

# Pocket Guide 2007/2008

English



SOLUTION-D: KM D



TLM 103



BCM 104

## Studio and Stage Microphones

Analog and digital (incl. Accessories)



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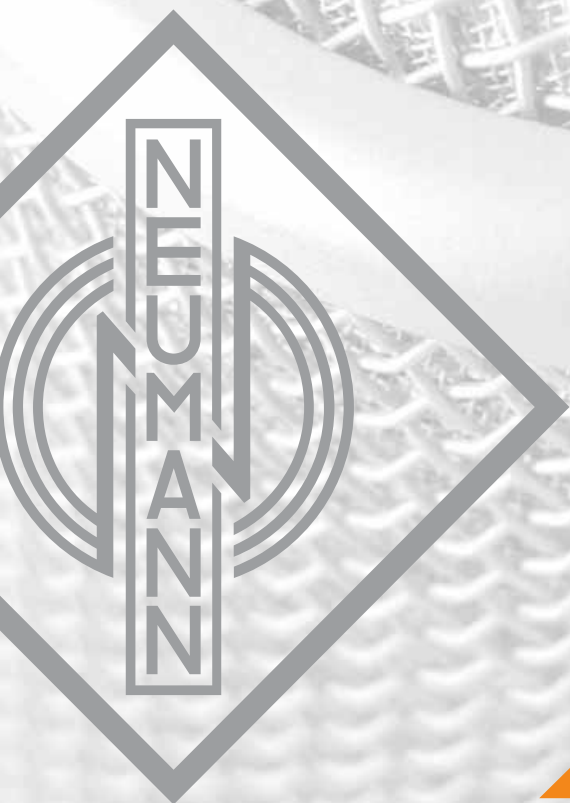
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# Solution-D

► **Digital Microphones**



[www.neumann.com](http://www.neumann.com)



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► THE MICROPHONE COMPANY



## A Microphone Technology Milestone

Neumann has repeatedly set new standards in the field of analog microphone technology. The first condenser microphone, switchable directional characteristics, the first stereo microphone and 48 V phantom power were all developed by Neumann, introducing new dimensions to the field of microphone and recording technology.

With the digital Solution-D microphone system, Neumann has now succeeded in bringing the dynamic range and signal fidelity of the best analog studio microphones into the digital realm. This means that, for the first time, the whole audio production signal chain is entirely digital.

Optimized A/D conversion, especially developed synchronization technology and the capability of controlling standard microphone parameters and various integrated signal processing functions remotely ensure that Solution-D meets the most demanding professional audio production requirements. The basic technological principle is to permit recording with no "bottlenecks" associated with loss of signal quality.

The comprehensive features provided by Solution-D make it possible to achieve excellent quality with small digital productions – with only a single microphone and a recording device.

The Solution-D digital microphone system is comprised of the following components: A digital microphone (e.g. the D-01 large-diaphragm microphone or a KM D small-diaphragm microphone), the DMI-2 digital microphone interface and the RCS remote control software, which operates and remotely controls the microphone. A PC or Mac can serve as the control computer, which of course can simultaneously be used to operate the actual recording system, for instance.

The signal and data transmission of the microphone conform to the new AES 42 standard. The introduction of this standard governing the transmission of output signals, the supply of power and the remote control of microphones with digital outputs provided the necessary preconditions for the development of digital microphone technology. Neumann made a decisive contribution to the drafting of the AES 42 standard.

Instead of being used with the DMI-2, the KM D small-diaphragm microphones can alternatively be connected to the AES/EBU or S/PDIF interface of a recording system by means of a Connection Ki. However, if a Connection Kit is used, it is not possible to control the microphone functions remotely. Thus a control computer is not required. In this case, if it is necessary to synchronize several microphones, a sample rate converter must be used.

A Battery Pack is available as an option for use with the Connection Kit, thus permitting the small-diaphragm microphones to be used with portable recording equipment.

All of the possible Solution-D system configurations are illustrated on the following pages.

The Starter Set, comprised of a KM 184 D and a Connection Kit, provides an economically attractive entry into the world of digital microphones. If the user later wishes to take advantage of additional switchable parameters and remotely con-



**TRUE NEUMANN SOUND:**  
The legendary Neumann sound in the digital realm. Pure Neumann capsule sound.

# The System

## Description

trolled functions, the system can be expanded at any time by acquiring a separate DMI-2.

Any audio engineer who is familiar with digital technology can begin production with Solution-D immediately, without extensive training. The additional features provided by digital microphones open up new possibilities for production.

### Remote control of standard microphone parameters

With the DMI-2 digital microphone interface, familiar microphone settings such as the directional characteristic, pre-attenuation and low-cut filter can be controlled remotely. Changing the settings of microphone parameters is greatly simplified, which facilitates rapid testing of different settings so as to optimize the sound quality. It is no longer necessary to make handwritten records of all of the settings.

### Integrated digital audio signal processing

An A/D converter developed by Neumann, especially optimized for the capsule signal conditions, receives the output signal directly from the microphone capsule. Level matching required for subsequent devices is performed digitally, in the microphone itself. Analog components such as preamplifiers and A/D converters are thus no longer required, resulting in significant cost savings.

The immediate conversion of the analog signal results in a significant improvement in the dynamic range. This is perceptible throughout the entire signal chain, making level adjustments less critical.

Mixing console functions such as mute and phase reverse, which affect the microphone signal, are likewise integrated into the microphone. For the D-01, even commands such as "On Air" (red light) are executed by means of remotely controlled microphone LEDs. A particularly significant feature is the transient limiter function. For the first time, this function can be applied at the most effective point, at the signal source, in order to reduce harmful transients. In the case of analog microphones, in the subsequent signal path a great deal of headroom must be provided for such signals, which are very short but which have a large amplitude.

### Data transmitted by the microphone

Information transmitted by the microphone includes the name of the manufacturer, the model, the serial number, the software version installed in the microphone, and a list of remotely controlled functions supported by the microphone. Sta-

tus indicators such as certain warning functions and operating readiness are also transmitted.

During production, the audio engineer can continuously monitor the status of the microphones, since all the important parameters, including signal levels, are displayed on the screen. In addition, a text input field is provided, allowing a channel name to be assigned, e.g. indicating the sound source. All of the microphone settings can be stored in configuration files and retrieved as required.

### Why digital signal processing?

The digitization of audio data began many years ago, at the end of the signal processing chain, with the development of the first digital recording equipment. Almost all audio signal processing components are now available in digital form.

It is well-known that digital signals provide the necessary preconditions for mathematically precise calculations and processing, permitting signals to be modified, copied, transmitted and stored as desired, with no loss of quality.

In contrast, analog signal processing is characterized by limited precision, error accumulation, a lack of redundant signal information, and the use of error correction procedures. Each analog signal processing step is thus associated with a degradation of signal quality.

This results in a gradual decrease in the dynamic range, due to the introduction of noise voltages and nonlinear distortion.

In addition, digital processing permits the performance of functions that are difficult or impossible to execute via analog signal processing. This applies particularly to functions that are based on intermediate data storage.

### A/D conversion

Despite continuing improvements, integrated circuits available on the market still constitute a limiting factor in the conversion of audio data from analog to digital form.

For instance, the best delta-sigma A/D converters currently available as integrated circuits provide a dynamic range of 115 dB to 120 dB (A-weighted), for a theoretical word length of 24 bits.

This can be compared with the dynamic range of up to 130 dB exhibited by a high-quality analog condenser microphone. In order to prevent the addition of noise to the signal, a significantly improved A/D converter is therefore required. The conversion process must simultaneously be optimized for the signal levels and source impedance found in the microphone.



#### TRUE TO THE ORIGINAL:

The satisfaction of recording the uncolored original, with no "bottlenecks" between the capsule and the recording system.



#### TRUE CONVERSION:

The guarantee of having one of the best A/D converters available.



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When A/D conversion is carried out in a mixing console or other equipment, as a rule, loss of signal quality is to be expected, since the conversion occurs after level matching has already been performed. As a result, the dynamic range is affected by headroom considerations and by the characteristics of the microphone preamplifier and the A/D converter.

The development goal was thus to effect high-quality digitization of the capsule signal directly in the microphone, so as to permit level matching and other processing steps to be performed digitally. This is the only way of preserving the signal quality that is generated by the microphone.

## Synchronization

The AES 42 standard describes two modes of synchronizing the microphone with the receiver (e.g. a mixing console or DMI-2 digital microphone interface):

**Mode 1:** The microphone operates asynchronously, using the sampling rate of its internal quartz oscillator. In this case, a sample rate converter is required at the receiver. However, this mode of operation should be used only if mode 2 synchronization is not possible, since conventional sample rate converters will impair the signal quality, for instance in terms of dynamic range and latency time.

**Mode 2:** The microphone is synchronized with a master word clock, which can be either an external word clock or the internal word clock of the DMI-2. In this case, a frequency/phase comparison of the microphone signal with the master word clock is carried out in the AES 42 receiver (DMI-2). A control signal is then generated that is transmitted via the remote control data stream to the microphone, where it controls the frequency of the internal quartz oscillator.

Via the BNC output of the DMI-2, the internal word clock generator can be used to synchronize additional DMI-2s and subsequent processing equipment, such as a mixing console.

## The D-01 digital microphone

At first glance, the D-01 microphone appears similar to an analog microphone. However, in the microphone, an A/D converter developed by Neumann which is especially optimized for capsule signal conditions receives the output signal directly from the capsule. The signal is immediately converted into a digital signal, generating an internal 28-bit signal with a dynamic range of more than 130 dB (A-weighted, including capsule characteristics).

The digital signal is then processed directly in the microphone. This means that parameters such as the directional characteristic, pre-attenuation, low-cut filter, gain and various switching functions can be set digitally and controlled remotely. External components such as analog preamplifiers and A/D converters are thus no longer required.

For the purpose of clear identification, information concerning the name of the manufacturer, model, serial number and installed software version is transmitted by the microphone to the connected receiver.

The microphone is equipped with a 3-pin XLR connector for transmission of a bi-directional signal conforming to the AES 42 standard. This signal includes the balanced digital microphone output signal, the phantom power supply, and a remote control data stream that also contains a signal for synchronizing the microphone with a master clock.

The D-01 is available with a classic nickel finish. All standard sampling frequencies are supported, from 44.1 kHz to 96 kHz.

## KM D digital miniature microphones

The KM D microphones are the digital counterparts of the well-known successful miniature microphones of the 180 series. The KM 184 in particular is regarded as a standard-setting analog miniature condenser microphone, and is one of the most popular of all Neumann microphones.

Six different capsule characteristics are being offered initially. The modular construction of the new microphones permits the KM D output stage to be combined with the various passive microphone capsules.

In the microphone, the Neumann A/D converter which has been extensively proven in the D-01 receives the output signal directly from the capsule. With a dynamic range exceeding that of the capsule, the converter permits optimal utilization of the capsule qualities. This ensures that the capsule signal is made available to the recording system without any coloration, with a hitherto unknown transparency.

If required, the DSP functions integrated into the microphone can be configured and controlled remotely via the DMI-2 digital microphone interface and the RCS remote control software. These functions include gain setting, a compressor/limiter with an additional de-esser function, and a peak limiter. The digital concept proves particularly beneficial here. The peak limiter, which receives the output signal almost directly from the capsule, acts as an automatic "safety valve", permitting

**TRUE HANDLING SAFETY:**  
Anti-clipping processing  
ensures handling safety,  
and reduces stress.



# The System

Description

safe exploitation of the entire available dynamic range even in stressful recording situations.

For the purpose of clear identification, information concerning the name of the manufacturer, model, serial number and installed software version is transmitted by the microphones to the connected receiver.

The microphones are equipped with a 3-pin XLR connector for transmission of a bi-directional signal conforming to the AES 42 standard. This signal includes the balanced digital microphone output signal, the phantom power supply, and a remote control data stream that also contains a signal for synchronizing the microphone with a master clock.

Two versions of the digital miniature microphones are available: Classic nickel, and black Nextel finish. All standard sampling frequencies are supported, from 44.1 kHz to 192 kHz.

## S/PDIF and AES/EBU Connection Kits

In addition to the DMI-2 digital microphone interface, Neumann is now offering attractively priced Connection Kits to permit easy connection of individual miniature microphones to the widely used S/PDIF and AES/EBU interfaces. This makes it possible for numerous users to enjoy "Neumann sound direct to disk", without the extensive functionality of the comprehensive DMI-2. The D-01 microphone can not be operated by a Connection Kit.

An upgrade to the DMI-2, with its configuration capabilities and DSP functions, is of course possible at any time. A plug-in power supply is included as a standard feature. A Battery Pack to permit outdoor operation is also available as an option.

## Attractive Starter Sets for an economical entry into the field of digital microphone technology

Two Starter Sets offer a straightforward introduction to digital microphone technology at a very attractive price. They include a KM 184 D microphone and a Connection Kit for either an S/PDIF or AES/EBU connection. An interesting aspect for those budgeting for future purchases of recording equipment is that an A/D converter is already integrated into the digital Neumann system, and that a preamplifier is not required. Another advantage is the elimination of compatibility considerations. All of the components are available from a single source, so that the Neumann microphone sound can be captured on a digital recording medium with no coloration.

## The DMI-2 digital microphone interface

Equipment that supports the new AES 42 standard can process the output signals of Solution-D microphones directly. In all other cases, the DMI-2 digital microphone interface is used. The DMI-2 is a separate, two-channel device which converts the AES 42 data format supplied by the microphone into an AES/EBU signal.

The DMI-2 is operated via the Neumann RCS remote control software, which is installed on a desktop or laptop computer. The computer is connected to the DMI-2 via a USB port and a USB to RS 485 interface converter. If a large number of microphones is used, several DMI-2s can be cascaded. In this case, each digital microphone interface can be addressed individually.

In addition to a word clock input and output, the DMI-2 also has an internal word clock generator. If no master word clock signal (e.g. from a mixing console) is present at the input, the DMI-2 internal word clock is used automatically to synchronize the two microphone channels, and the signal is switched to the word clock output.

External commands such as "On Air" (red light) can be controlled via a 9-pin user port.

## RCS remote control software

The digital microphones can be controlled via the RCS remote control software, which is a component of the Solution-D system. The software runs as an independent program on a desktop or laptop computer.

All important parameters are displayed on the screen and can be changed at any time. During production, the audio engineer can monitor the operating status and parameters of all connected microphones, and can change the settings quickly and easily if necessary.

The parameters displayed include the directional characteristic, pre-attenuation, low-cut filter, gain, various microphone status indicators, command indicators, and mute and phase reverse functions. It is also possible to monitor signal levels on the screen.

Information transmitted by the microphone, such as the name of the manufacturer, model and serial number, is displayed for clear identification of the microphone. In addition, it is possible to input additional information, such as the name of the sound source. Settings for the complete microphone setup can of course be stored and retrieved as required.



### TRUE TIME SAVINGS:

Reduced time requirements and personnel costs, particularly due to faster post production processing.



### TRUE ECONOMY:

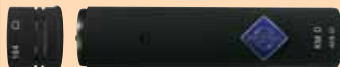
Lower investment costs, since separate A/D converters and preamps are no longer needed. This also means space and weight savings (e.g. in the OB van).





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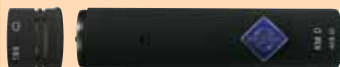
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► KM D nx<sup>3)</sup>

XLR 3 Cable<sup>1)</sup>  
(not included)

► KM D Starter Set - S/PDIF (44.1 or 48 kHz)<sup>3)</sup>



► KM D nx<sup>3)</sup>

XLR 3 Cable<sup>1)</sup>  
(not included)

► KM D Starter Set - AES/EBU (44.1 or 48 kHz)<sup>3)</sup>



► KM D Preset: 44.1, 48 or 96 kHz<sup>3)</sup>  
(other preset frequencies on demand)

XLR 3 Cable<sup>1)</sup>



XLR 3 Cable<sup>1)</sup>



XLR 3 Cable<sup>1)</sup>

XLR 3 Cable<sup>1)</sup>

► KM D Sampling frequencies 44.1...192 kHz  
(software-selectable)



XLR 3 Cable<sup>1)</sup>

► D-01 Sampling frequencies 44.1...192 kHz  
(software-selectable)

XLR 3 Cable<sup>1)</sup>

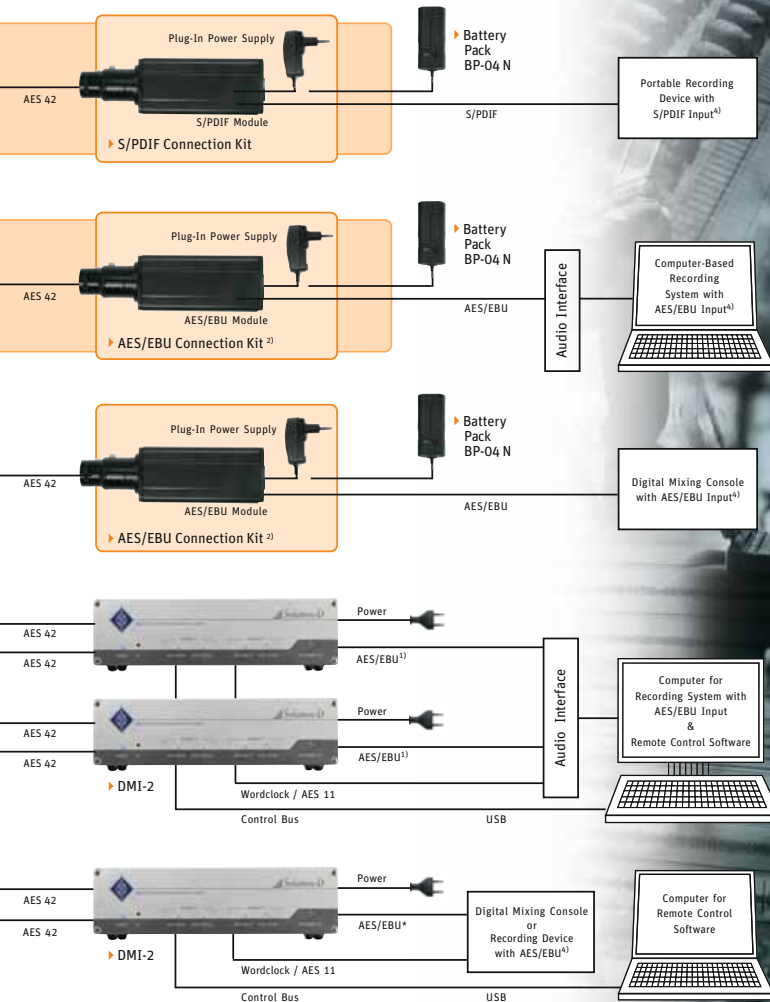
<sup>1)</sup> special cable recommended for digital use

<sup>2)</sup> not necessary when using DMI-2



# The Family

Combinations



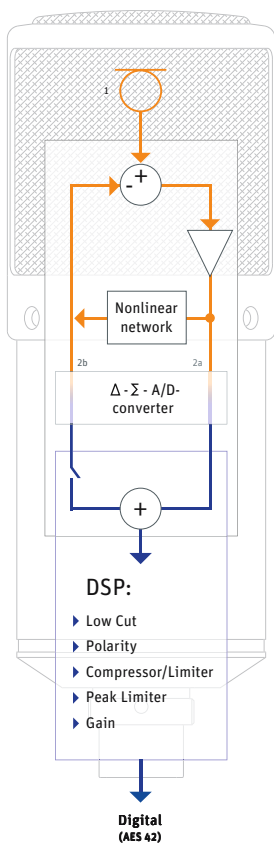
<sup>3)</sup> with the DMI-2 the frequency can be set to 44.1, 48, 88.2, 96, 176.4 or 192 kHz

<sup>4)</sup> these are only examples

<sup>5)</sup> nx = Nextel black



## The Principle



Analog capsule

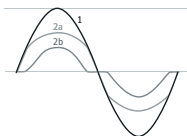
Ideal matching of  
Neumann A/D-converter  
with microphone capsule

Neumann A/D converter:

Patented process

Dynamic range  $\geq 140$  dB

The capsule signal is  
transferred to the digital  
domain without any loss  
of quality.



Entire range  
of functionality  
remote controlled

Synchronization with  
studio word clock

Clipping protection



► Recording with no "bottlenecks"

## Toolbox

Components & Sets



▶ BP-04 N Battery Pack (batteries not included)



## Large Diaphragm Microphone



► D-01 microphone  
in wooden box



► D-01 Mono Set:  
D-01, elastic suspension,  
DMI-2, RCS software, interface  
converter and all cables,  
in aluminum case)



► D-01 Stereo Set:  
2 x D-01, elastic suspensions,  
DMI-2, RCS software, interface  
converter and all cables,  
in aluminum case)

## DMI-2



► DMI-2 (incl. RCS software and cables)

## Miniature Microphones



► KK 131



► KK 143



► KK 145



► KK 183



► KK 184



► KK 185



► KK 131 nx<sup>1)</sup>



► KK 143 nx<sup>1)</sup>



► KK 145 nx<sup>1)</sup>



► KK 183 nx<sup>1)</sup>



► KK 184 nx<sup>1)</sup>



► KK 185 nx<sup>1)</sup>



► KM 183 D



► KM 184 D



► KM 185 D

KM 183/184/185 D (nx) are delivered with wind-screen and clamp, also available as stereo sets.

## Toolbox

### Components & Sets



► KM D, Preset: 44.1, 48 or 96 kHz<sup>2)</sup>



► KM D nx, Preset: 44.1, 48 or 96 kHz<sup>2)</sup>



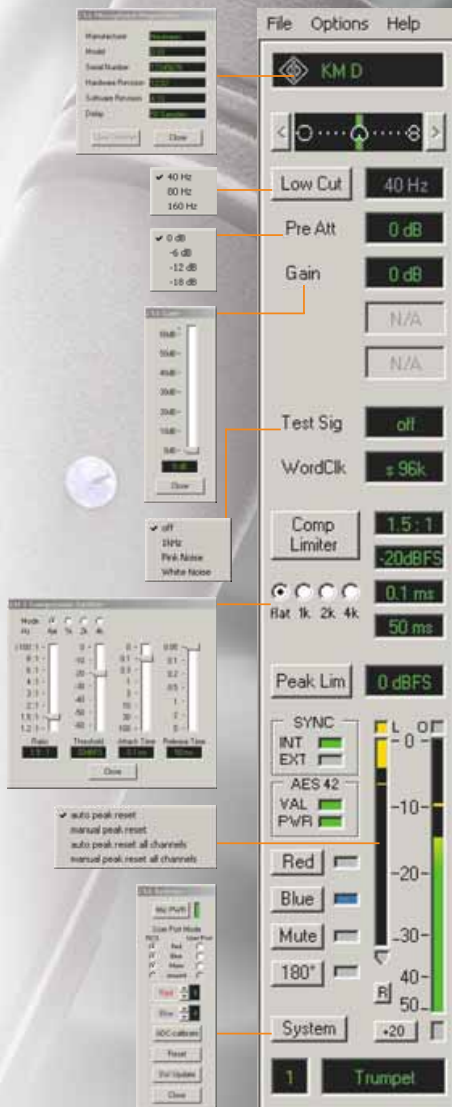
► KM 183 D nx<sup>1)</sup>



► KM 184 D nx<sup>1)</sup>



► KM 185 D nx<sup>1)</sup>



<sup>1)</sup> nx = Nextel black

<sup>2)</sup> With the DMI-2 the frequency can be set to 44.1, 48, 88.2, 96, 176.4 or 192 kHz



### Application Hints

#### D-01

- Universally applicable, and particularly suitable for applications where maximum resolution and transparency are desired.

#### KK 183 + KM D

- For close miking of instruments when there is no need to attenuate extraneous noise, and in a balanced acoustic environment to record acoustic guitar, wind instruments, strings, percussion, drums
- Ideal as AB stereo pair because of the flat frequency response in the diffuse sound field
- Main mic, especially for capturing room acoustics
- For stereo recordings with a baffle plate
- Spot mic for piano, wind instruments, organ, choir

#### KK 184 + KM D

- For universal use, especially for recording situations when it is necessary to attenuate off-axis sound (mainly from the rear) from other nearby instruments.
- As XY and ORTF stereo pair
- Broadcasting mic for announcers
- Spot mic and overhead
- Close miking of strings, wind instruments, percussion, piano, Leslie speakers and guitar amps

#### KK 185 + KM D

- Especially for recording situations when it is necessary to attenuate off-axis (lateral and rear) sound from other nearby instruments.
- As XY stereo pair
- Overhead, toms
- In situations that are susceptible to acoustic feedback
- To attenuate unwanted sound of nearby instruments
- Recording of speech, as in TV, movie and video productions, PA systems
- Produces especially warm and bass supporting sound for artists who perform in proximity effect range

#### KK 131 + KM D

- For close miking of instruments when there is no need to attenuate extraneous noise, and in a balanced acoustic environment to record acoustic guitar, wind instruments, strings, percussion, and drums
- Flat frequency response for close miking, spot mic

#### KK 143 + KM D

- Polar response characteristic acts more like an omni. Therefore, it is an ideal tool to record larger instrument ensembles
- As AB stereo pair, especially in rooms with less than ideal acoustics
- As spot mic for strings, wind instruments, percussion, and Leslie speakers
- Acts very neutral when used close up to bass instruments, such as double bass, bass amps, guitar amps

#### KK 145 + KM D

- It naturally compensates for proximity effect
- Very neutral tonal balance during close miking of speech, as in TV, movie and video, PA
- Acts very neutral when used close up to bass instruments, such as double bass, bass amps, guitar amps, Leslie speakers, toms

### Delivery Range D-01

#### D-01 Microphone:

D-01 Microphone in wooden box

#### D-01 Mono set:

D-01 Microphone  
DMI-2 Digital Microphone Interface  
RCS Remote Control Software  
EA 2 Elastic suspension  
USB 485 Converter  
USB cable, RJ 45 patch cable, BNC cable,  
IC 3 XLR cable, AC line cable  
Aluminium case

#### D-01 Stereo set:

2x D-01 Microphone  
1x DMI-2 Digital Microphone Interface  
1x RCS Remote Control Software  
2x EA 2 Elastic suspension  
1x USB 485 Converter  
1x USB cable, 1x RJ 45 patch cable, 1x BNC cable,  
1x IC 3 XLR cable, 1x AC line cable  
1x Aluminium case

### Catalog No. D-01

D-01 Single Microphone .....	ni .....	008482
D-01 Mono set (230 V, EU) .....	ni .....	008473
D-01 Mono set (230 V, UK) .....	ni .....	008477
D-01 Mono set (170 V, US) .....	ni .....	008478
D-01 Stereo set (230 V, EU) .....	ni .....	008479
D-01 Stereo set (230 V, UK) .....	ni .....	008481
D-01 Stereo set (170 V, US) .....	ni .....	008480

## Order Information

### Selection of Accessories D-01

Interface, DMI-2 (230 V, EU) .....	008561
Interface, DMI-2 (230 V, UK) .....	008587
Interface, DMI-2 (117 V, US) .....	008588
Elastic suspension, EA 1 .....	ni ..... 008449
Elastic suspension, EA 1 mt .....	blk ..... 008450
Auditorium hanger, MNV 87 .....	ni ..... 006804
Auditorium hanger, MNV 87 mt .....	blk ..... 006806
Popscreen, PS 15 .....	blk ..... 008472
Popscreen, PS 20 a .....	blk ..... 008488
Microphone cable, IC 3 mt .....	blk ..... 006543

### Delivery Range KM D

#### KM 183 D / KM 184 D / KM 185 D:

KM 183 D (nx) ... KM 185 D (nx) microphone
WNS 100 windscreen
Stativgelenk SG 21/17 mt
Wooden box

#### KM D Starter sets:

KM 184 D nx (44.1 oder 48 kHz) microphone
WNS 100 Windscreen
SG 21/17 mt Stand mount swivel
Connection Kit (S/PDIF or AES/EBU)
Wooden box

#### Delivery Range KM D Stereo Sets

2x KM 183 D (nx) ... KM 185 D (nx) microphone
2x WNS 100 Windscreen
2x SG 21/17 mt Stand mount swivel
Wooden box

### Catalog No. KM D

KM 183 D .....	ni ..... 008553
KM 183 D nx .....	nx ..... 008554
KM 183 D stereo set .....	ni ..... 008572
KM 183 D nx stereo set .....	nx ..... 008573
KM 184 D .....	ni ..... 008555
KM 184 D nx .....	nx ..... 008556
KM 184 D stereo set .....	ni ..... 008574
KM 184 D nx stereo set .....	nx ..... 008575
KM 185 D .....	ni ..... 008557
KM 185 D nx .....	nx ..... 008558
KM 185 D stereo set .....	ni ..... 008576
KM 185 D nx stereo set .....	nx ..... 008577
Starter Set S/PDIF (44.1 kHz) .....	nx ..... 008564
Starter Set S/PDIF (48 kHz) .....	nx ..... 008565
Starter Set AES/EBU (44.1 kHz) .....	nx ..... 008562
Starter Set AES/EBU (48 kHz) .....	nx ..... 008563

### Selection of Accessories KM D

Output Stage KM D (44.1 kHz) .....	ni ..... 008578
Output Stage KM D nx (44.1 kHz) .....	nx ..... 008581
Output Stage KM D (48 kHz) .....	ni ..... 008579
Output Stage KM D nx (48 kHz) .....	nx ..... 008582
Output Stage KM D (96 kHz) .....	ni ..... 008580
Output Stage KM D nx (96 kHz) .....	nx ..... 008583
Capsule head, KK 131 .....	ni ..... 008591
Capsule head, KK 131 nx .....	nx ..... 008592
Capsule head, KK 143 .....	ni ..... 008593
Capsule head, KK 143 nx .....	nx ..... 008594
Capsule head, KK 145 .....	ni ..... 008595
Capsule head, KK 145 nx .....	nx ..... 008596
Capsule head, KK 183 .....	ni ..... 008566
Capsule head, KK 183 nx .....	nx ..... 008567
Capsule head, KK 184 .....	ni ..... 008568
Capsule head, KK 184 nx .....	nx ..... 008569
Capsule head, KK 185 .....	ni ..... 008570
Capsule head, KK 185 nx .....	nx ..... 008571
Connection Kit AES/EBU .....	008584
Connection Kit S/PDIF .....	008585
Interface, DMI-2 (230 V, EU) .....	008561
Interface, DMI-2 (230 V, UK) .....	008587
Interface, DMI-2 (117 V, US) .....	008588
Battery Pack, BP-04-N .....	008586
Elastic suspension, DA-KM .....	blk ..... 008420
Elastic suspension, EA 2124 A mt .....	blk ..... 008433
Table stands, MF 2 .....	blk ..... 007266
Table stands, MF 3 .....	blk ..... 007321
Auditorium hanger, MNV 21 mt .....	blk ..... 006802
Double mount, DS 120 .....	blk ..... 007343
Stand mount, SG 21/17 mt .....	blk ..... 006149
Windscreen, WKD-KM .....	gr ..... 008424
Windjammer, WJ-KM .....	gr ..... 008426
Foam windscreen, WNS 100 .....	blk ..... 007323
Foam windscreen, WNS 110 .....	blk ..... 008535
Foam windscreen, WNS 120 .....	blk ..... 008427
Foam windscreen, WS 100 .....	blk ..... 006751
Popscreen, PS 15 .....	blk ..... 008472
Microphone cable, IC 3 mt .....	blk ..... 006543
Microphone cable, IC 31 mt .....	blk ..... 006570

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

Meaning of color codes:

ni = nickel, nx = nextel black, blk = black, gr = grey





### ▶ General Specifications of the Solution-D microphones

Interface: AES 42

Remote controlled<sup>5)</sup> functions:

- Polar pattern<sup>5)</sup>
- Low-cut: flat, 40, 80, 160 Hz
- Pre-attenuation: 0, -6, -12, -18 dB
- Gain: 0...63 dB in 1 dB steps, clickless
- Testsignal: 1 kHz, pink noise, white noise
- Parametric compressor/limiter (incl. de-esser function)
- Independent peak limiter avoiding any clipping
- Switch functions: soft muting, phase reverse, signal lights
- Signal lights: red<sup>5)</sup> and blue LEDs (switchable via control software or User Port)

A/D conversion: Neumann process (patented), 28-bit internal word length

Digital signal processing: Fixed-point, variable internal word length 28 bits to 60 bits

Synchronization:

AES 42-Mode 2, Mode 1 (asynchronous),

Asynchronous operation (free-running),

basic frequency accuracy:  $\pm 25$  ppm

Synchronous operation, pull-in range: Min.  $\pm 100$  ppm

Power supply (phantom power complying with AES 42)

Supply voltage range: +7 V to +10,5 V

Output: XLR3M, 24 bits as per AES/EBU (AES 3)

### ▶ KM D + KK 183 / 184 / 185 Specifications

Acoustic transducer: KK 183/184/185 (known from Series 180)

Directional characteristic: Omni/cardioid/hypercardioid

Frequency response: 20 Hz to 20 kHz

Free-field sensitivity<sup>3)</sup>: -41/-39/-42 dBFS

Equivalent noise level, CCIR<sup>4)</sup>: 25/22/25 dB

Equivalent noise level, A-weighted<sup>4)</sup>: 13/13/16 dB-A

Signal-to-noise ratio<sup>3)</sup>, CCIR<sup>4)</sup>: 69/70/69 dB

Signal-to-noise ratio<sup>3)</sup>, A-weighted<sup>4)</sup>: 81/81/78 dB

Maximum SPL at 0 dBFS: 135/133/136 dB SPL

Sampling rates:

Preset: 44.1, 48 or 96 kHz

(with DMI-2 switchable: 44.1/48/88.2/96/176.4/192 kHz)

Preset Gain: 10 dB (variable with DMI-2)

Current consumption: max. 150 mA

Weight: approx. 80/84/88 g, Diameter: 22 mm, Length: 108 mm

### ▶ KM D + KK 131 / 143 / 145 Specifications

Acoustic transducer: KK 131/143/145

Directional characteristic: Omni free field equalized/cardioid wide angle/ cardioid low frequency roll-off

Frequency response: 20 Hz to 20 kHz

Free-field sensitivity<sup>3)</sup>: -41/-39/-40 dBFS

Equivalent noise level, CCIR<sup>4)</sup>: 24/24/24 dB

Equivalent noise level, A-weighted<sup>4)</sup>: 13/13/13 dB-A

Signal-to-noise ratio<sup>3)</sup>, CCIR<sup>4)</sup>: 70/70/70 dB

Signal-to-noise ratio<sup>3)</sup>, A-weighted<sup>4)</sup>: 81/81/80 dB

Maximum SPL at 0 dBFS: 135/133/134 dB SPL

Sampling rates:

Preset: 44.1, 48 or 96 kHz

(with DMI-2 switchable: 44.1/48/88.2/96/176.4/192 kHz)

Preset Gain: 10 dB (variable with DMI-2)

Current consumption: max. 150 mA

Weight: approx. 80/84/88 g, Diameter: 22 mm, Length: 108 mm

### ▶ D-01 Specifications

Acoustic transducer: K 07 large double-diaphragm capsule, diameter 30 mm with protected internal electrodes

Directional characteristic: 15 remote controllable polar patterns, from omni to cardioid to figure-8

Frequency response: 20 Hz to 20 kHz

Free-field sensitivity<sup>3)</sup>: -44 dBFS

Equivalent noise level, CCIR<sup>4)</sup>: 19 dB

Equivalent noise level, A-weighted<sup>4)</sup>: 8 dB-A

Signal-to-noise ratio<sup>3)</sup>, CCIR<sup>4)</sup>: 75 dB

Signal-to-noise ratio<sup>3)</sup>, A-weighted<sup>4)</sup>: 86 dB

Maximum SPL at 0 dBFS: 138 dB SPL

Dynamic range, A-weighted<sup>4)</sup>: 130 dB

Sampling rates: 44.1, 48, 88.2, 96, 176.4, 192 kHz

Current consumption: max. 230 mA

Weight: approx. 700 g, Diameter: 63.5 mm, Length: 185 mm

### ▶ DMI-2 (Digital Microphone Interface) Specifications

2 channels, Inputs: XLR3F, AES 42

Outputs: XLR3M, AES/EBU, 24 bit

Control bus: RS485 via RJ 45 jack. Second RJ 45 jack for cascading purposes (up to 4 DMI devices today, 16 devices in future). Connection to the computer's USB port via Neumann USB485 interface converter (included).

User Port: 9-pin sub-D, 3 functions per channel

Synchronization: AES 42 - Mode 2 (PLL system using an external Word Clock and remote controlling the VCXO in the microphone, default mode), AES 42 - Mode 1, (asynchronous, needs a sample rate converter (SRC) at the receiver side).

Word clock input: BNC, 75 ohms.

Word clock output: BNC, 75 ohms, automatically set to the internal word clock master when no external word clock received. Selectable internal sampling rates: 44.1, 48, 88.2, 96, 176.4, 192 kHz.

External Word clock: 44.1, 48, 88.2, 96, 176.4, 192 kHz or AES 11 format.

Indicators: Data Valid (AES 42) and Sync Locked (Mode 2) for each channel, Power On and Ext. Word Clock.

Power supply: 90-240 V, 50/60 Hz.

Storage of the last microphone settings and reloading to the microphones after power on automatically without the need of the computer/RCS.

### ▶ Features of the RCS (Remote Control Software)

Communication via USB port (Win 2000/98SE/ME/XP, MAC OS version 8.6...10 on PowerPC)

Up to 8 channels displayed simultaneously on the screen

Controllable functions: polar pattern, low-cut, pre-attenuation, gain, test signals, limiter/compressor/de-esser, peak limiter, phase reverse, mute, sampling rate, synchronization mode, signal lights,...

Display: peak level meter, gain reduction meter for compressor/limiter/de-esser and peak limiter, microphone properties (manufacturer, model, serial number, hardware and software revision, internal latency time), DMI properties, status signals (overload, limiter active, data valid, sync locked, power on)

Saving/Loading of configurations

Individual channel labelling

Software update of Neumann microphones and DMI device

### ▶ Battery Pack BP 04 N Specifications

4 AA (rechargeable) batteries (not included)

Weight: approx. 84 g (without batteries)

Diameter: 43 mm, Length: 105 mm

### ▶ Connection Kit S/PDIF (AES/EBU) Specifications

Connector: input XLR3F, output Cinch (XLR3M)

Weight: approx. 96 g (S/PDIF), approx. 130 g (AES/EBU)

Width: 32 mm, Height: 26 mm, Length: 105 mm

Power supply: 90-240 V, 50/60 Hz

For remote controlling functions you have to use the DMI-2

All data with respect to 0 dB pre-attenuation and 0 dB gain.

