SERVICE MANUAL

TRANSVIDEO TRV-S8 TRV-R8

1. See PARTS LIST (NO. 279) for TRANSVIDEO TRV-S8/TRV-R8 as well for disassembly and reassembly.
2. Should some trouble occur, see "V. LIST OF TROUBLESHOOTING HINTS" at the end of this volume.

ELMO CO., LTD.

CONTENTS

I. GENERAL INTRODUCTION

I – 1 Features

The ELMO TRANSVIDEO SERIES is a system to convert your film image into electronic image by means of a projector equipped with a built-in video camera. The video camera, employing CCD, has little irregularity in light quantity and excellent color replaying property, and projects the film directly, ensuring distinct image.

I – 2 Specifications

* General specifications

Power source:	AC 120 V 60 Hz for U.S.A./Canada
Power consumption:	100 W
External dimension:	315 x 229 x 172 mm (12.4 x 9.0 x 6.8 in.)
Weight:	Approx. 8 kgs (Approx. 17.7 lbs)

* Specifications for mechanism section

Film:	TRV-S8 . . . Super 8/Single 8 sound and silent films TRV-R8 . . . Regular 8 silent film
Projection speed:	20 fps standard with fine speed adjustment of ±1 fps
Film capacity:	600 ft (180 m)
Film threading:	Fully automatic
Film control:	One-knob control
Motor:	Frequency generator servo DC magnet motor
Shutter:	3-blade shutter
Quick review:	Standard
Loop restorer:	Automatic loop restorer

* Specifications for video section

Television system:	NTSC compatible
Image pick-up device:	CCD (Charge Coupled Device)
Color tone control:	Manual adjustment possible
Output level:	1 Vp-p/75 ohm (Ω)
Horizontal resolution:	240 TV lines
S/N ratio:	Magnetic sound playback

* Specifications for audio section

Playback system:	Magnetic sound playback
Output level:	400 mV/600 Ω (US pin)
Frequency response:	50 Hz ~ 12 KHz
Monitoring:	3.5 mm receptacle provided

* Specifications for optical section

Lens:	F/1.4, f = 16 mm
Iris adjustment:	Manual with fine adjustment
Focusing:	Manual with fine adjustment
Light source:	6V – 10W Halogen lamp (Type JDR)

* Supplied accessories

600 ft (180 m) auto reel, video/audio cable (TRV-S8) or video cable (TRV-R8) and power cord.

I – 3 Major Parts Description

I – 3 – 1 Front

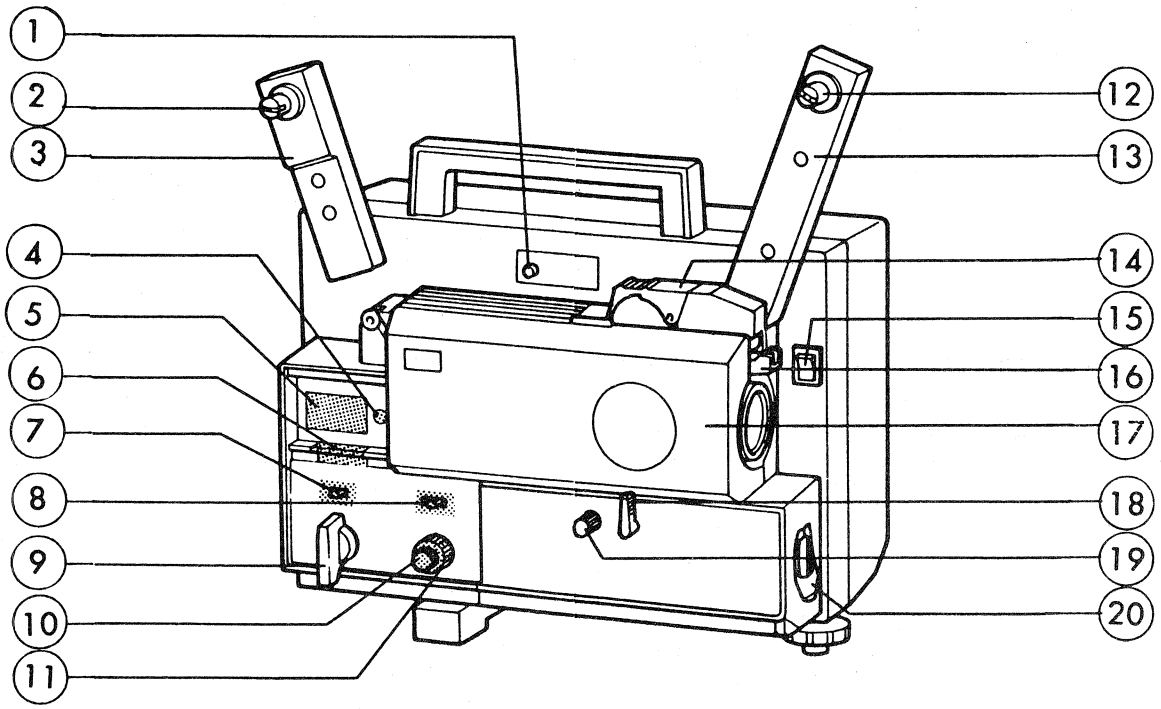


Fig. 1

① Fine speed adjustment:
Carries out fine adjustment up to ± 1 frame.

② Reel lock:
Locks the reel to prevent it from coming off the arm.

③ Take-up reel arm:
Holds and drives the take-up reel.

④ Record lamp:
Lights up when the device is set for recording.

⑤ Level meter:
Used for setting the level of recording.

⑥ Record button:
Depressed to start recording.

⑦ Sound selector:
Set to "M" for magnetic film replay, and to "SILENT" for silent film replay.

⑧ Track selector:
Set to "1" for first track replay, to "2" for second track replay, and to "1 + 2" for simultaneous replay of first and second tracks.

⑨ Master control knob:
Used for controlling "stop, forward, reverse, lamp ON and rewind."

⑩ Volume control:
Adjusts the sound volume, and sets the recording level.

⑪ Balance control:
Adjusts for the balance of high/low sound.

⑫ Reel spindle:
Holds the reel.

⑬ Feed reel arm:
Holds the reel, and drives for rewinding.

⑭ Auto-thread lever:
Sets the projector for film loading.

⑮ Main switch:
Used for turning the projector power to ON.

⑯ Thread slot:
Leader is inserted in this slot at the time of film loading.

⑰ Front cover:
Protects the internal mechanism.

⑱ Loop former:
Used for forming the film loop at the time of projection.

⑲ Framer:
To eliminate boundary line by rotating this knob.

⑳ Film trimmer:
Used for trimming the film and to allow the film to thread in smoothly.

I – 3 – 2 Back/Rear

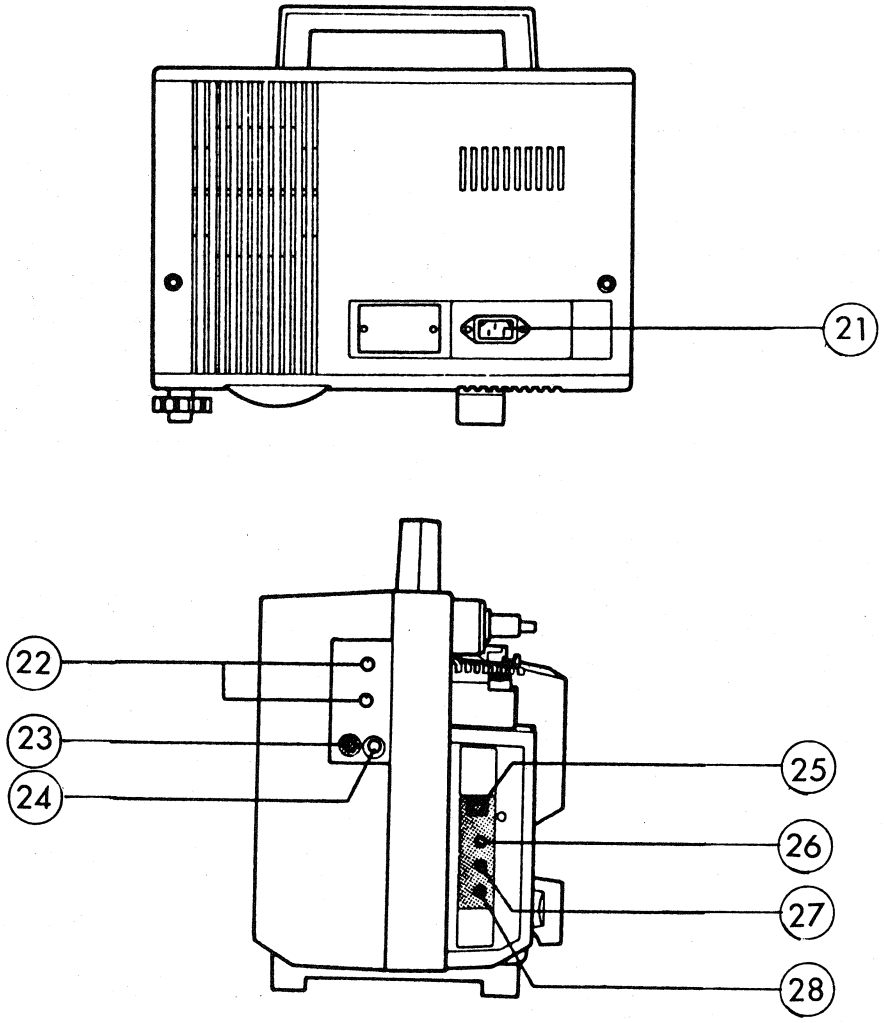


Fig. 2

㉑ Power cord receptacle:
Used for connecting the power cord.

㉒ Color control knobs:
Used for controlling the colors -- red level and blue level.

㉓ Audio-out receptacle:
This terminal, used for taking out the audio signal, is connected to the audio input terminals of television (monitor) and VCR.

㉔ Video-out receptacle:
This terminal, used for taking out the video signal, is connected to the video input terminals of television (monitor) and VCR.

㉕ Record control button:
Used for setting the device to RECORD during replay without stopping the main body.

㉖ Mic receptacle:
This is the microphone input terminal.

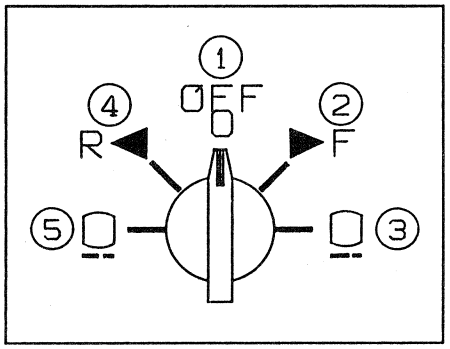
㉗ Aux-in receptacle:
Used for recording from the tape recorder and stereo amplifiers.

㉘ Moni/Aux-out receptacle:
Earphone is connected to this terminal in order to listen to the recording sound.

Note: The names of parts, explained here, are basically for type S8; the type R8 is not equipped with the audio knobs and terminals.

I – 3 – 3 Master Control Knob:

Knob position (with the main switch turned to ON)



① OFF : When the knob is set to this position during forwarding, reversing, rewinding and film loading, the projector comes to a stop.

② ▶ F : When the knob is set to this position, the first sprocket assy, second sprocket assy, shutter assy and reel shaft rear arm start rotating, and the film can be loaded. When the knob is set to this position during reversing, the machine immediately gets set to FORWARD.

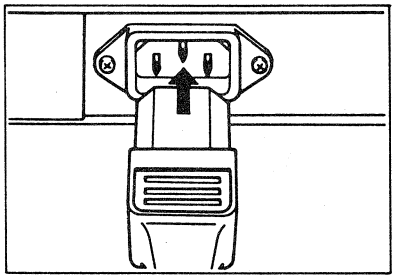
③ : When the knob is set to this position, the lever pad roller comes down, the lamp lights up and then forward replay starts. In the meantime, the button thread returns to its original position.

④ R◀ : When the knob set to this position, the first sprocket assy, second sprocket assy, shutter assy and reel shaft front arm start rotating. If the knob is set to this position during forwarding, the machine gets immediately set to REVERSE.

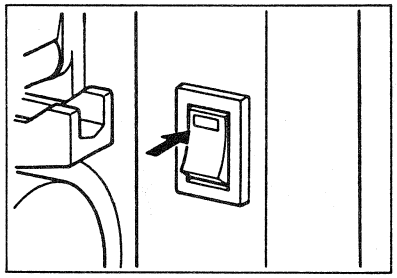
⑤ : When the knob is set to this position, the lamp lights up and then reverse replay starts. Sound does not come out during reverse replay.

I – 4 Setting Up

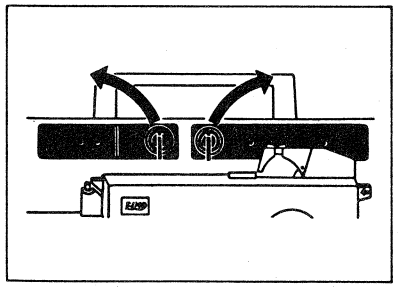
1. Plug the power cord.



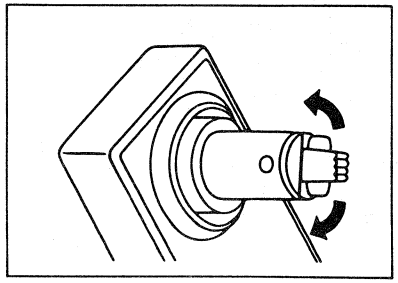
2. Turn on the main switch.



3. Pull both reel arms up into position.

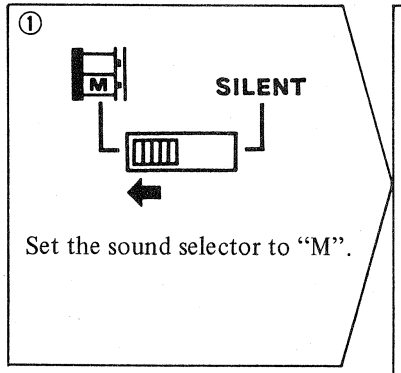


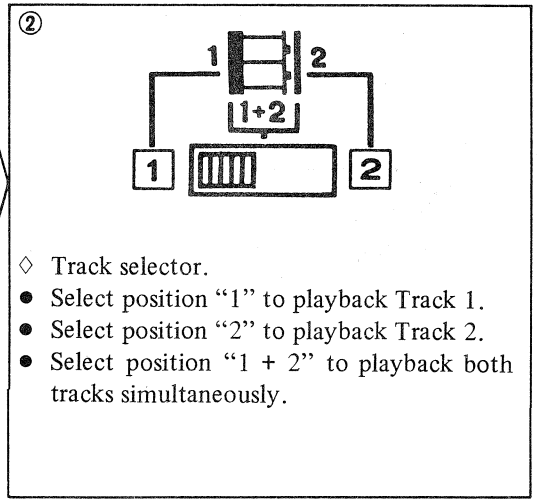
4. Place your film on the feed reel arm and the take-up reel on the take-up reel arm. Press the reel locks until the reels are snugged against the spindles.



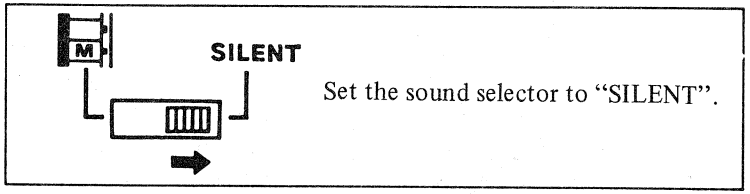
5. Set the sound selector to "M" or "SILENT" according to the type of film to be projected.

◈ Magnetic Sound Film





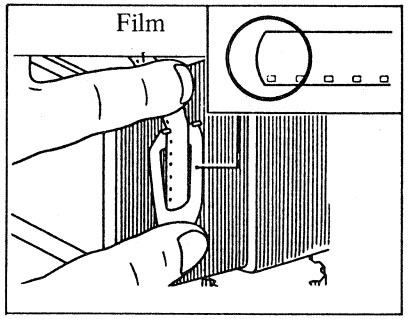
◈ Silent Film



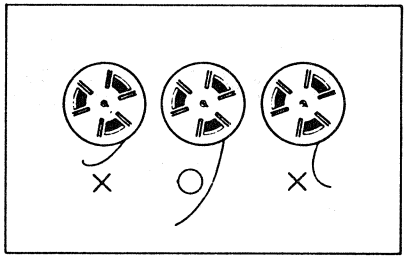
Note: Track selector is for magnetic film only, and optical sound is not played back.

I – 5 Film Threading

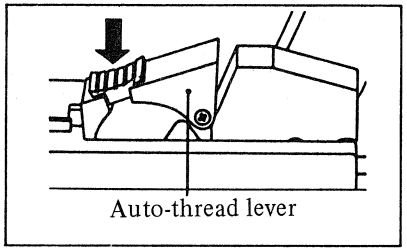
1. To insure smooth automatic threading, trim the end of the film leader with the film trimmer. Locate a film perforation over the pin and trim off the end of the film.



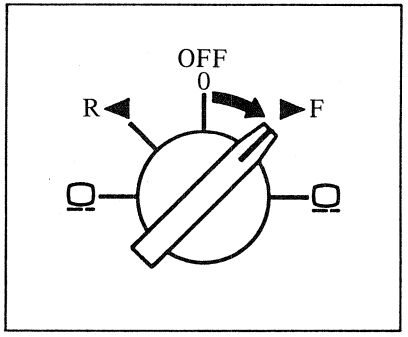
Note: When the tip of the leader is bent or snapped, trim off. Be sure to prepare a straight leader without any bend or snap as illustrated.



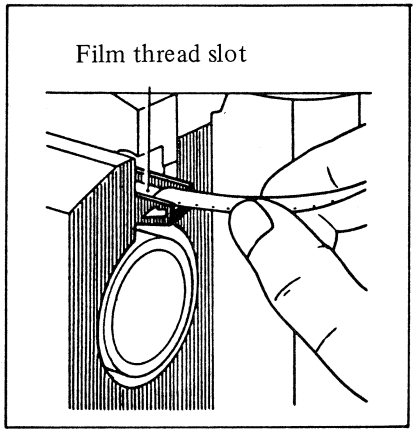
2. Depress the green auto thread lever until it locks.



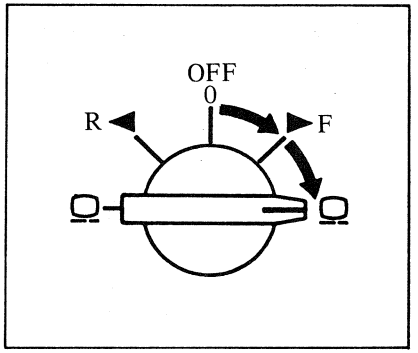
3. Advance the master control knob to "▶F" position with the main switch on, and the motor runs.



4. Insert the film leader into the thread slot as indicated by the arrow. The film will automatically thread to the take-up reel through the film guide.
   Note: If the film fails to attach itself to the take-up reel, reverse the master control knob to "OFF" position and then attach the leader to the take-up reel manually.



5. When the master control knob is further turned to "⏀" position; the auto thread lever will release automatically.

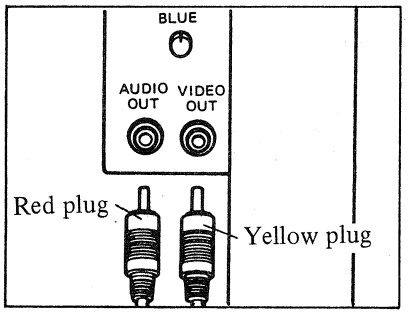


I – 6 Connection to Monitor TV

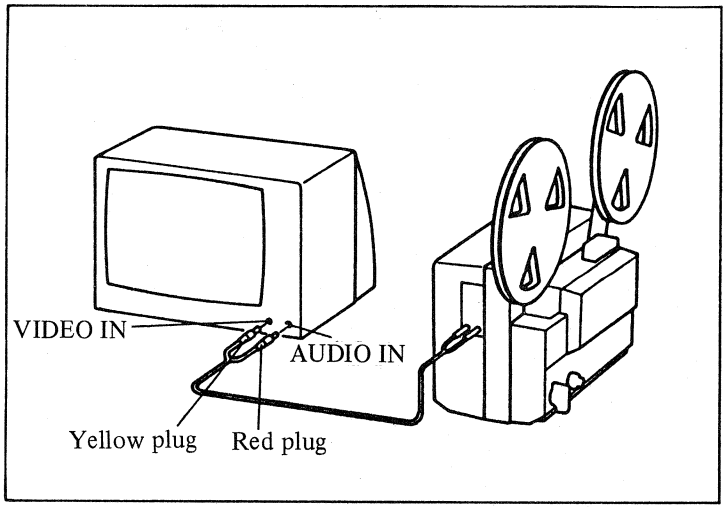
Connect the TRV-S8/R8 and a monitor TV with the supplied video/auto cable.

1. Connect the yellow plug to VIDEO OUT (Yellow) and the red plug to AUDIO OUT (Red) receptacles of the TRV respectively.

   Note: Audio out receptacle is not built in the TRV-R8.

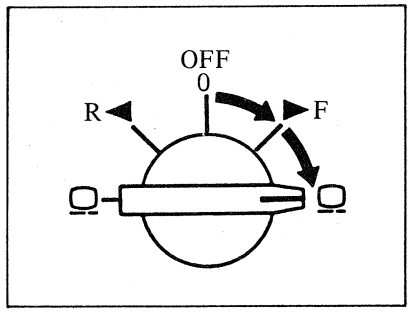


2. Connect the yellow plug to VIDEO IN and the red plug to AUDIO IN receptacles of a monitor TV respectively.

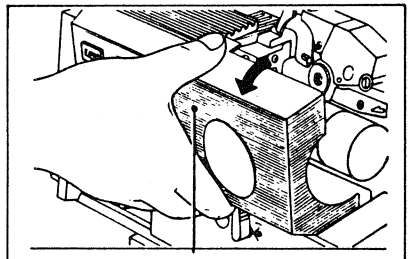


I – 7 Playback on Monitor TV

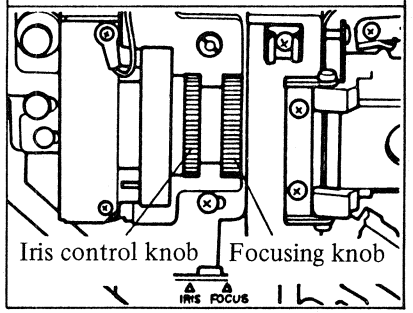
1. Turn the master control knob clockwise to "▶F", and then turn it further to "⏍" to start playback of the film image on a monitor TV.



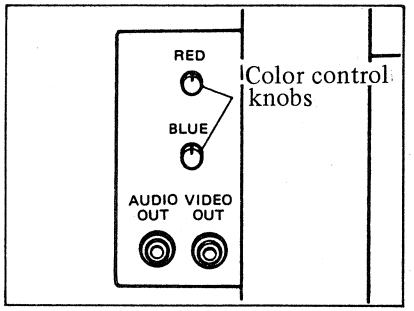
2. Open the front cover by pulling the top toward yourself.



Adjust focus with the focusing knob and brightness with the iris control knob respectively.

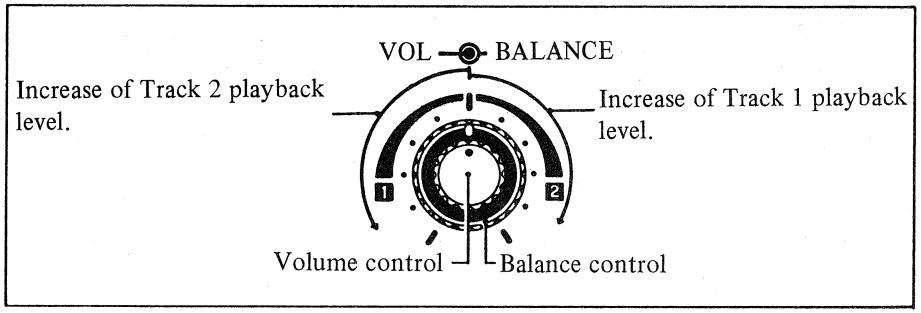


3. Adjust blue/red color tones with the color control knobs.

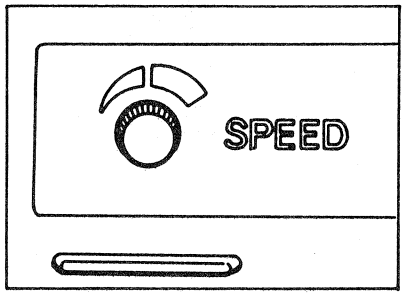


4. Adjust the volume by turning the volume control knob.

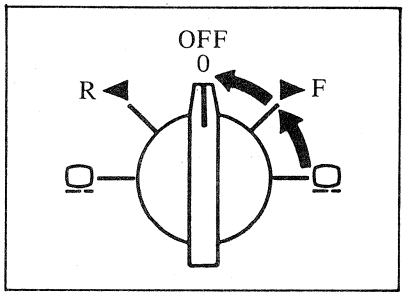
5. The balance control knob is used to balance the playback levels of Track 1 and Track 2. The balance control is normally set in the middle position. If Track 1 is higher than Track 2, turn the knob clockwise until both tracks are balanced.
   Note: 1. Be sure to set the track selector at "1+2" position.
   2. Only one track will be played back if the balance control is turned all the way in one direction.
   3. When recording sound, the balance control knob will not function.



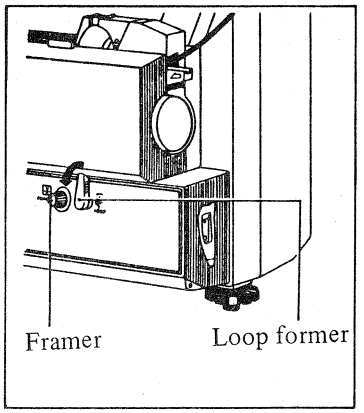
6. Fine speed adjustment:
   This projector is set at 20 fps projection speed, and fine speed adjustment of ±1 fps is possible. Take care so that a bar may not appear on a TV screen during playback.



7. When playback is over, turn the master control knob to "OFF".

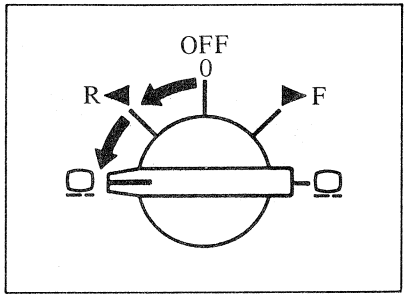


Adjust the framer to eliminate frame line. Press the loop former to restore the film loop if lost during profection.
Note: When the film loop is lost during projection, check the film's perforations and splices after projection is over.

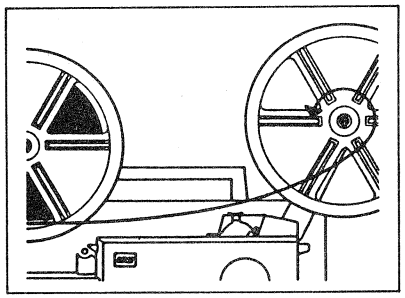


I – 8 Reverse Playback

Advance the master control knob counterclockwise to "▭" position through "R◀".
Note: Sound is not played back during reverse playback

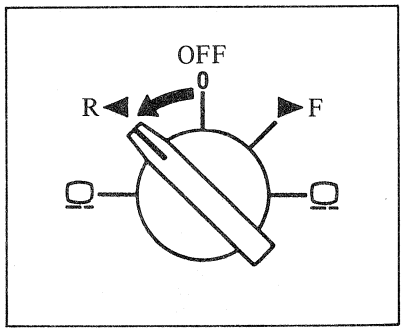


I – 9 Film Rewinding



1. When the playback is over, insert the film end into the slot of the feed (front) reel hub.

2. Turn the master control knob to "R◀".

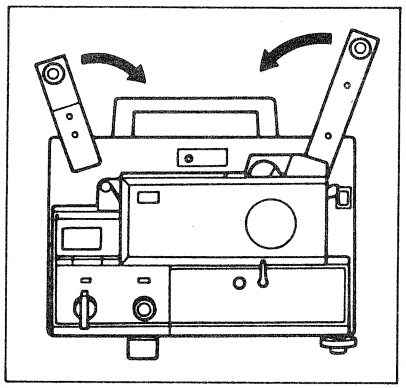


3. After the film is completely rewound, turn the master control knob to "OFF".

4. Remove reels.

I – 10 Stowing

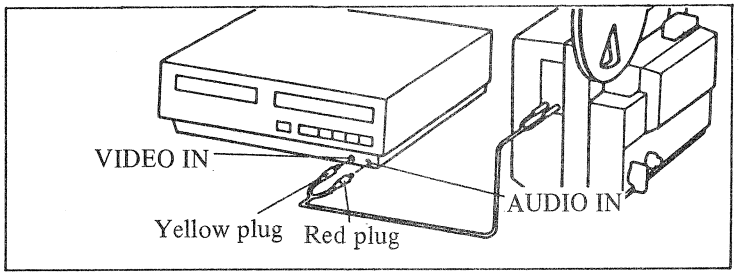
- Turn off the main switch.
- Return the power cord, video/audio cable to the cord storage.
- Fold the feed and the take-up arms.



I – 11 Recording with VCR

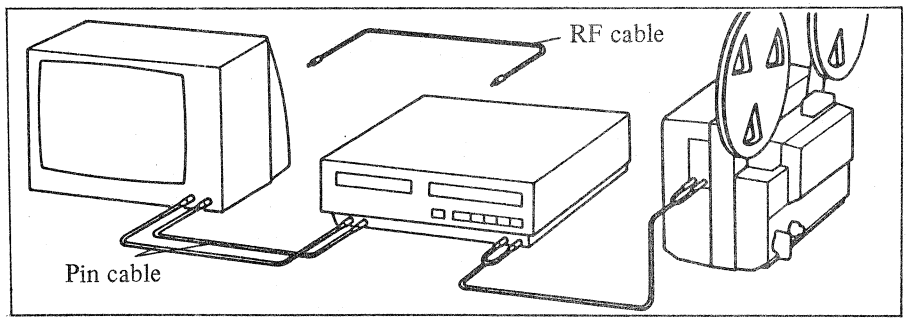
Connect the TRV-S8/R8 and a video cassette recorder (VCR) with the supplied cable. video/audio
Connect the yellow plug and the red plug to VIDEO IN and AUDIO IN of VCR respectively.

Note: Audio out receptacle is not built in the TRV-R8.



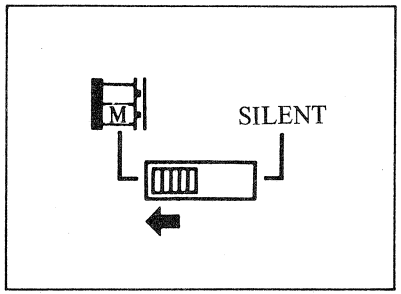
* Monitoring while Recording

Connect the TRV-S8/R8 to a VCR with the supplied video/audio cable as above.
Connect the VCR to a monitor TV with a RF cable or video/audio pin cables.

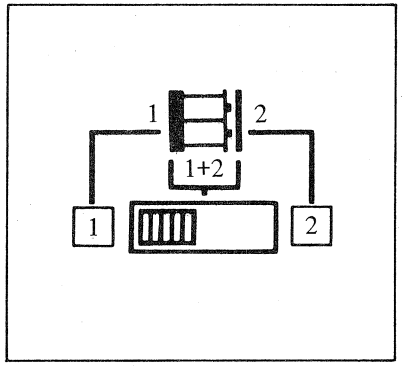


I – 12 Recording on Film (TRV-S8 only)

1. Set the sound selector to "M".
   Note: Record button does not work unless the selector is set to "M".



2. Set the track selector either to "1" (Track 1) or "2" (Track 2).
   (The sync-film carries sync-sound on Track 1. So, set the track selector to "2" to build new music or narration on Track 2 without affecting the sound on Track 1.)
   Note: 1. Sound cannot be recorded if the track selector is at "1+2" position.
   2. If a new sound is recorded on a previously recorded track, the previous sound is erased.

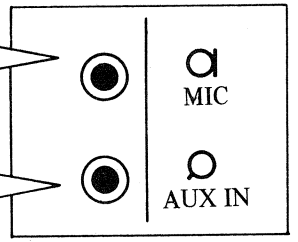


3. Load the TRV-S8 with film.

4. Connect record input lines.

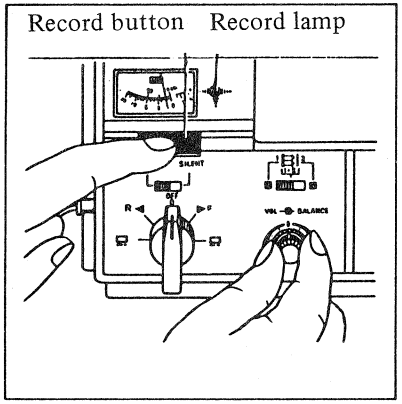
Connect the microphone plug to MIC jack.
Note: When using the microphone, hold it as close to sound source as possible.

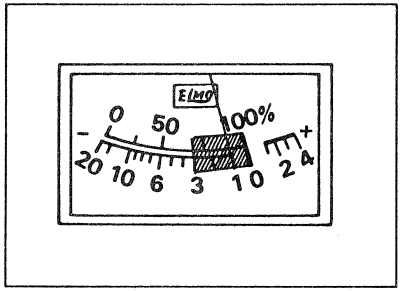
Connect LINE OUT or AUX OUT jack of the tape recorder, tuner or stereo set to AUX IN jack of the projector.



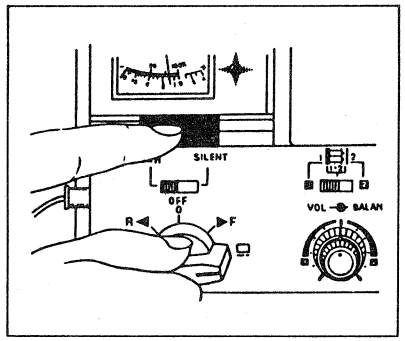
- If MIC and AUX IN jacks are plugged in simultaneously, sounds from MIC and AUX IN are blended.

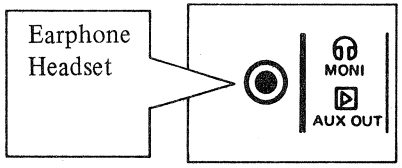
5. Depress the record button and the record lamp comes on.
   Adjust the sound input level by turning the volume control while checking the recording level on the level meter. Set the level so that the needle of the level meter stays within the shaded zone (from –3 to 0) as illustrated.
   - The built-in limiter circuit works at a maximum input level to eliminate distortion, achieving optimum recording. The limiter circuit works for both MIC and AUX IN.



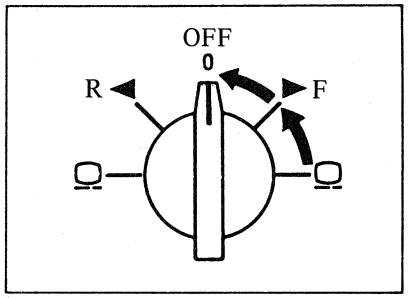


6. Start Recording
   Advance the master control knob clockwise to "▭" postiton while depressing the record button.
   - Monitoring
     Connect an earphone or a headset to MONI jack to monitor the sound being recorded.



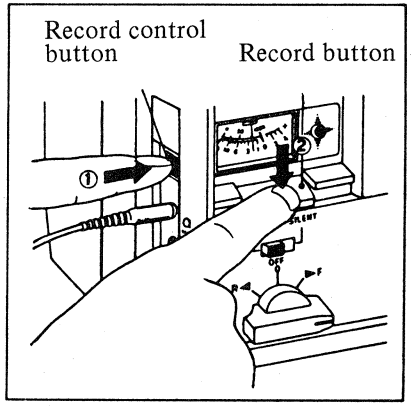


7. Stop Recording
   Turn the master control knob to "OFF" position.



I – 13 Spot Recording (TRV-S8 only)

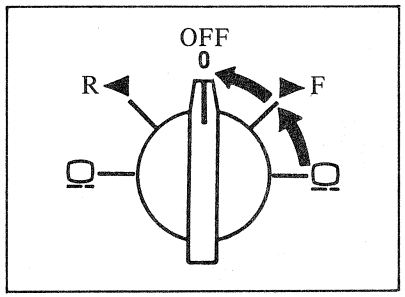
1. Record Control Button
   This button allows you to make spot recording without stopping the TRV-S8. Depress the record control button ① together with the record button ② when the desired film position is reached. Release your finger from the record control button ① and the record button ② is locked.



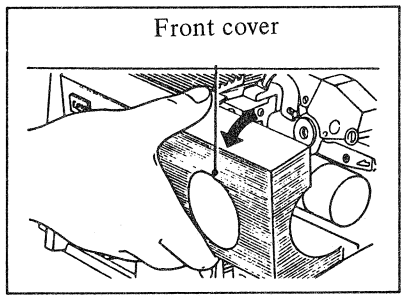
2. How to Release Record Control Button
   Just depress the record control button and the recording setup is released. This procedure permits you to resume playback mode without stopping the TRV-S8.

I – 14 Removing the Film during Midway Playback

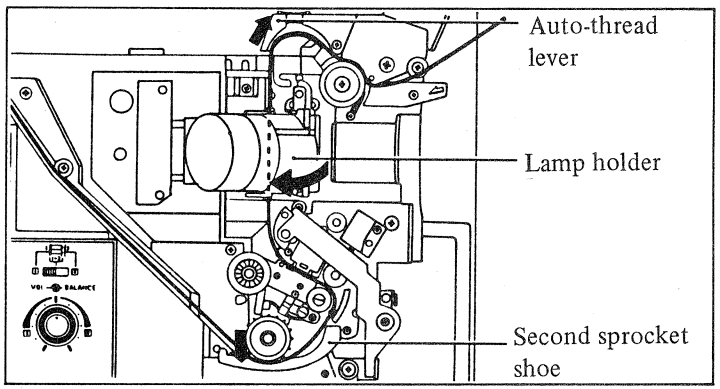
1. Turn the master control knob to "OFF" position.



2. Open the front cover by pulling the top toward yourself.

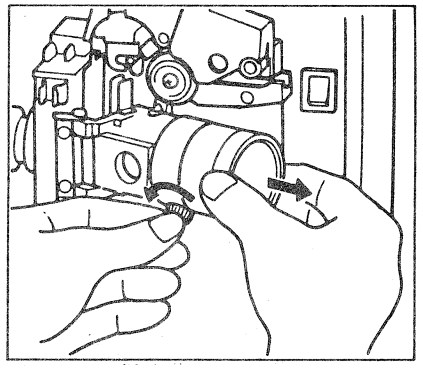


3. Swing the lamp holder to the arrow direction.
4. Open the auto thread lever upward and remove film.
5. Press the second sprocket shoe downward and remove film.

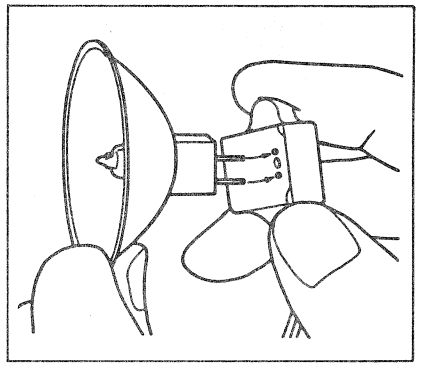


I – 15 Replacing Lamp

1. Remove the front cover.
2. Remove the lamp holder by turning the attaching screw counterclockwise.

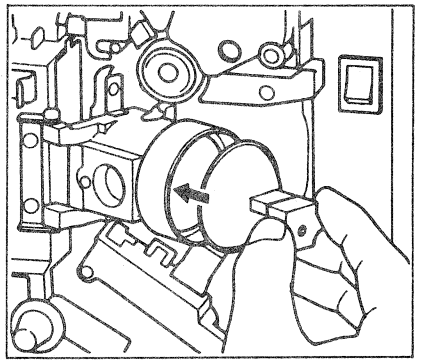


3. Remove the halogen lamp from lamp socket and insert a new lamp to the socket.
   Use ELMO JDR 6V-10W lamp.



4. Install the lamp and then put the lamp holder and fix it with the screw.

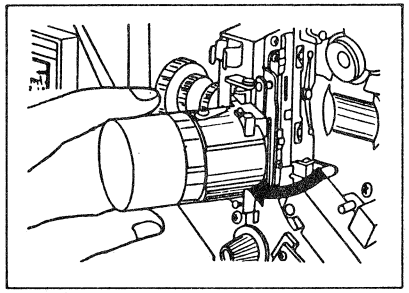
   Note: Do not apply force to two pins of lamp.



I – 16 Cleaning

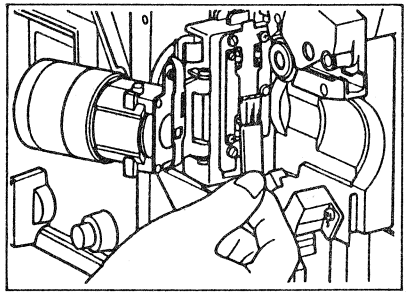
Periodic cleaning of the projector is important for keeping it (and your films) in top condition.

1. Pull the front cover down to open.

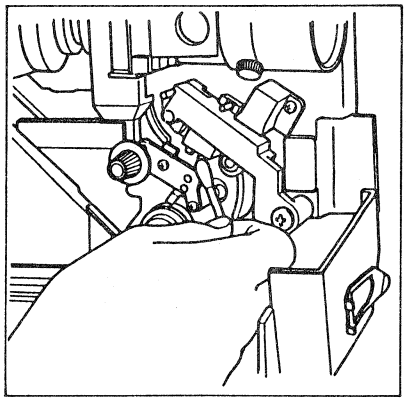


2. Swing the lamp holder away from the body in the direction of the arrow.

3. Gently clean the aperture and pressure plates with the brushes or a soft lintfree cloth.



4. Dirt or dust deposits on the sound heads will degrade the sound playback quality. Clean the sound heads with a cotton swab or soft cloth. In this case, be sure to disconnect the power cord and set the master control knob at "OFF" position.



I – 17 Troubleshooting Hints

Q. When the motor fails to operate;
- A. Check if the main switch is turned on.
- A. Check the power cord for proper connection.

Q. When film is not threaded;
- A. Check if the proper type of film is used. (TRV-S8 for Super 8 film and TRV-R8 for Regular 8 film)
- A. Check if the end of the film leader is properly trimmed.
- A. Check if the perforations are not damaged and if the film is spliced correctly.
- A. Check if the film is not bent or not snapped.

Q. When no playback picture is reproduced;
- A. Check if the lamp is securely inserted.
- A. Check the lamp for blowout.
- A. Check the video cable for proper connection.

Q. When no sound is reproduced;
- A. Check the audio cable for proper connection.
- A. Check if the volume control knob is turned clockwise.
- A. Check if the track selector is set properly.
- A. Check if the sound selector is set properly.
- A. Check if the film is not silent one.

II. CCD CAMERA SECTION

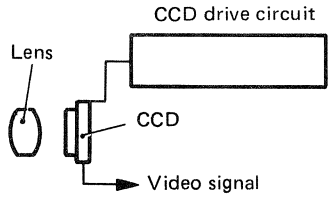
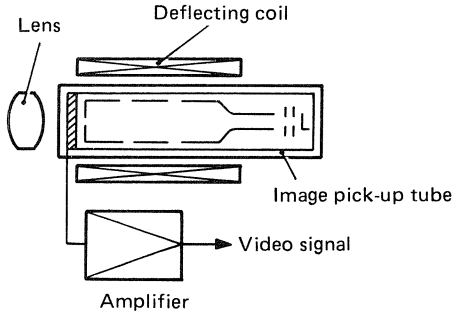
II – 1 Outline of CCD:

The CCD (Charge Coupled Device) is a semiconductor image pick-up element applying the latest technology of large scale integrated circuit (LSI), and is used as a substitute for the image pick-up tube. In other words, it is one of the solid image pick-up elements. This image pick-up element is made by arranging numerous picture elements on the silicon substructure board by using the semiconductor technology.
The solid image pick-up element generates charges in proportion to the quantity of incident light due to photoelectric effect, the charges are accumulated in the "potential well" formed by applying voltage to the CCD. The accumulated charges have a property to flow into the deeper neighboring "potential well." Hence, the charges are transferred in a "bucket relay" form in accordance with the voltage applied to the electrodes of CCD one after another. In other words, the CCD is capable of carrying out three functions, namely photoelectric conversion due to light, accumulation of signal charges and transfer of signal charges. This transfer system is called "charge transfer system." There are other solid image pick-up elements also, such as MOS, CPD, etc.

