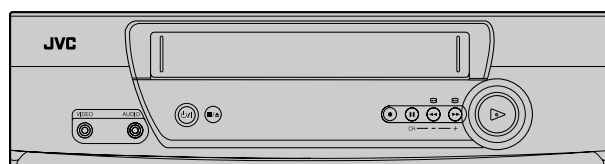


# JVC

## SERVICE MANUAL

### VIDEO CASSETTE RECORDER

## HR-J3008UM/J4008UM



**VHS**  
**SQPB**

Regarding service information other than these sections, refer to the HR-A37U service manual (No.82836). Also, be sure to note important safety precautions provided in the service manual.

### SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-J4008UM)*

#### GENERAL

Power requirement	: AC 110 V – 220 V~, 50 Hz/60 Hz
Power consumption	
Power on	: 14 W
Power off	: 2.0 W
Temperature	
Operating	: 5°C to 40°C
Storage	: -20°C to 60°C
Operating position	: Horizontal only
Dimensions (W x H x D)	: 360 mm x 94 mm x 247 mm
Weight	: 3.0 kg
Format	: VHS NTSC standard
Maximum recording time	
SP	: 210 min. with ST-210 video cassette
EP	: 630 min. with ST-210 video cassette

#### VIDEO/AUDIO

Signal system	: NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/Playback system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 230 lines
Frequency range	: 70 Hz to 10,000 Hz
Input/Output	: RCA connectors (IN x 1, OUT x 1)

#### TUNER

Tuning system	: Frequency-synthesized tuner
Channel coverage	
VHF	: Channels 2–13
UHF	: Channels 14–69
CATV	: 113 Channels
RF output	: Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

#### TIMER

Clock reference	: Quartz
Program capacity	: 1-year programmable timer/8 programs
Memory backup time	: Approx. 6 months Estimated figure based on supplied fresh battery; actual performance may differ.

#### ACCESSORIES

Provided accessories	: RF cable (F-type), Lithium battery CR2025, Infrared remote control unit, “AA” battery x 2, Conversion plug
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Specifications shown are for SP mode unless specified otherwise.  
E. & O.E. Design and specifications subject to change without notice.

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The following table indicate main different points between models HR-A37U, HR-J3008UM and HR-J4008UM.

ITEM	MODEL	HR-A37U	HR-J3008UM	HR-J4008UM
POWER VOLTAGE		120V, 60Hz	←	110-220V, 50/60Hz
POWER PLUG		UL, CSA	←	SASO
COSMETIC/COLOR		MOLD-DARK GRAY	PAINT-Pure SILVER	←
RCU TYPE / COLOR		U1 / MOLD BLACK	←	E1 / PAINT SILVER
INSTRUCTION / LANGUAGE		1 SHEET / ENG	YES / SPA	YES / SPA, ENG
PLUG ADAPTER		NOT USED	←	SASO → CEE
LITHIUM BATTERY		NOT USED	←	CR2025
HEAD CLEANER		NOT USED	←	USED
SHUTTLE SERCH(LATCH)		SPx7, EPx21	SPx7, EPx21(x21)	←
B.E.S.T. PICTURE		AUTO PICTURE	←	A.V. CALIBRATION
AUTO CH PRESET		USED (P&P)	←	USED
BACKUP TIME		NOT USED	←	6 MONTHS(LI BATT.)
TIMER PROGRAM BACKUP		PERMANENT PROGRAM	←	NOT USED
SUMMER TIME ADJUST		USED	←	NOT USED
AUTO CLOCK / JUST CLOCK		USED	←	NOT USED
REC RESUME		NOT USED	←	USED
LANGUAGE[INITIAL]		[ENG], SPA, FRE	←	[SPA], ENG

Note: Mark ← is same as left.

The following table indicate main different points between models HR-A37U, HR-J3008UM and HR-J4008UM.

## PACKING AND ACCESSORY ASSEMBLY <M1>

REF NO.	ITEM	MODEL	HR-A37U	HR-J3008UM	HR-J4008UM
301	PACKING CASE		LP30836-006A	LP30836-017A	LP30836-015B
306	REMOTE CONTROL UNIT		LP20878-001A	←	LP20878-002A
306A	COVER(BATTERY)		LP40610-001A	←	LP40610-002A
309	LITHIUM BATTERY		—	—	PECA0903
310	INST. BOOK(EN)		LPT0497-001A	—	LPT0533-001A
310	INST. BOOK(SP)		—	LPT0532-001A	LPT0533-002A
311	POLY BAG		—	QPC02503530P	←
313	CONVERSION PLUG		—	—	PEMC1012
317	REGIST. CARD		BT-51020-2	—	—
320	CONNECTION SHEET		—	PU36560-2	←

Note: Mark — is not used.

Mark ← is same as left.

**FINAL ASSEMBLY<M2>**

△ REF NO.	ITEM	MODEL	HR-A37U	HR-J3008UM	HR-J4008UM
△ 501	FRONT PANELASSEMBLY		* LP10348-004D	LP10348-009F	LP10348-008F
501A	CASSETTE DOOR		* LP20977-002C	LP20977-008C	←
501C	DISPLAY WINDOW		LP20976-004A	LP20976-009A	LP20976-008A
△ 502	TOP COVER		LP10352-002A	LP10352-008A	←
503	SCREW,X2,TOP COVER(SIDE)		QYTDSF3010M	QYTDSF3010R	←
△ 511	BOTTOM CHASSIS		* LP10350-003D	LP10350-004D	LP10350-005D
△ 517	POWER CORD		—	—	QMP73J0-170
518	CLEANER ASSEMBLY		—	—	LP40369-001D
518A	CLEANER ROLLER		—	—	PQ46418-1-2
518B	CLEANER		—	—	PQ46419-1-2
518C	CLEANER ARM		—	—	LP30407-001D
520	CAP		—	—	LP30336-001A
531	SCREW,REAR		—	—	QYTDSF3010M
532	SCREW,TERMINAL BOARD		—	—	QYTDSF3010Z

**MAIN BOARD ASSEMBLY<03>**

△ REF NO.	ITEM	MODEL	HR-A37U	HR-J3008UM	HR-J4008UM
PW1	MAIN BOARD ASSEMBLY		* LPA10130-02D1	←	LPA10130-05B1

**LITHIUM BATTERY BOARD ASSEMBLY<93>**

△ REF NO.	ITEM	MODEL	HR-A37U	HR-J3008UM	HR-J4008UM
△ PW4	LITHIUM BATTERY BOARD ASSEMBLY		—	—	LPA10130-01A4

Note : Mark — is not used.

Mark ← is same as left.

Mark \* reference model was also changed.

## SECTION 2 MECHANISM ADJUSTMENT

### 2.1 Before starting repair and adjustment

#### 2.1.1 Precautions

- (1) Unplug the power cord plug of the VCR before using your soldering iron.
- (2) Take care not to cause any damage to the conductor wires when plugging and unplugging the connectors.
- (3) Do not randomly handle the parts without identifying where the trouble is.
- (4) Exercise enough care not to damage the lugs, etc. during the repair work.
- (5) When reattaching the front panel assembly, make sure that the door opener of the cassette holder assembly is lowered in position prior to the reinstallation. (See SECTION 1 DISASSEMBLY.)
- (6) When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). (See SECTION 1 DISASSEMBLY.)

#### 2.1.2 Checking for proper mechanical operations

Enter the mechanism service mode when you want to operate the mechanism when no cassette is loaded. (See SECTION 1 DISASSEMBLY.)

#### 2.1.3 Manually removing the cassette tape

##### 1. In case of electrical failures

If you cannot remove the cassette tape which is loaded because of any electrical failure, manually remove it by taking the following steps.

- (1) Unplug the power cord plug from the power outlet.
- (2) Refer to the disassembly procedure and perform the disassembly of the major parts before removing the drum assembly.
- (3) Unload the pole base assembly by manually turning the loading motor of the mechanism assembly toward the front. In doing so, hold the tape by the hand to keep the slack away from any grease. (See Fig.2-1-3a.)
- (4) Bring the pole base assembly to a pause when it reaches the position where it is hidden behind the cassette tape.
- (5) Move the top guide toward the drum while holding down the lug (A) of the bracket retaining the top guide. Likewise hold part (B) down and remove the top guide. Section (C) of the top guide is then brought under the cassette lid. Then remove the top guide by pressing the whole cassette tape down. (See Fig.2-1-3b.)
- (6) Remove the cassette tape by holding both the slackened tape and the cassette lid.
- (7) Take up the slack of the tape into the cassette. This completes removal of the cassette tape.

##### Note:

- For the disassembly procedure of the major parts and details of the precautions to be taken, see "SECTION 1 DISASSEMBLY".

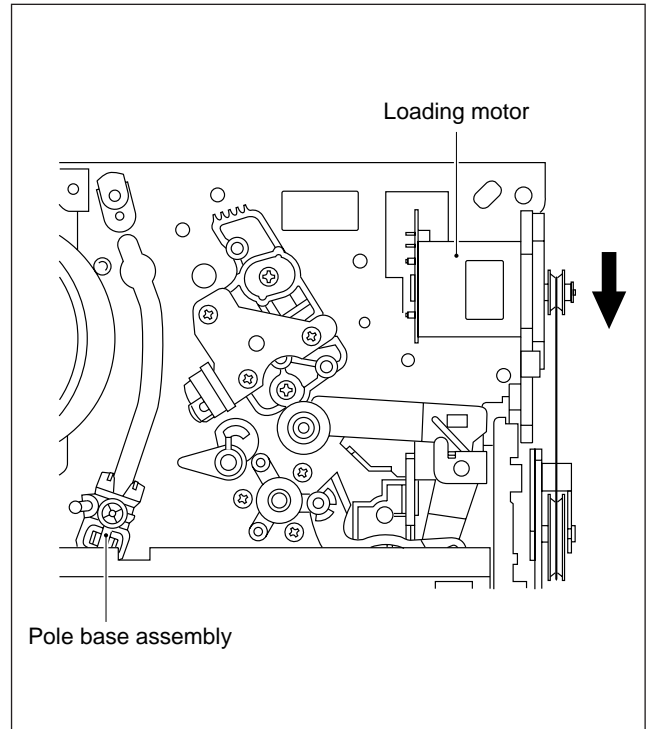


Fig. 2-1-3a

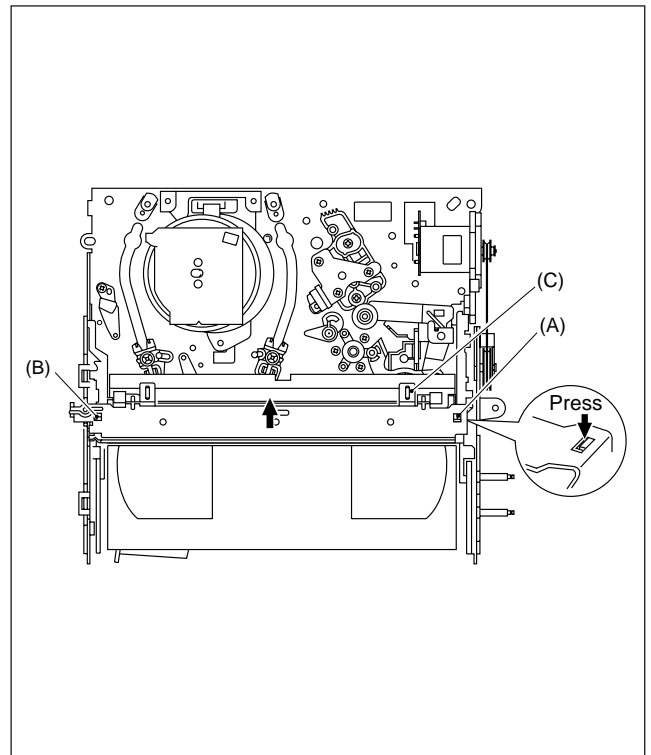


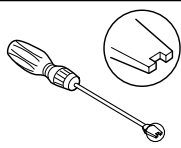

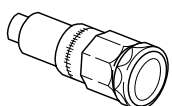
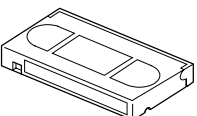
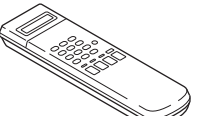
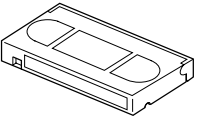
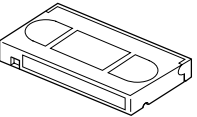
Fig. 2-1-3b

2. In case of mechanical failure

If you cannot remove the cassette tape which is loaded because of any mechanical failure, manually remove it by taking the following steps.

- (1) Unplug the power cable and remove the top cover, front panel assembly and others so that the mechanism assembly is visible. (See SECTION 1 DASSEMBLY.)
- (2) While keeping the tension arm assembly of the mechanism assembly free from tension, pull the tape on the pole base assembly (supply or take-up side) out of the guide roller. (See Fig.2-1-3c.)
- (3) Take the spring of the pinch roller arm assembly off the hook of the press lever assembly, and detach it from the tape. (See Fig.2-1-3d.)
- (4) In the same way as in the electrical failure instructions in 2.1.3-1(5), remove the top guide.
- (5) Raise the cassette tape cover. By keeping it in that position, draw out the cassette tape case from the cassette holder and take out the tape.
- (6) By hanging the pinch roller arm assembly spring back on the hook, take up the slack of the tape into the cassette.

