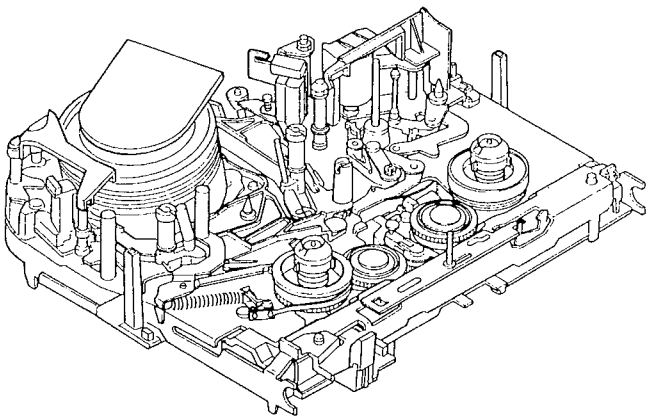
HITACHI

SERVICE MANUAL

TK | No. 6704E

PCF-9 MECHANISM

Disassembly & Adjustment



VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CAMERA/RECORDER

February 1997 Image & Information Media Systems Division, Tokai

ENGLISH

CONTENTS

CHAPTER 1 DISASSEMBLY

CHAPTER 2 MECHANICAL ADJUSTMENT

CHAPTER 3 MAINTENANCE/INSPECTION PROCEDURE

CHAPTER 4 EXPLODED VIEWS

CHAPTER 1 DISASSEMBLY

1. REMOVAL PROCEDURE

Before removing specific parts, see the table below to check the removal procedure.
Remove the parts in the left column before removing the part in the right column.
Remove the parts from the the top to the bottom of the left column in order.
The parts not shown in the right column can be removed independently.

Example: Parts to remove in advance before removing the tension arm in item 3-9.

		3-9 Tension Arm
3-1	Cassette Holder	①
3-1	Supply Sensor Circuit Board	②

ITEM No. / REMOVE PARTS		3-8 Pressure Roller Assembly	3-9 Tension Arm	3-9 Tension Band	3-10 Supply Reel Disk	3-11 Take-up Reel Disk	3-12 Take-up Sub Brake	3-15 A/C Head Base
ITEM No	ORDER FOR REMOVING PARTS							
3-1	Cassette Holder	①	①	①	①	①	①	
3-1	Supply Sensor Circuit Board	②	②	②	②	②	②	
3-3	A/C Head							①
3-9	Tension Arm				③			
3-9	Tension Band				④			

ITEM No. / REMOVE PARTS		3-17 Supply Guide Roller Base	3-17 Take-up Guide Roller Base	3-17 Guide Roller Rail	3-17 End LED	3-18 Supply Sub Brake	3-19 Cylinder Base	3-20 Supply Loading Cam Gear	3-20 Take-up Loading Cam gear
ITEM No	ORDER FOR REMOVING PARTS								
3-1	Cassette Holder	①	①	①	①	①	①	①	①
3-1	Supply Sensor Circuit Board	②	②	②	②	②	②	②	②
3-2	Cylinder	③	③	③	③	③	③	③	③
3-3	A/C Head	④	④	④	④	④	④	④	④
3-4	FE Head	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
3-9	Tension Arm	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
3-9	Tension Band	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
3-13	Supply Guide Roller	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
3-14	Take-up Guide Roller	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
3-15	A/C Head Base	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
3-17	Supply Guide Roller Base					⑪	⑪	⑪	⑪
3-17	Take-up Guide Roller Base					⑫	⑫	⑫	⑫
3-17	Guide Roller Rail					⑬	⑬	⑬	⑬
3-17	End LED					⑭	⑭	⑭	⑭
3-19	Cylinder Base							⑮	⑮

ITEM No. / REMOVE PARTS / ITEM No / ORDER FOR REMOVING PARTS	3-21 Take-up Guide Arm	3-22 Pressure Roller Control Arm	3-23 Cassette Holder Lock Slider	3-24 Reel Gear Block	3-24 Mechanism State Switch	3-24 Relay Gear	3-25 Loading Gear	3-26 Tension Pole Drive Arm
3-1 Cassette Holder	①	①	①					
3-1 Supply Sensor Circuit Board	②	②	②					
3-6 Take-up Sensor Circuit Board				①	①	①	①	①
3-8 Pressure Roller Assembly	③	③						
3-24 Reel Gear Block							②	②

ITEM No. / REMOVE PARTS / ITEM No / ORDER FOR REMOVING PARTS	3-27 Driving Gear	3-28 Cassette Holder Lock	3-29 Cam Gear Arm	3-30 Cassette Holder Lock Drive Arm				
3-6 Take-up Sensor Circuit Board	①	①	①	①				
3-7 Capstan Motor			②	②				
3-24 Reel Gear Block	②	②	③	③				
3-25 Loading Gear	③		④	④				
3-26 Tension Pole Drive Arm	④		⑤	⑤				
3-27 Driving Gear			⑥	⑥				
3-29 Cam Gear Arm				⑦				

2. MAIN MECHANICAL COMPONENTS IDENTIFICATION

2-1. Top View

1. Cylinder (Video Head)
2. Guide Roller Rail
3. X-Value Adjust Nut
4. Take-up Guide Roller
5. Audio/Control (A/C) Head
6. Take-up Guide Pole
7. Pressure Roller Assembly
8. Take-up Guide Arm
9. EST (Take-up End Sensor) Circuit Board
10. EL (End LED) Circuit Board
11. Take-up Reel Disk
12. Cassette holder Lock Slider
13. Reel Gear Block
14. Supply Reel Disk
15. Tension Band
16. Tension Arm
17. Supply Guide Roller
18. ESS (Supply End Sensor) Circuit Board
19. Supply Guide Post
20. Supply Guide Pole
21. Full Erase (FE) Head
22. Cylinder Cover

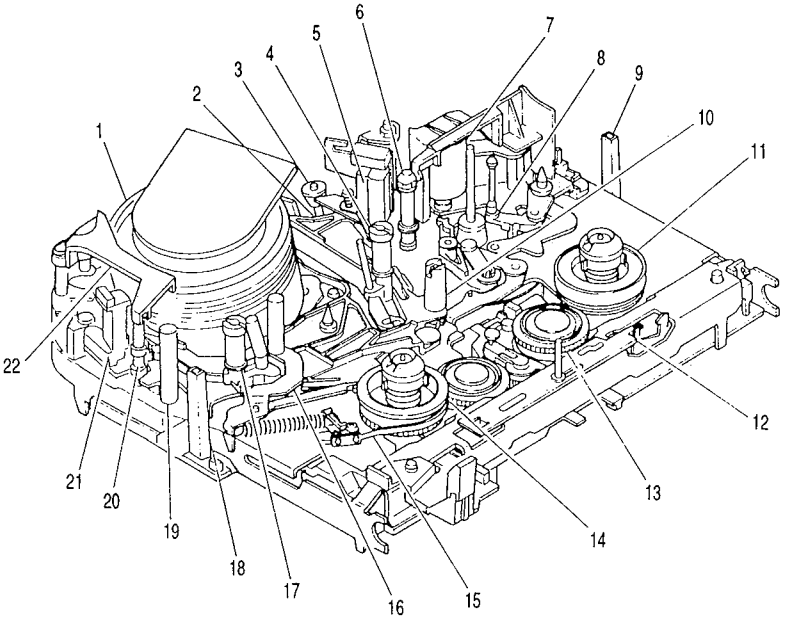


Fig. 2-1

2-2. Bottom View

1. Cylinder (Video Head)
2. Supply Loading Cam Gear
3. Loading Motor
4. Tension Pole Drive Arm
5. Mechanism State Switch
6. TSS (Supply Sensor) Circuit Board
7. Loading Gear
8. Driving Gear
9. ERS (Take-up Sensor) Circuit Board
10. Capstan Motor
11. Take-up Loading Cam Gear

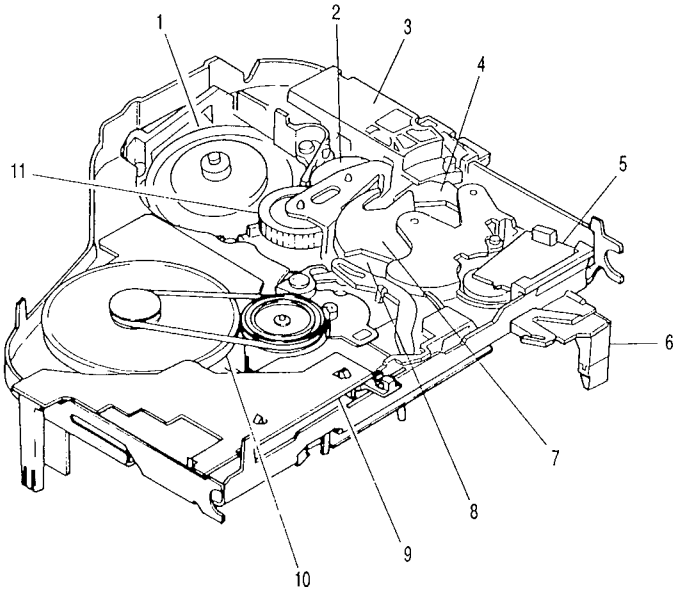


Fig. 2-2

3. MAIN MECHANICAL COMPONENTS REMOVAL

Note: For the item marked *, refer to the Removal Procedure in item 1.

