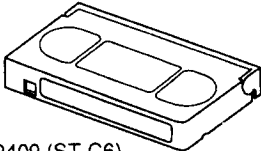
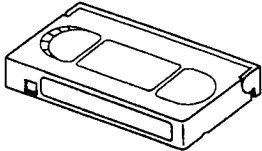
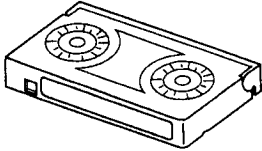
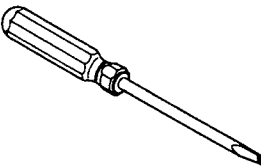
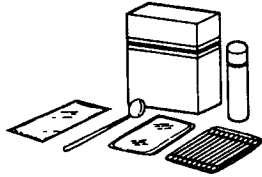


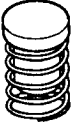


Bottom View

## 1-2. Servicing Jig List

<p>Alignment tape</p>  <p>70909409 (ST-C6) 70909410 (ST-C7)</p>	<p>Back tension cassette gauge</p>  <p>70909103</p>	<p>Torque cassette gauge (KT-300NR)</p>  <p>70909199</p>
<p>Taper nut driver</p>  <p>70909228</p>	<p>VTR cleaning kit</p> 	<p>VTR lubrication kit</p> 
<p>Grease</p> 	<p>Pre-load tool 1.8</p>  <p>70909416</p>	<p>For Service Manuals Contact MAURITRON TECHNICAL SERVICES 8 Cherry Tree Rd, Chinnor Oxon OX9 4QY Tel:- 01844-351694 Fax:- 01844-352554 Email:- enquiries@mauritron.co.uk</p>

**Note:** Conventional alignment tapes ST-C1 (70909227) and ST-C3 (70909264) can be used partially.

### 1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions

	Part Name	Service time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension post											<ul style="list-style-type: none"> <li>• When cleaning, use a swab or piece of gauze soaked in alcohol.</li> </ul>
	S/T slant guide post											
	Impedance roller *											
	No. 8 guide post	△	△	△	△	△	△	△	△	△	△	<ul style="list-style-type: none"> <li>• After cleaning, cleaned parts are dried completely, and then load a video cassette.</li> </ul>
	Capstan											
	No. 9 guide post											
	No. 3 guide post											<ul style="list-style-type: none"> <li>• When lubricating, always use the specified oil.</li> <li>• When the lubricating, apply one or two drops of oil after the cleaning with alcohol.</li> </ul>
	S/T guide roller	△	△	△	○	○	○	○	○	○	○	
	Upper cylinder	△	○	○	○	○	○	○	○	○	○	
	Slip ring assembly		○	○	○	○	○	○	○	○	○	
	FE head	△	△	△	○	○	○	○	○	○	○	
	ACE head	△	○	○	○	○	○	○	○	○	○	
	Pinch roller	△	○	○	○	○	○	○	○	○	○	
Tape Drive System	Capstan motor	△	△	△	△	△	○	○	○	○	○	<ul style="list-style-type: none"> <li>• Check the back tension.</li> </ul>
	Loading motor				○	○	○	○	○	○	○	
	Loading belt/ Reel belt	△	○	○	○	○	○	○	○	○	○	
	S reel table assembly		○	○	○	○	○	○	○	○	○	
	T reel table assembly		○	○	○	○	○	○	○	○	○	
	Idle gear assembly	△	○	○	○	○	○	○	○	○	○	
Other	Band brake assembly		○		○		○		○		○	

△ : Cleaning    ○ : Check and replace if necessary

\* There are two types. One type has an impedance roller and another type has no impedance roller.

## 1-4. V3 Mechanism Check Method

If the abnormal condition is caused by the mechanism itself, analyze the cause according to the following procedures.

### 1-4-1. External Appearance Check

- (1) Check whether there are foreign matters or not inside the VTR.
- (2) Check whether the cylinder and the guides for tape transport system are contaminated.

### 1-4-2. Motor Sensor System Check

Check whether some abnormalities are found in the motor or the sensor system (including control circuits) according to the flow chart.

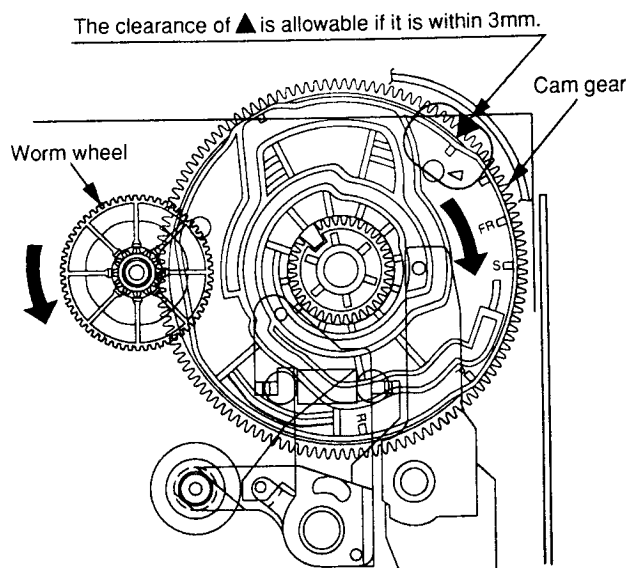
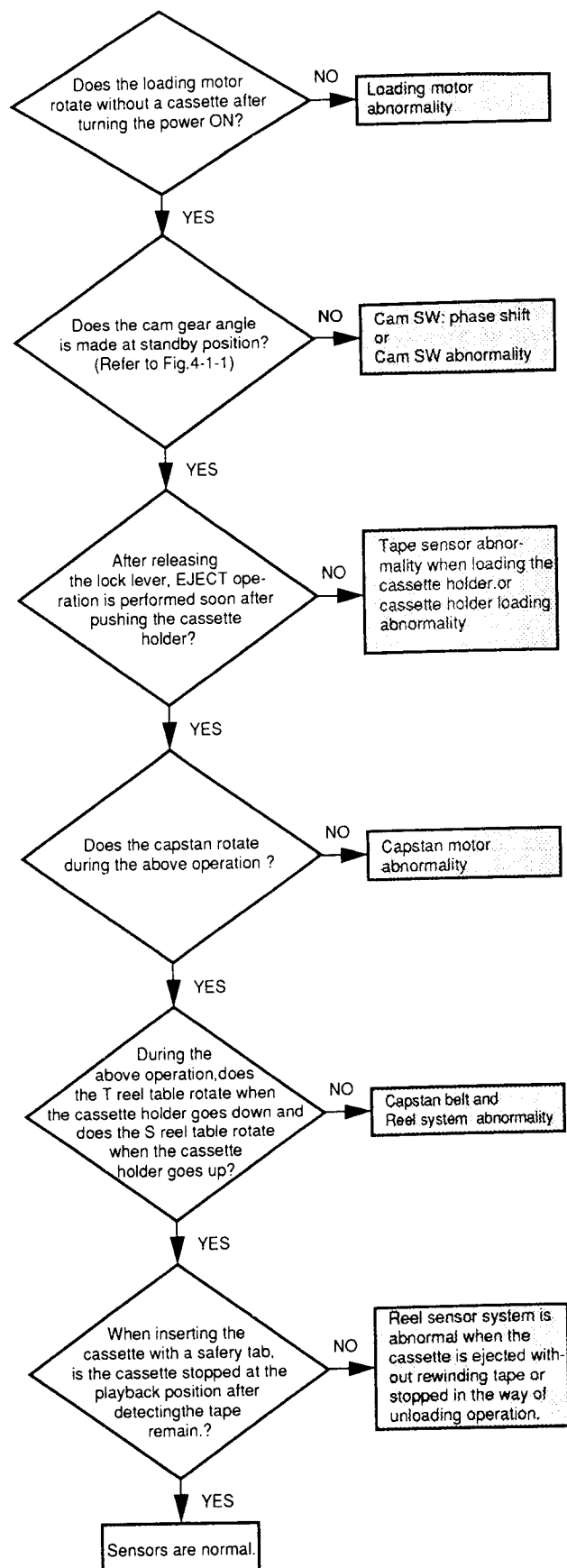


Fig. 4-1-1

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### 1-4-3. Abnormality Analysis by Self-check

#### Function

The unit used V3 mechanism has a self-check function. The self-check function works as a system which stored some abnormal condition. So, use this function to try to analyze the cause(s).

For the data display method and the content of the data, refer to the self-check function (described on page 2-50) in item 2-3.

#### Note:

- Abnormal data is displayed only when the first abnormal condition occurs, and is not displayed in the second time. Accordingly, the claim from customers and the actual data displayed may be different.
- The data is stored only when the power turns off after occurring the abnormality condition(s). The data is not stored when the unit operation is recovered by the microcomputer.
- After repairing, initialize the data by pressing the [COUNTER RESET] button while displaying the abnormal mode.

The typical examples in abnormal condition are shown below.

Table 4-3-1

A	B	C	Abnormal Condition	Check Item
06	01	09	Cylinder is stopped at playback position during playback the tape.	} Check the cylinder motor. Check if the cylinder and tape transport guide are clogged.
02	01	0d	Cylinder is stopped at FF/REW position during rewind the tape.	
06	02	09	T reel sensor is abnormal at playback position during playback the tape.	} Check the capstan motor. Refer to the cases 2 and 3 describe on the table "Defective analyzing list".
03	03	07	S reel sensor is abnormal at playback position during REVIEW the tape.	
01	04	02	Cassette-in and out operation cannot be performed.	} Refer to the case 1 described on the table "Defective analyzing list".
03	05	08	Mode shift cannot be performed during shifting to REVIEW.	

A: System control mode, B: Abnormality No., C: Mechanical position when an abnormality occurs.

### 1-4-4. Check by Defective Analyzing List

If the abnormality causes the mechanism abnormal condition, presume, confirm and treat the defective according to the "Defective analyzing list" in table 4-4-1.

#### (1) Manual mechanism operation (mode shift) method

Push in the lock lever R and L manually and turn the worm wheel counterclockwise as shown in Fig. 4-1-1. The cam gear is turned clockwise and the mode shifts to the direction where the loading operation can be performed. So, check the mechanism condition in the defective mechanism position when the abnormality occurs.

#### (2) Defective parts replacement

When a defective occurs due to the defective part(s) and the part(s) is replaced, take care the following items.

- Especially as for the mechanical parts requiring the phase alignment, take care of the part replacement E.g., Assembling mode, phase alignment mark and etc.

- As for the part(s) requiring lubricant such as a specified amount of oil or grease, apply grease or oil according to the instructions and do not stick grease or oil to the portions without allowing to stick it (especially in removal and assembly).

#### (3) Check after treating the defective

After replacing a defective part and/or aligning a part, first check the mechanism operation manually and confirm that no problem occurs, and then mount the mechanical deck, turn the power ON and check the mechanism operation.

#### Note:

- After replacing the defective parts according to the procedure of the treatment method for the "damage and phase shift of mechanical part", check the operation of the mechanism again, since the same (or similar) defective problem may occur due to other serious cause (in mechanism or electrical circuit) when performing the actual total check with turning the power on.

Table 4-4-1 Defective Analyzing List

Case	Defective Phenomenon (Main Items)	Presumed Cause (Main Cause)	Check Method
1	Power does not turn on. Loading operation is defective. Mode shift operation is defective.	<General> Mechanical stops due to mechanical phase unmatching.	Check mode shift "Cassette out FF/REW position" can be performed when turning worm wheel.
	Loading operation is not performed.	Loading motor does not rotate. (Loading motor is defective or circuit is defective.)	Check loading motor whether it turns by the outer power supply (12.5V).
	Unloading operation is not performed.	S reel does not wind the tape.	Refer to case 3 in this table.
2	Playback operation is not performed. Playback operation is defective.	<General> Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch does not press.	Check mechanical position.
	<b>For Service Manuals Contact MAURITRON TECHNICAL SERVICES 8 Cherry Tree Rd, Chinnor Oxon OX9 4QY Tel: 01844-351694 Fax: 01844-352554 Email: enquiries@mauratron.co.uk</b>	Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
	Playback picture does not appear Video recording can not be performed.	<In case of no mechanical problem> Cylinder is defective. (Circuit is defective.)	Check cylinder assembly.
3	Playback interruption. Defective phenomenon during playback. Recording interruption.	Reel rotation detection is defective. (Sensor is defective. Circuit is defective.)	Check sensor output.
		Idler does not swing.	Check mechanical position.
		Reel belt is removed.	Check the reel belt is removed or not.
4	FF operation is not performed. FF operation is defective. REW operation is not performed. REW operation is defective. Others: REV/FF is not performed. Others: REV/FF is defective.	Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch is not released.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
5	REVIEW is not performed.	Main brake is not released. (ON) T soft brake is not actuated. Idler does not turn. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
6	Slot-in is not performed. Cassette can not be inserted.	<General> When the F/L is mounted on the mechanical deck, the position is not correct.	Check mechanical position.
7	Capstan servo does not work. Capstan servo is uneven. Tape speed is fast. Tape speed is slow. Tape speed is uneven. FG pulse is not output.	Capstan motor is defective.	Check capstan motor.
		ACE head control output is defective. (Circuit is defective.)	Check ACE head. Check CTL output.
8	Audio output does not come out. Audio output is small. Audio output variation is large. Audio output is uneven. Audio distortion. Audio noise. Others: Audio is defective.	ACE head is defective.	Check ACE head. Check CTL output.
		Tape transport adjustment is not defective.	Perform tape transport adjustment again after confirming tape transport condition.
		Hi-Fi head (cylinder) is defective. (Circuit is defective.)	Check cylinder. Check whether B+14V is supplied.

Treatment: If the mechanical is found out to be defective according to the procedures described above, perform the following treatment.

- Misassembling, mechanical phase mismatch .....Repair correctly.
- Parts defect, parts damage.....Replace parts.

