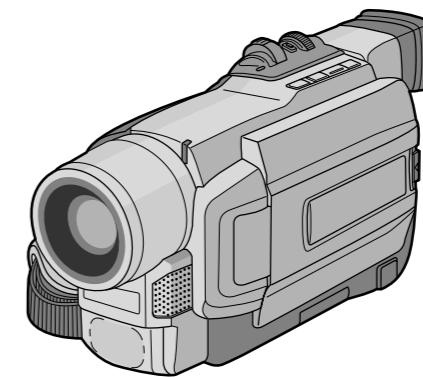


SERVICE MANUAL

DIGITAL VIDEO CAMERA

GR-DVL510U/815U/817U/915U



Mini DV NTSC
DSC
DIGITAL
STILL CAMERA

GR-DVL510U/815U/817U/915U

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JVC

S40895-03

No. 86601

SPECIFICATIONS *(The specifications shown pertain specifically to the model GR-DVL310/510/815/915)*

Camcorder		For Digital Still Camera (GR-DVL915/DVL815/DVL510 only)	
For General		Storage media	: SD Memory Card/MultiMediaCard
Power supply	: DC 11.0 V \equiv (Using AC Adapter) DC 7.2 V \equiv (Using battery pack)	Compression system	: JPEG (compatible)
Power consumption		File size	: VGA (640 x 480 pixels)
LCD monitor off, viewfinder on	: Approx. 4.3 W	Picture quality	: 2 modes (FINE/STANDARD)
LCD monitor on, viewfinder off	: Approx. 5.3 W	Approximate number of storable images with memory card [8 MB] (provided with GR-DVL510 only)	
Video light	: Approx. 3.5 W	FINE	: 100
Dimensions (W x H x D)	: 83 mm x 97 mm x 188 mm (3-5/16" x 3-7/8" x 7-7/16") (with the LCD monitor closed and the viewfinder pushed down)	STANDARD	: 200
Weight	: Approx. 610 g (1.4 lbs) (GR-DVL915) Approx. 600 g (1.4 lbs) (GR-DVL815) Approx. 590 g (1.3 lbs) (GR-DVL510/DVL310)	with memory card [16 MB] (provided with GR-DVL915/DVL815 only)	
Operating temperature	: 0°C to 40°C (32°F to 104°F)	FINE	: 200
Operating humidity	: 35% to 80%	STANDARD	: 400
Storage temperature	: -20°C to 50°C (-4°F to 122°F)	with memory card [32 MB] (optional)	
Pickup	: 1/4" CCD	FINE	: 400
Lens	: F 1.8, f = 3.6 mm to 36 mm, 10:1 power zoom lens	STANDARD	: 800
Filter diameter	: ϕ 37 mm	with memory card [64 MB] (optional)	
LCD monitor	: 3.5" diagonally measured, LCD panel/TFT active matrix system (GR-DVL915) 3" diagonally measured, LCD panel/TFT active matrix system (GR-DVL815) 2.5" diagonally measured, LCD panel/TFT active matrix system (GR-DVL510/DVL310)	FINE	: 800
Viewfinder	: Electronic viewfinder with 0.44" color LCD (GR-DVL915/DVL815) Electronic viewfinder with 0.24" black/white LCD (GR-DVL510/DVL310)	STANDARD	: 1600
Speaker	: Monaural	For Connectors	
For Digital Video Camera		S-Video	
Format	: DV format (SD mode)	Output	: Y : 1 V (p-p), 75 Ω , analog C : 0.29 V (p-p), 75 Ω , analog
Signal format	: NTSC standard	Input (GR-DVL915 only)	: Y : 0.8 V (p-p) - 1.2 V (p-p), 75 Ω , analog C : 0.2 V (p-p) - 0.4 V (p-p), 75 Ω , analog
Recording/Playback format	: Video: Digital digital recording Audio: PCM digital recording, 32 kHz 4-channel (12-bit), 48 kHz 2-channel (16-bit)	AV	
Cassette	: Mini DV cassette	Video output	: 1 V (p-p), 75 Ω , analog
Tape speed	: SP: 18.8 mm/s LP: 12.5 mm/s	Video input (GR-DVL915 only)	: 0.8 V (p-p) - 1.2 V (p-p), 75 Ω , analog
Maximum recording time (using 80 min. cassette)	: SP: 80 min. LP: 120 min.	Audio output	: 300 mV (rms), 1 k Ω , analog, stereo
		Audio input (GR-DVL915 only)	: 300 mV (rms), 50 k Ω , analog, stereo
		DV	
		Output	: 4-pin, IEEE 1394 compliant
		Input	: 4-pin, IEEE 1394 compliant
		USB (GR-DVL915/DVL815/DVL510 only)	: 5-pin
		PC (DIGITAL PHOTO) (GR-DVL310 only)	: ϕ 2.5 mm, 3-pole
		EDIT (GR-DVL915/DVL815/DVL510 only)	: ϕ 3.5 mm, 2-pole
		LIIP (GR-DVL310 only)	: ϕ 3.5 mm, 4-pole
		AC adapter AP-V10U	
		Power requirement	
		U.S.A. and Canada	: AC 120 V \sim , 60 Hz
		Other countries	: AC 110 V to 240 V \sim , 50 Hz/60 Hz
		Output	: DC 11 V \equiv , 1 A
		Dimensions (W x H x D)	: 59 mm x 31 mm x 84 mm (2-3/8" x 1-1/4" x 3-5/16")
		Weight	: Approx. 130 g (0.29 lbs.)

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

TABLE OF CONTENTS

Section	Title	Page	Section	Title	Page
Important Safety Precautions			3. ELECTRICAL ADJUSTMENT		
INSTRUCTIONS			3.1 PRECAUTION		3-1
1. DISASSEMBLY			3.2 SETUP		3-2
1.1 BEFORE ASSEMBLY AND DISASSEMBLY		1-1	4. CHARTS AND DIAGRAMS		
1.1.1 Precautions		1-1	NOTES OF SCHEMATIC DIAGRAM		4-1
1.1.2 Assembly and disassembly		1-1	CIRCUIT BOARD NOTES		4-2
1.1.3 Destination of connectors		1-1	4.1 BOARD INTERCONNECTIONS		4-3
1.1.4 Disconnection of Connectors (Wires)		1-1	4.2 SYSCON SCHEMATIC DIAGRAM		4-5
1.2 JIGS AND TOOLS REQUIRED FOR DISASSEMBLY, ASSEMBLY AND ADJUSTMENT		1-2	4.3 PC IF SCHEMATIC DIAGRAM		4-7
1.2.1 Tools required for adjustments		1-2	4.4 VTR CPU SCHEMATIC DIAGRAM		4-9
1.3 DISASSEMBLY/ASSEMBLY OF CABINET PARTS AND BOARD ASSEMBLY		1-2	4.5 MDA SCHEMATIC DIAGRAM		4-11
1.3.1 Disassembly flow chart		1-2	4.6 AUDIO SCHEMATIC DIAGRAM		4-13
1.3.2 Disassembly method		1-3	4.7 DV MAIN SCHEMATIC DIAGRAM		4-15
1.4 ⑨ MONITOR ASSEMBLY		1-8	4.8 PRE/REC SCHEMATIC DIAGRAM		4-17
1.4.1 Disassembly/assembly of monitor assembly (for 2.5"-type LCD)		1-8	4.9 V OUT SCHEMATIC DIAGRAM		4-19
1.4.2 Disassembly/assembly of hinge assembly (for 2.5"-type LCD)		1-8	4.10 ANA IN SCHEMATIC DIAGRAM [GR-DVL915U]		4-21
1.4.3 Disassembly/assembly of monitor assembly (for 3"/3.5"-type LCD)		1-9	4.11 CAM DSP SCHEMATIC DIAGRAM		4-23
1.4.4 Disassembly/assembly of hinge assembly (for 3"/3.5"-type LCD)		1-9	4.12 OP DRIVE SCHEMATIC DIAGRAM		4-25
1.5 ⑩ E. VF ASSEMBLY		1-10	4.13 TG/VDRV SCHEMATIC DIAGRAM		4-27
1.5.1 Disassembly/assembly of E. VF assembly (for B/W VF)		1-10	4.14 REG SCHEMATIC DIAGRAM		4-29
1.5.2 Disassembly/assembly of E. VF assembly (for Color VF)		1-11	4.15 DSC/USB SCHEMATIC DIAGRAM		4-31
1.6 DISASSEMBLY/ASSEMBLY OF OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY		1-12	4.16 MONITOR SCHEMATIC DIAGRAM		4-33
1.6.1 Precautions		1-12	4.17 LCD BL SCHEMATIC DIAGRAM		4-35
1.6.2 How to remove CCD board assembly and CCD base assembly ..		1-12	4.18 CCD SCHEMATIC DIAGRAM		4-37
1.6.3 How to assemble CCD base assembly and CCD board assembly		1-12	4.19 JUNCTION SCHEMATIC DIAGRAM		4-38
1.6.4 Replacement of Service Repair Parts		1-12	4.20 JACK SCHEMATIC DIAGRAM		4-39
1.7 EMERGENCY DISPLAY		1-13	4.21 B/W VF SCHEMATIC DIAGRAM		4-40
1.8 SERVICE NOTE		1-14	4.22 ZOOM UNIT SCHEMATIC DIAGRAM		4-41
2. MECHANISM ADJUSTMENT			4.23 MAIN CIRCUIT BOARD		4-43
2.1 PRELIMINARY REMARKS ON ADJUSTMENT AND REPAIR		2-1	4.24 MONITOR CIRCUIT BOARD		4-49
2.1.1 PRECAUTIONS		2-1	4.25 LCD BL CIRCUIT BOARD		4-51
2.1.2 Notes on procedure for disassembly/assembly		2-1	4.26 CCD AND JUNCTION CIRCUIT BOARDS		4-53
2.2 JIGS AND TOOLS REQUIRED FOR DISASSEMBLY, ASSEMBLY AND ADJUSTMENT		2-2	4.27 JACK CIRCUIT BOARD		4-55
2.2.1 Tools required for adjustments		2-2	4.28 POWER SYSTEM BLOCK DIAGRAM		4-57
2.3 DISASSEMBLY/ASSEMBLY OF MECHANISM ASSEMBLY		2-3	4.29 REGULATOR SYSTEM BLOCK DIAGRAM		4-59
2.3.1 General statement		2-3	4.30 VIDEO SYSTEM BLOCK DIAGRAM		4-61
2.3.2 Explanation of mechanism mode		2-3	4.31 AUDIO SYSTEM BLOCK DIAGRAM		4-65
2.3.3 Mechanism timing chart		2-4	4.32 VOLTAGE CHARTS		4-67
2.4 DISASSEMBLY/ASSEMBLY OF MECHANISM ASSEMBLY		2-5	5. PARTS LIST		
2.4.1 Follow chart		2-5	5.1 PACKING AND ACCESSORY ASSEMBLY <M1>		5-1
2.4.2 Disassembly/assembly		2-8	5.2 FINAL ASSEMBLY <M2>		5-3
2.4.3 List of procedures for disassembly		2-14	5.3 MECHANISM ASSEMBLY <M3>		5-6
2.5 CHECKUP AND ADJUSTMENT OF MECHANISM PHASE		2-15	5.4 ELECTRONIC VIEWFINDER ASSEMBLY <M4> [GR-DVL815U/915U]		5-8
2.6 MECHANISM ADJUSTMENTS		2-16	5.4 ELECTRONIC VIEWFINDER ASSEMBLY <M4> [GR-DVL510U/817U]		5-9
2.6.1 Assembling slide deck assembly and main deck assembly ..		2-16	5.5 MONITOR ASSEMBLY <M5> [GR-DVL510U]		5-10
2.6.2 Locating tension pole		2-17	5.5 MONITOR ASSEMBLY <M5> [GR-DVL815U/817U/915U]		5-11
2.7 SERVICE NOTE		2-18	5.6 ELECTRICAL PARTS LIST		5-12
2.8 JIG CONNECTOR CABLE CONNECTION		2-20	MAIN BOARD ASSEMBLY <01>		5-12
			MONITOR BOARD ASSEMBLY <02>		5-21
			LCD BL BOARD ASSEMBLY <03>		5-22
			CCD BOARD ASSEMBLY <04>		5-23
			JUNCTION BOARD ASSEMBLY <05>		5-23
			JACK BOARD ASSEMBLY <06>		5-23

The following table lists the differing points between Models GR-DVL510U,GR-DVL815U,GR-DVL817U and GR-DVL915U in this series.

	GR-DVL510U	GR-DVL815U	GR-DVL817U	GR-DVL915U
E.VF UNIT	B/W	COLOR	B/W	COLOR
LCD MONITOR	2.5"	3.0"	3.5"	3.5"
SIDE LED INDICATER	NOT USED	USED	USED	USED
ANALOG INPUT	NOT USED	NOT USED	NOT USED	USED
REMOTE CONTROL	RM-V715U	RM-V716U	RM-V716U	RM-V716U
REMEMORY CARD	USED(8MB)	USED(16MB)	USED(8MB)	USED(16MB)
EDITING CABLE	NOT USED	USED	USED	USED

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.

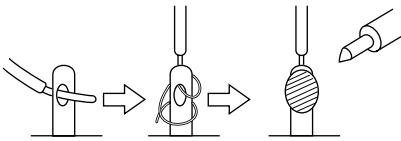


Fig.1

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.

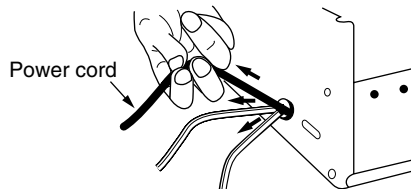


Fig.2

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).

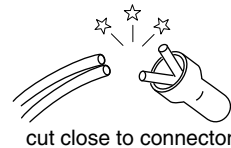


Fig.3

(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.

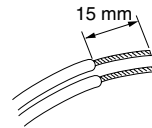


Fig.4

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

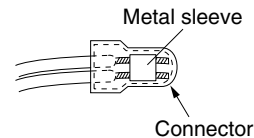


Fig.5

(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.

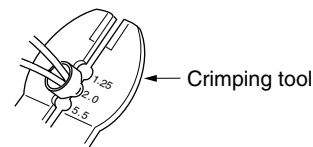


Fig.6

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

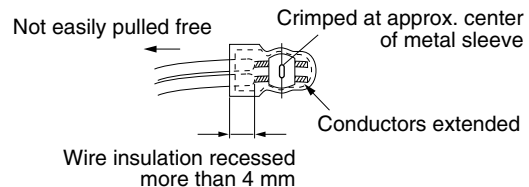


Fig.7

● 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

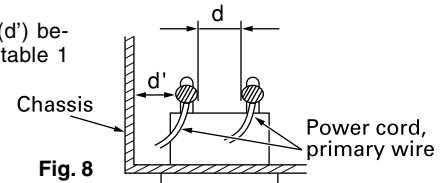
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

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.

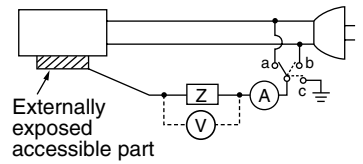


4. Leakage current test

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.

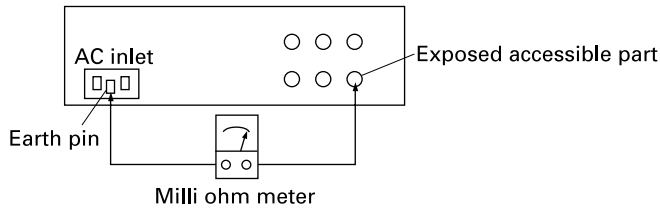


5. Grounding (Class 1 model only)

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.



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 200 to 240 V	Europe & Australia	$R \geq 10 \text{ M}\Omega/500 \text{ V DC}$	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	$d \geq 4 \text{ mm}$ $d' \geq 8 \text{ mm}$ (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 kΩ	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
		50 kΩ	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	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 0.069N·m(0.7kgf·cm).

1.1.2 Assembly and disassembly

STEP No.	PART	Fig.No.	POINT	NOTE
①	COVER(ZOOM) ASSY	Fig.1-3-1	(S①a),(S①b),2(L①a),2(L①b)	-
②	UPPER CASE ASSY (Inc.E.VF UNIT (B/W.COLOR), SPEAKER/MONITOR)	Fig.1-3-2	(S②a),(S②b),(L②),(S②c) 2(S②a),(S②d),4(S②a) CAP(DC JACK) ☆CN②a	NOTE②

(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.	
②a	MAIN	CN101	↔	MONITOR	CN761	50

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.

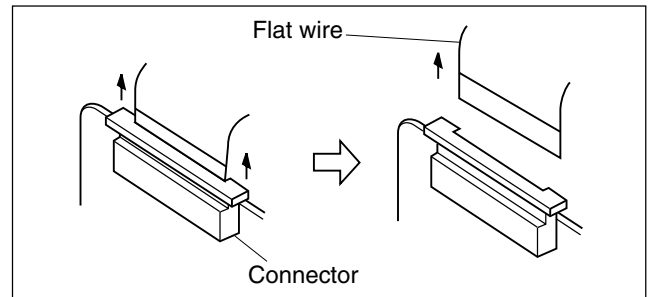


Fig. 1-1-1 Connector 1

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.

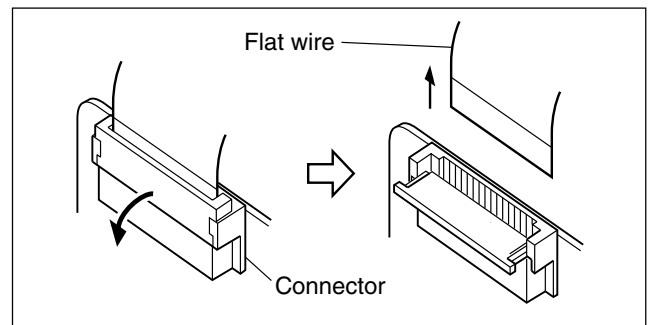


Fig. 1-1-2 Connector 2

B-B connector

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

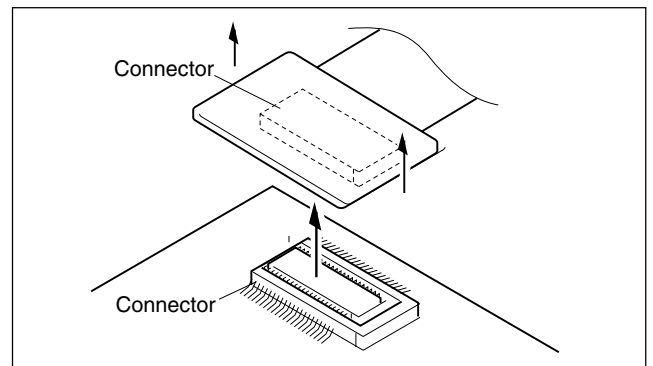


Fig. 1-1-3 Connector 3

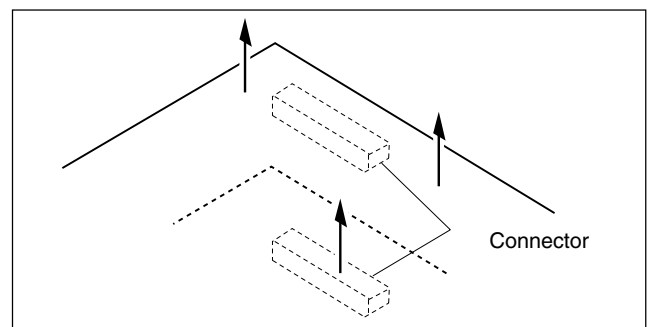


Fig. 1-1-4 Connector 4

1.2 JIGS AND TOOLS REQUIRED FOR DISASSEMBLY, ASSEMBLY AND ADJUSTMENT

1.2.1 Tools required for adjustments

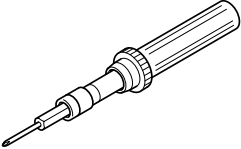
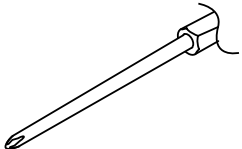
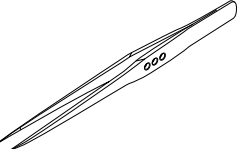
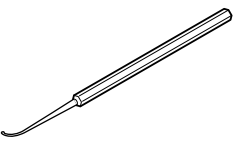
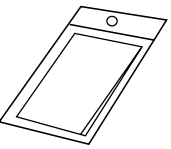
1	Torque Driver YTU94088	2	Bit YTU94088-003
			
3	Tweezers P-895	4	Chip IC Replacement Jig PTS40844-2
			
5	Cleaning Cloth KSMM-01		
			

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. 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.

