PIONEER

Service Manual

REPAIR & ADJUSTMENTS

ORDER NO.
ART-712-0

STEREO TURNTABLE

PL-220

- **For the circuit and mechanism descriptions, please refer to the supplement of model PL-7 service manual (ART-768).**

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1. SPECIFICATIONS

Motor and Turntable

Drive System ..... Belt-drive
Motor ..... DC servo motor
Turntable Platter ..... 310mm diam. aluminum alloy die-cast
Speeds ..... 33-1/3 and 45rpm
Wow and Flutter ..... Less than 0.045% (WRMS)
Signal-to-Noise Ratio ..... More than 70dB (DIN-B)
(with Pioneer cartridge model PC-220)

Tonearm

Type ..... Static-balance type, Straight pipe arm
Effective Arm Length 221mm
Overhang 15.5mm
Usable Cartridge Weight ..... 3g (min.) to 8g (max.)

Subfunctions

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

Miscellaneous

Power Requirements AC120V,60Hz
Power Consumption 3W
Dimensions ..... 420(W) × 108(H) × 367(D)mm
16-1/2(W) × 4-1/4(H) × 14-7/16(D)in.
Weight ..... 5.4kg/12 lb

PC-220 Specifications

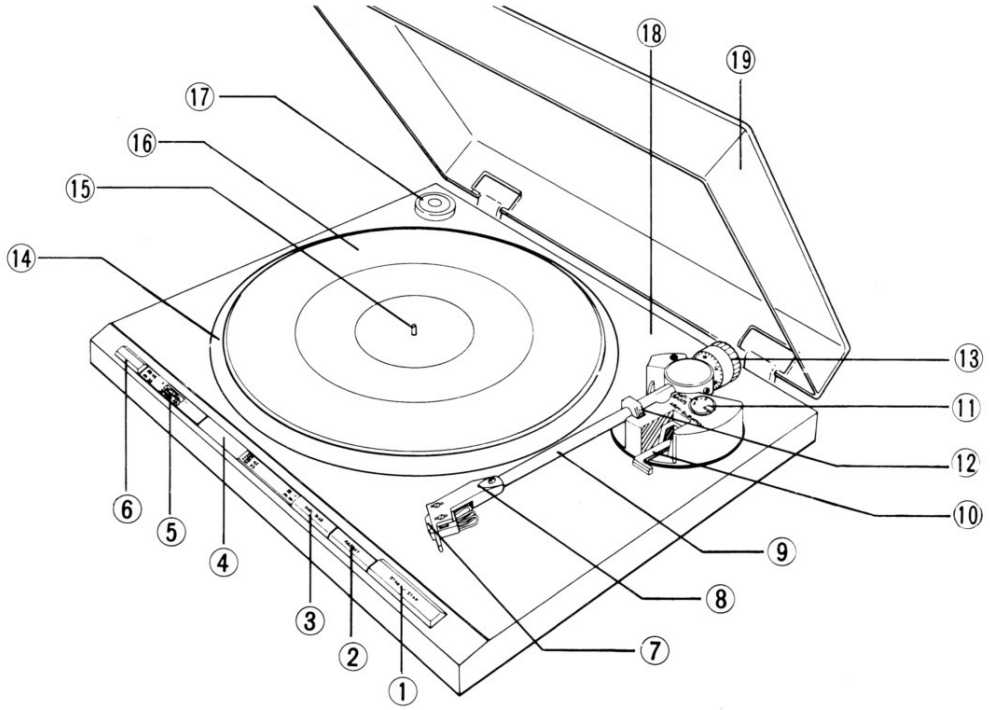
Type ..... Moving magnet type
Stylus ..... 0.5 mil diamond (PN-220)
Output Voltage ..... 2.5mV (1kHz, 50mm/s, LAT)
Tracking Force ..... 1.7g to 2.3g (proper 2.0g)
Frequency Response ..... 10 to 30,000Hz
Recommended Load 50kΩ
Weight 5.5g

Accessories

EP Adapter 1
Operating Instructions 1

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

2. FRONT PANEL FACILITIES



① START/STOP switch
Depress this switch when starting auto play or when stopping play.

② REPEAT switch
Set this switch for repeat play.

③ DISC SIZE switch
Set this switch in accordance with the size of the record which is to be played.
[7" 17] (released position): For 17 cm EPs
[12" 30] (depressed position): For 30 cm LPs

④ Speed check window
Look through this window and observe the movement of the striped pattern when checking the rotational speed or finely adjusting the speed. The position of the striped pattern differs according to the power line frequency (50 Hz or 60 Hz) in the area of use and the speed (33 or 45 rpm) of the platter.
Top pattern: For 45 rpm in 50 Hz area
Second pattern: For 45 rpm in 60 Hz area
Third pattern: For 33 rpm in 50 Hz area
Bottom pattern: For 33 rpm in 60 Hz area

⑤ SPEED ADJ control
Rotate this control in order to finely adjust the speed of the platter.
The speed is reduced when the control is rotated in the [−] direction.
The speed is increased when the control is rotated in the [+] direction.

⑥ SPEED switch
Set this switch in accordance with the speed of the record which is to be played.
[33] (depressed position): For 33-1/3 rpm records
[45] (released position): For 45 rpm records

⑦ Cartridge (PC-220)

⑧ Headshell

⑨ Tonearm

⑩ ARM ELEVATION lever
Operate this lever when starting manual play or when temporarily suspending play.

⑪ ANTI-SKATE control
This is rotated when performing the anti-skating adjustment.

⑫ Arm rest
This serves to hold and clamp the tonearm. When moving the tonearm, release the clamp.

⑬ Tracking force adjustment weight
This is used when adjusting the tracking force.

⑭ Platter

⑮ Platter mounting shaft

⑯ Rubber mat

⑰ EP adapter
This is used when playing records without a "middle."

⑱ Cabinet

⑲ Dust cover

3. DISASSEMBLY

3.1 PANEL AND BASE

In removing the panel, follow the below listed steps in the order given. Using any unnecessary force will result in bending the springs or damaging other parts.

Panel removal steps

1. Remove the headshell and weight assembly, and the weight shaft assembly.
   The weight shaft assembly is removed by loosening screw (Hexagone socket screw) and the headshell by loosening screw ❶.
2. Lift off the turntable platter.
3. Loosen insulator attachment screws ❷ and remove the insulator. (Do not mix the color-coded float springs. They must be replaced with their original insulators during reassembly.)
4. Remove the rear panel PU cord strain relief.
5. Lift the front section of the panel (operating controls) very slightly .
6. Unplug the 2p connector.
7. Completely remove the PU cord from the panel.

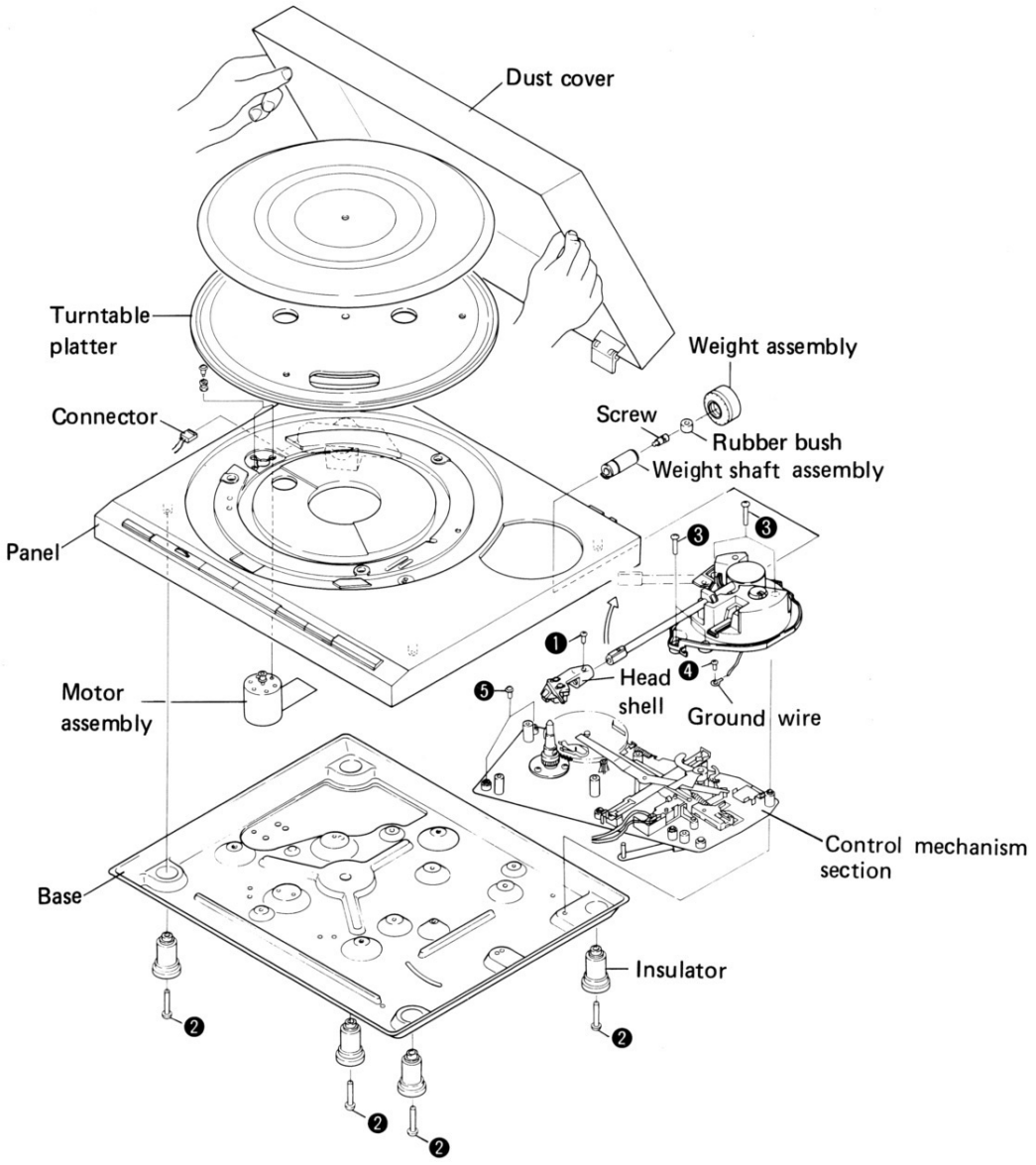


Fig. 3-1 Disassembly

8. Lift up the headshell end of the tonearm, and taking care not to damage the tonearm, remove it from the panel. (Hold the tonearm steady.)

