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Service Manual

QUARTZ Turntable System
SL-Q303

[M], [MC]



Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply: 120 V, AC, 50 Hz/60 Hz
Power consumption: 7 W
Dimensions: 43 x 10.6 x 37.5 cm
 (W x H x D) (16-15/16" x 4-7/32" x 14-3/4")
 Maximum height when top (dust cover) is open.
 43 x 37 x 42 cm
 (16-15/16" x 14-9/16" x 16-17/32")
Weight: 6.5 kg (14.3 lb.)

■ Turntable section

Type: Quartz direct drive
 Automatic turntable
 (Auto start)
 (Auto return)
 (Auto stop)
 (Manual play)
 (Repeat play)
Drive method: Direct drive
Motor: Brushless DC motor
Drive control method: Quartz-phase-locked control
Turntable platter: Aluminum die-cast
 Diameter 31.2 cm (12-9/32 inches)
Turntable speeds: 33-1/3 rpm and 45 rpm
Wow and flutter: 0.012% WRMS*
 0.025% WRMS (JIS C5521)
 ± 0.035% peak (IEC 98A Weighted)

*This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter.
 Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble: -56 dB (IEC 98A Unweighted)
 -78 dB (IEC 98A Weighted)

■ Tonearm section

Type: Universal tonearm
 "S" shaped tubular arm
 Static balanced type
Effective length: 230 mm (9-1/16")
Overhang: 15 mm (19/32")
Tracking error angle: Within 2°32' at the outer groove of 30 cm (12") record
 Within 0°32' at the inner groove of 30 cm (12") record
Offset angle: 22°
Friction: Less than 7 mg (lateral, vertical)
Effective mass: 11 g (without cartridge)
Stylus pressure adjustment range: 0 - 2.5 g
Applicable cartridge weight range: (See page 10)
Headshell weight: 7.5 g
Phono cable capacitance: 135pF

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Technics

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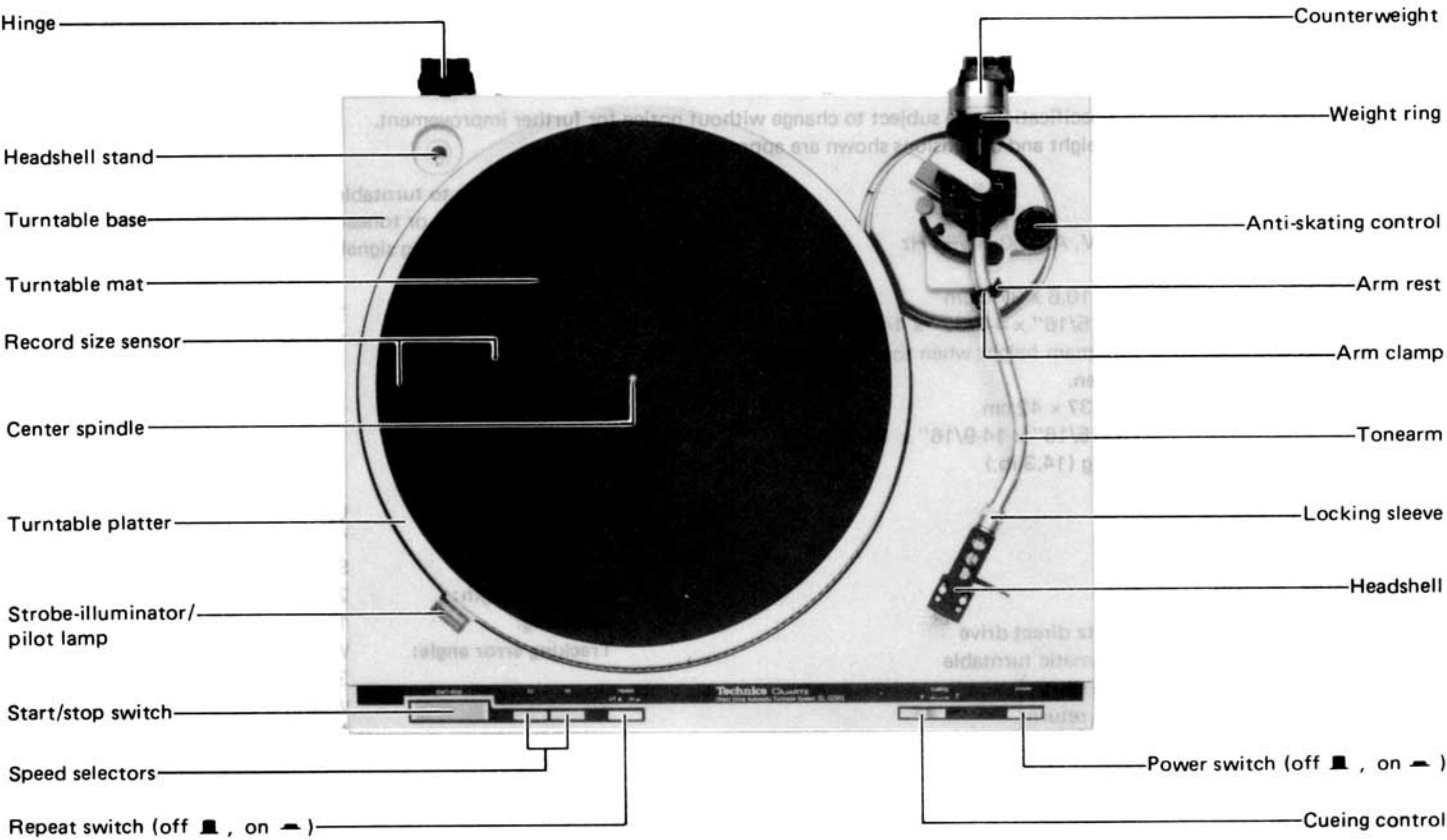
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 Division of Matsushita Electric
 of Puerto Rico, Inc.
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 Victoria Industrial Park
 Carolina, Puerto Rico 00630

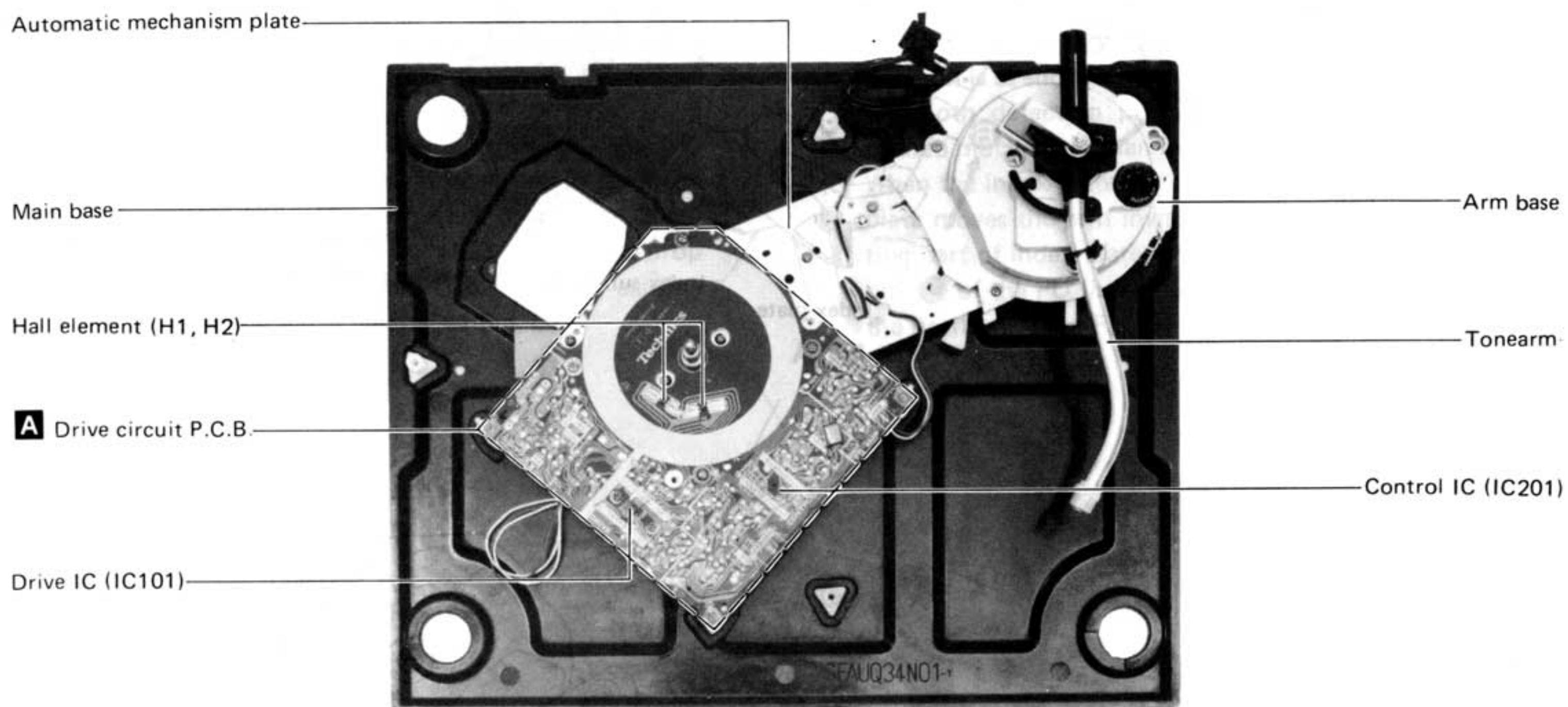
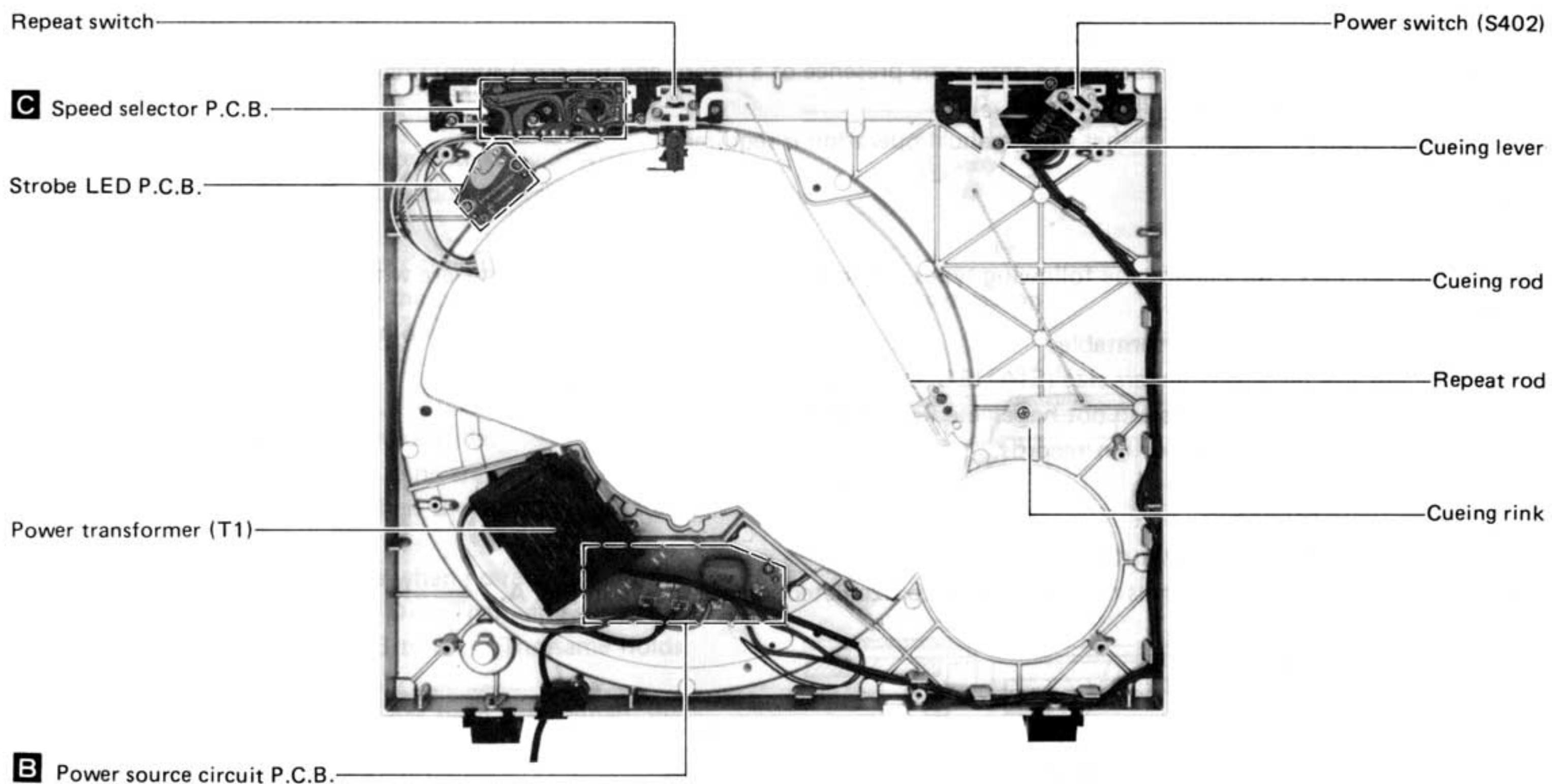
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■ LOCATION OF CONTROLS





■ TECHNICAL EXPLANATION

● Principles of Auto Size Detection

This unit employs a mechanical detection system instead of a conventional electrical detection system. The mechanical system makes it possible to detect the presence of a record and the size (30cm/17cm) of the record. However, it is unable to detect a 25cm record. It is detected as a 17cm record. In that case, manual operation is required.

Note: Playing special records

Follow "Manual play" for playing the following types of records. (Special records may interfere with correct automatic operation.)

This is not a malfunction of the turntable.

* Non-standard size records (standards size (EIA, IEC, DIN, JIS.) are 17,25 and 30 cm).
(However, 25 cm (10") records can not be selected automatically by sensor.)

* Sono-sheets, on light record and thin records.

* Badly warped records.

● Mechanism operation for auto size detection

The mechanism and the part names necessary for auto size detection are shown in Fig. A.

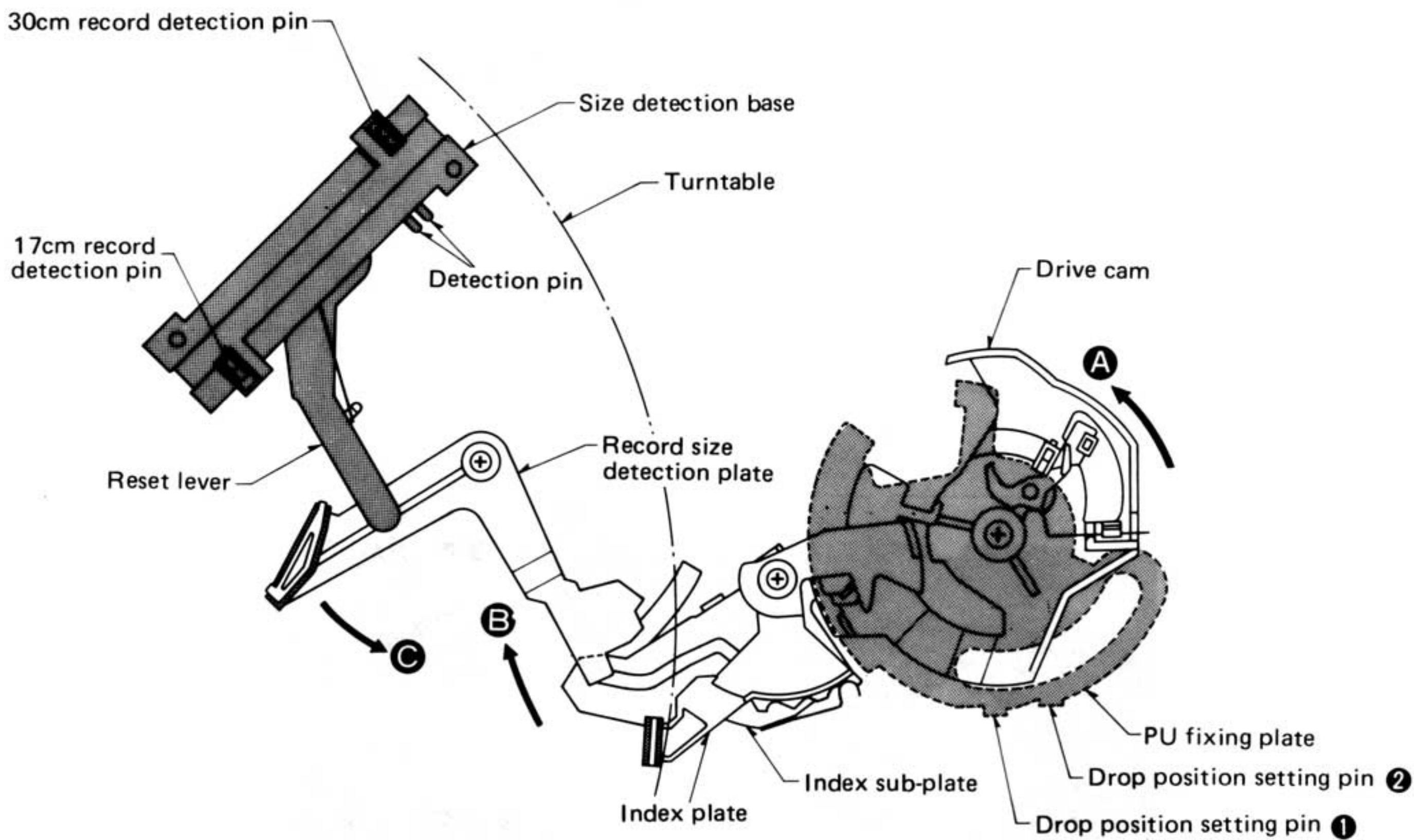


Fig. A

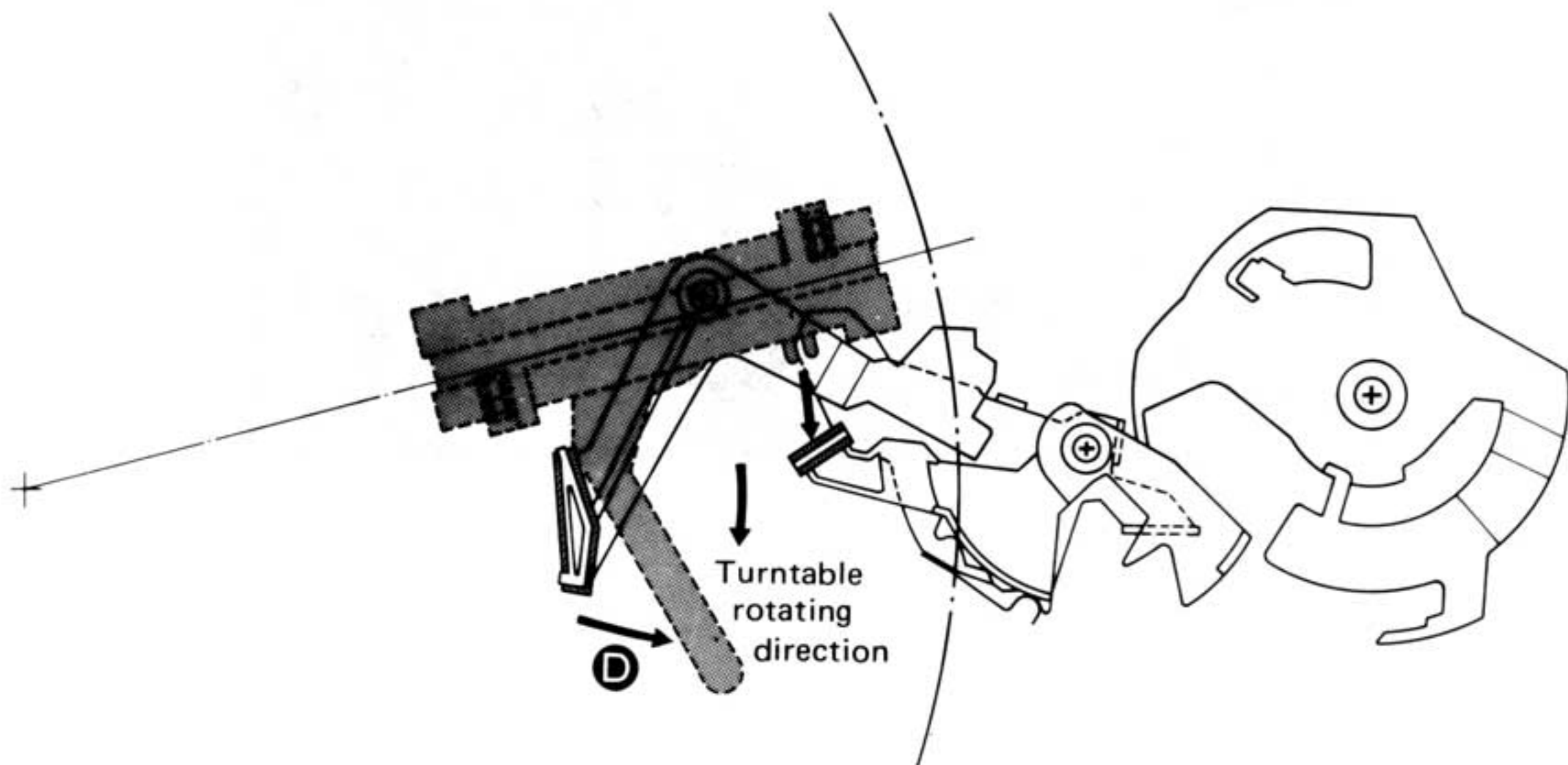
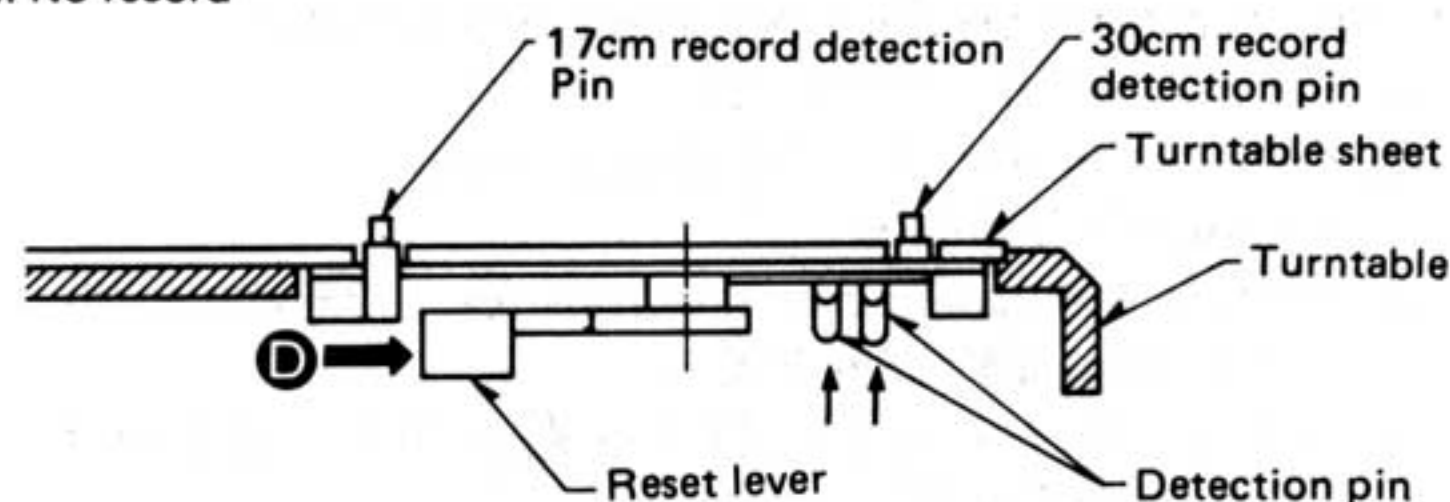


