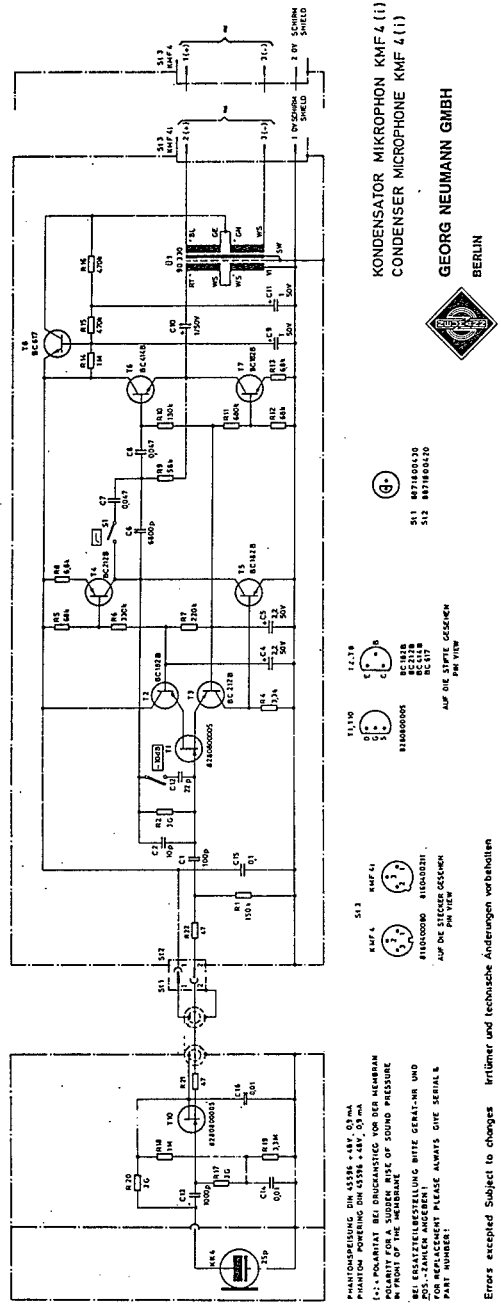

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Operating Instructions for the KMF 4 i mt Condenser Microphone

page

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1. The KMF 4imt Condenser Microphone

The KMF 4 i mt microphone consists of an amplifier unit and a miniature condenser microphone capsule with impedance converter connected by a cable.

This capsule has a diameter of only 17 mm and may be located inconspicuously from its amplifier section.

This creates new possibilities for the concealing of a studio quality condenser microphone for stage and television productions.

By contrast to other microphones of this size, the capsule used here is a cardioid, so that the distance from the sound source may be greater than it would be for a pressure transducer.

Sound inpinging on the microphone from the rear is attenuated by at least 20 dB, and thus any possible feedback is avoided.

The microphone may be suspended from its own cable either vertically or tilted, using the MNV 8 suspension, making it easy to hide it in theatrical scenery.

This microphone may also be combined with the small MF 2 table stand and SG 8 connecting piece into a very attractive table top microphone. The elastic mounting, in this case, is built into the table stand. The same connecting piece also permits the microphone to be attached to a "Fishpole", making use of the extremely small dimensions and a weight of only 20 g (0.7 oz).

The amplifier section is drawn from our fet 80 R -series and thus operates on a 48 volt phantom supply.

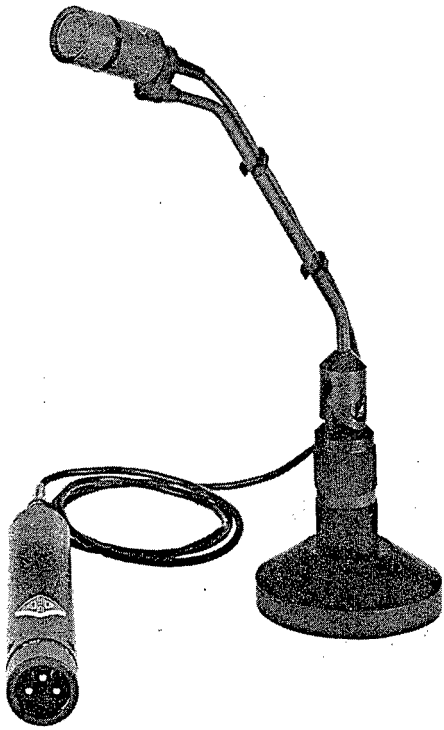
The thin, highly flexible cable from the capsule connects the amplifier input Lemo jack.

