

Piezotron® Sensor

Type 8152B...

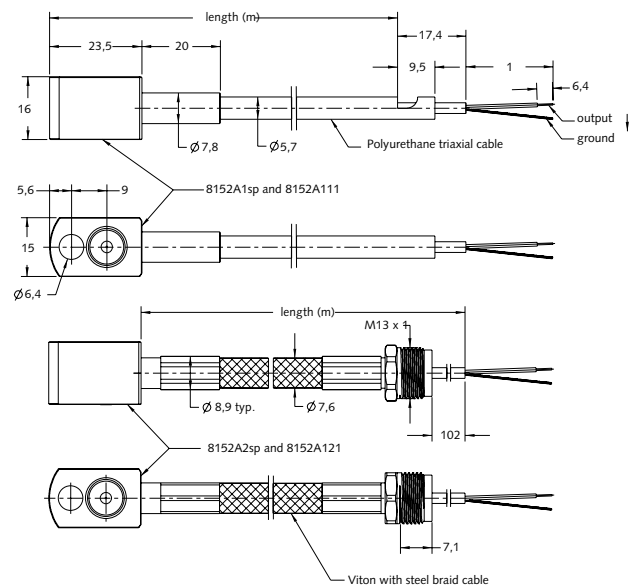
Acoustic Emission Sensor

Piezotron Acoustic Emission Sensor with an integral impedance converter for measuring acoustic emission (AE) above 50 kHz in machine structures. With its small size it mounts easily near the source of emission to optimally capture the signal. The sensor has a very rugged welded housing (degree of protection IP 65 PUR or IP 67 Viton). The small sensor is easily mounted nearby everywhere; an M6 or 1/4-28 bolt is all that is needed.

- High sensitivity and wide frequency range
- Inherent highpass-characteristic
- Insensitive to electric and magnetic noise fields
- Robust, for industrial use (IP65 (PUR), IP67 (Viton))
- Ground isolated: Prevents ground loops
- Conforming to CE

Description

The Piezotron AE Sensor consists of the sensor housing, the piezoelectric sensing element and the built-in impedance converter. The sensing element, made of piezoelectric ceramic, is mounted on a thin steel diaphragm. Its construction determines the sensitivity and frequency response of the sensor. The coupling surface of the diaphragm welded into the housing is slightly protruding to measure the AE signals. Thus a precisely defined coupling force results when mounting. This assures a constant and reproducible coupling for the AE transmission. The sensing element is acoustically isolated from the housing by design and therefore well protected against external noise. The Kistler AE sensors feature a very high sensitivity for surface (Rayleigh) and longitudinal waves over a broad frequency range. Type 8152B1... covers 50 ... 400kHz and Type 8152B2... covers 100 ... 900 kHz. A miniature impedance converter is built into the Piezotron AE Sensor, giving an output low-impedance voltage signal. The AE Piezotron Coupler Type 5125B1, is used to supply power to the sensor and for signal processing. Special highly insulating and low noise connecting cables are not required.



