



## Vibration Monitoring Unit Series HE200

MADE IN  
GERMANY

SIL2

PL-d



IECEE

EAC



Proc. Cont. Eq.  
for Ord. Loc.  
Proc. Cont. Eq.  
for Haz. Loc.



IECEX

EACEx



- Vibration speed (mm/s, rms)  
Vibration acceleration (g, rms)
- ATEX / IECEx / EACEx Zone 2 / 22 and 1 / 21
- cULus OrdLoc / HazLoc Div 2
- 2 potential-free switching contacts
- Analogue current output: 4–20 mA
- Frequency range: 10 Hz – 1000 Hz  
1 Hz – 1000 Hz



Date of manufacture: \_\_\_\_\_

Type description: \_\_\_\_\_

Serial no.: \_\_\_\_\_

## **Operating instructions**

### **Vibration Monitoring Unit Type HE200**

Standard and ATEX / IECEx / EACEx

**Version: 2022-03-28**

**Attention!**

Prior to commissioning the product, the instruction manual must be read and understood.

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Subject to modifications.

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## 2 Safety information

### 2.1 General

*The safety instructions are intended to protect people and property from damage and hazards that could arise as the result of improper use, incorrect operation or other misuse or devices, especially in explosive areas. Therefore, please read the operating instructions carefully before working on the product or operating it. The operating instructions must be accessible to operating personnel at all times.*

Please make sure that all documents are present and complete before commissioning or performing other work on the product. If the documents have not all been delivered in full or if further copies are necessary, they can also be obtained in other languages.

The product is built according to the latest state of the art. However, hazards to people, machinery and systems can still arise as the result of improper handling, unintended use or operation and maintenance by persons inadequately trained on the product.

All those who are involved in the installation, operation and maintenance of the product in the operator's plant must read and understand the operating instructions.

The product may only be assembled, disassembled, installed and repaired by instructed, sufficiently trained and authorised personnel.

### 2.2 Symbols used



This symbol indicates an explosion hazard.



This symbol indicates a hazard from electrical current.



This symbol indicates safety-related information.



This symbol indicates information unrelated to safety.

### 3 Scope of this instruction manual

This instruction manual for the HE200-type vibration monitoring unit applies to the following versions:

HE200.00, HE200.01 and HE200.02

The variants are functionally identical. The variants HE200.01 and HE200.02 have additional certifications and labels which permit use in potentially explosive atmospheres.

For further information, see chapter "Overview of application areas" on page 7.

### 4 Vibration Monitoring Unit Type HE200

The HE200 type vibration monitoring unit is used to measure and monitor absolute bearing vibrations in machines in line with DIN ISO 10816.

It offers the following features:

- Two limit values and associated delay timings can be adjusted separately.
- The two potential-free switching contacts will signal any exceeding of the relevant defined limit values. This can be used to generate a pre-alarm and a main alarm.
- Measurement parameter: The effective value (rms) of the vibration velocity (mm/s), or the effective value (rms) of the vibration acceleration (g)
- Analogue current output: Interference-free DC signal from 4-20 mA, proportional to the measuring range of the monitoring unit.

### 5 Intended Use

Type HE200 is used to protect machines and mechanical equipment against undue strong vibrations. It may only be used in accordance with the specifications listed in the data sheet. It is used exclusively for measuring mechanical vibrations. **Main fields of application:** Fans, ventilators, blowers, electric motors, pumps, centrifuges, separators, generators, turbines and similar oscillating mechanical equipment.



If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

### 6 Scope of supply

All versions include:

- Vibration monitoring
- Cylinder head screw with hex socket, M8 x 20 mm
- Seal label
- Operating instructions

## 7 Documents and Certificates

You can find the following documents and certificates for HE200 type at [www.hauber-elektronik.de](http://www.hauber-elektronik.de) where they can be viewed and downloaded:

- EU type examination certificate ATEX, no.: UL 20 ATEX 2421 X Rev. 0
- Type examination certificate ATEX, no.: UL 21 ATEX 2570 X
- IECEx Certificate of conformity, no.: IECEx ULD 20.0022X
- UL Certificate of compliance, no.: E507077-20210204
- EACEx certificate, No.: %PLACEHOLDER%
- EAC Declaration
- Functional safety certificate (SIL 2)
- Safety manual SIL2

## 8 Transfer of liability when operating in potentially explosive atmospheres

The owner of the system is exclusively liable for the appropriate configuration of the electrical connections with respect to explosion protection regulations and correct commissioning.

