Film-Tech

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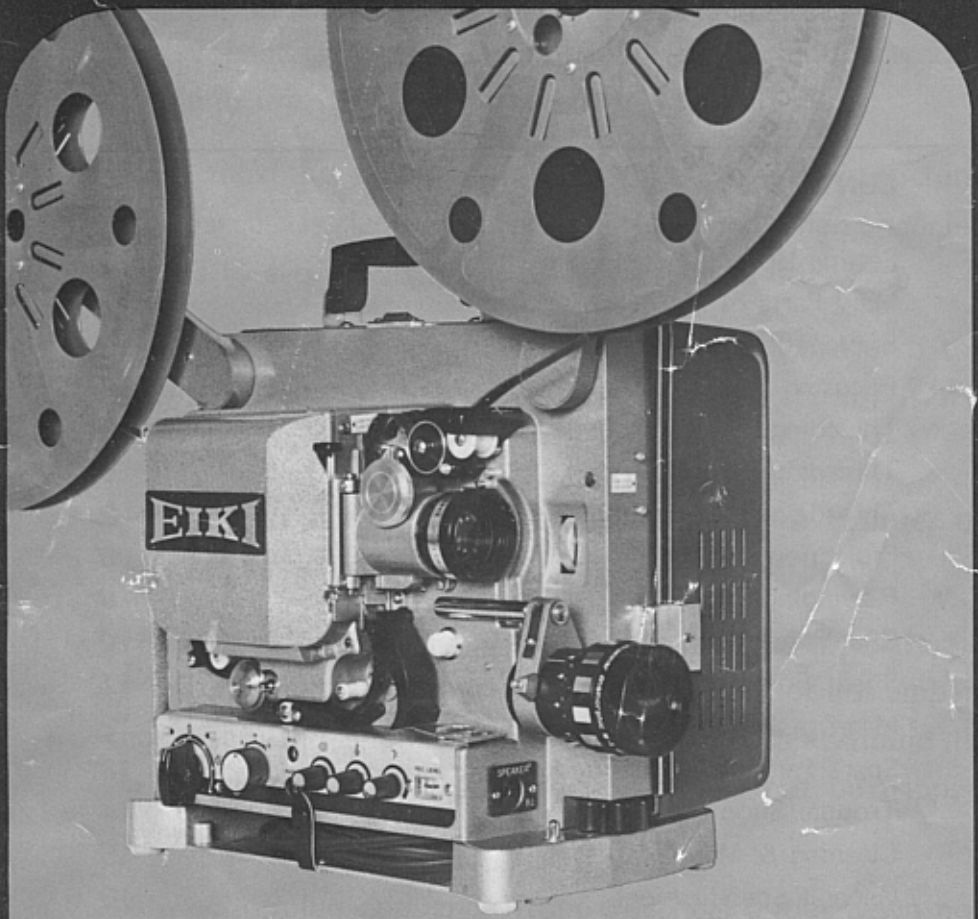
These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

www.film-tech.com

EIKI

RST/RT/RM series
16mm Sound Projector



Patent: France, U.S.A.
Patent Pending: United Kingdom, W. Germany, Italy, Japan.

Owner's Instruction Manual

EIKI RST/RT/RM Series

Simple Operation

Easy Maintenance

Trouble-free Use

This Operator's Manual is easy-to-read, informative and helpful.
Please read carefully before operating projector for the first time.

CONTENTS

IMPORTANT SAFEGUARDS

When using your Eiki 16 mm projector, basic safety precautions should always be followed, including the following:

1. Read and understand all instructions.
2. Close supervision is necessary when any appliance is used by or near children. Do not leave appliance unattended while in use.
3. Care must be taken as burns can occur from touching hot parts. Use lamp ejection lever provided when changing lamps to avoid possibility of burns from a hot lamp.
4. Do not operate appliance with a damaged cord or if the appliance has been dropped or damaged – until it has been examined by a qualified servicemen.
5. Do not let cord hang over edge of table or counter or touch hot surfaces.
6. If an extension cord is necessary, a cord with a suitable current rating should be used. Cords rated for less amperage than the appliance may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
7. Always unplug appliance from electrical outlet when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.

IMPORTANT SAFEGUARDS (cont'd)

8. Let appliance cool completely before putting away. Return cord to cord storage space provided when storing projector.

9. To protect against electrical shock hazards, do not immerse this appliance in water or other liquids.

10. To avoid electric shock hazard, do not disassemble this appliance, but take it to a qualified servicemen when some service or repair work is required. Incorrect reassembly can cause electric shock hazard when the appliance is used subsequently.

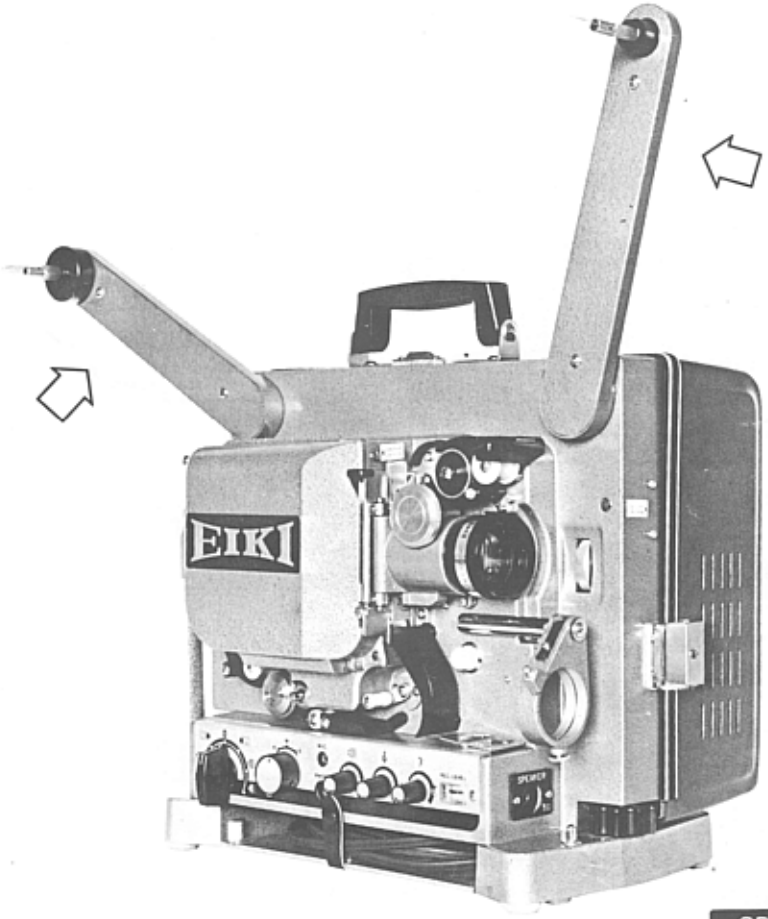
11. Do not open lamphouse door when projector motor is running.

12. Observe the caution plate by rear cover latch "DISCONNECT POWER SUPPLY BEFORE OPENING".

13. Do not look directly at an operating lamp with unprotected eyes.

SAVE THESE INSTRUCTIONS

SETTING UP YOUR PROJECTOR



Lift latch to remove front cover.

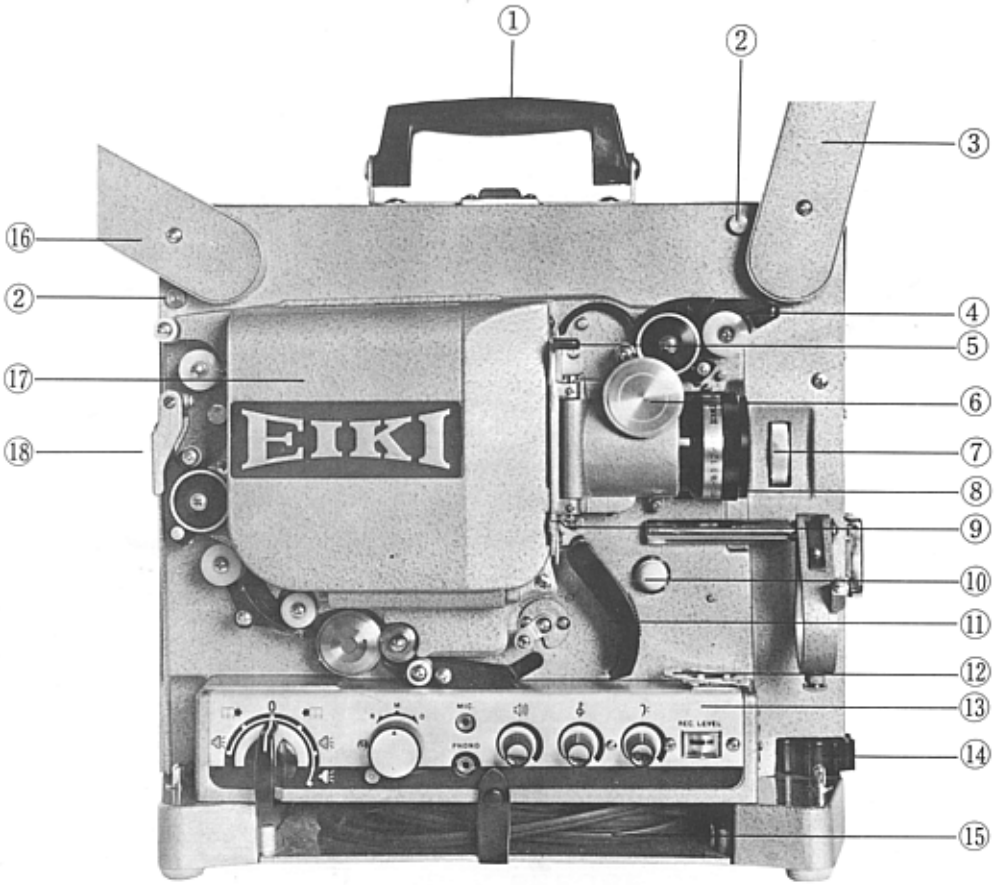
Raise both reel arms until they snap into place.

Speaker cord must be plugged into speaker socket on projector and speaker unit on cover. (Only models with removable speaker in front cover.)

Connect power plug into proper power outlet.

Make sure the rotary switch is on OFF (O) position.

MAIN PARTS OF YOUR PROJECTOR

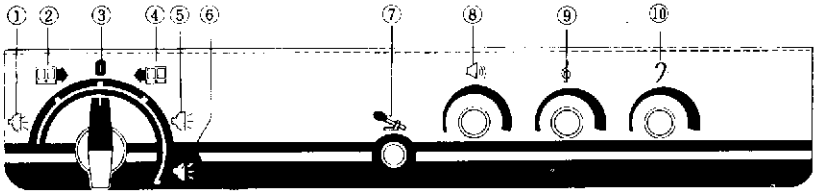


[Model RST-3]

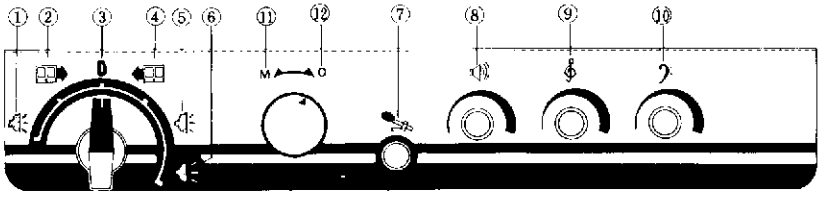
1. Handle
2. Arm Lock
3. Supply Arm
4. Film Channel & Rewind Lever
5. Still Picture Lever
6. Focus Knob
7. Inching Knob
8. Lens
9. Framing Lever
10. Pilot Lamp
11. Automatic Threading Control Lever (RST/RT)
12. Film Trimmer (RST/RT)
13. Switch Plate
14. Elevator Knob
15. Power Cord
16. Take-up Arm
17. Lamp House
18. Auto Take-up Guide (RST)

EXPLANATION OF SWITCH PLATE

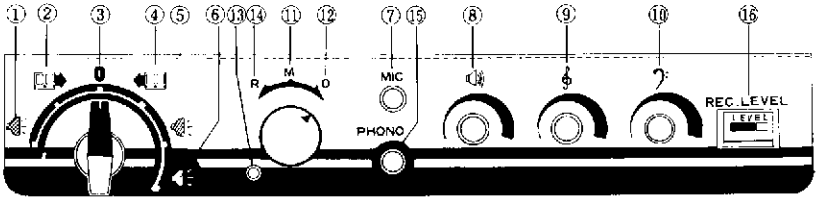
Model RST/RT/RM-0, 1



Model RST/RT/RM-2



Model RST/RT/RM-3

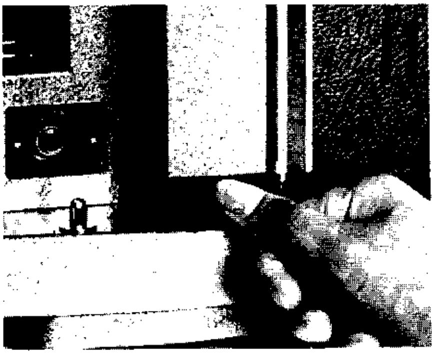


All Models	Additional on RST/RT/RM-2
1. Lamp Low (Reverse)	11. Magnetic Playback
2. Reverse	12. Optical Playback
3. Off	
4. Forward	
5. Lamp Low (Forward)	
6. Lamp High (")	**Additional on RST/RT/RM-3**
7. MIC Input	13. Recording Lock Button
8. Volume & Amp Switch	14. Recording
9. Treble Control	15. PHONO Input
10. Bass Control	16. Level Indicator

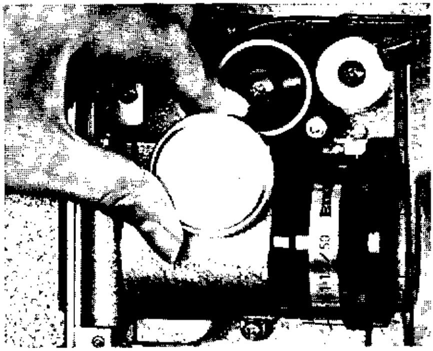
FOCUSING

Turn ROTARY SWITCH to FORWARD position (◀▭) and LAMP position. (💡, 💡)

A



B



Raise projector if required by turning black elevator knob (photo A) on front of projector.
When screen is illuminated and is of the correct size, focus (photo B) so edge of light is sharp.
Switch OFF. (**O**)

SCREEN SIZE CHARTS IN INCHES

Distance / Lens		8'	10'	12'	15'	20'	25'	30'	35'	40'	45'	50	60'	75'	100'
1"	H	2'2"	2'9"	3'4"	4'2"	5'7"	6'11"	8'4"	9'9"						
	W	2'11"	3'8"	4'5"	5'7"	7'5"	9'4"	11'3"	13'1"						
1.5"	H	1'5"	1'10"	2'2"	2'9"	3'8"	4'7"	5'7"	6'6"	7'5"	8'4"	9'4"			
	W	1'11"	2'5"	2'11"	3'8"	4'1"	6'2"	7'6"	8'9"	10'0"	11'3"	12'5"			
2.0"	H		1'4"	1'8"	2'1"	2'9"	3'5"	4'2"	4'10"	5'7"	6'3"	6'11"	8'4"	10'5"	13'11"
	W		1'10"	2'2"	2'9"	3'8"	4'8"	5'7"	6'6"	7'5"	8'5"	9'4"	11'3"	14'0"	18'9"
3.0"	H						2'3"	2'9"	3'3"	3'8"	4'2"	4'7"	5'7"	6'11"	9'3"
	W						3'1"	3'8"	4'4"	4'11"	5'7"	6'2"	7'5"	9'4"	12'6"
4.0"	H						1'8"	2'1"	2'5"	2'9"	3'1"	3'5"	4'2"	5'2"	6'11"
	W						2'3"	2'9"	3'3"	3'8"	4'2"	4'8"	5'7"	7'0"	9'4"

SCREEN SIZE CHARTS IN METERS

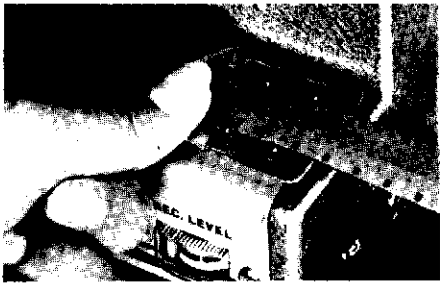
Distance / Lens		3m	5	10	15	20	25	30	40
38mm	H	0.56	0.94	1.89	2.84	3.79	4.74	5.69	7.58
	W	0.76	1.26	2.53	3.80	5.07	6.34	7.61	10.15
50	H	0.43	0.72	1.44	2.16	2.88	3.60	4.32	5.76
	W	0.57	0.96	1.93	2.89	3.86	4.82	5.79	7.72
65	H	0.33	0.55	1.10	1.66	2.21	2.77	3.32	4.43
	W	0.44	0.74	1.48	2.22	2.96	3.71	4.45	5.93
76	H	0.28	0.47	0.94	1.42	1.89	2.37	2.84	3.79
	W	0.38	0.63	1.26	1.90	2.53	3.17	3.80	5.07
100	H	0.21	0.36	0.72	1.08	1.44	1.80	2.16	2.88
	W	0.28	0.48	0.96	1.44	1.93	2.41	2.89	3.86

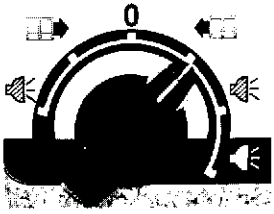
THREADING/FULLY AUTOMATIC THREADING (REEL-TO-REEL)

MODELS RST-0, 1, 2, 3

1. Place EIKI AUTO REEL on take-up arm.
   Insert film in trimmer and cut with raised end.
   (Photo A)

A

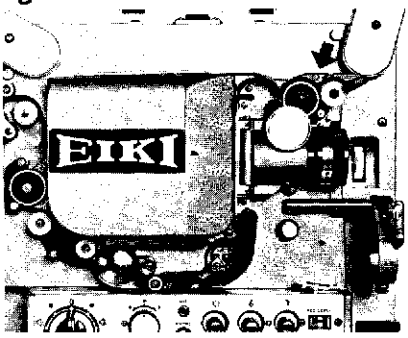




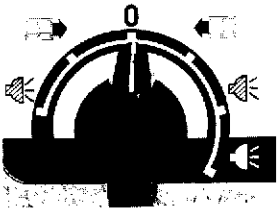
2. Turn ROTARY SWITCH to FORWARD position (◀▣).