2.1.4 Jigs and tools required for adjustment

Roller driver PTU94002	A/C head positioning tool PTU94010	Torque gauge PUJ48075-2
		
Back tension cassette gauge PUJ48076-2	Jig RCU PTU94023B	
		
Alignment tape (SP, stairstep, NTSC) MHP	Alignment tape (EP, stairstep, NTSC) MHP-L	
		

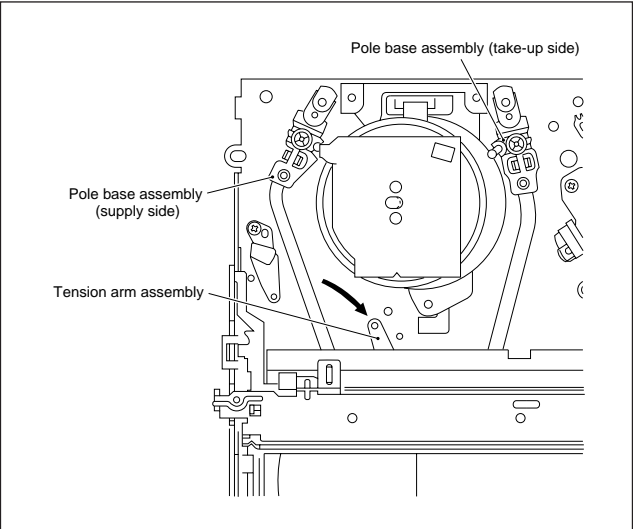


Fig. 2-1-3c

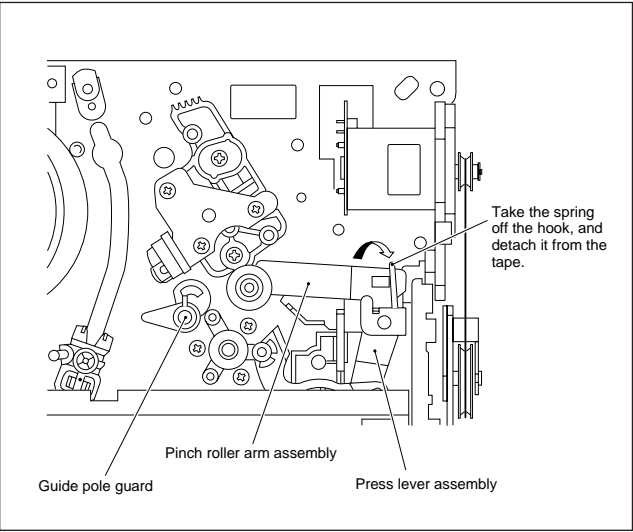


Fig. 2-1-3d

## 2.1.5 Maintenance and inspection

### 1. Location of major mechanical parts

In this chapter, the two mechanism speeds are described by comparing the speeds of the standard type and the high-speed FF/REW type.

It is possible to distinguish between these two types of mechanism by the diameters of their capstan pulleys.

The capstan pulley diameter for the standard type is approx. 32 mm.

The capstan pulley diameter for the high-speed FF/REW type is approx. 43 mm.

For information on the different parts used in the two mechanism types, please refer to the "Replacement of major parts".

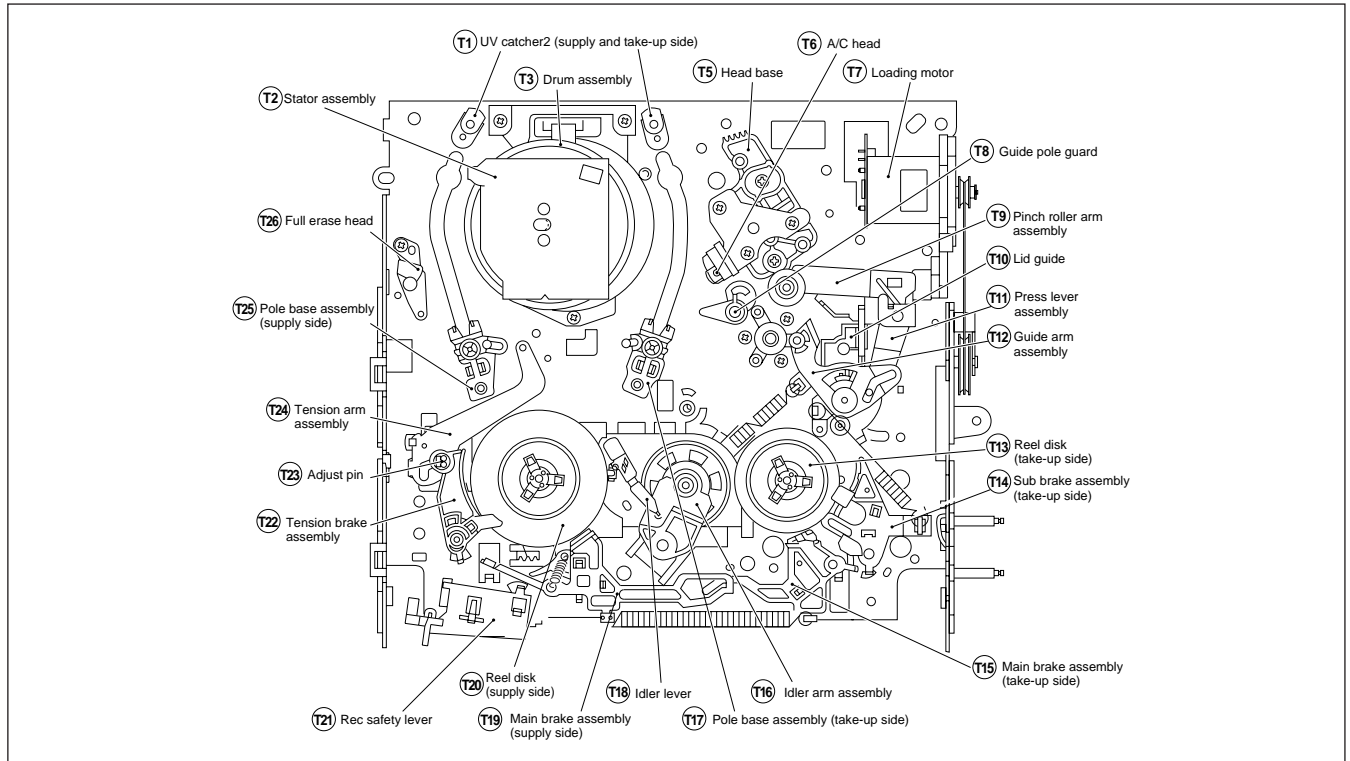


Fig. 2-1-5a Mechanism assembly top side

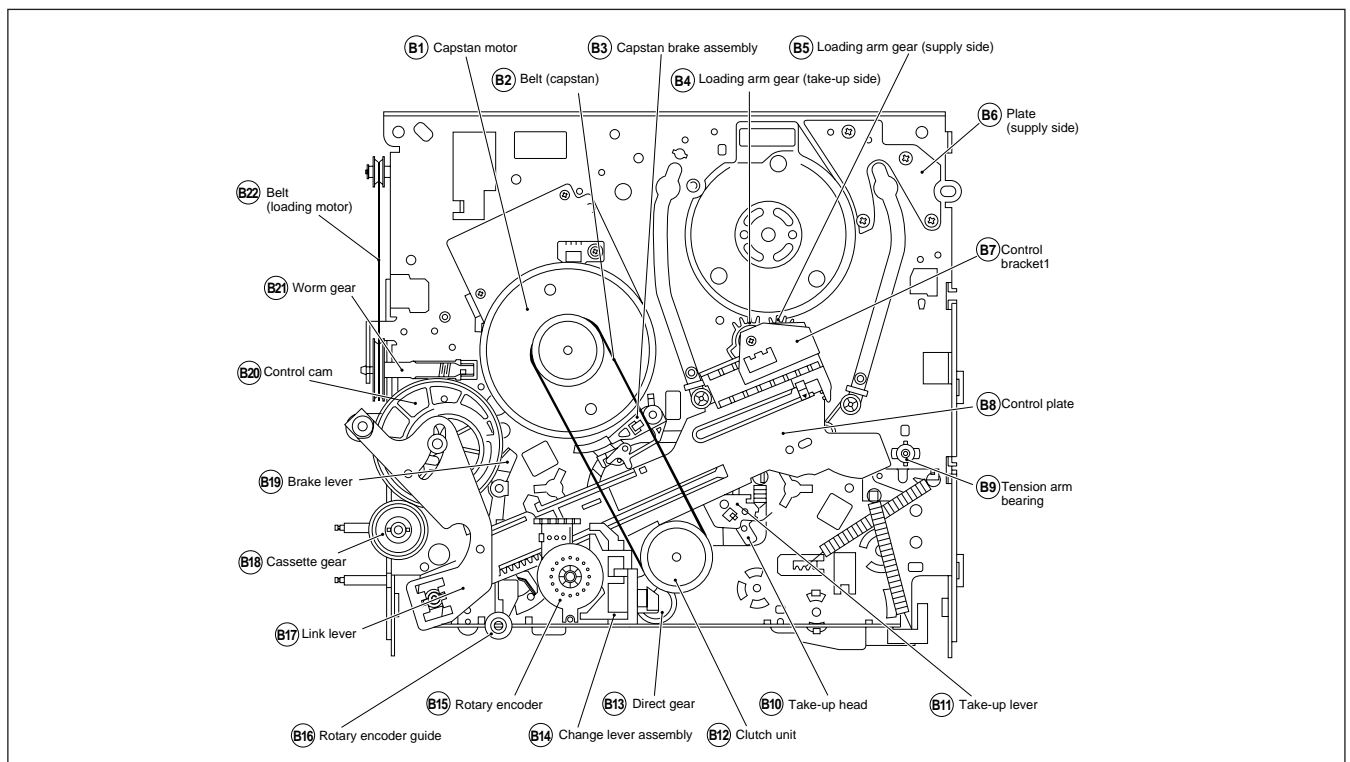


Fig. 2-1-5b Mechanism assembly bottom side

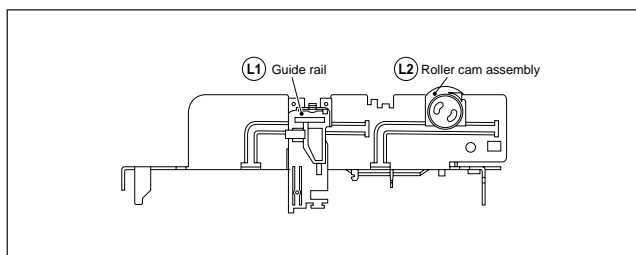


Fig. 2-1-5c Mechanism assembly left side

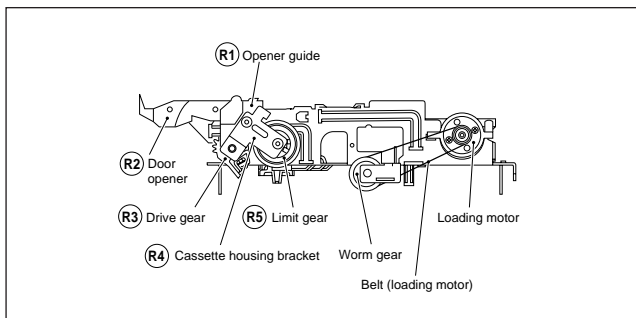


Fig. 2-1-5d Mechanism assembly right side

## 2. Cleaning

Regular cleaning of the transport system parts is desirable but practically impossible. So make it a rule to carry out cleaning of the tape transport system whenever the machine is serviced.

When the video head, tape guide and/or brush get soiled, the playback picture may appear inferior or at worst disappear, resulting in possible tape damage.

- (1) When cleaning the upper drum (especially the video head), soak a piece of closely woven cloth or Kimu-wipe with alcohol and while holding the cloth onto the upper drum by the fingers, turn the upper drum counterclockwise.

### Note:

- **Absolutely avoid sweeping the upper drum vertically as this will cause damage to the video head.**

- (2) To clean the parts of the tape transport system other than the upper drum, use a piece of closely woven cloth or a cotton swab soaked with alcohol.
- (3) After cleaning, make sure that the cleaned parts are completely dry before using the video tape.

## 3. Lubrication

With no need for periodical lubrication, you have only to lubricate new parts after replacement. If any oil or grease on contact parts is soiled, wipe it off and newly lubricate the parts.

### Note:

- **See the “mechanism assembly” diagram of the parts list for the lubricating or greasing spots, and for the types of oil or grease to be used.**

## 4. Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time, even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assembly	★○	○
	A/C head	★○	★○
	Lower drum assembly	★	★○
	Pinch roller arm assembly	★	★
	Full erase head	★	★
	Tension arm assembly	★	★
	Capstan motor (Shaft)	★	★
	Guide arm assembly	★	★
	Capstan motor		○
Drive	Capstan brake assembly		○
	Main brake assembly		○
	Belt (Capstan)	○	○
	Belt (Loading motor)		○
	Loading motor		○
	Clutch unit		○
	Worm gear		○
	Control plate		○
	Brush	★○	★○
Other	Tension brake assembly	○	○
	Rotary encoder		○

★ : Cleaning

○ : Inspection or replacement if necessary

Table 2-1-5a

## 5. Disassembling procedure table

The following table indicates the order in which parts are removed for replacement. To replace parts, remove them in the order of 1 to 18 as shown in the table. To install them, reverse the removal sequence.

The symbols and numbers preceding the individual part names represent the numbers in the “Location of major mechanical parts” table. Also, the “T”, “B”, and “T/B” on the right of each part name shows that the particular part is removed from the front, from the back, and from both sides of the mechanism, respectively.