If the system is installed by a sub-contractor on behalf of the owner, the system may only be commissioned after the sub-contractor has issued written confirmation in the form of a certificate of installation that the system has been installed correctly and professionally in accordance with the applicable legal regulations.

The operator is obliged to notify the responsible authorities of the initial commissioning of explosion-protected systems or system components and their re-commissioning following extensive changes or maintenance.

9 Overview of application areas

|   |   |                       |                       |                       |                       |                       |                       |
|---|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Coding  |   | HE200.00.xx.xx.00.xxx | HE200.00.xx.xx.01.xxx | HE200.02.xx.xx.00.xxx | HE200.02.xx.xx.01.xxx | HE200.01.xx.xx.00.xxx | HE200.01.xx.xx.02.xxx |
| Connection  | M12 connector   | x                     |                       | x                     |                       |                       |                       |
|   | Integrated cable  |                       | x                     |                       | x                     | x                     | x                     |
| Measuring head temperature T <sub>M</sub><br>Ambient temperature T <sub>A</sub> | -40 °C ≤ T <sub>M</sub> ≤ 85 °C<br>-40 °C ≤ T <sub>A</sub> ≤ 60 °C  | x                     |                       | x                     |                       | x                     |                       |
|   | Restriction for the range of application cULus:<br>-30 °C ≤ T <sub>M</sub> ≤ 80 °C<br>-30 °C ≤ T <sub>A</sub> ≤ 60 °C |                       |                       | x                     | x                     |                       |                       |
|   | -20 °C ≤ T <sub>M</sub> ≤ 125 °C<br>-20 °C ≤ T <sub>A</sub> ≤ 60 °C   |                       |                       |                       |                       |                       | x                     |

|          |                                  |   |   |   |   |   |   |
|----------|----------------------------------|---|---|---|---|---|---|
| Standard |                                  | x | x | x | x | x | x |
|          | Proc. Cont. Eq. Ord. Loc E507077 | x | x | x | x |   |   |

|                  |   |                            |  |  |   |   |  |
|------------------|---|----------------------------|--|--|---|---|--|
| Ex Zone 2 and 22 | II 3G Ex ec IIC T4 Gc<br>II 3D Ex tc IIIC 135°C Dc  | UL 21 ATEX 2570 X          |  |  | x | x |  |
|                  | <b>IECEX</b> Ex ec IIC T4 Gc<br>Ex tc IIIC 135°C Dc   | IECEX ULD 20.0022 Issue 0X |  |  | x | x |  |
|                  | Proc. Cont. Eq. Haz. Loc.<br>Class I, Division 2, Groups A, B, C and D, T4<br>Class II, Division 2 Groups F and G, T4 | E516625                    |  |  | x | x |  |
|                  | <b>EAC Ex</b> ?<br>?  | ?                          |  |  | x | x |  |
|                  | Ex ec IIC T4 Gc<br>Ex tc IIIC 135°C Dc  | UL-BR 21.1250X             |  |  | x | x |  |
|                  | <b>CCC</b> Ex nA IIC T4 Gc<br>Ex tD A22 IP66/67 T135°C  | No: 2021122315114599       |  |  | x | x |  |

|                  |   |                            |  |  |  |   |   |
|------------------|---|----------------------------|--|--|--|---|---|
| Ex Zone 1 and 21 | II 2G Ex db IIC T4 Gb<br>II 2D Ex tb IIIC 135°C Db    | UL 20 ATEX 2421 X          |  |  |  | x | x |
|                  | <b>IECEX</b> Ex db IIC T4 Gb<br>Ex tb IIIC 135°C Db   | IECEX ULD 20.0022 Issue 0X |  |  |  | x | x |
|                  | <b>EAC Ex</b> ?<br>?                                  | ?                          |  |  |  | x | x |
|                  | Ex db IIC T4 Gb<br>Ex tb IIIC 135°C Db                | UL-BR 21.1250X             |  |  |  | x | x |
|                  | <b>CCC</b> Ex d IIC T4 Gb<br>Ex tD A21 IP66/67 T135°C | No: 2021122315114599       |  |  |  | x | x |

