PRODUCT DATA

# ¼″ Production Line Test Microphone Type 4989-A

*Microphone Type 4989-A is well suited for cost effective and precise measurements close to sound ports and in production testing where the acoustic performance of the device under test (DUT) is a key differentiator. The microphone is designed to ensure maximum resistance to corrosion and minimum sensitivity to magnetic fields, with the microphone capsule and preamplifier housing made of titanium, and it is fitted with a gold-plated brass connector.*

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*The consistent performance of Type 4989-A microphones means that the variation between individual microphones is kept to a minimum. They are virtually unaffected by temperature and humidity changes, making them the ideal microphones for integration in production test systems in locations where temperature and humidity can vary.*

## Uses and Features

### Uses

- Measurements very close to sound ports of an audio device (near field)
- Production test systems
- Measurements in unpredictable sound field conditions
- Measurements requiring an EMC-compliant product (EN/IEC 61326)

### Features

- Corrosion resistant design
- Sensitivity: 9 mV/Pa (−41 dB ±3 dB, re 1 V/Pa)
- Frequency range: 5 Hz to 20 kHz, ±2 dB
- Dynamic range: 30 to 140 dB
- Flat frequency response
- Minimal frequency response variance from microphone to microphone
- Minimal phase response variance from microphone to microphone
- Connects directly to CCLD* input
- Transducer electronic data sheet (TEDS)
- Engraved bar code that provides serial number information

* CCLD: Constant current line drive, also known as DeltaTron® (ICP and IEPE compatible)

## Description

### Manufacturing and Stability

The microphone cartridge and preamplifier housing of Type 4989-A are made of titanium to ensure maximum resistance to corrosion and minimum sensitivity to magnetic fields. The microphone is also fitted with a gold-plated brass connector. The combination of this and the laser-welded diaphragm results in superior robustness and long-term stability.

All Brüel & Kjær measurement microphones are assembled in a clean room to guarantee that the microphones maintain their high stability and low inherent noise characteristics even when used in humid and/or high-temperature environments.

The minimal variation from microphone to microphone and the well-defined phase response make this microphone well suited as a reference microphone for the tuning of microphone arrays and active noise-cancelling systems.

Type 4989-A is vented through two holes positioned at the bottom of a groove that extends around the circumference of the microphone. This ensures that the vents do not become blocked when the microphone is mounted in a microphone holder. The vents are placed 19.5 mm (0.77″) from the front of the microphone.

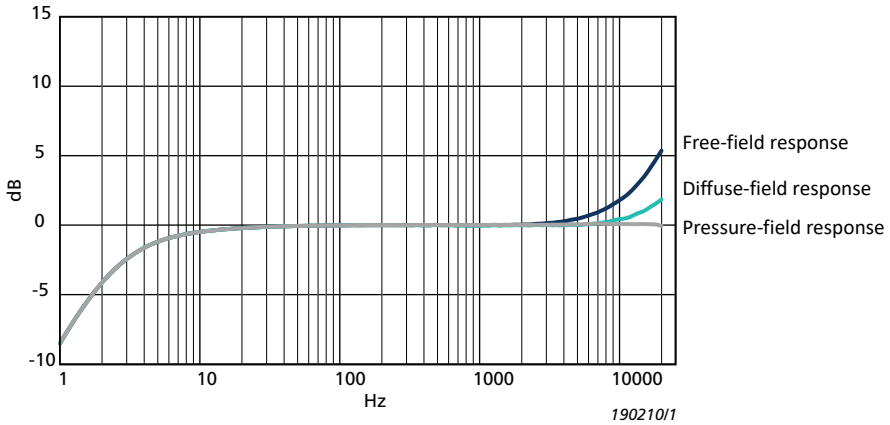
### TEDS Microphone

Type 4989-A is a TEDS microphone. It consists of a ¼″ prepolarized microphone cartridge and a high-quality CCLD preamplifier assembled into one unit to ensure the integrity of the microphone, as well as the validity of the TEDS data.

### Frequency response

Type 4989-A is optimized for pressure-field measurements with the grid mounted. Fig. 1 shows its typical frequency response in different sound fields. The differences between the responses only appear at higher frequencies.

