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DENON

Hi-Fi Component/Turntable

SERVICE MANUAL

SERVO-CONTROLLD DIRECT DRIVE TURNTABLE

MODEL DP-1000
MODEL DP-1700

MODEL DP-1700

NIPPON COLUMBIA CO.,LTD

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SPECIFICATIONS

TURN TABLE

System:	Direct drive by AC servo motor
Rotation speed:	33-1/3 rpm, 45 rpm
Range of speed adjustment:	±3%:
Wow and flutter:	Less than 0.03% (w-r.m.s.)
S/N:	Over 60dB
Starting characteristic:	Less than 1/2 turn to reach nominal speed (at 33-1/3 rpm)
Platter:	Aluminum diecast, dia; 300mm Mass of inertia; 160kg-cm^2 Weight: 1.1kg Approx.

TONE ARM

Type:	Static balance type
Effective length:	244mm
Overhang:	14mm
Tracking error:	Less than 2.5°
Adjustable range of stylus pressure:	0 ~ 2.5g direct reading
Weight of acceptable cartridge:	5 ~ 11g
Shell weight:	9g (net exclusive of screws and nuts)
Head connector:	EIA standard, 4P connector

Power supply:	AC 200, 220, 230, 240, 50/60Hz selected
Power consumption:	11W Approx.
Dimensions:	485 x 405 x 170mm
Weight:	12kg: Approx.

* DP-1700 consists of phono motor (DP-1000), wooden cabinet and tone arm.

DP-1000 Record Player—Theory of Operation

1. Detection of signal

The DP-1000 has a magnetic head which detects the 1,000 pulses recorded on magnetic coating on the inside surface of the rim of the turntable. This magnetic head detects the rotating speed of the turntable as a frequency. When the turntable is rotating at 33-1/3 rpm, a frequency of approx. 555Hz is detected as a head output. When it is rotating at 45 rpm, a frequency of 750Hz is detected. So the time of a cycle is approx. 1.82ms at 33-1/3 rpm and 1.33ms at 45 rpm. If correct spacing is maintained between the head and the magnetic coating surface of the turntable, approx. 3mV r.m.s. sine-wave signal is detected.

On servo turntables, all manufacturers are incorporating their own features in the signal detector section, but DENON was the first to develop the method of detecting signals as an application of magnetic recording. (see Fig.12)

2. Detected signal amplifier, limiter, differential and gate circuits

The signal obtained by the detector head is a sine wave signal which must be converted into pulses necessary for operation of a servo system. So the signal is amplified and limited by Q_1, Q_2, Q_3 and D_1 and is converted into pulses. The pulses pass through the differential and gate circuits and as trigger the monostable multivibrator. The amplifier circuit is a general 2-stage direct-coupled circuit which having no voltage feadback, offers a large gain. C_3, together with the head inductance, forms a low-pass filter circuit which rejects the high frequency noise from the head.

The limiter consists of D_1 and Q_3.

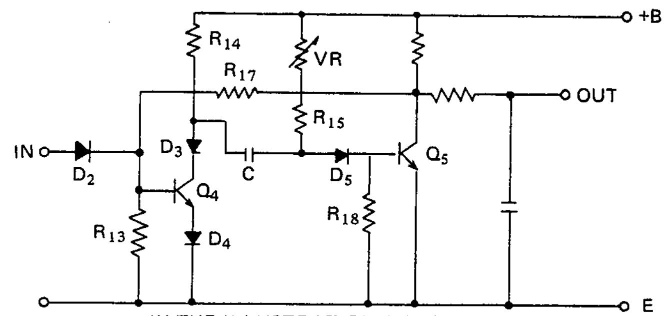
If the gap between the magnetic coating surface of the turntable and the magnetic head is too wide, only a very low voltage is detected, resulting in the insufficient pulses to trigger the monostable multivibrator, so the turntable rotates at high speed. A correct gap between the magnetic coating surface and magnetic head is 0.2 to 0.25mm.

If the gap is only slightly wider than specified, the eccentricity of the magnetic coating surface will cause a trouble. The trigger pulses will become alternately smaller and larger in a rotation and the monostable multivibrator will operate at times but not at other times. So the turntable will rotate irregularly.

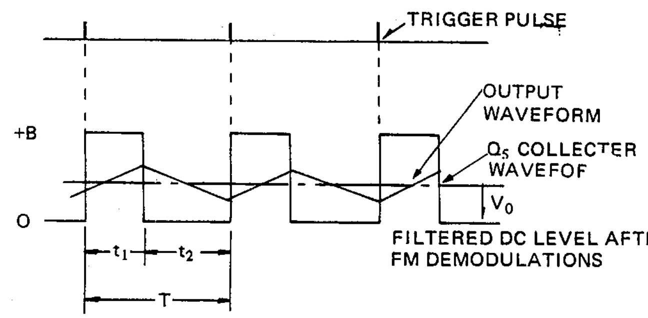
3. Monostable multivibrator and FM demodulator circuit

This circuit is a pulse-count type FM demodulator circuit. A simplified illustration of the circuit is given Fig. 1, in which some omissions were made for the sake of convenience in the explanation of its operation.

Here is a brief account of operation of the circuit according to the illustration Fig. 1. If for some reason or other the turntable slows down, the detected frequency will be lower and "T" will be longer. Even if "T" becomes longer, "t_1" will be maintained constant by $VR+R_{15}$ and C. As a result, "t_2" will become longer as a necessity. Accordingly. the FM demodulated output will be reduced and the filtered



IN THE ILLUSTRATION AT LEFT
VR: COMPOUND OF VR_0 AND VR_1
C: COMPOUND OF C_8 AND C_9



T: 1.82 ms AT 33-1/3 rpm, 1.33 ms AT 45 rpm
t_1: DETERMINED BY VR + R_{15} AND C

Fig. 1

DC level "Vo" will fall. Under closed loop servomechanism as in the DP-1000, the rotating speed of the turntable will be then increased by the closed loop function in order that "Vo" will be maintained constant.

On the other hand, if "t_1" is reduced by the VR adjustment, the FM demodulated output will be also reduced and "Vo" will fall. Then, the closed loop function works in order to maintain "Vo" constant. That is, more current will be applied to the motor untill "T" will be shortened or the detected frequency will be increased. The turntable will speed up and settle down.

* See also the section 7 "Summary of operations."

