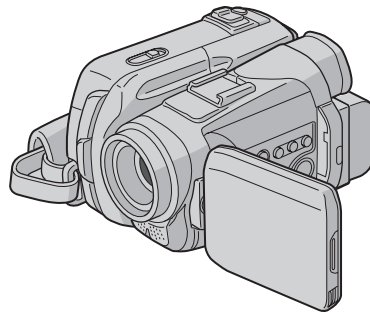


JVC

SERVICE MANUAL

DIGITAL VIDEO CAMERA

GR-DF430US, GR-DF450US, GR-DF470US



Mini **DV** NTSC



MultiMediaCard

GR-DF430USM[M5D5S3],
GR-DF450USM[M5D5S5],
GR-DF470USM[M5D5S7]

For disassembling and assembling of MECHANISM ASSEMBLY, refer to the SERVICE MANUAL No.86700(MECHANISM ASSEMBLY).

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SPECIFICATION

■Camcorder

For General	Power supply		DC 11.0 V(Using AC Adapter) DC 7.2 V (Using battery pack)
	Power consumption		Approx. 3.2 W(3.5W*)(LCD monitor off, viewfinder on) Approx. 4.2W (4.5W*)(LCD monitor on, viewfinder off) * Using LED Light
	Dimensions (W × H × D)		75 mm × 74mm × 111 mm(3" x 2-15/16" x 4-3/8") (with the LCD monitor closed and the viewfinder pushed back in)
	Weight		Approx. 400g (0.89 lbs) (without battery, cassette, memory card and lens cap) Approx. 480 g (1.06 lbs) (incl. battery, cassette memory card and lens cap)
	Operating temperature		0°C to 40°C(32°F to 104°F)
	Operating humidity		35% to 80%
	Storage temperature		-20°C to 50°C (-4°F to 122°F)
	Pickup		1/6" CCD
	Lens		F 1.2, f = 2.6 mm to 39 mm, 15:1 power zoom lens
	Filter diameter		Ø30.5 mm
	LCD monitor		2.5" diagonally measured, LCD panel/TFT active matrix system
	Viewfinder		Electronic viewfinder with 0.16" color LCD
	Speaker		Monaural
For Digital Video Camera	LED Light		Effective distance: 1.5 m (5 ft)
	Format		DV format (SD mode)
	Signal format		NTSC standard
	Recording/Playback format	Video	Digital component recording
		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
For Digital Still Camera (GR-DF470 only)	Maximum recording time (using 80 min. cassette)		SP: 80 min., LP: 120 min.
	Storage media		SD Memory Card/MultiMediaCard
	Compression system		JPEG (compatible)
	File size		Still image : 2 modes (1024 × 768 pixels/640 × 480 pixels) Moving image:1 mode (160 × 120 pixels)
For Connectors	Picture quality		2 modes (FINE/STANDARD)
	S	S-Video input	Y: 0.8 V to 1.2 V (p-p), 75Ω , analog C: 0.2 V to 0.4 V (p-p), 75Ω , analog
		S-Video output	Y: 1.0 V (p-p), 75Ω, analog C: 0.29 V (p-p), 75Ω, analog
	AV	Video input	0.8 V to 1.2 V (p-p), 75Ω, analog
		Video output	1.0 V (p-p), 75Ω, analogue
		Audio input	300 mV (rms), 50 kΩ , analog, stereo
		Audio output	300 mV (rms), 1 kΩ, analogue, stereo
	Microphone	input	Ø3.5 mm, stereo
	DV	Input/output	4-pin, IEEE 1394 compliant
	USB(GR-DF470/450 only)		Mini USB-B type, USB 1.1/2.0* compliant *Supports at the maximum of Full-Speed (12 Mbps) when using USB Mass Storage Class driver.

■AC Adapter

Power requirement	AC 110 V to 240 V, 50 Hz/60 Hz
Output	DC 11 V, 1 A

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

SECTION 1 PRECAUTIONS

1.1 SAFTY 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.

1.1.1 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  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:
 - Wires covered with PVC tubing
 - Double insulated wires
 - High voltage leads
- (5) Use specified insulating materials for hazardous live parts.
Note especially:
 - Insulation Tape
 - PVC tubing
 - Spacers
 - Insulation sheets for transistors
 - Barrier
- (6) When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

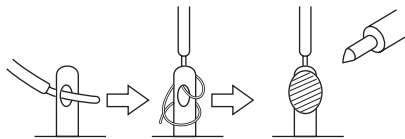


Fig.1-1-1

- (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.

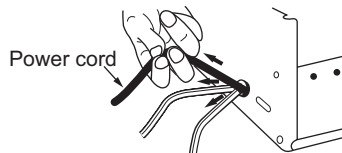


Fig.1-1-2

- (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.

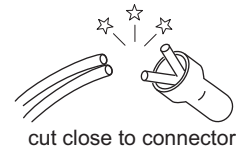
- (12) Crimp type wire connector In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards,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

• **Connector part number** :E03830-001

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

• **Replacement procedure**

- a) Remove the old connector by cutting the wires at a point close to the connector. Important : Do not reuse a connector (discard it).



cut close to connector

Fig.1-1-3

- b) 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.

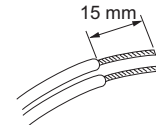


Fig.1-1-4

- c) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

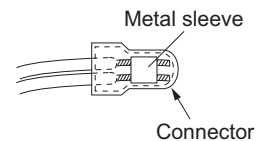


Fig.1-1-5

- d) As shown in Fig.1-1-6, 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.

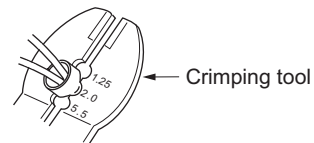


Fig.1-1-6

- e) Check the four points noted in Fig.1-1-7.

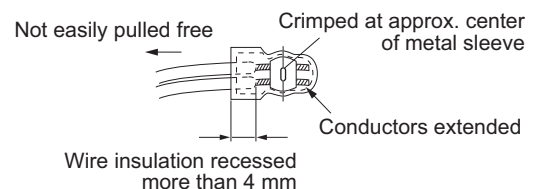


Fig.1-1-7

1.1.2 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 Fig.1-1-11 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 Fig.1-1-11 below.

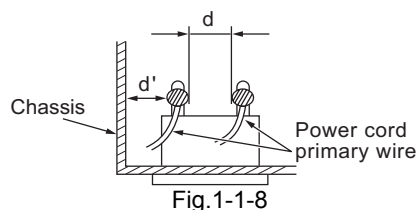


Fig.1-1-8

(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 Fig.1-1-9 and following Fig.1-1-12.

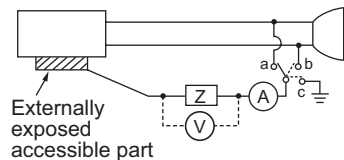
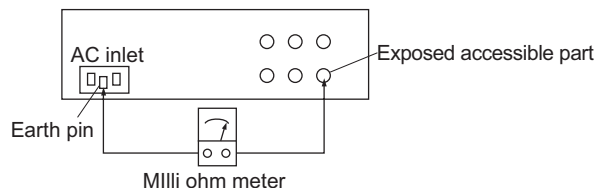


Fig.1-1-9

(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 Fig.1-1-10 and grounding specifications.



Grounding Specifications

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

Fig.1-1-10

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)

Fig.1-1-11

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	$0.15 \mu\text{F}$ and $1.5 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	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

Fig.1-1-12

NOTE :

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

SECTION 2

SPECIFIC SERVICE INSTRUCTIONS

2.1 DIFFERENCE LIST

The following table indicate main different points between models GR-DF430US, GR-DF450US AND GR-DF470US.

MODEL NAME	GR-DF430US	GR-DF450US	GR-DF470US
MEMORY CARD	NO	NO	MMC(8MB)
USB TERMINAL	NO	YES	YES
BODY COLOR	Silver	Silver(PU coat)	Silver(PU coat)
CD-ROM	NO	YES	YES

SECTION 3 DISASSEMBLY

3.1 BEFORE ASSEMBLY AND DISASSEMBLY

3.1.1 Precautions

- Be sure to disconnect the power supply unit prior to mounting and soldering of parts.
- Prior to removing a component part that needs to disconnect its connector(s) and its screw(s), first disconnect the wire(s) from the connector(s), and then remove the screw(s).
- When connecting/disconnecting wires, pay enough attention not to damage the connectors.
- When inserting the flat wire to the connector, pay attention to the direction of the flat wire.
- Be careful in removing the parts to which some spacer or shield is attached for reinforcement or insulation.
- When replacing chip parts (especially IC parts), first remove the solder completely to prevent peeling of the pattern.
- Tighten screws properly during the procedures. Unless otherwise specified, tighten screws at a torque of 0.069N·m (0.7kgf·cm). However, as this is a required value at the time of production, use the value as a measuring stick when proceeding repair services. (See "SERVICE NOTE" as for tightening torque.)

3.1.2 Destination of connectors

Two kinds of double-arrows in connection tables respectively show kinds of connector/wires.

↔ : Flat wire ↔ : Wire ↔ : Board to board (B-B)
 □ : The connector of the side to remove

CONN. No.	CONNECTOR					PIN No.
CN2a	MAIN	CN101	↔	MONI BW	CN761	40
CN2b	MAIN	CN103	↔	MINI BW	CN762	10

3.1.3 Disconnection of connectors (Wires)

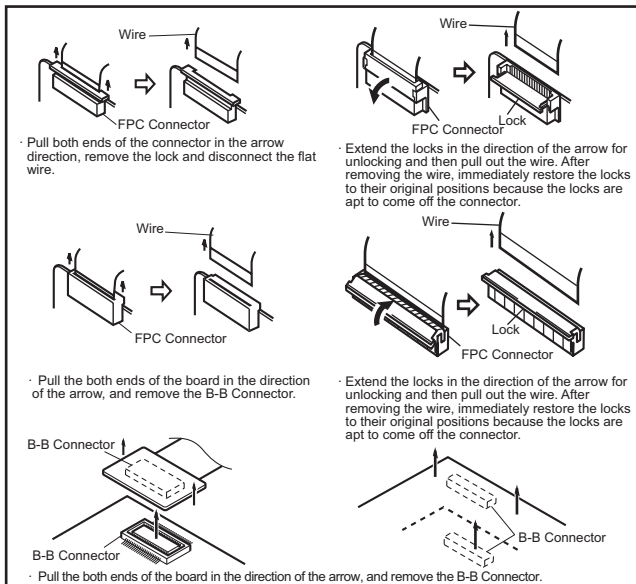


Fig.3-1-1

3.1.4 Tools required for disassembly and assembly

Torque driver YTU94088	Bit YTU94088-003	Tweezers P-895
Chip IC replacement jig PTS40844-2	Cleaning cloth KSMM-01	

Fig.3-1-2

- **Torque driver**
Be sure to use to fastening the mechanism and exterior parts because those parts must strictly be controlled for tightening torque.
- **Bit**
This bit is slightly longer than those set in conventional torque drivers.
- **Tweezers**
To be used for removing and installing parts and wires.
- **Chip IC replacement jig**
To be used for replacement of IC.
- **Cleaning cloth**
Recommended cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.