*Fig. 1 Typical frequency responses of Type 4989-A*




### Calibration Charts

Calibration Chart and correction curves for each individual Type 4989-A can be downloaded from the Online Calibration Cloud.

## Compliance with Standards

| | |
|---|---|
| CE RCM e WEEE | The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives<br>RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME<br>China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China<br>WEEE mark indicates compliance with the EU WEEE Directive |
| **Safety** | EN/IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use<br>ANSI/UL 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use |
| **EMC Emission** | EN/IEC 61000-6-3: Generic emission standard for residential, commercial and light industrial environments<br>EN/IEC 61000-6-4: Generic emission standard for industrial environments<br>CISPR 32: Radio disturbance characteristics of information technology equipment. Class B Limits<br>FCC Rules, Part 15: Complies with the limits for a Class B digital device<br>This ISM device complies with Canadian ICES-001 (standard for interference-causing equipment) |
| **EMC Immunity** | EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments<br>EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments<br>EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements<br>**Note:** The above is only guaranteed using accessories listed in this product data |
| **Temperature** | IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat<br>Storage Temperature: –20 to +70 °C (–4 to +158 °F) |
| **Humidity** | IEC 60068 – 2 – 78: Damp Heat: 0 to 93% RH (non-condensing) storage |
| **Mechanical** | Non-operating:<br>IEC 60068-2-6: Vibration: 0.3 mm, 20 $m/s^2$, 10 – 500 Hz<br>IEC 60068-2-27: Shock: 1000 $m/s^2$<br>IEC 60068-2-29: Bump: 1000 bumps at 250 $m/s^2$ |

