

# MICROTECH GEFELL

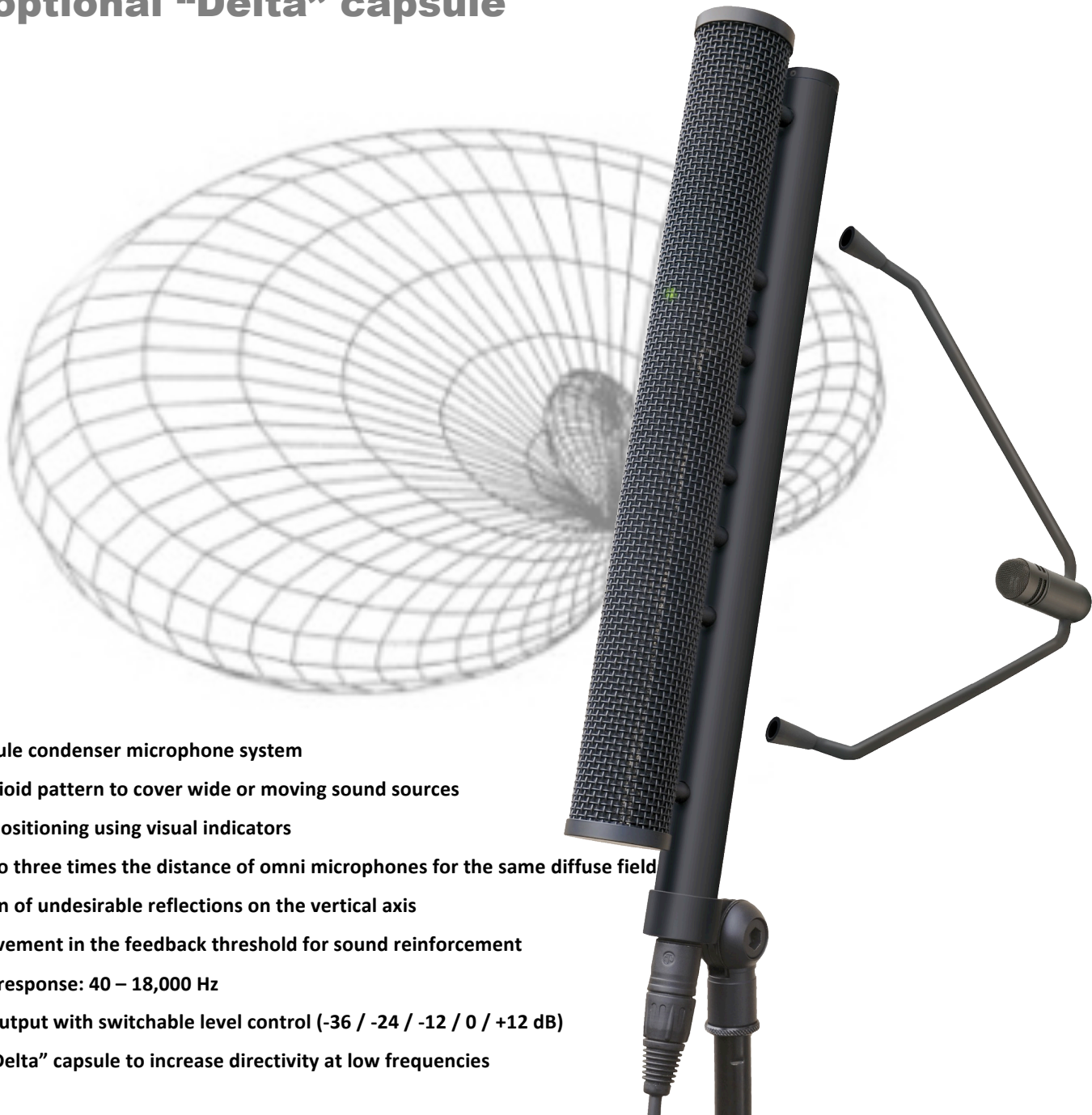


microphones & acoustic systems - founded 1928 by Georg Neumann

# KEM 975

## CARDIOID PLANE MICROPHONE

### with optional "Delta" capsule



- multi-capsule condenser microphone system
- broad cardioid pattern to cover wide or moving sound sources
- optimum positioning using visual indicators
- locate up to three times the distance of omni microphones for the same diffuse field
- suppression of undesirable reflections on the vertical axis
- 6dB improvement in the feedback threshold for sound reinforcement
- frequency response: 40 – 18,000 Hz
- line level output with switchable level control (-36 / -24 / -12 / 0 / +12 dB)
- optional "Delta" capsule to increase directivity at low frequencies