3.2 TONEARM SECTION

Remove the tonearm section by taking out the three arm base attachment screws ❸ and one ground wire securing screw ❹.

3.3 CONTROL MECHANISM SECTION

After the tonearm section has been removed, loosen the three control mechanism attachment screws ❺ and remove the assembly.

3.4 TONEARM

1. 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.
2. Loosen the set screw ❻ with a screwdriver to remove the PU plate under the arm base (See Fig. 3-3).
3. Undo the screw ❼ securing the tonearm to the arm base (See Fig. 3-3).

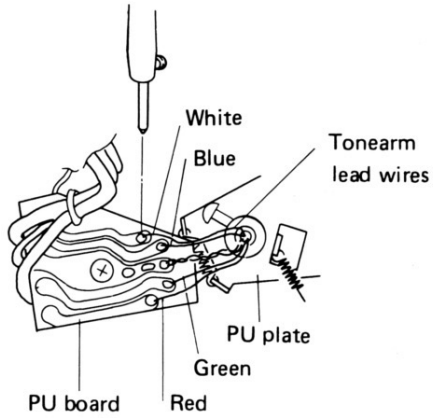


Fig. 3-2 Disconnect the tonearm lead wires

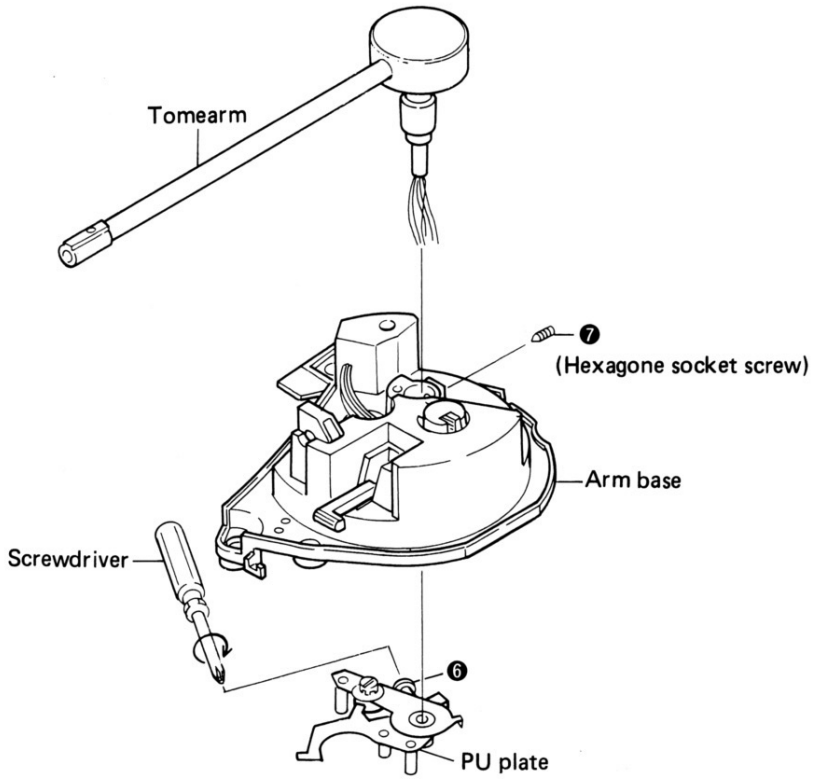


Fig. 3-3 Remove tonearm

3.5 PANEL AND BASE REASSEMBLY

1. Turn the center shaft clockwise so that the mechanism assembly is set to the reset position.
2. Hook the driver lever spring to the panel boss.
3. Lift the forward of the panel and plug in the 2P connector.
4. Clamp the tonearm in the arm rest and push the START/STOP button.
5. Attach the PU cord stopper.
6. Attach the insulators. (Make certain the color-coded float springs are attached to the correct insulators.)
7. Attach the weight shaft assembly.

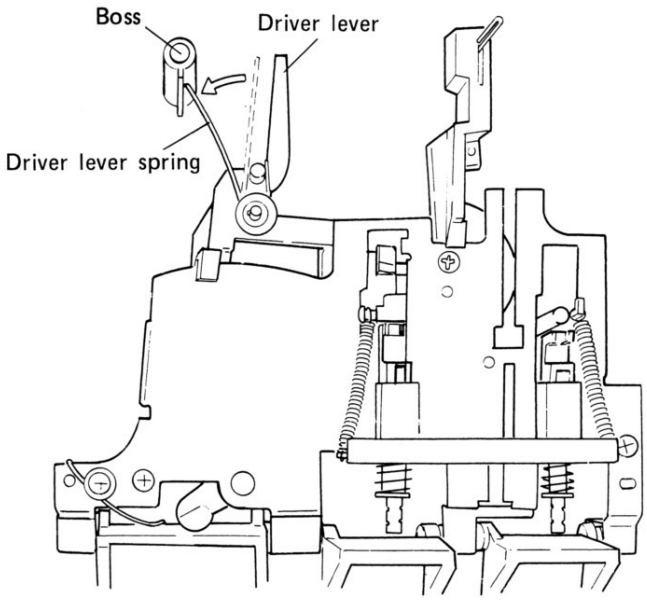


Fig. 3-4 Spring positioning

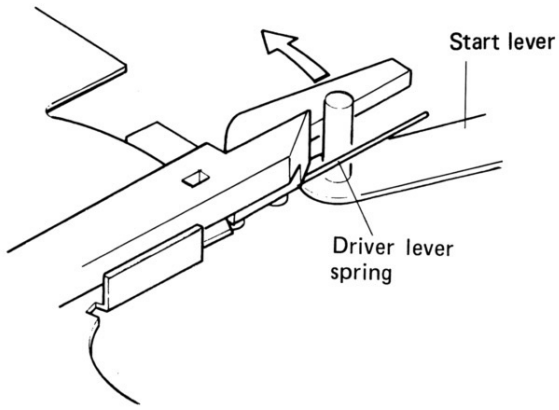
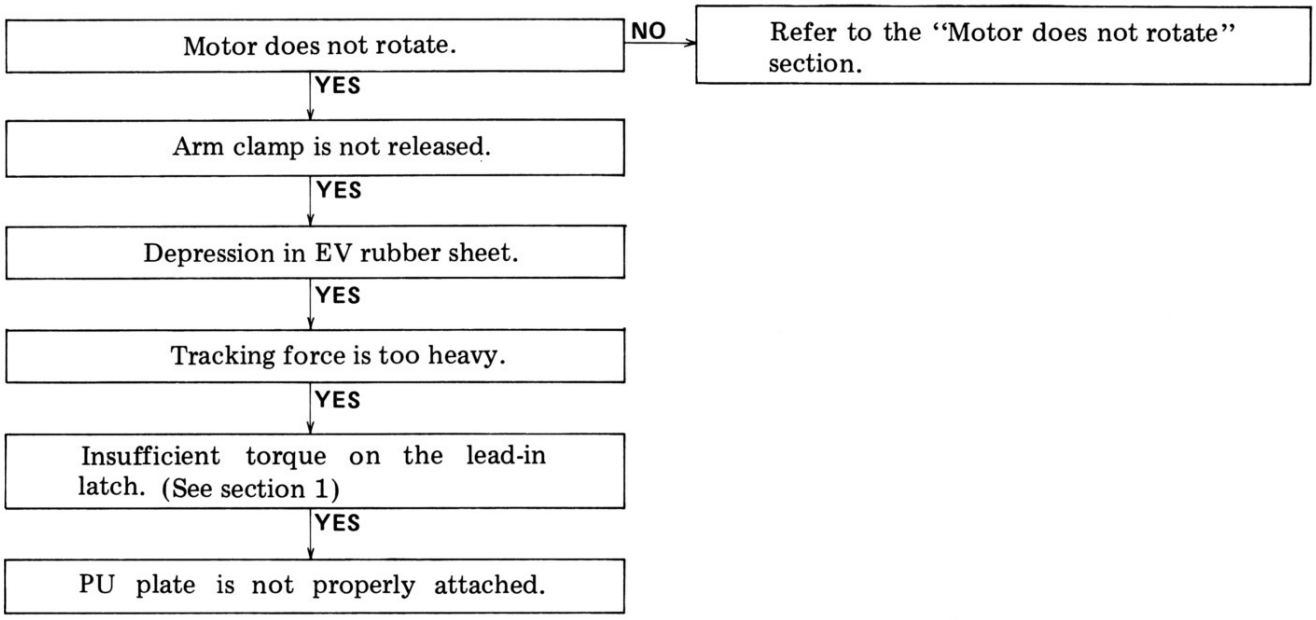


Fig. 3-5 Positioning the spring

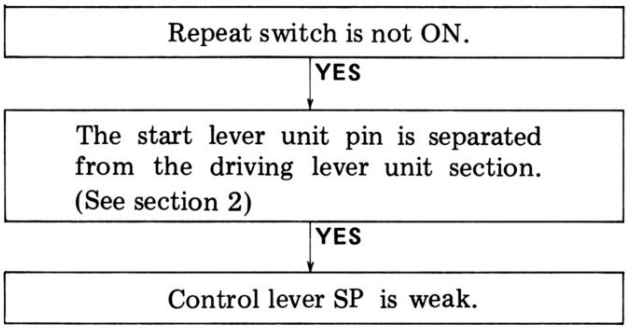
4. TROUBLESHOOTING

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

■ **DOES NOT LEAD IN**



■ **DOES NOT REPEAT**



Section 1

As shown in figure 4-1, if the force required to turn over the lead-in latch is less than 180g at a point 13mm from the center, bend the click leaf spring toward until the force is 180 — 320g.

