½-inch TEDS Microphones

Product Data and Specifications

Typical features/applications

- ***Single unit comprising microphone cartridge and TEDS[1]-enabled preamplifier***
- ***Stability***
- ***Plug and play***
- ***Precision acoustic measurements***

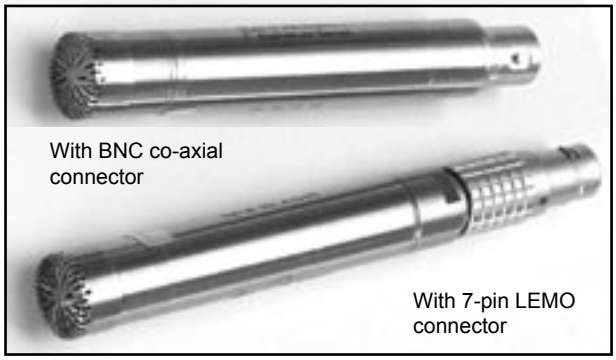

Fig. 1 ½-inch TEDS microphones

IEEE P1451.4 is an emerging standard for adding plug and play capabilities to analogue transducers. The underlying mechanism for plug and play identification is the standardisation of a Transducer Electronic Data Sheet (TEDS[1]). A TEDS contains the critical information needed by an instrument or measurement system to identify, characterise, interface, and properly use the signal from an analogue sensor. The TEDS resides in embedded memory, typically an EEPROM, within the analogue transducer, as defined in the IEEE P1451.4 standard.

IEEE P1451.4 defines the method of encoding TEDS information for a broad range of sensor types and applications. In order to cover such a broad range while also keeping memory usage to a minimum, the IEEE P1451.4 TEDS concept utilises the concept of templates that define the specific properties for different sensor types.

Instrumentation and software to read TEDS information directly from the transducer are available, for example, from National Instruments, OROS, etc.

Each G.R.A.S. TEDS microphone is a combination of a TEDS-enabled preamplifier and a microphone cartridge which is sealed with a sticker. The TEDS is programmed to store the calibration information for the specific combination using IEEE P1451.4 TEDS template number 27: *microphone with built-in preamplifier*.

The G.R.A.S. ½-inch TEDS microphones described in this document are a combination of various ½-inch microphone cartridges and one of the following ½-inch TEDS-enabled preamplifiers:

- Preamplifier Type 26TK with:
  with a 7-pin LEMO connector, see Fig. 2
- CCP [2] Preamplifier Type 26CA with:
  with a BNC co-axial connector

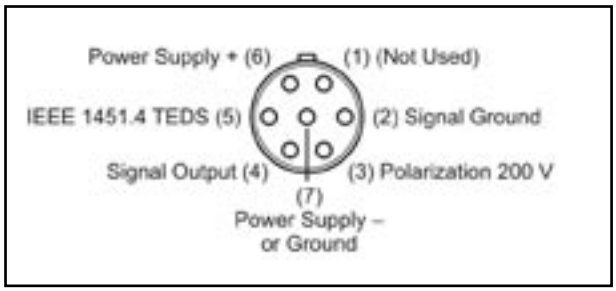

Fig. 2 7-pin LEMO connector 1B male (ext. view)

[1] Transducer Electronic Data Sheet - as proposed by IEEE-P1451.4

[2] CCP (constant current power) preamplifiers; also known under other trade names such as ICP®, Deltatron®, Isotron®, IEPE and Piezotron®.