The microphone is supplied in dark matt finish.

2. Microphone Versions and Output Wiring

These versions are available:

KMF 4 i mt Standard version with male 3-pole connector insert as per IEC 268-12.
Requires Switchcraft A 3 F female connector (XLR type).



Microphone wired per IEC 268-12 (pin conn. 130-x-IEC 02) or DIN 45599 I, respectively:

Modulation is connected to pins 2 and 3, the shield to pin 1. A sudden sound pressure rise in front of the membrane causes a positive voltage to appear at pin 2.

KMF 4 mt Special version with male 3-pole connector insert per DIN 41 524.
Requires Binder 09-0006-00-03, Tuchel 3261 001 female connectors.

Microphone wired per DIN 45599 N:

Modulation is connected to pins 1 and 3, the shield to pin 2.
A sudden sound pressure rise in front of the membrane causes a positive voltage to appear at pin 1.

3. Microphone Cables

The following microphone cables are available:

KMF 4 i mt

IC 3 mt — 10 m (33 ft.), without swivel mount, Switchcraft connectors. May also be used as extension cable.

KMF 4 mt

KT 1 mt — 10 m (33 ft.), without swivel mount, with 3-pole connectors at both ends. May also be used as extension cable.

These cables have a dark matt connector at the micropone end.

Other cable lengths on special order.

The cable length between microphone preamplifier and e.g. the following console should not exceed 300 m (980 ft.). The capacitance of greater cable lengths could affect the frequency response and, in conjunction with the leakage inductance of the microphone's output transformer, would result in a rise at the upper end of the frequency range.

The LC 1/2.5 (2.5 m = 8.2 ft.) and LC 1/5 (5 m = 16.4 ft.) long cables serve to extend the 3.5 meter (10.5 ft) cable between the capsule (KVF) and the microphone amplifier. These cables are equipped with dark matt Lemo connectors; the cable diameter is 3 mm (0.12").

The capsule-to-amplifier distance may be extended to a maximum of 50 meters (164 ft.), using, for example, 10 x LC 1/5. This distance may depend on the electrical environment in which the microphone is operated. For severe RF fields near the capsule, this distance may have to be restricted.

4. Power Supply

The KMF 4 i mt microphone operates on 48-volt phantom power (P 48, IEC 268-15 A, DIN 45 596).

With phantom powering the dc from the positive supply terminal is divided via two identical resistors, one half of the dc flowing through each audio (modulation) conductor to the microphone, and returning to the voltage source via the cable shield. As a consequence, the effect of dc supply voltage noise superimposed on the microphone output voltage is reduced by the common mode rejection factor ($\geq$ 60 dB).

Phantom powering provides a fully compatible connecting system, since no potential differences exist between the two audio conductors. Studio outlets so powered will therefore also accept dynamic microphones and ribbon microphones as well as the modulation conductors of tube-equipped condenser microphones without the need to switch off the dc supply voltage. No harm is done even if a phantom power supply is connected to an outlet which is centrally phantom powered.

AC Supply Operation

All P 48 power supplies according to IEC 268-15A and DIN 45 596 are suitable for powering the microphone.

The Neumann P 48 power supply unit bears the designation N 452 i. It is designed to power one or two microphones. It operates from 110 V or 220 V ± 10% power lines. Switching of the line voltage is easily accomplished by changing the line fuse which is accessible after removing the supply cover. Four screws must be removed for this purpose.

Modulation polarity at the power supply output is identical with that at the microphone (see chapter 2).

It is recommended that a permanently wired central powering be utilized when powering numerous microphones (see our bulletin No.10000 808.."Central Powering"):

N 448 a — ac mains operated central powering unit,maximum current output 100 mA. Available versions: plug-in PC board as well as various modules.

GW 2448 ka — dc-to-dc converter using 24 Vdc operating voltage. Maximum current output 50 mA. Available versions: plug-in PC board as well as various modules.

