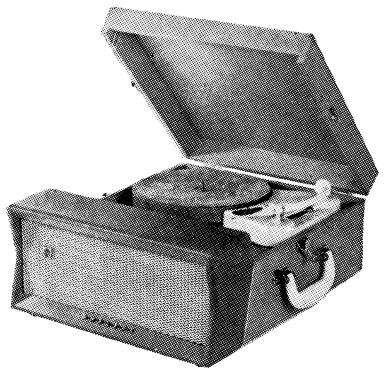
PHILIPS PHONOGRAM

MODEL NG1004

SPECIFICATIONS

(Subject to alteration without notice)



Power Supply	6V Dry Battery (Lantern) type 509 or 3509
Weight packed/unpacked	15/12½ lbs.
Transistor Amplifier	CZ.165.400
Av. Current Consumption (66-88°F)	6mA
Av. Current Consumption (88-104°F)	11.5mA
Record Player, 33⅓, 45, 78 R.P.M.	Type NG1000
Av. Current Consumption (33⅓ R.P.M.)	45mA
Pick-up Head	Type AG3010

VOLTAGE ANALYSIS

Transistor			Volts			Collector Current mA.
Function	Type	Ref. No.	Emitter	Base	Collector	
Pre-amplifier	OC71	Tr1	0.28	0.31	5.0	0.3
Driver	OC71	Tr2	0	0.15	5.5	2.5
Power Output	OC72	Tr3	0	0.15	6.0	1.0 at 72°F. 2.5 at 90°F.
Power Output	OC72	Tr4	0	0.15	6.0	1.0 at 72°F. 2.5 at 90°F.

NOTE: All voltages, measured at transistor lead ends, are 20,000 Ω per volt meter readings and may vary ± 10% of quoted figure. Milliameter is shunted by a 2,000 μF capacitor for collector current measurement. Tr3 and Tr4 are matched pair.

TO REMOVE MOTOR BOARD ASSEMBLY FROM CASE

Ensure that pick-up arm is clipped in its rest position. Remove turntable, unscrew the two knurled screws securing battery holder and withdraw assembly complete to gain access beneath motor board. Remove the six wood screws securing motor board and by placing one hand through battery holder cut-out, apply pressure to under surface of motor board while easing unit from case.

COMPONENT REPLACEMENT

The amplifier is completely accessible in its mounted position, thus facilitating component replacement in the majority of cases without necessity for removal from mounting panel. The record player in mounted position is also accessible for all necessary adjustments, lubrication, etc.

TRANSISTOR HEAT PROTECTION

Special care must be exercised during soldering operations to ensure that transistors are not subjected to excessive heat, either radiated or through the medium of soldering iron application to a transistor connection. A lead length, at least equal to original, must be used when replacing transistors. The soldering iron should be of the pencil bit instrument type, and be applied to tags at, or in the vicinity of transistors, for the minimum possible period consistent with a satisfactory joint. The use of a high tin content solder (low melting point) is recommended. Where it is necessary to unsolder connections to a component also wired to a transistor, prior