Symbols and numbers				L1	L2	R4	R1	—	—	R3	—	T9	T12	T11	T1	B15	B12	B14	B13	—	B17	B21	B7	B8	B5	B4	B11	T14	T15	T13	T22	T24	T18	B19	
Symbols and numbers	Removal parts		Front (T)/Back (B) of mechanism	Number of removal steps	Guide rail	Roller cam assembly	Cassette housing bracket	Opener guide	Relay gear	Cassette holder assembly	Drive gear	Drive arm	Pinch roller arm assembly	Guide arm assembly	Press lever assembly	UV catcher2	Rotary encoder	Clutch unit	Change lever assembly	Direct gear	Clutch gear	Link lever	Worm gear	Control bracket1	Control plate	Loading arm gear (supply side)	Loading arm gear (take-up side)	Take-up lever	Sub brake assembly (take-up side)	Main brake assembly (take-up side)	Reel disk (take-up side)	Tension brake assembly	Tension arm assembly	Idler lever	Brake lever (*1)
	(Reference items)	Replacement parts																																	
L1	2.2.3	Guide rail	T	1																															
L2	2.2.3	Roller cam assembly	T	1																															
R4	2.2.3	Cassette housing bracket	T	1																															
R1	2.2.3	Opener guide	T	2			1																												
R2	2.2.3	Door opener	T	3			1	2																											
—	2.2.3	Relay gear	T	3			1	2																											
R5	2.2.3	Limit gear	T	3			1	2																											
—	2.2.3	Cassette holder assembly	T	6	1	2	3	4	5																										
R3	2.2.3	Drive gear	T	4			1	2	3																										
—	2.2.3	Drive arm	T	8	1	2	3	4	5	6	7																								
T9	2.2.4	Pinch roller arm assembly	T	1																															
T12	2.2.5	Guide arm assembly	T	1																															
T11	2.2.5	Press lever assembly	T	3									1	2																					
T6	2.2.6	A/C head	T	1																															
T7	2.2.7	Loading motor	T	1																															
B1	2.2.8	Capstan motor	T/B	1																															
T1	2.2.9	UV catcher2	T	1																															
T17	2.2.9	Pole base assembly (take-up side)	T/B	2											1																				
T25	2.2.9	Pole base assembly (supply side)	T/B	2											1																				
B15	2.2.10	Rotary encoder	B	1																															
B12	2.2.11	Clutch unit	B	1																															
B14	2.2.12	Change lever assembly	B	3												1	2																		
B13	2.2.12	Direct gear	B	4												1	2	3																	
—	2.2.12	Coupling gear	B	5												1	2	3	4																
—	2.2.12	Clutch gear	B	6												1	2	3	4	5															
B17	2.2.13	Link lever	B	1																															
B18	2.2.14	Cassette gear	B	2																		1													
B20	2.2.14	Control cam	B	2																		1													
B21	2.2.14	Worm gear	B	1																															
T10	-	Lid guide	T/B	5									1	2	3								4												
B7	2.2.15	Control bracket1	B	1																															
B8	2.2.15	Control plate	B	6													1	2	3			4		5											
B5	2.2.16	Loading arm gear (supply side)	B	7													1	2	3			4		5	6										
B4	2.2.16	Loading arm gear (take-up side)	B	8													1	2	3			4		5	6	7									
—	2.2.16	Loading arm gear shaft	B	9													1	2	3			4		5	6	7	8								
B11	2.2.17	Take-up lever	T/B	7													1	2	3			4		5	6										
B10	2.2.17	Take-up head	T/B	8													1	2	3			4		5	6			7							
—	2.2.17	Control plate guide	T/B	8													1	2	3			4		5	6			7							
B3	2.2.18	Capstan brake assembly	T/B	7													1	2	3			4		5	6										
T14	2.2.19	Sub brake assembly(take-up side)	T/B	15	1	2	3	4	5	6	7	8					9	10	11			12		13	14										
T15	2.2.20	Main brake assembly(take-up side)	T/B	16	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15						
T19	2.2.20	Main brake assembly(supply side)	T/B	9	1	2	3	4	5	6	7	8																							
T13	2.2.20	Reel disk (take-up side)	T/B	16	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15						
T22	2.2.21	Tension brake assembly	T/B	9	1	2	3	4	5	6	7	8																							
T20	2.2.21	Reel disk (supply side)	T/B	10	1	2	3	4	5	6	7	8																				9			
T24	2.2.21	Tension arm assembly	T/B	10	1	2	3	4	5	6	7	8																				9			
B9	2.2.21	Tension arm bearing	T/B	10	1	2	3	4	5	6	7	8																				9			
T18	2.2.22	Idler lever	T/B	17	1	2	3	4	5	6	7	8					9	10	11			12		13	14						15	16			
T16	2.2.22	Idler arm assembly	T/B	18	1	2	3	4	5	6	7	8					9	10	11			12		13	14						15	16	17		
B19	-	Brake lever (*1)	T/B	18	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15	16	17				
B16	-	Rotary encoder guide	T/B	19	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15	16	17				

Table 2-1-5b

Note:

- The parts with marked ( \*) have different types of mechanisms (standard type or high-speed FF/REW type).

\*1 : Uses the standard type mechanism only.

\*2 : Uses the high-speed FF/REW type mechanism only.



## 2.2 Replacement of major parts

### 2.2.1 Before starting disassembling (Phase matching between mechanical parts)

The mechanism of this unit is closely linked with the rotary encoder and system controller circuits.

Since the system controller detects the status of mechanical operation in response to phases of the rotary encoder (internal switch positions), the mechanism may not operate properly unless such parts as the rotary encoder, control plate, loading arm gear, control cam, cassette gear, limit gear, relay gear and drive gear are installed in their correct positions.

Especially, this model is not provided with any cassette housing assembly, so that cassette loading and unloading must be accomplished by operation of the cassette holder assembly. The latter is in turn driven by such parts as the drive gear, relay gear and limit gear. Exercise enough care, therefore, to have the phases of all this gear matching one another. (For information on phase matching of the mechanism, see the instructions on how to install individual parts.)

This unit is provided with a mechanism assembly mode. It is therefore necessary to enter this mode for assembling and disassembling procedures.

This mode is usually not in use, manually set it when it is required.

### 2.2.2 How to set the “Mechanism assembling mode”

Remove the mechanism assembly and place it bottom side up. (See SECTION 1 DISASSEMBLY.) Turn the worm gear toward the front so that the guide hole of the control cam is brought into alignment with the hole at the mechanism assembly chassis. This position renders the mechanism assembling mode operational. Make sure that the control plate is located in alignment with the mark E. (See Fig.2-2-2a.)

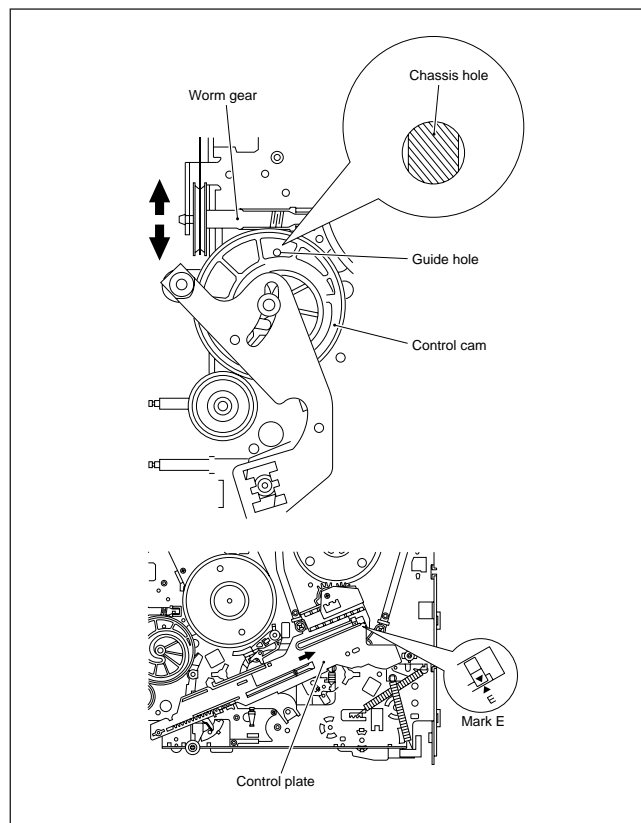


Fig. 2-2-2a

### 2.2.3 Cassette holder assembly

#### 1. How to remove

- (1) Remove the guide rail and roller cam assembly. (See Fig.2-2-3a.)
- (3) Lugs on the guide rail and one lug on the roller cam assembly

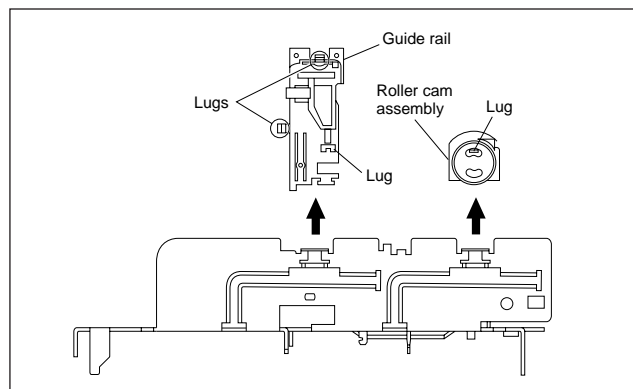


Fig. 2-2-3a

- (2) Remove the two slit washers and remove the cassette housing bracket. (See Fig.2-2-3b.)
- (3) Remove the opener guide, spring(A), door opener, relay gear and limit gear. (See Fig.2-2-3b.)

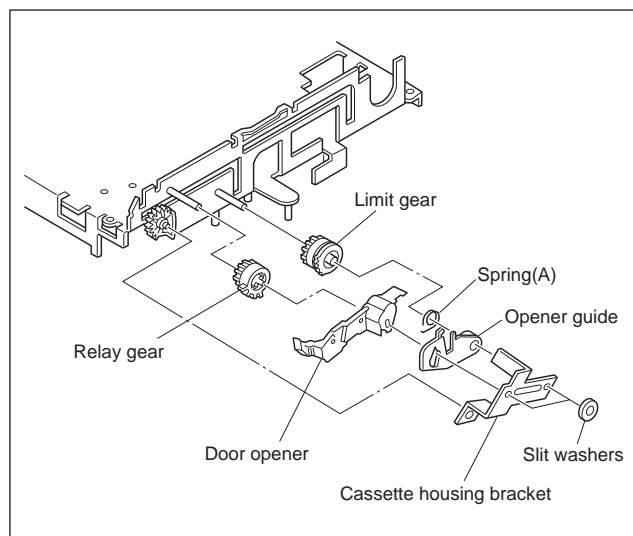


Fig. 2-2-3b

- (4) While swinging the lock levers (R) and (L) of the cassette holder assembly toward the front, slide the cassette holder assembly until its legs come to where the guide rail and the roller cam assembly have been removed (so that the drive arm is upright). (See Fig.2-2-3c.)

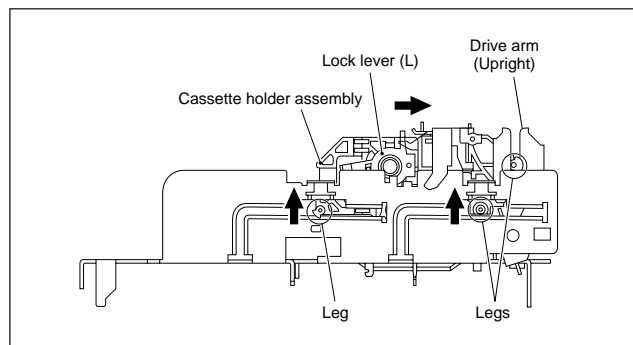


Fig. 2-2-3c

- (5) While holding the left side of the cassette holder, lift the cassette holder assembly so that the three legs on the left side are all released. Then pull the legs (A) and (B) on the right side out of the rail and also pull up the leg (C). (See Fig.2-2-3d and Fig.2-2-3e.)
- (6) Draw out the drive gear, and remove the drive arm.

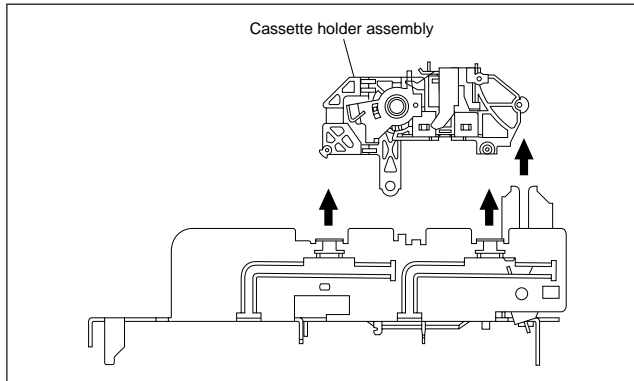


Fig. 2-2-3d

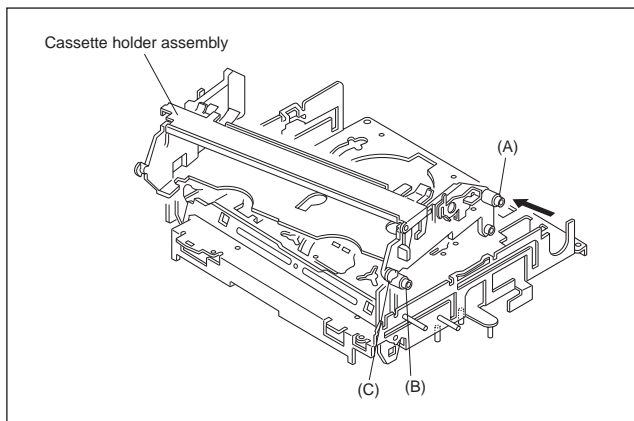


Fig. 2-2-3e

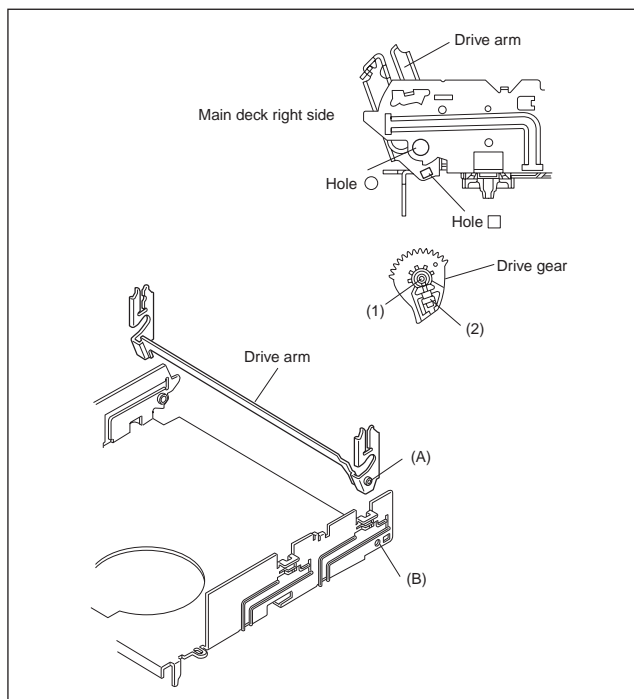


Fig. 2-2-3f

## 2. How to install (Phase matching)

- (1) Insert the section (A) of the drive arm into the section (B) of the main deck.
- (2) Insert the section (1) of the drive gear into the round hole, and the section (2) into the square hole on the drive arm. (See Fig.2-2-3f.)
- (3) Hold the drive arm upright and fit the leg (C) on the right side of the cassette holder assembly into the groove. (See Fig.2-2-3g.)
- (4) While swinging the lock lever (R) of the cassette holder assembly toward the front, put the legs (A) and (B) into the rail. (See Fig.2-2-3g.)
- (5) Drop the three legs on the left side of the cassette holder assembly into the groove at one time. (See Fig.2-2-3h.)
- (6) Slide the whole cassette holder assembly toward the front to bring it to the eject end position.
- (7) Install the limit gear so that the notch on the outer circumference of the limit gear is brought into alignment with the guide hole on the main deck. (See Fig.2-2-3i.)
- (8) Install so that the notch on the periphery of the relay gear is aligned with the notch of the main deck and that hole A of the relay gear is aligned with the hole B of the limit gear and that hole B of the relay gear is aligned with the hole B of the drive gear. (See Fig.2-2-3i.)
- (9) Install the door opener, opener guide, spring(A) and cassette housing bracket and fasten the two slit washers.