3.2 ASSEMBLY AND DISASSEMBLY OF MAIN PARTS

3.2.1 Assembly and disassembly

When reassembling, perform the step(s) in reverse order.

STEP No.	PART	Fig. No.	POINT	NOTE
[1]	TOP COVER ASSY	C1	4(S1a), 3(L1a), CN1a	-
[2]	UPPER ASSY (Inc. VF ASSY, SPEAKER/MONITOR)	C2-1	(S2a), 2(S2b), 3(S2c) 2(SD1a), L2, CN2a, b	-
[8]	E.VF UNIT(B/W)	C2-2	2(S8), L8, CN8a	NOTE 8
(*1)	(*2)	(*3)	(*4)	(*5)

- (*1) Order of steps in Procedure
When reassembling, preform the step(s) in the reverse order. These numbers are also used as the identification (location) No. of parts Figures.
- (*2) Part to be removed or installed.
- (*3) Fig. No. showing Procedure or Part Location.
- (*4) Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped or unsoldered.
S = Screw L = Lock, Release, Hook
SD = Solder CN = Connector

[Example]

- 4 (S1a) = Remove 4 S1a screws.
 - 3 (L1a) = Disengage 3 L1a hooks.
 - 2 (SD1a) = Unsolder 2 SD1a points.
 - CN1a = Remove a CN1a connector.
- (*5) Adjustment information for installation.

3.2.2 ASSEMBLY/DISASSEMBLY OF CABINET PARTS AND ELECTRICAL PARTS

●Disassembly procedure

STEP No.	PART	Fig. No.	POINT	NOTE
[1]	COVER(JIG CON)	FA1	S1a,S1b,JACK COVER(DV)	NOTE1a,b,c
[2]	COVER(TOP) ASSY		S2,L2	-
[3]	SHOE	FA2	3(S3)	-
[4]	CENTER COVER		4(S4),L4	NOTE4
[5]	REAR COVER ASSY	FA3	3(S5a),S5b,S5c,S5d,L5a,L5b,CN5	NOTE5
[6]	FRONT COVER(N-MG)ASSY	FA4	2(S6a),3(S6b),CN6	NOTE6a,b
[7]	MIC ASSY		2(S7),BKT(FRONT)	NOTE7
[8]	UPPER CASE ASSY	FA5	S8a,S8b,2(S8c),CN8,L8a,L8b	NOTE8
[9]	OP FRAME ASSY	FA6	2(S9),CN9a,CN9b	-
[10]	LOWER ASSY	FA7	CN10a,CN10b,CN10c,4(S10)	NOTE10a,b,c
[11]	COVER(FRONT) ASSY	FA8	3(S11a),S11b,JACK COVER(MIC)	NOTE11a,b,c
[12]	FRONT BOARD ASSY		S12,L12a,L12b	NOTE12
[13]	MAIN BOARD ASSY	FA9	3(S13a),2(L13a),SHIELD PLATE, CN13a,b,c,S13b	NOTE13a,b
[14]	MDA BOARD ASSY	FA10-1	CN14a,b,c,d,2(S14)	-
[15]	MECHA(B) ASSY	FA10-2	S15a,BKT(PRE-REC),3(S15b), BKT(MECHA) ASSY	NOTE15

NOTE1a:

During the procedure, leave the CASSETTE COVER (C. COVER) open.

NOTE1b:

When removing the screw No.2, leave the JACK COVER (DV) open. Be careful in handling the JACK COVER (DV), as it comes off together when disassembling.

NOTE1c:

When removing the JACK COVER (DV), leave the VF ASSEMBLY pulled out.

NOTE4:

During the procedure, leave the CASSETTE COVER (C. COVER) open.

NOTE5:

When removing the screw No.15, leave the JACK COVER (DC) open.

NOTE6a:

During the procedure, be careful not to break the MAIN BOARD parts.

NOTE6b:

When attaching the screw No.20, be careful not to damage the FFC.

NOTE7:

When attaching, be careful with the wiring..

NOTE8:

During the procedure, leave the CASSETTE COVER (C. COVER) open.

NOTE10a:

As the screw No.31 is located under the connector (CN10a), pull out the connector first, before removing the screw.

NOTE10b:

During the procedure, be careful in handling the HEAT SINK1.

NOTE10c:

When attaching, be careful with the wiring.

NOTE11a:

During the procedure, remove the GRIP BELT.

NOTE11b:

During the procedure, leave the CASSETTE COVER (C. COVER) open.

NOTE11c:

When disassembling, be careful in handling the JACK COVER (MIC) as it comes off together.

NOTE12:

During the procedure, be careful not to break the EJECT SW.

NOTE13a:

During the procedure, be careful in handling the HEAT SINK1.

NOTE13b:

Be careful with the wiring and the handling of the wire. Pay special attention for the wire folding position.

NOTE15:

When attaching, be careful not to catch the FPC in between.

●Destination of connectors

CN.NO.	CONNECTOR					PIN NO.
CN5	MAIN	CN103	↔	REAR	CN501	40
CN6	MAIN	CN114	↔	MIC	-	4
CN8	MAIN	CN105	↔	MONI.OPE	CN601	45
CN9a	MAIN	CN102	↔	OP BLOCK	-	22
CN9b	MAIN	CN101	↔	CCD	CN5001	20
CN10a	MAIN	CN107	↔	FRONT	CN401	16
CN10b	MAIN	CN108	↔	CAMERA OPE	-	14
CN10c	MAIN	CN112	↔	SPEAKER	-	2
CN13a	MAIN	CN104	↔	MDA	CN305	30
CN13b	MAIN	CN106	↔	SENSOR	-	16
CN13c	MAIN	CN109	↔	HEAD	-	8
CN14a	MDA	CN304	↔	LOADING MOTOR	-	6
CN14b	MDA	CN303	↔	ROTARY ENCORDER SW	-	6
CN14c	MDA	CN302	↔	DRUM MOTOR	-	11
CN14d	MDA	CN301	↔	CAPSTAN MOTOR	-	18

