

Moving Coil Type Microphone and Associated Apparatus No. 618A

Instructions for Use

GENERAL

In radio broadcasting, sound recording and public address systems a microphone is needed which has the utmost fidelity of pick-up, inherent quietness, stability and mechanical ruggedness. These requirements are met by the Western Electric No. 618A Moving Coil Type Microphone. This microphone has a low electrical impedance and may be connected to its amplifier by means of a suitable transformer; it may be used at a considerable distance from an associated amplifier.

The microphone may be mounted in a suspension, table, or floor type of mounting; it is shown in Figure 1.

DESCRIPTION

No. 618A Microphone

The microphone has a thin duralumin diaphragm of low mechanical stiffness, which is clamped around its outer edge. To this diaphragm is attached a coil of aluminum ribbon. Motion of the diaphragm causes the coil to move in the magnetic field in which it is located. The magnetic field is maintained by a permanent magnet made from a high grade cobalt steel alloy. The use of the permanent magnet eliminates the necessity for supplying a polarizing voltage to the microphone.

Motion of the coil in the magnetic field, caused by sound pressures acting on the diaphragm, induces a voltage in the coil which is proportional to the velocity with which it moves. A number of air chambers and slot openings connecting them have been associated with the diaphragm in order to obtain substantially uniform response over a frequency range of from 35 to 9500 cycles per second. One of these acoustic elements, in addition to exerting a control on the motion of the diaphragm, allows air to be transferred from the front to the back of the diaphragm. This eliminates effects due to changes in barometric pressure.



Figure 1 - No. 618A-13 Moving Coil Type Microphone

The design and principles of operation of the No. 618A Microphone are such that it is not affected appreciably by any changes in temperature likely to be encountered in its use.

The electrical impedance of the No. 618A Microphone at low frequencies is approximately 28 ohms with a phase angle of nearly zero degrees. The impedance rises gradually to about 38 ohms with a phase angle of about 20 degrees at 10,000 cycles per second.

The efficiency of this microphone is higher than that of the conventional form of condenser microphone. For the condition of a person speaking with normal conversational intensity at a distance of 3 feet from the microphone, an output level of -84 db relative to a zero level of 6 milliwatts is representative.

A speaker need not be directly in front of a No. 618A Microphone. If he talks toward it, he may even be at right angles to the front of the microphone without great loss of efficiency. The same is true of orchestral instruments and other program sources.

Nos. 17A, 18A-13 and 19A-13 Microphone Mountings

The No. 17A Type Mounting illustrated in Figure 2 is intended for suspension from a boom. In this mounting the face of the microphone may be adjusted in a horizontal plane.

The No. 18A-13 Mounting illustrated in Figure 3 is a table type mounting and has an oxidized bronze finish. It has a fixed overall height of 13 inches

and has a clamp for holding the microphone. This clamp is removable and may be used interchangeably on the No. 19A-13 Mounting.

The No. 19A-13 Mounting, illustrated in Figure 4 is a floor type mounting and has an oxidized bronze finish. It may be adjusted in height from 3 feet 8 inches to a maximum height of 5 feet 10 inches. The clamp for holding the microphone is removable and may be used interchangeably on the No. 18A-13 Mounting.

Plugs and Jacks

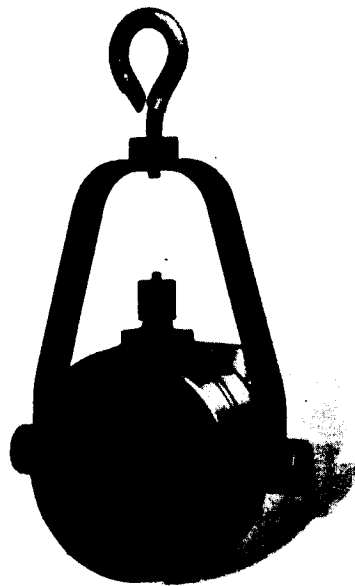
The contacts of the plugs and jacks furnished for use with the No. 618A Microphone and associated apparatus are of the compression type. They are connected and held in firm contact by pressure applied by means of a cam lever located on the side of the plug. Figure 5 outlines the various units and their uses.

Nos. 405A, 405B and 406A Jacks

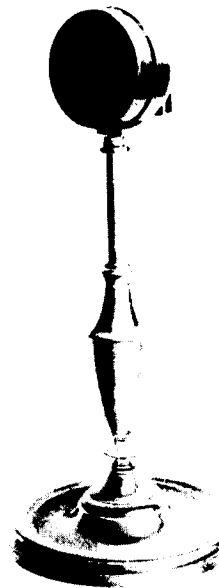
The No. 405A Jack is of the fixed mounted type and is designed to mount as a part of the No. 618A Microphone.