If the mechanical is found out not to be defective according to the procedures above, check the circuit(s)

## 1-5. Mechanical Deck Removal and Mounting

### 1-5-1. Mechanical Deck Removal

1. Remove five screws (2) mounting the top cover (1) and remove the top cover (1) sliding backward and lifting upward.
2. Remove two screws (4) securing the front panel (3), and remove the front panel (3).

#### Note:

These screws (4) are not always applied to all VTRs.

3. Remove the FFC (7) connecting the main unit (5) and the KDB unit (6).

#### Note:

Be sure to remove the FFC on the KDB unit side.

4. Remove two screws (9) securing the power unit (8).
5. Remove three screws (11) securing the mechanical deck (10).

6. Remove the claw securing the main unit (5) and the terminal board (12).
7. Remove the mechanical deck (10) with the main unit (5) from the chassis lifting the terminal board (12) slightly and pulling the top bracket (13) upward.

#### Note:

When pulling the top bracket (13) upward, take care not to deform the reinforcement plate located below the F/L assembly.

8. Remove the lead wire connecting between the mechanical deck (10) and the main unit (5).
9. Turn over the mechanical deck (10).
10. Remove the reel belt (16) and one screw (17).
11. Remove four claws securing the mechanical deck (10) and the main unit (5), and then remove the main unit (5) pulling upward.

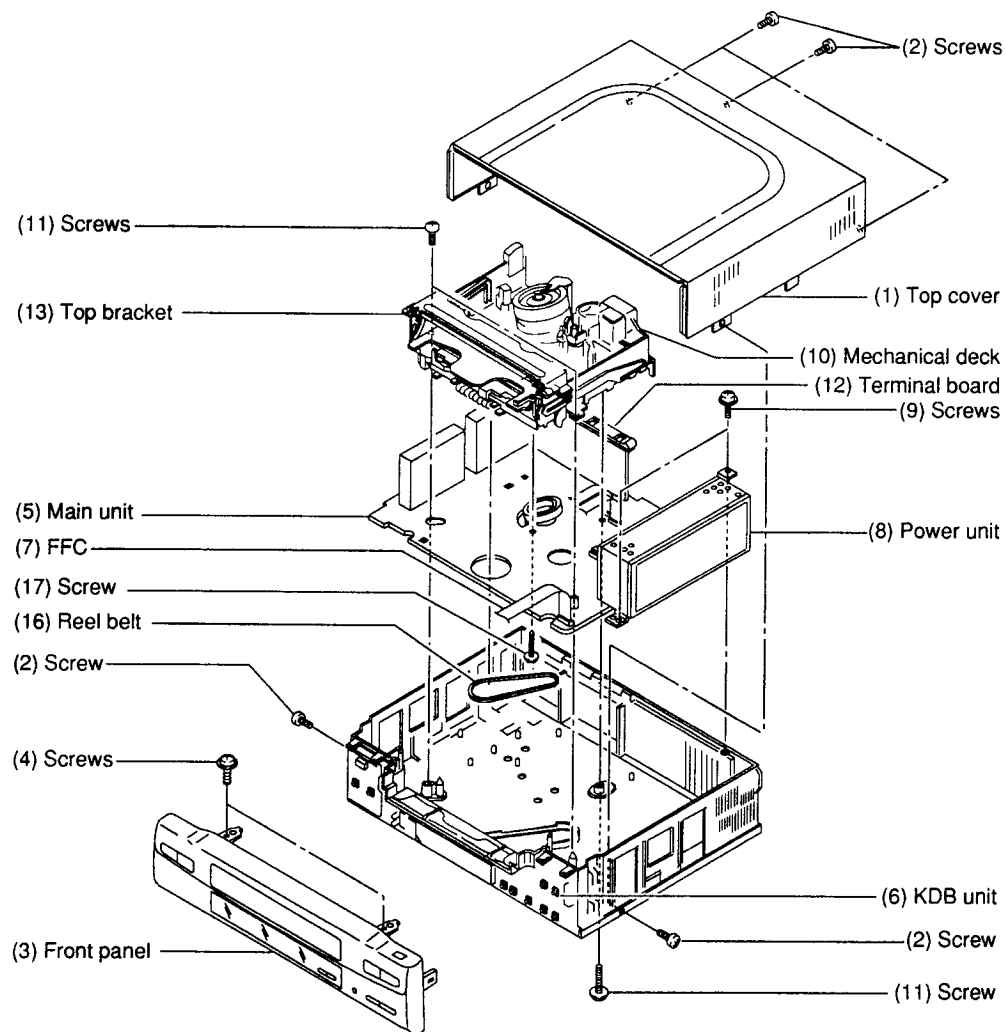


Fig. 5-1-1

### 1-5-2. Mechanical Deck Mounting

1. Turn over the mechanical deck and lower the main unit vertically adjusting the tape end sensor and etc. to the holes.

**Note:**

- Adjust the rotor of the cylinder motor and the stator of the main unit, and then lower the main unit further more till four claws catch the mechanical deck completely.
  - Take care not to damage the rotor and the stator.
  - When locking the claw of the front right side to the main unit, turn the REC inhibit lever so as not to damage the switch.
2. Mount the mechanical deck on the chassis in reverse order of removal.

**Note:**

When mounting the front panel, mount it with its door fully open.

### 1-5-3. Confirmation of Each Operation Mode without Cassette

1. Shut out the light to the start/end sensor.
2. Release the both sides of the lock lever and make a slot-in condition.
3. Turn the reel table manually located on the opposite side of the rotating reel table.
4. In this condition, confirmation of each operation mode can be performed.

**Note:**

When turning the opposite side reel table of the rotating reel table manually in playback, FF/REW mode, and sending no reel pulse, the auto eject or power off function is performed.

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## 1-6. Main Parts Replacement

### 1-6-1. Top Bracket Replacement

1. Remove two securing screws (2) on the top bracket (1).
2. Remove the top bracket (1) lifting in the direction shown by the arrow.

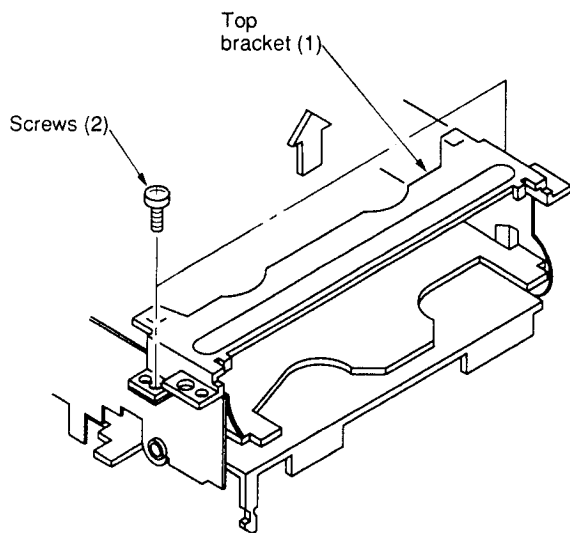


Fig. 6-1-1

3. When mounting the top bracket (1), move the tip of the grip lever (3) on the cassette holder assembly to the inclined portion of a trapezoidal cam, and then mount the top bracket (1).

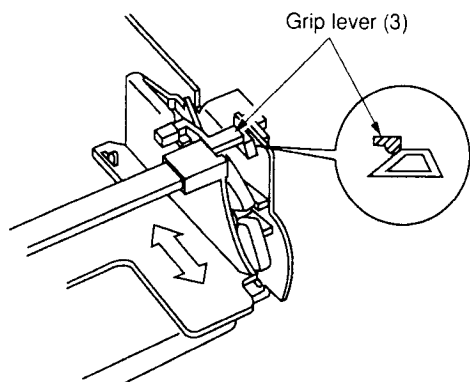


Fig. 6-1-2

#### Note:

- After remounting the top bracket (1), move the cassette holder forward and backward, and then confirm the claws of the lock lever (5) catch completely the both left and right sides of the stopper section (4) at the top bracket (1).

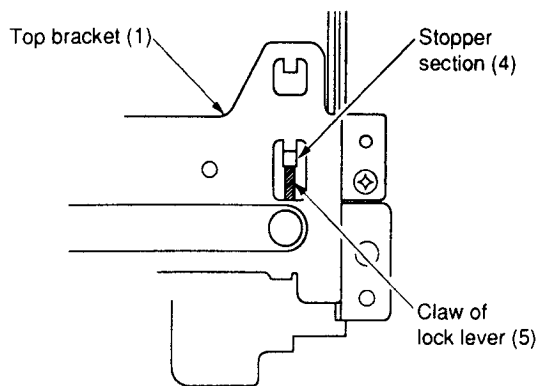


Fig. 6-1-3

### 1-6-2. Cassette Holder Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. The cassette holder assembly (1) is guided along the guide grooves (2) with both left and right bosses of the cassette holder assembly (1). So first remove each side boss (3) on both left and right sides of cassette holder assembly (1) from the guide groove (2).
3. When the cassette holder assembly (1) is set at the EJECT position, the boss is located at (a), so move the boss from (a) to (b) and remove the bosses on both left and right sides simultaneously.

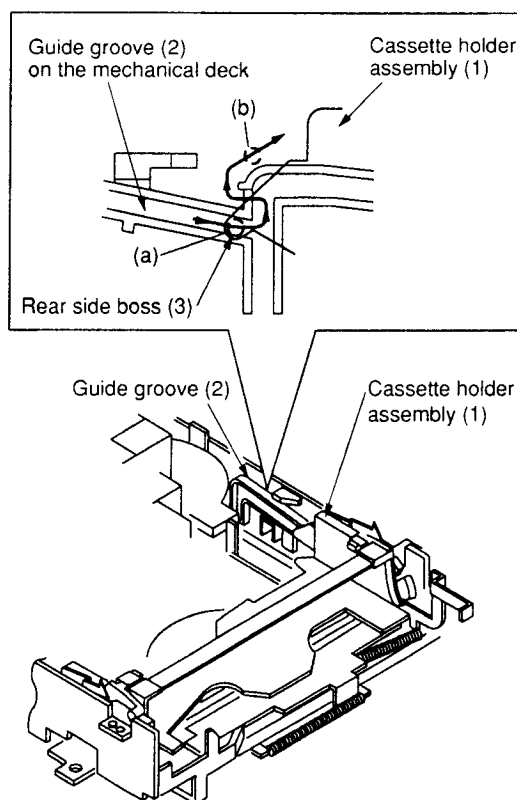
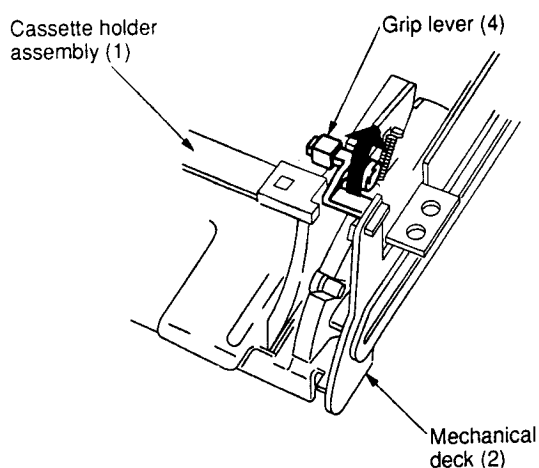


Fig. 6-2-1

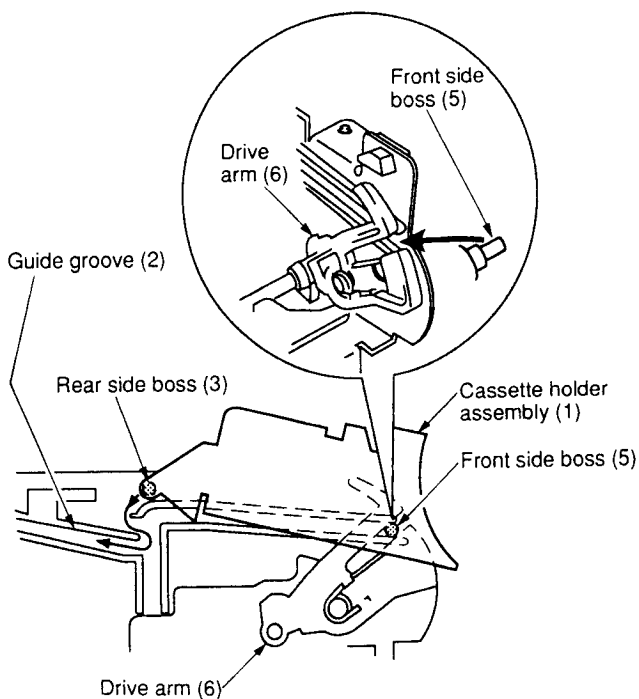


**Note:**

The grip lever (4) on the cassette holder assembly (1) may catch the trapezoidal cam on the mechanical deck (2), so perform the work lifting the grip lever in the direction shown by the arrow.

**Fig. 6-2-2**

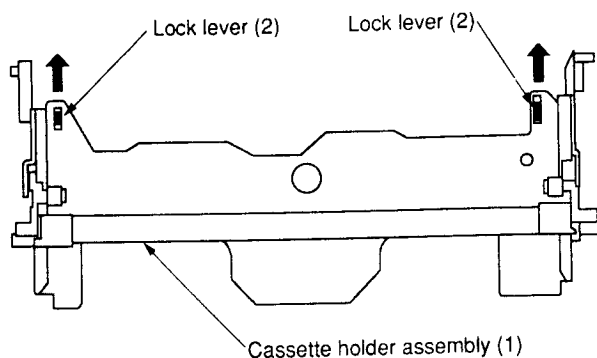
4. After removing the front side bosses (5) on both left and right sides, remove the cassette holder assembly (1) pulling to the front side.
5. When mounting the cassette holder assembly (1), insert the front side bosses (5) to the U shaped groove of the drive arm (6) and the guide groove (2) on the mechanical deck lifting the rear side of the cassette holder assembly (1).

