STEREO TURNTABLE

PL-55X

KUT

<ART-104-0>

Service Manual

PIONEER®

CONTENTS

1. SPECIFICATIONS

MOTOR AND TURNTABLE

Motor ..... Brushless DC servo motor
Turntable drive ..... Direct-driven
Speed ..... Two speeds, 33-1/3, 45 rpm
Wow and flutter ..... 0.05% (WRMS) or less
S/N ..... 58dB or more (in case of using Pioneer cartridge model PC-50)
Turntable platter ..... 31cm diam. Aluminum-diecast alloy

TONEARM

Tonearm type ..... Static balance, S-shaped, pipe arm
Effective arm length 221mm
Usable cartridge weight ..... 4g (MIN) ~ 14g (MAX)
Overhang ..... 15.5 mm

Accessories

Weight plate (cartridge weight adjustable) 1
Cartridge mounting screws 10
Cartridge mounting nuts 2
Cartridge mounting washers 2
45 rpm record adaptor 1
Screwdriver 1
Sub weight 1
Overhang gauge 1
Connection cord (output cord) 1
Operating instructions 1

SUBFUNCTIONS

Automatic return tonearm system
Skating force canceler
Hydraulic cueing device
Plug-in type light aluminum head shell
Dust cover with free stop hinges
Lateral balance control
Wooden base with anti-acoustic feedback suspension
Strobolight

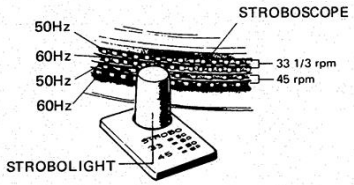
MISCELLANEOUS

Power requirements AC120V 60Hz
Power consumption ..... 5.2W (MAX)
Outer dimensions ..... 480(W) x 185(H) x 410(D) mm
18-7/8(W) x 7-5/16(H) x 16-1/8(D) in.
Weight 11.3kg 24lb 15oz

2. PARTS AND THEIR FUNCTIONS

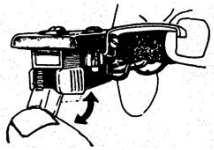
Stroboscope

Refer to the accompanying illustration for positioning of the strobo in respect to the line frequency and turntable speed. On moving the function lever from OFF to ON/UP and DOWN, strobolight is lit.



Cartridge Stylus Cover

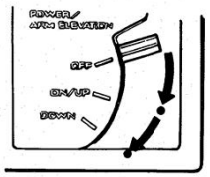
Bring the cartridge stylus cover into position when the PL-55X is not in use as shown in the accompanying illustration.



45 rpm Record Adaptor

A 45 rpm record adaptor is supplied in the accessory group, which permits 45 rpm EP records with large center holes to be played.

Function Lever



At ON/UP

The turntable is driven. In moving this lever from DOWN to this position, the tonearm (stylus) lifts slowly from the record surface, thereby interrupting operation.

At DOWN

The tonearm is brought into position over the record. Setting the lever to this position gently lowers the stylus onto the record. Playing starts at this time.

At OFF

Moving the lever to this position from DOWN causes the tonearm to lift and return to the arm rest. Power is cut off and the turntable stops.

NOTES:

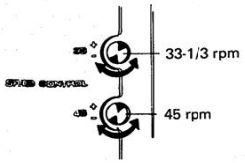
1. *On moving the function lever from DOWN to OFF pause at the ON/UP position until the arm lifts from the record. Failure to do so may allow the stylus to bounce against the record and drag across it.*
2. *Also once you have moved the function lever to DOWN you cannot immediately return it to OFF or ON/UP.*
3. *Wait until the tonearm has floated down on the record and begun to play. Only the playing may be interrupted.*

Arm Rest

The arm rest supports the tonearm. The tonearm should always sit on the arm rest when a record is not in use. Ordinarily, the arm clamp should be engaged to lock the tonearm in place on the rest.

Fine Speed Adjustment Knob

With the turntable operating at 33-1/3 or 45 rpm, make fine speed adjustment while observing the stroboscope. Turning the knob in the (+) (clockwise) direction increases speed while turning it in the (—) (counterclockwise) direction decreases speed. Marks on the turntable must appear to "stand still" under strobolight, indicated correct speed.

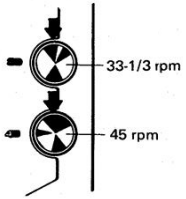


33-1/3 rpm Speed Switch

Push this switch if 33-1/3 rpm records are to be played.

45 rpm Speed Switch

Push this switch for 45 rpm operation.



OPERATION

Operation of the PL-55X is uncomplicated. Use the following procedure.

1. Place the record to be played on the turntable.
2. Move the cartridge stylus cover out of position. Release the arm rest clamp.
3. Move the function lever from the OFF position to the ON/UP position. At this time, the turntable begins to turn.
4. Push the speed button (33-1/3 or 45 rpm) corresponding to the speed of the record to be played.
5. With the strobolight on, adjust the fine speed control until the turntable appears to "stand still". Turning this control in the (+) direction raises the speed, while turning it in the (—) direction decreases the speed.
6. After the speed has been set to the proper value, carefully move the tonearm into position over the lead-in record grooves to be played.
7. Set the function lever to DOWN. The tonearm drops gently to the record grooves and playing begins.
8. To stop playing at an intermediate point, move the function lever to the ON/UP position. If operation is to be suspended, move the function lever to the OFF position. (This action returns the tonearm to the arm rest and stops the turntable).
9. Upon completion of playing, the tonearm returns automatically to the arm rest and the turntable stops. The function lever returns automatically to the OFF position.

3. OPERATION OF MOTOR AND MECHANISM

3.1 MOTOR

Construction of motor control for the PL-55X is depicted in Fig. 2.

1. Applying power sets the oscillator into operation. Output of this circuit passes to the pole position detecting circuit (L1 ~ L6).
2. Here, assume that coupling between L1 and L4 is the tightest. Voltage induced in L4 is rectified and applied to Q106/Q109 in the driver.
3. Q109 in turn conducts and causes current to flow in the associated drive coil (A-1). The rotor moves in the direction shown by arrow in Fig. 1. The magnetic pole affixed to the rotor induces a voltage proportional to rotor movements, in the sensing coil (A-4).
4. Voltage induced in A-4 is rectified by a diode in the speed sensor and applied to Q103 in the control stage. This point is also fed from the reference voltage generator (voltage Es) through a fine speed control pot.
5. Voltage applied to the base of Q103 in the control stage controls current that flows in Q104.
6. Q104 serves as a constant current source for Q106 through Q111 in the driver and therefore controls current flow in the drive coils.
7. When ambient temperature change causes driver current to rise, the speed of rotation increases above the rated value. Q104 current increases and Q106 ~ Q111 currents decrease. As a result, the speed of rotation falls off.

Pole Position Detector

Fig. 1 shows a simplified view of the drive and sense coils. With power applied and coupling between L1 and L4 high, Q109 causes current to flow through A-1. As a result, the rotor end of coil A-1 becomes a south pole (S1) and attracts N1. The rotor moves in the direction shown by arrow. Coupling factor between L2 and L5 increases and operation of Q110 causes current to flow in coil A-2. Pole S2 attracts pole N2 and rotor rotation continues. In the same manner, S3 attracts Pole N3. Continuation of this process causes the rotor to turn on a steady basis.

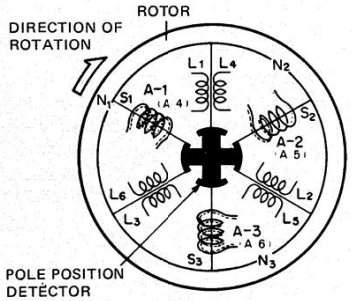


Fig. 1

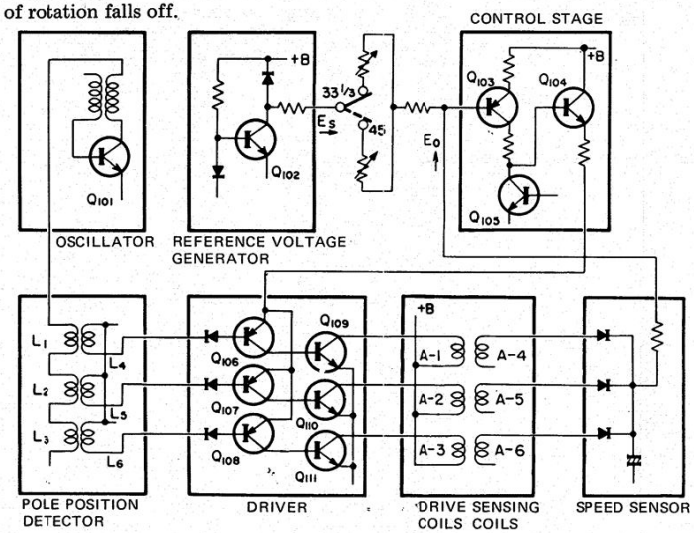


Fig. 2

3.2 PRIOR TO START OF PLAYING

1. After the tonearm has been swung into place for the start of playing of the record, moving the FUNCTION lever to the ON/UP position causes plate (1) to turn through connecting link (1) to the point at which pawl (1) engages plastic arm (1).
2. Plate (2) turns along with plate (1), through action of interconnecting spring (1). Upon completion of this action, the microswitch actuator is released, thereby applying power to the phono motor. The turntable begins to revolve.
3. Moving the FUNCTION lever to the DOWN position turns plate (1) still further through link (1). Pawl (2) engages plastic arm (1).
4. The arm elevator riding on the cam portion of plate (2) drops, lowering the tonearm onto the record.
5. Pawl (3) of plate (2) applies pressure to plastic arm (2), so that there is no interference to motion of the stop required for automatic return operation.

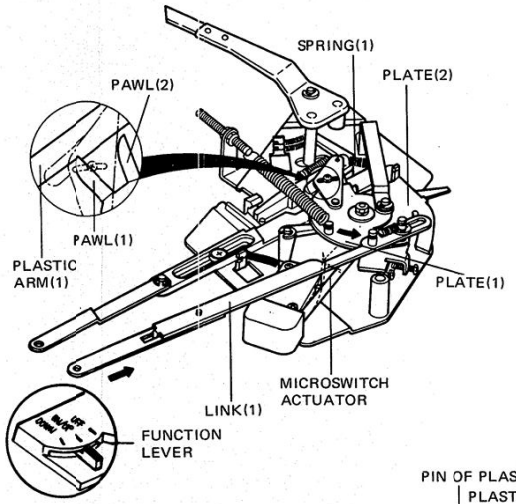


Fig. 3

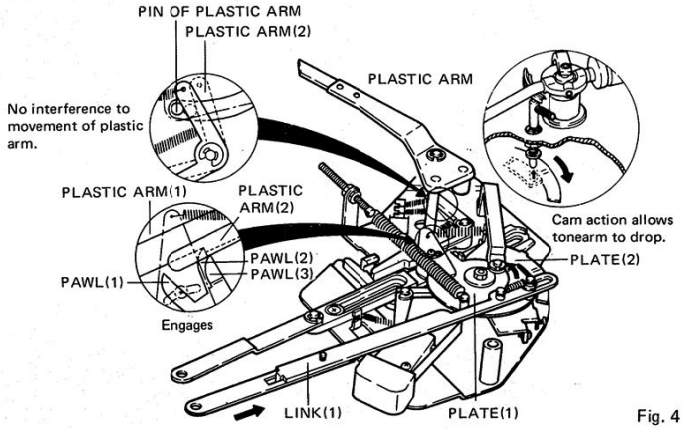


Fig. 4

3.3 RETURN OPERATIONS

1. When the tonearm is going to come to the inside (end) of the record, the pick-up lever applies pressure to the aluminum arm. This means that the arm is coupled indirectly to the plastic arm. Resultant action causes the end of the plastic arm to swing toward the center of the turntable.
2. As soon as the tonearm enters the return groove of the record, the pin on the bottom of the turntable imparts a kick to the plastic arm.
3. Motion of the plastic arm at this time acts on plastic arm (1), thereby releasing plate (1).
4. Plastic arm (3) then locks plastic arm (1). This action closes the shorting switch so that noise will not be generated as the tonearm separates from the record.
5. Plate (1) returns through action of spring (2). Plate (2) also returns.
6. Return of plate (1) results in the following sequence.
   - Pressure is applied to plastic arm (1) and the FUNCTION lever is forced back to the OFF position.
   - Action of link (2) returns the aluminum arm to the start position.
7. Return of plate (2) results in the following sequence.
   - Action at the cam portion of plate (2) lifts the tonearm from the record.
   - Plate (3) indirectly coupled to plate (2) swings the tonearm back to the arm rest.
   - Pressure is applied to the microswitch actuator, opening the microswitch contacts and stopping the phono motor.

