USER'S MANUAL

Cardioid Microphones

Type **4011-TL**
Type **4012**

Wide Cardioid Microphones

Type **4015-TL**
Type **4016**

Included in kit solutions:

Type **3511**

CONTENTS

TECHNICAL DESCRIPTION

The cartridge

Directional microphones Type 4011-TL, 4012, 4015-TL and 4016 use a 19 mm diameter prepolarised pressure gradient condenser-microphone cartridge. Type 4011-TL and 4012 offer a first order cardioid pick-up pattern, the Type 4015-TL and 4016 offer a wide cardioid pattern (see Fig. 1 & 2). The diaphragm is highly resistant to the most aggressive kinds of humidity. The large spacing between the diaphragm and the back plate in this cartridge makes the microphone highly insensitive to temperature influence and allows the capsule to handle greater sound pressure levels.

Type 4011-TL and 4012 are designed to have a linear on-axis response from 40 Hz to 20 kHz (± 2dB) measured at 30 cm (see Fig. 3). Type 4015-TL and 4016 are designed to have a linear on-axis response from 40 Hz (±2 dB) to 20 kHz (+3/-1 dB) measured at 60 cm (see Fig. 4) and are furthermore intentionally calibrated with a slight high-frequency soft boost.

Great attention has also been paid to the microphone's natural sounding off-axis performance during the design process (see Fig. 3 & 4). The diaphragm is protected from dust by an acoustically transparent net behind the front protection grid and inside the back port of the cartridge. For optimum stability the microphone cartridge has undergone a special pre-aging process, which stabilizes all tensions in the materials as well as the polarisation voltage.

The preamplifiers

The 4011-TL and 4015-TL are 48 V phantom powered, whereas the 4012 and 4016 are powered with 130 V via the DPA Type HMA5000 high-voltage Microphone Amplifier. The 4011-TL and 4015-TL are transformerless and impedance balanced and have a standard 3-pin XLR-connector (see Fig. 5 for pin designation). They feature a 20 dB attenuator push-switch built into the connector (see Fig. 6). When the button is pushed in, the output is attenuated 20 dB. The attenuation allows the microphones to be used for close-miking high SPL sound sources without overloading the console input amplifier from the output of the microphone. The 4012 and 4016 have a modified 4-pin XLR-connector (see Fig. 7 for pin designation).

The high-voltage powering system enables the microphone preamplifier to handle approximately 10 dB higher sound pressure level than similar microphone types powered through conventional P48 systems (4012 and 4016: 168 dB SPL peak, 4011-TL and 4015-TL: 158 dB SPL peak).

The 4011-TL, 4012, 4015-TL and 4016 together with the HMA5000 are transformerless. All 4 microphones use state-of-the-art low-noise preamplifier technology and are driven with unity gain.

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

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 specifications. The maximum reduction of the microphone SPL handling capability will be 13 dB and it is possible to drive up to 100 m 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.

Important: The microphone will only operate within its specifications if powered correctly.

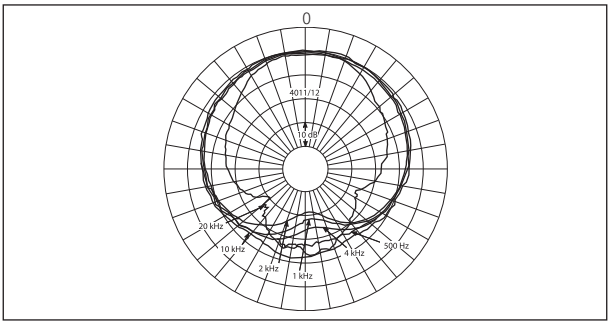


Fig. 1. Directional characteristics of 4011-TL and 4012 (normalised). Shifts between emphasized circles indicate 10 dB steps.

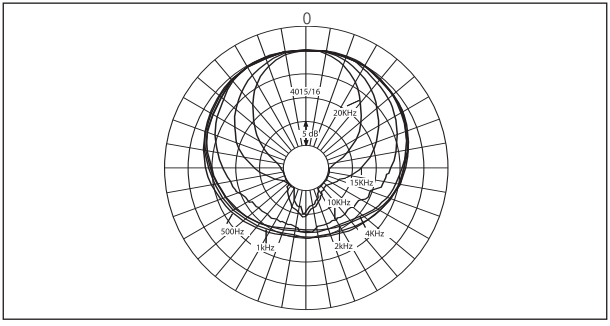


Fig. 2. Directional characteristics of 4015-TL and 4016 (normalised). Shifts between emphasized circles indicate 5 dB steps.

