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Service Manual

DC Servo Automatic
Turntable System

Turntable System

SL-BD20



Color

(S)..... Silver Type
(K) Black Type

Color	Areas
(S) (K)	[M] U.S.A.
(S) (K)	[MC] ... Canada.
(S) (K)	[E] Switzerland and Scandinavia.
(S) (K)	[EK] United Kingdom.
(S) (K)	[XL] Australia.
(S) (K)	[EG] ... F.R. Germany.
(S) (K)	[EB] Belgium.
(S) (K)	[EH] Holland.
(S) (K)	[EF] France.
(S) (K)	[Ei] Italy.
(S) (K)	[EC] Czechoslovakia.
(S) (K)	[XA] Southeast Asia, Oceania, Africa, Middle Near East and Central South America.



is the standard mark for plug-in-connector system. Products carrying this mark are interchangeable and compatible with each other.

SPECIFICATIONS

■ TURNTABLE SECTION

Type: Automatic turntable
Features: Auto-return
Auto-stop
Drive method: Belt drive
Motor: DC motor
Drive control method: DC servo control
Turntable platter: Aluminum die-cast
Diameter 31.2 cm (12-9/32")
Turntable speeds: 33-1/3 rpm and 45 rpm
Wow and flutter: 0.045% WRMS (JIS C5521)
±0.06% Weighted zero to peak
(IEC 98A weighted)
Rumble: -70 dB DIN-B (IEC 98A weighted)

■ TONEARM SECTION

Type: Static-balanced straight tonearm
Plug-in-connector cartridge
system
Overhang: 15 mm (19/32")
Effective length: 230 mm (9-1/16")

Tracking error angle: Within 2°32' at outer groove of
30 cm (12") disc within 0°32' at
inner groove of 30 cm (12") disc
Effective mass: 13.5 g (including cartridge)
Stylus pressure: 1.25 g (Fixed)
**Applicable cartridge
weight:** 6 g
**Phono cable
capacitance:** 90 pF

■ CARTRIDGE SECTION (Except for U.S.A. and Canada.)

Type: Moving magnet stereo cartridge
Frequency response: 10 Hz ~ 30 kHz
Output voltage: 2.5 mV at 1 kHz, 5 cm/s. zero to
peak lateral velocity
Channel separation: 22 dB at 1 kHz
Channel balance: Within 2 dB at 1 kHz

Technics

Matsushita Services Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Panasonic Hawaii, Inc.
91-238, Kauhii St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Recommended load impedance:	47 k Ω ~ 100 k Ω
Compliance (dynamic):	12 $\times 10^{-6}$ cm/dyne at 100 Hz
Stylus pressure range:	1.25 \pm 0.25g (12.5 \pm 2.5mN)
Weight	6 g (cartridge only)
Replacement stylus	EPS-24CS

Power consumption	For (M), (MC) area 2.5W For (XA) area 2W For Others: 1.5W
Dimensions (W\timesH\timesD)	430 \times 93 \times 375 mm (16-15/16" \times 3-21/32" \times 14-3/4") When dust cover is open: 430 \times 360 \times 410 mm (16-15/16" \times 14-5/32" \times 16-1/8")
Weight	3.6 kg (7.9 lb.)

■ GENERAL

Power supply:	For U.S.A. and Canada: AC 120V, 60 Hz For United Kingdom and Australia: AC 240V, 50 Hz For Continental Europe: AC 220V, 50 Hz For Others: AC 110~127/220~240V, 50/60 Hz
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Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

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■ SAFETY PRECAUTION

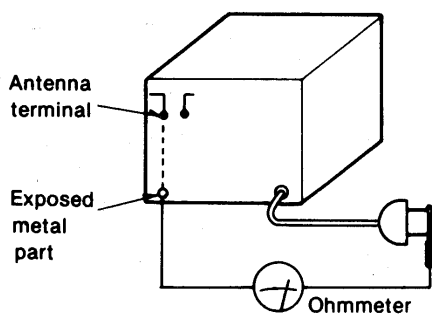
(This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

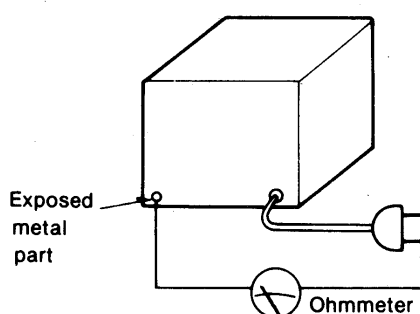
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads, antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3M Ω and 5.2M Ω to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3M Ω —5.2M Ω

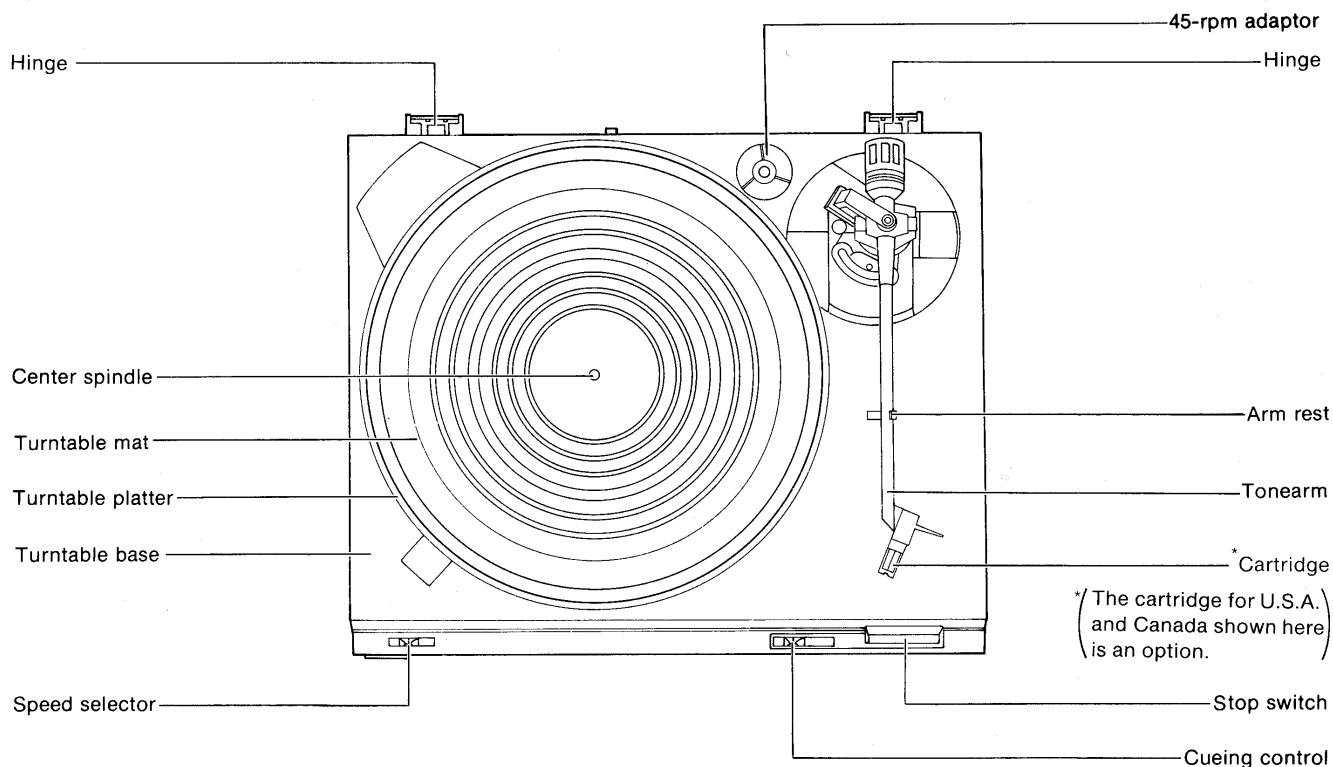


(Fig. B)

