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Service Manual

STEREO TURNTABLE

PL-500X

PIONEER®

MODEL PL-500X COMES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
HET	220V and 240V (Switchable)	Europe model (Without cartridge)
HBT	220V and 240V (Switchable)	United Kingdom model (Without cartridge)

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For description of the D. D. motor, refer to the PL-630 service manual (ART-314) and for full auto mechanism, refer to the PL-3000 service manual (ART-350).

1. SPECIFICATIONS

Motor and Turntable

Drive System ..... Direct-drive
Motor ..... Quartz PLL Hall motor
Turntable Platter ..... 330mm diam. aluminum alloy die-cast
Moment of Inertia ..... 300kg-cm² (including platter mat)
Speeds ..... 33-1/3 and 45rpm
Wow and Flutter ..... Less than 0.025% (WRMS)
Signal-to-Noise Ratio ..... More than 75dB (DIN-B)
(with Pioneer cartridge model PC-200)

Rotational Characteristics

Build-up Time ..... Within 120° rotation at 33-1/3rpm
Speed Deviation ..... Less than 0.002%
Speed vs. Load Characteristics ..... Stable up to 150 grams drag load
Speed Drift ..... Less than 0.00008%/h at 33-1/3rpm
Less than 0.00003%/degree temp. change at 33–1/3rpm

Tonearm

Type ..... Static-balance type, S-shaped pipe arm
Effective Arm Length 221mm
Overhang 15.5mm
Usable Cartridge Weight ..... 4g (min.) to 10g (max.)

Subfunctions

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

Semiconductors

ICs 3
Transistors 3
Diodes 3
Hall Elements 3

Miscellaneous

Power Requirements ..... 220/240V ~ (switchable), 50, 60Hz
Power Consumption 10W
Dimensions ..... 440(W) x 140(H) x 388(D)mm
17-15/16(W) x 5-1/2(H) x 15-1/4(D)in.
Weight ..... 9.1kg/20 lb

Accessories

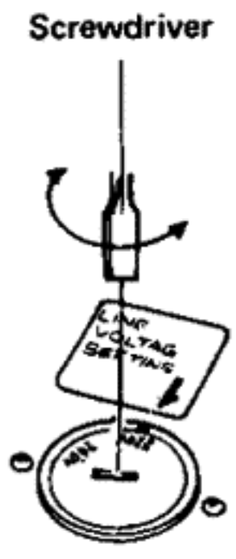
EP Adapter 1
Screwdriver 1
Cartridge mounting parts
Cartridge mounting screws 6
Cartridge mounting nuts 2
Cartridge mounting washers 2
Operating Instructions (French and German furnished on models for HET) 1

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

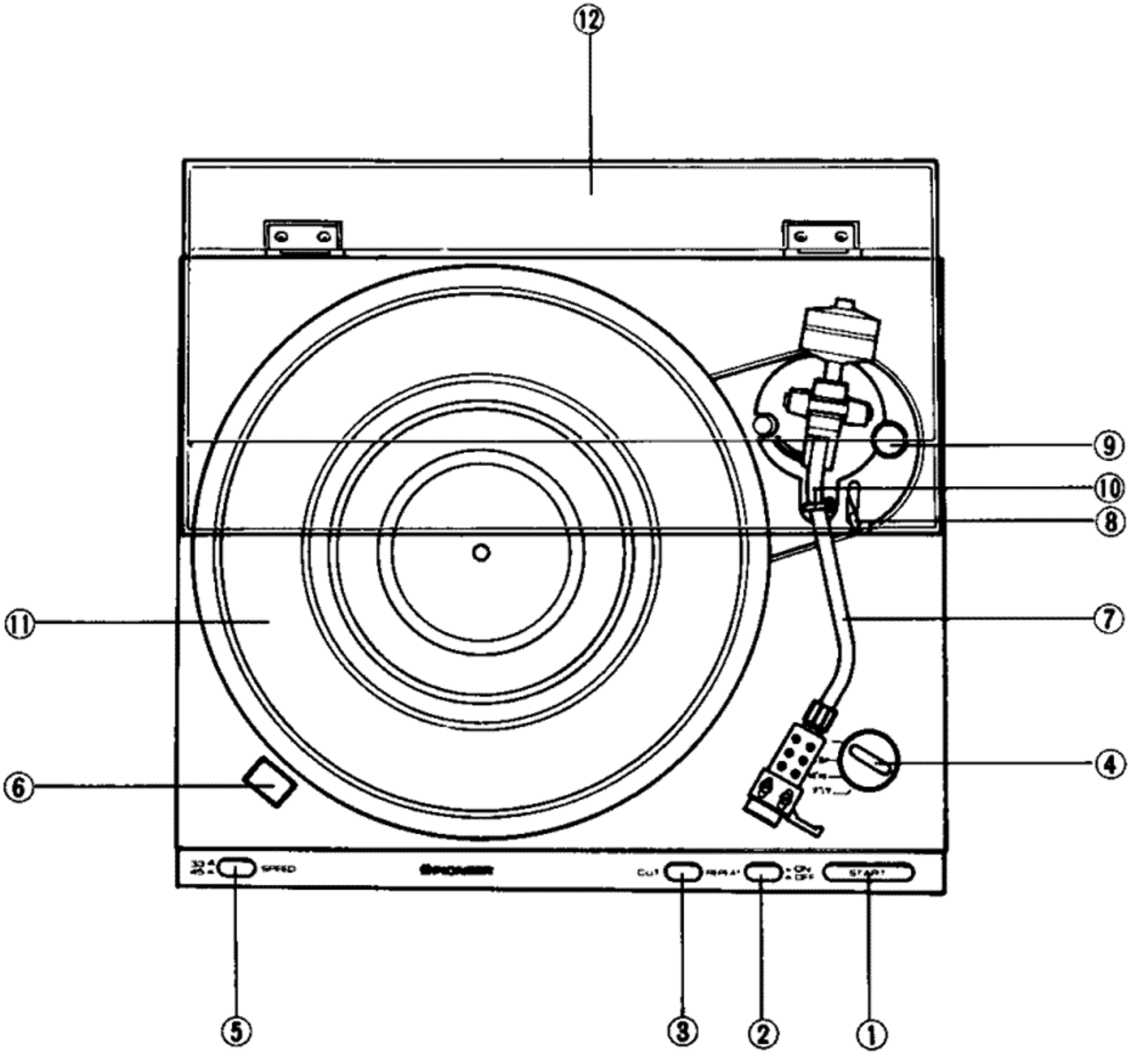
LINE VOLTAGE SELECTOR SWITCH

The line voltage selector switch is located on the top surface of the cabinet of this turntable. Before your turntable is shipped from the factory, the switch is set to the power requirements of the turntable's destination, check that it is set properly before plugging the power cord into the outlet. If the voltage is not properly set or if you move to an area where the voltage requirements differ, adjust the selector switch as follows:

1. Disconnect the power cord.
2. Provide yourself with a medium-sized screwdriver. Insert the tip of the screwdriver into the groove of the selector switch and turn it so that the power voltage marking of your area points to the white mark by the arrow on the label.



2. PANEL FACILITIES



① START BUTTON

When this button is depressed, the power is turned on to the turntable, the strobe light comes on and the platter starts to rotate. With the RECORD SIZE SELECTOR set at one of the positions — 30, 25, or 17 — the tonearm moves automatically to the record disc as the platter starts rotating, thus starting record play

② REPEAT BUTTON

Push this button when you want to listen to the same record again. Press the button once more to release.

NOTE:
All you have to do for repeat play is to press the REPEAT button. There is no need to push the START and CUT button again.

③ CUT BUTTON

If this button is depressed while the record is playing, the tonearm automatically returns to the arm rest, and the power to the turntable will be cut off.

④ RECORD SIZE SELECTOR

This selector selects the size of the record for automatic play and also selects manual play.

7"17 . . . . For the automatic play of 17cm (7-inch) LP and EP records.
10"25 . . . . For the automatic play of 25cm (10-inch) LP records.
12"30 . . . . For the automatic play of 30cm (12-inch) LP records.
MANUAL . . For the manual play of records.

NOTE:
The tonearm will not be actuated when the RECORD SIZE SELECTOR is at the MANUAL position for play, even if the START button and the REPEAT button are pushed.

⑤ 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 release position, the platter will rotate at 33-1/3rpm. Release for playing 33-1/3rpm records like LP's.

⑥ STROBE LIGHT

This light comes on when the tonearm moves away from the arm rest toward the platter. It irradiates the stroboscope around the outside of the platter.

⑦ TONEARM

This tonearm is designed to apply the correct tracking force to the cartridge and to keep this force at the precise level for faithful tracking of the record grooves.

⑧ ARM-ELEVATION LEVER

This lever controls the ascent and descent of the tonearm.

UP (▼) . . . . . The tonearm rises.
DOWN (▼) . . The tonearm descends gently.
Set to this position for auto play, auto repeat and other automatic operations.

NOTE:
When the ARM ELEVATION lever is set to the UP position for automatic play, the tonearm will move over as far as the lead-in groove on the record but it will not descend and the record will therefore not be played.

