

APOLLO

MODEL

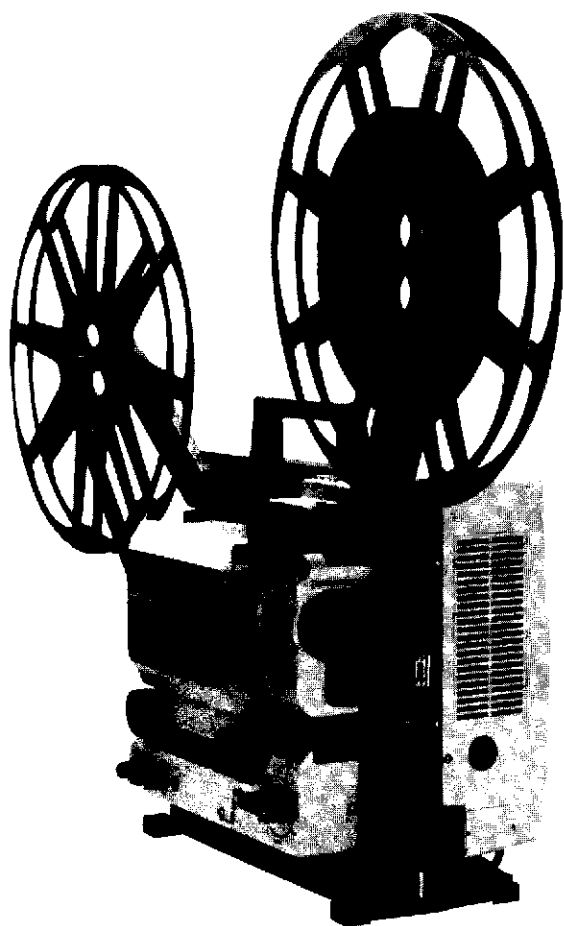
SERIES QL-100

INSTRUCTION MANUAL

"QUICK LOADING"[®]

EASY THREADING

16mm SOUND PROJECTOR



apollo

IMPORTANT SAFEGUARDS

1. Read and understand all instructions.
2. Close Supervision is necessary when this projector is used by or near children. Do not leave projector unattended while in use.
3. Care must be taken as burns can occur from touching hot parts. Especially, extreme caution should be taken when replacing projection lamp.
4. Do not operate projector with a damaged cord or if the projector has been dropped or damaged-until it has been examined by a qualified serviceman.
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 projector may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
7. Always unplug projector from electrical outlet when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.
8. Let projector cool completely before putting away.
9. To protect against electrical shock hazards, do not immerse this projector in water or other liquids.
10. To avoid electric shock hazard, do not disassemble this projector, but take it to a qualified serviceman when some service or repair work is required. Incorrect reassembly can cause electric shock hazard when the projector is used subsequently.
11. When inside of mechanism is to be checked, prior to removal of back cover, disconnect power cord from electrical outlet.
12. Be careful not to clog cooling vent during operation.
13. Use proper projection lamp, exciter lamp, fuse, etc.

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Keep this instruction bulletin ready to operator's hand.

1. GENERAL DESCRIPTION

1.1 Introduction

QL-100 Series are the 16mm motion picture sound projectors featuring unique "QUICK LOADING" easy threading and other provisions including fast rewinding of film in projection path.

They are designed and produced under APOLLO A.V.s brilliant traditions and up-to-date technique of quality control.

The following models are available.

- QL-100 : Optical sound reproduction, with a small built-in speaker. Used for an easy film show in a room.
- QL-100S : The mechanism same as QL-100, plus a speaker on front cover. Used for general purpose film show with superior sound reproduction.
- QL-100M : Optical and magnetic sound reproductions. Magnetic sound recording can be performed by employing an optional Magnetic Recording Adapter.
- QL-100MS : The mechanism same as QL-100M, plus a speaker on front cover. For general use with superior sound reproduction.

1.2 Specifications

- Power requirements: Rated voltage is indicated on your projector. Standard rated voltage is 120V ($\pm 10V$ allowable), 110V-130V. Also available 220V-240V. Frequency 50/60 Hz.
- Power consumption : 350VA approx.
- Projection lamp : 24V - 250W Halogen quartz lamp with cold mirror (ELC)
- Projection lens : f=50mm, large aperture F1.2, hard coated, tube dia.42.5
- Film loading : "QUICK LOADING" easy threading system.
- Film speed : 24 frames/sec.
- Rewinding : Film in normal projection path can be rewound as well as ordinary reel-to-reel rewinding.

Applicable reel : Any of 15m - 600m capacity is applicable.

Motor : Capacitor start induction motor, 35W.

Sound reproduction: Models QL-100 and QL-100S are for optical sound;
QL-100M and QL-100MS are for optical and
magnetic sound.

Exciter lamp : 6V-1A, lit on DC power. ANSI Code:BSS

Sound lens : Cylindrical lens is used, slitless.

Photo-electric
transducer : Solar cell is used.