MICROTECH GEFELL GmbH GEORG-NEUMANN-PLAZ D-07926 GEFELL • TEL: +49 (0)36649-882-0 FAX: +49 (0)36649-882-11

WEBSITE: [www.microtechgefell.de](http://www.microtechgefell.de) • e-mail: [info@microtechgefell.de](mailto:info@microtechgefell.de)

## OVERVIEW

The Cardioid Plane Microphone is a multi-capsule microphone system, using the well-proven ceramic capsules of the M300 series, which has unique directional characteristics that are largely independent of frequency. On the horizontal axis the KEM 975 has the characteristic of a cardioid microphone, whilst on the vertical axis the characteristics resemble a shotgun microphone with a very narrow acceptance angle of about  $30^\circ$ . The directional pattern is therefore particularly well suited to the most frequently encountered situations where the source to be recorded is widely spread, or moving across the horizontal plane, and sound arriving from other directions needs to be attenuated.

Attenuated sound may consist of unwanted noise or reflections from surfaces such as ceilings, tables or the floor. Mounting the microphone physically on its side can significantly reduce feedback problems from sound reinforcement loudspeaker installations on the side walls.

For effective use of the highly directional nature of this microphone, a good understanding of the directions from which wanted and unwanted sounds arrive is important. The more care taken in positioning the KEM 975, the better the results obtained will be. Integrated front facing indicator LED helps in positioning the microphone accurately.

Acoustic treatment to improve a room can be an extremely costly exercise, and perhaps not even

possible when trying to achieve the average 5dB increase in operating level that the KEM 975 provides. An added benefit of the KEM 975, as shown in Fig.3, is its ability through skilled use of the sensitivity characteristics, to compensate for level changes if the sound source moves closer to the microphone.

Recommended applications for the KEM 975:

- on the front, or side ends of a stage
- at a presenter's lectern
- as a table microphone
- radio and TV productions
- video conferencing
- location of neighbouring unwanted noise

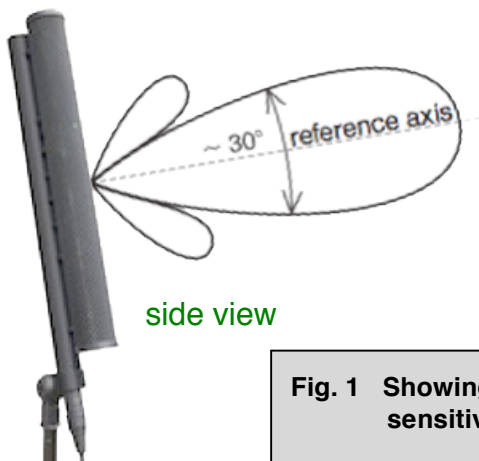
Experience gained from practical applications in TV production, stage-sound reinforcement and presenter amplification at lecterns, confirms the fundamental theoretical benefits of the Cardioid Plane Microphone across a wide range of varied applications.

The new KEM 975 incorporates a newly-developed low-noise pre-amplifier which increases its application in music recording. Microtech Gefell's well-proven optical principle to generate the capsule polarisation voltage is also used in the KEM 975 – this eliminates any "nasties" on the power line getting into the audio circuit.