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G.R.A.S.
Sound & Vibration

Skovlytoften 33
2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk

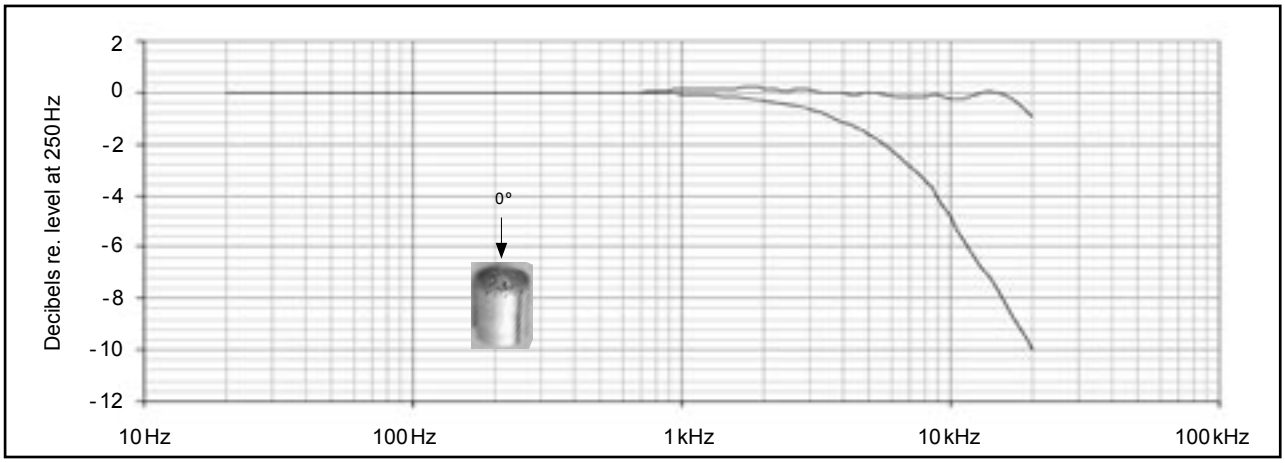


Fig. 3 Typical frequency response of Type 46AF. Upper curve shows free-field response for 0°, lower curve shows pressure response

Type 46AF: A combination of ½-inch Free-field Microphone Type 40AF and ½-inch Preamplifier Type 26TK with 7-pin LEMO connector (Fig. 2).

Pin 5 in Fig. 2 is used for reading the TEDS information directly from the preamplifier.

Specifications Type 46AF

Frequency response:
3.15 Hz - 20 kHz: . . . . . ± 2.0 dB
5 Hz - 10 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
200 V

Dynamic range:
Upper limit (peak): . . . . . 154 dB re. 20 µ Pa
Lower limit (thermal noise): 14.5 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . 55 Ω

Power supply:
Single: . . . . . 28 V (0.7 mA) to 120 V (2.5 mA)
Dual: . . . . . ± 14 V (0.7 mA) to ± 60 V (2.5 mA)

Maximum signal-output voltage (peak):
from ± 10 V to ± 50 V

Temperature:
Operation: . . . . . − 30 °C to + 70 °C
Storage: . . . . . − 40oC to + 85oC
Coefficient (250 Hz): - 0.007 dB / °C

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
- 0.01 dB / k Pa

Influence of axial vibration, 1 m/s²:
63 dB re. 20 µ Pa

Connector:
LEMO: . . . . . 7-pin 1B male plug

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 100 mm
Weight: . . . . . 40 g