3-1. Cassette Holder and TSS (Supply Sensor) Circuit Board

1) Remove 1 screw (1) holding the TSS circuit board. (See Fig. 3-1)
2) Release 1 tab (2) and lift up the cassette holder. (See Fig. 3-2)
3) Remove the TSS circuit board in the direction of the arrow. (See Fig. 3-1)
4) Remove 2 screws (3) holding the cassette holder and cassette holder spring. (See Fig. 3-3)
5) Remove 1 screw (4) holding the cassette holder and chassis holder. (See Fig. 3-4)
6) Move the front arm of the cassette holder in the direction of arrow (A). (See Figs. 3-3, 3-4)
7) Move the rear arm of the cassette holder in the direction of arrow (B). (See Figs. 3-3, 3-4)

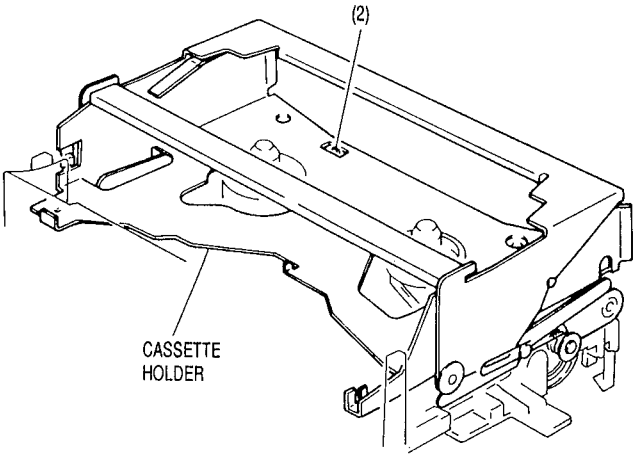


Fig. 3-2

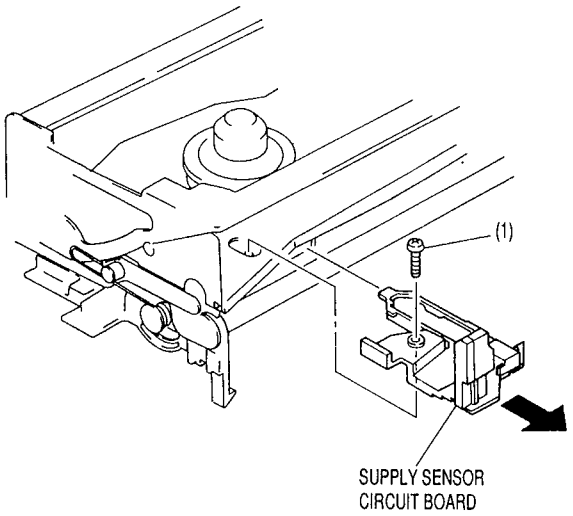


Fig. 3-1

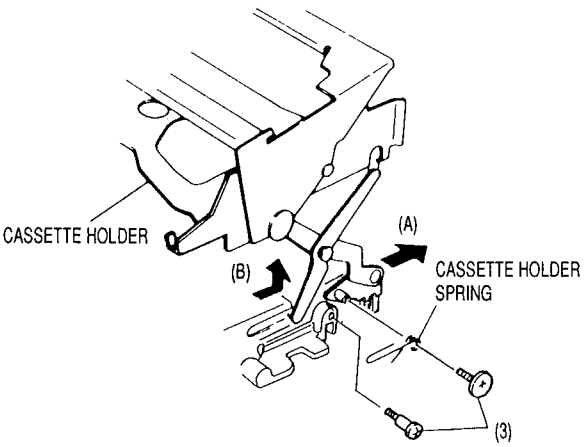


Fig. 3-3

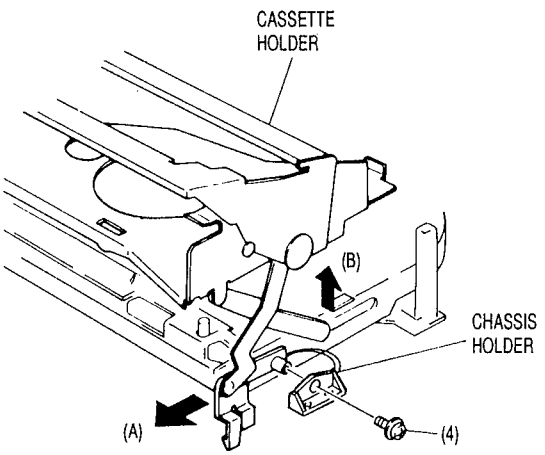


Fig. 3-4

3-2. Cylinder (Video Heads)

1) Remove 1 screw (1) holding the cylinder cover. (See Fig. 3-5)
2) Remove 3 screws (2) holding the cylinder and pull out the cylinder from the chassis. (See Fig. 3-6)

Cautions :

1. Do not touch the video head tips with your fingers or tools.
2. After reinstalling the cylinder, be sure to perform adjustment after replacing the cylinder.

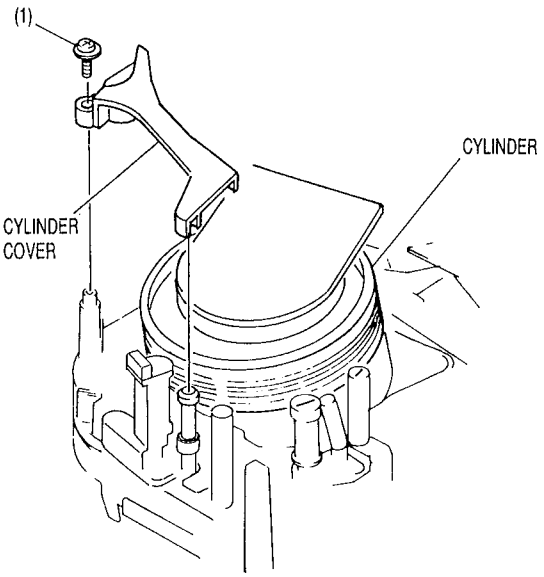


Fig. 3-5

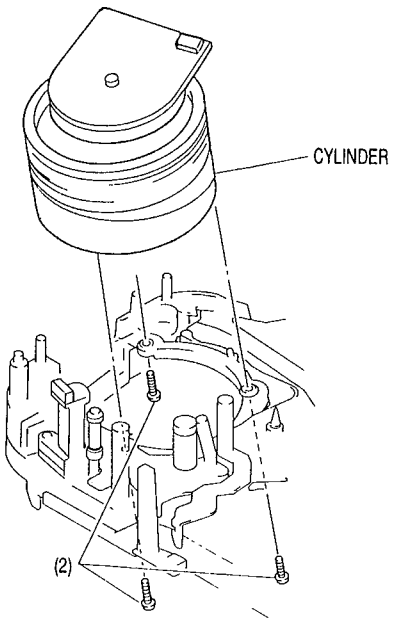


Fig. 3-6

3-3. Audio/Control (A/C) Head

1) Disconnect the connector (1). (See Fig. 3-7)
2) Remove 2 screws (2).

Caution :

1. Adjust as follows after installing the Audio/ Control Head.
   - A/C HEAD ADJUSTMENT

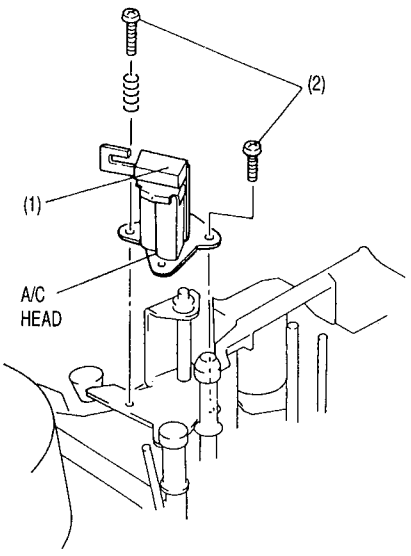


Fig. 3-7

3-4. Full Erase (FE) Head

1) Disconnect the connector (1). (See Fig. 3-8)
2) Remove 1 screws (2).

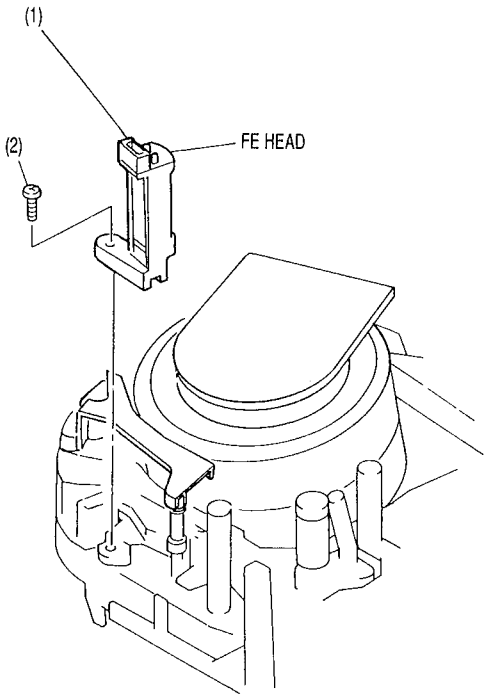


Fig. 3-8

3-5. ESS (Supply End Sensor) Circuit Board and Loading Motor

1) Remove 1 screw (1) holding the ESS circuit board.
2) Release 1 tab (2) of the ESS circuit board.
3) Remove the ESS circuit board.
4) Remove 1 screw (3) holding the motor holder.
5) Release 1 tab (4) of the motor holder.
6) Remove the motor holder.
7) Release 3 tabs (5) holding the loding motor.

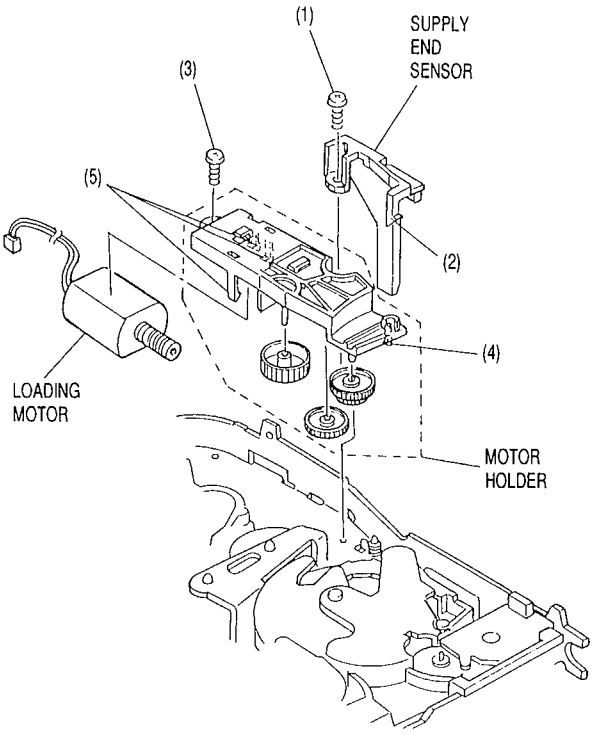


Fig. 3-9

3-6. ERS (Take-up Sensor) Circuit Board (Take-up Reel Sensor/Take-up End Sensor/Cassette Holder Switch)

1) Remove 2 screw (1). (See Fig. 3-10)
2) Release 3 tabs (2) and open the ERS circuit board.

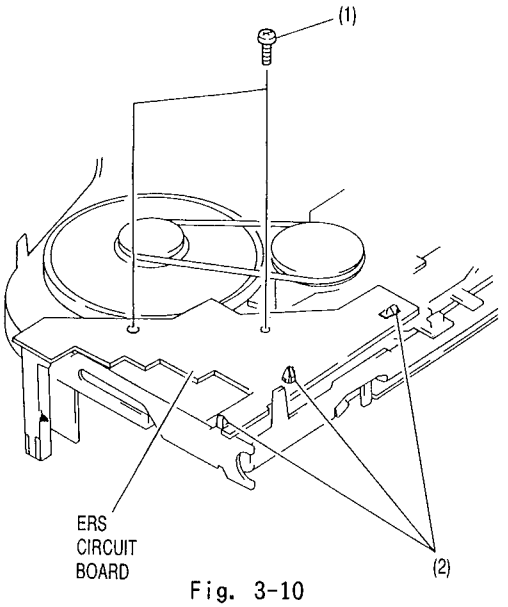


Fig. 3-10

3-7. Capstan Motor

1) Move the take-up guide arm in the direction of the arrow (pressure roller side). (See Fig. 3-11)
2) Remove 3 screws (1).
3) Disconnect the connector (2). (See Fig. 3-12)
4) Remove the capstan belt from the capstan motor.
6) Remove the capstan motor.