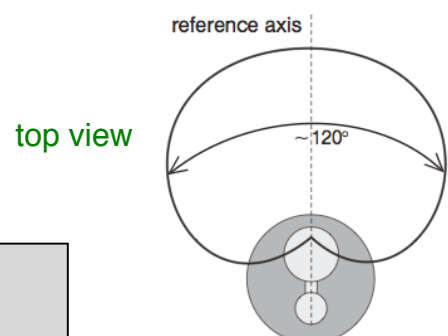
*The KEM 975 was developed in co-operation with the Institut für Rundfunktechnik (IRT) in Munich.*



## APPLICATIONS OF THE CARDIOID PLANE MICROPHONE



The specialty of the KEM 975 is the characteristic that the directional distribution of the sensitivity is a non-rotational-symmetrical pattern in relation to the reference axis.



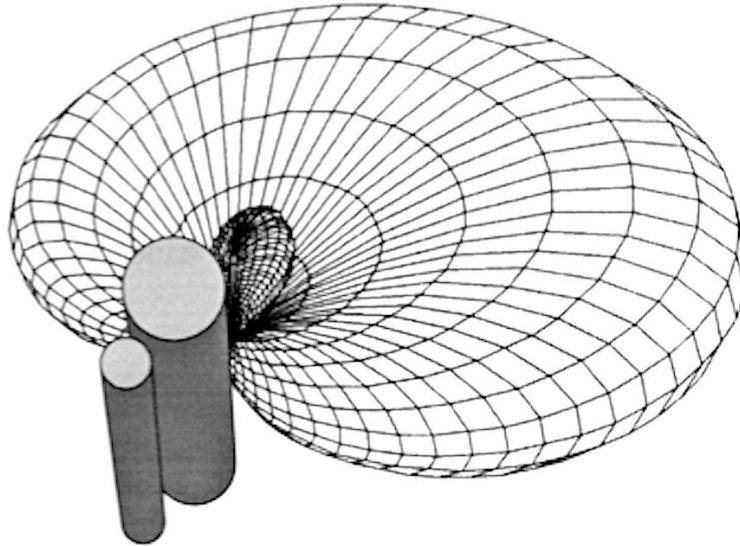
**Fig. 1** Showing the direction of maximum sensitivity along with the reference axis

# KEM 975

3

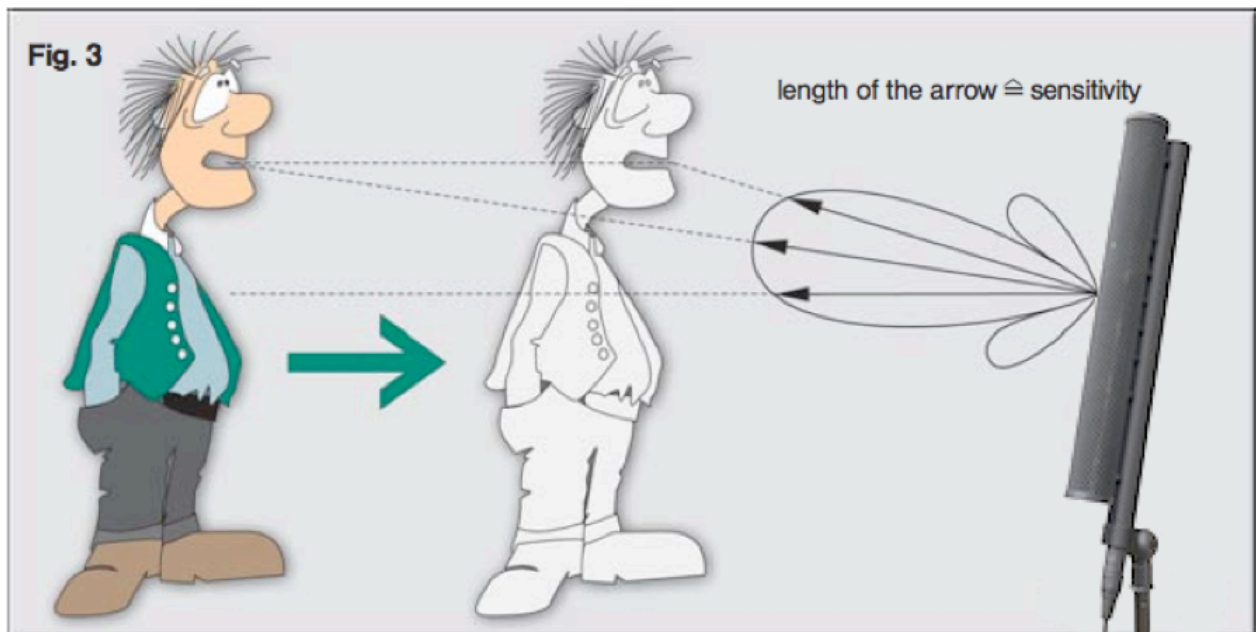
“Cardioid Plane Microphone” is a name that describes the unique directional pattern of the KEM 975 (a disc-shaped cardioid directional response). The KEM 975 response pattern exhibits the properties of:

- a microphone with a cardioid characteristic on the horizontal axis.
- the polar response of a highly directional microphone in the vertical plane.



**Fig. 2 Directional distribution pattern of sensitivity**

in added benefit of the KEM 975, as shown in Fig.3, is its ability through skilled use of its sensitivity characteristics, to compensate for level changes when the sound source moves closer to the microphone.



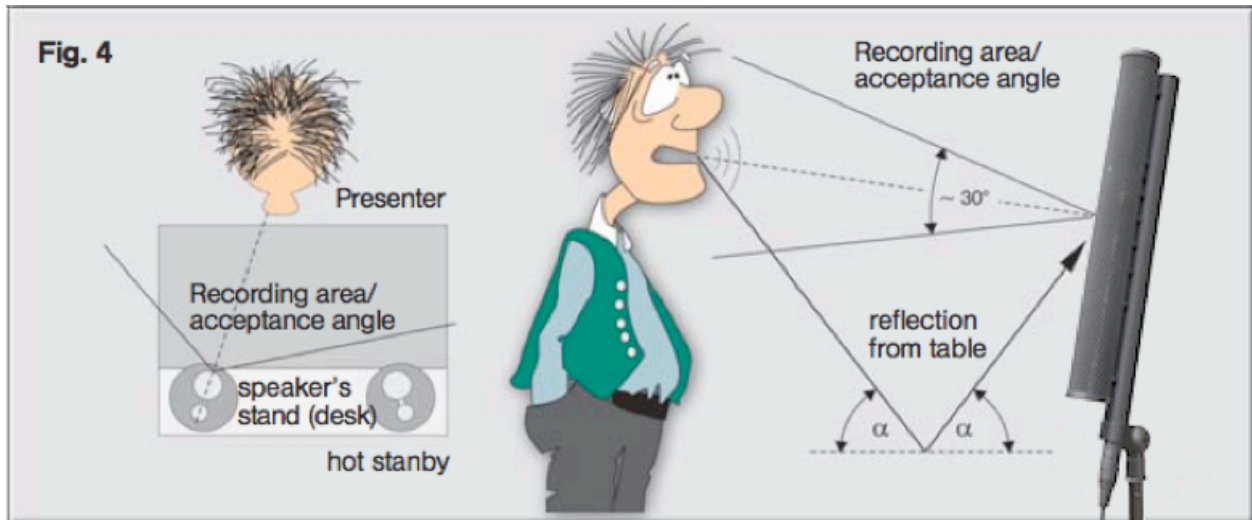
The sound source (the presenter in the illustration) initially starts to speak on the line of maximum sensitivity. If he approaches closer to the microphone he will deviate vertically from the line of maximum sensitivity. This change will compensate for the increase in sound level that arises from closer proximity to the microphone. By choosing different angles of inclination, the degree of the compensation can be varied.

Some applications in which the special features of the KEM 975 can be of particular advantage are briefly described in the following examples:



## 1. APPLICATION AS A TABLE MICROPHONE

Table mounting the KEM 975, as in Fig. 4, allows microphone the to reject unwanted noise or reflections generated by the table or lectern surface.



Comb-filter effects generated by table reflections, or paper rustling noises from the desk, etc. are all attenuated significantly. Also apparent from Fig. 4, is the microphones' immunity to sound from overhead or ceiling mounted sound reinforcement loudspeakers in the vicinity of the presenter. This significantly raises the threshold of feedback, providing much greater resistance to howl-round.