Amplifier : IC is fully used, solid state, 2-power supply
system.

Sound output : 20W max., 8 Ω ,

Line out : 0dB 600 Ω unbalanced

Built-in speaker : Elliptical speaker 16 Ω

External speaker : For QL-100S and QL-100MS, round type 8 Ω

Functional Description

Control Switch (128)

By means of a single knob, the operations including film loading, projection, and rewinding are selected at ease, as follows:

OFF : Whole film path is opened to prepare film loading.

SET : Film is threaded on the projection path, and the manual
inching of film is applicable.

FOR : Motor runs in the normal direction.

LAMP-L: Projection mode with low lamp voltage (at about 21.5V) for
long lamp life.

LAMP-H: Projection mode with rated lamp voltage (about 23.5V) for
brighter image.

REW : Fast rewinding in the projection path as well as reel-to-
reel direct rewinding.

Important Mechanism

High speed moving parts including pull-down mechanism are enclosed within an Oil Tank (404), providing the stabilized mechanism free from mechanical noise and wear, without daily oiling.

The tip of pull-down claw and side presser are lined with ceramics of excellent durability. The pull-down mechanism together with aperture plate and pressure plate are composed in one unit, for interchangeability and easy maintenance.

Framer Knob

By means of Framer Knob (125), the lateral position of frame on the film can be adjusted.

Sprocket Clutch Release Button (119)

When the upper film loop is lost, keep pushing this button slightly while push the film toward the sprocket, then the loop can be easily restored. And when the film between upper and lower sprockets becomes tensive, and dragging rotation of control switch from SET position to OFF position is detected the trouble can be removed by the same method.

Caution : Never push the sprocket clutch release button while the projector is running.

Inching Knob (205)

To be used for checking the film transportation manually on the completion of film loading.

Automatic Loop Restorer (127)

It resets the lower film loop automatically when the loop is lost due to damaged or defective film.

Take-up Mechanism (Rear Reel Arm 104)

The torque on take-up spindle is automatically regulated according to the weight of film roll wound on the reel. Any reel from 15m to 600m capacity can be used without adjustment.

Tilt Adjuster (129)

By means of double thread screw, tilting can be adjusted quickly and smoothly.

"O-M" Selection of Sound Reproduction (for QL-100M, QL-100MS)

The selection of optical or magnetic sound reproduction is made by a single action of rotating O-M Selector (109). For optical sound reproduction, turn it clockwise to "O" position, and for magnetic reproduction, turn it counterclockwise to "M" position.

Amp. Sw./Vol. Control (114)

By turning volume control clockwise from OFF position, the amplifier is energized and exciter lamp will be lit. The further clockwise rotation of it increases the volume of sound output.

Mic. PU Jack (111)

Connect a microphone or pick-up. When a microphone is used, caution should be taken to separate it from speaker to prevent howling. Appropriately controlled output of microphone or pick-up can be mixed with sound track output.

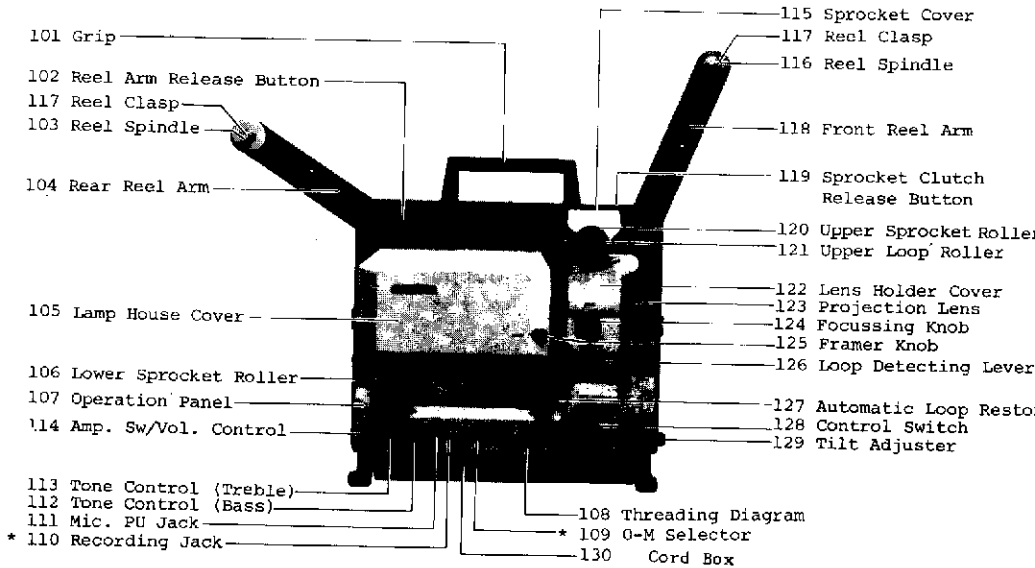
Speaker Jack (203)

Connect an external speaker, if used, whose impedance should be 8Ω , and capable maximum power should be 20W.