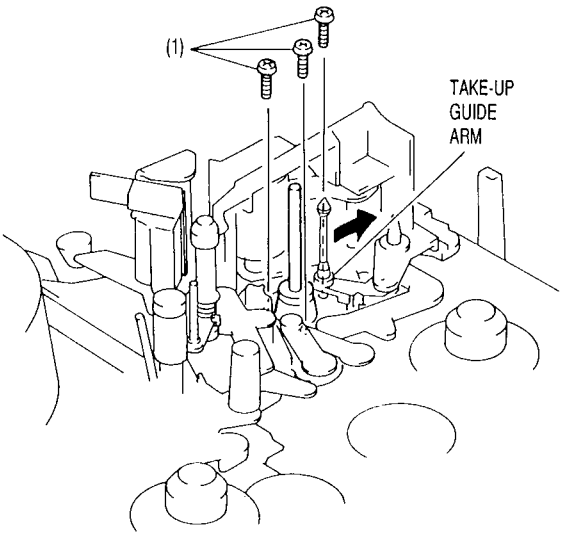


Fig. 3-11

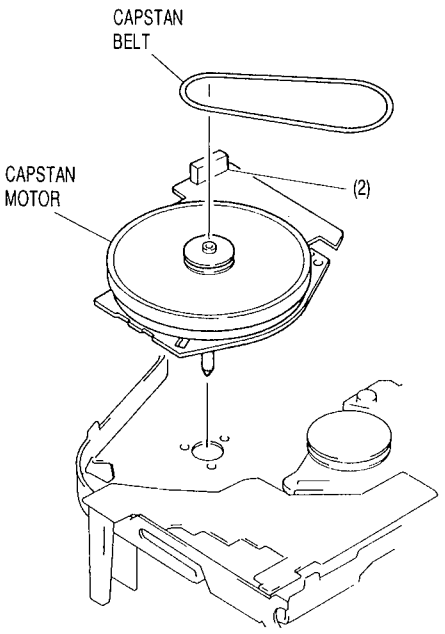


Fig. 3-12

*3-8. Pressure Roller Assembly

1) Remove 2 screws (1). (See Fig. 3-13)
2) Pull out the pressure roller assembly.

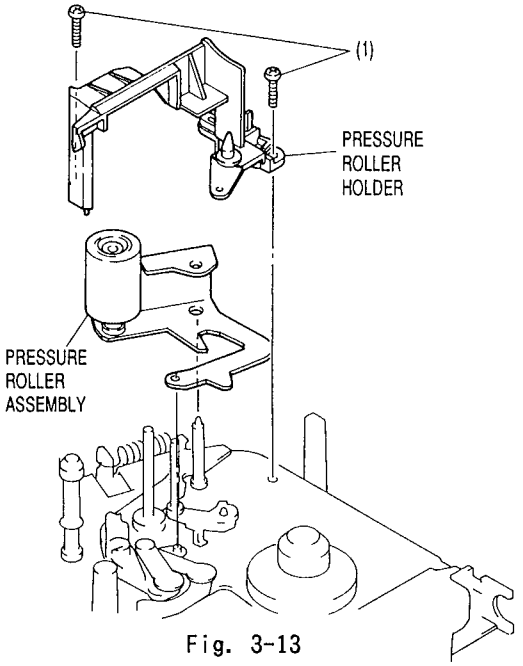


Fig. 3-13

*3-9. Tension Arm and Tension Band

1) Remove 1 tab (1) holding the tension arm (See Fig. 3-14)
2) Release the tension spring.
3) Remove 1 screw (2) holding the tension band.
4) Move the supply sub brake in the direction of the arrow.
5) Remove the tension arm and tension band.
6) Release 1 tab (3) and remove the tension band from the tension arm.

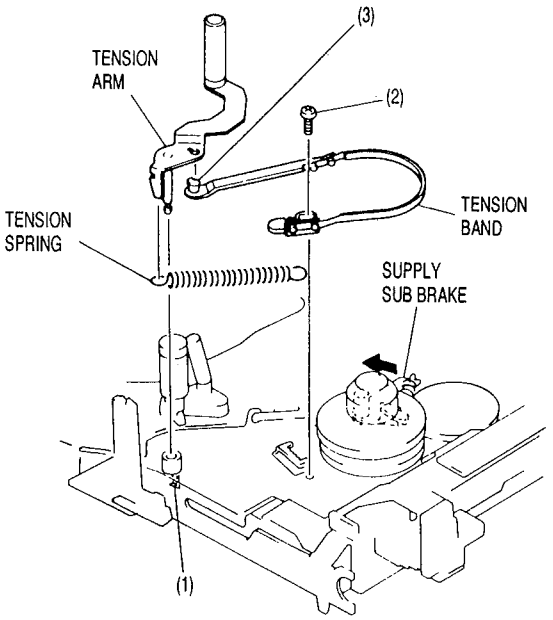


Fig. 3-14

*3-10. Supply Reel Disk

1) Remove 1 washer (1). (See Fig. 3-15)
2) Move the supply sub brake in the direction of the arrow.
3) Pull out the supply reel disk.

Cautions :

1. Take care not to lose the washer at the bottom of the reel disk.
2. Adjust as follows after installing the supply reel disk.
   · REEL DISK HEIGHT ADJUSTMENT

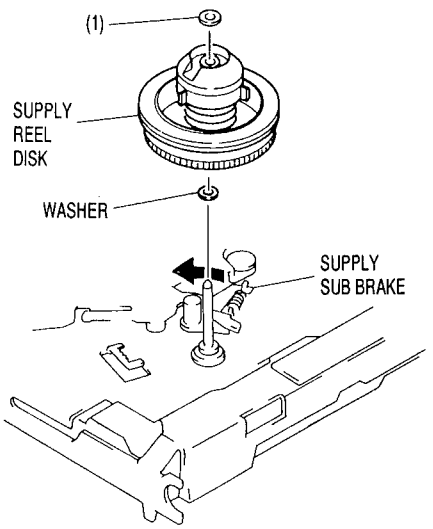


Fig. 3-15

*3-11. Take-up Reel Disk

1) Remove 1 washer (1). (See Fig. 3-16)
2) Pull out the take-up reel disk.

Cautions :
1. Take case not to lose the washer at the bottom of the reel disk.
2. Adjust as follows after installing the take-up reel disk.
   · REEL DISK HEIGHT ADJUSTMENT

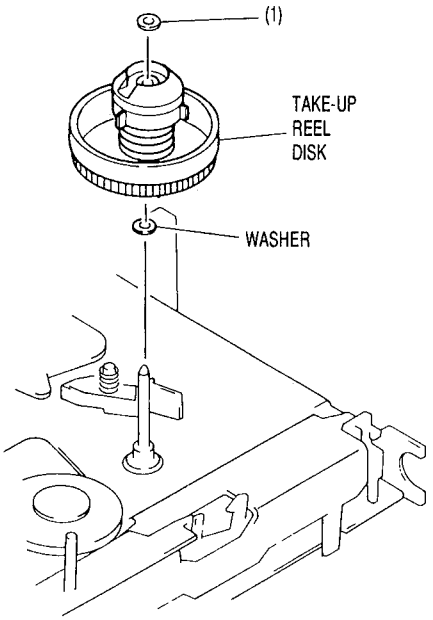


Fig. 3-16

*3-12. Take-up Sub Brake

1) Remove the spring between the chassis and take-up sub brake. (See Fig. 3-17)
2) Release 1 tab (1) and pull out the take-up sub brake.

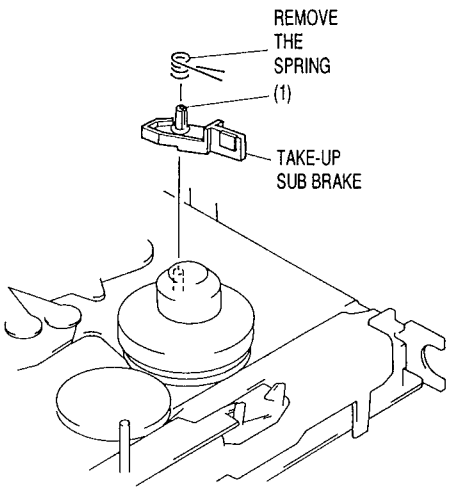


Fig. 3-17

3-13. Supply Guide Roller

1) Loosen 1 hexagonal screw (1) holding the supply guide roller. (See Fig. 3-18)
2) Turn the upper section of the supply guide roller using a flat-head driver to remove the supply guide roller from the supply guide roller base.

Caution :
1. Adjust as follows after installing the supply guide roller.
   · SUPPLY/TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT

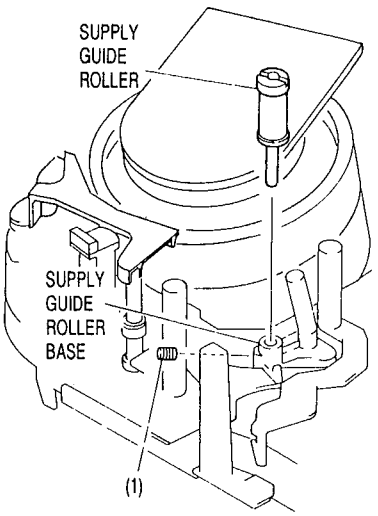


Fig. 3-18

3-14. Take-up Guide Roller

1) Loosen 1 hexagonal screw (1) holding the take-up guide roller. (See Fig. 3-19)
2) Turn the upper section of the take-up guide roller using a flat-head driver to remove the take-up guide roller from the take-up guide roller base.

Caution :
1. Adjust as follows after installing the take-up guide roller.
   - SUPPLY/TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT

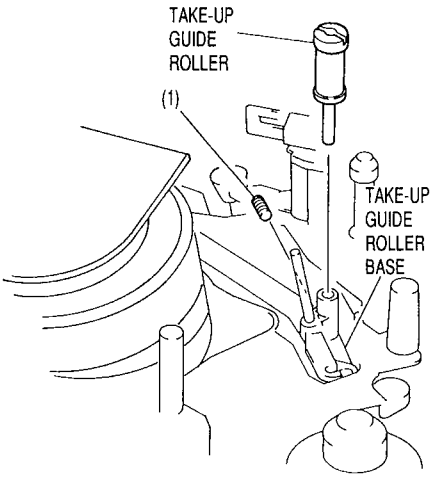


Fig. 3-19

*3-15. A/C Head Base

1) Remove 1 nut (1). (See Fig. 3-20)
2) Pull out the A/C head base together with the spring.