## 2. APPLICATION AS A LECTERN MICROPHONE

With the KEM 975 positioned as shown in Fig. 4, the presenter has much greater distance and lateral freedom of movement, without the normally attendant quality problems that could be expected with conventional microphones.



Two KEM 975 Cardioid Plane Microphones on a lectern in a local parliament



KEM 975  
Cardioid Plane Microphone  
"Reichstagsbäude Berlin"



# KEM 975

5

## KEM 975 Cardioid Plane Microphone



Dalai Lama, Maitland



Siemens shareholder meeting



Thuringia parliament



Used horizontally at the European Council – this method allows for tall or short speakers and rejects off-axis sound from the sides

Animated speakers are therefore unlikely to move outside the coverage area of the KEM 975. The low sensitivity of the microphone to off-axis disturbances, such as rustling of manuscripts on the desk, or reflections from the surface is a welcome advantage. Sensitivity to adverse influences from overhead sound reinforcement installations is effectively reduced compared with conventional microphones.

As an emergency backup, a second KEM 975 can be mounted on the other side of the desk. When two microphones are mounted symmetrically on either side of the desk, the view of the speaker from the auditorium or a camera is not impaired. By contrast, the conventional arrangement of multiple microphones often compromises the view considerably

## 3. APPLICATION FOR VIDEOCONFERENCING

KEM 975

KEM 975

The big advantage that the KEM 975 has in videoconferencing is that you normally only need a single KEM 975 – this does away with the expensive and constricting delegate microphone system and allows delegates to freely move around. They can therefore have a productive conference without the microphone system getting in the way.



application for interactive video conferences, live conferences

# KEM 975

6

## 4. APPLICATION ON STAGE AND RECORDING

As an example application, one or more KEM 975 microphones can be placed on floor stands near the edge of the stage, directed towards the area occupied by the actors. If the configuration shown in Fig. 3 is used, then undesirable noise emanating from the stage floor is considerably reduced.

If a sound reinforcement system is in use, the highly directional sensitivity of the KEM 975 on a single axis also adds increased immunity to feedback when compared to other commonly used microphones.

It is easy to imagine numerous other applications for the KEM 975, such as creating acoustic effects in radio drama production. Different acoustic scenes can be simulated by an actor changing position around the areas of varying sensitivity to influence the ratio of direct to diffuse sound.

### DELTA CAPSULE

IRT München (Institut für Rundfunktechnik), who originally designed and patented the line-array microphone and licensed Microtech Gefell to manufacture it, have significantly enhanced the directivity at low frequencies by the addition of a patented assembly that adds an extra microphone capsule mounted at the rear. This additional “Delta” capsule assembly is available as an optional accessory.

The advantage of this new construction, coupled with the improvements in lowering the noise floor, mean that the new KEM 975 is also suitable for music recordings as well as sound reinforcement, broadcast and video conferencing applications.

By using an optimised filter system, the sound of the rear capsule is summed with the sound of the Microphone Line Array. The output of the complete arrangement is provided at the 3-pin XLR output connector of the N 975 power supply. Signal integration is automatically enabled (“plug and play principle”) when the **Delta-Capsule** system is connected to the KEM 975 microphone.



