a)-(L1d)	1a, 1b, 1c, 1d	Adjustment
(2a)	Reel disk (SUP) assembly	T	Fig. 2-2-13	(W2)	2a, 2b	
(2b)	Reel disk (TU) assembly	T	Fig. 2-2-13	(W2)	2a, 2b	
(2c)	Reel cover assembly	T	Fig. 2-2-13	(S2b),2(S2a),(W2)	2c, 2d	
(3a)	Tension arm assembly	T	Fig. 2-2-14	(W3a)	3b	

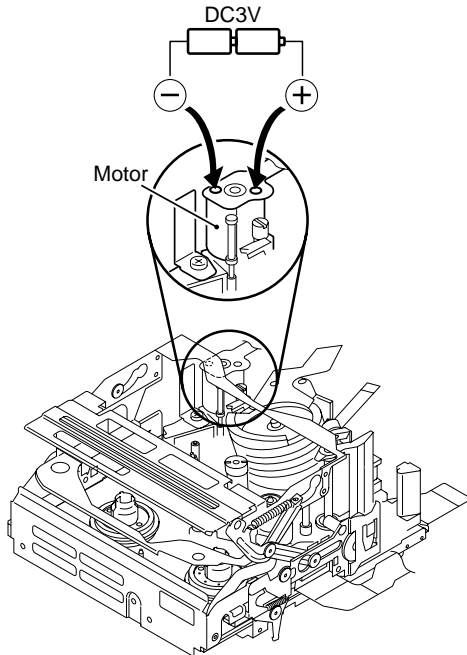
## 2.2 DISASSEMBLY/ASSEMBLY OF MECHANISM ASSEMBLY

### 2.2.1 General statement

The mechanism should generally be disassembled/assembled in the EJECT mode (ASSEMBLY mode). (Refer to Fig. 2-2-1.)

However, when the mechanism is removed from the main body, it is set in the STOP mode. Therefore, after the mechanism is removed from the main body, supply 3 V DC to the electrode on the top of the loading motor to enter the mechanism mode into the EJECT mode compulsory.

#### <Mechanism assembly/Cassette housing assembly>



#### <Back side of the mechanism assembly>

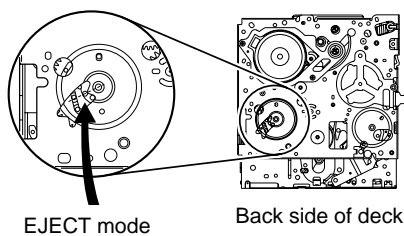


Fig. 2-2-1

### 2.2.2 Explanation of mechanism mode

The mechanism mode of this model is classified into six modes as shown in Table 2-2-1. Each mechanism mode can be distinguished from others by the relative position of "○" mark on the sub cam gear to the inner or outer protrusion on the main deck.

Refer to Fig. 2-2-2 to 2-2-7 below.

The EJECT mode, C IN mode and SHORT FF mode should be recognized by the relative position of the "○" mark to the inner protrusion, while the STOP mode, REV mode and PLAY mode should be recognized by that to the outer protrusion.

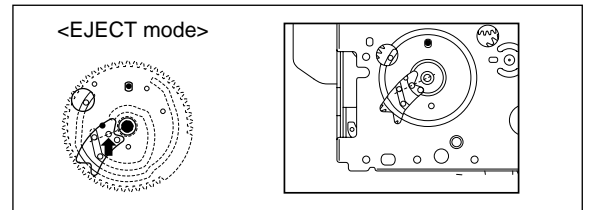
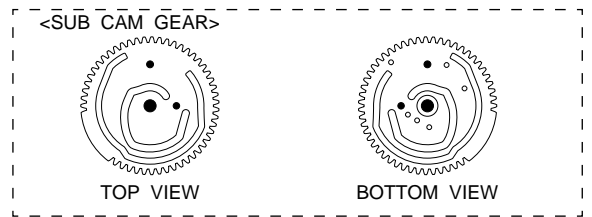