⑨ ANTI-SKATE KNOB

This knob is used to cancel out the harmful skating force which is generated during record play.
For further details, see "ANTI-SKATING ADJUSTMENT".

⑩ ARM REST/CLAMPER

The arm rest supports the tonearm when it is not being used. Set the tonearm on its rest when it is not playing records. Clamp it into position if you don't have any immediate plans to play records.

⑪ PLATTER/RUBBER PLATTER MAT

When the tonearm is moved and power is supplied to the turntable, the platter will start rotating at the set rotation speed. The rubber platter mat stabilizes the records and also absorbs external vibration.

⑫ DUST COVER

Keep this closed unless operating the controls or tonearm, or changing over records. This serves to keep dust from adhering to the records during record play. When fully opened and pulled straight up, this dust cover can be removed from the cabinet.

3. DISASSEMBLY

3.1 CABINET (See Fig. 3-1)

1. Remove the dust cover.
2. Undo the 4 screws securing the top cover.
3. Undo the 4 screws located in the rubber feet.
4. Move the tonearm over towards the center shaft as shown in the diagram.
5. Disconnect the connectors when lifting off the cabinet.

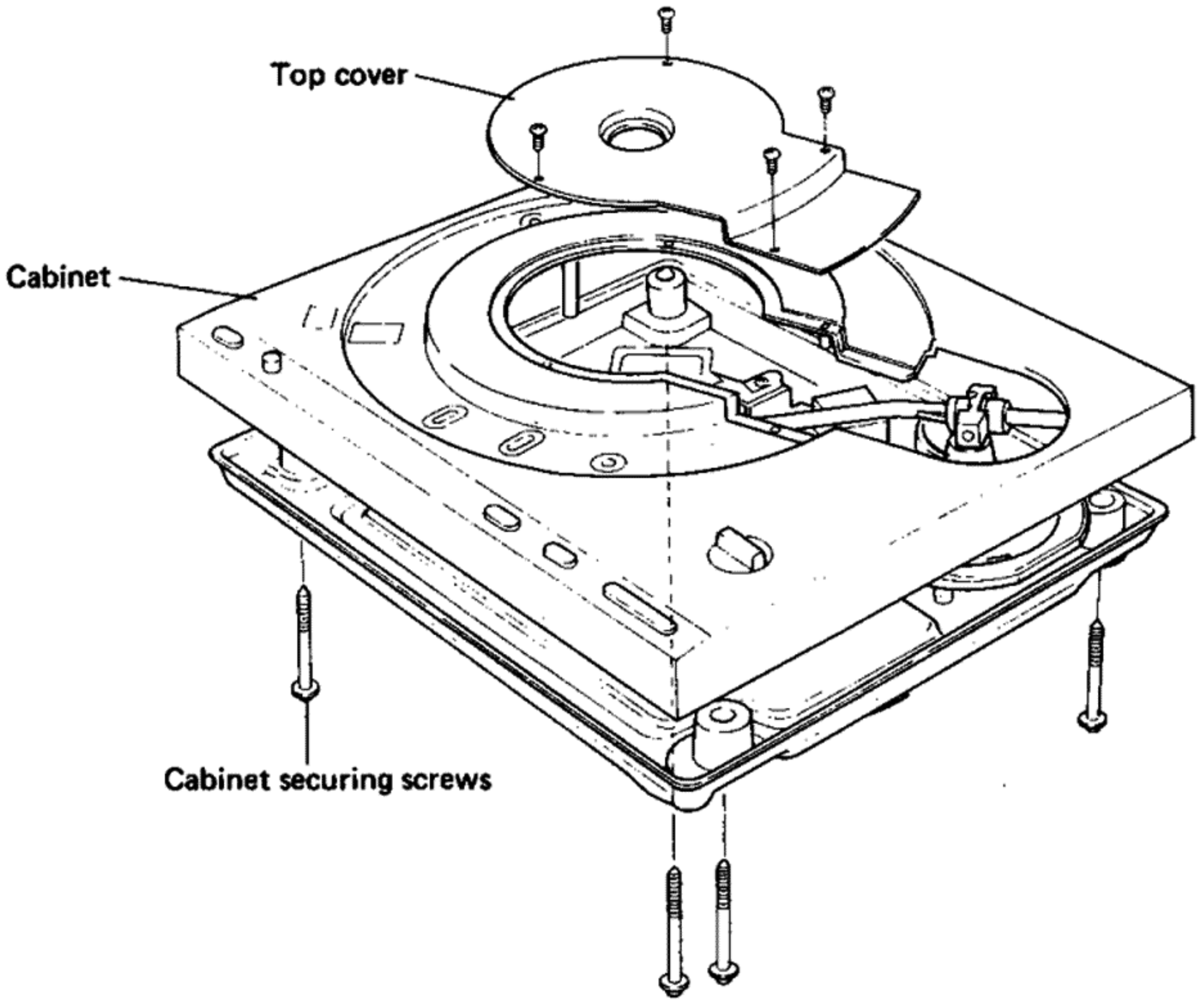


Fig. 3-1

3.2 TONEARM

1. Undo the 4 screws securing the arm base and the sub-panel (see Fig. 3-2).
2. Undo the 2 screws securing the arm base to the sub-panel (see Fig. 3-2).
3. Disconnect the tonearm lead wires from the PU board (see Fig. 3-2).
   Note that some of the lead wires have been soldered to the PU board, and must be disconnected with care.
4. Loosen the setscrews with a hexagonal wrench to remove the PU plate under the arm base (see Fig. 3-3).
5. Undo the screw securing the tonearm to the arm base (see Fig. 3-3)