**Fig. 6-2-3**

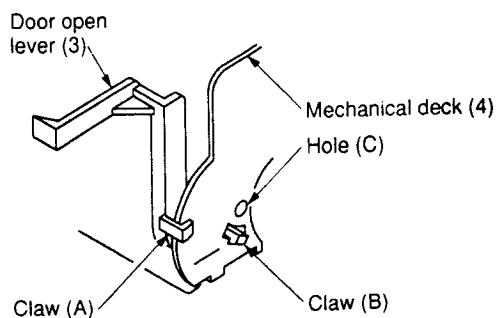
6. When mounting the rear side bosses (3), perform the reverse order of removal.

**1-6-3. Door Open Lever Replacement**

1. Release the lock lever (2) on the cassette holder assembly (1) pressing in the direction shown by the arrow.

**Fig. 6-3-1**

2. Move the cassette holder assembly (1) slightly to the rear side.
3. Remove the claws (A) and (B) on the door open lever (3) from the mechanical deck (4).
4. Match the boss on a new door open lever (3) and the hole (C) on the mechanical deck, and then insert the claws (B) first and then (A) to the mechanical deck (4).

**Fig. 6-3-2**

5. Remount the cassette holder assembly to the position as it was.

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#### 1-6-4. Drive Lever Gear Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.

##### Note:

- In this condition, both mark holes on the F/L drive slider (1) and the mechanical deck fit with each other, also the hole of the boss on the drive lever gear (2), the center of the gear tooth and the marking line are in line.
2. Move the claw of the drive arm (3) to the direction of the arrow (A) and remove the drive lever gear (2) upward.

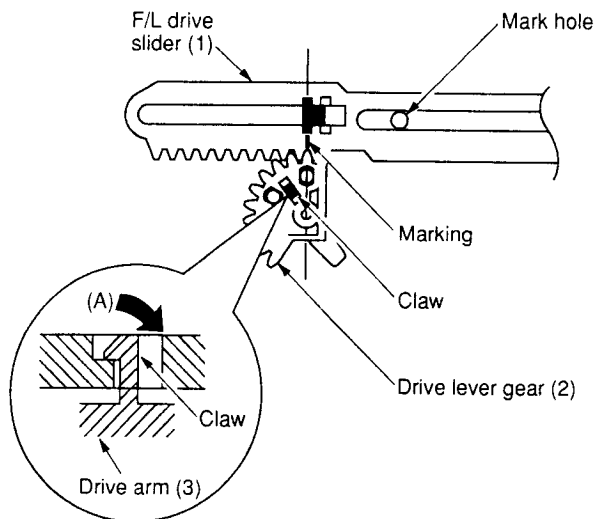


Fig. 6-4-1

3. When remounting the drive lever gear (2), take care of the phase position (refer to the note described above.) and mount in the reverse order of removal.

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#### 1-6-5. Drive Arm Assembly Replacement

1. Remove the top bracket assembly. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the door open lever. (Refer to item "1-6-3. Door Open Lever Replacement".)
4. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
5. Pull the REC-inhibiting lever slightly to the front side, turn the drive arm assembly (1) to the front side and push it in the direction shown by the arrow. Remove the left side boss (2) on the drive arm assembly (1) from the cutout of the guide groove on the mechanical deck (3).
6. Remount the drive arm assembly (1) in the reverse order of removal.

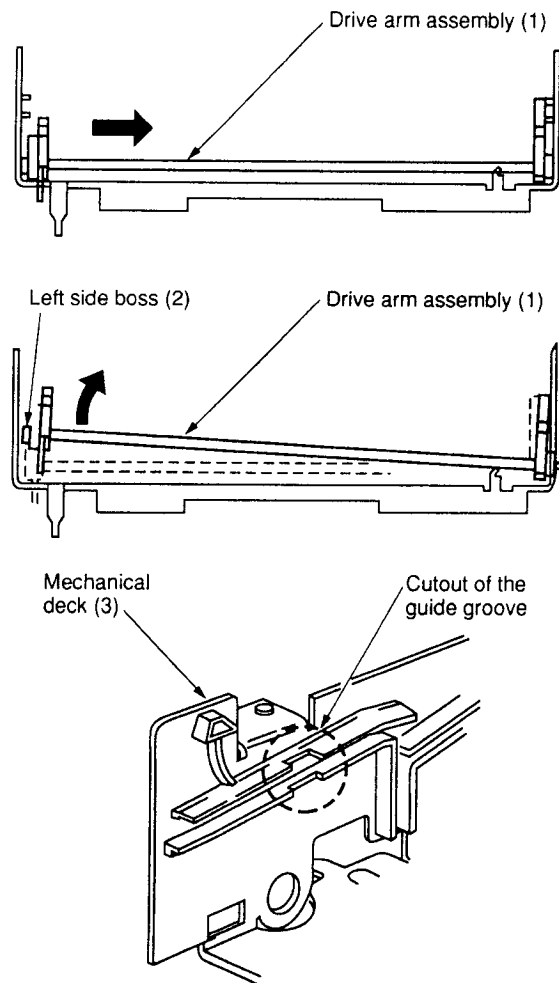


Fig. 6-5-1

### 1-6-6. Cam Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-30. Cam Gear Replacement".)
8. Move the cam lever (1) until it stops in the direction shown by the arrow (A). Pull out the cam lever (1) lifting up straightly at the position where the cam lever (1) stops.
9. Apply grease to the portions of bosses (A) to (C) on a new cam lever.

#### Note:

- Confirm that the boss (A) on the cam lever (1) is inserted into the hole on the F/L drive slider (2).
- After inserting the cam lever (1), confirm that the cam lever (1) moves smoothly.

10. Replace the cam lever in the reverse order of removal.

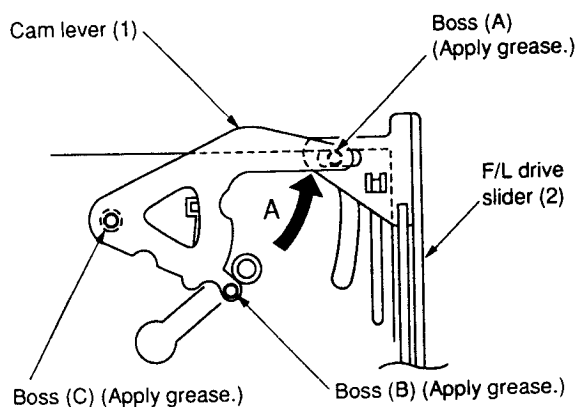


Fig. 6-6-1

### 1-6-7. F/L Drive Slider Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-30. Cam Gear Replacement".)
8. Remove the cam lever. (Refer to item "1-6-6. Cam Lever Replacement".)
9. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
10. Push the F/L drive slider (1) in the direction shown by the arrow (A) and slide it. Furthermore, pull out it to the front side lifting it in the direction shown by the arrow (B).
11. Apply grease to the shaded parts (a) to (d) on a new F/L drive slider (1).

#### Note:

For the phase alignment of the drive lever gear, refer to item "1-6-4. Drive Lever Gear Replacement".

12. Replace the F/L drive slider (1) in the reverse order of removal.

#### Note:

After completion of the replacement, confirm that the F/L drive slider (1) moves smoothly.

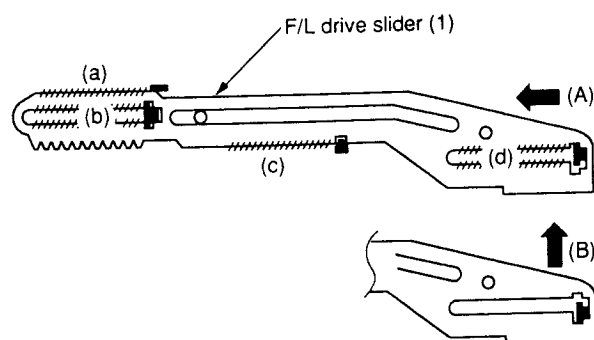


Fig. 6-7-1

### 1-6-8. Arm Brake Lever Assembly and Arm Brake Torsion Spring Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.
2. Turn the arm brake lever assembly (1) in the direction shown by the arrow (A) until it stops. Pull out the arm brake lever assembly (1) to the front at the position it stops.

#### Note:

Take care that the arm brake torsion spring (2) is removed forcefully.

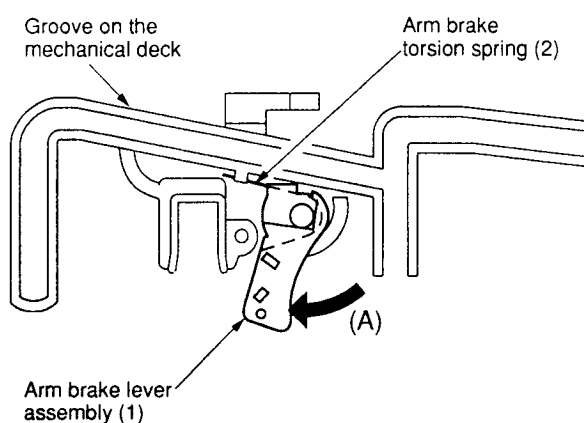


Fig. 6-8-1

3. Hook the arm brake torsion spring (2) temporarily to a new arm brake lever assembly (1).

#### Note:

Take care of the direction of the arm brake torsion spring (2) so that the longer end of the arm brake torsion spring (2) is hooked on the temporary hook.

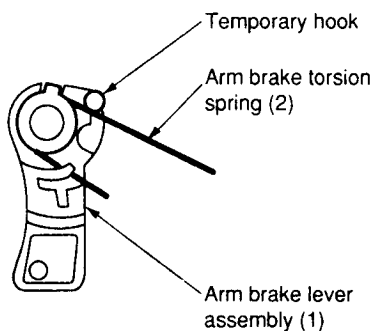


Fig. 6-8-2

4. Insert the hook portion on the arm brake lever assembly (1) to the cutout on the mechanical deck.
5. Turn the arm brake lever assembly (1) counterclockwise and fix it at the position which the arm brake lever assembly (1) faces to the straight below.
6. When pushing the tip of the arm brake torsion spring (2) located at (B) position, the tip is removed from the temporary hook and moves to the hook on the mechanical deck.
7. The arm brake lever assembly turns to the specified position by force of the arm brake torsion spring.

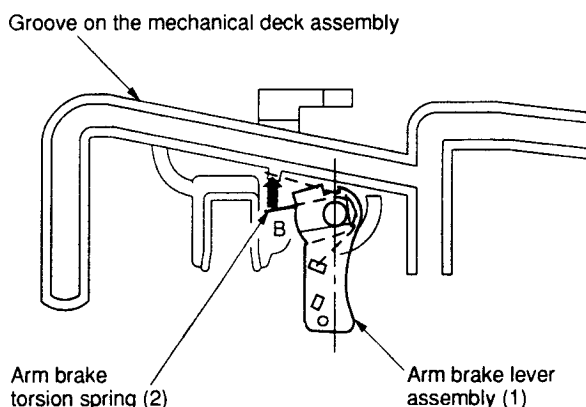


Fig. 6-8-3

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## 1-6-9. Cylinder Assembly Inspection and Replacement

### <Inspection>

1. Check if the tape transport surface on the lower cylinder assembly are not damaged.
2. Check if the rotation of the upper cylinder assembly is not abnormal.

When any abnormality is found according to the inspection procedures described above 1 and 2, replace the cylinder assembly.

### <Replacement>

1. Remove the ground brush assembly.
2. Remove the head cleaner. (Refer to item "1-6-13. Head Cleaner Replacement.")
3. Remove the FFC (1) on the pre amplifier.
4. Remove three screws (2) and the cylinder holding plate (3) and (4). (Refer to item "1-6-12. Cylinder Holding Plate Replacement".)
5. Remove the cylinder assembly (5).
6. Remount the cylinder assembly (5) in the reverse order of removal. Fix the cylinder pressing slightly in the direction shown by the arrow A and the cylinder holding plate (3) pressing slightly in the direction shown by the arrow (B). (Tightening torque: 294 – 392 mN•m (3 – 4 kg•cm))

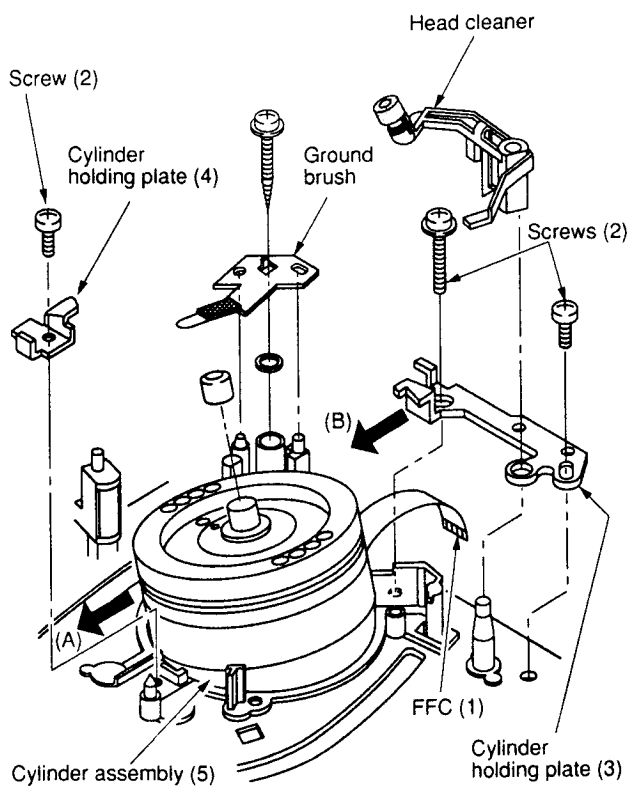


Fig. 6-9-1

### Note:

- When remounting the cylinder holding plate (3), insert the FFC under the tip of the cylinder holding plate (3).
  - When replacing, take much care not to touch the video head directly and damage the cylinder.
7. Perform the tape transport adjustment.

