

JVC

SERVICE MANUAL

MODEL
JL-A40
AUTO-RETURN
DIRECT DRIVE
TURNTABLE



Features

- * Cueing facility protects the record surface during manual playing.
- * Automatic reject facility
To stop playing a record at any point, push the START/REJECT operation lever towards "REJECT", and the tonearm will automatically return to the arm rest.

New gimbal support arm

Outstanding tonearm sensitivity is assured, because bearings for clockwise/counterclockwise rotation are provided above and under the pivot bearing. Trackability is, thanks to the TH (Tracing Hold) tonearm system — the axis of the balance weight is positioned below its fulcrum — superb, and tracking characteristics are maintained even if a record is warped or if there is external vibration.

Direct drive

A newly developed 12-pole DC servomotor provides greatly improved performance. Highly accurate speed control and freedom from vibration are the performance features available only in the direct drive system.

Large high-inertia platter

Aluminium die-cast platter having a diameter of 31cm and weighting 1.6kg is employed. The stroboscope on the platter rim (33-1/3 r.p.m.) permits fine speed adjustment while a record is being played.

Diamond stylus

Good sound quality and long life are ensured by the diamond stylus having a tip radius of 0.5 mil.

Anti-skating mechanism

Anti-skating force can be adjusted corresponding to the tracking force.

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1. Specifications

TURNTABLE

Type :	Auto-return Mechanism
Drive system:	Direct Drive
Drive motor:	D.C. Servo motor
Speeds:	33-1/3 and 45 rpm
Wow and flutter (WRNS):	Less than 0.03% (DIN)
Signal to noise ratio:	More than 60dB (IEC-B) 70dB (DIN-B)
Pitch control range:	More than $\pm 2.5\%$
Platter:	12-inch (31cm) Die-cast aluminum alloy

TO NEARM

Type:	Statically-balances S-shaped tubular arm with JVC developed TH(Tracing Hold) balancing system and with tracking force dial of 0.1 gram steps
Effective arm length:	220mm
Overhang:	15mm
Applicable tracking force range:	0 to 3 grams
Applicable cartridge weight:	14.5~21.5 grams (Headshell Included)
Tracking error:	+3° .35', -0° .43'

CARTRIDGE (Except U.S.A., Canada and U.K.)

Type:	Moving Magnet
Stylus:	0.5 mil, diamond
Optimum tracking force:	2g
Out put:	3mV (1kHz)
Frequency response:	10 - 25,000Hz
Separation:	More than 25dB
Load resistance:	47k - 100k ohms
Compliance:	25 x 10 ⁻⁶ cm/dyne (static) 10 x 10 ⁻⁶ cm/dyne (dynamic)

GENERAL

Dimensions:	46.0(W) x 36.7(D) x 14.5(H) cm
Weight:	7.2 kg

TABLE 1

Countries	Line Voltage & Frequency	Power Consumption
U.S.A., CANADA	AC 120V, 60Hz	4.5 watts
EUROPE CONTINENT	AC 220V~, 50Hz	4.5 watts
U.K., AUSTRALIA	AC 240V~, 50Hz	4.5 watts
U.S. MILITARY MARKET	AC 100/120/220/240V Selectable, 50/60Hz	3.5 watts
OTHER AREAS	AC 100/120/220/240V Selectable, 50/60Hz	3.5 watts

2. Block Diagram

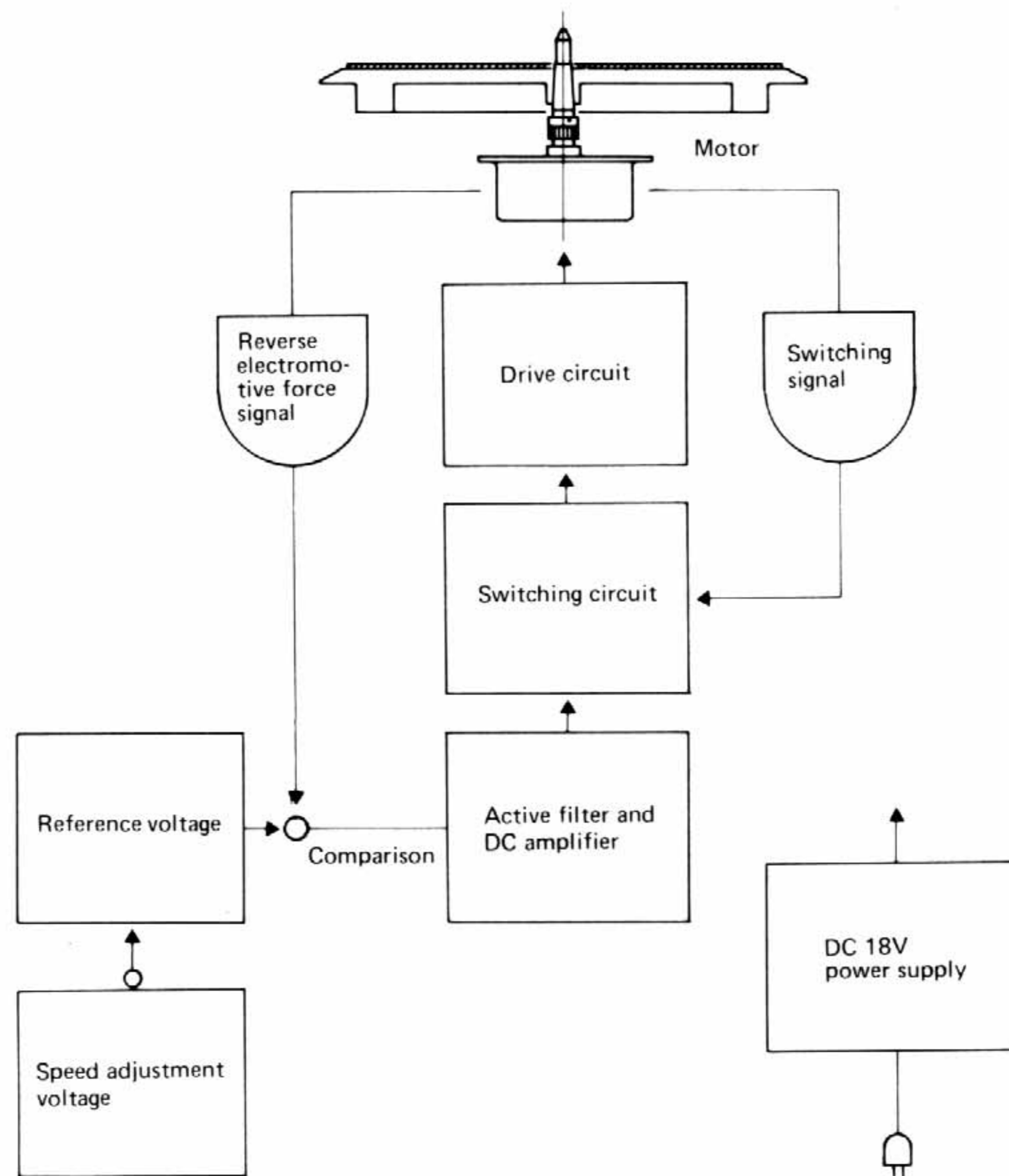


Fig. 1

* Starting platter revolution (refer to Schematic Diagram on page 21)

- 1) When the speed select knob is set to "33", switch S6 is closed (ON). For 45 rpm, switch S6 is opened. When the switch S6 is ON, the emitter of X13 is connected to the earth wire through the resistors for coarse and fine speed adjustment. The base of X13 is under a reference voltage of about 2V and the collector of X13 takes an earth level, causing the base of X12 to take an earth level at the same time.
- 2) This makes X11 conductive, raising the emitter potential of X11 to make X10 conductive.
- 3) The conducting X10 causes X9 to become conductive. In this condition, the emitters of X5, 6 and X7, 8 are connected to the positive line, allowing the maximum current to flow.
- 4) Therefore, the output of the Hall elements inside the motor is amplified to the maximum degree, and transistors X1, 2 and X3, 4 connected in series to the drive coil are driven by this output, starting the revolution of the platter.
- 5) As the number of revolutions increases, the reverse electromotive voltage induced in the drive coil of the motor also increases gradually and after being rectified by D1~4, is stored by C5 and R14.

- 6) If current flows through the base of X12, the platter rotation is accelerated. If no base current flows, the revolution of the platter tends to decrease. The collector potential of X13 is determined by its base potential and emitter resistance. When the X13 collector potential drops by more than 0.6V from the reference +18V, current flows to the base of X12, starting acceleration of the platter rotation.
- 7) An inverse voltage ripple remains in the X12 transistor collector. This ripple, in nearly 2.2V sine wave form, is added to the direct current.
- 8) The Hall element switching output is amplified by X5~X8 transistors to permit switching of X1~X4 transistors. The collector voltage of transistors X1~X4 which drives the motor is approximately 6.5Vp-p.
- 9) To ensure that the same amount of current flows to X1, 2 and X3, 4 voltage across R45 is fed back to X10. This prevents variations due to the components used.

* Speed adjustment

The rpm of the platter can be changed by varying the collector current of X13, which is varied by changing its emitter resistance. The rpm drops with reduced current. Therefore, lower speeds are obtained using higher resistances and vice versa.

* Power supply

The reference voltage of 18V is generated by a transistor 2SD325(E or D), and a Zener diode. The non-adjusted output voltage is about 0.6V lower than the voltage of the Zener diode.

3. Operation

3-(1) Construction diagrams

The mechanism are illustrated in the diatrams below.

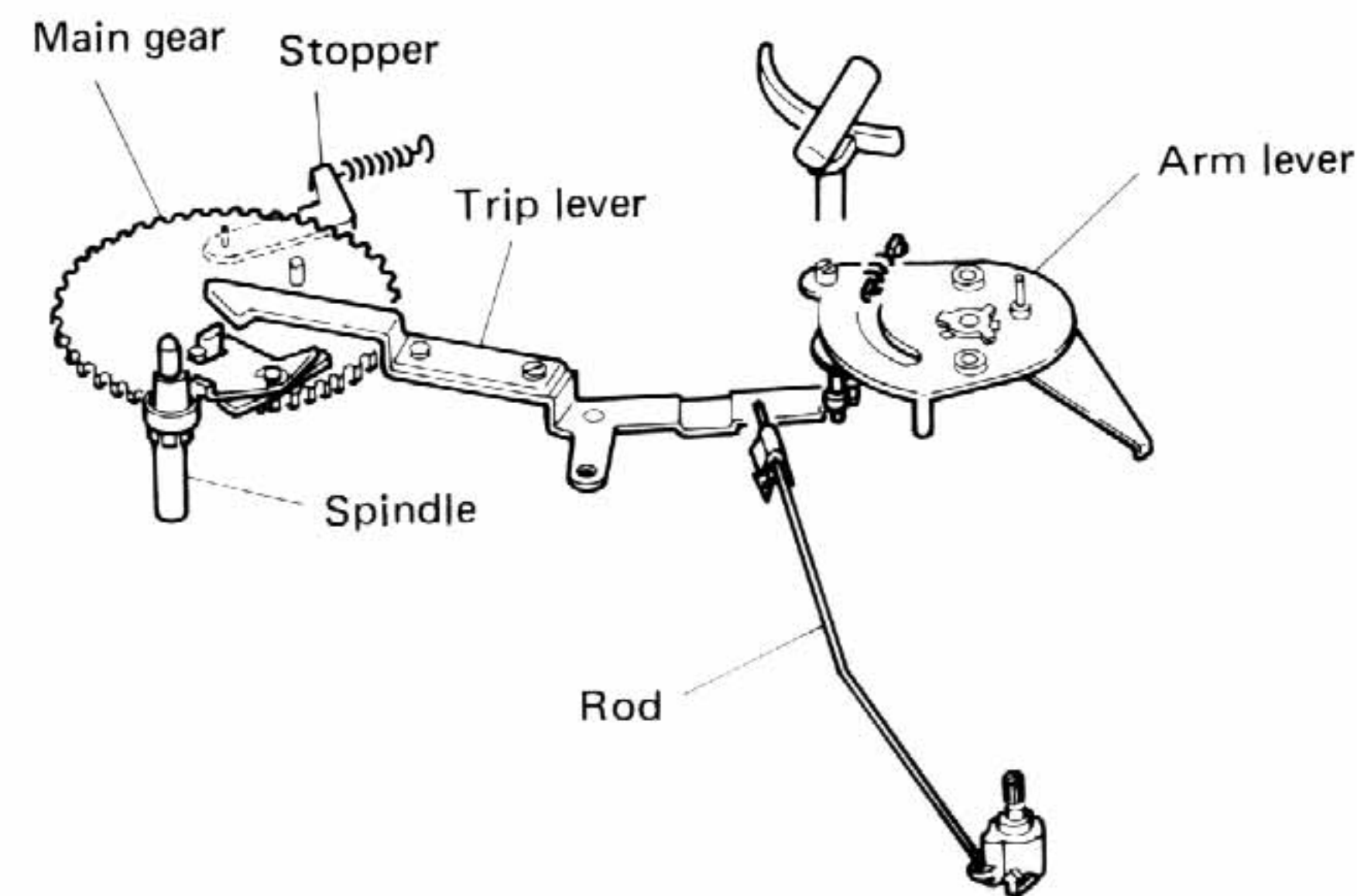


Fig. 2

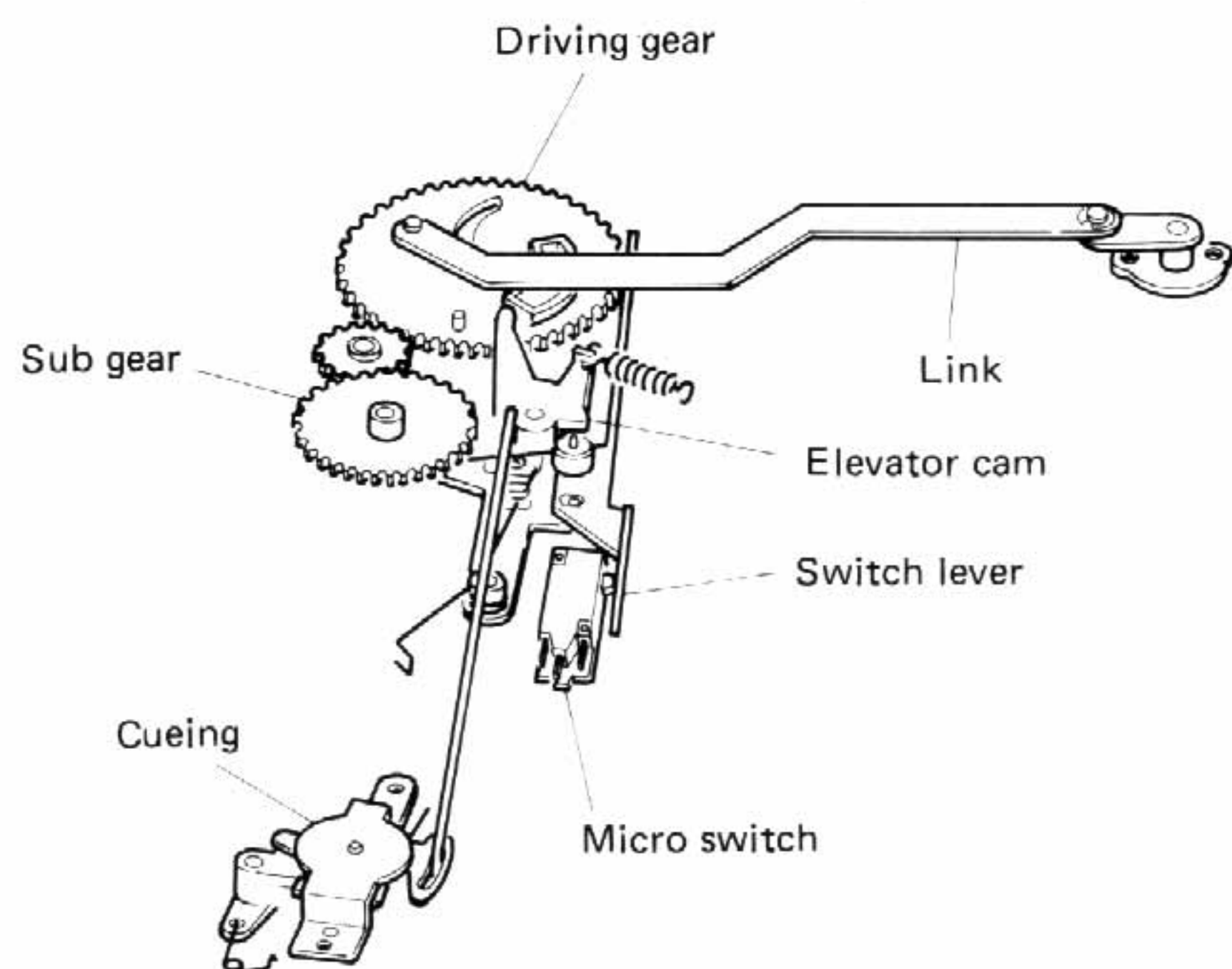


Fig. 3

3-(2) Return cycle mechanism

The smooth toothless part of the main gear and turntable gear make contact as indicated in Fig. 4 and the projection does not contact the engagement shoe.

This prevents main gear rotation even when the turntable is rotating. However, as playback proceeds, the lower trip, which causes the engagement shoe on the main gear to gradually move outward.