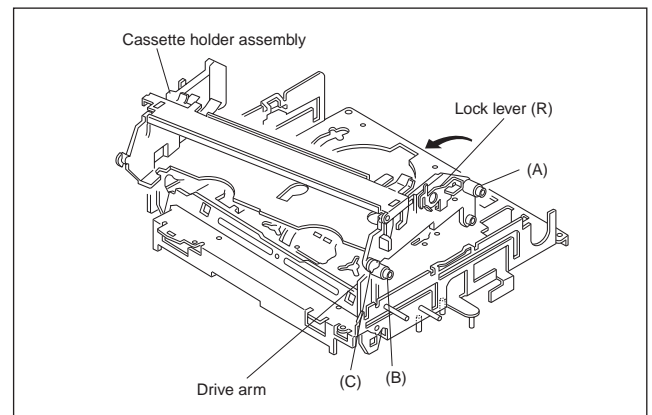


Fig. 2-2-3g

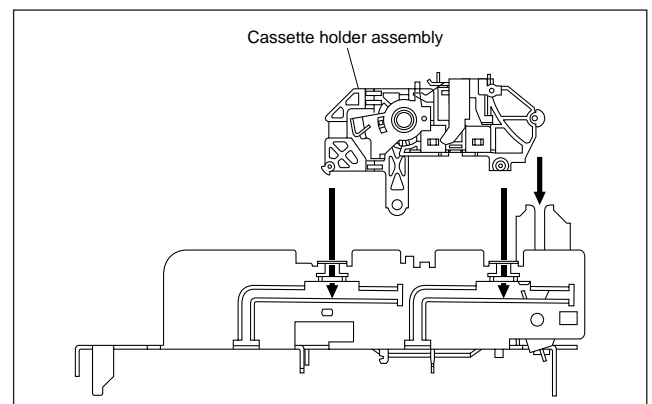


Fig. 2-2-3h

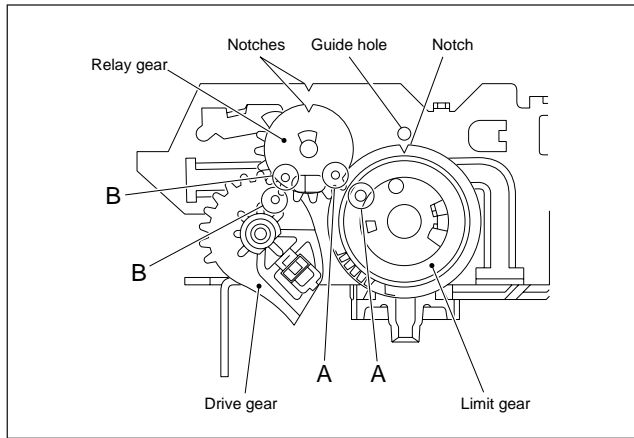


Fig. 2-2-3i

## 2.2.4 Pinch roller arm assembly

### 1. How to remove

- (1) Remove the spring from the hook of the press lever assembly.
- (2) Remove the slit washer and remove the pinch roller seat 2. (See Fig.2-2-4a.)
- (3) Remove the pinch roller arm assembly by pulling it up.

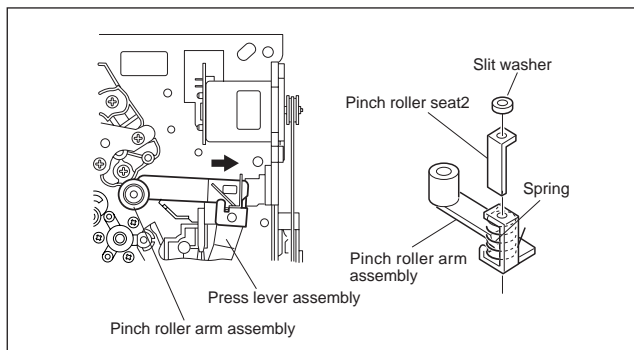


Fig. 2-2-4a

## 2.2.5 Guide arm assembly and press lever assembly

### 1. How to remove

- (1) Remove the spring and expand the lug of the lid guide in the arrow-indicated direction. Then remove the guide arm assembly by pulling it up.
- (2) Remove the press lever assembly by pulling it up. (See Fig.2-2-5a.)

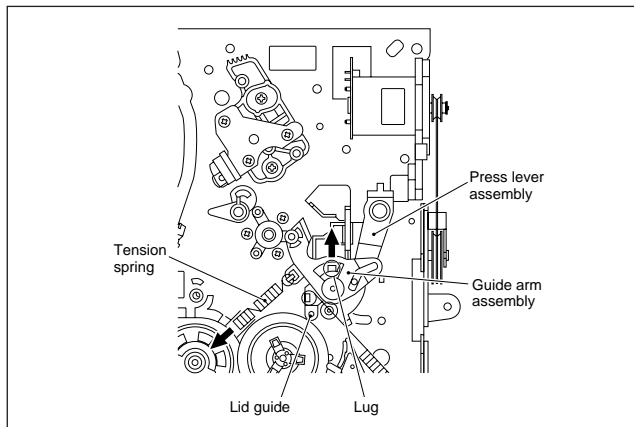


Fig. 2-2-5a

## 2.2.6 A/C head

### 1. How to remove

- (1) Remove the two screws (A) and remove the A/C head together with the head base.
- (2) When replacing only the A/C head, remove the three screws (B) while controlling the compression spring.

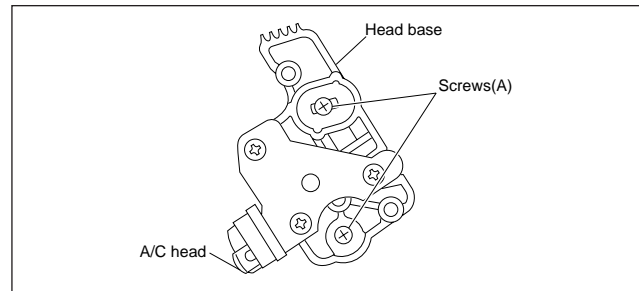


Fig. 2-2-6a

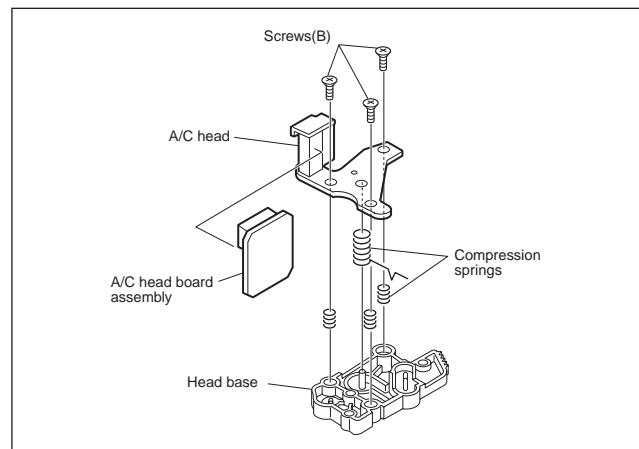


Fig. 2-2-6b

### 2. How to install

- (1) To make the post-installation adjustment easier, set the temporary level as indicated in Fig.2-2-6c. Also make sure that the screw center (centre) is brought into alignment with the center (centre) position of the slot.

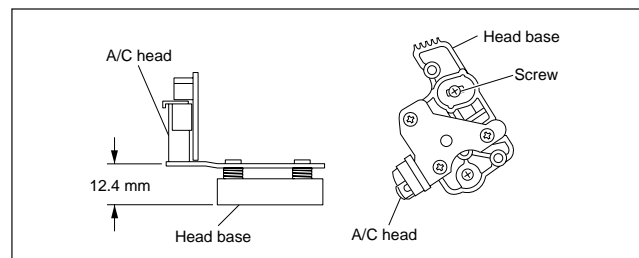


Fig. 2-2-6c

## 2.2.7 Loading motor

### 1. How to remove

- (1) Remove the belt wound around the worm gear.
- (2) Open the two lugs of the motor guide and remove the loading motor, loading motor board assembly and motor guide altogether by pulling them up.
- (3) When replacing the loading motor board assembly, take care with the orientation of the loading motor. (Install so that the loading motor label faces upward.)
- (4) When the motor pulley has been replaced, choose the fitting dimension as indicated in Fig.2-2-7a.

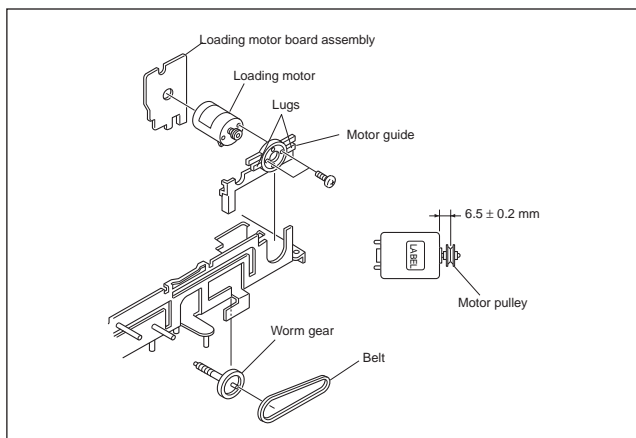


Fig. 2-2-7a

## 2.2.8 Capstan motor

### 1. How to remove

- (1) Remove the belt (capstan) on the mechanism assembly back side.
- (2) Remove the three screws (A) and remove the capstan motor.

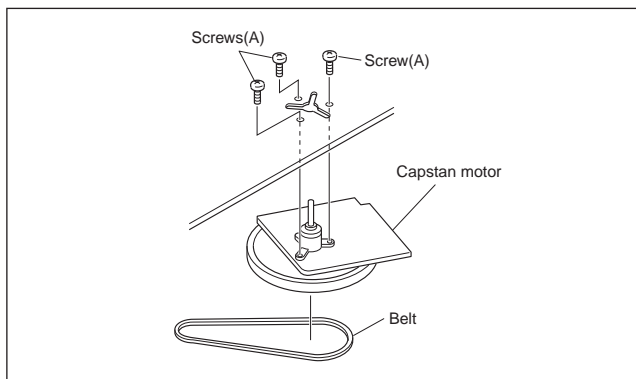


Fig. 2-2-8a

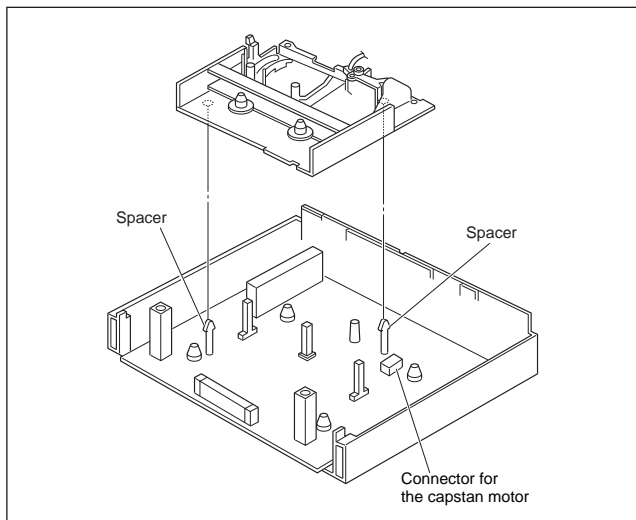


Fig. 2-2-8b

### 2. How to install (Centering the mounting position)

When the capstan motor has once been removed and then reinstalled out of the initial correct position in the rotational direction, the capstan motor current may be unstable during operation in high or low temperatures. This may result in greater Wow & Flutter and occasionally in power breakdown because of current over - load. Install the capstan motor while following the procedure given below.

(The capstan motor is centrally located when the unit is shipped from the factory.)

- (1) Provisionally tighten the three screws (A) securing the capstan motor.
- (2) Install the mechanism assembly to which the capstan motor is provisionally fastened on the bottom chassis which incorporates the Main board assembly. (No need to tighten the screws for mounting the mechanism.) Make sure that all the connectors for the mechanism assembly and the Main board assembly are correctly installed as indicated in Fig. 2-2-8b.
- (3) Making sure that the connector for the capstan motor is correctly mounted, and securely tighten the three screws (A).

