

PRODUCT DATA

1/2" Free-field Microphone — Type 4190

Type 4190 is designed for high-precision free-field measurements where a microphone with high sensitivity is required. Being external polarized type 4190 must be used with classical preamplifier.



080144

USES

- Precision sound measurement
- Premium class sound level meters
- Equipment complying with IEC 61672 class 1

FEATURES

- Sensitivity: 50 mV/Pa
- Frequency: 6.3 Hz – 20 kHz
- Dynamic Range: 14.6 – 146 dB
- Temperature: –30 to +150°C (–22 to +302°F)
- Polarization: 200 V

Use of Free-field Microphones

At higher frequencies, reflections and diffractions cause a pressure increase in front of the diaphragm of a microphone. If not corrected for this would result in an increased output voltage. A free-field optimisation means that the frequency response of the microphone has been designed in such a way that the free-field response at 0 degrees incidence is flat. This microphone is optimised for use with the protection grid in place.

Free-field microphones are commonly used for sound measurement in an anechoic chamber or far away from reflecting buildings, etc. Another area for free-field microphones is for general electroacoustic measurements like loudspeaker and microphone measurements.

Type 4190 is not only suited for use in class 1 Sound Level Meters but also for all high-precision acoustic measurements where a robust and stable, externally polarized free-field microphone with an upper frequency of 20 kHz is required.

Manufacturing and Stability

A press-fitted, stainless-steel diaphragm ensures superior long-term stability and mechanical robustness – Type 4190 will withstand the 1 m drop test of IEC 60068–2–32.

All Brüel & Kjær Measuring Microphones are assembled in a clean room. This ensures that the microphones

maintain their inherent low noise floor and high stability, even when used in environments with a combination of high humidity and high temperature.

Polarization Voltage

Type 4190 requires an external polarization voltage and must therefore be used with a classical preamplifier. Externally polarized microphones may be used at higher temperatures without severe changes in sensitivity.

TEDS Microphones

Type 4190 is available in TEDS combinations with the classical Microphone Preamplifier Type 2669. The TEDS microphone is considered one unit and has been sealed in a clean environment. The TEDS is programmed with the loaded sensitivity of the actual cartridge and the data is therefore readily available. The default TEDS template is to IEEE P 1451.4 but TEDS to IEEE 1451.4 is available on request.

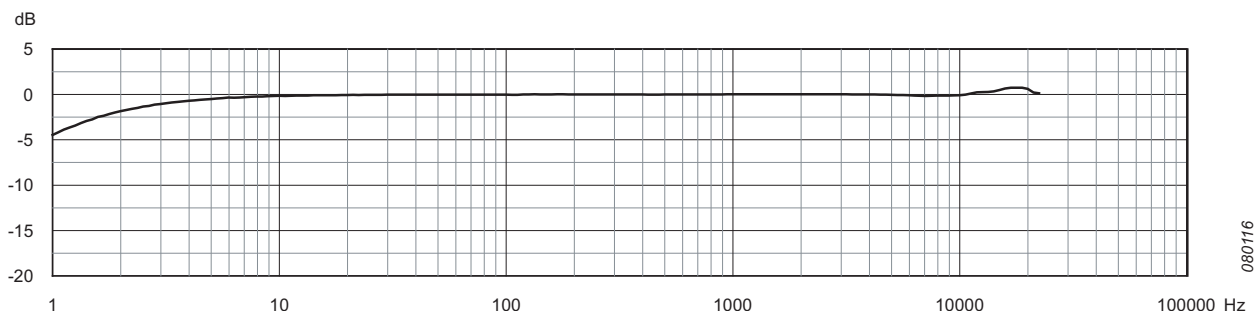
Individual Calibration Data

Each Type 4190 comes with an individual calibration chart including information about the open-circuit sensitivity, free-field frequency response as well as the electrostatic actuator response.

An enclosed mini-CD contains the individual calibration data at 1/12-octave frequencies plus a wealth of technical information, such as the influence of different accessories,

response in different sound fields and much more. Using the CD data and the REq-X feature of PULSE™, a real-time correction for different measurement situations, can increase measurement accuracy.