3. Push automatic threading control lever to SELF-THREAD position.
   (Photo B).

B



4. Insert film leader into film channel. (Photo B)
   Film threads.... EIKI AUTO REEL takes up film ..... and the automatic threading guides release automatically.

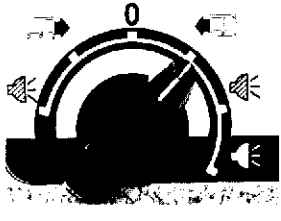


5. Switch OFF. (**O**)

THREADING / SELF THREADING MODELS RT-0, 1, 2, 3

A

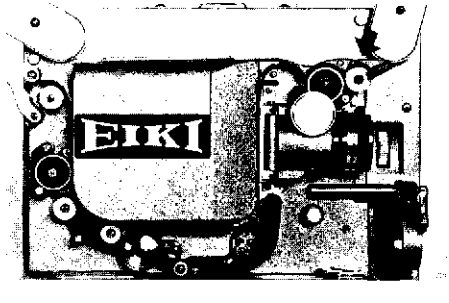
1. Insert film in trimmer and cut with raised end. (Photo A)



2. Turn ROTARY SWITCH to FORWARD position (◀▣).

3. Push automatic threading control lever to "SELF-THREAD" position. (Photo B)

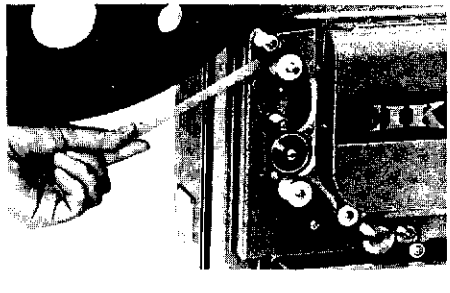
B

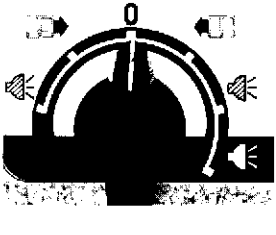


4. Insert film leader into Film channel. Film threads automatically. When a gentle tug is applied to film coming off last roller, the automatic threading guides will release. (Photo C)

5. When sufficient film has passed through projector to reach take-up reel, SWITCH OFF (**O**).

C

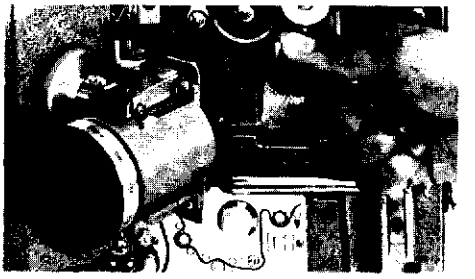




6. Attach leading edge of film on to take-up reel.

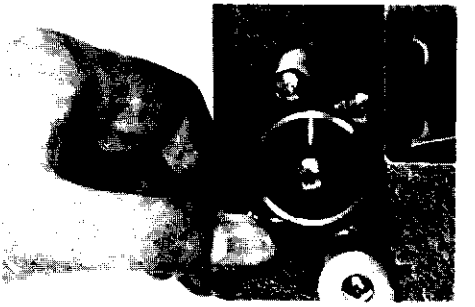
THREADING / MANUAL THREADING MODELS RM-0, 1, 2, 3

A

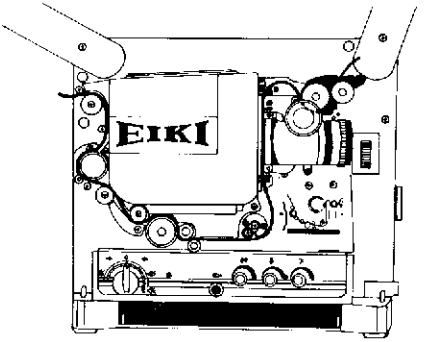


1. Swing lens away from projector by pulling on lens holder. (Photo A)

B



2. Open both sprocket shoes. and rubber roller. (Photo A, B)

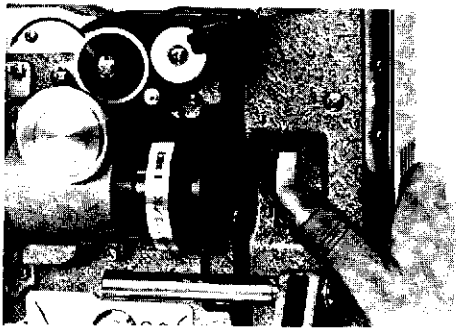


3. Thread film following THREADING DIAGRAM. Raise rubber guide roller as necessary.

4. Close both sprocket shoes and lens holder.

5. Be sure film is seated properly in gate.

C

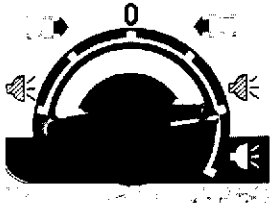


6. Check threading by turning inching knob. When knob is turned by pushing UP, film should move forward intermittently in film gate and both upper and lower loops will be maintained. (Photo C)

7. Attach leading edge of film on to take-up reel

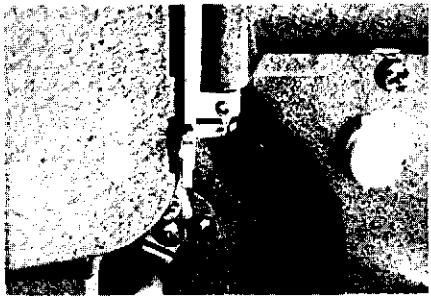
PROJECTION

1. Turn ROTARY SWITCH to FORWARD position (◀□) and LAMP position (🔊 , 🔉).



2. Focus picture, and frame film by adjusting the framing lever (photo A).

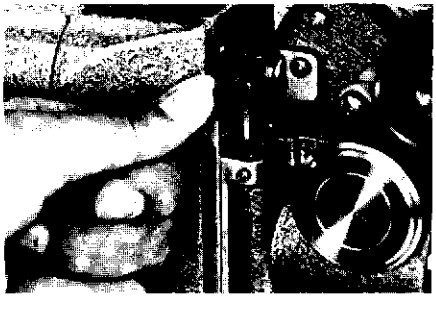
A



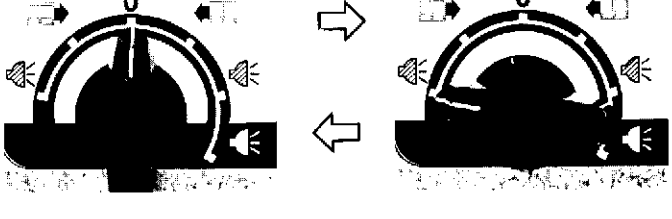
3. Volume switch on and adjust tone.

4. For STILL PICTURE, depress STILL PICTURE LEVER (photo B). (Focus adjustment may be necessary.) If shutter has stopped in front of picture, it may be moved by turning inching knob either direction until picture shows on screen.

B



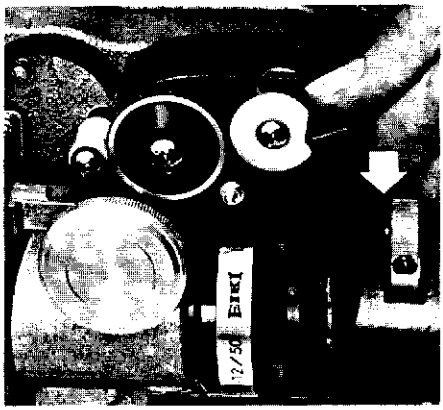
5. For REVERSE PROJECTION, turn ROTARY SWITCH from OFF position (**O**) to REVERSE (□▶) and LAMP (🔊).



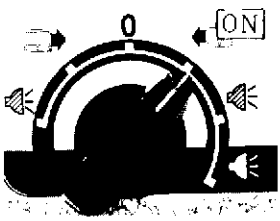
6. When film is completed, turn ROTARY SWITCH to FORWARD position (◀□) and let motor run until all film is on the take-up reel.

REWINDING

A

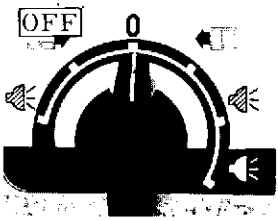


1. Attach tail end of film to supply reel.
2. Move rewind lever DOWN to REWIND position (photo A) and turn ROTARY SWITCH to FORWARD position (◀▣).
   After rewinding, FIRST return rewind lever UP to OPERATE position and turn ROTARY SWITCH to OFF position (**O**).

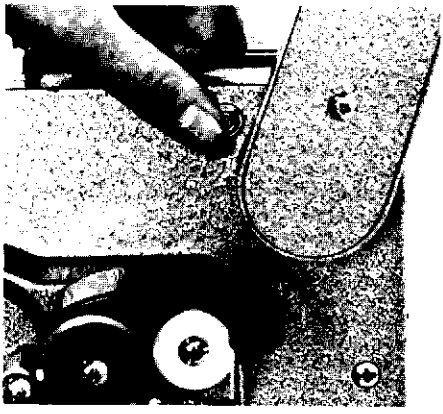


Rewinding

Return rewind lever UP to OPERATE



B

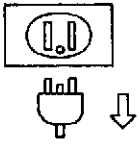


3. After removing reels from arms, depress arm locking buttons (photo B) and lower arms

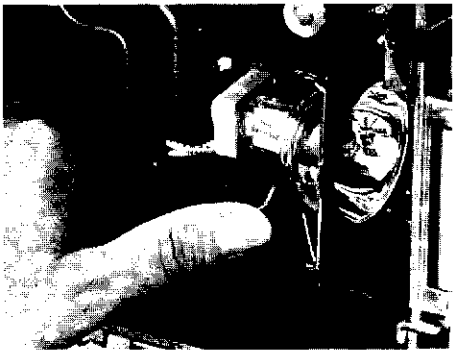
4. Replace projector cover to carry. The flexible plastic cover should be used to protect projector and to carry take-up reel, spare lamp, speaker cord, etc.

CHANGING LAMPS

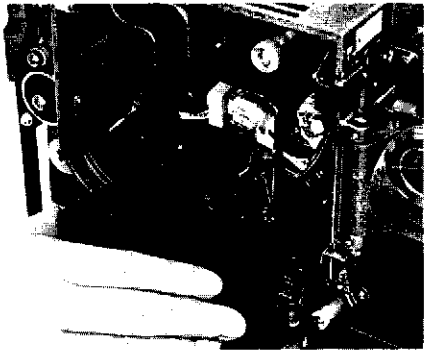
DISCONNECT POWER SUPPLY CORD



A



B



Remove lamp-house lock screw near the top of aperture plate. Pull out on top edge of lamp-house.

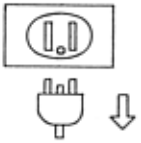
PROJECTION LAMP  (ELC/24V 250W)

Push (to left) ejection lever immediately below lamp and lamp will come out (photo A). Be sure replacement lamp snaps into place. Proper seating of lamp is essential.

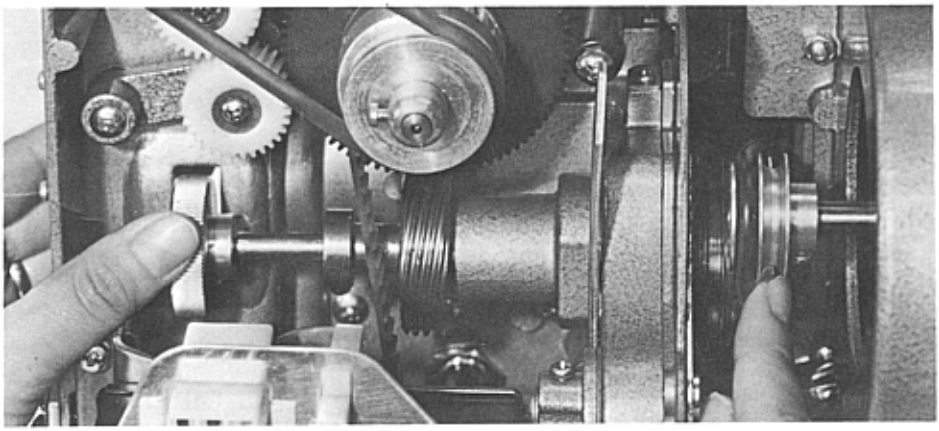
EXCITER LAMP  (BRK/4V 0.75A)

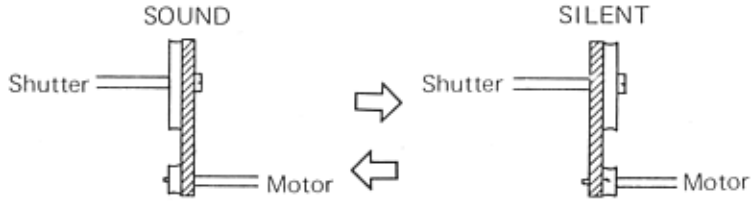
Pull out on black exciter lamp cover (photo B).
Push in on lamp and turn counter-clockwise to remove.
Insert new lamp with notch on base flange in upper right position, turn clockwise, clean fingerprints from lamp, and replace cover.
Close lamp-house door and replace lock-in screw.

SILENT FILM SPEED



DISCONNECT POWER SUPPLY CORD





This is changed by slipping the motor drive belt to the alternate set of pulleys

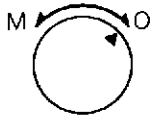
Open rear cover. Turn inching knob at the same time guiding the belt first to the smaller motor pulley then to the larger shutter pulley. Change back to sound speed by reversing the above procedure.

(Note. No silent speed on 50/60 Hz models.)

MAG-OPT PROJECTION

On the RST-2, 3, RT-2, 3, RM-2, 3 Models, either magnetic or optical sound tracks may be played back.

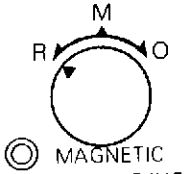
MAGNETIC PLAYBACK



OPTICAL PLAYBACK

RECORDING ON MAGNETIC STRIPED FILM

RST/RT/RM-3 Models



1. Put OPT-MAG knob to the Optical position and thread film in the projector in the normal manner, then set the knob to Recording position.
2. Connect the supplied microphone (or any high-impedance microphone) to the "MIC" input on the Amplifier Control panel. A record player or tape recorder may be plugged into the "PHONO" input.
3. Depress the small silver "Safety Recording Lock Button" below the function switch and turn the three-position function switch to record (R).
4. Adjust the Volume Control to obtain the proper recording level as indicated on the record level indicator.
   The best recording level is obtained when the needle just touches the red line. If the needle is allowed to swing into the red area, the recorded sound may be distored.
5. Run the film, watch the screen, record your voice or music on the film.
6. Playback – rewind film, turn function switch to the magnetic playback position (M), disconnect microphone or tape recorder – run film and check the quality of the sound just recorded.
7. A magnetic sound track may be erased by running the film through the projector with the function switch in (**R**) and the Volume Control in the minimum position and the MIC disconnected.

RECOMMENDED SPARE PARTS & ACCESSORIES

PROJECTION LAMP – ELC/24V, 250W

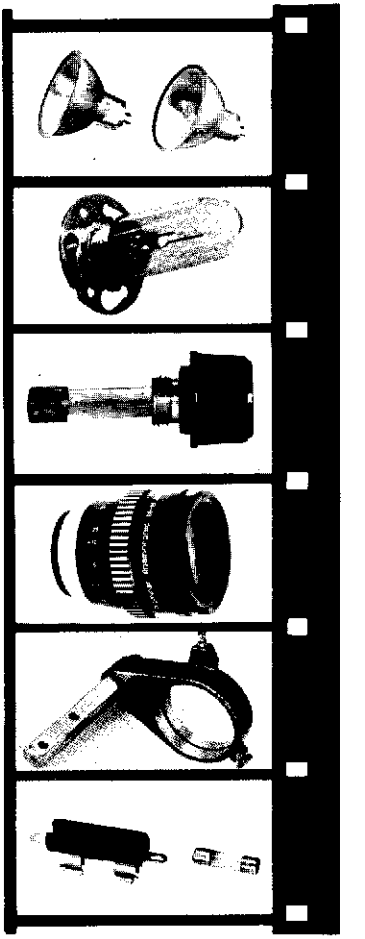
EXCITER LAMP – BRK/4V, 0.75A

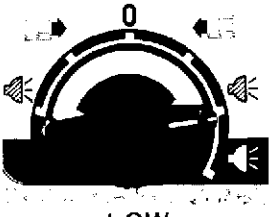
FUSE/2A with holder (large)

ANAMORPHIC LENS

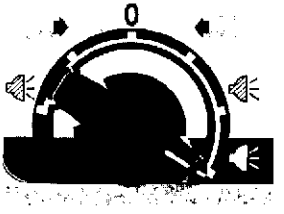
ANAMORPHIC LENS HOLDER

FUSE/2A with holder (small)





LOW



HIGH

LAMP HI-LOW SWITCH (for maximum life)

By switching to LOW position ( ) your lamp will last 3 times longer and even in this LOW position the lamp output will be minimum 550 lumens.