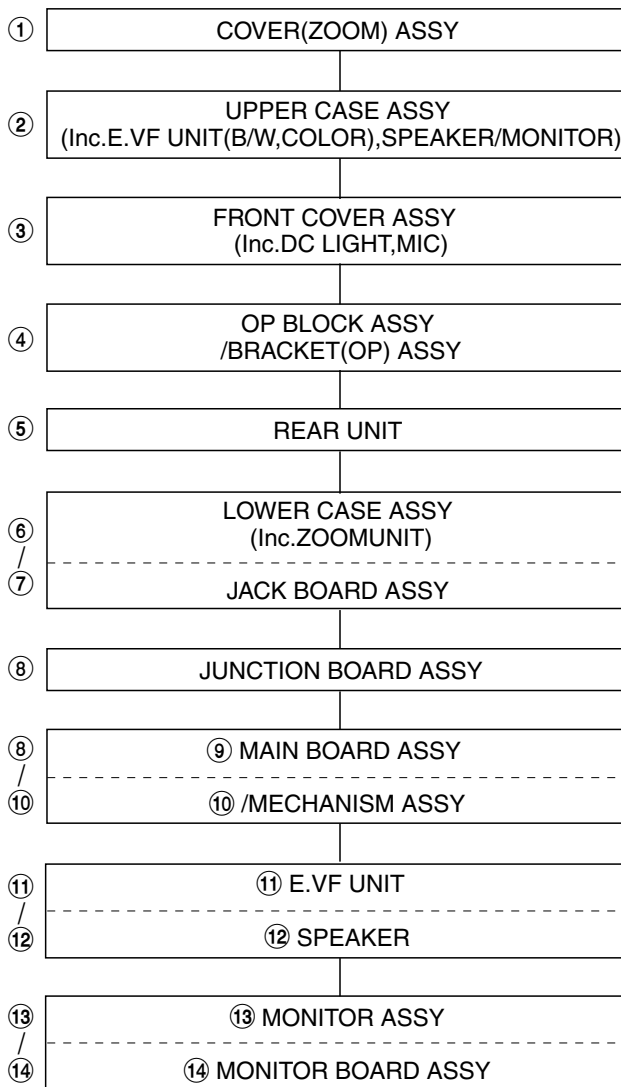


Table 1-3-1

1.3.2 Disassembly method

STEP No.	PART	Fig.No.	POINT	NOTE
①	COVER(ZOOM) ASSY	Fig.1-3-1	(S①a),(S①b),2(L①a),2(L①b)	-
②	UPPER CASE ASSY (Inc.E.VF UNIT (B/W.COLOR), SPEAKER/ MONITOR)	Fig.1-3-2	(S②a),(S②b),(L②),(S②c) 2(S②a),(S②d),4(S②a) CAP(DC JACK) ☆CN②a	NOTE②
③	FRONT COVER ASSY (Inc.DC LIGHT,MIC)	Fig.1-3-3	COVER(JACK),3(S③),(L③a) (L③b),☆CN③a	NOTE③a NOTE③b
④	OP BLOCK ASSY /BRACKET(OP) ASSY	Fig.1-3-4	☆CN④a,④b 2(S④),2(L④)	-
⑤	REAR UNIT	Fig.1-3-5	☆CN⑤a 4(S⑤)	NOTE⑤
⑥	LOWER CASE ASSY (Inc.ZOOMUNIT)	Fig.1-3-6	☆CN⑥a,⑥b,⑥c (S⑥a),2(S⑥b),2(S⑥c) (L⑥a),(L⑥b)	-
⑦	JACK BOARD ASSY		(S⑦)	NOTE⑦
⑧	JUNCTION BOARD ASSY	Fig.1-3-7	☆CN⑧a,⑧b,⑧c 2(S⑧),☆CN⑧d	NOTE⑧a NOTE⑧b
⑨	MAIN BOARD ASSY / /MECHANISM ASSY	Fig.1-3-8	(S⑨a),(L⑨a),SHIELD PLATE ☆CN⑨a,⑨b,⑨c 2(S⑨b),(L⑨b),(L⑨c)	-
⑩	E.VF UNIT	Fig.1-3-9	☆CN⑩a,(S⑩a),(S⑩b) (L⑩)	NOTE⑩a NOTE⑩b
⑪	SPEAKER		(S⑪),PLATE(SPK) ☆CN⑪a	-
⑫	MONITOR ASSY	Fig.1-3-10	2(S⑫a),COVER(HINGE) ☆CN⑫a,2(S⑫b)	NOTE⑫
⑬	MONITOR BOARD ASSY		3(S⑬),(L⑬)	NOTE⑬a NOTE⑬b NOTE⑬c NOTE⑬d

Table-1-3-2

Note: Remove the parts marked in .

CONN. No.	CONNECTOR					Pin No.
②a	MAIN	CN101	↔	MONITOR	CN761	50
③a	MAIN	CN106	↔	MIC	—	3
④a	MAIN	CN107	↔	CCD	—	20
④b	MAIN	CN108	↔	OP BLOCK ASSY	—	24
⑤a	MAIN	CN104	↔	REAR UNIT	CN1	10
⑥a	MAIN	CN109	↔	ZOOM UNIT	—	15
⑥b	MAIN	CN102	↔	JACK	CN501	9
⑥c	JACK	CN502	↔	MAIN	CN103	14
⑧a	JUNCTION	CN571	↔	MAIN	CN113	34
⑧b	JUNCTION	CN574	↔	LOADING MOTOR	—	6
⑧c	JUNCTION	CN573	↔	DRUM MOTOR	—	11
⑧d	JUNCTION	CN572	↔	SENSOR	—	15
⑨a	MAIN	CN110	↔	HEAD	—	8
⑨b	MAIN	CN112	↔	CAPSTAN MOTOR	—	18
⑨c	MAIN	CN111	↔	ROTARY ENCODER	—	6
⑩a	MONITOR	CN763	↔	E.VF UNIT (C_B/W)	CN721/CN751	20
⑩a	MONITOR	CN765	↔	SPEAKER	—	2
⑩a	MONITOR	CN764	↔	LCD BL	CN751	33/32

Table-1-3-3

NOTE ②: Remove the CAP (DC JACK) before removing these parts .

NOTE ③a: As it is difficult to remove (L③b), remove the F. COVER ASSY by lowering it.

NOTE ③b: Be careful not to damage any parts. Particularly, take care not to scratch or stain the lenses.

NOTE ⑤: As screw No. 19 is hidden behind the cassette cover, open the cassette cover to enable removal of the screw.

NOTE ⑦: As screw No. 27 is hidden behind the cassette cover, open it before removing the screw.

NOTE ⑧a: As the CN572 is located at the back of the assembly, unplug the three connectors and remove the screws before disconnecting the CN572.

NOTE ⑧b: Be careful not to damage any of the switches.

NOTE ⑩a: To remove the unit, unlock the connector and pull out the unit together with the FPC.

NOTE ⑩b: When removing the unit, insert the FPC into the gap.

NOTE ⑬: When reassembling the MONITOR ASSY, be careful not to damage any of the parts.

NOTE ⑭a: To remove the assembly, pull the memory card out in advance. (MMC compatible models only)

NOTE ⑭b: Be careful not to damage any of the parts.

NOTE ⑭c: Be careful not to damage any of the parts. SW KNOB(DC LIGHT: Gray)

NOTE ⑭d: Be careful not to damage any of the parts. SW KNOB(VIDEO-DSC: Violet)