Fig. 2-2-2

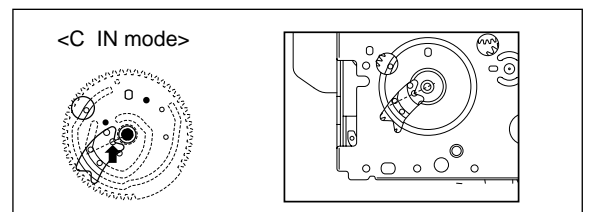


Fig. 2-2-3

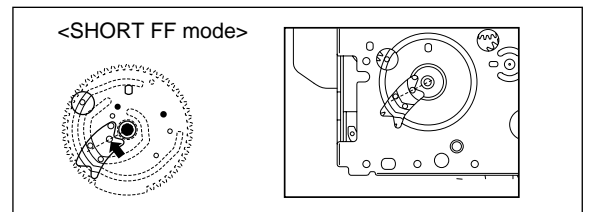


Fig. 2-2-4

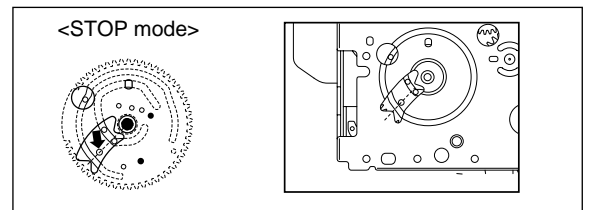


Fig. 2-2-5

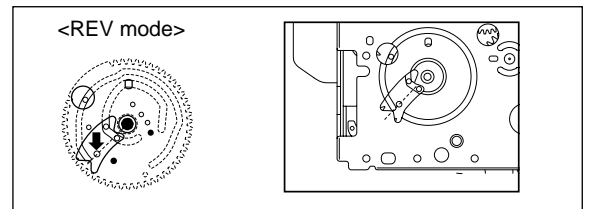


Fig. 2-2-6

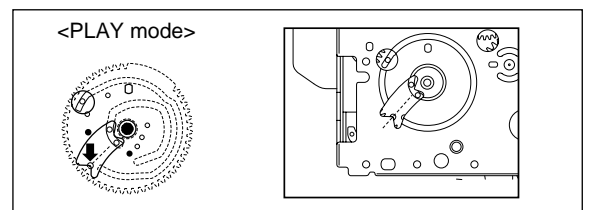


Fig. 2-2-7

2.2.3 Mechanism timing chart

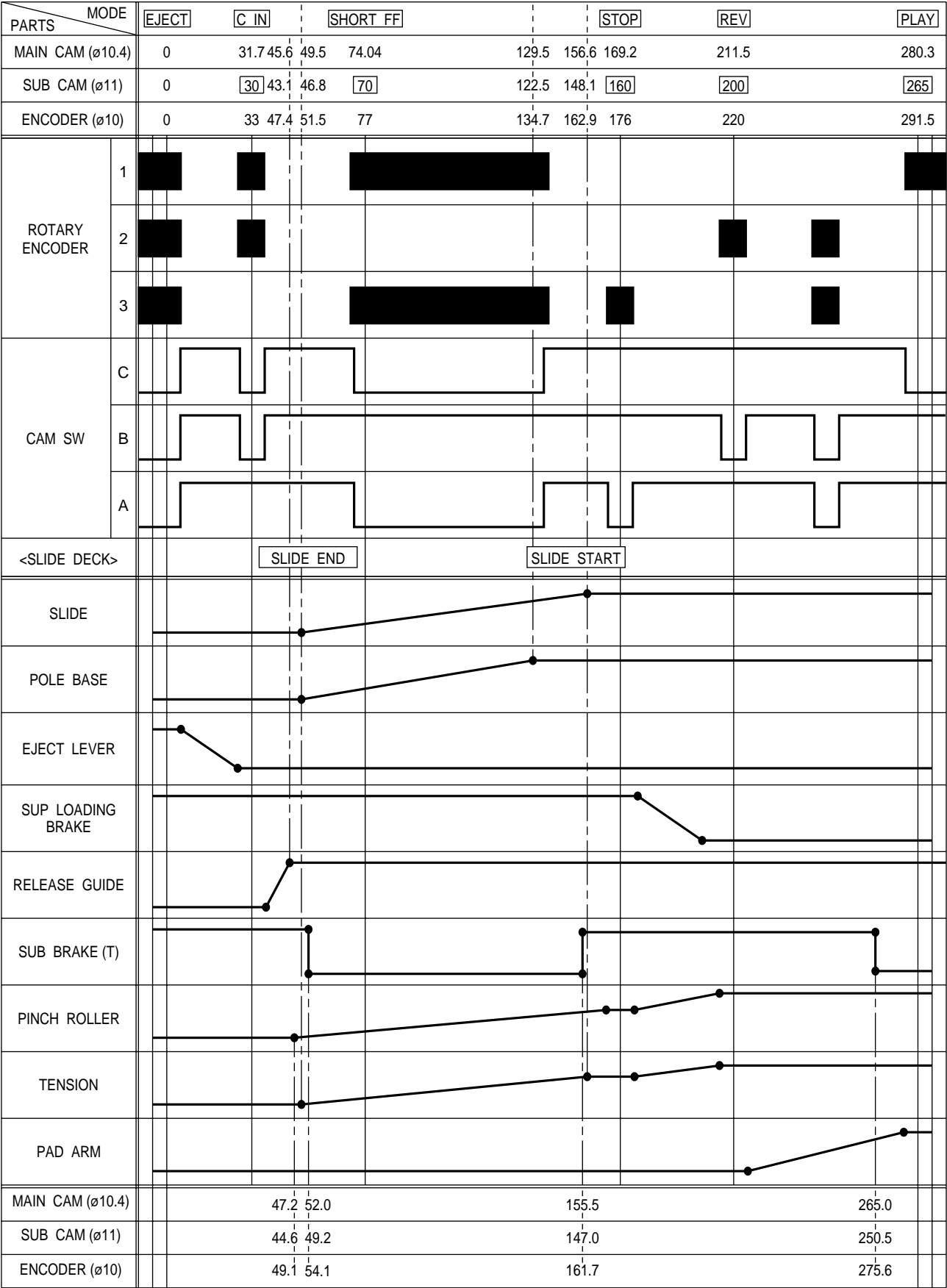


Table 2-2-1

## 2.2.4 Disassembly/assembly of mechanism assembly

### 1. Configuration

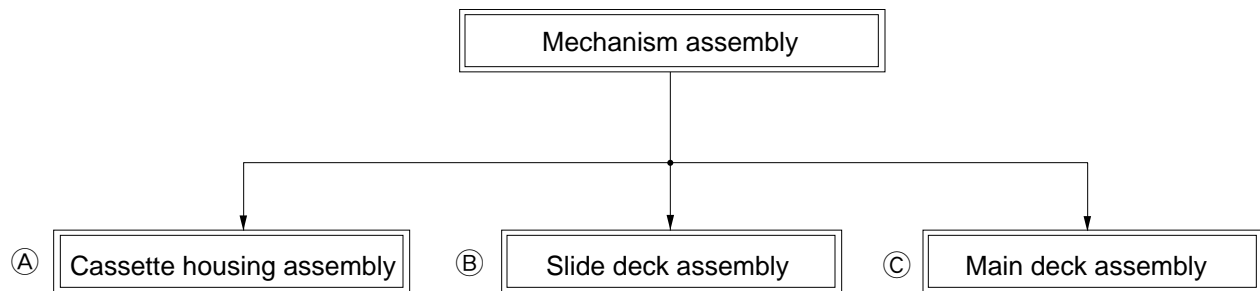


Fig. 2-2-8

### 2. Procedures for disassembly

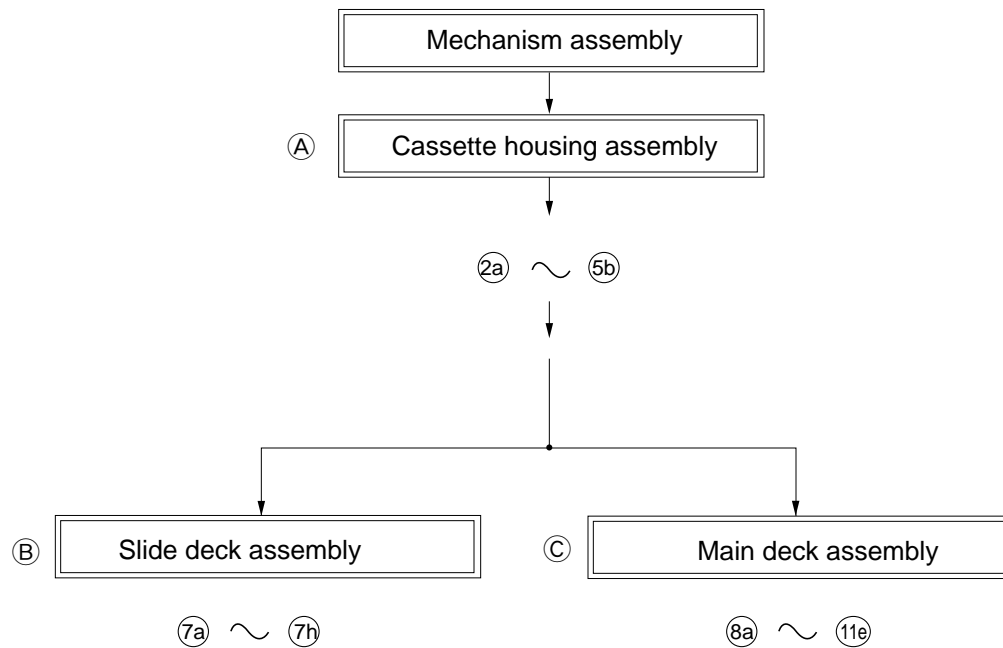


Fig. 2-2-9

### 3. Disassembling procedure table

Step	Part Name		Fig.	Point	Note	Remarks
①A	Cassette housing assembly	T	Fig. 2-2-12	3(S1),(L1a)-(L1d)	1a, 1b, 1c, 1d	Adjustment
②a	Reel disk (SUP) assembly	T	Fig. 2-2-13	(W2)	2a, 2b	
②b	Reel disk (TU) assembly	T	Fig. 2-2-13	(W2)	2a, 2b	
②c	Reel cover assembly	T	Fig. 2-2-13	(S2b),2(S2a),(W2)	2c, 2d	
③a	Tension arm assembly	T	Fig. 2-2-14	(W3a)	3b	
③b	Release guide assembly	T	Fig. 2-2-14	-	3a	
③c	Idler arm assembly	T	Fig. 2-2-14	(W3b)	-	
③d	Guide arm assembly	T	Fig. 2-2-14	-	3a	
③e	Pinch roller arm assembly	T	Fig. 2-2-14	(W3a)	-	
④a	Cleaner arm assembly	T	Fig. 2-2-15	(L4a)	4a	
④b	Slant pole arm assembly	T	Fig. 2-2-15	(W4),(L4b),(P4a),(P4b)	4b	
④c	Drum assembly	T	Fig. 2-2-15	3(S4)	-	Adjustment
⑤a	Guide roller (S) assembly	T	Fig. 2-2-16	(P5)	5a, 5b	Adjustment
⑤b	Rail assembly	T	Fig. 2-2-16	3(W5a), (W5b)	5c, 5d	
①B	Slide deck assembly / ①C Main deck assembly	T	Fig. 2-2-17	(W6),(L6a)-(L6d)	6a, 6b	(Adjustment)
①B	Slide deck assembly					
⑦a	Loading brake assembly	T	Fig. 2-2-18	(W7),(L7a),(P7a)	7e	Adjustment
⑦b	Guide pin (SUPPLY)	T	Fig. 2-2-18	(S7a)	-	
⑦c	Pad arm assembly	T	Fig. 2-2-18	(W7),(L7b),(P7b)	7d	
⑦d	Slide guide plate assembly	T	Fig. 2-2-18	(S7b)	7c	Adjustment
⑦e	Collar	T	Fig. 2-2-18	-	7a	
⑦f	Collar	T	Fig. 2-2-18	-	7a	
⑦g	Sub brake assembly	T	Fig. 2-2-18	(W7),(L7c),(P7c)	7b	
⑦h	Control plate assembly	T	Fig. 2-2-18	2(W7),(L7d),(P7d)	7b	
①C	Main deck assembly					
⑧a	Tension lever assembly	T	Fig. 2-2-19	-	8c	
⑧b	Slide lever assembly	T	Fig. 2-2-19	-	8b	
⑧c	Brake control lever assembly	T	Fig. 2-2-19	-	8a	
⑨a	Loading guide	T	Fig. 2-2-20	(S9)	-	
⑨b	Timing belt	T	Fig. 2-2-20	-	9b	
⑨c	Center gear assembly	T	Fig. 2-2-20	-	-	
⑨d	Motor bracket assembly	T	Fig. 2-2-20	2(S9)	9a	
⑨e	Worm wheel	T	Fig. 2-2-20	(W9)	-	(Phase adjustment)
⑨f	Gear holder	T	Fig. 2-2-20	(S9)	-	
⑩a	Main cam gear	T	Fig. 2-2-21	(S10)	10b	Phase adjustment
⑩b	Brake control plate	T	Fig. 2-2-21	(L10)	10b	Phase adjustment
⑩c	Rotary encoder	T	Fig. 2-2-21	(S10),(W10a)	10a	Phase adjustment
⑩d	Connect gear	T	Fig. 2-2-21	(W10a)	-	(Phase adjustment)
⑩e	Reel drive pulley assembly	T	Fig. 2-2-21	(W10b)	-	
⑪a	Catcher (T) assembly	T	Fig. 2-2-22	2(S11)	-	
⑪b	Capstan motor	T	Fig. 2-2-22	2(S11)	-	
⑪c	Charge arm assembly	T	Fig. 2-2-22	(W11)	11	
⑪d	Sub cam gear	T	Fig. 2-2-22	(S11)	-	Phase adjustment
⑪e	PWB holder	B	Fig. 2-2-22	2(S11)	-	

Table 2-2-2

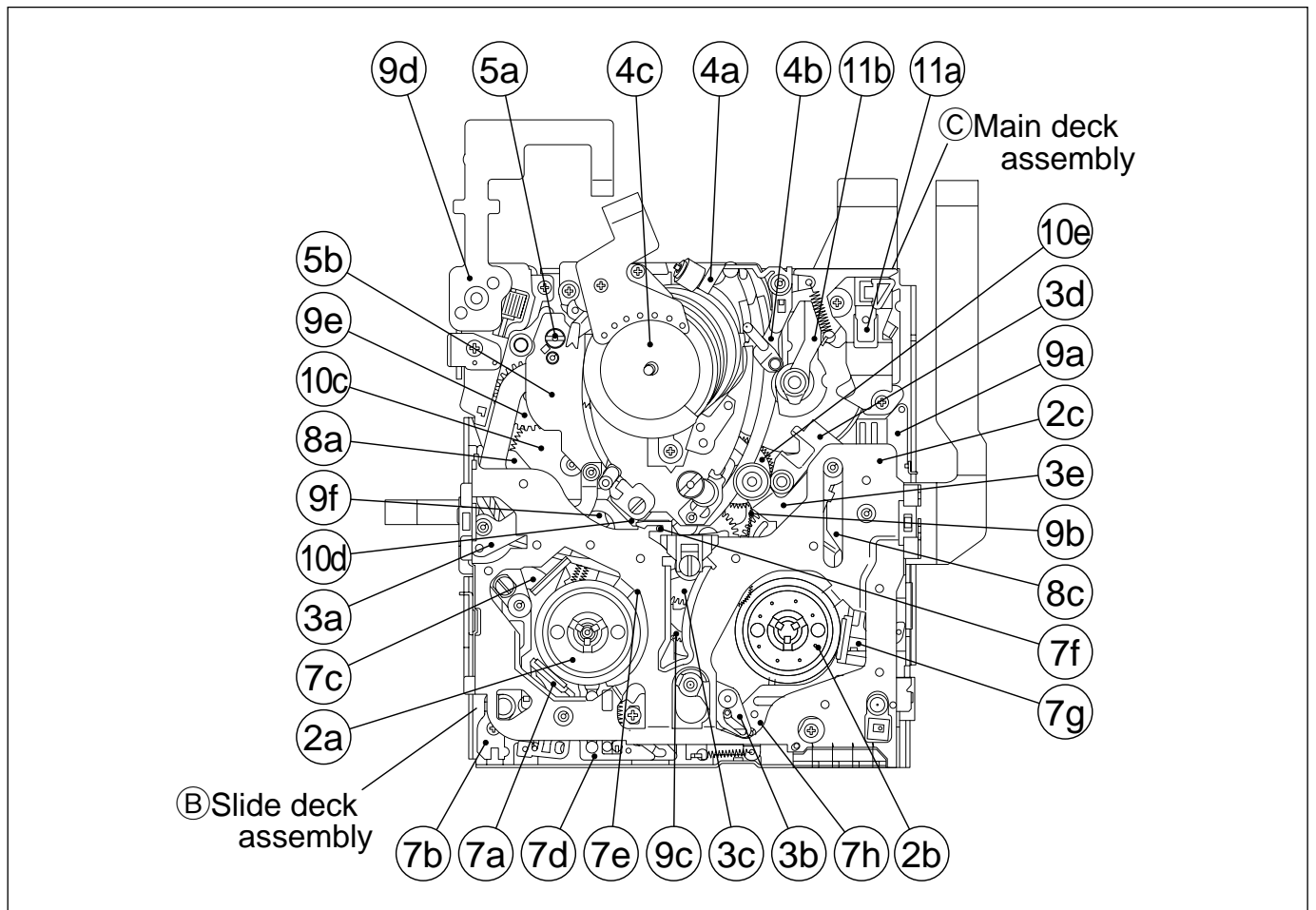


Fig. 2-2-10 Top view

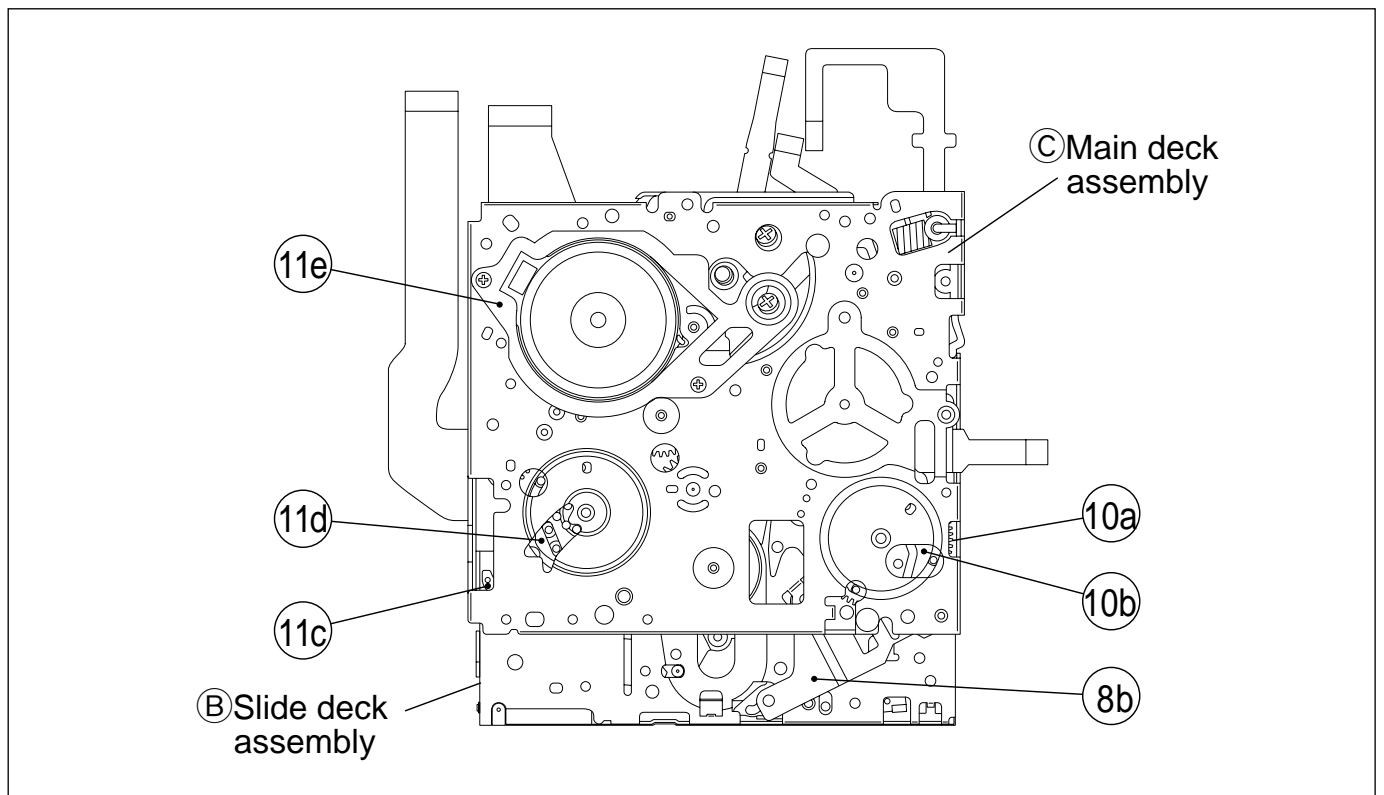


Fig. 2-2-11 Bottom view

## 2.2.5 Disassembly/assembly

### 1. ① Cassette housing assembly

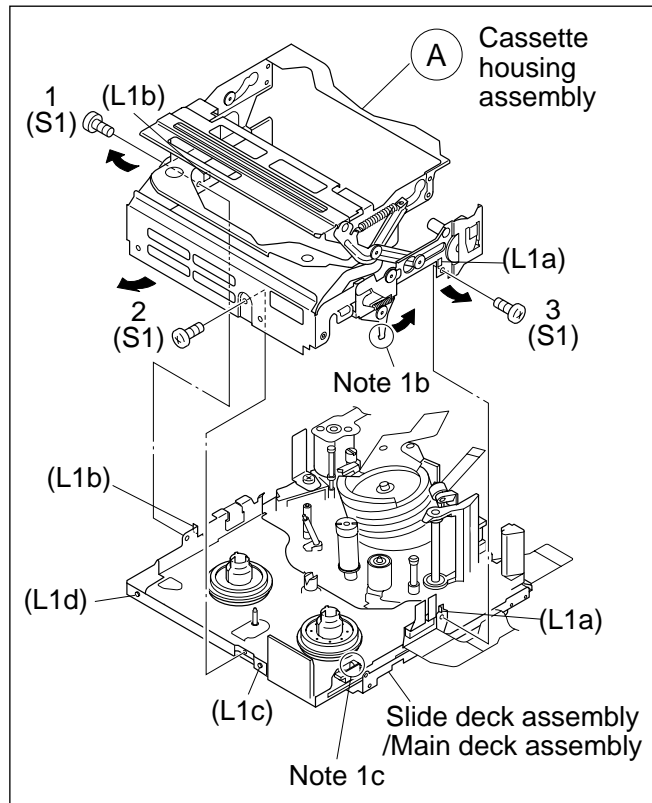


Fig. 2-2-12

### 2. ②a Reel disk (SUP) assembly

#### ②b Reel disk (TU) assembly

#### ②c Reel cover assembly

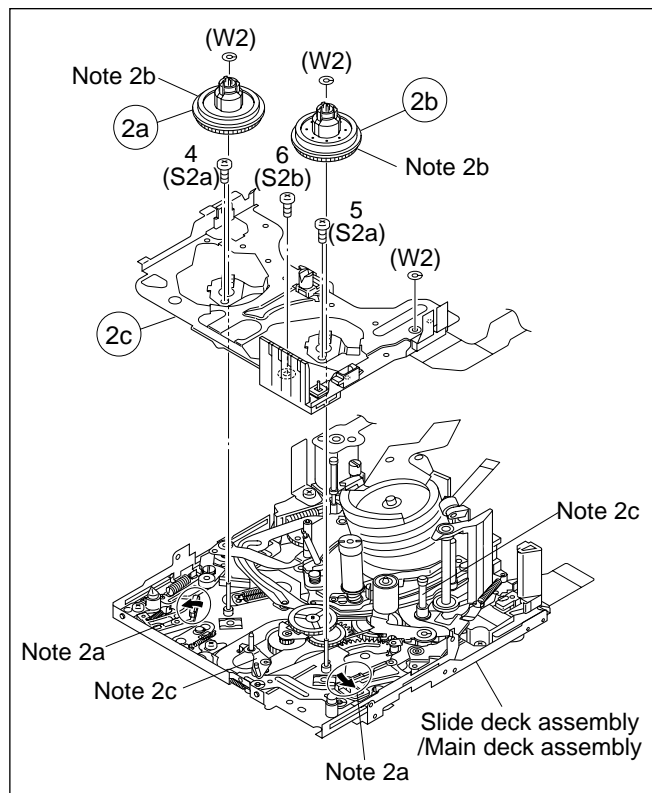
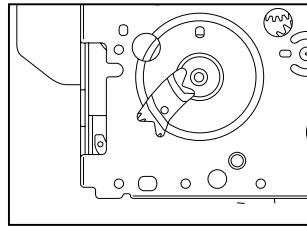
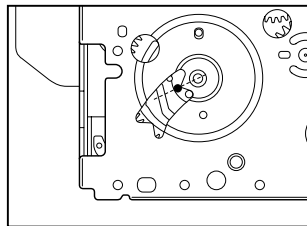


Fig. 2-2-13

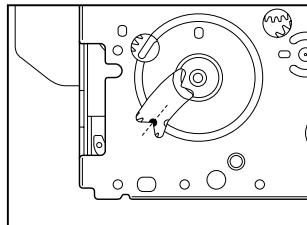
<STOP mode>



<EJECT mode>



<PLAY mode>



#### Note 1a:

Shift the mechanism mode from the STOP mode to the EJECT mode.