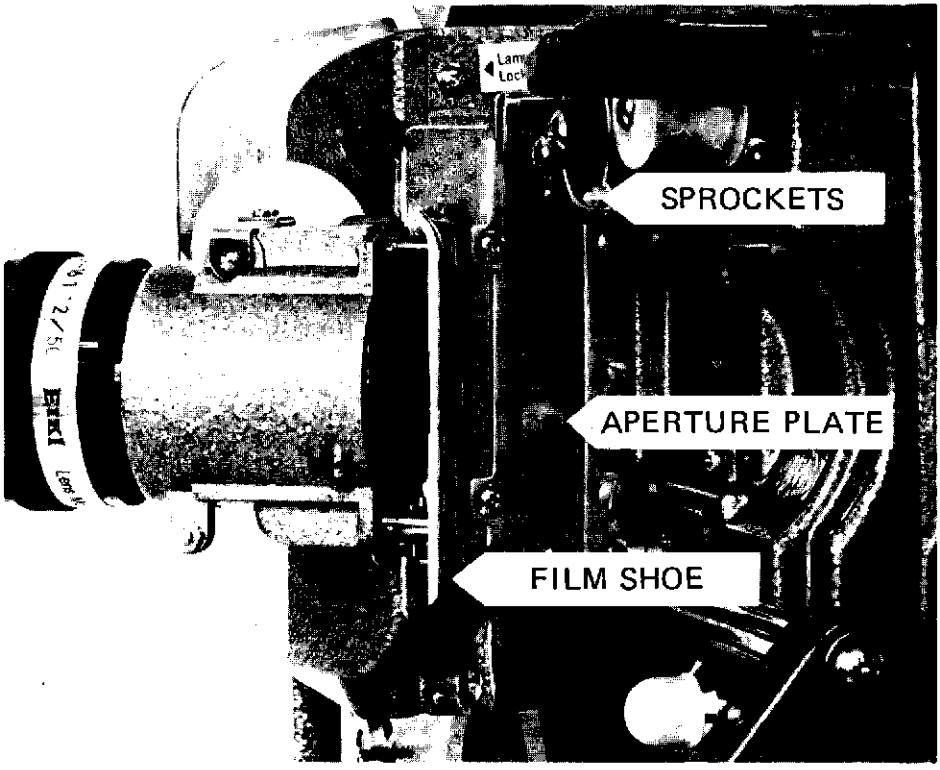
The HIGH position ( ) should be used for larger audiences, or when room light is too bright.
In HIGH position the projector light will be about 750 lumens on the screen.

TROUBLE SHOOTING

Here is a non-Professional's guide for locating minor problems. In nearly every case, a simple adjustment is all that is necessary to restore peak efficiency.

NO POWER TO MOTOR OR LAMP	1. Make sure power cord is connected to wall outlet and that outlet has power. 2. Check power cord and repair if necessary.
MOTOR RUNS, BUT PROJECTION LAMP DOES NOT LIGHT	1. Check position of rotary switch. 2. Replace projection lamp.
FILM DOES NOT RUN, BUT MOTOR AND LAMP BOTH OPERATE	1. Raise STILL PICTURE LEVER to operate. 2. Check Motor Belt.
NO SOUND	1. Turn amplifier switch on and increase volume. 2. Plug in speaker. (On models with removable speaker.) 3. On models with magnetic reproduction be sure "M-O" switch is in proper position. 4. Replace exciter lamp if lamp does not light. 5. Check 1A fuse & replace if necessary.
POOR SOUND	1. Check position of volume control. 2. Rethread film. 3. Clean exciter lamp. 4. Film may be defective, use new film if necessary.
POOR PICTURE	1. Check threading, rethread if necessary. 2. Clean projection lens with soft tissue, both front and rear. 3. Refocus lens. 4. Clean gate with soft bristle brush. 5. Film may be defective, use new film if necessary.

OPERATOR CLEANING AND MAINTENANCE



The following parts are to be cleaned with a soft brush after each showing :

APERTURE PLATE
FILM SHOE
SPROCKETS

Do not use oil or other lubricant on any part of the projector. Leave this to the service engineer.

GENERAL SPECIFICATIONS

RST Models. . . . .Reel-to-Reel Matic Threading
RT Models. . . . .Self Threading
RM Models. . . . .Manual Threading

POWER	AC. 50 or 60 Hz., 430 – 450W
LENS	super 50mm (2") f1.2 (standard)
PROJECTION LAMP	ELC Halogen lamp, 24V – 250W (200W lamp also usable)
EXCITER LAMP.....	BRK, 4V–0.75A
AMPLIFIER	solid state, I.C. 15W (20W max.)
	separate treble and bass controls independent use for publiccaddress
MOTOR	induction motor, plug-in type
FRAMES PER SECOND..	24 and 18 (sound and silent)
SPEAKER	13cm x 20cm (5" x 8") ..... RST, RT, RM-0
	16cm round (6.5") ..... RST, RT, RM-1, 2, 3
REVERSE PROJECTION.	yes
STILL PICTURE.....	yes
LOOP RESTORER.....	automatic
REWIND.....	high speed, without reel change
REEL CAPACITY.....	600m (2,000 ft)
MODULAR UNITS.....	amplifier, cam tank, motor, lens, holder, transformer
WEIGHT.....	17 Kgs. (37.4 lbs.)
DIMENSIONS.....	29cmx35cmx35cm (11.4"x13.8"x13.8") (with front cover)

EIKI INDUSTRIAL CO., LTD.
C.P.O. Box 1229, Osaka 530-91, Japan
Printed in Japan

EIKI RST/RT/RM SERIES

16mm Sound Projectors

SERVICE MANUAL

EIKI INDUSTRIAL CO., LTD
C.P.O.BOX 1229
OSAKA JAPAN

The following information will help the service technician to analyze the problem and determine the actual **SOURCE**. It is important that the effect be eliminated by curing the actual **CAUSE** of the problem.

I. MISCELLANEOUS TROUBLES

SYMPTOM	PROBABLE CAUSE	REMEDY
1. Pilot lamp does not light	1. No power at wall outlet. 2. Power cord defective. 3. Transformer defective. 4. Pilot lamp defective.	1. Check fuse or circuit-breaker of power circuit. 2. Repair or replace. 3. Check 9 pin nylon plug. Repai or replace. 4. Replace.
2. No power for motor in "FORWARD" position.( ) (Pilot lamp lights)	1. Rotary switch defective. 2. Transformer defective. (except 240V, 220V, 118V) 3. Motor plug defective.	1. Repair or replace. 2. Check 9 pin nylon plug. Repair or replace. 3. Check 6 pin nylon plug. Repair or replace.
3. Lamp does not light in "FORWARD LAMP" position. (,)	1. Lamp burned out. 2. Rotary switch defective. 3. Lamp socket defective. 4. Open circuit between lamp socket and transformer. 5. Transformer defective.	1. Replace. 2. Replace. 3. Replace. 4. Repair. 5. Repair or replace.
4. Film sprockets not turning. (Motor runs, lamp lights)	1. Still picture lever depressed. 2. Motor belt broken. 3. Plate washer ST-11351 loose. 4. Main drive belt broken, or off.	1. Raise the lever. 2. Replace. 3. Remove camtank as per S.1.6 and tighten screw. 4. Replace.
5. Take-up poor, or not at all in "FORWARD" position.	1. Broken or stretched take-up arm belt. 2. Take-up arm belt oily. 3. Improper friction at spindle assembly 312-14201. 4. Clutch cam not engaging.	1. Replace. 2. Clean. 3. See S.2.2 for remedy. 4. See S.5.
6. Take-up poor or not at all in "REVERSE" position.	1. Broken or stretched supply arm belt. 2. Supply arm belt oily. 3. Reverse belt broken. 4. Clutch cam not engaging. 5. Reverse spring 312-13321 weak.	1. Replace. 2. Clean. 3. Replace. 4. See S.6.1. 5. Tighten knurled nut 312-13311.

SYMPTOM	PROBABLE CAUSE	REMEDY
7. Rewind poor or not at all.	1. Broken tension spring 312-19251. 2. Broken or stretched supply arm belt. 3. Supply arm belt oily. 4. Take-up clutch cork too tight, or dry. 5. Defective rewind gear.	1. Replace. 2. Replace. 3. Clean. 4. See S.2.2 for remedy. 5. Replace.
8. Main drive belt slips over take-up drive gear when large film reel is full.	1. Take-up clutch cork too tight, or dry. 2. Oil on main drive belt or drive gear. 3. Spring on tension gear too weak. 4. Ball bearings seized or binding in take-up arm.	1. See S.2.2 for remedy. 2. Clean and wipe dry. Replace belt if necessary. 3. Replace spring ST-15251. 4. Replace or remove cause of binding.
9. Film spills from supply reel in "FORWARD" position.	1. Clutch cover pulley 312-15501 binding. 2. Clutch cam ST-14071 touching pins in clutch cover pulley 312-15501.	1. Remove, clean and lubricate. See S.6.1. 2. Trim cam to provide necessary clearance. Replace cam or pulley or both.
10. Film spills from take-up reel in "REVERSE" position.	1. Drive gear 312-14501 binding on shaft or clutch cover pulley 312-15501. 2. Clutch cam ST-14071 touching pins in clutch cover pulley 312-15501. 3. Edge of main drive belt touching shoulder of outer clutch collar ST-14401	1. Clean, lubricate and provide the necessary clearance. See S.5 including fiber washer behind drive gear. 2. Trim cam to provide necessary clearance. Replace cam or collar or both. 3. Remove belt and replace in opposite direction. Replace belt. See S.5.
11. Lower loop lost in "REVERSE" position.	1. Reverse rubber roller ST-41201 not moving to proper position because reverse bracket 312-41131 is binding. 2. Plate spring ST-41061 too weak causing insufficient friction.	1. Remove cause of binding. 2. Stretch or replace.
12. Upper loop lost in "REVERSE" position.	1. No.1 sprocket shoe clearance too great. 2. Claw protrusion incorrect 3. No.1 sprocket plate loose	1. Check and adjust as per S.9.1. 2. Adjust as per S.1.5. 3. Tighten screw in end of shaft.

SYMPTOM	PROBABLE CAUSE	REMEDY
12. Upper loop lost in "REVERSE" position.	4. Film defective.	4. Use new film.
13. Loop restorer rotates continuously or erratically.	1. Damaged film.	1. Repair or replace.
	2. Insufficient spring tension.	2. Stretch or replace spring ST-18061. See S.10.
	3. Loop restorer gear defective.	3. Repair or replace as per S.10.
	4. Sensing roller ST-18021 in wrong position.	4. Readjust as per S.10.
	5. No.2 sprocket plate loose	5. Remove lamp house frame casting 312-32111 and tighten screw in end of shaft. See S.8.1.
	6. No.2 sprocket shoe open. (RM Models)	6. See S.9.3 for timing instructions and tighten screw.
	7. Film touching sensing roller because lower loop too small.	7. See S.10. for adjustment.
	8. Insufficient claw protrusion.	8. Adjust as per S.1.5.
	9. Green film.	9. Treat with film conditioner or lubricant.
	10. Worm gear on cam shaft mounted incorrectly, causing variation in claw protrusion.	10. See S.1.3.
	11. Claw broken.	11. Replace.
14. Excessive noise in film gate in "FORWARD" position, with good, clean undamaged film.	1. Upper loop too small.	1. Increase to proper size.
	2. Film touching sensing roller ST-18021.	2. Adjust as per S.10.
	3. Emulsion build-up on film shoe or film gate.	3. Clean and buff.
	4. Claw loose.	4. Tighten.
	5. Inner guide rail binding.	5. Clean and adjust. See S.9.4.
	6. Film shoe binding.	6. Adjust. See S.9.5.
	7. Side pressure spring weak	7. Bend or replace. See S.9.4
	8. Film shoe bent.	8. Straighten or replace.
	9. Defective claw.	9. Replace. See S.1.1.
	10. Claw position incorrect.	10. Adjust as per S.1.4.
	11. Claw protrusion incorrect	11. Adjust as per S.1.5.
	12. Spring in camtank broken or weak.	12. Replace. See S.1.6, and S.1.7.
	13. Claw stroke incorrect.	13. Replace cam 312-11131. See S.1.6, and S.1.7.
15. Unsteady picture.	1. See previous section dealing with noise in film gate.	

SYMPTOM	PROBABLE CAUSE	REMEDY
16. Excessive noise in gate in "REVERSE" position only.	1. Claw position incorrect. 2. Claw angle incorrect. 3. Worm gear mounted incorrectly allowing shaft "end play".	1. Adjust as per S.1.4. 2. Adjust as per S.1.1. 3. See S.1.3 for adjustment.
17. Insufficient framing.	1. Claw position incorrect.	1. Adjust as per S.1.4.
18. Excessive noise when still picture lever depressed.	1. Motor pulley misaligned. 2. Shutter pulley binding on Shaft.	1. Adjust as per S.1.2. 2. Remove camtank assembly and remove pulley. Clean and lubricate. See S.1.6, and S.1.7.
19. Film transport does not stop when still picture lever depressed.	1. Shutter pulley seized. 2. Still picture lever shoulder screws 312-11271 loose.	1. Remove camtank. Clean and lubricate as per S.1.6, and S.1.7. 2. Remove camtank assembly and tighten screws. See S.1.6, and S.1.7.
20. Film burns when still picture lever depressed.	1. Still picture lever not fully depressed. 2. Heat filter misaligned. 3. Heat filter broken.	1. Depress **FULLY**. 2. Bend heat filter holder to cover aperture. 3. Replace.
21. Arm locks not entering arms.	1. Pins dirty. 2. Pin not entering hole in arm due to burrs or misalignment.	1. Clean and oil. See S.2.3. 2. See S.2.1 to remove arms.
22. Uneven screen illumination.	1. Lamp not seated properly. 2. Foreign object in light path. 3. Lamp not centered horizontally. 4. Defective lamp.	1. Correct. 2. Remove. 3. Turn knurled nut. See S.1.8. 4. Replace.
23. Uneven focus.	1. Dirty film gate. 2. Film shoe binding. 3. Inner guide rail binding. 4. Lens holder misaligned. 5. Defective lens.	1. Clean. 2. Adjust. See S.9.5. 3. Clean and adjust. See S.9.4 4. Adjust. See S.9.6. 5. Replace.
24. Light reflections outside of picture area.	1. Film shoe misaligned. 2. Edge of film shoe aperture reflections.	1. Realign shoe as per S.9.4, and S.9.9. 2. Touch up with black paint.

II. SELF-THREADING TROUBLES

SYMPTOM	PROBABLE CAUSE	REMEDY
25. No.2 film guide(Automatic threading control lever) not locking properly.	1. Release bracket 312-17981 not entering hook of interlocking bracket correctly.	1. See S.9.7 for adjustment.
26. Leader or film dimpled in first few inches by sprocket teeth.	1. Insufficient clearance between No.1 sprocket shoe and lens holder.	1. See S.9.6 for adjustment.
	2. Improper synchronization between claw and No.2 sprocket.	2. See S.8 for adjustment.
	a) Plastic leader with non-standard sprocket holes.	a) Replace plastic leader with acetate base emulsion type.
	b) No.2 sprocket out of adjustment.	b) See S.8 for adjustment.
27. End of leader strikes top of guide rail.	1. Film not trimmed properly	1. Trim as required, or replace trimmer.
	2. No.1 film guide pin loose or bent.	2. Tighten, or straighten. Or, replace as per S.9.2.
28. End of leader goes under top end of inner guide rail.	1. Guide rail bent.	1. Straighten.
	2. Shoulder screw 312-31061 loose.	2. Tighten. See S.9.4.
29. End of film does not go through film gate.	1. Film not trimmed.	1. Trim.
	2. No.1 sprocket shoe too far from No.1 sprocket. (teeth slip out of perforations.)	2. Adjust as per S.9.1, or replace and check.
	3. Obstruction or burr in film gate.	3. Remove obstruction.
	4. Insufficient side travel clearance of inner guide rail ST-31111.	4. See S.9.4 for checks and remedy.
	5. Film shoe or pins binding	5. See S.9.5 for remedy.
	6. Inner guide rail binding.	6. Clean. See S.9.4, and adjust.
30. Excessive clatter during "Self-Threading".	1. No.1 sprocket - claw timing incorrect.	1. See S.9.3 for adjustment.
31. Film "runs" through film gate instead of being pulled down by claw.	1. No.1 sprocket - claw timing incorrect.	1. See S.9.3 for adjustment.

SYMPTOM	PROBABLE CAUSE	REMEDY
32. End of curled film goes over loop restorer sensing roller.	1. Sensing roller ST-18021 too low. 2. Badly curled film from small reel.	1. Readjust as per S.10. 2. Straighten first few inches by drawing across table edge.
33. No.2 film guide not lined up with No.3 film guide in "Self-Threading" position.	1. No.2 film guide broken. 2. No.2 film guide not mounted correctly. 3. No.3 film guide defective	1. Replace. See S.9.7. 2. See S.9.7. 3. Repair or replace.See S.9.8.
34. Film goes under No.3 film guide.	1. End of No.2 film guide too far from No.3 guide.	1. See S.9.7 for adjustment.
35. Film stops at sound drum.	1. No.4 film guide bracket 312-17991 and rubber guide roller ST-17151 in wrong position. 2. Rubber roller ST-17151 binding or seized. 3. Roughness in casting above sound drum.	1. See S.9.9 for adjustment. 2. Remove. Clean and lubricate. See S.9.9. 3. Polish with very fine emery cloth.
36. Film stops just before No.2 sprocket.	1. Roughness in casting surface.	1. Clean and polish with very fine emery cloth. See S.9.10.
37. Film guides not releasing when release roller ST-17231 is pulled back.	1. Release bracket 312-17981 out of adjustment. 2. Return spring ST-17111 too weak.	1. See S.9.7 for adjustment. 2. See S.11 for remedy.

III. SOUND TROUBLES

38. No sound.	1. Amplifier not switched on 2. Amplifier switch defective. 3. Exciter lamp defective. 4. Fuse blown. 5. Speaker not plugged in. 6. Cable connections in amplifier loose. 7. Speaker defective. 8. Solar cell defective. 9. Foreign object in optical scanning beam. 10. Magnetic head defective.	1. Switch on. 2. Repair or replace. 3. Replace. 4. Replace. If it blows again check speaker load, must be 8 ohms or more on external speakers. Check output transistors. 5. Plug it in. 6. Plug in or tighten. 7. Replace. 8. Replace. 9. Remove. 10. Replace.