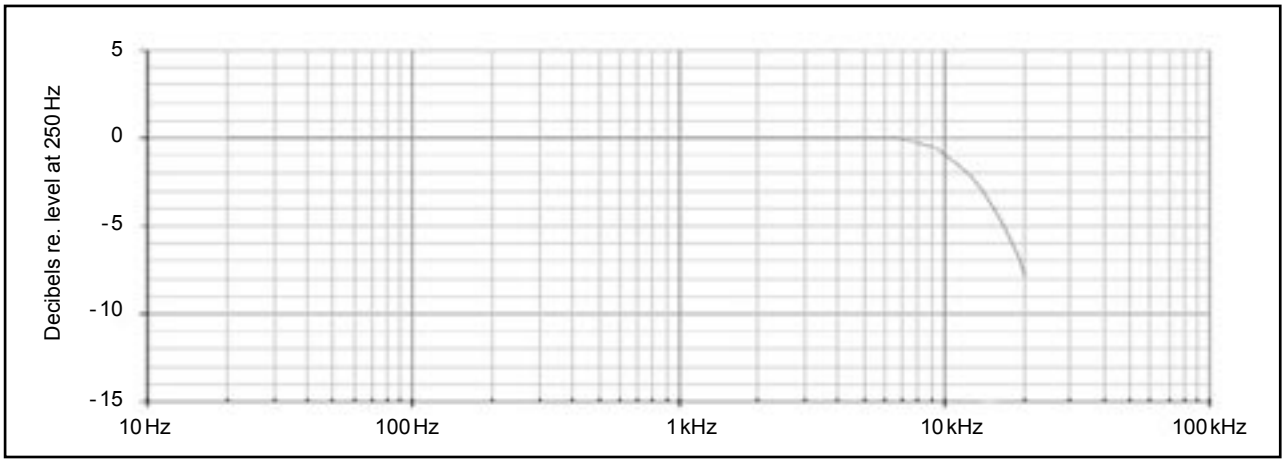


Fig. 4 Typical pressure frequency response for Type 46AP

Type 46AP: A combination of ½-inch Pressure Microphone Type 40AP and ½-inch Preamplifier Type 26TK with 7-pin LEMO connector (Fig. 2).

Pin 5 in Fig. 2 is used for reading the TEDS information directly from the preamplifier.

Specifications Type 46AP

Frequency response:
3.15 Hz - 10 kHz: . . . . . ± 2.0 dB
12.5 Hz - 7.5 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
200 V

Dynamic range:
Upper limit (peak): . . . . . 154 dB re. 20 µ Pa
Lower limit (thermal noise): . . . 16 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . 55 Ω

Power supply:
Single: . . . . . 28 V (0.7 mA) to 120 V (2.5 mA)
Dual: . . . . . ± 14 V (0.7 mA) to ± 60 V (2.5 mA)

Maximum signal-output voltage (peak):
from ± 10 V to ± 50 V

Temperature:
Operation: . . . . . – 30 °C to + 70 °C
Storage: . . . . . – 40°C to + 85oC
Coefficient (250 Hz): . . . . . - 0.008 dB / °C

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
- 0.01 dB / k Pa

Influence of axial vibration, 1 m/s²:
64 dB re. 20 µ Pa

Connector:
LEMO: . . . . . 7-pin 1B male plug

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 100 mm
Weight: . . . . . 40 g

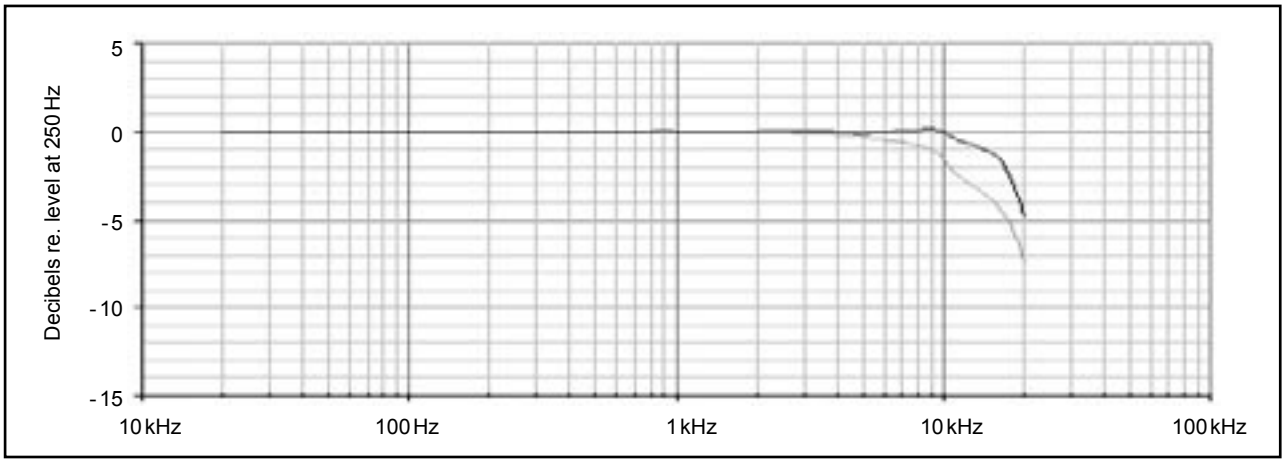


Fig. 5 Typical frequency response for Type 46AR. Upper curve shows response in a diffuse sound field (random incidence), lower curve shows pressure response

Type 46AR: A combination of ½-inch Random-incidence Microphone Type 40AR and ½-inch Preamplifier Type 26TK with 7-pin LEMO connector (Fig. 2).