Fig. B

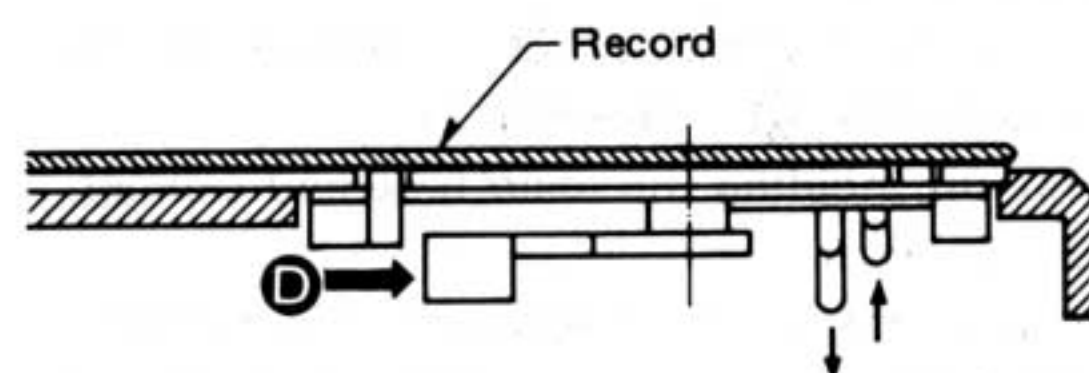
Detection of a record

1. When the start button is pressed without putting a record on the turntable, the drive cam rotates in the direction of arrow **A** to turn the index sub-plate in the direction of arrow **B**. At that time, the index plate moves in the same manner as the index sub-plate.
(See Fig. A)
2. The record size detection plate interlocked with the index sub-plate rotates in the direction of arrow **C**.
(See Fig. A)
3. Then, the reset lever of the size detection base, attached to the turntable, is pushed by the record size detection plate and moves in the direction of arrow **D**.
(See Fig. B)
4. When the reset lever is pushed, the record detection pins are projected on both inside and outside.
In this case, as both detection pins are up, they do not touch the index plate even when the turntable rotates.
(See Fig. B, C-a)
5. The index plate does not move when no record is on the turntable (dotted line in Fig. D). Then, the turntable rotates 3 times for detecting 3 times. (The same holds true for record size detection.)
6. When the index plate position has been determined, the PU fixing plate tends to move the arm, but the arm does not move because the short drop position setting pin **1** of the PU fixing plate touches the no-record detecting part of the index plate. (See Fig. D)

a. No record



b. 30cm record detection



c. 17cm record detection

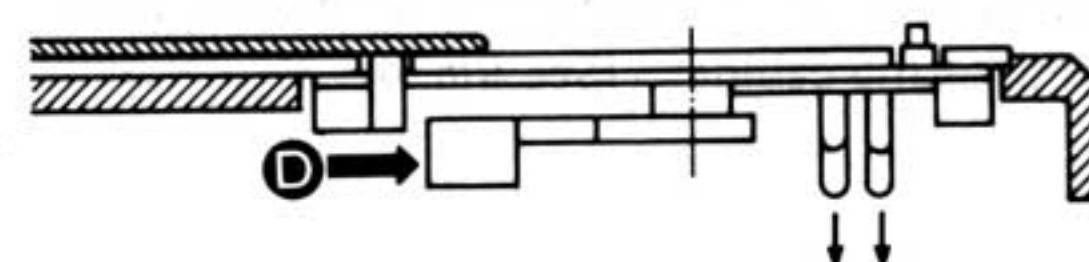


Fig. C

Detection of 30cm record

1. The operation is the same as for record detection, but as a record is on the turntable, both inside and outside detection pins are down. (See Fig. C-b)
2. As the detection pins are down, only the inside detection pin is down. (See Fig. C-b)
3. The detection pin touches the index plate and pushes it in the direction of arrow **E**. Then, the index plate position is as shown by the solid line in Fig. D.
4. When the index plate position has been determined, the PU fixing plate moves the arm inward, but the 30cm record detecting part of the index plate touches the drop position setting pin **2** of the PU fixing plate, causing the arm to drop at the position. (See Fig. D)

Detection of 17cm record

1. In the case of 17cm record, the outside detection pin is up and the inside pin is down. Therefore, both detection pins are down. (See Fig. C-c)
2. The detection pin touches the index plate to push it in the direction of arrow **F**. In this case, the index plate position is as shown by the broken line in Fig. D.
(As both detection pins are down, the index plate is pushed much more than in 30cm.)
3. When the index plate has been determined, the PU fixing plate moves the arm inward, but the 17cm record detecting part of index plate touches the drop position setting pin **2** of the PU fixing plate, causing the arm to drop at the position. (See Fig. D)

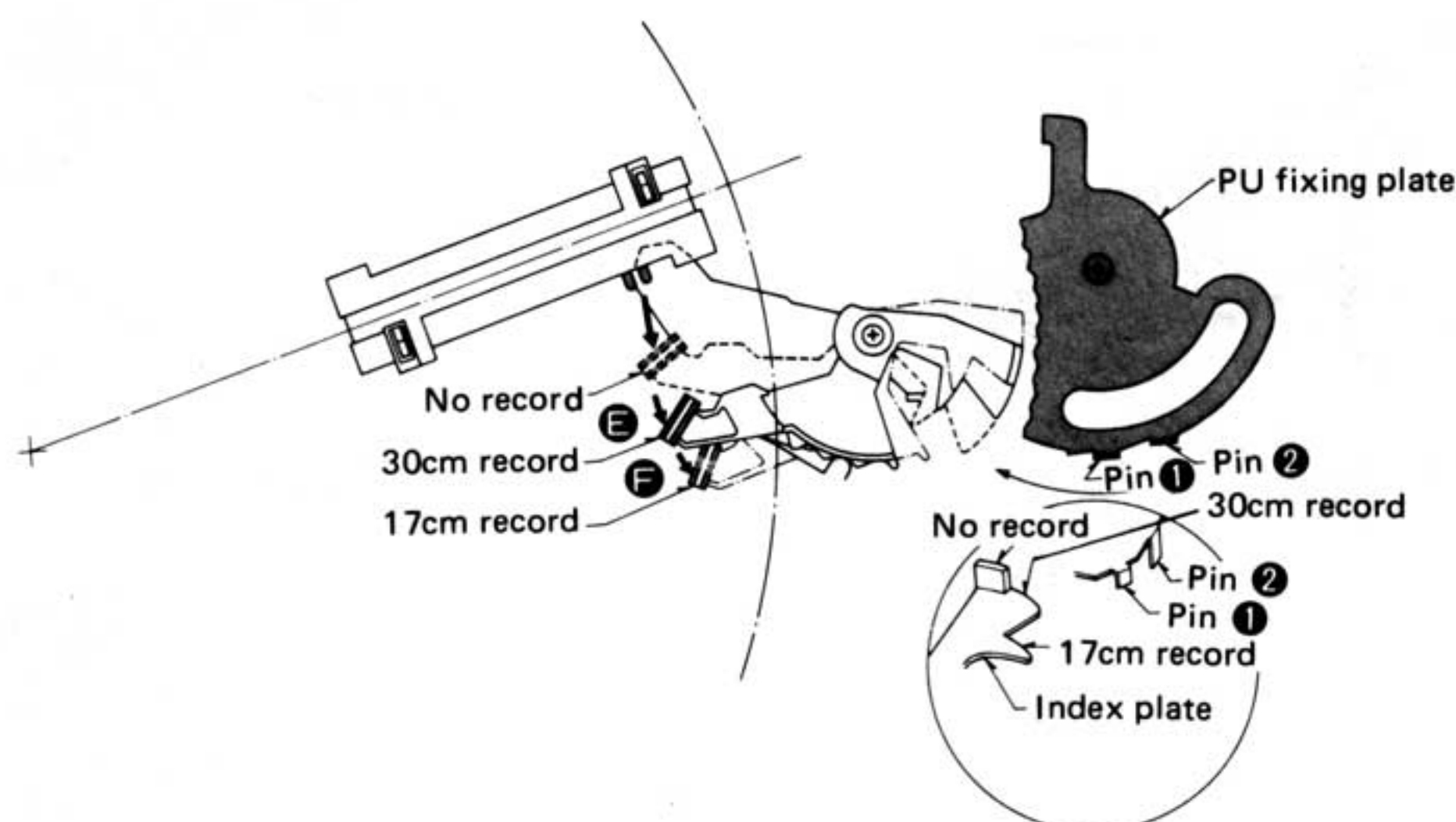


Fig. D

■ DISASSEMBLY INSTRUCTIONS

● How to remove the main base and cabinet

1. Fix the tonearm on the rest.
2. Remove the headshell and counter weight.
3. Remove the turntable.
4. Remove the panel cover setscrews ① ~ ③ and earth lead setscrew ④. (See Fig. 1)
5. Remove the connectors ⑤ and ⑥ of the drive circuit P.C.B. (See Fig. 1)
6. Close the dust cover, and turn over the unit, taking care not to scratch it.
7. Remove the insulator setscrews ⑦ ~ ⑩ and phono cord clamber setscrew ⑪. (See Fig. 2)
8. Turn the unit up, holding the main base and cabinet.
9. Remove the dust cover.
10. Remove the tonearm from the rest, shift the tonearm inward, and lift the cabinet. Then, the main base and cabinet can be disassembled. (See Fig. 3)
11. When assembling the main base and cabinet, make sure that the cueing lever of the arm base is engaged with the cueing ring of the cabinet. (See Fig. 4)

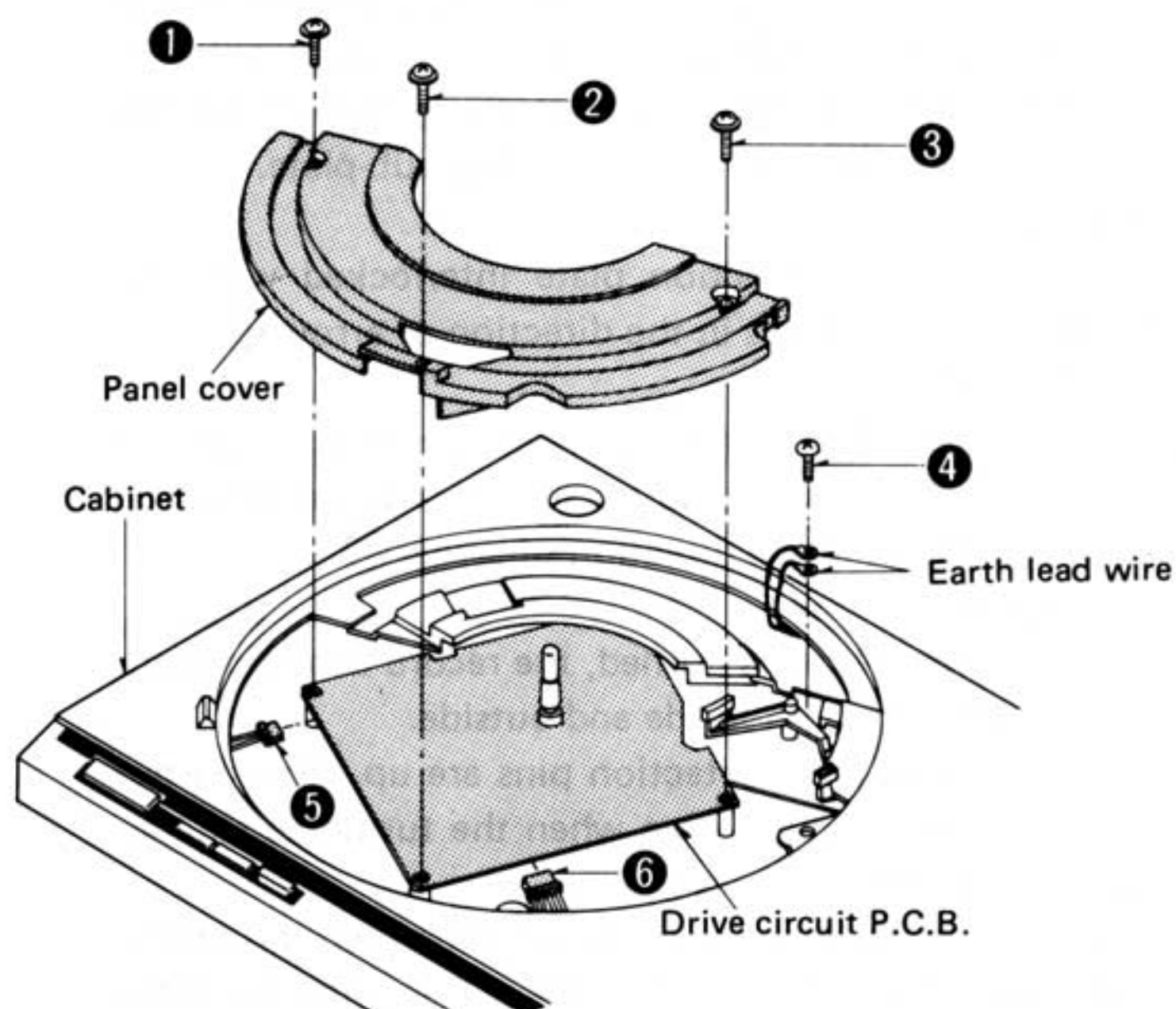


Fig. 1

※ The insulator spring (black) at this position is different from other three springs.