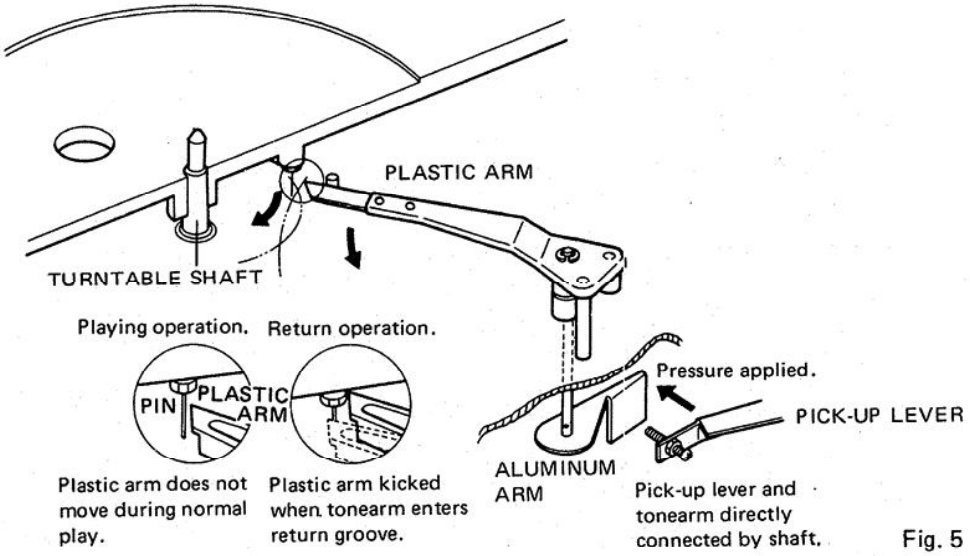


Fig. 5

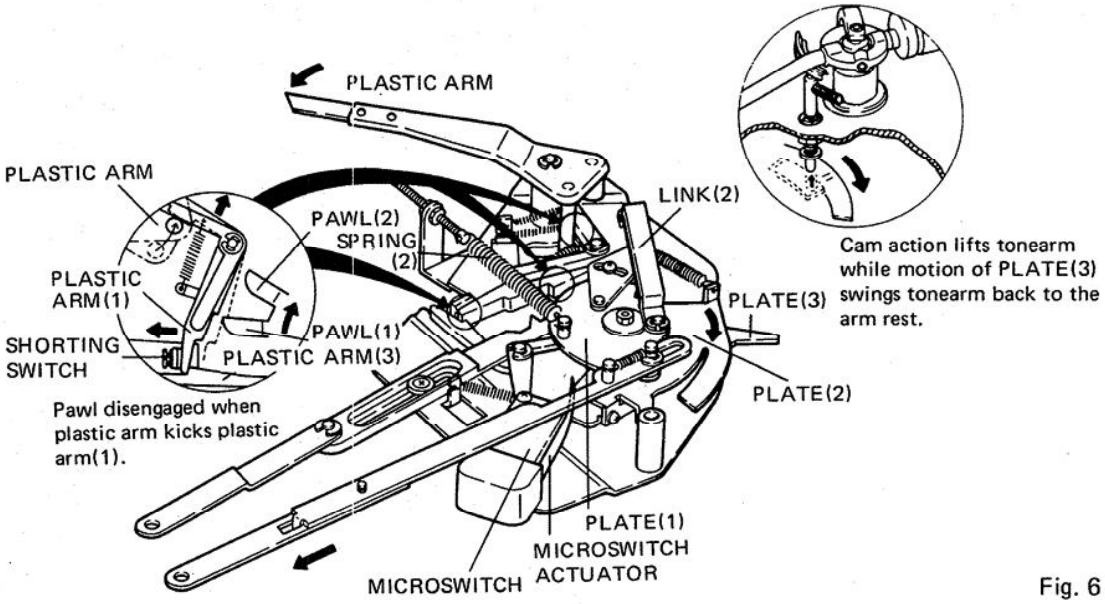


Fig. 6

3.4 STOPPING UNDER MANUAL

1. Moving the FUNCTION lever to the ON/UP position causes pawl (1) of plate (1) to engage plastic arm (1). Phono motor operation begins.
2. Moving the FUNCTION lever to the OFF position causes plastic link (4) to shift, in turn desengaging pawl (2) from plastic arm (1).
3. Action of spring (2) returns plate (1). As a result, the phono motor stops, as described under (6) and (7) on page 7.
4. Moving the FUNCTION lever to the DOWN position initiates playback of the record.
   When this lever is moved from the DOWN to the OFF position, pawl (2) is disengaged from plastic arm (1) through action of plastic link (4). The phono motor stops, as described under (4) through (7) on page 7.

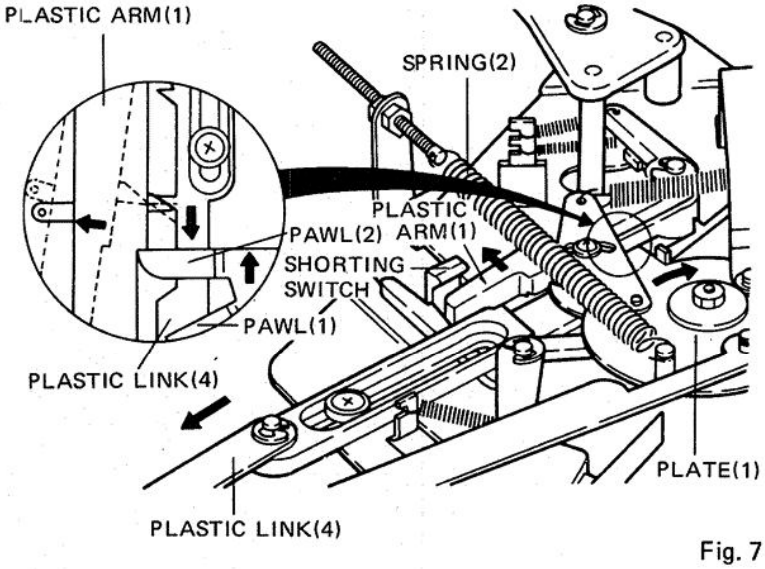


Fig. 7

4. ADJUSTMENTS

4.1 TONEARM WILL NOT RETURN TO THE ARM REST

If the pin at the back of the turntable is not (or incorrectly) engaged with the plastic arm the tonearm will not return to the arm rest. The probable causes of the trouble are as follows;
(a) The tip of the plastic arm bends downward.
(b) The pin is bent.
(c) The pick-up lever is incorrectly mounted.
In case (a) or (b) is responsible for the trouble, correct the curve of the plastic arm or the bend of the pin. If necessary, replace the plastic arm as the case may be.
In case (c) is the cause of the trouble, adjust the screw provided at the tip of the pick-up lever so that the pick-up lever will push the aluminum arm when the head of the tonearm reaches the point of 130ϕ from the center of the turntable (Fig. 8).

4.2 TONEARM RETURNS TO THE ARM REST BEFORE THE RECORD FINISHES

The pick-up lever is incorrectly mounted. The best solution to this trouble is to replace the plastic arm.
This trouble also occurs when the plastic arm fails to move smoothly. Oil the automatic return mechanism.

4.3 TONEARM RETURN SPEED IS INCORRECT

If the return speed is too slow, first insure that the cause is not due to dirt.
Adjust spring (2) tension to give the correct spring, increasing tension to increase speed and reducing tension to decrease speed (Fig. 9).

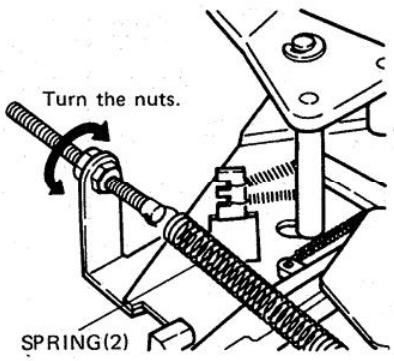


Fig. 9

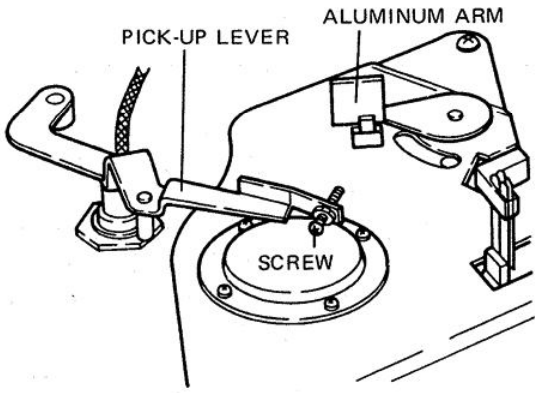


Fig. 8

4.4 TONEARM STOPS BEFORE IT REACHES THE ARM REST

This trouble occurs when the plate (1) and the plate (2) fail to move smoothly.
Oil the plate (1) and plate (2) first and see if they move smoothly.
If not, replace them.

4.5 TONEARM HITS THE INSIDE OF THE ARM REST

See if the head of the tonearm rises 5 ~ 10mm off the turntable with the FUNCTION lever set to OFF. If the tonearm rises incorrectly, adjust the height of the arm rest by means of the screw provided on the arm rest base; if not, adjust the height of the elevator rubber by means of the adjust screw on the elevator arm shaft (Figs. 10, 11).

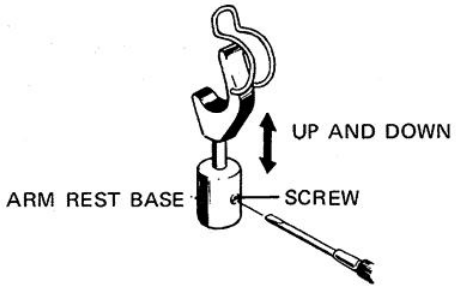


Fig. 10

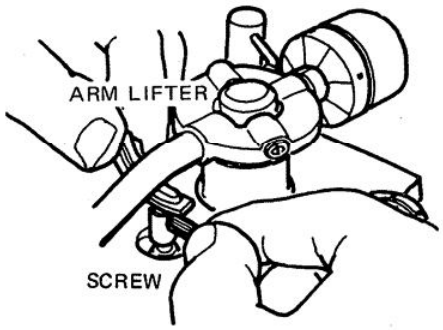


Fig. 11

4.6 TONEARM BOUNDS IN THE ARM REST

The tonearm hits the inside of the arm rest and bounds. The tonearm moves too fast, correct the speed in the manner described in "Tonearm return speed is incorrect".

