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Service Manual

STEREO TURNTABLE

PL-100
PL-100X

 **PIONEER®**

MODEL PL-100 COMES IN SEVEN VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC 120V only	U.S.A. model (with cartridge)
KUT	AC 120V only	U.S.A. model (without cartridge)
KCT	AC 120V only	Canada model (without cartridge)
WE	AC 220V – 240V	Europe model (with cartridge)
WB	AC 220V – 240V	United kingdom model (with cartridge)
WP	AC 220V – 240V	Oceania model (with cartridge)
R	AC 110-120/220-240V (switchable)	General export model (with cartridge)

- This service manual is applicable to the PL-100/WE, WB, WP, PL-100X/WE, WB. For servicing of the other types, please refer to the additional service manual.

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1. SPECIFICATIONS

Motor and Turntable

Drive System	Belt-drive
Motor	FG servo motor
Turntable Platter	310mm diam. aluminum alloy die-cast
Speeds	33-1/3 and 45rpm
Speed Control Range	±2%
Wow and Flutter	Less than 0.045% (WRMS)
Signal-to-Noise Ratio	More than 70dB (DIN-B)
	(with Pioneer cartridge model PC-135)

Tonearm

Type	Static-balance type, S-shaped pipe arm
Effective Arm Length	221mm
Overhang	15.5mm
Usable Cartridge Weight	4g (min.) to 9g (max.)

Subfunctions

Auto-return mechanism, Anti-skating force control, Stylus pressure direct-readout counterweight, Cueing device, Strobe light, Free stop hinges

Semiconductors

IC	1
Transistor	1
Diode	1

Miscellaneous

Power Requirements:	
WE, WB, WP models	AC 220-240V ~, 50, 60Hz
Power Consumption	4W
Dimensions	420(W) x 96(H) x 365(D) mm
	16-1/2(W) x 3-13/16(H) x 14-3/8(D) in.
Weight	5.2kg/11 lb 8 oz

PC-110/II Specifications

Type	Moving magnet type
Stylus	0.5 mil diamond (PN-110/II)
Output Voltage	3.5mV (1kHz, 50mm/s Peak velocity, LAT)
Tracking Force	1.5g to 2.5g (proper 2.2g)
Frequency Response	15 to 25,000Hz
Recommended Load	50kΩ +170 ~ 300pF

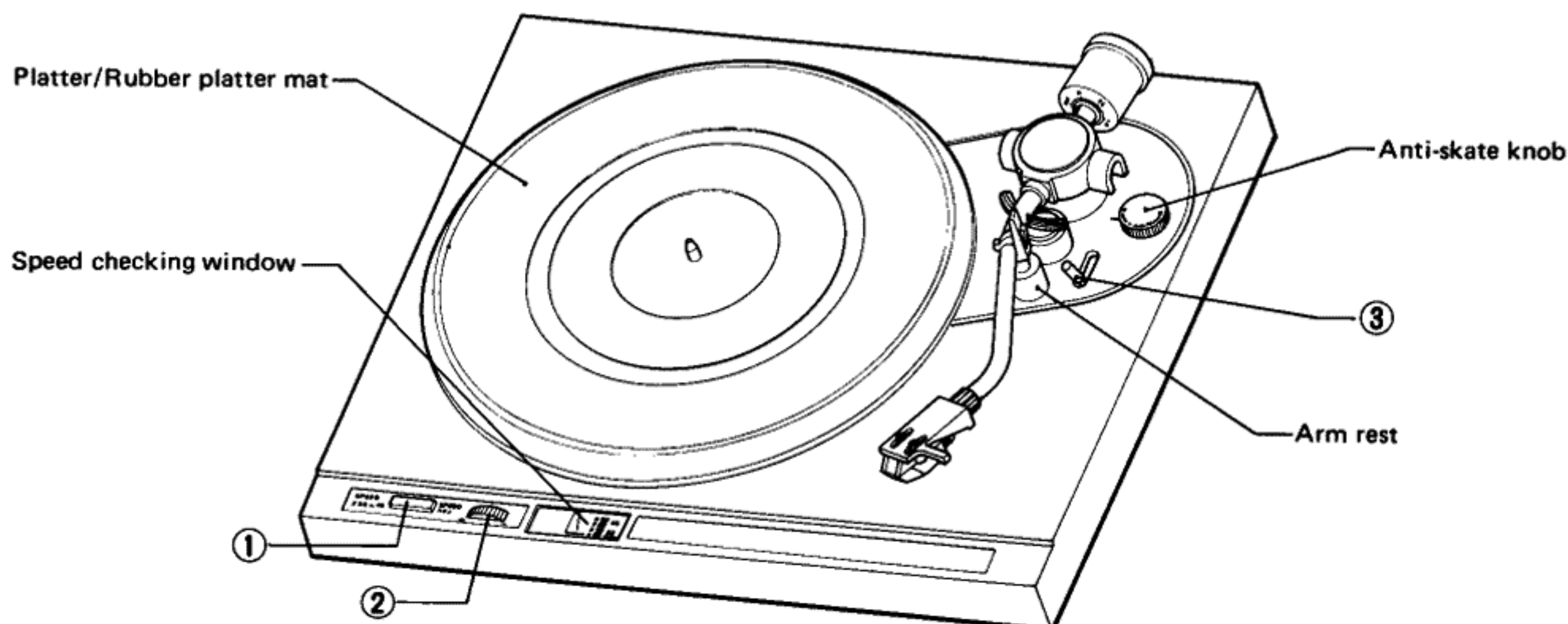
Accessories

EP Adapter	1
Operating Instructions (French and German furnished on model for WE)	1

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

2. PANEL FACILITIES



① SPEED SELECTOR BUTTON

45 When this button is depressed, the platter will rotate at 45rpm. Depress for playing 45rpm records, singles or EP's.

33 When this button is set to the released position, the platter will rotate at 33-1/3rpm. Release for playing 33-1/3rpm records like LP's.

② SPEED ADJUSTMENT KNOB

Turn this knob when finely adjusting the speed of the platter. The speed of platter will increase when the knob is turned to the left in the direction of "+"; it will decrease when turned to the right in the direction of "-".

③ ARM-ELEVATION LEVER

UP (▼): When this lever is set to this position, the tonearm will rise. Set it to UP before record play and when you want to stop record play while a track is being played or when you want to change over to a different track.

DOWN (▼): When the lever is set to this position the tonearm will be lowered. If it is set to DOWN for record play, the tonearm will be lowered onto the surface of the record, and play will begin.

3. DISASSEMBLY

3.1 PANEL AND BASE PLATE

1. Undo the 4 screws ❶ securing the insulator case.
2. Move the tonearm across to the center, and raise the panel a little.
3. Disconnect the circuit board connector (2-Pin).

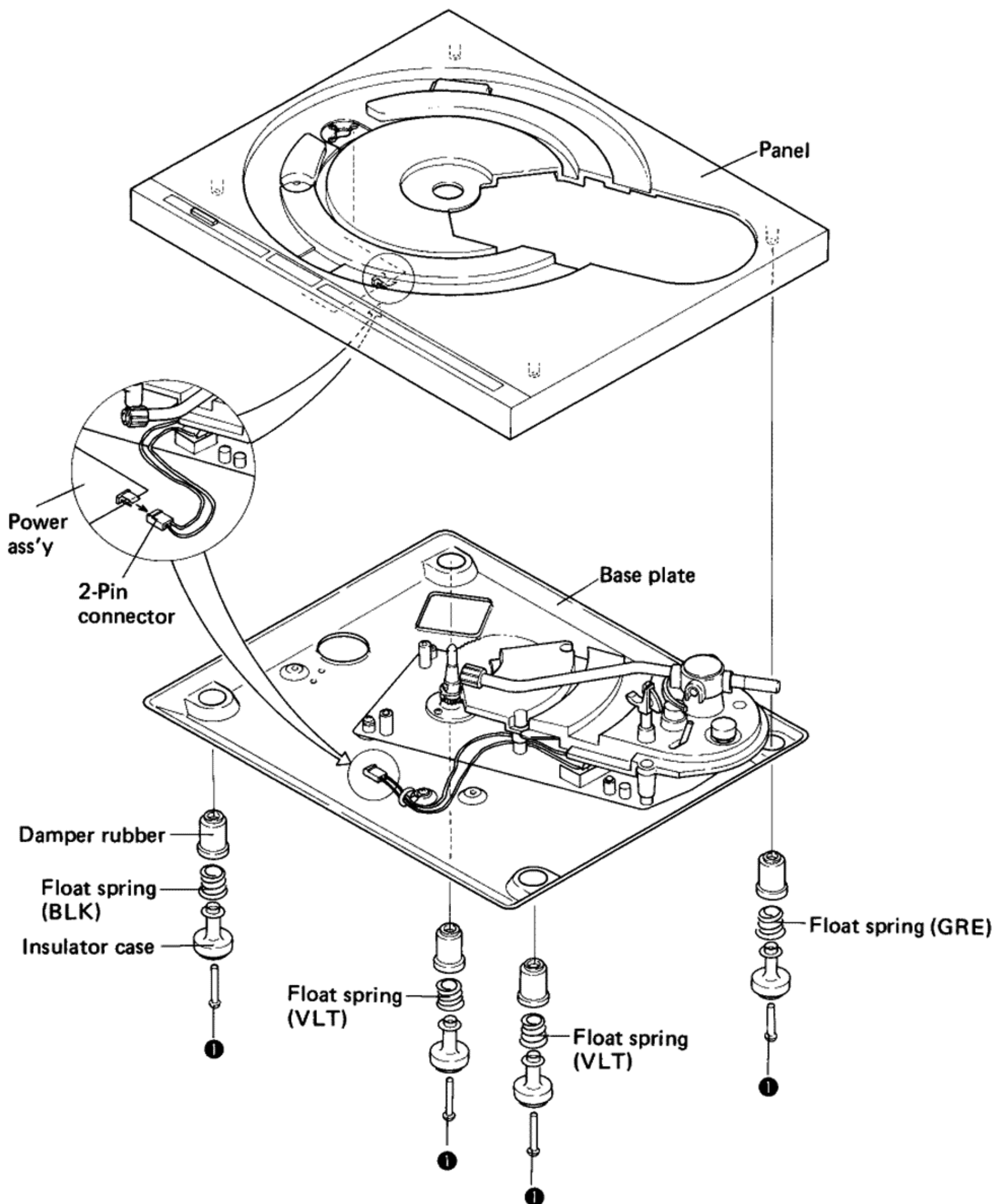


Fig. 3-1 Remove the panel and base plate

3.2 ARM BASE AND SUB-PANEL

1. Undo the 5 screws ❶ securing the arm base.
2. Undo the 2 screws ❷ securing the sub-panel.
3. Undo the 3 screws ❸ securing the center shaft.

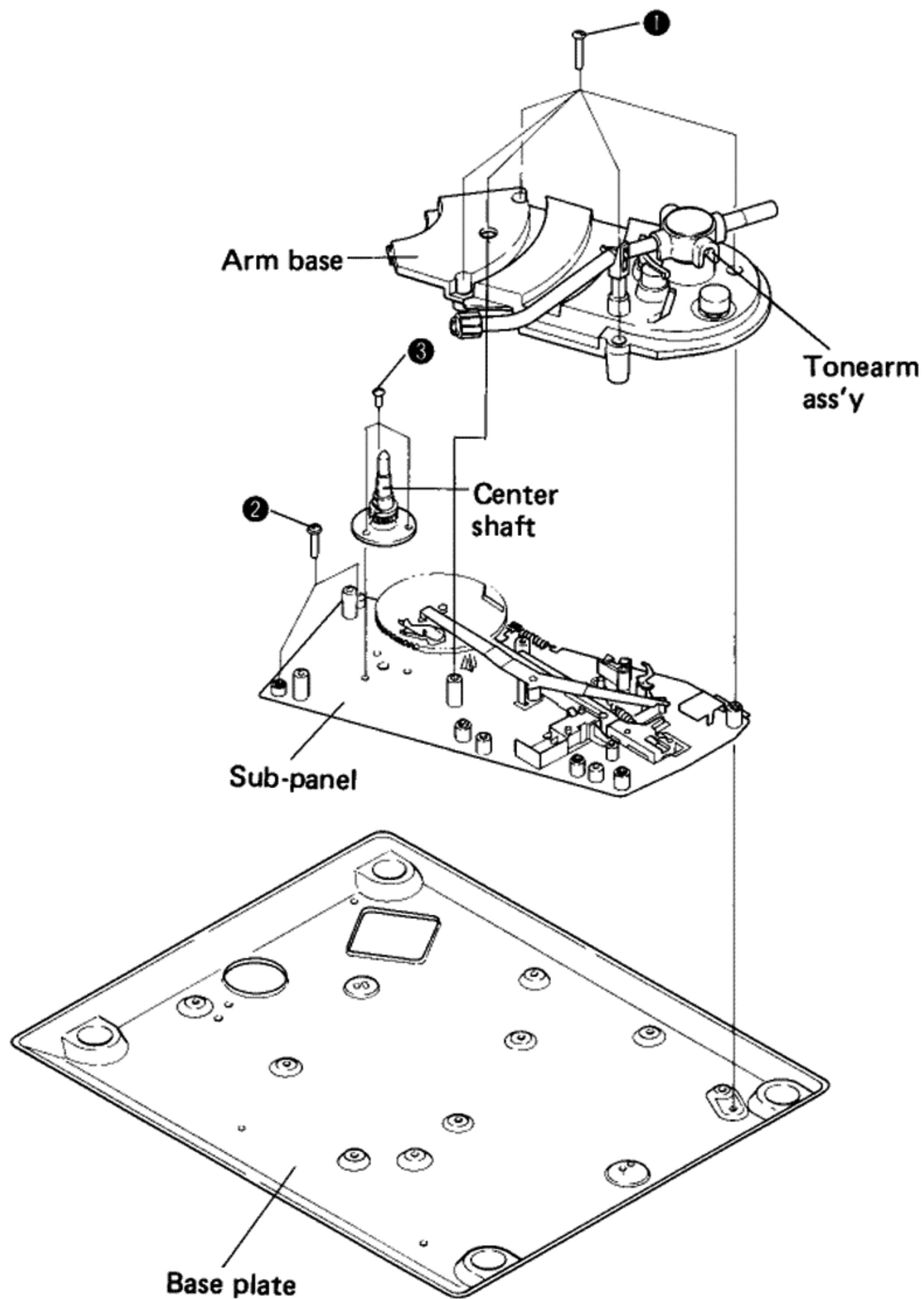


Fig. 3-2 Remove the arm base and sub-panel

4. MECHANISM DESCRIPTION

PL-100 MECHANISM OPERATING

The PL-100 is equipped with auto-return only. Fig. 4-1 shows the PL-100 in the stationary state with the tonearm back in the arm rest.

