

GENERAL POINTS WHICH SHOULD BE CAREFULLY OBSERVED BY THE OPERATOR.

A. VALVE TESTING

1. Preliminary tests of all valves should be made with the Gate *open*. (Handle DOWN).
2. Final tests should be made with the Gate *closed*. (Handle UP).
3. The test card should be removed from the Gate Switch immediately a valve has been tested.
4. If the instrument has previously been in use for set analysing, check up the mains adjustment with Control Card 1A and remove test leads before proceeding with any valve test.
5. When testing valves, rectifiers in particular, caution should be observed when closing the gate switch. If the valve emits a blue glow indicating that it is soft, the gate must be opened immediately, or damage to the instrument may result.
6. Make sure that the test card selected agrees both in type number and base with the valve to be tested.
7. When making insulation tests with the gate close (Handle UP) the buttons should be pressed in quick numerical succession.

B. SET ANALYSING.

1. Before making any test make sure that all buttons are released by pressing button M. Do not press any buttons when making voltage or current measurements.
2. For accurate capacity or resistance readings always adjust meter to full scale deflection.
3. Make sure that the correct card for the range to be measured is in the gate. If in doubt use the highest range card.
4. When using the capacity or resistance cards for tests in a receiver, make sure that the set under test is disconnected from the mains or batteries.

IMPORTANT. The Meter Panel of the instrument must always be screwed down.

SERVICE INFORMATION (from Mullard)

A. CONTROL CARD 1A IN THE GATE SWITCH. OPEN. (HANDLE DOWN).

I. L3 AND L5 DO NOT LIGHT.

1. Defective mains switch.
2. Fuse blown.
3. Card not pushed far enough into the gate.
4. Flying lead to arm of R2 disconnected.
5. Mains variation compensation switch SW3 faulty or disconnected.

L3 DOES NOT LIGHT.

1. L2 defective (DW2).
2. L3 defective or loose in holder.
3. C2 short circuit.
4. Lead from valveholder to S7 or S6 broken.
5. Short on either bias potentiometer R18-R26 or R46-R55.

These faults may be located immediately by checking the voltages in the grid bias unit.

Filament voltage 4V (S6), anode voltage 2 x 220V (S7).

II. L5 DOES NOT LIGHT.

1. L5 is burnt out.
2. L5 loose in holder.
3. Short circuit in holder (R10 becomes hot).
4. R10 open circuit.
5. Loose soldered joint S2.

B. CONTROL CARD 1A IN THE GATE SWITCH CLOSED. (HANDLE UP - Fig.1).

I. INSUFFICIENT ADJUSTMENT OF MAINS VOLTAGE.

1. Broken lead (R2 -- switch).
2. Switch (SW3) defective.
3. Mains adjustment (SW4) wrongly set.
4. Faulty meter.
5. Metal rectifier K2 faulty.

II. No DEFLECTION ON METER.

1. Plungers not making contact. Possibly withheld by the leads soldered to them.
2. R43 open circuit.
3. Meter or meter connections open circuit.
4. R6 open circuit.
5. Metal rectifier K2 shorted.

III. METER DEFLECTIONS TOO GREAT.

1. R7 open circuit.
2. R43 short circuit.

SERVICE INFORMATION. (from Mullard)

C. CONTROL CARD 1C IN THE GATE SWITCH. CLOSED. (HANDLE UP - Fig.2).

I. NO DEFLECTION ON METER.

1. L1 defective (AX1).
2. Smoothing choke S10 defective.
3. Condenser C1 short circuit.
4. Plungers jamming or withheld.
5. Leads from valveholder to transformer windings S4 or S5 broken
-- check voltage at high tension unit. (L1). filament 4V (S4), anode voltage 2 x 250V (S5).
6. R43 and R44 both open circuit.

II. METER DEFLECTION LESS THAN 450°

1. L1 faulty (AX1).
2. R43 or R44 open circuit.

III. METER DEFLECTION TOO GREAT.

1. Open circuit R27, R33, R34, R35, R36, R37.
2. Open circuit R11, R12, R13, R14, R15, R16, R17.

D. CONTROL CARD 2 IN THE GATE SWITCH CLOSED. (HANDLE UP - Fig.3).

I. NO DEFLECTION ON METER.

Open circuit R42, R54, R55 or bad contact R1.

II. METER DEFLECTION TOO GREAT.

Open circuit R18 to R26, or R47 to R53.

C. CONTROL CARD 3 IN THE GATE SWITCH. CLOSED. (HANDLE UP - Fig.4).

I. NO DEFLECTION ON METER.

Open circuit R9, R33 to R36 or R41.