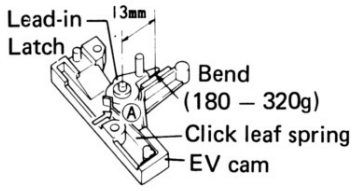


Fig. 4-1 Adjustment of lead-in latch with insufficient torque

Section 2

As shown in figure 4-2, if the start lever unit pin is out of line in the direction of Ⓐ, repeat will not operate. If it is too far in the direction of Ⓑ, the unit will not start. In these cases, assemble referring to the method of joining the panel and bottom panel (lid).

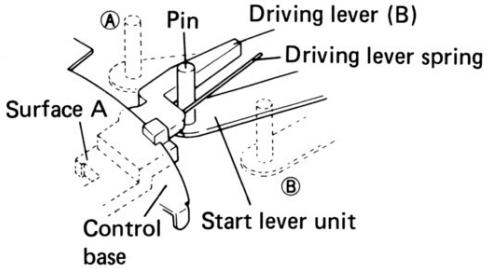


Fig. 4-2 Misaligned pin of start lever unit

■ REPEAT FUNCTION IS REPEATED

Separate the panel section and bottom panel and, as shown in figure 4-3, apply a tension of 10g to the start lever unit pin in direction Ⓐ. If the repeat function operates, the selector and reset plate sections are not moving properly. If the unit stops, the driving lever is not moving properly.

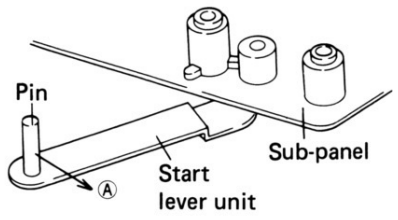
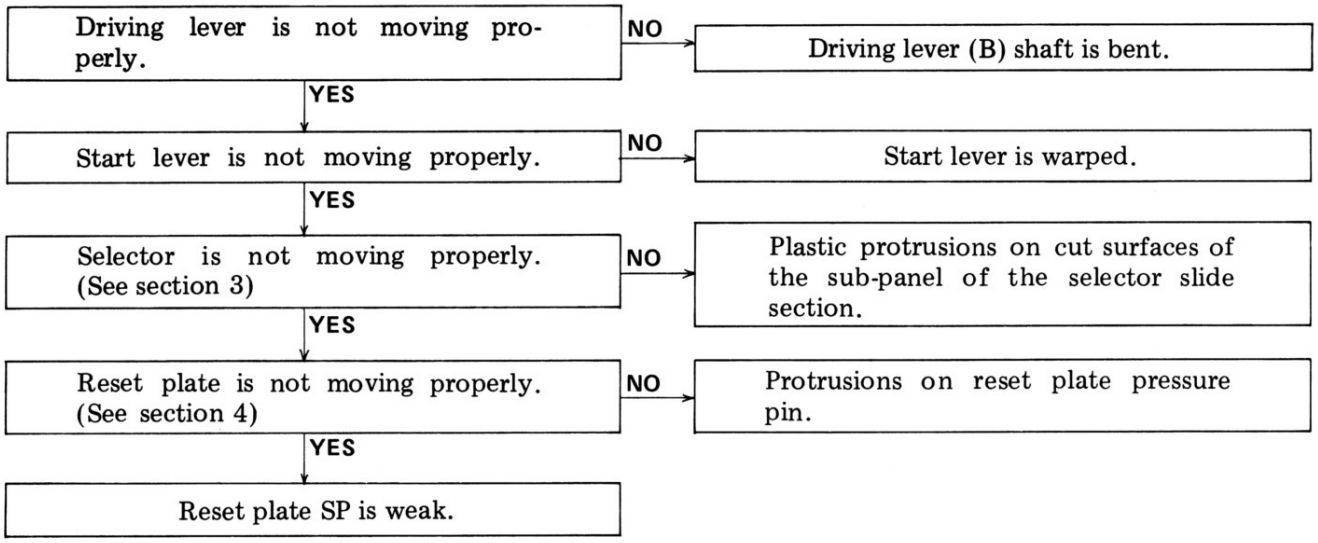


Fig. 4-3 Check of repat operation.



Section 3

If there are protrusions remaining from the original-pressing process on surfaces Ⓐ, Ⓑ, and Ⓒ of the sub-panel which slides with the selector, the movement of the selector will be adversely affected. Therefore, these protrusions must be removed (Fig. 4-4).

Section 4

If there are plastic protrusions on the pressure pin section of section Ⓓ of the reset plate, these protrusions will come in contact with the lower surface of the driving panel when the reset plate moves in direction Ⓔ and the movement of the reset plate will be adversely affected. Therefore, these protrusions must be removed (Fig. 4-4).

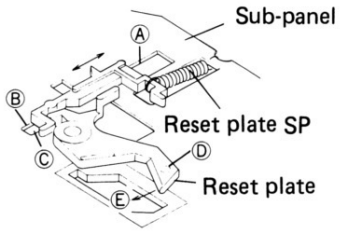


Fig. 4-4 Improper movement of selector

■ AUTO-RETURN DOES NOT WORK

Section 5

After performing the return operation, if the curved section of the signal plate and curved section of the starting plate are not in contact with surfaces Ⓐ and Ⓑ 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 signal plate Ⓒ so that dimension Ⓐ is 0.5mm or larger.

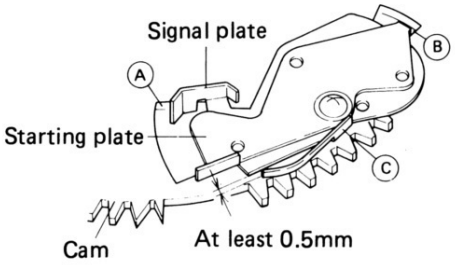


Fig. 4-5 Incomplete reset of starting and signal plates

Change in starting position adjustment.

YES

Starting plate does not follow the signal plate. — NO → Too much grease between the signal plate and the cam.

YES

Inner diameter of the starting plate hole is small.

Protrusions on the caulk section of the starting plate hole.

Not enough grease between the starting plate and signal plate.

After starting, incomplete reset of the signal plate. (See section 5) — NO → The curved section of the signal plate is deformed.

YES

The inner arease of records can not be tracked. — NO → Arm lead wire is caught on something.

YES

PU cord is touching the PU plate.

Operator of the detection lever is not smooth.

Looseness in the PU plate attachment.

■ **RETURN IS FAST (RETURN AT 1mm PITCH)**

Protrusions on the pinion gear section (See section 6)

Section 6

If there are touch areas of plastic protruding from the Ⓐ 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. 4-6).

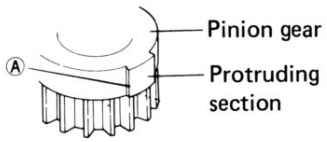
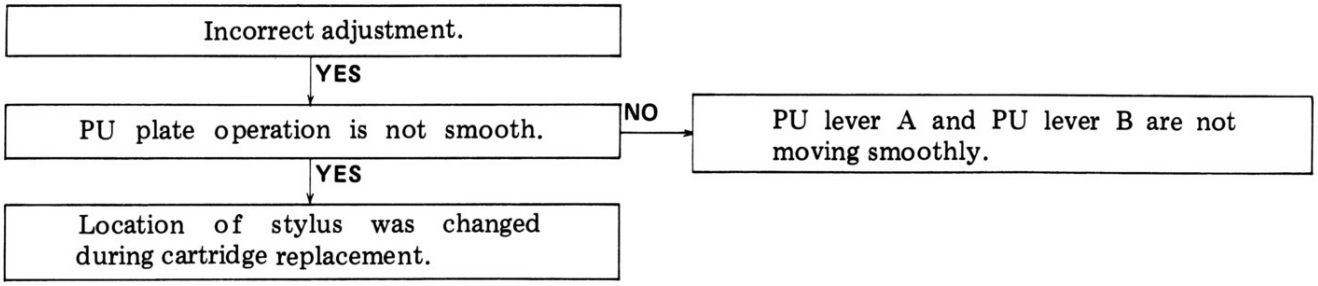


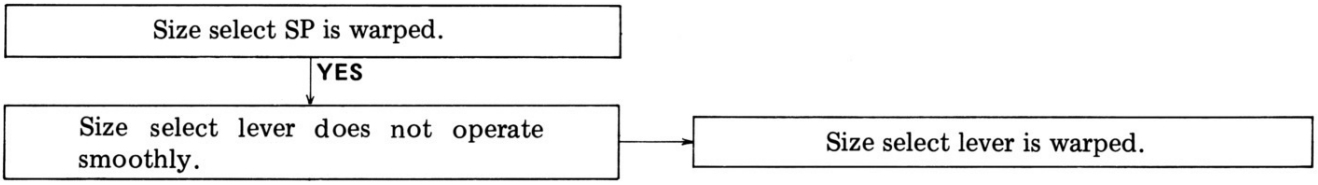
Fig. 4-6 Elimination of pinion gear protrusions