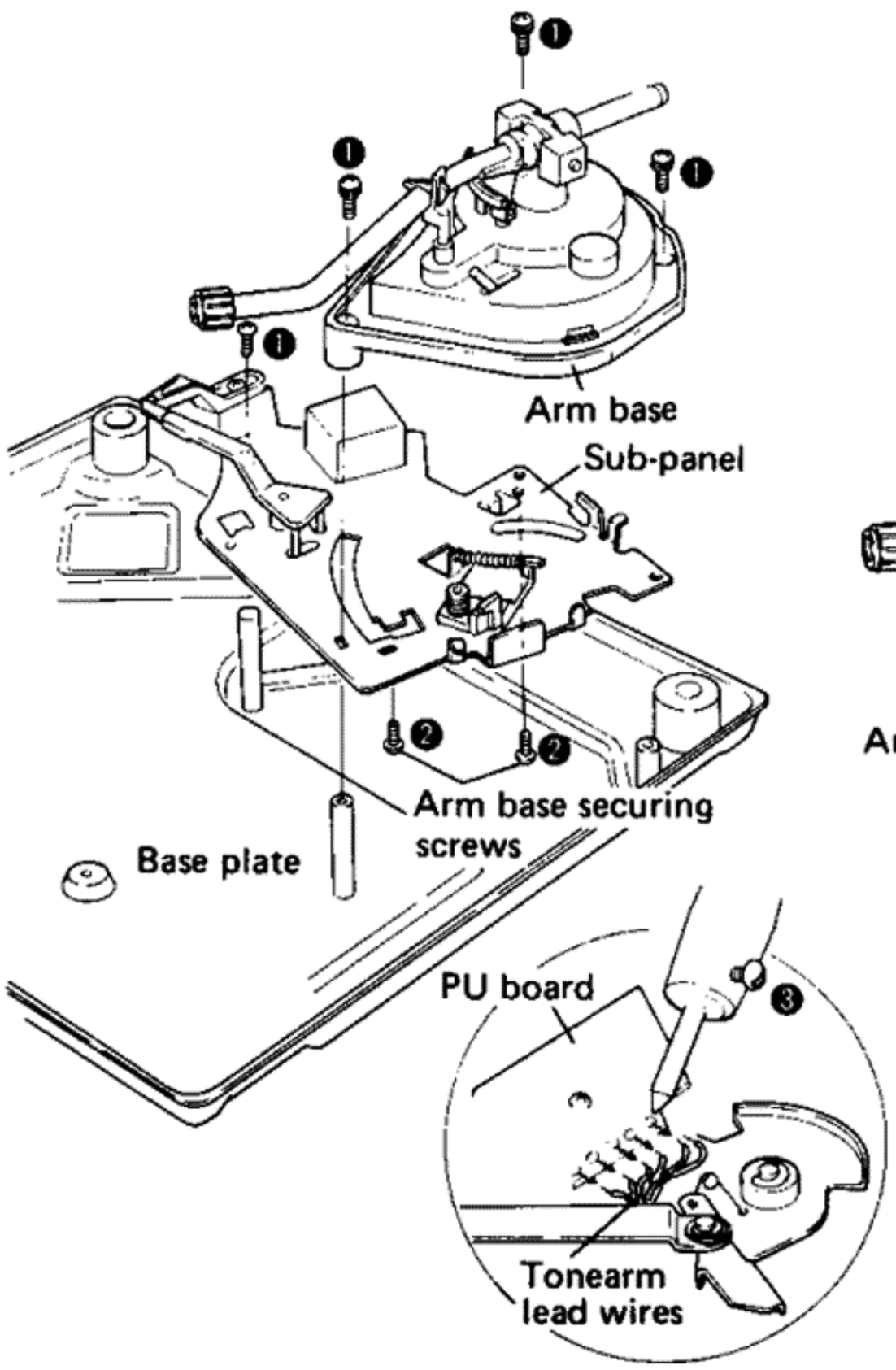


Fig. 3-2

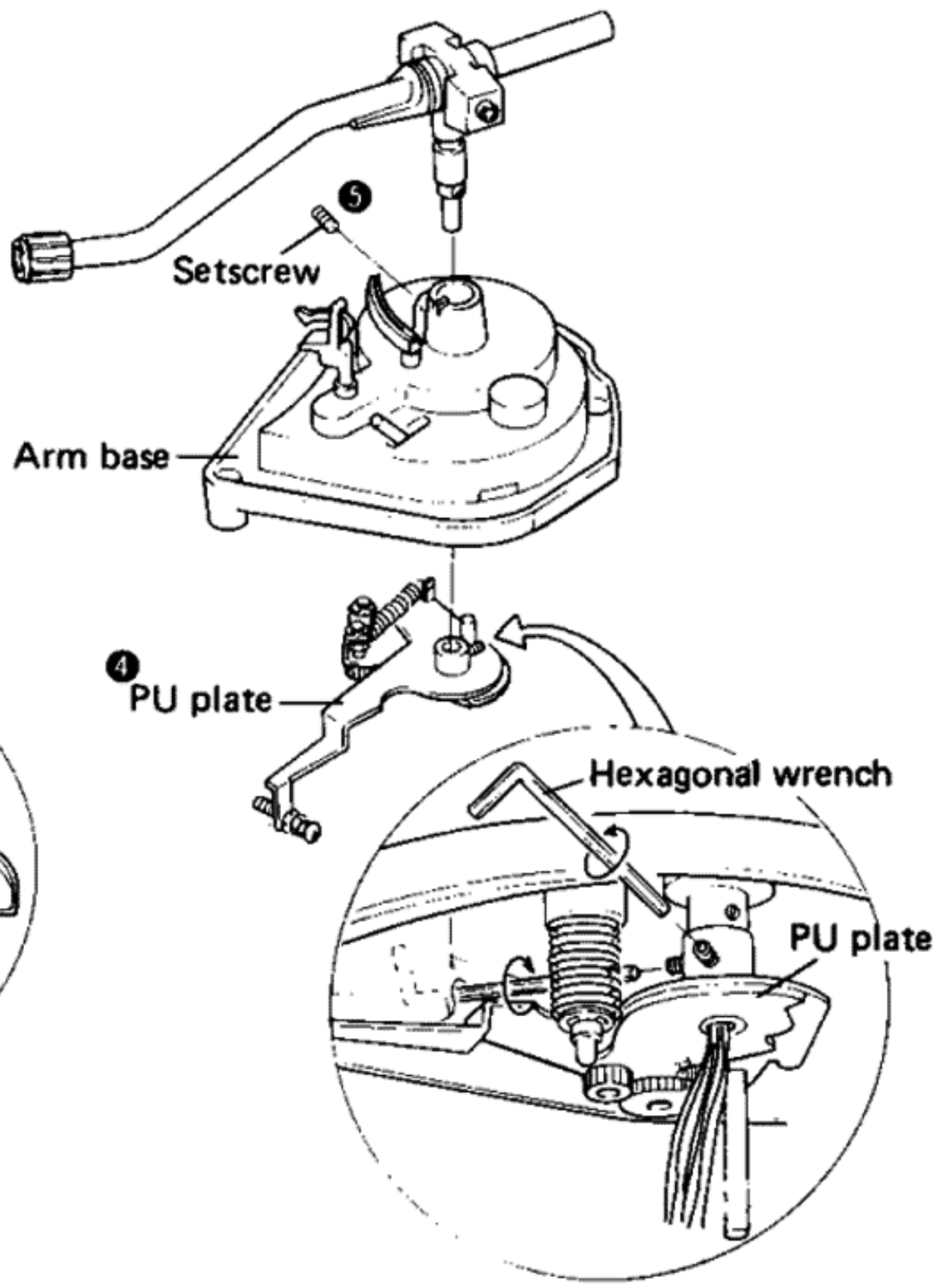


Fig. 3-3

4. ADJUSTMENTS

4.1 D.D MOTOR OPERATION ADJUSTMENT

1. Rotate the turntable platter.
2. Connect a dual-image oscilloscope (or synchroscope) to the TP3 and Q2 terminals of the circuit board ass'y.
3. Adjust VR1 (for 33-1/3 rpm) and VR2 (for 45rpm) on the circuit board ass'y in order to bring the rising edge of the TP5 terminal waveform within the width of the TP6 terminal waveform as shown in Fig. 4-2.

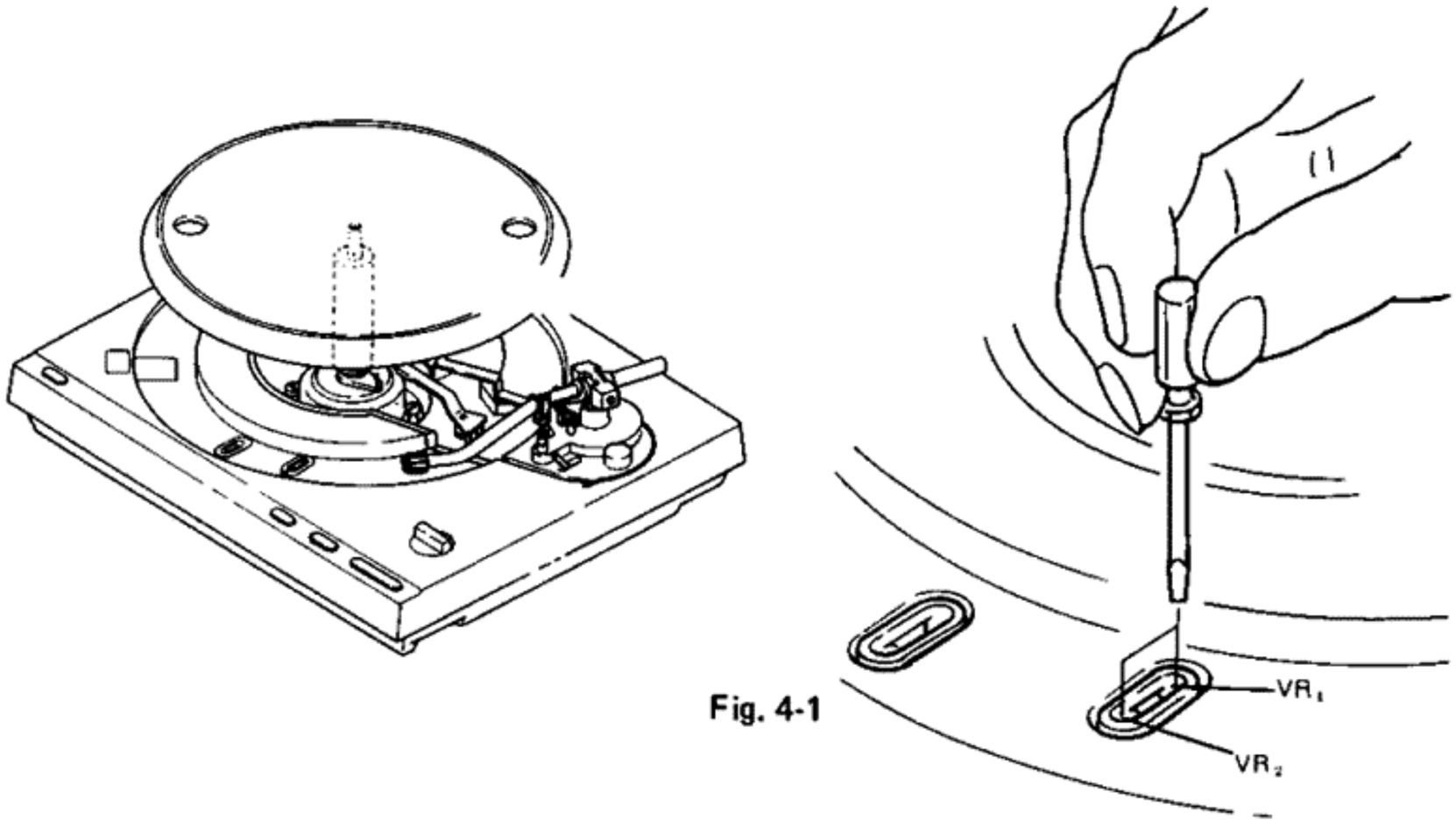


Fig. 4-1

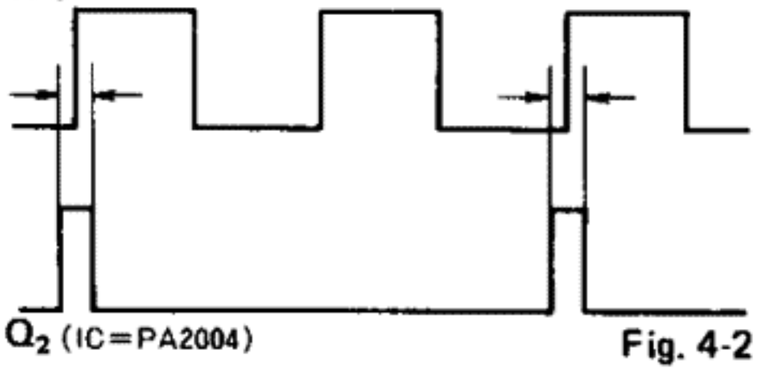


Fig. 4-2

4.2 MECHANISM ADJUSTMENTS

Prior to commencing any adjustments, check that the PU plate shaft moves along the center axis of the slot in the sub-panel as shown in Fig. 4-4.