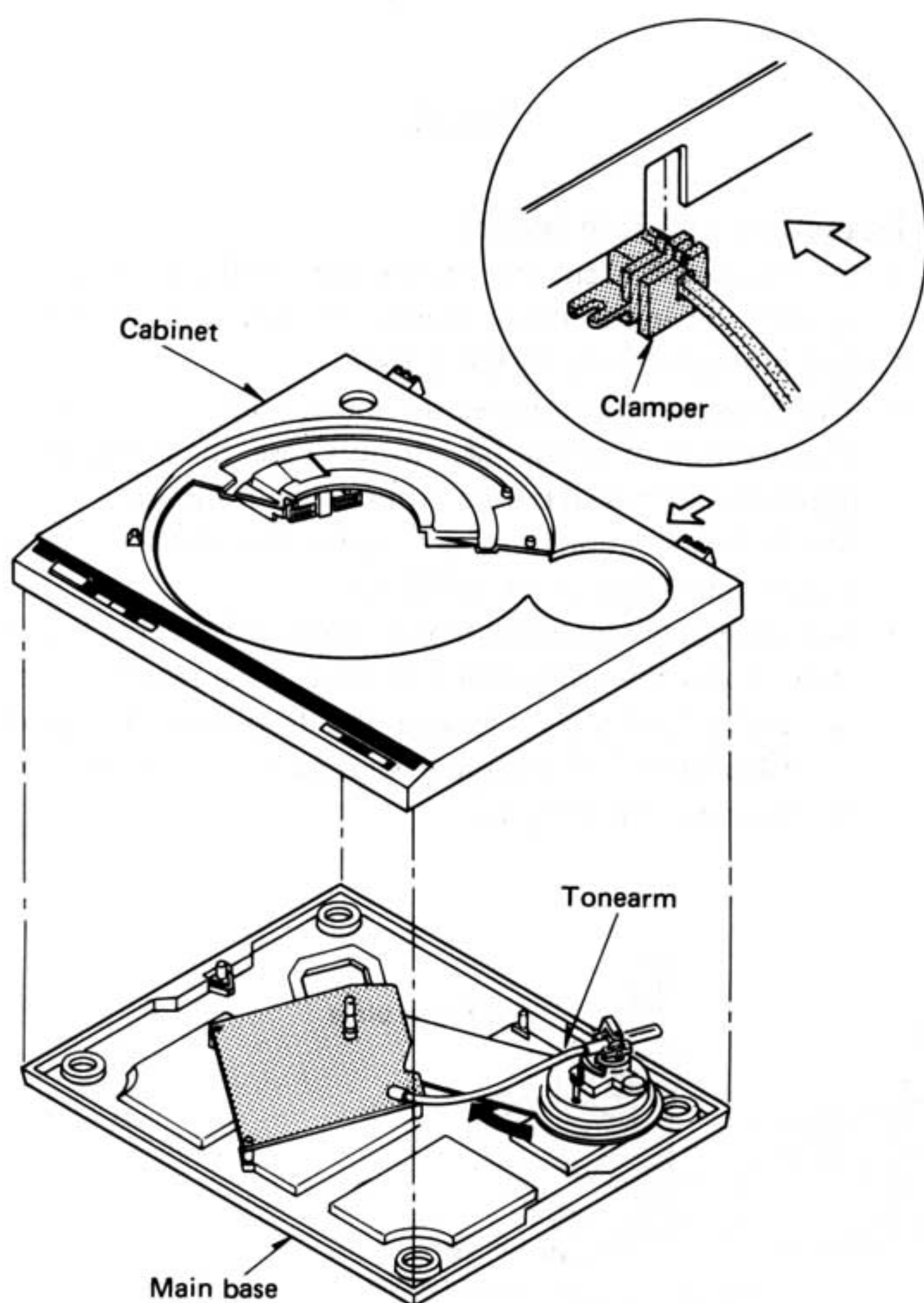


Fig. 3

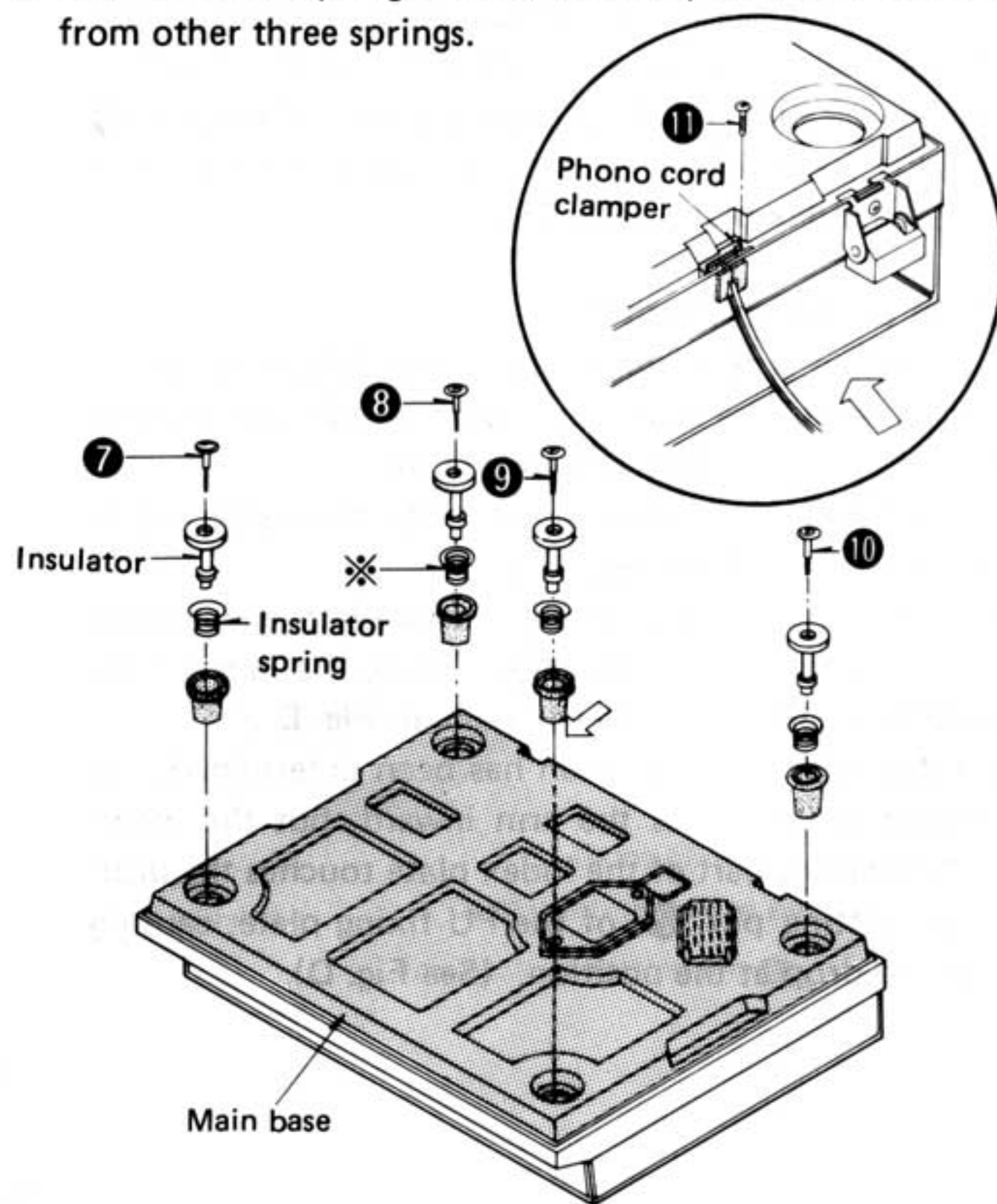


Fig. 2

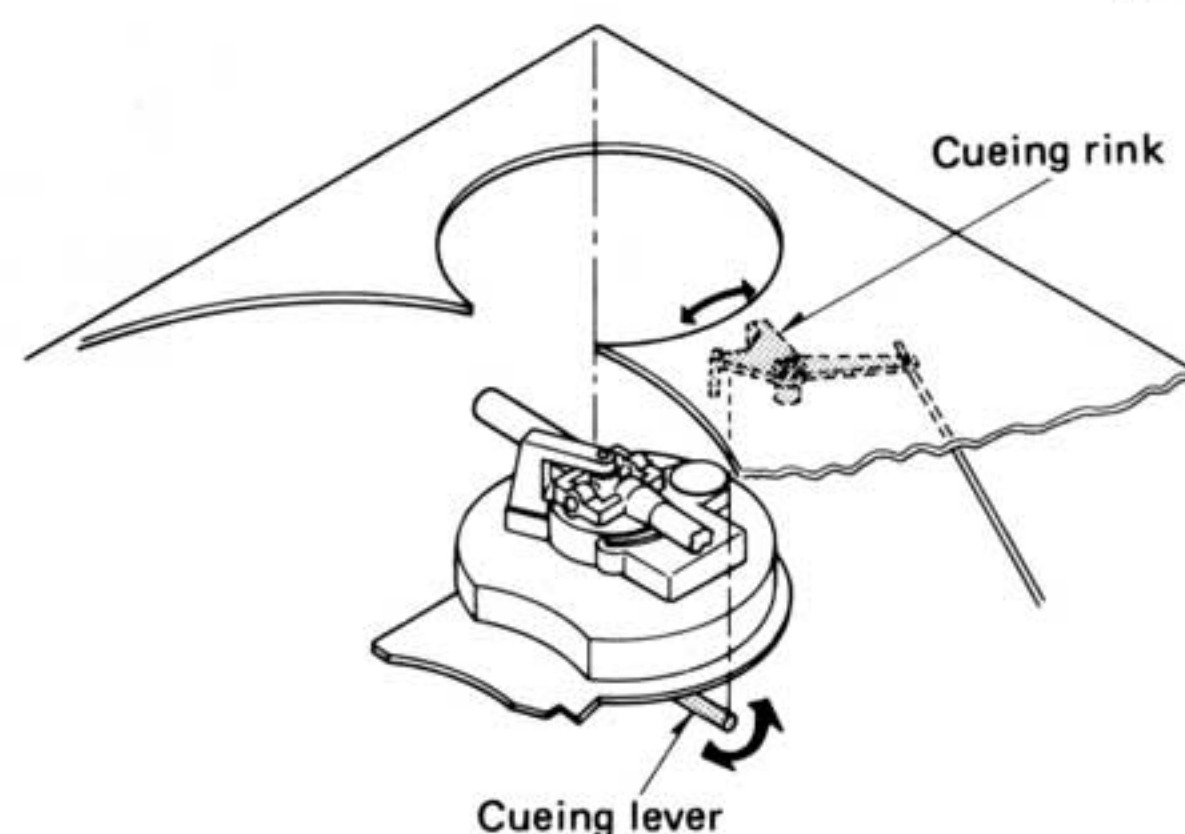


Fig. 4

- **How to remove the drive circuit P.C.B. and stator frame**

1. Remove the main base and cabinet. (Refer to "How to remove the main base and cabinet".)
2. Remove the drive circuit P.C.B. setscrews 12 ~ 15. (See Fig. 5)
3. Remove the stator frame setscrews 16 ~ 20. Remove the regulator transistor (Q3) setscrew 21 and connector 22. Then, the drive circuit P.C.B. can be separated from the stator frame. (See Fig. 5)
4. When removing the drive circuit P.C.B. and stator frame together, remove the connector 22 and setscrews 16 ~ 20. (See Fig. 5)

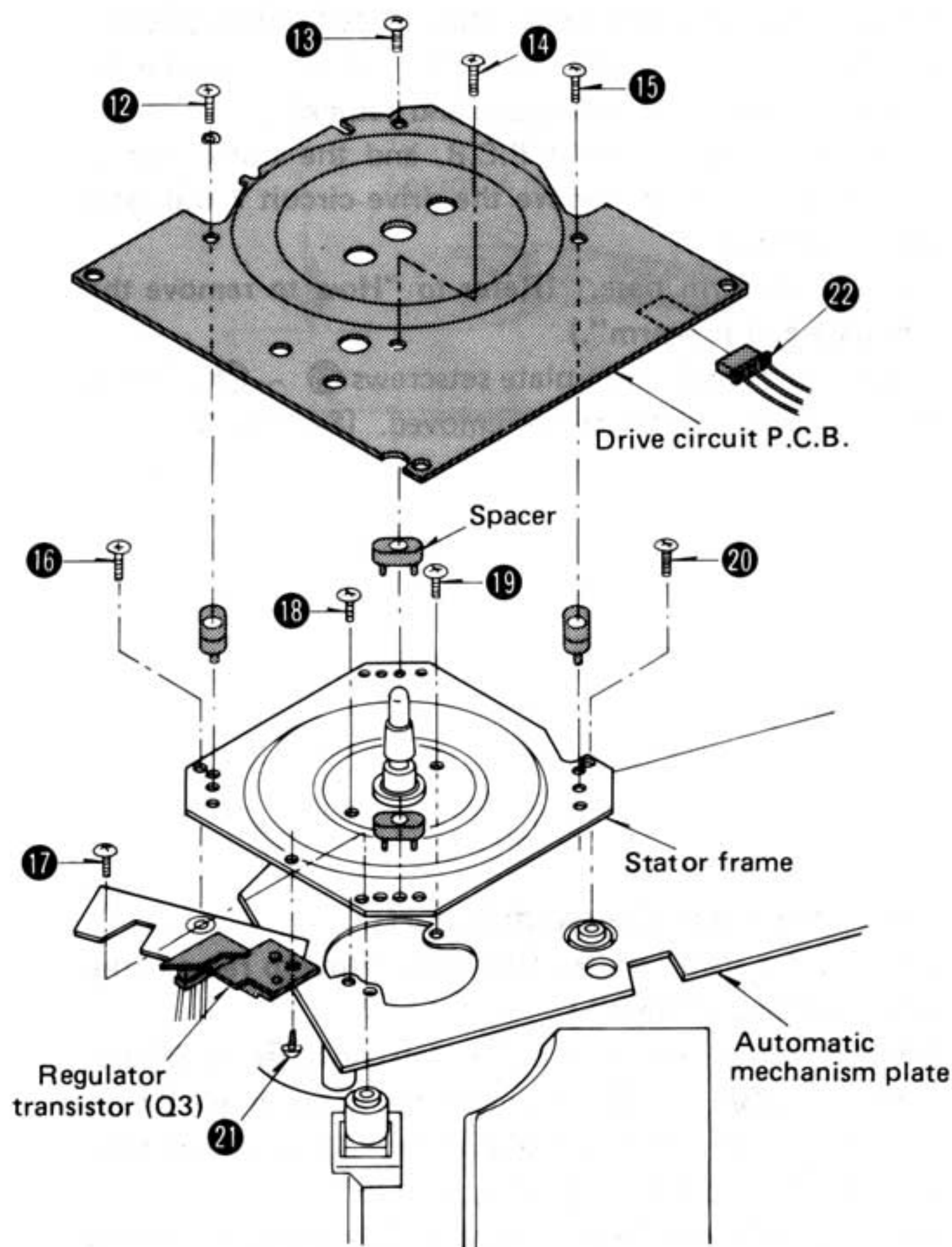


Fig. 5

- **How to remove the arm base and tonearm**

1. Separate the main base from the cabinet. (Refer to "How to remove the main base and cabinet".)
2. Remove the arm base setscrews 23 ~ 25. Then, the arm base can be removed. (See Fig. 6)
3. When removing the tonearm, turn over the arm base and remove the PU fixing plate setscrew 26 and canceller spring. (See Fig. 7)
4. Remove the phono output P.C.B. setscrew 27 and unsolder the 5 lead wires from the tonearm. (See Fig. 7)

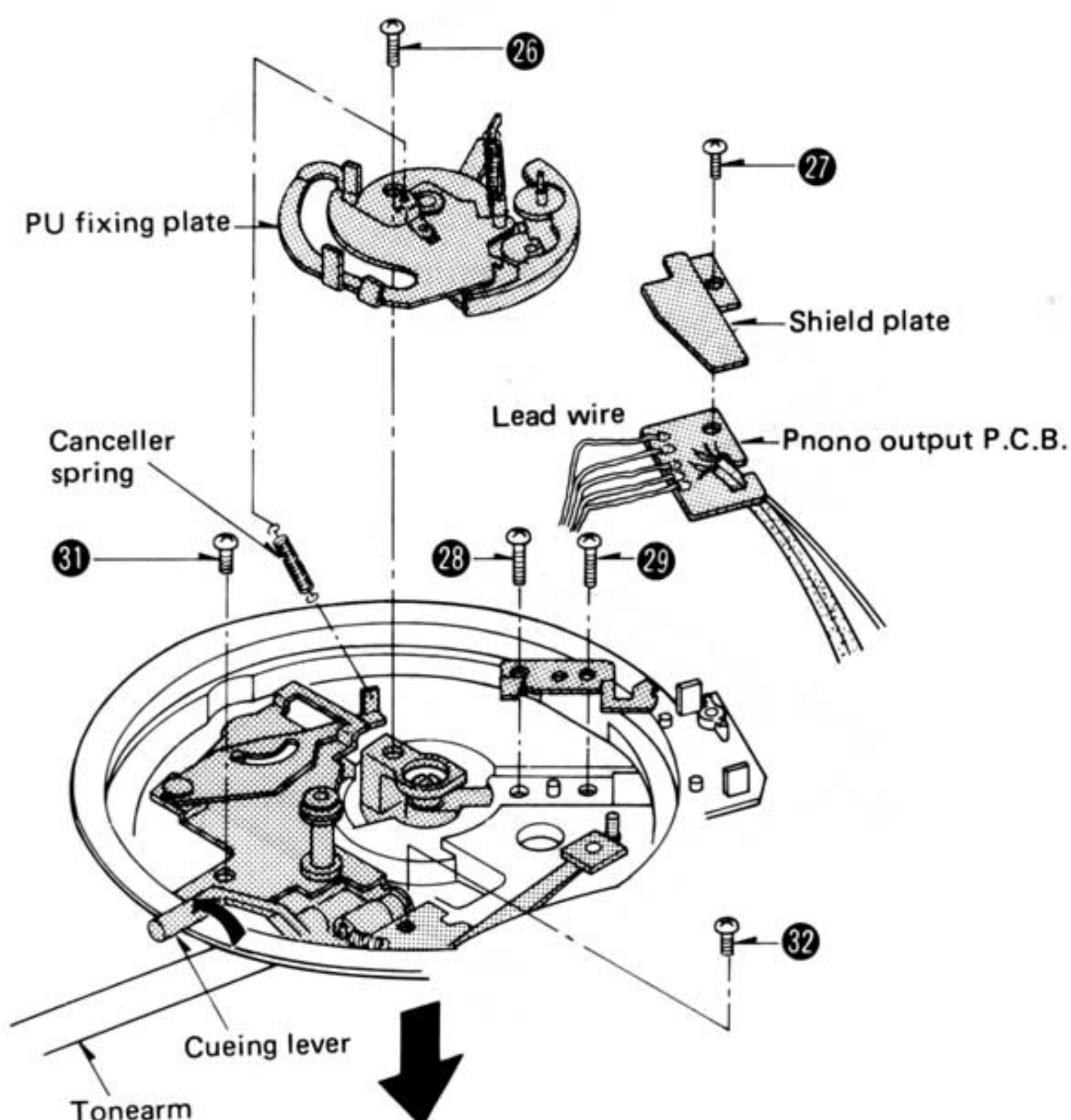


Fig. 7

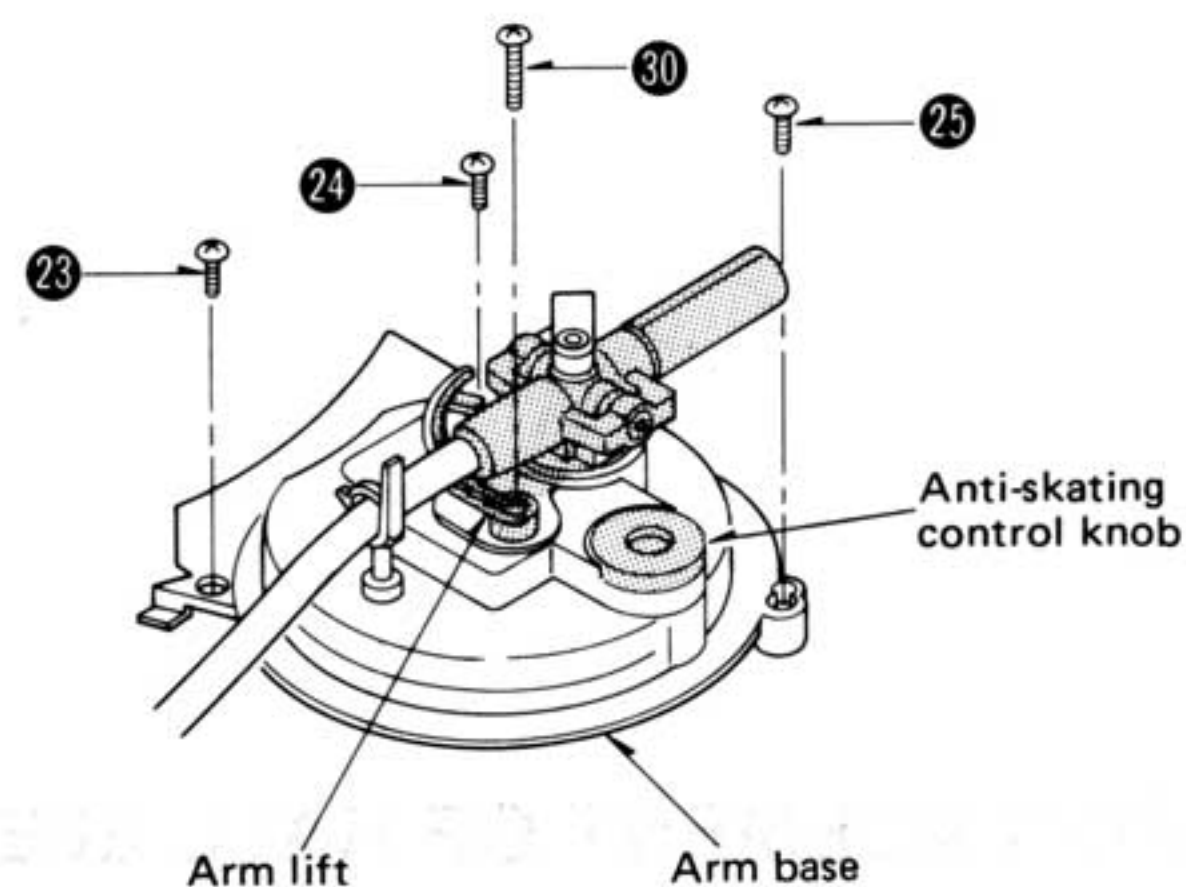


Fig. 6

5. Remove the tonearm setscrews 28 and 29. Then, the tonearm can be removed in the direction of the arrow. (See Fig. 7)
6. When removing this lift base plate, remove the arm lift setscrew 30 before turning over the arm base, and then remove the arm lift. (See Fig. 6)
- Note:** Remove the spring under the arm lift at the same time.
7. Remove the anti-skating control knob. (See Fig. 6)
8. Turn over the arm base and remove the PU fixing plate.
9. Remove the lift base plate setscrews 31 and 32. Then, the lift base plate can be removed.
10. Before mounting the arm base, make sure that the automatic mechanism is in the initial stage, and then shift the cueing lever of the arm base down in the direction of the arrow in order to make cueing-up. (See Fig. 7)

● How to remove the automatic mechanism plate

1. Separate the main base from the cabinet. (Refer to "How to remove the main base and cabinet".)
2. Remove the drive circuit P.C.B. and the stator frame. (Refer to "How to remove the drive circuit P.C.B. and stator frame".)
3. Remove the arm base. (Refer to "How to remove the arm base and tonearm".)
4. Remove the mechanism plate setscrews ③③ ~ ③⑥. Then, the mechanism plate can be removed. (See Fig. 8)

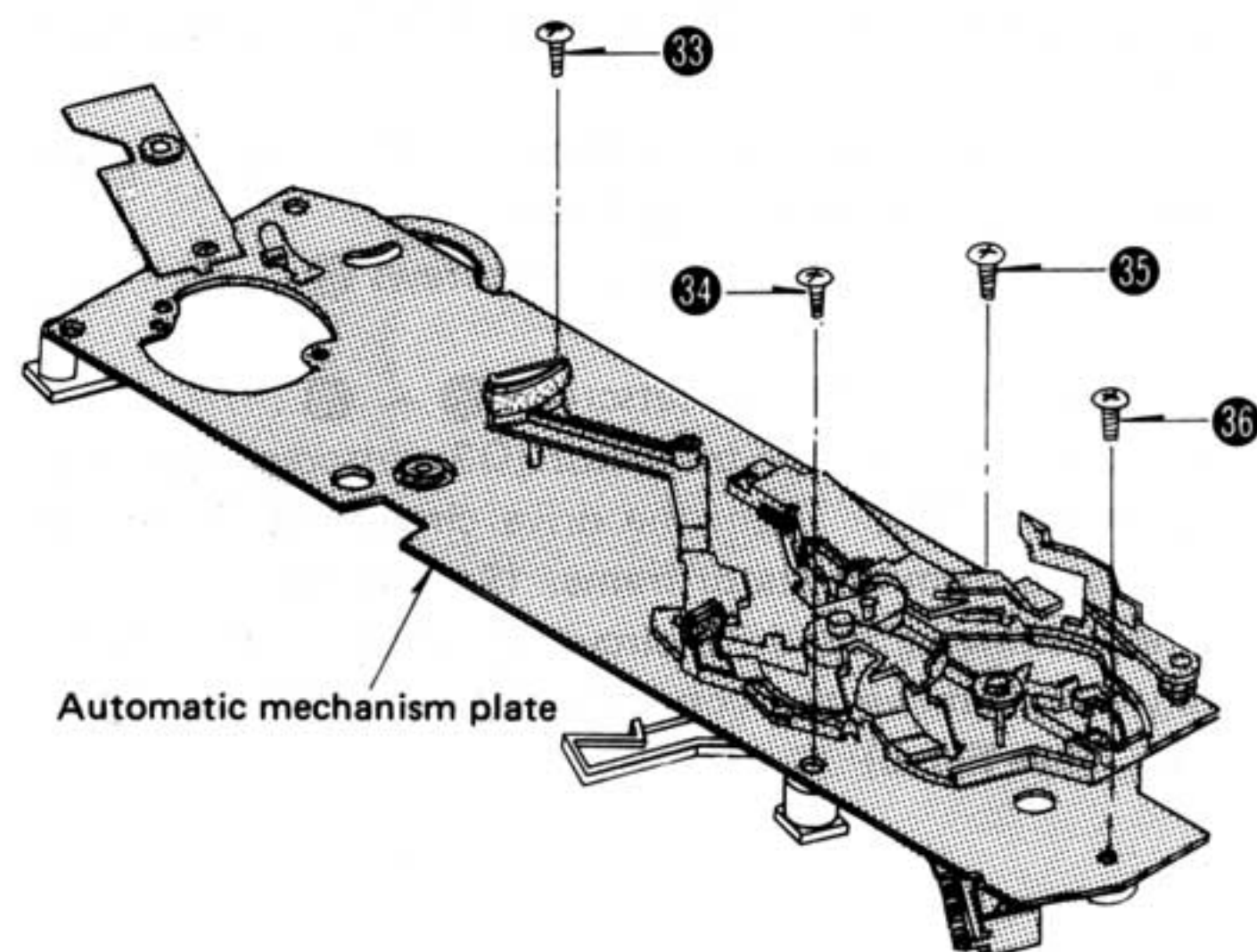


Fig. 8

● How to replace the electric parts

1. Remove the panel cover. (Refer to "How to remove the main base and cabinet".)
 2. Remove the drive circuit P.C.B. setscrews ③⑦ ~ ④① and connectors ④② ~ ④③. Remove the drive circuit P.C.B. by lifting it as shown by the arrow. Then, the electric parts can be replaced. (See Fig. 9)
- To replace the regulator transistor (Q3), the stator frame must be removed beforehand.