SYMPTOM	PROBABLE CAUSE	REMEDY
39. Low volume.	1. Defective exciter lamp.	1. Replace.
	2. Dirty optical sound lens, or foreign objects in light beam.	2. Clean.
	3. Low voltage to exciter lamp.	3. Repair amplifier.
	4. Optical sound lens misaligned.	4. Adjust as per S.1.3.
	5. Amplifier defective.	5. Repair or replace.
	6. Magnetic head dirty. (RST/RT/RM-2,-3 type)	6. Clean.
	7. Magnetic head defective.	7. Replace.
40. Loud hum.	1. Exciter lamp cover off, or not installed correctly. Light from projection lamp reached solar cell.	1. Install the cover on pins correctly.
	2. Input cable shields loose	2. Repair.
	3. Amplifier defective.	3. Repair or replace.
	4. No motor shield plate on magnetic model.	4. Install.
41. Distorted sound.	1. Defective exciter lamp.	1. Replace.
	2. Speaker defective.	2. Replace.
	3. Rubber roller seized or binding.	3. Clean, lubricate, and adjust. See S.9.9.
	4. Sound drum bearing defective.	4. Replace. See S.14.
	5. Reverse rubber roller touching set collar 312-41301.	5. Adjust as per S.15. Install if return spring ST-30061 loose.
	6. Flywheel off.	6. Install.
	7. Flywheel too loose.	7. Adjust. See S.14.
	8. Magnetic sound overrecorded.	8. Re-record.
	9. Defective amplifier.	9. Repair or replace.
	10. Optical sound lens misaligned.	10. Adjust as per S.13.
	11. Film touching loop restorer.	11. Adjust as per S.10.
	12. No.5 film guide rollers binding.	12. Clean and check as per S.9.11.
	13. Dirt on sound drum.	13. Clean.
42. Wow and flutter.	1. Rubber roller ST-17151 binding.	1. Clean and lubricate as per S.9.9.
	2. Sound drum bearings defective.	2. Replace. See S.14.
	3. No.5 film guide rollers binding or spring defective	3. See S.9.11 for adjustment

SYMPTOM	PROBABLE CAUSE	REMEDY
43. Sound not stabilized soon enough after starting.	1. Insufficient spring tension on flywheel. 2. Weak spring on rubber guide roller.	1. Bend spring ST-41061 to increase tension. See S.14. 2. Replace spring.

EIKI RST/RT/RM SERIES SERVICE INSTRUCTIONS

CONTENTS

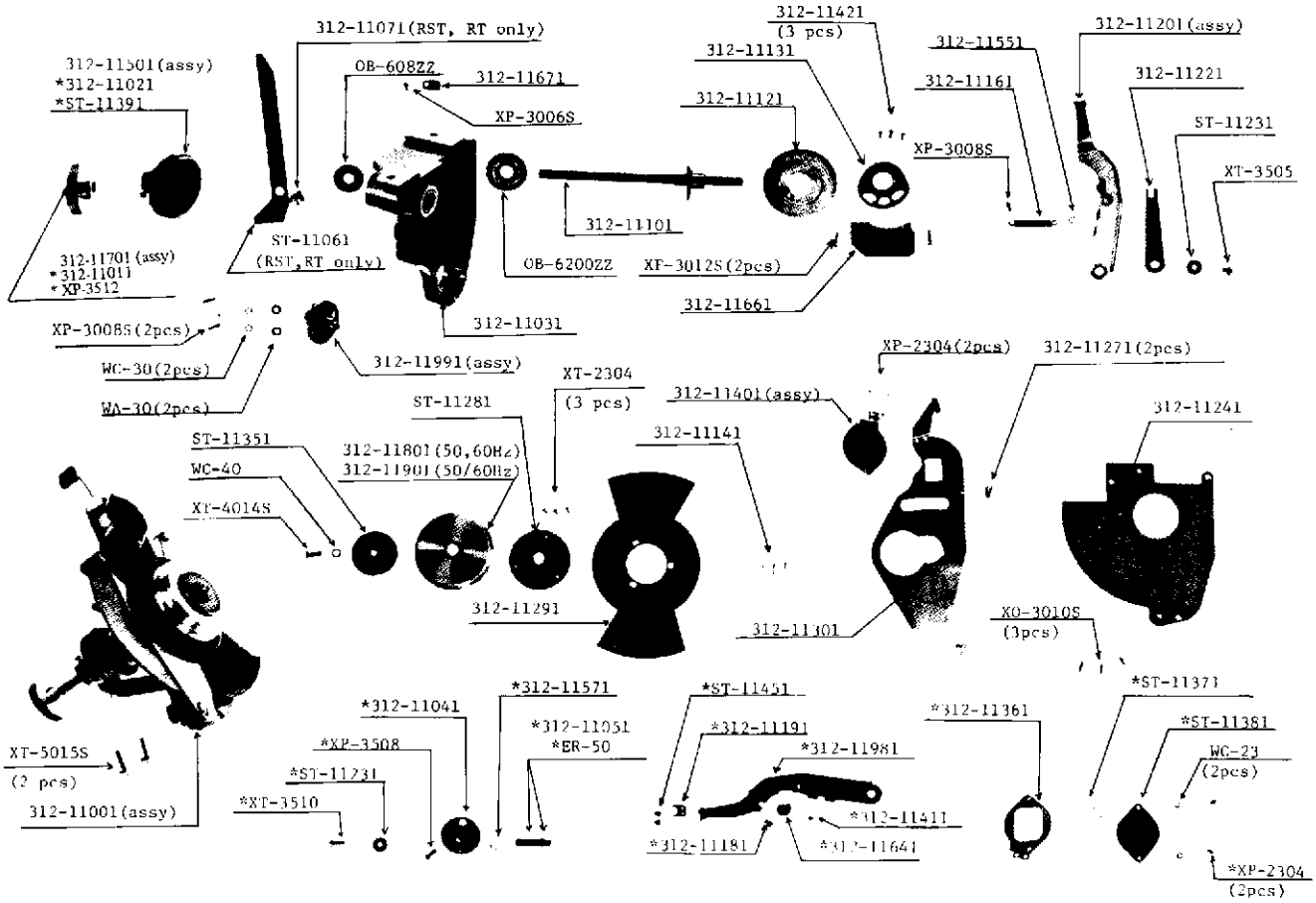
GENERAL NOTES ON SERVICING EIKI RST/RT/RM PROJECTORS

A. ISO screws, standard throughout the world, are used in all.
ISO stands for "International Standard Organization".

B. Most repairs and adjustments can be made on EIKI Projectors using two sizes of Phillips screwdrivers, and a blade screwdriver, and standard 16mm film as a thickness gauge. (Most 16mm film is about 0.1mm - 0.005" thick) To avoid damage to screw heads, it is important to remember the adage, "Use 70 % push, 30 % turn." Also, it is important to select right screwdrivers. Say, use smaller size Phillips screwdriver for the screws XT-23.., and XT-30.., larger size Phillips screwdriver for the screw XT-35.. and up, and other types of screws.

C. Lubrication is normally not required for average operation. It is recommended that once a year or every 500 hours, whichever occurs first, the moving parts be inspected for signs of excessive wear, cleaned and lubricated.
Use methyl hydrate, alcohol or tri-chlor-ethylene as cleaning agents. We do not recommend carbon tetrachloride due to the dangers involved. Polyurethane belts must be clean and dry. Remove oil and dirt accumulation with cloth moistened with cleaning agent.
Ball bearings should be clean and roll smoothly. If bearings are noisy or do not roll freely, they should be replaced. Shafts without ball bearings should be clean and lubricated with silicone fluid or a light smear of silicone compound.
Remove excess.
Rollers must rotate freely. Shafts and inside surface of rollers must be clean, free from burrs, scratches or other defects. Lubricate sparingly with a light silicone oil or other fine oil.
Remove excess.
For camtank, use approx. 1/2 teaspoonful grease to felt on cam.
Shutter pulley cone clutch surface and surface of shutter blade hub should be clean and dry. Surface of pulley and cast iron plate washer should be clean and dry.
Use light silicone oil or fluid to lubricate bronze bushing in shutter pulley.
Fiber gears must not allowed to run dry. Use light silicone oil or other light fine oil and cover all teeth with oil. Wipe off excess. This treatment will generally last many thousands of hours.

S.1. CAMTANK ASSEMBLY (Shutter, Claw, and Clutch) 312-11001



S.1.1 CLAW 312-11191

Function :
2 tooth claw is made of extremely hard material, precision ground for maximum efficiency.
Face of claw teeth are ground at a slight angle. Claw then looses contact immediately as it begins to retract. Film then rests undisturbed till next pulldown.

Check :
Claw screws must be tight. Do not over tighten ! Claw lever is made of alminum.

Adjustment :
Holes in claw are slightly oversize. Angle of claw teeth may be adjusted slightly by loosening screws and tilting claw. Claw angle may be further adjusted if necessary by bending claw lever in flat area. Use a pair of long nosed pliers with a right angle bend.

S.1.2 STILL PICTURE LEVER 312-11301

Function :
When FULLY depressed heat filter assembly is placed between lamp and aperture. This action also moves shutter, compressing clutch spring 312-11141. This releases shutter pulley, allowing it rotate freely on shaft. Special shoulder screws 312-11271 are used to mount still picture lever.

Check :
Motor pulley and shutter pulley must be properly aligned.
Depress still picture lever.
Turn rotary switch to "FORWARD" position. Shutter pulley should ride between shutter blade hub and plate washer, on end of shaft, without undue friction toward either side.

Adjustment :
Relocate motor pulley as necessary.

S.1.3 WORM GEAR ASSEMBLY 312-11501

Check :
Worm gear must be mounted and secured to eliminate any "end play" of shutter shaft.
Camtank assembly must be mounted so that there is a small amount of "play" between worm gear and fiber gear.
Rotate fiber gear to check.

Adjustment :
Reposition as necessary and tighten screws securely.

S.1.4 CLAW POSITION

Check :
Claw must enter film perforation, refer to section S.9.4 dealing with gate adjustments.
Claw must not touch sides of perforations at any time during its entry, pull-down or exit.
Claw should leave film so that frame is centered over aperture with framing lever in midway position.

Adjustment :
Slightly loosen two screws that hold fulcrum collar 312-11041. Holes in collar are oversize.
Move fulcrum collar horizontally and/or vertically to correct position.

Check :
Check for correct framing with film in projector and operating.

S.1.5 CLAW PROTRUSION

Check :
Claw protrusion should be 0.1 $\pm$ 0.012mm (0.040 $\pm$ 0.005").
Use gauge to determine.

Adjustment :
Loosen a lock screw on fulcrum control of camtank. Loosen screw XT-3510, and claw comes out.
Tighten screws, and claw comes in.
Tighten lock screw in right position.

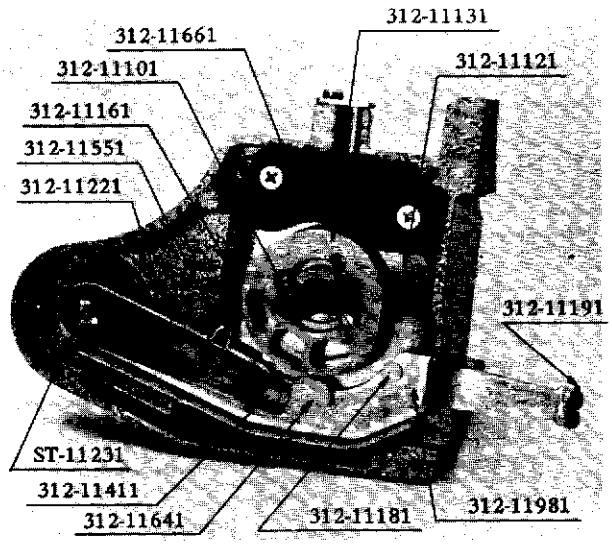
Note :
Claw protrusion may be affected by camtank position when reinstalling.
Check and reposition camtank if necessary.

S.1.6 CAMTANK ASSEMBLY REMOVAL

a) Remove transformer.
b) Remove reverse belt.
c) Remove main drive belt from No.1 sprocket drive gear.
d) Remove motor belt.
e) Remove lamp mounting assembly.
f) Turn inching knob to fully retract claw.
g) Depress still picture lever halfway.
h) Remove two mounting screws XT-5015S.
i) Remove assembly, being careful not damage claw.

Note :
When installing, be sure to :
a) Align motor and shutter pulley.
b) Provide a small amount of "play" between worm gear and fiber gear.
c) Check position of No.1 guide. See S.9.1.
d) Check timing of No.1 sprocket and claw. See S.9.3.
e) Check timing of No.2 sprocket and claw.

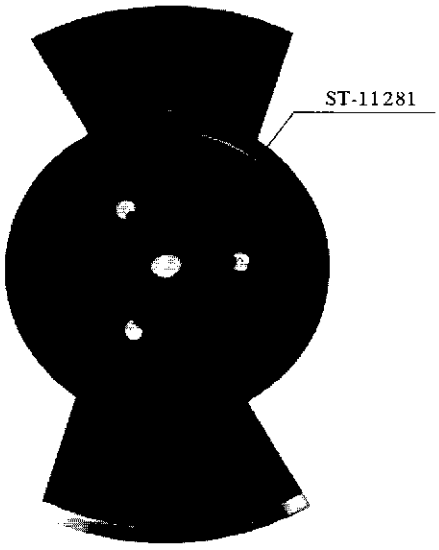
S.1.7 CAMTANK DISASSEMBLY



a) Depress still picture lever halfway.
b) Remove screw in end of shaft.
c) Remove plate washer ST-11351 and pulley.
d) Raise still picture lever and remove shutter blade and hub.
e) Depress still picture lever part way to expose three heads of cover plate mounting screws and remove screws.

f) Remove cover.
g) Hole in curved spring fits over fulcrum pin. When reassembling, be sure that spring is not jammed between end of fulcrum pin and washer ST-11231.
h) Cam shaft 312-11101 should have no end play.
Worm gear must be installed without clearance.
i) Ball bearings must be free from any play.
Replace if necessary.
j) Two-bladed shutter is mounted to hub ST-11281 so that raised semicircle of hub is facing one blade. (Three-bladed shutter is automatically correct.)
Shutter blade is depressed in center to offset blades.
Hub is inserted into hole of blade from protruded side.
k) Shutter blade has elongated mounting holes. Travel ghost is at minimum normally if blade is mounted with holes centered. If necessary, move blades slightly to overcome travel ghost.
l) Lubricate cam area with grease. Use approx. 1-1 1/2 tea-spoonful.
m) Shutter pulley must be clean and dry on both sides.
n) Shutter shaft must be clean.
o) Lubricate bronze bushing of shutter pulley and shutter shaft with a small amount of silicone oil.

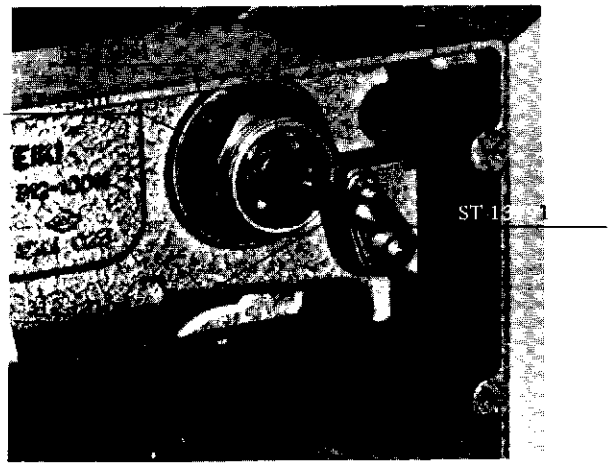
AVOID OVERLUBRICATION



S.2 REEL ARMS

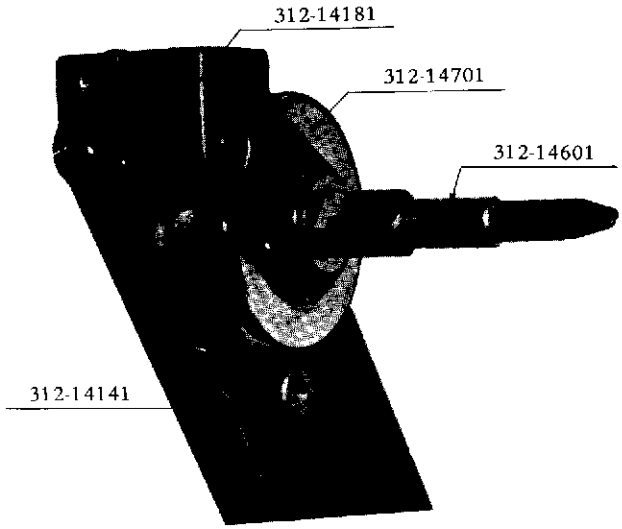
S.2.1 MOUNTING

Arm is mounted on chassis and held in place with a special locking nut.
The small screw through the split side of the locking nut must be released before attempting to turn the nut.
When mounting the arm, tighten the locking nut to provide the proper tension on the arm and then secure the locking nut by tightening the locking screw.



S.2.2 TAKE-UP SPINDLE ASSEMBLY 312-14201

Function :
The cork liner provides the necessary friction for film take-up. The design of the clutch allows for automatic compensation and balance of required torque for empty reel and full reel.
The required torque can be obtained by adjusting screw on top of arm.



Check :
PROPER CLEARANCE between cork liner and steel pulley 312-14131 is important. With film removed, a slight amount of "play" should be observed when spindle is moved up and down. Reel and release roller may also be misaligned causing undue film wear. Proper friction is checked by using a 600m(2000') reel. (A smaller size reel with same hub diameter is satisfactory.)
Thread film and operate projector in "FORWARD" mode. Release roller ST-17231 should be no more than to the midway point of its allowable travel, providing of course that spring ST-17291 is not defective.
Too much friction at cork liner may cause take-up arm belt to buckle and jam when in "FORWARD" mode.
In "REWIND" the same problem may occur in supply arm.