Resistance = Approx ∞

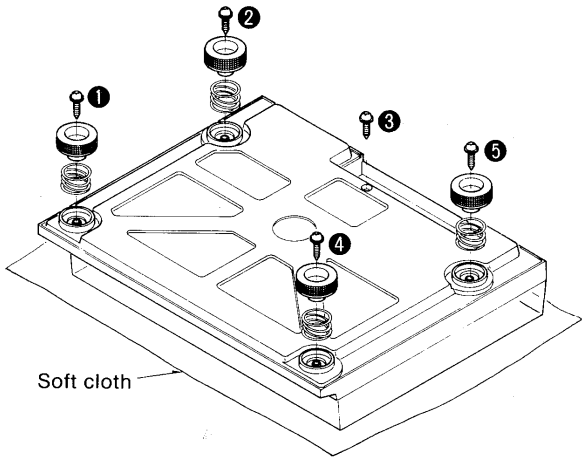
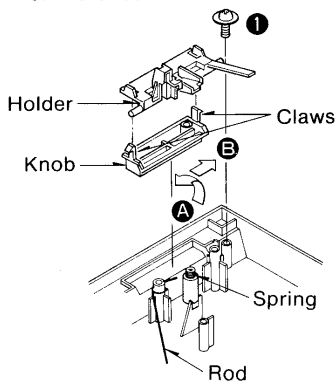
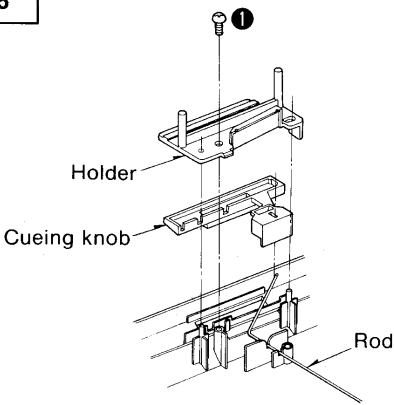
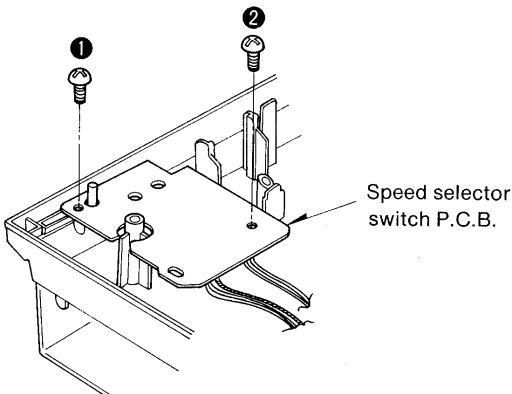
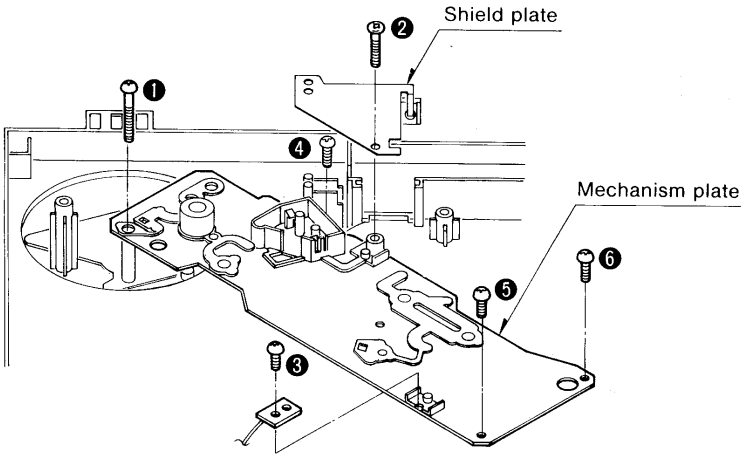
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

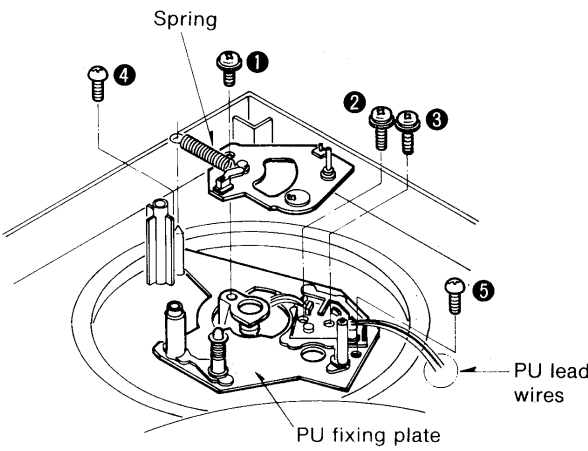
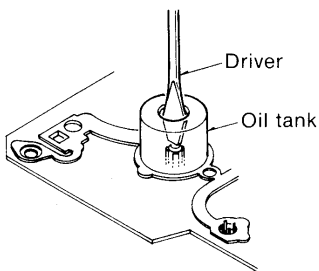
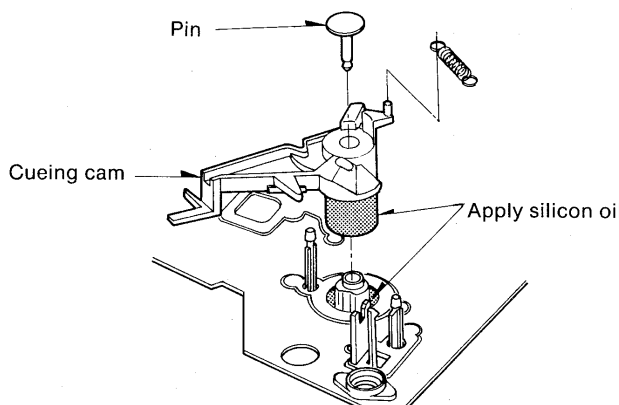
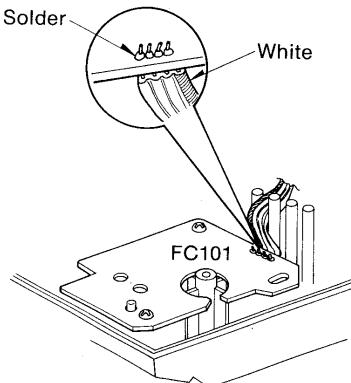
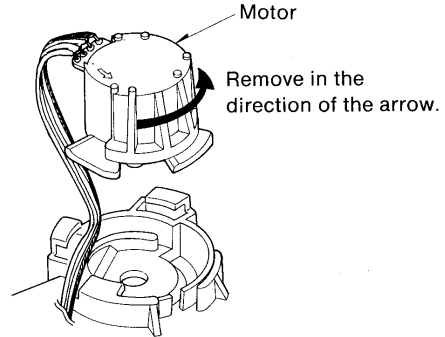
■ LOCATION OF CONTROLS