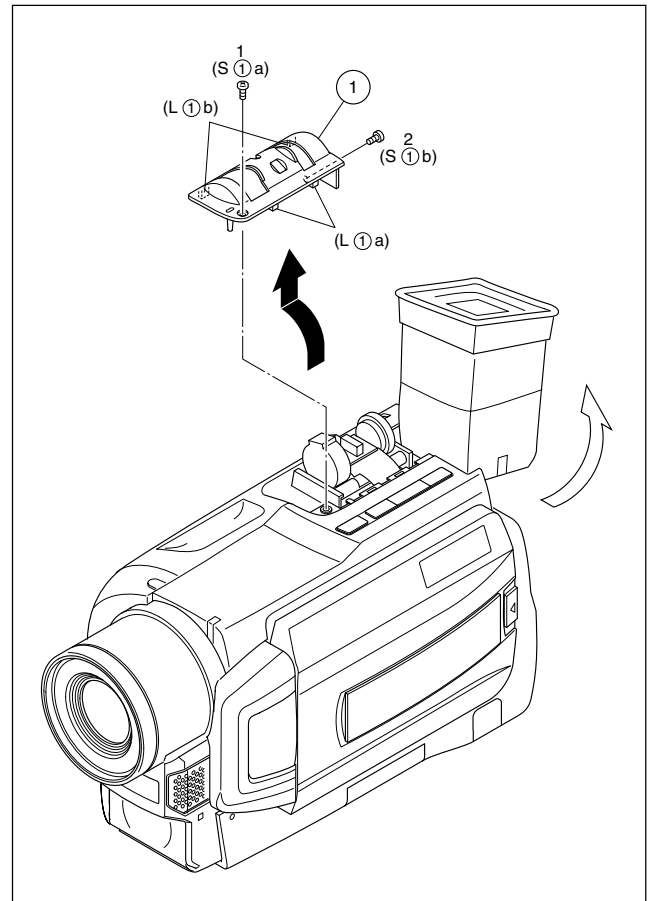


Fig. 1-3-1

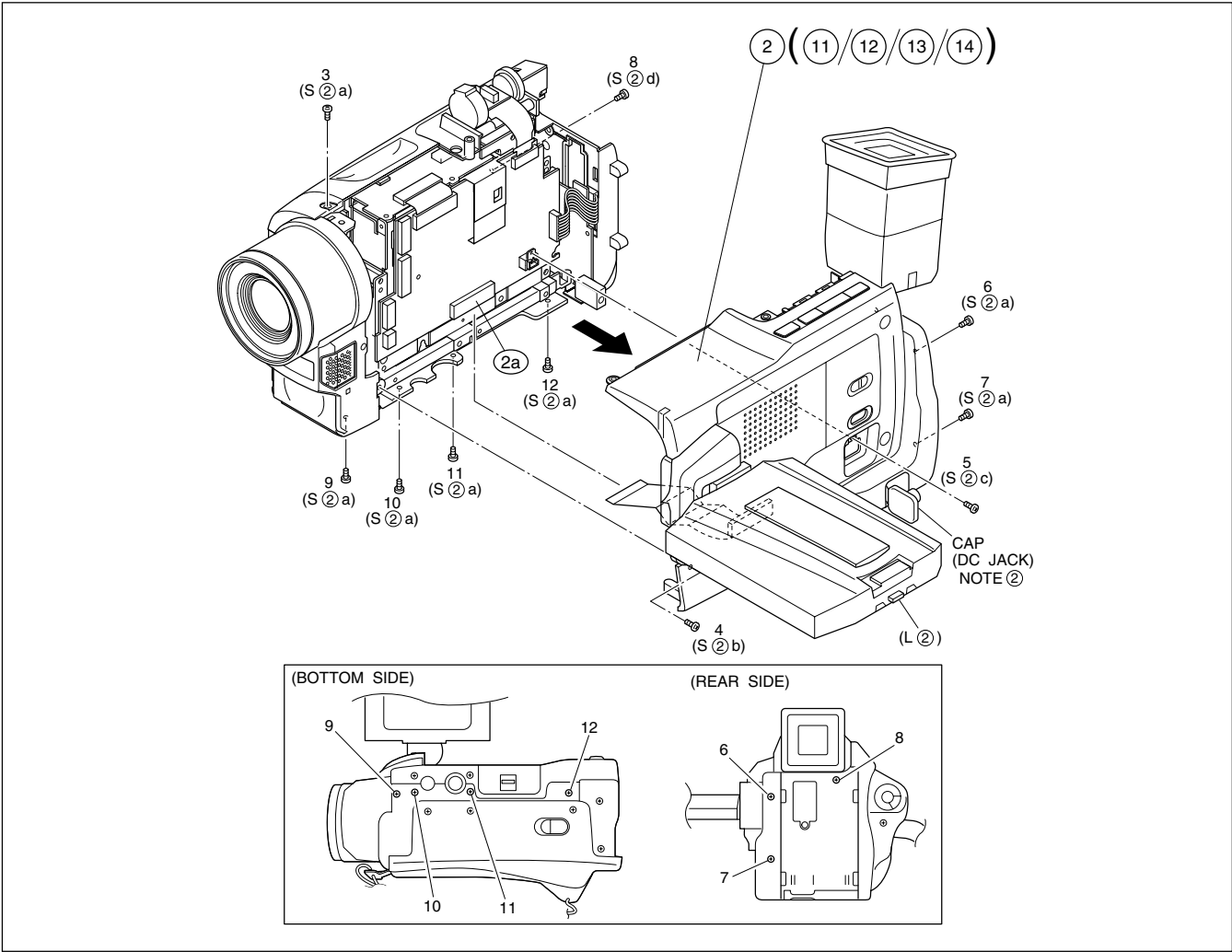


Fig. 1-3-2

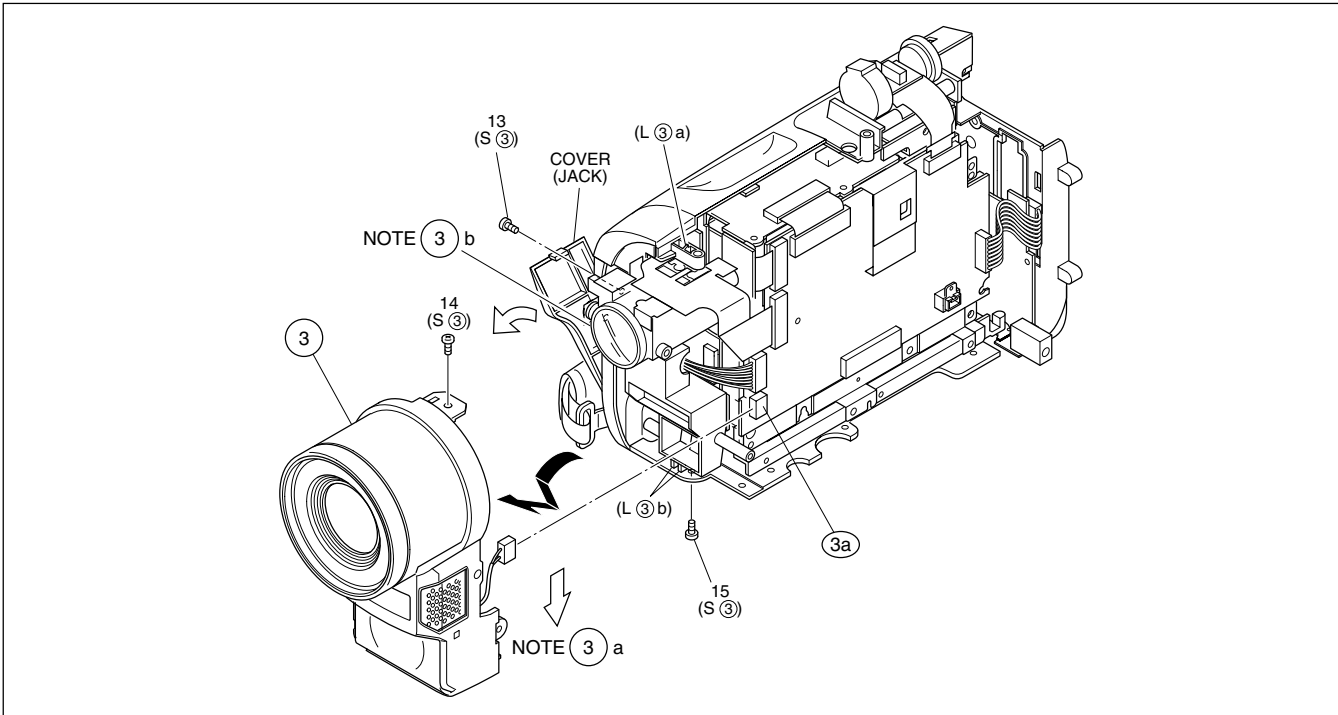


Fig. 1-3-3

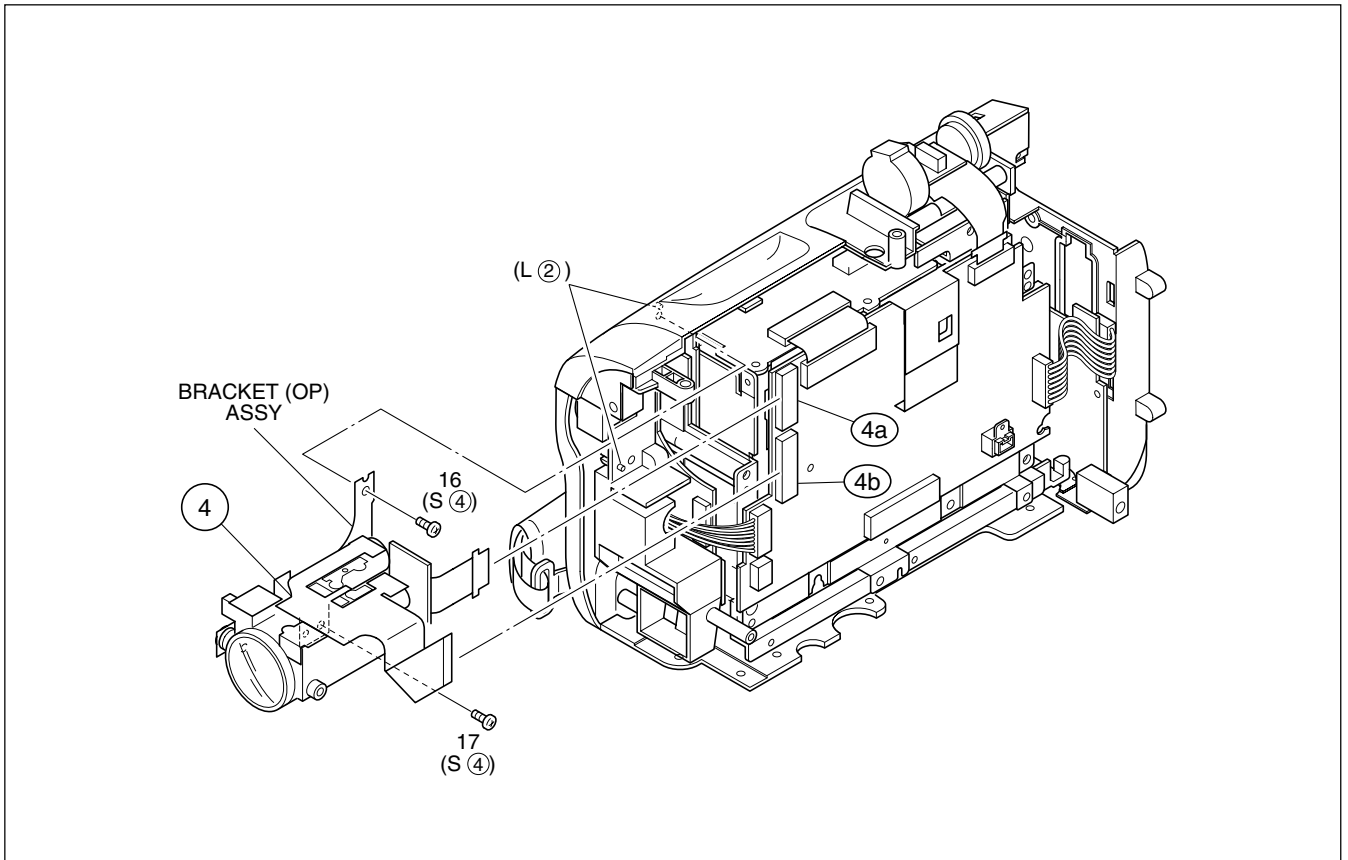


Fig. 1-3-4

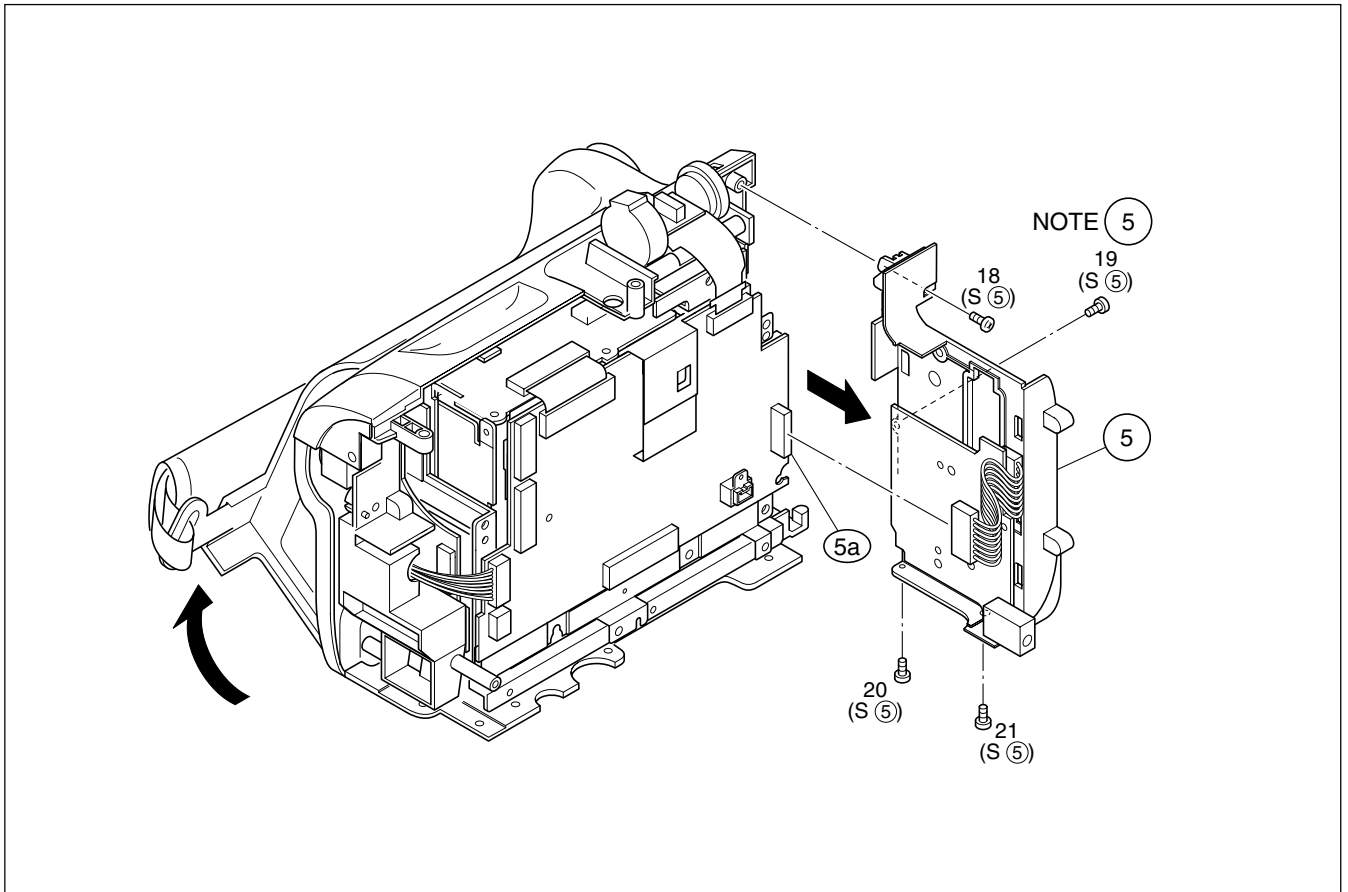


Fig. 1-3-5

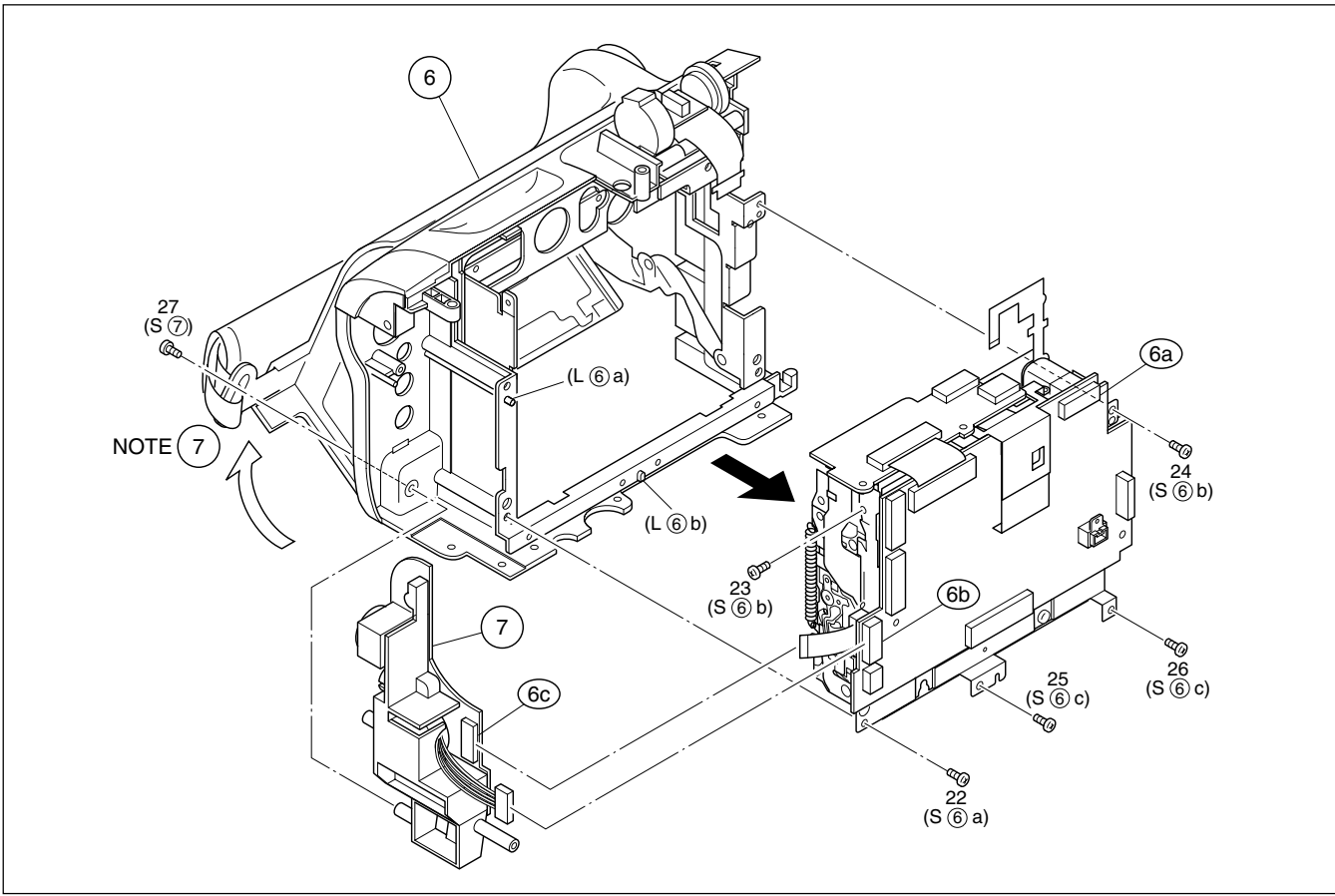


Fig. 1-3-6

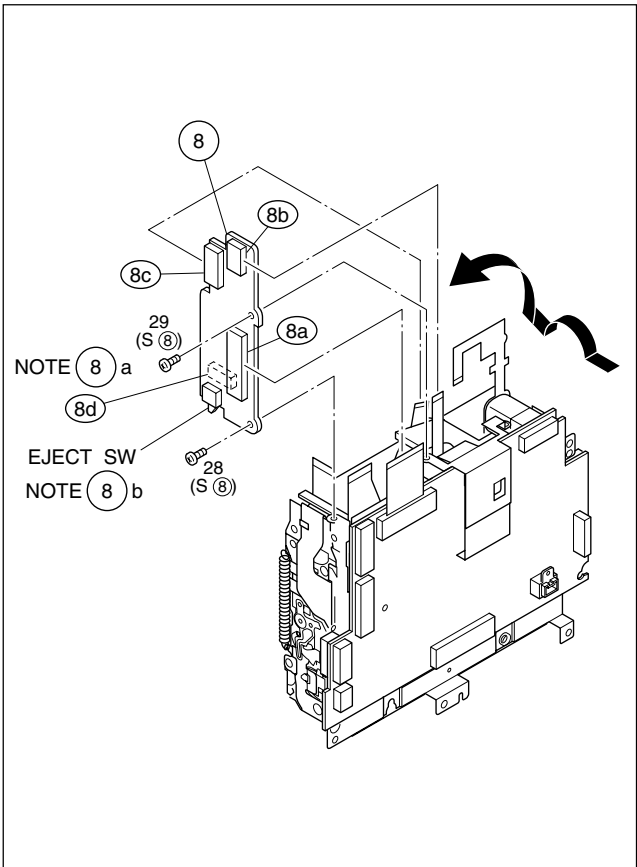


Fig. 1-3-7

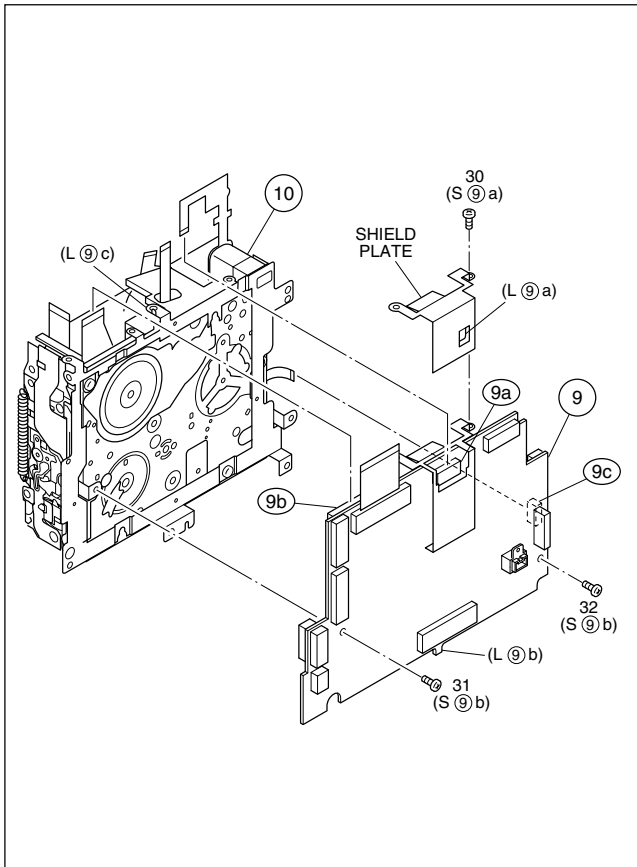


Fig. 1-3-8

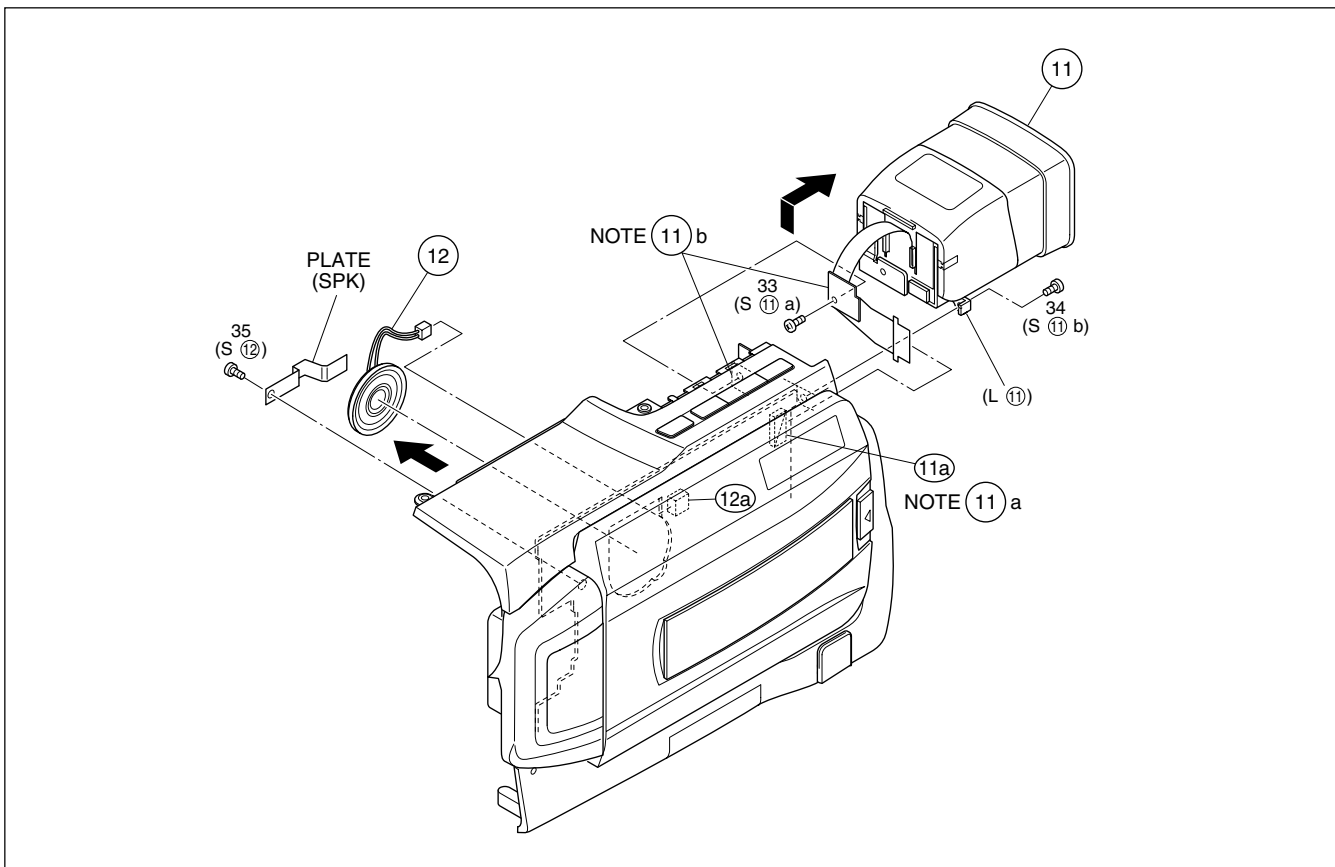


Fig. 1-3-9

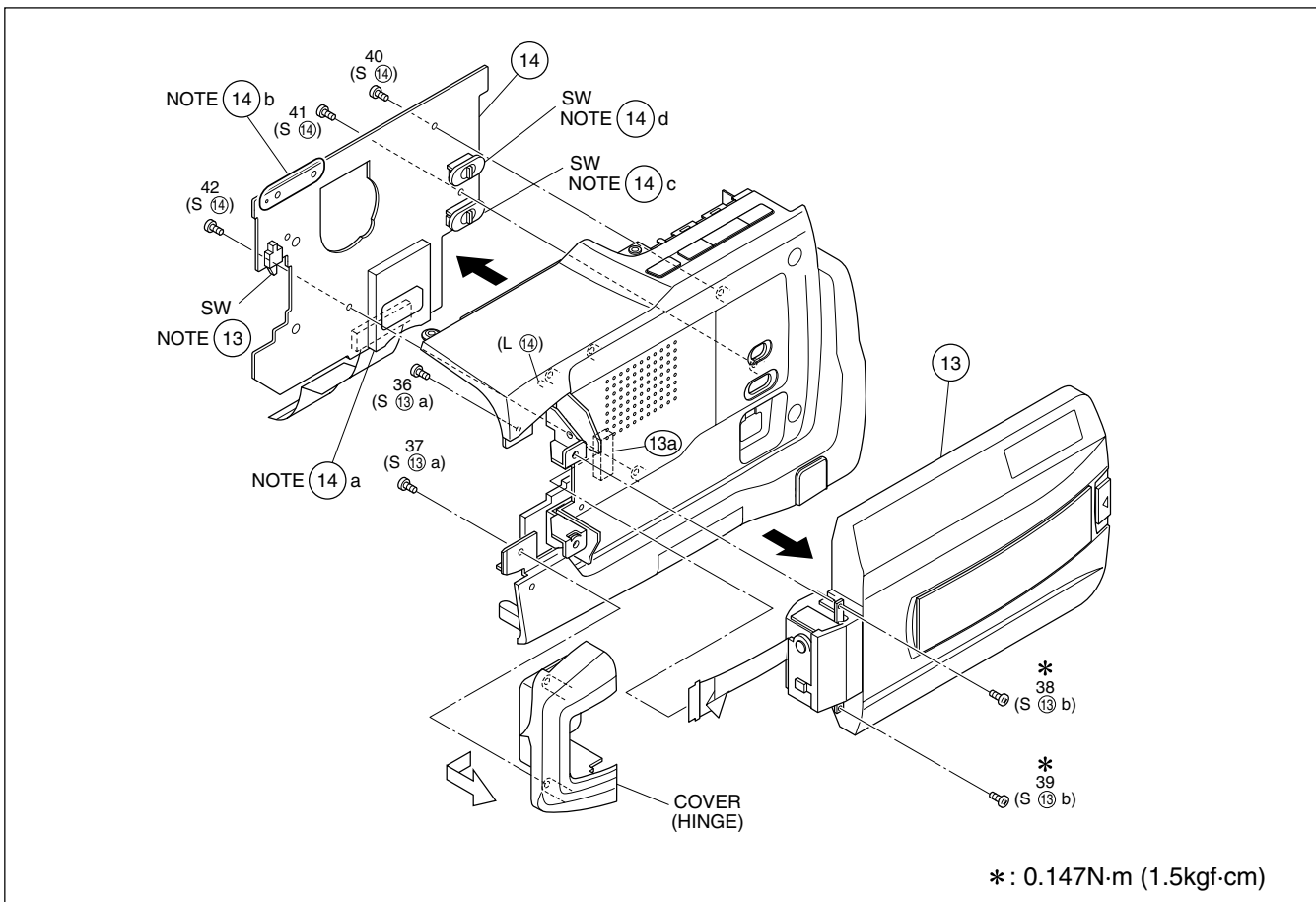


Fig. 1-3-10

1.4 ⑬ MONITOR ASSEMBLY

Note: The shape of the monitor assembly varies by the size of the LCD screen.

For the 2.5"-type LCD, refer to Fig. 1-4-1.

1.4.1 Disassembly/assembly of monitor assembly (for 2.5"-type LCD)

Note: Be careful not to soil or scratch the monitor screen through the disassembly/assembly work.

1. Remove the four screws 1 to 4 in numerical order. While disengaging the six hooks (L⑬a to L⑬f) in alphabetical order, remove the monitor cover assembly.
2. Unlock the connector a and then disconnect the FPC while lifting the hinge assembly upwards to remove it together with the FPC.

Note⑬a: For disconnecting the FPC, unlock the connector first and then lift the hinge assembly upwards. Accordingly, the FPC is disconnected together with the hinge assembly.

Note⑬b: Treat the wires carefully.

3. Unplug the wires and FPCs from the two connectors ⑬, ⑬, and then remove the MONITOR BL board assembly, holder (PWB) and backlight in that order.
4. Remove the LCD module.

1.4.2 Disassembly/assembly of hinge assembly (for 2.5"-type LCD)

1. Remove the three screws (5 to 7), and then remove the hinge covers (1) and (2) by disengaging a total of four hooks (L⑬g, L⑬h) at the two sides.
2. Separate the SW board assembly and the FPC from the hinge assembly.

Note⑬c: When connecting the FPC, arrange the FPC wire by winding it around the shaft (hinge pin) of the hinge assembly by two and a half turns while paying heed to the orientation of the hinge assembly and FPC.

Note⑬d: When disassembling/assembling the hinge assembly, pay careful attention to every part not to damage anything.

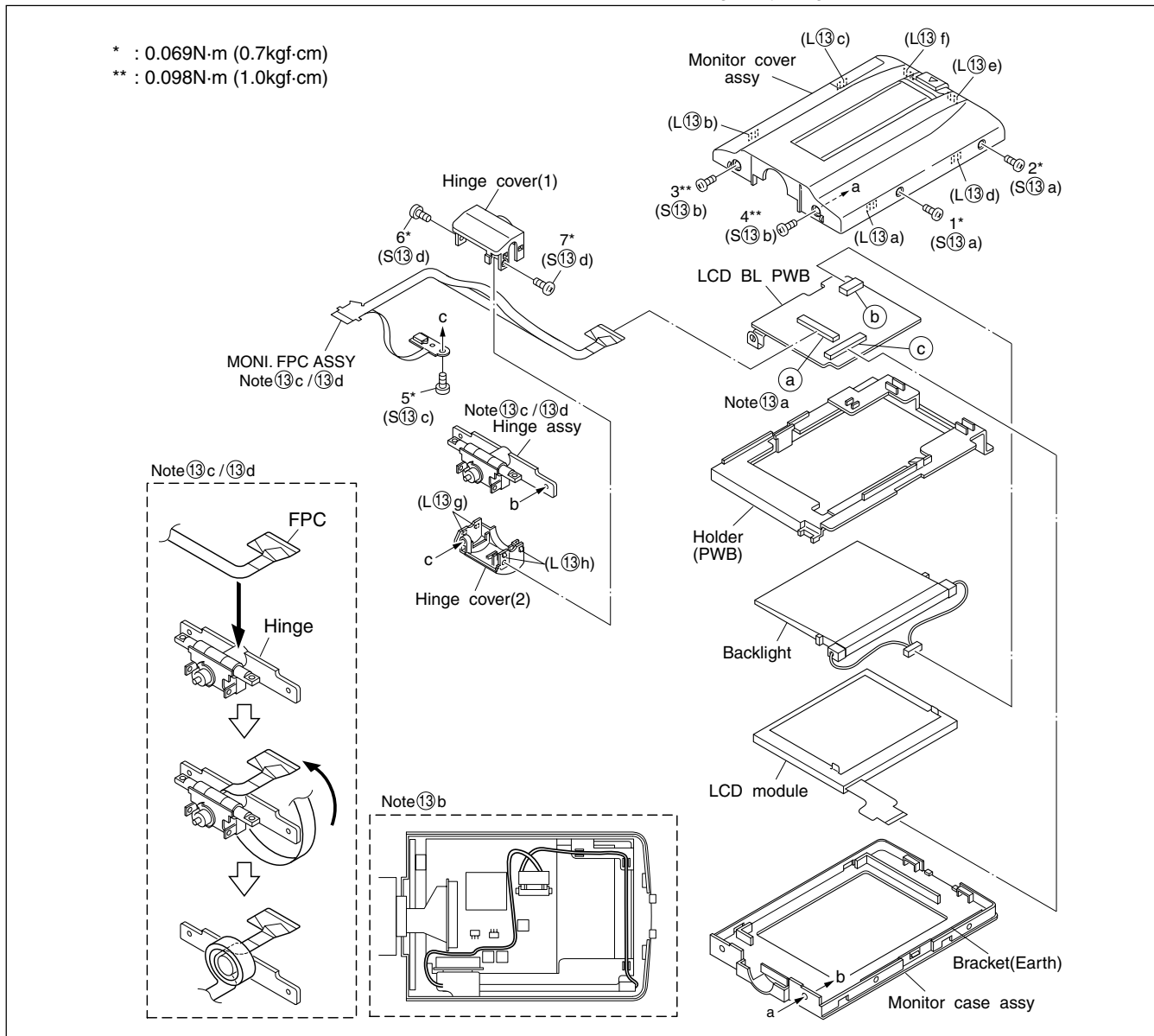


Fig. 1-4-1

Note: The shape of the monitor assembly varies depending on the size of the LCD screen.
For the 3"/3.5"-type LCD, refer to Fig. 1-4-2.

1.4.3 Disassembly/assembly of monitor assembly (for 3"/3.5"-type LCD)

Note: Be careful not to soil or scratch the monitor screen through the disassembly/assembly work.

1. Remove the four screws 1 to 4 in numerical order. While disengaging the six hooks (L13a to L13f) in alphabetical order, open the monitor cover assembly and remove it after disconnecting the FPC from the connector a..

Note13e: When removing the monitor cover assembly, be careful not to damage the FPC and connector.

2. Unlock the connector b and then disconnect the FPC while lifting the hinge assembly upwards to remove it together with the FPC.

Note13f: For disconnecting the FPC, unlock the connector first and then lift the hinge assembly upwards. Accordingly, the FPC is disconnected together with the hinge assembly.