Adjustment :
Replace defective spindle assembly. Lubricate between take-up pulley 312-14131 and pin 312-14251 with silicone oil. If rewind is too weak, loosen knurled nut 312-13311 and tighten screw on top of arm. If too strong, loosen screw, after adjusting, tighten knurled nut.

Note :
Do not overlubricate cork liner. Some lubricant will work over to arm belt. Insufficient friction will cause film to wind too loosely on reel.

S.2.3 ARM LOCKS

Function :
Arm locks snap into holes in arm when arms are moved into their operating position. Spring ST-13181 provides the necessary tension.

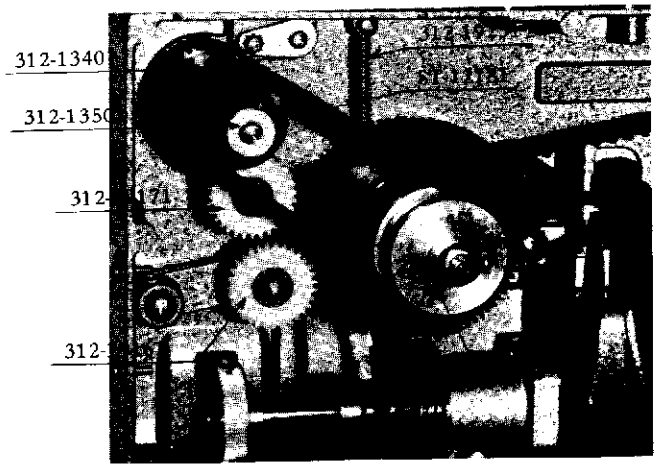
Check :
Pin should enter hole in arm freely every time arm is raised.
Dirty, gummed pins, broken or weak spring or burrs in hole or on pin will hinder smooth, positive action.

Adjustment :
Clean, remove burrs and lubricate with silicone oil.

S.3 SUPPLY ARM REVERSE PULLEY 312-13291

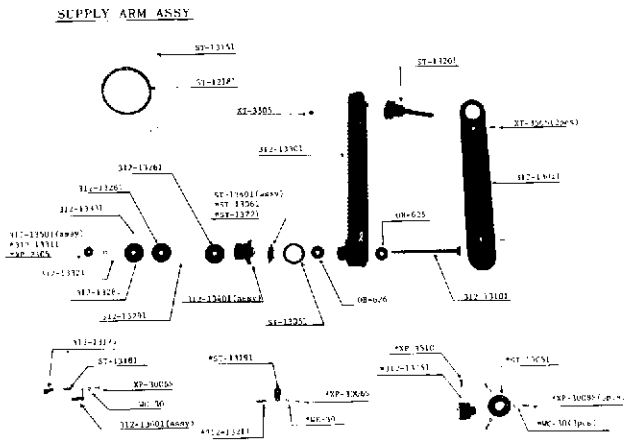
Function :
This pulley drives supply spindle when projector is in "REVERSE" model.
This pulley is seated between two corks and tension of pulley and cork is adjusted by knurled nut 312-13501. Reverse belt is used between this pulley and clutch cover pulley 312-15501 located on No.1 sprocket shaft.

Check :
Mount nut ST-13401 between spring washer ST-13501 and drive gear 312-13401. No clearance is required between drive gear 312-13401 and ball bearing OB-626.



S.4 SUPPLY ARM SPINDLE AND PULLEY ASSEMBLY ST-13201

Lubricate shaft and arm hub with silicone grease.
Belt must be clean and dry.
Pulley grooves must be clean and dry.
Slippage here will result in poor rewind.

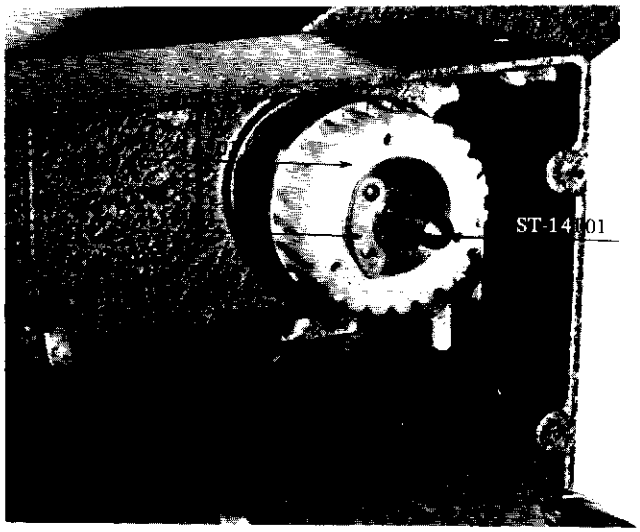


S.5 TAKE-UP DRIVE GEAR AND CLUTCH

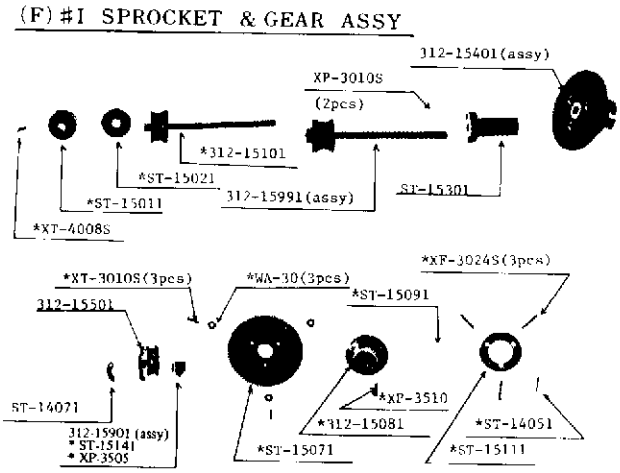
Function :
Drive gear 312-14501 has a protruding pin which holds clutch cam ST-14071. When projector is operated in "FORWARD" mode, clutch cam engages one of five(5) pins located in outer clutch collar ST-14401. This collar is secured to drive pulley shaft with a set screw.

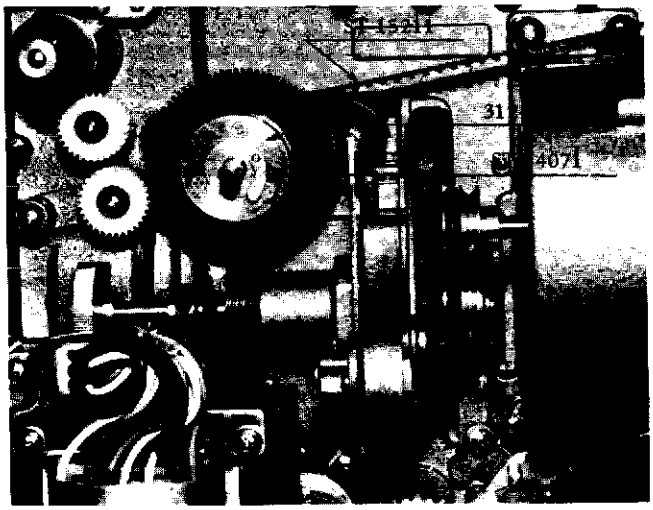
Check :
When projector is operated in "REVERSE" without film, outer clutch collar and pulley shaft should not turn. Main drive belt should not touch outer clutch collar.

Adjustment :
Drive gear 312-14501 should have a small amount of "end play", 0.1mm(0.005") or one(1) film thickness. Locate and secure outer clutch collar accordingly. To disassemble, remove two screws in arm cover plate.
Drive pulley and shaft may now be pushed out to allow removal of outer clutch collar.
Lubricate shaft and hub with silicone grease.
Clutch cam ST-14071 must be clean and dry. Oil or grease on cam may prevent it from engaging pins of outer clutch collar. To mount clutch cam, rotate drive gear 312-14501 so that pin is at "10:30 o'clock".
Hang clutch cam on pin. Carefully slide outer clutch collar on shaft and tighten set screw.
Replace main drive belt if necessary.



S.6 NO.1 SPROCKET AND GEAR ASSEMBLY

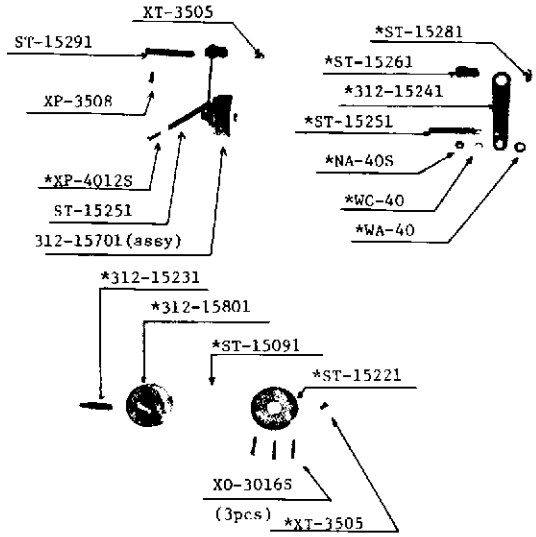




To mount clutch cam, rotate drive gear so that pin is in "1:30 o'clock" position. Hang cam on pin. Carefully install clutch collar. Install set collar ST-15141 allowing a small amount of clearance, one(1) film thickness, so that clutch collar does not bind. Clutch cam must be clean and dry.

Note :
If sprocket plate or gear assembly has been removed, check sprocket - claw timing, S.9.3, after installation.
Lubricate shaft, hub and clutch cover pulley 312-15501 with silicone grease. Lubricate fiber gear with silicone or other fine oil, completely wetting all teeth. Wipe off excess.

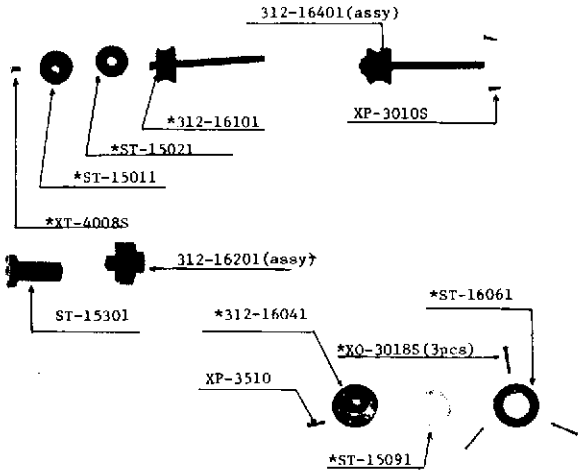
S.7 TENSION GEAR ASSEMBLY 312-15601



Function :
Maintains proper tension of main drive belt over gears.
Lubricate gear hub and shaft with silicone grease.

S.8 NO.2 SPROCKET AND GEAR ASSEMBLY

(G) #2 SPROCKET & GEAR ASSY



Function :
Toothed main drive belt assures proper synchronization between No.1 sprocket and No.2 sprocket.
Lubricate shaft and hub with silicone grease.
Assemble drive gear and sprocket shaft with minimum clearance.

Check :
Observe entry of sprocket teeth into first perforations of film leader.
Use acetate base film leader or film for this test.

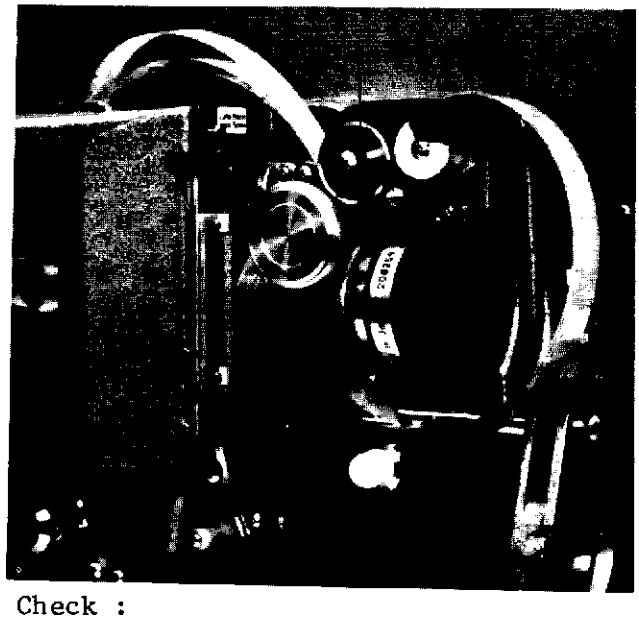
Adjustment :
Open lamp house door 312-32101. Loosen screw in end of sprocket shaft and rotate sprocket plate to correct position. Tighten screw and close lamp house door.

Note :
Above adjustment not critical. Film shrinkage will affect synchronization of film perforations and sprocket teeth at No.2 sprocket.
If main drive belt is removed or skips a tooth, or two, readjustment may be required. Above adjustment may also be made by repositioning main drive belt over No.1 sprocket drive gear until satisfactory synchronization is achieved. See also S.10.

S.9 SELF-THREADING PATH

S.9.1 NO.1 SPROCKET SHOE 312-15201

Function :
IN CLOSED POSITION it keeps film engaged with sprocket teeth.
IN OPEN POSITION film may be easily removed. To open, swing lens holder out, then depress film shoe. It will remain open. Shoe will close automatically when lens holder is swung back in to close gate.

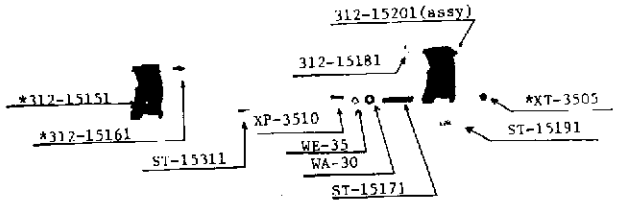


Check :
Proper clearance between shoe and sprocket is important. Take a piece of film and feed into sprocket using inching knob, advancing film approx. 5cm (2"). Add another piece of film over first one and turn inching knob.

Shoe should not move when end of second film is fed through. Take a third piece of film and feed through sprocket. Shoe should move when end of film passes between shoe and sprocket drum. A piece of test film is easy to make by cementing three pieces of film together. Add the second piece to first and third to second in "steps" of 5 - 6cm(2" - 3") long. A narrow strip of Scotch Tape may be used in center of film. Be sure tape does not touch sprocket drum thus adding to thickness of film for test purposes.

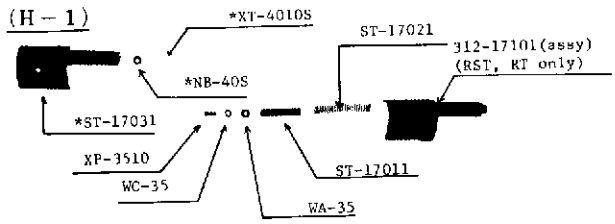
Adjustment :
A small protrusion located at center of inner side of shoe contacts hub casting when shoe is closed. If protrusion point is too long, shoe will remain too far away from sprocket drum. If necessary, remove shoe to file protrusion to provide proper clearance. Too little or no clearance will cause film damage.

Note :
Observe small "V" spring 312-15181 used to hold shoe in closed or open position. When replacing shoe, be sure to locate ends of spring in the appropriate holes.

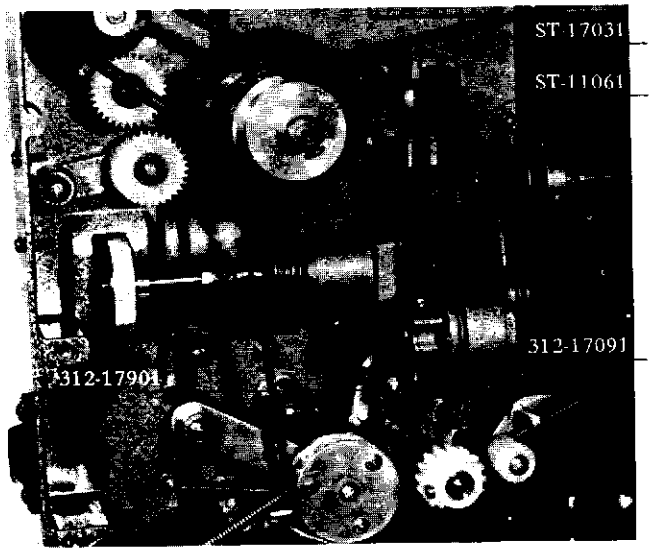


S.9.2 NO.1 FILM GUIDE ST-17031

Function :
In "SELF-THREAD" POSITION, guide is pushed out over gate and becomes an upper loop former while gliding the film into the gate.
In "OPERATE POSITION", guide recedes away from film path into projector body.



Check :
Film guide travels approx. 20mm(3/4") from "OPERATE" position to "SELF-THREAD" position.
In "Operate" position, end of guide should protrude 6mm(1/4") from projector frame casting. This provides 3mm (1/8") clearance between end of film guide and inner edge of film.
The measurements are not critical.
The film guide must recede sufficiently to clear film in "Operate" position.
Film guide must travel freely. Curved hole in casting must provide the necessary clearance.
The mounting pin ST-17011 must be straight and mounted so that it is perpendicular to film gate.
Spring ST-17021 should move guide easily.

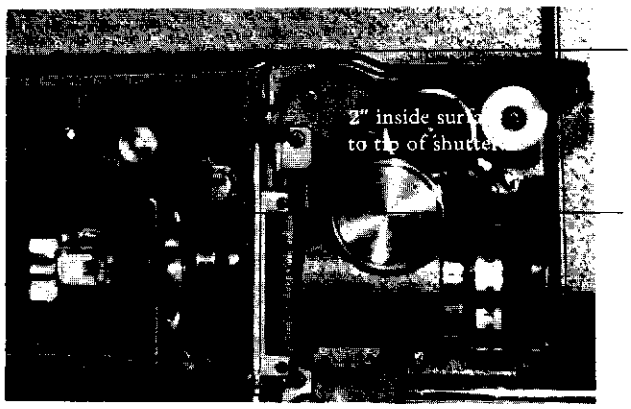


Adjustment :
Film guide position and movement is controlled by No.2 film guide 312-17801. Cam bracket 312-17901 is mounted on control lever shaft. The cam action moves controlbar ST-11061 which in turn moves No.1 film guide.
Position of No.1 film guide may be adjusted by one of two methods.
a) Bend control bar below mounting screw with a pair of long-nosed pliers so that cam contacts control bar sooner or later as required.
b) Loosen screw in end of No.1 film guide and make a clearance as required and tighten lock nut.