4.7 ARM ELEVATOR WILL NOT MOVE AT A CORRECT SPEED

Adjust the tension of the spring (1) attached to the plate (2). Turning the screw clockwise will make the plate (2) move slowly: turning it counterclockwise will make the plate (2) move fast (Fig. 12).

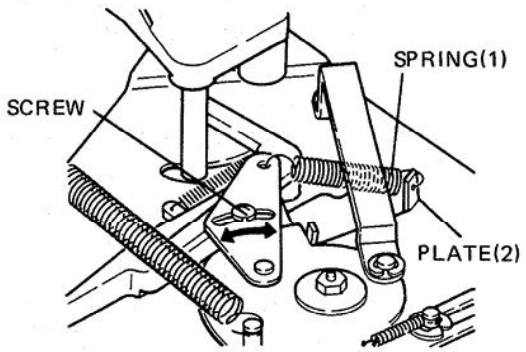


Fig. 12

4.8 TURNTABLE WILL NOT TURN OR STOP

This trouble indicates that the microswitch is not functioning correctly. Repeat automatic return cycle several times and adjust the microswitch actuator so that it performs ON, OFF action correctly (Fig. 13).

4.9 ADJUSTMENT OF THE SHORTING SWITCH CONTACTS

If the shorting switch does not contact at the very moment the tonearm starts returning, a pulse noise may be reproduced through the speakers.

4.10 ADJUSTMENT PROCEDURE

1. Set the FUNCTION lever to the OFF position.
2. Confirm that the plastic arm (5) is at the position shown in Fig. 14. If necessary, pull plastic link (4) so that (5) moves to this position.
3. Loosen the screw fixing the shorting switch contacts so that no gap remains between plastic arm (1) and the molded portion of the switch assembly.
4. At this time, contact clearance should be 0.3 ~ 0.7 mm.

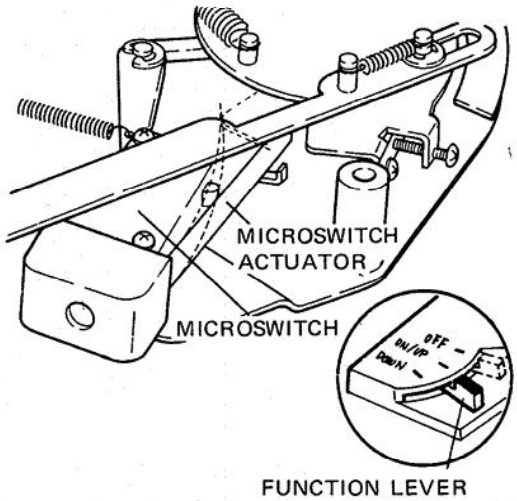


Fig. 13

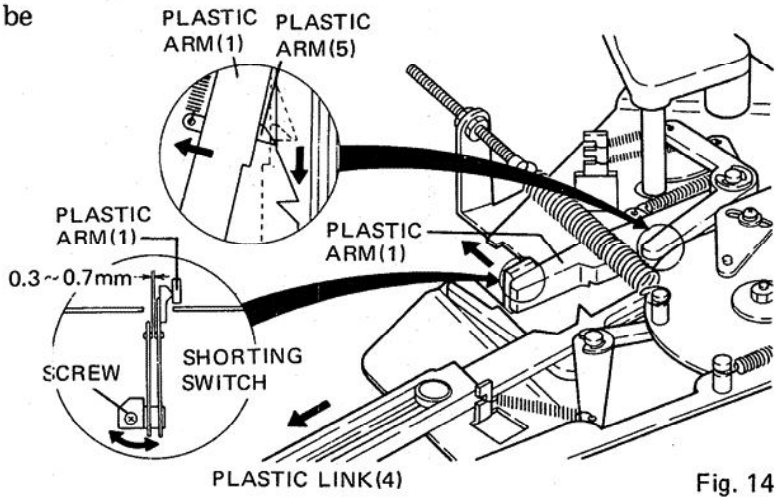


Fig. 14

4.11 ADJUSTMENT OF MOTOR SPEED

When adjustment of the fine speed control does not give a satisfactory speed, adjust the motor in accordance with the following procedure.

1. Remove the bottom cover.
2. Set the fine speed control to the midposition.
3. While observing the edge of the turntable platter with a strobo, adjust screws inside the motor as shown in Fig. 15.
4. Alternate switching between 33-1/3 and 45 rpm speeds while making adjustment. Make sure that both speeds are correct.

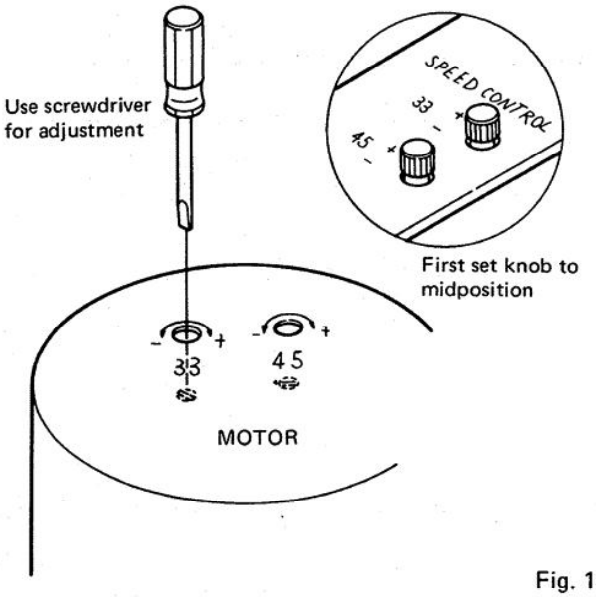
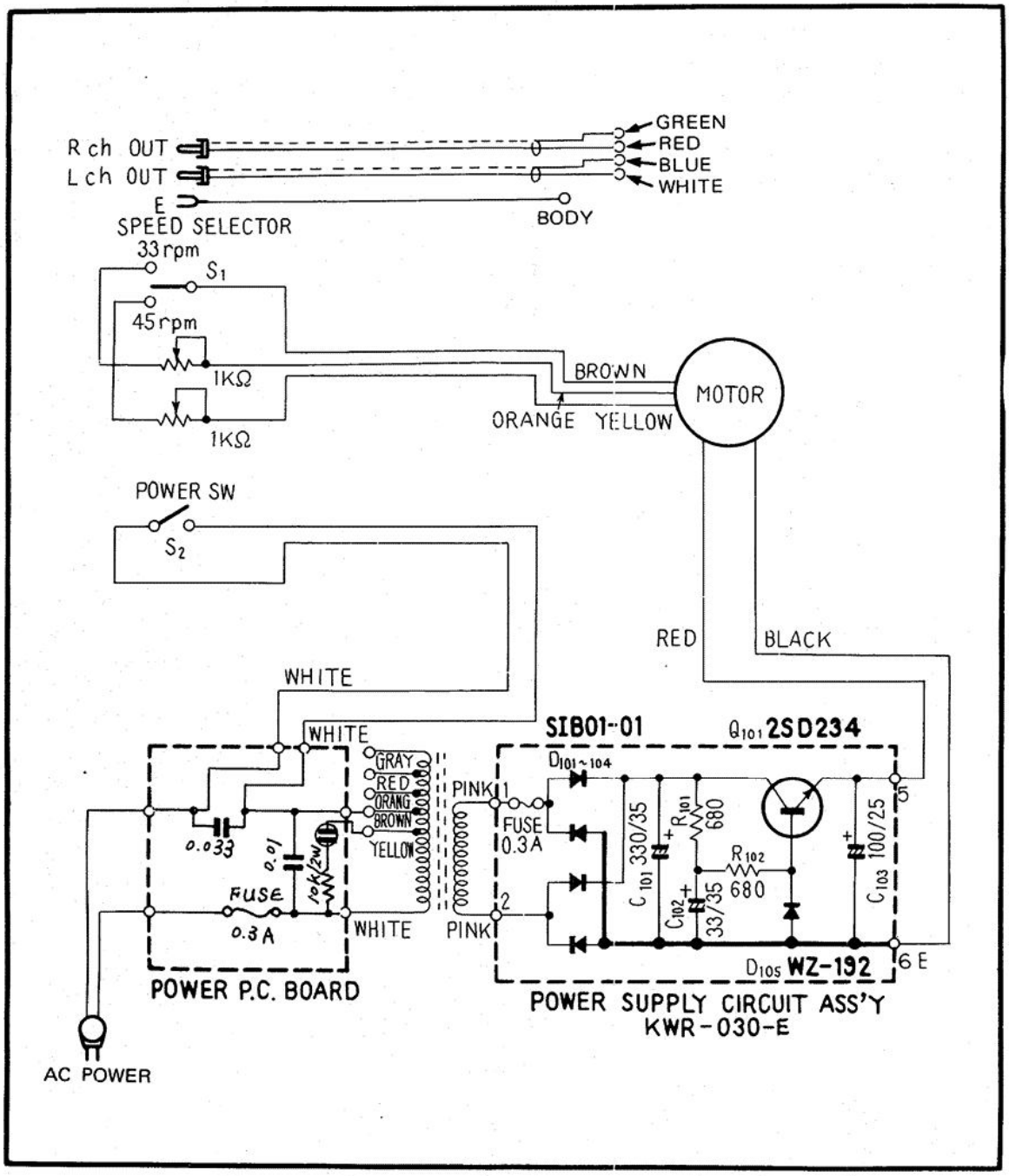