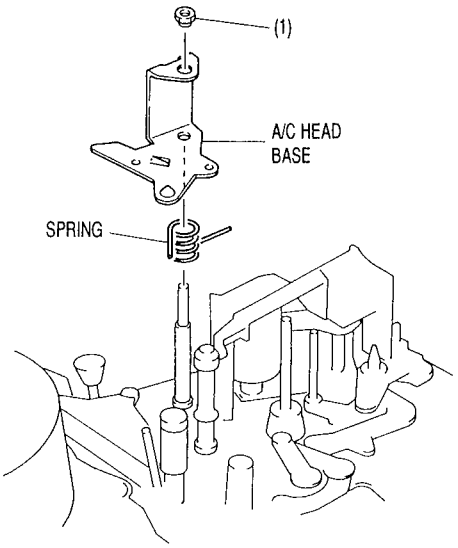


Fig. 3-20

3-16. Take-up Guide Pole

1) Turn the nut (5.0mm) at the top of the take-up guide pole and remove the take-up guide pole. (See Fig. 3-21)

Caution :
1. Adjust as follows after installing the take-up guide pole.
   - TAKE-UP GUIDE POLE HEIGHT ADJUSTMENT

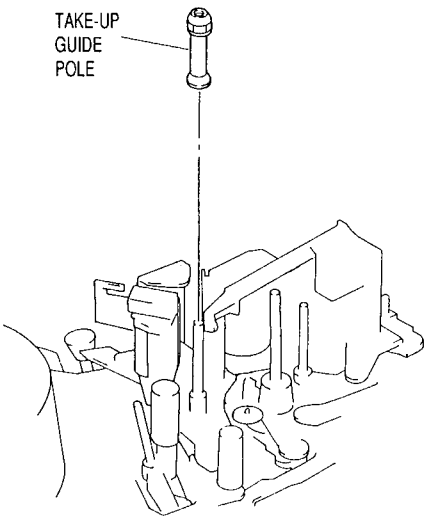


Fig. 3-21

*3-17. Supply Guide Roller Base, Take-up Guide Roller Base, Guide Roller Rail and End LED

1) Remove 3 screws (1) holding the guide roller rail. (See Fig. 3-22)
2) Release 7 tabs (2) and remove the guide roller rail together with the supply guide roller base, take-up guide roller base and end LED.
3) Remove the end LED in the direction of the arrow from the guide roller rail.

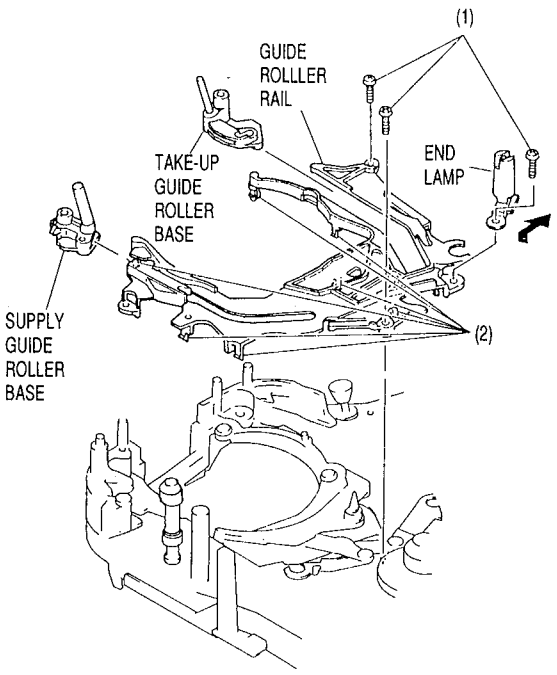


Fig. 3-22

*3-18. Supply Sub Brake

1) Release the spring between the supply sub brake and chassis. (See Fig. 3-23)
2) Pull out the supply sub brake.

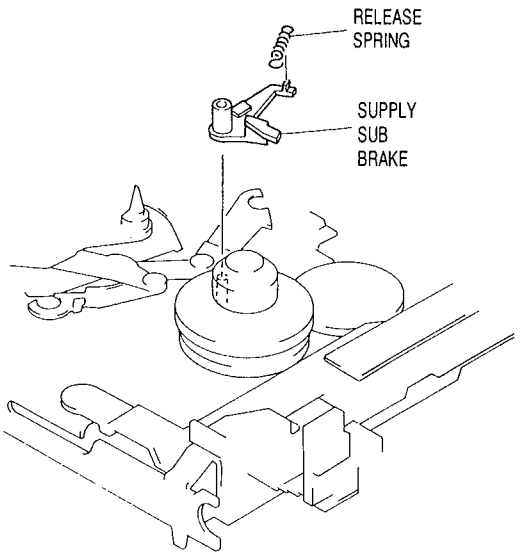


Fig. 3-23

*3-19. Cylinder Base

1) Remove 3 screws (1). (See Fig. 3-24)

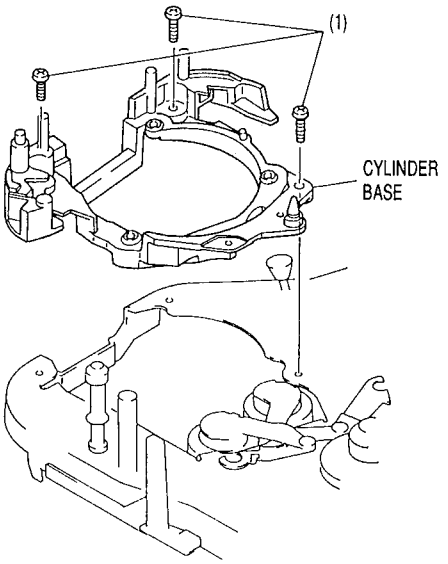


Fig. 3-24

*3-20. Supply Loading Cam Gear and Take-up Loading Cam Gear

1) Remove the supply loading cam gear and take-up loading cam gear. (See Fig. 3-25)

Caution when reinstalling

1) Align mark (A) on the supply loading cam gear and mark (B) on the take-up loading cam gear when reinstalling them. Check that the supply and take-up guide roller bases are in the unloading (stop) state (as shown in Fig. 3-26).

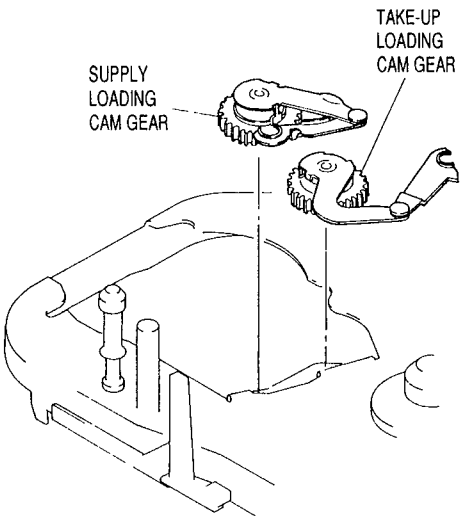


Fig. 3-25

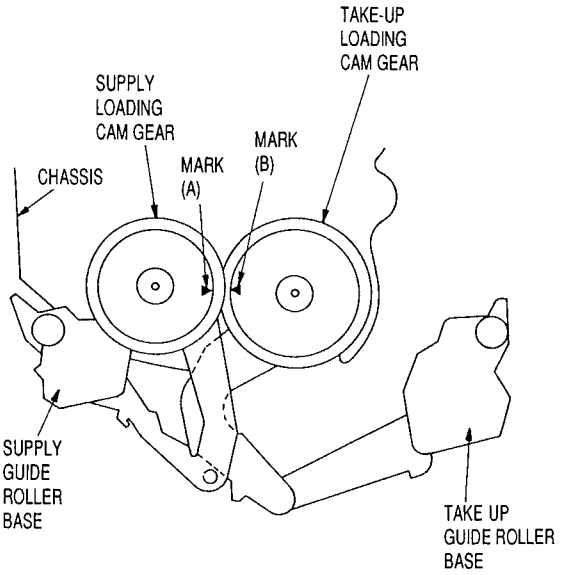


Fig. 3-26

*3-21. Take-up Guide Arm

1) Release the spring between the take-up guide arm and chassis. (See Fig. 3-27)
2) Pull out the take-up guide arm.

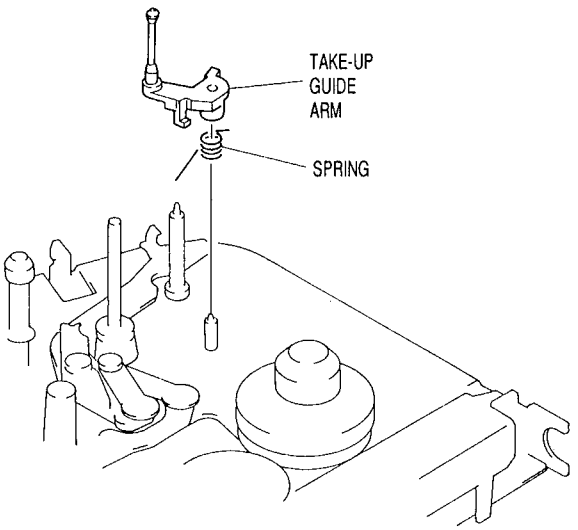


Fig. 3-27

*3-22. Pressure Roller Control Arm

1) Release the spring betweeen the pressure roller control arm and chassis. (See Fig. 3-28)
2) Remove 1 washer (1) holding the pressure roller control arm.
3) Pull out the pressure roller control arm from the chassis.

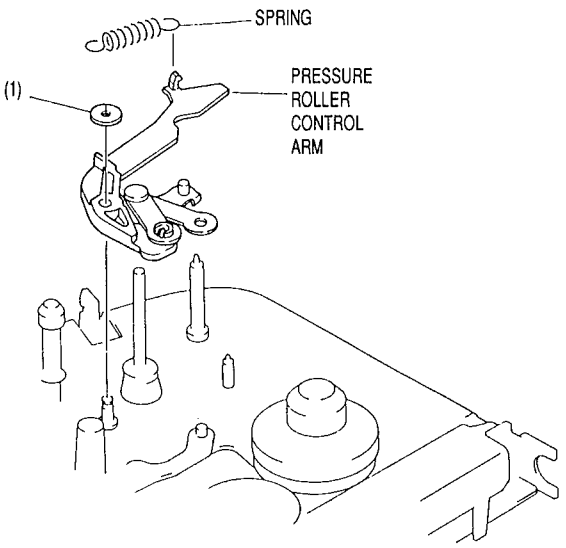


Fig. 3-28

*3-23. Cassette Holder Lock Slider

1) Remove 1 washer (1) and release 1 tab (2). (See Fig. 3-29)

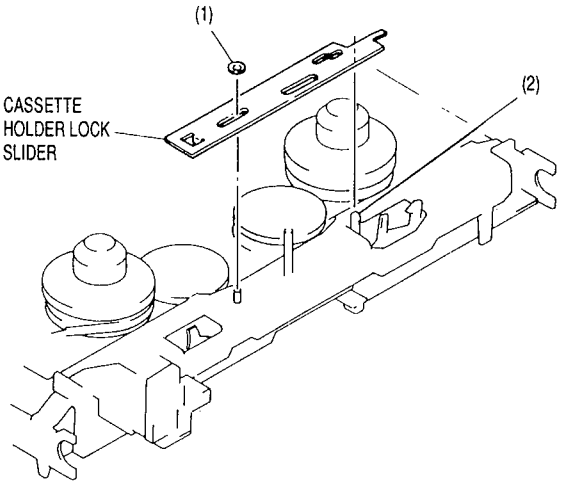


Fig. 3-29

*3-24. Reel Gear Block, Mechanism State Switch and Relay Gear

1) Remove the capstan belt from the reel gear block. (See Fig. 3-30)
2) Disconnct 1 connector (1) on the mechanism state switch
3) Remove 1 screw (2) holding the mechanism state switch.
4) Remove the mechanism state switch.
5) Remove the relay gear.
6) Remove 4 screws (3) holding the reel gear block.
7) Remove the reel gear block.