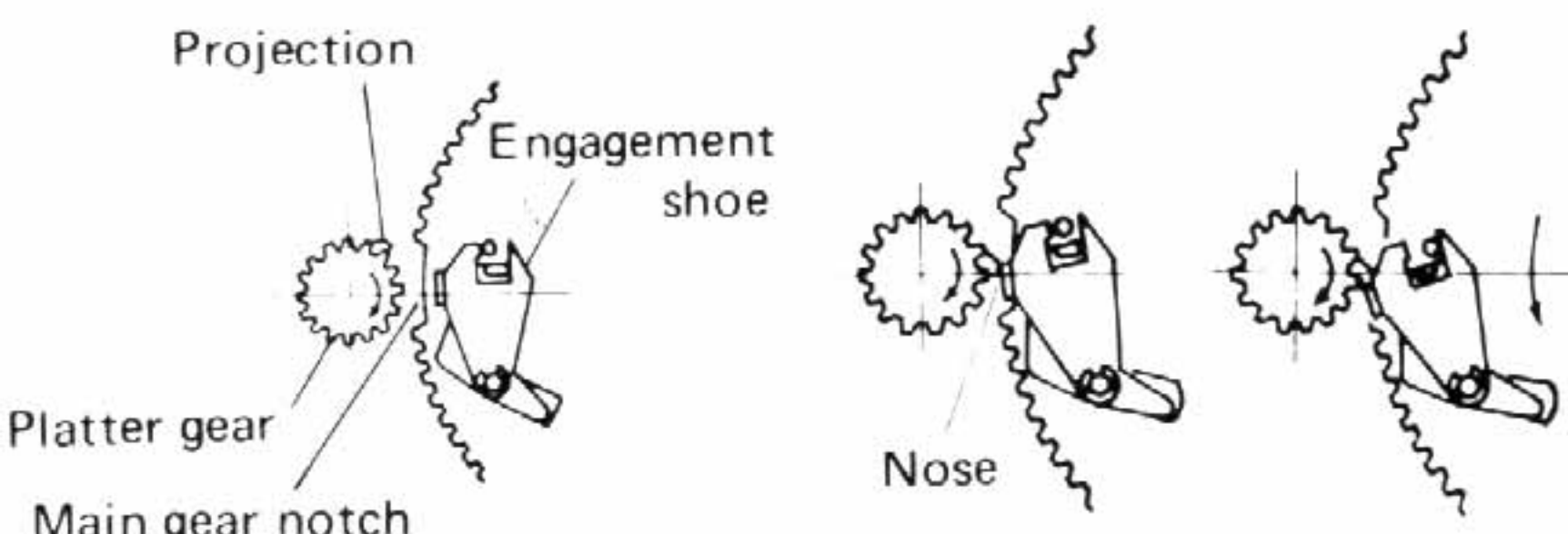


Fig. 4

Fig. 5

Fig. 6

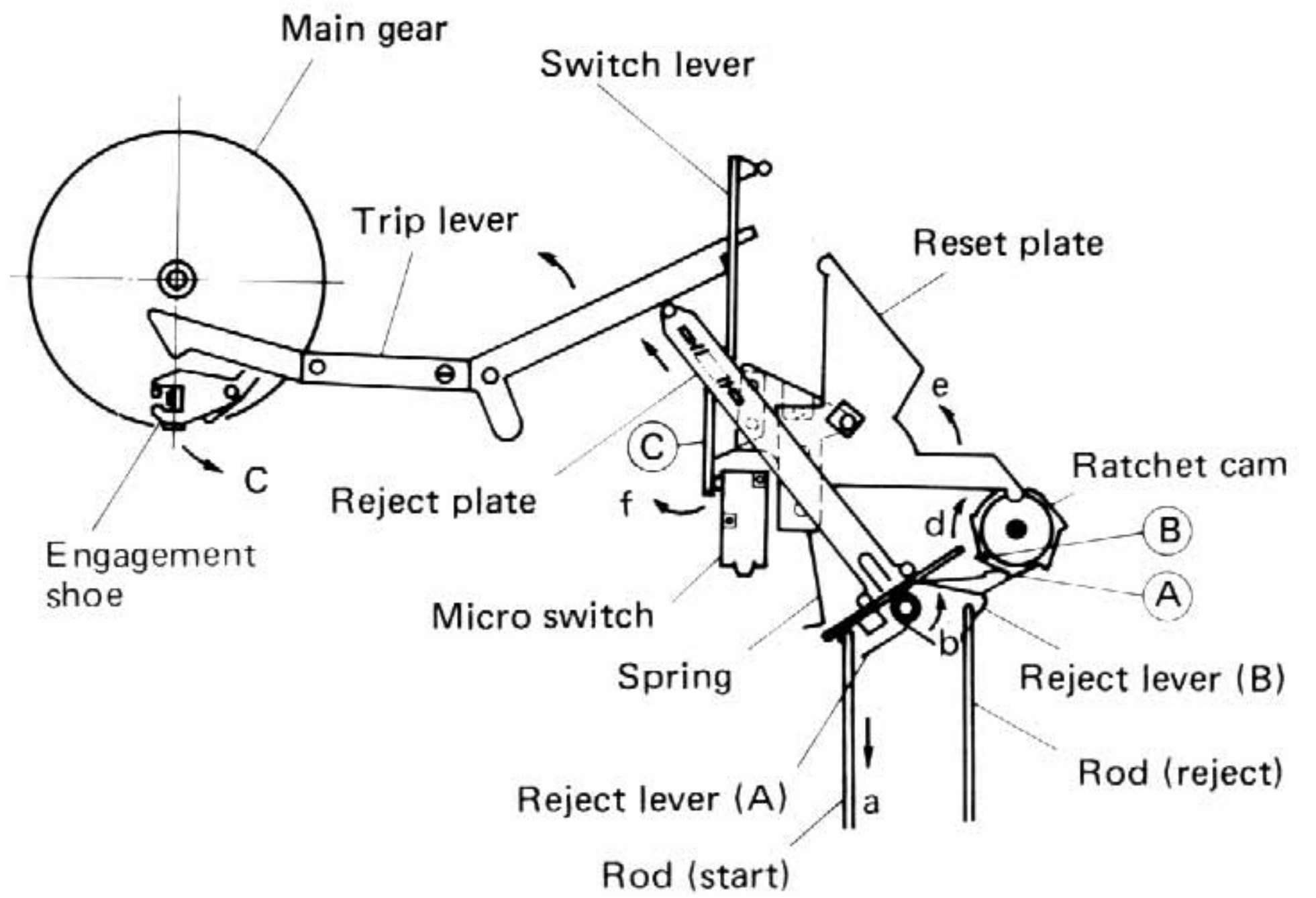


Fig. 7

In this case, the relationship between the engagement shoe and turntable projection is as shown in Fig. 5. When the stylus is in contact with the grooved part of the record, the engagement shoe shifts only slightly and is set back to its previous position by the projection. The gear does not rotate.

When playback ends and the stylus moves into the lead-out groove, the engagement shoe goes beyond the projection as illustrated in Fig. 6. The projection then turns the engagement shoe and the main gear starts rotating. This shifts the toothless part of the main gear, which engages the turntable gear and actuates the return cycle mechanism. When the main gear stops rotating, the engagement shoe returns to its original position as shown in Fig. 4 and prevents the rotating turntable gear from causing the main gear to rotate. The engagement shoe and lower trip are reset by the outer rim of the turntable gear to their original positions just before the main gear stops rotating. The trip lever is returned by the main gear boss to its original position while the main gear is rotating.

When the return cycle starts and the main gear rotates, the link causes the driving gear and elevator cam to move back and forth, as shown in Fig. 8.

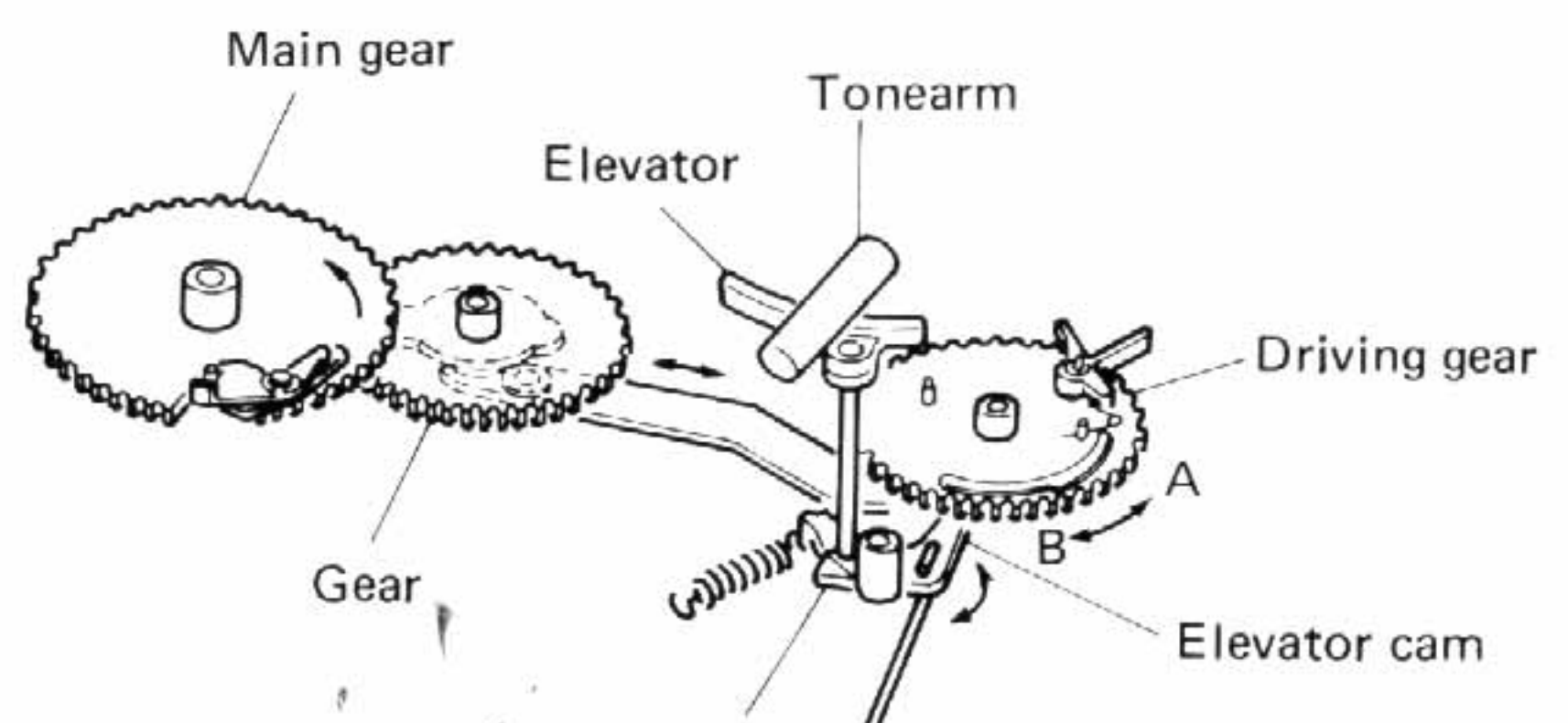


Fig. 8

When the elevator cam functions, the elevator is lifted by the inclined face and the pick-up arm moves upward. As shown in Fig. 9, the reciprocating movement of the driving gear actuates the push lever in the direction of b and moves the arm lever stud (B). The arm lever functions together with the driving gear to return the tonearm to the arm rest, thus completing the lead-out operation. See Fig. 9.

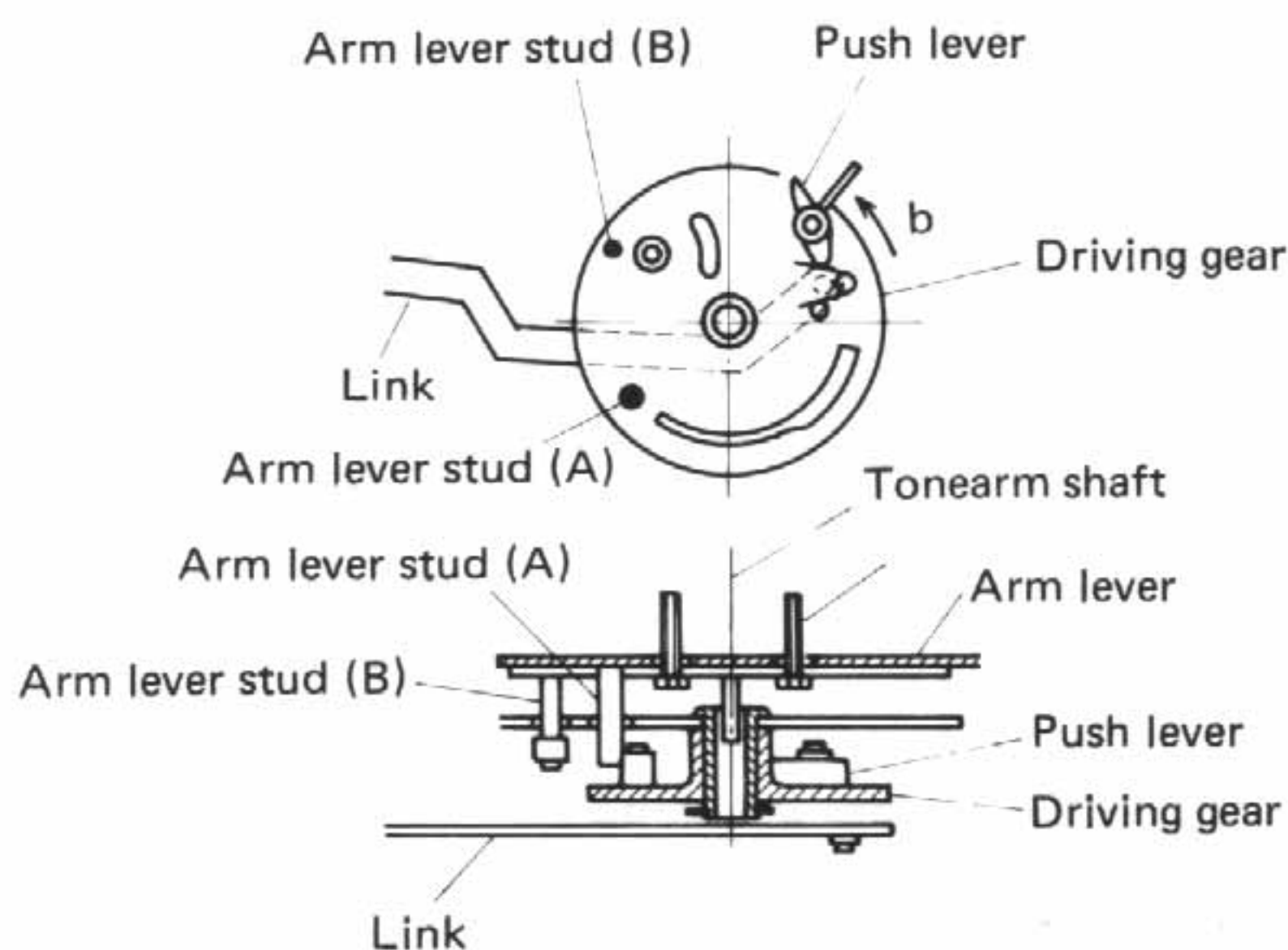


Fig. 9

3-(3) Reject mechanism

As is illustrated in Fig. 10, moving the START/REJECT lever to "REJECT" causes the start reject rod to move in direction (a) as indicated by the arrow to move the trip lever, which in turn pushes the engagement shoe out in the direction (c), thus starting the return cycle.

In the last stage of the return cycle, the arm lever stud pushes the switch lever in the direction of (b), which contacts the micro switch and cuts off the power.

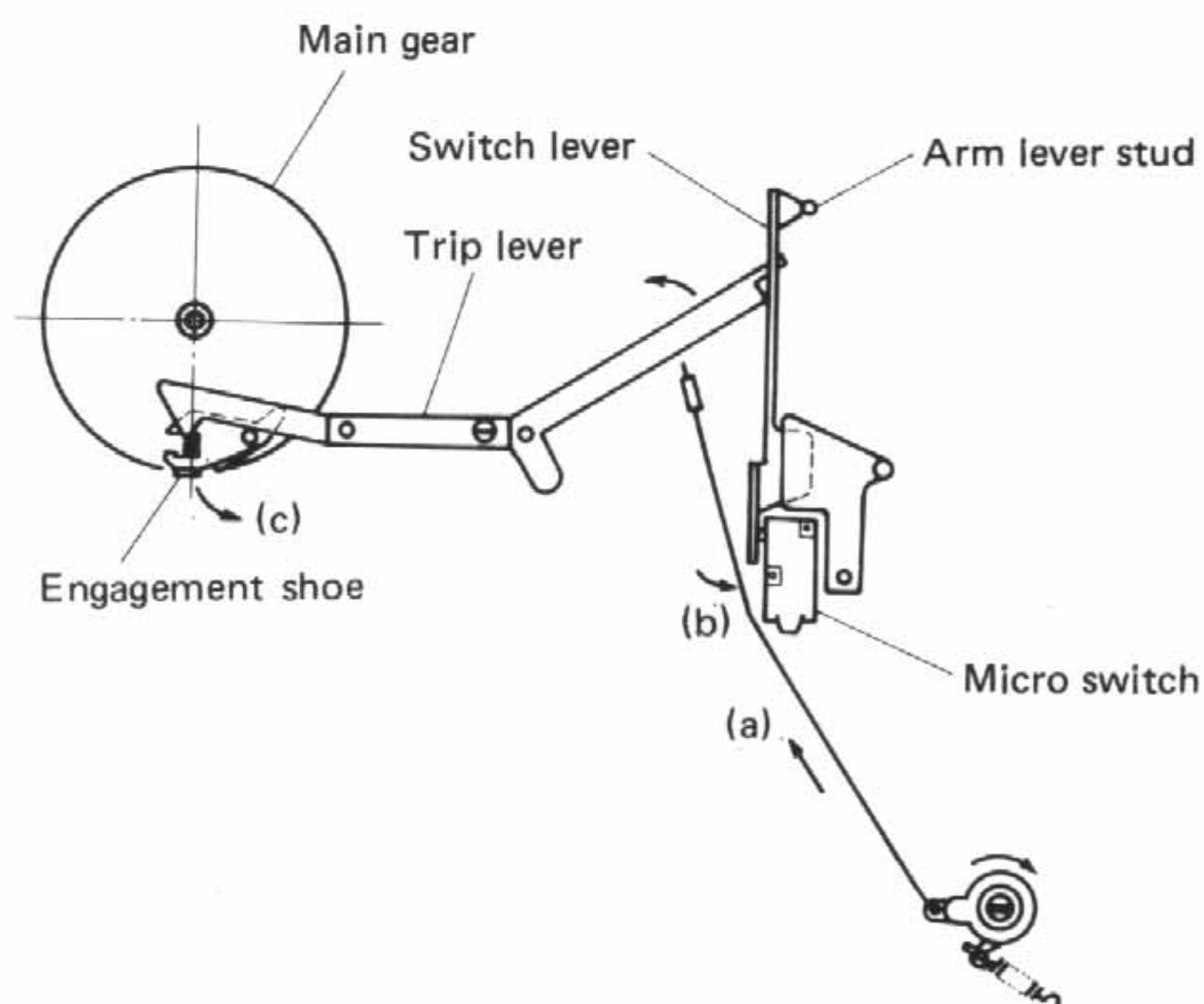


Fig. 10

4. Adjustment Procedure

Lead-out adjustment

Strict inspection is performed with regard to the lead-out adjustment before each unit is shipped. However, if you employ another type of tonearm, readjustment of the lead-out mechanism is recommended. In such cases, perform the adjustment following the procedure outlined below. (Refer to Fig. 11.) The automatic mechanism is not included in the figure.