■ DISASSEMBLY INSTRUCTIONS

Ref. No 1	How to remove the cartridge	Ref. No 3	How to remove the turntable platter
Procedure 1	<ol style="list-style-type: none"> 1. Remove the setscrew ❶. 2. Pull out the cartridge, taking care that your hand does not touch the stylus tip. 	Procedure 3	<ol style="list-style-type: none"> 1. Open the dust cover and remove the turntable mat. 2. Remove the belt 3. Lift up the turntable platter.
Ref. No 2	How to remove the stylus	<p>Dust cover</p> <p>Turntable mat</p> <p>Belt</p> <p>Turntable platter</p>	
Procedure 2	<ul style="list-style-type: none"> • Pull out the stylus, taking care not to touch the stylus tip. 		
<p>Cartridge</p> <p>Stylus</p>			

Ref. No 4	How to remove the bottom board	Ref. No 6	How to remove the stop switch knob
Procedure 3 ▶ 4	<ol style="list-style-type: none"> 1. Turn over the unit on a soft cloth. 2. Remove the 5 setscrews (① ~ ⑤). 	Procedure 3 ▶ 4 ▶ 6	<ol style="list-style-type: none"> 1. Remove the setscrew ①. 2. Remove the holder (with knob) in the direction of the arrows (A, B). 3. Release the 2 claws.
			 <p>Note: When attaching the stop knob, do not forget to attach the spring.</p>
Ref. No 5	How to remove the cueing knob	Ref. No 7	How to remove the speed selector switch P.C.B.
Procedure 3 ▶ 4 ▶ 5	<ul style="list-style-type: none"> • Remove the setscrew ①. 	Procedure 3 ▶ 4 ▶ 7	<ol style="list-style-type: none"> 1. Remove the 2 setscrews (①, ②). 2. Lift up the speed selector switch P.C.B.
			
Ref. No 8	How to remove the mechanism plate		
Procedure 3 ▶ 4 ▶ 8	<ol style="list-style-type: none"> 1. Remove the 6 setscrews (① ~ ⑥). 2. Lift up the mechanism plate. 		
			

Ref. No 9	How to remove the tonearm and PU fixing plate	
Procedure 3♦4♦8♦9		
	<ol style="list-style-type: none"> 1. Unsolder the 5 PU lead wires from the phono terminal. 2. Remove the setscrew ❶ and spring. 3. To remove the tonearm, remove the 2 setscrews (❷, ❸). 4. To remove the PU fixing plate, remove the 2 setscrews (❹, ❺). <p>* PU lead wiring method</p> <p>WhiteL channel (+) terminal Blue.....L channel (−) terminal RedR channel (+) terminal GreenR channel (−) terminal Black.....Ground terminal</p>	
Ref. No 10	How to remove the cueing cam	Note: If the cueing time of the tonearm becomes too short, or if the cueing cam is replaced, apply silicon oil (Part No. SZZ0L11) according to the following procedure.
Procedure 3♦4♦8♦10		<ol style="list-style-type: none"> 1. Remove the cueing cam. 2. Apply silicon oil to the cueing cam and oil tank.
	<ol style="list-style-type: none"> 1. Push the pin with a driver. 2. Remove the pin and spring. 3. Remove the cueing cam. 	
Ref. No 11	How to remove the turntable drive motor	
Procedure 3♦4♦11	<ol style="list-style-type: none"> 1. Unsolder the terminal (FC101). 2. Remove the motor from cabinet. 	
		 <p>Caution for fitting (Flat cable)</p> <ul style="list-style-type: none"> • The white side of the flat cable goes to the ❶ pin of the FC101 terminal.

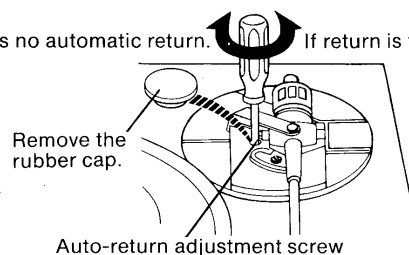
MEASUREMENTS AND ADJUSTMENTS

ADJUSTMENT OF THE AUTOMATIC-RETURN POSITION

Make this adjustment if the tonearm doesn't return automatically to the arm rest, or if it returns before the tune ends.

1. Adjust to the desired automatic-return position.
2. Check to be sure the automatic-return position is correct.

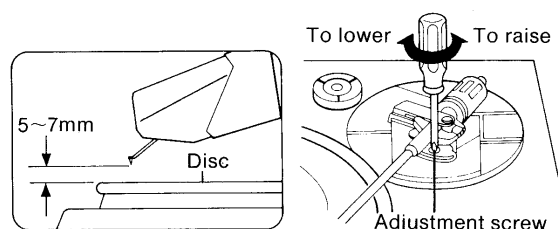
If there is no automatic return.  If return is too soon.



ADJUSTMENT OF THE STYLUS-TO-DISC CLEARANCE

Make this adjustment if the cartridge is replaced, or at any other time an adjustment is necessary because of the length of the stylus being used. (This adjustment is usually unnecessary.)