■ TONEARM DOES NOT LOWER IN CORRECT POSITION

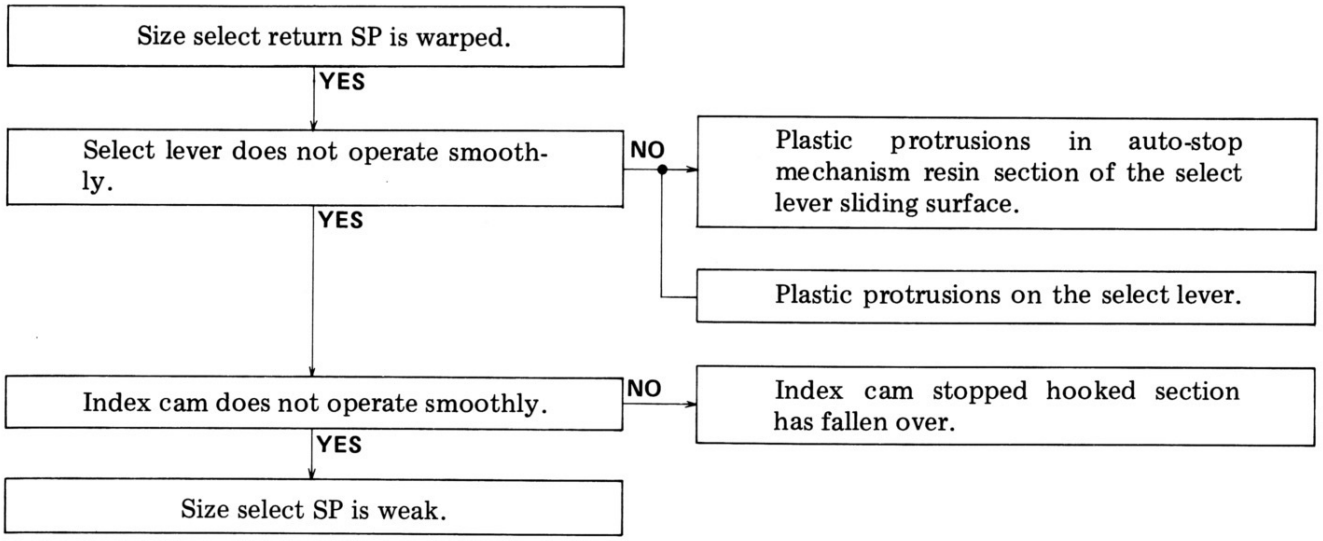


■ RECORD SIZE SELECTOR DOES NOT WORK

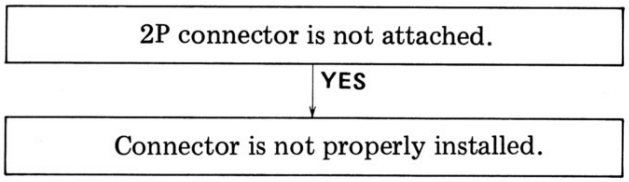
Tonearm descends at 17cm location when record size selector is set at 30cm.



Tonearm descends at 30cm location when record size selector is set at 17cm.



■ MOTOR DOES NOT ROTATE



■ **WITH THE RECORD SIZE SET AT 17cm, THE TONEARM IS RETURNED TO THE ARM REST THE LEAD-IN.**

Detector lever and signal lever are touching.

↓

Detector lever is bent.

■ **AUTO OPERATION REPEATS**

Detector lever and leaf spring (start plate) are touching at the mechanism stop location. → Leaf spring (start plate) is deformed.

■ **MOTOR DOES NOT STOP**

Start panel is not moving properly. — NO → EV cam is warped.

Start panel is not moving properly. — NO → The start plate spring is weak. (See section 7)

Start panel is not moving properly. — YES ↓

The switch lever and switch locker are not locking (See section 7). — NO → The installation location of the PU plate is incorrect.

Section 7

In order to turn the power OFF, the PU plate shaft touches surface Ⓐ of the switch locker pushing it over so it locks with the switch lever turning the microswitch OFF (Fig. 4-7). If the amount of push on the switch locker is insufficient, it can not lock with the switch lever. With the tonearm locked in the arm rest, as shown in figure 4-8, attach the PU plate precisely midway between the first and second points from the arm base scale mark counting away from you.

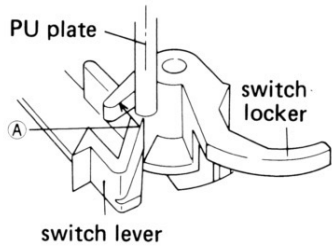


Fig. 4-7 Adjustment of switch locker

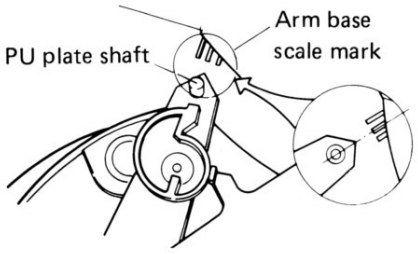


Fig. 4-8 Adjustment of PU plate

5. 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.

5.1 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 #100000 (GEM-002)	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.

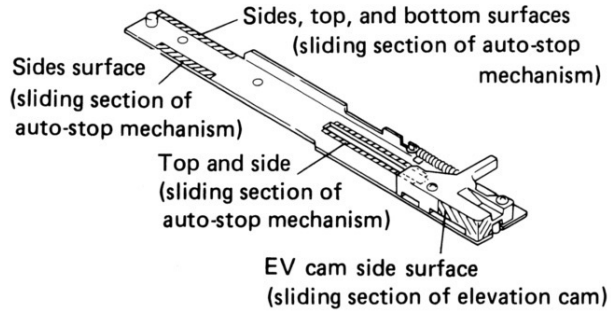


Fig. 5-1 Driving panel assembly section

- **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.

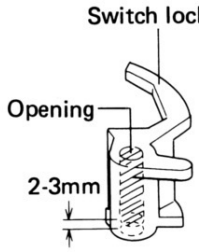


Fig. 5-2 Switch locker section

- **Selector Section**

Apply oil to the surface of the sub-panel base of the selector sliding section to decrease the burden on the mechanism and wear on the sliding section.

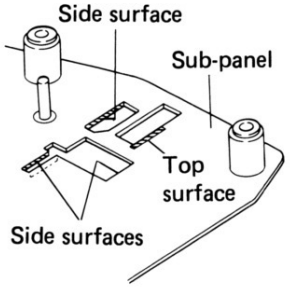


Fig. 5-3 Selector section

- **Reset Plate Section**

Apply oil to the sub-panel base (shaft) and sliding section of the reset plate to decrease the burden on the mechanism.

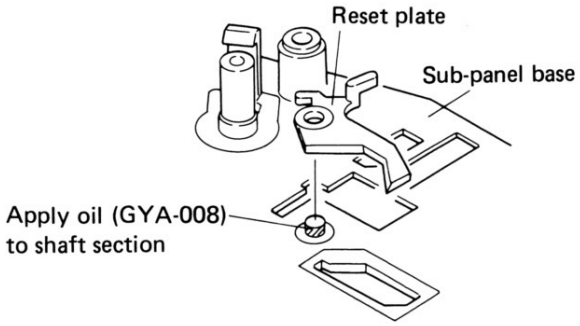


Fig. 5-4 Reset plate section

- **Index Cam Section**

Apply oil to the index cam, sub-panel shaft section, and lower surface of the hooked section to decrease the burden on the mechanism.

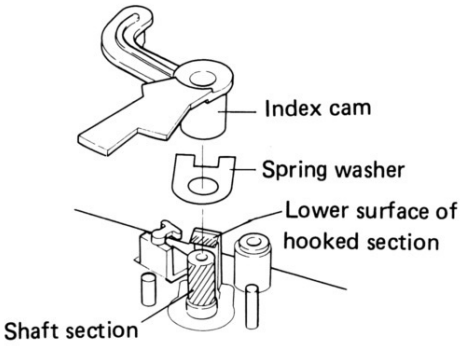


Fig. 5-5 Index cam section

- **EV Lever Unit Section**

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

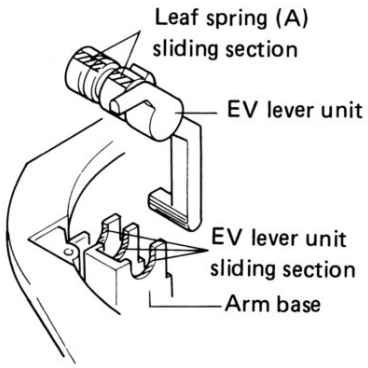


Fig. 5-6 EV lever unit section

- **Elevation Cam Section**

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

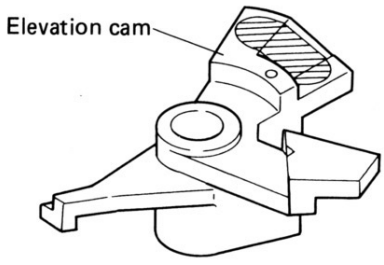


Fig. 5-7 Elevation cam section

- **EV Sheet Section**

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

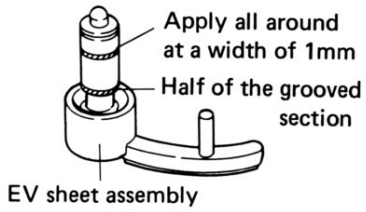


Fig. 5-8 EV sheet section

- **Driving Lever (B) Section**

Apply oil to the driving lever (B), control base, and the sliding section of the driving lever shaft to decrease the burden when operated.

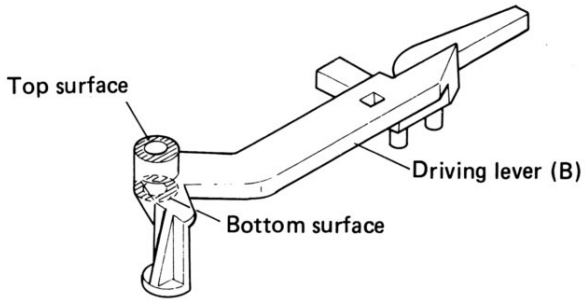


Fig. 5-9 Driving lever (B) section 1

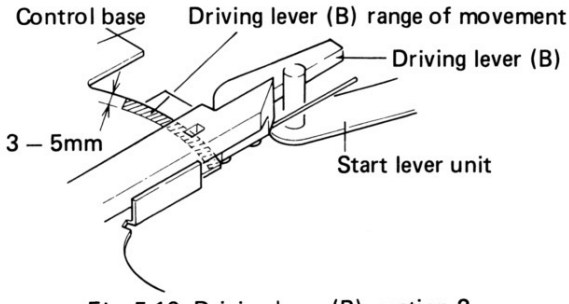


Fig. 5-10 Driving lever (B) section 2

5.2 PRECAUTIONS FOR ATTACHMENT OF PARTS AND REASSEMBLY

- **Reset Plate SP Attachment**

As shown in figure 5-11, the reset plate SP hook is attached by putting the open section on the sub-panel base side.

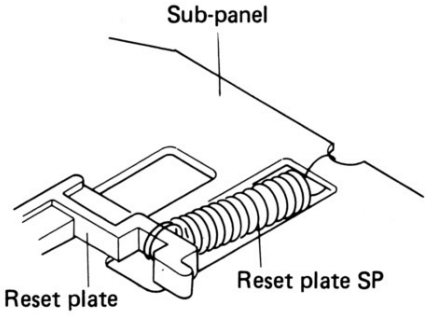


Fig. 5-11 Reset plate SP attachment

- **Cam Assembly Attachment**

The cam assembly is attached by letting the lock plate go in the direction Ⓐ as shown in figure 5-12.