KEM 975 used on front of stage



KEM 975 with “Delta” capsule slung over an orchestra

KEM 975 used over a choir








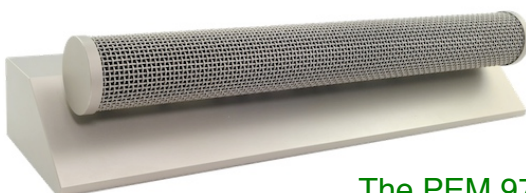


# KEM 975

7

## DELIVERY

	211180	<b>KEM 975 (satin nickel)</b>	<b>Cardioid Plane Microphone</b> - Multi-capsule line-array condenser microphone system with a broad cardioid pattern to cover wide or moving sound sources that can be located at up to three times the distance of omni microphones for the same diffuse field. Optimum positioning using visual indicators, suppression of undesirable reflections on the vertical axis and 6dB improvement in feedback threshold for sound reinforcement applications. Frequency response 40 - 18000 Hz, line level output, five position level switch (-36, -24, -12, 0, +12dB). Supplied in an aluminium carrying case complete with C975.1 10m cable, MH975 swivel joint, N975 power supply and rack-mount kit - colour: satin nickel.
	211120	<b>KEM 975 (satin nickel)</b>	As above but with MA 975 microphone hanger and 2 x MH 975
	211181	<b>KEM 975 (dark bronze)</b>	As KEM 975 above, but colour: dark bronze
	211121	<b>KEM 975 (dark bronze)</b>	As above but with MA 975 microphone hanger and 2 x MH 975
	custom	<b>KEM 975 CUSTOM</b>	As KEM 975 options above, but custom version in the colour finish the customer desires.
	201426	<b>DM 21 (Satin nickel)</b>	Optional "DELTA" capsule for KEM 975. This additional capsule increases the directivity at low frequencies - colour: satin nickel
	201427	<b>DM 21 (dark bronze)</b>	As above but colour: dark bronze
	custom	<b>DM 21 CUSTOM</b>	As above but custom colour
	2111142	<b>PEM 975 (satin nickel)</b>	<b>Cardioid Plane Microphone</b> - A horizontal version of the KEM 975 designed for desk mounting. In this case the cardioid pattern is vertical instead of horizontal with a tight coverage to the sides. IE: suppression of undesirable reflections on the horizontal axis and 6dB improvement in feedback threshold for sound reinforcement applications. Frequency response 40 - 18000 Hz, line level output, five position level switch (-36, -24, -12, 0, +12dB). Supplied complete with C975.1 10m cable, N975 power supply and rack-mount kit - colour: satin nickel.
	2111143	<b>PEM 975 (dark bronze)</b>	As above but colour: dark bronze



The PEM 975 is a special horizontal version of the KEM 975 for lectern use

The N 975 control unit / power supply is 1U high, half width and can be either rack-mounted or used free-standing





# KEM 975

8

## ACCESSORIES

	202224	<b>C 975.1</b>	<i>Connection cable for KEM 975 - 10m, XLR 5-pin</i>
	202225	<b>C 975.2</b>	<i>Connection cable for KEM 975 - 20m, XLR 5-pin</i>
	202226	<b>C 975.3</b>	<i>Connection cable for KEM 975 - 30m, XLR 5-pin</i>
	202227	<b>C 975.1 W</b>	<i>Connection cable with triangular adaptor for KEM 975 - 00m, XLR 5-pin</i>
	600138	<b>INV-BH</b>	<i>Rycote INV-BH suspension, with patented "Lyre" shock absorbers for the KEM 970 and KEM 975</i>
	202371	<b>MH 975</b>	<i>Microphone holder for KEM 975, stationary fixing, 3/8", 1/2" - colour: satin nickel</i>
	202372	<b>MH 975</b>	<i>As MH 975 above, but colour: dark bronze</i>
	202374	<b>KH 975.03</b>	<i>Microphone holder for KEM 975, elastic-stationary fixing cone, 30mm M10 (other lengths are available to suit customer requirements) - colour: satin nickel</i>
	202375	<b>KH 975.03</b>	<i>As KH 975.03 above, but colour: dark bronze</i>
	202376	<b>KH 975.1</b>	<i>Microphone holder for KEM 975, elastic-stationary fixing cone, 100mm M10 (other lengths are available to suit customer requirements) - colour: satin nickel</i>
	202377	<b>KH 975.1</b>	<i>As KH 975.1 above, but colour: dark bronze</i>
	202380	<b>MA 975</b>	<i>2-part Auditorium hanger for KEM 975 - Certified "TÜV Rheinland" BVG C1 - colour: satin nickel</i>
	202381	<b>MA 975</b>	<i>As MA 975 above, but colour: dark bronze</i>
	202323	<b>MF 97</b>	<i>Table stand, 180 mm diameter, for KEM 970/975</i>
	202411	<b>W 97</b>	<i>Foam windscreen for KEM 970/975, 2 parts</i>