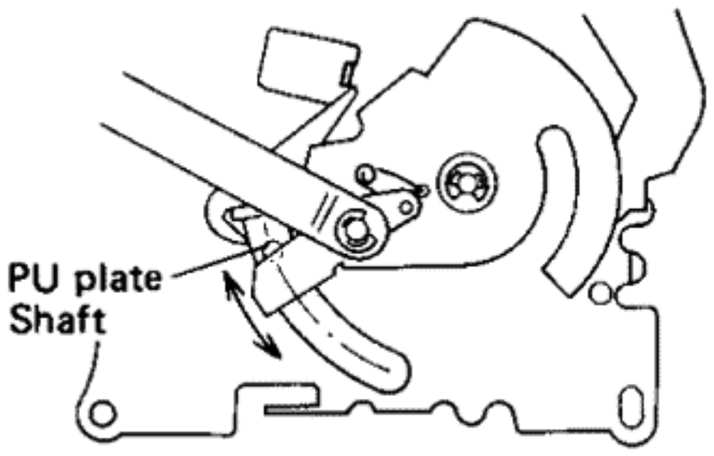


Fig. 4-4

- **Tonearm lowering position**

Tonearm lowering position is adjusted by turning an adjustment screw located in the hole at the base of the tonearm (see Fig. 4-5).

Turn the screw clockwise to move the lowering position inwards.

Turn the screw counterclockwise to move the lowering position outwards.

This adjustment may be simplified by using a test record .

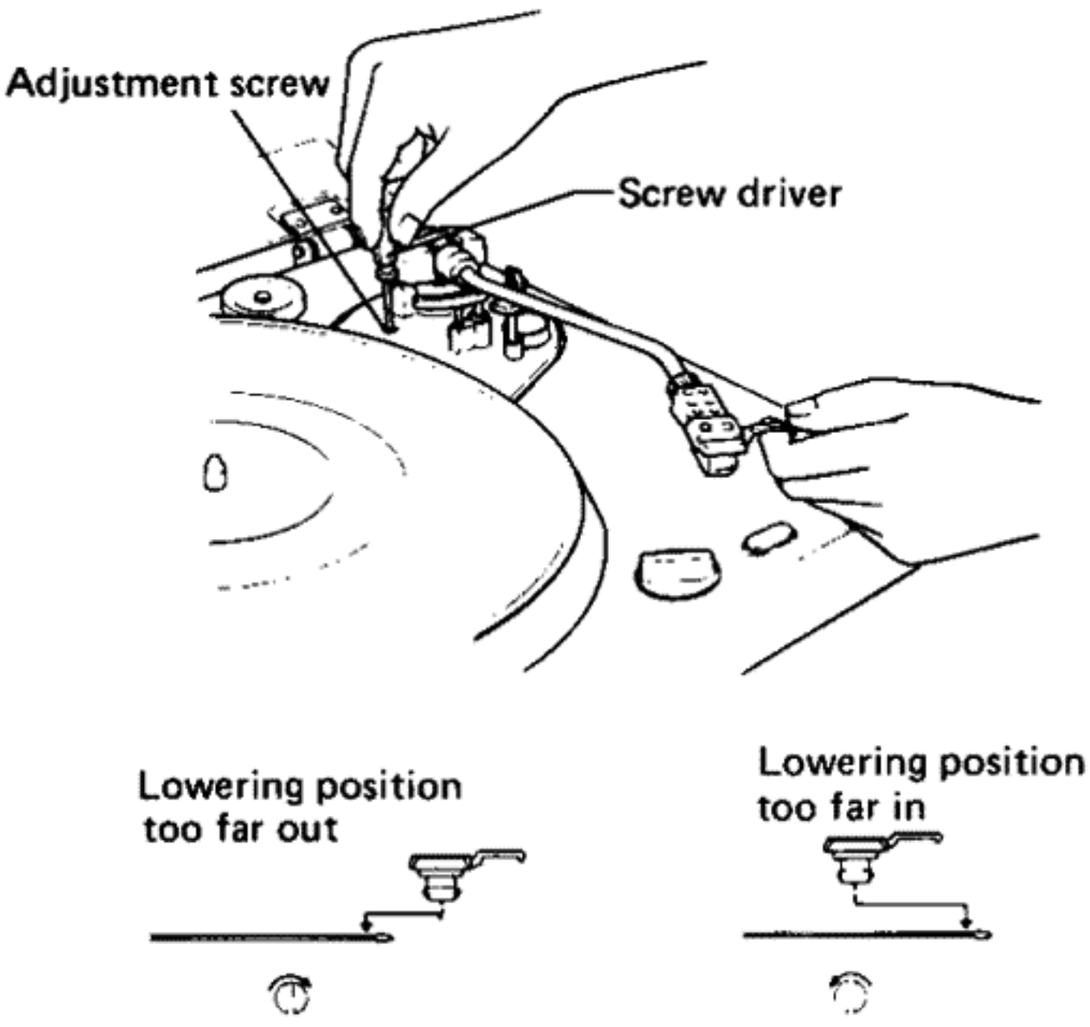


Fig. 4-5

- **Auto-return position**

1. If the tonearm returns too early, screw the PU plate screw outwards (see Fig. 4-6).
2. If the tonearm returns too slow, screw the PU plate screw inwards.

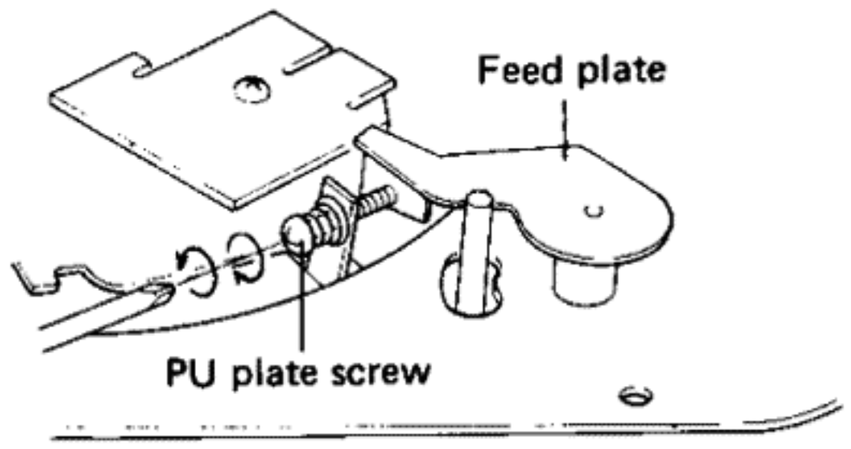


Fig. 4-6

- **Tonearm misoperation**

If the tonearm should happen to stop midway during the lead-in operation, adjust the nut shown in Fig. 4-7.

Note:
This nut should be neither too tight, nor too loose.

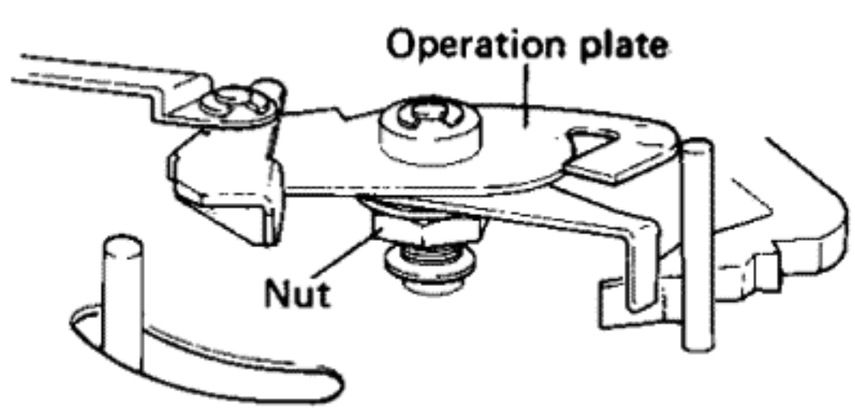


Fig. 4-7

- **Short switch**

The short switch gap should be 0.5mm during record play. This gap may be adjusted by the screw shown in Fig. 4-8 below.