10 Example labels

Variant 1 - HE200.00.xx.xx.xx.00.000

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.00.xx.xx.xx.00.000<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1 |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| -40 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure  |  |  |  |  |   |

Variant 2 - HE200.00.xx.xx.xx.01.xxx

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.00.xx.xx.xx.01.xxx<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1 |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| -35 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure  |  |  |  |  |   |

Variant 3 - HE200.02.xx.xx.xx.00.000

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.02.xx.xx.xx.00.000<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1   |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| II 3G Ex ec IIC T4 Gc<br>II 3D Ex tb IIC T135°C Dc<br>UL 21 ATEX 2570X<br>IECEx ULD 20.0022X<br>UL-BR 21.1250X<br>Proc. Cont. Eq. Haz. Loc<br>Class I, Div 2, Groups A, B, C and D, T4<br>Class II, Div 2, Groups F and G, T4<br>-40 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure |  |  |  |  |   |

Variant 4 - HE200.02.xx.xx.xx.01.xxx

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.02.xx.xx.xx.01.xxx<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1   |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| II 3G Ex ec IIC T4 Gc<br>II 3D Ex tb IIC T135°C Dc<br>UL 21 ATEX 2570X<br>IECEx ULD 20.0022X<br>UL-BR 21.1250X<br>Proc. Cont. Eq. Haz. Loc<br>Class I, Div 2, Groups A, B, C and D, T4<br>Class II, Div 2, Groups F and G, T4<br>-35 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure |  |  |  |  |   |

Variant 5 - HE200.01.xx.xx.xx.00.xxx

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.01.xx.xx.xx.00.xxx<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1 |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| II 2G Ex db IIC T4 Gb<br>II 2D Ex tb IIC T135°C Db<br>UL 20 ATEX 2421X<br>IECEx ULD 20.0022X<br>UL-BR 21.1250X<br>-40 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure          |  |  |  |  |   |

Variant 6 - HE200.01.xx.xx.xx.02.xxx

|  |  |  |  |  |   |
|--|--|--|--|--|---|
| <br>Type: HE2xx.01.xx.xx.xx.02.xxx<br>Item-no.: 12345<br>Serial-no.: 123456<br>Measuring range $V_{eff}$ : 0...xx mm/s<br>Frequency range $V_{eff}$ : xx...xxxx Hz<br>Year: 2020 Ver.: 1.1 |  |  |  |  | Manufacturer:<br>(производитель)<br>Hauber-Elektronik GmbH<br>Fabrikstraße 6<br>72622 Nürtingen<br>Germany (Германия)<br>www.hauber-elektronik.de |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
|  |  |  |  |  |   |
| II 2G Ex db IIC T4 Gb<br>II 2D Ex tb IIC T135°C Db<br>UL 20 ATEX 2421X<br>IECEx ULD 20.0022X<br>UL-BR 21.1250X<br>-20 °C ≤ T <sub>Amb</sub> ≤ +60°C<br>IP 66/67 Type 4x Enclosure          |  |  |  |  |   |



## 11 Information on the cULus validity range

In order to install the device according to the UL/CSA/IEC standard, the following information must be observed.

### Electrical protection



Devices must be protected by means of fuses, circuit breakers, overheating protection, impedance-limiting switches or similar to ensure protection against excessive power output if there is a fault in the device. Protection must be applied to supply lines and switching lines.



A circuit breaker suitable for 30V/3A according to UL Standard 489/CSA Standard (C22.2) no. 5/IEC 60947-2 must be installed near the device.



