

# OPERATING INSTRUCTIONS FOR CONDENSER MICROPHONES M 49b/M 50b AND ACCESSORIES

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APRIL 1960

## A. TECHNICAL DATA

### Microphone M 49 b

|                              |   |
|------------------------------|---|
| Useable Range of Frequencies | 40 to 15,000 cps  |
| Directional Characteristics  | non-directional, cardioid, bi-directional                             |
| Sensitivity                  | approx. 0.7 mv/dyne/cm <sup>2</sup> at 1000 ohms                      |
| Total Harmonic Distortion    | less than 0.6% (40-15,000 cps) up to a sound pressure level of 114 db |
| Source Impedance             | 200 or 50 ohms  |
| Tube Complement              | 1 Telefunken AC 701 k (selected)                                      |

### Microphone M 50 b

|                              |   |
|------------------------------|---|
| Useable Range of Frequencies | 40 to 15,000 cps  |
| Directional Characteristic   | non-directional   |
| Sensitivity                  | approx. 1.0 mv/dyne/cm <sup>2</sup> at 1000 ohms                      |
| Total Harmonic Distortion    | less than 0.6% (40-15,000 cps) up to a sound pressure level of 114 db |
| Source Impedance             | 200 or 50 ohms  |
| Tube Complement              | 1 Telefunken AC 701 k (selected)                                      |

### Power Supply NN 48 b

|                    |  |
|--------------------|--|
| Power Requirement  | 110/220 volts 50-60 cps $\begin{matrix} + 10\% \\ - 20\% \end{matrix}$   |
| Operating Voltages | 4 volts D.C. heater; 116 volts D.C. plate; 0-116 volts control potential |
| Operating Currents | 100 ma heater; 0.8 ma plate  |
| Fuse               | 80 ma / 50 ma  |
| Pilot Lamp         | 6 volts; 180 ma Rafi L. 2821   |

## B. GENERAL

Although completely identical in their appearance and dimensions, the type M 49 b and type M 50 b microphones differ from one another with respect to their structure and acoustical properties.

The M 49 b is a pressure-gradient microphone consisting of two equal cardioid condenser systems mounted back to back. By means of a patent-protected feature, this microphone's directional characteristic may be changed continuously by remote control from the non-directional to the cardioid to the bi-directional pattern, permitting easiest adaptation to various acoustical environments.

The M 50 b is a pressure-type microphone with non-directional characteristic. It is made up of a tightly stretched metal diaphragm mounted in a lucite ball. Its response rises slightly and it becomes increasingly more directional at higher frequencies, when exposed to direct sound, but it remains essentially flat in a diffused sound field.

The M 49 b microphones may be identified by a red jewel, the types M 50 b by a white one.

## C. PLACING IN OPERATION

1. The M 49 b and M 50 b microphones are equipped with 8-pin plugs which should be plugged into the mating receptacle of the C 26 extension cable or the C 28 (C 28 s) interconnecting cable, with microphone stand mount.
2. The C 28 s stand mount, incorporating a swivel joint, comes normally equipped with a  $\frac{1}{2}$ " right-hand thread (in case of U.S.A. use, with  $\frac{5}{8}$ "-27 thread) for the purpose of mounting the microphones on stands and booms.
3. The seven-conductor shielded cable comes normally 33 ft. long, but lengths up to 100 feet are admissible between microphone and power supply, and can be supplied on order. Should the microphone be located more than 70 feet from the power supply, it is advisable to bridge the heater voltage series resistor in the power supply (part R 8) which is accessible after removal of the power supply cover. (See diagram.)
4. When using the floor stand M 72 or the table stand M 70, the C 26 extension cable should be plugged into the mating plug located at the base of these stands.

5. All connectors on microphones, cables, and power supplies are equipped with bayonet fittings. Make sure that these are properly locked.
6. The NN 48 b power supply delivers the required operating voltages to the microphone (4 volts D.C. heater voltage; 116 volts plate voltage; 0—116 volts control potential).
7. The power supply is equipped with a two-pin plug to which the power cord has to be connected. A mating A.C. connector for this plug is supplied with the power supply on special request.
8. First, make certain that the A.C. line voltage (110 or 220 volts) is properly strapped. The correct setting of this strap is visible through a small window at one side of the power supply cover. The strapping board is accessible after removal of the cover.
9. Also make sure that the proper value fuse for the voltage used has been inserted in the fuse holder. 80 ma for 110 volts; 50 ma for 220 volts.
10. The output signal from the microphone is fed to a three-prong chassis-mounted plug on the power supply unit. The mating cable connector for this plug is supplied on special request. Connection to the microphone input of the console or recorder is accomplished by means of a two-conductor shielded cable of any desired length.
11. The directional characteristics of the M 49 b microphone may be continuously changed by means of a potentiometer located on the power supply.