#### Note:

- **When the capstan motor has been replaced with a new one, perform recording in the EP(or LP) mode for at least 2 minutes at normal temperatures immediately before starting the FF/REW or SEARCH operations (Aging).**

## 2.2.9 Pole base assembly (supply or take-up side)

### 1. How to remove

- (1) Remove the UV catcher 2 on the removal side by loosening the screw (A).
- (2) Remove the pole base assembly on the supply side from the mechanism assembly by loosening the screw (B) on the mechanism assembly back side and sliding the pole base assembly toward the UV catcher 2.
- (3) As for the pole base assembly on the take-up side, turn the pulley of the loading motor to lower the cassette holder because the screw (B) is hidden under the control plate. (See the "Procedures for Lowering the Cassette holder assembly" of 1.3 DISASSEMBLY/ASSEMBLY METHOD.) Further turn the motor pulley to move the cassette holder until the screw (B) is no longer under the control plate (in the half-loading position). Then remove it as done for the supply side by removing the screw (B).

#### Note:

- **After reinstalling the Pole base assembly and the UV catcher2, be sure to perform compatibility adjustment.**

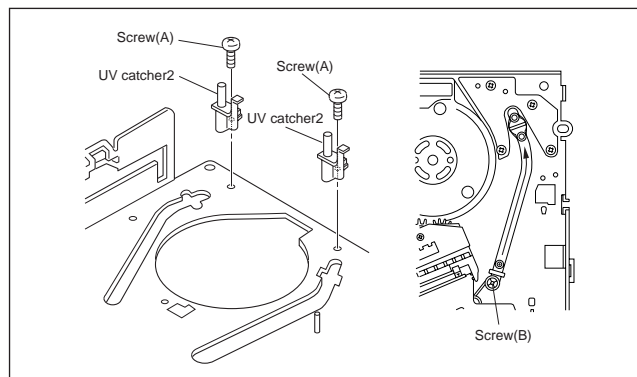


Fig. 2-2-9a

## 2.2.10 Rotary encoder

### 1. How to remove

- (1) Remove the screw (A) and remove the rotary encoder by pulling it up. (See Fig. 2-2-10a.)

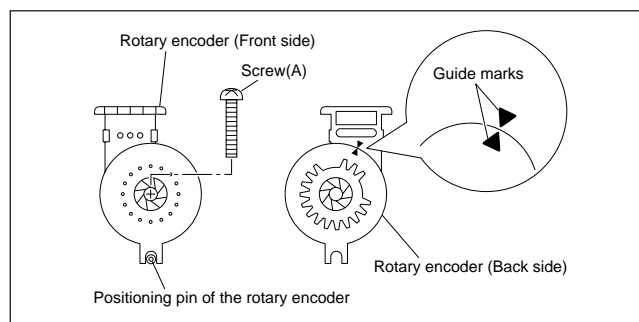


Fig. 2-2-10a

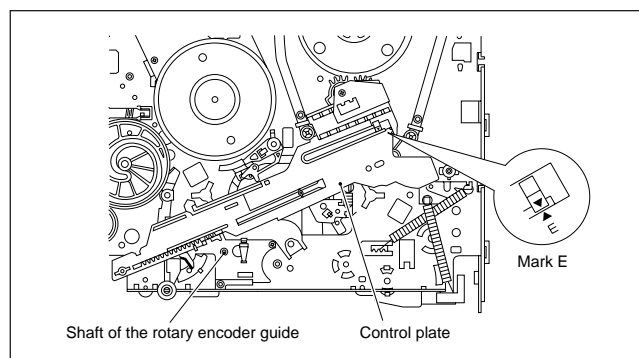


Fig. 2-2-10b

### 2. How to install (Phase matching)

- (1) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft and bring the guide marks on the rotary encoder into alignment as indicated in Fig.2-2-10a. (See Fig. 2-2-10a and Fig. 2-2-10b.)
- (2) Turn over the rotary encoder with its guide marks kept in alignment and install it by fitting on the shaft of the rotary encoder guide and the positioning pin.
- (3) Tighten the screw (A) to complete the installation.

## 2.2.11 Clutch unit

- (1) Remove the belt wound around the capstan motor and the clutch unit.
- (2) Remove the slit washer and remove the clutch unit.

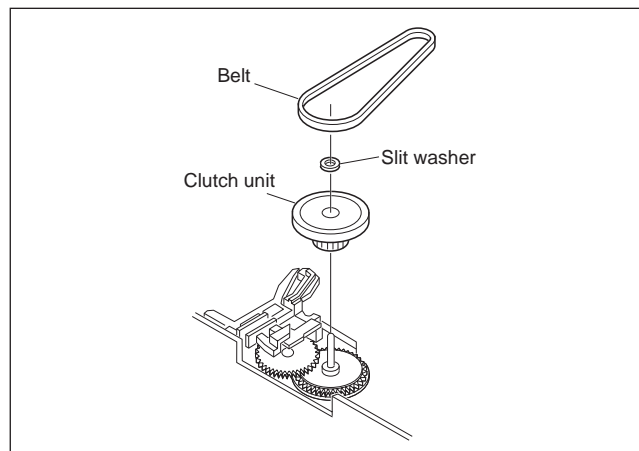


Fig. 2-2-11a

## 2.2.12 Change lever assembly, direct gear, clutch gear and coupling gear

### 1. How to remove

- (1) Release the two lugs of the rotary encoder guide in the arrow-indicated direction and remove the change lever assembly.
- (2) Remove the slit washer retaining the direct gear and remove the latter. Take care so as not to lose the washer and spring. (See Fig.2-2-12a.)

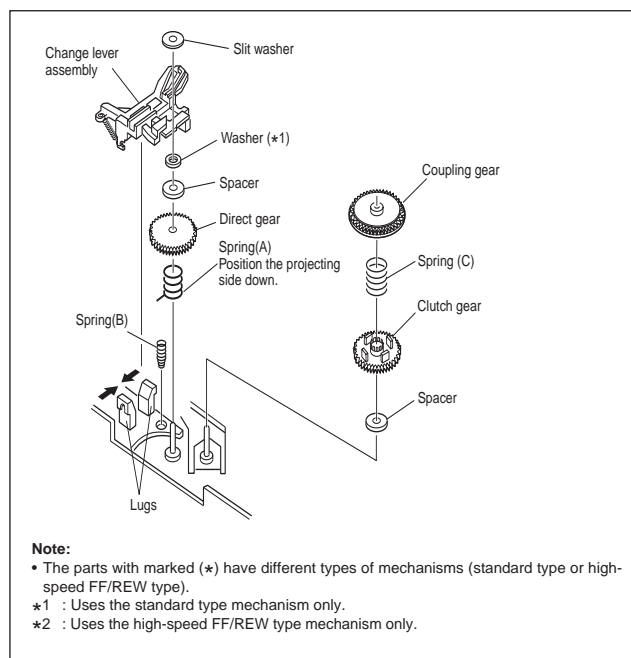


Fig. 2-2-12a

### 2. How to install

- (1) Install the clutch gear, spring (A), spring (C), direct gear, spacer and others to the individual shafts of the main deck, and finally the slit washer. (See Fig.2-2-12a.)
- (2) Let the spring (B) drops into the rotary encoder guide hole and install the change lever assembly. (Take care not to mistake a direction of the spring.) The point is to slightly lift the clutch gear and catch it from the both sides with the assembly. (See Fig.2-2-12b.)

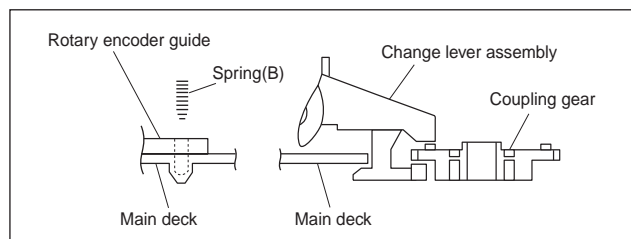


Fig. 2-2-12b



### 2.2.13 Link lever

#### 1. How to remove

- (1) Remove the two slit washers.
- (2) Remove the link lever by lifting it from the shaft retained by the slit washers. Then swing the link lever counterclockwise and remove it from the locking section of the control plate.

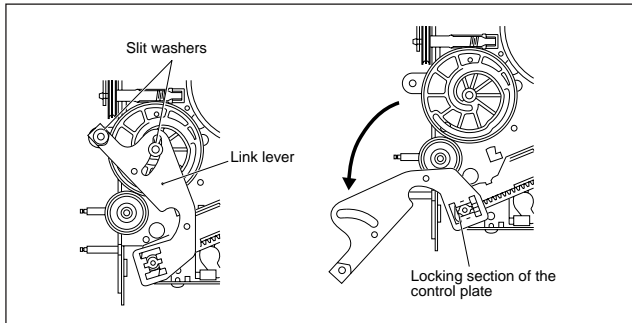


Fig. 2-2-13a

#### 2. How to install (Phase matching)

- (1) Slide the control plate so that its mark E is aligned with the mark ▼ on the loading arm gear shaft. (See Fig.2-2-13b.)
- (2) Rotate the worm gear until the guide hole of the control cam is aligned exactly with the guide hole of the main deck. (See Fig.2-2-13c.)
- (3) Insert the link lever into the locking section of the control plate. (See Fig.2-2-13a.)
- (4) Rotate the link lever clockwise so that it is installed on the shafts in the center (centre) and on the left of the control cam.
- (5) Fasten the slit washers at these two points.

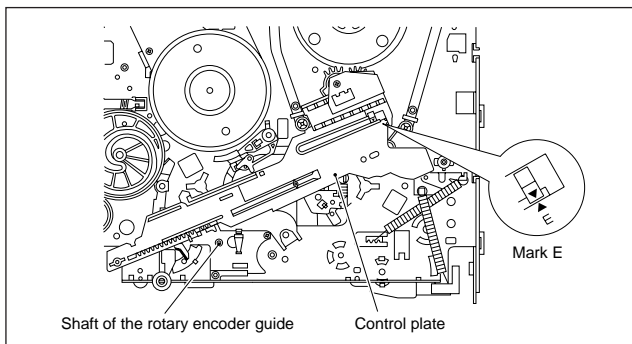


Fig. 2-2-13b

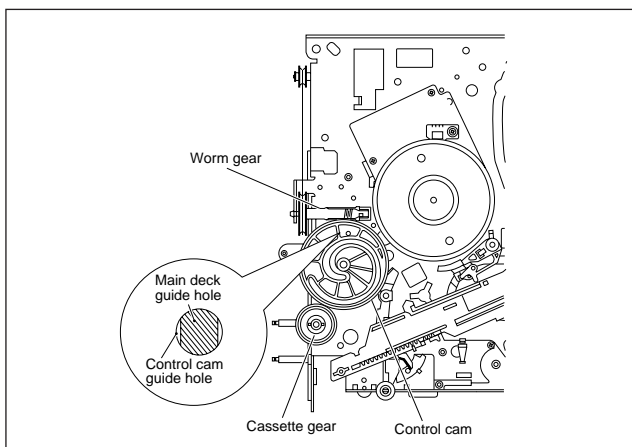


Fig. 2-2-13c

### 2.2.14 Cassette gear, control cam and worm gear

#### 1. How to remove

- (1) Remove the control cam by lifting it.
- (2) Open the two lugs of the cassette gear outward and pull the latter off.
- (3) Remove the belt wound around the worm gear and the loading motor.
- (4) Open the lug of the lid guide outward and remove the worm gear.

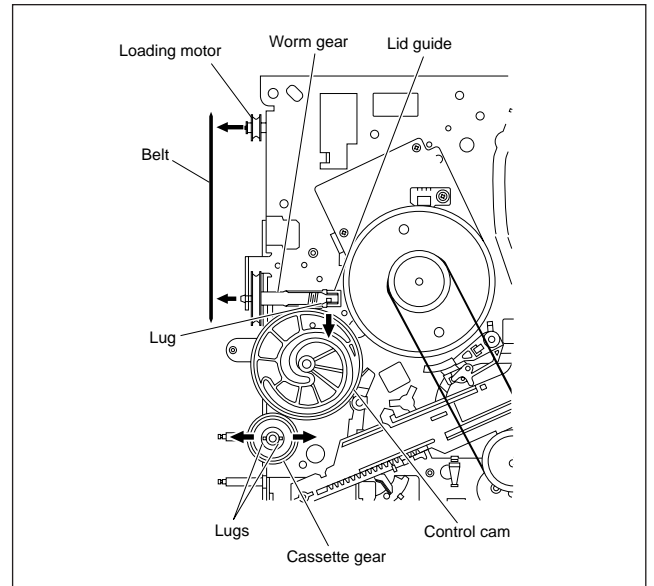


Fig. 2-2-14a

### 2.2.15 Control plate

#### 1. How to remove

- (1) Remove the screw (A) retaining the control bracket 1 and remove the latter.
- (2) Slide the control plate as indicated by the arrow and remove the control plate. (See Fig.2-2-15a.)

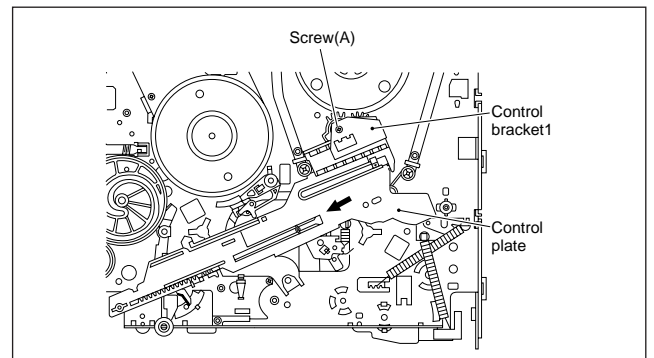


Fig. 2-2-15a

#### 2. How to install (Phase matching)

- (1) Adjust the position of the idler arm assembly pin as indicated in Fig.2-2-15b (to the left of center (centre) of the R section).
- (2) Bring the guide hole of the take-up lever into alignment with the hole at the control plate guide and fix the position by inserting a 1.5 mm hexagonal wrench.

