PIONEER

Service Manual

ORDER NO.
ART-608-0

STEREO TURNTABLE

PL-8 WE,WB

MODEL PL-8 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarsk
WE	220V – 240V	Europe model
WB	220V – 240V	United Kingdom model
KU	120V only	U.S.A model
KC	120V only	Canada model
R	110V – 120V and 220V – 240V (Switchable)	General export model

- **This service manual is applicable to the WE and WB types. When repairing the KC,KU and R types, please see the additional service manual.**
- **Ce manuel d'instruction se refère au mode de réglage, en français.**
- **Este manual de servicio trata del método de ajuste escrito en español.**

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
PIONEER ELECTRONIC (EUROPE) N.V. Luithagen-Haven 9, 2030 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

1980 Printed in Japan

1. SPECIFICATIONS

Motor and Turntable

Drive System . . . . Direct-drive
Motor . . . . Quartz PLL Hall motor
Turntable Platter. . . 320mm diam. aluminum alloy die-cast
Speeds . . . . 33-1/3 and 45rpm
Wow and Flutter . . . . Less than *0.012% (WRMS)
0.025% (WRMS)
0.035% (DIN)

Values marked with an " * " designate the wow and flutter for motor, and do not include the cartridge or tonearm load.

Signal-to-Noise Ratio . . . . More than 78dB (DIN-B)
(with Pioneer cartridge model PC-3MC)

Rotational Characteristics

Build-up Time . . . . . . Within 120° rotation at 33-1/3rpm
Speed Deviation . . . . Less than 0.002%
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, Straight pipe arm
Effective Arm Length 221mm
Overhang 15.5mm
Usable Cartridge Weight . . . . 3g (min.) to 8g (max.)

PC-3MC Specifications

Type . . . . Moving coil type
Stylus . . . . 0.5 mil diamond (PN-3MC)
Output Voltage 2.5mV
(1kHz, 50mm/s Peak velocity, LAT)
Tracking Force . . . . 1.7g to 2.3g (proper 2g)
Frequency Response . . . . 10 to 32,000Hz
Recommended Load 50kΩ
Weight 3.1g

Miscellaneous

Power Requirements
WE, WB models . . . . 220-240V~, 50, 60Hz
Power Consumption 15W
Dimensions . . . . 420(W) x 114(H) x 395(D)mm
16-9/16(W) x 4-1/2(H) x 15-9/16(D) in.
Weight 6.2kg/13lb 10oz

Accessories

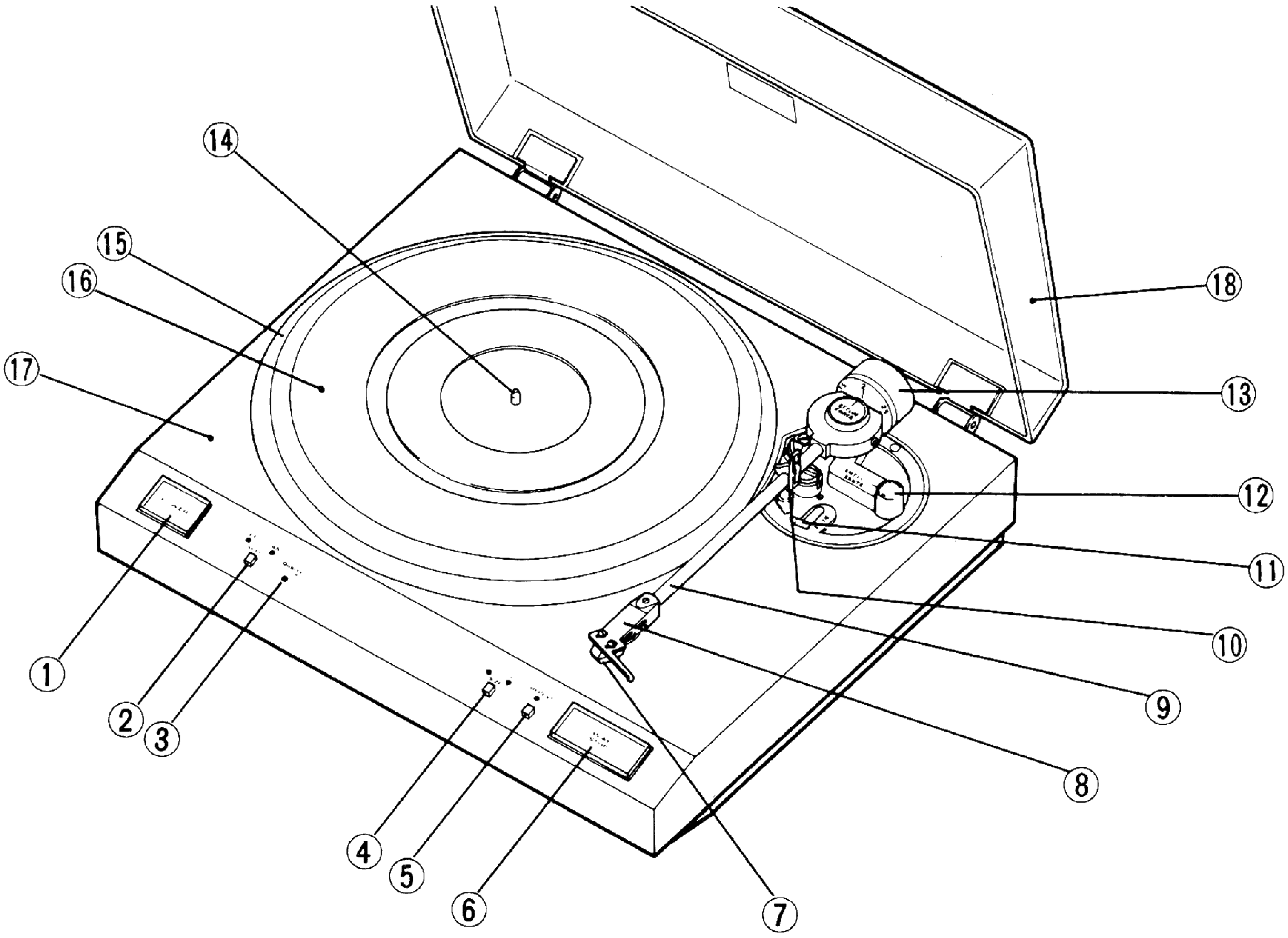
EP Adapter 1
Operating instructions (French, German and Italian furnished on models for WE) 1

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

Subfunctions

Auto lead-in
Auto-return
Auto cut
Auto repeat
Quick play
Quick stop
Anti-skating force control
Stylus tracking force direct-readout counterweight
Cueing device
Free stop hinges

2. PANEL FACILITIES



① POWER SWITCH (POWER)

Press this switch to turn power ON and OFF. When power is turned ON, the power lamp is illuminated; turning power OFF extinguishes the lamp.

② SPEED SWITCH (SPEED)

This switch is used to select turntable speed. The "33" lamp is illuminated for 33-1/3 rpm records, and the "45" lamp is illuminated for 45 rpm records.

③ QUARTZ LOCK INDICATOR (QUARTZ LOCK)

This lamp illuminates indicating accurate speed at 33-1/3 or 45 rpm.

④ RECORD SIZE SELECTOR SWITCH (SIZE)

This switch is used to select proper record size. The "30" lamp is illuminated when 30 cm LP record size is selected, and the "17" lamp is illuminated when 17cm EP record size is selected.

⑤ REPEAT PLAYBACK SWITCH (REPEAT)

Depressing this switch will cause the turntable to play the present record repeatedly.

⑥ PLAYBACK START/STOP SWITCH (PLAY/STOP)

This switch is depressed to start automatic playback or to stop playback in the middle of a record.

⑦ CARTRIDGE (PC-3MC)

⑧ HEADSHELL

⑨ TONEARM

Serves to trace the record groove. Stylus tracking force is set by adjusting the counterweight. Also serves to transmit operation signals to the turntable platter.

Arm rest position — stops turntable rotation
Off arm rest — starts turntable rotation

⑩ ARM REST/CLAMP

Serves to support the tonearm and lock it in place. Always unlock the clamp prior to moving tonearm.

⑪ ARM ELEVATION LEVER (ARM-ELEVATION)

Use this lever for manual operation, or to temporarily stop playback during the middle of a record.

▼ (up) — raises tonearm
▼ (down) — lowers tonearm

⑫ ANTI-SKATING ADJUSTMENT KNOB (ANTI-SKATE)

Turn this knob to adjust anit-skating force.

⑬ STYLUS TRACKING FORCE ADJUSTMENT WEIGHT

Rotate this weight to adjust vertical tracking force.

⑭ CENTER SHAFT

⑮ PLATTER

⑯ RUBBER PLATTER MAT

⑰ CABINET

⑱ 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 ❶ and the headshell by loosening screw ❷.
2. Lift off the turntable platter.
3. Loosen insulator attachment screw ❸ and remove the insulator. (Do not mix the color-coded float springs. They must be replaced with their original insulators during reassembly.)
4. Set the record size selector switch to "30cm".
5. Release the arm clamp and move the tonearm as far as it will go toward the center. Then rotate the motor center shaft clockwise returning the tonearm to the arm rest. Stop the center shaft.

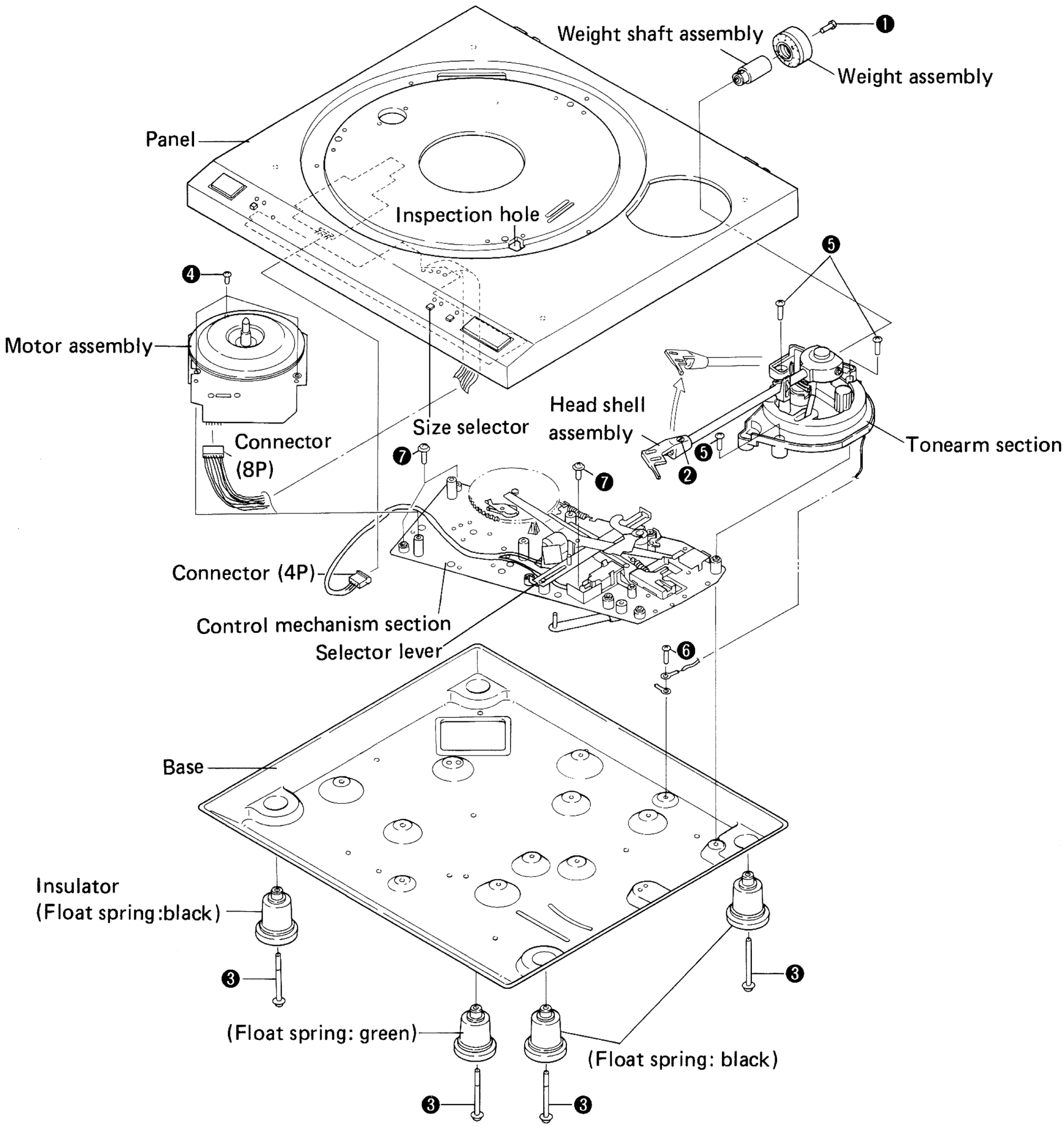


Fig. 3-1 Section disassembly

6. Remove the rear panel PU cord strain relief.
7. Lift the front section of the panel (operating controls) very slightly and make sure the slider and spring is disengaged from the selector lever. If the spring is caught on something, use a long and thin screwdriver and free the spring from the large center opening.
8. Unplug the 4P and 8P connectors.
9. Completely remove the PU cord from the panel.
10. 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 D.D MOTOR ASSEMBLY

After the panel has been removed, loosen the three motor attachment screws ❹ and remove the motor.

3.3 TONEARM SECTION

Remove the tonearm section by taking out the three arm base attachment screws ❺ and one ground wire securing screws ❻.

3.4 CONTROL MECHANISM SECTION

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

3.5 TONE ARM

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 ❶ with a screwdriver to remove the PU plate under the arm base (see Fig. 3-3).
3. Undo the screw ❷ securing the tonearm to the arm base (see Fig. 3-3)

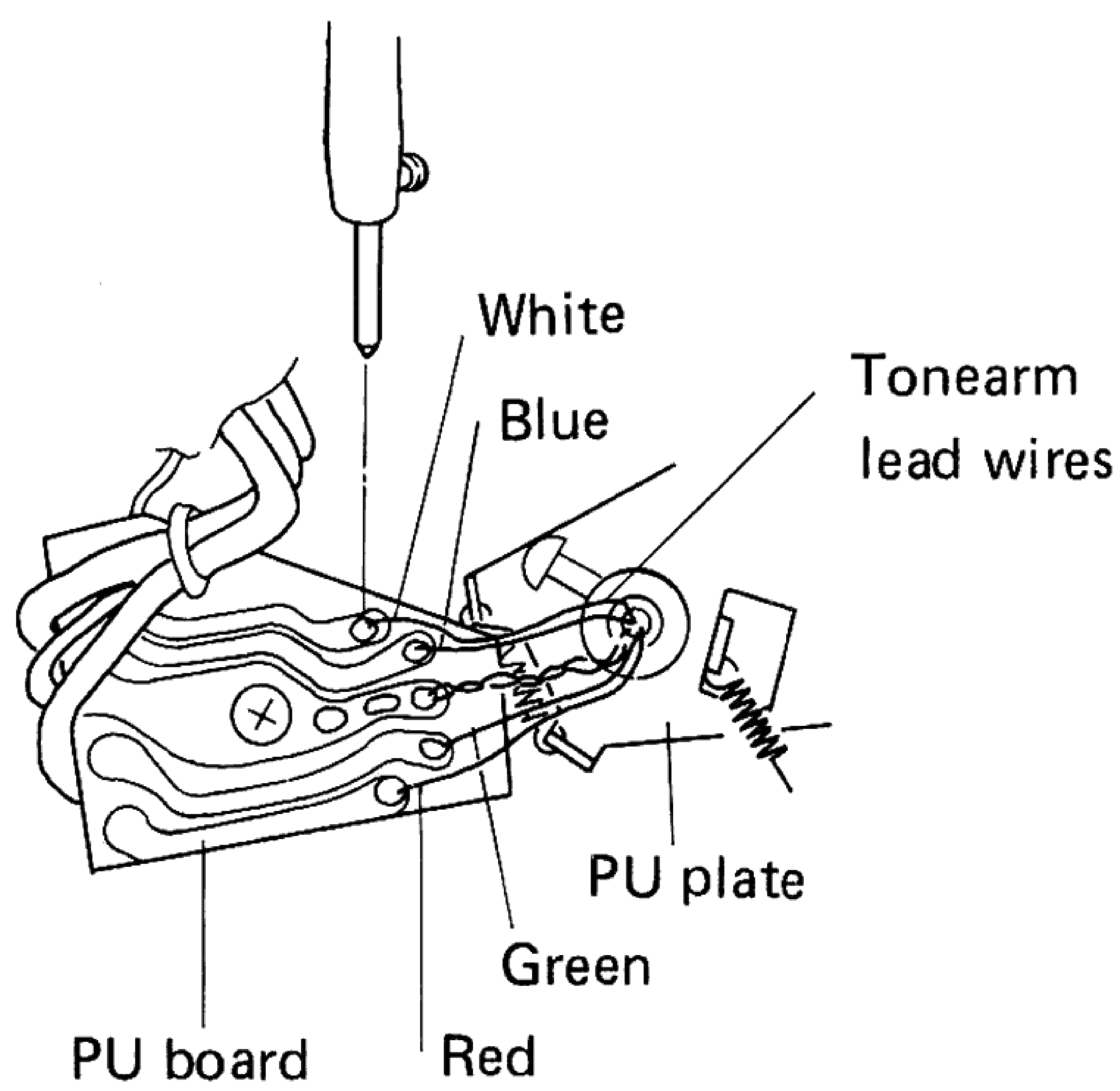


Fig. 3-2 Disconnect the tonearm lead wires

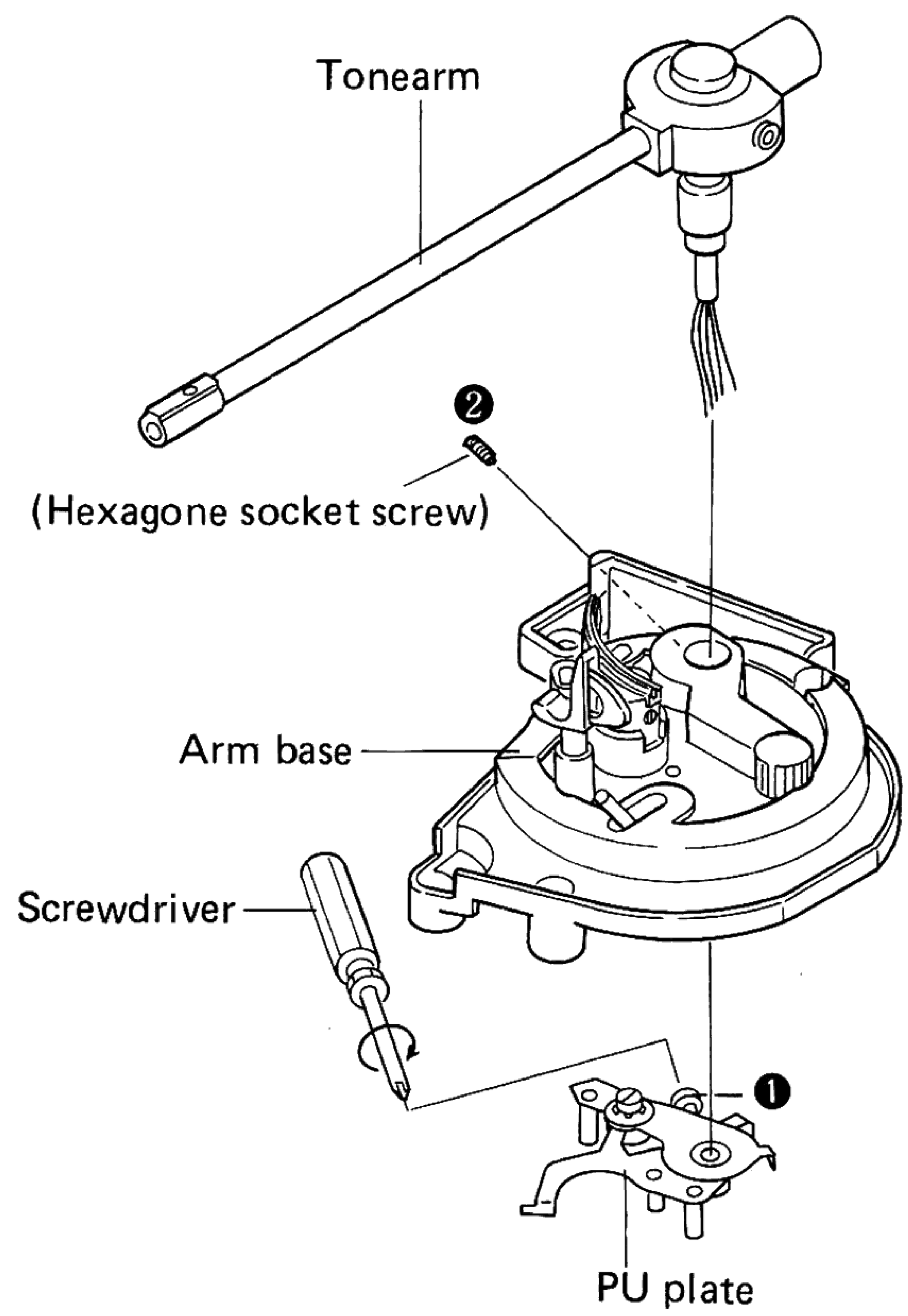


Fig. 3-3 Remove PU plate

3.6 PANEL AND BASE REASSEMBLY

1. Bring the tonearm as far as it will go toward the center shaft.
2. Return the tonearm to the arm rest.
3. Turn the motor center shaft by hand slowly in a clockwise direction and stop the selector lever in its the front position. (If turned too far, the tonearm will not lower in the lead in groove.)
4. Lift the tonearm. (Hold the tonearm steady and do not let it move toward the center shaft. If moved toward the center, the start lever will not engage with tonearm.)
5. Turn the REPEAT switch on the panel OFF, and set the record size selector switch to "30cm".
6. Hook the drive lever spring and slider spring (located toward the center of the panel) on the panel bosses. (Fig. 3-4)
7. Place the panel on the base. (Place the PU cord into the stopper attachment groove.)
8. Lift the forward part of the panel and plug in the 4P and 8P connectors.
9. Clamp the tonearm in the arm rest and turn the motor by hand until the control mechanism disengage.

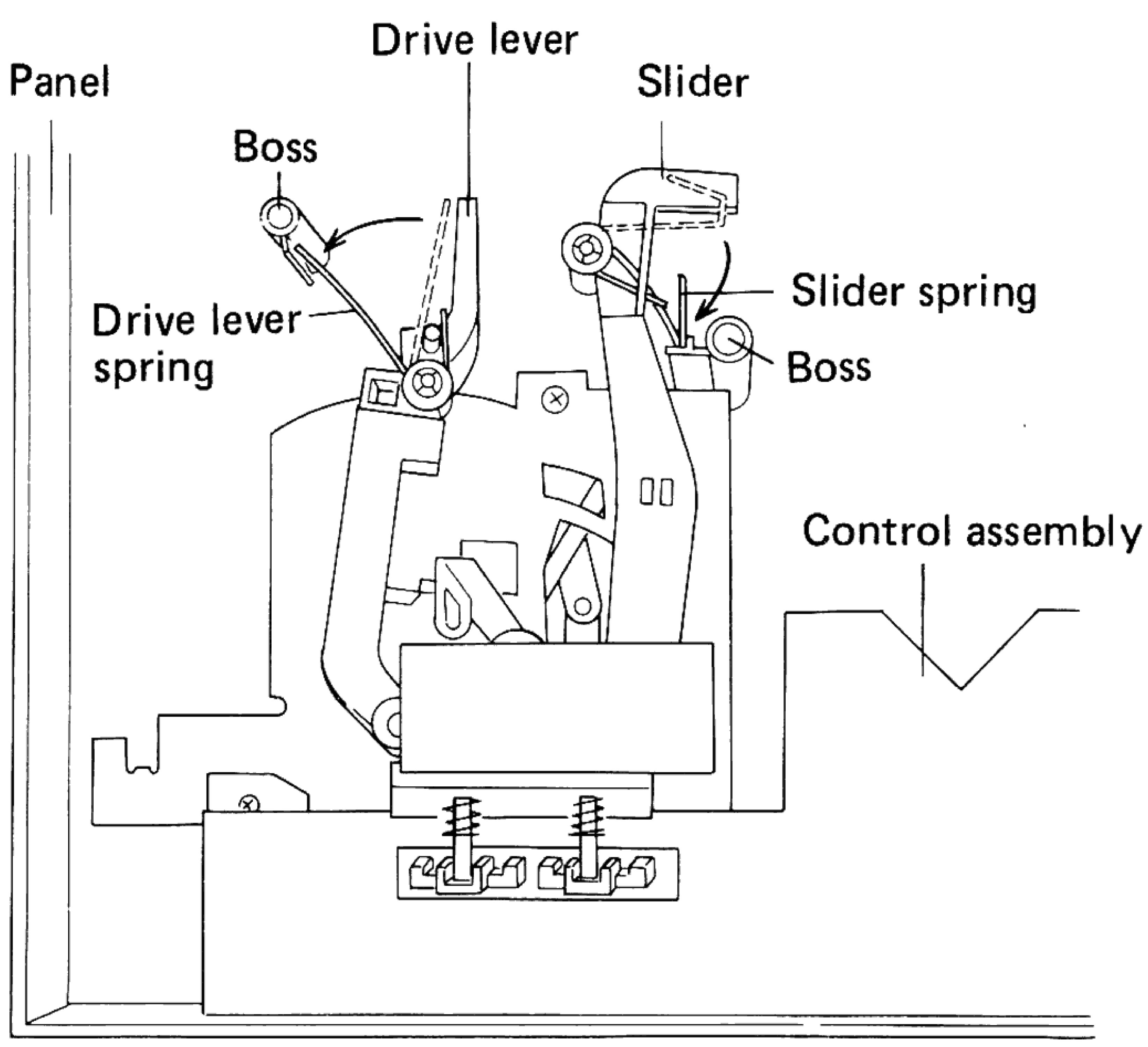


Fig. 3-4 Spring positioning

10. Insert a flat bladed screwdriver through the hole in the base (Fig. 3-5) and release the drive lever spring from the panel boss. When this is completed, the mechanism should appear as in Fig. 3-6.
11. Attach the PU cord stopper.
12. Attach the insulators. (Make certain the color-coded float springs are attached to the correct insulators.)
13. Attach the weight shaft assembly.

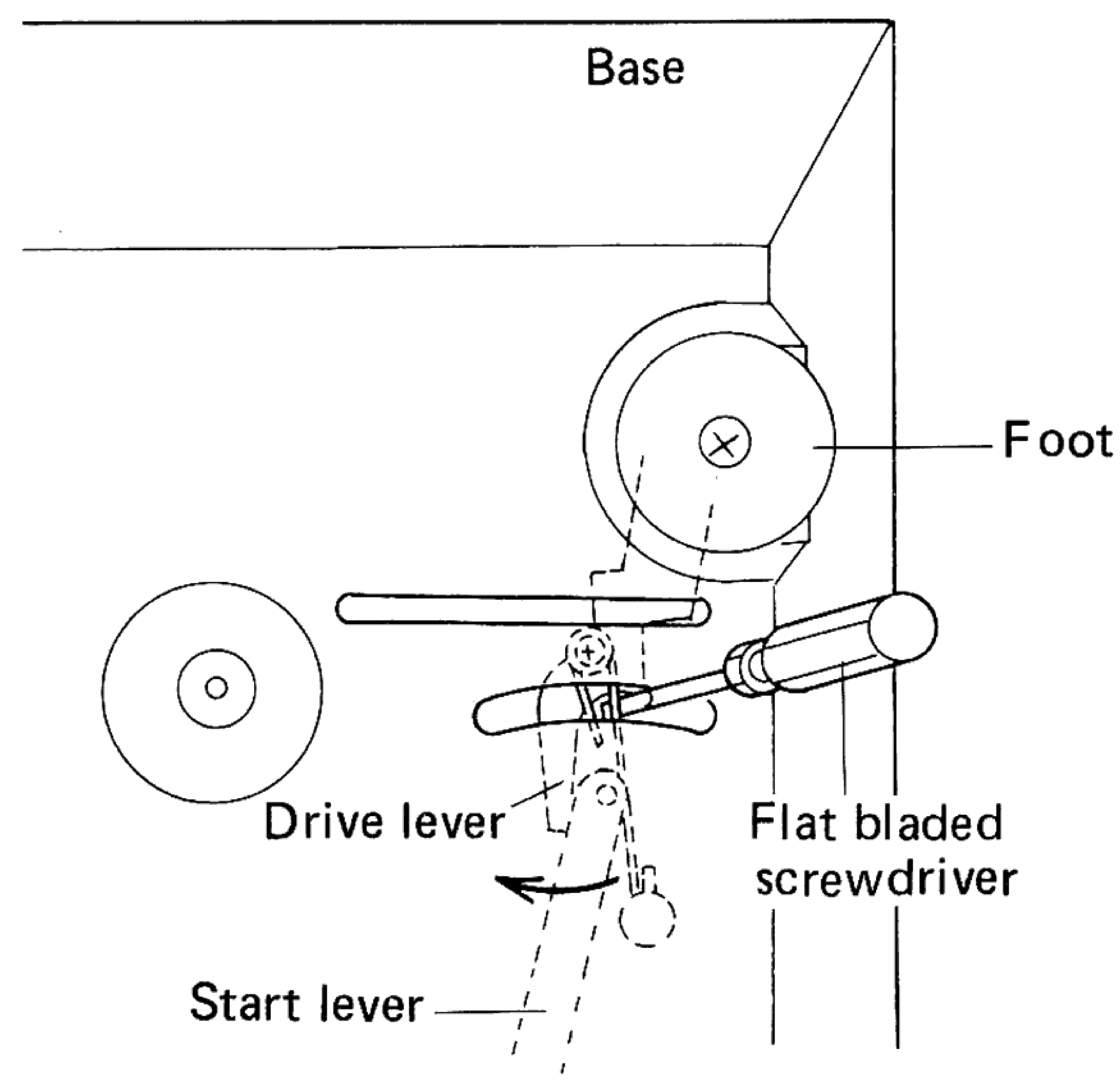


Fig. 3-5 Releasing the drive lever spring

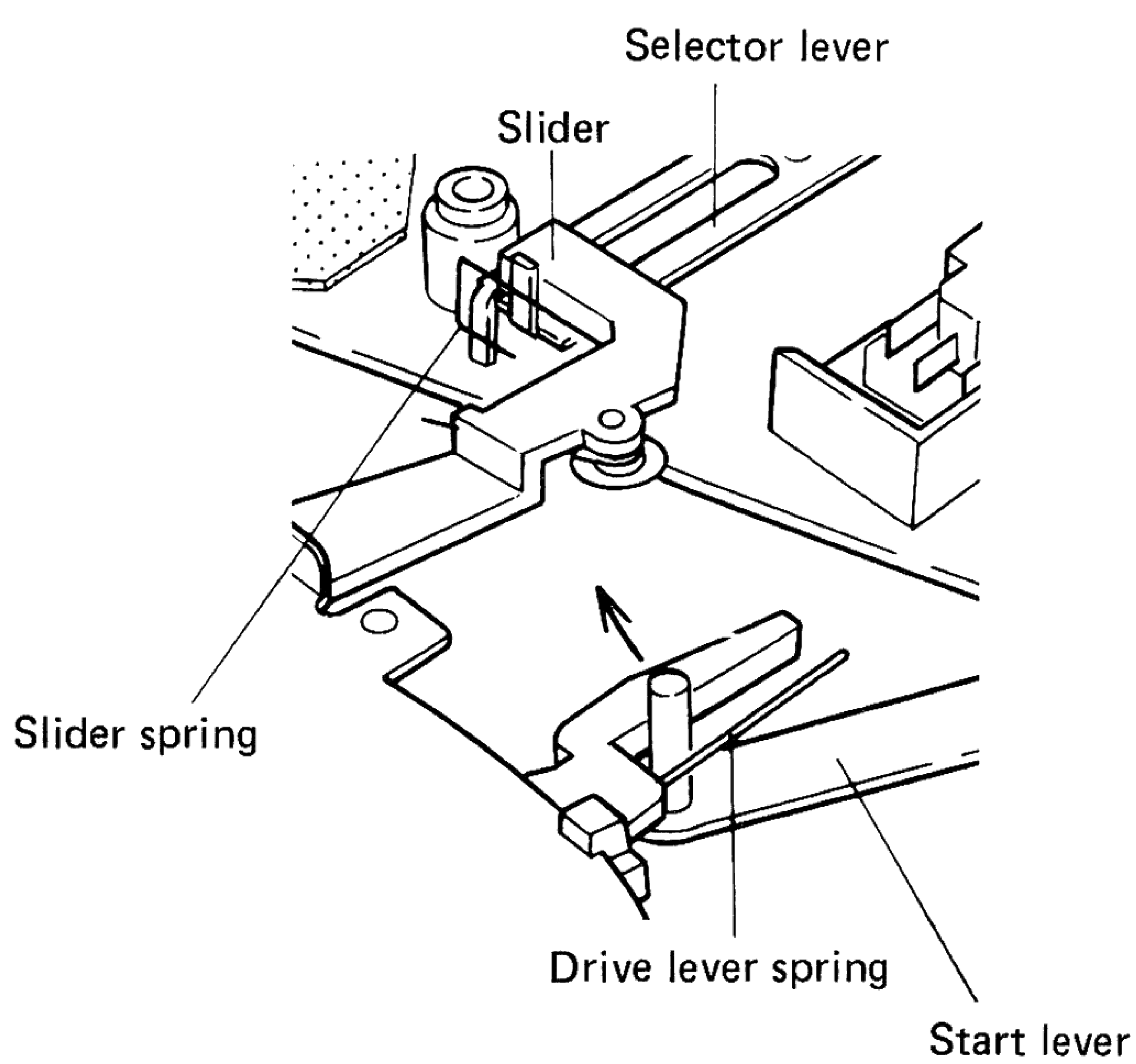
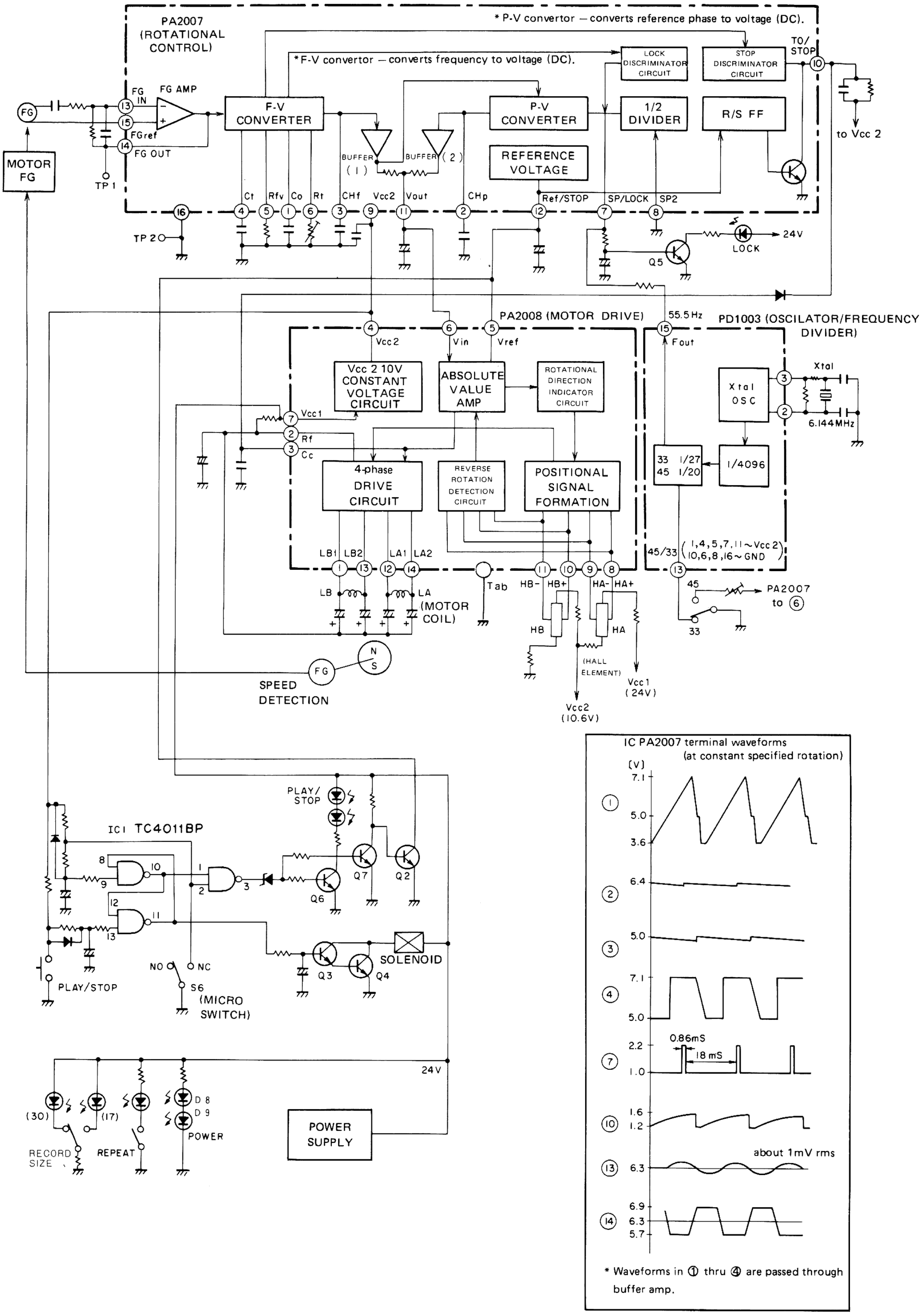


Fig. 3-6 Positioning the spring and lever

4. BLOCK DIAGRAM



5. CIRCUIT DESCRIPTIONS

5.1 CIRCUIT OPERATION

The 10.6V which is required at operating section is supplied from IC PA2008 ④(constant voltage circuit).