Fig. 15

5. SCHEMATIC DIAGRAMS AND P. C. BOARD PATTERN

5.1 SCHEMATIC DIAGRAMS



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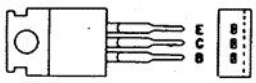
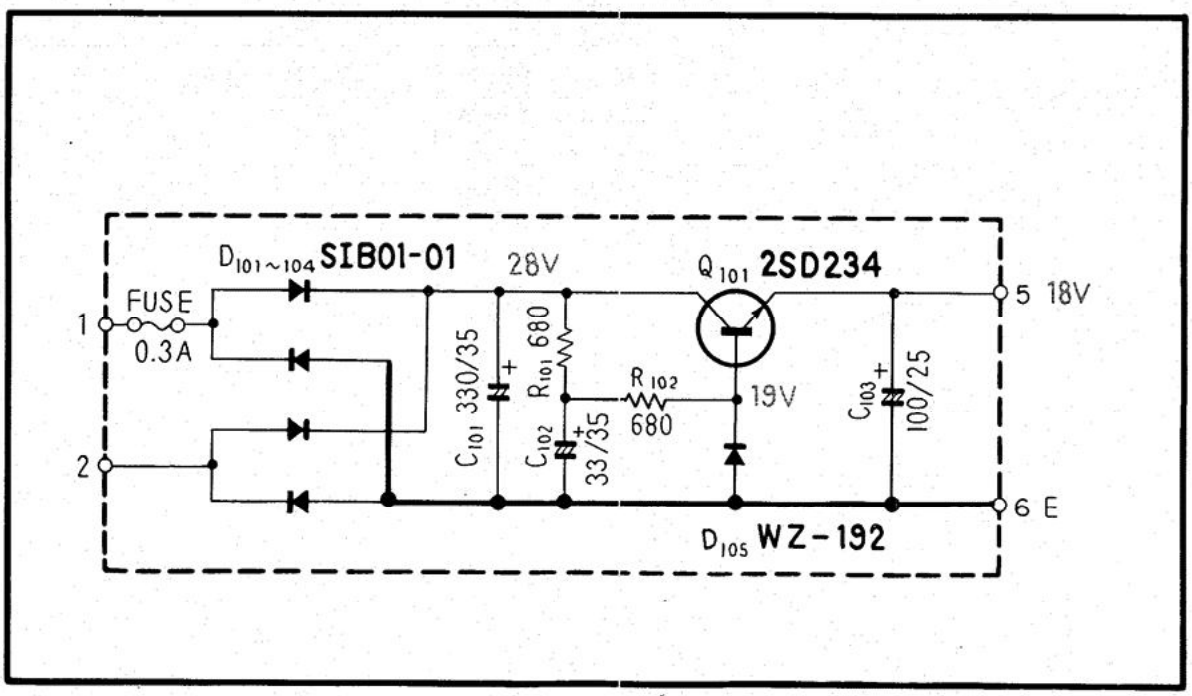
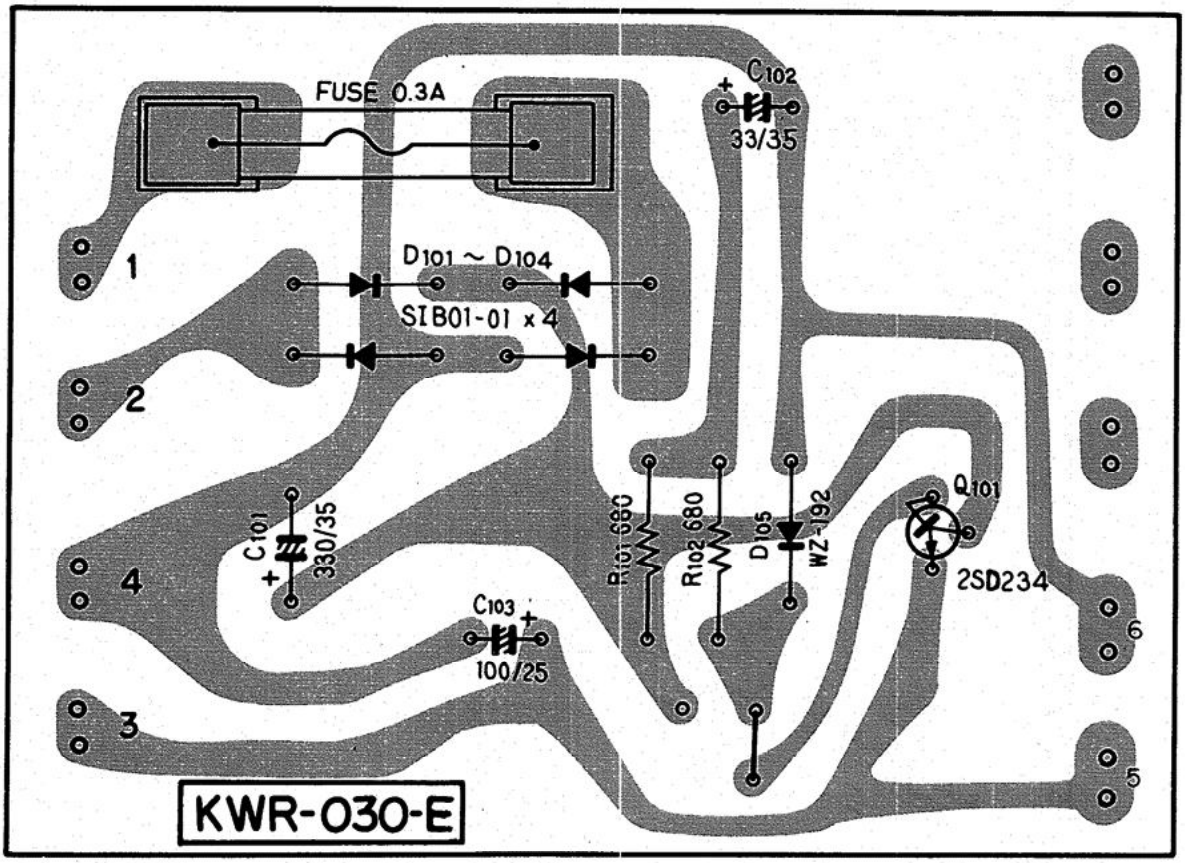


5.2 POWER SUPPLY CIRCUIT ASSEMBLY (KWR-030-E)



Foil Side



NOTE:
- *CAPACITORS: INμF UNLESS OTHERWISE NOTED p: pF*
- *RESISTORS: INΩ, ¼W UNLESS OTHERWISE NOTED k: kΩ, M: MΩ*

CAPACITORS

Symbol	Description			Part No.
C101	Electrolytic	330	35V	CEA 331P 35
C102	Electrolytic	33	35V	CEA 330P 35
C103	Electrolytic	100	25V	CEA 101P 25

RESISTORS

Symbol	Description		Part No.
R101	Carbon film	680	RD¼PS 681J
R102	Carbon film	680	RD¼PS 681J

SEMICONDUCTORS

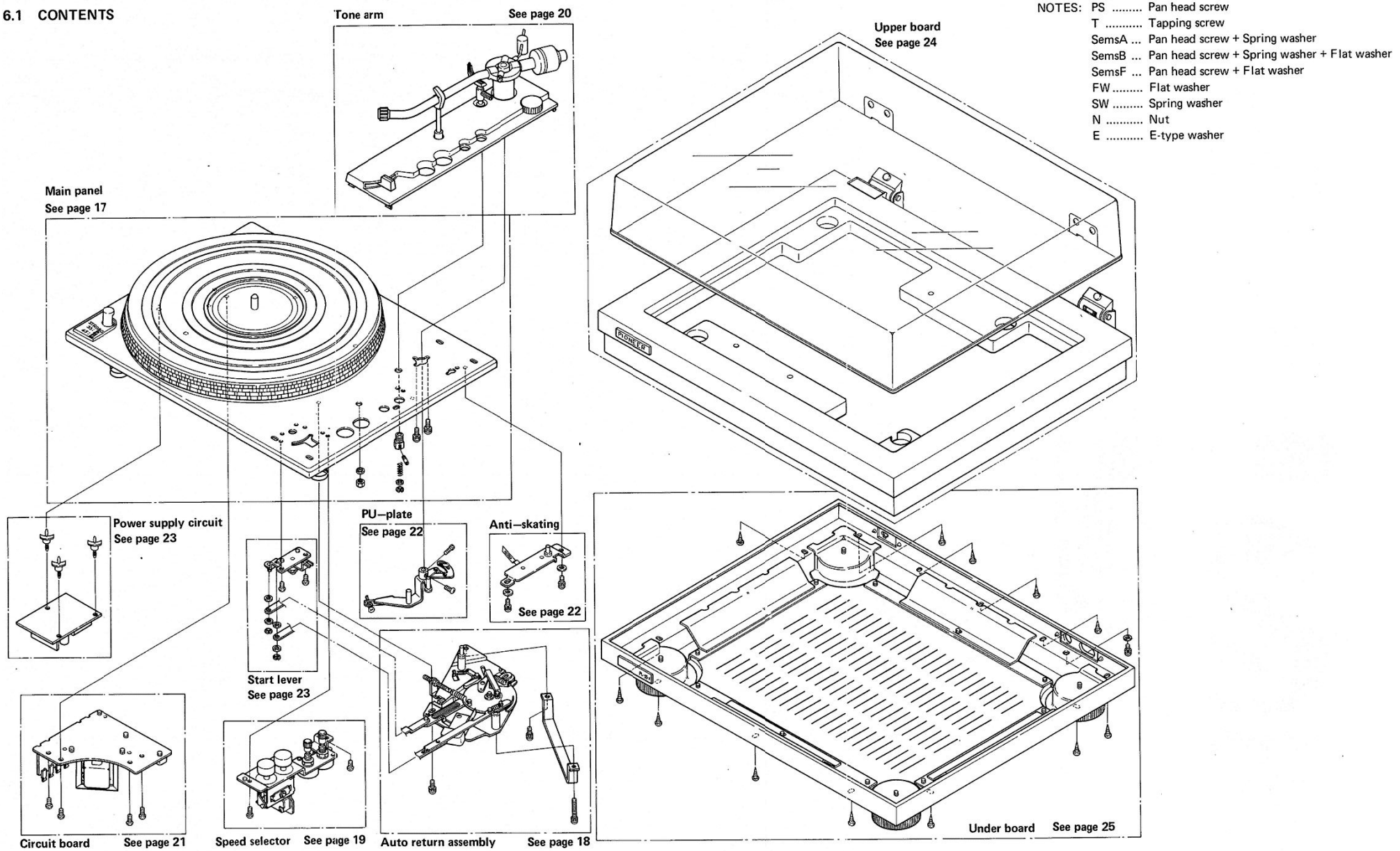
Symbol	Description		Part No.
Q101	Transistor	2SD234	
D101	Diode	SIB01-01	
D102	Diode	SIB01-01	
D103	Diode	SIB01-01	
D104	Diode	SIB01-01	
D105	Zener diode	WZ-192	