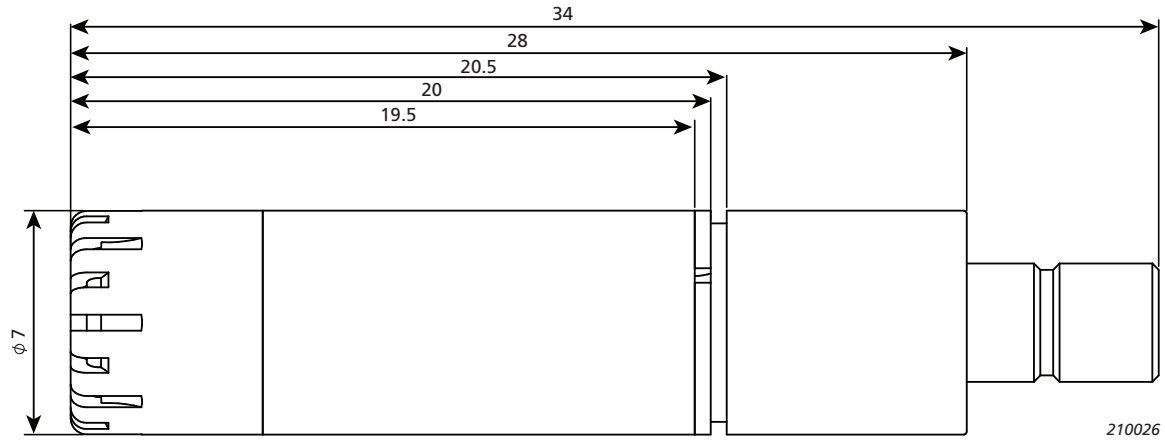
## Specifications – Type 4989-A

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

| | | |
|---|---|---|
| **GENERAL SPECIFICATIONS** | | |
| Sensitivity (250 Hz)* | | −41 dB ±3 dB (re 1 V/Pa), 9 mV/Pa |
| Pressure-field Response | | 20 Hz to 10 kHz, ±0.5 dB |
| | | 5 Hz to 20 kHz, ±2 dB |
| Phase Spread (95% of the population is within) | | ±0.5° up to 1 kHz |
| | | ±2° up to 5 kHz |
| | | ±5° up to 10 kHz |
| | | ±15° up to 20 kHz |
| Lower Limiting Frequency (−3dB) | | 1 – 4 Hz |
| Pressure Equalization Vent | | Vented through holes on the side of the microphone |
| Calibrator Load Volume | | 70 $mm^3$ |
| Pistonphone Correction | | 0.00 dB |
| Inherent Noise | | <30 dB(A) |
| Upper Limit of Dynamic Range (3% Distortion) | | 140 dB |
| Settling Time | | 50 s |
| Power Requirements | | CCLD supply 24 to 28 V |
| Power Supply | Nominal | 4 mA, 22 to 28 V (unloaded supply voltage) |
| | Full specs with 10 m (32.8 ft) cable | 3.5 – 20 mA, 22 – 28 V (unloaded supply voltage) |
| | With reduced specifications | Minimum 2 mA, 18 V |
| Output Bias Voltage | | 11 ± 2 V at −20 to 50 °C<br>11 ± 3 V up to 60 °C |
| Max. Output Voltage | | 7 V (peak) |
| Maximum Output Current | | Peak value 2.5 mA below supply current |
| Output Impedance | | <35 Ω |
| TEDS Template | | IEEE 1451.4 V1.0, UDID=127-0-0-0U |
| **ENVIRONMENTAL SPECIFICATIONS** | | |
| Operating Temperature Range | | −20 to +60 °C (−4 to +140 °F) |
| Storage Temperature | In Microphone Box | −20 to +70 °C (−4 to +158 °F) |
| | With Mini-CD | 5 to 50 °C (41 to 122 °F) |
| Temperature Coefficient (250 Hz) | | +0.013 dB/°C (typical) |
| Static Pressure Coefficient | | −0.0028 dB/kPa (typical) |
| Operating Humidity Range | | 0 to 100% RH (without condensation) |
| Influence of Humidity | | Unmeasurable in the absence of condensation |
| Vibration Sensitivity (< 1000 Hz) | | 62 dB equivalent SPL for 1 $m/s^2$ axial vibration (typical) |
| Magnetic Field Sensitivity | | No detectable influence from a 50 A/m, 50 Hz magnetic field |
| Estimated Long-term Stability | | <1 dB in 1000 years (air at 20 °C (68 °F), 90% RH)<br><1 dB in 4 years (dry air at 70 °C (158 °F))<br><1 dB in 40 years (air at 20 °C (68 °F), 90% RH)<br><1 dB in 1 year (air at 50 °C (122 °F), 90% RH) |
| **PHYSICAL SPECIFICATIONS** | | |
| Material | | Titanium Grade 2 |
| Diameter with Grid | | 7 mm (0.275″) |
| Length with Grid | | 34 mm (1.3″) with socket |
| Socket | | SMB |

* Individually calibrated

*Fig. 1 Physical dimensions of Type 4989-A in mm (microphone cartridge and preamplifier)*




## Ordering Information

Type 4989-A ¼″ Production Line Test Microphone

Individual calibration chart available on Online Calibration Cloud

### Optional Accessories

**CABLING**

| | |
|---|---|
| AO-0563 | Cable, SMB (right angle) to SMB (right angle) |
| AO-0564 | Cable, SMB (right angle) to BNC |
| AO-0587 | Cable, SMB (straight) to BNC |

**CALIBRATION**

| | |
|---|---|
| Type 4231 | Sound Calibrator |
| Type 4228 | Pistonphone |
| Type 4226 | Multifunction Acoustic Calibrator |
| DP-0775 | Calibration Adaptor, ¼″ microphones |
| UA-0033 | Electrostatic Actuator, ½″ microphones |
| DB-4121 | Adaptor, ¼″ microphones, use with UA-0033 |

**GENERAL ACCESSORIES**

| | |
|---|---|
| WQ-1099 | Spherical Windscreen, diameter 65 mm (2.6″) |
| WQ-1133 | Elliptical Windscreen, 38 × 55 mm (1.5 × 2.2″) |
| UA-2129 | Microphone Holder, built-in SMB connector |
| WA-1518 | Microphone Holder, 45° twist clip, straight entry, black POM (Polyoxymethylene) |

### Services

**MAINTENANCE**

| | |
|---|---|
| MIC-TEDS-EW1 | Extended Warranty, one year for TEDS microphones |

**ACCREDITED CALIBRATION**

| | |
|---|---|
| MIC-TEDS-CAI | Initial Accredited Calibration, Microphone with preamplifier and programming of TEDS |
| MIC-TEDS-CAF | Accredited Calibration, Microphone with preamplifier and programming of TEDS |

Visit www.bksv.com/Service/Calibration-and-verification to find more information about calibration services online.

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