Pin 5 in Fig. 2 is used for reading the TEDS information directly from the preamplifier.

Specifications Type 46AR

Frequency response:
3.15 Hz - 12.5 kHz: . . . . . ± 2.0 dB
12.5 Hz - 8 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
200 V

Dynamic range:
Upper limit (peak) . . . . . 154 dB re. 20 µ Pa
Lower limit (thermal noise) . . . . 16 dBA re. 20 µ Pa

Output impedance:
Typical . . . . . 55 Ω

Power supply:
Single: . . . . . 28 V (0.7 mA) to 120 V (2.5 mA)
Dual: . . . . . ± 14 V (0.7 mA) to ± 60 V (2.5 mA)

Maximum signal-output voltage (peak):
from ± 10 V to ± 50 V

Temperature:
Operation: . . . . . – 30 °C to + 70 °C
Storage: . . . . . – 40°C to + 85oC
Coefficient (250 Hz) - 0.01 dB / °C

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz) < 0.1 dB

Static-pressure coefficient:
- 0.008 dB / k Pa

Influence of axial vibration, 1 m/s²:
65 dB re. 20 µ Pa

Connector:
LEMO: . . . . . 7-pin 1B male plug

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 100 mm
Weight: . . . . . 40 g

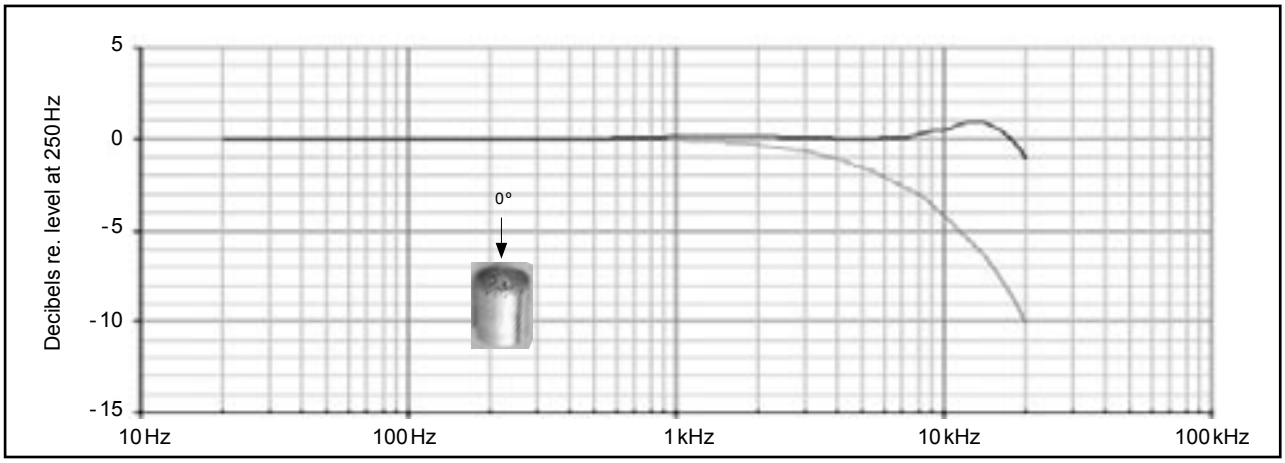
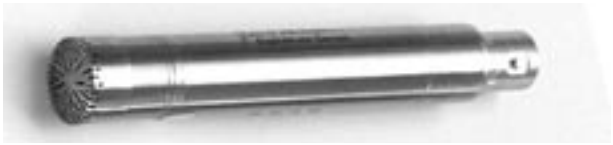


Fig. 6 Typical frequency response of Type 46AE. Upper curve shows free-field response for 0°, lower curve shows pressure response

Type 46AE: A combination of ½-inch Prepolarized Free-field Microphone Type 40AE and ½-inch CCP Preamplifier Type 26CA with BNC co-axial connector.

For CCP transducers, the signal wire is used for reading the TEDS information directly from the preamplifier.