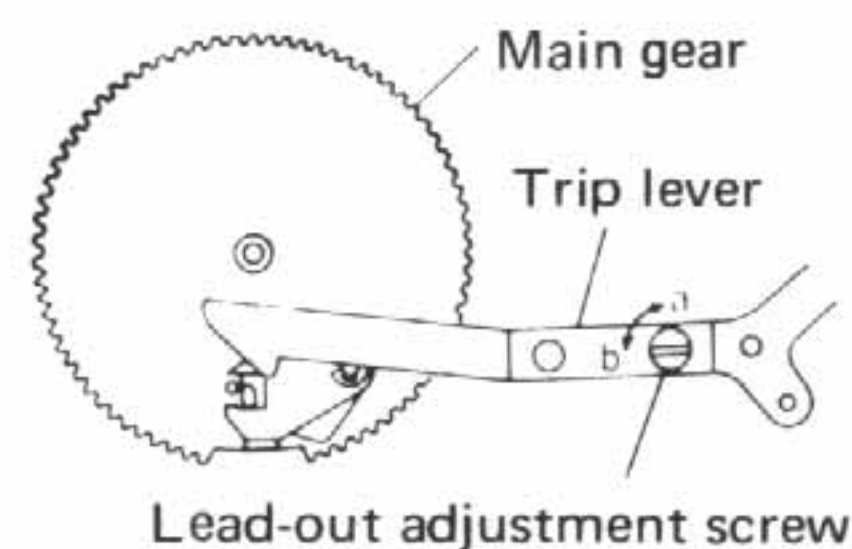


Fig. 11

Caution: Unplug the power cord first.

1. Clamp the tonearm to the arm rest.
2. Remove the dust cover.
3. Remove the rubber mat, the platter, and the belt.
4. Turn the set upside down, and place it on blocks to protect the tonearm assembly, spindle shaft and pulley.
5. After removing the signal and power cord assemblies from the bottom board, remove the seven screws fixing the bottom board.

- **When The lead-out mechanism does not function properly.**

If lead-out cannot be performed using JVC's RG652 17-cm test record, with 3m – 6m pitch lead-out groove, adjust by turning the lead-out adjustment screw in the direction of the arrow (a) as is shown in Fig. 11.

- **When the lead-out mechanism starts functioning earlier than required.**

If the lead-out mechanism functions while the stylus is still in an inner groove of JVC's RG653 17-cm test record (flip side of RG652), turn the lead-out adjustment screw in the direction of the arrow (b) until the proper lead-out function is obtained.

5. Removal of Chassis Base Ass'y

Remove the screws denoted by ○ mark in Fig. 12, then remove the mechanism chassis from the cabinet.

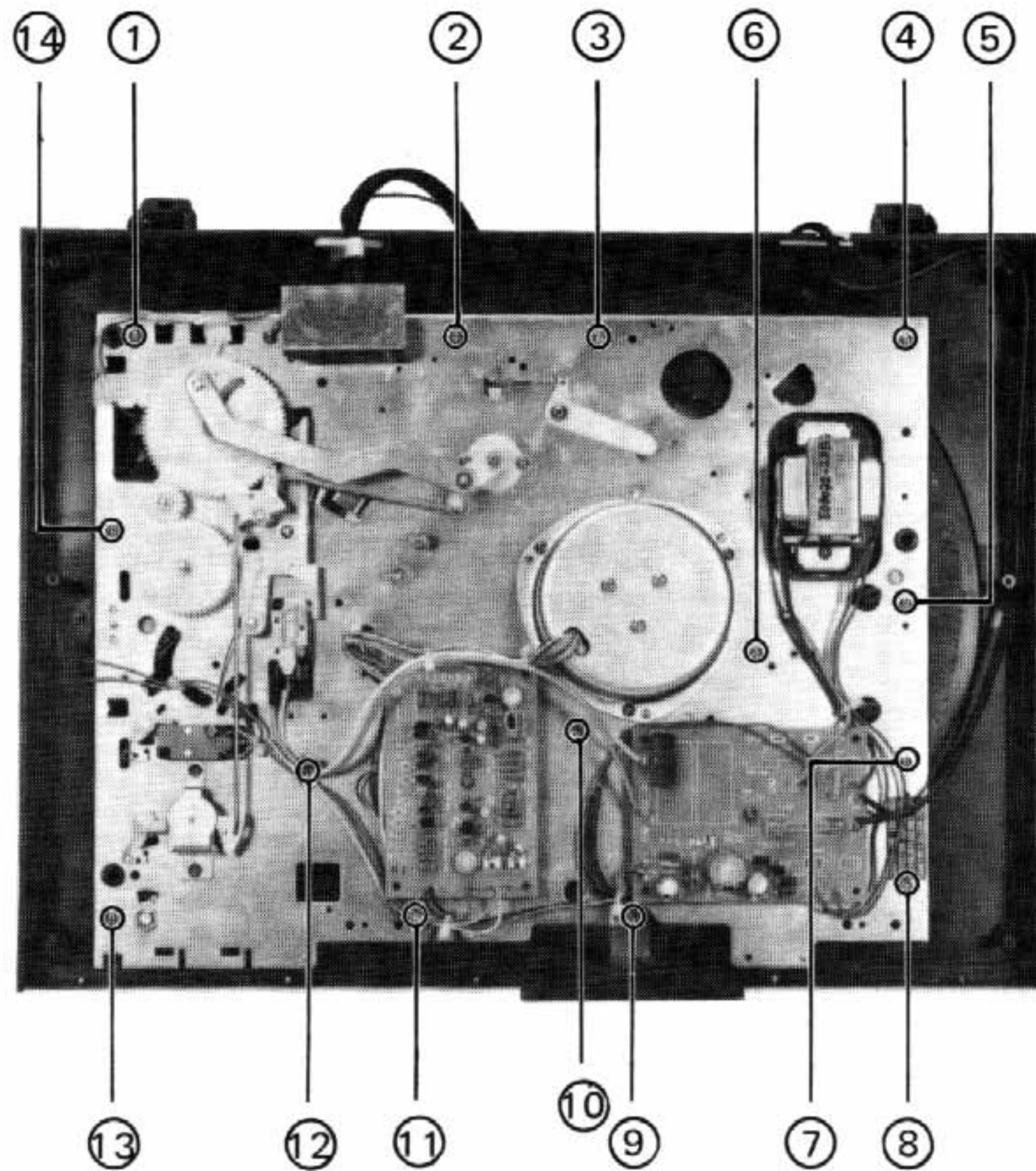


Fig. 12

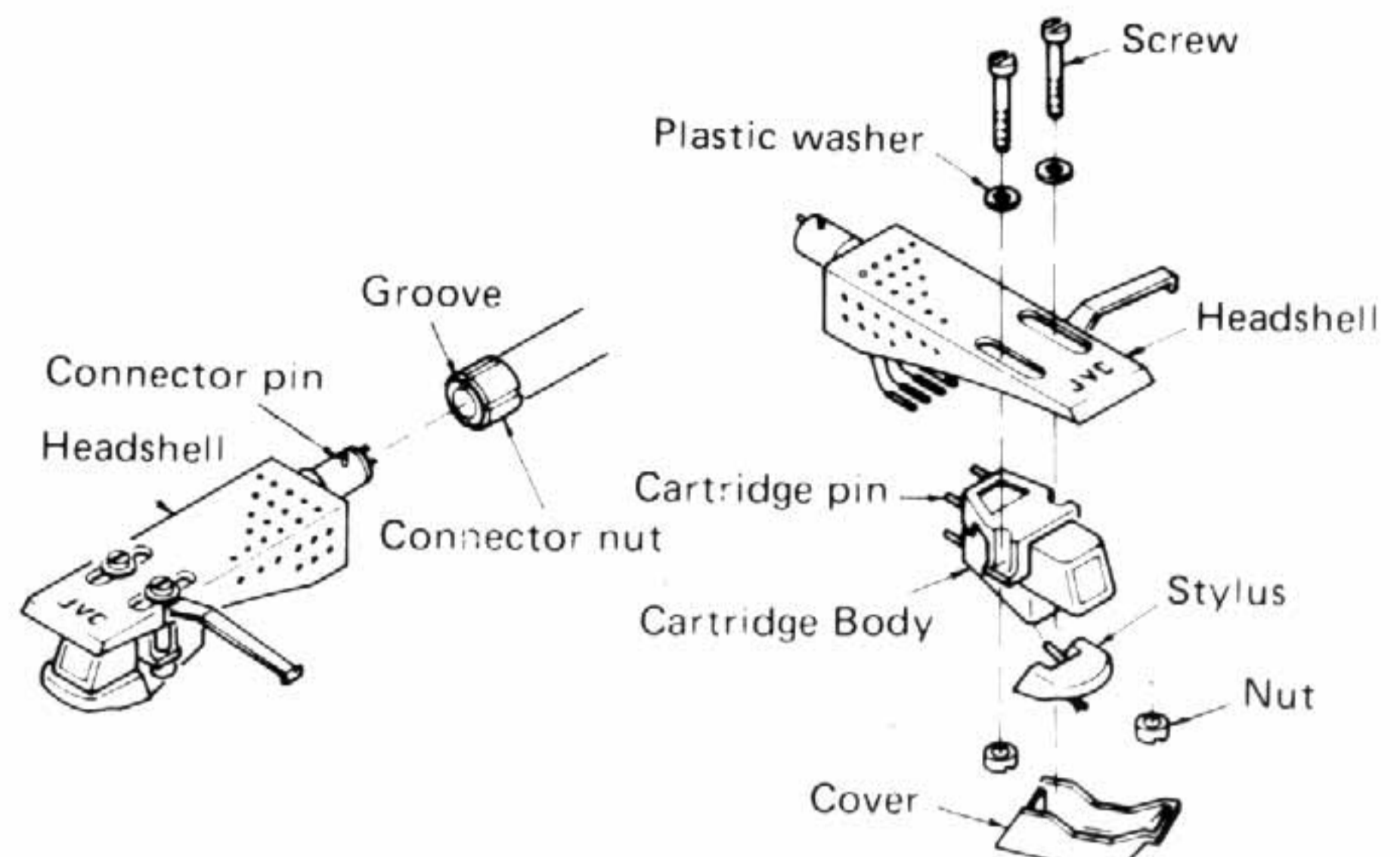


Fig. 13

Fig. 14

6-(2) Mechanism chassis

When you replace the entire mechanism (or the driving gear only), be sure to check that the lead-in lever attached to the driving gear has been returned in the direction of arrow (a) as shown in Fig. 15. (The lead-in lever faces in the direction of arrow (b), the mechanism may malfunction or be damaged.)

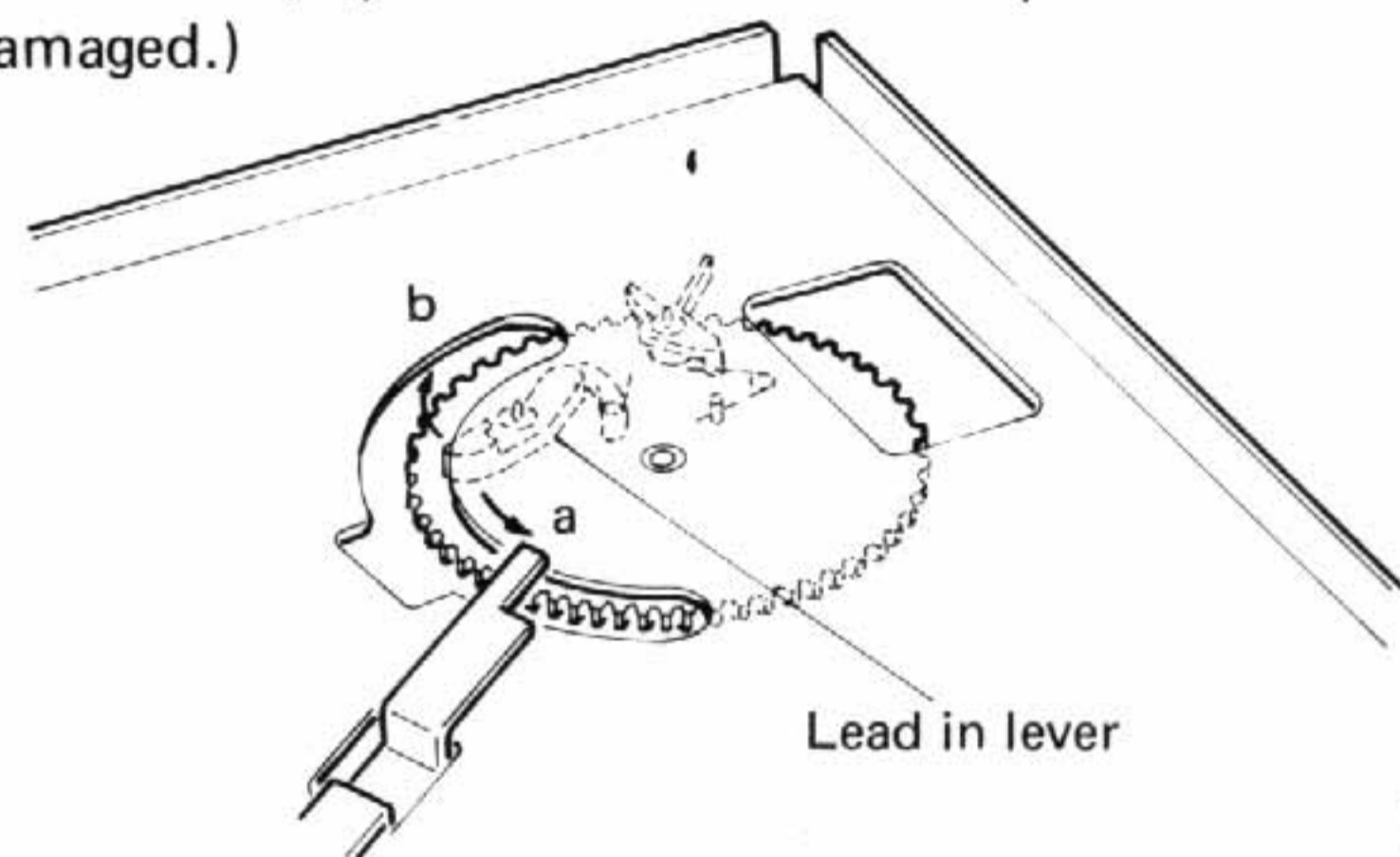


Fig. 15

6. Replacement of Parts

6-(1) Cartridge

1. Unscrew the connector nut to remove the headshell.
2. Remove the two long screws on the headshell which hold the cartridge.
3. Connect the lead wires of the headshell to the new cartridge, being careful to match the polarities correctly. Polarity and wire colors are as follows:

White (+)....L	Red (+).....R
Blue (-).....LE	Green (-)....RE
4. Attach the cartridge to the headshell squarely, and gently tighten the screws.
5. Set the tonearm cueing lever to "DOWN", and then bring the stylus tip to the overhang indicator by sliding the cartridge back and forth. After the adjustment, fix it firmly.
6. After attaching the cartridge, slide the headshell into the tonearm with the connector pin fitting in the groove. Tighten the connector nut.
7. Be sure to adjust the tracking force and lead-in position after replacing the cartridge.

Note: To play discrete 4 channel records, simply replace with the JVC stylus 4DT-Z1S the provided one.

6-(3) Voltage setting

(for U.S. Military Market and Other Areas)

Although this set is pre-set for the use on your area's AC line voltage without any re-adjustment, it can be used on all AC voltages in the world through following adjustments.

To change the voltage, remove a bottom board, and replace the plug so that the required voltage, marked on the socket, may come out in the window of the voltage selector plug. Do not forget to replace the fuse as well with one of appropriate capacity.