#### Note 1b:

Reassemble the cassette housing assembly to the mechanism as the cancel lever is moved in the direction of the arrow.

#### Note 1c:

When reassembling the cassette housing to the mechanism, make sure that there is no deformation in the frame or no damage to the switches, etc.

#### Note 1d:

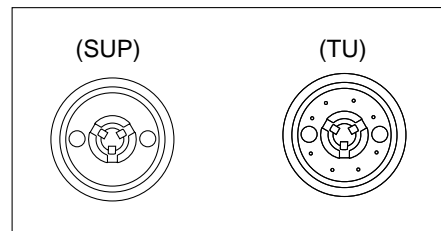
After reassembling the component parts, check the mechanism operation in the PLAY mode. For details of checking method, refer to "2.2.8 assembling slide deck assembly and main deck assembly".

#### Note 2a:

When removing the reel disk assembly, be careful not to break the brake pad which applies lateral pressure to the reel disk.

#### Note 2b:

Be careful not to make a mistake in installing the reel disk. The SUP reel disk and TU reel disk can be distinguished from each other by the appearance as shown below.



#### Note 2c:

When removing the reel cover assembly, pay heed to the guide arm assembly. For, the guide arm assembly is just inserted into the slide deck assembly from the upside and it is apt to come off after the reel cover assembly is removed.

#### Note 2d:

When fitting the reel cover assembly to the set, carefully tighten the screw with the specified tightening torque of 0.069N·m (0.7kgf·cm).



3. (3a) Tension arm assembly/ (3b) Release guide assembly  
 (3c) Idler arm assembly/ (3d) Guide arm assembly  
 (3e) Pinch roller arm assembly

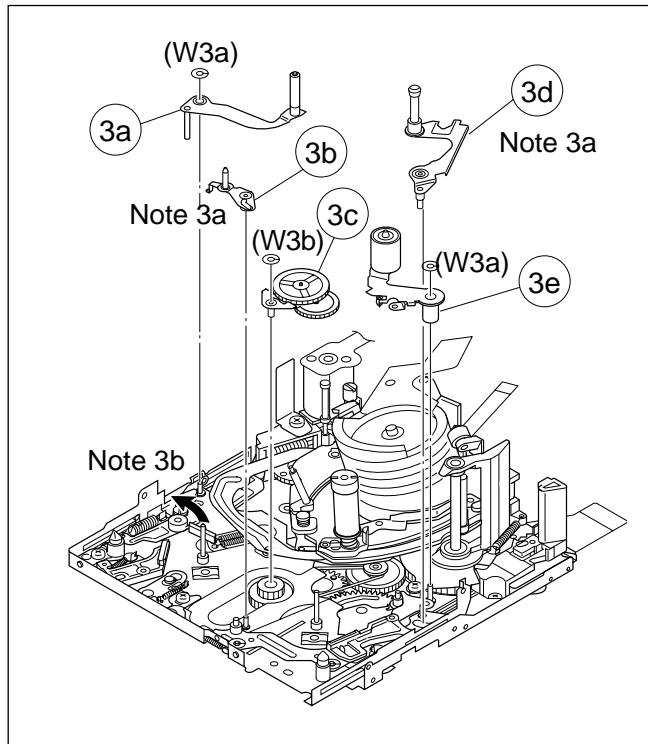


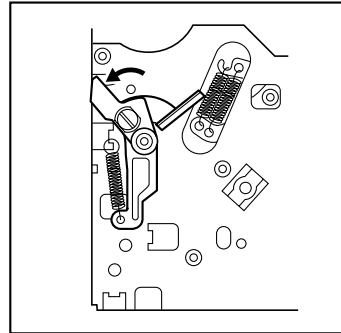
Fig. 2-2-14

**Note 3a:**

When removing the reel cover assembly, pay heed to release guide assembly and guide arm assembly. For, the guide arm assembly is just inserted into the slide deck assembly from the upside and it is apt to come off after the reel cover assembly is removed.

**Note 3b:**

Reassemble the tension arm assembly to the mechanism as the pad arm assembly is moved to the extent in the direction of the arrow.



4. (4a) Cleaner arm assembly/ (4b) Slant pole arm assembly  
 (4c) Drum assembly

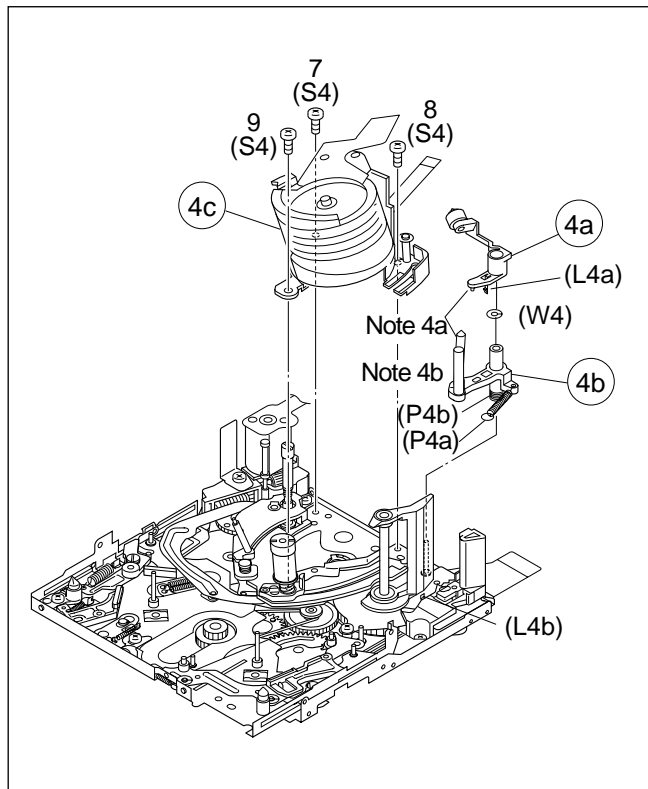


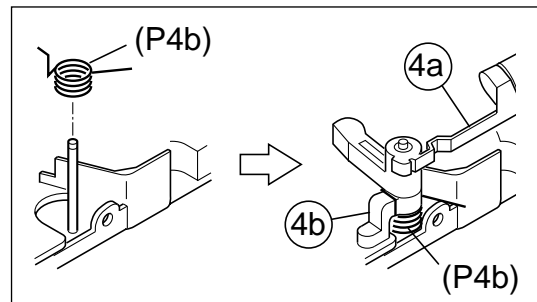
Fig. 2-2-15

**Note 4a:**

When removing the cleaner arm assembly, it is recommended to remove the slant pole arm assembly together with it except the case of a single unit replacement, because the hook (L4a) is hard to disengage.

**Note 4b:**

How to set the coil spring (P4b).



5. 5a Guide roller (SUPPLY) assembly/ 5b Rail assembly

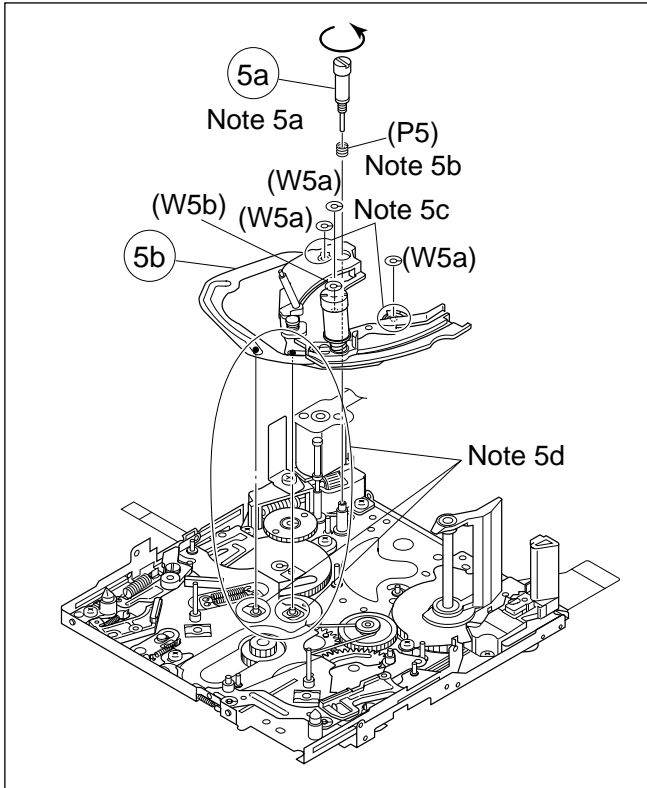
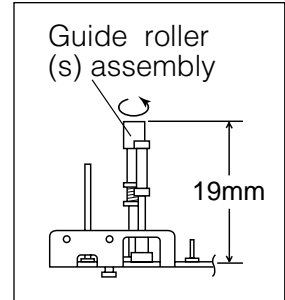


Fig. 2-2-16

**Note 5a:**

When reassembling, insert the tip of the guide roller with the coil spring put on it into the hole on the main deck. Tighten the guide roller by about 6 turns so that the height of the guide roller assembly is 19 mm or so as shown in the figure.



**Note 5b:**

Pay careful attention to the spring not to lose it.

**Note 5c:**

Pay careful attention to the engagement of the rail assembly's arm ends because they easily come off the engagement. Moreover, make sure that there is neither deformation nor damage observed in them.

**Note 5d:**

When removing the rail assembly, check to see if the collar is securely set in the arm groove.

6. B Slide deck assembly/ C Main deck assembly

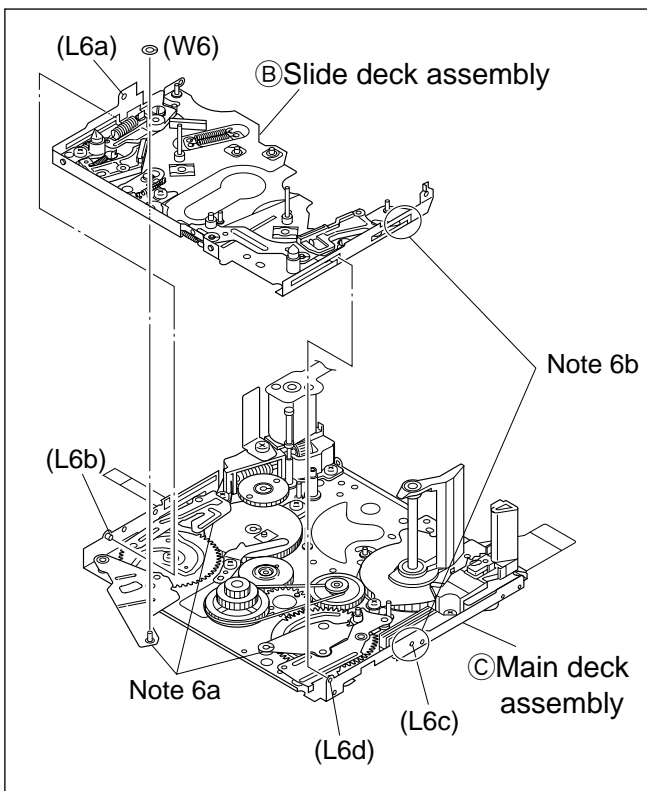


Fig. 2-2-17

**Note 6a:**

When removing the slide deck assembly, pay heed to the three components of the following because they are apt to come off after the slide deck assembly is removed.

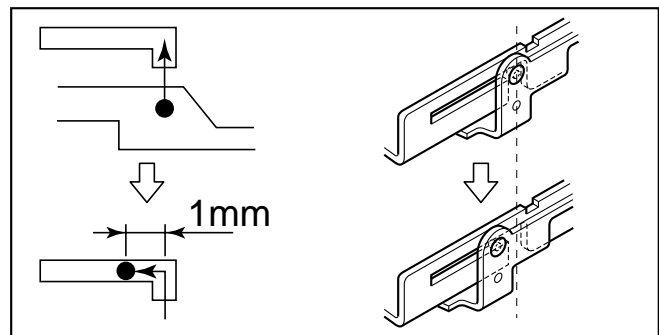
8a Tension lever assembly/ 8b Slide lever assembly

8c Brake control lever assembly

For reassembling those components, refer to Fig. 2-2-19 on page 2-10.

**Note 6b:**

When reassembling the slide deck assembly to the main deck assembly, combine them with each other by the side grooves and then slide the slide deck assembly by 1 mm or so.