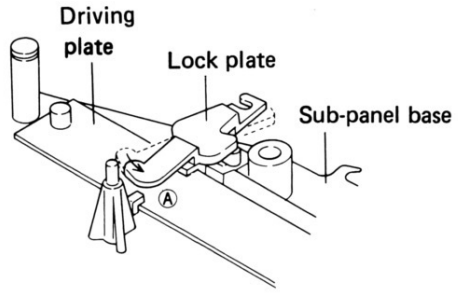


Fig. 5-12 Cam assembly attachment

- **Motor Attachment**

When installing the motor, set the cam in the mechanism stop location and verify that the starting plate section Ⓑ does not protrude beyond surface Ⓐ of the cam. If the motor is attached with the starting plate section Ⓑ protruding, the starting plate may be deformed, the motor pinion gear may be scratched, and the return function may be damaged.

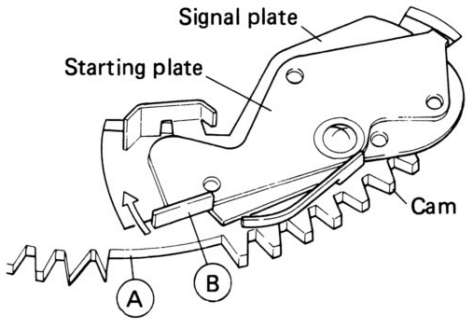


Fig. 5-13 Motor attachment

- **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 5-14.

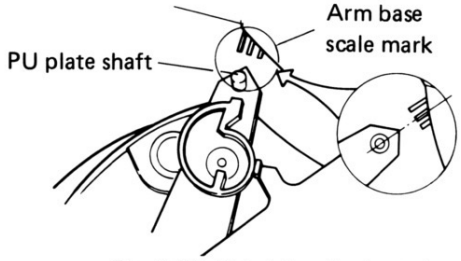


Fig. 5-14 PU plate attachment

- **AS 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.

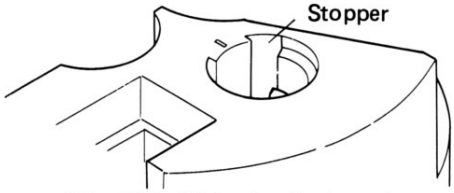


Fig. 5-15 AS knob attachment

- **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 5-16.

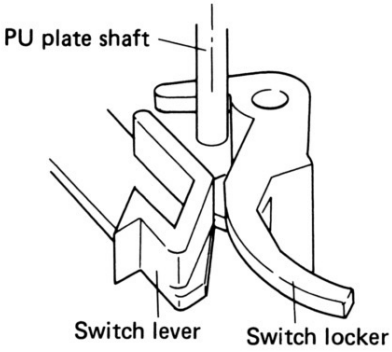


Fig. 5-16 Arm base attachment

- **Start Lever Unit Attachment**

Attach the shaft section of the start lever unit as shown in figure 5-17 so that it comes between the reset plate and start panel.

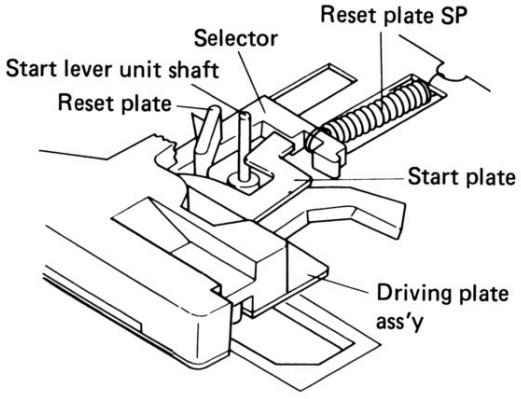


Fig. 5-17 Start lever unit attachment

- **Wiring the Connector**

When attaching the wires to the 2P connector from the microswitch, bend the lead wires from the connector housing as shown in figure 5-18 before attaching.

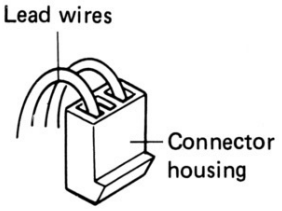


Fig. 5-18 Wiring the connector

6. ELECTRICAL PARTS LIST

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.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

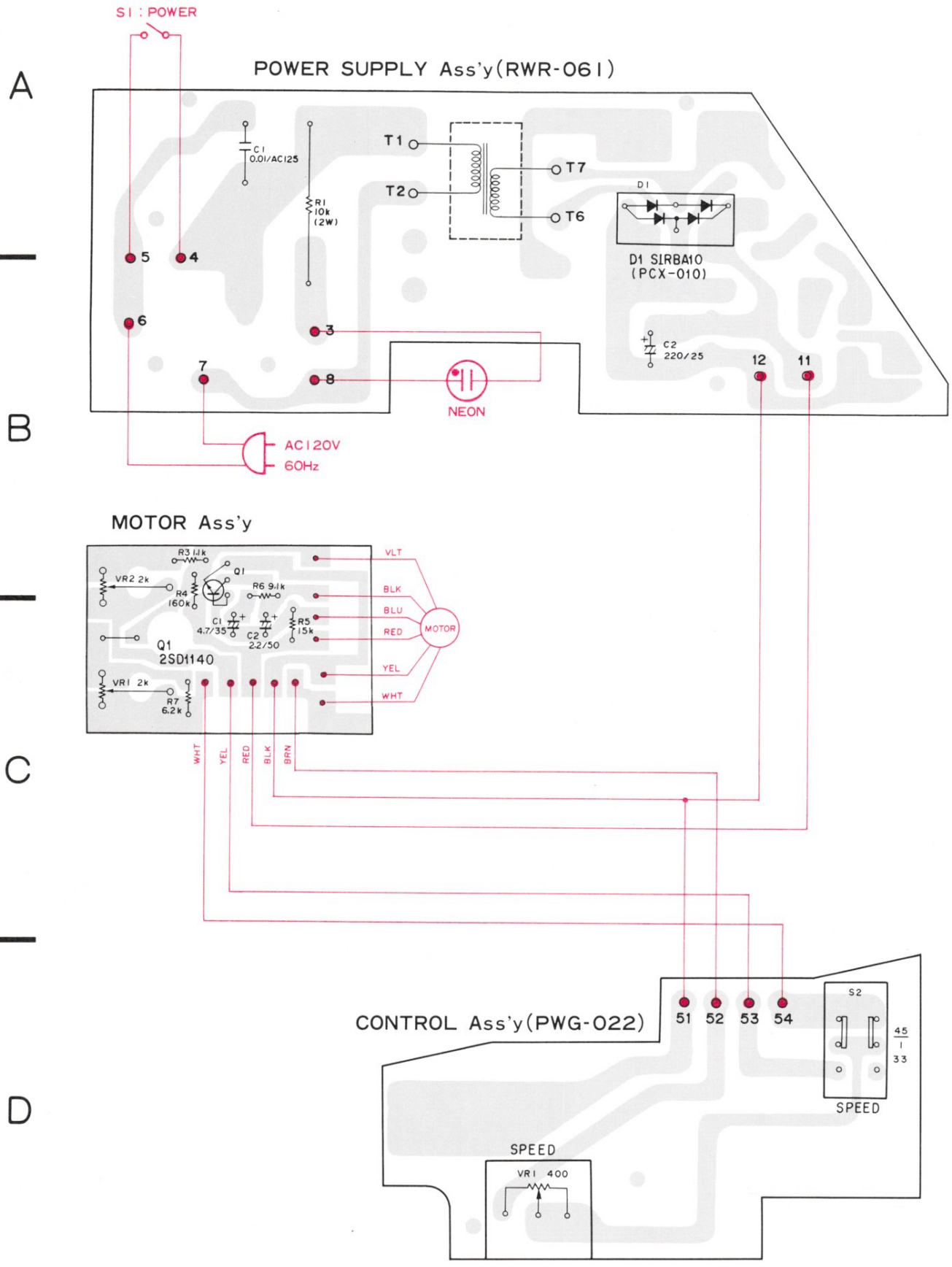
Control Assembly (PWG-022)

Mark	Part No.	Symbol & Description	
★★	PSG-029	S2	Push switch
★	PCS-021	VR1	Volume
	PMZ30P050FMC		Screw
	PDZ30P060FMC		Screw

