EIKI

When the show must go on.

16MM SOUND PROJECTOR

SSL & ESL SERIES SERVICE MANUAL

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INTRODUCTION

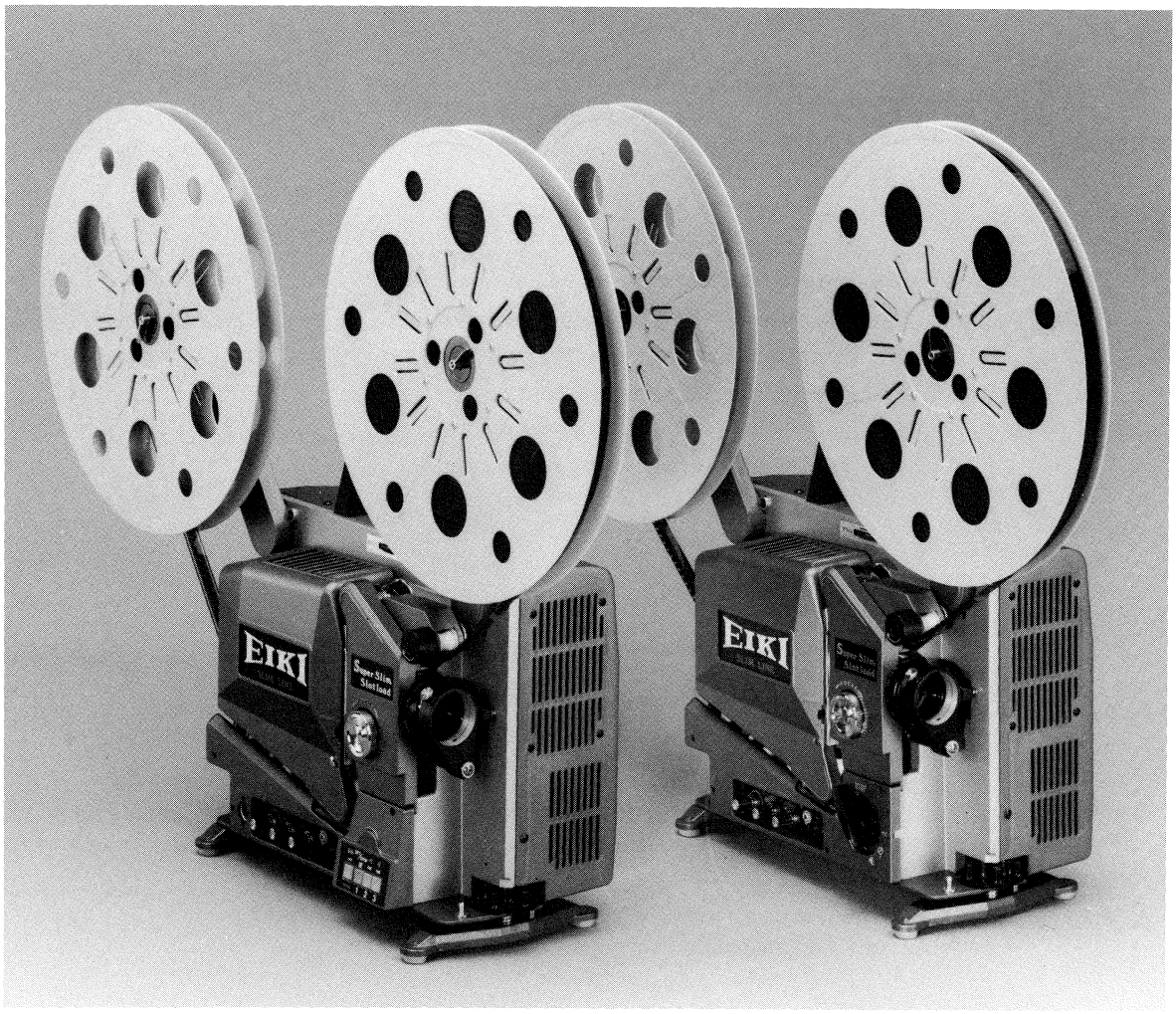
1. This Service Manual provides the necessary information for the repair, adjustment, and maintenance of EIKI's Slim Line Series projectors, models SSL-0, 1, 2, SSL-0L, 1 and ESL-0, 1, 2.

2. This service manual contains some part numbers for convenience in identification only. When ordering replacement parts, refer to SSL/ESL replacement parts list.

3. EIKI SSL/ESL projectors may in the future be improved or modified.
   Modifications made after the issue of this manual will be covered by Service Updates.

4. A copy of all of the pertinent diagrams are attached at the end of this manual.

5. CAUTION! Care must be exercised to avoid electrical shock while servicing the projector.



ESL-Series **SSL-Series**

322-1: GENERAL DESCRIPTION

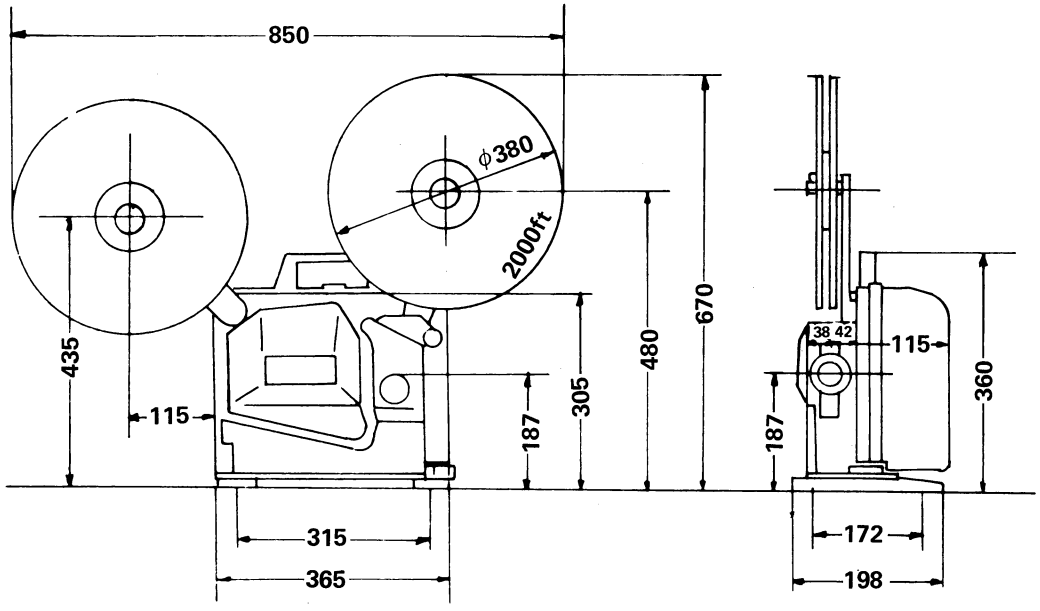
The Eiki Slim Line series of portable halogen lamp projectors may be divided into three major model groups;

* ESL, electronic touch button control slot load projectors utilizing a pre-programmed ROM with addressable remote control functions.
* SSL, conventional manual rotating function control with a 250 watt low voltage halogen lamp.
* SSL-0L, a light weight version of the SSL without the transformer module. This model utilizes a 300 watt 120V halogen lamp. (Available In 120V Main Power UL & CSA only)

This manual will cover the mechanical functions of all three groups together as they are very similar. In the electrical section each model group will be treated separately.

1-1 : PHYSICAL DIMENSIONS

MODEL	OPTICAL SOUND	MAG. SOUND	FRONT COVER SPK.	LAMP TYPE	HI-LO LAMP SWITCH	FUNCTION CONTROL	AMP POWER	WEIGHT LBS	WEIGHT KG	SIZE/INCHES	SIZE/MM
ESL-0	●			ELC/EJL 250W/24V	●	electronic push button	25W	31.5	14.3	14.4 x 11.8 x 8.1	365 x 300 x 206
ESL-1	●		●	"	●	"	"	33.3	15.1	14.4 x 11.8 x 9.3	365 x 300 x 235
ESL-2	●	●	●	"	●	"	"	"	"	"	"
SSL-0	●			"	●	ROTARY SWITCH	25W	29.1	13.2	14.4 x 11.8 x 8.1	365 x 300 x 206
SSL-1	●		●	"	●	"	"	32.2	14.6	14.4 x 11.8 x 9.3	365 x 300 x 235
SSL-2	●	●	●	"	●	"	"	"	"	"	"
SSL-0L	●			EYK/EWG 300W/120V		"	15W	24.5	11.1	14.4 x 11.8 x 8.1	365 x 300 x 206



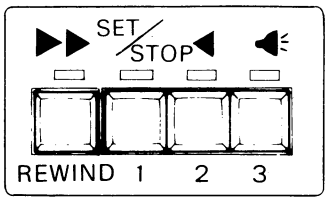
1-2 : SPECIFICATIONS

Power Requirement:	Models available from 100 to 240VAC 50 or 60Hz
Power Consumption:	430 to 470 watts
Lamp:	ESL/SSL models use ELC, 250 watt 24 volt lamps SSL-0L models use EYK or EWG, 300 watt 120 volt lamps
Hi-Low Lamp Switch:	All models except SSL-0L
Exciter Lamp:	4 volt 0.75 amp type BRK
Lens:	50mm (2") F, 1.2 6 element 160 lines center resolution standard
Film Speed:	24 frames/second standard sound speed
Shutter:	2 or 3 blade optional
Reel Capacity:	2000' (600m)
Controls:	Rotary switch models SSL- and SSL-0L, electronic touch control model ESL
Still Picture:	All models except SSL-0L
Amplifier:	All solid state
Power Output:	25 watts RMS, 8 ohm load, models ESL & SSL. 15 watts RMS, 8 ohm load, model SSL-0L
Tone Controls:	Bass and Treble
Frequency Response:	50 – 7000Hz
Aux Line Out:	600 ohm un-balance, all models except SSL-0L
Microphone Input:	Low impedance, un-balanced
Speakers:	10 x 15cm (4 x 6") built in rear cover speaker. 2 x 12.5cm (5") speakers in front cover on optional models
Wow & Flutter:	Better than 0.2% weighted
Elevation:	13° maximum
Operating Temperature and Humidity:	+5°C to +40°C 20% to 90%
Weight:	(25 to 33 lbs) 11 to 15kg

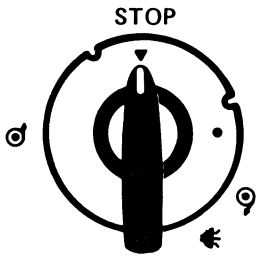
322-2: PRINCIPLES OF OPERATIONS

2-1 : MECHANICAL SYSTEM

ESL-MODELS



SSL & SSL-0L MODELS



The EIKI SSL-series projector is controlled by a single lock-out Rotary Function Switch. When the rotary function switch is positioned at;

"STOP" : Film path is fully open. Holding the film by the finger tips, beginning at entrance guide, pull the film along the slot path as indicated by the orange arrows. Attaching the film to the take- up reel completes the film loading.

Turn Function Switch To;

"MIC" : Film path is now closed. The film perforations are engaged with No. 1, and No. 2 sprockets, and the cam claw. The upper and lower loops are formed. The PA (Public Address) system can be used at this position.

" " : Motor runs advancing the film forward.

" " : Projection lamp is on for forward projection.

"STOP" : Motor is off and the film stops.

Turn Function Switch counter-clockwise to;

" " : Rewinds the film through the film path. Conventional rewinding from reel to reel can also be done.

The ESL-series projector employs electronic touch button control system. Each mode of switch position is indicated by the LED illumination.

"SET/STOP with Green LED" : Film path is fully open. Holding the film by the finger tips, beginning at an entrance guide, pull the film along the slot path as indicated by the orange arrows. Attaching the film to the take-up reel completes the film loading. Push the SET/STOP Red Switch.

"SET/STOP with Red LED" : Film path is now closed. The film perforations are engaged with No. 1 & No. 2 sprockets, and the cam claw. The upper and lower loops are formed. The PA (Public Address) system can be used at this position.

◀ : Motor runs advancing the film forward.

◀ : Projection lamp is turned on for forward projection.

⇒ Push the SET/STOP Red Switch, and the motor stops, the lamp is turned off, and the film path is now fully open.
Green LED is illuminated, which is the starting position.

⇒ Push " ▶▶ " REWIND Switch.

" ▶▶ " : Rewinds the film through the film path.
Conventional rewinding from reel to reel can also be done.

⇒ To stop rewinding, push either " ▶▶ " Rewind Switch, or "SET/STOP" Switch.
Rewind will stop and for approximately 6 seconds Red LED of Rewind Switch blinks indicating that during the blinking period no new operation command is possible.

Note : The touch button control system employs logic "ON/OFF", that is, the first push of the switch is a command "ON" and the second push of the same switch is a command "OFF".
Also, at any mode of operation, pushing the "SET/STOP" Switch stops the projector and revert to the starting position with the film path fully open.

2-2 : ELECTRICAL SYSTEMS

The Slim Line series projectors are available for voltage from 100V, 110V, 120V, 220V and 240V. 110/220V and 120/240V dual voltage models are also available.
According to the electrical safety regulations of various countries, UL (USA), CSA (Canada), VDE (Germany), SEV (Switzerland), SAA (Australia), SEMKO (Sweden), NEMKO (Norway), FEMKO (Finland), DEMKO (Denmark), specific models are manufactured to meet such regulations, including the option of 50/60Hz sound only. 50Hz sound & silent, 60Hz sound & silent operation.
Power Transformers vary according to the voltage range and also to the electrical safety requirements of each country. The secondary windings of all transformers provide 8V AC to the pilot lamp and exciter lamp circuits, 46V AC to the amplifier, 24V AC (high) and 22V AC (low) to the halogen projection lamp.
Motor ON/OFF, Lamp ON/OFF and Rewinding can be controlled by the function switch which consists of a cam bracket and 4 micro switches. The function switch cam also mutes the audio during rewind and the "STOP" or threading position.
The projection lamp is a HALOGEN ELC type 24V 250W. Inside of the lamp house is a "high-low" switch to help extend the lamp life. In the "high" position average lamp life is approximately 50 hours and at the "low" position about 150 hours.

Note : The HALOGEN LAMP EJL type 24V 200W may also be used with some reduction in light output.
Models SSL-0L use the 300W 120V EWG or EYK lamp.
The motor is an induction type with capacitor. Motors are available for all the voltage ranges. Transformers and motors are simple and easy-to-replace modules.
AC power cords, line terminals, and all other electrical parts are designed to meet the safety requirements of the individual countries listed.

2-3 : SOUND SYSTEM

EIKI SSL/ESL-series models are designed according to the sound playback capabilities and front cover extension speakers.

Optical Playback only: Model SSL-0L, SSL-0, -1, ESL-0, -1

Optical & Magnetic Playback: Model SSL-02, -2, ESL-2

Model SSL-1, -2 and ESL-1, -2 are standard with two (16 ohm, 12.5cm) speakers built-in the front cover, also with one (8 ohm, 10 x 15cm) speaker built-in the rear cover.

Model SSL-0 and SSL-02 are standard with one (8 ohm, 10 x 15cm) speaker only built-in the rear cover.

The standard amplifier modules for the SSL-0, -1 and ESL-0, -1 are optical sound reproduction only.

Standard amplifier modules for the SSL-02, -2 and ESL-02, -2 are capable of both optical and magnetic sound reproduction.

322-3: SERVICE PROCEDURES

3-1 : PRECAUTIONS

1. EIKI SSL/ESL-series projectors have been designed for the ultimate in simplicity, and ease of service and repair. Each screw is very important, and when servicing or reassembling the projector, screws should not be omitted or carelessly lost. All screws should be firmly tightened to assure reliable projector operation after disassembly.
2. When lubricating the projector's plastic parts, silicone oil or grease should be used. Other types of lubricants may harm plastic parts.
3. EIKI projectors require a minimum of special tools. The most important is an ordinary ISO Phillips screw driver set.
4. To avoid damage to screw heads it is important to remember the adage "70% push, 30% turn." It is also important to select the right size screw driver blade. A rule of thumb is to use the largest blade possible.
5. To avoid possible electrical shock, always disconnect the projector from the power source when servicing.

3-2 : TOOLS AND TEST EQUIPMENT

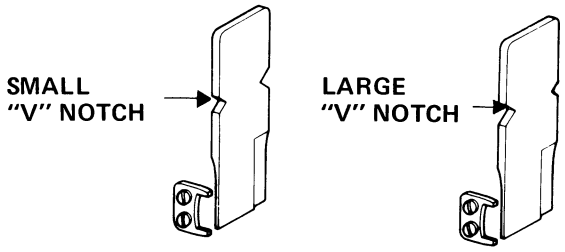
A. Tools:

When servicing EIKI SSL/ESL-series, ordinary ISO (Phillips type) screw drivers and single-bladed screw drivers should be enough. (EIKI Screw Driver Kit, P/N 5615 are available.) A Molex extractor tool is most useful when replacing the pins of nylon connectors to transformer or motor.

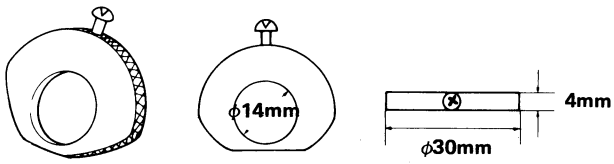
B. Special Tools:

EIKI SSL/ESL-series have been designed so that no special tools should be required to service the projector. However, several special tools are available to speed up adjustments and maintain a closer consistency between the projectors.

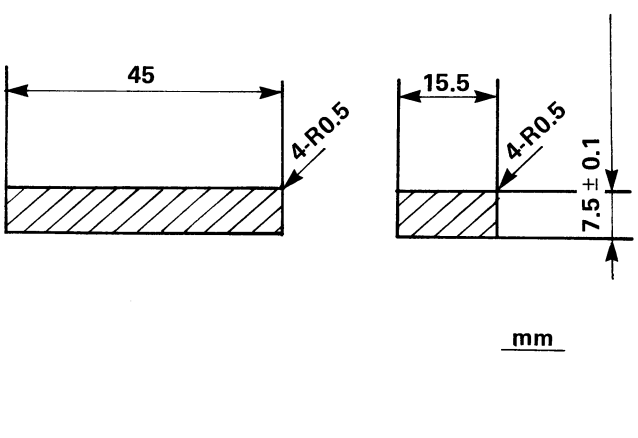
Tool No. 320-01T
Cam Claw Protrusion Tool (see sec. 4-1-D)



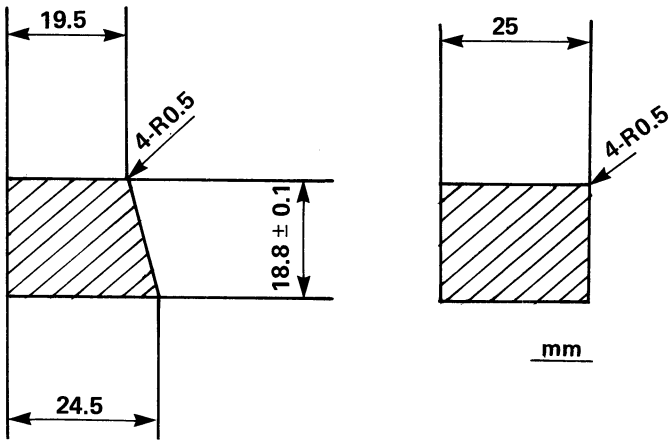
Tool No. 320-02T
Sound Lens Adjustment Tool (see sec. 7-1-B)



Tool No. 185-01111
Loop Setter Roller Positioning Tool (see sec. 6-3-B)



Tool No. 185-01211
Tension Roller Positioning Tool (see sec. 6-4-B7)



C. Test Equipment:

A limited amount of test equipment is required for routine maintenance and modular replacement. However, when servicing the individual modules such as the amplifier, the following equipment and test films would be essential:

a. Vom (Voltage/Ohm meter)
b. Oscilloscope
c. Audio AC VTVM
d. Wow & Flutter Metter
e. 400Hz SMPTE Test Film
f. 3150Hz Wow & Flutter SMPTE Test Film
g. Multi frequency SMPTE Test Film
h. 7000Hz Sound Focus SMPTE Test Film
i. 7000Hz Mag. Azimuth SMPTE Test Film
j. Buzz Track SMPTE Test Film
k. Audio Oscillator

3-3 : LUBRICANTS & LUBRICATION CHARTS

- Apply a few drops after every 500 operating hours.

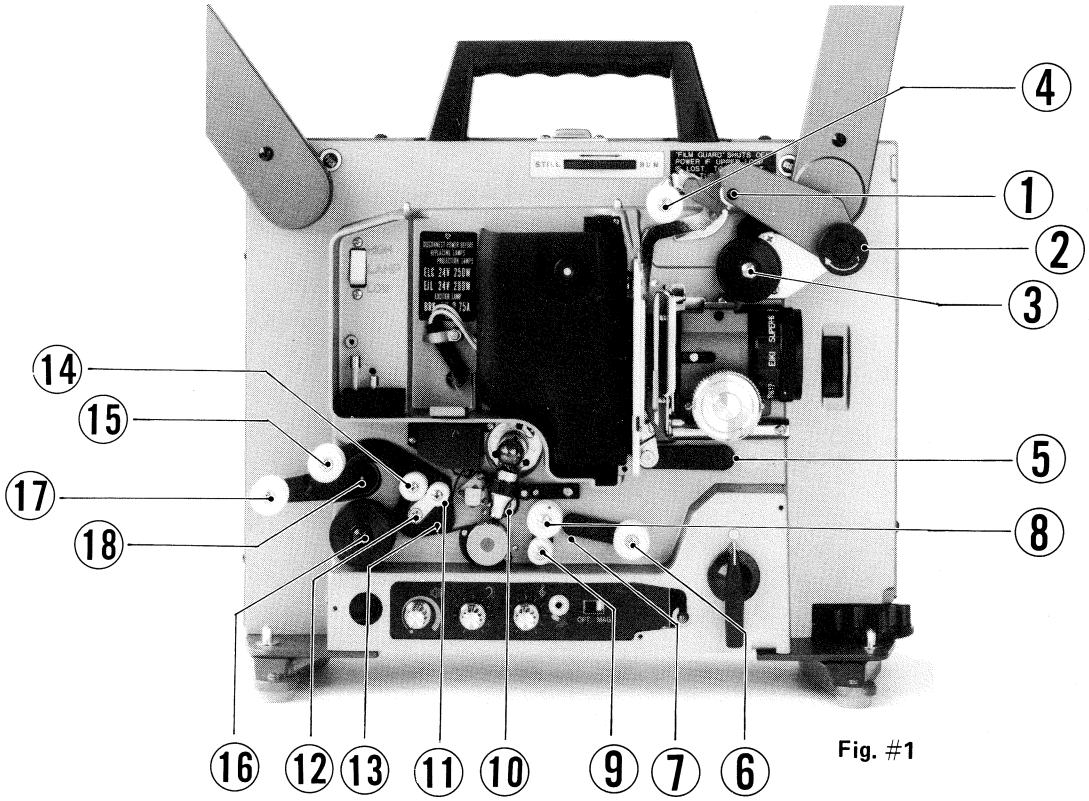


Fig. #1

ITEM #	DESCRIPTION	SUGGESTED LUBRICANT	EIKI PART #
1	#1 Sprocket Shoe Guide Roller	Silicone Oil #10	5632
2	#1 Guide Roller	Molybdenum Disulfide Grease	5628
3	#1 Sprocket Drum Shaft	Petroleum Oil	5631
4	Upper Loop Forming Guide Roller	Molybdenum Disulfide Grease	5628
5	Set Arm Fulcrum Pin	Silicone Oil #100	5629
6	Lower Loop Setter Roller	Molybdenum Disulfide Grease	5628
7	Lower Loop Setter Arm Fulcrum	Silicone Oil #100	5629
8	Buzz Roller	Molybdenum Disulfide Grease	5628

ITEM #	DESCRIPTION	SUGGESTED LUBRICANT	EIKI PART #
9	Buzz Roller Arm Fulcrum	Molybdenum Disulfide Grease	5628
10	Mag. Head Arm Fulcrum	Petroleum Oil	5631
11	Tension Guide Roller	Silicone Oil #10	5632
12	Tension Guide Roller Arm Fulcrum Pin	Silicone Oil #100	5629
13	#2 Sprocket Shoe Arm Fulcrum	Silicone Oil #100	5629
14	#2 Sprocket Shoe Guide Roller	Silicone Oil #10	5632
15	#2 Sprocket Shoe Large Roller	Silicone Oil #10	5632

3-3 : LUBRICANTS & LUBRICATION CHARTS

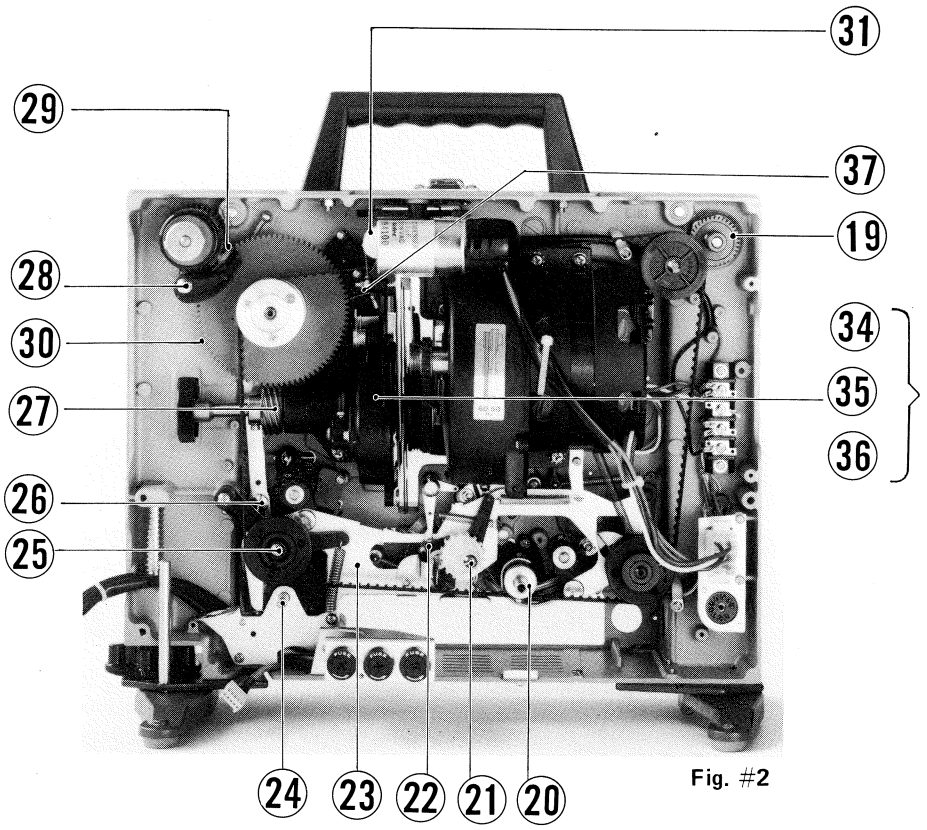


Fig. #2

ITEM #	DESCRIPTION	SUGGESTED LUBRICANT	EIKI PART #
16	#2 Sprocket Drum Shaft	Petroleum Oil	5631
17	Rear Dampening Tension Roller	Silicone Oil #10	5632
18	Rear Dampening Tension Roller Arm Fulcrum	Molybdenum Disulfide Grease	5628
19	Take-Up Arm Drive Gear	Silicone Oil #100	5629
20	Flywheel Bearings	Silicone Grease	5625
21	Loop Setter Gear	Silicone Oil #100	5629
22	Loop Setter Interlocking Arm	Molybdenum Disulfide Grease	5628
23	Function Main Interlocking Bracket, at each contact	Silicone Grease	5625
24	Function Rotary Switch Shaft Supporting Plate	Molybdenum Disulfide Grease	5628
25	Tension Gear	Silicone Oil #100	5629
26	Rewind Push Lever	Silicone Grease	5625
27	Worm Gear assy.	Silicone Grease	5625
28	Rewind Control Arm Fulcrum	Silicone Grease	5625
29	Rewind Drive Gear	Silicone Oil #1000	5630
30	No. 1 Sprocket Drive Fiber Gear	Molybdenum Disulfide Grease	5628
31	Wire Guide	Molybdenum Disulfide Grease	5628
32	Supply Arm Spindle Shaft	Petroleum Oil	5631
33	Take-Up Arm Spindle Shaft	Petroleum Oil	5631
34	Cam Tank Module	Molybdenum Disulfide Grease	5628
35	Cam Tank Felt	Molybdenum Disulfide Oil	5632
36	Cam Tank Fulcrum Pin	Petroleum Oil	5631
37	Film Guard Plate Spring	Silicone Grease	5625

3-4 : TROUBLE SHOOTING HINTS

A. There are four basic steps to trouble shooting this projector:
   a. Analyze the symptom
   b. Localize the trouble to a functional system or module
   c. Replace or repair that system or module
      a. Isolate the trouble within the module
      b. Locate and repair the specific trouble

B. Checking Semiconductors With A VOM:
   a. Set the ohms scale to R x 10
   b. The forward resistance should be low
   c. The reverse resistance should be high
      (See NOTE after Sec. D)

TRANSISTOR NPN TYPE (2SC, 2SD)

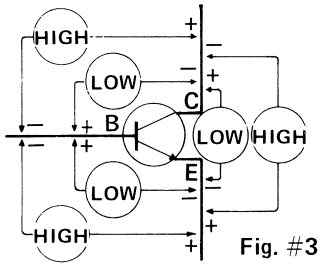


Fig. #3

TRANSISTOR PNP TYPE (2SA, 2SB)

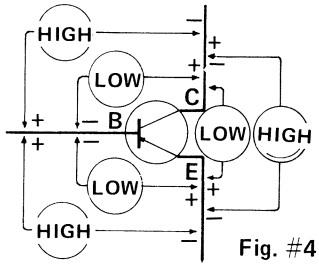


Fig. #4

Typical Amplifier Test Set-Up

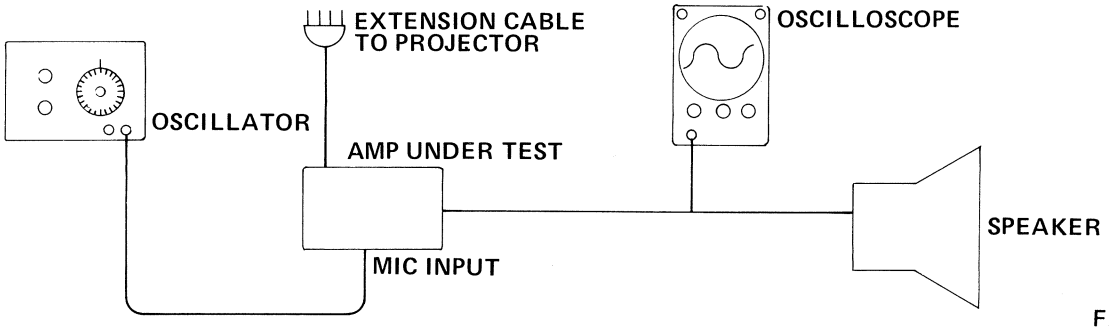


Fig. #5

DIODES

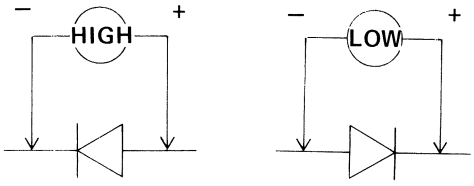


Fig. #6

C. IC's are best checked by checking the signal input and output condition. This can be done by inserting a low level audio tone into the MIC jack and the signal path from the input of IC-1 and to the output of IC-2.

D. Amplifier test cables can be easily made from locally available parts. A nine pin miniature tube socket and male plug can be wired as an extension power cable, allowing the amplifier to be operated away from the projector. The solar cell and exciter lamp connection can also be extended if so desired. (Fig. #5)

Note : Forward and reverse resistance LOW & HIGH is a suggested quick and easy check of out of circuit components for shorted and open junction test. A VOM will not test the quality of a semiconductor accurately.

3-5: SSL/ESL-Series TROUBLE SHOOTING CHART

I: ELECTRICAL SYSTEM

SYMPTOM	PROBABLE CAUSE	REMEDY (See Table of Contents)
1. Pilot lamp not on	1. Not plugged in 2. No power to the AC wall outlet 3. Defective power cord 4. Faulty transformer connector or defective transformer module SSL-0L: Faulty 4P Nylon connector or defect in motor windings 5. Defective pilot lamp 6. Film guard switch is actuated, or open	1. Check 2. Check outlet 3. Check and repair 4. Repair or replace (See Sec 5-4) Repair or replace (See Sec 5-3) 5. Replace 6. Check the position of upper loop roller. If down, pull up to loop forming position. Or check for defective micro switch behind loop roller (See Sec 6-4-B-2)
2. Pilot lamp on, motor does not rotate at function switch position ⊙	1. Motor thermal switch has opened (UL type only) 2. Defective micro switch #1, #3, #4 3. Defective motor connectors, or not plugged in 4. Faulty motor capacitor 5. Defective motor module 6. Mechanical linkage is not activating micro switch #1, #3, #4.	1. Allow motor to cool, check again (See Sec 5-3) 2. Check or replace (See Sec 9-1) 3. Check and repair (See Sec 5-3) 4. Check or replace (See Sec 5-3) 5. Replace (See Sec 5-3) 6. Check and adjust (See Sec 9-1)
3. Pilot lamp on, motor runs but lamp does not come on in switch position ⋐	1. Defective lamp 2. Lamp is not seated in the socket properly 3. Defective lamp socket 4. Faulty micro switch #2 SSL-0L: not applicable 5. Open Hi-low switch SSL-0L: not applicable 6. Open transformer/lamp connection SSL-0L: open lamp connection 7. Defective transformer module SSL-0L: not applicable	1. Replace lamp 2. Check and reseat 3. Repair or replace 4. Check or replace (See Sec 9-1) 5. Check or replace 6. Check and repair (See Sec 6-4) 7. Replace (See Sec 6-4)

(ELECTRICAL SYSTEM)

SYMPTOM	PROBABLE CAUSE	REMEDY
4. Motor does not operate in the rewind position (operates in forward)	1. Faulty micro switch #3, #4 2. Defective motor connector wiring 3. Mechanical linkage loose or out of adjustment	1. Replace (See Sec 9-1) 2. Check and repair (See Sec 5-3) 3. Check and repair (See Sec 6-4)
5. Function switch does not follow the indicated sequence	1. Loose function switch knob 2. Loose micro switch cam 3. Mechanical linkage loose or out of adjustment	1. Reposition and tighten 2. Reposition and tighten 3. Check and repair (See Sec 6-4)

II: LOADING SYSTEM

SYMPTOM	PROBABLE CAUSE	REMEDY
6. Function control switch does not open the film path	1. Loose function control knob	1. Reposition and tighten set screws
	2. Function switch cam is worn or loose on the shaft	2. Replace, re-adjust
	3. Incorrect lens	3. Check if SL type lens
	4. Film shoe reception arm is loose	4. Adjust and tighten (See Sec 6-4-B-3)
7. Function switch does not close the film path in the "MIC" position	1. Loose function control knob	1. Adjust & tighten
	2. Function switch cam is worn or loose	2. Replace, reposition & tighten set screws (See Sec 6-4)
	3. Film shoe reception arm is loose	3. Reposition and tighten set screws (See Sec 6-4)
	4. #1 sprocket shoe assembly does not close	4. Check for proper alignment & adjust (See Sec 6-4-B-1)
8. Film will not thread properly over the sound pick up area	1. Sound drum buzz pinch roller not releasing in the "STOP" position	1. Check for loose mechanical linkage (See Sec 6-4-B-6)
	2. Sound drum tension roller may be out of position	2. Check roller if loose, realign & tighten screws (See Sec 6-4-B-7)
9. Film does not engage at the #1 sprocket	1. Sprocket shoe roller tension spring broken or off	1. Replace (See Sec 6-4-B-1)
10. Upper loop is not formed correctly	1. Upper loop roller arm is out of position	1. Adjust & correct position (See Sec 6-4-B-2)
	2. Film guard arm is out of position	2. Adjust & correct position (See Sec 6-4-B-2)
	3. Deformed plate spring	3. Replace (See Sec 6-4-B-2)
11. Lower loop is not formed correctly	1. Loop-setter roller is not positioned correctly	1. Adjust (See Sec 6-3)
	2. Loose loading mechanism not activating the loop-setter	2. Check and repair (See Sec 6-4)
12. FILM GUARD does not shut off power when upper loop is lost	1. Upper loop arm is in wrong position	1. Check & adjust (See Sec 6-4-B-2)
	2. Film guard arm is in wrong position	2. Check & adjust (See Sec 6-4-B-2)
	3. Defective micro switch	3. Check & replace (See Sec 6-4-B-2)
	4. Deformed plate spring	4. Check & replace (See Sec 6-4-B-2)

III: MECHANICAL SYSTEM

SYMPTOM	PROBABLE CAUSE	REMEDY
13. Pilot lamp on, motor runs but film does not advance	1. Broken or defective motor belt 2. Motor pulley loose 3. Main drive belt off or broken	1. Replace 2. Check & tighten 3. Check & replace
14. Film speed is too slow or too fast	1. Belt installed incorrectly 2. Incorrect motor pulley 3. Incorrect line voltage	1. Re-locate belt position 2. Replace 3. Check
15. Film comes out of the path, or lifts off near the sound drum	1. Film is loaded incorrectly 2. #2 sprocket shoe rollers not seating properly 3. Buzz pinch roller's tension spring is off, or defective	1. Re-load 2. Check & adjust (See Sec 6-4-B-8) 3. Hook spring, or replace (See Sec 6-4-B-6)
16. Excessive take-up torque	1. Adjusted too tight 2. Dirty or sticky take-up arm belt or spindle 3. Take-up arm belt installed incorrectly	1. Loosen tension adjustment screw (See Sec 6-1) 2. Clean or replace (See Sec 6-1) 3. Check & re-install (See Sec 6-1)
17. Insufficient take-up tension or no take-up	1. Take-up tension adjusted too loose 2. Worn or oily belt 3. Binding spindle shaft 4. Defective take-up drive clutch 5. Broken take-up belt	1. Re-adjust (See Sec 6-1) 2. Clean or replace 3. Clean & lubricate 4. Check & repair 5. Replace
18. Weak back tension of the supply reel	1. Missing or weak back tension spring	1. Replace (See Sec 6-2)
19. Lower loop setter roller continues to activate	1. Damaged film 2. Lower loop is too small 3. Upper loop is too small 4. Too much take-up tension 5. #2 sprocket plate is loose 6. Loop setter eccentric gear dampening spring is weak 7. Loop setter gear is always in contact with the timing belt 8. Defective main drive belt	1. Check film sprocket holes for damage 2. Adjust loop setter roller position (See Sec 6-3) 3. Adjust upper loop forming system (See Sec 6-4-B-2) 4. Check take-up tension (See Sec 6-1) 5. Check & tighten 6. Stretch or replace (See Sec 6-3) 7. Adjust position of the loop setter gear, or main drive belt guide bracket (See Sec 6-3) 8. Inspect or replace

— to be continued —

(MECHANICAL SYSTEM)

SYMPTOM	PROBABLE CAUSE	REMEDY
19. Lower loop setter roller continues to activate — continued —	9. Insufficient claw protrusion or defective claw 10. Loop setter timing is incorrect	9. Check, adjust or replace (See Sec 5-1-D) 10. Check & adjust (See Sec 6-3)
20. Loss of upper loop	1. Damaged film 2. Loop setter is continually activated 3. #1 sprocket plate loose 4. #1 sprocket shoe rollers are not seating properly 5. #1 sprocket shoe position is incorrect. 6. Supply arm back tension too strong	1. Check film 2. See loop setter (See Sec 6-3) 3. Check & tighten (See Sec 6-4-B-1) 4. Check & adjust (See Sec 6-4-B-1) 5. Check & adjust (See Sec 6-4-B-1) 6. Check & adjust (See Sec 6-2)
21. Loss of lower loop	1. Damaged film 2. Excessive film lubricant 3. Main drive belt off or broken 4. Too much take-up torque 5. Loop setter continues to activate 6. Insufficient claw protrusion 7. Film shoe tension spring too strong 8. #2 Sprocket shoe position is incorrect	1. Check film 2. Clean film and film path 3. Check or replace 4. Check & adjust (See Sec 6-1) 5. See loop setter (6-3) 6. Adjust (See Sec 5-1-D) 7. Check & adjust (See Sec 5-5) 8. Check & adjust (See Sec 6-4-B-8)
22. Excessive film gate noise	1. Damaged or poor film 2. Emulsion and dirt build-up on the film shoe or aperture plate 3. Incorrect claw protrusion 4. Weak film shoe springs or film shoe not seating properly 5. Incorrect claw alignment or defective claw 6. Cam arm spring weak or broken 7. Worn cam follower (cam gliding pin) 8. Inner guide rail dirty, worn or binding 9. Film shoe closing mechanism does not completely close 10. Lower loop too small 11. Lower loop arm stop plate is out of position	1. Check film 2. Inspect & clean 3. Adjust (See Sec 5-1) 4. Check and adjust (See Sec 5-5) 5. Check, adjust or replace (See Sec 5-1) 6. Check or replace (See Sec 5-1) 7. Check and replace (See Sec 5-1) 8. Clean and adjust or replace (See Sec 5-5) 9. See Loading System (See Sec 6-4) 10. Re-set the function switch 11. Re-position & adjust

(MECHANICAL SYSTEM)

SYMPTOM	PROBABLE CAUSE	REMEDY
23. Unsteady picture	1. Emulsion or dirt build-up on the aperture plate or film shoe	1. Clean
	2. Incorrect claw protrusion	2. Check & adjust (See Sec 5-1-D)
	3. Film shoe not seating completely	3. Check & adjust (See Sec 5-5)
	4. Weak film shoe springs	4. Adjust or replace (See Sec 5-5)
	5. Improper claw alignment or defective claw	5. Check, adjust or replace (See Sec 5-1-D)
	6. Claw stroke not correct	6. Adjust (See Sec 5-1-D)
	7. Worn cam follower (cam gliding pin), or sliding pin	7. Replace (See Sec 5-1-D)
	8. Weak claw lever spring	8. Replace (See Sec 5-1-D)
	9. Inner guide rail spring missing or weak	9. Replace (See Sec 5-5)
	10. Loading mechanism does not close the gate completely	10. See loading system (See Sec 6-4)
	11. Worn cam	11. Check & replace (See Sec 5-1-D)
	12. Inner guide rail worn or binding	12. Check & replace or clean (See Sec 5-5)
	13. Outer guide rail loose	13. Check & tighten (See Sec 5-5)
	14. Worn claw lever fulcrum bushing	14. Check & replace (See Sec 5-1-D)
24. Travel ghost	1. Incorrect shutter blade position	1. Adjust (See Sec 5-1-F)
25. Insufficient framing	1. Aperture plate does not move freely, or loose	1. Disassemble and clean, or check & tighten (See Sec 5-5)
	2. Claw position or stroke is incorrect	2. Adjust (See Sec 5-1-D)
	3. Worn cam follower (cam gliding pin)	3. Replace (See Sec 5-1-D)
26. Excessive cam tank noise	1. Defective claw lever spring	1. Replace (See Sec 5-1)
	2. Defective plate spring	2. Replace (See Sec 5-1)
	3. Worn cam follower (cam gliding pin)	3. Replace (See Sec 5-1)
	4. Fulcrum bushing worn	4. Replace (See Sec 5-1)
	5. Cam shaft bearings defective or worn	5. Replace (See Sec 5-1)

(MECHANICAL SYSTEM)

SYMPTOM	PROBABLE CAUSE	REMEDY
27. Weak or slow rewind	1. Worn or slipping motor belt 2. Take-up arm clutch not rotating freely 3. Rewind Clutch spring is weak 4. Rewind clutch cork pads slipping	1. Check & replace 2. Check & adjust (See Sec 6-1) 3. Tighten (See Sec 6-5) 4. Replace (See Sec 6-5)
28. No rewind	1. Micro switch #3 and #4 are not activated 2. Defective micro switch 3. Broken supply arm belt 4. Rewind gears not engaged	1. Check & adjust (See Sec 9-1) 2. Replace (See Sec 9-1) 3. Replace (See Sec 6-5) 4. Repair or replace
29. Noisy rewind	1. Rewind gears not fully engaged 2. Worn or defective rewind gears	1. Adjust position of rewind gears activating lever (See Sec 6-5) 2. Replace (See Sec 6-5)
30. Uneven focus	1. Projector not facing screen at right angles 2. Film shoe not seated properly 3. Dirty film shoe or aperture plate 4. Film not seated in the gate 5. Inner guide rails sticking 6. Defective or incorrect lens	1. Correct position for right angle 2. Check & adjust (See Sec 5-5) 3. Clean 4. Check and reload film 5. Remove and clean or replace rail spring (See Sec 5-5) 6. Replace
31. STILL-RUN lever is activated to "STILL" but picture is not freezed	1. Still picture clutch mechanism is out of adjustment	1. Check and adjust (See Sec 5-1-G)

IV: LAMP CIRCUIT

SYMPTOM	PROBABLE CAUSE	REMEDY
31. Lamp life is abnormally short	1. Poor lamp socket connection	1. Replace lamp socket
	2. Cooling is restricted	2. Locate & remove
	3. Defective lamps, or incorrect lamp other than EIKI ELC type SSL-0L: other than EWG or EYK 120V 300W type	3. Check & replace
	4. Excessive or fluctuating AC line voltage	4. Check AC line
32. Insufficient illumination	1. Weak lamp, or incorrect lamp other than EIKI ELC type SSL-0L: other than EWG or EYK 120V 300W type	1. Check & replace
	2. Hi-low switch in the low position SSL-0L: not applicable	2. Switch to Hi position
	3. Slow or defective lens	3. Try another lens
	4. Low AC line voltage	4. Check AC line
	5. Improper shutter	5. Check or replace
	6. Light heat shield blocking part of the aperture	6. Re-align heat shield (See Sec 5-1-G)
	7. Lamp socket & bracket not seated properly	7. Check & correct position (See Sec 8-1)

V: SOUND SYSTEM

SYMPTOM	PROBABLE CAUSE	REMEDY
33. No sound and the exciter lamp is not on	1. Amplifier is not turned on	1. Turn on
	2. Function control not in the ⊙ or ☇ position	2. Check
	3. 9 pin amplifier plug defective	3. Check & repair, or replace
	4. Defective exciter lamp	4. Replace
	5. Defective exciter lamp socket	5. Replace or repair
	6. Exciter lamp fuse blown	6. Check & replace
	7. Slide switch in the mag position	7. Switch to optical
	8. Defective amplifier module	8. Repair or replace (See Sec 5-2)
	9. Defective exciter lamp power supply of the transformer module	9. Repair or replace (See Sec 5-4)
	SSL-0L: Defective exciter lamp power supply circuit of the motor module	(See Sec 5-3)
	10. Film guard switch is actuated or open	10. Check & repair, or replace (See Sec 6-4-B-2)
34. No sound, Exciter lamp is on	1. Amplifier volume is too low	1. Check & adjust
	2. Function switch not in the ⊙ or ☇ position	2. Check (See Sec 9-1)
	3. Sound muting micro switch defective or not activated	3. Check, replace or adjust (See Sec 9-1)
	4. 5 pin sound terminal plug disconnected or defective	4. Check & replace (See Sec 5-2)
	5. Rear cover speaker unplugged	5. Check & plug in
	6. Defective speaker	6. Replace
	7. Defective extension speaker jack	7. Repair or replace
	8. 2 amp fuse blown	8. Replace
	9. Defective solar cell or connections	9. Repair & replace (See Sec 5-2)
	10. Dirt or foreign object in sound optics	10. Clean
	11. Defective amplifier module	11. Replace
	12. Defective Amp. power supply circuit of the transformer module	12. Check & replace (See Sec 5-4)
	SSL-0L: Defective Amp. power supply circuit of the motor module	(See Sec 5-3)

35. Poor sound or low volume	1. Incorrect exciter lamp	1. Check & replace
	2. Defective exciter lamp	2. Replace
	3. Dirty exciter lamp	3. Clean
	4. Dirt in the sound focus lens or defective lens	4. Clean or replace (See Sec 7-1)
	5. Sound optics incorrectly aligned	5. Re-align sound pick-up system (See Sec 7-1)
	6. Low exciter lamp voltage, or low AC supply voltage	6. Check & repair amplifier exciter lamp supply (See Sec 5-2) Check wall outlet
	7. Weak or defective solar cell	7. Replace
	8. Defective speakers	8. Replace
	9. Poor film quality	9. Check with another film
	10. Defective amplifier module	10. Replace (See Sec 4-2)
36. No sound (magnetic only)	1. Mag/opt switch in the optical position	1. Check
	2. Magnetic head not in contact with the sound track	2. Check & adjust (See Sec 7-2)
	3. Defective magnetic reproduce head	3. Replace (See Sec 7-2)
	4. Mag/opt switch defective	4. Replace
	5. Defective amplifier module	5. Replace
37. Poor sound or low volume (magnetic only)	1. Dirty magnetic head	1. Clean
	2. Head not making good contact with the film	2. Adjust (See Sec 7-2)
	3. Incorrect sound head alignment	3. Align (See Sec 7-2)
	4. Defective magnetic head	4. Replace
	5. Defective speaker	5. Replace
	6. Poor sound track	6. Check with another film
	7. Defective amplifier module	7. Replace or repair (See Sec 5-2)
38. Exciter lamp fuse blows	1. Excessive AC line voltage	1. Check
	2. Incorrect fuse	2. Check & replace
	3. Incorrect exciter lamp	3. Replace
	4. Defective exciter lamp power supply	4. Check & repair (See Sec 5-2) (SSL-0L: Sec 5-3)
	5. Defective exciter lamp	5. Replace
	6. Defective exciter lamp socket	6. Replace
39. Amplifier fuse blows	1. Incorrect fuse	1. Check & replace
	2. Improper connection to an external speaker system	2. Check
	3. Defective amplifier module	3. Repair or replace (See Sec 5-2)

(SOUND SYSTEM)

SYMPTOM	PROBABLE CAUSE	REMEDY
40. Excessive amplifier hum (optical)	1. Defective exciter lamp supply	1. Check voltage & repair (See Sec 5-2)
	2. Improper connection to external speaker system	2. Re-connect correctly
	3. Defective solar cell or connections to amplifier	3. Check & repair
	4. Front or rear cover speaker jacks not insulated from the chassis properly	4. Check & repair
	5. Defective amplifier module	5. Repair or replace (See Sec 5-2)
41. Excessive Hum (magnetic)	1. Motor shield not installed	1. Check
	2. Defective magnetic head	2. Replace (See Sec 7-2)
	3. Magnetic head not in contact with the film	3. Adjust
	4. Poor shielding to the head or the head coil shorted to the projector's frame.	4. Repair
	5. Improper connection to external speaker	5. Re-connect correctly
	6. Poor film recording	6. Check with another film
	7. Defective amplifier module	7. Repair or replace (See Sec 5-2)
42. Excessive wow and flutter	1. Flywheel is not installed	1. Check & install
	2. Insufficient flywheel plate spring tension	2. Adjust by bending or replace (See Sec 6-6)
	3. Buzz pinch roller not riding parallel to the sound drum	3. Adjust & correct (See Sec 6-4-B-6)
	4. Buzz pinch roller tension spring insufficient	4. Adjust or replace (See Sec 6-4-B-6)
	5. Tension roller spring is weak, or too strong	5. Adjust or replace (See Sec 6-4-B-7)
	6. Uneven take-up torque	6. Repair & adjust (See Sec 6-1)
	7. Rear dampening roller tension is weak	7. Adjust or replace spring
	8. Defective sound drum bearings	8. Replace (See Sec 6-6)
	9. Any film path rollers not rotating freely	9. Check & lubricate (See 3-3)
	10. Any drive gears rotating eccentrically	10. Check & adjust, lubricate (See 3-3)
	11. Uneven contact of film sound track	11. Check & adjust (See Sec 6-4)
	12. Film contacts the lower loop setter roller	12. See loop setter adjustment (Sec 6-3)
	13. Excessive film lubricant	13. Clean film and film path

322-4: MODULE REMOVAL AND INSTALLATION PROCEDURES

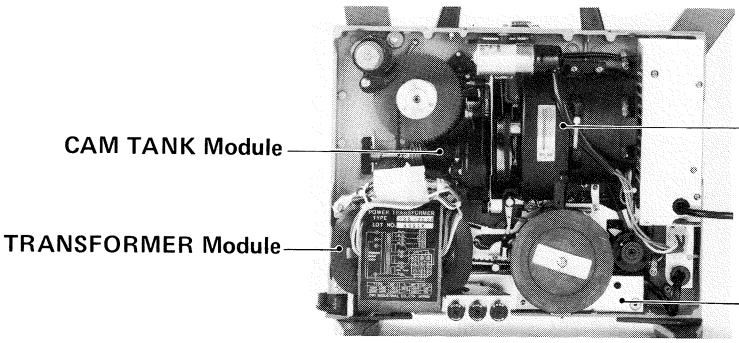
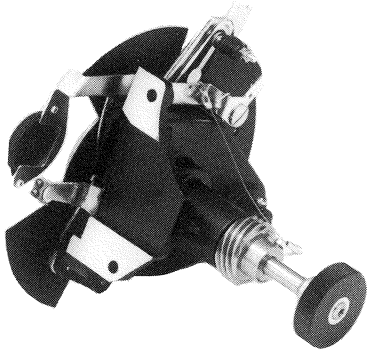


Fig. #7

4-1 : CAM TANK MODULE

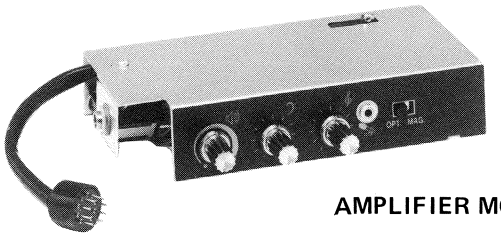
1. Turn function switch to "MIC" position.
2. Remove transformer module.
3. Remove motor belt, main drive belt. To remove main drive belt, it is easier with the function switch at "STOP" position.
4. Unhook the cable from the still picture clutch by removing the small screw in the STILL-RUN control Arm.
5. Unscrew the 2 screws supporting the cam tank.
6. Remove cam tank slowly and carefully. Claw should not touch the main casting or any other metal parts.
7. Re-installation can be done by reversing the above procedure. Checking the adjustment of claw and No. 2 sprocket teeth timing is necessary and critical. See section 5-1. Also check loop setter timing adjustment, See section 6-3.



CAM TANK MODULE Fig. #8

4-2 : AMPLIFIER MODULE

1. Remove flywheel.
2. Unplug the rear cover speaker cord.
3. (for ESL-2, SSL-2 models only) Unscrew the shoulder screw hooking up the OPT/MAG switch lever, and remove the lever.
4. Unplug 5 pin sound terminal connector.
5. Remove the three transformer mounting screws and the fuse holder.
6. Unplug MT 9 Pin socket.
7. Amplifier is hooked by the two screws. Push in on the amplifier's chassis, allowing the edge of the chassis to release from under the two screws mounted in the bottom of the casting. Sometimes a slight pry with a flat blade screw driver may be necessary to remove a stuborn amplifier. Slide the amplifier out.



AMPLIFIER MODULE Fig. #9

4-3 : MOTOR MODULE

1. Remove motor belt.
2. Disconnect motor nylon connector.
3. Unscrew 3 mounting screws.
4. Remove motor module.
5. To re-install reverse the above procedures.
   Don't forget to reset the nylon connector(s).

Fig. #10

MOTOR MODULE

4-4 : TRANSFORMER MODULE

1. Remove the three mounting screws.
2. Unplug nylon connectors.
3. To re-install reverse the above procedures.
   (Care should be taken that the wires are routed away from any moving parts of the projector)

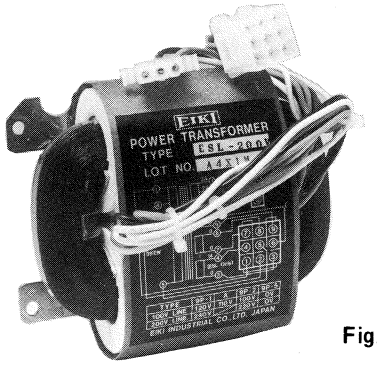


Fig. #11

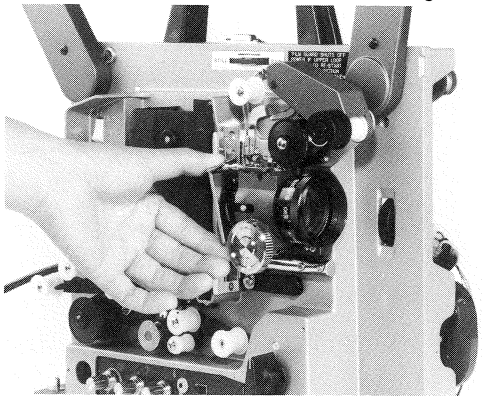
TRANSFORMER MODULE

4-5 : FILM SHOE AND BRACKET ASSY., LENS HOLDER ASSY., FILM GATE ASSY.

(A) Film Shoe and Bracket Assy.

1. Set function rotary switch at "STOP" position.
2. Remove the lens holder cover plate assembly.
3. Pull from the top of the film shoe bracket.
4. To re-insert the film shoe and bracket assy., slide the pin into the lower slot of the reception bracket and swing the film shoe and bracket assy. into the upper slot until the plate spring latches it in place.

Fig. #12



(B) Lens Holder assy.

1. Remove the lens holder cover plate assy.
2. Rotate the lens focus knob and advance the lens until rear of the lens clears the film shoe.
3. Unscrew the Phillips mounting screws (1 on the top, 2 at the bottom).
4. To re-install, reverse the procedure.
5. Care should be taken to avoid adjusting the two small slotted screws, otherwise the side to side focus will be affected.

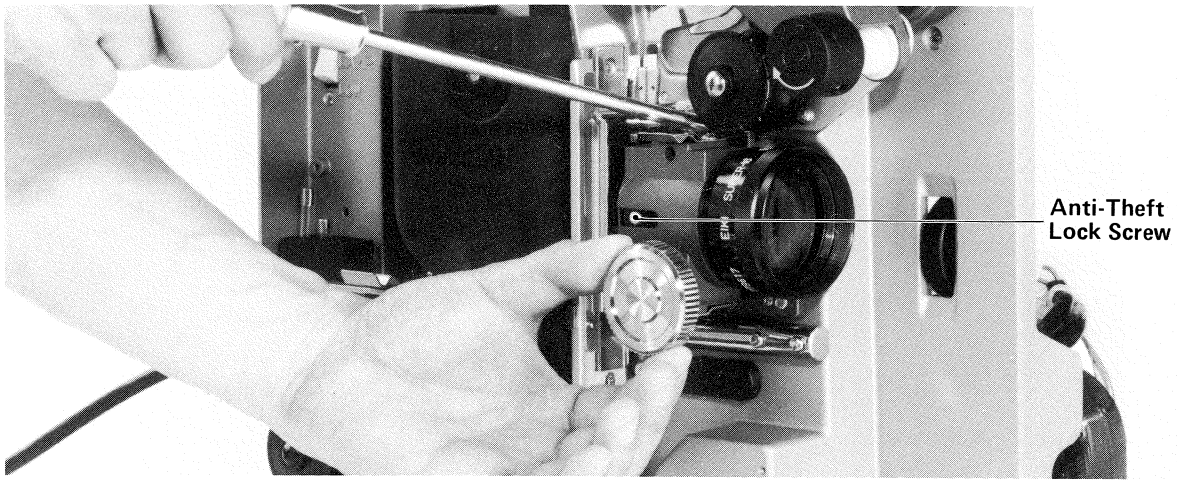


Fig. #13

Note : For USA and Canadian models, anti-theft lock screw secures the lens.

(C) Film Gate Assembly Removal.

1. Turn the rotary switch to "STOP" position.
2. Remove the No. 1 sprocket shoe bracket assy by loosening the set screw.
3. Remove the film shoe and bracket assy. (see 4-5-A).
4. Turn the rotary switch to "MIC" position to disengage the side pressure control lever from the gate.
5. Using a long screw driver, unscrew the top and bottom mounting screws of the film gate. Care should be taken not to damage the claw.
6. To re-install, reverse the above procedures.

Note : Care should be taken to insure that the Inner Guide Rail interlocking system is working properly.