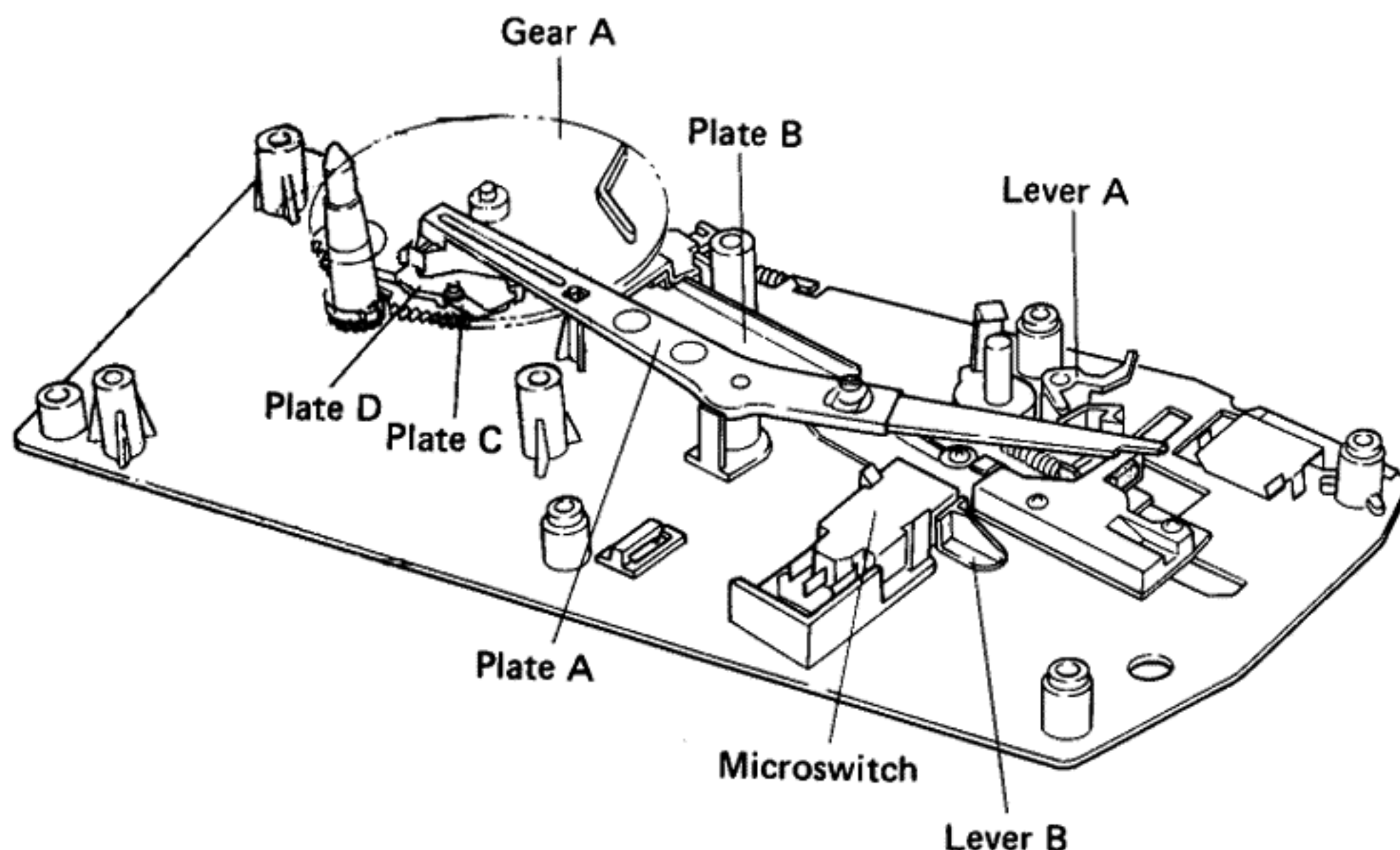


Fig. 4-1 Mechanical parts name

* Start of Play

1. When the tonearm is moved across to the disc, the PU plate located below in the arm base is also moved.
2. Lever A is moved over by pin A connected to this PU plate, resulting in lever B being unlocked (Fig. 4-3).
3. At the same time that lever B is unlocked, the microswitch is turned on (power on), and the motor commences to rotate (Fig. 4-3).

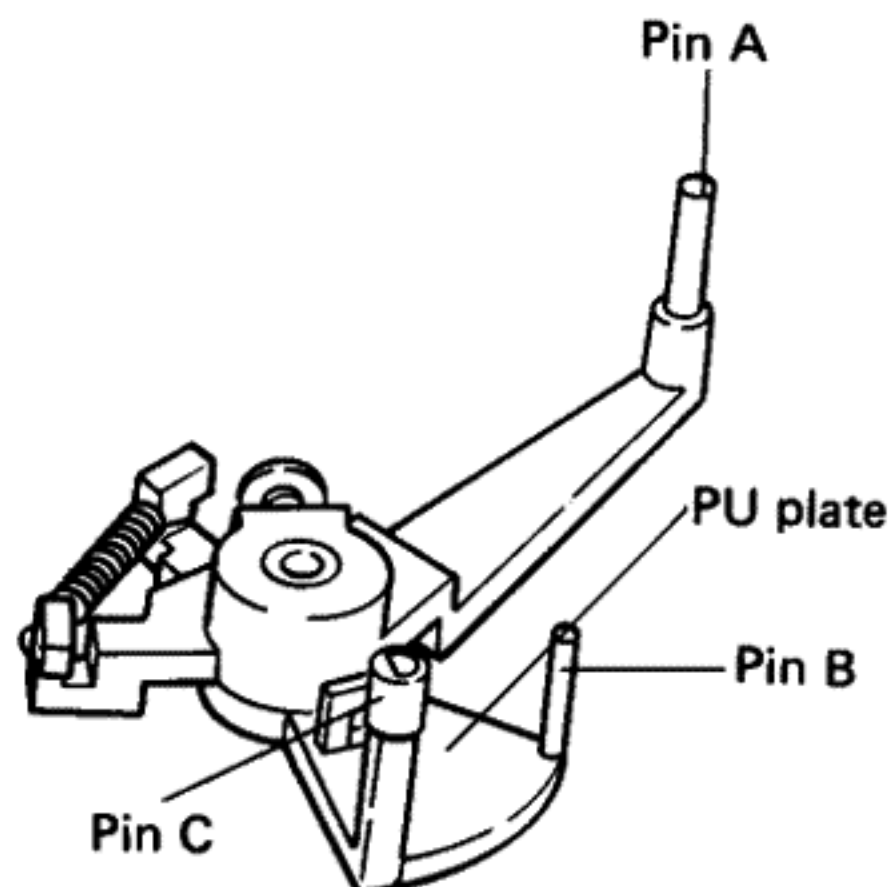


Fig. 4-2 PU plate

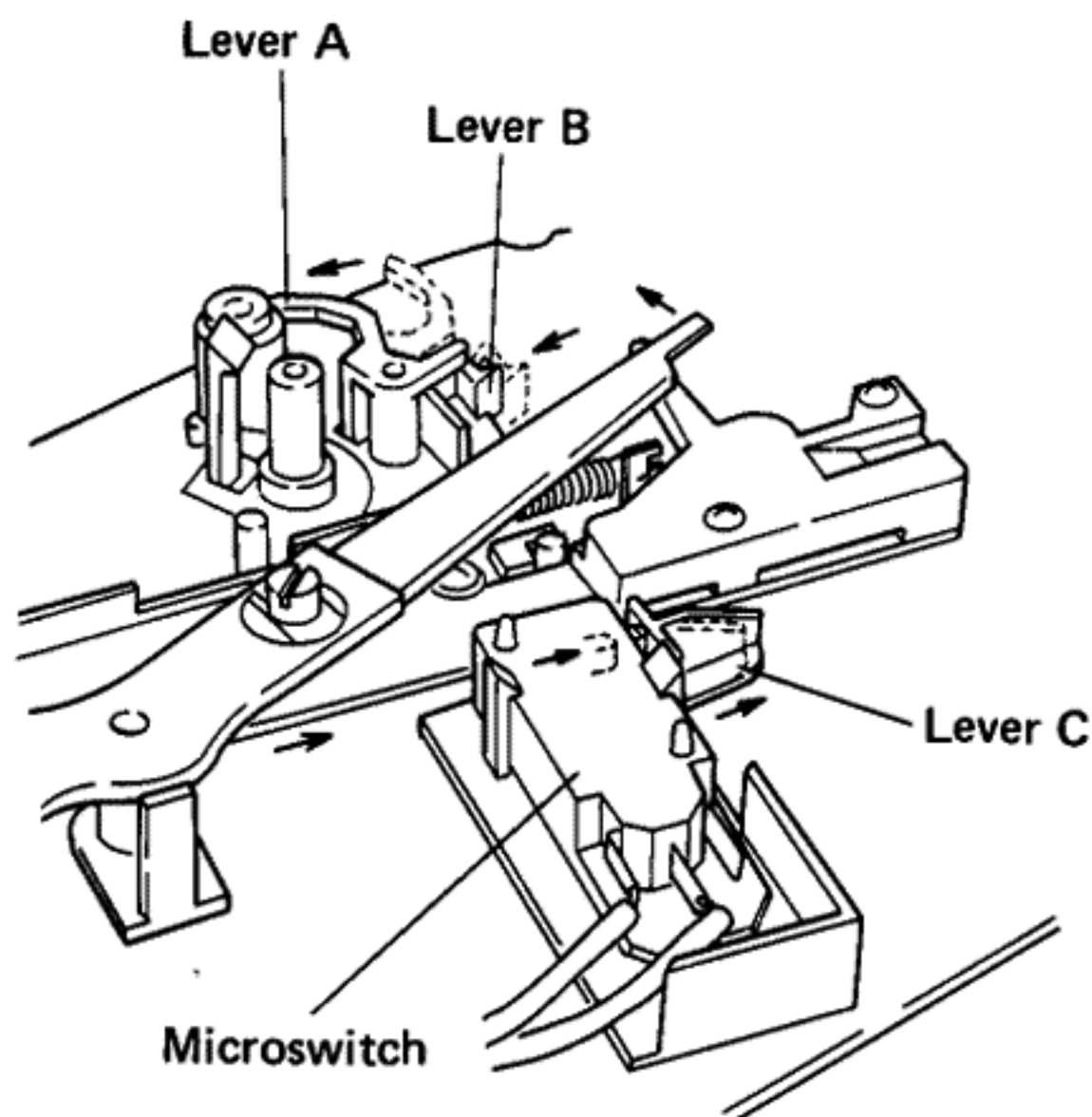


Fig. 4-3 Start of play

* AUTO-RETURN DETECTION

1. When the stylus nears the center shaft, pin B contacts plate A (Fig. 4-4).
2. Plate A pushes plate C by an amount directly proportional to the amount of movement of the tonearm (Fig. 4-5).
3. Plate D atop plate C is moved toward gear B by the movement of plate C.