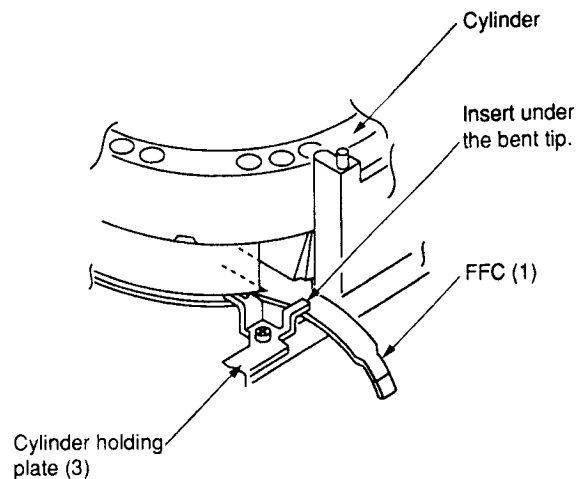


Fig. 6-9-2

## 1-6-10. Upper and Lower Cylinder Assembly Replacement (Rotor Assembly Replacement)

### Note:

- When handling a cylinder, always put on gloves, etc. Do not touch the cylinder directly with your naked hand.
- Do not touch video heads (1) with your hand. If touched they may be easily damaged.
- Do not apply excessive force to the rotor assembly light FG section (2).

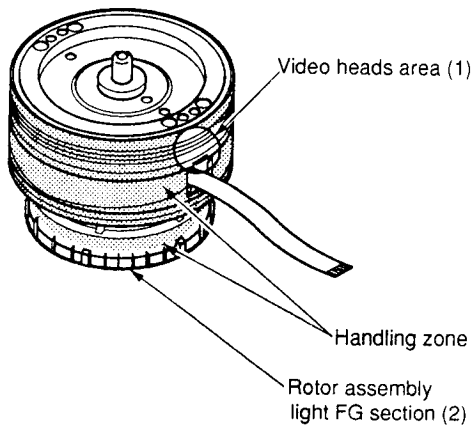


Fig. 6-10-1

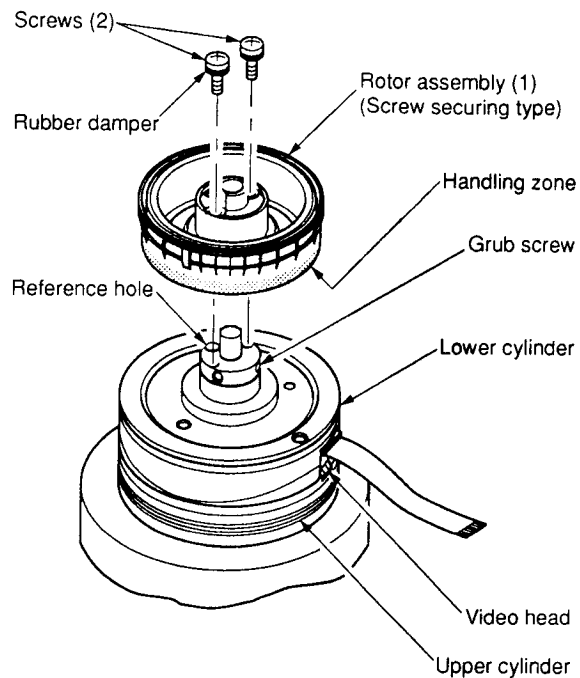


Fig. 6-10-2

### 2) Press-fit securing type (Fig. 6-10-3)

- Hold outer side of upper cylinder (3) and slowly pull out the rotor while rotating the rotor slowly.

### Note:

Do not apply an excessive force to the rotor assembly light FG section.

(When replacing the rotor assembly (1), refer to step 3 of item "<Assembling>".)

### <Disassembling>

1. Remove the cylinder assembly from the mechanical deck.
2. Place the cylinder upside down, and remove the rotor assembly (1) from the cylinder assembly.

### Note:

The cylinder has two types of rotor assembly, and removal methods for each is different as stated below.

#### 1) Screw securing type (Fig. 6-10-2)

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

### Note:

Take care not to lose rubber dampers attached to securing screws (2).

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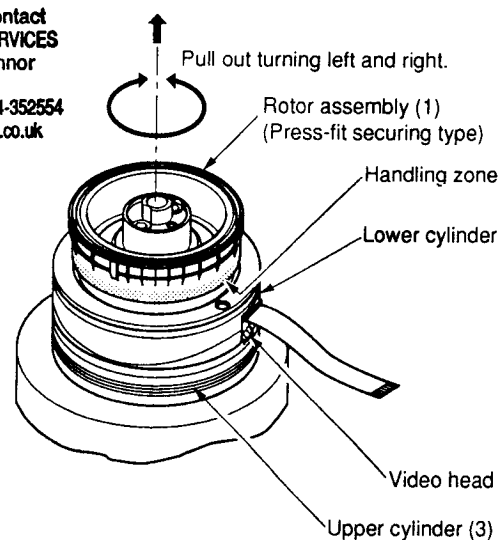


Fig. 6-10-3

- Loosen set screw (4) at side of pre-load boss (3), using a hex wrench and remove the pre-load boss (3) and pre-load spring (5).

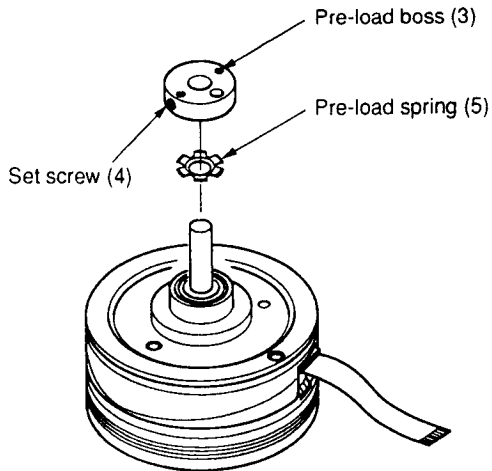


Fig. 6-10-4

- Slowly pull out the upper cylinder assembly (6) from the lower cylinder assembly (7). In this case, remove R. T gap washers (8) inserted onto the shaft. Also, remove ground cap (9) put on the shaft of upper cylinder assembly (6). The R. T gap washers (8), and ground cap (9) are used again in assembling, so, keep them securely.
- If tip (carbon contact) of ground cap (9) is excessively worn out, replace the ground cap (9).

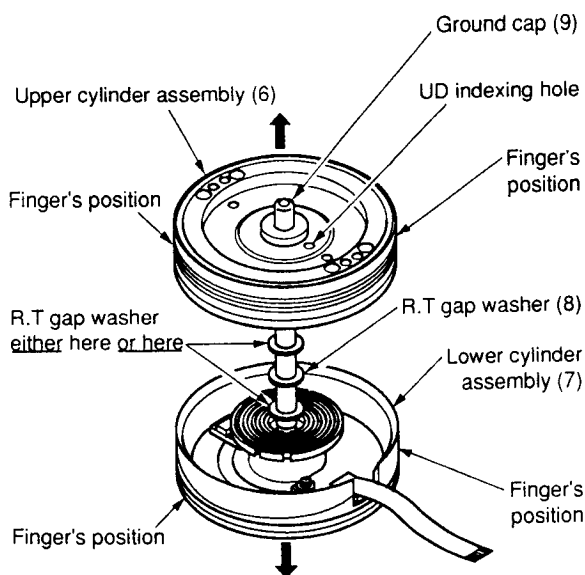


Fig. 6-10-5

### <Assembling>

- Insert R. T gap washers into a new upper cylinder shaft, and install the upper cylinder to the lower cylinder assembly.

#### Note:

- Since the shaft and bearing (1) are machined with high accuracy, insert the shaft just vertically into the bearing (1) so that unreasonable force is not applied.
- Take care the shaft and inside cylinder are free from any foreign matters such as dusts, etc.

- Apply pre-load spring (2) to the bearing (1).

- Place the cylinder upside down, insert the pre-load spring (2) and pre-load boss (3) into the shaft, and align phase of the reference video head and the pre-load boss reference hole.

#### Note:

Do not confuse outside and inside of the pre-load spring (2).

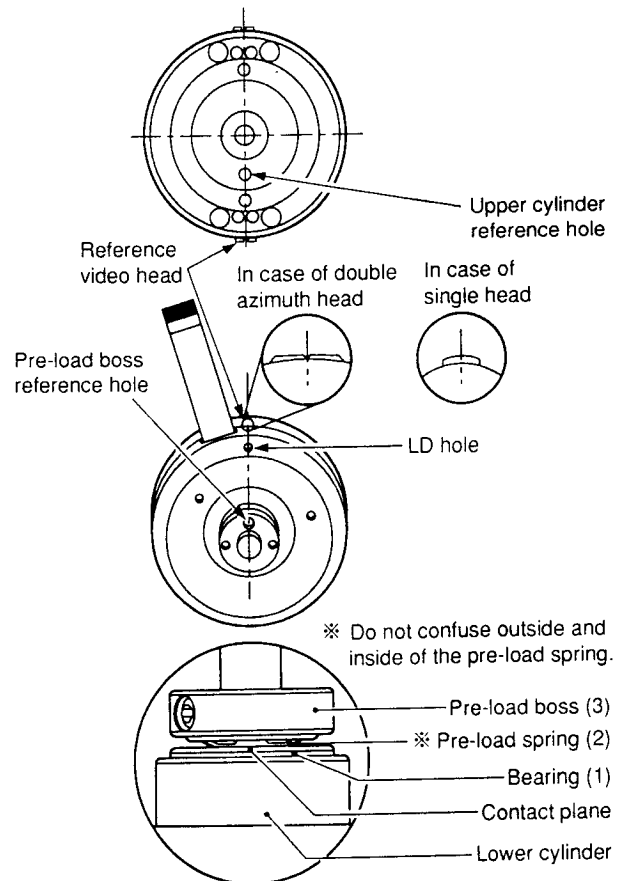


Fig. 6-10-6

- 2) Place the PRE-LOAD TOOL 1.8 (4) (Part No.: 70909416) on the pre-load boss (3) and press it with a finger until it touches end of the shaft.
- 3) Under condition of 2-2) above, tighten the set screw at the pre-load boss side with a hex wrench.
- 4) Confirm deviation of the phase. If deviated, loosen the set screw and repeat steps 2-1) through 3).

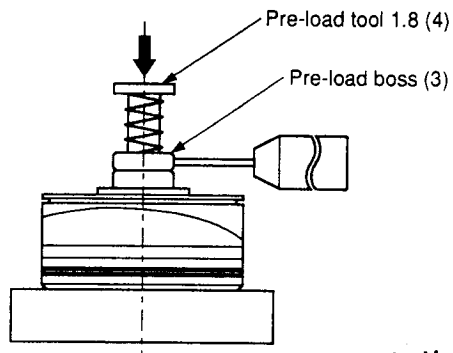


Fig. 6-10-7

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### 3. Mount the rotor assembly (5).

#### 1) Screw securing type (Fig. 6-10-8)

- Align the pre-load boss reference hole (6) and the rotor assembly reference hole (7), and fix the rotor assembly (5) with two screws (8).  
(Tightening torque: 200 – 300mN•m )

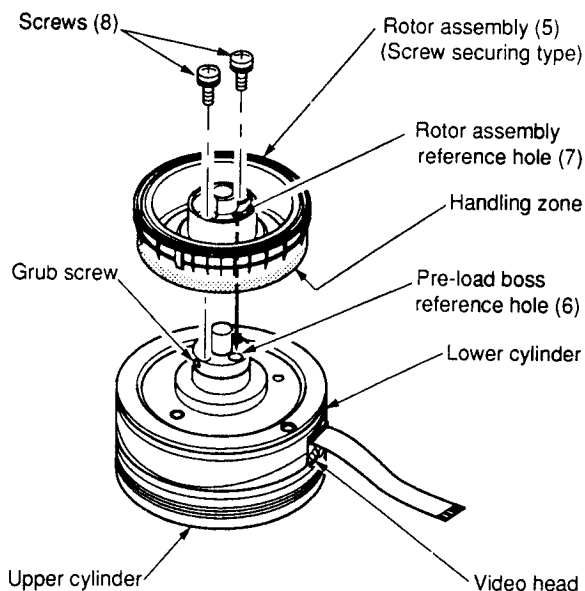


Fig. 6-10-8

#### 2) Press-fit securing type (Fig. 6-10-9)

- Align the pre-load boss reference hole (6) and the rotor assembly reference hole (7), and then press the rotor assembly (5) with a finger until it touches the pre-load boss. In this case, the press-fitting can be easily made by putting a coin between the rotor assembly (5) and the finger.

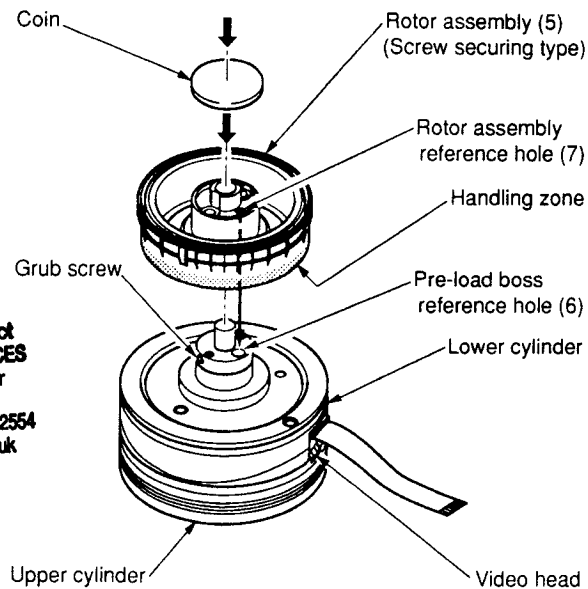


Fig. 6-10-9

- Confirm deviation of phase after the mounting. If deviated, correct the phase by rotating the rotor assembly (5).