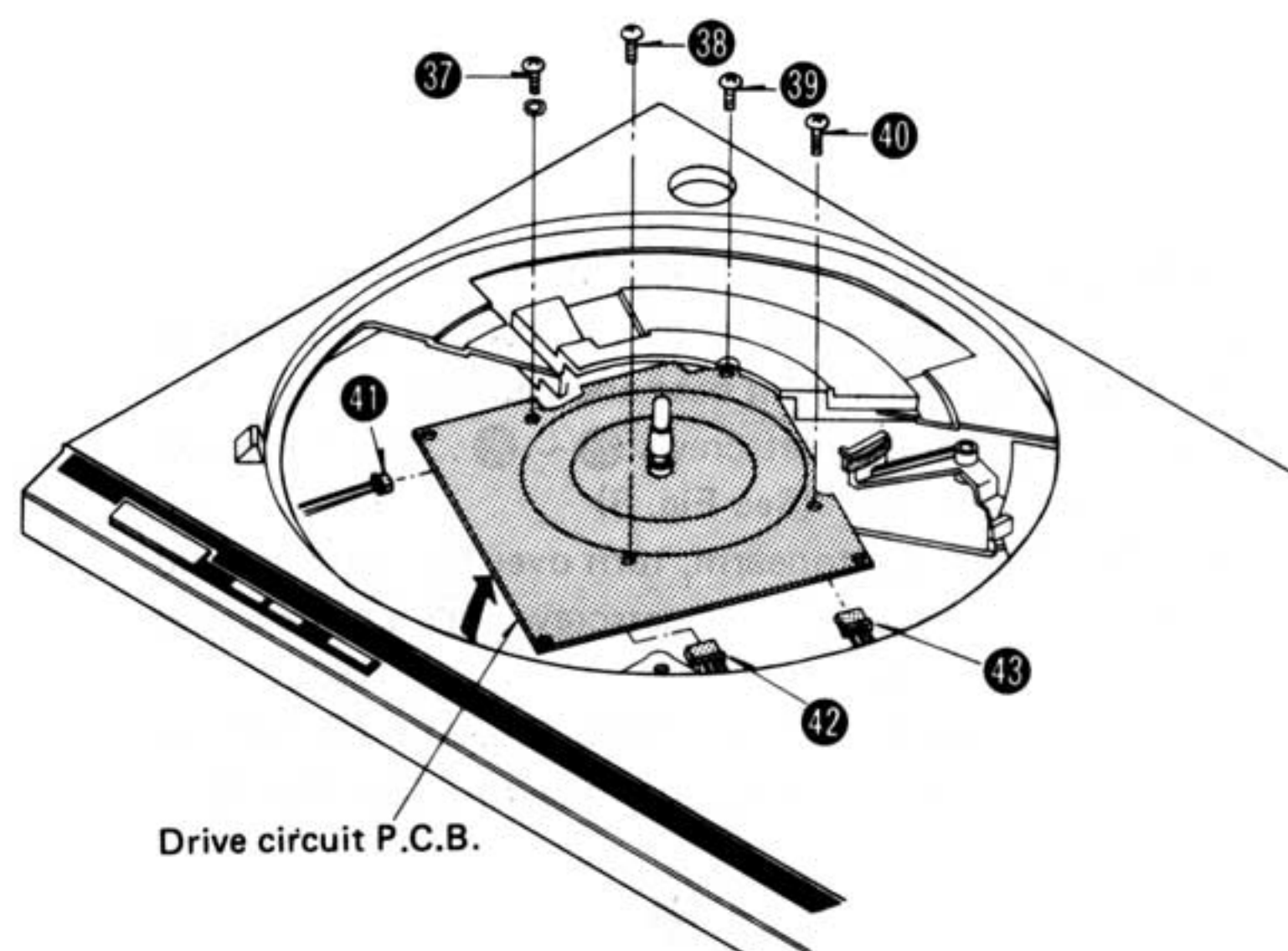


Fig. 9

■ REPLACEMENT OF HALL ELEMENT

When replacing the Hall element, note that the Hall element surface must be faced to the magnet of the turntable. The legs are allowed to be reverse in position provided that the surface is up. (See Fig. 10)

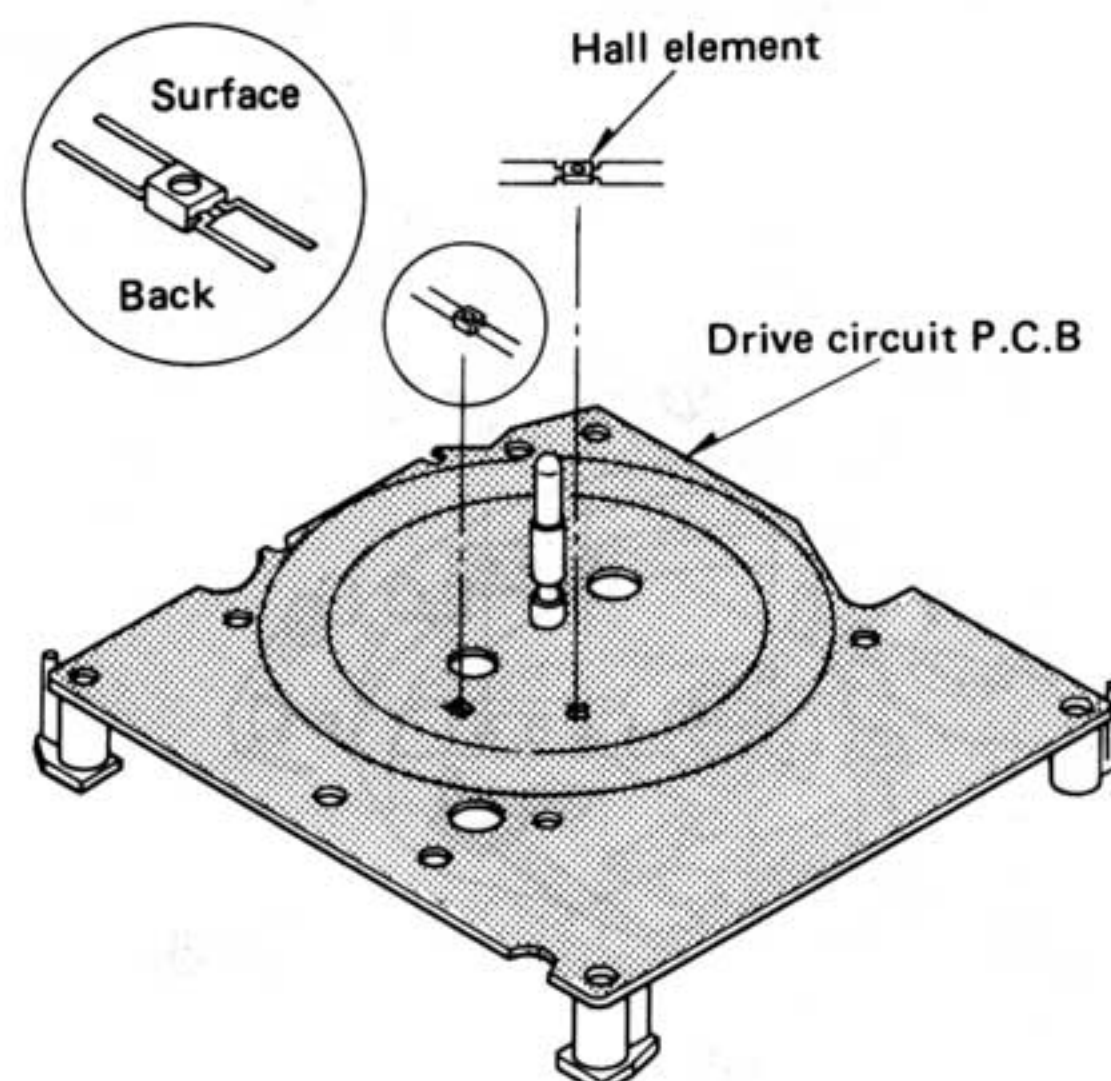


Fig. 10

■ MEASUREMENTS AND ADJUSTMENTS

● Arm-lift height adjustment

The arm-lift height (distance between the stylus tip and record surface when the cueing control is set to the "▼" position) has been adjusted at the factory to approximately 5 mm (3/16"). (Fig. 11)

If the clearance is too narrow or too wide (because of different cartridge dimensions, for example), turn the adjustment screw clockwise or counterclockwise.

(See Fig. 12)

Clockwise rotation

—distance between the record and stylus tip is decreased.

Counterclockwise rotation

—distance between the record and stylus tip is increased.

● Adjustment of automatic start position (Fig. 13)

Note:

The auto-start and auto-return adjustment screw are located together. When the tonearm is in or near the arm rest, the auto-start adjustment screw is visible; (See Fig. 13) when the tonearm is near the center of a record, the auto-return adjustment screw is visible. (See Fig. 14)

If the stylus does not land in the lead-in groove, adjust as follows.

1. Clamp the tonearm to the arm rest.
2. Take off the rubber cap covering the adjustment screw section.
Turn the screw with a screwdriver, clockwise or counterclockwise as necessary.
If the stylus lands too far in,
—turn counterclockwise.
If the stylus descends outside the record,
—turn clockwise.
Adjust so the stylus tip lands 1 ~ 2mm in from the edge of the record.

● Adjustment of automatic return position (Fig. 14)

1. Put the stylus protector on the cartridge.
2. Take off the rubber cap covering the adjustment screw section and move the tonearm toward the center of the record.
Then, the auto-return position adjustment screw will appear.
If the tonearm tends to return to the arm rest before the play has finished,
—turn counterclockwise.
If the tonearm fails to return after the final groove,
—turn clockwise.

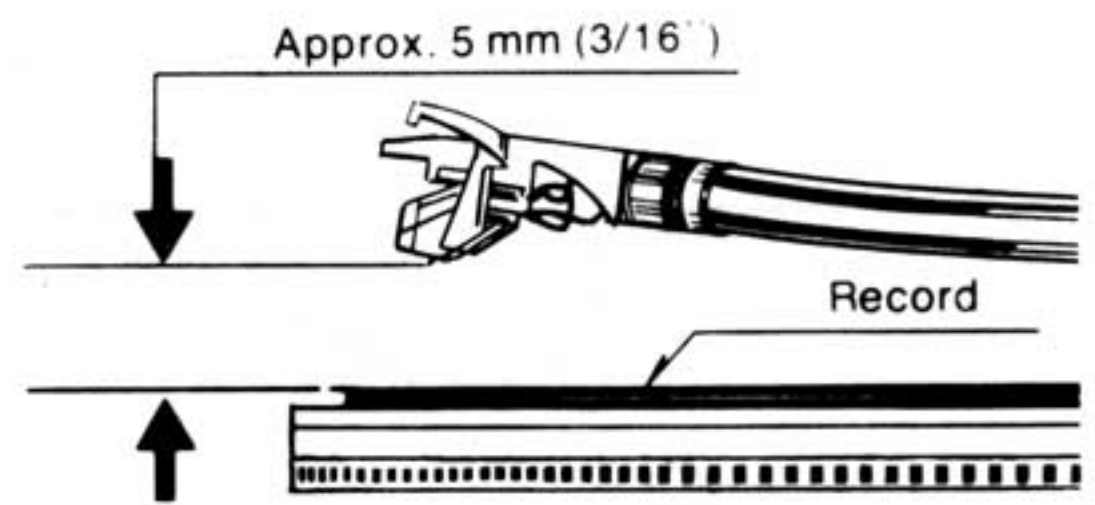


Fig. 11

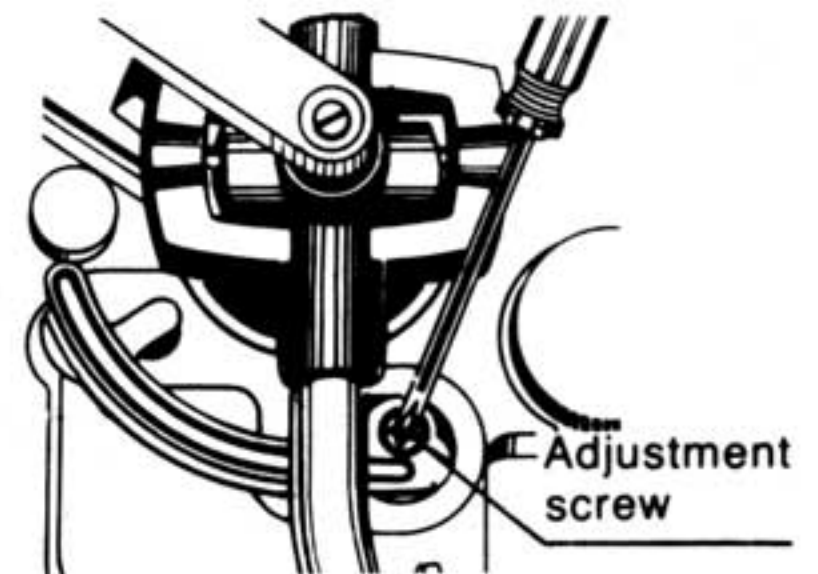


Fig. 12

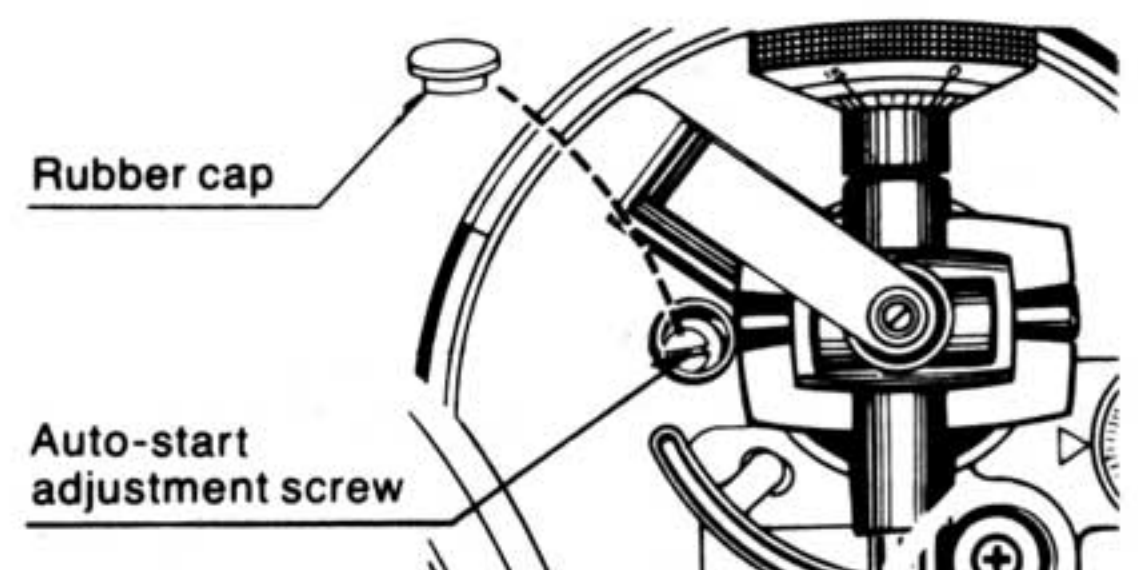


Fig. 13

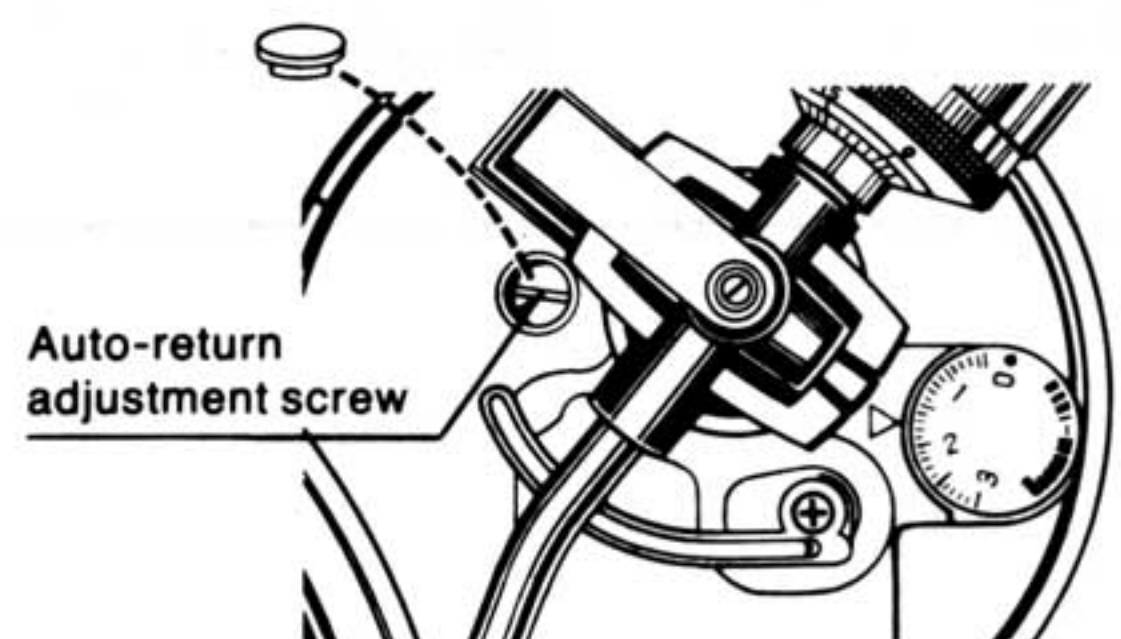


Fig. 14

- **Overhang adjustment** (See Fig. 15)
 1. Insert the headshell in the gauge.
 2. Loosen the screws and move the cartridge forward or backward until the stylus tip lines up with the edge of the gauge.
 3. Tighten the screws without moving the cartridge.

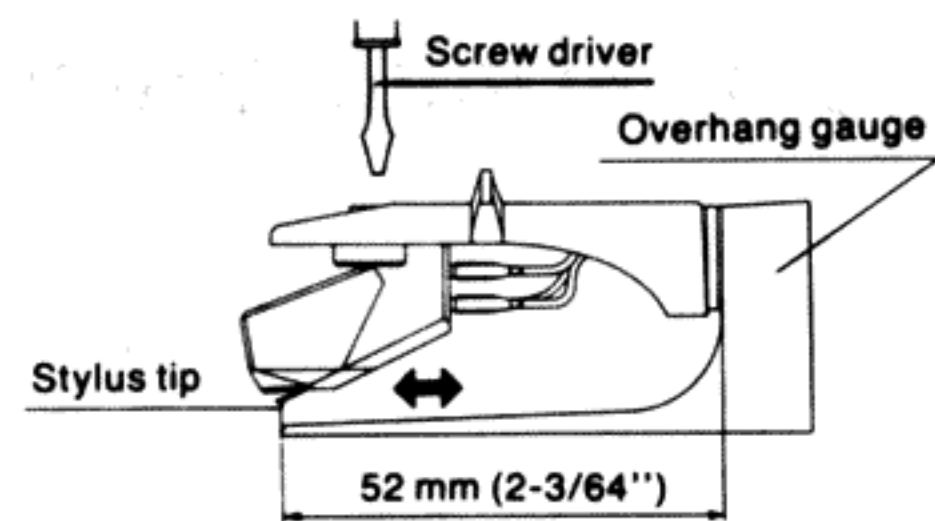


Fig. 15

CARTRIDGE INSTALLATION

When installing a cartridge, follow the instructions that came with the cartridge.

1. Connect the lead wires to the cartridge terminals.
The terminals of most cartridges are color coded.
Connect each lead wire to the terminal of the same color.
 White (L+) Left channel +
 Blue (L-) Left channel -
 Red (R+) Right channel +
 Green (R-) Right channel -
2. Mount the cartridge in the headshell using the screws provided with the cartridge. (Fig. 16)

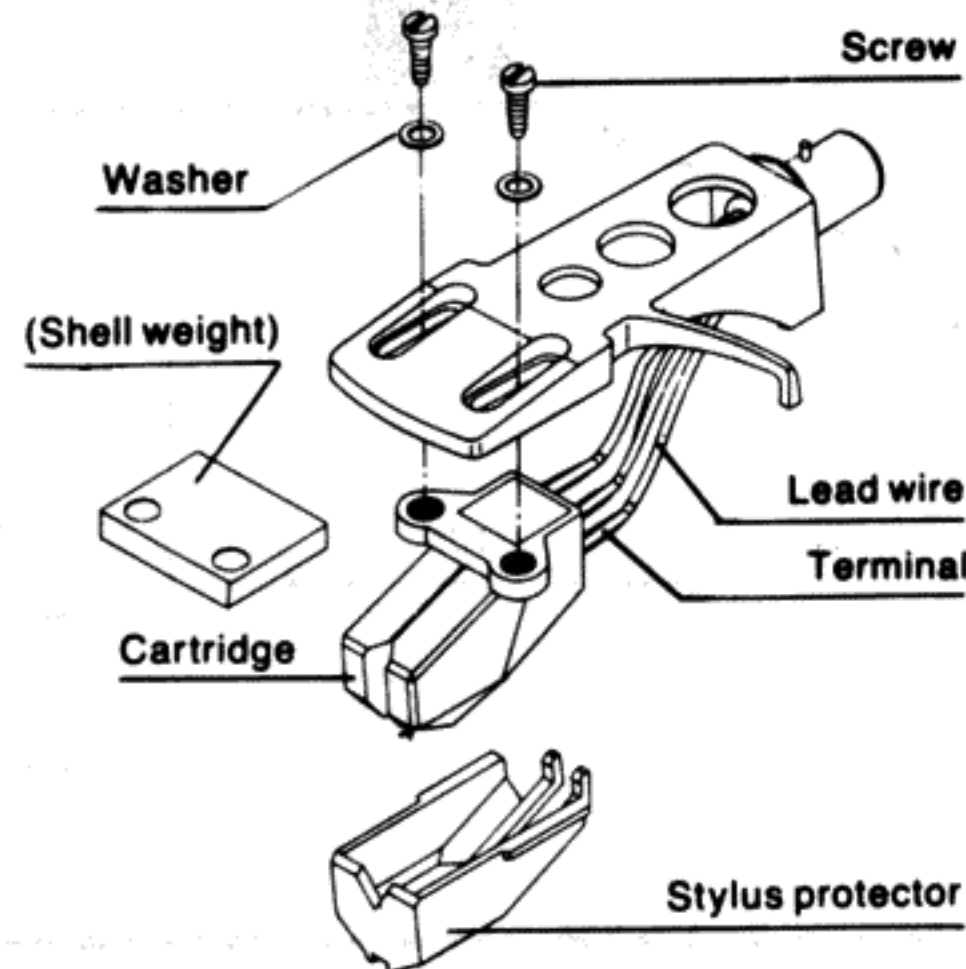


Fig. 16

ABOUT CARTRIDGE WEIGHT

(See chart below)

Cartridges weighing between 3.5 and 7.5 g can be used on this tonearm (with the headshell and accessory shell weight supplied).