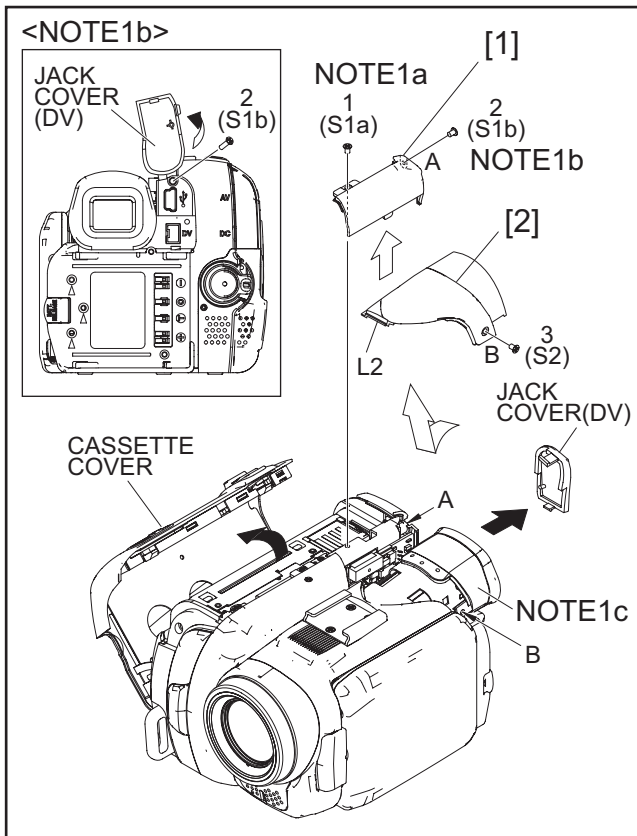


Fig.FA1

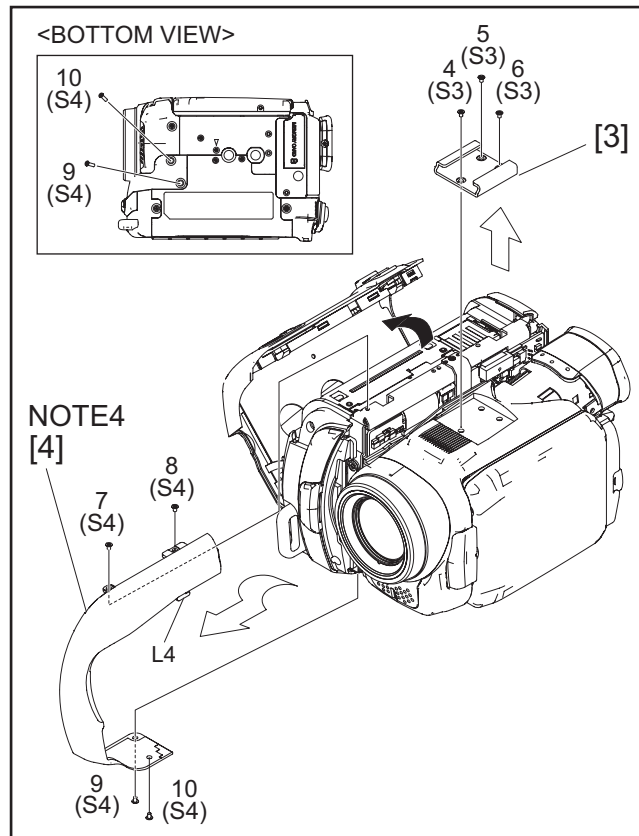


Fig.FA2

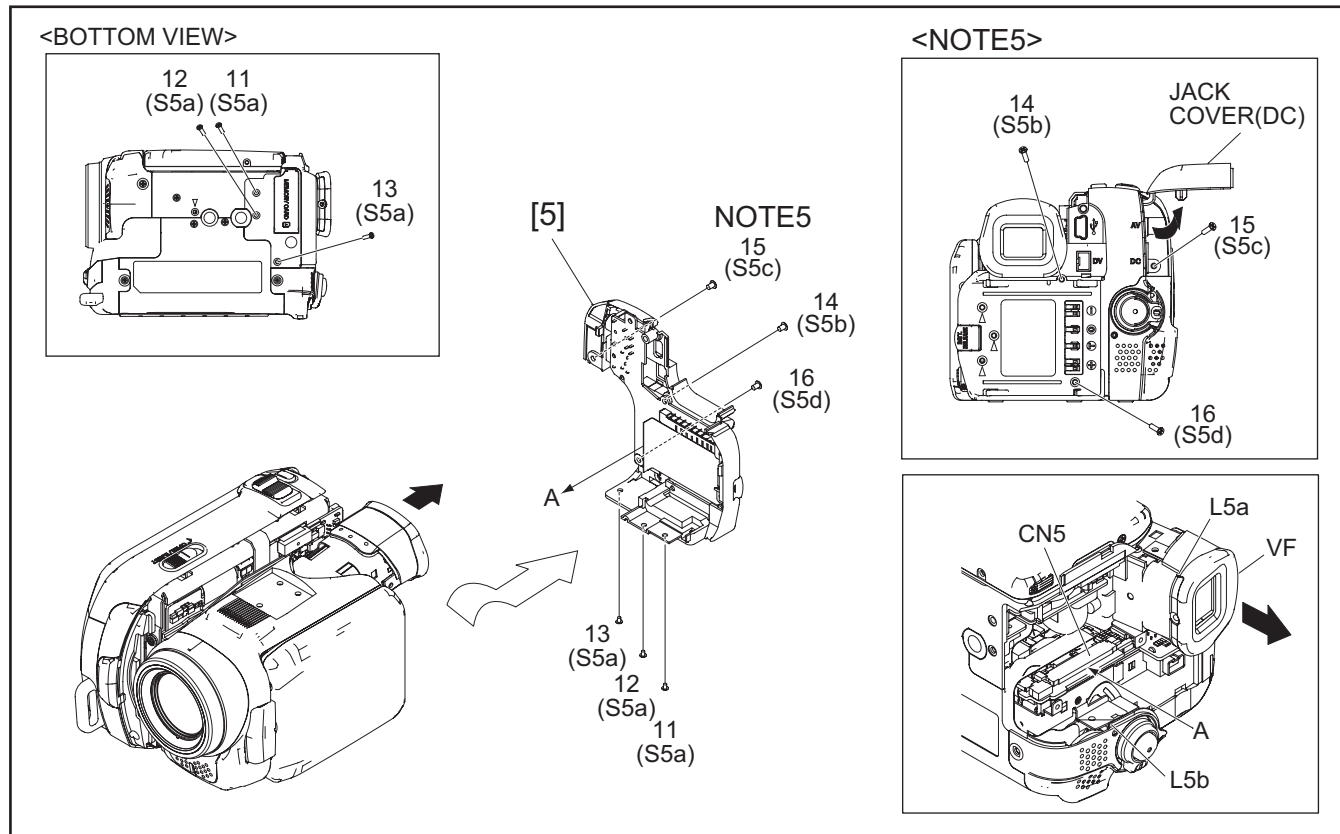


Fig.FA3

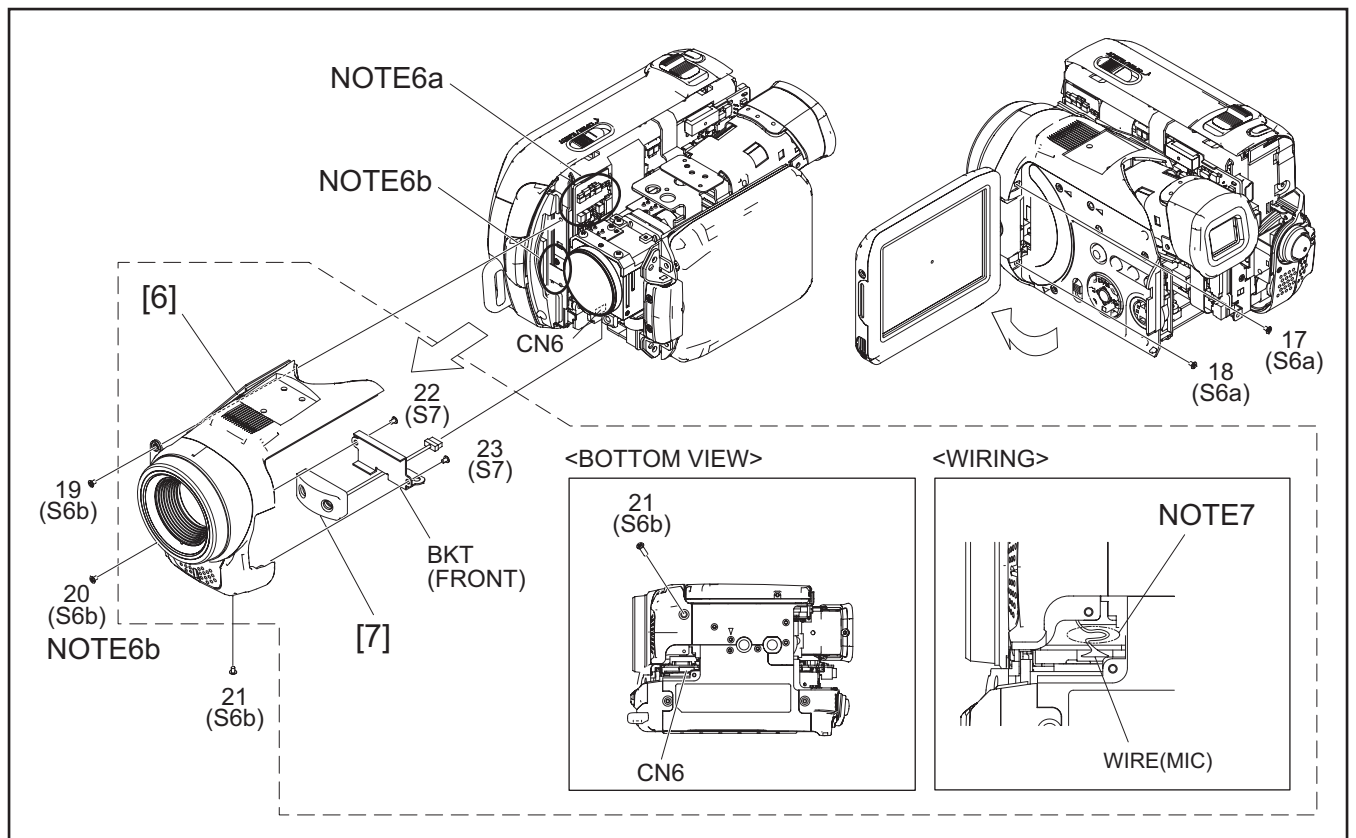


Fig.FA4

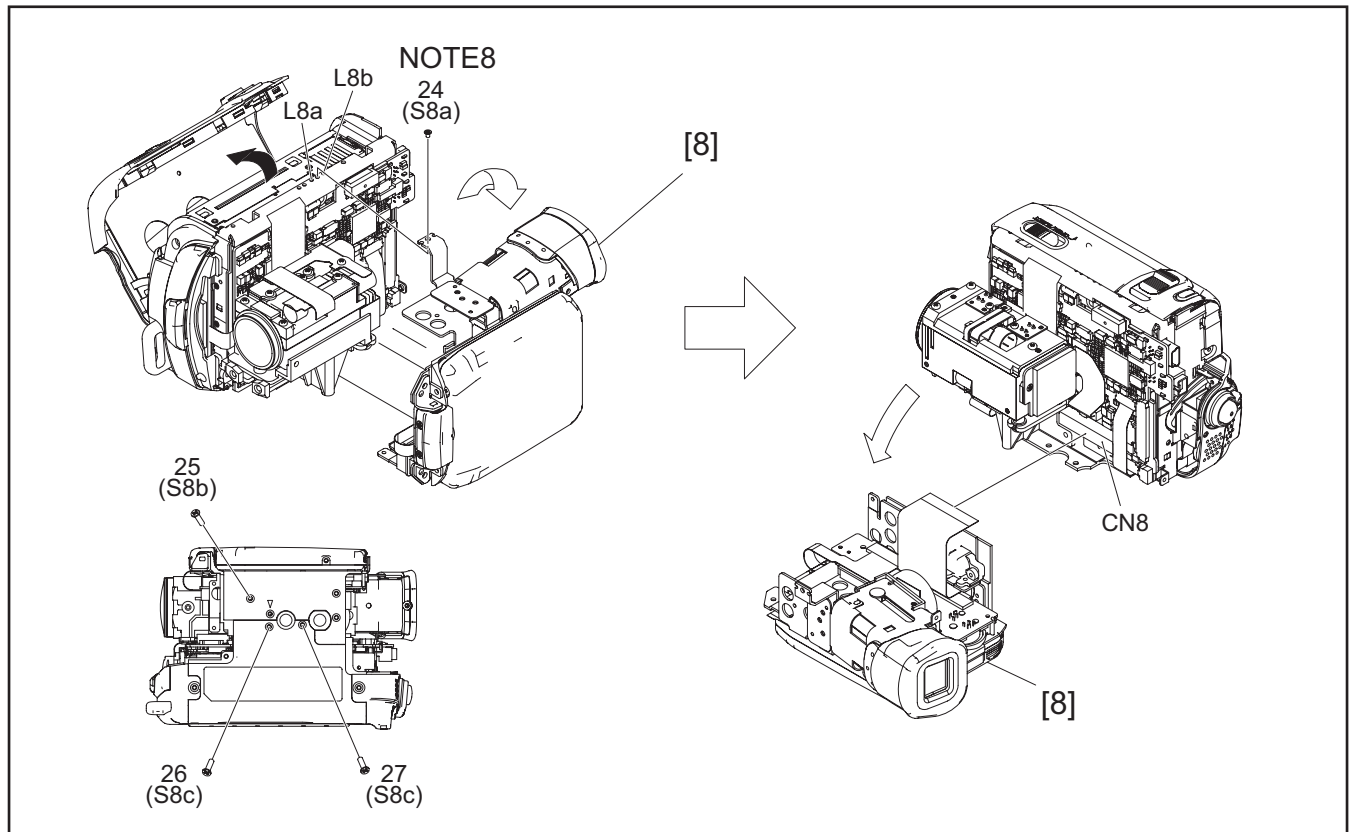


Fig.FA5

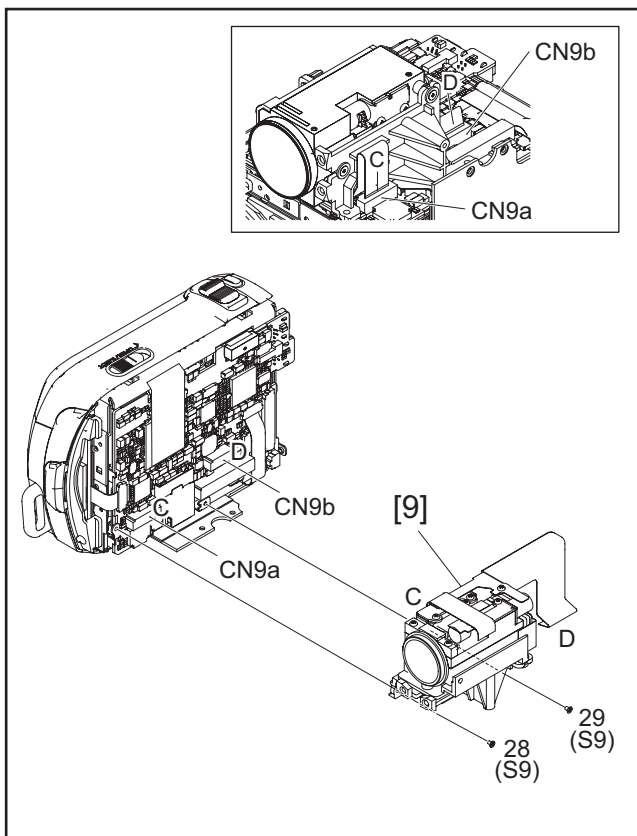


Fig.FA6

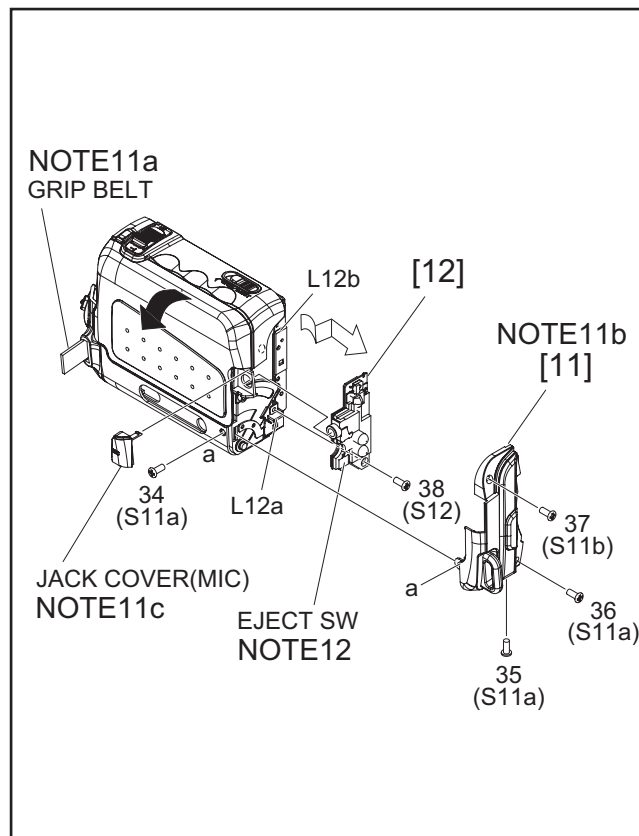


Fig.FA8

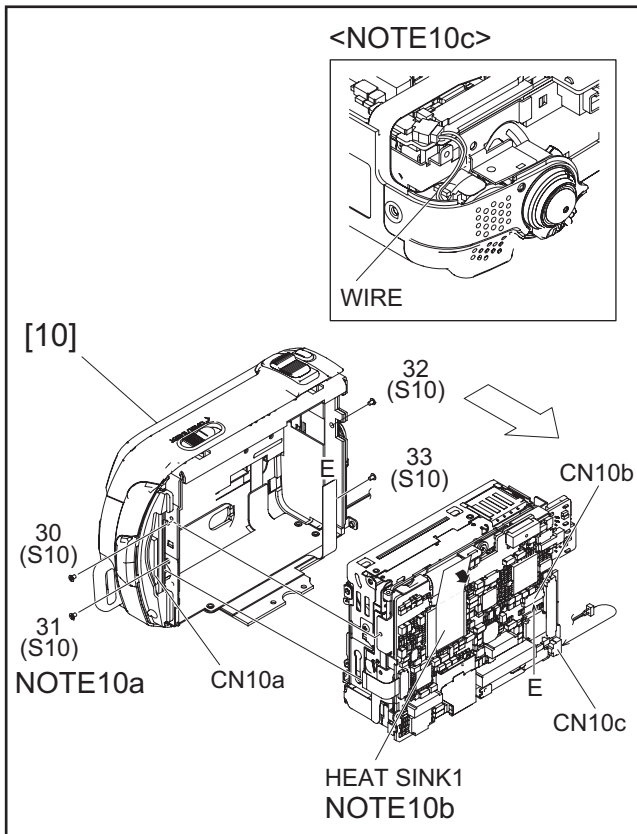


Fig.FA7

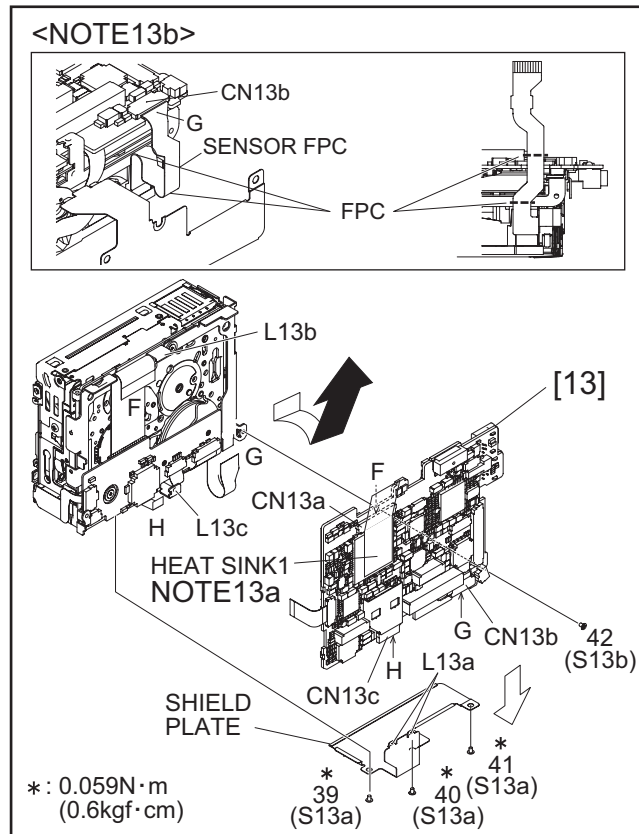


Fig.FA9

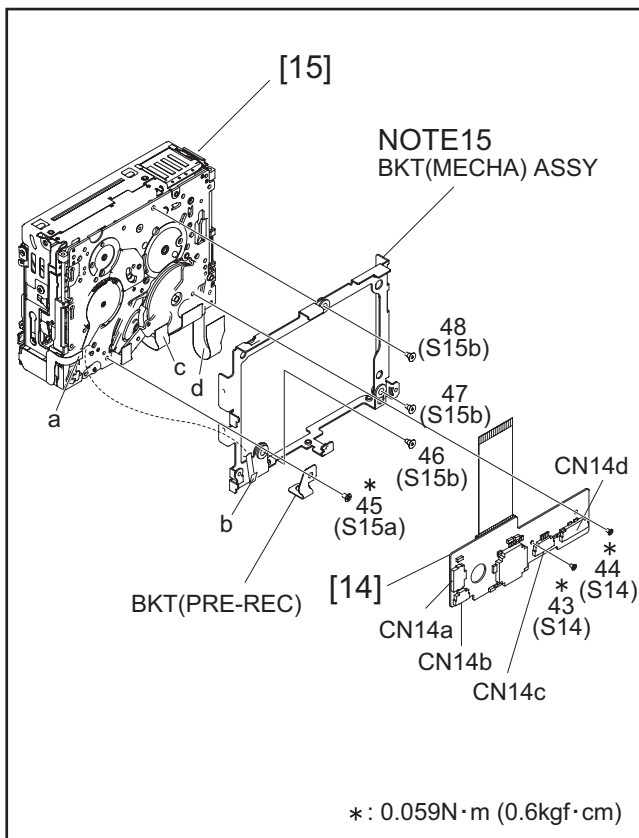


Fig.FA10-1

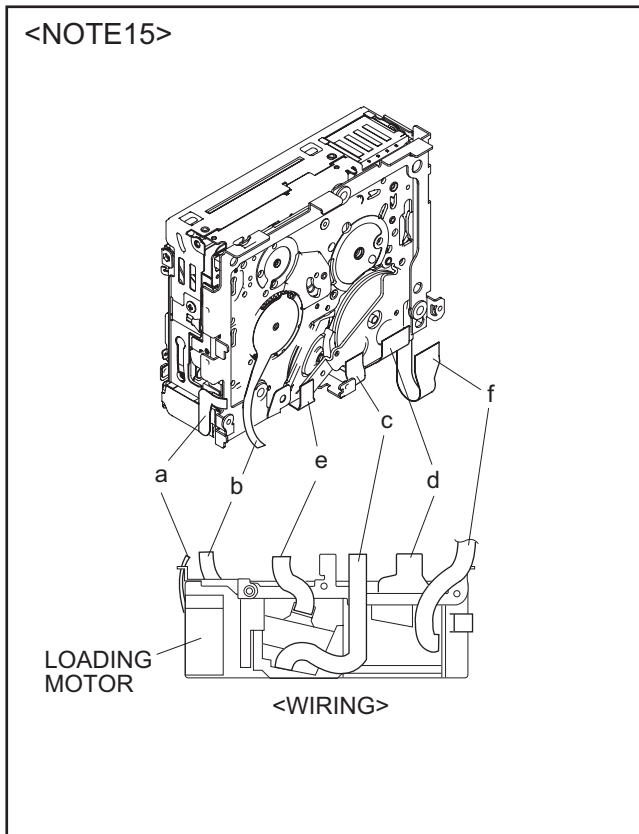


Fig.FA10-2

3.2.3 DISASSEMBLY of [8] UPPER ASSEMBLY

● [16] Removing VF ASSEMBLY

- (1) Remove the FPC from the connector (CN8a).
- (2) Remove the three screws (1-3), and remove the VF ASSEMBLY.

NOTE8a:

During the procedure, be careful not to break the FPC.

● [17] Removing MONITOR ASSEMBLY

- (1) Remove the screw (4).
- (2) Remove the connector (CN8b), and remove the FPC.
- (3) Remove the two screws (5, 6), and remove the MONITOR ASSEMBLY.

NOTE8b:

During the procedure, be careful not to break the FPC.

● [18] Removing MONITOR OPERATION BOARD ASSEMBLY

- (1) Remove the five screws (7-11), and remove the MONITOR OPERATION BOARD ASSEMBLY.

NOTE8c:

When removing, be careful in handling the parts (BUTTON (SET), KNOB(VIDEO/DSC)).

NOTE8d:

When attaching, be careful with the positions and the directions of the parts.

After attachment, make sure to perform a SLIDE SWITCH operation check.