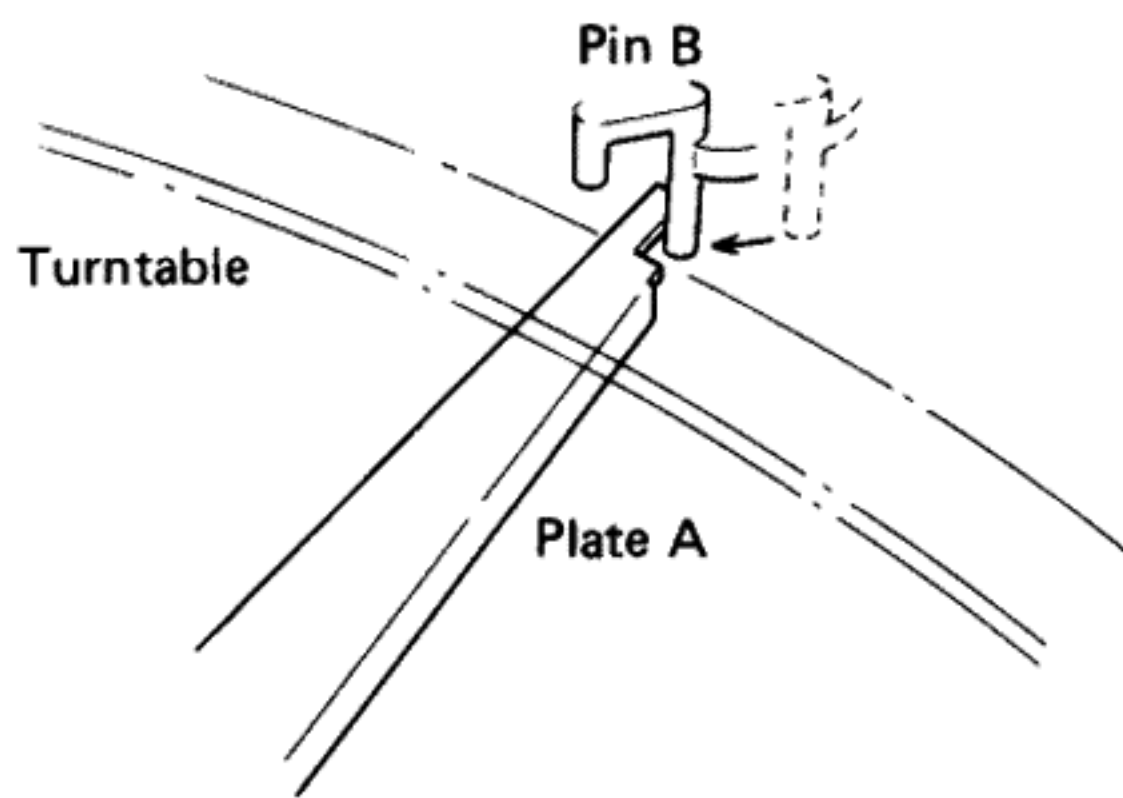


Fig. 4-4 Auto-return detection 1

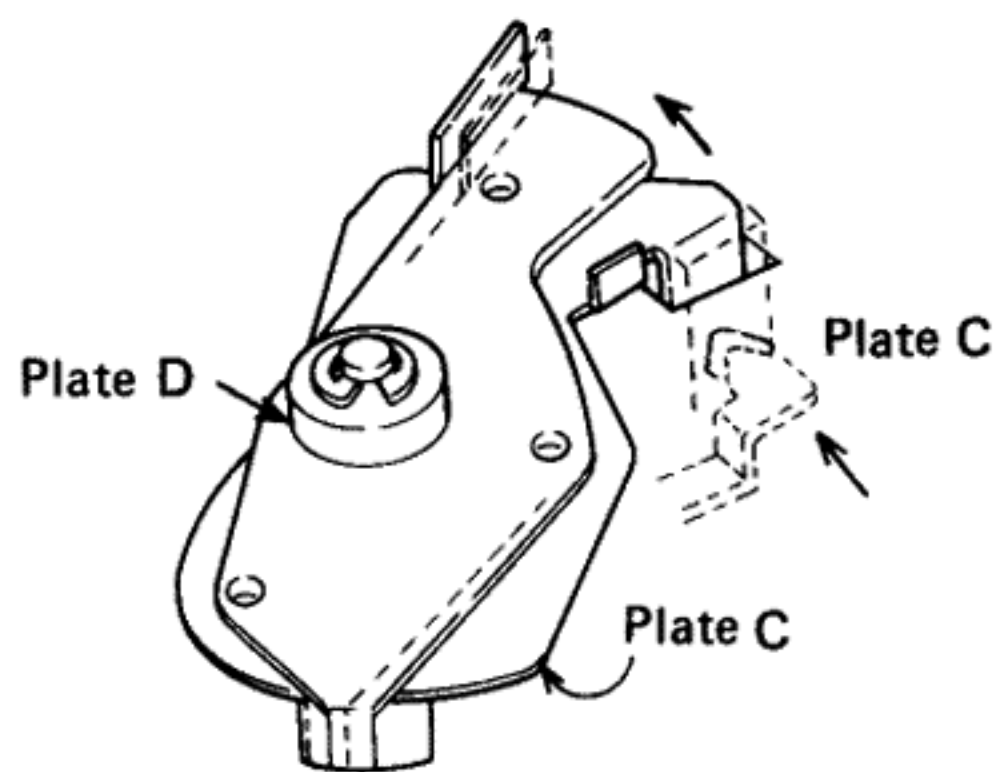


Fig. 4-5 Auto-return detection 2

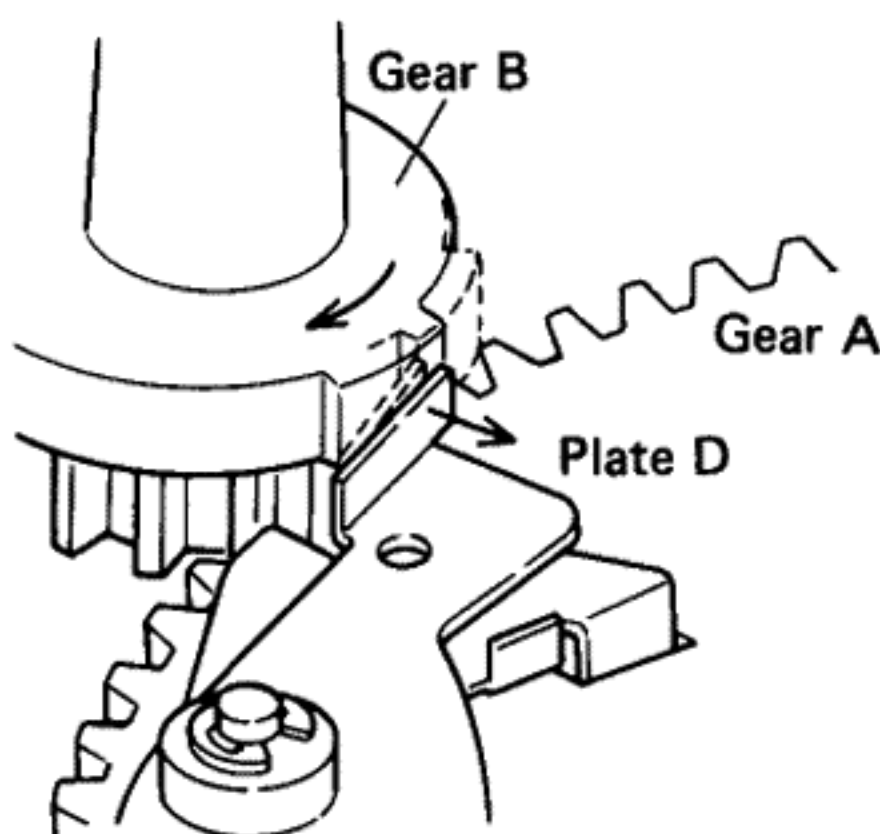


Fig. 4-6 Auto-return detection 3

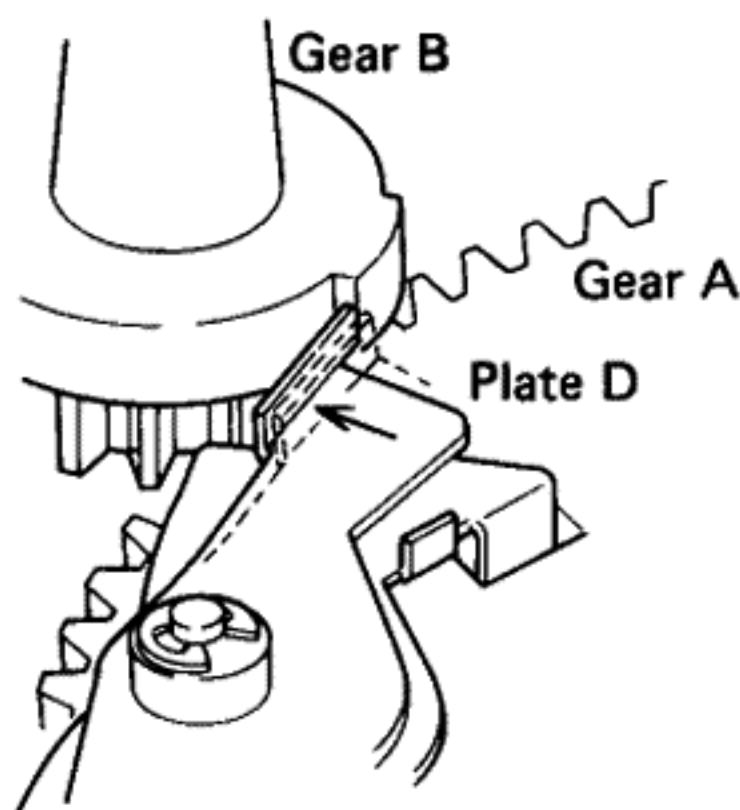


Fig. 4-7 Auto-return detection 4

4. The front end of plate D moves approximately 0.1mm when the stylus is advanced 1mm toward the center shaft by one revolution of the record.
5. The tooth of gear B has the dimensional difference shown in Fig. 4-6.
6. Plate D is pushed back by this dimensional difference at a stylus movement of within 1mm per revolution of the record.
7. When the stylus enters the lead-out groove in the record at the end of the performance, it is moved 4mm toward the center shaft by one revolution of the record.
8. The end of plate D contacts the protruding section of gear B (Fig. 4-7).
9. Gear B and gear A are engaged, and gear A is turned by rotation of the turntable.

* AUTO-RETURN

1. Gear A and B are engaged each other by the auto-return detector and gear A consequently is turned in the counter-clockwise direction.
2. Plate B is then shifted across towards the tonearm due to the groove in the underneath of gear A.
3. The edge of plate B pushes against lever C to force the arm elevation upwards.
4. Plate B continues to shift across to push against pin B on the PU plate, thereby returning the tonearm back to the arm rest.
5. At this stage plate B commences to return toward the center shaft guided by the groove in gear A.

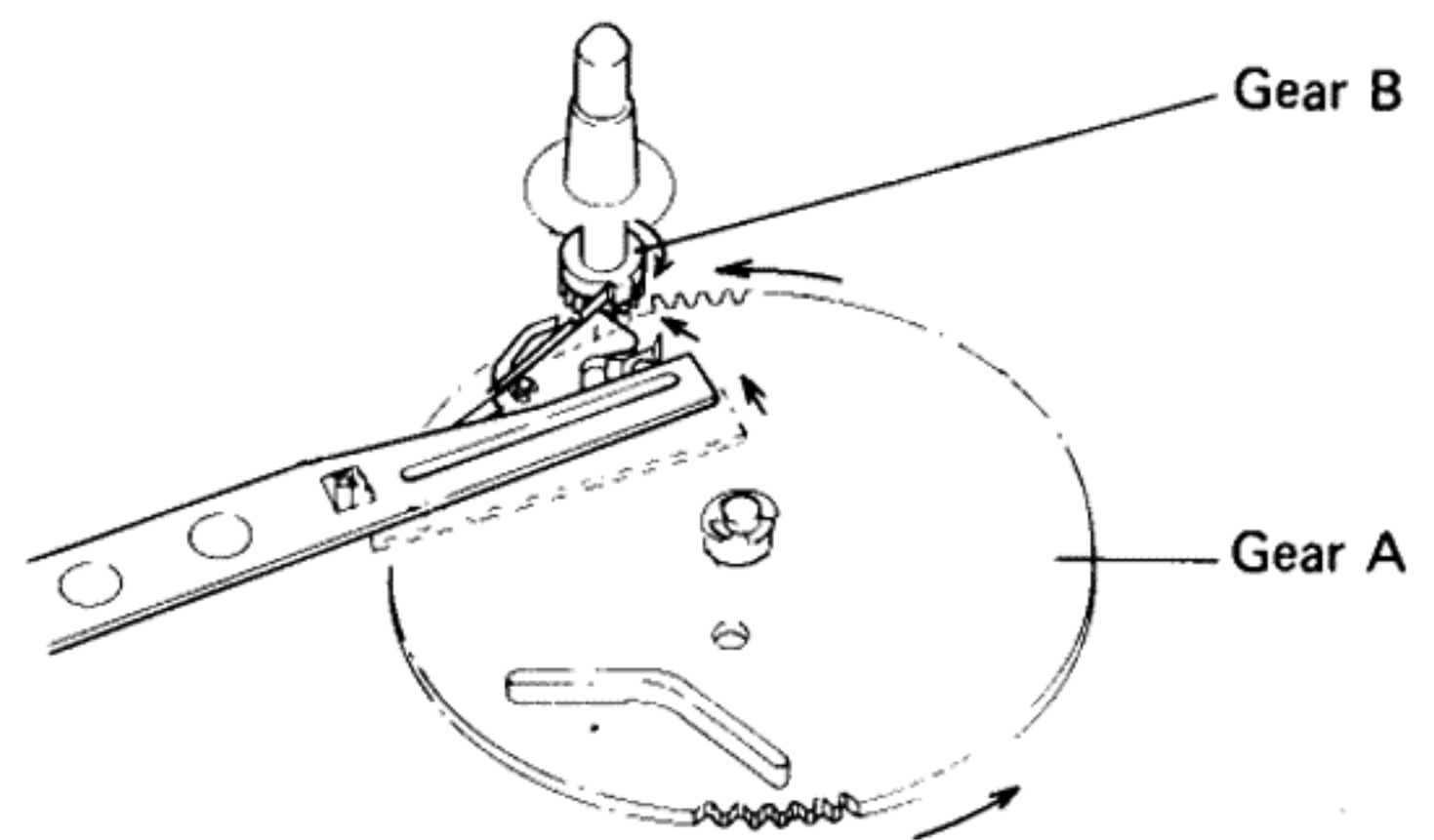


Fig. 4-8 Auto-return 1

6. When the edge of plate B separates from lever C, the arm elevation is lowered to drop the tonearm back into the arm rest.
7. And at the same time that the tonearm is returned to the arm rest, pin A returns lever A back to the stationary state.