Note :
The position of the camtank assembly is slightly variable due to mounting hole clearance.
No.1 film guide position is affected by camtank assembly position.

S.9.3 NO.1 SPROCKET - CLAW TIMING

Function :
It is important that the film perforations are in the correct position for claw entry as the film reaches the claw.
Film damage, Self-Threading failure and excessive clatter during self-threading operation are the result of improper timing.



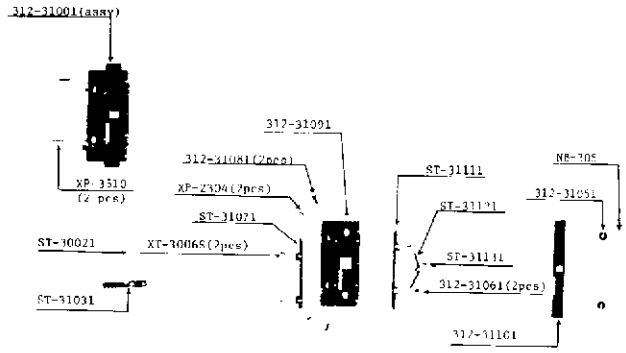
Check :
MOVE film guides to "SELF-THREAD", switch motor on and thread a piece of film.
Film must travel through gate so that claw pulls film. Misadjustment puts film in a position so that claw strikes film instead of perforation.
Film then "runs" through gate.

Adjustment :
Push No.2 film guide to "SELF-THREAD".
a) Install film and inch forward so that film is in gate.
b) Turn inching knob so that claw is engaging film ready to pull down.
c) Loosen screw in end of No.1 sprocket shaft.
d) Turn sprocket plate so that film contacts firmly complete inside of No.1 film guide.
e) Tighten screw. There should be no slack between No.1 sprocket and film shoe.

Note :
Check timing if :
a) Camtank has been removed.
b) No.1 sprocket or gears have been removed.

S.9.4 FILM GATE ASSEMBLY 312-31001

GATE ASSY



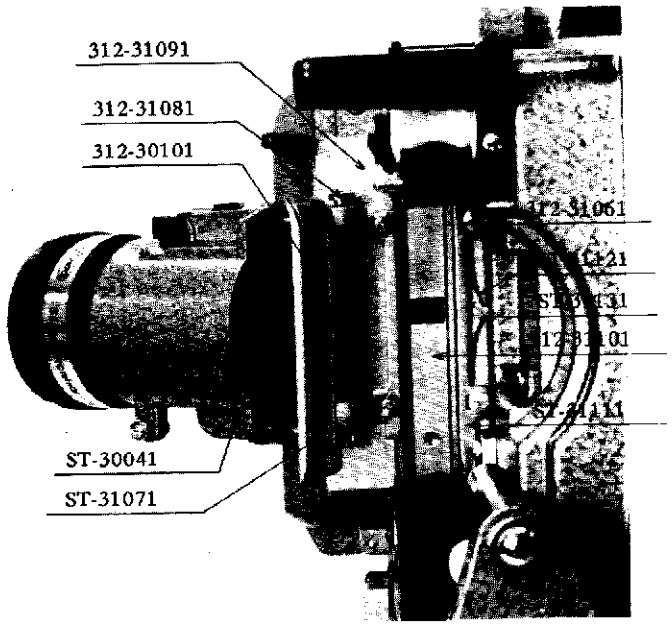
GUIDE RAILS :

Outer Guide Rail ST-31071
is secured to gate plate by two screws and located against shoulder of film gate 312-31101. This assures proper vertical travel of film, parallel to film gate.
Diagonal travel of film may cause picture or sound track portion of film to touch raised sections of film gate. Film damage will result.

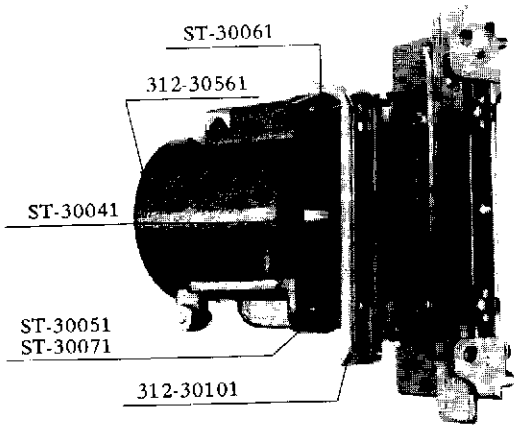
Inner Guide Rail ST-31111
is spring loaded, and held in place by two shoulder screws 312-31061. With screws secured, guide rail should

be free to travel with a minimum of clearance under screw head. Spring tension must be sufficient to hold film against outer guide rail during operation.

With film in gate, guide rail is moved away from its position against film gate 312-31101, thus establishing side tension on edge of film.
Check for additional clearance of inner guide rail to accommodate wider film or scotch tape wrapped around film.



S.9.5 FILM SHOE 312-30101



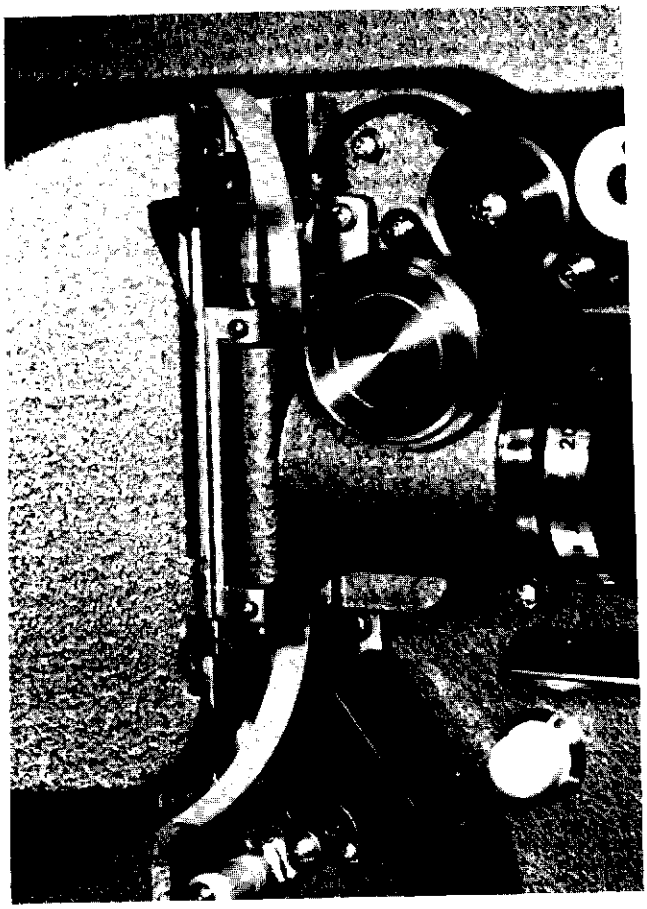
Film shoe is mounted on two pins and held in place by a shoe lock under lower pin. Retaining plate ST-30041 is secured to lens holder by two screws. Holes in lens are oversize, allowing for adjustment of film shoe position.

Check :
Outer guide rail must be snug against shoulder of film gate. Swing lens in to close gate.
Clearance between outer guide rail and outer edge of film shoe should be the thickness of one(1) film.

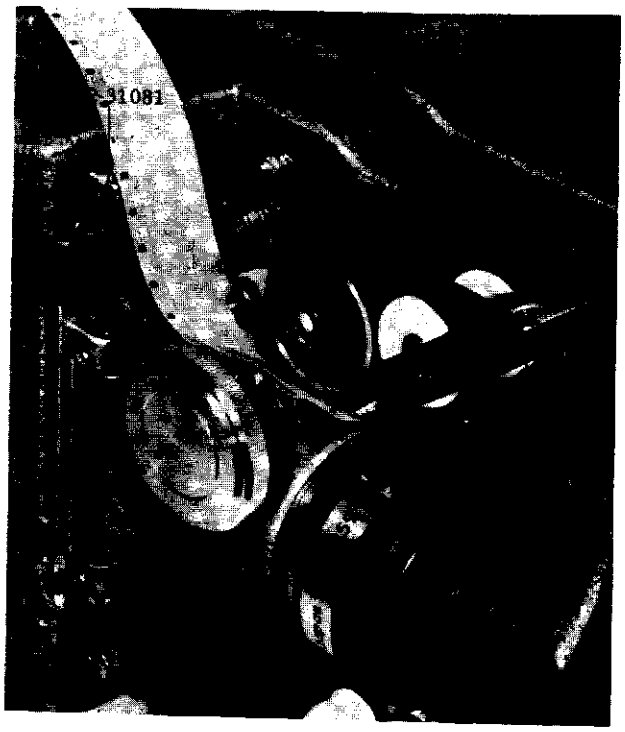
Adjustment :
Cut a 10cm(4") length of 16mm film 6mm(1/4") wide. Insert between film shoe and outer guide rail. Film shoe should be moderately snug. If adjustment is required, loosen two screws that hold retaining plate ST-30041. Reposition plate and tighten screws.

Check :
Be sure pins do not bind when fully depressed in lens holder. With gate closed and lens removed, check that hole in film shoe clears the film aperture on all sides.

Note :
Lower shoe pin spring ST-30071 is longer than upper spring ST-30061. Extra tension is designed to overcome film movement caused by claw action at lower end of film shoe.



S.9.6 LENS HOLDER ASSEMBLY 312-30201



Check :
Clearance between top of lens holder and bottom of No.1 sprocket should be no less than three film tickness. This provides the clearance necessary to depress sprocket shoe for film removal or insertion. This also helps prevent film damage, should the film jam up in gate area during self-threading. If lens holder fits tight against No.1 sprocket shoe and no clearance is provided, sprocket teeth may puncture film between perforations.

Adjustment :
Loosen two pivot locking screws and turn two pivot screws 312-31081 as required. Pivot screws must be snug against lens holder. Tighten two locking screws against pivot screws.

Check :
Optical axix of lens must be perpendicular to film plane. Set projector at exact right angles to screen. Without film, project light beam. A lm(3') wide area is a good size. Both side edges of illuminated area must be focused, equally sharp.

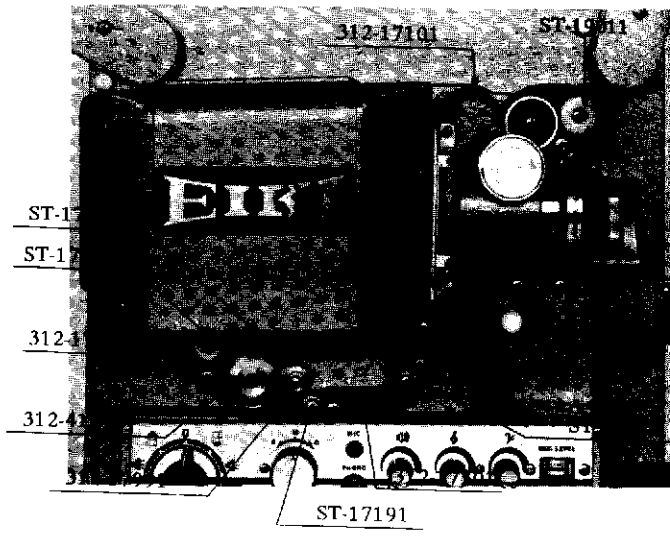
Adjustment :
Loosen lock nut and adjust screw located under front of lens holder to achieve optimum equal focus. Tighten lock nut.

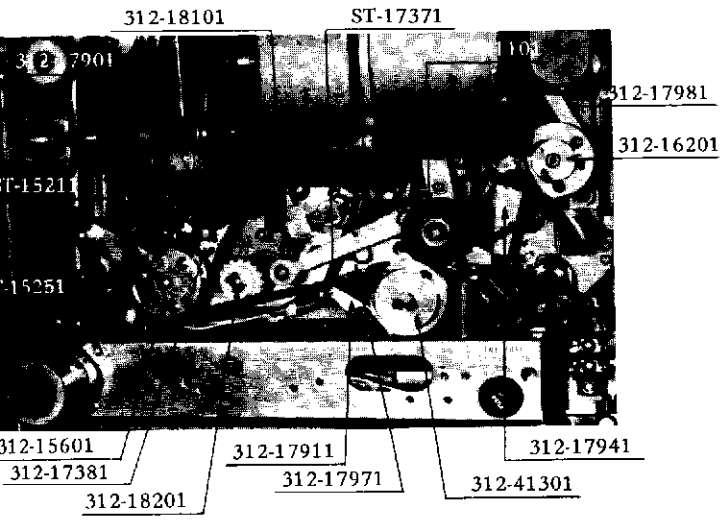
Note :
The Super f/1.3 high speed lens has a shallower depth of focus and requires a more accurate adjustment than other slower lenses.

S.9.7 NO.2 FILM GUIDE 312-17801

Function :
Moving this film guide to the left unt it locks as you face the projector, pr pares the film path for Self-Threading in the following manner :

a) No.1 Film guide is pushed into plac above the film gate.
b) No.2 and No.3 film guides are lined up.
c) Sound drum rubber roller ST-17151 is raised away from sound drum.
d) Main drive belt is depressed away from automatic loop restorer gear.
e) On magnetic models, magnetic sound head is raised clear of film path.
f) On reel-to-reel models, auto take-up guide is lifted.
g) System remains locked in position until released by taking-up film (RST), or pulling film on release roller(RT). No.2 film guide is held in cam bracket 312-17901 by screw 312-17381. A flat spot on shaft provides the seat for the screw.
Cam bracket and interlocking bracket 312-17901 are connected by shoulder screw 312-17081.
At other end of guide bar is a hook or "catch" that accepts the low end of release bracket assembly 312-1798
Release roller ST-17231 is attached to upper end of this bracket assembly.





Check :
When No.2 film guide is pushed to "Self-Thread" position, release bracket 312-17981 should just fall into hook with minimum clearance.
Too much clearance at this point will allow No.2 film guide to "back up" and leave too large a gap where No.2 and No.3 film guide meet. The film then could go under No.3 guide.

Adjustment :
Use a pair of long-nosed pliers to bend as required, the pin on release bracket 312-17981 that falls into hook. Lubricate hook area with small amount of grease.

S.9.8 NO.3 FILM GUIDE 312-17121

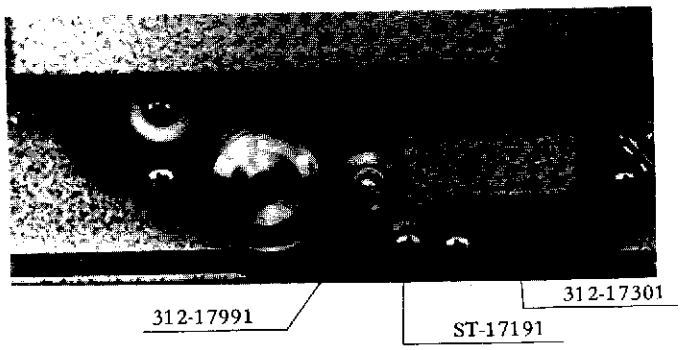
Function :
Film guide is raised into position by contact of low end of No.2 film guide to No.3 guide.

Check :
No.3 guide should drop down as soon as "Self-Thread" system is released.

Adjustment :
Clean. Remove cause of binding and lubricate sparingly with silicone oil.

S.9.9 NO.4 FILM GUIDE 312-17991 & RUBBER GUIDE ROLLER ST-17151

Function :
This guide deflects leading end of film up and over sound drum. In "Self-Thread" position, interlocking bracket 312-17091 depresses pin 312-17361, raising rubber guide roller assembly 312-17401.



Check :
In "Operate" position, rubber guide roller should rest firmly against sound drum.
Spring ST-17371 provides the necessary tension.
Clearance between lower edge of interlocking bracket and pin 312-17361 should be approx. 2mm(1/32").
Too small clearance will cause shoulders of rubber guide roller to be pressed against casting when in "Self-Thread" position.
If rubber guide roller does not turn freely, excessive friction may cause film to bind when threading.

Adjustment :
Push No.2 film guide to "Self-Thread" position.

a) Insert two layers of 16mm film between shoulders of rubber guide roller and lamp house casting.
b) Locate pin 312-17361 so that it touches bottom edge of interlocking bracket.
c) While pressing rubber guide roller toward casting (with film between roller shoulders and casting) tighten screw that holds pin bracket to rubber guide roller shaft.

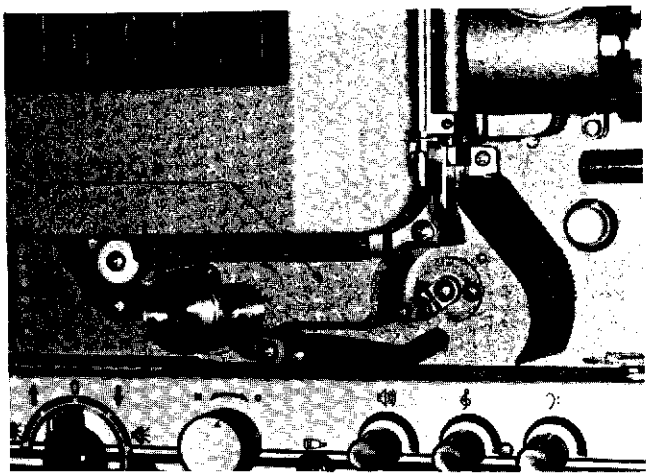
Note :
Clean and lubricate rollers as necessary with silicone oil.