7. (7a) Loading brake assembly/ (7b) Guide pin (S)  
 (7c) Pad arm assembly/ (7d) Slide guide plate assembly  
 (7e) Collar/ (7f) Collar/ (7g) Sub brake assembly  
 (7h) Control plate assembly

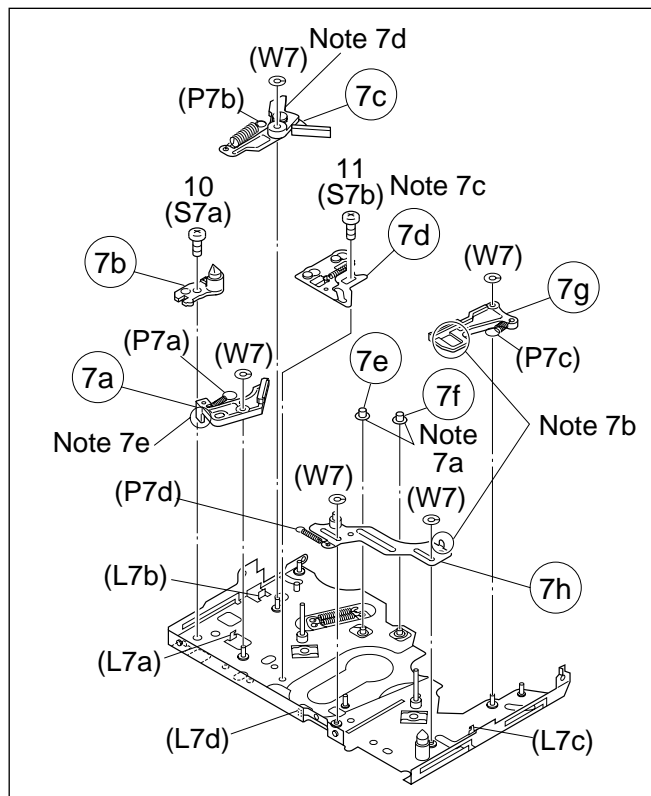


Fig. 2-2-18

8. (8a) Tension lever assembly/ (8b) Slide lever assembly  
 (8c) Brake control lever assembly

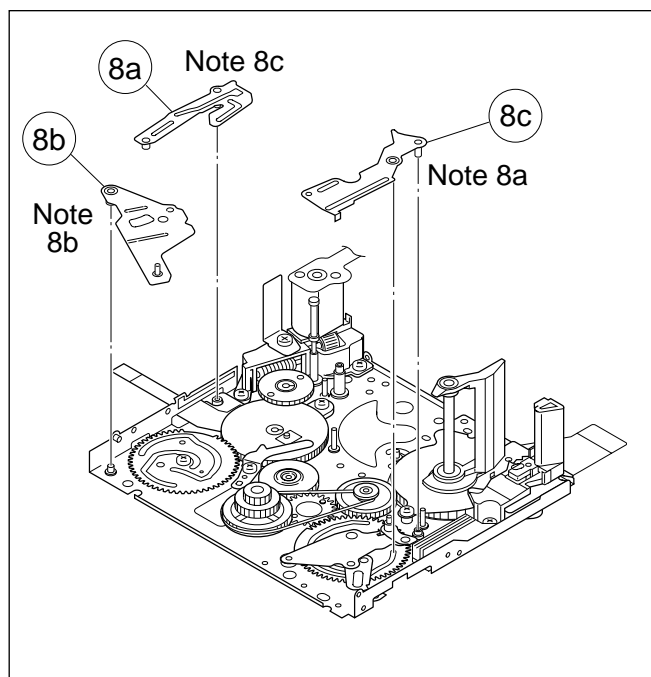


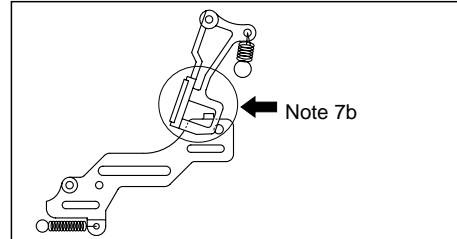
Fig. 2-2-19

**Note 7a:**

Don't remove these parts unreasonably. If they are removed for some reason, be very careful not to lose them.

**Note 7b:**

When reinstalling the sub brake assembly, set the control plate assembly so that its hook is set in the □ part of the sub brake assembly.



**Note 7c:**

Since the slide guide plate assembly controls the slide deck assembly so that it exactly slides the main deck assembly, it must exactly be assembled in the PLAY mode. Therefore, temporarily fix the slide guide plate assembly in this stage. For details of reassembling procedure, refer to "2.2.8 Assembling slide deck assembly and main deck assembly" on page 2-15.

**Note 7d:**

The pad arm assembly controls the tension level of the tension arm assembly. For adjustment of the tension arm assembly, refer to page 2-8.

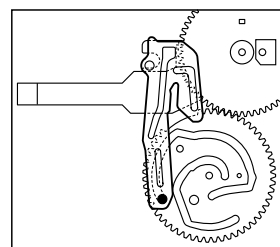
**Note 7e:**

When reinstalling the load brake assembly, slightly lift the slide deck assembly upwards because the lower part of the load brake assembly sticks out of the slide deck assembly.

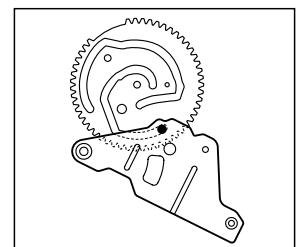
**Note 8a, 8b, 8c:**

For refitting the respective parts, refer to the following figures

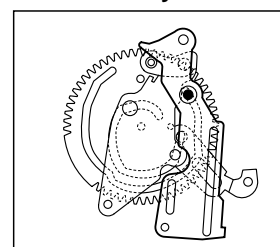
(8a) Tension lever assembly



(8b) Slide lever assembly



(8c) Brake control lever assembly



9. 9a Loading guide/ 9b Timing belt  
 9c Center gear assembly/ 9d Motor bracket assembly  
 9e Worm wheel/ 9f Gear holder

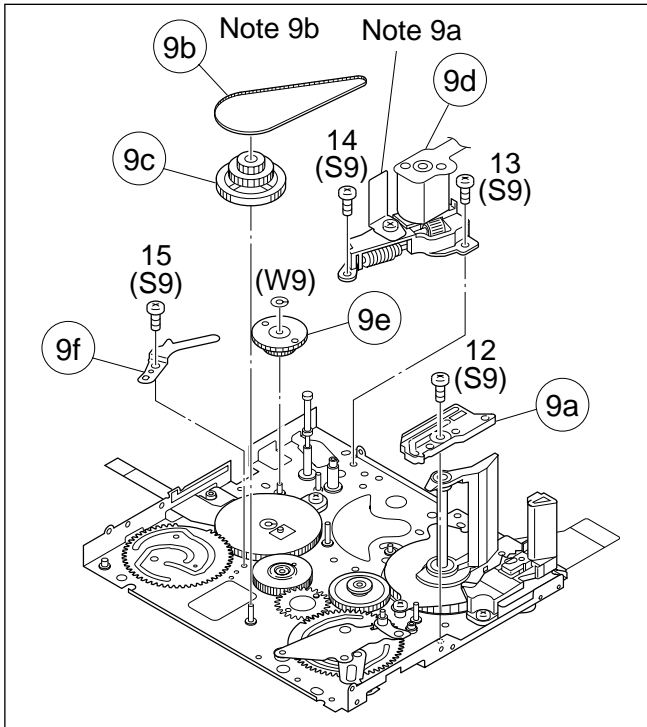


Fig. 2-2-20

10. 10a Main cam gear/ 10b Brake control plate  
 10c Rotary encoder/ 10d Connect gear  
 10e Reel drive pulley assembly

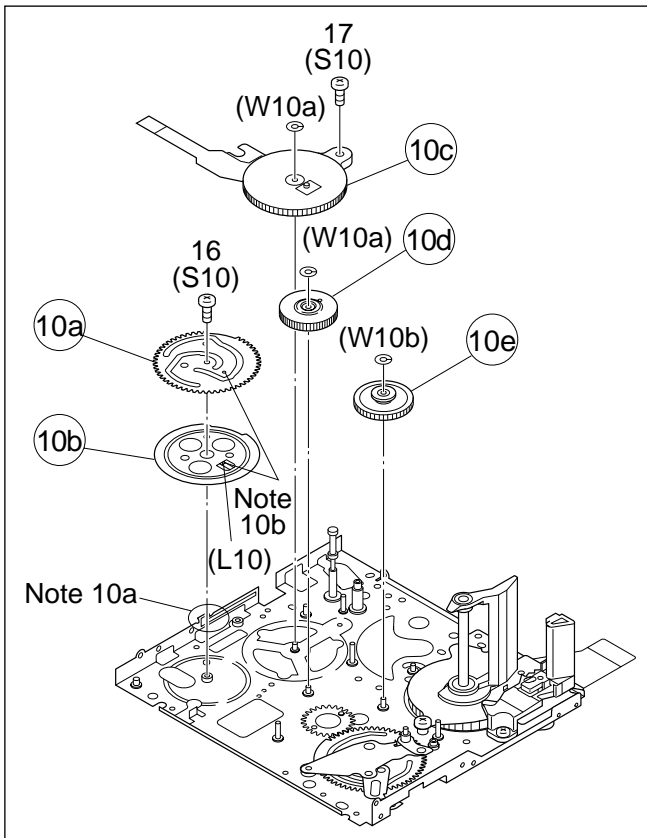


Fig. 2-2-21

**Note 9a:**

Carefully handle the DEW sensor. (Don't touch the sensor surface in particular.)

**Note 9b:**

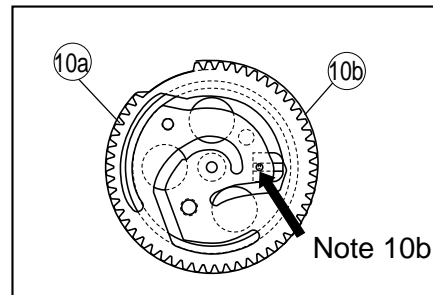
When engaging the timing belt, make sure that it securely engages with the gears of both the center gear assembly and reel drive pulley assembly.

**Note 10a:**

When removing/refitting parts, pay careful attention to the flexible board and so on not to damage them.

**Note 10b:**

When reinstalling the main cam gear and the brake control plate, first fit them together so that the protrusion on the brake control plate is set in the slot on the main cam gear as shown below, next install the two together to the main deck assembly.



11. (11a) Catcher (T) assembly/ (11b) Capstan motor  
 (11c) Charge arm assembly/ (11d) Sub cam gear  
 (11e) PWB holder

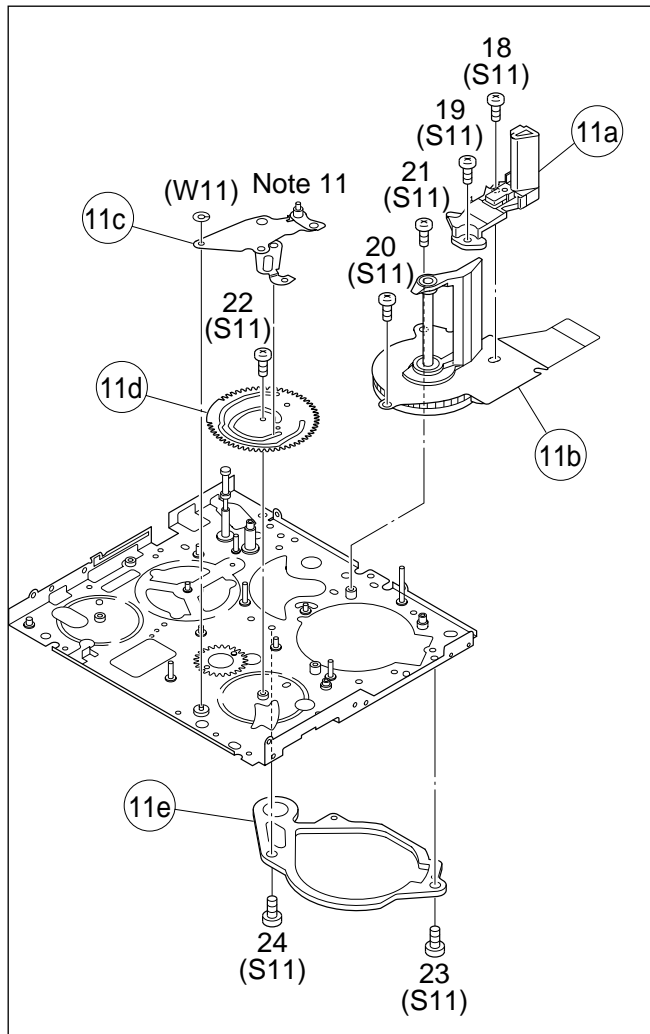
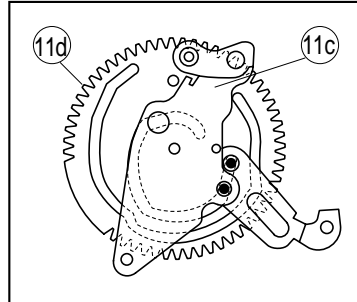


Fig. 2-2-22

**Note 11:**

*The following figure shows how to put the charge arm assembly and sub cam gear assembly together.*



