

User's Manual

Omnidirectional
Microphones
Type 4003
Type 4006



DPA 
MICROPHONES

Omnidirectional Microphones
Type 4003, Type 4006

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The cartridge

Types 4003 and 4006 are omnidirectional (pressure) microphones which use a 16mm diameter prepolarized condenser cartridge. The diaphragm is a nickel foil which has been coated with an ultra-thin polymer layer for optimum corrosion resistance. The microphone housing is of German silver, an alloy with a high content of nickel to match the stable thermal qualities of the diaphragm. The cartridge has low self noise (typical 15dB(A) re. 20 μ Pa) and high sensitivity (4003: 45mV/Pa and 4006: 10mV/Pa). For optimum stability the microphone cartridges have undergone a special pre-aging process which releases all tensions in the materials and stabilizes the polarization voltage.

The preamplifier

Types 4003 and 4006 are acoustically identical, but differ in their preamplifier powering system. The 4003 is powered with 130V via the HMA4000 High-Voltage Microphone Amplifier and has a modified 4-pin XLR-connector (see Fig. 1 for pin designation). This special powering system enables the microphone preamplifier to handle approximately 10dB higher SPL than similar microphone types powered through conventional P48 systems (4003: 154dB SPL peak and 4006: 143dB SPL peak). Furthermore the 4003 together with the HMA4000 is a totally transformerless system and therefore has an extended low-frequency handling capability (10Hz to 20kHz \pm 2dB). The 4006 is powered via a standard P48 system and is equipped with a standard 3-pin XLR-connector (see Fig. 2 for pin designation). Types 4003 and 4006 use state of the art low-noise preamplifier technology. The preamplifiers are driven with unity gain to keep noise as low as possible.

All microphones come with an individual calibration chart with the specifications of self noise, sensitivity and the frequency response.

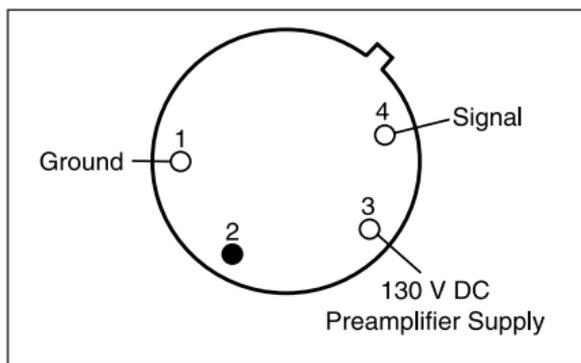


Fig. 1. External view of the output socket of the Type 4003.

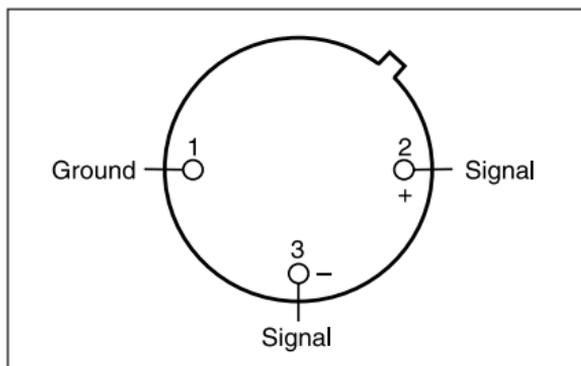


Fig. 2. External view of the output socket of the Type 4006.

Important: The microphones will only live up to their specifications if powered correctly.

The Nearfield Grid

The Nearfield Grid DD0251 on the microphone cartridge is designed to have a linear on-axis frequency response for near field applications (see Fig. 3 for frequency responses measured with the Nearfield Grid). The grid can be exchanged with the DD0297 Diffusefield Grid or the UA0777 Nose Cone.

The Diffusefield Grid

The Diffusefield Grid DD0297 is supplied as standard. It is designed for diffuse-field recordings, or recordings in the far field. The grid gives a high-frequency boost on-axis of 6dB around 15kHz (see Fig. 4) without adding noise to the recording. This boost gives a linear diffuse-field (far field) response up to 15kHz.

The Nose Cone

The Nose Cone UA0777 is available as an optional accessory. As with the Diffusefield Grid DD0297, the Nose Cone is simply screwed onto the microphone cartridge in place of the Nearfield Grid DD0251. When fitted, the Nose Cone gives the microphone a true omnidirectional response even at high frequencies (see Fig. 7) and a linear diffuse-field response (see Fig. 5). These qualities are useful at any distance for an even tonal balance of sound arriving at all angles of incidence, e.g. room reverberation or several sound sources placed around the microphone. The diaphragm is placed in a slot behind the solid cone and sound waves only have access to the diaphragm through the side of the Nose Cone. This way the Nose Cone prevents an on-axis, high frequency sound pressure build-up on the microphone, which is the reason for normal flat fronted omnidirectional microphones becoming more and more directional for higher frequencies. There is however, a slight high frequency boost on axis.

Acoustic Pressure Equalizers

Available as optional acoustical attachments are also the APE's – Acoustic Pressure Equalizers. The APE's use diffraction to passively modify the sound field near the microphone diaphragm, thus changing the microphone's frequency response and, in particular, the polar response (see Fig. 11 and Fig. 12) without adding any electrical noise to the recording. The size and shape of the APE determines the acoustical changes of the microphone. The APE's are precision made from a special compact nylon material and will only fit the Types 4003 and 4006 fitted with the standard Nearfield Grid DD0251. There are four different APE's in the range: L30B is a Ø30mm ball-shaped APE marked with a blue dot, L40B is a Ø40mm ball-shaped APE marked with a green dot, L50B is a Ø50 mm ball-shaped APE marked with a red dot and the L110C is a cylinder-shaped APE, 110mm long and marked with a yellow dot. The APE's can be obtained as single units or in two different equalizer kits: APE L4 contains 4 different APE's and APE L8 contains 2x4 different APE's. See Fig. 14 for how to mount the APE's on the microphones.

The Passive Connection Converter

The PCC4000 Passive Connection Converter is an optional accessory that makes it possible to run High-Voltage Microphones on standard 48 V phantom power with reduced microphone specs. The maximum reduction of the microphone SPL handling capability will be 13dB and it is possible to drive up to 100m of cable with the PCC4000 with the same specifications. Like the High-Voltage Microphones the PCC4000 is transformerless. The input connector is a modified 4-pin female XLR for connection directly to the microphone. The output is a standard 3-pin male XLR-connector for connection to standard cables.

Cartridge type: Pre-polarized condenser B&K Type MM0042

Principle of operation: Pressure

Power Supply: 4003: HMA4000 Two-channel High-Voltage Microphone Amplifier - 130V or PCC4000 Passive Connection Converter for P48
4006: Phantom P48

Frequency range: 4003: On-axis: 10Hz - 20kHz ± 2 dB
4006: On-axis: 20Hz - 20kHz ± 2 dB up to 124dB peak

Phase response: See Fig. 8 and 9. Phase matching between any two microphones: $\pm 10^\circ$

Directional characteristics: Omnidirectional

Sensitivity: 4003: Nominally 40mV/Pa; -27dB re. 1V/Pa unloaded (at 250Hz)
4006: Nominally 10mV/Pa; -40dB re. 1V/Pa unloaded (at 250Hz)

Equivalent noise level A-weighted: Typ. 15dB(A) re. 20 μ Pa (max. 17dB(A))

Equivalent noise level CCIR 468-1: Typ. 27dB (max. 29dB)

Max SPL: 4003: 154dB SPL peak (f < 4kHz)
4003: 151dB SPL peak (f < 14kHz)
4006: 143dB SPL peak (f > 200Hz)

Total Harmonic Distortion: 129 dB SPL peak (<0.5% THD)
135 dB SPL peak (<1% THD)

Preamplifier:

Frequency range: 4003: 20Hz to 50kHz $\pm 0,2$ dB, 5Hz to 150kHz -3dB
4006: 20Hz to 40kHz ± 1 dB

Output impedance: <75 Ohm

Cable drive capability: 4003: With HMA4000: Up to 300m
4003: With PCC4000: <100m
4006: Up to 300m

Polarity: 4003: Positively increasing sound pressure produces positive-going voltage at pin 4. Pin 1: Ground, Pin 2: Not used, Pin 3: 130 V DC preamplifier supply, Pin 4: Signal. See Fig. 1.
4006: Positively increasing sound pressure produces positive-going voltage at pin 2. Pin 1: Ground, Pin 2: Signal +, Pin 3: Signal return. See Fig. 2

Difference frequency distortion: (DF2, DF3, Df = 80Hz) <1% at 135dB SPL peak

Temperature coefficient: -0,025dB/°C at 25°C, 1013 hPa, 250Hz

Static pressure coefficient: -0,002dB/hPa at 25°C, 1013 hPa, 250Hz

Influence of vibration: 64dB equivalent SPL for 1m/s² in direction of greatest sensitivity

Influence of magnetic field: 45dB equivalent SPL for 80A/m, 50Hz in direction of greatest sensitivity

Operating temperature range: -10 to +70°C (+14 to 158°F)

Dimensions:

Microphone length: 165mm

Microphone diameter: 19mm

Capsule diameter: 16mm

Weight: 150g

For use with Microphone Amplifier:

HMA4000 Hi-Voltage Microphone Amplifier, 2 ch.

Accessories Included

Microphone Holders & Suspension Mounts

UA0639 Microphone Clip

Acoustic Modification Accessories

DD0251 Nearfield Grid, Silver

DD0297 Diffusefield Grid, Black

Windscreens

UA0638 Windscreen for Ø16mm Microphone

Accessories Available

Shock Mounts

- RSM4000 Shock Mount for
Windjammer
UA0897 Shock Mount

Shock Mount Rubbers

- DDS0731 Rubber Mount 19mm,
Medium Soft

Microphone Holders & Suspension Mounts

- UA0961 Microphone Holder

Stereo Accessories

- UA0836 Stereo Boom with Holders
UA0837 Stereo Boom
excluding Holders

Floor & Table Stands

- MB4000 Magnet Base
TB4000 Table Base

Acoustic Modification Accessories

- APE L4 Acoustic Modification Kit,
Mono

- APE L8 Acoustic Modification Kit,
Stereo
L110C Acoustic Pressure Eq.,
110mm Cylinder
L30B Acoustic Pressure
Equalizer, 30mm Ball
L40B Acoustic Pressure
Equalizer, 40mm Ball
L50B Acoustic Pressure
Equalizer, 50mm Ball
UA0777 Nose Cone

Connection Adapters

- HTP4000 Converter: 130V to P48
PCC4000 Passive Connection
Converter: P48 to 130V

Cables

- AO0182 P48 Microphone Cable, 5m
AO0261 130V Microphone Cable,
5m (Type 2812)
DA00130 130V Microphone Cable,
5m (Type HMA4000)

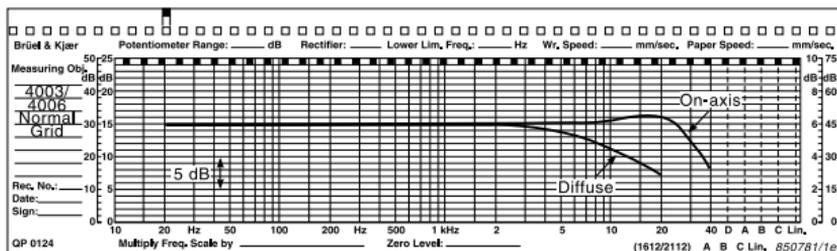


Fig. 3. On-axis and diffuse-field responses of Types 4003 and 4006 with the Nearfield Grid DD0251 fitted.

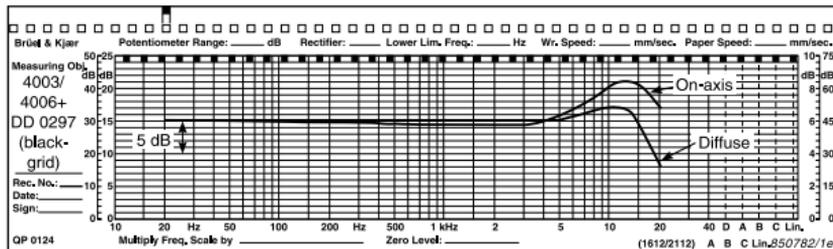


Fig. 4. On-axis and diffuse-field responses of Types 4003 and 4006 with the Diffusefield Grid DD0297 fitted.

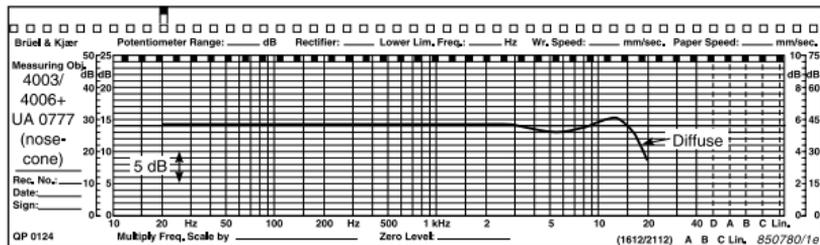


Fig. 5. Diffuse-field response of Types 4003 and 4006 with Nose Cones UA0777 fitted.

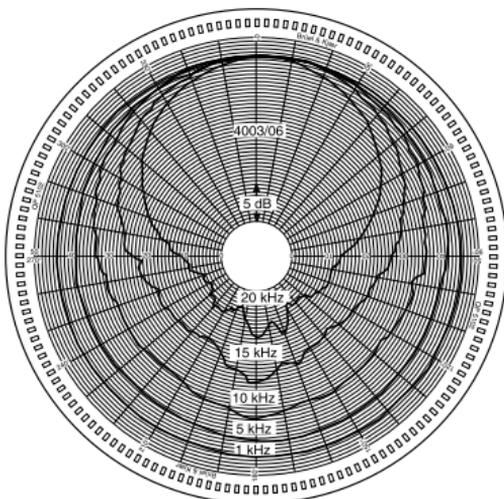


Fig. 6.
Directional characteristics of
Types 4003 and 4006 with Nearfield
Grid DD0251 fitted.

Fig. 7.
Normalised directional characteristics of Types 4003 and 4006 with Nose Cone UA0777 fitted.

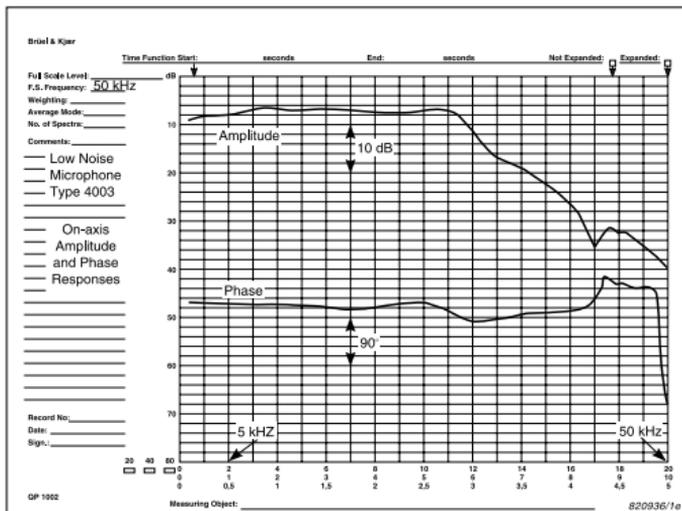
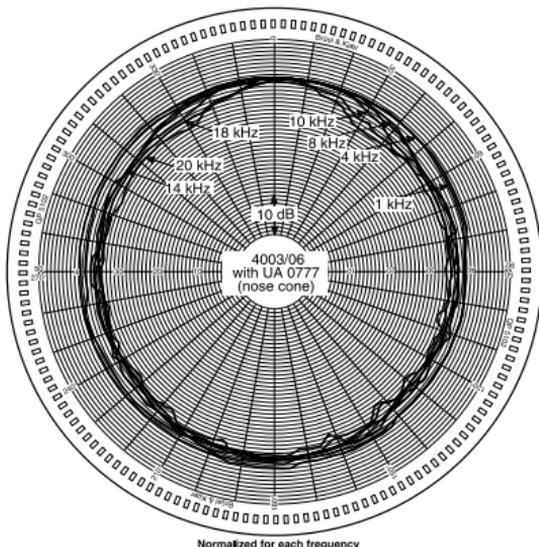


Fig. 8. On-axis amplitude and phase responses of Types 4003 and 4006 plotted using a linear frequency axis for evaluation of the phase response.

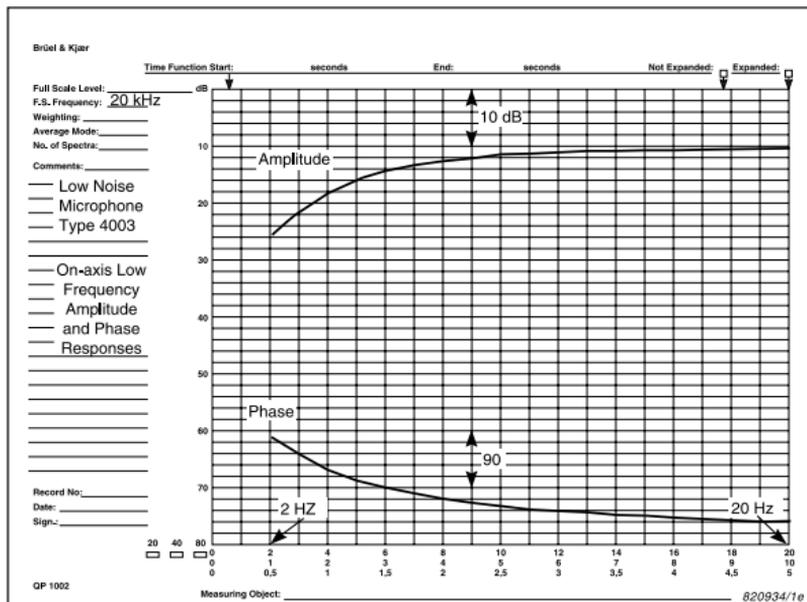


Fig. 9. On-axis low frequency amplitude and phase response of Types 4003 and 4006.

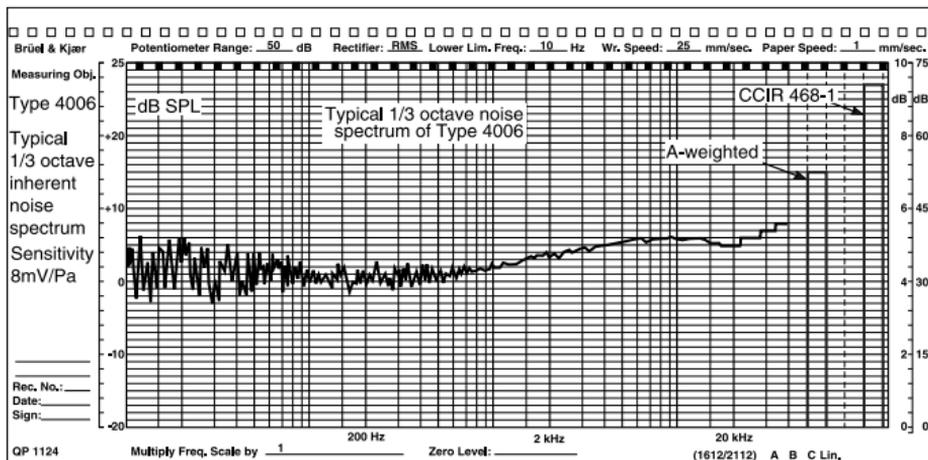


Fig. 10. Typical third-octave inherent-noise spectrum of Type 4006.

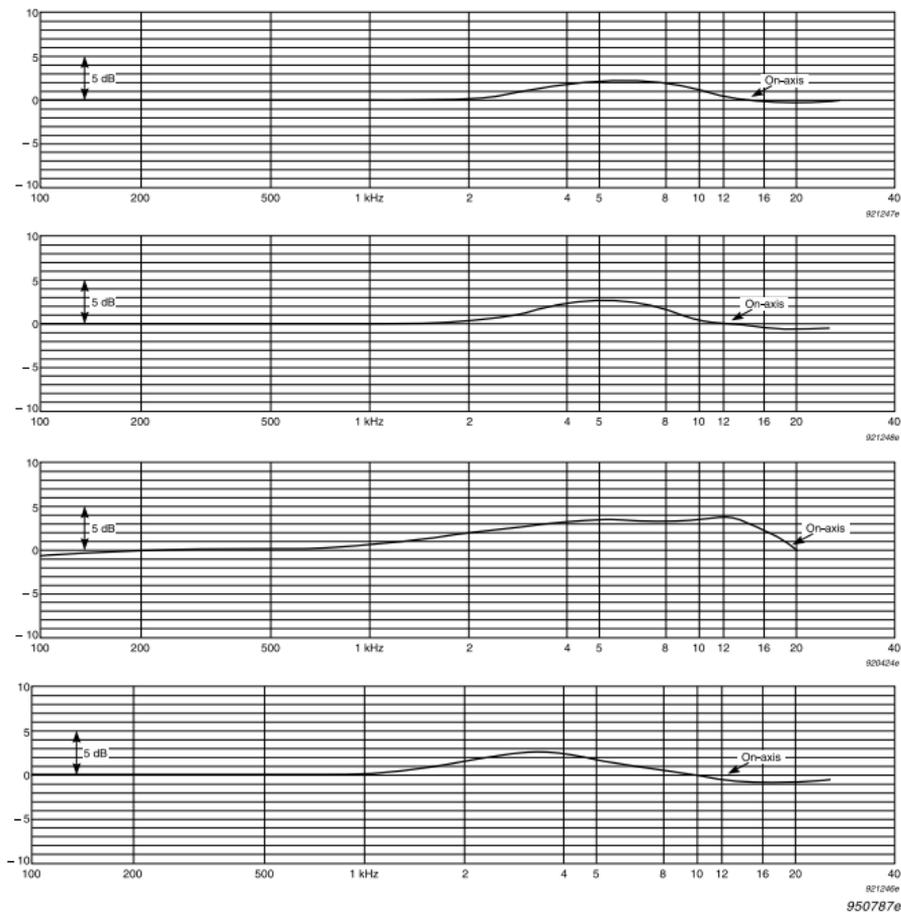


Fig. 11. Response characteristics of APE L30B (top), APE L40B, APE L50B and APE L110C.

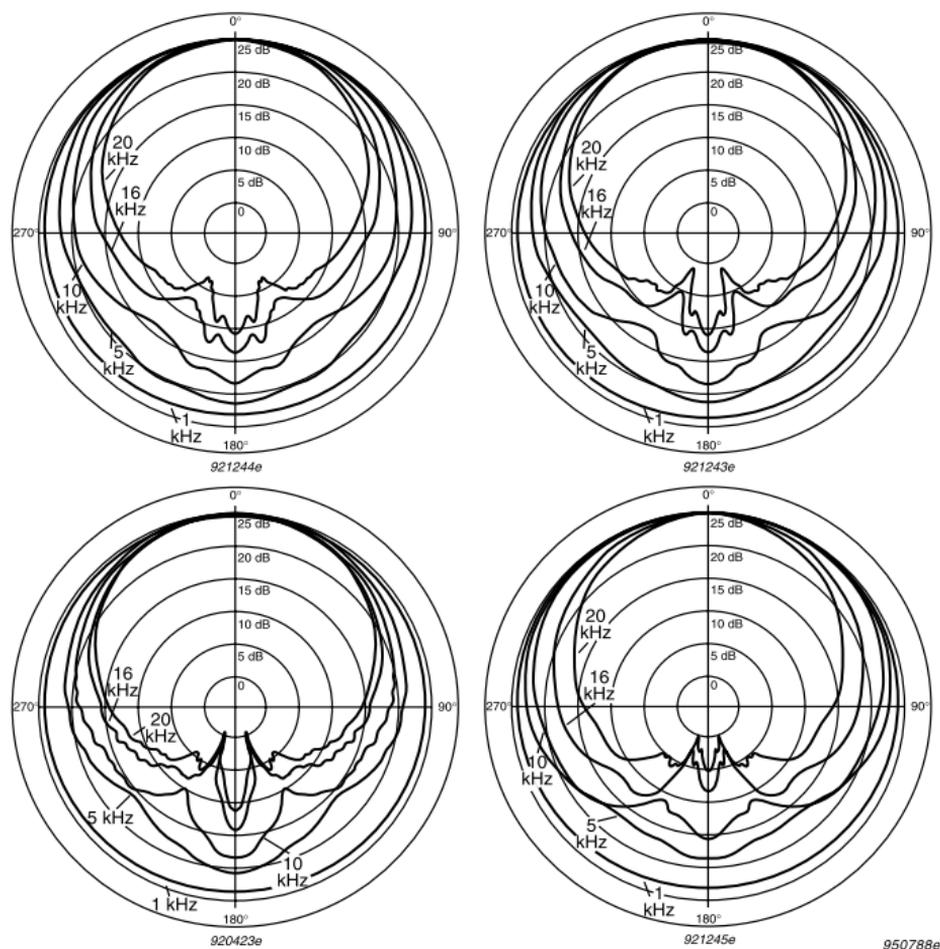


Fig. 12. Directional characteristics of APE L30B (top left), APE L40B, (top right), APE L50B and APE L110C.

It is important to bear in mind the following points with regards to mounting, microphone care and the use of accessories:

- The microphone cartridge is tightly secured to the main body housing, and no attempt should be made to remove it. If a replacement cartridge is required, contact your local DPA Microphones representative.
- Types 4003 and 4006 are supplied with an additional Diffusefield Grid DD0297 (see "Technical Description" and "Full Specifications"). On delivery, the normal protection grid is screwed on to the cartridge housing and normal finger torque is required to remove it. Do not try to unscrew or tighten the protection grids with any kinds of tools as both surface and thread might be damaged.
- **Caution:** When changing grids, be very careful to avoid any contact with the diaphragm. Over time a visible dust layer can build up on the diaphragm. Since the mass added is extremely small and the influence on the frequency response is negligible, the dust will not change the characteristics of the microphone. Therefore cleaning the diaphragm is not necessary and must not be done.
- Use of windscreen is recommended when microphones are used in dirty or dusty environments.
- When not in use, the microphone should be disconnected and kept in the case supplied.



Fig. 13. Be careful to avoid any contact with the diaphragm.

Use of Acoustic Pressure Equalizers

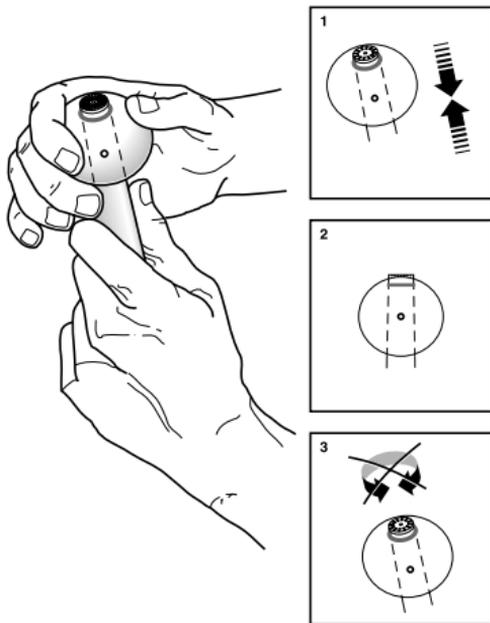
- Acoustic Pressure Equalizers are only to be used with the standard silver protection grid DD0251.
- Do not try to fit APE's on Nose Cone UA0777.
- The microphone must be inserted into the APE hole from the end which is opposite to the O-ring. Push the microphone through the hole gently; apply a small amount of force when the microphone passes the O-ring and is locked. Never turn the microphone or the APE, since this may cause a tightening or loosening of the grids. When positioned correctly, the APE is flush with the diaphragm.
- **Caution:** During insertion of the microphone do not place a finger or a palm across the hole, as air confined in the hole may cause the diaphragm to crack.
- When dismantling the APE, use a thumb to press it off. Never turn the microphone or the APE.

Fig. 14.
Correct mounting and
dismounting of APE's.

1. Correct direction for mounting
and dismantling APE's.

2. The APE must be positioned so
that it is flush with the diaphragm.

3. To avoid separation of the
microphone or tightening of the
grid, do not turn the microphone.



Service & Repair

Products from DPA Microphones are extremely stable and there should not be any significant change in the specifications with time and use. If, however, you are not totally satisfied with the characteristics exhibited by these products, then contact your nearest DPA Microphones representative for further details of service and the repair facilities that are available.

DPA Microphones has a maximum seven working days in-house service policy, guaranteeing that no more than seven working days will elapse from the day we receive the item for service to the day we are ready to return it to you. Your satisfaction is our satisfaction.

Please contact DPA Microphones for your nearest representative on tel. +45 48 14 28 28 or fax +45 48 14 27 00.

Warranty

All products from DPA Microphones are covered by a limited warranty on both their mechanical functionality and their documented specifications. We are so confident of the quality of these products, that this warranty is valid for one year from the date of purchase, as long as the items are not directly mistreated or abused. In case of a warranty claim, your invoice is your warranty registration.

CE Standard

The CE-mark guarantees all products conform with relevant standards approved by the European Community. The products described in this User's Manual comply with current relevant standards when used with cables from DPA Microphones.

EMC Directive: 89/336/EEC, amended by 92/31/EEC and 93/68/EEC

Low Voltage Directive: 73/23/EEC, amended by 93/68/EEC



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