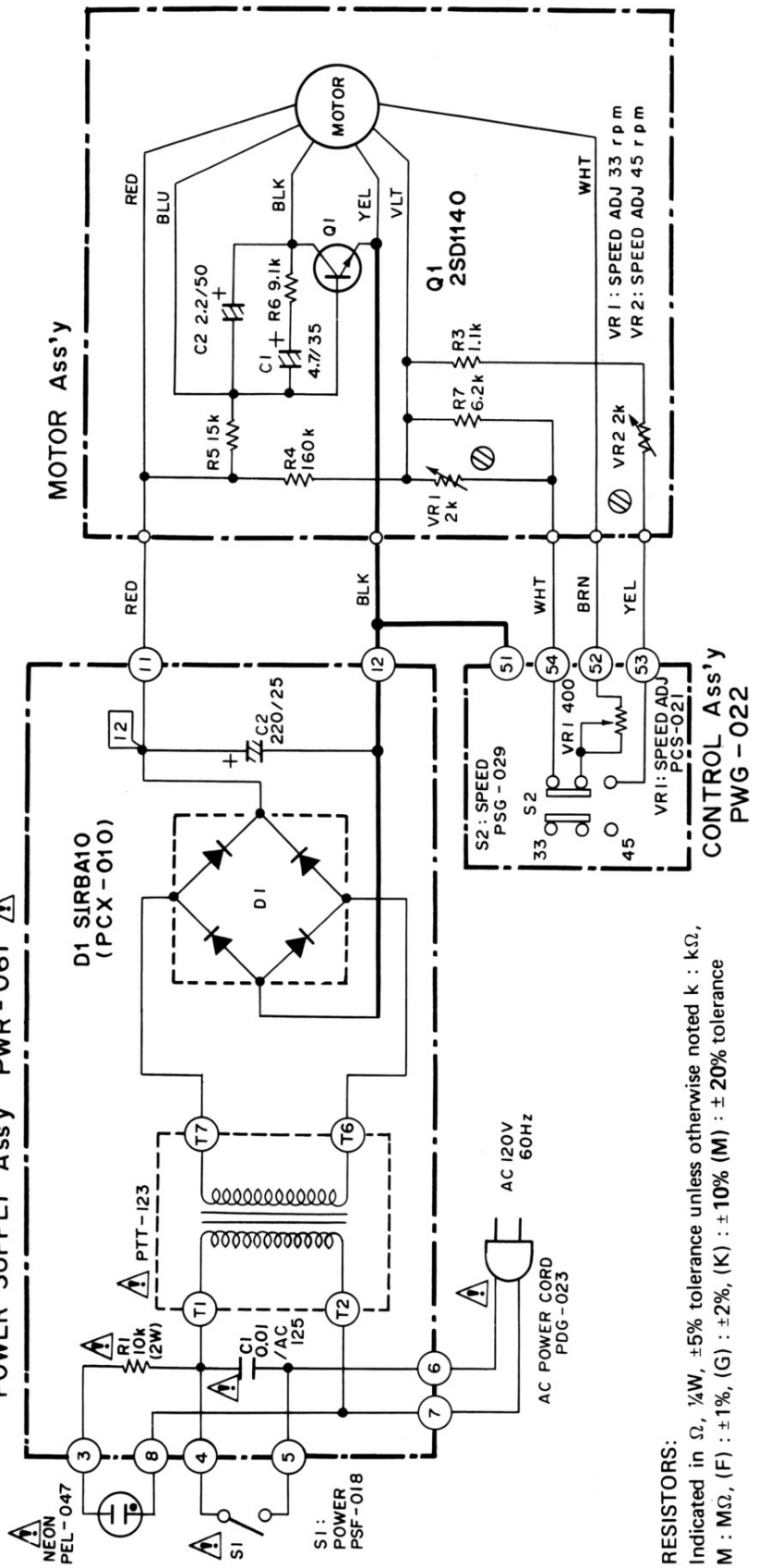
Power Supply Assembly (PWR-061)

Mark	Part No.	Symbol & Description	
⚠	PCL-036	C1	
	CEA 221M 25L	C2	
★	PCX-010 (WL02)	D1	
⚠	RS2PF103J	R1	
⚠ ★	PTT-123		Power transformer (120V)

7. P.C.BOARDS CONNECTION DIAGRAM



8. SCHEMATIC DIAGRAM



SWITCHES:

S1 : POWER — ON —— OFF

S2 : SPEED — 33 1/3 r p m — 45 r p m

The underlined indicates the switch position.

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

1. RESISTORS:
   Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M) : ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
   Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE
   ▭ : DC voltage (V) 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.

9. EXPLODED VIEWS

9.1 MECHANISM ASSEMBLY

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.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

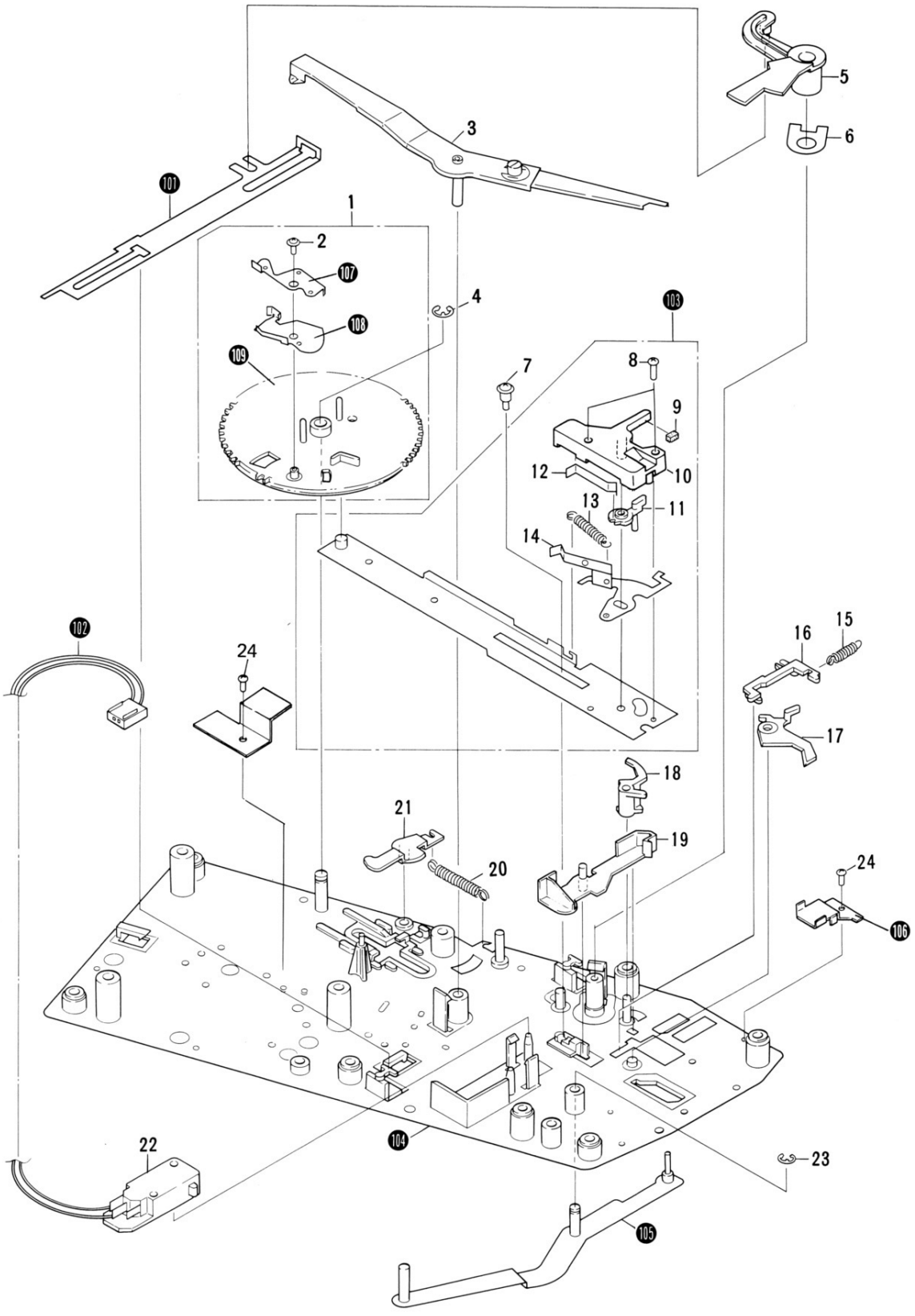
Parts List

Mark	No.	Part No.	Description
	1.	PYY-100	Sensing unit
	2.	PBA-126	Screw
	3.	PXT-355	Detector lever unit
	4.	YE40S	E-type washer
	5.	PNX-305	Index cam
	6.	PBK-039	Spring washer
	7.	PBA-123	Screw
	8.	PMZ26P100FMC	Screw
	9.	PEC-065	EV cam buffer
	10.	PNX-304	EV cam
	11.	PNX-032	Lead ratch
	12.	PBK-038	Plate spring
	13.	PBH-224	Start plate spring
	14.	PXT-454	Start plate unit
	15.	PBH-223	Reset plate spring
	16.	PNX-029	Selector
	17.	PNX-028	Reset plate
	18.	PNX-031	Switch lock angle
	19.	PNX-030	Switch lever
	20.	PBH-225	Lock plate spring
	21.	PNX-035	Lock plate
⚠ ★★	22.	PSF-020	Microswitch
	23.	YE30S	E-type washer
	24.	PDZ30P050FMC	Screw
	25.		
	101.		Select lever
	102.		Connector assembly
	103.		Driving plate assembly
	104.		Sub-panel unit
	105.		Start lever unit
	106.		Protection plate
	107.		Signal plate
	108.		Starting plate
	109.		cam