8. Plate B continues to move toward the center shaft and pushes against pin C on lever B. Lever B thus switches the microswitch off (power off), and is then locked by lever A, thereby bringing a complete operation cycle to an end.

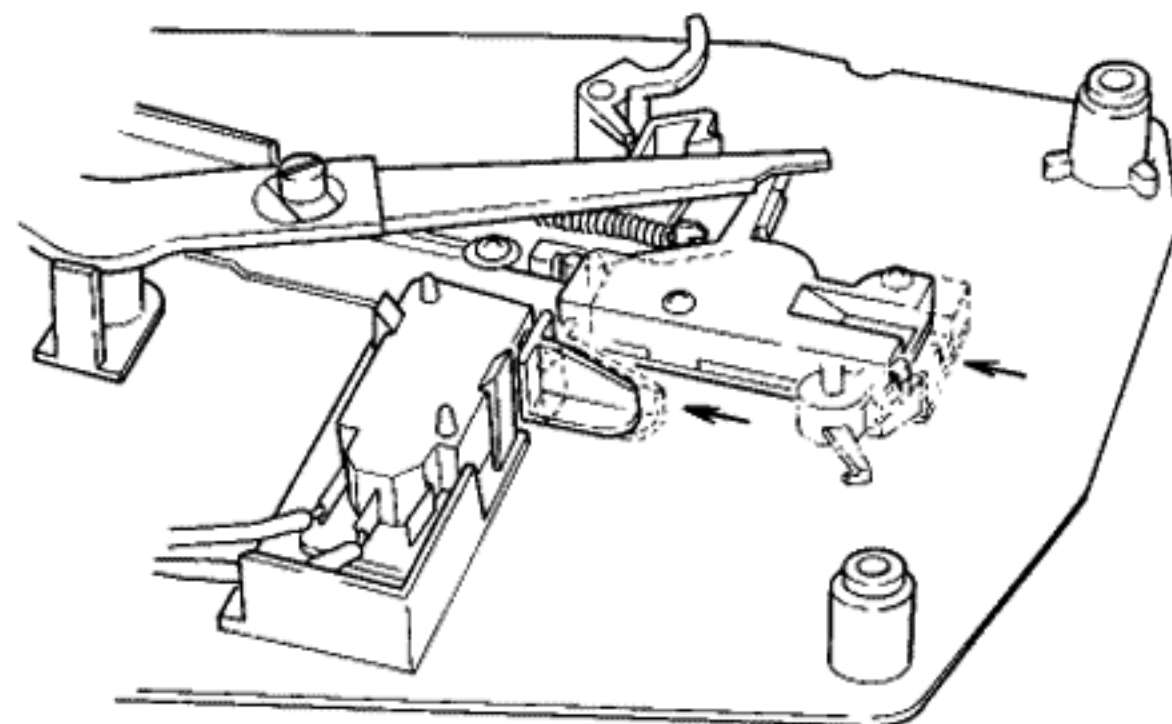


Fig. 4-9 Auto-return detection 2

5. ADJUSTMENT

5.1 AUTO-RETURN ADJUSTMENT

1. Turn the auto return adjustment screw full around clockwise.
2. Move the tonearm right across toward the center.
3. When the auto return adjustment screw is turned back a little at a time counter clockwise, the tonearm will commence to return to the outer circumference.
4. Stop turning the adjustment screw once the stylus tip is 33mm away from the center shaft.
5. Once the above adjustment procedure has been completed check that the tonearm returns automatically as designed.

5.2 F.G. MOTOR ADJUSTMENT

1. Turn the power on and start the turntable platter rotating.
2. Turn the speed adjustment knob around to the mechanically center position.
3. Adjust VR2 and VR3 in the motor assembly so that the stroboscope appears to be stationary. Again this adjustment is performed from below.
4. Adjust VR2 for 33rpm speed, and VR3 for 45rpm.

5.3 ARM-ELEVATION ADJUSTMENT

To proceed with the elevation sheet height adjustment, insert the hexagonal wrench (for 3 mm) into the hole at the front of the EV sheet and rotate it clockwise to reduce the height and counter-clockwise to increase the height. The height of the stylus tip from the record surface is 7 ± 2 mm.