If you purchase the optional auxiliary weight (part number: SFPWG17202), cartridges weighing up to 10.5 g can be used.

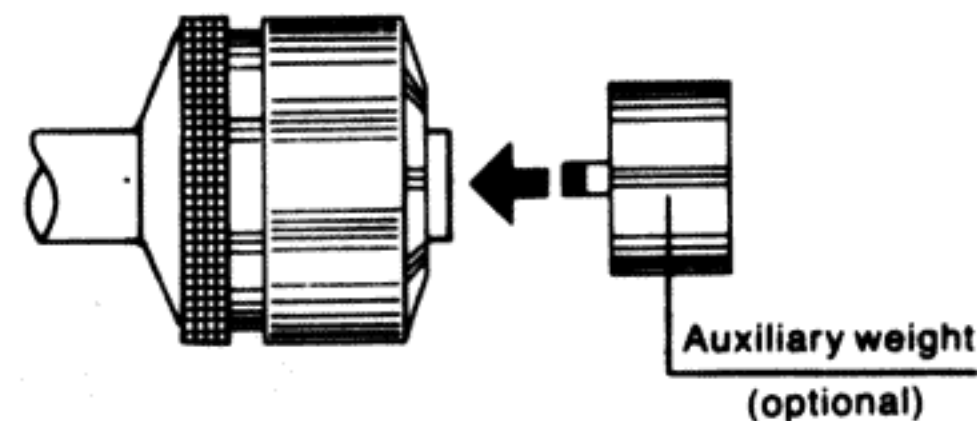
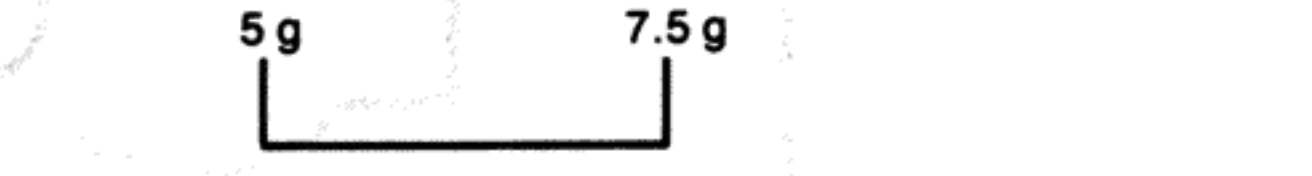
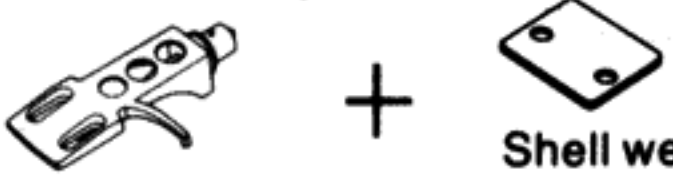
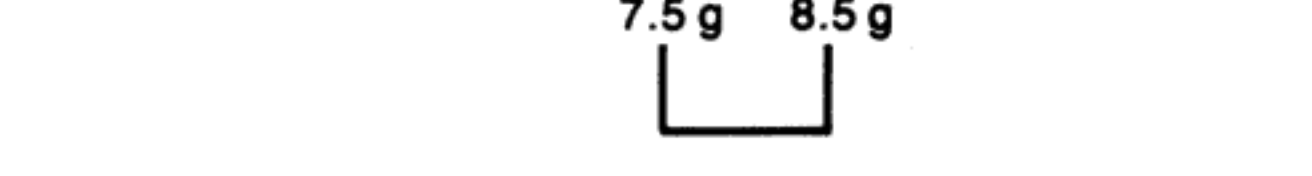
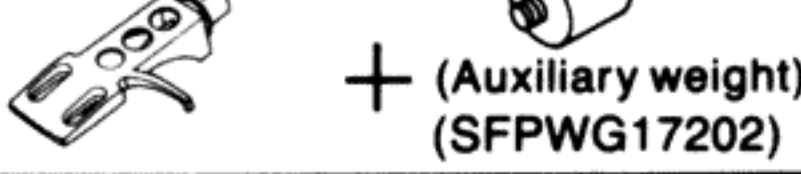
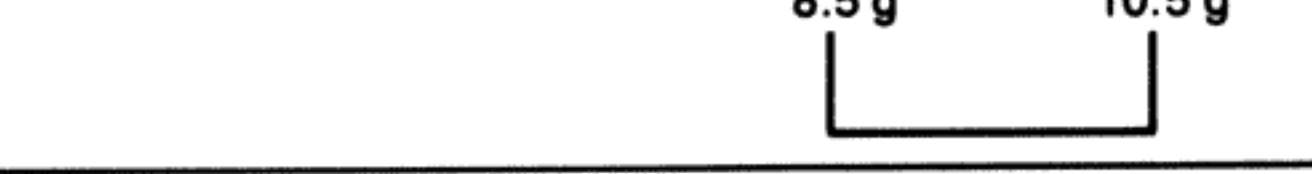
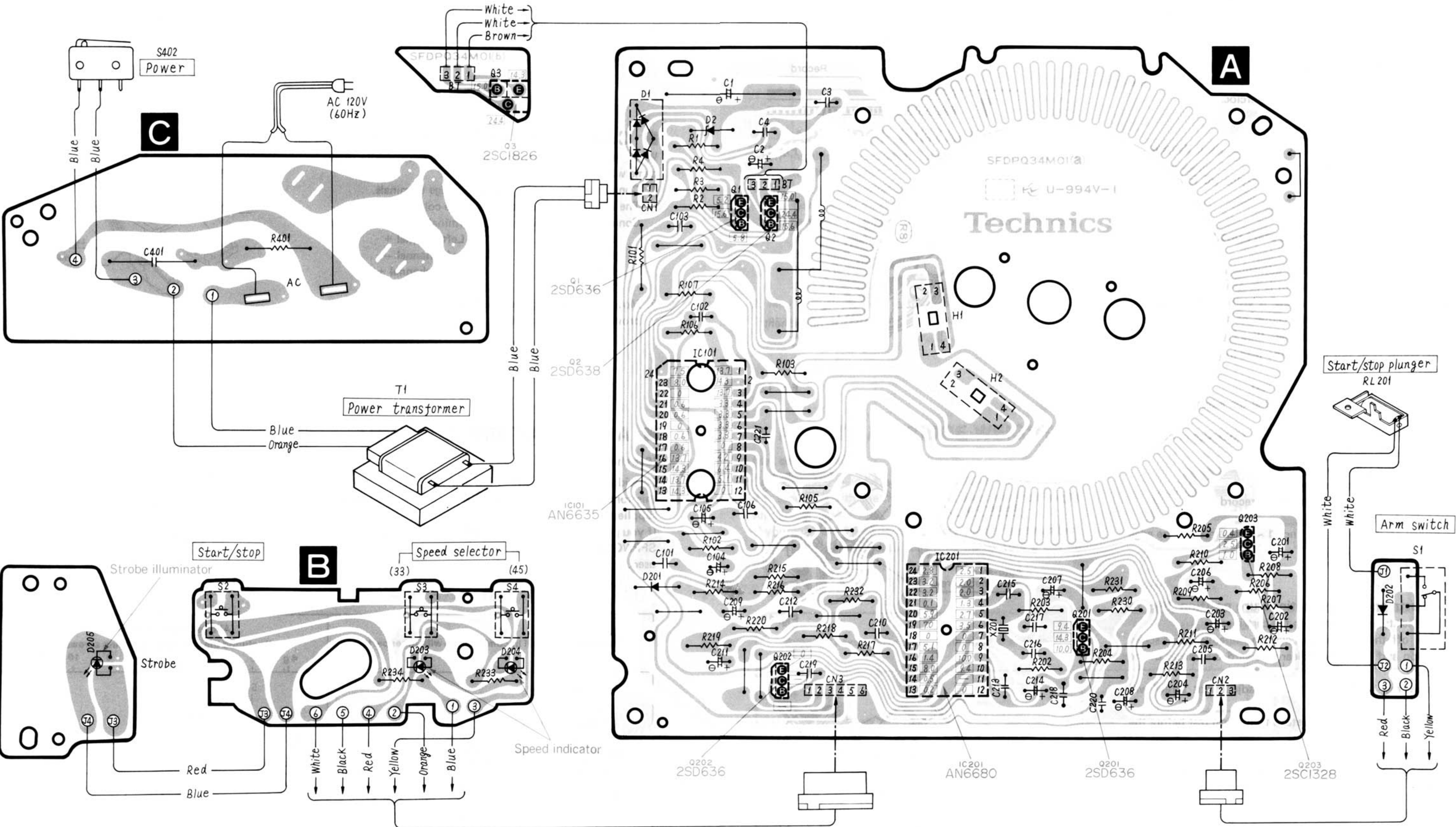


Fig. 17

Supplied headshell in combination with other parts.	Allowable cartridge weight. (Included the cartridge mounting screws)
A)  Headshell only (7.5 g)	
B)  Headshell + Shell weight	
C)  Headshell + (Optional) Shell weight + (Optional) Auxiliary weight (SFPWG17202)	
D)  Headshell + (Auxiliary weight) (SFPWG17202)	
Note: • Attach the auxiliary weight to the rear end of the tonearm. (Fig. 17)	• When attached, the auxiliary weight bumps against the dust cover, so remove the cover during play.

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) Lines



■ SCHEMATIC DIAGRAM

● Product for MC only

FUSE REPLACEMENT

Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

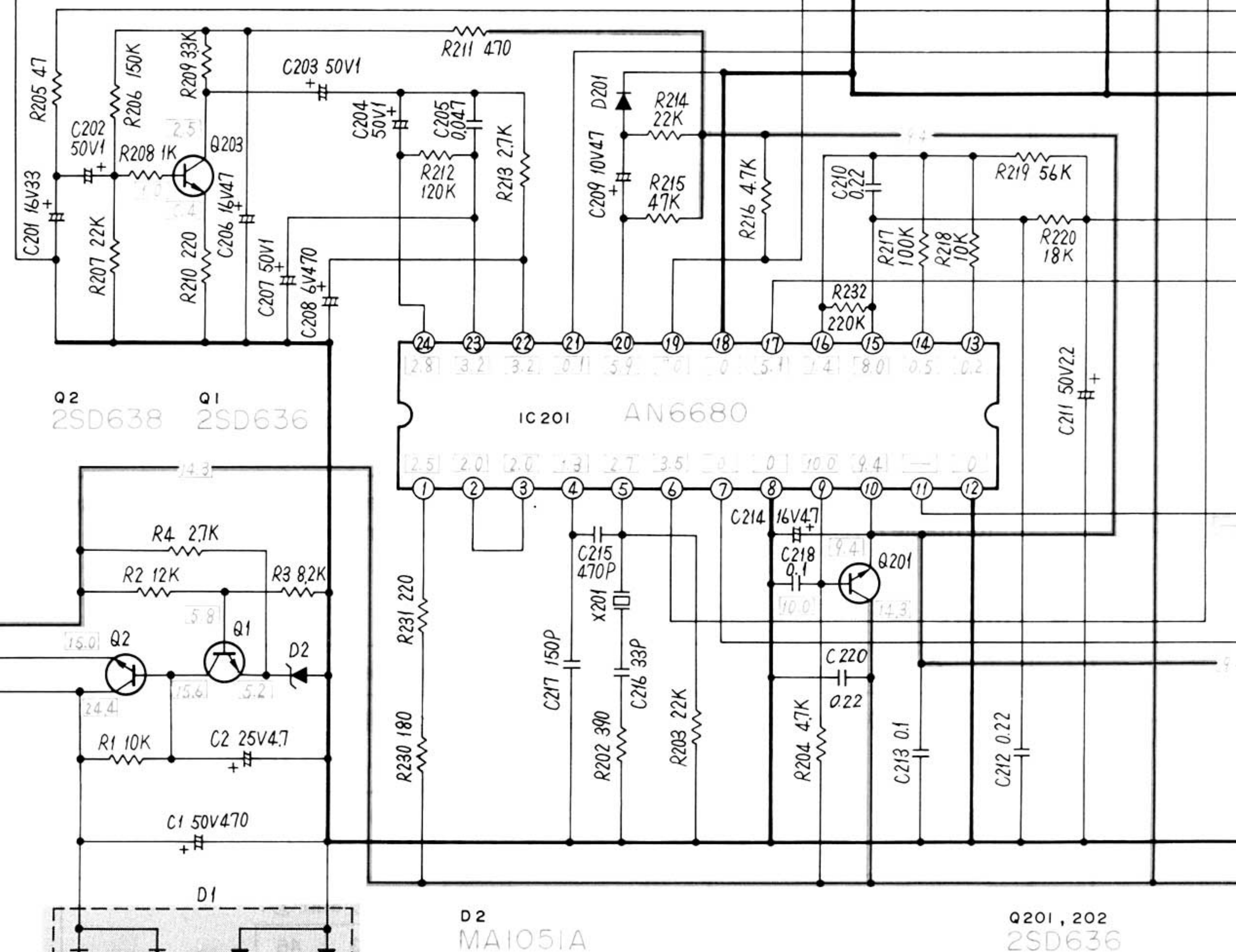
FUSIBLE REMPLACEMENT

Le symbole qui se trouve près du fusible signifie un fusible à action rapide. Pour une protection continue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