2.2.6 List of procedures for disassembly

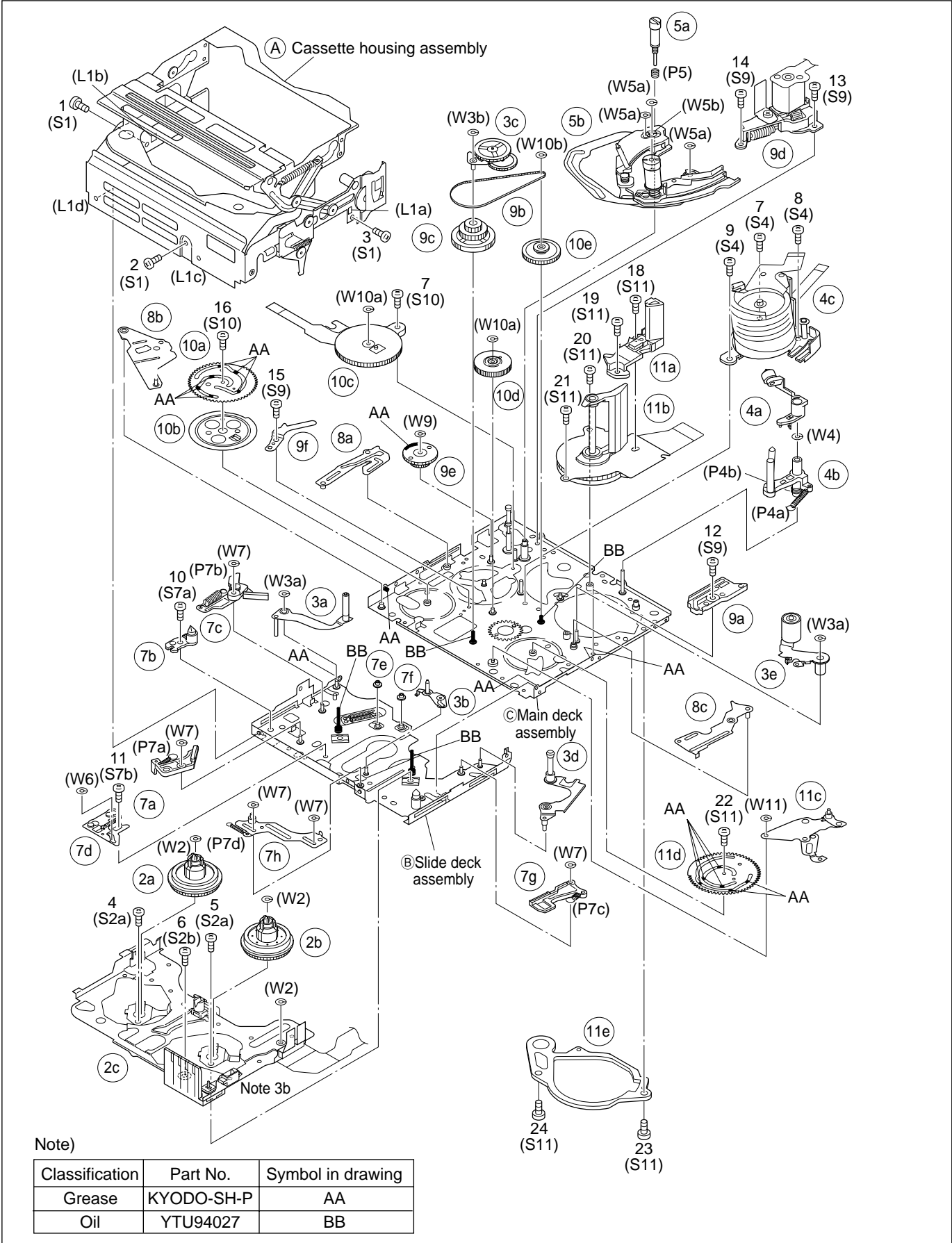


Fig. 2-2-23

## 2.2.7 Checkup and adjustment of mechanism phase

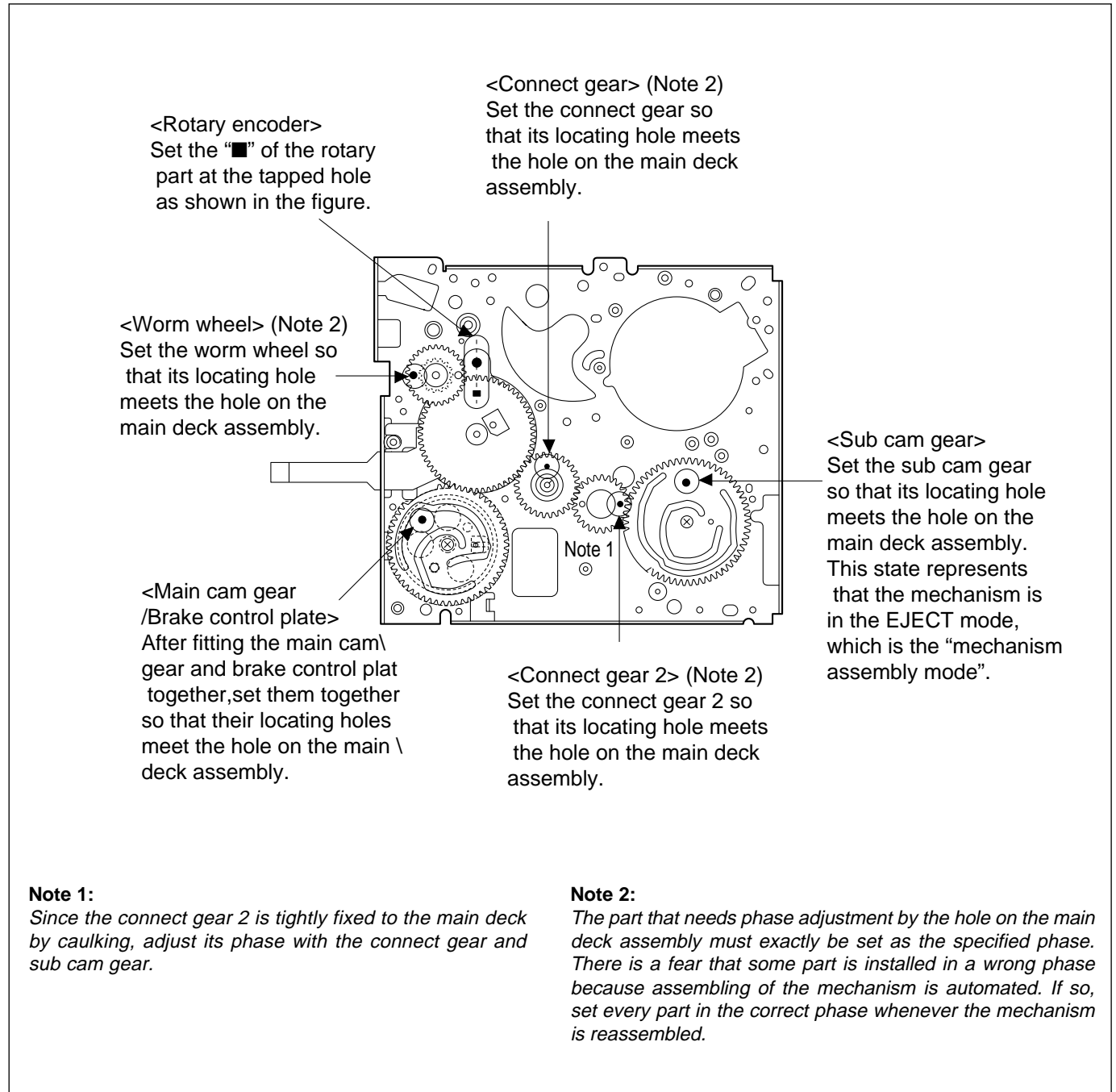


Fig. 2-2-24

### 2.2.8 Assembling slide deck assembly and main deck assembly

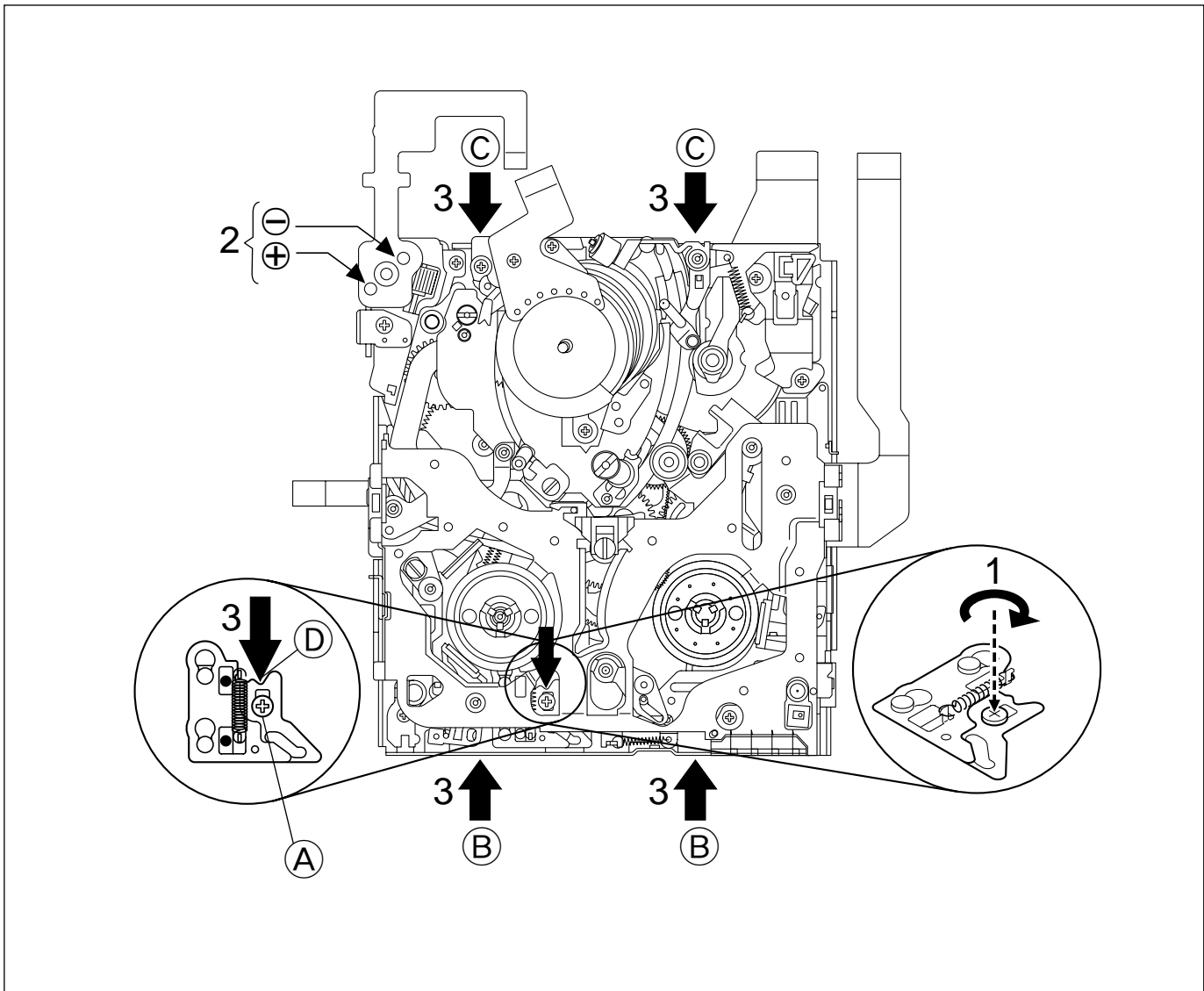


Fig. 2-2-25

#### Assembling procedure

1. Loosen the screw **A**.
2. Set the mechanism in the PLAY mode.  
(Refer to page 2-2.)
3. Press the end face **B** of the slide deck assembly (reel disk side) and the end face **C** of the main deck assembly (drum assembly side) with uniform force so that the two assemblies are tightly pressed to each other. Furthermore, press the part **D** and tighten the screw **A**.

**Note :** Tightening torque for screw **A**: 0.069 N·m (0.7 kgf·cm)



## 2.2.9 Locating tension pole

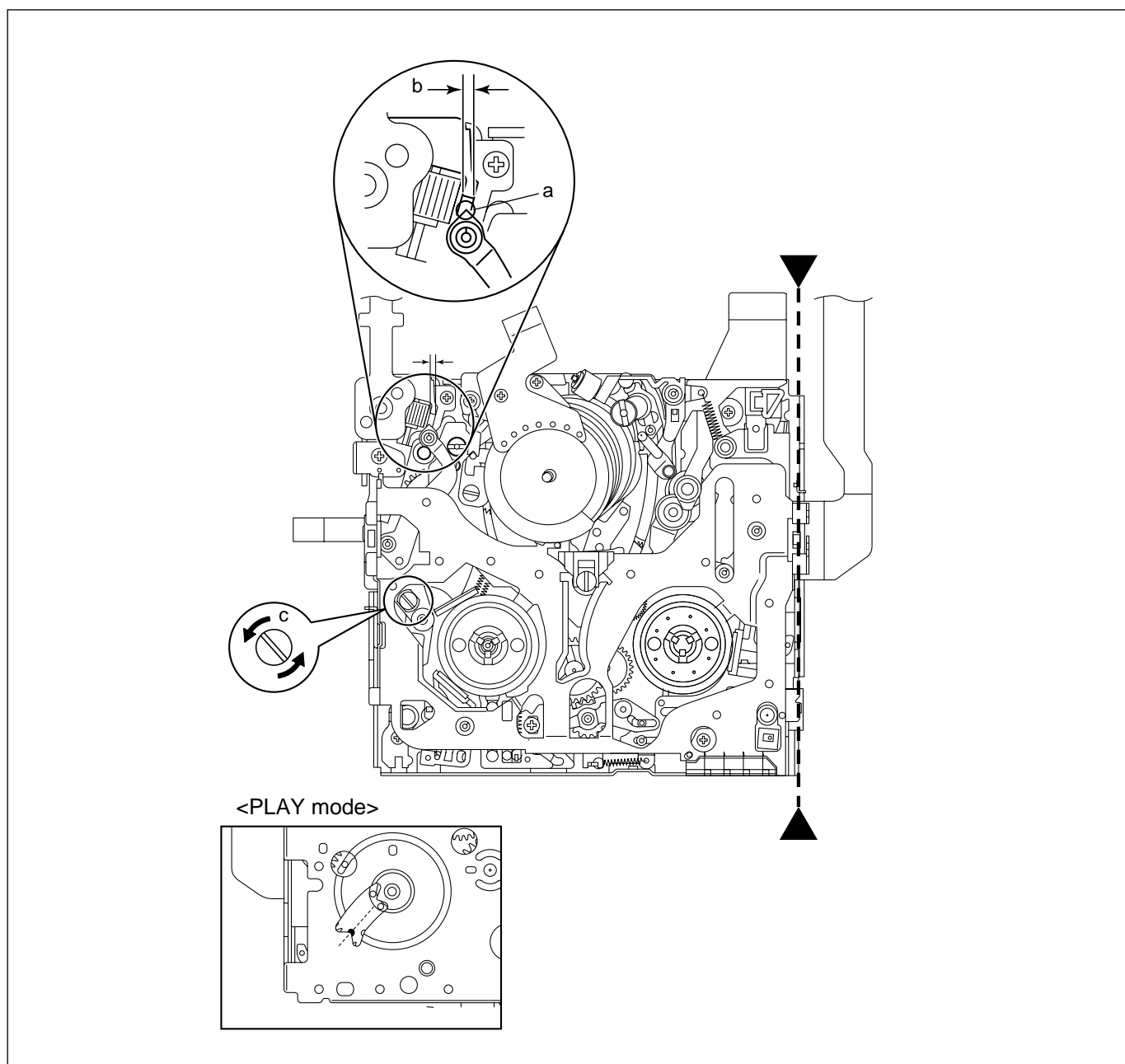


Fig. 2-2-26

### Locating procedure

1. Enter the mechanism assembly into the PLAY mode.  
(Refer to page 2-2.)
2. When the “▶-----◀” part is positioned down, make sure that the part “a” of the tension arm assembly is located within the range of “b”.
3. If the part “a” is out of the range, turn the pin “c” to adjust the position.