<sup>1)</sup> Remote control with DMI-2 only

<sup>2)</sup> at 1 kHz

<sup>3)</sup> re 94 dB SPL

<sup>4)</sup> according to IEC 60268-1

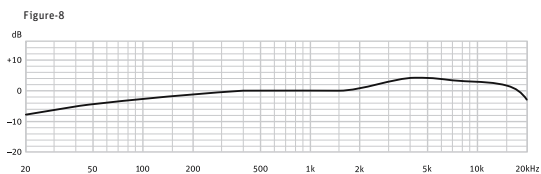
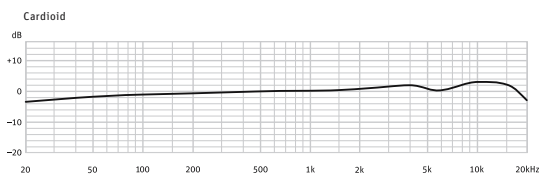
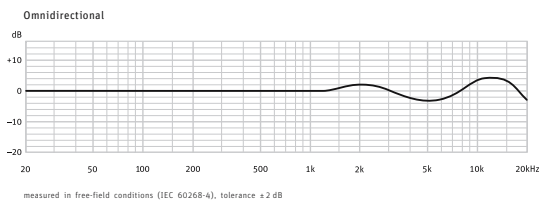
CCIR-weighting according to CCIR 468-3, quasi peak;

A-weighting according to IEC 61672-1, RMS

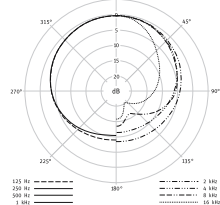
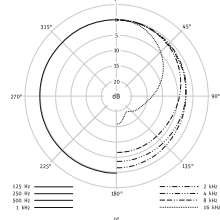
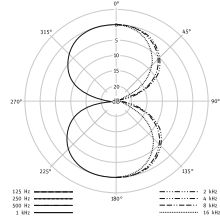
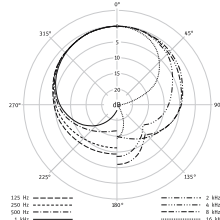
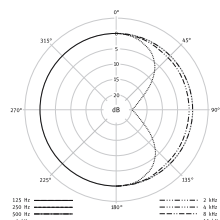
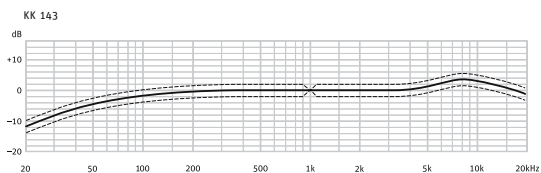
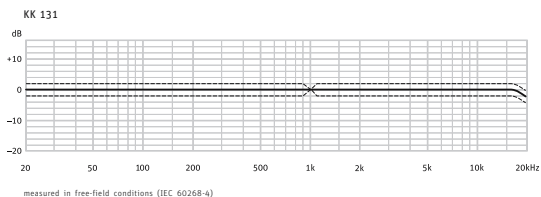
<sup>5)</sup> D-01 only

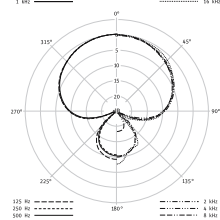
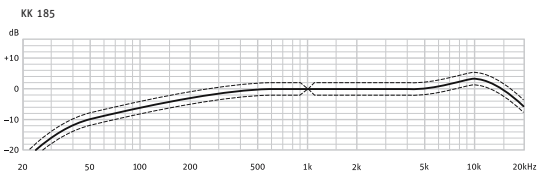
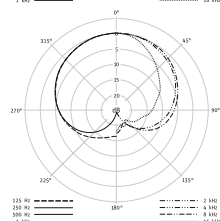
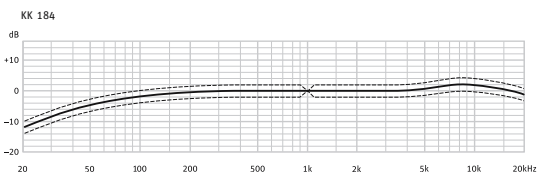
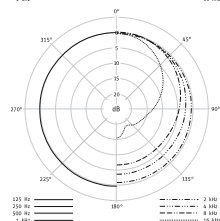
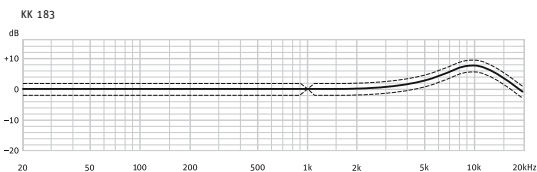
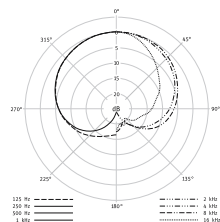
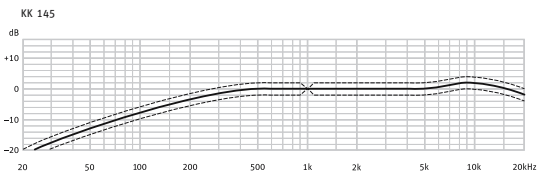
## Diagrams

### D-01



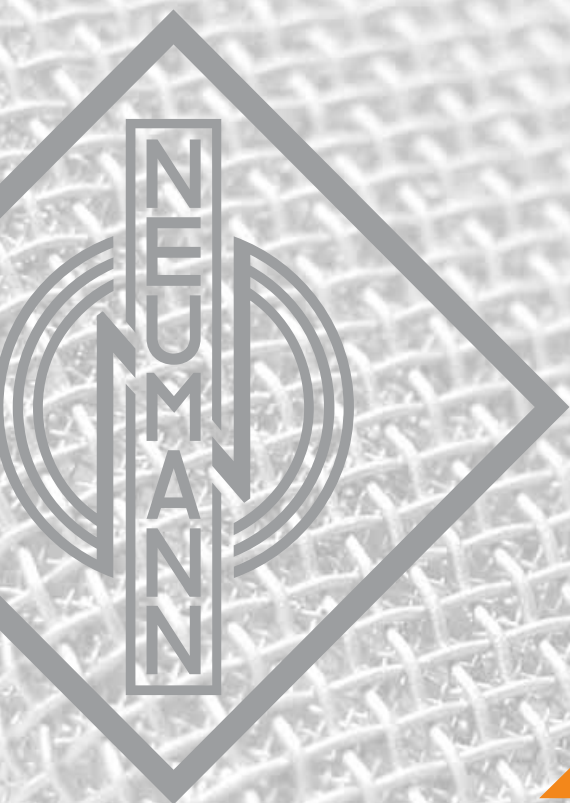
### KM D + KK...





# M 147 Tube

► **Tube Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY

The M 147 Tube is a vacuum tube condenser microphone with cardioid characteristic. At the heart of this microphone is the K 47/49 dual diaphragm capsule, inherited from this model's now legendary predecessors, the U 47 and the M 49.

Following the capsule is a tube that functions as an impedance converter. The next stage is an efficient, transformerless output circuit, that guarantees an extremely low self-noise level. Note: This innovative combination of current tube technology with the most advanced solid-state circuitry was decisive in awarding the 1997 TEC Award to the related M 149 Tube mic.

The M 147 Tube can feed extremely long microphone cables without affecting the quality of the audio signal.

Like all Neumann tube microphones, the M 147 Tube comes with an elegant satin nickel finish.

The microphone is delivered as a complete set in a high-quality aluminum case. Included with the microphone are a microphone cable, a metal swivel mount for a mic stand, and a compact universal power supply for standard mains sockets. Our modern manufacturing methods makes it possible to offer this complete set at a very attractive price.

## Applications

The famous capsule, together with complimenting tube characteristics, makes the M 147 Tube especially well suited as a vocal mic. In addition, it is a superb spot mic for all types of musical instruments.

The extremely low self-noise of its tube circuitry makes the mic perfectly suited for use in modern recording chains, analog and digital.

## Acoustic Features

The M 147 Tube is addressed from the side where the microphone body has the diamond-shaped Neumann company logo. The black color identifies tube microphones.

The capsule is equivalent to the one used in the U 47, and is the deciding factor in determining the sound characteristic. It has a flat frequency response to the upper midrange, and a boost of up to 3 dB above 2 kHz.

The headgrille design is a smaller version of the U 47. It protects the capsule effectively against popping and wind noise.

## Polar Pattern

The M 147 Tube has a cardioid characteristic, leaning more toward super-cardioid due to its distinctive capsule design. At higher frequencies the pattern becomes more directional. This is very similar to the model after which this new tube microphone was patterned, the U 47 and the successor, the U 47 fet.

## Features

- Universal tube microphone
- Pressure gradient transducer with the large diaphragm capsule from the legendary U 47 and M 49
- Transformerless circuitry
- Low self noise level
- Comes with swivel stand mount made of metal, universal power supply, and cable in an attractive aluminium case

## Application Hints

- Vocalist mic: its warm and yet transparent sound gives volume and presence
- Announcer's mic for broadcasting/voice over
- Spot mic for close miking of solo instruments, especially strings, wind instruments, and piano

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

M 147 Tube microphone,

M 149 A power supply incl. power cable, SG 1 swivel mount, KT 8 microphone cable, dust cover, aluminium case

## Catalog No.

M 147 Tube (230 Volt, EU)	.....ni	.....008435
M 147 Tube (117 Volt, US)	.....ni	.....008434
M 147 Tube (230 Volt, UK)	.....ni	.....008436

## Selection of Accessories

Elastic suspension, EA 1	.....ni	.....008449
Elastic suspension, EA 1 mt	.....blk	.....008450
Auditorium hanger, MNV 87	.....ni	.....006804
Auditorium hanger, MNV 87 mt	.....blk	.....006806
Table stand, MF 3	.....blk	.....007321
Table stand, MF 4	.....blk	.....007337
Stand extension, STV 4	.....blk	.....006190
Stand extension, STV 20	.....blk	.....006187
Stand extension, STV 40	.....blk	.....006188
Stand extension, STV 60	.....blk	.....006189
Popscreen, PS 15	.....blk	.....008472
Popscreen, PS 20 a	.....blk	.....008488
Windscreens, WS 87	.....blk	.....006753
Microphone cable, IC 3 mt	.....blk	.....006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

Meaning of color codes: blk = black, ni = nickel

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## Electrical Features

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When compared to other microphones, the impedance converter used in the M 147 Tube is distinguished by its extremely low self-noise level of only 12 dB-A / 24 dB CCIR weighted.

Similar to the recently introduced M 149 Tube, the new M 147 Tube combines a specifically selected vacuum tube (triode) with modern circuitry. This technique takes full advantage of the special transfer characteristics of the tube and passes the processed audio signal of the capsule to the microphone output, without any coloration or unwanted side effects.

The tube amplifies the capsule's signal by approximately 10 dB, thus preventing any possible influences from subsequent electronics. The M 147 Tube delivers a high output voltage, and therefore can feed microphone cables up to 300 m length without signal degradation.

The ideal operating conditions (anode current and heater voltage) of the tube are maintained throughout its life expectancy. A sensor lead detects any voltage drop that occurs through the microphone cable and compensates for it in the N 149 A power supply.

The tube warms up gradually using inverse current limiting to guarantee long life.

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## Operational Stability

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Both, the capsule and the entire circuitry are shock mounted to prevent any structure-borne noise.

Because of its wide operating range, the M 147 Tube can reproduce extremely low frequency signals without distortion.

This implies that the microphone may also be sensitive to unwanted LF interference by structure-borne noise, or wind noise. To avoid possible signal degradation, we offer the EA 1 elastic suspension and the WS 87 windscreens as accessories.

During close miking of vocals we recommend using the PS 15 or PS 20 a pop screen. You will find detailed information in our accessory catalog.

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## Filter

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The electronic circuitry of the M 147 Tube mic has a flat frequency response from 20 Hz to well above 20 kHz. Only the attributes of the capsule determine the typical sound characteristics of the microphone.

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## N 149 A Power Supply

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The N 149 A universal power supply works with all mains AC voltages from 100 V to 240 V, 50 or 60 Hz. Mains power is connected through a standard IEC 320 mains socket. The only difference between the three versions of the M 147 Tube set is the power cord supplied. Note: The N 149 V power supply is fully compatible with the M 147 Tube microphone.





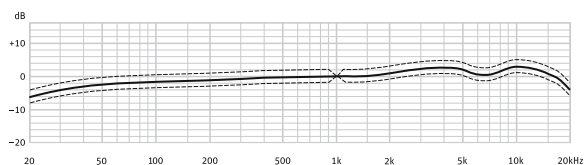
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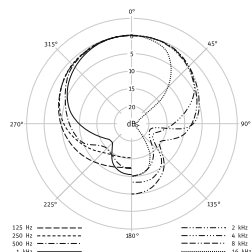




## Technical Data



measured in free-field conditions (IEC 60268-4)



Acoustical operating principle ..... Pressure gradient transducer  
 Directional pattern ..... Cardioid  
 Frequency range ..... 20 Hz...20 kHz  
 Sensitivity at 1 kHz into 1 kohm ..... 20 mV/Pa  
 Rated impedance ..... 50 ohms  
 Rated load impedance ..... 1000 ohms  
 Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 70 dB  
 Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 82 dB  
 Equivalent noise level, CCIR<sup>1)</sup> ..... 24 dB  
 Equivalent noise level, A-weighted<sup>1)</sup> ..... 12 dB-A  
 Typical SPL (tube characteristic)<sup>2)</sup> .....  
 for < 0.5% THD (for < 5% THD) ..... 114 (134) dB

Maximum output voltage ..... 8 dBu  
 Dynamic range of the microphone amplifier:  
 (A-weighted) for < 0.5% THD (for < 5% THD) ..... 102 (122) dB  
 Powering ..... Power supply N 149 A  
 Matching connector microphone ..... DIN 8F  
 Matching connector power supply ..... XLR3F  
 Weight ..... 460 g  
 Diameter ..... 57 mm  
 Length ..... 142 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi static; A-weighting according to IEC 61672-1; RMS

<sup>2)</sup> measured as equivalent el. input signal

## Selection of Accessories



Elastic suspension,  
EA 1 (m)



Auditorium hanger, MNV 87 (m)



Table stand, MF 3 (m)  
in connection with stand extension



Table stand, MF 4 (m)  
in connection with stand extension



Stand extensions,  
STV 4 / 20 / 40 / 60



Popscreen, PS 15



Popscreen, PS 20 a



Windscreens, WS 87



Microphone Cable, IC 3 m

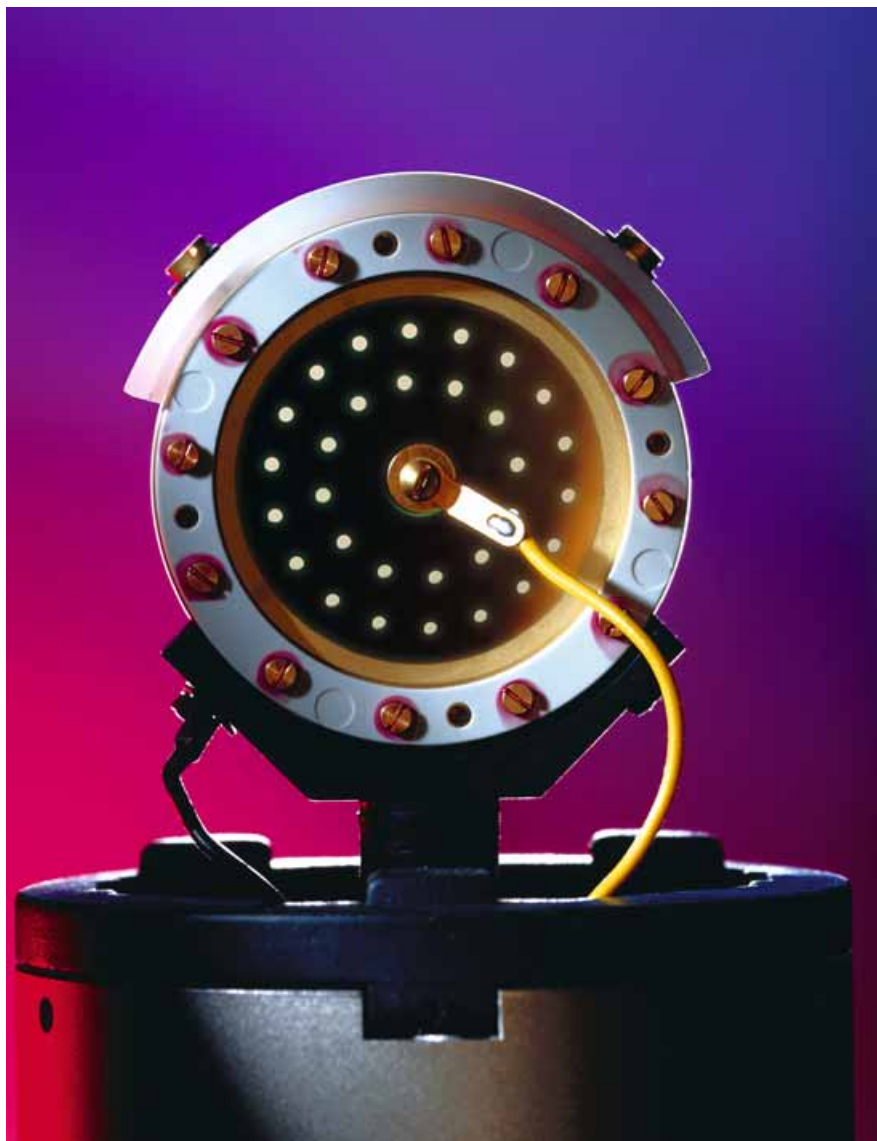


Adaptor Cable, AC 25



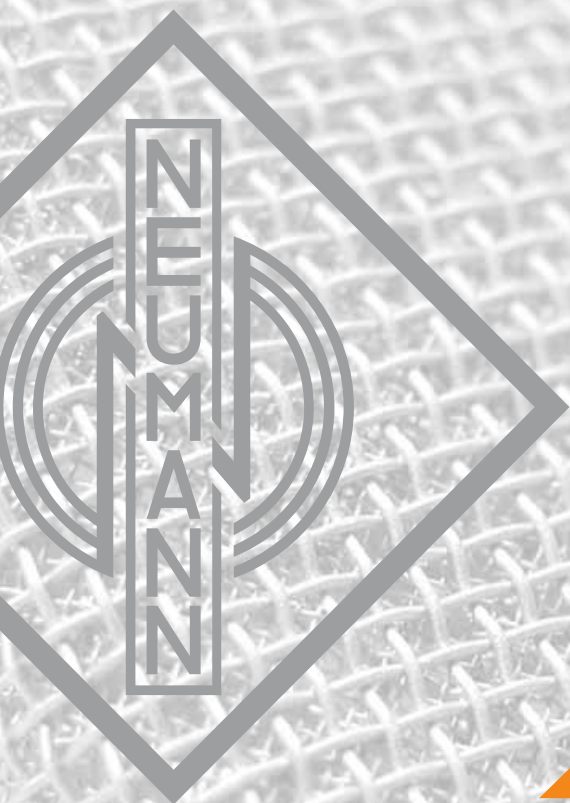
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» THE MICROPHONE COMPANY



# M 149 Tube

► **Tube Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY

The M 149 Tube is a variable dual-diaphragm microphone. The K 49 capsule – well-known from the legendary U 47 and M 49 microphones – is followed by a tube functioning as an impedance converter. In contrast to earlier concepts – utilizing a transformer – the tube is complemented with a transformerless output circuit design.



The M 149 Tube can thus feed long microphone cables without any coloration.

Two slide switches are located below the large, acoustically very open headgrille.

The switch at the front allows selection one of nine directional patterns. The slide switch at the rear operates a seven-step high pass filter. It allows a very fine adjustment of the cut-off frequency.

## Applications

There are nine polar patterns to choose from, making this microphone an ideal choice for a wide range of recording situations.

As its ancestors, the M 149 Tube is a superb vocalist microphone, not only because of the capsule, but also due to its modern circuitry, characterized by extremely low noise level.



## Acoustic features

The M 149 Tube is addressed from the front, marked with the Neumann logo. Also on the front is the switch for the selection of the polar patterns.

The capsule is mounted elastically inside the headgrille to eliminate structure borne noise. The surface below the capsule is shaped like a cone to disperse any reflected sound from the acoustic upper half space. This avoids any interference with the primary sound arriving at the capsule directly.

A large headgrille surrounds the capsule. It is acoustically very open and therefore increases the sonic realism.



The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

## Polar patterns

The polar pattern switch selects one of nine directional patterns: omnidirectional, wide-angle-cardioid, cardioid, hypercardioid, figure-8, and one additional intermediate pattern between each major position.

## Electrical features

The circuit of the M 149 Tube microphone has been developed to exceed traditional designs. We have selected a modern tube (triode) and combined its exceptional transmission characteristics with the advantages of our proven transformerless output circuit. The aim was to provide a more controlled environment for the audio signal on its path from the capsule to the output section.

The final stage is an integrated amplifier, especially designed for such applications. It features very low distortion (THD < 0.002 % at  $\pm 10$  V), very low self-noise, and high output current capability. As a result, the tube circuit is completely decoupled from the microphone output and its characteristic response curve will be unaffected by very high signal levels or varying load conditions.

The lower output impedance and higher output current capability allow cable lengths up to 300 m (1000 feet) without any degradation of the audio signal.

The tube amplifier changes the high impedance of the capsule and adds 10 dB of gain to the audio signal, providing optimum operating spec-



## Technical Data

Acoustical operating principle	Pressure gradient transducer
Directional pattern	Omnidirectional, wide angle cardioid, cardioid, hypercardioid, figure-8 plus one intermediate position each
Frequency range	20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm	34/47/62 mV/Pa <sup>1)</sup>
Rated impedance	50 ohms
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>2)</sup> (rel. 94 dB SPL)	66/69/71 dB <sup>1)</sup>
Signal-to-noise ratio, A-weighted <sup>2)</sup> (rel. 94 dB SPL)	78/81/83 dB <sup>1)</sup>
Equivalent noise level, CCIR <sup>2)</sup>	28/25/23 dB <sup>1)</sup>
Equivalent noise level A-weighted <sup>2)</sup>	16/13/11 dB-A <sup>1)</sup>

Typical SPL (tube characteristic) <sup>3)</sup> for < 0.5% THD	120 dB
for < 5% THD	136 dB
Maximum output voltage	18 dBu
Dynamic range of the microphone amplifier cardioid: (A-weighted) for < 0.5% THD (for < 5% THD)	101 (121) dB
Powering	Power supply N 149 A
Microphone matching connectors	DIN8F
Power supply matching connectors	XLR3F
Weight	730 g
Diameter	70 mm
Length	201 mm

<sup>1)</sup> Omnidirectional / cardioid / figure-8 <sup>2)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>3)</sup> measured as equivalent el. input signal



ifications. The wide dynamic range is impressive, as peak output can be  $\pm 10$  V, at 20 mA.

The ideal operating point of the tube is maintained throughout its entire life expectancy. Plate current and filament voltage are constantly regulated. A sensor circuit monitors and compensates for any voltage drop across the microphone cable. The tube is heated up slowly through inverse current limiting to guarantee long life. Optimum operating conditions are reached within a very short time.

## Filter

A seven-position slide switch is located on the back of the microphone. It selects a high-pass filter, advancing in half-octave steps between 20 Hz and 160 Hz (-3dB). This filter is useful to suppress rumble from air-conditioning and in windy situations.

In addition, the filter provides an effective tool to control the audio signal when the microphone is used at close distance and therefore proximity effect alters the program material.



## Delivery Range

The specifically designed new N 149 A power supply unit feeds the M 149 Tube through an 8-core cable. The output connector for the audio signal is a 3-pin XLR. The output signal is balanced.



The microphone comes as a set in a high-quality aluminum case, together with the 8-core microphone connecting cable, the N 149 A power supply with plug-in mains unit, the EA 170 full elastic microphone suspension and a dust cover.

## Features

- Switchable tube microphone
- Transformerless circuitry
- High output level
- Pressure gradient transducer with the M 49 capsule
- Acoustically very open wire mesh cage
- Nine directional characteristics: omni, wide angle cardioid, cardioid, hypercardioid, figure-8, and one intermediate position each
- 7fold switchable low frequency roll-off

## Delivery Range

M 149 Tube Microphone  
N 149 A Power supply unit with power cable,  
EA 170 Elastic suspension,  
KT 8 Microphone cable,  
Aluminium case,  
Dust cover

## Catalog No.

M 149 Tube (230 V, EU) .....ni .....008390  
M 149 Tube (117 V, US) .....ni .....008399  
M 149 Tube (230 V, UK) .....ni .....008403

## Selection of Accessories

Auditorium hanger, MNV 87 .....ni .....006804  
Auditorium hanger, MNV 87 mt .....blk .....006806  
Table stand, MF 3 .....blk .....007321  
Table stand, MF 4 .....blk .....007337  
Stand extension, STV 4 .....blk .....006190  
Stand extension, STV 20 .....blk .....006187  
Stand extension, STV 40 .....blk .....006188  
Stand extension, STV 60 .....blk .....006189  
Popscreen, PS 15 .....blk .....008472  
Popscreen, PS 20 a .....blk .....008488  
Microphone cable, IC 3 mt .....blk .....006543  
Adapter cable AC 25 .....blk .....006600

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

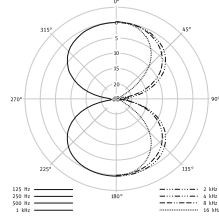
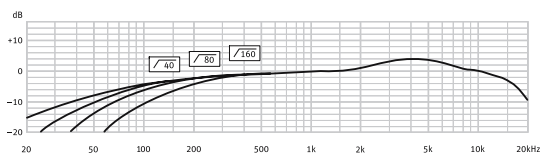
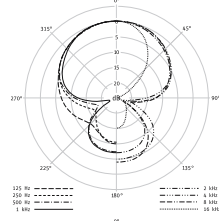
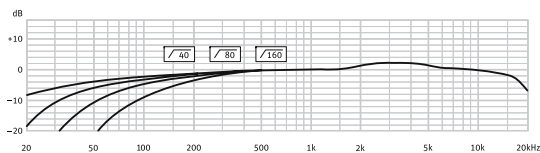
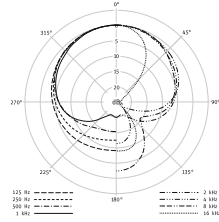
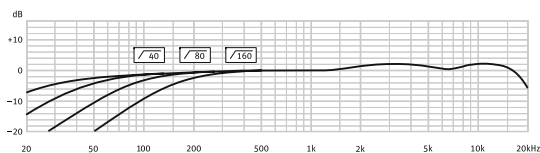
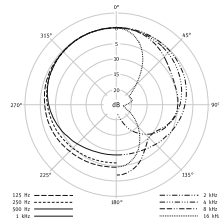
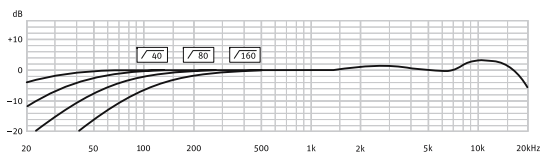
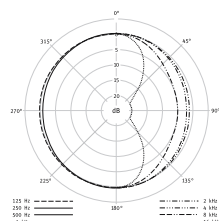
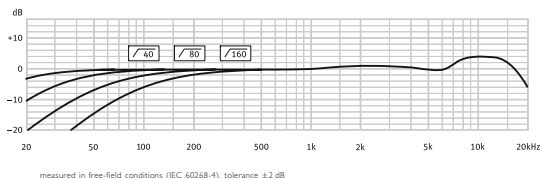
Meaning of color codes:

blk = black  
ni = nickel

## Application Hints

- Universal tube mic
- Its warm and yet transparent sound gives volume and presence to a vocalist
- A wide range of adjustments provide the most subtle differentiation of sound, especially in the range of proximity effect
- Mic for broadcasting, dubbing, and voice-over
- Spot mic for close miking of solo instruments, especially strings, wind instruments, and piano

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.







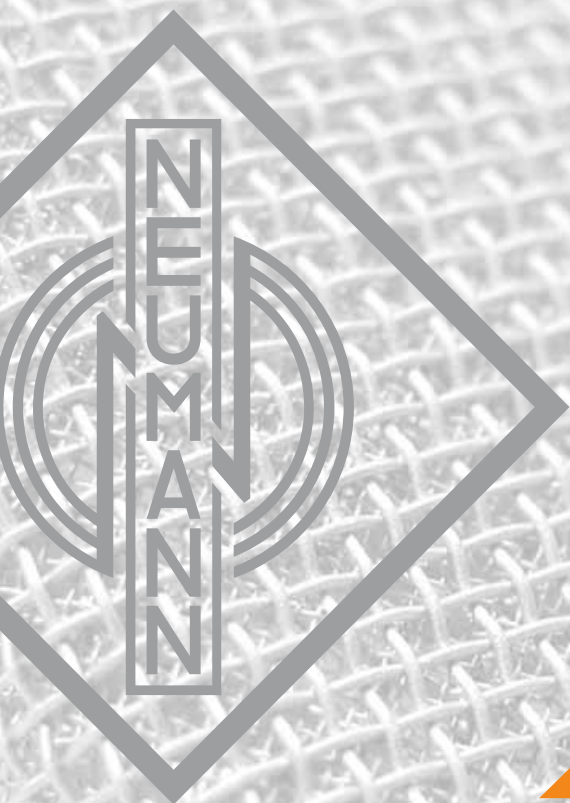
NEUMANN.BERLIN

▶ THE MICROPHONE COMPANY



# M 150 Tube

► **Tube Microphone**



[www.neumann.com](http://www.neumann.com)



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» THE MICROPHONE COMPANY



The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

Since the 1950s, the Neumann M 50 has been heralded as the ideal microphone for orchestral recording and string scoring. With its phenomenal transient response and unique directional characteristic, this classic mic has endeared many fans, both in the control room and on the soundstage.

The new M 150 Tube takes many of the features from the original M 50 and incorporates them in a very modern microphone. With low self noise, a Titanium membrane and capsule, transformerless tube amplifier and sophisticated power supply, the M 150 Tube is not a reissue but an entirely new microphone in its own right.

### Acoustical features

The Titanium diaphragm of the pressure capsule is 12 mm in diameter and is exceedingly thin. Although Titanium has been known to have unique and desirable characteristics for some time, it has, until very recently, been very difficult to procure in the quality necessary for use in a microphone of this type.

The headgrille is shaped just like that on the original M 50, as requested by various top engineers in the recording industry. Due to mounting the pressure capsule with the diaphragm flush to the surface of a small (40 mm) sphere, the directional characteristic of the M 150 Tube is entirely unique.

At the lowest frequencies, this system is a pure omnipressure transducer with a perfectly circular polar pattern. However, in the mid- and upper frequencies, the pickup pattern becomes more narrow.

The M 150 Tube is an ideal microphone for any stereo, 5.1 or 7.1 surround recording, particularly DECCA Tree technique.

### Features

- All Titanium capsule
- Unparalleled transient accuracy
- Pressure omni capsule for extended low frequency response
- Modern version of the world-famous M 50
- Very low self noise of 15 dB-A
- Transformerless tube amplifier based on the award-winning M 149 Tube microphone
- Ideal for DECCA tree recording and surround miking techniques
- Stereo sets with consecutive serial numbers

## Electrical features

The dynamic range of the M 150 Tube is 119 dB, allowing reproduction of the full musical expression, without restraint.

With a low self noise of 15 dB-A, more gain can be used without risk of adding noise to the final product. The transformerless output circuit of this microphone allows for extremely fine reproduction of small signals and low frequency information. Also, long cable runs can be used with no loss of signal quality.



## Application Hints

- Its special acoustic properties make this an ideal mic for most classical recordings
- A superb AB stereo pair for perfect balance of direct and reverberant sound
- Decca tree, setup with three microphones
- A highest quality spot (solo) mic

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

**M 150 Tube:** M 150 Tube Microphone, N 149 A Power supply, EA 170 Elastic suspension, KT 8 Connecting cable, Aluminium case

**M 150 Tube Stereo-Set:** 2x M 150 Tube Microphone, 2x N 149 A Power supply, 2x EA 170 Elastic suspension, 2x KT 8 Connecting cable, Aluminium case

## Catalog No.

M 150 Tube (230 V, EU)	.....ni	.....008456
M 150 Tube (230 V, UK)	.....ni	.....008458
M 150 Tube (117 V, US)	.....ni	.....008457
M 150 Tube Stereo set (230 V, EU)	.....ni	.....008462
M 150 Tube Stereo set (230 V, UK)	.....ni	.....008464
M 150 Tube Stereo set (117 V, US)	.....ni	.....008463

## Selection of Accessories

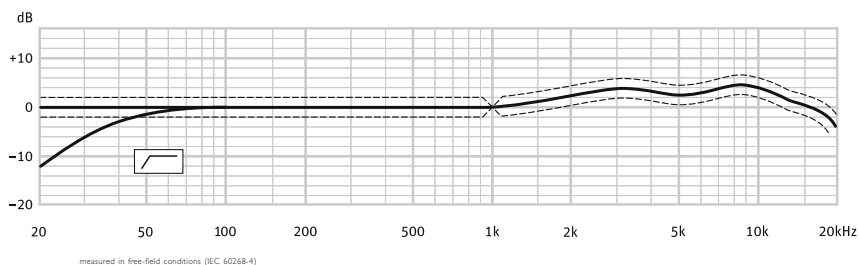
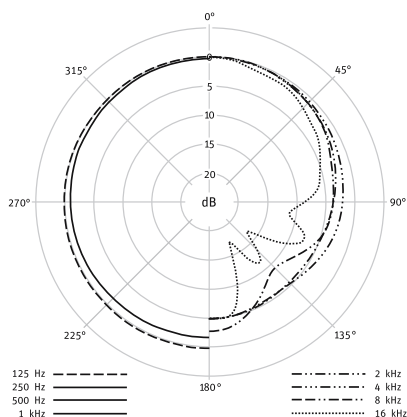
Power supply, N 149 A (EU)	.....blk	.....008447
Power supply, N 149 A (US)	.....blk	.....008446
Power supply, N 149 A (UK)	.....blk	.....008448
Elastic suspension, EA 170	.....ni	.....007271
Auditorium hanger, MNV 87	.....ni	.....006804
Floor stand, MF 4	.....blk	.....007337
Stand extension, STV 60	.....blk	.....006189
Popscreen, PS 15	.....blk	.....008472
Popscreen, PS 20 a	.....blk	.....008488
Microphone cable, IC 3 mt.	.....blk	.....006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

Meaning of color codes:

blk = black,  
ni = nickel





## Technical Data

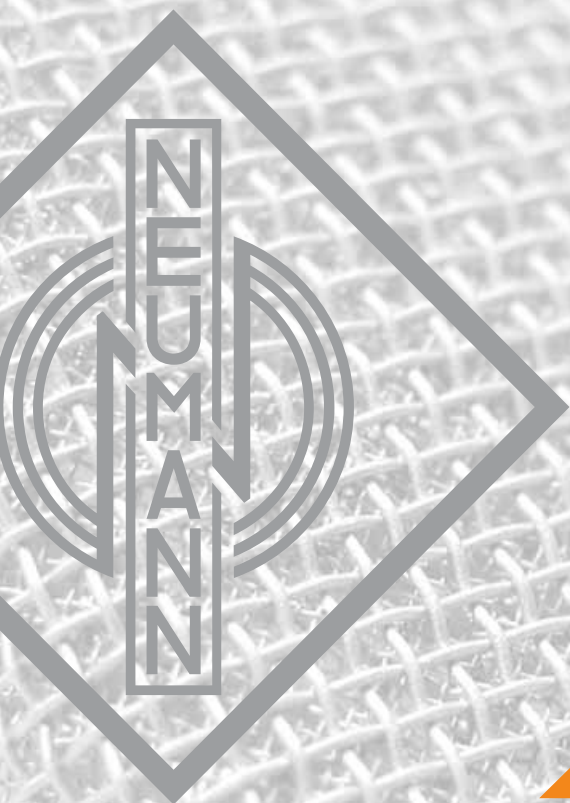
Acoustical operating principle ..... Pressure transducer  
Directional pattern ..... omnidirectional  
Frequency range ..... 20 Hz...20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 20 mV/Pa  
Rated impedance ..... 50 ohms  
Rated load impedance ..... 1 kohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 66 dB  
Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 79 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 28 dB  
Equivalent noise level, A-weighted<sup>1)</sup> ..... 15 dB-A

Typical SPL (tube characteristic)<sup>2)</sup>  
for < 0.5% THD (for < 5% THD) ..... 114 (134) dB  
Maximum output voltage ..... 8 dBu  
Dynamic range of the microphone amplifier:  
(A-weighted) for < 0.5% THD (for < 5% THD) ..... 99 (119) dB  
Powering ..... Power supply N 149 A  
Matching connector microphone ..... DIN 8F  
Matching connector power supply ..... XLR3F  
Weight ..... 800 g  
Diameter/Length ..... 78/165 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS    <sup>2)</sup> measured as equivalent el. input signal

# TLM 49

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)





# NEUMANN.BERLIN

► THE MICROPHONE COMPANY



The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

The TLM 49 is a large-diaphragm studio microphone with a cardioid directional characteristic and a warm sound which is especially optimized for vocal performance. It is supplied as a set, with an elastic suspension.

The design is inspired by that of the legendary M 49 and M 50 microphones of the 1950s. Naturally the TLM 49 has the typical Neumann fine matte nickel finish. The "sound design" is also oriented toward that of the M 49 and the U 47.

By combining its retro look with proven Neumann transformerless circuit technology, this microphone ensures low self-noise and the use of high gain levels.

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## Applications

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During the development phase, the sound was adjusted in extensive practical tests, so as to make the TLM 49 ideal particularly for vocal and speech recording. However, in addition, it is also suitable for instrumental applications in professional production studios and demanding home recordings.

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## Polar patterns

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The large-diaphragm capsule of the TLM 49 provides a cardioid directional characteristic with a tendency toward supercardioid, due to the special capsule construction. Following the example of the M 49, high frequencies are more directional. The capsule diameter is 34 mm.

The front of the microphone is indicated by the red Neumann logo on the microphone body. The capsule is oriented so that the microphone is addressed from the front.

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## Acoustic features

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The TLM 49 uses the famous K 47 capsule, which was also used in the M 49 and the U 47. The capsule has a linear frequency response up to the upper mid-range. Above 2 kHz there is a gentle presence boost up to 3 dB.

The capsule is enclosed by a large microphone headgrille, which is acoustically very open and is hence neutral with regard to the sound.

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## Electrical features

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The letters TLM stand for "transformerless microphone". With TLM technology the usual output transformer is replaced by an electronic circuit.

As with traditional transformers, it ensures good common mode rejection, and prevents RF interference that may influence the balanced audio signal.



Noise signals which affect the balanced modulation line are therefore effectively suppressed. The microphone can operate at sound pressure levels of up to 140 dB, and provides a dynamic range of 117 dB (A-weighted).

### **Operational reliability**

The entire interior structure is mounted elastically, to prevent the transmission of structure-borne noise. In addition, the capsule is mounted with a rubber shock mount.

Due to the wide frequency response, the TLM 49 can also transmit extremely low-frequency signals without coloration. Of course this means that the microphone is also sensitive to noise signals such as vibration noise and wind noise in this frequency range. The TLM 49 is therefore supplied with the elastic suspension EA 3, which effectively protects the microphone from structure-borne noise. If the microphone is addressed at extremely close range, pop screen PS 15 or PS 20 a can be used in front of the microphone to provide protection against plosive sounds.