The TRANSVIDEO series uses Toshiba CCD (TCD 2040), with the number of picture elements being 398 (W) x 492 (H) = 200,000 pieces, and the size of the image pick-up section being 6.39 x 4.88 mm (equivalent to ½ inch).

* Comparison between solid image pick-up element (CCD) and image pick-up tube camera:

	CCD	Image pick-up tube camera
1. Life	The CCD, being equivalent to the semiconductors such as transistor and IC, has long life and high reliability.	Like the vacuum tube, the image pick-up tube camera has economical deterioration of the heater due to beam radiation.
2. Residual image and seizure	The CCD has less residual image, and has no seizure even when the same object is photographed for a long time or when extremely strong light (such as spot light) is applied.	The residual image and seizure can not be avoided because of the property of photoelectric conversion film. Should the extremely strong light (such as sunrays) be mistakenly photographed, the image pick-up tube may have to be changed. Hence, due care is necessary.
3. Pattern distortion	With the picture elements properly arranged and the signals read out by scanning these elements, there is no pattern distortion.	Since the scanning is carried out by means of the electronic beam, it is difficult to scan correctly both the center and peripheral sections, resulting in color shading, etc.
4. Resistance against vibration and shock	Being a semiconductor, it has excellent resistance against vibration and shock.	Composed of glass tubes, filaments, electrodes, etc., it is vulnerable to vibration and shock.

5. Picture appearing time	Since there is no heater, the picture appears immediately after turning the power to ON.	The picture does not appear till the heater gets warmed up.
6. Size and weight	It is small in size and light in weight. * External dimension: 25 mm (D) x 19 mm (W) x 10 mm (H) (including lead wire leg length) * Weight: 5 g	The length for sending out electronic beam and the space for deflecting coil are needed. * For ½" image pick-up tube for EC-10: Tube dia.: 13.5 mm Total length: 92 mm Weight: 3 g (with coil:) 5.1 g Coil dia.: 22 mm
7. When used in electro-magnetic field	It is not affected.	The electronic beam being likely to get affected, there are pattern distortion, color shade, etc.
8. Power consumption	Being a semiconductor, the power consumption is small, amounting to 1.5 – 2 W for the camera section only. 	The power consumption is 2.5 – 4 W because of the heater, deflecting coil, high voltage, etc. 

II – 2 Principle of Function

(1) Basic Structure:

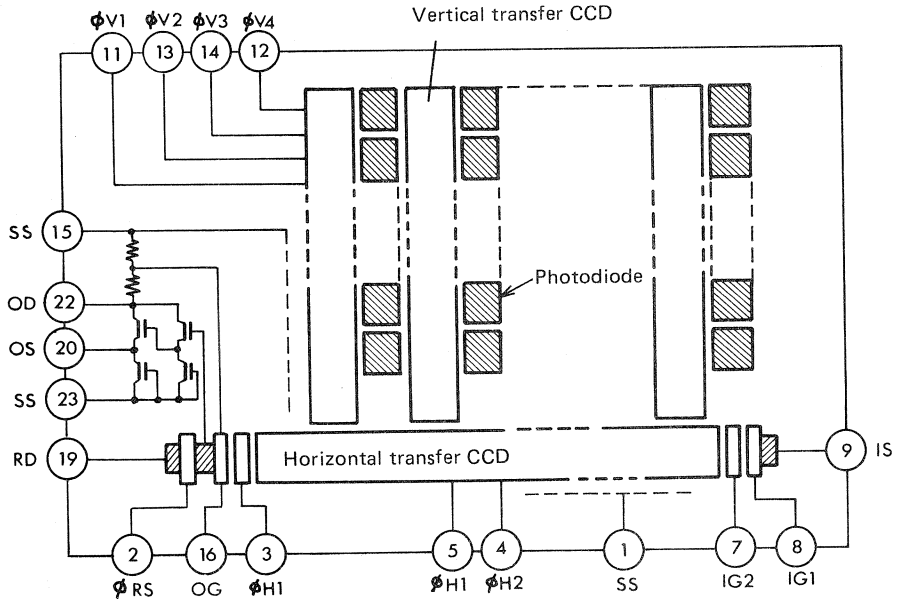
The color CCD (TCD 204C), adopted in TRV series, has a total number of 200,000 picture elements – 398 in horizontal direction and 492 in vertical direction – are properly arranged, with each element formed by photodiode photographic element. The picture elements generate signal charges in proportion to the intensity of light. Furthermore, each picture element is pasted with color filter to correspond with each other.

Vertical transfer CCD:

The vertical transfer CCD is located adjacent to each picture element in order to carry out vertical transfer. The signal charges generated by photodiode every 1/60 second in the picture elements are all shifted simultaneously into vertical transfer CCD. The transfer is thus repeated till the signal charges are transferred to the horizontal transfer CCD at the final stage.

Horizontal transfer CCD:

The signal charges, equivalent to the signal of 1 scanning line, are shifted from vertical transfer CCD, transferring the signal charges at a high speed, and reading them out through the output stage.



Transfer drive:

Vertical transfer:	$\phi V_1 - \phi V_4$	4-phase drive
Horizontal transfer:	$\phi H_1/\phi H_2$	2-phase drive

(2) Transfer System:

The signal charges are basically read out in the following manner.

1) First of all, the signal charges, generated in the picture elements in proportion to the quantity of light, are all simultaneously shifted into vertical transfer CCD, with the voltage applied to the electrodes of vertical transfer CCD to prevent the signal charges from getting mixed up. The picture elements, with no signal charges, accumulate new signal charges until the next transfer starts.

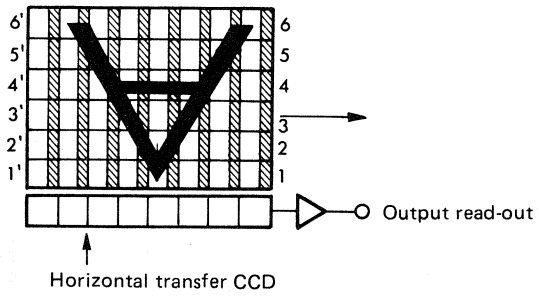
2) The signal charges, transmitted to the vertical transfer CCD, are shifted to the horizontal transfer CCD by changing the voltage to the electrodes. The signal charges in 1 – 1' are shifted to the horizontal transfer CCD, and the signal charges in 2 – 2' to the vertical transfer CCD. In this way, the signal charges successively shift in the direction of the horizontal transfer CCD.

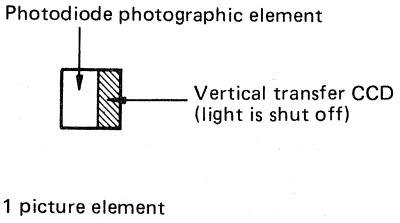
3) The signal charges in 1 – 1', transferred to the horizontal transfer CCD, are read out as output by changing the voltage to the electrodes. This read-out output becomes the signal of 1 scanning line.

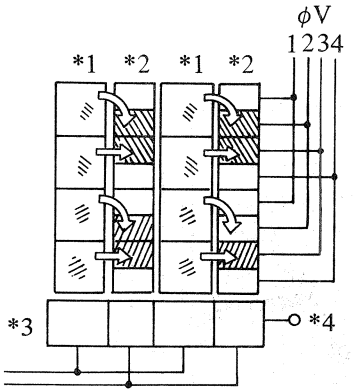
4) After reading the signal charges in 1 – 1', the signal charges in 2 – 2' are shifted to the empty horizontal transfer CCD in the manner mentioned above.

5) The operations in items 2) – 4) are continuously made to repeat the transfer in item 1) after the horizontal and vertical transfer CCDs become empty.

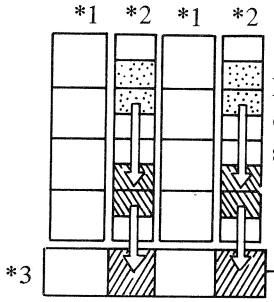
Since the signal charges of all picture elements are read out by one vertical scanning, the signal charges are shifted by applying the CCD drive pulse of $\phi V_1 - \phi V_4$ to the vertical transfer CCD, carrying out operations in items 1) – 4) per 1/60 second (field accumulation), and the pulse of $\phi H_1/\phi H_2$ to the horizontal transfer CCD.





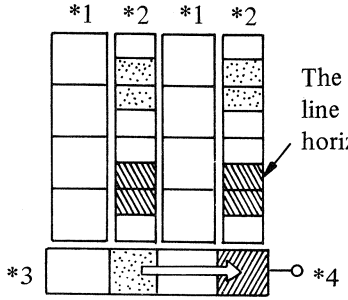


(1) From photographic section to vertical transfer CCD.



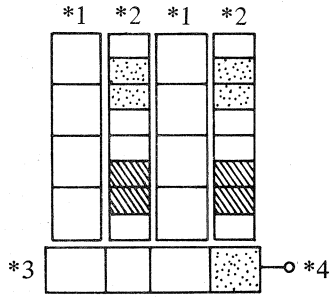
Photographic section carries out photo electric conversion till next transfer starts.

(2) From vertical transfer CCD to horizontal transfer CCD.

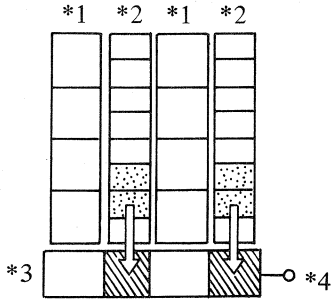


The signal charges of next line do not shift till the horizontal reading ends.

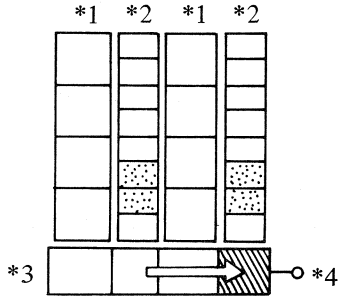
(3) Read out of one scanning line signal



(4) End of one scanning line



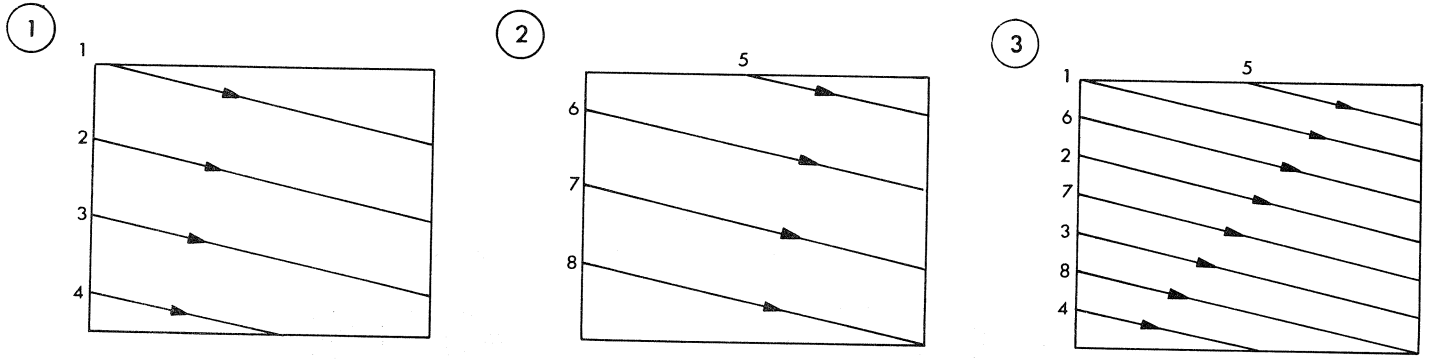
(5) Transfer of next line signal charges



(6) Read out of next one scanning line signal

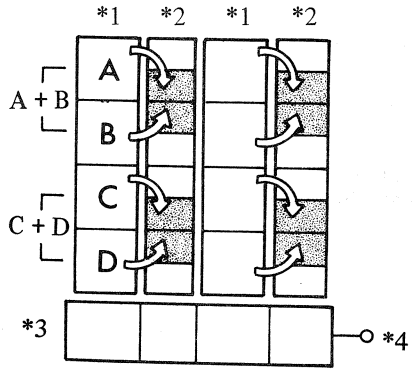
Remarks, *1: photographic section
*2: vertical transfer CCD
*3: horizontal transfer CCD
*4: read out

* The standard television system in Japan consists of a total number of 525 scanning lines and 30 pieces of pictures per second, with the aspect ratio of the picture being 3 : 4.
The scanning system is the interlaced scanning of 2 : 1. As shown in the Figs., scanning is first carried out by skipping 1 – 4, and then between 5 – 8 and section of preceding scanning till the scanning of the whole picture is completed. At the first scanning, 262.5 pieces of scanning lines are scanned while the remaining 262.5 are scanned at the second scanning, the scanning time in both cases being 1/60 second. In other words, 2 pieces of rough pictures have to be piled to complete one piece of picture, with the needed for this being 1/60 x 2 = 1/30 second.
The rough picture after 1 vertical scanning is called 1 field, and the picture completed by 2 vertical scanning is called 1 frame.

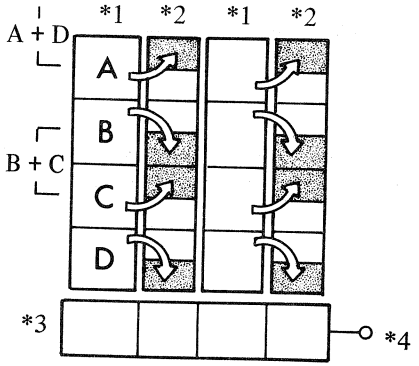


In CCD, this interlaced scanning is taken into consideration, and the photographic signal charges are read out.
In TRV-series, CCD is used at field accumulation mode, that is, 2 neighboring picture elements are simultaneously added to produce the signal corresponding to one horizontal scanning line, and the interlaced scanning is carried out by changing the simultaneously added vertical picture elements at the first and second vertical scanning as shown in the Figs.

First scanning



Second scanning



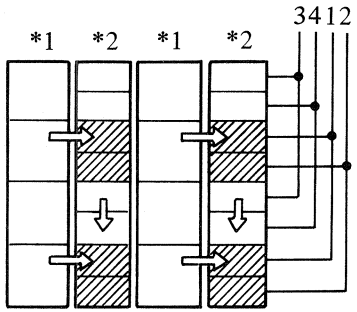
remarks, *1: photographic section
*2: vertical transfer CCD
*3: horizontal transfer CCD
*4: read out

Supplementary explanation

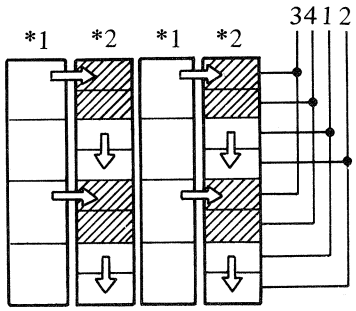
- Frame accumulation:

  There is also the signal charge read-out system as shown in the Figs. below in order to carry out interlaced scanning. This system is adopted in ELMO's CCD monochromatic (black & white) camera 8400.

First vertical scanning



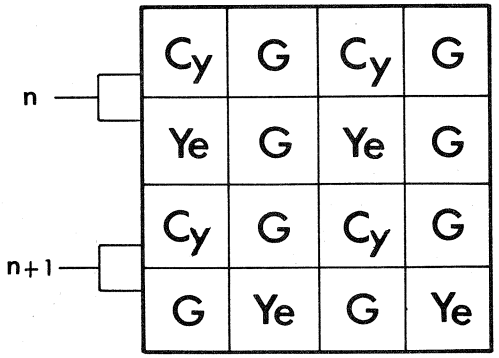
Second vertical scanning



Remarks, *1: photographic section
*2: vertical transfer CCD

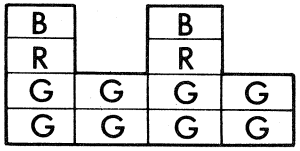
(3) Color CCD Camera Main Body:

The monoplate type color CCD camera has color filters piled on the chip in mosaic form. There are various types of color systems such as frequency separation system, Bayer system, color difference succession system, etc.
The TRV series uses the frequency separation system with the features such as excellent resolution of brightness signal, high sensitivity, easier signal processing circuit, etc. Furthermore, the color fitters are piled on the picture elements of CCD, and are arranged to correspond with the elements. Below is shown the arrangement of color filters.

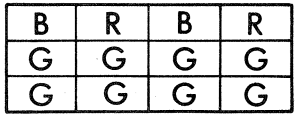


	Color	Feature
Cy :	Cyanic (bluish green)	The filter eliminates the red component of light, letting the blue and green components pass (permeate).
Ye :	Yellow	The filter eliminates the blue component of light, letting the red and green components pass.
G :	Green	The filter permeates the green component of light.

When shooting white color by using the CCD color camera, the light components passing through the filters are as shown below.



(a) n-line



(b) n + 1 line

Expressing these components by formulas (equations);

$$S_n = \frac{1}{2}\{4G + B + R + \frac{4}{\pi}(B + R)\sin \omega t\} \quad (A)$$

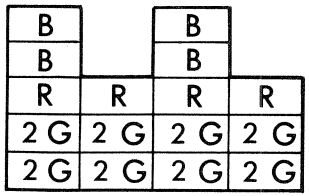
$$S_{n+1} = \frac{1}{2}\{4G + B + R + \frac{4}{\pi}(B - R)\sin \omega t\} \quad (B)$$

ω: Repeated space frequency of the color filter

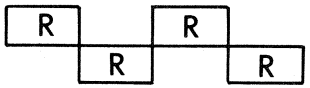
The brightness signal Y_H is obtained by passing the DC components of both equations through the LPF (low-pass filter), and the green (color) signal Y_L by limiting the bands of these DC components.

$$Y_H = \frac{1}{2}(4G + B + R)$$

Next, the signal with red or blue component can be obtained by adding/subtracting the AC components of the above equations.



(a) + (b)



(a) – (b)

$$n = \frac{1}{2}\left\{\frac{4}{\pi}(B + R)\sin \omega t\right\}$$

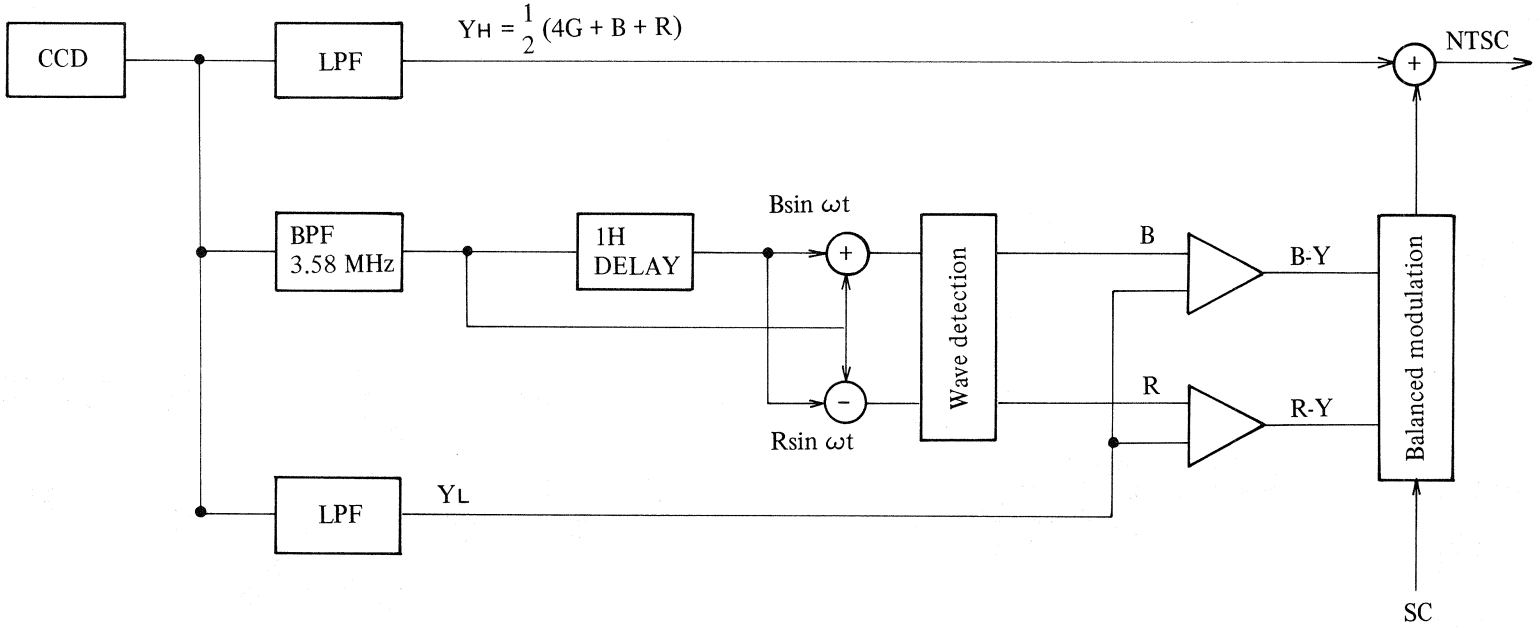
$$n + 1 = \frac{1}{2}\left\{\frac{4}{\pi}(B + R)\sin \omega t\right\}$$

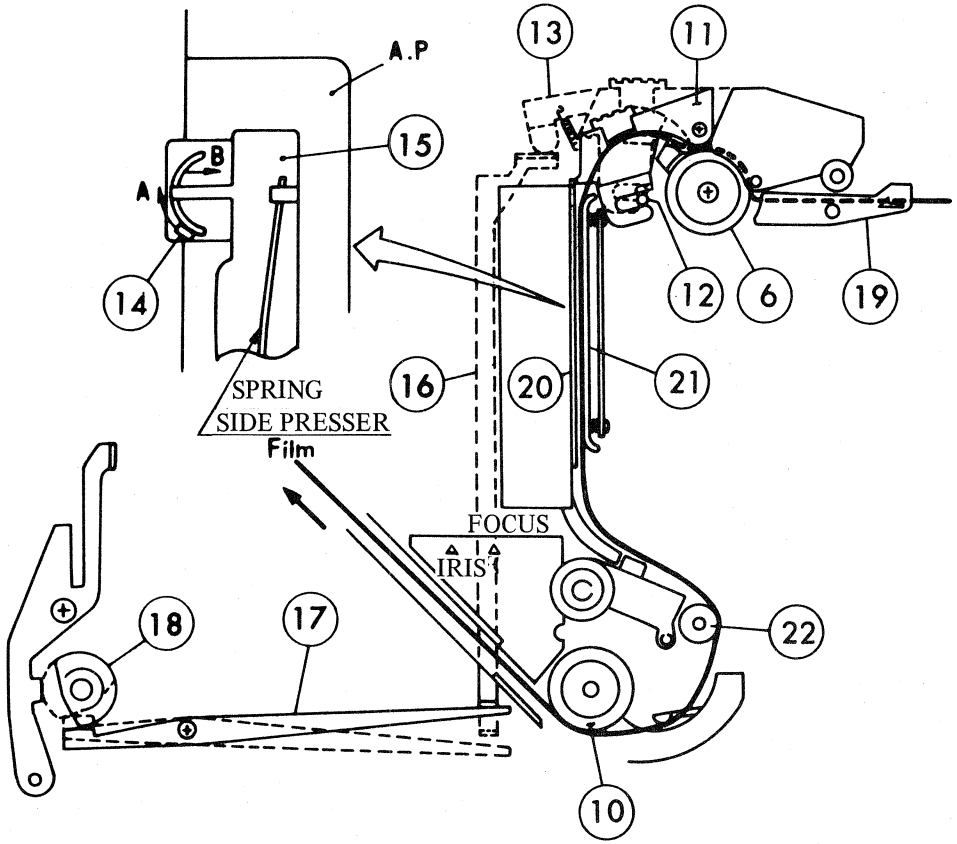
$$\therefore n + (n + 1) = \frac{4}{\pi} B \sin \omega t$$

$$n - (n + 1) = \frac{4}{\pi} R \sin \omega t$$

Here, $\omega = 3.58$ MHz due to the arrangement of picture elements. Hence, the carrier waves of 3.58 MHz are multiplexed with R and B signals, which are amplitude-modulated (B + R) and (B – R), in the form of frequency interleaf in the DC component composed of ½ (4G + B + R).

The circuit structure is shown below.


CCD
LPF
$Y_H = \frac{1}{2}(4G + B + R)$
NTSC
BPF
3.58 MHz
1H
DELAY
Bsin ωt
Rsin ωt
Wave detection
B
R
B-Y
R-Y
Balanced modulation
LPF
Y_L
SC


A.P
B
A
13
11
15
14
12
6
19
16
20
21
SPRING
SIDE PRESSER
Film
FOCUS
IRIS
18
17
22
10

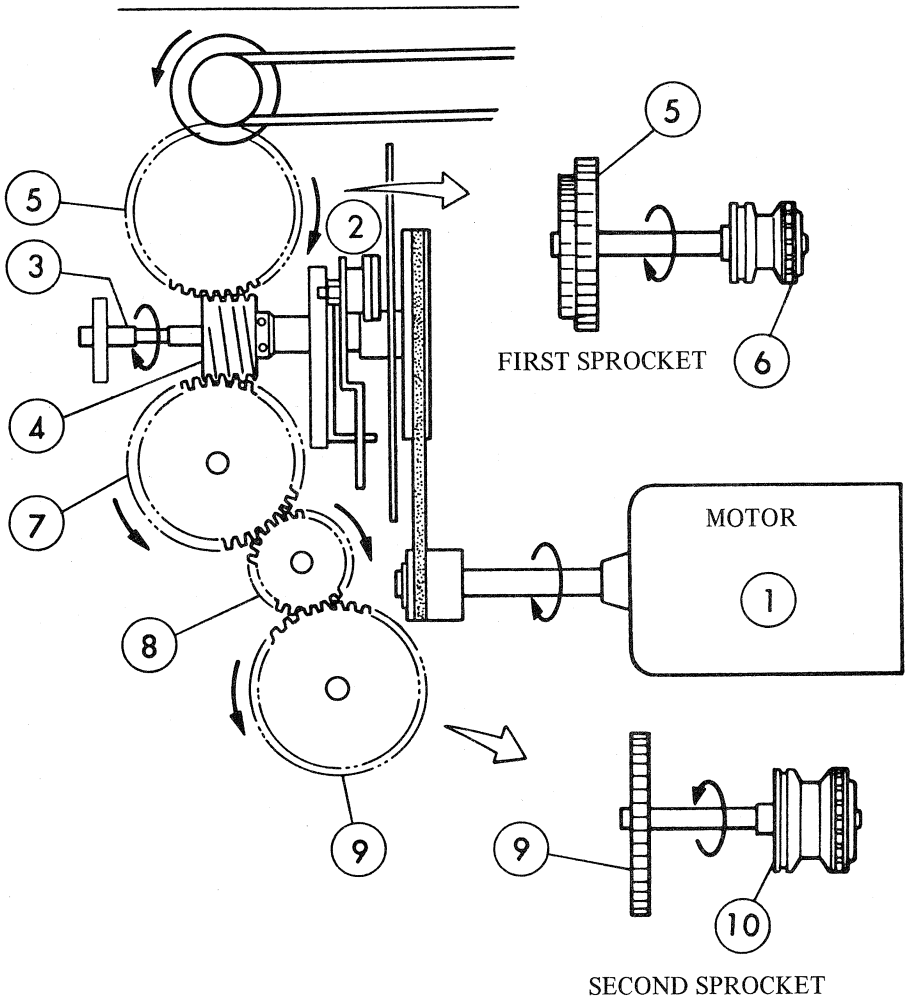
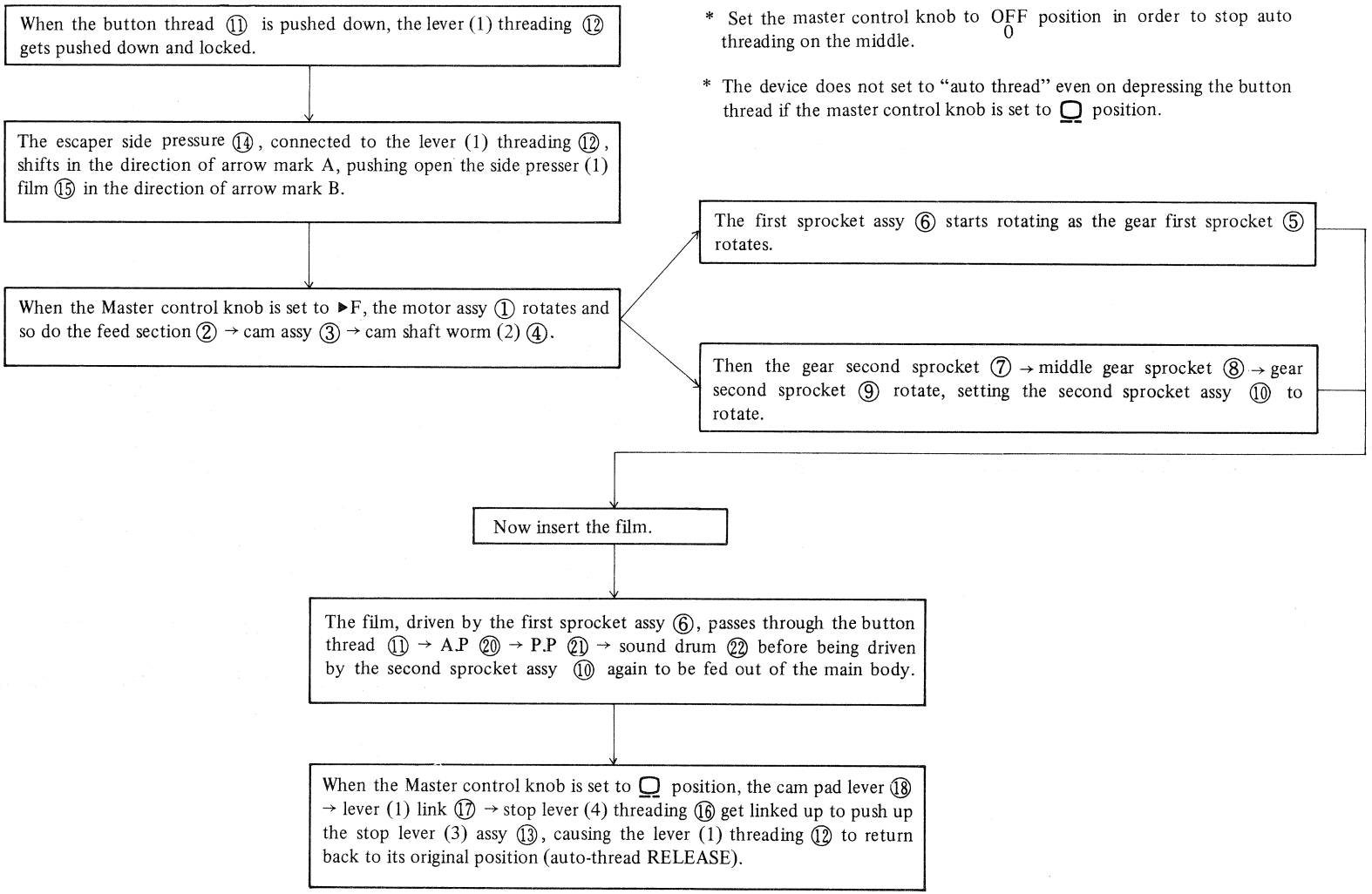

5
5
2
3
FIRST SPROCKET
6
4
7
MOTOR
1
8
9
9
10
SECOND SPROCKET

Fig. 4

III. MECHANICAL SECTION

III – 1 Driving Mechanism Functions

III – 1 – 1 Auto Thread Function (See Fig. 4)



* Set the master control knob to OFF position in order to stop auto threading on the middle.

* The device does not set to "auto thread" even on depressing the button thread if the master control knob is set to ⏀ position.

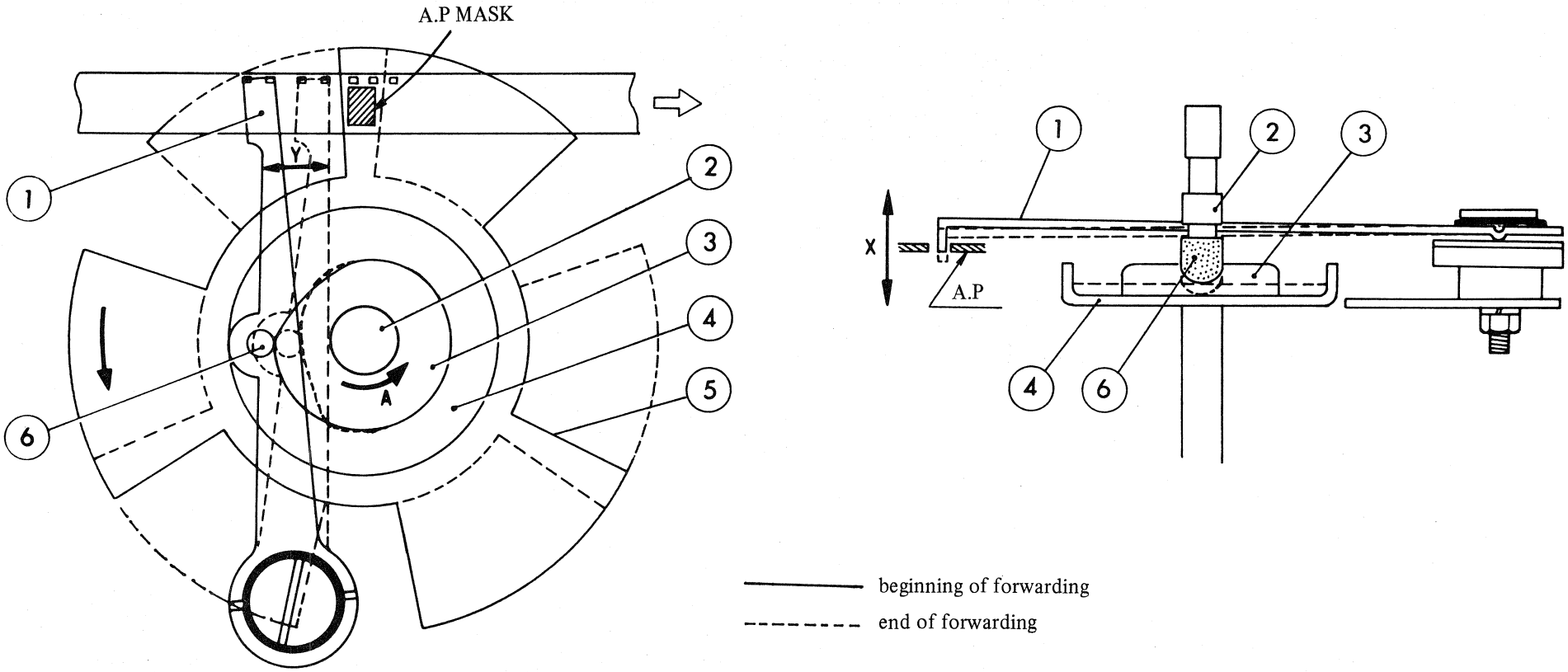

A.P MASK
Y
1
2
3
4
5
6
A
X
A.P
beginning of forwarding
end of forwarding

Fig. 5

Ⅲ – 1 – 2 Intermittent Film Feeding Function (See Fig. 5)

The rotation, transmitted from the motor, sets the cam assy ② shaft to rotate.

Then the cam ③, attached to ②, starts rotating.

The face cam ④, attached to ②, also rotates.

The shutter assy ⑤ is installed to cover the A.P mask when the claw assy ① moves in the direction of arrow mark Y.

The pin claw ⑥, touched ③, sets ① to function in the direction of arrow mark Y when the ③ rotates.

Since the ⑥, installed to the ①, is close fitted to the ④, the ① moves in the direction of arrow mark X when the ④ rotates.

The film is fed through the movement of the ① in the direction of arrow marks X and Y.

The relation among claw assy ①, cams ③ and ④, and shutter assy ⑤ is shown in Fig. 6.

A – Film feeding section B – Rear feeding section

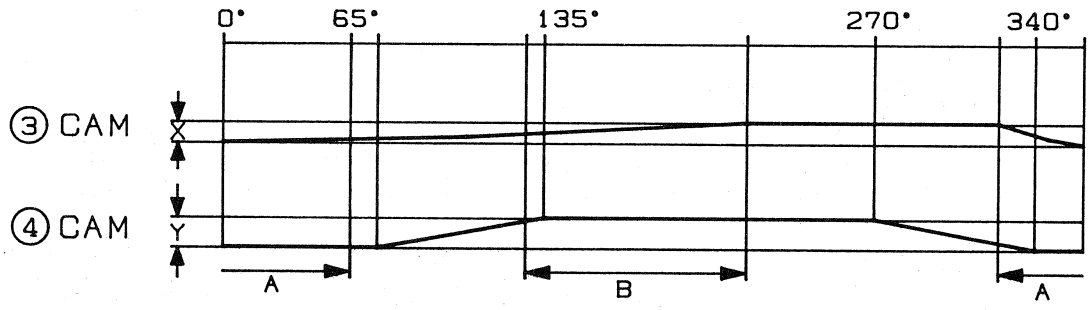


Fig. 6

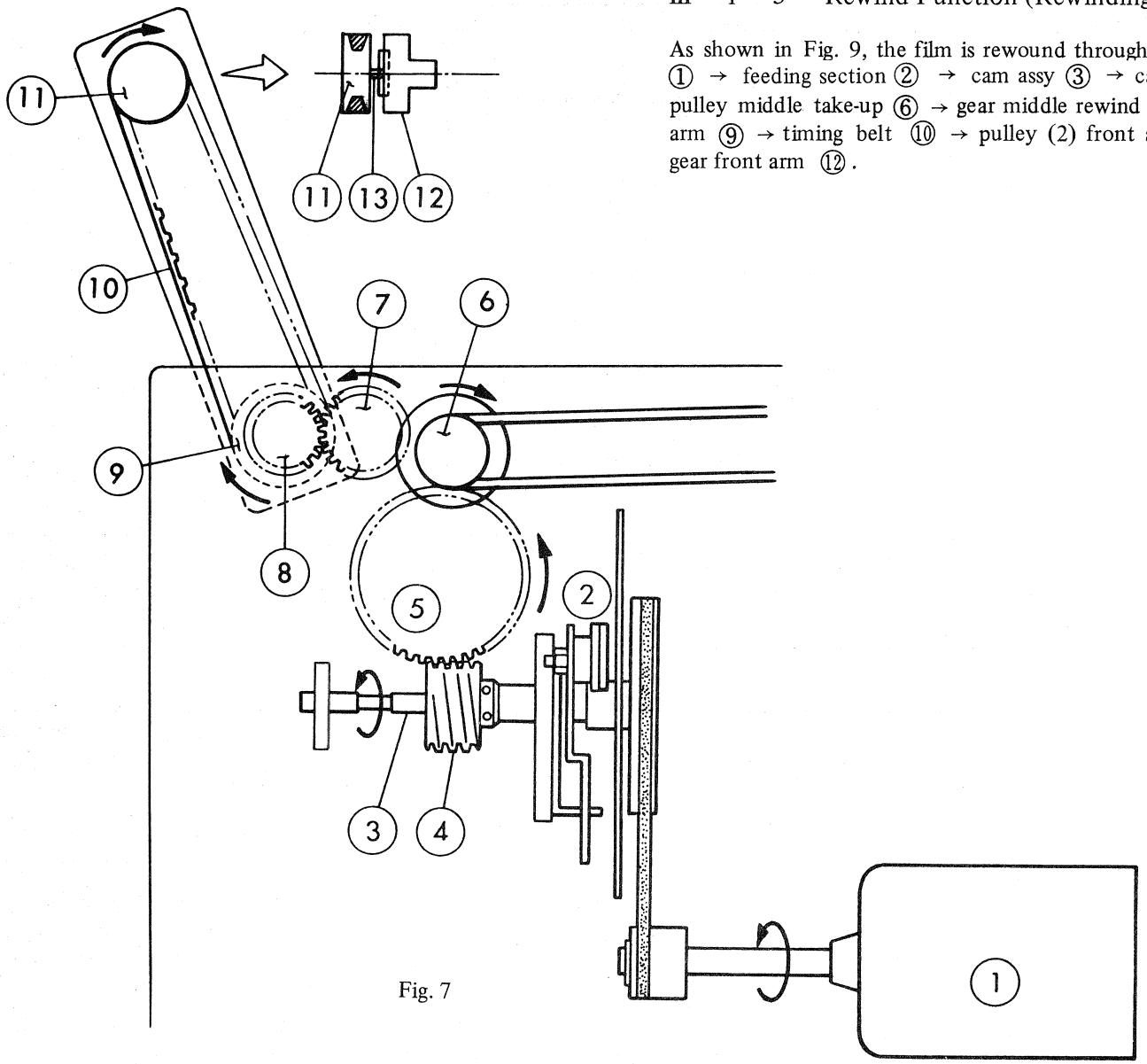


Fig. 7

III — 1 — 3 Rewind Function (Rewinding at reverse projection)

As shown in Fig. 9, the film is rewound through the transmission of rotation from the motor assy ① → feeding section ② → cam assy ③ → cam shaft worm ② ④ → gear first sprocket ⑤ → pulley middle take-up ⑥ → gear middle rewind ⑦ → gear front arm shaft ⑧ → pulley (1) front arm ⑨ → timing belt ⑩ → pulley (2) front arm ⑪ → claw ratchet rear reel ⑬ → ratchet gear front arm ⑫.

III – 1 – 4 Take-up Function

As shown in Fig. 8, the film take-up is carried out by rotating the reel through the rotation transmitted from the motor assy ① → feeding section ② → cam assy ③ → cam shaft worm (2) ④ → gear first sprocket ⑤ → pulley middle take-up ⑥ →take-up belt ⑦ → pulley rear arm shaft ⑧ → rear arm gears of ⑨, ⑩, ⑪ and ⑫ → pin clutch rear arm ⑮ → gear (1) rear arm ⑭.

* The gear (2) rear arm ⑫, with ⑮ inserted into it, transmits rotation in only one direction.