■ POWER Switch Turned ON

When the POWER switch (S1) is turned ON, LED 8 and 9 are illuminated, and the control assembly IC1 (TC4011BP) transit through the following stages to reach a stagle state.

1. When the power switch is turned ON, the circuit of R5 and C1 causes terminal ⑨ of NAND logic to momentarily go to L level, and the output terminal ⑩ goes to H level regardless of whether terminal ⑧ is H or L.
2. Terminal ②, via R4 goes to H level, and since the terminal ① is at H level, the output of terminal ③ goes to L level. This causes Q6 and Q7, via D4 to go OFF due to base voltage decrease and Q2 to come ON. Q2 to ON causes the PA2008 terminal ⑤ (Vref) to go to L level stopping motor rotation.
3. Terminal ⑬, via R7, R9 and R18, goes to H level, and since terminal ⑩ is at H level, terminal ⑫ goes to H level sending the output from terminal ⑪ to L level. This causes Q3 and Q4 to go OFF, stopping solenoid activiation.
4. As C1 gradually reaches charge, terminal ⑨ goes to H level, however, since terminal ⑧ (terminal ⑪) is at L level, the output of terminal ⑩ is held at H level and IC1 operation reaches stability.

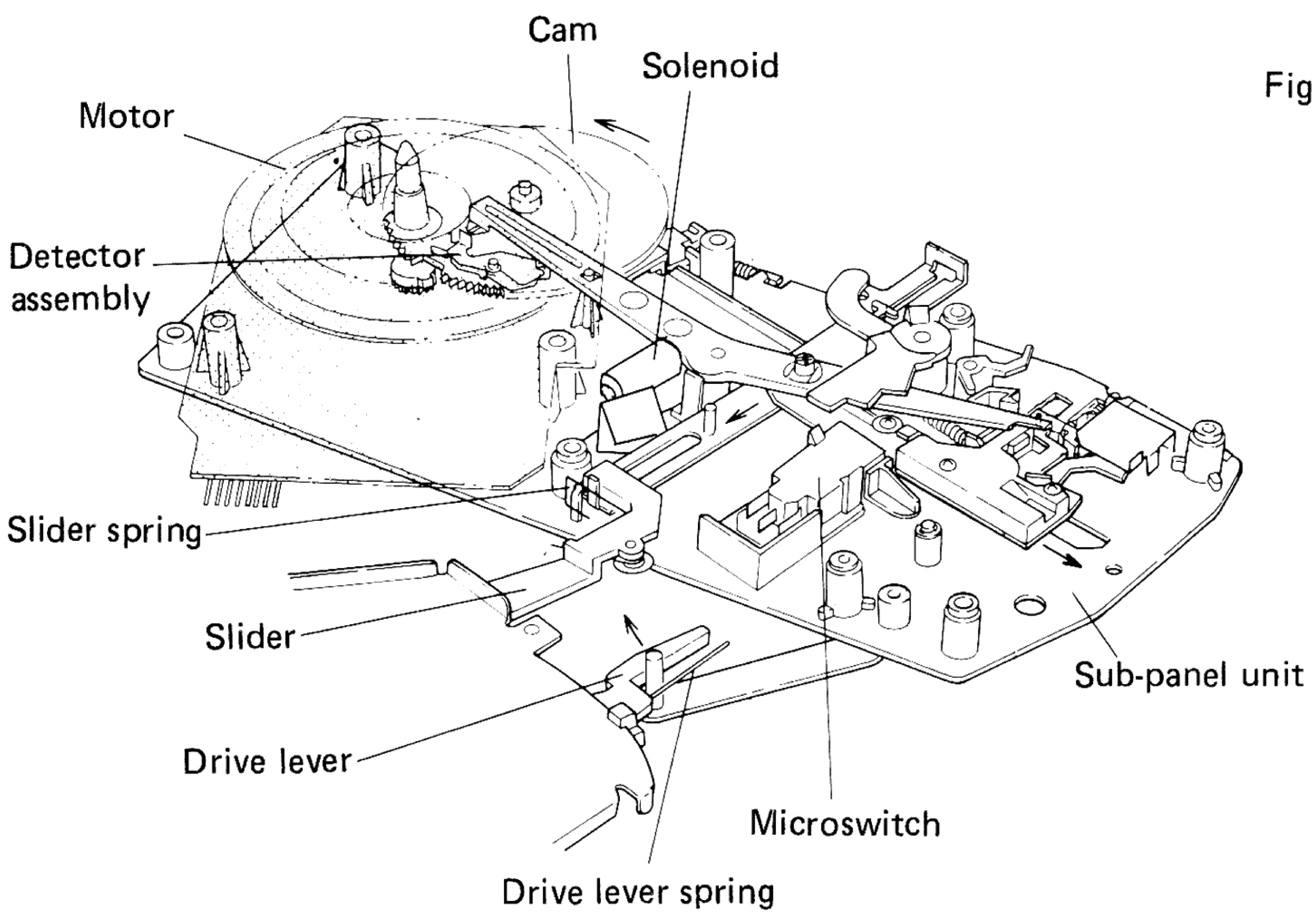


Fig. 5-1 Control mechanism unit

■ Tonearm Removed From Arm Rest

1. When the tonearm is brought toward the center of the record, the microswitch S6 on the control mechanism comes ON (to NC side).
2. This causes terminal ② to go to L level (terminal ① at H level), and the output of terminal ③ goes to H level to bring Q6 and Q7 ON. Q6 going to ON causes the PLAY/STOP LEDs, D6 and D7 to light.

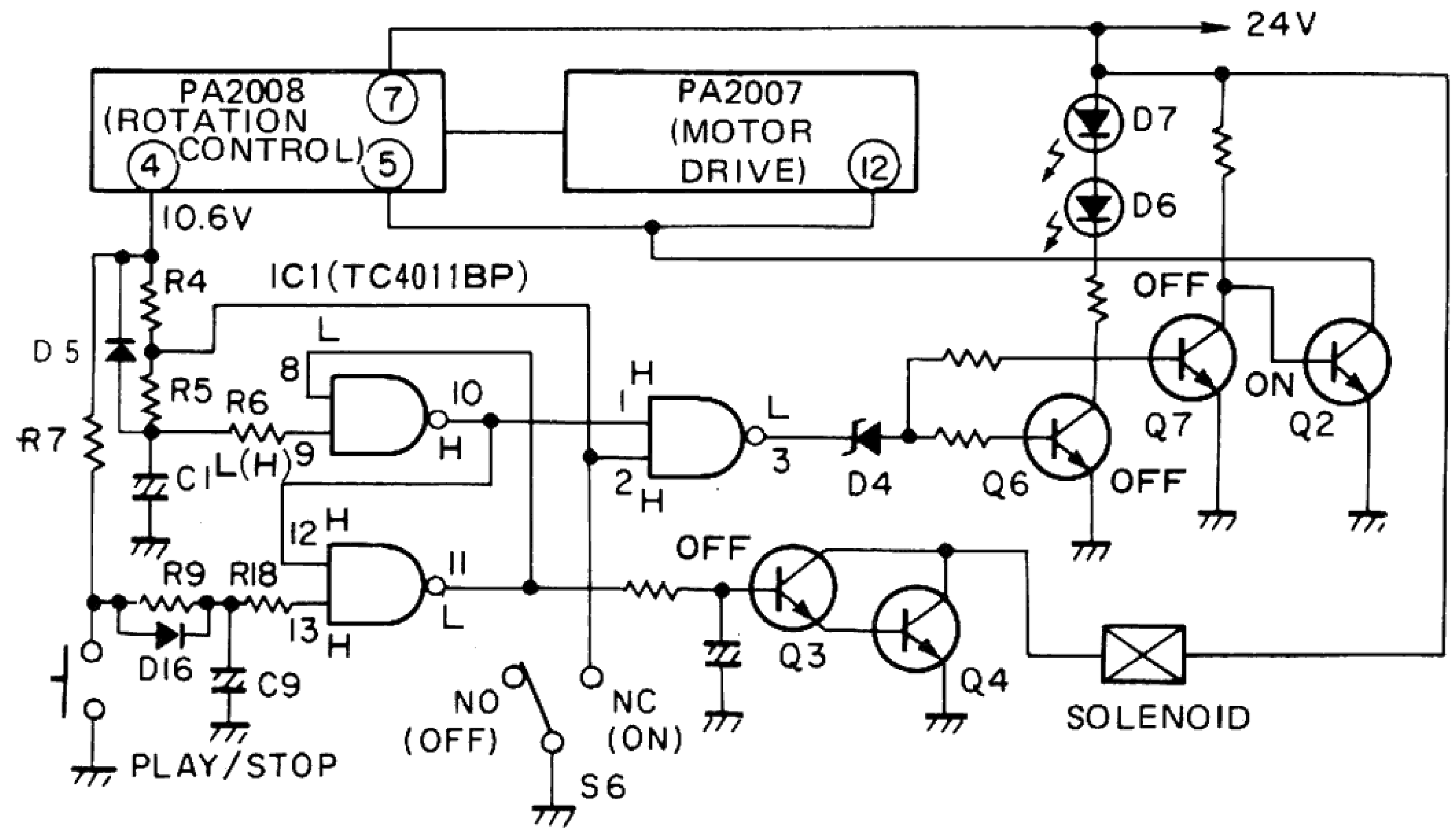


Fig. 5-2 Power switch ON

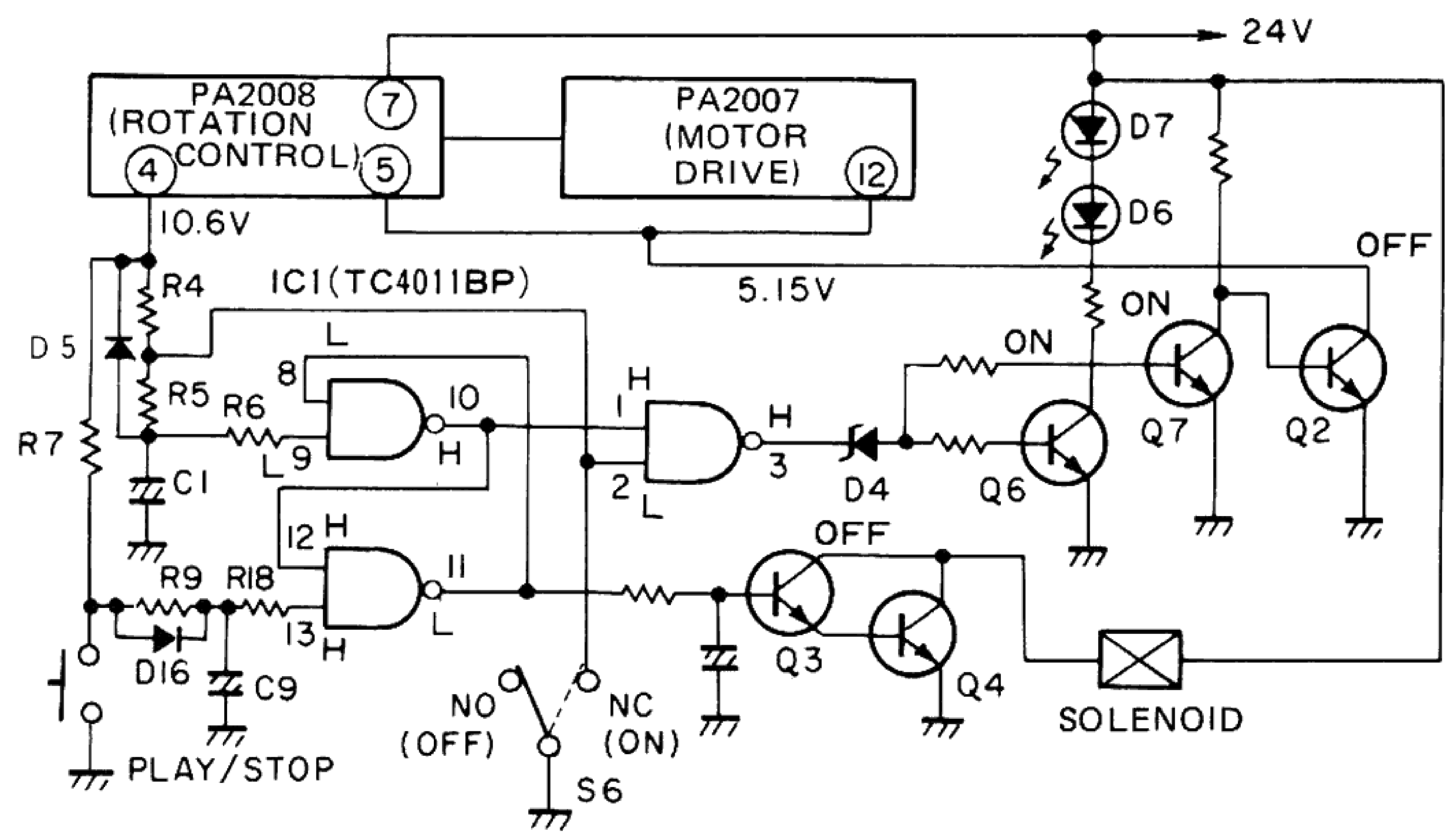


Fig. 5-3 Tonearm removed from arm rest

3. Q7 coming ON cuases Q2 to go OFF returning the Vref voltage at terminal ⑤ of PA2008 to normal and starting motor rotation.
4. Thus, as the tonearm moves toward the center of the record, the control mechanism operates (with S6 at NC) for record playback.

■ PLAY/STOP Switch ON (Auto Lead-in)

1. After the power switch is turned ON. IC1 reaches its stable state, Q2 comes ON, stopping motor rotation.
2. The PLAY switch going momentarily ON causes terminal ⑬ to go to L level, and the output of terminal ⑪ goes to H level bringing Q3 and Q4 ON. As Q4 comes ON, the solenoid is activated, drawing the control mechanism detector lever in engaging it with the detector assembly.
3. Since terminals ⑧(⑪) and⑨are all H level, the output from terminal ⑩ goes to L level, consequently terminal①also goes to L level (terminal ② at H level). Output ③ going to H level causes Q6 and Q7 to come ON. When Q7 comes ON, Q2 goes OFF starting motor rotation. Thus, the tonearm is moved over the record disc for playback. As Q6 comes ON, the PLAY/STOP LED D7 and D6 are illuminated.
4. As the control mechanism commences operation, the microswitch S6 moves from NO to NC (switch ON), and simultaneously terminal ②changes from H to L level.
5. Since terminal ② goes to L level, terminal ③ is held at H level and motor rotation continues. Also, terminal ⑨ changes from H to L level (terminal⑧is at H level).
6. When the finger depressing the PLAY switch is removed, terminal ⑬ goes into on OFF state, so goes to H level (terminal ⑫ at H level) and the output from terminal ⑪ changes to L level. Then Q3 and Q4 go OFF, stopping solenoid operation and releasing the detector lever.
7. The rotation of the motor also causes rotation of the cam, and as the lobe of the cam is moved over the end of the detector lever, the lever is disengaged from the detector assembly.

■ Auto Return

1. When record playback is completed the stylus moves into the lead-out groove and the detector assembly detects playback end (auto return).
2. As the tonearm returns to the arm rest and the control mechanism goes into a free state, the microswitch S6 returns to the NO side. This changes terminal②to H level.
3. Terminal ⑨ changes to H level, however, since terminal ⑪ is at L level, terminal ⑧ also remains at L level, holding terminal ⑩ to H level.
4. When terminal ② changes to H level, since terminal① is at H level the output from terminal ③changes to L level, causing Q6 and Q7 to go OFF (extinguishing LED D7 and D6), and bringing Q2 ON, stopping motor rotation.

■ Auto-Cut

To stop playback in the middle of a record, depress the PLAY/STOP button.

1. As in PLAY operations, depressing the PLAY/STOP button causes terminal ⑬ to change from H to L level, and for the output of terminal ⑪ to go to H level.
2. As terminal ⑪ goes to H level, Q3 and Q4 comes ON activating the solenoid and drawing the detector lever in.
3. As the detector lever operates the detector assembly, the coupled control mechanism completes its operation returning the tonearm to the arm rest.

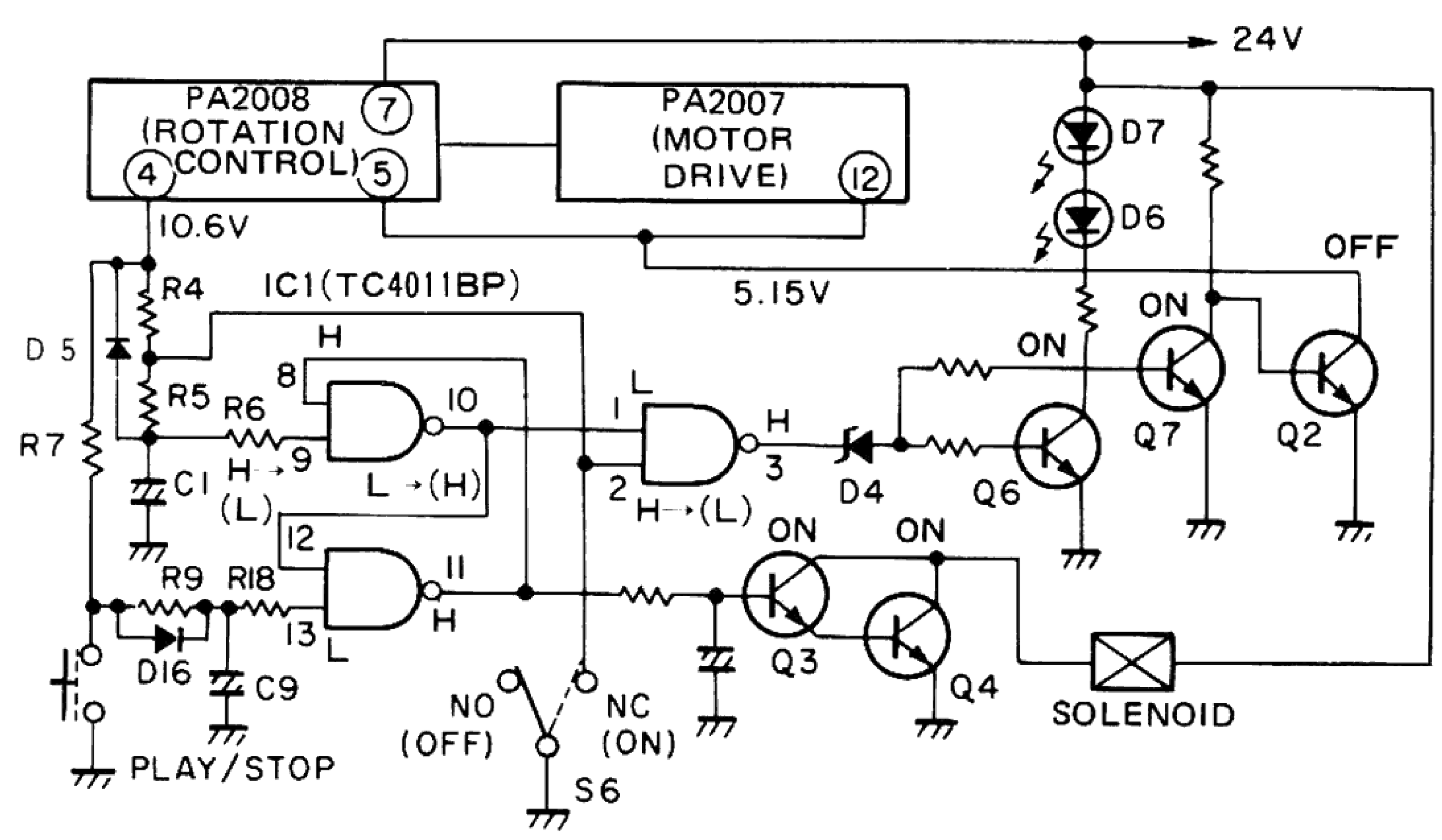


Fig. 5-4 PLAY/STOP switch ON

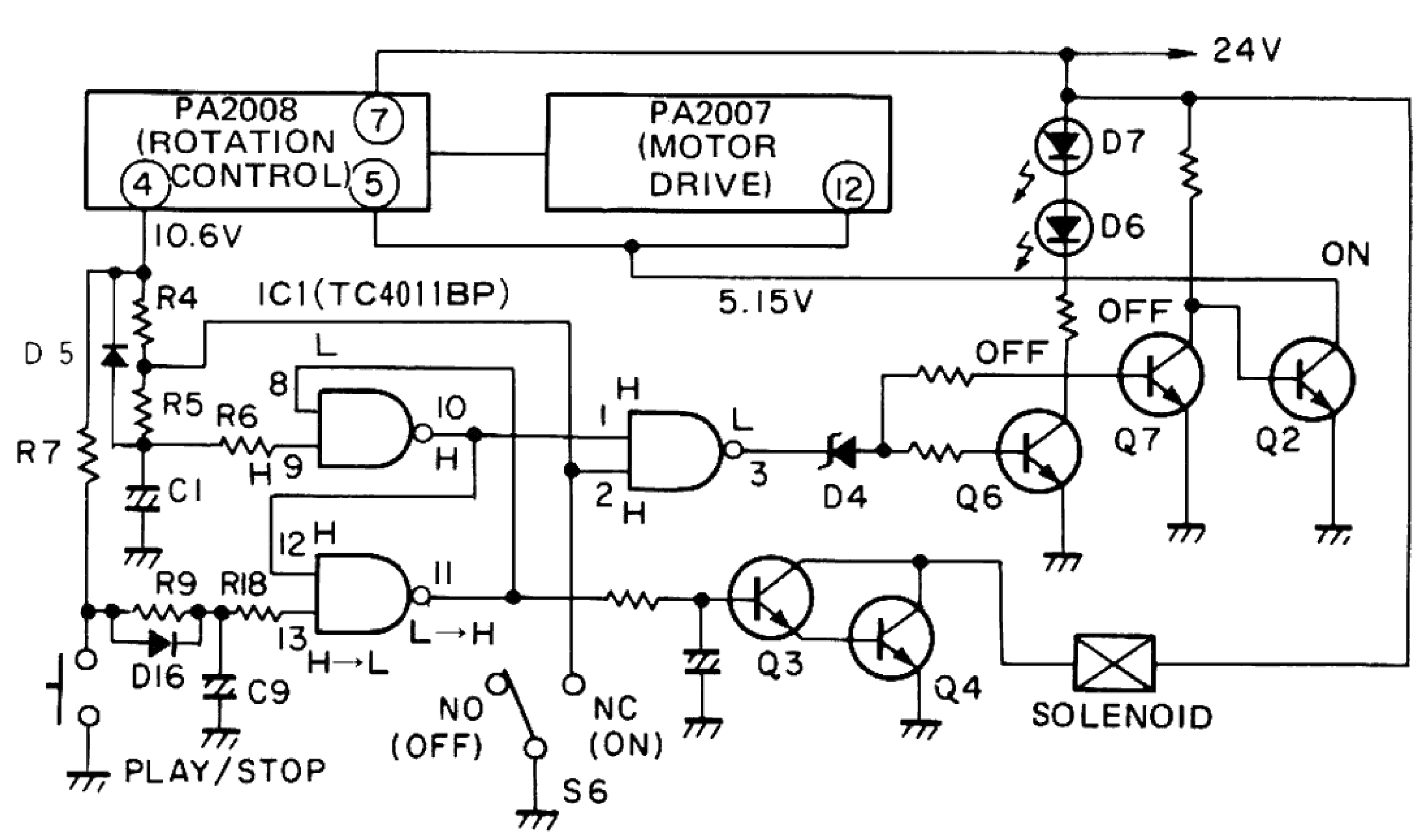


Fig. 5-5 Auto return

4. When the tonearm returns to the arm rest, as in auto-return, the microswitch S6 goes to an OFF state (to NO side) causing terminal ② to go to H level, and the output terminal goes to an L level turning Q6 and Q7 OFF. Q6 going OFF extinguishes LED D7 and D6.
5. When Q7 goes OFF, Q2 comes ON stopping motor rotation.

▪ Repeat Play and Record Size Selection

Circuit operation is coupled to control mechanism operations, repeating PLAY and auto-return operations.

- When the repeat switch is turned ON, LED D15 is illuminated.
- The record size selector is also coupled to the control mechanism, and depressing the selector switches illuminates LED 13 (17cm) or LED 14 (30cm) respectively.

5.2 MOTOR SECTION

A block diagram explaining motor operation is given on page 7.

▪ Motor Rotation

1. When the PLAY/STOP button is depressed, Q2 goes OFF, and the ground at PA2007 terminal ⑫ and PA2008 terminal ⑤ is released. This causes the motor controller reference voltage (5.15V) to return to normal.
2. At the same time the PA2007 stop indicator FF circuit (R/S FF) is reset, and the PA2008 4-phase drive circuit becomes active, starting motor rotation.

▪ Constant Speed

3. As the motor starts rotation, the signal from the motor rotation control section frequency generator (FG) is converted into a 50% duty rectangular wave signal in the waveform block and applied to PA2007 terminal ⑮ (FG ref) and terminal ⑬ (FG IN). The frequency for 33 rpm is 55.5 Hz, and 75 Hz for 45 rpm.
4. This signal is boosted by the PA2007 FG amp, then converted to a voltage by the F-V converter and input to buffer amp (1).

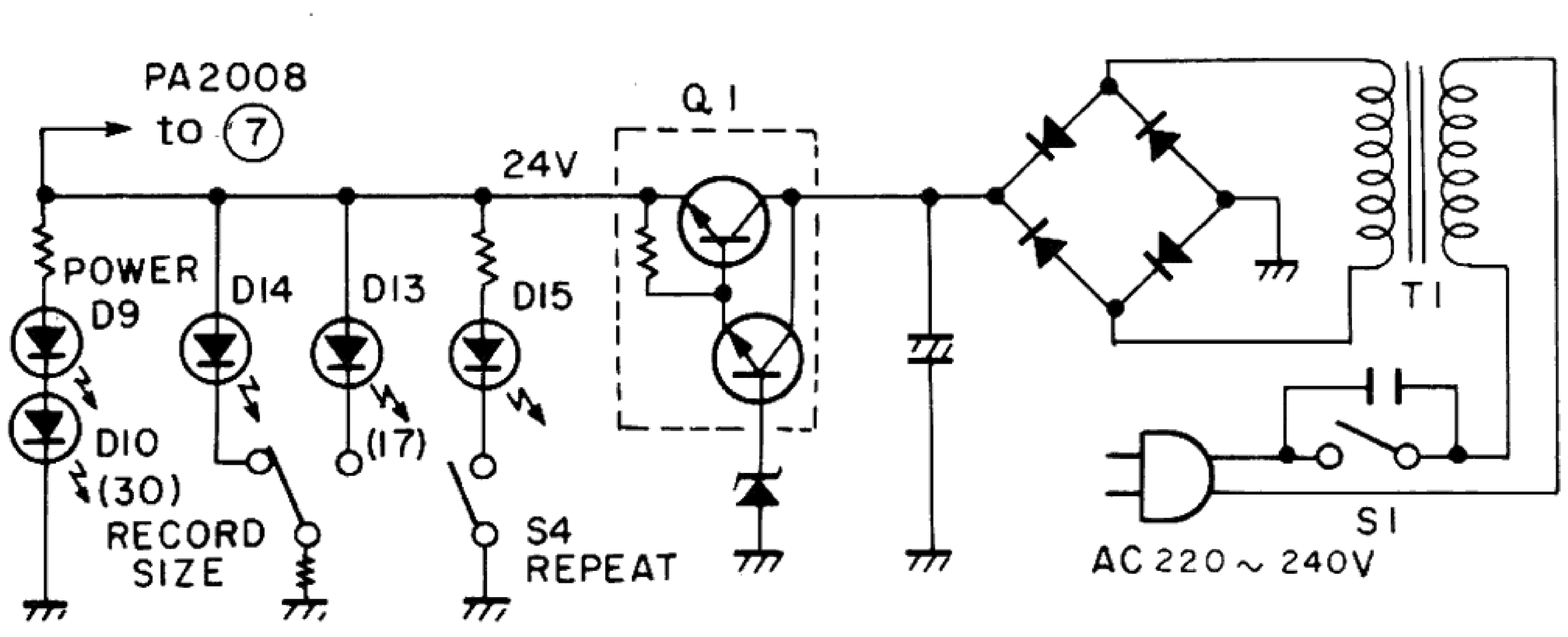


Fig. 5-6 Repeat play, record size selection

5. At the same time, the crystal oscillator external to the oscillator/frequency divider IC PD1003 producing a 6.144 MHz frequency is reduced 1/4096 by the PD1003 dividing circuit to 1.5 kHz. This signal is then converted to a phase comparison sampling pulse by the divider/selector circuit. These pulses are applied to PA2007 terminal ⑦ divided 1/20 (75 Hz for 45 rpm and 1/27 (55.5 Hz) for 33 rpm.
6. The frequency phase of the sampling pulse from the PD1003 and motor rotational speed output are compared at the PA2008 P-V converter, and a voltage corresponding to any phase difference is applied to buffer amp (2).
7. The output from buffer amp (1) and (2) is combined and transmitted from output terminal ⑪ to the PA2008 absolute value amp terminal ⑥ as a reference voltage.
8. At the PA2008 absolute value amp, this voltage is compared with the reference voltage from terminal ⑫ PA2007, and any difference in voltage is applied to the motor winding as current.
9. When the motor has just started up and has not reached specified speed, it will be lower than reference voltage (5.15V). This causes the absolute value amp to send signals to the rotational direction indicator circuit directing it to apply forward torque. Thus, specified speed is quickly reached. (When the motor speed exceeds specified speed, the voltage will be higher than reference voltage, and the absolute value amp will send signals to the rotational direction indicator circuit directing it to apply a reverse controlling torque, slowing the motor.)

▪ Quartz-Lock

10. As the motor reaches specified speed, the PA2007 lock indicator discriminator circuit causes the lock indicator LED to light.

▪ Stopping Motor Rotation

11. When the PLAY/STOP button is depressed, Q2 comes ON, and PA2007 terminal ⑫ (Vref/STOP) and PA2008 terminal ⑤ is grounded.
12. Since PA2008 terminal ⑤ (Vref) is grounded, at the PA2008 absolute value amp, the control input from terminal ⑥ is at a higher value, and this causes a negative torque to be applied to the rotating motor, stopping rotation.
13. Also, when PA2007 terminal ⑫ is grounded, the stop indicator FF (R/S FF) is set.

14. The stop discriminator circuit uses the discharge of the CR connected to PA2007 terminal ⑩ (TO/STOP) to detect rotation speed status. When the rotation speed is lower than that indicated by R/S FF, the stop discriminator circuit acts to reduce motor torque to "0".

6. MECHANISM DESCRIPTIONS

■ Lead-in

Fig. 6-1 shows the PL-8 in the stationary state with the motor stopped and the tonearm upon the arm rest.