2.3 SERVICE NOTE

Use the following chart to manage mechanism parts that are removed for disassembling the mechanism.

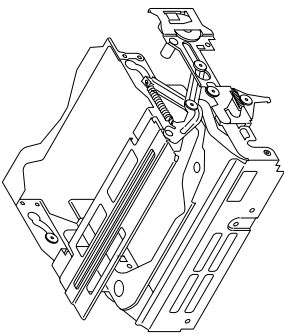
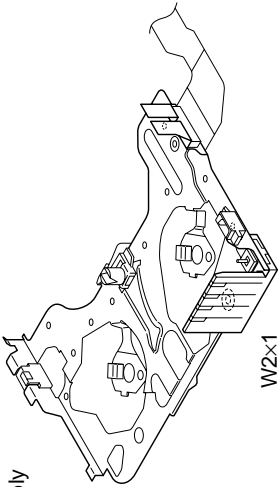
1	<div>④ Cassette housing assembly</div> 				
2	②a Reel disk (SUP) assembly	<div>②c Reel cover assembly</div> 			
	②b Reel disk (TU) assembly				
3	③a Tension arm assembly	③b Release guide assembly	③c Idler arm assembly	③d Guide arm assembly	③e Pinch roller arm assembly
	W3ax1	W3bx1	W3bx1	W3bx1	W3ax1
4	④a Cleaner arm assembly	④b Slant pole arm assembly		④c Drum assembly	
		W4x1 P4ax1 P4bx1		S4x3	
5	⑤a Guide roller (S) assembly	⑤b Rail assembly			
	P5x1	W5ax3 W5bx1			

Table 2-3-1a

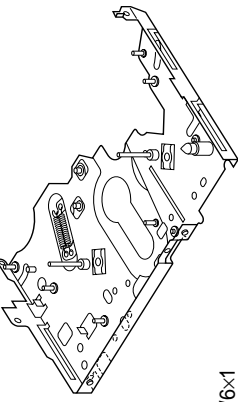


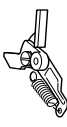





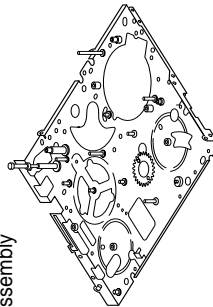

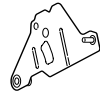




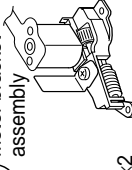



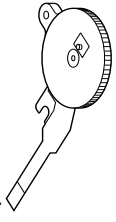


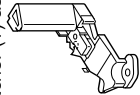
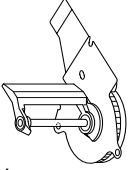
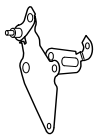
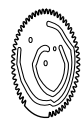
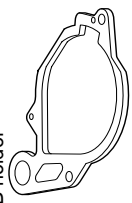
6	 <b>Ⓑ Slide deck assembly</b> W6×1	<b>7a</b> Loading brake assembly W7×1 P7a×1 	<b>7b</b> Guide pin (SUPPLY) S7a×1 	<b>7c</b> Pad arm assembly W7×1 P7b×1 	<b>7d</b> Slide guide plate assembly S7b×1 W7×1 
7		<b>7e</b> Collar 	<b>7f</b> Collar 	<b>7g</b> Sub brake assembly W7×1 P7c×1 	<b>7h</b> Control plate assembly W7×2 P7d×1 
8	 <b>Ⓒ Main deck assembly</b>	<b>8a</b> Tension lever assembly 	<b>8b</b> Slide lever assembly 	<b>8c</b> Brake control lever assembly 	
9	<b>9a</b> Loading guide S9×1 	<b>9b</b> Timing belt 	<b>9c</b> Center gear assembly 	<b>9d</b> Motor bracket assembly S9×2 	<b>9e</b> Worm wheel W9×1 
10	<b>10a</b> Main cam gear S10×1 	<b>10b</b> Brake control plate 	<b>10c</b> Rotary encoder S10×1 W10ax1 	<b>10d</b> Connect gear W10ax1 	<b>10e</b> Reel drive pulley assembly W10b×1 
11	<b>11a</b> Catcher (T) assembly S11×2 	<b>11b</b> Capstan motor S11×2 	<b>11c</b> Charge arm assembly W11×1 	<b>11d</b> Sub cam gear S11×1 	<b>11e</b> PWB holder S11×2 

Table 2-3-1b

2.4 JIG CONNECTOR CABLE CONNECTOR

Remove one screw (1) first and the cover (JIG) next.

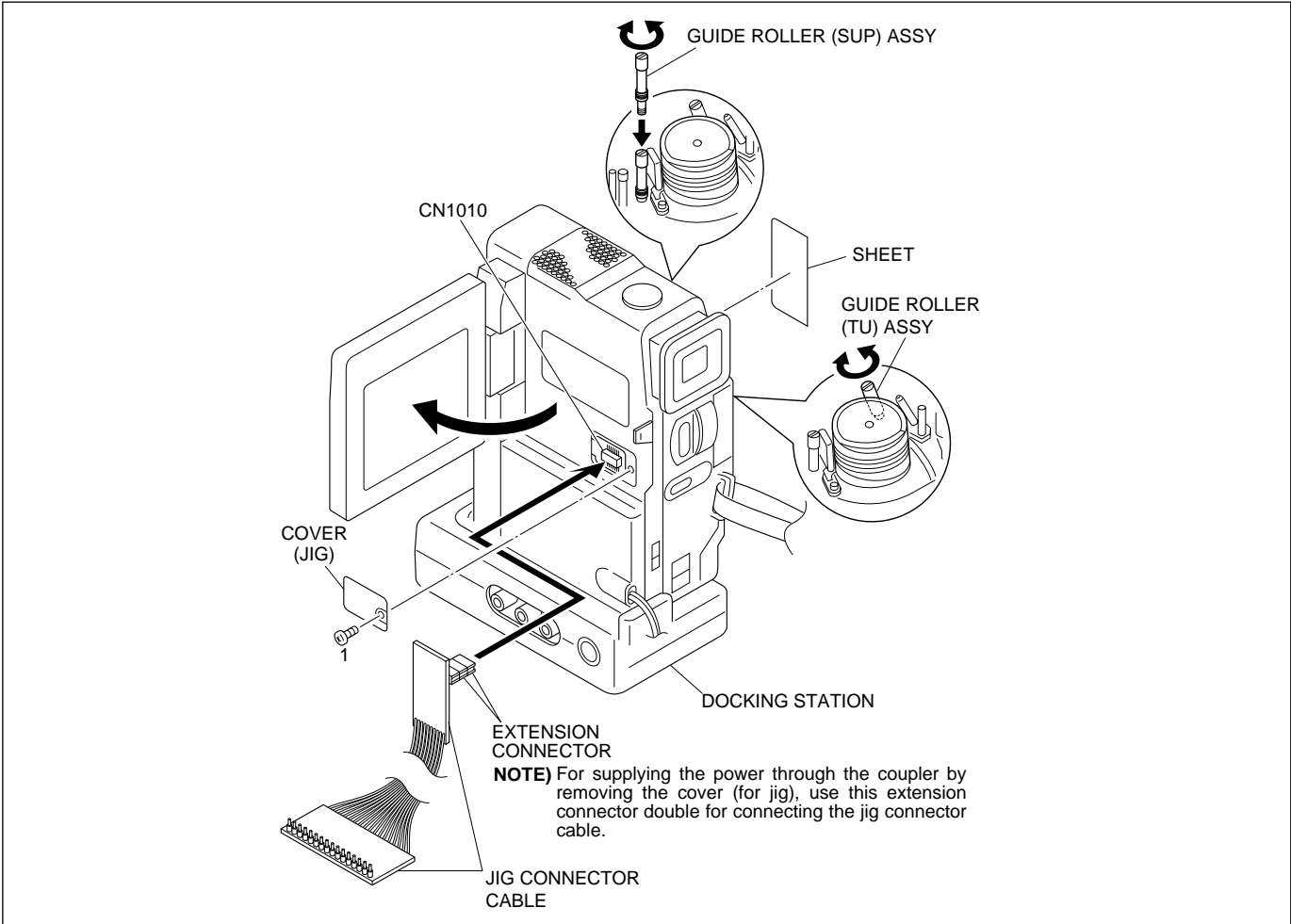


Fig. 2-3-1 Jig connector cable connection

MAIN BOARD ASSEMBLY			JIG CONNECTOR CABLE		
1		D_REG2.9	1		D_REG2.9
	11	JIG_SPT	2		JIG_SCK
2		JIG_SCK	3		RST
	12	JIG_MOD	4		SBD
3		RST	5		AL_3VSY
	13	VPP	6		MAIN_VCO
4		SBD	7		ATFI
	14	SBT	8		HID
5		AL_3VSY	9		UNREG
	15	PB_VCO	10		UNREG
6		MAIN_VCO	11		JIG_SPT
	16	ENV_OUT	12		JIG_MOD
7		ATFI	13		VPP
	17	FS_PLL	14		SBT
8		HID	15		PB_VCO
	18	SBE	16		ENV_OUT
9		UNREG	17		FS_PLL
	19	GND	18		SBE
10		UNREG	19		GND
	20	GND	20		(GND)

Fig. 2-3-2 Jig connector cable schematic diagram

## ELECTRICAL ADJUSTMENT

### 3.1 PREPARATION

## 1. Precaution

Both the camera and deck sections of this model needs a personal computer for adjustment except simple adjustment with potentiometers. If some of the following parts is replaced for repair or other reason, the repaired set must be adjusted with a personal computer.

- OP block
- E<sup>2</sup>PROM (IC1003 of MAIN board)
- MONITOR
- E<sup>2</sup>P ROM (IC7603 of MONITOR board)

In the event of malfunction with electrical circuits, troubleshooting with the aid of proper test instruments must be done first, and then commence necessary repair, replacement and adjustment, etc.

1. In case of wiring to chip test points for measurement, use IC clips, etc. to avoid any stress.
2. Since connectors are fragile, carefully handle them in disconnecting and connecting.
3. Shortcircuit between operation unit and DECK chassis.

## 2. Required test equipment

1. Color TV monitor.
2. AC power adapter/charger
3. Oscilloscope (dual-trace type, observable 100 MHz or higher frequency)

**Note:** It is recommended to use one observable 300 MHz or higher frequency.

4. Digital voltmeter
5. Frequency counter (with threshold level adjuster)
6. Personal computer

### 3. Required adjustment tools

For details of special jigs necessary for adjustment, refer to page 1-2 and 1-3 of the Section 1.