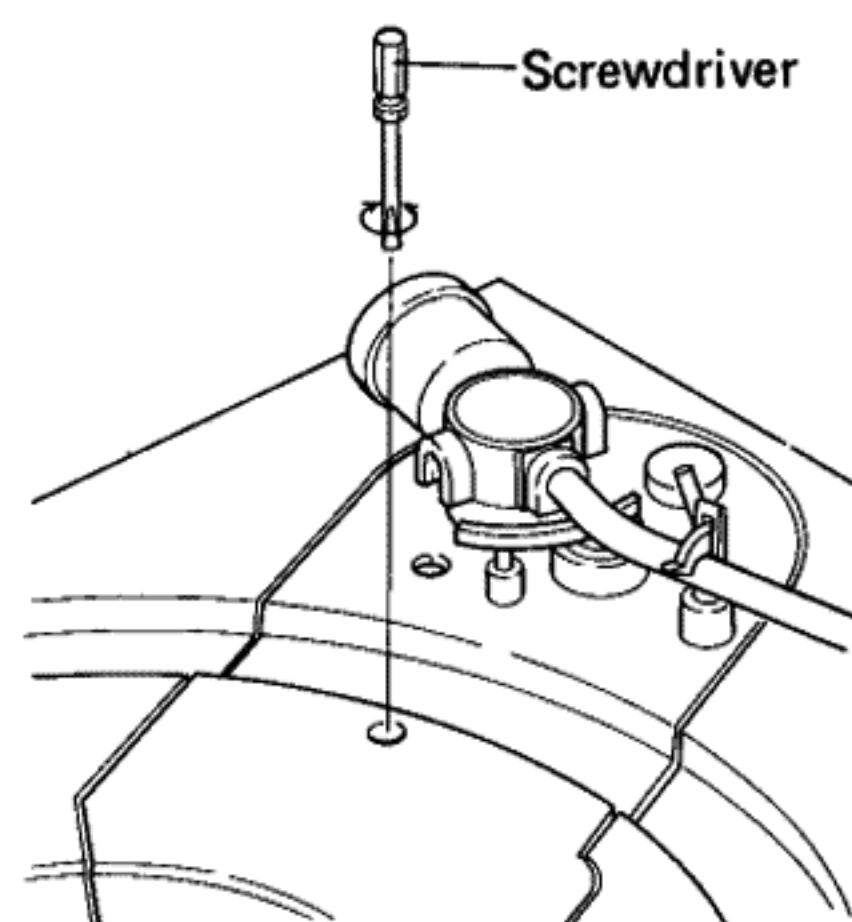


Fig. 5-1 Auto return adjustment

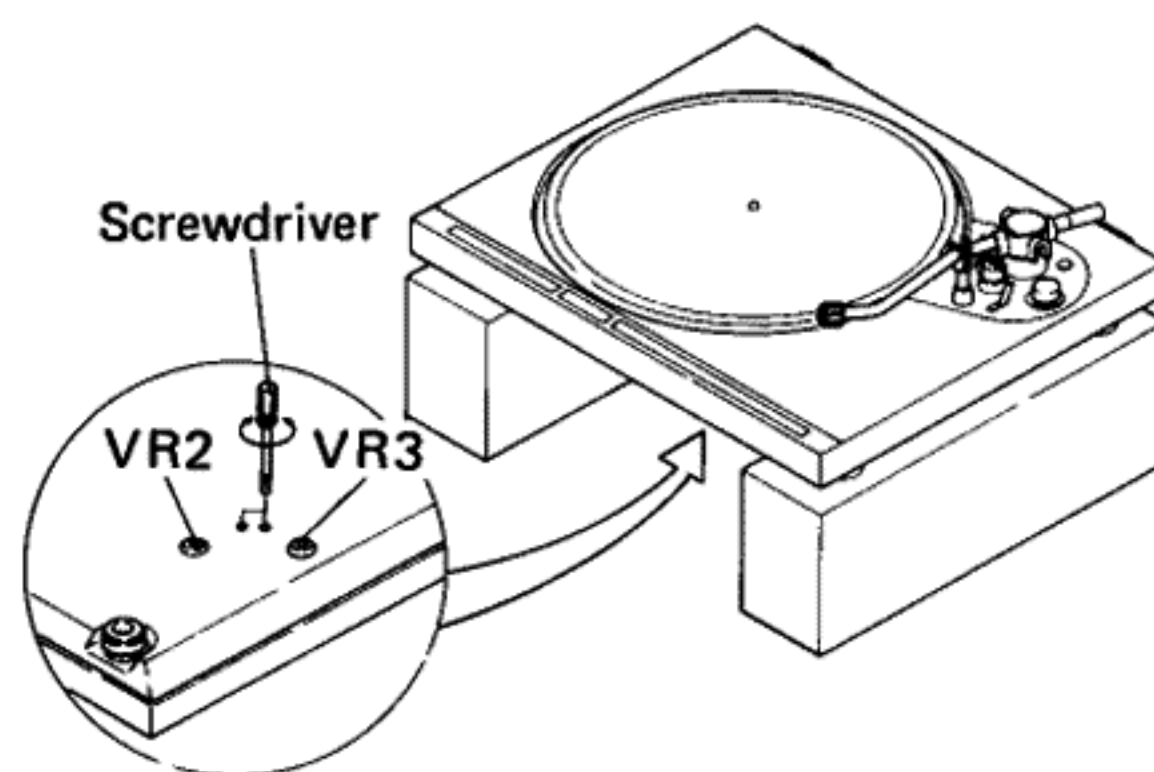


Fig. 5-2 Motor adjustment

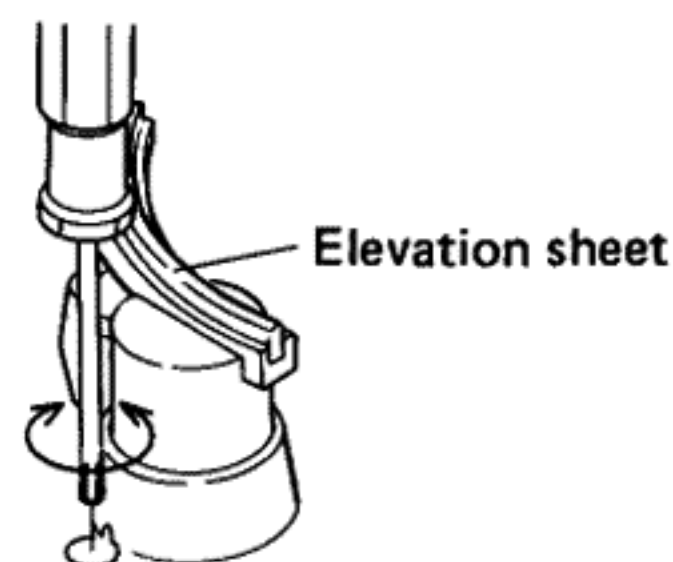
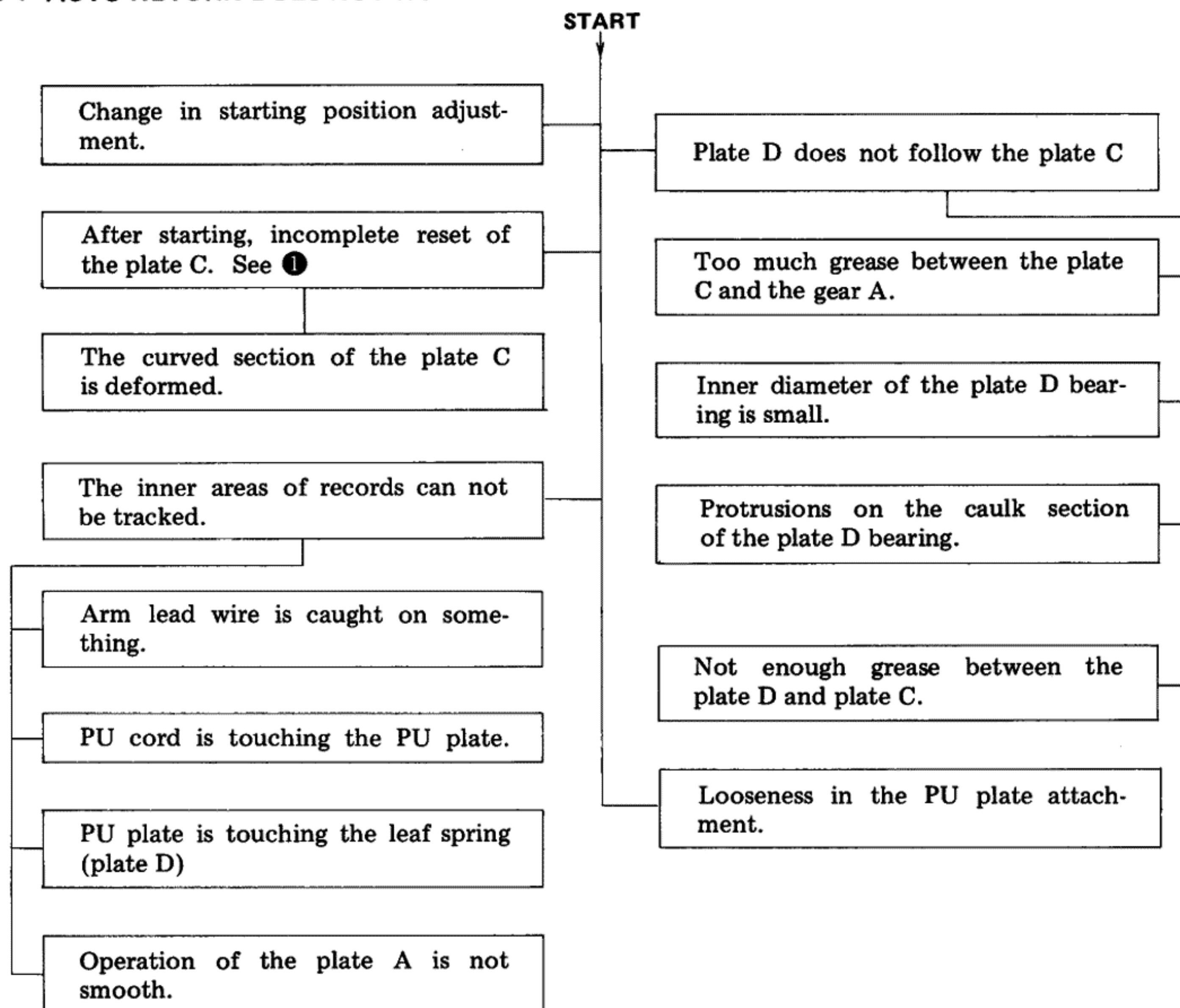


Fig. 5-3 Arm-elevation adjustment

6. TROUBLE SHOOTING

Use the following directions to find the cause of each type of breakdown. Improperly adjusted units should be completely readjusted.

6-1 AUTO-RETURN DOES NOT WORK



Procedure for Dealing with Item ①

After performing the return operation, if the curved section of the plate C and curved section of the plate D are not in contact with surfaces ① and ② respectively of the cam, reset will be incomplete and the starting position will be late. As a result, the return function may not operate at times. In this case, bend the plate C ③ so that dimension A is 0.5mm or larger.

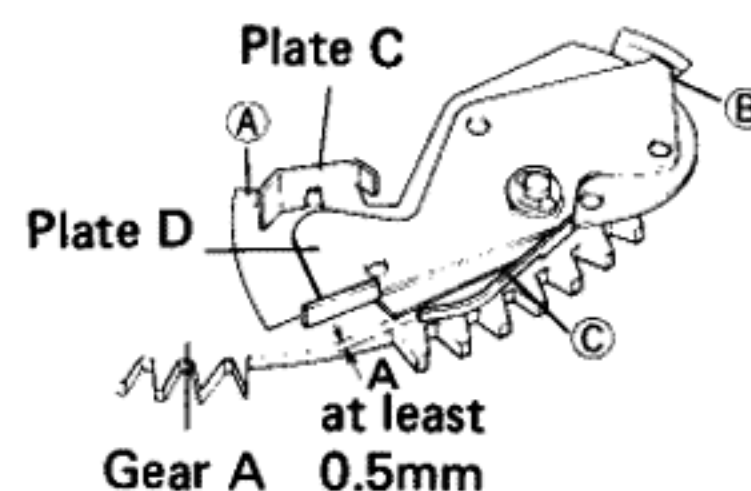


Fig. 1-6 Incomplete plate D and plate C.

6.2 RETURN IS FAST (RETURN AT 1mm PITCH)

Protrusions on the pinion gear section. See ②

Procedure for Dealing with Item ②

If there are rough areas of plastic protruding from the ① section of the protruding section of the pinion gear, the return function may operate at a pitch of only 1mm. In this case, remove the plastic protrusions completely (Fig. 6-2).

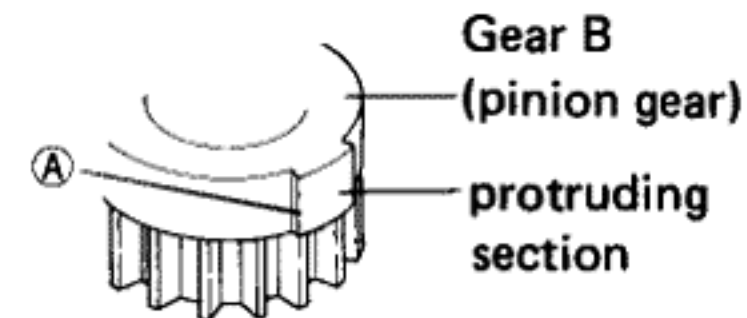


Fig. 6-2 Elimination of pinion gear protrusions.

7. PRECAUTIONS FOR REASSEMBLY

Follow these directions and precautions when reassembling a unit after completing repairs. Be sure to lubricate as required, make no mistakes when attaching parts, and avoid all other careless mistakes that may be the cause of trouble later on.

7.1 AREAS THAT REQUIRE LUBRICATION

NOTE:

Types of lubricants and areas where they are used are listed in table 1.

Table 1

Type of Oil	Areas used
Silicon Oil #50000	raising shaft
GYA-008	all other areas

Lubrication points are specified for oils other than GYA-008. Never use a different type of oil.

• Cam Section

Apply oil to the heart-shaped grooved section (rear side of the cam) and lock plate sliding section in order to minimize wear on the sliding section and the burden on the mechanism.

• Driving Plate Assembly

Decrease the burden on the mechanism and the wear on the sliding section.

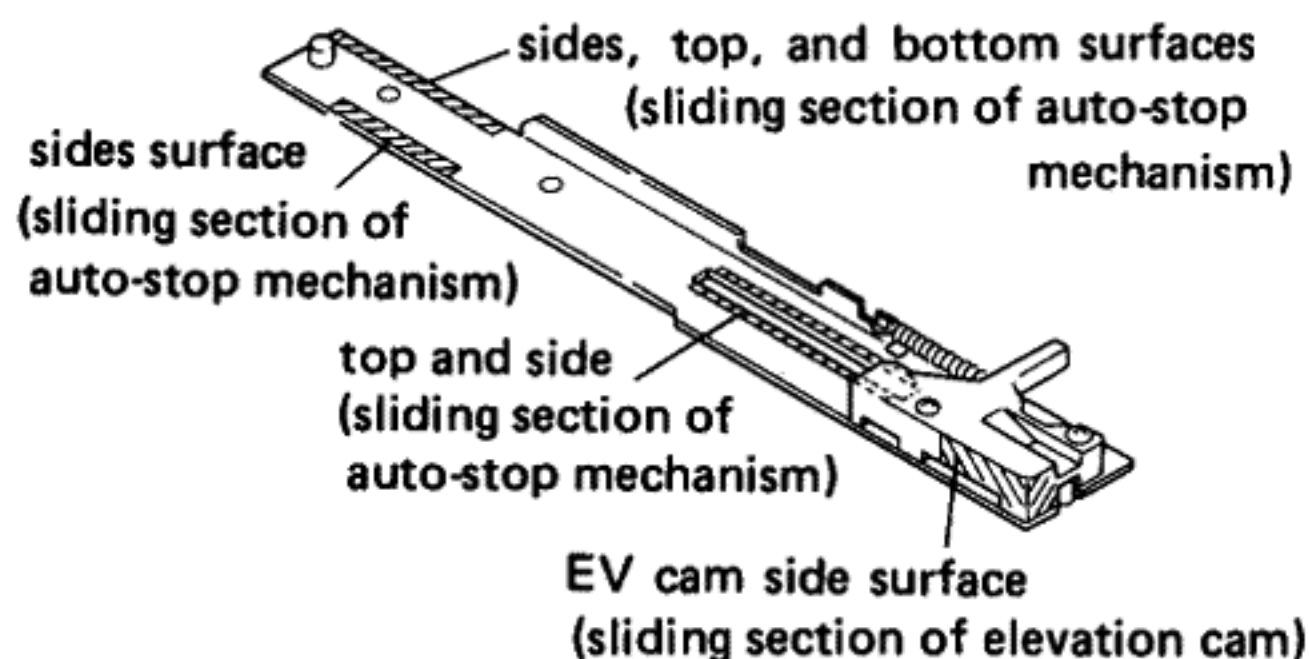


Fig. 7-1 Driving panel assembly section Switch Locker Section

• Switch Locker Section

Apply oil to the switch locker (opening) and sub-panel base sliding section to decrease the burden on the mechanism.

When applying oil to the opening (shaft hole), do not apply any oil 2—3mm from the bottom surface. If oil is applied 2—3mm within the bottom surface, it may come out the bottom and go between the switch lever and sub-panel base causing the switch lever to operate ineffectively.

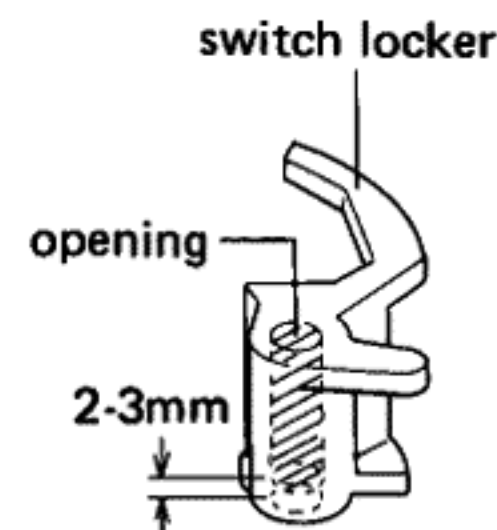


Fig. 7-2 Switch locker section

• EV Lever Unit Section

Apply oil to the sliding sections of leaf spring (A) and EV lever unit to decrease the burden on the mechanism.

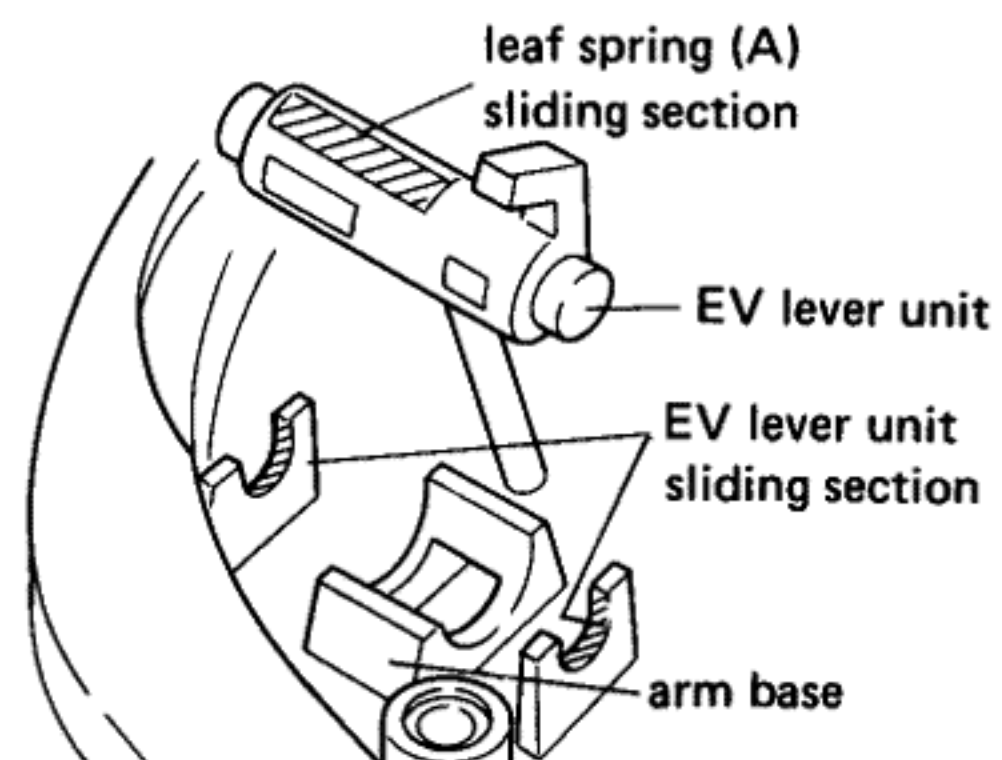


Fig. 7-3 EV lever unit section

- **Elevation Cam Section**

Apply oil to the elevation cam and sliding section of the raising shaft to decrease the burden when operated.