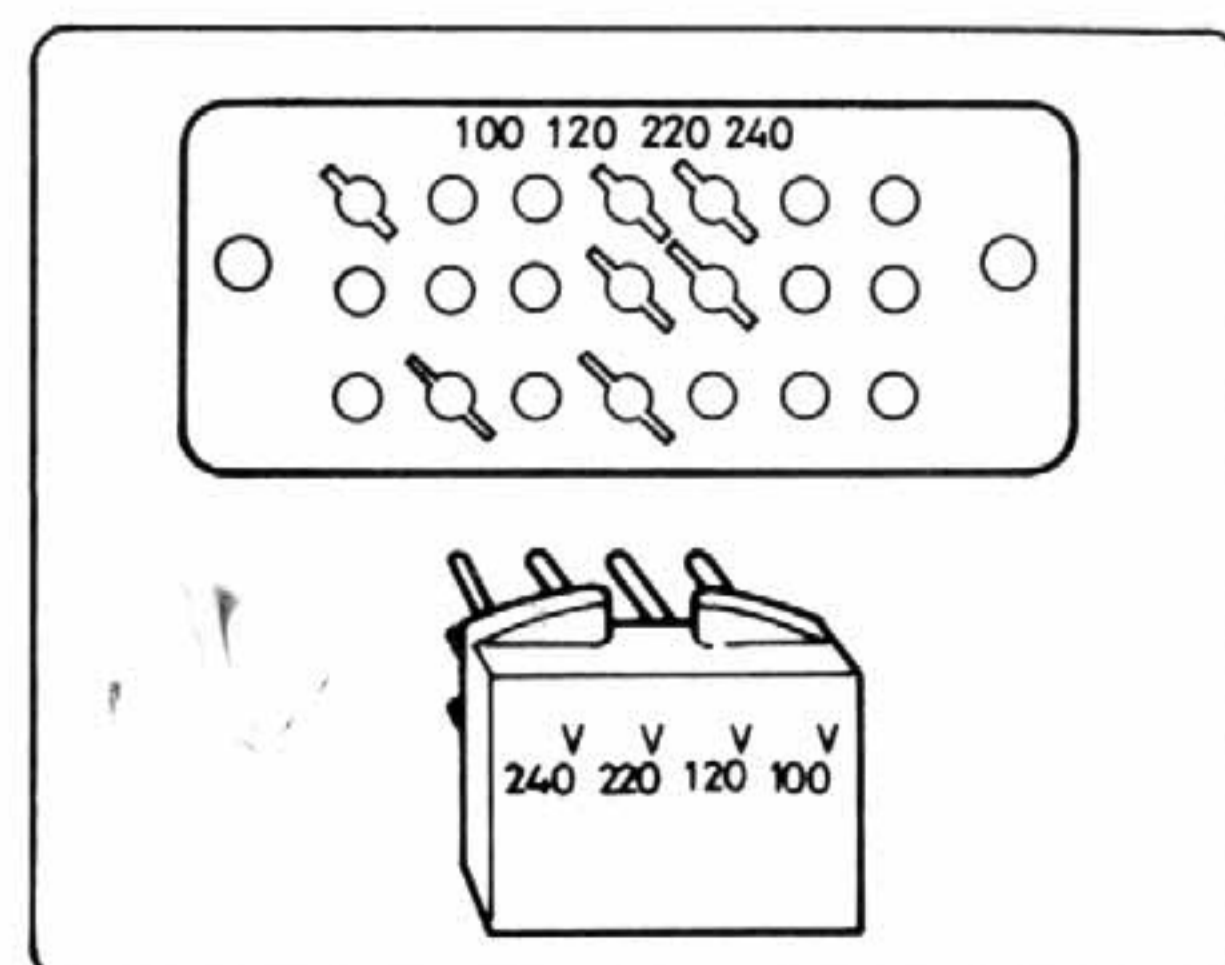


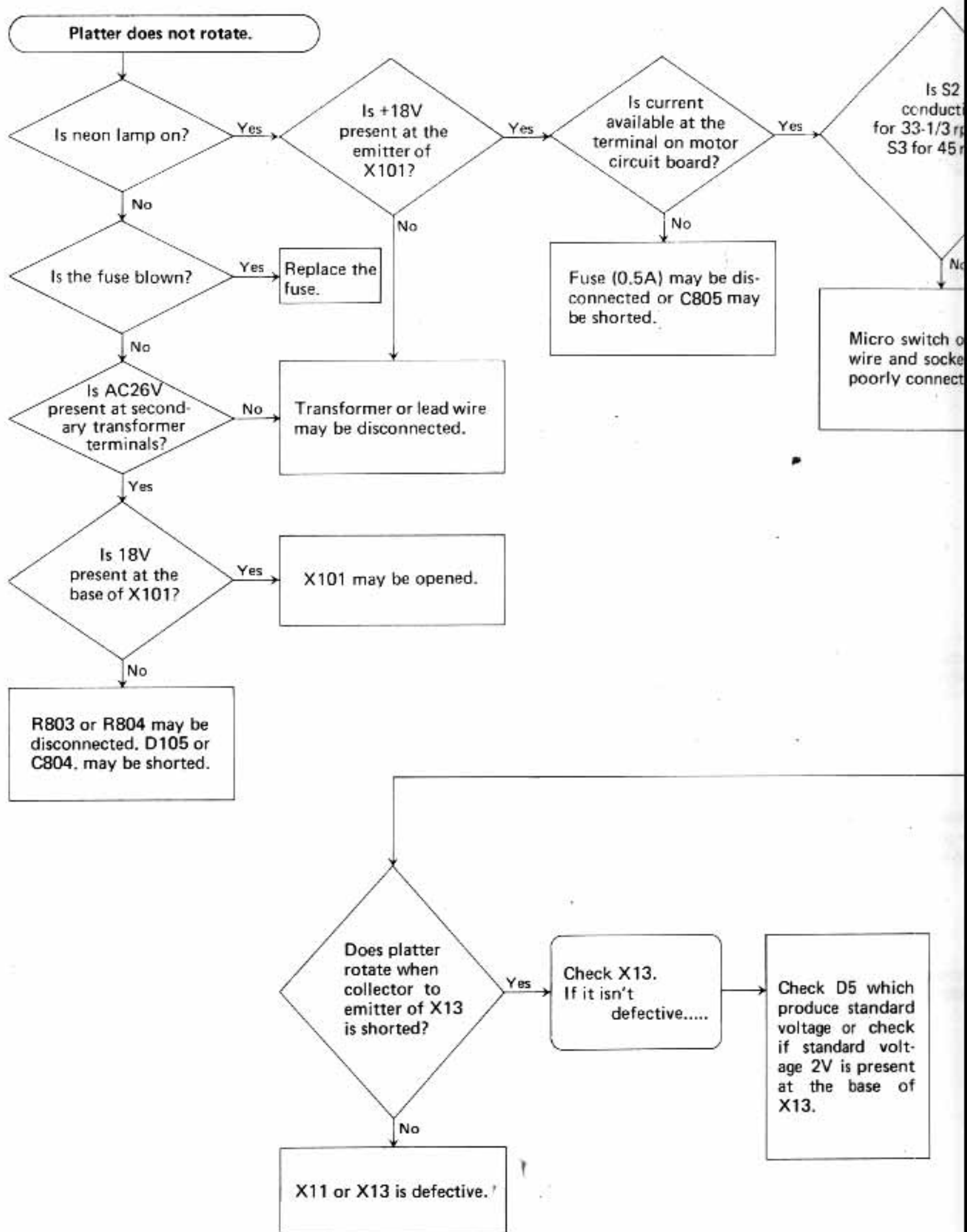
Fig. 16

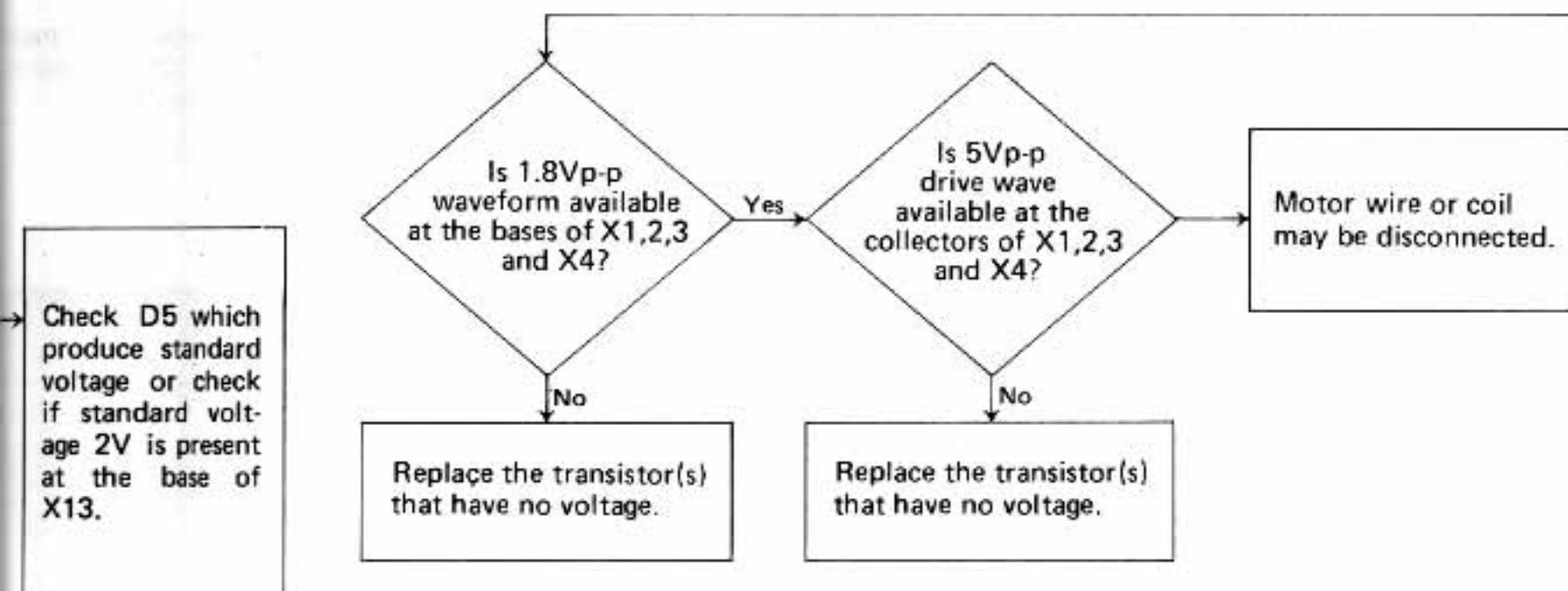
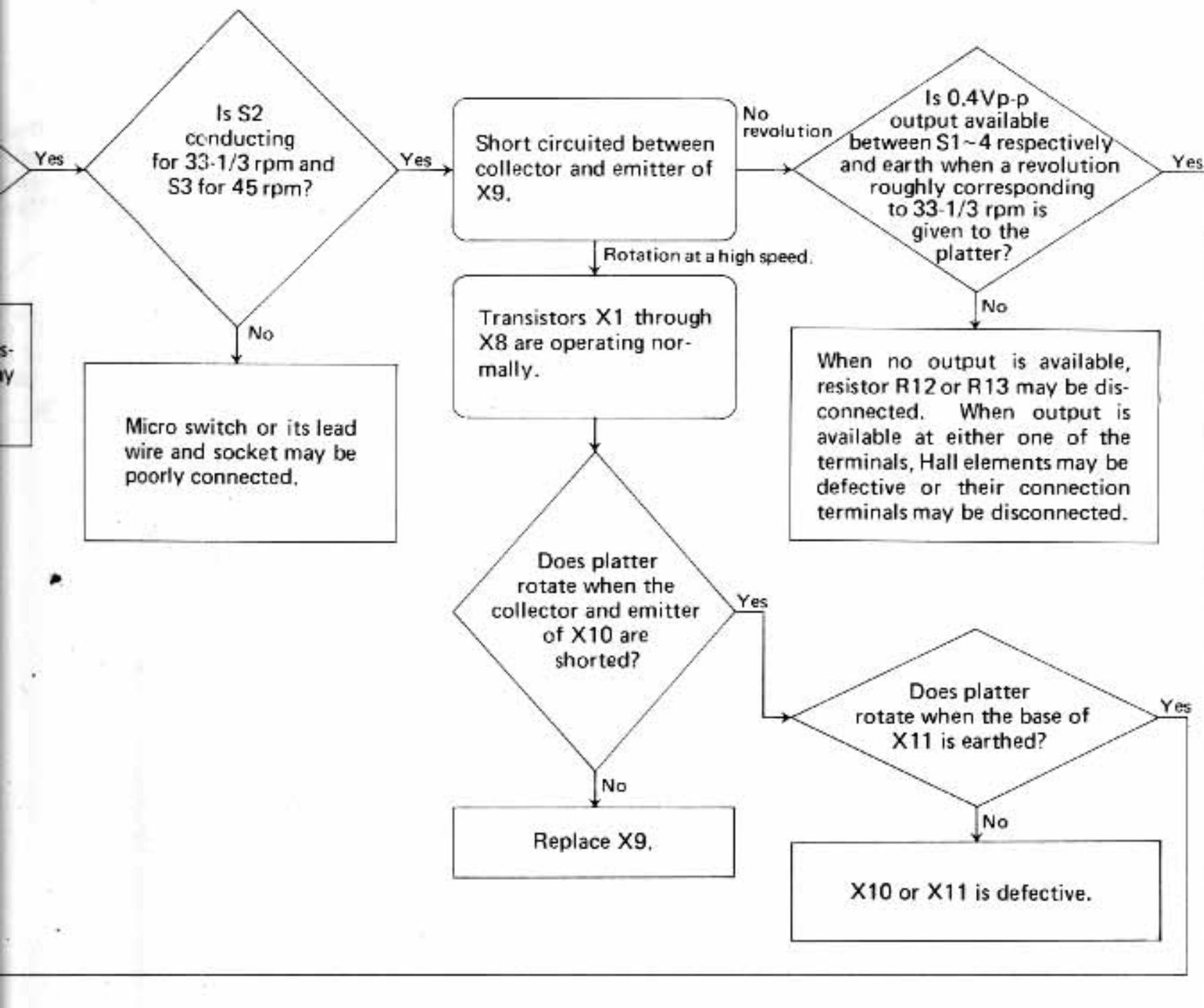
7. Troubleshooting

7-(1) Table of Troubleshooting

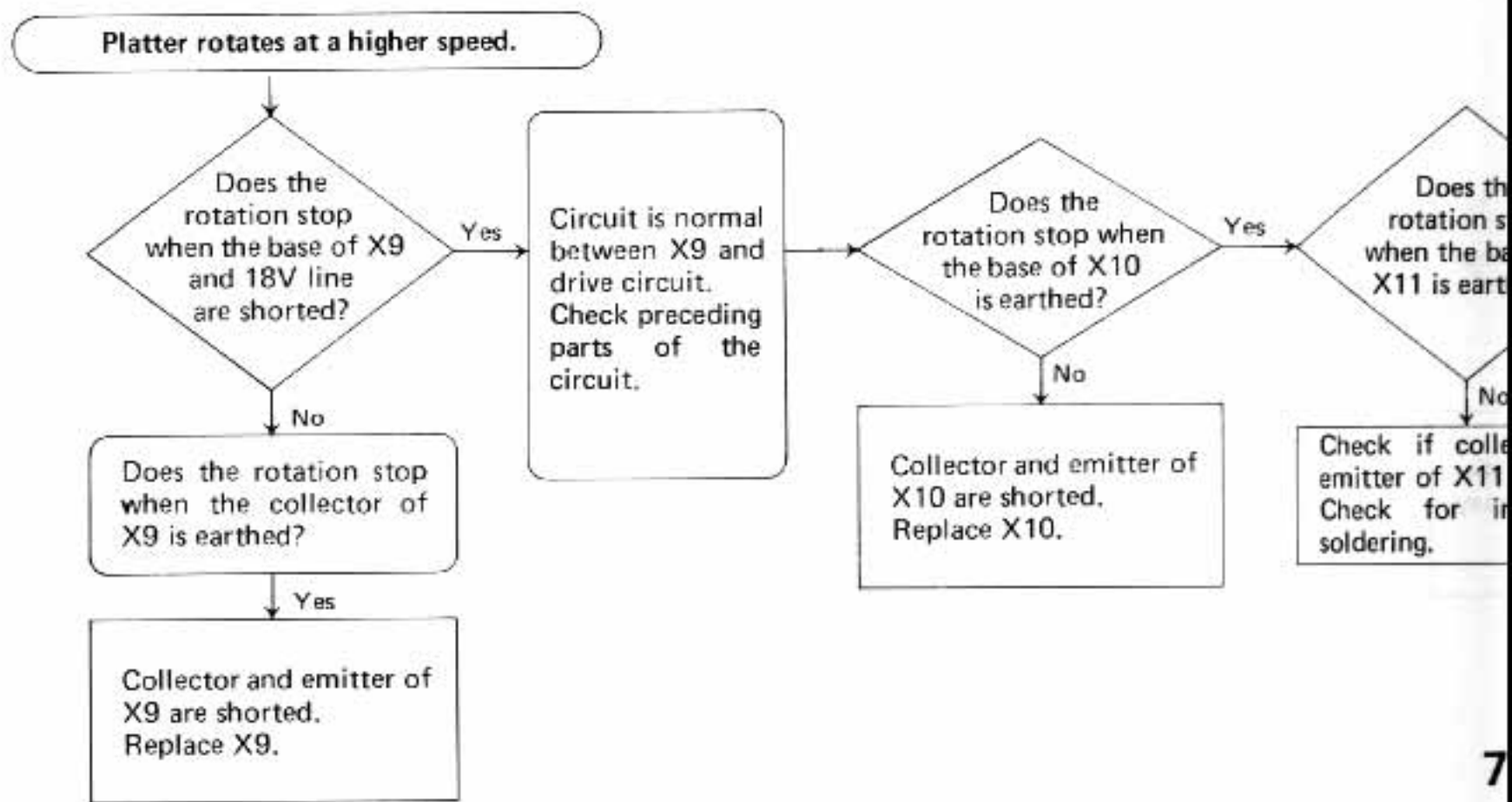
Symptom	Cause	Remedies
Platter does not rotate when tonearm is moved manually or by automatic start operation.	<ol style="list-style-type: none"> 1. Motor is not powered. 2. Motor and motor circuit are defective. 3. Switch lever remains in contact with the switch. 	<ul style="list-style-type: none"> * Check if the power cord is plugged in or the fuse is blown when the neon lamp also does not light. * Check the transistors in the power circuit. (Check if 18V is available at the motor terminals.) * Check voltage of each part of the servo circuit board. * Adjust the switch lever for correct clearance.
Platter speed is not correct.	<ol style="list-style-type: none"> 1. The circuit board is out of fine adjustment. 	<ul style="list-style-type: none"> * Adjust so that it rotates correctly for both 33 (VR1) or 45 rpm (VR2).
Motor rotates at high speed without being controlled by the servo system.	<ol style="list-style-type: none"> 1. The printed pattern, capacitors etc. are short-circuited. (Capacitors, particularly C5 should be checked carefully.) 	<ul style="list-style-type: none"> * Separate the short-circuited points.
Unbalanced motor rotation.	<ol style="list-style-type: none"> 1. Platter is not correctly fitted on the start. 2. Any one of transistors X1~X8 in the drive unit is defective. 	<ul style="list-style-type: none"> * Fit the platter on the motor shaft correctly. * Check voltage for X1~X8.
Platter stops at a point when held by hand. (Dead point occurs.)	<ol style="list-style-type: none"> 1. Either one of the Hall elements is defective. 2. Input or output of the Hall elements is incompletely soldered. 	<ul style="list-style-type: none"> * Replace * Solder it completely.
Change cycle will not stop.	<ol style="list-style-type: none"> 1. Trip lever and engagement shoe of the main gear malfunction. 	<ul style="list-style-type: none"> * Check that trip lever returns after completing the change cycle, and that the engagement shoe moves smoothly and freely with its own weight.
No sound is reproduced while playing.	<ol style="list-style-type: none"> 1. Cartridge is defective. 2. Wiring is not correct. (Live and earth are connected inversely.) 3. Stylus is defective. 4. Amplifier is defective. 	<ul style="list-style-type: none"> * Replace * Check the wiring * Replace
Stylus does not follow the groove correctly	<ol style="list-style-type: none"> 1. Dust or foreign matter is in the record groove. 2. Stylus is dirty or defective. 3. Lead wires in tonearm are tangled or too tight. 4. Tracking force is abnormal. 5. Tonearm bearings have too much friction. 	<ul style="list-style-type: none"> * Clean * Clean or replace. * Slacken the wires. * Adjust * Replace tonearm.
Motor rumble is heard while playing.	<ol style="list-style-type: none"> 1. Motor is defective. 2. Transformer is defective. 	<ul style="list-style-type: none"> * Bearing shake is excessive. * Replace it. * Check if the transformer is floating.
Tonearm does not leadout.	<ol style="list-style-type: none"> 1. The lead-out groove is not standard. 	<ul style="list-style-type: none"> * It may not lead out when old or non-standard records such as film records are used. * Lead-out will not occur if the pitch of the lead-out groove is less than 3mm. * Check if the tracking force is correct. * Check if trip mechanism does not operate smoothly.