- (3) Install the control plate so that the section A of the loading arm gear shaft fits into the hole (A) of the control plate, the section B of the control plate guide into the hole (B), and the control plate comes under the section C of the rotary encoder guide and the section D of the loading arm gear shaft while press-fit the pole base assembly (supply side) as indicated by the arrow. It is important that the tension arm assembly shaft is positioned closer toward you than the control plate. (See Fig.2-2-15c.)
- (4) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft. (See Fig.2-2-15c.)
- (5) Pull off the hexagonal wrench for positioning.

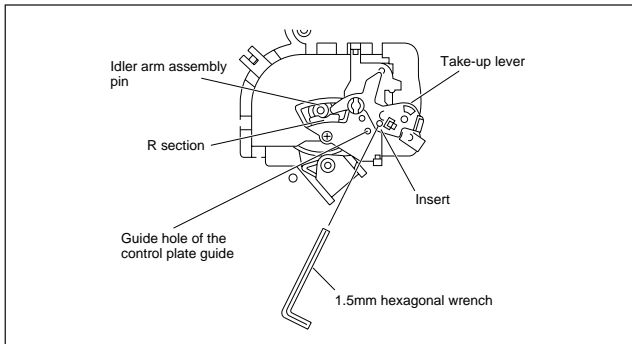


Fig. 2-2-15b

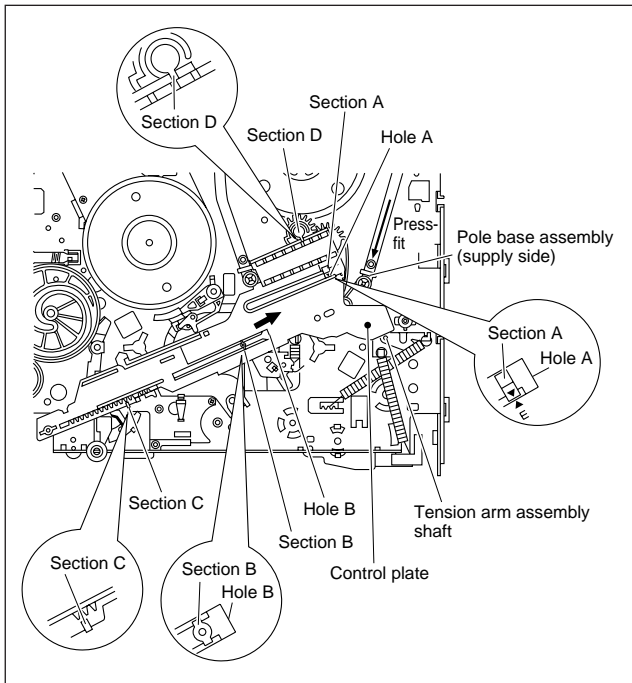


Fig. 2-2-15c

## 2.2.16 Loading arm gear (supply or take-up side) and loading arm gear shaft

### 1. How to remove

- (1) Remove the loading arm gear (supply side) by loosening the screw (A). (See Fig. 2-2-16a.)
- (2) Remove the screw (B) and remove the torsion arm from the pole base assembly (take-up side). (See Fig.2-2-16a.)

- (3) Turn the loading arm gear (take-up side) clockwise so that the notch of the loading arm gear (take-up side) is in alignment with the projection of the loading arm gear shaft and lift it. Likewise, turn the loading arm counterclockwise so that the notch is in alignment with the projection and remove the loading arm gear (take-up side). (See Fig.2-2-16a and Fig. 2-2-16b.)
- (4) When removing the loading arm gear shaft, be sure of first removing the screw retaining the drum assembly (on the back side of the loading arm gear shaft). Then remove the screw (C) and remove the loading arm gear shaft by sliding it.

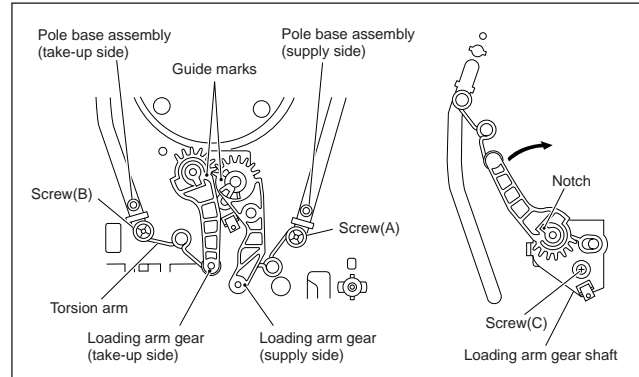


Fig. 2-2-16a

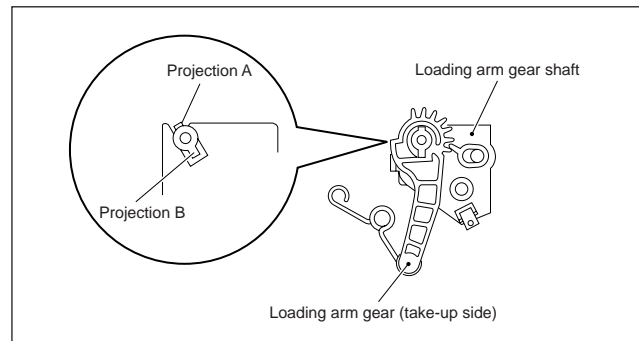


Fig. 2-2-16b

### 2. How to install

- (1) Align the notch of the loading arm gear (take-up side) to the projection B of the loading arm gear shaft and slip it over. Then rotate it clockwise for alignment with the projection A and slip it down to the bottom. (See Fig.2-2-16b.)
- (2) Then turn the loading arm gear (take-up side) counterclockwise. Hang the torsion arm on the pole base assembly (take-up side) and tighten the screw (B).
- (3) Install the loading arm gear (supply side) so that the guide mark of the loading arm gear (take-up side) is in alignment with the guide mark of the loading arm gear (supply side). Then hang the torsion arm on the pole base assembly (supply side) and tighten the screw (A). (See Fig.2-2-16a.)



### 2.2.17 Take-up lever, take-up head and control plate guide

- (1) Remove the spring of the take-up lever from the main deck.
- (2) Remove the lug (A) of the take-up lever from the main deck and pull out the take-up lever and the take-up head together.
- (3) Remove the screw (A).
- (4) Align the idler arm assembly pin in the center (centre) of the R section of the control plate guide, remove the control plate guide lugs (B) and (C) from the main deck, and remove the control plate guide.

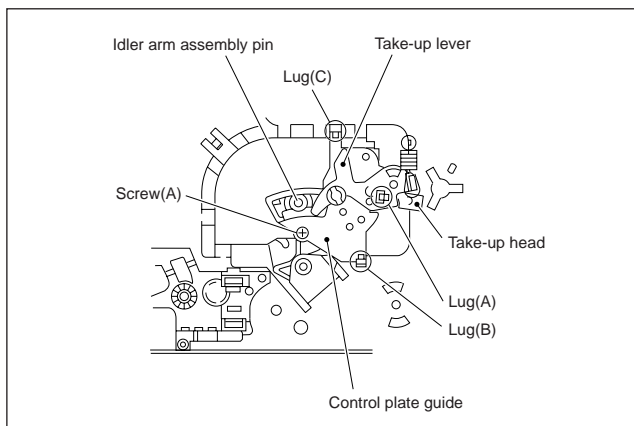


Fig. 2-2-17a

### 2.2.18 Capstan brake assembly

#### 1. How to remove

- (1) Move the lug (A) of the capstan brake assembly in the arrow-indicated direction so that it comes into alignment with the notch of the main deck. (See Fig. 2-2-18a.)
- (2) Remove the lug (B) of the capstan brake assembly from the main deck and remove the capstan brake assembly.

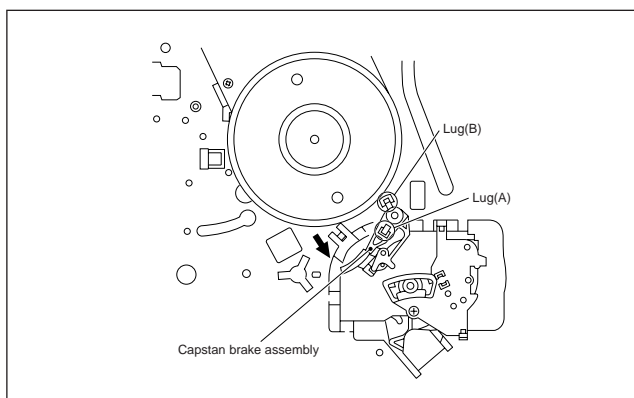


Fig. 2-2-18a

### 2.2.19 Sub brake assembly (take-up side)

#### 1. How to remove

- (1) Remove the spring attached to the lid guide and sub brake assembly (take-up side).
- (2) Bring the lug (A) of the sub brake assembly (take-up side) into alignment with the notch of the main deck.
- (3) Remove the lugs (B) and (C) of the sub brake assembly (take-up side) from the main deck and remove the sub brake assembly (take-up side).

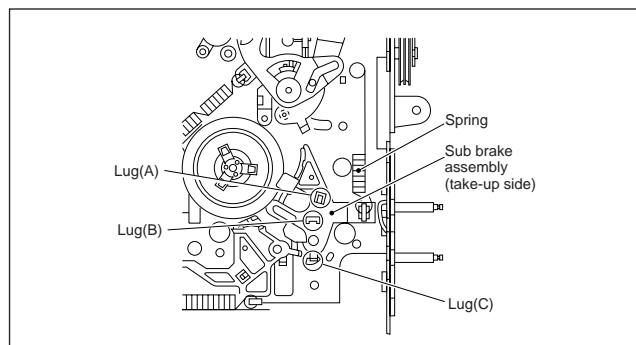


Fig. 2-2-19a

### 2.2.20 Main brake assembly (take-up side), reel disk (take-up side) and main brake assembly (supply side)

#### 1. How to remove

- (1) Move the main brake assembly (take-up side) in the arrow-indicated direction and remove the reel disk (take-up side).
- (2) Remove the spring attached to the main brake assembly.
- (3) Remove the lug (A) of the main brake assembly (take-up side) and pull out the lug (B) after bringing it into alignment with the main deck notch.
- (4) Remove the lugs (C), (D) and (E) of the main brake assembly (supply side) from the main deck and pull them off. (See Fig.2-2-20a.)
- (5) When installing the main brake assembly (take-up side), slide the brake lever in the direction as indicated by the arrow to prevent it from hitting the projection of the main brake assembly (take-up side). (See Fig.2-2-20b.)

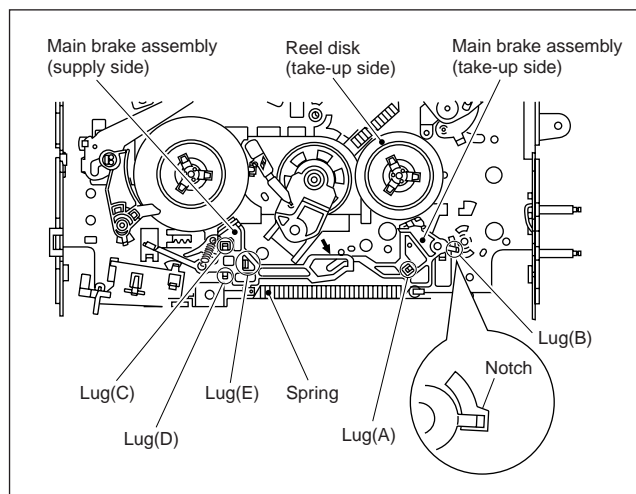


Fig. 2-2-20a

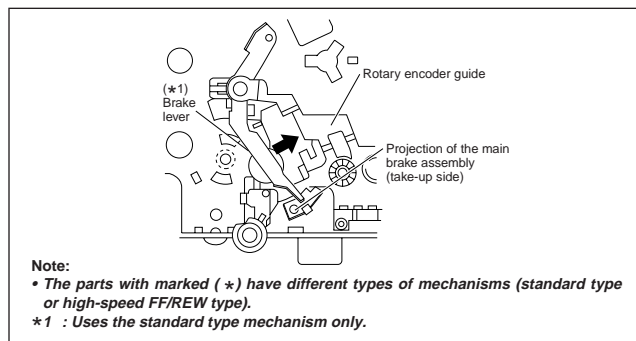


Fig. 2-2-20b

## 2.2.21 Tension brake assembly, reel disk (supply side) and tension arm assembly

### 1. How to remove

- (1) Remove the three lugs of the tension brake assembly from the main deck and pull them off.
- (2) Remove the reel disk (supply side) by loosening in the arrow-indicated direction the main brake assembly (supply side).
- (3) Remove the tension spring on the back of the main deck. Then release the lug of the tension arm bearing in the arrow-indicated direction and draw out the tension arm assembly. (See Fig. 2-2-21a.)

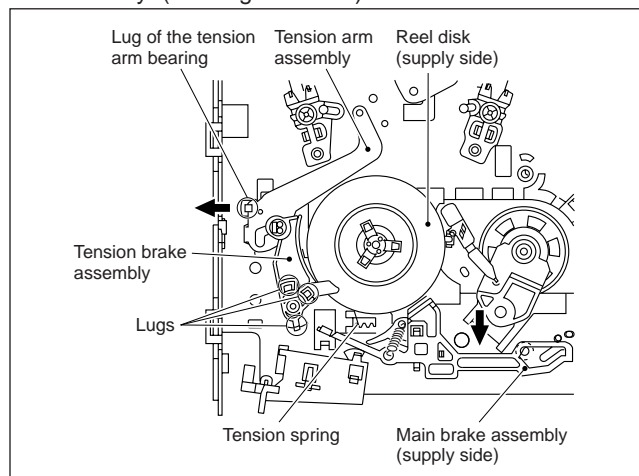


Fig. 2-2-21a

## 2.2.22 Idler lever, idler arm assembly

### 1. How to remove

- (1) Remove the lug of the idler lever from the main deck and remove the hook fitted in the idler arm assembly hole by lifting it.
- (2) Remove the slit washer and pull out the idler arm assembly.