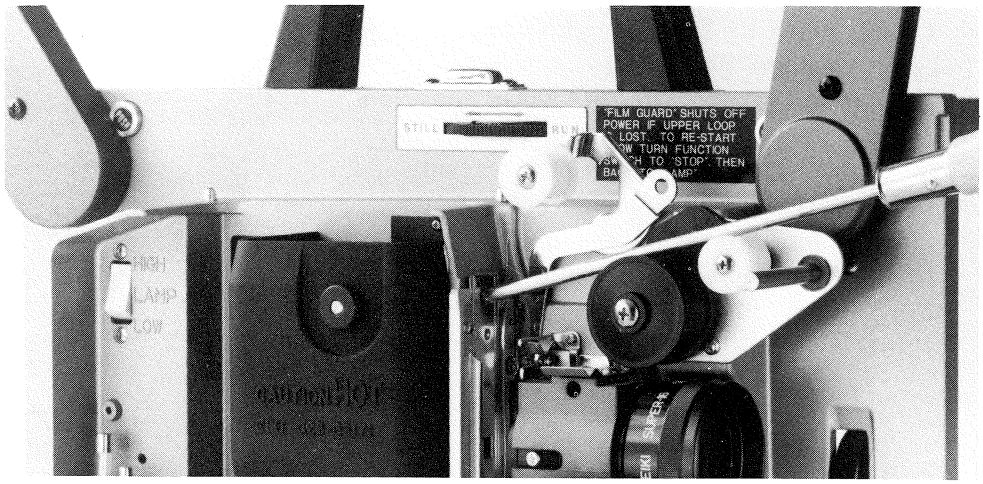


Fig. #14

322-5: MODULE REPAIR AND ADJUSTMENTS

5-1 : CAM TANK MODULE

A. SPECIFICATIONS

1. Revolution
   24 FPS. 1440 RPM.
   18 FPS. 1080 RPM.
2. Cam Claw Protrusion MIN. 1.0mm – MAX. 1.2mm (.040" to .045")
3. Claw Pitch 7.64 – 7.67mm
4. Tension of Claw Lever Spring 322-11161
   1.2 – 1.25kg.
   Note : Tension of claw lever spring is measured with a tension scale pulling on cam claw and the claw lever spring stretched to maximum.

B. DISASSEMBLY OF CAM TANK

1. Remove cam tank module as described in sec. 322-4-1.
2. Remove two slotted screws (49), and slide out the still picture clutch lever. (Not used on Models SSL-0L)
3. Unscrew the screw (47) at the end of the cam shaft (3).
4. Remove shutter pulley (42) and the shutter blade (39).
5. Unscrew three screws (38) and remove cover plate (37). If necessary, turn the shutter blade (39) to expose the screws. The heat filter glass Arm assy (54) can stay on the cover plate. In reassembling the cover plate, make sure the spring (55) is seated in correct position on the cam housing (1).
6. A hole in the curved plate spring (24) fits over fulcrum control pin (16). Unscrew the screw (25) and remove curved plate spring.
7. Unhook the claw lever spring (33), and remove claw lever assy. (26).
8. To remove cam (10) and cam plate (9), unscrew the three set screws (11).
9. To remove cam shaft assy., remove inching knob (7) and worm gear (5).
10. To replace the cam tank bearings, the inner bearing is pressed on the cam tank shaft and should be replaced as part of the cam shaft bearing assy.
    The outer bearing may be replaced separately.
11. Clean all the old dried molybdenum grease from the cam tank.
12. Avoid using a de-greaser or solvent which may wash the lubricant from the cam shaft ball bearings.

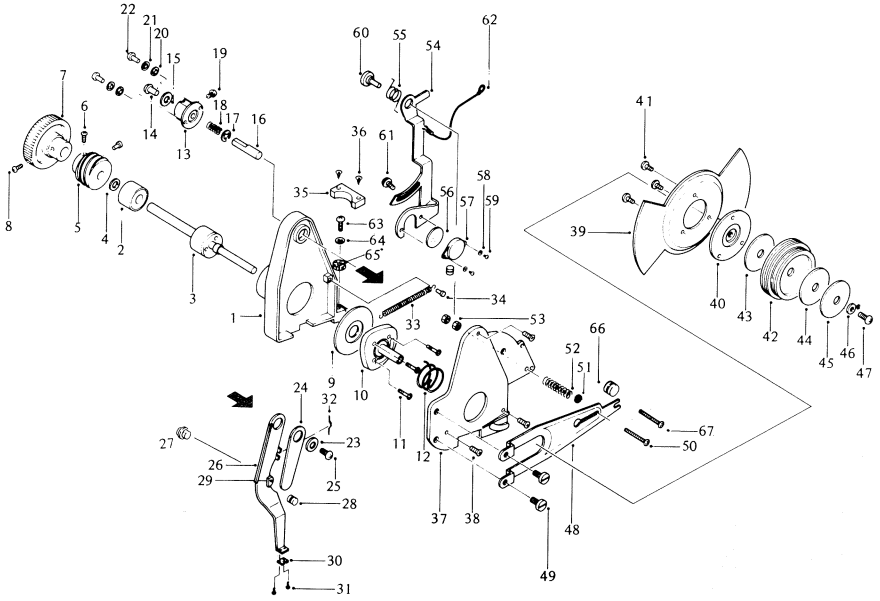


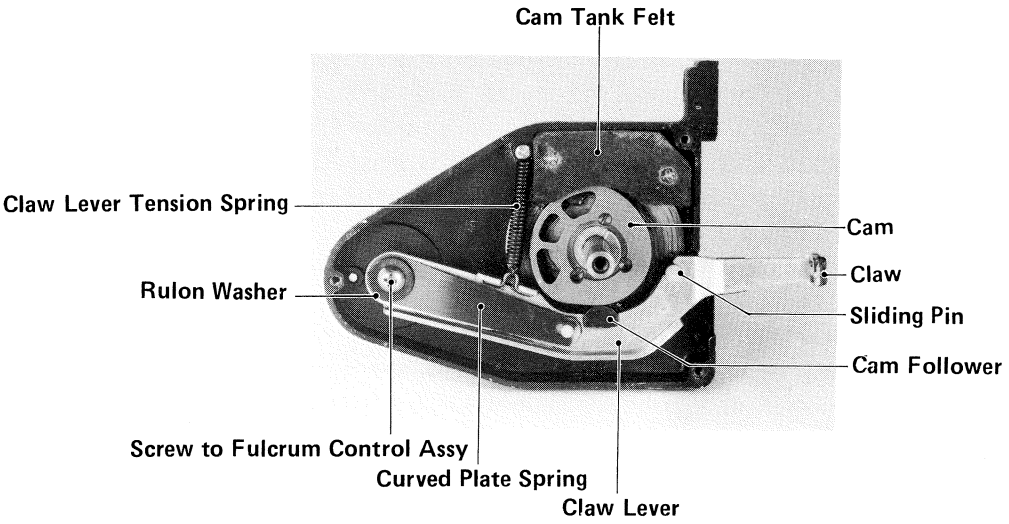
Fig. #16

C. REASSEMBLY OF CAM TANK BY REVERSING THE ABOVE PROCEDURE

1. Make sure curved plate spring is not jammed between the end of fulcrum pin and washer (23) 312-11681.
2. The cam shaft should have no end play.
3. Worm gear is mounted without any clearance between the cam tank bearing.
4. No end play is allowed in the ball bearings on the cam shaft.
5. When overhauling the cam tank, it is suggested that the felt oil pad be replaced.
6. Re-lubricate the cam area with a small amount of molybdenum disulfide grease and moisten the felt with a few drops of molybdenum oil.
7. If the shutter blade has not been removed from the hub, no synchronization adjustment is required. For correct synchronization see sec. 4-1-F.

D. ADJUSTMENTS

1. Claw Protrusion



a. Claw protrusion can be adjusted by the fulcrum collar. As the sliding pin 312-11181 wears, the protrusion will increase.
b. Loosen set screw (A) by 1/8 of turn as indicated in Fig. #17.
c. Turn screw (B). Loosening screw (B) (counterclockwise) increases the claw protrusion. Tightening the screw (B) (clockwise) decreases the claw protrusion.

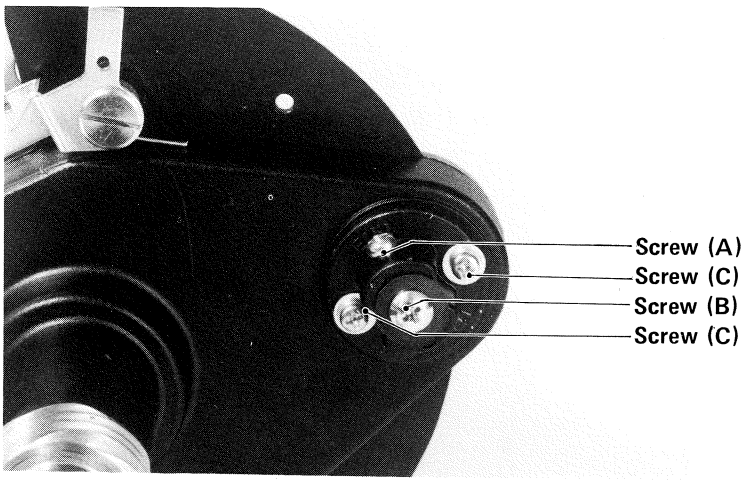


Fig. #17

d. Checking claw protrusion using Tool No. 320-01T (Fig. #18), or equivalent.
   (1) Set the function switch at "MIC" position.
   (2) Remove Lens Holder Cover Plate.
   (3) Remove Film Shoe and Bracket Assy.
   (4) Attach the tool between the inner guide rail and the outer guide rail.
   (5) With the edge-side that has the smaller "V" notch and claw protrusion should be enough to touch.
   (6) Change to the side that has the larger "V" notch and the claw should move freely.

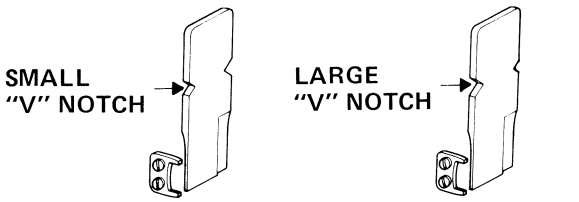


Fig. #18

e. When using another type of claw protrusion gauge of similar specifications as (322-4-1-A), disregard Item (d) and follow the instructions associated with that gauge.

2. Claw Position And Framing Adjustments:
   a. If the claw does not enter the center of the film perforations, or if the framing adjustment is insufficient, the claw position should be adjusted. This adjustment can be either horizontal or vertical. To adjust, slightly loosen the two screws (C) of the fulcrum assy. shown in Fig. #17.
      (1) Framing Adjustment: This is best accomplished with the projector running, showing a shop test film. With the framing control lever in the up position, the frame bar of the film should appear as in Fig. #19 and in the down position the frame bar should appear as in Fig. #20.

Fig. #19

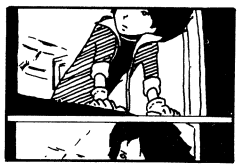
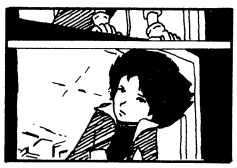


Fig. #20



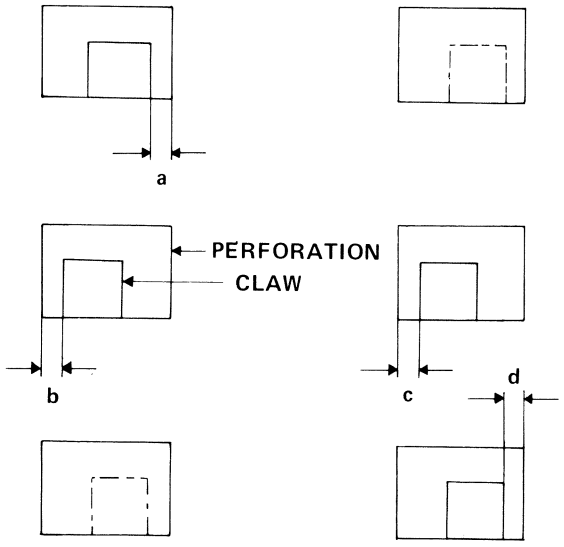
      (2) If the conditions in step 1 are not correct, adjust the vertical or up and down position of the fulcrum assy. by slightly loosening screws (C) (Fig.#17)The fulcrum assy. requires only a very small movement to effect the framing position.
      Note : If framing range as indicated cannot be reached, check for a worn cam follower (or cam gliding pin. 312-11641) (Fig. #17)
      (3) Checking Position For Correct Alignment With The Sprocket Holes: To view the claws position in the sprocket holes, thread a strip of good film. Remove the film shoe and bracket assy. With a standard 50mm (2") lens installed, look through the lens. Focus and rotate the inching knob while observing the claw position in the film sprocket holes.

(4) Fig. #21 indicates the correct position of the claw just before the start of the pull-down. Fig. #22 indicates the position after completion of the pull down.

(5) To adjust the claw position, move the fulcrum assy. horizontal and slightly vertical until the distances a, b, c, d are equal as indicated in Fig. #21, #22.
Upon completion of the position adjustment, tighten the fulcrum assy. screws and re-check the framing range with the projector running.

Fig. #21
BEFORE PULL DOWN

Fig. #22
AFTER PULL DOWN

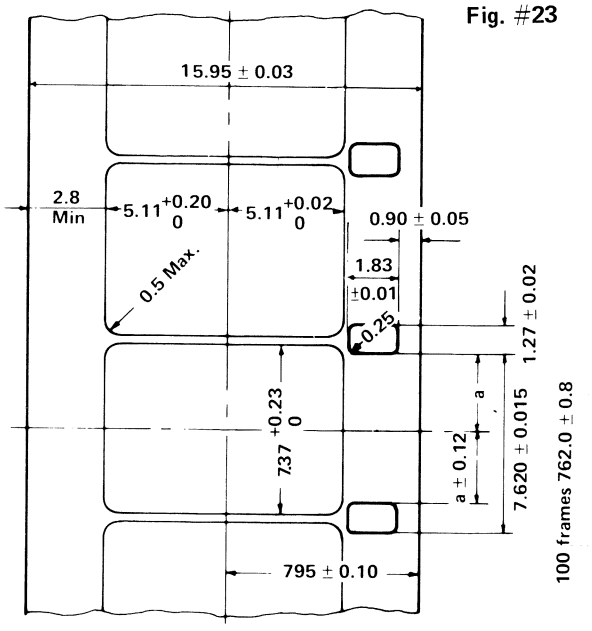


E. REPLACING THE CLAW

When replacing a worn or defective claw, it is important to mount the claw correctly before securing the mounting screws. Incorrect claw mounting may result in excessive film gate noise or unsteady picture.

International Dimension of the 16mm Film

Fig. #23



1. Correct Claw Pitch

a. The international dimensions of the 16mm film are shown in Fig. #23. Claw pitch is set at 7.64 – 7.67mm. A pitch less than 7.64mm will cause the claw to engage the film between perforations possibly causing film damage or unsteady pictures.

b. A pitch more than 7.67mm will cause excessive gate noise. Typical film perforation should have a pitch of 7.605 – 7.635mm, but older films may have a smaller pitch due to shrinkage.

c. The claw as shown in Fig. #24 has a 5° angle at the top tooth, and should the claw pitch become larger than the pitch of the perforations, this would help prevent any film damage.

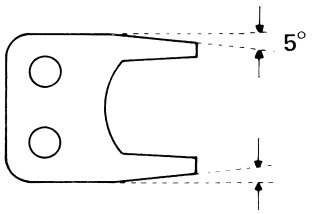


Fig. #24

2. Adjusting of The Claw Pitch

a. Moving the fulcrum control assy.: Fig. #25 shows the correct position between the cam and the cam follower (cam gliding pin, 312-11641). The contact point of the cam follower with the cam will change the pitch. Moving the fulcrum control assy. to the left decreases the pitch and moving it to the right increases the pitch.

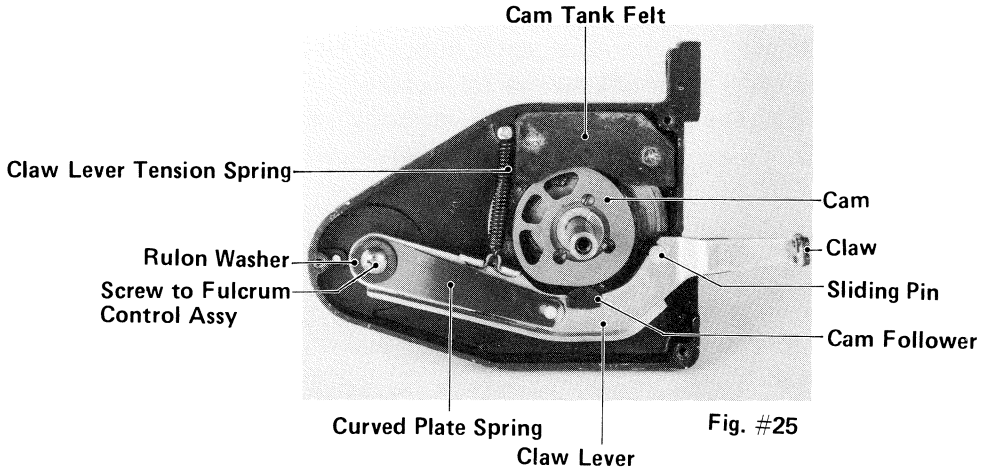
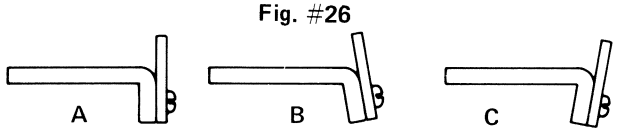


Fig. #25

b. The fulcrum control assy. should only be moved slightly. Too much adjustment will cause the claw to hit the sides of the film perforations causing film jitter.

c. Correct claw angle is shown in Fig. #26-A. Under some circumstances a bent claw lever as shown in Fig. #26-B and -C may have to be corrected by straightening out the claw.

Fig. #26



3. Claw Lever Tension

(See Fig. #25)

The claw lever tension force should be from 1.2 to 1.25kg when the spring is stretched to the maximum travel of the claw lever arm. If the tension is too weak, the cam follower may float off the cam surface causing excessive gate noise and an unsteady picture. On the other hand, if the spring is too strong the cam follower may wear out prematurely or cause a slight hesitation to the claw lever when the projector is initially started. To obtain the correct tension it may be necessary to replace the spring. A slight adjustment can be made by stretching the spring if necessary.

F. CHANGING SHUTTER BLADES

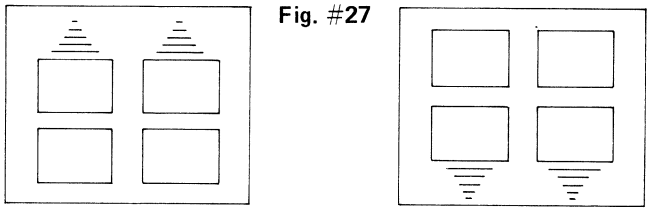


Fig. #27

Two, three and five bladed shutters can be mounted on the shutter hub. The mounting holes used to secure the blades to the hub allow a small adjustment for shutter blade timings. Incorrect shutter timing results in what is commonly called "travel ghost". The adjustment is accomplished using the SMPTE test film and adjusting the blade position for minimum upper or lower image movement as shown in Fig. #27. Since the adjusting screws are only accessible with the cam tank removed, this becomes a trial and error adjustment. However, the skilled technicians can accomplish this in one or two adjustments.

When mounting a 2 blade shutter to the center hub, the recessed circle of the blades must be toward the side where the 3 mounting screws are located.

The relationship of the shutter blade to the indexing semicircle on the hub must be as illustrated in Fig. #28. 3 blade shutters will always index correctly.

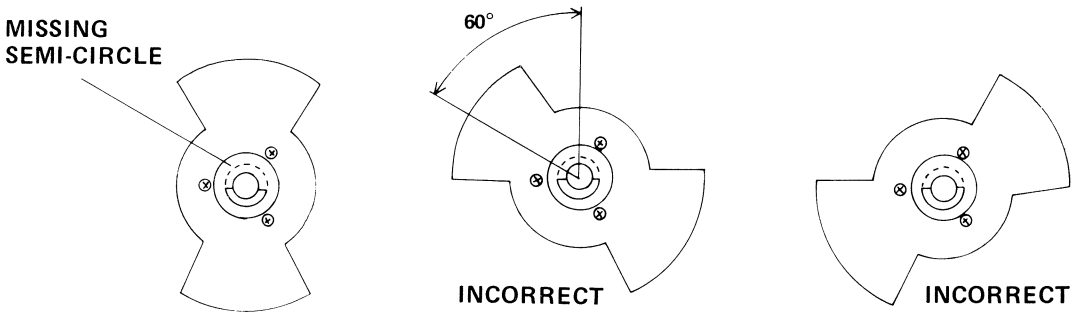


Fig. #28

G. STILL PICTURE CLUTCH MECHANISM

1. Description:

The still picture control "RUN-STILL" (32) is spring loaded and snaps into position when operated.

When placed in the still mode the wire cable tension is released, dropping the (54) heat filter in front of the projection lamp.

At the same time the "RUN-STILL" lever moves the shutter (39) and clutch hub assembly away from the shutter pulley (42), disengaging the shutter blade and cam shaft.

The shutter pulley (42) is now free to rotate on the cam shaft without turning the camtank mechanism.

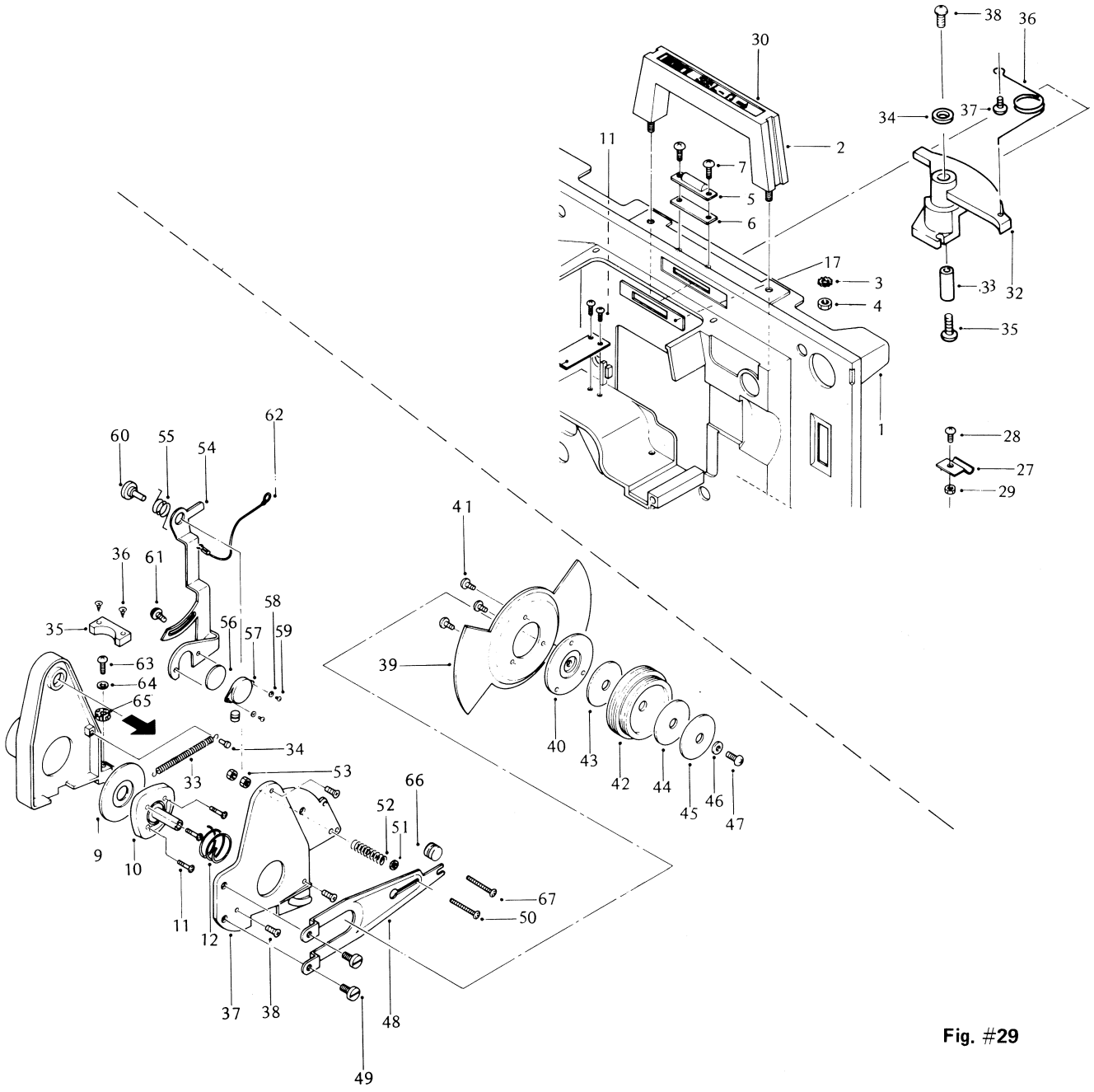


Fig. #29

Still PictureClutch Mechanism in "RUN" Position

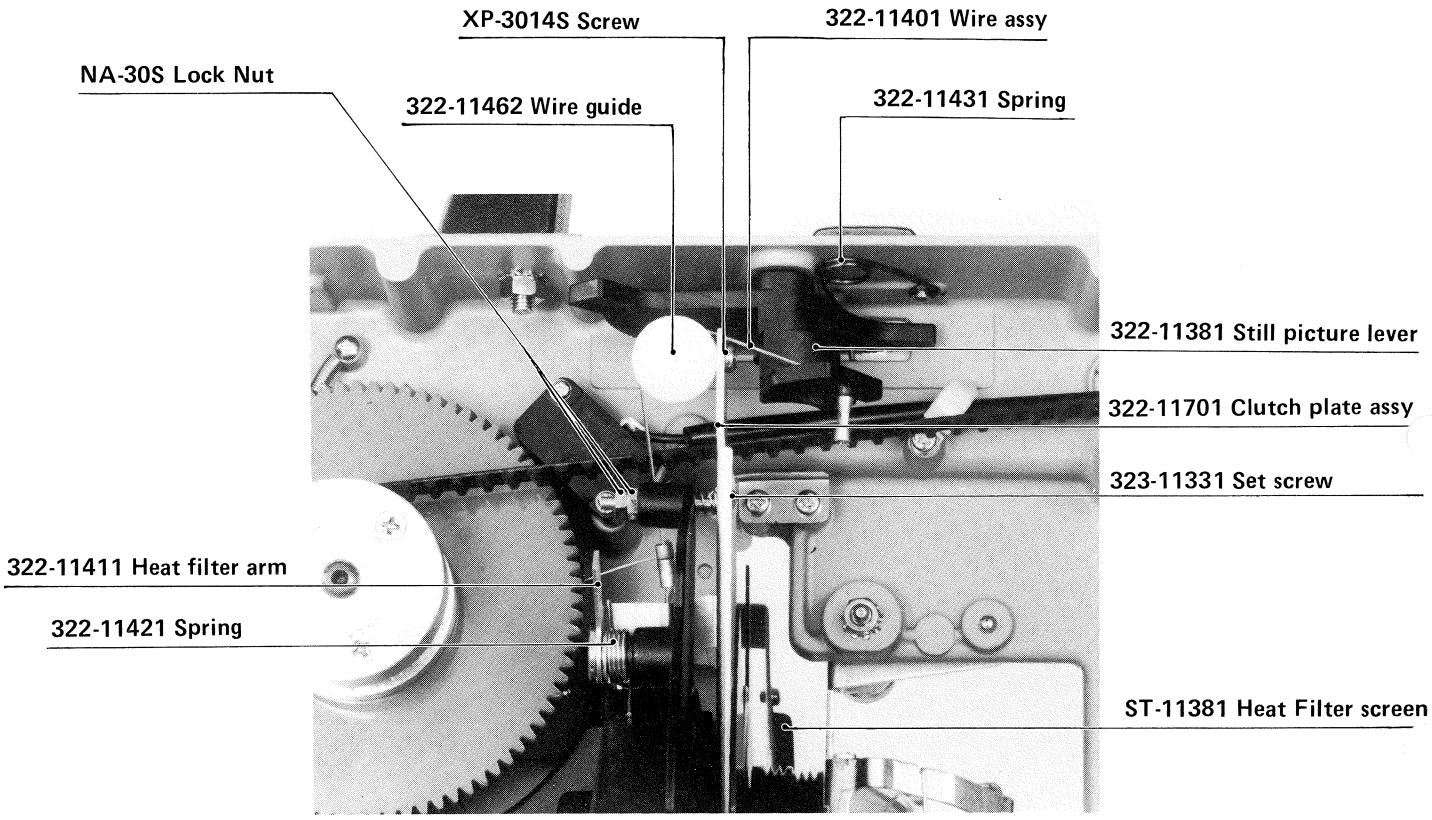


Fig. #30

Still Picture Clutch Mechanism in "STILL" Position

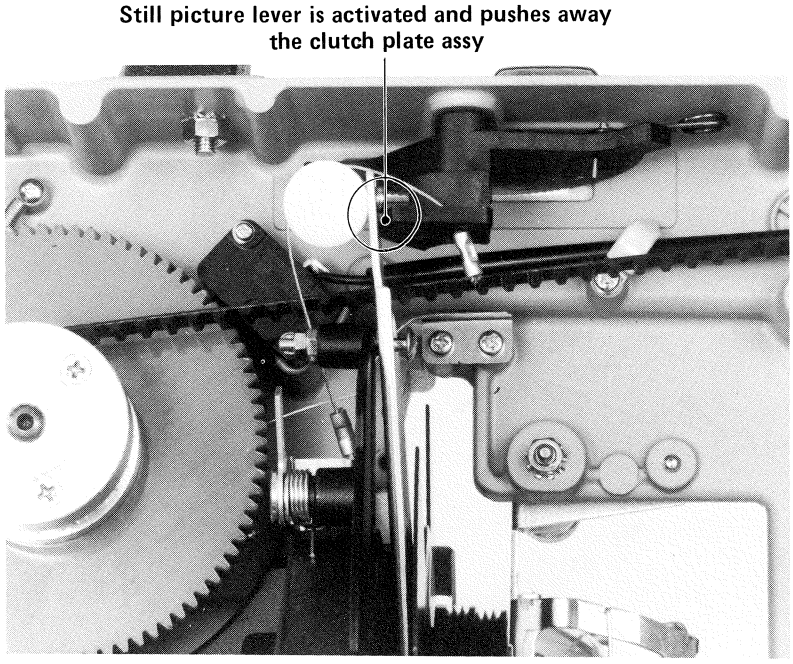


Fig. #31

2. Adjustment:

(a) In the run position the spacing between the clutch lever and the inside flange of the shutter hub should be approximately 0.2mm (see "Fig. #32). Adjust the set screw (322-11331)

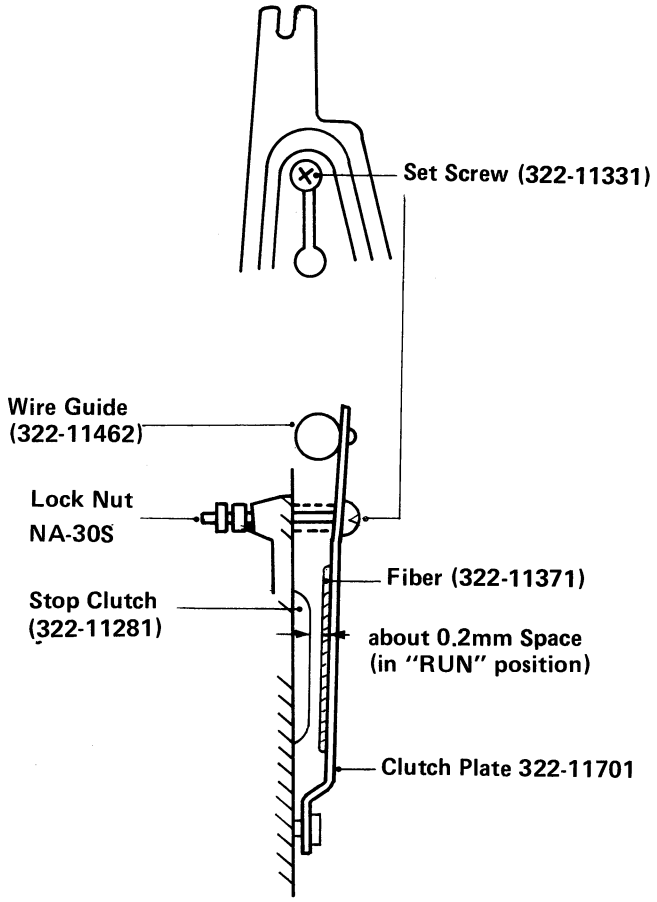
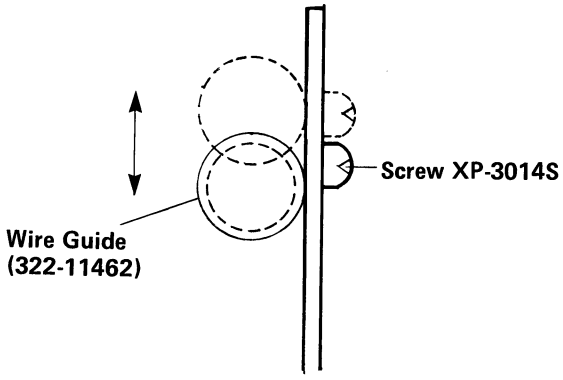


Fig. #32

for correct spacing and secure the jam nuts. The above adjustment is critical for proper clutch action. If the space is too large, the clutch will not release in still and if the space is smaller, the clutch will slip in run.

(b) The correct position of the heat filter is determined by the cable tension.
In the run position the cable is tight, holding the heat filter above the aperture opening. Adjust the white duracon wire guide position to insure that the heat filter is clear of the optical path (see Fig. #33)

The angle of the wire guide should also be adjusted so as to provide a straight pull to the heat filter lever.



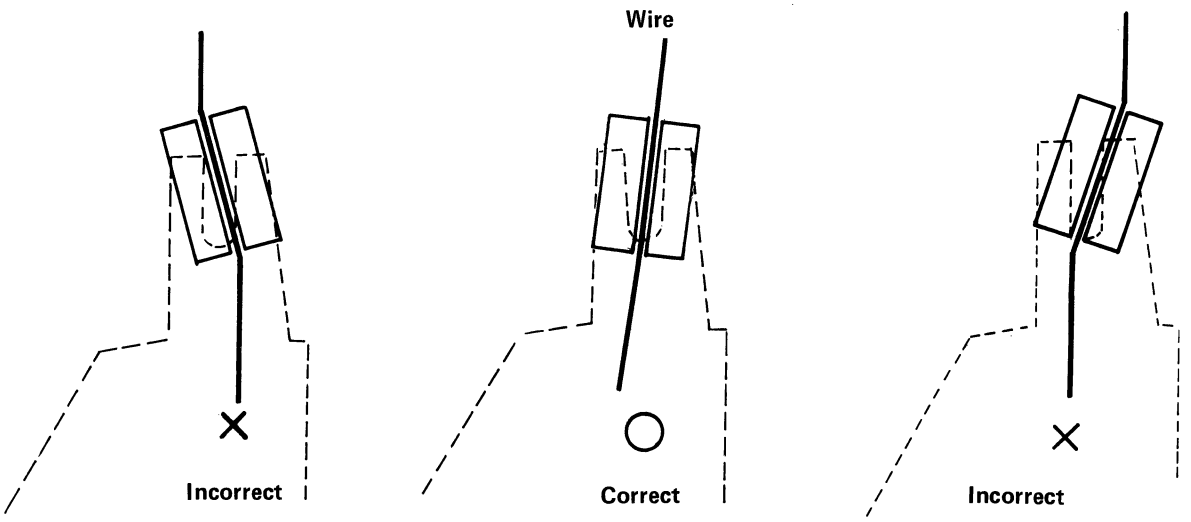


Fig. #33

Correct Angle of Wire Guide

The heat filter lever is spring loaded and in the still position the cable should provide sufficient slack to allow the heat filter to drop in front of the lamp.

(c) The above adjustments should be checked whenever a cam tank module has been removed and re-installed.

5-2 : AMPLIFIER MODULE

Refer to Amplifier Circuit Diagrams for the following:

A. Specifications

1. Solid State, "2" IC and "8" transistors
2. Output Power: 25 watts RMS 8 ohm load
   15 watts RMS for Models SSL-0L & SSL-1L
3. Distortion: Less than 5% at 400Hz
   Less than 3% at 1KHz
4. Wow & Flutter: Less than 0.2% WRMS.
5. Frequency Response: Optical 50Hz – 7000Hz ±4db
   Magnetic 50Hz – 12000Hz ±4db
6. S/N ratio of the amp: 60db
7. MIC input impedance: 600 ohm and up (Hi Z)
8. MIC input level: 10mv max.
9. Speaker Jacks: 8 ohms
10. Aux output: 600 ohm un-balanced –20db to 0db (1.4V)
    10K ohm +19db (7.0V)

B. Amplifier Power Supply Circuit

AC power to the amplifier is supplied from the 46V AC secondary windings of the transformer through pins #1 & #2 of the 9 pin socket (MT-9P), dual diodes D-4 & 5 bridge rectifier, filtered by capacitor C-35 providing the amplifier voltage of approximately 62V DC. The 8V AC transformer secondary winding supplies AC exciter lamp voltage through pins #4 & #5 of the 9 pin socket. Dual diodes D-6 & 7 form a bridge rectifier which is filtered by capacitor C-36, C-37, and C-38. Zener D-3 provide a base reference to TR-7. R-42 is a current sense resistor serving as feedback to TR-8's base. TR-7 acts as a series regulator with a voltage sense from TR-8 to maintain the 3.5 volt to 4 volts. DC Exciter Lamp voltage is routed through pins #8-9 of 9 pin socket to the exciter lamp.

In magnetic playback the base input voltage to TR-7 is held at 0V, turning TR-7 "OFF".

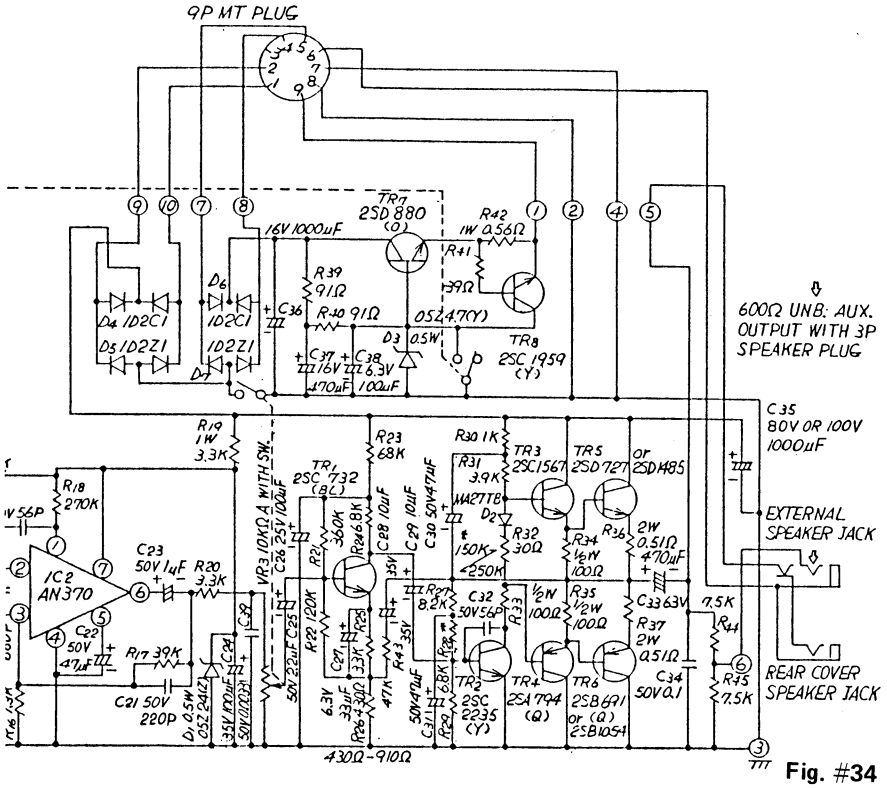


Fig. #34

C. Audio Amplifier Circuit

The input from the solar cell or magnetic head is accomplished through the 5 pin connector and switched to their appropriate impedance loading circuit. Models with optical sound capabilities only have amplifiers without the opt/mag switch. The input signal is routed through the MIC jack and coupled to IC-1 (AN-370) via capacitor C-3 and resistor R-6.

R-8, 9 and 10 C-8 and 9 form the opt/mag input equalization network, with feed back from the tone controls VR-1 and VR-2.

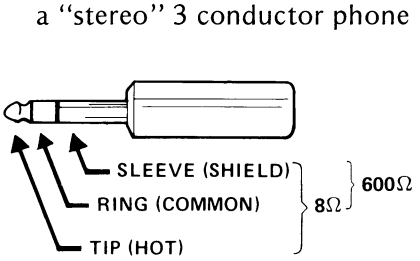
Tone control equalization is accomplished by R-13, 14 and 15 and capacitors C-13, 14, 16 and 17.

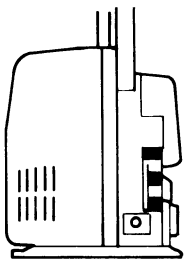
From the tone controls the signal is coupled to the pin 2 of IC-2 (AN-370) via C-18 and R-15, and IC-2.

The output of IC-2, pin-6 is coupled through C-23 and R-20 to VR-3 (volume control). The wiper of VR-3 is coupled through C-25 to the base of TR-1 amplified and coupled to the base of TR-2, from TR-2 the signal is phase split to intermediate drivers TR-3 and TR-4 respectively. The final complimentary drivers TR-5 and TR-6's emitter are coupled to R-36 and R-37 through C-33. The final driver to the speaker jack is from the negative side of C-33 and ground. Note that the output to the rear cover speaker jack is switched through the external speaker jack.

600 ohm un-balanced aux line output is available through the external speaker jack provided a "stereo" 3 conductor phone plug is used.

Fig. #35





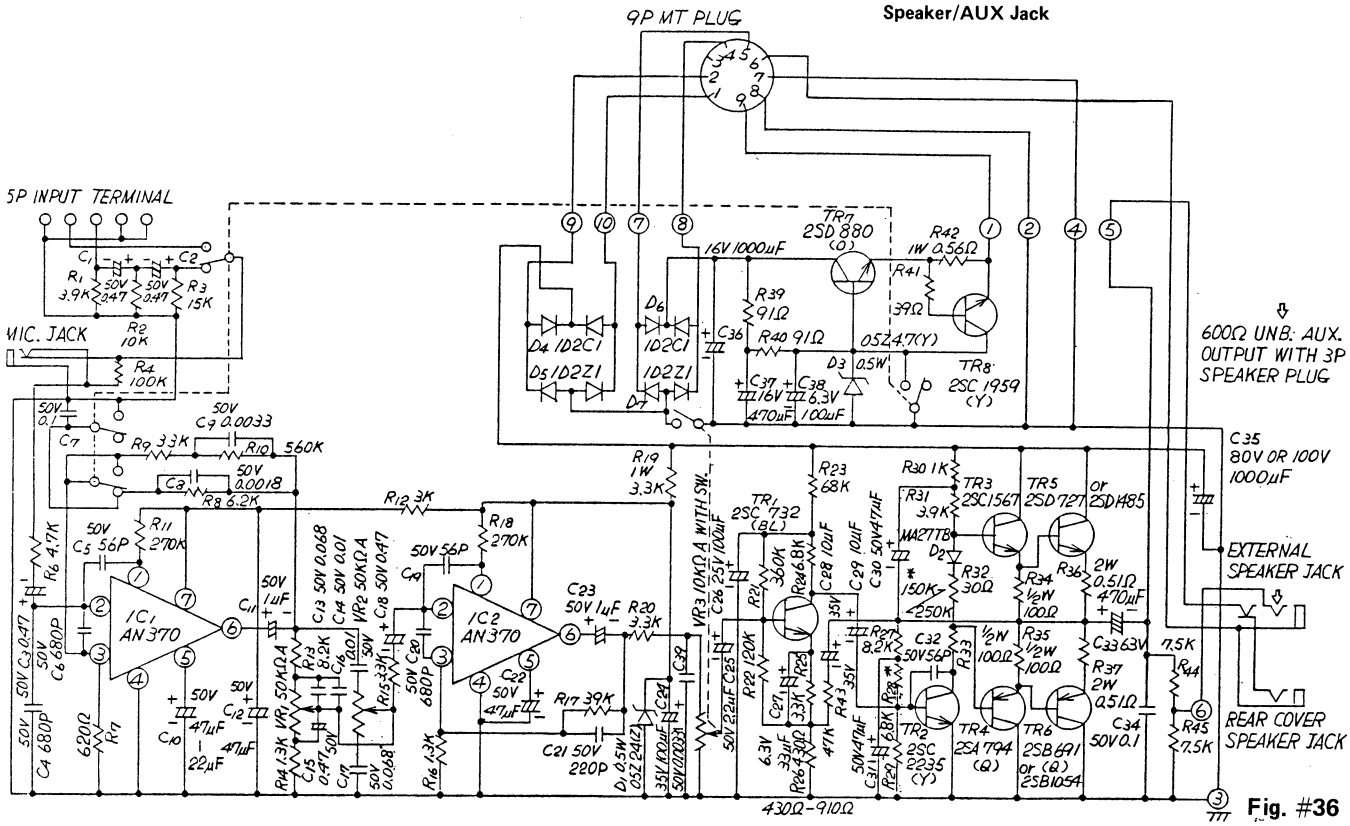
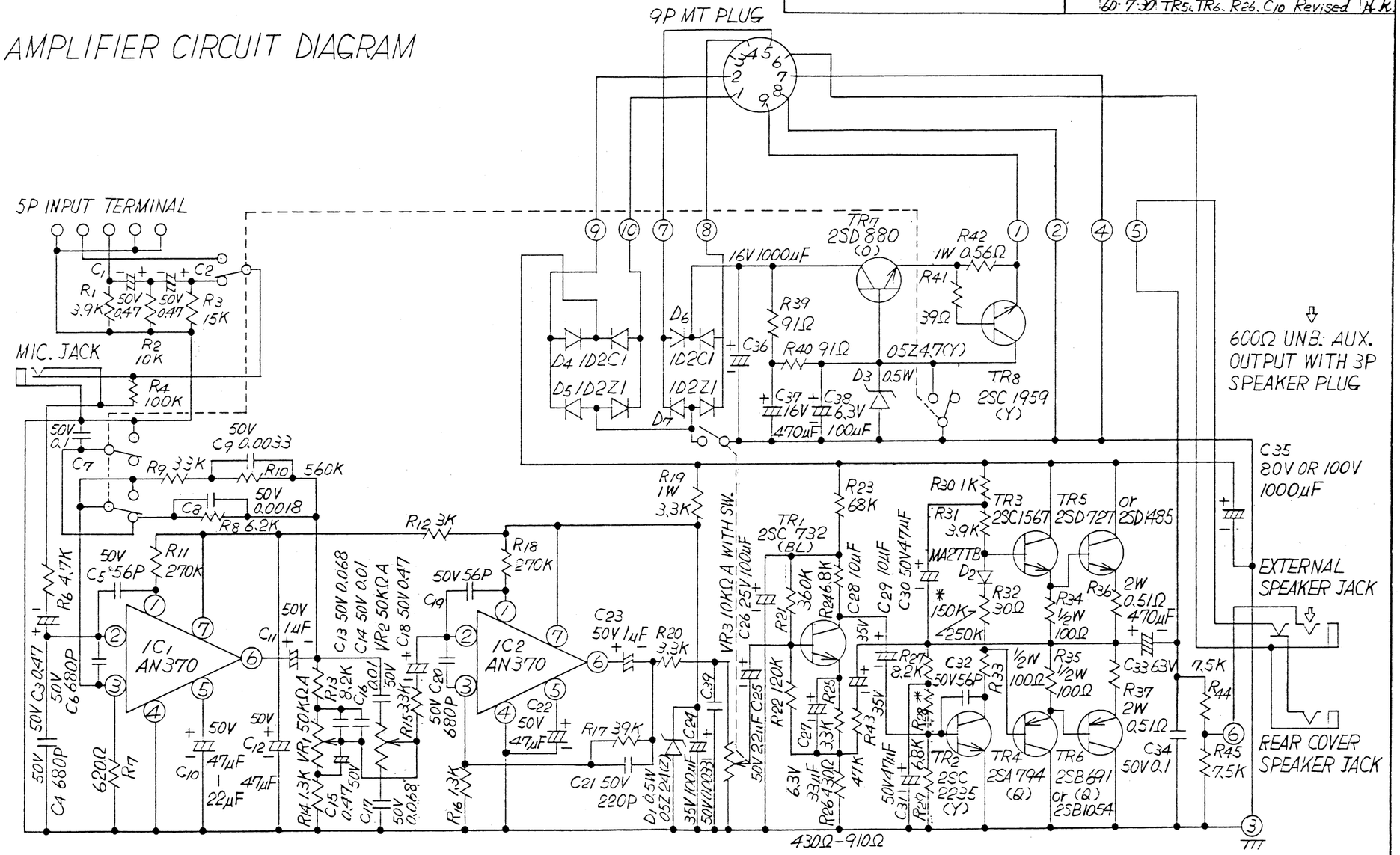


Fig. #36

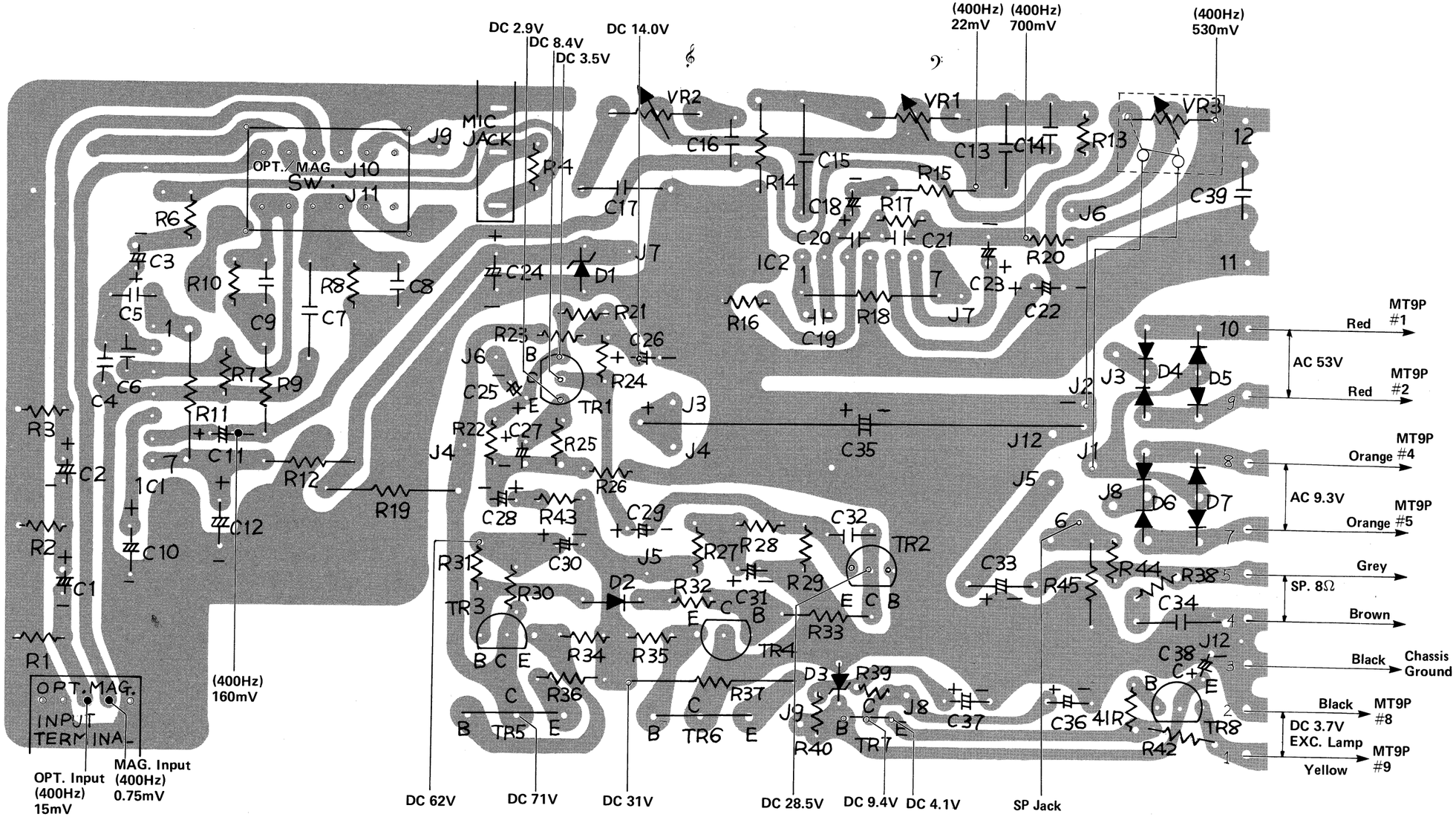
処理・加工	図面訂正欄			
	符号	年月日	訂正要領	担当
		・ ・		
		60・7・30	TR5、TR6、R26、C10 Revised	H.K.

AMPLIFIER CIRCUIT DIAGRAM



映機工業株式会社	承認	設計	製図	品名	SSL-O SERIES CIRCUIT DIAGRAM
作図 59年 6月23日 尺度 /			H.K.		
材質 / 台当個数 / 単重量 / g	製図記号	SSL		部番	322-50101

SSL/ESL SERIES AMPLIFIER P.C. BOARD



Note (1) VR1 & VR2 are positioned at ⓣ ⓣ.
Note (2) All DC voltage is measured to chassis ground.
Note (3) For SSL/ESL-0, -1 models, J10, J11 are short circuited.
Note (4) Jumper wire J3, J4, J5, J6, J7, J8, for all models, and J9 for -2 model only.

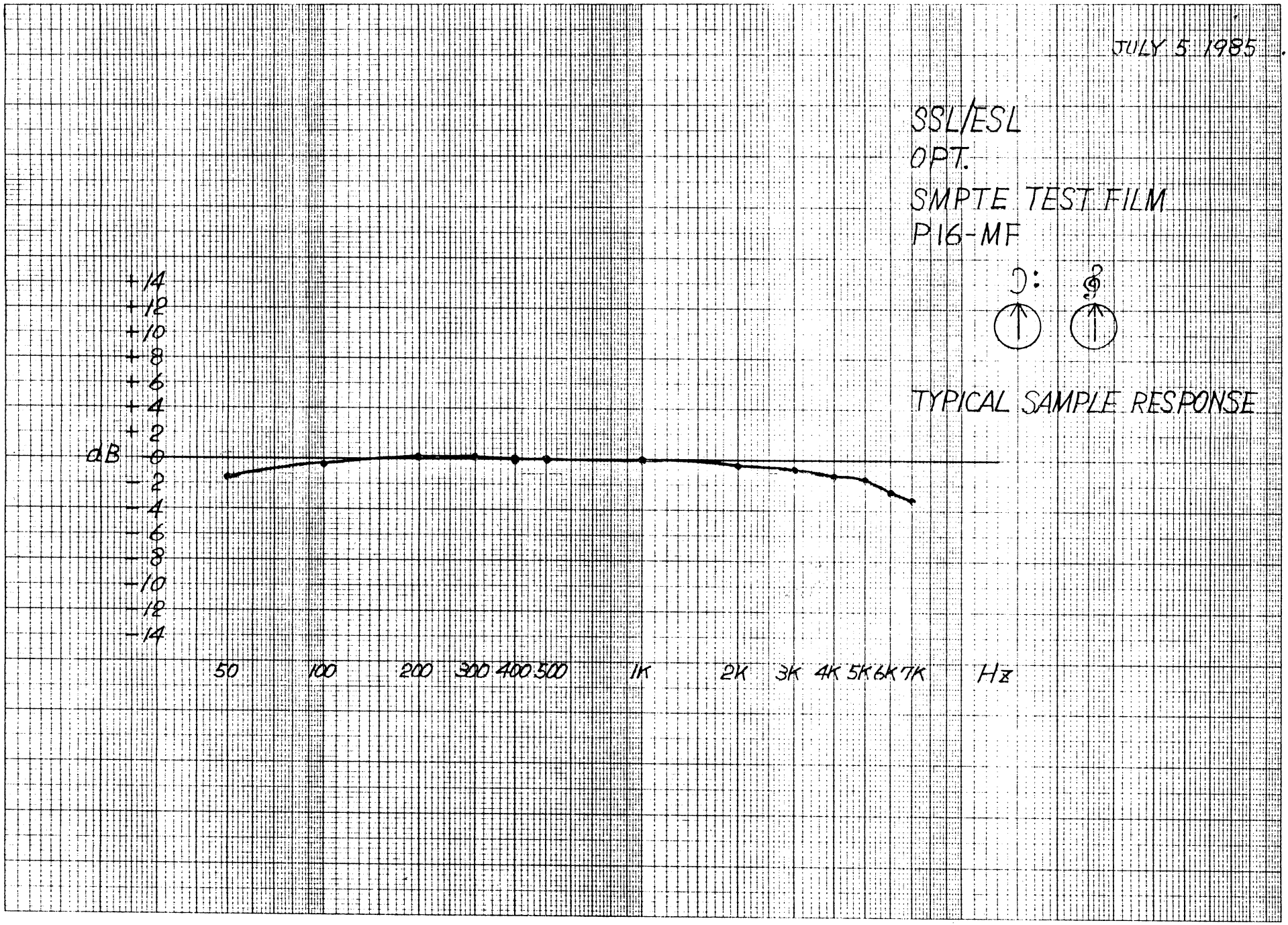
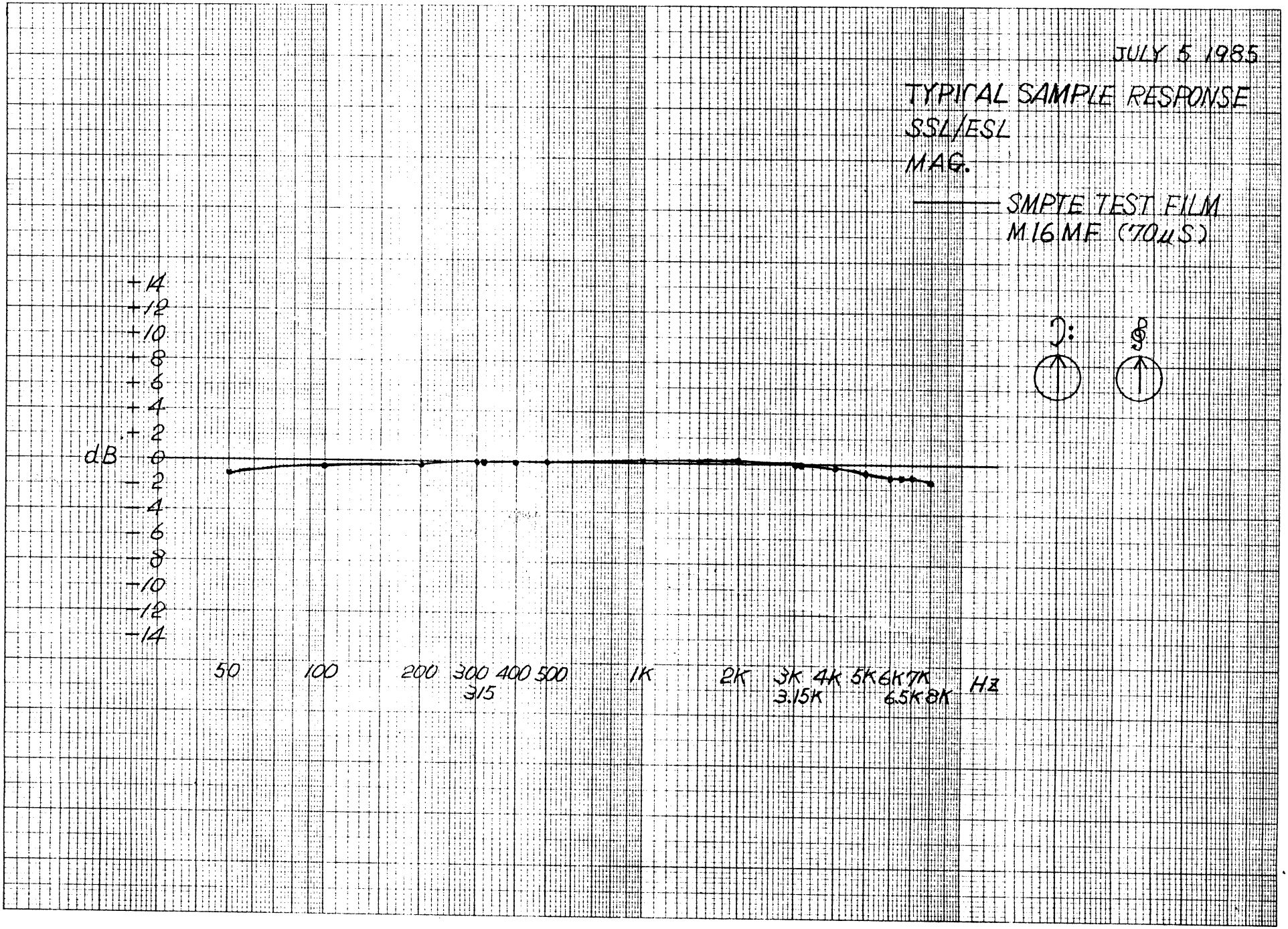

JULY 5 1985
SSL/ESL
OPT.
SMPTE TEST FILM
P16-MF
TYPICAL SAMPLE RESPONSE
dB
+14
+12
+10
+8
+6
+4
+2
0
-2
-4
-6
-8
-10
-12
-14
50
100
200
300
400
500
1K
2K
3K
4K
5K
6K
7K
Hz

Fig. #37-OPT.