The control potential across connecting points 3 and 6 is

| in position: | M 49 b    |
|--------------|-----------|
| ○            | 0 volt    |
| ☺            | 58 volts  |
| ∞            | 116 volts |

12. The M 49 b and M 50 b microphones are designed to work into a load impedance (input impedance of console preamplifier) of 250 respectively 1000 ohms, or even higher. To provide a sufficiently low source impedance from the microphones, they have been designed for a source impedance one-fifth the load impedance. For a 250 ohm load impedance, the source impedance of the microphone preamplifier is set for 50 ohms, and for a 1000 ohm load impedance, it is set for 200 ohms. This prevents overloading of the preamplifier in the microphone itself.

The microphones are usually supplied strapped for a 1000 ohm load impedance, but on request will be delivered for 250 ohms. The 250 ohm - adjusted microphones may be identified by a red dot located on the type number tag of the microphone.

13. After interconnection of the microphone, power supply, and A.C. line, the main switch may be switched on. Operating condition will be indicated by a pilot lamp. It is not harmful to the power supply if it is operated even for longer periods of time without connection of a microphone.

## D. TESTING AND MAINTENANCE

NEUMANN microphones are made with extreme care and accuracy, and careful handling is required if consistently excellent results are expected.

### Warning

**Should the microphones need servicing, it is recommended that they be repaired at our factory or at our authorized service centers, otherwise the guarantee will be void.**

The following instructions are given on the understanding only that all manipulations performed on NEUMANN microphones are undertaken on own responsibility.

1. Work performed on the microphones should be approached with extreme care and dry hands. Such repair should only be attempted by a skilled technician.
2. Under no circumstances should one blow into the microphone capsule itself, and the capsule diaphragm should remain untouched.
3. The wire-mesh cover of the M 49 b and M 50 b microphones may be removed after a d v a n c i n g the three set screws at the base of the housing.
4. Should the diaphragm have become dusty after a long period of service, it may be cleaned by means of an extremely soft camel hair brush.
5. The microphone capsule together with its plexiglass mounting plate can be removed from the amplifier part by unscrewing the three set screws. To replace the capsule itself, carefully unsolder the connecting wires.
6. In order to change the tube, extreme care must be exercised. To do so, grip the helically spiralled tube leads, in turn, with a small pair of long-nose pliers, and apply a minimum of heat from a miniature soldering iron to the soldering joint. The spiral as well as the pliers serve as heat conductors to prevent cracking of the tube's glass envelop by the expanding wire.

The AC 701 k tube is especially selected for low noise and its connecting leads are properly curled for quick installation at our factory. It is imperative for proper operation that replacement tubes be obtained through us or our representatives.

7. The amplifier portion of these microphones is shock-mounted in rubber and can be removed from the base by exertion of a slight upward pull which causes the rubber ring to leave the groove in which it is seated. It can be re-inserted with the aid of a screw driver.
8. The characteristics of the amplifier can be measured by means of the M 73 test stand and the Z 8/49 or Z 8/50 test capsule. (Instructions for test procedure are included with the M 73 test stand respectively Z 8 test capsule.)
9. It is advisable to check the power supply for proper operating voltages every six months.
10. Re-strapping from one impedance to the other can be simply performed after removal of the wire-mesh cover, by following the diagram and pictorial presentation of the terminal board attached.
11. When ordering spare parts, it is recommended that you include the serial number, so that the proper parts for your particular model can be supplied.
12. The frequency response of the M 49 b microphones shows a drop below 40 cycles. Should you desire a response substantially flat down to 20 cycles, you must remove the resistor shown in the schematic M 49 b / 3-S (4) diagram as resistor no. 3.
13. Under the plexiglass cover of the M 49 b you will find a terminal board with a strap. Opening this strap will produce the following results:  
The equivalent loudness level is reduced by 4 db, however, the M 49 b microphone is then permanently adjusted to the cardioid characteristic. The characteristic control on the power supply is then of no effect.

## **E. RECOMMENDATIONS**

1. The M 49 b and M 50 b microphones can be suspended from film and television booms by means of special suspensions, type MZ 49, which permit rotation of the microphones through almost 360 degrees where such freedom of movement is desirable.
2. Where M 49 b or M 50 b microphones are permanently installed in studios or other locations, we recommend the installation of microphone outlets (T 3053/S) into which the microphone inter-connecting cable can be plugged. Concealed lines should lead from these wall sockets to the equipment rack or console where a type N 52 a plug-in power supply may be installed in a suitable plug-in frame.
3. A self-contained battery supply, type BB 9, may be used in place of the NN 48 b A.C. operated supply where A.C. power is not available.