7-(2) Chart 1 "Platter Does not rotate"

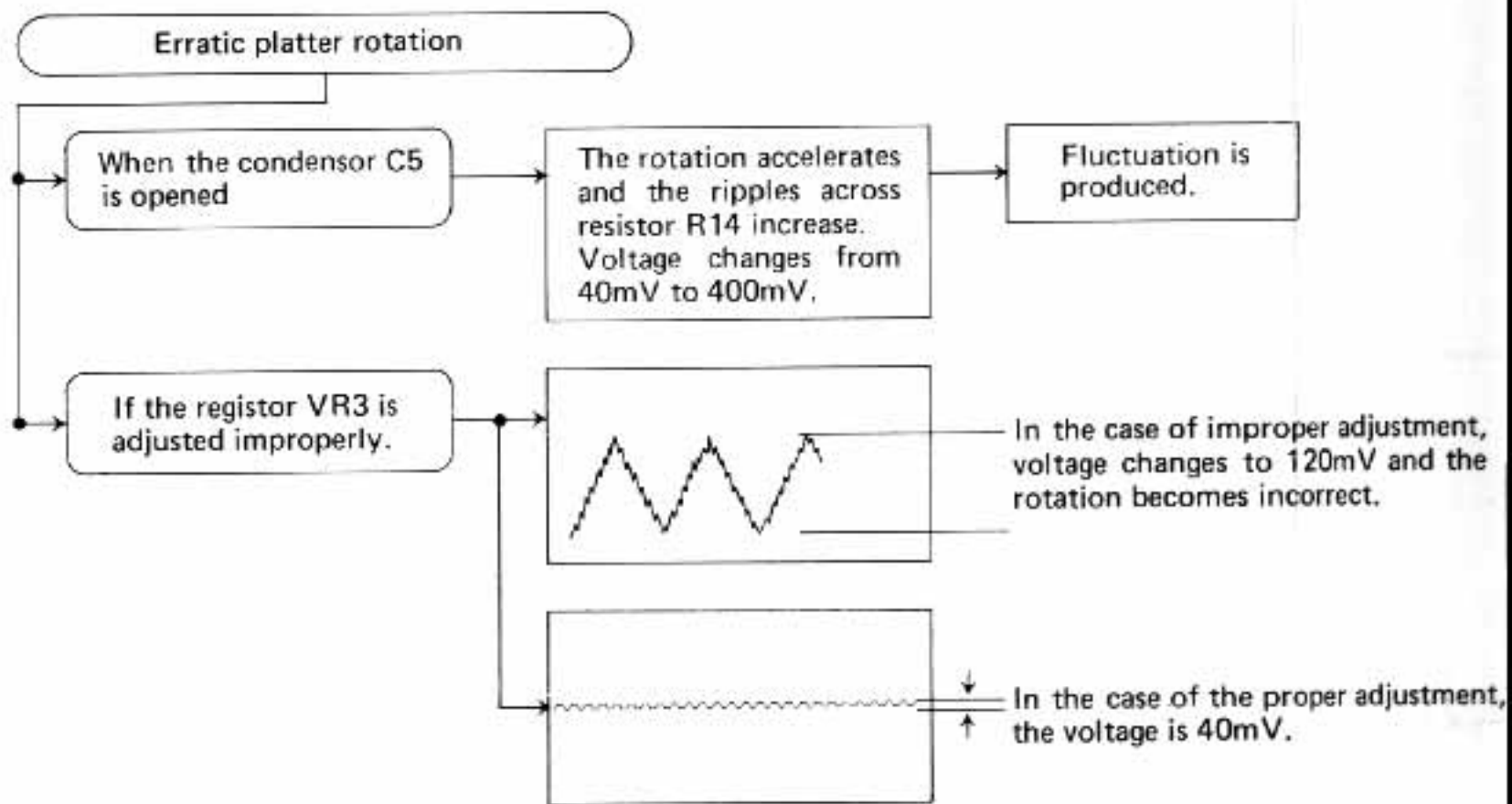


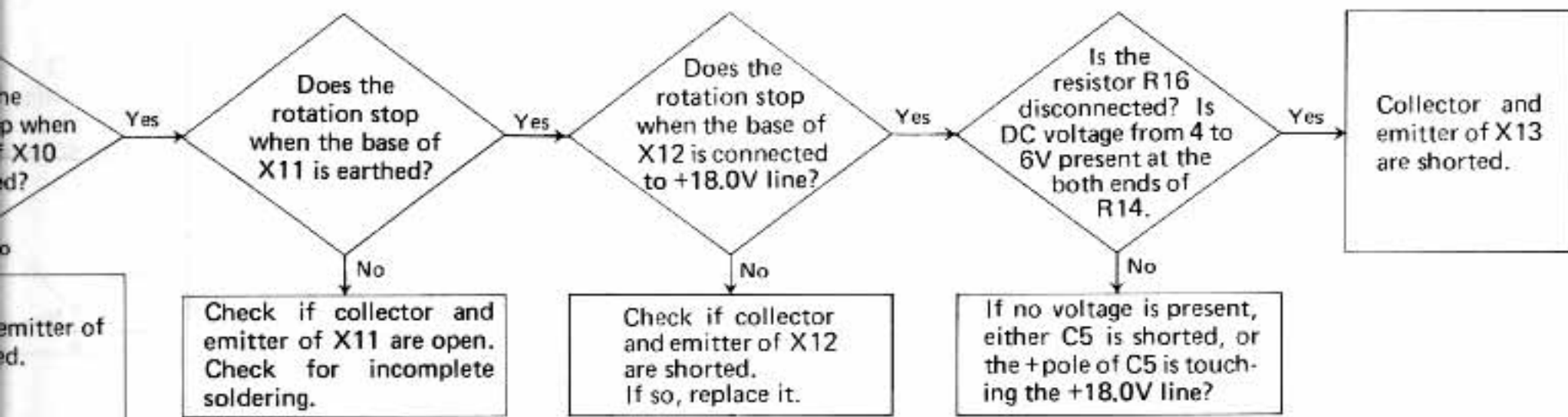


7-(3) Chart 2 "Platter rotates at a high speed"

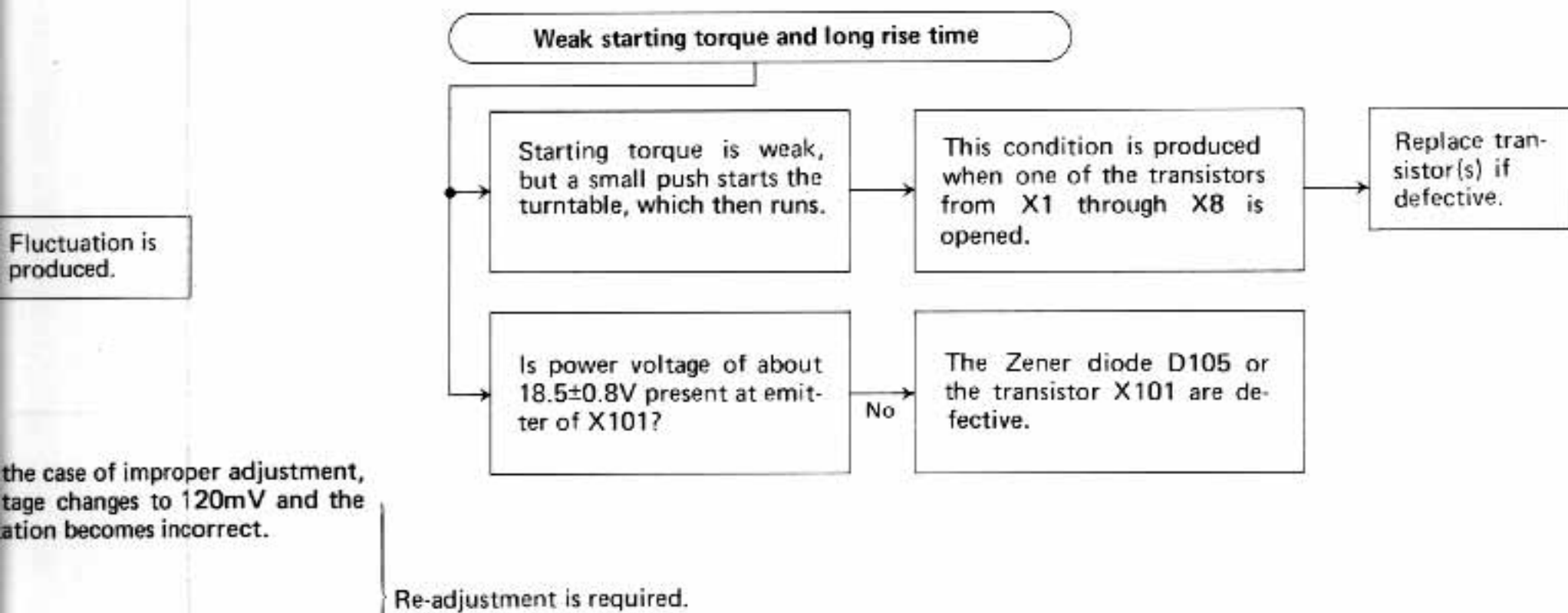


7-(4) Chart 3 "Erratic platter rotation"





7-(5) Chart 4 "Weak starting torque and long rise time"



the case of improper adjustment, voltage changes to 120mV and the rotation becomes incorrect.

the case of the proper adjustment, voltage is 40mV.

8. Exploded Views and Parts List

8-(1) Tonearm Ass'y

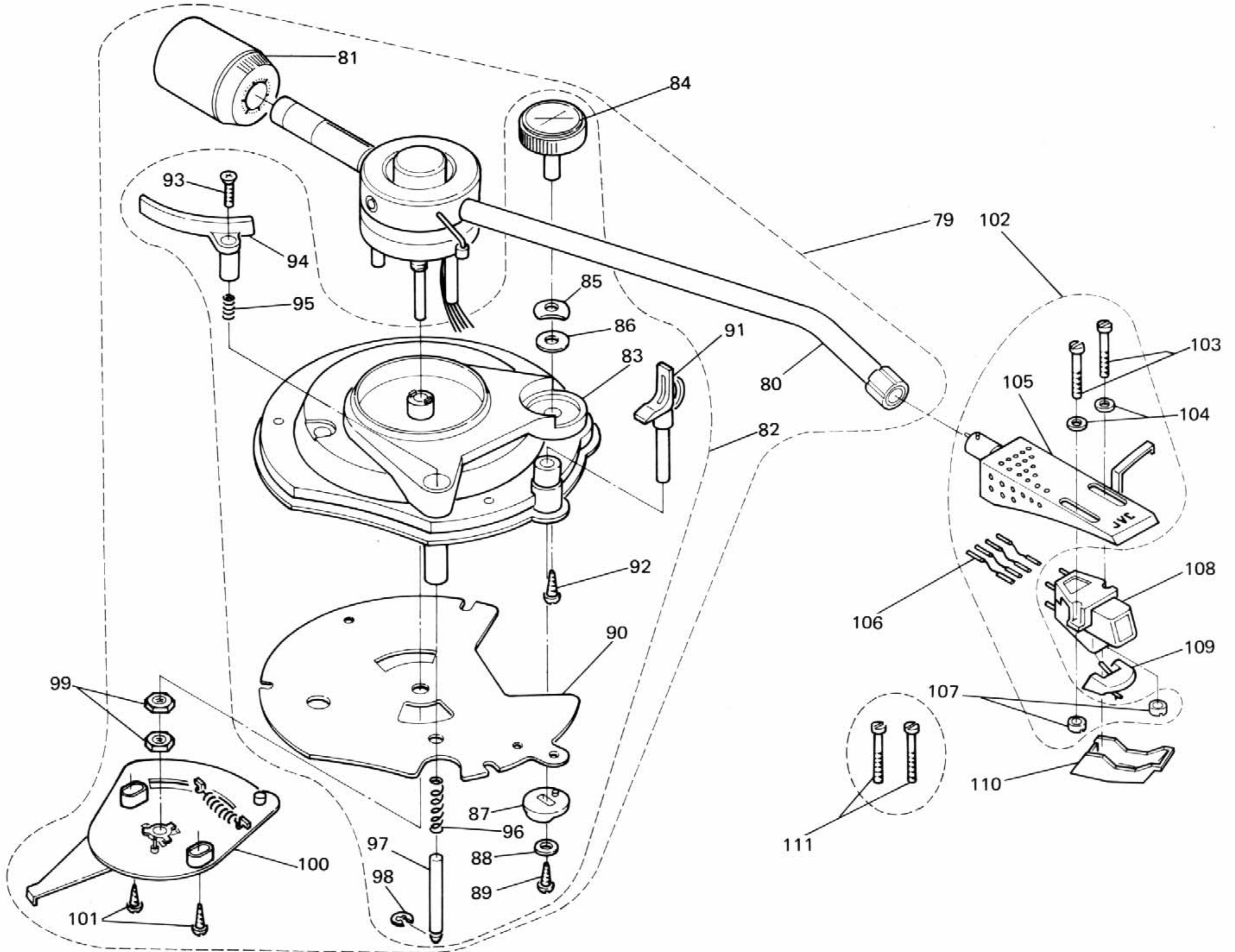


Fig. 17

No.	Parts No.	Parts Name
79	*E22324-001	Tonearm Ass'y
80	*E21985-003	Arm Ass'y
81	E34534-002	Main Weight Ass'y
82	*E22377-001	Tonearm Base Ass'y
83	*E22392-001	Tonearm Base Sub Ass'y
84	*E61743-001	Anti-skating Knob Ass'y
85	E49602-002	Washer
86	G4517-1	Thrust Washer
87	E34258-001	Anti-skating Cam
88	WSS2000Z	Washer
89	SBSB2005Z	Tapping Screw
90	*E35028-001	Plate
91	*E60326-002	Arm Rest Ass'y
92	SBSB2608Z	Tapping Screw
93	SSSP3016MS	Screw
94	*E60475-001	Elevator Ass'y
95	E49649-001	Spring

No.	Parts No.	Parts Name
96	E61194-001	Spring
97	*E49655-005	Elevator Shaft
98	REE3000	"E-typed" Ring
99	G5053	Nut
100	*E61693-002	Arm Lever Ass'y
101	SBSB3008Z	Tapping Screw
102	E34991-002	Headshell Ass'y
103	E60502-008	Screw
104	EG82971	Washer
105	E34990-002	Headshell Body
106	E60501-001	Wire Ass'y
107	E60503-001	Nut
108	See page 16	Cartridge (Refer to table 2)
109	See page 16	Needle Ass'y (")
110	See page 16	Needle Cover (")
111	See page 16	Screw (Refer to table 2)