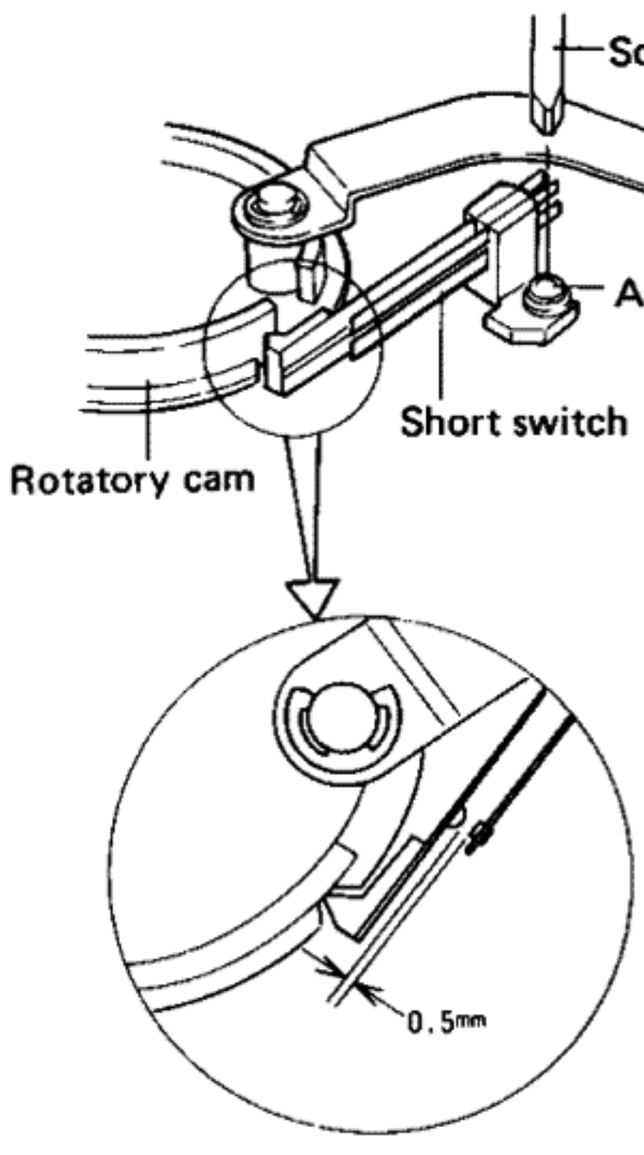
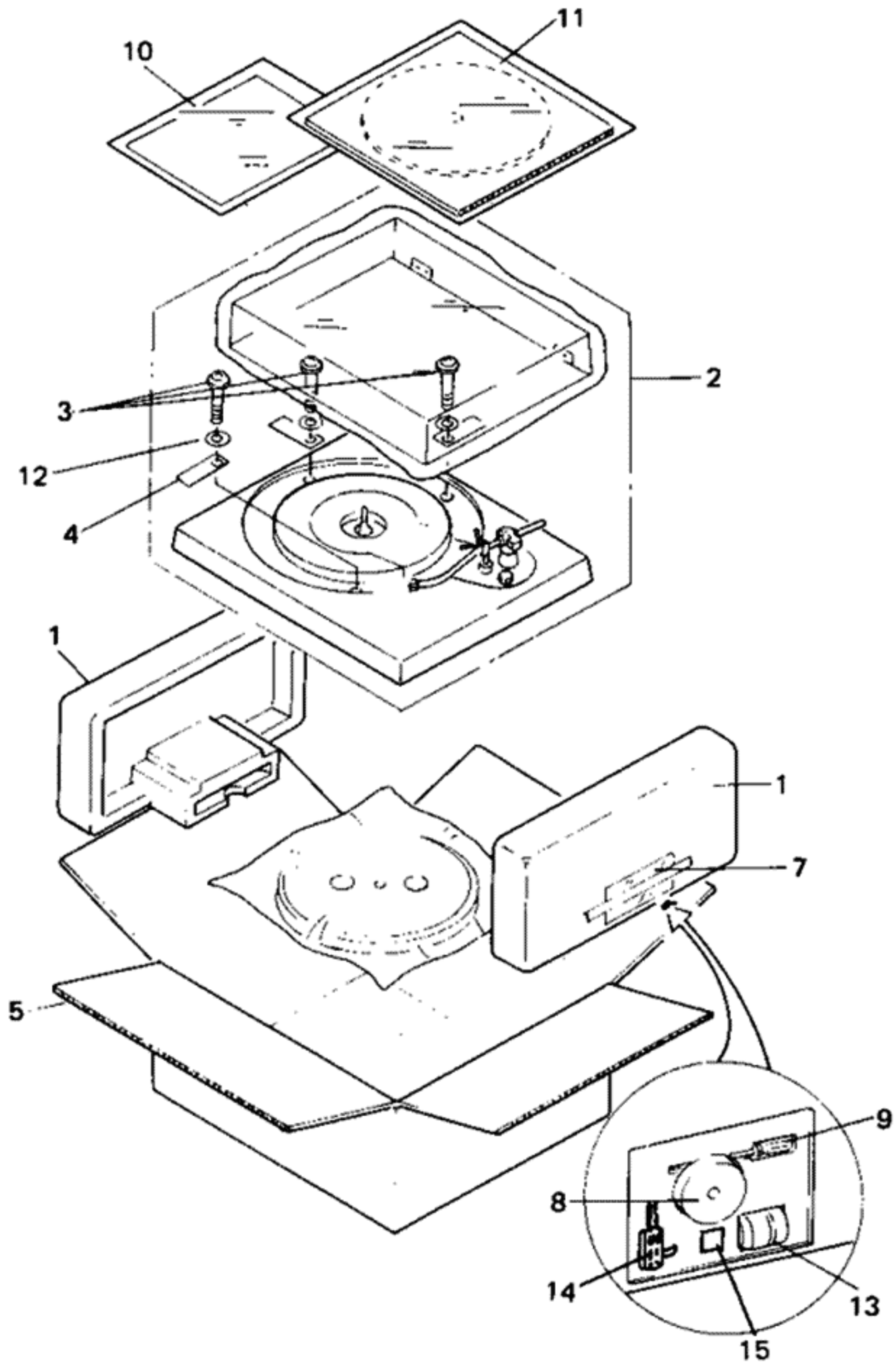