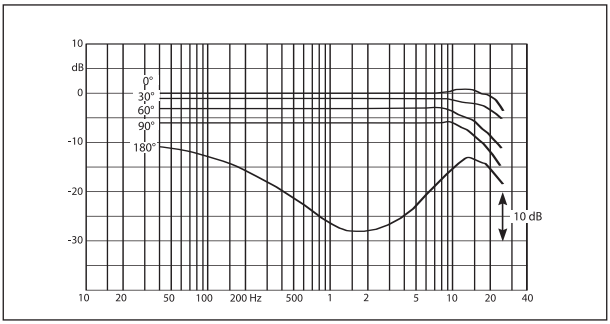


Fig. 3. On-and off-axis responses of 4011-TL and 4012 measured at 30 cm.

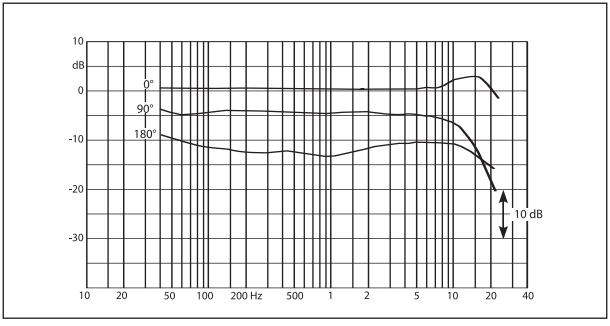


Fig.4 On-and off-axis responses of 4015-TL and 4016 measured at 60 cm.

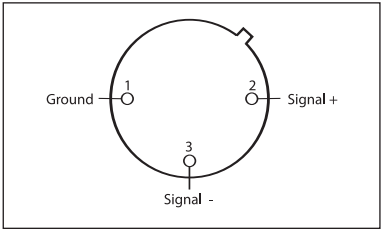


Fig. 5.
External view of the output socket of the 4011-TL and 4015 -TL.

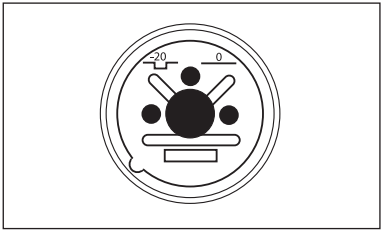


Fig.6
The switch on the XLR-connector of 4011-TL and 4015-TL is used to select between 0 dB and 20 dB attenuation. Switch pressed in results in 20 dB attenuation.

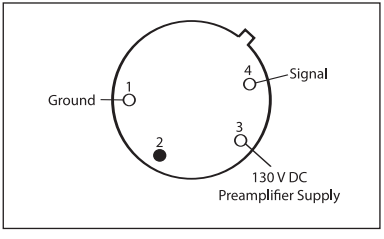


Fig. 7.
External view of the output socket of the 4012 and 4016.

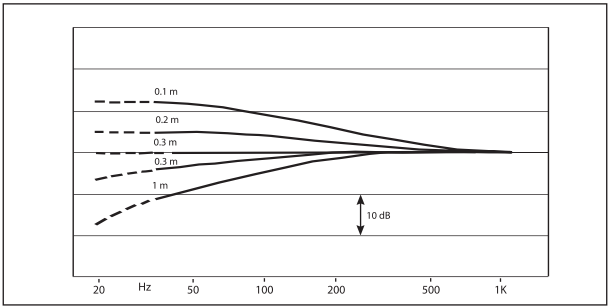


Fig. 8. The proximity effect exhibited by the 4011-TL and the 4012.

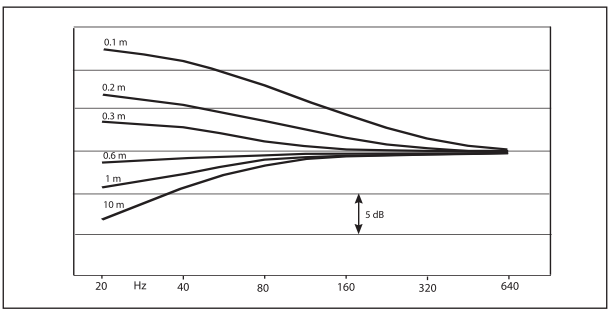


Fig. 9. The proximity effect exhibited by the 4015-TL and the 4016.