Caution when reinstalling

1) Reinstall the loading gear so its mark (c) and mark (D) on the supply loading cam gear are aligned. (See Fig. 3-32)
2) Reinstall the tension pole drive arm so that hole (E) in this arm is aligned with hole (F) in the driving gear.
3) Align section (A) of the mechanism state switch and mark (B) of the rotor. (See Fig. 3-31)
4) Align hole (G) in the driving gear and mark (H) on the relay gear. Check that hole (I) in the relay gear in aligned with the hole in reel gear block. (See Fig. 3-32)
5) Install the mechanism state switch in condition set in step 3) in to the chassis.

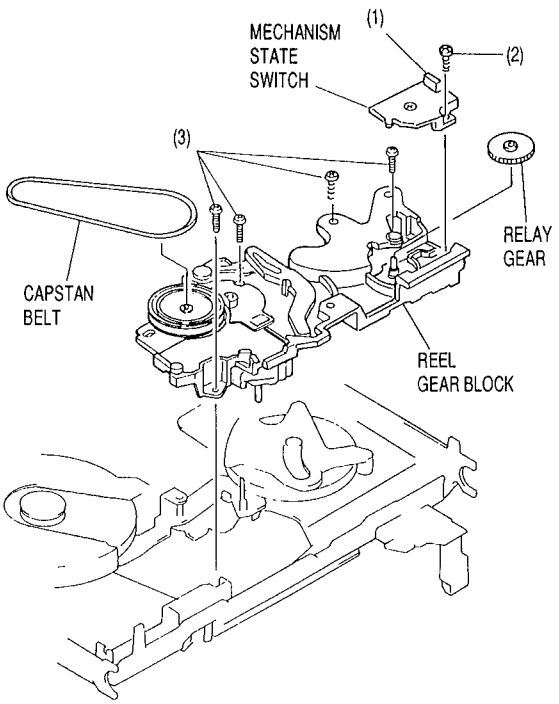
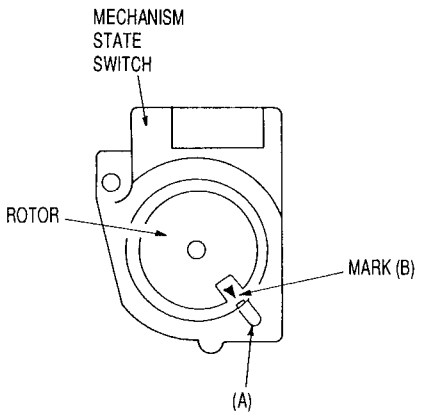
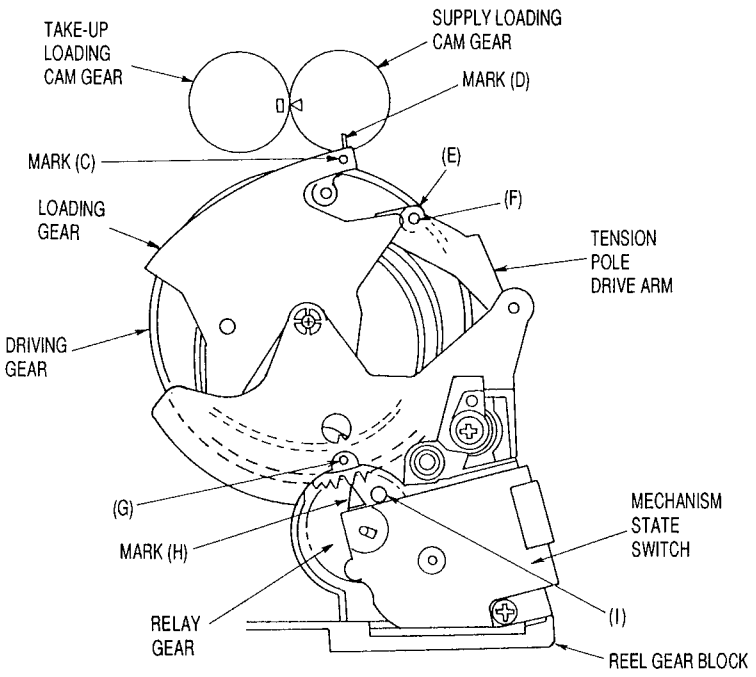


Fig. 3-30



(BOTTOM VIEW)

Fig. 3-31



(TOP VIEW)

Fig. 3-32

*3-25. Loading Gear

1) Pull out the loading gear. (See Fig. 3-33)

Caution when reinstalling

1) Refer to the Fig. 3-32

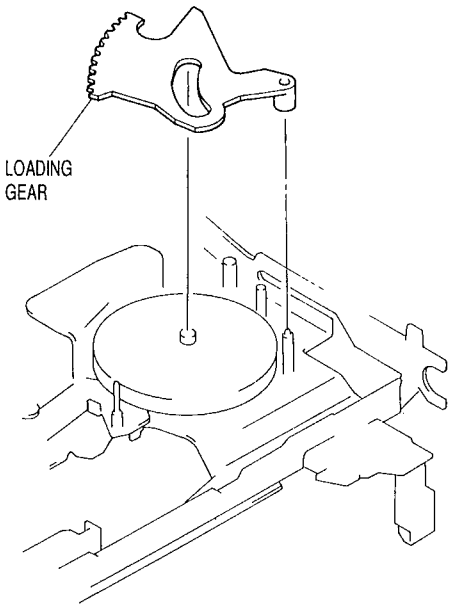


Fig. 3-33

*3-26. Tension Pole Drive Arm

1) Pull out the tension pole drive arm.
(See Fig. 3-34)

Caution when reinstalling

1) Refer to the Fig. 3-32

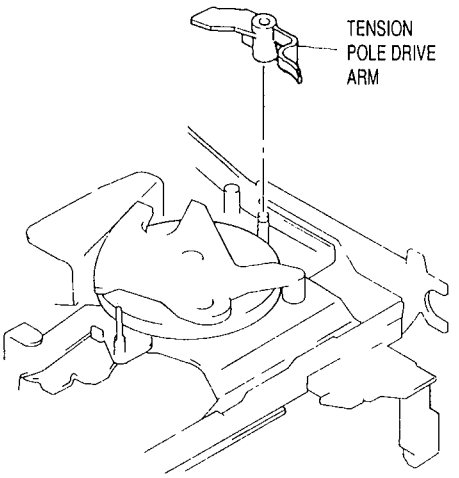


Fig. 3-34

*3-27. Driving Gear

1) Pull out the driving gear. (See Fig. 3-35)

Caution when reinstalling

1) Move the cassette holder lock drive arm so that the pin comes into contact with section (A) of the cam gear arm. (See Fig. 3-36)
2) Reinstall the driving gear so that hole (B) in the driving gear is aligned with the through-hole in the chassis. (See Fig. 3-37)

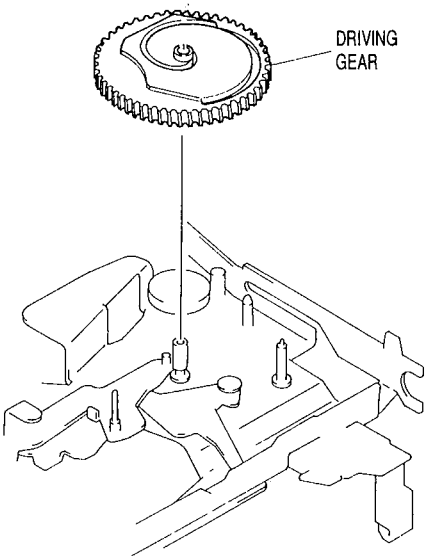


Fig. 3-35

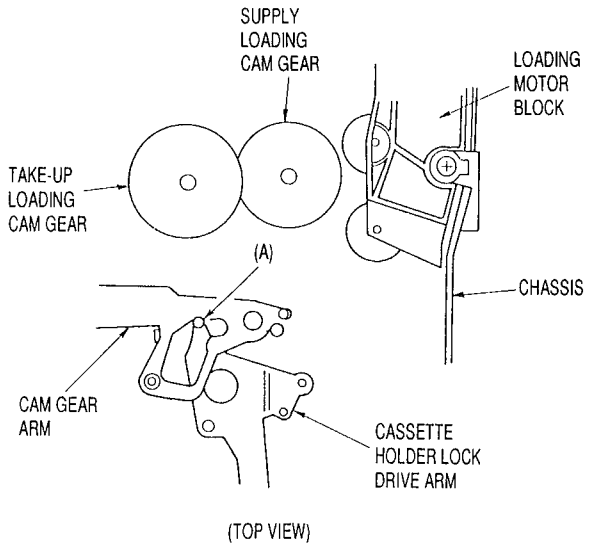


Fig. 3-36

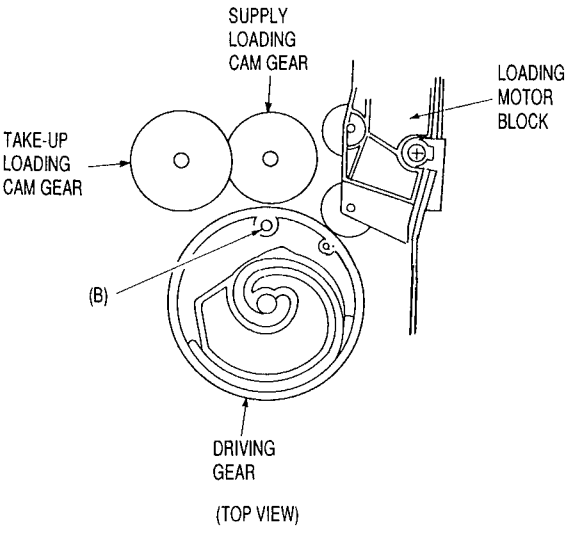


Fig. 3-37

*3-28. Cassette Holder Lock

1) Remove 1 screw (1). (See Fig. 3-38)
2) Release 1 tab (2) and remove the cassette holder lock.