OTHERS

Symbol	Description	Part No.
	Fuse 0.3A	E21-030-0

6. EXPLODED VIEW

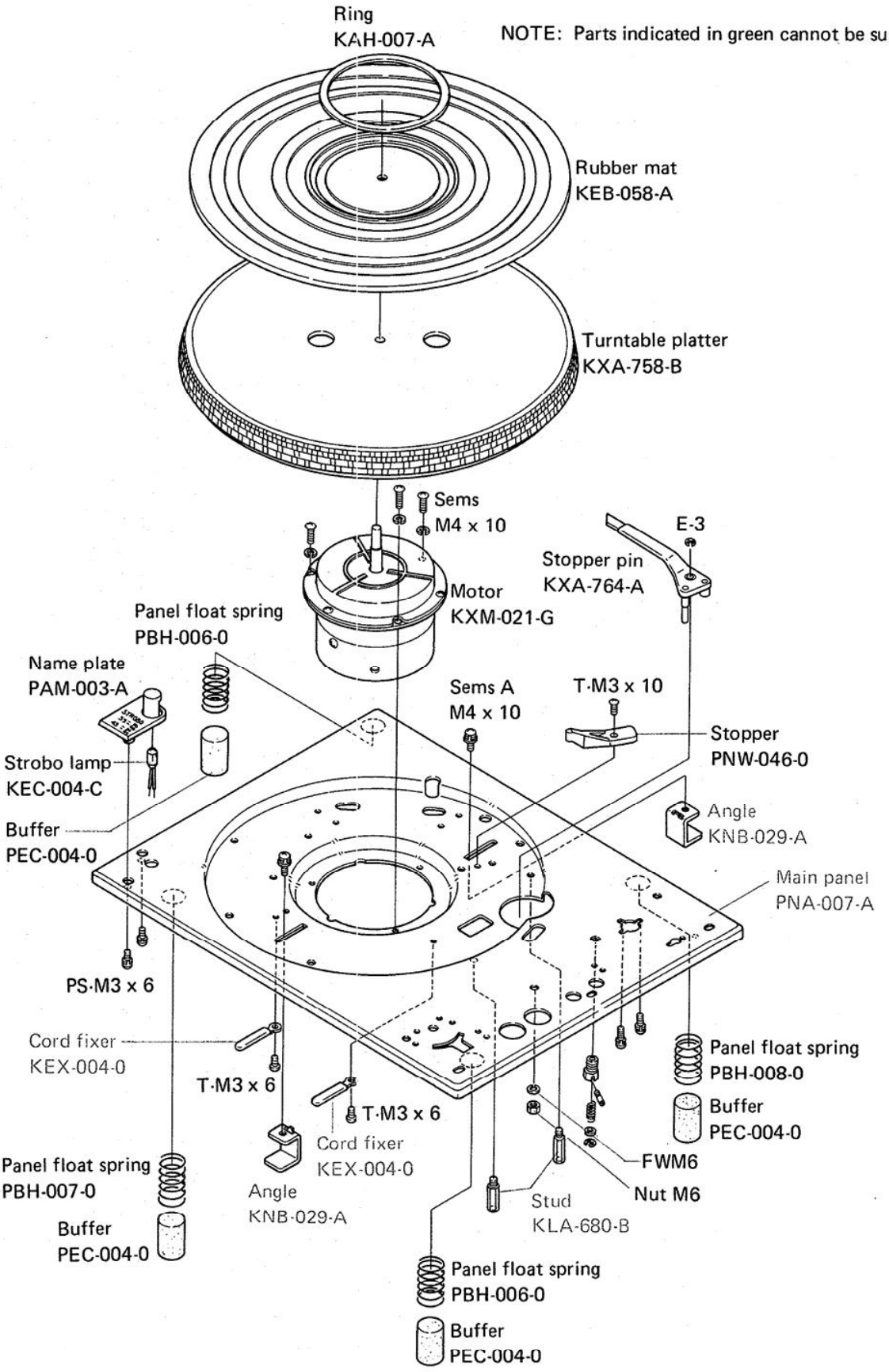
6.1 CONTENTS



NOTES:
- PS ..... Pan head screw
- T ..... Tapping screw
- SemsA ... Pan head screw + Spring washer
- SemsB ... Pan head screw + Spring washer + Flat washer
- SemsF ... Pan head screw + Flat washer
- FW ..... Flat washer
- SW ..... Spring washer
- N ..... Nut
- E ..... E-type washer

6.2 MAIN PANEL

NOTE: Parts indicated in green cannot be supplied.



6.3 AUTO RETURN ASSEMBLY (PXA-044-0)

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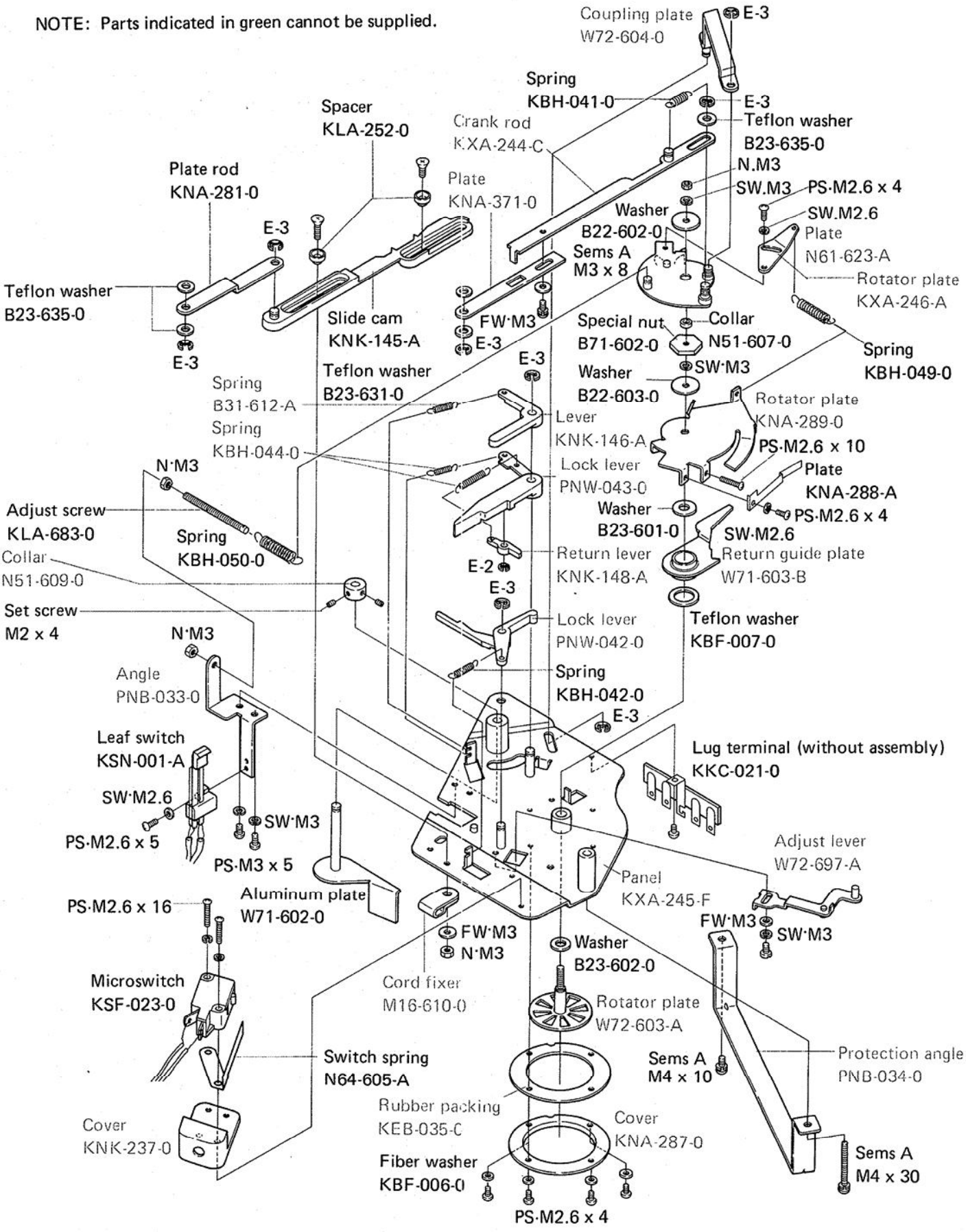
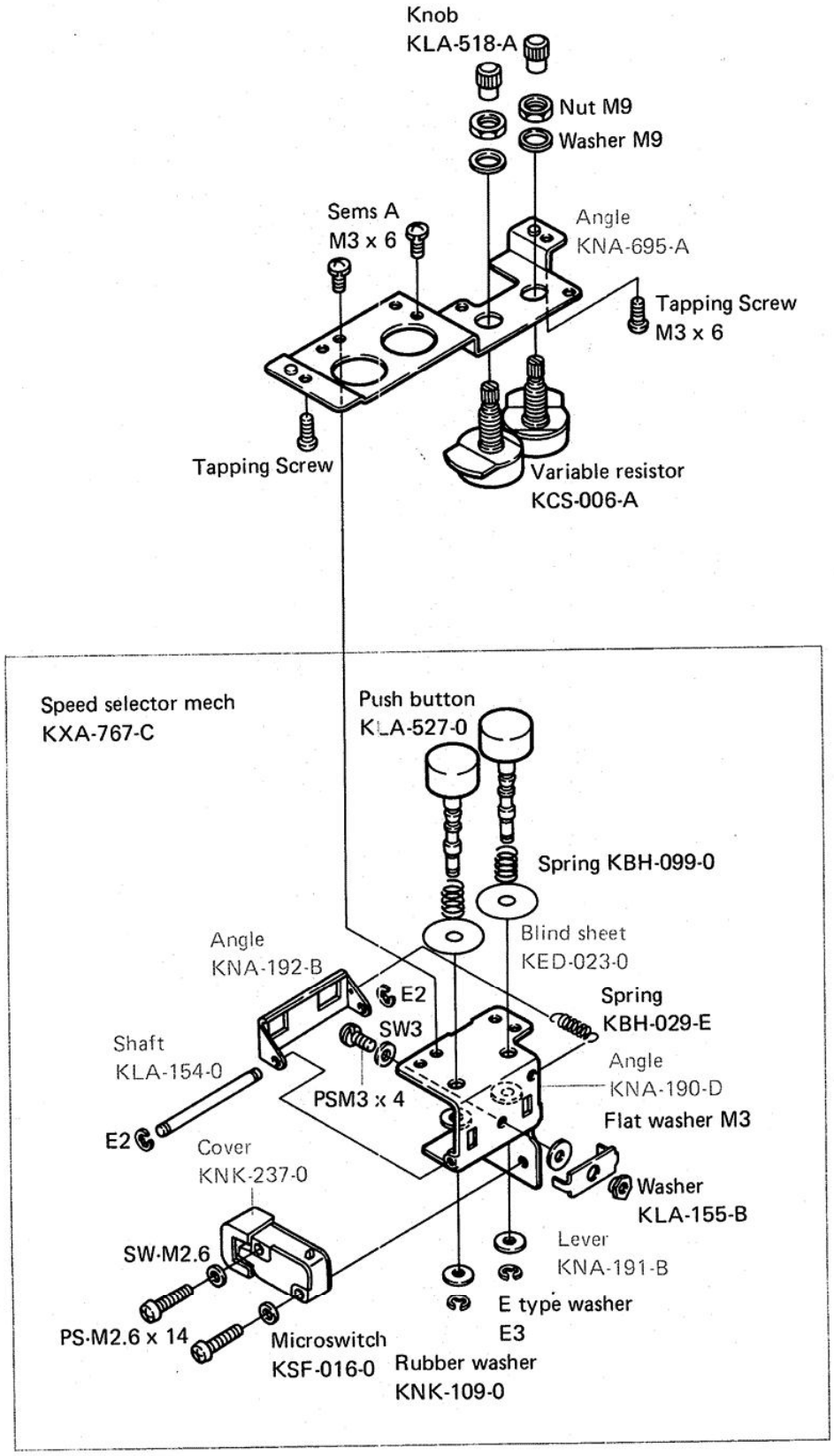


6.4 SPEED SELECTOR ASSEMBLY (KXA-766-D)

NOTE: Parts indicated in green cannot be supplied.