JULY 5 1985
TYPICAL SAMPLE RESPONSE
SSL/ESL
MAG.
SMPTE TEST FILM
M.16 MF (70μS)
+14
+12
+10
+8
+6
+4
+2
dB
0
-2
-4
-6
-8
-10
-12
-14
50
100
200
300
315
400
500
1K
2K
3K
3.15K
4K
5K
6K
6.5K
7K
8K
Hz

#37-MAG.

5-3 : MOTOR MODULE

A. SPECIFICATION

1. AC Induction type
2. 1/20HP
3. 100-120V, and 220-240V
4. Power consumption 144 – 168W (120V, 1.2A), or (220, 240V 0.7A)
5. Starting Torque: 1.6kg/cm
6. Rated Torque: 0.8kg/cm

B. MOTOR CIRCUIT DIAGRAM

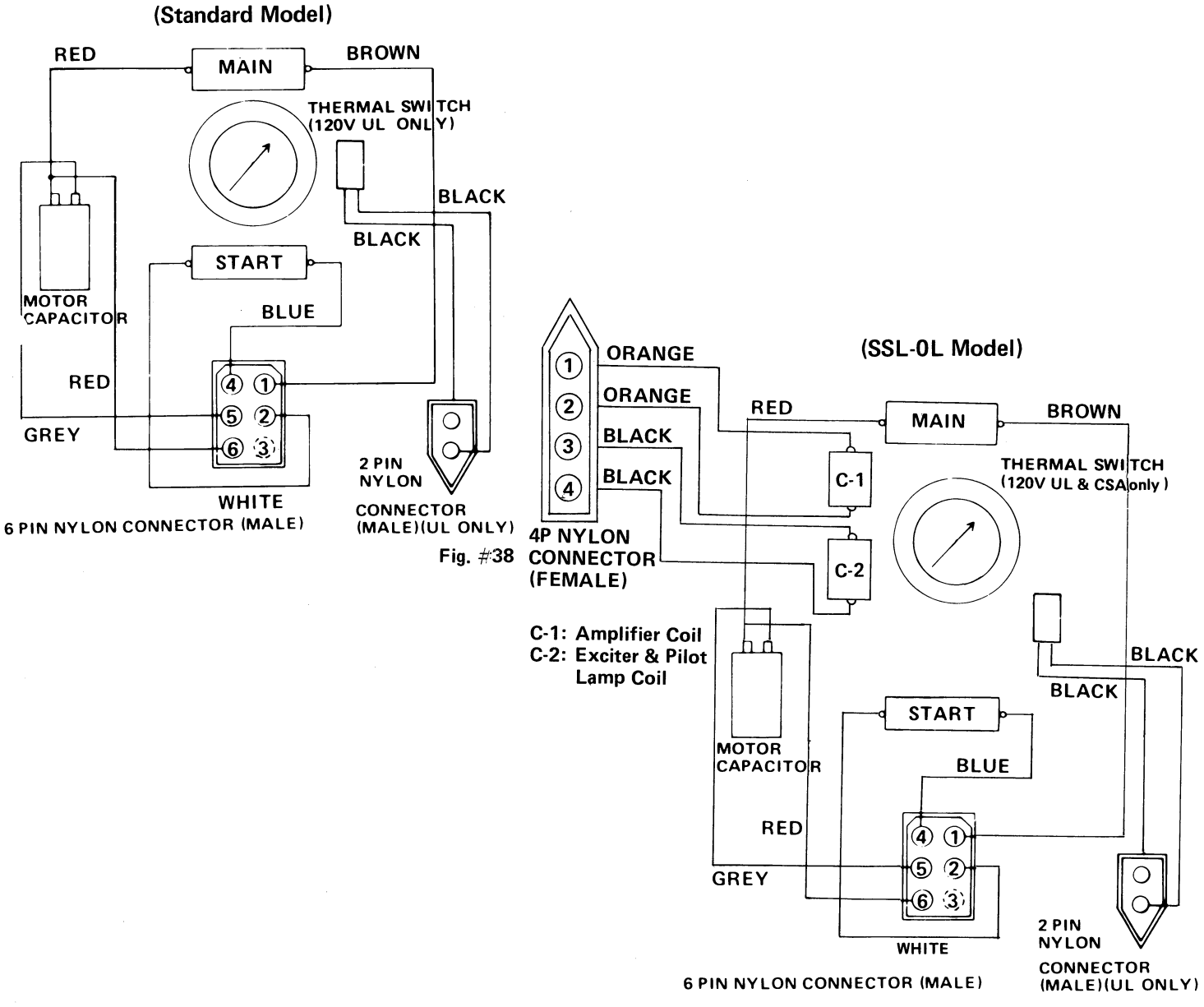


Fig. #38

Fig. #39

C. SILENT FILM OPERATION AND 50/60HZ CONVERSION

SSL/ESL Standard models are provided with 50/60Hz sound only (24 FPS) speed. To convert from 50Hz to 60Hz, or vice versa, remove the rear cover, and while turning the inching knob, guide the motor belt to the desired position. (Fig. #40) (Fig. #41)

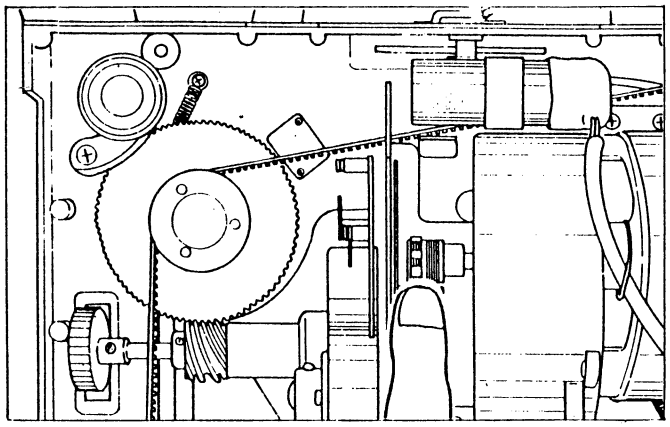


Fig. #40

As an option, 18/24 FPS 50Hz, or 18/24 FPS at 60Hz models are available. To convert from 18 FPS to 24 FPS or vice versa, follow the same step as above. (Fig. #42)

Fig. #41

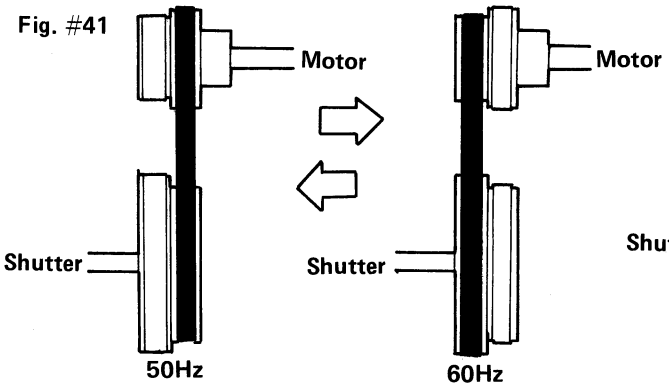
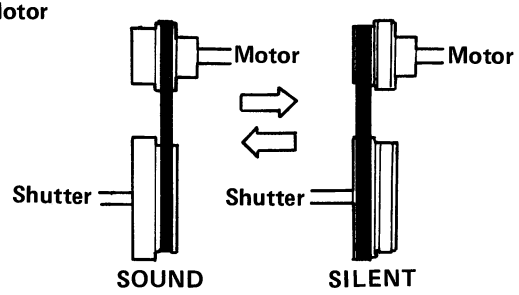


Fig. #42



The chart below will assist in selecting the proper pulley combination.

OPERATION	MOTOR PULLEY ASSY	SHUTTER PULLEY ASSY	MOTOR BELT
100/110/120V or 220/240V 50/60Hz sound only 24 FPS	322-12101	322-11871	322-12181
100/110/120V or 220/240V 60Hz sound & silent 18/24 FPS	322-12401	322-11851	322-12181
100/110/120V or 220/240V 50Hz sound & silent 18/24 FPS	322-12501	322-11861	322-12181

5-4 : TRANSFORMER MODULE

Secondary Windings

1 – 3 : Halogen Lamp 24V Hi.

2 – 3 : Halogen Lamp 22V Low.

6 – 9 : Amplifier (46V)

7 – 8 : Exciter Lamp & Pilot Lamp (8V)

For ESL only;

3 – 4 : Main P.C. Board assy (14V)

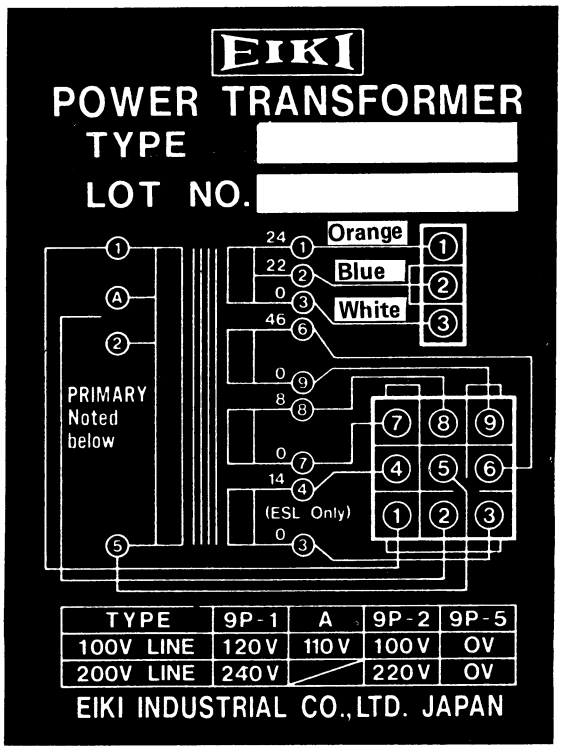


Fig. #43

Wires Colouring of 9P Connector

1. Black
2. Blue (or Grey)
3. Brown
4. Black
5. White
6. Yellow
7. Red
8. Red
9. Blue

5-5 : FILM GATE ASSEMBLY

A. Aperture Plate (Film Gate) Assy

1. Description

The aperture plate (4) is mounted on the gate plate (1) by two nuts and can slide up and down for framing adjustment. The outer guide rail (8) is fixed to the gate plate by two screws. The movable inner guide rail (12) is mounted by two shoulder screws and adjusted by the side pressure spring (14). The side pressure control lever (10) is linked to the film loading mechanism controlled by the function switch, opening and closing the inner guide rail.

2. Adjustment

a. Tension of the Side Pressure Spring

The proper tension is about 60 – 75g. Excessive tension will cause earlier film wear, while insufficient tension causes an unsteady picture. The adjustment of tension can be made by bending or straightening the spring. A weak or incorrectly formed spring should be replaced.

b. Outer Guide Rail Position

When the film is loaded, the center of the film should align with the center of the aperture. To accomplish this, adjust the position of the outer rail.

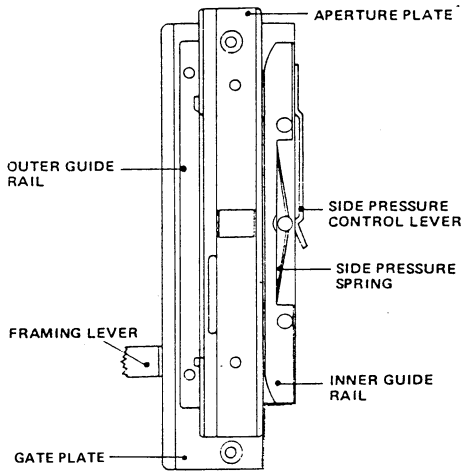


Fig. #44

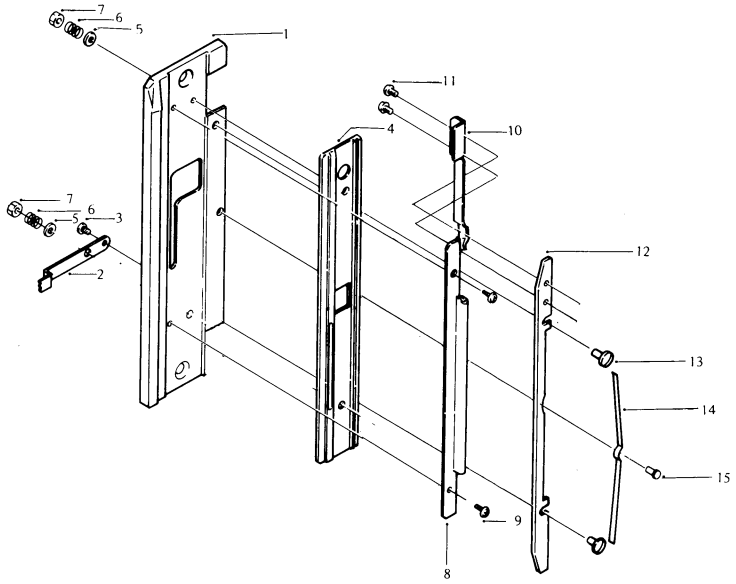


Fig. #45

B. Film Shoe And Bracket Assembly

1. Description

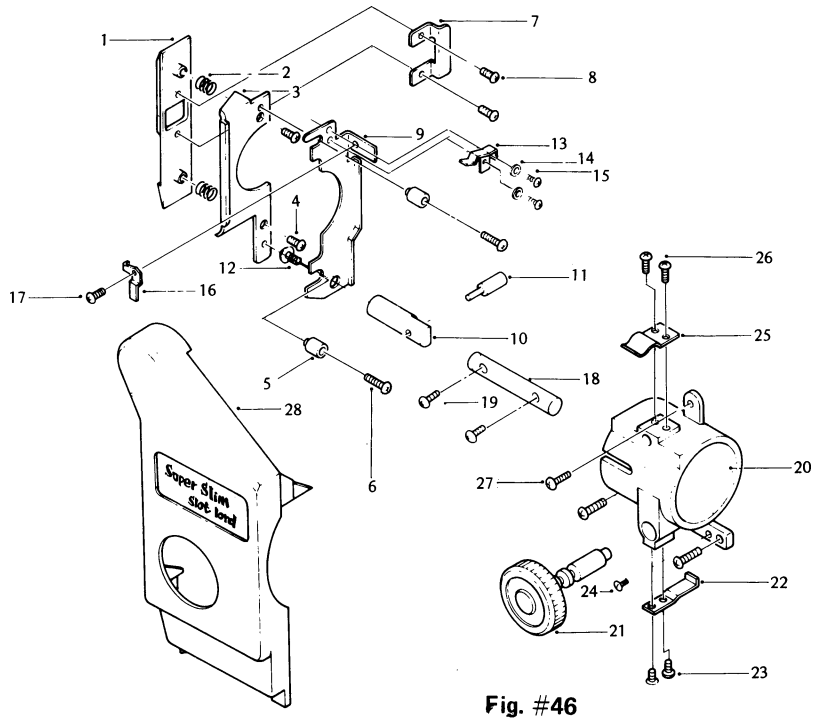


Fig. #46

2. Removable Film Shoe and Bracket Assembly

The spring loaded film shoe (1) is mounted to a bracket (3) and is easily removable as an assembly for cleaning and servicing the film gate.

The film shoe and bracket assembly is then seated in the reception bracket (9). The reception bracket is linked to the loading mechanism which opens and closes the film gate as the function switch is activated.

3. Adjustment

a. Uneven Focus

Uneven focus occurs whenever the image of the film is not flat and perpendicular to the optical path of the lens. Since the lens holder assembly is mounted directly on the projectors casting, any adjustment would have to be as a result of improper mounting of the Lens Holder.

To compensate for small tolerance differences in the projectors main casting, the lens holder bracket is fitted with 2 small set screws. When removing or replacing the lens holder assembly, carefull adjustment of the set screws for even side to side focus is required.

When performing this procedure, projector must be absolutely perpendicular to the viewing screen and the lens focused for a sharp center image.

It is a good idea to use a test film with a continuous pattern since many production films purposesly use out of focus images to achieve special effects.

Loosen the small phillips screws and adjust the set screws to obtain an even focus condition then secure the small phillip screws.

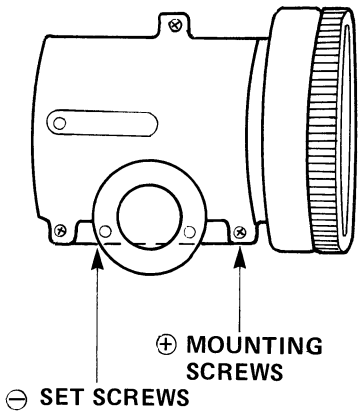


Fig. #47

b. Film Shoe Pressure

The pressure of the film shoe against the film is maintained by two small tension springs between the shoe and the mounting bracket. Excessive tension will cause unnecessary film wear, and insufficient tension can cause an unsteady picture, excessive film gate noise and uneven or erratic focus. To test the film shoe pressure, insert a strip of film in the gate, close the gate. Attach a gram scale to the end of the film at the top. A gentle but steady pull should produce about 90 to 110 grams of pull, indicating the correct film shoe pressure. To adjust this pressure, stretch, shorten or replace the shoe springs.

c. Film Shoe Position

With the gate closed, the film shoe should line up along the edge of the outer guide rail and seat evenly against the aperture plate. To adjust the position of the film shoe, close the film gate by setting the function control to the "MIC" position. Loosen the two screws (6) and align the film shoe with the outer guide rail, making sure that the shoe is flat against the aperture plate and secure the screws (6).

322-6: GENERAL MECHANICAL SERVICING AND ADJUSTMENTS

6-1 : TAKE-UP ARM

A. Description

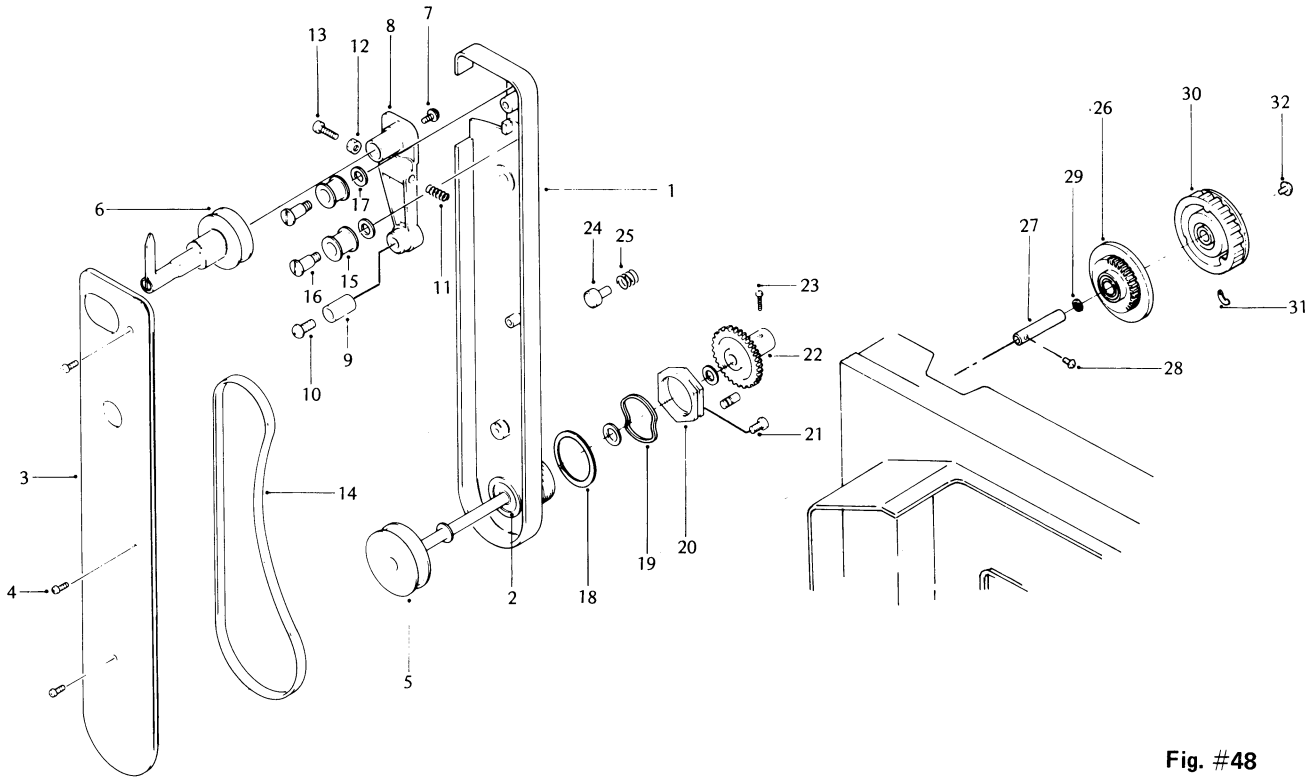


Fig. #48

The drive to the take-up arm is obtained through the take-up clutch mechanism (items 22-32) during normal forward projection. During rewind the motor is reversed, disengaging the clutch cam (31) removing all drive to the take-up arm. In forward the drive is transmitted via the drive pulley (5) to the arm belt and the take-up spindle (6). The amount of take-up torque is controlled by the friction of the belt against the pulley (5) and spindle pulley (6). The amount of friction is adjusted by a combination of the tension spring (11) and the weight of the take-up reel.

B. Adjustments

1. Take-Up Torque

The take-up arm belt must be kept clean with the blue side of the belt positioned towards the pulleys. Avoid any oily substances on the belt. Clean the belt with Isoprophyl Alcohol. The take-up tension is adjusted by increasing or decreasing the belt tension with the adjustment screw (13). This tension should have a range from approximately 90 grams to 150 grams, depending on the reel size. Torque in excess of 150 grams should not be permitted on small film reels. Under normal operation where small to medium size reels are used, the tension screw should be adjusted to where it barely makes contact with the tension spring (1mm to 3mm). Clockwise adjustment increases the take-up torque. Counter clockwise adjustment decreases the take-up torque.

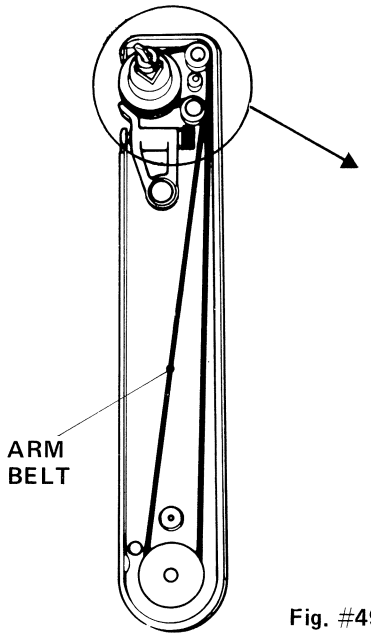


Fig. #49

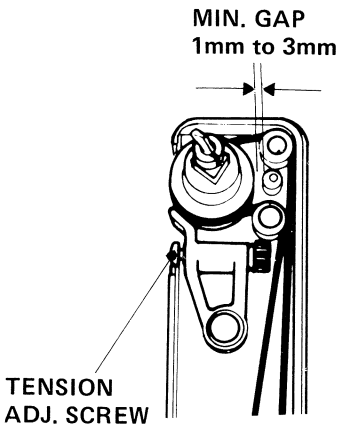


Fig. #50

2. Take-Up Clutch Mechanism

The take-up clutch mechanism requires no lubrication. The clutch cam, clutch cover and drive gear should be kept clean and free from dirt. A small amount of silicone oil on the drive pulley shaft is sufficient.

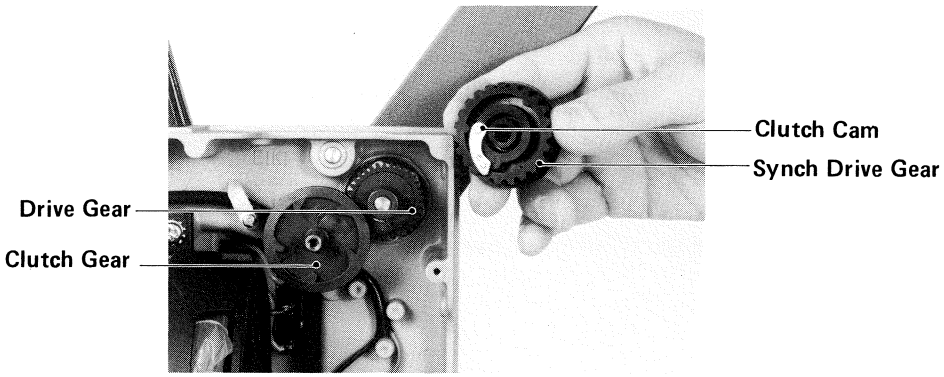


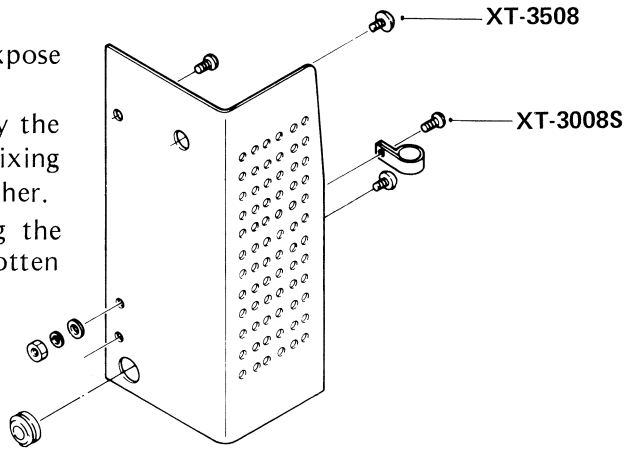
Fig. #51

To Adjust,

1. Remove the rear cover.
2. Remove the AC cord storage bracket and expose the drive gear and clutch mechanism.

CAUTION 1 : This screw XT-3008S (Fig. #52) is locked by the nut and washer behind the storage bracket fixing the AC cord clip. Do not drop the nut and washer.

CAUTION 2 : This screw XT-3508 (Fig. #52) is securing the drive gear as well. It should not be lost or forgotten during disassembly or after the servicing.



AC Cord Storage Bracket Fig. #52

6-2 : SUPPLY ARM

A. Description

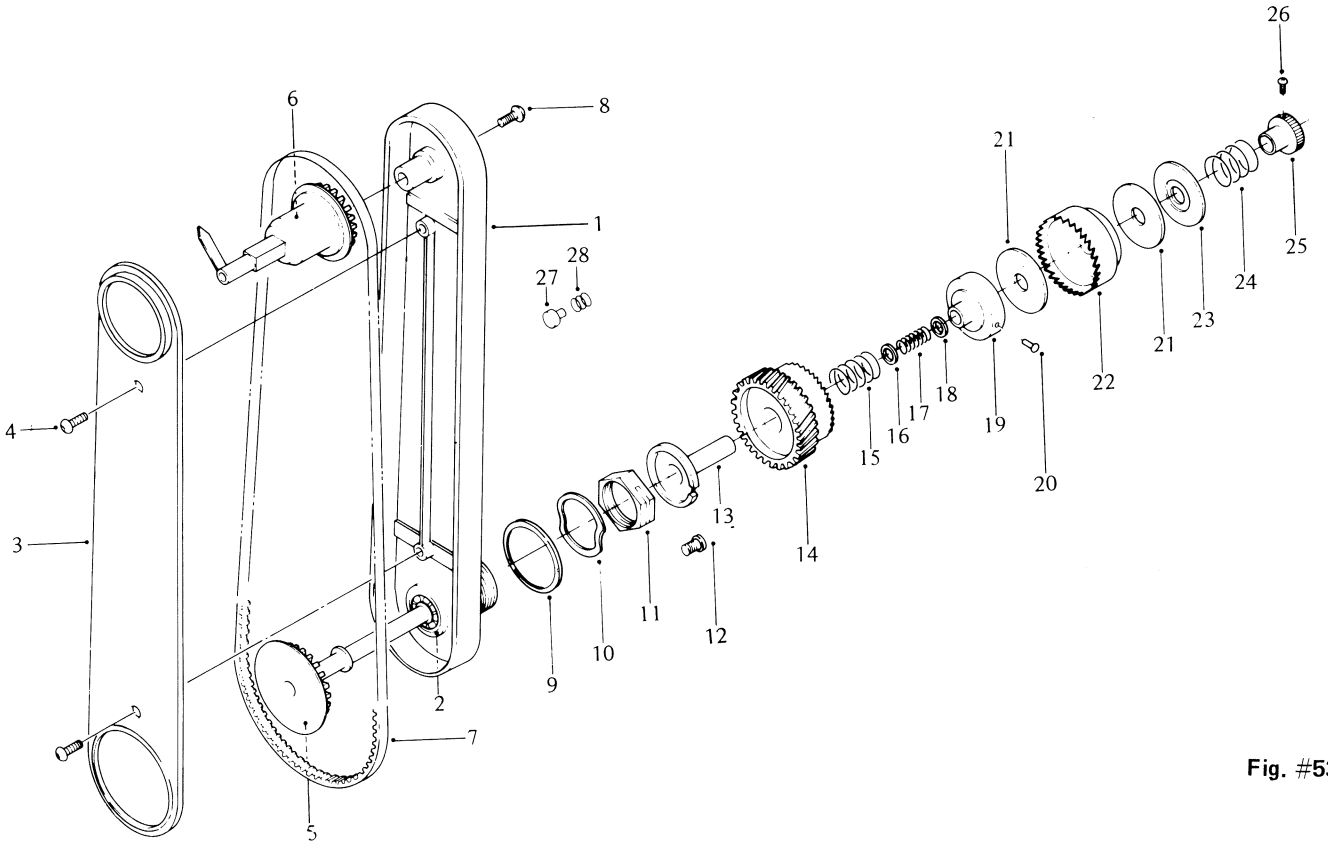


Fig. #53

During forward the supply arm only serves as a drag to provide a small amount of back tension to the film. The amount of back tension is controlled by spring (17)'s tension. For a more complete description of the supply arm, refer to the rewind section.

B. Adjustments

— None —

6-3 : LOWER LOOP SETTER SYSTEM

A. Description

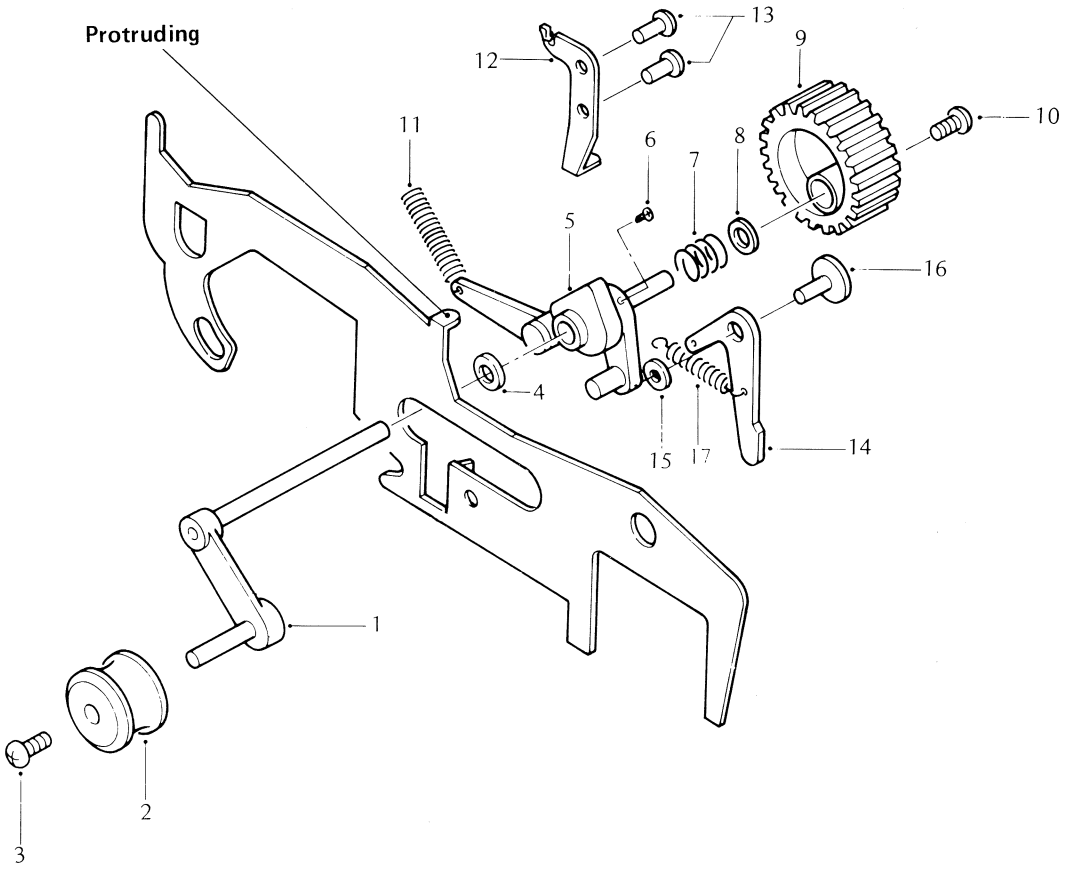


Fig. #54

The lower loop setter mechanism is an integral part of the loading mechanism which is controlled by the function switch. At the "STOP" position the loop setter gear (9) is raised up away from the main drive belt. The loop setter arm (1) and the lower loop setter roller (2) is locked in the down position, functioning as the lower loop former while loading the film. Rotating the function switch to the "MIC" position, the stop plate (14) is pushed to the left by the protruding tab of the main interlocking bracket until the loop setter interlocking arm (5) is released away from the stop plate (14). While the protruding tab on the interlocking bracket is pushing the stop plate, the film is seated in the #1 sprocket shoe and the film gate is completely closed. The loop setter roller is then raised up away from the film and the loop setter gear is lowered into position near the main drive belt. In this position the loop setter is ready to be activated by any small amount of film pressure against the loop setter roller. When the loop setter roller is activated, the loop setter gear engages with the main drive belt, causing the eccentric gear to cycle the loop setter mechanism, pulling down the film from the gate, thus forming a new loop. In "Rewind" and "Stop" the lower loop setter roller is locked in position to guide and dampen the tension of the film during high speed rewind.

B. Adjustments

1. Position of the Lower Loop Setter Roller:

With the function switch in the "Stop" position, the loop setter roller must lock into the position as in Fig. #55.

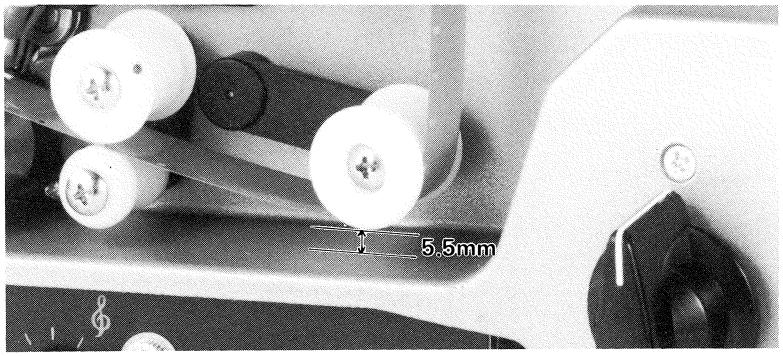


Fig. #55

To check for the correct position of the loop setter roller, set the function switch at "STOP". The distance between the outer edge of the roller and the main frame casting should measure 5.5mm. In this position, the film should clear the aperture plate, the film shoe, and sound drum when rewinding. To adjust the roller position, set the function switch to "STOP". Loosen the set screw on the loop setter interlocking arm, position the loop setter roller 5.5mm up from the main frame casting as Fig. #55. Then tighten the set screw. To obtain the correct position of the loop setter roller tool No. 185-01111 (Fig. #56) may be used.

(1) Set the function switch at "STOP".
(2) Apply the tool No. 185-01111 as Fig. #57. Push the roller against the tool.
(3) Loosen the interlocking arm set screw.
(4) Adjust the position of the interlocking arm and secure the set screw.

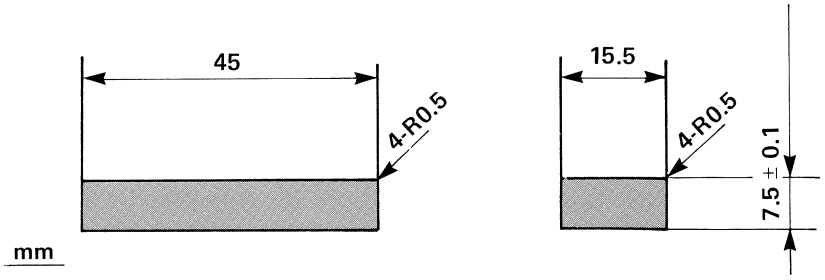


Fig. #56

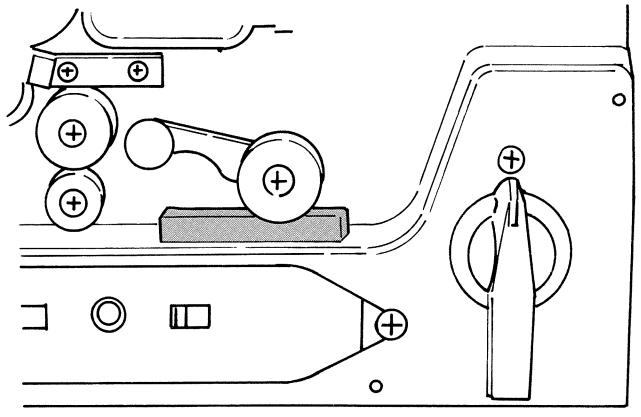


Fig. #57

2. Interlocking Arm and Stop Plate Clearance:

The correct clearance with the function switch in the "MIC" position is shown in Fig. #58 When the loop setter gear cycles, the tip of the interlocking arm should clear the end of the stop plate. Where it contacts the stop plate, the clearance is adjusted by slightly reforming the tab on the main interlocking bracket. (Fig. #58)

CAUTION : Avoid over-bending. Too much of a bend will cause the interlocking arm to release too early, forming too small a lower loop.

3. Loop Setter Gear And Main Drive Belt Clearance:

The correct clearance is indicated in Fig. #58.

Insufficient clearance will cause the loop setter roller to be too sensitive or cause it to cycle continuously. Too much clearance will cause poor sensitivity and the loop setter will not reset the loop unless the film is severely damaged. To adjust, simply reform the belt support plate and tighten the mounting screw.

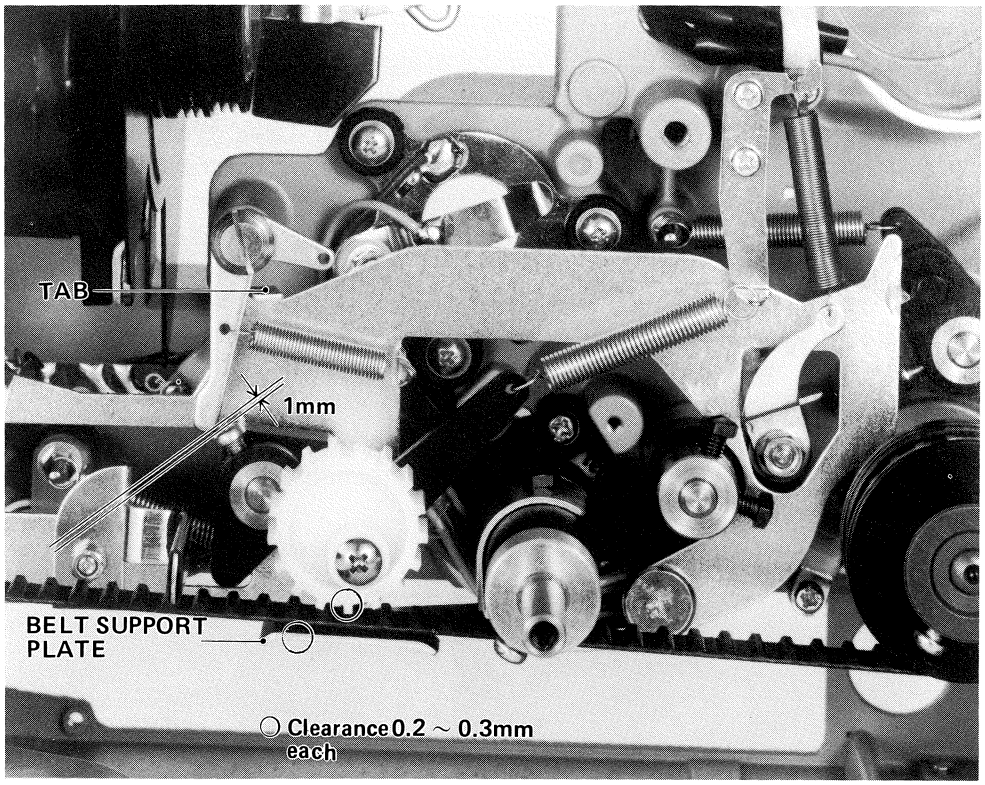


Fig. #58

4. Loop Setter Tension Springs

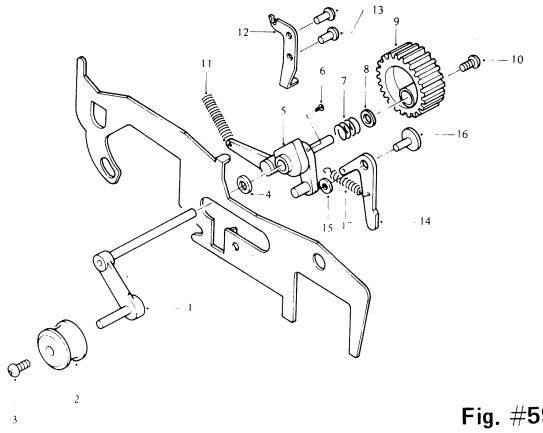


Fig. #59

Correct adjustment of the loop setter tension springs is essential to the proper operation of the automatic loop setter.

a. The loop setter gear spring 320-18061 (7) acts as a dampener to the rotation of the loop setter gear.
   Too strong a spring tension will cause a sluggish action of the loop setter while too weak a spring will cause the frequent and erratic action of the loop setter.
   The spring can be adjusted by simply stretching or compressing it to obtain a smooth but dampened rotation of the loop setter gear.

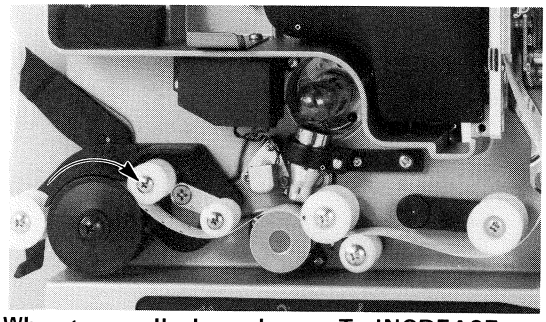
b. The arm spring 322-18111 (11) adjusts the tension of the loop setter arm and roller. Too tight a spring will cause the loop setter to be ineffective where too loose a spring will cause erratic rotations of the loop setter gear.
   To adjust the loop setter's tension, change the position of the spring arm (12) until the loop setter function operates smoothly.

5. Loop Setter Timing

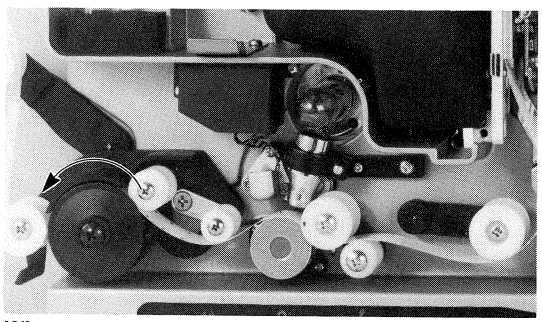
To check the loop setter timing, load the projector with film, advance the function control to position ⊙ and operate the projector. While observing the loop setter, insert a finger in the upper loop causing the lower loop to loose one frame. With only one frame lost, the loop setter will not activate. Loose one more frame. At this time the loop setter should be activated by too small a lower loop, causing it to reset the lower loop once only. If it requires holding the upper loop for more than two frames to activate the lower loop, the lower loop is too large. If the lower loop is always in contract with the loop setter roller, the lower loop is too small.

The correct lower loop should not come in contact with the loop setter roller, but at the same time the loop setter should easily activate when two frames of defective sprocket holes pass through the film gate.

a. To increase the size of the lower loop, loosen the #2 sprocket cover screw and rotate the sprocket teeth plate in the clockwise direction until the correct size lower loop is obtained. (Fig. #60)



When too small a lower loop → To INCREASE Fig. #60



When too large a lower loop → To DECREASE Fig.

b. To decrease the size of the lower loop, loosen the #2 sprocket cover screw and rotate the sprocket teeth plate in the counter-clockwise direction. (Fig. #61) In the event of over-correction, refer back to step a.

6-4 : LOADING MECHANISM

A. Description

All mechanical functions seating the film around the sprockets, forming the upper and lower loops, and closing the film gate are accomplished by a single rotary function switch.

The action of the function switch activates a series of levers, cams and roller arms in the sequence described below.

1. When the function switch is at the "STOP" position, the film loading path is fully open, and the #1 and #2 sprocket shoe rollers are away from the sprockets.

FILM LOADING POSITION ("STOP")

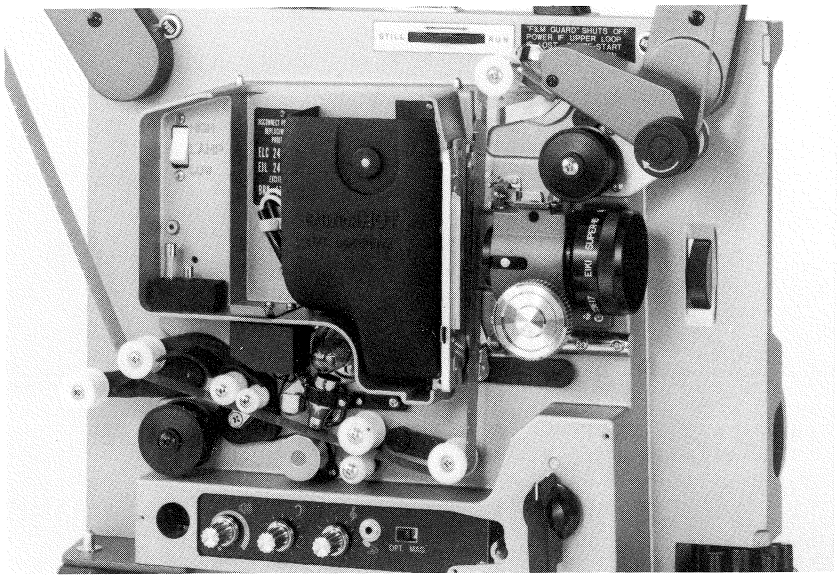


Fig. #62

OPERATION POSITION ("MIC")

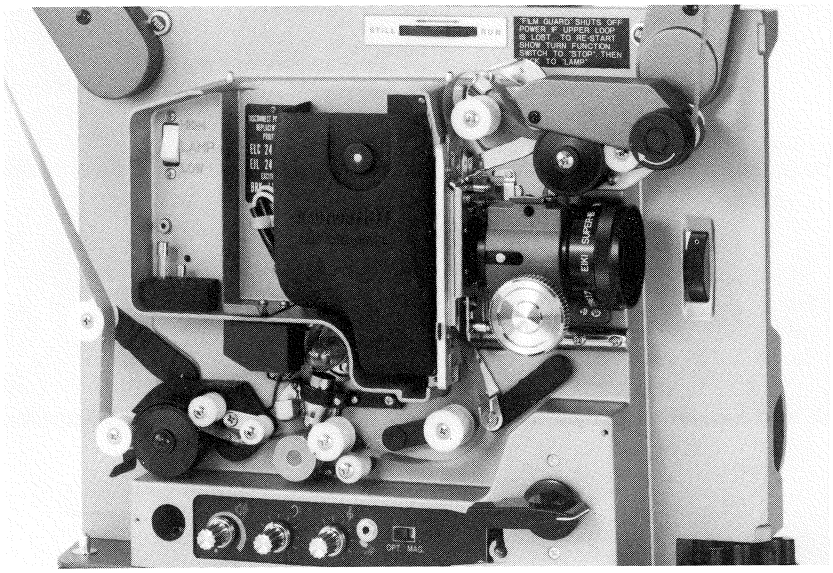


Fig. #63

2. When the function switch is at the "MIC" or , position, the loading mechanism is closed forming the upper and lower loops while seating the film in #1 and #2 sprockets.

CORRESPONDING MAIN INTERLOCKING BRACKET MECHANISM IN THE "STOP" POSITION

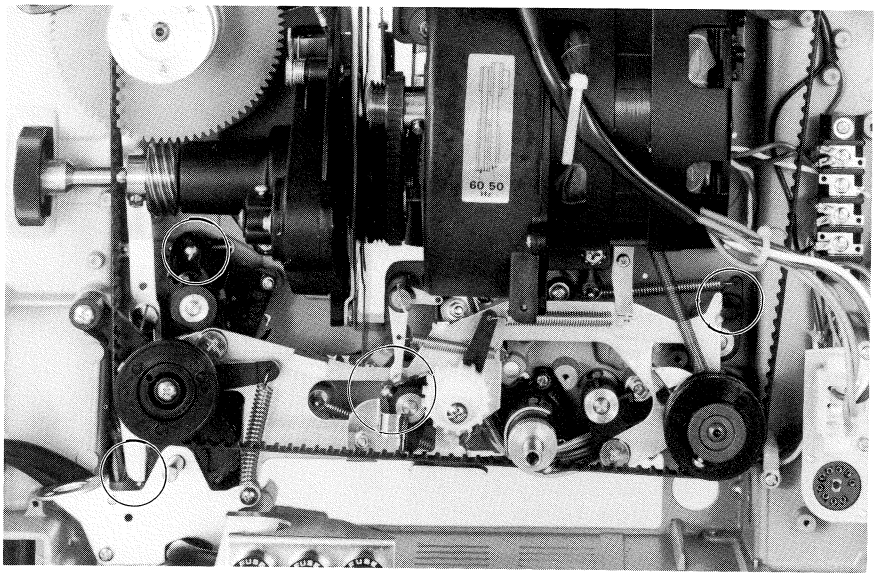


Fig. #64

CORRESPONDING MAIN INTERLOCKING BRACKET MECHANISM IN THE "MIC" POSITION

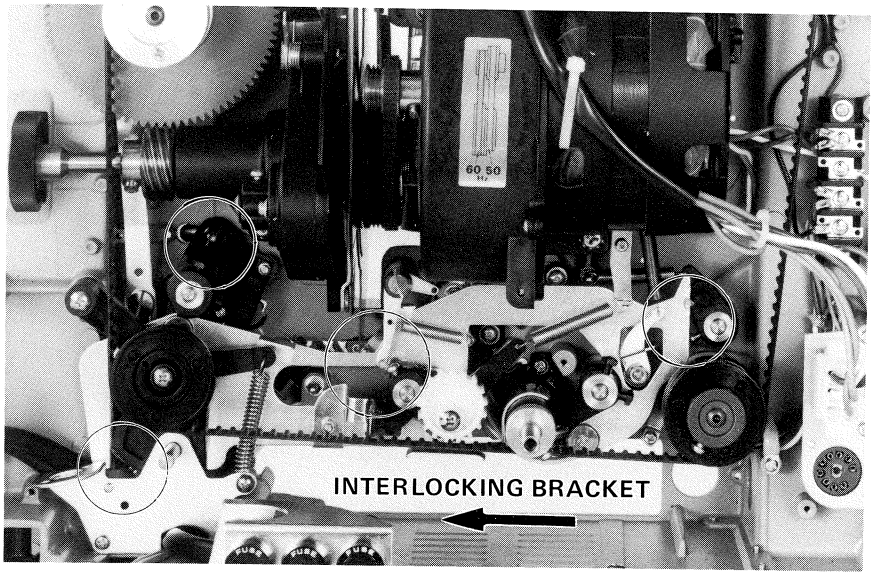


Fig. #65

B. Adjustments

1. #1 Sprocket Shoe And Roller Assy. (Fig. #66)

The #1 sprocket plate (3) is spring loaded with limited travel to assist the film in seating around the sprocket drum.

Check to make sure the sprocket plate (3) is moving freely before proceeding with the loading mechanism adjustments. (See Fig. #66)

a. Loading position: In the "STOP" position the shoe roller (26) should be in contact with the top inside of the #1 sprocket shoe cover assy (23).

The spring tension keeping the shoe roller up during film loading can be adjusted by the position of the arm, mounted to the end of the shaft of the shoe roller arm.

b. Closed ("MIC") position: Loosen the two set screws on the reception arm directly behind the set arm shaft. Push down on the #1 sprocket film shoe assembly to make sure that the film shoe rollers are completely seated around the sprocket. Tighten the set screws. (Fig. #68)

Note : No end play is allowed for #1 Sprocket shaft.

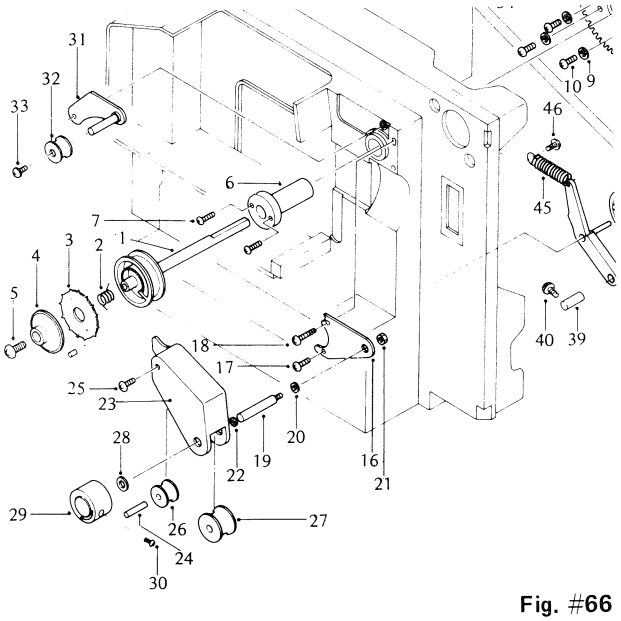


Fig. #66

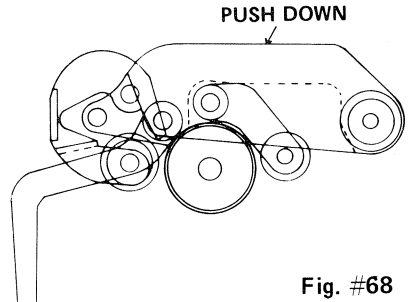
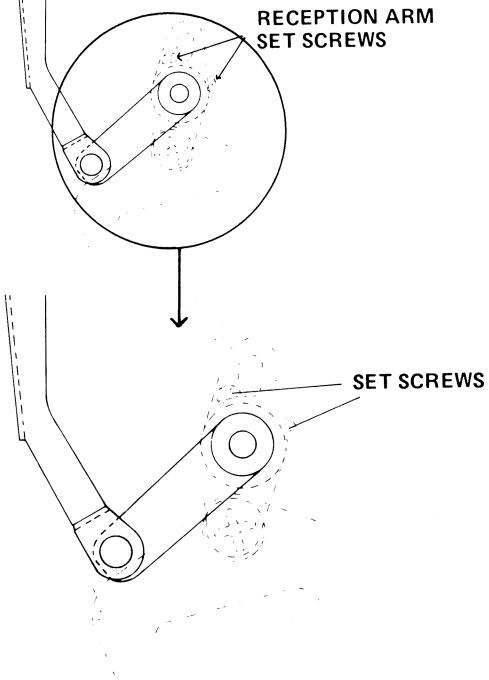


Fig. #68



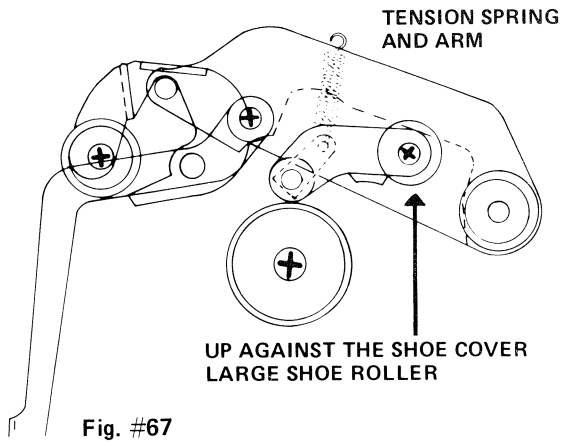


Fig. #67

2. Upper Loop Forming Roller And Film Guard

a. Function: The position of the upper loop forming guide roller is determined by the position of the function switch;

Position A: (Fig. #69) The function switch is at "STOP" position for the film loading, or at "⟲" for the rewinding.

Position B: (Fig. #70) This is the actual upper loop forming position. When turning the function switch from "STOP" to "MIC", the upper loop forming guide roller kicks upward to form the enough upper loop.

Position C: (Fig. #71) As keep turning the function switch to "MIC" (or ⊙ , ⟵) positions, the roller comes down and stays at this position "C", ready to activate the "Film Guard" switch should the upper loop be lost.
Note the distance between the top edge of the upper loop guide bracket till the projector's chassis is approximately 13mm.

Position D: (Fig. #72) When the upper loop is lost due to the bad film with a series of damaged perforations by more than about 6 frames, the loop forming guide roller is pulled by the film and moves to this position "D".
As the roller moves to this position, the film guard is activated at the same time and shuts off the power, stopping the projection to protect the film from the further damage.
To re-start the projection, turn the function switch to "STOP", then back to ⟵ position.

b. Adjustment: The upper loop arm assy, when inserted into the hole of the main frame casting without being engaged with the plate spring, should be free to rotate. Check for a smooth rotation.

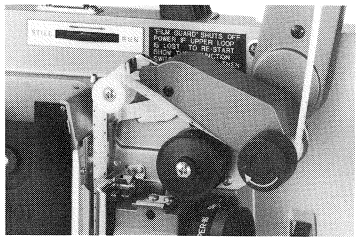


Fig. #69

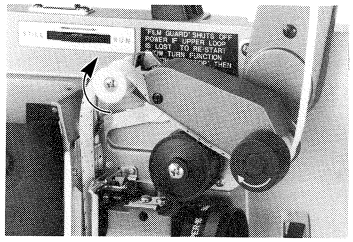


Fig. #70

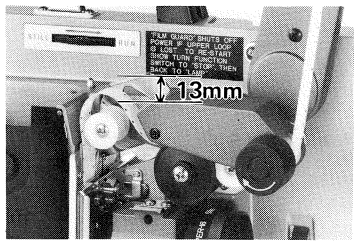


Fig. #71

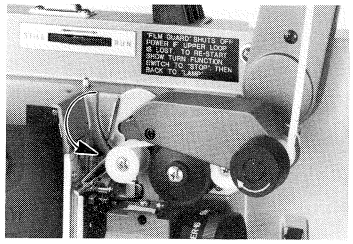


Fig. #72

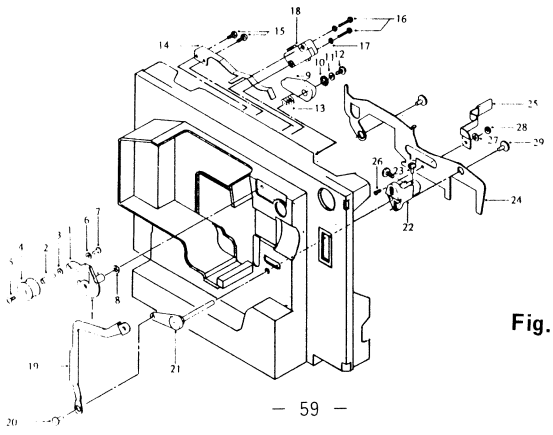


Fig. #73

The position of the film guard arm (9) is important and very critical.
To adjust;

(1) Remove the #1 sprocket gear assy and the idler gear.
(2) Mount the arm (9) on the upper loop arm shaft (1) and tighten the screw tentatively.
(3) Turn the function switch to "STOP".
(4) Make sure the convex mount on the end of the #1 sprocket shoe is seated in the slot of the upper loop arm (1). (Fig. #74)
(5) The tip of the arm (9) should be seated on the plate spring (14) as Fig. #75. Tighten the arm Screw. (Before tightening slightly move the arm tip to the right to compensate for the tightening of the screw)
(6) Slowly turn the function switch toward "MIC". Observe the movement of the arm tip, which should slide on the plate spring to the right and seat as in Fig. #76. This corresponds with the upper loop forming guide roller's position B (Fig. #70).
(7) Now turn the function switch to "MIC". The arm tip will rotate clockwise sliding on the plate spring until seated as Fig. #77.
(8) Push the upper loop forming guide roller down. The arm tip should slip on plate spring. (Fig. #78) This corresponds to the loss of an upper loop position D (Fig.#72).
(9) Turn the function switch to "STOP" and see if the arm tip returns to the position of Fig. #75. To recheck turn the function switch to "MIC" and observe again the arm tip.
(10) Lubricate the arm tip with silicone grease.
(11) Apply "loc-tite to" the screw.