### **Features**

- Sound profile optimized for vocal performance
- Pressure gradient transducer with the large-diaphragm capsule of the legendary U 47
- Cardioid characteristic
- Retro design
- Transformerless output circuitry
- Acoustically very open wire mesh headgrille
- Complete set with elastic suspension

### **Application Hints**

- Vocal microphone: Lends richness, power and brilliance to the voice, while remaining balanced and transparent
- Announcer's microphone for broadcasting, dubbing and voice-overs
- Spot microphone and for recording e.g. strings, piano and guitar

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.





### Delivery Range

TLM 49 Microphone, EA 3 Elastic suspension

### Catalog No.

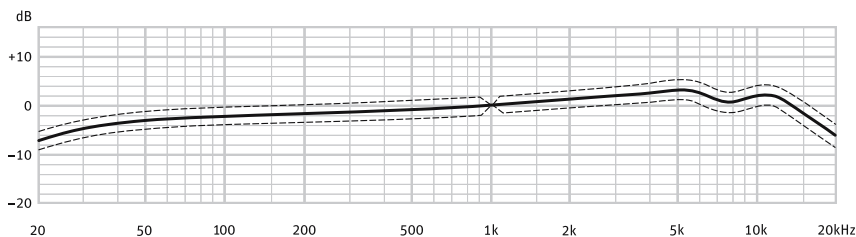
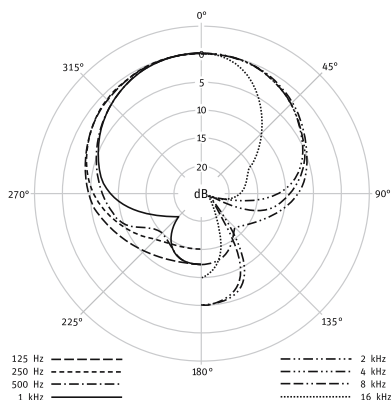
TLM 49 Set ..... ni ..... 008550

### Selection of Accessories

Power supply, N 248 (EU) .....	blk .....	008537
Power supply, N 248 (US) .....	blk .....	008538
Power supply, N 248 (UK) .....	blk .....	008539
Battery supply, BS 48 i .....	blk .....	006494
Auditorium hanger, MNV 87 .....	ni .....	006804
Auditorium hanger, MNV 87 mt .....	blk .....	006806
Popscreen, PS 15 .....	blk .....	008472
Popscreen, PS 20 a .....	blk .....	008488
Microphone cable, IC 3 mt .....	blk .....	006543
Microphone cable, IC 4 .....	ni .....	006547
Microphone cable, IC 4 mt .....	blk .....	006557

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black, ni = nickel



measured in free-field conditions (IEC 60268-4)

### Technical Data

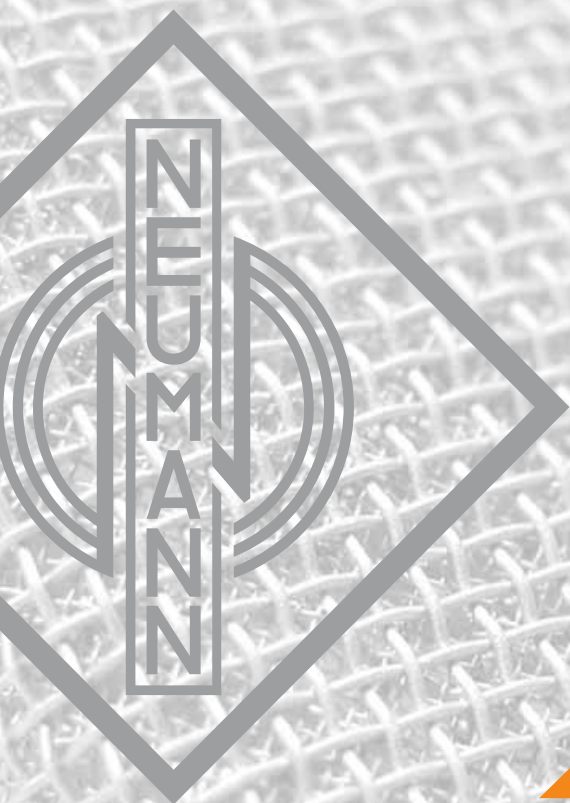
Acoustical operating principle .....	Pressure gradient transducer
Directional pattern .....	Cardioid
Frequency range .....	20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm .....	13 mV/Pa
Rated impedance .....	50 ohms
Rated load impedance .....	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL) .....	71 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL) .....	82 dB
Equivalent noise level, CCIR <sup>1)</sup> .....	23 dB
Equivalent noise level, A-weighted <sup>1)</sup> .....	12 dB-A

Maximum SPL for THD < 0.5% <sup>2)</sup> (THD < 7% <sup>2)</sup> ) .....	110 (140) dB
Maximum output voltage for THD < 7% <sup>2)</sup> .....	11 dBu
Dynamic range of the amplifier (A-weighted, 0.5% <sup>2)</sup> ) .....	98 dB
Dynamic range of the amplifier (A-weighted, 5% <sup>2)</sup> ) .....	117 dB
Supply voltage (P48, IEC 61938) .....	48 V ± 4 V
Current consumption (P48, IEC 61938) .....	3.2 mA
Matching connector .....	XLR3F
Weight .....	825 g
Diameter .....	78 mm
Length .....	165 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal, THD<sub>2</sub> dominant

# TLM 103

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

▶ THE MICROPHONE COMPANY

The TLM 103 is the ideal large diaphragm microphone for all professional and semi-professional applications requiring the utmost in sound quality on a limited budget.

By utilizing the tried and true transformerless circuit found in numerous Neumann microphones, the TLM 103 features yet unattained low self-noise and the highest sound pressure level transmission. The capsule, derived from that used in the U 87, has a cardioid pattern, is acoustically well-balanced and provides extraordinary attenuation of signals from the rear.

The TLM 103 is available in satin nickel and matte black. Delivery includes an SG 1 metal swivel mount and a wooden jeweler's box.

## Applications

Due to the universal cardioid pattern, straightforward handling, extremely low self-noise level, and finally, the price, the TLM 103 is predestined for all demanding applications from home recording to professional broadcasting and commercial recording studios.

## Polar pattern

The TLM 103 is equipped with a large diaphragm capsule with cardioid pattern. By focusing on this pattern – used in most recording situations – the attenuation of unwanted rear sound has been optimized.

Off-axis sounds are rendered naturally while isolation is increased. This also leads to a high feedback suppression when the microphone is used in live situations or where loudspeaker playback is a factor.

## Acoustic features

The TLM 103 is addressed from the front, marked with the red Neumann logo on the microphone body.

The K 103 large diaphragm capsule is based on the K 87, well known from the U 67 / U 87 microphones.

## Features

- Large diaphragm cardioid microphone
- Pressure-gradient transducer with one-diaphragm capsule
- Transformerless circuitry
- Extremely low noise: 7 dB-A
- Includes swivel mount
- Straightforward handling for homerecording and professional studios
- High-quality professional equipment for limited budgets

## Application Hints

- A universal cardioid mic
- Vocalist recording
- Announcer's mic for broadcasting/voice over
- Due to minimal self-noise: on-air mic for radio/broadcast, very low amplitude signals, radio drama, sampling, foley/sound effects
- Home recording and project studios
- Spot mic for wind instruments, strings, percussion, guitar amps, drum overhead

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

TLM 103 (mt) Microphone, SG 1 Stand mount swivel in Wooden box

**Mono set:** TLM 103 (mt) Microphone, EA 1 (mt) Elastic suspension in aluminium case

**Stereo set:** 2x TLM 103 (mt) Microphone, 2x EA 1 (mt) Elastic suspension in aluminium case

**Studio set:** TLM 103 (mt) Microphone, EA 1 (mt) Elastic suspension

## Catalog No.

TLM 103 .....	ni .....	008430
TLM 103 mt .....	blk .....	008431
TLM 103 Mono set .....	ni .....	008508
TLM 103 mt Mono set .....	blk .....	008509
TLM 103 Stereo set .....	ni .....	008501
TLM 103 mt Stereo set .....	blk .....	008502
TLM 103 Studio set .....	ni .....	008545
TLM 103 mt Studio set .....	blk .....	008544

## Selection of Accessories

Power supply, N 248 (EU) .....	blk .....	008537
Power supply, N 248 (US) .....	blk .....	008538
Power supply, N 248 (UK) .....	blk .....	008539
Auditorium hanger, MNV 87 .....	ni .....	006804
Auditorium hanger, MNV 87 mt .....	blk .....	006806
Elastic suspension, EA 1 .....	ni .....	008449
Elastic suspension, EA 1 mt .....	blk .....	008450
Popscreen, PS 15 .....	blk .....	008472
Popscreen, PS 20 a .....	blk .....	008488
Microphone cable, IC 3 mt .....	blk .....	006543
Microphone cable, IC 4 .....	ni .....	006547

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes: blk = black, ni = nickel

The capsule has a flat frequency response up to about 5 kHz, and above that, a wide flat 4 dB presence boost.

The large wire mesh headgrille protects the capsule from plosive sounds and effectively prevents pop noises.

These characteristics are achieved without resorting to corrective resonance effects. Therefore, the microphone maintains an excellent impulse response and reproduces the finest details of music and speech without coloration.

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### **Electrical features**

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With just 7 dB-A / 17.5 dB CCIR the self-noise level of the TLM 103 is so reduced that even the smallest signals are reproduced basically noise-free. As it is capable of handling sound pressure levels up to 138 dB without distortion, the TLM 103 provides a dynamic range of 131 dB (A-weighted).

The letters TLM stand for "transformerless microphone". With TLM technology the usual output transformer is replaced by an electronic circuit.

As with traditional transformers, it ensures good common mode rejection, and prevents RF interference that may influence the balanced audio signal.

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### **Operational safety**

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The entire internal construction is elastically mounted to attenuate any structure borne noise that could interfere with the TLM 103's operation. Furthermore the capsule is set on an elastic mount.

The frequency range reaches below 20 Hz and thus even very low bass signals are reproduced without coloration.

Due to this low frequency extension, the TLM 103 is more sensitive to structure borne interference and wind noise. For such cases, the elastic suspension EA 1 and the windscreens WS 87 are available as accessories. For close vocal use, the PS 15 or PS 20 a pop screens are recommended.



The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

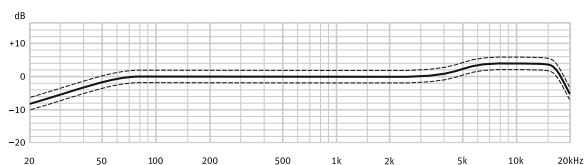


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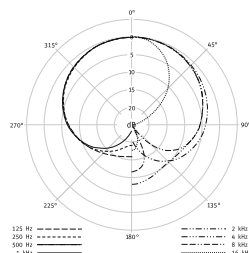
» THE MICROPHONE COMPANY



## Technical Data



measured in free-field conditions (IEC 60268-4)



Acoustical operating principle	Pressure gradient transducer
Directional pattern	Cardioid
Frequency range	20 Hz..20 kHz
Sensitivity at 1 kHz into 1 kohm	23 mV/Pa
Rated impedance	50 ohms
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	76.5 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL)	87 dB
Equivalent noise level, CCIR <sup>1)</sup>	17.5 dB
Equivalent noise level, A-weighted <sup>1)</sup>	7 dB-A

Maximum SPL for THD 0.5% <sup>2)</sup>	138 dB
Maximum output voltage	13 dBu
Dynamic range of the microphone amplifier (A-weighted)	131 dB
Supply voltage (P48, IEC 61938)	48 V $\pm$ 4 V
Current consumption (P48, IEC 61938)	3 mA
Matching connector	XLR3F
Weight	approx. 500 g
Diameter	60 mm
Length	132 mm

<sup>1)</sup> according to IEC 60268-1, CCIR-weighting according to CCIR 468-3, quasi peak A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal

## Selection of Accessories



Power supply, N 248



Battery supply, BS 48 i



Elastic Suspension, EA 1 (mt)



Table Stand, MF 3  
(in connection with IC 4)



Auditorium Hanger, MNV 87 (mt)



Popscreen, PS 15



Popscreen, PS 20 a



Windscreens, WS 87



Microphone Cable, IC 3 mt



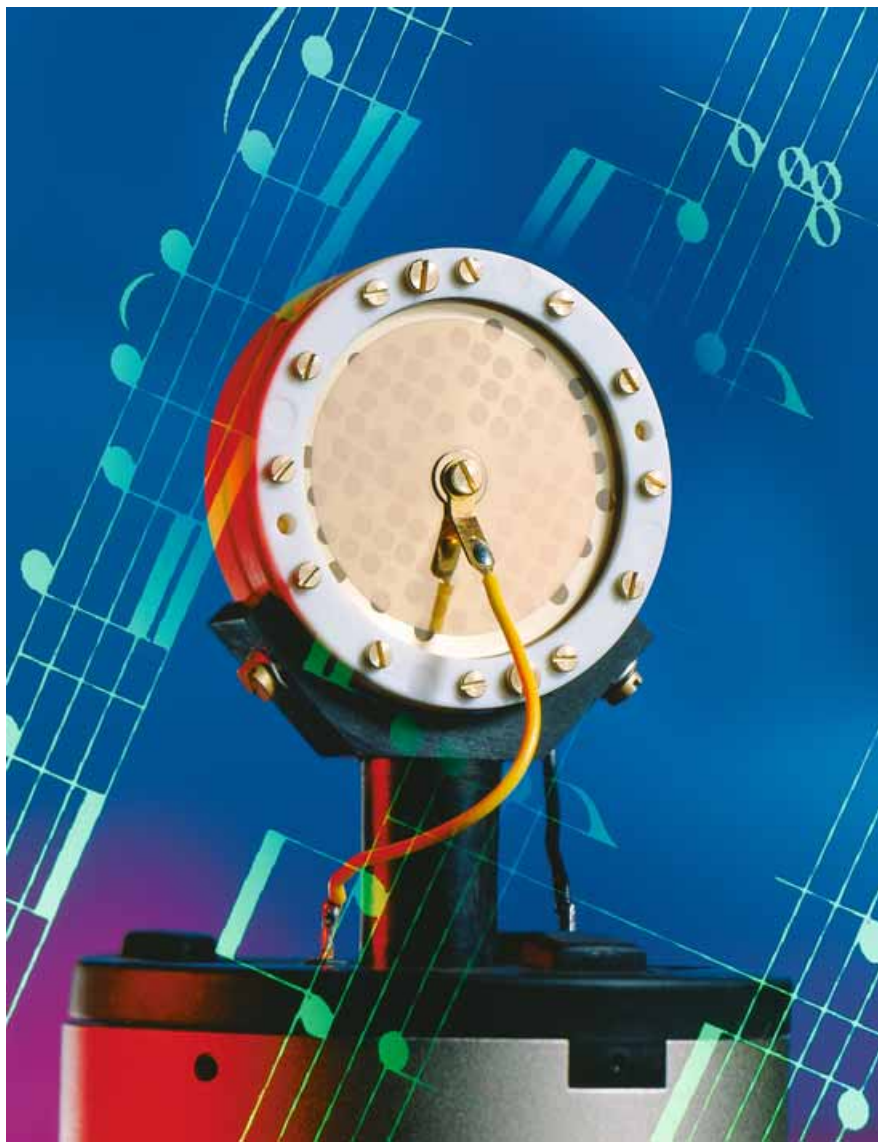
Microphone Cable, IC 4 (mt)





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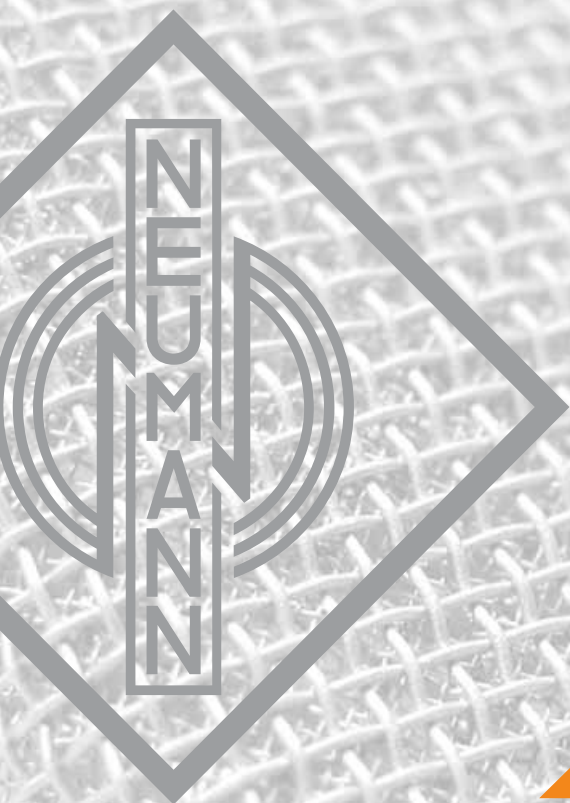
▶▶ THE MICROPHONE COMPANY





# TLM 193

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY

The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.



## Features

- Large diaphragm cardioid microphone
- Pressure-gradient transducer
- Transformerless circuitry
- Extremely low noise: 10 dB (A)
- Includes swivel mount
- The "plug and play" microphone for professional studios, musicians and homerecording applications
- High-quality professional equipment for mid-size budgets

The TLM 193 is a large diaphragm microphone with a cardioid polar pattern. With this microphone Neumann continues its long tradition, and is offering high end technology at an affordable price for musicians and the home recording studio.

The microphone uses a transformerless circuit, featuring extremely low self noise and large dynamic range.

The polar response is very linear over a wide incidence angle. Thus, even signals coming from the side are reproduced faithfully and without coloration.

The exposed surface of the microphone capsule is at ground potential, making it immune to typical interference and contamination. The microphone is supplied with a swivel mount.



## Applications

The TLM 193 is a microphone with cardioid characteristic for professional recording and live applications. It is the ideal microphone for professional productions, for musicians and project studios.

## Polar pattern

The TLM 193 has a large diaphragm capsule with cardioid characteristic.

## Acoustic features

The TLM 193 is addressed from the front, marked with the Neumann logo.

The large diaphragm capsule inside the headgrille has a very smooth frequency response for all polar patterns over a wide acceptance angle.

The curves are flat and parallel to the 0° frequency curve up to 10 kHz within a pickup angle of  $\pm 100^\circ$ .



The TLM 193 differs from omnidirectional pressure transducers, where, due to physical reasons, the diffuse-field and free-field responses never agree.

This microphone has a very even diffuse-field response for all polar patterns. This is important in a reverberant environment, as more reflections arrive at the microphone from different directions.

The acoustic information is not affected in its tonal quality when recorded by the microphone. This characteristic is achieved without resorting to corrective resonance effects.

Therefore, the microphone maintains an excellent impulse response reproducing all transient phenomena of music and speech without coloration.

### Electrical features

The letters TLM stand for "transformerless microphone". With TLM technology the usual output transformer is replaced by an electron-circuit.

As with traditional transformers, it ensures good common mode rejection, and prevents RF interference, that may influence the balanced audio signal.

Compared to other microphones the self noise level of the TLM 193 is considerably reduced. As it is capable of handling sound pressure levels up to 140 dB without distortion, the TLM 193 provides a dynamic range of 130 dB (A-weighted).

### Operational safety

All exposed surfaces of the microphone capsule, including the diaphragms, are at ground potential. This technology makes them highly immune to electrical and atmospheric interference and contamination through microscopic dust particles.

The capsule is elastically mounted to avoid any structure borne noise that could interfere with its operation.

The frequency response of the TLM 193 amplifier is linear down to 20 Hz. Even very low bass signals are reproduced without coloration.



This implies that the microphone becomes more sensitive to subsonic frequencies, from structure borne noise or pop and wind noise.

To avoid any LF interference, we recommend to use the EA 1 elastic suspension, the PS 15 pop screen, or the WS 89 windscreens.

### Application Hints

- A universal cardioid mic
- Ideal for close miking of instruments with high sound pressure levels
- Announcer's mic for broadcasting/dubbing
- Home recording and project studios
- Vocalist recording
- Spot mic for
  - wind instruments
  - strings
  - percussion
  - guitar amps

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

### Delivery Range

TLM 193 Microphone  
SG 1 Stand mount swivel  
Wooden box

### Catalog No.

TLM 193 ..... blk ..... 008381

### Selection of Accessories

Battery supply, BS 48 i ..... blk ..... 006494  
Power supply, N 248 (EU) ..... blk ..... 008537  
Power supply, N 248 (US) ..... blk ..... 008538  
Power supply, N 248 (UK) ..... blk ..... 008539

Auditorium hanger, MNV 87 mt ..... blk ..... 006806

Elastic suspension, EA 1 mt ..... blk ..... 008450

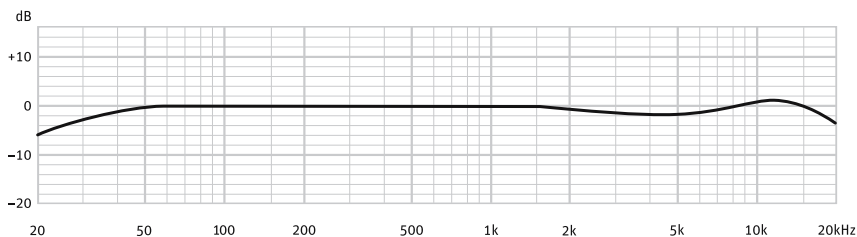
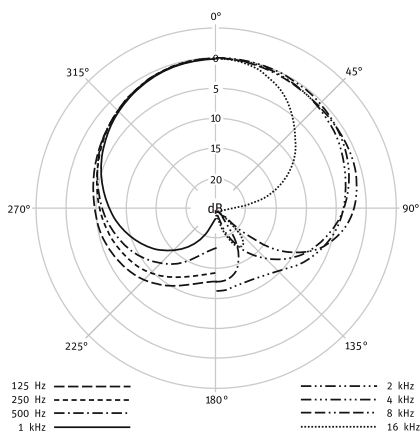
Popscreen, PS 15 ..... blk ..... 008472

Windscreens, WS 89 ..... blk ..... 007197

Microphone cable, IC 4 mt  
(with stand mount swivel) ..... blk ..... 006557

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black, ni = nickel



## Technical Data

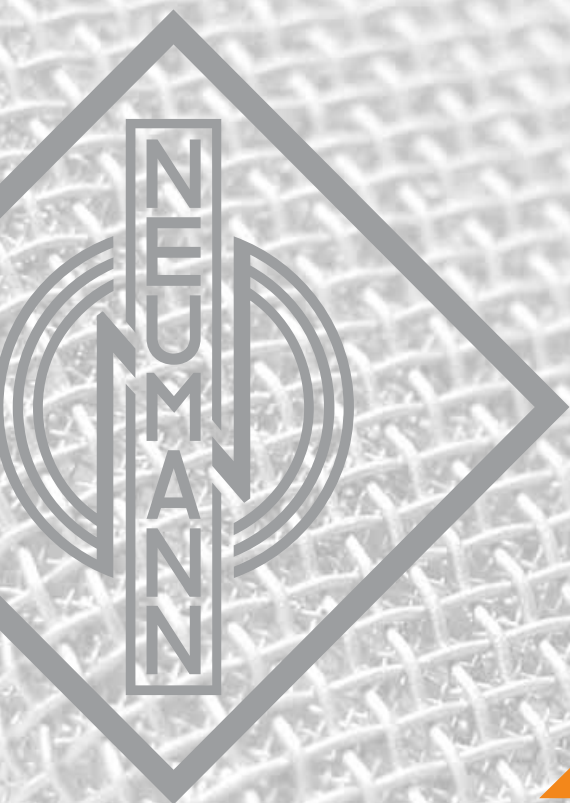
Acoustical operating principle ..... Pressure gradient transducer  
Directional pattern ..... Cardioid  
Frequency range ..... 20 Hz..20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 18 mV/Pa  
Rated impedance ..... 50 ohms  
Rated load impedance ..... 1000 ohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 73 dB  
Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 84 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 21 dB  
Equivalent noise level, A-weighted<sup>1)</sup> ..... 10 dB-A

Maximum SPL for THD 0.5%<sup>2)</sup> ..... 140 dB  
Maximum output voltage ..... 13 dBu  
Dynamic range of the microphone amplifier (A-weighted) ..... 130 dB  
Supply voltage (P48, IEC 61938) ..... 48 V  $\pm$  4 V  
Current consumption (P48, IEC 61938) ..... 3 mA  
Matching connector ..... XLR3F  
Weight ..... 480 g  
Diameter ..... 49 mm  
Length ..... 175 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS    <sup>2)</sup> measured as equivalent el. input signal

# TLM 127

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY

The TLM 127 is a large-diaphragm studio microphone with omnidirectional and cardioid directional characteristics. In addition, via a special power supply it is possible to use remote control to switch between the five directional characteristics: omnidirectional, wide-angle cardioid, cardioid, hypercardioid and figure-8.

The TLM 127 is addressed from the front, marked with the Neumann logo. On the front of the microphone is also the switch for selecting the directional characteristic. There are 3 settings: omnidirectional, cardioid, and remote control ("R").

On the back of the microphone is a 14 dB attenuation switch, as well as a high-pass filter switch with 2 settings: -3 dB cut-off frequency 15 Hz ("LIN"), and 100 Hz.

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## Applications

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The comprehensive control features, which permit optimal adjustment to particular requirements, make the TLM 127 well-suited to a wide range of applications. It is an extremely flexible tool, appropriate for advanced operators of home recording studios as well as for experienced audio professionals who place the highest demands on the sound and technical capabilities of a microphone.

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## Acoustic Features

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When the cardioid setting is used the capsule has a flat frequency response up to 3 kHz and an increased presence of 3 dB at higher frequencies.

The wire mesh headgrille houses the large-diaphragm K 127 capsule. This capsule is derived from the K 103 (of the TLM 103), which accounts for its outstanding impulse response. The TLM 127 is thus capable of reproducing all transient phenomena of music and speech without any coloration.

The sound character of the microphone is determined exclusively by the capsule; no electronic equalization is used.

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## Polar Patterns

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Via a special power supply, the five directional characteristics omnidirectional, cardioid, figure-8, hypercardioid and wide-angle cardioid can be selected by remote control. The directional characteristic switch on the front of the microphone must be set to "R" (remote control).

The hypercardioid directional characteristic is superior to the cardioid in suppressing sounds to the left and right of the source, while the wide-angle cardioid is especially suitable for recording large sound sources.

The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

## Electrical Features

The TLM 127 is a fet 100 series studio microphone. The letters TLM stand for "Transformerless Microphone".

By means of modern circuit technology, the self-noise level of the TLM 127 has been reduced significantly relative to that of comparable conventional microphones. The TLM 127 transmits a sound pressure level of 140 dB without distortion, and provides a dynamic range of 132 dB with no switchover (A-weighted).



## Filter and Preattenuation

Two switches are located on the back of the TLM 127 microphone. The left switch reduces the sensitivity of the microphone by 14 dB, and should be used only when there is a risk that very high sound pressure levels could overload following devices. The switch does not expand the dynamic range of the microphone, but rather shifts it upward by 14 dB to higher sound pressure levels.

The slide switch on the right sets the cut-off frequency of a high-pass filter built into the microphone. When the "LIN" setting is used, a high-pass filter suppresses frequencies below 15 Hz by 12 dB/octave. Alternatively, the cut-off frequency can be set to 100 Hz. This setting may be used, among other things, to suppress the proximity effect.



## Features

- Studio microphone, controlled locally or remotely
- Pressure-gradient transducer with double-diaphragm capsule (based on the K 103)
- Switchable to omni and cardioid + remotely controllable polar pattern (subcardioid, hypercardioid and figure-8)
- Extremely low-noise: 8 dB-A
- High SPL capability: 140 dB
- Transformerless circuit technology
- Switchable 14 dB preattenuation and low-frequency roll-off
- Complete set including elastic suspension

## Application Hints

- For universal use
- Announcer's mic for broadcasting/voice over
- Ideal mic for close miking of instruments with high sound pressure levels
- Spot mic for wind instruments, especially trumpet and saxophone, strings, piano, kick drum, guitar amps
- During recordings when the mic is in a location where it is difficult to change polar patterns, for example, suspended from a ceiling. A special remote control is available.

*These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.*

## Remote Control

In principle, any P48 power supply is suitable for powering the TLM 127. When a standard P48 power supply is used, the switch on the microphone can be used to select the omnidirectional or cardioid directional characteristic.

Using the special power supply unit N 248 the directional characteristics of the TLM 127 can be controlled remotely and the additional directional characteristics (wide angle cardioid, hypercardioid and figure 8) can be used.

The absolute level of the phantom voltage indicates to the microphone which directional characteristic is to be used. As in conventional operation, cable lengths of up to 300 m are permissible.

Since the voltage variation is within the normed tolerance range of phantom powering, the power supply unit can also be used with any conventional microphone designed for P48 operation.

Mixed operation is also possible. Thus a TLM 127 can be controlled remotely at one output, while a conventional microphone is powered by the second output.







## Operational Reliability

The entire internal assembly is elastically mounted to reduce interference from structure-borne noise. In addition, the capsule is set on an elastic mount.

The frequency range of the TLM 127 extends well below 20 Hz. Thus even extremely low-frequency signals can be reproduced without coloration.

This naturally also makes the microphone more sensitive to low-frequency interference signals, such as structure-borne and wind noise. To counteract this, the EA 1 elastic suspension (included) and the WS 87 windscreen may be used. For close vocal use, the PS 15 or PS 20 a pop screen is recommended.



## Delivery Range

**TLM 127 (mt):** TLM 127 (mt) Microphone  
SG 1 Stand mount

**TLM 127 (mt) Set:** TLM 127 (mt) Microphone  
EA 1 (mt) Elastic suspension  
Wooden box

**TLM 127 (mt) Stereo set:** 2x TLM 127 (mt) Microphone  
2x EA 1 (mt) Elastic suspension  
Aluminium case

## Catalog No.

TLM 127 .....	ni .....	008527
TLM 127 mt .....	blk .....	008528
TLM 127 Set .....	ni .....	008475
TLM 127 mt Set .....	blk .....	008486
TLM 127 Stereo set .....	ni .....	008512
TLM 127 mt Stereo set .....	blk .....	008513

## Selection of Accessories

Battery supply, BS 48 i .....	blk .....	006494
Battery supply, BS 48 i-2 .....	blk .....	006496
Power supply, N 248 (EU) .....	blk .....	008537
Power supply, N 248 (US) .....	blk .....	008538
Power supply, N 248 (UK) .....	blk .....	008539
Double mount, DS 120 .....	blk .....	007343
Auditorium hanger, MNV 87 .....	ni .....	006804
Auditorium hanger, MNV 87 mt .....	blk .....	006806
Popscreen, PS 15 .....	blk .....	008472
Popscreen, PS 20 a .....	blk .....	008488
Windscreen, WS 87 .....	blk .....	006753
Microphone cable, IC 3 mt .....	blk .....	006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

Meaning of color codes:

blk = black

ni = nickel

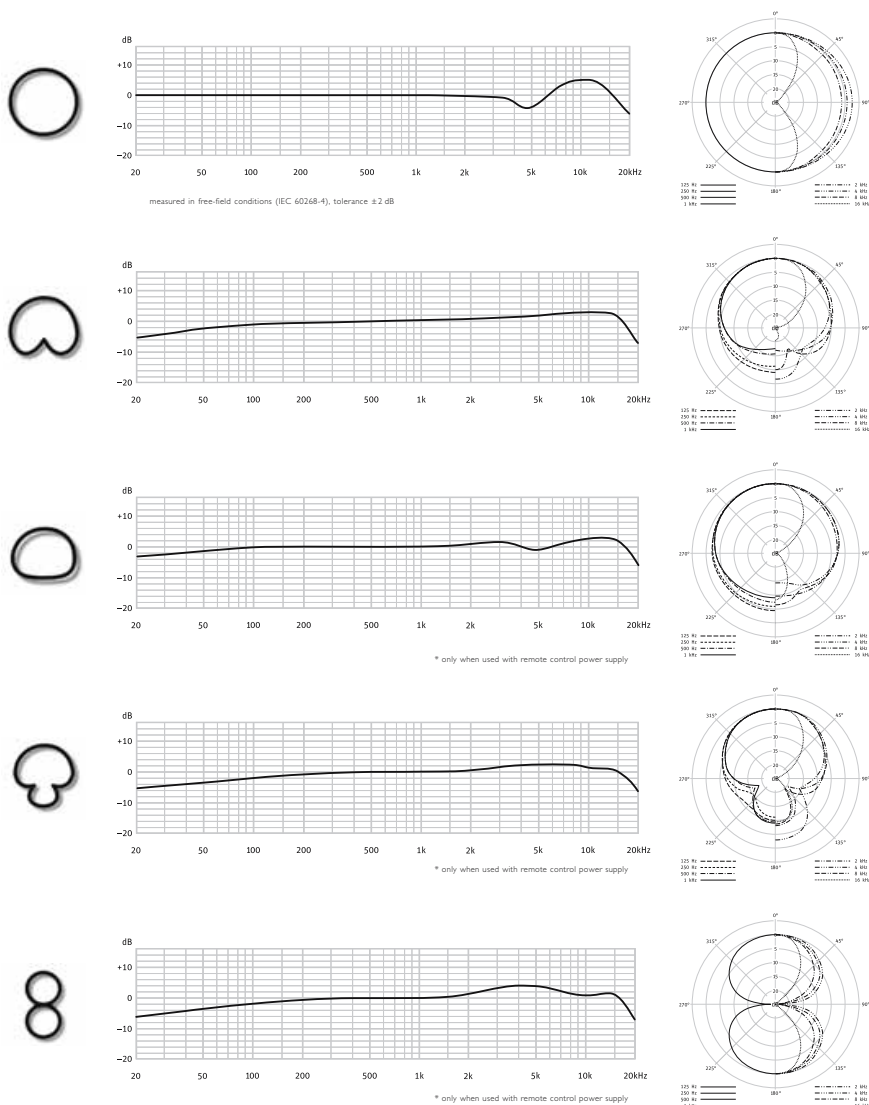
## Technical Data

Acoustical operating principle .....	Pressure gradient transducer
Directional pattern .....	Omnidirectional, cardioid, (wide angle cardioid, hypercardioid and figure-8 also available, via remote control)
Frequency range .....	20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm .....	12 mV/Pa
Rated impedance .....	50 ohms
Rated load impedance .....	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL) .....	74 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL) .....	86 dB
Equivalent noise level, CCIR <sup>1)</sup> .....	20 dB

Equivalent noise level, A-weighted <sup>1)</sup> .....	8 dB-A
Maximum SPL for THD 0.5% <sup>2)</sup> .....	140 dB
Maximum SPL for THD 0.5% with preattenuation <sup>2)</sup> .....	154 dB
Maximum output voltage .....	10 dBu
Dynamic range of the microphone amplifier (A-weighted) .....	132 dB
Supply voltage (P48, IEC 61938) .....	48 V ± 4 V
Current consumption (P48, IEC 61938) .....	3.2 mA
Matching connector .....	XLR3F
Weight .....	450 g
Diameter .....	57 mm
Length .....	173 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal







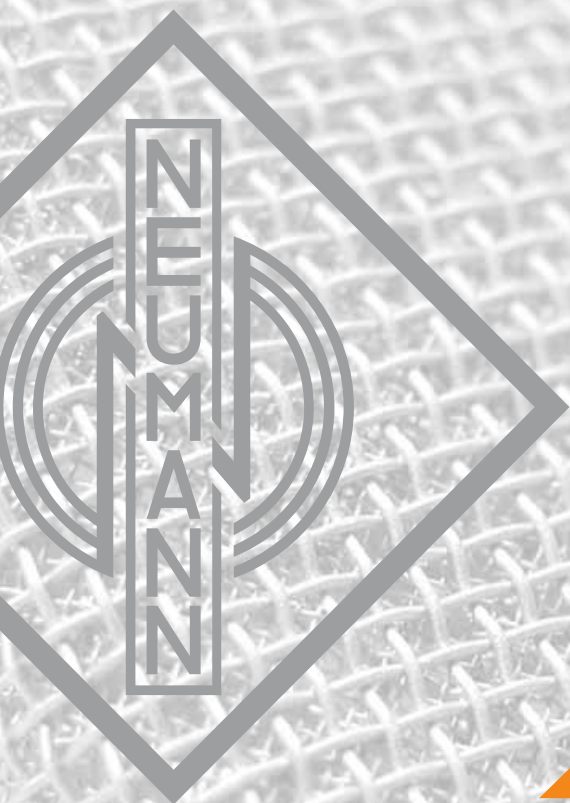
NEUMANN.BERLIN

» THE MICROPHONE COMPANY



# TLM 170 R

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



NEUMANN.BERLIN

► THE MICROPHONE COMPANY

The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.



The TLM 170 R was the first microphone to use the successful fet 100 technology. Along with a balanced, transformerless output stage it features extremely low self-noise and an impressive dynamic range.

Five directional characteristics are selectable by means of a rotary switch. In the sixth position, marked "R", the directional patterns can be controlled remotely with the N 248 power supply. There is no special cable necessary for this purpose.

The microphone has at its rear a 10 dB attenuation switch for extremely high sound pressure levels, and a high-pass filter to suppress structure born noise.



### Applications

The TLM 170 R condenser microphone is a large diaphragm microphone with multiple polar patterns. Its sound has a very transparent characteristic, in contrast to some of our other microphones that have a distinct personality.

Therefore, this microphone is used for many diverse applications in professional recording studios, in broadcasting, film and television, and for semiprofessional productions. The polar patterns can be selected either at the microphone itself, or controlled remotely through the special N 48 R-2 power supply.

### Acoustic features

The microphone is addressed from the front, marked with the Neumann logo. The large diaphragm capsule inside the headgrille has a

### Features

- Local and remote controlled large diaphragm microphone
- Pressure-gradient transducer with double membrane capsule
- Five directional characteristics: omni, wide angle cardioid, cardioid, hypercardioid, figure-8
- Patented circuitry for remote and local switching of directional characteristics
- Switchable low frequency roll-off and 10 dB preattenuation
- Tiltable, elastically suspended bracket mount

very smooth frequency response for all polar patterns over a wide acceptance angle. The curves are flat and parallel to the 0° frequency curve up to 10 kHz within an angle of  $\pm 100^\circ$ .

As a result the TLM 170 R has a very even diffuse-field response for all polar patterns. This is important in a reverberant environment, as more reflections arrive at the microphone from different directions. The acoustic information is not affected in its tonal quality when recorded by the microphone. This characteristic is achieved without resorting to corrective resonance effects.

Therefore, the microphone maintains an excellent impulse response reproducing all transient phenomena of music and speech without any coloration.

The capsule is elastically mounted to avoid any structure borne noise that could interfere with its operation.

## Polar patterns

In addition to the usual directional polar patterns: omnidirectional, cardioid, and figure-8, we have added a hypercardioid and wide-angle cardioid characteristic. When compared to the standard cardioid pattern, the hypercardioid characteristic suppresses sound from the side more efficiently. The wide-angle polar pattern is especially useful to record large sound sources.



## Remote control

The N 248 controls the polar pattern remotely by varying the phantom voltage. The range is  $\pm 3$  V of the nominal 48 V value. (According to DIN standard a range of  $\pm 4$  V is permissible.)