Fig. 1 Typical free-field response of the microphone with protection grid. The low-frequency response is valid when the vent is exposed to the sound field



Specifications – ½" Free-field Microphone Type 4190 (valid from serial number 2495487)

IEC 61094–4 Type Designation: WS2F

Polarization Voltage: 200 V (external)

Open-circuit Sensitivity (250 Hz)^a:

50 mV/Pa, -26 dB ±1.5 dB re 1 V/Pa

0° Incidence Free Field Response^a:

5 Hz to 10 kHz: ±1 dB

3.15 Hz to 20 kHz ±2 dB

Lower Limiting Frequency (–3 dB)^a:

1 to 2 Hz

Pressure Equalization Vent: Rear vented

Diaphragm Resonance Frequency:

14 kHz (90° phase shift)

Cartridge Capacitance (Polarized)^a:

16 pF at 250 Hz

Equivalent Air Volume: 46 mm³ (250 Hz)

Pistonphone Correction (Type 4228 with

DP-0776) 0.00 dB

Cartridge Thermal Noise:

14.6 dB(A), 15.3 dB(Lin)

Upper Limit of Dynamic Range

(3% Distortion): >148 dB SPL^b

Max. Sound Pressure Level: 159 dB (peak)

ENVIRONMENTAL

Operating Temperature Range:

–30 to +150°C (–22 to +302°F)

Storage Temperature:

In Microphone Box: –30 to +70°C

(–22 to +158°F)

With Mini-CD: 5 to 50°C (41 to 122°F)

Temperature Coefficient (250 Hz):

–0.012 dB/K (–10 to +50°C, 14 to 122°F)

Pressure Coefficient: –0.01 dB/kPa

Operating Humidity Range:

0 to 100% RH (without condensation)

Influence of Humidity:

<0.1 dB in the absence of condensation

Vibration Sensitivity (<1000 Hz): 62.5 dB

equivalent SPL for 1 m/s² axial vibration

Magnetic Field Sensitivity:

4 dB SPL for 80 A/m, 50 Hz field

Estimated Long-term Stability:

> 1000 years/dB in dry air at 20°C (68°F)

> 100 hours/dB in dry air at 150°C (302°F)

DIMENSIONS

Diameter with Grid: 13.2 mm (0.52")

Diameter without Grid: 12.7 mm (0.50")

Height with Grid: 17.6 mm (0.69")

Height without Grid: 16.3 mm (0.64")

Thread for Preamplifier Mounting:

11.7 mm–60 UNS

Note: All values are typical at 23°C (73.4°F), 101.3 kPa and 50% RH unless otherwise specified

  Compliance with EMC Directive

a. Individually calibrated

b. 140 dB (peak) with ±15 V supply

Ordering Information

Type 4190 ½" Free-field Microphone

Includes the following accessories:

- BC-0225: Calibration Chart^c
- BC-5002: Microphone Mini-CD^c

TEDS COMBINATIONS

4190-B-001 ½" Free-field Microphone with Preamplifier Type 2669-B

4190-C-001 ½" Free-field Microphone with Preamplifier Type 2669-C

c. State microphone serial number if re-ordering calibration data

4190-L-001 ½" Free-field Microphone with Preamplifier Type 2669-L

OPTIONAL ACCESSORIES

Type 2669 ½" Microphone Preamplifier

Type 4231 Sound Calibrator

Type 4228 Pistonphone

Type 4226 Multifunction Acoustic

Calibrator

DP-0776 Calibration Adaptor for ½"

Microphones

UA-0033 Electrostatic Actuator

UA 1260 Angle Adaptor (approx. 80°)

UA 0386 Nose Cone for ½" Microphone

UA-0237 Windscreen for ½" microphone, 90 mm diameter

UA-0459 Windscreen for ½" Microphone, 65 mm diameter

BA 5105 The Microphone Handbook

CALIBRATION SERVICES

4190-CAI Accredited Initial Calibration

4190-CAF Accredited Calibration

4190-CFF Factory Standard Calibration

Brüel & Kjær reserves the right to change specifications and accessories without notice

HEADQUARTERS: DK-2850 Nærum · Denmark · Telephone: +45 4580 0500
Fax: +45 4580 1405 · www.bksv.com · info@bksv.com

Australia (+61) 2 9889-8888 · Austria (+43) 1 865 74 00 · Brazil (+55) 11 5188-8161
Canada (+1) 514 695-8225 · China (+86) 10 680 29906 · Czech Republic (+420) 2 6702 1100
Finland (+358) 9-755 950 · France (+33) 1 69 90 71 00 · Germany (+49) 421 17 87 0
Hong Kong (+852) 2548 7486 · Hungary (+36) 1 215 83 05 · Ireland (+353) 1 807 4083
Italy (+39) 0257 68061 · Japan (+81) 3 5715 1612 · Republic of Korea (+82) 2 3473 0605
Netherlands (+31) 318 55 9290 · Norway (+47) 66 77 11 55 · Poland (+48) 22 816 75 56
Portugal (+351) 21 4169 040 · Singapore (+65) 6377 4512 · Slovak Republic (+421) 25 443 0701
Spain (+34) 91 659 0820 · Sweden (+46) 33 225 622 · Switzerland (+41) 44 8807 035
Taiwan (+886) 2 2502 7255 · United Kingdom (+44) 14 38 739 000 · USA (+1) 800 332 2040

Local representatives and service organisations worldwide

Brüel & Kjær 