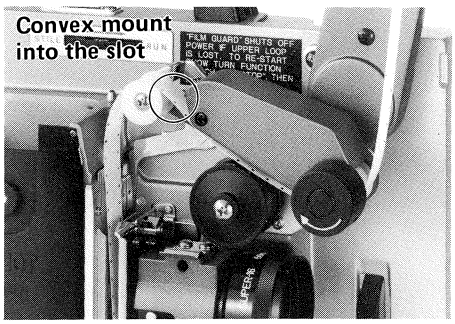


Fig. #74

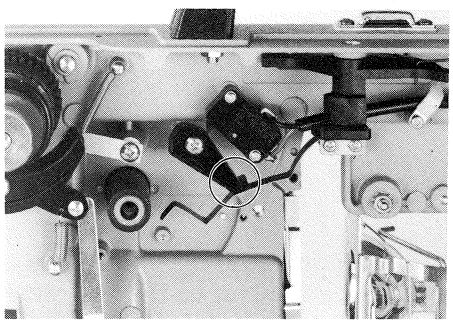


Fig. #75

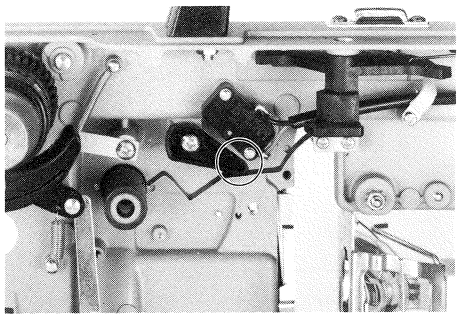


Fig. #76

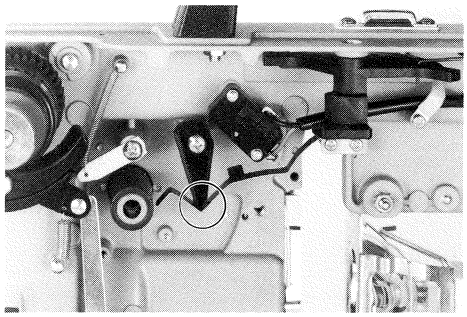


Fig. #77

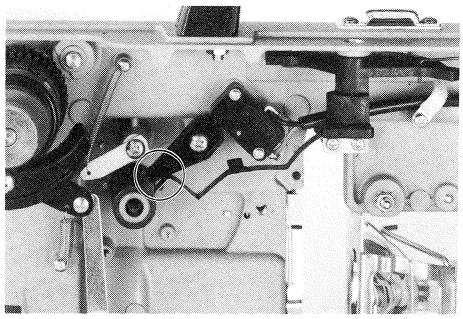


Fig. #78

Note (1) : The arm tip should not be seated too far beyond the curved point on the plate spring at "STOP" as Fig. #79.
In the event of the incorrect position as Fig.#79 the following troubles may be expected;
(1) When the function switch is slowly turned from "MIC" to "STOP", the arm tip will not stop at the position as Fig. #75 and slip over to the position as Fig. #76 which means the upper loop forming guide roller is at its top position as Fig. #70.

Consequently,
(2) The upper loop is not formed correctly.
(3) In "Rewind" the film may be in contact with the parts in the film path.
(4) The upper loop forming guide roller exceeds over the top of the lens holder cover and the film may not be loaded smoothly.

Note (2) : The arm tip should not be positioned below the curved point on the plate spring as Fig. #80.
In the event of the incorrect position as Fig. #80 the following troubles may be expected;
(1) The arm tip will not slide on the plate spring to the position as Fig. #76 which means the upper loop forming guide roller does not move to its top position as Fig.#70.
(2) The upper loop is not formed correctly.
(3) The activation of the film guard switch will delay resulting in the switch not activating with the six frames consecutive film damage.

Note (3) : The proper clearance between the film guard arm and the film guard switch shoulder is required. If being too close or with no clearance, the arm tip may stick fast and will not rotate resulting in the switch not activating. To adjust, re-mount the switch swinging clockwise so that the maximum clearance is obtained as Fig. #81.

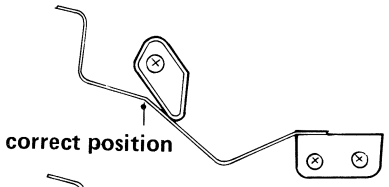


Fig. #79

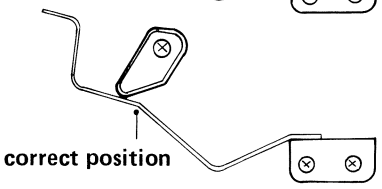


Fig. #80

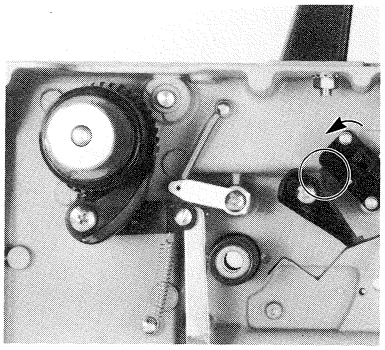


Fig. #81

3. Film Gate Opening And Closing

a. The alignment of the film shoe is effected by the position of the guide shaft. (Fig.#82)

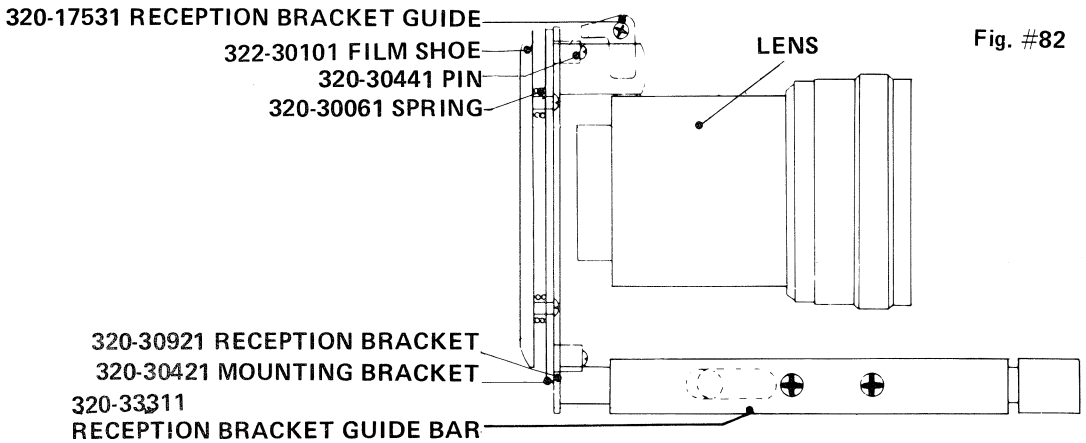


Fig. #82

b. To adjust, set the function control to "STOP", loosen the two mounting screws, rotate the function control to "MIC". The film shoe should be seated flat against the aperture plate, at the same time it is aligned with the outer guide rail. Secure the mounting screws, open and close the gate, and re-check the position of the film shoe.

c. Load up a film and check for even focus. If necessary, refer to the section on uneven focus.

4. Retraction of the Cam Claw

a. In the "STOP" or load position the cam claw is retracted by the action of the #1 sprocket shoe interlocking bracket.

b. Incorrect alignment of the cam claw retraction mechanism will result in some type of abnormal noise during forward or rewind without film.

(1) "Rewind": If the claw does not clear the shutter, locate the bent shutter blade and re-form to clear the claw.

(2) "Forward": Check the position of the reception arm as described in Sec. 6-4-B-1-b.

5. Lower Loop Forming Mechanism

Refer to section 322-6-3 Lower Loop Setter System.

To check for correct adjustment of the loop setter roller, load a film and observe that the film is not in contact with the film shoe, aperture plate, rubber rollers, sound drum, and solar cell case.

6. Buzz Roller Tension and Position (Fig. #83)

a. During normal projection the buzz roller (19) firmly holds the film against the sound drum by the tension of spring (25).

b. The position of the buzz roller and its tension is critical for minimum wow and flutter. In "STOP" and "REWIND" it must be clear from the film path. It is also important that there is no end play. The end play of the buzz roller will cause variable or poor sound tracking. (See section 322-7)

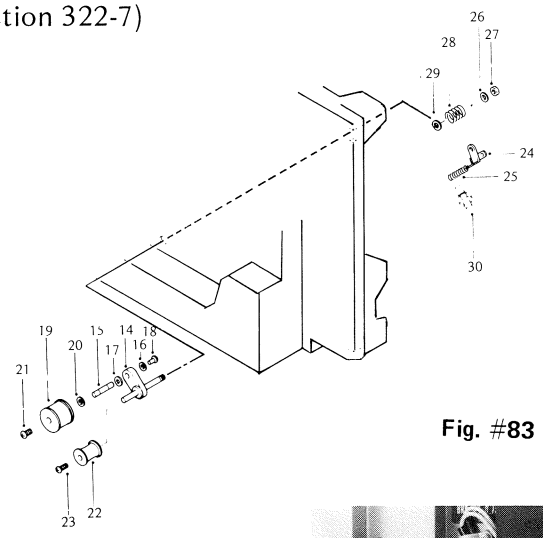


Fig. #83

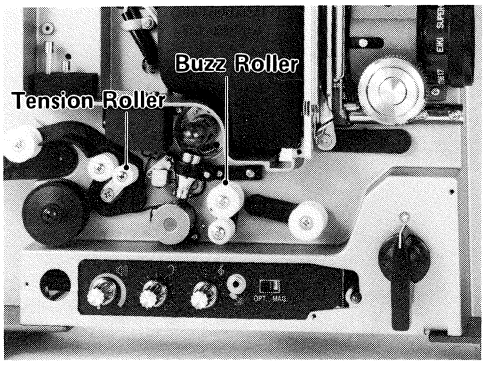


Fig. #84

at "STOP" Position

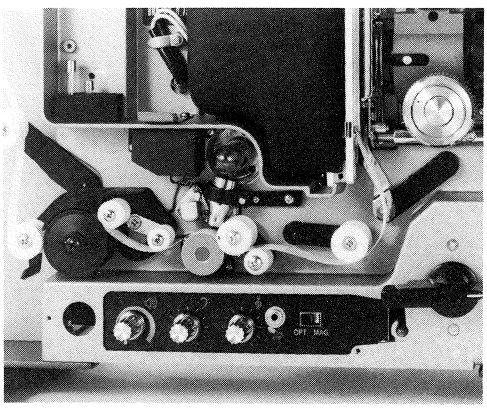


Fig. #85

at "MIC" Position

a. The tension roller (5) applies constant but gentle tension to stabilize the film over the sound drum. The amount of tension is determined by tension spring (11).

b. In the "STOP" and "REWIND" position, the tension roller is at the top (See Fig.#84) allowing the film to clear the sound drum.
In the "MIC" or "FORWARD" position, the roller swings down as it is released by the main interlocking bracket. (See Fig.#85)

c. To check the roller tension, load the film and turn the function control to "MIC". The tension roller should ride on the film with gentle tension. A slight push on the roller should allow it to travel downward slightly. In "REWIND" the roller is raised up by the interlocking bracket to clear the film path.

d. Adjustment: To adjust the tension roller's position, remove the control pannel and turn function switch to "MIC" to expose the nut (4mm) from behind the interlocking bracket. (See Fig.#89)

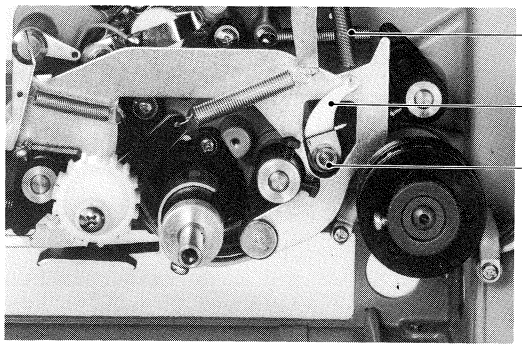


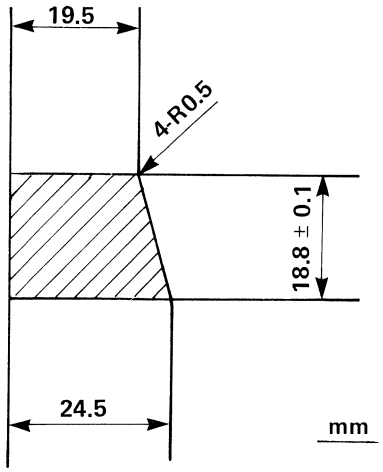
Fig. #89

Unhook the tension spring and using a 7mm nut driver, loosen the 4mm nut slightly and return the function switch to "STOP".

(1) Bring the tension roller close to the No. 2 sprocket shoe roller keeping approximately 0.5mm gap.
(2) Turn the rotary switch to "MIC" holding the tension roller in the position.
(3) Tighten the 4mm nut.
(4) Hook up the tension spring.
(5) Make sure the tension roller position is correct at "STOP" "MIC" "REWIND".

e. Another method using the EIKI (185-01211) adjustment gauge.

Tool No. 185-01211



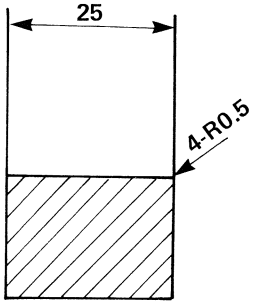


Fig. #90

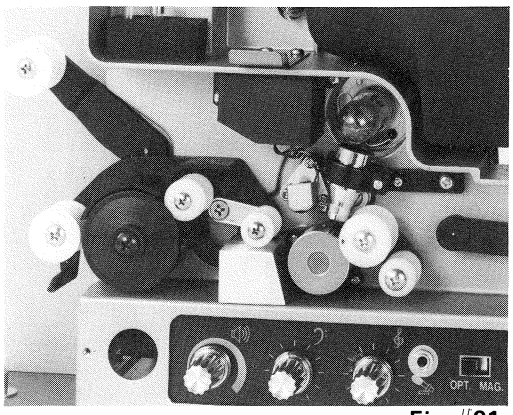


Fig. #91

(1) Set the function switch to "MIC" and slightly loosen the 4mm nut as shown in Fig. Fig. #89.
(2) Insert the EIKI tension roller gauge.(185-01211) (Fig. #90, #91)
(3) Push the tension roller down against the gauge. (18.8mm)
(4) Holding the tension roller, tighten the 4mm nut.
(5) Remove the gauge and check the rollers position in "STOP" "MIC" and "REWIND".

f. The tension spring may be adjusted by slightly stretching if necessary to minimize wow and flutter. A weak spring should be replaced. A properly adjusted tension roller should ride in the middle of it's travel.

8. #2 Sprocket Shoe Adjustment

The #2 Sprocket Shoe Assembly closes around the #2 sprocket when the projector is in the "MIC" or No. 2 or 3 position. (Fig.#60)

With the rotary switch at "STOP" position, loosen the two set screws on the No. 2 sprocket shoe interlocking arm bracket.

Turn the rotary switch to "MIC" position, and push down the No. 2 sprocket shoe bracket completely against the No. 2 sprocket. Secure the two set screws. (Fig. #92)

Note : No end play is allowed for #2 sprocket shaft. (Fig. #92)

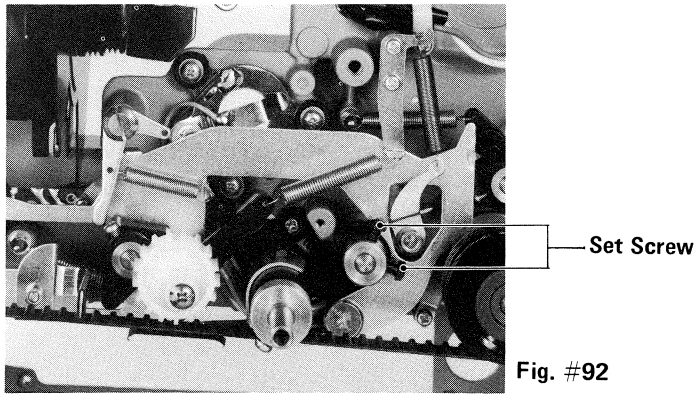


Fig. #92

6-5 : REWIND SYSTEM

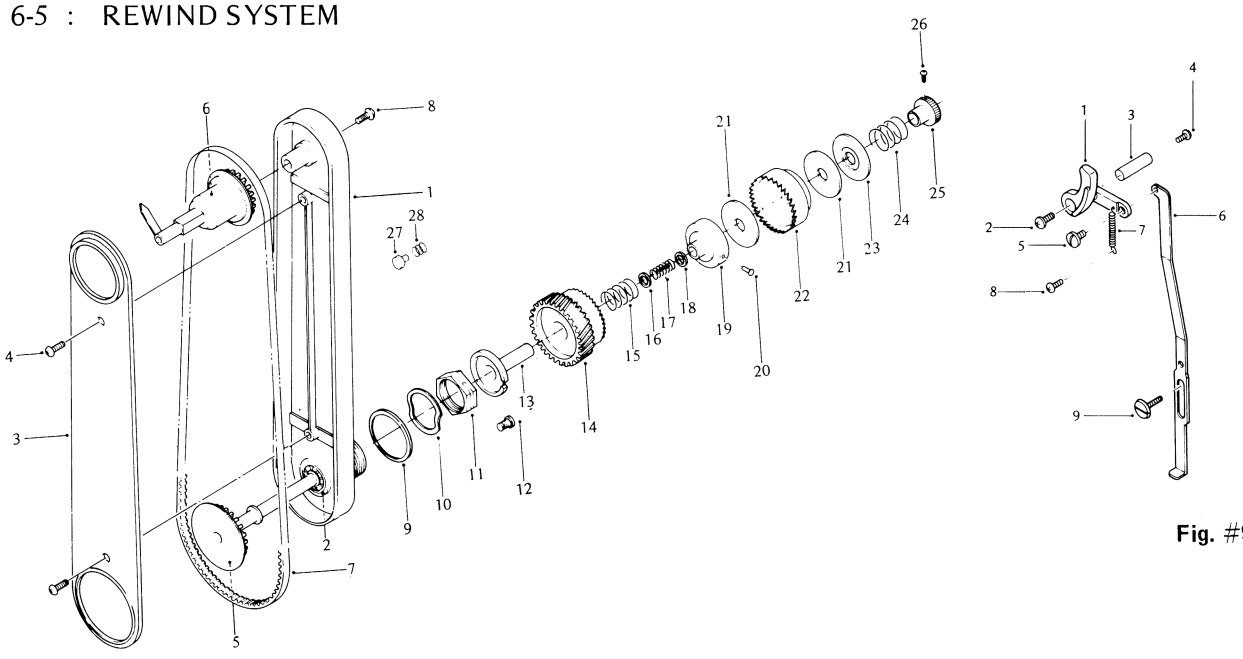


Fig. #93

A. Description

In the rewind function, the film path is opened allowing the film only to contact the four film guide rollers. At the same time the rewind control arm moves the rewind drive gear (14) towards the opposite mating driven gear (22) which in turn drives the set collar (19) via a cork clutch plate which drives the pulley shaft, arm belt and arm spindle assy. When the drive gears are engaged, the function control switches the motor's direction and energizes the main drive motor.

The large drive gear tension spring (15) provides the tension keeping the drive gears A (14) & B (22) from engaging during forward. The smaller back tension spring (17) maintains a small amount of back tension to the supply reel. The rewind spring (24) sets up the rewind clutch tension by supplying pressure to the sleeve plate (23) the cork clutch liners (21) which in turn transmits the rewind drive from drive gear A to B and to the drive pulley shaft, belt and spindle. (Fig. #93)

B. Adjustments

1. Rewind Mechanism

A 0.5mm clearance between the two mating drive gears is critical for correct rewind engagement. This distance is maintained by fiber washers as indicated, adding or subtracting washers as may be necessary to accomplish the desired clearance. Too much clearance will result in improper mating of the gears and will damage the gears. Too close a clearance will cause the gears to contact in forward, resulting in abnormal gear wear and noise. With the correct fiber washers the clutch springs should be compressed with the set collar pushed all the way towards drive gear A and secured with the set screw. (Fig. #95)

2. Rewind Spring Adjustment

The knurled nut (25) adjusts the rewind torque. Excessive rewind torque will cause the motor belt to slip when rewinding a large full reel; too little rewind torque will not rewind a large 2000' reel. The correct adjustment must reduce the space between the clutch hub and knurled nut to be less than the thickness of the adjusting spring.

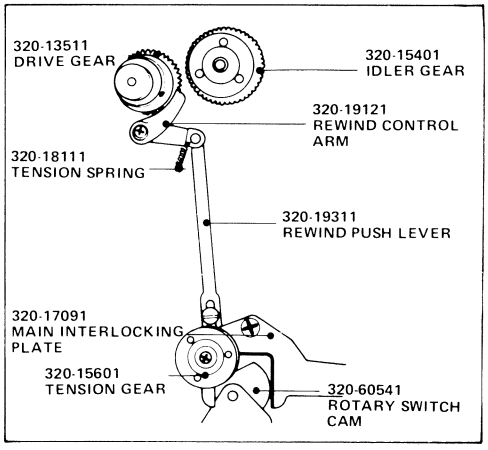


Fig. #94

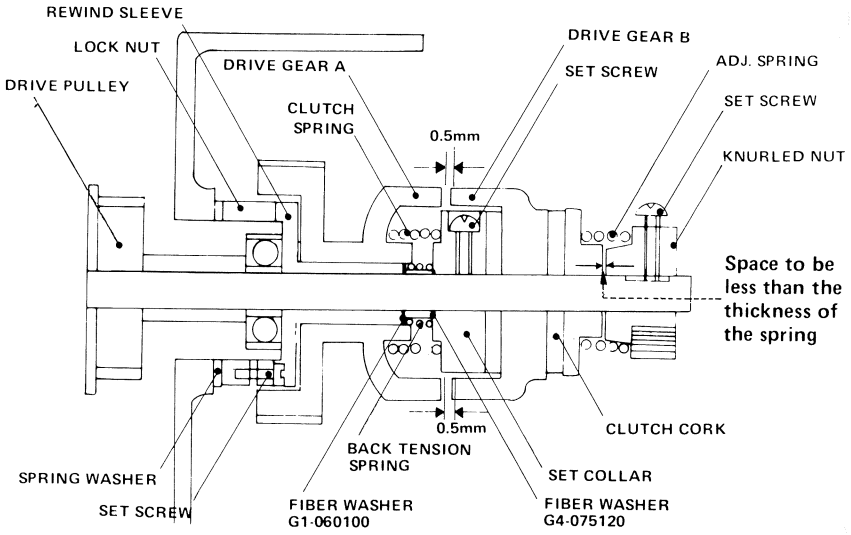


Fig. #95

6-6 : SOUND DRUM AND FLYWHEEL

A. Description

The sound drum and flywheel assembly's main function is to stabilize the film, allowing the sound optics or magnetic head to read the sound tracks with a minimum of speed variations. The sound drum, shaft, bearing and flywheel are precision machined and balanced to maintain a consistent linear film speed. Care should be used when disassembling or re-assembling these precision parts.

The sound drum shaft (46) is seated in two precision ball bearings (48) which are sealed and factory lubricated. The ball bearings are lightly press fitted into the sound hub casting (47). The shaft is secured in place by a set collar (51). With the fiber washer in place, with no end play in the sound drum shaft, it must rotate freely and not bind. Any binding or imperfections in the ball bearing will result in excessive wow & flutter. In the forward direction, the sound drum shaft (46) is driven by the tension of the film. The flywheel is free to slip on the sound drum shaft during the initial start up of the projector to prevent any possible film damage. The flywheel brake mounted on the main interlocking bracket stops the rotation of the flywheel instantly when the function switch is turned to "STOP" so that the film is not scratched by the sound drum which intends to keep turning. During projection the brake is off away from the flywheel. (Fig. #97)

B. Adjustments

The ball bearings are life time lubricated and lightly presses into the hub (47). The amount of shaft (46) end play should not exceed 0.2mm and is determined by the set collar's (51) position. Care should be taken not to bend the shaft or lubricate the bearings. (Bearings are factory lubricated and should be replaced if defective). Defective or incorrect lubrication of the bearings will result in excessive wow and flutter. The plate spring (54) tension may be adjusted for minimum wow and flutter with the screw secured. Whenever removing the spring and flywheel is necessary, care should be taken to avoid changing the plate spring's tension.

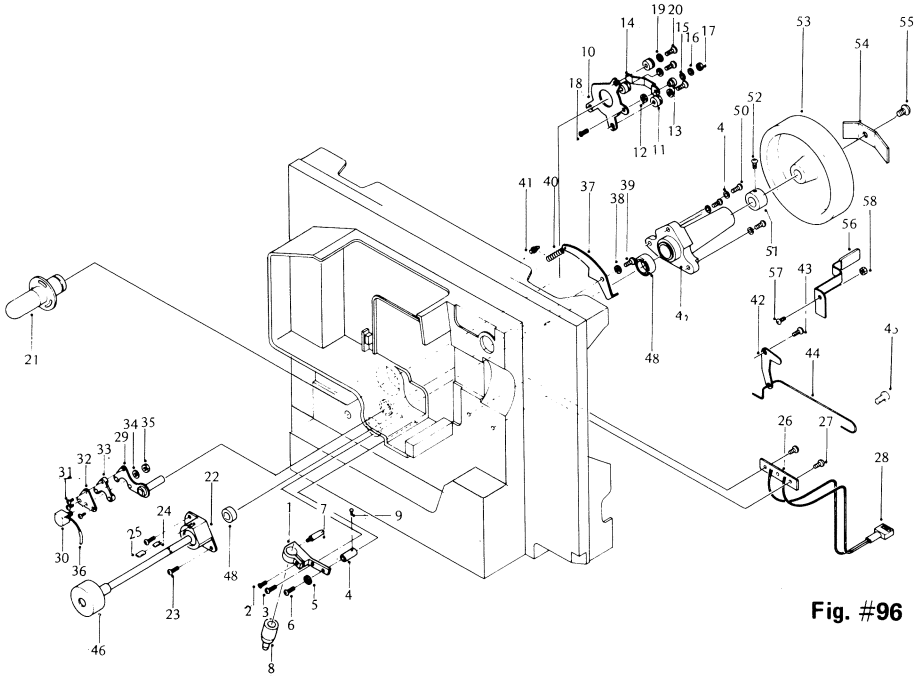


Fig. #96

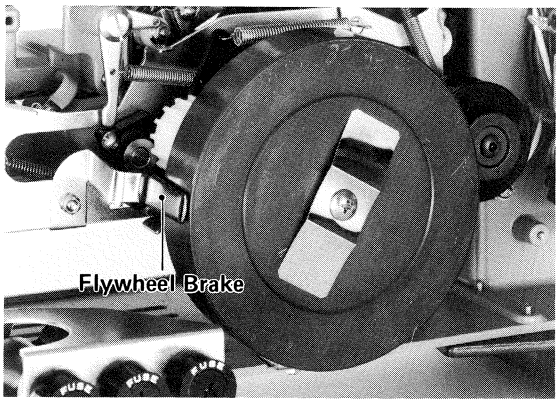


Fig. #97

322-7: SOUND PICK-UP SYSTEM

7-1 : OPTICAL SOUND FOCUSING PROCEDURE

A. Description

Models ESL/SSL-0, 1 are optical sound playback only, models ESL/SSL-2 are both optical and magnetic playback. The optical pick-up system resembles a small projector within a projector, consisting of a light source, a lens, an image, and a screen or target.

The light from the exciter lamp is focused through the sound track imaged onto the (target) solar cell where varied light intensity is converted into a minute electrical voltage change which is amplified and converted into acoustical variation or sound directly related to the photographic variations recorded on the film. (Fig. #98)

B. Sound Focus Alignment Procedure

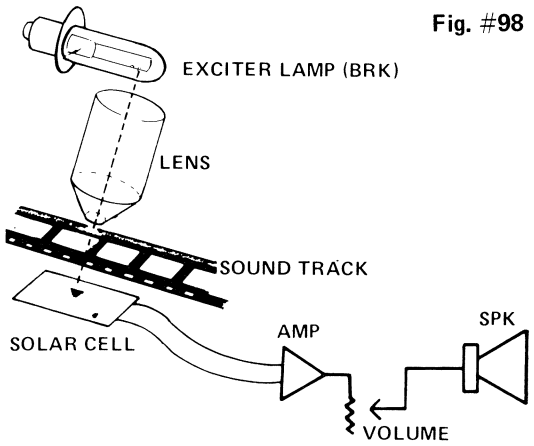
1. Tools and Equipment Required

a. Screw driver set (Iso)
b. Sound lens adjustment tool (Tool No. 320-02T. Fig. #100)
c. SMPTE sound focus test film 7000Hz
d. SMPTE buzz track test film
e. AC VTVM (audio range) and or
f. Oscilloscope
g. 8 ohm 30 watt dummy load resistor
h. External speaker (front cover)

2. Set-up Procedure

a. Remove the lamp house cover, light shield and lamp.
b. Load a SMPTE test loop.
c. Turn the function control to "MIC" position.
d. Loosen a screw mounting sound lens holder assy, and remove the lens holder assy.
e. Insert the Tool No. 320-02T on the larger barrel of sound lens and tighten a set screw on the tool. (Fig. #101)
f. Loosen a sound lens lock screw, and mount the sound lens clamped to the tool to the lens holder assy.
g. Mount the sound lens holder assy to the projector's casting and tighten the mounting screw. (Fig. #102)

Fig. #98



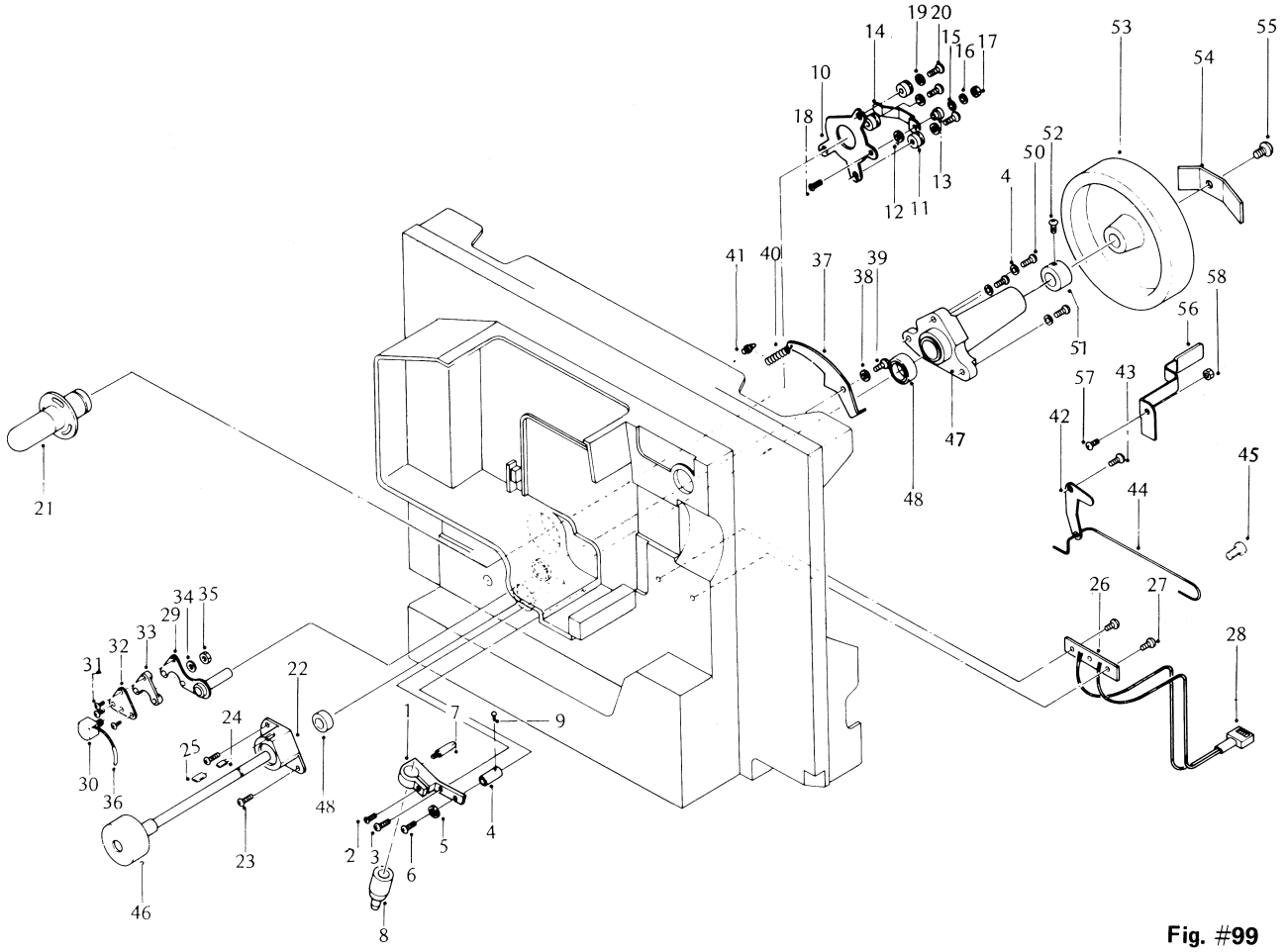
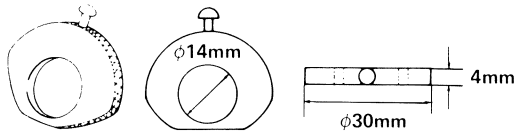


Fig. #99



SOUND LENS ADJUSTMENT TOOL
320-02T

Fig. #100

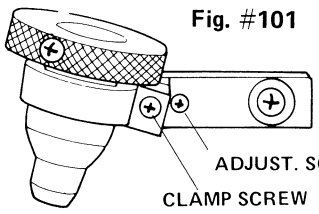


Fig. #101

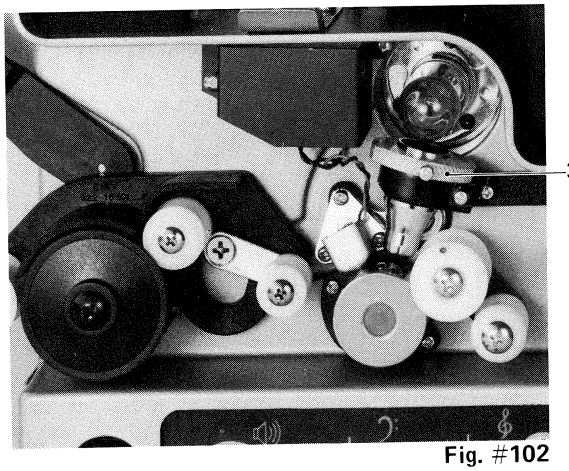


Fig. #102

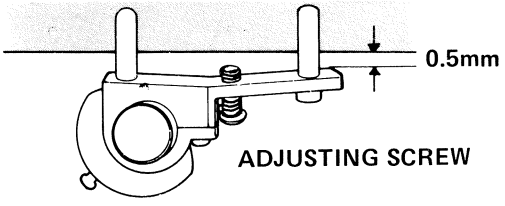


Fig. #103

Note : Keep 0.5mm distance from the casting. (Fig. #103)

Note : The top of the adjusting screw should not touch the casting. (Fig. #103)

3. Sound Focusing Adjustment Procedure

a. Connect the dummy load resistor to the speaker output jack.

b. Load the 7000Hz SMPTE test film loop with the emulsion side towards the film shoe.

c. Connect either an AC VTVM (20 volt range) or an Oscilloscope across the dummy load resistor. (Fig. #104)

Note : When using instruments with a grounded shield input, avoid a ground loop condition by not connecting the shield at both ends.

d. Turn the volume and tone controls to the maximum (clockwise) position.

e. Loosen the sound focus lens clamp screw slightly to allow a rotation of the lens.

f. Turn on the projector and observe the AC VTVM or the Oscilloscope.

(1) With the AC VTVM connected, observe the meter while slowly moving the lens up or down and slightly rotating until the maximum voltage reading is achieved. Clamp the sound lens and this completes the sound focusing alignment.

(2) With the Oscilloscope connected across the dummy load resistor a more precise alignment can be achieved. Observe the 7000Hz sine wave at both full volume and a lower volume at the same time adjusting the rotation and up or down position of the sound lens, for maximum P-P voltage of the sine wave. A clean undistorted sine wave should be observed as shown in Fig. #105 corresponding to the volume and tone control positions as indicated.

g. This completes the Sound Focus adjustment. Clamp the sound lens clamp screw and test with a good sound track film.

4. Buzz Track Adjustment Procedures

a. Connect an extension speaker to the speaker jack.

b. Load an SMPTE buzz track test film loop with the emulsion side towards the film shoe.

c. Turn the function control switch to the No. 2 position.

d. Turn the amplifier volume and tone controls to maximum (clockwise) and listen for a clear 1000Hz tone.

e. Adjust the buzz track alignment screw clockwise until the 1000Hz tone is inaudible and a 300Hz tone becomes audible.

f. Turn the set screw counter-clockwise until neither the 300Hz or the 1000Hz tone is audible, indicating correct buzz track alignment.

g. Re-check the 7000Hz sound focus alignment.

h. Remove the exciter lamp. Remove the lens adjustment tool. Re-install the exciter lamp and wipe off any fingerprints.

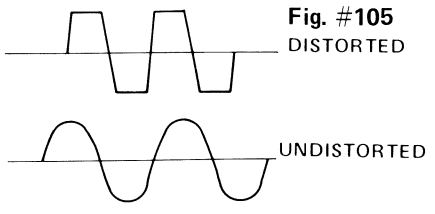


Fig. #105

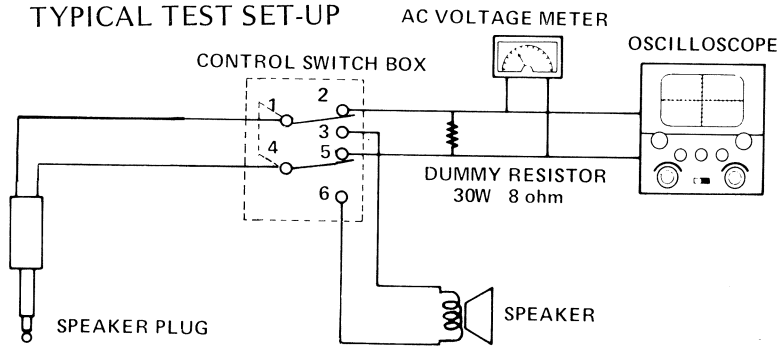


Fig. #104

7-2 : MAGNETIC SOUND PLAYBACK SYSTEM

A. Description

Models ESL/SSL-2 in addition to the standard optical sound reproduction are equipped with optional magnetic track (100 mil) playback only. The opt/mag slide switch on the amplifier effects this conversion by switching the input to the amplifier while at the same time moving the magnetic playback head into position against the films magnetic sound track.

B. Magnetic Alignment Procedure

1. Tools and Equipment Required
   a. Screw driver set (ISO)
   b. Magnetic Azimuth 7000Hz alignment SMPTE test film loop.
   c. Pliers
   d. AC VTVM (Audio Range) and or
   e. Oscilloscope
   f. 8 ohm 30 watt dummy load resistor
   g. External speaker (front cover)
2. Set-Up Procedure
   a. Remove lamp house cover.
   b. Set the function control to "STOP".
   c. Load the magnetic test loop (oxide side toward the head)
   d. Turn the function control to "MIC".
   e. Slide the mag/opt switch to mag.
   f. Connect the output of the amplifier to the dummy load resistor.
   g. Connect the AC VTVM and or the Oscilloscope across the dummy load.
   h. Turn the function control to No. 2 operate position, and check for the correct engagement of the magnetic head and the rubber roller.
   i. Turn the volume and tone controls to the maximum (clockwise) position.
   j. Holding the magnetic head with the pliers coarsely adjust the three screws adjustment screws for the correct position as shown in (Fig. #106). The head should also contact the film parallel as illustrated in (Fig. #107).

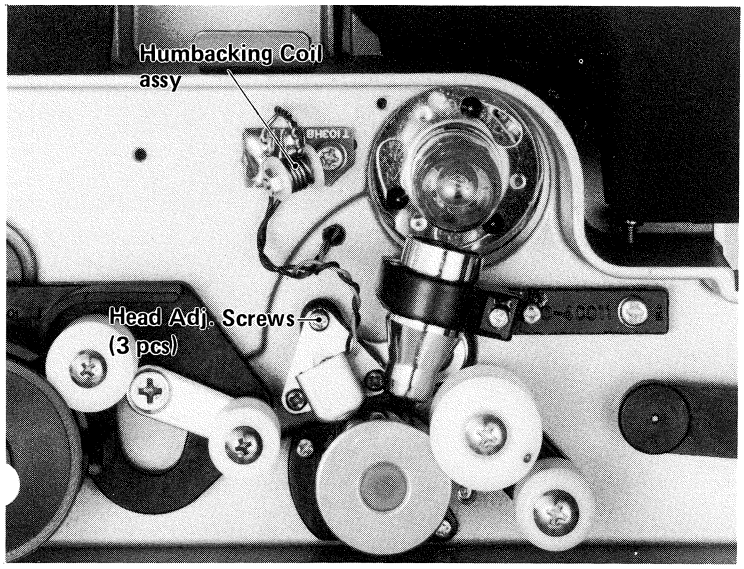


Fig. #106

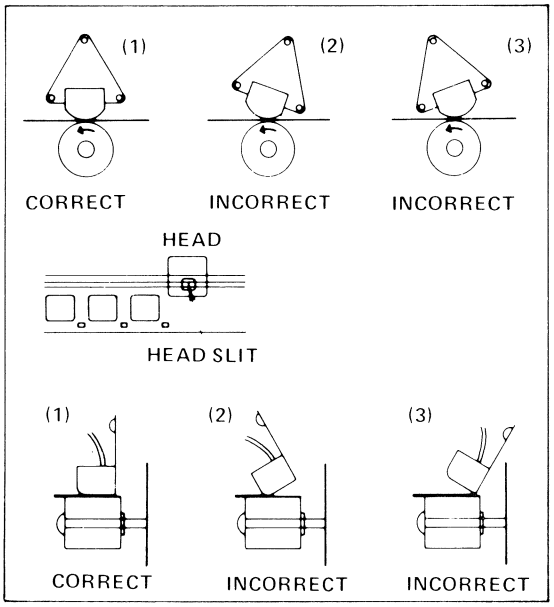


Fig. #107

k. To precisely adjust the head azimuth using the AC VTVM or Oscilloscope:
   (1) With the AC VTVM connected across the load resistor, observe the meter while making small adjustments to the three alignment screws in turn until the maximum voltage reading is achieved. This completes the azimuth alignment.
   (2) With the Oscilloscope connected across the load resistor, observe the 7000Hz sine wave at full and low volume. Adjust the three head alignment screws until a maximum P-P sine wave voltage is observed. When a clean undistorted sine wave at maximum voltage is achieved the alignment is completed.

l. This completes the Azimuth alignments.

m. Humbucking coil adjustment is accomplished by carefully bending the coil for minimum hum.
   Coil is located under the black shield. (Fig. #106)

322-8:LAMP CIRCUIT

8-1 : LAMP CIRCUIT

A. Description

The SSL/ESL projector is designed with a 24V AC Quartz Halogen Lamp ELC 250 watt. A 200 watt EJL Lamp may also be used with some reduction in light output. A high/low switch located in the lamp house allows the selection of either the normal 24V or the 22V secondary from the transformer.

Note : SSL-0L projector is, however, designed with a 120V AC Line Voltage Quartz Halogen Lamp EWG or EYK 300 watt, and does not have a high/low switch, nor the transformer.

B. Replacement and Alignment

1. Disconnect the AC power cord.
2. Remove the lamp house cover.
3. Remove the black heat shield cover.

CAUTION : The shield cover may be hot.

4. Push the lamp ejection lever to the left and the lamp will come out.
5. When replacing a lamp, be sure that it snaps into the lamp socket properly and that the heat shield and lamp house cover are re-installed properly.
6. For the maximum, even illumination, it may be necessary to adjust the lamp position to allow for slight variations in lamps. Turn the knurled nut for horizontal adjustment.

Note : In the event of the lamp socket replacement, and the knurled nut has been removed from the pin, make sure of the correct direction of the knurled nut when re-mounting to the pin. (Fig. #108)

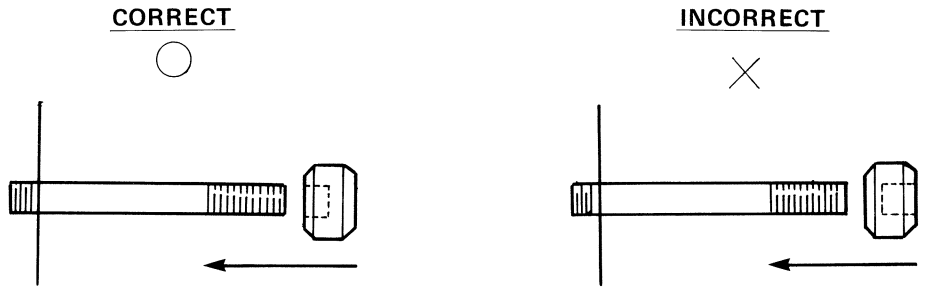


Fig. #108

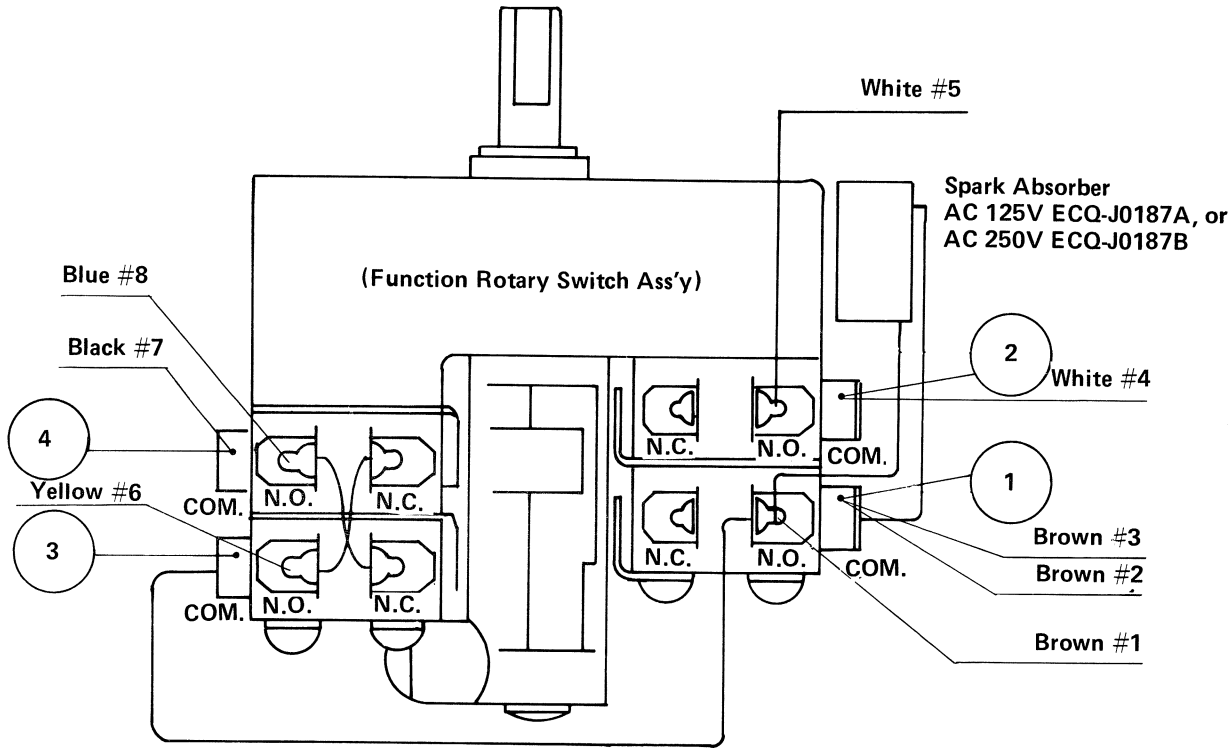
322-9:ELECTRICAL SYSTEM

9-1 : ELECTRICAL SYSTEM

A. Function Rotary Switch (SSL-Series)

Micro Sw. #	Type of Sw. & Part No.	Function
1	V-15-1A3M 312-60051	Motor Forward
2	" "	Lamp
3	" "	Motor Rewind
4	" "	Motor Rewind

Wire # & Colour	Type of Wire	Connected to:
Brown #1	AWG #22	Motor 6P Connector (F) No. 1
Brown #2	"	Transformer 9P Connector (F) No. 1
Brown #3	"	Fuse Holder 2A
White #4	AWG #18	Transformer 3P Connector (M) No. 3
White #5	"	Lamp Socket
Yellow #6	AWG #22	Motor 6P Connector (F) No. 2
Black #7	"	" (F) No. 5
Blue #8	"	" (F) No. 4



N.O.: Normal open N.C.: Normal close COM.: Common

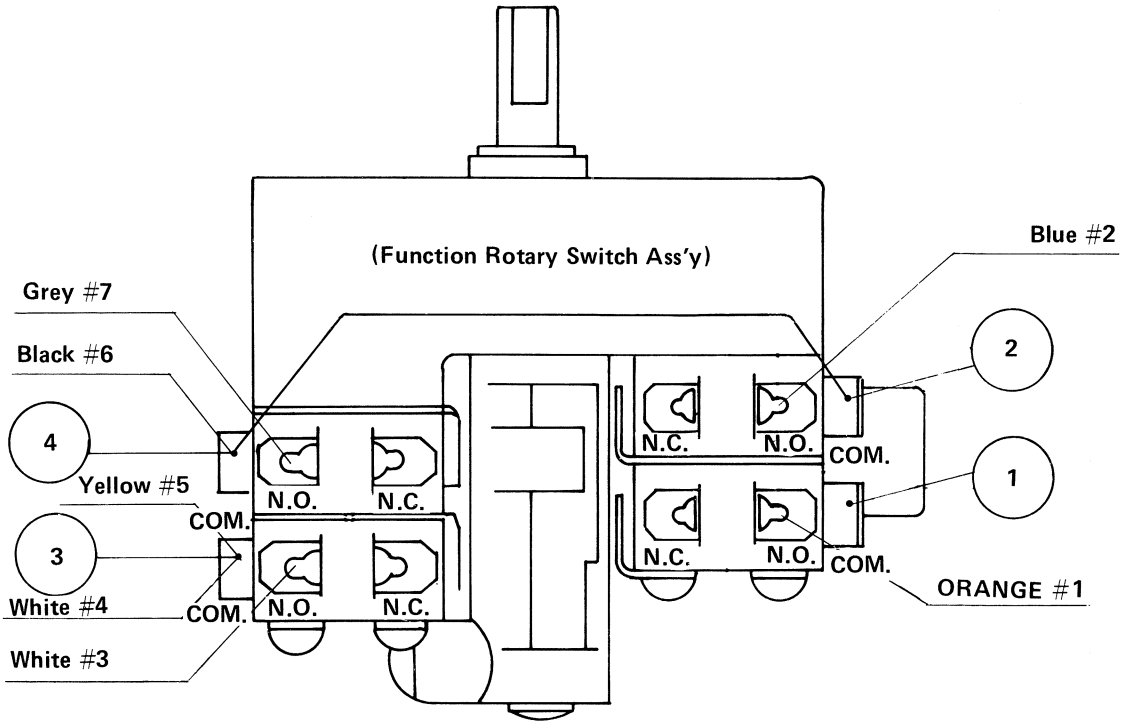
Fig. #109

SSL-Series

B. Function Rotary Switch (ESL-Series)

Micro Sw. #	Type of Switch & Part No.		Function
1	V-15-1A3M	312-60051	Rewind Position
2	"	"	SET position
3	"	"	LAMP position
4	"	"	STOP position

Wire # & Colour	Type of Wire	Connected to:
Orange #1	AWG #22	6P Connector Sensor Signal
Blue #2	"	Signal Transformer
White #3	AWG #18	2P Connector
White #4	"	Transformer 3P Connector (M) No. 3
Yellow #5	AWG #22	Secondary Source
Black #6	"	6P Connector Sensor Signal Transformer
Grey #7	"	"



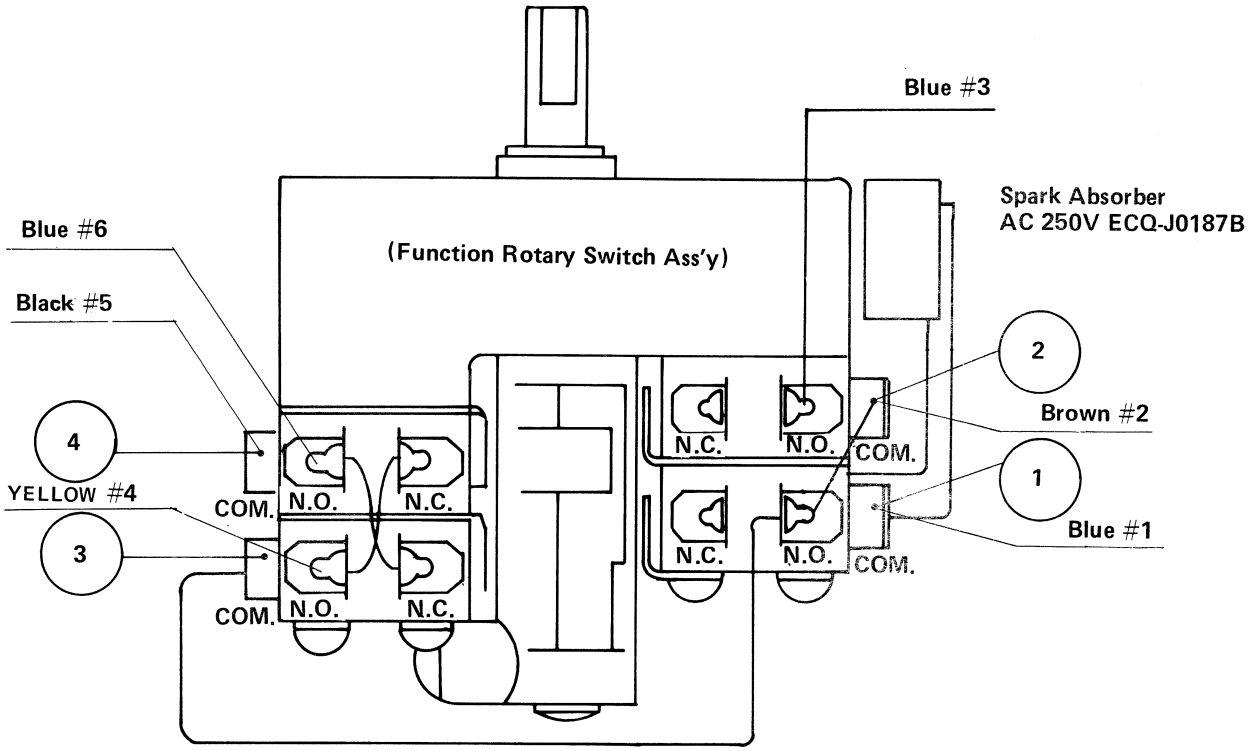
ESL-Series

Fig. #110

C. Function Rotary Switch (SSL-0L Series, Line Voltage Models)

Micro Sw. #	Type of Sw. & Part No.	Function
	~ See 9-1-A (SSL-Series)~	

Wire # & Colour	Type of Wire	Connected to:
Blue #1	AWG #18	4P AC Terminal No. 2
Brown #2	AWG #22	Motor 6P Connector (F) No. 1
Blue #3	AWG #18	Lamp Socket
Yellow #4	AWG #22	Motor 6P Connector (F) No. 2
Black #5	"	" (F) No. 5
Blue #6	"	" (F) No. 4



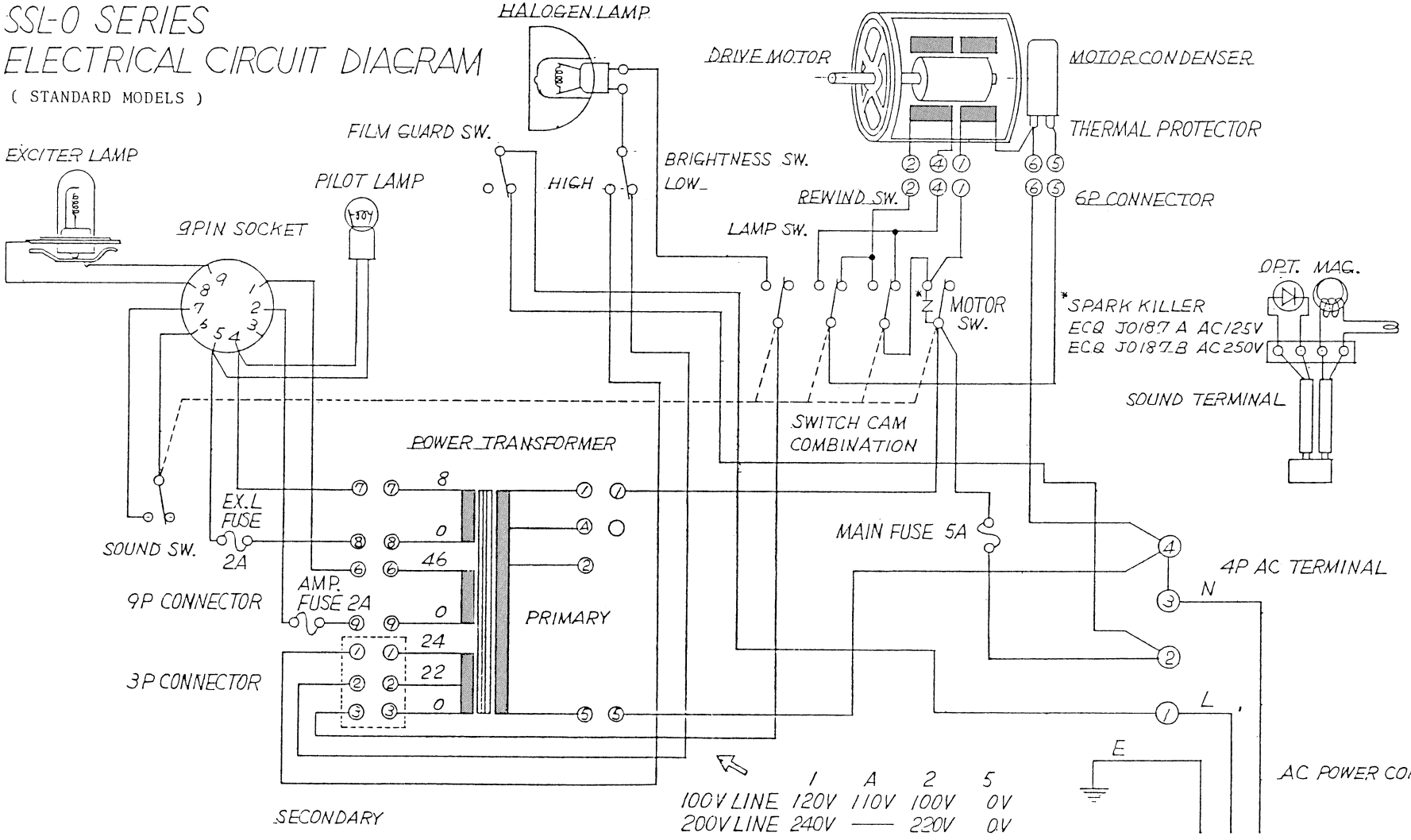
SSL-0L Line Voltage Model

Fig. #111

処理加工	図面訂正個		
	符号	年月日 訂正要領	担当
	A	60 3 15 322-61102a	H.K.