Models GW 2448 ka and N 448 a are improved later models of the discontinued GW 2448 k, NK 48 a or N 448, respectively.

Battery Operation

Neumann condenser microphones may also be operated from batteries using the BS 945 i battery supply.

This battery supply provides 48-volt-phantom powering for any of the fet 80^{R}-

series condenser microphones. It requires two ordinary IEC 6 F 22 9-volt-batteries which may be readily obtained everywhere. The 48-volt potential required is produced by a dc converter. Battery life depends mainly on the type of battery used. It is at least 15 hours operating time for most fet 80^{R}-series microphones. Decreasing battery voltage is indicated by a flashing LED. The use of mercury batteries increases battery life fourfold. Instead of batteries, rechargeable NiCd batteries may be used. They may be recharged via the built-in charging jack in the power pack, using a Beyer Dynamic SLG 150/180 battery charger.
The BS 945 i is equipped with Switchcraft connectors.

Technical Specifications

N 448 a

Operating voltage	110 V/220 V ± 10% 50/60 Hz
Power consumption	max.15 VA
dc voltage output	48 V ± 0,5 V
Current output	max. 100 mA (max. 50 mA shorted)
Ripple	≦ 0.3 mV_{rms}
Fuse	220 V: 0.1 A, slo-blo 110 V: 0.2 A, slo-blo
Connector	15-pole male DIN 41612
Mating connector required	15-pole female DIN 41612
Dimensions of PC board	160 mm long (6.5") 100 mm wide (4") 36 mm high (1.4")
Weight	approx. 300 g (11 ozs.)

GW 2448 ka

Operating voltage	24 V (21 ... 28 V)
Current consumption	max. 230 mA
dc voltage output	48 V ± 1 V
Current output	max. 50 mA (max. 60 mA shorted)
Ripple	≦ 0.1 mV_{rms}
Connector	31-pole male S 31 DIN 41 617
Mating connector required	31-pole female FL 31 DIN 41 617
Dimensions of PC board	160 mm long (6.5") 100 mm wide (4") 36 mm high (1.4")
Weight	approx. 190 g (7 ozs.)

N 452 i

Operating voltage	110 V/220 V ±10% 50/60 Hz
Power consumption	max. 5 VA
dc voltage output	2x48 ... 53 V
Currrent output	max. 2x10 mA
Ripple	≦ 0.2 mV_{rms}
Dimensions	135 mm long (5.3") 125 mm wide (5") 65 mm high (2.6")
Weight	approx. 750 g (1.65 lbs.)

BS 945 i

Operating voltage	18 V
dc voltage output	~ 48 V ±4 V
Maximum current output	1 mA
Batteries	2x9 V (IEC 6 F 22)
Dimensions	120 mm long (4.7") 67 mm wide (2.6") 24 mm high (0.9")
Weight (without batteries)	approx. 170 g (6 ozs.)

5. Operation with Unbalanced and Center Tap Grounded Inputs

With phantom powering both modulation leads of the microphone cable, as well as the outgoing modulation leads of the power supply, are at +48 volt potential. This is of no consequence with regard to the balanced, floating amplifier and console inputs commonly used in studio equipment.If, however, the supply voltage is applied to unbalanced or center tap grounded amplifier inputs, it will be shorted and the microphone so connected will not work.

In center tap grounded equipment with input transformers (e.g. some NAGRA models) this ground connection may be lifted without any negative effect on equipment performance.

There are two ways of connecting a phantom-powered condenser microphone to unbalanced amplifier inputs:

a) Insert a high-quality AT 8/1 i-type 1:1 cable transformer in the outgoing modulation lead. Since there exist a great number of different microphone input connectors, the secondary side of the cable transformer comes with tinned wire ends (see "Accessories" section).

b) Microphone and power supply may be adapted to unbalanced inputs by means of some minor alterations at our factory. This is recommended if microphones are intended exclusively for use with unbalanced inputs commonly found in semi-professional or hometype equipment.