6.5 TONE ARM

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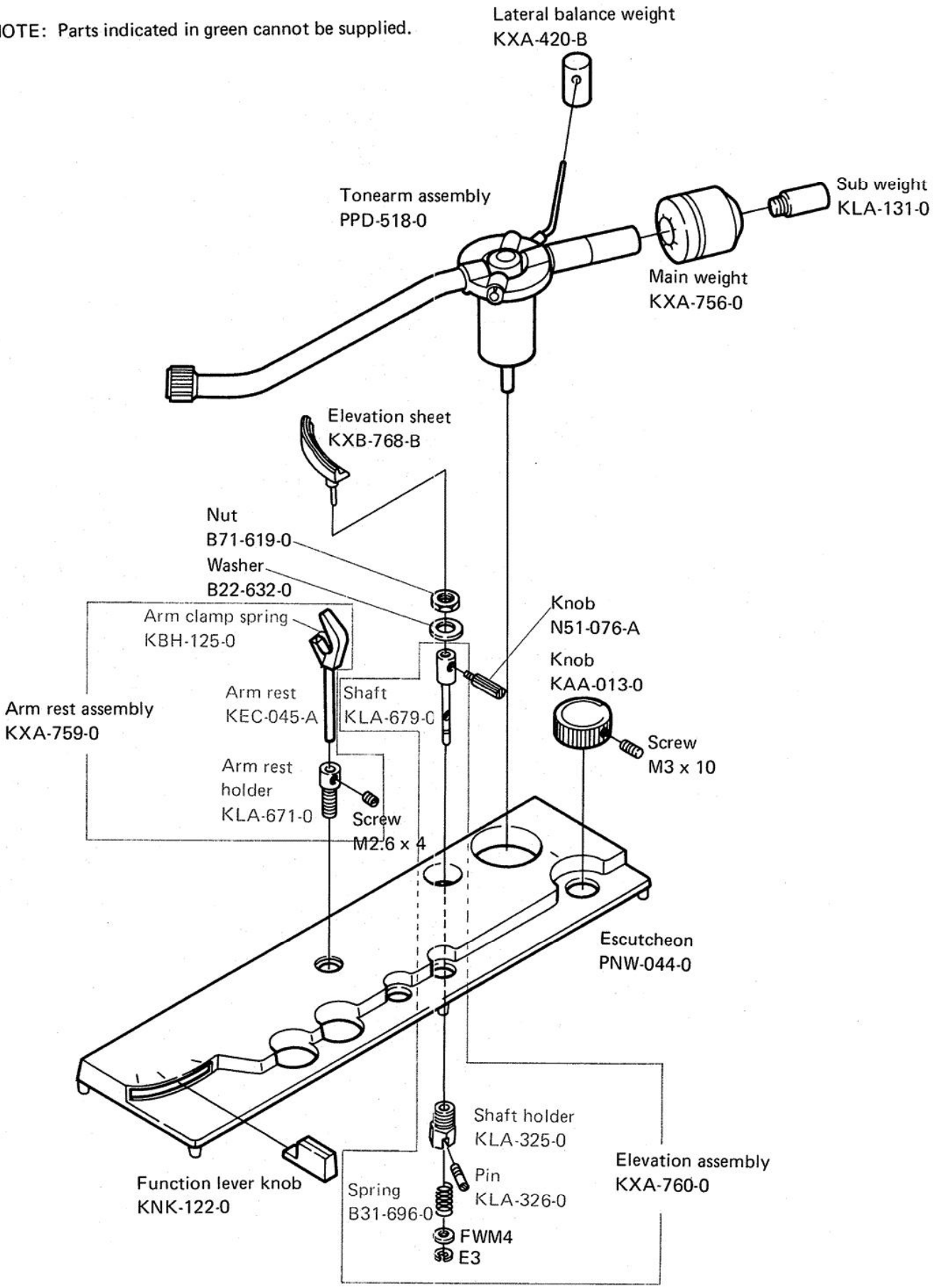
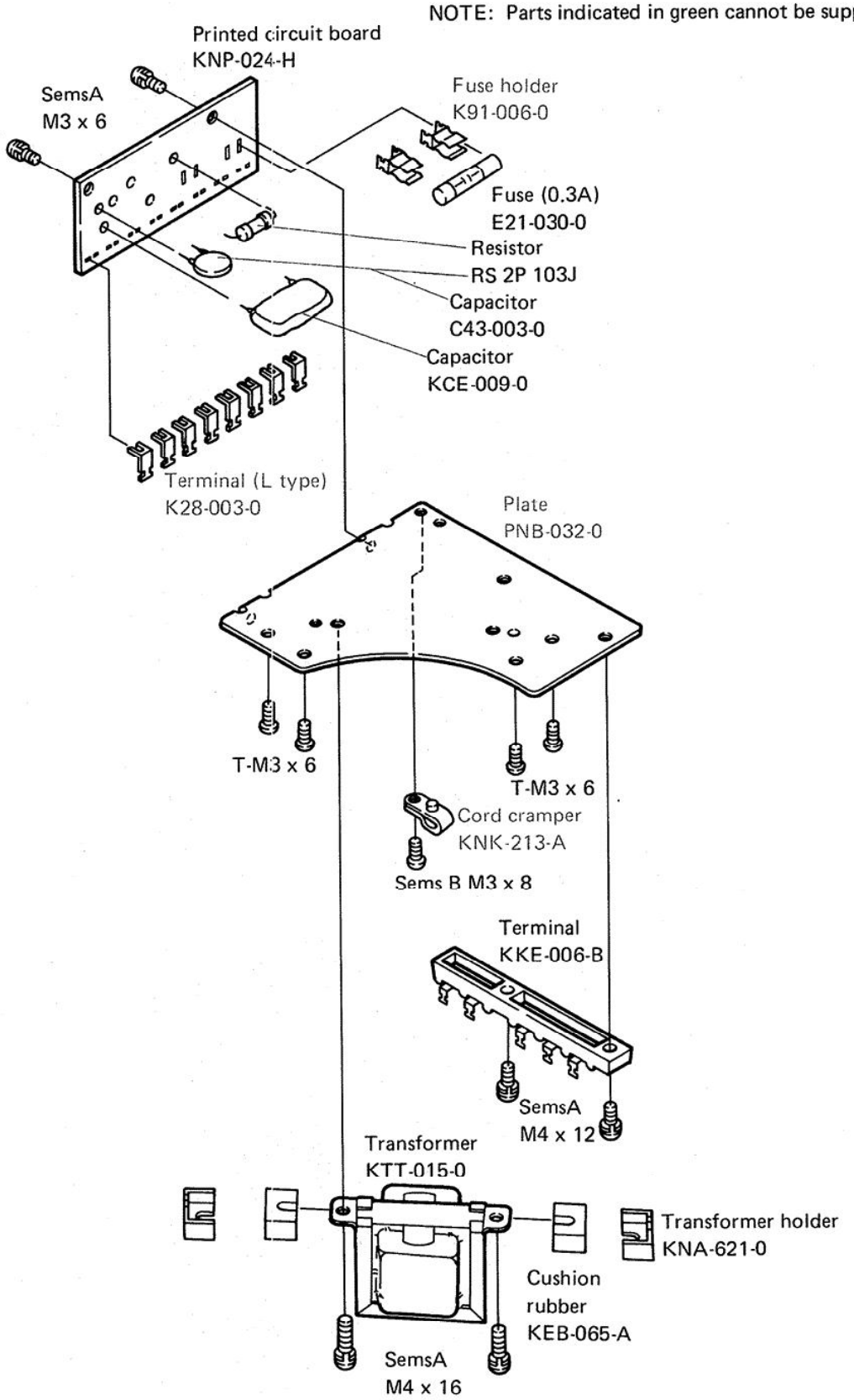


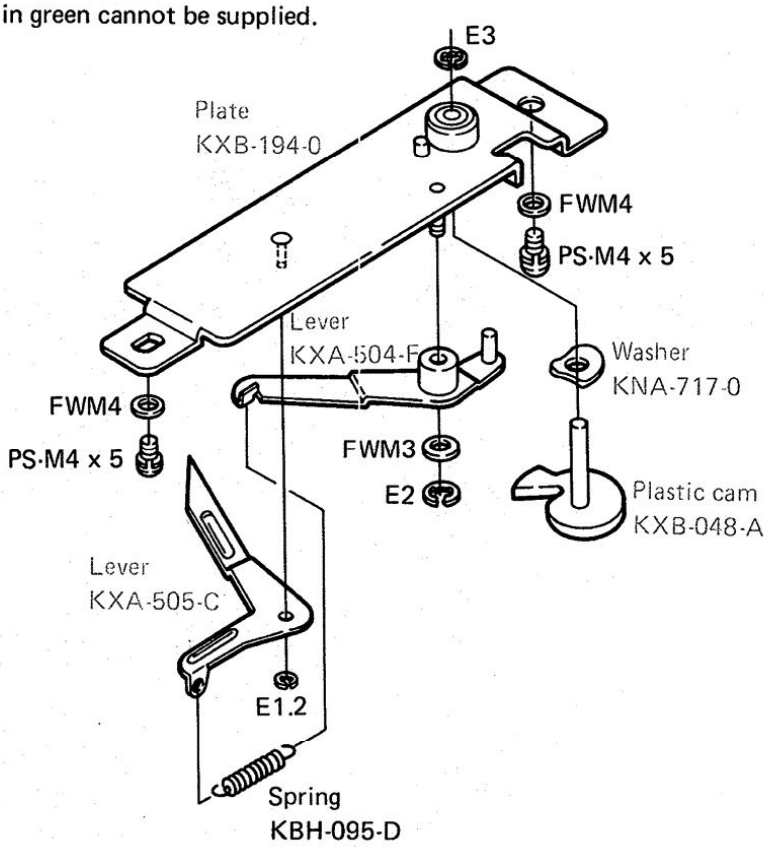
6.6 CIRCUIT BOARD

NOTE: Parts indicated in green cannot be supplied.



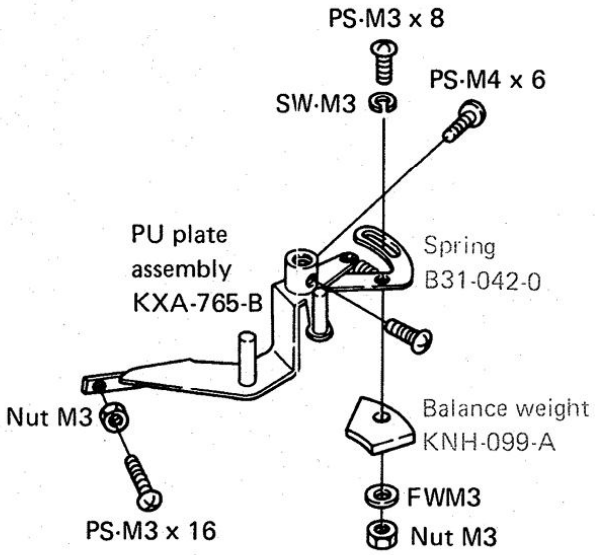
6.7 ANTI-SKATING ASSEMBLY (KXB-162-C)

NOTE: Parts indicated in green cannot be supplied.



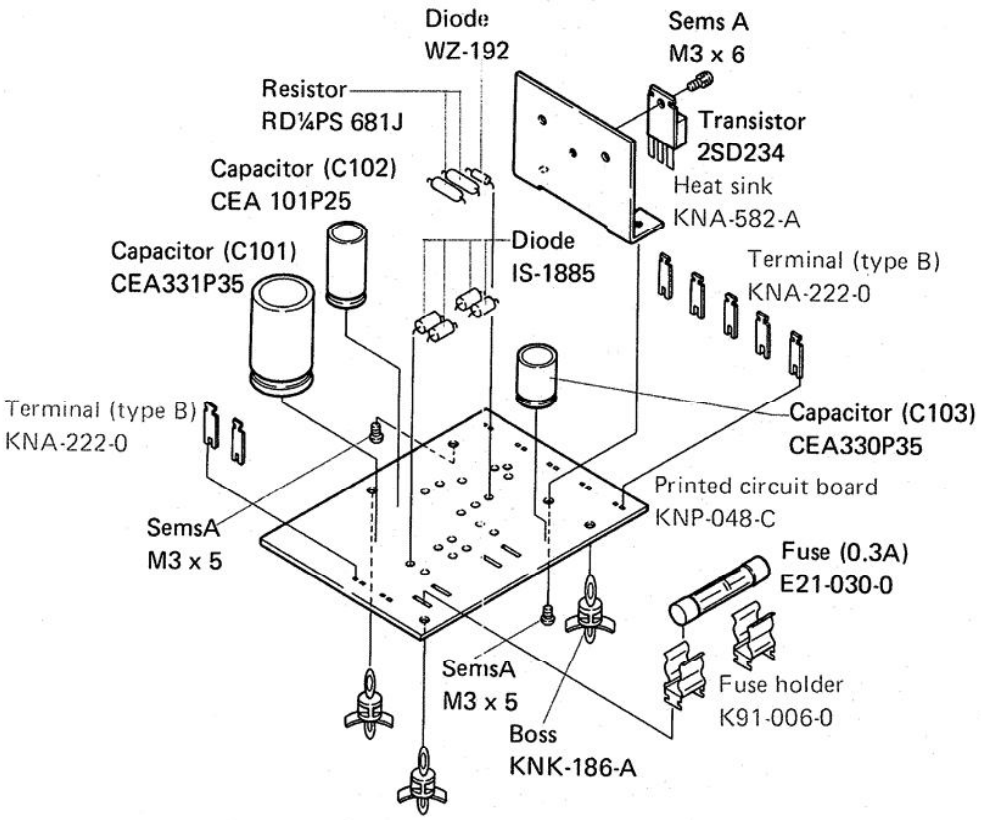
6.8 PU-PLATE

NOTE: Parts indicated in green cannot be supplied.