SSL-0 SERIES
ELECTRICAL CIRCUIT DIAGRAM

(STANDARD MODELS)

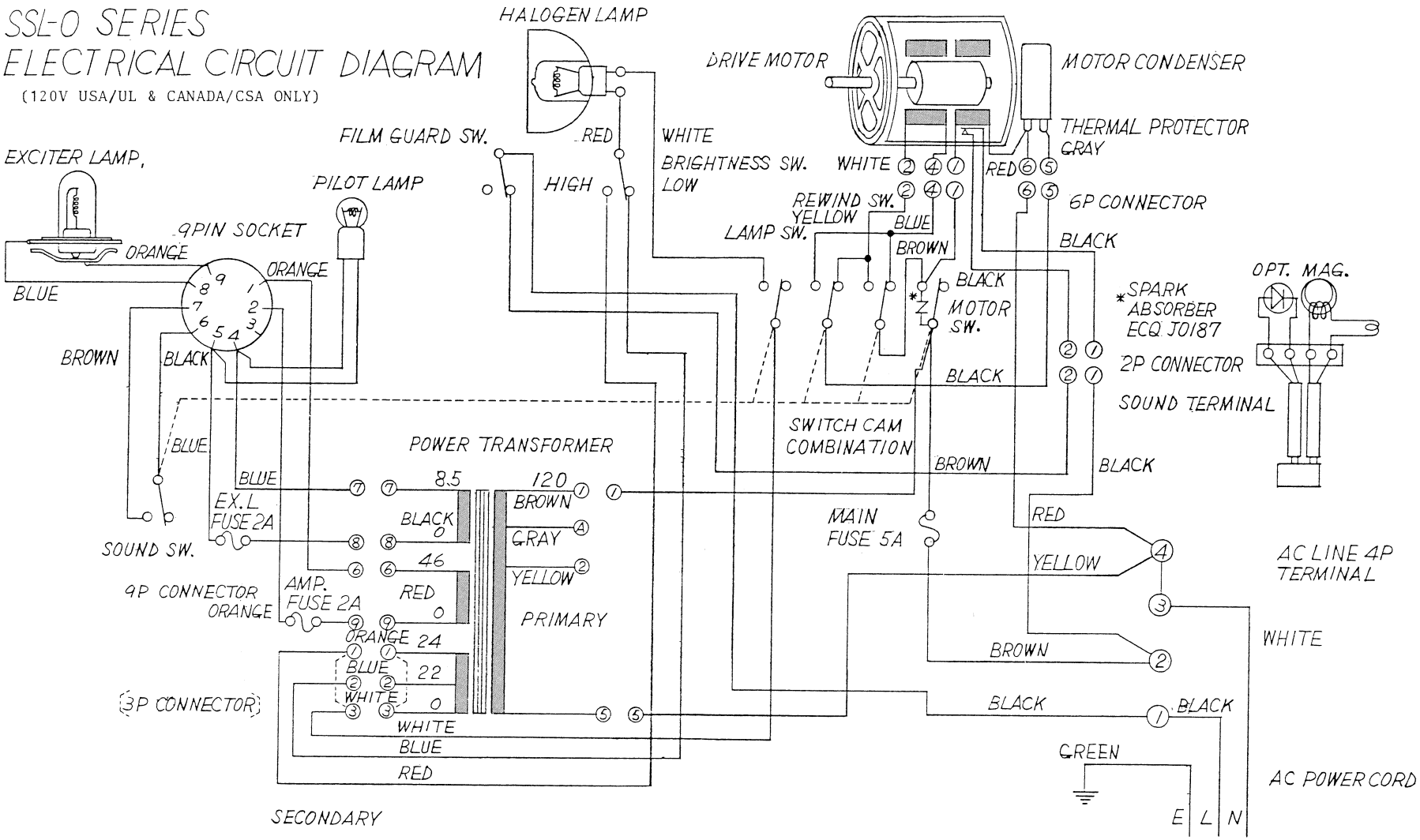


映機工業株式会社	承認	設計	製図	品名	SSL-0 SERIES CIRCUIT DIAGRAM
作図 59年 6月 10日 尺度 /			H.K.		
材質	台当個数	単重量 g		部番	322-61101

処理加工	図面訂正欄		
	符号	年月日 訂正要領	担当
	5P	8・10 REVISED FROM UL REQUIRED	K.K.
	5P	9・30 FUSES LOCATION CHANGED	K.K.

SSL-0 SERIES
ELECTRICAL CIRCUIT DIAGRAM

(120V USA/UL & CANADA/CSA ONLY)

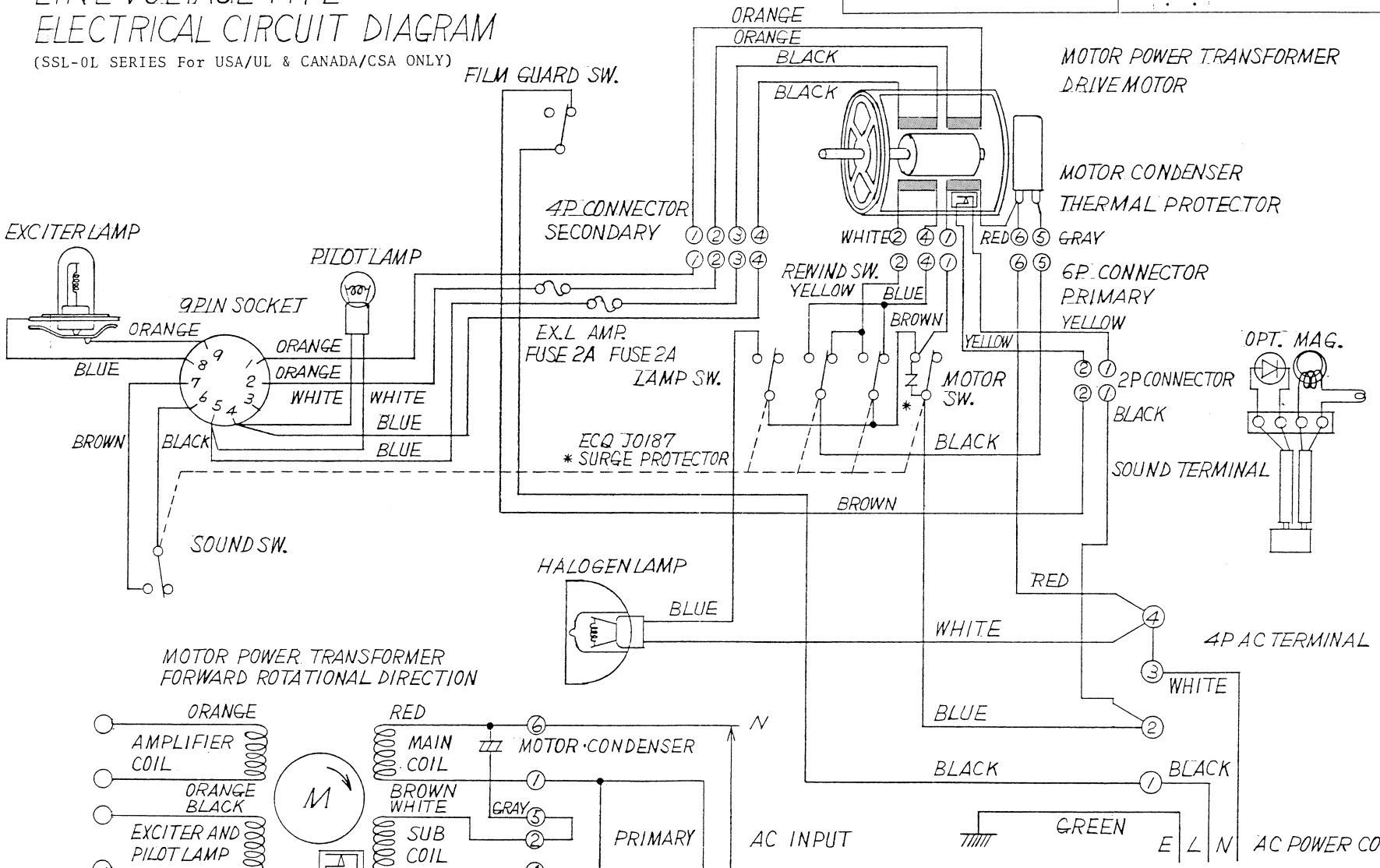


映機工業株式会社	承認 設計 製図	品名	SSL-0 SERIES CIRCUIT DIAGRAM
作図 59年 6月 10日	尺度 /		
材質	台当個数 単重量 g	製品番号 SSL	部番 322-61803

LINE VOLTAGE TYPE
ELECTRICAL CIRCUIT DIAGRAM

(SSL-0L SERIES For USA/UL & CANADA/CSA ONLY)

処理加工	図面訂正欄
	符号 年月日 訂正要領 担当
	59 8·10 REVISED FROM UL REQUIRED

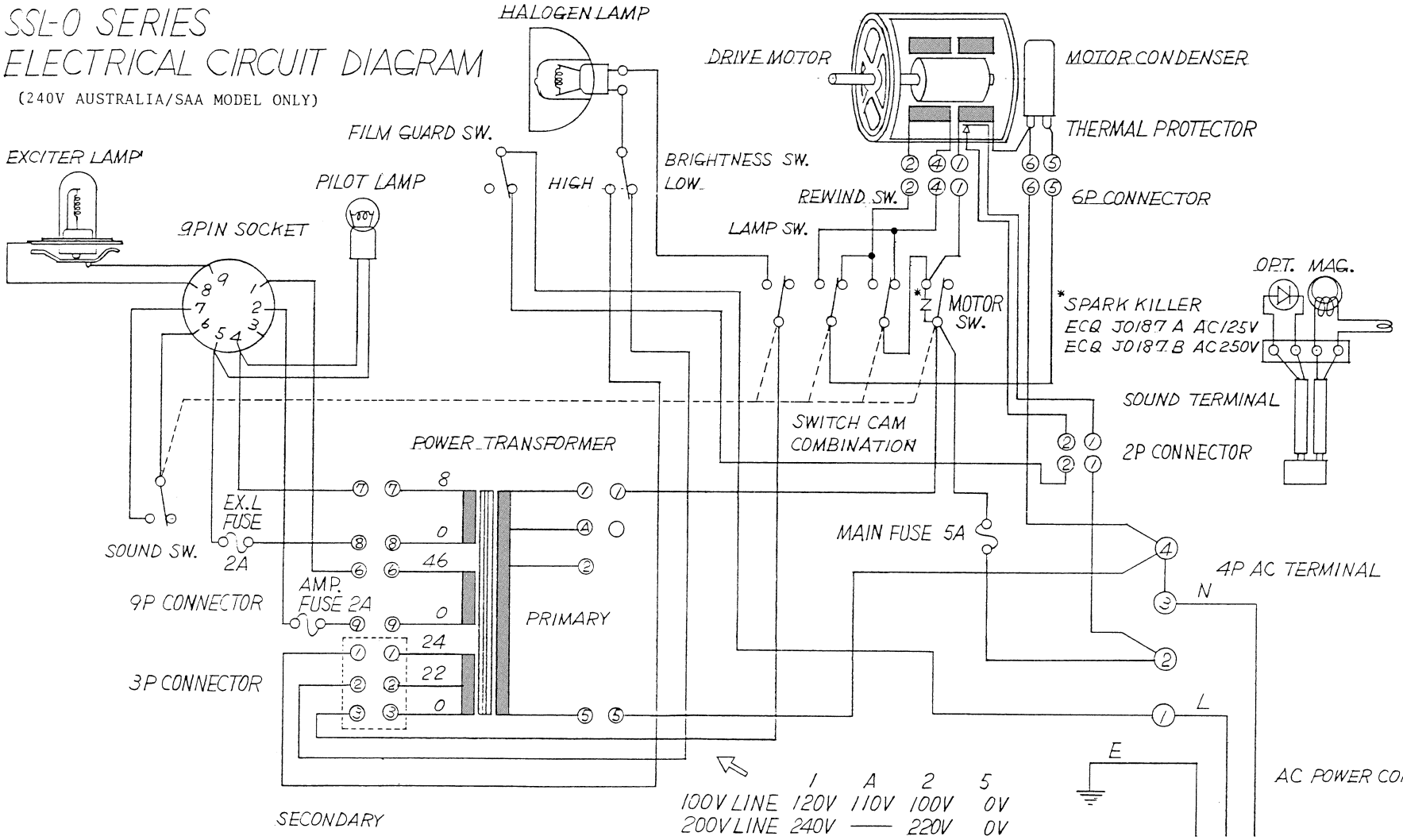


映機工業株式会社	承認 設計 製図	品名 SSL LINE VOLTAGE CIRCUIT DIAGRAM
作図 59年 6月 24日 尺度		
材質 台当個数 単重量 g	製品記号 SSL	部番 322-61902

処理加工	図面訂正欄			
	符号	年月日	訂正要領	担当
	a	60 3·15	322-61102a	HK

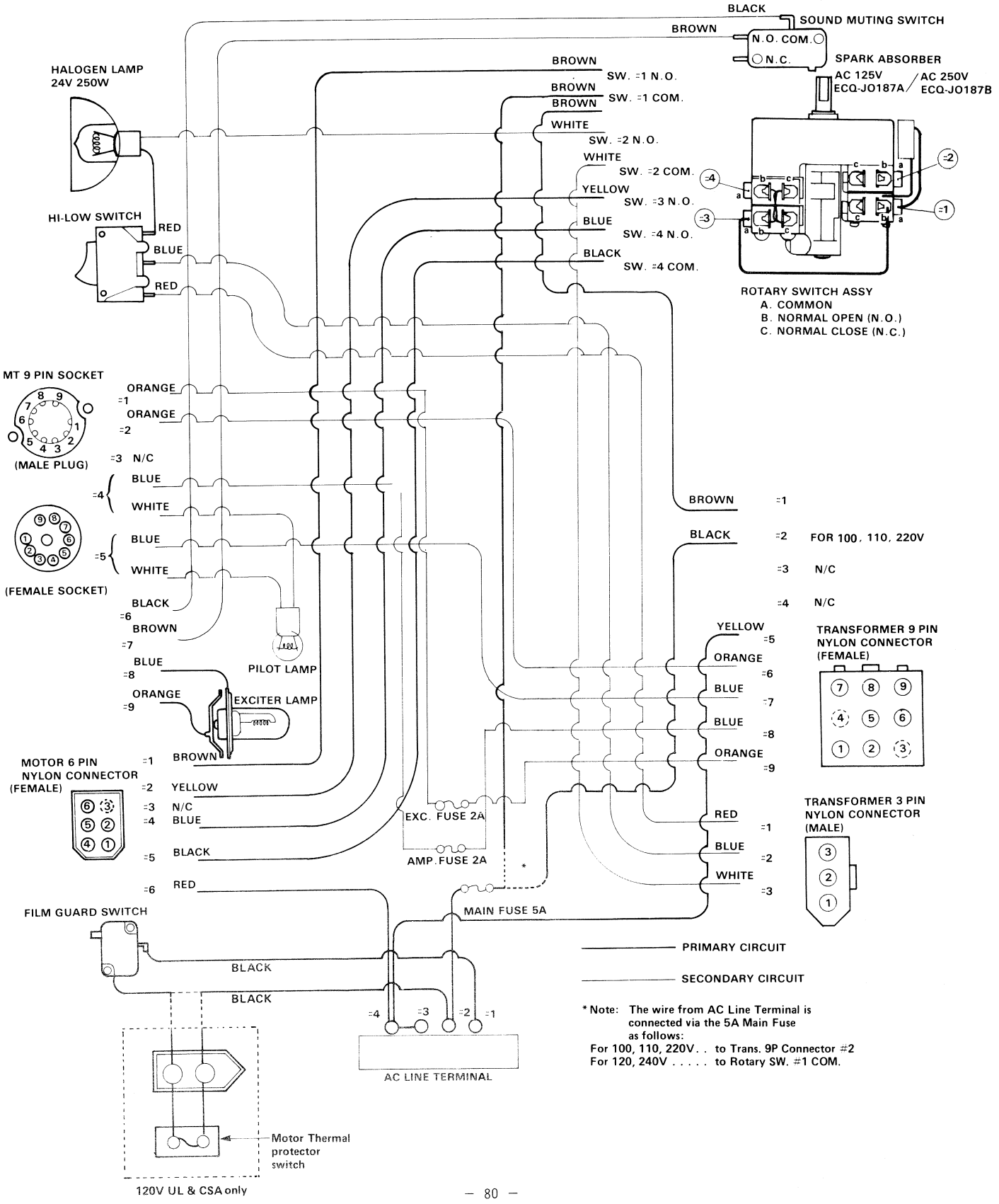
SSL-0 SERIES
ELECTRICAL CIRCUIT DIAGRAM

(240V AUSTRALIA/SAA MODEL ONLY)

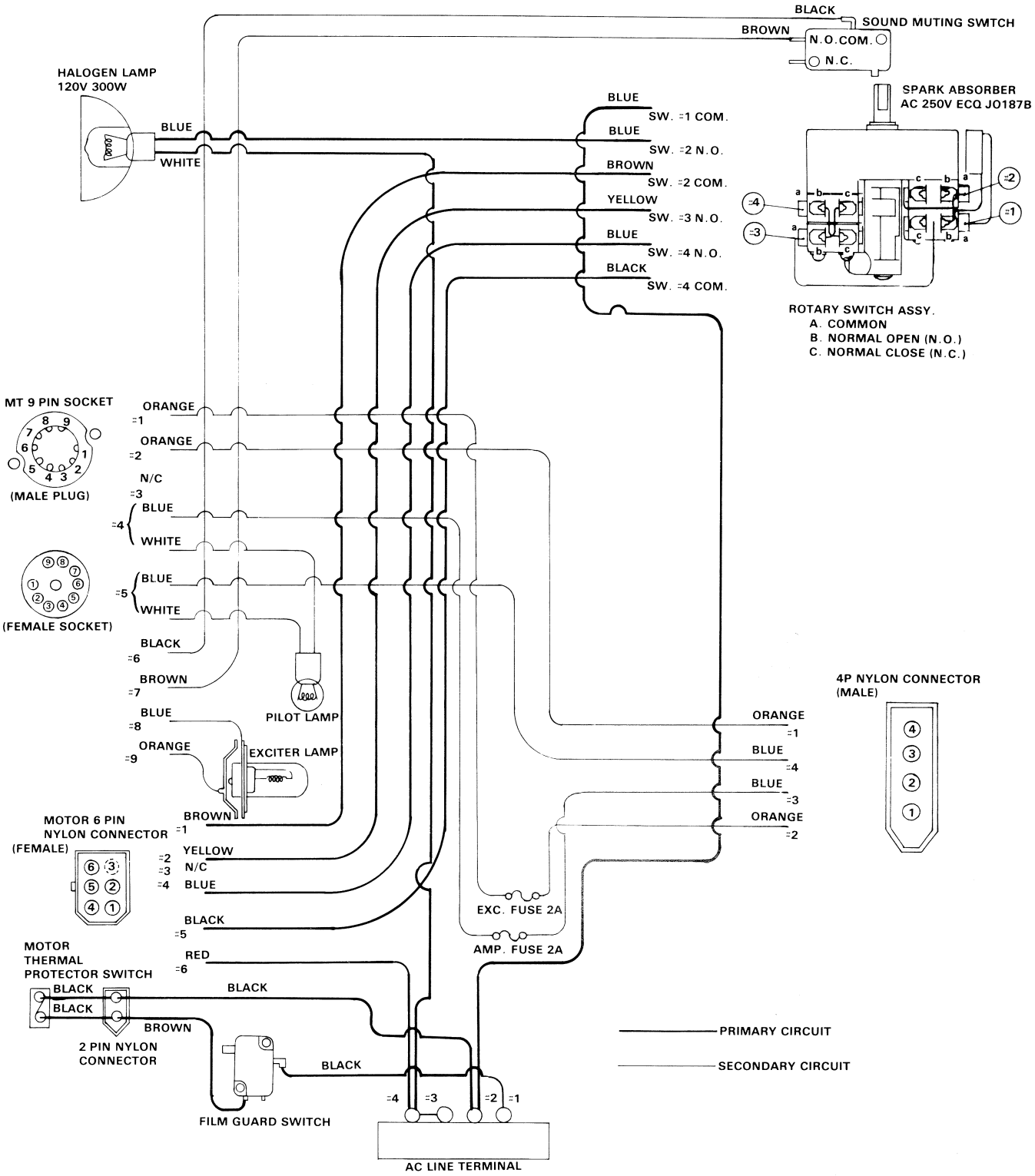


映機工業株式会社	承認 設計 製図	品名 SSL-0 SERIES CIRCUIT DIAGRAM
作図 59年 6月 10日	尺度 /	
材質	台当個数 / 単重量 g	製品記号 / 部番 322-61102a

SSL-SERIES ELECTRICAL BLOCK DIAGRAM (FOR STANDARD TYPE)



SSL-0L SERIES ELECTRICAL BLOCK DIAGRAM (FOR 120V UL & CSA TYPE ONLY)



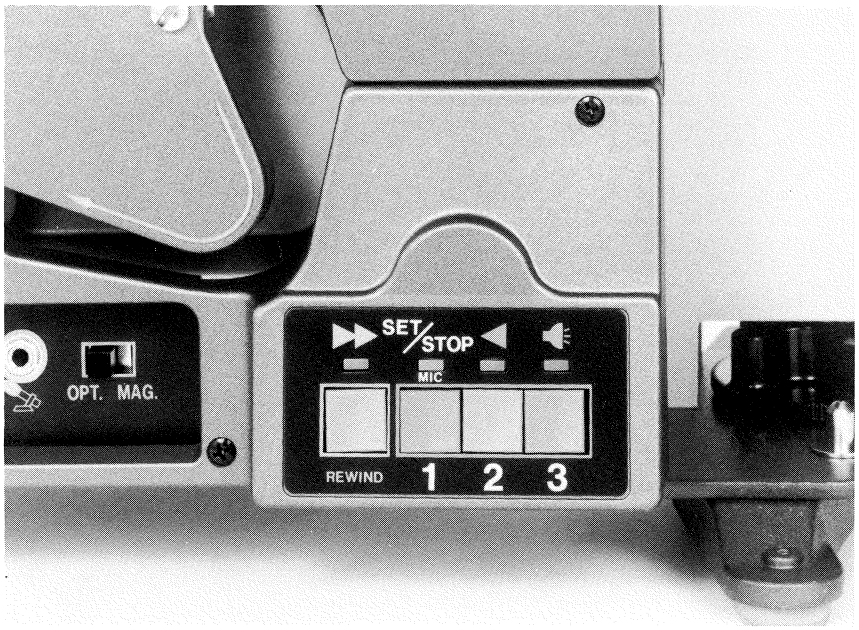
9-2 : ESL ELECTRONIC CONTROL SYSTEM

A. Description:

ESL-Series employ an electronic touch button control system, utilizing a pre-programmed E-Prom. The Circuit is also addressable for remote control operation by means of a hand held remote unit or may be custom interfaced to other electronic control equipment. All logic circuit controls are contained on a single P.C. Board (322-60201). Addressed commands are momentary contracts for the following functions:

- set/stop
- forward
- lamp
- rewind

Mechanical operations are accomplished by means of a DC Control motor, driving the function control cam. All mechanical operations are the same as described for the SSL-Series. To service the P.C. Board, remove the three mounting screws as designated in (fig. #114). Do not remove any other screws as they secure the transistor heat sink to the P.C. Board.



ESL TOUCH BUTTON CONTROLS **Fig. #112**

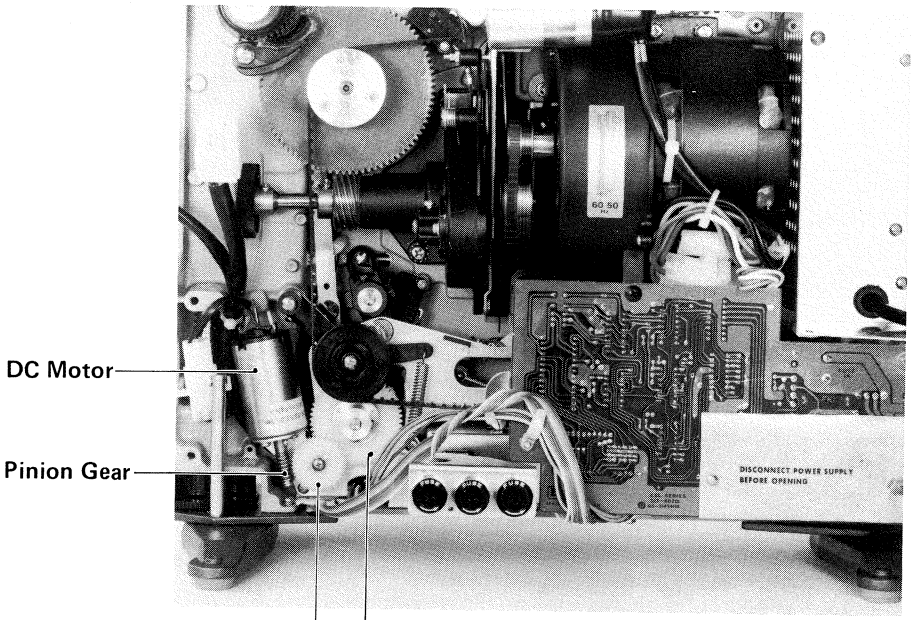


Fig. #113

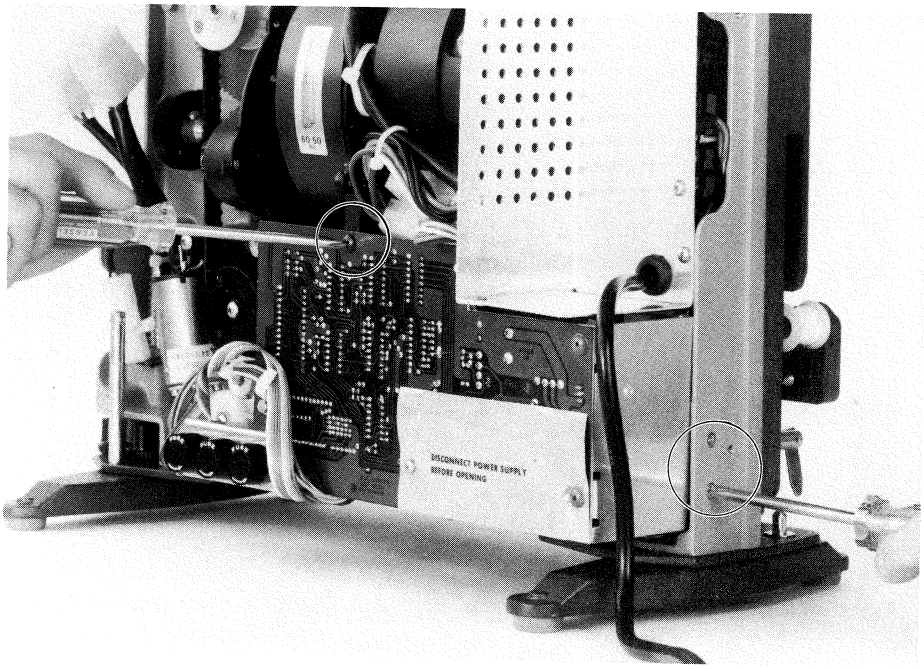
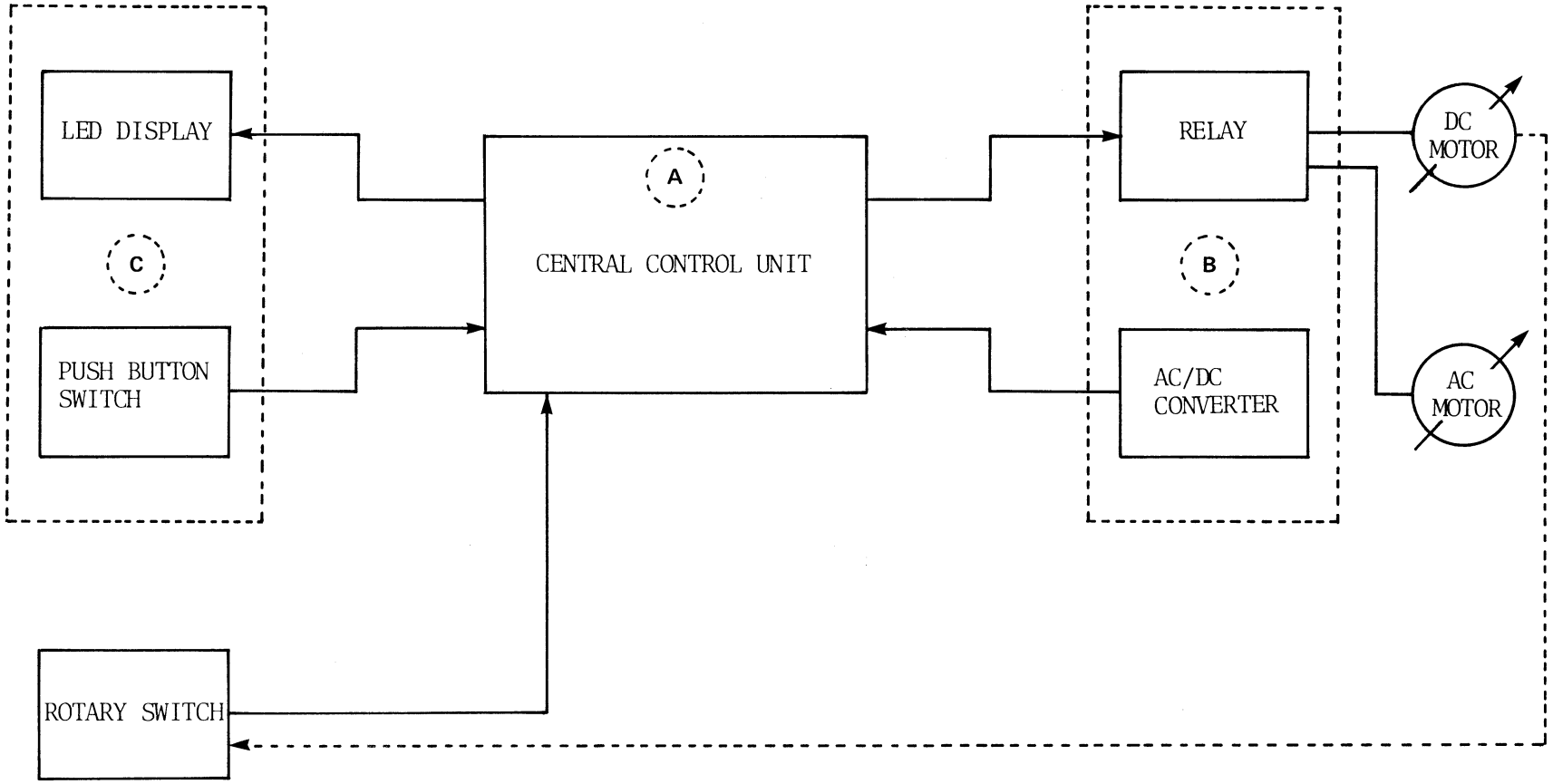


Fig. #114

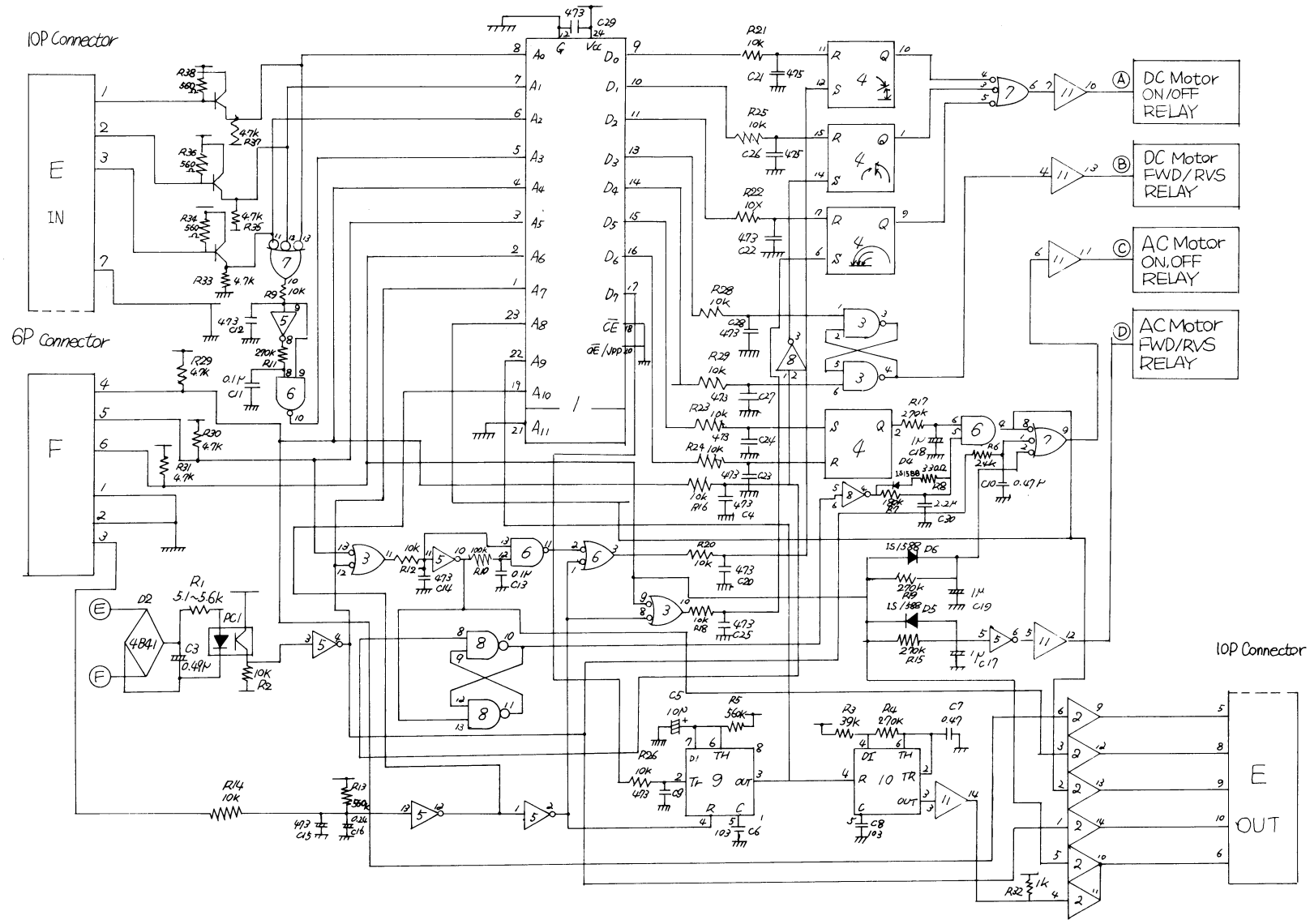
B. TROUBLE SHOOTING INFORMATIONS & CIRCUIT DIAGRAMS.

ESL SERIES FUNCTION CONTROL BLOCK DIAGRAM

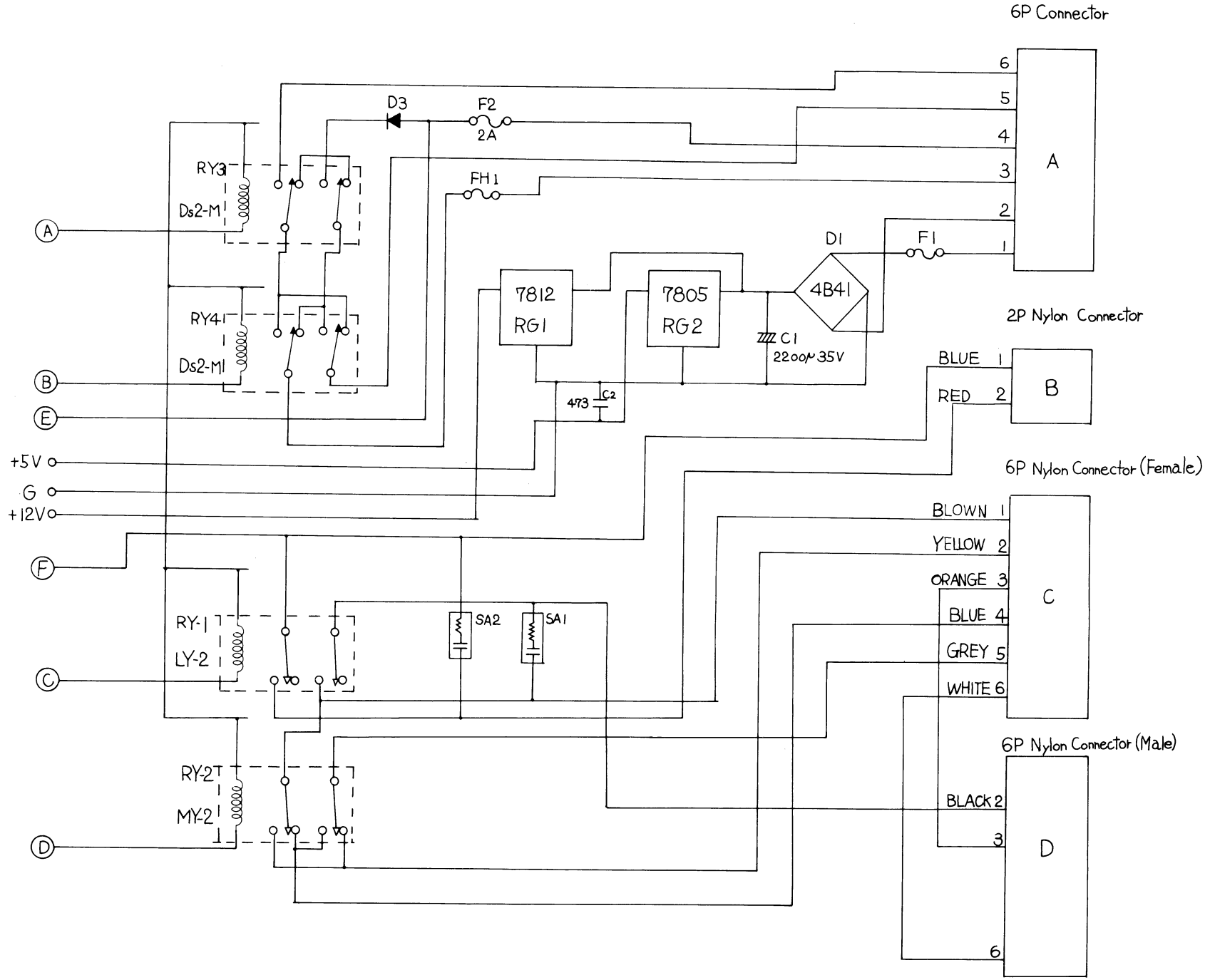
(A) See page 85
(B) See page 86
(C) See page 87



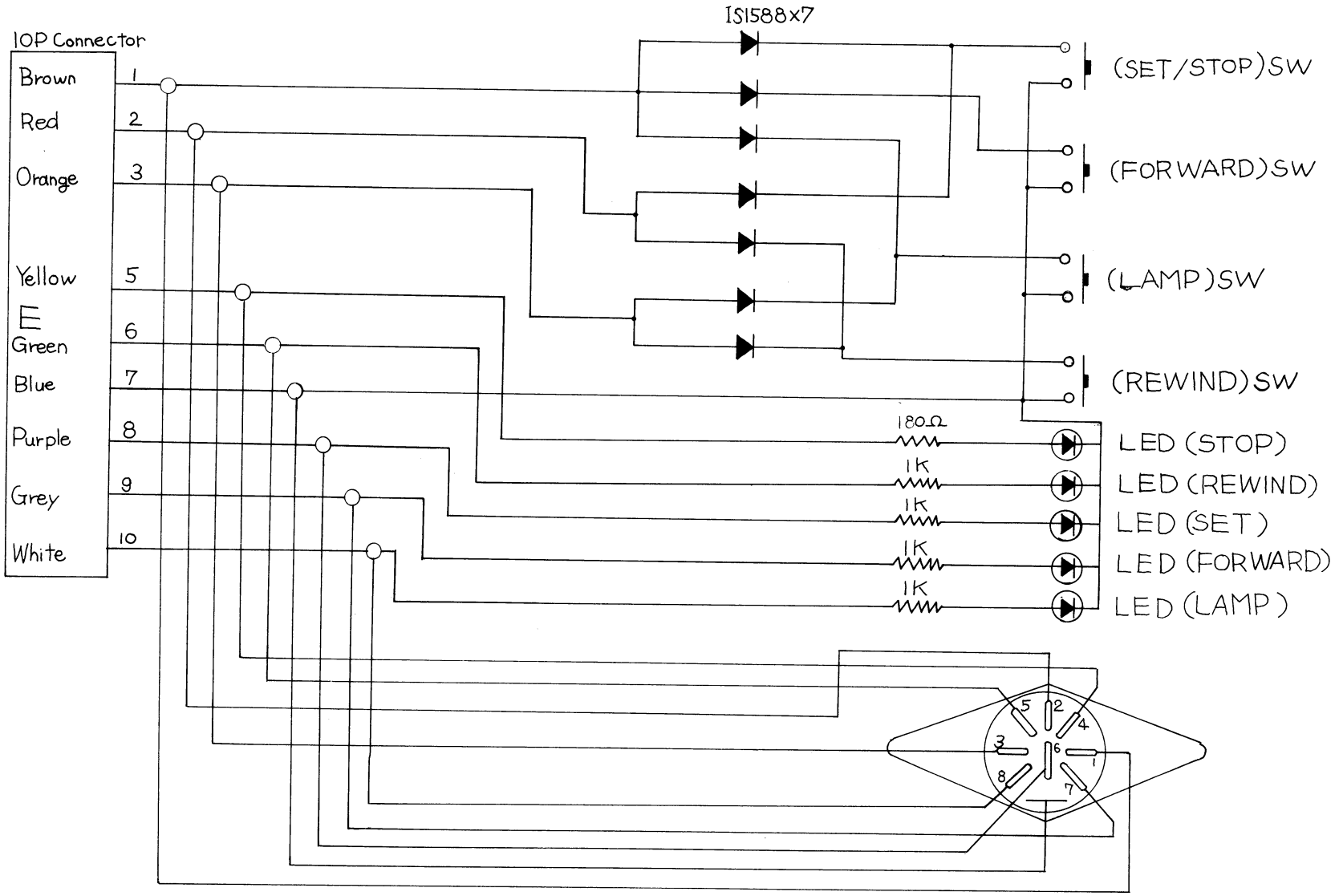
ESL SERIES. CENTRAL CONTROL UNIT CIRCUIT DIAGRAM (A)



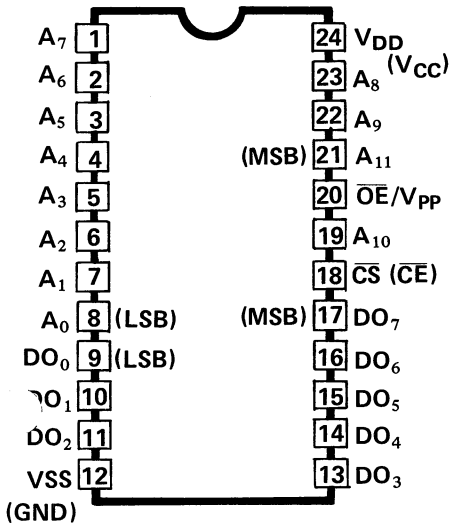
ESL SERIES: RELAY & AC/DC CONVERTER CIRCUIT DIAGRAM (B)



ESL SERIES: PUSH BUTTON FUNCTION SWITCH & LED DISPLAY CIRCUIT DIAGRAM ©



◈ Pin Connections

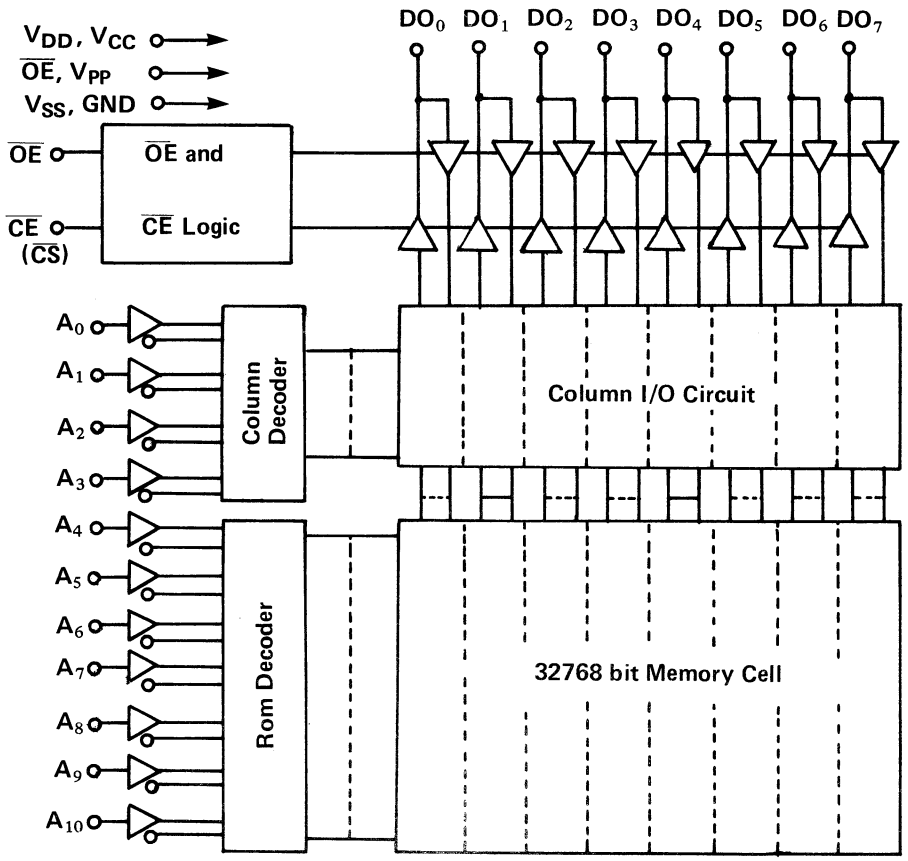


PIN NAMES

$A_0 - A_{11}$	Addresses
$DO_0 - DO_7$	Outputs
$\overline{CS}$, $\overline{CE}$	Chip Enable
$\overline{OE}$	Output Enable
V_{CC}, V_{PP}	Power Supply
V_{SS}, GND	Ground

◈ Power Supply
V_{DD}: +5V Pin 24
V_{SS} (GND) Pin 12

BLOCK DIAGRAM



LOGIC SEQUENCE OF ESL-SERIES P.C. BOARD

1. IC1 (2732) 0 = low level (0-0.8V) 1 = high level (+5V)

Terminal Description	Pin No.	Input or Output	Mode of Function Switch	Signal Pulse
A_0 A_1 A_2	8 7 6	Input Input Input	Press SET/STOP Sw. Press FORWARD ◀ Sw. Press LAMP 🔦 Sw. Press REWIND ▶▶ Sw. No Sw. is pressed	$A_0 = 0, A_1 = 0, A_2 = 1$ $A_0 = 0, A_1 = 1, A_2 = 1$ $A_0 = 0, A_1 = 1, A_2 = 0$ $A_0 = 1, A_1 = 0, A_2 = 0$ $A_0 = 1, A_1 = 1, A_2 = 1$
A_3	5	Input	Any one of Switches is pressed	$A_3 = 0$ (20ms)
A_4	4	Input	SET/STOP with Green LED ON	$A_4 = 0$
A_5	3	Input	Press SET/STOP Sw. Red LED ON	$A_5 = 0$
A_6	2	Input	Press REWIND ▶▶ Sw. Red LED ON	$A_6 = 0$
A_7	1	Input	Press LAMP 🔦 Sw. Red LED ON	$A_7 = 0$
A_8	23	Input	Press FORWARD ◀ Sw. Red LED ON	$A_8 = 0$
A_9	22	Input	Press REWIND ▶▶ Sw. for 2nd time. Rewinding stops and Red LED to Blink for 7 sec.	$A_9 = 0$ (7 sec.)
A_{10}	19	Input	AC Main Power is supplied. SET/STOP Sw. Green LED ON. Or, when Fim Guard Sw. is activated and SET/STOP Sw. Green LED ON	$A_{10} = 0$ (0.1s) $A_{10} = 0$
A_{11}	21	Input	Any mode	always $A_{11} = 0$
$\overline{CE}$	18	Input	Any mode	always $\overline{CE} = 0$
$\overline{OE}$/Vpp	20	Input	Any mode	always $\overline{OE}$/Vpp = 0

[IC1 (2732)]

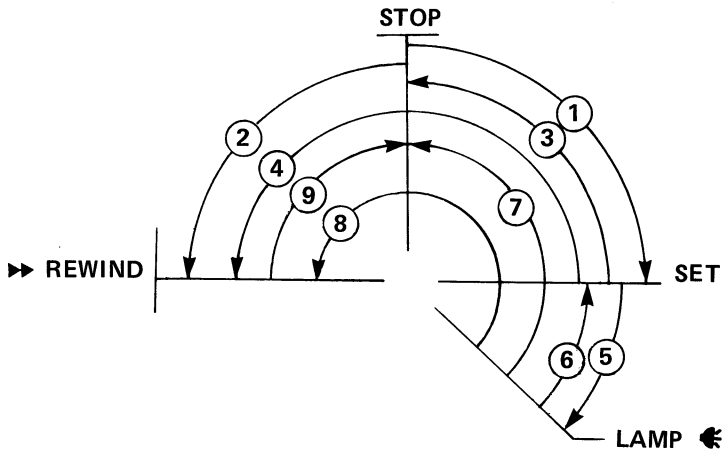
Terminal Description	Pin No.	Input or Output	Mode of Function Switch	Signal Pulse
DO_0	9	Output	At STOP (Green LED ON) position, SET/STOP Sw. or FORWARD ◀ Sw. is pressed At LAMP 🔦 position, LAMP 🔦 Sw. or FORWARD ◀ Sw. is pressed At FORWARD ◀ position, LAMP 🔦 Sw. is pressed	DO_0 = 1 (20ms)
DO_1	10	Output	At any position other than STOP (Green LED ON), SET/STOP Sw. is pressed At REWIND ▶▶ position, REWIND ▶▶ Sw. is pressed	DO_1 = 1 (20ms)
DO_2	11	Output	At any position other than REWIND▶▶ , REWIND ▶▶ Sw. is pressed	DO_2 = 1 (20ms)
DO_3	13	Output	At STOP (Green LED ON) position, SET/STOP Sw. or FORWARD ◀ Sw. is pressed At FORWARD ◀ position, LAMP 🔦 Sw. is pressed At REWIND ▶▶ position, SET/STOP Sw. or REWIND ▶▶ Sw. is pressed	DO_3 = 0 (20ms) Note: always D_3 = 0 when at REWIND position
DO_4	14	Output	At STOP (Green LED ON), or SET (Red LED ON) position, REWIND ▶▶ Sw. is pressed At LAMP 🔦 position At SET (Green LED ON) position, when Film Guard Sw. is activated	DO_4 = 0 (20ms) always DO_4 = 0 DO_4 = 0

[IC1 (2732)]

Terminal Description	Pin No.	Input or Output	Mode of Function Switch	Signal Pulse
DO_5	15	Output	At STOP (Green LED ON) position, FORWARD ◄ Sw. is pressed At SET (Red LED ON) position, FORWARD ◄ Sw. is pressed At FORWARD ◄ position, LAMP ◄ Sw. is pressed At LAMP ◄ position, LAMP ◄ Sw. is pressed	DO_5 = 1 (20ms)
DO_6	16	Output	At STOP (Green LED ON), or at SET (Red LED ON), or at LAMP ◄ position, REWIND ►► Sw. or SET/STOP Sw. is pressed When AC Main Power is supplied and SET/STOP Green LED is ON	DO_6 = 1 (20ms) DO_6 = 1 (0.1s)
DO_7	17	Output	At REWIND ►► position, REWIND ►► Sw. or SET/STOP Sw. is pressed	DO_7 = 0 (20ms)

IC Number	Pin No.	Input or Output	Mode of Function Switch	Signal Pulse
IC4 4043	10	Output	At STOP (Green LED ON) position, SET/STOP Sw. is pressed, and when SET position is completed	1 0
			At FORWARD ◂ position, LAMP 🔦 Sw. is pressed, and LAMP position is completed	1 0
			At LAMP 🔦 position, LAMP 🔦 Sw. or FORWARD ◂ Sw. is pressed, and SET (Red LED ON) position is completed	1 0
IC4 4043	1	Output	At any position other than STOP (Green LED ON), SET/STOP Sw. is pressed, or when Film Guard Sw. is activated, and STOP (Green LED ON) position is completed	1 0
IC4 4043	9	Output	At any other position than REWIND ▸▸ , REWIND ▸▸ Sw. is pressed, and REWIND ▸▸ position is completed	1 0
IC3 4011	4	Output	When the rotary switch is positioned at ② ③ ④ ⑥ ⑦ ⑧ When the rotary switch is positioned at ① ⑤ ⑨ See Figure No. 115.	1 0
IC4 4043	2	Output	At STOP (Green LED ON), FORWARD ◂ Sw. is pressed.	1

IC Number	Pin No.	Input or Output	Mode of Function Switch	Signal Pulse
IC4 4043	2	Output	At STOP (Green LED ON) position, FORWARD◄ Sw. is pressed At SET (Red LED ON) position, FORWARD◄ Sw. is pressed At LAMP, or FORWARD◄ position, SET/STOP Sw. or FORWARD◄ Sw. or REWIND►► Sw. is pressed	1 1 0
IC6 4093	10	Output	Any one of the switches is pressed	0 (20ms)
IC6 4093	3	Output	When the rotary Sw. settles at FORWARD or LAMP position,	0
IC5 4584	4	Output	At LAMP position	0
IC5 4584	12	Output	When AC Main Power is supplied When the Film Guard Sw. is activated	1 (0.1s) 1
IC9 555	3	Output	At REWIND►► position, REWIND►► Sw. or SET/STOP Sw. is pressed	1 (7s)



Rotary Switch Cam Position **Fig. #115**

ESL-Series P.C. BOARD: TIMING CHART

Mode of switch \ 10P Connector E pin No.	1	2	3
SET/STOP	0	0	1
FORWARD	0	1	1
LAMP	0	1	0
REWIND	1	0	0
NOP	1	1	1

* 0 = low level (0-0.8V)
* 1 = high level (+5V)
* NOP means the situation of no switch is activated, just AC main power is supplied.