6. Disassembling of the Microphones and Test Input

After removing the three Philips screws near the connector end of the amplifier, the housing tube may be withdrawn upwards. To open the KVF capsule unit, turn the set screw below the serial number clockwise (inward). The housing, including the capsule, may then be withdrawn from the amplifier.
The KK 4 capsule may be unscrewed from the KVF capsule unit. Replacing the capsule with the MA 84 test adapter, using the adapter ring enclosed with it, permits a test tone to be injected.
The adapter prevents acoustic interference which would otherwise emanate from the microphone's capsule, while at the same time simulating the capsule's impedance. This permits the impedance converter to operate with its proper operating parameters. (See our publication "MA Test Adapters" No. 10000 805..)

Nominal values for the KMF 4 i mt:
(tolerance: ± 0.5 dB)

Voltage gain (1 kHz, 1 kohm termination)	-3 dB
Rel. gain 40 Hz	-1.2 dB
at 40 Hz, switch ⌐¯	-18 dB
at 16 kHz	0 dB
$E_{in\ (max.)}$ [1]	1340 mV_{rms}
Current consumption at 48 V	0.9 mA
Nominal self-noise levels (Reference: 0.775 V, quasi peak, tolerance: +1 dB)	
Unweighted self-noise level	-101 dB
Self-noise level weighted according to CCIR 468-1 (1976)	-101 dB
Self-noise level weighted according to DIN 45 405	-105 dB

1) = 1 kHz ac voltage applied to the test input for which THD should be less than 0.5% at the 150 ohm output terminated in 1 kohm.

If it is desired to test the amplifier without the capsule section, a test tone may be injected directly into its input at St 2, Pin 2 (see schematic). This alters the values listed above in the following manner:

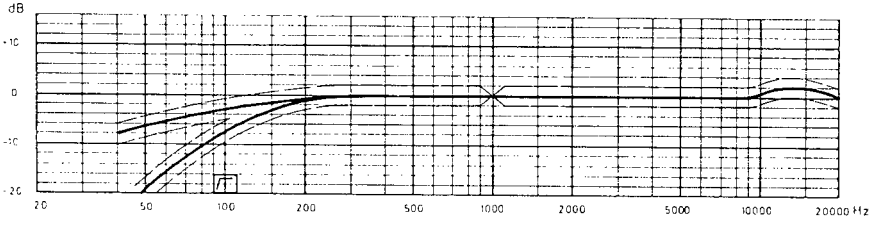
Voltage gain (1 kHz, 1 kohm termination)	-2 dB
Current consumption at 48 V	0.7 mA

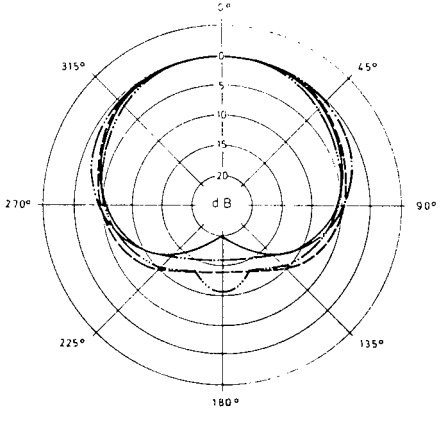
7. KMF 4 i mt Technical Specifications

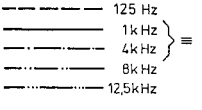
Acoustical operating principle	Pressure gradient transducer
Polar pattern	cardioid
Frequency range	40...20 000 Hz
Sensitivity at 1 kHz	12 mV/Pa
Source impedance	150 ohms
Minimum load impedance	1000 ohms
Equivalent weighted self-noise level	CCIR 468-1 29 dB DIN 45 405 25 dB
S/N ratio according to DIN 45 590 (ref. level 1 PA)	69 dB
A-weighted equivalent loudness level due to inherent noise (ref. level 1 Pa, IEC 179, DIN 45 634)	17 dB
Maximum SPL for 0.5% THD at 1 kHz	132 dB ≙ 79 Pa
with pre-attenuation	142 dB ≙ 251 Pa
max. output voltage	950 mV
Total dynamic range of the microphone amplifier (Referred to IEC 179 weighted equivalent loudness level)	125 dB
Phantompowering (P 48, IEC 268-15A, DIN 45 596)	48 V ± 4 V
Current consumption	0.9 mA
Minimum operating time on BS 945 i battery	10 hours
Required cable connector	A 3 F
Weight	20 g (0.7 ozs.) and 105 g (3.7 ozs.)
Dimensions	17 mm in diam. (0.7") 38 mm long (1.5") and 21 mm in diam. (0.8") 132 mm long (5.2")