1 2 3

A B C D

Mechanism Assembly



9.2 EXTERIOR

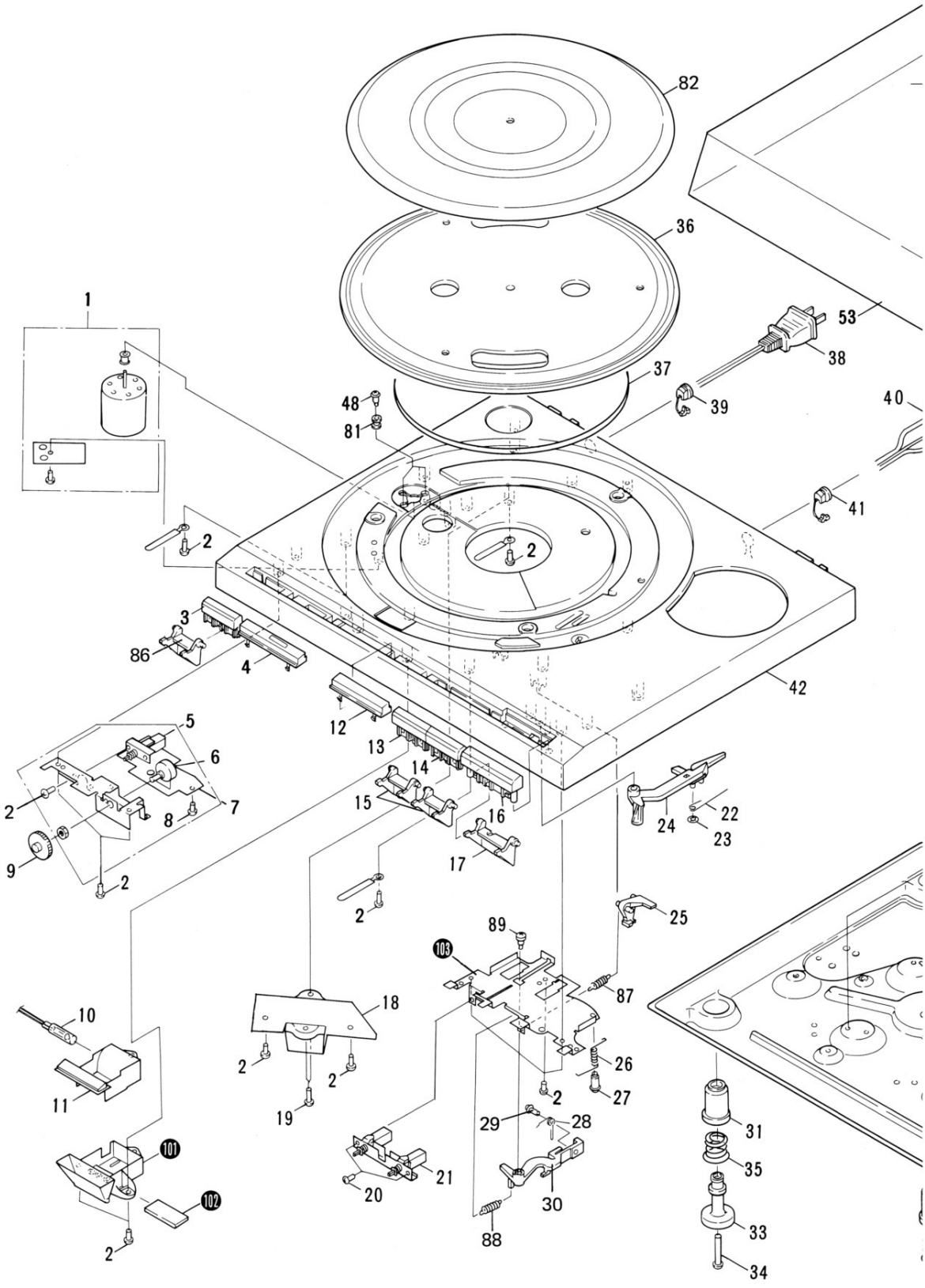
Parts List

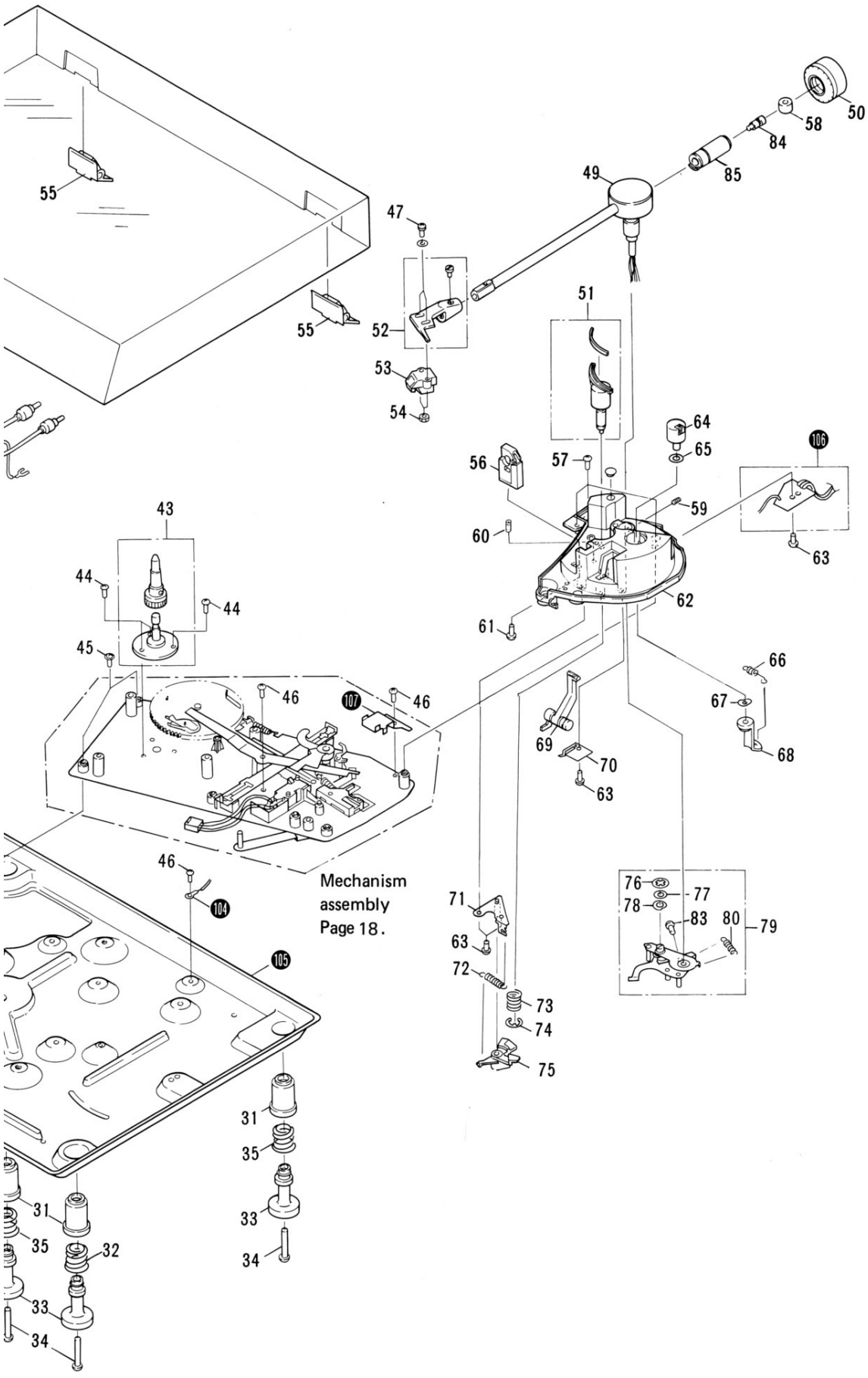
Mark	No.	Part No.	Description
★★	1.	PYY-101	Motor assembly
	2.	PPZ30P080FMC	Screw
	3.	PAD-090	SP knob (B) unit
	4.	PAM-082	Front name plate (C)
★★	5.	PSG-029	Push switch
★	6.	PCS-021	Volume
	7.	PWG-022	Control assembly
	8.	PDZ30P060FMC	Screw
	9.	PAC-092	Adjustment knob
⚠ ★★	10.	PEL-047	Neon lamp
	11.	PNX-298	Lens holder
	12.	PAM-081	Front name plate (B)
	13.	PAD-092	SE knob (B) unit
	14.	PAD-091	R knob (B) unit
	15.	PNX-291	Switch lever (A)
	16.	PAD-089	S/S knob (B) unit
	17.	PNX-303	Switch lever (C)
⚠	18.	PWR-061	Power supply assembly
	19.	IPZ30P160FMC	Screw
	20.	PDZ30P050FMC	Screw
★★	21.	PSG-033	Push switch
	22.	PBH-247	Driving lever (A) spring
	23.	YP30S	Push nut
	24.	PNX-289	Driving lever
	25.	PNX-290	Control lever
	26.	PBH-307	Switch lever (C) spring
	27.	PBA-086	Screw
	28.	PBH-320	Spring
	29.	IPZ30P080FMC	Screw
	30.	PNX-340	Lever
	31.	PEB-194	Damper cushion
	32.	PBH-312	Spring
	33.	PNX-293	Holder
	34.	PBA-118	Screw
	35.	PBH-311	Spring
	36.	PNR-165	Turntable platter
★★	37.	KEB-004	Belt
⚠	38.	PDG-023	Power cord
	39.	PEC-058	Strain relief
	40.	PDE-064	PU cord
	41.	PEC-056	Strain relief
	42.	PNX-351	Panel
	43.	PXB-177	Shaft assembly
	44.	PDZ30P080FMC	Screw
	45.	PBA-109	Screw
	46.	PDZ30P050FMC	Screw
	47.	PBA-905	Screw
	48.	PBA-112	Screw
★	49.	PPD-624	Tonearm assembly
★	50.	PXB-501	Weight assembly
	51.	PXB-227	EV sheet assembly
	52.	PXA-882	Headshell assembly
★★	53.	PNV-034	Dust cover
	54.	PBN-902	Nut
★	55.	PXB-155	Hinge assembly
	56.	PXB-247	Tonearm rest assembly
	57.	PBA-108	Screw
	58.	PNT-554	Rubber bush
	59.	ZMD40H080FBT	Screw
	60.	ZMR30H150FZK	Screw
	61.	IPZ30P100FMC	Screw
	62.	PNX-341	Tonearm base
	63.	VBZ30P080FMC	Screw
	64.	PAC-101	AS knob
	65.	PBF-017	Washer
	66.	PBH-292	Spring
	67.	PBE-012	AS spring washer
	68.	PNX-335	AS plate
	69.	PNX-344	EV cam lever
	70.	PBK-053	EV plate spling (A)
	71.	PXT-462	EV plate spring (B) unit
	72.	PBH-238	EV cam spring
	73.	PBH-293	EV spring
	74.	YE50S	E-type washer
	75.	PNX-339	EV cam
	76.	YS40FBT	Fixed washer
	77.	WC40FMC	Plate washer
	78.	PNC-227	PU spring washer
	79.	PXB-228	PU plate assembly
	80.	PBH-244	PU plate spring
	81.	PEB-172	Rubber cushion
	82.	PEA-057	Rubber mat assembly
	83.	PMD40P060FMC	Screw
	84.	PBA-535	Screw
	85.	PXT-596	Weight shaft assembly
	86.	PNX-292	Switch lever (B)
	87.	PBH-321	Spring
	88.	PBH-322	Spring
	89.	PBA-128	Screw
	101.		Strobe holder
	102.		Mirror
	103.		Controller base
	104.		Lead unit (GND)
	105.		Base
	106.		PU cord assembly
	107.		Protection plate