Specifications Type 46AE

Frequency response:
3.15 Hz - 20 kHz: . . . . . ± 2.0 dB
5 Hz - 10 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
0 V

Dynamic range:
Upper limit (peak): . . . . . 138 dB re. 20 µ Pa
Lower limit (thermal noise): 14.5 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . < 50 Ω

Power-supply:
2 mA to 20 mA (typically 4 mA)

Maximum signal-output voltage (peak):
± 8.0 V

Temperature:
Operation: . . . . . -30 °C to + 70 °C
Storage: . . . . . -40 °C to + 85 °C
Coefficient (250 Hz): -0.007 dB / °C

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
-0.01 dB / k Pa

Influence of axial vibration, 1 m/s²:
63 dB re. 20 µ Pa

Connector:
BNC: . . . . . Co-axial

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 84 mm
Weight: . . . . . 33 g

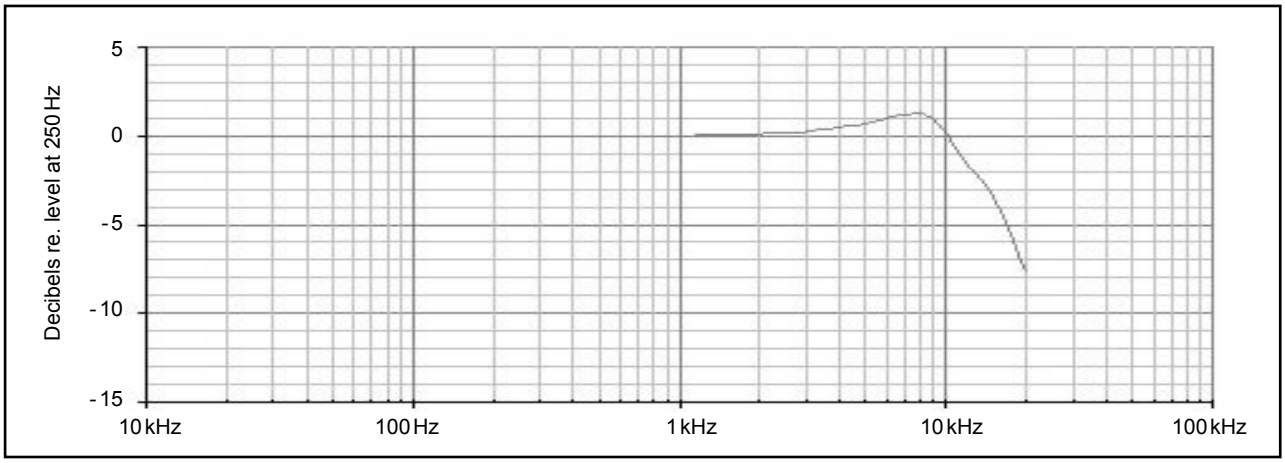
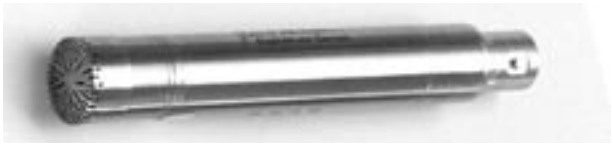


Fig. 7 Typical pressure frequency response for Type 46AD

Type 46AD: A combination of ½-inch Prepolarized Pressure Microphone Type 40AD and ½-inch CCP Preamplifier Type 26CA with BNC co-axial connector.

For CCP transducers, the signal wire is used for reading the TEDS information directly from the preamplifier.