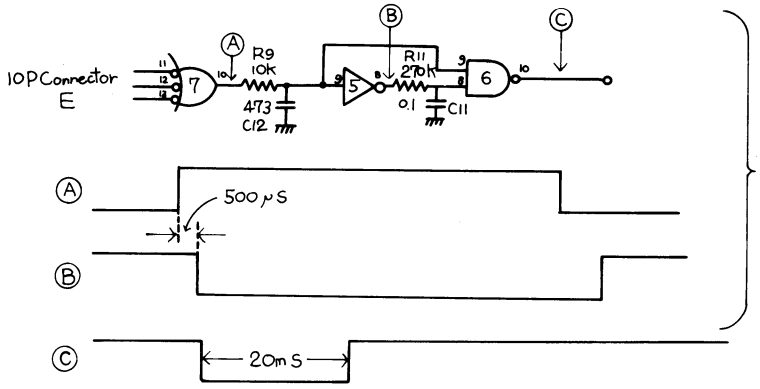


Fig. #116

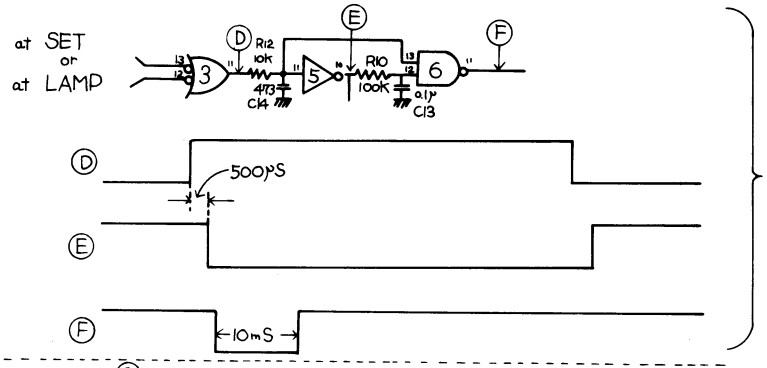
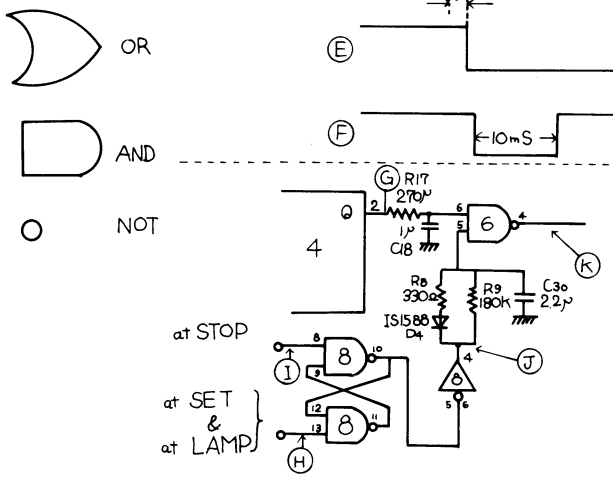


Fig. #117



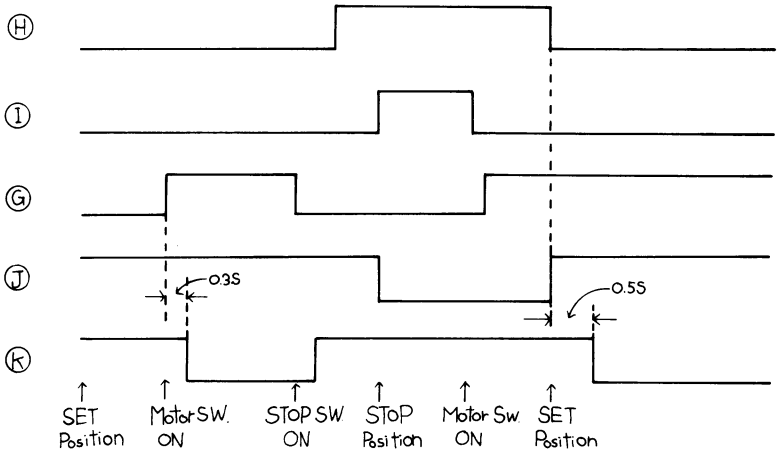


Fig. #118

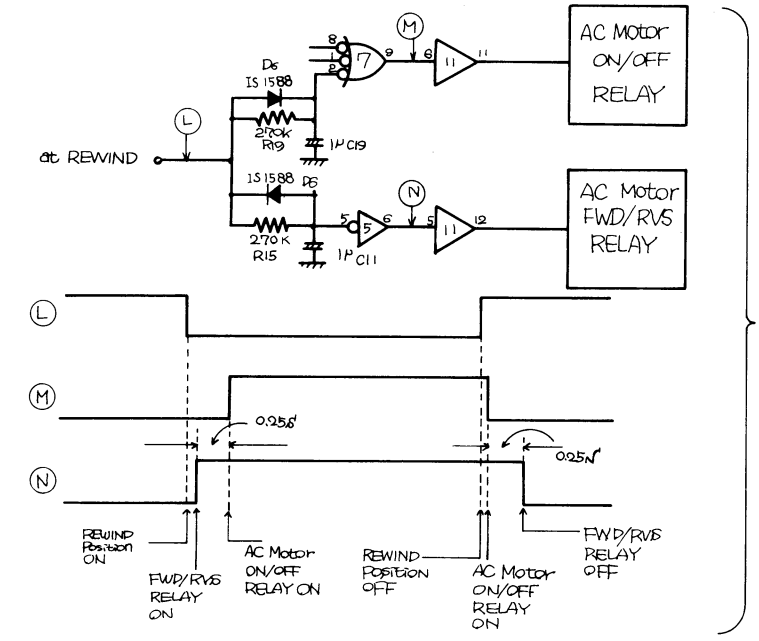


Fig. #119

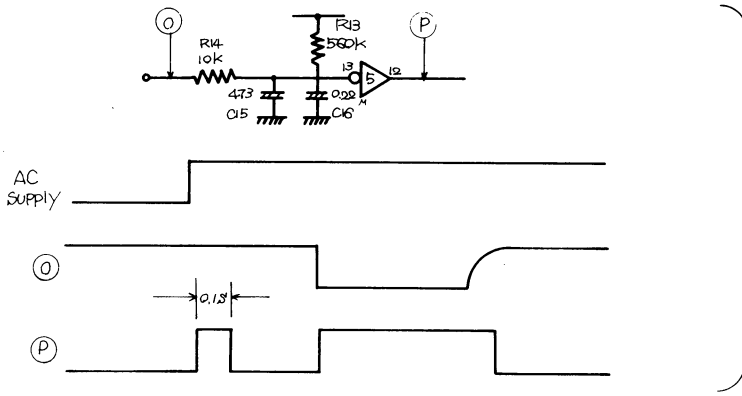
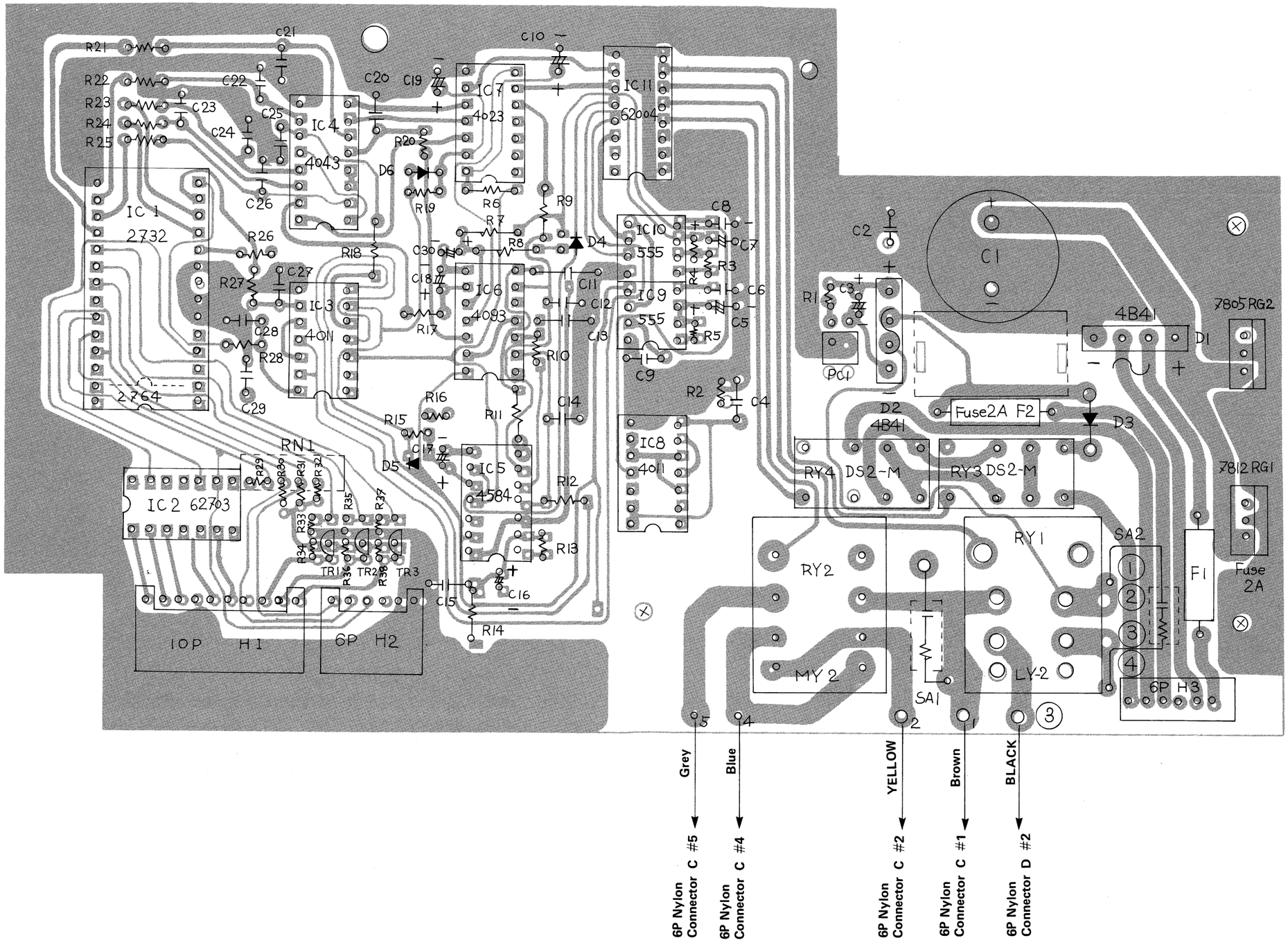
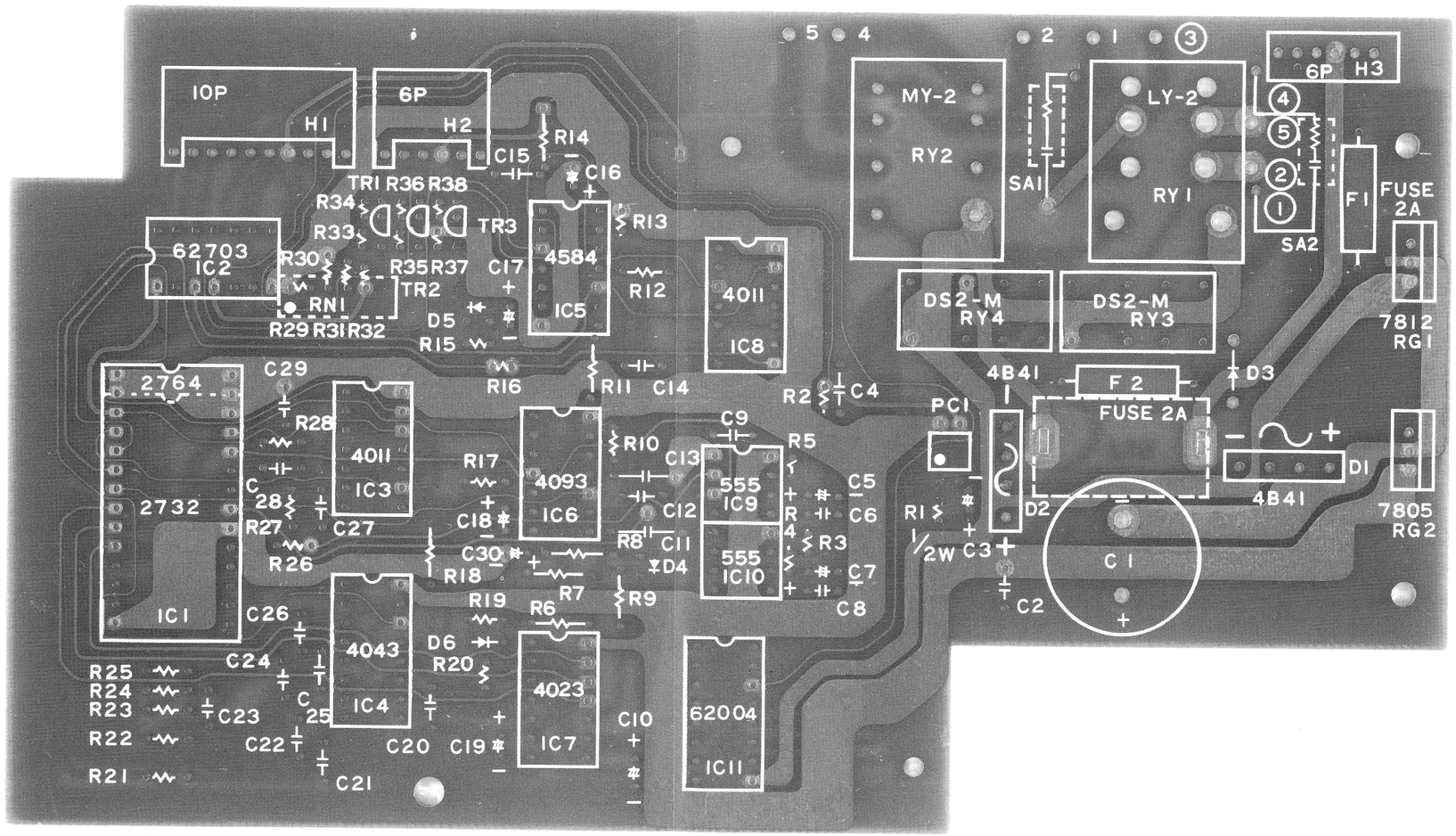


Fig. #120

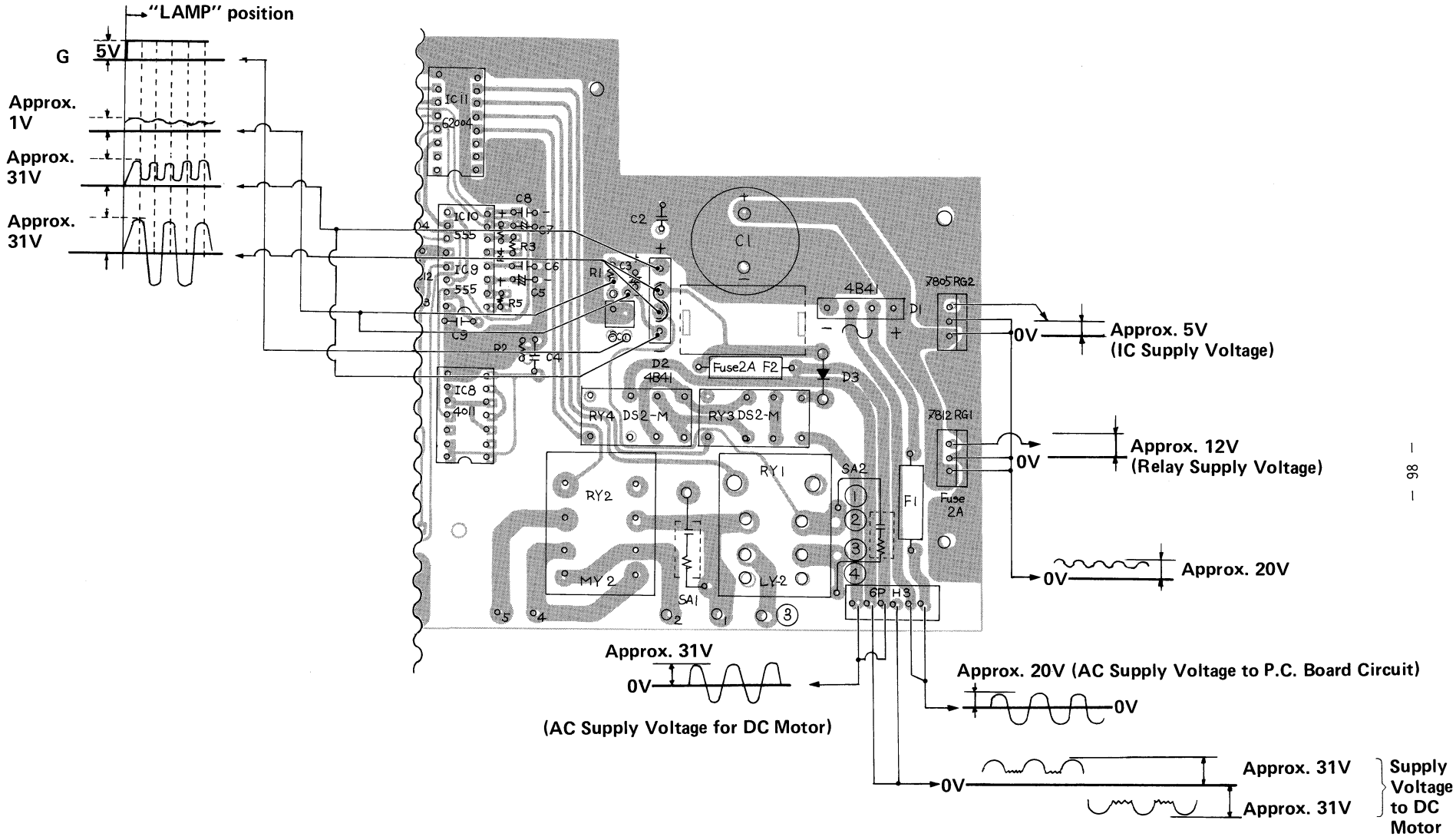
ESL SERIES CONTROL P.C. BOARD (Soldered Side)

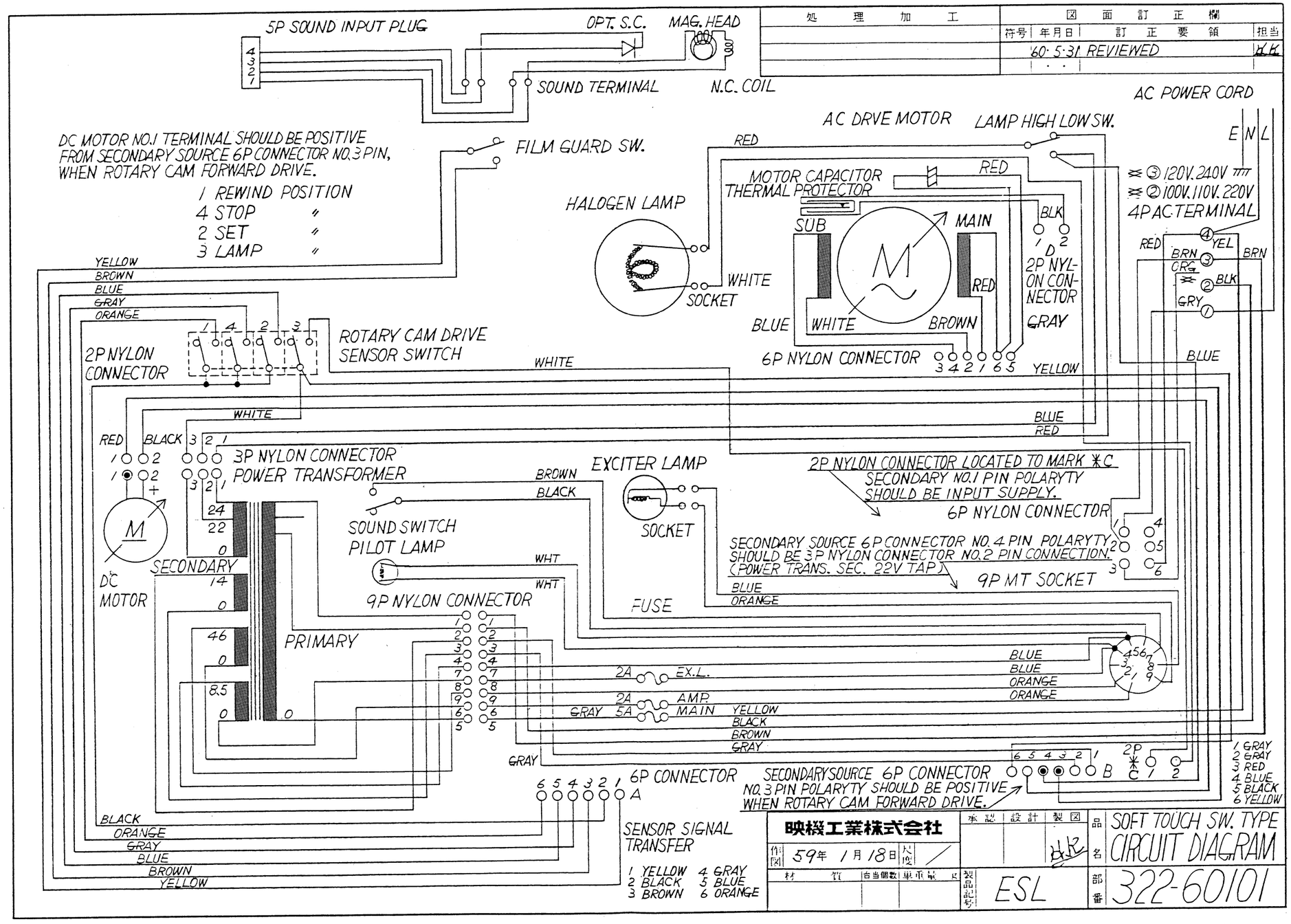


ESL SERIES CONTROL P.C. BOARD(Component Side)



ESL CONTROL P.C. BOARD (Supply Voltage Checks)




5P SOUND INPUT PLUG
OPT. S.C.
MAG. HEAD
SOUND TERMINAL
N.C. COIL
処 理 加 工
図 面 訂 正 欄
符号 年月日 訂 正 要 領 担当
60·5·31 REVIEWED
AC POWER CORD
E N L
③ 120V. 240V
② 100V. 110V. 220V
4P AC TERMINAL
AC DRVE MOTOR
LAMP HIGH LOW SW.
DC MOTOR NO.1 TERMINAL SHOULD BE POSITIVE FROM SECONDARY SOURCE 6P CONNECTOR NO.3 PIN, WHEN ROTARY CAM FORWARD DRIVE.
1 REWIND POSITION
4 STOP "
2 SET "
3 LAMP "
FILM GUARD SW.
HALOGEN LAMP
WHITE
SOCKET
MOTOR CAPACITOR
THERMAL PROTECTOR
SUB
MAIN
2P NYLON CONNECTOR
6P NYLON CONNECTOR
YELLOW
BROWN
BLUE
GRAY
ORANGE
2P NYLON CONNECTOR
ROTARY CAM DRIVE SENSOR SWITCH
WHITE
RED
BLACK
3P NYLON CONNECTOR
POWER TRANSFORMER
DC MOTOR
SECONDARY
PRIMARY
SOUND SWITCH
PILOT LAMP
WHT
9P NYLON CONNECTOR
EXCITER LAMP
SOCKET
FUSE
2A EX.L.
2A AMP.
5A MAIN
2P NYLON CONNECTOR LOCATED TO MARK ※C SECONDARY NO.1 PIN POLARYTY SHOULD BE INPUT SUPPLY.
6P NYLON CONNECTOR
SECONDARY SOURCE 6P CONNECTOR NO.4 PIN POLARYTY SHOULD BE 3P NYLON CONNECTOR NO.2 PIN CONNECTION. (POWER TRANS. SEC. 22V TAP)
9P MT SOCKET
6P CONNECTOR
SECONDARY SOURCE 6P CONNECTOR NO.3 PIN POLARYTY SHOULD BE POSITIVE WHEN ROTARY CAM FORWARD DRIVE.
SENSOR SIGNAL TRANSFER
1 YELLOW 4 GRAY
2 BLACK 5 BLUE
3 BROWN 6 ORANGE
1 GRAY
2 GRAY
3 RED
4 BLUE
5 BLACK
6 YELLOW
映機工業株式会社
作図 59年 1月18日
尺度
承認 設計 製図
品名 SOFT TOUCH SW. TYPE CIRCUIT DIAGRAM
材質 台当個数 単重量
製品記号 ESL
部番 322-60101

処理加工	図面訂正欄			
	符号	年月日	訂正要領	担当
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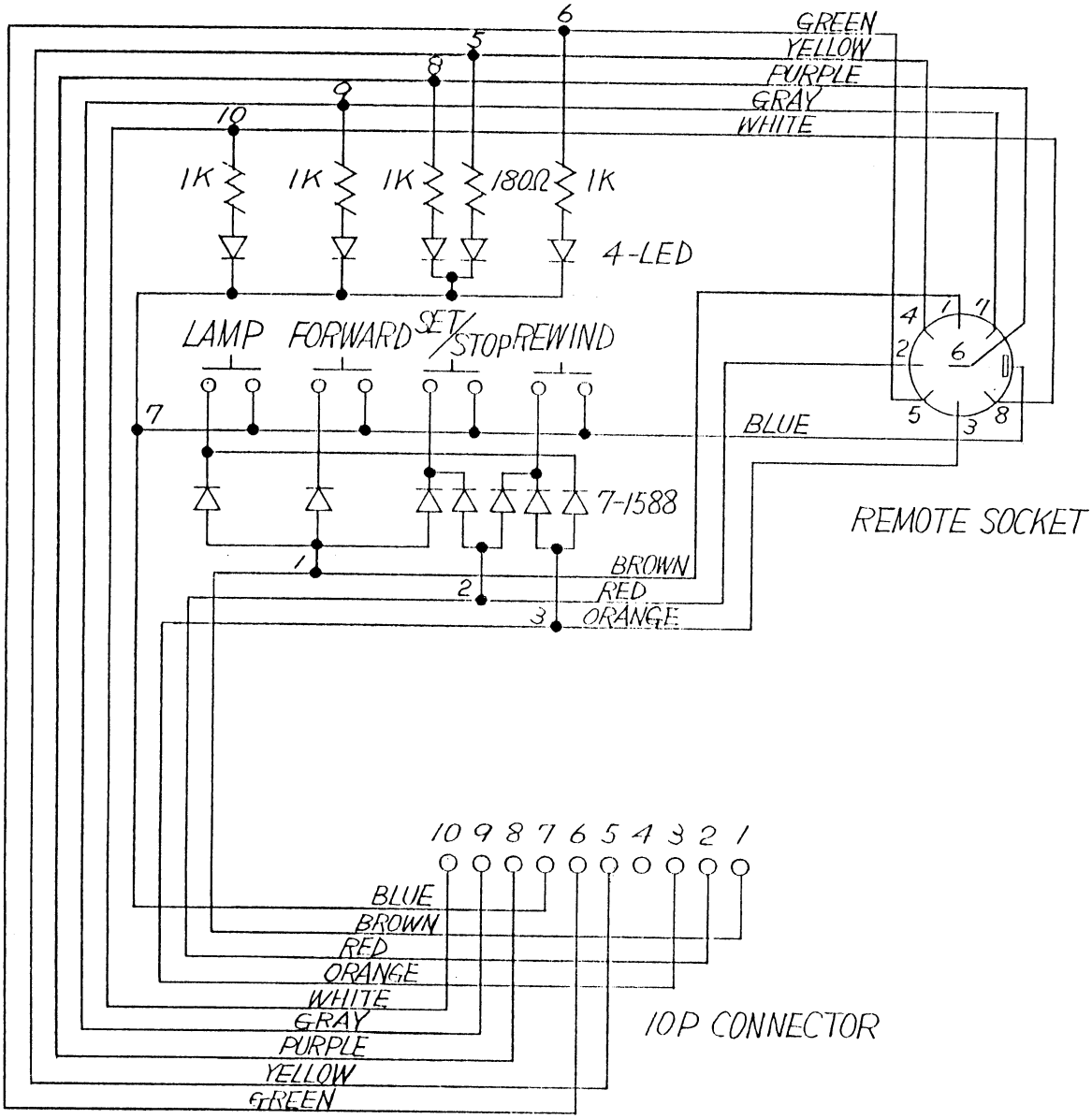
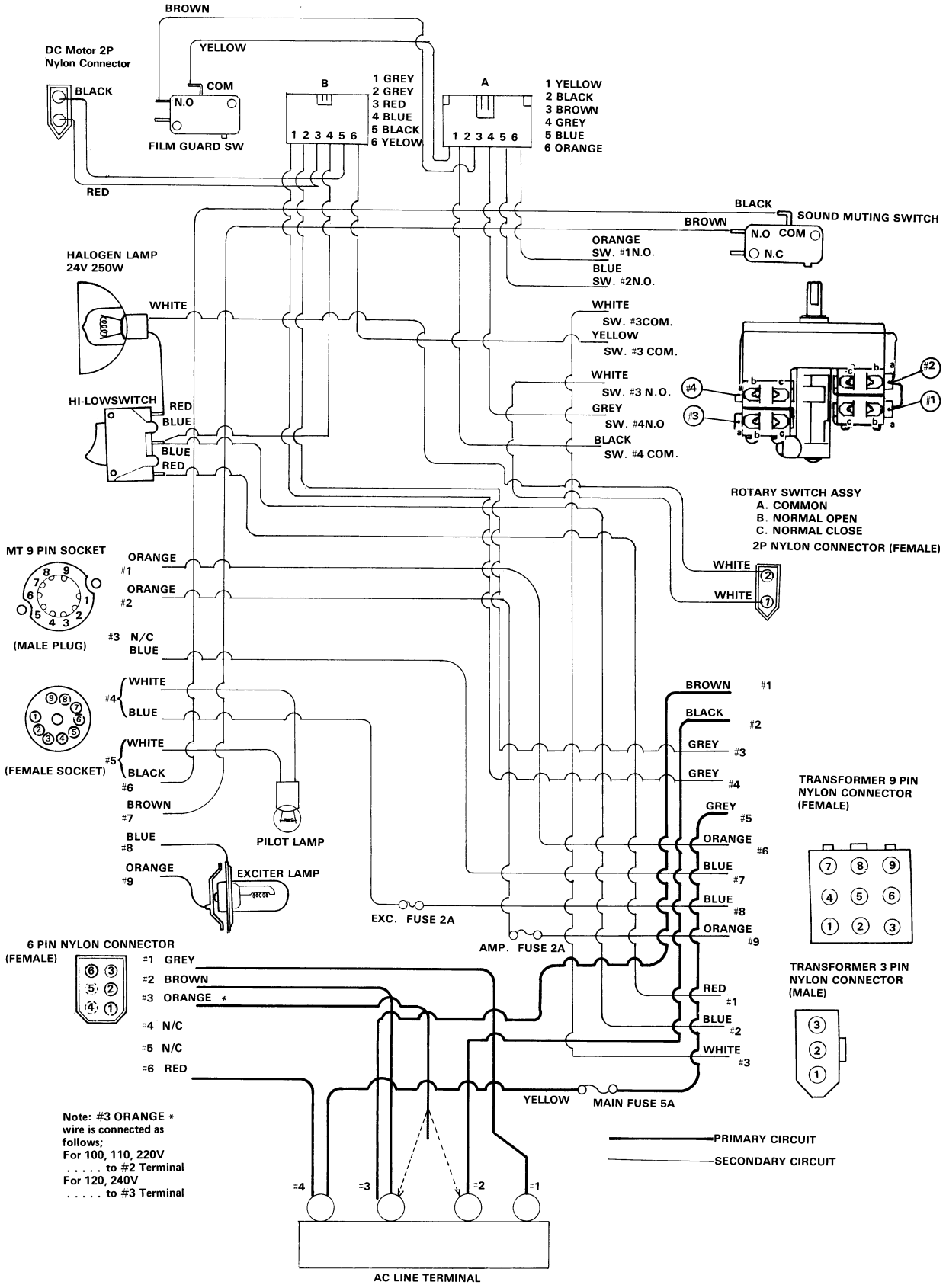


映機工業株式会社				承認	設計	製図	品名	PUSH BUTTON SW. CIRCUIT DIAGRAM
作図	59年 7月 15日	尺度	/					
材質	台当個数	単重量 g		製品記号	ESL		部番	322-60121

ESL-SERIES ELECTRICAL BLOCK DIAGRAM (FOR STANDARD TYPE)



EIKI

16MM SOUND PROJECTORS

MODEL

SSL/ESL

SERIES

REPLACEMENT PARTS LIST

COVERING S/N SSL/ESL-10001 and up
REVISION DATE: JULY 1985

EIKI INDUSTRIAL CO., LTD.
C.P.O. BOX 1229 OSAKA JAPAN
Tel: (06) 311-9475

EIKI INTERNATIONAL INC.
27882 Camino Capistrano
P.O.BOX 30000
Laguna Niguel, Ca. 92677-8000
Tel: 714/831-2511 · Telex: 685-638

NOTE

To the user of this parts list:
The following is an explanation of the EIKI part numbering system. Understanding the system used will help you stock and expedite parts orders promptly and correctly.

1. PREFIX CODE:

Describes model that the part was originally designed for.
ST – ST/M Series
210 – EX-300SL
312 – RST/RT/RM Series
313 – DOMESTIC MODEL
314 – NST/NT Series
320 – SL Series
321 – SL II Series
322 – SSL/ESL Series

2. PART NUMBER:

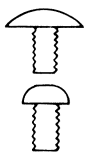
*	322	–	1	1	0	0	1
	Model		Main Assy.		Part No.		Revision No.

Revision No.
1 to 2, 3, 4, etc. Non-Interchangable Revision
1 to 1a, 1b, etc. Interchangable Revision
* ASTERISK indicates parts associated with the above assembly.

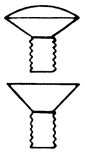
3. SCREWS: "ISO" Standard

XT	30	10	S (K*)
Head Style	Diameter (3.0mm)	Length (10mm)	Indicates "ISO" No "S" indicates JIS

X = Philips
T = Truss
P = Pan



O = Oval Countersunk
F = Flat
K = Black Color



4. WASHERS:

WA	–	30	S
Style		Diameter (3.0mm)	Indicates "ISO" No "S" indicates JIS

WA = Flat washer
WC = Lock Washer
WE = Star Washer External
ER = "E" Ring
WD = Internal Star Washer

5. FIBER WASHERS:

G1	–	030	072
Thickness (.1mm)		I.D. (3mm)	O.D. (7.2mm)

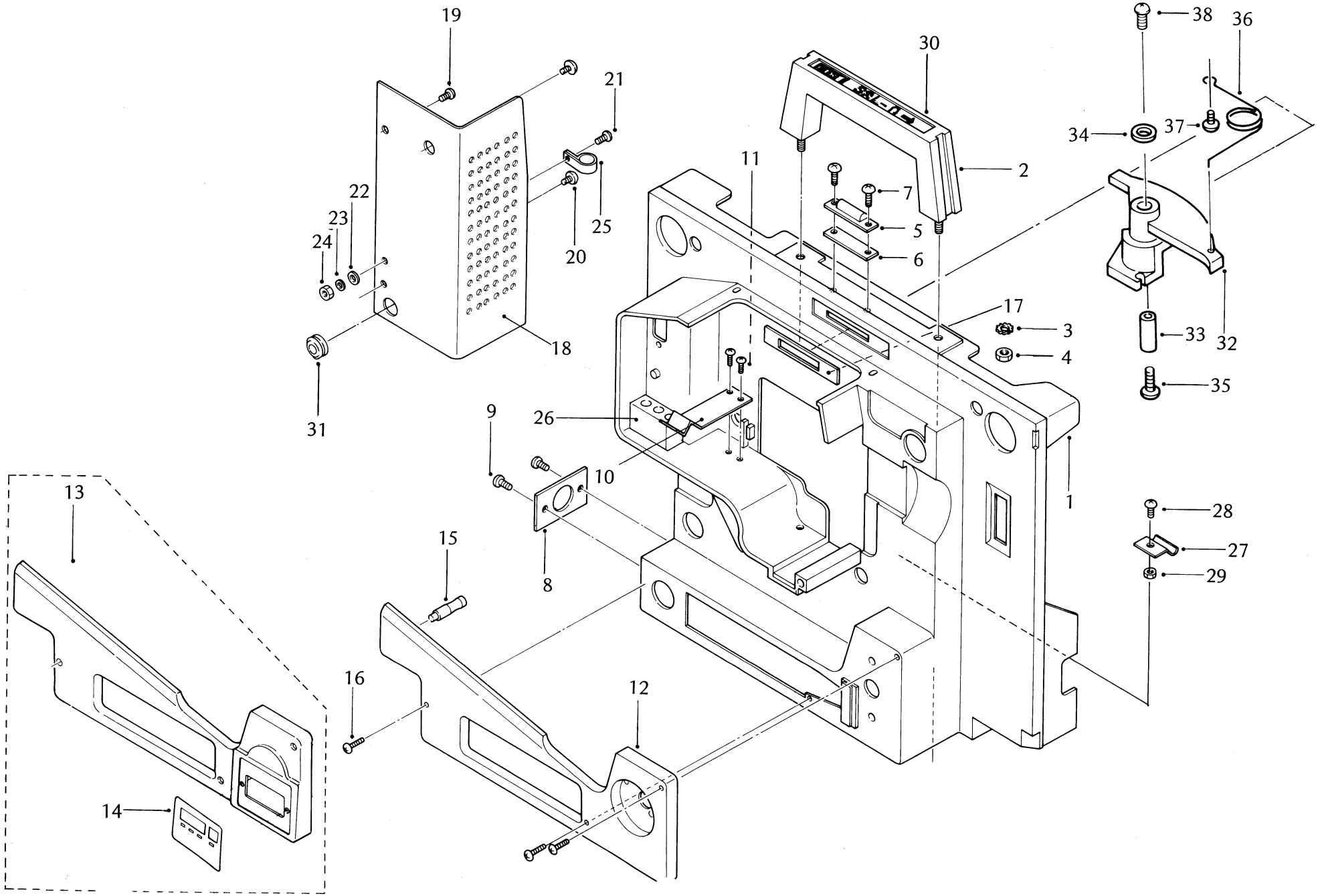
6. NUTS:

NA	–	30	S
Style		Diameter (3.0mm)	"ISO" No "S" indicates JIS

NA = Thick
NB = Thin

CONTENTS

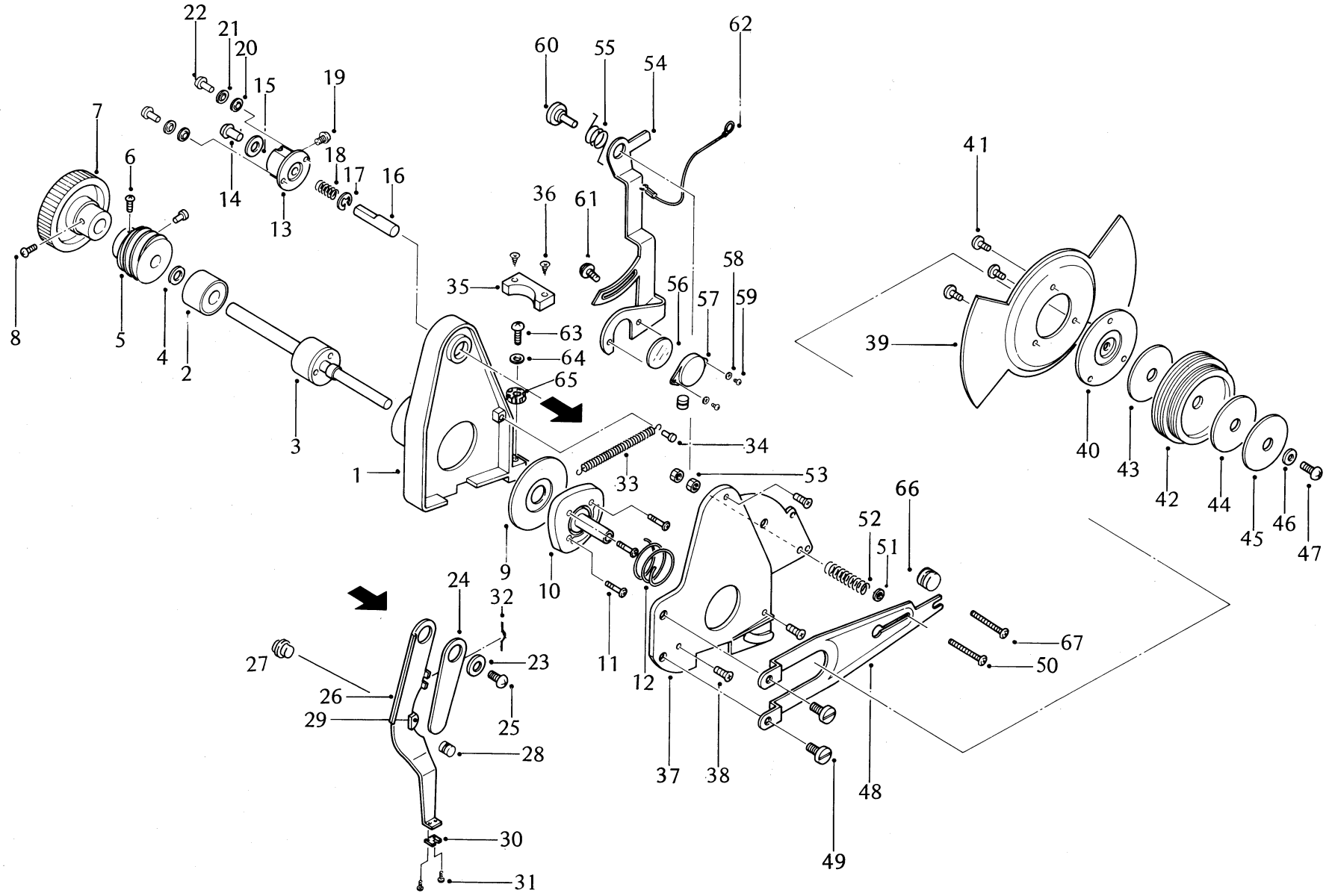
10-0 MAIN FRAME CASTING



10-0 MAIN FRAME CASTING

INDEX NO	PART NO	DESCRIPTION	QTY.
1	322-10001	Main Frame Casting Assy.	1
2	322-10101	Handle	1
3	W E-50	Washer	2
4	N A-50S	Nut	2
5	S T-10041	Female Latch	1
6	322-10051	Latch Plate	1
7	X T-3006S	Screw	2
8	S T-10071	Speaker Plate	1
9	X T-2304	Screw	2
10	322-32081	Plate Spring	1
11	X P-3004S	Screw	2
12	322-10321	Control Panel	1
*	322-10381	Control Panel for SSL-0L	1
13	322-10311	Control Panel for ESL Model	1
14	322-10351	Switch Plate for ESL Model	1
15	322-10331	Amplifier Cover Pin	1
16	X O-3010S	Screw	3
17	322-10371	Plate "Still-Run"	1
*	322-10391	Cover Plate for SSL-0L, 1L, 2L	1
18	322-10411	Cord Storage Plate	1
19	X T-3006S	Screw	2
20	X T-3508	Screw	1
21	X T-3008S	Screw	1
22	W A-30	Washer	1
23	W C-30	Lock Washer	1
24	N A-30	Nut	1
25	314-60341	Cord Clip	1
26	322-10612	Spare Fuse Stand	1
27	322-10711	Rear Cover Supporting Plate	1
28	X T-3006S	Screw	1
29	N A-30S	Nut	1
30	322-10251	Model Plate "SSL-0"	1
*	322-10261	Model Plate "SSL-1"	1
*	322-10271	Model Plate "SSL-2"	1
*	322-10211	Model Plate "ESL-0"	1
*	322-10221	Model Plate "ESL-1"	1
*	322-10231	Model Plate "ESL-2"	1
*	322-10471	Model Plate "SSL-0L"	1
*	322-10481	Model Plate "SSL-1L"	1
*	322-10491	Model Plate "SSL-2L"	1
31	322-60061	Cord Bush	1
32	322-11381	Still Picture Lever	1
33	322-11441	Shaft	1
34	W A-35	Washer	1
35	X T-3506	Screw	1
36	322-11431	Spring	1
37	322-11391	Screw	1
38	X F-3510	Screw	1

11-0 CAM TANK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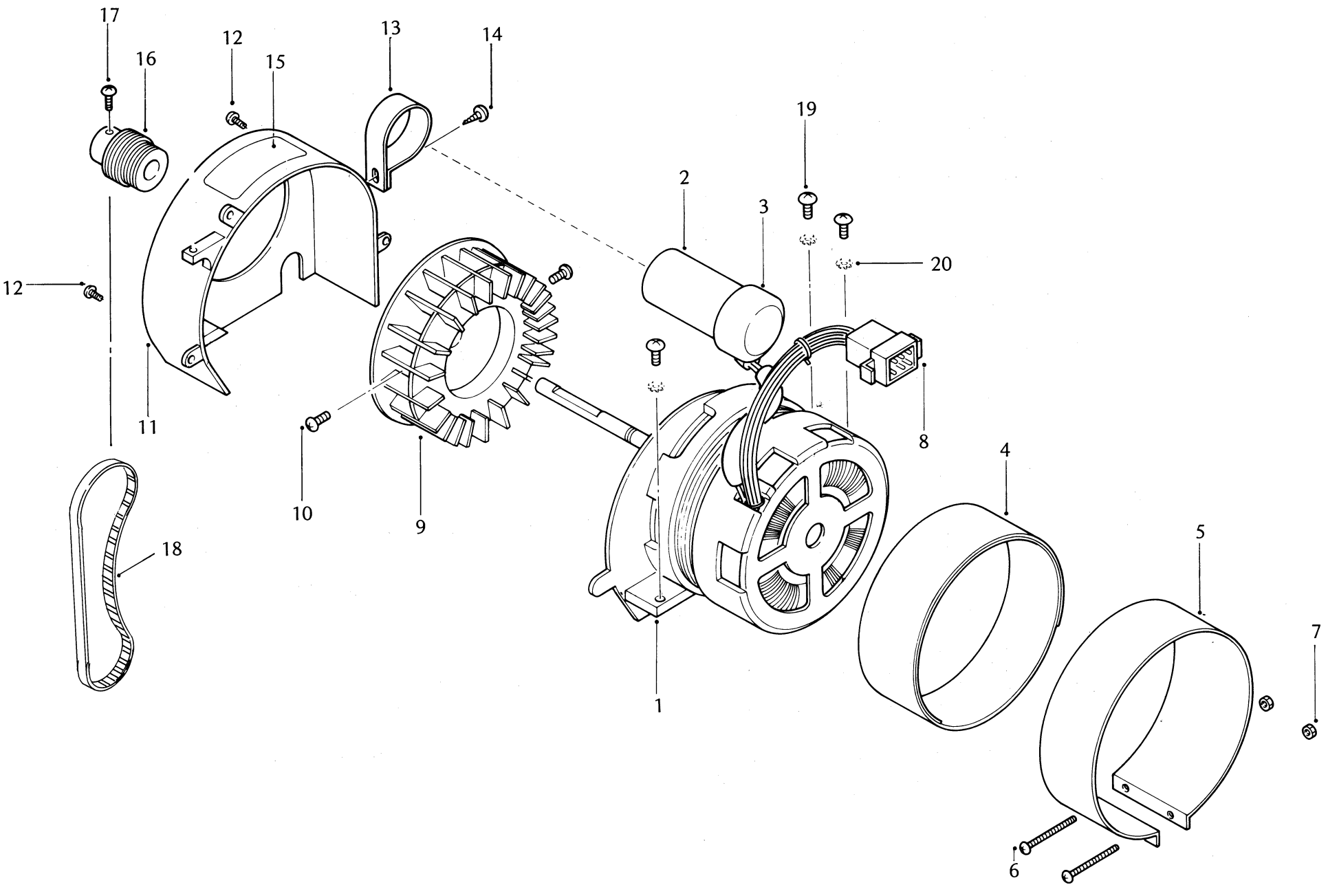
11-0 CAM TANK

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-11011	Cam Tank Module (2 Blade Shutter)	1
*	322-11101	Cam Tank Module (3 Blade Shutter)	1
*	322-11801	Cam Tank Module (2 Blade Shutter w/o Still Lever)	1
*	322-11901	Cam Tank Module (3 Blade Shutter w/o Still Lever)	1
1	322-11031	Cam Housing	1
2	O B-608ZZ	Ball Bearing	1
3	322-11601	Cam Shaft and Bearing Assy.	1
4	G 1-080120	Fibre Washer	1
5	322-11501	Worm Gear Assy.	1
6	*322-11521	Set Screw (for above)	2
7	320-11701	Inching Knob Assy.	1
8	*X P-3005S	Screw (for above)	1
9	312-11121	Cam Plate	1
10	312-11131	Cam	1
11	312-11421	Set Screw	3
12	312-11181	Clutch Spring	1
*	312-11141	Clutch Spring for w/o Still Lever	1
*	313-11991	Fulcrum Collar Assy.	1
13	*313-11041	Fulcrum Collar	1
14	*X P-3508	Screw (for above)	1
15	*S T-11231	Washer	1
16	*312-11051	Fulcrum Pin	1
17	*E R-50	"E" Ring	1
18	*312-11571	Spring	1
19	*X T-3510	Screw	1
20	W A-30	Washer	2
21	W C-30	Lock Washer	2
22	X P-3008S	Screw	2
23	312-11681	Rulon Washer	1
24	312-11221	Plate Spring	1
25	X T-3505	Screw	1
*	322-11201	Claw Lever Assy.	1
26	*322-11981	Claw Lever	1
27	*312-11411	Supporting Pin	1
28	*312-11181	Sliding Pin	1
29	*312-11641	Cam Follower	1
30	*312-11191	Claw	1
31	*S T-11451	Set Screw	2
32	312-11551	Spring Hook	1
33	322-11161	Spring	1
34	X P-3005S	Screw	1
35	312-11661	Felt	1
36	X F-3012S	Screw	2
37	322-11241	Cover Plate	1
38	X F-3010S	Screw (for above)	3

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-11971	2 Blade Shutter Assy.	1
*	322-11961	3 Blade Shutter Assy.	1
39	322-11291	2 Blade Shutter	1
*	322-11261	3 Blade Shutter	1
40	322-11281	Stop Clutch	1
41	X T-2304	Screw	3
42	322-11871	Shutter Pulley Assy. 50/60HZ	1
*	322-11851	Shutter Pulley Assy. 60HZ	1
*	322-11861	Shutter Pulley Assy. 50HZ	1
43	322-11141	Clutch Cork (Large)	1
44	322-11151	Clutch Cork (Small)	1
45	322-11351	Stop Plate	1
46	W C-40	Lock Washer	1
47	X T-4012S	Screw	1
48	322-11701	Clutch Plate Assy.	1
49	322-11321	Set Screw (for above)	2
50	322-11331	Screw (for above)	1
51	W C-30	Lock Washer	1
52	322-11341	Clutch Plate Spring	1
53	N A-30S	Nut	2
54	322-11411	Heat Filter Arm	1
55	322-11421	Heat Filter Arm Spring	1
56	S T-11371	Heat Filter Glass	1
57	S T-11381	Heat Filter Screen	1
58	W C-23	Lock Washer	2
59	X P-2303	Screw	2
60	312-11471	Set Screw	1
61	312-11451	Screw	1
62	322-11401	Wire Assy.	1
63	X P-5016S	Screw	2
64	W E-50	Washer	2
65	W C-50	Lock Washer	2
66	322-11462	Wire Sliding Bush	1
67	X P-3014S	Screw	1

12-0 MOTOR

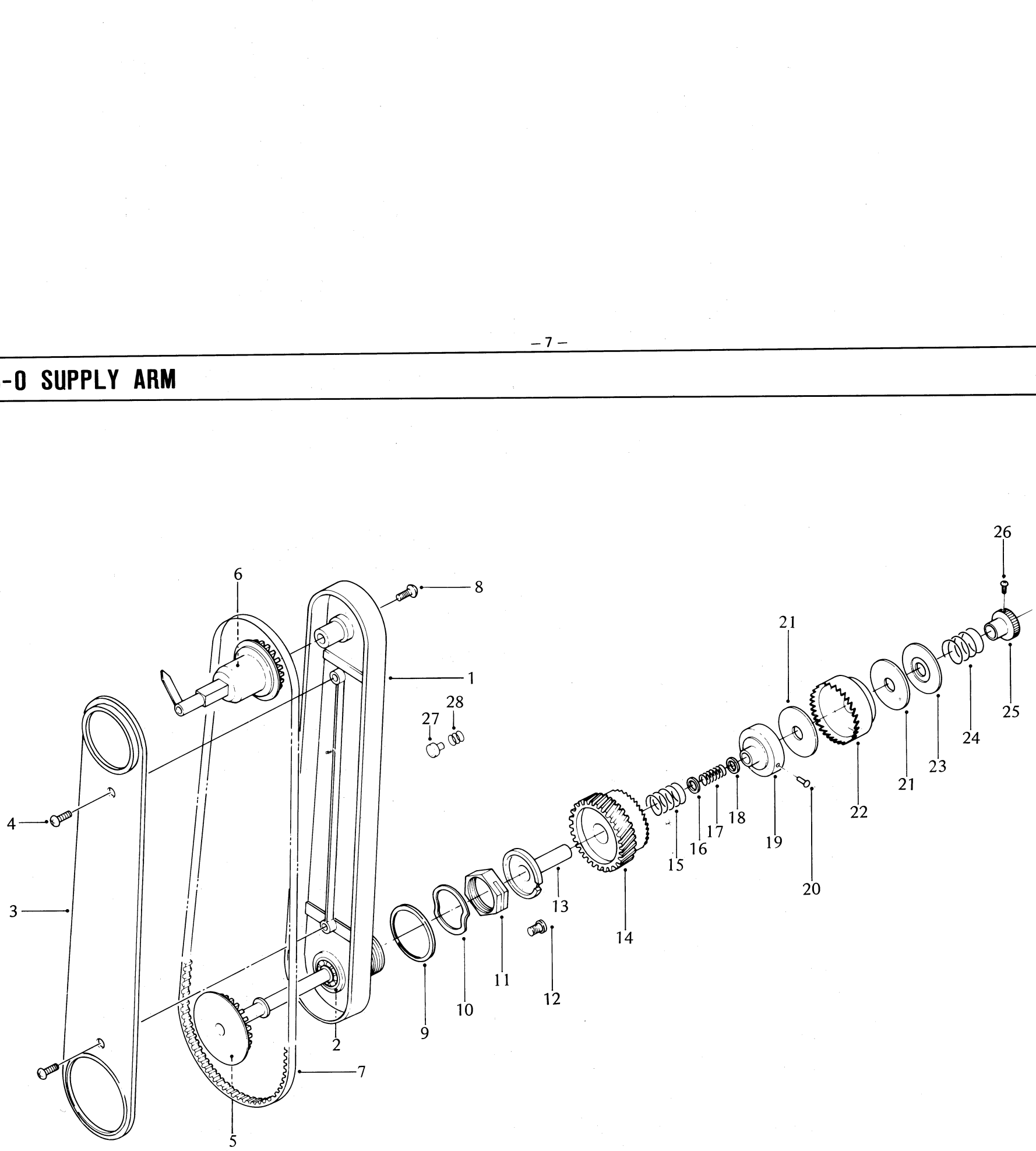


12-0 MOTOR

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-12811	MOTOR/FAN MODULE 120V, SSL-2L (UL)	1
*	322-12821	MOTOR/FAN MODULE 120V, SSL-0,1L (UL)	(1)
*	322-12831	MOTOR/FAN MODULE 120V, SSL-2L (CSA)	(1)
*	322-12841	MOTOR/FAN MODULE 120V, SSL-0,1L (CSA)	(1)
*	322-12851	MOTOR/FAN MODULE 120V, SSL-2 (UL)	(1)
*	322-12861	MOTOR/FAN MODULE 120V, SSL-0,1 (UL)	(1)
*	322-12871	MOTOR/FAN MODULE 120V, SSL-2 (CSA)	(1)
*	322-12881	MOTOR/FAN MODULE 120V, SSL-0,1 (CSA)	(1)
*	322-12891	MOTOR/FAN MODULE 220/240V, ESL-2, SSL-2 (SAA only)	(1)
*	322-12901	MOTOR/FAN MODULE 220/240V, ESL-0, 1 SSL-0, 1 (SAA only)	(1)
*	322-12911	MOTOR/FAN MODULE 220/240V, SSL-2	(1)
*	322-12921	MOTOR/FAN MODULE 220/240V, SSL-0, 1	(1)
*	322-12931	MOTOR/FAN MODULE 110/220V Switchable ESL-2	(1)
*	322-12941	MOTOR/FAN MODULE 110/220V Switchable ESL-0, 1	(1)
*	322-12951	MOTOR/FAN MODULE 110/220V Switchable SSL-2	(1)
*	322-12961	MOTOR/FAN MODULE 110/220V Switchable SSL-0, 1	(1)
1	322-12711	Motor Assy. 120V SSL-0L (UL)	1
*	322-12721	Motor Assy. 120V SSL-0L (CSA)	(1)
*	322-12731	Motor Assy. 120V SSL-0,1,2 (UL)	(1)
*	322-12751	Motor Assy. 120V SSL-0,1,2 (CSA)	(1)
*	322-12761	Motor Assy. 220/240V ESL, SSL (SAA only)	(1)
*	322-12771	Motor Assy. 220/240V SSL	(1)
*	322-12781	Motor Assy. 110/220V Switchable ESL	(1)
*	322-12791	Motor Assy. 110/220V Switchable SSL	(1)
2	320-12021	Capacitor 8MFD, 120V	1
*	320-12031	Capacitor 2.3MFD, 220/240V	1
3	320-12111	Shield Cap	1
4	322-12111	Inner Shield Cover	1
5	322-12121	Outer Shield Cover	1
6	X P-3015S	Screw	2
7	N A-30S	Nut	2
8	312-12371	6 Pin Nylon Plug 1991-6P	1
*	312-60621	Male Pin (for above) 1380T	1 per wire
*	312-12241	2 Pin Nylon Plug (USA, Canada) 1545P-1	1
*	312-60621	Male Pin (for above) 1380T	1 per wire

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-12201	Fan Assy. w/Screw (60HZ)	1
9	322-12211	Fan only (60HZ)	1
10	X P-3510	Screw	2
*	322-12991	Fan Assy. w/Screw (50HZ)	(1)
*	*322-12241	Fan only (50HZ)	(1)
*	*X P-3510	Screw	(2)
11	322-12141	Fan Cover	1
12	X P-3006S	Screw	3
13	320-12041	Mounting Bracket	1
14	322-12341	Screw	2
15	322-12251	Plate	1
*	322-12101	Motor Pulley Assy. 50/60HZ	1
*	322-12401	Motor Pulley Assy. 60HZ	(1)
*	322-12501	Motor Pulley Assy. 50HZ	(1)
16	322-12231	Motor Pulley only 50/60HZ	1
*	322-12151	Motor Pulley only 60HZ	(1)
*	322-12161	Motor Pulley only 50HZ	(1)
17	X P-3506	Screw	1
18	322-12181	Motor Belt	1
19	X P-5016S	Screw	3
20	W E-50	Washer	3

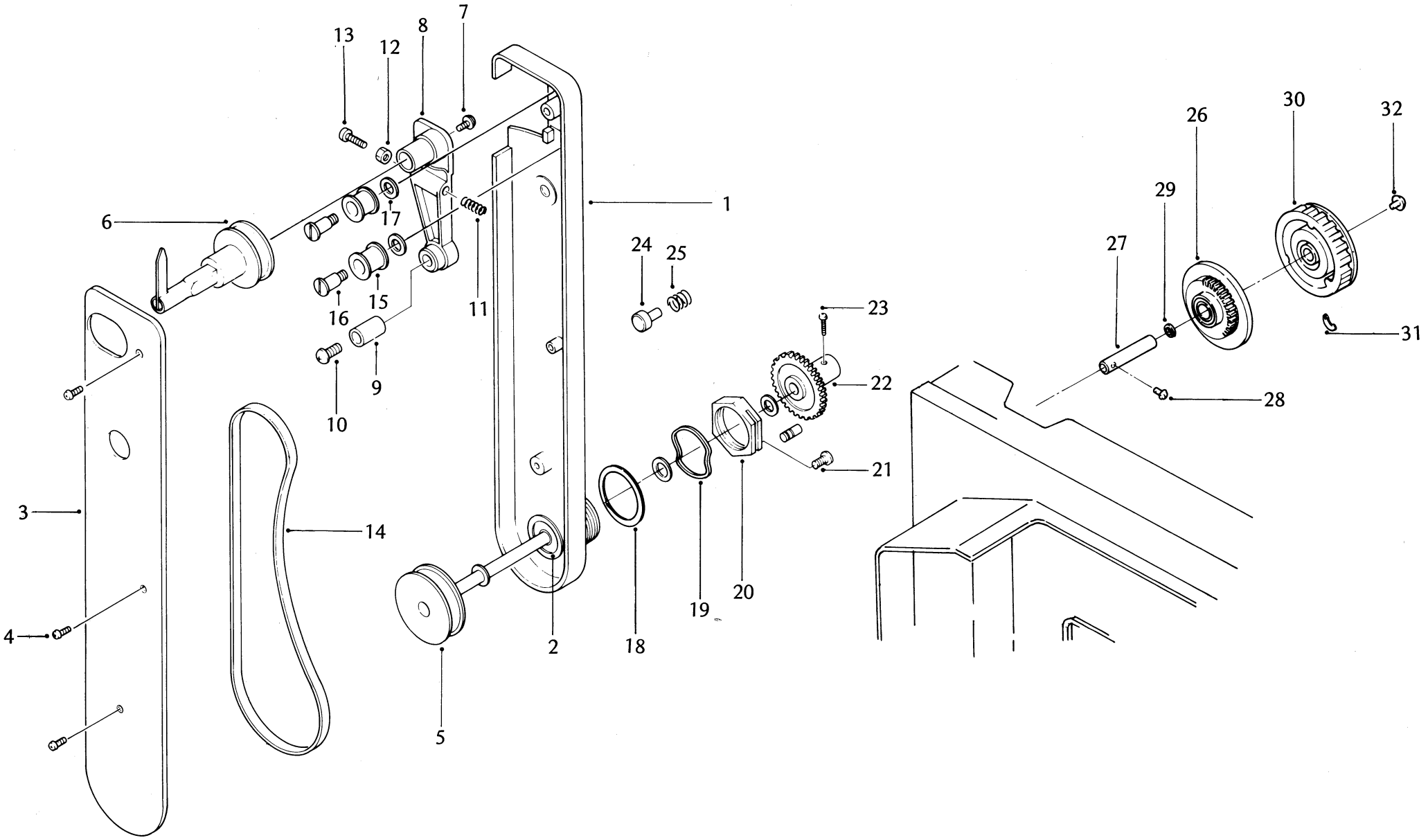
13-0 SUPPLY ARM



13-0 SUPPLY ARM

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-13001	Supply Arm Assy.	1
*	322-13801	Supply Arm Sub-Assy.	1
*	322-13701	Inner Half Arm Assy.	1
1	*322-13301	Inner Half Arm	1
2	*O B-626	Ball Bearing	1
3	322-13011	Arm Plate	1
4	X T-3508K	Screw (for above)	2
5	320-13101	Drive Pulley	1
6	320-13201	Supply Arm Spindle Assy.	1
7	320-13151	Supply Arm Belt	1
8	X T-3505	Screw	1
9	G 4-230330	Fibre Washer	1
10	S T-13051	Washer	1
11	S T-13401	Nut Assy.	1
12	*S T-13221	Screw	1
13	320-13411	Rewind Sleeve	1
14	322-13511	Drive Gear	1
15	320-13531	Spring	1
16	G 2-060095	Fibre Washer	1
17	320-13541	Spring	1
18	G 4-075120	Fibre Washer	1
19	320-13601	Set Collar Assy.	1
20	*X P-3508	Screw (for above)	1
21	321-13261	Clutch Plate	2
22	320-13521	Drive Gear	1
23	320-13281	Rewind Sleeve Plate	1
24	320-13551	Spring	1
25	320-13501	Knurled Nut Assy.	1
26	*X P-3008S	Screw (for above)	1
27	321-13101	Arm Lock Pin Assy.	1
28	S T-13181	Spring	1

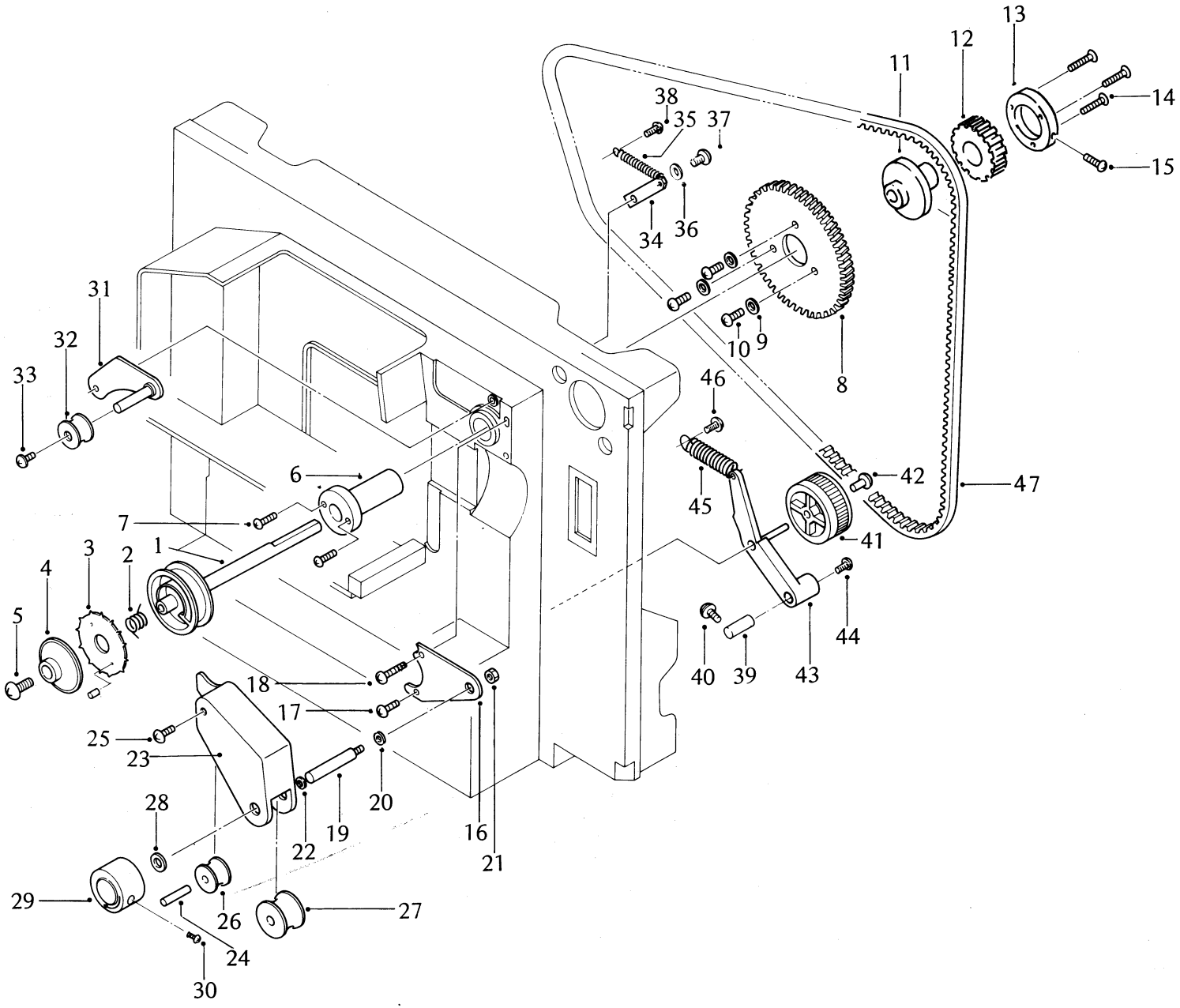
14-0 TAKE-UP ARM



14-0 TAKE-UP ARM

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-14001	Take-Up Arm Assy.	1
*	322-14801	Take-Up Arm Sub-Assy.	1
1	322-14301	Inner Half Arm Assy.	1
2	*O B-626	Ball Bearing	2
3	322-14011	Arm Plate	1
4	X T-3508K	Screw (for above)	3
5	322-14101	Drive Pulley	1
6	322-14201	Take-Up Spindle Assy.	1
7	X T-3505	Screw (for above)	1
8	322-14601	Spindle Arm	1
9	320-14321	Spindle Arm Shaft	1
10	X T-4018S	Screw (for above)	1
11	320-14312	Spring	1
12	N B-40S	Nut	1
13	X P-1012S	Screw	1
14	320-14411	Take-Up Arm Belt	1
15	320-14231	Roller	2
16	320-14221	Shoulder Screw	2
17	WA-35	Washer	2
18	G 4-230330	Fibre Washer	1
19	S T-13051	Washer	1
20	S T-13401	Nut Assy.	1
21	*S T-13221	Screw (for above)	1
22	322-14511	Gear	1
23	X T-2308	Screw	1
24	321-13101	Arm Lock Pin Assy.	1
25	S T-13181	Spring	1
26	322-14081	Clutch Gear	1
27	322-14091	Shaft	1
28	X P-3508	Screw	1
29	G 4-060120	Fibre Washer	1
30	322-14501	Gear Assy.	1
31	*S T-14071	Clutch Cam	1
32	X T-3508	Screw	1