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Technical Data

| Type | Unit | 8152B111/121 | 8152B11/12sp | 8152B211/221 | 8152B21/22sp |
|-------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|
| Sensitivity | dBref 1V/(m/s) | 57 | 57 | 48 | 48 |
| Frequency Range ±10dB | kHz | 50 ... 400 | 50 ... 400 | 100 ... 900 | 100 ... 900 |
| Ground Isolation | MΩ | >1 | >1 | >1 | >1 |
| Environmental: | | | | | |
| Shock Limit (0,5ms pulse) | gpk | 2000 | 2000 | 2000 | 2000 |
| Temperature Range Operating | °C | -40 ... 60 | -40 ... 60 | -40 ... 60 | -40 ... 60 |
| Output: | | | | | |
| Bias nom. | VDC | 2,2 | 2,2 | 2,5 | 2,5 |
| Impedance | Ω | <10 | <10 | <10 | <10 |
| Voltage full scale | V | ±2 | ±2 | ±2 | ±2 |
| Current | mA | 2 | 2 | 4 | 4 |
| Source: | | | | | |
| Voltage (Coupler) | VDC | 5 ... 36 | 5 ... 36 | 5 ... 36 | 5 ... 36 |
| Constant Current | mA | 3 ... 6 | 3 ... 6 | 3 ... 6 | 3 ... 6 |
| Construction: | | | | | |
| Sensing Element | type | ceramic | ceramic | ceramic | ceramic |
| Housing/Base | material | stainless steel | stainless steel | stainless steel | stainless steel |
| Sealing-housing/connector | type | hermetic | hermetic | hermetic | hermetic |
| Viton Cable Bend Radius, max. | mm | 15,24 | 15,24 | 15,24 | 15,24 |
| Weight (without cable) | grams | 29 | 29 | 29 | 29 |
| Mounting Torque | Nm | 9±1 | 9±1 | 9±1 | 9±1 |

1 g = 9,80665 m/s², 1 Inch = 25,4 mm, 1 gram = 0,03527 oz, 1 lbf-in = 0,1129 Nm

Application

The AE Sensor is especially well suited for measuring AE above 50 kHz in the surface of metallic components or structures. Such AE results from plastic deformation of materials, crack formation and growth, fracturing or friction. Application examples are monitoring of processes, tools and machines in metal cutting as well as forming operations. Thanks to its rugged construction and the tightly welded housing this sensor can operate under severe environmental conditions.

Accessories Included

- | | Type |
|--------------------------------|--------------|
| • Mounting screw, 1/4-28 x 1in | 431-0500-001 |
| • Mounting screw, M6 x 25mm | 431-0497-001 |

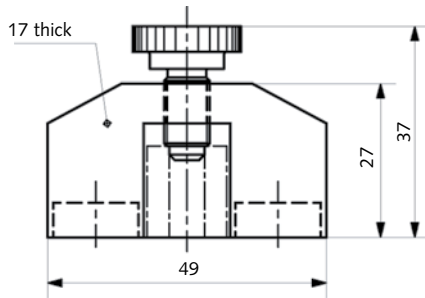
Optional Accessories

- | | Type |
|------------------------|-------|
| • Magnetic clamp | 8443B |
| • Piezotron AE coupler | 5125B |

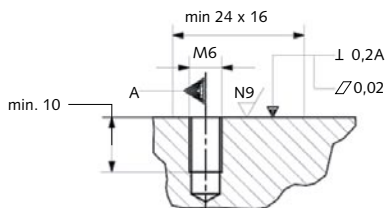
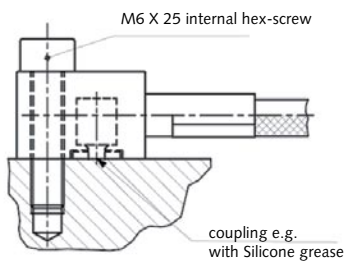
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Mounting

The AE Sensor is simply mounted with an M6-1/4 screw or a magnetic clamp Type 8443B onto the surface of the structure. A minimum tightening torque is sufficient for a reproducible and constant coupling. The smoother the mounting surface, the better the result. The use of a highly viscous grease (e.g. silicone grease) between the coupling surfaces is recommended.