In the DP-1000, the latter operation described above is performed as the rotating speed is selected by S_1 in the circuit diagram which varies the resistance value of this circuit. Furthermore, the rotating speed is adjustable with VR_1 or VR_2 of the circuit diagram.

As is evident from the above explanation, the DC level after FM demodulation has large effects on the rotating speed. So the circuit has a provision for stabilizing the +B voltage and sufficient temperature compensation. That is, R_{15} is a metal film resistor with a small temperature coefficient, while consists of a polyester film capacitor and polypropylene film capacitor connected in parallel for mutual temperature compensation. D_3 serves for temperature compensation of V_{BE} of Q_5. The VR is a carbon film variable resistor, but its portion in the combined resistance value of the VR and R_{15} is so small that its effect is negligible as a whole. D_5 is a protection against an inverse voltage between the base and emitter of Q_5. D_4 is a temperature compensation for D_5.

4. Comparator, reference voltage and error signal amplifier circuits

The comparator circuit is a differential amplifier circuit which involves a minimum of temperature drift.
If the FM demodulator circuit has a large time constant, even if the rotating speed changes with consequent variation in the cycle of the monostable circuit, the output of the demodulator circuit does not follow up the variation of the rotating speed due to the effect of the time constant, resulting in a time lag. This means that the response of the servo system is poor. That is, if for some reason or other the turntable is overloaded and the rotating speed is reduced, a certain duration of time is required before corrective force is exerted by servomechanism to bring back the speed to normal, making it impossible to provide correct speed control. This means that the transient response of the servo system is poor and that wow and flutter and overshoot could occur. All these are determental to the turntable. In order to prevent the above determental factors, the time constant of the demodulator must be reduced and the time lag minimized in order to assure the nominal rotating speed is instantly restored. If the time constant is merely reduced, however, the demodulator efficiency will deteriorate. So the detected frequency must be increased. The fact that the DP-1000 has a higher detected frequency than the other brands is very advantageous for reasons mentioned above, enabling the servo system of the DP-1000 to provide top stability and high gain.

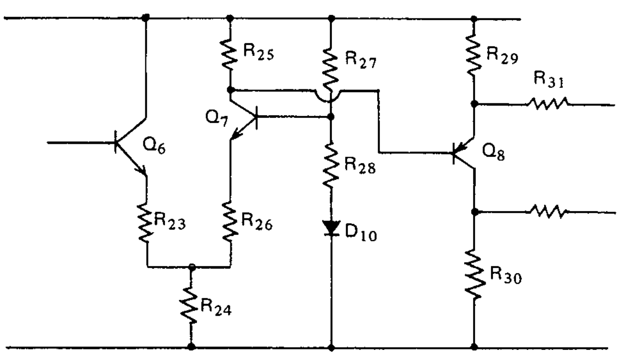


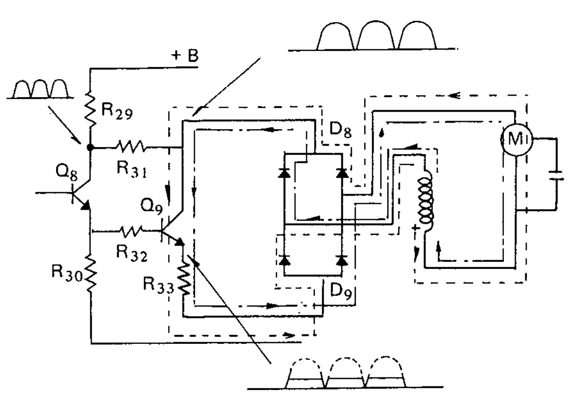
Fig. 2

Fig. 2 shows the comparator circuit and error signal amplifier circuit adopted for the DP-1000.
When the output voltage of the FM demodulator circuit decreases (the rotating speed of the turntable falls), the differential amplifier circuit operates as follows. The output voltage of the FM demodulator circuit is applied through a filter to the base of Q_6 so that the collector current of Q_6 decreases. At that time, since the emitter current of Q_6 also decreases, the collector current of Q_7 increases and the collector voltage falls. A divided voltage of + B (23.5V) obtained by R_{27}, R_{28} and D_{10} is applied to the base of Q_7. This voltage is the reference voltage. The output signal of the comparator circuit is directly coupled to the error signal amplifier circuit.
When the collector voltage of Q_7 falls, the base voltage of Q_8 falls, and this causes the collector current of Q_8 to increase. As a result, the voltage of R_{30} increases, and the base current of Q_9 of the next stage amplitude modulator circuit increases.

How does the circuit operate when the temperature changes? If the temperature rises and the current of Q_6 tends to increase, its emitter voltage will become higher, causing the current of Q_7 to decrease. On the other hand, if the current of Q_7 tends to increase, the circuit accomplishes the function of reducing the current of Q_6. Even if the currents of both Q_6 and Q_7 tend to increase at the same time, the mutual suppression prevents the increase of currents.
Since the differential amplifier circuit operates as described Fig. 2, it is desirable that the right and left of the differential amplifier circuit (Q_6 and Q_7 for example) are completely balanced.
When the circuit is serviced, therefore, make certain that the resistors of the same constant and the transistors of the same characteristics are used. The parts which deserve special attention are marked ※ on the wiring diagram. Make sure that the specified parts are used.

5. Amplitude modulator circuit

The amplitude modulator circuit controls the AC voltage by means of the signal delivered from the error signal amplifier circuit, thereby changing the voltage applied to the motor to correct the motor torque and adjust the rotating speed of the turntable. Fig. 3 shows the amplitude modulator circuit which achieves the objective by controlling the collector current flowing through Q_9. If base current if applied to Q_9, current multiplied by hfe will flow through the collector during the period of the positive half cycle of AC supply as indicated by arrow (solid line). During the period of the negative half cycle, the current will flow as indicated by dotted line. So AC current will flow through the motor. When the voltage applied to the amplitude modulator circuit becomes higher, the circuit will operate as described below. Since the corrective voltage over R_{30} becomes higher, the base current of Q_9 increases, and the collector current of Q_9 during both the positive half cycle and the negative half cycle of AC supply increases. So the AC current which flows through the motor can be controlled by Q_9.