Turttable drive circuit

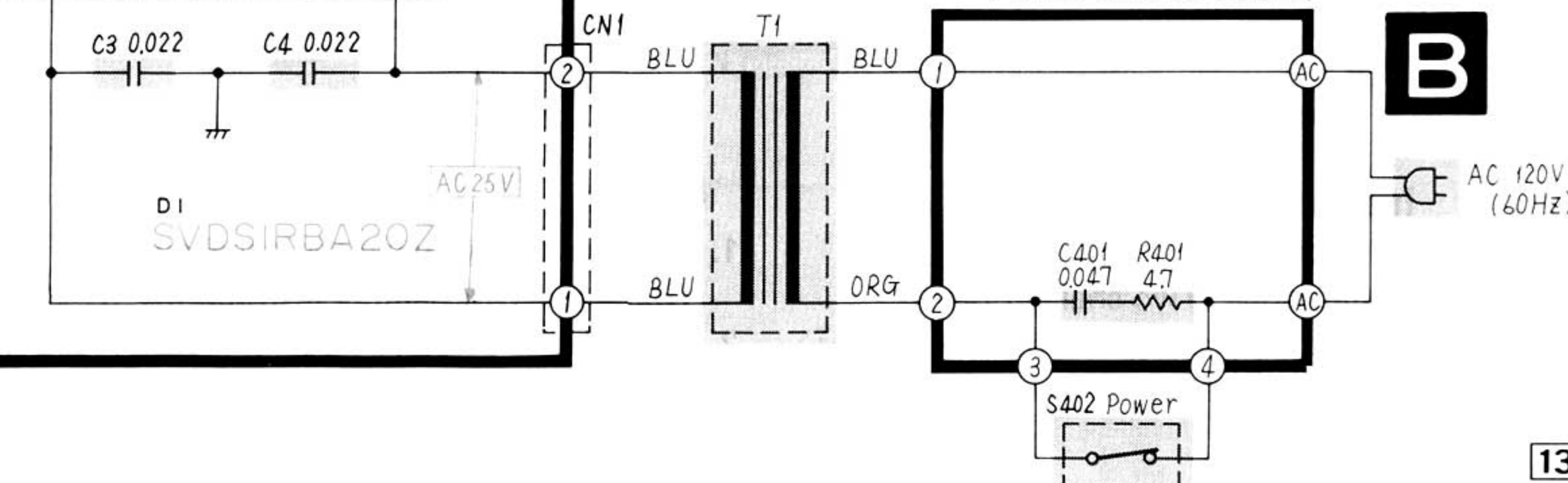
A

Q203
2SC1328

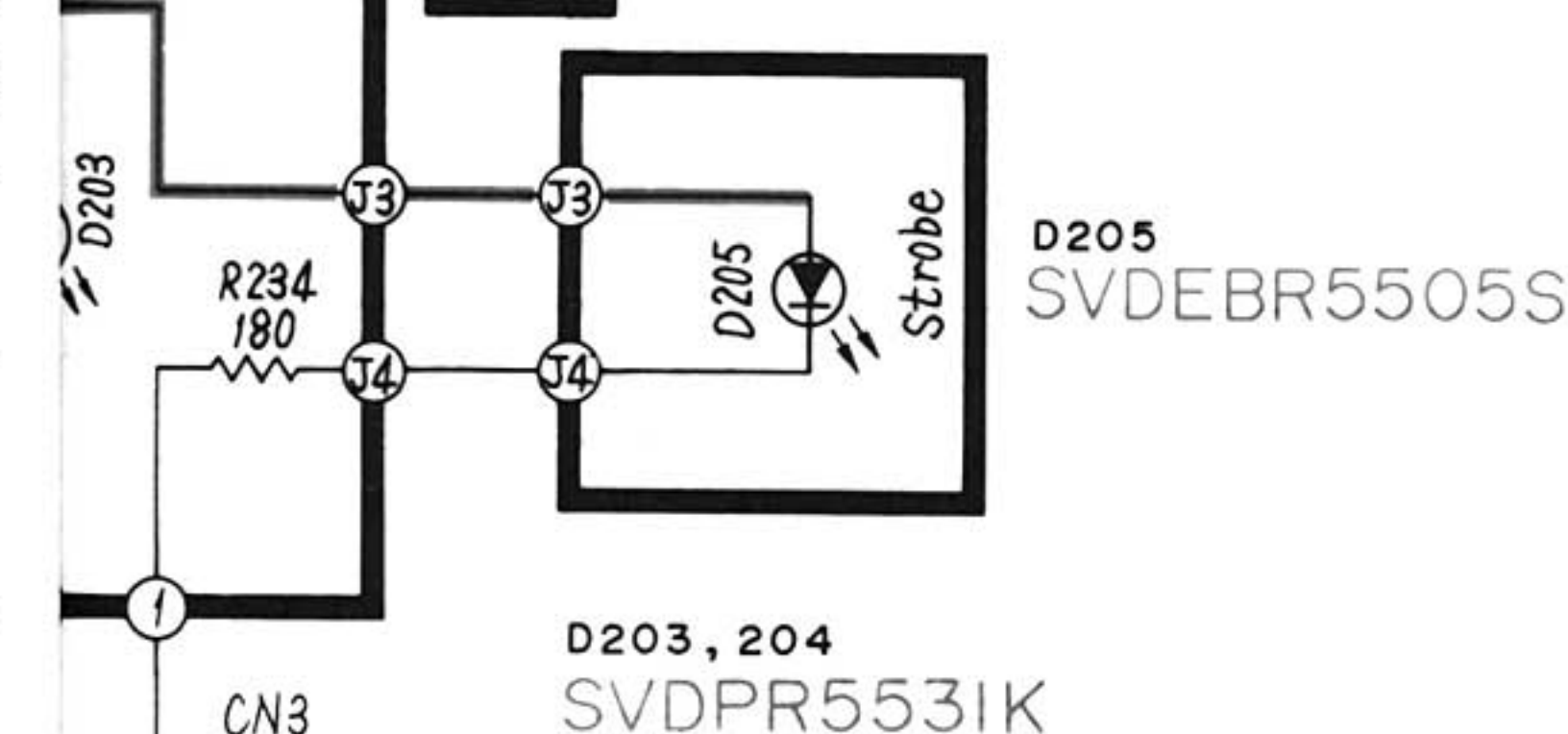


Power source circuit

B



C



● Product for [MC] only

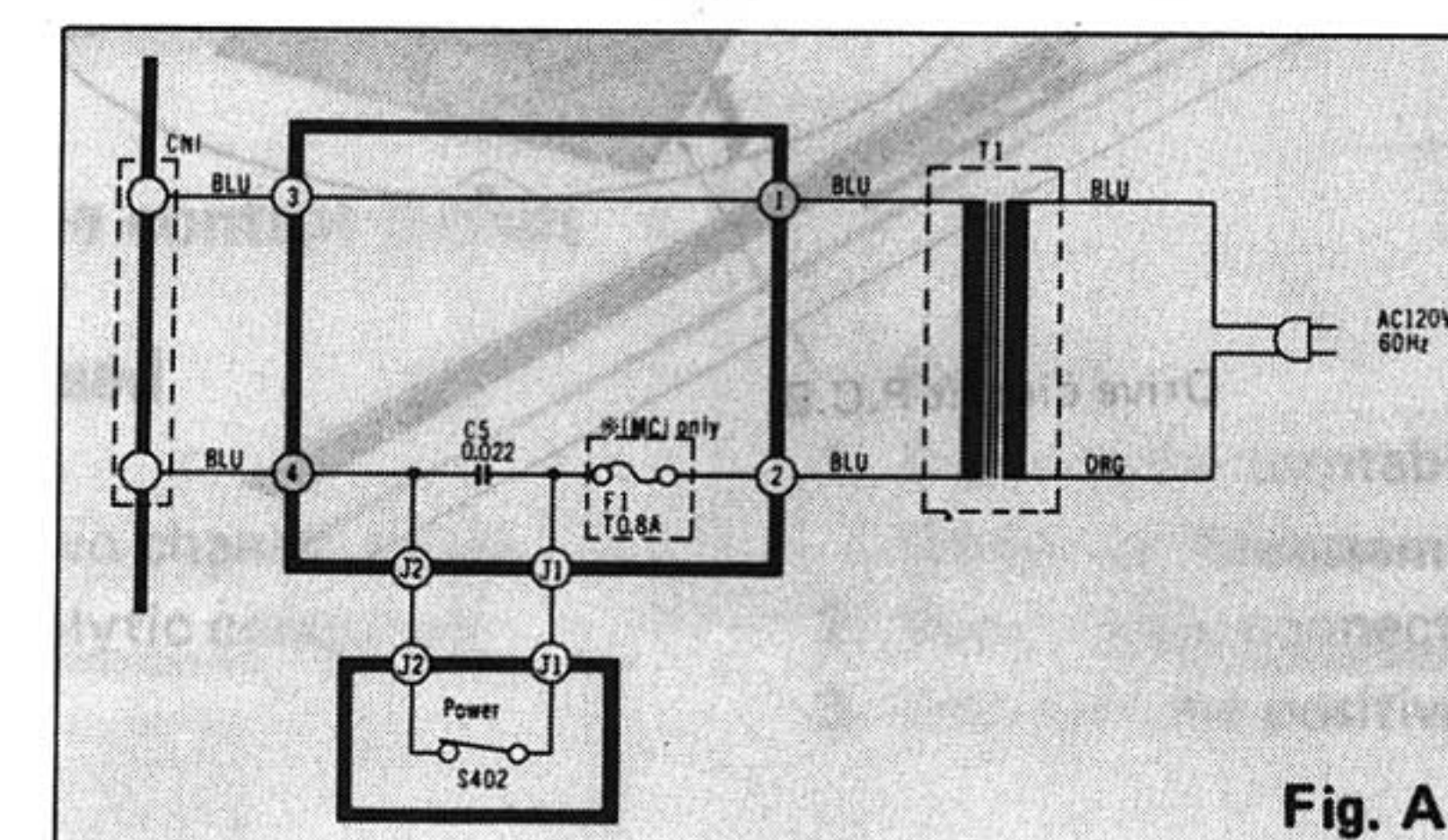
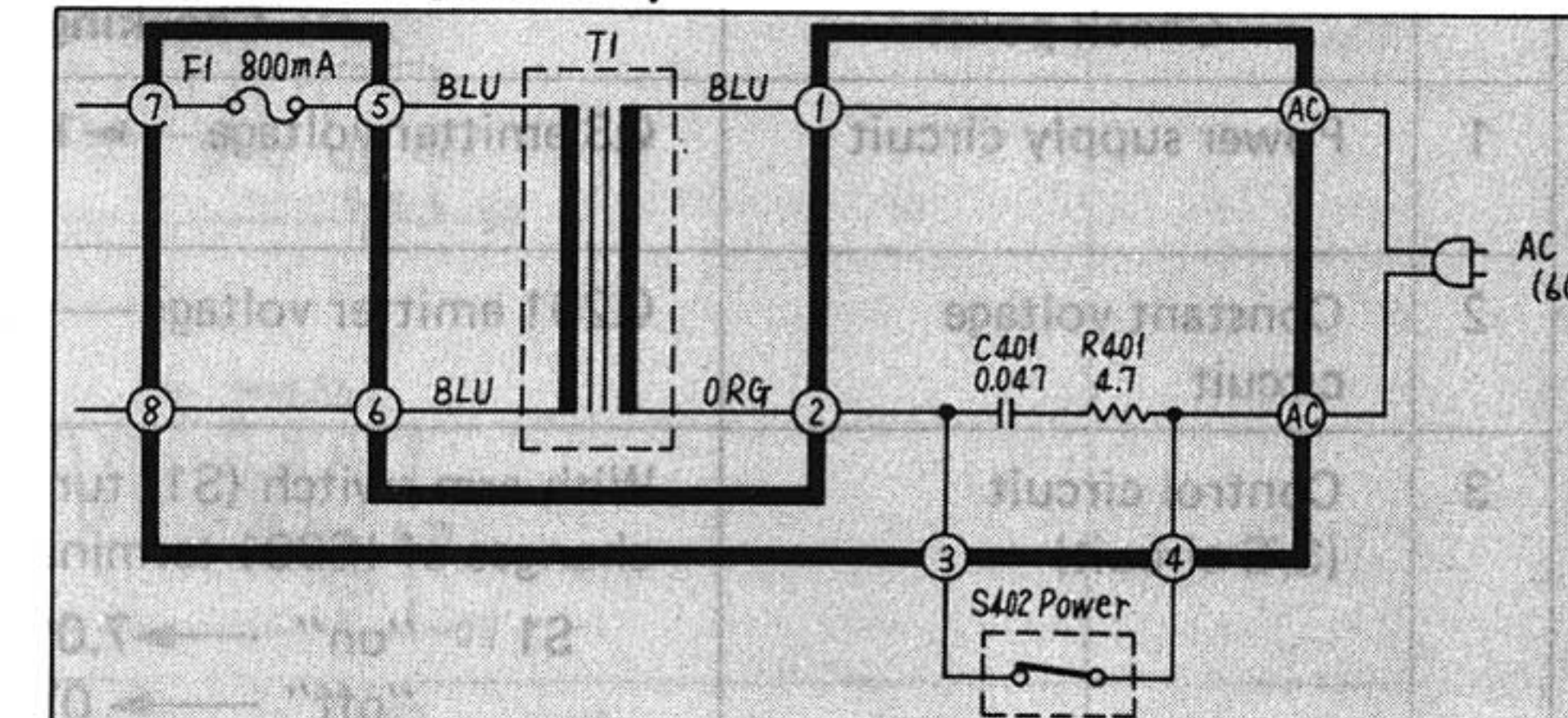


Fig. A

Notes:

1. **S1** : Arm switch in "on" position.
2. **S2** : Start/stop switch in "off" position.
(not push condition)
3. **S3, 4** : Speed selector switch in "off" position.
(not push condition)
S333-1/3 r.p.m. S445 r.p.m.
4. **S402** : Power switch in "on" position.
5. The value in is the reference voltage at stop of turntable, measured by DC electronic circuit tester (high-impedance) on the basis of chassis. (S1 "on")
Therefore, the measured value may include some error depending on the internal impedance of DC circuit tester and other conditions.
6. + B voltage line.

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

*The power switch of this unit is changed in type from primary side ON-OFF to secondary side ON-OFF type in the course of manufacture. Therefore, check the type when repairing. For the circuit of the secondary side ON-OFF type, See Fig. A on page 14.

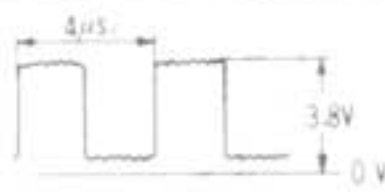
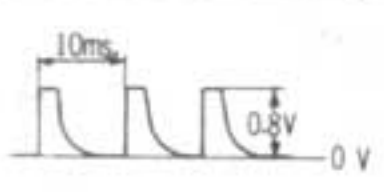
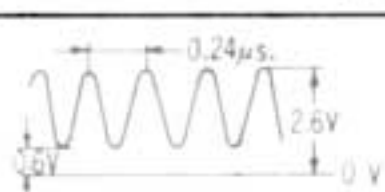
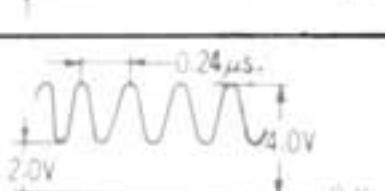
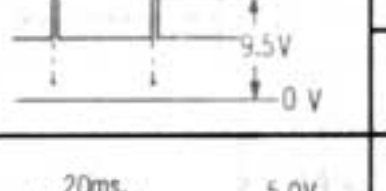
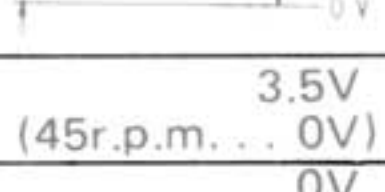
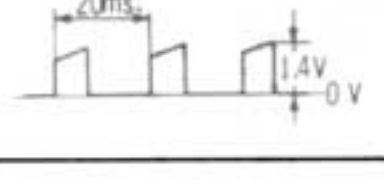
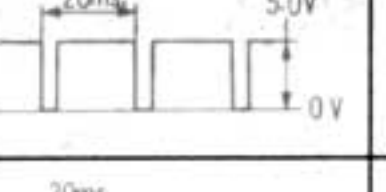
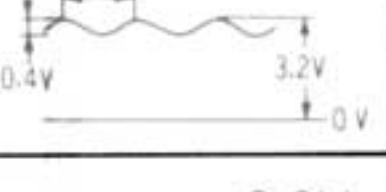
Reference voltage and waveform at each IC terminal (pin)

This indicated voltage values and waveform are measured by oscilloscope at 33 r.p.m. rotation.

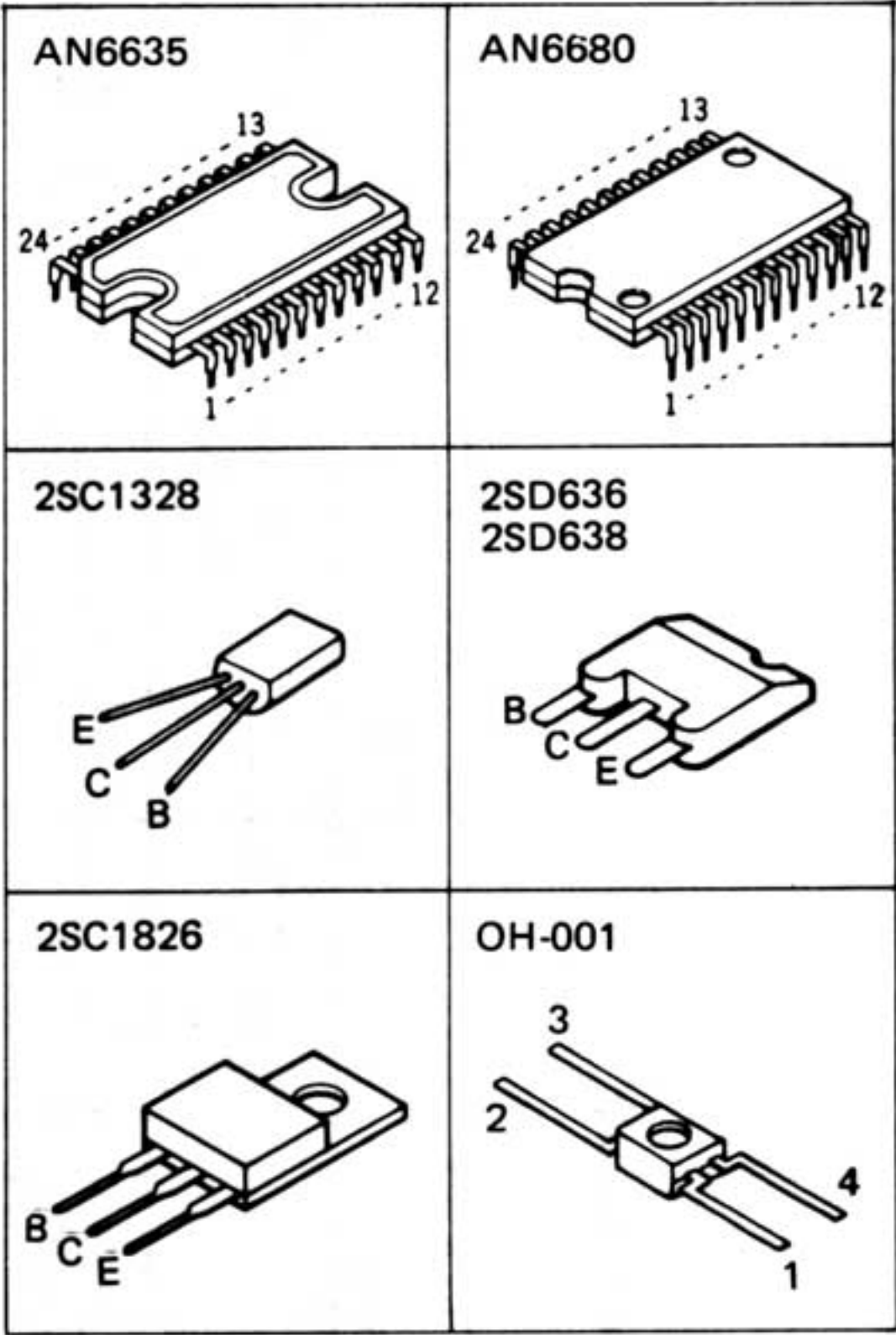
IC101 (AN6635)

No.	Stop	Start	No.	Stop	Start	No.	Stop	Start
①	13.7V	13.7V	⑨	0.1V	4.2V	⑰	0.6V	
②	14.3V	14.3V	⑩	6.4V	5.2V	⑱		
③	13.7V	13.7V	⑪	5.1V	5.1V	⑳		
④	3.3V	3.3V	⑫	0V	0V	㉑		
⑤	3.3V	3.3V	⑬	14.3V	14.3V	⑲	0V	0V
⑥	3.3V	3.3V	⑭	13.7V	13.7V	㉒	0V	0V
⑦	3.3V	3.3V	⑮	14.3V	14.3V	㉓	8.0V	7.9V
⑧	0V	0V	⑯	13.7V	13.7V	㉔	7.5V	7.5V

IC201 (AN6680)

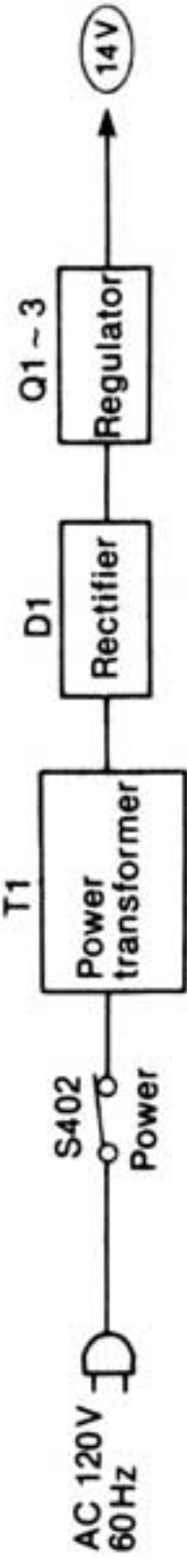
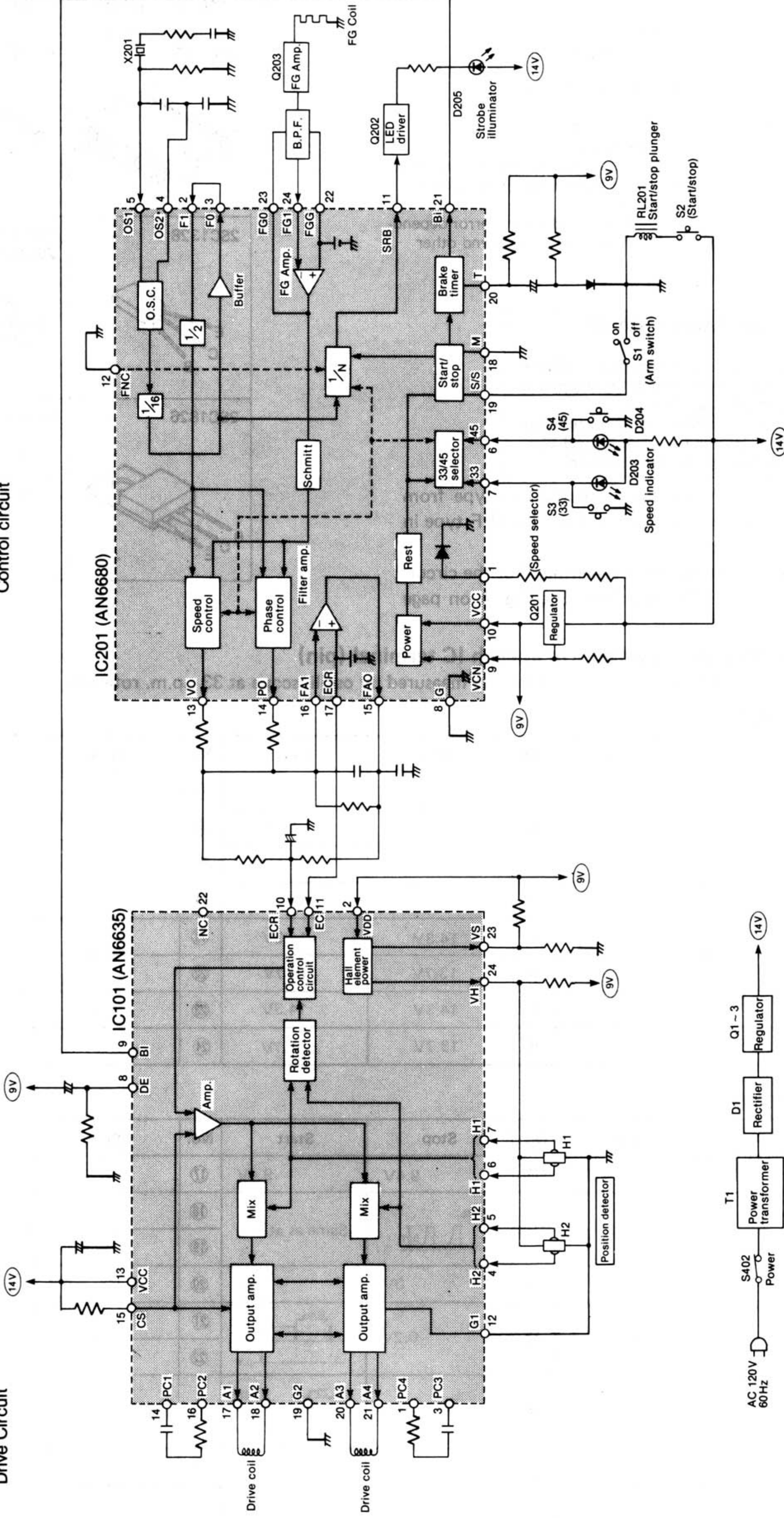
No.	Stop	Start	No.	Stop	Start	No.	Stop	Start
①	2.5V	2.5V	⑩	9.4V	9.4V	⑰	5.1V	5.1V
②		Same as at left	⑪		Same as at left	⑱	0V	0V
③			⑫	0V	0V	⑲	0V	7.0V
④		Same as at left	⑬	0.2V		⑳	5.9V	0.2V
⑤			⑭			㉑	0.1V	4.2V
⑥	3.5V (45r.p.m. . . 0V)	3.5V (45r.p.m. . . 0V)	⑮	8.0V		㉒	3.2V	3.0V
⑦	0V (45r.p.m. . . 4.0V)	0V (45r.p.m. . . 4.0V)				㉓	3.2V	
⑧	0V	0V				㉔	2.8V	3.0V
⑨	10.0V	10.0V	⑯	1.4V	5.2V			

Terminal guide of transistors and IC's



Drive Circuit

Control circuit



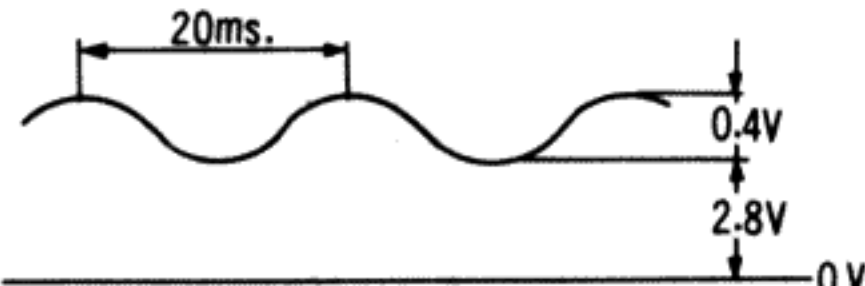
■ TROUBLE SHOOTING GUIDE

1. No rotation

	Check point	Checking method	Possible defects																																																				
1	Power supply circuit	Q3 emitter voltage → 14.3V	Q1 ~ 3 D1, 2																																																				
2	Constant voltage circuit	Q201 emitter voltage → 9.4V	Q201																																																				
3	Control circuit (S/S circuit)	With arm switch (S1) turned on/off, the voltage changes of IC201 terminal ⑰ are as follows: S1 "on" → 7.0V "off" → 0V	S1 IC201																																																				
4	Drive circuit	Voltage at each terminal of IC101 (in start mode) (S1 "on") <table><tr><td>Terminal</td><td>①</td><td>②</td><td>③</td><td>④</td><td>⑤</td><td>⑥</td><td>⑦</td><td>⑧</td><td>⑨</td><td>⑩</td><td>⑪</td><td>⑫</td></tr><tr><td>Voltage</td><td>13.7</td><td>9.4</td><td>13.6</td><td>3.3</td><td>3.3</td><td>3.3</td><td>3.3</td><td>0</td><td>4.2</td><td>6.4</td><td>5.1</td><td>0</td></tr><tr><td>Terminal</td><td>⑬</td><td>⑭</td><td>⑮</td><td>⑯</td><td>⑰</td><td>⑱</td><td>⑲</td><td>⑳</td><td>㉑</td><td>㉒</td><td>㉓</td><td>㉔</td></tr><tr><td>Voltage</td><td>14.3</td><td>13.7</td><td>14.3</td><td>13.6</td><td>0.6</td><td>0.6</td><td>0</td><td>0.6</td><td>0.6</td><td>0</td><td>8.0</td><td>0.7</td></tr></table>	Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	Voltage	13.7	9.4	13.6	3.3	3.3	3.3	3.3	0	4.2	6.4	5.1	0	Terminal	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	Voltage	14.3	13.7	14.3	13.6	0.6	0.6	0	0.6	0.6	0	8.0	0.7	IC101
Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫																																											
Voltage	13.7	9.4	13.6	3.3	3.3	3.3	3.3	0	4.2	6.4	5.1	0																																											
Terminal	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔																																											
Voltage	14.3	13.7	14.3	13.6	0.6	0.6	0	0.6	0.6	0	8.0	0.7																																											

Note: Besides the above-mentioned defects, burnt-out drive coil is also possible. But if it is on one phase, the motor rotates although the driving torque is halved. Also, it is possible that both Hall elements are defective.