Note13g: Treat the wires carefully.

3. Unplug the wires and FPCs from the two connectors ①, ②, and then remove the MONITOR BL board assembly, holder (PWB) and backlight in that order.
4. Remove the LCD module while disengaging it from the four hooks (L13g, L13h, L13j, L13k).

Note13h: The holder (LCD) is used for the 3"-type monitor assembly only.

1.4.4 Disassembly/assembly of hinge assembly (for 3"/3.5"-type LCD)

1. Remove the three screws (5 to 7), and then remove the hinge covers (1) and (2) by disengaging a total of four hooks (L13m, L13n) at the two sides.
2. Separate the SW board assembly and the FPC from the hinge assembly.

Note13j: When disassembling/assembling the hinge assembly, pay careful attention to every part not to damage anything.

Note13k: When connecting the FPC, arrange the FPC wire by winding it around the shaft (hinge pin) of the hinge assembly by two and a half turns while paying heed to the orientation of the hinge assembly and FPC.

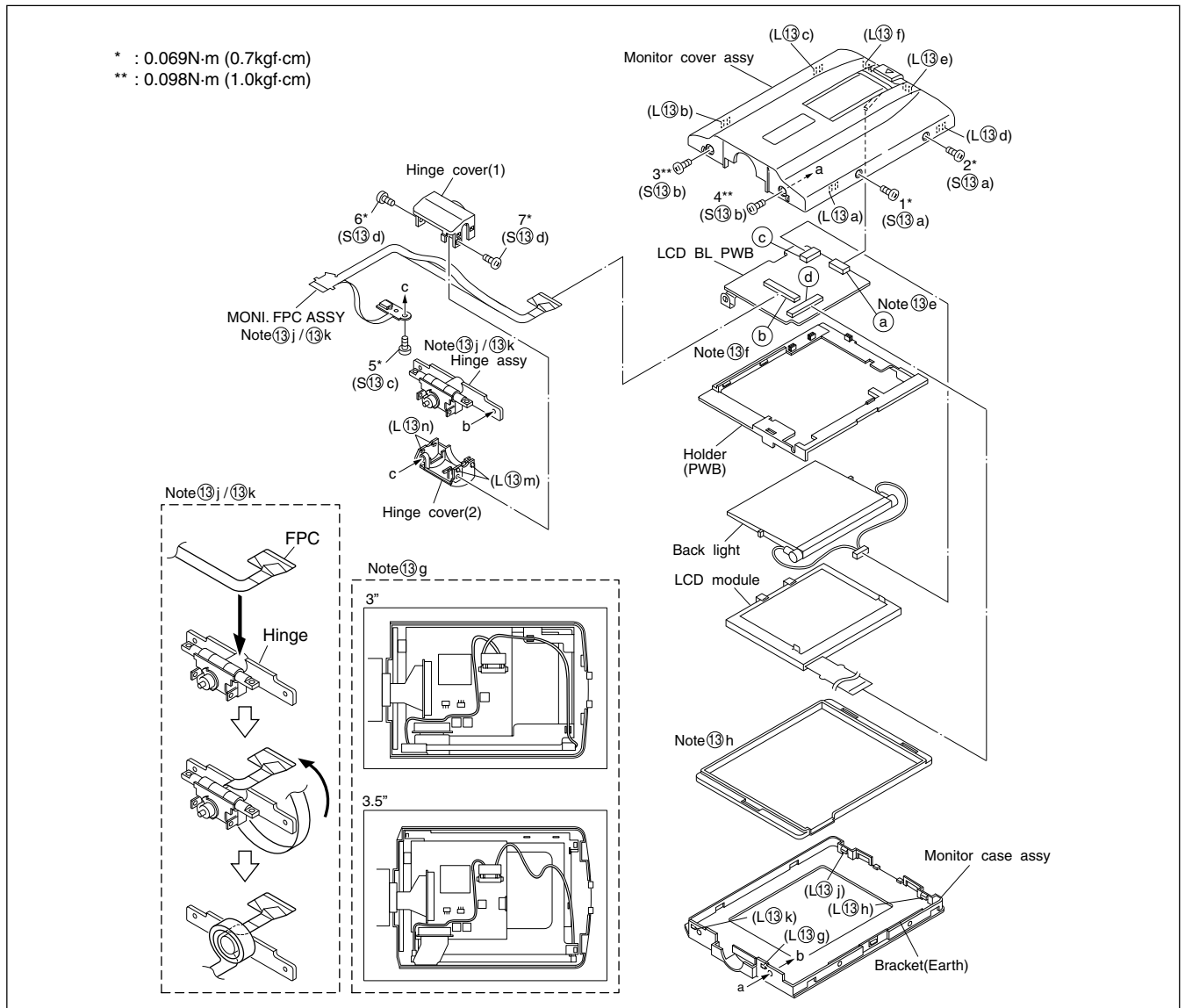


Fig. 1-4-2

1.5 ⑪ E. VF ASSEMBLY

Note: The shape of the E. VF assembly varies by the type of the viewfinder (B/W, color VF).

(For the B/W VF, refer to Fig. 1-5-1.
For the COLOR VF, refer to Fig. 1-5-2.)

1.5.1 Disassembly/assembly of E. VF assembly (for B/W VF)

1. Remove the two screws (1, 2) and the eyepiece assembly while disengaging the hook (L⑪a).
2. Remove the two screws (3, 4). And spread one side of the top case sub-assembly to disengage the hooks (L⑪b, L⑪c) that are located at both sides of the top case sub-assembly, then remove the top case sub-assembly.

Note⑪a: When removing the top case sub-assembly, peel off or unplug the FPC that is bonded to the sub-assembly.

Note⑪b: When reassembling the top case sub-assembly, be careful not to catch the FPC between any of the parts.

3. Remove the screw (5) and then remove the LCD assembly.

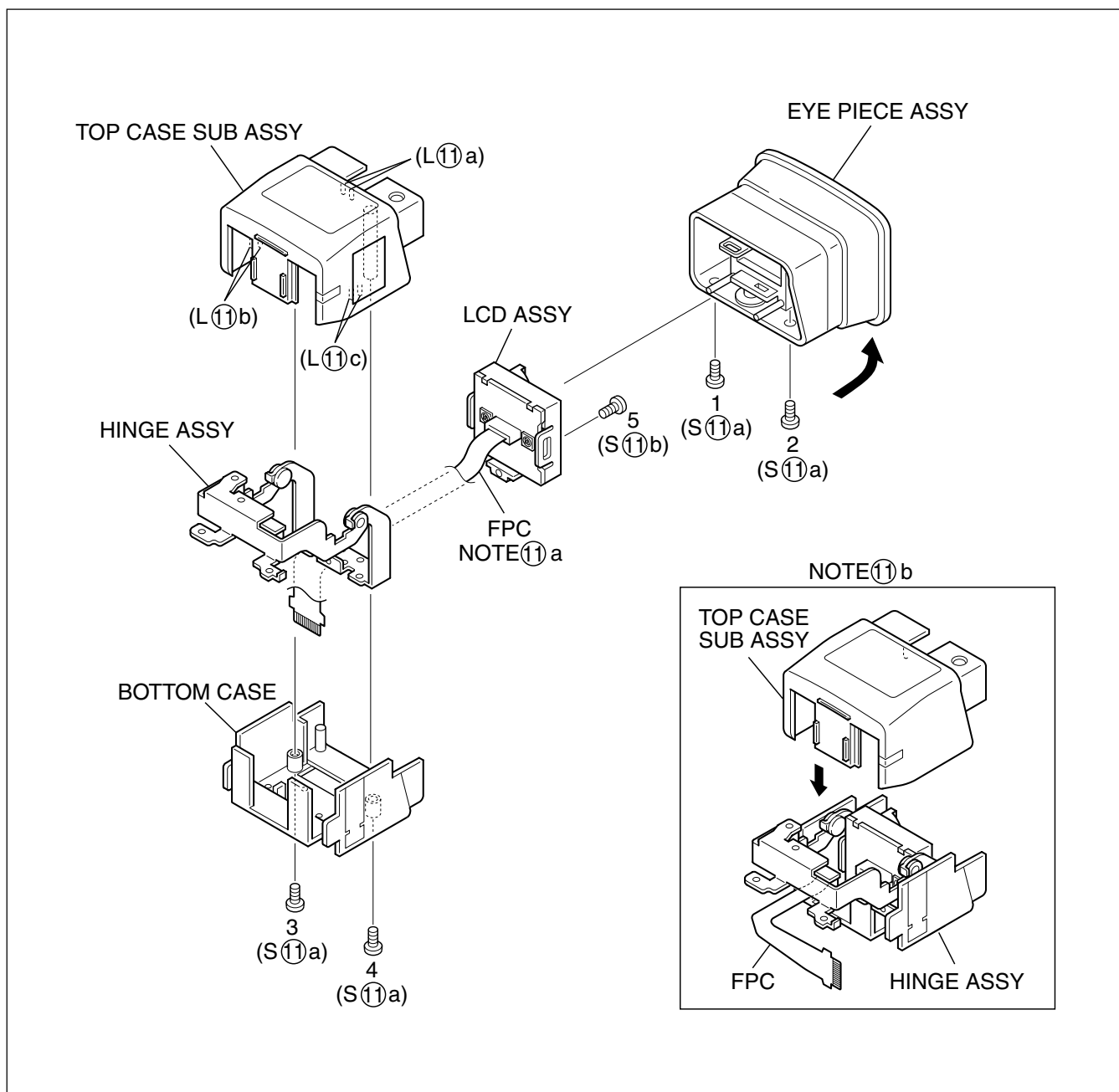


Fig. 1-5-1

**1.5.2 Disassembly/assembly of E. VF assembly
(for Color VF)**

Note: Place the E. VF assembly with the VF case (upper) assembly down through the disassembly/assembly work.

1. Remove the two screws (1, 2) and the eyepiece assembly while disengaging the hook (L11a).
2. Remove the two screws (3, 4). And spread one side of the top case sub-assembly to disengage the hooks (L11b, L11c) that are located at both sides of the top case sub-assembly, then remove the top case sub-assembly.

Note11c: When removing the top case sub-assembly, peel off or unplug the FPC that is bonded to the sub-assembly.

Note11d: When reassembling the top case sub-assembly, be careful not to catch the FPC between any of the parts.

3. Remove the screw (5) and then remove the LCD assembly.

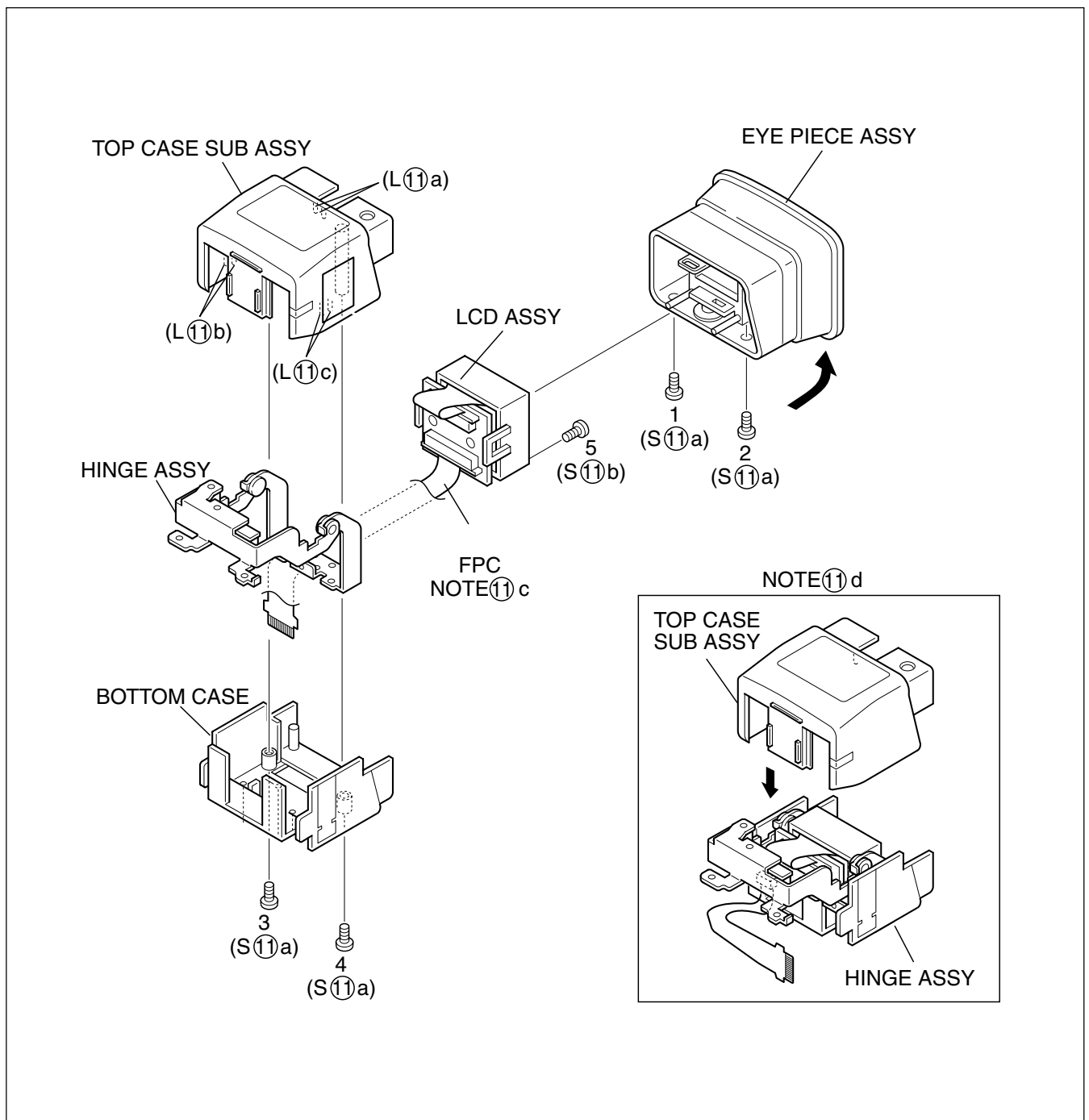


Fig. 1-5-2

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

1.6.1 Precautions

1. Take care in handling the CCD image sensor, optical LPF and lens components when performing maintenance etc., especially with regard to surface contamination, attached dust or scratching. If fingerprints are present on the surface they should be wiped away using either a silicon paper, clean chamois or the cleaning cloth.
2. The CCD image sensor may have been shipped with a protective sheet attached to the transmitting glass. When replacing the CCD image sensor, do not peel off this sheet from the new part until immediately before it is mounted in the OP Block Assembly.
3. The orientation of the optical LPF is an important factor for installation. If there is some marking on the LPF, be sure to note it down before removing and to reassemble it very carefully as it was referring to the marking.

1.6.2 How to remove CCD board assembly and CCD base assembly

1. Unsolder the CCD board assembly by the 14 points (SD1) and then remove it.
2. Remove the two screws (1, 2) and remove the CCD base assembly.

Note ④a: When removing the CCD base assembly, pay heed to the CCD image sensor because the spacer rubber and optical LPF are occasionally removed together with the CCD image sensor.

Note ④b: 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 assemble CCD base assembly and CCD board assembly

1. Install the optical LPF with the spacer rubber attached to its CCD side in the OP block assembly.

Note ④c: Pay careful attention to the orientation of the LPF.

2. Set the CCD base assembly with careful attention to the spacer rubber not to come off the right position, and fasten them together with the two screws (1, 2).
3. Set the CCD board assembly in the CCD base assembly, and then solder it by the 14 points (SD1).

1.6.4 Replacement of Service Repair Parts

The service repair parts for the OP Block Assembly are as listed below.

Before replacement of these parts, remove the bracket (OP assembly) as required.

Take special care not to disconnect any of the FPC wires or cause any damage due to soldering (excessive heating).

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

Note ④d: When replacing the focusing motor or the zoom motor, solder the FPC at a space of about 1 mm above the terminal pin.

Note ④e: The iris motor unit includes the FPC Assembly and two sensors.

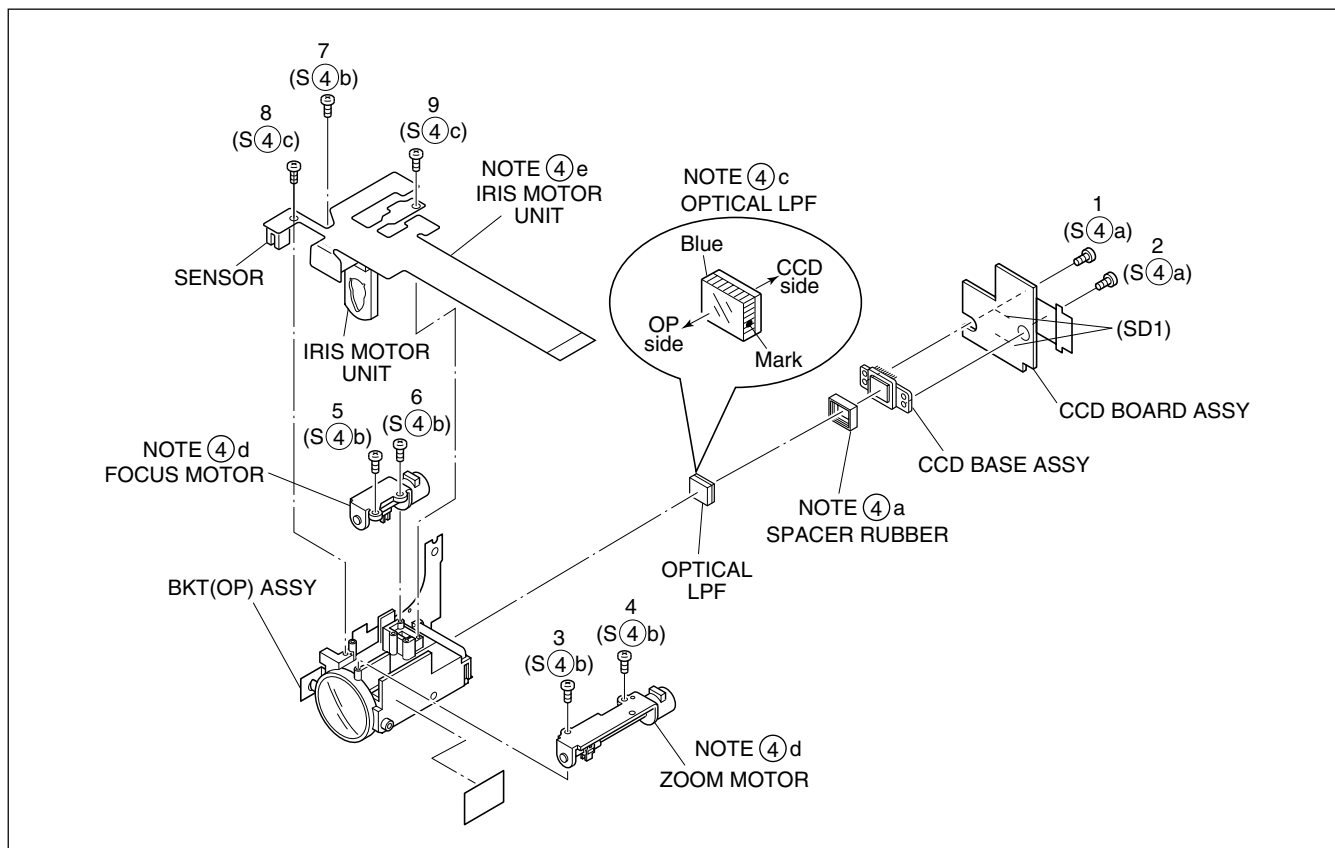


Fig. 1-6-1

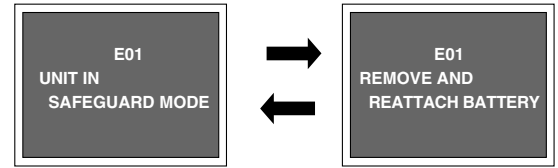
1.7 EMERGENCY DISPLAY

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"> The mechanism is locked during mode shift. The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift. No power is supplied to the loading MDA.
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"> The mechanism is locked during mode shift. The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift.
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"> The idler gear does not engage with the reel disk well. Though the idler gear and reel disk are engaged with each other, the tape is not wound because of overload to the mechanism. No FG pulse is output from the reel sensor. No power is supplied to the reel sensor. Tape transport operation takes place with a cassette having no tape inside. The tape slackens and no pulse is produced until the slack is taken up and the tape comes into the normal status.
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"> The drum cannot be started or drum rotation is stopped because tape transport load is too high. <ol style="list-style-type: none"> Tape tension is extremely high. The tape is damaged or soiled with grease, etc. The DRUM FG signal is not received by the syscon CPU. <ol style="list-style-type: none"> Disconnection in the middle of the signal line. Failure of the DRUM FG pulse generator (hall element). No drum control voltage is supplied to the MDA. No power is supplied to the DRUM MDA.
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"> The CAPSTAN FG signal is not received by the syscon CPU. <ol style="list-style-type: none"> Disconnection in the middle of the signal line. Failure of the CAPSTAN FG pulse generator (MR element). No capstan control voltage is supplied to the MDA. No power is supplied to the CAPSTAN MDA. The capstan cannot be started or capstan rotation is stopped because tape transport load is too high. <ol style="list-style-type: none"> Tape tension is extremely high. (Mechanical locking) The tape is damaged or soiled with grease, etc. (Tape tangling occurs, etc.)