Fig. 4-8

5. PACKING

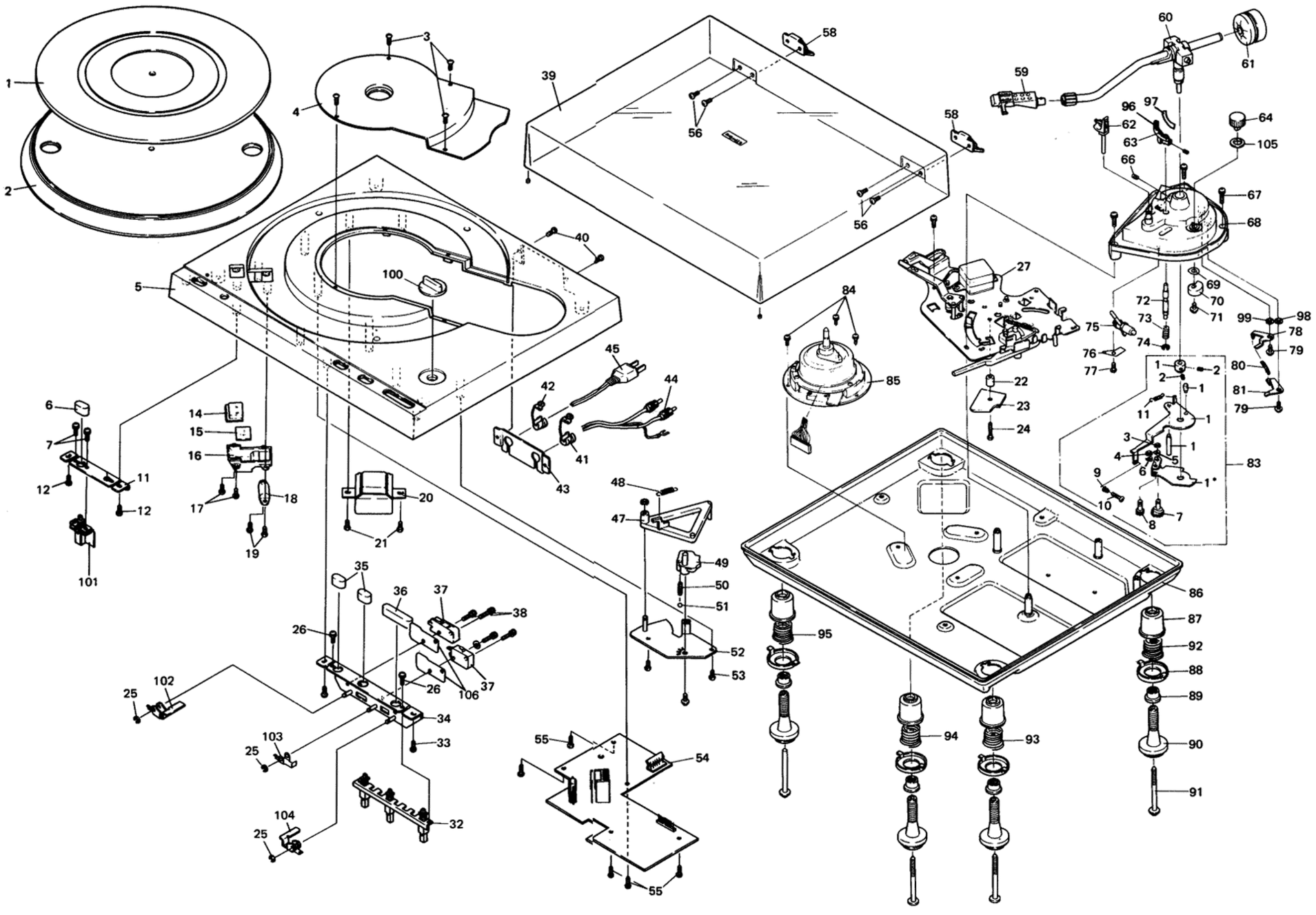


Parts List

Key No.	Part No.	Description
1.	PHA-077	Protector
2.	H56-603	Vinyl bag
3.	PBA-079	Screw
4.	PRW-038	Caution label
5.	PHG-369	Packing case
6.	.....	
7.	PHC-069	Cover
8.	N93-603	45 adaptor
9.	KEX-002	Driver
10.	PRB-135	Operating instructions (English)
	PRD-046	Operating instructions (French/German)
11.	PEA-032	Rubber mat assembly
12.	B22-026	Washer
13.	PXA-720	Weight assembly
14.	PXA-676	Headshell assembly
15.	PXB-125	Cartridge mounting screw assembly

6. EXPLODED VIEWS AND PARTS LIST

6.1 CABINET



PARTS LIST OF CABINET

NOTES:

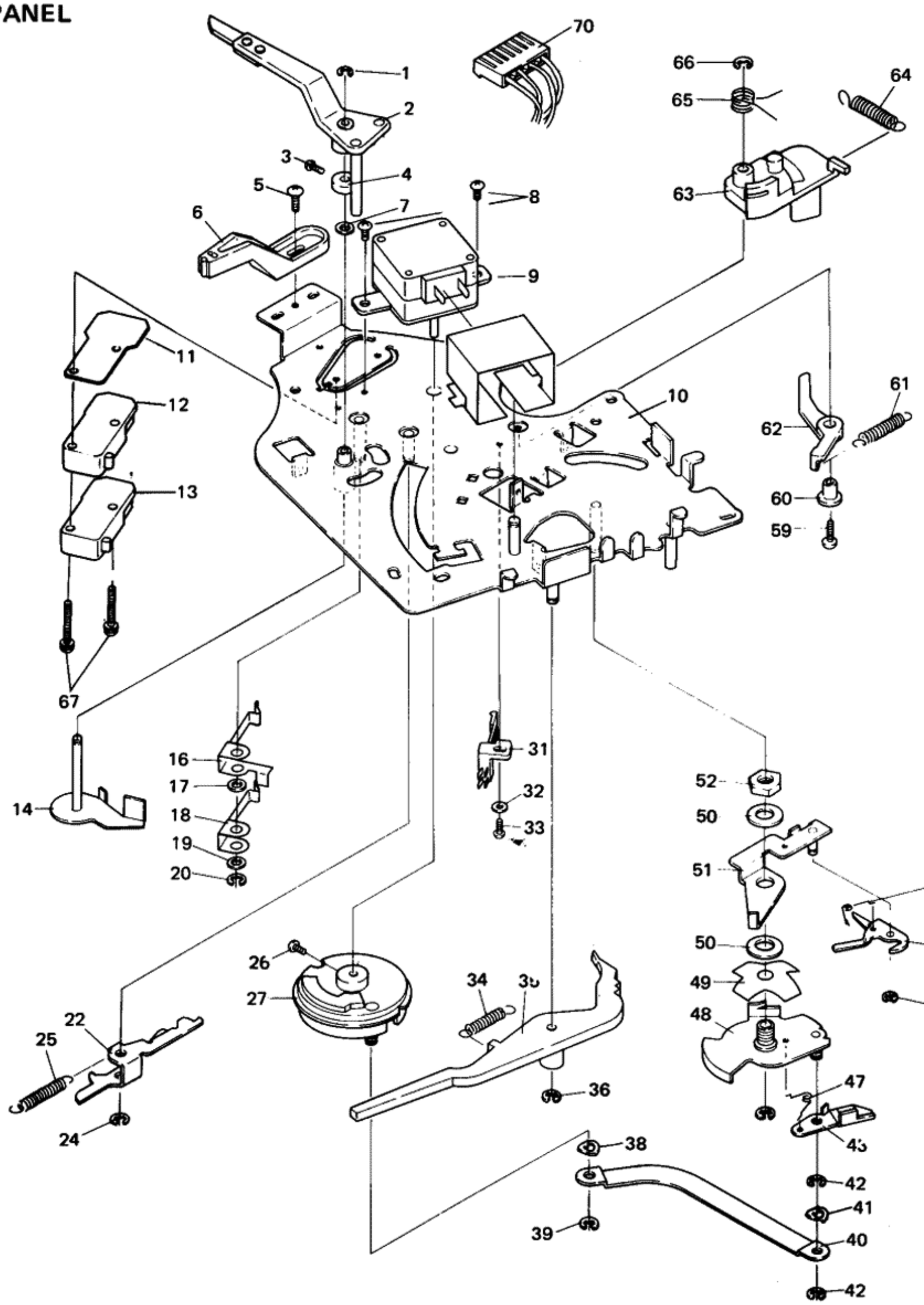
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Key No.	Part No.	Description
1.	PEA-032	Rubber mat assembly
2.	PNR-089	Turntable platter
3.		Taptite P screw 3x8
4.		Cover
5.	PNX-080	Panel
6.	PAC-024	Push button
7.		PSA 3x5
8.	.....	
9.	.....	
10.	.....	
11.		Angle
12.		Taptite P screw 3x10
13.		Speed selector assembly
14.	PNW-473	Lens
15.	PAG-001	Mirror
16.	PNW-472	Holder
17.		Taptite P screw 3x10
18.	PNX-078	Neon lamp holder
19.		Taptite P screw 3x10
⚠ 20.	PTT-093	Power transformer
21.		Taptite P screw 4x10
22.		Spacer
23.		Output terminal
24.		PSA 3x12
25.		EW3
26.		PSA 3x5
27.	PXB-103	Sub panel assembly
28.	.....	
29.	.....	
30.	.....	
31.	.....	
32.	PXT-295	Push button unit
33.		Taptite P screw 3x10
34.		Button base
35.	PAC-024	Push button
36.	PAC-020	Start button
⚠ 37.	PSF-012	Microswitch
38.		PSA 3x15
39.	PNV-014	Dust cover
40.		PSF 3x8
41.	PEC-051	Strain relief
42.	PEC-051	Strain relief
43.		Angle
44.	PDE-044	Output cord
⚠ 45.	PDG-021 (HE)	AC power cord
⚠	PDG-022 (HB)	
46.	.....	
47.	PNW-475	Selector lever
48.	.....	
49.	PNW-474	Selector cam
50.	PBH-213	Spring
51.		Steel ball 5/32"
52.		Selector base unit
53.		Taptite P screw 3x10
54.	XWM-033	Circuit board
55.		Taptite P screw 3x10
56.		Taptite screw 4x8
57.	.....	
58.	PXA-323	Hinge assembly
59.	PXA-676	Headshell assembly
60.	PPD-580	Tonearm assembly
61.	PXA-720	Weight assembly
62.	PXB-002	Arm rest assembly
63.	PNW-577	Elevation sheet
64.	PAC-026	AS knob
65.	.....	
66.		Hexagon socket headless set screw 4x8
67.		Plastic screw 3x8
68.	PNX-088	Arm base
69.	PBE-012	AS spring washer
70.	PNW-379	AS cam
71.		Taptite screw 3x6
72.	PLA-396	Shaft
73.	PBH-201	EV spring
74.		EW4
75.	PXT-301	EV lever unit
76.	PBK-030	EV spring
77.	.....	
78.	PNC-068	AS lever
79.	PBA-085	AS screw
80.	PBH-250	AS spring
81.	PNB-460	Bias lever
82.	.....	
83.	PXB-001	PU plate assembly
83-1.		PU plate
83-2.		Hexagon socket headless set screw 4x6
83-3.		EW2 (SUS)
83-4.		EW3 (SUS)
83-5.	PNB-224	Washer
83-6.	PNB-519	AS washer
83-7.	PXT-109	Adjust washer
83-8.	PXT-201	Adjust shaft
83-9.	PBH-045	Spring
83-10.		Plastic screw 3x12
83-11.	PBH-193	Spring
84.		PSA 4x10
85.	PXB-010	D.D. motor
86.		Base
87.	PEB-102	Damper cushion A
88.	PNW-484	Holder
89.	PNW-375	Ring
90.	PYY-024	Foot