1. When the PLAY/STOP button is depressed, lever A is drawn in the direction of the arrow by the solenoid (Fig. 6-2).
2. Once the motor commences to rotate, the motor pinion gear (gear B) catches the claw of the detector assembly, and gear A and gear B engage each other, resulting in gear A rotating in the counter-clockwise direction (Fig. 6-3).
3. And since gear A commences to rotate, plate A moves towards the tonearm, resulting in the plate A projection (point A) being pressed against cam B to turn the plate in the counter-clockwise direction (Fig. 6-4).
   Plate A makes a round trip by tracing the heart shaped groove formed in the underneath of gear A.
4. When cam B rotates counter-clockwise, lever B is moved forwards by spring action (in the direction of the arrow). And while plate A is being moved across to the tonearm, lever B is being pulled forwards to reach the state shown in Fig. 6-4. The slider stops at the position selected by the size selector. And although cam B continues to press against lever A, excess stroke action by lever B at this time is absorbed by the flexible spring.
5. When plate A moves towards the tonearm, cam C fixed to the right hand of plate A presses against elevation shaft, thereby lifting the arm elevation, and resulting in the raising of the tonearm.
6. Just before plate A completes its movement across towards the tonearm, pin C of the PU plate is clasped by the lead-in latch due to the action of the hole in the sub-panel unit (Fig. 6-5). And when plate A commences to return towards the center shaft, the PU plate moves in a clockwise direction, thereby carrying the tonearm across to the record.
7. When plate A commences to return towards the rear, lever B is also pulled back by the action of spring A, and stops when it meets the slider. Cam B is also brought to a stop by this action (Fig. 6-4, 6-6).

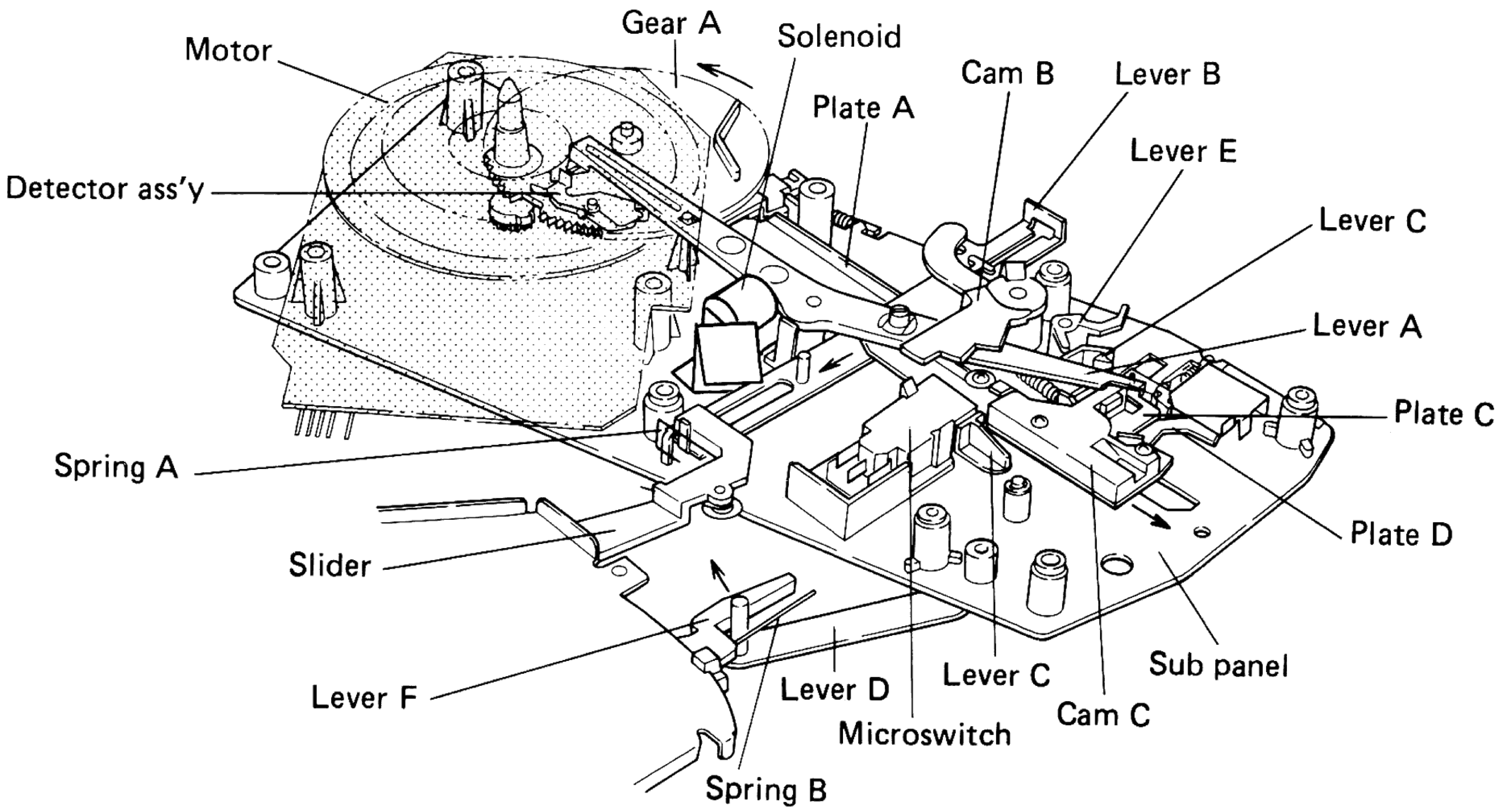


Fig. 6-1 Mechanism in STOP mode and names of parts

8. The PU plate led in by the lead-in latch also stops when it meets cam B (Fig. 6-6). Then when plate A returns further, the lead-in latch is opened by the action of the sub-panel unit hole, resulting in the release of pin C on the PU plate (Fig. 6-7).
   The position where the PU plate stops corresponds to the postion set by the disc size selector.
9. As plate A returns towards the center shaft, thereby lowering the arm elevation to commence record play.
10. Then when plate A returns further towards the center shaft, cam B is rotated clockwise by the projection on plate A, and lever A is returned towards the rear. Lever A and cam B are thus returned to their original positions to permit the tonearm free movement.
11. Furthermore, plate C presses pin A on lever D across to the left hand side, thereby returning lever D back to its position prior to starting.
12. Lever A is set by striking against the projection on gear A.

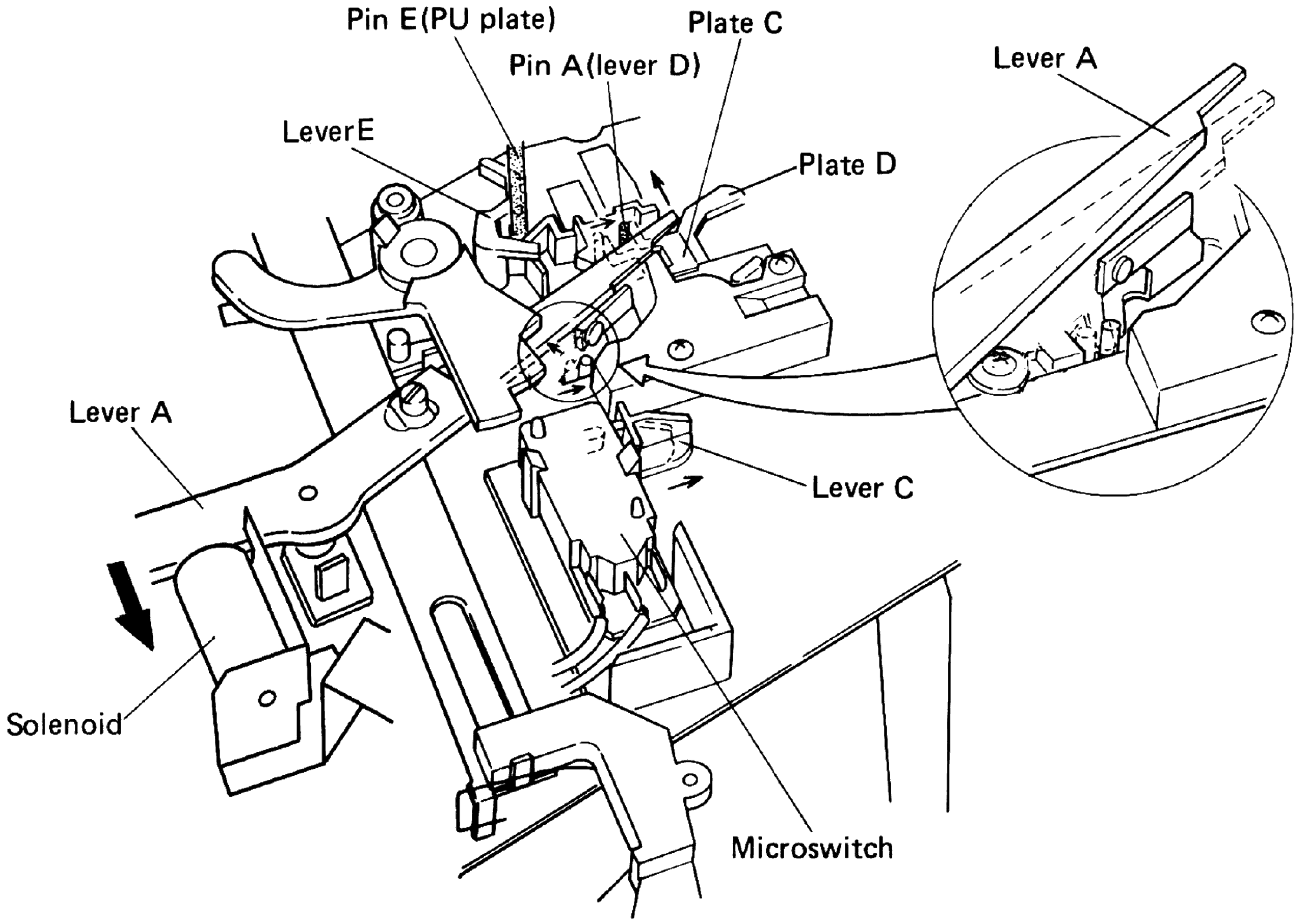


Fig. 6-2 Turn motor power switch (micro-switch) on

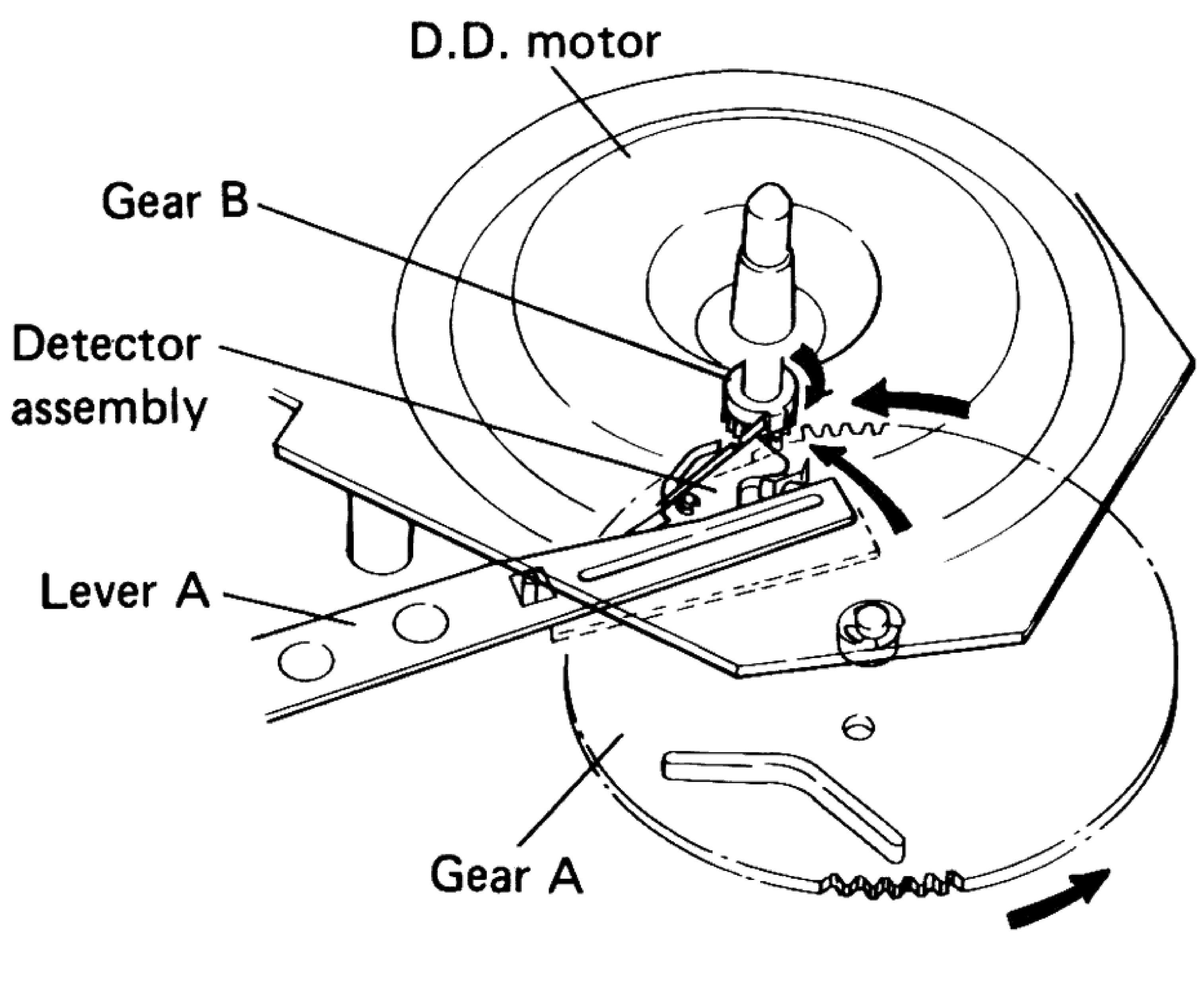


Fig. 6-3 Gear A rotates

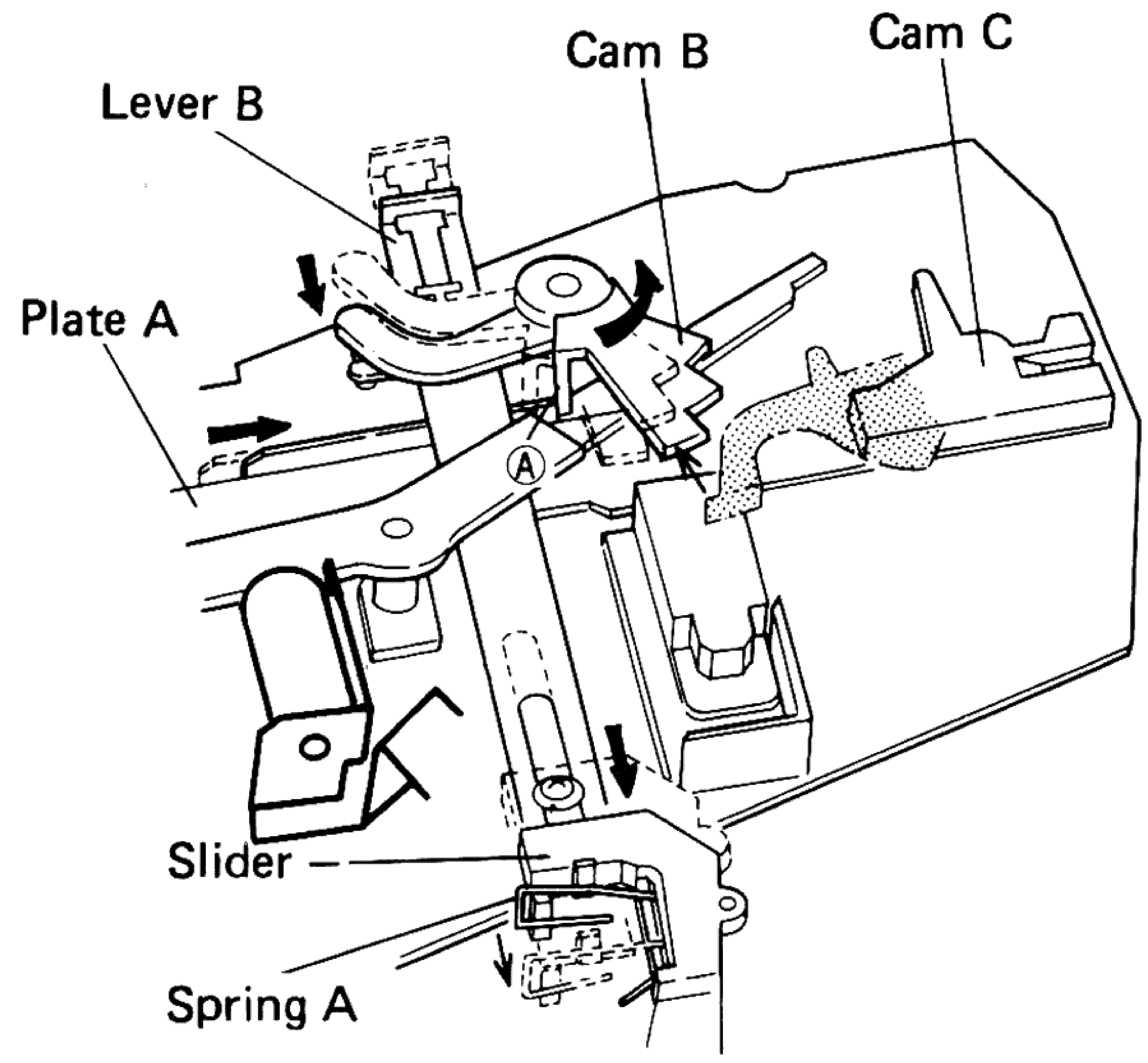


Fig. 6-4 Size selector

13. When the PU plate completes the lead-in operation, pin E of the PU plate rotates lever E in the counter-clockwise direction, resulting in lever C separating from the microswitch to leave the motor power on for continued disc play (See Fig. 6-2).

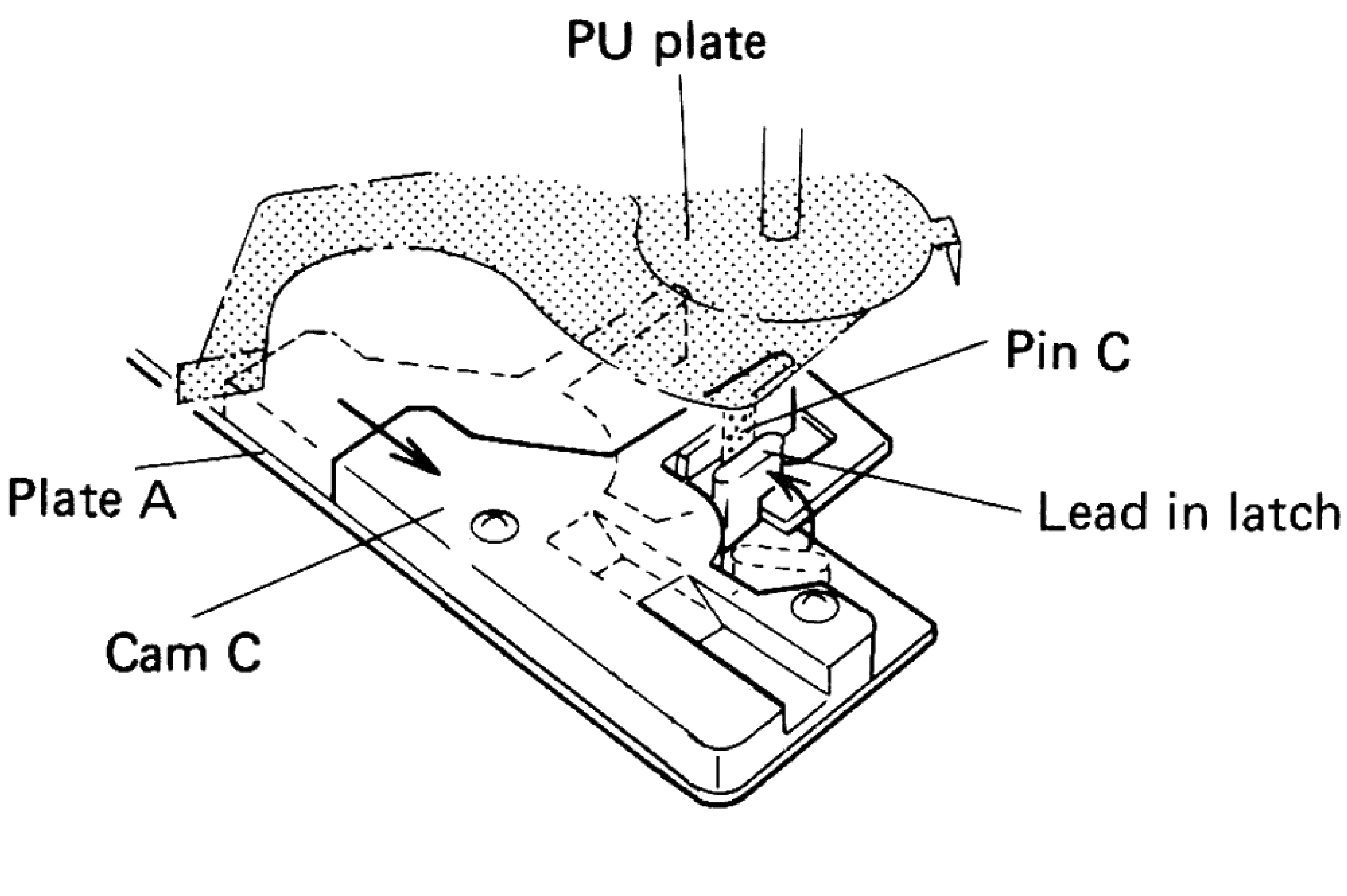


Fig. 6-5 Tonearm lifting and movement

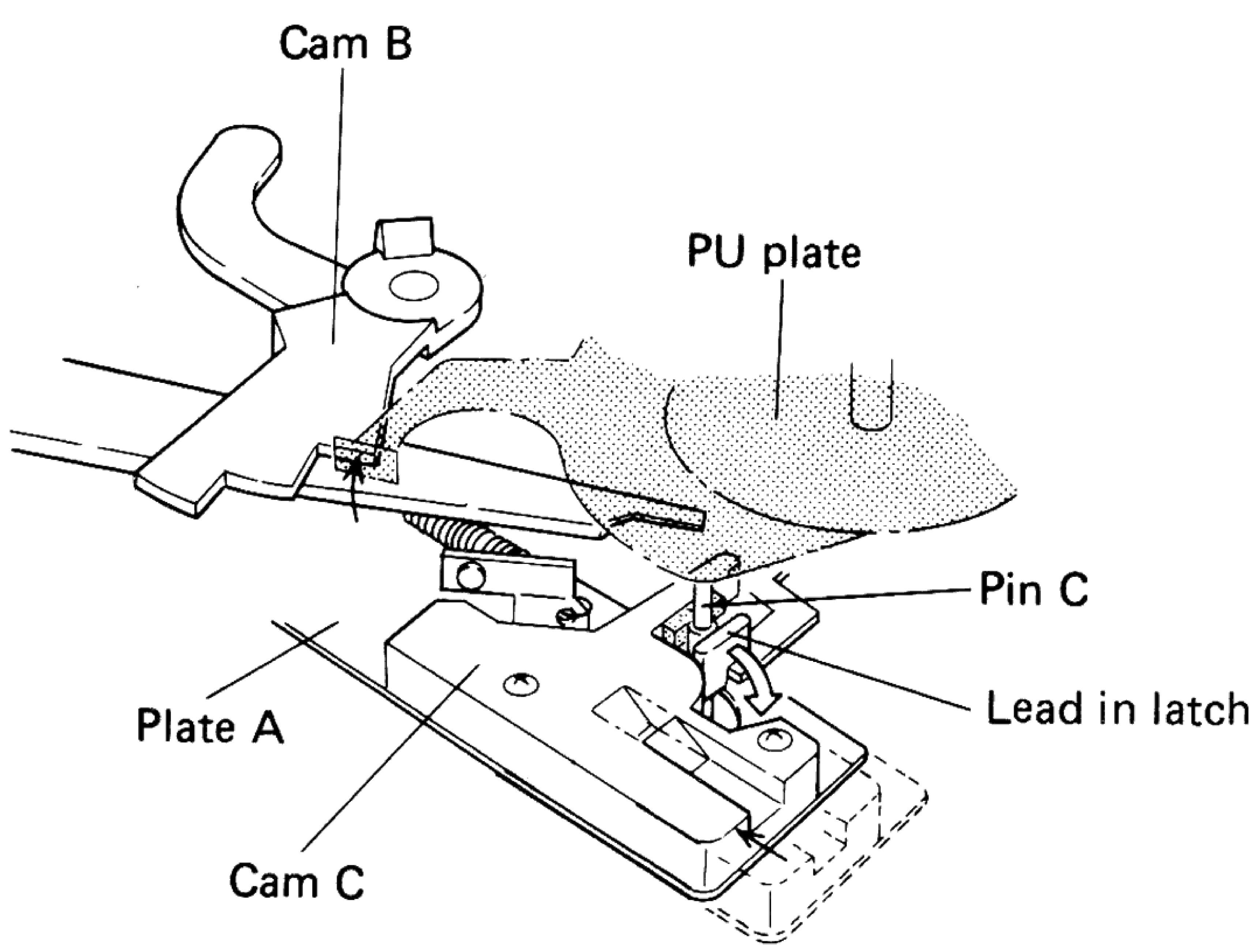


Fig. 6-6 Tonearm elevation up-down operation

■ Auto-return

1. When the stylus enters the lead-out groove at the end of the disc, the end of the paly is detected by the detector assembly.
   *For details on the operational principles involved in the auto-return detector mechanism, refer to the PL-516 Service Manual (ART-279).
2. When the claw of the detector assembly catches the motor pinion gear (gear B), gear A commences to rotate. Subsequent operation is the same as during lead-in.
3. When gear A commences to rotate, plate A moves towards the tonearm.
4. Cam C presses against elevation shaft, thereby lifting the arm elevation.
5. Cam C pushes pin C of the PU plate across to the arm rest position. Pin E also moves at the same time, rotating lever B in the clockwise direction. Lever B thus pushes lever C to the right (See Fig 6-2).
6. Just before plate A reaches the end of its movement across towards the tonearm, pin C of the PU plate is clasped by the lead-in latch due to the action of the sub-panel unit hole.
7. When plate A starts to return towards the center shaft, the lead-in latch holding pin C is opened again by plate D, thereby releasing pin C to permit the tonearm to return the arm rest (Fig. 6-7, Fig. 6-10).
8. As cam C returns to the left hand side, the arm elevation being lowered to drop the tonearm back into the arm rest.
9. When plate A approaches its original position, plate C is pushed to the left by cam C fixed to plate A, resulting in the microswitch being turned off by lever C to turn the motor off.

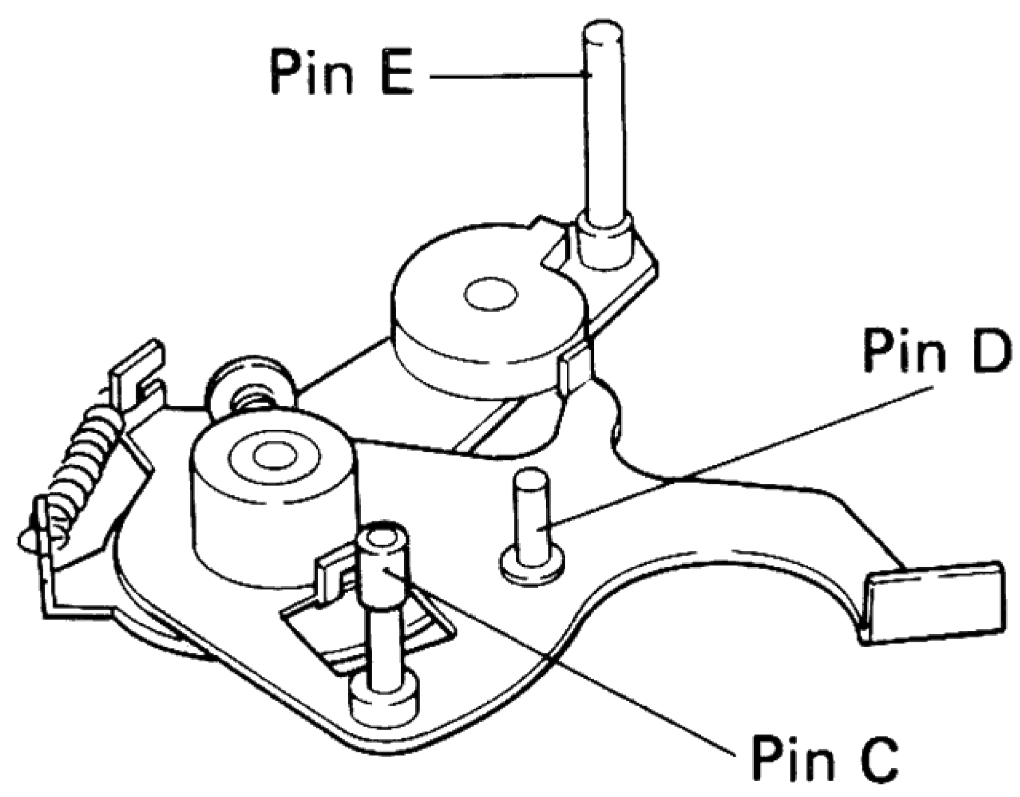


Fig. 6-7 PU plate appearance

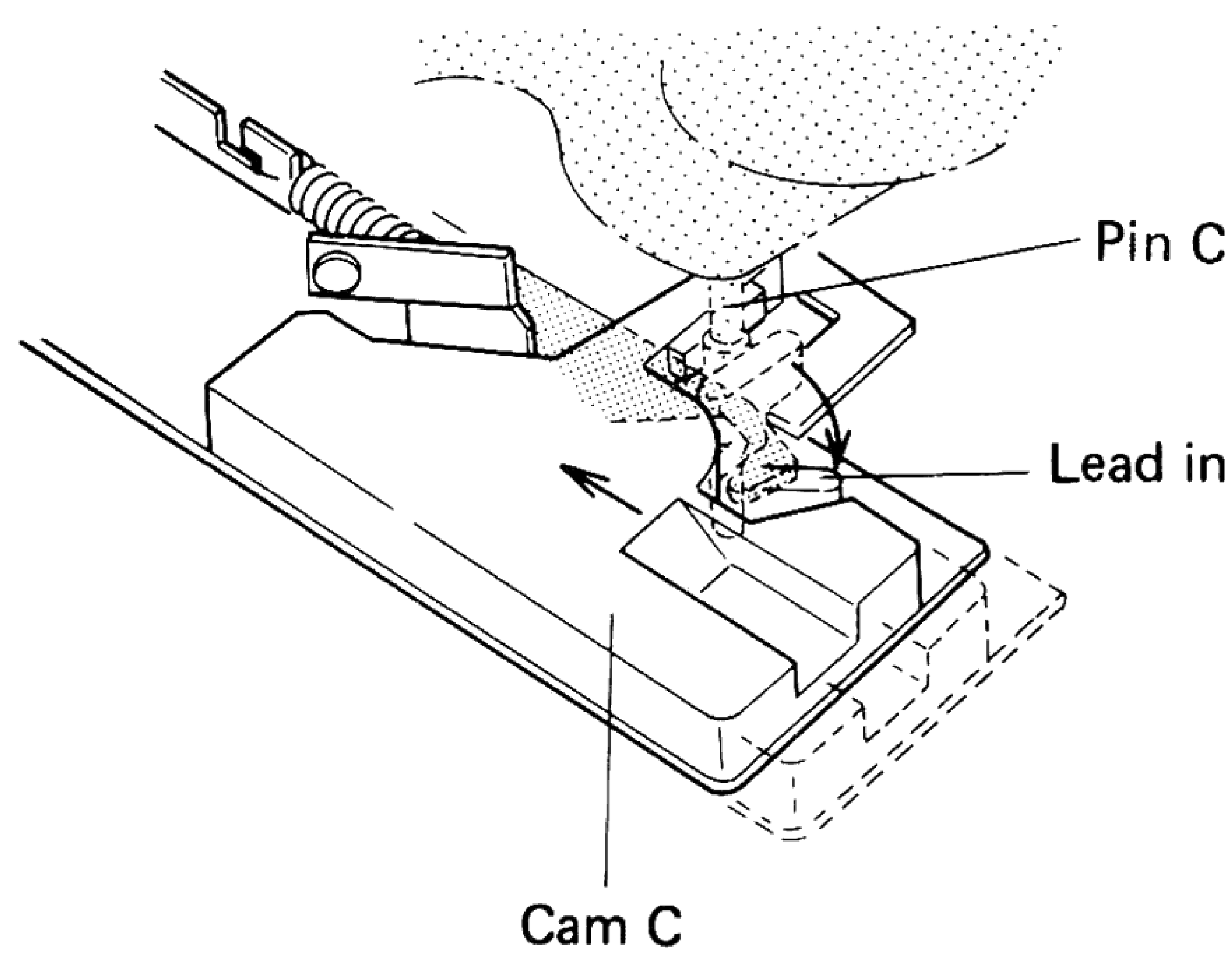


Fig. 6-8 The lead-in latch catches pin C of the PU plate

■ Repeat Operation

When the repeat button is pressed during record play, the control base unit will be as shown in Fig. 6-9. Lever D will thus not to move any further left than a pre-determined position.

After the end of the "lead-in" operation, the "auto-return" operation commences when the end of record play is reached.

1. At the start of the auto-return operation, cam A rotates to move plate A towards the right.
2. Cam C pushes against cam D to raise the arm elevation.
3. Cam C pushes pin C of the PU plate to the right.
4. When cam C reaches across to the right hand side, the lead-in latch grasps pin C of the PU plate, resulting in the tonearm being moved across to the disc.
   The main difference here to the auto-lead-in operation is that pin A of lever C pushes plate D when the repeat button is pressed, resulting in the lead-in latch not being opened by plate D (as occurs during auto-return). Consequently, the tonearm does not stay at the arm rest, but proceeds to move back towards the record for repeated play. Subsequent operations are the same as during normal auto lead-in operation.

■ Interruption of Record Play

1. Press the PLAY/STOP button.
2. The solenoid draws lever A. And this in turn repels the detector assembly.
3. Subsequent steps are the same as steps 3 to 10 described under auto-return.

■ Manual Start and Stop

1. When the tonearm is lifted over to the disc by hand, pin E of the PU plate rotates lever B in the clockwise direction. Lever B is thereby disengaged from lever C, switching the micro-switch on to start the motor.
2. When the tonearm is lifted off the record during play and returned to the arm rest, pin E of the PU plate rotates lever B in the clockwise direction and this lever thus presses against lever C. When lever C then makes contact with the microswitch (pressing the microswitch push-button), the motor is subsequently turned off.