The No. 405B Jack consists of a No. 405A Jack mounted on an escutcheon plate, and is suitable for mounting on a single gang outlet box.

The No. 406A Jack is of the portable type and is designed for use on the end of a cord.



*Figure 2—No. 618A-13 Moving Coil
Type Microphone mounted in
No. 17A-13 Mounting*

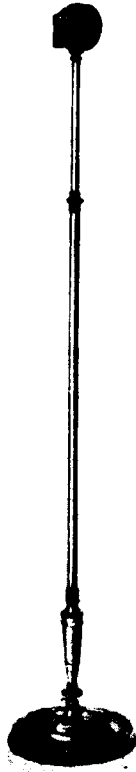


*Figure 3—No. 618A-13 Moving Coil
Type Microphone mounted in
No. 18A-13 Mounting*

Nos. 284A, 285A, 286A and 286B Plugs

The No. 284A Plug is of the fixed type and is arranged for mounting on apparatus. The prongs of this plug project at right angles to the mounting surface.

The No. 285A Plug is of the portable type and is designed for use on the end of a cord.



*Figure 4—No. 618A-13 Moving Coil
Type Microphone mounted in
No. 19A-13 Mounting*

The No. 286B Plug is of the fixed type and is furnished with a plate for mounting on a single gang outlet box. This plug also may be had without the mounting plate and is then known as the No. 286A. The prongs of this plug are parallel to the mounting surface.

Nos. M3J, M3K and M3T Cords

The No. M3J Cord is a black rubber covered cord with a standard length of 100 feet and is intended for use with the No. 17A-3 Mounting. It has a black crystalline lacquer finished No. 285A-3 Plug for engaging the jack on the microphone on one end and a No. 406A-3 Jack on the other end. This cord is shown in Figure 6.

The No. M3K Cord is a brown cotton covered cord and is intended for use with the Nos. 18A and 19A Mountings. Its standard lengths are 12 feet or 5 feet and it has an oxidized bronze finished No. 285A-13 Plug for engaging the jack on the microphone on one end. It is equipped with a No. 406A-13 Jack on the other end. It is furnished 12 feet long unless otherwise specified.

The No. M3T Cord is a brown rubber covered cord with standard lengths of 5, 12 or 20 feet, otherwise the same as the No. M3K. It is also furnished in the 12 foot length unless otherwise specified.

NOTE: *On special order, the No. 618A Microphone, the No. 17A Mounting, and the associated plugs and jacks may be finished in black crystalline lacquer instead of oxidized bronze. The black finish is designated by the figure "-3" after the code number of the apparatus, and the bronze finish by the figure "-13".*

