CK 69-ULS

Condenser Shotgun Capsule

User Instructions

AKG
by HARMAN

Introduction of ULS Technique:

The AKG staff of engineers have concentrated their efforts and know-how to produce a microphone which is equal to and, in fact, deserving of the pristine transmission qualities of Digital Technology.

The electronics of the new microphones are a completely new departure, and the key to the digital-level performance of the microphone.

The resulting technical specifications are unique among today's microphones and will remain in the forefront of even tomorrow's microphones.

The following main features are provided:

- CK 69-ULS, **two shotgun capsules in one** by separate extension of the interference tube.
- Extremely linear in respect to frequency response, and electrical specifications.
- Ultra low noise figures.
- High operating reliability.
- Extremely low distortion.
- Low power consumption.
- Extended long-life stability.

General Description:

The design of this microphone is based on over thirty years of experience and gained know-how in condenser microphone development of our R&D engineers and at the same time considers new and future orientated technologies. The microphone meets therefore the highest technical standards and will withstand rough handling in studio applications.

Special attention has been paid within this microphone to the complete linear transfer characteristics of all transmission parameters.

The low inherent self-noise and the high overload point guarantees a high dynamic range of this microphone, which is substantially more than figures found in conventional microphones and other associated equipment.

The switchable attenuation of the output level by 10 dB is especially useful in connection with high sound pressure levels (when used in close proximity to high-energy sound sources) and using input stages of amplifiers or mixing desks with limited input level capabilities. Otherwise, this associated equipment will overload before the maximum overload point of the microphone has been reached.

The incorporated bass-cut filter reduces the risk of distortion at low frequencies. This feature is especially useful in combating wind noise or stage floor vibration. The slope of the bass-cut filter is more than 12 dB/octave, the cut-off frequency may be set to 70 Hz or 150 Hz.

The all-metal housing effectively rejects r.f. interference when the microphone is used in close proximity to transmitter stations or in conjunction with wireless microphones or other communication equipment.

Application Notes:

a) The Sound Power Concentration Factor (Directivity):

The CK 69-ULS was designed to achieve a high degree of directivity with the smallest possible dimensions. A combination of the pressure gradient and the interference principles was used: For higher frequencies mainly the interference principle accounts for the directivity whereas for lower frequencies, the pressure gradient is effective.

Interference principle means sound interference between the sound waves passing through the tube and sound waves entering through the lateral slots. Pressure gradient principle means utilizing the pressure difference of the sounds arriving via the on- and off-axis entries, having acoustical phase shifting networks in the off-axis sound path.

Combining these principles, together with extremely careful dimensioning of the tube, made it possible to increase the directivity from about $\gamma = 4$ in the case of a conventional hypercardioid microphone to $\gamma = 6$ to 20 for the shotgun microphone at the higher frequency end. For practical purposes it is possible for the C 480 B + CK 69-ULS combination to be about twice as far away from the sound source than one would place a hypercardioid microphone resulting in the same ratio of direct sound to indirect sound. Alternatively, at an unchanged distance, the level of the diffuse sound will be reduced by about 8/12 dB in the case of the shotgun microphone.

Due to the narrower pickup angle with about 6 dB of damping at ± 45°/30° off-axis the orientation and placement of the microphone should be done with great care.

Due to the possibility of extending the interference tube, two application areas are now open for this microphone capsule:

The full-length (long) shotgun capsule may be used for sound recording in film/TV/video at average distance, for

recording of "atmosphere" in open-air venues to have the ambience in sync to the picture (e.g. recording of sport events), and for sound recording or reinforcement from the edge of a stage at larger distances from the sound source up to 6 to 8 m (20 to 25 feet).

By removing the extension tube **a half-size (short) shotgun capsule** is created and may be used for various applications, like close-ups in film/TV and video recordings, sound pickup from the edge of the stage at moderate distances up to 3 to 5 m (10 to 15 feet), and interview situations in noisy environments.