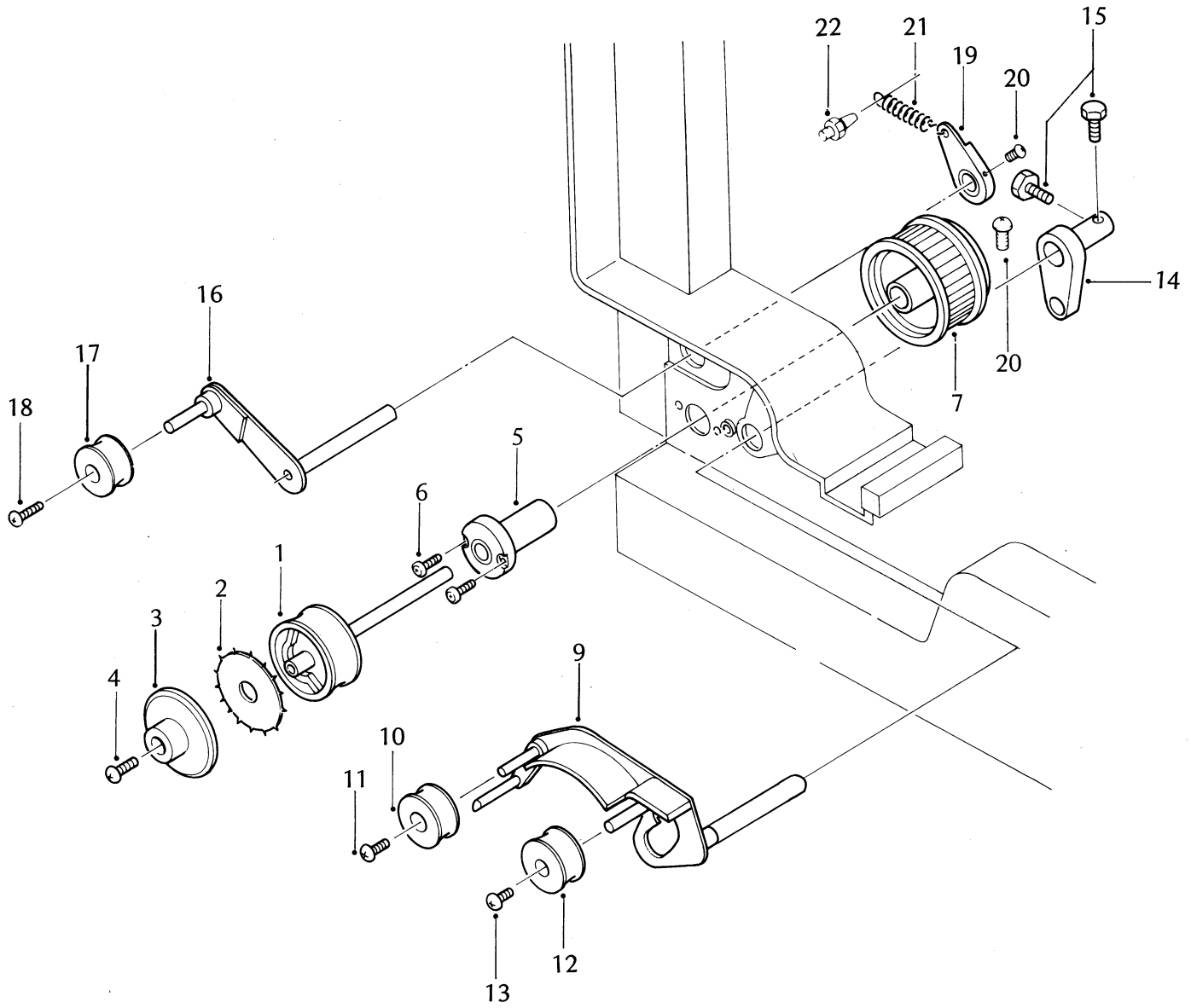
15-0 #1 SPROCKET & GEAR



15-0 # 1 SPROCKET & GEAR

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-15301	Sprocket Drum & Shaft Assy.	1
1	*322-15101	Sprocket Drum & Shaft	1
2	*320-15451	Sprocket Spring	1
3	*322-15901	Sprocket Plate	1
4	*322-15011	Cover Plate	1
5	*X T-4008S	Screw (for above)	1
6	313-15301	Hub	1
7	X P-3010S	Screw (for above)	2
*	322-15201	Drive Gear Assy.	1
8	*322-15931	Drive Gear	1
9	*W A-30	Washer	3
10	*X T-3010S	Screw	3
11	*312-15081	Drive Gear Flange	1
12	*S T-15091	Drive Gear	1
13	*S T-15111	Spacer	1
14	*X F-3024S	Screw (for above)	3
15	X P-3510	Screw (for above)	1
16	322-15511	#1 Sprocket Shoe Mounting Plate	1
17	X P-3508	Screw (for above)	1
18	X F-3510	Screw (for above)	1
19	320-15631	Shaft	1
20	W A-40	Washer	1
21	N A-40S	Nut	1
22	G 4-060120	Fibre Washer	1
23	322-17941	#1 Film Guide	1
24	322-15641	#1 Sprocket Shoe Guide Roller Shaft	1
25	X O-3008S	Screw	1
26	321-15731	#1 Shoe Roller	1
27	320-17551	Guide Roller	1
28	G 4-060120	Fibre Washer	1
29	322-15501	#1 Shoe Bush Assy.	1
30	X P-3008S	Screw (for above)	1
31	322-15911	Shoe Roller Arm	1
32	320-15231	Shoe Roller	1
33	X T-3006S	Screw	1
34	320-15411	Arm	1
35	320-15421	Spring	1
36	W C-35	Lock Washer	1
37	X T-3508	Screw	1
38	X P-2304	Screw	1
39	320-15771	Tension Arm Assy. Mounting Shaft	1
40	X P-3508	Screw	1
*	322-15701	Tension Arm Assy. (Includes items 41 thru 45)	1
41	320-15601	Tension Gear	1
42	X T-3506	Screw	1
43	322-17911	Tension Arm	1
44	X T-3506	Screw	1
45	322-15251	Tension Spring	1
46	312-10161	Screw	1
47	322-15211	Main Drive Belt	1

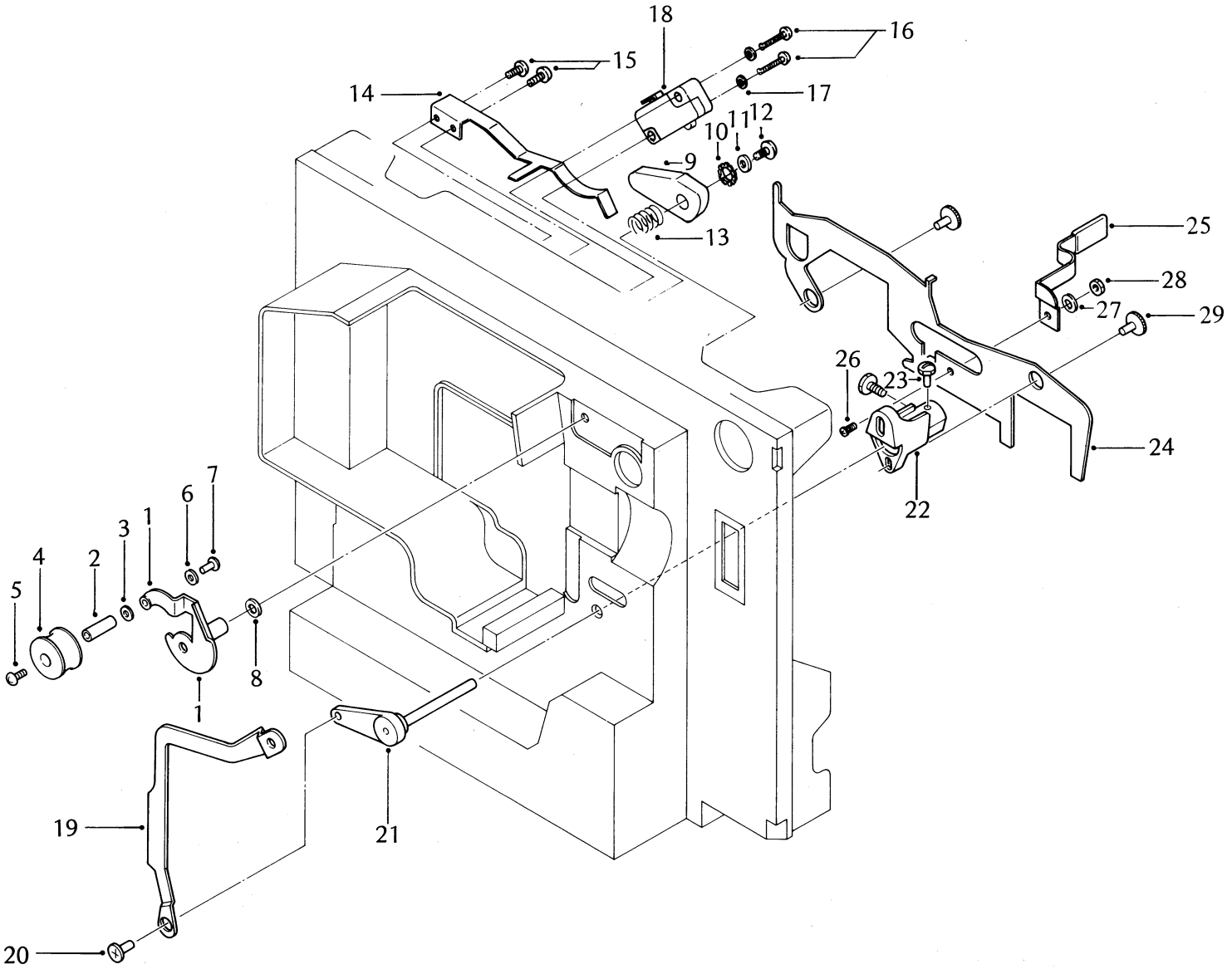
16-0 #2 SPROCKET & GEAR



16-0 # 2 SPROCKET & GEAR

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-16401	Sprocket Drum & Shaft Assy. (Includes items 1 thru 4)	1
1	322-16101	Sprocket Drum & Shaft	1
2	322-16021	Sprocket Plate	1
3	322-16011	Cover Plate	1
4	X T-4008S	Screw	1
5	313-15301	Hub	1
6	X P-3010S	Screw	2
7	320-16201	Drive Gear Assy.	1
8	*X P-3510	Screw (for above)	1
*	322-16601	#2 Sprocket Shoe Assy. (Includes items 9 thru 13)	1
9	322-16501	#2 Sprocket Shoe	1
10	322-17551	Guide Roller	1
11	X T-3506	Screw	1
12	320-16221	#2 Shoe Roller	1
13	X T-3006S	Screw	1
14	322-16701	#2 Shoe Interlocking Arm Assy.	1
15	*312-17381	Set Screw (for above)	2
16	322-16921	Last Roller Arm	1
17	320-17441	Guide Roller	1
18	X T-3506	Screw	1
19	322-16801	Last Roller Interlocking Arm Assy.	1
20	*X P-3508	Screw	1
21	*322-16291	Spring	1
22	*312-10161	Screw	1

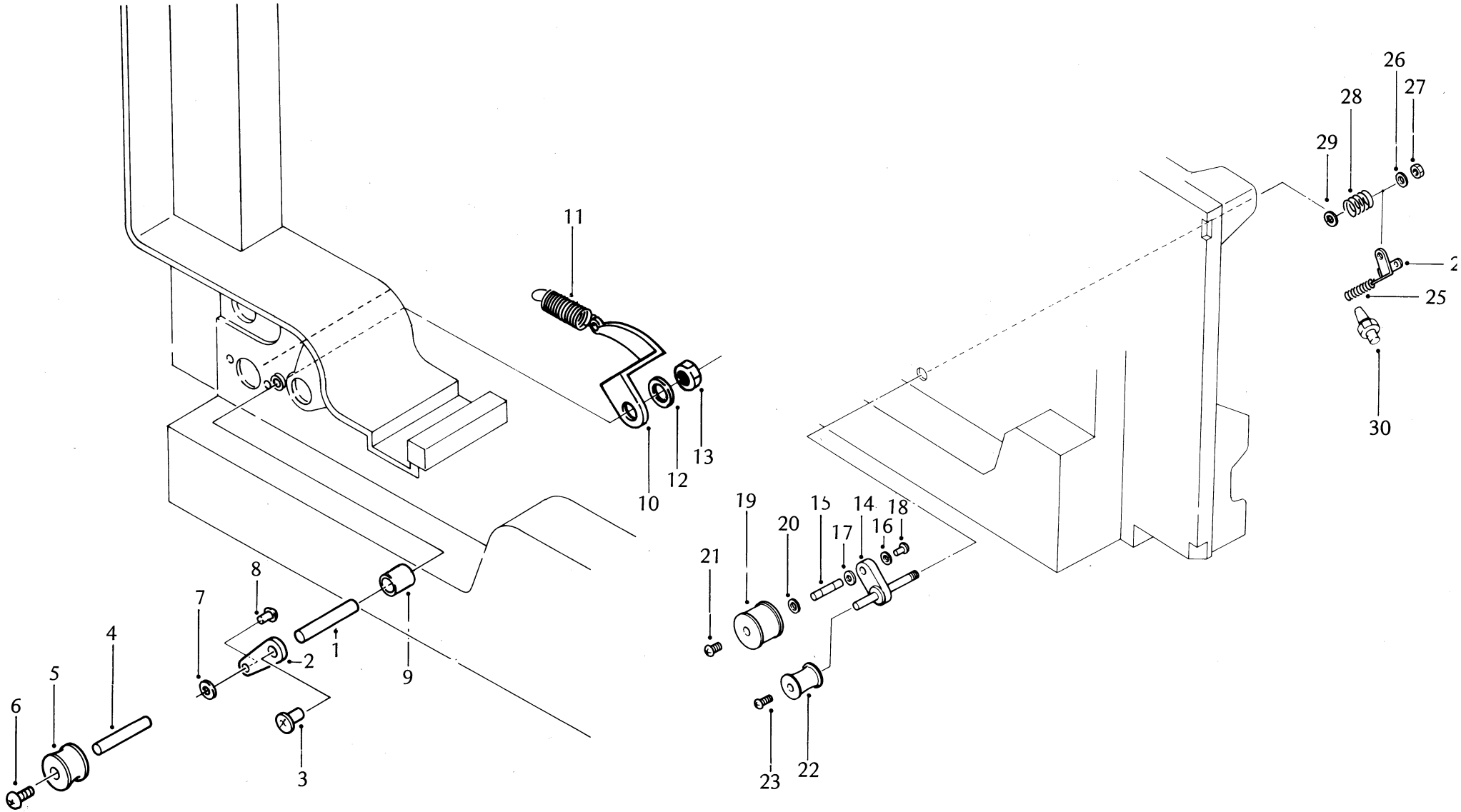
17-0 FILM GUIDE



17-0 FILM GUIDE

INDEX NO	PART NO	DESCRIPTION	QTY.
1	322-17901	Upper Loop Arm	1
2	320-17781	Roller Shaft	1
3	W A-35	Washer	1
4	320-17551	Guide Roller	1
5	X T-3506	Screw	1
6	W C-35	Lock Washer	1
7	X P-3508	Screw	1
8	G 8-070100	Fibre Washer	1
9	320-17461	Arm SSL	1
*	322-17461	Arm ESL	1
10	W E-35	Washer	1
11	G 4-070100	Fibre Washer	1
12	X T-3510	Screw	1
13	321-17471	Spring	1
14	322-17451	Plate Spring	1
15	X P-3005S	Screw	2
16	X P-2314	Screw	2
17	W C-23	Lock Washer	2
18	320-17101	Micro Switch & Lead	1
19	322-17511	#1 Shoe Interlocking Plate	1
20	320-17211	Screw (for above)	1
21	322-17801	Set Arm (for Interlocking Plate)	1
22	322-17501	Reception Arm Assy.	1
23	*312-17381	Set Screw	2
24	322-17091	Main Interlocking Plate	1
25	*322-17101	Brake Plate Assy.	1
26	*X T-3006S	Screw	1
27	*W C-30	Lock Washer	1
28	*N A-30	Nut	1
29	320-17081	Screw	2

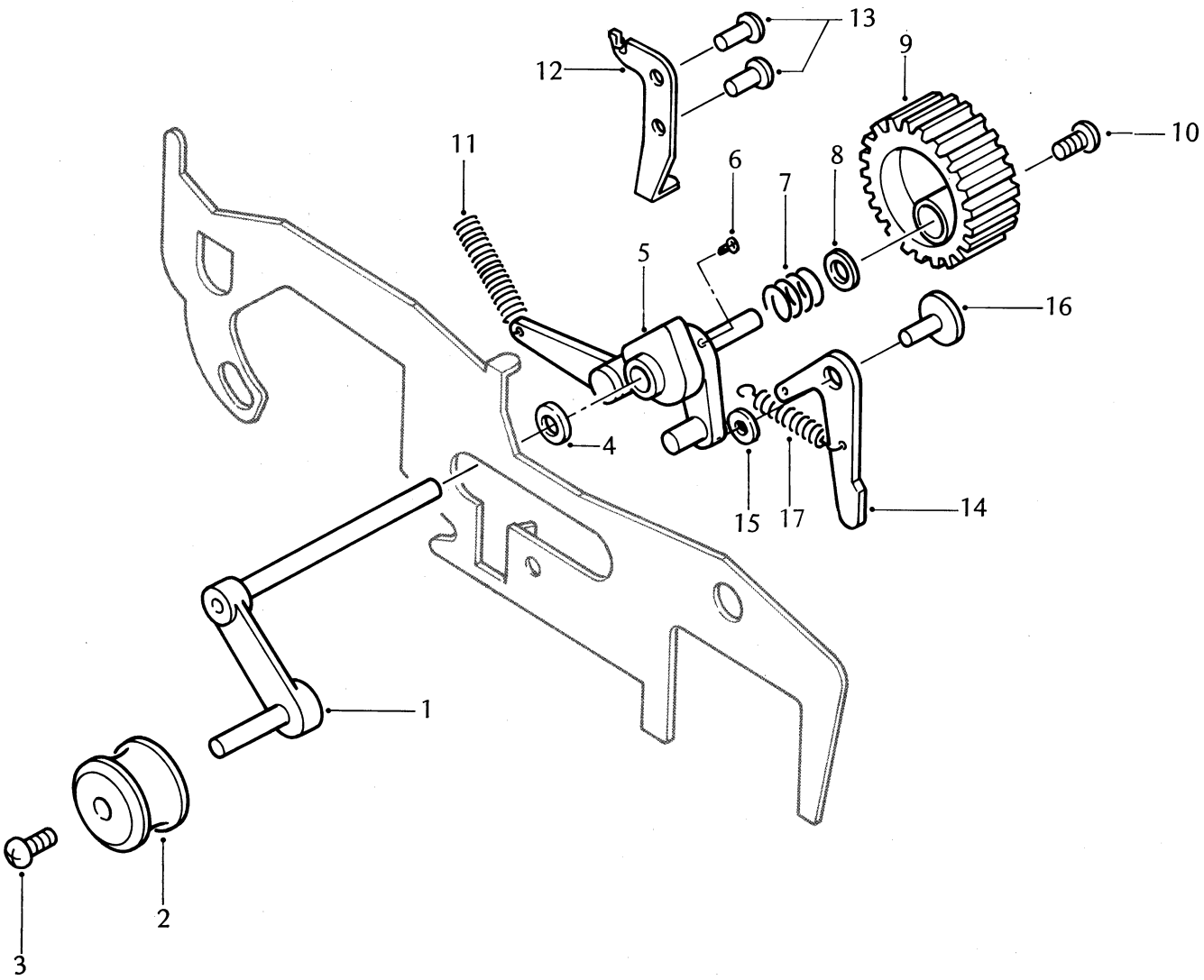
17-1 FILM GUIDE



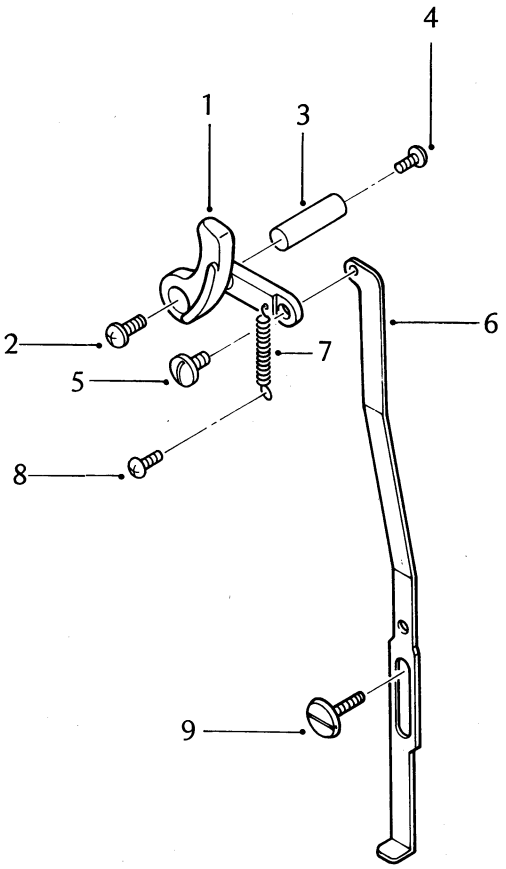
17-1 FILM GUIDE

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-17601	Tension Arm Assy. Complete (Includes items 1 thru 8)	1
1	321-17851	Tension Arm Shaft	1
2	322-17811	Tension Arm	1
3	X F-3506	Screw	1
4	321-17841	Tension Roller Shaft	1
5	321-17571	Tension Roller	1
6	X T-3006S	Screw	1
7	W A-30	Washer	1
8	X F-3008S	Screw	1
9	321-17431	Spacer	1
10	322-17111	Tension Interlocking Arm	1
11	321-17121	Spring	1
12	W C-40	Lock Washer	1
13	N A-40S	Nut	1
*	321-17701	Buzz Roller Arm Assy. (Includes items 14 thru 23)	1
14	321-17391	Buzz Roller Arm	1
15	S T-17161	Roller Shaft	1
16	W C-35	Lock Washer	1
17	W A-35	Washer	1
18	X P-3510	Screw	1
19	321-17411	Buzz Roller	1
20	G 8-060100	Fibre Washer	1
21	X T-3506	Screw	1
22	321-17421	Roller	1
23	X T-3506	Screw	1
24	321-17031	Buzz Roller Interlocking Arm	1
25	321-17441	Spring	1
26	W C-40	Lock Washer	1
27	N A-40S	Nut	1
28	321-17041	Spring	1
29	G 4-060100	Fibre Washer	1
30	312-10161	Screw	1

18-0 LOOP RESTORER



19-0 REWIND CONTROL



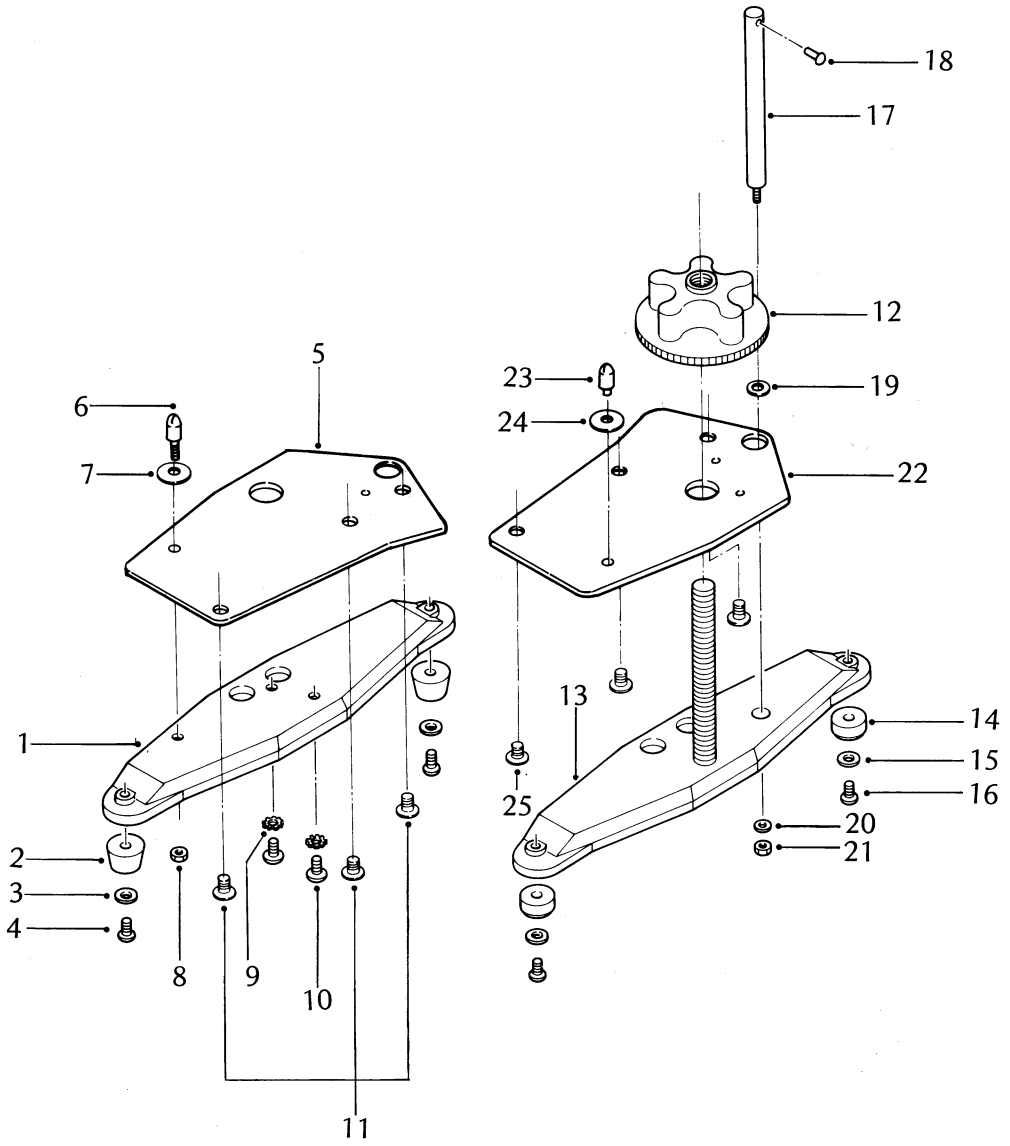
18-0 LOOP RESTORER

INDEX NO	PART NO	DESCRIPTION	QTY.
1	322-18501	Loop Setter Arm	1
2	320-18021	Loop Setter Roller	1
3	X T-3506	Screw	1
4	G 4-060100	Fibre Washer	1
*	322-18201	Loop Setter Interlocking Arm Assy. (Includes items 5 thru 11)	1
5	322-18601	Loop Setter Interlocking Arm	1
6	X P-3508	Screw	1
7	320-18061	Spring	1
8	G 4-060100	Fibre Washer	2
9	322-18071	Loop Setter Gear	1
10	X T-3506	Screw	1
11	322-18111	Spring	1
12	321-17381	Spring Arm	1
13	X P-3006S	Screw	2
14	322-18131	Stop Plate	1
15	WA-40	Washer	1
16	312-11071	Screw (for above)	1
17	321-18121	Spring	1

19-0 REWIND CONTROL

INDEX NO	PART NO	DESCRIPTION	QTY.
1	320-19121	Rewind Control Arm	1
2	X T-4006S	Screw	1
3	320-19261	Rewind Shaft	1
4	X O-4010S	Screw	1
5	320-19271	Screw	1
6	320-19311	Rewind Push Lever	1
7	320-18111	Spring	1
8	X T-2306	Screw	1
9	312-11271	Screw	1

20-0 BASE CASTING / ELEVATOR FOOT

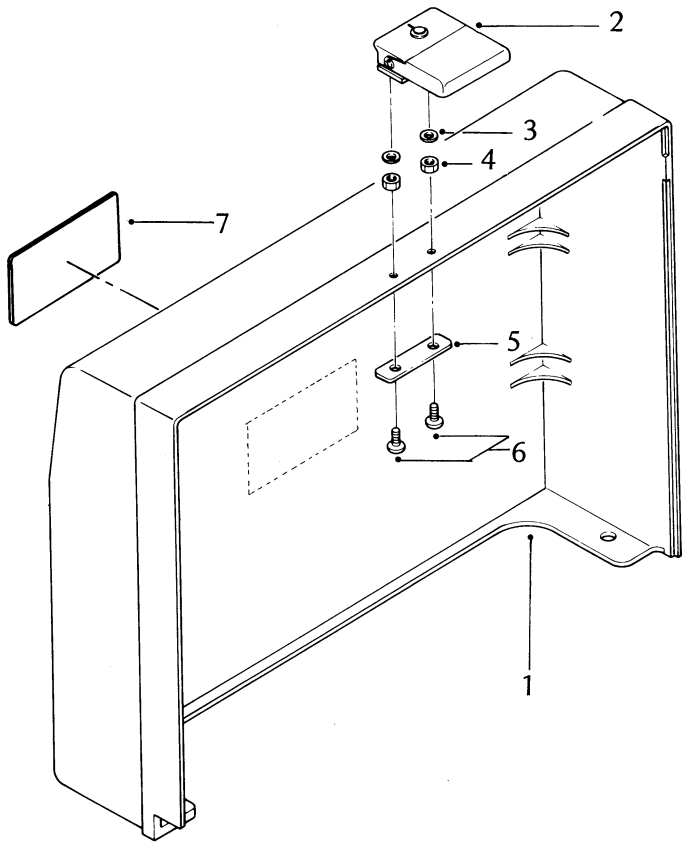


20-0 BASE CASTING/ELEVATOR FOOT

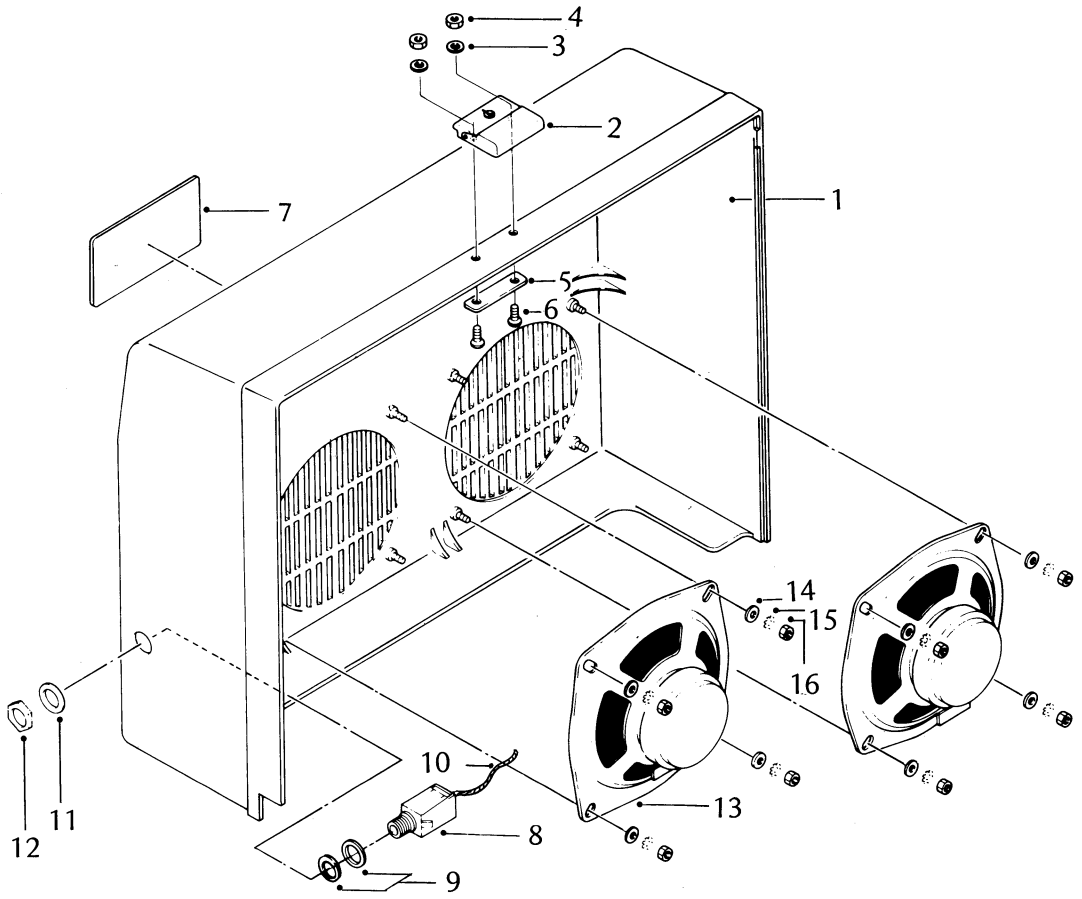
INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-20101	Rear Leg Assy. (Includes items 1 thru 4)	1
1	322-20051	Rear Leg only	1
2	321-20141	Rubber Foot	2
3	WA-35	Washer	2
4	X P-3510	Screw	2
5	322-20091	Rear Leg Mounting Bracket	1
6	322-20031	Rear Cover Stopper	1
7	S T-20041	Washer	1
8	N A-40S	Nut	1
9	W E-40	Washer	2
10	X P-4008S	Screw	2
11	X O-4012S	Screw	3
12	322-20061	Elevator Knob	1
*	322-20301	Elevator Foot Assy. (Includes items 13 thru 21)	1
13	322-20401	Elevator Foot	1
14	321-20141	Rubber Foot	2
15	WA-35	Washer	2
16	X P-3510	Screw	2
17	322-20142	Guide Bar	1
18	X P-3006S	Screw	1
19	WA-50	Washer	1
20	W C-50	Lock Washer	1
21	N A-50S	Nut	1
22	322-20071	Front Leg Mounting Bracket SSL	1
*	322-20111	Front Leg Mounting Bracket ESL	(1)
23	322-20041	Front Cover Stopper	1
24	S T-20041	Washer	1
25	X O-4012S	Screw	3

21-0 FRONT COVER

MODEL SSL–0, 02



MODEL SSL/ESL–1, 2

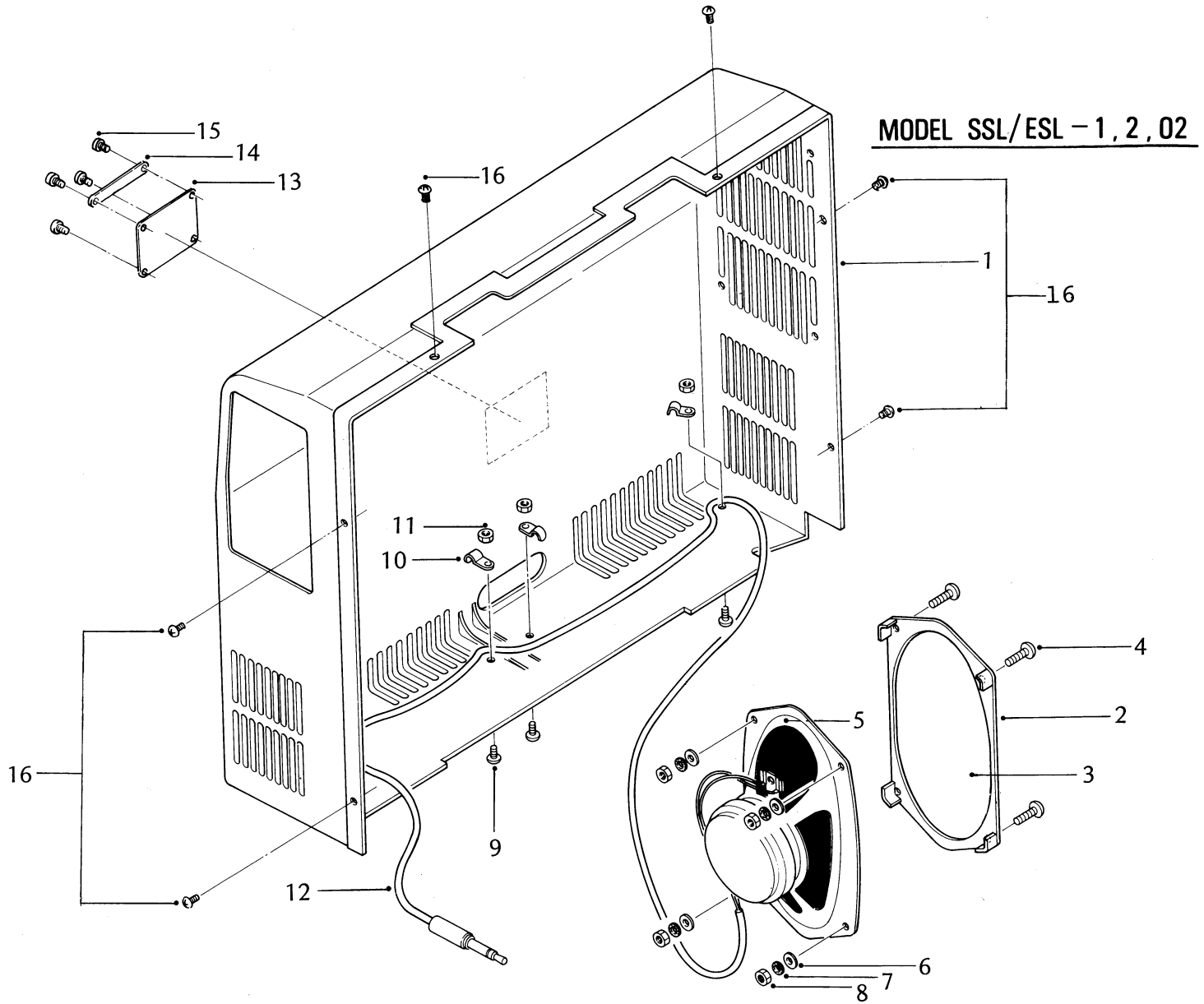


21-0 FRONT COVER

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-21101	Front Cover Assy. w/o Speaker SSL-0, SSL-02 (Includes items 1 thru 7)	1
1	322-21011	Front Cover	1
2	S T-10031	Male Latch	1
3	W C-30	Lock Washer	2
4	N A-30S	Nut	2
5	314-21231	Latch Plate	1
6	X T-3012S	Screw	2
7	322-32151	Name Plate "EIKI Slim Line"	1

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-21201	Front Cover Assy. w/12.5cm Speaker (Includes items 1 thru 16)	1
1	322-21051	Front Cover only	1
2	S T-10031	Male Latch	1
3	W C-30	Lock Washer	2
4	N A-30S	Nut	2
5	314-21231	Latch Plate	1
6	X T-3012S	Screw	2
7	322-32151	Name Plate "EIKI Slim Line"	1
*	314-21401	Speaker Jack Assy.	1
8	*S T-21051	Speaker Jack	1
9	*G I-090150	Fibre Washer	2
10	*314-21091	Speaker Leads	1
11	*S T-21211	Washer	1
12	*S T-21221	Nut	1
13	322-21301	Speaker and Grill Cloth Assy.	1
14	W A-35	Washer	8
15	W E-35	Washer	8
16	N A-35	Nut	8

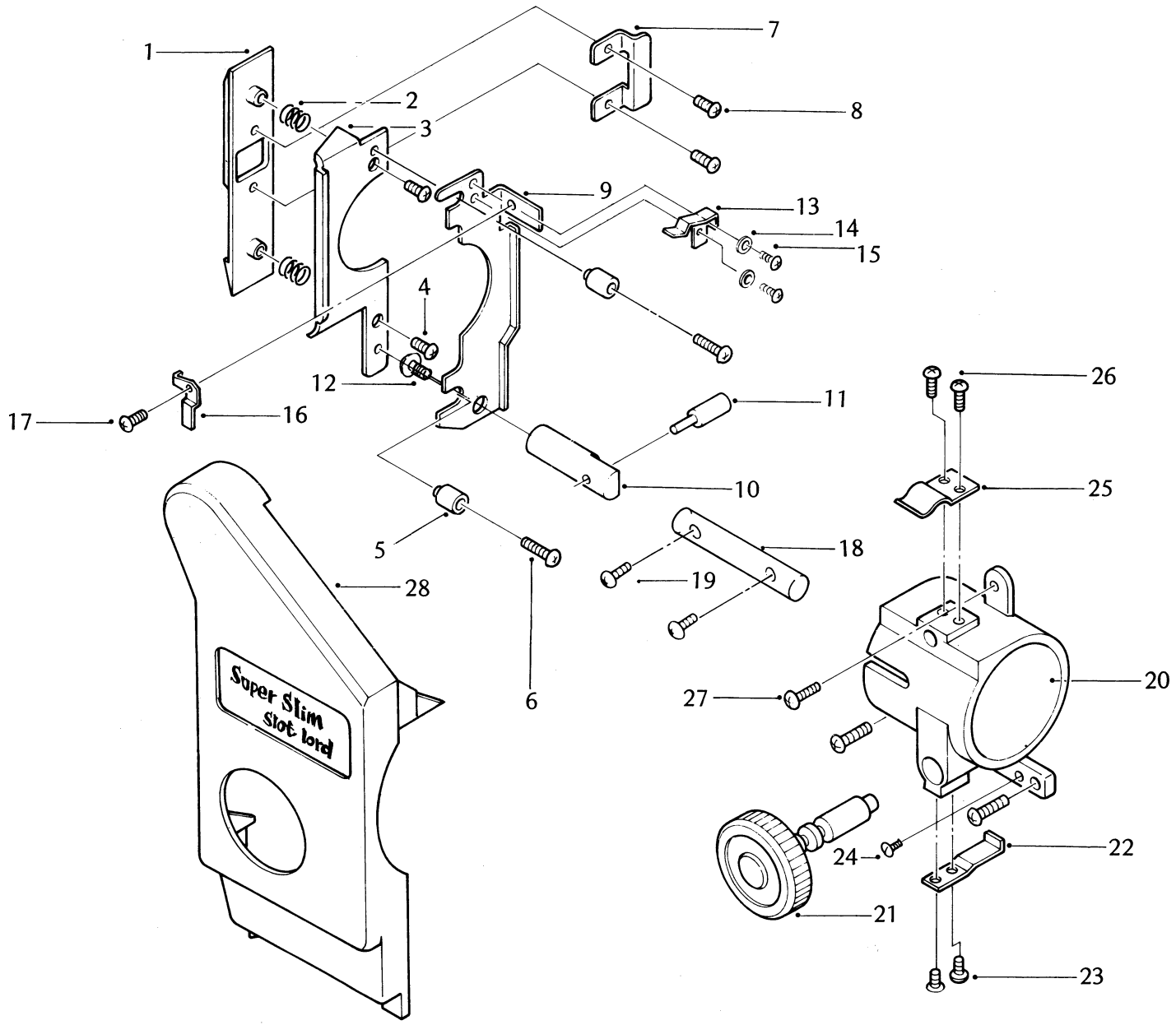
22-0 REAR COVER



22-0 REAR COVER

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-22101	Rear Cover Assy. w/10 x 15cm Speaker (Includes items 1 thru 12)	1
1	322-22311	Rear Cover only	1
*	322-22301	Speaker Support Plate & Net Assy.	1
2	*322-22321	Speaker Support Plate	1
3	*322-22811	Grill Cloth	1
4	X T-3016SK	Screw	4
5	322-22801	Oval Speaker	1
6	W A-30	Washer	4
7	W E-30	Washer	4
8	N A-30	Nut	4
9	X T-3006SK	Screw	4
10	S T-22041	Cord Clip	4
11	N A-30S	Nut	4
12	322-22901	Speaker Plug & Cable Assy.	1
*	322-22611	Caution Plate UL, CSA	(1)
13	322-22131	Rating Plate 110V 60HZ 25W	1
*	322-22151	" " 120V 60HZ 25W	(1)
*	322-22161	" " 120V 60HZ 15W	(1)
*	322-22171	" " 220V 50HZ 25W	(1)
*	322-22181	" " 220V 60HZ 25W	(1)
*	322-22191	" " 220V 50/60HZ 25W	(1)
*	322-22211	" " 240V 50HZ 25W	(1)
*	322-22241	" " 110/220V 50/60HZ 25W	(1)
*	322-22251	" " 120/240V 50/60HZ 25W	(1)
14	322-22371	Number Plate ESL	1
*	322-22381	Number Plate SSL	(1)
15	X T-2305K	Screw	4
16	X T-3510K	Screw	5

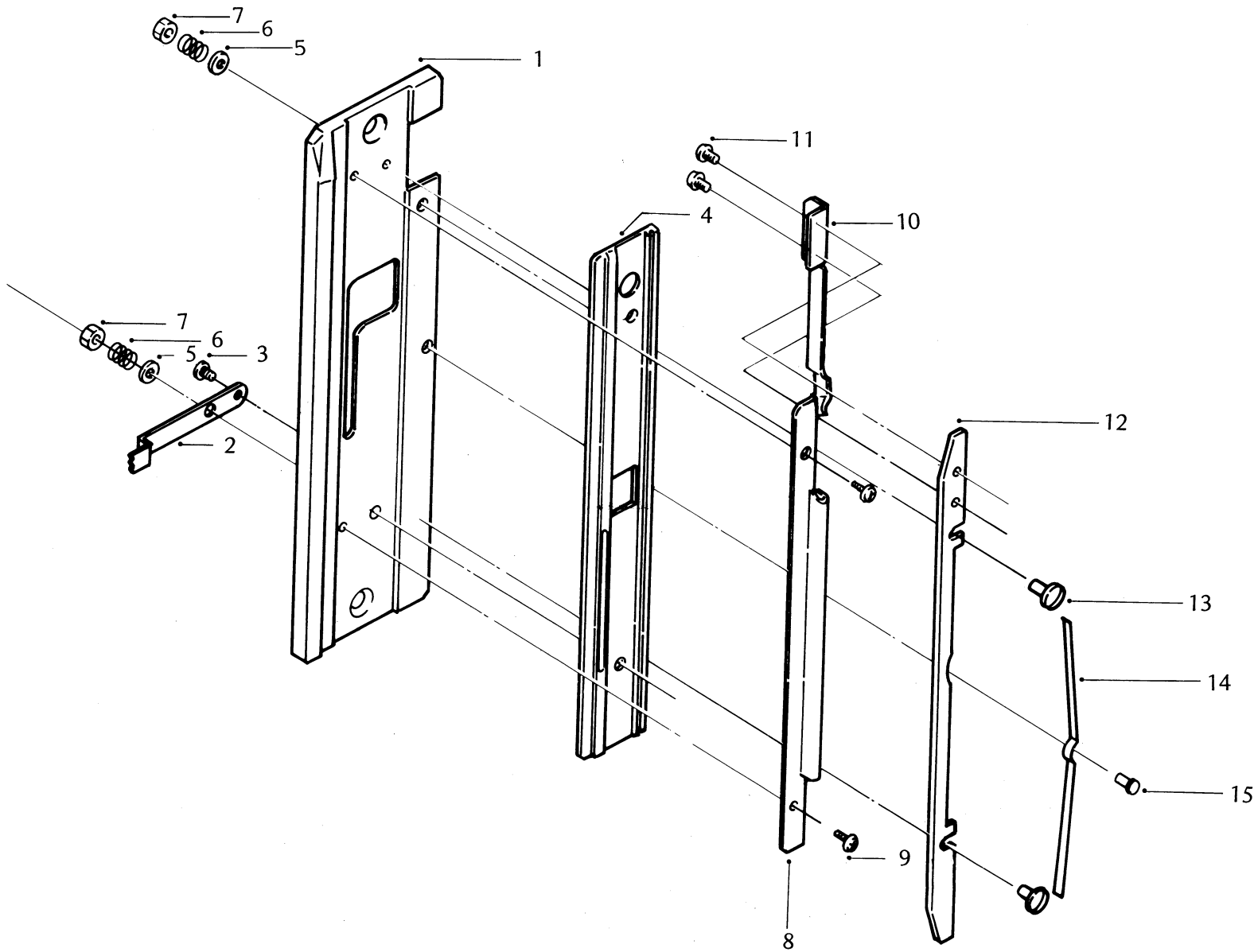
30-0 LENS HOLDER



30-0 LENS HOLDER

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-30501	Film Shoe & Bracket Assy. (Includes items 1 thru 17)	1
1	322-30101	Film Shoe only	1
2	320-30061	Spring	2
3	320-30421	Mounting Bracket	1
4	X T-2303	Screw	2
5	320-30441	Pin	2
6	X P-2310	Screw	2
7	322-30311	Plate	1
8	X P-2303	Screw	2
*	320-30701	Film Shoe Reception Bracket Assy. (Includes items 9 thru 17)	1
9	320-30921	Reception Bracket	1
10	320-30451	Sliding Pin Shaft	1
11	320-30491	Guide Pin	1
12	X T-4008S	Screw	1
13	320-30431	Plate Spring	1
14	W C-23	Lock Washer	2
15	X T-2303	Screw	2
16	320-17531	Reception Bracket Guide	1
17	X P-2304	Screw	1
18	320-33311	Reception Bracket Guide Bar	1
19	X P-3516	Screw	2
*	322-30201	Lens Holder Assy. (Includes items 20 thru 26)	1
20	322-30081	Lens Holder only	1
21	322-30401	Focus Knob Assy.	1
22	312-30211	Plate Spring	1
23	X P-2305	Screw	2
24	H S-4006S	Screw	2
25	320-30131	Plate Spring	1
26	X T-3005S	Screw	2
27	X P-3010S	Screw	3
28	322-30411	Lens Holder Cover Assy.	1

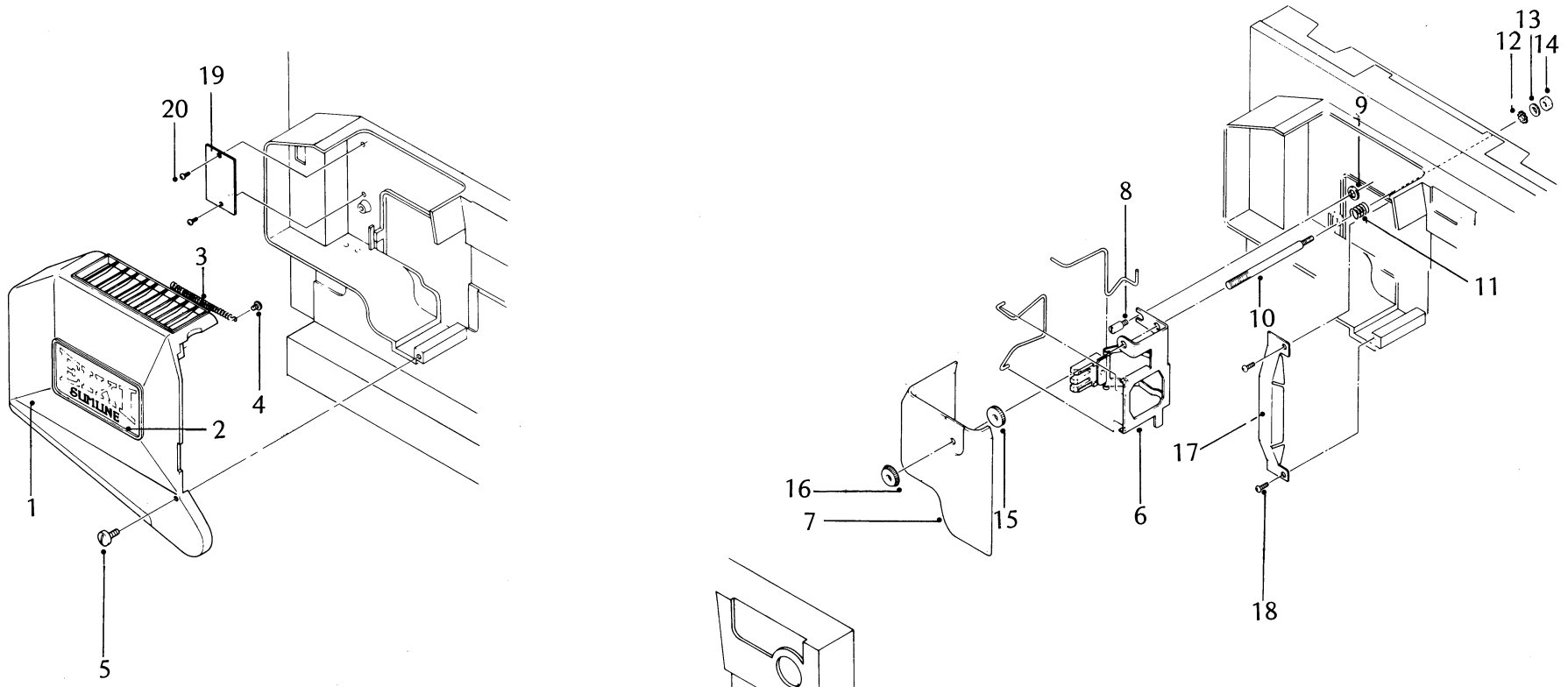
31-0 GATE



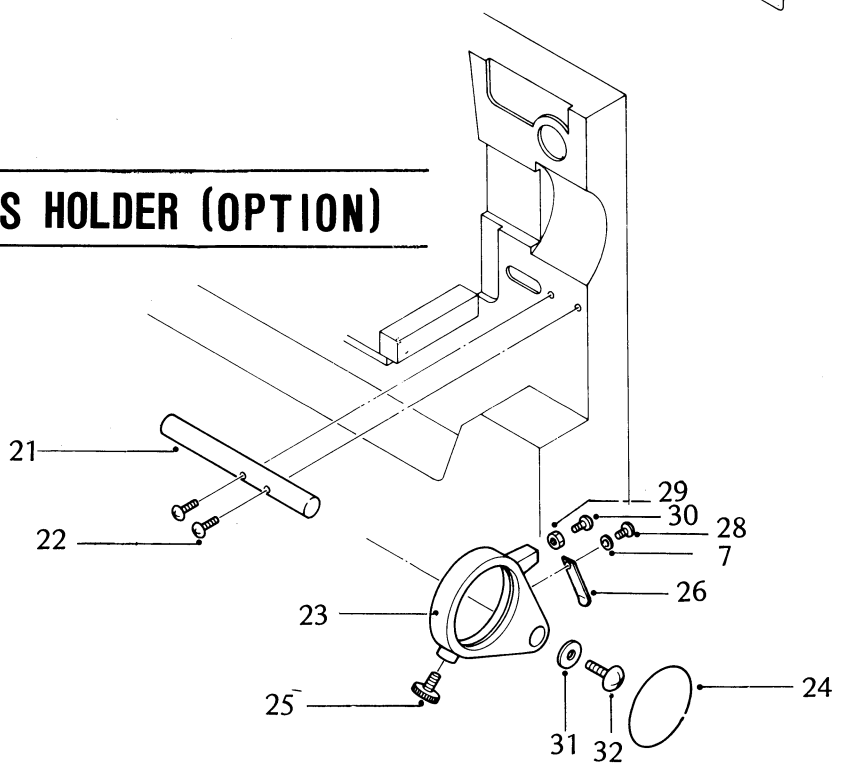
31-0 GATE

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-31001	Film Gate Assy. (Includes items 1 thru 15)	1
1	322-31091	Gate Plate	1
2	322-31031	Framing Lever	1
3	S T-30021	Screw (for above)	1
4	320-31101	Film Gate	1
5	W A-30	Washer	2
6	320-31051	Spring	2
7	N B-30S	Nut	2
8	320-31071	Outer Guide Rail	1
9	X P-2303	Screw (for above)	2
10	320-31411	Side Pressure Control Lever	1
11	X P-2304	Screw	2
12	320-31111	Inner Guide Rail	1
13	320-31061	Screw (for above)	2
14	314-31121	Side Pressure Spring	1
15	320-31131	Screw (for above)	1

32-0 LAMP HOUSE



33-0 CINEMASCOPE LENS HOLDER (OPTION)



32-0 LAMP HOUSE

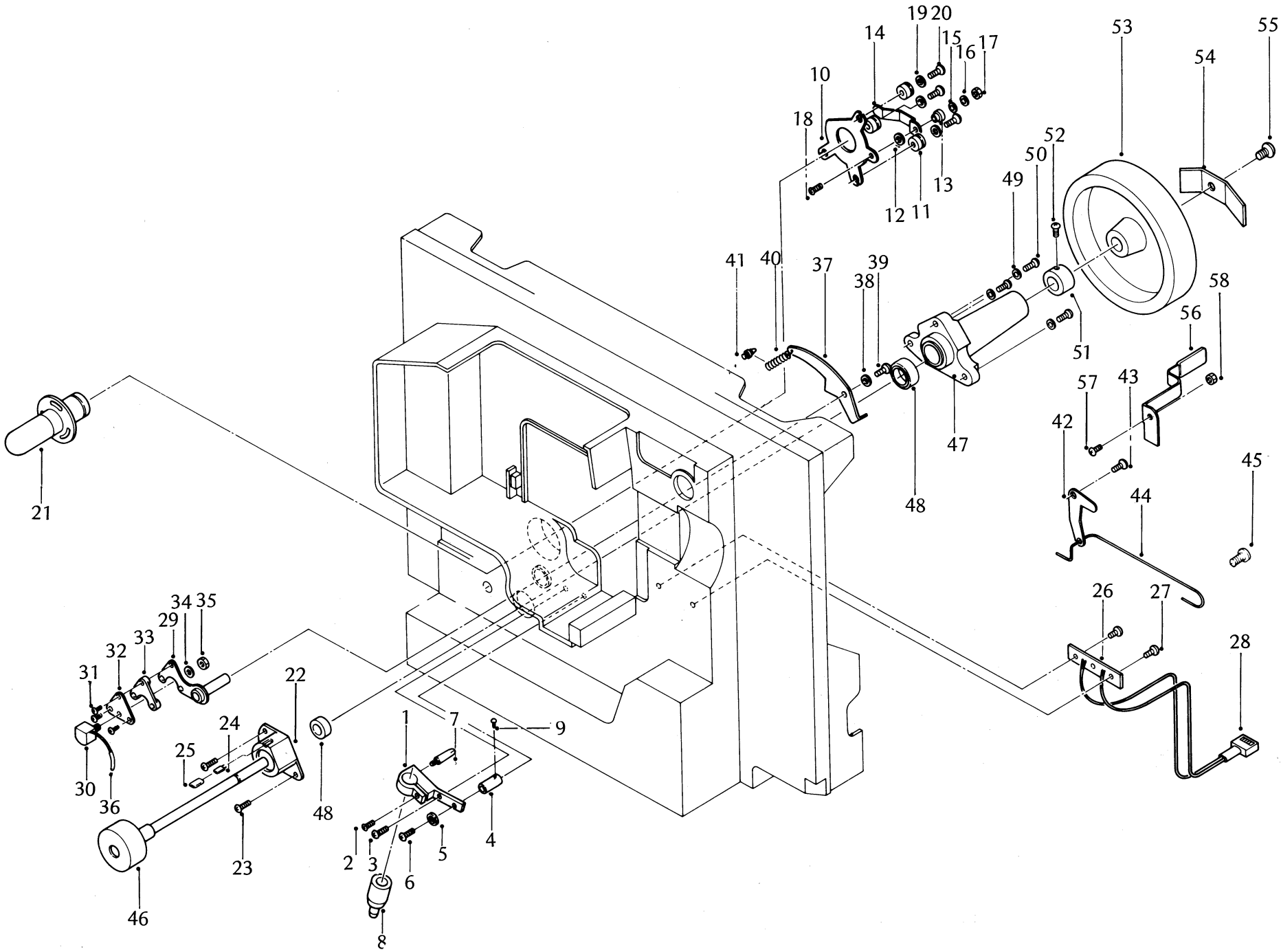
INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-32701	Lamp House Door Assy.	1
1	*322-32601	Lamp House Door Sub-Assy. w/Eiki Decal	1
2	**322-32151	Eiki Decal	1
3	*312-32031	Spring	1
4	*322-32161	Tapping Screw	1
5	320-32421	Lamp House Lock Screw	1
6	322-32801	Lamp Holder Assy.	1
*	322-32901	Lamp Holder Assy. (for 120V 300W Lamp)	(1)
7	322-32171	Heat Shield	1
8	312-32161	Guide Pin	1
9	W A-40	Washer	1
10	322-32221	Shaft	1
11	S T-32181	Spring	1
12	W E-40	Washer	2
13	W C-40	Lock Washer	1
14	N A-40S	Nut	1
15	322-32191	Knurled Nut	1
16	322-32211	Knob	1
17	322-32311	Shutter Cover	1
*	322-32301	Shutter Cover (VDE)	(1)
18	X P-2304	Screw	2
19	322-32111	Plate "24V 250W"	1
*	322-32411	Plate "120V 300W"	(1)
20	X P-2304	Screw	2