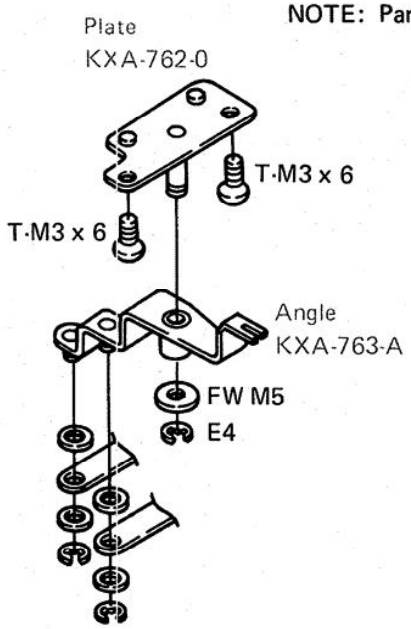
6.9 POWER SUPPLY CIRCUIT

NOTE: Parts indicated in green cannot be supplied.



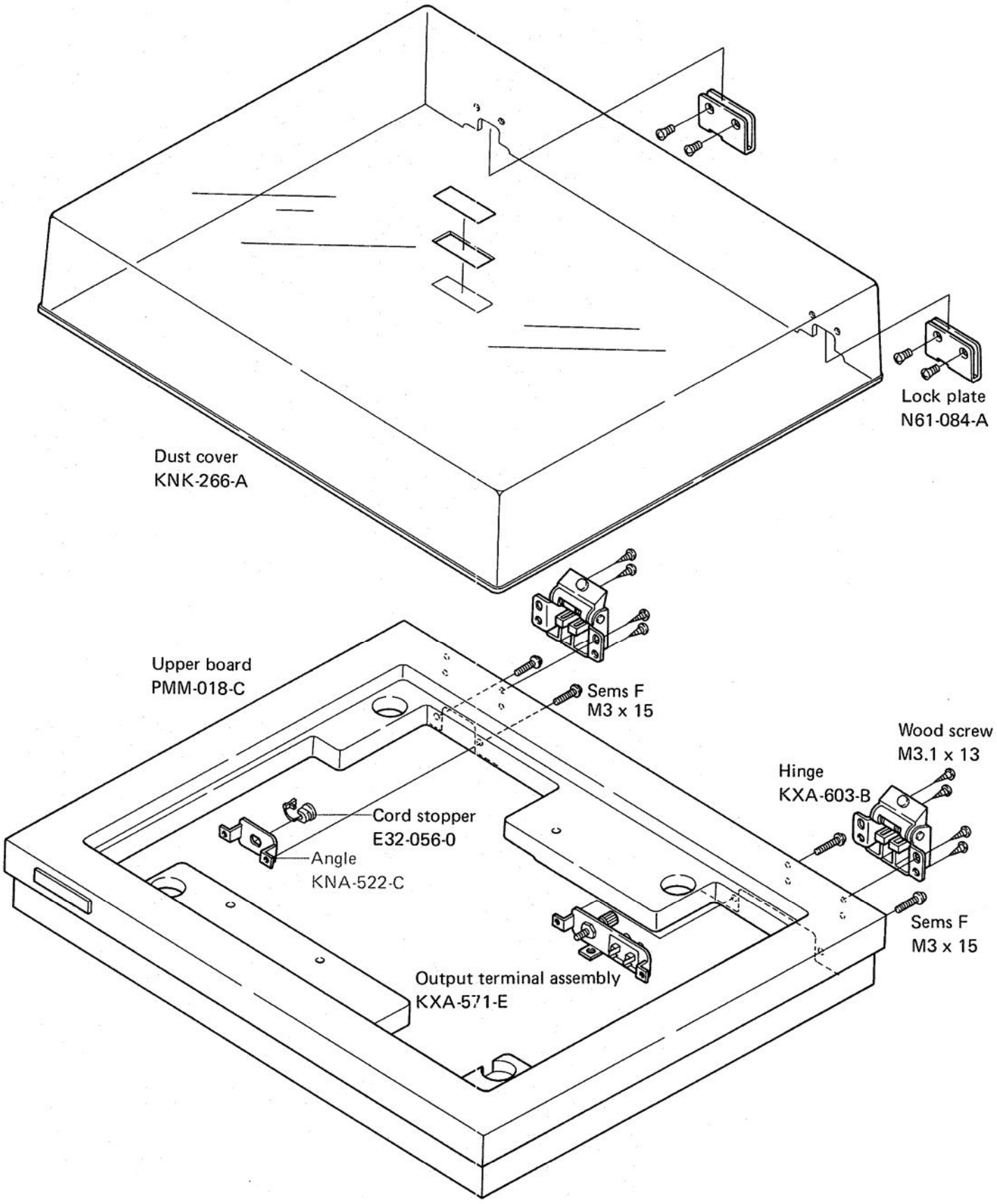
6.10 START LEVER ASSEMBLY (KXA-761-A)

NOTE: Parts indicated in green cannot be supplied.

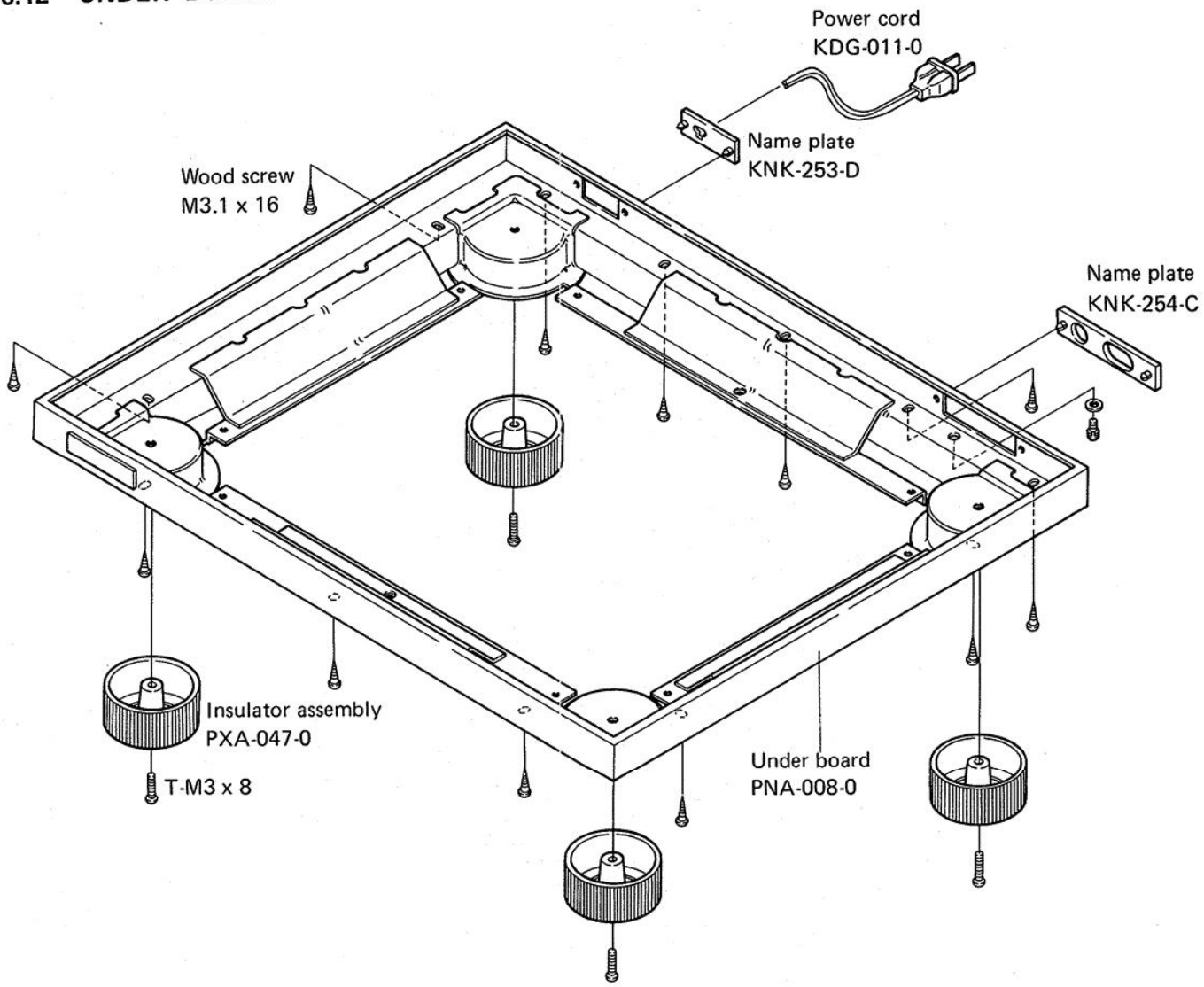


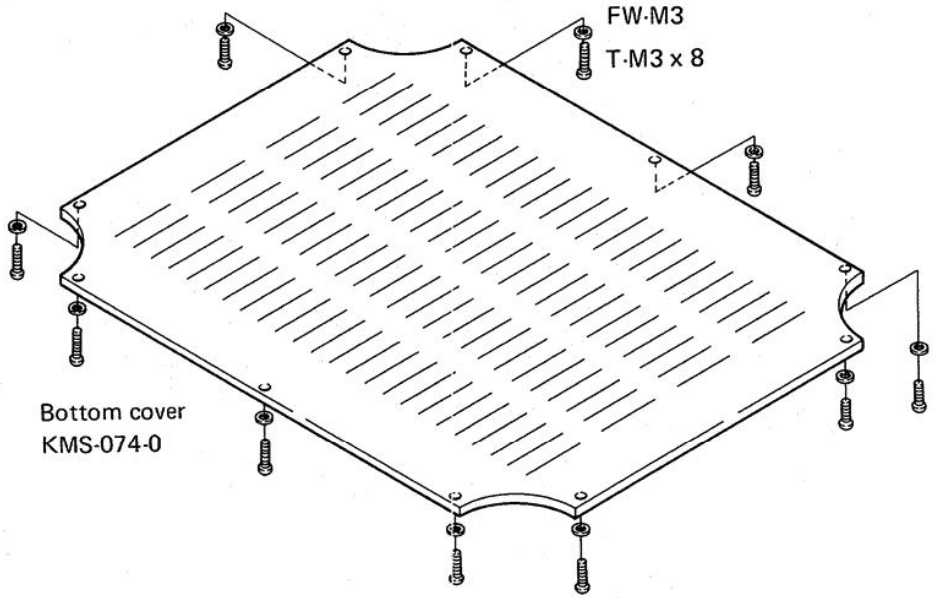
6.11 UPPER BOARD

NOTE: Parts indicated in green cannot be supplied.