Specifications Type 46AD

Frequency response:
3.15 Hz - 10 kHz: . . . . . ± 2.0 dB
12.5 Hz - 7.5 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
0 V

Dynamic range:
Upper limit (peak): . . . . . 138 dB re. 20 µ Pa
Lower limit (thermal noise): . . . 16 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . < 50 Ω

Power-supply:
2 mA to 20 mA (typically 4 mA)

Maximum signal-output voltage (peak):
± 8.0 V

Temperature:
Operation: . . . . . -30 °C to + 70 °C
Storage: . . . . . -40 °C to + 85 °C
Coefficient (250 Hz): -0.01 dB / °C

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
-0.01 dB / k Pa

Influence of axial vibration, 1 m/s²:
62 dB re. 20 µ Pa

Connector:
BNC: . . . . . Co-axial

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 84 mm
Weight: . . . . . 35 g

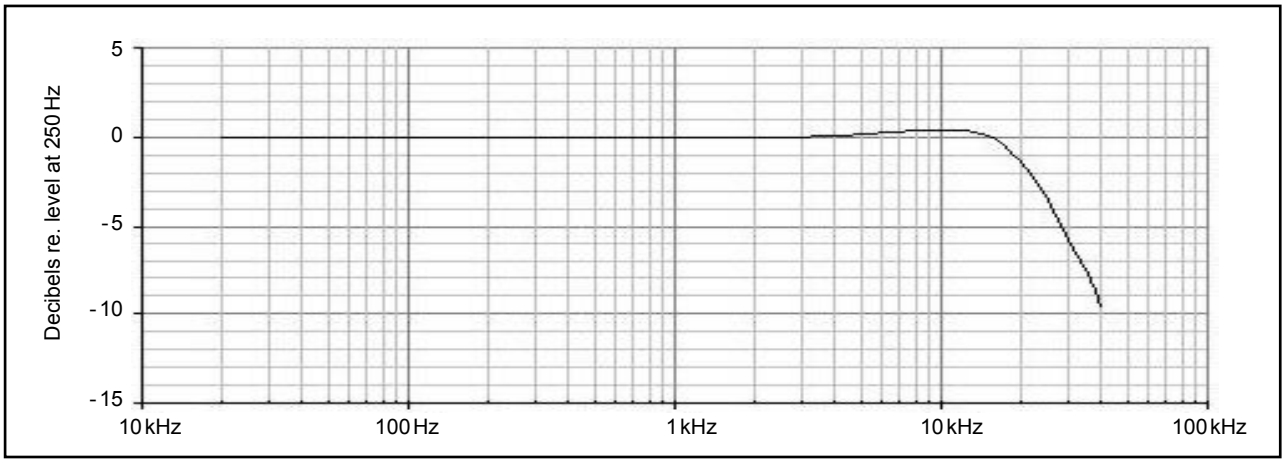
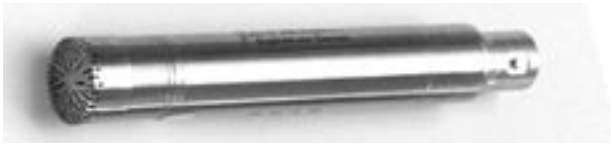


Fig. 8 Typical pressure frequency response for Type 46AO

Type 46AO: A combination of ½-inch Prepolarized Wide-frequency, Pressure Microphone Type 40AO and ½-inch CCP Preamplifier Type 26CA with BNC co-axial preamplifier.

For CCP transducers, the signal wire is used for reading the TEDS information directly from the transducer.



Specifications Type 46AO

Frequency response:
3.15 Hz - 20 kHz . . . . . ± 2.0 dB
5 Hz - 12.5 kHz . . . . . ± 1.0 dB

Nominal sensitivity:
12.5 mV/Pa

Polarization voltage:
0 V

Dynamic range:
Upper limit (peak): . . . . . 150 dB re. 20 µ Pa
Lower limit (thermal noise): . . . 20 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . < 50 Ω

Power-supply:
2 mA to 20 mA (typically 4 mA)

Maximum signal-output voltage (peak):
± 8.0 V

Temperature:
Operation: . . . . . -30 °C to + 70 °C
Storage: . . . . . -40 °C to + 85 °C
Coefficient (250 Hz): -0.002 dB / °C
(–10 °C to +50 °C)

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
250 Hz at 25 °C: . . . . . -0.007 dB / k Pa

Influence of axial vibration, 1 m/s²:
66 dB re. 20 µ Pa

Connector:
BNC: . . . . . Co-axial

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 80.3 mm
Weight: . . . . . 33 g