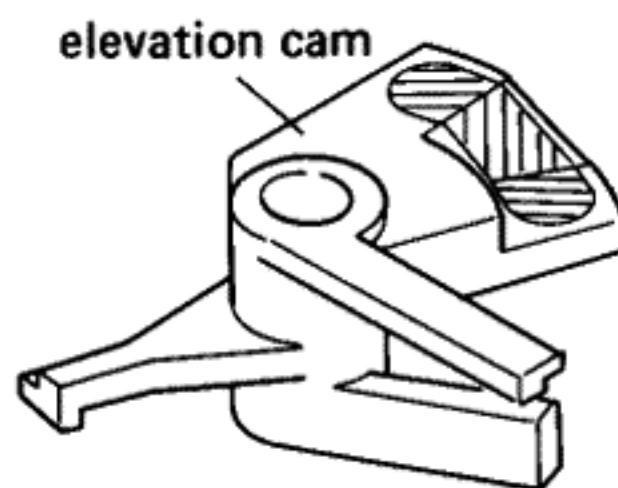


Fig. 7-4 Elevation cam section

- **EV Sheet Section**

Apply oil to the raising shaft and sliding section of the bearing to assure stability in the elevation lowering speed.

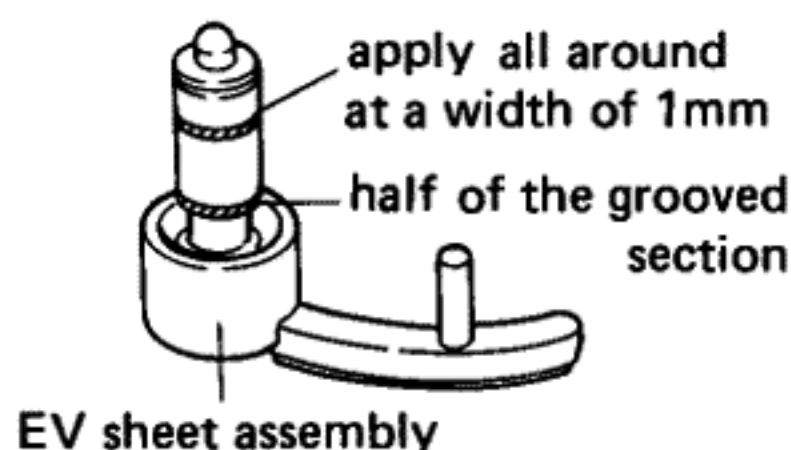


Fig. 7-5 EV sheet section

7.2 PRECAUTIONS FOR ATTACHMENT OF PARTS AND REASSEMBLY

- **Cam Assembly Attachment**

The cam assembly is attached by letting the lock plate go in the direction ① as shown in figure 7-6.

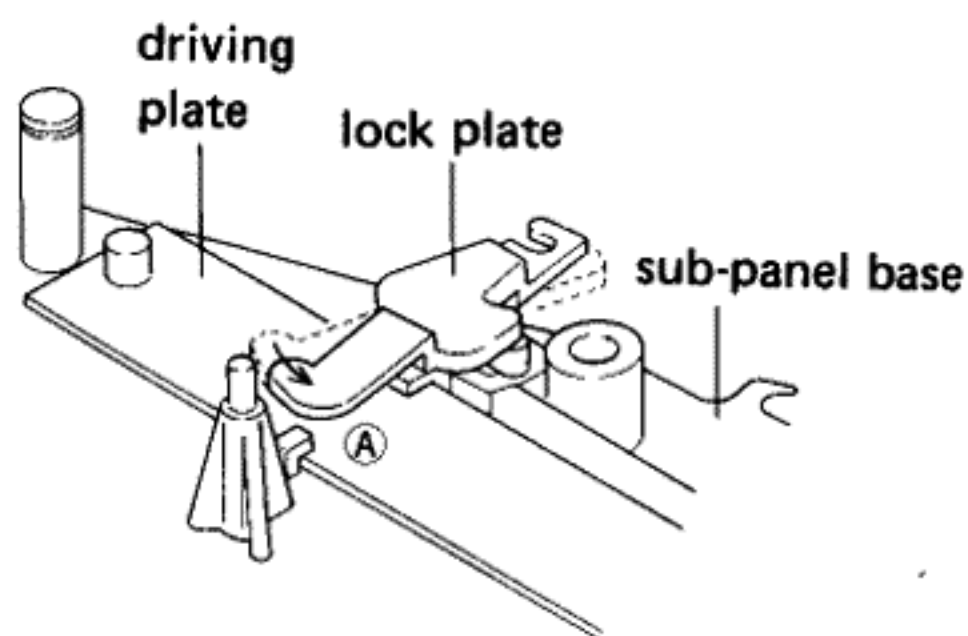


Fig. 7-6 Cam assembly attachment

- **PU Plate Attachment**

Push the PU plate into place so that the PU plate bearing section touches the revolution shaft attachment nut. Installation direction is as shown in figure 7-7. Note that there is a difference between auto-return and fully automatic models.

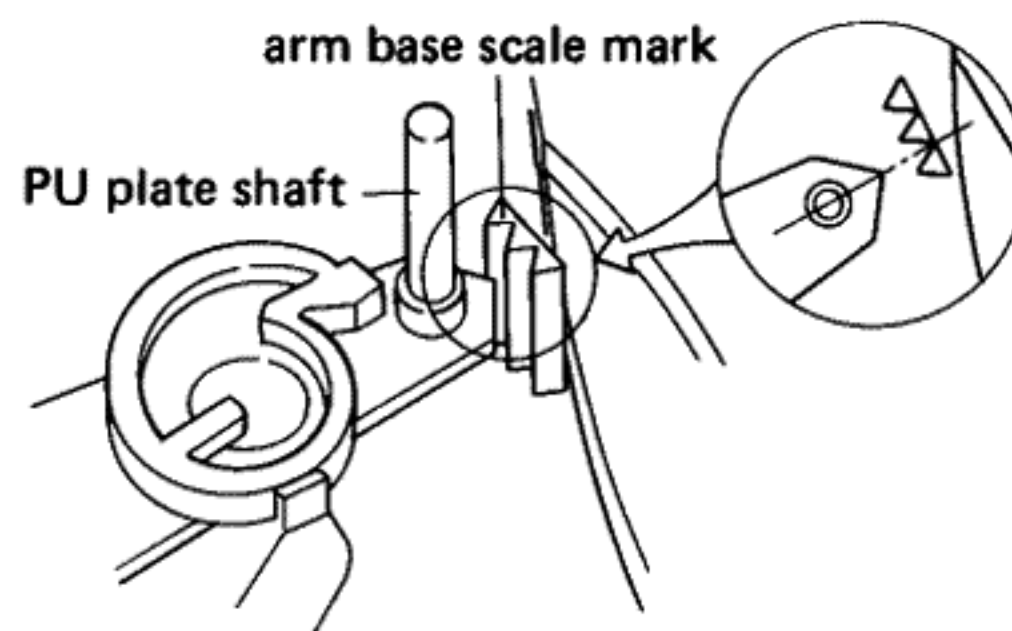


Fig. 7-7 PU plate attachment

- **Anti-Skating Knob Attachment**

When installing the AS knob, put the AS knob rib against the AS knob revolution control stopper (attached to the arm base) and affix with the screw. As the stopper may break, be sure to press the AS knob down firmly when installing it.

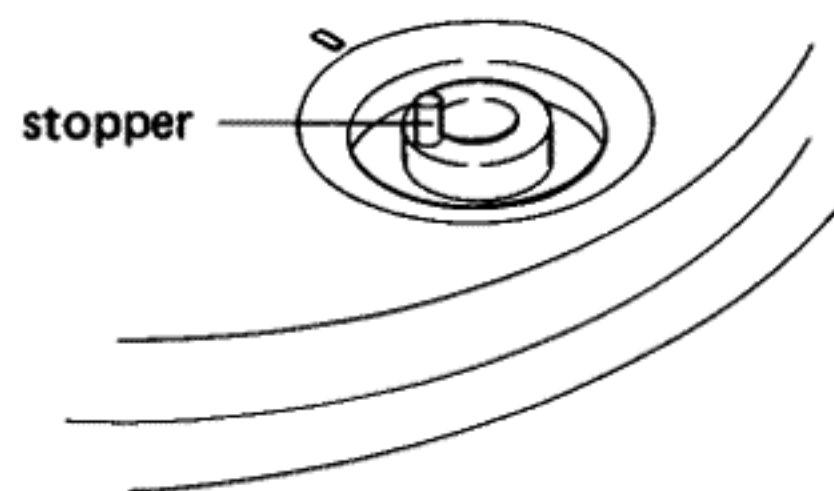


Fig. 7-8 AS knob attachment

- **Arm Base Attachment**

When attaching the arm base section to the mechanism section, put the mechanism section switch locker and switch lever in the locked position and verify that the tonearm is in the arm rest location. Also be sure to put the manual elevation lever in the up position and check that the PU plate shaft is in the position shown in figure 7-9.

