

# Outdoor Microphones

Nor1216 for permanent installations

Nor1217 for semi-permanent installations

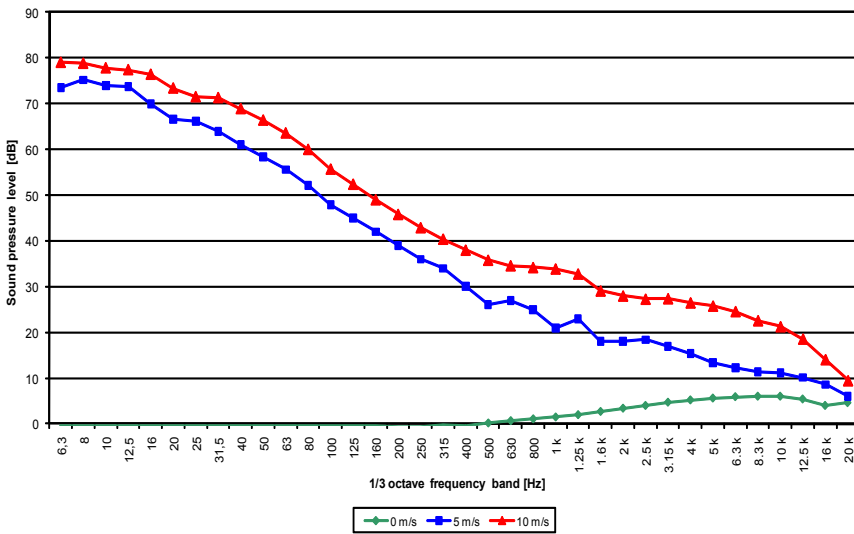


- Outdoor microphone for community and aircraft noise.
- Horizontal or vertical reference direction set by external frequency correction.
- Fulfils IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1 (when used with Sound Analyser Nor140).
- Protection class IP 55 (dust and water).
- Easy to calibrate with a normal 1/2" sound calibrator.
- Powered from the sound level meter.
- Microphone verification by SysCheck facility.
- Low self-noise – typically below 18 dB, A-weighted.
- Delivered with individual calibration certificate.
- Build in heating for enhanced weather protection (Nor1216 only)
- Directly powered and supported by Sound Analyser Nor140 (build in selectable frequency correction networks, heater supply and SysCheck signal generator)



The Outdoor Microphones Nor1216 and Nor1217 are high quality measurement microphones for all-weather conditions sharing the same acoustical and weather protection design. The Nor1216 is mainly designed for permanent outdoor applications due to the build in heater, whereas the Nor1217 is designed for semi-permanent application requiring low power. The Nor1217 uses the standard preamplifier and microphone from the Nor140, making it a very cost effective solution. The Nor1216 has a special preamplifier with a build in electrical heater resistor which further enhances the weather proof protection, and prevents the system from condensation problems in cold weather with high humidity. The Nor1216/1217 is designed for use with the Nor140 Sound

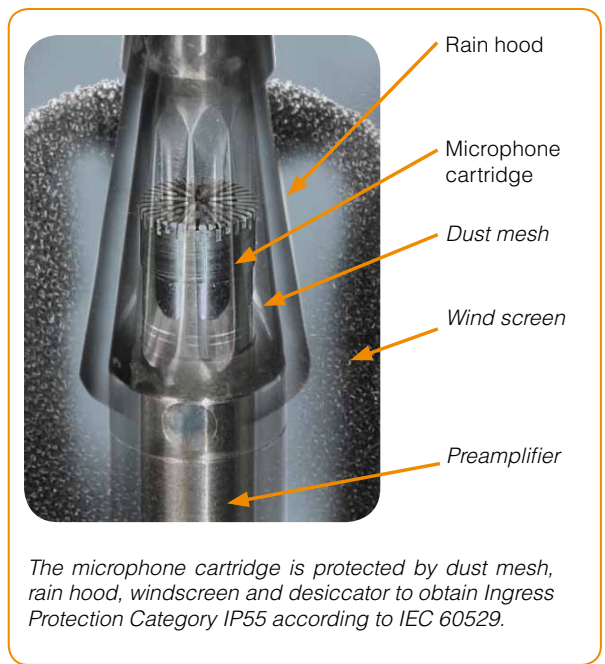
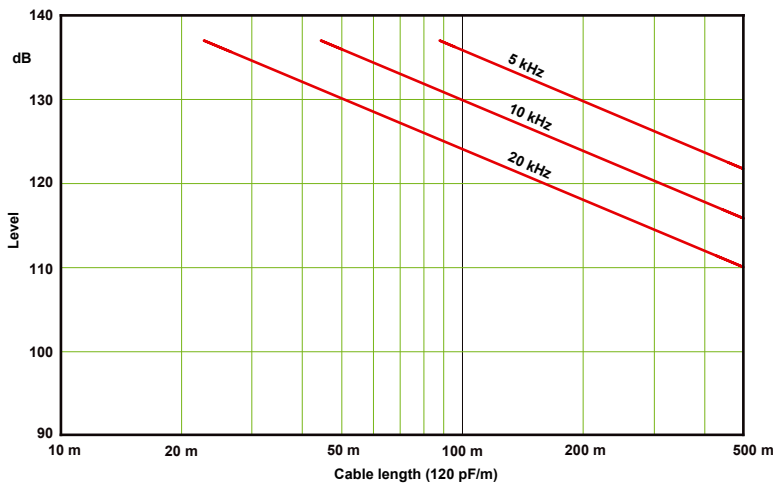
Analyser. The instrument allows a direct connection via Nor1408A, a standard Lemo 7 pin microphone cable supplied in various lengths. There is no need for extra adapter box or power supplies. The Nor140 has selectable frequency correction for both community and airport applications. The instrument also supports the SysCheck verification and power for the heater resistor in the Nor1216



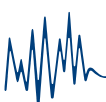
**Wind induced noise**

Compared to a standard measurement microphone, the Outdoor Microphone Nor1216/Nor1217 improves the measurement accuracy by reducing the wind noise and by improving the directional response for sound from different directions. The diagram shows the typical noise floor for different wind speeds. The noise is typically more than 20 dB less than an unprotected microphone.

The figure below shows the maximum level as function of cable length and frequency. 20 kHz corresponds to the bandwidth of the microphone system with the normal microphones Nor1225 and Nor1227.

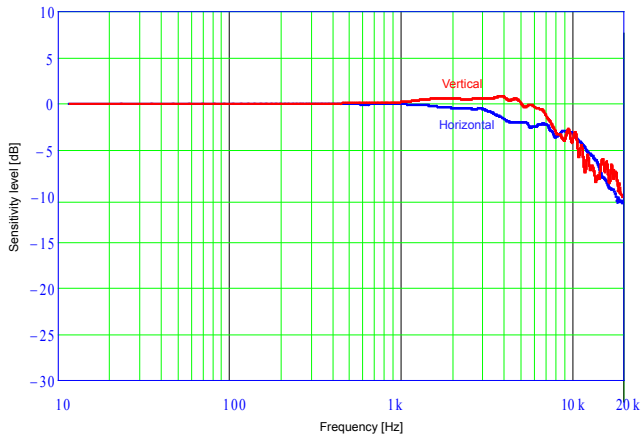


The microphone cartridge is protected by dust mesh, rain hood, windscreen and desiccator to obtain Ingress Protection Category IP55 according to IEC 60529.



### Frequency response

Both Nor1216 and Nor1217 satisfy Class 1 specification requirements according to IEC61672-1 and related national standards when used with Nor140 and the correction network automatically selected when this microphones are selected. The diagram below shows the typical frequency response of the microphone along the vertical and the horizontal reference direction before correction is applied.



### Calibration

The Outdoor Microphone may be calibrated with a normal sound calibrator suitable for 1/2" working standard microphones (WS2) without the need for extra accessories. Access to the microphone cartridge is easily gained by dismounting the upper part of the microphone.

The base is made of an electrical insulating material. The microphone body will be fully insulated from the mounting mast thereby reducing pick-up of electrical hum and noise.

*By removing the upper part, the outdoor microphone may be calibrated as an ordinary 1/2" microphone.*

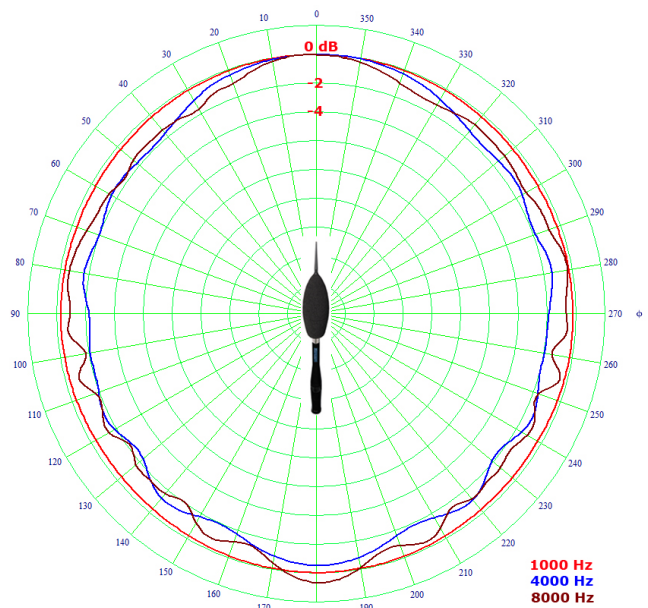
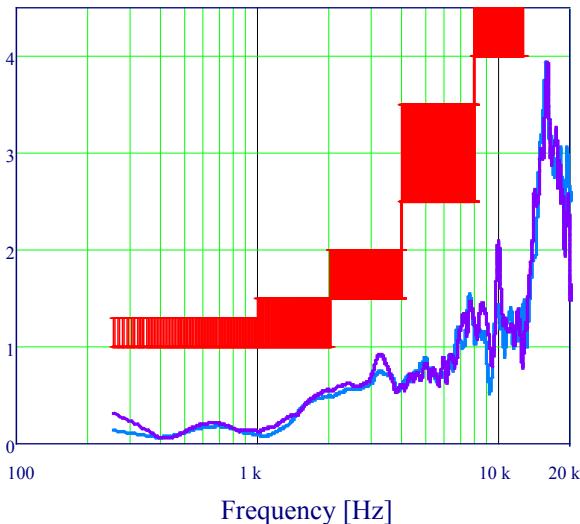


### Directional response

The figure below to the right shows the directional response for three frequencies in a vertical plane. A similar diagram in the horizontal plane is very close to circular.

The figure below to the left shows the maximum deviations from an ideal circular response within ±30 degree from a horizontal reference axis as a function of frequency (blue curves) and the tolerance limits as specified in IEC 61672, class 1 (red).

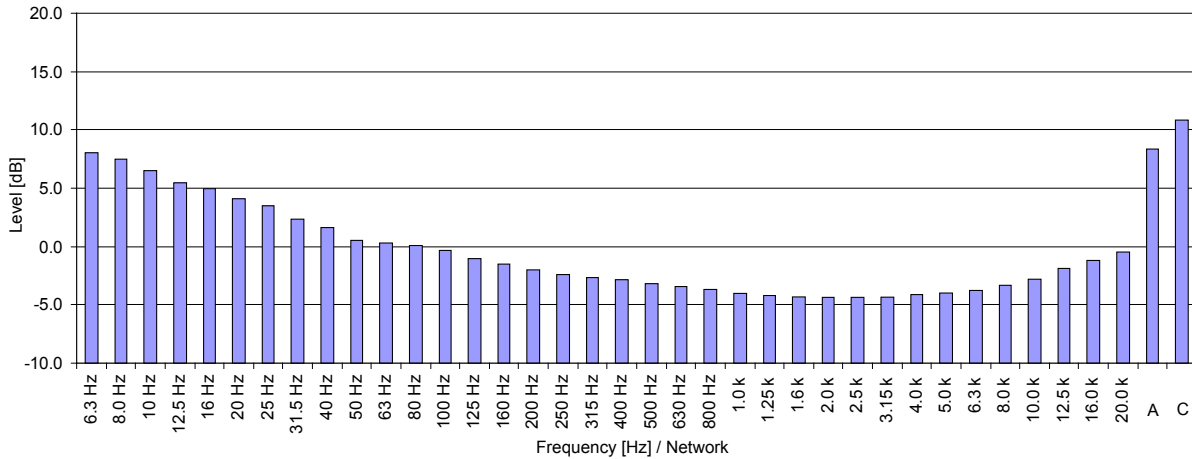
+/- 30 deg – Horizontal reference



## SysCheck verification

For verification of proper operation, the microphone is equipped with a system check facility (SysCheck), where an electrical signal applied on one of the terminals are returned after passing through the complete signal

chain, thus verifying proper operation of the microphone cartridge, preamplifier and microphone cable. It is a robust and simple method for verifying a microphone system.



Typical self noise of the microphone system when the microphone is substituted by a capacitor with similar capacitance as the microphone. Note that the acoustical self-noise for a real microphone will be higher due to thermal noise in the microphone cartridge.

### Specifications

**Acoustic performance:** IEC 60651, IEC 61672 class 1 and ANSI S1.4 type 1 (frequency correction applied) with a suitable instrument (Nor140).

**Max sound pressure level:** >140 dB peak dependent on supply voltage.

**Microphone cartridge:** Nor1227 or Nor1225 (1/2" 50 mV/Pa)

**Polarization voltage:** 0 volt (Nor1227) 200V (Nor1225)

**Inherent noise:** < 18 dB A-weighted

**Reference direction:** Vertical or horizontal dependent on the applied frequency correction

**Ingress Protection Category:** IP55 according to IEC 60529.

**Supply voltage:** ±14 volt to ±16 volt (Nor1216); ±14 volt to ±60 volt (Nor1217)

**Current consumption:** 18mA (Nor1216) 1,5mA (Nor1217)

**Connector:** 7 pin Lemo type 1B male

**Temperature range:** -40°C to +85°C

**Height:** 390 mm / 15.4" (without tripod adapter)

**Diameter:** Approx 80 mm / 3.1" (with windshield)

**Weight:** Approx 300 g (with preamp microphone)

**Mounting thread:** Standard 1" pipe threads according to ISO 228 (Nor1216 only). When using the tripod adapter: 3/8" UNC (Nor1216 and Nor1217)

### Accessories and spare parts

**Windshield upper part:** Nor4529

**Assembled upper part with windscreen:** Nor4560

**Microphone:** Nor1227 or Nor1225

**Microphone preamplifier Nor1216 / Nor1217:** Nor1209A / Nor1209

**Sound calibrator:** Nor1251 or Nor1253

**Microphone cable:** Nor1408A Standard lengths 5, 10, 15, 20, 30 and 50 meters – other lengths on request.

### Ordering information

**Nor1216** – Outdoor microphone excluding microphone cartridge with internal preamp1209A with heating.

**Nor1216/1225** – same as above, but including 1/2" 200V polarised microphone Nor1225

**Nor1216/1227** – same as **Nor1216**, but including 1/2" self polarised microphone Nor1227

**Nor1217** – Outdoor microphone excluding preamplifier and microphone.