(DVC_03)

Table 1-7-1

1.8 SERVICE NOTE

Symbol No.	② (⑪ / ⑫ / ⑬ / ⑭)														③	④			⑤		
Removing order of screw	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Place to stick screw	*														Fig. 1-3-3			Fig. 1-3-4	Fig. 1-3-5		
Reference drawing	Fig. 1-3-2														Fig. 1-3-3			Fig. 1-3-4	Fig. 1-3-5		
Screw tightening torque	I																				

Symbol No.	⑥	⑦	⑧	⑨ / ⑩	⑪	⑫	⑬	⑭													
Removing order of screw	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Place to stick screw	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Reference drawing	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			I						

MONITOR ASSY							
Removing order of screw	1	2	3	4	5	6	7
Place to stick screw							
Reference drawing	Fig. 1-4-1, 2						
Screw tightening torque	III	IV	IV	IV	IV	IV	III

VF UNIT(B/W,COLOR)				
Removing order of screw	→	→	→	→
Place to stick screw	→	→	→	→
Reference drawing	→ Fig. 1-5-1, 2			
Screw tightening torque	→ III			

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

< NOTE >

- 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 : 0.088N·m (0.9kgf·cm)
 - II : 0.147N·m (1.5kgf·cm)
 - III : 0.069N·m (0.7kgf·cm)
 - IV : 0.098N·m (1.0kgf·cm)
 - V : 0.118N·m (1.2kgf·cm)

Table 1-8-1

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 2-4-1 on page 2-6, 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.

Step Part Name Fig. Point Note Remarks

- (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 "2.6 MECHANISM ADJUSTMENTS".)

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

NO.	PART NAME	FIG.	POINT	NOTE	REMARKS
(A)	Cassette housing assembly	T Fig. 2-4-5	3(S1),(L1a)-(L1d)	1a, 1b, 1c, 1d	Adjustment
(2a)	Reel disk (SUP) assembly	T Fig. 2-4-6	(W2)	2a, 2b	
(2b)	Reel disk (TU) assembly	T Fig. 2-4-6	(W2)	2a, 2b	
(2c)	Reel cover assembly	T Fig. 2-4-6	(S2b),2(S2a),(W2)	2d	
(3a)	Tension arm assembly	T Fig. 2-4-7	(W3a)	3b	
(3b)	Release guide assembly	T Fig. 2-4-7	-	3a	
(3c)	Idler arm assembly	T Fig. 2-4-7	(W3b)	-	
(3d)	Guide arm assembly	T Fig. 2-4-7	-	3a	
(3e)	Pinch roller arm assembly	T Fig. 2-4-7	(W3a)	-	
(4a)	Cleaner arm assembly	T Fig. 2-4-8	(L4a)	4a	
(4b)	Slant pole arm assembly	T Fig. 2-4-8	(W4),(L4b),(P4a),(P4b)	4b	
(4c)	Drum assembly	T Fig. 2-4-8	3(S4)	-	
(5a)	Guide roller (S) assembly	T Fig. 2-4-9	(P5)	5a	
(5b)	Rail assembly	T Fig. 2-4-9	3(W5a), (W5b)	5b, 5c	

(1) ↑

(2) ↑

(3) ↑

(4) ↑

(5) ↑

(6) ↑

(7) ↑

2.2 JIGS AND TOOLS REQUIRED FOR DISASSEMBLY, ASSEMBLY AND ADJUSTMENT

2.2.1 Tools required for adjustments

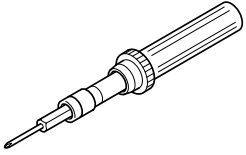
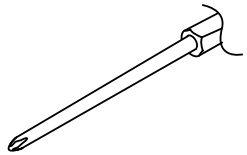
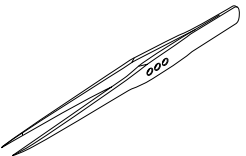
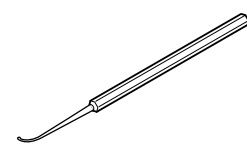
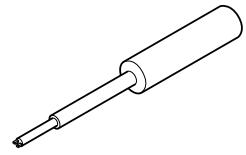
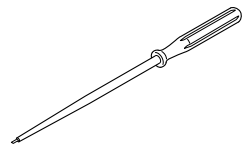
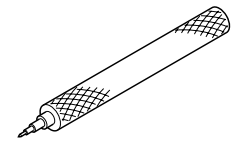
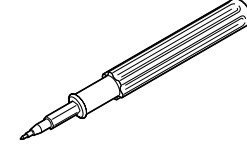
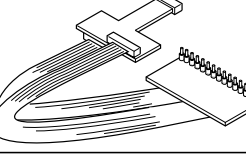
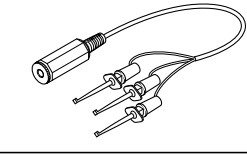
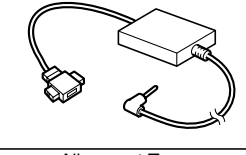
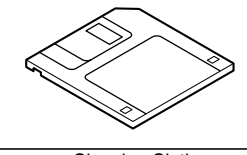
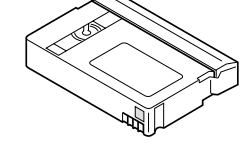
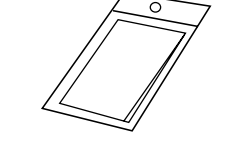
1	Torque Driver YTU94088	2	Bit YTU94088-003
			
3	Tweezers P-895	4	Chip IC Replacement Jig PTS40844-2
			
5	Guide Driver YTU94148A	6	Adjustment Driver YTU94028
			
7	Slit Washer Installation Jig YTU94121A	8	Slit Washer Installation Jig YTU94121B
			
9	Jig Connector cable YTU93082G	10	Communication cable YTU93107A
			
11	PC cable QAM0099-002	12	Service Support System YTU94057-52
			
13	Alignment Tape MC-1	14	Cleaning Cloth KSMM-01
			

Table 2-2-1

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. Guide Driver

To be used to turn the guide roller to adjustment of the linearity of playback envelope.

6. Adjustment Driver

To be used for adjustment.

7. Slit washer Installation Jig

To be used to install slit washers.

8. Slit washer Installation Jig (NEW TYPE)

To be used to install slit washers.

9. Jig Connector cable

Connected to CN105 of the main board and used for electrical adjustment, etc.

10. Communication cable

Connect the Communication cable between the PC cable and Jig connector cable when performing a PC adjustment.

11. PC cable

To be used to connect the VideoMovie and a personal computer with each other when a personal computer is used for adjustment.

12. Service Support System

To be used for adjustment with a personal computer.

13. Alignment Tape

To be used for check and adjustment of interchangeability of the mechanism.

14. Cleaning Cloth

Recommended cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.

2.3 DISASSEMBLY/ASSEMBLY OF MECHANISM

ASSEMBLY

2.3.1 General statement

The mechanism should generally be disassembled/assembled in the EJECT mode (ASSEMBLY mode). (Refer to Fig. 2-3-1.)

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.

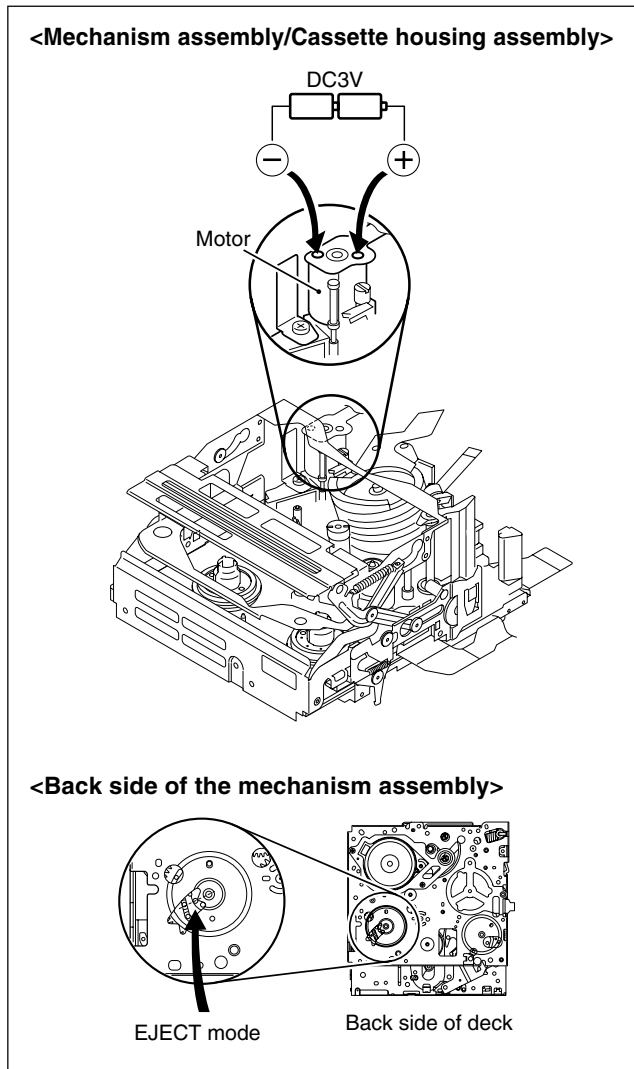


Fig. 2-3-1

2.3.2 Explanation of mechanism mode

The mechanism mode of this model is classified into six modes as shown in Table 2-3-1. 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. 2-3-2 to 2-3-8 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.

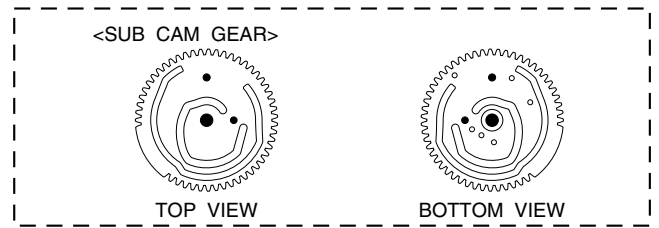


Fig. 2-3-2

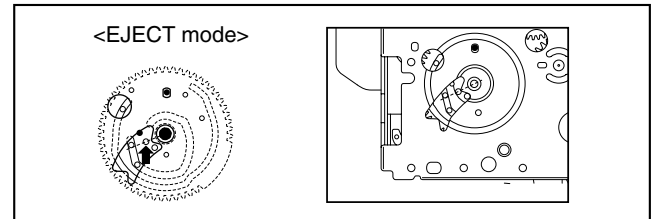


Fig. 2-3-3

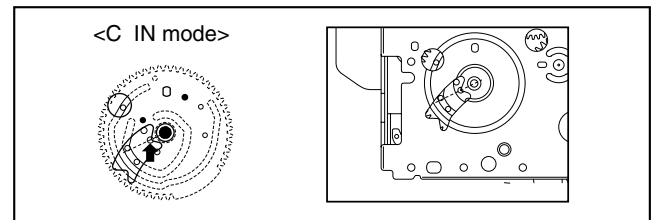


Fig. 2-3-4

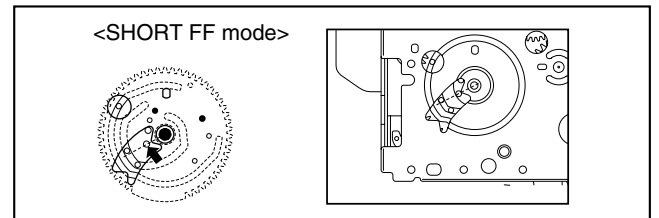


Fig. 2-3-5

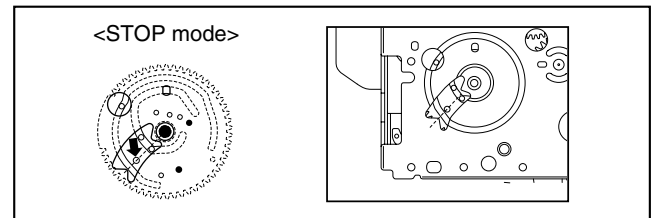


Fig. 2-3-6

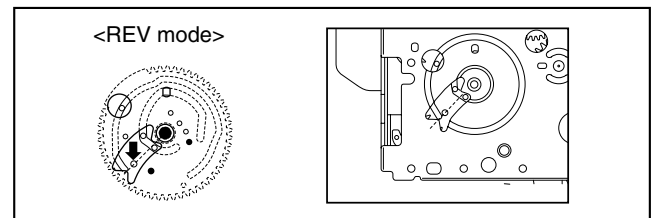


Fig. 2-3-7

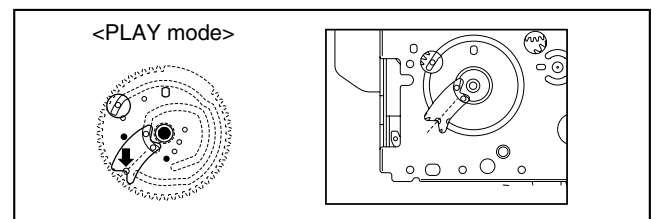


Fig. 2-3-8

2.3.3 Mechanism timing chart

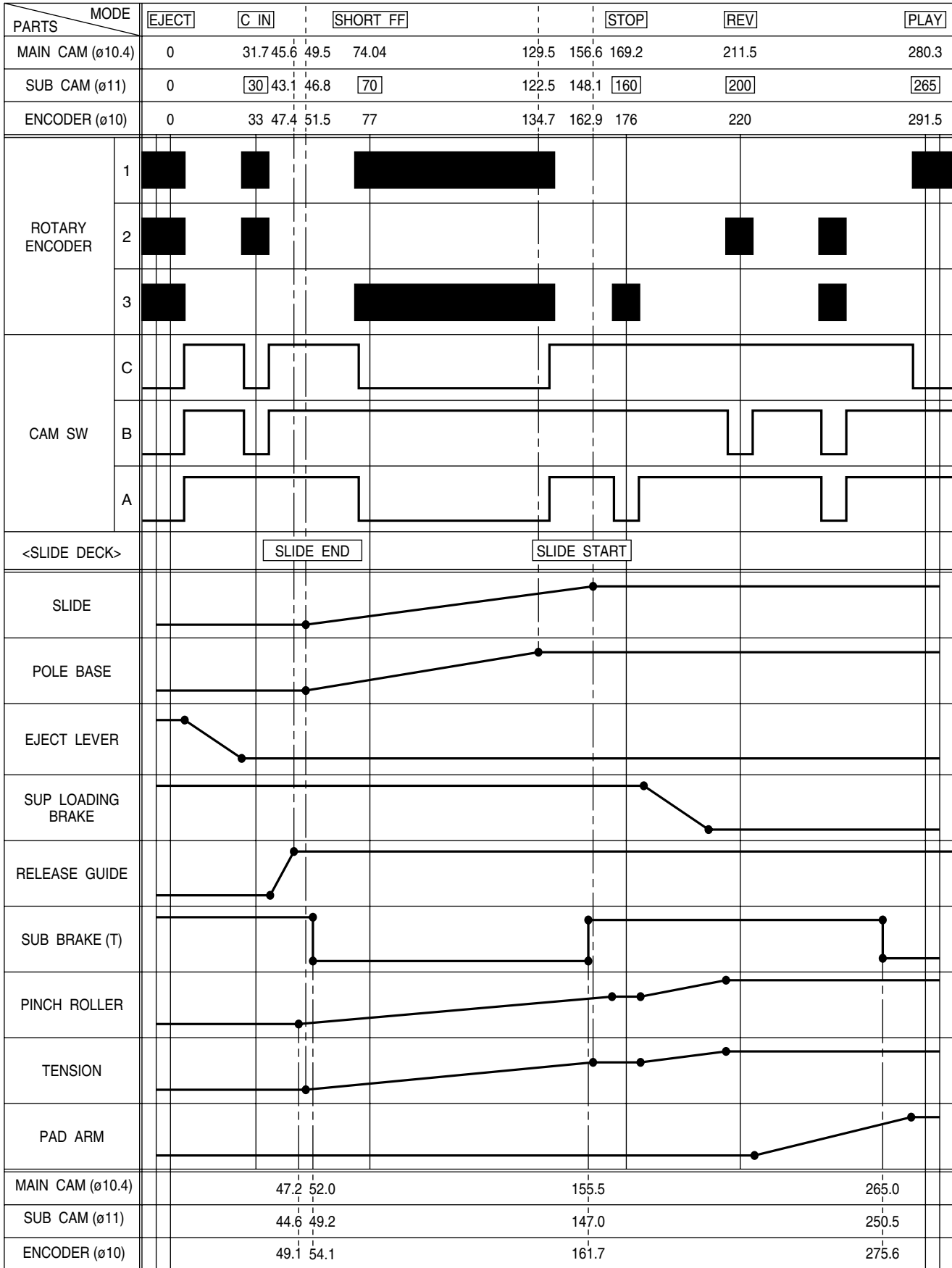


Table 2-3-1

2.4 DISASSEMBLY/ASSEMBLY OF MECHANISM ASSEMBLY

2.4.1 Follow chart

1. Configuration

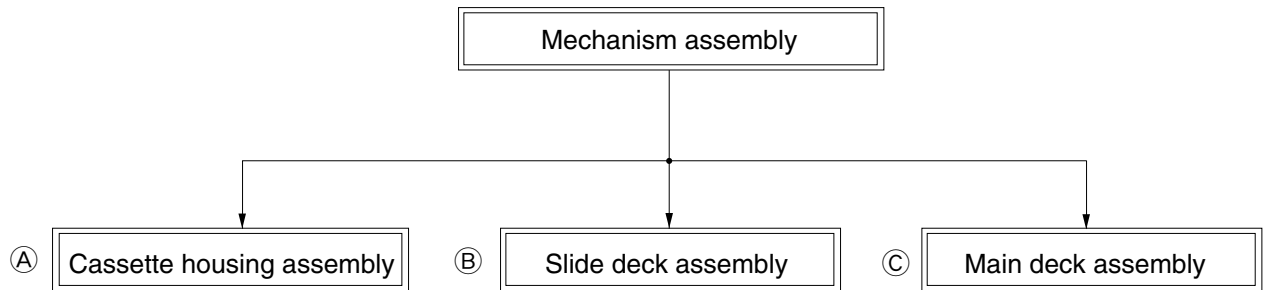


Fig. 2-4-1

2. Procedures for disassembly

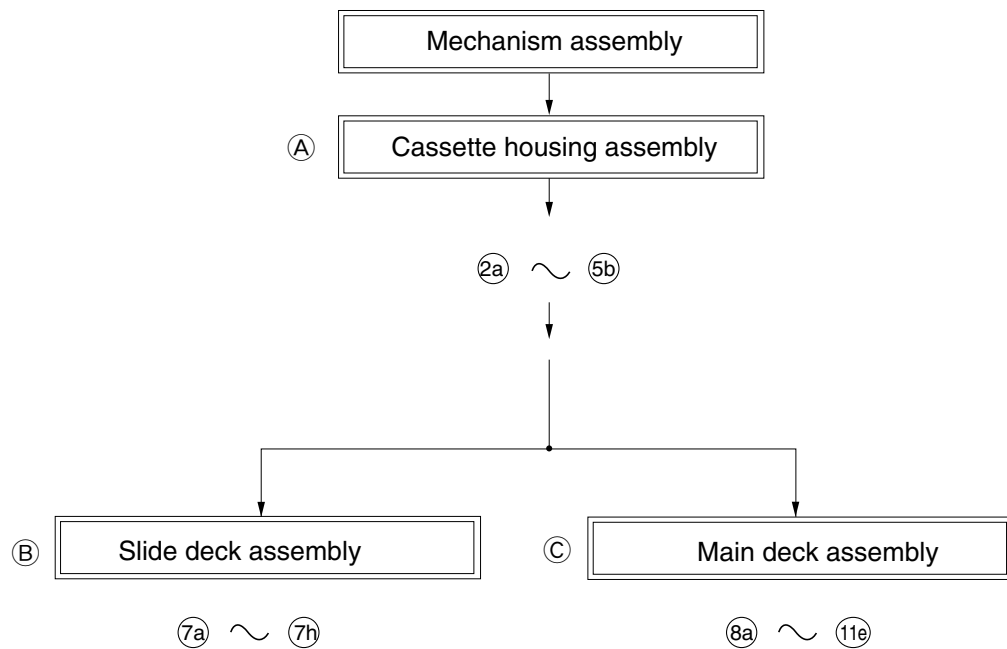


Fig. 2-4-2

3. Disassembling procedure table

NO.	PART NAME		FIG.	POINT	NOTE	REMARKS
Ⓐ	Cassette housing assembly	T	Fig. 2-4-5	3(S1),(L1a)-(L1d)	1a, 1b, 1c, 1d	Adjustment
②a	Reel disk (SUP) assembly	T	Fig. 2-4-6	(W2)	2a, 2b	
②b	Reel disk (TU) assembly	T		(W2)	2a, 2b	
②c	Reel cover assembly	T		(S2b),2(S2a),(W2)	2d	
③a	Tension arm assembly	T	Fig. 2-4-7	(W3a)	3b	
③b	Release guide assembly	T		-	3a	
③c	Idler arm assembly	T		(W3b)	-	
③d	Guide arm assembly	T		-	3a	
③e	Pinch roller arm assembly	T		(W3a)	-	
④a	Cleaner arm assembly	T	Fig. 2-4-8	(L4a)	4a	
④b	Slant pole arm assembly	T		(W4),(L4b),(P4a),(P4b)	4b	
④c	Drum assembly	T		3(S4)	-	
⑤a	Guide roller (S) assembly	T	Fig. 2-4-9	(P5)	5a	
⑤b	Rail assembly	T		3(W5a), (W5b)	5b, 5c	
Ⓑ	Slide deck assembly / Ⓒ Main deck assembly	T	Fig. 2-4-10	(W6),(L6a)-(L6d)	6a, 6b	(Adjustment)
Ⓑ	Slide deck assembly					
⑦a	Loading brake assembly	T	Fig. 2-4-11	(W7),(L7a),(P7a)	7e	Adjustment
⑦b	Guide pin (SUPPLY)	T		(S7a)	-	
⑦c	Pad arm assembly	T		(W7),(L7b),(P7b)	7d	
⑦d	Slide guide plate assembly	T		(S7b)	7c	Adjustment
⑦e	Collar	T		-	7a	
⑦f	Collar	T		-	7a	
⑦g	Sub brake assembly	T		(W7),(L7c),(P7c)	7b	
⑦h	Control plate assembly	T		2(W7),(L7d),(P7d)	7b	
Ⓒ	Main deck assembly					
⑧a	Tension lever assembly	T	Fig. 2-4-12	-	8c	
⑧b	Slide lever assembly	T		-	8b	
⑧c	Brake control lever assembly	T		-	8a	
⑨a	Loading guide	T	Fig. 2-4-13	(S9)	-	
⑨b	Timing belt	T		-	9b	
⑨c	Center gear assembly	T		-	-	
⑨d	Motor bracket assembly	T		2(S9)	9a	
⑨e	Worm wheel	T		(W9)	-	(Phase adjustment)
⑨f	Gear holder	T		(S9)	-	
⑩a	Main cam gear	T	Fig. 2-4-14	(S10)	10b	Phase adjustment
⑩b	Brake control plate	T		(L10)	10b	Phase adjustment
⑩c	Rotary encoder	T		(S10),(W10a)	10a	Phase adjustment
⑩d	Connect gear	T		(W10a)	-	(Phase adjustment)
⑩e	Reel drive pulley assembly	T		(W10b)	-	
⑪a	Catcher (T) assembly	T	Fig. 2-4-15	2(S11)	-	
⑪b	Capstan motor	T		2(S11)	-	
⑪c	Charge arm assembly	T		(W11)	11	
⑪d	Sub cam gear	T		(S11)	-	Phase adjustment
⑪e	PWB holder	B		2(S11)	-	