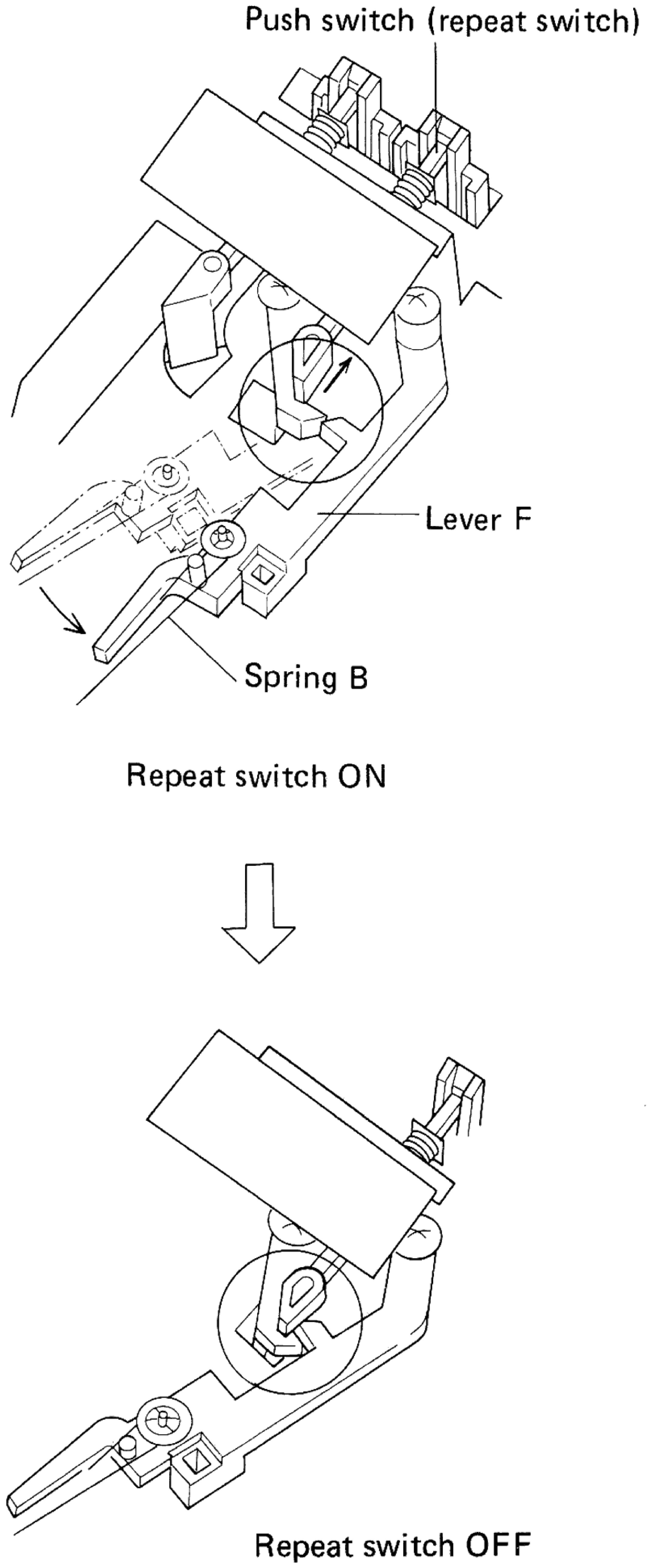


Fig. 6-9 Repeat switch operation

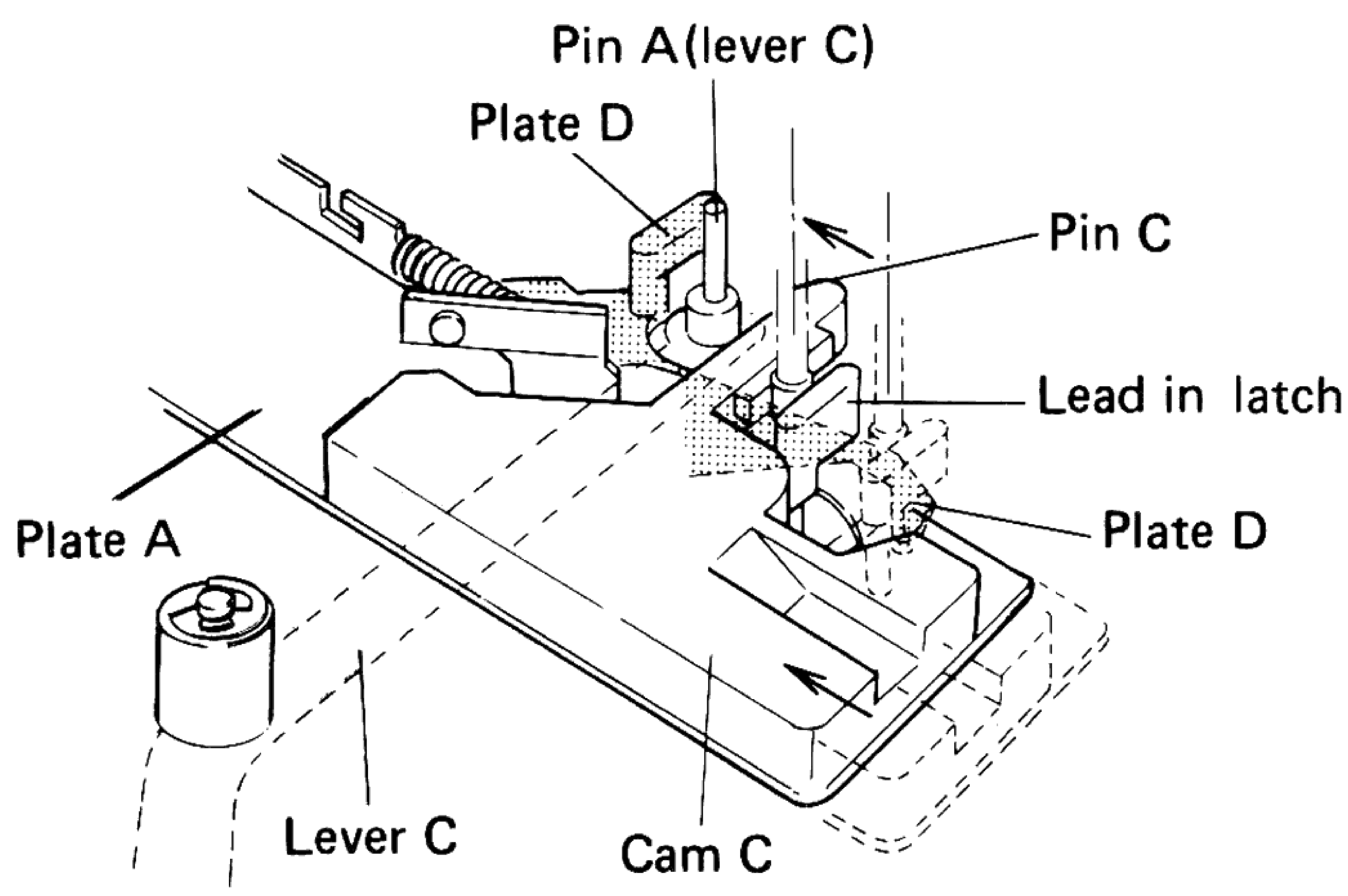
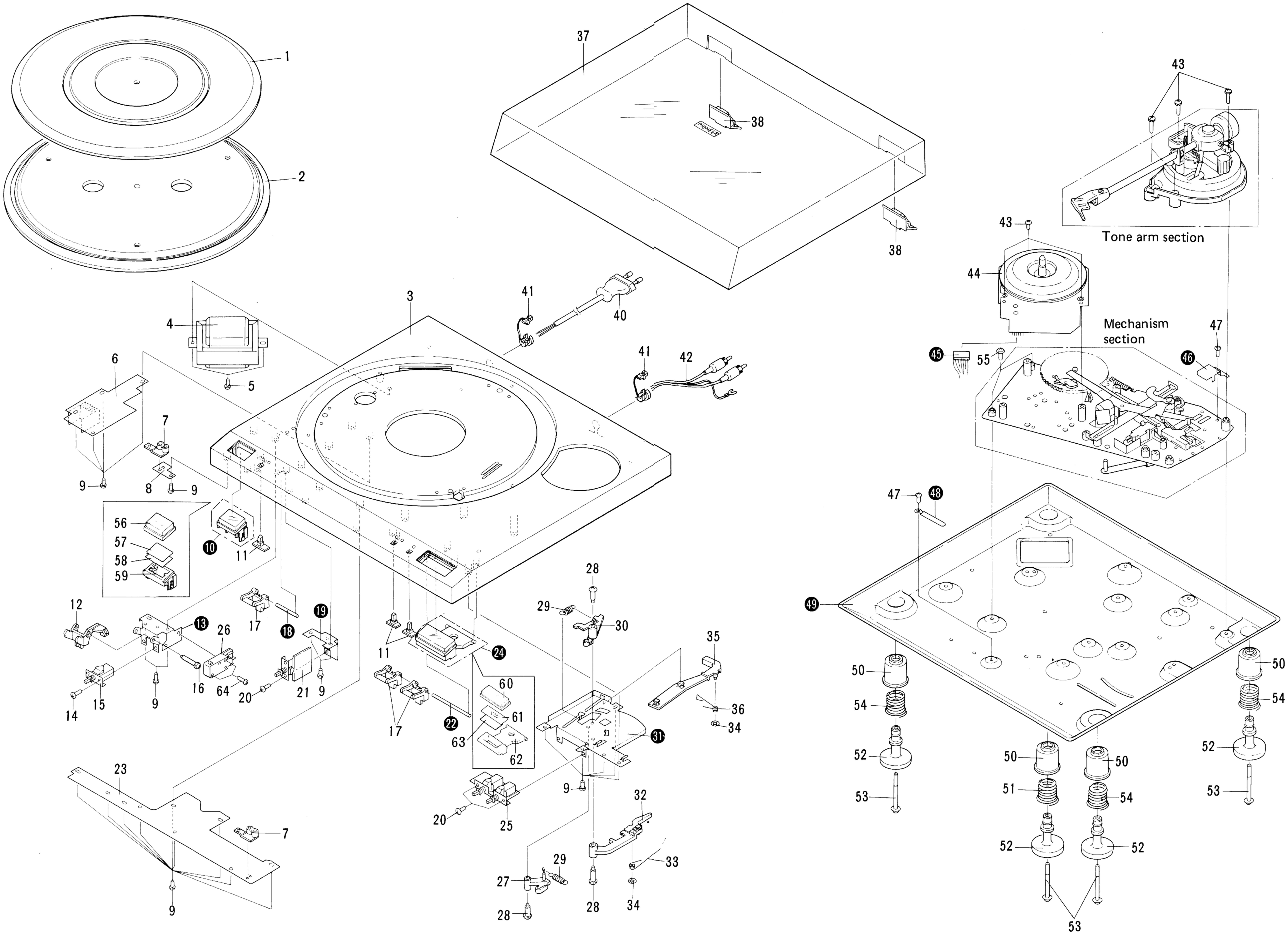


Fig. 6-10 Repeat operation

7. EXPLODED VIEWS

7.1 MAIN PANEL



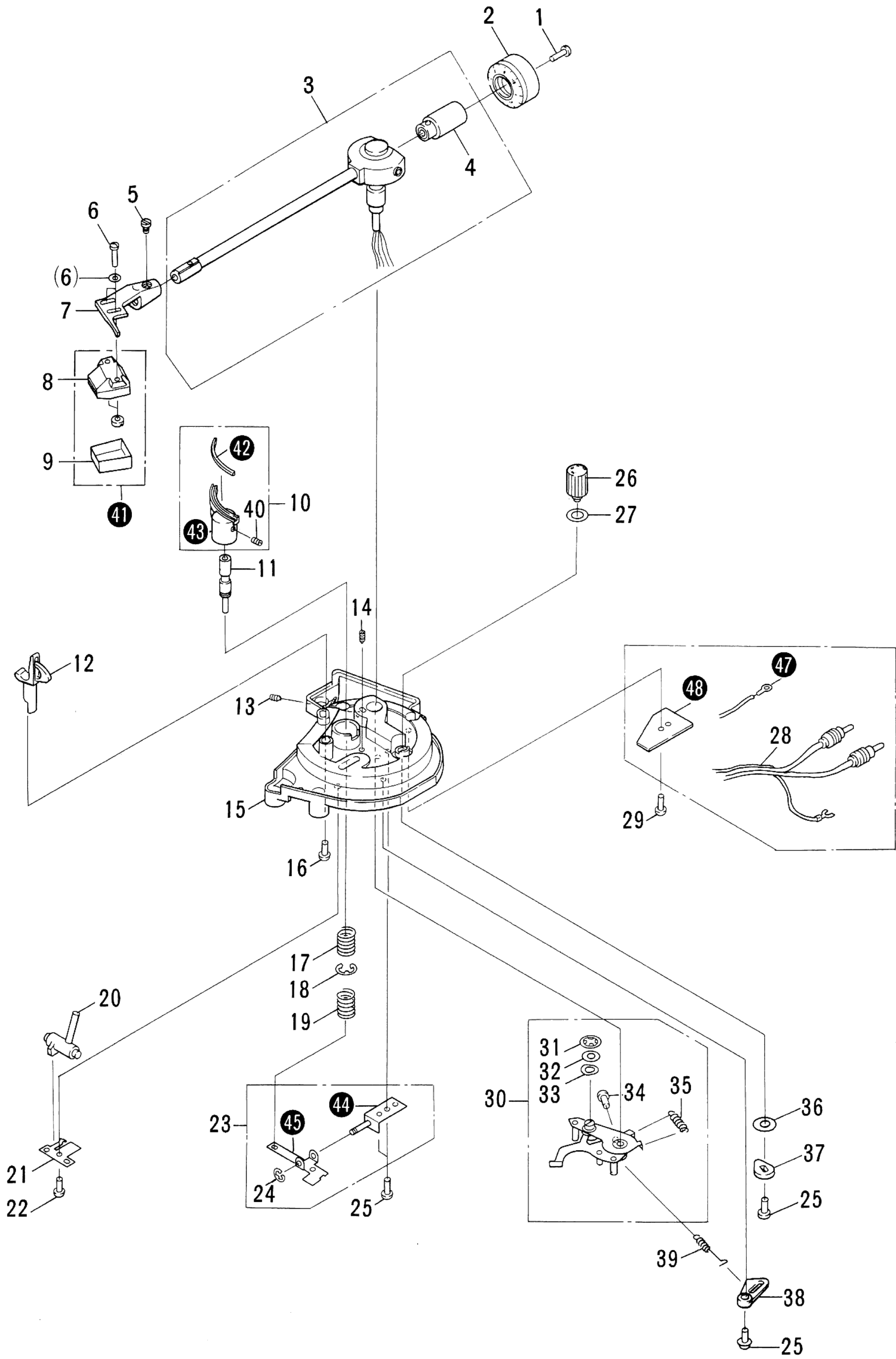
Parts List

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 symbols ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model No., temperature, humidity, etc.

Mark	No.	Part No.	Description
	1.	PEA-050	Rubber mat assembly
	2.	PNR-148	Turntable platter
	3.	PNX-214	Panel
⚠	4.	PTT-114	Power transformer
	5.	PLZ40P120FMC	Screw
⚠	6.	XWR-002	Power supply assembly
	7.	PNX-194	LED holder
	8.	XWX-057	LED assembly
	9.	PPZ30P100FMC	Screw
	10.		Power button unit
	11.	PAC-066	Push button
	12.	PNX-182	Switch lever
	13.		Switch base
	14.	iDZ30P060FMC	Screw
	15.	PSG-017	Push switch
	16.	PBA-117	Screw
	17.	PNX-200	Lever
	18.		Shaft (A)
	19.		Angle
	20.	PMZ30P050FMC	Screw
	21.	XWS-009	Switch assembly B
	22.		Shaft (B)
	23.	XWG-002	Control assembly
	24.		Play button unit
	25.	XWS-008	Switch assembly A
⚠	26.	PSF-009	Microswitch
	27.	PNX-202	Repeat lever
	28.	PBA-II9	Shaft
	29.	PBH-273	Control spring
	30.	PNX-201	Lever
	31.		Control base
	32.	PNX-198	Lever (C)
	33.	PBH-247	Operating spring A
	34.	YP30S	Washer
	35.	PNX-199	Slider
	36.	PBH-287	Slider spring
	37.	PNV-037	Dust cover
★	38.	PXB-201	Hinge assembly
	39.	......	
⚠	40.	PDG-025	AC power cord (WE type)
⚠		PDG-026	AC power cord (WB type)
	41.	PEC-056	Strain relief
	42.	PDE-044	OUTPUT cord
	43.	PBA-108	Deltite screw
★★	44.	PXM-085	Motor
	45.		Connector assembly
	46.		Protector
	47.	PDZ30P050FMC	Screw
	48.		Cord fixer
	49.		Base
	50.	PEB-163	Rubber cushion
	51.	PBH-274	Foot spring
	52.	PNX-190	Foot case
	53.	PBA-118	Screw
	54.	PBH-275	Foot spring
	55.	PBA-109	Deltite screw
	56.	PAC-065	Cap (B)
	57	PAG-005	Screen (C)
	58.	PAG-008	Sheet (small)
	59.	PNX-188	Switch holder
	60.	PAC-064	Cap (A)
	61.	PAG-006	Screen (D)
	62.	PNX-185	Start lever
	63.	PAG-007	Sheet (large)
	64.	PMA30P150FMC	Screw

7.2 TONE ARM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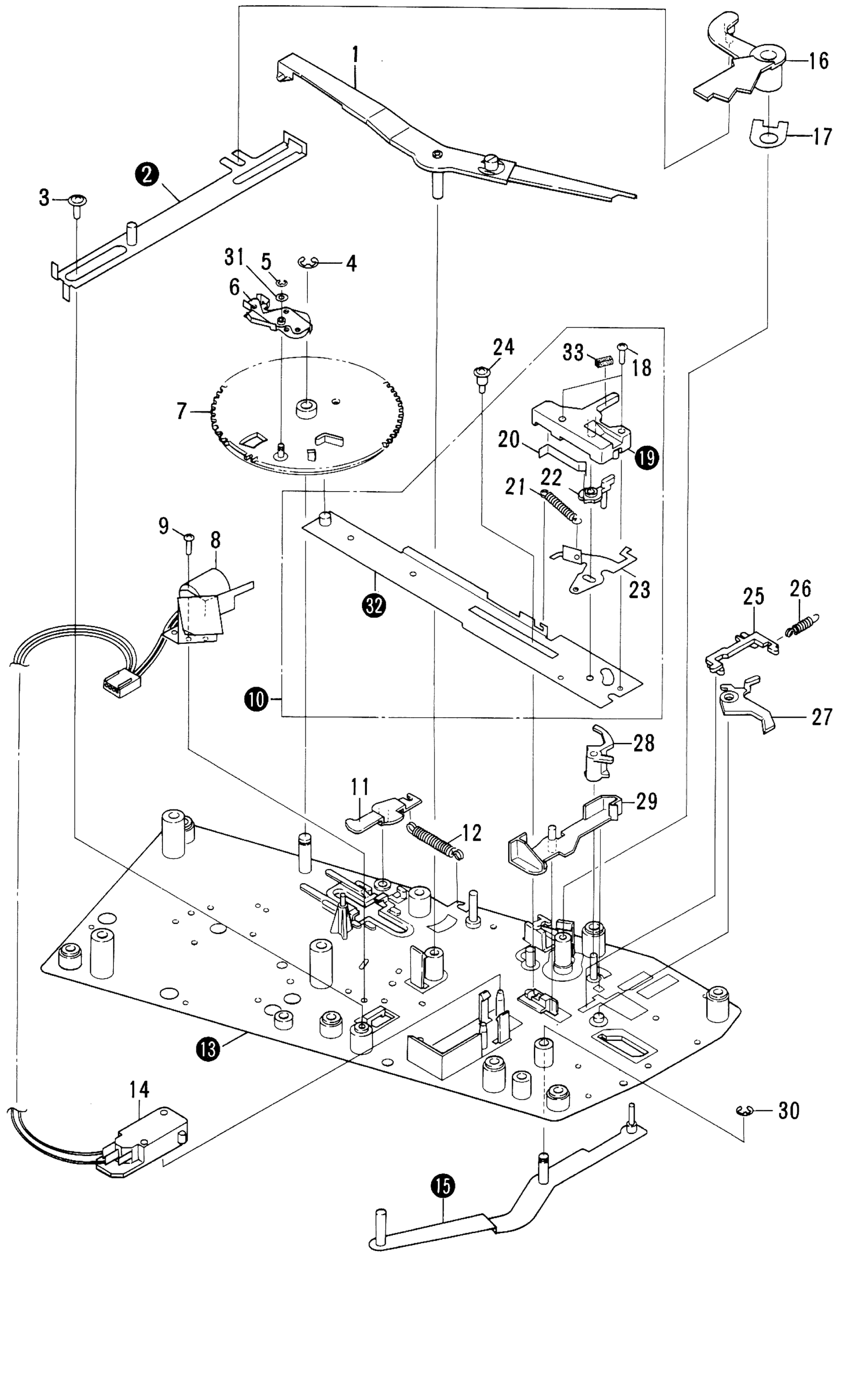
Parts List

Mark	No.	Part No.	Description
	1.	PMZ40P250FMC	Screw
★	2.	PXA-873	Weight assembly
★	3.	PPD-612	Arm assembly
	4.	PXA-871	Weight shaft assembly
	5.	PBA-533	Screw
	6.	PBA-909	Cartridge mounting screws
	7.	PXA-867	Head shell assembly
	8.	PXT-981	Cartridge (without stylus)
	9.	PNX-926	Stylus cover
	10.	PXB-203	EV sheet assembly
	11.	PLB-086	Shaft
★	12.	PXB-192	Arm rest assembly
	13.	ZMD40H080FBT	Screw
	14.	ZMR30H150FZK	Screw
	15.	PNX-161	Arm base
	16.	iPZ30P100FMC	Screw
	17.	PBH-237	EV spring
	18.	YE70S	Washer
	19.	PBH-272	Spring
	20.	PXT-433	EV lever unit
	21.	PNC-187	Plate spring
	22.	VBZ30P080FMC	Screw
	23.	PXB-204	EV assembly
	24.	YE30S	Washer
	25.	iPZ30P080FMC	Screw
	26.	PNX-196	AS knob
	27.	PBF-017	AS washer
	28.	PDE-044	OUTPUT cord
	29.	VBZ30P080FMC	Screw
	30.	PXB-205	PU plate assembly
	31.	YS40FBT	Washer
	32.	WC40FMC	Washer
	33.	PNB-405	PU washer
	34.	PMD40P080FMC	Screw
	35.	PBH-244	PU spring
	36.	PBE-012	AS washer
	37.	PNX-054	AS adjusting plate
	38.	PNX-055	Lever
	39.	PBH-236	Spring
	40.	ZMK40M050FZK	Screw
	41.		Cartridge assembly (PC-3MC)
	42.		Sheet cushion
	43.		EV sheet
	44.		EV angle unit
	45.		EV spring unit
	46.		OUTPUT cord assembly
	47.		Earth unit
	48.		OUTPUT terminal

7.3 SUB PANEL



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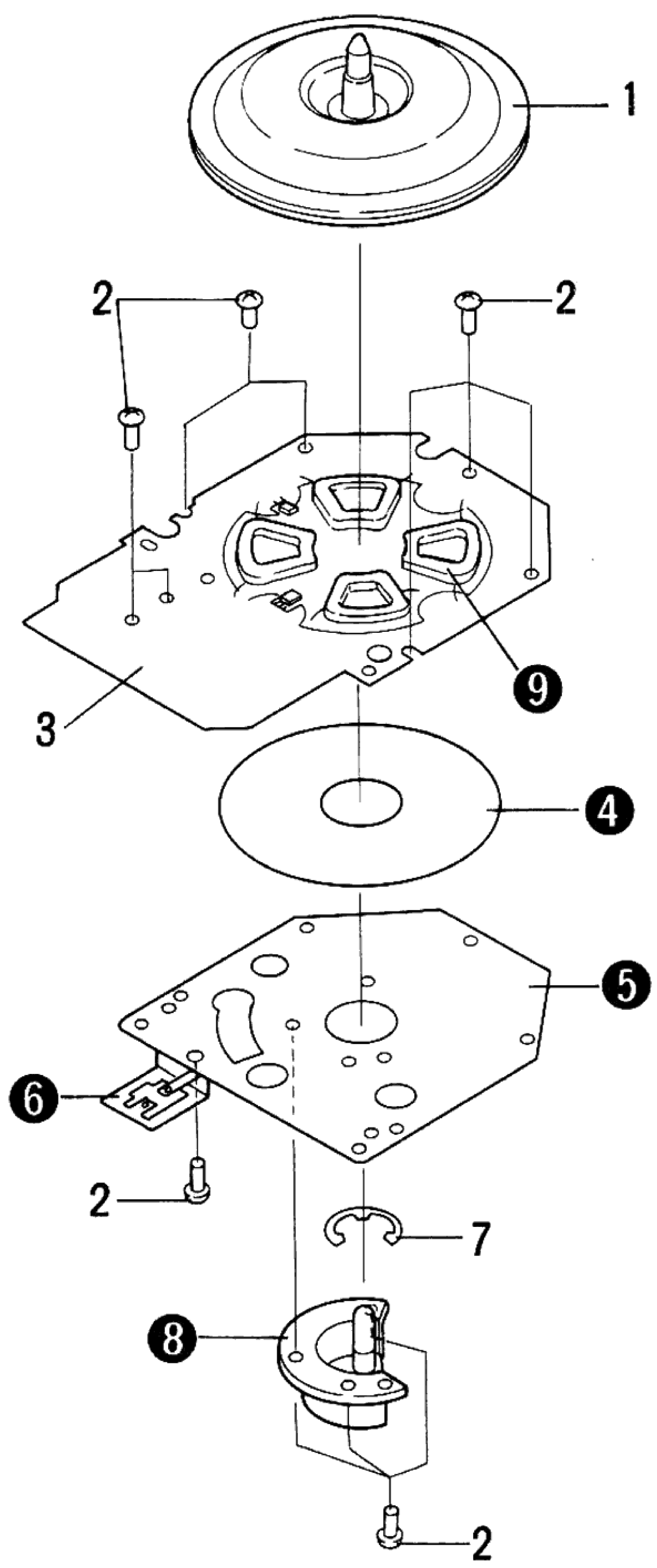
Parts List

Mark	No.	Part No.	Description
	1.	PXT-355	Detector lever
	2.		Lever
	3.	iPZ30P100FMC	Screw
	4.	YE40S	Washer
	5.	YE15S	Wahser
	6.	PYY-058	Return signal unit
	7.	PNX-167	Cam
	8.	PXB-202	Solenoid assembly
	9.	PDZ30P050FMC	Screw
	10.		Driving plate assembly
	11.	PNX-035	Lock plate
	12.	PBH-225	Spring
	13.		Sub panel unit
	14.	PSF-017	Microswitch (S6)
	15.		START lever unit
	16.	PNX-034	Index cam
	17.	PBK-039	Spring washer
	18.	PMZ26P100FMC	Screw
	19.		EV cam
	20.	PBK-038	Plate spring
	21.	PBH-224	Spring
	22.	PNX-032	Lead in latch
	23.	PNC-100	Start plate
	24.	PBA-103	Screw
	25.	PNX-029	Selector
	26.	PBH-223	Reset plate spring
	27.	PNX-028	Reset plate
	28.	PNX-031	Switch plate
	29.	PNX-030	Switch lever
	30.	YE30S	Washer
	31.	WA21D040D025	Screw
	32.		Driving plate unit
	33.	PEC-064	EV cam cushion

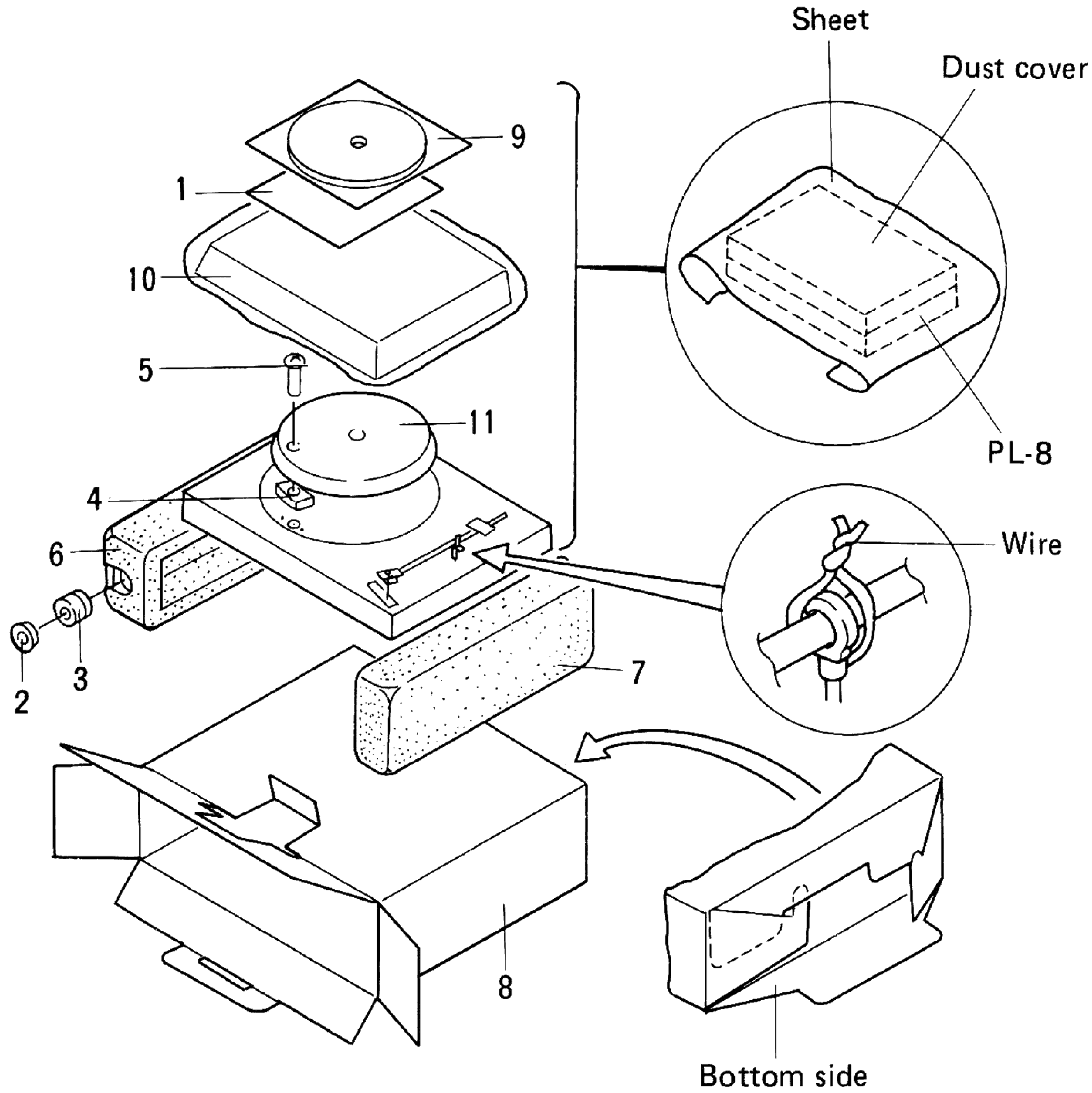
7.4 D.D. MOTOR



Parts List

Mark	No.	Part No.	Description
	1.	PXT-386	Rotor unit
	2.	PSZ30P050FMC	Screw
★	3.	PWM-050	Motor P.C.B assembly
	4.		Insulator
	5.		Base unit
	6.		Heat sink
	7.		E ring (ETW-12)
	8.		Shaft holder
	9.		Coil

7.5 PACKING



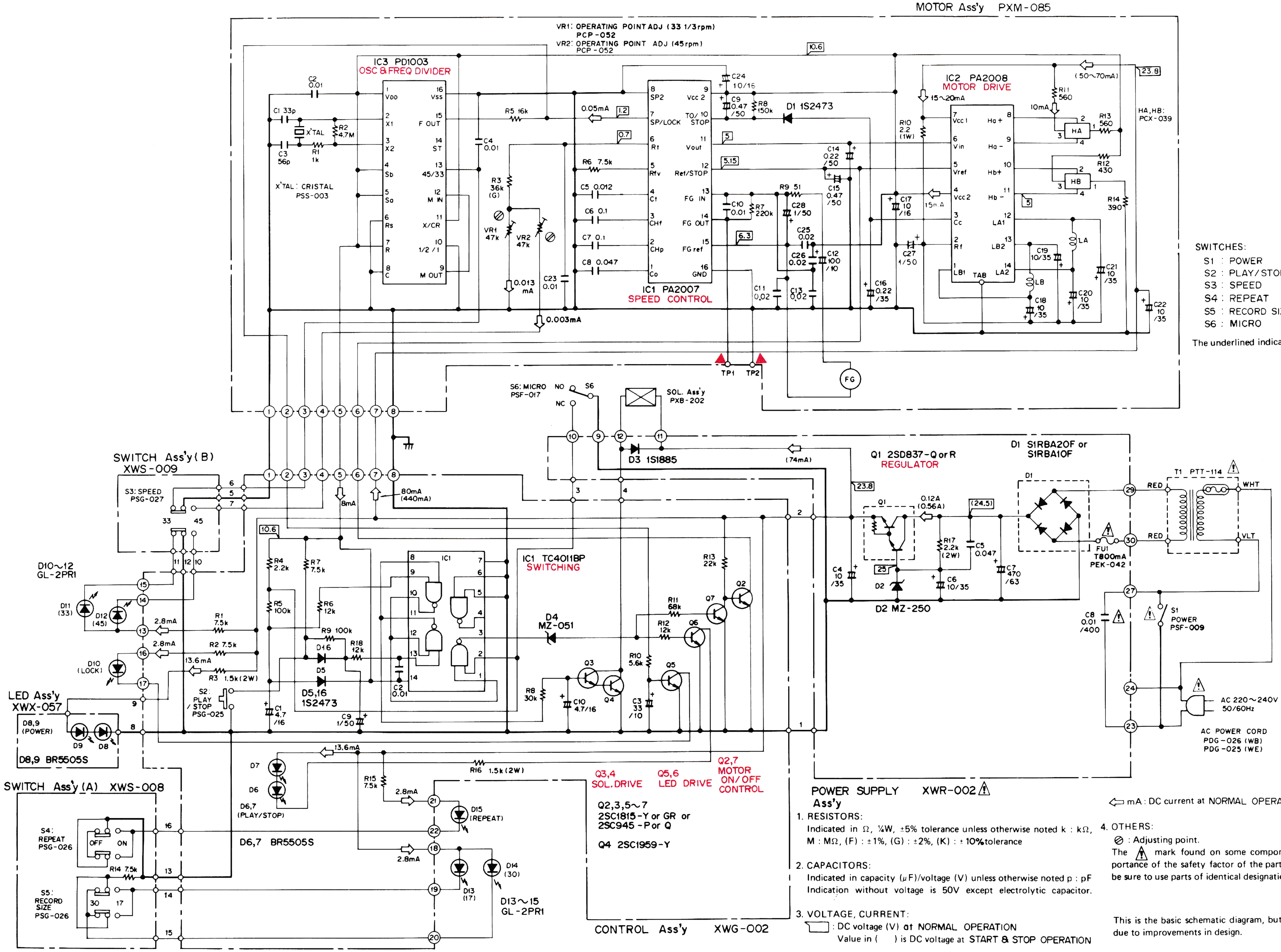
Parts List

Mark	No.	Part No.	Description
	1.	PRB-184	Operating instructions (English)
		PRD-059	Operating instructions (German/French/Italian for WE tyep only
	2.	N93-603	45 adaptor
	3.	PXA-873	Weight assembly
	4.	PNX-064	Turntable protector
	5.	PBA-100	Screw
	6.	PHA-123	Side protector L
	7.	PHA-124	Side protector R
	8.	PHG-429	Packing case
	9.	PEA-050	Rubber mat assembly
	10.	PNV-037	Dust cover
	11.	PNR-148	Turntable platter

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

8.1 P.C. BOARD CONNECTION DIAGRAM

8.2 SCHEMATIC DIAGRAM



SWITCHES:

S1	POWER	ON - OFF
S2	PLAY/STOP	ON - OFF
S3	SPEED	33 1/3rpm - 45rpm
S4	REPEAT	ON - OFF
S5	RECORD SIZE	30cm - 17cm
S6	MICRO	ON - OFF

The underlined indicates the switch position.