Amplitude Modulator Circuit

Fig. 3

Since this kind of circuit uses the DC base voltage for Q_9 to control the AC voltage applied to the motor, some manufacturers call it a DC-AC control circuit. If AC current is controlled simply by this principle, the control current will become a current which looks like rectangular waves, making it impossible to obtain a smooth rotating field. The reason is this. The collector current of a transistor is determined by the base current and collector voltage. While, the base current varies with the current from the error signal amplifier circuit, and the collector voltage varies with the voltage from the power transformer. Although the base current is applied to Q_9, if the collector voltage of Q_9 is zero, the collector current is also zero. But the increase of the collector voltage of Q_9 increases the collector current. When the collector voltage reaches to a certain value, the collector current is saturated so that the current represents a waveform similar to a rectangular wave. Fig. 4 shows the relationship between the voltage applied to the collector and collector current. The hatched area shows the saturated and sliced portion of collector current. If a rectangular wave current resulting from the non-linearity of the transistor flows through the motor, the rotating field does not become circular, and motor vibration increases excessively.

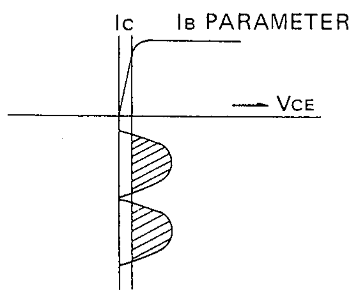


Fig. 4 Relationship between VCE and IC

To solve this problem, the waveform must be reshaped. In the DP-1000, R_{31} of the amplitude modulator circuit does the job. Without R_{31}, the current indicated by solid line of Fig. 3 flows through transistor Q_9. At that time, the collector voltage at Q_9 is almost same as a rectified sine wave. Application of this voltage through R_{31} to Q_8 increases the base current of Q_9 and also increases the collector current of Q_9. So the current which flows through Q_9 collector is a rectified sine wave current, offering smooth rotating field in the motor. (The dotted line of waveform shown in Fig. 3 represents the amount of current corrected by R_{31}.) That is, the base current of Q_9 is varied by the voltage applied thereto reshaping the collector current into a sine wave current.

6. Constant voltage power supply circuit

The constant voltage circuit adopted for the DP-1000 is a simple one which derives the voltage of the Zener diode D_8 after current amplification by Q_{10}.
The constant voltage power supply is designed to deliver an output voltage of 23.5V.
This constant voltage circuit has no protective circuit. When the circuit is serviced, care should be taken not to short the output side (load side).

7. Summary of operations

Operation of each circuit has been described above. Here is a summary of operations to be performed when the rotating speed of the turntable falls.

(1) The detected frequency from the magnetic head falls and the trigger pulse cycle of the monostable circuit becomes longer.

(2) The time of a cycle "T" of the monostable circuit becomes longer. Since "t_1" remains unchanged, "t_2" becomes longer and FM demodulated output falls.

(3) The base voltage of Q_6 of the comparator circuit falls and the collector voltage of Q_7 falls.

(4) The base voltage of Q_8 of the error signal amplifier circuit falls, the collector current increases, and the voltage across R_{30} increases.

(5) The base current of Q_9 of the amplitude modulator circuit increases and the AC current of the motor increases.

(6) The torque of the motor increases, and brings back the reduced rotating speed of the turntable to normal.

The rotating speed is maintained constant through these operations. When the rotating speed was switched over or was adjusted, the following operations are performed.

(1) When the resistance of the monostable circuit (VR or R_{15} of Fig. 1) is reduced (for example, when the speed is changed over from 33-1/3 rpm to 45 rpm), "t_1" becomes shorter and the demodulated output falls.

(2) Operations above described Items (3) through (6) are performed to increase the rotating speed.

(3) The detected frequency at the magnetic head becomes higher and the trigger pulse cycle becomes faster.

(4) The time of a cycle "T" of the monostable circuit becomes shorter.

(5) Then, the demodulated and rectified DC voltage tends to equal the reference voltage, settling on the faster rotating speed. (When the resistance set for 45 rpm is selected, the speed settles on 45 rpm.)

TO CHANGE THE OPERATIONAL VOLTAGES

The model DP-1000 Turntable unit can be operated with either 200, 220, 230 or 240 volts power supply.
If you bring the set to the other country or place for operation, check the power supply voltages first and if it is different from the pre-set voltage, please contact your nearest DENON dealer for re-adjustment.
FOLLOWING VOLTAGE CHANGE PROCEDURES ARE FOR AUTHORIZED DENON DEALER OR EXPERIENCED PERSONAL FOR ELECTRONICS ONLY.

1. Remove the three bottom cover fixing screws and take off the cover cap. (See figure 5)
2. Take out carfully the fuse from the fuse clip of the power source unit. (Fig. 6)
3. Set the fuse at the required voltage position.