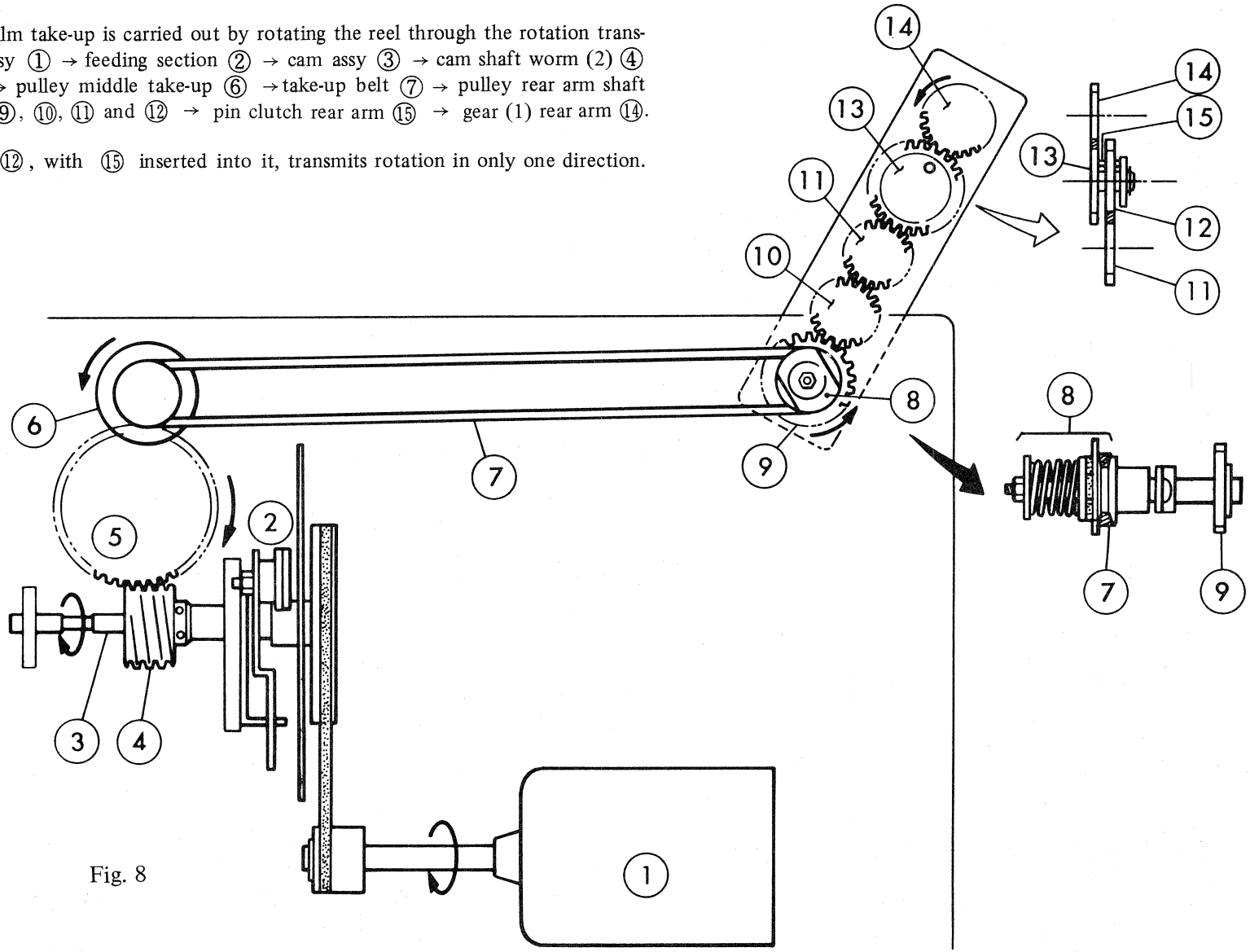


Fig. 8

III — 1 — 5 Forward/Reverse Projection

With the master control knob set to ⏏ (forward projection), the cam pad lever ②, interlocked with the knob motor switch, starts to rotate in the direction of arrow mark, and as the ② rotates, the lever (2) link ①, connected to the cam section of ②, moves in the direction of arrow mark C. This interlocks the link (2) pad lever ③ → collar link ④ → link (1) pad roller lever ⑤, causing the lever pad roller assy ⑥ to move in the direction of arrow mark A. In the meantime, the film guide (1) ⑨, so far pressed down by ⑩, moves in the direction of arrow mark B.

STOP:
In order to stop projection, return the knob motor switch to F▶, then ⑤ is pulled by ④, causing ⑥ and ⑦ to return to OFF position.

REVERSE PROJECTION:
The cam height of ② does not change even by setting the knob motor switch to ⏏ (reverse projection), so that ⑥ does not mvoe in the direction of arrow mark A. (Sound is not replayed at the time of reverse projection.)

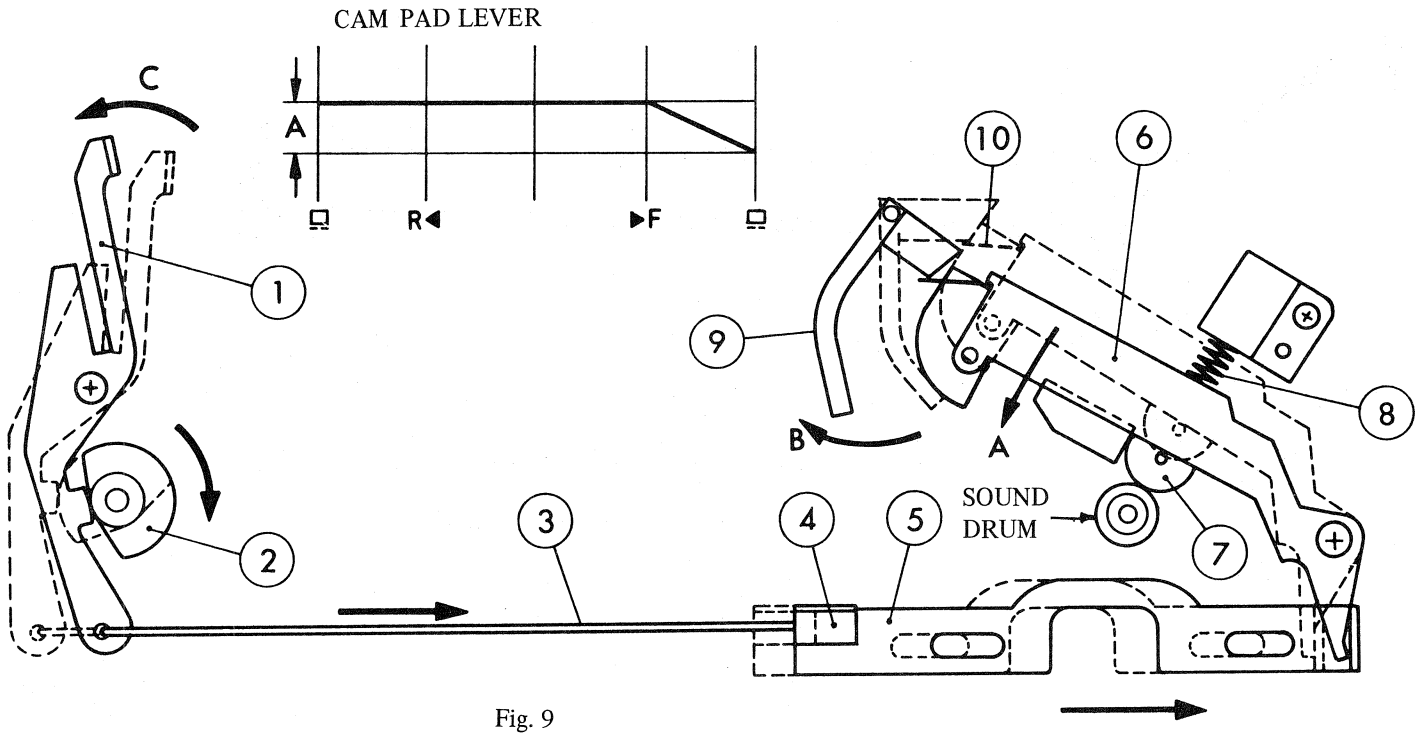


Fig. 9

III – 2 Disassembly and Reassembly

III – 2 – 1 List of Exclusive Parts for TRV-S8/R8

PART NAME	PART NO.		PAGE	ILLUST NO.
	TRV-S8	TRV-R8		
Film cutter mount	4P45750	4M44467	35	9
Film cutter pin	4P54249	4P55132	35	10
Cutter film	4P48765	4M44468	35	11
Holder CCD	4M45455	4M45456	55	18
Plate (1) CCD holder	4M45450	4M45624	55	11
Reel shaft front arm	4P8STJ042	4M44451	39	13
Roller (2) sprocket shoe	P412443	4M44463	37	9
Claw assy	4P31928	4M31303	61	14
Cam assy	P414036	4M44455	59	17
Cap sprocket	–	4M44466	37	12
			53	16
Cap first sprocket	P412785	–	37	12
Cap second sprocket	P412786	–	53	16
Sprocket (R)	–	4M44453	37	13
			53	16
Super sprocket	4P46283	–	37	13
Second sprocket	4P32059	–	53	15
Boss first sprocket	4P48642	4M44464	37	15
Boss second sprocket	4P48763	4M44465	53	14
Gear (A) first sprocket	–	4M44458	37	19
Gear (B) first sprocket	–	4M44459	37	19
Gear first sprocket	P412698	–	37	19
Gear (1) second sprocket	P411739	4M44461	53	3
Middle gear sprocket	P411736	4M44460	53	7
Gear (2) second sprocket	P414157	4M44462	53	10
Shoe second sprocket	4P31934	4M31302	49	11
Aperture plate assy	4M31874	4M31874002	47	20
Pressure plate assy	P413134	4M44424	47	15
Cam shaft worm (2)	4P47329	4M44456	59	1
Machine frame	4P8TRS019	4P8TRG019	43	2

* For further details, refer to PARTS LIST FOR TRANSVIDEO TRV-S8/TRV-R8 (No. 279) as well.

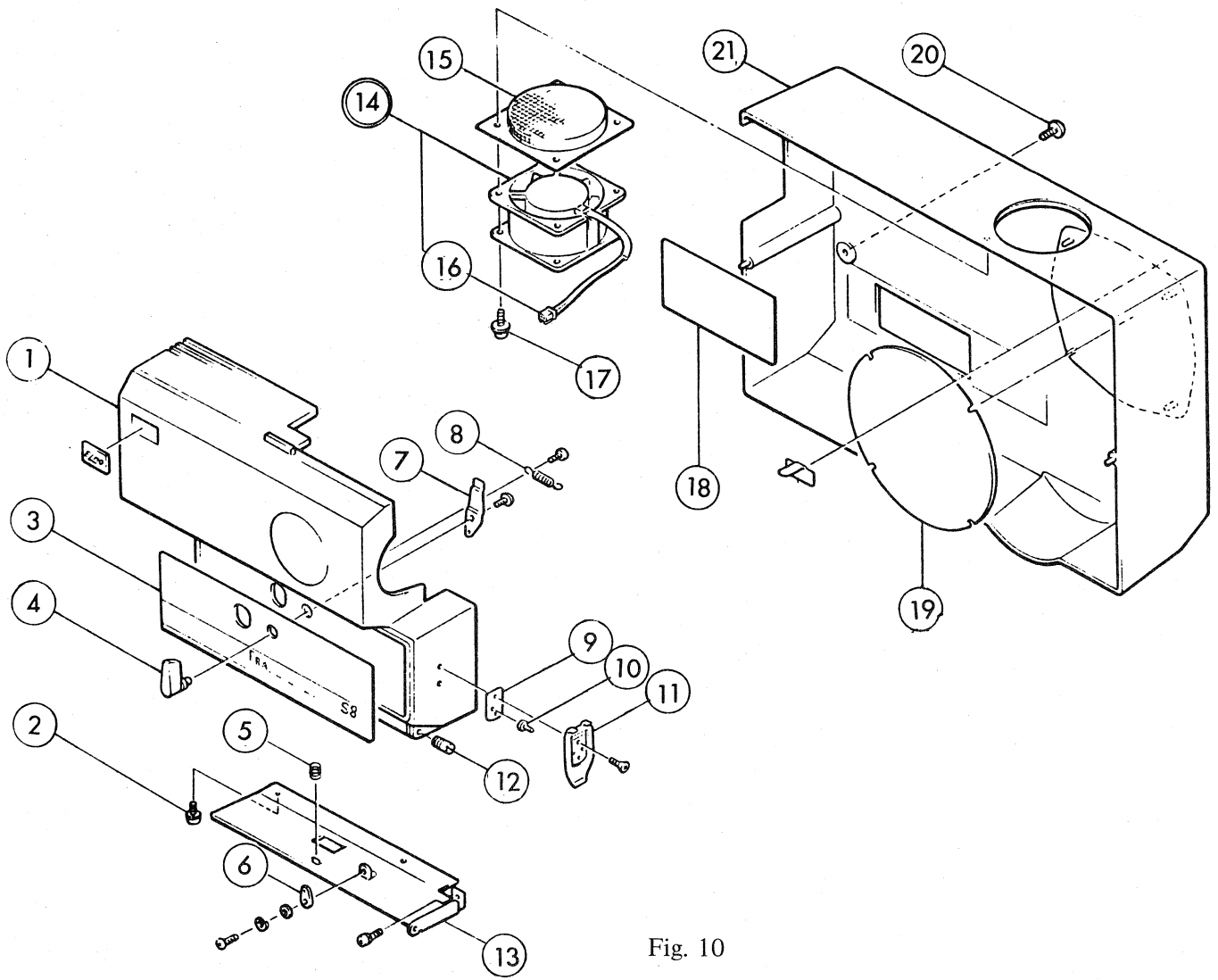


Fig. 10

III – 2 – 2 Machine Cover Assy and Rear Cover (See Fig. 10)

Note: Each of ③, ⑨, ⑩ and ⑪ is available in two types for S8 and for R8.

Disassembly:

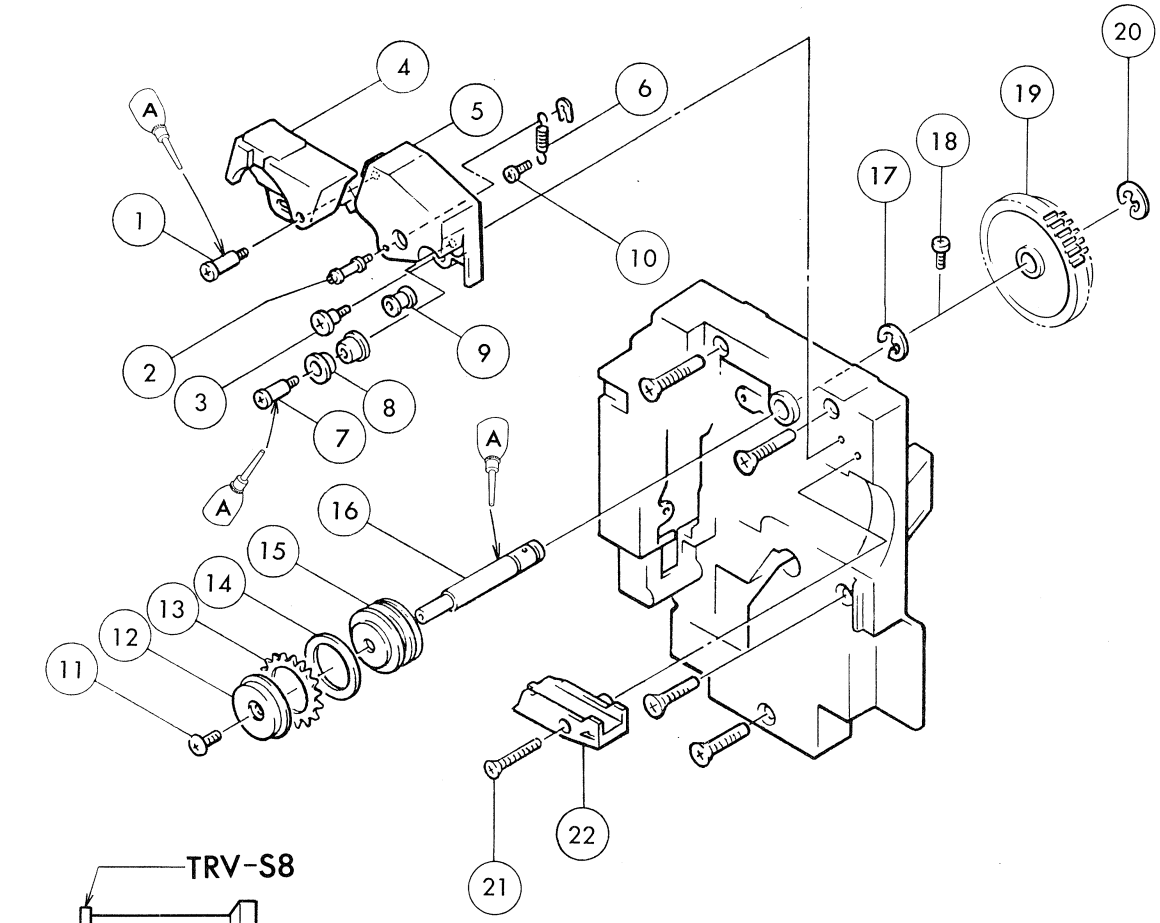
1. Unscrew 2 pieces of ⑳ to remove ㉑, and pull out ⑯.
2. Remove ① by unscrewing 1 piece of ⑫.
3. Disconnect the spring attached to ⑥, and remove ⑬ by unscrewing 3 pieces of ②.
4. See Fig. 10 for further disassembly.

Reassembly:

1. See Fig. 10 for the installation direction of ⑭, tightening the 2 pieces on this side only with ⑰.
2. After installing ④, ⑦ and ⑧, make sure of the smooth function.

Troubleshooting hints:

Symptoms	Causes
Lever loop setter fails to activate.	Defective installing position of ⑦
Lower loop gets gradually reduced.	Improper tension of ⑤
Lower loop is not formed.	Defective installing position of ⑥
Fan motor fails to rotate.	Defective contact or/and wire disconnection of ⑯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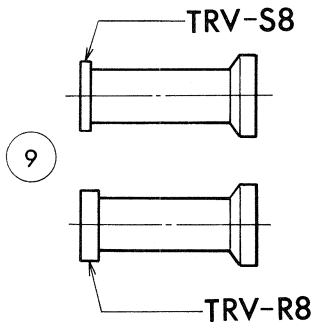
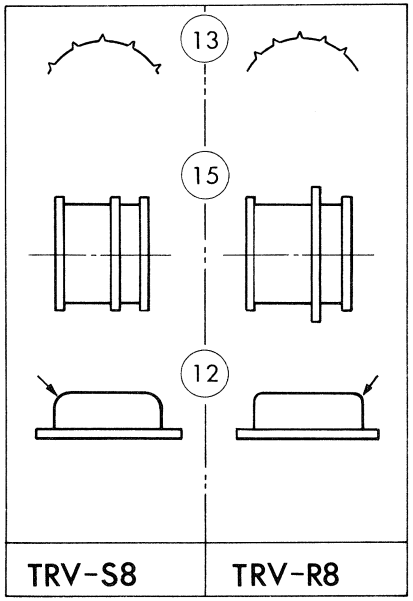

TRV-S8
9
TRV-R8

Fig. 11


13
15
12
TRV-S8
TRV-R8

III – 2 – 3 First Sprocket Assy and Shoe First Sprocket (See Fig. 11)

Note: Each of ⑨, ⑫, ⑬ and ⑮ is available in two types for S8 and for R8.

Disassembly:
1. Unscrew ㉑ to remove ㉒, and open the holder lens to this side.
2. Unscrew 1 piece each of ③ and ⑩ to remove ④ and ⑤.
3. Remove ①, and take out ④ from ⑤.
4. See Fig. 11 for further disassembly.

Reassembly:
1. Apply ALVANIA GREASE 2 to ① and ⑦.
2. When installing ⑪ ~ ⑯ to the machine, make sure that the rotation is smooth with no play (slackening).
3. Make sure that the film traveling surface of ⑮ has no scratch, etc.

Troubleshooting hints:

Symptoms	Causes or/and countermeasures
Film gets scratched. Upper film loop gets gradually reduced (shortened). Abnormal noise is heard during projection. Wow/flutter appears.	Wear and breakage of ⑧, ⑨ and ⑮ Replace ⑥ if pressure of ⑤ is weak causing detachment of film from ⑬ Deformation and breakage of ⑬, and deflection of ⑯ Deformation and breakage of ⑬, deflection of ⑯, and breakage of ⑲; if excessively dirty, clean with alcohol and apply grease.

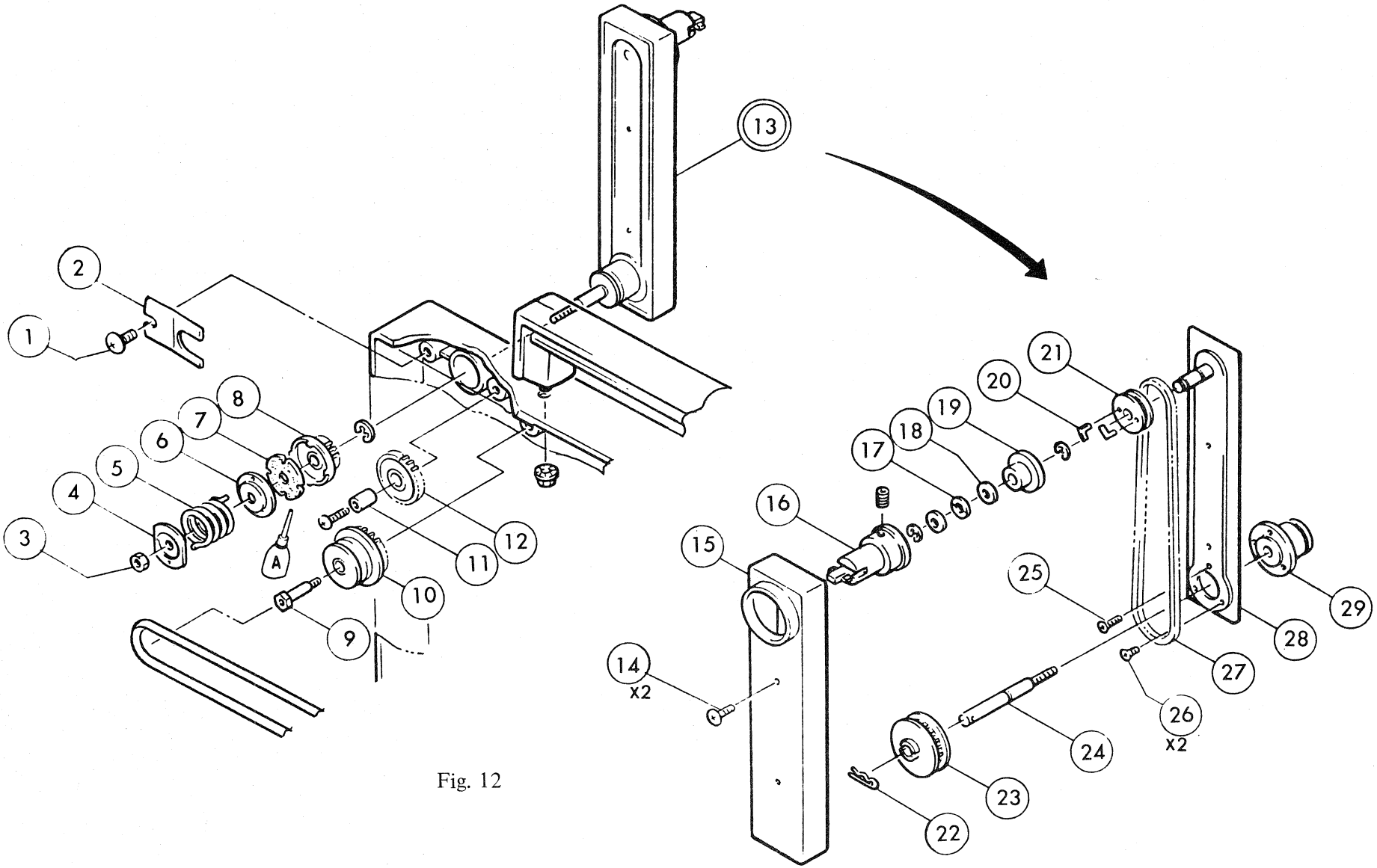

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Fig. 12

III – 2 – 4 Front Arm (See Fig. 12)

Note: ⑯ is available in two types for S8 and for R8.

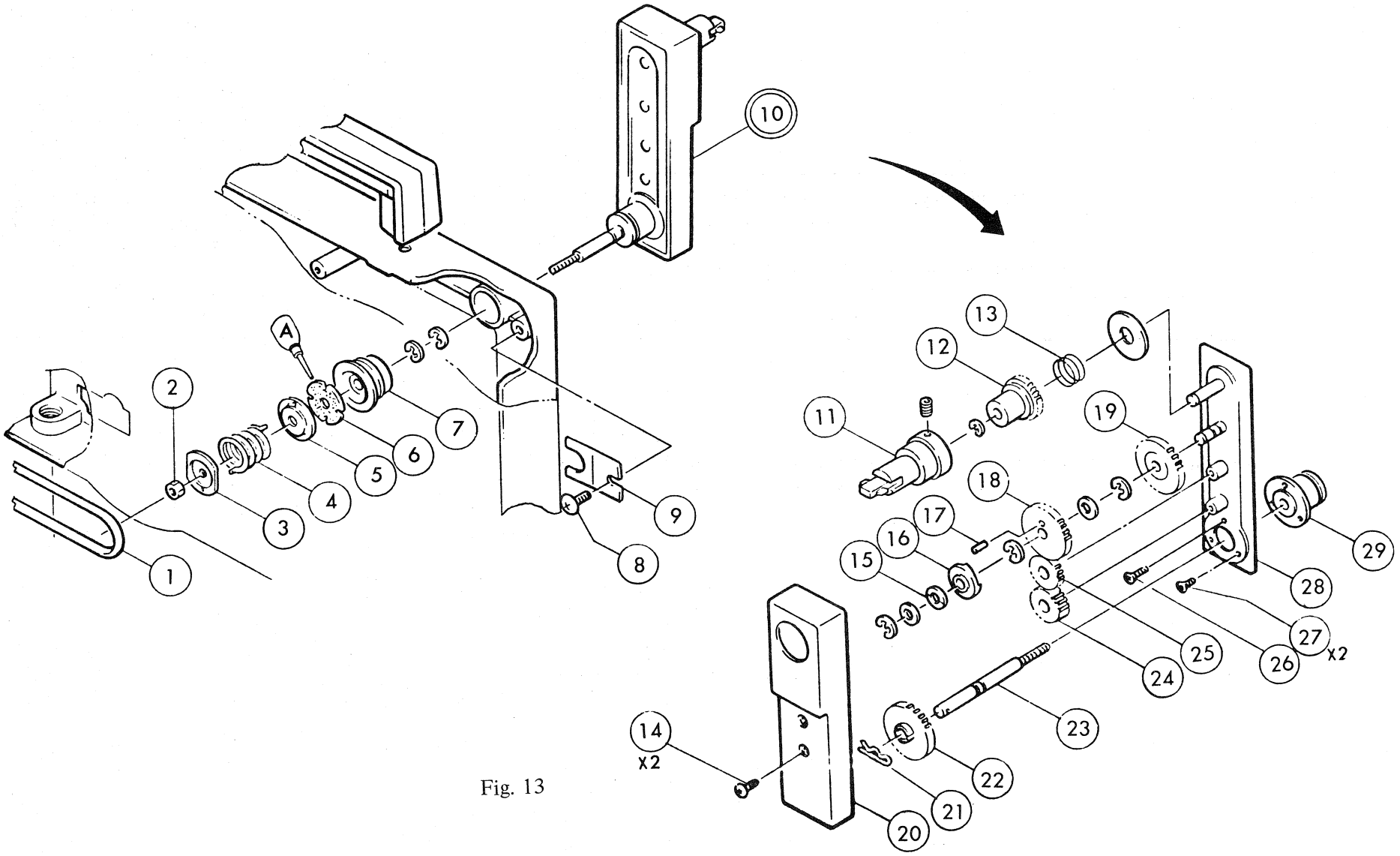
Disassembly:
1. Unscrew 2 pieces of ⑭ to remove ⑮.
2. Pull out ㉒ to remove ㉓.
3. Unscrew 1 piece of ㉕ and 2 pieces of ㉖ to remove ㉘ from the base frame.
4. Unscrew 1 piece of ① and disconnect ② to remove ㉙.
5. See Fig. 12 for further disassembly.

Reassembly:
1. Carry out reassembly in the reverse order of disassembly.
2. Take care, since ⑯ for type S8 is different from that for R8.
3. Make sure that ⑯ is neither heavy nor light in rotation (i.e. has smooth rotation) before engaging ㉗.
4. Adjust the raising force of ⑬ by controlling the tightening torque of ①, the aimed force being 850 g, and the permissible range being 700 ~ 1000 g.
5. Note that ㉕ and ㉖ differ in length (㉕ being longer than ㉖).

Troubleshooting hints:

Symptoms	Causes or/and countermeasures
Fails to rewind Rewinding is unstable. Front arm is heavy or unstable when raised. Rewinding tension is irregular (uneven).	Breakage of ⑲, ㉑ and ㉓, and defective installing position of ⑳ Adherence of oils to the pulley ⑩ Improper tightening torque of screw ① Improper tension of ⑤; adjust with screw ③. (See page 71.)

Note: Refer to page 71 for the adjustment of film rewinding force.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X2
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29

Fig. 13

III – 2 – 5 Rear Arm (See Fig. 13)

Disassembly:

1. Unscrew 2 pieces of ⑭ to remove ⑳.
2. Pull out ㉑ to remove ㉒.
3. Unscrew 1 piece of ㉖ and 2 pieces of ㉗ to remove ㉘ from the base frame.
4. Unscrew ⑧ and disconnect ⑨ to remove ㉙.
5. See Fig. 13 for further disassembly.

Reassembly:

1. Make sure that there is no scratch, wear or deformation before installing the gears ⑫, ⑱, ⑲, ㉔ and ㉕.
2. Make the same confirmation (as in 1) for ⑯ and ⑲ clutch surfaces as well, insert ⑰ and check to see that the movement is smooth.
3. Note that ㉖ and ㉗ differ in length (㉖ be longer).
4. Adjust the raising force of ⑩ by controlling the tightening torque of ⑧, the aimed value being 850 g and the range being 700 ~ 1000 g. Use a 1-kg spring scale (P048) to measure.

Troubleshooting hints:

Symptoms	Causes or/and countermeausres
Abnormal sound is heard.	Lubricate the gears.
Fails to wind up the film	One of the gears is defective; ⑪ fails to rotate.
Film in rear arm slackens during reversing.	Deflection and scratch of ⑱, or/and scratch and breakage of ⑲
Take-up speed is slow.	Improper tension of ⑬
Take-up tension is irregular (uneven).	Improper tension of ④; adjust by means of the screw ② (See page 71)
Arm is heavy or unstable when raised.	Excessive tightening of ⑧

Note: Refer to page 71 for the adjustment of film take-up tension.

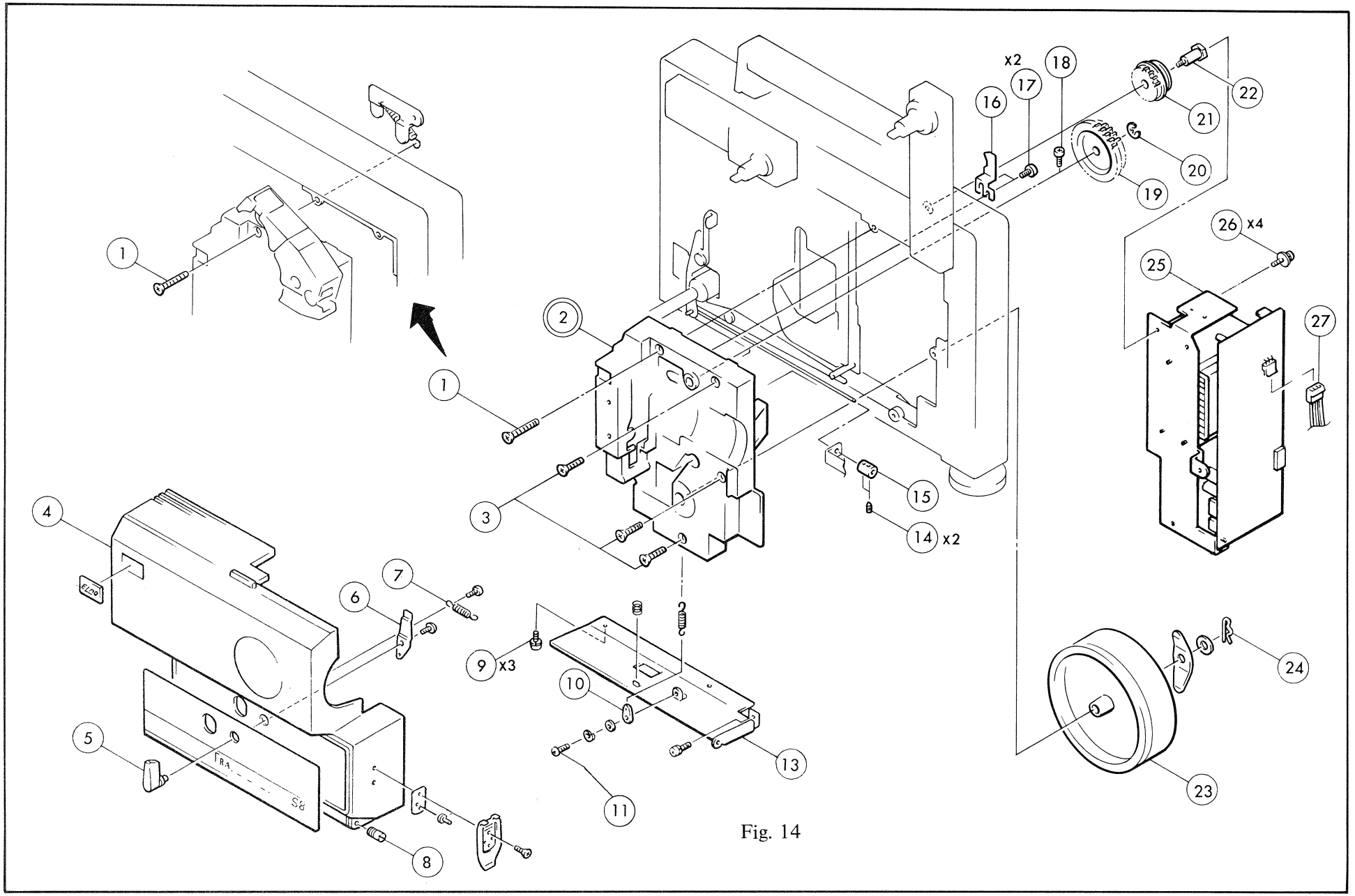


Fig. 14

Ⅲ – 2 – 6 Machine Frame (See Fig. 14)

Note: The disassembly procedure below is for removing the ② from the base frame; for the detail of "Disassembly and Reassembly" of the parts, refer to the respective "explanation columns" (at the end of the sentences).

Disassembly:

1. Unscrew 1 piece of ⑧ to remove ④. (See page 35)
2. Unscrew 1 piece of ⑪ to remove ⑩. (See page 35)
3. Unscrew 3 pieces of ⑨ to remove ⑬. (See page 35)
4. Loosen 2 pieces of ⑭ to remove ⑮. (See page 67)
5. Take out ㉔ to remove ㉓. (See page 59)
6. Unscrew 4 pieces of ㉖ and disconnect ㉗ to remove ㉕. (See page 63)
7. Unscrew 1 piece of ㉒ to remove ㉑ (See page 39)
8. Remove ⑳ to remove ⑲. (See page 37)
9. Unscrew 2 pieces of ⑰ to remove ⑯. (See page 45)
10. Unscrew 1 piece of ① and 3 pieces of ③ to remove ② from the base frame.

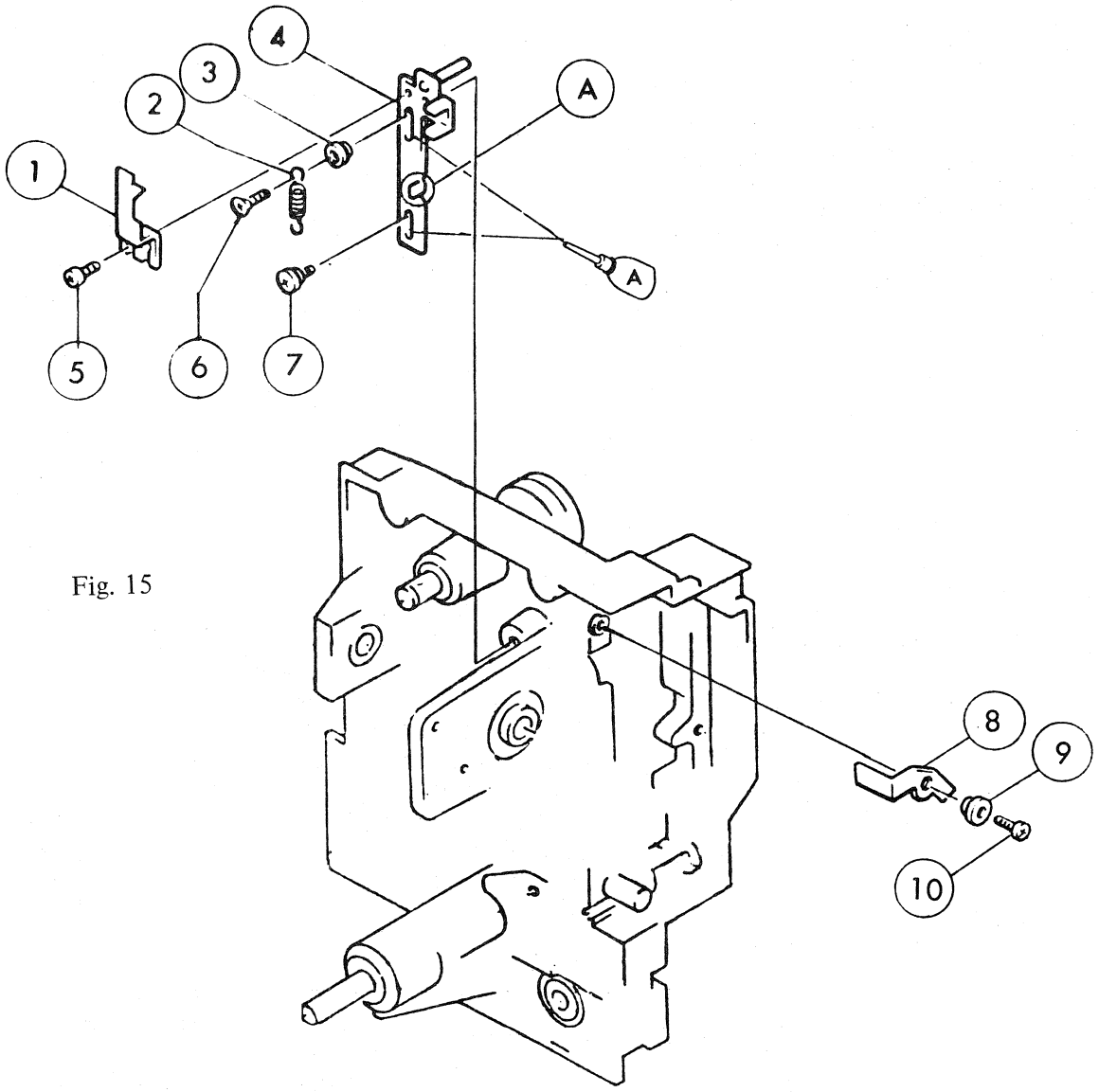
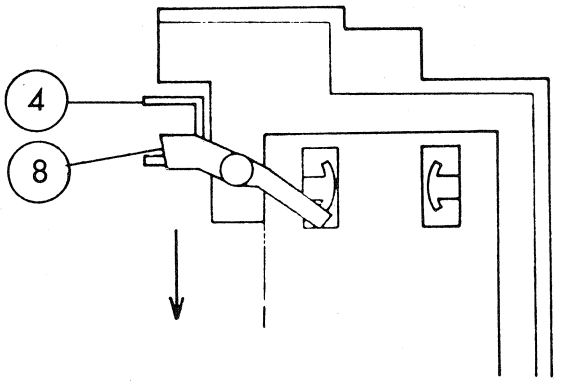


Fig. 15

in projecting



in auto-threading

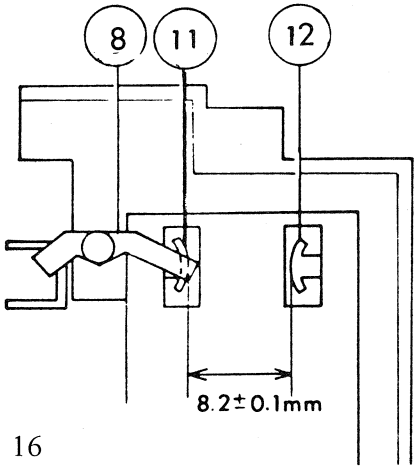


Fig. 16

III – 2 – 7 Lever (1) (2) Threading and Escaper Side Pressure (See Figs. 15 and 16)

Disassembly:
1. Unscrew ⑩ to remove ⑨ and ⑧.
2. Unscrew ⑥ to remove ②.
3. Unscrew ⑦ to remove ④.

Reassembly:
1. Apply ALVANIA GREASE 2 to two installing portions of ④. (See Fig. 15)
2. Engage ② to Ⓐ section of ④.
3. With ⑧ pushing down ⑪ at the time of threading, install ⑧ so that the space (gap) between ⑪ and ⑫ is 8.1 ~ 8.3 mm.
4. When installing ④, make sure that it moves smoothly.

Troubleshooting hints:

Symptoms	Causes
Film gets trapped (engaged) during threading.	Malfunction of ⑧
Unstable projection (left-right)	Malfunction of ⑧
Fails to maintain the threading state	Malfunction of ④

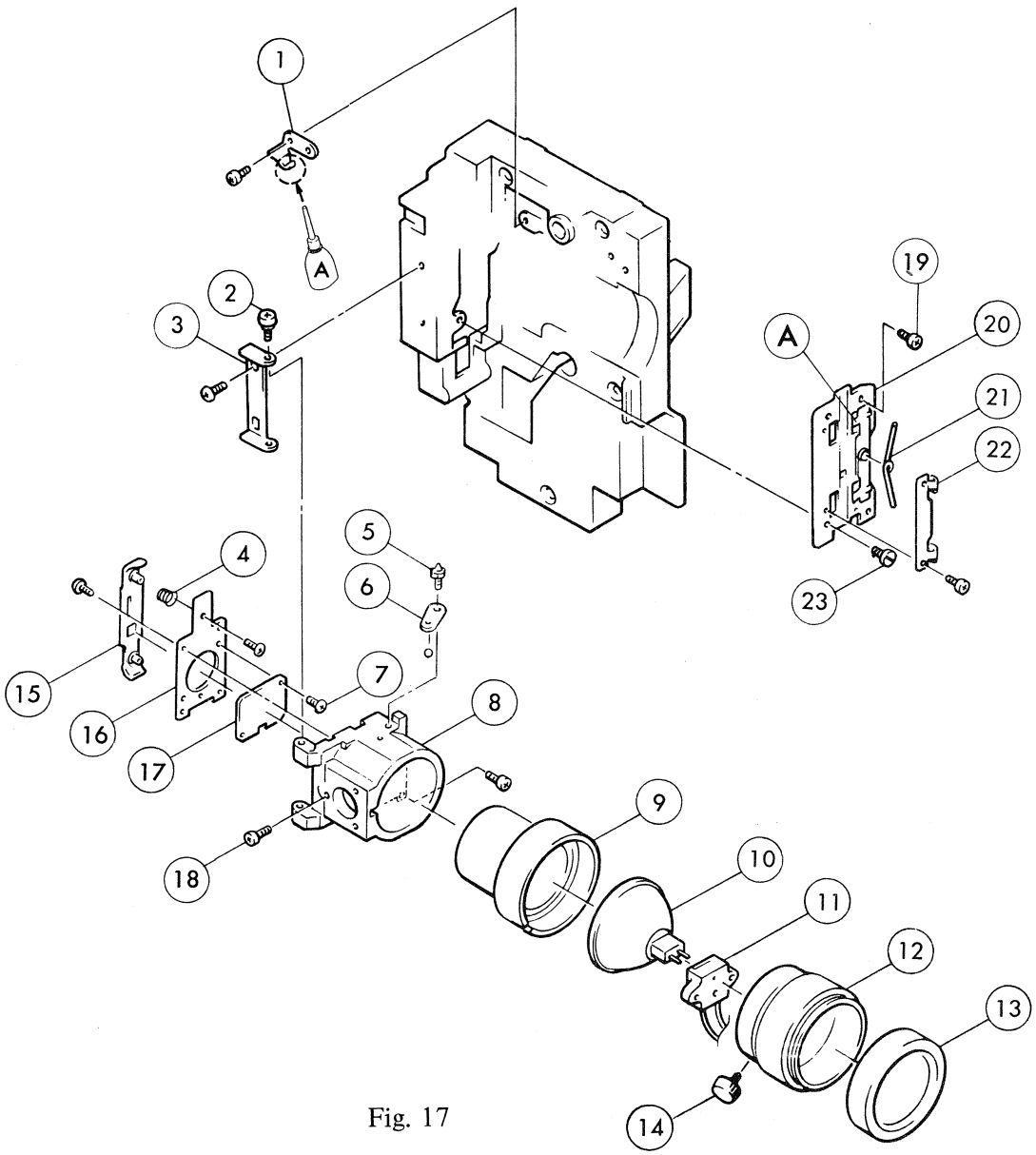

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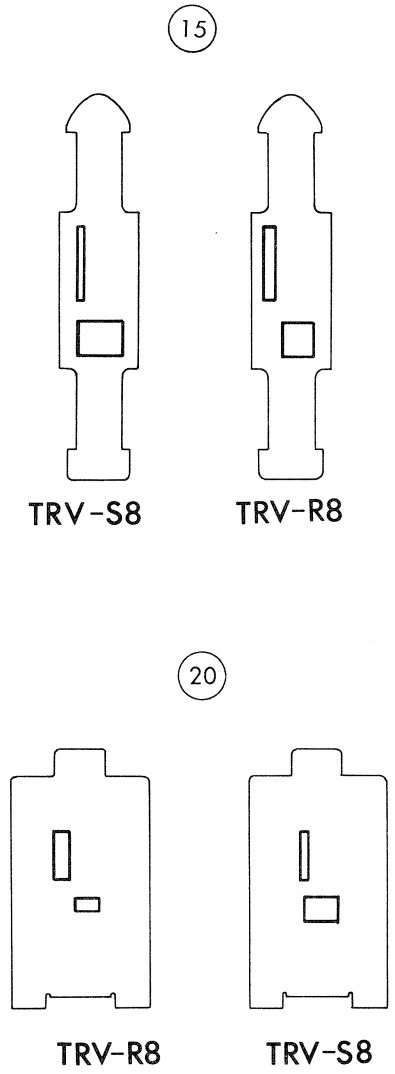
Fig. 17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TRV-S8
TRV-R8
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TRV-R8
TRV-S8

III – 2 – 8 Holder Lens and Aperture Plate Assy (See Fig. 17)

Note: Each of ⑮ and ⑳ is available in two types for S8 and for R8.