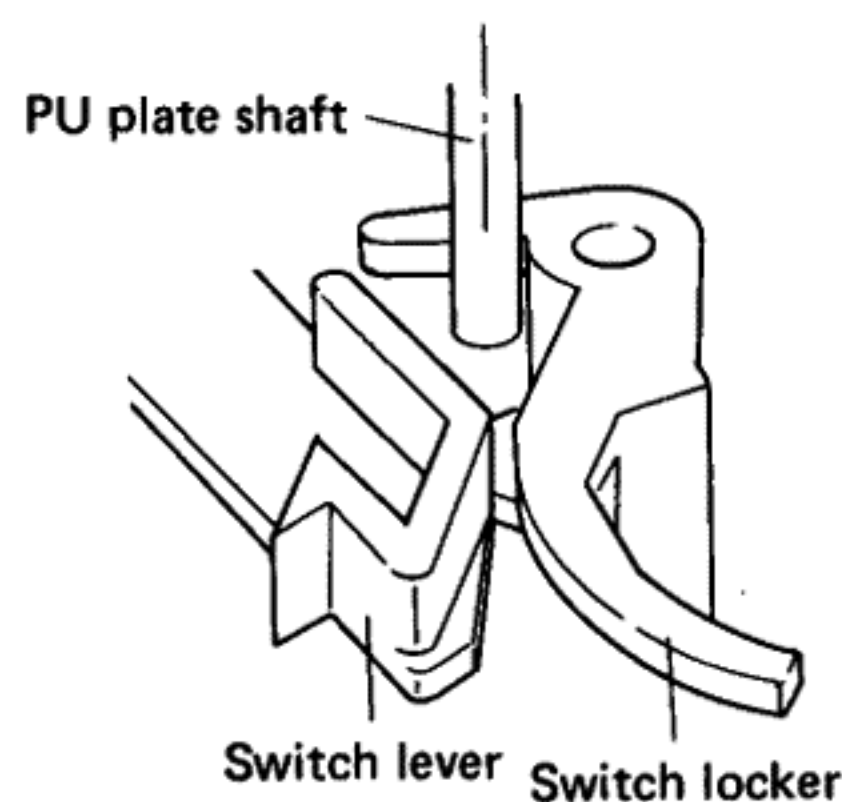


Fig. 7-9 Arm base attachment

8. EXPLODED VIEWS

8.1 EXTERIOR

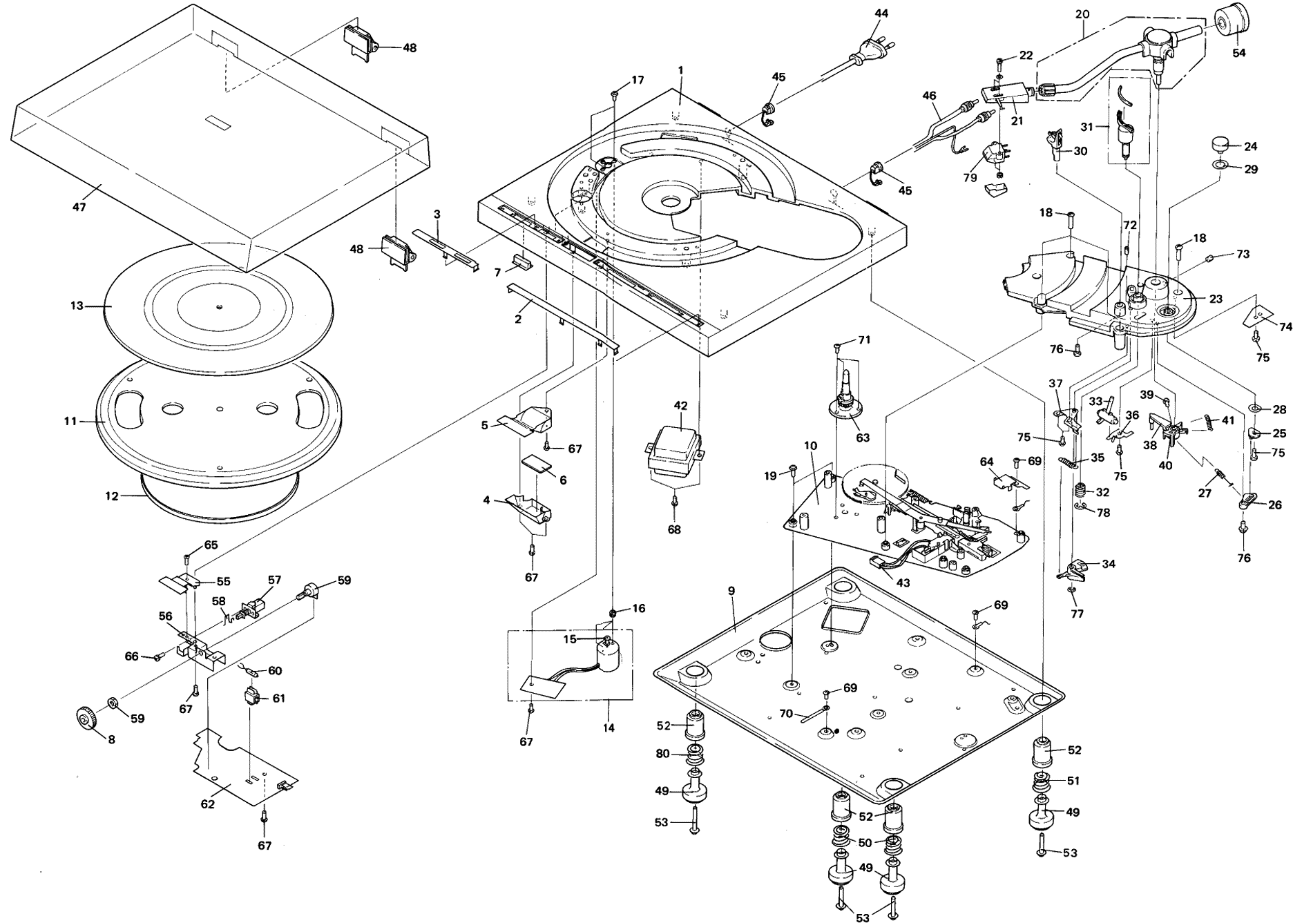
NOTE:

- Parts without part number cannot be supplied.
- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

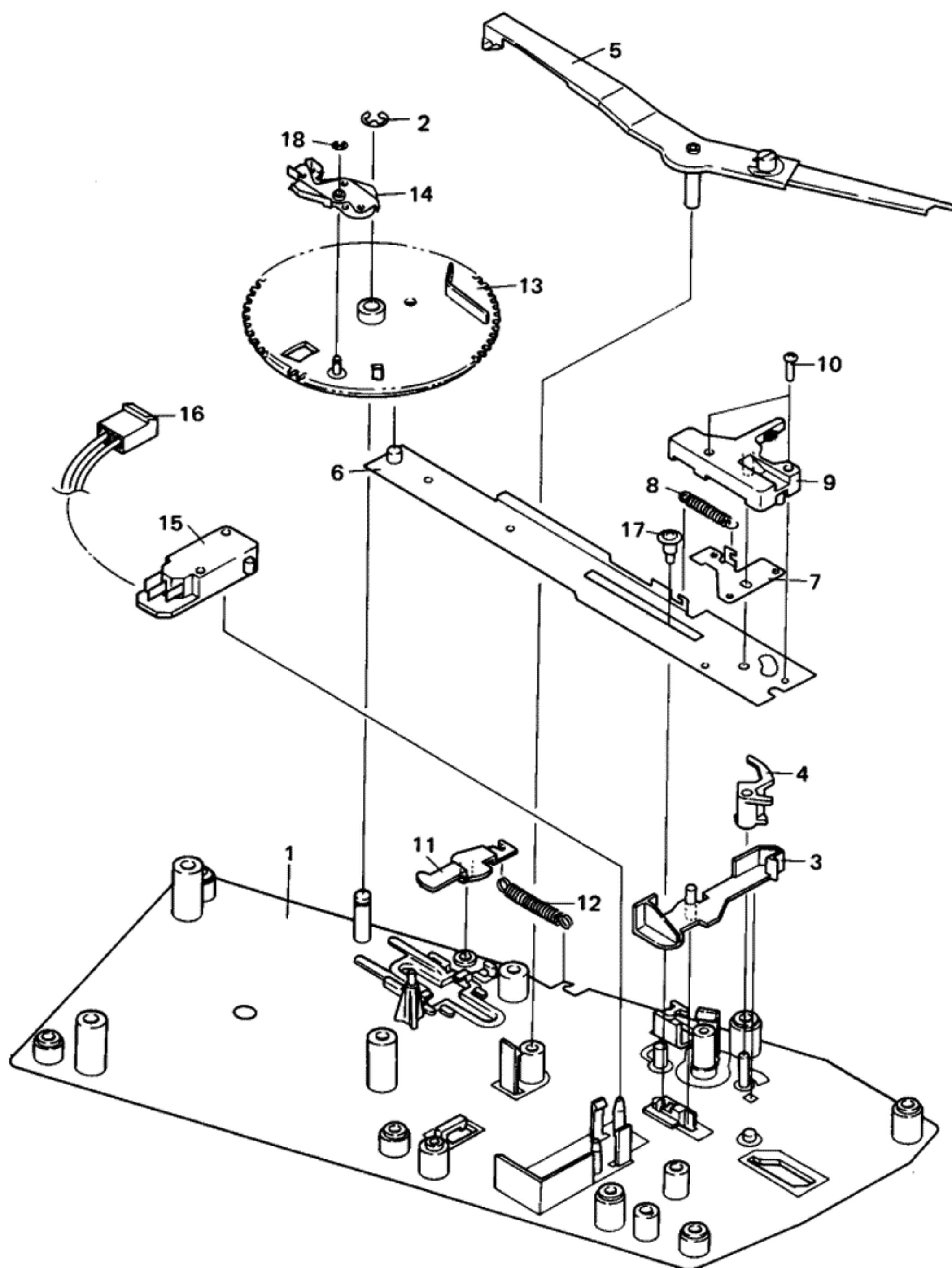
Parts list

Key No.	Part No.	Description	Key No.	Part No.	Description
1.	PNX-151	Panel	46.	PDE-044	PU cord
2.	PAM-068	Name plate	47.	PNV-034	Dust cover
3.	PAM-069	Name plate	48.	PXB-155	Hinge assembly
4.		Lens holder	49.	PNX-062	Foot case
5.	PNX-051	Lens	50.	PBH-264	Foot spring (A)
6.		Mirror	51.	PBH-265	Foot spring (B)
7.	PAC-043	Push button	52.	PEB-163	Rubber cushion
8.	PAC-047	Knob	53.	PBA-099	Screw
9.		Base plate	54.	PXA-841	Weight assembly
10.		Sub-panel assembly	55.		Button guide C
11.	PNR-140	Turntable platter	56.		Angle
12.	KEB-004	Belt	57.	PSG-020	Push switch
13.	PEB-150	Rubber mat	58.	PBH-261	Spring
14.	PYY-071	Motor assembly	59.	PCS-016	Variable resistor
15.		Motor pulley	60.	PEL-042	Neon lamp
16.	PEB-172	Rubber cushion	61.	PNX-074	Neon lamp base
17.	PBA-112	Screw	62.		Power supply assembly
18.	PBA-108	Screw M3x25	63.	PXB-177	Shaft assembly
19.	PBA-109	Screw	64.	PNC-132	Plate
20.	PPD-603	Arm assembly	65.	VBZ30P100FMC	Screw
21.	PXA-792	Head shell assembly	66.	PMZ30P050FMC	Screw
22.	PBA-905	Screw	67.	PPZ30P080FMC	Screw
23.	PNX-152	Arm base	68.	PLZ40P120FMC	Screw
24.	PAC-045	AS knob	69.	PDZ30P050FMC	Screw
25.	PNX-054	AS washer	70.		Cord clasper
26.	PNX-055	Base lever	71.	PDZ30P080FMC	Screw
27.	PBH-236	AS spring	72.	ZMR30H120FZK	Screw
28.	PBE-012	AS spring washer	73.	ZMD40H080BT	Screw
29.	PBF-005	AS knob washer	74.		Terminal
30.	PXB-094	Arm rest assembly	75.	VBZ30P080FMC	Screw
31.	PXB-107	EV sheet assembly	76.	IPZ30P100FMC	Screw
32.	PBH-237	EV spring	77.	YE30S	E type washer
33.	PXT-382	EV lever unit	78.	YE70S	E type washer
34.	PNX-059	EV cam	79.	PXT-910	Cartridge (without stylus)
35.	PBH-238	EV cam spring	80.	PBH-266	Foot spring (C)
36.	PBK-042	EV plate spring (A)	PL-100X		
37.	PXT-413	EV plate spring (B) unit			
38.	RNX-060	PU plate (A)	Key No.	Part No.	Description
39.		Set screw	1.	PNX-155	Panel
40.	PNX-061	PU plate (B)	2.	PAM-070	Name plate
41.	PBH-259	PU plate spring	3.	PAM-071	Name plate
 42.	PTT-107	Power transformer	20.	PPD-609	Arm assembly
43.		Connector assembly	21.	PXA-791	Head shell assembly
 44.	PDG-021	AC power cord (WE)	23.	PNX-156	Arm base
	RDG-022	AC power cord (WB)	24.	PAC-041	AS knob
	PDG-020	AC power cord (WP)			
45.	PEC-056	Strain relief			

Exterior



8.2 SUB-PANEL



Parts list

Key No.	Part No.	Description	Key No.	Part No.	Description
1.		Sub-panel unit	11.	PNX-035	Lock plate
2.	YE40S	E type washer	12.	PBH-225	Lock plate spring
3.	PNX-030	Switch lever	13.	PNX-036	Cam
4.	PNX-031	Plate	14.	PYY-058	Return signal unit
5.	PXT-355	Lever unit	15.	PSF-009	Microswitch
6.		Operation lever assembly	16.	PDE-079	Connector assembly
7.	PNC-126	Start plate	17.	PBA-103	Screw
8.	PBH-224	Start plate spring	18.	YE15S	E type washer
9.		EV cam			
10.	PMK26P100FMC	Screw			

9. SCHEMATIC DIAGRAM,P.C.BOARDS CONNECTION DIAGRAM AND PARTS LIST

NOTE:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	56 × 10 ¹	561	RD½PS 561 J
47kΩ	47 × 10 ³	473	RD½PS 473 J
0.5Ω	0R5		RN2H 0R5 K
1Ω	010		RS1P 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	562 × 10 ¹	5621	RN¼SR 5621 F
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- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

9.1 PARTS LIST

Power Supply Assembly

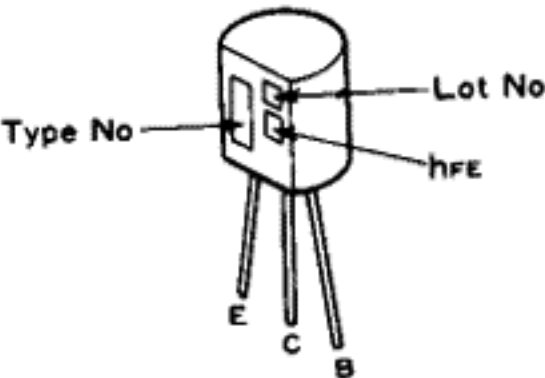
Part No.	Symbol & Description
2SC1959-Y	Q1
PCX-010	D1
WZ-120	D2
CEA 102M 25L	C2
CKDYF 103Z 50	C3
 PCL-039	C5
RS2PF 361 J	R1
RD½PS 152J	R2
RS2HSFB 333JL	R4
PCS-016	VR1
PSG-020	Volume Push switch
 PEL-042	Neon lamp
PBH-261	Push button spring
 PEK-039	Fuse

Motor Assembly (PYY-071)