33-0 CINEMASCOPE LENS HOLDER (OPTION)

INDEX NO	PART NO	DESCRIPTION	QTY.
21	322-33011	Reception Bracket Guide Bar	1
22	X P-3516	Screw	2
*	313-33101	Anamorphic Lens Holder Assy. (Includes items 23 thru 30)	1
23	313-33041	Anamorphic Lens Holder only	1
24	S T-33061	Retaining Ring	1
25	312-33051	Adjusting Screw	1
26	S T-33021	Snap Spring	1
27	W C-30	Lock Washer	1
28	S T-11391	Screw	1
29	N B-30S	Nut	1
30	X P-3010S	Screw	1
31	S T-22041	Washer	1
32	X T-4008S	Screw	1

40-0 SOUND PICK-UP

41-0 SOUND DRUM



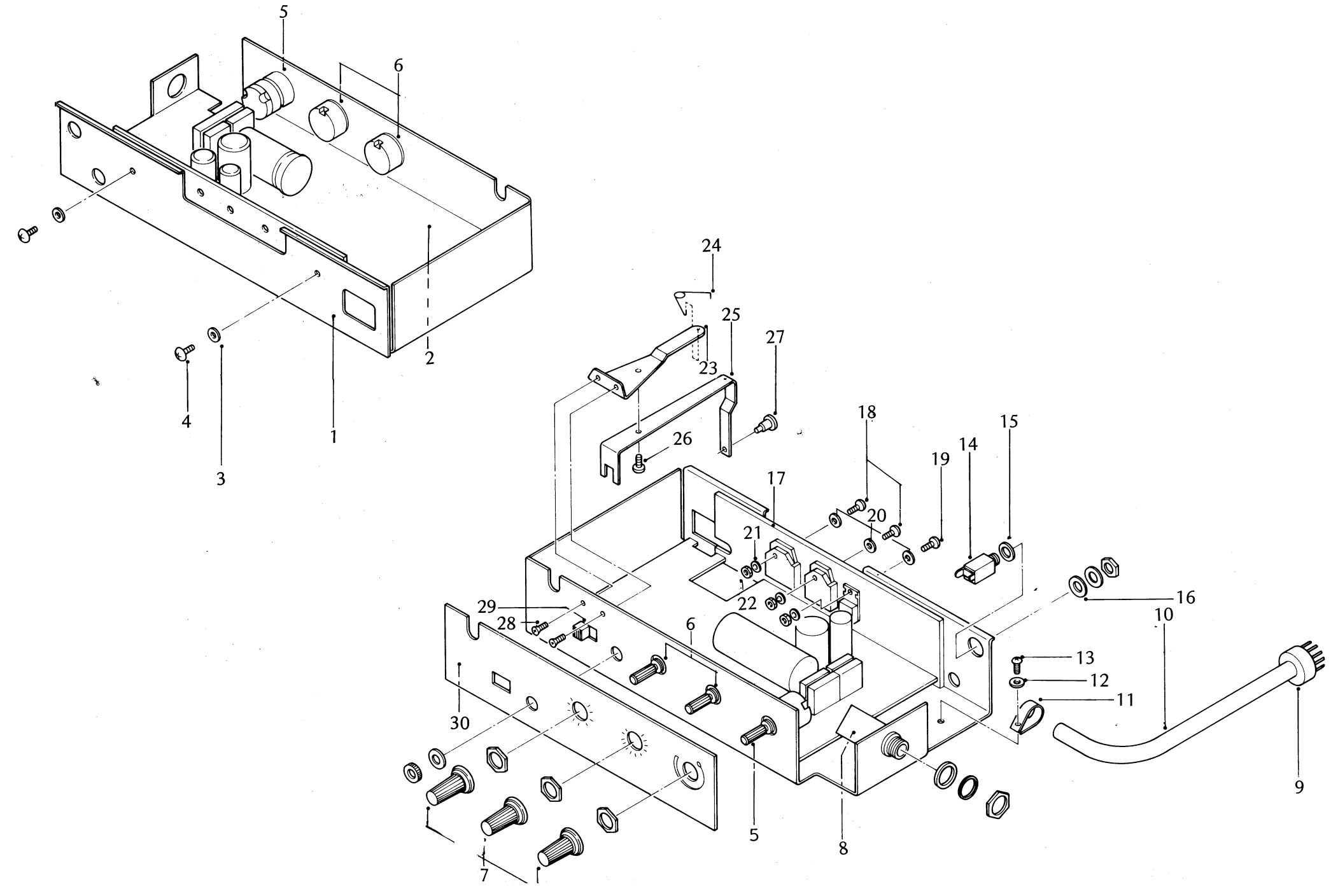
40-0 SOUND PICK-UP

INDEX NO	PART NO	DESCRIPTION	QTY.
*	320-40101	Sound Lens Holder Assy. (Includes items 1 thru 7)	1
1	320-40011	Sound Lens Holder	1
2	X P-2308	Screw	1
3	X P-2306	Screw	1
4	312-40021	Sound Lens Holder Pin	1
5	W C-30	Lock Washer	1
6	X P-3008S	Screw	1
7	320-40031	Sound Lens Holder Spring Pin	1
8	320-40201	Sound Lens Assy.	1
9	X P-3012S	Screw	1
*	321-40601	Exciter Lamp Socket Assy. (Includes items 10 thru 18)	1
10	321-40401	Exciter Lamp Socket	1
11	S T-40141	Rubber Grommet	3
12	S T-40161	Insulating Washer (Female)	1
13	S T-40151	Insulating Washer (Male)	1
14	S T-40171	Lug	1
15	W A-30	Washer	1
16	W C-30	Lock Washer	1
17	N A-30S	Nut	1
18	X T-3012S	Screw	1
19	W A-30	Washer	1
20	X T-3010S	Screw	1
21	S T-40111	Exciter Lamp BRk (5104)	1
*	321-40801	Solar Cell Case Assy.	1
22	*321-41021	Solar Cell Case	1
23	X P-2306	Screw	2
24	*320-40181	Solar Cell	1
25	*320-40311	Sleeve	1
*	320-40601	Sound Terminal Board Assy.	1
26	*S T-40261	Sound Terminal Board	1
27	X P-3006S	Screw	2
28	*320-40281	Connector only	1
*	321-40701	Magnetic Head Assy. (-2 type only) (Includes items 29 thru 36)	1
29	321-40501	Head Arm	1
30	320-40191	Magnetic Head	1
31	X P-2305	Screw	3
32	321-40611	Magnetic Head Mounting Plate	1
33	321-40621	Rubber Spacer	1
34	W C-30	Lock Washer	1
35	N B-30S	Nut	1
36	320-40311	Protector (for Magnetic Wire)	1
37	322-40051	Head Interlocking Plate A	1
38	W C-40	Lock Washer	1
39	X P-4008S	Screw	1
40	322-40251	Spring	1
41	312-10161	Screw	1
42	322-40061	Head Interlocking Plate B	1
43	321-40071	Screw	1
44	322-40631	Joint	1
45	320-40641	Screw	1

41-0 SOUND DRUM

INDEX NO	PART NO	DESCRIPTION	QTY.
46	321-41011	Sound Drum	1
47	322-41401	Hub Casting w/Bearing	1
48	*O B-1280ZZ	Ball Bearing (for above)	2
49	W C-35	Lock Washer	3
50	X P-3510	Screw	3
*	320-41301	Set Collar Assy. w/Screw	1
51	*320-41041	Set Collar	1
52	*X P-3506	Screw	1
53	320-41051	Flywheel	1
54	S T-41061	Plate Spring	1
55	X T-4006S	Screw	1
56	322-18211	Belt Support Plate	1
57	322-18221	Screw	1
58	W C-35	Lock Washer	1

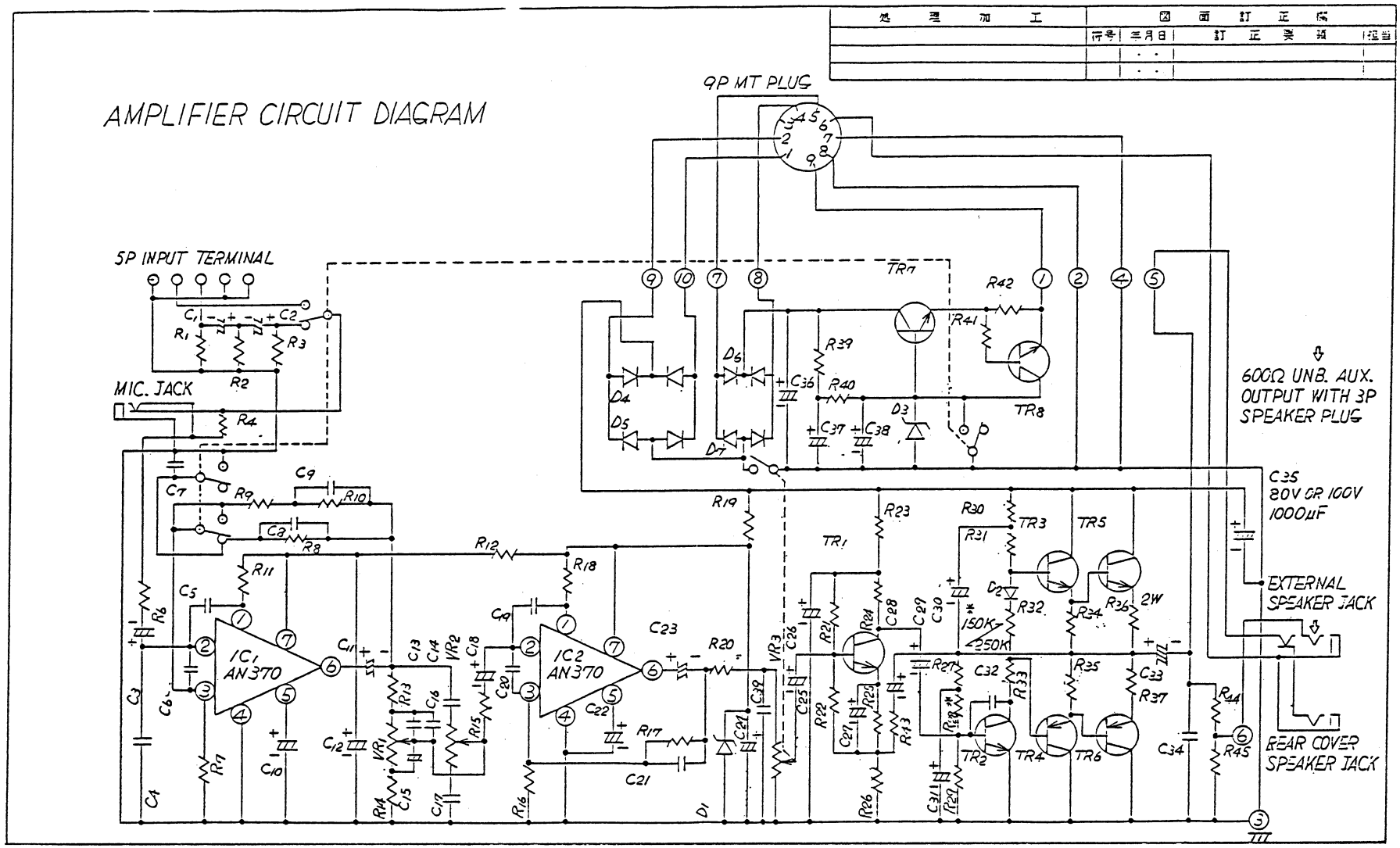
50-0 AMPLIFIER CHASSIS



50-0 AMPLIFIER CHASSIS

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-50201	Amplifier Module -0, 1 type	1
*	322-50301	Amplifier Module -0L, 1L type	(1)
*	322-50001	Amplifier Module -2 type	(1)
*	322-50401	Amplifier Module -2L type	(1)
*	322-50501	Amplifier Module -0, 1 type (VDE)	(1)
*	322-50601	Amplifier Module -2 type (VDE)	(1)
*	322-51001	Printed Circuit Board Assy. -0, 1 type	1
*	322-51101	Printed Circuit Board Assy. -0L, 1L type	(1)
*	322-51201	Printed Circuit Board Assy. -2 type	(1)
*	322-51301	Printed Circuit Board Assy. -2L type	(1)
1	322-50591	Amplifier Chassis only	1
2	322-51011	Printed Circuit Board only	1
3	W C-30	Lock Washer	2
4	X P-3005S	Screw	2
5	320-51011	Volume Control w/Switch (Includes Metal Washer & Nut)	1
6	322-51021	Tone Control w/Switch (Includes Metal Washer & Nut)	2
7	321-50281	Control Knob	3
8	322-50111	Speaker Jack (Includes Metal Washer & Nut)	1
9	S T-50111	MT 9 Pin Plug	1
10	320-50751	Insulating Tubes	1
11	312-60391	Cord Clip	1
12	W A-30	Washer	1
13	X P-3006S	Screw	1
14	312-50641	Phono Jack ϕ3.5 (Includes Metal Washer & Nut)	1
15	312-50211	Insulating Bushing ϕ6 x ϕ11	1
16	G 2-060120	Fibre Washer	1
17	320-50021	Heat Sink Plate	1
18	X P-3012S	Screw	2
19	X P-3010S	Screw	1
20	W A-30	Washer	3
21	W C-30	Lock Washer	3
22	N A-30	Nut	3
23	320-50721	Supporting Bracket -2, 02 type	1
24	320-50741	Spring -2, 02 type	1
25	322-50711	Switch Interlocking Plate -2, 02 type	1
26	320-50731	Screw	1
27	320-40641	Screw -2, 02 type	1
28	X F-2305	Screw	2
29	320-51051	Sliding Switch (Opt/Mag) -2, 02 type	1
30	322-10081	Switch Plate -0, 1 type	1
*	322-10091	Switch Plate -2 type	(1)

51-0 AMPLIFIER P.C.BOARD (SSL/ESL SERIES)

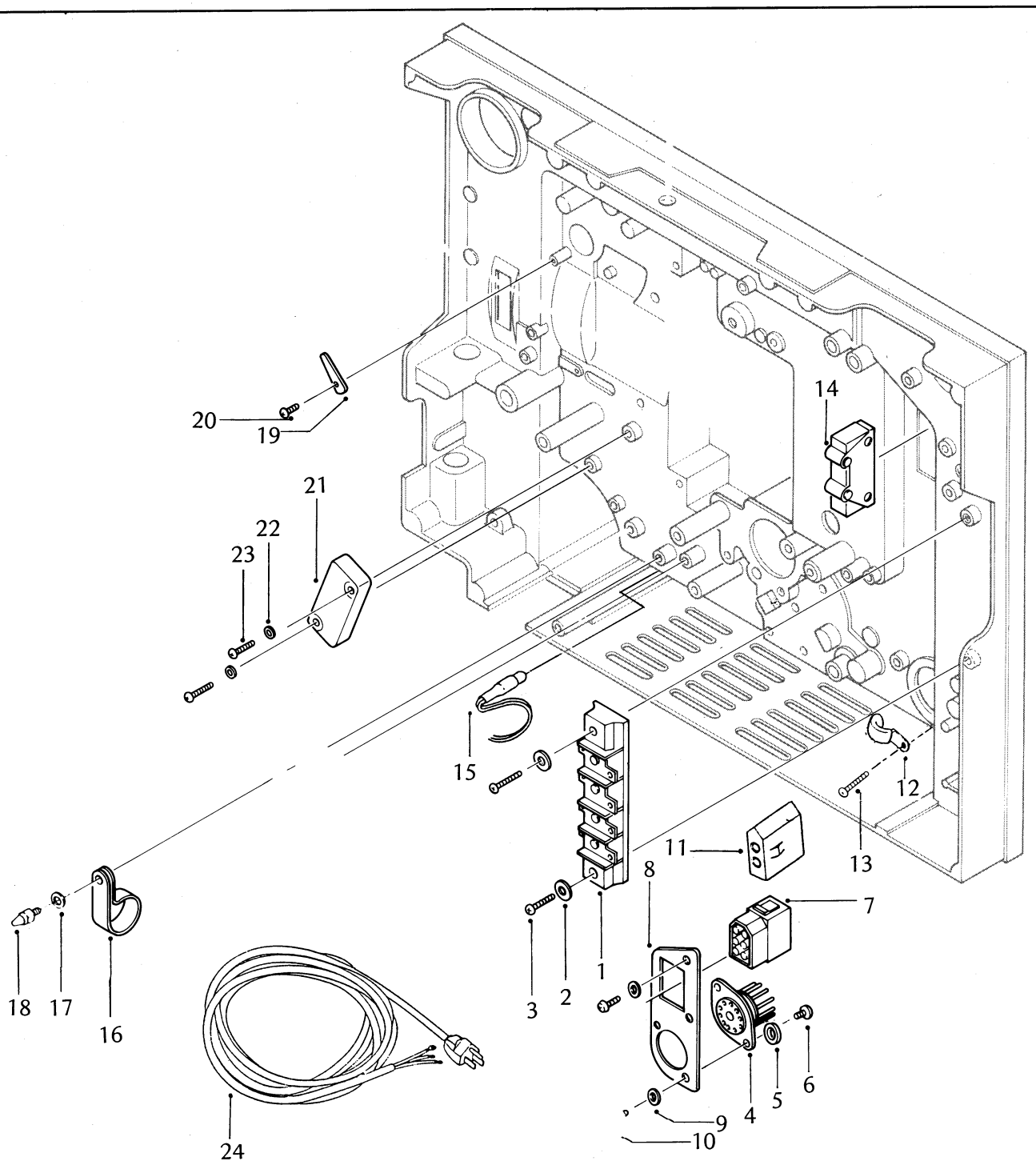


51-0 AMPLIFIER P.C.BOARD

INDEX NO	PART NO	DESCRIPTION	QTY.
IC-1	322-51031	IC AN 370	
IC-2	322-51031	" AN 370	
TR-1	2SC-732	Transistor 2SC 732	
TR-2	2SC-2235	" 2SC 2235	
TR-3	2SC-1567	" 2SC 1567	
TR-4	2SA-794	" 2SA 794	
TR-5	2SD-727	" 2SD 727	
TR-6	2SB-691	" 2SB 691	
TR-7	2SD-880	" 2SD 880	
TR-8	2SC-1959	" 2SC 1959	
D-1	322-51041	Diode 05Z24	
D-2	322-51061	" MA27TB	
D-3	322-51051	" 05Z4.7	
D-4	S T-51091	" ID2C1	
D-5	S T-51111	" ID2Z1	
D-6	S T-51091	" ID2C1	
D-7	S T-51111	" ID2Z1	
C-1	C E-500474	Capacitor 50V 0.47 MFD	
C-2	C E-500474	" 50V 0.47 MFD	
C-3	C E-500474	" 50V 0.47 MFD	
C-4	C C-500681	" 50V 680 PFD	
C-5	C C-500560	" 50V 56 PFD	
C-6	C C-500681	" 50V 680 PFD	
C-7	C M-500104	" 50V 0.1 MFD	
C-8	C M-500182	" 50V 0.0018 MFD	
C-9	C M-500332	" 50V 0.0033 MFD	
C-10	C E-500476	" 50V 47 MFD	
C-11	C E-500105	" 50V 1 MFD	
C-12	C E-500476	" 50V 47 MFD	
C-13	C M-500683	" 50V 0.068 MFD	
C-14	C M-500103	" 50V 0.01 MFD	
C-15	C E-500474	" 50V 0.47 MFD	
C-16	C M-500103	" 50V 0.01 MFD	
C-17	C M-500683	" 50V 0.068 MFD	
C-18	C E-500474	" 50V 0.47 MFD	
C-19	C C-500560	" 50V 56 PFD	
C-20	C C-500681	" 50V 680 PFD	
C-21	C C-500221	" 50V 220 PFD	
C-22	C E-500476	" 50V 47 MFD	
C-23	C E-500105	" 50V 1 MFD	
C-24	C E-350107	" 35V 100 MFD	
C-25	C E-500225	" 50V 2.2 MFD	
C-26	C E-250107	" 25V 100 MFD	
C-27	C E-6R3336	" 6.3V 33 MFD	
C-28	C E-350106	" 35V 10 MFD	
C-29	C E-350106	" 35V 10 MFD	
C-30	C E-500476	" 50V 47 MFD	
C-31	C E-500476	" 50V 47 MFD	
C-32	C C-500560	" 50V 56 PFD	
C-33	C E-630477	" 63V 470 MFD	
C-34	C M-500104	" 50V 0.1 MFD	
C-35	C E-800108	" 80V 1000 MFD	
C-36	C E-160108	" 16V 1000 MFD	
C-37	C E-160477	" 16V 470 MFD	
C-38	C E-6R3107	" 6.3V 100 MFD	
C-39	C M-500332	" 50V 0.0033 MFD	

INDEX NO	PART NO	DESCRIPTION	QTY.
R-1	R A-R25392	Resistor 1/4W 3.9K Ohm	
R-2	R A-R25103	" " 10K "	
R-3	R A-R25153	" " 15K "	
R-4	R A-R25104	" " 100K "	
R-6	R A-R25472	" " 4.7K "	
R-7	R A-R25621	" " 620 "	
R-8	R A-R25622	" " 6.2K "	
R-9	R A-R25333	" " 33K "	
R-10	R A-R25564	" " 560K "	
R-11	R A-R25274	" " 270K "	
R-12	R A-R25302	" " 3K "	
R-13	R A-R25822	" " 8.2K "	
R-14	R A-R25132	" " 1.3K "	
R-15	R A-R25332	" " 3.3K "	
R-16	R A-R25132	" " 1.3K "	
R-17	R A-R25393	" " 39K "	
R-18	R A-R25274	" " 270K "	
R-19	R W-1R0332	" 1W 3.3K "	
R-20	R A-R25332	" 1/4W 3.3K "	
R-21	R A-R25364	" " 360K "	
R-22	R A-R25124	" " 120K "	
R-23	R A-R25683	" " 68K "	
R-24	R A-R25682	" " 6.8K "	
R-25	R A-R25332	" " 3.3K "	
R-26	R A-R25431	" " 430 "	
R-27	R A-R25822	" " 8.2K "	
R-28	R A-R25204	" " 200K "	
R-29	R A-R25682	" " 6.8K "	
R-30	R A-R25102	" " 1K "	
R-31	R A-R25392	" " 3.9K "	
R-32	R A-R25300	" " 30 "	
R-33	R A-R50101	" 1/2W 100 "	
R-34	R A-R50101	" " 100 "	
R-35	R A-R50101	" " 100 "	
R-36	R W-2R0R51	" 2W 0.51 "	
R-37	R W-2R0R51	" " 0.51 "	
R-39	R A-R25910	" 1/4W 91 "	
R-40	R A-R25910	" " 91 "	
R-41	R A-R25390	" " 39 "	
R-42	R W-1R0R56	" 1W 0.56 "	
R-43	R A-R25473	" 1/4W 47K "	
R-45	R A-R25752	" " 7.5K "	
R-46	R A-R25752	" " 7.5K "	
VR-1	322-51021	Tone Control	
VR-2	322-51021	Tone Control	
VR-3	322-51011	Volume Control w/Switch	

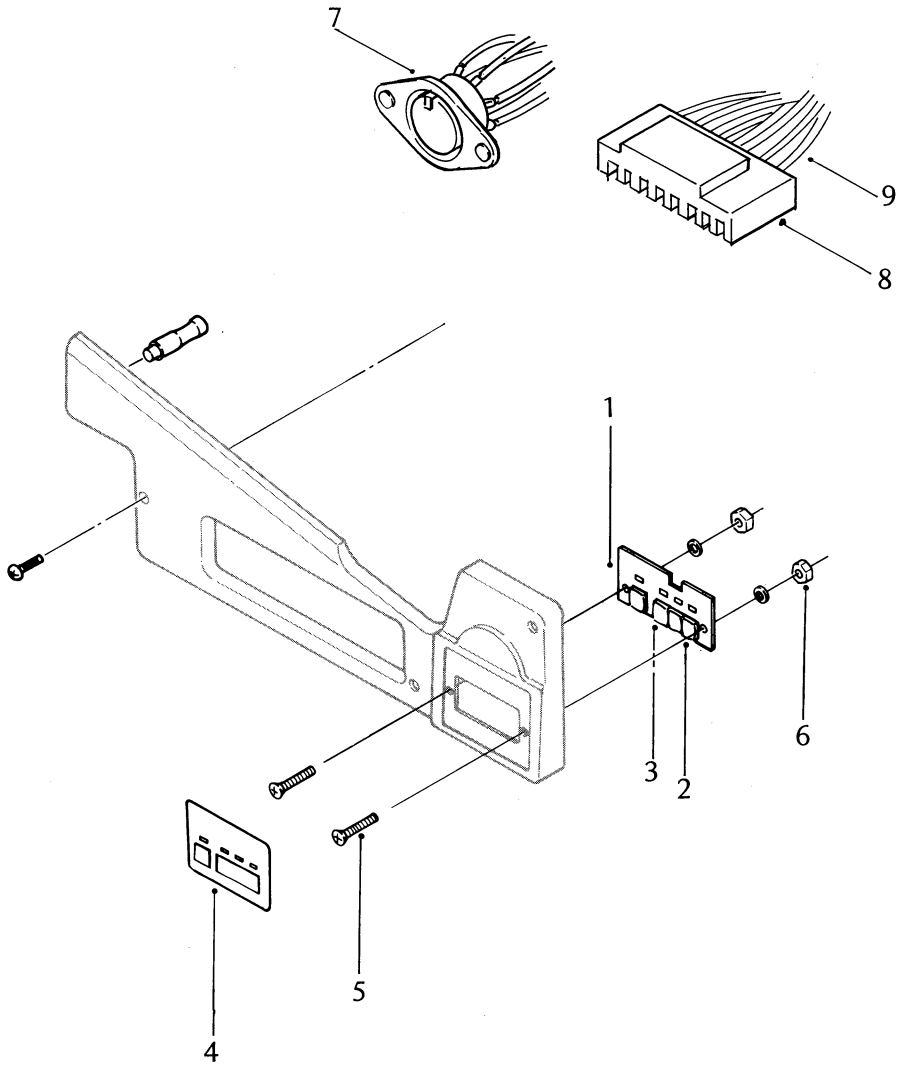
60-0 ELECTRIC PARTS

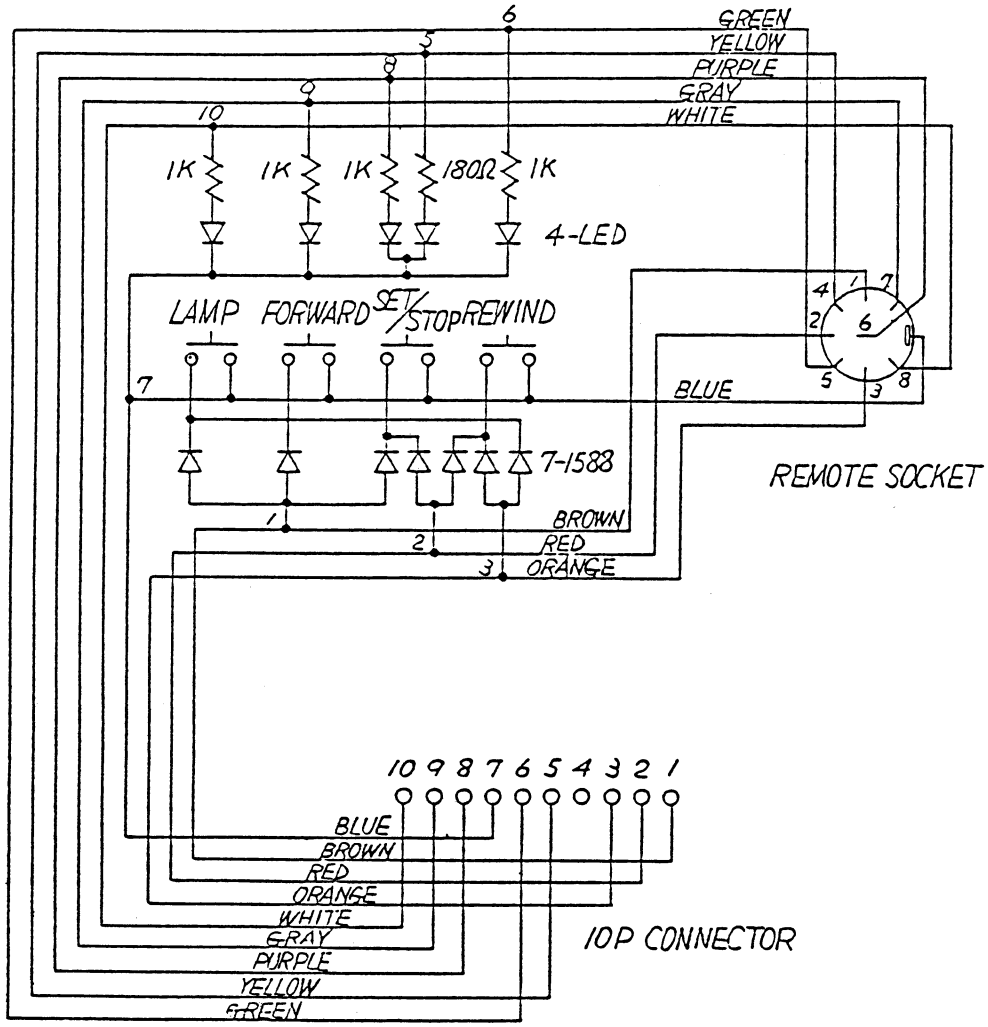


60-0 ELECTRIC PARTS

INDEX NO	PART NO	DESCRIPTION	QTY.
1	S T-60041	AC Terminal 4P	1
2	W A-30	Washer	2
3	X P-3012S	Screw	2
4	S T-60081	9 Pin Socket MT Type	1
5	W C-30	Lock Washer	2
6	X P-3005S	Screw	2
7	312-60691	6 Pin Nylon Connector 1991-6R	1
8	322-60511	Mounting Bracket	1
9	W C-30	Lock Washer	1
10	X P-3005S	Screw	2
11	312-60771	2 Pin Nylon Connector 1545R	1
*	312-60631	Female Pin (for above)	1 per wire
12	S T-60361	Cord Clip	8
13	X P-3005S	Screw (for above)	8
14	S T-60171	Switch SPDT (High-Low) w/Screws	1
15	320-60121	Pilot Lamp w/Wire	1
*	320-60131	Sleeve (for above)	1
16	314-60341	Cord Clip (Large)	1
17	W A-30	Washer	1
18	312-10161	Screw (for above)	1
19	321-60361	Cord Clip	1
20	X P-3006S	Screw (for above)	1
21	312-60051	Micro Switch	1
22	W C-23	Lock Washer	2
23	X P-2314	Screw	2
24	322-60011	AC Power Cord 3 Pin w/Plug (UL, CSA)	1
*	322-60021	AC Power Cord 3 Pin w/Plug (SAA)	(1)
*	322-60031	AC Power Cord 3 Pin w/Plug (SEMCO, FWU)	(1)
*	322-60041	AC Power Cord 3 Pin w/o Plug (Standard)	(1)

60-1 PUSH BUTTON SW P.C. BOARD (ESL)

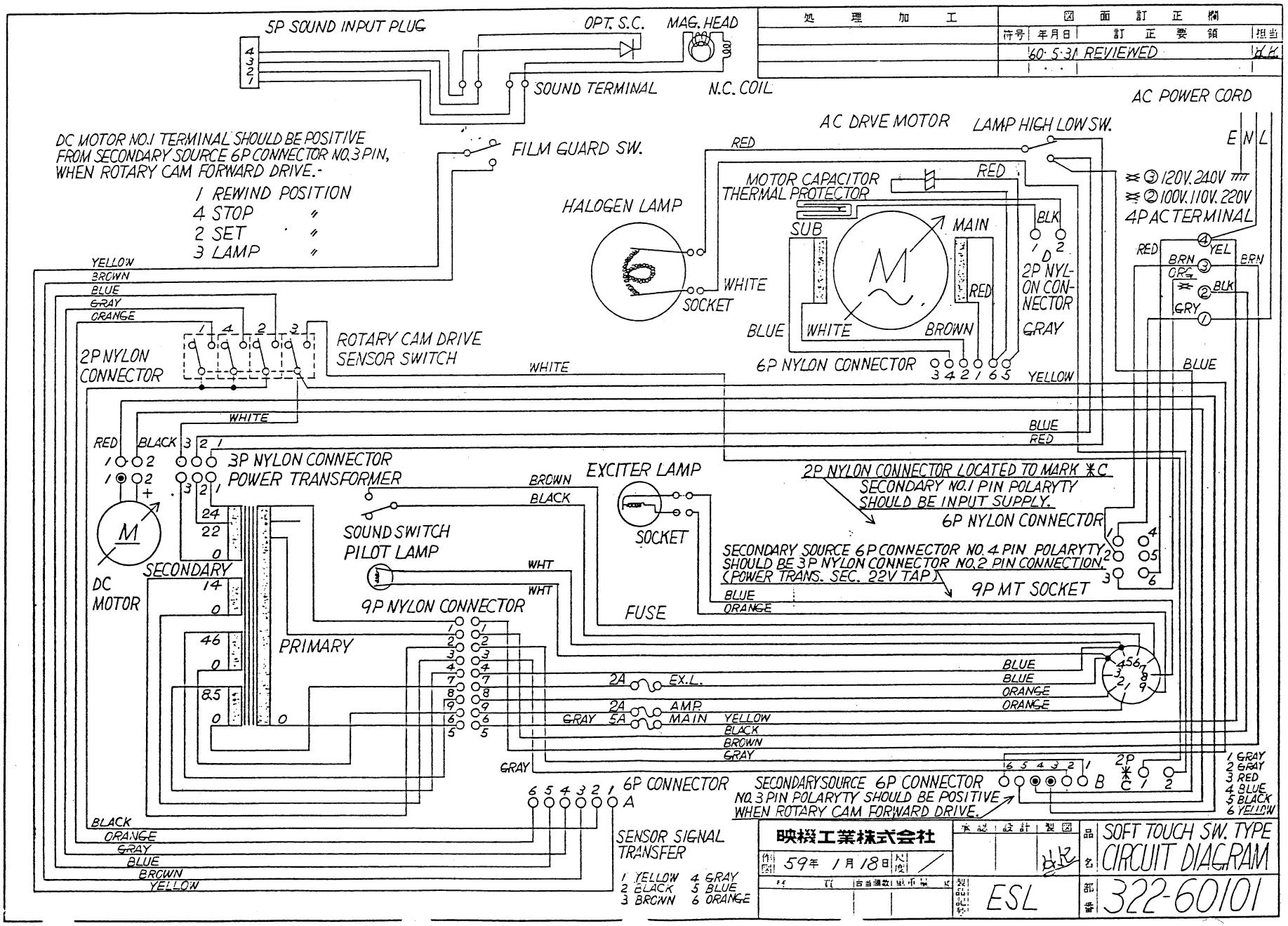




60-1 PUSH BUTTON SW P.C. BOARD (ESL)

INDEX NO	PART NO	DESCRIPTION	QTY.	INDEX NO	PART NO	DESCRIPTION	QTY.
1	322-61501	Switch P.C. Board Assy.	1				
*	*322-60211	Switch P.C. Board only	1				
2	*322-61021	Switch (Light Gray)	3				
3	*322-61031	Switch (Red)	1				
*	*322-61041	LED (Red)	3				
*	*322-61051	LED (Red/Yellow Green)	1				
*	*081-02571	Diode 1S1588	7				
*	*R A-R25102	Resistor 1/4W 1K Ohm	4				
*	*R A-R25181	" " 180 "	1				
4	322-10351	Switch Plate	1				
5	X F-2308	Screw	2				
6	N A-23	Nut	2				
7	081-02611	Din Remote Socket	1				
8	322-61061	10 Pin Connector	1				
9	322-61081	10 Pin Cable 0.75m	1				

60-2 PUSH BUTTON MAIN P.C. BOARD (ESL)



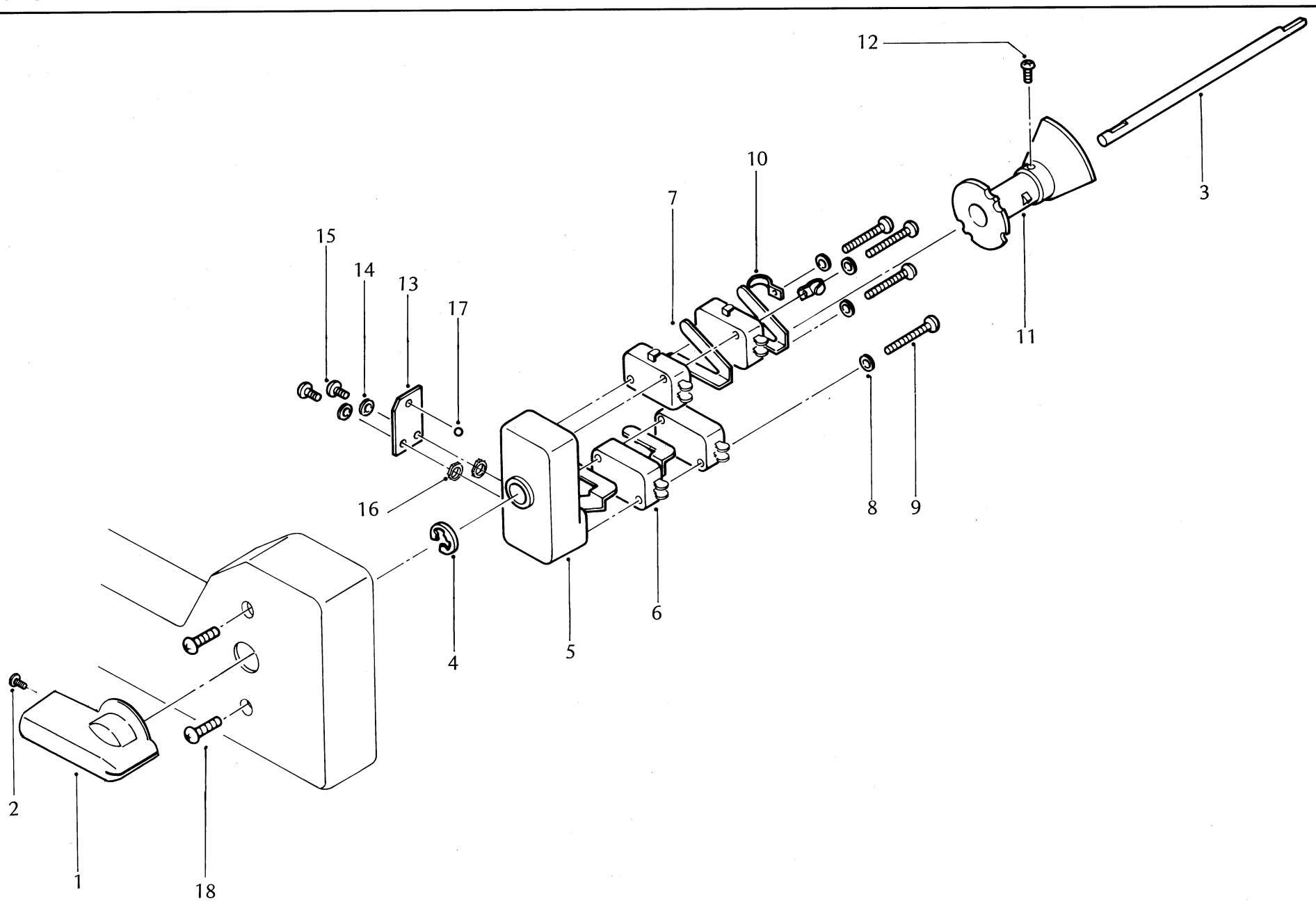
60-2 PUSH BUTTON MAIN P.C. BOARD (ESL)

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-60201	Main P.C. Board Assy.	1
*	322-61121	Main P.C. Board only	1
	322-60491	IC Receptacle 24P	1
	081-02021	" " 16P	3
	081-02031	" " 14P	6
	322-60221	10P Angle Pin Header	1
	322-60231	6P Angle Pin Header	1
	322-60241	6P Straight Pin Header	1
	322-60271	Fuse 2A	2
	322-60281	Relay Switch RY1	1
	081-02481	" " RY2	1
	322-60311	" " RY3, RY4	2
	320-60321	Spark Killer SA1	1
	320-60311	" " SA2	1
	081-02561	Voltage Regulator 12V	1
	322-60331	" " 5V	1
IC-1	322-60341	IC 2732 (or 2764)	
IC-2	322-60351	" 62703P	
IC-3	322-60361	" 4011	
IC-4	081-02191	" 4043	
IC-5	322-60381	" 4584	
IC-6	322-60391	" 4093	
IC-7	322-60411	" 4023	
IC-8	322-60361	" 4011	
IC-9	322-60421	" 555	
IC-10	322-60421	" 555	
IC-11	322-60431	" 62004 (A) P	
	081-02041	Photo Coupler	
TR-1	2SC-732	Transistor 2SC732	
TR-2	2SC-732	" 2SC732	
TR-3	2SC-732	" 2SC732	
D-1	083-01331	Diode 1B4B41	
D-2	083-01331	" 1B4B41	
D-3	322-60471	" GM3Z	
D-4	081-02571	" 1S1588	
D-5	081-02571	" 1S1588	
D-6	081-02571	" 1S1588	

INDEX NO	PART NO	DESCRIPTION				QTY.
C-1	C E-350228	Capacitor	35V	2200	MFD	
C-2	C C-500473	"	50	0.047		
C-3	C E-500335	"	50	3.3		
C-4	C C-500473	"	50	0.047		
C-5	C E-350106	"	35	10		
C-6	C C-500103	"	50	0.01		
C-7	C E-500474	"	50	0.47		
C-8	C C-500103	"	50	0.01		
C-10	C E-500474	"	50	0.47		
C-11	C M-500104	"	50	0.1		
C-12	C C-500473	"	50	0.047		
C-13	C M-500104	"	50	0.1		
C-14	C C-500473	"	50	0.047		
C-15	C C-500473	"	50	0.047		
C-16	C E-500224	"	50	0.22		
C-17	C E-500105	"	50	1		
C-18	C E-500105	"	50	1		
C-19	C E-500105	"	50	1		
C-20/29	C C-500473	"	50	0.047		10
C-30	C E-500225	"	50	2.2		
R-1	R A-R25562	Resistor	1/4W	5.6K	Ohm	
R-2	R A-R25103	"	1/4	10K		
R-3	R A-R25393	"	1/4	39K		
R-4	R A-R25274	"	1/4	270K		
R-5	R A-R25564	"	1/4	560K		
R-6	R A-R25243	"	1/4	24K		
R-7	R A-R25184	"	1/4	180K		
R-8	R A-R25330	"	1/4	330		
R-9	R A-R25103	"	1/4	10K		
R-10	R A-R25274	"	1/4	270K		
R-11	R A-R25274	"	1/4	270K		
R-12	R A-R25103	"	1/4	10K		
R-13	R A-R25564	"	1/4	560K		
R-14	R A-R25103	"	1/4	10K		
R-15	R A-R25274	"	1/4	270K		
R-16	R A-R25103	"	1/4	10K		
R-17	R A-R25274	"	1/4	270K		
R-18	R A-R25103	"	1/4	10K		
R-19	R A-R25274	"	1/4	270K		
R-20/28	R A-R25103	"	1/4	10K		9
R-29/33	R A-R25472	"	1/4	4.7K		5
R-34	R A-R25561	"	1/4	560		
R-35	R A-R25472	"	1/4	4.7K		
R-36	R A-R25561	"	1/4	560		
R-37	R A-R25472	"	1/4	4.7K		
R-38	R A-R25561	"	1/4	560		

322-60821	Radiating Plate	1
X P-3005S	Screw	2
W A-30	Washer	2
X T-3005S	Screw	2
312-12371	6 Pin Nylon Connector 1991-6P	
312-60691	6 Pin Nylon Connector 1991-6R	
312-12241	2 Pin Nylon Connector 1545-P	
312-60771	2 Pin Nylon Connector 1545-R	

61-0 ROTARY SWITCH (SSL)

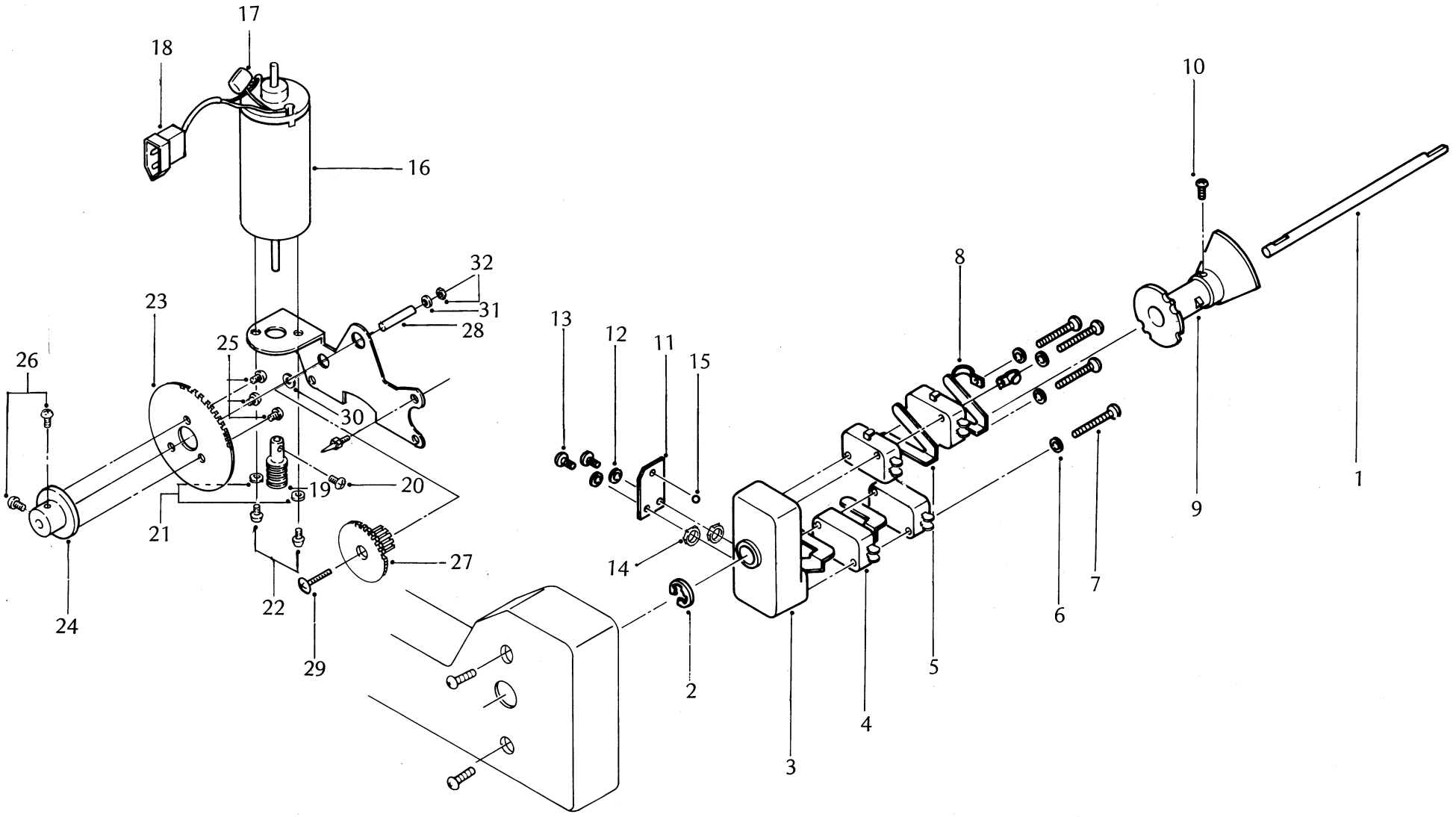


61-0 ROTARY SWITCH (SSL) REVISED

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-61911	Rotary Switch Assy. w/Wires & Fuse Holders (110/220V or 120/240V)	1
*	322-61921	Rotary Switch Assy. w/Wires & Fuse Holders (240V)	(1)
*	322-61931	Rotary Switch Assy. w/Wires & Fuse Holders (110V or 220V)	(1)
*	322-61941	Rotary Switch Assy. w/Wires & Fuse Holders (CSA SSL-0/1L)	(1)
*	322-61951	Rotary Switch Assy. w/Wires & Fuse Holders (CSA SSL-0, 1, 2)	(1)
*	322-61961	Rotary Switch Assy. w/Wires & Fuse Holders (UL SSL-0/1L)	(1)
*	322-61971	Rotary Switch Assy. w/Wires & Fuse Holders (UL SSL-0, 1, 2)	(1)
*	322-61521	Rotary Switch Assy. w/Wires (110/220V or 120/240V)	(1)
*	322-61531	Rotary Switch Assy. w/Wires (240V)	(1)
*	322-61541	Rotary Switch Assy. w/Wires (110V or 220V)	(1)
*	322-61551	Rotary Switch Assy. w/Wires (CSA SSL-0, 1, 2)	(1)
*	322-61561	Rotary Switch Assy. w/Wires (UL SSL-0, 1, 2)	(1)

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-60501	Rotary Switch Assy. SSL (Includes items 3 thru 18)	1
1	322-60301	Control Knob Assy.	1
2	*X P-3510	Screw (for above)	1
3	322-60581	Switch Shaft	1
4	E R-50	"E" Ring (for above)	1
5	312-60521	Switch Mounting Bracket	1
6	312-60051	Micro Switch	4
7	312-60531	Actuator	4
8	W C-30	Lock Washer	4
9	X P-3028S	Screw	4
10	S T-60361	Cord Clip	2
11	320-60541	Switch Cam	1
12	X P-3508	Screw	1
13	312-60561	Plate Spring	1
14	W C-35	Lock Washer	2
15	X P-3508	Screw	2
16	N A-35	Nut	2
17	S T-13231	Clicking Ball	1
*	322-60711	Switch Shaft Supporting Plate	1
18	X F-3010S	Screw	2
*	312-60941	9 Pin Nylon Connector 3191-09P	1
*	312-60631	Female Pin (for above)	11
*	312-61021	3 Pin Nylon Connector 1991-3P	1
*	312-60621	Male Pin (for above)	3

61-1 ROTARY SWITCH (ESL)

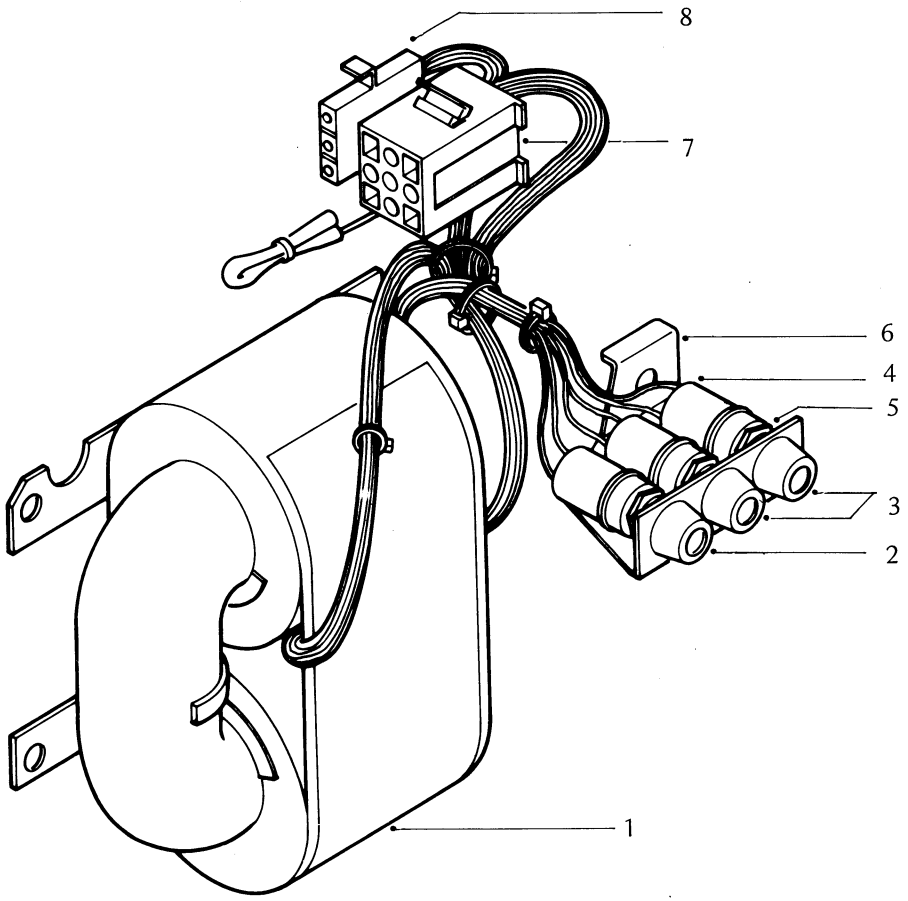


61-1 ROTARY SWITCH (ESL) REVISED

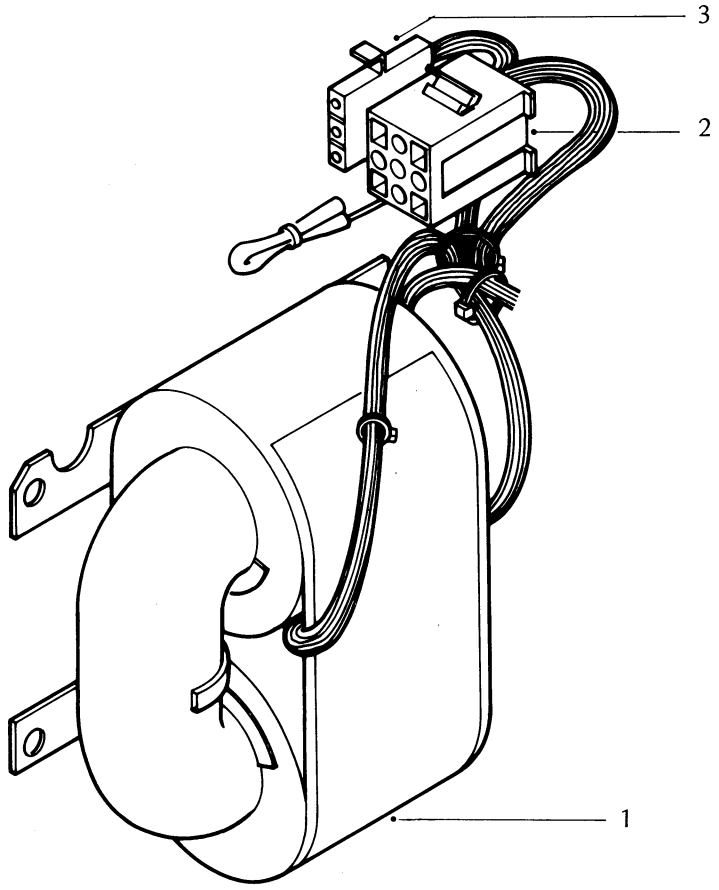
INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-61861	Rotary Switch Assy. w/Wires & Fuse Holders (Standard)	1
*	322-61871	Rotary Switch Assy. w/Wires & Fuse Holders (110/220V, 120/240V)	(1)
*	322-61881	Rotary Switch Assy. w/Wires & Fuse Holders (CSA only)	(1)
*	322-61891	Rotary Switch Assy. w/Wires & Fuse Holders (UL only)	(1)
*	322-61711	Rotary Switch Assy. w/Wires (Standard)	1
*	322-61721	Rotary Switch Assy. w/Wires (110/220V, 120/240V)	(1)
*	322-61731	Rotary Switch Assy. w/Wires (CSA only)	(1)
*	322-61741	Rotary Switch Assy. w/Wires (UL only)	(1)
*	322-60401	Rotary Switch Assy. ESL (Includes items 1 thru 15)	1
1	322-60571	Switch Shaft	1
2	E R-50	"E" Ring (for above)	1
3	312-60521	Switch Mounting Bracket	1
4	312-60051	Micro Switch	4
5	312-60531	Actuator	4
*	322-60531	Actuator ESL	1
6	W C-30	Lock Washer	4
7	X P-3028S	Screw	4
8	S T-60361	Cord Clip	2
9	322-60551	Switch Cam	1
10	X P-3508	Screw	1
11	322-60561	Plate Spring	1
12	W C-35	Lock Washer	2
13	X P-3508	Screw	2
14	N A-35	Nut	2
15	S T-13231	Clicking Ball	1
*	322-60771	Switch Shaft Supporting Plate	1

INDEX NO	PART NO	DESCRIPTION	QTY.
*	312-60941	9 Pin Nylon Connector 3191-09P	1
*	312-60631	Female Pin (for above)	17
*	312-61021	3 Pin Nylon Connector 1991-3P	1
*	312-60621	Male Pin (for above)	3
*	312-60771	2R Nylon Connector 1545P	2
*	322-61821	DC Motor Assy.	1
16	*081-02871	DC Motor only	1
17	*C M-101104	Capacitor 100V 0.1MFD	1
18	*312-12241	2 Pin Nylon Connector 1545P	1
*	*312-60621	Male Pin (for above)	2
19	322-60731	Drive Pinion Gear	1
20	X P-2304	Screw	1
21	W C-30	Lock Washer	2
22	X P-3005S	Screw	2
*	322-60901	Drive Gear (A) Assy. (Includes items 23 thru 26)	1
23	322-60911	Drive Gear only	1
24	322-60921	Drive Gear Flange	1
25	X T-2306	Screw	3
26	X P-3005S	Screw	2
27	322-60701	Drive Gear (B) Assy.	1
28	322-60721	Screw Shaft	1
29	X T-3004S	Screw	1
30	W A-30	Washer	1
31	W C-30	Lock Washer	1
32	N A-30	Nut	1

61-2 TRANSFORMER (REVISED)



Serial No. SSL up to #10883
ESL " #10297
SSL switchable up to #18619
ESL " up to #10804



Serial No. SSL #10884 and up
ESL #10298 and up
SSL switchable #18620 and up
ESL switchable #10805 and up

61-2 TRANSFORMER (REVISED)

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-61621	TRANSFORMER MODULE w/Fuse Holder Assy. and Nylon Connectors, SSL, 120V	1
*	322-61611	" SSL, 110V	(1)
*	322-61631	" SSL, 220V, 240V	(1)
*	322-61671	TRANSFORMER MODULE w/Fuse Holder Assy. and Nylon Connectors, SSL, ESL, 110/220V	(1)
*	322-61681	" SSL, ESL, 120/240V	(1)
*	322-61651	TRANSFORMER MODULE w/Fuse Holder Assy. and Nylon Connectors, ESL, 120V	(1)
*	322-61641	" ESL, 110V	(1)
*	322-61661	" ESL, 220V, 240V	(1)
1	322-61311	Transformer Assy. SSL, 110V, 120V	1
*	322-61321	" " SSL, 220V, 240V	(1)
*	322-61331	" " SSL, ESL switchable	(1)
*	322-61341	Transformer Assy. ESL, 110V, 120V	(1)
*	322-61351	" " ESL, 220V, 240V	(1)
2	322-60851	Fuse Holder (6.4ϕ x 30)	1
*	F05-6030U	Fuse FGAO 5A (6.4ϕ x 30)	1
3	322-60841	Fuse Holder (5.2ϕ x 20)	2
*	F02-5020U	Fuse FGMA 2A (5.2ϕ x 20)	2
4	322-60871	Tube	3
5	322-60861	Fuse Holder Spacer	3
6	322-60811	Fuse Holder Bracket	1
7	312-60931	9 Pin Nylon Connector 3191-3R	1
*	312-60621	Male Pin (for above)	9
8	312-61011	3 Pin Nylon Connector 1991-3R	1
*	312-60631	Female Pin (for above)	4
*	314-60161	Wire Retainer	1
*	X P-5016S	Transformer Mounting Screw	3
*	W C-50	Lock Washer	3

INDEX NO	PART NO	DESCRIPTION	QTY.
*	322-61601	TRANSFORMER MODULE w/Nylon Connectors, SSL 120V	1
*	322-61851	" " SSL 110V	(1)
*	322-61401	" " SSL 220V, 240V	(1)
*	322-61701	TRANSFORMER MODULE w/Nylon Connectors, SSL, ESL 110/220V	(1)
*	322-61831	w/Nylon Connectors, SSL, ESL 120/240V	(1)
*	322-61001	TRANSFORMER MODULE w/Nylon Connectors, ESL 120V	(1)
*	322-61841	" " ESL 110V	(1)
*	322-61301	" " ESL 220V, 240V	(1)
1	322-61311	Transformer Assy. SSL 110V, 120V	1
*	322-61321	" " SSL 220V, 240V	(1)
*	322-61331	" " SSL, ESL, Switchable	(1)
*	322-61341	Transformer Assy. ESL 110V, 120V	(1)
*	322-61351	" " ESL 220V, 240V	(1)
2	312-60931	9 Pin Nylon Connector 3191-3R	1
*	312-60621	Male Pin (for above)	9
3	312-61011	3 Pin Nylon Connector 1991-3R	1
*	312-60631	Female Pin (for above)	4
*	314-60161	Wire Retainer	1
*	X P-5016S	Transformer Mounting Screw	3
*	W C-50	Lock Washer	3

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