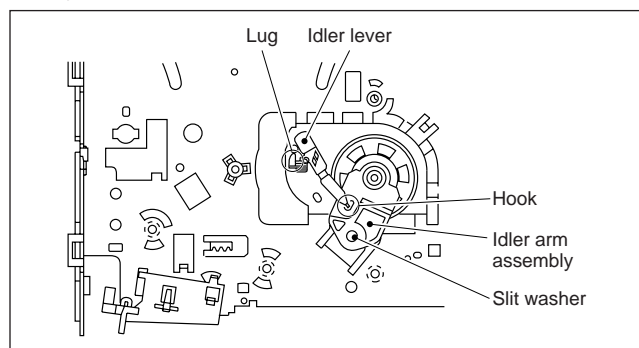


Fig. 2-2-22a

## 2.2.23 Stator assembly

- (1) Remove the flat cable.
- (2) Remove the two screws (A), (B) and remove the lug wire.
- (3) Remove the stator assembly by lifting in the arrow-indicated direction. (Take care that the brush spring does not jump out.)

### Notes:

- **Be careful not to lose the brush and spring.**
- **There are some models that do not use the lug wire. Refer to the parts list for these models.**
- **When tightening the screw (B), place the caulked part of the lug terminal near to the shaft of the drum and then tighten it.**
- **After installation, be sure to perform the switching point adjustment according to the electrical adjustment procedure.**

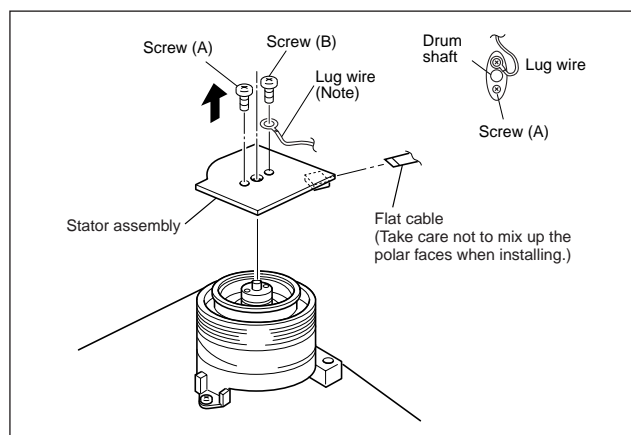


Fig. 2-2-23a

## 2.2.24 Rotor assembly

### 1. How to remove

- (1) Remove the stator assembly.
- (2) Remove the two screws (B) and remove the rotor assembly.

### 2. How to install

- (1) Match the phases of the upper drum assembly and the rotor assembly as indicated in Fig.2-2-24a.
- (2) Place the upper drum assembly hole (a) over the rotor assembly holes (b) (with three holes to be aligned) and tighten the two screws (B). (See Fig.2-2-24a.)

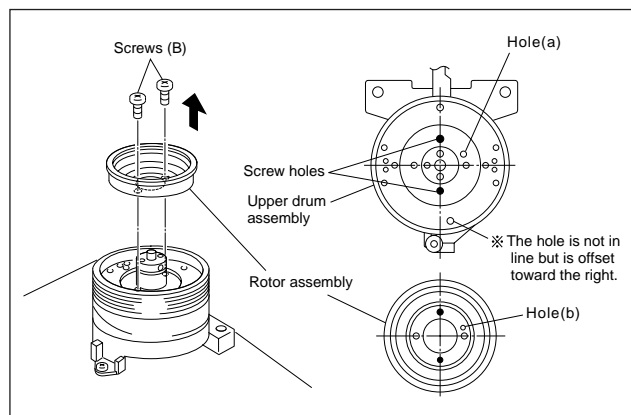


Fig. 2-2-24a

## 2.2.25 Upper drum assembly

### Notes:

- *To replace the upper drum assembly only may not be possible with some models. For upper drum assembly replacement, refer to the parts list. (When the parts number of the upper drum assembly is not listed on the parts list, then this cannot be replaced.)*
- *When replacement is required, control the up- down movement of the brush. Never apply grease.*
- *When replacing the upper drum assembly, replace it together with the washer.*

### 1. How to remove

- (1) Remove the stator assembly and rotor assembly.
- (2) Loosen the screw of the collar assembly using a 1.5 mm hexagonal wrench and remove the collar assembly. Also remove the brush, spring and cap at one time.
- (3) Remove the upper drum assembly and remove the washer using tweezers.

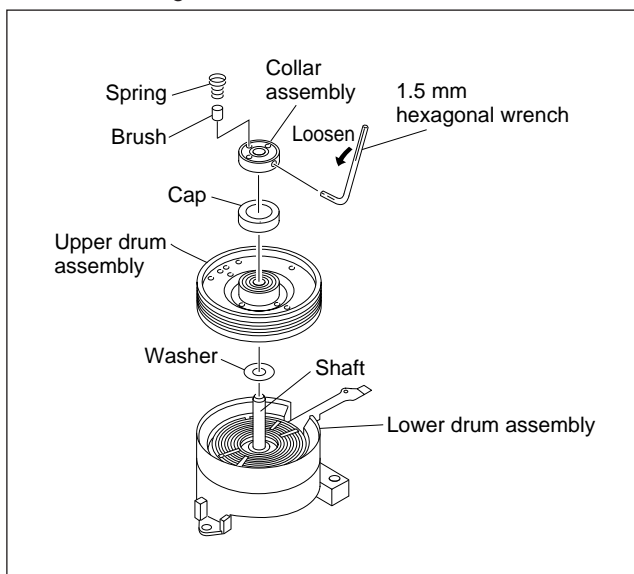


Fig. 2-2-25a

### 2. How to install

- (1) Clean the coil parts of the lower drum assembly and the newly installed upper drum assembly with an air brush in advance. (See Fig.2-2-25b.)
- (2) Install a new washer and upper drum assembly on the drum shaft. (See Fig.2-2-25a.)
- (3) Install the cap to the upper drum assembly.
- (4) Position the collar assembly as indicated in Fig.2-2-25c while controlling its up- down movement.
- (5) Secure the collar assembly in position with a hexagonal wrench while pressing its top with the fingers.
- (6) After installation, gently turn the upper drum assembly with your hand to make sure that it turns normally. Then install the brush and the spring.
- (7) Install the rotor assembly and stator assembly according to Fig 2-2-23a and 2-2-24a.
- (8) When installation is complete, clean the upper drum assembly and lower drum assembly and carry out the following adjustments.
  - PB switching point adjustment
  - Slow tracking adjustment
  - Compatibility adjustment (Be sure to check for compatibility for the EP (or LP) mode.)

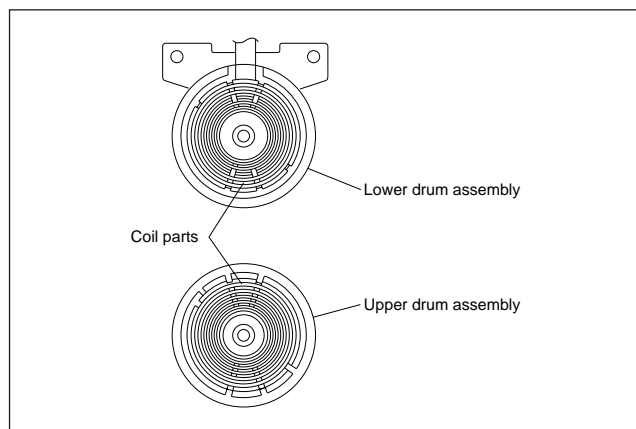


Fig. 2-2-25b

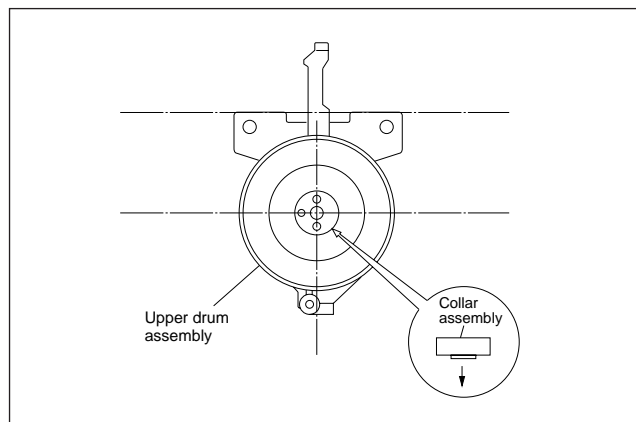


Fig. 2-2-25c

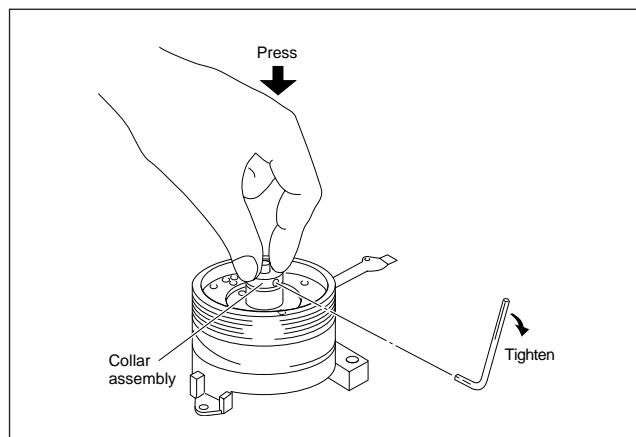


Fig. 2-2-25d

## 2.3 Compatibility adjustment

### Notes:

- **Although compatibility adjustment is very important, it is not necessary to perform this as part of the normal servicing work. It will be required when you have replaced the A/C head, drum assembly or any part of the tape transport system.**
- **To avoid any damage to the alignment tape while performing the compatibility adjustment, get a separate cassette tape (for recording and play back) ready to be used for checking the initial tape running behavior.**
- **Unless otherwise specified, all measuring points and adjustment parts are located on the Main board.**
- **When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). (See SECTION 1 DISASSEMBLY.)**

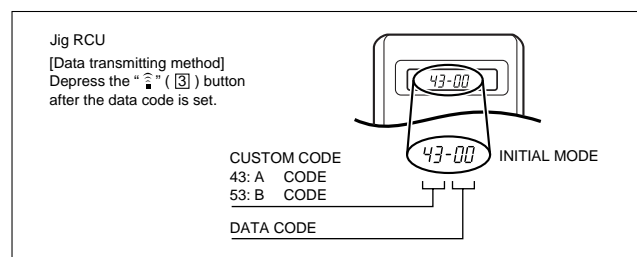


Fig. 2-3a Jig RCU [PTU94023B]

### 2.3.1 FM waveform linearity

Signal	(A1) (A2)	<ul style="list-style-type: none"> <li>• Alignment tape(SP, staircase, NTSC) [MHP]</li> <li>• Alignment tape(EP, staircase, NTSC) [MHP-L]</li> </ul>
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• Guide roller [Mechanism assembly]
Specified value	(G)	• Flat V.PB FM waveform
Adjustment tool	(H)	• Roller driver [PTU94002]

- (1) Play back the alignment tape (A1).
- (2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
- (3) Set the VCR to the manual tracking mode.
- (4) Make sure that there is no significant level drop of the V.PB FM waveform caused by the tracking operation, with its generally parallel and linear variation ensured. Perform the following adjustments when required. (See Fig. 2-3-1a.)
- (5) Reduce the V.PB FM waveform by the tracking operation. If a drop in level is found on the left side, turn the guide roller of the pole base assembly (supply side) with the roller driver to make the V.PB FM waveform linear. If a drop in level is on the right side, likewise turn the guide roller of the pole base assembly (take-up side) with the roller driver to make it linear. (See Fig. 2-3-1c.)
- (6) Make sure that the V.PB FM waveform varies in parallel and linearly with the tracking operation again. When required, perform fine-adjustment of the guide roller of the

pole base assembly (supply or take-up side).

- (7) Unload the cassette tape once, play back the alignment tape (A1) again and confirm the V.PB FM waveform.
- (8) After adjustment, confirm that the tape wrinkling does not occur at the roller upper or lower limits. (See Fig. 2-3-1d.)

**[Perform adjustment step (9) only for the models equipped with SP mode and EP (or LP) mode.]**

- (9) Repeat steps (1) to (8) by using the alignment tape (A2).