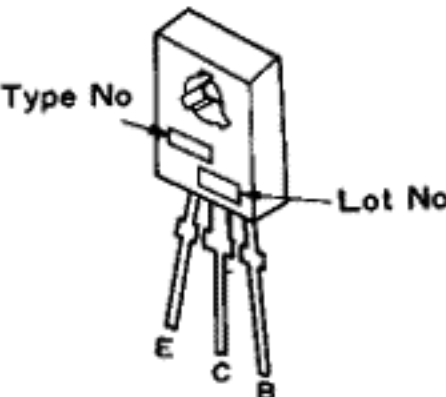
Part No.	Symbol & Description
2SD947	Q1
EVN-31AA00B24	VR2, VR3
ERD-78TJ103	R1
ERO-25CKF2002	R2
ERO-25CKF6201	R3

Appearance of Transistors ICs

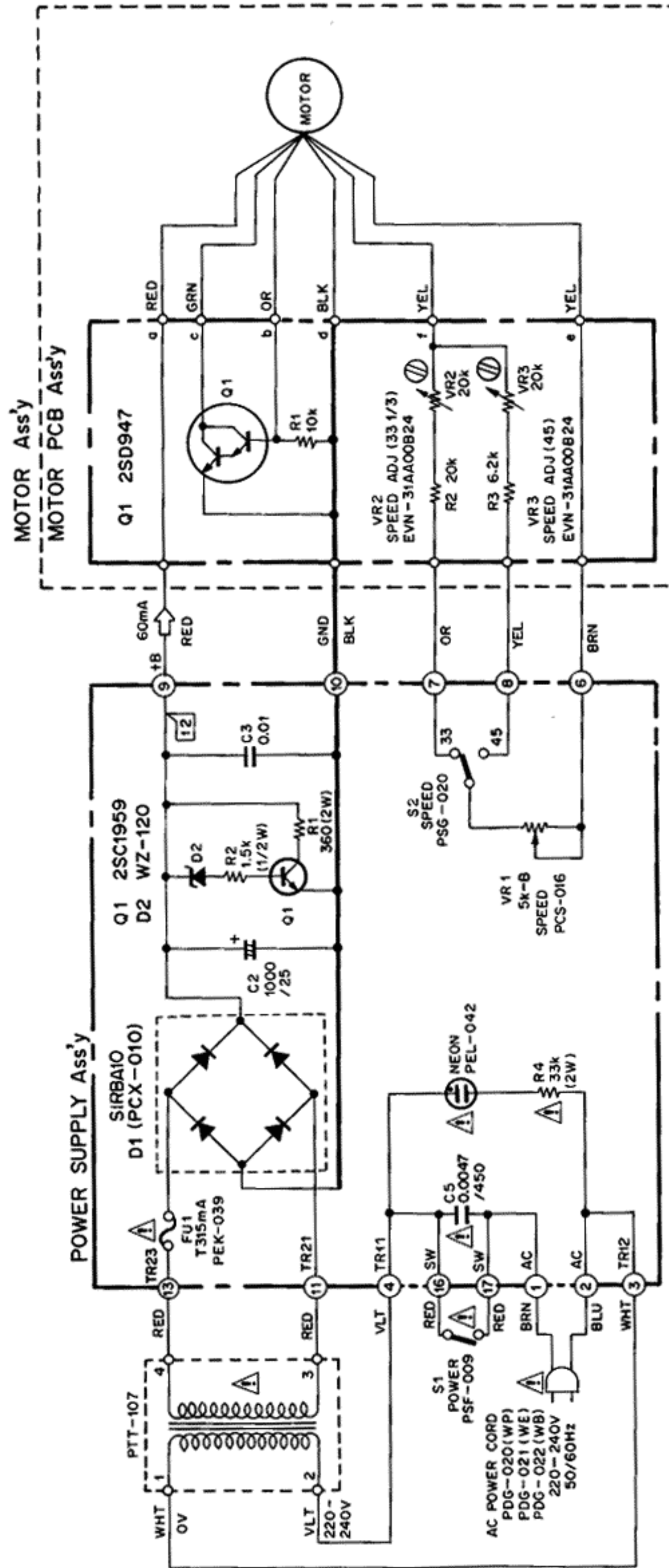
2SC1959



2SD947



9.2 SCHEMATIC DIAGRAM



1. RESISTORS:

Indicated in Ω , $\frac{1}{2}W$, $\pm 5\%$ tolerance unless otherwise noted k : k Ω ,
M : M Ω , (F) : $\pm 1\%$, (G) : $\pm 2\%$, (K) : $\pm 10\%$ tolerance

2. CAPACITORS:

Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:

$\square$: DC voltage (V)
 $\triangle$: mA : DC current

4. OTHERS:

$\odot$: Adjusting point.

The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

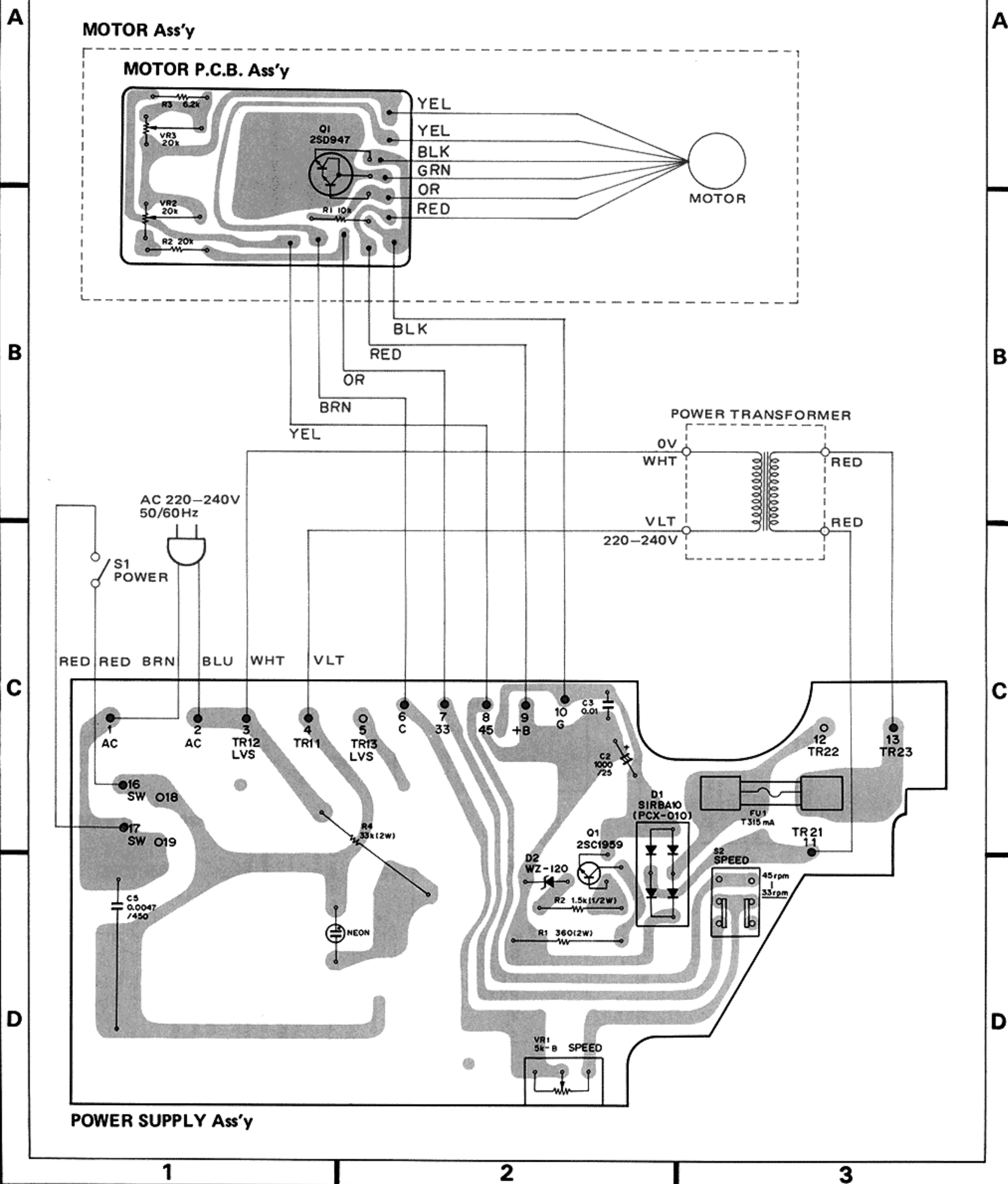
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:

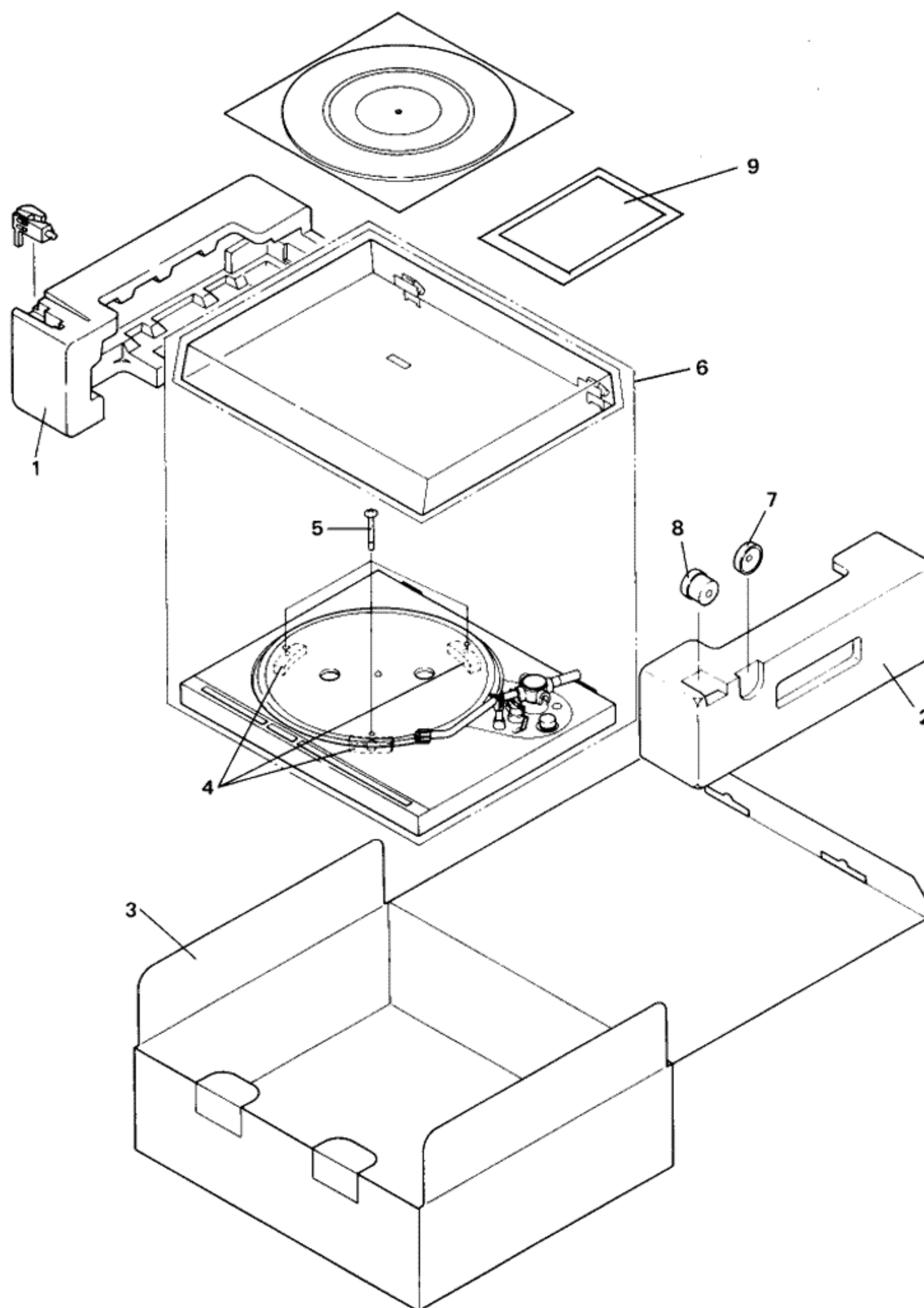
S1 POWER ON - OFF
S2 SPEED 33 1/3rpm - 45rpm

The underlined indicates the switch position.

9.3 P.C. BOARDS CONNECTION DIAGRAM



10. PACKING



Parts list

Key No.	Part No.	Description
1.	PHA-107	Side protector L
2.	PHA-108	Side protector R
3.	PHG-414	Packing case
4.	PNX-064	Turntable platter packing
5.	PBA-100	Screw
6.		Viny bag
7.	N93-603	45 adaptor
8.	PXA-841	Weight assembly
9.	PRB-162	Operating instructions
	PRD-054	Operating instructions (WE) (French/German)

PL-100X

Key No.	Part No.	Description
3.	PHG-416	Packing case
9.	PRB-167	Operating instructions
	PRD-055	Operating instructions (WE) (French/German)

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