1. Set the cueing control to "∇".
2. Move the tonearm to a position above the disc.
3. Adjust the stylus tip position.

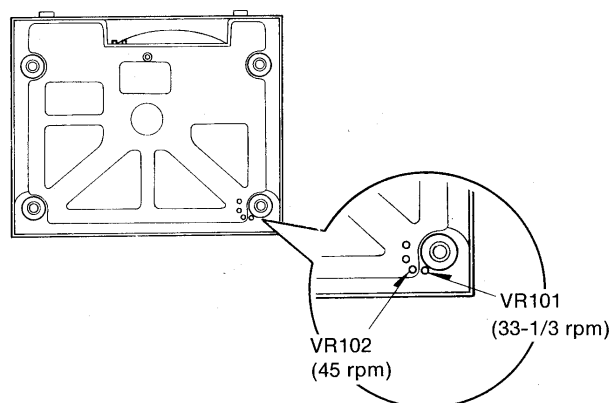


ADJUSTMENT OF THE ROTATING SPEED

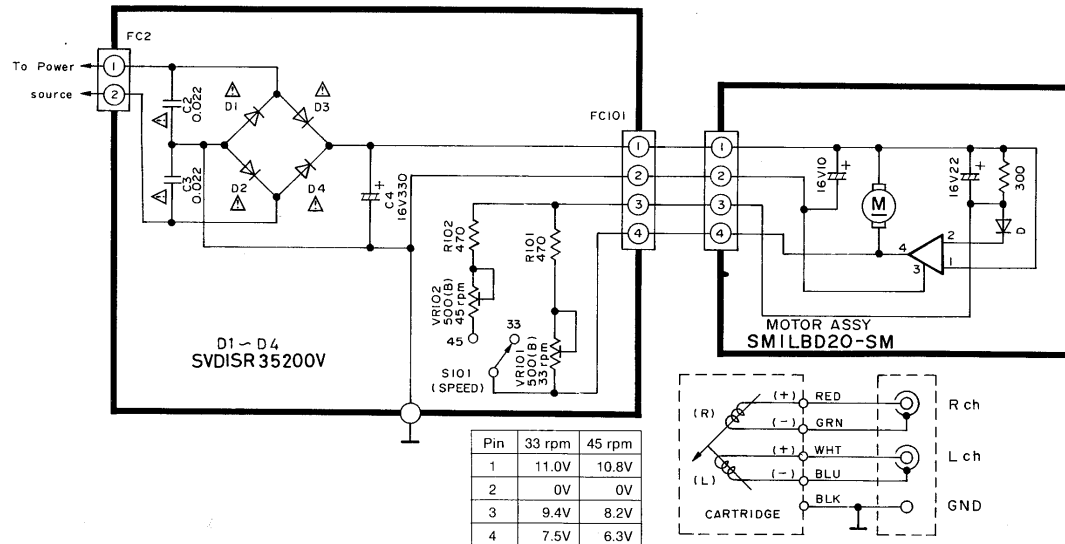
When the turntable drive motor or the variable resistors (VR101, 102) are changed, or if the rated rotation is not reached even, adjust the rotating speed in the following procedure.

1. Set the speed selector switch to the "33" position.
2. Turn VR101 with a screwdriver from the bottom of the set to the rated rotation (33-1/3 rpm).
3. Set the speed selector switch to the "45" position.
4. Turn VR102 with a screwdriver from the bottom of the set to the rated rotation (45 rpm).

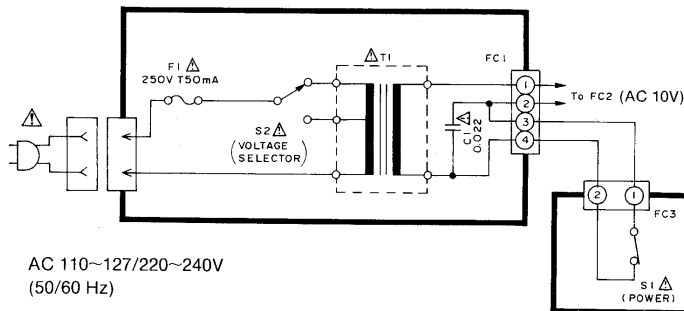
Note: Be sure to make the adjustment for 33-1/3 rpm first.



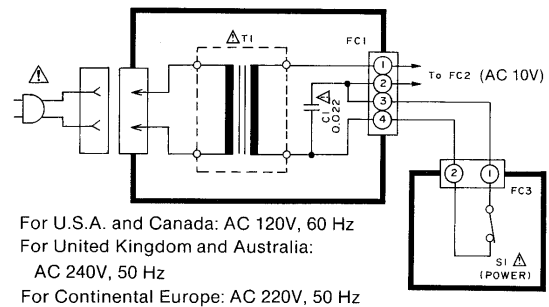
■ SCHEMATIC DIAGRAM



• Power source circuit For [XA] area



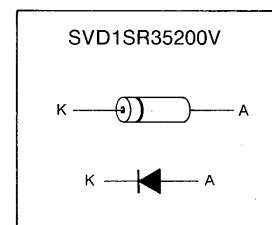
For other areas



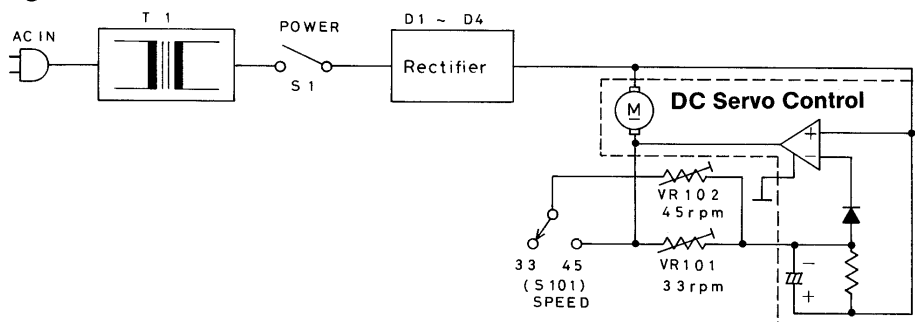
Notes:

1. S1: Power switch in "on" position.
2. S2: Voltage selector switch. (For [XA] area only.)
3. S101: Speed selector switch in "33" position.
4. The values are of the reference voltage for the turntable rotation of this unit, measured by a DC voltmeter (high impedance) on the basis of chassis. So, some error might be included depending on the internal impedance of the measuring instrument and the unit measured.
5. Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
6. VR101 is the 33-1/3 rpm speed adjustment variable resistor.
7. VR102 is the 45 rpm speed adjustment variable resistor.
8. This schematic diagram may be modified at any time with the development of new technology.

• Terminal guide of diode

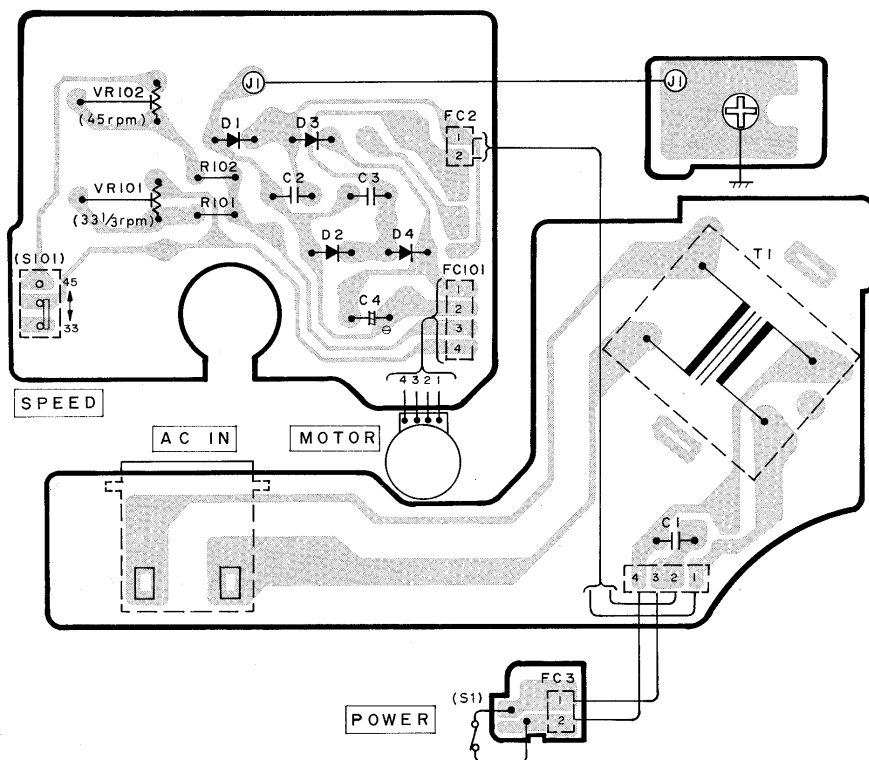


• Block diagram

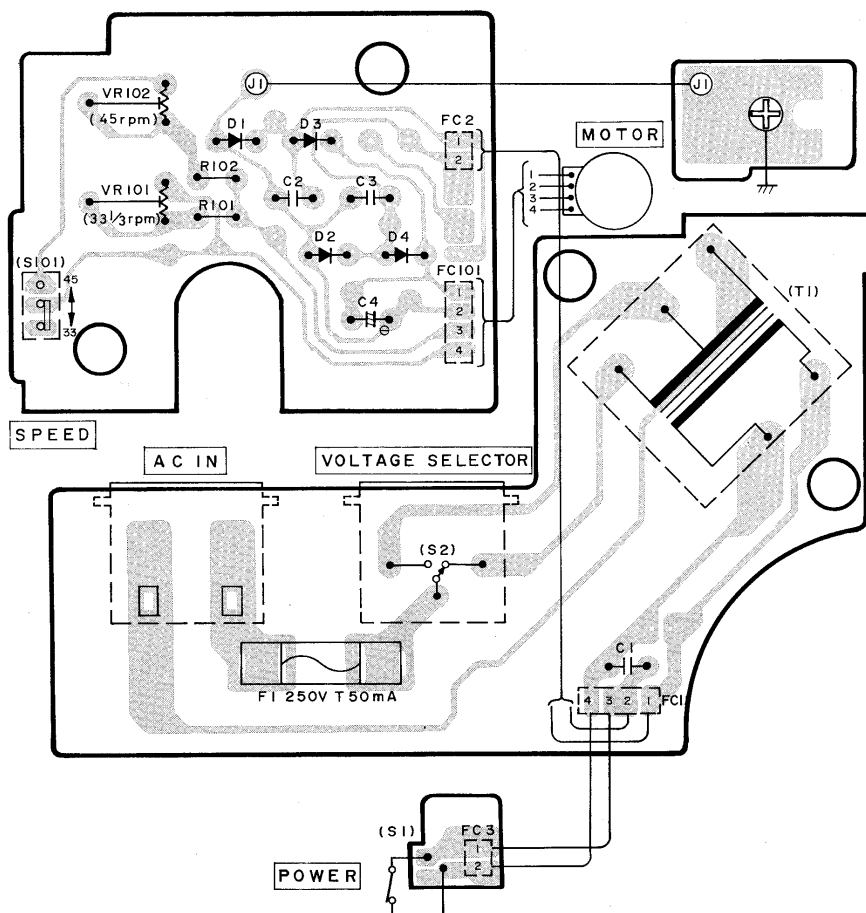


■ **CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM**

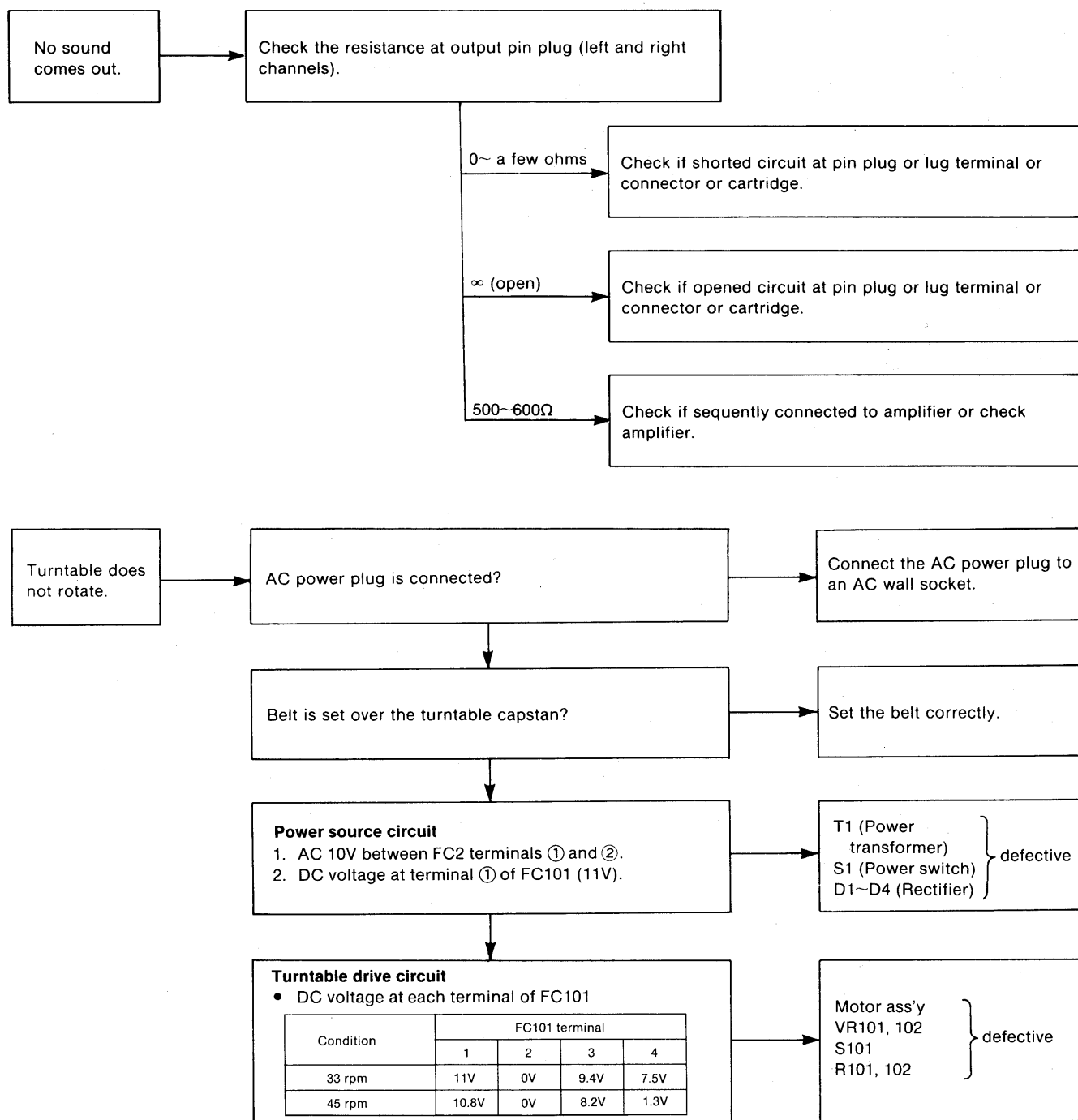
• For U.S.A., Canada, United Kingdom, Australia and Continental Europe.



• For Others

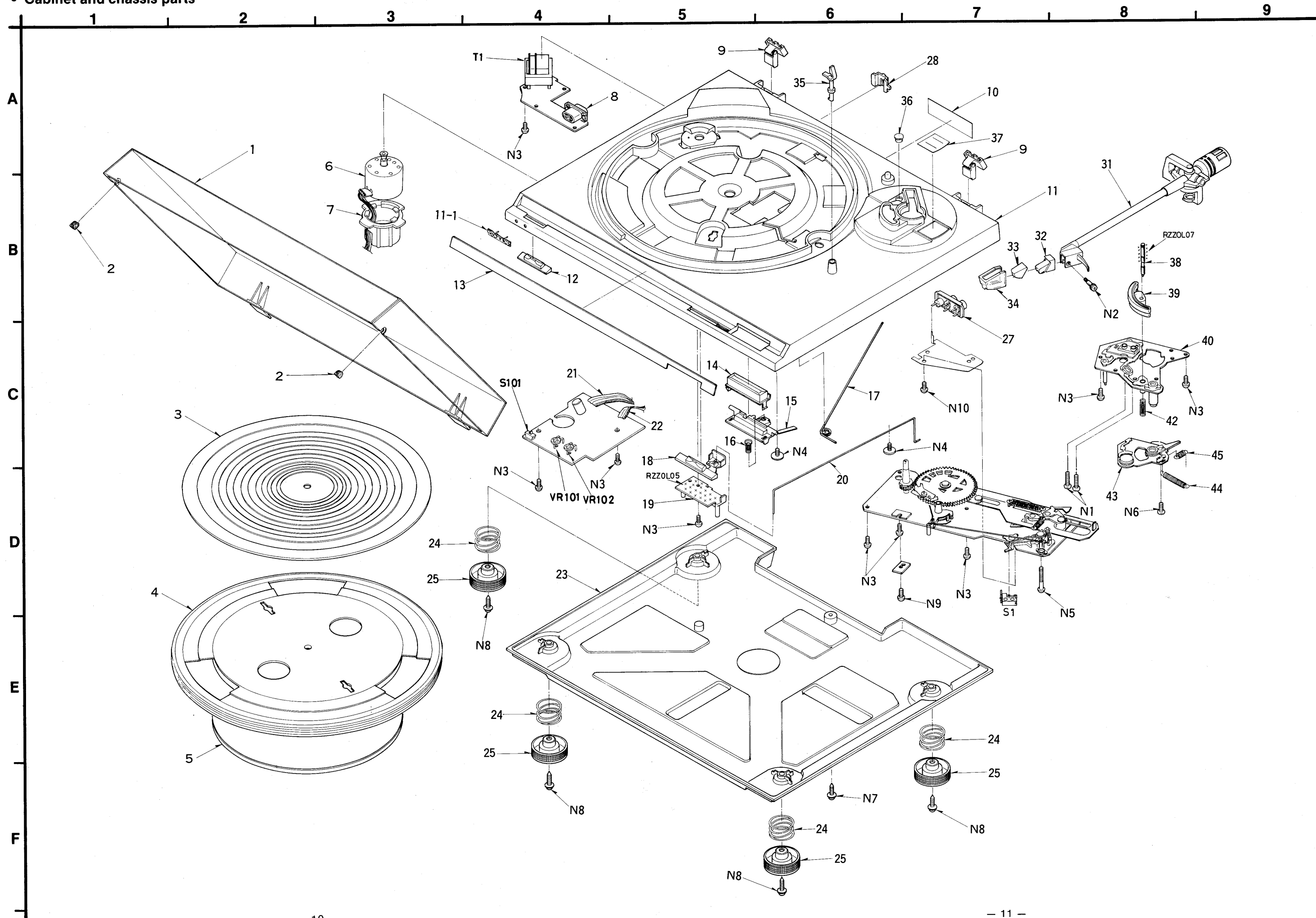


■ TROUBLESHOOTING

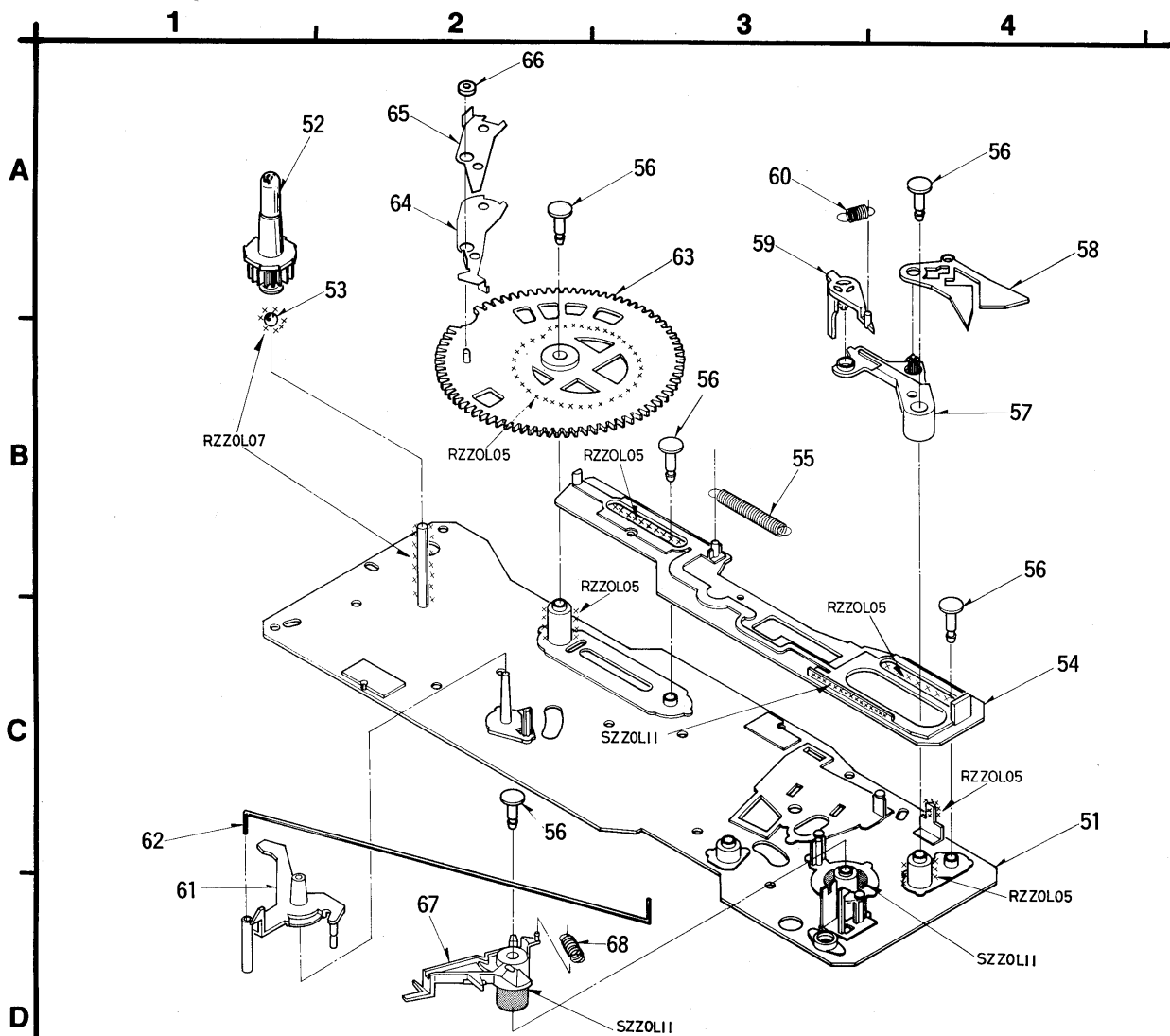


■ EXPLODED VIEW

• Cabinet and chassis parts



• Mechanism parts



■ REPLACEMENT PARTS LIST

- Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. Important safety notice:
Components identified by \triangle mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
 3. \otimes -marked parts are used for black type only, while \bigcirc -marked parts are used for silver type only.
 4. Parts other than \otimes - and \bigcirc -marked are used for both black and silver types.
 5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
 6. The "S" mark is service standard parts and may differ from production parts.
 7. The parenthesized numbers in the column of description stand for the quantity per set.

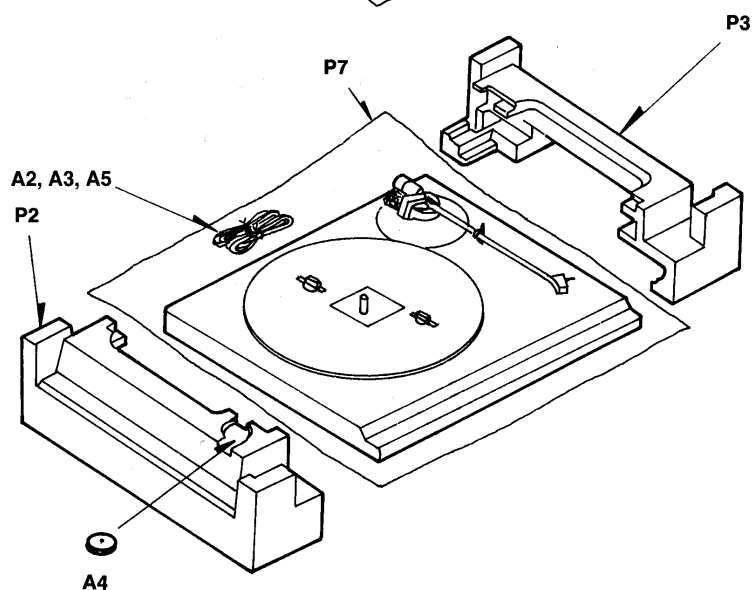
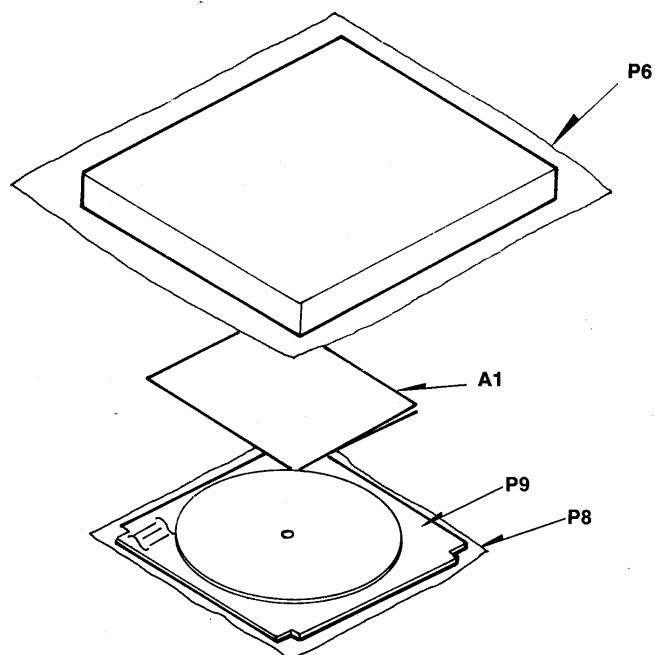
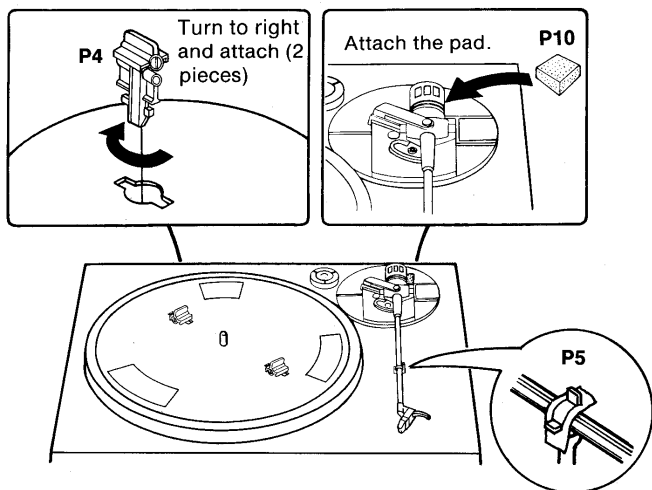
Color	Areas
(S) (K)	[M] U.S.A.
(S) (K)	[MC] ... Canada.
(S) (K)	[E] Switzerland and Scandinavia.
(S) (K)	[EK] United Kingdom.
(S) (K)	[XL] Australia.
(S) (K)	[EG] ... F.R. Germany.
(S) (K)	[EB] Belgium.
(S) (K)	[EH] Holland.
(S) (K)	[EF] France.
(S) (K)	[Ei] Italy.
(S) (K)	[EC] Czechoslovakia.
(S) (K)	[XA] Southeast Asia, Oceania, Africa, Middle Near East and Central South America.

Ref. No.	Part. No.	Description
RESISTORS		
R101, 102	ERD25FJ471	Carbon, 1/4W, 470Ω, ±5%
CAPACITORS		
C1	△ ECQG1223KZ	Polyester, 100V, 0.022μF, ±10%
C2, C3	△ ECKR1H223ZF	Ceramic, 50V, 0.022μF, ±20%
C4	ECEA1CU331	Electrolytic, 16V, 330μF
DIODES		
D1~4	△ SVD1SR35200V	Rectifier
VARIABLE RESISTORS		
VR101, 102	EVN61AA00B52	Speed Adjuster, 500Ω (B)
POWER TRANSFORMERS		
T1	△ SLTB28B39K	Power Source
[M, MC]		
T1	△ SLTB35F33K	Power Source
[EK, XL]		
T1 [XA]	△ SLTB35F35K	Power Source
T1 [other]	△ SLTB35F34K	Power Source
SWITCHES		
S1	△ SFDSD72R01	Power
S2 [XA]	△ SFDSDHXW02067	Voltage Selector only
S101	SFDSHSW0834	Speed Selector
FUSE		
F1 [XA]	△ XBA2C005T1B	250V, T50mA only
CABINET AND CHASSIS PARTS		
1	SFADZ15R01	Dust Cover (1)
2	SFGZD04N01	Rubber Cushion, Dust Cover (2)
3	SFTGB93M01	Turntable Mat (1)
4	SFTEB83M01	Turntable (1)
5	SJY90080-1	Belt (1)
6	SMILBD20-SM	Motor (1)
7	SHGB7	Rubber Cushion, Motor (1)
8	△ SFDJHSC0515	AC Socket (1)
9	SFATZ15R01A	Hinge (2)
10 [M]	SGTB30	Name Plate (1)
10 [MC]	SGTB31	Name Plate (1)
10 [E, EC]	SGTB32	Name Plate (1)
10 [EK]	SGTB33	Name Plate (1)
10 [XL]	SGTB34	Name Plate (1)
10 [EG]	SGTB35	Name Plate (1)
10 [XA]	SGTB37	Name Plate (1)
10 [other]	SGTB36	Name Plate (1)
11	○ SKMLBD20-SM	Cabinet (1)
11	⊗ SKMLBD20-KM	Cabinet (1)
11-1	○ SGB628	Badge (1)
11-1	⊗ SGB628-1	Badge (1)
12	○ SFKTBD2N03	Knob, Speed Selector (1)
12	⊗ SFKTBD2N03	Knob, Speed Selector (1)
[M, MC]		
12	⊗ SBCB70-0C	Knob, Speed Selector (1)
[other]		

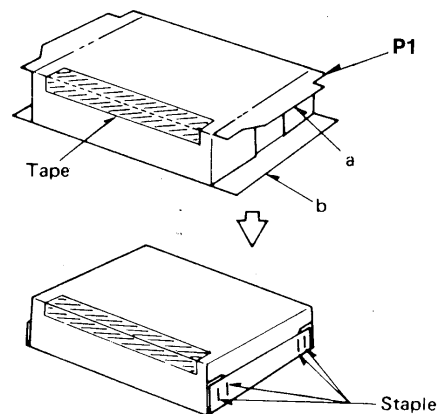
Ref. No.	Part. No.	Description
13	SGXB120	Ornament Plate (1)
[M, MC]		
13 [other]	SGXB70	Ornament Plate (1)
14	○ SFKTBD2N01	Knob, Stop (1)
14	⊗ SFKTBD2N01	Knob, Stop (1)
[M, MC]		
14	⊗ SBCB30-0C	Knob, Stop (1)
[other]		
15	SFUMBD2N01	Base, Stop Knob (1)
16	SFQHZ15R01	Spring, Stop Knob (1)
17	SFUZZ15R01	Rod, Stop Knob (1)
18	○ SBCB60-0S	Knob, Cueing (1)
18	⊗ SBCB60-0S	Knob, Cueing (1)
[M, MC]		
18	⊗ SBCB60-0C	Knob, Cueing (1)
[other]		
19	○ SKMB140-0S	Bracket, Cueing Knob (1)
19	⊗ SKMB140-0K	Bracket, Cueing Knob (1)
20	STZB4	Rod, Cueing Knob (1)
21	W4FCB23f	Lead Wire (1)
22	W4FCB29ff	Lead Wire (1)
23	SKUB3	Bottom Cover (1)
24	SFQCB2N01	Spring, Insulator (4)
25	SKLB2	Insulator (4)
27	SFDJBD2N03	Jack, Output (1)
28	○ SKMB130-0S	Cover (1)
28	⊗ SKMB130-0K	Cover (1)
ONEARM PARTS		
31	SFAB5A	Tonearm (1)
32	EPC-P24S	★Cartridge (1)
[except]		
[M, MC]		
33	EPS-P24CS	★Stylus (1)
[except]		
[M, MC]		
34	SFCNC05101	Cover (1)
[except]		
[M, MC]		
35	SHRB14	Tonearm Rest (1)
36	○ SFGK170-01	Cap (1)
36	⊗ SFGK171F01	Cap (1)
37	SGXB60	Plate, Cancellor (1)
38	SFXJBD2N51	Shaft, Arm Lift (1)
39	SFUMBD2N51	Arm Lift (1)
40	SFUPBD2N51E	Arm Base (1)
42	SUSB12	Spring (1)
43	SFUPBD2N52E	Plate, Pick-up (1)
		Fixing (1)
44	SFQHZ15R55	Spring (1)
45	SFQHZ15R61	Spring (1)
MECHANISM PARTS		
51	SUKB4E	Mechanism Plate (1)
52	SDWB1A	Turntable Shaft (1)
53	SFYB-5-32	Ball (1)
54	SFUBZ15R51	Plate, Drive (1)
55	SFQHZ15R64	Spring, Drive Plate (1)
56	SFUMZ15R56	Pin (5)
57	SFUMZ15R54	Switch Lever (A) (1)
58	SFUMBD2N52	Switch Lever (B) (1)
59	SFUMZ15R59	Switch Lever (C) (1)
60	SFQHZ15R62	Spring (1)

Ref. No.	Part. No.	Description
61	SFUMZ15R52	Lever, Actuating (1)
62	SFQSZ15R51	Rod, Actuating (1)
63	SFUGZ15R51	Main Gear (1)
64	SFURZ15R52	Rink (A), Main Gear (1)
65	SFURZ15R51	Rink (B), Main Gear (1)
66	SFUMZ15R61	Washer (1)
67	SHRB11	Cam, Cueing (1)
68	SFQHZ15R63	Spring (1)
SCREWS AND WASHERS		
N1	SNSB1	Screw (2)
N2	SFPEV0Q601	Screw, Cartridge (1)
N3	XTV3+8G	Screw, ⊕3×8 (9)
N4	SFXGQ06N01	Screw (2)
N5	XTV3+30J	Screw, ⊕3×30 (1)
N6	XYC3+CG10	Screw, ⊕3×10 (1)
N7	XTW3+14QFYR	Screw, ⊕3×14 (1)
N8	SNSB3	Screw (4)
N9	XYE3+EJ8	Screw, ⊕3×8 (1)
N10	XTV3+16J	Screw, ⊕3×16 (1)
ACCESSORIES		
A1 [M]	SQX53764	Instruction Book (1)
A1 [MC]	SQXLB20-SMC	Instruction Book (1)
A1 [EK]	SQX53766	Instruction Book (1)
A1 [EG]	SQX53767	Instruction Book (1)
A1 [EF]	SQX53768	Instruction Book (1)
A1 [Ei]	SQX53769	Instruction Book (1)
A1 [other]	SQXLB20-SE	Instruction Book (1)
A2	SFDHBD2N01	Output Cord (1)
A3	SFDLJ11N01E	Ground Wire (1)
A4	SFWE212-01	45 Adaptor (1)
A5	△ SJA170	AC Cord (1)
[M, MC]		
A5 [XL]	△ SJA163	AC Cord (1)
A5 [EK]	△ SFDAC05G02	AC Cord (1)
A5 [XA]	△ SJA168-1	AC Cord (1)
A5 [other]	△ SFDAC05E02	AC Cord (1)
A6 [XA]	△ SJP9215	Adaptor (1)
only		
PACKING PARTS		
P1	○ SPGB11	Carton Box (1)
[MC, EF]		
P1	○ SPGB10	Carton Box (1)
[other]		
P1	⊗ SPGB13	Carton Box (1)
[MC, EF]		
P1	⊗ SPGB12	Carton Box (1)
[other]		
P2	SPSB4	Pad, Left (1)
P3	SPSB5	Pad, Right (1)
P4	SPEB3	Clamper, Turntable (2)
P5	SPEB2	Clamper, Tonearm (1)
P6	SPPB1	Polyethylene Bag, Dust Cover (1)
P7	SFYH60×60	Polyethylene Bag, Unit (1)
P8	SFYF32A35	Polyethylene Bag, Turntable Mat (1)
P9	SFHDDB2N01	Pad, Turntable Mat (1)
P10	SPEB4	Pad, Turntable Weight (1)

■ PACKING



1. Place the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
 - Use gum tape or adhesive cloth tape of 50mm wide at least.
4. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple.)



- Stapling positions are shown below.