2. Abnormal rotation

	Check point	Checking method	Possible defects
1	FG amplifier circuit	Solder lead wire to terminal ㉓ of IC201; remove it from the bottom plate and measure the waveform in the state of rotation. (See Fig. 18) 	Q203 IC201 FG coil pattern breakage
2	Control circuit (Reference voltage circuit)	Voltage of IC201 terminal ⑰ 5.1V	IC201

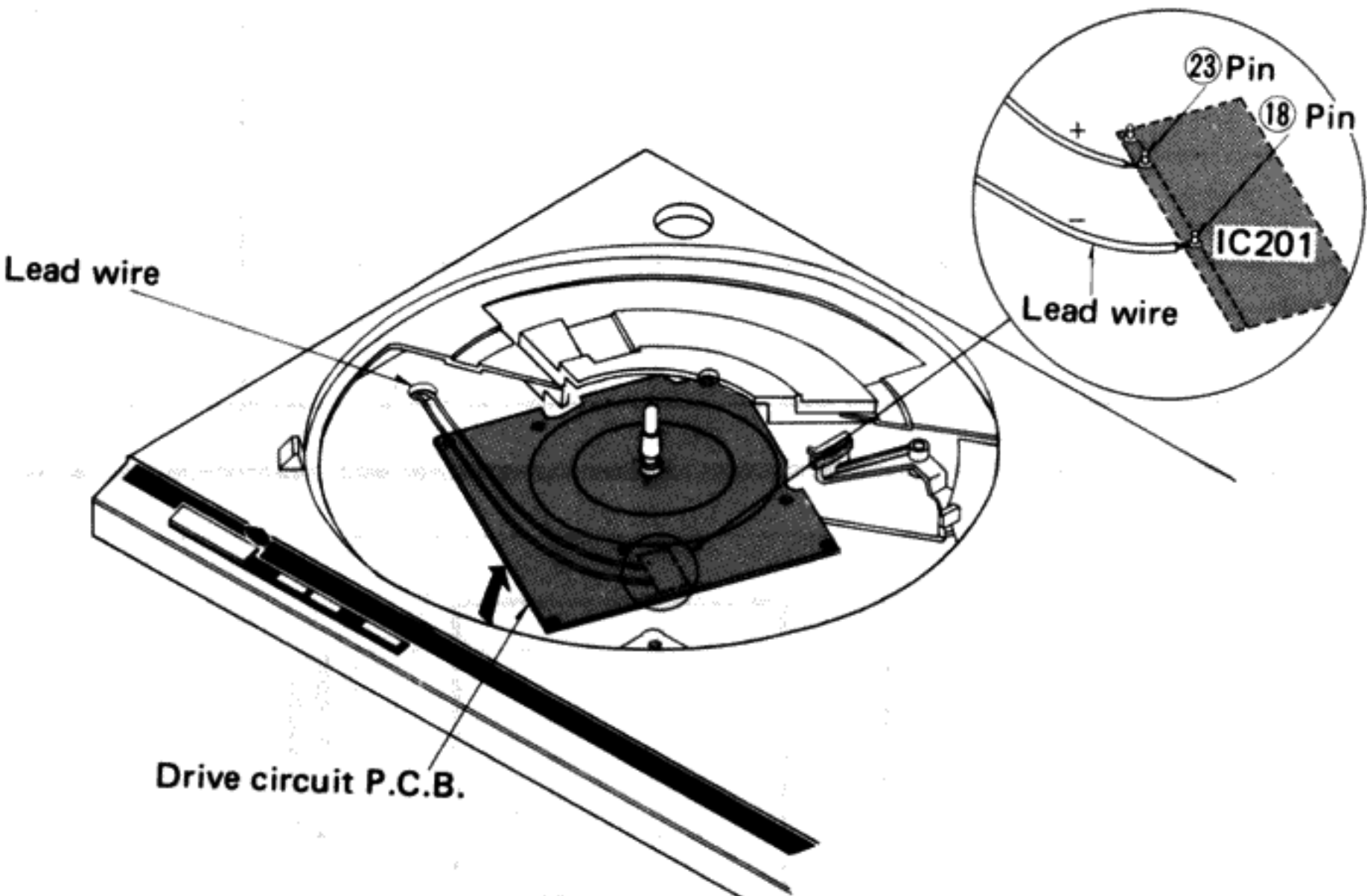
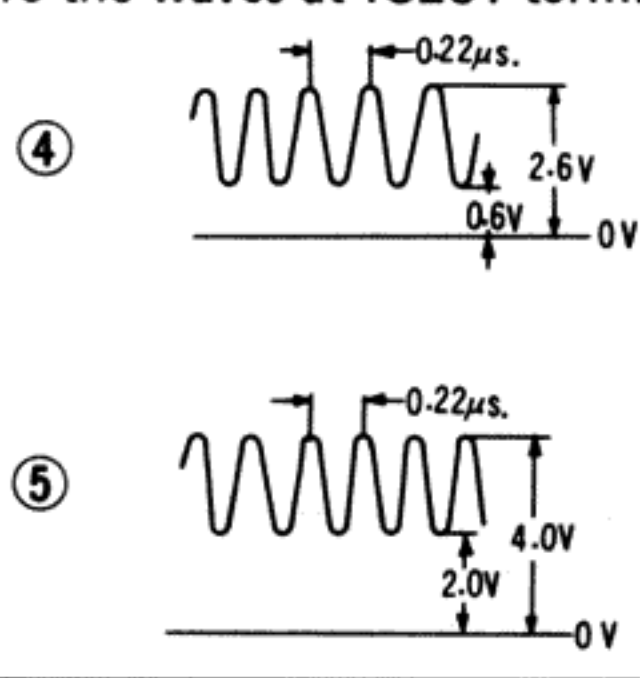
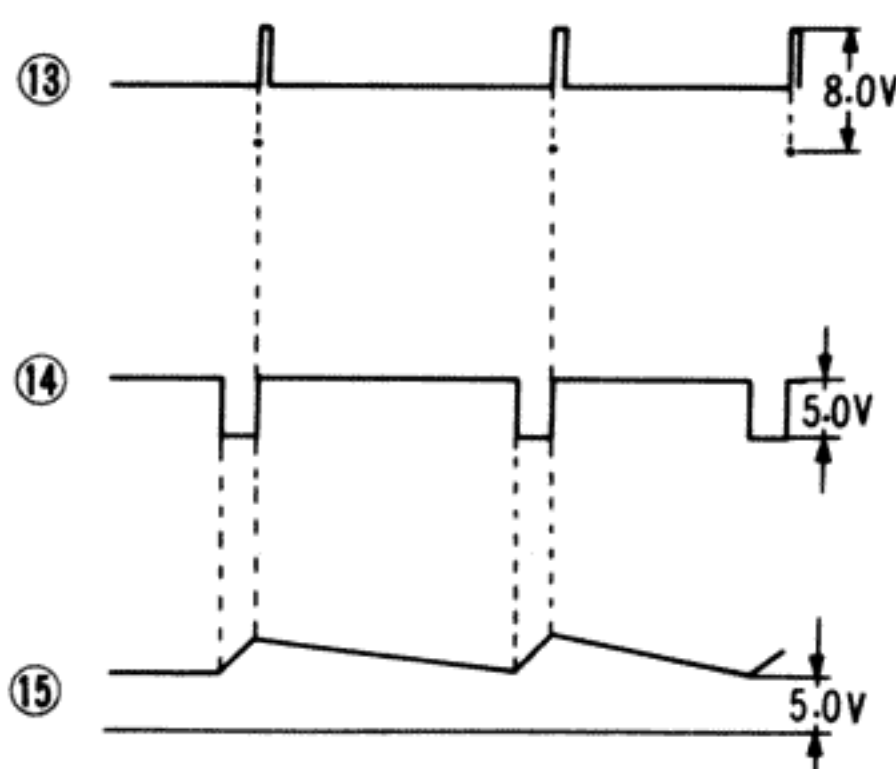


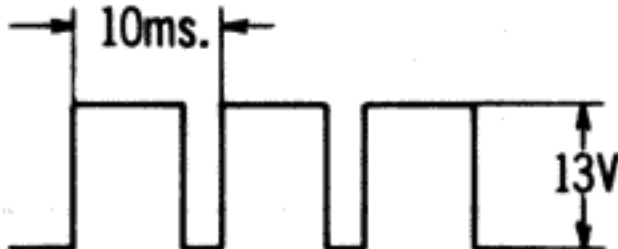
Fig. 18

3. Unstable rotation (Uneven rotation, repeat of normal and reverse rotations)

	Check point	Checking method	Possible defects
1	Control circuit (Crystal oscillator)	Measure the waves at IC201 terminals ④ and ⑤. 	X201 IC201
2	Control circuit (Brake, timer circuit)	Voltage at IC201 terminals ⑳ and ㉑. (S1 'on') ㉑ → 5.9V ㉑ → 4.2V	IC201 IC101
3	Control circuit (Control output circuit)	Instead of FG signal, apply FG signal by CR oscillator, (Refer to "How to check the control circuit.") Measure the waves at IC201 terminals ⑬, ⑭, ⑮. 	IC201

Note: Besides the above, it is possible that Hall elements are defective. In this case, the symptom may be that the turntable reversely rotates because the turntable position cannot be detected.

4. Others

	Check point	Checking method	Possible defects									
1	Strobe LED does not light up.	Q202 collector output waveform. 	D215 Q202									
2	33/45 r.p.m. changeover is impossible.	Voltage at IC201 terminals ⑥ and ⑦. <table border="1" data-bbox="928 2237 1373 2386"><tr><th>Speed \ Terminal</th><th>33</th><th>45</th></tr><tr><th>⑥</th><td>3.5V</td><td>0V</td></tr><tr><th>⑦</th><td>0V</td><td>4.0V</td></tr></table>	Speed \ Terminal	33	45	⑥	3.5V	0V	⑦	0V	4.0V	IC201 S3, 4
Speed \ Terminal	33	45										
⑥	3.5V	0V										
⑦	0V	4.0V										

•How to check the control circuit

Instruments used

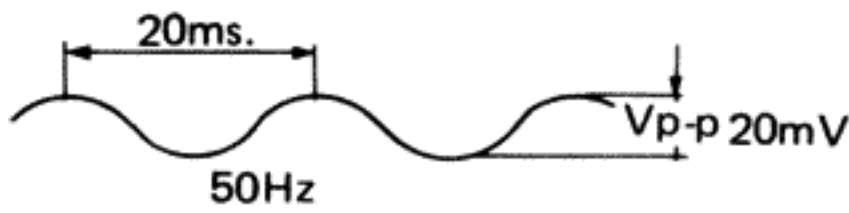
1. CR oscillator
2. Oscilloscope (Two channel type)
3. 50V 1 μ F electrolytic condenser

Setting

1. Remove the turntable and panel cover.
(Refer to "Disassembly instructions".)
2. Remove the connector (CN2) from the arm switch.
3. Unsolder the positive $\oplus$ side of C203.

Checking procedure

- 1. Solder the condenser to the negative $\ominus$ side of C203, and connect the CR oscillator to it.
Or, connect the oscillator to the positive $\oplus$ side of C203. (See Fig. 19)
- 2. Checking the output of the oscillator on the oscilloscope, adjust so that the waveform becomes as shown below.



- 3. Measure the waves at terminals ⑬, ⑭, ⑮ of IC201. When the output waveforms are as shown below, the control circuit is normal. However, because of ther stability of the CR oscillator, the waveforms are not the same as those in normal rotation.

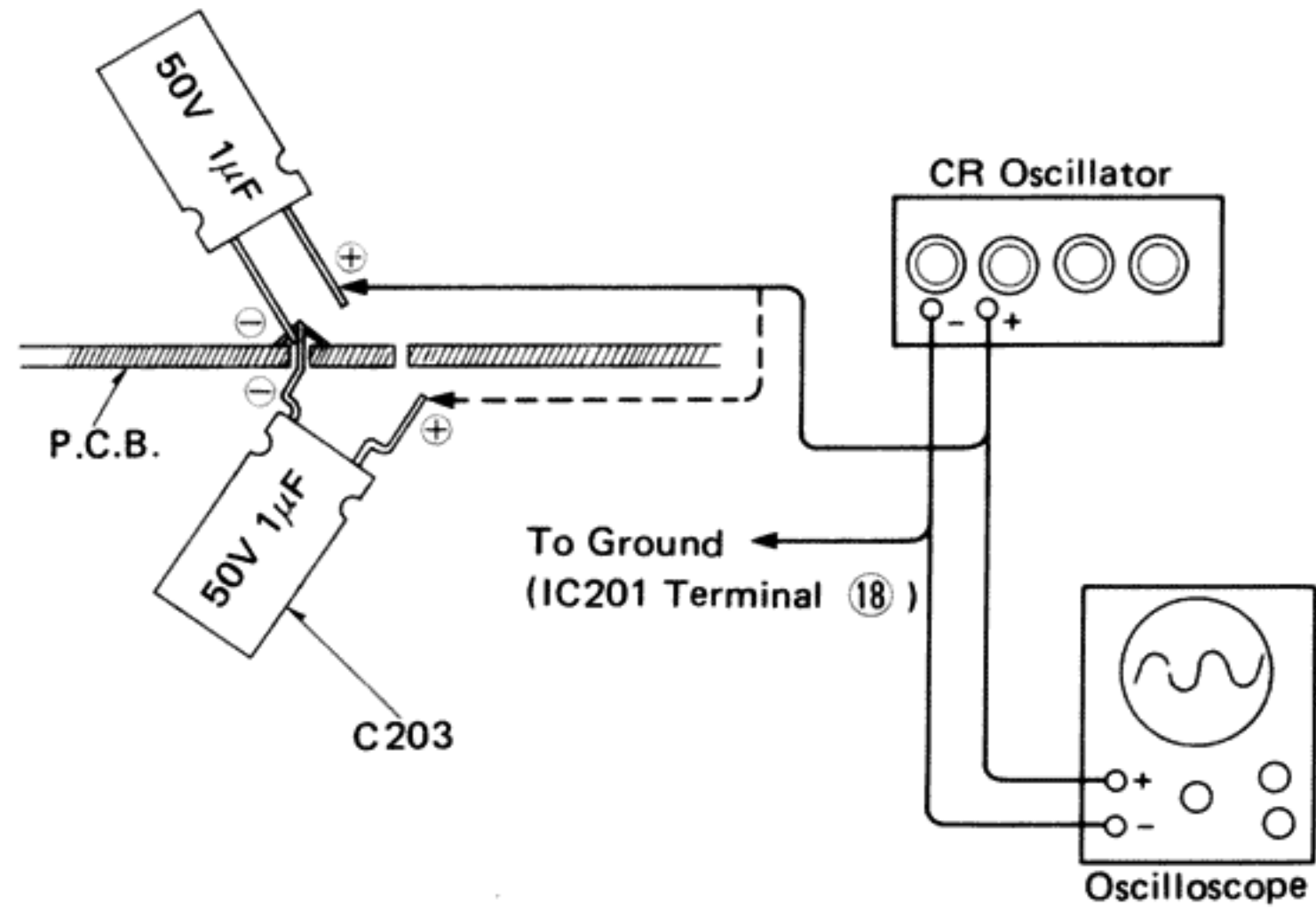
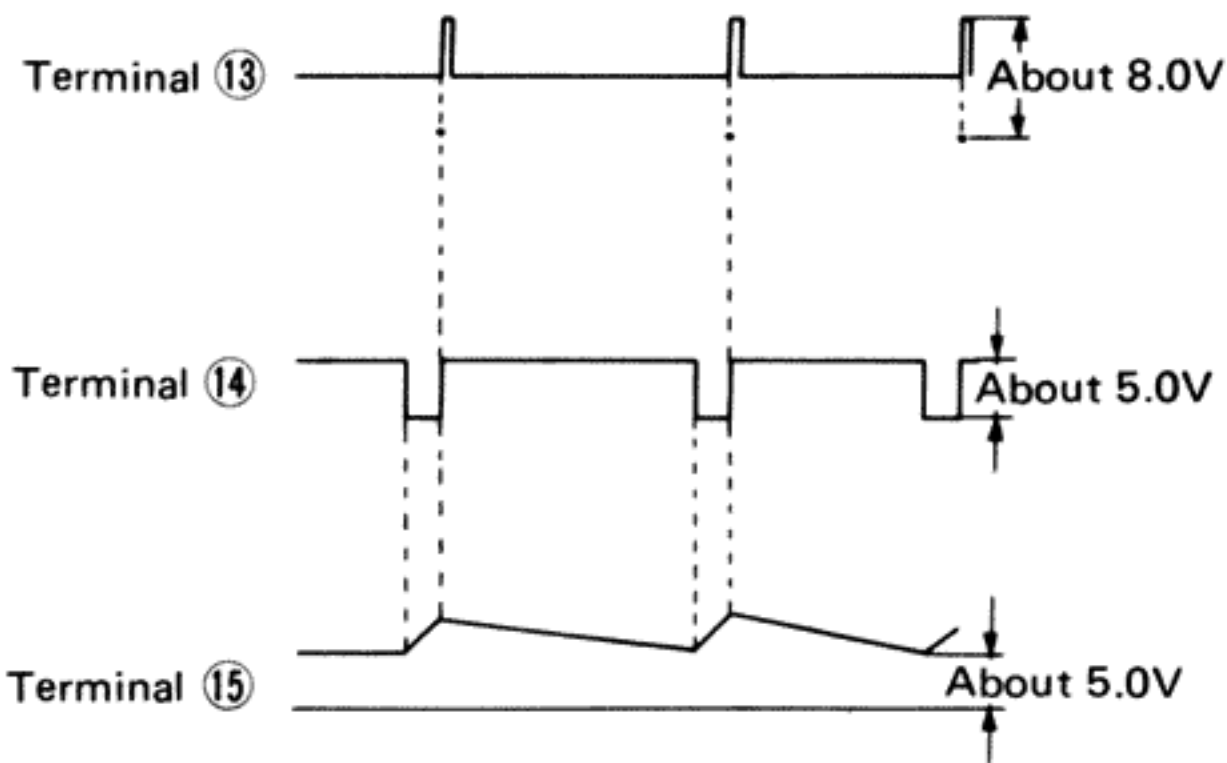


Fig. 19

REPLACEMENT PARTS LIST...Electrical Parts

- Notes:**
- 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - 2. Important safety notice: Components indetified by Δ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
 - 3. Brakerted indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
- Areas**
- * [M] is available in U.S.A.
 - * [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUIT		
IC101 IC201	AN6635 AN6680	IC, Drive IC, Control
TRANSISTORS		
Q1, 201, 202 Q2 Q3 Q203	2SD636 2SD638 2SC1826 2SC1328-T	Transistor, Regulator & Switching Transistor, Regulator Transistor, Regulator Transistor, FG Amplifier
DIODES		
D1 D2 D201 D202 D203, 204 D205	Δ SVDS1RBA20Z MA1051A MA162A SVDRM1Z SVDP5531K SVDEBR5505S	Diode, Rectifier Diode, 5.1V Zener Diode Diode Light Emitting Diode, Speed Indicator (Red) Light Emitting Diode, Strobe
HALL ELEMENT		
H1, 2	OH-001	Hall Element, Turntable Position Detector
CRYSTAL		
X201	SVQU306115	Crystal, 4,19328MHz Counter Oscillator

Ref. No.	Part No.	Part Name & Description
SOLENOID		
RL201	SFDZQ34N01Z	Solenoid Ass'y, Start/Stop
SWITCHES		
S1 S2 ~ 4 S402	Δ SFDSA2985 EVQQJR02K SFDSQ34N05R	Switch, Arm (Rest) Switch Switch, Start/Stop & Speed Selector Switch, Power Source
FUSE		
F1 [MC] only	Δ XBA2F08NU100	Fuse T 0.8A 250V
POWER TRANSFORMER		
T1 [M] T1 [MC]	Δ SLT57PL1A Δ SLT57P23C	Transformer, Power Source Transformer, Power Source
RESISTORS		
R1 R2 R3 R4 R101 R102 R103	ERD25FJ103 ERD25TJ123 ERD25FJ822 ERD25FJ272 ERX1ANJ1R2 ERD25FJ472 ERD25FJ822	Carbon, 1/4W, 10k Ω , $\pm$ 5% Carbon, 1/4W, 12k Ω , $\pm$ 5% Carbon, 1/4W, 8.2k Ω , $\pm$ 5% Carbon, 1/4W, 2.7k Ω , $\pm$ 5% Metal Oxide, 1W, 1.2 Ω , $\pm$ 5% Carbon, 1/4W, 4.7k Ω , $\pm$ 5% Carbon, 1/4W, 8.2k Ω , $\pm$ 5%

Ref. No.	Part No.	Part Name & Description
R105	ERD25TJ683	Carbon, 1/4W, 68kΩ, ± 5%
R106, 107	ERD25FJ221	Carbon, 1/4W, 220Ω, ± 5%
R202	ERD25FJ391	Carbon, 1/4W, 390Ω, ± 5%
R203	ERD25TJ223	Carbon, 1/4W, 22kΩ, ± 5%
R204	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ± 5%
R205	ERD25FJ470	Carbon, 1/4W, 47Ω, ± 5%
R206	ERD25TJ154	Carbon, 1/4W, 150kΩ, ± 5%
R207	ERD25TJ223	Carbon, 1/4W, 22kΩ, ± 5%
R208	ERD25FJ102	Carbon, 1/4W, 1kΩ, ± 5%
R209	ERD25FJ332	Carbon, 1/4W, 3.3kΩ, ± 5%
R210	ERD25FJ221	Carbon, 1/4W, 220Ω, ± 5%
R211	ERD25FJ471	Carbon, 1/4W, 470Ω, ± 5%
R212	ERD25TJ124	Carbon, 1/4W, 120kΩ, ± 5%
R213	ERD25FJ272	Carbon, 1/4W, 2.7kΩ, ± 5%
R214	ERD25TJ223	Carbon, 1/4W, 22kΩ, ± 5%
R215	ERD25TJ473	Carbon, 1/4W, 47kΩ, ± 5%
R216	ERD25FJ472	Carbon, 1/4W, 4.7kΩ, ± 5%
R217	ERD25TJ104	Carbon, 1/4W, 100kΩ, ± 5%
R218	ERD25FJ103	Carbon, 1/4W, 10kΩ, ± 5%
R219	ERD25TJ563	Carbon, 1/4W, 56kΩ, ± 5%
R220	ERD25TJ183	Carbon, 1/4W, 18kΩ, ± 5%
R230	ERD25FJ181	Carbon, 1/4W, 180Ω, ± 5%
R231	ERD25FJ221	Carbon, 1/4W, 220Ω, ± 5%
R232	ERD25TJ224	Carbon, 1/4W, 220kΩ, ± 5%
R233	ERD25FJ222	Carbon, 1/4W, 2.2kΩ, ± 5%
R234	ERD25FJ181	Carbon, 1/4W, 180Ω, ± 5%
R401	Δ ERD50FJ4R7	Carbon, 1/2W, 4.7Ω, ± 5%