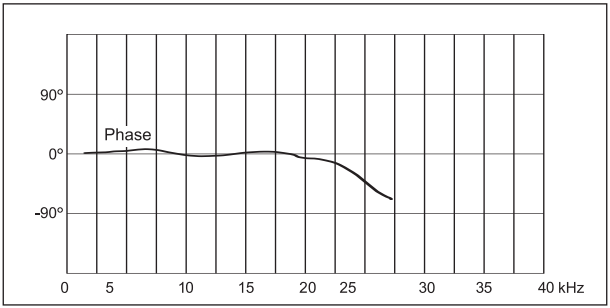


Fig. 10. Phase response of Types 4011-TL,
4012, 4015-TL and 4016 plotted using a linear frequency axis for evaluation of the phase response.

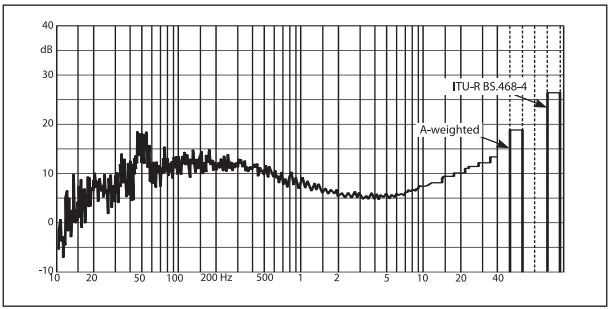


Fig. 11. Typical third-octave inherent-noise spectrum of Types 4011-TL, 4012, 4015-TL and 4016.

SPECIFICATIONS:

Cartridge type:
4011-TL and 4012: Pre-polarised condenser Type DMM0056
4015 and 4016: Pre-polarised condenser Type DMM0058

Principle of operation:
Pressure gradient

Power supply:
4011-TL and 4015-TL: Phantom P48
4012 and 4016: HMA5000 or PCC 4000 for 48 V

Frequency range:
4011-TL and 4012: On-axis: 40 Hz to 20 kHz (±2dB) at 30 cm
4015-TL and 4016: On-axis: 40 Hz ±2 dB to 20 kHz (+3/-1dB) at 60 cm with a max. 3 dB soft boost at 10 – 15 kHz

Phase response:
Phase matching between any two microphones: ±15°

Directional characteristics:
4011-TL and 4012: First order cardioid
4015-TL and 4016: Wide cardioid

Sensitivity:
4011-TL and 4015-TL: Nominally 10 mV/Pa; -40 dB re. 1 V/Pa
4012 and 4016: Nominally 9 mV/Pa; -41 dB re. 1 V/Pa

Equivalent noise level A-weighted:
Typ. 19 dB(A) re. 20 µPa (max. 20 dB(A))

Equivalent noise level ITU-R BS.468-4:
Typ. 25 dB

Max SPL:
4011-TL and 4015-TL: 158 dB SPL peak before clipping (attenuator set to either 0 dB or -20 dB)
4012 and 4016: 168 dB SPL peak
4012 or 4016 with PCC4000: 155 dB peak

S/N ratio re. 1 kHz at 1 Pa (94 dB SPL):
75 dB(A)

Total Harmonic Distortion:
<0,5% up to 110 dB SPL peak
<1% up to 116 dB SPL peak

Dynamic range:
Typ. 97 dB

Switchable attenuator:
0 dB, - 20 dB

Preamplifier frequency range:

4012 and 4016: 20 Hz to 50 kHz ±0.2 dB, 5 Hz to 150 kHz -3 dB
4011-TL and 4015-TL: 20 Hz to 40 kHz -3 dB (loaded with 2x10 kOhm// 10 nF - equivalent to 100 m cable)

Preamplifier output impedance:

<200 Ohm

Cable drive capability:

4011-TL and 4015-TL: Up to 100 m (328 ft)
4012 and 4016: With HMA5000: Up to 300 m (984 ft)
4012 and 4016: With PCC4000: Up to 100 m (328 ft)