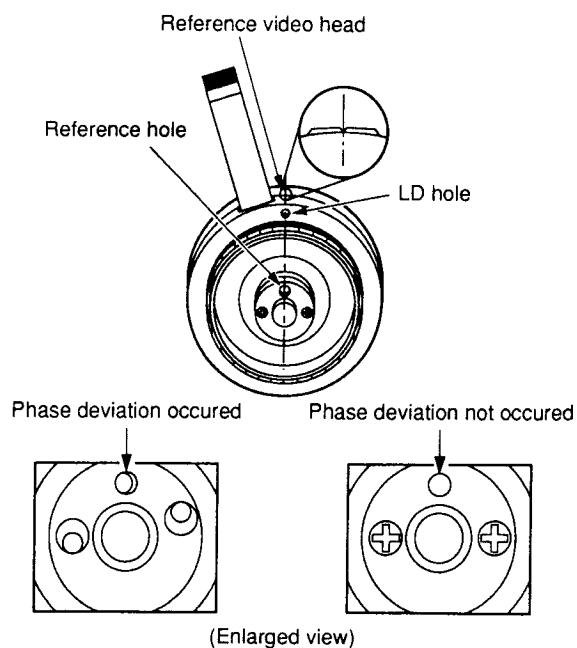


Fig. 6-10-10



4. Confirm outside of the cylinder is free from scratches, dirt, and the cylinder rotates correctly without any abnormality.
5. Mount the cylinder assembly on the mechanical deck.
6. Perform the tape transport adjustment.

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### 1-6-12. Cylinder Holding Plate Replacement

1. Remove screws (1) and (2) securing the cylinder holding plate (3) and a screw (5) securing the cylinder holding plate (4).
2. Remove the cylinder holding plate (3) and (4) sliding in the direction shown by the arrow (B) and (A).
3. Eliminate the cylinder lock key (wedge shaped parts).
4. After replacing the cylinder holding plates (3) and (4), mount new parts in the reverse order of removal.

#### Note:

- When remounting, fix the cylinder while pushing in the direction shown by the arrow (A) and the cylinder holding plate (3) in the direction shown by the arrow (B). Then tighten three screws while pushing the cylinder holding plate (4) toward the stopper on the outsert of the mechanical deck.
- Take care of the position inserting the FFC. (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)
- Tightening order of the screws is (1) → (2) → (5).
- Tightening torque of the screws (1), (2), (5) is 294 – 392 mN•m (3 – 4 kg•cm).
- Take care of the position inserting the FFC when mounting the cylinder holding plate (3). (Refer to item "1-6-9. Cylinder Assembly Inspection and Replacement".)

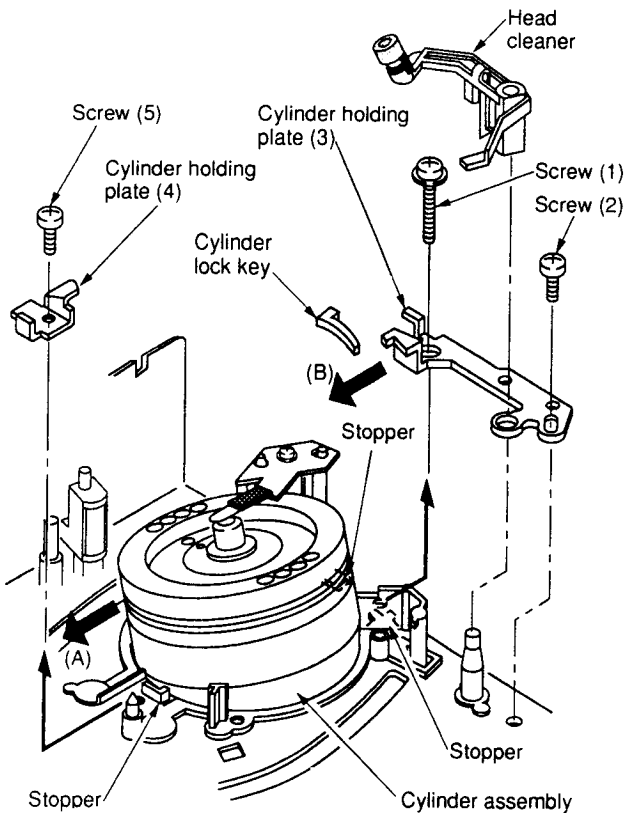


Fig. 6-12-1

### 1-6-13. Head Cleaner Replacement

#### <Roller sub assembly replacement>

1. Remove the roller sub assembly (2) pulling upward from the hook (A) on the cleaner lever (1).
2. After replacing the roller sub assembly, mount in the reverse order of removal.

#### <Cleaner lever replacement>

1. Undo the hook (B) of the cleaner lever (1) from the mechanical deck, and pull out the cleaner lever (1) upward.
2. Replace the cleaner lever (1) on the roller sub assembly (2), and mount the cleaner lever (1) in the reverse order of removal.

#### Note:

- Take care the roller sub assembly (2) is not stained with grease or oil.

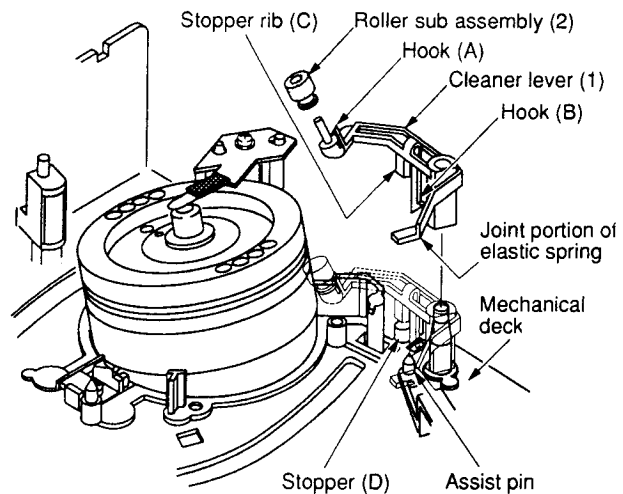


Fig. 6-13-1

#### Note:

- When remounting the head cleaner, position the stopper rib (C) in front of the stopper (D).

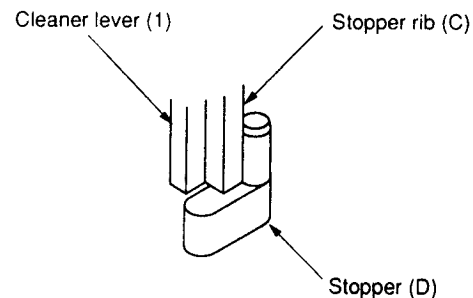
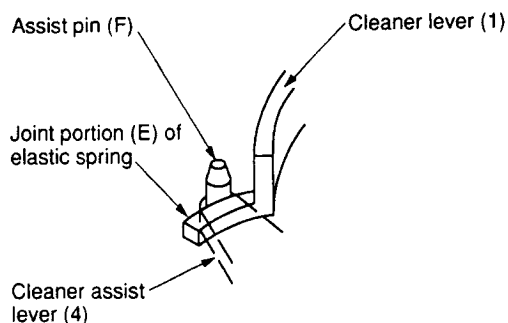


Fig. 6-13-2

**Note:**

- Confirm that the joint portion (E) of the elastic spring positions in front of the assist pin (F) on the cleaner assist lever (4).

**Fig. 6-13-3****1-6-14. No. 8, No. 3 Guide Sleeves Replacement**

1. When replacing the No. 8 guide sleeve (1), first remove the guide cap (2) on the loading bracket assembly.
2. Pull out the guide sleeve (1) from the guide post (3).

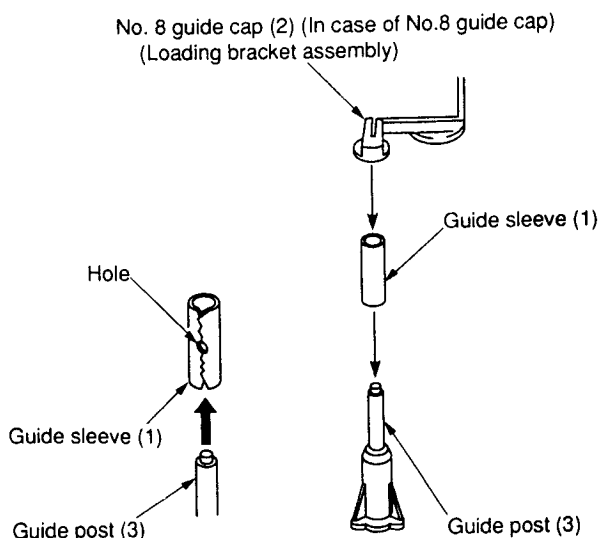
**Note:**

- Take care not to break the No. 8, No. 3 guide posts on the mechanical deck if twisting the guide sleeve forcefully.

3. Insert a new guide sleeve (1) to the guide post.

**Note:**

- When inserting the guide sleeve (1), take care so that its hole faces the opposite side to the tape transport surface.
4. For No. 8 guide sleeve, insert the No. 8 guide cap (2) onto it.

**Fig. 6-14-1****1-6-15. ACE Head Assembly Replacement**

1. Remove the FFC (1) from the connector.
2. Remove two screws (2) and remove the ACE main base (3) and ACE head assembly (4).
3. Remove three adjusting screws (5), (6), and (7) and then remove the ACE head assembly (4).

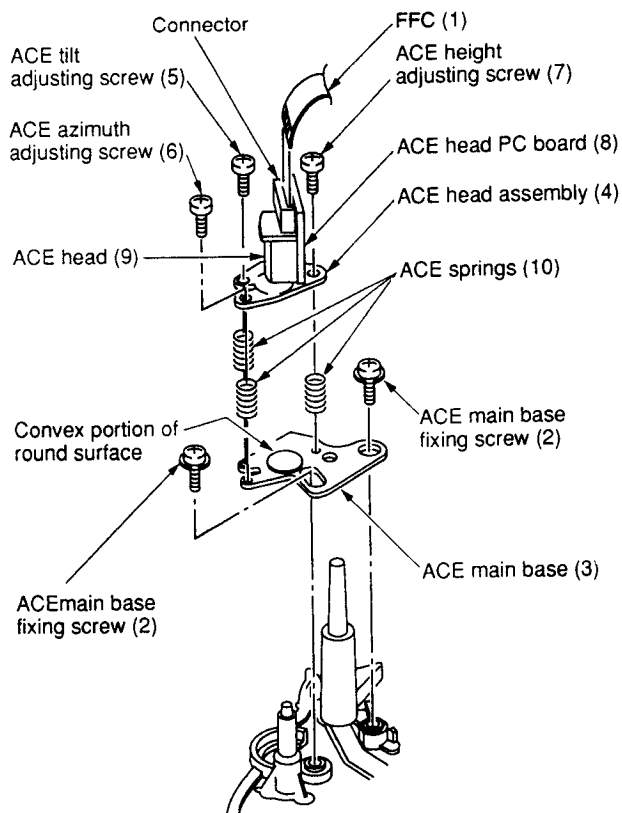
**Note:**

- When replacing ACE head (9) only without replacing its PC board, unsolder the ACE head (9) on the ACE head PC board (8) and then remove the ACE head (9) and the ACE head PC board (8).

4. Mount the ACE head assembly (4) in the reverse order of removal.

**Note:**

- When reassembling the ACE head assembly (4), First set the ACE springs (10) between the ACE head assembly (4) and the ACE main base (3), and secure the adjusting screws (5), (6), and (7).

**Fig. 6-15-1**

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- When securing three adjusting screws, mount the ACE main base (3) and ACE head assembly (4) so that the clearance between them becomes parallel with the specified preset value ( $4.3 \pm 0.1$  mm).
5. After replacing, perform the tape transport adjustment.

**Note:**

- When replacing the ACE head assembly (4), always use an ACE head (9) having the same part number. Do not use any other ACE head assembly.

### 1-6-16. FE Head Replacement

1. Open the FE head holding hook (1) on the mechanical deck slightly in both left and right directions and remove the FE head (2) by moving in the direction shown by the arrows.
2. Replace the FE head (2) and mount the parts in the reverse order of removal.
3. Perform adjustment from the linearity adjustment item in the tape transport system adjustment.

**Note:**

- When mounting the FE head, Push the head backward completely.
- Though FE head (2) can be removed upward by opening the FE head holding hook (1) to both left and right directions, perform the standard replacement procedure described above since this may cause deformation of the hook.

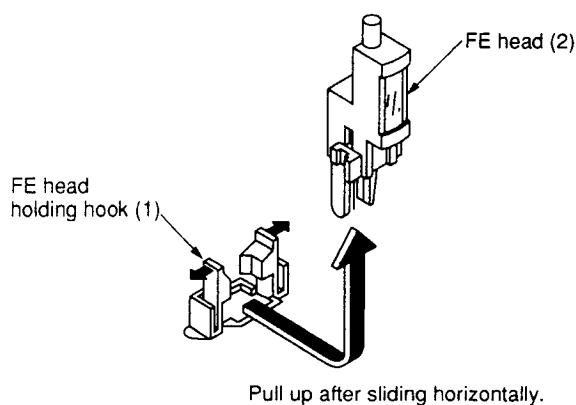


Fig. 6-16-1

### 1-6-17. S, T Slider Replacement

1. Remove the tension lever assembly. (Refer to item "1-6-22. Tension Lever Assembly Replacement".)
2. Remove the loading slider. (Refer to item "1-6-24. Loading Slider Replacement".)
3. Remove the S loading assembly. (Refer to item "1-6-23. S Loading Assembly Replacement".)
4. Remove the T loading assembly. (Refer to item "1-6-23. T Loading Assembly Replacement".)
5. Remove the S slider (1) and T slider (2) lifting up to the cutout of the groove on the mechanical deck (3).
6. Remove the S and T guide rollers and mount a new slider.
7. Mount the parts in the reverse order of removal.