S.9.10 LAMP HOUSE FRAME CASTING 312-32111

Function :
Casting forms part of "Self-Threading guide system."

Check :
Areas where leading end of film touches casting must be very smooth and

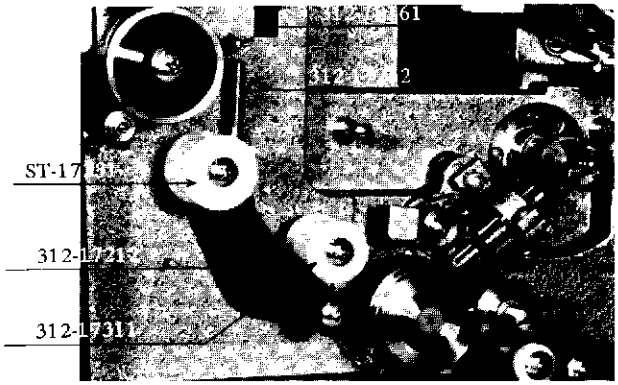
free from any burrs or imperfections that could cause jamming.



Adjustment :
Remove imperfections as required and polish with fine sandpaper or emery cloth.

S.9.11 NO.5 FILM GUIDE (TENSION GUIDE) 312-17212

Function :
This guide has roller ST-17231 attached to the upper end. Close to upper end also is spring 312-17252. In proper operation, the spring tension balances the combined resistence of rubber guide roller, sound drum and flywheel and tension roller.
The No.5 guide then rides midway between its limits. Wow and flutter are minimized.



Check :
Thread film and operate in normal manner. After a few seconds of operation, sound drum and flywheel will come up to speed. No.5 film guide should now ride between lower limit pin and lamp house casting.

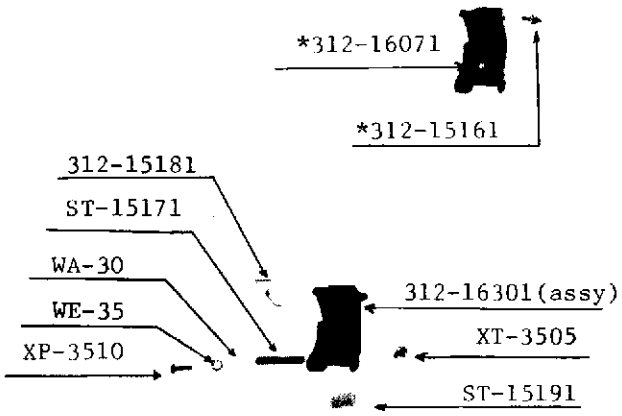
Movement of tension roller should not be rhythmic, in such a case a roller or sound drum would be binding or out-of-round. An out-of-round No.2 sprocket drum assembly could also cause the rhythmic motion.

Adjustment :
Clean and lubricate sparingly all rollers with silicone oil.

a) Remove burrs or imperfections or replace defective parts.
b) Clean or replace sound drum ball bearing OB-608Z.
c) Replace defective No.2 sprocket drum assembly.
d) Replace spring 312-17252 if necessary.

S.9.12 NO.2 SPROCKET SHOE 312-16301

Function :
In closed position, it keeps film engaged with sprocket teeth.
On SELF-THREAD MODELS (RST/RT) shoe is always closed.
On MANUAL MODEL (RM) shoe will stay open for easier threading.



Check :
Proper clearance between shoe and sprocket is important. Take a piece of film and feed into No.2 sprocket using inching knob, advancing film approx. 5cm(2"). Add another piece of film over first one and turn inching knob. Shoe should not move when end of second film is fed through. Take a third piece of film and feed through sprocket. Shoe should move when end of film passes between shoe and sprocket drum. A piece of test film is easy to make by cementing three pieces of film together. Add the second piece to first and third to second in "Steps" of 5cm - 6cm(2 - 3") long.

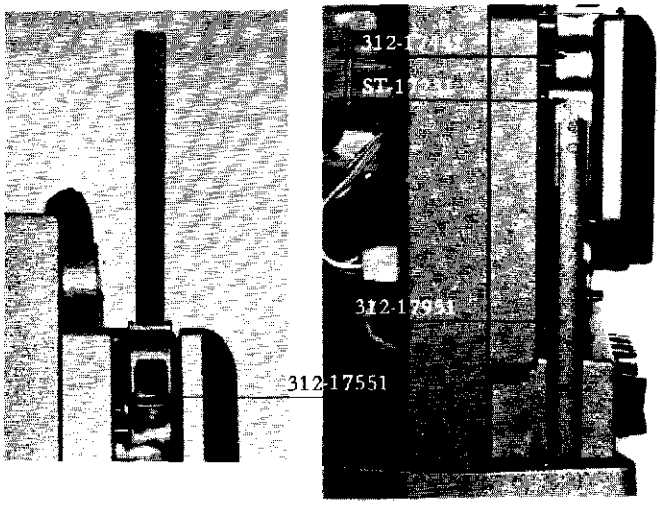
A narrow strip of scotch tape may be used in center of film. Be sure tape does not touch sprocket drum thus adding to thickness of film for test purposes. See S.9.1.

Adjustment :
A small protrusion located at center of inner side of shoe contacts hub casting when shoe is closed. If protrusion point is too long, shoe will remain too far away from sprocket drum. If necessary, remove shoe to file protrusion point to provide proper clearance. Too little or no clearance will cause film damage.
This protrusion point of No.2 sprocket shoe is a little higher than that of No.1 sprocket shoe.

Note :
Observe small "V" spring 312-15181 used to hold shoe in closed or open position. When replacing shoe, be sure to locate ends of spring in the appropriate holes.

S.9.13 AUTO TAKE-UP GUIDE (FOR RST) 312-17951

Function :
This guide leads film to take-up reel after it comes off the release roller.



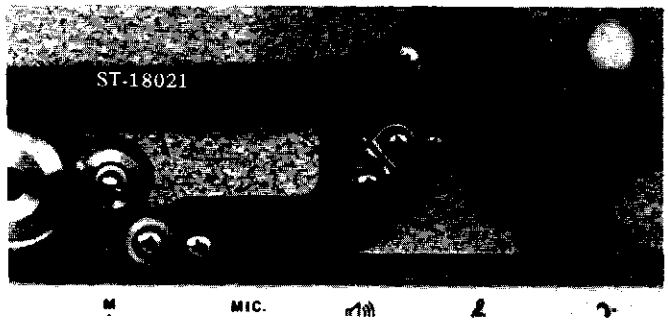
Check :
Without reel on take-up arm, when setting Automatic Threading Control Lever the top of guide should be pointed to the center of take-up arm spindle.

Adjustment :
Loosen set screw on end of guide, reposition and tighten screw.

S.10 LOOP RESTORER ASSEMBLY

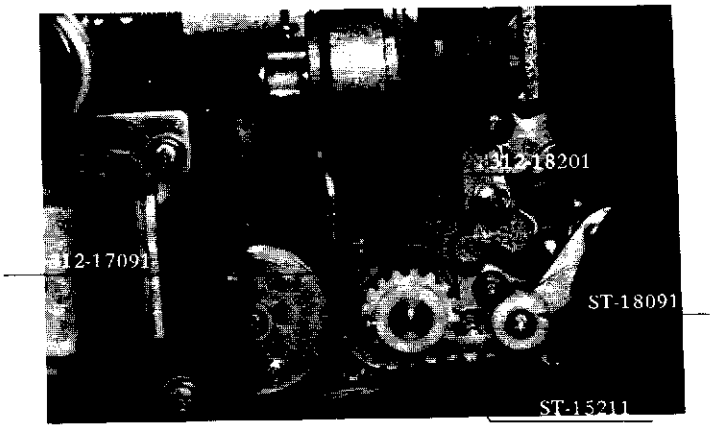
Function :
This device maintains correct lower loop size. If sensing roller ST-18021 is pulled up by film, nylon gear 312-18201 engages toothed main drive belt and rotates one full turn.
Tension of spring ST-18061 keeps loop restorer stationary during normal projector operation.

Check :
Turn projector on "FORWARD" mode without film. Touch bottom of sensing roller to cause loop restorer assembly to work. Loop restorer sensing roller should make one complete revolution only. The roller should come to rest at "7:00 o'clock".

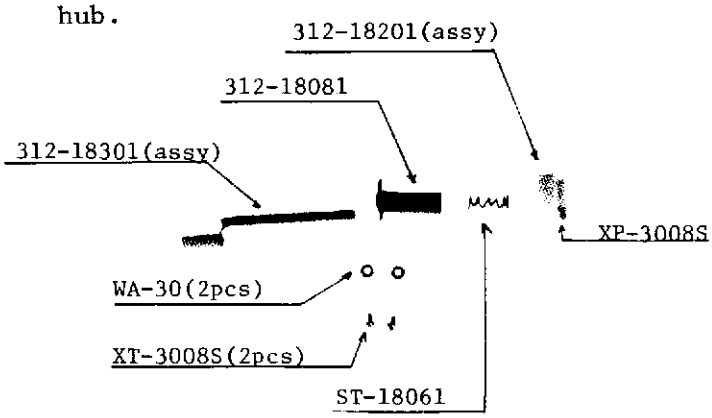


Adjustment :
Insufficient spring tension could cause loop restorer to rotate more than once. Increase tension by repositioning gear 312-18201 closer to hub.
Additional rotation could also be caused by belt engaging a tooth on nylon gear that has not been trimmed properly. Use a sharp knife to remove the offending part if necessary.
To relocate sensing roller, loosen screw in end of shaft beside sensing roller. Hold nylon gear with other hand while loosening or tightening this screw. Tighten screw SECURELY when adjustment is completed.

Check :
Thread film completely and with projector in "Operate" condition, turn inching knob. Film should not touch sensing roller. Double check with projector running.

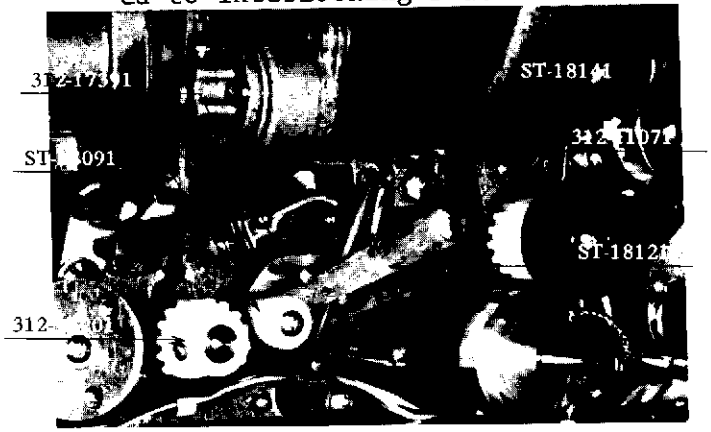


Adjustment :
(RST/RT MODELS) Open lamp house door 312-32101. Loosen screw in end of No.2 sprocket shaft and rotate sprocket plate counterclockwise as required. Tighten screw. See also S.8.
Clearance between main drive belt and loop restorer gear is adjusted loosening two screws on hub and relocating hub.



S.11 SAFETY ARM ASSEMBLY 312-18101

Function :
When projector is placed in "Self-Threading" position, belt is depressed to make loop restorer inoperative, thus preventing possible damage to No.2 film guide. Arm ST-18121 is pushed down by pin 312-17391 which is attached to interlocking bracket 312-17091.



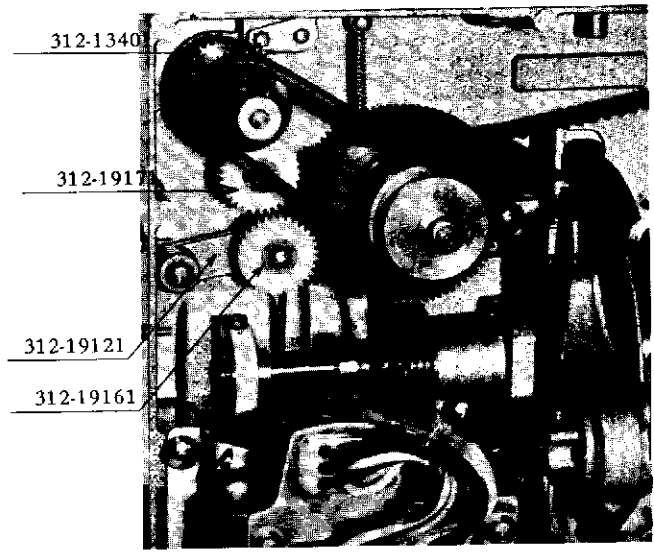
Check :
Excessive friction at point where pin 312-17391 touches arm ST-18121 may not allow release of "Self-Threading" guide system.

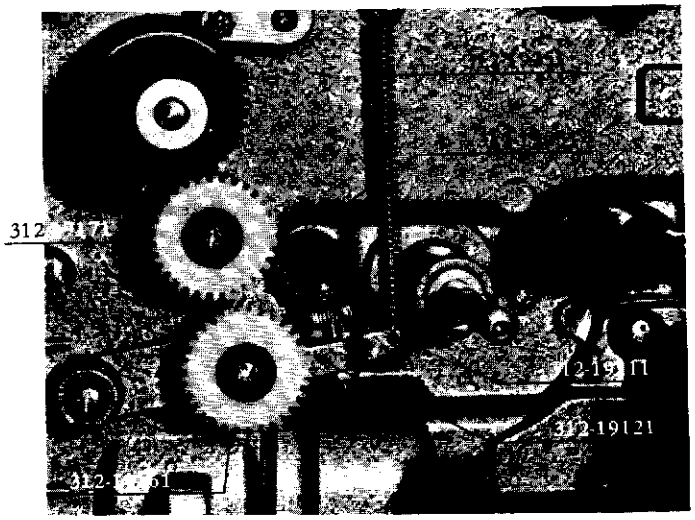
Adjustment :
Return spring ST-17111 is attached to front end of interlocking bracket. This spring should be shortened or replaced with a stronger one.

Check :
Be sure shoulder screw 312-11071 is securely tightened. Too much clearance may allow safety arm ST-18121 to swing out and slip past.

S.12 REWIND CONTROL ASSEMBLY

Function :
Rewind is accomplished by pushing rewind lever 312-19231 down to "Rewind" position. The flat part at the end of the shaft 312-19031 allows rewind gear(lower nylon gear) 312-19161 to engage with another gear (upper nylon gear) 312-19171. The supply arm spindle is driven in reverse by gearing the supply arm drive shaft.
The rotary switch on control panel must be in "FORWARD" position.
The cap screw lock nut on the rewind gear bracket position. When engaged the gears should mesh completely with a slight amount of "play" to avoid undue wear caused by excessive pressure.





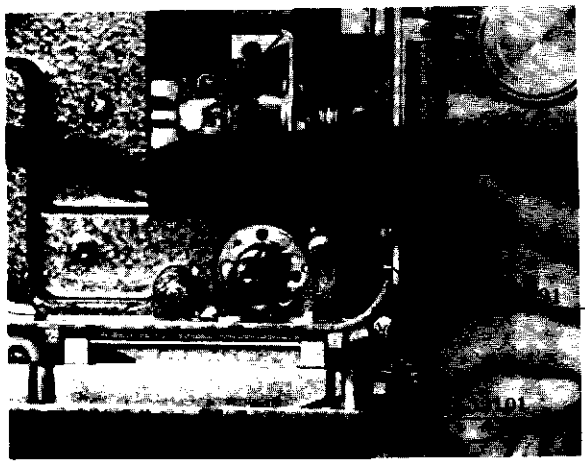
Adjustment :
To adjust, loosen screw in rewind lever and rotate shaft as necessary. Be sure that roller is free to turn, before securing screws in rewind lever.
Adjust cap screw 312-19111 to provide correct clearance.
Lubricate fiber gear teeth with silicone or other fine oil. Wipe off excess.

S.13 SOUND PICK-UP

Function :
The focus and azimuth of the optical sound lens ST-40201 are very critical and are adjusted simultaneously.
Note position of filament of exciter lamp. It must be in center line of optical sound lens. The scanning beam must be a sharp thin line focused on the film sound track. The scanning beam must also strike the center of the sound track. In this position, it will clear the edge of the sound drum and strike the solar cell.

Check :
A frequency test film should provide a good response up to 6000, or 7000 Hz. A normal sound test film should produce enough high frequency tones for a pleasant sound balance.

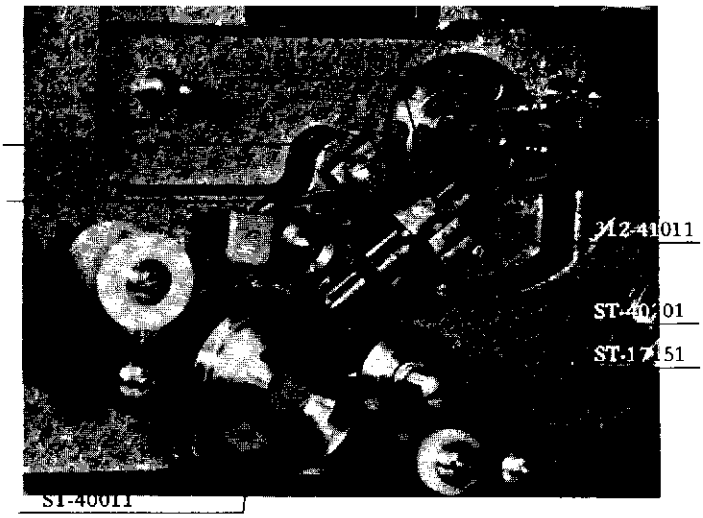
Adjustment :
To adjust optical sound lens for focus and azimuth, it is necessary to use a test film with a 7000 Hz. tone.
SMPTE PH 22.42 - 7000 is such a film. A 1m(3') length of this film should be spliced to form a loop. Installed in the projector it will provide the necessary signal for accurate adjustment.