# KEM 975

9

## TECHNICAL DATA

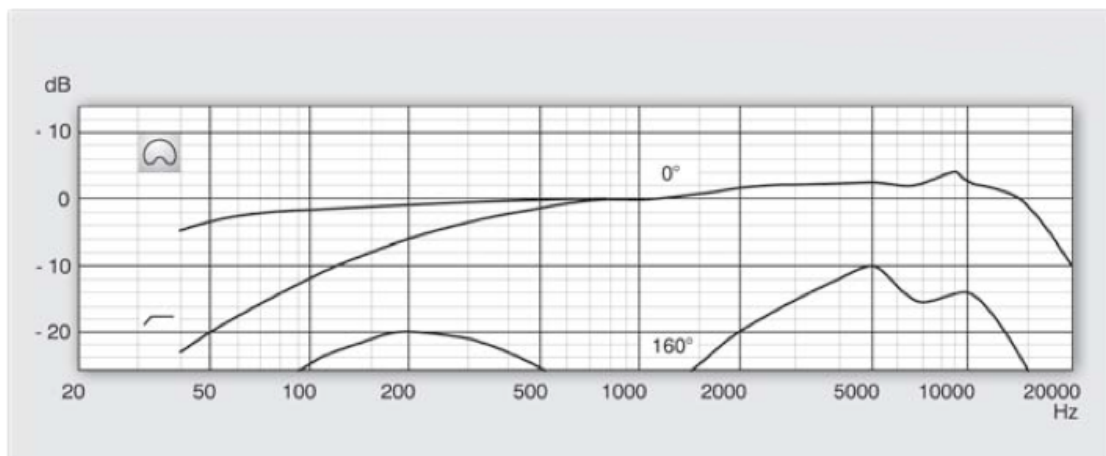
### KEM 975 Cardioid Plane Microphone with non-rotational-symmetrical directivity

Polar-Pattern	horizontal vertical	cardioid lobar
Recording angle	horizontal vertical	120° 30°
Acoustic operating principle	pressure-gradient transducers	
Frequency range	40 – 18,000 Hz	
Sensitivity @ 1kHz (switch position 0)	775 mV/Pa	
Output connector	5-pin XLR	
Finish	satin nickel / dark bronze / custom	

### N 975 Control Unit / Power Supply

Power supply voltage	230/115 V AC $\pm$ 10% 50/60 Hz
Input connector (from KEM/PEM 975)	5-pin XLR
Output connector	3-pin XLR
Housing	1U, half width

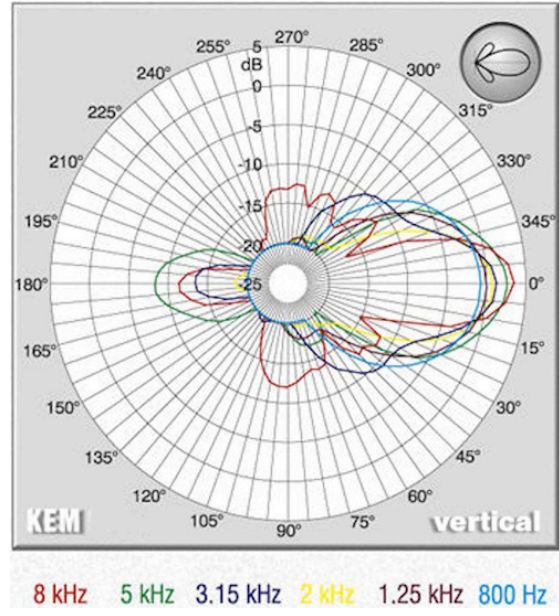
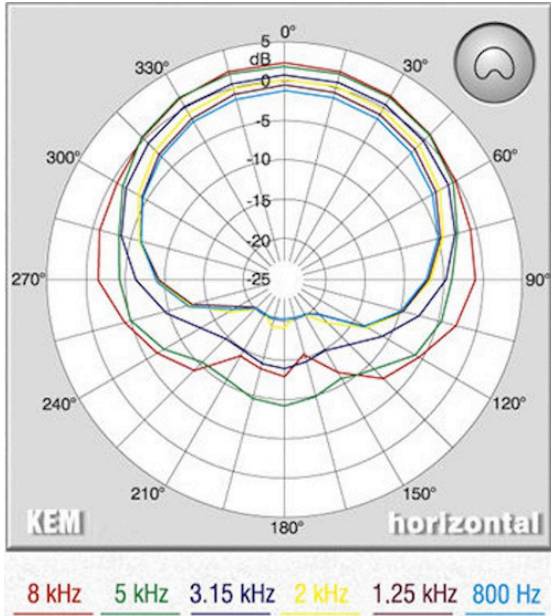
## FREQUENCY RESPONSE