### 3.2 SETUP

- ### 1. Setup for electrical adjustment with personal computer

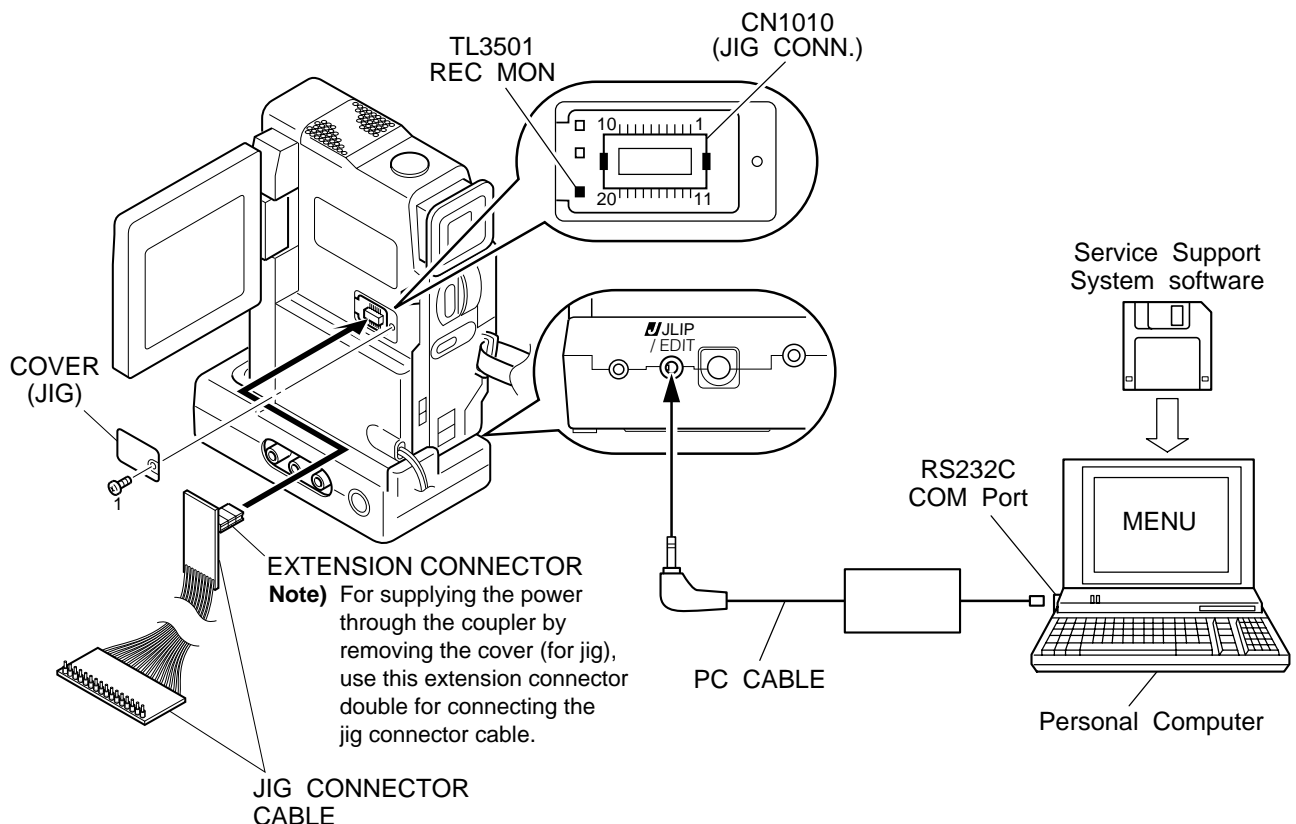
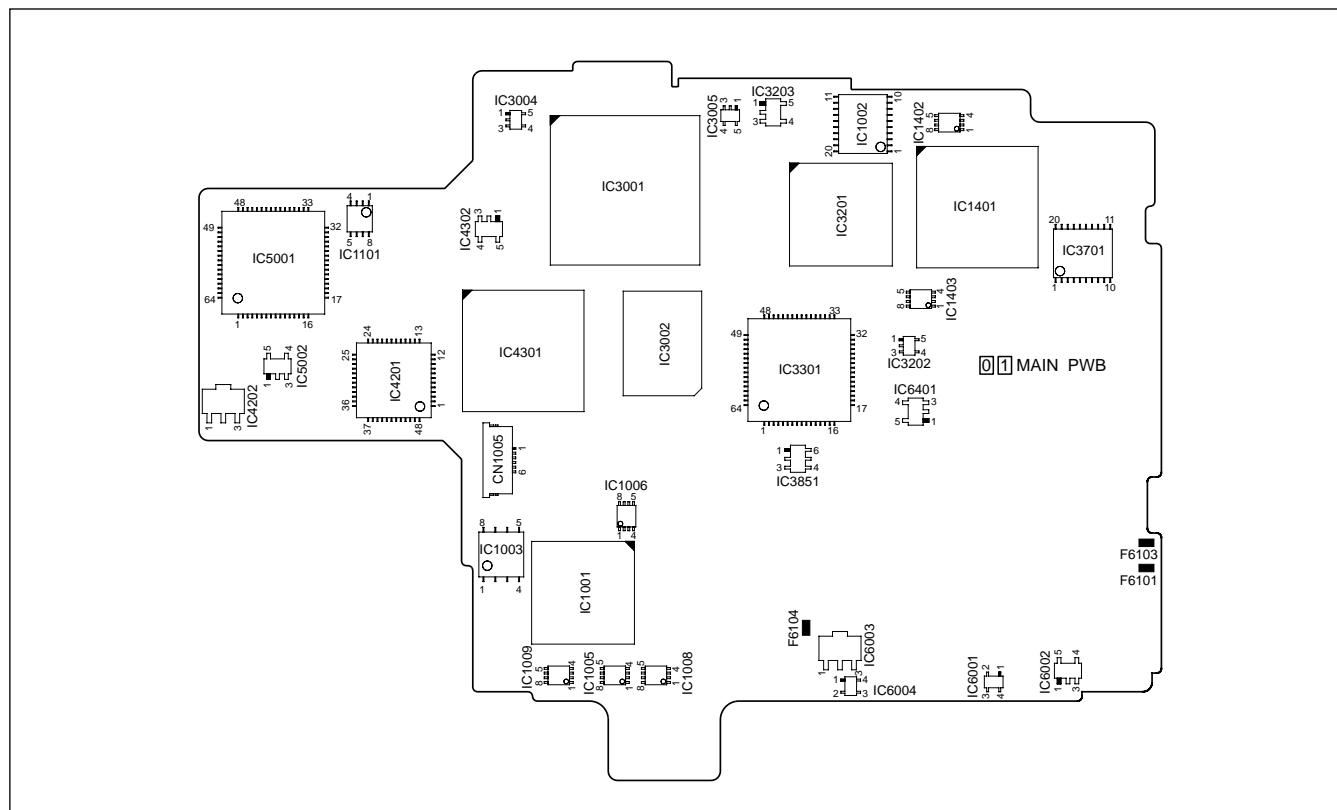


Fig. 3-2-1 Connection for Service support system

### 3.3.1 MAIN PWB (FOIL SIDE)



3.3.3 MONITOR PWB (COMPONENT SIDE)

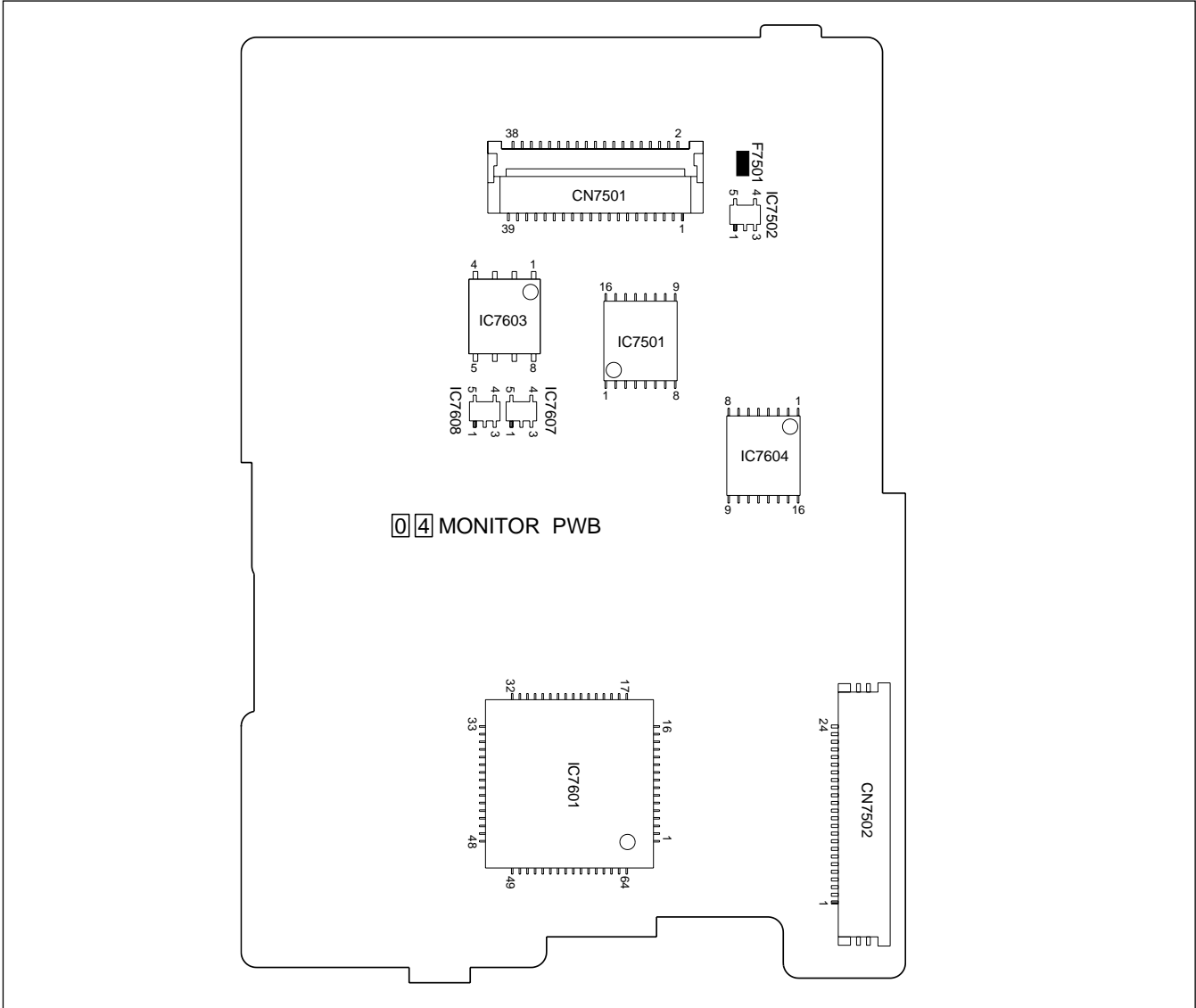


Fig. 3-3-3 Fuse location for MONITOR board assembly

# △ REF No.	PART No.	PART NAME, DESCRIPTION
C2627	NCBA1HK-102W	CAPACITOR 0.001μF,50V
C2628	NCBA1HK-102W	CAPACITOR 0.001μF,50V
C2629	NBE20GM-336X	T CAPACITOR 33μF,4.0V
C2631	NCB31EK-103X	CAPACITOR 0.01μF,25V
C2632	NCB31EK-103X	CAPACITOR 0.01μF,25V
C2635	NCB30JK-105X	CAPACITOR 1μF,6.3V
C2636	NCB30JK-105X	CAPACITOR 1μF,6.3V
C2639	NCB31CK-104X	CAPACITOR 0.1μF,16V
C2640	NCB31CK-104X	CAPACITOR 0.1μF,16V
C2702	NBE90GM-226X	T CAPACITOR 22μF,4.0V
C2703	NBE90GM-226X	T CAPACITOR 22μF,4.0V
C2753	NCB20JK-225X	CAPACITOR 2.2μF,6.3V
C2754	NCB20JK-225X	CAPACITOR 2.2μF,6.3V
C2764	NCB20JK-225X	CAPACITOR 2.2μF,6.3V
C2765	NCB20JK-225X	CAPACITOR 2.2μF,6.3V
C2766	NCB21CK-474X	CAPACITOR,E,F 0.47μF,16V
C2767	NCB21CK-474X	CAPACITOR,E,F 0.47μF,16V
C2768	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
C2769	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
C7427	NBP41DM-106X	T CAPACITOR 10μF,20V
C7428	NCB21CK-105X	CAPACITOR 1μF,16V
C7429	NBE21AM-106X	T CAPACITOR 10μF,10V
C7431	NBE20JM-106X	T CAPACITOR 10μF,6.3V
L2101	NQL402M-100X	COIL 10μH
L2102	NQL402M-100X	COIL,C,D,E,F 10μH
L2131	NQL402M-100X	COIL 10μH
L2601	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
L2602	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
L2603	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
L2604	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
L7403	NQL045K-100X	COIL 10μH
L7404	NQL045K-100X	COIL 10μH
S7001	NSW0129-001X	PUSH SWITCH
CN801	QGB0401L1-A0X	CONNECTOR
CN802	QGF0517F2-12X	FPC CONNECTOR
CN803	QGF0517F1-06X	FPC CONNECTOR
CN804	QGA1001F1-05X	CONNECTOR
CN805	QGF0507F1-20X	FPC CONNECTOR
OT1	LY42535-001A	SHEET(AUD.PWB)
OT2	LY42775-001A	S.SHEET(AU/VF)

\*\*\*\*\*

JACK BOARD ASSEMBLY <09>

PW1	YB10288C1	JACK BOARD ASSY
Q2851	2SD1979/S/-X	TRANSISTOR
D2852	MA8068	ZENER DIODE
R2851	NRSA63J-183X	MG RESISTOR 18kΩ,1/16W
R2852	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
R2853	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
R2854	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
R2855	NRSA63J-0R0X	MG RESISTOR 0Ω,1/16W
C2854	NCB31EK-223X	CAPACITOR 0.022μF,25V
C2856	NCB31EK-153X	CAPACITOR 0.015μF,25V
C2859	NCB31HK-332X	CAPACITOR 0.0033μF,50V
C2860	NCB31HK-102X	CAPACITOR 0.001μF,50V
L2851	NQR0251-004X	FERRITE BEAD

# △ REF No.	PART No.	PART NAME, DESCRIPTION
L2852	NQR0251-004X	FERRITE BEAD
L2853	NQR0251-004X	FERRITE BEAD
J2851	QNS0078-001	3.5 JACK
CN901	QGF0507F1-16X	FPC CONNECTOR
CN902	QGF0517F2-08X	FPC CONNECTOR

\*\*\*\*\*

W/B BOARD ASSEMBLY <11>

PW3	YB10285A3	W/B BOARD ASSY
Q1151	RPM-22PB	PHOTO TRANSISTOR
R1151	NRSA63J-302X	MG RESISTOR 3kΩ,1/16W
C1151	NBE90JM-106X	T CAPACITOR 10μF,6.3V
C1152	NCB21EK-683X-R	CAPACITOR 0.068μF,25V
L1151	NQR0265-001X	FERRITE BEAD
WR1	WJM0144-001A	E-SI C WIRE C-F

\*\*\*\*\*

EJECT BOARD ASSEMBLY <12>

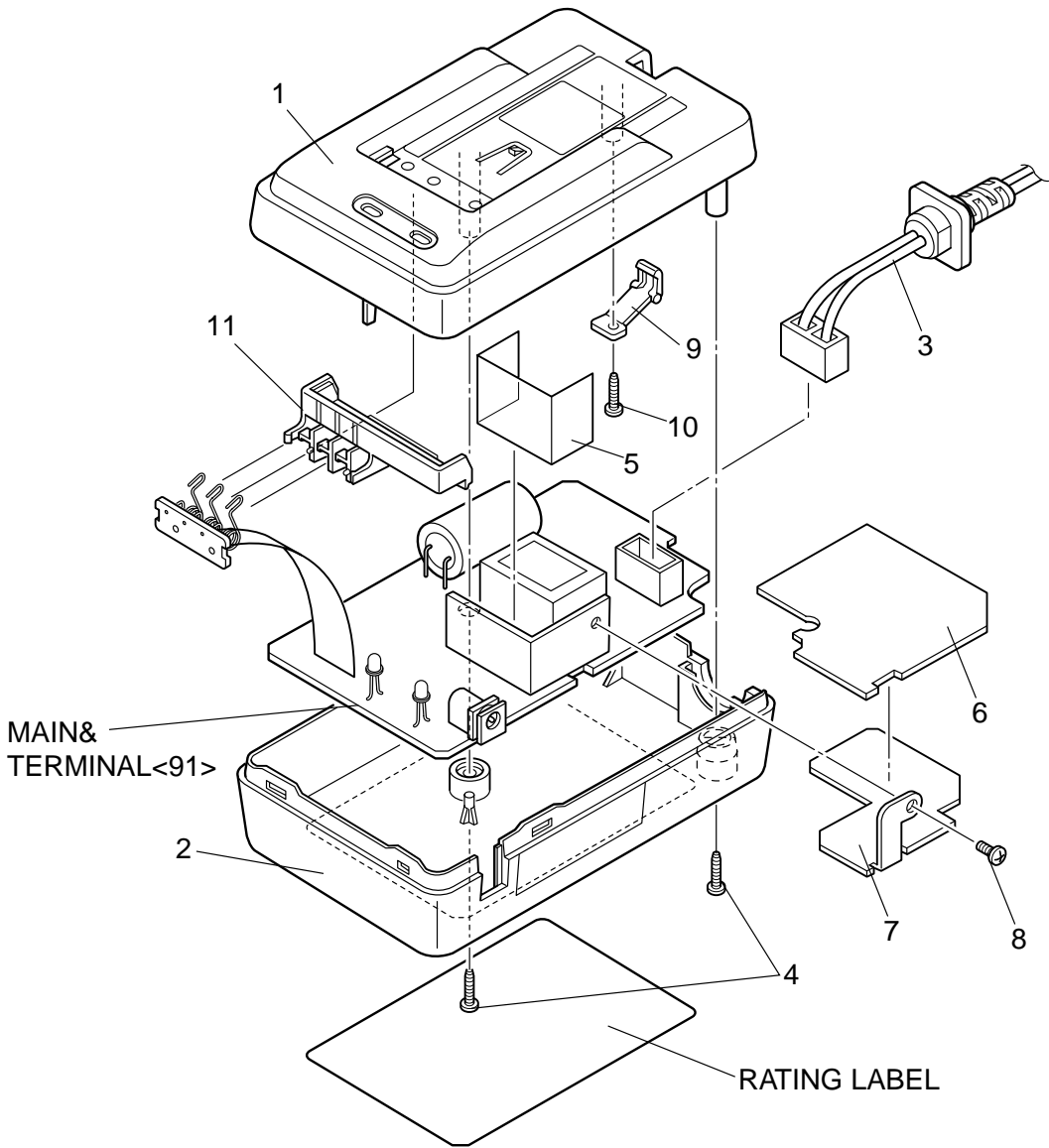
PW2	YB10288A2-01	EJECT BOARD ASSY
S1	NSW0120-002X	PUSH SWITCH
WR1	WJM0145-001A	E-SI C WIRE C-F

SECTION 6  
AC POWER ADAPTER (AA-V51EG/EK)

SAFETY PRECAUTION

Parts identified by the △ symbol are critical for safety. Replace only with specified part numbers.