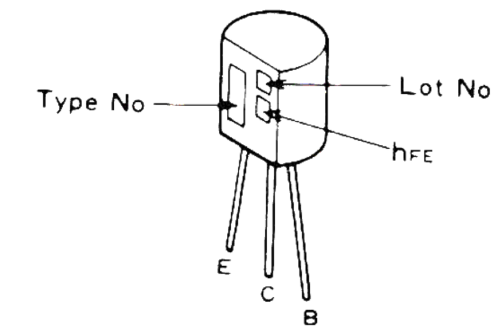
⇦ mA : DC current at NORMAL OPERATION

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 NORMAL OPERATION
   Value in ( ) is DC voltage at START & STOP OPERATION
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.

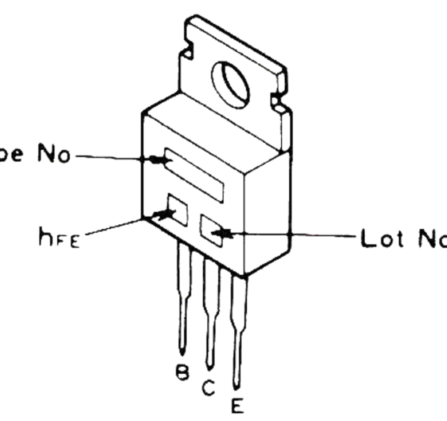
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

Appearance of Transistors and ICs

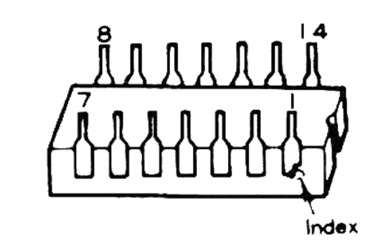
2SC945
2SC1815
2SC1959



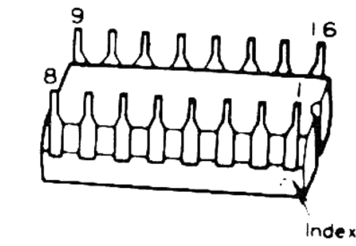
2SD837



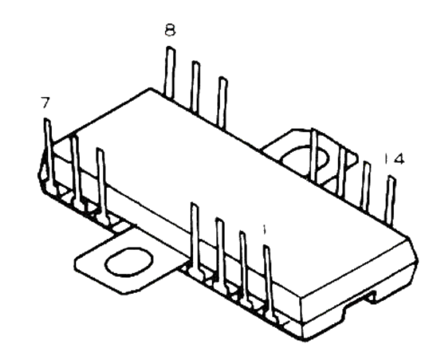
TC4011BP



PA2007
PD1003



PA2008



8.3 PARTS LIST

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 × 10^1*	*561 . . . . .*	*RD¼PS 561 J*
57kΩ	*47 × 10^3*	*473 . . . . .*	*RD¼PS 473 J*
0.5Ω	*0R5*	*. . . . .*	*RN2H 0R5 K*
1Ω	*010*	*. . . . .*	*RS1P 010 K*

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

5.62kΩ	*562 × 10^1*	*5621 . . . .*	*RN¼SR 5621 F*

- *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 symbols ★★ and ★*

  ★★ GENERALLY MOVES FASTER THAN ★

  This classification shall be adjusted by each distributor because it depends on model No., temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	XWG-002	Control assembly
⚠	XWR-002	Power supply assembly
	XWS-008	Switch assembly A
	XWS-009	Switch assembly B
	XWX-057	LED assembly

SWITCHES

Mark	Part No.	Symbol & Description	
	PSG-017		Push switch
⚠	PSF-009	S1	Microswitch
	PSF-017	S6	Microswitch

OTHERS

Mark	Part No.	Symbol & Description	
⚠	PTT-114	T1	Power transformer (220V-240V)
⚠	PDG-025		AC power cord (WE type)
⚠	PDG-026		AC power cord (WB type)
	PDE-044		OUTPUT cord
★★	PXB-202		Solenoid assembly
★★	PXM-085		Motor
★	GL-2PR1	D10 – D15	LED

Power Supply Assembly (XWR-002)

CAPACITORS

Mark	Part No.	Symbol & Description	
	CEA 100M 35L	C4, C6	
	CKDYF 473Z 50	C5	
⚠	CEA 471M 63L	C7	
	PCL-034	C8	(0.01/400)

RESISTOR

Mark	Part No.	Symbol & Description
	RS2PF 222J	R17

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SD837	Q1
★	S1RBA20F	D1
★	(S1RBA10F)	
★	MZ-250	D2
★	(WZ-250)	
★	1S1885	D3

FUSE

Mark	Part No.	Symbol & Description	
⚠ ★★	PEK-042		Fuse (800mA)

Switch Assembly A (XWS-008)

RESISTOR

Mark	Part No.	Symbol & Description
	RD 1/4 PM 752J	R14

SWITCH

Mark	Part No.	Symbol & Description	
★★	PSG-026	S4,S5	Push switch

Switch Assembly B (XWS-009)

SWITCH

Mark	Part No.	Symbol & Description	
★★	PSG-027	S3	Push switch

LED Assembly (XWX-057)

OTHER

Mark	Part No.	Symbol & Description	
★	BR5505S	D8, D9	LED
★	PNX-194		LED holder
	PMZ30P050FMC		Screw

Control Assembly (XWG-002)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 4R7M 16L	C1,C10
	CKDYF 103Z 50	C2
	CEA 330M 10L	C3
	CEA 1R0M 50L	C9

RESISTORS

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

Mark	Part No.	Symbol & Description
	RD 1/4PM □□□J	R1,R2,R4–R13,R15,R18
	RS2PF 152J	R3,R16

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	TC4011BP	IC1
★★	2SC1815-Y	Q2,Q3,Q5 – Q7
★★	(2SC945)	
★★	2SC1959-Y	Q4
★	MZ-051	D4
★	(WZ-050)	
★	1S2473	D5,D16
★	(1S1555)	
★	BR5505S	D6,D7

OTHERS

Mark	Part No.	Symbol & Description	
★★	PSG-025	S2	Tact switch
	PNX-194		LED holder

Motor P.C.B Assembly (PWM-050)

CAPACITORS

Mark	Part No.	Symbol & Description
	CCDCH 330J 50	C1
	CKDYF 103Z50	C2,C4,C10,C23
	CCDCH 560J 50	C3
	CQMA 123K 50	C5
	CQMA 104K 50	C6,C7
	CQMA 473K 50	C8
	CEA R47P 50	C9, C15
	CEA 101P 10	C12
	CSYA R22M 50	C16
	CEANL R22M 50	C14
	CEA 100P 16	C17, C24
	CEA 100P 35	C18 – C22
	CKDYF 203Z 50	C11,C13,C25,C26
	CEA 010P 50	C27,C28

RESISTORS

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

Mark	Part No.	Symbol & Description
	RD 1/4 PM □□□J	R1,R2,R5 – R9,R11 – R14
	RN 1/4 PR □□□G	R3
	RN1PF 2R2J	R10
★	PCP-052	VR1,VR2 (47k-B)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PA2007	IC1
★★	PA2008	IC2
★★	PD1003	IC3
★	1S2473	D1

OTHERS

Mark	Part No.	Symbol & Description	
★	PCX-039	HA, HB	Hall element
★	PSS-003		X'tal
	PSZ30P050FMC		Screw

9. 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.

9.1 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.

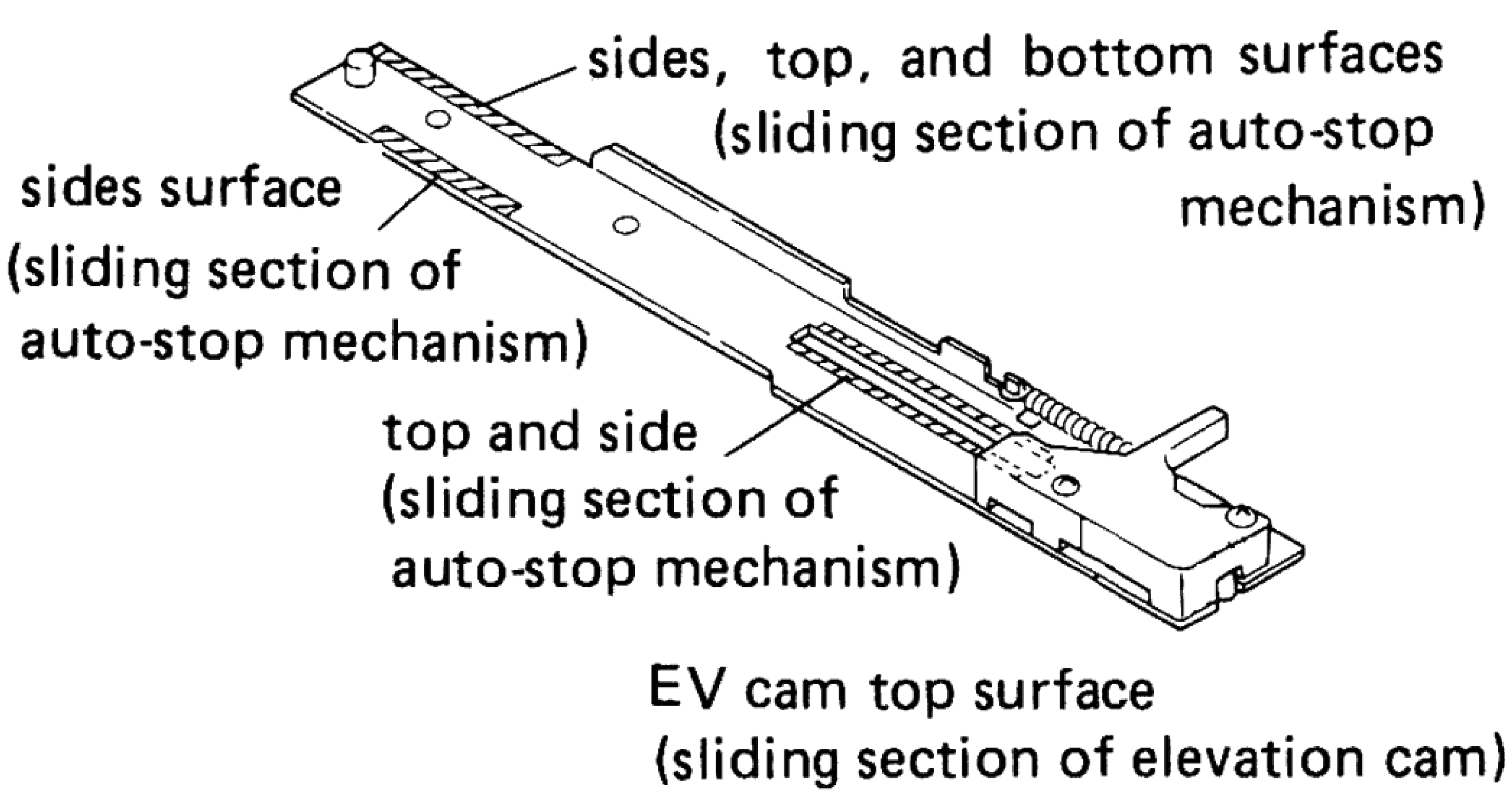


Fig. 9-1 Driving panel assembly section

- **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.

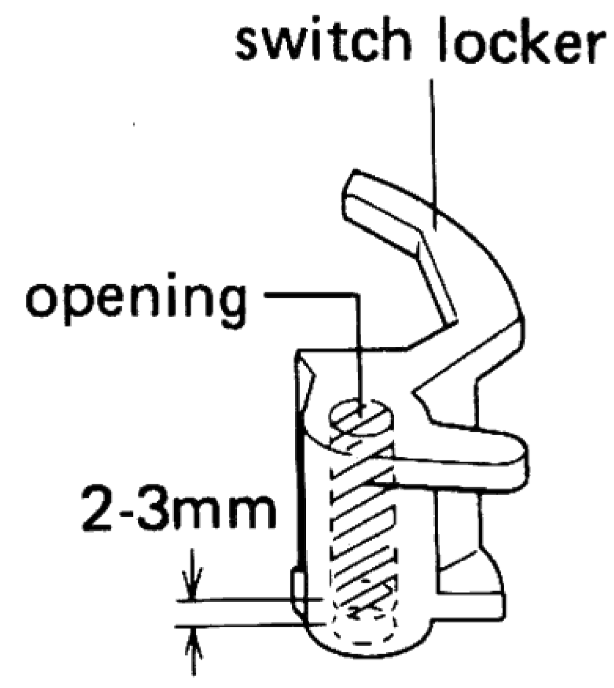


Fig. 9-2 Switch locker section

- **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.

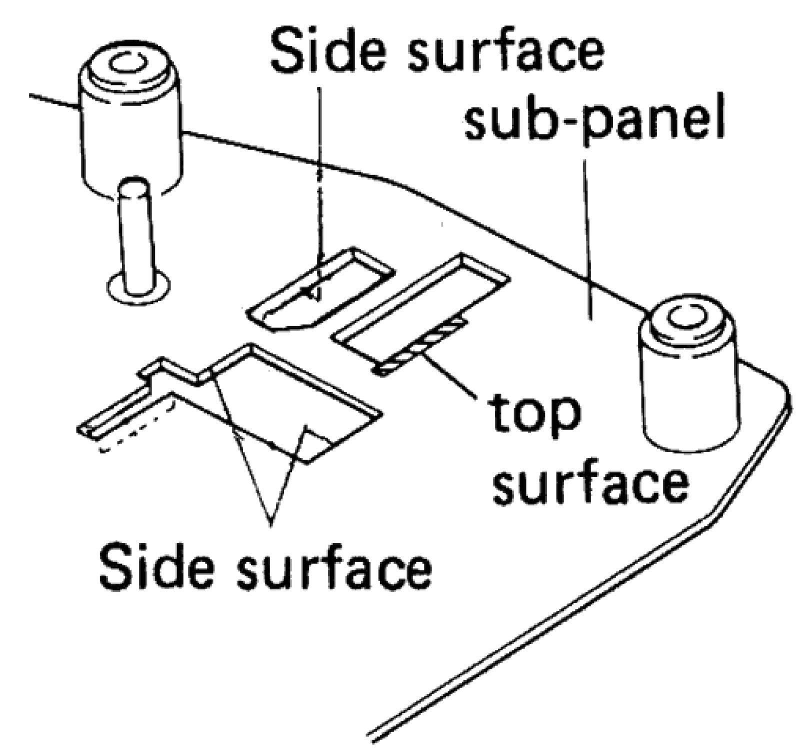


Fig. 9-3 Selector section

- **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.

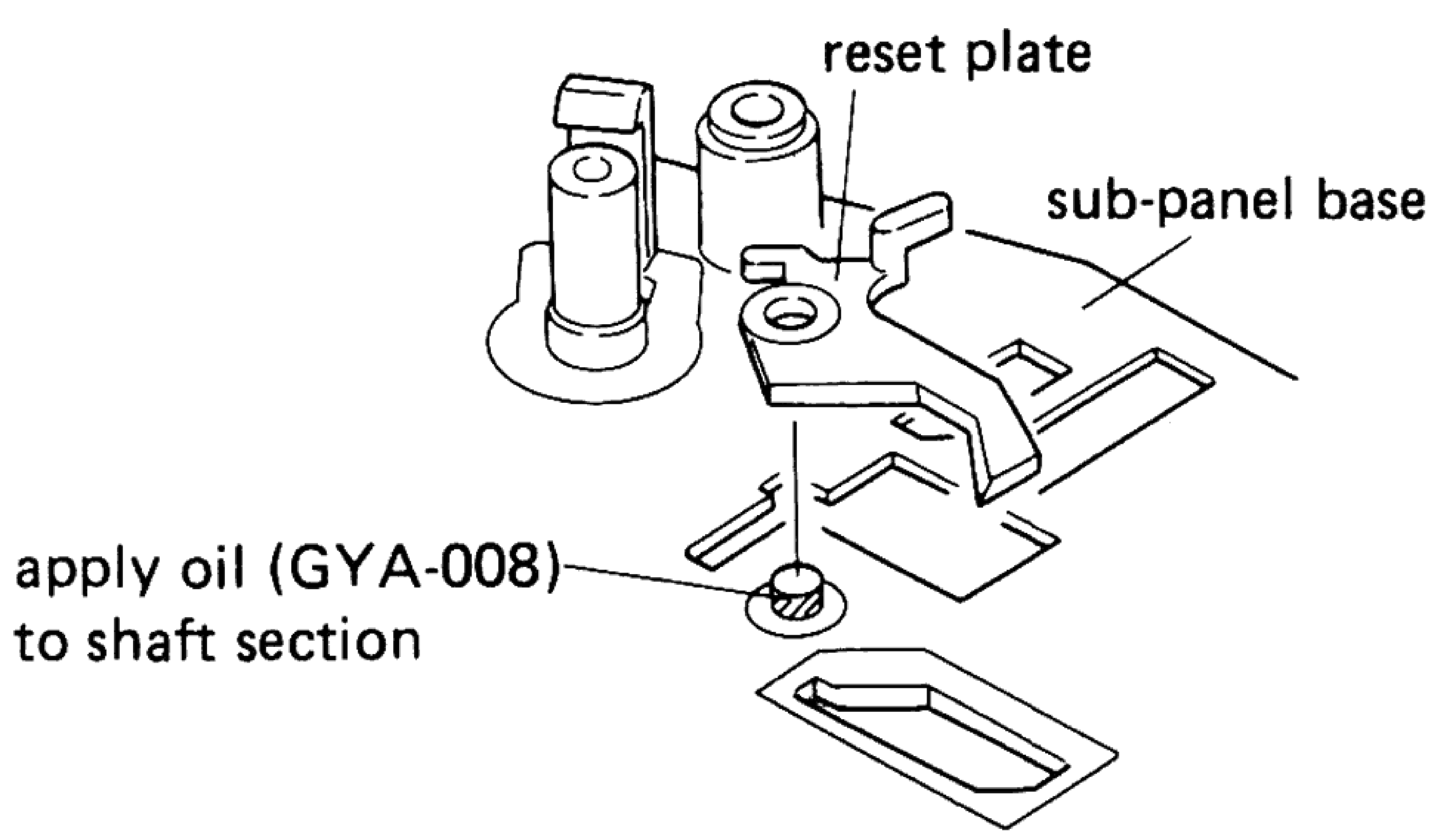


Fig. 9-4 Reset plate section

- **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.

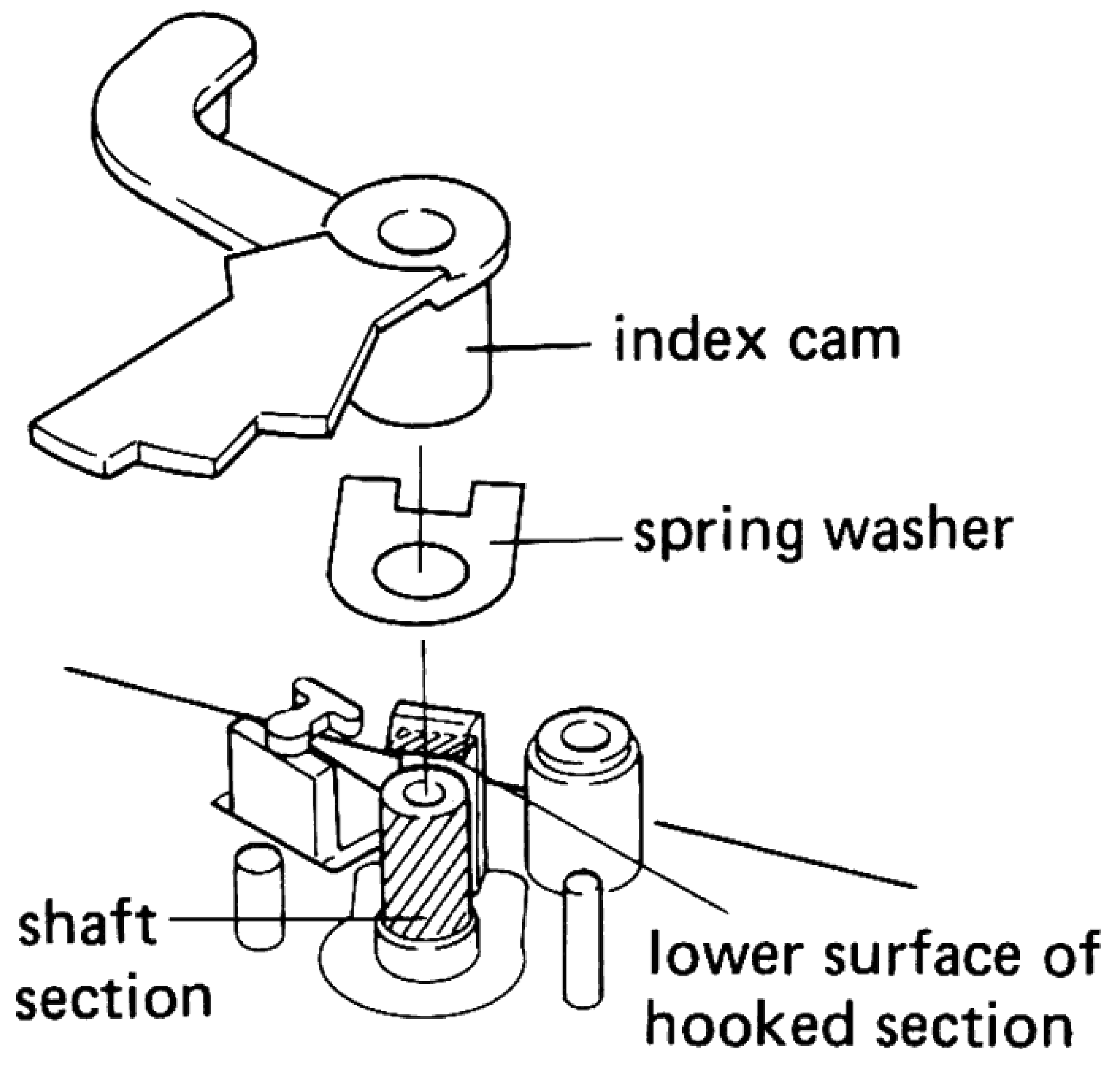


Fig. 9-5 Index cam section

- **EV Lever Unit Section**

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

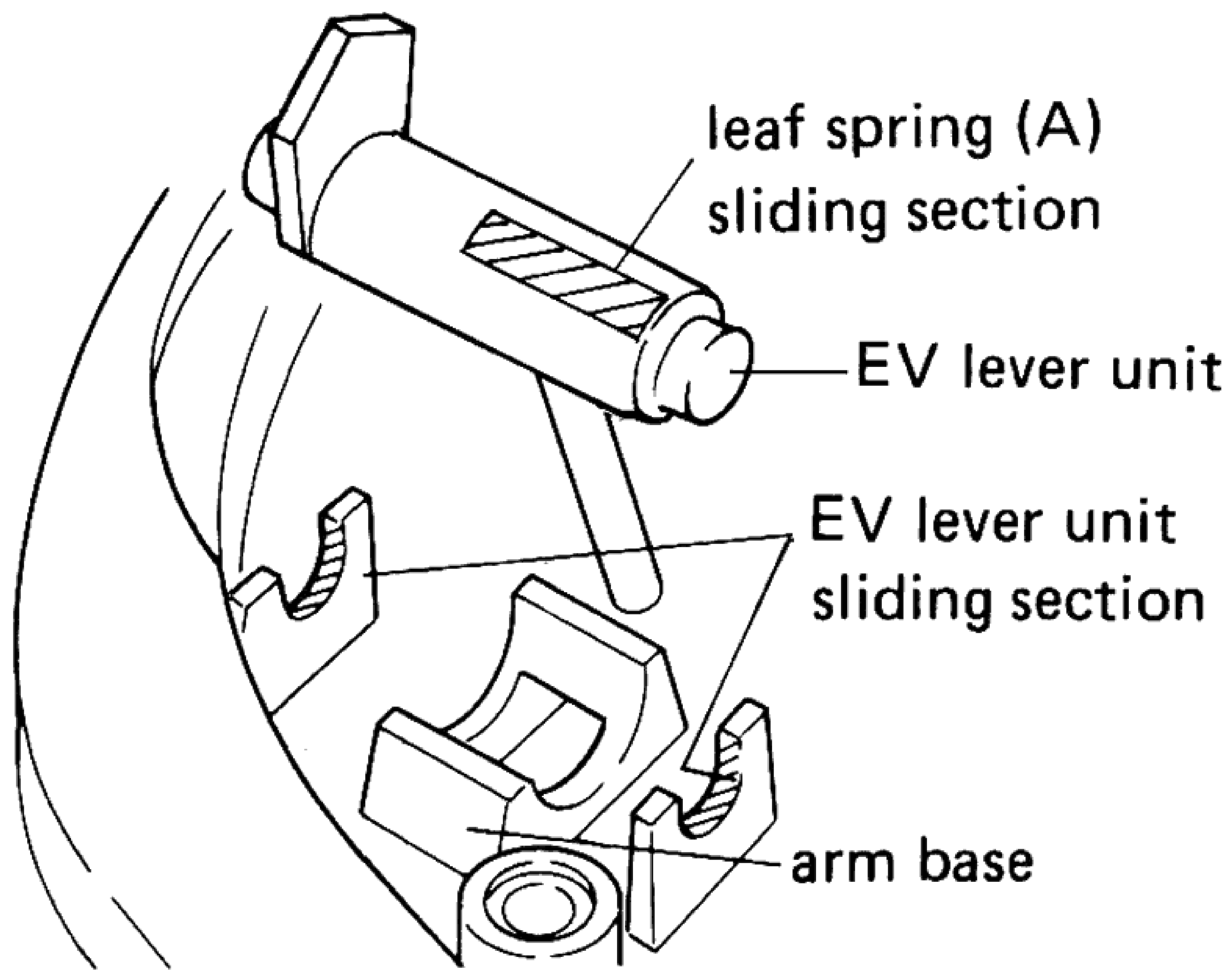


Fig. 9-6 EV lever unit section

- **EV Sheet Section**

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

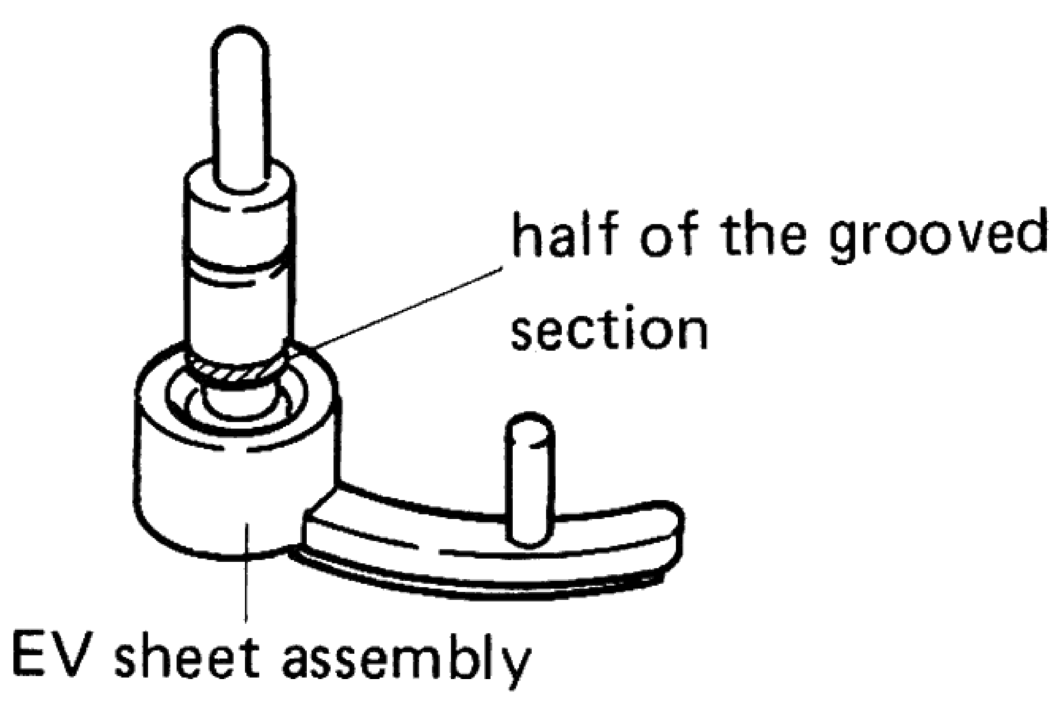


Fig. 9-7 EV sheet section

9.2 PRECAUTIONS FOR ATTACHMENT OF PARTS AND REASSEMBLY

- **Reset Plate SP Attachment**

As shown in figure 9-8, the reset plate SP hook is attached by putting the open section on the sub-panel base side.

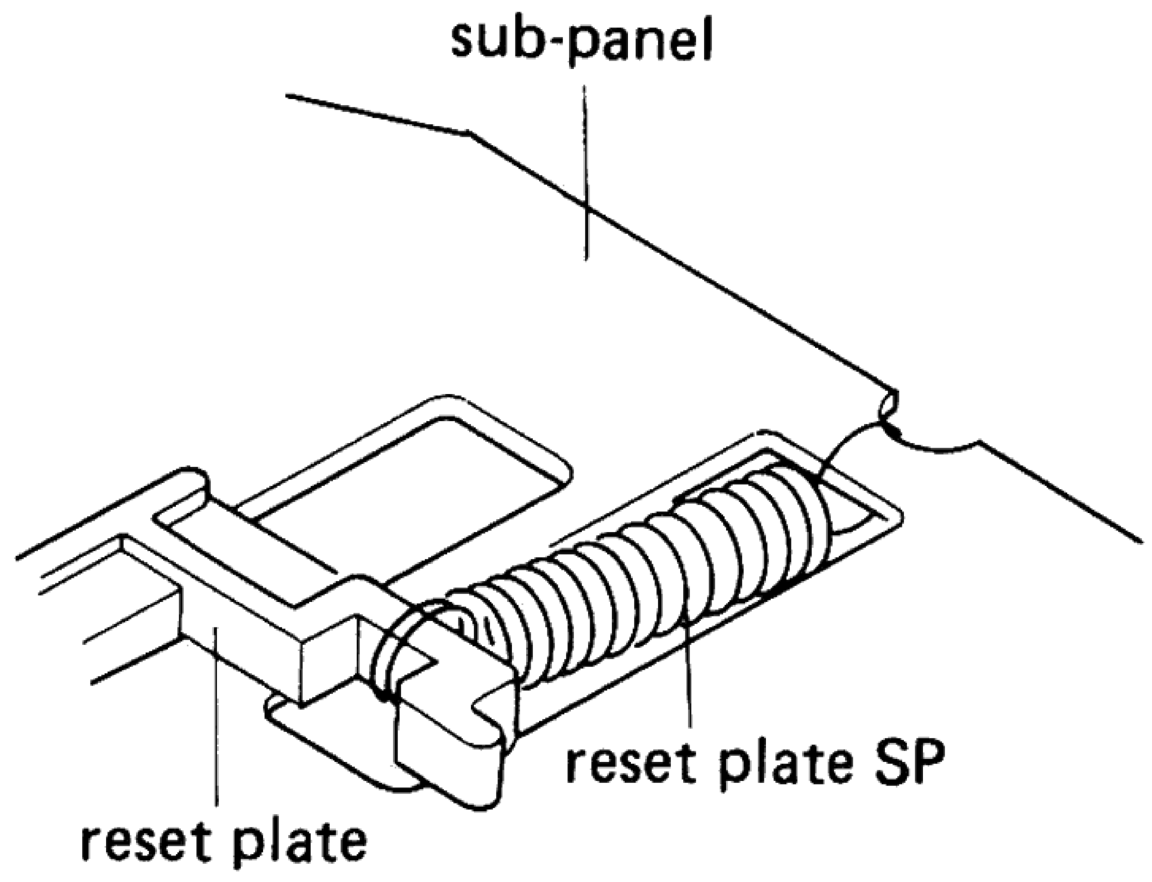


Fig. 9-8 Reset plate SP attachment

- **Cam Assembly Attachment**

The cam assembly is attached by letting the lock plate go in the direction Ⓐ as shown in figure 9-9.