The rotary switch on the microphone must be in the position R (= remote control). In this switch position the TLM 170 R microphone analyses the absolute value of the phantom power and selects the corresponding polar pattern. A standard 3-pin microphone cable is used, similar to the microphone's conventional operation. Cable lengths may be up to 300 m (1000 feet).

## Electrical features

The letters TLM stand for "transformerless microphone". With TLM technology the usual output transformer is replaced by an electronic circuit.

As with traditional transformers, it ensures good common mode rejection, and prevents RF interference, that may influence the balanced audio signal.



## Technical Data

Acoustical operating principle	Pressure gradient transducer
Directional pattern	Omnidirectional, wide angle cardioid, cardioid, hypercardioid, figure-8
Frequency range	20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm	8 mV/Pa
Rated impedance	50 ohms
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	68 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL)	80 dB
Equivalent noise level, CCIR <sup>1)</sup>	26 dB
Equivalent noise level, A-weighted <sup>1)</sup>	14 dB-A

Maximum SPL for THD 0.5% <sup>2)</sup>	144 dB
Maximum SPL for THD 0.5% with preattenuation <sup>2)</sup>	154 dB
Maximum output voltage	10 dBu
Dynamic range of the microphone amplifier (A-weighted)	130 dB
Supply voltage (P48, IEC 61938)	48 V $\pm$ 4 V
Current consumption (P48, IEC 61938)	3 mA
Matching connector	XLR3F
Weight	625 g
Diameter	60 mm
Length	152 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal



## Operational safety

All exposed surfaces of the capsule, including the diaphragms, are at ground potential. This technology makes them highly immune to electrical and atmospheric interference and contamination through dust particles.

## Filter and attenuation

The TLM 170 R microphone has a 10 dB attenuation switch to prevent the input of the following unit from being overloaded.

A second switch at the rear allows to attenuate the frequency response below 100 Hz to suppress undesired structure borne noise.



## Use on tripods

The TLM 170 R is provided with a tilting side bracket to attach the microphone to booms or stands. The bracket is equipped with rubber elements that effectively protect the microphone from mechanical shock.

If necessary, it can be mounted on the other side of the microphone as well.

When using the IC 4 cable (for example to suspend the microphone from the ceiling with the MNV 87 auditorium hanger), the bracket and its holder need to be removed.

The microphone can then be connected to the swivel mount connector of the cable.



## Delivery Range

Microphone TLM 170 R (mt), Dust cover, Wooden box

**Stereo set:** 2x TLM 170 R (mt) Microphone, 2x EA 170 (mt) Elastic suspension, Dust cover, Aluminium case

## Catalog No.

TLM 170 R .....	ni	007165
TLM 170 R mt .....	blk	007166
TLM 170 R Stereo set .....	ni	008503
TLM 170 R mt Stereo set .....	blk	008504

## Selection of Accessories

Battery supply, BS 48 i .....	blk	006494
Power supply, N 248 EU .....	blk	008537
Power supply, N 248 US .....	blk	008538
Power supply, N 248 UK .....	blk	008539
Elastic suspension, EA 170 .....	ni	007271
Elastic suspension, EA 170 mt .....	blk	007273
Auditorium hanger, MNV 87 .....	ni	006804
Auditorium hanger, MNV 87 mt .....	blk	006806
Popscreen, PS 20 a .....	blk	008488
Windscreens, WS 87 .....	blk	006753
Microphone cable, IC 4 .....	ni	006547
Microphone cable, IC 4 mt .....	blk	006557

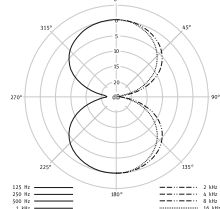
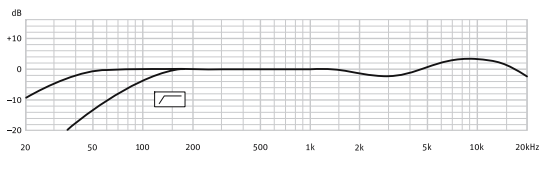
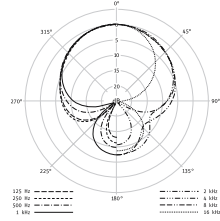
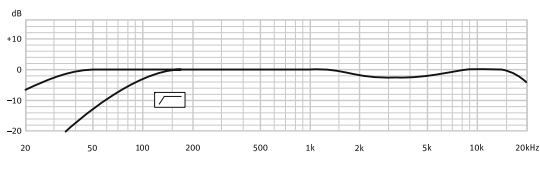
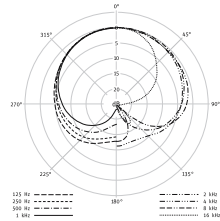
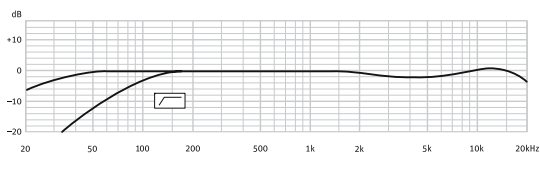
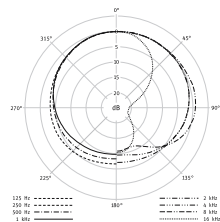
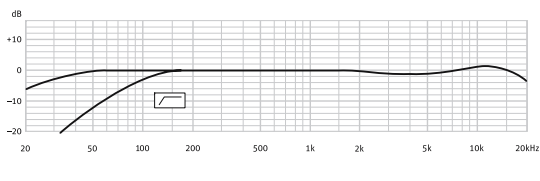
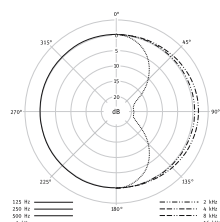
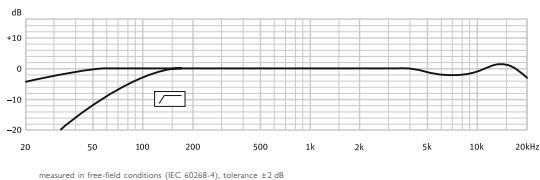
A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black  
ni = nickel

## Application Hints

- For universal use, very transparent, without coloration
- Announcer's mic for broadcasting, dubbing, voice-over
- Ideal mic for close miking of instruments with high sound pressure levels
- Spot mic for wind instruments, especially trumpet and saxophone, strings piano, kick drum, guitar amps
- During recordings when the mic is in a location where it is difficult to change polar patterns, for example, suspended from a ceiling. A special remote control is available.

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.







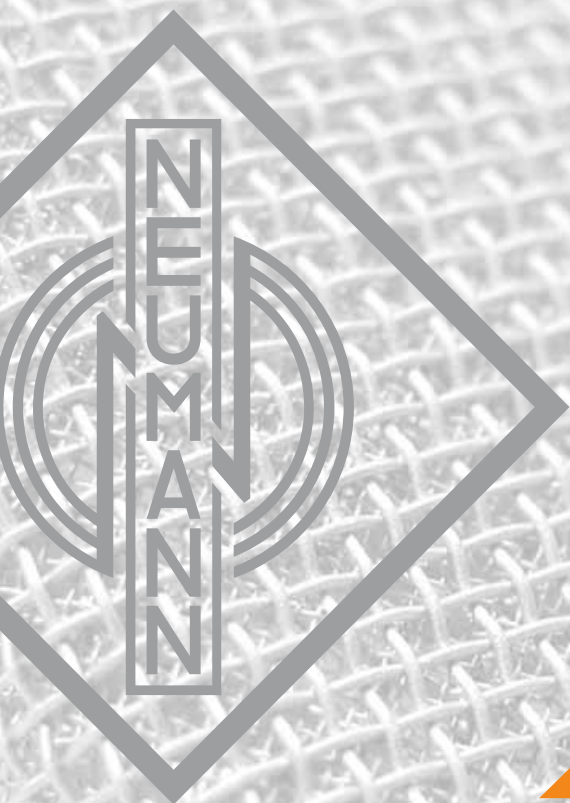
**NEUMANN.BERLIN**

» THE MICROPHONE COMPANY



# U 87 Ai

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

▶ THE MICROPHONE COMPANY

The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.



## Features

- Variable large diaphragm microphone
- Pressure-gradient transducer with double membrane capsule
- The studio microphone classic
- Three directional characteristics: omni, cardioid, figure-8
- Switchable low frequency roll-off
- Switchable 10 dB pre-attenuation
- Ideal as main and as support microphone in the most differing recording situations

The U 87 is probably the best known and most widely used Neumann studio microphone. It is equipped with a large dual-diaphragm capsule with three directional patterns: omnidirectional, cardioid and figure-8. These are selectable with a switch below the headgrille.

A 10 dB attenuation switch is located on the rear. It enables the microphone to handle sound pressure levels up to 127 dB without distortion.

Furthermore, the low frequency response can be reduced to compensate for proximity effect.



## Applications

The U 87 Ai condenser microphone is a large diaphragm microphone with three polar patterns and a unique frequency and transient response characteristic.

Users recognize the microphone immediately by its distinctive design. It is a good choice for most general purpose applications in studios, for broadcasting, film and television.

The U 87 Ai is used as a main microphone for orchestra recordings, as a spot mic for single instruments, and extensively as a vocal microphone for all types of music and speech.

## Acoustic features

The U 87 Ai is addressed from the front, marked with the Neumann logo.

The frequency response of the cardioid and figure-8 directional characteristics are very flat for frontal sound incidence, even in the upper frequency range.

The microphone can be used very close to a sound source without the sound becoming unnaturally harsh.

By means of a high-pass filter interferences through subsonic and low frequencies are reduced remarkably.



### Polar patterns

The dual-diaphragm capsule is elastically mounted and protected by a large headgrille.

A switch below the headgrille selects the three directional patterns: omnidirectional, cardioid and figure-8.

A window above this switch shows the symbol of the selected characteristic.



### Electrical features

The letter A in the name indicates a more recent generation, as compared to the U 87 i microphones that were built from 1967 to 1986. Modifications apply to the electronic components of the microphone only; the capsule remained unchanged.

The present-day circuitry increases the operational headroom of the U 87 Ai by supplying the bias voltages for the capsule through a reduced resistance. The result is a higher sensitivity of 10 dB for identical sound pressure levels, and an improved S/N ratio of 3 dB.

### Filter and attenuation

A switch located at the rear attenuates the sensitivity by 10 dB. When this switch is activated, the microphone accepts sound pressure levels up to 127 dB (equivalent to a sound pressure of 45 Pa) without distortion.

An additional switch at the rear allows to change the microphone's cutoff frequency. This reduces low frequency interference directly at the input of the microphone amplifier.

This setting also compensates for the unavoidable bass boost that occurs with all pressure gradient transducers when they are used at close distance (proximity effect).

The cardioid characteristic maintains a smooth frequency response at a distance of 30 to 40 cm, the figure-8 characteristic even at a distance of 15 to 20 cm.



### Application Hints

- For universal use
- The classical studio mic for vocalists (soloists and background vocalists)
- Announcer's mic for broadcasting, dubbing, voice-over
- Overhead
- Spot mic for
  - wind instruments
  - strings (especially cello and double bass)
  - piano
  - percussion
- Note: To record instruments with very high sound pressure levels we recommend our mics with TLM circuitry

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

### Delivery Range

Microphone U 87 Ai (mt) in Wooden box

**Stereo set:** 2x U 87 Ai (mt) Microphone, 2x EA 87 (mt) Elastic suspension, 2x Dust cover, Aluminium case

### Catalog No.

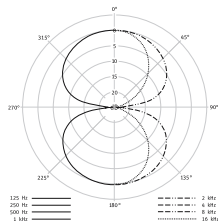
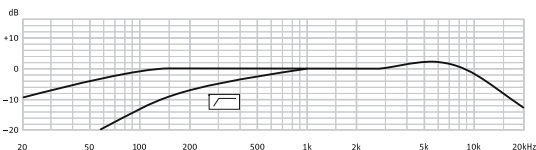
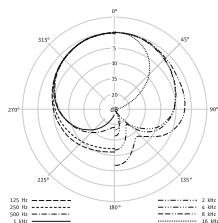
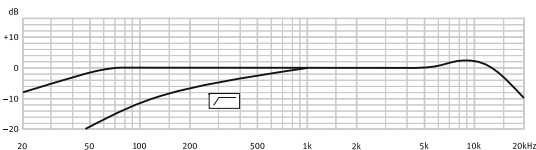
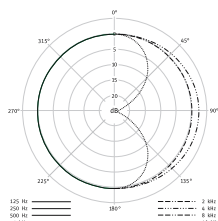
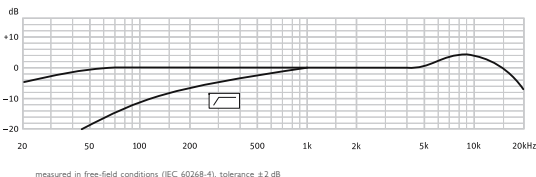
U 87 Ai .....	ni	.....007022
U 87 Ai mt .....	blk	.....007023
U 87 Ai Stereo set .....	ni	.....008505
U 87 Ai mt Stereo set .....	blk	.....008506

### Selection of Accessories

Battery supply, BS 48 i .....	blk	.....006494
Power supply, N 248 EU .....	blk	.....008537
Power supply, N 248 US .....	blk	.....008538
Power supply, N 248 UK .....	blk	.....008539
Auditorium hanger, MNV 87 .....	ni	.....006804
Auditorium hanger, MNV 87 mt .....	blk	.....006806
Elastic suspension, EA 87 .....	ni	.....007297
Elastic suspension, EA 87 mt .....	blk	.....007298
Stand mount swivel, SG 367 mt .....	blk	.....006145
Popscreen, PS 20 a .....	blk	.....008488
Windscreens, WS 87 .....	blk	.....006753
Microphone cable, IC 4 mt .....	blk	.....006557

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes: blk = black, ni = nickel



### Technical Data

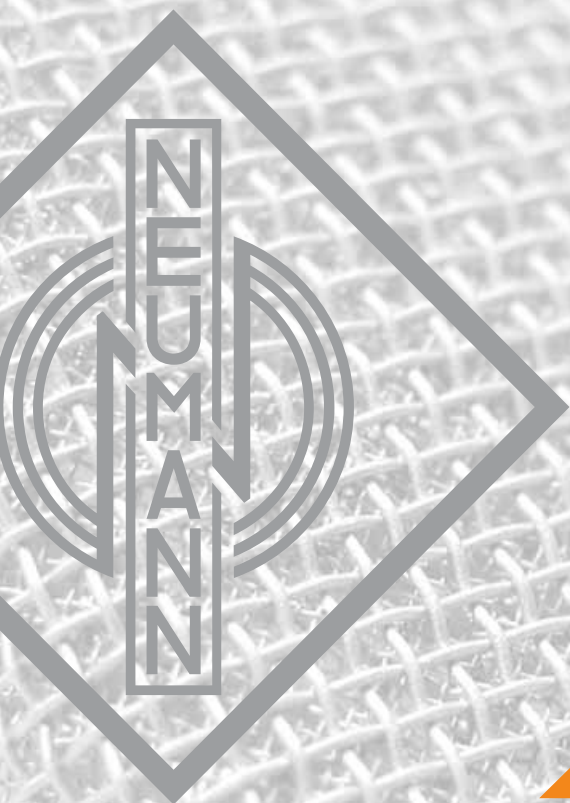
Acoustical operating principle ..... Pressure gradient transducer  
 Directional pattern ..... Omnidirectional, cardioid, figure-8  
 Frequency range ..... 20 Hz..20 kHz  
 Sensitivity at 1 kHz into 1 kohm ..... 20/28/22 mV/Pa<sup>1)</sup>  
 Rated impedance ..... 200 ohms  
 Rated load impedance ..... 1000 ohms  
 Signal-to-noise ratio, CCIR<sup>2)</sup> (rel. 94 dB SPL) ..... 68/71/69 dB<sup>1)</sup>  
 Signal-to-noise ratio, A-weighted<sup>3)</sup> (rel. 94 dB SPL) ..... 79/82/80 dB<sup>1)</sup>  
 Equivalent noise level, CCIR<sup>2)</sup> ..... 26/23/25 dB<sup>1)</sup>  
 Equivalent noise level, A-weighted<sup>3)</sup> ..... 15/12/14 dB-A<sup>1)</sup>

Maximum SPL for THD 0.5%<sup>3)</sup> ..... 117 dB (cardioid)  
 Maximum SPL for THD 0.5% with preattenuation<sup>3)</sup> ..... 127 dB  
 Maximum output voltage ..... 390 mV  
 Dynamic range of the microphone amplifier, A-weighted ..... 105 dB  
 Supply voltage (P48, IEC 61938) ..... 48 V  $\pm$  4 V  
 Current consumption (P48, IEC 61938) ..... 0.8 mA  
 Matching connector ..... XLR3F  
 Weight ..... 500 g  
 Diameter ..... 56 mm  
 Length ..... 200 mm

<sup>1)</sup> Omnidirectional / cardioid / figure-8 <sup>2)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak A-weighting according to IEC 61672-1, RMS <sup>3)</sup> measured as equivalent el. input signal

# U 89 i

► **Large Diaphragm  
Microphone**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

►► THE MICROPHONE COMPANY

The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

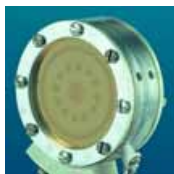


## Features

- Variable large diaphragm microphone
- Pressure-gradient transducer with double membrane capsule
- Five directional characteristics: omni, wide angle cardioid, cardioid, hypercardioid, figure-8
- Thereby most versatile in all recording situations
- Two-stage roll-off filter
- Switchable 10 dB pre-attenuation
- Extended frequency range in comparison to U 87 Ai

The U 89 is a studio microphone for universal applications. The headgrille protects a dual-diaphragm capsule. A rotary switch below the headgrille selects from five different polar patterns. Therefore the microphone can be adapted easily to large sound sources, and those that are spread wide apart, or to sound sources to be recorded at a greater distance.

The amplifier accepts sound pressure levels up to 134 dB without distortion. This figure can be increased to 140 dB. An additional rotary switch activates a filter that changes the low frequency response either below 80 Hz or 160 Hz.



## Applications

The U 89 i is similar in appearance to the U 87. It is of smaller size, and lighter weight. It features five instead of three directional characteristics and a higher maximum sound pressure level which make this microphone easier adaptable to different applications.

## Polar patterns

In addition to the usual directional polar patterns: omnidirectional, cardioid, and figure-8, we have added a hypercardioid and wide-angle cardioid characteristic.

When compared to the standard cardioid pattern, the hypercardioid characteristic suppresses sound from the side more efficiently. The wide-angle polar pattern is especially useful to record large sound sources.

## Acoustic features

The microphone is addressed from the front, marked with the Neumann logo. The large diaphragm capsule has a very smooth frequency response for all polar patterns over a wide acceptance angle. The frequency response curves are flat up to 10 kHz within a pickup angle of  $\pm 100^\circ$ .

As a result the U 89 i has a very even diffuse-field response for all polar patterns. This is important in a reverberant environment when more reflections arrive at the microphone capsule. The acoustic information is not affected in its tonal quality when recorded by the microphone.



This characteristic is achieved without resorting to corrective resonance effects.

The capsule is elastically mounted to avoid any structure borne noise that could interfere with its operation.

### Filter and attenuation

The amplifier handles sound pressure levels up to 134 dB without distortion.

With a self noise level of 17 dB (A-weighted) the total dynamic range is 117 dB. Maximum sound pressure level is 140 dB when the -6 dB rotary switch is in the ON position.



A low frequency roll-off at 80 Hz or 160 Hz can be activated with the third rotary switch below the headgrille.

This filter suppresses low frequency interference, yet maintains an even frequency response for close-up sound sources, for example, when proximity effect could adversely affect the program material.



A steep high-pass filter in the LIN position prevents the output transformer of the microphone from being overloaded due to undesired subsonic frequencies.

### Operational safety

All exposed surfaces of the microphone capsule, including the diaphragms, are at ground potential. This technology makes them highly immune to electrical and atmospheric interference and contamination through microscopic dust particles.

### Delivery Range

Microphone U 89 i (mt)  
Wooden box

### Catalog No.

U 89 i ..... ni ..... 006449  
U 89 i mt ..... blk ..... 006450

### Selection of Accessories

Battery supply, BS 48 i ..... blk ..... 006494  
Power supply, N 248 EU ..... blk ..... 008537  
Power supply, N 248 US ..... blk ..... 008538  
Power supply, N 248 UK ..... blk ..... 008539  
Auditorium hanger, MNV 87 ..... ni ..... 006804  
Auditorium hanger, MNV 87 mt ..... blk ..... 006806  
Elastic suspension, EA 89 A ..... ni ..... 007195  
Elastic suspension, EA 89 A mt ..... blk ..... 007196  
Stand mount swivel, SG 389 mt ..... blk ..... 006620  
Popscreen, PS 20 a ..... blk ..... 008488  
Windscreens, WS 89 ..... blk ..... 007197  
Microphone cable, IC 4 mt  
(with stand mount swivel) ..... blk ..... 006557

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black, ni = nickel

### Application Hints

- A microphone for universal usage
- Use as spot mic for
  - wind instruments,
  - strings,
  - piano

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

### Technical Data

Acoustical operating principle ..... Pressure gradient transducer  
Directional pattern ..... Omnidirectional, wide angle cardioid,  
cardioid, hypercardioid, figure-8  
Frequency range ..... 20 Hz...20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 8 mV/Pa  
Rated impedance ..... 150 ohms  
Rated load impedance ..... 1000 ohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 66 dB  
Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 77 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 28 dB

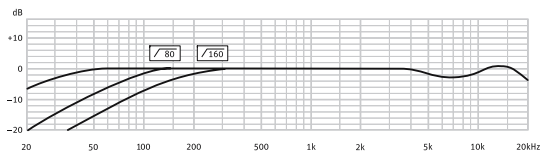
Equivalent noise level, A-weighted<sup>1)</sup> ..... 17 dB-A  
Maximum SPL for THD 0.5%<sup>2)</sup> ..... 134 dB  
Maximum SPL for THD 0.5% with preattenuation<sup>2)</sup> ..... 140 dB  
Maximum output voltage ..... 800 mV  
Dynamic range of the microphone amplifier (A-weighted) ..... 117 dB  
Supply voltage (P48, IEC 61938) ..... 48 V ± 4 V  
Current consumption (P48, IEC 61938) ..... 0.8 mA  
Matching connector ..... XLR3F  
Weight ..... 400 g  
Dimensions ..... Ø 46 mm x 185 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal

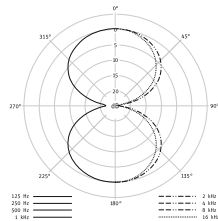
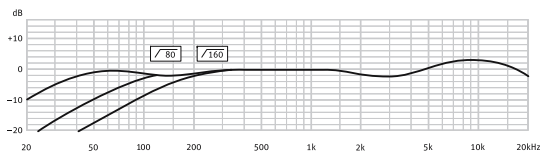
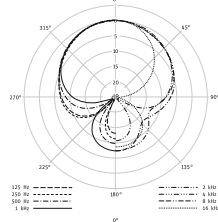
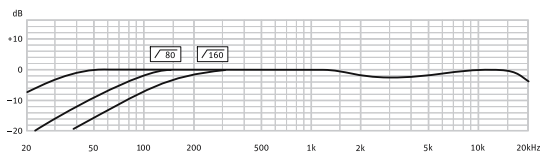
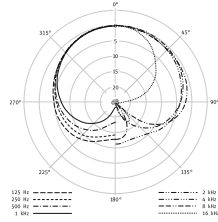
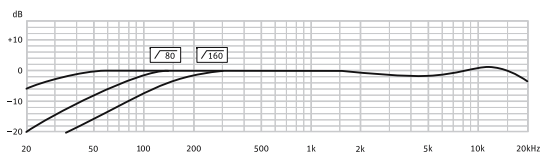
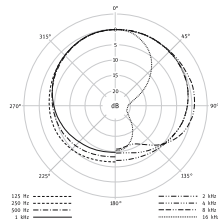
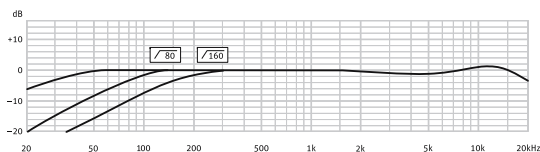
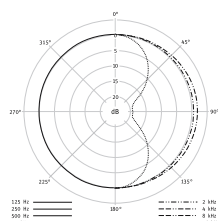


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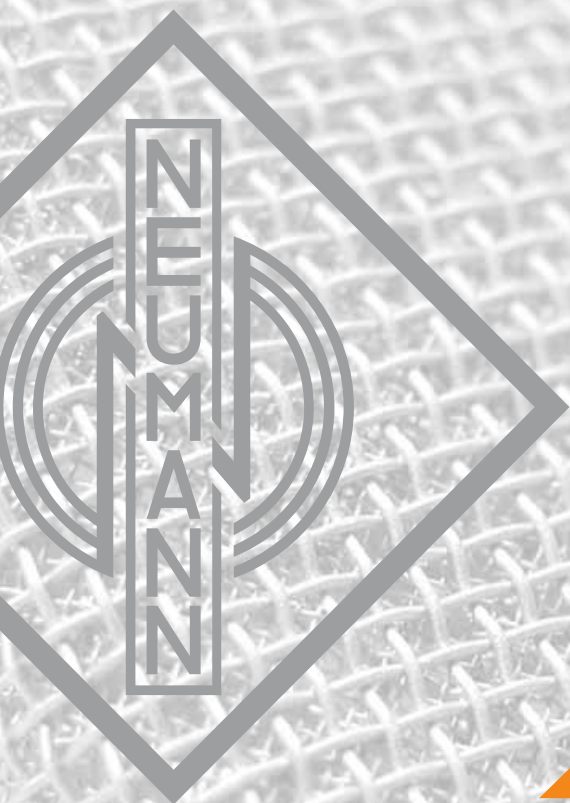


measured in free-field conditions (IEC 60268-6), tolerance  $\pm 2$  dB



# KK 104/105 S

► **Capsule Heads  
for Sennheiser  
SKM 5200/SKM 5000 N\*  
Wireless Systems**



[www.neumann.com](http://www.neumann.com)



Combining the Neumann KK 104/105 S capsule heads with the Sennheiser SKM 5200/SKM 5000 N\* Wireless System thrusts the legendary Neumann sound into the wireless domain, thus opening up new dimensions in sound for sophisticated live-performance engineering.

## Neumann KK 104/105 S Capsule Heads for Sennheiser SKM 5200/SKM 5000 N\* Wireless Systems

In terms of engineering, the KK 104/105 S are based on the KMS 105, 140, and 150 family of wired vocalist microphones.

They inherit not only their outstanding tonal characteristics and specifications but also their sturdiness and effi-

ciency in suppressing popping and handling noise.

The Sennheiser SKM 5200 and SKM 5000 N handheld transmitter are advanced versions of the SKM 5000\*, optimized for the Neumann capsule heads, and ensuring reliable, interference-free, high-quality transmission of the capsule signal to the corresponding Sennheiser receiver.

The capsule and handheld transmitter are available with the typical Neumann nickel-colored finish and in black. The KK 104/105 S package includes a spacious, roadworthy nylon



### Features

- Neumann capsule head engineering expands with Sennheiser liveperformance engineering
- Cardioid (KK 104 S) and Supercardioid (KK 105 S) characteristic
- Low susceptibility to handling noise
- Built-in, highly effective suppression of popping noises
- Easy dismantling for cleaning
- Pure, open, and neutral sound transmission

### Delivery Range

for Sennheiser SKM 5200 and SKM 5000 N\*  
Wireless Systems:

- KK 104 S (blk) Capsule head,  
Padded nylon bag
- KK 105 S (blk) Capsule head,  
Padded nylon bag
- KK 105 HD (blk) Capsule head,  
Padded nylon bag

### Catalog No.

KK 104 S .....	ni .....	008534
KK 104 S blk .....	blk .....	008533
KK 105 S .....	ni .....	008474
KK 105 S blk .....	blk .....	008476
KK 105 HD .....	ni .....	008559
KK 105 HD blk .....	blk .....	008560

### Selection of Accessories

Windscreen, WSS 100 ..... blk ..... 007352

Meaning of color codes:  
blk = black, ni = nickel

### Application Hints

- Vocals and speech on stage
- Especially suited for in-ear-monitoring
- Especially suitable with front-of-stage monitor systems
- For feedback-prone environment

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

pouch big enough to hold not only the capsule, but the transmitter, battery packs, and additional accessories as well.

These product components are a dream come true for countless customers, who time and again demanded a wireless variant of the successful Neumann KMS 104/105 vocalist microphones. Simultaneously, this combination unites the core areas of competence of two established global players and market leaders: Neumann – the world's leading manufacturer of condenser microphones, and Sennheiser – the market leader with years of experience in the area of high-quality wireless systems.



\* Also all existing Sennheiser SKM 5000 handheld transmitters can be upgraded with the Neumann KK 104 S and KK 105 S capsule heads. Still, to take full advantage of the acoustical properties of these heads it is recommended to utilize the SKM 5200 or SKM 5000 N.

\*\* "Heavy duty" variant with integrated foam popscreen instead of wire mesh for even better plosive attenuation. In addition, foam material provides a very large surface area and can therefore absorb moisture very well.

## Technical Data KK 104/105 S (incl. SKM 5200/SKM 5000 N)

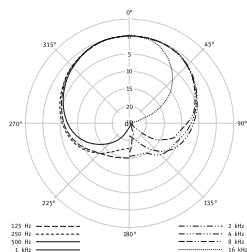
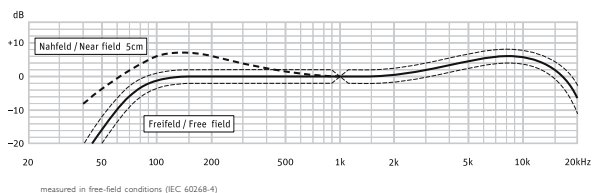
Directional pattern ..... Cardioid/Supercardioid  
Frequency range ..... 80 Hz...20 kHz  
Sensitivity at 1 kHz into 1 kohms ..... 1.7/1.3 mV/Pa  $\pm$  1 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 42/44 dB  
Equivalent noise level, A-weighted<sup>1)</sup> ..... 31/33 dB-A  
Max. SPL for 0.5% THD<sup>2)</sup> ..... 148/150 dB  
Max. SPL for 3% THD<sup>2)</sup> ..... 153/155 dB  
Dynamic range (A-weighted) ..... > 117 dB-A

Frequency range ..... 450–960 MHz  
Switching bandwidth ..... 24 MHz  
Transmitter frequencies ..... 16  
RF-output ..... 50 mW (–3 dB)  
Noise suppression system ..... Sennheiser "HiDyn<sub>as</sub>"™  
Weight (incl. transmitter + power supply unit) ..... approx. 325 g  
Dimensions (+ transmitter) ..... length: 257 mm, Ø 48 mm

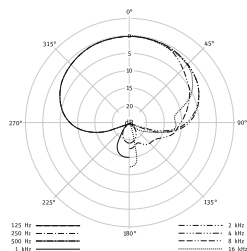
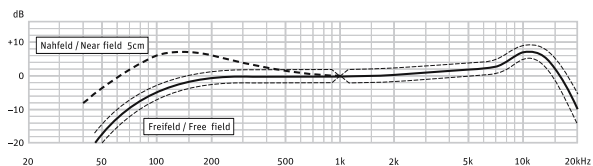
<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1; RMS <sup>2)</sup> measured as equivalent el. input signal



## KK 104 S

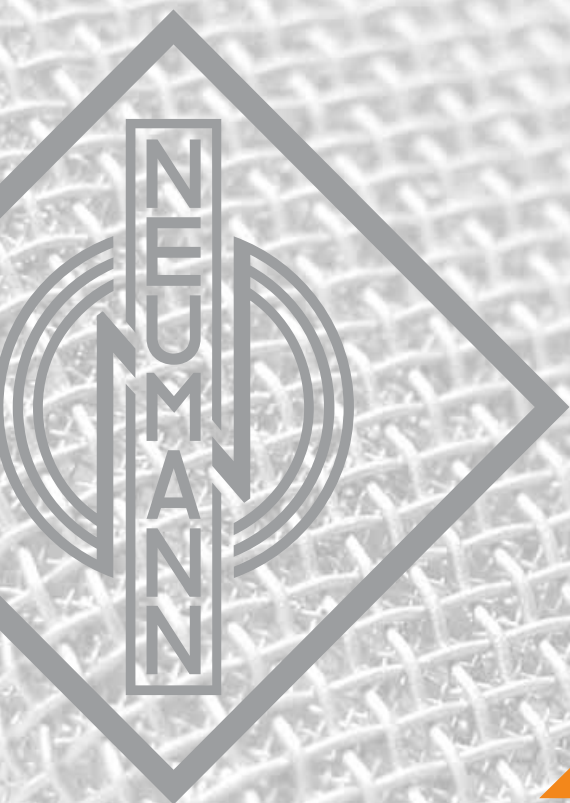


## KK 105 S (HD)



# KMS 104/105

► **Vocalist Microphones**



[www.neumann.com](http://www.neumann.com)





The KMS 104 and KMS 105 microphones have been developed to permit optimal transmission of the human voice, and are thus microphones of choice for demanding live applications. The KMS 105, which has already been available on the market for some time, has become an internationally recognized standard in the field of high-quality stage microphones.

Due to their low self-noise and crosstalk behavior which is free of coloration, both microphones are ideal for use with in-ear monitoring systems.

The KMS 104 has a microphone capsule with a cardioid directional characteristic which provides the best possible suppression of sounds originating from behind the microphone. In contrast, with its supercardioid characteristic the KMS 105 is particularly good at suppressing sounds originating from the entire 180° hemisphere behind the microphone. The user can thus select the version that is optimally suited to the specific application.

The high acoustic resolution and smooth frequency response of the microphones ensure that the musician has optimal control of all times.

## Acoustic features

The studio condenser capsules used in both microphone versions provide the basis for transmitting all the nuances of the human voice. In comparison with other handheld microphones, which operate mostly with dynamic capsules, the KMS series has a particularly high acoustic transparency, a wide frequency range and a fine resolution of transients.

In both microphones, carefully adjusted acoustic filters and transformerless impedance converters that can handle very high sound pres-

sure levels prevent the microphones from being overloaded even by strong plosive sounds.

In spite of excellent pop protection, sibilants and "S" sounds are transmitted with their natural accentuation, as is possible only with condenser microphones. Furthermore, the above-mentioned acoustic filters are designed so that the distinctive directional characteristics of the capsules are preserved even in the bass range. The filters thus ensure a very high level of feedback protection for the KMS 104 and KMS 105 vocalist microphones when they are used with a stage sound system.

## Electrical features

Since vocalist microphones are typically addressed at the close range, for the bass frequency response of the microphones, electronic compensation is used for the proximity effect in the respective capsules.

In addition, each microphone has an invariable, built-in high-pass filter with a cutoff frequency of 120 Hz (-3 dB, measured in a free sound field). The dynamic range of the KMS 104/105 is 132 dB, and the maximum sound pressure level is 150 dB.



The low self-noise level of only 18 dB-A permits both microphones to be used at high gain levels without the risk of additional noise. Even at large distances, the microphones thus operate with a high signal-to-noise ratio, facilitating the freedom of movement and creativity that are important to the artist.

Due to the transformerless output circuit, the microphone signals can be transmitted even through long cables without loss of sound.

## Mechanical features

Microphones designed for use on stage require a particularly robust construction. The KMS 104 and KMS 105 therefore have thick-walled metal housings, which also provide effective protection against handling noise.

The microphone headgrilles are made of hardened steel. If required, they can easily be unscrewed to permit cleaning of the interior acoustic filters.



### Delivery Range

The KMS 104 and KMS 105 microphones, with a matching stand clamp, are supplied in an attractive padded nylon bag that is sufficiently durable for touring.

### Features

- Neumann sound on stage
- Excellent transparency for vocals/speech
- Cardioid/Supercardioid polar pattern with excellent feedback rejection
- Without off-axis coloration
- Transformerless output
- Effective pop shielding without any side effects
- Set includes stand clamp

### Application Hints

- Vocals and speech on stage
- Announcer's mic for broadcasting/dubbing
- Especially suited for in-ear-monitoring
- For feedback-prone environment

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

### Delivery Range

KMS 104/105 Microphone  
SG 105 Stand clamp  
Padded nylon bag

### Catalog No.

KMS 104	.....ni	.....008548
KMS 104 bk	.....blk	.....008549
KMS 105	.....ni	.....008454
KMS 105 bk	.....blk	.....008455

### Selection of Accessories

Battery supply, BS 48 i	.....blk	.....006494
Battery supply, BS 48 i-2	.....blk	.....006496
Power supply, N 248 EU	.....blk	.....008537
Power supply, N 248 US	.....blk	.....008538
Power supply, N 248 UK	.....blk	.....008539

Microphone cable, IC 3 mt	.....blk	.....006543
Adapter cable, AC 25	.....blk	.....006600
Adapter cable, AC 27	.....blk	.....006602

Table stand, MF 3	.....blk	.....007321
Windscreens, WSS 100	.....blk	.....007352
Stand clamp, SG 105	.....blk	.....008460

(included in the supply schedule)

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes: blk = black, ni = nickel

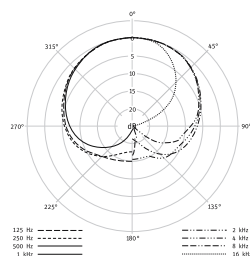
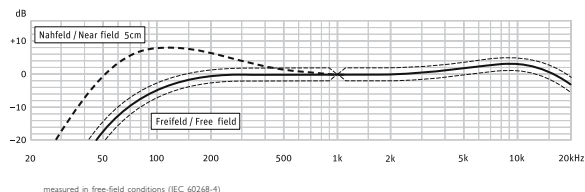


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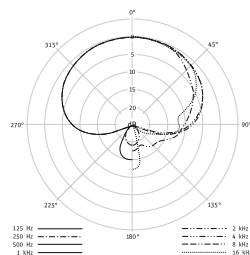
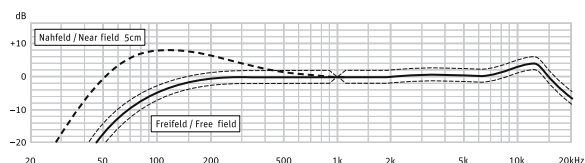
▶▶ THE MICROPHONE COMPANY



## KMS 104



## KMS 105



### Technical Data

Acoustical operating principle	Pressure gradient transducer
Directional pattern	cardioid/supercardioid
Frequency range	20 Hz..20 kHz
Sensitivity at 1 kHz into 1 kohm	4.5 mV/Pa
Rated impedance	50 ohms
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	66 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL)	76 dB
Equivalent noise level, CCIR <sup>1)</sup>	28 dB
Equivalent noise level, A-weighted <sup>1)</sup>	18 dB-A

Maximum SPL for THD 0.5% <sup>2)</sup>	150 dB
Maximum output voltage	12 dBu
Dynamic range of the mic. amplifier (A-weighted)	132 dB
Supply voltage (P48, IEC 61938)	48 V ± 4 V
Current consumption (P48, IEC 61938)	3.5 mA
Matching connector	XLR3F
Weight	approx. 300 g
Diameter	48 mm
Length	180 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal

### Selection of Accessories



IC 3 mt. Microphone cable



AC 25. Adapter cable



WSS 100. Windscreen



BS 48 i. Battery supply



N 248. Power supply



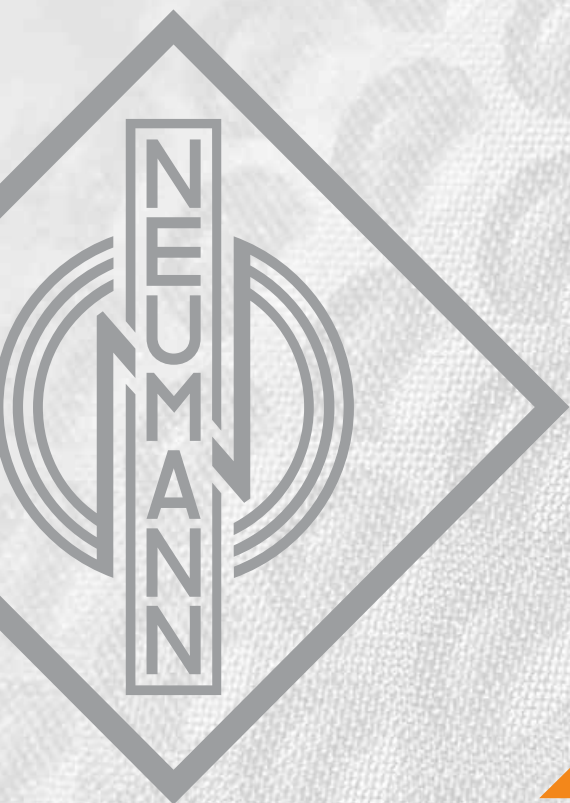
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THE MICROPHONE COMPANY



# Series 180

▶ **Miniature  
Microphones**



[www.neumann.com](http://www.neumann.com)



## Features

- Three different miniature microphones for all typical studio applications
- Successor of the worldwide successful KM 83/84
- Transformerless circuitry
- Trouble-free operation also with unbalanced equipment (e.g., DAT recorders)
- Set includes windshield and two different microphone clamps

The “Series 180” consists of three compact miniature microphones with patterns that satisfy the demands of all common studio applications. Because of its optimized mechanical construction and conscious omission of modularity, which is unnecessary in many cases, the “Series 180” is predestined for economy-minded production and home recording studios.