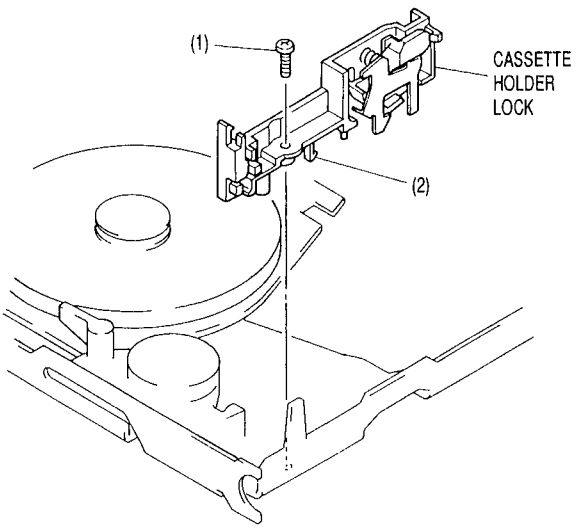


Fig. 3-38

*3-29. Cam Gear Arm

1) Move the cam gear arm in the direction of the arrow. (See Fig. 3-39)
2) Pull out the cam gear arm from the chassis.

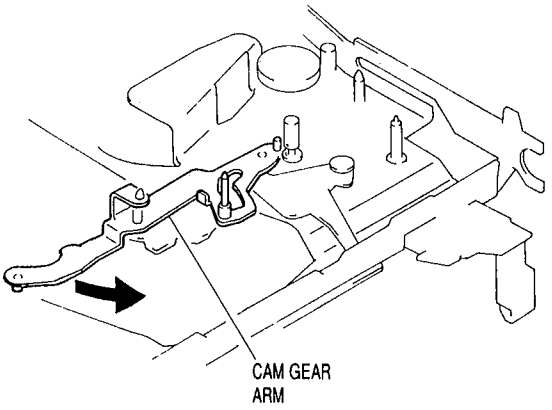


Fig. 3-39

*3-30. Cassette Holder Lock Drive Arm

1) Release the spring between the cassette holder lock drive arm and chassis. (See Fig. 3-40)
2) Pull out the cassette holder lock drive arm.

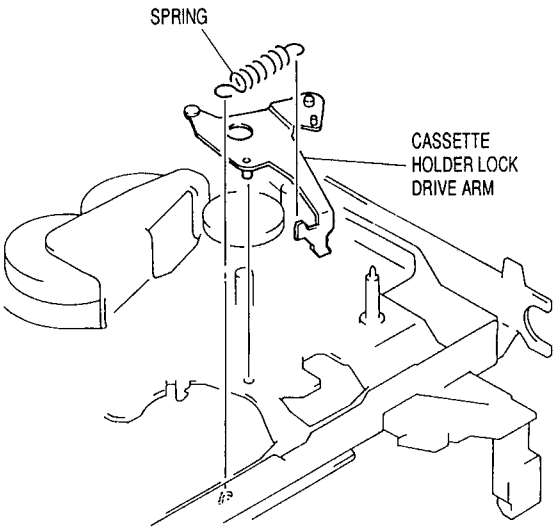
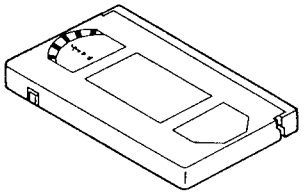
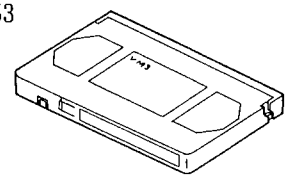
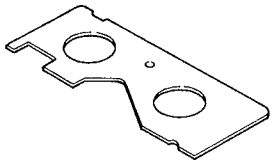
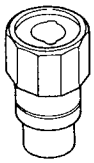
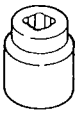
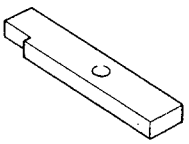
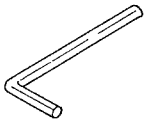


Fig. 3-40

CHAPTER 2 MECHANICAL ADJUSTMENT

JIGS AND TAPES FOR ADJUSTMENT

1. BACK TENSION METER No.7099004 	2. ALIGNMENT TAPE NTSC(MH-1) : No.7099046 PAL(MH-2) : No.7099052 SECAM(MH-4): No.7099053 		3. MASTER PLANE No.7099279 
4. TORQUE GAUGE No.7099039 	5. TORQUE GAUGE ADAPTER No.7099204 	6. REEL DISK HEIGHT JIG No.7099038 	7. HEXAGONAL WRENCH 0.9mm : No.7099202 

1. TAPE TRANSPORT SYSTEM COMPONENTS CHECK/ ADJUSTMENT

The tape transport system is the path from the supply reel disk to the take-up reel disk via the video heads. The tape treansport components, especially the components which come into direct contact with the tape, should be kept clean without damage, dust and oil, etc. adhering to the contact surfaces. The tape transport system is adjusted before shipment from the factory, so when any transport compoents are replaced, the transport system is stabilized by correctly adjusting the new components.

1-1. Reel Disk Height Adjustment (Fig. 1-1)

1) Place the master plane on the cassette holder and lower the holder.
2) Place a reel disk height jig on the master plane and fit it to the reel disk.
3) Check that the top of the reel disk is positioned between sections A and B of the reel disk height jig.
4) When the top of the reel disk is not positioned between section A and B, adjust the number of the spacers (2 types: 0.25mm and 0.5mm thick) at the bottom of the reel disk.

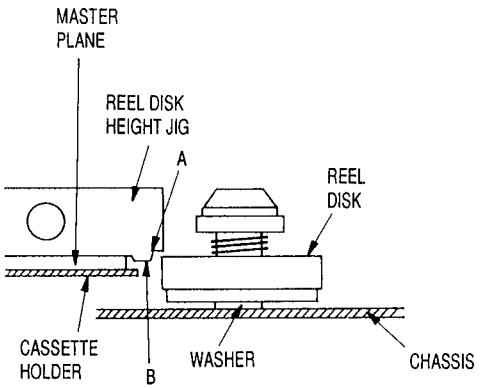


Fig. 1-1

1-2. Tension Pole Position/Tension Adjustment (Fig. 1-2)

Tension Pole Position Adjustment

1) Hook the tension spring to notch (C) of the spring holder.
2) Block the supply end sensor with something which does not transmit light (thick paper, etc.)
3) Press the playback button without loading a cassette to set the unit to the loading state.
4) After loading is completed, loosen screw (B) holding the tension band holder and adjust the position of the tension band holder so the tension pole is above section (A) (concave) of the guide roller rail.
5) After adjustment is completed, tighten screw (B).

Tension Adjustment

1) Load the back tension meter and set to the playback mode.
2) Read the scale on the supply.
3) This reading should be between 19 and 26.
4) Move the tension arm spring to the position "A" or "B" on the spring holder when the tension adjustment tape reads 27 or higher, and to the position "D" or "E" on the spring holder when it is 18 or lower, and adjust the back tension for a nominal reading of 19-26 on the scale.
5) Recheck the tension arm position when the back tension is changed greatly (5 or more).

Note: The instrument must be in a horizontal position for this adjustment.

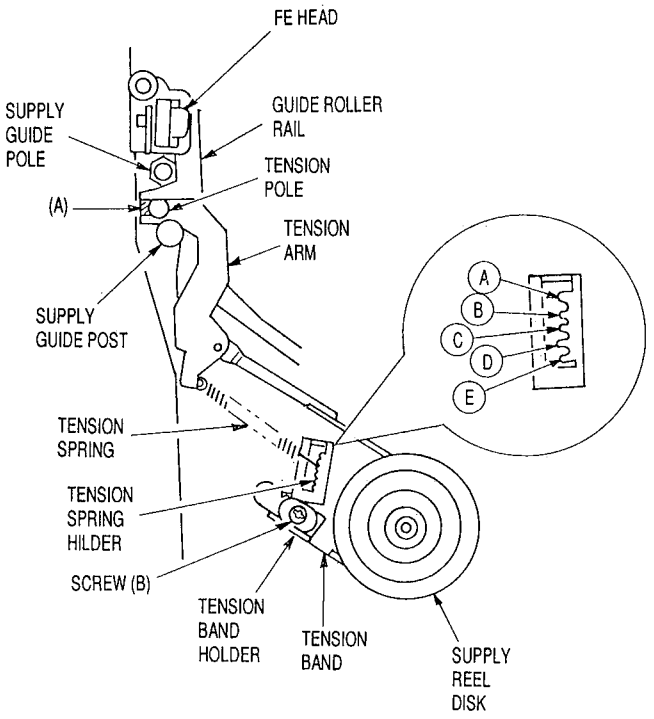


Fig. 1-2

1-3. Take-up Guide Poles Height Adjustment (Fig. 1-3)

1) Place the master plane on the cassette holder and lower the holder.
2) Place a reel disk height jig on the master plane and fit it to the guide pole.
3) Adjust the nut on the top of the guide pole so that the upper flange is aligned with the top edge of the height jig.

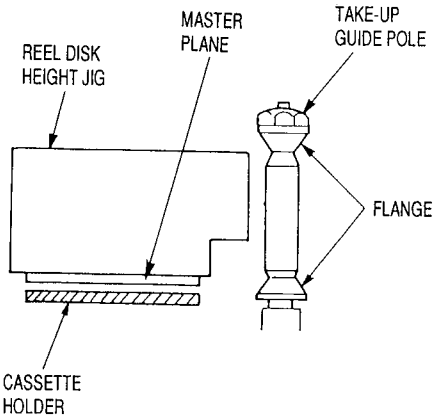


Fig. 1-3

1-4. Supply/Take-up Guide Rollers Height Adjustments (Figs. 1-4, 1-5)

1) Place the master plane on the cassette holder and lower the holder.
2) Place the reel disk height jig on the master plane and fit it to the guide roller.
3) Loosen the guide roller fixing hexagonal screw and use a flat-bladed screwdriver, etc. to turn the top of the guide roller to adjust so the upper flange of the guide roller is aligned with the top surface of the reel disk height jig.
4) After adjustment is completed, tighten the guide roller fixing hexagonal screw.
5) Run a blank tape and check that the tape does not curl or ride over the guide roller. If it curls or rides over the guide roller, fine adjust the height of the guide rollers.
6) Connect an oscilloscope to test point of the FM envelope.
7) Trigger the oscilloscope at SW30Hz.
8) Playback the color bar signal on alignment tape and set the TRACKING control to the center position.
9) Check that the FM waveform is flat.
10) If the FM envelope is not flat, fine adjust the height of the supply and take-up guide rollers to flatten the FM envelope.
11) After adjustment is completed, tighten the guide roller fixing hexagonal screw.

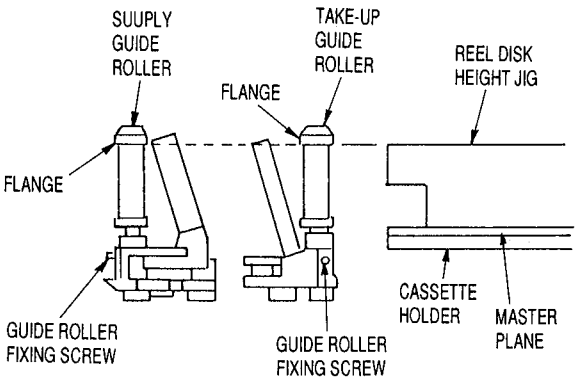
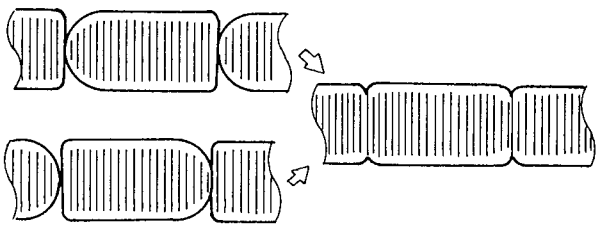


Fig. 1-4



Turn guide roller height adjustment screw a little at a time to flatten waveform.

