

PRODUCT DATA

1/4" Pressure-field Microphone — Type 4938

Type 4938 is designed for high-level and high-frequency measurements where a microphone with pressure-field response is needed. Being externally polarized, Type 4938 must be used with a classical preamplifier.



080109

USES

- High-level measurements
- High-frequency measurements
- Flush measurements
- Measurements at high temperatures

FEATURES

- Sensitivity: 1.6 mV/Pa
- Frequency: 4 Hz–70 kHz
- Dynamic Range: 30 – 172 dB
- Temperature: –40 to +300°C (–40 to +572°F)
- Polarization: 200 V External

Use of Pressure-field Microphones

Pressure-field microphones are optimised to have a flat frequency response in a pressure field. Such microphones should be used in small, closed couplers or close to hard, reflective surfaces. For optimum performance at higher frequencies or when flush mounted in an airflow, Type 4938 should be used without its protection grid.

- Type 4938 is suited for all high-level, high-frequency measurements where a robust and stable pressure-field microphone is required
- Type 4938-W-001 is a variant optimised for use in high static pressure
- Type 4938 with WB-1418 is for measurement of airbag deployment noise according to SAE J247, Feb., 1987

Manufacturing and Stability

A laser-welded, stainless-steel diaphragm ensures superior long-term stability and mechanical robustness – Type 4938 will withstand the 1 m drop test of IEC 60068–2–32.

The design of Type 4938 makes it especially suited for flush mounting.

All Brüel & Kjær Measuring Microphones are assembled in a clean room. This ensures that the microphones maintain their inherent noise floor and high stability, even when used in environments with a combination of high humidity and high temperature.

Polarization Voltage

Type 4938 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

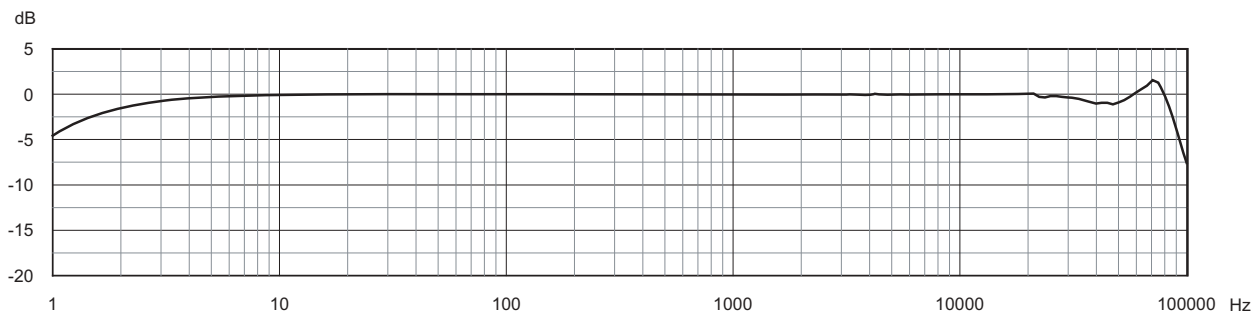
Type 4938 is available in TEDS combinations with different classical preamplifiers. The TEDS microphone is considered as a single unit and has been sealed in a clean environment. The TEDS is programmed with the loaded sensitivity of the actual cartridge and the data is therefore readily available in the transducer. The default TEDS template is according to IEEE P1451.4 but TEDS to IEEE 1451.4 is available on request.

Individual Calibration Data

Each Type 4938 comes with an individual calibration chart including information about the open-circuit sensitivity and the pressure-field frequency 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, corrections 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 pressure response of Type 4938 without protection grid. The low-frequency response is valid when the vent is exposed to the sound field



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Specifications – 1/4" Pressure-field Microphone Type 4938 (valid from serial number 2496492)

IEC 61094-4 Type Designation: WS 3P

Polarization Voltage: 200 V

Open-circuit Sensitivity (250 Hz)^a:

-56 ±3 dB re 1 V/Pa, 1.6 mV/Pa

0.4 mV/Pa ±3 dB^b

Pressure-field Response^a:

4 Hz to 70 kHz: ±2 dB

Lower Limiting Frequency (-3 dB)^a:

0.3 to 3 Hz

Lower Limiting Frequency with

Modification WB-1418: <0.15 Hz

Pressure Equalization Vent: Side vented

Diaphragm Resonance Frequency:

60 kHz (90° phase shift)

Polarized Cartridge Capacitance^a:

6.1 pF (250 Hz)

Equivalent Air Volume: 0.25 mm³ (250 Hz)

Cartridge Thermal Noise^c:

30 dB(A), 37 dB(Lin., 20 Hz to 100 kHz)

a. Individually calibrated

b. With WB-1418, and Type 2670 with WB-1419

c. Not valid with modification WB-1419

Upper Limit of Dynamic Range

(3% Distortion): >172 dB SPL^d

Max. Sound Pressure Level: 182 dB (peak)

ENVIRONMENTAL

Operating Temperature Range:

-40 to +150°C (-40 to +302°F)^e

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):

0.003 dB/K (-10 to +50°C, 14 to 122°F)

Pressure Coefficient: -0.003 dB/kPa

Operating Humidity Range:

0 to 100% RH (without condensation)

Influence of Humidity:

<0.1 dB in the absence of condensation

d. 170 dB (peak) with ±15 V preamplifier supply

voltage. Airbag noise set >177 dB SPL peak

e. Can be used up to 300°C (572°F)^d but with a

permanent sensitivity change of typ. 0.6 dB

which stabilises after 1 hour

Vibration Sensitivity (< 1000 Hz): 69 dB

equivalent SPL for 1m/s² axial vibration

Magnetic Field Sensitivity:

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

Estimated Long-term Stability:

> 1000 years/dB (at 20°C (68°F))

> 100 hours/dB (150°C (302°F))

DIMENSIONS

Diameter with Grid: 7 mm (0.27")

Diameter without Grid: 6.35 mm (0.25")

Height with Grid: 10.5 mm (0.41")

Height without Grid: 9 mm (0.35")

Thread for Preamplifier Mounting:

5.7 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

Ordering Information

Type 4938 1/4" Pressure-field Microphone
4938-W-001 Optimised for high static
pressure

4938/WB-1418 For airbag deployment noise

Include the following accessories:

- BC-0229: Calibration Chart^f
- BC-5002: Microphone Mini-CD^f

TEDS COMBINATIONS

4938-A-011 1/4" Pressure-field Microphone,
with Preamplifier 2670

4938-B-002 1/4" Pressure-field Microphone,
with Preamplifier 2669-B with
Adaptor UA-0035

f. Quote microphone serial number if re-ordering
calibration data

4938-C-002 1/4" Pressure-field Microphone,
with Preamplifier 2669-C with
Adaptor UA-0035

4938-L-002 1/4" Pressure-field Microphone,
with Preamplifier 2669-L with
Adaptor UA-0035

OPTIONAL ACCESSORIES

Type 2670 1/4" Microphone Preamplifier

Type 4231 Sound Calibrator

Type 4228 Pistonphone

Type 4226 Multifunction Acoustic Calibrator

DP-0775 Calibration Adaptor for 1/4"

Microphones

UA-0033 Electrostatic Actuator

DB-0264 1/4" Adaptor for UA-0033

UA-0035 1/4" to 1/2" Adaptor, L = 72.5 mm

WA-0371 1/4" to 1/2" Adaptor, L = 32 mm

UA-0122 Flush Mounting Kit (angle)

UA-0123 Flush Mounting Kit (straight)

EU-4000 1/4" Angle Piece

UA-0385 Nose Cone for 1/4" Microphone

WQ-1099 Windscreen for 1/4" Microphone,

65 mm diameter

WQ-1133 Windscreen for 1/4" Microphone,

ellipsoidal

CALIBRATION SERVICES

4938-CAI Accredited Initial Calibration

4938-CAF Accredited Calibration

4938-CFF Factory Standard Calibration

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

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