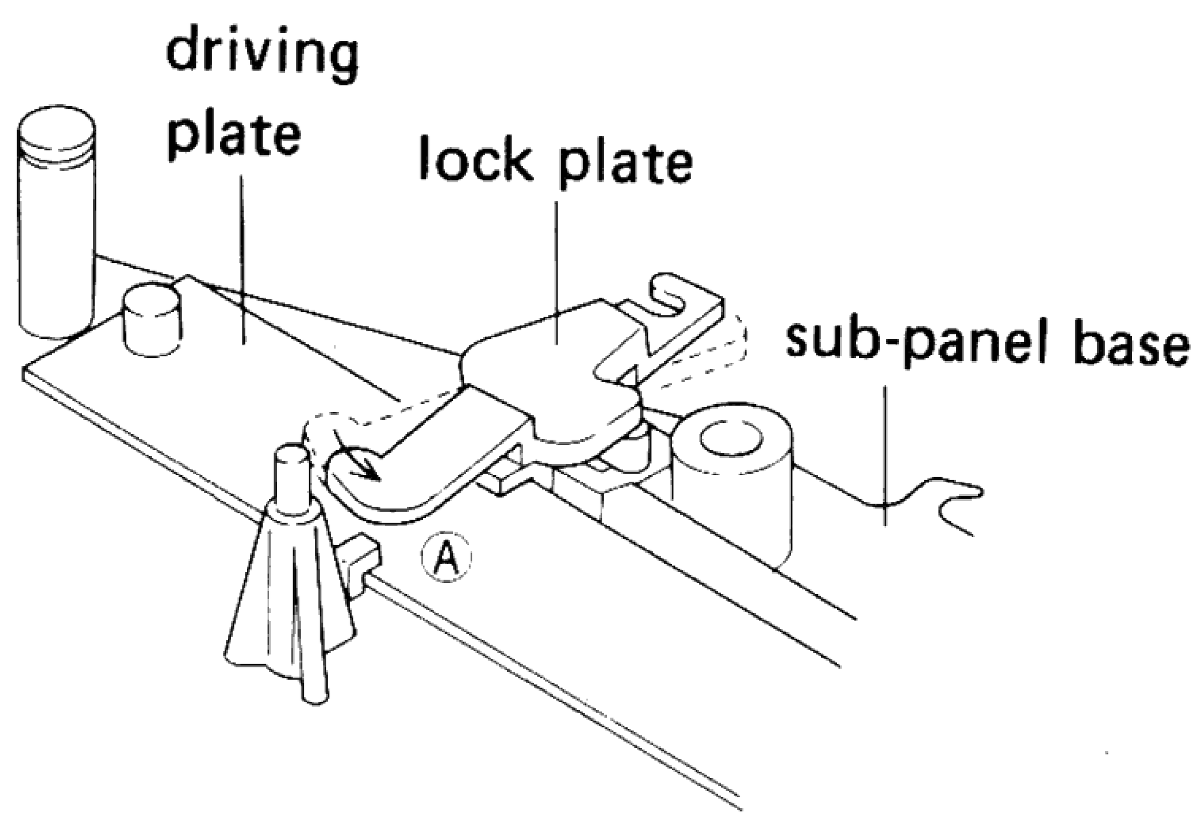


Fig. 9-9 Cam assembly attachment

- **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.

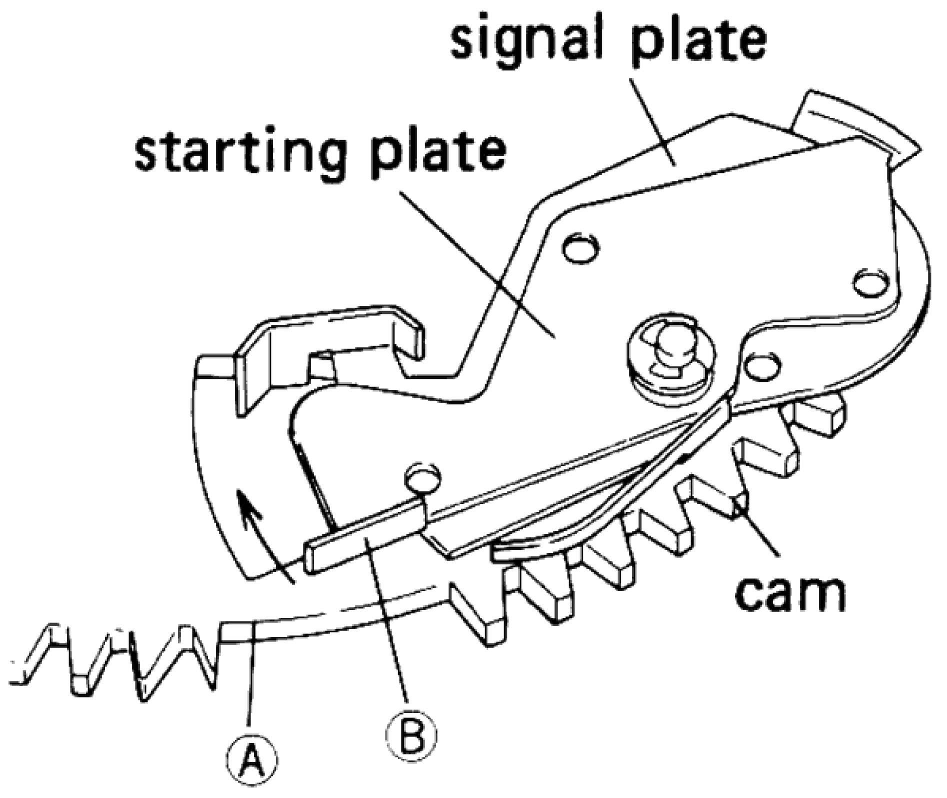


Fig. 9-10 Motor attachment

- **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 9-11. Note that there is a difference between auto-return and fully automatic models.

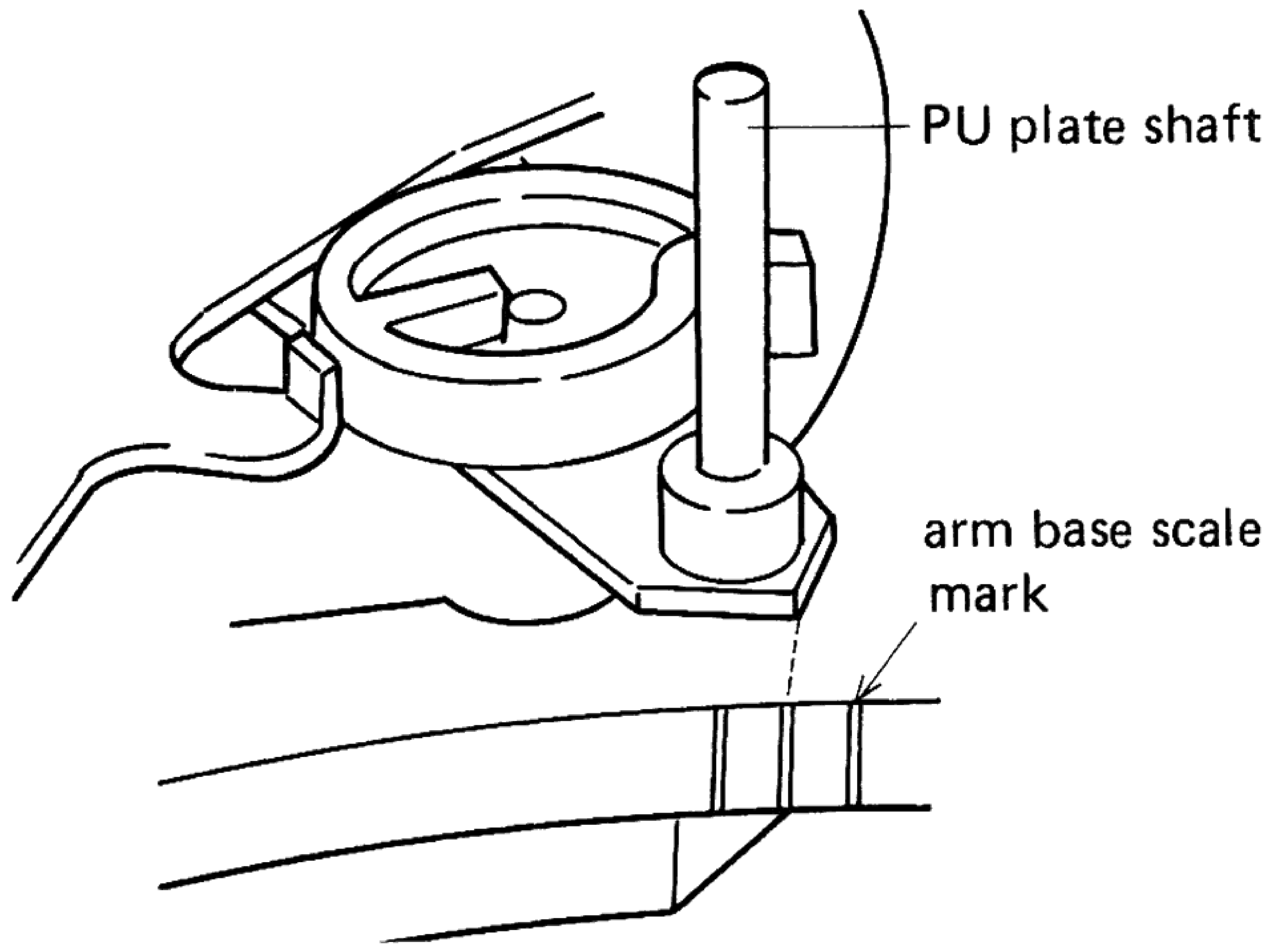


Fig. 9-11 Adjustment of pu plate attachment location

- **Start Lever Unit Attachment**

Attach the shaft section of the start lever unit as shown in figure 9-12 so that it comes between the reset plate and start panel.

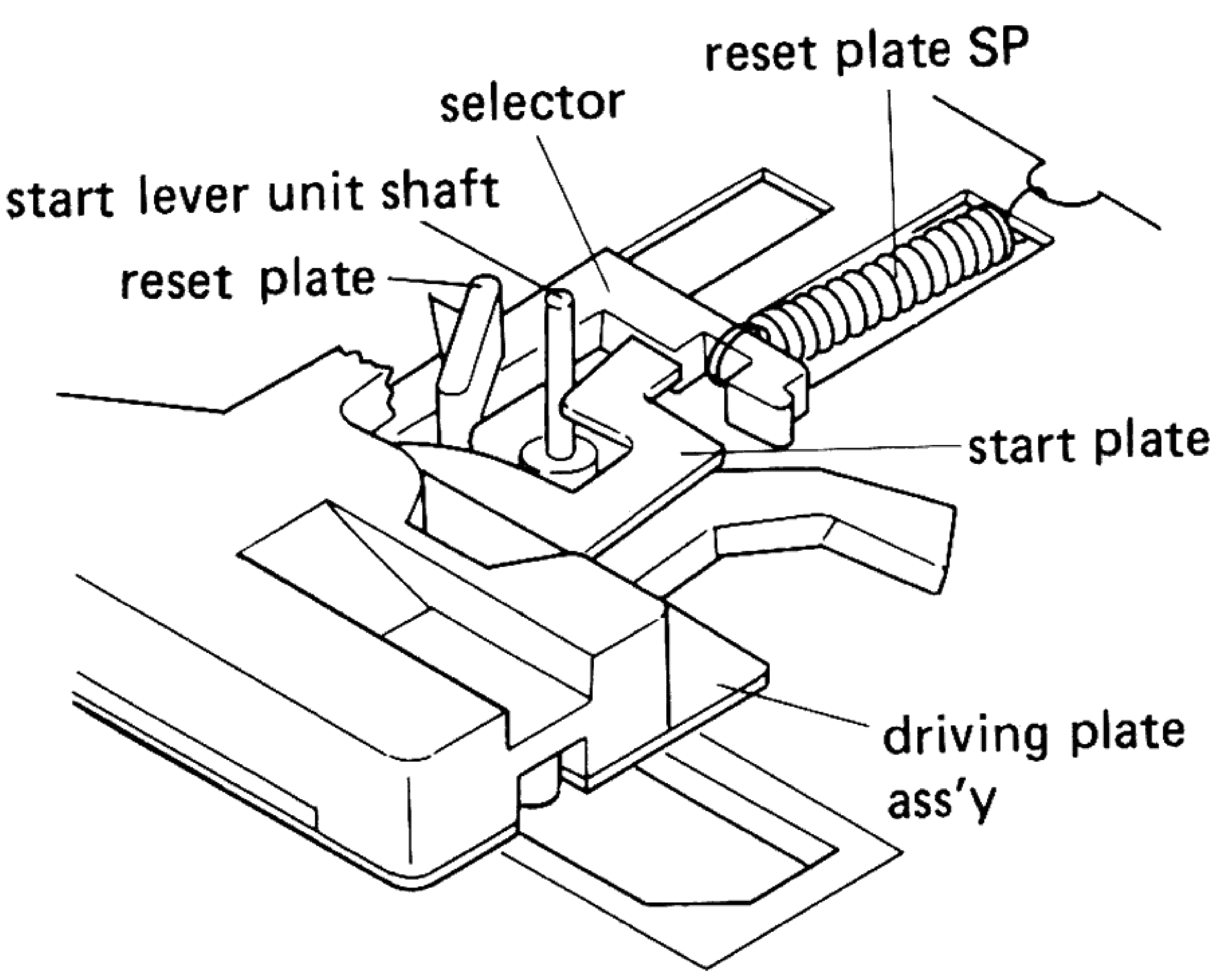


Fig. 9-12 Start lever unit attachment

- **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 9-13.

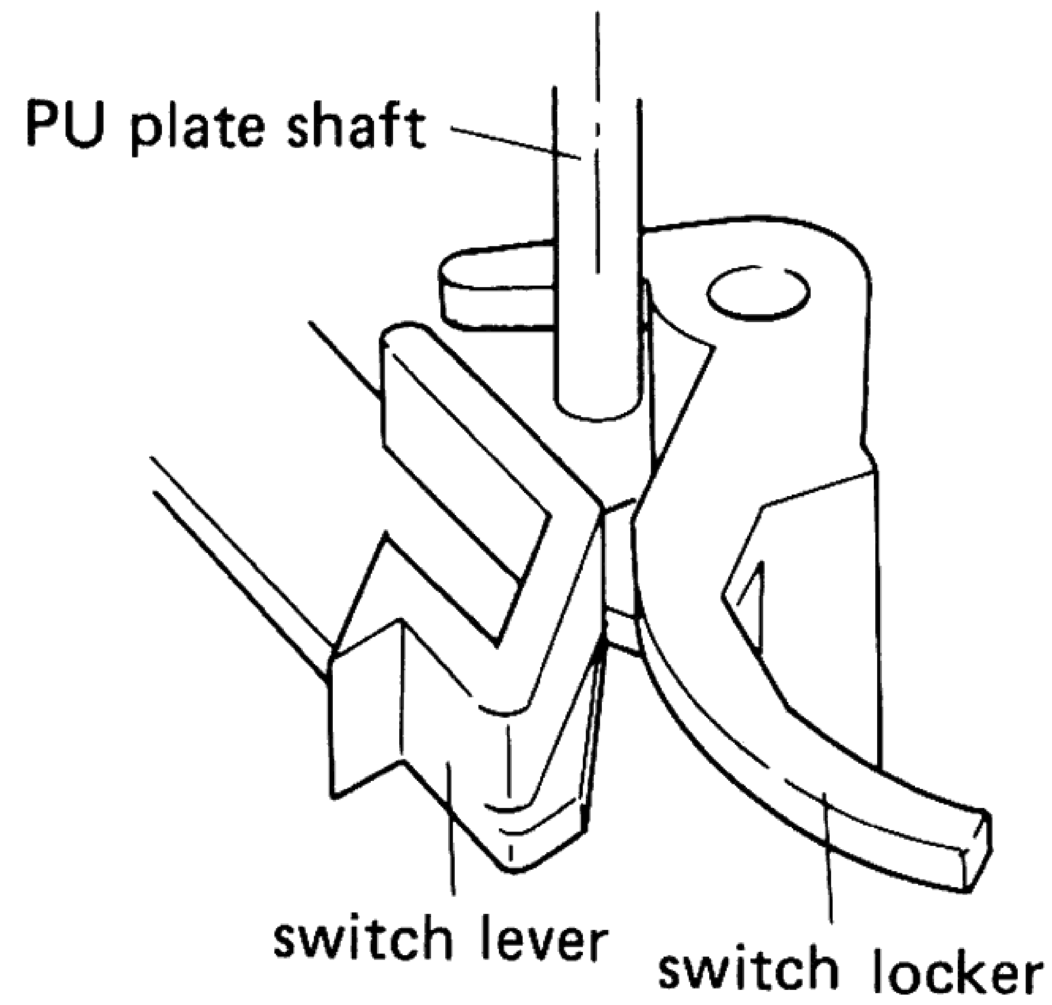


Fig. 9-13 Arm base attachment

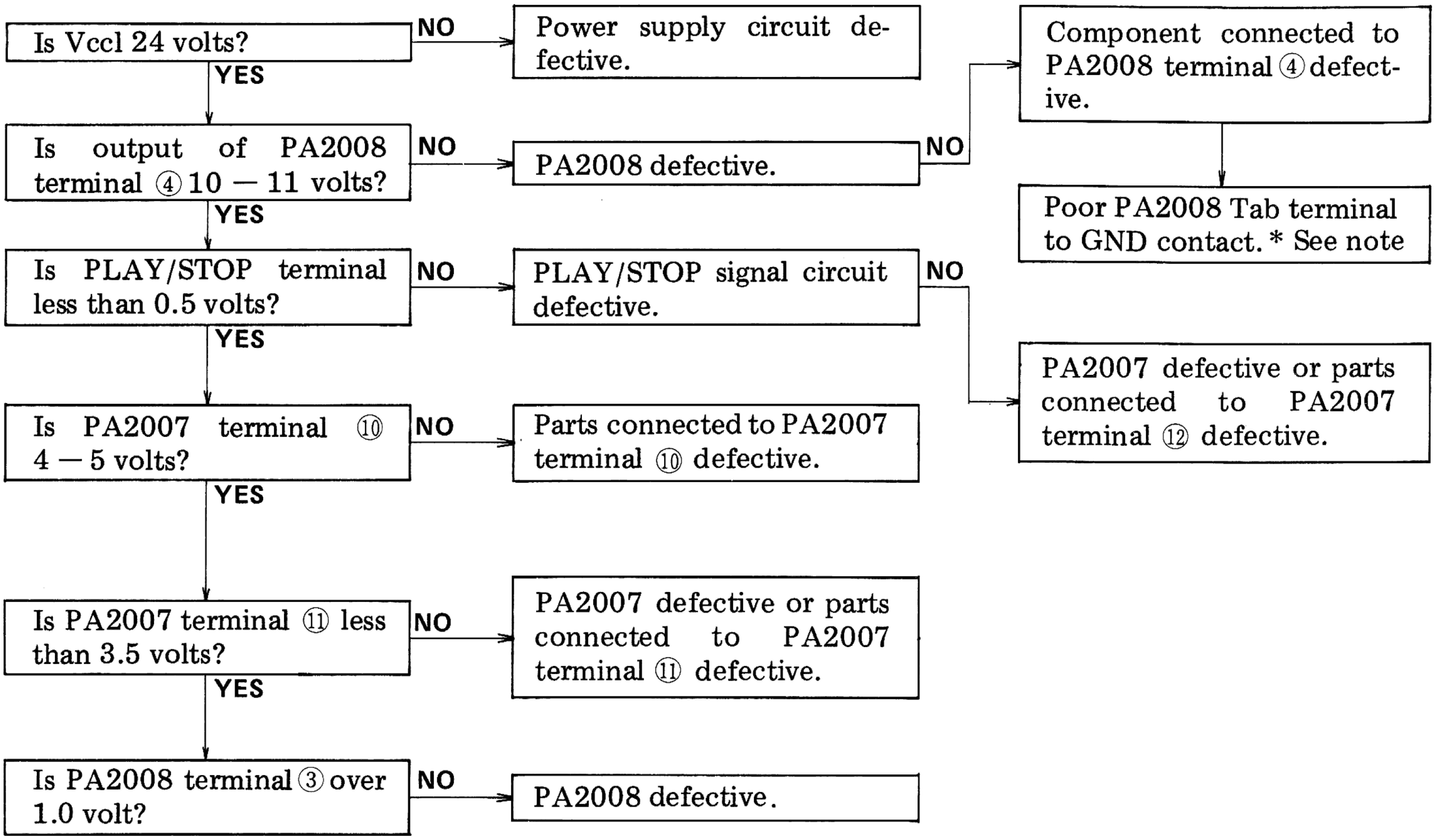
10. TROUBLESHOOTING

10.1 MOTOR (PXM-085)

NOTES:

- *The IC PA2008 used in the PXM-085 does not have a dedicated ground pin for its internal circuitry, but uses the thermal fan ground. When replacing the IC, make sure the securing screws retaining the ground line between the IC and thermal dissipator and between the thermal dissipator and motor base, and base to circuit board is securely tightened.*

■ Motor Dose not Turn



■ Motor Runs away

Is Vcc 1 24 volts?
- NO → Power supply circuit defective.
- YES ↓

Is PA2008 terminal ④ 10 —11 volts?
- NO → PA2008 defective. — NO → Parts connected to PA2008 terminal ④ defective.
- YES ↓

Is FG signal input to TP1?
- NO → PC pattern open in FG.
- YES ↓

Is FG signal input to PA2007 terminal ⑬?
- NO → C12, R9, C26, C13 defective or PC pattern open.
- YES ↓

Is FG signal output from PA2007 terminal ⑭ over 12V p-p?
- NO → PA2007 defective or C10, R7, R9 defective.
- YES ↓

Slow down the motor at about 33 1/3 rpm with a hand, is the prescribed waveform output from PA2007 terminal ④?
- NO → PA2007 defective or C5 defective.
- YES ↓ (refer to pg. 7)

Slow down the motor at about 33 1/3 rpm with a hand, is the prescribed waveform output from PA2007 terminal ① ?
- NO → PA2007 defective or C8 defective.
- YES ↓ (refer to Pg.7)

When the motor is stopped by hand, is the output from PA2007 terminal ⑪ less than 3.5 volts?
- NO → Is the potential between PA2007 terminal ⑤ — ⑥ 0.5 — 0.8 volts? — NO → PA2007 defective, or C7, C6 defective, or parts connected between PA2007 terminal ⑤ —⑥ defective.
- YES ↓

When D1 is removed, is normal operation restored?
- NO → D1 defective.
- YES ↓

PA2008 defective.

■ Motor Dose not Stop

Is the prescrived waveform output from PA2007 terminal ⑩ ?

NO → PA2007 defective or R8, C9 defective.

YES (refer to Pg. 7)

Is D1 normal?

NO → D1 defective.

YES

PCB or PA2008 defective.

■ Unsteady Rotation

Connect PA2007 terminal ① and ⑦ to a oscilloscope and check for phase synchronization.

NO → Adjust VR1 and VR2.

(refer to Pg.42)

YES

Is prescribed waveform output from PA2007 terminal ⑦ ?

NO → PD1003 defective or Xtal OSC defective.

YES (refer to pg. 7)

PA2008 defective.

■ Lock Indicator Blinking

Perform the steps in the above procedure.

YES

LED defective or LED related parts defective.

- **Motor Dead Spot**

When the motor is rotated by hand, is Hall voltage (Ha, Hb) generated?

NO → Is Hall voltage DC bias Ha: 15 — 17 volts; Hb: 4 — 6 volts?

NO → Hall element defective or Hall element bias resistor defective.

YES ↓

With power OFF, is DC resistance between PA2008 terminals ⑫ — ⑭ and ①—⑬ 40 ~ 50 ohms?

NO → If resistance is high, coil wire is open; if resistance is low, PA2008 is defective or coil is shorted.

YES ↓

With power OFF, is DC resistance between PA2008 terminals ⑦—②2.2 ohms?

NO → R10 defective or printed circuit open.

YES ↓

PA2008 defective.

10.2 MECHANISM

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

Refer to the explanation of circuit operations for problems concerning the logic circuit (IC TC4011BP).

10.2.1 DOSE NOT LEAD IN

START

- Motor does not rotate.
  - Refer to the "Motor does not rotate" section.
- Tracking force is too heavy.
- PU plate is not properly attached.
- Arm clamp is not released.
- Depression in EV rubber sheet.
- See ❶ Insufficient torque on the lead-in latch.
- The solenoid assembly does not pull up the detection lever.
- Solenoid assembly, logic circuit (TC4011BP), transistor, IC defective.

Procedure for dealing with item ❶

As shown in Figure 10-1, if the force required to turn over the lead-in latch is less than 100g at a point 13mm from the center, bend the click leaf spring toward Ⓐ until the force is 100—250g.

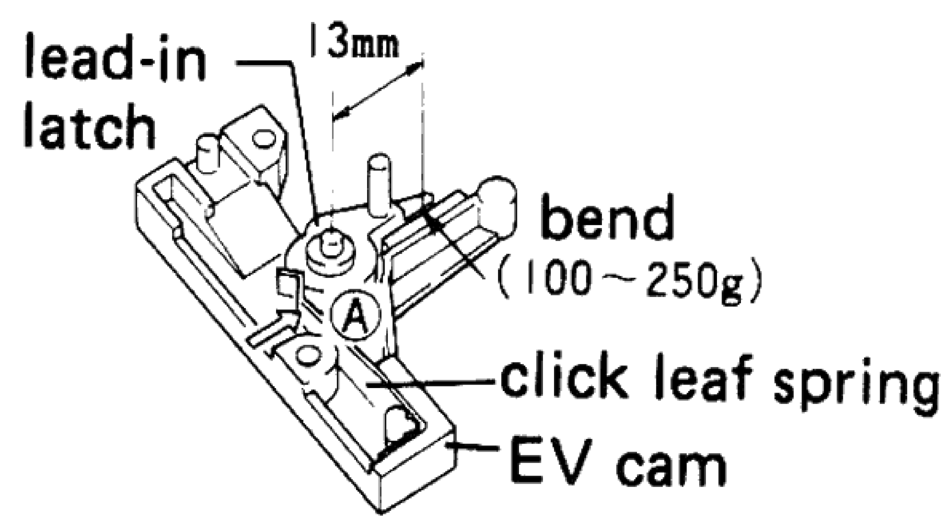


Fig. 10-1 Adjustment of lead-in latch with insufficient torque.

10.2.2 DOSE NOT REPEAT

START

- Repeat switch is not ON.
- Improper movement of the repeat lever.
- Control spring is loose. Drive lever is bent, protrusion of repeat lever.
- See ❷ The start lever unit pin is separated from the driving lever unit section.

Procedure for dealing with item ❷

As shown in Figure 10-2, if the start lever unit pin is out of line in the direction of Ⓐ, repeat will not operate. In these cases, assemble referring to the method of joining the panel and bottom panel (lid).

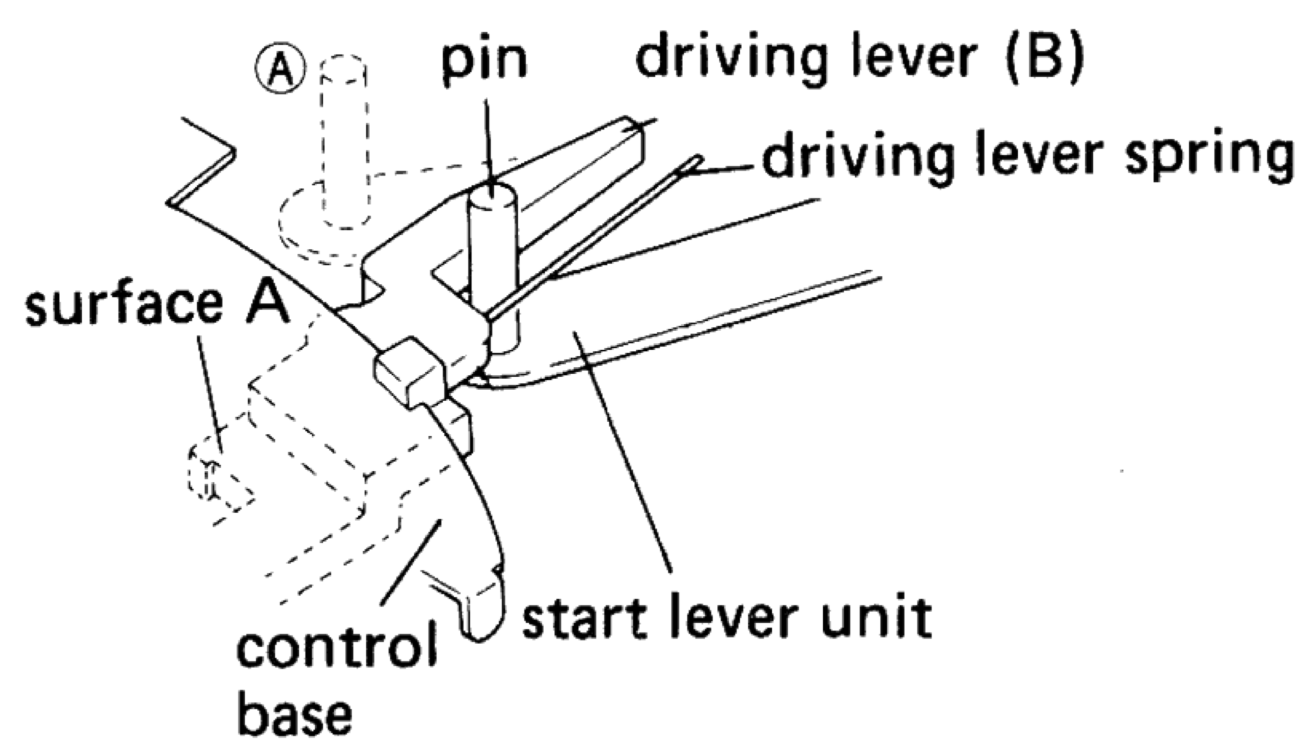


Fig. 10-2 Misaligned pin of start lever unit.

10.2.3 REPEAT FUNCTION IS REPEATED

Separate the panel section and bottom panel and, as shown in figure 10-3, 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 (B) is not moving properly.

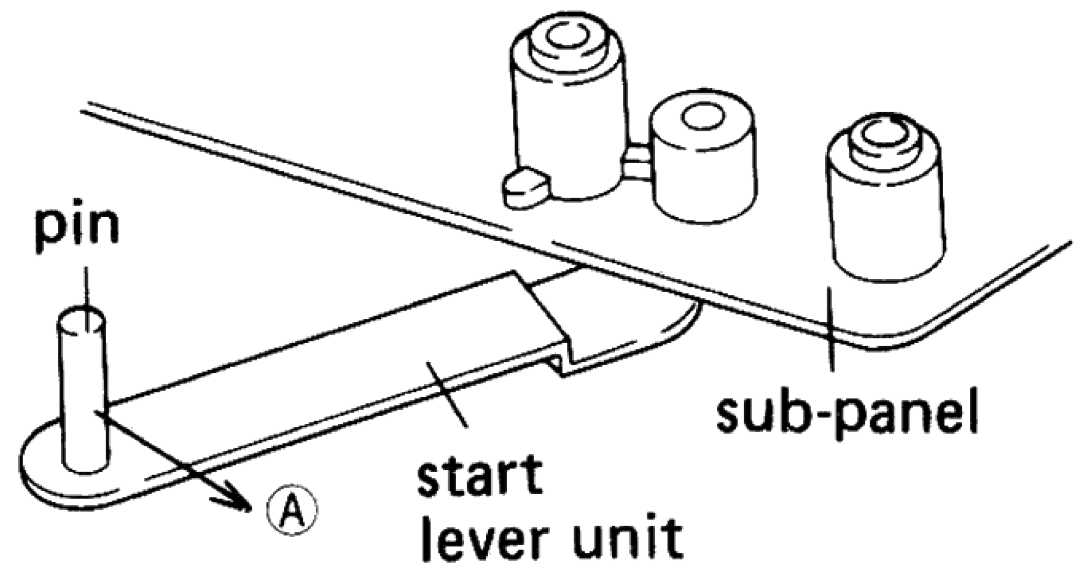


Fig. 10-3 Check of repeat operation.

START

- Control spring is loose.
- Drive lever is bent, protrusion of repeat lever.
- Driving lever (B) is not moving properly.
  - Driving lever shaft is bent.
- Start lever is not moving properly.
  - Start lever is warped.
- See ❸ Selector is not moving properly.
  - Plastic protrusions on cut surfaces of the sub-panel of the selector slide section.
- See ❹ Reset plate is not moving properly.
  - Protrusions on reset plate pressure pin.
- Reset plate SP is weak.

Procedure for Dealing with Item ❸

If there are plastic 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. 10-4).

Procedure for Dealing with Item ❹

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. 10-4).

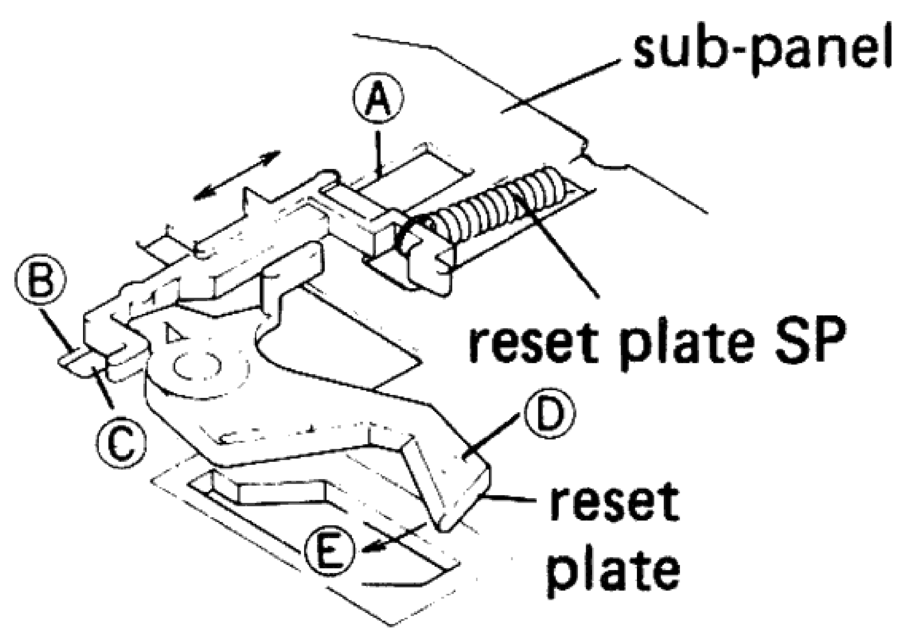


Fig 10-4 Improper movement of selector.

10.2.4 AUTO-RETURN DOSE NOT WORK

START

Change in starting position adjustment.

See ❺

After starting, incomplete reset of the signal plate.

The curved section of the signal plate is deformed.

Starting plate does not follow the signal plate.

Too much grease between the signal plate and the cam.

Inner diameter of the starting plate bearing is small.

Protrusions on the caulk section of the starting plate bearing.

Not enough grease between the starting plate and signal plate.

Looseness in the PU plate attachment.

The inner areas of records can not be tracked.

Arm lead wire is caught on something.

PU cord is touching the PU plate.

PU plate is touching the leaf spring (start panel).

Operation of the detection lever is not smooth.

Procedure for Dealing with Item ❺

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 A is 0.5mm or larger.