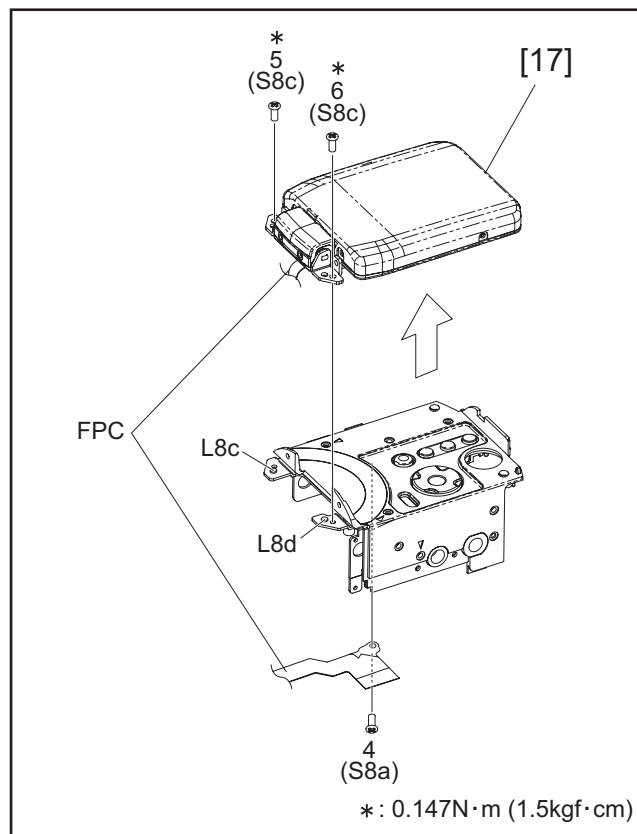


Fig.U2

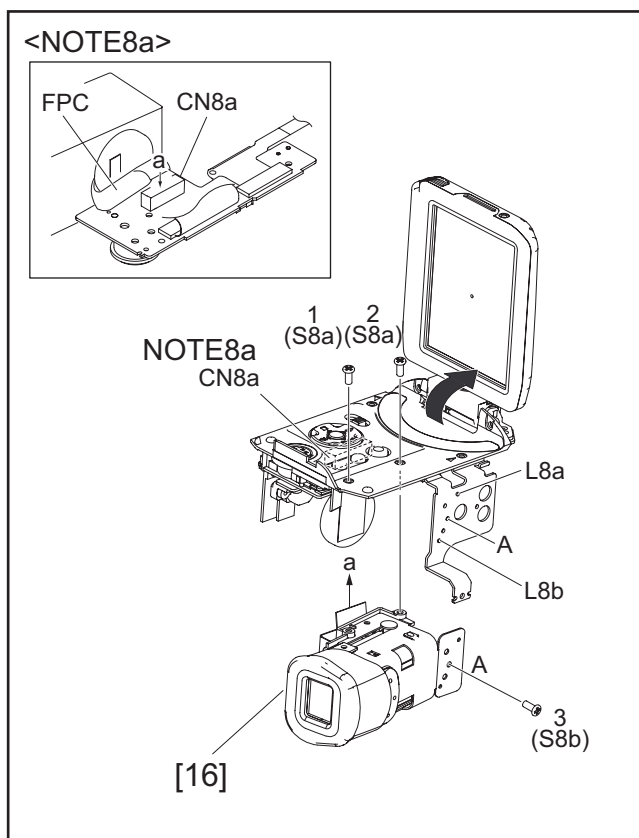


Fig.U1

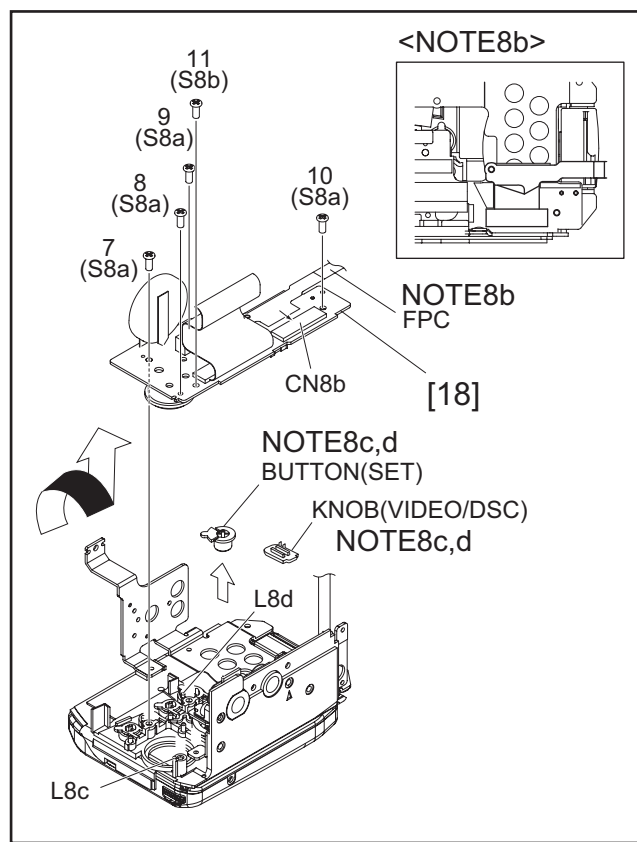


Fig.U3

3.2.4 DISASSEMBLY of [9] OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY

●CAUTIONS

- (1) During the procedure, be careful in handling the CCD IMAGE SENSOR, OP LPF, and lens components.
Pay special attention not to soil, dust, or scratch the surfaces.
If the surfaces are soiled with fingerprints and others, they should be wiped away using silicon paper, clean chamois or cleaning cloths.
- (2) The CCD IMAGE SENSOR may be shipped with a protective seal attached to the transmitting glass.
When replacing the CCD IMAGE SENSOR, do not peel off the protective seal from the new part until immediately before it is mounted in the OP BLOCK ASSEMBLY.
- (3) The attachment direction of the OP LPF is so important for installation that there may be a marking. Be careful when removing the OP LPF, and make sure to attach it exactly as same as its original status.

●Disassembly of OP BLOCK ASSEMBLY/ CCD BOARD ASSEMBLY

- (1) Remove the three screws (1-3), and remove the BKT (OP) ASSEMBLY.
- (2) Remove the HEAT SINK2.
- (3) Remove the two screws (4,5), and remove the CCD BOARD ASSEMBLY together with CCD BASE ASSEMBLY.
- (4) Remove the LPF HOLDER from the CCD BASE ASSEMBLY, and remove the MASK.

NOTE 9a:

Since the MASK is between the LPF HOLDER and CCD IMAGE SENSOR, be careful in handling the MASK.

NOTE9b:

In removing the CCD IMAGE SENSOR, unsolder the fourteen soldered parts (SD9a), and remove the CCD BASE ASSEMBLY from the CCD BOARD ASSEMBLY. In replacing the CCD IMAGE SENSOR, don't remove the CCD IMAGE SENSOR from the CCD BASE AS-

SEMBLY. Instead, replace the whole CCD BASE ASSEMBLY.

NOTE9c:

Since the OP LPF is inside the LPF HOLDER and the OP LPF is attached to the LPF HOLDER by using the SHEET, remove the OP LPF from the LPF HOLDER if necessary.

In removing the OP LPF from the LPF HOLDER, be careful not to damage the LPF HOLDER, and remove the SHEET carefully if you want to use the same SHEET in attachment procedure.

NOTE9d:

In removing the OP LPF, be careful of the direction of its attachment. Since one side of the OP LPF is coated for the purpose of protection, attach the OP LPF so that the coated side faces the OP lens (a subject of photograph).

●Replacement of service repair parts

The service repair parts for the OP BLOCK ASSEMBLY are as listed below.

When replacing the parts, pay special attention not to cut/damage the FPC or not to cause any damage by soldering (excessive heating).

- (1) FOCUS MOTOR UNIT
- (2) ZOOM MOTOR UNIT
- (3) AUTO IRIS UNIT

NOTE9e:

When replacing the FOCUS MOTOR UNIT or the ZOOM MOTOR UNIT, solder the FPC at a space of about 0.5 mm above the terminal pin.

NOTE9f:

The AUTO IRIS UNIT includes the FPC ASSEMBLY and two SENSORS.

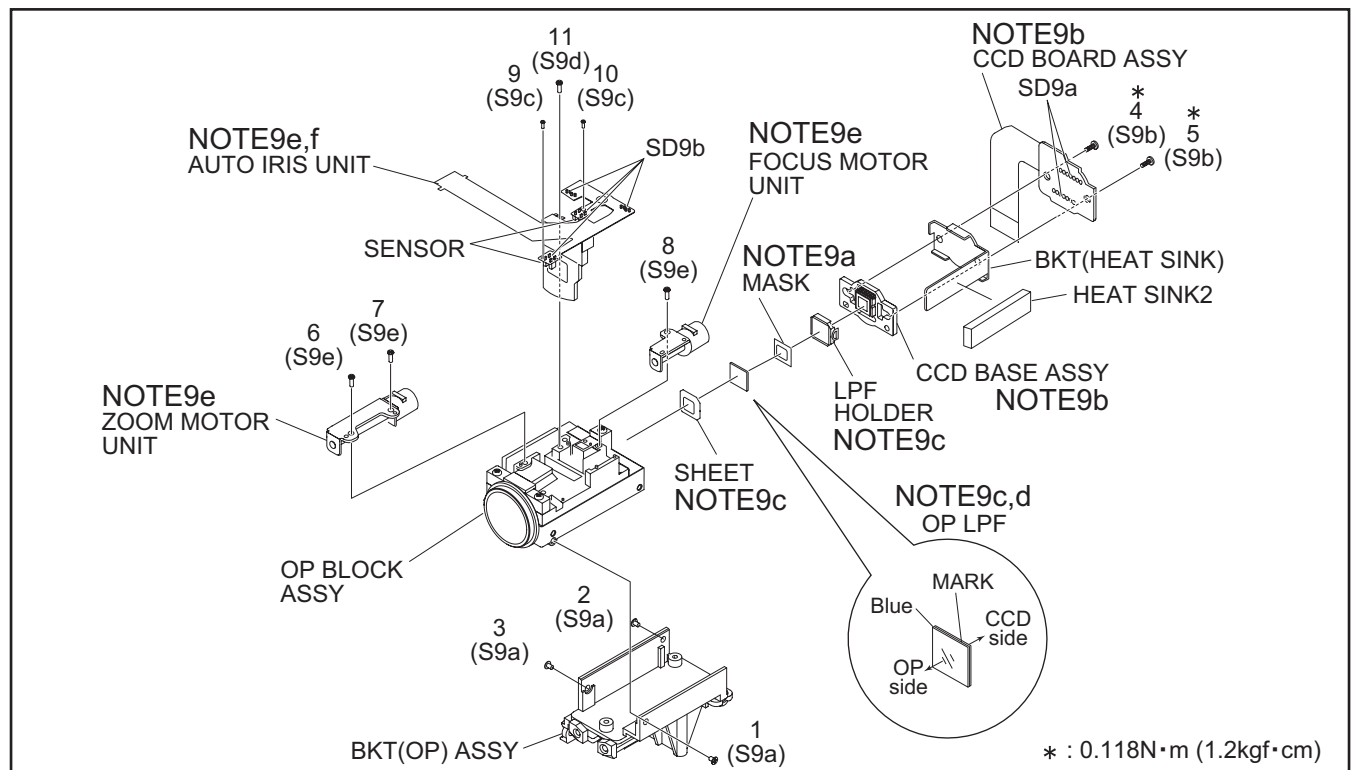


Fig.3-2-4

3.2.5 DISASSEMBLY of [16] VF ASSEMBLY

●Before disassembly

As the VF ASSEMBLY has complicated structure, do not disassemble if not needed.

Inside the VF is divided into two units: LCD ASSEMBLY / LENS ASSEMBLY, and each unit is made up of several parts. Disassemble the VF ASSEMBLY if necessary.

When assembling, pay special attention not to allow foreign materials (dusts etc.) commingling inside, and not to soil the LENS or the SHEET.

●Disassembly of the CABINET PARTS

- (1) Remove the four screws (1-4), and remove the GUIDE (VF).