Fig. 1-5

1-5. A/C Head Adjustment (Figs. 1-6, 1-7)

Perform the height, tilt and azimuth adjustments repeatedly to determine the A/C head installation position, then adjust the X-value.
Detailed adjustment below is the procedure when the A/C head is replaced; be sure to do precise adjustment after rough adjustment.

Note: For the X-value adjustment, refer to the service manual (electrical adjustment) issued for each model.

<u>Rough Adjustment</u> (Fig. 1-6)

1) Place the master plane on the cassette holder and lower the holder.
2) Adjust NUT (A), AZIMUTH SCREW (B), TILT SCREW (C) and SCREW (D) so the height difference between the master plane and A/C head plate is approx. 1.78mm and A/C head base and A/C head plate are parallel.

<u>Precise Adjustment</u> (Figs. 1-6, 1-7)

3) Connect the oscilloscope to audio output (AV OUT).
4) Playback a 1kHz audio signal on the alignment tape.
5) Adjust the AZIMUTH SCREW (B) and TILT SCREW (C) so the audio output is maximum and flat (without any fluctuations). (See Fig. 1-7)

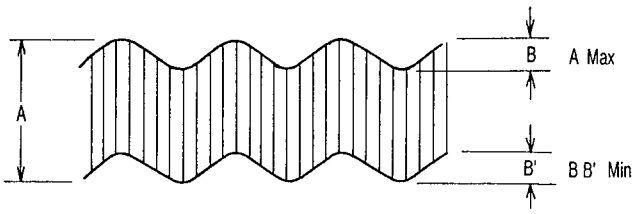


Fig. 1-7

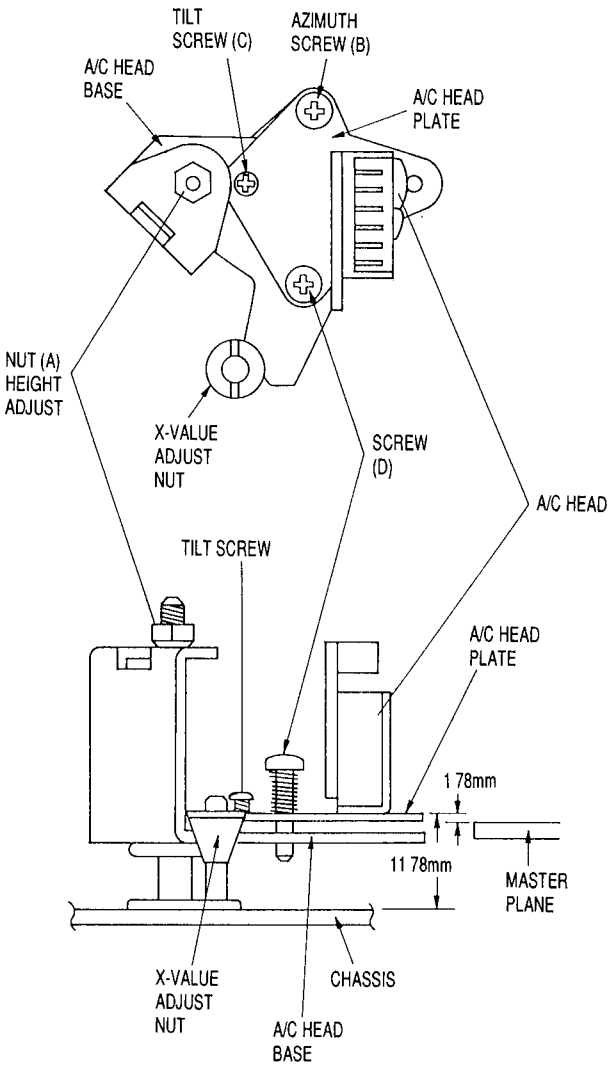


Fig. 1-6

2. ADJUSTMENT AFTER REPLACING THE CYLINDER (VIDEO HEADS)

When the cylinder is replaced, the relative height with respect to the guide rollers or the X-value, etc. drifts (this drift is smallwhen the cylinder is replaced correctly).
Therefore, it is necessary to readjust the tape transport system and servo system. Perform checks and adjustments by the following steps.

Note: For the X-value adjustment, refer to the service manual (electrical adjustment) issued for each model.

1) Load a blank tape and play it. Check that no curling or creasing occurs around the guide rollers. If curling or creasing occurs, fine adjust the height of the guide rollers.
2) Confirm that the FM envelope is flat and level fluctuations are minimum.
   If it cannot be confirmed, adjust the height of the guide rollers. See the next item for these checks.
3) Check or/and adjust the head switching point. (Refer to the service manual (electrical adjustment) issued for each model.)
4) Confirm that the X-value adjustment is correct. If it cannot be confirmed, adjust the X- value.

Check Flatness and Level Fluctuations of the FM Output

1) Connect an oscilloscope to test point of FM envelope.
2) Trigger the oscilloscope at SW30Hz.
3) Set the TRACKING control to center position.
4) Playback the alignment tape.
5) Adjust the voltage level control on the oscilloscope so the maximum amplitude of the FM output is 4 graduations on the oscilloscope.
6) Adjust the tracking control buttons so the maximum amplitude of the FM output is 3 graduations on the oscilloscope.
7) Check that the minimum amplitude is more than 2 graduations. If this cannot be confirmed, fine adjust the height of the guide rollers.

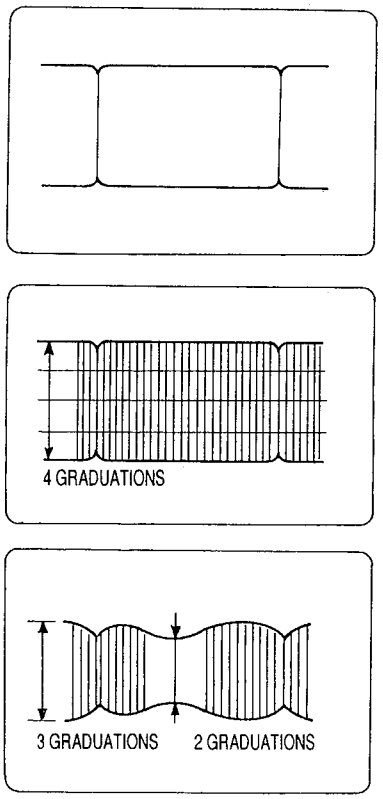


Fig. 2-1

3. TENSION AND TORQUE CHECKS

It is necessary to check the tension, torque and compression strength in the tape take-up section and moving section to smoothen the tape transport and to satisfy the basic performance of the VCR. When the tape transport is not smooth or the tape speed is abnormal, detect the faulty section by this checking, and then check again after replacing the faulty parts with normal ones to complete the work.

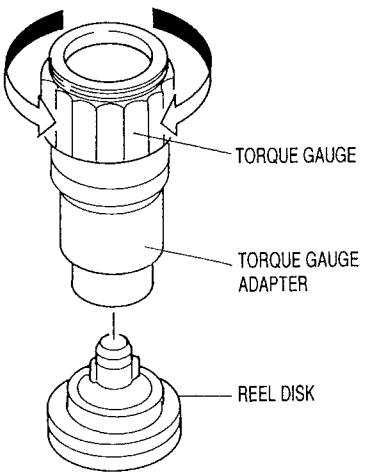


Fig. 3-1

Item	VCR Operation	Measured Reel	Measurement Value	Remarks
Main brake torque	STOP	Supply	140 g·cm or more	Fig. 3-1
		Take-up	100 g·cm or more	Fig. 3-1
Slack removal torque	UNLOADING	Supply	90～200 g·cm	Fig. 3-1
Fast forward torque	F.FWD	Take-up	400 g·cm or more	Fig. 3-1
Rewind torque	REW	Supply	400 g·cm or more	Fig. 3-1
Take-up torque	PLAY	Take-up	80～110 g·cm	Fig. 3-1
Back-tension torque	F.FWD REW	Supply Take-up	4～10 g·cm	Fig. 3-1

CHAPTER 3 MAINTENANCE/INSPECTION PROCEDURE

1. Required Maintenance

The recording density of a VCR is much higher than that of an audio tape recorder. VCR components must be very precise to ensure compatible with other VCRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective.
To ensure a good picture, periodic inspection and maintenance, including replacement of worn-out parts and lubrications, is necessary.

2. Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they are greatly according to the way in which the customer uses the VCR, and the environment in which the VCR is used. But, in general home use, a good picture will be maintained if the inspection and maintenance is done every 1,000 hours. Table 1 shows the relation between time used per day and inspection period.

Table 1

Average hours used per day	When inspection is necessary		
	About 1 year ↓	About 18 months ↓	About 3 years ↓
One hour			
Two hours			
Three hours			

3. Check before starting Repairs

The faults occurring in the playback picture as shown in Table 2 can be remedied by cleaning and oiling. Check the need for lubrication and the conditions of cleanliness in the unit.
Check with the customer to find out how often the unit is used. If from that you determine that the unit is ready for inspection and maintenance, check the parts shown in Table 2.

Table 2

Phenomenon	Inspection Location
Poor S/N, no color	Dirt on video head or it is degraded
Tape does not run or tape is slack	Dirt on pressure roller, cylinder or in tape transport system
Vertical jitter	Dirt on video head or in tape transport system
Low volume or sound distorted	Dirt on video head or it is degraded
Color beats	Dirt on full erase (FE) head or it is degraded

4. Tools Needed for Inspection and Maintenance

(1) Head cleaning kit
(2) VCR oil and grease (Table 3)
(3) Alcohol
(4) Gauze
(5) Cleaning tape (Dry type)

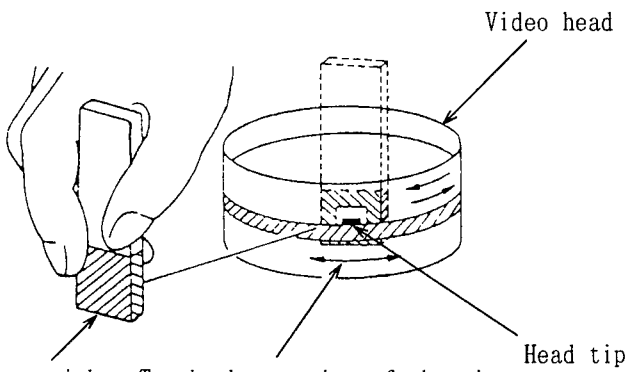
Table 3 Locations for Greasing and Oiling

Name	Oil or Greasing Location
Sonic Slidas Oil (#1600)	Oil low-speed rotating sections
Froil (G31-SAY)	Lubricate metal or molded section under light load
Molicoat (PG-641)	Lubricate metal or molded sections under light load
Lock paint	Fix adjustment screws and nuts.

5. Maintenance Procedures

5-1 Cleaning

(1) Cleaning video head
First use a cleaning tape. Read its instruction sheet carefully before using it. If dirt on head is too stubborn to remove by tape, use the cleaning kit. Moisten the cleaning stick with cleaning fluid at the point indicated.
Touch the stick to the head tip and gently turn the head (rotating cylinder) to the right and left. (Do not move the stick vertically and make sure that only the chamois leather on the stick comes into contact with the head. Otherwise, the head may be damaged.) Thoroughly dry the head. Then test run a tape.
If cleaning fluid remains on the video head, the tape may be damaged when in comes into contact with the head surface.



(2) Cleaning the tape transport system and drive system, etc.

Wipe with gauze moistened with alchol.

Notes: 1) The tape transport system is the system which comes into contact with the running tape. The drive system consists of those parts which run the tape.

2) Make sure that during cleaning you do not touch the tape transport system with the tip of a screwdriver and that no force is applied to the system that could deform it.

5-2 Lubrication

(1) Guide lines for lubricating with oil

Use the oiler to apply one or two drop of Sonic Slidas oil. Make sure not to use too mach oil because it may spill over or leak out coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean with alchohol.

(2) Periodic oil lubrication

Lubricate the specified locations only when replacing components. Refer to the exploded views for the lubricating locations.

5-3 Greasing

(1) Greasing guidelines

Apply grease Froil or Molicoat, with a stick or brush. DO not use excess grease. It may come into contact with the tape transport or drive system. Wipe any excess and clean with gauze moistend with alcohol.

(2) Periodic greasing

Grease the specified locations only when replacing components. Refer to the exploded views for the greasing locations.

Table 4 Parts to be Maintained/Inspected and Maintenance/Inspection Schedules

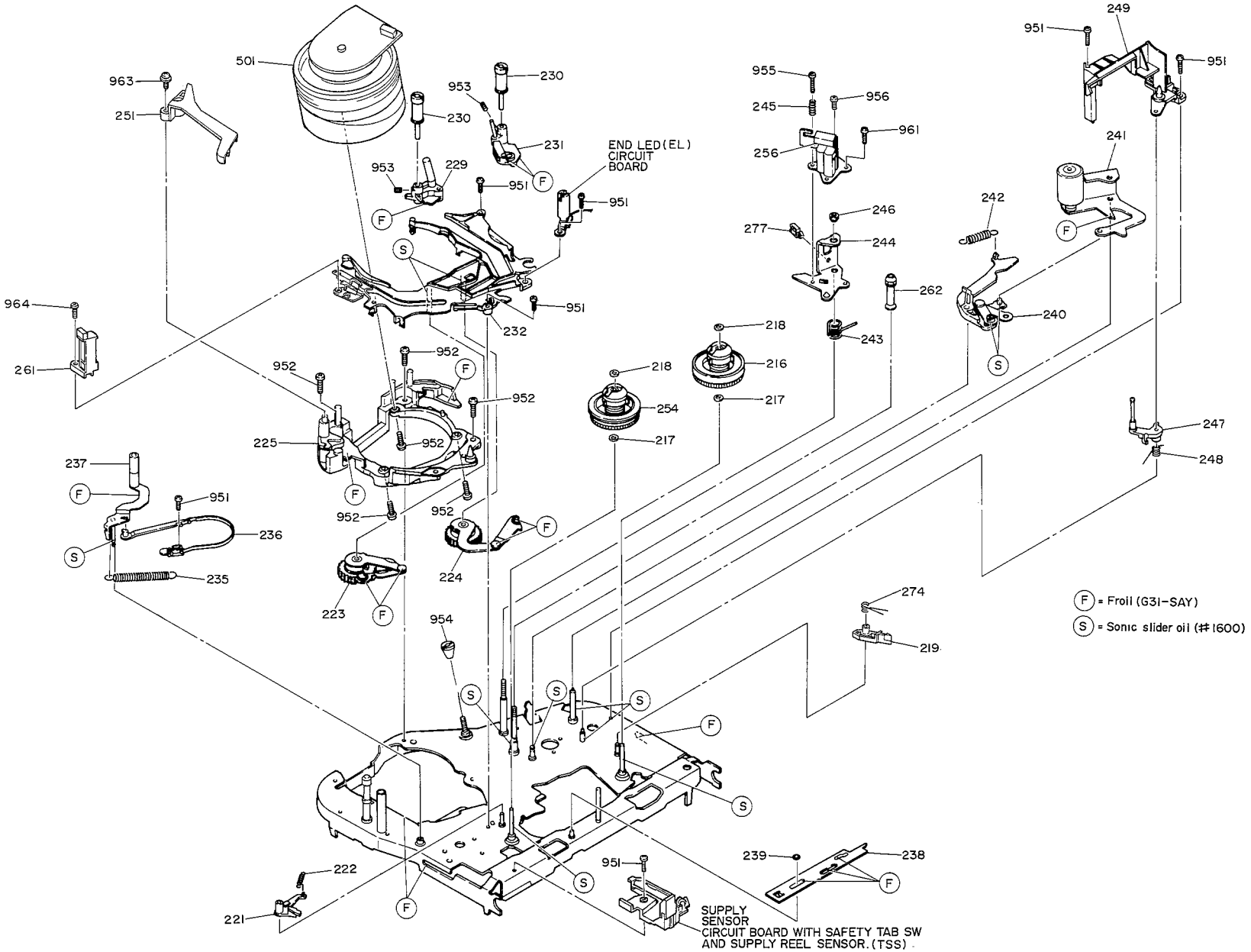
Caution: The following table does not apply to all units. The maintenance/inspection schedules depend on how the unit is used and the environment in which it is used.

Component \ Hours	1000	2000	3000	4000	5000	6000
Video heads (upper cylinder)	C／R	C／R	C／R	C／R	C／R	C／R
Audio/control head	C	C／R	C	R	C	C／R
Full erase head	C	C	C	R	C	C
Supply guide roller	C	C	C	C	C	C
Supply guide pole/post	C	C	C	C	C	C
Take-up guide roller	C	C	C	C	C	C
Take-up guide pole/post	C	C	C	C	C	C
Tension band	——	R	——	R	——	R
Supply reel disk	C	C	C	C	C	C
Take-up reel disk	C	C	C	C	C	C
Impedance roller	C	C	C	C	C	C
Pressure roller	C	R	C	R	C	R
Reel drive belt	C	R	C	R	C	R
Capstan shaft (capstan motor)	C	C／R	C	C／R	C	C／R
Loading motor	——	R	——	R	——	R
Cylinder motor (lower cylinder)	——	R	——	R	——	R

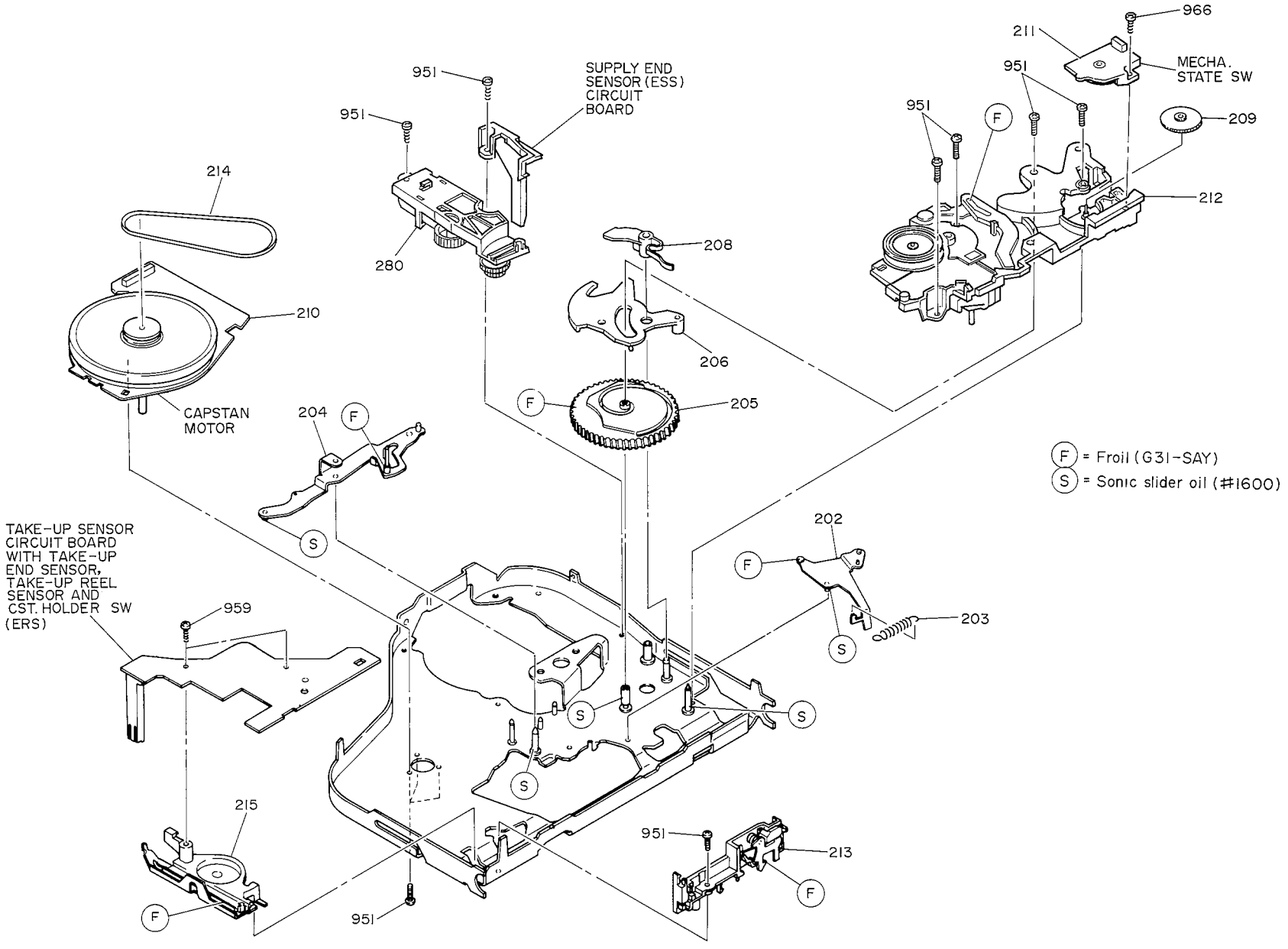
C : Cleaning

R : Parts replacing

1. CHASSIS (TOP VIEW) SECTION



2. CHASSIS (BOTTOM VIEW) SECTION



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