1 Pa = 10 µbar
0 dB ≙ 20 µPa

8. Frequency Response and Polar Pattern







9. Accessories

Most of the accessories have a 5/8"-27 thread. An adapter is supplied to provide compatibility with 3/8" and 1/2" threads. It can also be delivered separately (Parts Catalog No. 8421400018).

MF 1

MF 2

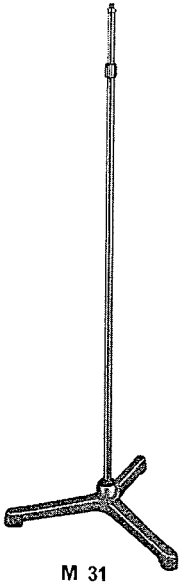
Stands

MF 1
Table stand with bell-shaped cast-iron base, 0.9 kg (2 lbs.), 115 mm (4.5") in diameter.
The stand is black wrinkle finish lacquer and non-slip due to a rubber ring attached to the bottom. A reversible stud having two different threads permits use of two thread standards. Thread combinations: 1/2" and 5/8"-27 or 3/8" and 5/8"-27.

MF 2
Table stand with brass foot, 0.35 kg (6.3 ozs.) 60 mm (2.2") diameter with isolation against structure born sound; very stable. The stand is lacquered matt black and rests on slip-proof foam rubber mat. The 1/2" threaded stud for attaching an SG 8 swivel is decoupled from the foot by a rubber isolator. A 5/8"-27 adapter is supplied as well.

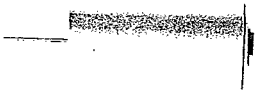
M 31
Floor stand with tripod, hammertone lacquered cast-iron base.
Weight 4 kg (8.8 lbs.). Nickel-plated tube shock mounted for dampening structure-borne vibrations. Height adjustable from 1.1 m to 1.8 m (43.3" to 71"). The stand is equipped with a reversible thread stud having a 1/2" and a 3/8" thread for mounting the microphone.

Shorter versions as well as an "mt" version with a matt black tube are also available.



M 31

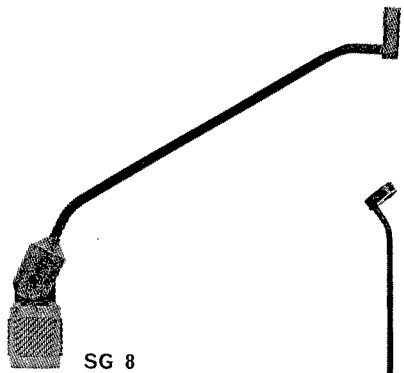
MA 84 Test Adapter
With the aid of the test adapter measurements can be made on the amplifier (see also section 6 and our information sheet "MA Test Adapters for fet 80 R -series Condenser Microphones", No. 10000 806..).



MA 84

SG 8 Swivel Mount

The SG 8 swivel mount is equipped with an 8 mm (0.3") diameter plastic clip to accept the capsule of the KMF 4 i mt, and a swivelable 5/8"-27 threaded part with a 1/2" and 3/8" reducing adapter. The connecting rod is angled by about 35° at each of two places. The height of the capsule if the swivel is not tilted, is about 15 cm (6"). The swivel is supplied with several clips for the purpose of fastening the cable to the rod.
Weight: approx. 85 g (3 ozs.).



SG 8

DS 8 Double Mount

The double mount allows two KMF 4 i mt capsules to be mounted side by side to a stand or boom, for instance for stereo recording. The angle between the capsules may be selected.
The capsules are tilted by 30° with a spacing of 8 cm (3.2") to the stand clamp. The membrane distance for a 90° recording angle is 10 cm (4"). A 5/8"-27 threaded part with a 1/2" and 3/8" adapter is provided. Weight: approx. 55 g (2 ozs.).