*New part Item

8-(2) Player Ass'y

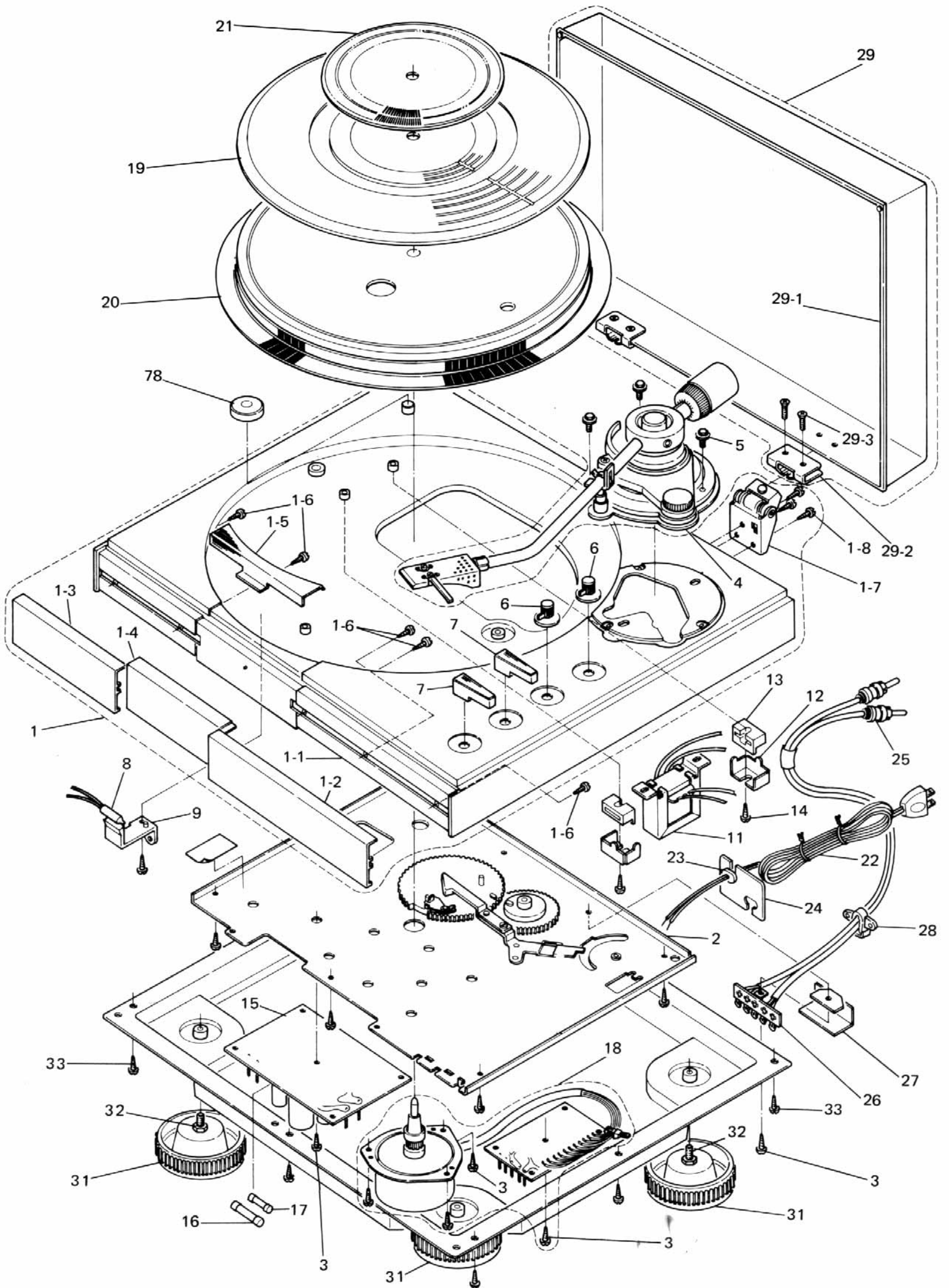


Fig. 18

No.	Parts No.	Parts Name	Description
1	See page 16	Cabinet Ass'y	Refer to table 2
1-1	See page 16	Cabinet	"
1-2	E34989-001	Front Panel	"
1-3	" -002	"	"
1-4	E34982-001	Center Panel	"
1-5	E61690-001	Lamp Cover	"
1-6	LPSP3005NS	Screw	"
1-7	E60989-001	Hinge Ass'y	"
1-8	SPSP3005NS	Screw	"
2	A4001	Base Ass'y	Refer to table 2
3	SBSB3008Z	Screw	"
4	See page 16	Tornarm Ass'y	Refer to table 2
5	E61853-001	Screw	"
6	E61686-001	Knob Ass'y	
7	E34970-001	Knob Ass'y	
8	QLN3104-003	Neon Lamp	
9	E61763-001	Lamp Holder	
10			
11	See page 16	Power Transformer	Refer to table 2
12	E61825-001	Holder	"
13	E61824-001	Cushion	"
14	SBSB3016Z	Tapping Screw	"
15	See page 16	Power Circuit Board Ass'y	Refer to table 2
16	See page 16	Fuse	"
17	See page 16	Fuse	"
18	MC933A	Motor Ass'y	"
19	See page 16	Platter Cover	Refer to table 2
20	E22340-001	Platter	"
21	E61136-002	Strobo Plate	
22	See page 16	Power Cord	Refer to table 2
23	QHS3876-162	Cord Stopper	"
24	E61695-001	Cord Stopper Plate	"
25	G30062-5	Signal Cord Ass'y	"
26	QML1310-051	Lug Strip Ass'y	
27	E60090-002	Shield Cover	
28	E33944-001	Cord Stopper	
29	E34993-004	Dust Cover Ass'y	
29-1	E10156-002	Dust Cover	
29-2	E60990-001	Lock Plate	
29-3	SHSP3010RS	Screw	
30	See page 16	Bottom Board Ass'y	Refer to table 2
31	See page 16	Foot Ass'y	"
32	SBSB4012Z	Screw	"
33	SBSB3012M	Screw	"

8-(3) Mechanism Ass'y

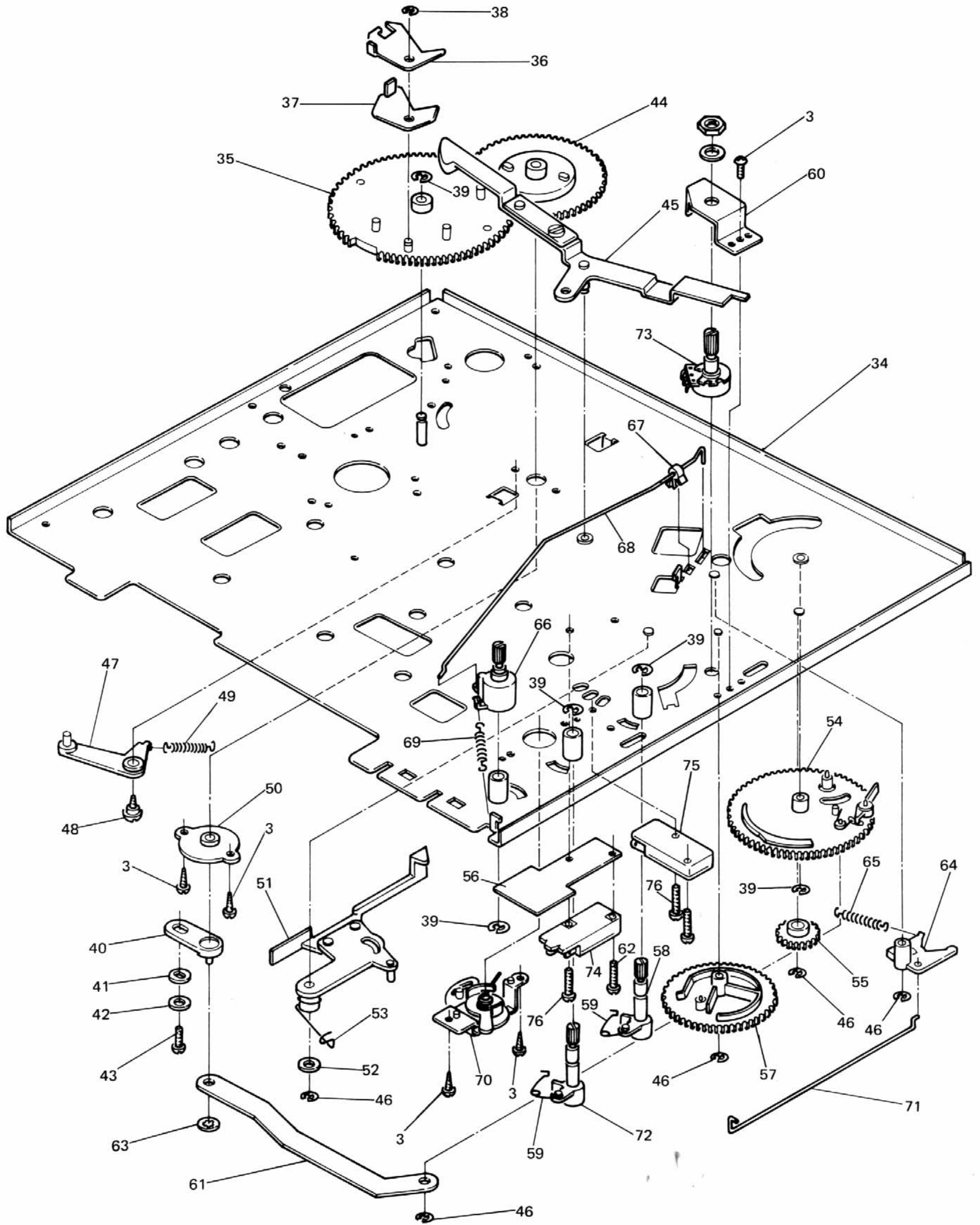


Fig. 19

No.	Parts No.	Parts Name	Description
34	E10175-001	Base Sub Ass'y	
35	E21913-002	Main Gear Ass'y	
36	E49627-001	Engagement Pawl	
37	E60380-001	Lower Trip Pawl	
38	REE2000	"E-typed" Ring	
39	REE5000	"E-typed" Ring	
40	E60381-001	Lever	
41	E60844-001	Spacer	
42	WNS3000N	Washer	
43	LPSP3008ZS	Screw	
44	E60449-001	Following Gear	
45	E34234-001	Trip Ass'y	
46	REE3000X	"E-typed" Ring	
47	E60383-001	Stopper	
48	G41507-1	Tapping Screw	
49	E60384-001	Spring	
50	E60382-001	Bushing	
51	E60394-001	Switch Plate Ass'y	
52	Q03091-110	Washer	
53	E60396-001	Spring	
54	E34236-003	Driving Gear Ass'y	
55	E60400-001	Idler Gear	
56	See page 16	Insulator Sheet	Refer to table 2
57	E60402-001	Sub Gear	
58	E61696-001	Switch Cam Ass'y	
59	E49608-002	Spring	
60	E61697-001	Volume Bracket	
61	E34237-002	Link	
62	See page 16	Screw	Refer to table 2
63	G4942-4	Speed Nut	
64	E60390-002	Elevator Cam	
65	E49596-001	Spring	
66	E60429-002	Starting Shaft Ass'y	
67	E49679-001	Rod Holder	
68	E61698-001	Reject Rod	
69	E60416-001	Spring	
70	E34240-002	Cueing Ass'y	
71	E60414-001	Rod	
72	E34239-001	Cueing Cam Ass'y	
73	QVF1A2B-013	Variable Resistor	
74	See page 16	Micro Switch	Refer to table 2
75	QSM1V01-002	Micro Switch	
76	LPSP3014ZS	Screw	
78	E48820-001	EP Adaptor	

8-(4) Parts List with Specified Numbers for Designated Areas

Item No.	Description	U.S.A. & Canada	Europe	U.K.	Australia	U.S. Military Market and Other Countries
1	Cabinet Ass'y	E22338-001	E22338-002	E22338-002	E22338-002	E22338-002
1-1	Cabinet	E10172-001	E10172-002	E10172-002	E10172-002	E10172-002
4	Tonearm Ass'y	ARM-516	MP-169S	ARM-516	MP-169S	MP-169S
11	Power Transformer	E03032-23B	E03032-23C	E03032-23C	E03032-23C	E03032-23D
15	P.C. Board Ass'y	TPS-96A(U.S.A.)	TPS-96C	TPS-96F	TPS-96D	TPS-96B
15	P.C. Board Ass'y	TPS-96E(Canada)				
16	Fuse (Primary)	QMF61U2-R30 (0.3A)	QMF51A2-R10 (100mAT)	QMF51A2-R10 (100mAT)	QMF51A2-R10 (100mAT)	QMF60S1-R30 (0.3A) QMF60R1-R20 (0.2A)
17	Fuse (Secondary)	_____	QMF51A2-R50 (500mAT)	QMF51A2-R50 (500mAT)	QMF51A2-R50 (500mAT)	_____
19	Platter Cover	E22375-004	E22375-003	E22375-003	E22375-003	E22375-003
22	Power Cord	QMP1200-244	QMP3910-244	QMP9017-007	QMP2500-200	QMP1200-244
30	Bottom Board Ass'y	E22342-004	E22342-002	E22342-002	E22342-002	E22342-002
31	Foot Ass'y	E35118-004	E35118-005	E35118-005	E35118-005	E35118-005
56	Insulator Sheet	_____	E60964-002	E60964-002	E60964-002	_____
62	Screw	LPSP3014ZS	SPKP3015S	SPKP3015S	SPKP3015S	LPSP3014ZS
74	Micro Switch	QSM1V01-018	QSM1V01-022	QSM1V01-022	QSM1V01-022	QSM1V01-018
108	Cartridge	_____	MD-1025	_____	MD-1025	MD-1025
109	Needle Ass'y	_____	DT-Z1S	_____	DT-Z1S	DT-Z1S
110	Needle Cover	_____	E34268-001	_____	E34268-001	E34268-001
111	Screw	E60502-002	_____	E60502-002	_____	_____

(Table 2)

9. Printed Circuit Board Ass'y and Parts List

9-(1) TPS-96 Power Supply P.C. Board Ass'y

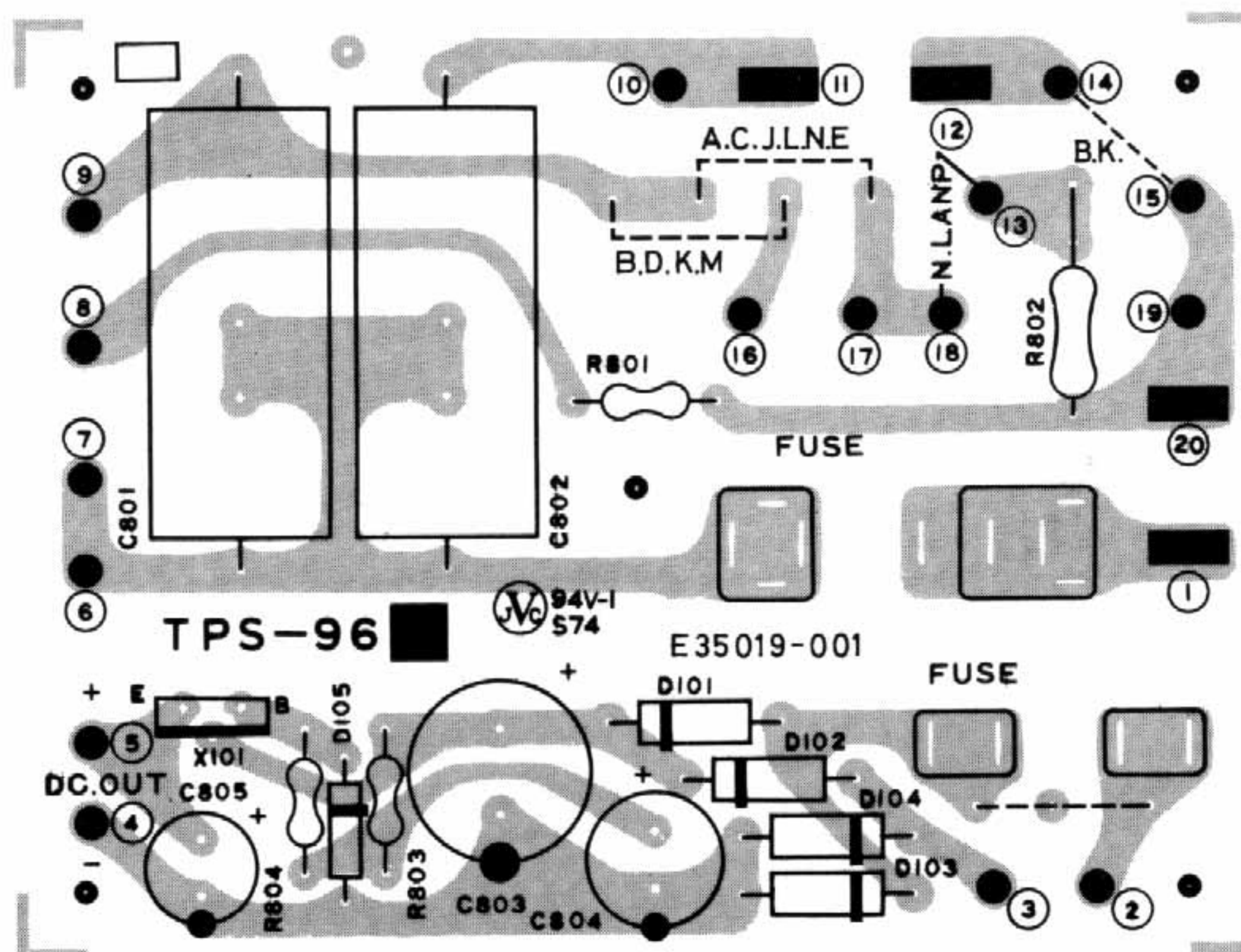


Fig. 20

Description	U.S.A. & Canada	Europe	U.K.	Australia	U.S. Military Market and Other Countries
Power Supply P.C. Board Ass'y	TPS-96A (U.S.A.) TPS-96E (Canada)	TPS-96C	TPS-96F	TPS-96D	TPS-96B

Transistor

Item No.	Part Number	Rating		Description	Maker
		Pc	fT		
X101	2SD325(E)	10W	8MHz	Silicon	Sanyo Denki

Diodes

Item No.	Part Number	Rating	Description	Maker
D101~D104 D105	SIB01-02 WZ-192		Silicon Zener	Fuji Denki Shin Nihon Musen

Capacitors

Item No.	Part Number	Rating		Description
C801	See page 18	0.047 μ F		Refer to table 3
C803	QEW41VA-477	470 μ F	35V	Electrolytic
C804	QEW41VA-107	100 μ F	35V	"
C805	QEW41HA-476	47 μ F	50V	"

Resistors

Item No.	Part Number	Rating		Description
R801	See page 18			Refer to table 3
R802	See page 18			"
R803	QRG129J-681	680 Ω	$\frac{1}{2}$ W	Uninflammable O.M.
R804	QRX129J-100	10 Ω	$\frac{1}{2}$ W	"

TPS-96 Parts List with Specified Numbers for Designated Areas

Item No.	Description	U.S.A. & Canada	Europe	U.K.	Australia	U.S. Military Market and Other Countries
	Power Supply P.C. Board (Plain)	E35019-001	E35019-002	E35019-002BS	E35019-002	E35019-002
	Fuse Clip	E45524-001	E48965-002	E48965-002	E48965-002	E45524-001
	Fuse (Primary)	QMF61U2-R30 (0.3A)	QMF51A2-R10 (100mAT)	QMF51A2-R10BS (100mAT)	QMF51A2-R10 (100mAT)	QMF61U2-R30 (0.3A/110, 120V)
	(Secondary)	—————	QMF51A2-R50 (500mAT)	QMF51A2-R50BS (500mAT)	QMF51A2-R50 (500mAT)	QMF61U2-R20 (0.2A/220, 240V)