NOTE16a:

When removing, be careful not to damage the hooks.

NOTE16b:

Be careful in handling the GUIDE (VF) as there is grease applied inside.

- (2) Remove the screw (5), and remove the PLATE (CLICK).
- (3) Remove the screw (6), and remove the HOLDER (EYE CAP) and the EYE CAP.
- (4) Pull out the VF ASSEMBLY then remove the screw (7), and free the FPC.

NOTE16c:

During the procedure, be careful not to cut/ damage the FPC.

- (5) Peel off and remove the FPC which is affixed to the back of the HOLDER (SW).
- (6) Remove the two hooks (L16k, m) from both sides, and remove the UPPER CASE (VF).

NOTE16d:

When attaching, be careful with the positions of the KNOB (ADJ) and the LENS ASSY. Make sure to check the slide operation.

- (7) Remove the FPC from the CASE (LOWER) to free the FPC, and remove the LCD ASSEMBY/LENS ASSEMBLY.

NOTE16e:

During the procedure, be careful not to cut/ damage the FPC.

NOTE16f:

When attaching, be careful in handling the FPC.

- (8) Remove the connector (CN16) and the hook (L16p, q), and remove the VF BOARD ASSEMBLY.

NOTE16g:

When removing, be careful not to damage the hooks.

●Disassembly of LCD SA/LENS SA

Refer to the Fig.VF4 for the disassembly of the LCD ASSEMBLY, and disassemble if needed.

NOTE16h:

During the procedure, be careful in handling the parts. Pay special attention not to damage, soil, or leave fingerprints on the surface.

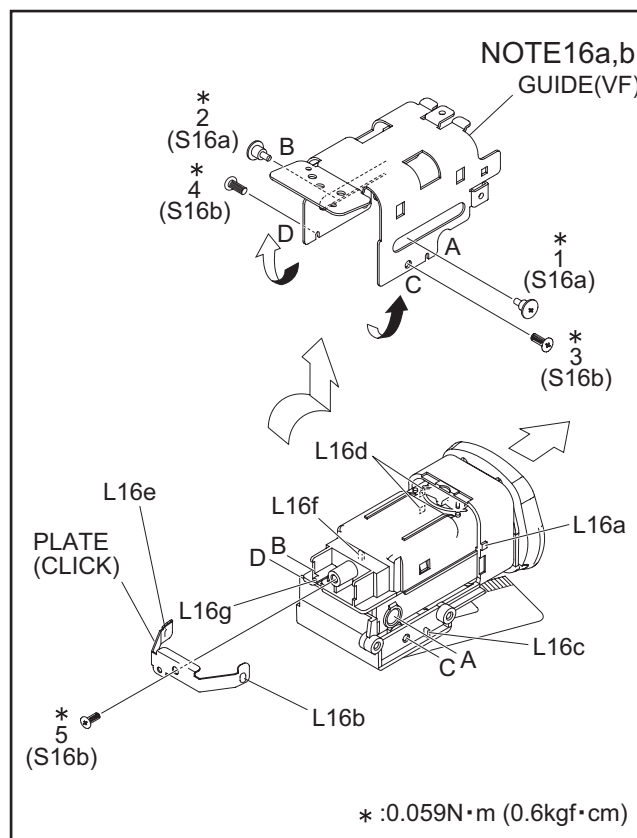


Fig.VF1

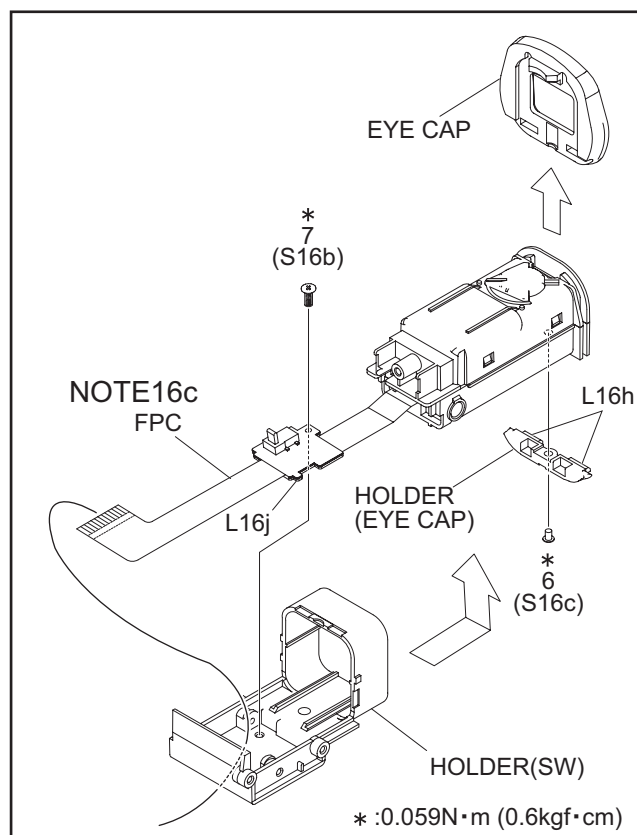


Fig.VF2

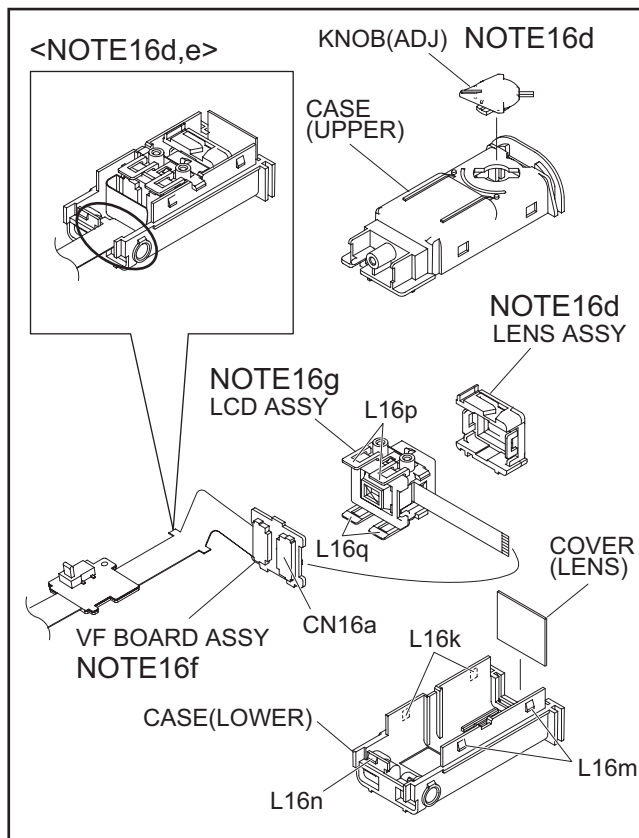


Fig.VF3

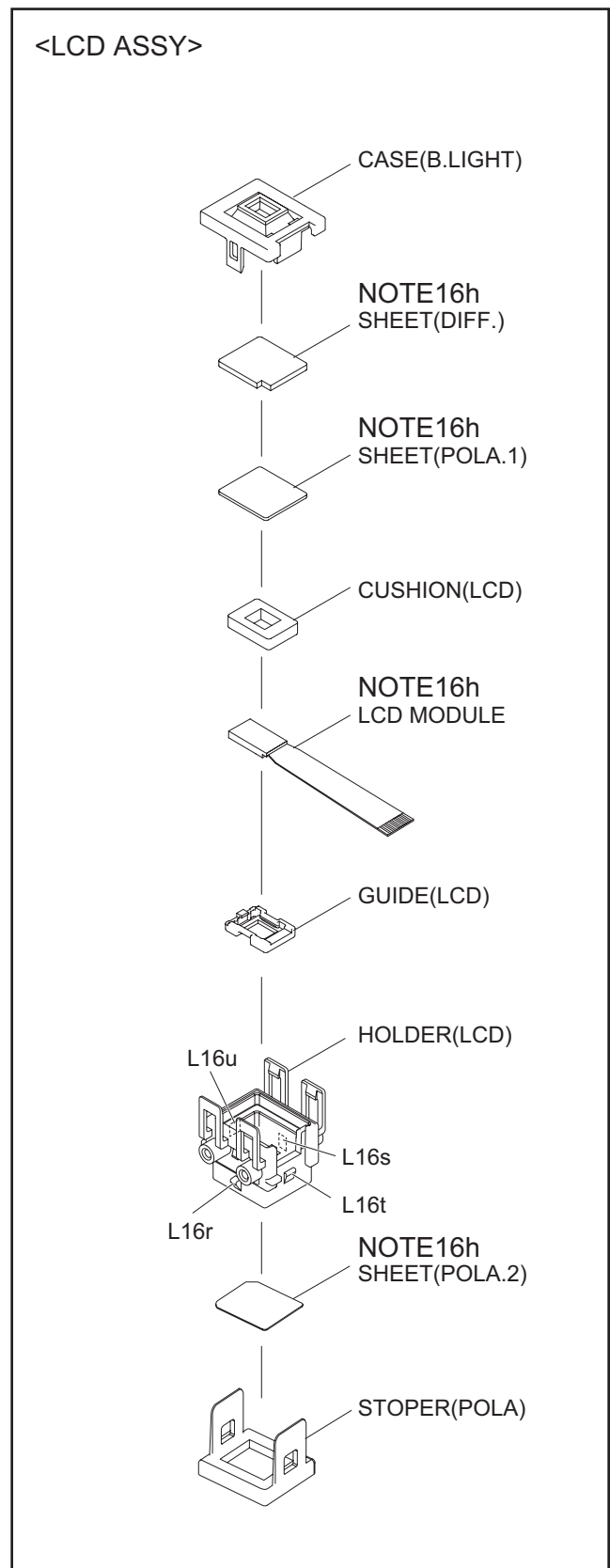


Fig.VF4

3.2.6 DISASSEMBLY of [17] MONITOR ASSEMBLY

●Disassembly of MONITOR ASSEMBLY

- (1) Remove the three screws (1-4), and remove the MONITOR COVER ASSEMBLY by disengaging the five hooks (L17a-e).

NOTE17a:

When removing, be careful not to damage the hooks.

- (2) Pull out the U/D SWITCH BOARD from the MONITOR CASE ASSEMBLY.

NOTE17b:

When attaching, make sure to place the FPC over the HINGE ASSEMBLY, and set it in the slot of the MONITOR CASE.

- (3) Release the lock of the connector(CN17a,b), and remove the HINGE ASSEMBLY by pulling it up.

NOTE17c:

During the procedure, be careful in handling the FPC.
When attaching, make sure to place the CN17b under.

- (4) Release the lock of the connector (CN17c), and pull out the FPC.

- (5) Remove the screw (5).

- (6) Remove the MONI BL BOARD ASSEMBLY and the BACK LIGHT together.

NOTE17d:

Since the BACKLIGHT is soldered to the BOARD ASSEMBLY (SD17), they should be removed together except for the replacement.

- (7) Remove the SHEET (DIFF.) and the SHEET (BEF).