Disassembly:
1. Unscrew ⑱ to remove the assy parts ⑨ ~ ⑭ from ⑧.
2. Unscrew 2 pieces of ② to remove the assy parts ⑧.
3. Unscrew 2 pieces each of ⑲ and ㉓ to remove the assy parts of ⑳.
4. See Fig. 17 for further disassembly.

Reassembly:
1. After adjusting the machine frame, install ⑰ to ⑯ in the assy of ⑧ by means of 2 pieces of ⑦.
2. Apply ALVANIA GREASE 2 to ①.
3. When installing the assy parts of ⑧ to the machine frame, make adjustment for verticalness (perpendicularity), and check to see that the opening or closing can be smoothly done.
4. Apply screw lock after installing ⑤.
5. Wipe off the oils from the film traveling surface and make sure that there is no scratch before installing ⑳; take care so as not to scratch the film traveling surface after installation.
6. Check for warps and bends when installing ㉒, and make sure that it has smooth movement before engaging ㉑.
7. After installing ㉒, make adjustment so that the chart in the projector comes as the mask center.
8. Measure the tension of ④.
   Measuring method: Set the claw so that its end section does not extend out of the rail surface of ⑳, and set the leader frame therein. Then use a 110-g bar spring scale (C043) to measure the tension by pulling the film upward.
   Aimed value: 55 g Permissible range: 50 ~ 60 g
9. Measure the tension of ㉑.
   Measuring method: Measure by applying a 100-g dial tension gauge (C063) to Ⓐ. Aimed value: 35 g Permissible range: 30 ~ 40 g

Troubleshooting hints:

Symptoms	Causes
Film gets scratched. Unstable image (left-right) Unstable image (up-down) Image tilts. Occasionally fails to focus	Existance of scratch on the film traveling surface of ⑮ and ⑳, or/and excessively high tension of ④ Improper tension of ㉑ Improper tension of ④ Defective installing position of ㉒ Bent or distorted ⑮

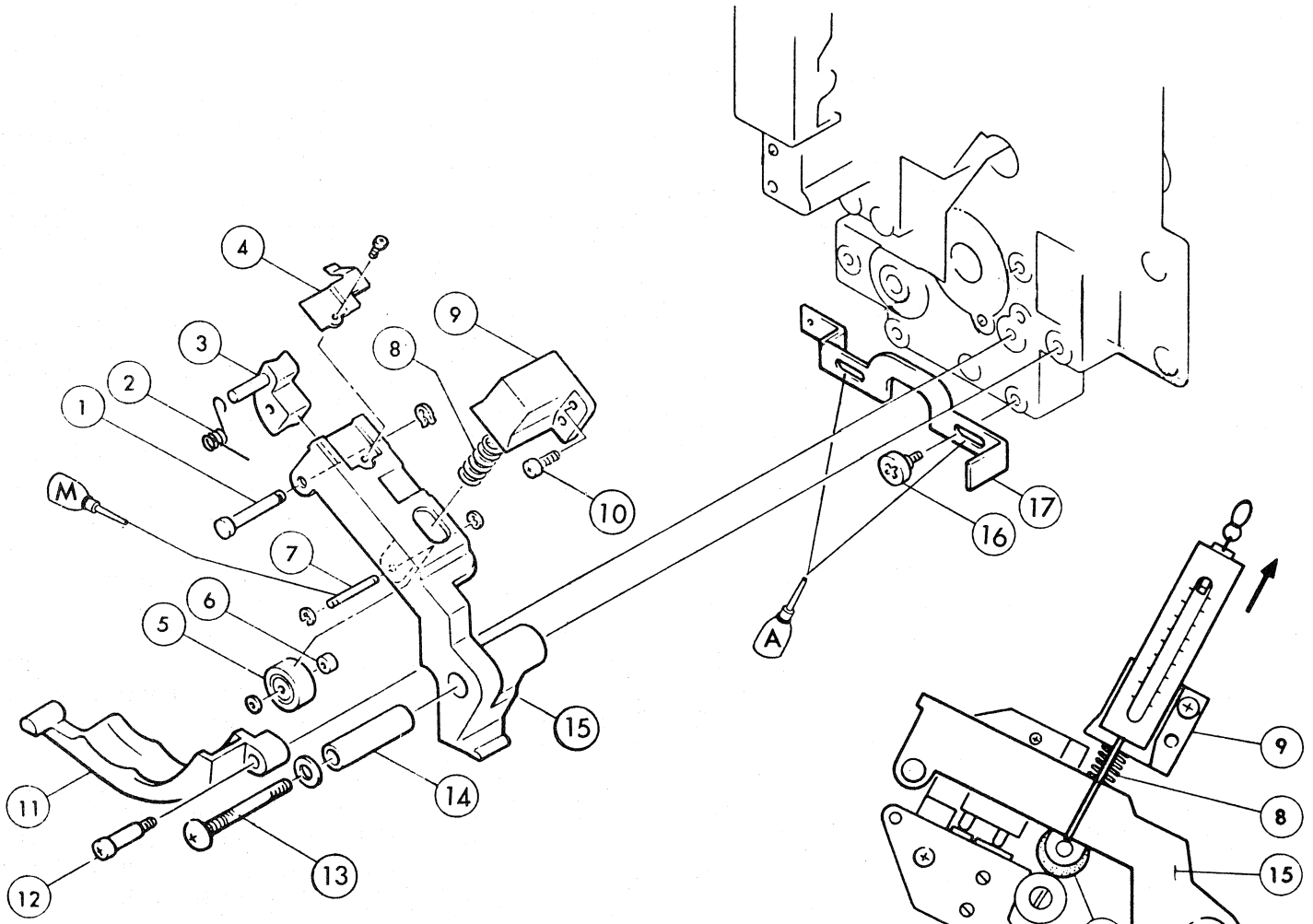

Fig. 18

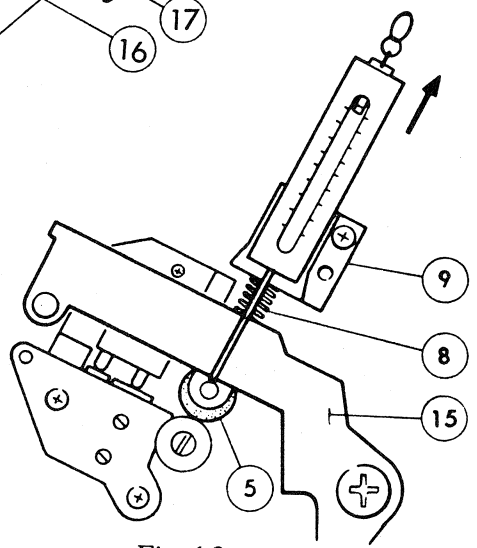

Fig. 19

III – 2 – 9 Lever Pad Roller (See Fig. 18)

Disassembly:
1. Unscrew 1 piece of ⑩ to remove ⑨ and ⑧.
2. Unscrew 1 piece of ⑬ to remove the assy parts of ⑮.
3. Unscrew 1 piece of ⑫ to remove ⑪.
4. See Fig. 18 for further disassembly.

Reassembly:
1. Apply DAPHNE 44 to ⑦, taking care so as not to stain the surface of ⑤.
2. See to it that ⑤ has smooth surface with no scratch, and make sure, after installation, that it rotates smoothly.
3. Apply ALVANIA GREASE 2 to ⑰.
4. Measure the tension of ⑧.
   Measuring method: Set the master control knob to ⏀, and measure at pad roller by using a 1-kg spring scale (P048). (See Fig. 19)
   Aimed value: 325 g Permissible range: 300 ~ 500 g

Troubleshooting hints:

Symptoms	Causes
Wow/flutter appears. Lower film loop is not formed.	Deformation and breakage of ⑤, or/and excessively high tension of ⑧ Improper tension of ⑧

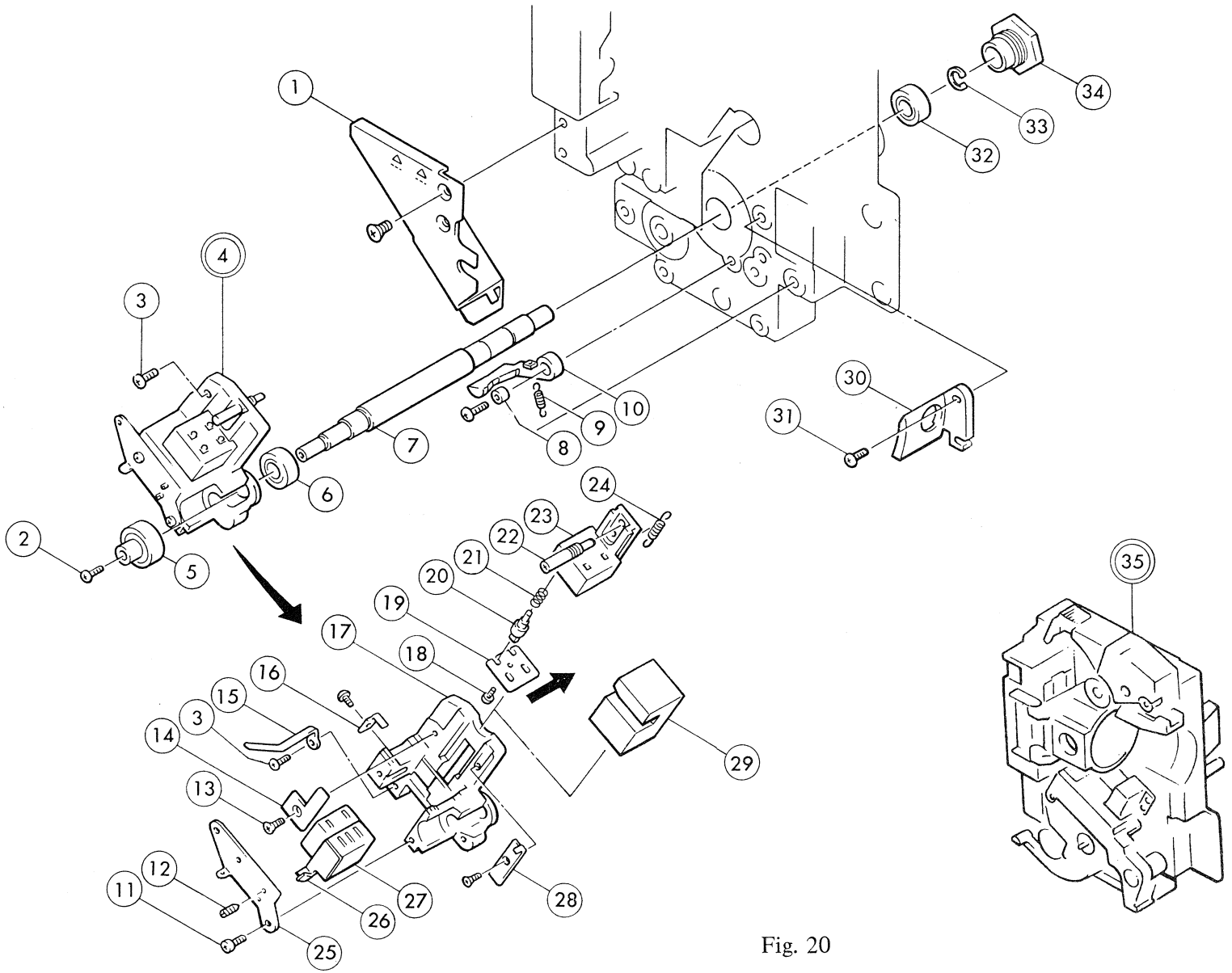
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Fig. 20

III – 2 – 10 Holder Head Assy and Shaft Sound Drum (See Fig. 20)

Note: Parts ⑬~⑮, ⑱~㉔, ㉖ and ㉗ are exclusively for type S8, and ㉙ for R8.

Disassembly:
1. Unscrew 1 piece of ② to remove ⑤.
2. Unscrew 3 pieces of ③ to remove ④.
3. Loosen 2 pieces of ⑫ to remove ㉖ and ㉗. (Type S8 only)
4. Loosen 2 pieces of ⑫ to remove ㉙. (Type R8 only)
5. Disconnect ㉔ to remove assy parts of ㉓ from ⑰. (Type S8 only)
6. Remove ㉞ and ㉝ to pull out ⑦ together with ⑥.
7. See Fig. 20 for further disassembly.

Reassembly:
1. Apply screw lock after tightening ㉒. (Type S8 only)
2. Check ⑳ for scratch or dent before installation, and after installation, make sure that it moves smoothly. (Type S8 only)
3. Install ⑲, with main surface facing downward, by shifting it in the direction of arrow mark. (Type S8 only)
4. Install ㉘, taking care so that it may not get tilted.
5. Install ㉖ and ㉗ (type S8) or ㉙ (type R8) to ⑰ and fix by 2 pieces of ⑫ after installing ㉕ to ⑰ by using 2 pieces of ⑪.
6. See to it that ⑤ and ⑦ have no scratch on the surface, and after installation, make sure that they rotate smoothly without play (slackening).
7. Apply screw lock between ㉞ and machine frame.

Troubleshooting hints: (Type S8 only)

Symptoms	Causes
Fails to replay	Defective installing position of ㉖ and ㉗, or/and improper contact of sound head with the film recording zone
Recording level is low.	Shortcircuit or wear of ㉖ and ㉗, or/and ㉓, ㉖, ㉗ and film surface not parallel respectively
Inadequate replay output	Defective installing position of ㉖ and ㉗
Defective sound at replay	Wear of ㉖ and ㉗, or/and improper tension of ㉑
Wow/flutter appears.	Deformation and breakage of ⑤

Note: Refer to page 72 for the adjustment of holder head assy section, and refer to page 75 for the details of troubleshooting.

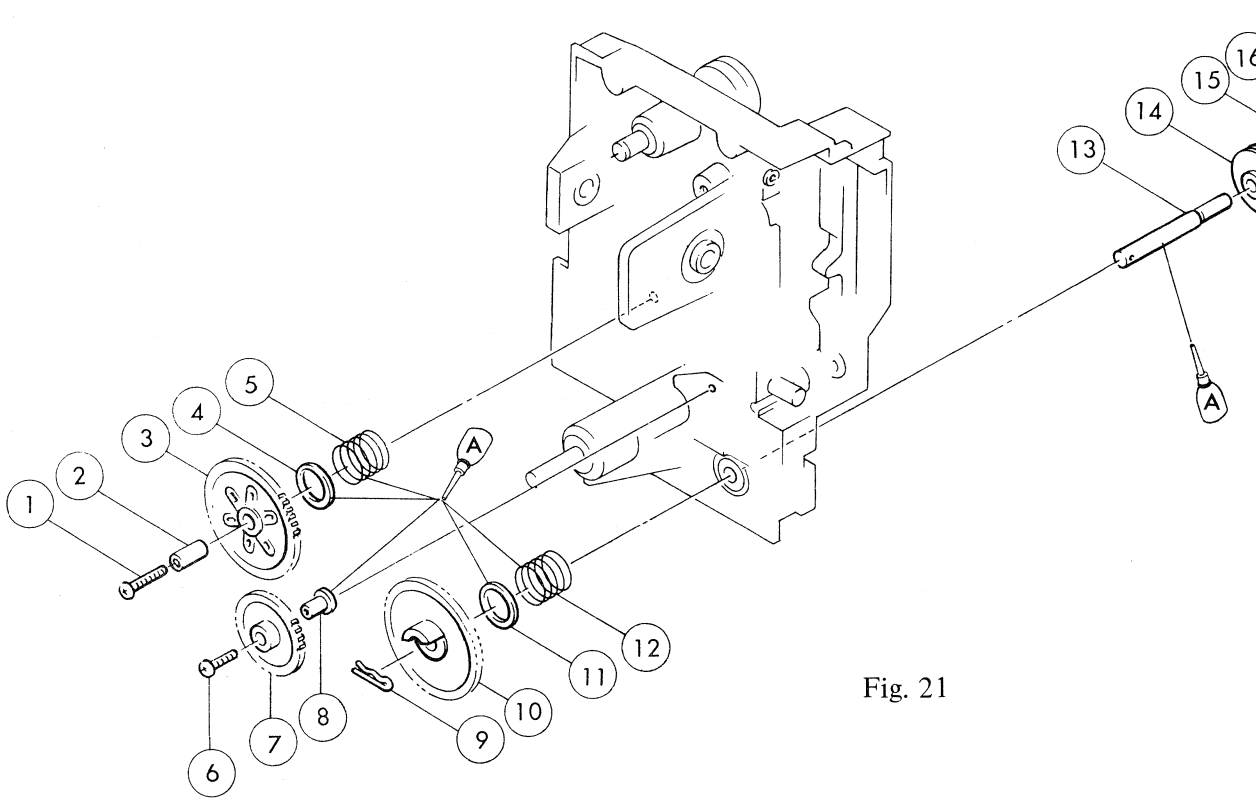
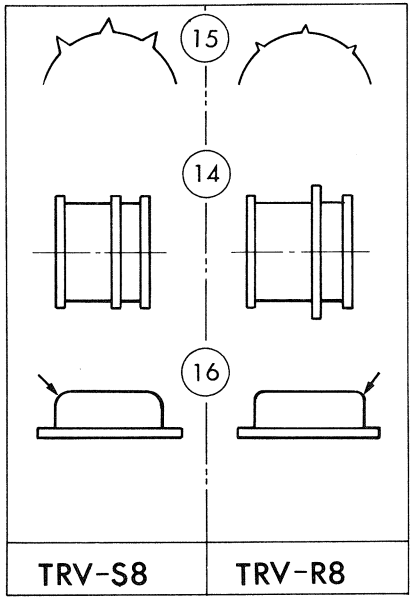


Fig. 21



III – 2 – 11 Second Sprocket (See Fig. 21)

Note: Each of ③, ⑦, ⑩, ⑭, ⑮ and ⑯ is available in two types for S8 and for R8.

Disassembly:

1. Unscrew 1 piece of ① to remove first ②, then ③, ④ and ⑤.
2. Unscrew 1 piece of ⑥ to remove first ⑦ and then ⑧.
3. Take out ⑨ to remove first ⑩, then ⑪ and finally ⑫.
4. Unscrew 1 piece of ⑰ to remove ⑯, ⑮ and ⑭.

Reassembly:

1. Apply ALVANIA GREASE 2 to the gear side of ④, ⑧ and ⑪, and to the washer side of ⑤ and ⑫.
2. Make sure that there is no scratch, wear or deformation in ③, ⑦, ⑩ and ⑮.
3. Make sure that the film traveling surface of ⑭ has no scratch.
4. When installing the assy parts ⑬ ~ ⑰, make sure that there is no slackening (play), and that they have smooth rotation.
5. Take utmost care so as not to mix up the parts specially used for type S8 with the parts specially used for type R8; refer to Fig. 21.

Troubleshooting hints:

Symptoms	Causes or/and countermeasures
Abnormal sound comes from second sprocket Wow/flutter appears.	Deformation and breakage of ⑮, or/and deflection of ⑬ Deformation and breakage of ⑮, deflection of ⑬, or/and breakage of ③, ⑦ and ⑩; thoroughly wash the excessively stained parts in alcohol, and apply grease.

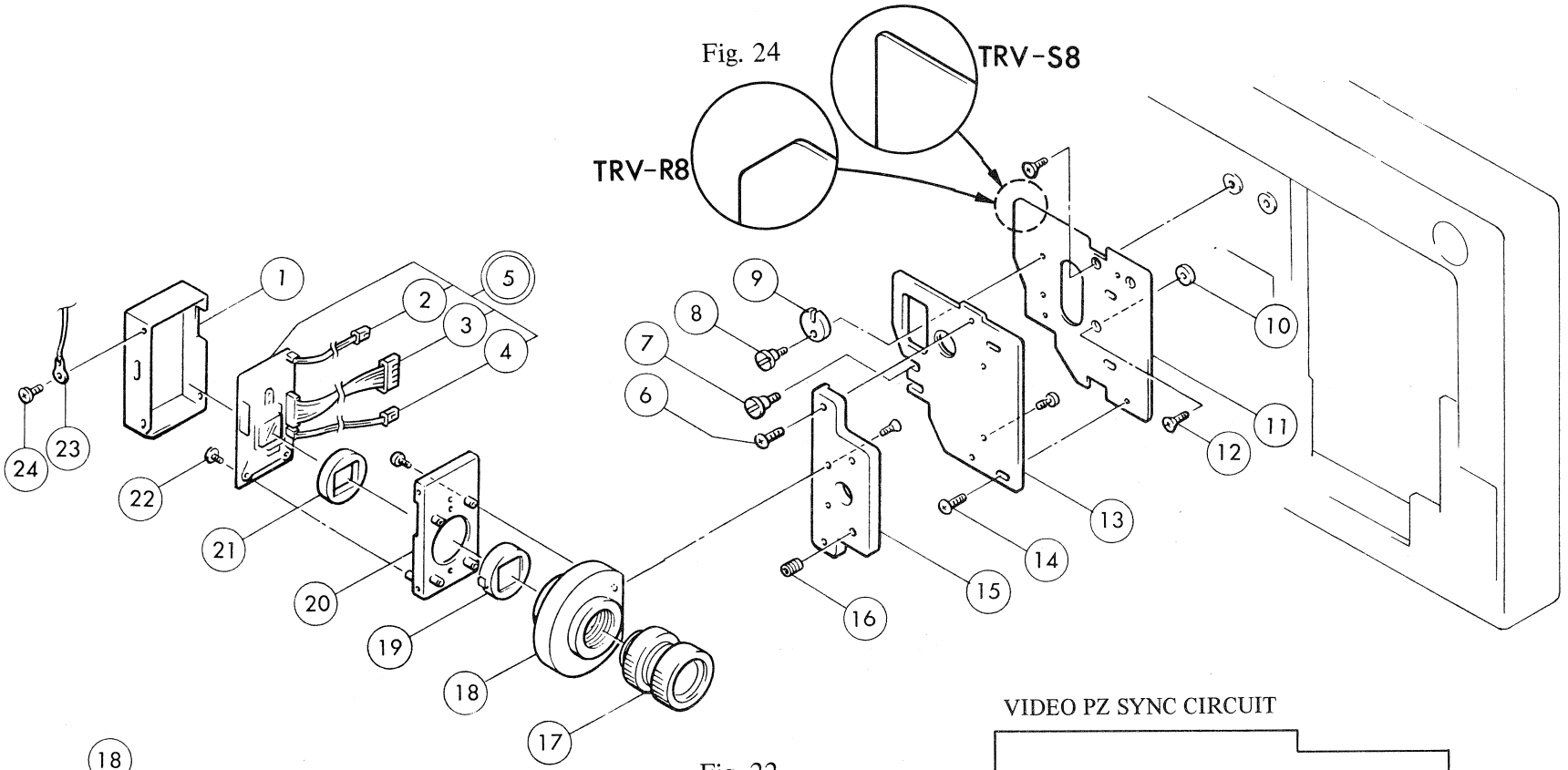


Fig. 24

Fig. 22

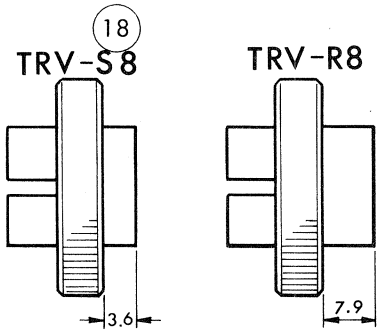


Fig. 23

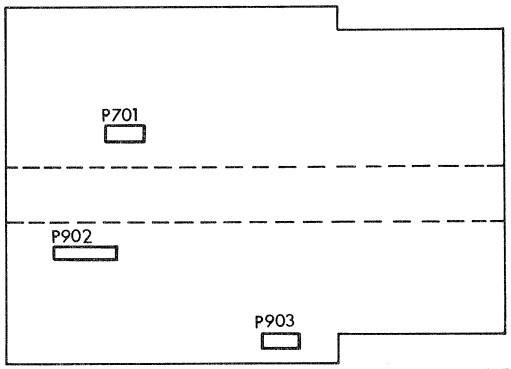


Fig. 25

III – 2 – 12 Camera Head Assy CCD (See Fig. 22 ~ 25)

Note: Each of ⑪ and ⑱ is available in two types for S8 and for R8.

Diassembly:

1. Disconnect the connectors ②, ③ and ④ from the PC board of video Pz sync circuit. (See Fig. 25)
2. Unscrew 2 pieces of ⑥ to remove the assy parts of camera head assy CCD from the base frame.
3. Unscrew 1 piece of ⑦ and 3 pieces of ⑭ to remove ⑬.
4. Unscrew 3 pieces of ⑫ to remove ⑪.
5. See Fig. 22 for further disassembly.

Reassembly:

1. Make sure that the CCD surface has no stain or scratch before installing ㉑ to ⑤.
2. Apply screw lock after tightening 3 pieces of ㉒. Refer to page 73 for the setting of frame position.
3. When fitting ①, take ㉓ out of the notch, and tighten together; take care so that the cords may not get entangled.
4. When installing ⑰ to ⑱, apply lock tight to the threads of ⑰ before screwing in.
5. When installing ⑮ to ⑬, carry out temporary tightening so that ⑯ may not touch ⑬.

Note: Should some trouble occur in the electric circuit or optical system of CCD camera, send the whole unit of the camera section (camera head and camera control unit) to the following Elmo's service station for replacement of parts or for adjustment. Do not carry out replacement or/and adjustment by yourself.

U.S.A.: Elmo Mfg. Corp.
Canada: Elmo Canada Mfg. Corp.

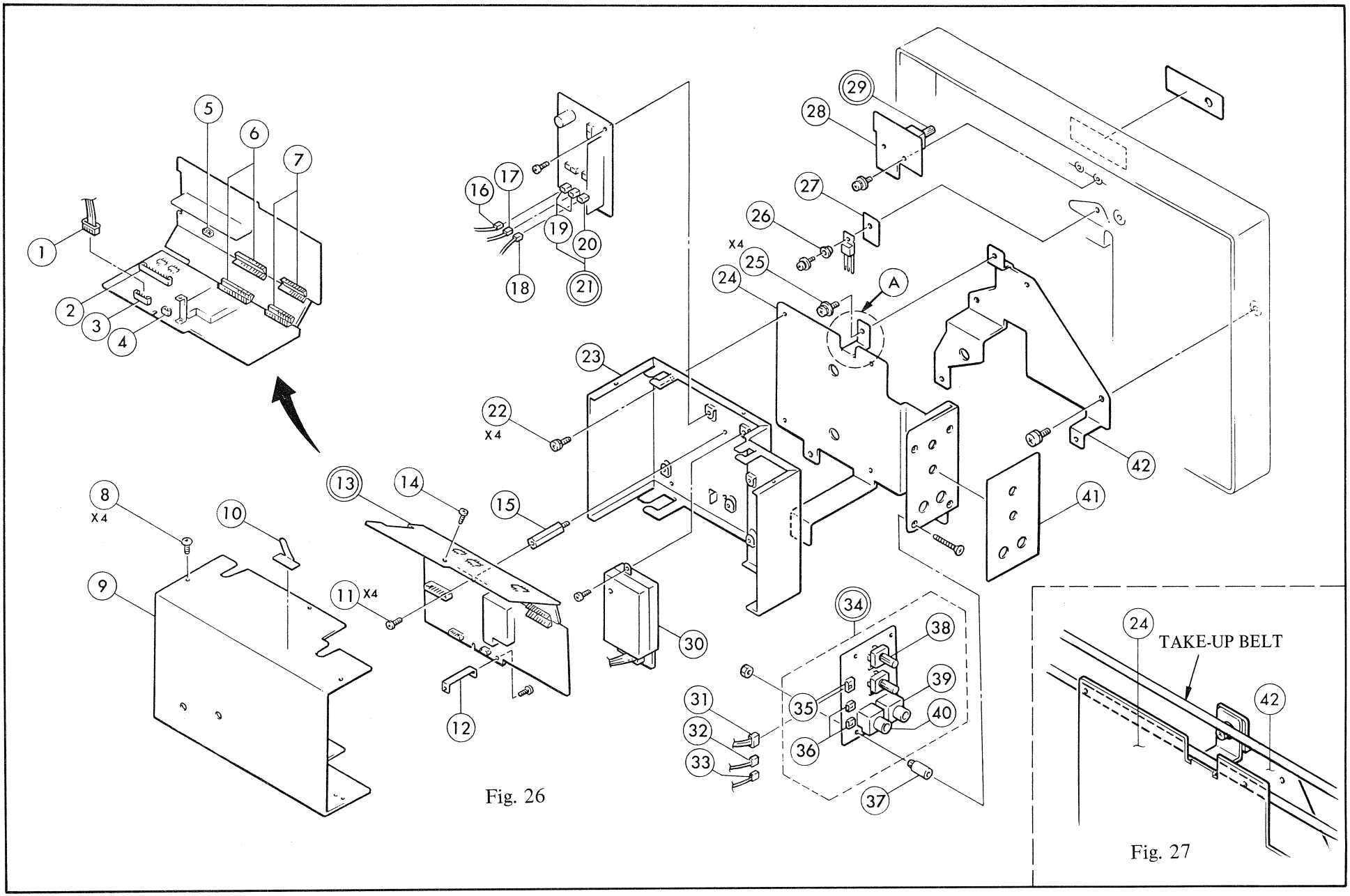

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Fig. 26

24
TAKE-UP BELT
42

Fig. 27

III – 2 – 13 Video PZ Sync Circuit (See Figs. 26 and 27)

Note: Take electrostatic safety measures before starting the work.

Disassembly:

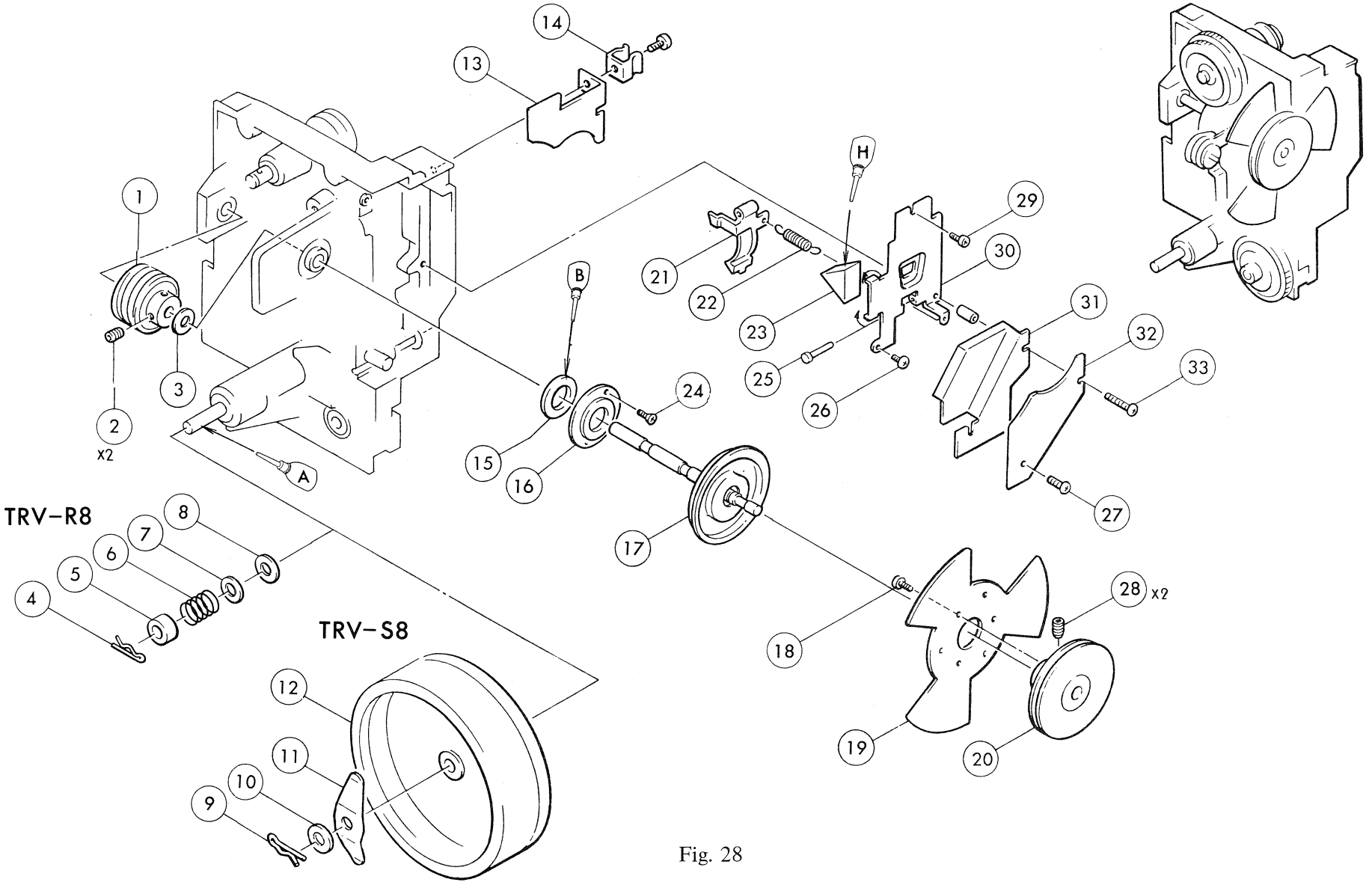
1. Unscrew 4 pieces of ㉕ to remove the camera control unit from ㊷.
2. Unscrew 4 pieces of ⑧to remove ⑨.
3. Unscrew 1 piece of ⑭ to open ⑬ and disconnect connectors (leading to CCD head) from receptacles ②, ④ and ⑤.
4. Unscrew 4 pieces of ⑪ to disconnect the connectors before removing ⑬.
5. Unscrew 4 pieces of ㉒ to remove ㉔ from ㉓.
6. See Fig. 26 for further disassembly.

Reassembly:

1. Take out the cords from the notches of ⑨ when installing ⑨, taking care so that the cords may not get trapped in the notches.
2. When installing Ⓐ of ㉔, pass it through the take-up belt as shown in Fig. 27.
3. The PC board assy output terminal ㉞ with ㊵ and ㊱ (at the bottom) is for S8, and the one without ㊵ and ㊱ is for R8.
4. The name plate of output terminal ㊶ with "AUDIO OUT" is for S8, and the one without "AUDIO OUT" is for R8.

Note: Should some trouble occur in the electric circuit or optical system of CCD camera, send the whole unit of the camera section (camera head and camera control unit) to the following Elmo's service station for replacement of parts or for adjustment. Do not carry out replacement or/and adjustment by yourself.

U.S.A.: Elmo Mfg. Corp.
Canada: Elmo Canada Mfg. Corp.


TRV–R8
TRV–S8
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A
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Fig. 28

III – 2 – 14 Shutter Assy and Flywheel (See Fig. 28)

Note: Parts ④ ~ ⑧ are exclusively for type R8, and ⑨ ~ ⑫ for type S8, while ① and ⑰ are available for types S8 and R8.

Disassembly:
1. Take out ⑨ to remove ⑩, ⑪ and ⑫. (Type S8 only)
2. Take out ④ to remove ⑤, ⑥, ⑦ and ⑧. (Type R8 only)
3. Unscrew 1 piece each of ㉗ and ㉝ to remove ㉜ and ㉛.
4. Unscrew 1 piece each of ㉖ and ㉙ to remove assy parts of ㉚.
5. Unscrew 2 pieces of ㉘ to remove assy parts of ⑲.
6. Unscrew 2 pieces of ② to remove ⑰ and ①.
7. See Fig. 28 for further disassembly.

Reassembly:
1. When installing ㉛, make sure that it does not interfere with the shutter asys.
2. When installing ⑲, make adjustment so that it covers the A.P mask at the time of film feeding (See Fig. 5 on page 29).
3. When replacing ㉚, fold the claw of ㉚ at two places after adhering ㉓. (See Fig. 28) Further, flatten the end of ㉕ and apply ALUMI GREASE 1 to ㉓.
4. After installing ㉒, fold the hooks (2 pcs.).
5. When installing ⑯, wipe off the oils in the surrounding, and apply THREE BOND 4 (G051) to the outer periphere (excluding the lubricating slot) before airtightening.
6. Apply VEEDOL 20-40 to ⑮.
7. When installing ⑫, apply ALVANIA GREASE 2 to the sliding surface of fly wheel. Also, after installation make sure that the rotation is smooth without play (slackening).

Troubleshooting hints:

Symptoms	Causes
Flowing of shutter	Defective installing position of ⑲ assy
Irregular rotation	Adherence of oils to ⑳
Unstable image (up-down)	Deflection, slackening or wear of ⑰
Slow projection speed	Lubricate the shaft of ⑰.
Wow/flutter appears.	Scratch and breakage of ① and ⑰, or/and deflection of ⑫
Failure in lower loop formation	Bend ⑪ to increase the spring tension.

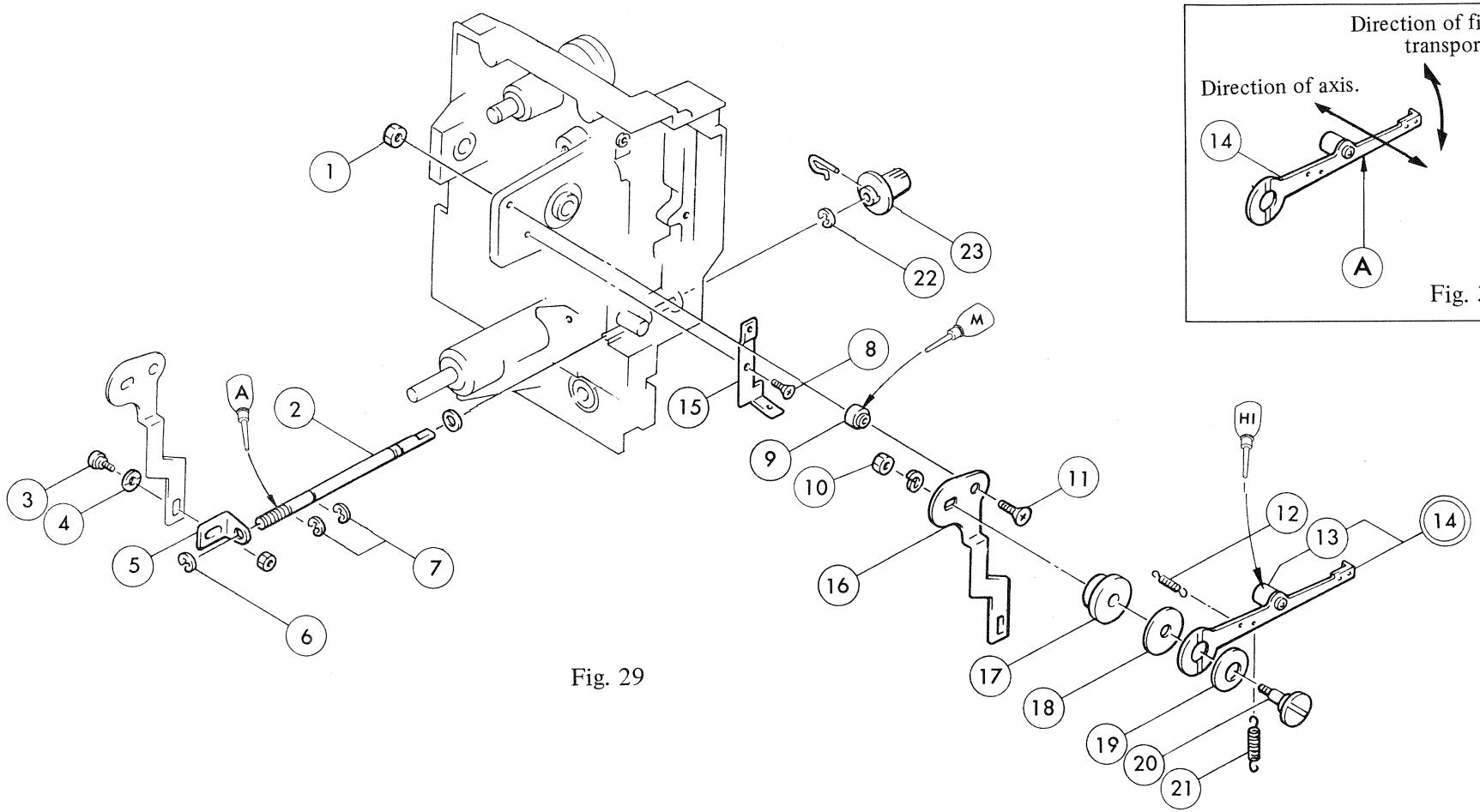
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Fig. 29

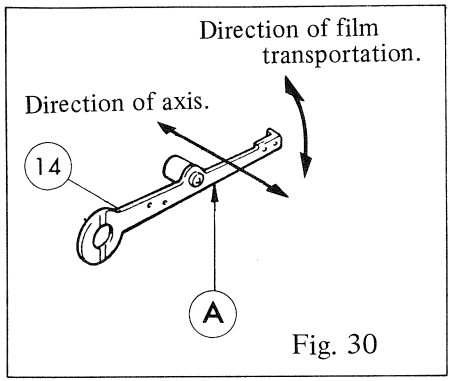
Direction of film transportation.
Direction of axis.
14
A

Fig. 30

III – 2 – 15 Claw Assy and Lever ⑤ Framing (See Figs. 29 and 30)

Note: ⑭ is available in two types for S8 and for R8.

Disassembly:
1. Unscrew ⑩ to remove ⑳.
2. Disengage ㉑ and ⑫ to remvoe assy parts of ⑭.
3. Unscrew 1 piece of ⑪ and take out ㉒ and ㉓ to remove ⑯ and ② from machine frame.
4. Take out ⑥ to remove ② from ⑤.
5. See Fig. 29 for further disassembly.