DS 8

MNV 8 Microphone Suspension

The MNV 8 microphone suspension consists of a 30 cm (12") bent rod with a clamp for the capsule part of the KMF 4 i mt at each end. This permits the capsule to be inclined by either 35° or 45°. The capsule and suspension hang freely from the cable end. Clips are supplied to attach the cable to the rod.
Weight: approx. 35 g (1.2 ozs.).

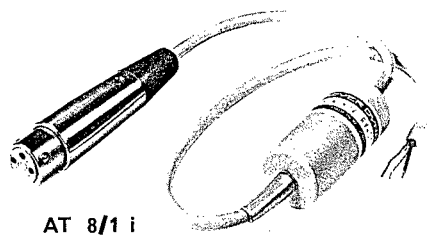
MNV 8

AT 8/1 i Line Transformer

Line transformer 1:1; 0.5 m (20") long, Switchcraft A3F female connector primary, tinned end secondary, for 150...250 ohms microphone.

Max. input voltage:	300 mV (40 Hz)
Transmission range:	30...16 000 Hz

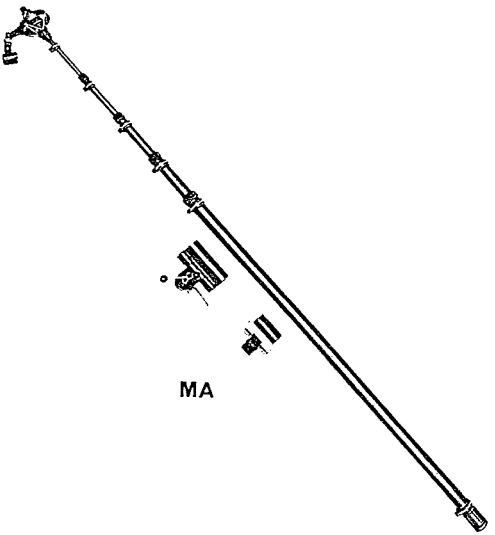
Connects to unbalanced or center tap grounded equipment input.
This cable transformer is also available with Binder connector and is then reffered to as AT 8/1.



AT 8/1 i

MA Telescoping "Fishpole" Boom

The MA "Fishpole" consists of 5 telescoping fiber glass tubes. It can be extended to any working length up to 3.75 m (12 ft. 4 in.). The telescoped length is 1.25 m (4 ft.). Weight 0.55 kg (1 lb 3 osz.). An elastic suspension is attached to the front end of the "Fishpole" permitting the mounting of microphones up to 21 mm (13/16") in diameter.
An SG 8 swivel mount may be mounted in place of the 21 mm diameter clamp. The SG 8 and DS 8 may, however, be mounted inflexibly to the fish-pole's 5/8"-27 threaded stud.
Microphone accessories such as a swivel mount and a power supply holder are available. The swivel mount permits using the "Fishpole" as a boom. It has a rugged plastic clamp which permits rapid fastening and removal of the "Fishpole". Tilt may be varied between 0^{o} and 180^{o}.
Connector: 5/8"-27 thread, reducer for 1/2" and 3/8" threads.
The power supply holder is fastened on to the "Fishpole" by means of a rugged plastic clamp and accommodates a BS 945 i battery supply.



MA

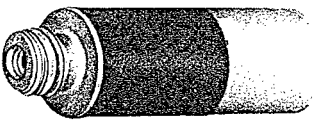
WS 17 Windscreens

The WS 17 open-cell polyurethane foam windscreen is available to guard against disturbances that may be caused by wind, close talk applications, or rapid boom movements. This windscreen have no disturbing resonances and only slightly affect the frequency response.
Wind noise suppression: approx. 18 dB measured in pulsating air currents produced by a noiseless wind machine at 20 km/h (without electrical filter). The wind screen is included in microphone delivery.

WS 17

Z 26 Rubber Shock Mount (Elastic Mount)

The Z 26 shock mount is used to prevent mechanical vibration interference between the stand and the swivel mount. It has a 1/2" stud and a 5/8"-27 female thread. A reducer for 1/2" and 3/8" threads is provided. A 5/8"-27 male stud is available.



Z 26

Microphone Case

A jeweller's case with insert and metal locking is available as special accessory.