- (8) Remove the LCD MODULE.

- (9) Remove the BKT(LCD) ASSY.

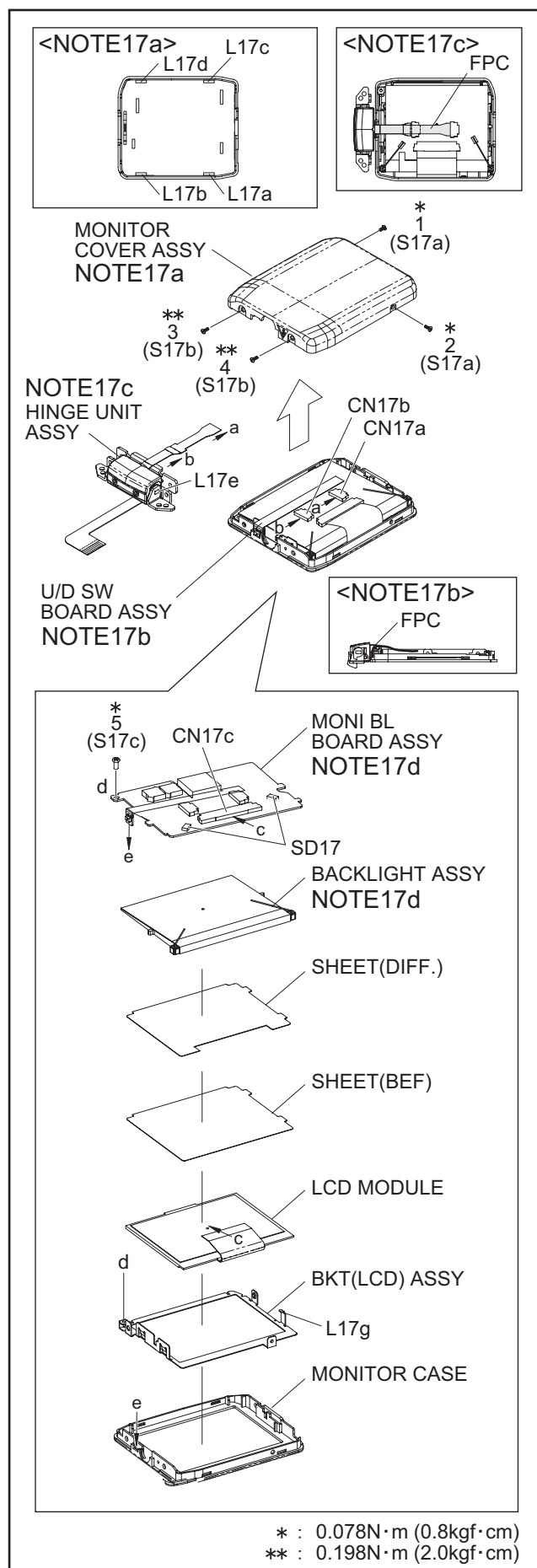


Fig.U5

SECTION 4 ADJUSTMENT

4.1 PREPARATION

4.1.1 Precaution

Camera system and deck system of this model are specially adjusted by using PC.

However, if parts such as the following are replaced, an adjustment is required. The adjustment must be performed in a Service Center equipped with the concerned facilities.

- OP BLOCK ASSEMBLY
- VF ASSEMBLY
- MONITOR ASSEMBLY
- EEP ROM (IC1005 of MAIN board)

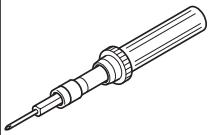
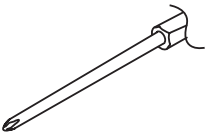
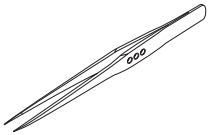
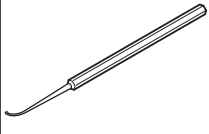
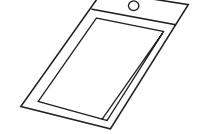
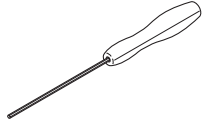
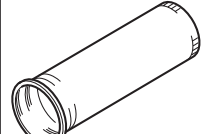
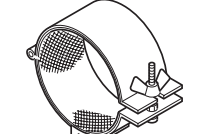
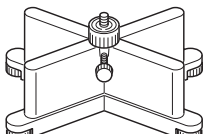
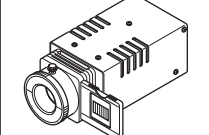
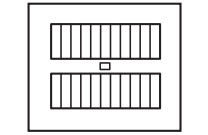
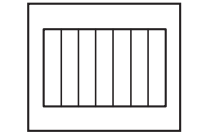
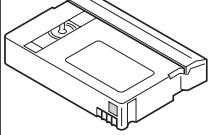
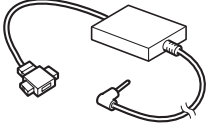
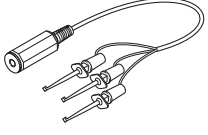
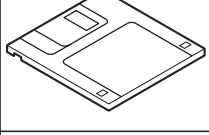
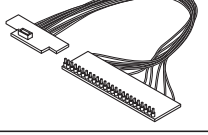
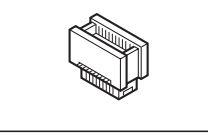
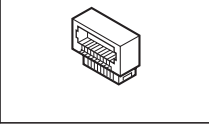
In the event of malfunction with electrical circuits, first find a defective portion with the aid of proper test instruments as shown in the following electrical adjustment procedure, and then commence necessary repair/ replacement/adjustment.

- In observing chip TP, use IC clips, etc. to avoid any stress. Prior to replacement of chip parts (especially IC), remove the solder completely to prevent peeling of the pattern.
- Use a patch cord if necessary. As for a patch cord, see the BOARD INTERCONNECTIONS.
- Since connectors are fragile, carefully handle them in disconnecting and connecting the FPC.

4.1.2 REQUIRED TEST EQUIPMENT

- Personal computer (for Windows)
- Color TV monitor
- Oscilloscope (dual-trace type, observable 100MHz or higher frequency). The one observable 300 MHz or higher frequency is recommended.
- Digital voltmeter
- DC power supply or AC adapter
- Frequency counter (with threshold level adjuster)

4.1.3 TOOLS REQUIRED FOR ADJUSTMENT

Torque Driver YTU94088	Bit YTU94088-003	Tweezers P-895
		
Chip IC Replacement Jig PTS40844-2	Cleaning Cloth KSMM-01	Guide Driver (Hexagonal) D-770-1.27
		
INF Adjustment Lens YTU92001B	INF Adjustment Lens Holder YTU94087	Camera Stand YTU93079
		
Light box Assembly YTU93096A	Gray Scale Chart YTU94133A	Color Bar Chart YTU94133C
		
Alignment Tape MC-1	PC Cable QAM0099-002	Communication Cable YTU93107A
		
Service Support System YTU94057-86	Jig Connector Cable YTU93106C	Extension Connector YTU94145D-40
		
Conversion Connector YTU94145F-40		
		

• Torque driver

Be sure to use to fastening the mechanism and exterior parts because those parts must strictly be controlled for tightening torque.

• Bit

This bit is slightly longer than those set in conventional torque drivers.

• Tweezers

To be used for removing and installing parts and wires.

- **Chip IC replacement jig**
To be used for adjustment of the camera system.
- **Cleaning cloth**
Recommended the Cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.
- **Guide driver (Hexagonal)**
To be used to turn the guide roller to adjustment of the linearity of playback envelope.
- **INF adjustment lens**
To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **INF adjustment lens holder**
To be used together with the Camera stand for operating the Videocamera 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. For the usage of the INF lens holder, refer to the Service Bulletin No. YA-SB-10035.
- **Camera stand**
To be used together with the INF adjustment lens holder. For the usage of the Camera stand, refer to the Service Bulletin No. YA-SB-10035.
- **Light box assembly**
To be used for adjustment of the camera system. For the usage of the Light box assembly, refer to the Service Bulletin No. YA-SB-10035.
- **Gray scale chart**
To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **Color bar chart**
To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **Alignment tape**
To be used for check and adjustment of interchangeability of the mechanism.
- **PC cable**
To be used to connect the Videocamera and a personal computer with each other when a personal computer issued for adjustment.
- **Communication cable**
Connect the Communication cable between the PC cable and Jig connector cable when performing a PC adjustment.
- **Service support system**
To be used for adjustment with a personal computer. Software can be downloaded also from JS-net.
- **Jig connector cable**
Connected to JIG CONNECTOR of the main board and used for electrical adjustment, etc.
- **Extension connector**
Connect this extension connector to the connector of the Jig connector cable for extending the cable connector.
- **Conversion connector**
Conversion connector is used to convert the connector part of the JIG connector cable.