Reassembly:
1. Apply DAPHNE 44 to ⑨.
2. Screw ② into ⑤ and lock with ⑥. Fit ⑦ to the specified portion of ②, and install together with assy parts of ⑯ to machine frame. Apply ALVANIA GREASE 2 to the threads of ②.
3. After installing ⑭, apply HITASOL MO-109N to the sliding surface of cam. (See Fig. 29- ⑬)
4. Carry out adjustment, so that the claw of ⑭ extends out 1 ~ 1.2 mm from the A.P. surface.
5. Measure the tension of ⑲ in the following manner. Measure the tension at Ⓐ in Fig. 30 by using a 110-g bar spring scale (C043), with the springs ⑫ and ㉑ not engaged. Aimed value: 65 g, Permissible range: 60 ~ 70 g
6. Measure the tension of ⑫ in the following manner. Engage the springs ⑫ and ㉑, and measure the tension by pulling the Ⓐ section in Fig. 30 in the direction of axis by means of a 1-kg spring scale (P048). Aimed value: 400 g, Permissible range: 350 ~ 450 g
7. Measure the tension of ㉑ in the same manner as in 6. by pulling the Ⓐ section in Fig. 30 in the direction of film transportation. Aimed value: 900 g, Permissible range: 850 ~ 950 g

Troubleshooting hints:

Symptoms	Causes
Flowing of film Abnormal sound is heard during projection. Unstable image (up-down) Unstable image (left-right) Frame can not be adjusted.	Excessive extension of claw of ⑭ from A.P rail Wear and oil shortage of ⑬, ⑭, ⑱ and ⑲, or/and improper tension of ⑫ and ㉑ Improper tension and tensile strength of ⑫, ⑲ and ㉑ Defective installing position of ⑭ Defective installing position of ⑦, or/and wear of ⑬

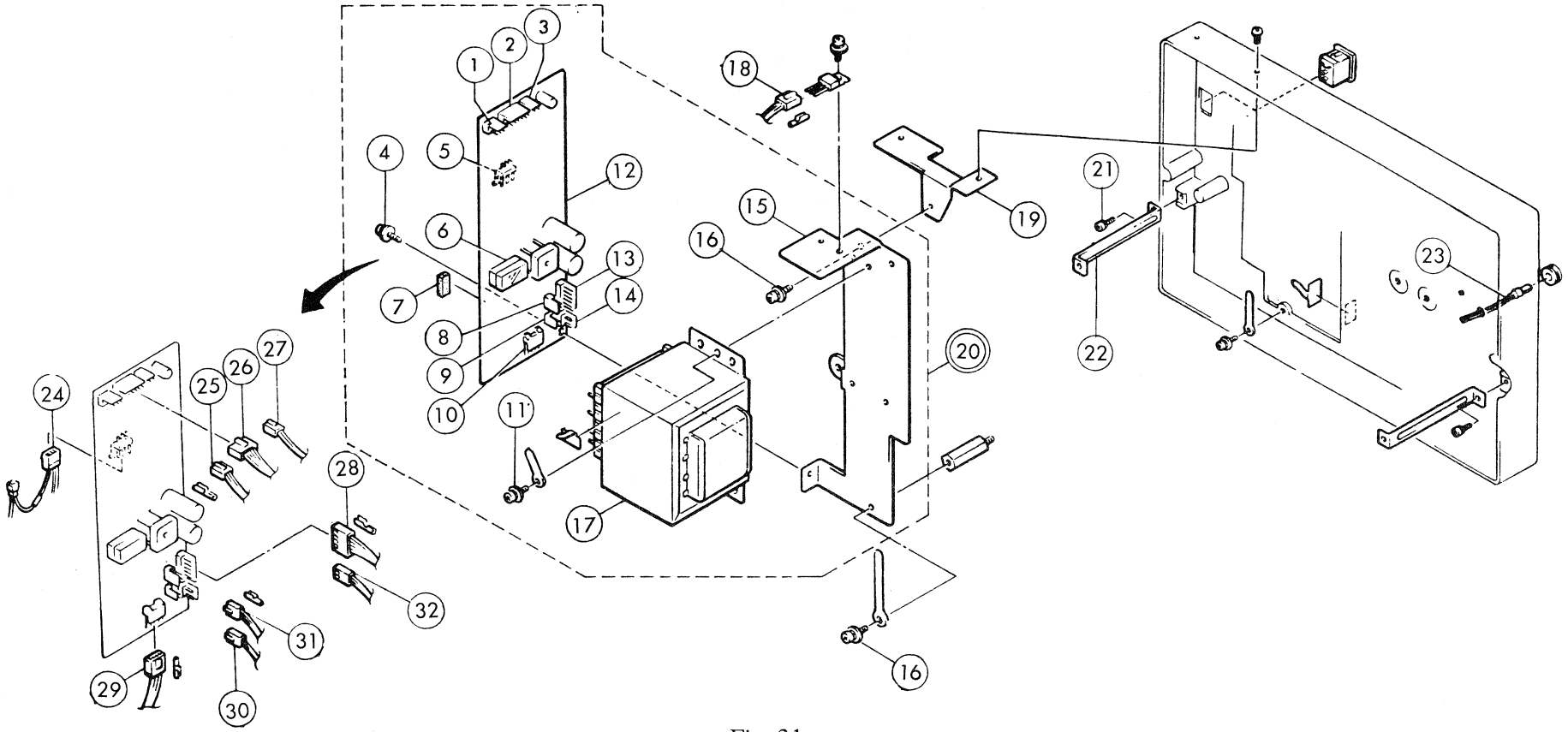
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Fig. 31

III – 2 – 16 Transformer Circuit Assy (See Fig. 31)

Note: Parts ②, ③, ㉓, ㉖ and ㉗ are exclusively for type S8, while ㉙ is available for S8 and R8.

Disassembly:
1. Unscrew 1 piece of ㉑ to remvoe ㉒.
2. Pull out the connector assies ㉔ ~ ㉜. (㉖ and ㉗ – S8 only)
3. Unscrew 4 pieces of ⑯ to remove ⑳.
4. Unscrew 4 pieces of ⑪ and 1 piece of ④ to remove ⑮.
5. See Fig. 31 for further disassembly.

Reassembly:
1. Connector ㉗ is for audio output, ㉘ for switch, ㉙ for LED, ㉚ for speed adjustment, ㉛ for transistor and ㉜ for lamp.
2. Carry out reassembly in the reverse order of disassembly, taking care so that there are no scratches on and disconnection of cords to prevent miscontact of connectors. Furthermore, take due care so that the cords may not get entangled.

Troubleshooting hints:

Symptoms	Causes
Sound does not come out. (Type S8 only)	Miscontact or/and disconnection of ㉖ and ㉗
Lamp fails to light up.	Miscontact or/and disconnection of ㉘ and ㉛
Pilot lamp fails to light up. (Type S8 only)	Miscontact of ㉙ or/and disconnection of ㉓
Failure in fine speed adjustment	Miscontact or/and disconnection of ㉚
Motor fails to rotate.	Miscontact or/and disconnection of ㉘

Note: Refer to page 81 for the detail of troubleshooting hints.

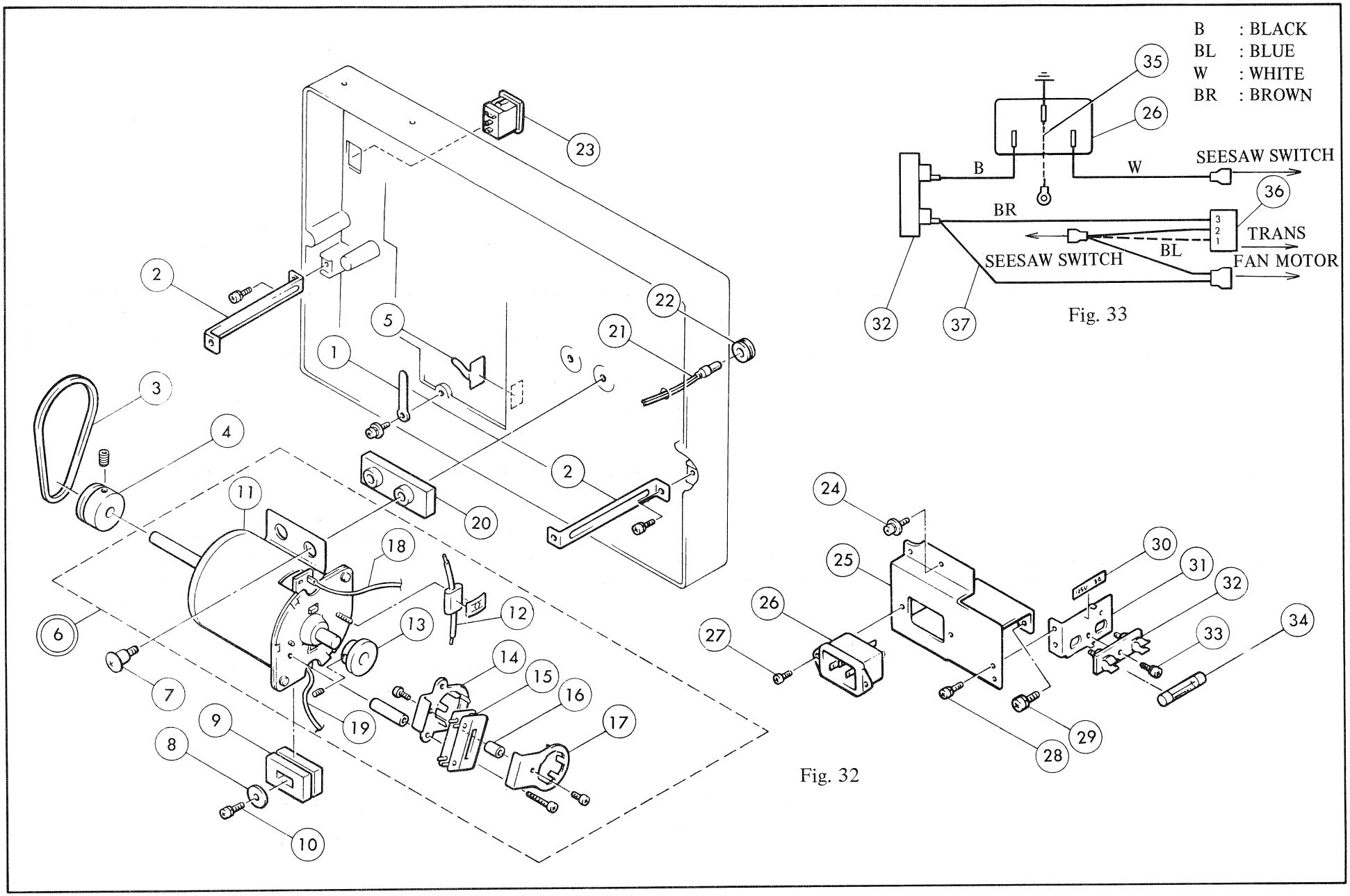
B : BLACK
BL : BLUE
W : WHITE
BR : BROWN
SEESAW SWITCH
TRANS
FAN MOTOR
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Fig. 33

Fig. 32

III – 2 – 17 Motor Assy and Holder (4) Power Socket (See Figs. 32 and 33)

Disassembly:

1. Unscrew 1 piece of ㉔ and 2 pieces of ㉙ to remove ㉕.
2. Unscrew 2 pieces of ㉗ to remove ㉖.
3. Unscrew 2 pieces of ㉘ to remove the assy parts ㉚ ~ ㉞.
4. Disengage ③ from ④, then unscrew 2 pieces of ⑦ and loosen 1 piece of ⑩ to remove ⑥.
5. See Fig. 32 for further disassembly.

Reassembly:

1. Install ㉖, with earth terminal facing upward.
2. Parts ㉟ and ㊱, indicated in full line, are for use in Japan, and those indicated in broken line are for use in North America. (See Fig. 33)
3. Make sure that ③ and ④ have no oils adhered to them and that ③ has no conspicuous crack on it.
4. Tighten ④ temporarily, engage ③, and install ⑥ to the base frame.
5. Fix ④ to prevent ③ from getting twisted and to keep pulley shutter straight.

Troubleshooting hints:

Symptoms	Causes or/and countermeasures
Power fails to turn on.	Disconnection of ㉞
Motor fails to rotate.	Disconnection of ⑱ and ⑲ or/and defect of ⑪
Motor rotation is slightly slow.	Inadequate torque of ⑪, or/and deterioration and defective installing position of ③
Motor rotation is excessively slow.	Defect of ⑪
Motor vibration sound is excessively large.	Play in the shaft of ⑪
Unstable projection speed	Adherence of oils to ③ and ④

Note: Refer to page 81 for the detail of troubleshooting hints.

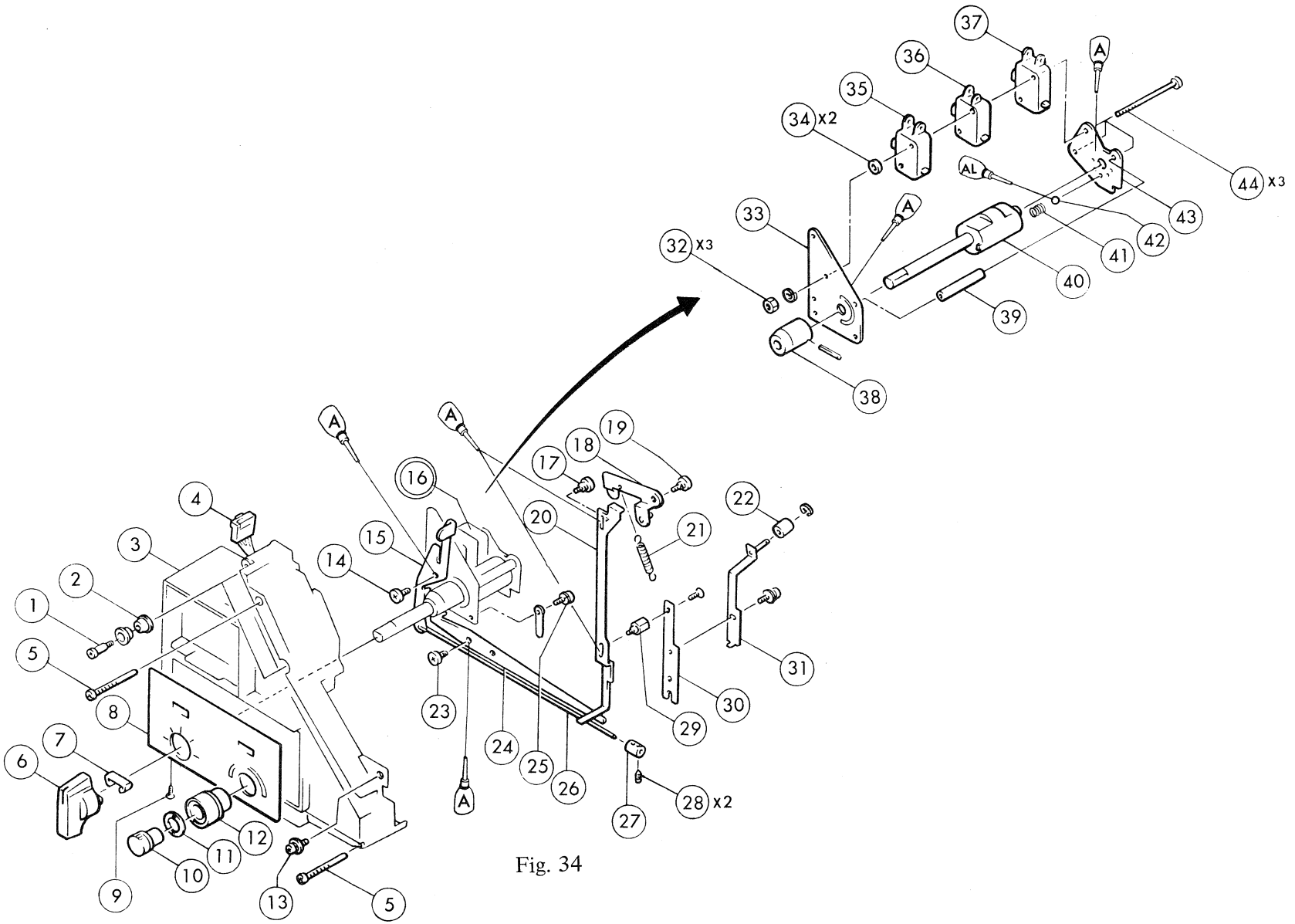
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Fig. 34

III – 2 – 18 Cam Switch and Cover Amplifier (See Fig. 34)

Note: Parts ④, ⑩, ⑪ and ⑫ are exclusively for type S8, ③ and ⑧ for types S8 and R8.

Disassembly:
1. Parts ⑯ ~ ㉒, ㉕, ㉙ ~ ㊹ are all installed to the rear of base frame.
2. Pull out ⑥.
3. Unscrew 2 pieces of ⑤ and 1 piece each of ⑨ and ⑬ to remove the cover amplifier ③.
4. Unscrew 3 pieces of ㉕ to remove ⑯.
5. See Fig. 34 for further disassembly.

Reassembly:
1. Apply ALVANIA GREASE 2 to the cam contact surface of ㉝ and ㊸.
2. Combine the microswitches ㉟ and ㊲ for motor with the microswitch ㊱ for lamp as shown in Fig. 34.
3. Apply ALUMI GREASE 1 to ㊷.
4. After installing ⑯, make sure that ㊵ activates smoothly and that the switches ㉟, ㊱ and ㊲ turn to ON/OFF without fail.
5. After tightening 3 pieces of ㉜, apply screw lock.
6. Engage ㉑ to the machine frame fixing screw (Fig. 14-① on page 43).

Troubleshooting hints:

Symptoms	Cause or/and countermeasures
Motor fails to rotate/stop.	Defect of ㉟
Lamp fails to light up.	Defect of ㊱
Failure in FORWARD/REVERSE change-over of motor	Defect of ㊲
Master control knob rotation is heavy.	Improper tension or/and oil shortage of ㊶
The state of "thread" can not be maintained/released.	Defective installing position of ⑱ ; lubricate ⑳

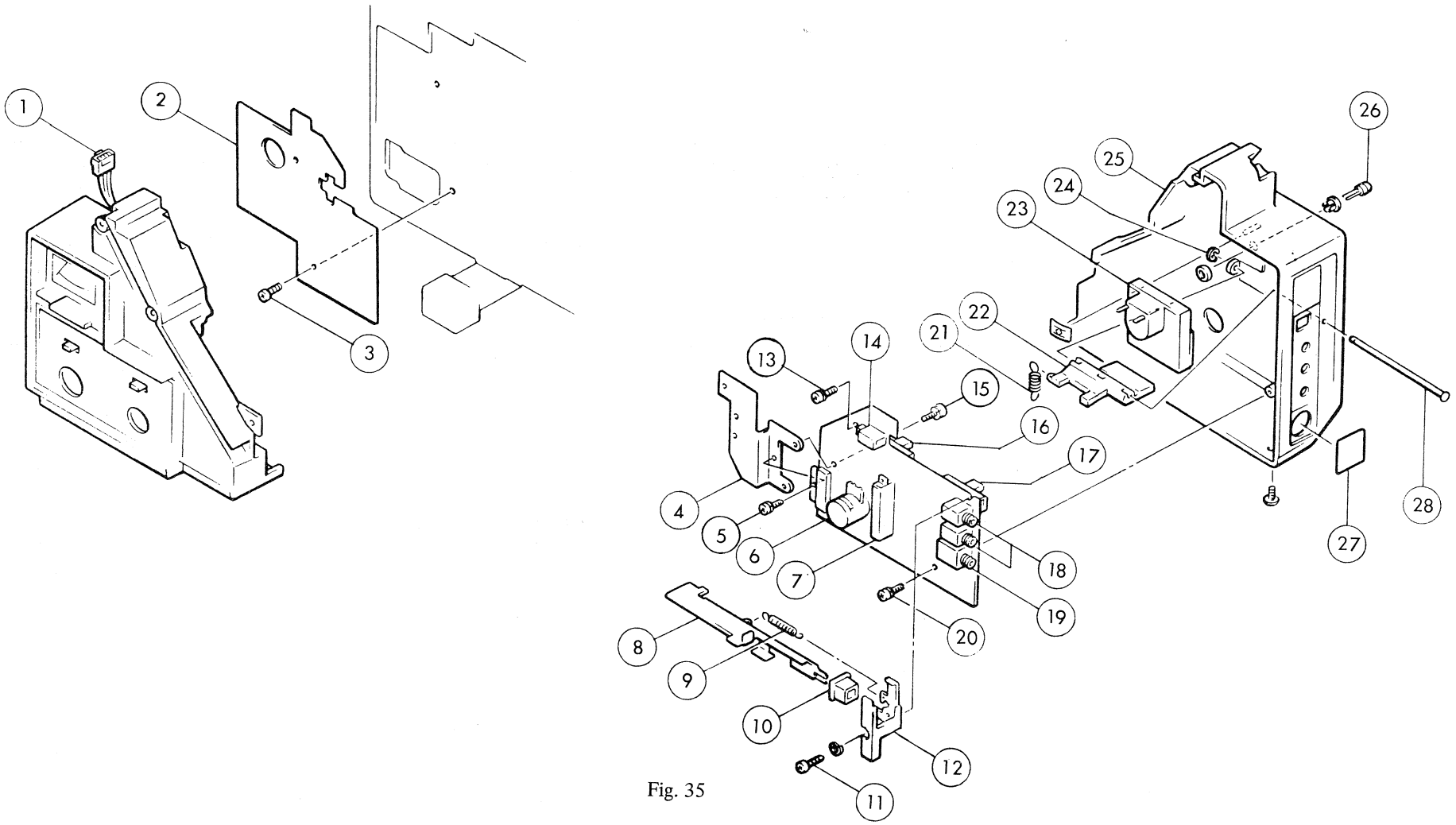


Fig. 35

III – 2 – 19 Amplifier (TRV-S8 only)

Disassembly:

1. Pull out knob volume control and knob balance. (See Fig. 34-⑩, ⑪, ⑫ on page 69)
2. Disengage ⑨ to remove ⑧.
3. Disengage ㉑ from ㉒.
4. Unscrew 1 piece each of ⑪, ⑬ and ⑳ to remove amplifier PC board.
5. Remove ㉔ to pull out ㉒ and ㉘.
6. See Fig. 35 for further disassembly.

Reassembly:

1. Carry out reassembly in the reverse order of disassembly, taking care so that there are no scratches on and disconnection of cords to prevent miscontact of connectors.
2. Make sure that the slide switches ⑯ (track selector) and ⑰ (sound selector) activate normally.

Note: See Fig. 20 for disassembly of sound head, and refer to page 75 for the detail of troubleshooting hints.

Troubleshooting hints:

Symptoms	Causes
Amplifier fails to activate.	Miscontact and disconnection of ①
Failure in recording	Defect of ⑦ and ⑭
Failure in volume and tone adjustment	Defect of ⑥
Failure in track selection (change-over)	Defect of ⑯
Failure in sound selection	Defect of ⑰

III – 3 Measurement and Adjustment

III – 3 – 1 Film Take-up Force and Film Rewinding Force (See page 39 ~ 42)

1. Film take-up force (See Fig. 36):
   See to it that there is no irregularity, affecting wow/flutter, during one turn of the reel when the reel used falls within the specified range.
   Engage 600 ft reel to the rear arm, and wind approximately 5 ~ 10 turns of film to measure the take-up force with a 110-g bar spring scale (C043) by pulling the film, with the projector turned to ON. The permissible range is 30 ~ 40 g.
2. Rewinding force (See Fig. 37):
   Similar to the take-up force, measure the rewinding force by engaging 600 ft reel to the front arm, then rewinding 5 ~ 10 turns of film. Measure with a 110-g bar spring scale (C043), the permissible range being 60 ~ 70 g.

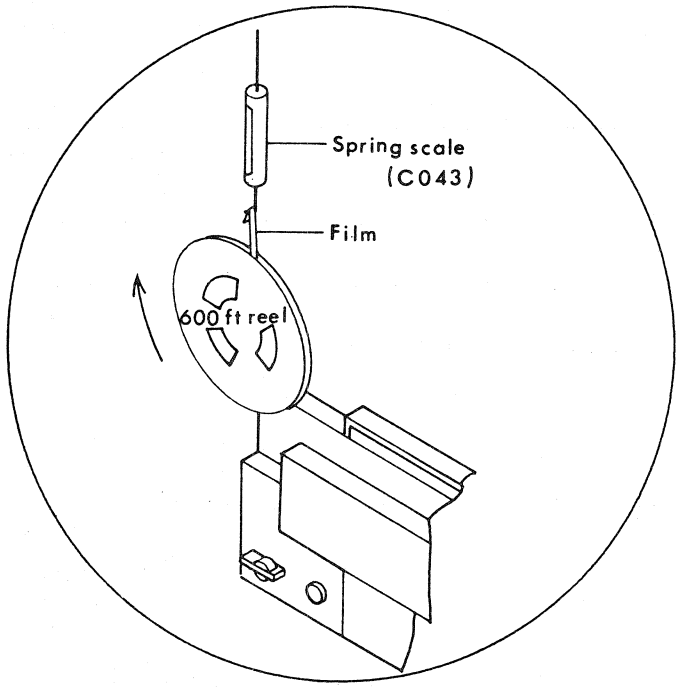


Fig. 36

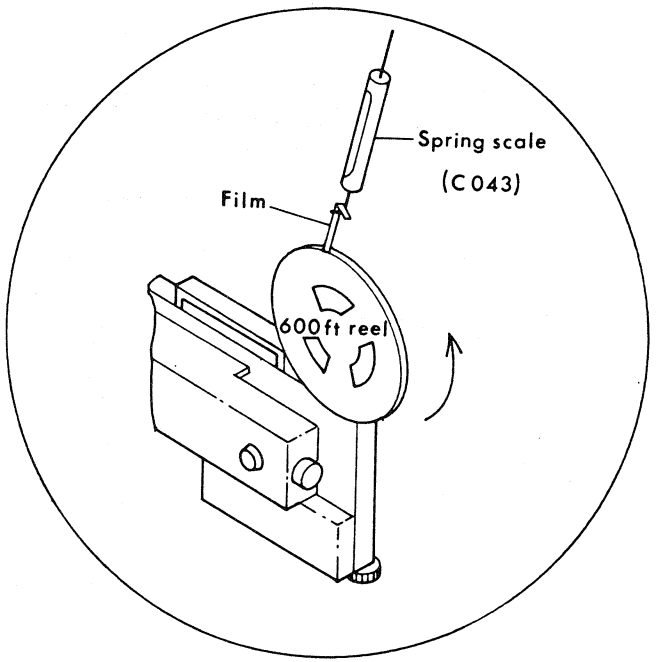


Fig. 37

III – 3 – 2 Periphery of Holder Head Installing Stand

1. Rise of lever pad roller (See Fig. 18 on page 49):
   Measure the space (gap) between the end of ⑳ and ㉖, ㉗, with the Master control knob turned to OFF. The permissible range is 2 ~ 3 mm.
   In order to adjust the space, change the installing position of collar link Ⓐ.
2. Tension of head presser (1) (See Fig. 20 – ㉔ on page 51):
   With the master control knob set to FORWARD, measure the tension of spring head presser (1) ㉔ at Ⓑ of ㉓ with a 500-g bar spring scale (C067). The permissible range is 110 ~ 130 g.
3. Tension of head presser (2) (See Fig. 20 ~ ㉑ on page 51):
   Measure the tension of head presser (2) ㉑ at the end of ⑳ with a 30-g dial tension gauge (C062). The permissible range is 20 ~ 22 g.

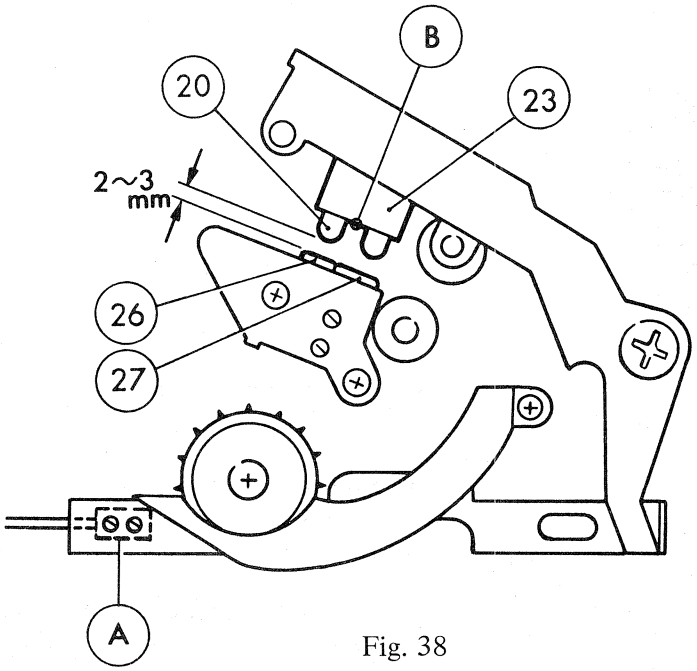


Fig. 38

III — 3 — 3 Setting of Frame Position

* Make the following adjustments, observing the TV screen and underscan, and use the revolving power film type S (P054) after getting the projector ready for projection.

1. Keep the focus ring near the center position (in the direction of rotation), then tighten 3 pieces of ③ temporarily, and focus by rotating ① clockwise and counter-clockwise.
2. Loosen 2 pieces of ②, and set the screen in up and down directions by moving the camera lens. After focusing, tighten the screws ②. See "Note" below.
3. Tighten 2 pieces of ④ to focus the screen in left-right directions. See "Note" below.
4. Turn the focus ring, and make sure that the focus changes due to turning and gets focused at the position near the center.
5. After making the confirmation in item 4 , apply screw lock to ② and ④.

Note: In the case of procedures 2 and 3, carry out adjustment so that the image frame on the underscan screen is at the same position in up and down and left and right directions (i.e. at the center of underscan screen). See Fig. 40.

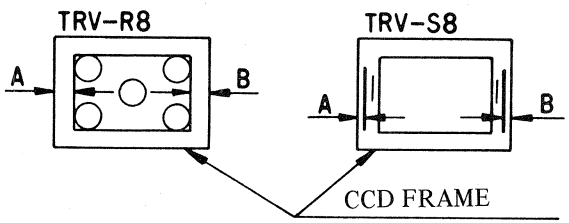


Fig. 40

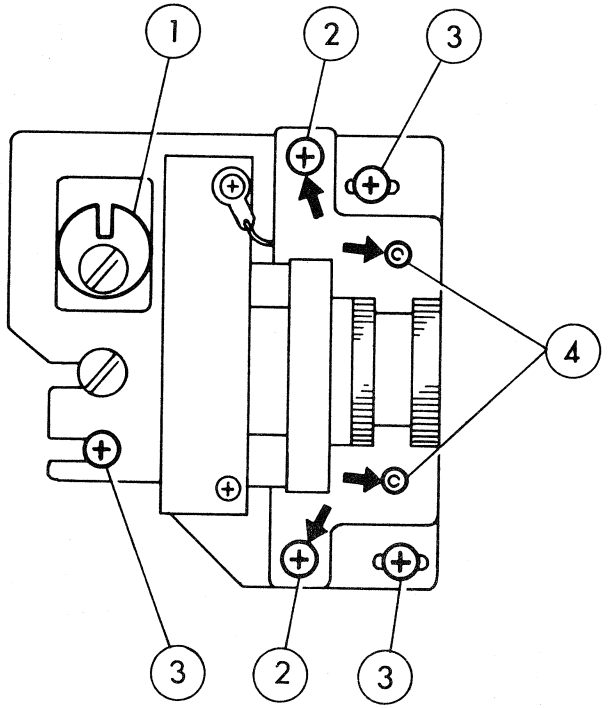


Fig. 39

III – 3 – 4 Measurement of Sound Characteristics (TRV-S8 only)

1. S/N ratio -- Over 46 dB
   * Film used: Kodak magnetic Posi-film
   * Measuring instrument: Distortion meter (P084)
   * Measuring method: Measure the sound level when the 400 Hz sound, recorded in PO50 film at 0 reading of the level meter, is replayed at 0 dB (1 V), and the noise output level when the projector is set to FORWARD projection with no film loaded. Set the knob balance to center position.
2. Wow/flutter -- Below 0.5 %
   * Film used: P050
   * Measuring instrument: Wow/flutter meter (P083)
   * Measuring method: Set the P050 film to the projector and record the signal of 3 KHz. Then measures, with the projector set to FORWARD projection and the sprocket gear phase shifted by 180°.
3. Frequency characteristic
   * Film used: P050
   * Measuring instrument: Distortion meter (P084)
   * Measuring method: Record the 400 Hz signal in P050 film, with the level meter at 0 position. Then measure with the strain meter (P084) the replay output level when the 400 Hz signal is replayed by adjusting the volume control knob to 0 dB (1 V), with the balance control knob at the center position. Here, make sure that the output signal is within the range in Fig. 41.

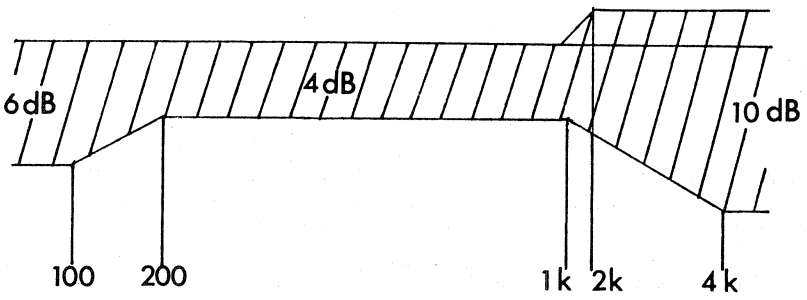


Fig. 41

IV. ELECTRIC CIRCUITS

IV-1 Troubleshooting Hints for Electric Circuits

IV — 1 — 1 Amplifier Circuit (TRV-S8 only)

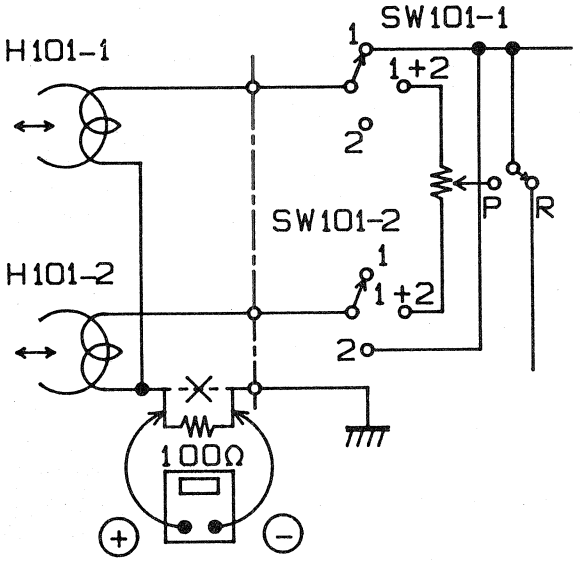
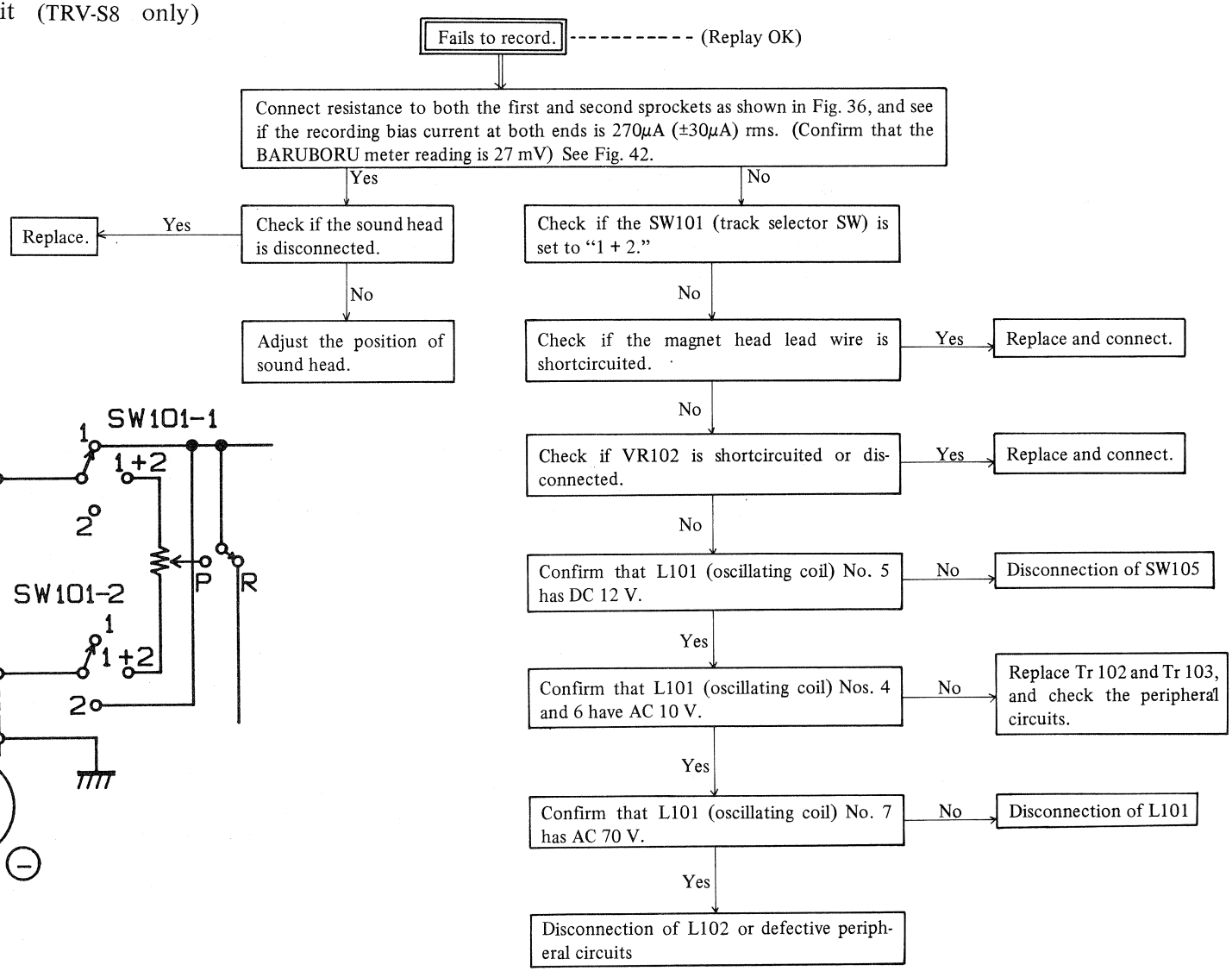
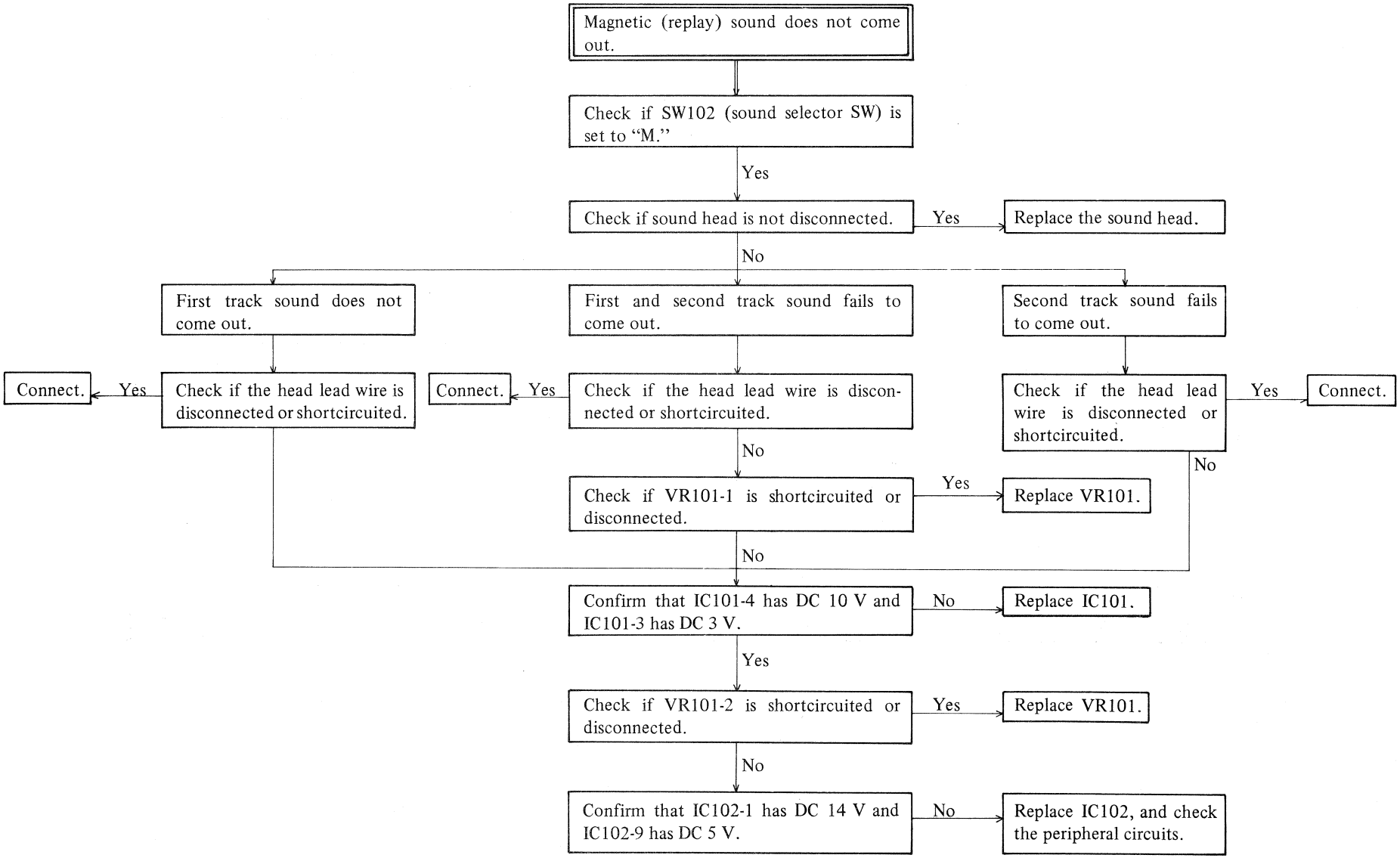


Fig. 42




Magnetic (replay) sound does not come out.
Check if SW102 (sound selector SW) is set to "M."
Yes
Check if sound head is not disconnected.
Yes
Replace the sound head.
No
First track sound does not come out.
First and second track sound fails to come out.
Second track sound fails to come out.
Connect.
Yes
Check if the head lead wire is disconnected or shortcircuited.
Connect.
Yes
Check if the head lead wire is disconnected or shortcircuited.
Check if the head lead wire is disconnected or shortcircuited.
Yes
Connect.
No
No
Check if VR101-1 is shortcircuited or disconnected.
Yes
Replace VR101.
No
Confirm that IC101-4 has DC 10 V and IC101-3 has DC 3 V.
No
Replace IC101.
Yes
Check if VR101-2 is shortcircuited or disconnected.
Yes
Replace VR101.
No
Confirm that IC102-1 has DC 14 V and IC102-9 has DC 5 V.
No
Replace IC102, and check the peripheral circuits.

Sound can not be erased.

Connect resistance to both the first and second sprockets as shown in Fig. 37, and check if the demagnetizing current at both ends is 80 ~ 90 mA. (Confirm that the BARUBORU meter reading is 90 mV) See Fig. 43.

Yes

Check if the magnet head is not disconnected.

Yes

Replace.

No

Readjust the magnet head position.

No

Confirm that L101 (oscillating coil) No. 8 has AC 12 V.

No

Confirm that L101 No. 5 has DC 12 V.

No

For further operation, refer to page 71 for the Fails to record.

Yes

Disconnection or shortcircuit of SW101-4 (track selector SW)

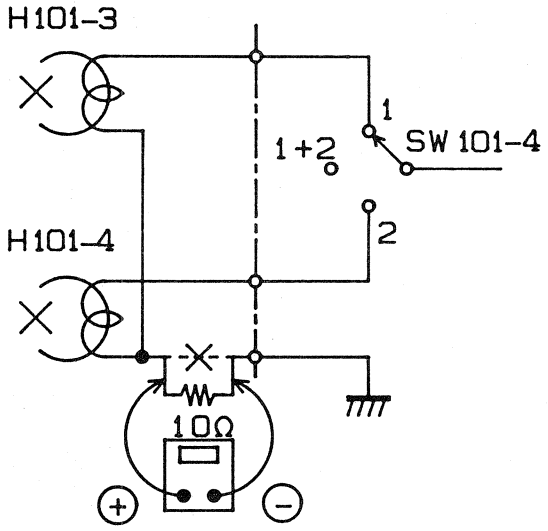
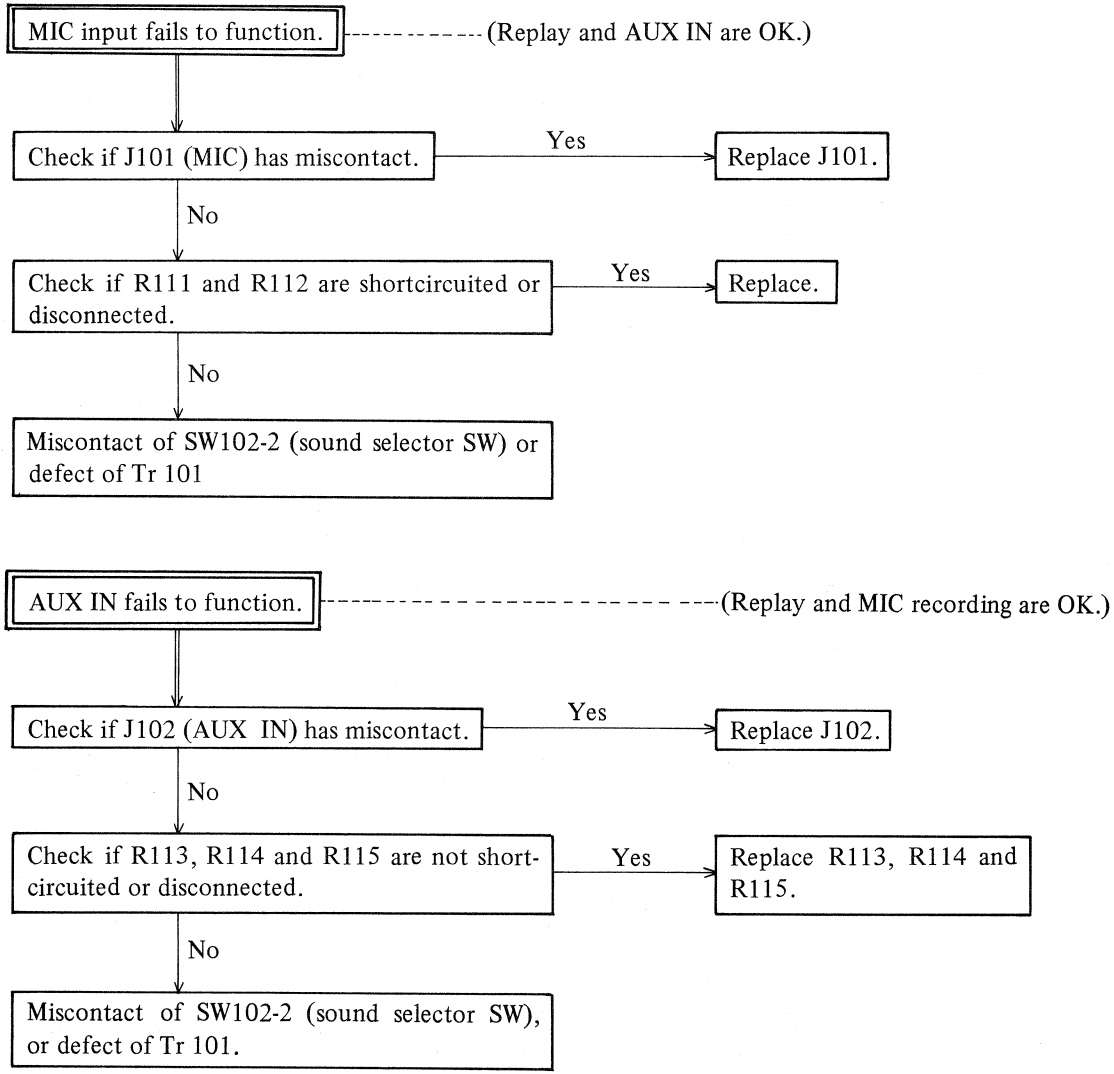
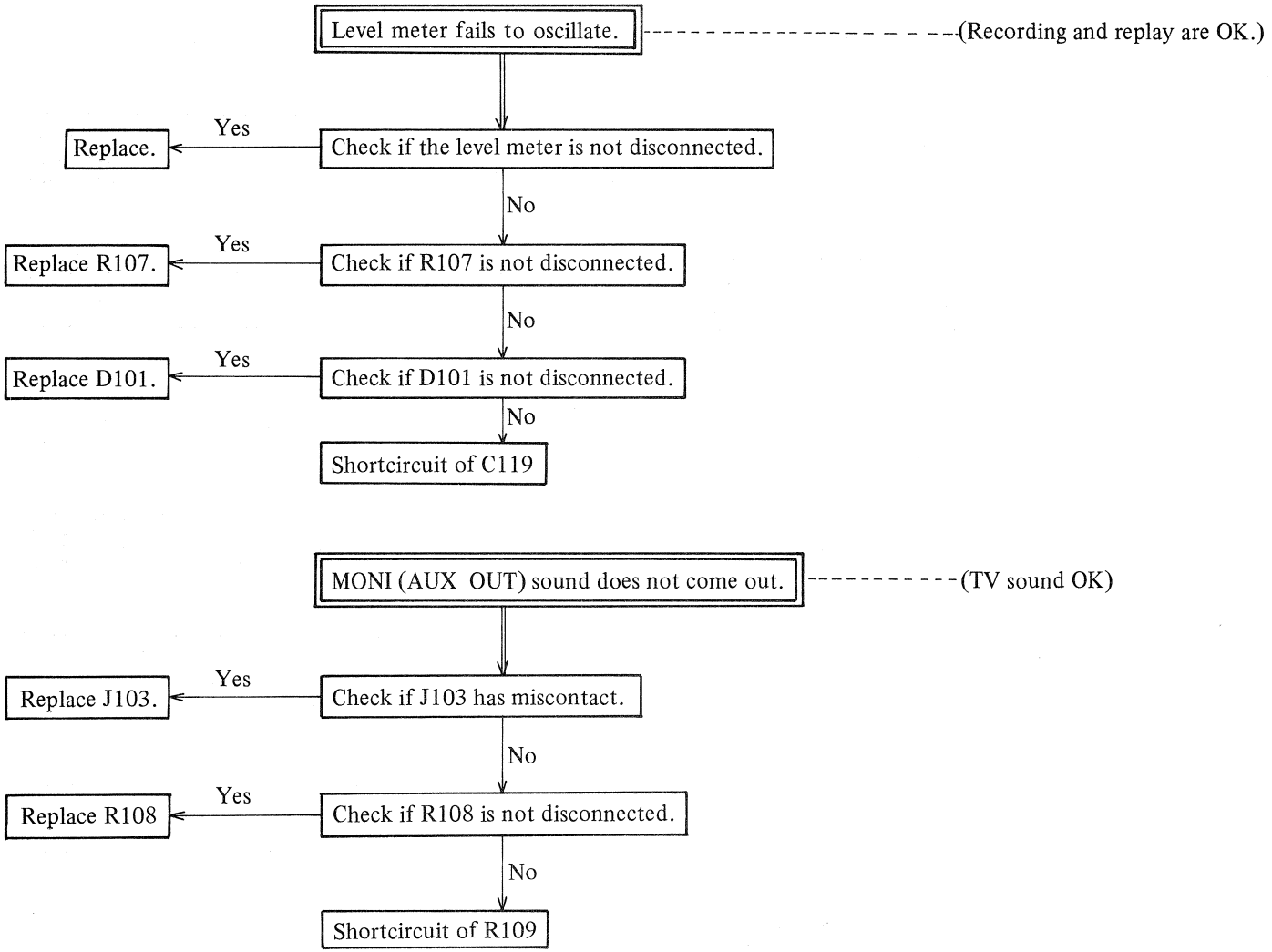
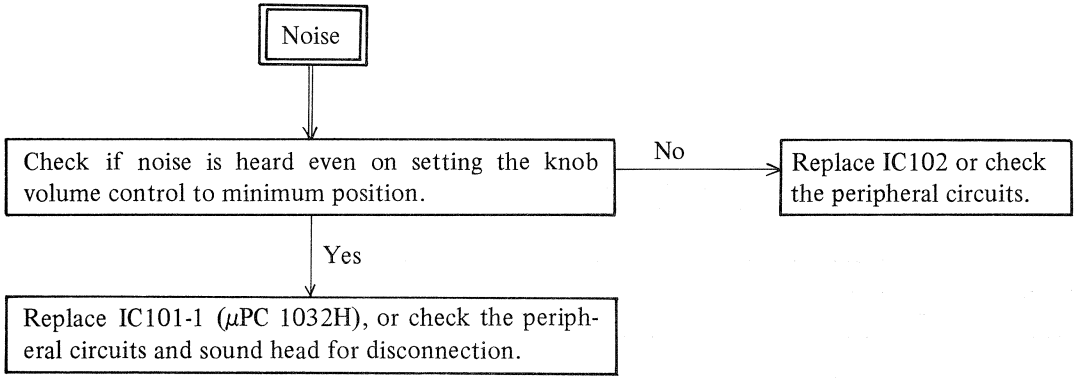


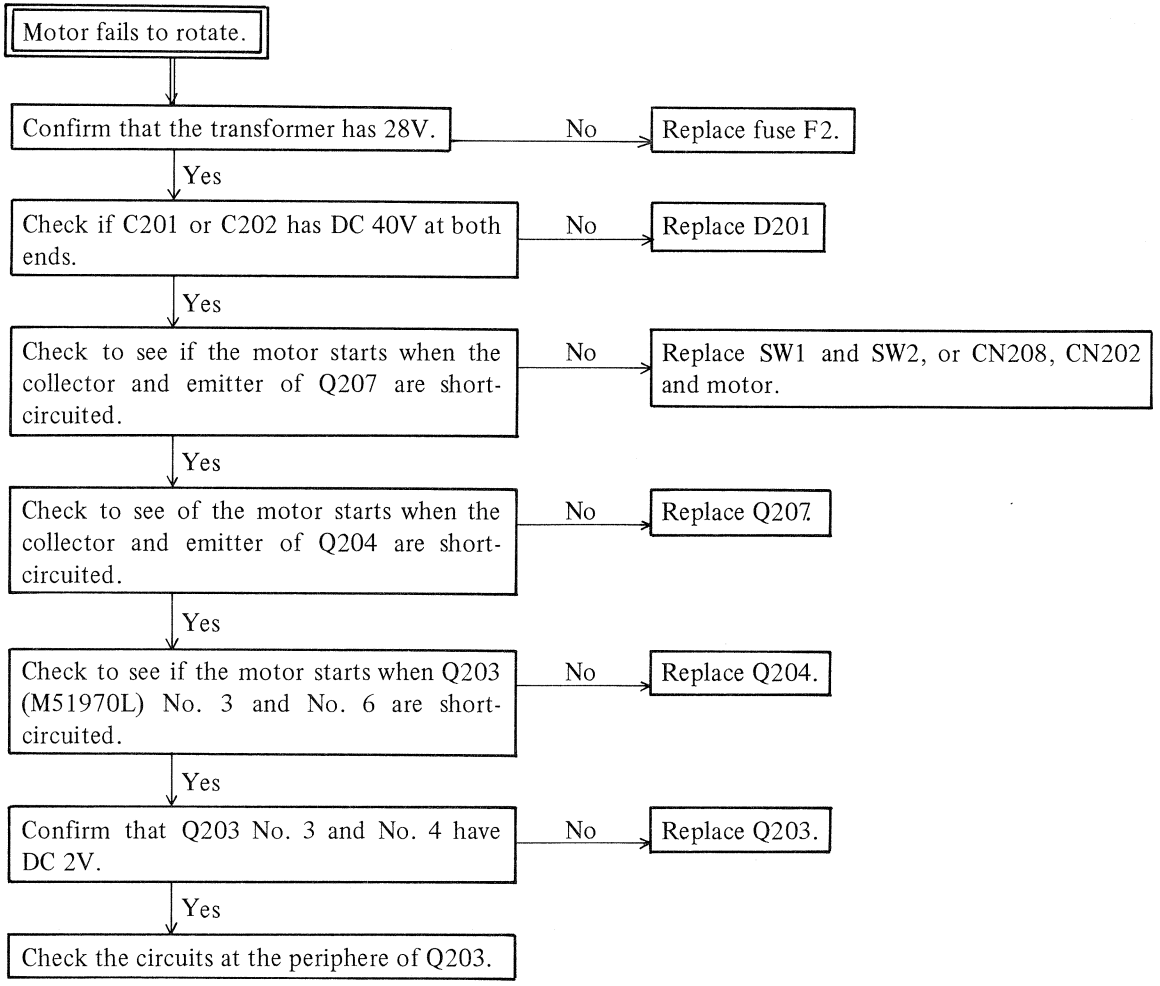
Fig. 43

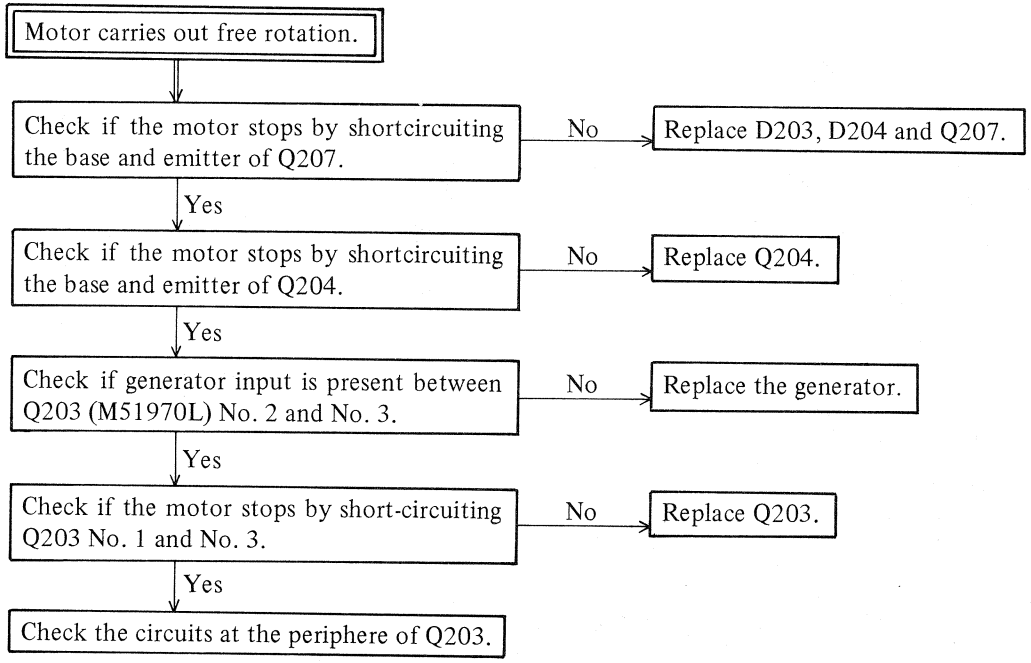

MIC input fails to function.
(Replay and AUX IN are OK.)
Check if J101 (MIC) has miscontact.
Yes
Replace J101.
No
Check if R111 and R112 are shortcircuited or disconnected.
Yes
Replace.
No
Miscontact of SW102-2 (sound selector SW) or defect of Tr 101
AUX IN fails to function.
(Replay and MIC recording are OK.)
Check if J102 (AUX IN) has miscontact.
Yes
Replace J102.
No
Check if R113, R114 and R115 are not short-circuited or disconnected.
Yes
Replace R113, R114 and R115.
No
Miscontact of SW102-2 (sound selector SW), or defect of Tr 101.


Level meter fails to oscillate.
(Recording and replay are OK.)
Yes
Replace.
Check if the level meter is not disconnected.
No
Yes
Replace R107.
Check if R107 is not disconnected.
No
Yes
Replace D101.
Check if D101 is not disconnected.
No
Shortcircuit of C119
MONI (AUX OUT) sound does not come out.
(TV sound OK)
Yes
Replace J103.
Check if J103 has miscontact.
No
Yes
Replace R108
Check if R108 is not disconnected.
No
Shortcircuit of R109


Noise
Check if noise is heard even on setting the knob volume control to minimum position.
No
Replace IC102 or check the peripheral circuits.
Yes
Replace IC101-1 (μPC 1032H), or check the peripheral circuits and sound head for disconnection.

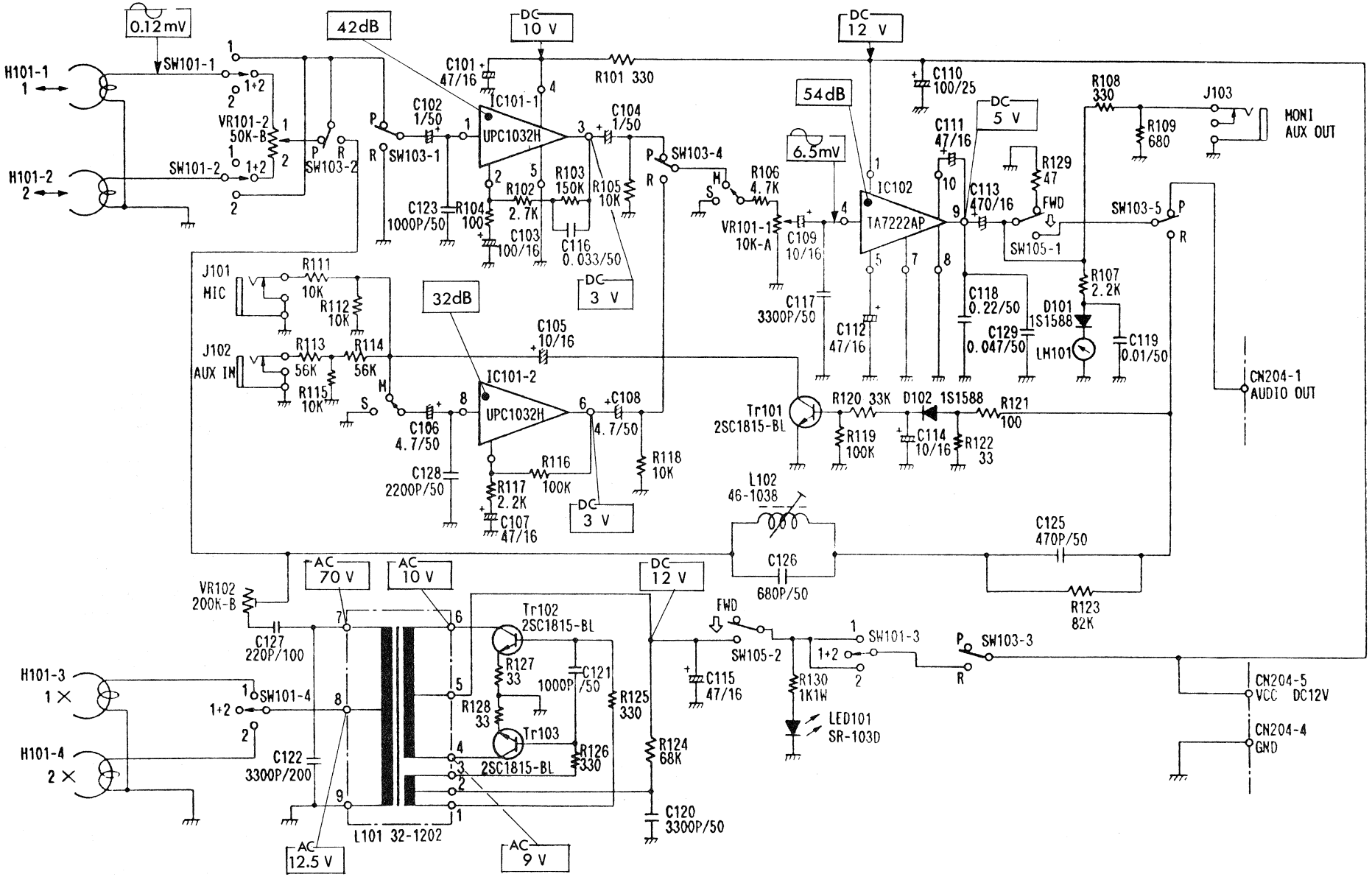
IV — 1 — 2 Motor Circuit



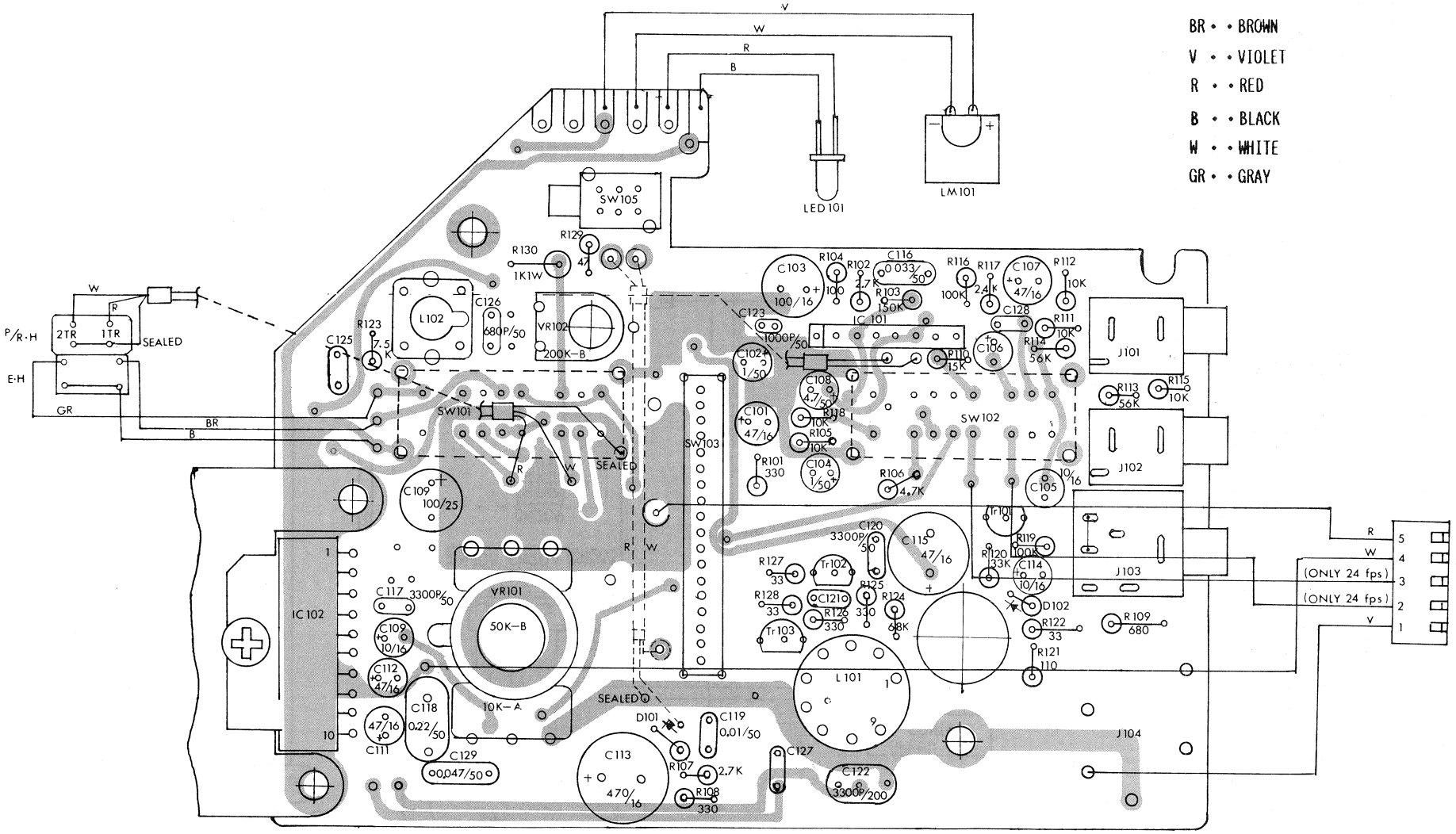

Motor carries out free rotation.
Check if the motor stops by shortcircuiting the base and emitter of Q207.
No
Replace D203, D204 and Q207.
Yes
Check if the motor stops by shortcircuiting the base and emitter of Q204.
No
Replace Q204.
Yes
Check if generator input is present between Q203 (M51970L) No. 2 and No. 3.
No
Replace the generator.
Yes
Check if the motor stops by short-circuiting Q203 No. 1 and No. 3.
No
Replace Q203.
Yes
Check the circuits at the periphere of Q203.

IV – 2 Connecting and Schematic Diagrams

IV – 2 – 1 Connecting and Schematic Diagrams for Amplifier (TRV-S8 only)

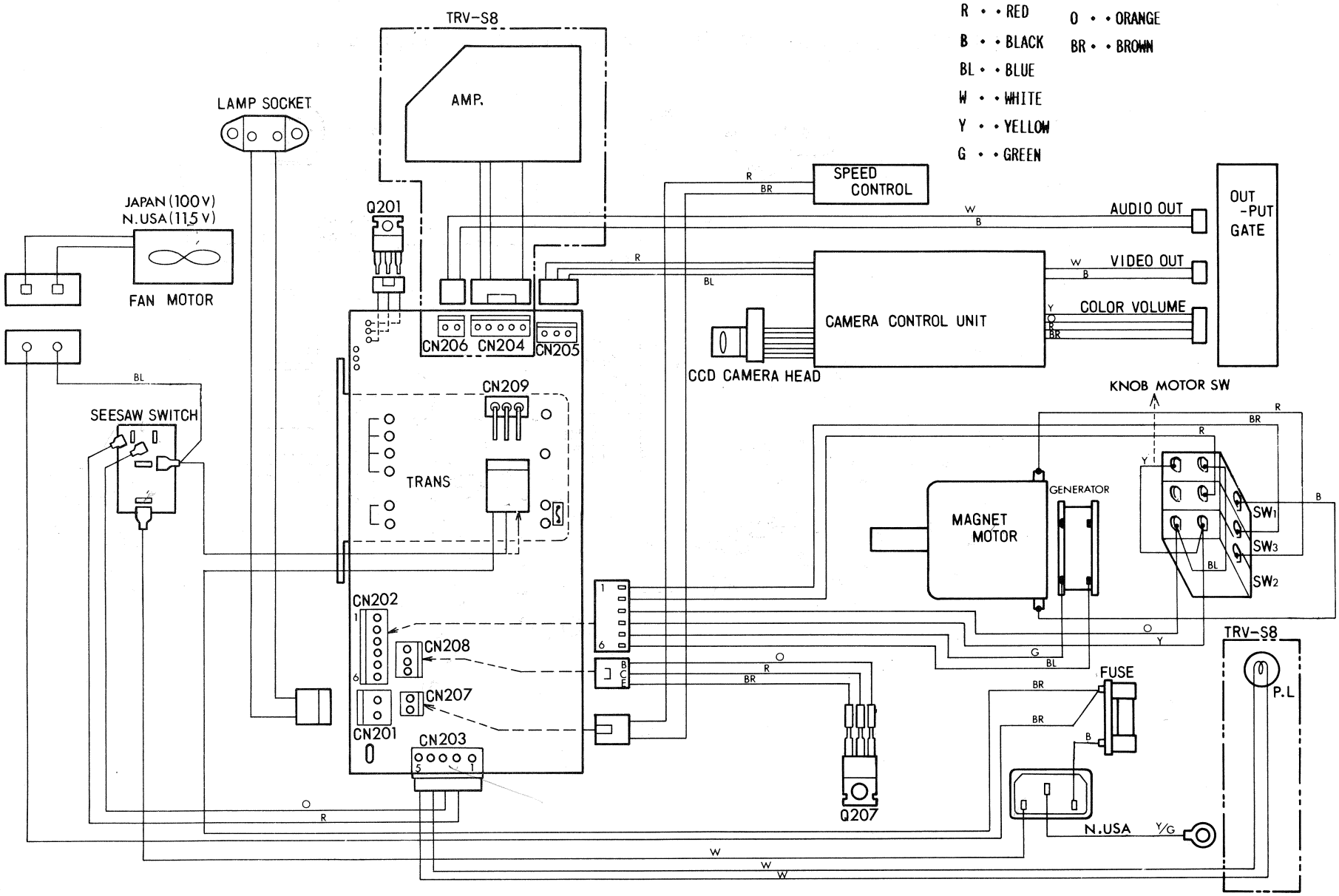


Schematic diagram for amplifier for TRV-S8 (E44234)

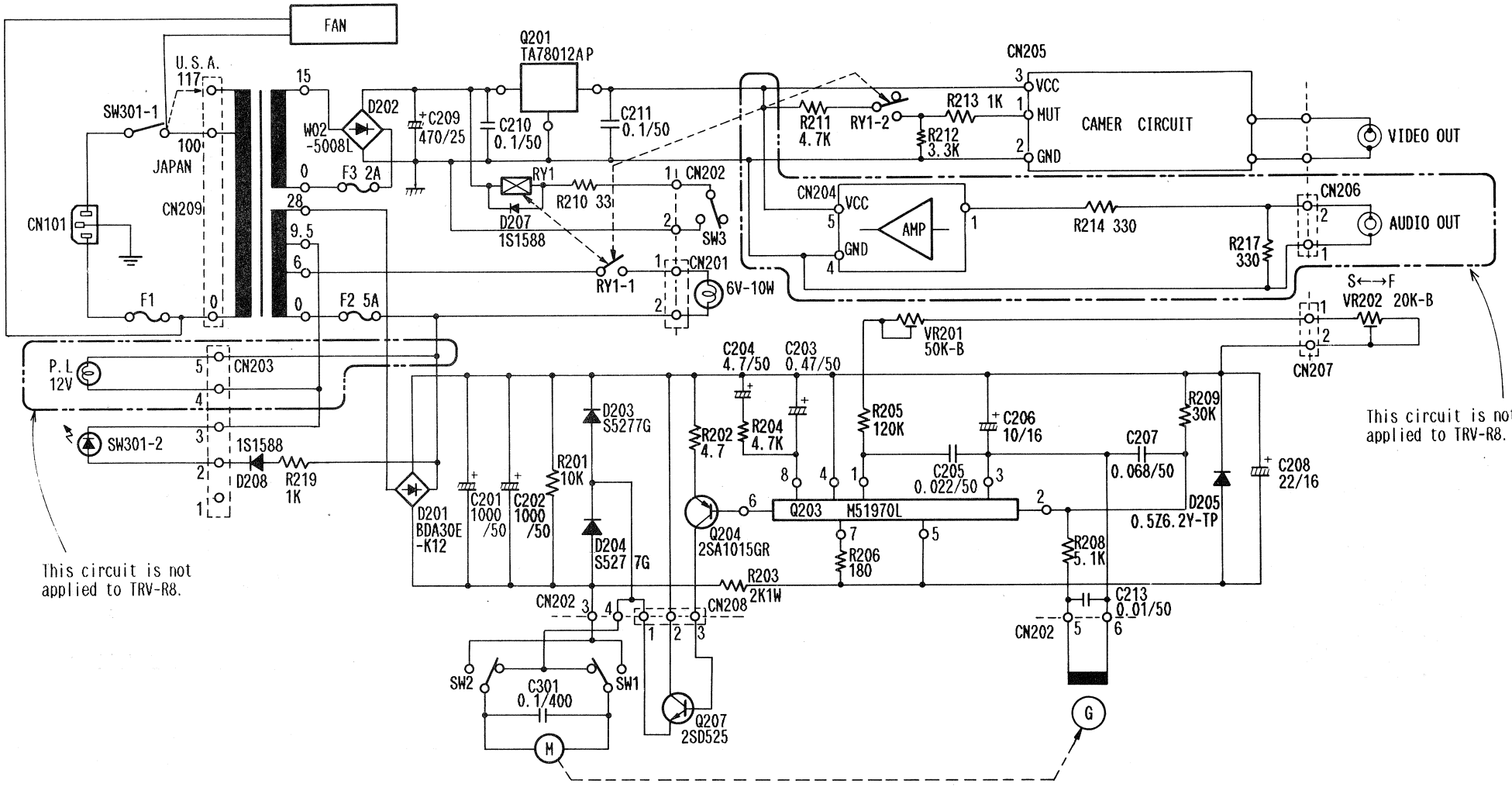


Connecting diagram for amplifer for TRV—S8 (E32763)

IV — 2 — 2 Connecting and Schematic Diagrams for Machine

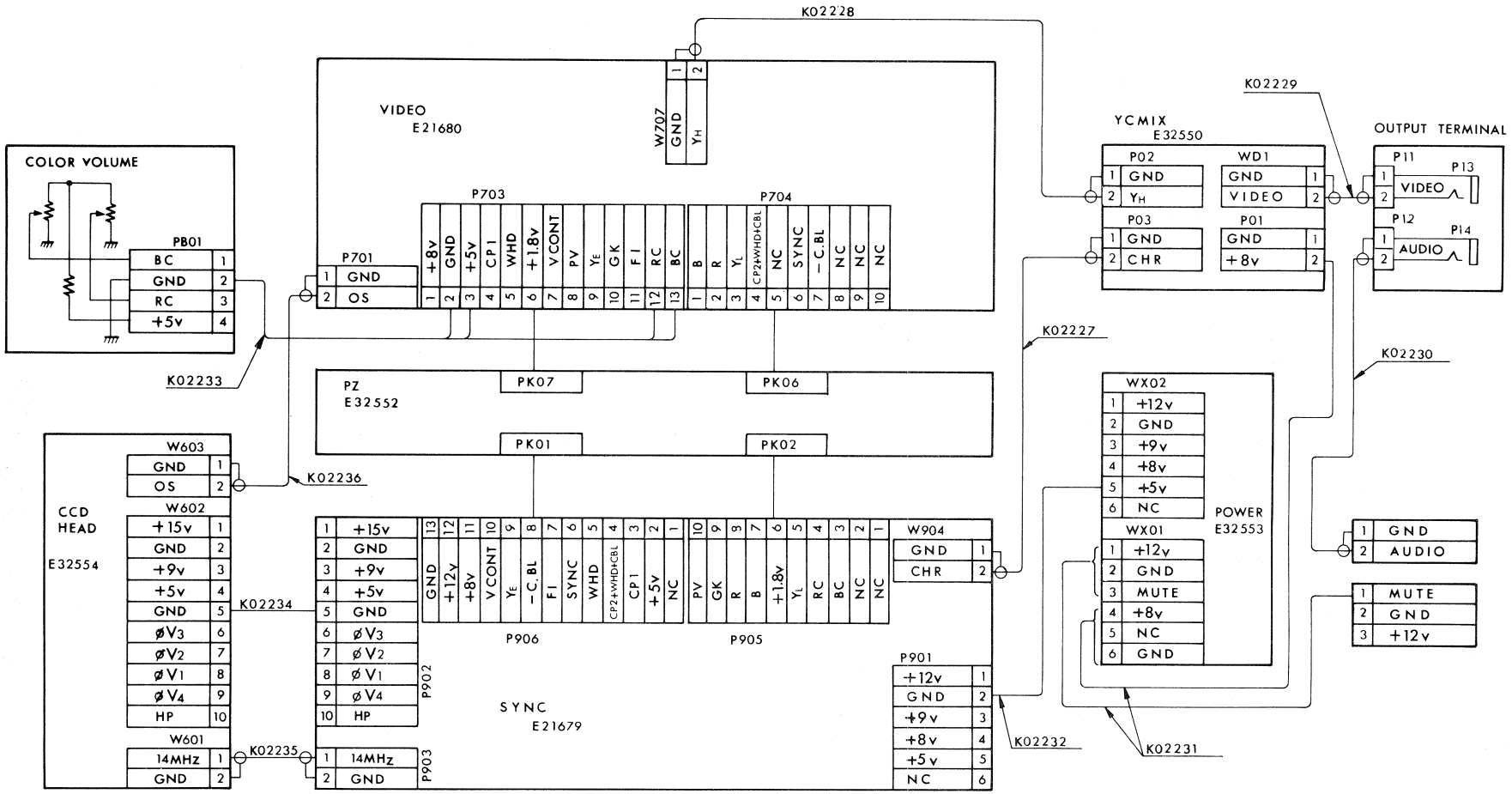


Connecting diagram for machine for TRV-S8 , TRV-R8



SCHEMATIC DIAGRAM FOR MACHINE FOR TRV-S8 (E44144)
TRV-R8 (E44147)

IV — 2 — 3 Connecting Diagram for CCD Camera



CONNECTING DIAGRAM FOR CCD CAMERA (E32551)

V. LIST OF TROUBLESHOOTING HINTS

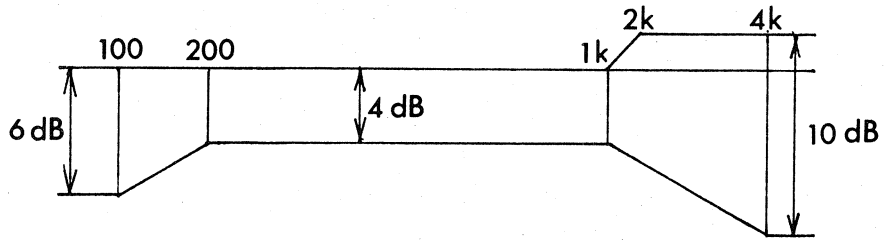
	Symptoms	Page
Film feeding section	Unstable image (up-down)	48, 60, 62
	Unstable image (left-right)	45, 48, 62
	Flowing of film	62
	Tilting of image	48
	Slow and unsteady projection speed	60, 66
	Flowing of shutter	60
	Irregular rotation of shutter	60
	Failure in focusing	48
	Gradual reduction of upper film loop	38
	Gradual reduction of lower film loop	36
	Failure in lower film loop formation	36, 50, 60
	Sound from first sprocket during projection	38
	Sound from second sprocket during projection	54
	Loop setter fails to activate.	36
	Failure in frame adjustment	62
	Abnormal sound is heard during projection.	38, 62
	Film gets scratched.	38, 48
	Film gets trapped at the time of threading.	45
	Threading state can not be maintained.	45, 68
Take-up and rewinding sections	Irregular take-up tension	42
	Slow take-up speed	42
	Failure in rewinding	40
	Irregular rewinding tension	40
	Film in rear arm slackens during rewinding.	42
	Slow rewinding speed	40
	Fails to take up film	42
	Abnormal sound is heard.	42
	Arm is heavy and unsteady when raised.	40

	Symptoms	Page
Sound (Audio) section	Magnetic film can not be replayed.	52, 64, 72
	Inadequate replay output	52
	Defective replayed sound (tone)	52
	Low replay level	52
	Failure in recording	70, 71
	Failure in volume and tone adjustments	70
	Sound can not be erased.	73
	Noise is heard.	76
	AUX IN fails to function.	74
	AUX OUT sound does not activate.	75
	MIC IN fails to function.	74
	Sound selector does not activate.	70
	Track selector SW does not activate.	70
	Wow/flutter appears.	38, 50, 52, 54, 60
Motor and lamp	Motor fails to start/stop.	64, 66, 68, 77
	Motor carries out free rotation.	78
	Motor normal/reverse rotation can not be changed over.	68
	Excessive large vibration of motor	66
	Fan motor fails to rotate.	36
	Lamp fails to light up.	64, 68
	Pilot lamp fails to light up.	64
	Level meter does not oscillate.	75
	Fine adjustment of speed can not be made.	64
	Master control knob is heavy to rotate.	68

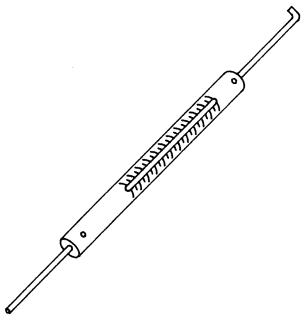
VI. TOLERANCE

Item		Type		Permissible range	Page
		S8	R8		
Pressure plate spring tension		○	○	50 ~ 60 g	47, 48
Side presser film tension		○	○	30 ~ 40 g	47, 48
Claw breaking tensile strength		○	○	60 ~ 70 g	61, 62
Claw spring tensile strength	Directions of axis	○	○	350 ~ 450 g	61, 62
	Directions of film transportation	○	○	850 ~ 950 g	
Claw length		○	○	1.0 ~ 1.2 mm	61, 62
Lever pad roller tension		○	○	300 ~ 350 mm	49, 50
Head presser (1) tension		○	–	110 ~ 130 g	51, 52, 72
Head presser (2) tension		○	–	20 ~ 22 g	51, 52, 72
Lever pad roller rise		○	–	2 ~ 3 mm	72
Front and rear arm raising force		○	○	700 ~ 1,000 g	39 ~ 42
Film take-up force		○	○	30 ~ 40 g	41, 42, 71
Film rewinding force		○	○	60 ~ 70 g	39, 40, 71
Film scratch		○	○	There shall be no harmful scratch or abnormality in the joint section when the properly loaded raw film in loop form is fed repeatedly 10 times.	

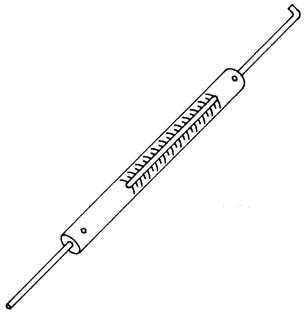
Item		Type		Permissible range	Page
		S8	R8		
Reply speed		○	–	20 Frames/sec (±1 frame adjustment possible)	
Screen oscillation	up-down direction	○	–	Max. 2 mm	When replayed on TV screen of 50 cm width
	left-right direction	○	–	Max. 2 mm	
S/N ratio (magnetic replay)		○	–	Max. 46 dB	74
Wow/flutter		○	–	Max. 0.5%	74
Magnetic replay frequency characteristic		○	–	Refer to the following.	74



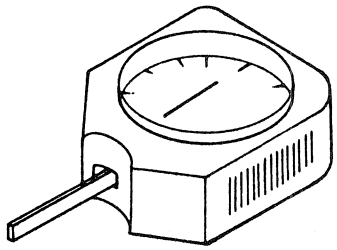
VII. TEST INSTRUMENTS AND TOOLS



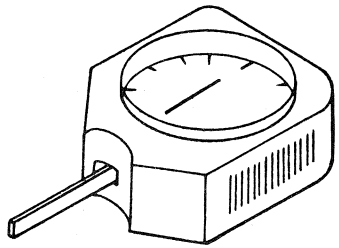
Code No. : C043
Name : Spring Scale 110 g
Use : Measuring the spring pressure
Page : 48, 62, 71
Weight : 40 g
Dimensions : 10 dia. x 280 mm



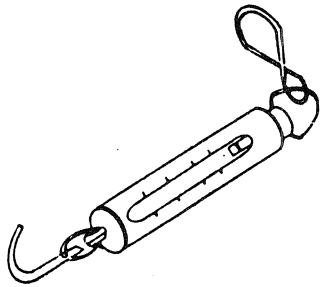
Code No. : C067
Name : Spring Scale 500 g
Use : Measuring the spring pressure
Page : 72
Weight : 40 g
Dimensions : 10 dia. x 280 mm



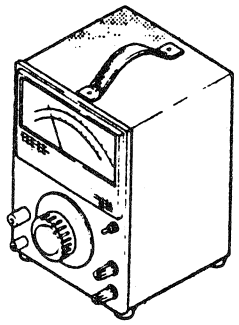
Code No. : C062
Name : Dial Tension Gauge 30 g
Use : Measuring the spring pressure
Page : 72
Weight : 60 g
Dimensions : 20 x 48 x 90 mm



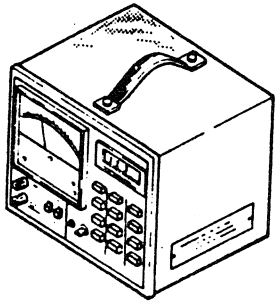
Code No. : C063
Name : Dial Tension Gauge 100 g
Use : Measuring the spring pressure
Page : 48
Weight : 60 g
Dimensions : 20 x 48 x 90 mm



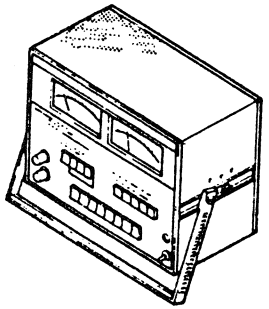
Code No. : P048
Name : Spring Scale 1 Kg
Use : Measuring the spring pressure
Page : 40, 42, 50, 62
Weight : 110 g
Dimensions : 37 dia x 180 mm



Code No. : P080
Name : AC Voltage Meter
Use : to measure signal level
Page : 75, 77
Weight : 3.2 kg
Dimensions : 780 x 205 x 240 mm



Code No. : P083
Name : Wow/Flutter Meter
Use : to measure wow/ flutter
Page : 78
Weight : 5.5 kg
Dimensions : 200 x 160 x 140 mm



Code No. : P084
Name : Distortion Meter
Use : to measure distortion factor
Page : 74
Weight : 6 kg
Dimensions : 270 x 200 x 250 mm

VIII. TEST FILM, OIL AND GREASE

1. Oil and Grease

In the figure, there is the mark  (Ex. Fig. 29) which shows the point to be lubricated and the kind of oil or grease by letters, A, AL, B, HI and M in the mark.

	Code No.	Brand Name
A	G001	ALVANIA GREASE 2
AL	G002	ALUMI GREASE 1
B	G005	VEEDOL 20 – 40
HI	G008	HITASOL Mo-109N
M	G012	DAPHNE No. 44

2. Test Film

Code No.	Film Name	Page
P050	Kodak magnetic Posi-film	74
P054	Revoling power film type S	73

PARTS LIST

TRANSVIDEO

TRV-S8
TRV-R8

No. 279

OCTOBER 1986

INTRODUCTION

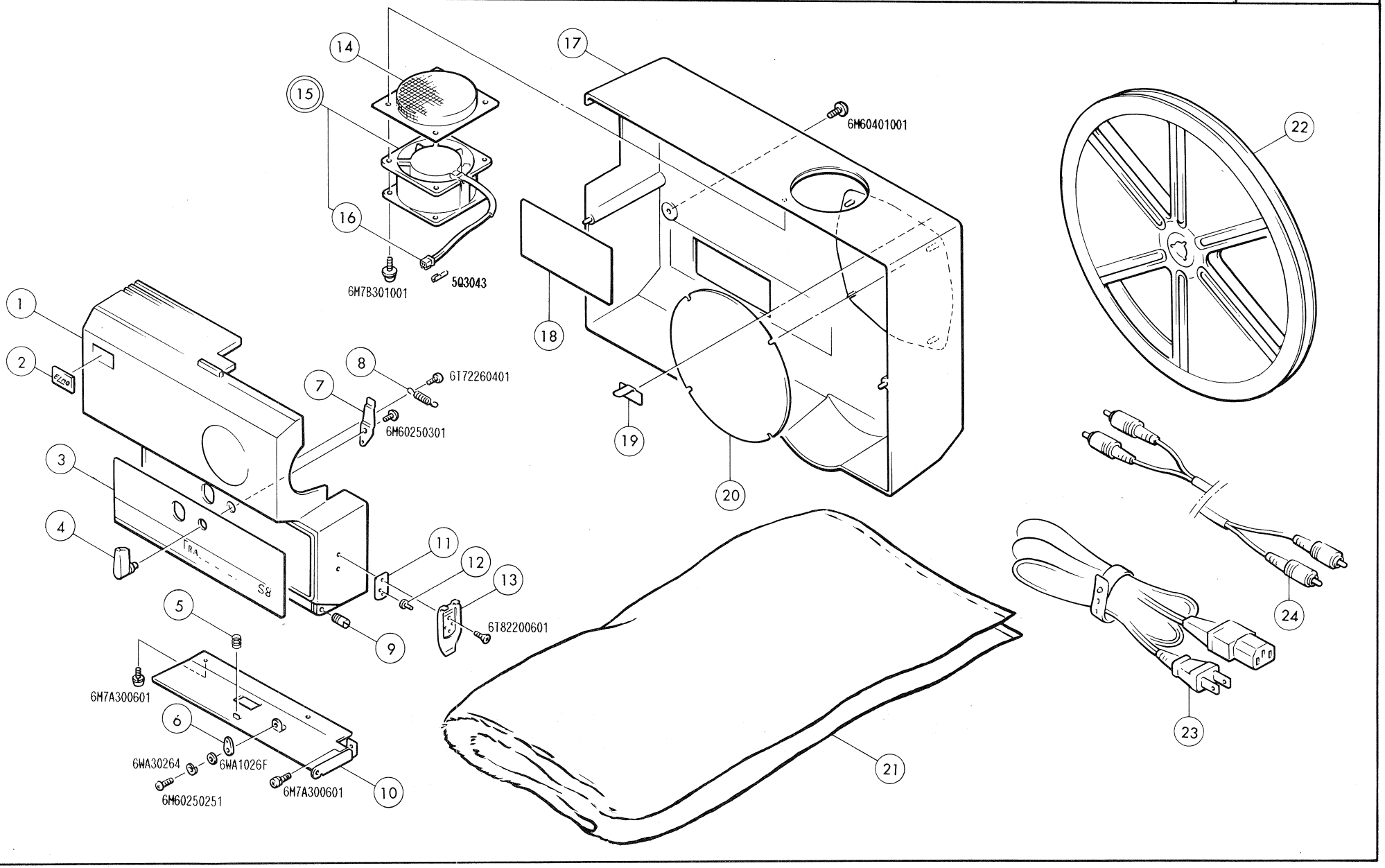
1. This parts list shows all of spare parts for the following two Film-to-Video converters.
   TRV-S8 ..... Page 1 to 8.
   TRV-R8 (Exclusive Parts) ..... Page 9.
2. The part marked with double-encircled illustration number can be supplied as the assembly shape.
3. parts numbers for the readily-available parts such as screws, nuts, washers and E-rings are indicated in the illustration directly.
4. The part number encircled with a circlet in the column Illustration No. is for Japanese market only. For your market use, please refer to Page 10.
5. The model name marked with ※ in the column Common use model indicates an improved model.
6. The spare parts index is listed on page 11 and the schematic diagrams and electric parts are listed on page 12 and 13.

はじめに

1. このパーツリストは、下記機種の補修用部品が記載してあります。
   ＴＲＶ－Ｓ８　の全部品 ..... １～８ページ
   ＴＲＶ－Ｒ８　の専用部品 ..... ９　ページ
2. イラスト番号が二重丸で表示してある部品は、組立品として供給できます。
3. ネジ・ナット・Ｅリング等基本部品の部品番号は、図中に直接表示してあります。
4. イラスト番号欄に○印が付記されている部品は、国内用とは異なる国外用部品があり１０ページに記載してあります。
5. 共用機種欄の※印は、その機種の改訂機との共用を表しています。
6. 部品番号索引は、１１ページにあります。
7. 結線図と電気部品表は、１２～１３ページにあります。

ELMO CO., LTD.

TRV-S8


14
15
16
17
6M60401001
22
6M7B301001
5Q3043
1
2
18
8
6T72260401
7
6M60250301
19
3
20
4
11
12
13
6T82200601
5
9
21
24
6M7A300601
6
6WA30264
6WA1026F
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL	ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4P8TRS024	組立カバー　機構部	MACHINE COVER ASSY						
2	4N01787003	銘板(1)　カバー機構部	PLATE(1) MACHINE COVER						
3	4N40797	銘板　カバー機構部 TRS	PLATE MACHINE COVER TRS						
4	P412777	ツマミ　ループセッタ	KNOB LOOP SETTER	ST-180					
5	4P48811	バネ　ソレノイド	SOLENOID SPRING	ST-180					
6	4C52479	コネクタプリント基板(2)用ラグ板	TERMINAL CIRCUIT PLATE	ST-180					
7	P412776	レバー　ループセッタ	LEVER LOOP SETTER	ST-180					
8	4P55730	バネ　ループセッタ	SPRING LOOP SETTER	ST-180					
9	4P55731	ネジ　カバー機構部	SCREW MACHINE COVER	ST-180					
10	P412655B	底板	BOTTOM PLATE	ST-180E					
11	4P45750	間座　フィルムカッタ	FILM CUTTER MOUNT	ST-180					
12	4P54249	フィルムカッタピン	FILM CUTTER PIN	ST-180					
13	4P48765	カッタ　フィルム	CUTTER FILM	ST-180					
14	4M45586	パンチングメタル　後面カバー	LOUVER						
(15)	4K02288	ファンモータ　2412PS-10W-B30	FAN MOTOR 2412PS-10W-B30						
16	5N202812	2P　ソケットハウジング 5102-02	2-P CONNECTOR (5102-02)	OMNI 550XN					
17	4M20747	後カバー	REAR COVER						
18	4M45582	塞ギ板　トランス部	LID TRANSFORMER						
19	5G6010	ステッカ　T-18	STICKER (T-18)	TRV-16					
20	4M45583	塞ギ板　スピーカ部	LID SPEAKER						
21	4K01071	本体用ポリ袋(1)	MACHINE DUST COVER 1	※ST-180					
22	4P20774	組立180m　オートリール	REEL 180m	※ST-180					
(23)	4K01078	電源コード	POWER CORD	OMNI 250					
24	5Z0064	ビデオ　オーディオケーブル	VIDEO AUDIO CABLE	TRV-16					

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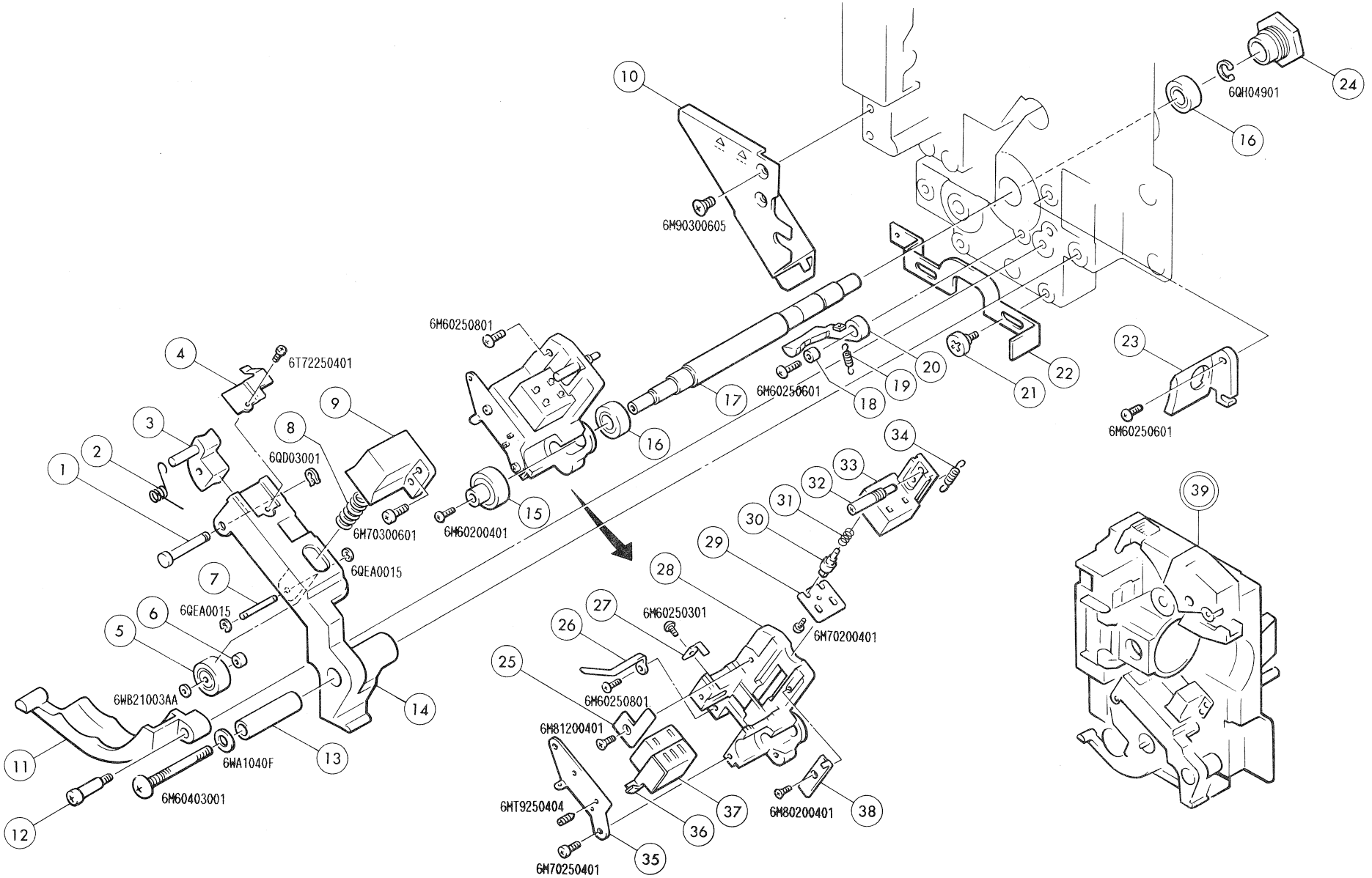
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4P55715	軸　バックテンション	SHAFT BACK TENSION	ST-180
2	4P55716	バネ　バックテンション	SPRING BACK TENSION	ST-180
3	P412709	フィルム押エ　バックテンション	PRESSER BACK TENSION	ST-180
4	P414645	レバー　フィルムガイド(1)	LEVER FILM GUIDE 1	※ST-180
5	4P48658	パッドローラ	PAD ROLLER	※ST-180
6	4P55807	間座　パッドローラ	WASHER PAD ROLLER	ST-180
7	P414378	軸　テンションローラ(2)	SHAFT(2) TENSION ROLLER	※ST-180
8	4P55811	バネ(2)　パッドローラレバー	SPRING(2) PAD LEVER	ST-180
9	P412710	カバー　パッドローラバネ	COVER PAD ROLLER SPRING	ST-180
10	4P31925002	フィルムガイド(3)	FILM GUIDE 3	
11	4P31934	シュー　第2スプロケット	SHOE SECOND SPROCKET	ST-180
12	P411486	ネジ　フィルム出口	SCREW FILM OUTLET	ST-180
13	4P55991	間座　パッドローラレバー	WASHER PAD ROLLER LEVER	※ST-180
14	4P31933	レバー　パッドローラ	LEVER PAD ROLLER	ST-180
15	4P48730	サウンドドラム	SOUND DRUM	ST-180
16	6B20601201	ラジアル玉軸受　6×12×4	BALL BEARING (SSL-1260ZZ)	ST-180
17	P414158	軸　サウンドドラム	SHAFT SOUND DRUM	ST-180
18	4P55502	間座　中間テンション	WASHER MIDDLE TENSION	ST-180
19	4P53019	バランシングスタビライザバネ(2)	SPRING(2) BALANCE LEVER	ST-180
20	P412715	レバー　中間テンション	LEVER MIDDLE TENSION	ST-180
21	4P55804	段付ネジ　連桿	SCREW LINK	ST-180
22	P412718B	連桿(1)　パッドローラレバー	LINK(1) PAD ROLLER LEVER	※ST-180
23	P412708	フィルムガイド(2)	FILM GUIDE 2	ST-180
24	P414159B	ナット　ホルダフライホイール	NUT HOLDER FLY WHEEL	※ST-180
25	P412706	押エ板(1)　ヘッド押エ	PRESS PLATE(1) HEAD	ST-180
26	6Z0063	リード押エ　0002-2	SUPPORTER CORD (0002-2)	ST-180
27	P412844B	巻込ミ除ケ　取付台ヘッド	FILM STOPPER HEAD HOLDER	※ST-180
28	4P31931B	取付台　ヘッド	HOLDER HEAD	※ST-180
29	P413174	廻り止メ(2)　ヘッド押エ	STOPPER(2) HEAD	ST-180
30	P412631	ヘッド押エ(2)	HEAD PRESSER 2	ST-180
31	4P55733	バネ　ヘッド押エ	SPRING HEAD PRESSER	ST-180
32	4P55713	ピン　ヘッド押エ	PIN HEAD PRESSER	ST-180
33	4P31932	ヘッド押エ(1)	HEAD PRESSER 1	ST-180
34	4P55714	バネ　ヘッド押エ(1)	SPRING HEAD PRESSER 1	ST-180
35	P412705B	押エ板　ヘッド	PRESS PLATE HEAD	ST-180
36	P412979	調節板　ヘッド	ADJUST PLATE HEAD	ST-180
37	5V4026	録再ヘッド　SH-825CPE	SOUND HEAD (SH-825CPE)	SC-30
38	P415130	押エ板(3)　ヘッド押エ	PRESS PLATE(3) HEAD	※ST-180
39	4P8TRS025	マシンフレーム(小)組立品 TRS	MACHINE FRAME ASSY TRS	

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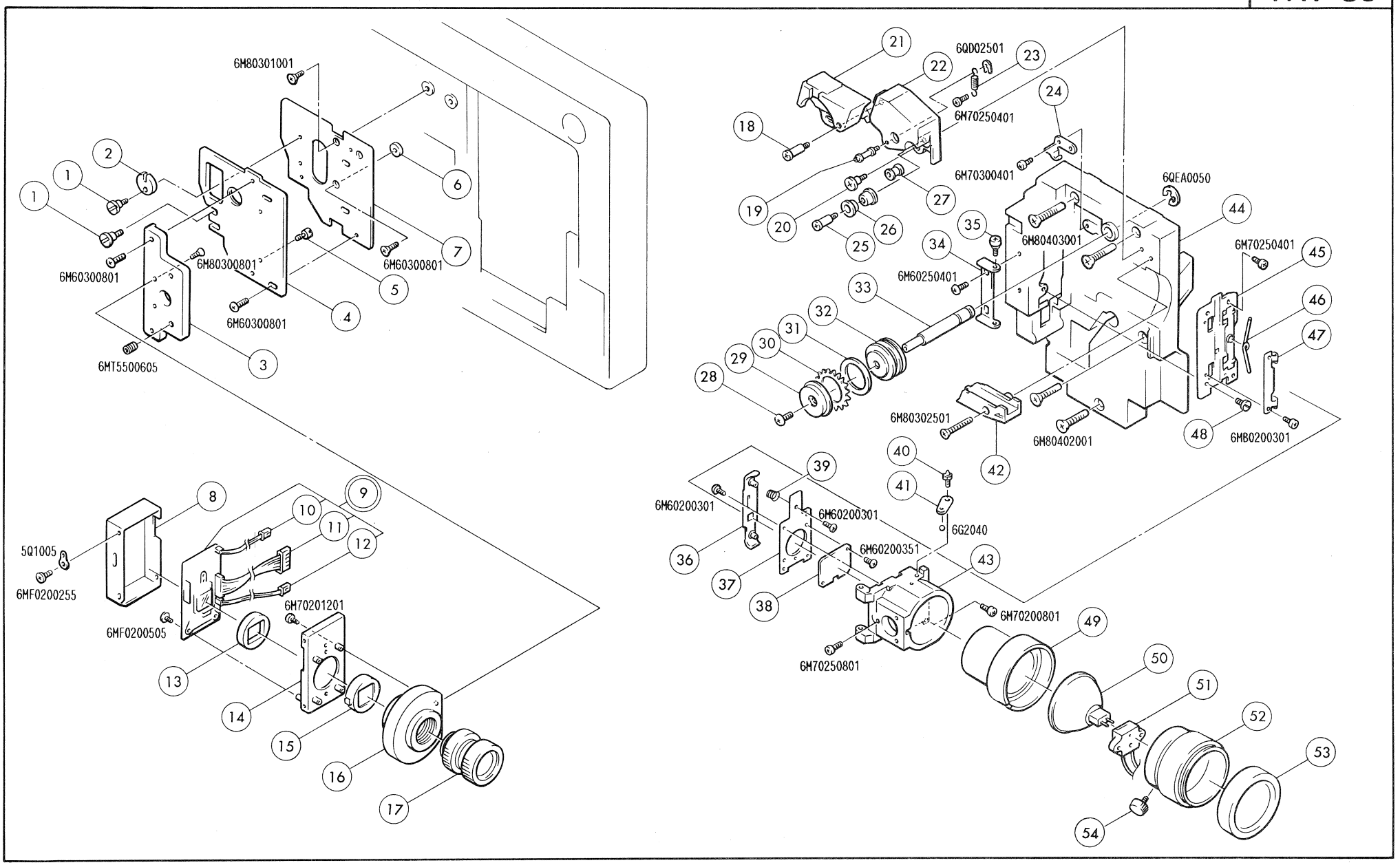
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4M50536	ガイドネジ　CCDホルダ	GUIDE SCREW CCD HOLDER	
2	4M45452	調節カラー　CCDホルダ	COLLAR CCD HOLDER	
3	4M45453	取付板(3)　CCDホルダ	PLATE(3) CCD HOLDER	
4	4M45451	取付板(2)　CCDホルダ	PLATE(2) CCD HOLDER	
5	4M50535	ガイドピン　取付板(2)　CCDホルダ	PIN PLATE(2) CCD HOLDER	
6	4M50534	間座　取付板(1)　CCDホルダ	WASHER PLATE(1) CCD	
7	4M45450	取付板(1)　CCDホルダ　S用	PLATE(1) CCD HOLDER TRS	
8	70851441	CCDシールドケース組立品	SHIELD CASE ASSY CCD	TRV-16
9	4P8TRV025	CCDカメラヘッド組立品	CAMERA HEAD ASSY CCD	TRV-16
10	4K02236	2P　コネクタ組立品(6)	2-P CONNECTOR ASSY 6	TRV-16
11	4K02234	10P　コネクタ組立品	10-P CONNECTOR ASSY	TRV-16
12	4K02235	2P　コネクタ組立品(5)	2-P CONNECTOR ASSY 5	TRV-16
13	70382010	遮光枠	SHADE FRAME	TRV-16
14	70361247A	CCD取付ベース	BASE CCD	TRV-16
15	70153161	組立光学水晶フィルタ	OPTICAL FILTER ASSY	TRV-16
16	4M45455	取付台　CCD　S用	HOLDER CCD TRS	
17	4M31866	組立T1416 レンズ	LENS ASSY (T1416)	
18	4P55699	軸　スレッドボタン	SHAFT THREAD BUTTON	ST-180
19	P412678	ネジ　ローラシュー	SCREW ROLLER SHOE	ST-180
20	4P56077	ネジ(2)　第1スプロケットシュー	SCREW(2) SPROCKET SHOE	※ST-180
21	4P31926	ボタン　スレッド	BUTTON THREAD	ST-180
22	4P20610C	シュー　第1スプロケット	SHOE FIRST SPROCKET	※ST-180
23	4P55701	バネ　第1スプロケットシュー	SPRING SPROCKET SHOE	ST-180
24	P412691	クリックバネ　レンズホルダ	CLICK SPRING LENS HOLDER	ST-180
25	4P55789	ネジ　ローラフィルムガイド	SCREW ROLLER FILM GUIDE	ST-180
26	P412957	ローラ　フィルムガイド	ROLLER FILM GUIDE	ST-180
27	P412443	ローラ(2)　スプロケットシュー	ROLLER(2) SPROCKET SHOE	ST-180
28	4P55643	特殊トラス小ネジ　3×8	SPECIAL SC TRUSS 3×8	ST-180
29	P412785	キャップ　第1スプロケット	CAP FIRST SPROCKET	ST-180
30	4P46283	スプロケットスーパ	SUPER SPROCKET	ST-180

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	4P55977	間座　第1スプロケット	WASHER FIRST SPROCKET	ST-180
32	4P48642	ボス　第1スプロケット	BOSS FIRST SPROCKET	ST-180
33	P412697	軸　第1スプロケット	SHAFT FIRST SPROCKET	ST-180
34	P412693	取付板　レンズホルダ	FIXING PLATE LENS HOLDER	ST-180
35	4P55708	取付ネジ　レンズホルダ	SCREW LENS HOLDER	ST-180
36	P413134	組立プレッシャプレート	PRESSURE PLATE ASSY	ST-180
37	4M45443	ホルダ　プレッシャプレート	HOLDER PRESSURE PLATE	
38	4M45444	拡散板(8)	DIFFUSE PLATE 8	
39	4P49754	プレッシャプレートバネ	SPRING PRESSURE PLATE	ST-180
40	4P55223	クリックピン　レンズホルダ	LENS HOLDER CLICK PIN	ST-180
41	4P55663	バネ　レンズホルダ	SPRING LENS HOLDER	ST-180
42	4M43258	挿入口(2)	FILM SLOT 2	※ST-180
43	4P31927002	ホルダ　映写レンズ	HOLDER LENS	※ST-180
44	4P8TRS019	マシンフレーム（メタル付）	MACHINE FRAME	
45	4M31874	アパーチュアプレート組立品	APERTURE PLATE ASSY	
46	4P48810	バネ　フィルム横押エ	SPRING SIDE PRESSER	ST-180
47	4P48745	横押エ(2)　フィルム	SIDE PRESSER(2) FILM	ST-180
48	4P48336	取付ネジ　アパーチュアプレート	SCREW APERTURE PLATE	ST-180
49	4M45447	ホルダ(1)　ランプ	HOLDER(1) LAMP	
50	5L40600111	ハロゲンランプ　JDR 6V10W	LAMP (6V-10W)	TRV-16
51	4K02256	ランプソケット組立品	LAMP SOCKET ASSY	
52	4M45449	ホルダ(2)　ランプ	HOLDER(2) LAMP	
53	4M45448	キャップ　ホルダ(2)ランプ	CAP HOLDER(2) LAMP	
54	6Y26519012	ユリア化粧ネジ　M3×4	SCREW　(M3×4)	TRV-16

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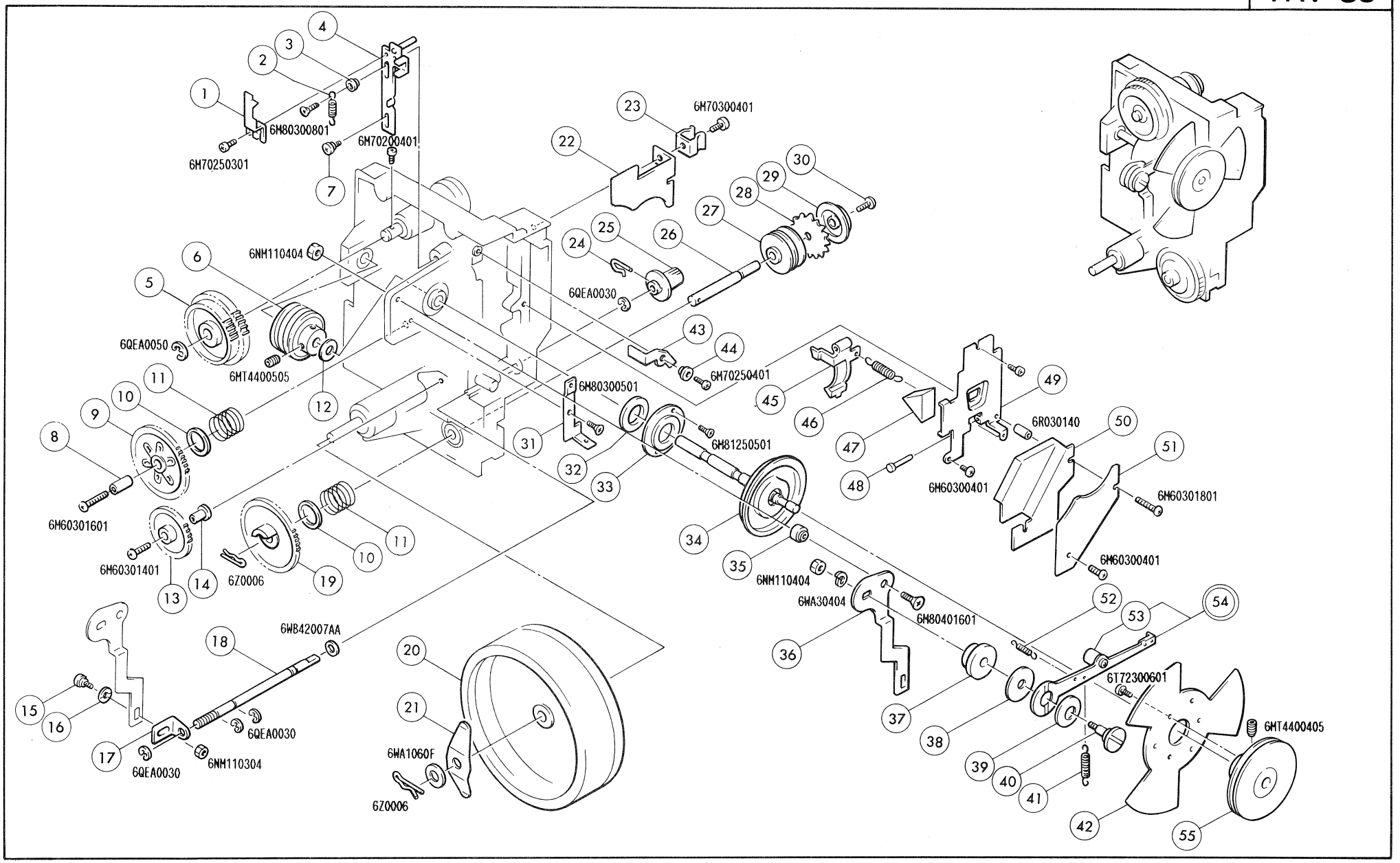
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	P412687	レバー(2) スレッディング	LEVER(2) THREADING	ST-180
2	4P55706	バネ レバー(1)スレッディング	SPRING THREADING LEVER 1	ST-180
3	4P55705	間座 レバー(1)スレッディング	WASHER THREADING LEVER	ST-180
4	P412685	組立レバー(1) スレッディング	LEVER(1) THREADING	ST-180
5	P412698	ギヤ 第1スプロケット	GEAR FIRST SPROCKET	ST-180
6	4P47329	ウォーム(2) カム軸	CAM SHAFT WORM 2	ST-180
7	4P55230	ネジ(1) ループフォーマ	SCREW(1) LOOP FORMER	ST-180
8	4P55722	間座 第2スプロケットギヤ	WASHER SPROCKET GEAR	ST-180
9	P411739	ギヤ 第2スプロケット	GEAR SECOND SPROCKET	※ST-180
10	4P55798	バネ座 第2スプロケットギヤ	SPRING MOUNT SPROCKET	ST-180
11	4P55778	制動バネ(4) 中間ギヤ	BRAKE SPRING MIDDLE GEAR	ST-180
12	4P54978	間座 プーリ軸	PULLEY SHAFT WASHER	※ST-180
13	P411736	中間ギヤ 第2スプロケット	MIDDLE GEAR SPROCKET	ST-180
14	4P55968	間座(2) 中間ギヤ	WASHER(2) MIDDLE GEAR	ST-180
15	4P55707	ネジ フレーミングレバー	SCREW FRAMING LEVER	ST-180
16	4P47468	制動バネ 前部リール	BRAKE SPRING FRONT REEL	ST-180
17	P412688B	レバー(2) フレーミング	LEVER(2) FRAMING	※ST-180
18	P412689B	軸 フレーミング	SHAFT FRAMING	※ST-180
19	P414157	ギヤ(2) 第2スプロケット	GEAR(2) SECOND SPROCKET	ST-180
20	4P48612	フライホイール	FLY WHEEL	ST-180
21	P410587	バネ フライホイール	FLY WHEEL SPRING	ST-180
22	4M45445	カバー(1) シャッタ	COVER(1) SHUTTER	
23	P412676	金具 カバーロック	LOCK COVER	ST-180
24	P411949	バネ フレーミングツマミ	SPRING FRAMING KNOB	ST-180
25	P411948	ツマミ フレーミング	KNOB FRAMING	ST-180
26	P414156	軸 第2スプロケット	SHAFT SECOND SPROCKET	ST-180
27	4P48763	ボス 第2スプロケット	BOSS SECOND SPROCKET	ST-180
28	4P32059	第2スプロケット	SECOND SPROCKET	ST-180
29	P412786	キャップ 第2スプロケット	CAP SECOND SPROCKET	ST-180
30	4P55643	特殊トラス小ネジ 3×8	SPECIAL SC TRUSS 3×8	ST-180

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	P412692	バネ掛ヶ板 送り爪	HANG MOUNT CLAW SPRING	ST-180
32	4P48629	油含ミ カム軸	OIL KEEPER CAM SHAFT	ST-180
33	4P48630	蓋 給油フェルト	LID OIL KEEPER	ST-180
34	P414036	組立(4)カム(2)	CAM ASSY	ST-180
35	4P55711	間座 フレーミング支点	WASHER FRAMING FULCRUM	ST-180
36	P414300	レバー(5) フレーミング	LEVER(5) FRAMING	※ST-180
37	4P43683B	送り爪バネ座	CLAW SPRING MOUNT	※ST-180
38	4P45962	送り爪バネ座(2)	CLAW SPRING MOUNT 2	ST-180
39	4P52338	送り爪制動バネ	CLAW BRAKING SPRING	ST-180
40	P413178	軸 送り爪	SCREW CLAW	ST-180
41	4P45151	送り爪バネ(1)	CLAW SPRING 1	ST-180
42	P411441B	シャッタ	SHUTTER ASSY	※ST-180
43	P412690	レバー サイドプレッシャ逃シ	ESCAPER SIDE PRESSURE	ST-180
44	4P55760	間座 サイドプレッシャ逃シ	WASHER ESCAPE	ST-180
45	4P32252	フィルムガイド(1)	FILM GUIDE 1	※ST-180
46	4P55702	バネ フィルムガイド(1)	SPRING FILM GUIDE 1	ST-180
47	4P49252	油含ミ	OIL KEEPER	ST-180
48	P412683	軸 フィルムガイド(1)	SHAFT FILM GUIDE 1	ST-180
49	P412681	遮熱板	HEAT SHIELDING PLATE	ST-180
50	P412684B	遮光板	LIGHT SHIELDING PLATE	※ST-180
51	4M45446	カバー(2) シャッタ	COVER(2) SHUTTER	
52	4P55710	送り爪バネ(2)	SPRING(2) CLAW	ST-180
53	4P45364	送り爪ピン組立品	PIN CLAW	ST-180
54	4P31928	組立アーム送り爪	CLAW ASSY	ST-180
55	P414039C	プーリ シャッタ	PULLEY SHUTTER	※ST-180

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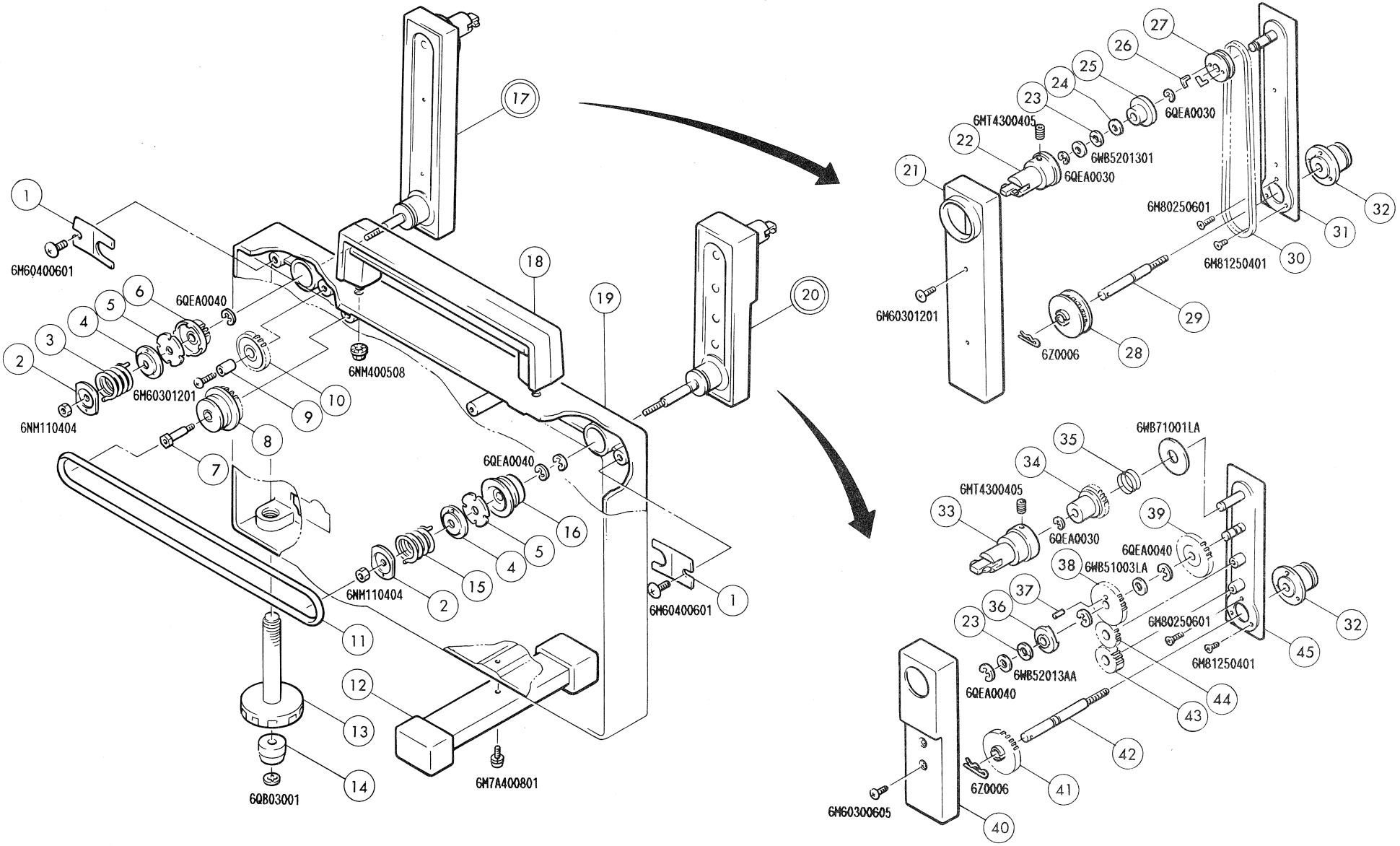
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	P413908	ロックバネ(2) ボスアーム	LOCK SPRING(2) BOSS ARM	ST-180
2	P412763	スリップ板(2) アーム軸	SLIP PLATE(2) ARM SHAFT	ST-180
3	4P55999	バネ 前部アーム軸	SPRING FRONT ARM SHAFT	※ST-180
4	P412762	スリップ板(1) アーム軸	SLIP PLATE(1) ARM SHAFT	ST-180
5	P412761C	摩擦板 アーム軸	FRICTION PLATE ARM SHAFT	※ST-180
6	P412760B	ギヤ 前部アーム軸	GEAR FRONT ARM SHAFT	※ST-180
7	4M45457	ボス(1) 取付板トランス	BOSS(1) FIX PLATE TRANS.	
8	P412657	プーリ 中間巻取	PULLEY MIDDLE TAKE-UP	ST-180
9	4P55694	間座 中間ギヤ	WASHER MIDDLE GEAR	ST-180
10	P412658	ギヤ 中間巻戻	GEAR MIDDLE REWIND	ST-180
11	P412659	巻取ベルト	TAKE-UP BELT	ST-180
12	P411727	支持足	SUPPORT LEG	ST-180
13	P413248	ツマミ アオリ足	TILTING KNOB	ST-180
14	P411539	ゴム足 アオリ	TILTING LEG RUBBER	ST-180
15	4P55728	バネ アーム軸	SPRING ARM SHAFT	ST-180
16	P412774	プーリ 後部アーム軸	PULLEY REAR ARM SHAFT	ST-180
17	4P8STJ015	前部アーム組立品	FRONT ARM ASSY	ST-180
18	P413671	吊手	CARRYING HANDLE	ST-180
19	4M20746	ベースフレーム	BASE FRAME	
20	4P8STE016	後部アーム組立品	REAR ARM ASSY	ST-180
21	P414154	前部アーム	FRONT ARM	ST-180
22	4P8STJ042	組立前部リール軸	REEL SHAFT FRONT ARM	ST-180
23	4P48572	制動バネ ギヤ(4)アーム	BRAKING SPRING(4) ARM	ST-180
24	4P56005	間座 前部リール軸	WASHER FRONT REEL SHAFT	SC-18
25	P412756B	ラチェットギヤ 前部アーム	RATCHET GEAR FRONT ARM	ST-180
26	4P47944	爪 ラチェット後部リール	CLAW RATCHET REAR REEL	ST-180
27	P414153	シンクロプーリ(2) 前部アーム	PULLEY(2) FRONT ARM	ST-180
28	P414152	シンクロプーリ(1) 前部アーム	PULLEY(1) FRONT ARM	ST-180
29	P414155	軸 前部アーム	SHAFT FRONT ARM	ST-180
30	6VS116XL32	タイミングベルト 116×L巾3.2	TIMING BELT (116×L3.2)	ST-180

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	P414150	組立基板 前部アーム	BASE PLATE FRONT ARM	ST-180
32	P412749	ボス アーム	BOSS ARM	ST-180
33	P413729	組立リール軸	REEL SHAFT	ST-180
34	P412773	ギヤ(1) 後部アーム	GEAR(1) REAR ARM	ST-180
35	4P55748	制動バネ 後部リール軸	BRAKING SPRING REEL	ST-180
36	P412772	クラッチ(2) 後部アーム	CLUTCH(2) REAR ARM	ST-180
37	4P55727	ピン クラッチ後部アーム	PIN CLUTCH REAR ARM	ST-180
38	P412771	ギヤ(2) 後部アーム	GEAR(2) REAR ARM	ST-180
39	P412770	クラッチ(1) 後部アーム	CLUCH(1) REAR ARM	ST-180
40	4P31936	後部アーム	REAR ARM	ST-180
41	P412752	ギヤ(1) アーム	GEAR(1) ARM	ST-180
42	P413839	軸(2) 後部アーム	SHAFT(2) REAR ARM	ST-180
43	P412753	ギヤ(2) アーム	GEAR(2) ARM	ST-180
44	P412769	ギヤ(3) 後部アーム	GEAR(3) REAR ARM	ST-180
45	P412764	組立基板 後部アーム	BASE PLATE REAR ARM	ST-180

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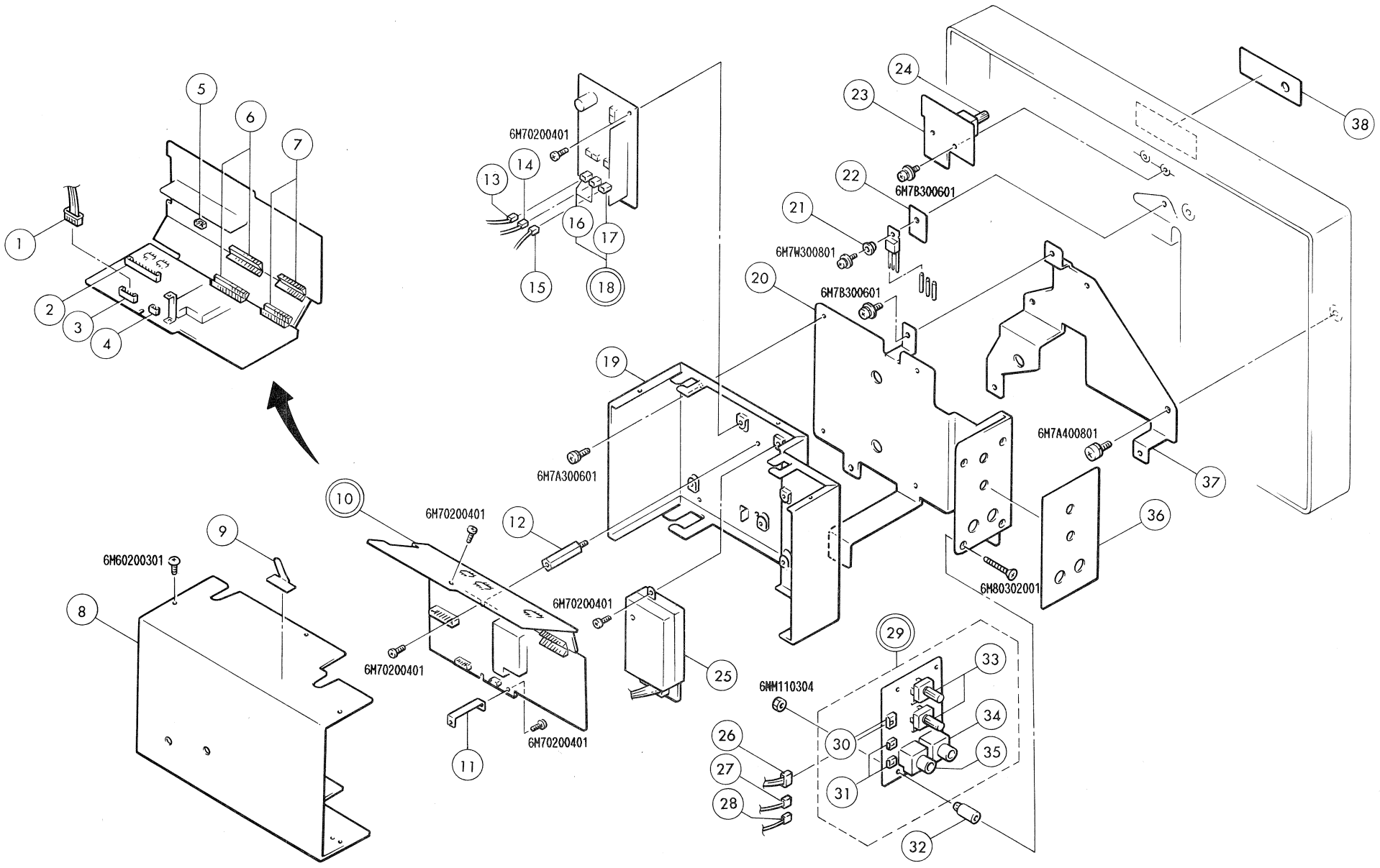
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4K02232	6P コネクタ組立品(2)	6-P CONNECTOR ASSY 2	TRV-16
2	23164469	10P プラグ	10-P PLUG	TRV-16
3	23164473	6P プラグ	6-P PLUG	TRV-16
4	23164477	2P プラグ	2-P PLUG	TRV-16
5	23164410	2P プラグ GRN	2-P PLUG GREEN	TRV-16
6	23364188	13P プラグ B/B 2.0mm	13-P CONNECTOR (BB2.0mm)	TRV-16
7	23364187	10P プラグ B/B 2.0mm	10-P CONNECTOR (BB2.0mm)	TRV-16
8	4M31749	カバー カメラコントロールユニット	COVER CONTROL UNIT	TRV-16
9	5G6010	ステッカ T-18	STICKER (T-18)	TRV-16
10	4P8TRV029	VIDEO PZ SYNC 基板組立品	VIDEO PZ SYNC CIRCUIT	TRV-16
11	70842416	ビデオ連結金具	CONNECT METAL VIDEO	TRV-16
12	4M50524	スタッド シャーシ	STUD CHASSIS	TRV-16
13	4K02231	6P コネクタ組立品(1)	6-P CONNECTOR ASSY 1	TRV-16
14	4K02228	2P コネクタ組立品(2)	2-P CONNECTOR ASSY 2	TRV-16
15	4K02227	2P コネクタ組立品(1)	2-P CONNECTOR ASSY 1	TRV-16
16	5N202681	2P ピンヘッダ IL-S-2P-S2T2-EF	2-P CONNECTOR 1	TRV-16
17	5N202911	2P ピンヘッダ 赤 IL-S-2P-S2T2-EFR	2-P CONNECTOR 1 RED	TRV-16
18	4P8TRV028	YCMIX基板組立品	YCMIX CIRCUIT ASSY	TRV-16
19	4M31748	シャーシ カメラコントロールユニット	CHASSIS CONTROL UNIT	TRV-16
20	4M31871	取付板(1) コントロールユニット	PLATE(1) CONTROL UNIT	
21	5G9016	絶縁ワッシャ AC316A	ISOLATE WASHER (AC-316A)	SC-30
22	5G9013	絶縁サーコン TO-220	ISOLATOR (TO-220)	ST-180
23	4E44040	PC板 ETC切換	PRINTED PLATE ETC CHANGE	
24	5R6Z0024B5	可変抵抗 VO12L-PV20U-B20K	VR (VO12L-PV20U-B20K)	
25	4P8TRV027	POWER基板組立品	POWER CIRCUIT ASSY	TRV-16
26	4K02233	4P コネクタ組立 ボリューム・VIDEO	4-P CONNECTOR ASSY	TRV-16
27	4K02229	2P コネクタ組立品(3)	2-P CONNECTOR ASSY 3	TRV-16
28	4K02230	2P コネクタ組立品(4)	2-P CONNECTOR ASSY 4	TRV-16
29	4P8TRS017	組立出力端子 TRS	POWER CIRCUIT PLATE ASSY	
30	5N204681	4P アングルピンヘッダ S2L2-EF	4-P CONNECTOR 1	
31	5N202931	2P アングルピンヘッダ S2L2-EF	2-P CONNECTOR (S2L2-EF)	
32	P414939	スタッド プリント基板	STUD PRINTED PLATE	SC-30
33	5R6Z0014BD	可変抵抗 VO12L-PV20U-B10K	VR (VO12L-PV20U-B10K)	
34	5N50842	ピンジャック SQ-3012(黄)	JACK (SQ-3012 YELLOW)	
35	5N50832	ピンジャック SQ-3012(赤)	JACK (SQ-3012 RED)	
36	4N40801	銘板 出力端子	PLATE VIDEO AUDIO OUT	
37	4M31872	取付板(2) コントロールユニット	PLATE(2) CONTROL UNIT	
38	4N40558	銘板 スピード (R)	PLATE SPEED (R)	

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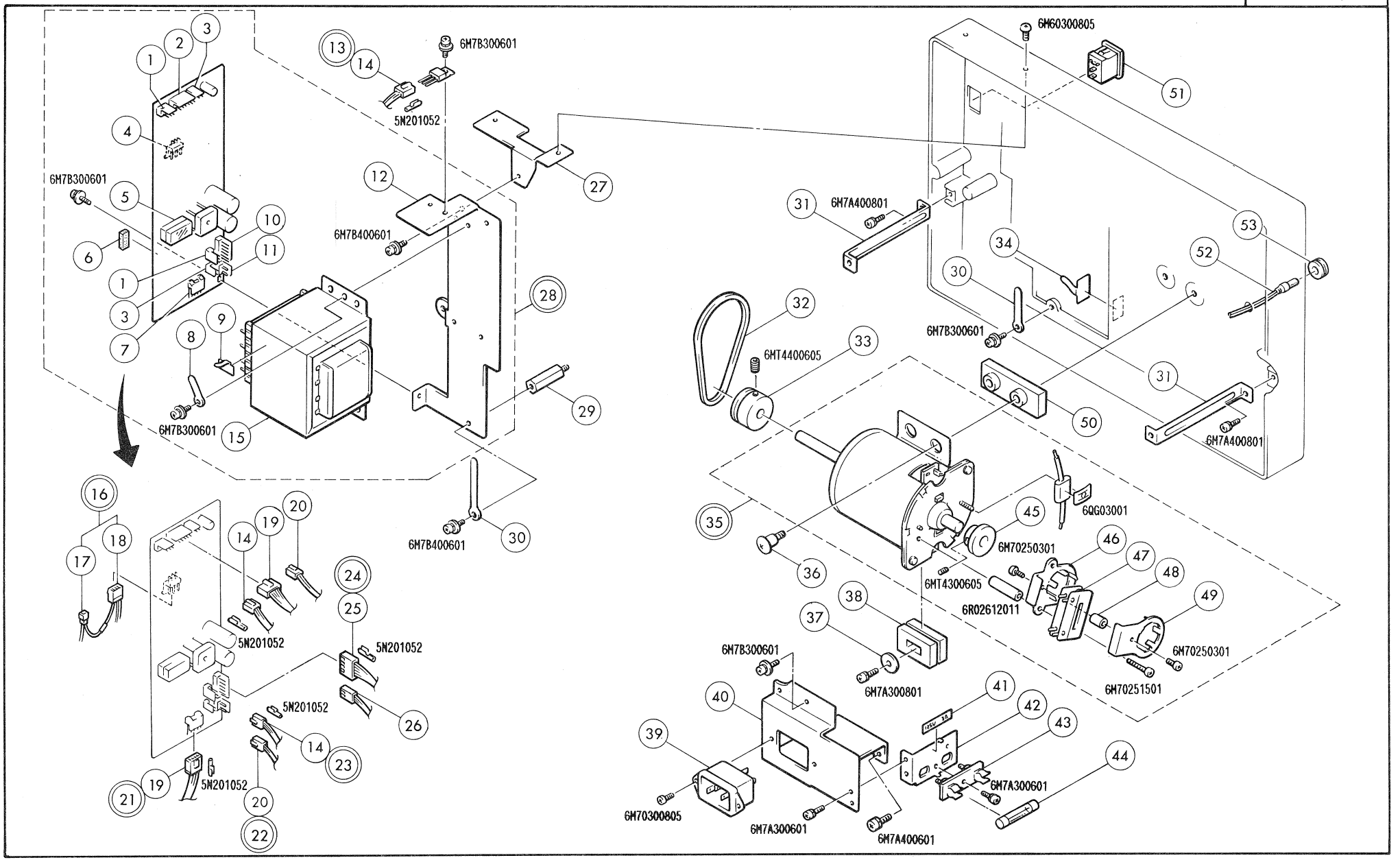
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	5N203231	3P ピンヘッダ IL-3P-S3EN2	3-P CONNECTOR 1	TRV-16
2	5N205091	5P ピンヘッダ IL-5P-S3EN2	5-P CONNECTOR 1	SC-30
3	5N202361	2P ピンヘッダ IL-2P-S3EN2	2-P CONNECTOR 1	TRV-16
4	5N203761	3P ウェハ 5274-03A	3-P WAFER 1 (5274-03A)	
5	5E7129	リレー FBR244D012/02CE	RELAY (FBR244D012/02CE)	
6	4M45579	ゴム板 基板	CUSHION CIRCUIT PLATE	
7	5N205141	5P ピンヘッダ IL-5P-S3FP2	5-P CONNECTOR 1	ST-180E
8	6Z0063	リード押エ 0002-2	SUPPORTER CORD 0002-2	ST-180
9	5G6010	ステッカ T-18	STICKER (T-18)	TRV-16
10	5N206171	6P ピンヘッダ IL-6P-S3EN2	6-P CONNECTOR 1	GS-1200
11	5N202961	2P ウェハ 5281-02A	2-P CONNECTOR (5281-02A)	TRV-16
12	4M31873	取付板 トランス	HOLDER TRANSFORMER	
13	4K02258	3P コネクタ組立 レギュレータ用	3-P CONNECTOR ASSY	
14	5N203252	3P ハウジング IL-3S-S3LN	3-P CONNECTOR 2	
15	5V3040	トランス TRS	TRANSFORMER TRS	
(16)	4K02260	トランスコネクタ組立品	CONNECTOR ASSY TRANS.	
17	5N202651	2P ミニスボックプラグ 5240-021	2-P CONNECTOR 1 5240-021	16-AL
18	5N203752	3P ハウジング 5195-03	3-P HOUSING 2 (5195-03)	
19	5N205112	5P ハウジング IL-5S-S3LN	5-P CONNECTOR 2	
20	5N202352	2P ハウジング IL-2S-S3LN	2-P CONNECTOR 2	
21	4K02263	5P コネクタ組立 LED用	5-P CONNECTOR ASSY (LED)	
22	4K02257	2P コネクタ組立 スピード調整	2-P CONNECTOR ASSY	
23	4K02259	3P コネクタ組立 トランジスタ用	3-P CONNECTOR ASSY (TR)	
24	4K02264	6P コネクタ組立 スイッチ用	6-P CONNECTOR ASSY	
25	5N206172	6P ハウジング IL-6S-S3LN	6-P CONNECTOR 2	
26	5N202962	2P ハウジング 5197-02	2-P CONNECTOR (5197-02)	TRV-16
27	4M45622	補助金具 トランス取付	REINFORCE PLATE TRANS.	
28	4P8TRS006	組立トランス基板 TRS	TRANSFORMER CIRCUIT ASSY	
29	4M45458	ボス(2) 取付板トランス	BOSS(2) FIX PLATE TRANS.	
30	6Z0046	リード押エ A	CORD SUPPORTER	TRV-16

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	P411756	取付金具 後カバー	FIX METAL REAR COVER	ST-180
32	6VVVP237	Vベルト VP-237	V BELT (VP-237)	※ST-180
33	P412775	プーリ モータ	PULLEY MOTOR	ST-180
34	5G6030	ステッカ T-23	STICKER (T-23)	CX-350
35	4P8STB047	マグネットモータ組立 MM-3B	MOTOR ASSY	ST-180
36	4P55208	ネジ モータ	SCREW MOTOR	ST-180
37	4P45652	押エ板 モータホルダ	PRESSER MOTOR HOLDER	ST-180
38	4P53276	電動機防振ゴム	RUBBER VIBRATION PROOF 2	ST-180
39	5N203222	3P インレット CM-3	3-P SOCKET 1 (CM-3)	ST-180
40	4M45459	ホルダ(4) 電源受口	HOLDER(4) POWER SOCKET	
41	4N02424	ヒューズ銘板(7)	FUSE PLATE 7	ST-180
42	P414160	ホルダ(4) ヒューズ	HOLDER(4) FUSE	ST-180
43	5H2023	ヒューズホルダ S-N1152-1	FUSE HOLDER (S-N1152-1)	ST-180
(44)	5H1030004	ヒューズ 3A	FUSE (3A)	TRV-16
45	4E42857	組立マグネット	MAGNET ASSY	ST-180
46	4E31122	コアー(2) ジェネレータ	CORE(2) GENERATOR	ST-180
47	4E42858	組立ボビン	GENERATOR ASSY	ST-180
48	4E50864	間座 ジェネレータ	WASHER(2) GENERATOR	ST-180
49	4E31121	コアー(1) ジェネレータ	CORE(1) GENERATOR	ST-180
50	4P45653	ゴム 防振(1)	RUBBER VIBRATION PROOF 1	ST-180
51	5E6043	シーソスイッチ JWZ1120-0201	SEESAW SWITCH (JWZ1120)	
52	4K02265	パイロットランプ 12V	PILOT LAMP (12V)	
53	5G5028	ゴムブッシュ No. 687D	GUM BUSH (No. 687D)	ST-180

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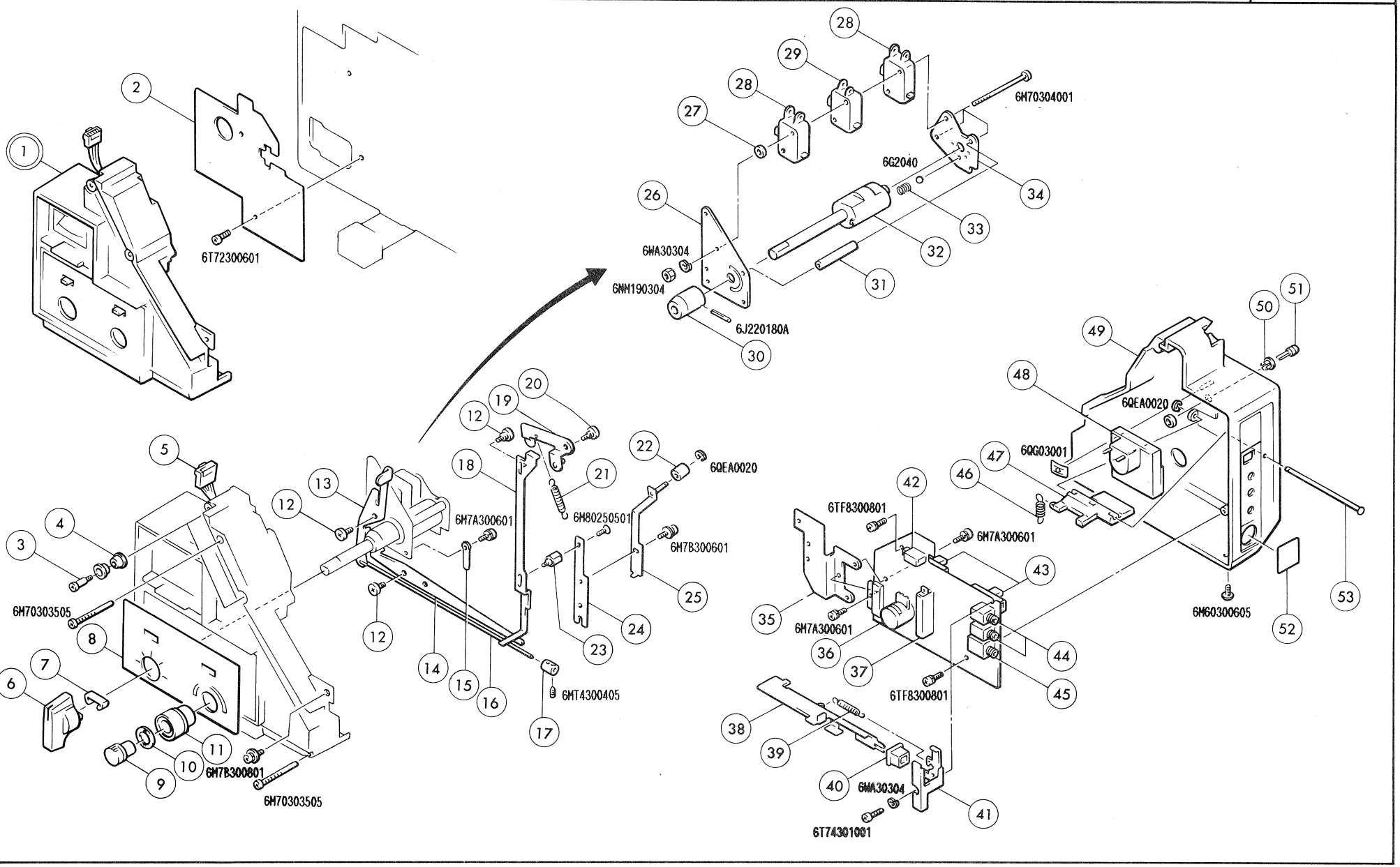
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4P8TRS009	組立アンプ TRS	AMPLIFIER ASSY	
2	4P32122002	シールドプレート TRS	SHIELDING PLATE TRS	
3	4P55789	ネジ ローラフィルムガイド	SCREW ROLLER FILM GUIDE	ST-180
4	P412957	ローラ フィルムガイド	ROLLER FILM GUIDE	ST-180
5	4K02262	5P アンプコネクタ組立品	5-P CORD ASSY AMP.	
6	4P31807002	ツマミ モータスイッチ	KNOB MOTOR SWITCH	※ST-180
7	4P48784	バネ ツマミ	KNOB SPRING	ST-180
8	4N40799	銘板 カバーアンプ TRS	PLATE COVER AMPLIFIER	
9	P413805002	ツマミ ボリューム	KNOB VOLUME CONTROL	※ST-180
10	4N03122	銘板 バランス	PLATE BALANCE	ST-180
11	P413806	ツマミ バランス	KNOB BALANCE	ST-180
12	4P55804	段付ネジ 連桿	SCREW LINK	ST-180
13	P412667	レバー(2) 連桿	LEVER(2) LINK	ST-180
14	P412666	レバー(1) 連桿	LEVER(1) LINK	ST-180
15	6Z0063	リード押エ 0002-2	SUPPORTER CORD (0002-2)	ST-180
16	P412668	連桿(2) パッドレバー	LINK(2) PAD LEVER	ST-180
17	P412669	止メカラー 連桿	COLLAR LINK	ST-180
18	P413742	ストップレバー(4) スレッディング	STOP LEVER(4) THREADING	※ST-180
19	P413744	組立ストップレバー(3)	STOP LEVER(3) ASSY	ST-180
20	4P55636	段付ネジ M-O切換レバー(1)	SCREW M-O SWITCH LEVER 1	ST-180
21	4P55987	バネ(2) ストップレバー	SPRING(2) STOP LEVER	ST-180
22	4M42826	ローラ	ROLLER	※ST-180
23	4M42828	段付ネジ(2) 連桿	LEVER SCREW 2	※ST-180
24	4M42827	取付板(1) ローラ	ROLLER HOLDER 1	※ST-180
25	4M42823	組立取付板(2) ローラ	ROLLER HOLDER(2) ASSY	※ST-180
26	P412673B	プレート(1) スイッチ	PLATE(1) SWITCH	※ST-180
27	4P55173	ローラ ラッチ	RATCH ROLLER	※ST-180
28	5E1079	マイクロスイッチ AH712089	MICRO SWITCH (AH712089)	※ST-180
29	5E1047	マイクロスイッチ V-15-1A	MICRO SWITCH (V-15-1A)	ST-180
30	P412674	カム パッドレバー	CAM PAD LEVER	ST-180

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	4P55698	間座 スイッチ	WASHER SWITCH	ST-180
32	P412671	カム スイッチ	CAM SWITCH	ST-180
33	4P55528	クリックバネ スイッチカム	CLICK SPRING SWITCH CAM	ST-180
34	P412670B	プレート(2) スイッチ	PLATE(2) SWITCH	※ST-180
35	P414164	放熱板 パワーIC	RADIATION PLATE IC	ST-180
36	5R4Z0054B4	2連可変抵抗 50K-B 10K-A	VR 50K B-TYPE + 10K A-TYPE	ST-180
37	5E5051	スライドスイッチ SS-118-APL	SLIDE SWITCH (SS-118-APL)	ST-180
38	P414162	レバー 録音ボタン	LEVER RECORDING BUTTON	ST-180
39	4P55726	バネ レバー途中録音	SPRING SPOT RECORDING	ST-180
40	P412742B	ボタン 途中録音	BUTTON SPOT RECORDING	※ST-180
41	P414163	座板 バネ掛ヶ	MOUNT HOOK	ST-180
42	5E2034	押ボタンスイッチ SPJ-02	PUSH SWITCH (SPJ-02)	ST-180
43	5E5049	スライドスイッチ SSP-043	SLIDE SWITCH (SSP-043)	ST-180
44	5N50622	3.5mm プリントジャック X-G8052	JACK 3.5mm (X-G8052)	SC-30
45	5N50392	3.5mm M-7Cジャック X-G8017	JACK 3.5mm (M-7X-G8017)	ST-180
46	4P55971	バネ 録音スイッチ	SPRING RECORDING SWITCH	ST-180
47	P412744B	ボタン 録音	BUTTON RECORDING	※ST-180
48	5F7D013	レベルメータ	LEVEL METER	ST-180
49	4P8TRS022	組立カバーアンプ TRS	COVER AMPLIFIER ASSY TRS	
50	5K1019	LEDパネルマウント	MOUNT LED	ST-180
51	5S2SR503D	発光ダイオード SR503D 赤	LED (SR503D RED)	SC-18
52	4M45460	塞ギ板 アンプカバー	SHELTER COVER AMPLIFIER	
53	P412743B02	軸 録音ボタン	SHAFT REC. BUTTON CR	※ST-180

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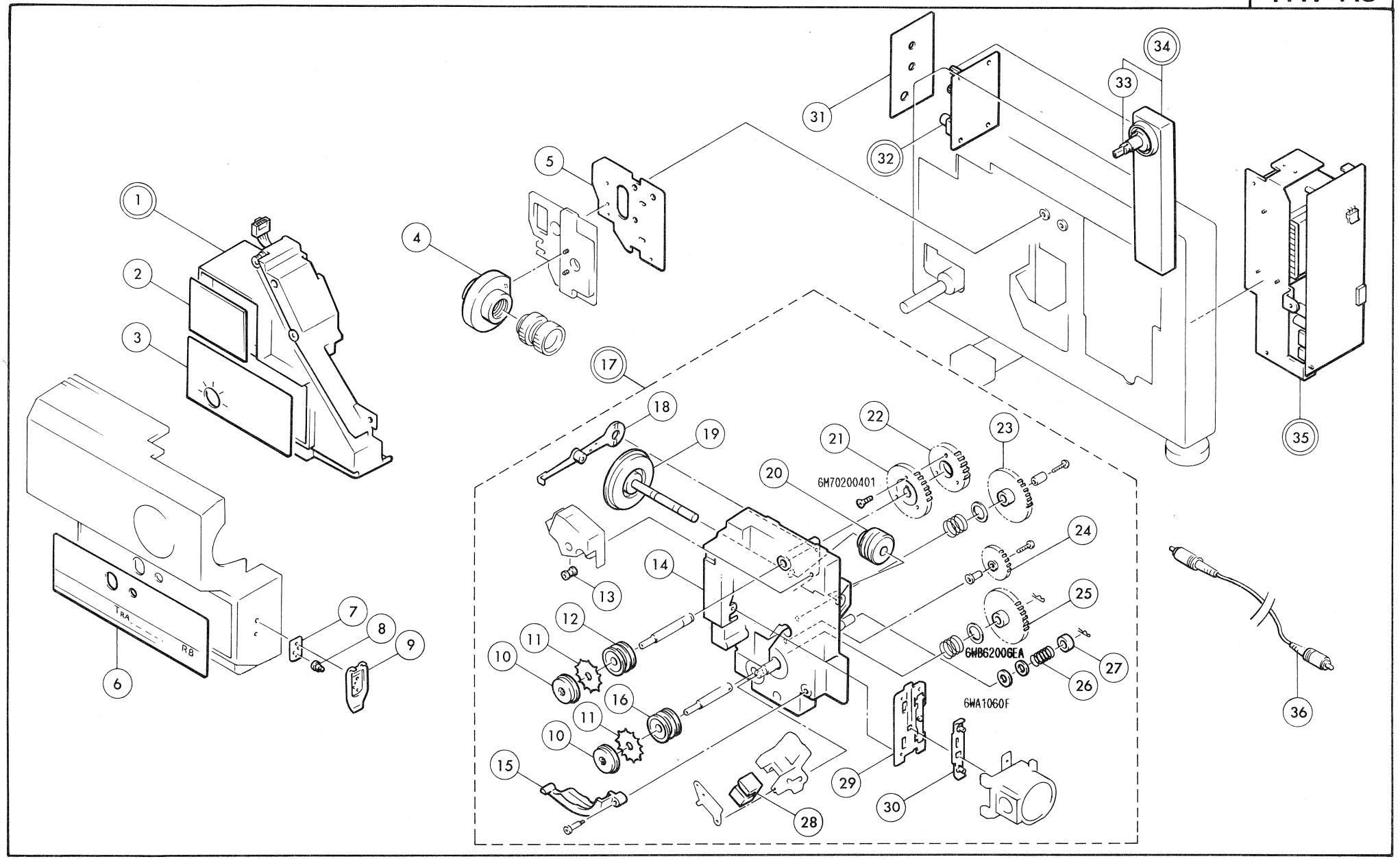
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ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
1	4P8TRG023	組立カバーアンプ TRG	COVER AMPLIFIER ASSY TRG	
2	4M45462	化粧板(1) カバーアンプ	DECORATION PLATE(1) AMP.	
3	4N40800	銘板 カバーアンプ TRG	PLATE COVER AMP. TRG	
4	4M45456	取付台 CCD R用	HOLDER CCD TRG	
5	4M45624	取付板 CCDホルダ R用	PLATE CCD HOLDER TRG	
6	4N40798	銘板 カバー機構部 TRG	PLATE MACHINE COVER TRG	
7	4M44467	間座 フィルムカッタ (R)	MOUNT FILM CUTTER(R)	
8	4P55132	ピン フィルムカッタ	PIN FILM CUTTER	16-AL
9	4M44468	フィルムカッタ (R)	FILM CUTTER(R)	
10	4M44466	キャップ スプロケット	CAP SPROCKET	
11	4M44453	スプロケット (R)	SPROCKET(R)	
12	4M44464	ボス 第1スプロケット	BOSS FIRST SPROCKET	
13	4M44463	ローラ スプロケットシュー	ROLLER SPROCKET SHOE	
14	4P8TRG019	マシンフレーム (メタル打込ミ)	MACHINE FRAME	
15	4M31302	シュー 第2スプロケット	SHOE SECOND SPROCKET	
16	4M44465	ボス 第2スプロケット	BOSS SECOND SPROCKET	
17	4P8TRG025	マシンフレーム(小)組立品 TRG	MACHINE FRAME ASSY TRG	
18	4M31303	組立アーム 送り爪 (R)	CLAW ASSY(R)	
19	4M44455	組立カム (R)	CAM ASSY(R)	
20	4M44456	ウォーム カム軸	WORM CAM SHAFT	
21	4M44458	ギヤ (A) 第1スプロケット	GEAR(A) FIRST SPROCKET	
22	4M44459	ギヤ (B) 第1スプロケット	GEAR(B) FIRST SPROCKET	
23	4M44461	ギヤ(1) 第2スプロケット	GEAR(1) SECOND SPROCKET	
24	4M44460	中間ギヤ 第2スプロケット	MIDDLE GEAR SPROCKET	
25	4M44462	ギヤ(2) 第2スプロケット	GEAR(2) SECOND SPROCKET	
26	4M50489	バネ サウンドドラム軸	SPRING SOUND DRUM SHAFT	
27	4P55844	間座 ウォーム	WASHER WORM	CX-350
28	4M44454	フィルムガイド	FILM GUIDE	
29	4M31874002	組立アパーチュアプレート TRG	APERTURE PLATE ASSY TRG	
30	4M44424	組立プレッシャプレート	PRESSURE PLATE ASSY	

ILLUST No.	PART NO.	PART NAME		COMMON USE MODEL
31	4N40802	銘板 出力端子	PLATE POWER CIRCUIT	
32	4P8TRG017	出力端子板組立品 TRG	POWER CIRCUIT PLATE ASSY	
33	4M44451	組立リール軸 前部アーム	REEL SHAFT FRONT ARM	
34	4P8STJ207	前部アーム組立品	FRONT ARM ASSY	
35	4P8TRG006	組立トランス基板 TRG	TRANSFORMER CIRCUIT ASSY	
36	4K02266	ビデオコード	VIDEO CORD	

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2	1 −23	4K01205	POWER CORD ASSY	CANADA U.S.A.
3	7 −16	4K02261	CONNECTOR ASSY TRANS.	CANADA U.S.A.
4	7 −44	5H1030009	FUSE 125V 3A	CANADA U.S.A.

ITEM NO.	PAGE AND ILLUST NO.	PART NO.	PART NAME	REMARKS

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P411539	5-14	P412690	4-43	P412774	5-16	P414158	2-17	4K02230	6-28
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P411948	4-25	P412698	4-5	P412786	4-29	P414164	8-35	4K02235	3-12
P411949	4-24	P412705B	2-35	P412844B	2-27	P414300	4-36	4K02236	3-10
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P412674	8-30	P412760B	5-6	P413908	5-1	4E42857	7-45	4M20746	5-19
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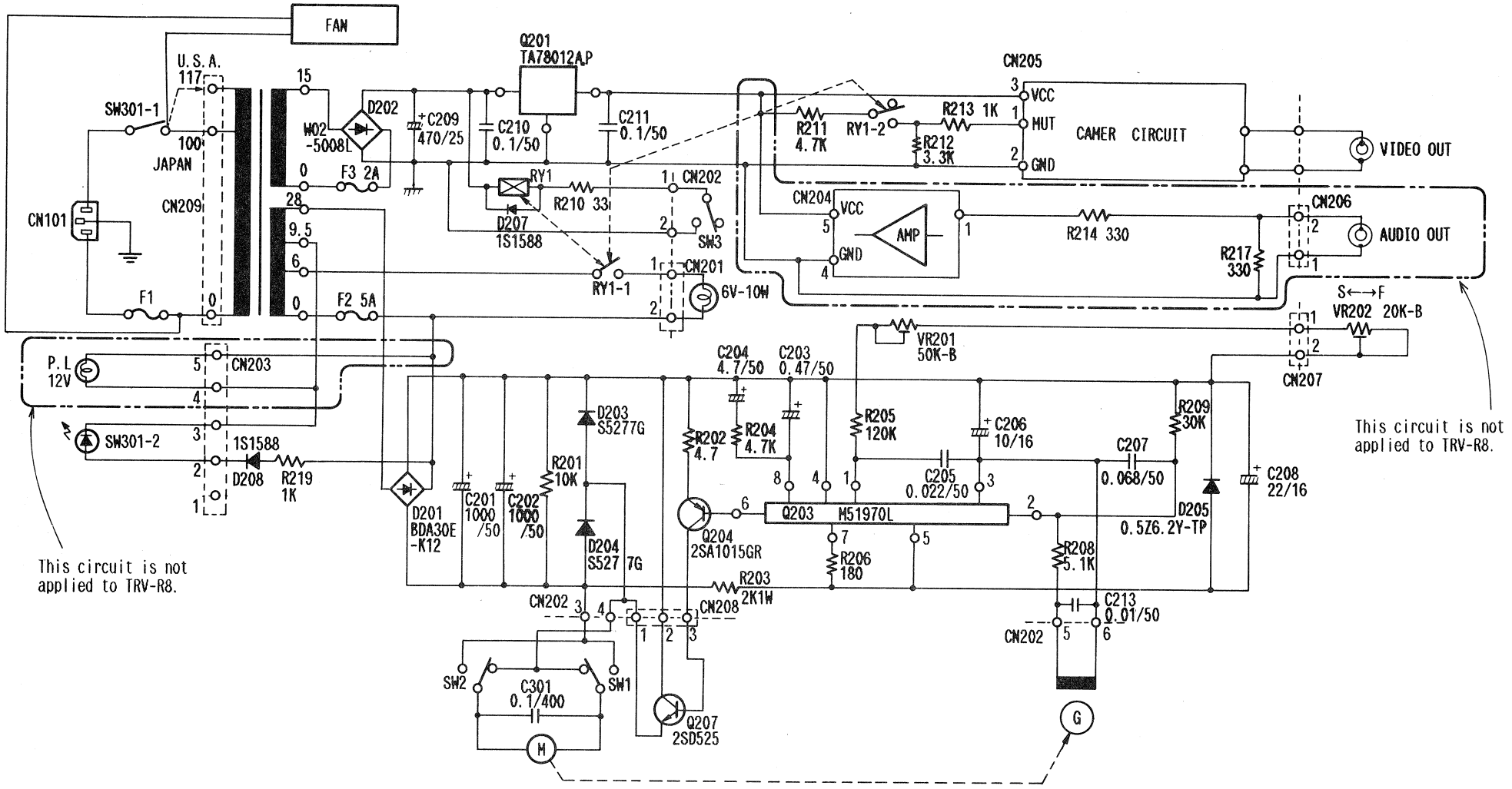
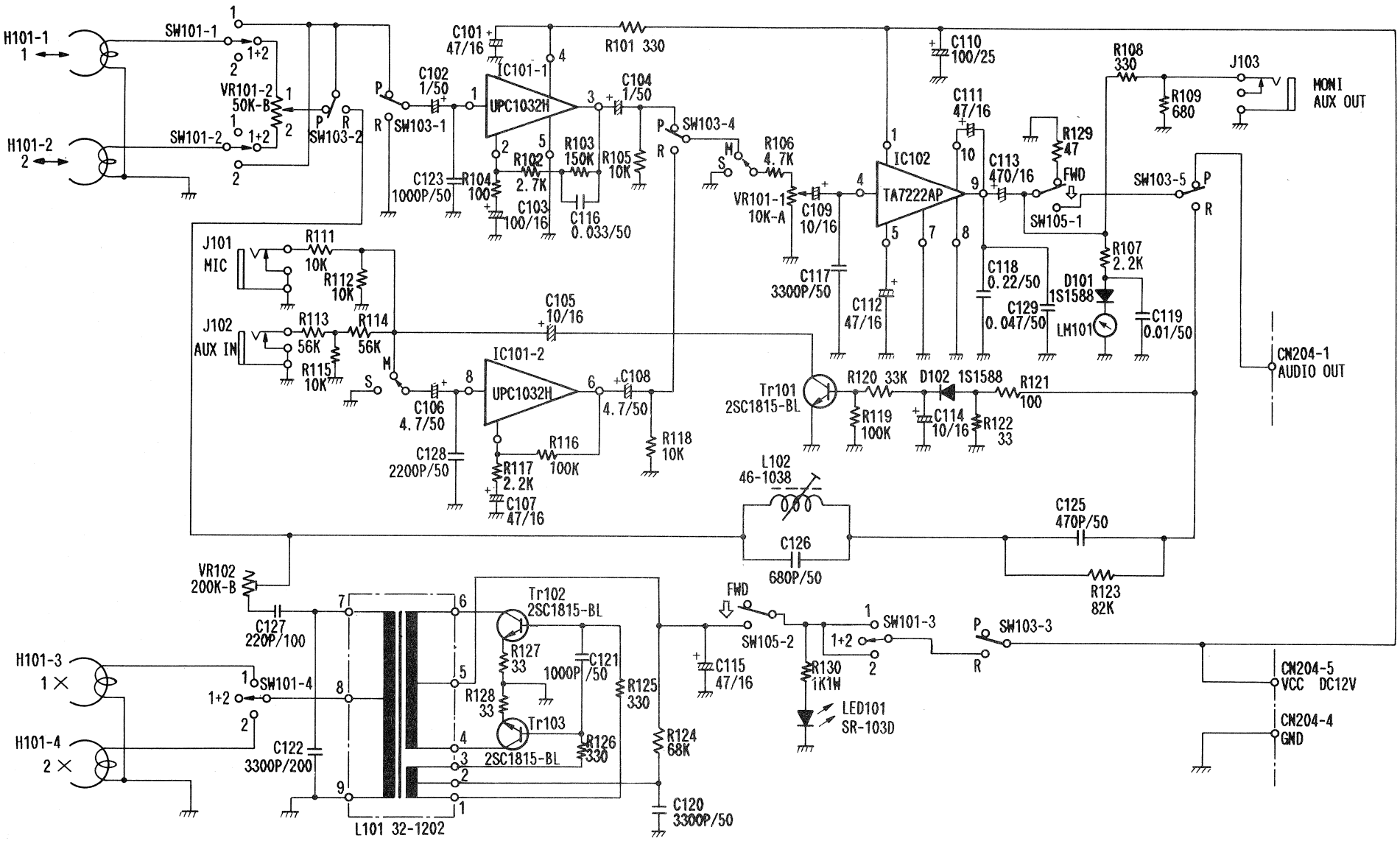


SCHEMATIC DIAGRAM FOR MACHINE FOR TRV-S8 (E44144)
TRV-R8 (E44147)

ITEM	PART NO.	PART NAME	CIRCUIT DIAGRAM NO.
IC	5ATA78012P	IC (TA78012P)	Q201
	5AM51970L	(M51970L)	Q203
Tr	5S1A10155	TRANSISTOR (2SA1015GR)	Q204
	5S12SD525	(2SD525)	Q207
D	5S2S5277G	DIODE (S5277G)	D203 D204
	5S21S15881	(1S1588)	D207 D208
REC	5S2DBA30EF	RECTIFIER (BDA30E-K12)	D201
	5S2W02F	(W02-5008L)	D202
ZD	5S205AZ621	ZENER DIODE (0.5Z6.2Y-TP)	D205
F	5H1050011	MC FUSE 5A	F2
	5H1020011	2A	F3
C	5DJ0140515	POLYEST FILM 0.01MF 50V	C213
	5DJ2230512	0.022MF 50V	C205
	5DQ6830513	CERAMIC CON 0.068MF 50V	C207
	5DQ0150515	0.1MF 50V	C210 C211
	5DH0150421	METAL POLYEST 0.1MF 400V	C301
	5DB4740517	AL ELECT CON 0.47MF 50V	C203
	5DB4750514	4.7MF 50V	C204
	5DB0171605	10MF 16V	C206
	5DB2261606	22MF 16V	C208
	5DB4772503	470MF 25V	C209
	5DB0190514	1000MF 50V	C201 C202

ITEM	PART NO.	PART NAME	CIRCUIT DIAGRAM NO.
R	5R1C047J42	C FILM FIX R 4.7Ω 1/4W	R202
	5R1B033042	33Ω 1/4W	R210
	5R1C018143	180Ω 1/4W	R206
	5R1C033143	330Ω 1/4W	R214 R217
	5R1B001343	1KΩ 1/4W	R213
	5R1C001343	1KΩ 1/4W	R219
	5R5B002362	METAL FILM R 2KΩ 1W	R203
	5R1B033243	C FILM FIX R 3.3KΩ 1/4W	R212
	5R1C047243	4.7KΩ 1/4W	R204 R211
	5R1C051243	5.1KΩ 1/4W	R208
	5R1C001443	10KΩ 1/4W	R201
	5R1B003442	30KΩ 1/4W	R209
	5R1B012442	120KΩ 1/4W	R205
	5R8Z0054BJ	SEMI FIX R 50KΩ B-TYPE	VR201



SCHEMATIC DIAGRAM FOR AMPLIFIER FOR TRV-S8 (E44234)

ITEM	PART NO.	PART NAME	CIRCUIT DIAGRAM NO.
IC	5AUPC1032H	IC (UPC1032H)	IC101
	5ATA7222AP	(TA7222AP)	IC102
Tr	5S1C1815BL	TRANSISTOR (2SC1815-BL)	Tr101 Tr102 Tr103
D	5S21S1588	DIODE (1S1588)	D101 D102
L	5J20021	OSC COIL (32-1200)	L101
	5J20022	TRAP COIL (46-1038)	L102
C	5DQ2210121	CERAMIC CON 220PF 100V	C127
	5DQ4710511	470PF 50V	C125
	5DQ6810511	680PF 50V	C126
	5DJ0130511	POLYEST FILM 1000PF 50V	C121 C123
	5DQ2220511	CERAMIC CON 2200PF 50V	C128
	5DJ3320511	POLYEST FILM 3300PF 50V	C117 C120
	5DJ3320221	3300PF 200V	C122
	5DJ0140511	0.01MF 50V	C119
	5DJ3330511	0.033MF 50V	C116
	5DJ4730511	0.047MF 50V	C129
	5DJ2240511	0.22MF 50V	C118
	5DB0160511	AL ELECT CON 1MF 50V	C102
	5DB0160512	1MF 50V	C104
	5DB4750511	4.7MF 50V	C108
	5DB4750512	4.7MF 50V	C106
	5DB0171601	10MF 16V	C105 C109 C114
	5DB4761602	47MF 16V	C101 C107 C111 C112 C115
	5DB0181601	100MF 16V	C103
	5DB0182502	100MF 25V	C110
	5DB4771602	470MF 16V	C113

ITEM	PART NO.	PART NAME	CIRCUIT DIAGRAM NO.
R	5R1C033042	C FILM FIX R 33Ω 1/4W	R122 R127 R128
	5R1C047041	47Ω 1/4W	R129
	5R1C001242	100Ω 1/4W	R104 R121
	5R1C033142	330Ω 1/4W	R101 R108 R125 R126
	5R1C068142	680Ω 1/4W	R109
	5R5B001361	METAL FILM R 1KΩ 1W	R130
	5R1C022242	C FILM FIX R 2.2KΩ 1/4W	R107 R117
	5R1C027242	2.7KΩ 1/4W	R102
	5R1C047242	4.7KΩ 1/4W	R106
	5R1C001442	10KΩ 1/4W	R105 R111 R112 R115 R118
	5R1C033342	33KΩ 1/4W	R120
	5R1C056342	56KΩ 1/4W	R113 R114
	5R1C068342	68KΩ 1/4W	R124
	5R1C082342	82KΩ 1/4W	R123
	5R1C001542	100KΩ 1/4W	R116 R119
	5R1C015442	150KΩ 1/4W	R103
	5R8Z0025B7	SEMI FIX R 200KΩ B-TYPE	VR102

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