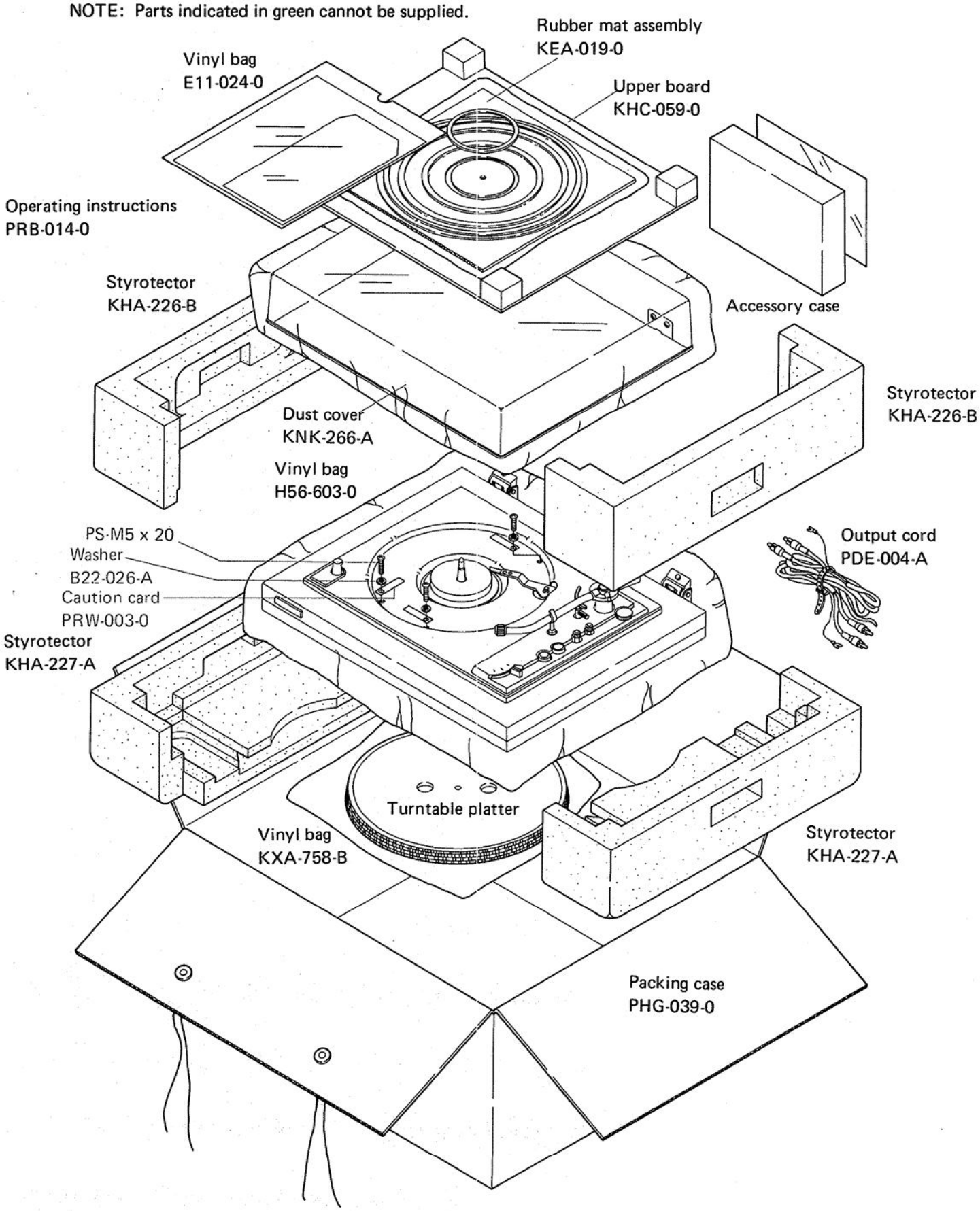
6.12 UNDER BOARD



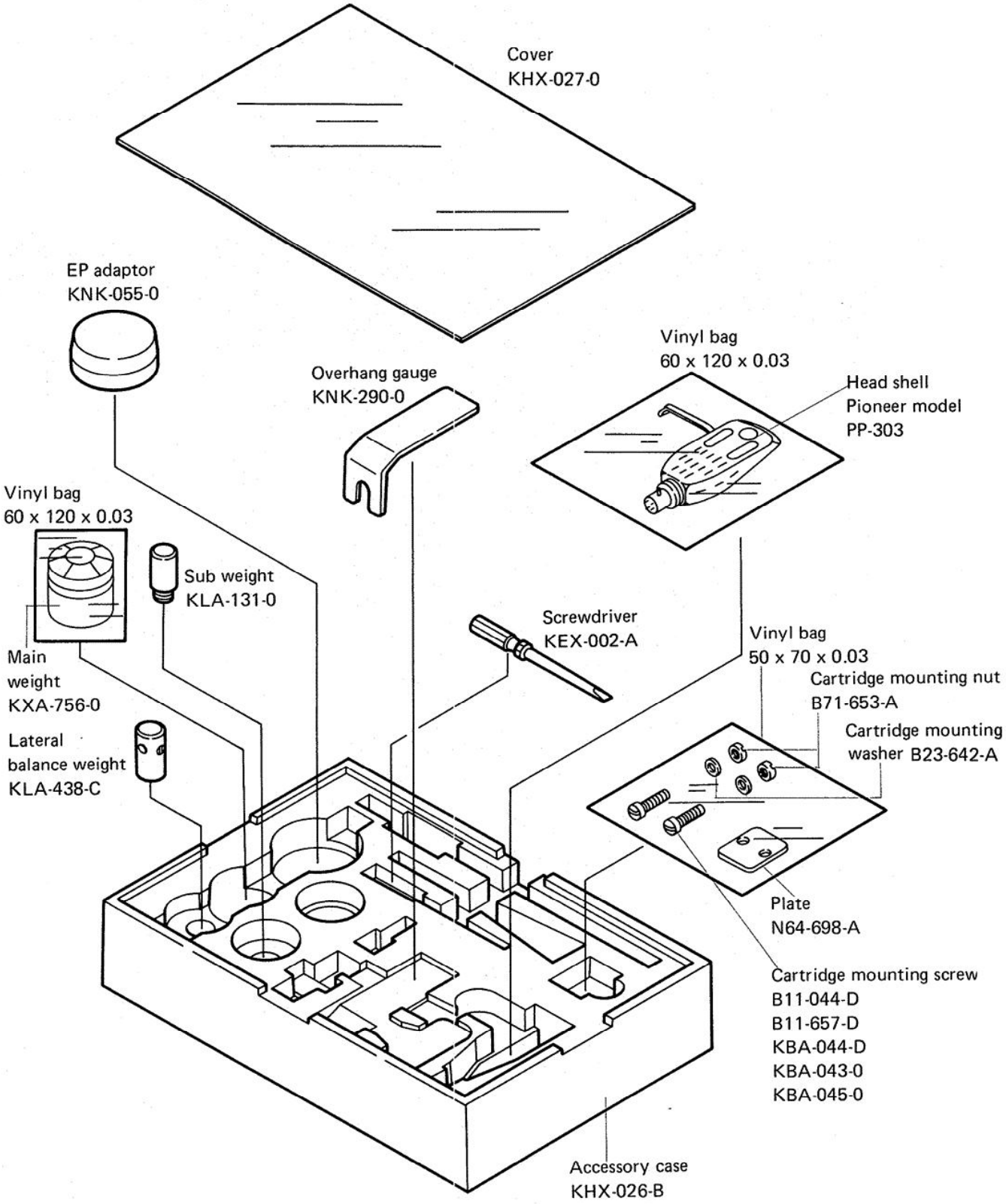


6.13 PACKING

NOTE: Parts indicated in green cannot be supplied.



6.14 ACCESSORY CASE



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PIONEER ELECTRONIC CORPORATION
4-1, 1-Chome, Meguro, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION
75 Oxford Drive, Moonachie, New Jersey 07074,U.S.A.
PIONEER ELECTRONIC (EUROPE) N.V.
Meir-Center Meir 21, 2000 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD.
256-8 City Road, South Melbourne, Victoria 3205, Australia

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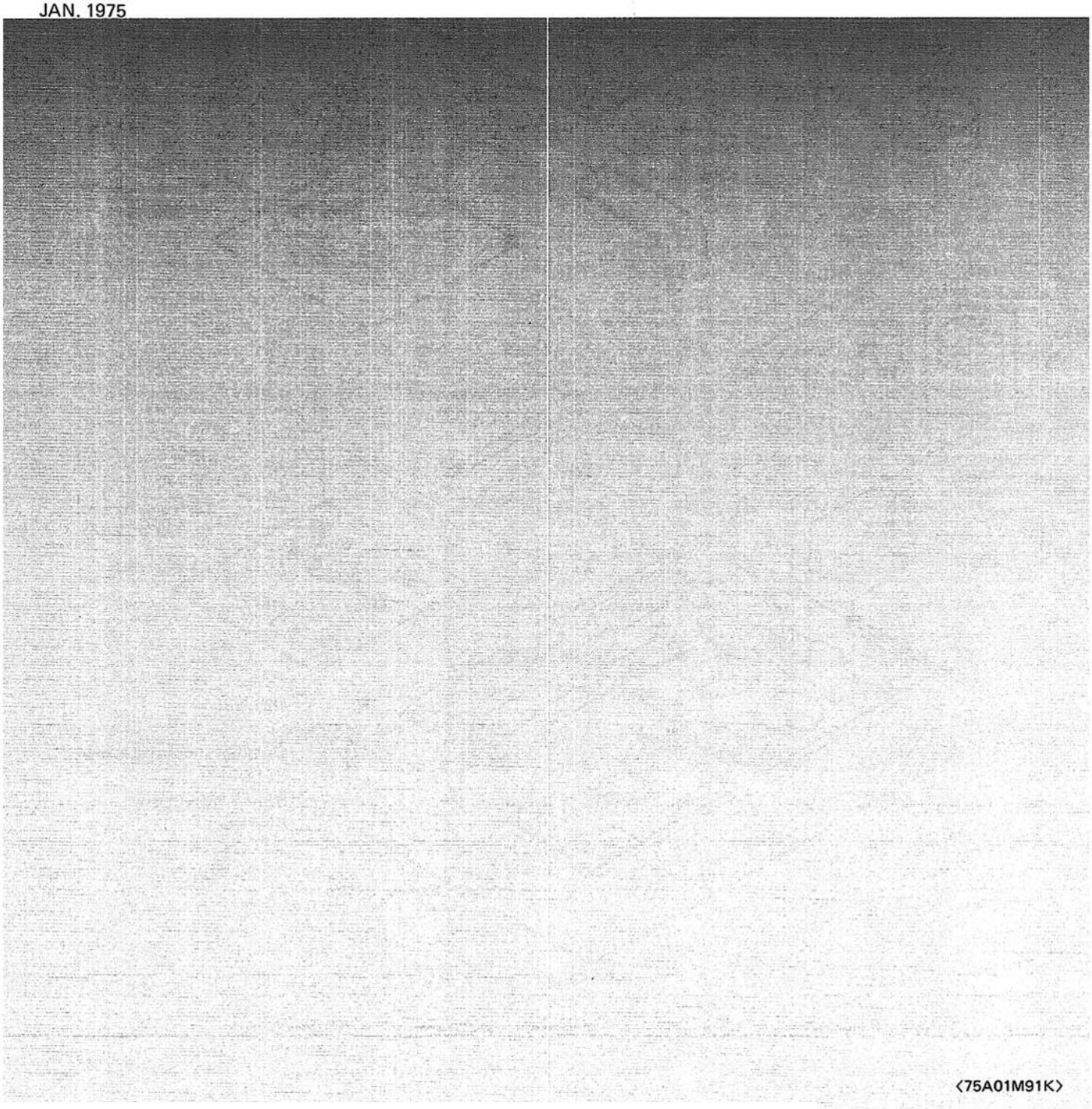

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