Generally speaking, when any deviation is found from the working conditions described in the operating instructions, an examination of the plungers should be made. The movement of these plungers must not be hampered by the flexible leads, and it is important to inspect them from time to time for the presence of any dust, which is a likely cause of bad contact.

Finally, the short circuit test should be checked. A short circuit is made between two contacts of one of the valveholders after the insertion of any card in the open gate (handle down). The keys of the button switch corresponding to these shorted contacts are now depressed successively. If the short circuit test is operating satisfactorily L6 should light. This check is carried out between :--

- Circuits 1 and 4-5-6-7-8 and P successively.
- Circuits 4 and 5-6-7-8 and P successively.
- Circuits 5 and 6-7-8 and P successively.
- Circuits 6 and 7-8 and P successively.
- Circuits 7 and 8 and P successively.
- Circuits 8 and P.

SERVICE INFORMATION (from Philips)

A. KEY CARD IN OPEN SLOT

I. L3 is not lit

1. Mains switch defective
2. Fuse defective
3. Card not properly inserted into slot
4. L2 defective
5. L3 open circuit
6. C2 has short circuit
7. Connections to S7 or S6 interrupted (valve socket)

These errors are detected easily by measuring the voltage at the tap for the negative plate voltage.

The filament voltage is 4 V (S6), plate voltage 2 x 20 V (S7)

II. L5 is not lit

1. Current consumption of the valve is too high (must not exceed 120 mA)
2. Lamp is not properly fitted into the socket
3. Short circuit in the socket (R10 gets hot)
4. R10 open circuit
5. Soldering at S2 open circuit

B. Key card in closed slot

I. Mains Voltage cannot be properly adjusted

1. Connection (R2 - switch) broken
2. Switch defective
3. Mains voltage carousel not properly set up

II. No deflection at the meter

1. Bad contact of the contact pins (might be kept back by solderings)
2. R43 open circuit
3. Connections to M broken
4. R6 open circuit
5. Selenium cell K2 has short circuit

III. Too large deflection of the meter

1. R7 open circuit
2. R43 has short circuit

SERVICE INFORMATION (from Philips)

C. Key card ic in closed slot

I. No deflection of the meter

1. L1 defective
2. S10 broken
3. C1 has short circuit
4. Contact pins are kept back
5. Connection to S4 or S5 broken (valve socket).
Measure voltages in plate voltage supply: filament voltage 4 V (S4), plate voltage 2 x 250 V (S5)
6. R43 or R44 open circuit

II. Deflection of meter less than 450°

1. L1 defective
2. R43, R44 open circuit

III. Deflection of the meter too large

1. Break in R27, R33, R34, R35, R26, R37
2. Break in R11, R12, R13, R14, R15, R16, R17

D. KEY CARD II IN CLOSED SLOT

I. No deflection of the meter

Break in R42 - R54 - R55 or bad contact of R1

II. Excessive deflection of the meter

Break in R18 to R26 or in R47 to R53

E. KEY CARD III IN CLOSED SLOT

I. No deflection of the meter

Break in R9 - R33 or R36 - R41

Each deviation of the key cards from the setup mentioned in the manual requires a check of the contact pins. The soldered connections must not disturb the movement of the pins. From time to time the top of the pins have to be checked for dust that would deteriorate the contact.

Finally the short circuit measurement has to be checked. Put an arbitrary card into the open slot and create a short circuit between two jacks of a valve socket. If the buttons of the eightfold switch corresponding to the shorted jacks are pushed one after another L6 has to light up. The short circuit has to be made between
pin 1 and one after the other with 4-5-6-7-8 and P,
pin 4 and one after the other with 5-6-7-8 and P,
pin 5 and one after the other with 6-7-8 and P,
pin 6 and one after the other with 7-8 and P,
pin 7 and one after the other with 8 and P
pin 8 and P.

If L6 does not light up when making the connections it has to be checked if the corresponding connections to the valve socket are broken and if the tappet has good contact to the moveable bar.

The buttons have to be pressed briefly and not to be left pressed because the contact would not be proper. When the push-button switch is oiled it has to be taken care that no oil film is between the backside of the tappet and the rear contact bars.

The contact pins and the bars are easily accessible. To get access to them the four nuts on the backside of the gate switch have to be released, the small gate with the contact pins removed and the horizontal pin to be pushed out. The moveable part can not be pulled out completely without the necessity of untying wires. It is recommended to check contacts and bars a couple of times per year.