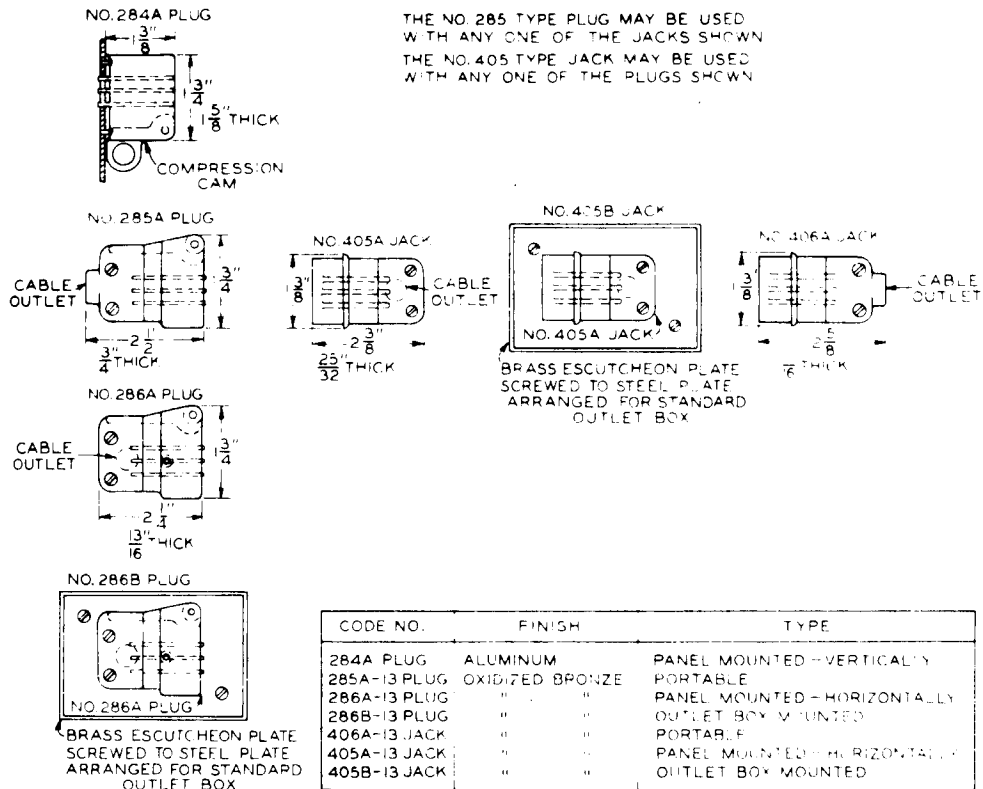


Figure 5—Plugs and Jacks for Use with No. 618A Moring Coil Type Microphone

OPERATION

The microphone may be placed in any of the mountings by loosening the knurled clamping ring nut sufficiently to allow the microphone to be readily inserted. The nut should then be tightened until the instrument is firmly held.

The plug of the cord being used should be inserted in the jack forming part of the microphone and the cam lever on the plug pressed down flush with the plug body. This not only compresses the contacts to insure good contact, but locks the plug and jack together mechanically.

If the table mounting (No. 18A) or floor mounting (No. 19A) is being used the cord should be led through the hook in the base. This will not only present a better appearance than if the cord is left loose, but will also prevent the mounting being overturned if the cord is accidentally pulled. The other end of the cord equipped with the jack should be plugged into a plug connected to the amplifying equipment. As the impedance of the microphone is low, it may be used at a considerable distance (several hundred feet) from this equipment.

A preliminary amplifier is required with this microphone. Such a unit is available in the No. 80A Amplifier. This is a single-stage rack-mounted unit having an input impedance suited to that of the microphone, an output impedance of 200 or 50 ohms, and a uniform gain of approximately 31 db over a frequency range of from 35 to 10,000 cycles per second. Full details of this amplifier may be obtained from any distributor listed on the last page of this bulletin.

Because of the low energy level generated by the microphone, the entire circuit between it and the associated amplifier equipment should be shielded. The cords described previously have two insulated conductors surrounded by a braided copper shield, this shield being connected to the middle contact of the plug and jack and the two conductors to the outside contacts. The case of the microphone is also connected to the middle contact of the jack.

The heads of the Nos. 18 and 19 Type Mountings are interchangeable so that a microphone may be transferred from one to the other without delay. This should be done, however, only when the instrument is not in circuit, as otherwise the noise of moving it will be picked up.

The actual field calibration of the No. 618A Microphone, as in the case of all microphones, is dependent not only upon the construction of the instrument but also upon the conditions under which it is used.

The acoustic conditions encountered in the practical use of a microphone vary so widely that no single response curve can be considered as representative under all conditions of use. These variables include such factors as the nature of the sound source or sources, the configuration and acoustic properties of the reflecting surfaces which surround the microphone, etc.



Figure 6—No. M3J Cord for Use with No. 618A Moving Coil Type Microphone

MAINTENANCE

The No. 618A Moving Coil Microphone is a precision instrument and should be handled as such. The instrument is too tightly assembled during manufacture and should not be opened in the field. Should it become defective for any reason it should be returned for repair to the nearest distributor listed on the last page of this bulletin.

If a cord breaks, it may be readily changed. The two screws on the back of the plug and the jack may be removed, exposing the connections. These should be unsoldered and the new cord soldered in place, care being taken that solder or loose strands of wire do not touch the body or the cover of the plug or jack. The red conductor should be soldered to the contact nearest the cam lever of the plug or the strike plate of the jack, the shield conductor to the middle contact and the green conductor to the third contact. After the conductors have been soldered in, the cover plate should be replaced and screwed home. This plate not only protects the connections but acts as a strain relief, preventing strains on the cord from being transmitted to the soldered connections.

REPLACEMENT PARTS

Black rubber covered cord—Western Electric No. M3J Cord, standard length 100 feet, order as needed

Brown cotton covered cord—Western Electric No. M3K Cord, standard length 12 feet or 5 feet, order as needed

Brown rubber covered cord—Western Electric No. M3T Cord, standard length 5 feet, 12 feet or 20 feet, order as needed

The apparatus described in this Bulletin
was developed for the

Western Electric Company

by

BELL TELEPHONE LABORATORIES