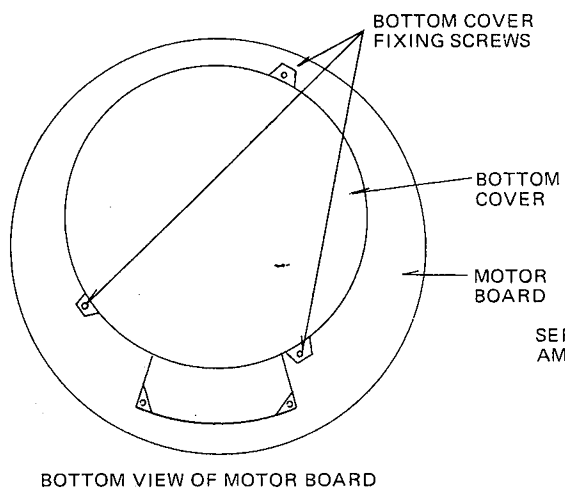


Fig. 5

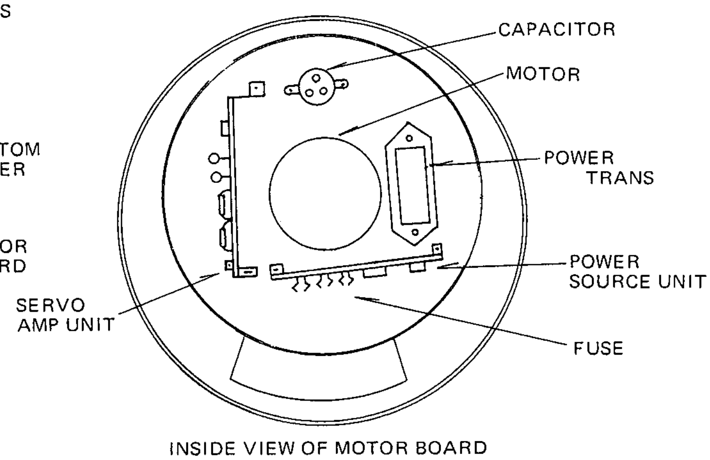


Fig. 6

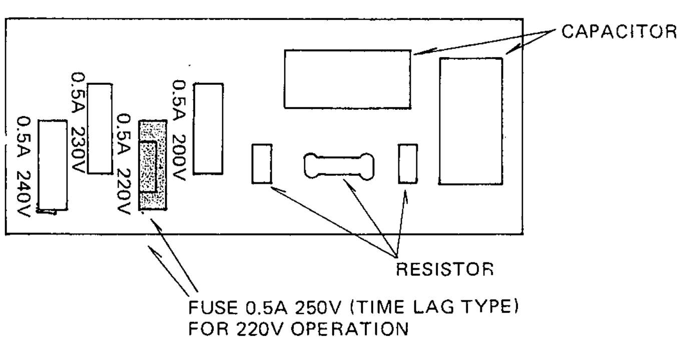


Fig. 7

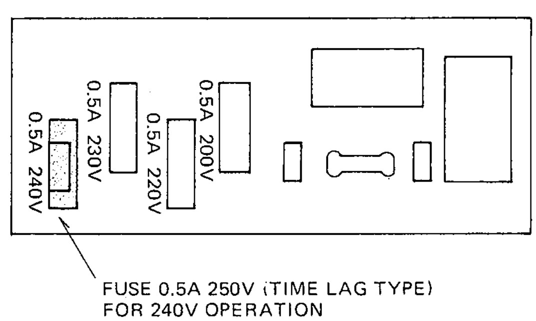
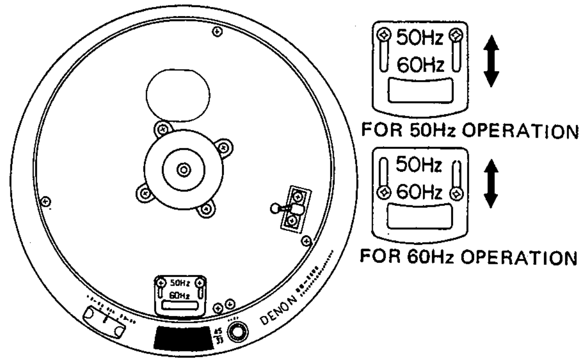


Fig. 8

ALTERATION OF SUPPLY FREQUENCY

1) It is required to change the strobo shutter according to the power supply frequency. Fasten the screw for the strobo shutter on the required frequency. (See Fig. 9)
2) Then set the speed selection knob "45", and adjust the speed adjustment knob to obtain a still strobo pattern on "45" side. Next, set the speed selection knob "33", and a running strobo pattern on "33" side will be observed.
   To have still pattern, adjust the speed-adjustment VR with a small screwdriver through the hole with an indication of "33" as shown in Fig. 10.



STROBO SHUTTER AND POWER SUPPLY FREQUENCY

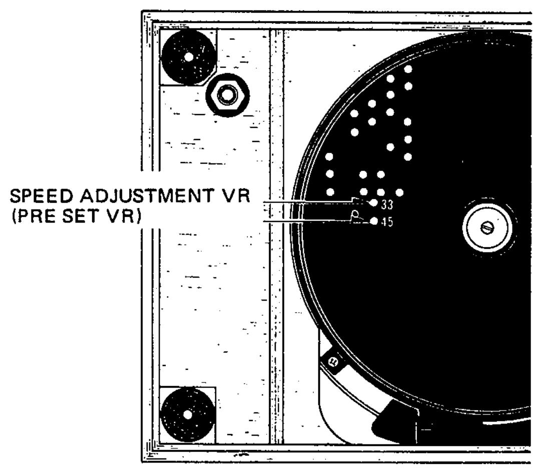
Fig. 9

ADJUSTMENT OF ROTATIONS

This player set or turntable unit is preadjusted so that no readjustment is required, once speed is adjusted for either 33-1/3 rpm or 45 rpm. Should readjustment become necessary for any reason upon altering the speed selection, follow adjustment procedures as mentioned below:

1) First, set the speed-selection knob for "45" and adjust the speed adjustment knob to have a still strobo pattern.
2) Then, change the speed selection to "33" and, leaving the speed adjustment knob untouched, adjust the speed-adjustment V.R. to have a still strobo pattern on "33" side using a small (−) screw driver through the hole which is provided at the bottom with an indication of "33". (See Fig. 10)

   Note: Please do not touch the VR indicated as "45", the variable range of the speed-adjustment knob for 45 rpm is pre-adjusted to be more than ±3%.



BOTTOM OF THE TURNTABLE FRAME

Fig. 10

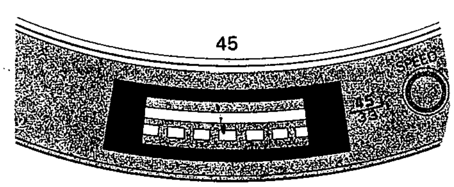
STROBO PATTERN STABILITY

In the case of a turntable driven by a conventional synchronous motor, both motor driving and neon-lamp lighting have a same power source.

Therefore, on such a turntable, the strobo pattern does not run even if the rotation of the turntable is fluctuated according to variation of power frequency.

In the case of this model DP-1700, though the servo circuit is designed to constantly maintain a stipulated speed once the strobo pattern is adjusted to remain still, the strobo pattern may slightly run due to frequency fluctuation of a power supply which lights the neon lamp of this set. Actually the frequency fluctuation of power supply might exist. In adjusting the motor speed, observe the movement of strobo pattern for a few minutes and, taking the frequency fluctuation into consideration, adjust the strobo pattern speed at an average frequency.

When the strobo pattern runs 6 frames/min. for 50Hz and/or 7 frames/min. for 60Hz, that corresponds to a 0.1% variation of the number of motor rotation.



STROBO PATTERN

Fig. 11

BLOCK DIAGRAM OF DP-1000

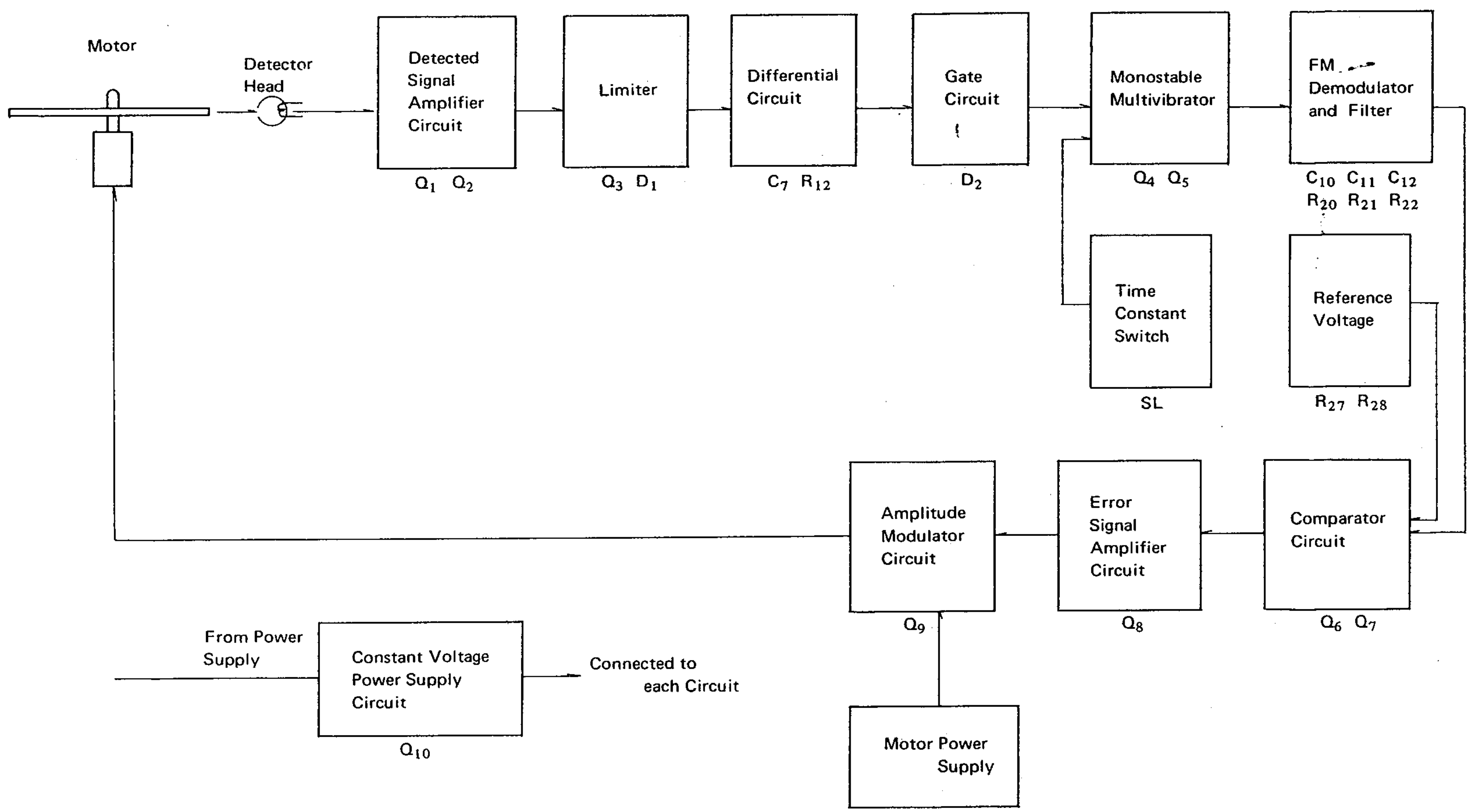
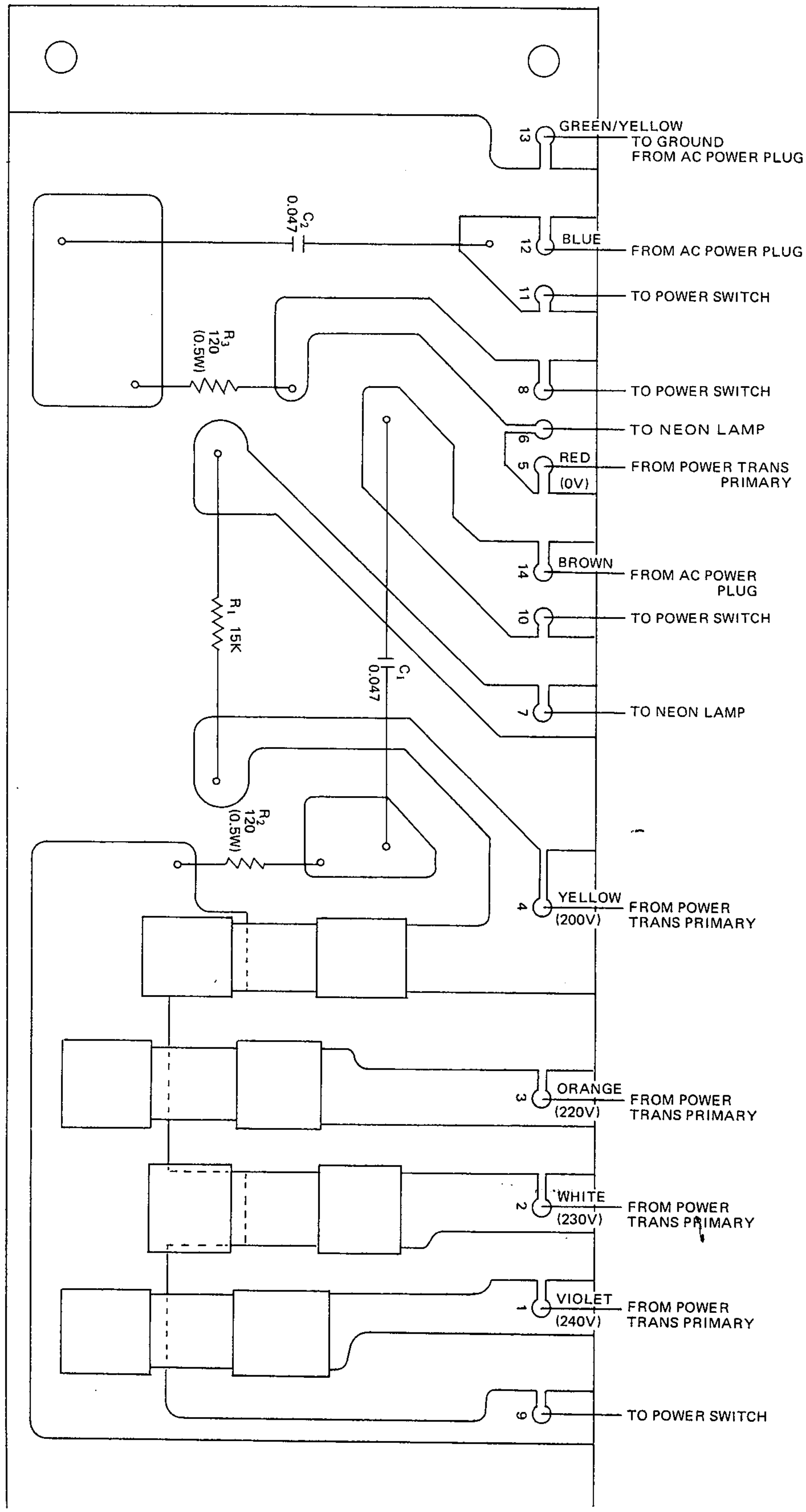


Fig. 12

PS-119 POWER SOURCE UNIT



MODEL DP-1700 DIRECT DRIVE PLAYER

Ref. No.	Part No.	Part Name	Descriptions
UNIT GROUP			
	FMD-469J	STAND SHEET	
	FMD-470H	RUBBER WASHER	
	FEP-1179K	OUTPUT CORD	
	FE-2050H	CORD CLAMPER	
CABINET GROUP			
	FCT-309K-1	CABINET ASS (ASH)	
	FCT-309K-2	CABINET ASS (WALNUT)	
	FPR-464-1	DENON MARK	
	FMD-496	BUSHING	
	FMD-524-1	INSULATOR	
	FTS-700H	HINGE	
	FPU-440J	TONE ARM ASS	
	FPU-432H	HEAD SHELL ASS	
	FPU-437	ARM LIFTER ASS	
	FPU-439	ARM STAND	
	FMD-544H	DUST COVER ASS	
ACCESSORY GROUP			
	FMD-541	45 ADAPTOR	
	FMD-443K	RUBBER SHEET	
	FPR-491	INSTRUCTION MANUAL	
	FPU-320J	MINI DRIVER	
MECHANISM GROUP			
	FMD-611	RECORDED TURN TABLE (C)	
	FMD-621	MOTOR BOARD (A)	
	FMD-510K	MOTOR BOARD COVER (BOTTOM COVER)	
	2568006104	CH64H2DAC305J	
	FEP-1208	V16N20KB203	
	FMD-516J	VOLUME KNOB	
	F14/21 M-2	MOTOR	
	FLT-165	POWER TRANS	
	FMD-521H	CUSHION RUBBER	
	FTS-703	SPRING PIN	
	KU-207	SERVO AMP UNIT	
	PS-119	POWER SUPPLY UNIT	
	PH-24	MAGNETIC HEAD	
	FE-2341	HEAD SUPPORT	
SWITCH GROUP			
	FMD-524H	SWITCH LEVER ASS	
	FMD-514H	KNOB ASS	
	FEP-1278	MICRO SWITCH	
	FEP-1215	MICRO SWITCH	
	FE-2511	ACTUATOR	
	FE-2512	ACTUATOR SHAFT	
	FMD-520J	MIRROR CASE ASS	
	3933001021	NEON LAMP	
	FMD-517	STROBO WINDOW	
	FPR-451H	WINDOW SPACER	
	FTS-692J	STROBO SHUTTER	

PS-119 POWER SOURCE UNIT

Ref. No.	Part No.	Part Name	Descriptions
C1, 2	2518001023	CP05C=AC473M	0.047μF 450VAC OIL PAPER CAPACITOR
R1, 2	2410163001	RD14B2H121J	1/2W 120Ω ±5% CARBON FILM RESISTOR
R3	2440167006	RS14B3F153JNB	3W 15kΩ ±5% METAL OXIDE RESISTOR
	2061015003	FUSE	250V 0.5A
	FEP-1287	FUSE HOLDER	

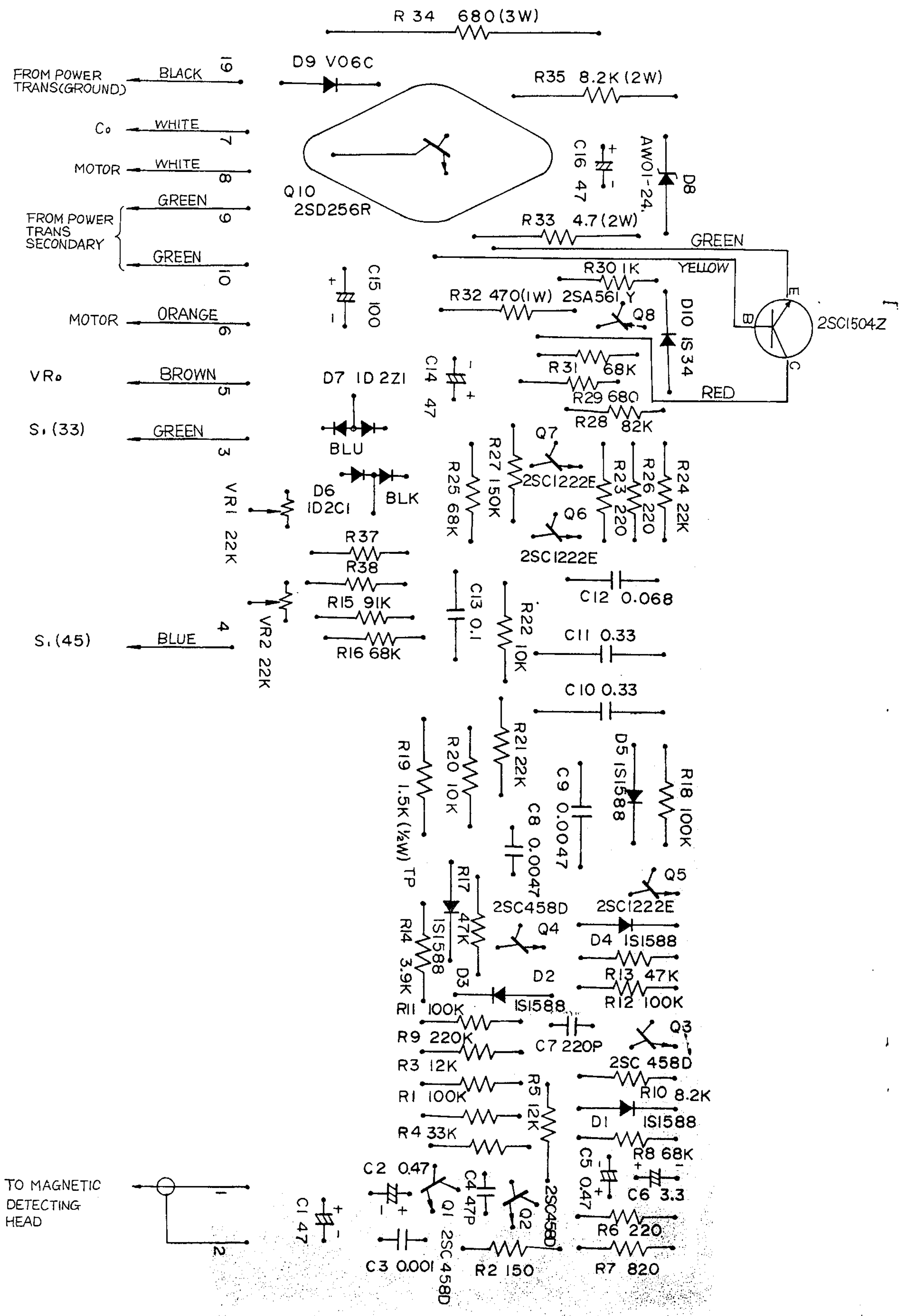
KU-207 SERVO AMP UNIT

* Marks are a specified part.

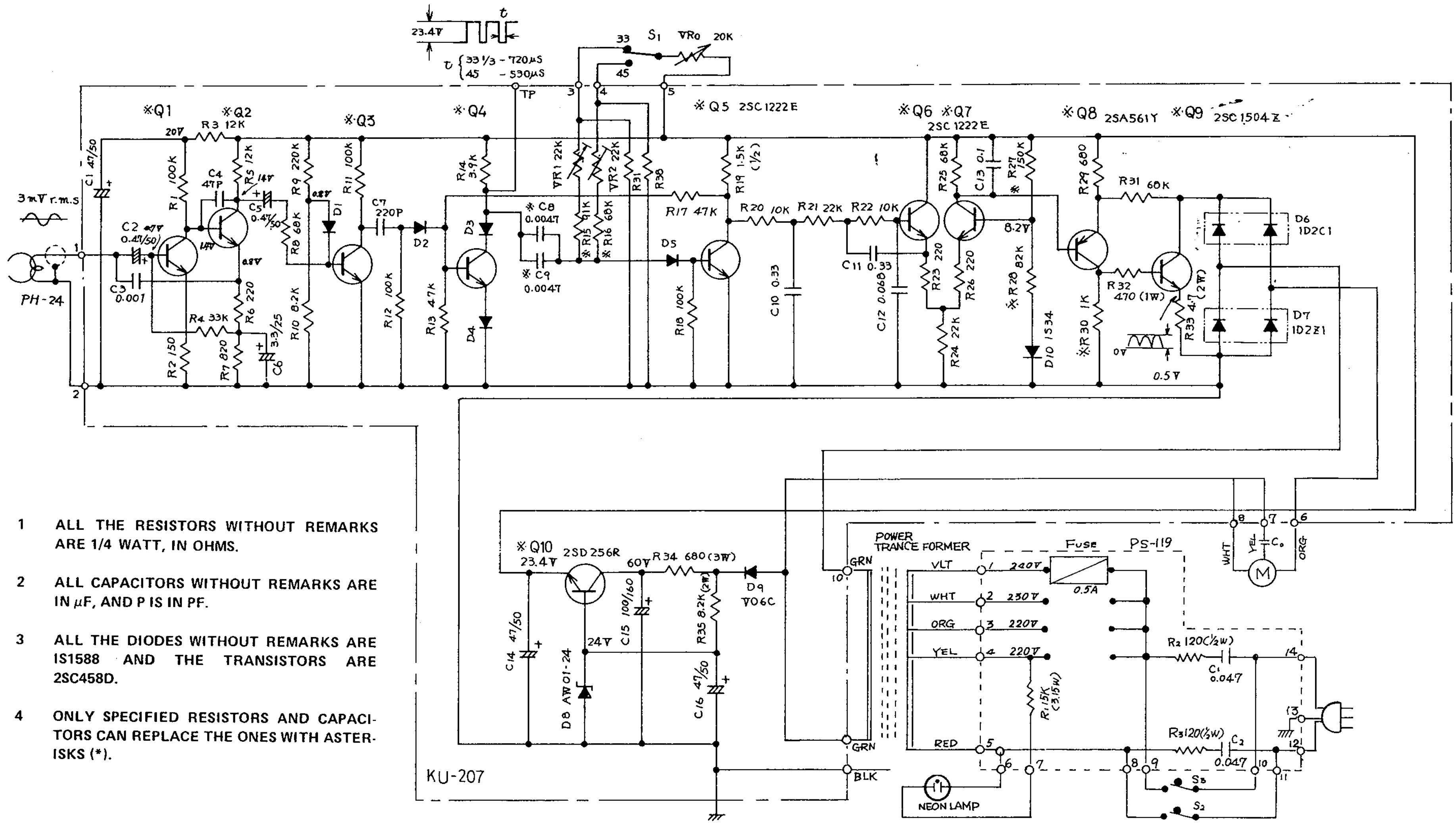
Ref. No.	Part No.	Part Name	Descriptions	
•Q1,2,3,4	2730021043	2SC458D		SILICON TRANSISTOR
•Q5,6,7	FEP-1221	2SC1222E		SILICON TRANSISTOR
•Q8	2710025014	2SA561Y		SILICON TRANSISTOR
•Q9	FEP-1196H	2SC1504Z		SILICON TRANSISTOR
•Q10	FEP-1096-1	2SD256R		SILICON TRANSISTOR
D1,2,3,4,5	2760057016	1S1588	REVERSE VOLTAGE 30VDC FORWARD CURRENT 150mA	SILICON DIODE
D6	2760151006	1D2C1	REVERSE VOLTAGE 200VDC FORWARD CURRENT 2A	SILICON RECTIFIER STACK
D7	2760152005	1D2Z1	REVERSE VOLTAGE 200VDC FORWARD CURRENT 2A	SILICON RECTIFIER STACK
D8	2760071018	AW01-24	PERMISSIBLE POWER DISSIPATION 1W ZENER VOLTAGE 24V	ZENER DIODE
D9	2760057016	V06C	REVERSE VOLTAGE 300VDC FORWARD CURRENT 1.1A	SILICON RECTIFIER
D10	2760010008	1S34	REVERSE VOLTAGE 60VDC FORWARD CURRENT 90mA	GERMANIUM DIODE
R1,11,12, 18	2410362006	RD14B2E104J	1/4W 100kΩ ±5%	CARBON FILM RESISTOR
R2	2410294006	RD14B2E151J	1/4W 150Ω ±5%	CARBON FILM RESISTOR
R3,5	2410340002	RD14B2E123J	1/4W 12kΩ ±5%	CARBON FILM RESISTOR
R4	2410350005	RD14B2E333J	1/4W 33kΩ ±5%	CARBON FILM RESISTOR
R6,23,26	2410298002	RD14B2E221J	1/4W 220Ω ±5%	CARBON FILM RESISTOR
R7	2410312001	RD14B2E821J	1/4W 820Ω ±5%	CARBON FILM RESISTOR
R8,25,31	2410358007	RD14B2E683J	1/4W 68kΩ ±5%	CARBON FILM RESISTOR
R9	2410370001	RD14B2E224J	1/4W 220kΩ ±5%	CARBON FILM RESISTOR
R10	2410336003	RD14B2E822J	1/4W 8.2kΩ ±5%	CARBON FILM RESISTOR
R13,17	2410354001	RD14B2E473J	1/4W 47kΩ ±5%	CARBON FILM RESISTOR
R14	2410328008	RD14B2E392J	1/4W 3.9kΩ ±5%	CARBON FILM RESISTOR
•R15	FEP-1011-13	RN1/4PS100kΩG	1/4W 100kΩ ±2%	METAL FILM RESISTOR
•R16	FEP-1011-4	RN1/4PS68kΩG	1/4W 68kΩ ±2%	METAL FILM RESISTOR
R19	2410189001	RD14B2H152J	1/2W 1.5kΩ ±5%	CARBON FILM RESISTOR
R20,22	2410338001	RD14B2E103J	1/4W 10kΩ ±5%	CARBON FILM RESISTOR
R21,24	2410346006	RD14B2E223J	1/4W 22kΩ ±5%	CARBON FILM RESISTOR
•R27	FEP-1011-12	RN1/4PS150kΩG	1/4W 150kΩ ±2%	METAL FILM RESISTOR
•R28	FEP-1011-11	RN1/4PS82kΩG	1/4W 82kΩ ±2%	METAL FILM RESISTOR
R29	2410310003	RD14B2E681J	1/4W 680Ω ±5%	CARBON FILM RESISTOR
R30	2410314009	RD14B2E102J	1/4W 1kΩ ±5%	CARBON FILM RESISTOR
R32	2440037000	RS14B3A471JNB	1W 470Ω ±5%	METAL OXIDE RESISTOR
R33	2440070009	RS14B3D4R7JNB	2W 4.7Ω ±5%	METAL OXIDE RESISTOR
R34	2440151012	RS14B3F681JNBF	3W 680Ω ±5%	METAL OXIDE RESISTOR
R35	2440109006	RS14B3D822JNB	2W 8.2kΩ ±5%	METAL OXIDE RESISTOR
VR1,2	2116001043	V10QB223	22kΩ	CARBON SOLID RESISTOR
C1,14,16	2544049004	CE04W1H470=	47μF 50V	ALUMINUM FOIL ELECTROLYTIC CAPACITOR
C2,5	2544043000	CE04W1HR47=	0.47μF 50V	ALUMINUM FOIL ELECTROLYTIC CAPACITOR
C3	2551060005	CQ93M1H102K	0.001μF ±10% 50V	POLYESTER FILM CAPACITOR
C4	2533653003	CC45SL1H470K	47pF ±10% 50V	CERAMIC CAPACITOR

Ref. No.	Part No.	Part Name	Descriptions			
C6	2544023004	CE04W1E3R3=	3.3μF	25V		ALUMINIUM FOIL ELECTROLYTIC CAPACITOR
C7	2531028009	CK45B2H221K	220pF	±10%	500V	CERAMIC CAPACITOR
*C8	2551120084	CQ93M1H472J	0.0047μF	±5%	50V	POLYESTER FILM CAPACITOR
*C9	2554038005	CQ93P2J472K	0.0047μF	±10%	630V	POLYPROPYLENE FILM CAPACITOR
C10,11	FEP-1013	CF91A2D334K	0.33μF	±10%	200V	METALLIZED POLYESTER CAPACITOR
C12	2551082009	CQ93M1H683K	0.068μF	±10%	50V	POLYESTER FILM CAPACITOR
C13	2551084007	CQ93M1H104K	0.1μF	±10%	50V	POLYESTER FILM CAPACITOR
C15	EP-7355-8	CE04W2C101=	100μF	160V		ALUMINIUM FOIL ELECTROLYTIC CAPACITOR
	FE-2364J	P. C. BOARD				PRINTED CIRCUIT BOARD
	FEP-1081-2	TR SOCKET				TRANSISTOR SOCKET
	FE-2358	C. B. STAY				P. C. BOARD STAY
	FE-2359H	HEAT SINK				HEAT SINK FOR Q_9

KU-207 SERVO AMP UNIT



DP-1000 CIRCUIT DIAGRAM



1. ALL THE RESISTORS WITHOUT REMARKS ARE 1/4 WATT, IN OHMS.
2. ALL CAPACITORS WITHOUT REMARKS ARE IN μF, AND P IS IN PF.
3. ALL THE DIODES WITHOUT REMARKS ARE IS1588 AND THE TRANSISTORS ARE 2SC458D.
4. ONLY SPECIFIED RESISTORS AND CAPACITORS CAN REPLACE THE ONES WITH ASTERISKS (*).

DENON

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