Table 2-4-1

< TOP VIEW >

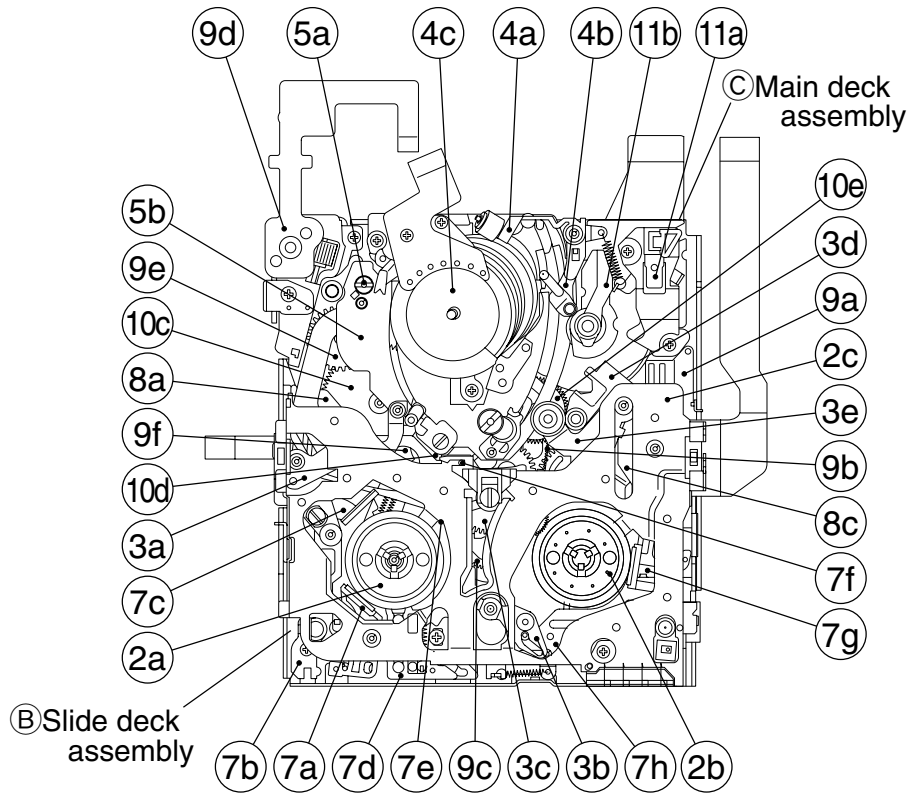


Fig. 2-4-3

< BOTTOM VIEW >

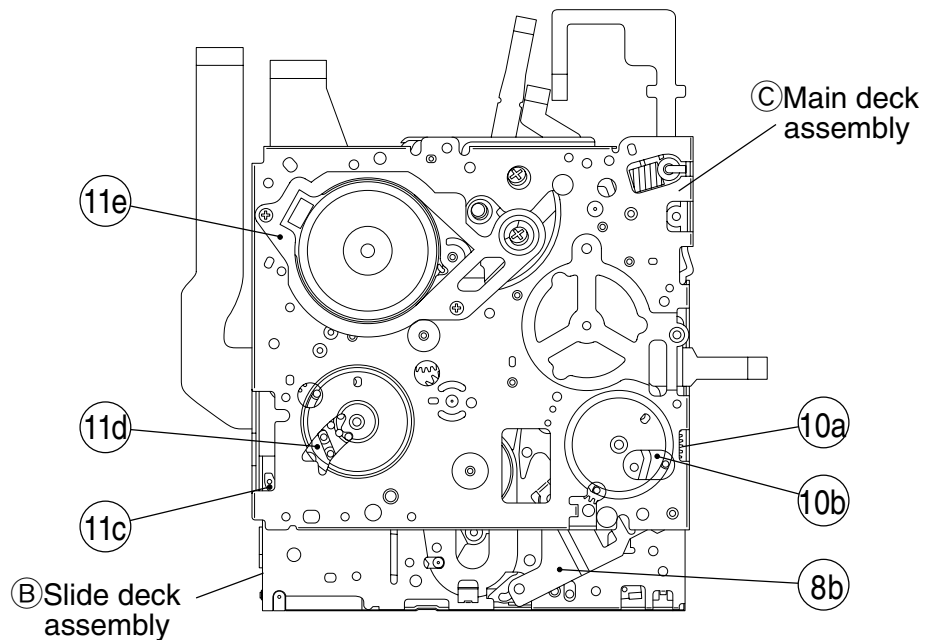


Fig. 2-4-4

2.4.2 Disassembly/assembly

1. (A) Cassette housing assembly

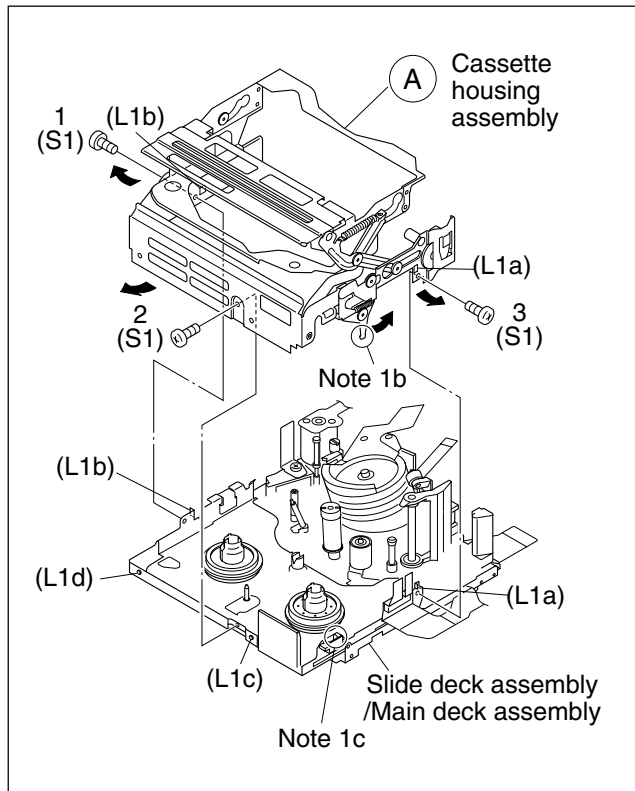


Fig. 2-4-5

2. (2a) Reel disk (SUP) assembly

(2b) Reel disk (TU) assembly

(2c) Reel cover assembly

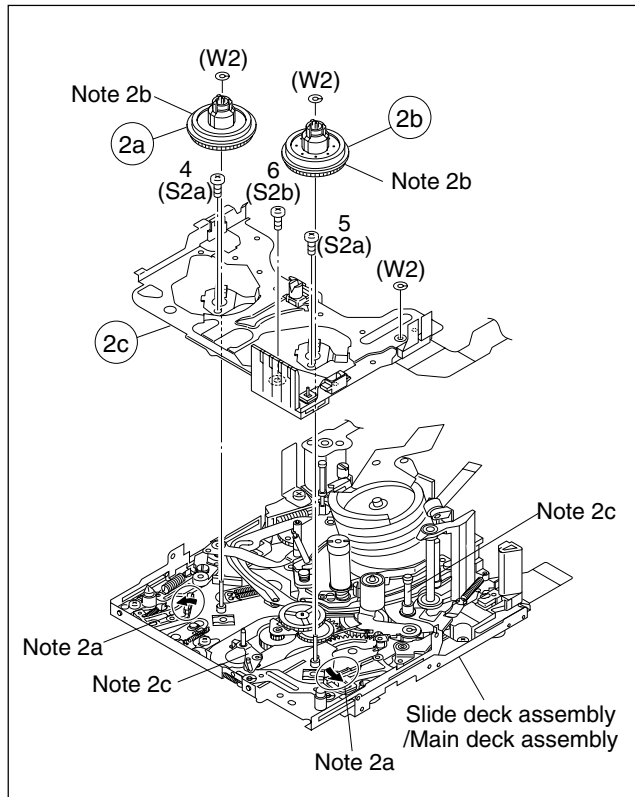
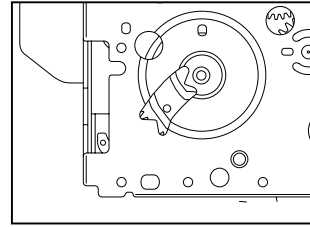
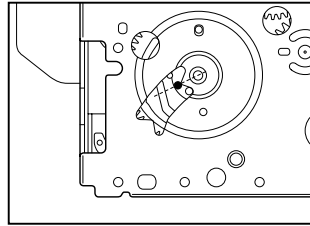


Fig. 2-4-6

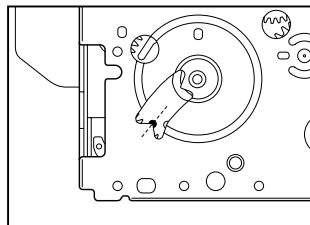
<STOP mode>



<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.

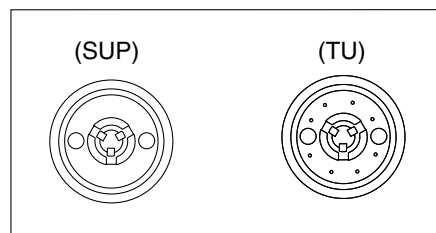
For details of checking method, refer to "2.6.1 assembling slide deck assembly and main deck assembly".

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 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 2d:

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

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

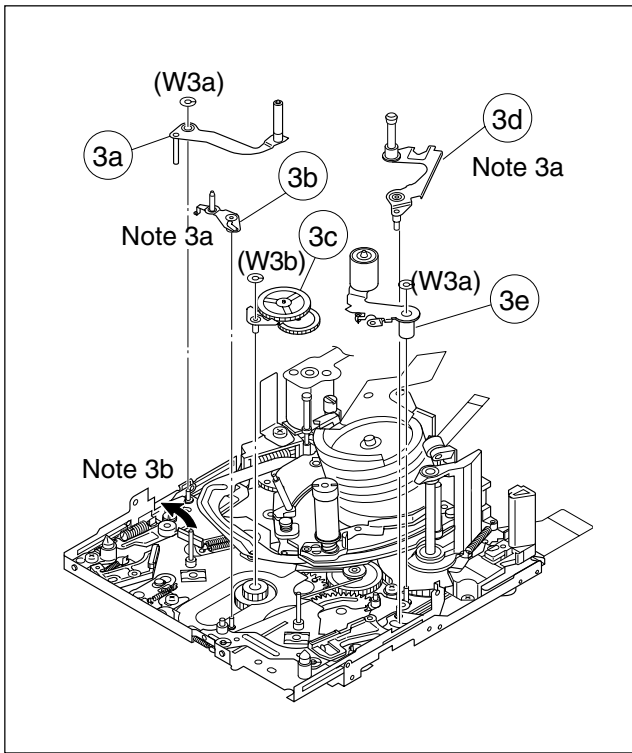


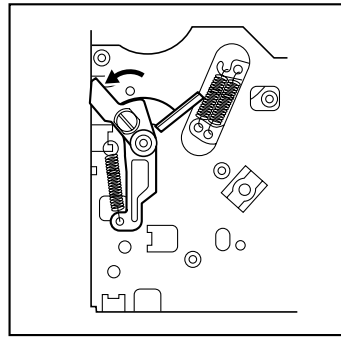
Fig. 2-4-7

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
 (4b) Drum assembly

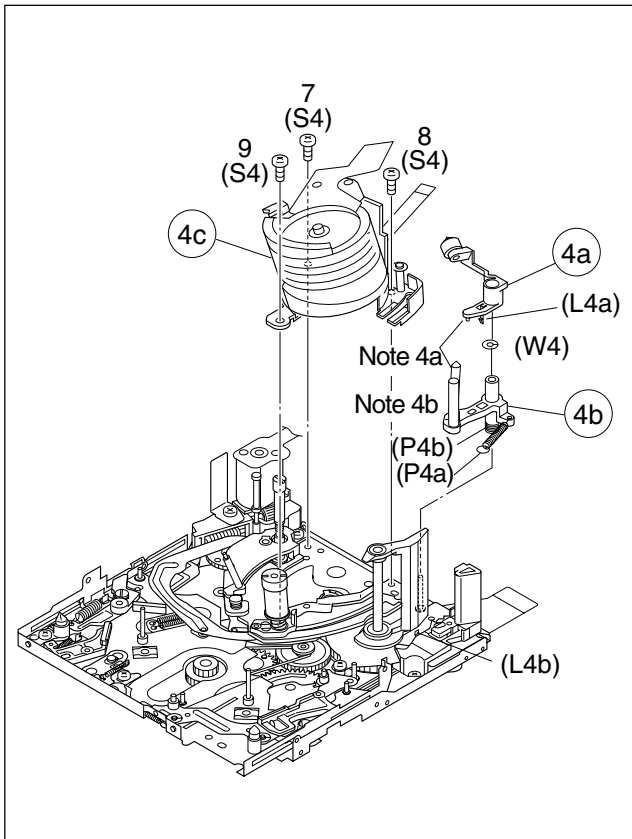


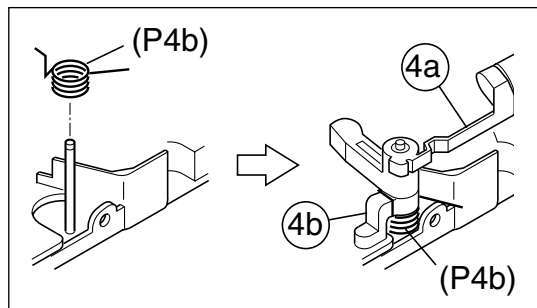
Fig. 2-4-8

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

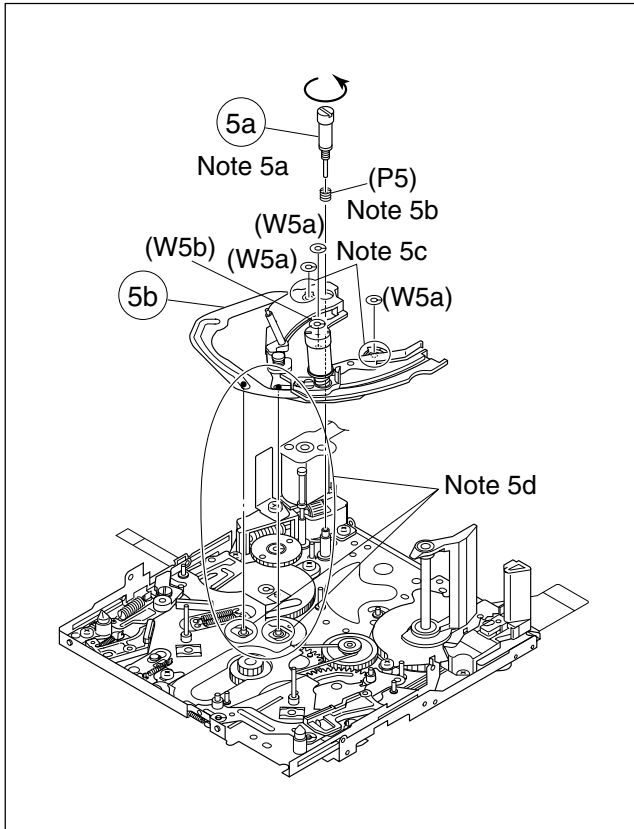
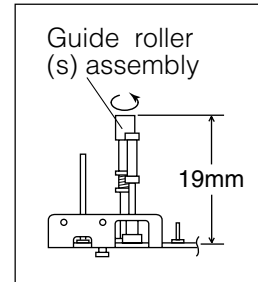


Fig. 2-4-9

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. ⑥ Slide deck assembly/ ⑥ Main deck assembly

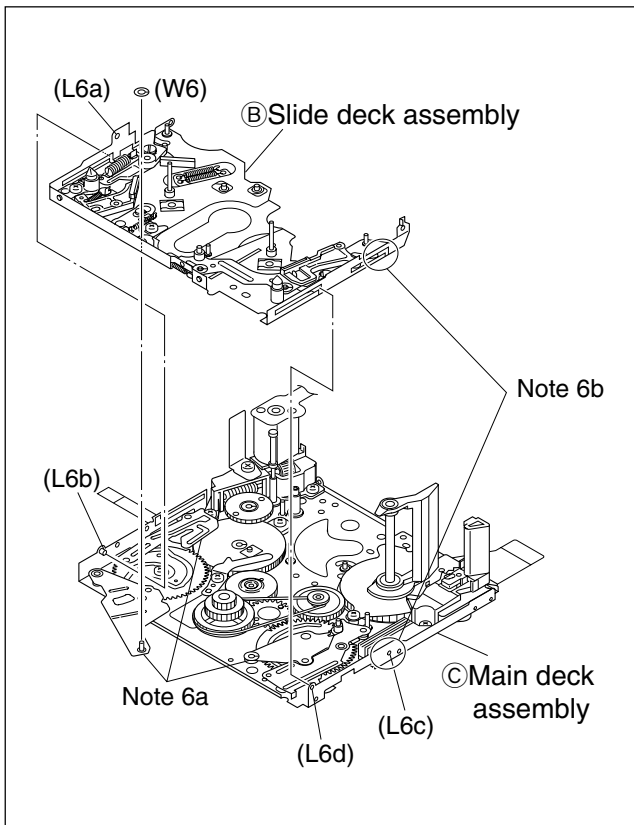


Fig. 2-4-10

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.

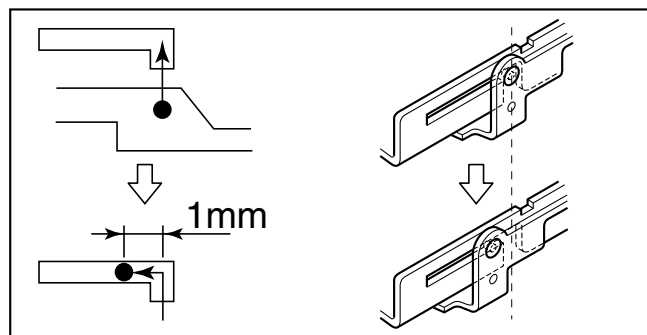
⑧a Tension lever assembly/ ⑧b Slide lever assembly

⑧c Brake control lever assembly

For reassembling those components, refer to Fig. 2-4-12.

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

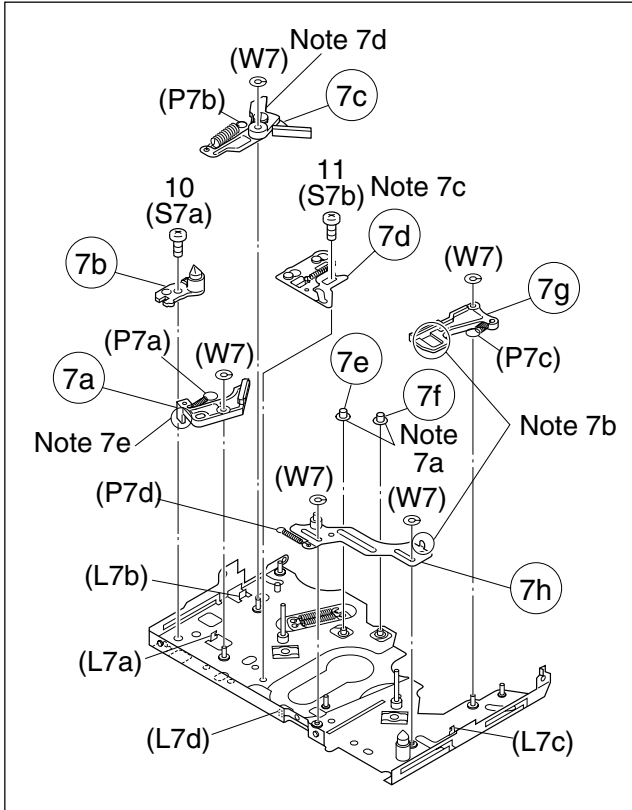
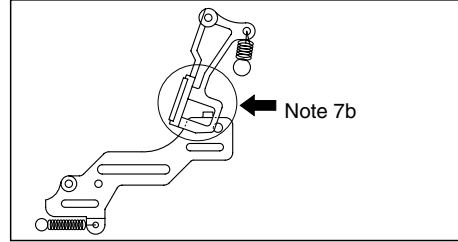


Fig. 2-4-11

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 "2.6.1 Assembling slide deck assembly and main deck assembly".