The KM 183 omnidirectional and KM 185 hypercardioid microphones are based on the tremendously successful KM 184 cardioid microphone, which has become a standard within the global studio community in just a very short time.

All “Series 180” microphones are available with either matte black or nickel finish. They come in a folding box with a windshield and two stand mounts that permit connection to the microphone body, or the XLR-connector.

## Applications

Their slender shapes and the transmission characteristics described below make the “Series 180” especially suitable for a very wide range of tasks in the radio and television sector.

## Acoustic features

The KM 183 and KM 184 microphones are the successors of the well proven KM 83 and KM 84, which have been used since the seventies worldwide with great success. The KM 185 rounds out the series with a hypercardioid microphone.

The KM 183 is a pressure transducer with a boost of approximately 7 dB at 10 kHz in the free field. In the diffuse sound field it has a flat frequency response.





The pressure gradient transducers KM 184 and KM 185 feature very smooth frequency responses not only for the 0° axis, but also for lateral (off-axis) sound incidence. In typical usage, there is no coloration of sound over a wide pickup angle.

Although the KM 184 has the same capsule as the KM 84, the microphone differs slightly on the 0° frequency response: The KM 184 has a gentle rise at about 9 kHz, a characteristic that was introduced very successfully with the KM 140. The result is a tonal balance that is fresher and livelier when compared to the KM 84 with its flat frequency response in that band.

This difference was achieved with just a slight change of the capsule's rear opening, and is not due to resonances.

The KM 185 with its hypercardioid characteristic features attenuation of sound incidence from the side or rear of about 10 dB, with minimum sensitivity at an angle of 120°.

### Electrical features

The "Series 180" microphones have the same transformerless circuitry as is used in the KM 100 system, resulting in excellent technical specifications: Compared to the KM 84 the dynamic range of the KM 184 increased by 24 dB mainly through the reduction of self-noise level to only 22 dB (CCIR) and an increased sound pressure handling capability of up to 138 dB.

The microphones operate without any problems, even if the input of following equipment happens to be unbalanced, for example as in some DAT recorders.

The output of the "Series 180", as in all Neumann microphones, is balanced and phantom (48V) powered.

### Economy

The "Series 180" is a good choice for all users who look for a high-quality miniature microphone, but do not need the complex, modular KM 100 system, which continues to be part of the Neumann product range.

The mechanical construction was simplified, for example, capsule and output stage cannot be separated from each other. For this reason the "Series 180" is an economical alternative without giving up the electroacoustic features the users expect from Neumann microphones.

### Delivery Range

KM 183 (mt) ... 185 (mt) Microphone, WNS 100  
Windscreens, SG 21/17 mt Stand mount

**Stereo set:** 2x KM 183 (mt) ... 185 (mt)  
Microphone, 2x WNS 100 Windscreens,  
2x SG 21/17 mt Stand mount, Wooden box

### Catalog No.

KM 183	.....ni	008437
KM 183 mt	.....blk	008438
KM 183 Stereo set	.....ni	008522
KM 183 mt Stereo set	.....blk	008521
KM 184	.....ni	008439
KM 184 mt	.....blk	008389
KM 184 Stereo set	.....ni	008524
KM 184 mt Stereo set	.....blk	008523
KM 185	.....ni	008440
KM 185 mt	.....blk	008441
KM 185 Stereo set	.....ni	008526
KM 185 mt Stereo set	.....blk	008525

### Selection of Accessories

Elastic suspension,		
EA 2124 A mt .....	blk	008433
Auditorium hanger, MNV 21 mt .....	blk	006802
Popscreen, PS 15 .....	blk	008472
Windscreen, WS 100 .....	blk	006751

A complete survey and detailed descriptions  
of all accessories are contained in the  
accessories catalog.

Meaning of color codes: blk = black, ni = nickel





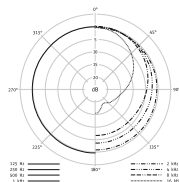
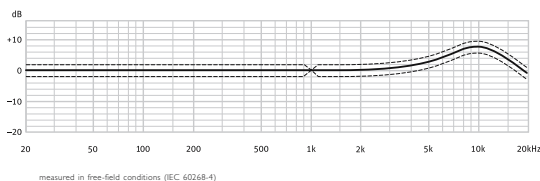
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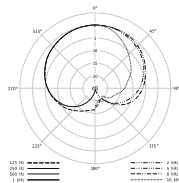
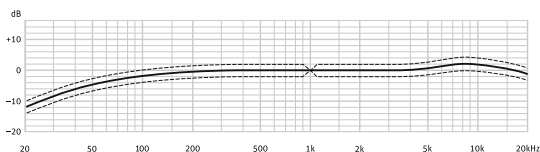


## Technical Data

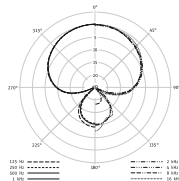
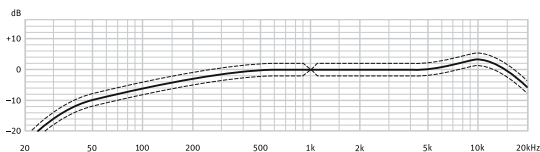
### KM 183



### KM 184



### KM 185



## Technical Data KM 183 / KM 184 / KM 185

Acoustical operating principle ..... Pressure/Pressure gradient transducer  
 Directional pattern ..... omnidirectional/cardioid/hypercardioid  
 Frequency range ..... 20 Hz..20 kHz  
 Sensitivity at 1 kHz into 1 kohm ..... 12/15/10 mV/Pa  
 Rated impedance ..... 50 ohms  
 Rated load impedance ..... 1000 ohms  
 Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 70/72/70 dB  
 Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 81/81/79 dB  
 Equivalent noise level, CCIR<sup>1)</sup> ..... 24/22/24 dB

Equivalent noise level, A-weighted<sup>1)</sup> ..... 13/13/15 dB-A  
 Maximum SPL for THD 0.5%<sup>2)</sup> ..... 140/138/142 dB  
 Maximum output voltage ..... 10 dBu  
 Supply voltage (P48, IEC 61938) ..... 48 V ± 4 V  
 Current consumption (P48, IEC 61938) ..... 3.2 mA  
 Matching connector ..... XLR3F  
 Weight ..... approx. 80 g  
 Diameter ..... 22 mm  
 Length ..... 107 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal



## Application Hints

### KM 183

- For close miking of instruments when there is no need to attenuate extraneous noise, and in a balanced acoustic environment to record
  - acoustic guitar,
  - wind instruments,
  - strings,
  - percussion,
  - drums
- Ideal as AB stereo pair because of the flat frequency response in the diffuse sound field
- As a main mic, especially for capturing room acoustics
- For stereo recordings with a baffle plate
- As a spot mic for
  - piano,
  - wind instruments,
  - organ,
  - choir

### KM 184

- For universal use, especially for recording situations when it is necessary to attenuate off-axis sound (mainly from the rear) from other nearby instruments.
- As XY and ORTF stereo pair
- Announcer's mic for broadcasting
- Spot mic, overhead
- Close miking of
  - strings,
  - wind instruments,
  - percussion,
  - piano,
  - Leslie speakers,
  - guitar amps

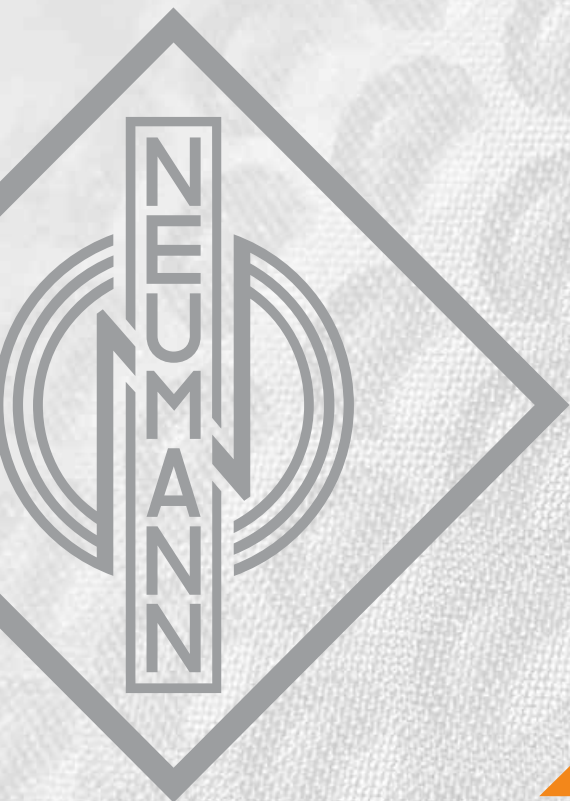
### KM 185

- Especially for recording situations when it is necessary to attenuate off-axis sound (lateral and rear) from other nearby instruments.
- As XY stereo pair
- Overhead, toms
- In situations that are susceptible to acoustic feedback
- To attenuate unwanted sound of nearby instruments
- Recording of speech, as in
  - TV,
  - movie and video productions,
  - PA systems
- Produces especially warm and bass supporting sound for artists who perform in proximity effect range

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

# KM 100

▶ **Miniature  
Microphone System**



[www.neumann.com](http://www.neumann.com)



## Features

- Miniature microphones with 7 exchangeable capsules
- Active capsules, detachable up to 50 m from the output stage
- Great variability through capsule extensions and goosenecks
- Switchable 10 dB pre-attenuation
- Set includes windshield and two different clamps
- Transformerless circuitry
- Extensive accessories

The variable condenser miniature microphone system consists of several active microphone capsules with different directional characteristics, an output stage, and numerous accessories.

Currently there are seven active capsules available: omni diffuse-field equalized, omni free-field equalized, cardioid, wide-angle cardioid, cardioid with bass roll-off, hypercardioid, and figure-8.

Through the modular construction of mic capsules and the output stage it is very easy to adapt the system to a wide range of applications. The mic becomes nearly invisible during work with cameras (film, video), on stage, or suspended from the ceiling in a concert hall.

An active capsule can also be screwed directly onto the output stage. The result is a compact miniature microphone.



## Construction

The microphones are only 92 or 110 mm resp. long and 22 mm in diameter. They consist of the condenser capsule and the output stage. Both parts can be unscrewed from each other. The system offers several condenser capsules with different directional characteristics.

Numerous accessories can be mounted between the capsules and the output stage. The capsules attach to cables, capsule extensions, swivel mounts, table stands, goosenecks, stereo mounts, and hangers. Therefore, it is very easy to adapt the system to a wide range of applications.

The active capsule itself is only 35 or 47 mm resp. long. The KM 100 output stage and the active microphone capsule may be separated by up to 50 m of interconnecting cable. These cables are 3 mm in diameter, and therefore very inconspicuous.



### Acoustic features

**AK 20** is a pressure gradient transducer with the figure-8 characteristic, realized with a single diaphragm. The diaphragm diameter is just 16 mm. All sound field components reach the diaphragm directly. This results in identical frequency response curves and output levels at 0° and 180° sound incidence. Corresponding accessories allow combining the AK 20 with other active capsules or microphones to obtain an MS-Stereo setup.

**AK 30** is a diffuse-field equalized pressure transducer with a flat frequency response up to 10 kHz (in the diffuse field). In the free sound field this microphone has a boost of approximately 7 dB at 10 kHz.

**AK 31** is a free-field equalized pressure transducer with a flat frequency response up to 20 kHz (in the free field). In the diffuse sound field this microphone has a high frequency roll-off above 5 kHz.

**AK 40** is a pressure gradient transducer with cardioid characteristic. The frequency curves are very smooth and match 0° sound incidence. Sound from sources within a pickup angle of  $\pm 135^\circ$  is reproduced without any coloration.

**AK 43** is a pressure gradient transducer with wide-angle cardioid characteristic. Attenuation at 90° is 4 dB, at 135° it is 8 dB and at 180° it is 11 dB. The frequency response curves for sound sources within an angle of  $\pm 90^\circ$  are parallel up to 12 kHz.

**AK 45** is a pressure gradient transducer with cardioid characteristic, similar to the AK 40. However, it has an acoustic bass roll-off that is useful during applications when subsonic and low frequencies may cause difficulties. The AK 45 is optimized for a flat low frequency response at a recording distance of 15 cm ("speech cardioid").

**AK 50** is a pressure gradient transducer with hypercardioid characteristic. Attenuation of sound incidence from the side or rear is about 10 dB, with minimum sensitivity at an angle of 120°.







## Electrical features

The KM 100 is phantom powered (48 V) and uses transformerless output circuitry. This has several advantages. It features high output capability and extremely low self noise. It provides exceptionally clean sound, free of any coloration. As with traditional transformers, this circuit approach ensures good common mode rejection. The balanced output signal is protected against interference.

The construction is extremely compact. The entire microphone circuitry is on a single hybrid module measuring only 2 cm<sup>2</sup> in area. It is built into the microphone capsule, therefore the term "active capsules".

All sensitive components are protected within the capsule. As a result, the quality of the audio signal is never compromised through the use of accessories, for example, when the capsule is detached from the output stage and mounted on a cable or a gooseneck.



Even with a long cable between active capsule and output stage, the signal is immune to external interference.

## Preattenuation

The output stage has a 10 dB switch. Attenuation is achieved by reducing the capsule voltage to one third.

When the switch is on, the microphone is capable of accepting sound pressure levels up to 150 dB without being overloaded.



## Connectors

To diminish the number of connectors within the KM 100 System some accessories were modified. They can now be screwed directly onto the KM 100 output stage without using the KA 100 cable adapter. The new accessories which include the cable adapter, were renamed adding the suffix KA. For example: LC 3 is now LC 3 KA.

The separate KA 100 cable, needed for older accessories, will be available also in future.

The KM 100 output stage has a 3-pin XLR connector.

## Sound diffraction sphere

The SBK 130 sound diffraction sphere slips onto the front of the KM 130/KM 131 pressure microphones. The diaphragm becomes an integral part of the surface of the sphere. This affects the frequency response of the microphones.

While sounds coming from the front-half space are emphasized by up to 2.5 dB between 2 kHz and 10 kHz, sounds arriving from the rear-half space are attenuated by a maximum of 2.5 dB in the range above 5 kHz.

Since the sound diffraction sphere causes the pressure buildup of the KM 130/KM 131 pressure microphones to begin earlier, the frequency response rises smoothly in the middle and upper range. This is similar to a typical pressure gradient microphone, where the directivity increases with rising frequencies. However, since the KM 130/KM 131 are pressure microphones, they maintain a linear sensitivity down to the lowest frequencies.

This changing directivity allows to record at a greater distance from the sound source, and makes the KM 130/KM 131 microphones especially suited as stereo main microphones in A-B configurations.

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### **KM 100 F Output stage**

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The KM 100 F output stage is an alternative to the KM 100 output stage. In contrast to the KM 100 output stage with a flat frequency response, the KM 100 F attenuates frequencies below 80 Hz at 6 dB/octave. This eliminates or suppresses interference caused by wind or structure-borne noise.

A built-in slide switch allows to raise the cut-off frequency (-3 dB point) from 80 Hz to 120 Hz. An additional slide switch lowers the sensitivity by 10 dB.

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### **Stereo recordings**

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By means of the AC 30 adapter cable two active capsules, AK 20 and e.g. AK 40 can be connected as MS stereo pair directly with the MTX 191 (A) matrix amplifier. The XY or MS signal is then available at the 5-pin XLR output connector of the MTX 191 (A), and the recording angle can be electrically remote controlled. The output stages KM 100 are then not required.

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### **Stereo set**

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The cardioid and hypercardioid microphones are also available as complete stereo sets, SKM 140 and SKM 150, including all accessories in a single jeweler's box.

A further SKM 100-MS Stereo Set containing the microphones KM 120 and KM 140 is available.



## Current:



KM 100 Output stage



KA 100 Cable adapter



LC 3 Microphone cable

## New:



KM 100 Output stage



LC 3 KA Microphone cable

## Accessories\*



AK 20, Active capsule  
Catalog No.: 71659



AK 30, Active capsule  
Catalog No.: 69001



AK 31, Active capsule  
Catalog No.: 69002



AK 40, Active capsule  
Catalog No.: 69007



AK 43, Active capsule  
Catalog No.: 69014



AK 45, Active capsule  
Catalog No.: 69015



AK 50, Active capsule  
Catalog No.: 69016



KA 100, Cable adapter  
Catalog No.: 07330



KM 100, Output stage  
Catalog No.: 07395



KM 100 F, Output stage  
Catalog No.: 07376



SBK 130, Sound diffraction sphere  
for dia. 22 mm  
Catalog No.: 07371



BS 48 i, Battery supply  
Catalog No.: 06494



BS 48 i-2, Battery supply  
Catalog No.: 06496



N 248, Power supply  
EU: Catalog No.: 08537  
US: Catalog No.: 08538  
UK: Catalog No.: 08539



LC 3 mt, Microphone cable  
Catalog No.: 06543



Extension cable  
LC 2, 10 m, Catalog No.: 06690



Microphone cable  
LC 3 KA, 5 m, Catalog No.: 08408  
LC 3 KA, 10 m, Catalog No.: 08409



DS 21 mt, Double mount  
Catalog No.: 06798



DS 100-1, Double swivel mount  
(for KVF... extension tubes)  
Catalog No.: 08491



DS 120, Double mount  
Catalog No.: 07343

\*) Detailed descriptions of all accessories are contained in the accessories catalog.



AK... Active capsule



AK... Active capsule



EA 2124 A mt,  
Elastic suspension  
Catalog No.: 08433



KVF 118 KA, Capsule extension  
(with gooseneck, 300 mm)  
Catalog No.: 08410



KVF 158 KA, Capsule extension  
(with gooseneck, 700 mm)  
Catalog No.: 08411



KVF 148 KA, Capsule extension  
(with double gooseneck, 700 mm)  
Catalog No.: 08412



MF 2, Table stand  
(with rubber mounted thread)  
Catalog No.: 07266



MF 3, Table stand  
Catalog No.: 07321



MF 4, Table stand  
Catalog No.: 07337



MF 5, Table stand  
Catalog No.: 08489



MA, Microphone fishpole  
Catalog No.: 06771



MF-AK, Table Stand  
(with Swivel Joint)  
Catalog No.: 08453



MNV 21 mt,  
Auditorium hanger  
with clamp for KM ...  
Catalog No.: 06802



MNV 87 mt, Auditorium hanger  
(with threaded adapter)  
Catalog No.: 06806



MNV 100, Auditorium hanger  
(with clamp for AK ...)  
Catalog No.: 06811



SG 21/17 mt, Swivel mount  
(with 21 mm and 17 mm clamp)  
Catalog No.: 06149



SG 100, Swivel mount (for KVF ...)  
Catalog No.: 06688



SG 100-1, Swivel mount  
Catalog No.: 08490



SG-AK, Swivel Mount  
Catalog No.: 08452



SGE 100, Swivel mount for MF 2  
(with rubber mounted thread  
for AK ...)  
Catalog No.: 06742



SMK 8 i, Gooseneck  
Catalog No.: 06181

\*) Detailed descriptions of all accessories are contained in the accessories catalog.



## Accessories



SMK 100 KA, Gooseneck  
(with cable, 160 mm)  
Catalog No.: 08413



SMK 100.2 KA, Double gooseneck  
(with cable, 160 mm)  
Catalog No.: 08414



PS 15, Pop screen  
Catalog No.: 08472



STH 100, Stereo mount  
(for 2xAK ... with LC 3)  
Catalog No.: 07315



SR 100, Stand tube  
Catalog No.: 07336 and  
KA 100, Catalog No.: 07330



Stand extension  
STV 4, Catalog No.: 06190  
STV 20, Catalog No.: 06187  
STV 40, Catalog No.: 06188  
STV 60, Catalog No.: 06189



TF 221 c, Table flange  
(with rubber mounted thread)  
Catalog No.: 07278



Windscreens, 45 mm  
WNS 100 blk., Cat. No.: 07323  
WNS 100 red., Cat. No.: 07324  
WNS 100 gm., Cat. No.: 07325  
WNS 100, yel., Cat. No.: 07326  
WNS 100, blu., Cat. No.: 07327



WS 100, Windscreens, 90 mm  
Catalog No.: 06751

## Special Accessories for AK 20 and Stereo-Applications



DA-AK, Elastic suspension  
for two AK ...  
Catalog No.: 08419



DA-KM, Elastic suspension  
for two KM ...  
Catalog No.: 08420



WKD-AK, Windscreens  
for DA-AK  
Catalog No.: 08423



WKD-KM, Windscreens  
for DA-KM  
Catalog No.: 08424



STH 120, Stereo mount  
for AK 20 and e.g. AK 40  
Catalog No.: 08422



Wj-AK, Windjammer  
for WKD-AK  
Catalog No.: 08425



Wj-KM, Windjammer  
for WKD-KM  
Catalog No.: 08426



WNS 120, Windscreens  
for AK 20  
Catalog No.: 08427



AC 30, Adapter cable for connection of 2 AK ... with MTX 191 (A).  
Catalog No.: 08418



MTX 191 A,  
Matrix amplifier  
Catalog No.: 07331

## Application Hints

For recording situations where the microphone must remain "invisible".

### KM 120

- MS-Stereo microphone (in combination with the KM 140)
- Two crossed AK 20s in Blumlein technique
- Inconspicuous spot microphone with optimum attenuation of lateral sound sources
- Single microphone for two speakers facing each other

### KM 130

- Ideal as AB stereo pair in the diffuse sound field because of the flat frequency response
- As a main mic, especially for capturing room acoustics
- For stereo recordings with a baffle plate
- As a spot mic for piano, wind instruments, organ, and choir

### KM 131

- For close miking of instruments when there is no need to attenuate extraneous noise, and in a balanced acoustic environment to record acoustic guitar, wind instruments, strings, percussion, and drums
- Flat frequency response for close miking, spot mic

### KM 140

- Universal usage, especially in situations when it is necessary to attenuate sound coming from adjacent instruments
- As XY and ORTF stereo pair
- Announcer's mic for broadcasting
- Spot mic, overhead
- Close miking of strings, wind instruments, percussion, piano, Leslie speakers, guitar amps
- We recommend using an additional windscreen to minimize the effects of high wind velocity

### KM 143

- Polar response characteristic acts more like an omni. Therefore, it is an ideal tool to record larger instrument ensembles
- As AB stereo pair, especially in rooms with less than ideal acoustics
- As spot mic for strings, wind instruments, percussion, and Leslie speakers
- Acts very neutral when used close up to bass instruments, such as double bass, bass amps, guitar amps

### KM 145

- It naturally compensates for proximity effect
- Very neutral tonal balance during close miking of speech, as in TV, movie and video, PA
- Acts very neutral when used close up to bass instruments, such as double bass, bass amps, guitar amps, Leslie speakers, toms

### KM 150

- As XY stereo pair
- Overhead, toms
- In situations that are susceptible to acoustic feedback
- To attenuate unwanted sound of nearby instruments
- Recording of speech, as in TV, movie and video productions, PA systems
- Produces especially warm and bass supporting sound for artists who perform in proximity effect range
- We recommend using an additional windscreen to minimize the effects of high wind velocity, and plosive sounds

These are just some of the most common applications. Detailed hints are described in the catalog "KM 100 Application Guide".

## Delivery Range KM ...

Microphone KM 120 ... KM 150  
 Windscreen WNS 100 or WNS 120  
 Stand mount swivel SG 21/17  
 Wooden box

## Delivery Range SKM 140 (150)

2x Microphones KM 140 (150)  
 2x Connecting cables LC 3 KA  
 1x Stereo mount STH 100  
 Wooden box

## Delivery Range SKM 100-MS

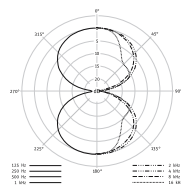
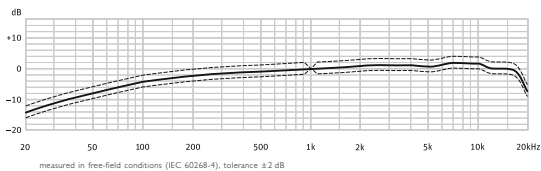
1x Microphone each KM 120 and KM 140  
 2x Connecting cables LC 3 KA  
 1x Stereo mount STH 120, Wooden box

## Catalog No.

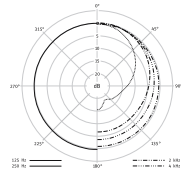
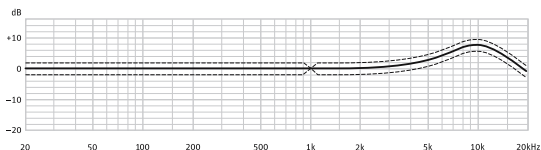
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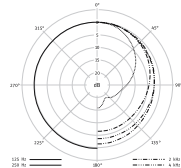
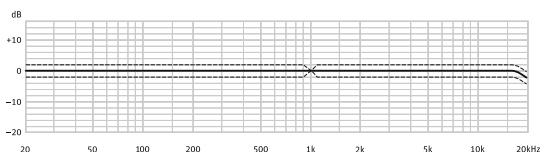
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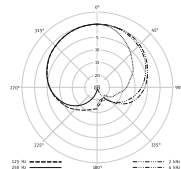
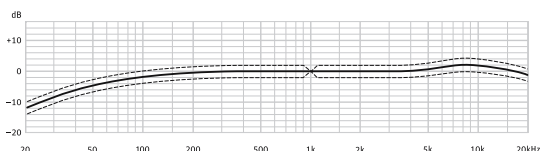
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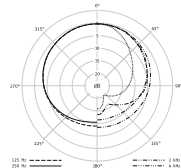
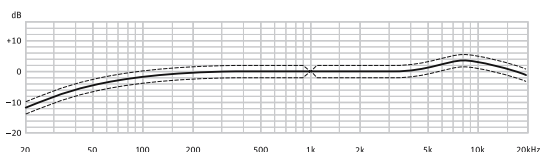
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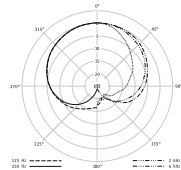
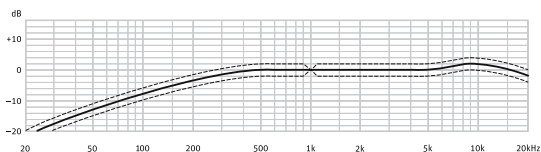
## KM 140



## KM 143

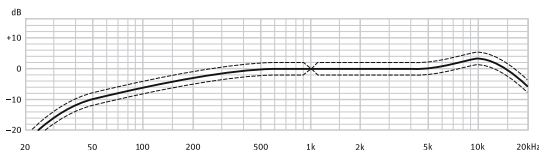


## KM 145



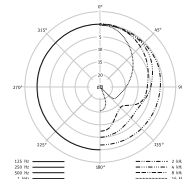
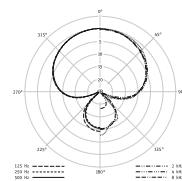
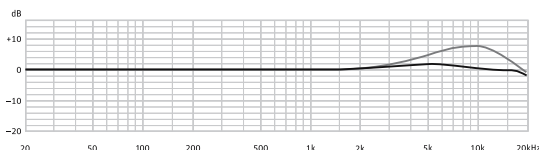


## KM 150



## KM 130 with SBK 130

## KM 131 with SBK 130



## Technical Data

## KM 120 KM 130 KM 131 KM 140 KM 143 KM 145 KM 150

Acoustical operating principle	Press. grad. transducer	Pressure transducer	Pressure transducer	Press. grad. transducer	Press. grad. transducer	Press. grad. transducer	Press. grad. transducer
Directional pattern	Side-fire figure-8	Omni diffuse field equalized	Omni free field equalized	Cardioid	Cardioid wide angle	Cardioid low frequency roll-off	Hyper-cardioid
Frequency range	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz
Sensitivity at 1 kHz into 1 kohm	12 mV/Pa	12 mV/Pa	12 mV/Pa	15 mV/Pa	15 mV/Pa	14 mV/Pa	10 mV/Pa
Rated impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
Rated load impedance	1000 ohms	1000 ohms	1000 ohms	1000 ohms	1000 ohms	1000 ohms	1000 ohms
Signal-to-noise ratio							
CCIR <sup>1)</sup> (rel. 94 dB SPL)	68 dB	67 dB	69 dB	69 dB	69 dB	68 dB	67 dB
A-weighted <sup>1)</sup> (rel. 94 dB SPL)	76.5 dB	78 dB	78 dB	78 dB	78 dB	77 dB	76 dB
Equivalent noise level, CCIR <sup>1)</sup>	26 dB	27 dB	25 dB	25 dB	25 dB	26 dB	27 dB
Equivalent noise level, A-weighted <sup>1)</sup>	17.5 dB-A	16 dB-A	16 dB-A	16 dB-A	16 dB-A	17 dB-A	18 dB-A
Maximum SPL							
for THD 0.5% <sup>2)</sup>	140 dB	140 dB	140 dB	138 dB	138 dB	138 dB	142 dB
for THD 0.5% with preatt <sup>2)</sup>	150 dB	150 dB	150 dB	148 dB	148 dB	148 dB	152 dB
Maximum output voltage	10 dBu	10 dBu	10 dBu	10 dBu	10 dBu	10 dBu	10 dBu
Dynamic range of the mic amp (A-weighted)	122.5 dB	124 dB	124 dB	122 dB	122 dB	121 dB	124 dB
Supply voltage (P48, IEC 61938)	48 V ± 4 V	48 V ± 4 V	48 V ± 4 V	48 V ± 4 V	48 V ± 4 V	48 V ± 4 V	48 V ± 4 V
Current consumption (P48, IEC 61938)	2 mA	2 mA	2 mA	2 mA	2 mA	2 mA	2 mA
Matching connector	XLR3F	XLR3F	XLR3F	XLR3F	XLR3F	XLR3F	XLR3F
Weight	102 g	80 g	80 g	80 g	80 g	80 g	80 g
Diameter	24/22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
Length	110 mm	92 mm	92 mm	92 mm	92 mm	92 mm	92 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3; quasi peak; A-weighting according to IEC 61672-1; RMS <sup>2)</sup> measured as equivalent el. input signal



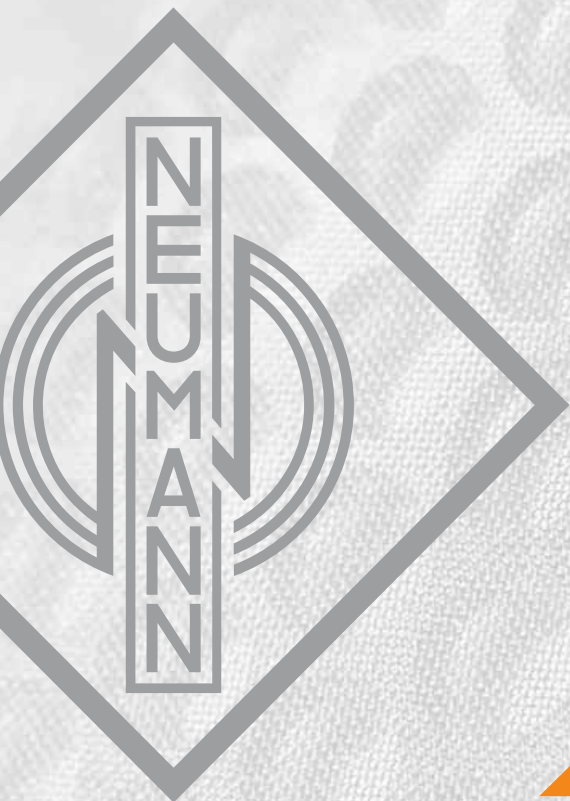
NEUMANN.BERLIN

» THE MICROPHONE COMPANY



# KU 100

► **Dummy Head**



[www.neumann.com](http://www.neumann.com)



## Features

- Dummy head for head-related stereophony
- Pressure transducer with flat diffuse-field frequency response
- Loudspeaker compatible
- Transformerless circuitry
- Two-stage switchable low frequency roll-off
- Switchable 10 dB preattenuation
- Balanced and unbalanced outputs (XLR and BNC)

The KU 100 dummy head is a binaural stereo microphone. It resembles the human head and has two microphone capsules built into the ears. When listening through high-quality headphones it gives the illusion of being right at the scene of the acoustic events.

When using the KU 100 dummy head, the binaural stereo experience moves the listener into the scene of the original performance, in contrast to other space-related recording techniques, where the acoustic event is moved to the listener.

The dummy head is also used in many industrial applications as a measuring device, for example in acoustic research.

The KU 100 can be operated with typical 48 V phantom powering, or from an external power supply unit, or from the built-in battery.

At the bottom of the unit is a switch for the different power supply modes, as well as connectors for balanced and unbalanced output signals.

Inside the head are additional switches for 10 dB attenuation and the high-pass filter.

## The Idea

The KU 100 dummy head is a replica of the human head with a microphone built into each ear.

When the recorded audio signal is reproduced through high-quality headphones the listener perceives a sound image almost identical to the one he would have heard at the recording location of the dummy head (head-related stereophony).

When played back through loudspeakers, the sound matches to a high degree that of conventional stereo microphones, placed in the same position. However, a superior quality is added, that of a distinct spatial depth perception.



The KU 100 dummy head is just as easy to use during creative radio drama productions, and music recordings where the room acoustics should be recorded at the same time.

The dummy head is also contributed essentially as an important tool to preserve natural sounds of all kinds.

In addition, the dummy head is frequently used to examine and document the influence of noise in industrial applications at various working places under realistic conditions.



## Electrical features

The KU 100 uses transformerless circuitry with the advantage of high output capability, fast transient response, and extremely low self noise. The usual output transformers are replaced by electronic circuits. As with traditional transformers, this technique ensures good common mode rejection, and prevents RF interference, that may influence the balanced audio signals.

The dummy head provides balanced (XLR) and unbalanced (BNC) outputs. It can be powered in three different modes:

from an external P48 phantom power supply,

with batteries as part of the internal battery supply,

or from an external AC mains supply (included with the system).



## Filter and attenuation

A 10 dB switch inside the head attenuates the sensitivity. A second switch selects the cutoff frequency of the high-pass filter to be either linear, 40 Hz, or 150 Hz.



## Delivery range

The KU 100 comes in a robust aluminum carrying case, together with an external power supply unit, a 5-pin XLR cable, and an adapter cable that splits the 5-pin XLR output into two 3-pin XLR connectors.



## Technical Data

Acoustical operating principle	Pressure transducer
Directional pattern	Ear
Frequency range	20 Hz..20 kHz
Sensitivity at 1 kHz into 1 kohm	20 mV/Pa
Rated impedance	50 ohms balanced 200 ohms unbalanced
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	65 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL)	78 dB
Equivalent noise level, CCIR <sup>1)</sup>	29 dB
Equivalent noise level, A-weighted <sup>1)</sup>	16 dB-A

Maximum SPL for THD 0.5% <sup>2)</sup>	135 dB
Maximum SPL for THD 0.5% with preattenuation <sup>2)</sup>	145 dB
Maximum output voltage	1950 mV
Dynamic range of the microphone amplifier (A-weighted)	119 dB
Supply voltage	200..240 V / 48 V $\pm$ 4 V / 6 x 1.5 V
Current consumption	2 x 2 mA
Matching connector	XLR3F / XLR5F
Weight	3500 g
Height	280 mm
Width	180 mm
Depth	220 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal <sup>3)</sup> P48, IEC 61938



## Application Hints

- Radio drama productions
- Live concert recordings in complex acoustic environments
- Documentation of
  - nature's sound,
  - theater,
  - round table discussions
- Documentation and measurement of
  - room acoustics,
  - PA systems,
  - stereo sound inside an automobile,
  - musical instruments
- Analysis of
  - noise,
  - speech intelligibility,
  - headphone performance

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

Dummy head KU 100  
Microphone cable IC 5  
Adapter cable AC 20  
Plug-in mains unit  
Aluminium case

## Catalog No.

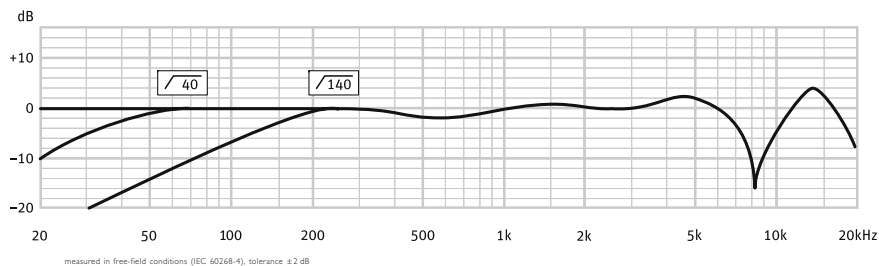
KU 100 (230 V) ..... blk \_\_\_\_ 007130  
KU 100 (117 V) ..... blk \_\_\_\_ 007132

## Selection of Accessories

Windscreens, WSB ..... blk \_\_\_\_ 007372

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

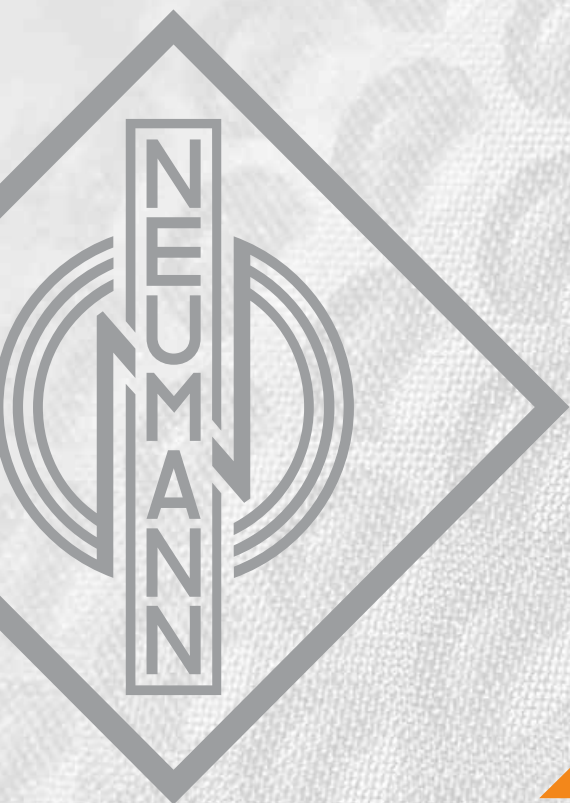
Meaning of color codes:  
blk = black  
ni = nickel





# RSM 191

► **Stereo Shotgun  
Microphone**



[www.neumann.com](http://www.neumann.com)





The RSM 191 is a stereo microphone system consisting of the microphone and the MTX 191 A matrix amplifier. It has an adjustable pick-up angle and high directivity.