1 2 3

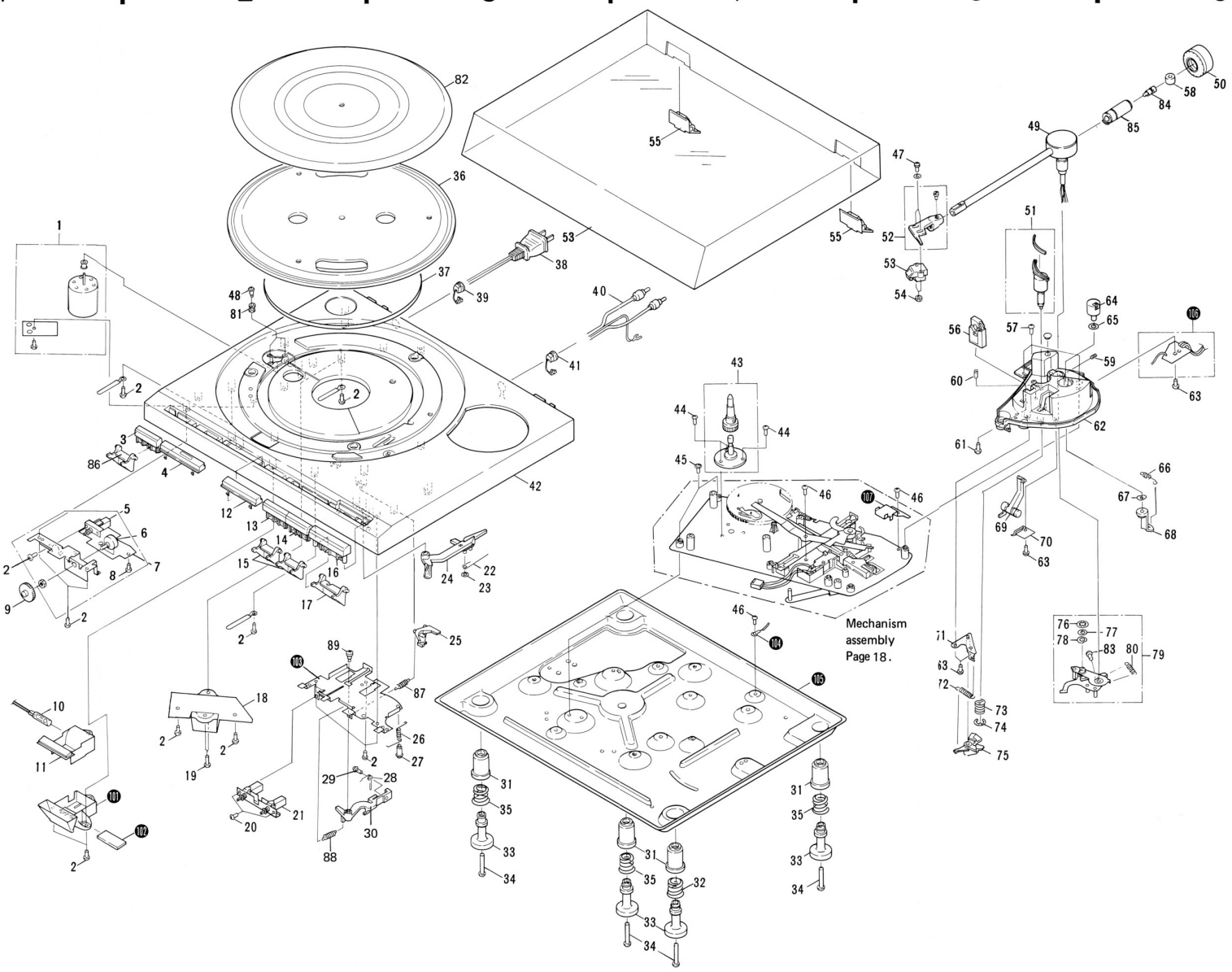
A B C D

Exterior





Exterior



10. ADJUSTMENTS

10.1 AUTO RETURN ADJUSTMENT

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

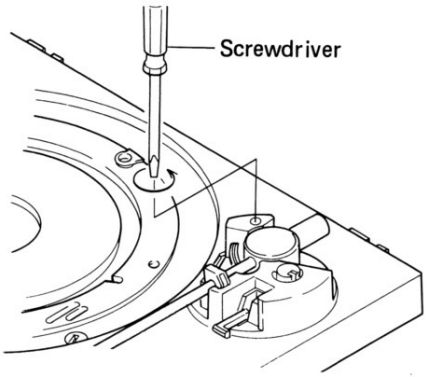


Fig. 10-1 Auto-return adjustment

10.2 ARM-ELEVATION ADJUSTMENT

To proceed with the elevation sheet height adjustment, insert the hexagonal wrench (for 3mm) 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 ±2mm.

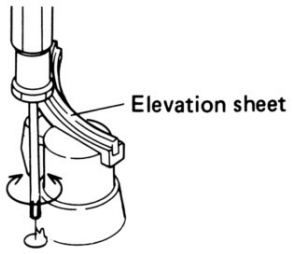


Fig. 10-2 Arm-elevation adjustment

10.3 STYLUS LANDING POSITION ADJUSTMENT

1. Place a 30 cm record on the platter.
2. Depress the START/STOP button and start auto play.
   Check the direction and amount of stylus deviation (how many millimeters toward the inside or outside of the record's lead-in groove).
3. Depress the START/STOP button and return the tonearm to the arm clamp.
4. After the platter has stopped rotating, check the screw in the adjustment hole.
5. Rotate the screw with a small screwdriver in accordance wich the direction of the deviation observed in step 2.
   - Every semi-turn of the screw corrects the stylus descent position by about 18 mm.
   - Rotate the screw clockwise if the stylus descends on the outside of the proper position.
   - Rotate the screw counterclockwise if the stylus descends on the inside of the proper position.
6. Depress the START/STOP button and check that the adjustment has been performed properly
   Repeats steps 3 through 6 if the stylus still deviates.

Proceed as follows when the stylus does not descend in the proper position on the record during auto play.
While performing the adjustment, take care not to scratch the record with the stylus.

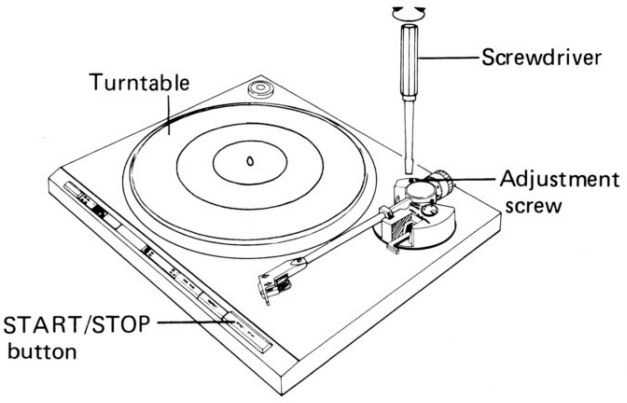


Fig. 10-3 Stylus landing point adjustment

10.4 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 VR1 and VR2 in the motor assembly so that the stroboscope appears to be stationary. Again this adjustment is performed from below.
4. Adjust VR1 for 33 rpm speed, and VR2 for 45 rpm.

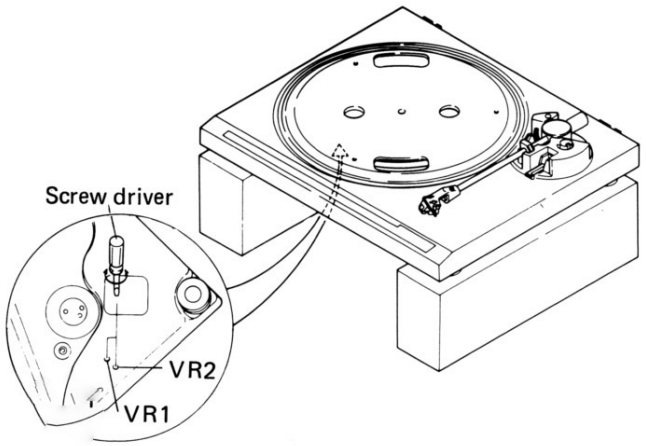
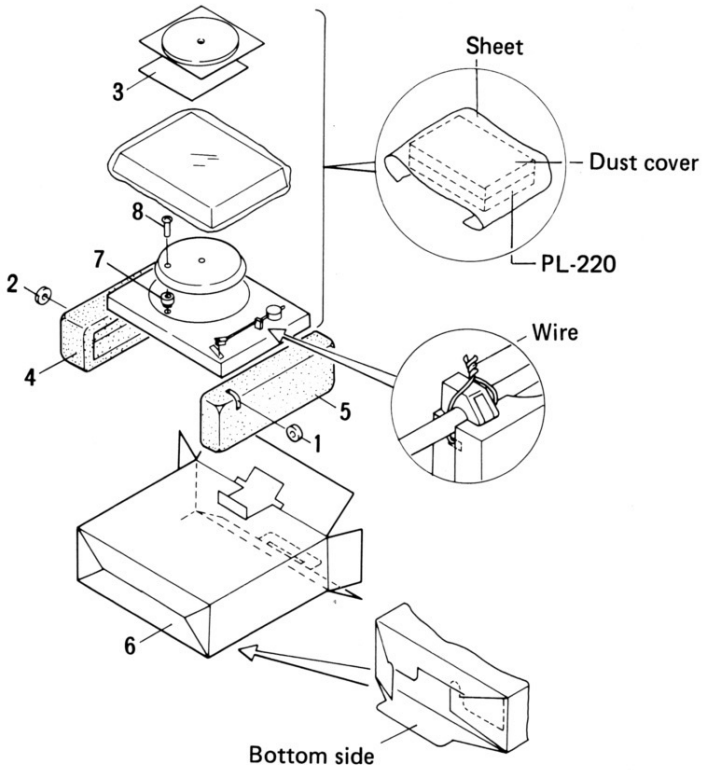


Fig. 10-4 Motor adjustment

11. PACKING



Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	N93-603	45 adaptor		6.	PHG-478	Packing case
★	2.	PXB-501	Weight assembly		7.	PNX-294	Turntable platter packing
	3.	PRB-192	Operating instructions		8.	PBA-100	Screw
	4.	PHA-127	Protector (L)				
	5.	PHZ-128	Protector (R)				