Note 7d:
 The pad arm assembly controls the tension level of the tension arm assembly. For adjustment of the tension arm assembly, refer to "2.6.2 Locating tension pole".

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.

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

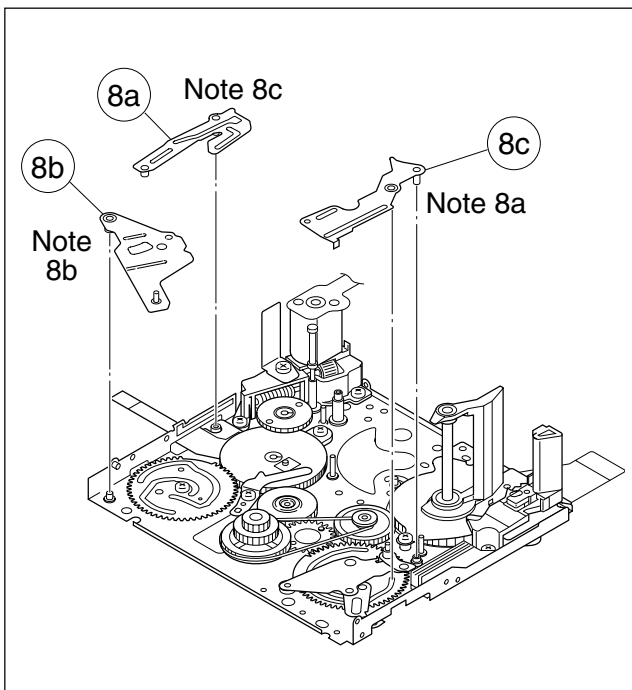
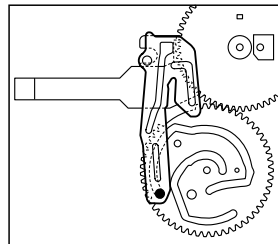


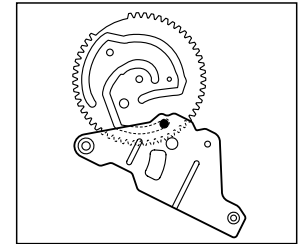
Fig. 2-4-12

Note 8a, 8b, 8c:
 For refitting the respective parts, refer to the following figures

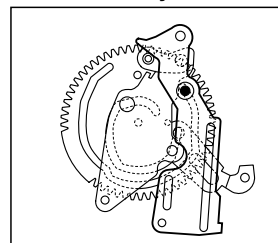
(8a) Tension lever assembly



(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

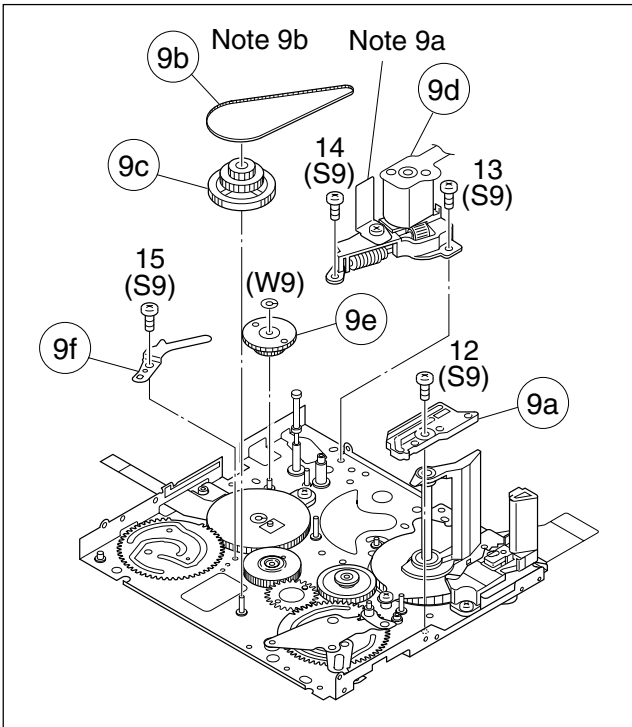


Fig. 2-4-13

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.

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

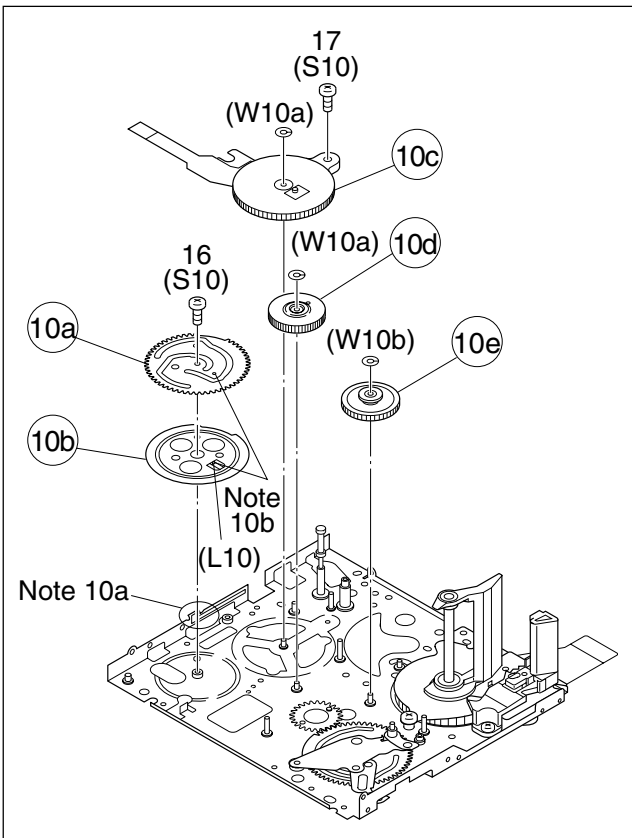


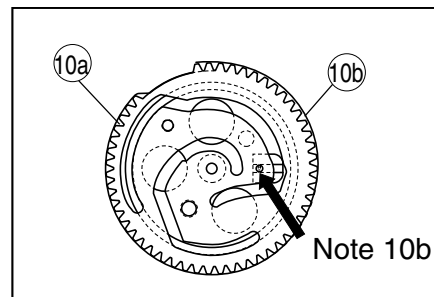
Fig. 2-4-14

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

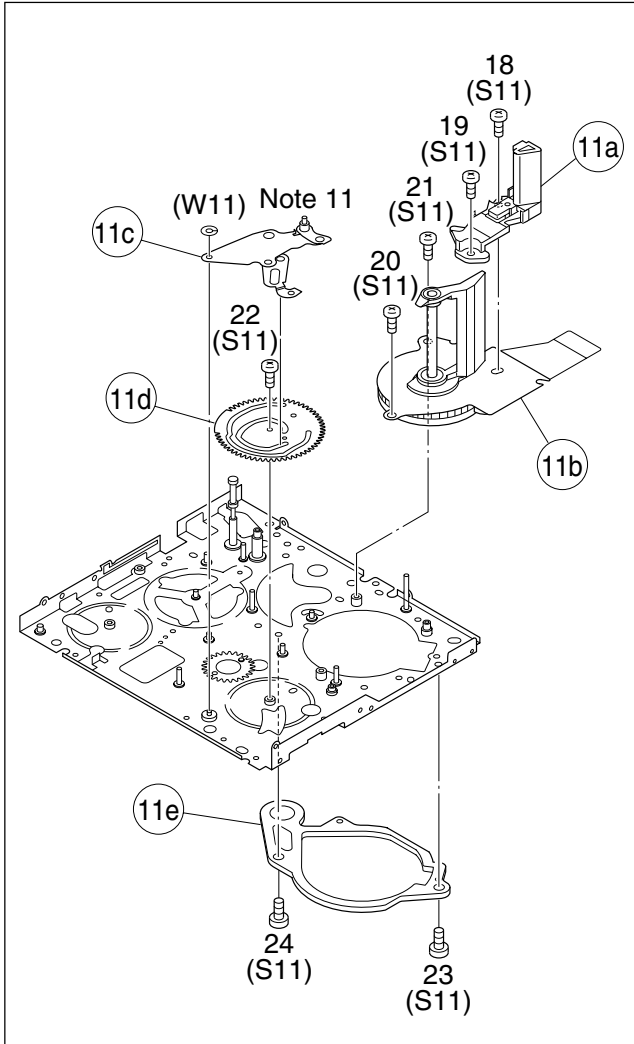
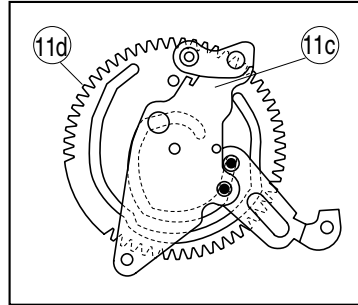


Fig. 2-4-15

Note 11:

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



2.4.3 List of procedures for disassembly

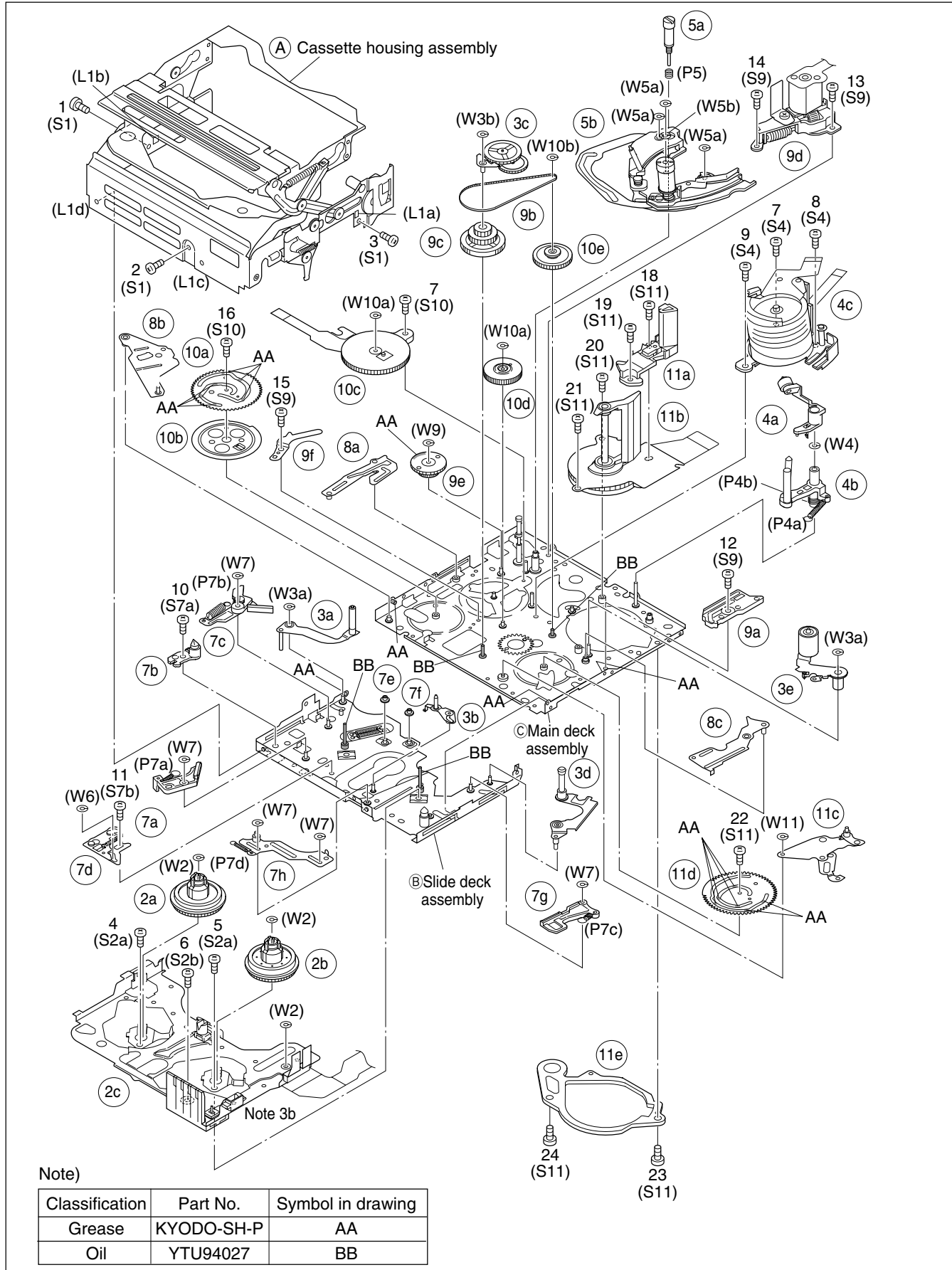


Fig. 2-4-16

2.5 CHECKUP AND ADJUSTMENT OF MECHANISM PHASE

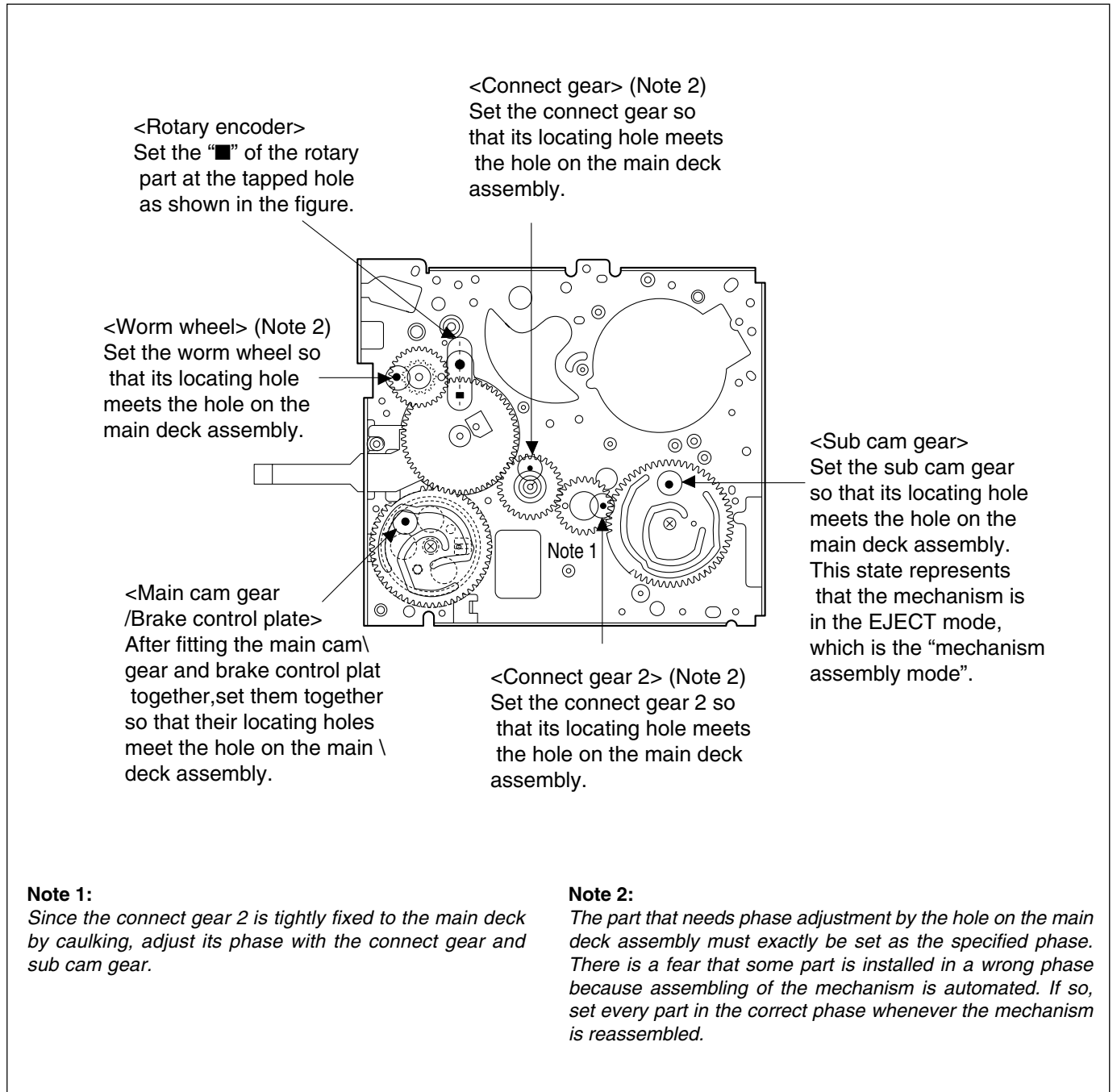


Fig. 2-5-1

2.6 MECHANISM ADJUSTMENTS

2.6.1 Assembling slide deck assembly and main deck assembly

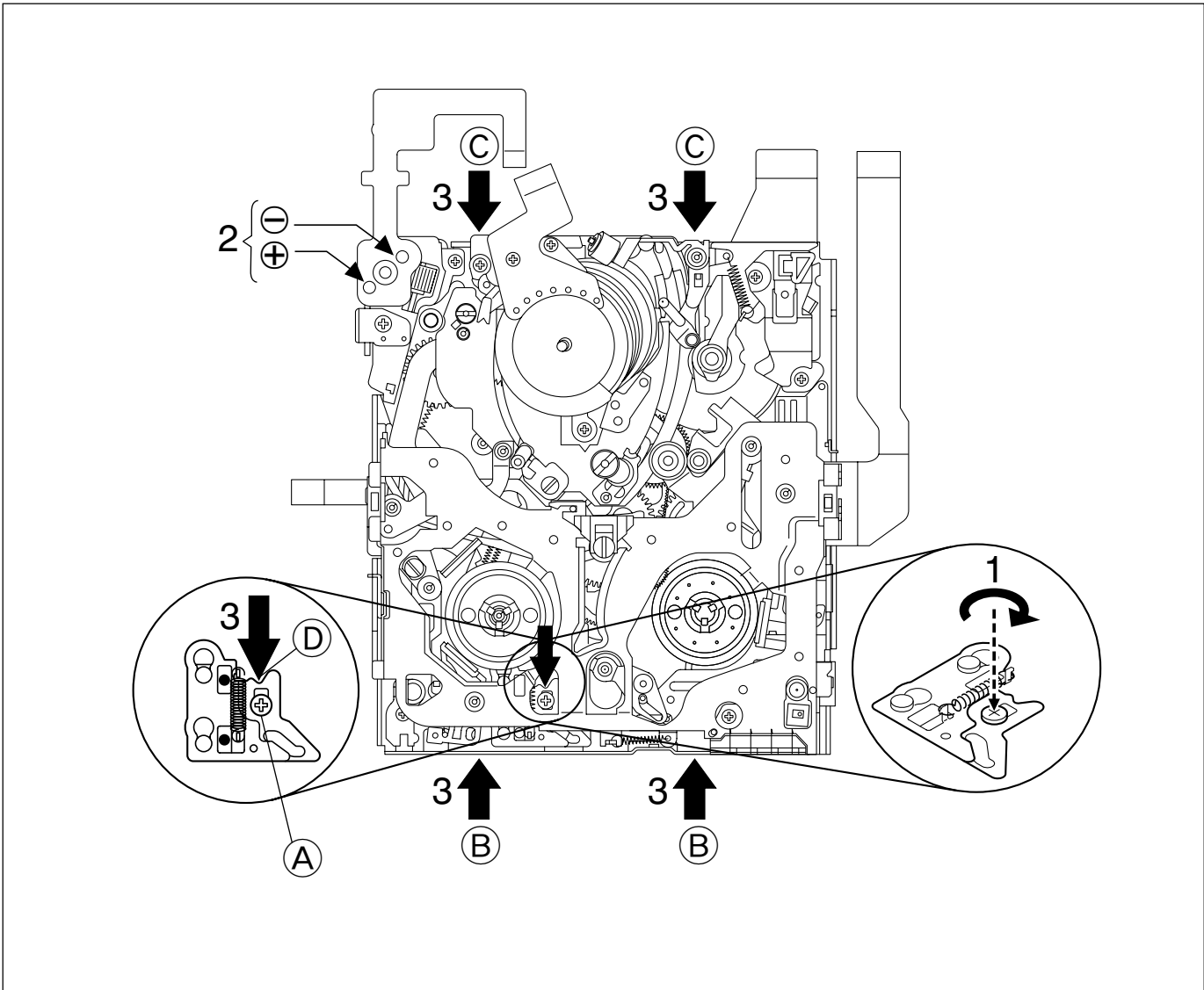


Fig. 2-6-1

Assembling procedure

1. Loosen the screw (A).
2. Set the mechanism in the PLAY mode.
(Refer to "2.3.2 Explanation of mechanism mode".)
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)

2.6.2 Locating tension pole

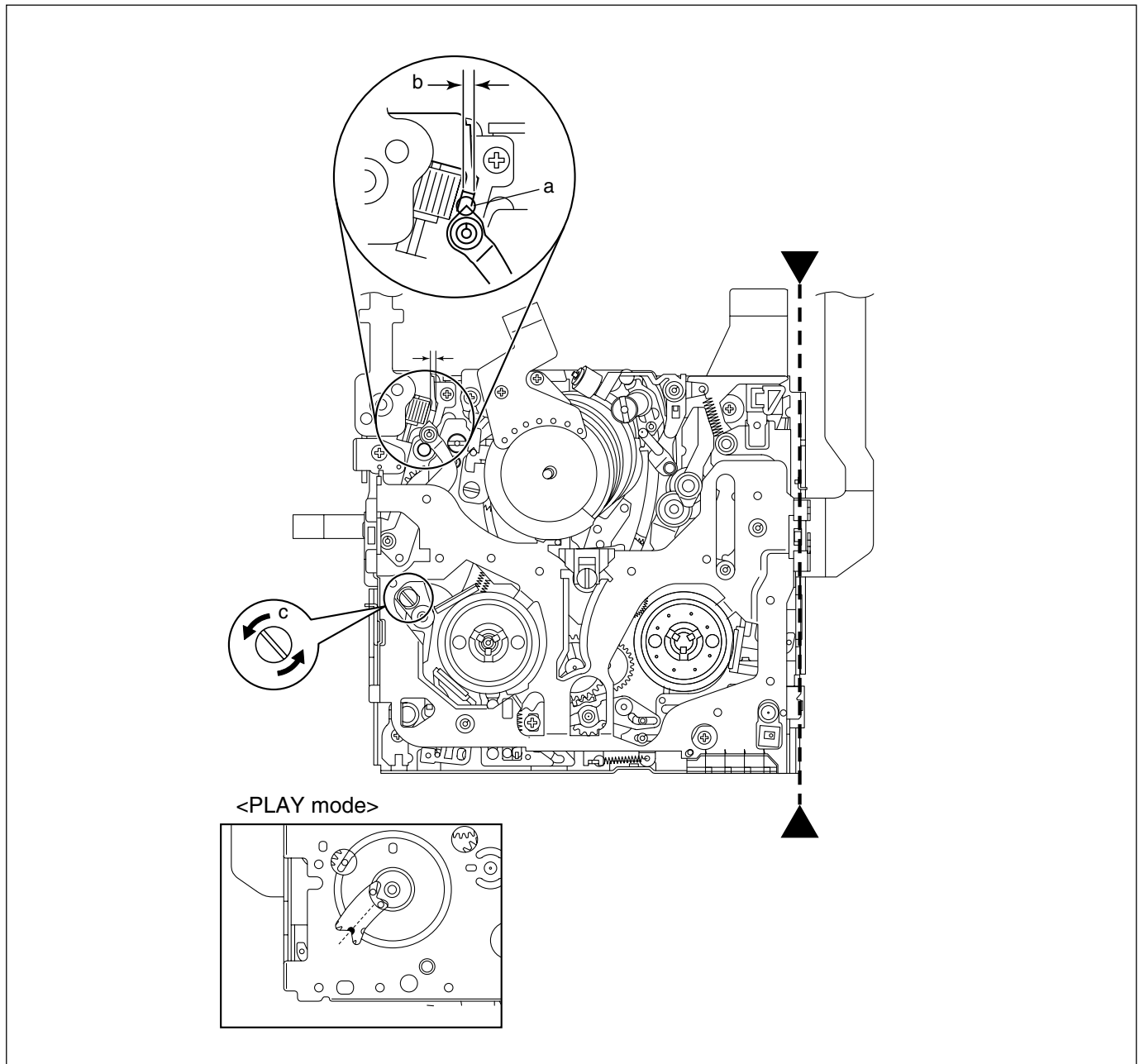


Fig. 2-6-2

Locating procedure

1. Enter the mechanism assembly into the PLAY mode.
(Refer to "2.3.2 Explanation of mechanism mode".)
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.