6.1 CABINET ASSEMBLY <MA>



#△REF No.	PART No.	PART NAME, DESCRIPTION
*****		

CABINET ASSEMBLY <MA>

△ 1	PTY20603-013	UPPER CASE ASSY
△ 2	PTY20483-023	LOWER CASE
△ 3	YQ10531-006	POWER CORD For EG
	PTY20080-034	POWER CORD For EK
4	YQ10531-011	SCREW,x2
△ 5	PTY20483-078	INSULATOR B
△ 6	PTY20483-076	SHILED PLATE
△ 7	PTY20483-077	INSULATOR A

#△REF No.	PART No.	PART NAME, DESCRIPTION
-----------	----------	------------------------

8	PTY20483-079	SCREW, for shield plate
9	PTY20603-055	LOCK LEVER
10	PTY20545-055	SCREW
11	PTY20603-054	TERMINAL HOLDER



## 5

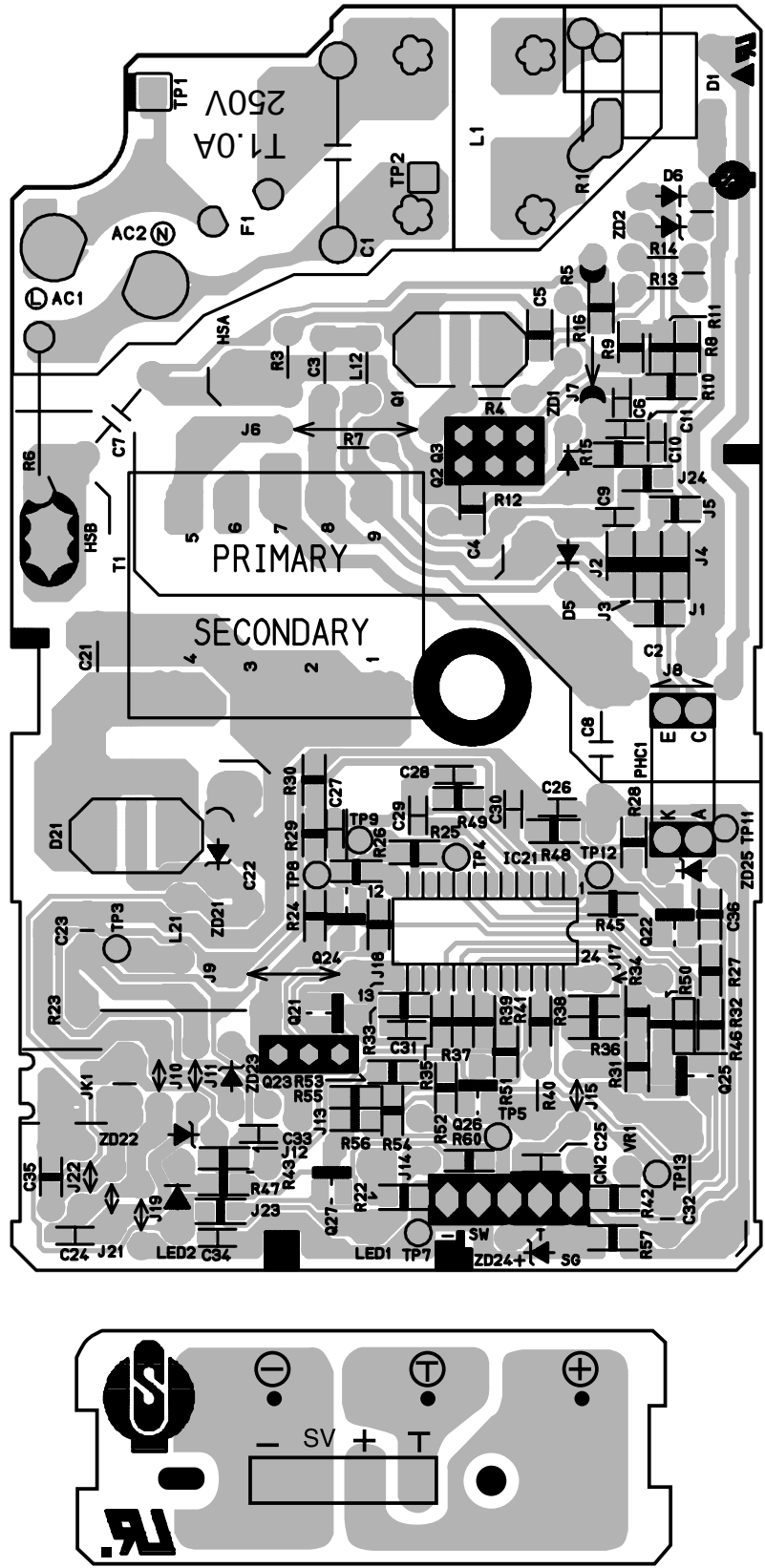
4

3

2



6.3 CIRCUIT BOARD



## 6.4 ELECTRICAL PARTS LIST

#△REF No.	PART No.	PART NAME, DESCRIPTION	
*****			
<b>MAIN &amp; TERMINAL BOARD ASSY &lt;91&gt;</b>			
△ PW1	PTY20603-503	MAIN & TERMINAL BOARD ASSY	
△ HS1	PTY20483-071	HEAT SINK A	
△ HS2	PTY20591-072	HEAT SINK B	
OT1	PTY10067-551	SCREW	
IC21	M61030AFP	CHARGE COTROL IC 24pin SOP	
Q1	FS2KM18A	MOS FET	
Q2	2SD2227	TRANSISTER	
Q3	2SD2227	TRANSISTER	
Q21	UN2211TX	DIG.TRANSISTER	
Q22	2SA1037AK/QR/-X	CHIP TRANSISTER	
Q23	2SB1592	TRANSISTER	
Q24	2SA1037AK/QR/-X	TRANSISTER	
D1	S1WBA60	B.DIODE!	600V 1A
D5	1SS244T77	DIODE	200V 6A
D6	1SS244T77	DIODE	200V 6A
D21	MA7D56	DIODE	60V 10A
ZD1	MTZJ12C-T2	ZENER DIODE	12V
ZD2	MTZJ6.2B-T2	ZENER DIODE	6.2V 500mW
ZD21	MTZJ12C-T2	ZENER DIODE	12V
ZD22	MTZJ12C-T2	ZENER DIODE	12V
ZD23	MTZJ12C-T2	ZENER DIODE	12V
ZD24	MTZJ12C-T2	ZENER DIODE	12V
ZD25	MA4047NM	ZENER DIODE	4.7V 500mW
LED1	YQ10531-540	LED RED POWER	
LED2	YQ10531-542	LED GREEN CHARGE	
R1	QRN141J-105	RESISTOR	1MΩ 1/4W
R3	PTY10067-601	MF RESISTOR	0.62Ω 1W
R4	QRE141J-334Y	RESISTOR	330kΩ 1/4W
R5	QRE141J-334Y	RESISTOR	330kΩ 1/4W
R7	QRE141J-751Y	RESISTOR	750Ω 1/4W
R8	NRSA02J-103X	MG RESISTOR	10kΩ 1/10W
R9	NRSA02J-272X	MG RESISTOR	2.7kΩ 1/10W
R10	NRSA02J-104X	MG RESISTOR	100kΩ 1/10W
R11	NRSA02J-682X	MG RESISTOR	6.8kΩ 1/10W
R12	QRE141J-181Y	RESISTOR	180Ω 1/4W
R13	QRE141J-334Y	RESISTOR	330kΩ 1/4W
R14	QRE141J-334Y	RESISTOR	330kΩ 1/4W
R15	NRSA02J-182X	MG RESISTOR	1.8kΩ 1/10W
R16	NRSA02J-753X	MG RESISTOR	75kΩ 1/10W
R22	NRSA02J-621X	MG RESISTOR	620Ω 1/10W
R23	PTY20539-605	MF RESISTOR	0.20Ω 2W
R24	NRSA02J-102X	MG RESISTOR	1kΩ 1/10W
R25	NRSA02J-101X	MG RESISTOR	100Ω 1/10W
R26	NRSA02J-103X	MG RESISTOR	10kΩ 1/10W
R27	NRSA02J-102X	MG RESISTOR	1kΩ 1/10W
R28	NRSA02J-151X	MG RESISTOR	150Ω 1/10W
R29	PTY20539-601	MG RESISTOR	47.0kΩ 1/10W
R30	PTY20539-601	MG RESISTOR	47.0kΩ 1/10W
R31	PTY20292-227	MG RESISTOR	10.0kΩ 1/10W
R32	NRSA02J-103X	MG RESISTOR	10kΩ 1/10W
R33	NRSA02J-333X	MG RESISTOR	33kΩ 1/10W
R34	PTY20539-601	MG RESISTOR	47.0kΩ 1/10W
R35	NRSA02F-8451X	MG RESISTOR	8.45kΩ 1/10W
R36	NRSA02F-6192X	MG RESISTOR	61.9kΩ 1/10W
R37	PTY20539-603	MG RESISTOR	1.0kΩ 1/10W
R38	PTY20539-601	MG RESISTOR	47.0kΩ 1/10W
R39	PTY20539-604	MG RESISTOR	1.3kΩ 1/10W
R40	PTY20450-200	MG RESISTOR	20.0kΩ 1/4W
R41	NRSA02F-1152X	MG RESISTOR	11.5kΩ 1/10W
R42	NRSA02F-1152X	MG RESISTOR	11.5kΩ 1/10W

#△REF No.	PART No.	PART NAME, DESCRIPTION	
R43	QRE141J-103Y	MF RESISTOR	10kΩ 1/4W
R45	NRSA02J-222X	MG RESISTOR	2.2kΩ 1/10W
R46	NRSA02J-472X	MG RESISTOR	4.7kΩ 1/10W
R47	NRSA02J-221X	MG RESISTOR	220Ω 1/10W
R48	NRSA02J-102X	MG RESISTOR	1kΩ 1/10W
R49	NRSA02J-473X	MG RESISTOR	47kΩ 1/10W
R57	NRSA02J-100X	MG RESISTOR	10Ω 1/10W
△ C1	QFZ9072-104	CAPACITOR	0.1μF 275V
C2	YQ10626-402	E CAPACITOR	47μF 400V
C3	PTY10067-651	CAPACITOR	1500pF 250V
C4	NCB21CK-224X	CAPACITOR	0.22μF 16V
C5	PTY10067-653	CAPACITOR	0.01μF 50V
C6	NCB31HK-391X	CAPACITOR	390pF 50V
△ C7	PTY20538-611	CAPACITOR	2200pF 250V
△ C8	PTY20538-611	CAPACITOR	2200pF 250V
C9	NDC31HJ-680X	CAPACITOR	68pF 50V
C10	NDC31HJ-151X	CAPACITOR	150pF 50V
C11	NDC31HJ-151X	CAPACITOR	150pF 50V
C21	PTY10067-657	CAPACITOR	0.01μF 250V
C22	PTY20292-321	E CAPACITOR	680μF 16V
C23	QETL1CM-227	E CAPACITOR	220μF 16V
C24	PTY20603-601	CAPACITOR	0.22μF 10V
C25	NCF31EZ-104X	CAPACITOR	0.1μF 25V
C26	PTY20603-601	CAPACITOR	0.22μF 10V
C27	NCB31CK-473X	CAPACITOR	0.047μF 16V
C28	NCB31CK-473X	CAPACITOR	0.047μF 16V
C29	NCB31CK-104X	CAPACITOR	0.1μF 16V
C30	NCF31EZ-104X	CAPACITOR	0.1μF 25V
C31	NCB31HK-222X	CAPACITOR	0.0022μF 50V
C32	QEHA1HM-475	E CAPACITOR	4.7μF 50V
C33	NCF31EZ-104X	CAPACITOR	0.1μF 25V
C34	NCF31EZ-104X	CAPACITOR	0.1μF 25V
C35	QFLA1HJ-224	F CAPACITOR	0.22μF 50V
C36	NCB21CK-224X	CAPACITOR	0.22μF 16V
△ T1	PTY20538-801	SW TRANS	
VR1	PTY20483-101	VOLUME	2kΩ
△ F1	PTY20450-041	FUSE	1A 250V
JK1	YQ21032-301	DC JACK	
△ L1	PTY20450-401	LINE FILTER	
L12	PTY10067-702	BEAD INDUCTOR	
L21	PTY10067-703	COIL	
△ PHC1	PC123YS	PHOTO COUPLER	
TB1	PTY20603-053	TERMINAL, x3	
WR1	PTY20603-052	FLAT CABLE, (4P)	
CN1	PTY20603-056	CONNECTOR	