Ref. No.	Part No.	Part Name & Description
CAPACITORS		
C1	ECEB1HS471	Electrolytic, 50V, 470μF
C2	ECEA25Z4R7	Electrolytic, 25V, 4.7μF
C3, 4	Δ ECKD1H223ZF	Ceramic, 50V, 0.022μF, ± 80%
C101, 102	ECQM1H104KZ	Polyester, 50V, 0.1μF, ± 10%
C103	ECQM1H104KZ	Polyester, 50V, 0.1μF, ± 10%
C104	ECEA1CS330	Electrolytic, 16V, 33μF
C105	ECEA1AS470	Electrolytic, 10V, 47μF
C106	ECKF1E104ZV	Ceramic, 25V, 0.1μF, ± 80%
C201	ECEA1CS330	Electrolytic, 16V, 33μF
C202, 203	ECEA50Z1	Electrolytic, 50V, 1μF
C204	ECEA50Z1	Electrolytic, 50V, 1μF
C205	ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C206	ECEA1ES470	Electrolytic, 25V, 47μF
C207	ECEA50Z1	Electrolytic, 50V, 1μF
C208	ECEA0JS471	Electrolytic, 6.3V, 470μF
C209	ECEA1AS470	Electrolytic, 10V, 47μF
C210	ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C211	ECEA50Z2R2	Electrolytic, 50V, 2.2μF
C212	ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C213	ECKF1E104ZV	Ceramic, 25V, 0.1μF, ± 80%
C214	ECEA1ES470	Electrolytic, 25V, 47μF
C215	ECCD1H471K	Ceramic, 50V, 470pF, ± 10%
C216	ECCD1H330K	Ceramic, 50V, 33pF, ± 10%
C217	ECCD1H151K	Ceramic, 50V, 150pF, ± 10%
C218	ECKF1E104ZV	Ceramic, 25V, 0.1μF, ± 80%
C219, 220	ECQV05224JZ	TF, 50V, 0.22μF, ± 5%
C221	ECQM1H103KZ	Polyester, 50V, 0.01μF, ± 10%
C401 [M]	Δ ECQF1A473MD	Polypropylene, 125VAC, 0.047μF, ± 20%
C401 [MC]	Δ ECQU2A473MF	Polypropylene, 250VAC, 0.047μF, ± 20%

■ REPLACEMENT PARTS LIST...Cabinet, Chassis and Packing Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders. 3. Brakerted indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

2. Important safety notice:

Components indented by Δ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

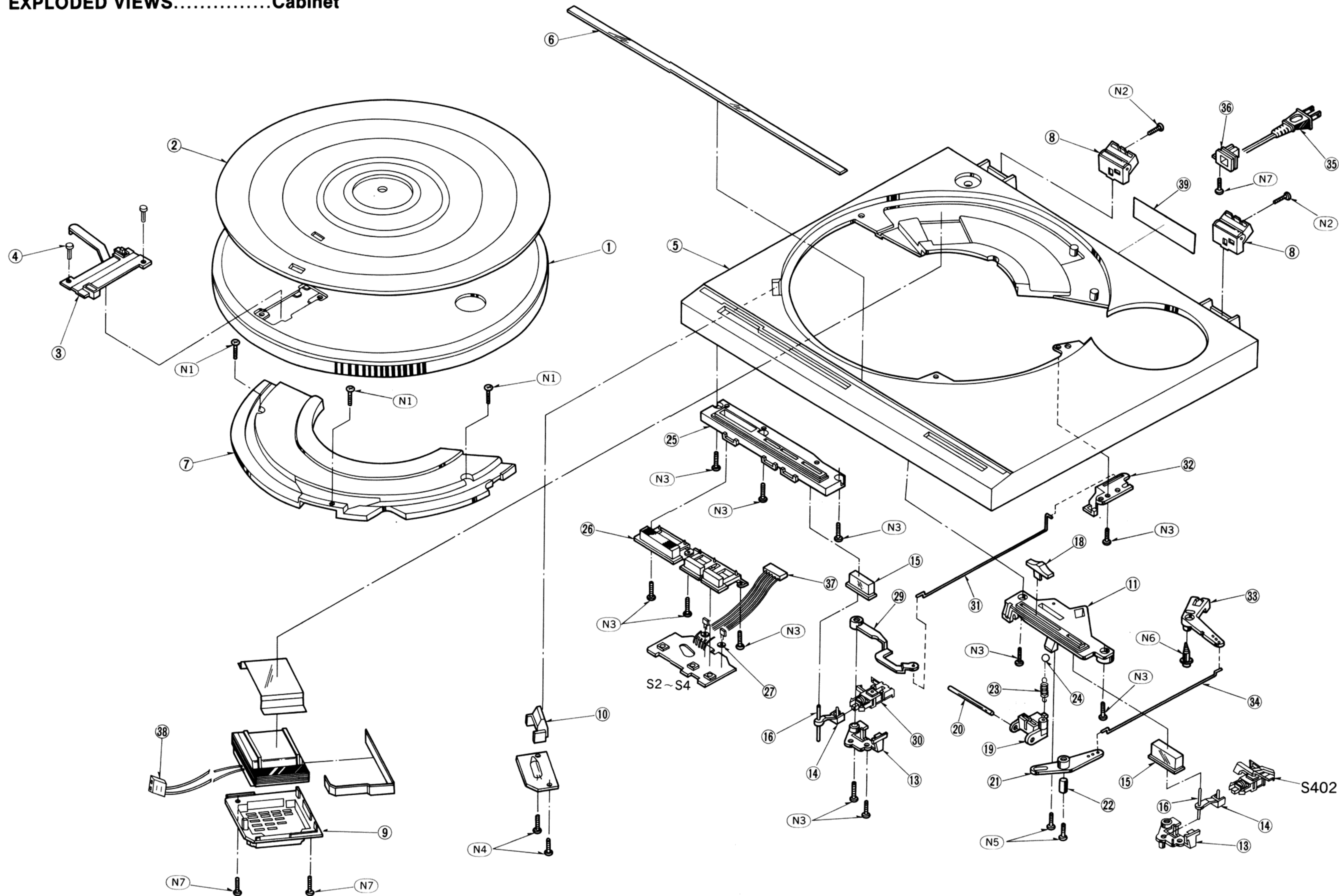
Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.

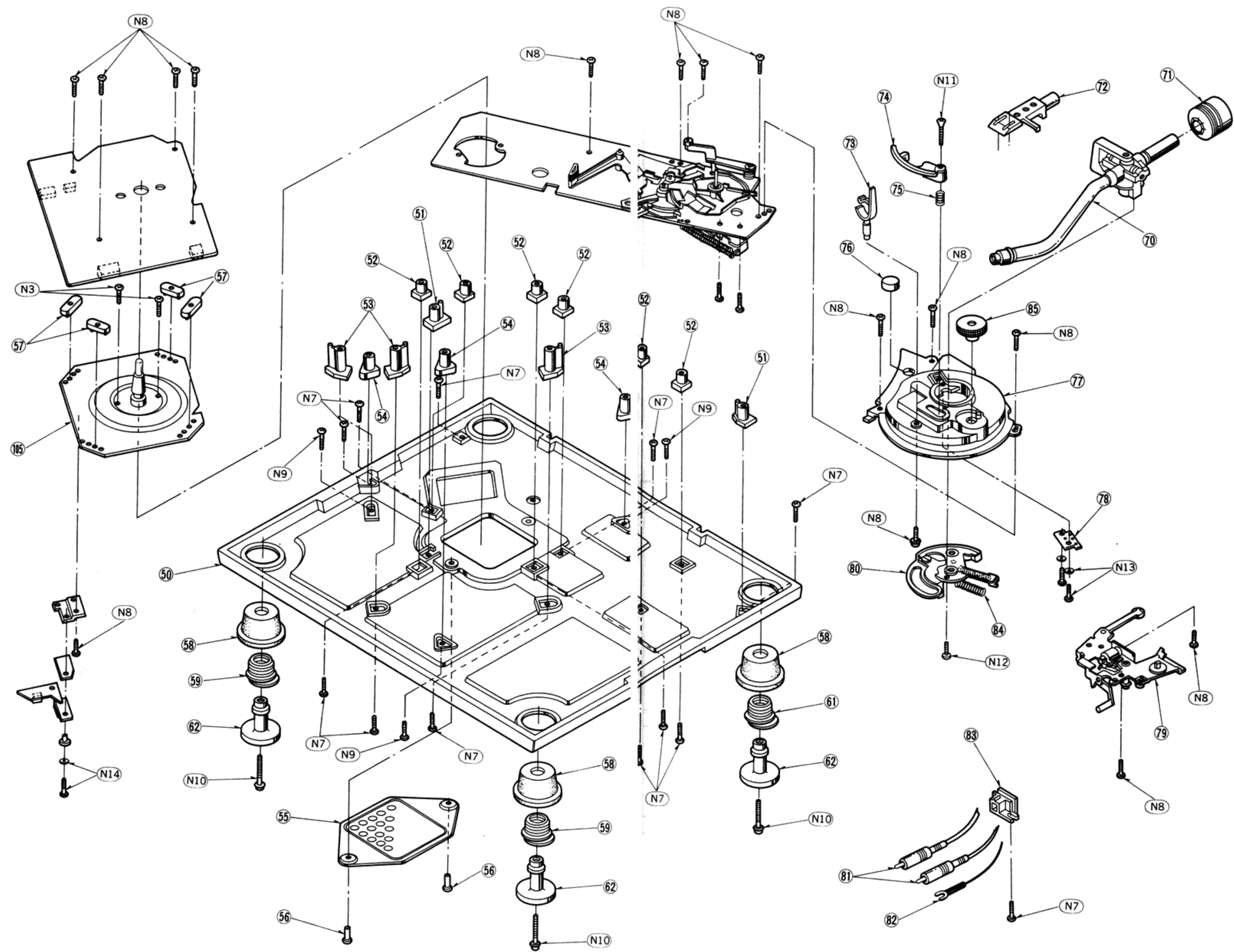
Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
1	SFTEQ34N01E	Turntable
2	SFTGQ34N01	Turntable Mat
3	SFUMQ34N01E	Base, Disc Size Sensor
4	SFUZD33-01E	Latch, Disc Size Sensor Base
5	SFACQ34N01	Cabinet
6	SFKKQ34G01	Surface Plate
7	SFUMQ34N22	Cover, Panel
8	SFATQ34N01A	Hinge
9	SFUMQ34N06	Cover, Transformer
10	SFUMQ11N09	Cover, Neon Lamp Strove
11	SFUMQ34N02	Guide, Power Switch
13	SFUMQ34N12	Plate, Power/Repeat Switch
14	SFUMQ34N13	Plate, Power/Repeat Knob
15	SFKTQ34N02	Knob, Power/Repeat
16	SFXJQ34N02	Shaft, Power/Repeat
18	SFKTQ34N01	Knob, Cueing
19	SFUMQ34N23	Slider, Cueing
20	SFXJQ34N01	Shaft Guide
21	SFUMQ34N04	Rink, Cueing (A)
22	SFXOQ34N01	Pipe, Cueing
23	SFQA130-11	Spring, Cueing
24	SFYB-5-32	Ball, Cueing
25	SFUMQ34N03	Guide, Start/Stop Switch
26	SFKTQ34N03	Knob, Start/Stop Switch
27	SFGZD11N01	Spacer, LED Speed
29	SFUMQ34N05	Rink, Repeat
30	SFDSQ34N01	Switch, Repeat
31	SFUZQ34N01	Rod, Repeat
32	SFUMQ34N21	Guide, Repeat
33	SFUMQ34N11	Rink, Cueing (B)
34	SFUZQ34N02	Rod, Cueing
35	Δ RJA9Y	AC Cord
36	SFUMQ34N09	Bushing, AC Cord
37	SFDJQ34N03E	Connector Ass'y 6P
38	SFDJQ34N04E	Connector Ass'y 2P
39 [M]	SFNNQ34M01	Name Plate
39 [MC]	SFNNQ34C01	Name Plate

Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
40	SFADQ34N01E	Dust Cover
MAIN BASE and TONE ARM PARTS		
50	SFAUQ34N01	Bottom Board
51	SFUMQ34N08	Supporter, Mechanism Plate (A)
52	SFUMQ34N14	Supporter, Mechanism Plate (B)
53	SFUMQ34N15	Supporter, Drive P.C.B.
54	SFUMQ34N16	Supporter, Clamper
55	SFUPQ34N01	Cover, Gear
56	SFUZQ34N06E	Latch, Gear Cover
57	SFMZQ34N31	Spacer, Driver P.C.B.
58	SFGAQ34N01	Rubber Insulator
59	SFQHQ34N01	Spring, Insulator Front & Rear Left
61	SFQHQ34N03	Spring, Insulator Rear Right
62	SFUMQ34N07E	Foot, Insulator
105	SFMZQ34N01A	Stater Frame Ass'y
TONE ARM PARTS		
70	SFPAM30301A	Tone Arm
71	SFPWG30301A	Balance Weight
72	SFPCC31002K	Head Shell
73	SFPRT30301E	Arm Rest
74	SFPRT30302E	Lift Arm
75	SFPSP30304	Spring, Left Arm
76	SFGK170-01	Rubber Cap
77	SFPKD30301	Base, Tone Arm
78	SFPAB30310	Sub Base, Tone Arm
79	SFPAB30305A	Plate, Left Ass'y
80	SFPAB30301A	Plate, Tone Arm
81 [MC]	SFDH212-01	Phono Cord
81 [M]	SFDHD33M01	Phono Cord
82	SFEL028-01E	Ground Wire
83	SFUMQ34N10	Bushing, Phono Cord
84	SFPSP30302	Spring, Anti-Skate Force Control
85	SFPJK30301	Knob, Anti-Skate Force Control

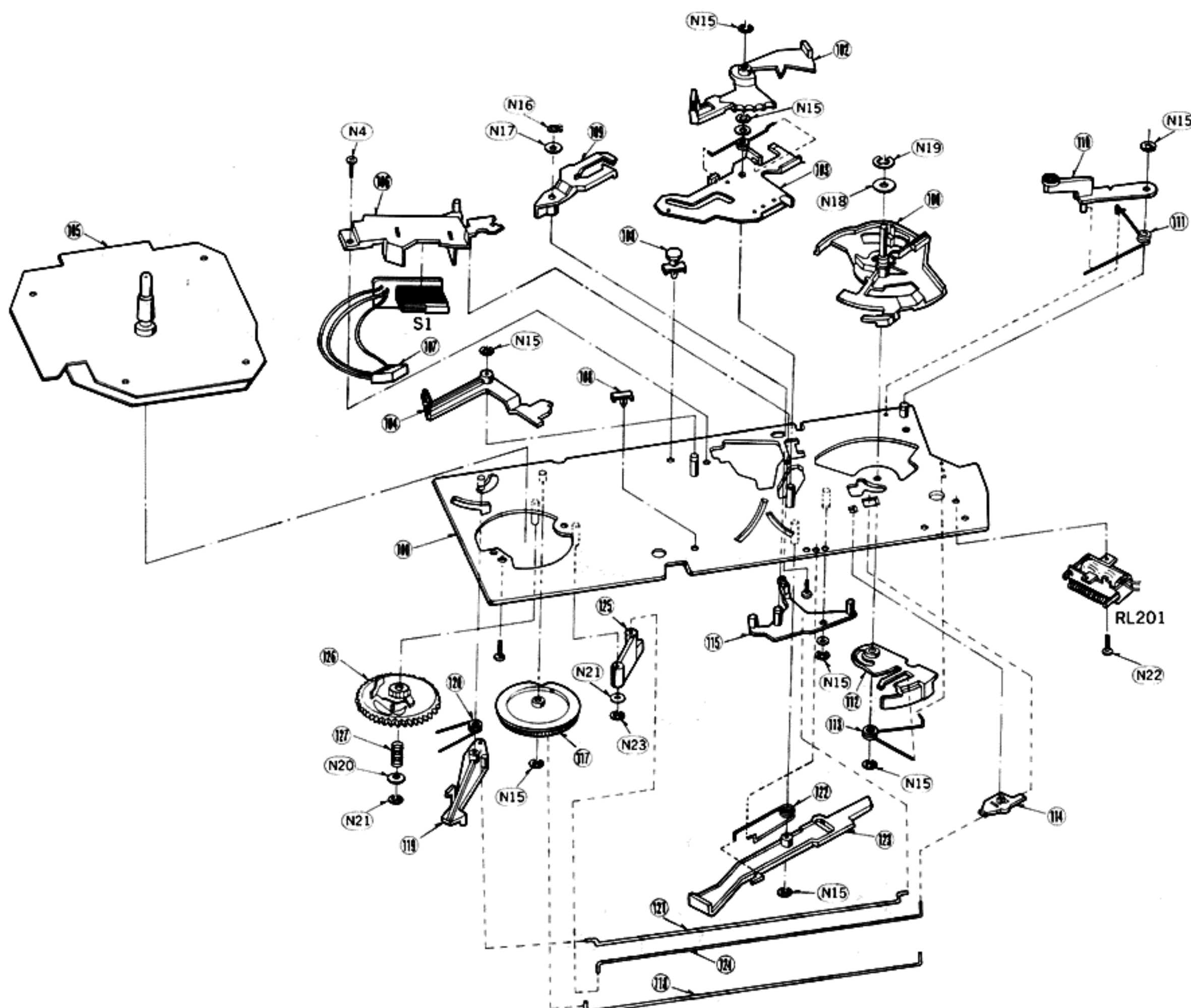
■ EXPLODED VIEWS.....Cabinet



■ EXPLODED VIEWS.....Main Base



EXPLODED VIEWS.....Automatic Mechanism Plate



Ref. No.	Part No.	Part Name & Description
AUTOMATIC MECHANISM ASS'Y		
100	SFUKQ34N21E	Plate, Automatic Mechanism
101	SFUMQ34N39E	Cam, Drive
102	SFUMQ34N34E	Index Plate Ass'y
103	SFUPQ34N23E	Index Sub Plate Ass'y
104	SFUMQ34N33E	Plate, Disk Size Sensor
105	SFMZQ34N01A	Stator Frame Ass'y
106	SFUMQ34N36	Case, Switch
107	SFDJQ34N02E	Connector Ass'y 3P
108	SFEZQ34N01	Clamper
109	SFUMQ34N38	Lever, Stop
110	SFUMQ34N43	Plate, Brake
111	SFQSQ34N28	Spring, Brake
112	SFUMQ34N35	Cam, Start
113	SFQSQ34N24	Spring, Start
114	SFUMQ34N32	Support, Actuating Rod
115	SFUMQ34N37	Lever, Switch
117	SFUGQ34N22	Gear, Drive
118	SFQSQ34N22	Rod, Drive
119	SFUMQ34N31	Plate, Stop Gear
120	SFQSQ34N21	Spring, Stop Gear
121	SFQSQ34N26	Rod, Switch
122	SFQSQ34N25	Spring, Repeat Lever
123	SFUMQ34N41	Lever, Repeat
124	SFQSQ34N23	Rod, Actuating
125	SFUMQ34N42	Connector, Actuating
126	SFUGQ34N21E	Main Gear Ass'y
127	SFQAQ34N21	Spring, Main Gear
SCREWS, WASHERS and CIRCLIPS		
N1	XTW3+14GFZ	Screw, Tapping, $\oplus$ 3 x 14
N2	XTV3+8BFZ	Screw, Tapping, $\oplus$ 3 x 8
N3	XTV3+8BFN	Screw, Tapping, $\oplus$ 3 x 8
N4	XTW3+8T	Screw, Tapping, $\oplus$ 3 x 8
N5	XTW3+10Q	Screw, Tapping, $\oplus$ 3 x 10
N6	SFXGQ20-01	Screw, Tapping
N7	XTW3+10TFZ	Screw, Tapping, $\oplus$ 3 x 10
N8	XTV3+10BFN	Screw, Tapping, $\oplus$ 3 x 10

Ref. No.	Part No.	Part Name & Description
N9	XTW4+10QFZ	Screw, Tapping, $\oplus$ 4 x 10
N10	XTW4+30TFYR	Screw, Tapping, $\oplus$ 4 x 30
N11	XTS3+16BFZ	Screw, Tapping, $\oplus$ 3 x 16
N12	SFXGQ34N02	Screw, Tapping
N13	XYN3+C12S	Screw, Tapping, $\oplus$ 3 x 12
N14	XYN3+C8S	Screw, Tapping, $\oplus$ 3 x 8
N15	XUC3FT	Circlip, ϕ 3
N16	XUB4FT	Circlip, ϕ 4
N17	SFXWQ34N26	Washer
N18	SFXWQ30-11	Washer
N19	XUC5FT	Circlip, ϕ 5
N20	XWE4BW	Washer, ϕ 4
N21	SFXWQ34N21	Washer
N22	XTV3+6BFN	Screw, Tapping, $\oplus$ 3 x 6
N23	XUC2FT	Circlip, ϕ 2
ACCESSORIES		
A1 [M]	SFNUQ34M01	Instructions Book, Printed Matter
A1 [MC]	SFNUQ34C01	Instructions Book, Printed Matter
A2	SFWE212-01	Adaptor, 45 rpm
A3	SFK0135-01	Overhung Gueage
A4	SFCZB30505	Shell Weight
PACKING PARTS		
P1 [M]	SFHPQ34M01	Carton Box
P1 [MC]	SFHPQ34C01	Carton Box
P2	SFHHQ34N01	Pad, Front
P3	SFHHQ34N02	Pad, Rear
P4	SFHDQ34N01	Pad, Turntable
P5	SFHZ144X02	Sheet
P6	SFYH60X60	Polyethylene Bag, Unit & Dust Cover
P7	SPB1083	Polyethylene Bag, Accessoris
P8	SFYH40X45	Polyethylene Bag, Turntable
P9	SFXGQ34N04	Screw, Clamp
P10	SFXW172-03	Washer

■ PACKINGS

