USER'S MANUAL

Omnidirectional Microphones

DPA 4003
DPA 4006
DPA 4006-TL

Included in kit solutions

DPA 3503
DPA 3530-A
DPA 3506

DPA MICROPHONES

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CONTENTS

TECHNICAL DESCRIPTION

The cartridge

DPA 4003 and 4006 are omnidirectional (pressure) microphones that use a 16 mm diameter prepolarized condenser cartridge. The cartridge has low self noise (typical 15 dB(A) re. 20 µPa) and high sensitivity (4003 and 4006-TL: 40 mV/Pa and 4006: 10 mV/Pa). For optimum stability the microphone cartridges have undergone a special pre-aging process which stabilizes all tensions in the materials as well as the polarization voltage.

The preamplifiers

DPA 4003, 4006 and 4006-TL are acoustically identical, but differ in their preamplifier powering system. The 4003 is powered with 130 V via the HMA5000 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 10 dB higher SPL than similar microphone types powered through conventional P48 systems (4003: 154 dB SPL peak and 4006: 143 dB SPL peak). Furthermore, the 4003 together with the HMA5000 is a totally transformerless system and therefore has an extended low-frequency handling capability (10 Hz to 20 kHz ± 2 dB). 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). DPA 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.

The 4006-TL is equipped with a state-of-the-art transformerless preamaplifier. All components in this construction are very carefully selected to fulfil the demand for optimal neutral timbre, tight and focused imaging and extremely low distortion even at very high sound pressure levels. The transformerless design has an extended low frequency handling capability (10 Hz to 20 kHz ±2 dB). The 4006-TL is powered via a standard 48 V Phantom Power supply and has a standard 3-pin XLR connector. See Fig. 3 for pin designation. The output is impedance balanced between pin 2 and pin 3, with pin 2 carrying the signal.

An attenuator is applied in the output amplifier to prevent overloading of input sections in the following equipment such as mixing consoles etc. When the button is pushed in, the output is attenuated by 20 dB.

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

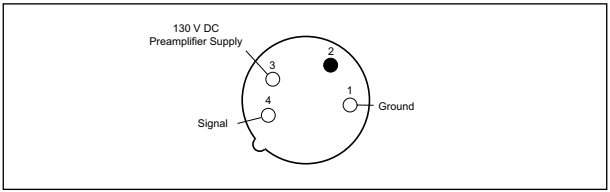


Fig. 1. External view of the output connector of the DPA 4003.

Important:
The microphone will only operate within it's specifications if powered correctly.

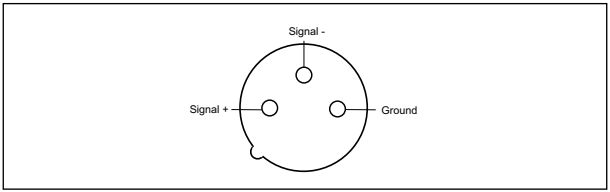


Fig. 2. External view of the output connector of the DPA 4006 and 4006-TL.

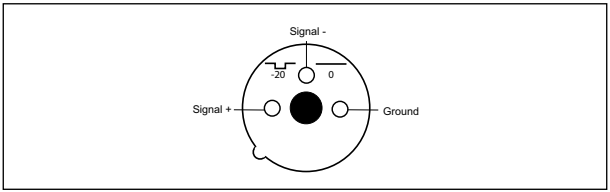


Fig. 3. The switch on the XLR-connector of DPA 4006-TL is used to select between 0 dB and 20 dB attenuation. Switch pressed in results in 20 dB attenuation.

The Free-field Grid, Silver

The DD0251 Free-field Grid 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 Free-field Grid). The grid is factory mounted but can be exchanged with the DD0297 Diffuse-field Grid or the UA0777 Nose Cone. Please be extremely careful not to touch the exposed diaphragm when changing the grids.

The Diffuse-field Grid, Black

The DD0297 Diffuse-field Grid 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 6 dB around 15 kHz (see Fig. 5) without adding noise to the recording. This boost gives a linear diffuse-field (far field) response up to 15 kHz.

The Close-miking Grid, Trapezoid, Silver

The DD0254 Close-miking Grid is available as an optional accessory. Due to its high frequency roll-off (beginning at 12 kHz and -3 dB at 20 kHz) it is designed to provide a soft and smooth high-end response, especially suitable for close miking applications. The response is altered acoustically without adding any noise or distortion. See Fig. 6 for frequency response.

The Nose Cone, Trapezoid

The UA0777 Nose Cone is available as an optional accessory. As with the DD0297 Diffuse-field Grid, the Nose Cone is simply screwed onto the microphone cartridge in place of the DD0251 Free-field Grid. 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 APEs – Acoustic Pressure Equalizers. The APEs 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. 14 and Fig. 15) without adding any electrical noise to the recording. The size and shape of the APE determines the acoustical changes of the microphone. The APEs are precision made from a special compact nylon material and will only fit the DPA 4003 and 4006/4006-TL fitted with the standard DD0251 Free-field Grid. There are four different APEs in the range: L30B is a Ø30 mm ball-shaped APE marked with a blue dot, L40B is a Ø40 mm ball-shaped APE marked with a green dot, L50B is a Ø50 mm ball-shaped APE marked with a red dot. The APEs can be obtained seperately or in the APE L6 Acoustic Modification kit. See Fig. 17 for how to mount the APEs on the microphone.

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 13 dB and it is possible to drive up to 100 m (328 ft) 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.

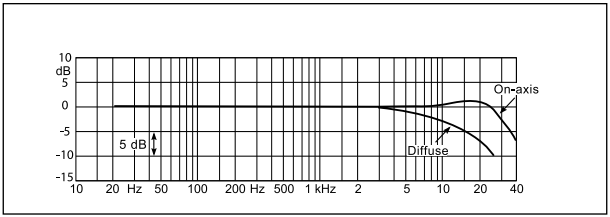


Fig. 4. On-axis and diffuse-field responses of DPA 4003, 4006 and 4006-TL with the Free-field Grid DD0251 fitted.

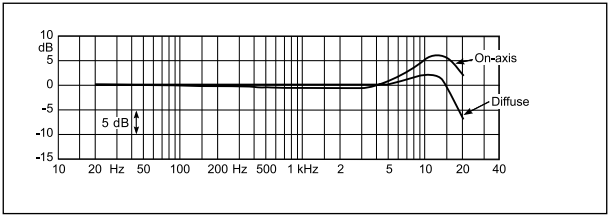


Fig. 5. On-axis and diffuse-field responses of DPA 4003, 4006 and 4006-TL with the Diffuse-field Grid DD0297 fitted.

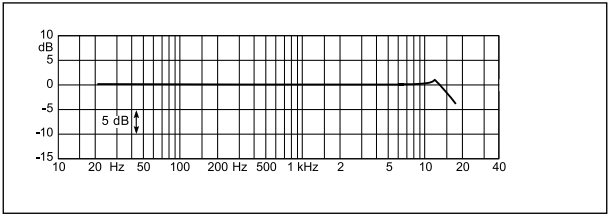


Fig. 6. On-axis response of DPA 4003, 4006 and 4006-TL with Close-miking Grid DD0254.

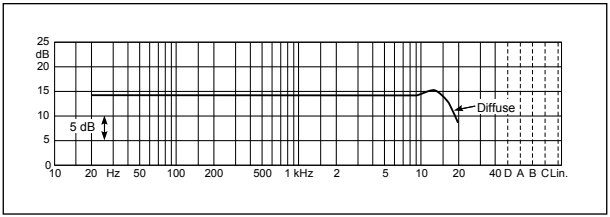


Fig. 7. Diffuse-field response of DPA 4003, 4006 and 4006-TL with UA0777 Nose Cones fitted.

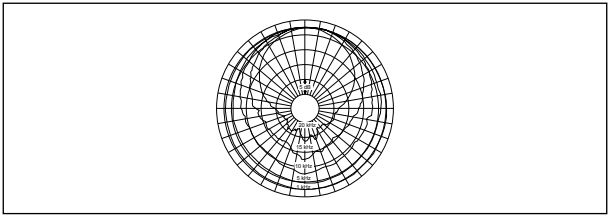


Fig. 8 Directional characteristics of DPA 4003, 4006 and 4006-TL with the DD0297 Diffuse-field Grid fitted (normalized).

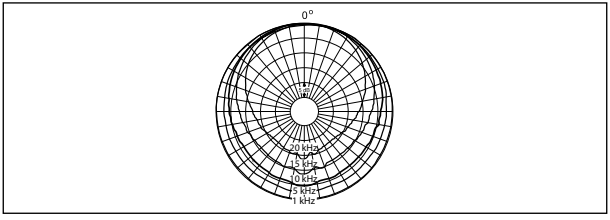


Fig. 9. Directional characteristics of DPA 4003, 4006 and 4006-TL with DD0254 Close-miking Grid (normalized).

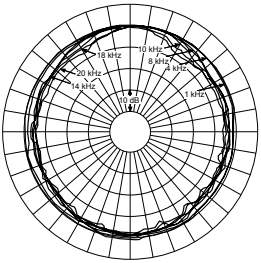


Fig. 10. Directional characteristics of DPA 4003, 4006 and 4006-TL with UA0777 Nose Cone fitted (normalized).

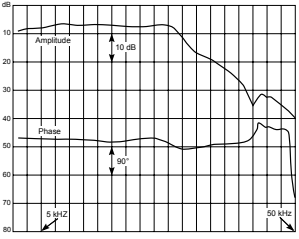


Fig. 11. On-axis amplitude and phase responses of DPA 4003, 4006 and 4006-TL plotted using a linear frequency axis for evaluation of the phase response.

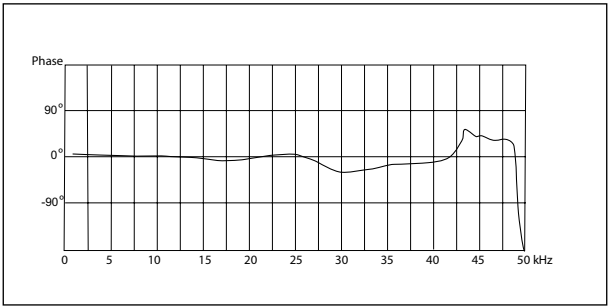


Fig. 12. On-axis amplitude and phase responses of DPA 4003, 4006 and 4006-TL plotting using a linear frequency axis for evaluation of the phase response.

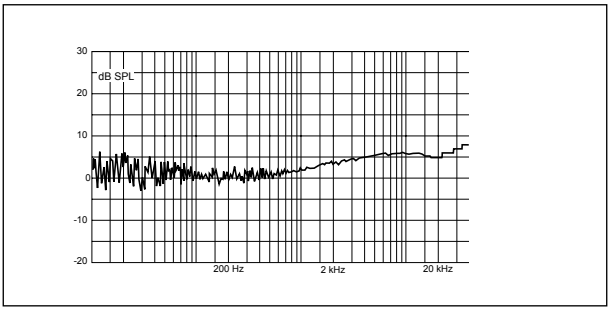


Fig. 13. Typical third-octave inherent-noise spectrum of DPA 4003, 4006 and 4006-TL.

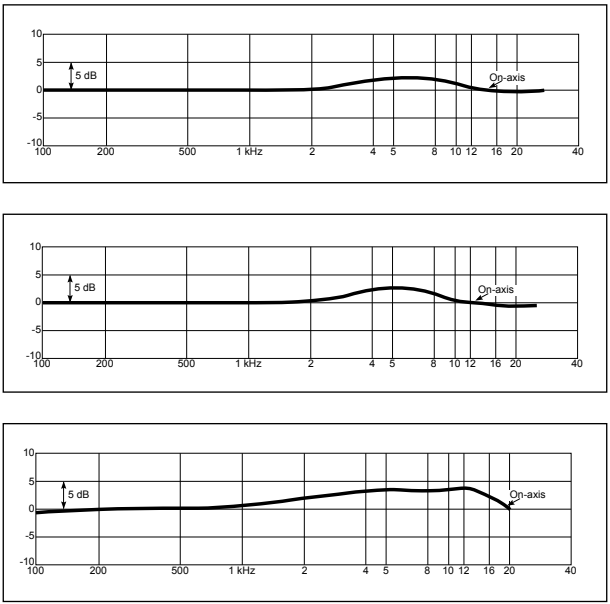
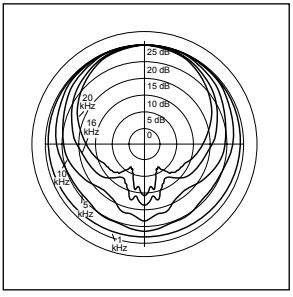
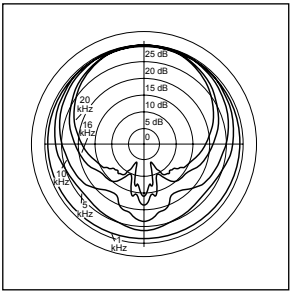


Fig. 14. Response characteristics of APE L30B (top), APE L40B and APE L50B, fitted on 4006.





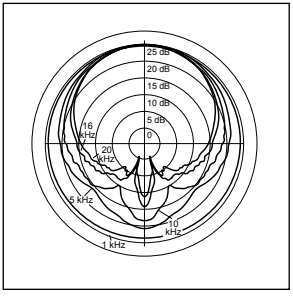


Fig. 15. Directional characteristics of APE L30B (top left), APE L40B, (top right), and APE L50B, fitted on 4006 (normalized).

FULL SPECIFICATIONS:

Cartridge type:
Pre-polarized condenser
Principle of operation:
Pressure
Power supply:
4003: HMA5000 for 130 V or PCC4000 for P48
4006 and 4006-TL: Phantom P48
Frequency range; ±2 dB:
4006-TL and 4003: On-axis: 10 Hz - 20 kHz
4006: On-axis: 20 Hz - 20 kHz
Phase compatibility:
Max. deviation between any two 4003, 4006 and 4006-TL microphones ±10° (See Fig. 12)
Directional characteristics:
Omnidirectional
Sensitivity, nominal, ±2 dB:
4003: 40 mV/Pa; -27 dB re. 1 V/Pa
4006: 10 mV/Pa; -40 dB re. 1 V/Pa
4006-TL: 35 mV/Pa ; -29 dB re. 1 V/Pa
Matching tolerance for 3503 and 3506
±0.5 dB (for frequency response, sensitivity and self-noise)
Equivalent noise level A-weighted:
Typ. 15 dB(A) re. 20 µPa (max. 17 dB(A))
Equivalent noise level ITU-R BS.468-4:
Typ. 27 dB (max. 29 dB)
Max SPL, peak before clipping:
4003: 154 dB
4006-TL: 143 dB
Total Harmonic Distortion:
<0.5% up to 129 dB SPL peak
<1% up to 135 dB SPL peak

PREAMPLIFIER:

Frequency range:
4003: 20 Hz to 50 kHz ±0.2 dB, 5 Hz to 150 kHz -3 dB
4006 and 4006-TL: 20 Hz to 40 kHz ±1dB

Output impedance:
4003 and 4006: <75 Ohm
4006-TL: <220 Ohm
Cable drive capability:
4003: From microphone to HMA5000: Up to 20 m (66ft)
From HMA500: Up to 300 m (984 ft)
4006: Up to 300 m (984 ft)
4006-TL: Up to 100 m (328 ft)
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 and 4006-TL: 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 = 80 Hz) <1% at 135 dB SPL peak
Temperature coefficient:
-0.025 dB/°C at 25°C, 1013 hPa, 250 Hz
Static pressure coefficient:
-0.002 dB/hPa at 25°C, 1013 hPa, 250 Hz
Influence of vibration:
64 dB equivalent SPL for 1 m/s^2 in direction of greatest sensitivity
Influence of magnetic field:
45 dB equivalent SPL for 80 A/m, 50 Hz in direction of greatest sensitivity
Operating temperature range:
-10 to +70°C (+14 to 158°F)

DIMENSIONS:

Microphone length:
165 mm (6.5 in)
Microphone diameter:
19 mm (0.75 in)
Capsule diameter:
16 mm (0.63 in)
Weight:
150 g (5.29 oz)

FOR USE WITH MICROPHONE AMPLIFIER

HMA5000	High-Voltage Microphone Amplifier, 2 ch.

ACCESSORIES INCLUDED

Holders

UA0639	Microphone Clip

Acoustic Equalizers and Windscreens

DD0251	Free-field Grid, Silver
DD0254	Close-miking Grid, Trapezoid, Silver
DD0297	Diffuse-field Grid, Black
UA0638	Windscreen for 4003/4006

ACCESSORIES AVAILABLE

Converters

HTP4000	Converter: 130 V to P48
PCC4000	Passive Connection Converter: P48 to 130 V
PPC4000	Phantom Power Checker

Holders

UA0836	Stereo Boom with Holders
UA0837	Stereo Boom excluding Holders
UA0897	Shock Mount
UA0639	Microphone Clip
UA0961	Microphone Holder
DUA0019	Spacer for Stereo Boom, 19 mm (0.75 in)
TB4000	Table Base
WINDPAC-M	Microphone Windshield System, Medium
WINDPAC-L	Microphone Windshield System, Medium

Acoustic Ezualizers and Windscreens

DUA0090	Pop-filter
UA0777	Nose Cone
APE L6	Acoustic Modification Kit, 2x3 pcs.
L30B	Acoustic Pressure Equalizer, 30 mm (1.18 in) Ball
L40B	Acoustic Pressure Equalizer, 40 mm (1.57 in) Ball
L50B	Acoustic Pressure Equalizer, 50 mm (1.97 in) Ball

Cables and Cases

AO0182	P48 Microphone Cable, 5 m
DAO0130	130 V Microphone Cable, 5 m
DAO0131	130 V Microphone Cable, 10 m
KE3530	Briefcase with foam insert for 3503/3506

Shock Mount Rubbers

DDS0731	Rubber Mount 19 mm (0.75 in), Medium Soft

3503: 4003 STEREO KIT, 130 V
3506: 4006-TL STEREO KIT, P48
3530-A: 4006 STEREO KIT, P48

From acoustic soloist to full orchestra, these A-B Stereo Kits are the ultimate portable solution for making sharply focused, realistically ambient stereo recordings.

Each kit consists of a pair of carefully matched microphones, the complete selection of acoustic modification accessories, windscreens and a compact stereo boom for floor or ceiling mounting. The 3503 uses the DPA preamp included. This allows a completely transformerless signal path and high voltage powering. Both sets are delivered in an attractively fitted Samsonite© carrying case.

The specially selected microphones are matched within 1dB on both frequency range, sensitivity and self noise.

3503, 3506 AND 3530-A KITS INCLUDE

2 x 4006-TL	4006-TL Stereo Kit, P48 , matched (3506)
	or
2 x 4006	Omnidirectional Microphone, P48 matched (3530-A)
	or
2 x 4003	Omnidirectional Microphone, 130V, matched (3503)
UA0836	Stereo Boom with Holders
2 x DD0251	Free-field Grid, Silver
2 x DA0254	Close-miking Grid, Trapezoid, Silver
2 x DD0297	Diffuse-field Grid, Black
2 x UA0777	Nose Cone
2 x UA0638	Windscreen for 4003/4006/4006-TL
2 x L30B	Acoustic Pressure Equalizer, 30 mm (1.18 in) Ball
2 x L40B	Acoustic Pressure Equalizer, 40 mm (1.57 in) Ball
2 x L50B	Acoustic Pressure Equalizer, 50 mm (1.97 in) Ball
2 x DA00130	Microphone cable for 4003/4004/4012/4016 5 m (16.4 ft)
HMA5000	High-Voltage Microphone Amplifier, 2 channel

CARE OF MICROPHONE

It is important to bear in mind the following points with regard 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.

DPA 4003, 4006 and 4006-TL are supplied with an additional Diffuse-field 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 kind of tool as both surface and thread might be damaged.

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. 16. Be careful to avoid any contact with the diaphragm.

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 should not be attempted.

USE OF ACOUSTIC PRESSURE EQUALIZERS

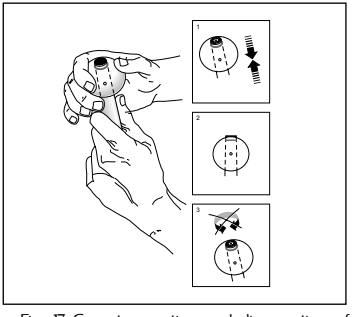
Acoustic Pressure Equalizers are only to be used with the standard silver protection grid DD0251.

Do not try to fit APEs on Nose Cone UA0777.

The microphone must be inserted into the APE from the hole 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 grid. When positioned correctly, the APE is flush with the diaphragm.

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 dismounting the APE, use a thumb to press it off. Never turn the microphone or the APE.



1. Correct direction for mounting and dismounting APE's.
2. The APE must be positioned so that it is flush with the diaphragm.
3. To avoid separation of the microphone or tight ening of the grid, do not turn the microphone.

Fig. 17. Correct mounting and dismounting of APEs.

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, contact your nearest DPA Microphones representative for further details of service and the repair facilities that are available.

WARRANTY

All products from DPA Microphones are covered by a two-year limited warranty on both mechanical functionality and documented specifications as long as the items are not mistreated, abused or modified in any way. In case of a warranty claim your invoice is your warranty registration.

CE MARKING

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

CE

ENVIRONMENTAL POLICY

DPA Microphones A/S wishes to be known as a "green" company. It is our company objective that DPA products are produced in accordance with the best ecological practices in order to preserve the environment we are all a part of. Consequently, it is our aim to cooperate with both national and international legislative bodies in order to fulfil the requirements and recommendations set forth in environmental standards and directives.

This means that through our conduct and in our design of new products, we shall pursue solutions that bear minimal impact on the ecology and are coherent with the latest legislation requirements (at present directive 9002/95/EC) at the time a new product is introduced to the market. These requirements are valid for DPA as well as for our suppliers.

With respect to waste disposal, we comply in full with the WEEE directive (9002/96/EC) and are prepared to comply to any amendments and succeeding requirements in connection hereto. Thus, starting from 1 January 2006, all DPA products that require a return for upgrading and/or reuse will be provided a "waste" label. This means that the product at the end of its usable life may be returned to the local DPA representative who is prepared to return the product to DPA for disposal under the national legislation program. Furthermore, DPA warrants that any DPA product bought after 1 January 2000 will be covered under the same program in order to ensure our end users adequate means to dispose of obsolete DPA products.

Product features and specifications are subject to change without notice.

DPA4003-4

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