To separate the shotgun capsule, turn the extension tube a few times **anti-clockwise** against the microphone.

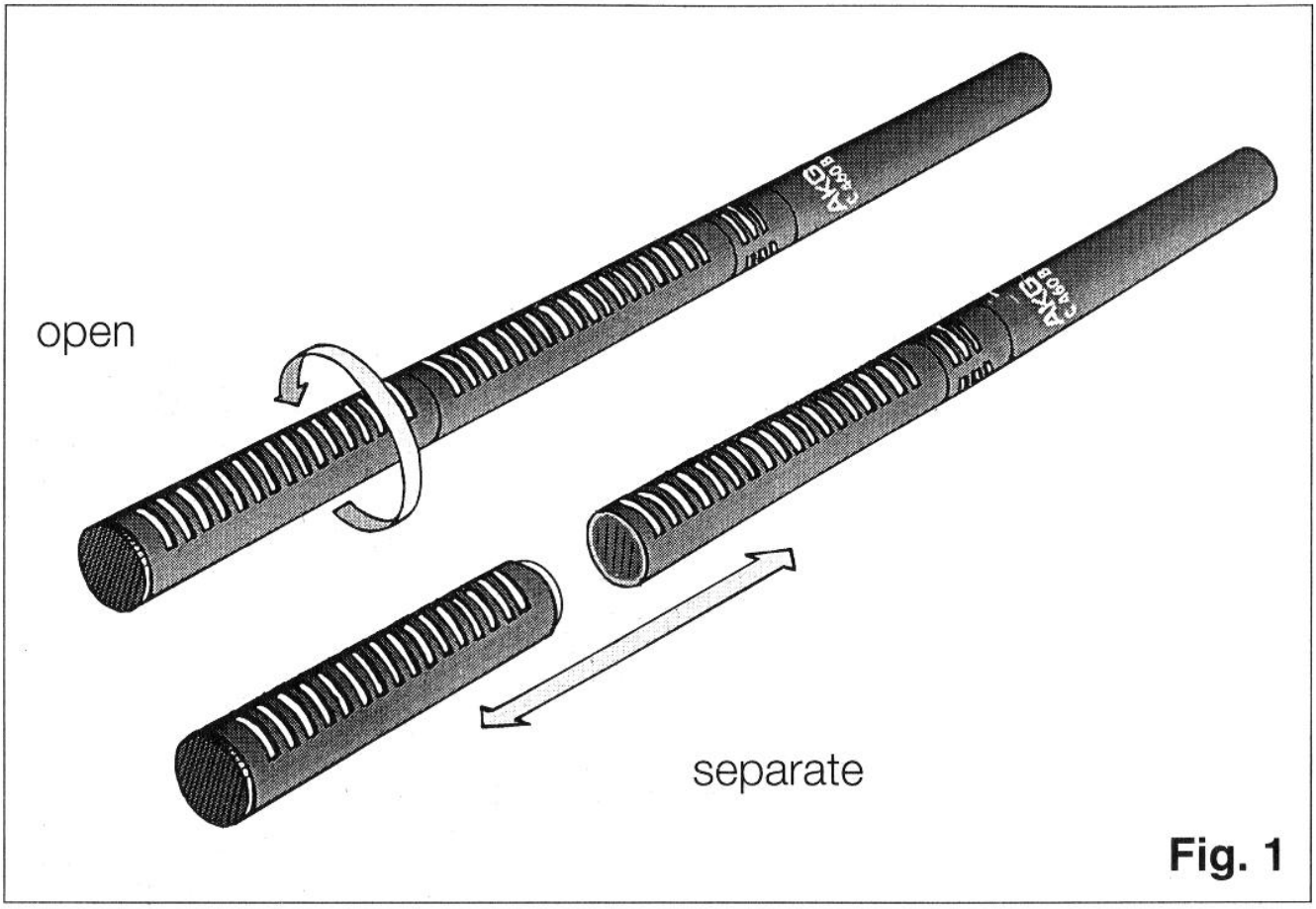


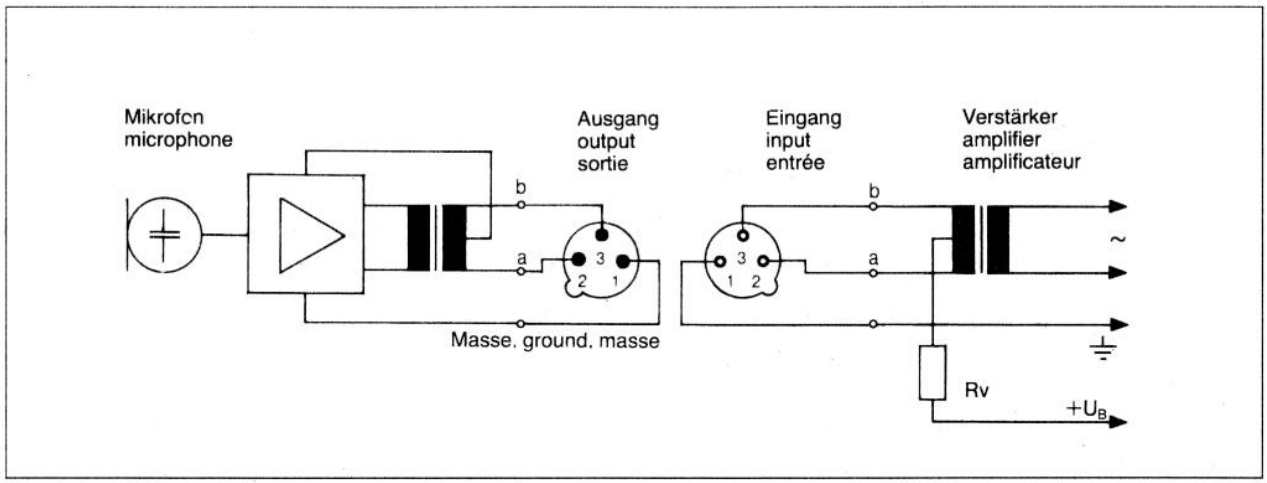
Fig. 1

Because of the high directivity of the capsule, it is inherently sensitive to wind noise and should be used only with an efficient windscreen supplied.

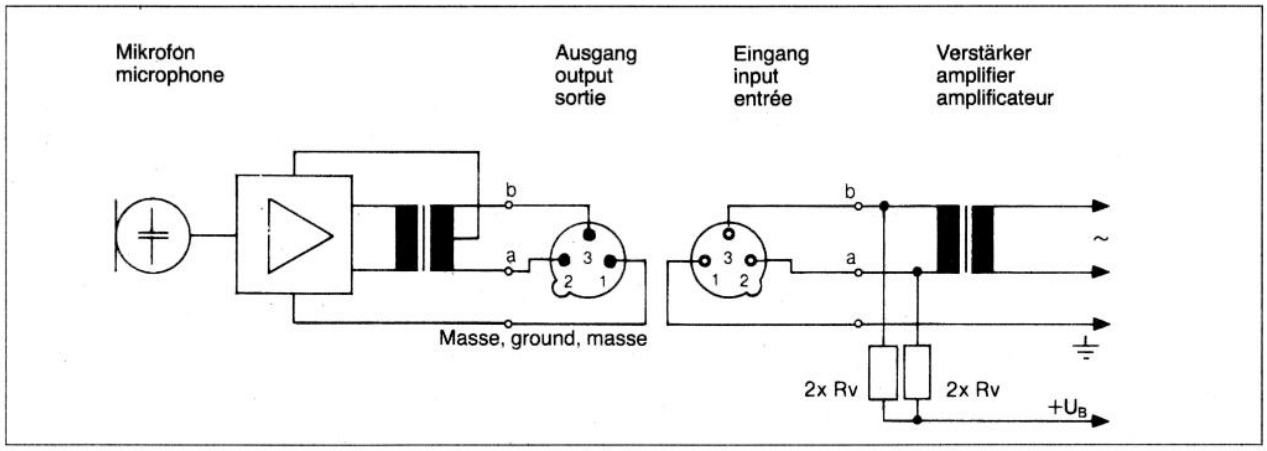
b) Powering Technique:

The standards defined in DIN 45596 specify a positive voltage on the audio lines versus the screen of the audio cable of 48 volts.
The possible connection diagrams are as shown below:

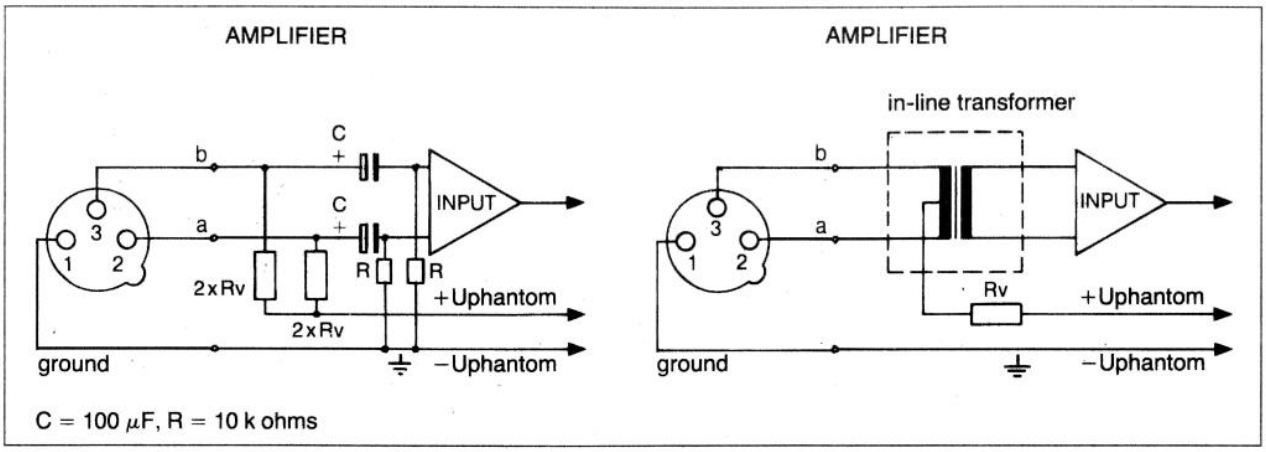
1. Circuitry incorporating an input transformer **with centre tap** (ungrounded):



2. Circuitry incorporating an input transformer **without centre tap** (ungrounded):



3. In the case where single ended (grounded) amplifier inputs are used or where no input transformer are available, either capacitors or optional transformers have to be wired into the audio lines to prevent any current leakage into the input circuitry.



The components in the last figure may be easily and economically added to most existing input circuitries and would save the operation of external powering elements.

The following values for Rv (or 2 x Rv) are standardized:

+UB (volts)	Rv (ohms)	2 x Rv (ohms)
48 ± 4	3300	6800

Please note:
The resistors 2 x Rv have to be at least of the 0.5% tolerance type to satisfy the symmetry requirements.

c) Cleaning Hints:

All metal surfaces may be safely cleaned from time to time with methylated spirit or alcohol: The foam windscreen should be occasionally soaked in a non-aggressive detergent/water solution and will be ready for use after drying.