NOTES:
- *Parts without part number cannot be supplied.*

Key No.	Part No.	Description
91.	PBA-096	Screw
92.	PBH-197	Spring
93.	PBH-196	Spring
94.	PBH-198	Spring
95.	PBH-198	Spring
96.	PNW-577	EV sheet
97.	PNT-516	Sheet cushion
98.		FW3
99.		FW3
100.	PAC-023	Knob
101.	XWX-013	Switch assembly
102.	PXT-314	Actuator D
103.	PBK-027	Actuator B
104.	PXT-296	Actuator A
105.	PBF-005	AS knob washer
⚠106.	PEC-052	Insulator

6.2 SUB PANEL

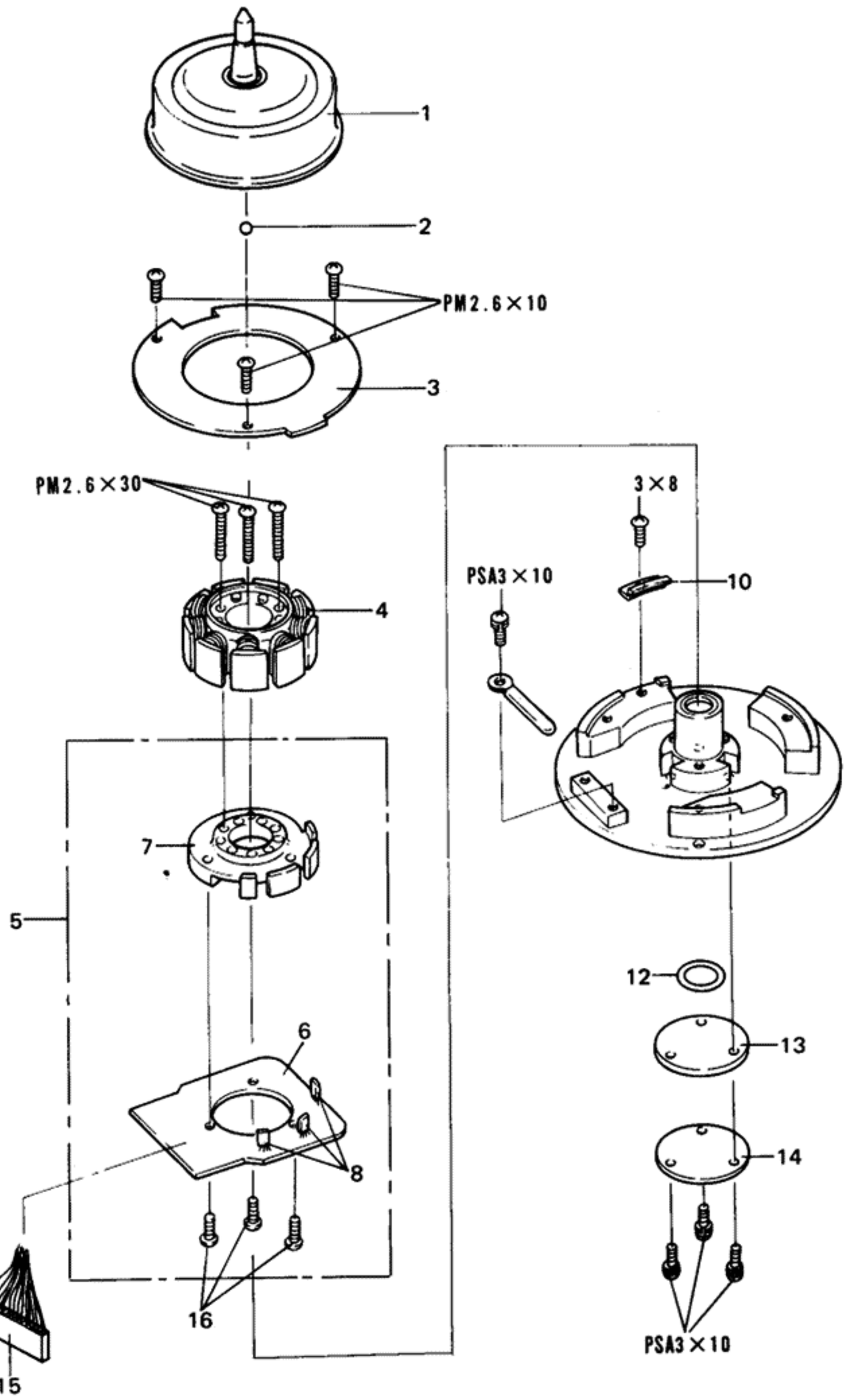


PARTS LIST OF SUB PANEL

NOTES:
- *Parts without part number cannot be supplied.*

Key No.	Part No.	Description
1.		EW2
2.	PXT-297	Stopper unit
3.		PM 2.6x6
4.	N51-786	Stopper
5.		Taptite screw 3x8
6.	PXT-219	Stopper rubber unit
7.		Polyethylene washer 4.1φx0.25t
8.		Taptite screw 3x5
⚠ 9.	PXM-080	Timing motor
10.		Sub panel unit
⚠ 11.	PEC-052	Insulator
⚠ 12.	PSF-009	Microswitch
⚠ 13.	PSF-009	Microswitch
14.	PXT-124	Plate
15.	.....	
16.	PBK-029	Actuator D
17.		Polyethylene washer 4.1φx0.25t
18.	KNA-101	Actuator A
19.		Polyethylene washer 4.1φx0.25t
20.		EW3
21.	.....	
22.	PNB-112	Lever
23.	.....	
24.		EW3
25.	PBH-096	Lever spring
26.		Taptite screw 2x2.6
27.	PNW-476	Cam
28.	.....	
29.	.....	
30.	.....	
31.	KSN-001	Switch
32.		FW2.6
33.		PM2.6x5
34.	PBH-194	Spring
35.	PNW-477	Selector plate
36.		EW3
36.		EW3
37.	.....	
38.	PNB-519	Washer
39.		EW3
40.		Lever
41.	PNB-519	Washer
42.		EW3
43.	PXT-310	Lever unit
44.	.....	
45.	.....	
46.	.....	
47.	B33-609	Spring
48.	PXT-308	Rotor unit
49.	PBK-006	Spring
50.	PBF-003	Washer
51.	PXT-300	Start lever unit
52.	KLA-159	Nut
53.	.....	
54.	.....	
55.	.....	
56.		EW2
57.	PXT-312	Lock lever unit
58.	B33-635	Lock lever spring
59.		PM2.6x8
60.	PLA-404	Collar
61.	PBH-097	Spring
62.	PNW-490	Lever
63.	PNW-478	EV cam
64.	PBH-200	EV cam spring
65.	PBH-195	EV lever spring
66.		EW3
67.	.....	PSA 3x25
68.	.....	
69.	.....	
70.		Connector assembly