The microphone has two separate capsule systems, a hypercardioid element and a figure-8, both in a short shotgun. Together they generate the mid and the side signals.

The matrix amplifier controls the width of the stereo image by changing the gain of the side signal relative to the middle signal in six 3 dB steps.

The output signals of the matrix amplifier are either mid-side (MS) or left/right (XY). The signals are converted through transformerless sum-and-difference circuitry.

The balanced, transformerless technology permits the use of long cables between the microphone, the matrix amplifier and the following mic input of other signal processing equipment.

## Applications

The RSM 191 system is an ideal microphone system for:

Outdoor stereophonic news coverage, even in extremely noisy surroundings;

Stereo recordings for film and television where the actors are recorded simultaneously with acoustic ambience, or an orchestra;

Stereophonic motion picture sound where the width of the sound image must match the camera viewing angle.



## Features

- Variable stereo shotgun microphone with shotgun and figure-8 patterns
- Interference/pressure-gradient transducer
- MS-stereo microphone, switchable to XY-stereophony
- Transformerless circuitry
- Switchable low frequency roll-off and switchable 10 dB preattenuation
- Set with case and accessories
- Battery or phantom powering

## Construction

The RSM 191 consists of a capsule head containing two separate transducer systems and an amplifier section with two independent transformerless microphone amplifiers.

An interference tube system with a hypercardioid characteristic generates the middle signal, while a horizontal figure-8 assembly provides the side signal.

## Acoustic features

The RSM 191 achieves its high directivity and special acoustic features through a unique construction. The microphone capsule assembly is mounted inside a housing tube that is acoustically open but has a high flow resistance.

This results in a high driving force for the diaphragm, even with a low pressure gradient factor of the capsule. Therefore, the microphone can suppress unwanted off-axis interference to a considerably higher degree than other microphones without such an interference tube.



The middle system (M-signal) combines high attenuation of lateral sound incidence, similar to a hypercardioid characteristic (which is about 10 dB), with the large front-to back ratio of the super-cardioid characteristic.

Therefore, sound from the rear is likewise attenuated by approximately 10 dB. This design approach makes the microphone less sensitive to wind or pop noise than other shotgun microphones.

The side system (S-signal) consists of two single capsules arranged back to back, closely behind the interference tube (M-signal) capsule. Arrows engraved on the microphone housing show their orientation.

The uniform and balanced performance characteristic of the microphone system is achieved without resorting to corrective resonance effects. Therefore, the microphone maintains



an excellent impulse response, reproducing all transient phenomena in music and speech without coloration. The entire internal construction is decoupled from the housing to avoid structure borne and handling noise.

### Electrical features

The output signals of the included matrix amplifier are in either MS or XY format. The small capsules are mounted in close proximity to ensure transparent and coloration-free stereo sound with excellent mono-compatibility. The stereo acceptance angle is variable and controlled remotely.

### Filter and attenuation

For the handling of very high sound pressure levels, a 10 dB attenuation can be switched ON to avoid overloading of the following equipment.

To suppress structure borne noise, a high-pass filter in the matrix box provides cutoff frequencies of 40 Hz, 80 Hz, and 200 Hz.



### Battery supply

The RSM 191 system is fed from either 2 x P48 phantom power or from a 9 V battery inside the matrix box.

One alkaline battery provides 8 hours of operation.



### Technical Data

Acoustical operating principle	M: Pressure gradient/interference transducer
	S: Pressure gradient transducer
Directional pattern	M: Lobe-shaped
	S: Figure-8
Frequency range	20 Hz..20 kHz
Sensitivity at 1 kHz into 1 kohm	23 mV/Pa
Rated impedance	50 ohms
Rated load impedance	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	69/63 dB <sup>2)</sup>
Signal-to-noise ratio, A-weighted <sup>3)</sup> (rel. 94 dB SPL)	78/72 dB <sup>2)</sup>

Equivalent noise level, CCIR <sup>1)</sup>	25/31 dB <sup>2)</sup>
Equivalent noise level, A-weighted <sup>3)</sup>	16/22 dB-A <sup>2)</sup>
Maximum SPL for THD 0.5% <sup>3)</sup>	134 dB
Maximum SPL for THD 0.5% with preattenuation <sup>3)</sup>	144 dB
Maximum output voltage	2540 mV
Supply voltage (P48, IEC 61938)	2 x 48 V ± 4 V
Current consumption (P48, IEC 61938)	2 x 1.9 mA
Matching connector	2 x XLR3F
Weight	170 g
Diameter	30 mm
Length	212 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1; RMS <sup>2)</sup> MS <sup>3)</sup> measured as equivalent el. input signal



## Delivery range

The complete microphone system comes in a robust aluminum carrying case.

Along with the microphone and the matrix amplifier the case contains a windscreen, the special interconnecting cable and an adapter cable that splits the 5-pin XLR output of the matrix amplifier into two 3-pin XLR connectors for channels I and II to connect with the following equipment.



## Application Hints

- Stereo recordings for
    - broadcasting/ENG,
    - film productions
    - video productions
  - Recordings with variable stereo width
  - Handheld and boom/fishpole operation
  - As variable stereo overhead system for drums (percussion)
- These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

Microphone RSM 191  
Matrix amplifier MTX 191 A  
Microphone cable KT 5  
Adapter cable AC 20  
Windscreen WS 191  
Aluminium case

## Catalog No.

RSM 191 A Set ..... blk ..... 007087

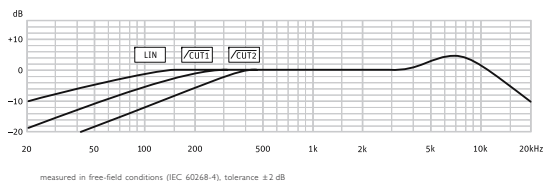
## Selection of Accessories

Power supply, N 248 EU ..... blk ..... 008537  
Power supply, N 248 US ..... blk ..... 008538  
Power supply, N 248 UK ..... blk ..... 008539  
Auditorium hanger, MNV 87 mt ..... blk ..... 006806  
Elastic suspension, EA 30 B mt ..... blk ..... 006349  
Microphone cable, KT 6  
(with stand mount swivel) ..... blk ..... 006725  
Microphone cable, IC 7 ..... blk ..... 006740

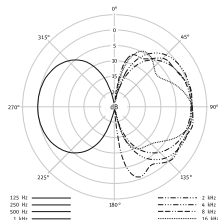
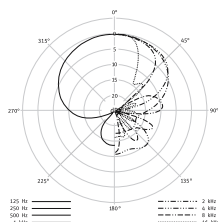
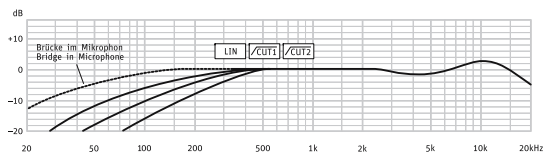
A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black  
ni = nickel

## M-System

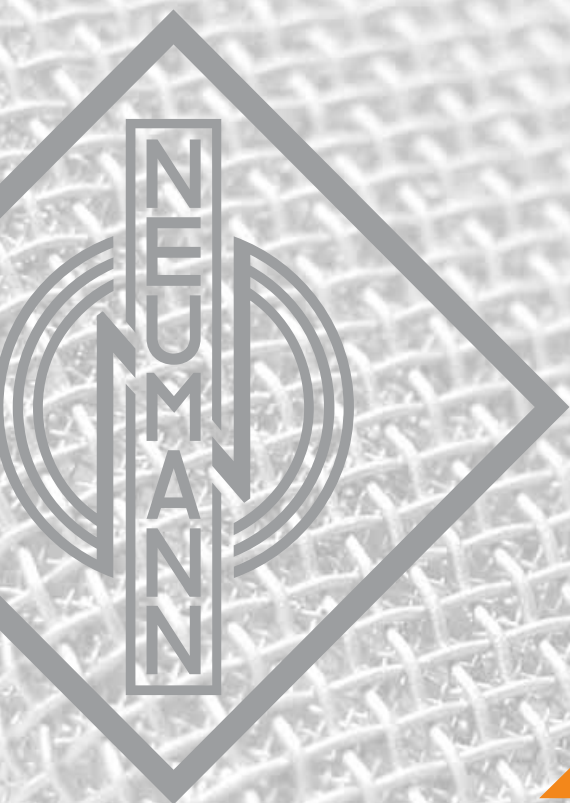


## S-System



# USM 69 i

► **Stereo Microphone**



[www.neumann.com](http://www.neumann.com)



## Features

- Switchable stereo microphone
- Two pressure-gradient transducers with double membrane capsules
- MS- or XY-stereophony
- Capsules rotary by 270°
- Very low noise
- Aperture and pick-up angles freely choosable
- Directional characteristics reproducibly switchable, omni, wide angle cardioid, cardioid, hypercardioid, figure-8

The USM 69 i stereo microphone has two separate dual-diaphragm capsules. These are mounted vertically and rotate against each other. The directional polar patterns can be selected separately for each capsule. The capsules operate independently from each other.

## Applications

The USM 69 i condenser stereo microphone is a studio microphone for intensity stereo recording. It is suitable for XY and MS recordings.

## Construction

The microphone consists of the amplifier section and the capsule head. The amplifier section contains two microphone amplifiers operating independently from each other. They have an extremely low self noise.

Two completely separate microphone capsules are positioned closely above each other within the capsule head. Their diaphragms are made out of gold-sputtered polyester film. The upper capsule rotates against the lower one over a range of 270°. Color markings on the lower capsule system help to identify the angle by which the upper capsule has been rotated.

When sound waves reach the microphone capsules from different directions they will generate audio signals with different intensity only, but not with time differences, since the capsules are in close proximity and the sound arrives at both capsules simultaneously. The result is an intensity stereo signal that can be summed together for excellent mono compatibility without causing interference.

## Polar patterns

The USM 69 i has two built-in rotary switches. The five polar patterns of both capsules can be selected at the microphone itself. Therefore, no special AC power supply units or powering adapters are necessary.

The two outputs attach directly to any 48 V phantom powered connectors.

In addition to the usual polar patterns: omnidirectional, cardioid, and figure-8, we have added a hypercardioid and a wide-angle cardioid pattern.

A built-in DC converter generates the required capsule polarizing voltages.

## Electrical features

The amplifiers feature high output capability and extremely low self noise. Distant sound sources, as well as very loud sound sources at close range can therefore be recorded without any problem.

Each amplifier has an active filter. It effectively suppresses subsonic interference as caused by wind or structure borne noise. At the same time, the filter prevents the output transformers from overloading through very low frequency energy.

## Use as a mono microphone

The microphones may also be used as completely independent mono microphones. There are many applications when it is important to have a second mono microphone as a back-up, or when the outputs of microphones with different polar response characteristics must be available simultaneously.

The outputs of the two microphone channels can be linked (cascaded). In addition to the individual directional patterns, other characteristics are available through the combination of both channels.

## Operational safety

Both microphone systems operate completely independent from each other.

The second amplifier will be unaffected, even in case of a faulty ground of the supply voltage for one of the channels, or a short circuit in one of the outputs.

The microphone is reliable in mono usage, even if only one of the systems is operated and connected. Its simple and redundant circuitry guarantees a low failure rate.

Should the DC converter ever fail, a diode circuit within the microphone ensures that both systems will remain operational. The cardioid pattern is automatically chosen. The sensitivity is reduced by 3 dB.

## Application Hints

- As XY stereo mic
- As MS stereo mic
- Overall stereo main mic (overhead)
- Announcer's mic for broadcasting, drama, features...

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range

Microphone USM 69 i (mt)

## Catalog No.

USM 69 i ..... ni ..... 006974  
USM 69 i mt ..... blk ..... 006976

## Selection of Accessories

Auditorium hanger, MNV 87 ..... ni ..... 006804  
Auditorium hanger, MNV 87 mt ..... blk ..... 006806

Elastic suspension, EA 30 A ..... ni ..... 006346  
Elastic suspension, EA 30 A mt ..... blk ..... 006347

Windscreen, WS 69 ..... blk ..... 006750

Battery supply, BS 48 i-2 ..... blk ..... 006496  
Power supply, N 248 EU ..... blk ..... 008537  
Power supply, N 248 US ..... blk ..... 008538  
Power supply, N 248 UK ..... blk ..... 008539

Microphone cable, IC 5 ..... blk ..... 006623  
Microphone cable, IC 5 mt ..... blk ..... 006624  
Microphone cable, IC 6  
(with stand mount swivel) ..... ni ..... 006621  
Adapter Cable, AC 20 (1m) ..... 006595

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black, ni = nickel

## Technical Data

Acoustical operating principle ..... Pressure gradient transducer  
Directional pattern ..... Omnidirectional, wide angle cardioid,  
cardioid, hypercardioid, figure-8  
Frequency range ..... 20 Hz - 20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 13 mV/Pa  
Rated impedance ..... 150 ohms  
Rated load impedance ..... 1000 ohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 70 dB  
Signal-to-noise ratio, A-weighted<sup>2)</sup> (rel. 94 dB SPL) ..... 81 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 24 dB

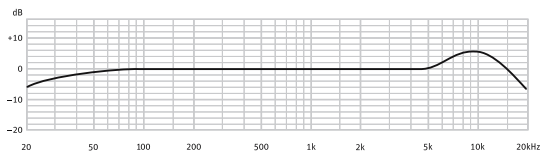
Equivalent noise level, A-weighted<sup>2)</sup> ..... 13 dB-A  
Maximum SPL for THD 0.5%<sup>2)</sup> ..... 132 dB  
Maximum output voltage ..... 3 dBu  
Dynamic range of the microphone amplifier (A-weighted) ..... 119 dB  
Supply voltage (P48, IEC 61938) ..... 48 V ± 4 V  
Current consumption (P48, IEC 61938) ..... 2 x 0.7 mA  
Matching connector ..... XLR 5F  
Weight ..... 510 g  
Diameter ..... 30 + 48 mm  
Length ..... 293 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS <sup>2)</sup> measured as equivalent el. input signal

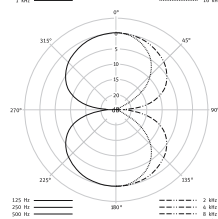
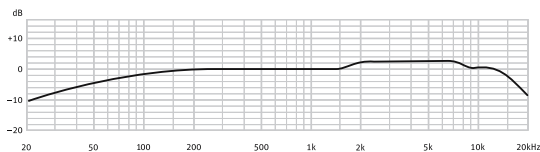
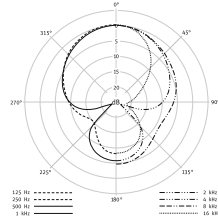
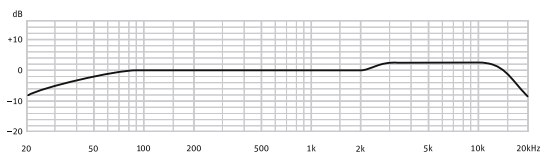
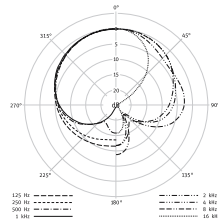
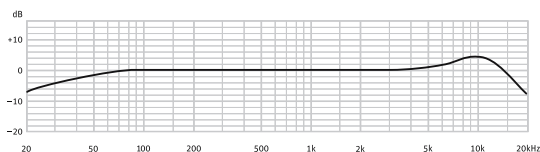
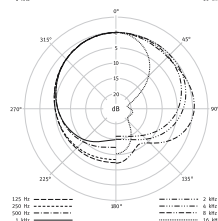
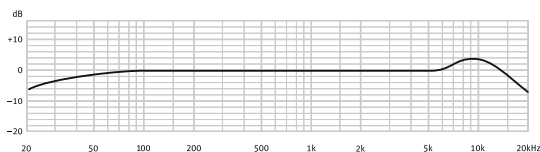
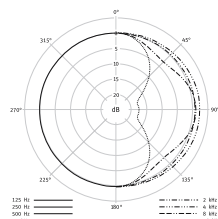


# NEUMANN.BERLIN

► THE MICROPHONE COMPANY



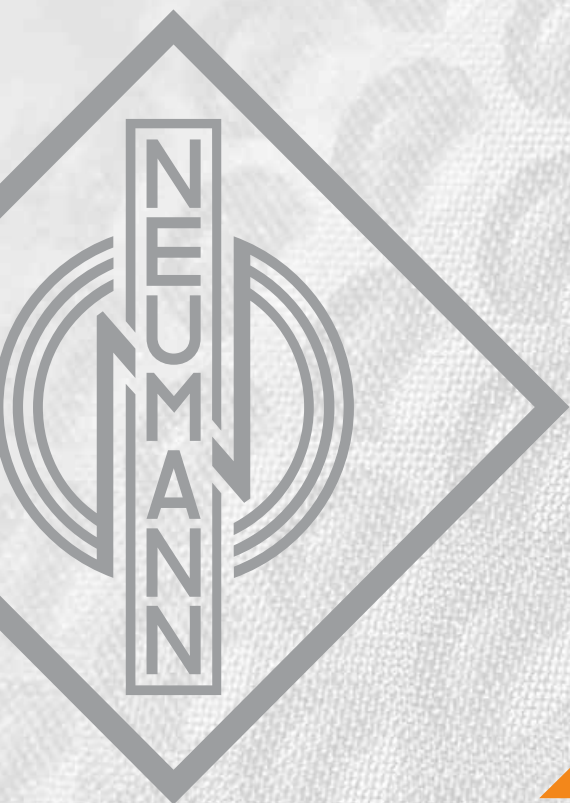
measured in free-field conditions (IEC 60268-6), tolerance  $\pm 2$  dB





# KMR 81/82 i

► **Shotgun  
Microphones**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY

**T**he KMR 81 and KMR 82 are shotgun microphones with a high directivity that remains within the acceptance angle independent of the frequency.

The advantage is that a sound source, for example an actor on stage, will not change its apparent tonal balance when moving within this area.

## Applications

Shotgun microphones are particularly useful in recording situations where a microphone cannot be positioned within the desired distance of the sound source to produce a sufficiently loud signal level.

Typical applications are film and video recordings, where the microphone should not appear in the picture.

The KMR 82 is very often used on stage. The KMR 81 has been specifically designed for electronic news gathering.



## Acoustic features

In principle, Neumann shotgun microphones use a combination of a pressure gradient transducer and an interference tube. If the wavelength of the frequency is longer than the tube

length, the microphones work as pressure gradient transducers. At higher frequencies they operate as interference transducers for lateral sound. Off-axis sound sources are picked up with reduced level, but without coloration.

Therefore, the microphones are well suited to record individual instruments of an orchestra. The pickup areas of several shotgun microphones may even overlap as, for example, during recordings on a large stage, without causing any problem.

The KMR 81 and KMR 82 are less sensitive to wind and pop noise when compared to the KM 150 miniature microphone with a similar high directivity. Both shotgun microphones feature extremely low self noise, good impulse response, and high output level.

## Polar pattern

KMR 81 and KMR 82 are shotgun microphones with a very directional characteristic.

The microphone capsule is positioned inside a housing tube that is acoustically open but has a high flow resistance.

The directional patterns of the microphones are lobe shaped. The attenuation of lateral sound is practically independent of the frequency.

The KMR 82 has a frequency independent directivity within a pickup angle of 45° for audio signals that determine the tonal balance of the program material. For the KMR 81, this angle is 90°.



## Features

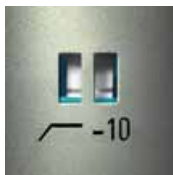
- Interference tube microphones with shotgun directional characteristic
- Interference/pressure-gradient transducer
- High lateral and back attenuation
- 90°/45°-recording angle
- Switchable filter or preattenuation features
- Extensive accessories for outdoor use
- Light weight: 145 g/250 g



### Filter and attenuation KMR 81 i

The microphone has a 10 dB attenuation switch to prevent the input of the following unit from overloading.

A second switch activates a 200 Hz high-pass filter. Toward the lower frequencies the sensitivity of the microphone is attenuated by approximately 15 dB at 50 Hz. The frequency range above 200 Hz is unaffected.



### Filter KMR 82 i

Between 2 kHz and 15 kHz the KMR 82 has a boost to compensate for HF transmission losses in air when recording distant sound sources.

This may overemphasize any sibilance if the microphone is used close-up.

Therefore, a two-position slide switch allows to select the setting that is best for balanced upper frequencies.



The KMR 82 has a high-pass filter to suppress subsonic interference. The cutoff frequency may be raised to 120 Hz (-3 dB) with a built-in two-position slide switch.

### Use on location

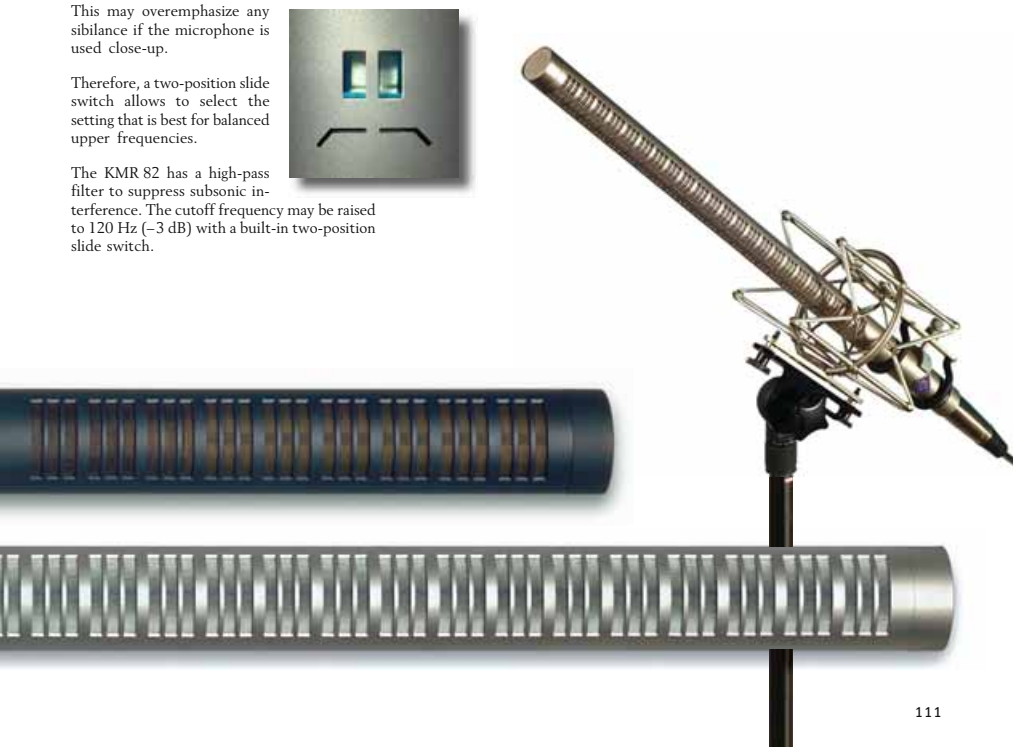
The shotgun microphones feature very high output capability and a remarkably low self-noise level.

Their low power consumption, light weight, and low sensitivity to wind and handling noise, make them ideal tools for news gathering on location.

Small dimensions, together with a balanced center of gravity, make handling easy without any whiplash effect.

However, when on location and during strong wind conditions, we recommend using an additional wind screen (included as standard accessory). The wind screen is made of polyurethane foam and also serves as soft padding of the microphone in its leather carrying case.

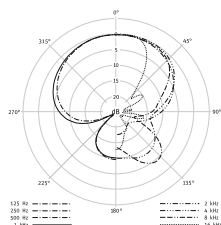
For mobile use a handle and an elastic suspension are available.



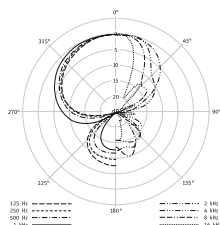


# NEUMANN.BERLIN

THE MICROPHONE COMPANY



**KMR 81 i**



**KMR 82 i**

## Application Hints

- Recordings for
  - broadcasting/ENG
  - film and video productions
- Medium length shotgun spot mic in noisy surroundings
- Balanced weight during handheld and boom/fishpole operation

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

## Delivery Range KMR 81 i

Microphone KMR 81 i (mt), Windscreen WS 81, Leather carrying case

## Delivery Range KMR 82 i

Microphone KMR 82 i (mt), Windscreen WS 82, Leather carrying case

## Catalog No.

KMR 81 i .....	ni	006961
KMR 81 i mt .....	blk	006962
KMR 82 i .....	ni	006878
KMR 82 i mt .....	blk	006879

## Selection of Accessories

Battery supply, BS 48 i .....	blk	006494
Power supply, N 248 EU .....	blk	008537
Power supply, N 248 US .....	blk	008538
Power supply, N 248 UK .....	blk	008539
Stand mount swivel, SG 82 .....	blk	006616
Handle, HG 82 .....	blk	006856
Auditorium hanger, MNV 21 mt .....	blk	006802
Elastic suspension, EA 82 .....	ni	006846
Elastic suspension, EA 82 mt .....	blk	006848
Microphone cable, IC 3 mt .....	blk	006547

## for KMR 81 i only:

Windscreen, WK 81 .....	gr	007275
Elastic suspension, EA 2124 A mt .....	blk	008433

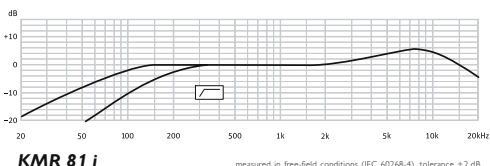
## for KMR 82 i only:

Windscreen, WK 82 .....	gr	006855
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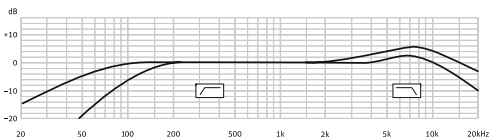
A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:

blk = black; ni = nickel; gr = grey



**KMR 81 i**



**KMR 82 i**

## Technical Data

## KMR 81 i KMR 82 i

Acoustical operating principle .....	Interference transd. ....	Interference transd.
Directional pattern .....	Supercard/lobe .....	Supercard/lobe
Frequency range .....	20 Hz.. 20 kHz .....	20 Hz.. 20 kHz
Sensitivity at 1 kHz into 1 kohm .....	18 mV/Pa .....	21 mV/Pa
Rated impedance .....	150 ohms .....	150 ohms
Rated load impedance .....	1000 ohms .....	1000 ohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL) .....	71 dB .....	71 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL) .....	82 dB .....	82 dB
Equivalent noise level, CCIR <sup>1)</sup> .....	23 dB .....	23 dB
Equivalent noise level, A-weighted <sup>1)</sup> .....	12 dB-A .....	12 dB-A
Maximum SPL for THD 0.5% <sup>2)</sup> .....	128 dB .....	128 dB
Maximum SPL for THD 0.5% with preattenuation <sup>2)</sup> .....	138 dB .....	138 dB
Maximum output voltage .....	900 mV .....	1050 mV
Dyn. range of the mic. amplifier (A-weighted) .....	116 dB .....	116 dB
Supply voltage (P48, IEC 61938) .....	48 V ± 4 V .....	48 V ± 4 V
Current consumption (P48, IEC 61938) .....	0.8 mA .....	0.7 mA
Matching connector .....	XLR3F .....	XLR3F
Weight .....	145 g .....	250 g
Diameter .....	21 mm .....	21 mm
Length .....	226 mm .....	395 mm

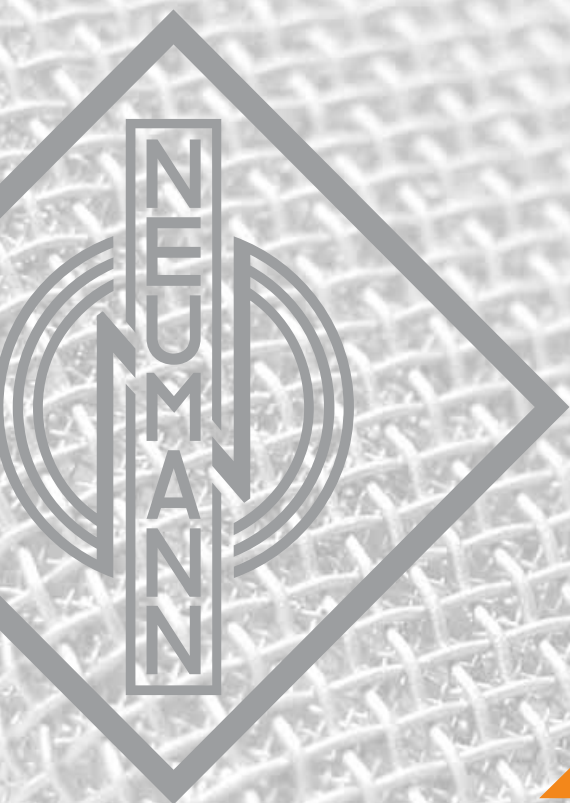
<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak

A-weighting according to IEC 61672-1, RMS

<sup>2)</sup> measured as equivalent el. input signal

# BCM 104

► **Broadcast Line**



[www.neumann.com](http://www.neumann.com)



NEUMANN.BERLIN

►► THE MICROPHONE COMPANY



\* The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

**E**motion conveyed with technical perfection. This is the ideal which the Neumann microphones in the Broadcast Line have been designed to fulfill. The fine-tuning to the requirements of professional broadcast studios and the individual, functionally optimized design\* ensure that these are microphones of character.

With its large-diaphragm condenser capsule and cardioid directional characteristic, the BCM 104 is ideal for the faithful reproduction of speech and music. This is due, for instance, to the frequency response that is flat up to 3 kHz and then gradually boosted in the higher frequencies. If required, internal switches can be used to compensate for the proximity effect and to reduce the sensitivity by 14 dB. The versatility of the BCM 104 can be seen in its wide range of applications, from news, to round-table discussions, to radio plays, to musical recordings.

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### **Mechanical Features**

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The microphone headgrille twists off easily for quick cleaning. Neumann offers optional color-coded headgrilles so that, for reasons of hygiene, each announcer can use his or her individual headgrille. In front of the capsule, mounted on a frame holder, a fine gauze serves as a built-in popscreen.

The microphones of the Broadcast Line have an elastic mount against structure-borne noise, that is compatible with standard broadcast-segment microphone arms.

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### **Acoustic Features**

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The microphone headgrille houses the K 04 large-diaphragm capsule, which has a flat frequency response up to 3 kHz. Higher frequencies have an increased presence up to 2 dB.

Since the above-mentioned microphone characteristics are obtained without the use of resonance effects, the microphone features excellent transient response and transmits all transient phenomena of music and speech without any coloration.

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### **The integrated Pop Screen**

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A pop screen not only prevents the occurrence of plosive pop noises in vocal recordings, but also efficiently prevents unwanted particles, from respiratory moisture, nicotine, to food remnants, from settling on the diaphragm. The pop screen can be removed for cleaning without the use of tools.

## Electrical features

Instead of a transformer to couple the microphone output to the supply voltage, the BCM 104 has an electronic circuit which, like a transformer, provides for good common mode rejection. Interference induced in the balanced modulation line is thus suppressed effectively.

With a very low self-noise of 7 dB(A), and an overload capability extending to 138 dB SPL, the BCM 104 has a dynamic range of 131 dB (A-weighted).



## Filter and Preattenuation

The BCM 104 amplifier has a linear operation down to 20 Hz. An active filter efficiently suppresses signals below this frequency. In order to compensate for the proximity effect, an electronic high-pass filter, activated by a switch, is built into the microphone. This filter reduces frequencies below 100 Hz by 12 dB/octave.

A 14-dB preattenuation switch is provided in order to adjust the sensitivity, if necessary, to circuits designed for dynamic microphones. This will increase the self noise level accordingly.

Both switches are located inside the microphone housing, since they will normally be operated only once, when the broadcasting facility is set up.

## Mounting

The preferred mode of operation is to suspend the microphones in the Broadcast Line from a standard studio boom arm. A thread adapter to fit different connector threads is included. In order to provide protection from structure-borne noise, both the capsule and the microphone in its mount are elastically suspended.

The optional SG 5 swivel mount allows additional angling of the microphone by  $\pm 90$  degrees.

## Delivery Range

BCM 104 Microphone

## Catalog No.

BCM 104 ..... ni ..... 008483

## Selection of Accessories

Power supply, N 248 EU ..... blk ..... 008537

Power supply, N 248 US ..... blk ..... 008538

Power supply, N 248 UK ..... blk ..... 008539

Headgrille, BCK ..... ni ..... 008520  
(incl. Assortment of colored rings)

Swivel Mount, SG 5 ..... 008529

Popscreen, PS 15 ..... blk ..... 008472

Popscreen, PS 20 a ..... blk ..... 008488

Windscreen, WS 47 ..... blk ..... 006826

Microphone cable, IC 3 mt ..... blk ..... 006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

Meaning of color codes:

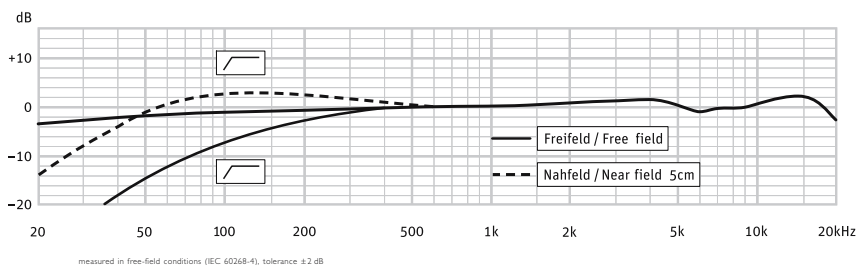
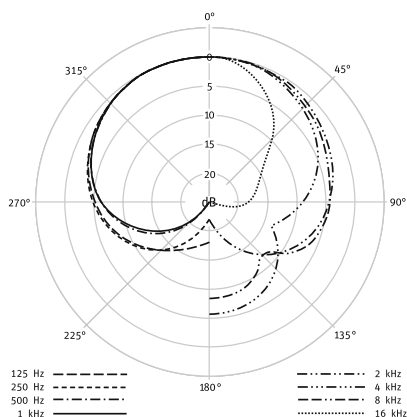
blk = black

ni = nickel

## Features

- Large-diaphragm condenser capsule
- Cardioid directional characteristic
- Characteristic, functionally optimized design
- Integrated, neutral pop protection
- Integrated elastic suspension
- Individual headgrilles for different users
- Colored rings to identify the replacement headgrilles
- Easy removal and cleaning of microphone headgrille (with bayonet mount)
- Mechanical compatibility with standard studio boom arms
- Internal switches: high-pass and preattenuation





## Technical Data

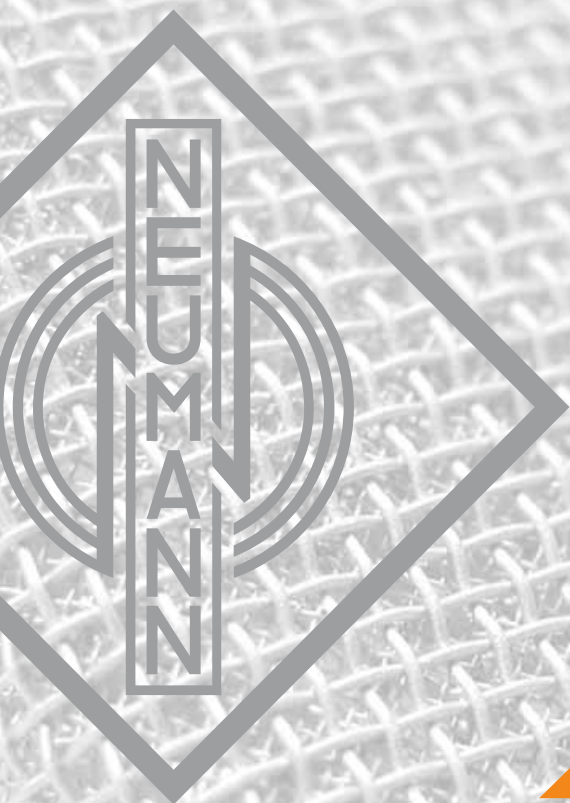
Acoustical operating principle	Pressure gradient transducer
Directional pattern	Cardioid
Frequency range	20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm	22 mV/Pa
Sensitivity at -14 dB attenuation	4.4 mV/Pa
Rated impedance	50 ohms
Rated load impedance	1 kohms
Signal-to-noise ratio, CCIR <sup>1)</sup> (rel. 94 dB SPL)	76 dB
Signal-to-noise ratio, A-weighted <sup>1)</sup> (rel. 94 dB SPL)	87 dB
Equivalent noise level, CCIR <sup>1)</sup>	18 dB
Equivalent noise level, A-weighted <sup>1)</sup>	7 dB-A

Maximum SPL for THD 0.5% <sup>2)</sup>	138 dB
Maximum SPL for THD 0.5% with preattenuation <sup>2)</sup>	152 dB
Maximum output voltage	10 dBu
Dynamic range of the microphone amplifier (A-weighted)	131 dB
Supply voltage (P48, IEC 61938)	48 V ± 4 V
Current consumption (P48, IEC 61938)	3.2 mA
Matching connector	XLR3F
Weight	500 g
Diameter	64 mm
Length	85 mm
Height (without suspension)	110 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS    <sup>2)</sup> measured as equivalent el. input signal

# BCM 705

► **Broadcast Line**



[www.neumann.com](http://www.neumann.com)



# NEUMANN.BERLIN

► THE MICROPHONE COMPANY



\* The design of the microphone is a registered design of the Georg Neumann GmbH in certain countries.