Polarity:

4011-TL and 4015-TL: Positively increasing sound pressure produces positive-going voltage at pin 2. Pin 1: Ground, Pin 2: Signal +, Pin 3: Signal. (See Fig. 5)
4012 and 4016: 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. 7)

Difference frequency distortion:

(DF2, DF3, Df = 70 Hz) <0.5 % at 110 dB SPL peak

Influence of vibration:

<71 dB equivalent SPL for 1 m/s² 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 +55°C (+14 to 131°F)

Dimensions:

Microphone length: 175 mm (6.89 in)
Microphone diameter: 19 mm (0.75 in)
Capsule diameter: 19 mm (0.75 in)

Weight:

165 g (5.82 oz)

Connector:

4011-TL and 4015-TL: 3-pin XLR-M (Standard P48)
4012 and 4016: 4-pin modified XLR-M (high-voltage)

FOR USE WITH MICROPHONE AMPLIFIER

HMA5000	High-Voltage Microphone Amplifier, 2 ch.

ACCESSORIES INCLUDED

Microphone Holders & Suspension Mounts

UA0961	Microphone Holder

Windscreens

UA0896	Windscreen for 4011-TL/4012/4015-TL/4016

ACCESSORIES AVAILABLE

Shock Mounts

UA0897	Shock Mount

Shock Mount Rubbers

DDS0731	Rubber Mount 19 mm, Medium Soft

Microphone Holders & Suspension Mounts

UA0639	Microphone Clip

Stereo Accessories

DUA0019	Spacer for Stereo Boom, 19 mm
UA0836	Stereo Boom with Holders
UA0837	Stereo Boom excluding Holders

Floor & Table Stands

MB4000	Magnet Base
TB4000	Table Base

Connection Adapters

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

Cables

DA00130	130 V Microphone Cable, 5 m (Type HMA5000)
DA00131	130 V Microphone Cable, 10 m (Type HMA5000)

Windscreens

DUA0090	Pop-filter
WINDPAC-M	Microphone Windshield and Shock Mount

3511: CARDIOID STEREO KIT, P48

Audio professional´s choice of versatile high quality condensers
The 3511 is a complete stereo kit for a broad range of recording applications using two carefully matched 4011-TL Cardioid Microphones. These cardioids are exceptionally linear in their frequency response - also off axis, giving you the natural experience. Several standard set-ups such as ORTF or XY are possible. This kit handles high SPL and will therefore allow close placement as well as more distant. Often used for piano recordings of jazz or pop with a placement closer to the hammers or as overheads.

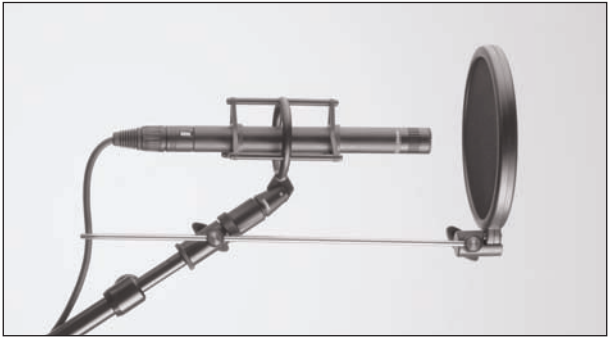
The kit includes 2 Shock Mounts, a precision-crafted Stereo Boom for secure mounting of microphone pairs for A-B stereo recordings and a spacer to allow XY or ORTF stereo set-ups on the boom.

3511 KIT INCLUDES

2 x 4011-TL	Cardioid Microphones, P48 (matched)
2 x UA0897	Shock Mount
UA0836	Stereo Boom with Holders
DUA 0019	Spacer for Stereo Boom, 19 mm (0.75 in)
2 x UA0896	Windscreen for 4011-TL/4012/4015-TL/4016

DPA Matched Pair
A matched pair from DPA Microphones guarantees and substantiates, that the two microphones are identical within ± 1 dB on both frequency response (40 Hz – 20 kHz), self-noise and sensitivity. The phase reponses are within 10°.

3511



Popfilter with 4015-TL

CARE OF MICROPHONE

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.

- 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.

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

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.

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