6.3 D.D. MOTOR

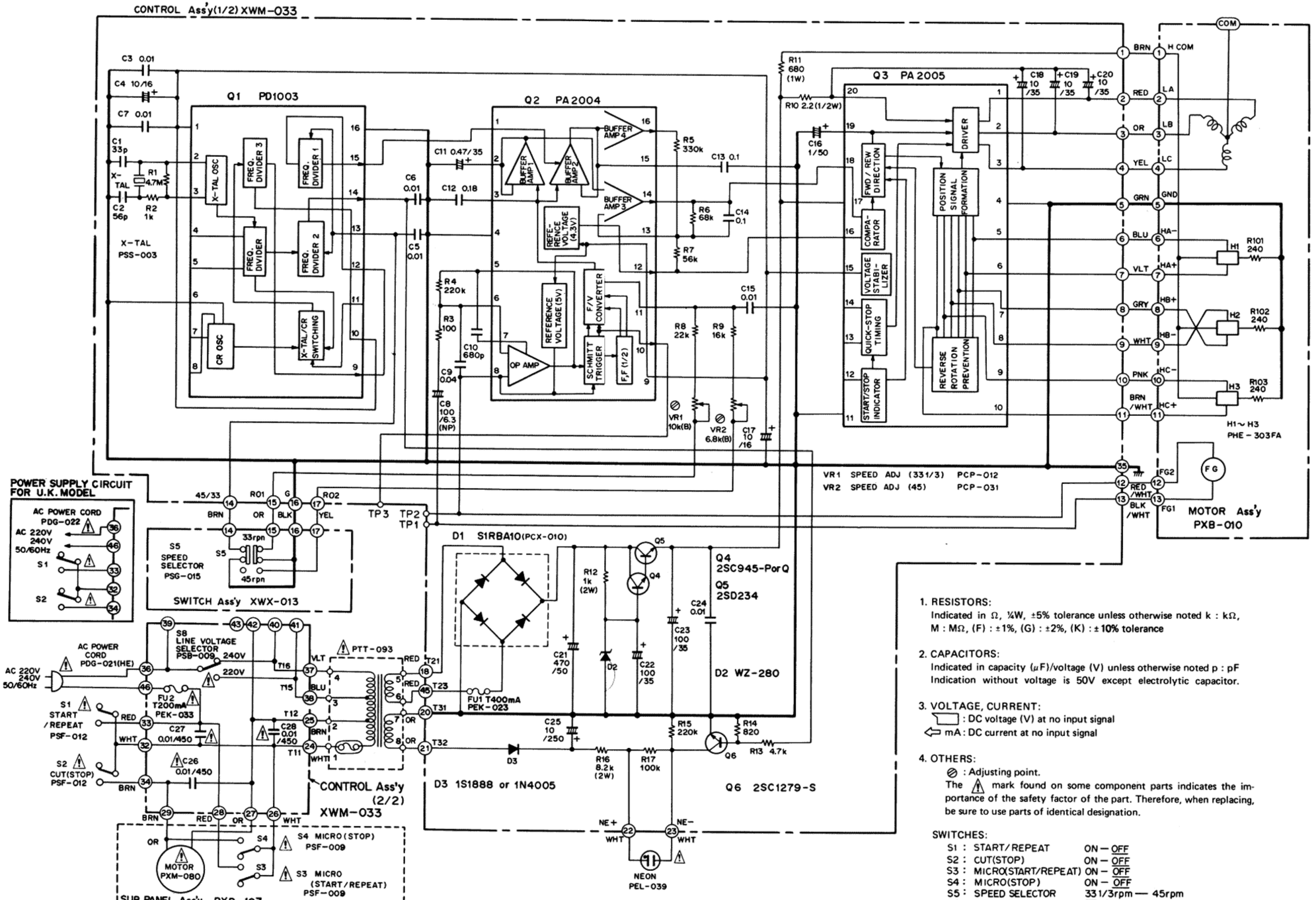


Parts List

NOTES:
- *Parts without part number cannot be supplied.*

Key No.	Part No.	Description
1.		Rotor assembly
2.	PEF-001	Steel ball
3.		Speed detector assembly
4.	PTL-003	Core unit
5.		Positional detector assembly
6.		P. CB
7.		Base
8.	PHE-030FA	Hall element
9.		Cord fixer
10.		Angle
11.		Base
12.	MNT-001	Ring
13.	MNW-001	Plate
14.		Cover
15.	PDE-038	Connector assembly
16.		Taptite screw 3x8

7. SCHEMATIC DIAGRAM



1. RESISTORS:
   Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±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:
   ▭ : DC voltage (V) at no input signal
   ⇦ mA : DC current at no input signal

4. OTHERS:
   ⊘ : Adjusting point.
   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.

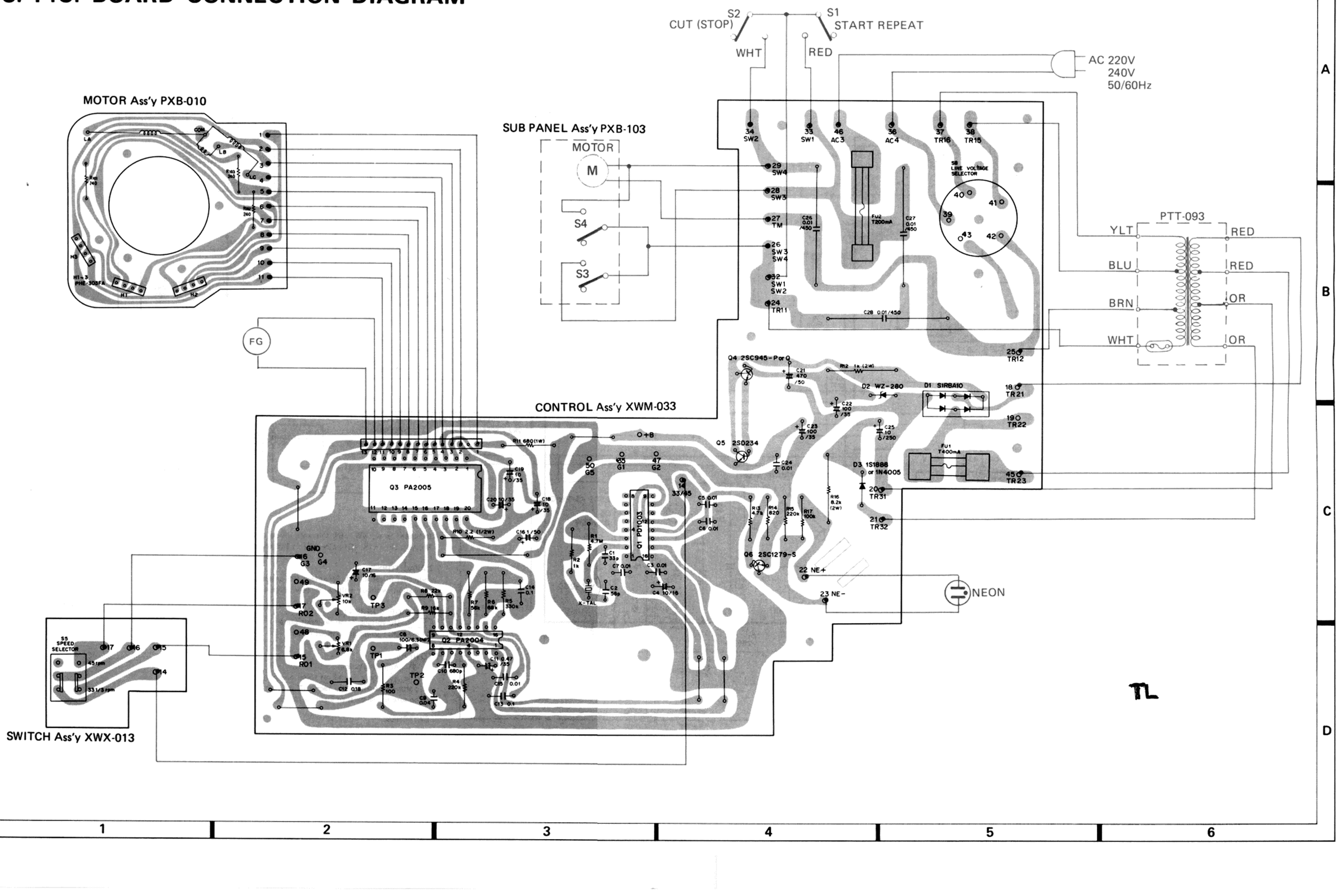
SWITCHES:

S1 :	START/REPEAT	ON — OFF
S2 :	CUT(STOP)	ON — OFF
S3 :	MICRO(START/REPEAT)	ON — OFF
S4 :	MICRO(STOP)	ON — OFF
S5 :	SPEED SELECTOR	331/3rpm — 45rpm
S8 :	LINE VOLTAGE SELECTOR	220V—240V

The underlined indicates the switch position.

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

8. P.C. BOARD CONNECTION DIAGRAM



8.1 PARTS LIST OF P.C. BOARD ASSEMBLY

NOTES:

- *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 x 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RSIP 0 1 0 K*

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

5.62kΩ	*562 x 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *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.*

CONTROL ASSEMBLY (XWM-033)

CAPACITORS

Part No.	Symbol & Description
CCDCH 330J 50	C1
CCDCH 560J 50	C2
CKDYF 103Z 50	C3, C5–C7, C15, C24
CKDYF 403Z 50	C9
CKDYB 681K 50	C10
CSZA R47K 35	C11
CQMA 184J 50	C12
CQMA 104K 50	C13
CQMA 104J 50	C14
CEA 010P 50	C16
CSZA 100K 16	C17
CEA 100P 35	C18–C20
CEA 471M50L	C21
CEA 101P 35	C22, C23
CEA 100M 250L	C25
CEA 100P 16	C4
CEA 101M 6.3NP	C8
⚠ PCL-034	C26–C28

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PS □□□ J	R1–R9, R15
RD½PS 2R2J	R10
RS1P 681J	R11
RS2P 102J	R12
RS2P 822J	R16
PCP-012	VR1
PCP-031	VR2

SEMICONDUCTORS

Part No.	Symbol & Description
PD1003	Q1
PA2004	Q2
PA2005	Q3
2SC945-P (2SC945-Q)	Q4
2SD234	Q5
2SC1279S	Q6
SIRBA10	D1
WZ280	D2
1S1888 (1N4005)	D3

OTHERS

Part No.	Symbol & Description
PSS-003	Crystal
⚠ PEL-039	Neon lamp
PNW-482	Neon lamp base PM3x5 PSA3x8
⚠ KKR-001	Fuse holder
⚠ PEK-023	Fuse Fu1
⚠ PEK-033	Fuse Fu2

SWITCH ASSEMBLY (XWX-013)

Part No.	Symbol & Description
PSG-015	Push switch PSA3x5

POSITIONAL DETECTOR ASSEMBLY

Part No.	Symbol & Description
PHE-303FA	Hall element (H1, H2, H3)
RD¼PS 241J	R101–R103

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