Type 8443B Magnetic clamp



Mounting AE-Sensor

Ordering Key

Variants

| | |
|------------------------------------|------|
| PUR, 5m (50 ... 400kHz) | 111 |
| PUR, 0,3 ... 10m (50 ... 400kHz) | 11sp |
| PUR, 5m (100 ... 900kHz) | 211 |
| PUR, 0,3 ... 10m (100 ... 900kHz) | 21sp |
| Viton, 2m (50 ... 400kHz) | 121 |
| Viton, 0,3 ... 3m (50 ... 400kHz) | 12sp |
| Viton, 2m (100 ... 900kHz) | 221 |
| Viton, 0,3 ... 3m (100 ... 900kHz) | 22sp |

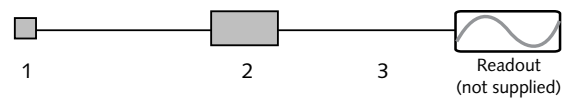


Measuring Chain

- 1 Acoustic emission sensor
- 2 Piezotron AE Coupler
- 3 Outout cable, made by customer

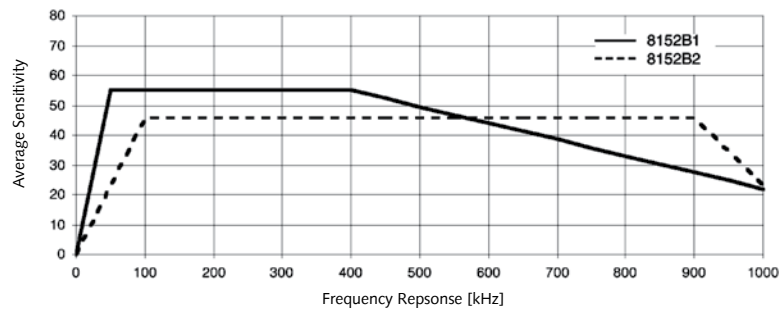
Type

- 8152B...
5125B...

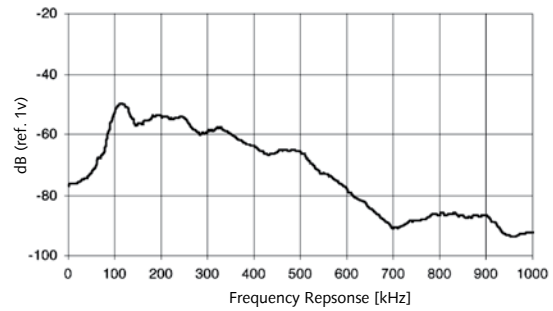
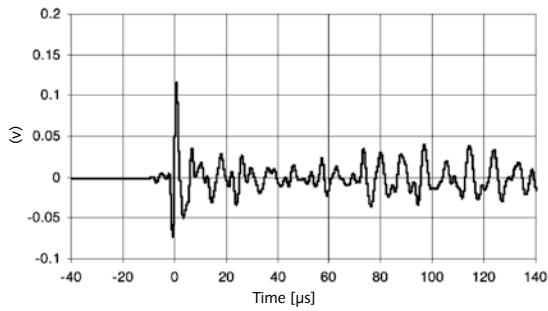


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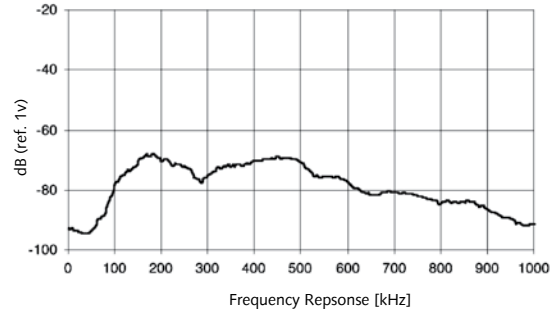
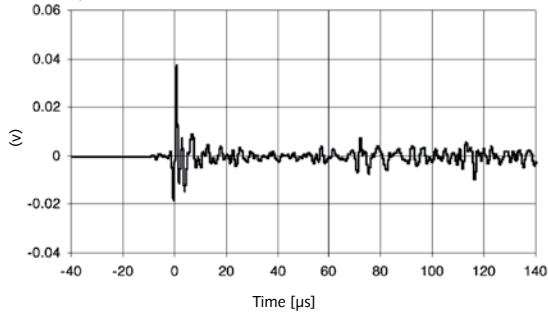
Frequency Response



Type 8152B1



Type 8152B2



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