**E**motion conveyed with technical perfection. This is the ideal which the Neumann microphones in the Broadcast Line have been designed to fulfill. The fine-tuning to the requirements of professional broadcast studios and the individual, functionally optimized design\* ensure that these are microphones of character.

The BCM 705 is Neumann's first dynamic microphone. The housing and headgrille are identical to those of the BCM 104; only the green logo indicates that this is something new from Neumann. The principle of reduction to the essentials can be seen in the dynamic capsule with a hypercardioid directional characteristic, specifically designed for speech reproduction at close range. Multi-level isolation from structure-borne noise ensures operation free of interference, even in a lively studio environment.



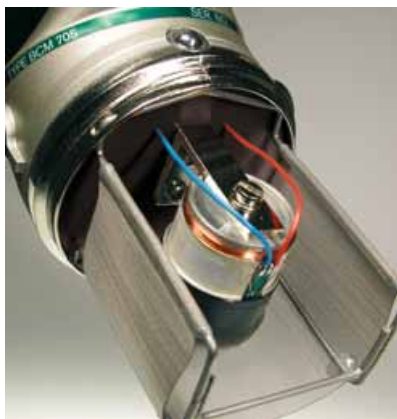
## **Mechanical Features**

The microphone headgrille twists off easily for quick cleaning. Neumann offers optional, color-coded headgrilles so that, for reasons of hygiene, each announcer can use his or her individual headgrille. In front of the capsule, mounted on a frame holder, a fine gauze serves as a built-in pop-screen.

The microphones of the Broadcast Line have an elastic mount against structure-borne noise, that is compatible with standard broadcast-segment microphone arms.

## **Acoustic Features**

The frequency response has a light treble boost, in the region from 2 kHz to 9 kHz, aiding the speech intelligibility. The bass frequency response is designed to compensate for the overemphasis of the bass caused by the proximity effect.



### The integrated Pop Screen

A pop screen not only prevents the occurrence of plosive pop noises in vocal recordings, but also efficiently prevents unwanted particles, from respiratory moisture, nicotine, to food remnants, from settling on the diaphragm.

The pop screen can be removed for cleaning without the use of tools.



### Mounting

The preferred mode of operation is to suspend the microphones in the Broadcast Line from a standard studio boom arm. A thread adapter to fit different connector threads is included. In order to provide protection from structure-borne noise, both the capsule and the microphone in its mount are elastically suspended.

The optional SG 5 swivel mount allows additional angling of the microphone by  $\pm 90$  degrees.



### Delivery Range

BCM 705 Microphone

### Catalog No.

BCM 705 ..... ni ..... 008507

### Selection of Accessories

Headgrille, BCK ..... ni ..... 008520  
(incl. assortment of colored rings)

Swivel Mount, SG 5 ..... 008529

Popscreen, PS 15 ..... blk ..... 008472

Popscreen, PS 20 a ..... blk ..... 008488

Windscreen, WS 47 ..... blk ..... 006826

Microphone cable, IC 3 mt. .... blk ..... 006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog

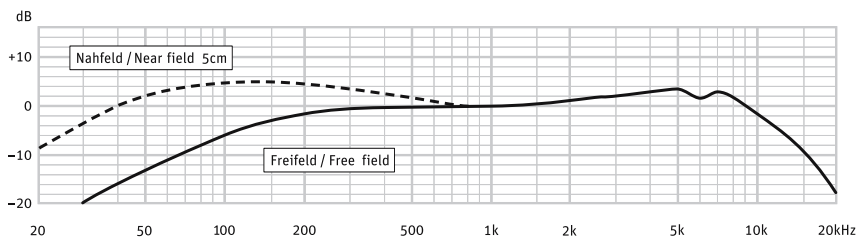
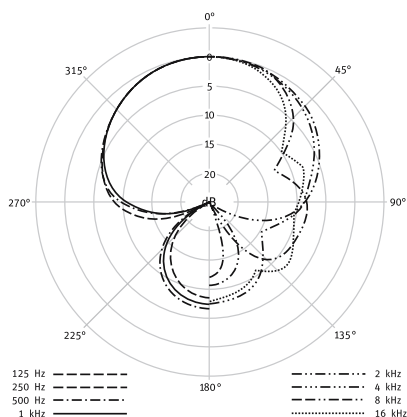
Meaning of color codes:

blk = black,

ni = nickel

### Features

- Dynamic capsule
- Hypercardioid directional characteristic
- Characteristic, functionally optimized design
- Integrated, neutral pop protection
- Integrated elastic suspension
- Individual headgrilles for different users
- Colored rings to identify the replacement headgrilles
- Easy removal and cleaning of microphone headgrille (with bayonet mount)
- Mechanical compatibility with standard studio boom arms
- Multi-level isolation from structure-borne noise
- No power supply required



measured in free-field conditions (IEC 60268-4) into 10 kohms rated load impedance, tolerance  $\pm 2$  dB

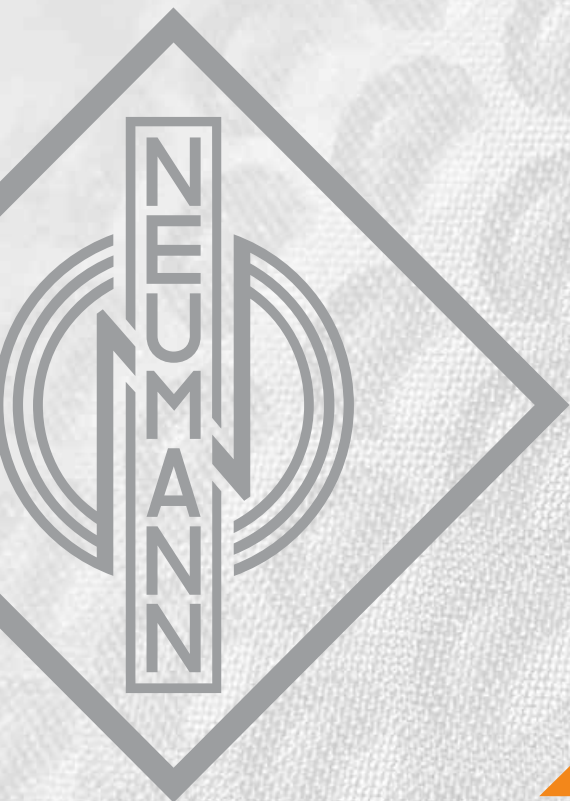
### Technical Data

Acoustical operating principle	Pressure gradient transducer	Signal-to-noise ratio, A-weighted <sup>(1)</sup> (rel. 94 dB SPL)	76 dB
Directional pattern	Hypercardioid	Equivalent noise level, CCIR <sup>(1)</sup>	32 dB
Frequency range	20 Hz..20 kHz	Equivalent noise level, A-weighted <sup>(1)</sup>	18 dB A
Sensitivity at 1 kHz into 10 kohm	1.7 mV/Pa	Weight	500 g
Rated impedance	200 ohms	Diameter	64 mm
Rated load impedance	1 kohms	Length	85 mm
Signal-to-noise ratio, CCIR <sup>(1)</sup> (rel. 94 dB SPL)	62 dB	Height (without suspension)	110 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS

# GFM 132

► **Boundary Layer  
Microphone**



[www.neumann.com](http://www.neumann.com)



**T**he GFM 132 is a boundary layer microphone. Through computer simulation Neumann optimized the design to be free of any comb filter effects due to reflections, typical of other such microphones.

The smooth frequency response for all angles of incidence exhibits a rise in the upper frequency range. This assures that all sound sources, even distant ones, will be recorded with clarity and presence.

Therefore, typical applications are for live recordings, such as in the orchestra pit of opera houses, theaters, and on stage.

The back of the microphone has non-slip pads for its use in a horizontal or inclined position, and holes for wall suspension. It is supplied with a wooden case and a wind screen.



## Features

- Boundary layer microphone
- Pressure transducer
- Frequency independent hemispherical directional characteristic
- Identical diffuse- and free-field response
- No angle dependent coloration through patented triangular form
- No comb filter effects
- Insensitive to structure-borne noise

## Background

Boundary-layer microphones are generally characterized by the following features:

They have an identical flat frequency response in the diffuse-field and free-field;

They have a hemispherical polar pattern, independent of the frequency;

They have a 6 dB higher output level through pressure doubling at the boundary surface.

Until recently, neither the potential of identical diffuse- and free-field response, nor the ideal hemispherical polar patterns throughout the entire frequency range have been achieved by any known boundary-layer microphone. Circular, square, or rectangular plates were used to mount the acoustic transducer and to provide the "live" sound reflecting surface for pressure doubling at high frequencies.

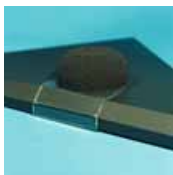
However, such shapes have disadvantages: The sound pressure level at the position of the transducer depends on the frequency and the incidence angle. The incoming primary sound field is superimposed upon the secondary sound field resulting from diffraction at the edges of the plate. As a result, boundary-layer microphones using circular, square or rectangular shaped plates generate linear distortion, such as comb filter effects, of frequency and polar response.



### The Neumann solution

The GFM 132 boundary-layer microphone has a unique, computer generated shape that totally avoids these disadvantages. The path lengths from each edge point to the center of the transducer are distributed evenly for all wavelengths within the frequency range.

This design eliminates any possible linear distortion of frequencies caused at the location of the electro-acoustic transducer by the interaction of the incoming primary sound field with the secondary sound field from diffraction at the edges of the plate.



The operating range of the plate reaches from the lowest frequency causing a pressure doubling in front of the plate to the upper limit of the audible range.

The microphone features a smooth frequency response for all angles of incidence, with a slight rise in amplitude in the upper frequency range. This assures that all sound sources, even distant ones, will be recorded with clarity and presence.

### Acoustic features

- The microphone provides high output voltage through pressure doubling at the boundary surface.
- Identical diffuse- and free-field frequency response. Its advantage is that the apparent tonal balance of a moving sound source is independent of the distance and direction.
- The special geometric shape prevents angle-dependent coloration in the vertical and horizontal planes.
- There are no comb filter effects in typical applications, for example on a speaker's desk, as they would occur through reflections, using conventional microphones.
- The hemispherical polar pattern is independent of the frequency, producing a spatial sound with presence and excellent transparency.
- As is common for a pressure transducer, the microphone is insensitive to structure borne noise and air movements.

- The microphone reproduces with great accuracy very low frequencies if the boundary layer is adequately large.
- In surroundings with good acoustics the GFM 132 creates incredibly realistic AB-stereo recordings, taking advantage of delay and intensity differences in the audio signal.

### Electrical features

The GFM 132 uses transformerless circuitry and operates on 48 V phantom power. The usual output transformer is replaced by an electronic circuit.

As with traditional transformers, this design ensures good common mode rejection and prevents RF interference that may influence the balanced audio signal. The microphone features high output capability and extremely low self noise. It provides exceptionally clean sound reproduction free of coloration.

### Attenuation

The microphone has a 10 dB attenuation switch to prevent the input of the following unit from being overloaded.



The switch is located next to the cable connector at the side of the GFM 132 boundary layer microphone.

### Application Hints

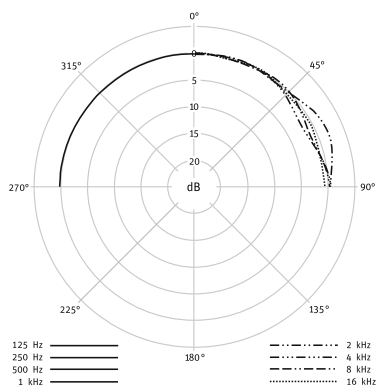
- An ideal stereo pair for AB technique
- For round table discussions
- Quick and easy installation for the "fast interview"
- Invisible spot mic for
  - harp,
  - cello,
  - double bass,
  - acoustic guitar
- Excellent bass response when used as main mic for drums

*These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.*



# NEUMANN.BERLIN

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## Delivery Range

Microphone GFM 132  
Plug-on Windscreen  
Microphone cable  
Wooden box

## Catalog No.

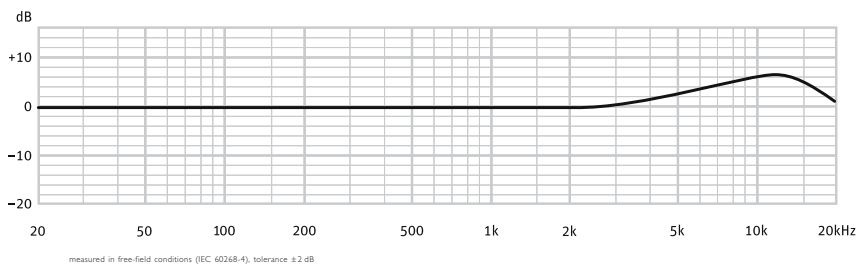
GFM 132 ..... blk ..... 007100

## Selection of Accessories

Battery supply, BS 48 i ..... blk ..... 006494  
Power supply, N 248 EU ..... blk ..... 008537  
Power supply, N 248 US ..... blk ..... 008538  
Power supply, N 248 UK ..... blk ..... 008539  
Microphone cable, IC 3 mt ..... blk ..... 006543

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:  
blk = black, ni = nickel



## Technical Data

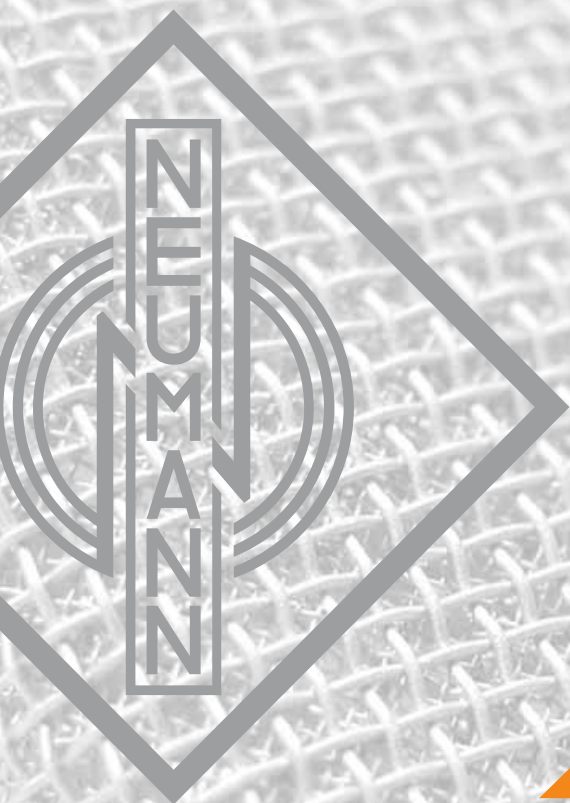
Acoustical operating principle ..... Pressure transducer  
Directional pattern ..... Hemispherical  
Frequency range ..... 20 Hz...20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 18 mV/Pa  
Rated impedance ..... 50 ohms  
Rated load impedance ..... 1000 ohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 70 dB  
Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 80 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 24 dB  
Equivalent noise level, A-weighted<sup>1)</sup> ..... 14 dB-A

Maximum SPL for THD 0.5%<sup>2)</sup> ..... 137 dB  
Maximum SPL for THD 0.5% with preattenuation<sup>2)</sup> ..... 147 dB  
Maximum output voltage ..... 10 dBu  
Dynamic range of the microphone amplifier (A-weighted) ..... 123 dB  
Supply voltage (P48, IEC 61938) ..... 48 V  $\pm$  4 V  
Current consumption (P48, IEC 61938) ..... 2 mA  
Matching connector ..... XLR3F  
Weight ..... 460 g  
Width ..... 213 mm  
Depth ..... 168 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1; RMS <sup>2)</sup> measured as equivalent el. input signal

# TLM 50

► **Pressure  
Microphone**



[www.neumann.com](http://www.neumann.com)



## Features

- Small diaphragm microphone with omnidirectional pattern
- Successor of the world-wide successful M 50
- Excellent response down to lowest frequencies
- Pressure transducer
- High frequency polar pattern similar to pressure gradient transducer
- Set includes cable and auditorium hanger

The TLM 50 is a studio microphone with an unusual omnidirectional characteristic. The same way as in the legendary M 50, the capsule is mounted flush into the surface of a sphere.

This unique design gives the microphone a smooth rise in frequency response and an increased directivity in the upper frequency range.

There the directional characteristic is almost comparable to a pressure gradient microphone. In the lower audio spectrum it performs more as a pressure transducer with a linear response down to the lowest frequencies.

In 1991 the TLM 50 received the MIX MAGAZINE TEC-Award. It is supplied with a swivel mount cable and an auditorium hanger.



## Applications

The design of the TLM 50 is based on the legendary M 50 and has very unique acoustic features. It provides a tool for capturing both direct sound from the instruments and a balanced image of the reverberant environment and is therefore especially suited for stereo recordings with two main microphones.

## Acoustic features

The diaphragm of the pressure capsule is 12 mm in diameter and is only 5  $\mu$ m thick. As a result it has a remarkably fast transient response. The diaphragm is made out of titanium, manufactured by Neumann in a proprietary electroplating process.

The headgrille is acoustically very transparent. Even extreme sound pressure levels do not at all affect the transducer's response.

Of course, the headgrille also protects the microphone capsule from mechanical shock and serves as wind and pop screen.



### Electrical features

The letters TLM stand for "transformerless microphone". The usual output transformer is replaced in the TLM 50 by an electronic circuit. As with traditional transformers, this technique ensures good common mode rejection, and prevents RF interference, that may influence the balanced audio signal. The transformerless microphone amplifier provides low self noise, fast transient response, and high output capability.

To protect the capsule from hum pickup through the gauze mesh, it is designed as an "active capsule": The capsule housing contains the impedance converter built as a hybrid module. The resulting audio signal is fed with low impedance to the filter and output stage in the housing.

### Filter and attenuation

A -10 dB switch and a high-pass filter for the attenuation of frequencies below 100 Hz are located at the rear of the microphone. In the position LIN, the cutoff frequency is 30 Hz. Its purpose is to protect the following equipment from subsonic interference (for example strong air currents).

The -10 dB function is achieved by reducing the capsule polarizing voltage from 60 V to 23 V. It helps to avoid overloading the following units during very high sound pressure levels.

The switch does not extend the dynamic range of the microphone amplifier, but shifts it upward by 10 dB.



### Application Hints

- Its special acoustic properties make this an ideal mic for most classical recordings
- A superb AB stereo pair for perfect balance of direct and reverberant sound
- Decca tree, setup with three microphones
- A highest quality spot (solo) mic

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

### Cable suspension

The recommended accessories, such as cables and connectors, provide sufficient stability and therefor allow suspending the TLM 50 eg. from the ceiling of a concert hall with the included MNV 87 auditorium hanger freely from its own cable.



### Delivery Range

TLM 50 Microphone  
IC 4 mt. Microphone cable (with stand mount swivel)  
MNV 87 mt Auditorium hanger  
Dust cover  
Wooden box

### Catalog No.

TLM 50 Set ..... blk ..... 007135

### Selection of Accessories

Battery supply, BS 48 i ..... blk ..... 006494  
Power supply, N 248 EU ..... blk ..... 008537  
Power supply, N 248 US ..... blk ..... 008538  
Power supply, N 248 UK ..... blk ..... 008539

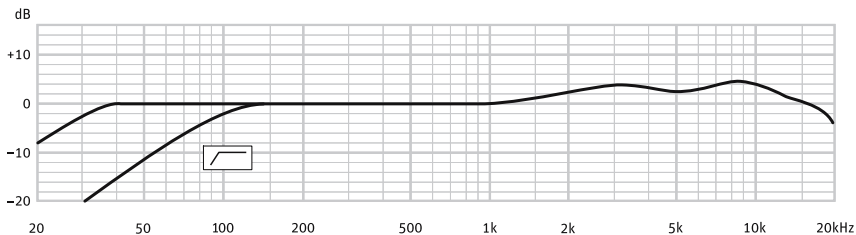
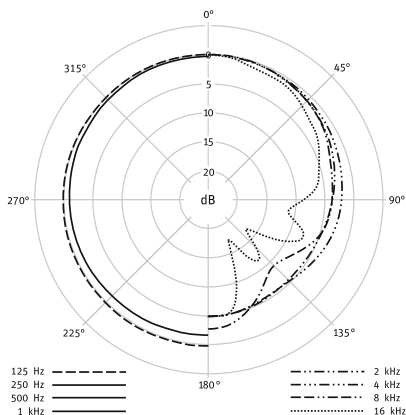
Elastic suspension, EA 50 ..... blk ..... 007359

Windscreen, WS 87 ..... blk ..... 006753

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:

blk = black  
ni = nickel



measured in free-field conditions (IEC 60268-4), tolerance  $\pm 2$  dB

## Technical Data

Acoustical operating principle ..... Pressure transducer  
Directional pattern ..... Omnidirectional  
Frequency range ..... 20 Hz...20 kHz  
Sensitivity at 1 kHz into 1 kohm ..... 20 mV/Pa  
Rated impedance ..... 50 ohms  
Rated load impedance ..... 1000 ohms  
Signal-to-noise ratio, CCIR<sup>1)</sup> (rel. 94 dB SPL) ..... 68 dB  
Signal-to-noise ratio, A-weighted<sup>1)</sup> (rel. 94 dB SPL) ..... 81 dB  
Equivalent noise level, CCIR<sup>1)</sup> ..... 26 dB  
Equivalent noise level, A-weighted<sup>1)</sup> ..... 13 dB-A

Maximum SPL for THD 0.5%<sup>2)</sup> ..... 136 dB  
Maximum SPL for THD 0.5% with preattenuation<sup>2)</sup> ..... 146 dB  
Maximum output voltage ..... 10 dBu  
Dynamic range of the microphone amplifier (A-weighted) ..... 123 dB  
Supply voltage (P48, IEC 61938) ..... 48 V  $\pm$  4 V  
Current consumption (P48, IEC 61938) ..... 3 mA  
Matching connector ..... XLR3F  
Weight ..... 490 g  
Diameter ..... 56 mm  
Length ..... 145 mm

<sup>1)</sup> according to IEC 60268-1; CCIR-weighting according to CCIR 468-3, quasi peak; A-weighting according to IEC 61672-1, RMS    <sup>2)</sup> measured as equivalent el. input signal



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Accessories



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## Elastic Suspensions



### Elastic Suspension DA-AK for AK ...

The DA-AK elastic suspension mounts two active capsules in parallel for MS recordings, e.g. AK 20 and AK 40. It has a swivel mount with 3/8" thread.

DA-AK ..... blk ..... Cat. No. 008419



### Elastic Suspension EA 30 B mt

The EA 30 B mt is designed for the RSM 190 and RSM 191 stereo shotgun microphones. It can be attached to the SG 82 swivel mount or the HG 82 handle and is also used for the installation of the microphones in the WK 81 wind-screen.

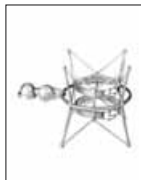
EA 30 B mt ..... blk ..... Cat. No. 006349



### Elastic Suspension DA-KM for KM 100

The DA-KM elastic suspension mounts two miniature microphones in parallel for MS recordings, e.g. KM 120 and KM 140. It has a swivel mount with 3/8" thread.

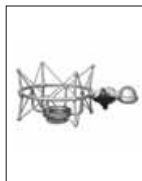
DA-KM ..... blk ..... Cat. No. 008420



### Elastic Suspension EA 47

The EA 47 is designed for the U 47 and U 47 fet microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 47 ..... ni ..... Cat. No. 006827

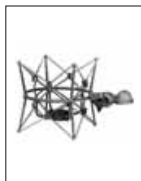


### Elastic Suspension EA 1 (mt)

The EA 1 is designed for the TLM 103, TLM 127, TLM 193 and M 147 Tube microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 1 ..... ni ..... Cat. No. 008449

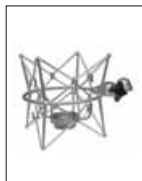
EA 1 mt ..... blk ..... Cat. No. 008450



### Elastic Suspension EA 50

The EA 50 is designed for the TLM 50 microphone. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 50 ..... blk ..... Cat. No. 007359

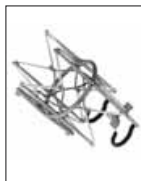


### Elastic Suspension EA 2 (mt)

The EA 2 is designed for the TLM 127, TLM 193 and D-01 microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 2 ..... ni ..... Cat. No. 008432

EA 2 mt ..... blk ..... Cat. No. 008428

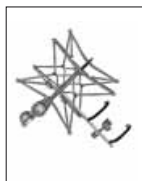


### Elastic Suspension EA 82 (mt)

The EA 82 is designed for the KMR 81 i and KMR 82 i shotgun microphones. It can be attached to the SG 82 swivel mount or the HG 82 handle and is also used for the installation of the microphones in the WK 81 or WK 82 wind-screen.

EA 82 ..... ni ..... Cat. No. 006846

EA 82 mt ..... blk ..... Cat. No. 006848



### Elastic Suspension EA 30 A (mt)

The EA 30 A is designed for the SM 69 fet and USM 69 stereo microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 30 A ..... ni ..... Cat. No. 006346

EA 30 A mt ..... blk ..... Cat. No. 006347



### Elastic Suspension EA 87 (mt)

The EA 87 is designed for the U 87 Ai microphone. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 87 ..... ni ..... Cat. No. 007297

EA 87 mt ..... blk ..... Cat. No. 007298

## Elastic Suspensions



### Elastic Suspension EA 89 A (mt)

The EA 89 A is designed for the U 89 i microphone. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

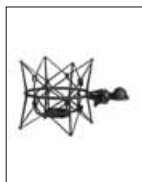
EA 89 A ..... ni ..... Cat. No. 007195  
EA 89 A mt ..... blk ..... Cat. No. 007196



### Elastic Suspension EA 2124 A mt

The EA 2124 A mt is able to accept microphones from 21 to 24 mm in diameter. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

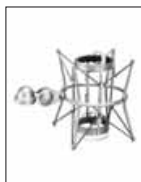
EA 2124 A mt ..... blk ..... Cat. No. 008433



### Elastic Suspension EA 170 (mt)

The EA 170 is designed for the TLM 170 (R) and M 149 Tube microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

EA 170 ..... ni ..... Cat. No. 007271  
EA 170 mt ..... blk ..... Cat. No. 007273



### Elastic Suspension Z 48

The Z 48 is designed for the U 67, U 87 and M 269 microphones. It has a swivel mount with a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

Z 48 ..... ni ..... Cat. No. 006208

## Table Stands, Table Flange



### Table Stand MF 2

Small table stand with brass base, very sturdy. It has a black matte finish. The bottom is fitted with a non-slip rubber disk. The stand has a 1/2" threaded stud for mounting the SG 21/17 mt, for example. The rubber shock mount between the stud and the base serves to suppress structure-borne noise.

Ø 60 mm, Weight 340 g.

MF 2 ..... blk ..... Cat. No. 007266



### MF-AK Table Stand with Swivel Joint

Small table stand with swivel joint, with 2.4 m cable, connecting directly to the active capsules of the KM 100 system. It is inserted between active capsule and KM 100 output stage. Cable outlets are sideways and on the underside. The MF-AK is fitted with a non-slip rubber disk.

Ø 60 mm, Weight 285 g.

MF-AK ..... blk ..... Cat. No. 008453



### Table Stand MF 3

The MF 3 is a table stand with iron base, 1.6 kg in weight, 110 mm in diameter. It has a black matte finish. The bottom is fitted with a non-slip rubber disk. The stand comes with a reversible stud and an adapter for 1/2" and 3/8" threads.

Stand extensions STV see page 5.

MF 3 ..... blk ..... Cat. No. 007321



### Table Flange TF 221 c

Table flange to mount components of the KM 100 system inconspicuously. It can be fastened under a tabletop or vertically to the edge of a stage allowing to hide other attachments, for example the SG 100 swivel mount. A KVF.. capsule extension, when clipped into the SG 100 is the only visible part above the hole in the table. The table flange comes with a connecting rubber piece for acoustic decoupling of the microphone from the mounting surface. 1/2" threaded stud. Flange-Ø 73 mm. 3 mounting holes, Ø 5.2 mm each.

TF 221 c ..... blk ..... Cat. No. 007278



## Floor Stands, Booms and Shock Mount



### Stand M 36

M 36 is an extremely sturdy folding stand, aluminium, weight 9.5 kg. Maximum height 4.4 m, minimum working height 1.8 m. The stand has a 1/2" threaded stud.

M 36 ..... blk ..... Cat. No. 007351



### Stand M 210/1

M 210/1 is a floor stand with boom attachment, weight 3.5 kg, nickel-plated. The height is adjustable between 0.9 m and 1.6 m, boom extends to 0.84 m. Stand and boom have a 3/8" threaded stud.

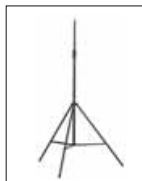
M 210/1 ..... nl ..... Cat. No. 007250



### Boom Attachment M 212 c

M 212 c is a boom attachment designed for the floor stand M 214/1. Weight 4.3 kg. Boom extension is adjustable between 1.1 m and 1.8 m. Counterbalanced for heavy microphones; 3/8" threaded stud, 1/2" female thread. The boom is partly nickel-plated, partly black lacquered.

M 212 c ..... blk ..... Cat. No. 007251



### Stand M 214/1

M 214/1 is a folding floor stand, weight 6 kg, heavy duty. The height is adjustable between 1.3 and 2.2 m, when folded 1.2 m. The stand is partly nickel-plated, partly black lacquered. It has a 1/2" threaded stud for mounting microphones or M 212 c boom attachment.

M 214/1 ..... blk ..... Cat. No. 007248



### Stand M 252

M 252 is a folding floor stand with boom attachment. Weight 3.2 kg. The height is adjustable between 0.61 m and 1.55 m, when folded 0.56 m. The boom attachment extends from 0.46 m to 0.765 m. The floor stand and the boom attachment have a 3/8" threaded stud. Partly nickel-plated, partly black lacquered.

M 252 ..... blk/nl ..... Cat. No. 007253



### Stand M 255

Folding floor stand, especially designed for adjustments close to the floor comes with a permanent boom attachment. Weight 3.0 kg. The height of the horizontal boom is 0.43 m. The boom attachment extends from 0.85 m to 1.54 m. It has a 3/8" threaded stud. Partly nickel-plated, partly black lacquered.

M 255 ..... blk/nl ..... Cat. No. 007249



### Floor Stand MF 4

Floor stand with grey cast iron base. The floor stand has a matte black finish and rests on a non-skid rubber disk attached to the bottom. A reversible stud and a reducer for 1/2" and 3/8" threads are also supplied. Weight 2.6 kg, Ø 160 mm.

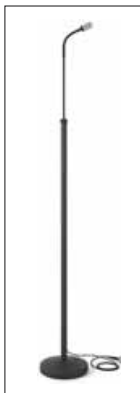
MF 4 ..... blk ..... Cat. No. 007337



### Floor Stand MF 5

Floor stand with grey soft-touch powder coating. It has a non-skid sound-absorbing rubber disk attached to the bottom. The stand connection has a 3/8" thread. Weight 2.7 kg, Ø 250 mm.

MF 5 ..... gr ..... Cat. No. 008499



### Stand Tube SR 100 with KVF 158

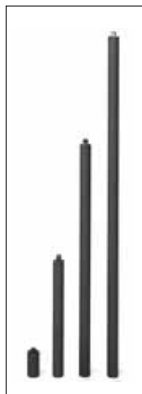
The SR 100 is part of a floor stand designed for the KM 100 system, for example using a KM 140.

For connecting with the KM 100 output stage, a KA 100 cable adapter is necessary.

The stand consists of an MF 4 stand and a guide tube in which an inserted KVF 158 capsule extension (included in the supply schedule) glides and can be locked. The guide tube is 20 mm in diameter and 0.8 m in height. The height of the capsule can be adjusted between 0.95 and 1.45 m.

SR 100 (+ KVF 158) .. blk . Cat. No. 007336

## Floor Stands, Booms and Shock Mount



### Stand Extensions STV 4/20/40/60

The STV... stand extensions are screwed between microphone stands (for example MF 4, MF 5) and swivel mounts (for example SG 21/17 mt).

Length 40, 200, 400 or 600 mm.  
Ø 19 mm.

STV 4 .....	blk .....	Cat. No. 006190
STV 20 .....	blk .....	Cat. No. 006187
STV 40 .....	blk .....	Cat. No. 006188
STV 60 .....	blk .....	Cat. No. 006189



### Shock Mount Z 26 mt

The Z 26 rubber shock mount is inserted between the stand and the swivel mount to avoid the transmission of structure-borne noise. It has a 1/2" threaded stud and a 5/8"-27 female thread to attach to tripods. Included is a thread adapter for 1/2" and 3/8" studs.

Z 26 mt .....	blk .....	Cat. No. 006207
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## Goosenecks



### Gooseneck SMK 8 i

The SMK 8 i gooseneck is 360 mm long and serves as electrical and mechanical connection of a microphone with XLR 3 connector. A counter nut secures the microphone against rattle and – to a certain extent – against theft. The cable comes out at the side, just above the bottom thread. Cable length 4.5 m, cable connector XLR 3 M. The gooseneck has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2" and 3/8" stands.

SMK 8 i .....	blk .....	Cat. No. 006181
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### Double Gooseneck SMK 100-2 KA

Gooseneck for directly mounting two active capsules of the KM 100 system, making a particularly small table microphone. Both goosenecks are only 8 mm in diameter. The bottom has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2" and 3/8" stands. The cables incorporated in the goosenecks emerge at the rear. They terminate with a ring contact adapter fitting onto the KM 100 (F) output stages. Gooseneck length 160 mm. Cable length 2.5 m.

SMK 100-2 KA .....	blk .....	Cat. No. 008414
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### Gooseneck SMK 100 KA

The SMK 100 KA for the KM 100 system is used to assemble particularly small table microphones, for example on an MF 2 table stand. The gooseneck is only 8 mm in diameter. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2" and 3/8" stands. The cable is incorporated in the gooseneck and emerges at the rear. It terminates with a ring contact adapter fitting onto the KM 100 (F) output stages. Gooseneck length 160 mm. Cable length 2.5 m.

SMK 100 KA .....	blk .....	Cat. No. 008413
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## Auditorium Hangers



### Auditorium Hanger MNV 21 mt

The auditorium hanger adjusts the tilting angle of a microphone suspended by its own cable. The MNV 21 consists of the tilting clamp, suitable to hold a Neumann miniature microphone or KMR 81, and a locking cable strain relief. Suitable for cables with 4–5 mm diameter.

MNV 21 mt ..... blk ..... Cat. No. 006802



### Auditorium Hanger MNV 100

The MNV 100 auditorium hanger is used to suspend an active capsule of the KM 100 system freely from its LC 3 KA interconnecting cable. The assembly can be rotated and tilted to any desired angle. Suitable for cables with 3–3.5 mm diameter.

MNV 100 ..... blk ..... Cat. No. 006811



### Auditorium Hanger MNV 87 (mt)

The auditorium hanger consists of a cable suspension and a rotating 1/2" threaded stud, to connect to e. g. swivel mounts. The stud is screwed into the threaded coupling of the swivel mount. Then the microphone can be tilted while it is suspended from its own cable. Suitable for cables with 4–8 mm diameter.

MNV 87 ..... ni ..... Cat. No. 006804

MNV 87 mt ..... blk ..... Cat. No. 006806

## Stand Mounts and Miscellaneous Mechanical Adapters



### Double Mount DS 21 mt

The DS 21 mt is designed for applications where two miniature microphones are used simultaneously in one location. The DS 21 mt has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

DS 21 mt ..... blk ..... Cat. No. 006798



### Double Mount DS 120

The DS 120 has a 150 mm long support bar with two movable 1/2" threaded studs. Two microphones in their mounts can be attached. Any space or angle between the microphones is freely adjustable. The DS 120 has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

DS 120 ..... blk ..... Cat. No. 007343



### Double Mount DS 100-1

Mount to attach two KVF.. capsule extensions of the KM 100 system onto a tripod. Especially suited for holding long KVF.. It is easy to arrange the capsule extensions in parallel or facing each other. The double mount has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

DS 100-1 ..... blk ..... Cat. No. 008491



### Mounting Bracket H 82

Mounting bracket for secure fixed positioning of microphones with a diameter of 21 or 22 mm. The mounting bracket itself can be attached to the SG 82 swivel mount and the HG 82 handle.

H 82 ..... blk ..... Cat. No. 007190

## Stand Mounts and Miscellaneous Mechanical Adapters



### Handle HG 82

Handle for work with hand-held microphones. An adjustable bracket allows to attach the H 82 mounting bracket or the EA 82/EA 30 B elastic suspension, with or without windscreen. The handle has a 3/8" thread to connect to stands.

HG 82 ..... blk ..... Cat. No. 006856



### Stand Mount SG 100

Swivel mount to attach capsule extensions KVF ... of the variable KM 100 miniature microphone system to tripods. It has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 100 ..... blk ..... Cat. No. 006688



### Stand Mount SG 1

Swivel mount for the TLM 103, TLM 127, TLM 193 and M 147 Tube microphones. The microphone mount of the SG 1 is made of metal. The SG 1 has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 1 ..... blk ..... Cat. No. 008445



### Stand Mount SG 100-1

Mount to attach a KVF.. capsule extensions of the KM 100 system onto a tripod. Especially suited for holding long KVF.. It has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 100-1 ..... blk ..... Cat. No. 008490



### Stand Mount SG 5

Swivel mount for BCM 104 and other microphones. On the microphone side it has a 3/8" male thread, on the stand side a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 5 ..... blk ..... Cat. No. 008529



### Stand Mount SG 105

Stand clamp for KMS vocalist microphones. The clamp can be swivelled and has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 105 ..... blk ..... Cat. No. 008460



### Stand Mount SG 21/17 mt

Swivel mount with a plastic clamp for miniature microphones. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands. An additional clamp, Ø 17 mm, is included for use when the microphone should be held more elegantly at the XLR connector.

SG 21/17 mt ..... blk ..... Cat. No. 006149



### Stand Mount SG 367 (mt)

Swivel mount for the U 87 i and U 87 Ai microphones. It has a swivel mount has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 367 ..... ni ..... Cat. No. 006143

SG 367 mt ..... blk ..... Cat. No. 006145



### Stand Mount SG 82

The EA 82/EA 30 B elastic suspensions and the H 82 holder can be fastened to tripods with the help of the SG 82 tripod mount. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 82 ..... blk ..... Cat. No. 006616



### Stand Mount SG 389 (mt)

Swivel mount for the U 89 i microphone. It has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

SG 389 ..... ni ..... Cat. No. 006619

SG 389 mt ..... blk ..... Cat. No. 006620



## Stand Mounts and Miscellaneous Mechanical Adapters



### Stand Mount SGE 100

Swivel mount for active capsules of the KM 100 system. A rubber shock mount suppresses structure-borne noise. The swivel mount has an M 6 thread (6 mm). Attaching the swivel mount to the MF 2 table stand, the SGE 100 replaces the rubber shock mount of the table stand.