Line Out (202)

The jack to feed an external amplifier with the audio signal generated from the projector. Since the line-out is independent from the volume control circuit of projector, the built-in speaker can be used as a monitor at the required volume of sound when the line-out is applied. In this case, the Amp. should be ON.

1.4 Arrangement of Parts



* only for QL-100M and QL-100MS Models

Fig. 1 Operating Side

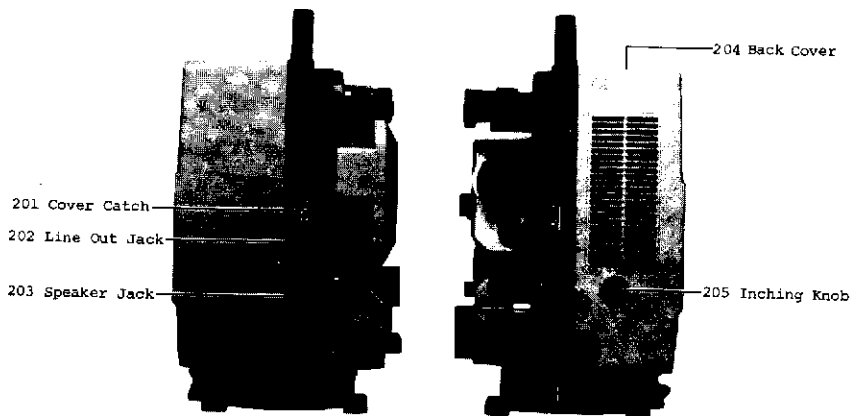


Fig. 2 Both Sides

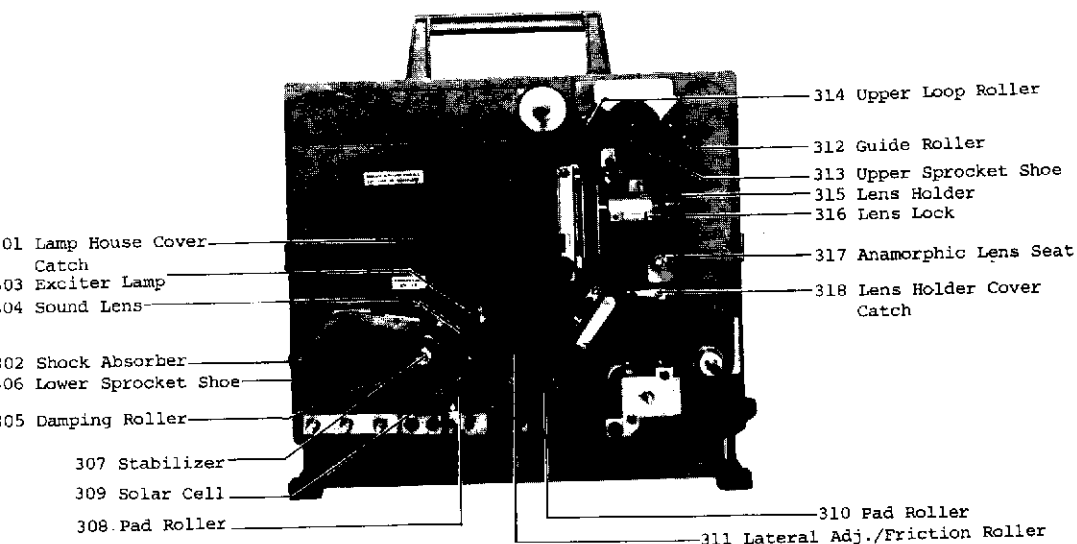


Fig. 3 Operating Side without Cover

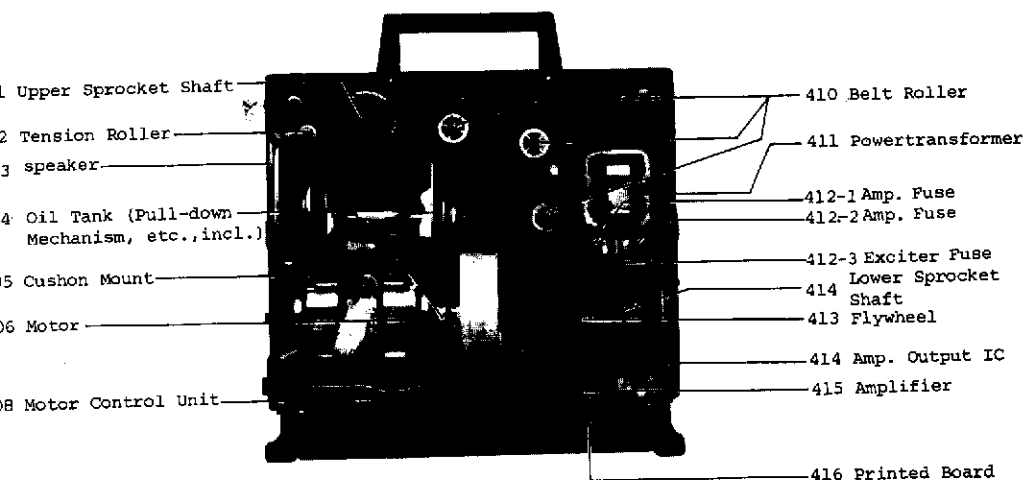


Fig. 4 Back View of Inside

2. HOW TO USE

2.1 Installation

- (1) Make sure that the AC main is of rated voltage, and that the power lines including the extension cord and the fuses are capable of carrying current continuously.
- (2) Place the projector on a substantial table or stand.
- (3) Raise Front and Rear Arms (118 and 114) until they are locked.
- (4) Place control switch in OFF position and Amp. switch in OFF position.
- (5) In case where an external speaker is employed, locate the speaker at the place not lower than screen so that reproduced sound reaches audiences directly. Connect the speaker cord to Speaker Jack (203) of projector.
- (6) Make sure that the control switch is in OFF position, then connect the power cord to Power outlet.

Caution: Place these cords in such a position that spectator will not kick or stamp them. A loop around a table leg at each end of the cord will prevent troubles on cord connections and possible interruption of show or mechanical shock to be given to the projector.

- (7) Clean the film path. (Refer to Maintenance)

2.2 Preparation

- (1) Rotate the Amp. Switch/Volume Control (114) clockwise to turn on the amplifier. Exciter Lamp (303) will light.
- (2) Rotate the volume control clockwise furthermore, and you will hear slight background noise. In case where an external speaker is placed in a distance, and you can hardly hear the noise, insert a piece of paper or end part of film between Sound Lens (304) and Solar Cell (309) to interrupt the light beam several times, then clicks will be heard from the speaker. These are the checking procedure for sound system.
- (3) Rotate the volume control counter-clockwise to reduce sound output.
- (4) Turn Control Switch (128) clockwise to SET position, and ascertain that whole threading path is closed.

- (5) Turn control switch to FOR position, then sprockets will begin to rotate.
- (6) Turn control switch clockwise furthermore to LAMP-L position, then projection lamp will light on the lower voltage.
- (7) Turn control switch clockwise furthermore to LAMP-H position, then projection lamp will light brighter.
- (8) Rotate Tilt Adjuster (129) to position the projected image on screen.
- (9) Turn Focussing Knob (124) to focus the image of picture aperture.
- (10) Return the control switch to OFF position.