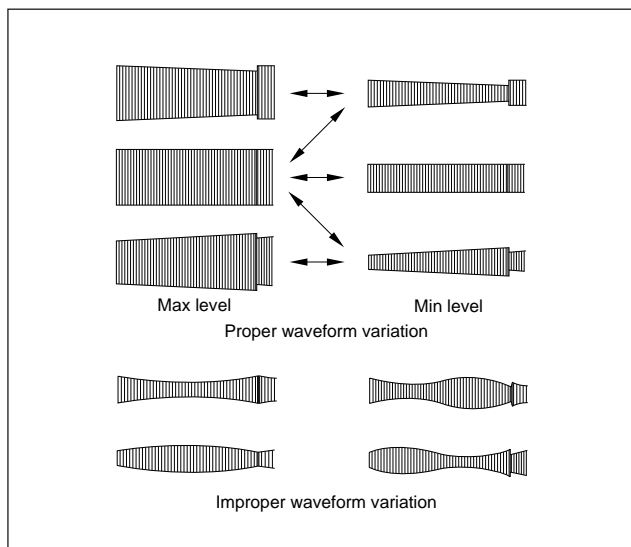


Fig. 2-3-1a

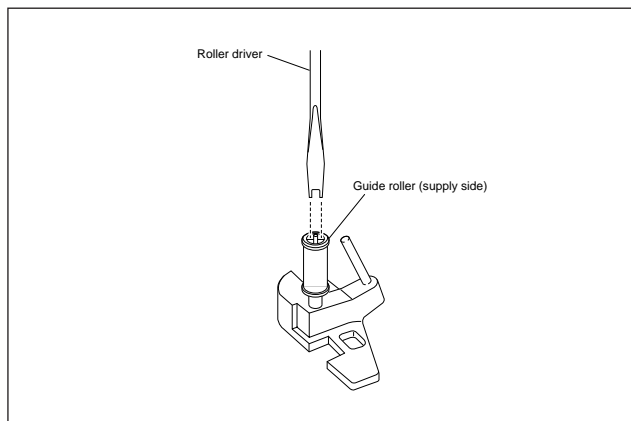


Fig. 2-3-1b

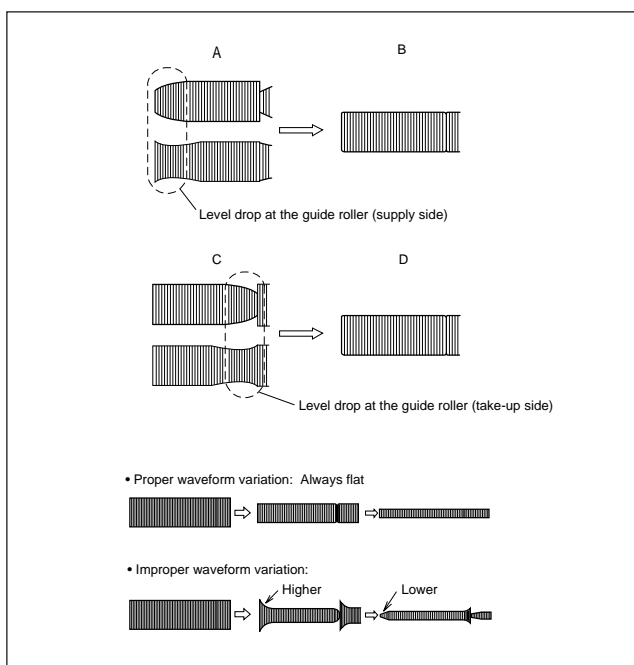


Fig. 2-3-1c

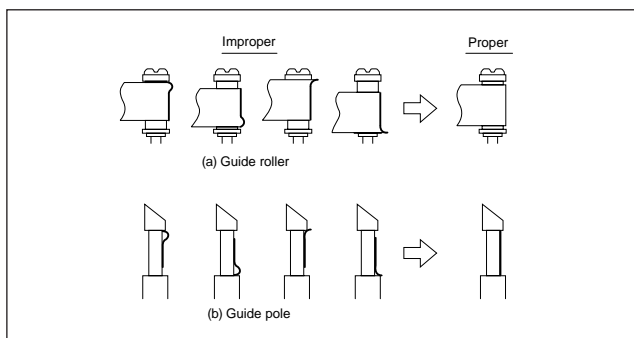


Fig. 2-3-1d

### 2.3.2 Height and tilt of the A/C head

#### Note:

- **Set a temporary level of the height of the A/C head in advance to make the adjustment easier after the A/C head has been replaced. (See Fig.2-2-6c.)**

Signal	(A)	• Alignment tape(SP, staircase, NTSC) [MHP]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D1) (D2)	• AUDIO OUT terminal • TP4001 (CTL. P)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• A/C head [Mechanism assembly]
Specified value	(G)	• Maximum waveform

- (1) Play back the alignment tape (A).
- (2) Apply the external trigger signal to D.FF (E), to observe the AUDIO OUT waveform and Control pulse waveform at the measuring points (D1) and (D2) in the ALT mode.
- (3) Set the VCR to the manual tracking mode.

- (4) Adjust the AUDIO OUT waveform and Control pulse waveform by turning the screws (1), (2) and (3) little by little until both waveforms reach maximum. The screw (1) and (3) are for adjustment of tilt and the screw (2) for azimuth.

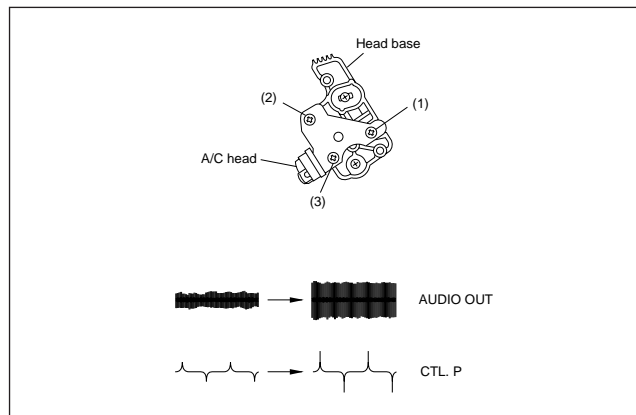


Fig. 2-3-2a

### 2.3.3 A/C head phase (X-value)

Signal	(A1)	• Alignment tape(SP, staircase, NTSC) [MHP]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• A/C head base [Mechanism assembly]
Specified value	(G)	• Maximum V.PB FM waveform
Adjustment tool	(H)	• A/C head positioning tool [PTU94010]

- (1) Play back the alignment tape (A1).
- (2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
- (3) Set the VCR to the manual tracking mode.
- (4) Loosen the screws (4) and (5), then set the A/C head positioning tool to the innermost projected part of the A/C head. (See Fig. 2-3-3a.)
- (5) Turn the A/C head positioning tool fully toward the capstan. Then turn it back gradually toward the drum and stop on the second peak point position of the V.PB FM waveform output level. Then tighten the screws (4) and (5).
- (6) Perform the tracking operation and make sure that the V.PB FM waveform is at its maximum. If it is not at maximum, loosen the screws (4) and (5), and turn the A/C head positioning tool to bring the A/C head to a position, around where the waveform reaches its maximum for the first time. Then tighten the screws (4) and (5).



**[Perform adjustment steps (7) to (10) only for 2 Head models equipped with LP mode.]**

- (7) Then play back the alignment tape (A2).
- (8) Set the VCR to the manual tracking mode.
- (9) Perform the tracking operation and make sure that the V.PB FM waveform is at its maximum.
- (10) If it is not at maximum, loosen the screws (4) and (5), and turn the A/C head positioning tool to bring the A/C head to a position, around where the waveform reaches its maximum for the first time. Then tighten the screws (4) and (5).

**Note:**

- After adjusting, always perform the confirmation and re-adjustment of the item 2.3.4.

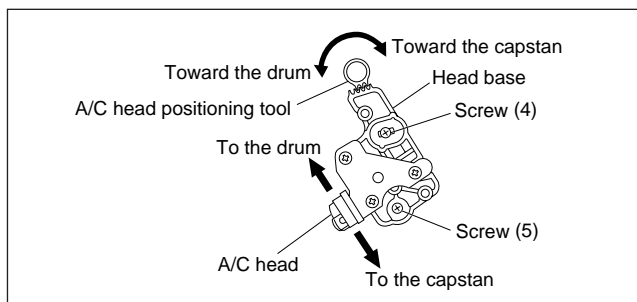


Fig. 2-3-3a

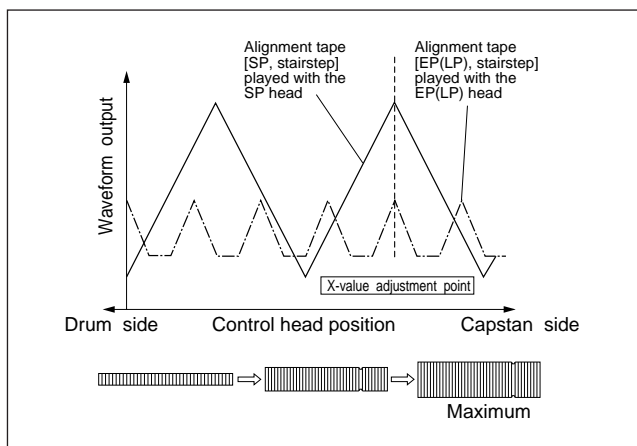


Fig. 2-3-3b

- (4) Set the VCR to the Auto adjust mode by transmitting the code (F) twice from the Jig RCU. When the VCR enters the stop mode, the adjustment is completed.
- (5) If the VCR enters the eject mode, perform adjustment for the audio control head phase (X-value) again.

**2.3.5 Tension pole position**

Signal	(A)	• Back tension cassette gauge [PUJ48076-2]
Mode	(B)	• PB
Adjustment part	(F)	• Adjust pin [Mechansim assembly]
Specified value	(G)	• 25 - 51 gf•cm (2.45 - 5 × 10 <sup>-3</sup> Nm)

- (1) Play back the back tension cassette gauge (A).
- (2) Check that the indicated value on the left side gauge is within the specified value (G).
- (3) If the indicated value is not within the specified value (G), perform the adjustment in a following procedure.
  - 1) Set the VCR to the mechanism service mode. (See SECTION 1 DISASSEMBLY.)
  - 2) Set the VCR to the play back mode and adjust by turning adjustment pin to align the tension arm assembly edge with the main deck hole (A) on the right edge marker. (See Fig. 2-3-5a)

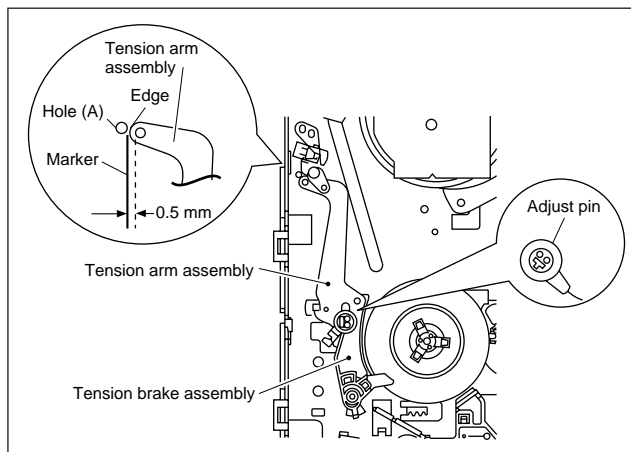


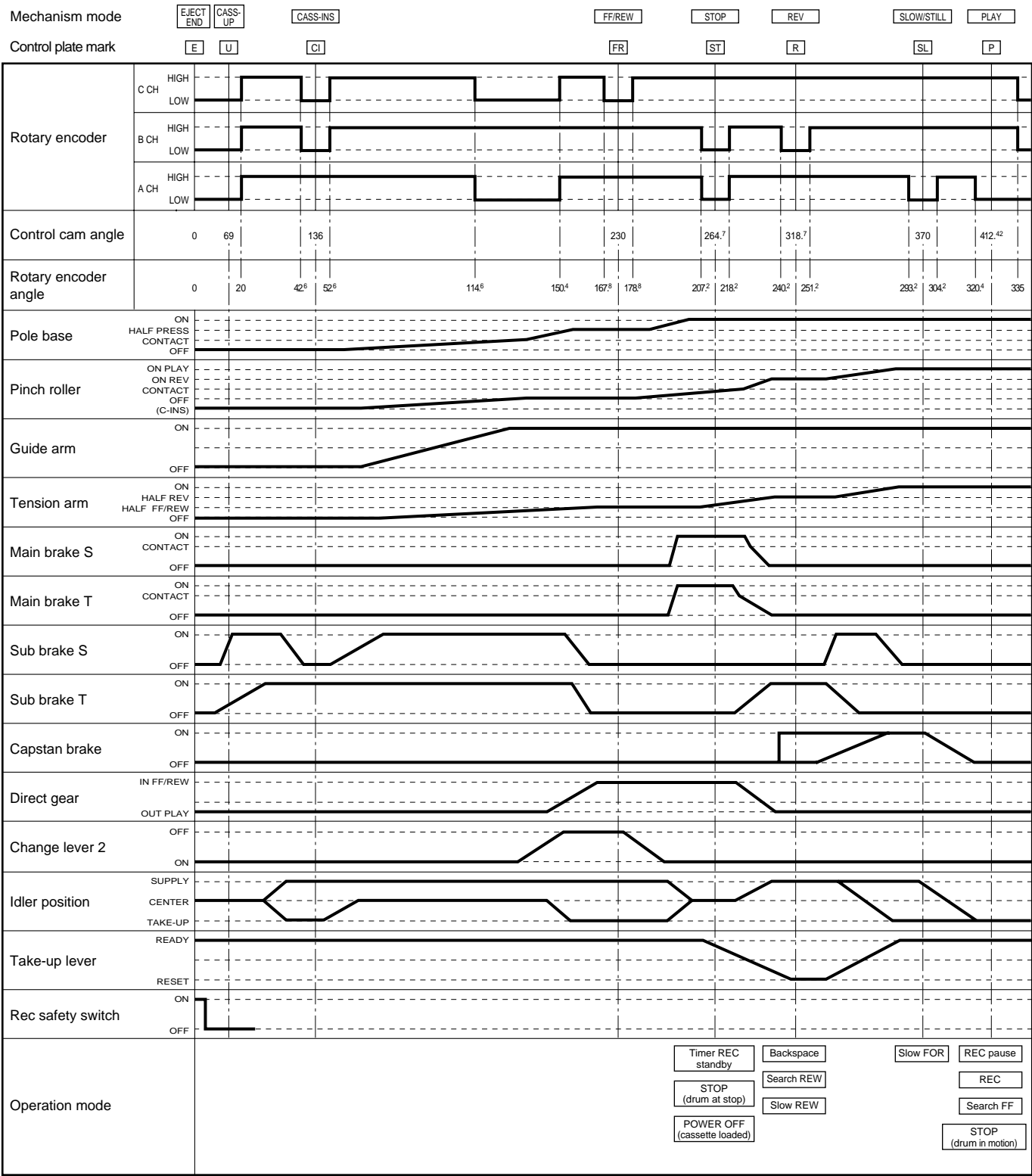
Fig. 2-3-5a

**2.3.4 Standard tracking preset**

Signal	(A)	• Alignment tape(EP, staircase, NTSC) [MHP-L]
Mode	(B)	• PB → Auto adjust
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• Jig RCU: Code "50"
Specified value	(G)	• STOP mode (Maximum V.PB FM waveform)
Adjustment tool	(H)	• Jig RCU [PTU94023B]

- (1) Play back the alignment tape (A).
- (2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
- (3) Confirm that the automatic tracking operation is completed.

Mechanism Timing Chart









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