Included Accessories:

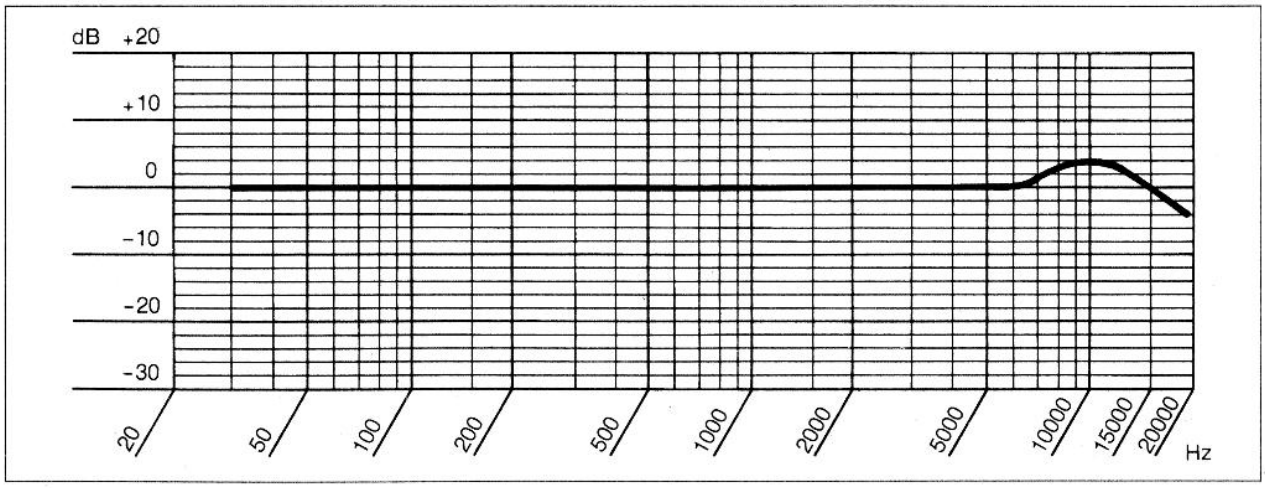
W 48	foam-type windscreen for short length
W 49	foam-type windscreen for shotgut with extension tube

Original frequency response curve
Practical quiver packaging

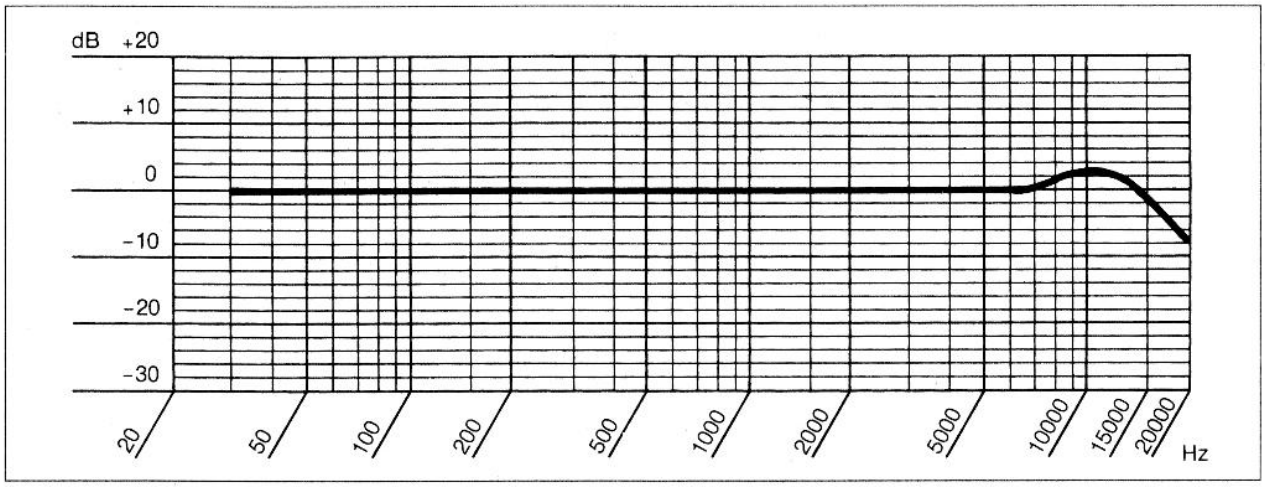
Optional Accessories:

H 30	Elastic shockmount/cradle
H 38	Elastic suspension
SA 38/H	Stand adapter/Suspension
KA 38	Camera adapter for the H 38
SA 18/2B	All-metal stand adapter
B 18	Battery supply unit
N 62E	Power supply unit for two microphones
N 66E	Power supply unit for six microphones

Frequency Response Curve:

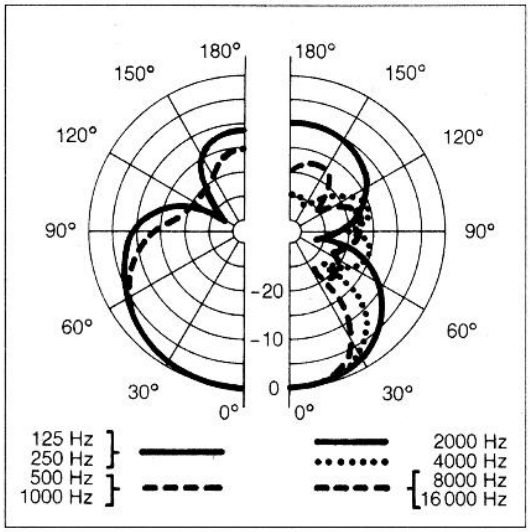


without extension tube

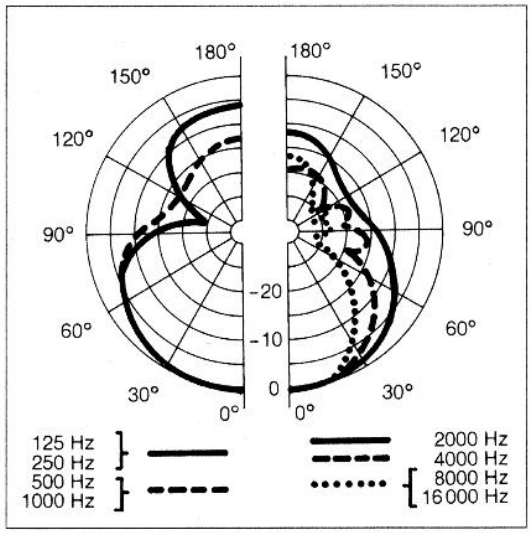


with extension tube

Polar Response:

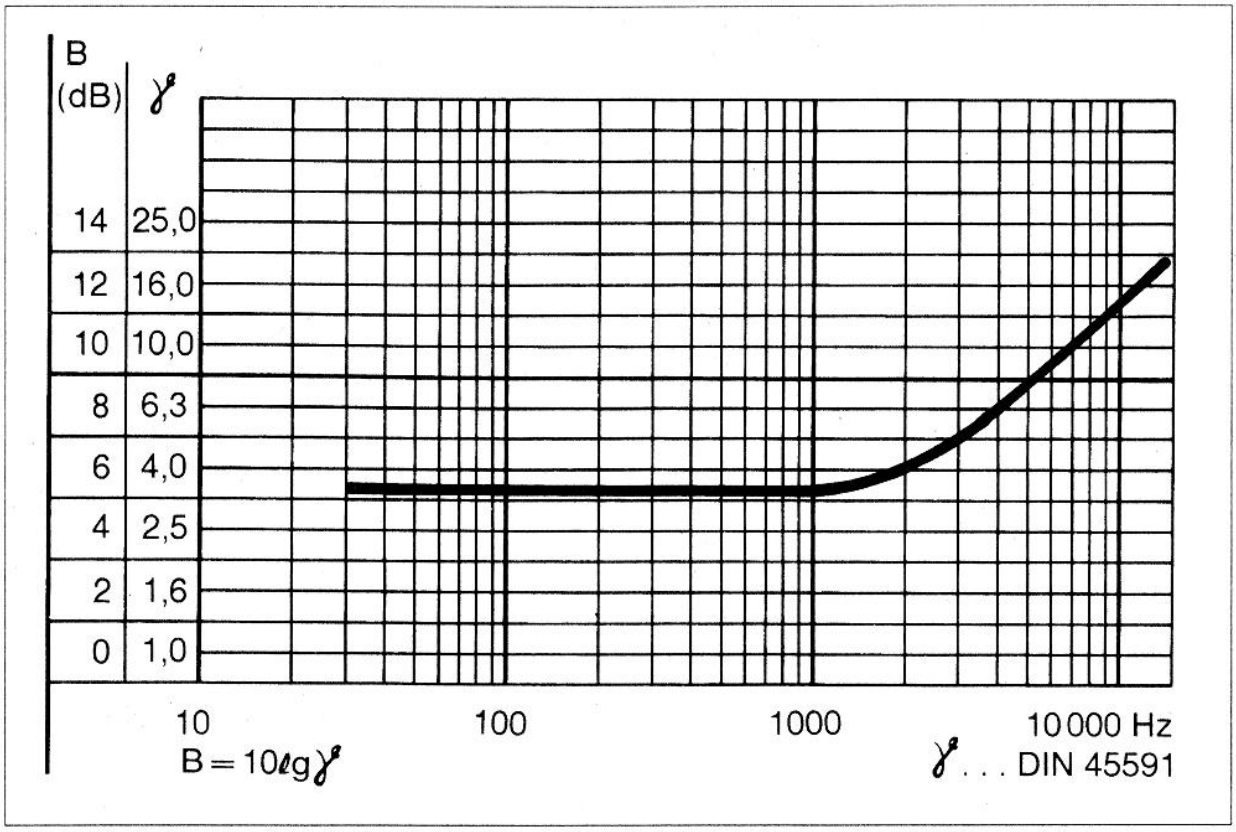


without extension tube

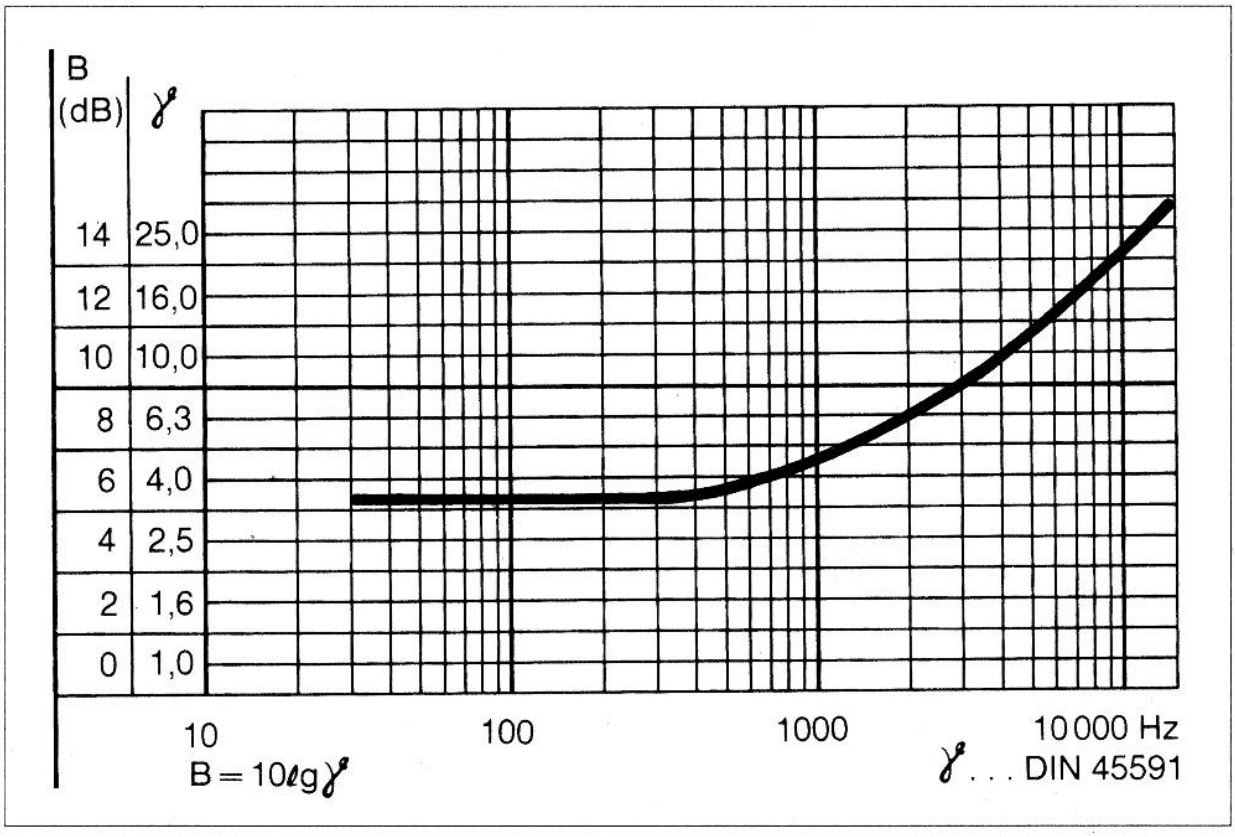


with extension tube

Directivity Factor:



without extension tube



with extension tube

Specifications

(measureed with C 480 B preamplifier)

Type:	Combined pressure gradient/interference microphone
Frequency range:	20 to 18.000 Hz ± 2 dB from specified curve
Sensitivity at 1000 Hz	
0 dB position:	27 mV/Pa ≙ -31 dBV*)
+6 dB position:	54 mV/Pa ≙ -25 dBV*)
-10 dB position:	8.5 mV/Pa ≙ -41 dBV*)
Plar pattern:	Directional
Impedance:	≤150 Ω
Recommended load impedance:	2000 Ω // 1 nF (IEC 268 15 A)
Equivalent noise level to DIN 45 405	
(CCIR 468-2)	
0 dB position:	16 dB
+6 dB position:	20 dB
-10 dB position:	25 dB
Equivalent noise level to DIN 45 412	
(A weighted)	
0 dB position:	9 dB-A
+6 dB position:	11 dB-A
-10 dB position:	15 dB-A
Signal/noise ratio re 1 Pa (A weighted)	
0 dB position:	85 dB
+6 dB position:	83 dB
-10 dB position:	79 dB
Max. SPL for 0.5 % THD	
0 dB position:	200 Pa ≙ 140 dB SPL**)
+6 dB position:	100 Pa ≙ 134 dB SPL**)
-10 dB position:	250 Pa ≙ 142 dB SPL**)

*) re 1 V/Pa

**) into recommended load impedance

Dynamic range (A weighted)	
0 dB position:	131 dB
+6 dB position:	123 dB
-10 dB position:	127 dB
Bass cut filter slope:	12 dB/octave, for all positions
Gain:	+6 dB, 0 dB und -10 dB, selectable
Supply voltage:	P 48 (phantom power to DIN 45 596 at 48 V ± 4 V)
Current consumption:	≤2 mA
Size (exclusive of C 480 B):	Dia.: 21 mm (0.8 in.); length: 176/317 mm (7/12.5 in.)
Net weight (exclusive of C 480 B):	70 g (2.5 ozs.)/100 g (3.5 ozs.)
Connector:	3-pin XLR type
Finish:	Matte black
Capsule contacts:	Self-cleaning, gold plated
Thread:	M 19 x 0.75
Operating temperature:	-20 °C to +60 °C
Environment	
Relative humidity:	99 % at +20 °C
	95 % at +60 °C

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