4.2 JIG CONNECTOR CABLE CONNECTION

■ Connection procedure

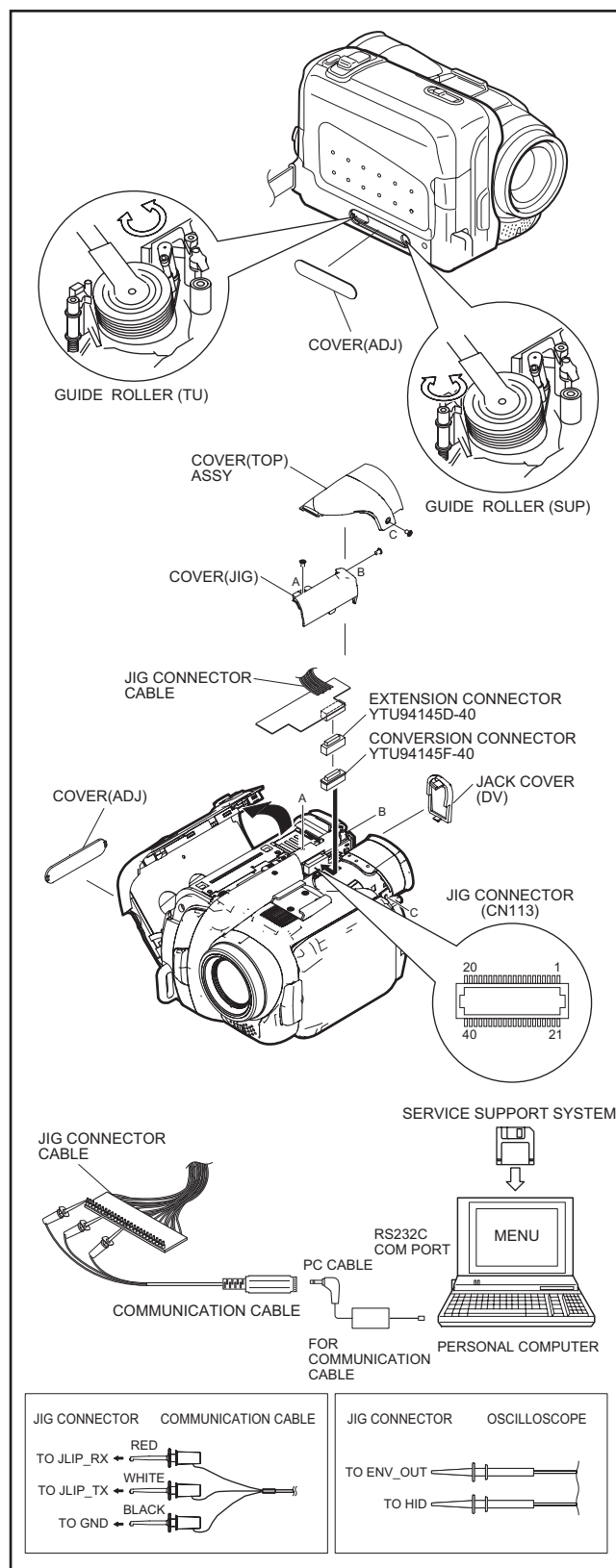


Fig.4-2-1

■ Jig connector diagrams

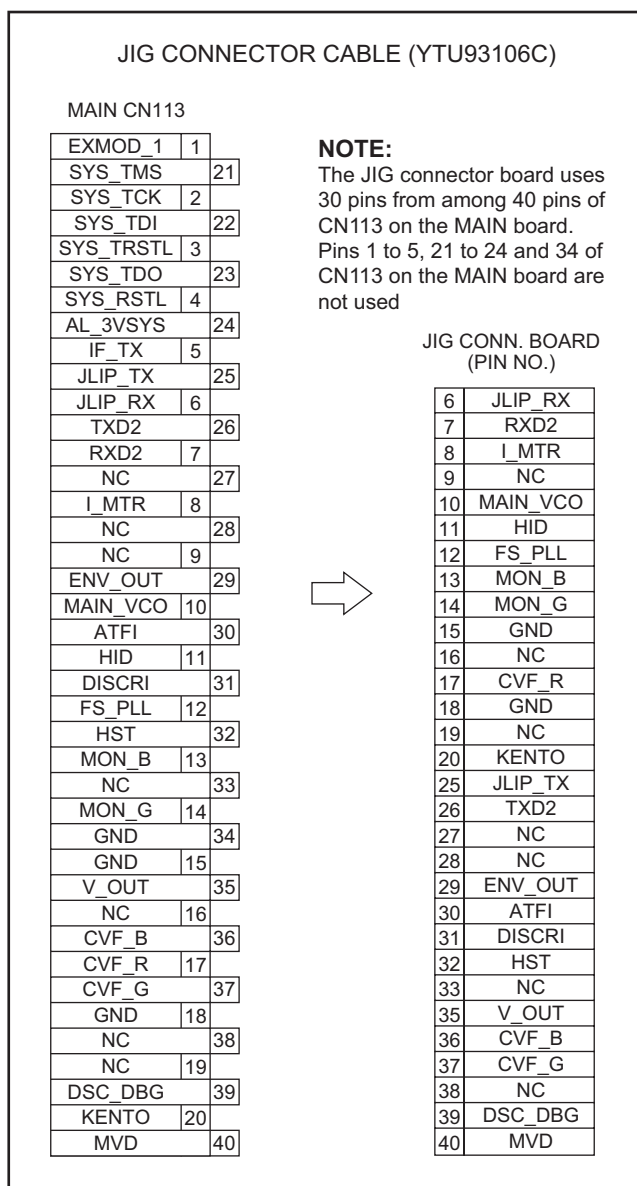


Fig.4-2-2

4.3 MECHANISM COMPATIBILITY ADJUSTMENT

4.3.1 Tape pattern adjustment

NOTE:

Prior to the adjustment, remove the COVER (ADJ).

- (1) Play back the compatibility adjustment tape.
- (2) While triggering the HID, observe the waveform of ENV_OUT.
- (3) Set the manual tracking mode (ATF OFF).
- (4) Confirm that the waveform is entirely parallel and straight, and free from remarkable level-down, through the tracking operation.

Make the confirmation as follows if necessary.

- (5) If level-down is observed on the left hand side of the waveform, straighten the level by turning the GUIDE ROLLER (SUP).

If level-down is observed on the right hand side of the waveform, straighten the level by turning the GUIDE ROLLER (TU).

For actual adjustment, first, turn both the GUIDE ROLLERS (SUP and TU) to tightening direction (clockwise) in order to misalign the waveform once.

Next, turn the GUIDE ROLLERS to returning direction (counterclockwise), then stop turning at the point where the waveform becomes flat.

Turn only the GUIDE ROLLER (SUP) further more, then stop turning at the point where the waveform starts changing.

- (6) After the adjustment, try the unloading motion once, and confirm that the waveform is flat when the tape has been played back again.

- (7) Play back the self-recording.

- (8) Confirm that the waveform is flat.



Fig.4-3-1

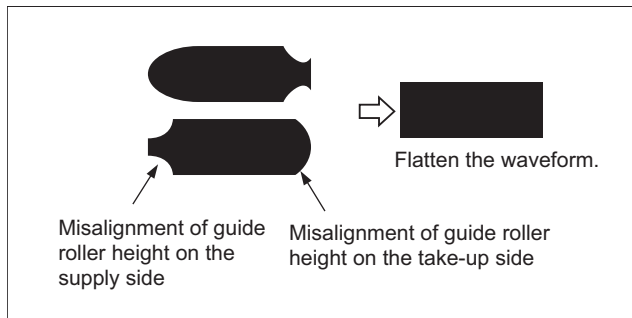


Fig.4-3-2

4.4 ELECTRICAL ADJUSTMENT

Electrical adjustment is performed by using a personal computer and software for SERVICE SUPPORT SYSTEM. Read README.TXT file to use the software properly.

As for the connection of cables, see "4.2 JIG CONNECTOR CABLE CONNECTION".

SECTION 5 TROUBLE SHOOTING

5.1 SERVICE NOTE

CABINET PARTS AND ELECTRICAL PARTS(1)

Symbol No.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Removing order of screw	1	2	3	4	5	6	7	8
Place to stick screw	*	*	*	*	*	*	*	*
Reference drawing (Fig.No.)	FA1	FA2			FA3			FA4
Screw tightening torque	a							

CABINET PARTS AND ELECTRICAL PARTS(2)

Symbol No.	[9]	[10]				[11]				[12]	[13]			[14]	[15]						
Removing order of screw	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Place to stick screw	*	*	*	*	*	*	*	*	*	*	*				*						
Reference drawing (Fig.No.)	FA5		FA7				FA8				FA9				FA10-1						
Screw tightening torque			a								b		a	b			a				

[8] UPPER CASE ASSY

Symbol No.	[16]	[17]	[18]
Removing order of screw	1	2	3
Place to stick screw	*	*	*
Reference drawing (Fig.No.)	U1	U2	U3
Screw tightening torque	a	c	a

[9] OP BLOCK ASSY/CCD BOARD ASSY

Symbol No.	[9]
Removing order of screw	1
Place to stick screw	*
Reference drawing (Fig.No.)	3-2-4
Screw tightening torque	a

[16] VF ASSY

Symbol No.	[16]
Removing order of screw	1
Place to stick screw	VF1
Reference drawing (Fig.No.)	b
Screw tightening torque	b

[17] MONITOR ASSY

Symbol No.	[17]
Removing order of screw	1
Place to stick screw	*
Reference drawing (Fig.No.)	3-2-6
Screw tightening torque	e

NOTE:

- 1) * (This mark shows where to attach the screws) : Do not reuse the screws because the screw lock bond was applied to prevent the screws from loosening.
Prepare the specified screws and use them in place of the removed screws.
- 2) Tightening torque for the screws
 - There are setting limits of the torque value for the torque driver. If the value exceeds the setting value, take it as a rough measurement (reference value), and tighten the screw manually.
 - The specified torque value is a recommended value of the initial assembly. Therefore, set the value below the specified torque value in the assembling procedure. Be careful not to break either the screws or the screw holes.

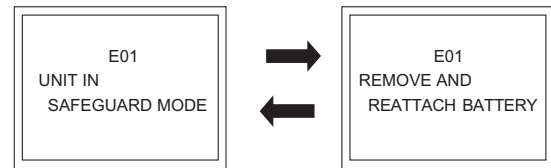
a : 0.069N·m (0.7kgf·cm) b : 0.059N·m (0.6kgf·cm) c : 0.147N·m (1.5kgf·cm) d : 0.118N·m (1.2kgf·cm) e : 0.078N·m (0.8kgf·cm)
f : 0.198N·m (2.0kgf·cm)

5.2 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 alter nately 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].	1. The mechanism is locked during mode shift. 2. The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift. 3. 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].	1. The mechanism is locked during mode shift. 2. 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 seconds shown in the table below 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 SLW/STILL mode. <table><tr><td></td><td>REEL(SUP)</td><td>REEL(TU)</td></tr><tr><td>PB/REC</td><td>3 SEC</td><td>3 SEC</td></tr><tr><td>S-FWD</td><td>3 SEC</td><td>0.3 SEC</td></tr><tr><td>S-REW</td><td>0.3 SEC</td><td>3 SEC</td></tr><tr><td>FF</td><td>3 SEC</td><td>0.1 SEC</td></tr><tr><td>REW</td><td>0.1 SEC</td><td>3 SEC</td></tr></table>		REEL(SUP)	REEL(TU)	PB/REC	3 SEC	3 SEC	S-FWD	3 SEC	0.3 SEC	S-REW	0.3 SEC	3 SEC	FF	3 SEC	0.1 SEC	REW	0.1 SEC	3 SEC	1. The idler gear does not engage with the reel disk well. 2. Though the idler gear and reel disk are engaged with each other, the tape is not wound because of overload to the mechanism. 3. No FG pulse is output from the reel sensor. 4. No power is supplied to the reel sensor. 5. Tape transport operation takes place with a cassette having no tape inside. 6. The tape slackens and no pulse is produced until the slack is taken up and the tape comes into the normal status.
	REEL(SUP)	REEL(TU)																			
PB/REC	3 SEC	3 SEC																			
S-FWD	3 SEC	0.3 SEC																			
S-REW	0.3 SEC	3 SEC																			
FF	3 SEC	0.1 SEC																			
REW	0.1 SEC	3 SEC																			
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.	1. The drum cannot be started or drum rotation is stopped because tape transport load is too high. 1) Tape tension is extremely high. 2) The tape is damaged or soiled with grease, etc. 2. The DRUM FG signal is not received by the syscon CPU. 1) Disconnection in the middle of the signal line. 2) Failure of the DRUM FG pulse generator (hall element). 3. No drum control voltage is supplied to the MDA. 4. 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.	1. The CAPSTAN FG signal is not received by the syscon CPU. 1) Disconnection in the middle of the signal line. 2) Failure of the CAPSTAN FG pulse generator (MR element). 2. No capstan control voltage is supplied to the MDA. 3. The capstan cannot be started or capstan rotation is stopped because tape transport load is too high. 1) Tape tension is extremely high. (Mechanical locking) 2) The tape is damaged or soiled with grease, etc. (Tape tangling occurs, etc.)																		

Fig.5-3-1



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