SGE 100 ..... blk ..... Cat. No. 006742



### Stereo Mount STH 120 for MS Method

The STH 120 stereo mount accepts two active capsules, e.g. one each AK 20 and AK 40 parallel and one above the other for MS stereo recordings. It is rotatable and swivelable. The swivel mount has a 5/8"-27 thread and a reducer for 1/2" and 3/8" studs is provided.

STH 120 ..... blk ..... Cat. No. 008422



### Swivel Joint SG-AK

The SG-AK swivel mount can be inserted between active capsules and the output stage of the KM 100 system. The capsule can then be swiveled and orientated through 90°. In combination with an elastic suspension and a table flange, a mechanically decoupled, unobtrusive setup can be realised, e.g. for TV news announcers. Length 45 mm, Ø 22 mm.

SG-AK ..... blk ..... Cat. No. 008452



### Stereo Mount STH 100

Stereo mount with a swivel mount and two holders, to attach two active capsules of the KM 100 system. Two stereo recording methods are then possible.

One holder enables the microphone setup according to the "ORTF Method": Two active capsules, with LC 3 KA cables, are snapped into the clamps at the end of the holder. The distance between diaphragms is then 170 mm, with an angle of 110°.

The other pair of holders allows stereo setups according to the "Coincidence Method": Active capsules, with LC 3 KA cables, are installed acoustically at one point in space, however, freely adjustable to any angle between 30° and 180°.

The swivel mount has a 5/8"-27 thread, plus a thread adapter to connect to 1/2"- and 3/8" stands.

STH 100 ..... blk ..... Cat. No. 007315



## Windscreens for Shotgun Microphones and KM 100

When microphones are exposed to strong wind, WK... windscreens should be used for best performance. Only in the upper frequency range is the output level slightly attenuated. The wind noise atten-

uation was measured without electrical filtering in a turbulent air stream traveling at 20 km/h, generated by a noiseless wind machine.



### Windscreen WK 81/82

WK 81 for KMR 81 & RSM 191, WK 82 or KMR 82 microphones. The microphone is mounted in the EA 82 elastic suspension (RSM 191: EA 30 B) and placed inside the windscreen, then attached to the SG 82 swivel mount, or the HG 82 handle. A windscreen cover is included. Wind noise attenuation 24 (25) dB. Attenuation at 15 kHz 2 (3) dB. Ø 100 mm, length 440 (610) mm.

WK 81 ..... gr ..... Cat. No. 007275

WK 82 ..... gr ..... Cat. No. 006855



### Windscreen WKD-KM

Windscreen for two miniature microphones, e.g. KM 120 and KM 140. To be used with the elastic suspension DA-KM. Wind noise attenuation 24 dB. Attenuation at 15 kHz 2 dB. Ø 148 mm, length 300 mm, color grey.

WKD-KM ..... gr ..... Cat. No. 008424



### Windscreen WKD-AK

Windscreen for two active capsules, e.g. AK 20 and AK 40. To be used with the elastic suspension DA-AK. Wind noise attenuation 24 dB. Attenuation at 15 kHz 2 dB. Ø 148 mm, length 115 mm, color grey.

WKD-AK ..... gr ..... Cat. No. 008423



### Windscreen WKE 191

Rycote windscreen with elastic suspension designed to hold the RSM 191 stereo shotgun microphone. A handle HG 82 and a stand adaptor are included. Wind noise attenuation 24 dB. Attenuation at 15 kHz 2 dB. Ø 150 mm, length 390 mm.

WKE 191 ..... gr ..... Cat. No. 007366

## Windjammers for Shotgun Microphones and KM 100

Fur-like "windjammers" are available as an accessory for WK... windscreens. Their effect is added to that of the WK windscreens.

During strong wind conditions they ensure an even better suppression of wind noise.



### Windjammer WJ 81/WJ 82 for WK 81/82

Wind noise attenuation 8 dB. Attenuation at 15 kHz 3 (6) dB.

WJ 81 ..... gr ..... Cat. No. 007283

WJ 82 ..... gr ..... Cat. No. 007284



### Windjammer WJ 191 for WKE 191

Wind noise attenuation 10 dB. Attenuation at 15 kHz 5 dB.

WJ 191 ..... gr ..... Cat. No. 007367



## Windjammers for Shotgun Microphones and KM 100



### Windjammer WJ-AK for WKD-AK

Wind noise attenuation 10 dB.  
Attenuation at 15 kHz 5 dB.

WJ-AK ..... gr ..... Cat. No. 008425



### Windjammer WJ-KM for WKD-KM

Wind noise attenuation 10 dB.  
Attenuation at 15 kHz 5 dB.

WJ-KM ..... gr ..... Cat. No. 008426

## Popscreens

Pop screens provide excellent suppression of so-called pop noise, such as "p" or "t". They consist of a round, thin frame covered with black gauze on both sides. A gooseneck of about 30 cm (12") in

length is mounted at the popshield. It will be attached to microphone stands by means of a clamp with a knurled screw.



### Popscreen PS 15

The frame is 15 cm in diameter.

PS 15 ..... blk ..... Cat. No. 008472



### Popscreen PS 20 a

The frame is 20 cm in diameter.

PS 20 a ..... blk ..... Cat. No. 008488

## Foam Windscreens

Close range sounds, wind, and fast movements of the microphone boom, all may cause interfering noises. To avoid these unwanted sounds, windscreens accessories are available. Typically, they are made out of open-cell polyurethane foam. These windscreens do not cause interfering resonances and do not influence the direc-

tional pattern. Only in the upper frequency range is the output level slightly attenuated. The wind noise attenuation was measured without electrical filtering in a turbulent air stream traveling at 20 km/h, generated by a noiseless wind machine.



### Windscreen WNS 100

Windscreen for KM 100 and Series 180.  
Wind noise attenuation 18 dB.  
Attenuation at 15 kHz 2 dB. Ø 45 mm.

WNS 100 ..... black ..... Cat. No. 007323  
WNS 100 ..... red ..... Cat. No. 007324  
WNS 100 ..... green ..... Cat. No. 007325  
WNS 100 ..... yellow ..... Cat. No. 007326  
WNS 100 ..... blue ..... Cat. No. 007327  
WNS 100 ..... white ..... Cat. No. 007328



### Windscreen WNS 110

Acoustically transparent wind and pop protection for KM 100 and Series 180 with improved efficiency.

Wind noise attenuation 21 dB. Attenuation at 15 kHz 1 dB. Ø 45 mm, length 70 mm. Color black.

WNS 110 ..... blk ..... Cat. No. 008535

## Foam Windscreens



### Windscreen WNS 120

Windscreen for the microphone KM 120 or the active capsule AK 20.  
Wind noise attenuation 15 dB. Attenuation at 15 kHz 2 dB. Ø 48 mm, length 65 mm. Color black.

WNS 120 ..... blk ..... Cat. No. 008427



### Windscreen WS 87

Windscreen for U 67, U 87 (Ai), TLM 50, TLM 103, TLM 127, M 147 Tube and TLM 170 (R).  
Wind noise attenuation 26 dB. Attenuation at 15 kHz 3 dB. Ø 90 mm. Color black.

WS 87 ..... blk ..... Cat. No. 006753



### Windscreen WS 47

Windscreen for D-01.  
Wind noise attenuation 22 dB. Attenuation at 15 kHz 3 dB. Ø 120 mm. Color black.

WS 47 ..... blk ..... Cat. No. 006826



### Windscreen WS 89

Windscreen for U 89 i and TLM 193.  
Wind noise attenuation 27 dB. Attenuation at 15 kHz approx. 3 dB. Ø 90 mm. Color black.

WS 89 ..... blk ..... Cat. No. 007197



### Windscreen WS 69

Windscreen for USM 69 i and SM 69 fet.  
Wind noise attenuation 20 dB. Attenuation at 15 kHz 3 dB. Ø 45 mm, length 70 mm. Color black.

WS 69 ..... blk ..... Cat. No. 006750



### Windscreen WS 100

Windscreen for KM 100 and Series 180.  
Wind noise attenuation 23 dB. Attenuation at 15 kHz approx. 4 dB. Ø 90 mm. Color black.

WS 100 ..... blk ..... Cat. No. 006751



### Windscreen WS 81

Windscreen for KMR 81 i.  
Wind noise attenuation 15 dB. Attenuation at 15 kHz 2 dB. Ø 50 mm, length 195 mm. Color black.

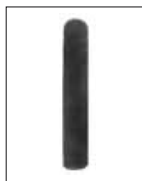
WS 81 ..... blk ..... Cat. No. 007268



### Windscreen WS 191

Windscreen for RSM 191.  
Wind noise attenuation 10 dB. Attenuation at 15 kHz 2 dB. Ø 58 mm, length 165 mm. Color black.

WS 191 ..... blk ..... Cat. No. 007292



### Windscreen WS 82

Windscreen for KMR 82 i.  
Wind noise attenuation 15 dB. Attenuation at 15 kHz 2 dB. Ø 50 mm, length 350 mm. Color black.

WS 82 ..... blk ..... Cat. No. 007264



### Windscreen WSB

Windscreen for KU 100.  
Wind noise attenuation 15 dB. Attenuation at 15 kHz approx. 3 dB. Ø 90 mm each. Color black.

WSB ..... blk ..... Cat. No. 007372



## Foam Windscreens



### Windscreen WSS 100

Windscreen for KK 105 S and KMS 105/140/150.

Wind noise attenuation 27 dB.

Attenuation at 15 kHz 3 dB. Ø 90 mm.

WSS 100	black	Cat. No. 007352
WSS 100	red	Cat. No. 007353
WSS 100	green	Cat. No. 007354
WSS 100	yellow	Cat. No. 007355
WSS 100	blue	Cat. No. 007356
WSS 100	white	Cat. No. 007357

## Power Supplies and Matrix Amplifier



### Battery Supply BS 48 i

The battery unit supplies one microphone with 48 V phantom powering (P48). The maximum supply current is 5 mA.

The audio output is dc-free. Therefore, no transformer is needed when connecting to unbalanced inputs. The cables couple to the BS 48 i through XLR 3 connectors.

Maximum length of operation depends on the type of battery and the current drain of the microphone. A microphone requiring e.g. 2 mA can be operated at least 20 hours with one alkaline battery.

Output voltage	48 ± 1 Vdc
Maximum current output	5 mA
Battery	IEC 6 F 22, 9 V
Weight	270 g (without battery)
H x W x D	37 x 80 x 102 mm

BS 48 i ..... blk ..... Cat. No. 006494



### Battery Supply BS 48 i-2

The battery unit supplies one or two microphones with 48 V phantom powering (P48). The maximum current drain is 5 mA for each microphone. The audio outputs are dc-free. Therefore, no transformer is needed to connect to unbalanced inputs. The unit has two XLR 5 connections which can be split to XLR 3 connectors with AC 20 and AC 21 adapter cables.

Maximum length of operation depends on the type of battery and the current drain of the microphone. A microphone requiring e.g. 2 mA can be operated at least 20 hours with one alkaline battery.

Output voltage	48 ± 1 Vdc
Maximum current output	2 x 5 mA
Battery	IEC 6 F 22, 9 V
Weight	310 g (without battery)
H x W x D	37 x 80 x 102 mm

BS 48 i-2 ..... blk ..... Cat. No. 006496



### (Remote Control) Power Supply N 248

The N 248 supplies one stereo microphone, or two mono condenser microphones with 48 V phantom power (P48). All connectors are of XLR 3 type. The audio signal outputs are DC-free. The 5 directional patterns of the TLM 127 and TLM 170 R can be remote controlled with rotary switches. The remote control operates by varying the nominal phantom voltage of 48 V over a range of ± 3 V (patented). As in standard operation, cable lengths up to 300 m are permissible. Set to P48, all conventional microphones can be used as well. Even mixed operation is possible, with one channel remote controlling a TLM 127/TLM 170 R, while the second output supplies a conventional microphone.

Three versions are available.

Mains voltage Euro	230V/50 Hz
Mains voltage US	117V/60 Hz
Mains voltage UK	240V/50 Hz
DC voltage input	5...15 V
Power consumption	max. 3 VA
DC voltage output	48 V ± 3 V each
Current output	max. 5 mA each
H x W x D	38 x 143 x 103 mm
Weight	415 g

N 248 EU ..... blk ..... Cat. No. 008537

N 248 US ..... blk ..... Cat. No. 008538

N 248 UK ..... blk ..... Cat. No. 008539

## Power Supplies



### Power Supply N 149 A (for M 147/149/150 Tube)

The N 149 A power supply generates the necessary operating voltages for M 147 Tube, M 149 Tube or M150 Tube microphones. It operates with all mains voltages from 100 V to 240 V, 50 or 60 Hz. Mains power is connected through a standard IEC 320 socket. The microphone connects via a DIN-8 connector. The microphone signal is fed to a XLR 3 M connector. The modulation output is balanced. The N 149 A supplies the bias voltages for the microphone capsule, the filament voltage controlled by a sensor circuit, and a further voltage to generate the plate voltage and other necessary operating voltages within the microphone itself. The unit produces constant current effecting a soft start of the tube. The KT 8 cable between microphone and power supply can be up to 100 m long. Modulation cable lengths up to approx. 300 m are allowed.

The three available versions of the N 149 A just differ in their enclosed mains power cable.

Mains voltage Euro .....	230V/50 Hz
Mains voltage US .....	117V/60 Hz
Mains voltage UK .....	240V/50 Hz
Output voltages .....	for M 149 Tube
Power plug .....	Euro/US/UK
H x W x D .....	90 x 100 x 145 mm
Weight approx. ....	1.5 kg

**N 149 A EU .....** blk ..... Cat. No. 008447  
**N 149 A US .....** blk ..... Cat. No. 008446  
**N 149 A UK .....** blk ..... Cat. No. 008448



### Matrix Amplifier MTX 191 A (for RSM 191 and AK 20/40)

The MTX 191 A matrix amplifier is used for processing the MS microphone signals of the RSM 191 shotgun stereo microphone, or the active capsules AK 20 and AK 40. The level of the side signal is variable, independent of which output mode is selected (MS or XY). It is adjusted through a rotary switch in 3 dB steps from -9 dB to +6 dB, relative to the level of the middle signal. Consequently the pickup angle is varied in steps between 60° and 170°.

Depending on the position of the rotary switch on the front of the matrix amplifier the output provides either an MS- or XY-signal. The XY-signal is obtained from the MS-signal by summation ( $X = M + S$ ) or subtraction ( $Y = M - S$ ). In both modes an electric left-right-inversion is alternatively possible if during the recording the microphone is turned upside-down.

To suppress low frequent interfering noise the matrix amplifier has a switchable high-pass filter at 40(LIN)/80/200 Hz. The power for both matrix amplifier and microphone, is either supplied by a 9 V battery (IEC 6 F 22), or through external 48 V phantom powering.

The RSM 191 is connected with the 7-pin KT 5/KT 6 cables. Two AK... active capsules can be connected with an AC 30 cable. The audio is passed through a XLR 5 M connector. The output signal is DC-free. Use AC ... adapter cables to connect the audio to unbalanced inputs.

Operating voltage .....	9 V or P48
Battery .....	IEC 6 F 22, 9 V
Side signal .....	variable -9 dB...+6 dB
	in 3 dB steps
	(pick-up angle 60°...170°)
Output .....	switchable MS or XY
High-pass filter .....	40(LIN)/80/200 Hz
Weight .....	390 g (without battery)
H x W x D .....	37 x 80 x 145 mm

**MTX 191 A .....** blk ..... Cat. No. 007331



## Connecting Cables

Other cable lengths are available upon request! Cable material without connectors see corresponding section on the following pages. Even if very long (Neumann) cables are used, the electroacoustic

characteristics of the microphone are not affected. Only with cable lengths well over 300 m a high-frequency roll-off is noticeable.



### Microphone Cable IC 3 mt

Microphone cable with double twist (double helix) braiding as shield. Ø 5 mm, length 10 m. XLR 3 connectors, matte black.

IC 3 mt (10 m) ..... blk ..... Cat. No. 006543



### Microphone Cable IC 7

Microphone cable with double twist (double helix) braiding as shield. Ø 5 mm, length 10 m. XLR 7 connectors. Extends KT 5/KT 6.

IC 7 (10 m) ..... ni ..... Cat.No. 006740



### Microphone Cable IC 4 (mt)

Microphone cable with rotatable swivel mount for microphones with a thread, and double twist braiding as shield. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands. Ø 5 mm, length 10 m. XLR 3 connectors.

IC 4 (10 m) ..... ni ..... Cat. No. 006547

IC 4 mt (10m) ..... blk ..... Cat. No. 006557



### Microphone Cable IC 31 mt

Microphone cable with double twist (double helix) braiding as shield. Textile-braided to avoid frictional noise due to the handling of booms or plastic leadings (for example in windscreens). Ø 4,5 mm, length 5 m. XLR 3 connectors, matte black.

IC 31 mt (5 m) ..... blk ..... Cat. No. 006570



### Microphone Cable IC 5 (mt)

Microphone cable with double twist (double helix) braiding as shield. Ø 5 mm, length 10 m. XLR 5 connectors.

IC 5 (10 m) ..... ni ..... Cat. No. 006623

IC 5 mt (10 m) ..... blk ..... Cat. No. 006624



### Microphone Cable KT 5

Cable for RSM 191, with double twist (double helix) braiding as shield. Ø 5 mm, length 5 m. DIN 7 F and XLR 7 M connectors.

KT 5 (5 m) ..... blk ..... Cat. No. 006719



### Microphone Cable IC 6 (mt)

Microphone cable with rotatable swivel mount for microphones with a thread, and double twist braiding as shield. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands. Ø 5 mm, length 10 m. XLR 5 connectors.

IC 6 (10 m) ..... ni ..... Cat. No. 006621

IC 6 mt (10 m) ..... blk ..... Cat. No. 006622



### Microphone Cable KT 6

Cable for RSM 191 with rotatable swivel mount, and double twist braiding as shield. It has a 5/8"-27 female thread, plus a thread adapter to connect to 1/2"- and 3/8" stands. Ø 5 mm, length 10 m. DIN 7 F and XLR 7 M connectors.

KT 6 (10 m) ..... blk ..... Cat. No. 006725

## Connecting Cables



### Microphone Cable KT 8

Cable for M 147/149/150 Tube, with double twist (double helix) braiding as shield. Ø 5 mm, length 10 m. DIN 8 connectors.

KT 8 (10 m) ..... nl ..... Cat. No. 008407



### Microphone Cable KT 51

Cable for RSM 191, with double twist (double helix) braiding as shield. Textile-braided to avoid frictional noise due to the handling of booms or plastic leadings (for example in windscreens). Ø 6 mm, length 5 m. DIN 7 F and XLR 7 M connectors.

KT 51 (5 m) ..... nl ..... Cat. No. 006729



### Microphone Cable LC 2

Extension cable for older KM 100 accessories, with double twist braiding as shield. Extension for LC 3 microphone cable. Ø 3.5 mm, length 10 m. 3-pin Lemo connectors, matte black.

LC 2 (10 m) ..... blk ..... Cat. No. 006690



### Microphone Cable LC 3 KA

The LC 3 KA connects active capsules AK... with the KM 100 output stage. Ø 3.5 mm, length 5 or 10 m.

LC 3 KA (5 m) ..... blk ..... Cat. No. 008408

LC 3 KA (10 m) ..... blk ..... Cat. No. 008409



### Adapter Cable AC 20

Y-cable with one XLR 5 F connector and two XLR 3 M connectors. It is used to split two-channel signals into two mono channels, when using, for example, the BS 48 i-2 power supply.

AC 20 (1 m) ..... Cat. No. 006595



### Adapter Cable AC 21

Y-cable with one XLR 5 M connector and two XLR 3 F connectors. It is used to connect two mono microphones to power supplies with 5-pin connectors, when using, for example, BS 48 i-2 power supply.

AC 21 (1 m) ..... Cat. No. 006597



### Adapter Cable AC 22

Adapter cable with XLR 5 F connector and unbalanced 3.5 mm stereo jack. It is used to connect the 5-pin XLR output of the BS 48 i-2 power supply or the MTX 191 A matrix amplifier to units with a 3.5 mm stereo input. It is designed for all microphones of the fet 80/100 series and KM 100 F, excluding the KM 100 and the GFM 132.

AC 22 (0.3 m) ..... Cat. No. 006598



### Adapter Cable AC 23

Adapter cable with XLR 5 F connector and unbalanced 3.5 mm stereo jack. It is used to connect 5-pin XLR outputs of the BS 48 i-2 power supplies to units with a 3.5 mm stereojack input. Designed only for the KM 100 output stage and the GFM 132 boundary-layer microphone.

AC 23 (0.3 m) ..... Cat. No. 006599



### Adapter Cable AC 25

Adapter cable with XLR 3 F connector and unbalanced 6.3 mm mono jack. It is used to connect 3-pin XLR outputs of power supplies to units with a 6.3 mm monojack input. Designed for all microphones, excluding KM 100 System and GFM 132.

AC 25 (0.3 m) ..... Cat. No. 006600



### Adapter Cable AC 26

Adapter cable with XLR 3 F connector and unbalanced 6.3 mm mono jack. It is used to connect XLR 3 outputs of power supplies to units with a 6.3 mm monojack input. Designed only for KM 100 System and GFM 132.

AC 26 (0.3 m) ..... Cat. No. 006601



## Adapter Cables

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### Adapter Cable AC 27

Y-cable with XLR 5 F connector and two unbalanced 6.3 mm mono jacks. It is used to connect XLR 5 outputs of the BS 48 i-2 power supply or the MTX 191 A matrix amplifier to units with 6.3 mm monojack inputs. Designed for all microphones, excluding KM 100 System and GFM 132.

AC 27 (0.3 m) ..... Cat. No. 006602



### Adapter Cable AC 28

Y-cable with XLR 5 F connector and two unbalanced 6.3 mm mono jacks. It is used to connect the XLR 5 output of the BS 48 i-2 power supply to units with 6.3 mm monojack inputs. Designed only for KM 100 System GFM 132.

AC 28 (0.3 m) ..... Cat. No. 006603



### Adapter Cable AC 29

Y-cable with XLR 5 F connector and two unbalanced 6.3 mm mono jacks, with blocking condensers. It is used to connect the XLR 5 output of the MTX 191 (MTX 191 A see AC 27) matrix amplifier and KU 100 microphone to units with 6.3 mm monojack inputs.

AC 29 (0.3 m) ..... Cat. No. 006604



### Adapter Cable AC 30

Y-cable, 5 m long, to connect two active capsules, e.g. AK 20 and AK 40 as MS stereo couple directly to the MTX 191(A) matrix amplifier. XY or MS signals are then available at the XLR 5 output connector of the MTX 191 (A). The recording angle is electrically remote controlled. KM 100 output stages are not required. Markings: yellow for channel 1 (cardioid), red for channel 2 (figure-8).

AC 30 (5 m) ..... Cat. No. 008418



## Cable Material for General Use

Our cable material has been developed by Neumann and is exclusively produced for Neumann by highly qualified manufacturers. All microphone cables have a counter wound double helix copper

shielding, assuring a particularly high degree of coverage (95%). HF rejection is exceptionally good, flexibility of the cable excellent. All prices on request.



### Cable Material K 3 x 0,08

- 3 conductors 0.08 mm<sup>2</sup> copper wire 41 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counter wound bare copper wire
- Jacket: special PVC matte charcoal-gray and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 3.4 mm

Conductor resistance .....	< 240 ohm/km
Insulation resistance .....	> 20 Mohm x km
Capacitance core/core .....	105 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

K 3 x 0,08 ..... blk ..... Cat. No. 062728



### Cable Material K 3 x 0,2

- 3 conductors 0.2 mm<sup>2</sup> copper wire 102 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counterwound bare copper wire
- Jacket: special pvc matte charcoal-grey and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 5.0 mm

Conductor resistance .....	< 96 ohms/km
Insulation resistance .....	> 20 Mohms x km
Capacitance core/core .....	135 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

K 3 x 0,2 ..... blk ..... Cat. No. 062700



### Cable Material K 5 x 0,14

- 5 conductors 0.14 mm<sup>2</sup> copper wire 72 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counterwound bare copper wire
- Jacket: special pvc matte charcoal-grey and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 5.0 mm

Conductor resistance .....	< 138 ohms/km
Insulation resistance .....	> 20 Mohms x km
Capacitance core/core .....	40 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

K 5 x 0,14 ..... blk ..... Cat. No. 062707



### Cable Material K 7 x 0,14

- 7 conductors 0.14 mm<sup>2</sup> copper wire 72 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counterwound bare copper wire
- Jacket: special pvc matte charcoal-grey and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 5.0 mm

Conductor resistance .....	< 138 ohms/km
Insulation resistance .....	> 20 Mohms x km
Capacitance core/core .....	110 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

K 7 x 0,14 ..... blk ..... Cat. No. 062729



### Cable Material K 11

- 3 conductors 0.5 mm<sup>2</sup> copper wire 256 x 0.05 mm<sup>2</sup>
- 8 conductors 0.14 mm<sup>2</sup> copper wire 72 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counterwound bare copper wire
- Jacket: special pvc matte charcoal-grey and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 7.5 mm

Conductor resistance	
0.14 mm <sup>2</sup> .....	< 138 ohms/km
0.5 mm <sup>2</sup> .....	< 38 ohms/km
Insulation resistance .....	> 20 Mohms x km
Capacitance core/core .....	95 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

K 11 ..... blk ..... Cat. No. 062699



## Cable Material for Fishpole and Boom Operation

Our cable material has been developed by Neumann and is exclusively produced for Neumann by highly qualified manufacturers. All these microphone cables currently offered by Neumann have a counter wound double helix copper shielding. This assures a particularly high degree of coverage (95%). The HF rejection is exceptionally good and flexibility of the cable excellent. When microphones are used on fishpole or studio booms relative movements occur between

the microphone cable and the accessories. This is particularly often the case if elastic suspensions or windscreens are added. If plastic-covered cables are employed, interference from frictional noise is caused, especially in cold weather. As a remedy for this problem Neumann offers textile-braided microphone cables. The textile braiding minimizes the friction between the synthetic material and the accessories. Frictional noises are effectively reduced. Price on request.



**Cable Material K 3 x 0,08 T**

- 3 conductors 0.08 mm<sup>2</sup> copper wire 41 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counter wound bare copper wire
- Jacket: special PVC matte charcoal-gray and round, covered with cell wool weave
- Overall diameter: 4.5 mm

Conductor resistance .....	< 240 ohm/km
Insulation resistance .....	> 20 Mohm x km
Capacitance core/core .....	105 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

**K 3 x 0,08 T ..... blk ..... Cat. No. 062731**



**Cable Material K 7 x 0,14 T**

- 7 conductors 0.14 mm<sup>2</sup> copper wire 72 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: 2 layers of counterwound bare copper wire
- Jacket: special pvc matte charcoal-grey and round, covered with cell wool weave
- Overall diameter: 6.0 mm

Conductor resistance .....	< 138 ohms/km
Insulation resistance .....	> 20 Mohms x km
Capacitance core/core .....	110 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

**K 7 x 0,14 T ..... blk ..... Cat. No. 062733**

## Cable Material for Booms with Roller Guides

Our cable material has been developed by Neumann and is exclusively produced for Neumann by highly qualified manufacturers. Usually, microphone cables are put under a lot of stress when used on microphone booms with roller guides. The rapid movement around relatively small casters may cause the twisted wires to shift to a fault, deforming the cable. To meet this demand a special cable has been developed. The cable is screened by "Reusen" mesh instead of twisted braiding. It is not as flexible as the other cables

offered, but it is unaffected by stresses due to heavy bending or twisting and will not deform. The degree of coverage is 90%. This 7-pin cable is especially designed for boom operation of the RSM 191 stereo shotgun microphone. Naturally, it is equally suitable for 3-pin or other XLR connections. Price on request.



**Cable Material K 7 x 0,14 G**

- 7 conductors 0.14 mm<sup>2</sup> copper wire 72 x 0.05 mm<sup>2</sup>
- Insulation: special thermoplastic
- Shielding: Reusen mesh shielding
- Jacket: special PVC matte charcoal-gray and round
- Printing "Georg Neumann GmbH Berlin - Made in Germany"
- Overall diameter: 5.0 mm

Conductor resistance .....	< 138 ohm/km
Insulation resistance .....	> 20 Mohm x km
Capacitance core/core .....	110 nF/km (1kHz)
Test voltage core/core .....	1.2 kV
Test voltage core/shield .....	0.6 kV
Temperature range .....	-20° to +70°C

**K 7 x 0,14 G ..... blk ..... Cat. No. 062732**

## Material used for Individual Cables

CC 21 mt K 3 x 0,2	IC 5 (mt) K 5 x 0,14	KT 8 K 7 x 0,14	AC 22 K 3 x 0,08	AC 28 K 3 x 0,2
CC 25 i mt K 3 x 0,2	IC 6 (mt) K 5 x 0,14	LC 2 K 3 x 0,08	AC 23 K 3 x 0,08	AC 29 K 3 x 0,2
IC 3 mt K 3 x 0,2	IC 7 K 7 x 0,14	LC 3 KA K 3 x 0,08	AC 25 K 3 x 0,2	AC 30 K 3 x 0,08 + K 7 x 0,14
IC 31 mt K 3 x 0,08 T	KT 5 K 7 x 0,14	AC 20 K 3 x 0,2	AC 26 K 3 x 0,2	
IC 4 (mt) K 3 x 0,2	KT 6 K 7 x 0,14	AC 21 K 3 x 0,2	AC 27 K 3 x 0,2	

## Active Capsules for Miniature Microphone System KM 100

AK... active capsules are part of the variable miniature microphone system. Together with the KM 100 output stage AK... active cap-

sules form a complete microphone. AK 30 and KM 100, for example, make up the KM 130.



### Active Capsule AK 20

AK 20 is a pressure gradient transducer with the figure-8 characteristic, realized with a single diaphragm. The diaphragm diameter is just 16 mm. All sound field components reach the diaphragm directly. This results in identical frequency response curves and output levels at 0° and 180° sound incidence. Corresponding accessories allow combining the AK 20 with other active capsules or microphones to obtain an MS-Stereo setup.

AK 20 ..... blk ..... Cat. No. 071659



### Active Capsule AK 30

AK 30 is a diffuse-field equalized pressure transducer with a free-field treble boost (approx. 7 dB at 10 kHz). The frequency response in the diffuse sound field is flat up to 10 kHz.

AK 30 ..... blk ..... Cat. No. 069001



### Active Capsule AK 31

AK 31 is a free-field equalized pressure transducer. The sensitivity in the free sound field is flat up to 20 kHz. In the diffuse sound field there is a roll-off above 5 kHz.

AK 31 ..... blk ..... Cat. No. 069002



### Active Capsule AK 40

AK 40 is a pressure gradient transducer with cardioid characteristic. The frequency curves are very even and parallel to 0° sound incidence. Sound sources within a pickup angle of  $\pm 135^\circ$  are transmitted without coloration.

AK 40 ..... blk ..... Cat. No. 069007



### Active Capsule AK 43

The AK 43 is a pressure gradient transducer with wide-angle cardioid characteristic. Attenuation: 4 dB at 90°, 8 dB at 135°, and 11 dB at 180°. The frequency response for sound sources within an angle of  $\pm 90^\circ$  (off axis) is parallel up to 12 kHz.

AK 43 ..... blk ..... Cat. No. 069014



### Active Capsule AK 45

AK 45 is a pressure gradient transducer with cardioid characteristic just like the AK 40. However, it has an acoustic bass roll-off characteristic in the free field and therefore suppresses interfering LF noise (wind, structure-borne noise). Since proximity effect is a natural feature of pressure gradient microphones, the AK 45 appears to be optimized for a flat frequency response at a recording distance of approximately 15 cm (speech cardioid).

AK 45 ..... blk ..... Cat. No. 069015



### Active Capsule AK 50

AK 50 is a pressure gradient transducer with a hypercardioid characteristic. Attenuation of sound incidence from the side or rear is approximately 10 dB. Minimum sensitivity occurs at an angle of about 120°.

AK 50 ..... blk ..... Cat. No. 069016



## Capsule Extensions for Miniature Microphone System KM 100

Any KVF... capsule extension allows to use the active capsules separated from the output stage without the need for additional cables. The rigid part of the capsule extension is 6.5 mm in diameter,

the flexible gooseneck has a diameter of 8 mm. Special length on request.



### Capsule Extension KVF 118 KA

The extended length of the KVF 118 KA is approximately 300 mm. Cable length: 2.2 m.

Mounted on SG 100(-1)/DS 100.

KVF 118 KA ..... blk ..... Cat. No. 008410



### Capsule Extension KVFF 148 KA

The extended length of the KVFF 148 KA is approximately 570 mm. It differs from the KVF 118/158 KA by providing a second flexible section of approximately 100 mm at about the middle of the rigid section. Cable length: 1.9 m.

Mounted on SG 100(-1)/DS 100.

KVFF 148 KA ..... blk ..... Cat. No. 008412



### Capsule Extension KVF 158 KA

The extended length of the KVF 158 KA is approx. 700 mm. Cable length: 1.8 m.

Mounted on SG 100(-1)/DS 100.

KVF 158 KA ..... blk ..... Cat. No. 008411

## Further Accessories for Miniature Microphone System KM 100



### Cable Adapter KA 100

The current KM 100 system accessories connect directly to the output stages. For older accessories, ending with a 3-pin LEMO plug, the redesigned KA 100 cable adapter connects these accessories to the KM 100 (F) output stages. Length: 0.5 m.

KA 100 ..... blk ..... Cat. No. 007330



### Output Stage KM 100

The KM 100 output stage is part of the variable KM 100 miniature microphone system. Together with an AK ... active capsule it constitutes a complete microphone of the KM 100 system. Ø 22 mm, length 63 mm.

KM 100 ..... blk ..... Cat. No. 007395



### Output Stage KM 100 F

The KM 100 F output stage is an alternative to the KM 100 output stage. It attenuates frequencies below 80 Hz at 6 dB/octave, suppressing or eliminating interference caused by wind or structure-borne noise.

Cut-off frequency (~3 dB) can be raised from 80 Hz to 120 Hz. Then the filter slope is 12 dB/octave. An additional slide switch lowers sensitivity by 10 dB. Ø 22 mm, length 130 mm.

KM 100 F ..... blk ..... Cat. No. 007376



### Sound Diffraction Sphere SBK 130

The SBK 130 sound diffraction sphere slips onto the KM 130, KM 131 and KM 183 pressure microphones. While sounds coming from the front-half space are emphasized by up to 2.5 dB between 2 kHz and 10 kHz, sounds arriving from the rear-half space are attenuated by 2.5 dB max in the range above 5 kHz. Inner Ø 22 mm. For details see also catalog KM 100.

SBK 130, 22 mm .... blk ..... Cat. No. 007371

## Miscellaneous

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### Headgrille BCK

Replacement Headgrille for the BCM 104, with 5 rings of different colors. Additional headgrilles enable each microphone user at the broadcasting facility to use his or her own individual headgrille. The improved hygiene ensures a more comfortable working environment at the studio.

BCK ..... ni ..... Cat. No. 008520



### Pistonphone Adapter PA 100

The pistonphone adapter allows to attach a calibration tool for any 1" measuring microphone (for example a Brüel & Kjaer 4228 or 4230) to each ear channel stud of the KU 100 dummy head. Each ear system can be calibrated separately.

PA 100 ..... blk ..... Cat. No. 006199



## List of contents (Arranged according to product lines)

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Elastic Suspension	EA 50	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 130
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Stand	M 214/1	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 252	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 255	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
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Elastic Suspension	DA-KM	○	●	○	●	○	○	○	○	○	○	○	○	○	Page 130
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Elastic Suspension	EA 2 (mt)	○	○	●	○	●	○	○	●	○	○	○	○	○	Page 130
Elastic Suspension	EA 30 A (mt)	○	○	○	○	○	○	○	○	○	○	○	○	●	Page 130
Elastic Suspension	EA 30 B mt	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 130
Elastic Suspension	EA 47	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 130
Elastic Suspension	EA 50	○	○	○	○	○	●	○	○	○	○	○	○	○	Page 130
Elastic Suspension	EA 82 (mt)	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 130
Elastic Suspension	EA 87 (mt)	○	○	○	○	○	○	○	○	○	○	●	○	○	Page 130
Elastic Suspension	EA 89 A (mt)	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 131
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Elastic Suspension	EA 2124 A mt	○	●	○	●	○	○	○	○	○	○	○	○	○	Page 131
Elastic Suspension	Z 48	○	○	○	○	○	○	○	○	○	○	●	○	○	Page 131
<b>Table Stands, Table Flange</b>															
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Table Stand with Swivel Joint	MF-AK	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 131
Table Flange	TF 221 C	○	●	○	●	○	○	○	○	○	○	○	○	○	Page 131
<b>Floor Stands, Booms and Shock Mount</b>															
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Stand	M 210/1	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 212 c	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 214/1	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 252	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand	M 255	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Floor Stand	MF 4	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Floor Stand	MF 5	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand Tube	SR 100 (+ KVF 158)	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 132
Stand Extension	STV 4/20/40/60	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 133
Shock mount	Z 26 mt	○	●	○	○	○	○	○	○	○	○	○	○	○	Page 133
<b>Goosenecks</b>															
Gooseneck	SMK 8 i	○	●	○	○	○	○	○	○	○	○	○	○	○	Page 133
Gooseneck	SMK 100 KA	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 133
Gooseneck	SMK 100-2 KA	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 133
<b>Auditorium Hangers</b>															
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Auditorium Hanger	MNV 100	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 134
<b>Stand Mounts and Miscellaneous Mechanical Adapters</b>															
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Double Mount	DS 100-1	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 134
Double Mount	DS 120	○	●	○	○	○	○	○	○	○	○	○	○	○	Page 134
Mounting Bracket	H 82	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 134
Handle	HG 82	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
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Stand Mount	SG 5	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 135



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Stand Mount	SG 21/17 mt	○	○	○	○	●	●	●	○	○	○	○	○	○	Page 135
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Stand Mount	SG 389 (mt)	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
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Windscreen	WS 100	○	○	○	○	●	○	○	○	○	○	○	○	○	Page 139
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Stand Mount	SG 21/17 mt	○	●	○	●	○	○	○	○	○	○	○	○	○	Page 135
Stand Mount	SG 82	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
Stand Mount	SG 100	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
Stand Mount	SG 100-1	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
Stand Mount	SG 105	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 135
Stand Mount	SG 367 (mt)	○	○	○	○	○	○	○	○	○	●	○	○	○	Page 135
Stand Mount	SG 389 (mt)	○	○	○	○	○	○	○	○	○	○	●	○	○	Page 135
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Stereo Mount	STH 120	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 136
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Windscreen	WK 82	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
Windscreen	WKD-AK	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
Windscreen	WKD-KM	○	●	○	●	○	○	○	○	○	○	○	○	○	Page 137
Windscreen	WKE 191	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
<b>Windjammers for Shotgun Microphones and KM 100</b>															
Windjammer	WJ 81	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
Windjammer	WJ 82	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
Windjammer	WJ 191	●	○	○	○	○	○	○	○	○	○	○	○	○	Page 137
Windjammer	WJ-AK	○	○	○	○	○	○	○	○	○	○	○	○	○	Page 138
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<b>Popscreens</b>															
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