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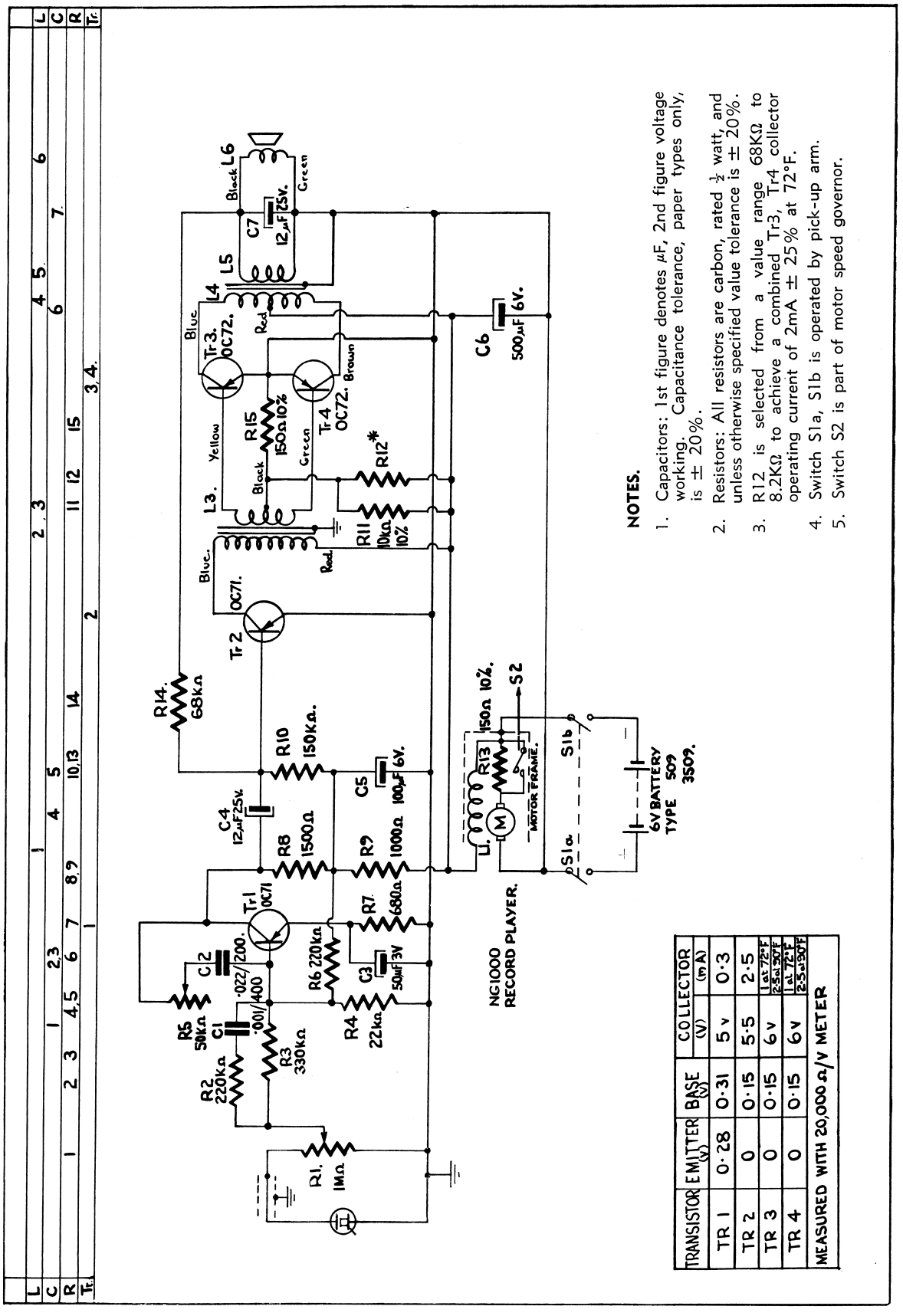

TRANSISTOR	EMITTER (V)	BASE (V)	COLLECTOR (V)	COLLECTOR (mA)
TR 1	0·28	0·31	5 v	0·3
TR 2	0	0·15	5·5	2·5
TR 3	0	0·15	6 v	1 at 72°F 2·5 at 30°F
TR 4	0	0·15	6 v	1 at 72°F 2·5 at 30°F

MEASURED WITH 20,000 Ω/V METER

NOTES.

1. Capacitors: 1st figure denotes μF, 2nd figure voltage working. Capacitance tolerance, paper types only, is ± 20%.
2. Resistors: All resistors are carbon, rated ½ watt, and unless otherwise specified value tolerance is ± 20%.
3. R12 is selected from a value range 68KΩ to 8.2KΩ to achieve a combined Tr3, Tr4 collector operating current of 2mA ± 25% at 72°F.
4. Switch S1a, S1b is operated by pick-up arm.
5. Switch S2 is part of motor speed governor.

removal of transistor connection will allow normal soldering procedure to be effected without special precaution.

The photo electric property of these type transistors is such that abnormal operation is possible if light entry through any broken surface of body paint occurs. A 50 cycle light source can produce a perceptible loud speaker hum through this medium if chassis is exposed. The application of a suitable non-conductive black paint to body of otherwise serviceable transistors will effect correction.

PLAYER DRIVE MECHANISM

The record player is tested, lubricated and adjusted for correct speed during manufacture and in normal circumstances should not require any service beyond regular cleaning and lubrication. For description of operation and service of the record player other than the drive mechanism, refer service data for record player type AG1002.

Provision to alter the speed of prime mover to effect a relative increase or decrease in all turntable speeds is provided by adjustment of the set screw (D) on centrifugal governor fitted to motor axle. This governor is capable of maintaining motor revolutions constant to within ± 0.5% of nominal speed.

To gain access to motor speed regulator screw, remove the push-fit aluminium cap and temporarily distort the sponge rubber surround. Speed adjustment should be made at 33⅓ r.p.m. with pick-up on the outer grooves of a 12" record, e.g., test record D99051L, in conjunction with the correctly calibrated 50 cycle stroboscopic disc (Code No. CS.413.212) on which speed tolerance limits are purposely set above the nominal turntable speed to allow for a normal small speed reduction during the life span of battery. A new battery must therefore be fitted prior to any speed adjustment which should select a speed setting providing for a stationary centre pattern (33⅓ R.P.M. + 0.5%). The inner and outer circles then appear to revolve in opposite directions.

A closed or open position of switch S2 which forms the vital section of governor effects a respective increase or decrease in motor speed by shunting or including in circuit series resistor R13. The speed adjustment process can be simplified by incorporating in circuit an auxiliary switch for battery disconnection in lieu of S1, thus enabling pick-up to remain on record during each trial setting of screw D. When adjustment is correct, seal screw at thread entry to bracket with a suitable paint sealer.

Battery drain with amplifier controls set to the minimum position and turntable rotating at 33⅓ r.p.m., with stylus in contact with the outer grooves of a 12" microgroove record, should not exceed 50 mA. Current increase when turntable is held stationary should be of the order 100%.

OPERATIONAL CHECK OF AMPLIFIER

Remove pick-up head and apply a 400 cycle signal through a suitable attenator to R1. With volume and tone control at maximum (fully clockwise) the input required to obtain 50 mW output, i.e., approx. 0.42 volts across speech coil L6, should not exceed 180 mV.

LUBRICATION

A record player (33 r.p.m.) battery current in excess of 50 mA can indicate a requirement for lubrication of bearing surfaces directly contributing to the total mechanical load imposed on the motor.

Initially remove accumulated dust and old lubricant with a suitable brush and methylated spirits.

Apply recommended lubricant as detailed below.

Location	Lubricant
Turntable, spindle	Shell Alvania No. 3
Turntable, cam	Shell Alvania No. 3
Intermediate wheel spindle	Clock Oil—Medium
Feeler arm, brass bush	Clock Oil—Medium
Motor spindle bearing	Clock Oil—Medium
Speed governor (C)	Shell Barbatia No. 3

The quantity of lubricant applied, particularly at motor bearing, speed governor and intermediate wheel spindle, must not exceed an adequate minimum. Any surplus

MISCELLANEOUS COMPONENTS

Description	Code No.
Badge	CR.531.422
Clip, pick-up retaining	CS.210.606
Container, battery	
Blue	CR.248.448
Tan	CR.248.453
Grey	CR.248.452
Screw, battery securing	CS.258.853
Fin, transistor, cooling, x2	56.200
Intermediate wheel	49.946.71
Knob, x2	CR.523.739
Lug strip (common negative)	CZ.375.081

Description	Code No.
Motor complete	49.266.75
Cap, aluminium, protective	49.892.07
Padding, sponge rubber, protective	49.892.39
Pulley (3 speed)	49.892.40
Grommet, motor mounting, x3	49.892.06
Speed adjustment screw	49.892.43
Philips name	CS.436.446
Pressure pad, turntable	CS.424.178
Screw, knurled, x2 (batt. plt. to mtg. board)	CS.258.857
Stroboscopic disc	CS.413.212

For remaining parts comprising record player type NG1000 refer AG2002 service data.

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PARTS LIST

No.	Description	Code No.
C1	0.001 μF ± 20%, 400V paper	
C2	0.022 μF ± 20% 200V paper	
C3	50 μF 3VW electrolytic	CZ.099.806
C4, 7	12 μF 25 VW electrolytic	CZ.099.502
C5	100 μF 6VW electrolytic	CZ.100.102
C6	500 μF 6VW electrolytic	CZ.100.103

RESISTORS

No.	Description	Code No.
R1	1.0 MΩ carbon pot. (vol.)	CZ.029.321
R2, 6	0.22 MΩ ½W carbon	
R3	0.33 MΩ ½W carbon	
R4	22 KΩ ½W carbon	
R5	50 KΩ carbon pot. (tone)	CZ.029.080
R7	680Ω ½W carbon	
R8	1.5 KΩ ½W carbon	
R9	1.0 KΩ ½W carbon	
R10	0.15 MΩ ½W carbon	
R11	10 KΩ ± 10% ½W carbon	
R12	Selected from:— 68 KΩ ½W carbon 27 KΩ ± 10% ½W carbon 18 KΩ ± 10% ½W carbon 10 KΩ ± 10% ½W carbon 8.2 KΩ ± 5% ½W carbon	
R13, 15	150Ω ± 10% ½W carbon	
R14	68 KΩ ½W carbon	

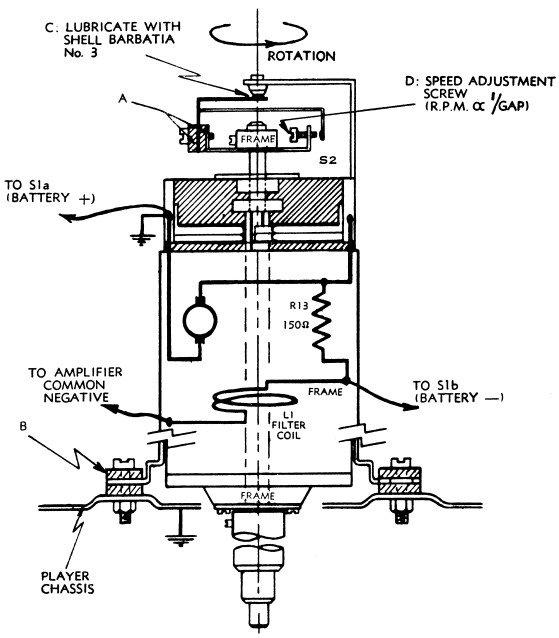
All tolerances are ± 20% unless otherwise specified.

INDUCTORS

No.	DC Resistance Ohms	Description	Type or Code No.
L1	2.4	Motor filter winding	Part of 49.266.75
L2, 3	250: 45/45	Drive transformer	Rola DR1
L4, 5	5.0/5.0: <0.5	Output transformer	Rola TR6
L6		Loudspeaker, 3.5Ω	Rola 5F, F87

IMPORTANT! When ordering spare parts, quote CODE NUMBER of part and MODEL NUMBER of Receiver. In claiming free replacement under GUARANTEE, return defective part PROMPTLY and quote MODEL and SERIAL NUMBER of Receiver and DATE OF PURCHASE.

must be removed to avert the detrimental effects of splashing during operation.



SCHEMATIC DETAILS
OF MOTOR AND SPEED REGULATOR

POSSIBLE MOTOR FAULTS AND THEIR REMEDIES

1. Excessive speed resulting from permanent short circuiting of governor resistor R13 can be caused by failure of fibre washer insulation "A" between the rotating contact arm and frame.

2. Insulation failure of one of the three motor mounting bushes "B" following possible excessive screw tightening or fatigue results in motor and battery short circuit. The battery switch S1 should therefore never be left in the "ON" position if motor will not operate.

3. An open circuit resistor R13 will result in very poor on-load motor speed regulation and excessive arcing at S2. Resultant carbon deposit on contacts should be removed by drawing a dry non-abrasive cleaning agent, e.g., paper or linen between contact surfaces. The loss of conducting surface plating on set screw through the use of abrasives will quickly result in unsatisfactory operation of governor.

4. Slow motor speed or erratic operation can be caused by poor contact between the rotating and fixed arm (C). The careful bending of the fixed arm will ensure constant pressure application (approx. 2 mm. depression of the lower contact). Do not use any other than a suitable grade conductive graphite type lubricant (Shell Barbatia No. 3 recommended) between these contacts.

5. Inadequate brush pressure on motor commutator can be responsible for torque reduction accompanied by excessive arcing resulting in a low motor speed and electrical noise reproduction in amplifier. An increase in brush to commutator pressure can be effected by carefully reducing the angle formed by the V-shaped brush contact strip which can be withdrawn from the polystyrene brush holder after removal of electrical tape and the slide fitting brass retention terminal clips.

6. Electrical noise without apparent mechanical defect can be caused by filter coil short circuit to frame following insulation damage to lead at common negative motor entry.