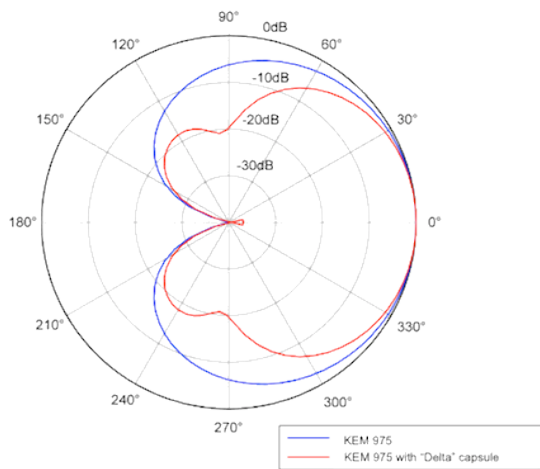
# KEM 975

10

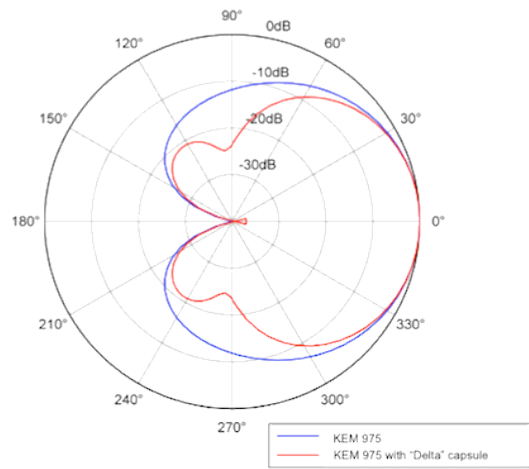
## POLAR PATTERNS



Horizontal characteristics, measured at 400Hz

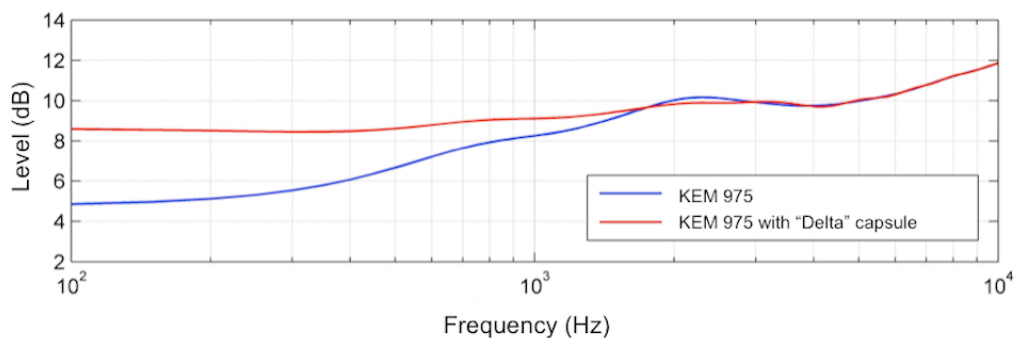


Vertical characteristics, measured at 400Hz



## DIRECTIVITY

Directivity





# KEM 975

11



*This Data Sheet prepared by John Willett, Sound-Link ProAudio (UK Distributor) April 2015, using the original KEM 970 Data Sheet as the guide*