It is best to remove lamp house frame casting 312-32111 for adjustments of optical sound lens.
Install an 8 ohm 10W resistor across speaker output. Connect a low reading AC voltmeter and an Oscilliscope across resistor, with projector operating, set meter and scope for convenient reading with volume control at approx. "9:00 o'clock"(1/4 rotation) and treble control at maximum.
Loosen screw in lens holder bracket ST-40011, thus allowing lens to be moved. Rotate lens for azimuth adjustment. Observe clean sine wave pattern on Oscilliscope. Set for maximum reading. Slide lens up or down for focus. Observe meter reading or Oscilliscope amplitude. Set for maximum reading. After obtaining maximum reading on both azimuth and focus with simultaneous adjustment, tighten screw to clamp lens. Observe meter or scope.
Out-put should not drop. Seal set screw with paint.

Check :
Scanning beam must fall on center of optical sound track of film. Excessive noise will be heard together with distorted sound if scanning beam position is incorrect. Use SMPTE "JIFFY" test film to check. It contains a section of Buzz Track Test Film.

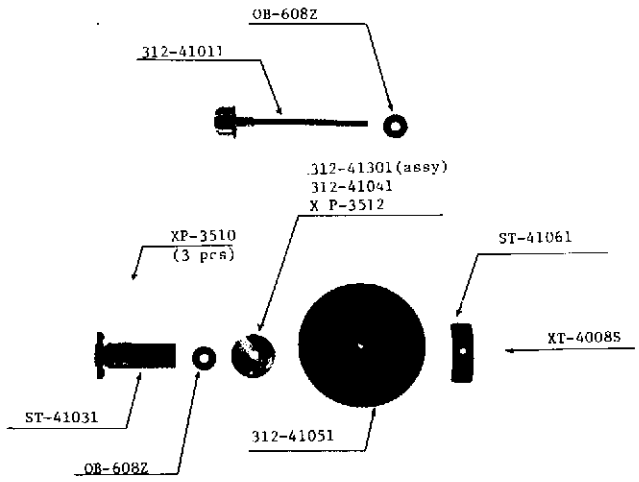
Adjustment :
To adjust, use SMPTE PH 22.57 Buzz Track Test Film. A 1m(3') length to form a loop is convenient.
(SMPTE "JIFFY Test Film may be used.)
Sound lens bracket is mounted on two pins which slide into holes of main casting.



Upper pin is held by a set screw through the casting. Loosen set screw to allow lens bracket assembly to slide.
With projector operating, speaker plugged in and volume at approximately "10:00 o'clock", slide assembly to a position where no sound is heard. Too far in one direction will produce a low tone ; too far in other direction will produce a high tone. After proper position is reached, tighten set screw and seal with paint or sealing wax.

S.14 SOUND DRUM AND FLYWHEEL ASSEMBLY

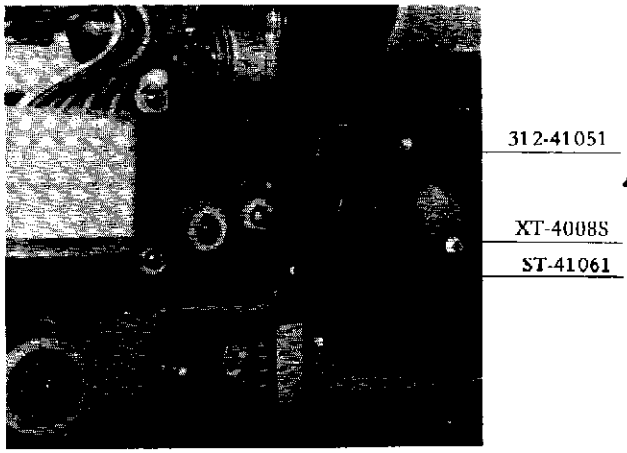
SOUND DRUM ASSY



Function :
The sound drum shaft is mounted in the shaft housing with ball bearings.
The set collar should be installed with minimum clearance. Shaft must not bind in rotation.

Flywheel is held on shaft with plate spring ST-41061 and screw. This arrangement allows the flywheel to slip on sound drum shaft at the moment the film is started in either "FORWARD" or "REVERSE" direction. This assures minimum film damage. Torque required to turn flywheel on shaft in forward direction should be approx. 100-110 cent.grams, or 1.5 in oz.

Check :
To check torque, use convenient scale and string which may be secured to outer circumference of flywheel with scotch tape. Install film in projector and turn switch to "FORWARD".
With projector operating, string attached to flywheel and scale, a reading of approx. 20-25 grams(1 ounce) should be observed.

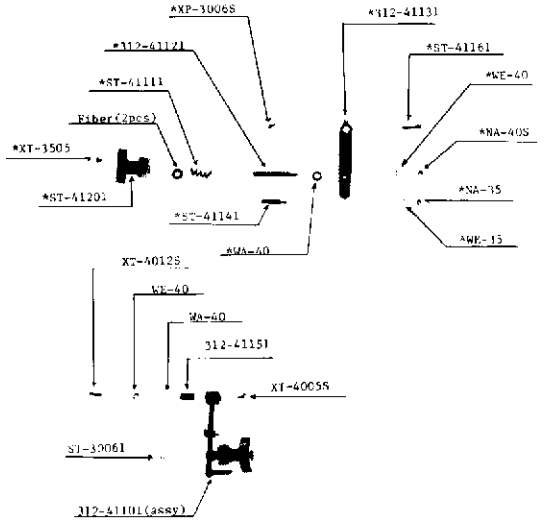


Adjustment :
To adjust, remove spring and bend to provide correct tension. Be sure the edge of spring does not dig into the surface of flywheel. Replace spring if necessary. Insufficient tension results in longer delay of sound stabilization.

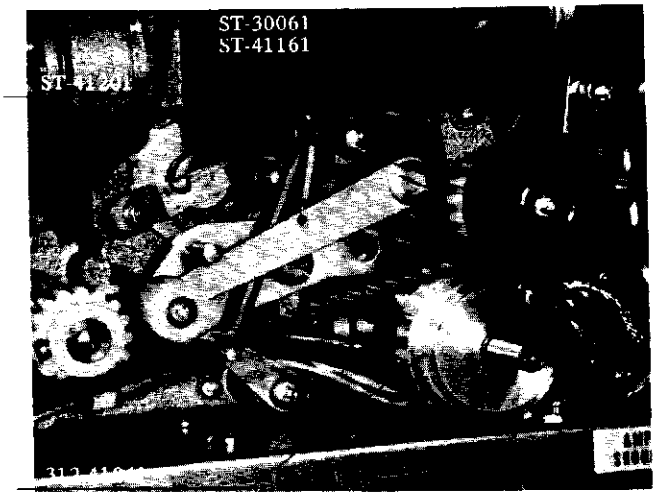
S.15 REVERSE RUBBER ROLLER ST-41201

Function :
When projector is operated in "REVERSE", roller ST-41201 is carried toward set collar by the main drive belt.
The rubber roller rotates the sound drum and pulls the film from No.2 sprocket. This maintains the lower loop under the film gate.
When projector is operated in "FORWARD", roller is carried away from set collar, thus allowing it to rotate freely.

The rubber roller must not contact set collar at any time in this mode of operation.



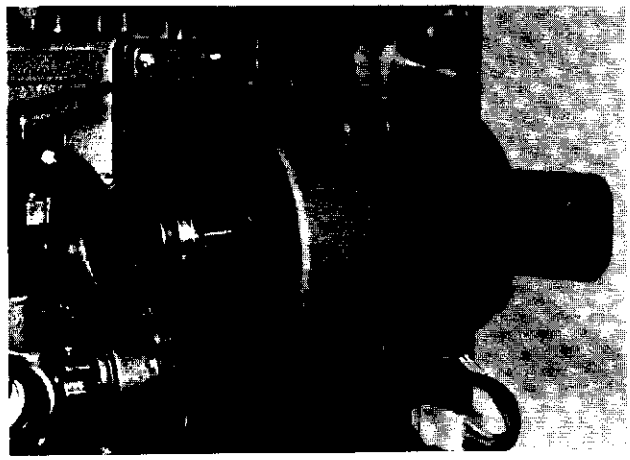
Check :
To check, move No.2 film guide to "Self-Thread" position, without film in projector, turn projector on in "FORWARD" mode. Observe flywheel. It should not move. Turn switch to "REVERSE" mode. Flywheel should rotate. Switch "OFF". Observe reverse roller as you turn inching knob clockwise. Rubber roller should be carried away from set collar toward rear of projector.



Adjustment :
Spring ST-41111 provides the resistance required to carry roller along main drive belt.
Stretch or replace as necessary.

S.16 MOTOR AND COOLING FAN

When mounting motor and fan, observe the clearance on either side of cooling fan. Tighten set screw securely. Be sure to install belt pulley with set screw toward motor before mounting motor and fan housing to projector chassis. After securing motor mounting, align the motor belt pulley with the shutter pulley. See S.1.2. Tighten set screw to flat spot on motor shaft.

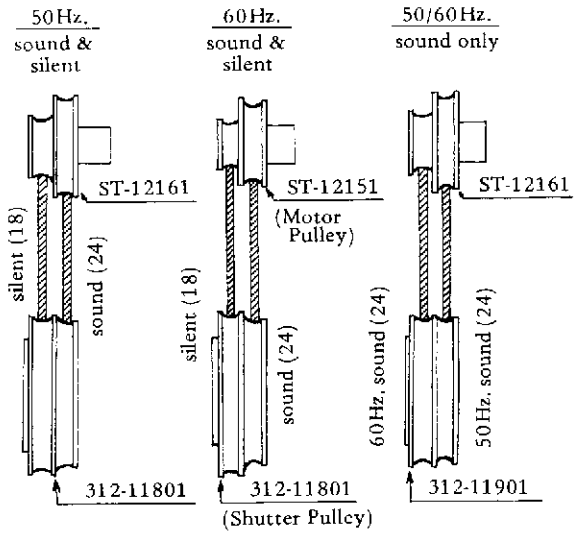


S.17 SPEED CHANGE (SOUND & SILENT)

Sound speed (24 frames per sec.) is obtained by placing the belt on the large size motor pulley and the corresponding shutter pulley.

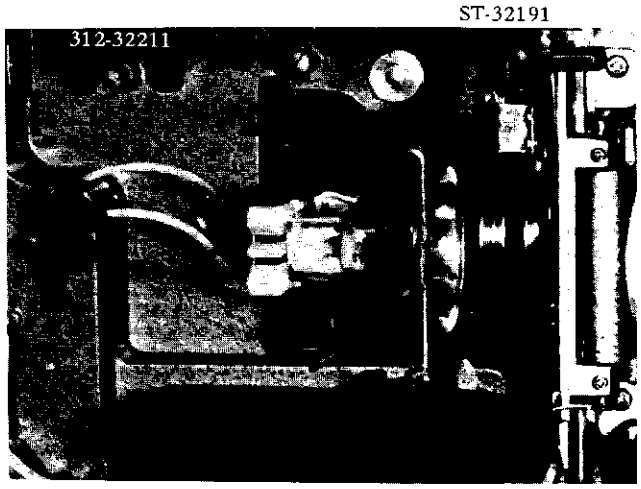
For silent (18 frames per sec.) place the belt on other pulley set.
See the illustration below.

Combination of Motor Pulley & Shutter Pulley



S.18 LAMP HOUSE

Open the lamp house door by loosening the locking screw located on the right side of the lamp house. The top part of the lamp house door swings out for ready access to projection lamp.
To correct the uneven brightness on right and left, adjust knurled nut ST-32191 right over the inner black lamp cover.

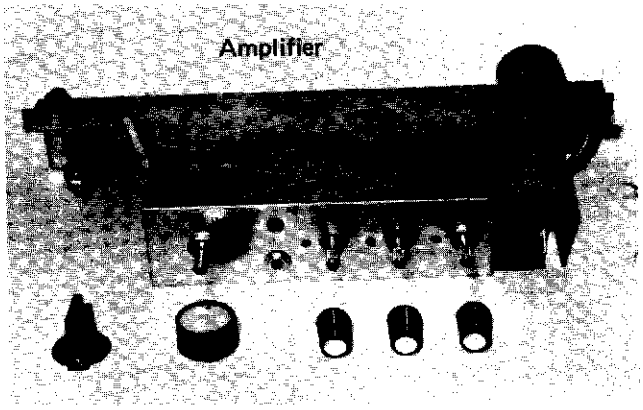


S.19 AMPLIFIER REMOVAL

Removal and replacement of the amplifier is very simple :

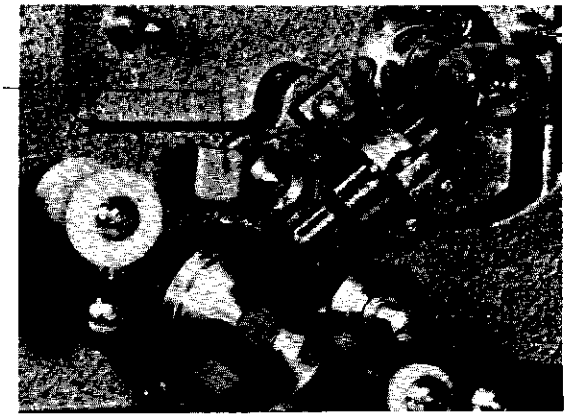
a) Disconnect power supply.
b) Remove flywheel.
c) Remove knobs on front control panel.
d) Pull out 9 pin plug.
e) Remove one screw at each end of amplifier chassis with Phillips screwdriver.
f) Remove amplifier.

To replace, reverse above procedures.



S.20 RST-2, -3, RT-2, -3 RM-2, -3 MEGNETIC PLAYBACK MODELS

These projectors have a magnetic head and associated switch and circuit for magnetic playback. In the OPT(O) position, the wafer contacts connect the solar cell circuit and exciter lamp circuit to the amplifier. The head is located two frames behind the optical sound lens scanning beam. The magnetic sound head is lifted off the film by the action of the lever attached to the end of the switch shaft.
The bracket and shaft assembly is spring-loaded so that when the function switch is in the MAG(M) position, the spring pulls the magnetic sound head down in contact with the magnetic sound strip on the film.

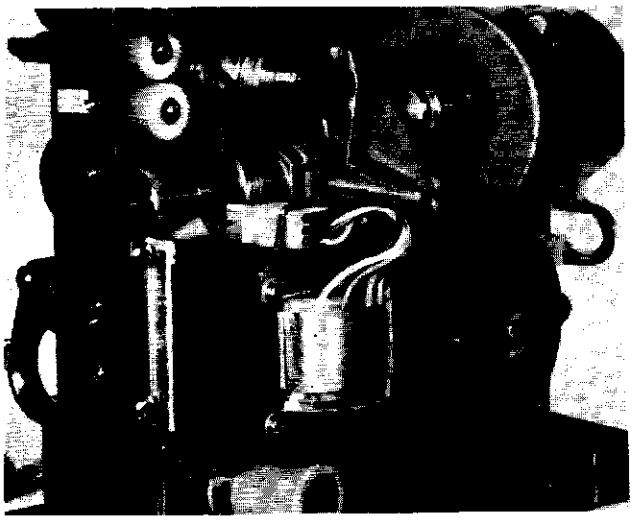


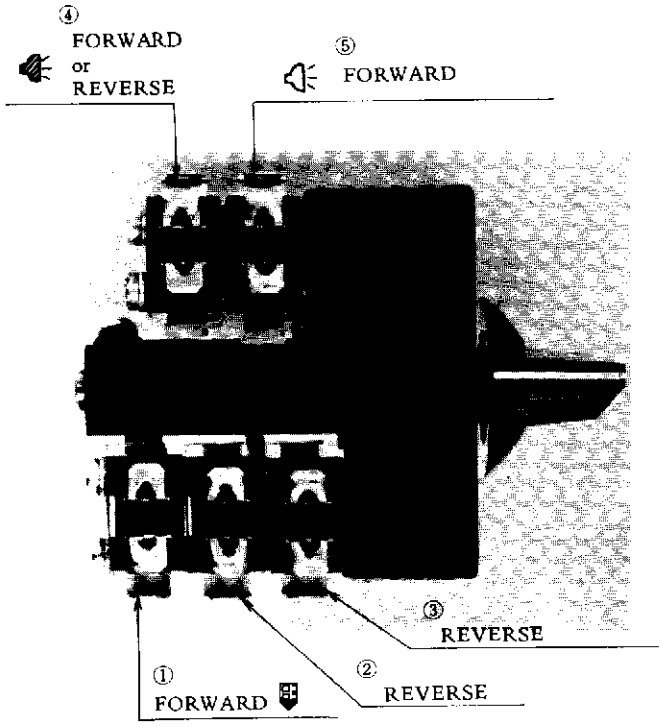
In the OPT(O) position, the switch lever strikes the sound head shaft bracket, lifting it up.
Observe this action and adjust the position of the switch lever if necessary. This is done by releasing the set screw in the end of the switch shaft. Wafer contacts must make full contact in either function switch position.

S.21 TRANSFORMER

Function :
Transformer supplies power to halogen lamp, amplifier, pilot lamp, and for 100V/110V area only motot also.

Check :
The plug must be connected properly.





S.22 ROTARY SWITCH DISASSEMBLY

a) Disconnect power supply.
b) Remove switch control knob 312-60611 and other amplifier control knobs on front control panel.
c) Remove front control panel.
d) Remove flywheel.
e) Remove amplifier.
f) Loosen two screws on front of Rotary switch mounting bracket, and pull out the switch assembly from the rear side of the projector.

To replace, reverse above procedures.
Before replacing, be sure to :

a) Check the clicking rotation of the cam bracket 312-60541.
b) Check "end play" at both sides, right and left. They must be even.
c) Check the position of control knob 312-60611. At "OFF" position, white arrow line must be on the top.
d) Lubricate mounting bracket 312-60521 and control knob with silicone oil.
e) Lubricate clicking ball ST-13231 and cam bracket 312-60541.

O : ALL OFF

: ① ON

: ① & ④ ON

: ① & ④ & ⑤ ON

: ① ② & ③ ON

(REV) : ① ② ③ & ④ ON