**Note:**

Perform the phase alignment between the loading slider (4) and S, T loading assemblies (5), (6) referring each replacement procedure.

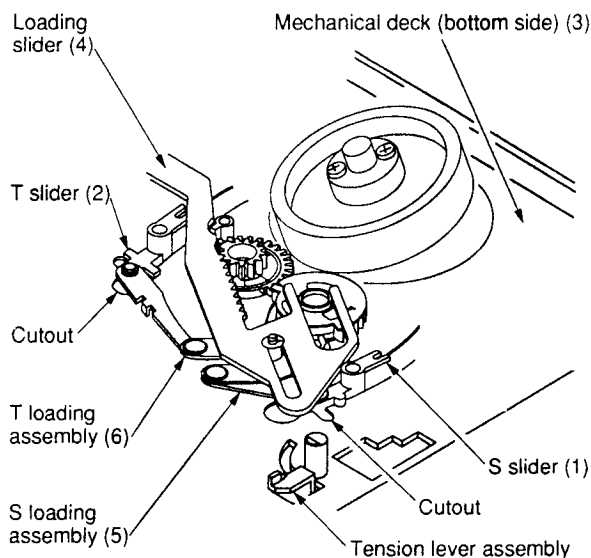


Fig. 6-17-1

8. After completion of the replacement, perform the adjustment from item 1 in the tape transport system adjustment.

### 1-6-18. S, T Guide Rollers Replacement

The same replacement procedures will be applied for the S, T guide rollers.

1. Turn the guide roller (1) counterclockwise and remove the guide roller (1) from the slider assembly (2).
2. Mount a new guide roller on the slider assembly (2) turning clockwise.
3. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

#### Note:

- O ring is not applied to the T guide roller.
- For the T guide roller, marking is located on the upper flange. So take care not to mis-mount with the S guide roller.

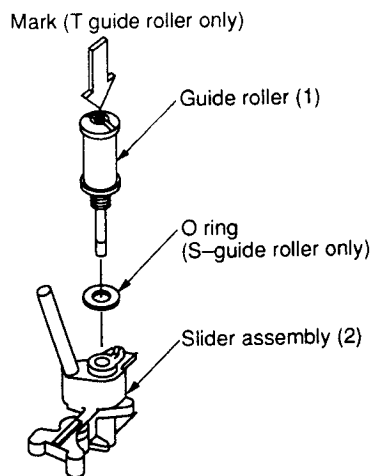


Fig. 6-18-1

### 1-6-19. S, T Impedance Roller Replacement

1. Remove two screws (1) and (2), and then remove two brackets (3), (4).
2. Replace two impedance rollers (5), (6).
3. Mount the parts in the reverse order of removal.
4. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

#### Note:

- S, T impedance rollers (5), (6) is not always applied to all models.

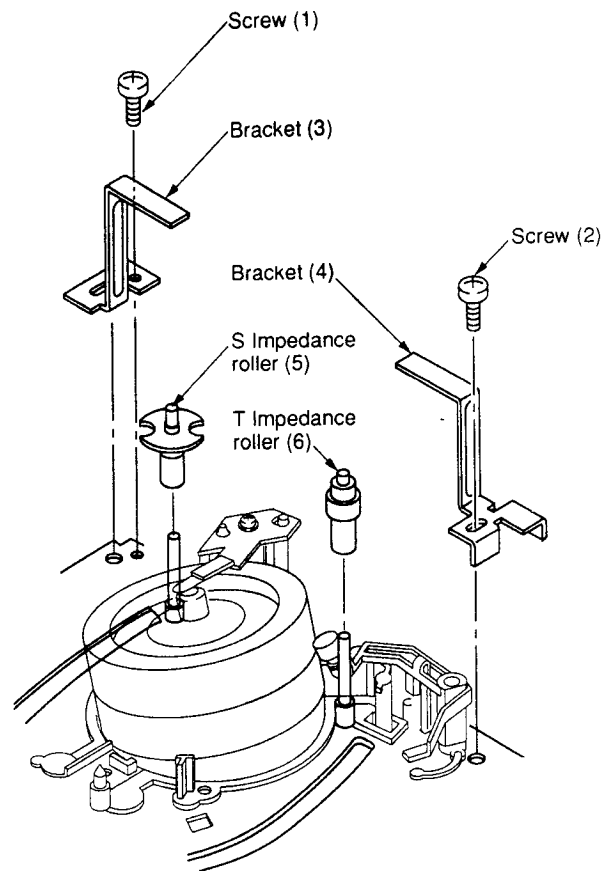


Fig. 6-19-1

### 1-6-20. Pinch Roller Assembly Replacement

1. Remove the loading drive assembly (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the pinch assembly (1) lifting vertically from the pinch post (2).
3. Remove the pinch spring (5) from the hooks on the pinch drive assembly (3) and the pinch lever assembly (4).
4. Turn the projection (A) on the pinch drive assembly (3) counterclockwise till it goes to the cutout on the pinch lever assembly (4).
5. After replacing, mount the parts in the reverse order of removal.
6. After completion of the replacement, perform the tape transport adjustment.

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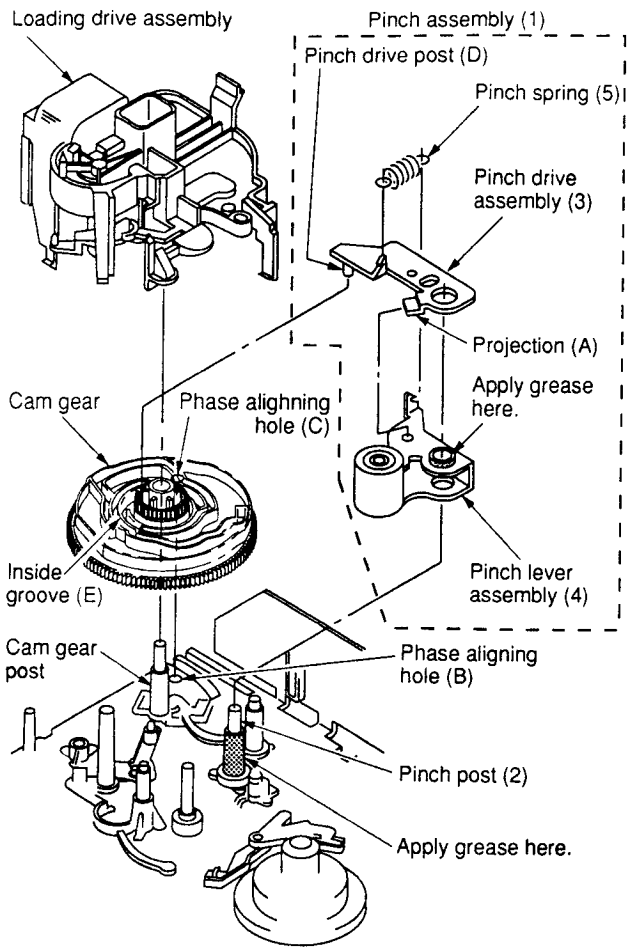


Fig. 6-20-1

**Note:**

- For the removal and assembling of the loading drive assembly, refer to item 1-6-28.
- When inserting the pinch assembly (1) into the pinch post (2), insert it so that the pinch drive post (D) enters the groove (E) inside the cam gear.
- Take care not to touch the surface of the pinch roller and the grease is not stained on it.
- Be sure to apply grease to the surface of the bar-ring on the pinch lever assembly (4) and the pinch post (2) on the mechanical deck.

**1-6-21. No. 9 Guide Lever Assembly Replacement**

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)

3. Remove the pinch assembly. (Refer to item "1-6-20. Pinch Roller Assembly Replacement".)
4. Remove the ACE head assembly. (Refer to item "1-6-15. ACE Head Assembly Replacement".)
5. Remove the cam gear (2) from the cam gear post (1).
6. Remove the T soft brake spring (3).
7. Remove the No. 9 guide lever assembly (4) lifting the No. 9 guide lever assembly upward from the No. 9 guide post (5).
8. After replacing, mount the parts in the reverse order of removal.
9. After completion of the replacement, perform the tape transport adjustment.

**Note:**

- When mounting the No. 9 guide lever assembly (4), confirm that (A) side of the No. 9 guide lever assembly (4) touches the capstan motor housing portion.
- After inserting the No. 9 guide lever assembly (4) into the No. 9 guide post (5), confirm that the lower projection of the No. 9 guide lever assembly (4) touches to the upper surface of the mechanical deck.
- Take care that the grease is not stained on the No. 9 guide post of the No. 9 guide lever assembly (4).
- Be sure to apply grease to the No. 9 guide post (5).

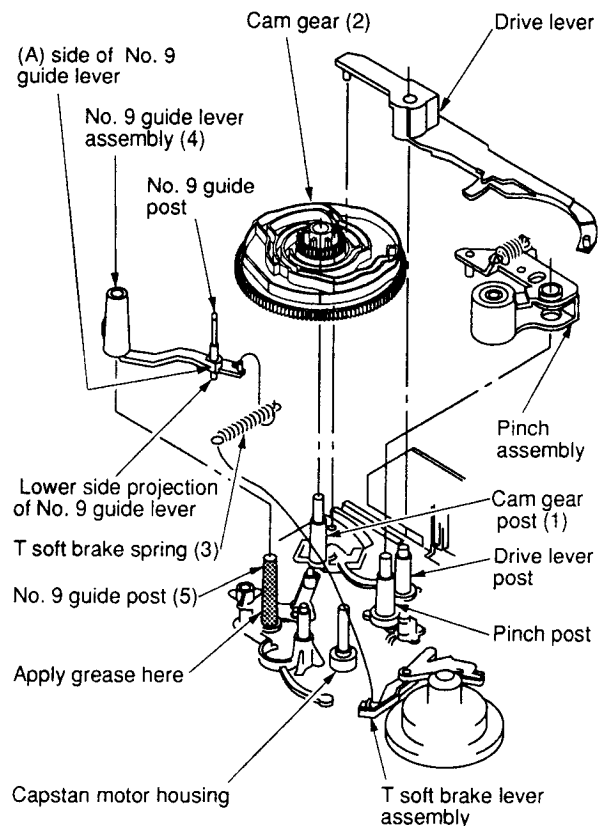


Fig. 6-21-1

## 1-6-22. Tension Lever Assembly, Band Holder and Band Brake Replacement

1. Remove the tension spring (1).

### Note:

- Take care not to extend or deform the tension spring.
2. After setting the band brake adjuster to the band holder assembling position, undo the claw of the snap-fit type and remove the band holder from the band brake adjuster by lifting it upward.

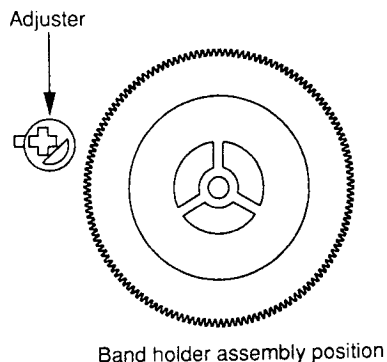


Fig. 6-22-1 Detail of band holder assembling

3. Undo the claw of the outsert on the mechanical deck catching the shaft of the tension lever assembly (3) and remove the tension lever assembly lifting it upward.
4. Remove the band brake (5) from the reel table while pulling the S soft brake lever (4) in the direction shown by the arrow.
5. Remove the band brake (5) from the hook on the tension lever assembly (3).

### Note:

- Take care not to contaminate, bend or damage the felt surface on the band brake (5).
6. After replacing the tension lever assembly (3), clean the shaft on the tension lever and apply a few amount of oil.
  7. Mount the parts in the reverse order of the removal.
  8. After mounting, check the tension post position and perform the adjustment and back tension check.
  9. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

### Note:

- The band holder (2) can be replaced in the procedures described above steps 1 to 3.
- The band brake (5) can be replaced in the procedures described above steps 1 to 5.
- When replacing the band holder (2) and band brake (5), the linearity adjustment is not necessary.

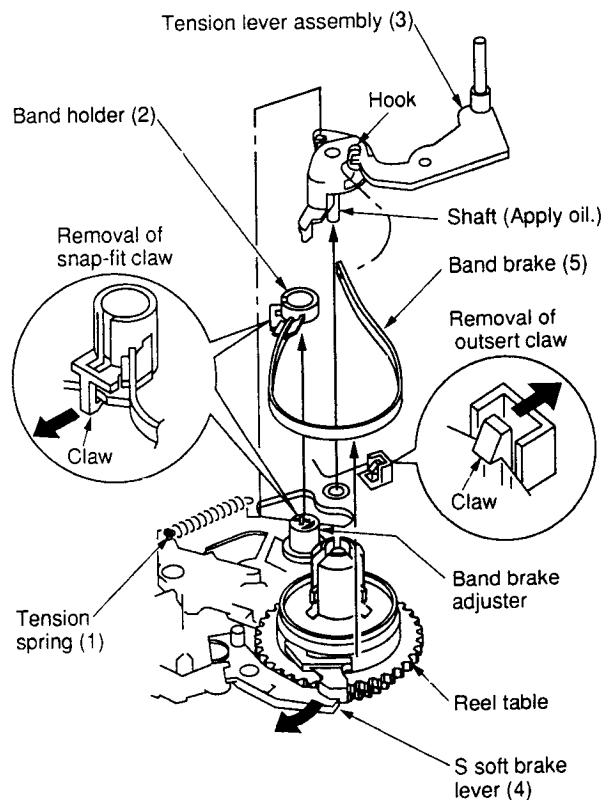


Fig. 6-22-2

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### 1-6-23. S,T Loading Assembly Replacement

1. Remove the mechanical deck assembly from the main PC board.
2. Set the mechanical position to the F/L out position (front side). Turn over the mechanical deck.
3. Remove the loading slider assembly. (Refer to item "1-6-24. Loading Slider Assembly Replacement".)