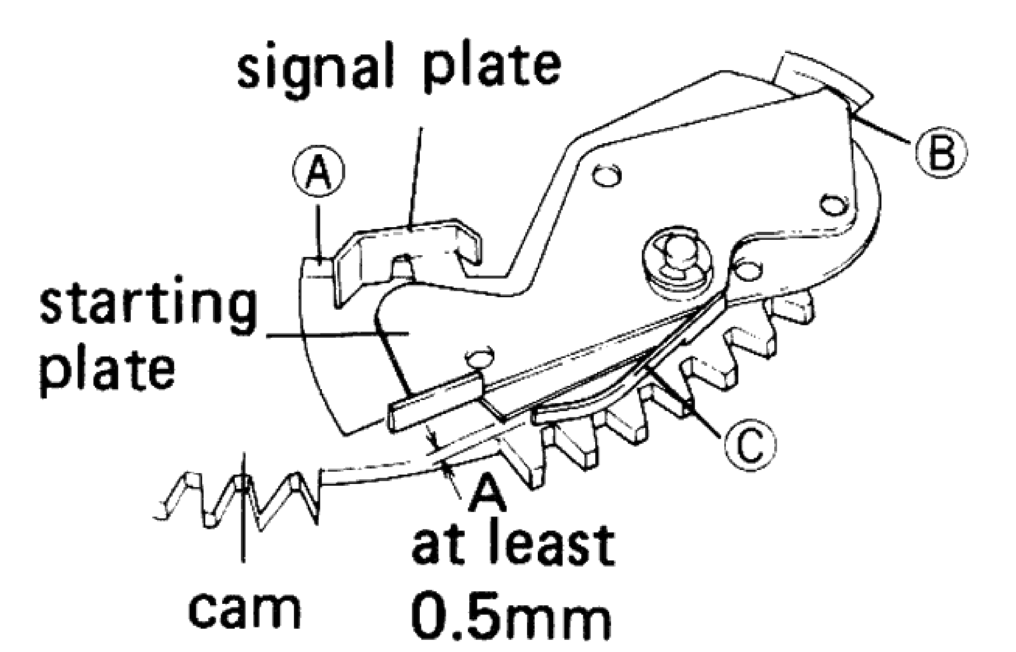


Fig. 10-5 Incomplete reset of starting and signal plates.

10.2.5 RETURN IS FAST (RETUEN AT 1mm PITCH)

See ❻

Protrusions on the pinion gear section.

Procedure for Dealing with Item ❻

If there are rough 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. 10-6).

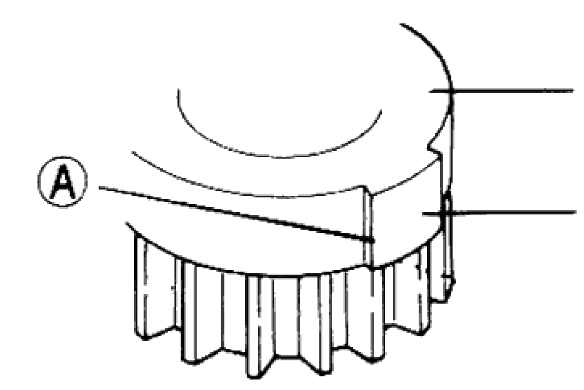


Fig. 10-6 Elimination of pinion gear protrusions.

10.2.6 TONEARM DOSE NOT LOWER IN CORRECT POSITION

START

- Incorrect adjustment.
- Location of stylus was changed during cartridge replacement.
- PU plate operation is not smooth.
  - The PU plate spring is weak. PU lever A and PU lever B are not moving smoothly.

10.2.7 RECORD SIZE SELECTOR DOSE NOT WORK

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

START

- Slider and panel are in contact.
  - Slider is warped.
- Slider does not operate smoothly.
  - Slider is warped.

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

START

- Slider has become disengaged from the control base.
  - Slider guide is warped.
- Slider spring is disengaged from the selector lever.
- Selector lever does not operate smoothly.
  - Plastic protrusions in auto-stop mechanism resin section of the select lever sliding surface.
  - Plastic protrusions on the select lever.
- Control spring is loose.
- Index cam does not operate smoothly.
  - Index cam stopped hooked section has fallen over.
- Slider spring is weak.
- The size selector lever is not moving smoothly.
- Drive lever shaft is slanted, size selector lever protrusions.

10.2.8 MOTOR DOSE NOT ROTATE

START

- 4P or 8P connectors are not attached.
- Connector(s) is not properly installed.
- Logic circuit defective. (Transistor defective)
- Microswitch defective.
- Connector assembly defective.

10.2.9 WITH THE RECORD SIZE SET AT 17cm, THE TONEARM IS RETUNED TO THE ARM REST AFTER THE LEAD-IN.

START

- Detection lever and signal lever are touching.
- Detection lever is bent.
- Change in starting position adjustment.

10.2.10 AUTO OPERATION REPEATS

START

- Connector assembly (4P) defective.
- PLAY/STOP button does not return.
- The solenoid assembly continuously pulls up the detection lever.
- Tact switch defective.
- Logic circuit (TC 4011BP), transistor, IC defective.

10.2.11 MOTOR DOES NOT STOP

START

- Start panel is not moving properly.
  - EV cam is warped.
  - The start plate spring is weak.
- See ❼ The switch lever and switch locker are not locking.
  - The installation location of the PU plate is incorrect.
- Logic circuit defective.
- Tact switch defective.
- Connector assembly defective.

Procedure for Dealing with Item ❼

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 micro-switch OFF (fig. 10-7). 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 10-8, attach the PU plate precisely midway between the first and second points from the arm base scale mark counting away from you (only for auto-return models; for fully automatic models, align with the center point).

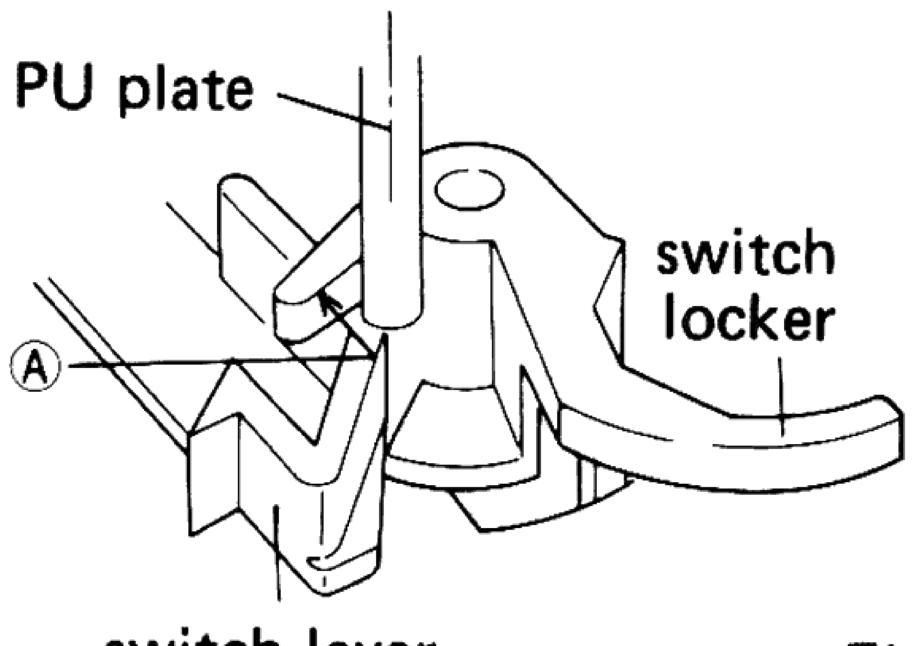


Fig. 10-7

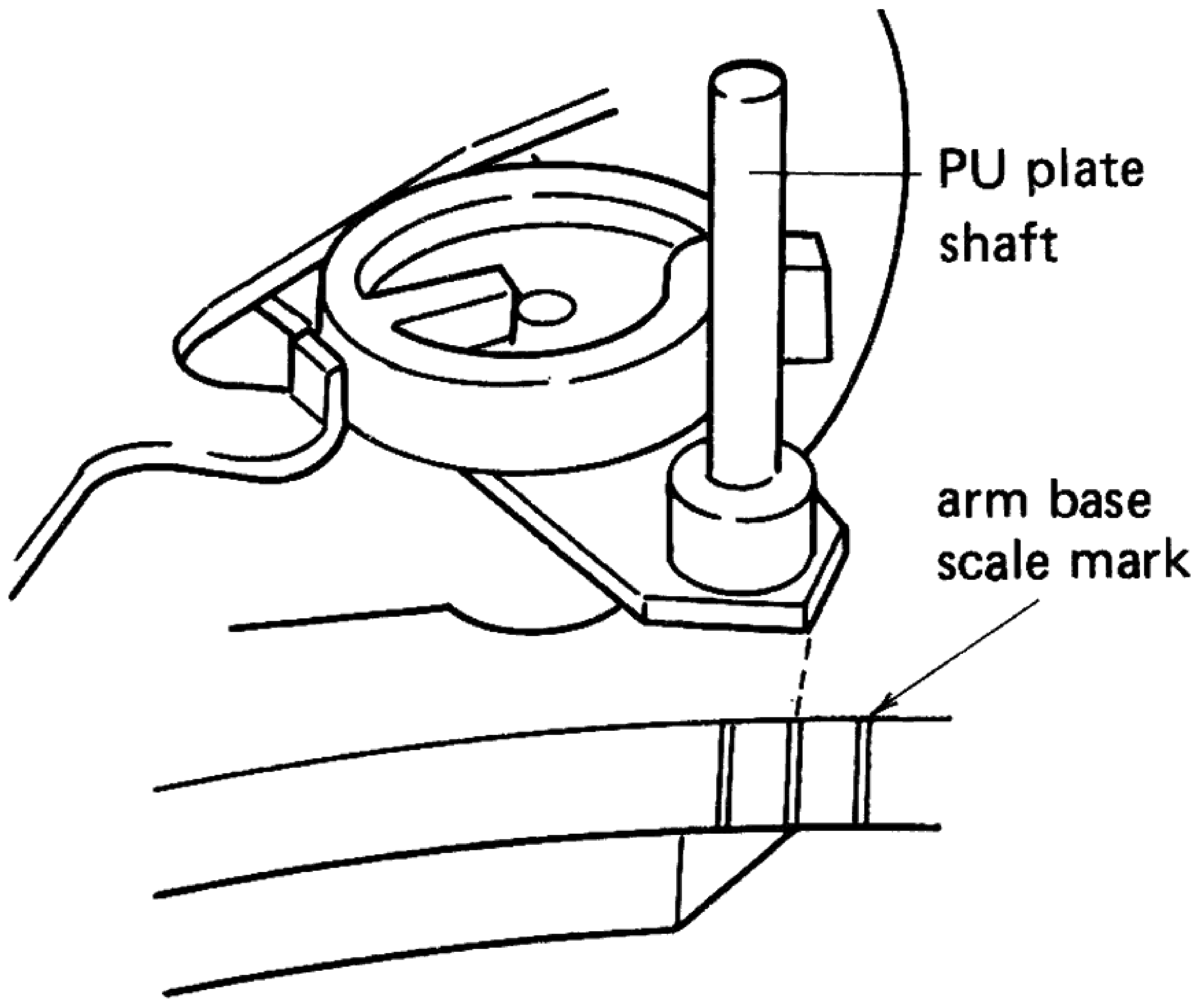


Fig. 10-8 Adjustment of PU plate attachment location

11. ADJUSTMENT

11.1 MOTOR ROTATION ADJUSTMENT

1. Set the speed to 33 1/3 rpm and start up the turntable by depressing the PLAY/STOP button.
2. Connect the self made buffer amp such as (Fig. 11-1) to the #1 terminal of IC PA2007 and output the waveform to a oscilloscope (Fig. 11-1).
3. When a waveform such as the one illustrated in Fig. 11-2 appears on the oscilloscope, vary gain on the oscilloscope until a sawtooth wave a 5 div peak-to-peak is attained. then referring to Fig. 11-2, adjust the ratio of a/b to 3/2 by adjusting VR1. (The presence of noise may affect this adjustment, so it must be done carefully.)
4. After 33 1/3 rpm adjustment is completed, switch to 45 rpm and adjust VR2 by the same way of step 3. Always adjust 33 1/3 rpm first and always make both adjustments even though only one adjustment may be off.
5. Connect the oscilloscope to the #7 pin of PA2007 and make sure 33 1/3 rpm is at 55.5 Hz and 45 rpm is at 75 Hz.

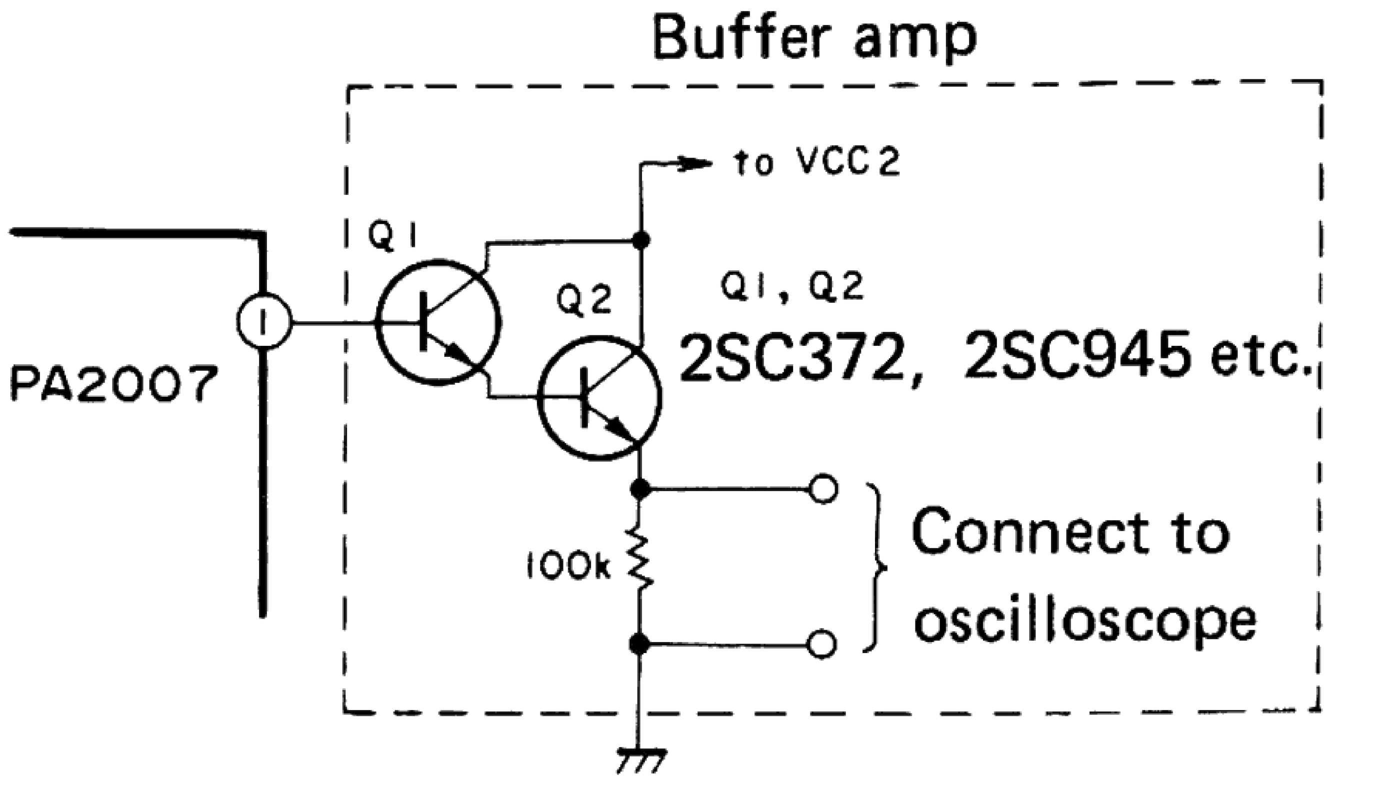


Fig. 11-1 Buffer amp connection

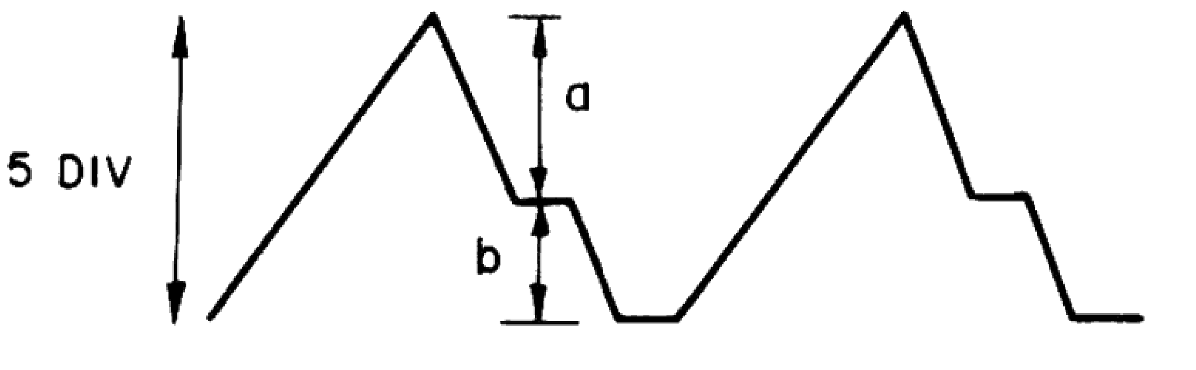


Fig. 11-2 Sawtooth wave adjustment

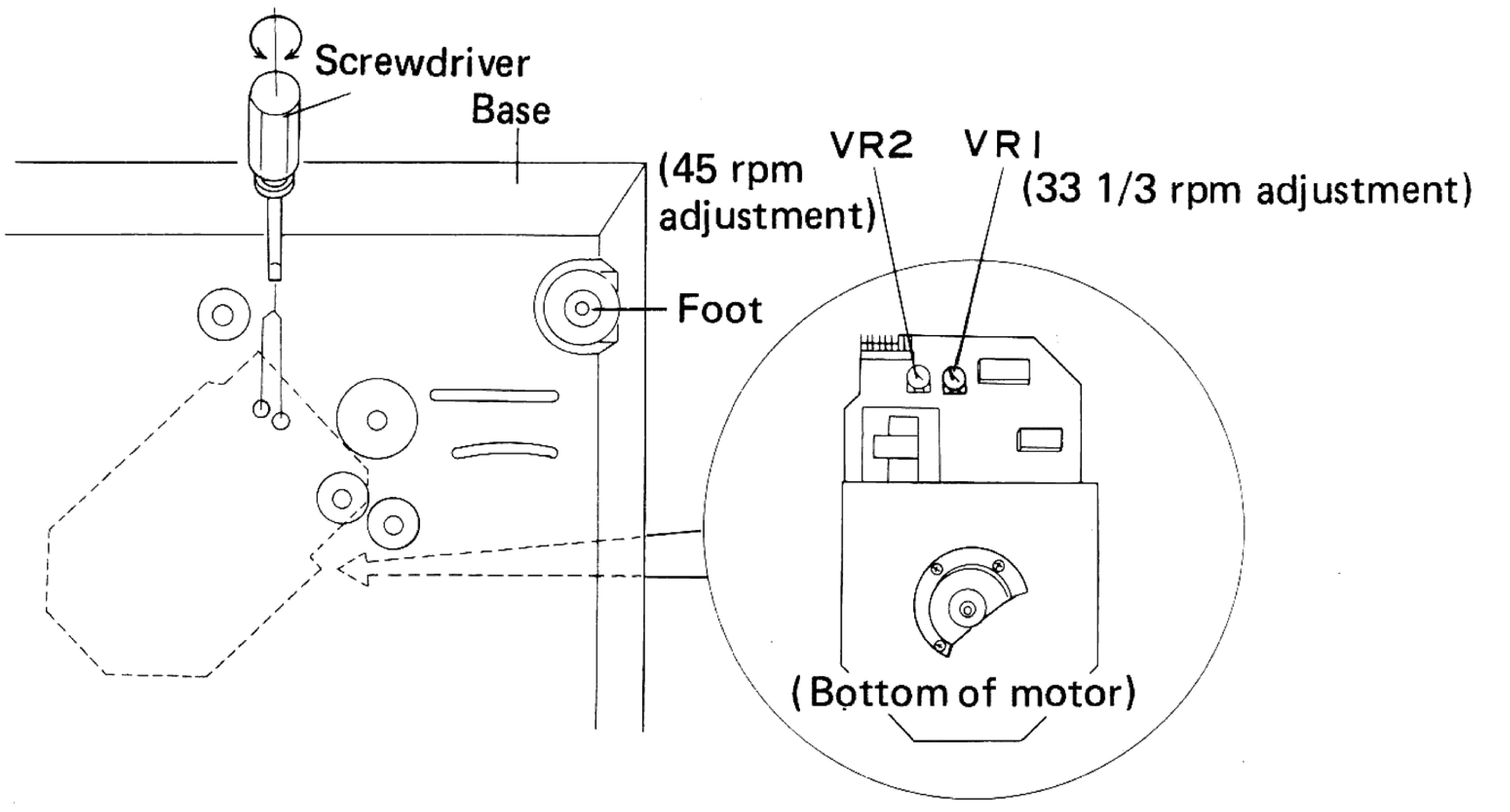


Fig. 11-3 Motor rotation adjustment

11.2 CONTROL MECHANISM ADJUSTMENT

Auto-Return

When auto-return occurs too early or too late, make the following adjustments.

1. Turn the auto-return adjustment screw fully clockwise.
2. Move the tonearm as far as it will go toward the center of the motor.
3. Turning the auto-return adjustment screw slowly counterclockwise, start the tonearm moving back toward the arm rest.
4. When the cartridge stylus is 32 mm from the center shaft, stop turning the screw.
5. Check the auto-return position during operation to make sure it is correct. Also check the stylus landing position.

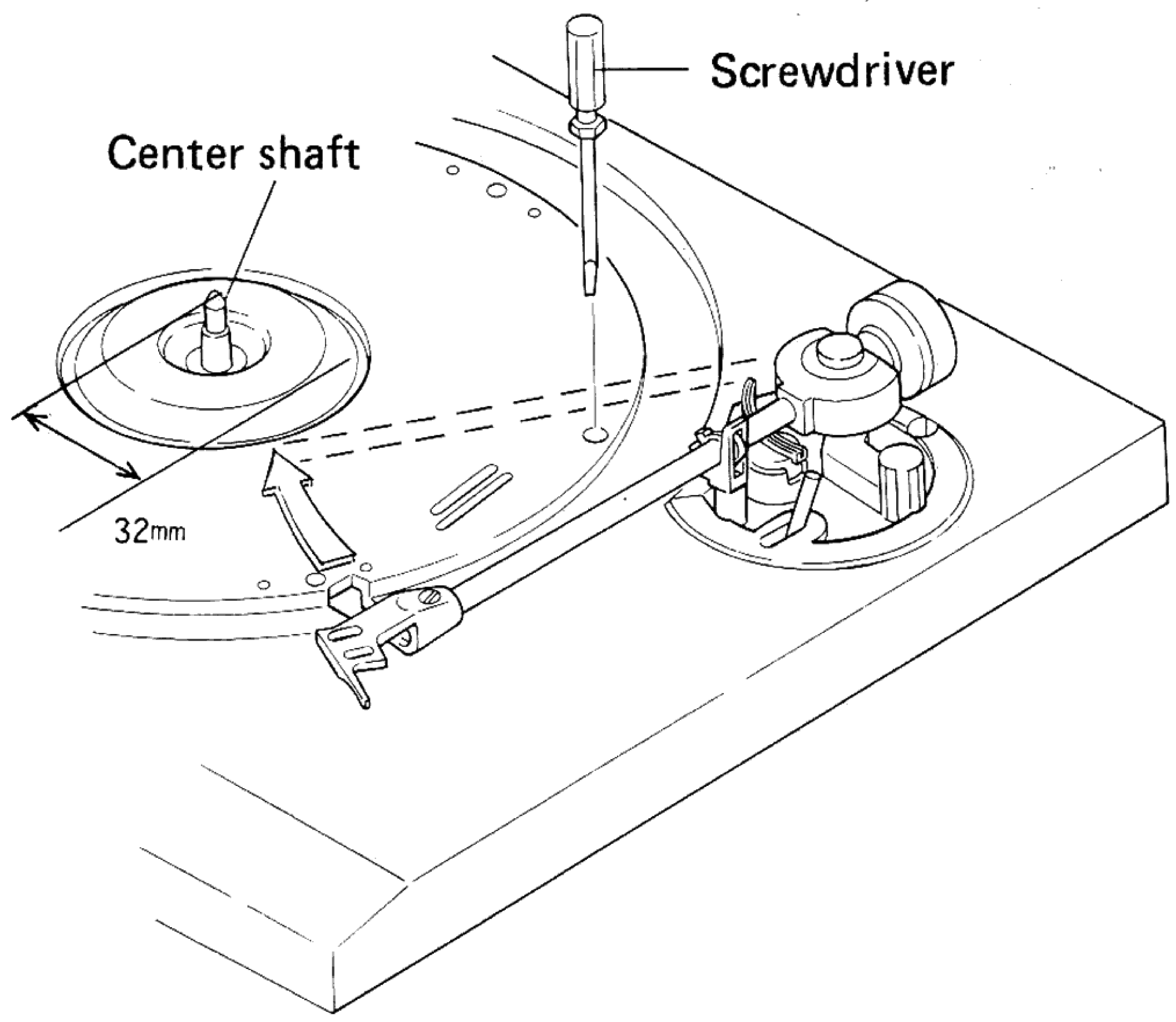


Fig. 11-4 Auto-return adjustment

■ Stylus Landing Position Adjustment

When the tonearm doesn't land in the correct point during automatic playback, adjust according to the following procedures. (Be careful not to damage the record disc with the stylus while making this adjustment.)

1. Place a 30cm record on the platter.
2. Depress the playback start/stop switch and start automatic playback. Note the direction and amount if the land point is off.
3. Depressing the playback start/stop switch, return the tonearm to its rest.
4. When the platter stops rotating, locate the adjusting screw inside the adjustment hole.
5. Using a small flat bladed screwdriver, refer to the illustration at right and adjust as follows:
   - When the stylus lands to the outside of the record, turn the screw clockwise (↻).
   - When the stylus lands too far to the inside of the record, turn the screw counterclockwise (↺).
6. Depress the playback start/stop switch and check the adjustment. If the lowering position is still off, repeat steps 3. through 6. above.

Adjustment Using the Test Record

(The lowering position adjustment is made with the tonearm on the arm rest.)

30cm landing point . . . lands between count 306 and 313.

17cm landing point . . . lands between count 175 and 183.

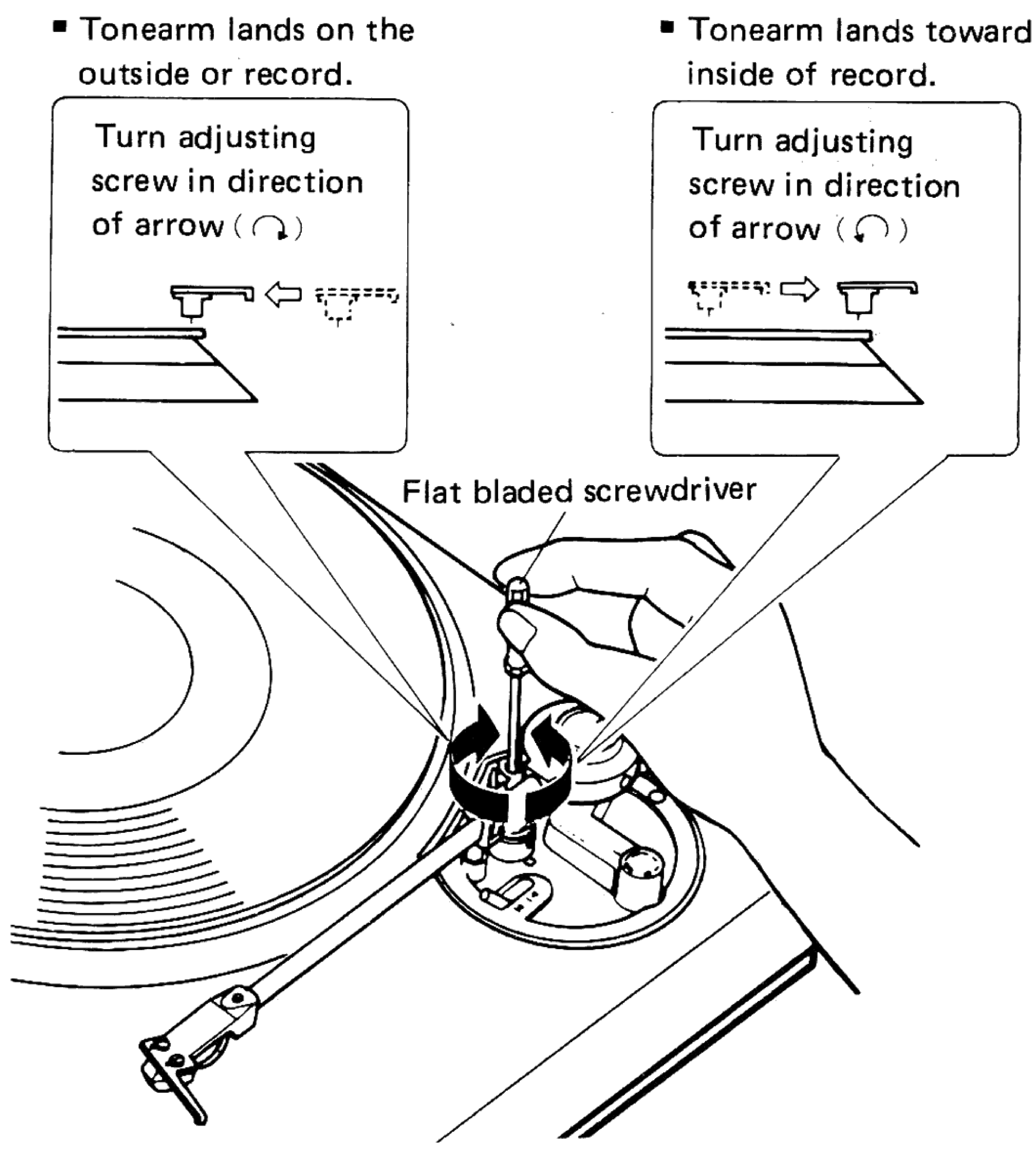


Fig. 11-5 Stylus landing point adjustment

11. RÉGLAGE

11.1 REGLAGE DE LA VITESSE DU MOTEUR

1. Régler la vitesse à 33-1/3 tpm et faire tourner la platine en appuyant sur la touche PLAY/STOP (lecture/arrêt).
2. Raccorder l'amplificateur intermédiaire à la borne n° 1 de IC PA2007 (Fig. 11-1) et fournir la sortie de forme d'onde à un oscilloscope.
3. Lorsque la forme d'onde sur le oscilloscope est telle que le représente la figure 11-2, modifier le gain sur le oscilloscope jusqu'à ce que l'on obtienne une onde en dents de scie de 5 divisions de crête à crête. Puis, en se reportant à la figure 11-2, régler le rapport a/b à 3/2 en jouant sur VR1. (La présence de bruit risquant d'affecter le réglage, celui-ci doit être effectué avec précautions.)
4. Après avoir terminé le réglage de 33-1/3 tpm, répéter l'opération 3 pour le réglage de 45 tpm au moyen de VR2. Toujours régler 33-1/3 tpm en premier et toujours effectuer les deux réglages même si seul l'un d'entre eux est nécessaire.
5. Raccorder le oscilloscope à la broche n° 7 de PA2007 et s'assurer que 33-1/3 tpm est à 55,5 Hz et que 45 tpm est à 75 Hz.