2.7 SERVICE NOTE

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

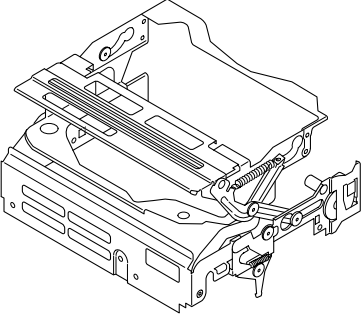
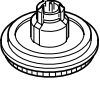
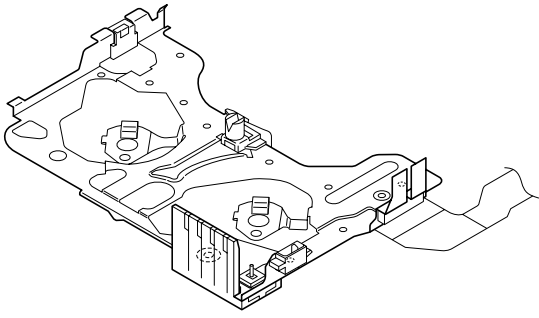
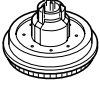


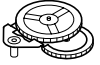
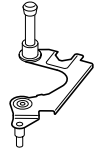


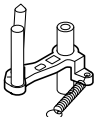
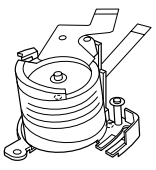

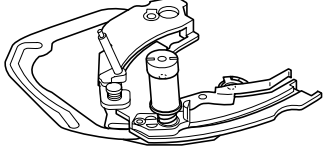
1	<p>Ⓐ Cassette housing assembly</p>  <p>S1×3</p>				
2	<p>Ⓐ Reel disk (SUP) assembly</p>  <p>W2×1</p>	<p>Ⓑ Reel cover assembly</p>  <p>S2a×2 S2b×1 W2×1</p>			
	<p>Ⓒ Reel disk (TU) assembly</p>  <p>W2×1</p>				
3	<p>Ⓓ Tension arm assembly</p>  <p>W3a×1</p>	<p>Ⓔ Release guide assembly</p> 	<p>Ⓕ Idler arm assembly</p>  <p>W3b×1</p>	<p>Ⓖ Guide arm assembly</p> 	<p>Ⓗ Pinch roller arm assembly</p>  <p>W3a×1</p>
4	<p>Ⓙ Cleaner arm assembly</p> 	<p>Ⓚ Slant pole arm assembly</p>  <p>W4×1 P4a×1 P4b×1</p>		<p>Ⓛ Drum assembly</p>  <p>S4×3</p>	
5	<p>Ⓜ Guide roller (S) assembly</p>  <p>P5×1</p>	<p>Ⓨ Rail assembly</p>  <p>W5a×3 W5b×1</p>			

Table 2-7-1a

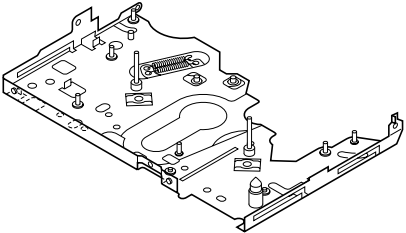







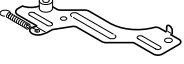
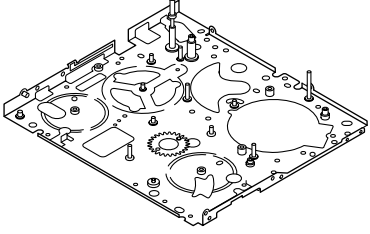
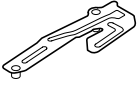





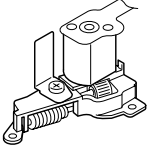




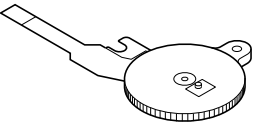


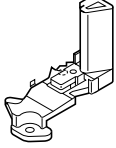
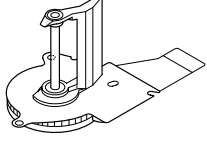
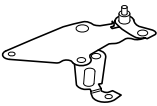

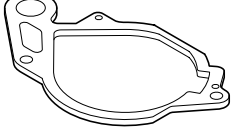
6	Ⓑ Slide deck assembly  W6×1	7 7a Loading brake assembly  W7×1 P7a×1	7b Guide pin (SUPPLY)  S7a×1	7c Pad arm assembly  W7×1 P7b×1	7d Slide guide plate assembly  S7b×1 W7×1	
		7e Collar 	7f Collar 	7g Sub brake assembly  W7×1 P7c×1	7h Control plate assembly  W7×2 P7d×1	
8	Ⓒ Main deck assembly 	8a Tension lever assembly 	8b Slide lever assembly 	8c Brake control lever assembly 		
9	9a Loading guide  S9×1	9b Timing belt 	9c Center gear assembly 	9d Motor bracket assembly  S9×2	9e Worm wheel  W9×1	9f Gear holder  S9×1
10	10a Main cam gear  S10×1	10b Brake control plate 	10c Rotary encoder  S10×1 W10a×1	10d Connect gear  W10a×1	10e Reel drive pulley assembly  W10b×1	
11	11a Catcher (T) assembly  S11×2	11b Capstan motor  S11×2	11c Charge arm assembly  W11×1	11d Sub cam gear  S11×1	11e PWB holder  S11×2	

Table 2-7-1b

2.8 JIG CONNECTOR CABLE CONNECTION

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

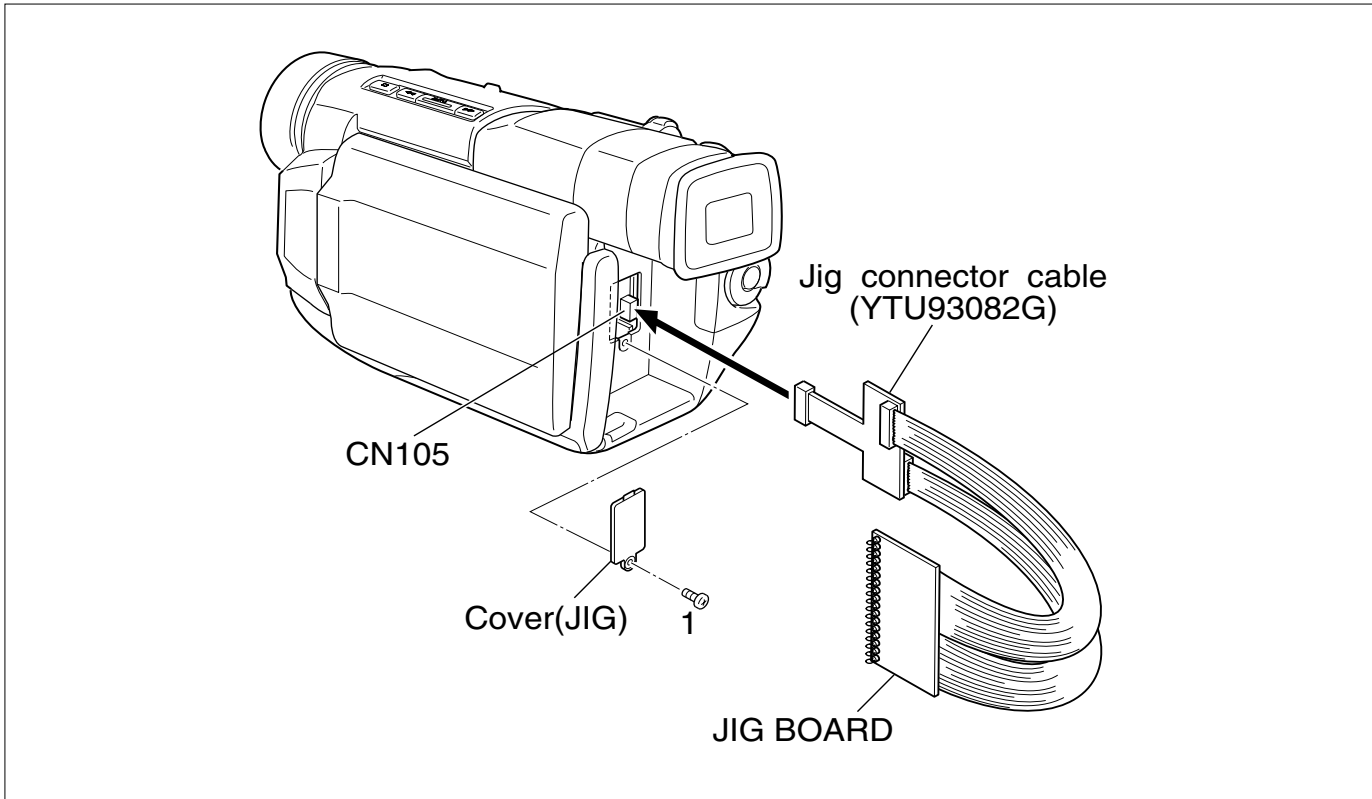


Fig. 2-8-1 Jig connector cable connection

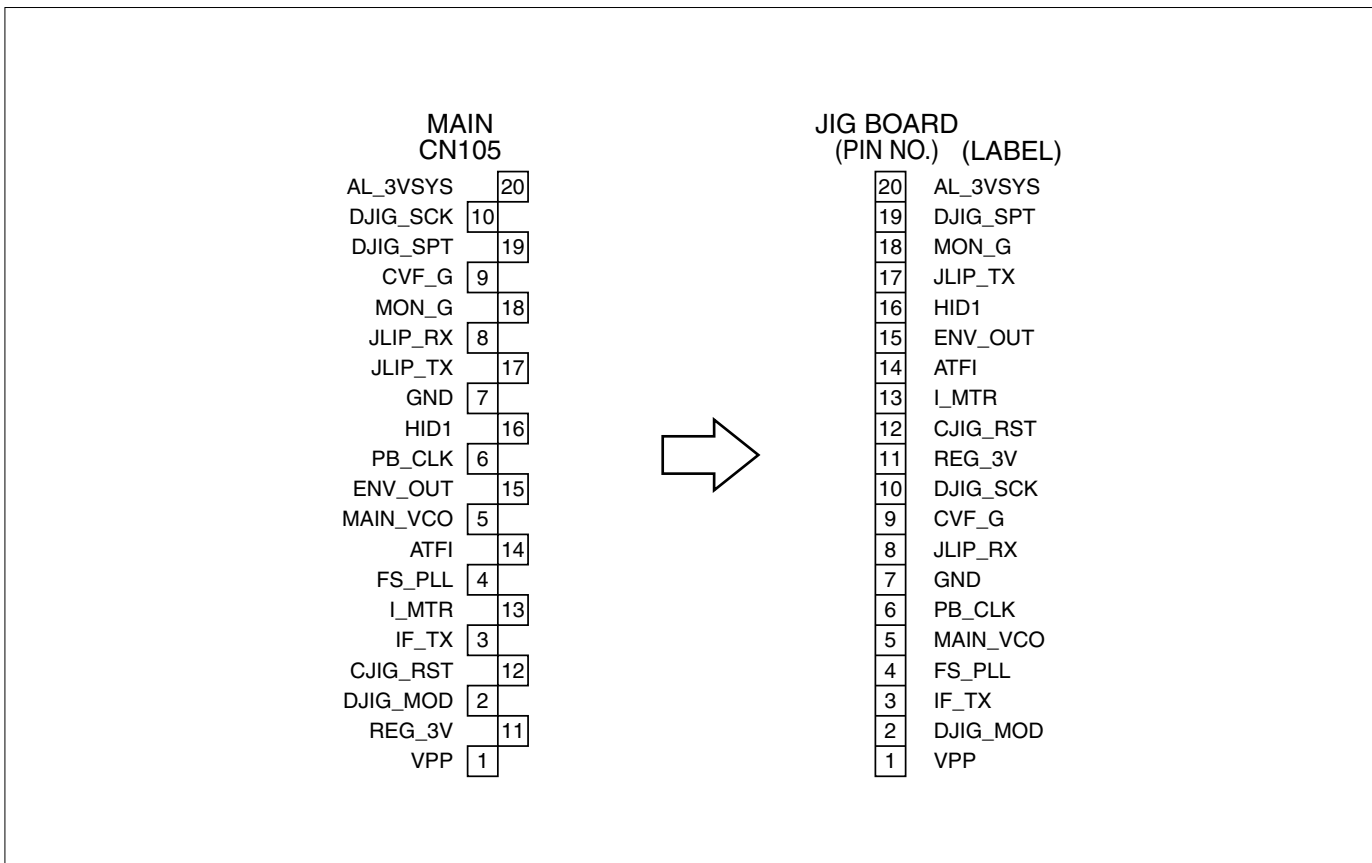


Fig. 2-8-2 Jig connector cable schematic diagram

SECTION 3 ELECTRICAL ADJUSTMENT

3.1 PRECAUTION

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
- E²PROM (IC1003 of MAIN board)
- MONITOR
- E²PROM (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 un it 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. Tools required for adjustments

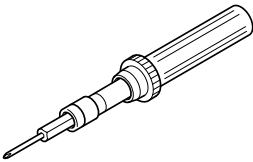
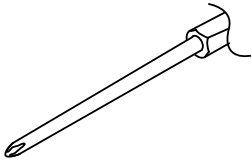
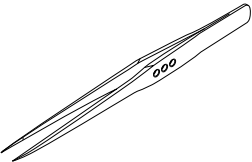
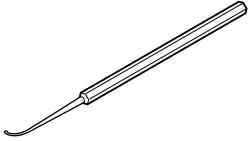
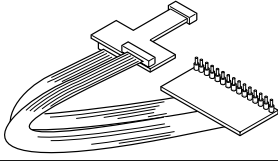
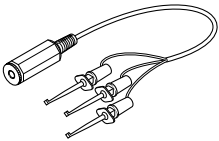
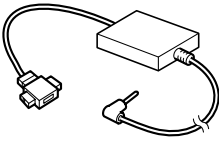
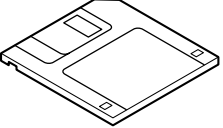
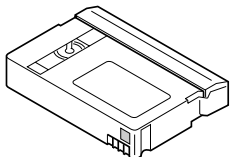
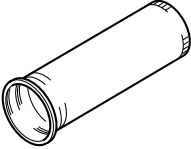
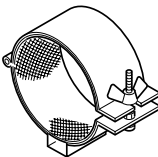
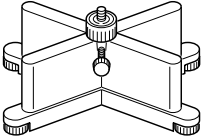
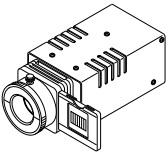
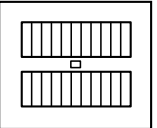
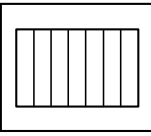
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3	Tweezers P-895	4	Chip IC Replacement Jig PTS40844-2
			
5	Jig Connector Cable YTU93082G	6	Communication Cable YTU93107A
			
7	PC Cable QAM0099-002	8	Service Support System YTU94057-52
			
9	Alignment Tape MC-1	10	INF Adjustment Lens YTU92001B
			
11	INF Adjustment Lens Holder YTU94087	12	Camera Stand YTU93079
			
13	Light box Assembly YTU93096A	14	Gray Scale Chart YTU94133A
			
15	Color Bar Chart YTU94133C		
			

Table 3-1-1

1. Torque driver

Be sure to use for 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. Jig connector cable

Connected to CN105 of the main board and used for electrical adjustment, etc.

6. Communication Cable

Connect the Communication cable between the PC cable and Jig connector cable when performing a PC adjustment.

7. PC cable

To be used to connect the VideoMovie and a personal computer with each other when a personal computer is used for adjustment.

8. Service support system

To be used for adjustment with a personal computer.

9. Alignment tape

To be used for check and adjustment of interchangeability of the mechanism.

10. INF adjustment lens

To be used for adjustment of the camera system.

11. 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.

12. Camera stand

To be used together with the INF adjustment lens holder.

13. Light box assembly

To be used for adjustment of the camera system.

14. Gray scale chart (for Light box assembly)

To be used for adjustment of the camera system.

15. Color bar chart (for Light box assembly)

To be used for adjustment of the camera system.

3.2 SETUP

1. Setup for electrical adjustment with personal computer.

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

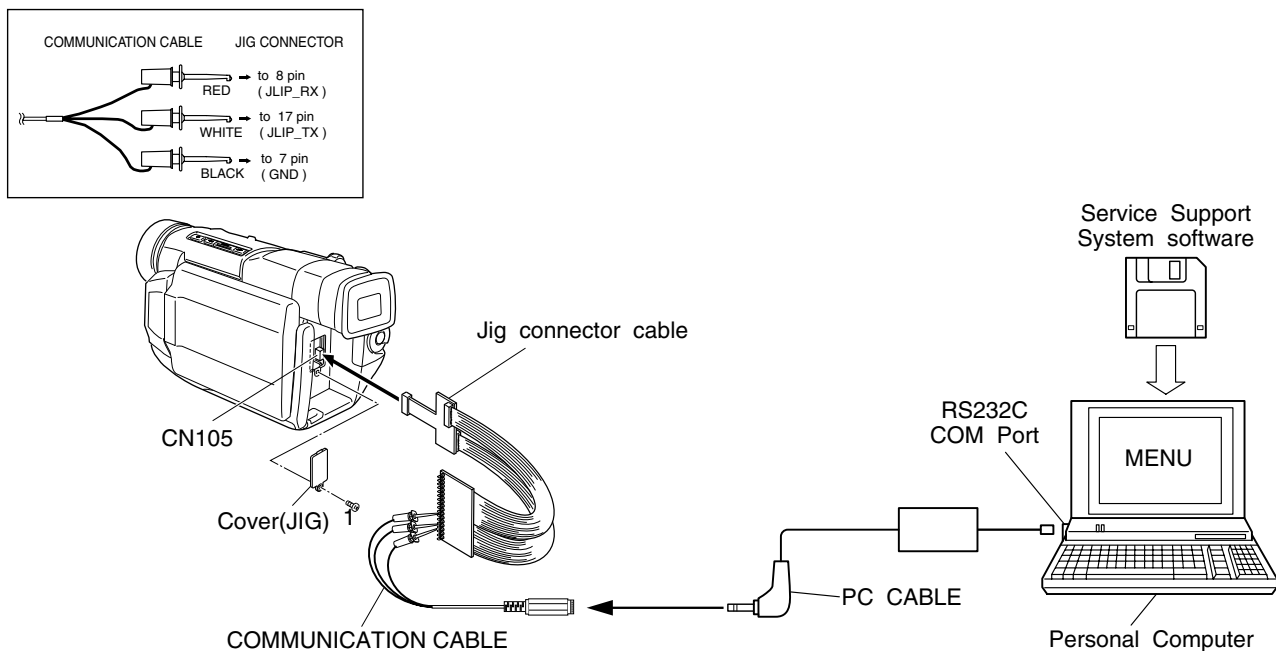


Fig. 3-2-1 Connection for Service support system