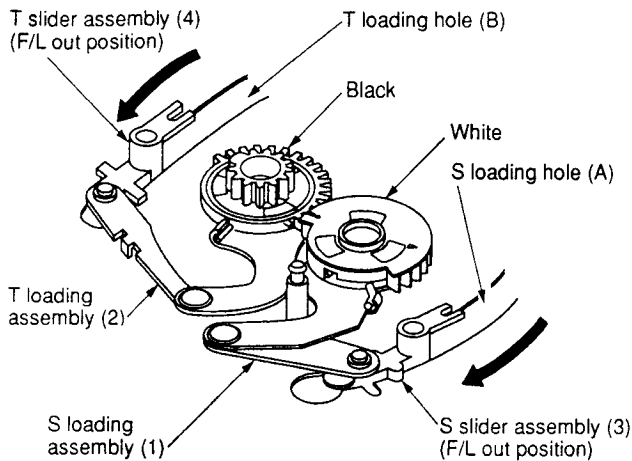


Fig. 6-23-1

4. Remove the S, T loading assemblies (1), (2).
5. Insert the S, T slider assemblies (3), (4) along the cutout of the S, T loading holes (A) and (B) on the mechanical deck and set the S, T slider assemblies (3), (4) to the loading position (rear side).
6. Insert the T loading assembly (2) to the post (C) on the T slider assembly (4) and the post (D) on the mechanical deck. And insert the S loading assembly (1) to the post (E) on the S slider assembly (3) and the post (F) on the mechanical deck.

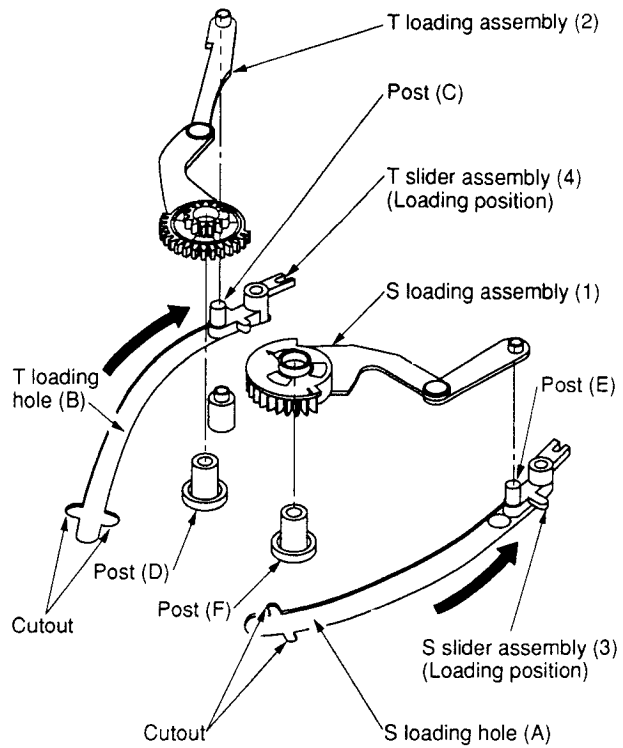


Fig. 6-23-2

#### Note:

- Align the phases of the ▲ marks on the S, T loading gear (1), (2).
7. Set the S, T slider assemblies (3), (4) to the F/L out position.

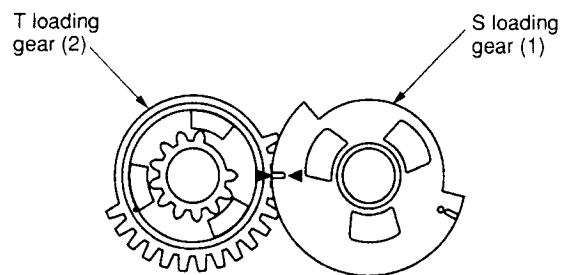


Fig. 6-23-3



### 1-6-24. Loading Slider Assembly Replacement

1. Remove the mechanical deck from the main PC board.
2. Set the mechanical position to the F/L out position.
3. Turn over the mechanical deck.
4. Remove the stop ring (1).
5. Remove the loading slider assembly (2) while lifting its tip upward using the mold portion on the loading slider assembly (2) as a fulcrum.
6. Mount the parts in the reverse order of removal.

#### Note:

- When mounting the loading slider assembly (2), insert the tip of the loading slider assembly (2) slightly to the mold portion, then mount it so that the claw on the outsert is in the position of the cutout portion of the loading slider assembly.
- Confirm that the position mark on the loading slider assembly (2) and the mark on the T loading gear match each other in position.

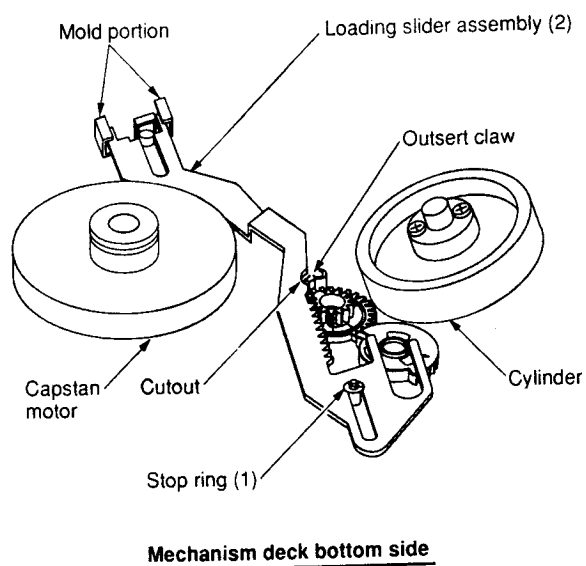


Fig. 6-24-1 View from Mechanical deck bottom side

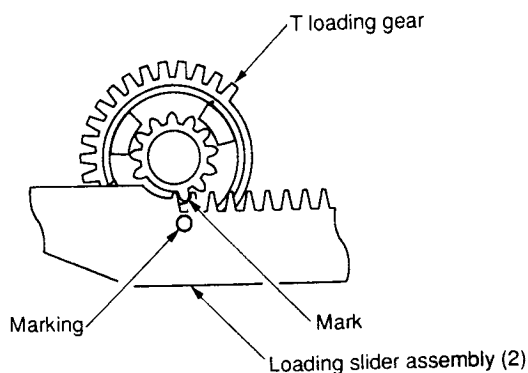


Fig. 6-24-2

### 1-6-25. Hook Lever Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the tension spring (1).
5. Turn the hook lever assembly (2) counterclockwise slightly, and remove the claw on the hook lever assembly (2) then replace.
6. After replacing the hook lever assembly (2), insert the (A) portion of the hook lever under the S reel table assembly. When the portions (B), (C), (D) are in line, push the claw into the mechanical deck.

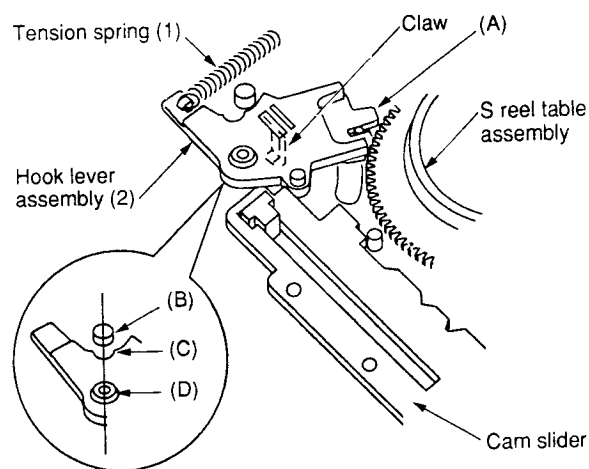


Fig. 6-25-1

7. Turn the hook lever assembly (2) clockwise till it stops, and mount the tension spring (1). After replacing the hook lever assembly (2), slide the cam slider in the direction shown by the arrow, and then position the boss (E) under the cam slider.

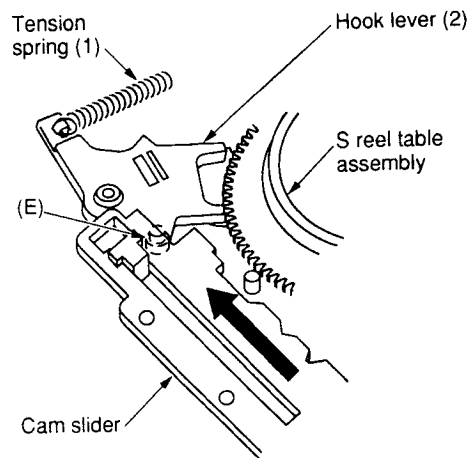


Fig. 6-25-2

### 1-6-26. Hook Replacement

1. Remove the hook lever assembly. (Refer to item "1-6-25. Hook Lever Assembly Replacement".)
2. Turn over the hook lever assembly (1) and remove the hook lever assembly (1) opening the portion (A) of the hook (2) slightly and lifting the hook (2) upward.
3. When mounting a new hook, push the hook (2) in the portion (B) from above.

#### Note:

- Take care not to confuse the mounting direction of the hook (2).

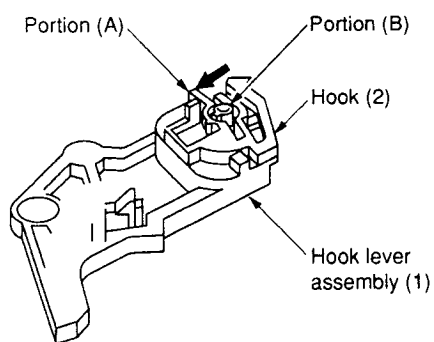


Fig. 6-26-1

### 1-6-27. Tension Drive Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
2. Turn over the mechanical deck and remove the tension drive lever (1) from the projection (A) moving counterclockwise slightly.
3. After replacing the tension drive lever (1), mount in the reverse order of removal.

#### Note:

- For the cam slider mounting, refer to the notes in item 1-6-40.

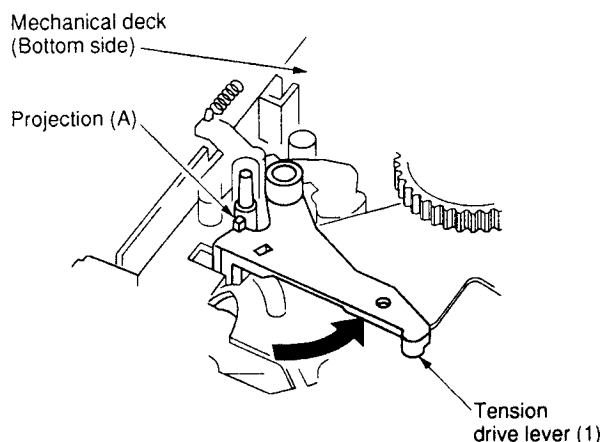


Fig. 6-27-1

### 1-6-28. Loading Drive Assembly Replacement

1. Remove the F/L ground plate and the head cleaner assembly. (Refer to item "1-6-13. Head Cleaner Assembly Replacement".)
2. Remove two flat cables (1) from the connectors.
3. Pull out the portion (A) (No. 8 guide cap) from the motor bracket (2).
4. Remove four claws (a), (b), (c), (d) securing the motor bracket in the order of (a) → (b) → (c) → (d).

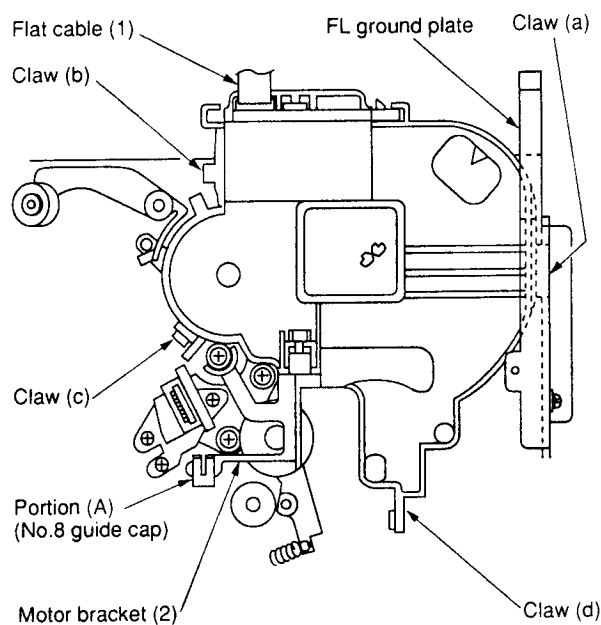


Fig. 6-28-1

#### Note:

- Remove the claw (a) inserting a driver.
- Remove the claws (b) and (c) pushing inside previously and opening the claws slightly.