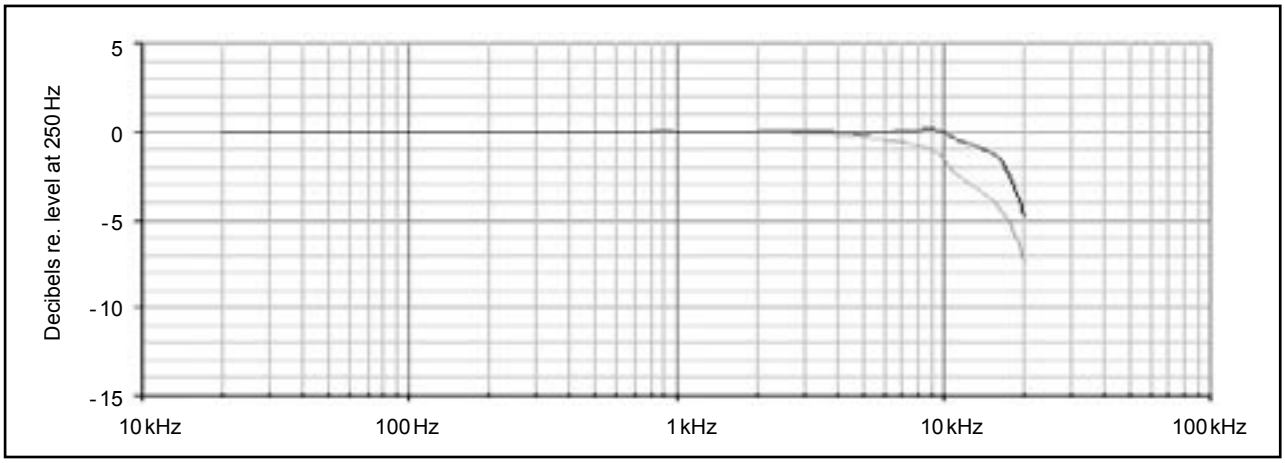
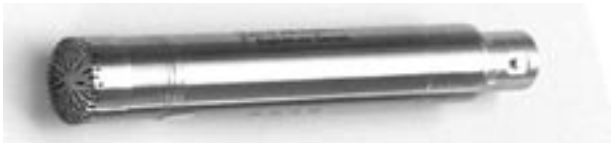


Fig. 9 Typical frequency response for Type 46AQ. Upper curve shows response in a diffuse sound field (random incidence), lower curve shows pressure response

Type 46AQ: A combination of ½-inch Prepolarized Random incidence Microphone Type 40AQ and ½-inch CCP Preamplifier Type 26CA with BNC co-axial connector.

For CCP transducers, the signal wire is used for reading the TEDS information directly from the preamplifier.



Specifications Type 46AQ

Frequency response:
3.15 Hz - 12.5 kHz: . . . . . ± 2.0 dB
12.5 Hz - 8 kHz: . . . . . ± 1.0 dB

Nominal sensitivity:
50 mV/Pa

Polarization voltage:
0 V

Dynamic range:
Upper limit (peak): . . . . . 138 dB re. 20 µ Pa
Lower limit (thermal noise): . . . 16 dBA re. 20 µ Pa

Output impedance:
Typical: . . . . . < 50 Ω

Power-supply:
2 mA to 20 mA (typically 4 mA)

Maximum signal-output voltage (peak):
± 8.0 V

Temperature:
Operation: . . . . . -30 °C to + 70 °C
Storage: . . . . . -40 °C to + 85 °C
Coefficient (250 Hz): 0.01 dB / °C
(–10 °C to +50 °C)

Relative humidity:
Operation: . . . . . 0 to 95 %
Storage: . . . . . 0 to 95 %
Influence (250 Hz): . . . . . < 0.1 dB

Static-pressure coefficient:
250 Hz at 25 °C: . . . . . – 0.008 dB / k Pa

Influence of axial vibration, 1 m/s²:
65 dB re. 20 µ Pa

Connector:
BNC: . . . . . Co-axial

Dimensions and weight:
Diameter: . . . . . 13.2 mm
Length: . . . . . 84 mm
Weight: . . . . . 35 g

G.R.A.S.
Sound & Vibration

Skovlytoften 33
2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk