External active shielding
Technical specifications

External active shielding (art. no. NM23040N) is a noise cancellation technology designed for protecting magnetometer systems from environmental interferences. Combined with a magnetically shielded room, external active shielding provides additional protection against magnetic field distortions without additional weight or size.

External active shielding reduces slow disturbances caused by moving objects, including subways, trams, elevators, or vehicles, as well as by power lines by establishing a compensation field that cancels out the interference. With compensation coils mounted on the outside surface of the magnetically shielded room, external active shielding reduces the need for expensive passive shielding.

**Operating principle**
The external active shielding system attenuates ambient magnetic distortions by measuring fluctuations of the magnetic field using a triaxial fluxgate magnetometer placed outside of the magnetically shielded room and feeding a corresponding compensation signal independently to three compensation coil pairs mounted on the outside surface of the magnetically shielded room.

**Magnetic shielding**
The attenuation provided by the external active shielding system depends on the presence of an identifiable interference source as well as on the tuning of the compensation against the identified source. Therefore, the magnetic shielding performance of the active shielding system may not be guaranteed. However, under typical conditions in which the system is tuned against a remote, identifiable interference source, attenuations up to 20 dB may be reached.

**Components**
- Six feedback compensation coils mounted on the external surfaces of the magnetically shielded room
- A three-channel magnetic field compensation unit
- A triaxial fluxgate magnetometer
- A mounting kit for the fluxgate magnetometer
- Cabling

**Amplifier**
- Output current: max. 2.5 A (single amplifier)
- Total output current: max. 3.5 A
- Load to single amplifier: ≥3.0 Ω
- Compliance at 2.5 A: typically ±7 V

**Magnetometer**
- Measurement range: ±19.99 μT and ±199.9 μT
- Resolution: 10 nT
- Noise: <0.7 nT RMS
- Accuracy: 0.5 % ± 25 nT ±1 digit
- Offset adjustment range: ±500 μT (coarse and fine)
- Analog output: 0.03 V/μT (BNC connector)
- Output voltage: ±6 V
- Bandwidth: 0–1 kHz (–3 dB)

**Filter**
- Band-pass filter: 2nd order biquad active filter
- Bandwidth: ~2.6 Hz
- Phase adjustment range: –120° to +0° and –30° to +90°
- Channel separation: >20 dB

**Operating environment**
The proper functioning of the external active shielding system depends on the presence of an identifiable, far-field interference.

- Operating temperature: 0–40 °C

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