- (11) Return the control switch to REW position, and ascertain that the front reel spindle rotates in the rewinding direction (counter-clockwise).
- (12) Return the control switch to OFF position.

Thus the checks and adjustment are completed.

Threading

- (1) Place a take-up reel on Rear Reel Spindle (103), and fold the clasp.
- (2) Place a feed reel with the film to be shown on Front Reel Spindle (116), so that the film perforation is toward you, and fold the reel clasp.
- (3) Ascertain that control switch is in OFF position.

Hold the film tip with your fingers, and pull it along the threading path. Thus the film will be threaded on four rollers with different colour (120, 121, 127 and 106 in order). The rollers rotate and guide the film into the normal path for projection.

Note : Threading diagram (108) is shown on Operation Panel (107) also.

- (4) Insert the end of film into the slot of take-up reel hub. Rotate the reel clockwise to wind the film one or more turns on the reel hub.
- (5) Turn control switch to SET position, so that the film path will be closed and the film settles in its normal position for projection.
- (6) Rotate Inching Knob (205) clockwise to ascertain that the film is transported correctly.

2.4 Starting Projection

Ascertain that the exciter lamp is lit then start projection as the following procedure.

- (1) To project a film with magnetic sound record, set the O-M Selector (109) in the "M" position. (In case of QL-100M, QL-100MS)
- (2) Turn the control switch to FOR position.
- (3) When the leader film passes through the gate, turn the control switch to LAMP-L or LAMP-H as required.
- (4) Rotate volume control clockwise until the appropriate sound level is obtained.
- (5) Adjust Focussing Knob (124) to obtain the sharpest image on screen

Note : During projection, pay attention to the projected image, reproduced sound and mechanical noise.

: Frequent adjustment of sound is not recommended for comfortable listening.

: Some films give vertically displaced frames, in such case adjust Framer Knob (124).

2.5 Concluding Projection

- (1) As soon as the final title fades out, turn the control switch to FOR position.
- (2) As soon as the background music is over, turn the volume control counter-clockwise to fade out the sound.
- (3) After the end of film comes out the projector, turn the control switch to SET or OFF position to stop the motor.
- (4) If the show was the last performance, turn off Amp. Switch (114).

Note : Sufficient cooling of lamp house after projection is recommended.

2.6 Rewinding (Reel to reel)

- (1) Insert the end of the film into the slot of the front reel, and rotate the front reel counter-clockwise to remove slack in film.
- (2) Turn the control switch counter-clockwise to REW position. The film will be rewound quickly on the front reel.
- (3) On completion of the rewinding, turn the control switch to OFF position to stop the motor.

2.7 Rewinding (On threaded path)

- (1) During normal projection, at any point of film to be reviewed, turn the control switch to SET position to stop the film movement.
- (2) Turn the volume control counter-clockwise to fade out the sound.
- (3) Turn the control switch to REW position. The film will be quickly rewound on the threaded path.
- (4) Rewinding is discontinued at any point of film by turning the control switch to OFF position.
- (5) To project the rewound film again, turn the control switch to SET position and proceed as stated in 2.4.

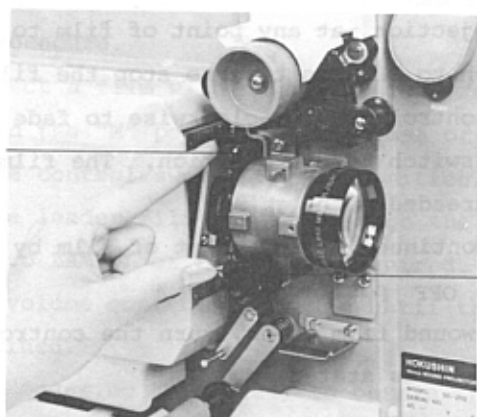
Note : For a long rewinding, apply the procedure stated in 2.6, for the film protection.

: Before the control switch is turned to REW position, and before it is turned from OFF position to SET position after REW, ascertain that the film is perfectly stopped.

2.8 After the Show

- (1) Clean the film path after the show is over.
- (2) Disconnect the cords. Put the power cord in Cord Box .(130).
- (3) Push Reel Arm Release Button (102) for front and rear arms and fold them.
- (4) Turn the tilt adjuster to let down the projector.
- (5) Put the front cover on, and fix the latch.

Upper Guide Pin



Lower Guide Pin

Fig. 6 Removing Pressure Plate

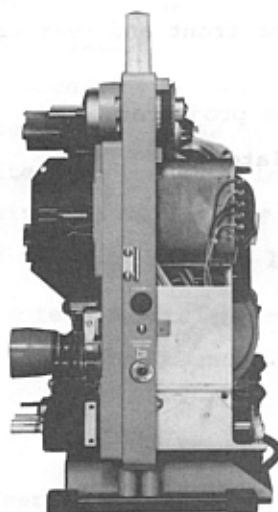


Fig. 7 Rear Side

60Hz

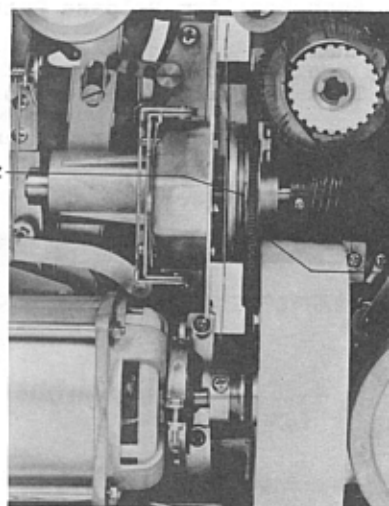


Fig. 8 Changing Speed

. MAINTENANCE

.1 Cleaning and Lubrication

- (1) Before and after the performance, clean the film path with a cleaning brush. Emulsion stuck on the film path due to high temperature and friction should be removed with a wood stick after it is wetted with water. Never attempt to remove it with a screw driver or other hard material.

Note : Removing pressure plate

Pressure plate is detachable in one block. To remove it, turn control switch to OFF position, hold the pressure plate as shown in Fig. 6, and push it up slantingly a little.

To replace it, set the upper guide pin (Fig. 6), then push the lower part slightly to be settled.

Pressure plate with scratch or scar should be replaced.

- (2) Lubrication

Daily oiling is not required, but at every 100 operation hours, or before and after a long period of storage, lubricate the roller shafts with a few drops of good machine oil.

Every 500 operation hours or at the chance of checking with the back cover removed, give a few drops of machine oil, or a little grease on the teeth of worm and worm wheel, bearings of gear shafts and the reel spindles. Excessive oiling is not desirable.

Caution : Keep the driving V-belt free from oil and grease.

- (3) Cleaning lens

Remove dust with a clean soft lens brush. Remove oil spot or fingerprint with a piece of gauze wetted with mixture of alcohol and ether.

- (4) Cleaning plastic cover

Clean the covers with a piece of gauze wetted with water or soap water. Never use thinner or gasoline since they are made of synthetic resin.

3.2 Replacing the Lamps

(1) Replacing the projection lamp (Fig. 5)

Remove the lamp house cover and inside cover. Pull Lamp Removing Lever (602) to your side, then the projection lamp will come off Lamp Socket (603).

Extra caution should be taken to prevent your fingers from burning by heated lamp.

(2) Replace the exciter lamp

Remove the lamp house cover. Remove the exciter lamp by rotating it counter-clockwise. Hold a new lamp with the notch of flange positioning downward, and plug the base into socket with the pin flange holes matched and turn the lamp clockwise.

3.3 Changing Speed (Fig. 8)

QL-100 provides the speed changing V-pulley device, to match the film speed in accordance with the frequency of the power line. Both of motor pulley and pull-down mechanism pulley should be changed. For power supply of 50Hz, use the right side pulley near fan case; and for 60Hz, use the left side pulley near shutter.

3.4 Removing Back Cover (204)

Remove the fastening screws on top and both sides, then the back cover can be removed.

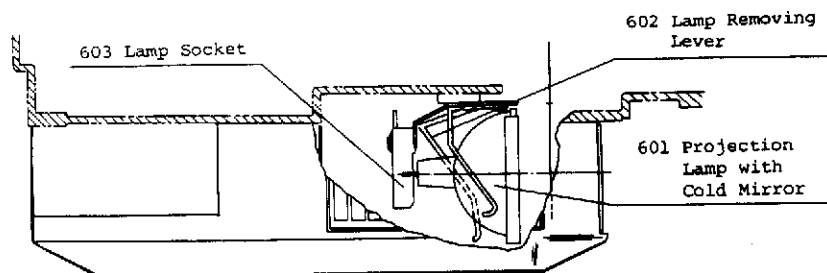


Fig. 5 Lamp House

IMPORTANCES ON OPERATION AND MAINTENANCES

1. Turn the control switch to the correct position of its stops.
2. When SET is to be selected after REW on threaded path, wait one moment at the OFF position of control switch until the film stops perfectly, then turn it to SET position. Otherwise, the result may be the damage of part or film.
3. When the control switch is turned from OFF to SET, natural slack should be left on the film between take-up reel and projector.
4. Before the lamp removal, be sure to turn the switch OFF, and disconnect the power cord.
5. For the lamp removal, be careful not to burn your finger with heated lamp.
6. Do not burn the projection lamp with the lamp house cover opened.
7. In case when the film frame between upper and lower sprocket decreased, and excessive film tension is detected for the rotation of control switch from SET to OFF, do not operate control switch forcibly. In such a case, turn control switch pushing the sprocket clutch release button slightly, then the film path can be opened smoothly.
But, do not push the sprocket clutch release button during projection or FOR operation.

5. TROUBLE SHOOTING

Trouble	Cause	Remedy
1. Inoperative motor	a) Incorrectly connected power cord b) Blown fuse c) Extremely low line voltage d) Faulty motor or motor circuit	Reconnect the power cord correctly. Replace the fuse after the cause removed. Apply step-up transformer. Check switch, relay, capacitor, etc.
2. Inoperative projection lamp	a) Defective lamp b) Faulty lamp circuit c) Blown fuse (407)	Replace the lamp. Check the lamp circuit. Check the fuse.
3. Dark projected image or un-uniform illumination	a) Defective lamp b) Improperly positioned lamp	Replace the lamp. Set the lamp correctly.
4. No focussing point	a) Poorly pressed pressure plate b) Lost film loops at film gate c) Play of lens element within lens tube	Check the pressure plate. Replace the side presser. Check the hitting sound by shaking it around your ear.
5. Whity picture	a) Dirty lens b) Dew on lens (when cold projector is brought in warm room)	Remove oil, grease, etc. Refer to 3.(3) cleaning lens. Wipe moisture off the lens, or warm up the lens.
6. Travel ghost vertically streaming picture	a) Lost film loop b) Improper shutter position	Adjust the shutter position.
7. Inoperative exciter lamp	a) Defective lamp or socket b) Faulty power circuit for exciter lamp	Replace the lamp or socket. Check the exciter power supply.
8. Blown amplifier fuse	a) Faulty rectifying circuit b) Over supply voltage c) Short circuit in speaker circuit	Replace fuse after the cause remedied. <u>Use proper fuse.</u> If a fuse larger than specified is used, it may cause another grave trouble.
9. Blown exciter fuse	a) Short circuit in power supply circuit for exciter lamp b) Over voltage	

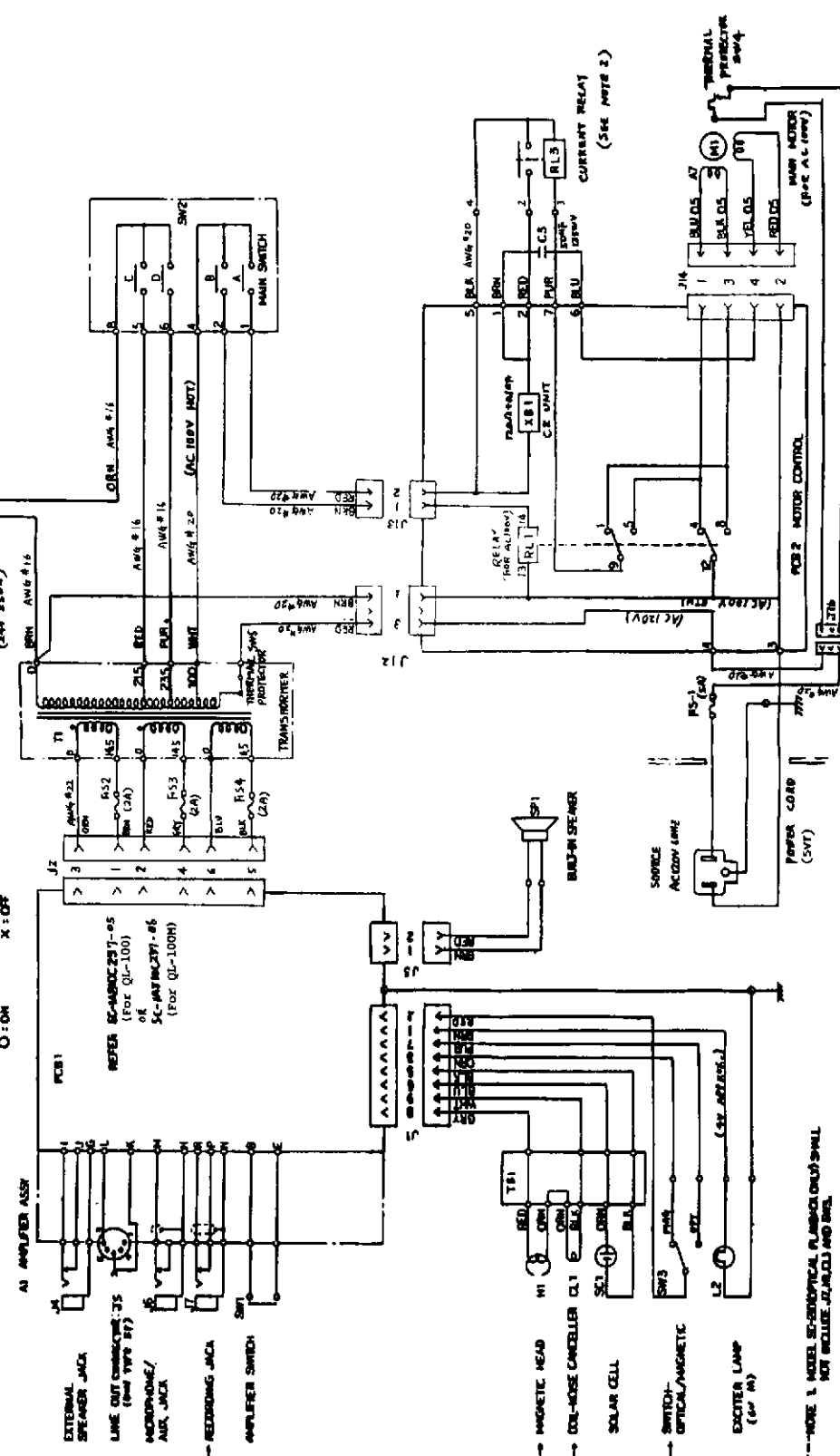
10. No sound	<p>a) Insufficiently raised Amp. sw/Volume control</p> <p>b) Wrong position of O-M switch (In case of SC-210M, SC-210MF)</p> <p>c) Blown amp. fuse</p> <p>d) Wrong connection of amplifier input, etc.</p> <p>e) Sound track is out of sound scanning beam.</p> <p>f) Extremely wrong adjustment of sound scanning beam</p> <p>g) Defective part or circuit of amplifier</p>	<p>Turn the control. Check exciter lamp burning in the optical sound position.</p> <p>Correct the position of the switch.</p> <p>Refer to Trouble 8.</p> <p>Check and mend</p> <p>Correct the film threading.</p> <p>Readjust the sound head.</p> <p>Check and mend</p>
11. Poor sound	<p>a) Insufficiently raised Amp. sw/Volume control</p> <p>b) Low power supply voltage</p> <p>c) Improper lateral or focussing adjustment</p> <p>d) Defective component part of amplifier</p> <p>e) Defective speaker</p>	<p>Adjust the control.</p> <p>Employ step-up transformer.</p> <p>Readjust correctly.</p> <p>Check and mend</p> <p>Replace the speaker.</p>
12. Poor sound quality	<p>a) Improper adjustment of sound head</p> <p>b) Foreign matter on sound lens</p> <p>c) Defective amplifier</p> <p>d) Defective speaker</p>	<p>Readjust the sound head.</p> <p>Remove foreign substance.</p> <p>Check and repair.</p> <p>Replace the speaker.</p>
13. Hoarse sound	<p>a) Lost film loop</p> <p>b) Sluggish fly-wheel</p>	<p>Correct the threading.</p> <p>Inspect fly-wheel.</p>
14. Noise	<p>a) Poor contact in connectors</p> <p>b) Defective component in amplifier</p> <p>c) Displaced backing coil</p> <p>d) AC hum detected by solar cell from a fluorescence lamp</p>	<p>Replace connector.</p> <p>Repair or replace.</p> <p>Readjust the backing coil.</p> <p>Intercept the light.</p>
15. Sluggish film pulling when loading	Insufficient slip on the upper V-belt	Adjust tension roller (402).
16. Insufficient REW tension	Insufficient tension of the upper V-belt	Adjust tension roller (402).
17. Malfunction of upper or lower sprocket clutch	<p>a) Incorrectly adjusted link mechanism</p> <p>b) Incorrectly assembled clutch or defective part</p>	<p>Adjust link mechanism.</p> <p>Adjust clutch. Replace the part.</p>
18. Inoperative open-close of film path	<p>a) Incorrectly assembled clutch or defective part</p> <p>b) Defective actuate cam</p>	<p>Adjust link. Replace part.</p> <p>Replace part.</p>

MAIN SWITCHING UNIT OPERATION TABLE

POSITION	SELECTOR	START	STOP	RESET	TEST	OVER	LOCK	ALARM
1	ON	ON	ON	ON	ON	ON	ON	ON
2	ON	ON	ON	ON	ON	ON	ON	ON
3	ON	ON	ON	ON	ON	ON	ON	ON
4	ON	ON	ON	ON	ON	ON	ON	ON
5	ON	ON	ON	ON	ON	ON	ON	ON
6	ON	ON	ON	ON	ON	ON	ON	ON
7	ON	ON	ON	ON	ON	ON	ON	ON
8	ON	ON	ON	ON	ON	ON	ON	ON
9	ON	ON	ON	ON	ON	ON	ON	ON
10	ON	ON	ON	ON	ON	ON	ON	ON
11	ON	ON	ON	ON	ON	ON	ON	ON
12	ON	ON	ON	ON	ON	ON	ON	ON
13	ON	ON	ON	ON	ON	ON	ON	ON
14	ON	ON	ON	ON	ON	ON	ON	ON
15	ON	ON	ON	ON	ON	ON	ON	ON
16	ON	ON	ON	ON	ON	ON	ON	ON
17	ON	ON	ON	ON	ON	ON	ON	ON
18	ON	ON	ON	ON	ON	ON	ON	ON
19	ON	ON	ON	ON	ON	ON	ON	ON
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21	ON	ON	ON	ON	ON	ON	ON	ON
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65	ON	ON	ON	ON	ON	ON	ON	ON
66	ON	ON	ON	ON	ON	ON	ON	ON
67	ON	ON	ON	ON	ON	ON	ON	ON
68	ON	ON	ON	ON	ON	ON	ON	ON
69	ON	ON	ON	ON	ON	ON	ON	ON
70	ON	ON	ON	ON	ON	ON	ON	ON
71	ON	ON	ON	ON	ON	ON	ON	ON
72	ON	ON	ON	ON	ON	ON	ON	ON
73	ON	ON	ON	ON	ON	ON	ON	ON
74	ON	ON	ON	ON	ON	ON	ON	ON
75	ON	ON	ON	ON	ON	ON	ON	ON
76	ON	ON	ON	ON	ON	ON	ON	ON
77	ON	ON	ON	ON	ON	ON	ON	ON
78	ON	ON	ON	ON	ON	ON	ON	ON
79	ON	ON	ON	ON	ON	ON	ON	ON
80	ON	ON	ON	ON	ON	ON	ON	ON
81	ON	ON	ON	ON	ON	ON	ON	ON
82	ON	ON	ON	ON	ON	ON	ON	ON
83	ON	ON	ON	ON	ON	ON	ON	ON
84	ON	ON	ON	ON	ON	ON	ON	ON
85	ON	ON	ON	ON	ON	ON	ON	ON
86	ON	ON	ON	ON	ON	ON	ON	ON
87	ON	ON	ON	ON	ON	ON	ON	ON
88	ON	ON	ON	ON	ON	ON	ON	ON
89	ON	ON	ON	ON	ON	ON	ON	ON
90	ON	ON	ON	ON	ON	ON	ON	ON
91	ON	ON	ON	ON	ON	ON	ON	ON
92	ON	ON	ON	ON	ON	ON	ON	ON
93	ON	ON	ON	ON	ON	ON	ON	ON
94	ON	ON	ON	ON	ON	ON	ON	ON
95	ON	ON	ON	ON	ON	ON	ON	ON
96	ON	ON	ON	ON	ON	ON	ON	ON
97	ON	ON	ON	ON	ON	ON	ON	ON
98	ON	ON	ON	ON	ON	ON	ON	ON
99	ON	ON	ON	ON	ON	ON	ON	ON
100	ON	ON	ON	ON	ON	ON	ON	ON

AI SELECTION GUIDE

MODEL	WARRANTY	NO. INQ.
01-100	100	100
02-100	100	100



NOTE 1. MODEL SC-100 OPTICAL PUMP-OUT ONLY SMALL NOT INCLUDE J1, J2, J3 AND J4.

2. CURRENT RELAY (RL2) OPERATES ONLY AT STARTING TIME OF MAIN MOTOR (M1).