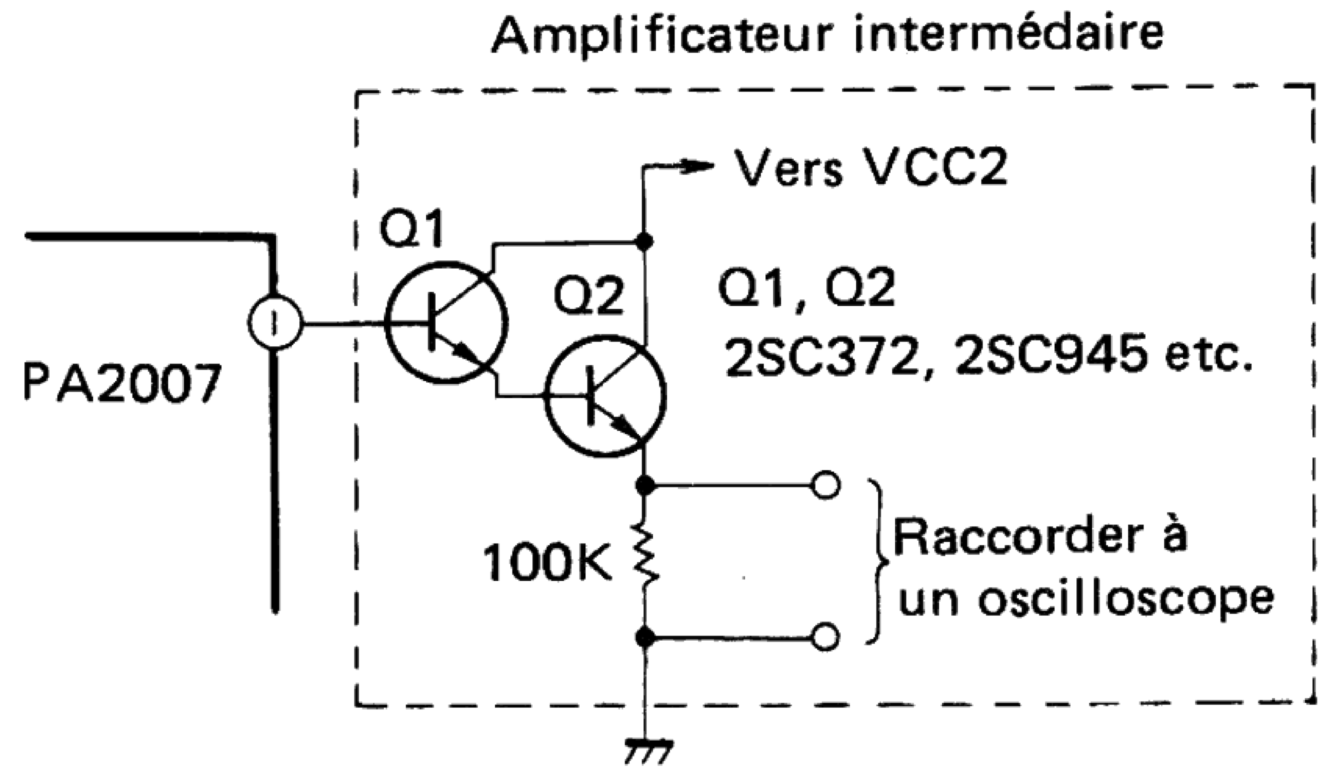


Fig. 11-1 Raccordement de l'amplificateur intermédiaire

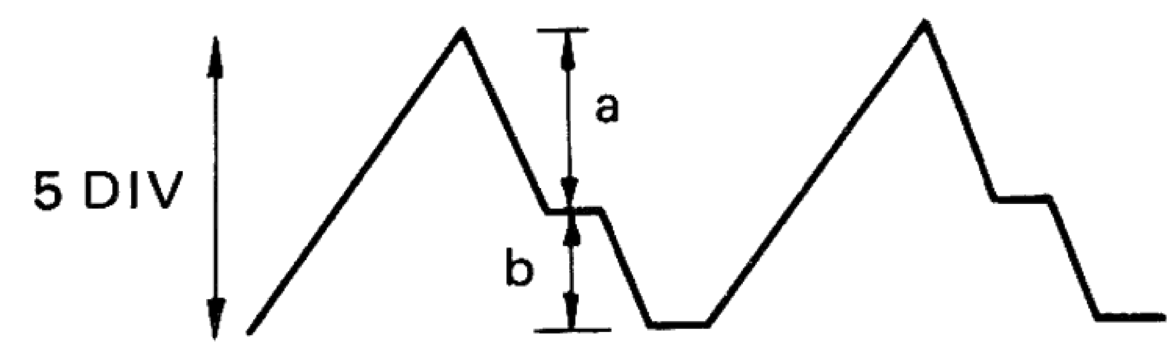


Fig. 11-2 Réglage de l'onde en dents de scie

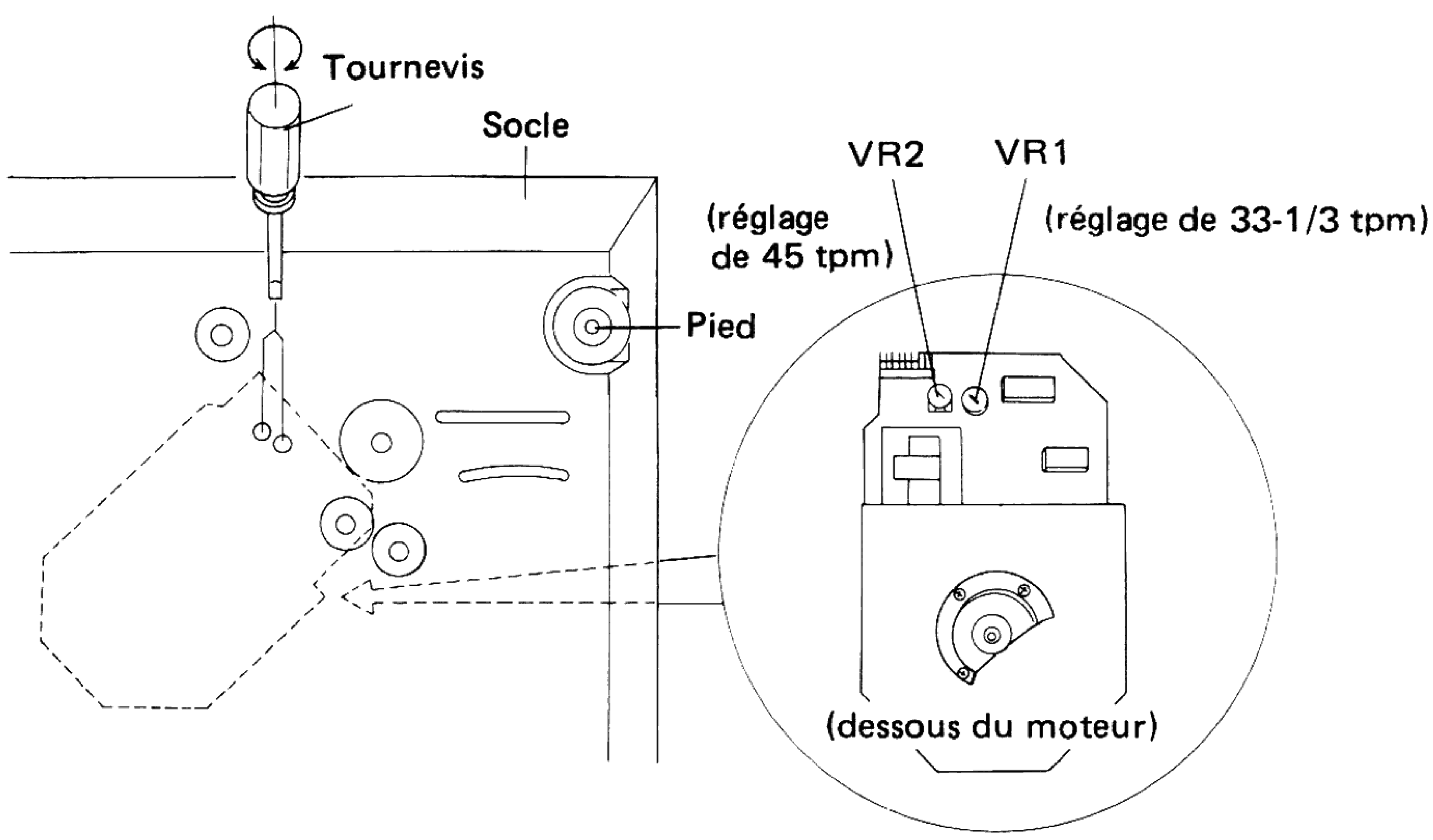


Fig. 11-3 Réglage de la vitesse du moteur

11.2 REGLAGE DU MECANISME DE COMMANDE

Retour automatique du bras

Si le retour automatique du bras s'effectue trop tôt ou trop tard, procéder aux réglages suivants:

1. Tourner la vis de réglage du retour automatique à fond dans le sens des aiguilles d'une montre.
2. Pousser le bras de lecture au maximum vers le centre du moteur.
3. En tournant lentement la vis de réglage dans le sens inverse des aiguilles d'une montre, faire revenir le bras vers le support du bras.
4. Lorsque la pointe de lecture se trouve à 32 mm du pivot central, arrêter le réglage.
5. Vérifier la position de retour automatique durant le fonctionnement afin de s'assurer qu'elle est correcte. Vérifier, également, la position de descente de la pointe de lecture.

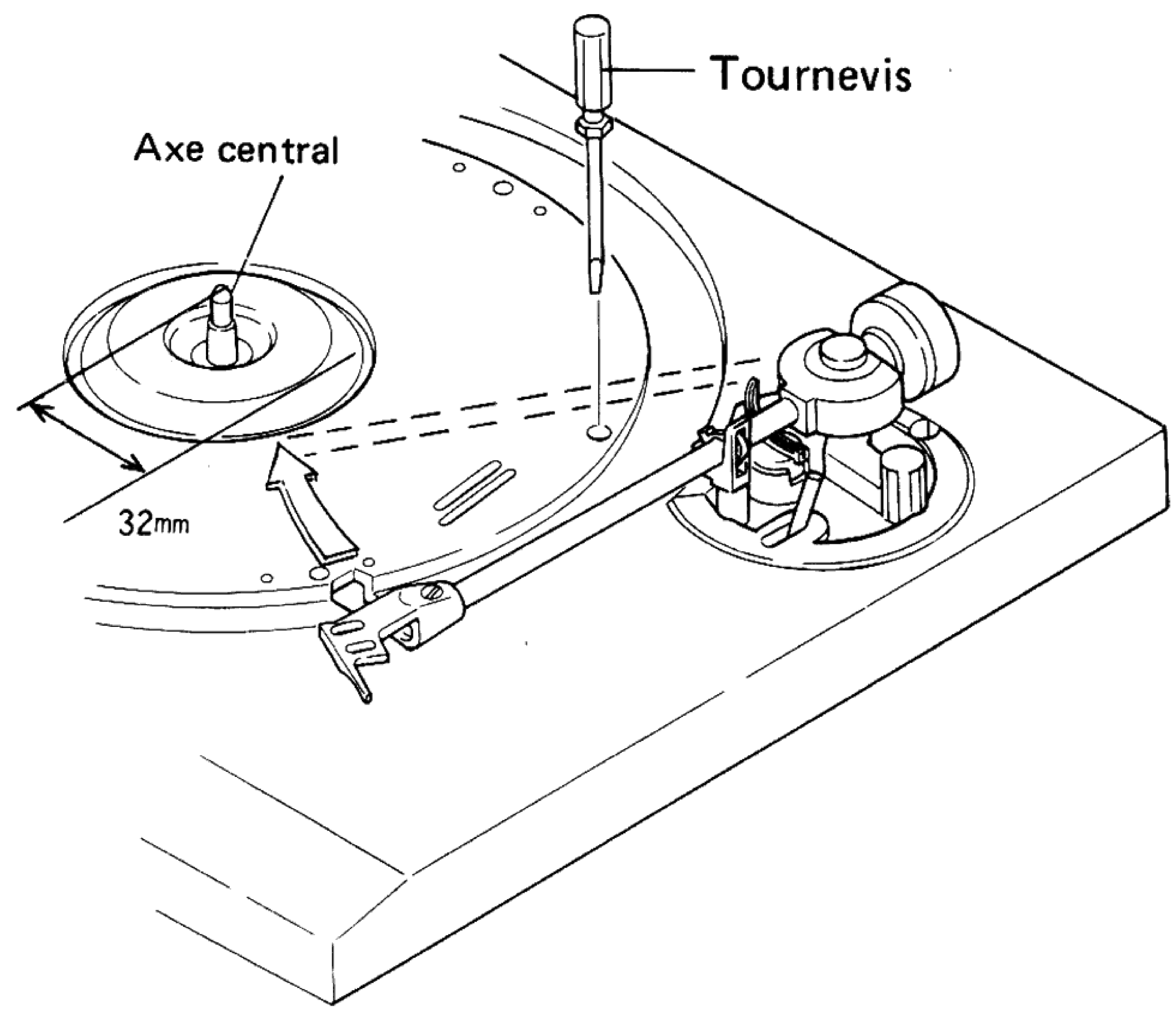


Fig. 11-4 Réglage du retour automatique du bras

■ Réglage de la position de descente de la pointe de lecture

Si le bras ne s'abaisse pas à l'endroit correct durant une lecture automatique, procéder au réglage ci-dessous. (Veiller à ne pas rayer le disque avec la pointe de lecture lors de ce réglage.)

1. Placer un disque de 30 cm sur le plateau.
2. Appuyer sur la touche de départ/arrêt de lecture pour commencer la lecture automatique. Noter le sens et la distance de la correction à effectuer.
3. Appuyer sur la touche de départ/arrêt de lecture pour faire revenir le bras de lecture sur son support.
4. Lorsque le mouvement du plateau s'arrête, localiser la vis à l'intérieur de l'orifice de réglage.
5. A l'aide d'un petit tournevis à lame plate, effectuer le réglage suivant en se reportant à l'illustration ci-contre:
   - Si la pointe de lecture descend hors du disque, tourner la vis dans le sens des aiguilles d'une montre (↻).
   - Si la pointe de lecture descend sur le disque trop loin du bord, tourner la vis dans le sens inverse des aiguilles d'une montre (↺).
6. Appuyer sur la touche de départ/arrêt de lecture et vérifier le réglage. Si la position de descente est toujours décentrée, recommencer les opérations 3 à 6 ci-dessus.

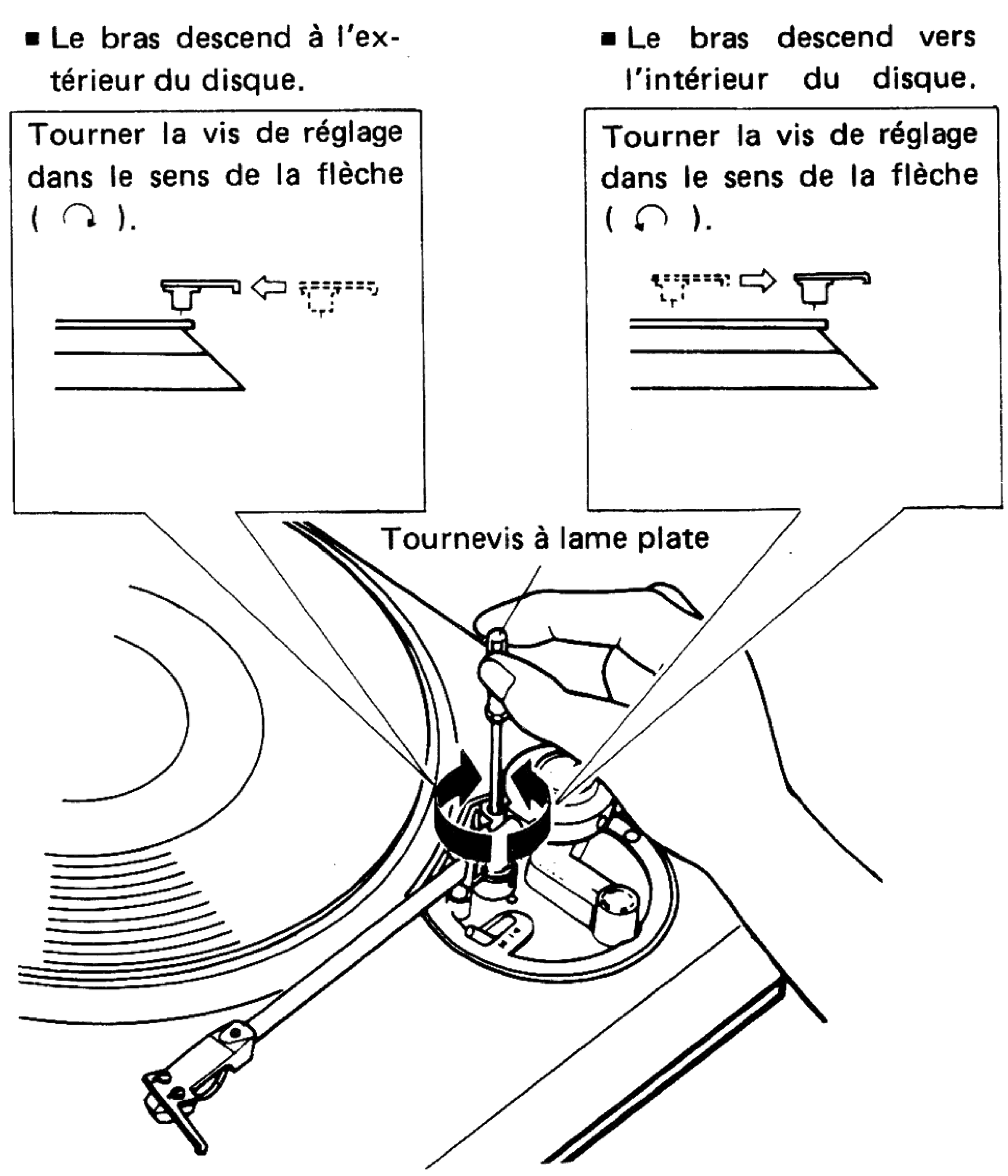


Fig. 11-5 Réglage de la position de descente de l'aiguille

Réglage au moyen du disque de réglage

(Le réglage de la position de descente s'effectue avec le bras de lecture sur son support.)

Position de descente

30 cm . . s'abaisse entre le comptage 306 et 313.

position de descente

17 cm . . s'abaisse entre le comptage 175 et 183.

11. AJUSTE

11.1 AJUSTE DE LA ROTACIÓN DEL MOTOR

1. Ajustar la velocidad a 33-1/3 rpm y poner en funcionamiento el giradiscos presionando el botón de reproducción/parada (PLAY/STOP).
2. Conectar el amplificador intermedio, de fabricación propia, como el de la figura 11-1, al terminal no. 1 del IC PA2007 y dar salida a la forma de onda a un osciloscopio (Fig. 11-1).
3. Cuando aparece una forma de onda como la de la ilustración de la Fig. 11-2 en el osciloscopio, variar de nuevo el osciloscopio hasta que se consiga una onda de diente de sierra de 5 div. de cresta a cresta. Luego, refiriéndose a la Fig. 11-2, ajustar la relación de a/b a 3/2 ajustando VR1. (La presencia de ruido puede afectar este ajuste, por lo que se tiene que realizar con cuidado.)
4. Una vez se ha completado el ajuste de 33-1/3 rpm, cambiar a 45 rpm y ajustar TR2 del mismo modo que en el paso. Ajustar siempre 33-1/3 rpm en primer lugar y hacer siempre ambos ajustes aunque sólo se requiera un solo ajuste.
5. Conectar el osciloscopio a la patilla no. 7 del PA2007 y cerciorarse de que 33-1/3 rpm esté a 55, 5 Hz y 45 rpm a 75 Hz.

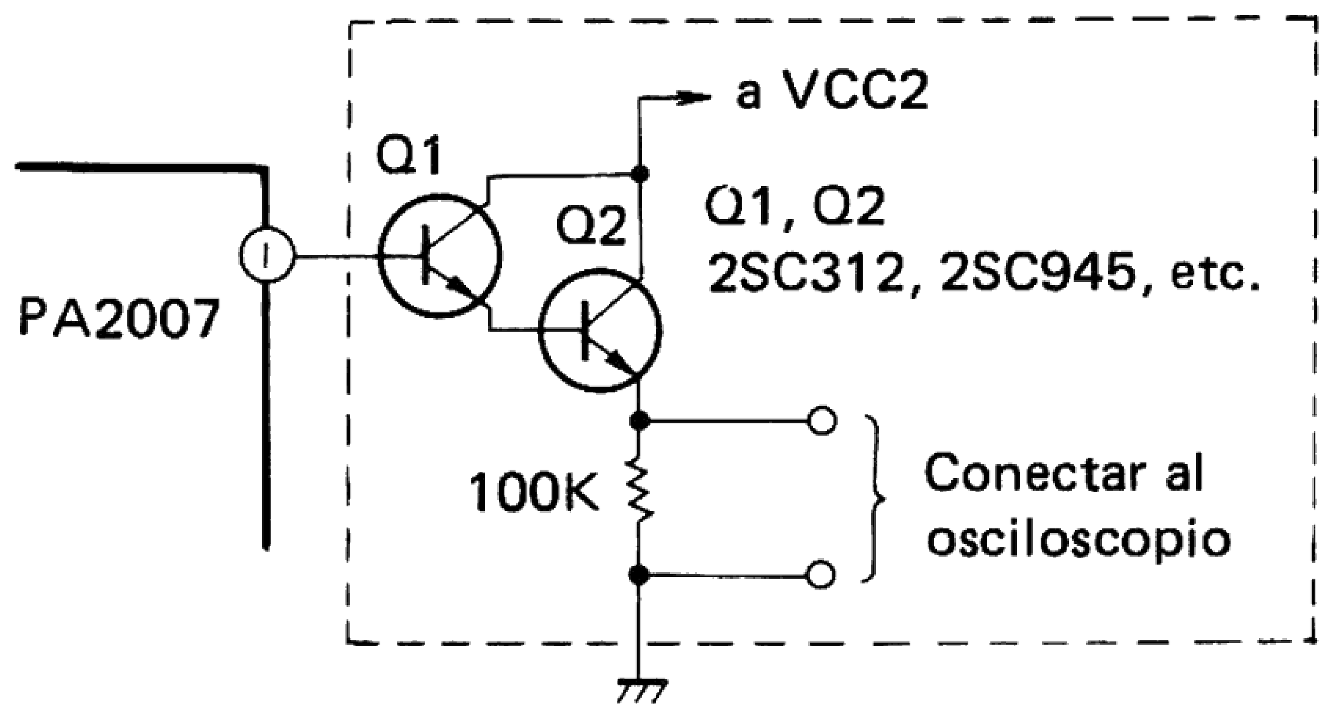


Fig. 11-1 Conexión del amplificador intermedio

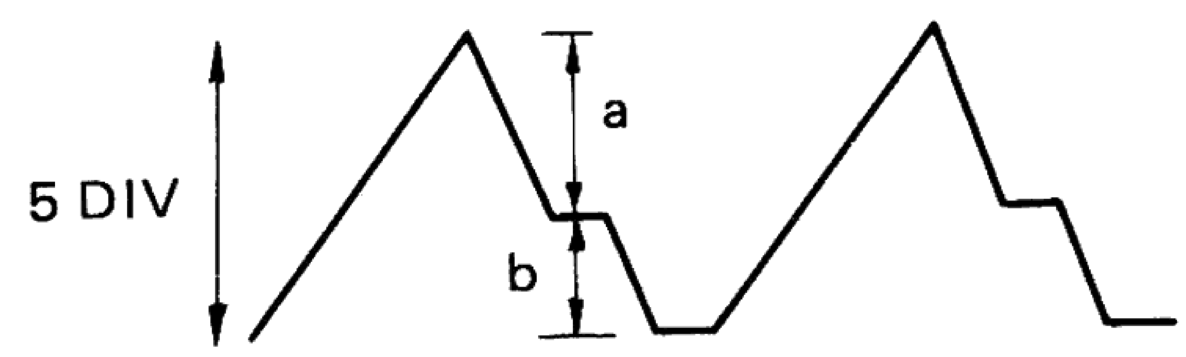


Fig. 11-2 Ajuste de la onda de diente de sierra

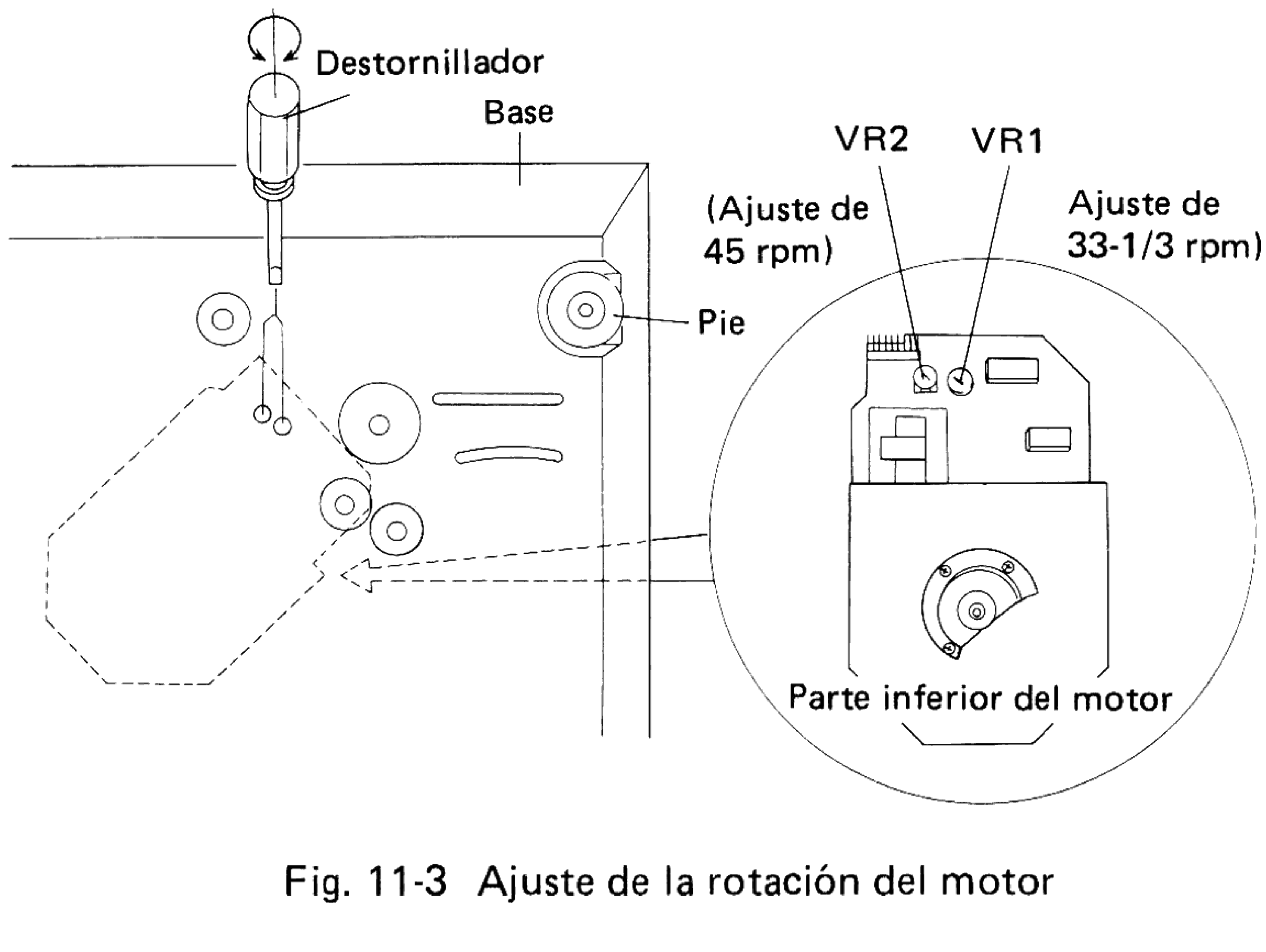


Fig. 11-3 Ajuste de la rotación del motor

11.2 AJUSTE DEL MECANISMO DE CONTROL

Retorno automático

Cuando el retorno automático ocurre demasiado temprano o demasiado tarde, realizar los siguientes ajustes.

1. Girar completamente hacia la derecha el tornillo de ajuste del retorno automático.
2. Mover el brazo fonocaptor todo lo que se pueda hacia el centro del motor.
3. Girando lentamente el tornillo de ajuste del retorno automático hacia la izquierda, hacer volver hacia atrás el brazo fonocaptor en sentido del apogo del brazo.
4. Cuando la aguja de la cápsula está a 32 mm del eje central, dejar de girar el tornillo.
5. Comprobar la posición del retorno automático durante la operación para cerciorarse de que es correcta. Comprobar también la posición de descenso de la aguja.

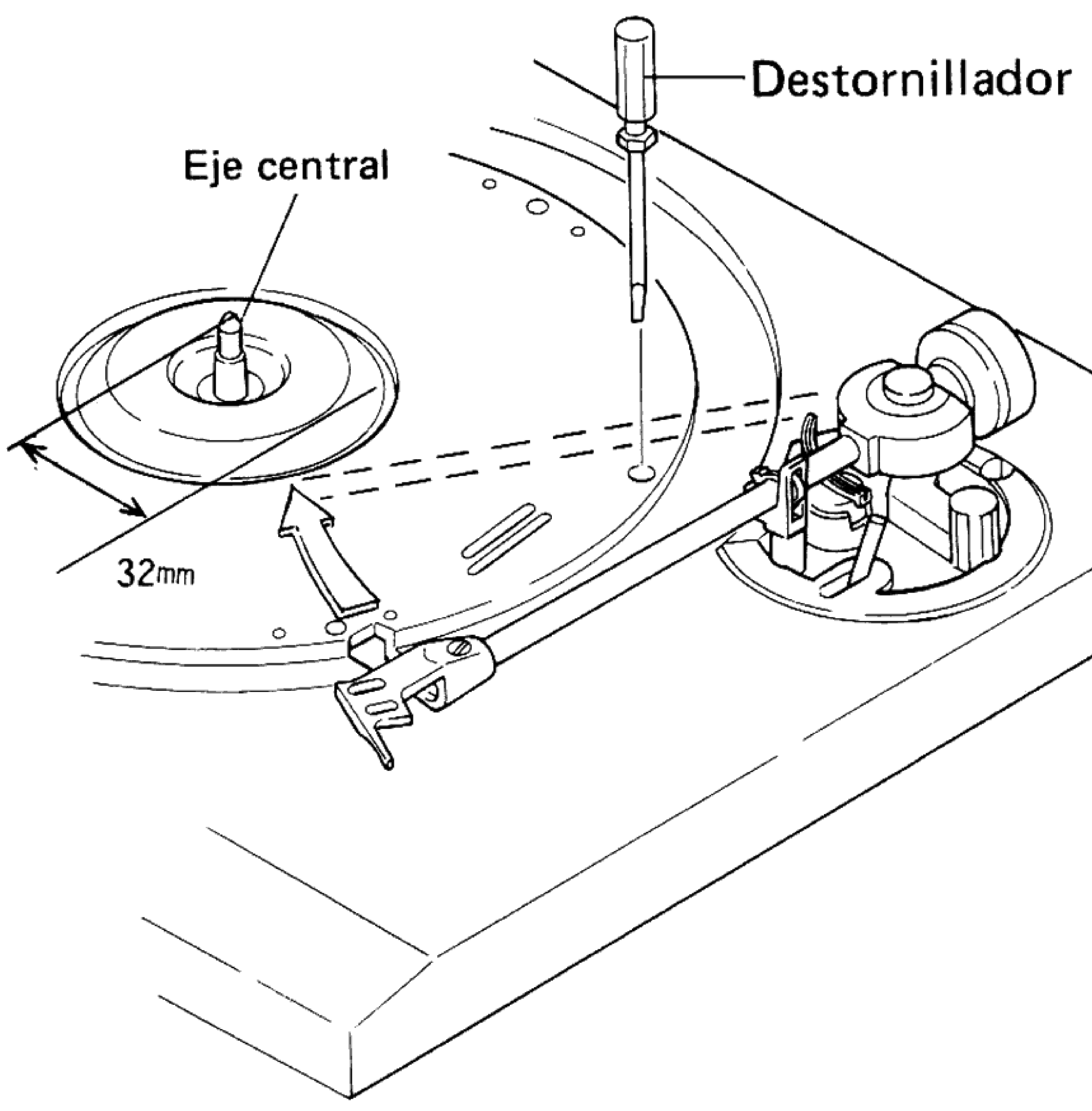


Fig. 11-4 Ajuste del retorno automático

■ Ajuste de la posición de descenso de la aguja

Cuando el brazo fonocaptor no desciende en la posición correcta durante la función de reproducción automática, ajustar de acuerdo con los siguientes procedimientos. (Téngase cuidado de no dañar el disco con la aguja mientras se realiza este ajuste.)

1. Poner un disco de 30 cm en el plato.
2. Presionar el interruptor de inicio/parada e iniciar la reproducción automática. Nótese i la dirección y posición de descenso están descentradas.
3. Presionando el interruptor de inicio/parada de reproducción, reponer el brazo fonocaptor a su apoyo.
4. Cuando el plato deje de girar, localizar el tornillo de ajuste en el interior del orificio de ajuste.
5. Utilizando un destornillador plano pequeño, referirse a la ilustración de la derecha y ajustar el modo siguiente:
   - Cuando la aguja desciende en la parte exterior del disco, girar el destornillador hacia la derecha ( ).
   - Cuando la aguja desciende demasiado adentro del disco, girar el destornillador hacia la izquierda ( ).
6. Presionar el interruptor de inicio/parada de reproducción y comprobar el ajuste. Si la posición de descenso está todavía fuera de lugar, repetir los pasos 3 al 6 de arriba.

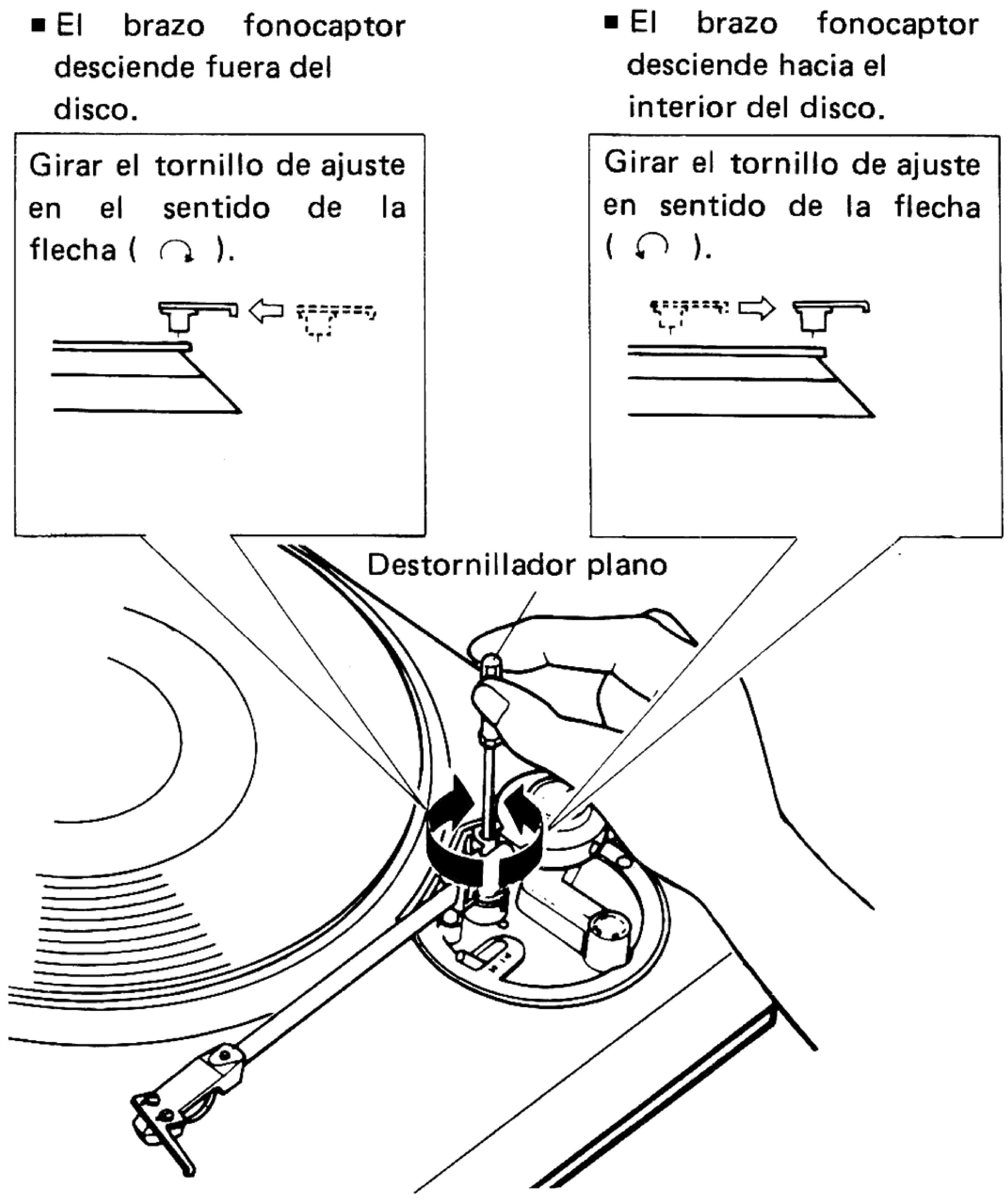


Fig. 11-5 Ajuste de la posición de descenso de la aguja

Ajuste utilizando el disco de prueba

(El ajuste de la posición de descenso se realiza estando el brazo fonocaptor en su posición de apoyo.)

Posición de descenso para discos de 30 cm ... desciende entre el cómputo de 306 y 313.

Posición de descenso para discos de 17 cm ... desciende entre el cómputo de 175 y 183.