(Table 3)

TPS-96 Parts List with Specified Numbers for Designated Areas

Item No.	Description	U.S.A. & Canada	Europe	U.K.	Australia	U.S. Military Market and Other Countries
C801	Capacitor	QFH72BM-473M (U.S.A. 0.047μF/AC125V) QFA72BM-473M (Canada 0.047μF/AC125V)	QFZ9007-473M (0.047μF/AC450V)	QFZ9007-473M (0.047μF/AC450V)	QFZ9007-473 (0.047μF/AC450V)	QFH53AM-473M (0.047μF/AC450V)
R801	Resistor	_____	QRG129J-102 (1k ohm/1/2W)	QRG129J-102 (1k ohm/1/2W)	QRG129J-102 (1k ohm/1/2W)	_____
R802	Resistor	QRG017J-153S (15k ohms/1W)	QRG027J-333 (33k ohms/2W)	QRG027J-333 (33k ohms/2W)	QRG027J-333 (33k ohms/2W)	QRG017J-103S (10k ohms/1W)

(Table 3)

9-(2) MDC-933A Servo Control P.C. Board Ass'y

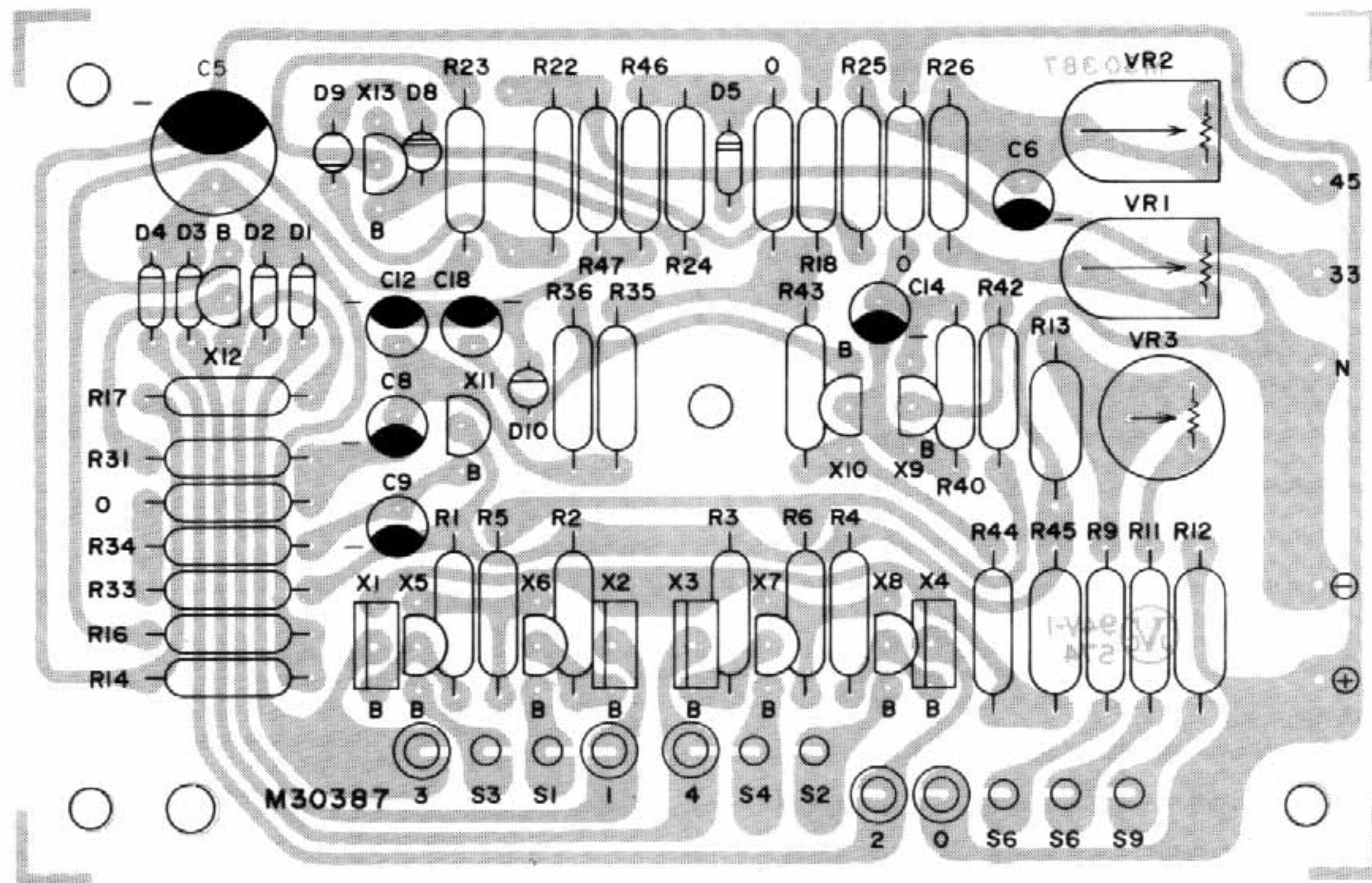


Fig. 21

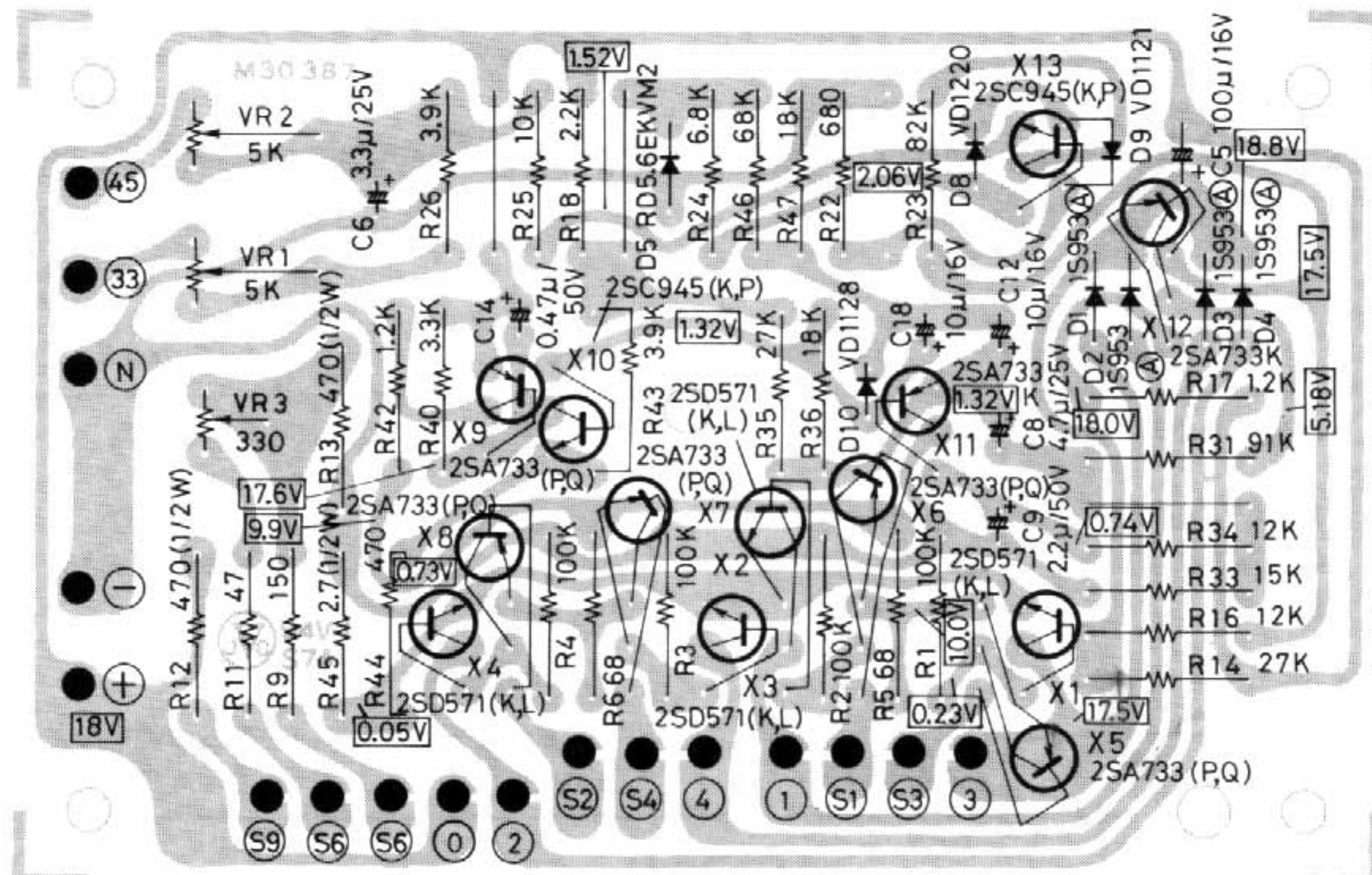


Fig. 22

Transistors

Item No.	Part Number	Rating		Description	Maker
		Pc	fT		
X1~X4	2SD571 (K,L)	800mW	110MHz	Silicon	Nihon Denki
X5~X9	2SA733 (P,Q)	250mW	180MHz	"	"
X10	2SC945 (K,P)	"	250MHz	"	"
X11~X12	2SA733 (K)	"	180MHz	"	"
X13	2SC945 (K,P)	"	250MHz	"	"

Diodes

Item No.	Part Number	Rating	Description	Maker
D1~D4	1S953 (A)		Silicon	Nihon Denki
D5	RD5.6EKVM2, or RD6.2EKVM2		Zener	"
D8	VD1220		Varistor	"
D9~D10	VD1121		"	"

Capacitors

Item No.	Part Number	Rating		Description
C5	QEW41CA107	100 μ F	16V	Electrolytic
C6	QEW41EA335	3.3 μ F	25V	"
C8	QEW41EA475	4.7 μ F	25V	"
C9	QEW41HA225	2.2 μ F	50V	"
C12	QEW41CA106	10 μ F	16V	"
C14	QEW41HA474	0.47 μ F	50V	"
C18	QEW41CA106	10 μ F	16V	"

Resistors

Item No.	Part Number	Rating		Description
R1~R4	QRD141J-104	100k Ω	$\frac{1}{4}$ W	Carbon
R5~R6	QRD141J-680	68 Ω	"	"
R9	QRD141J-151	150 Ω	"	"
R11	QRD141J-170	17 Ω	"	"
R12~R13	QRD121J-471	470 Ω	$\frac{1}{2}$ W	"
R14	QRD141J-273	27k Ω	$\frac{1}{4}$ W	"
R16	QRD141J-123	12k Ω	"	"
R17	QRD141J-122	1.2k Ω	"	"
R18	QRD141J-222	2.2k Ω	"	"
R22	QRD141J-681	680 Ω	"	"
R23	QRD141J-823	82k Ω	"	"
R24	QRD141J-682	6.8k Ω	"	"
R25	QRD141J-103	10k Ω	"	"
R26	QRD141J-392	3.9k Ω	"	"
R31	QRD141J-913	91k Ω	"	"
R33	QRD141J-153	15k Ω	"	"
R34	QRD141J123	12k Ω	"	"
R35	QRD141J-273	27k Ω	"	"
R36	QRD141J-183	18k Ω	"	"
R40	QRD141J-332	3.3k Ω	"	"
R42	QRD141J-122	1.2k Ω	"	"
R43	QRD141J-392	3.9k Ω	"	"
R44	QRD141J-471	170 Ω	"	"
R45	QRD121J-2R7	2.7 Ω	$\frac{1}{2}$ W	"
R46	QRD141J-683	68k Ω	$\frac{1}{4}$ W	"
R47	QRD141J-183	18k Ω	"	"
VR1~VR2	QVP8A0B-053	5k Ω		Variable Resistor
VR3	QVP4A0B-331	330 Ω		" "

Others

Item No.	Part Number	Rating	Description
	M30387 M40244 QXT310H-015 M40243-2	6φ x 12mm	Circuit Board Tab Vinyl Tube Silicon Tube

10. Packing Materials and Part Numbers

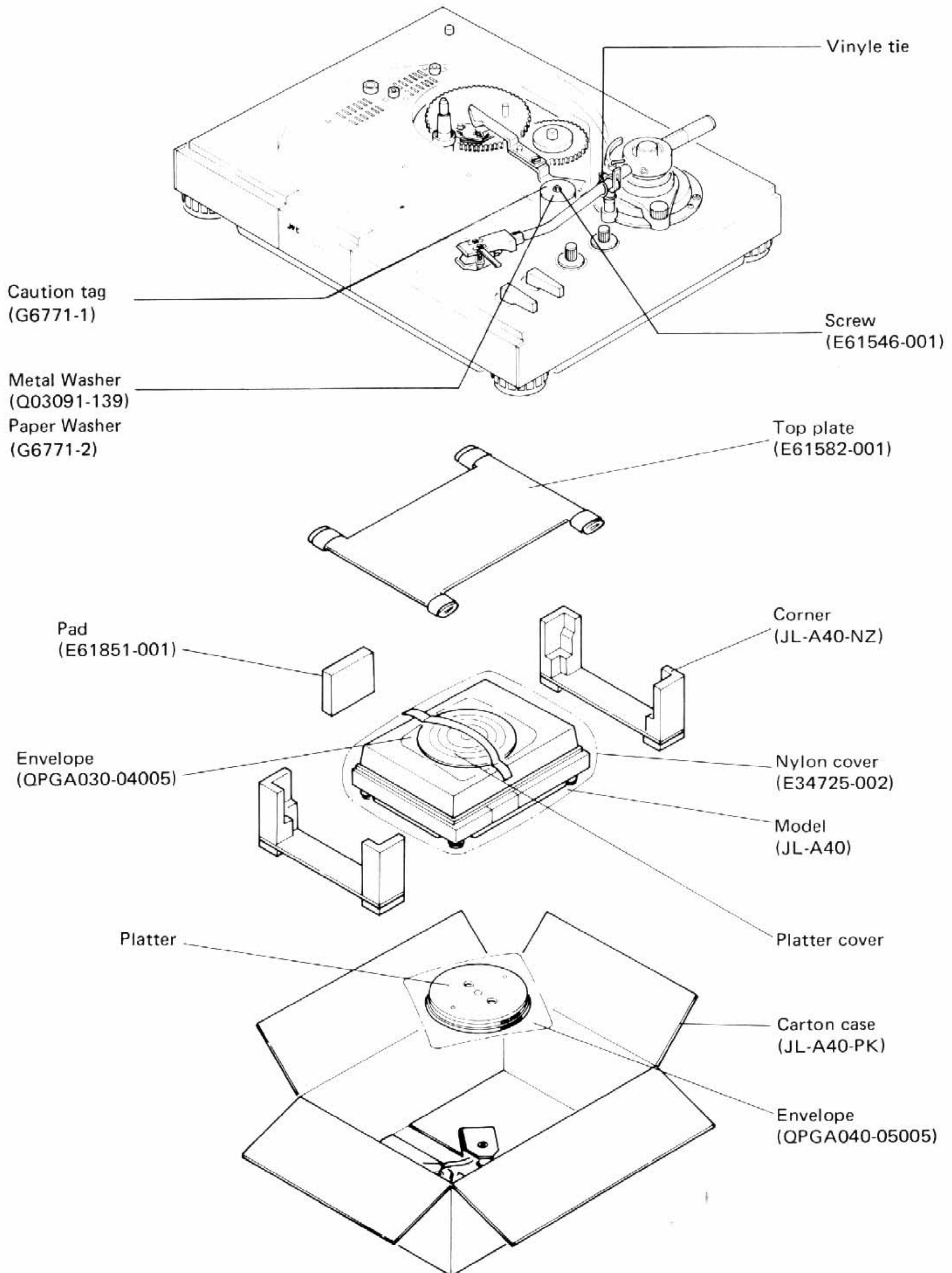
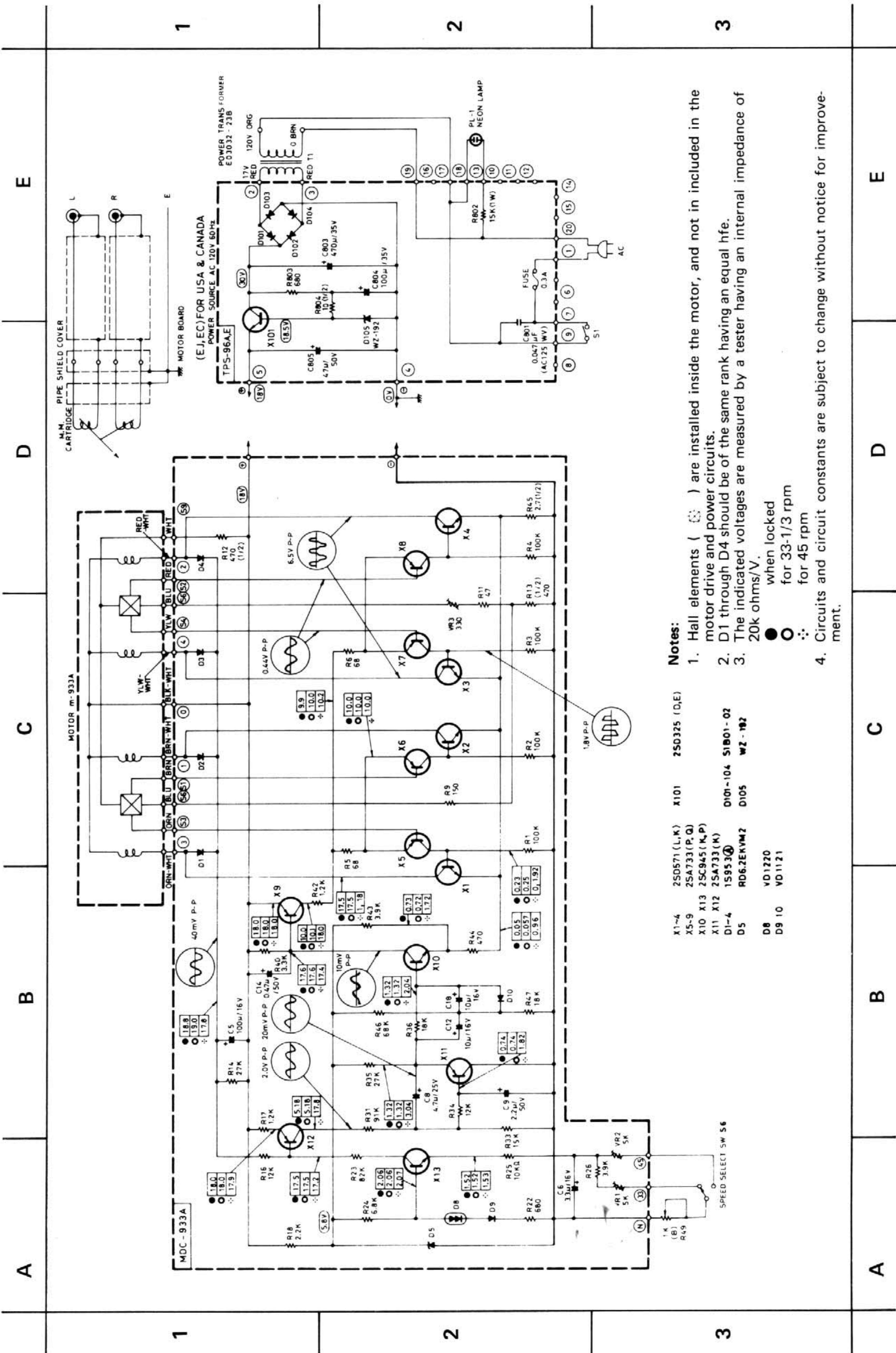