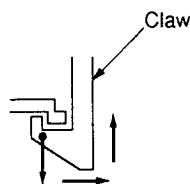
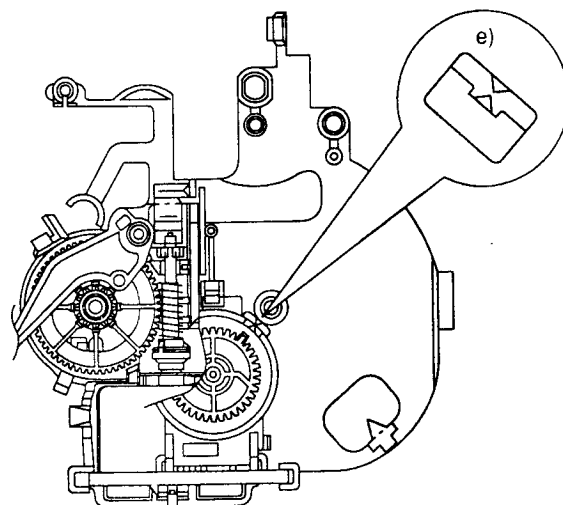
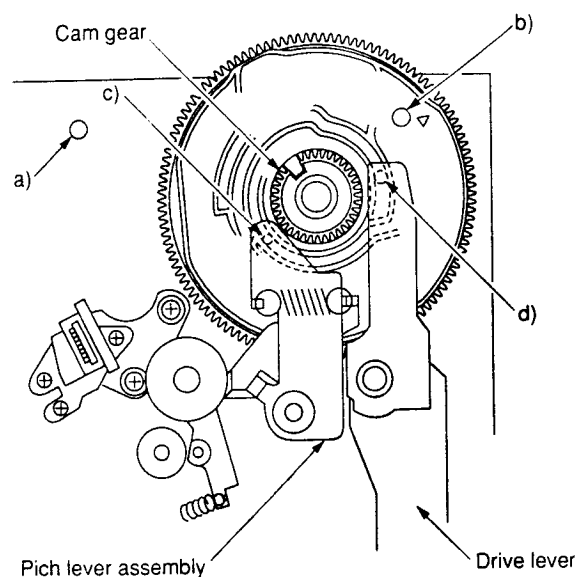


Fig. 6-28-2

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**<Preparation for Loading drive assembly mounting >**

- a) Confirm that the head cleaner assembly is removed.
  - b) Confirm that the small hole b) on the cam gear aligns with the hole on the mechanical deck.
  - c) Confirm that the clearance between the pinch lever assembly and the cam gear is approx. 0.3 mm.  
(Confirm that the pinch lever assembly is correctly mounted on the groove of the cam gear.)
  - d) Confirm that the clearance between the drive lever and the cam gear is approx. 2 mm. (Confirm that the drive lever is correctly mounted on the groove of the cam gear.)
  - e) Confirm that the  $\Delta$  mark on the rotor of the cam switch aligns with the  $\Delta$  mark on the motor bracket.
5. After completion above steps a) to e), mount the loading drive assembly. Push four claws to the motor bracket in the order of (d)  $\rightarrow$  (c)  $\rightarrow$  (b)  $\rightarrow$  (a) and push the portion (A) (No. 8 guide cap) into the motor bracket.
  6. Confirm that the  $\Delta$  mark on the rotor of the cam switch aligns with that on the bracket when the hole b) on the cam gear aligns with the hole on the mechanical deck. If the alignment of the  $\Delta$  marks cannot be confirmed, remove loading drive assembly once again and reinstall after confirming the above steps a) to e).
  7. Mount two flat cables.
  8. Mount the F/L ground plate and the head cleaner assembly.



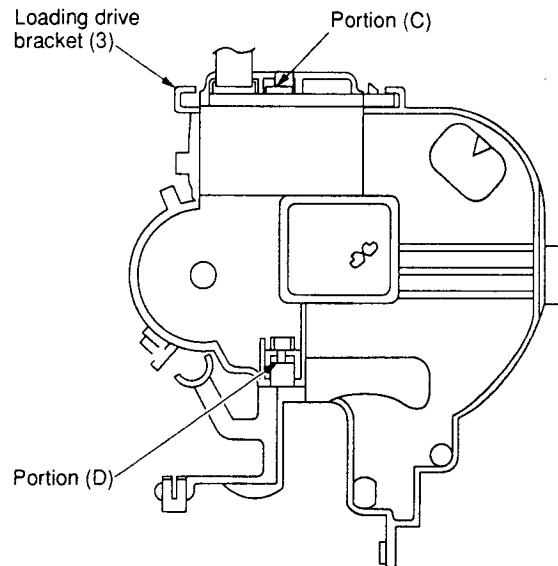
**Loading drive assembly bottom side**

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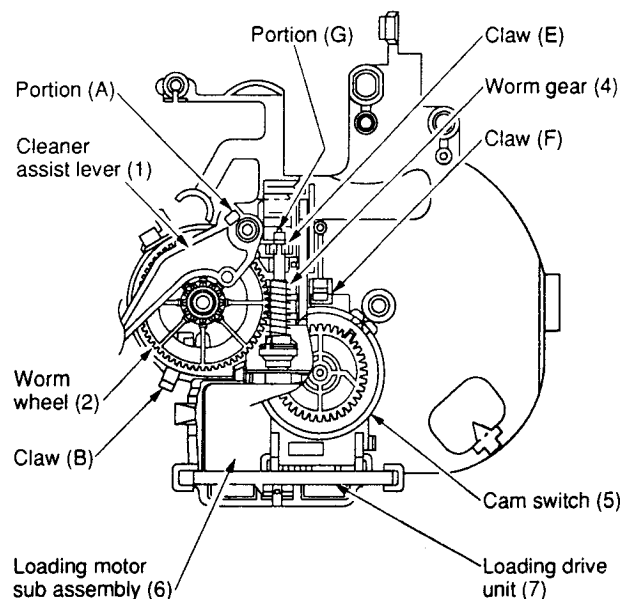
**Fig. 6-28-3**

### 1-6-29. Loading Motor Sub Assembly, Cam Switch and Loading Drive Unit Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the cleaner assist lever (1) from the claw (A).
3. After removing the cleaner assist lever (1), the worm wheel can be also removed upward.
4. Insert a slot-type screwdriver into the portion (C) of the loading drive bracket (3) and push the loading motor 2 – 3 mm lower. And push the tip of worm gear from the portion (D) of the loading bracket (3), then remove the worm gear (4) from the claw (E).
5. Remove the cam switch (5) from the claw (F) on the loading drive bracket (3) and pull out the loading drive unit (7) and the worm gear (4) simultaneously.
6. Replace the loading drive unit (7). When mounting the PC boards of the cam switch (5) and the loading drive unit (7), take care that no clearance is allowed.
7. Insert the loading drive unit (7) and the worm gear (4) into the loading drive bracket (3).
8. Push the tip (G) of the worm gear (4) into the claw (E) on the loading motor bracket.
9. Push the cam switch (5) into the claw (F) on the loading motor bracket.
10. Mount the parts in the reverse order of removal.



Loading drive assembly (Top Side)



Loading drive assembly (Bottom side)

**Fig. 6-29-1**

### 1-6-30. Cam Gear Replacement

1. Remove the loading drive assembly. (Refer to item "1-6-28. Loading Drive Assembly Replacement".)
2. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
3. Remove the drive lever. (Refer to item "1-6-39. Drive Lever Replacement".)
4. Remove the pinch roller assembly. (Refer to item "1-6-20. Pinch Assembly Replacement".)
5. Remove the cam gear.
6. Apply grease on a new cam gear on the shaded portion as shown in Fig. 6-30-1 and the shaft of the main base.

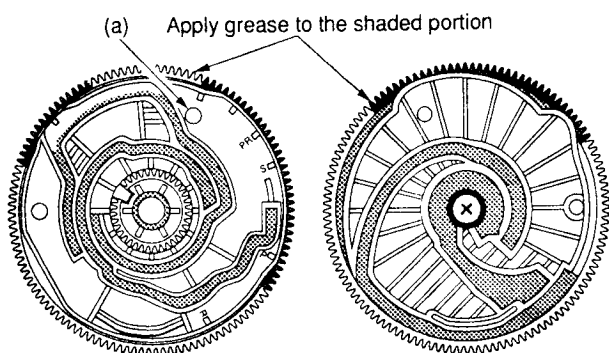


Fig. 6-30-1

7. Make the S, T slider to the slot out condition.
8. Push the cam lever (1) and the pin (2) (loading slider) in the direction shown by the arrows (A) and (B).
9. Mount the cam gear at the angle which the small hole (a) on the cam gear aligns with the hole on the mechanical deck. (Refer to Fig. 6-30-1.)

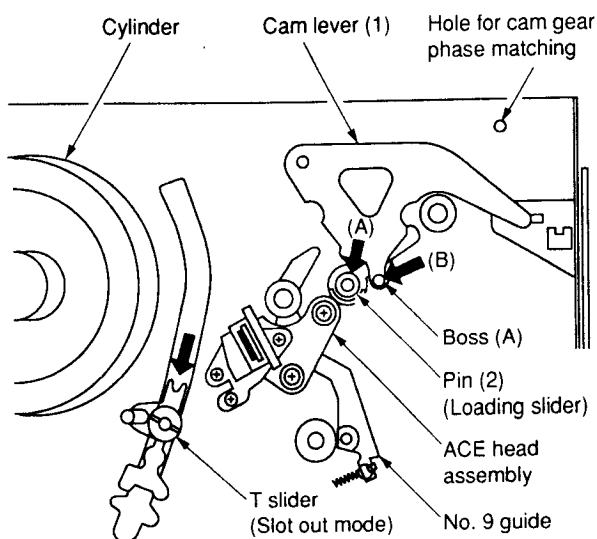


Fig. 6-30-2

10. Mount the parts in the reverse order of removal.

### 1-6-31. S Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the S soft brake and S main brake assembly. (Refer to item "1-6-37. S Soft Brake Replacement and 1-6-36. S Main Brake Assembly Replacement".)
5. Remove the tension lever assembly. (Refer to item "1-6-22. Tension Lever Assembly Replacement".)
6. Remove the S reel table assembly (1) pulling it out upward.
7. Remove the washer 2 (2).
8. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
9. After replacing, mount the parts in the reverse order of removal.
10. Confirm the reel torque using a torque cassette.

#### Note:

- The washer 2 (2) can use repeatedly.

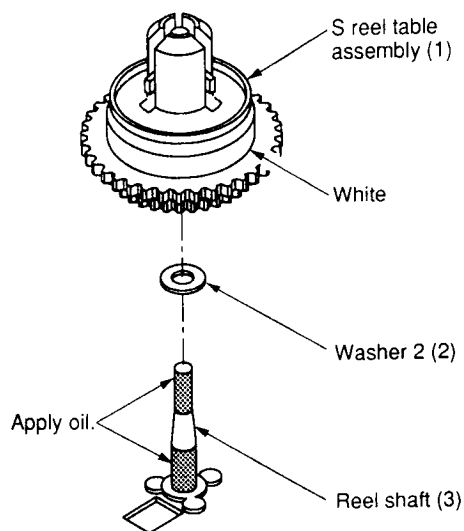


Fig. 6-31-1

### 1-6-32. T Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the T soft brake and T main brake assembly (Refer to item "1-6-40. Cam Slider Replacement".)
4. Remove the T reel table assembly (1) pulling it out upward.
5. Remove the washer 2 (2).
6. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
7. After replacing, mount the parts in the reverse order of removal.
8. Confirm the reel torque using a torque cassette.

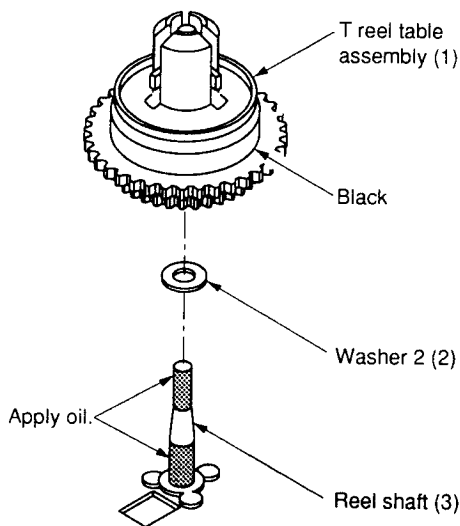


Fig. 6-32-1

#### Note:

- Washer 2 (2) can use repeatedly.

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### 1-6-33. Idle Arm Assembly Replacement (Center Gear Pulley, Idle Kick Lever, Idle up/down Lever)

1. Remove the mechanical deck from the main PC board.
2. Remove the stop ring (1) turning over the mechanical deck.
3. Remove the center gear pulley (2) lifting it upward.
4. Remove the claw (A) on the idle kick lever (3) moving and pulling it upward.
5. Remove the slit washer (4).
6. Remove the idle up/down lever (5) and the idle arm (6) simultaneously from two claws (B) on the mechanical deck.
7. After cleaning the center gear post (7) using a cleaning kit, apply a few drops of oil to the shaded portion on the center gear post.
8. Mount the parts in the reverse order of removal.

#### Note:

- Stop ring (1) is impossible to use again.
- When mounting the parts, take care of the notice shown in Fig. 6-33-2.

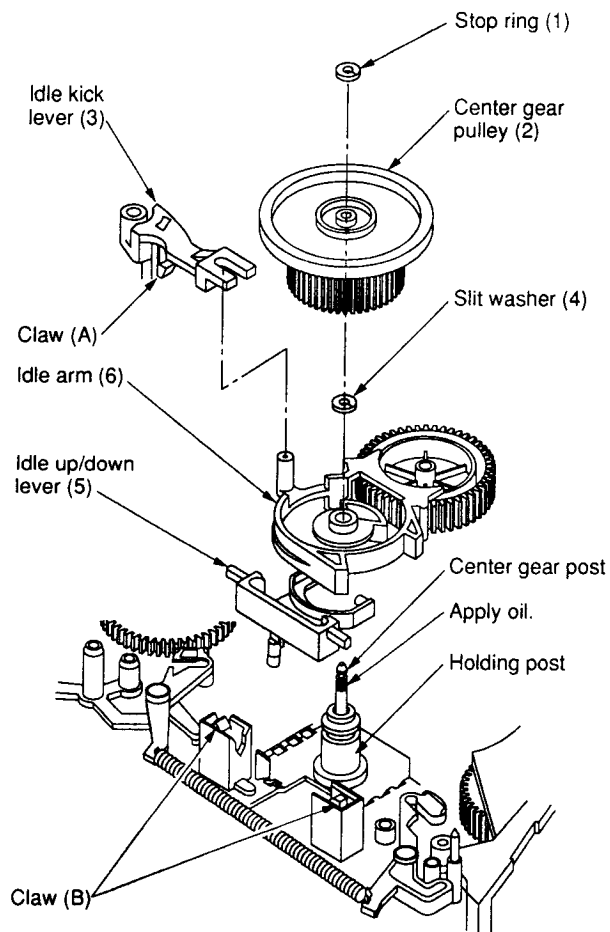


Fig. 6-33-1