Fig. 23

11. JL-A40 Schematic Diagram

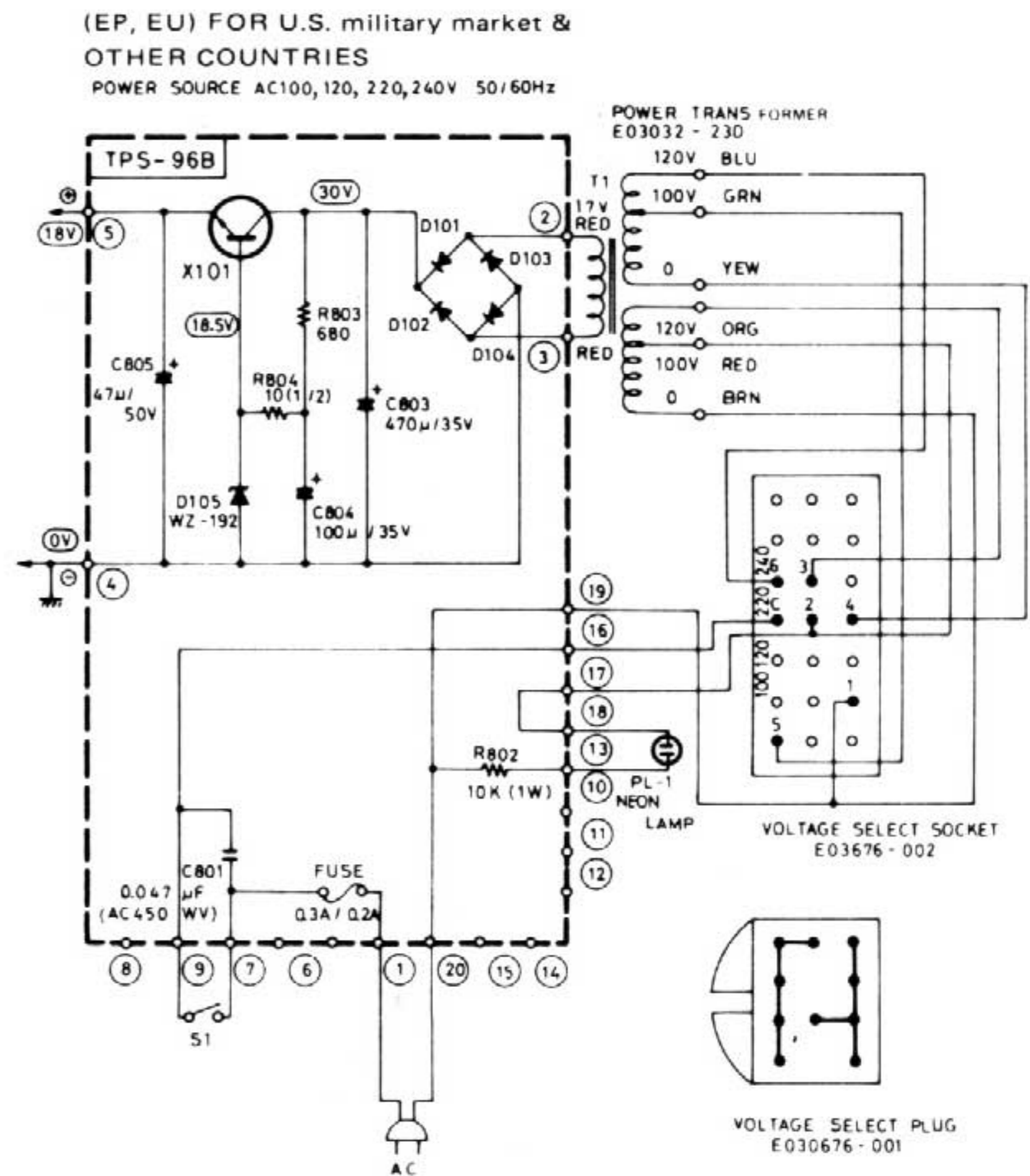
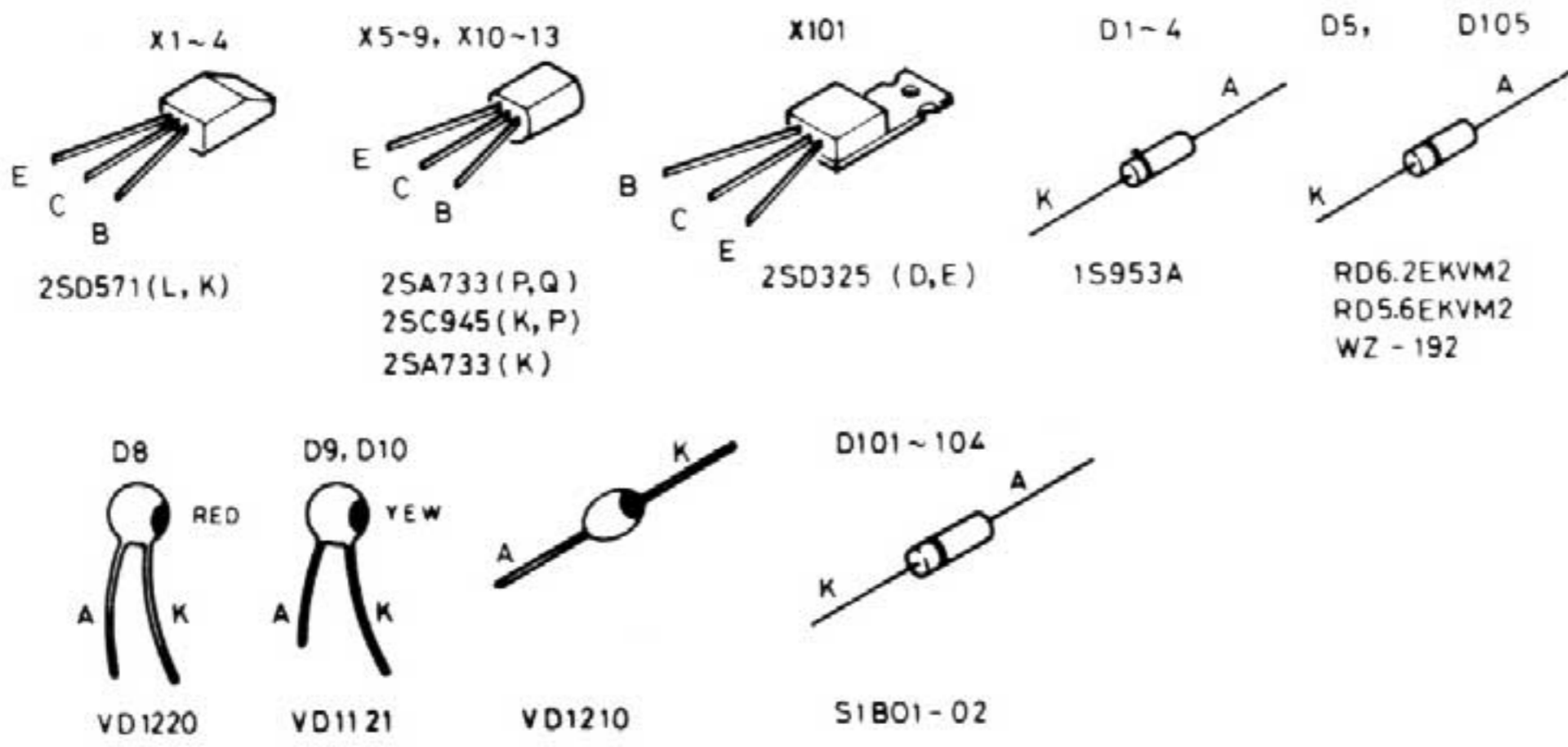
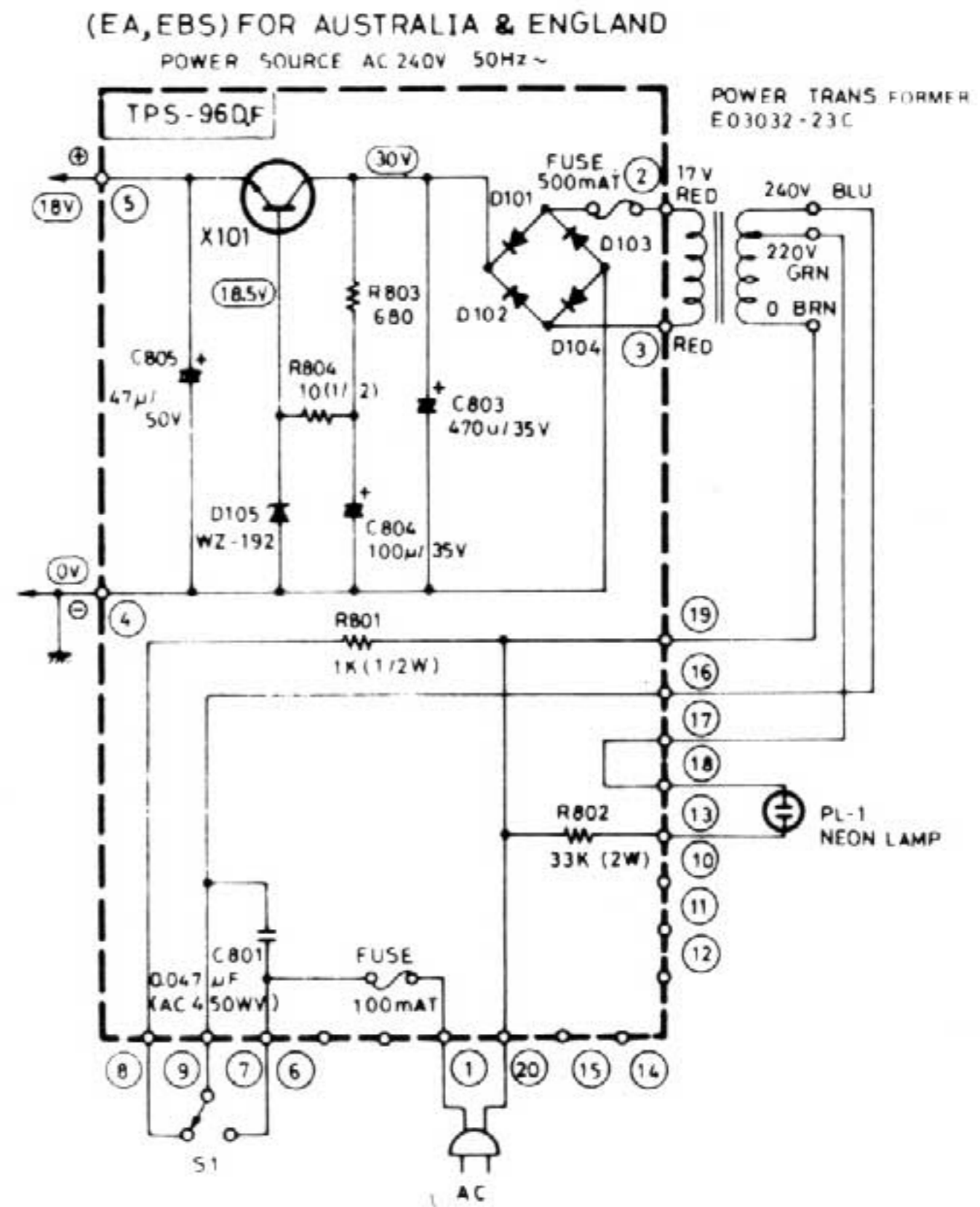
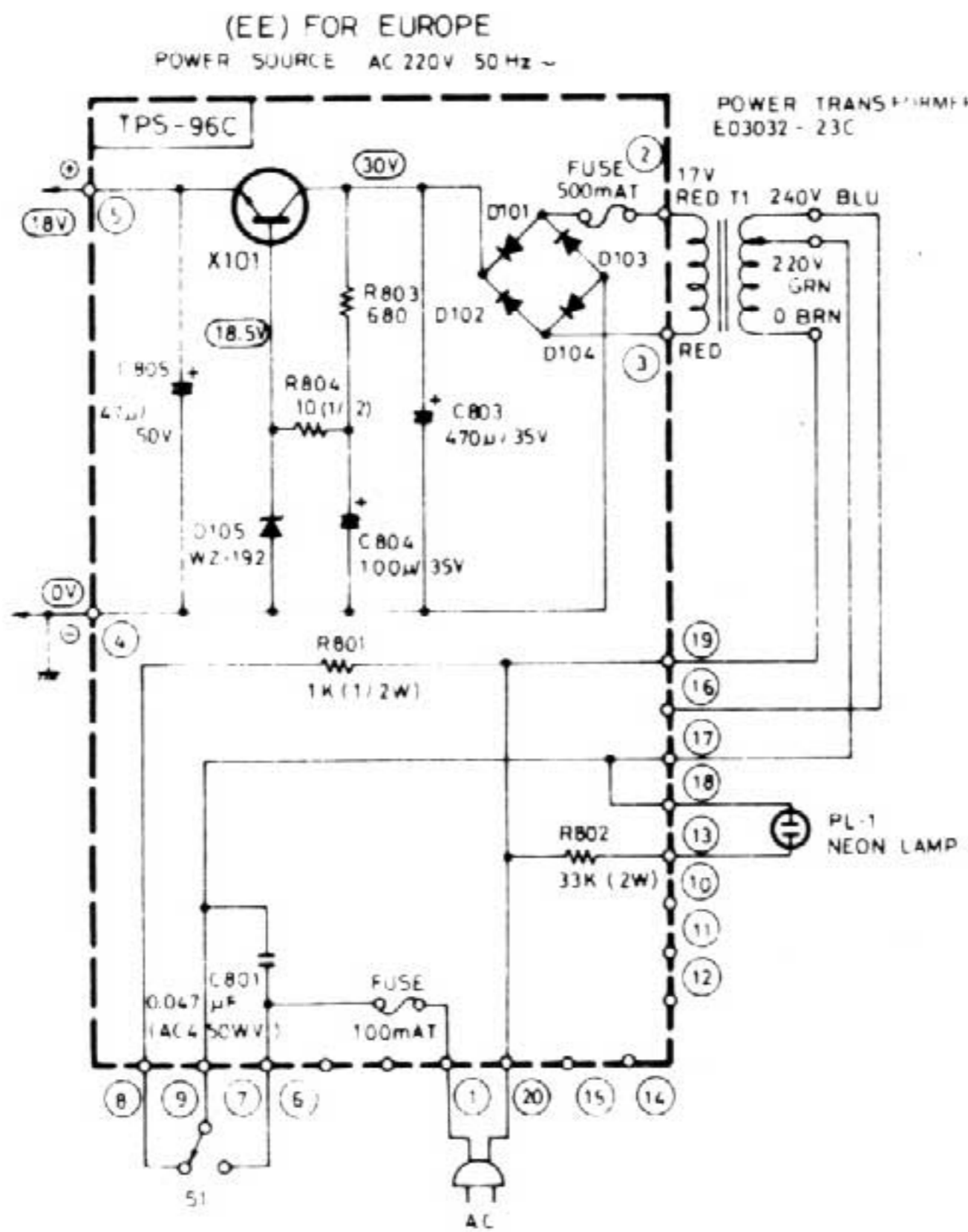


Notes:

- Hall elements () are installed inside the motor, and not included in the motor drive and power circuits.
- D1 through D4 should be of the same rank having an equal hfe.
- The indicated voltages are measured by a tester having an internal impedance of 20k ohms/V.
 - when locked
 - for 33-1/3 rpm
 - ⊘ for 45 rpm
- Circuits and circuit constants are subject to change without notice for improvement.

X1-4	2SD571 (L,K)	X101	2SD325 (D,E)
X5-9	2SA733 (P,Q)		
X10	X13 2SC945 (K,P)		
X11	X12 2SA733 (K)		
D1-4	15953④	D101-104	51B01-02
D5	RD6.2EKVM2	D105	WZ-192
D8	VD1220		
D9	10	VD1121	

12. Schematic Diagram for Designated Areas



13. Accessories List

Description	U.S.A.	Canada	Europe	U.K.	Australia	U.S. Military Market and Other Countries
Inst. Book	E30580-616A	E30580-616A	E30580-616A (English) E30580-617A (German) E30580-618A (French)	E30580-616A	E30580-616A	E30580-616A
Warranty Card	BT20032	BT20025	_____	BT20013B	BT20029	BT20014
Do it Better	BT20024B	_____	_____	_____	_____	_____
Service Procedure	BT20023	_____	_____	_____	_____	_____
Envelope	E64207-001	E64207-001	E64207-001	E64207-001	E64207-001	E64207-001
EP Adaptor	E48820-001	E48820-001	E48820-001	E48820-001	E48820-001	E48820-001

Memo

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