A fuse suitable according to UL Standard 248/CSA Standard (C22.2) no. 248/IEC 60127 must be installed near the device. The fuse must have a slow triggering characteristic ("T").

### Limited temperature range

The following temperature ranges apply for variants with integrated cable:

|                            |   |
|----------------------------|---|
| Measuring head temperature | $-30\text{ °C} \leq T_M \leq +80\text{ °C}$     |
| Ambient temperature        | $-30\text{ °C} \leq T_{Amb} \leq +60\text{ °C}$ |

## 12 Functional safety instructions

### 12.1 Safety level / key indicators

The HE200 vibration monitoring hardware was tested by TÜV Süd. The results meet the criteria according to SIL2 and PI-d.

|                   |                                       |
|-------------------|---------------------------------------|
| MTTF              | 984898h = 112,43 years                |
| DC <sub>avg</sub> | >90% Diagnostic Coverage              |
| MTTF <sub>d</sub> | 2889526h = 329,85 years = <b>HIGH</b> |
| CCF               | 95 (fulfilled)                        |

Further safety metrics and information can be found in the safety manual.

### 12.2 General notes



A reboot of the vibration monitoring unit must be performed annually in order to test the switching of potential-free switching contacts.



Safety functions are disabled whilst the sensor is in configuration mode.

### 12.3 Instructions for the Fail Safe State

When the power supply is switched on, the vibration monitoring unit will perform a self-test. During operation, self-tests are performed automatically in cycles. If a self-test fails, the vibration monitoring unit switches to the Fail Safe State.

In the Fail Safe State all status LEDs are lit, all potential-free switching contacts are open and the analogue current output supplies 0 mA.

### 13 Technical data

#### 13.1 General data



Each sensor has one of the listed measuring and frequency ranges. Further ranges on request.

Please indicate the measuring and frequency range in your request.

|                         |  |
|-------------------------|--|
| Measuring range:        | 0 - 8 mm/s rms (only for frequency range > 10 Hz)<br>0 - 10 mm/s rms<br>0 - 16 mm/s rms<br>0 - 20 mm/s rms<br>0 - 25 mm/s rms<br>0 - 32 mm/s rms<br>0 - 50 mm/s rms<br>0 - 64 mm/s rms<br>0 -128 mm/s rms<br>0 - 1 g rms<br>0 - 2 g rms<br>0 - 4 g rms<br>0 - 6 g rms<br>0 - 8 g rms<br>0 - 10 g rms |
| Measuring accuracy:     | ± 10% (as per DIN ISO 2954)  |
| Transverse sensitivity: | < 5%   |
| Frequency range:        | 10 Hz–1,000 Hz (standard)<br>1 Hz–1000 Hz  |
| Calibration point:      | 159.2 Hz and 90% amplitude of measuring range  |
| Ready delay:            | 10 sec seconds   |
| Maximum acceleration:   | ±16.5 g  |
| Lifetime:               | 10 years   |

Tab. 1: General data

#### 13.2 Electrical data

|                                   |  |
|-----------------------------------|--|
| Output signal:                    | 1 x 4-20 mA (proportional to the measuring range)  |
| Switching contact:                | 2 x potential-free switching contacts (pre- and main alarm)  |
| Switching contact switching load: | 1A / 30 V DC   |
| Power supply:                     | 24 V DC ± 10%  |
| Power input (max.):               | 100 mA   |
| Load/output load (max.):          | 500 Ω  |
| Automatic:                        | As soon as the vibration values fall below the limit values, the potential-free switching contacts <b>automatically</b> re-energize. |

Tab. 2: Electrical data

**13.3 Operating range of the vibration monitoring unit**

The operating range is independent from the measuring range. It can be derived from the maximum acceleration, which is 16.5 g across all frequencies. The maximum measurable vibration velocity is based on the formula

$$v_{max} = \int a_{max}$$

For sinusoidal vibration,  $v_{max} = \frac{a_{max}}{2\pi f}$  applies

Fig. 1: shows the operating range of the vibration monitoring unit, which is limited by the maximum measurable vibration velocity in mm/s depending on the frequency in Hz.

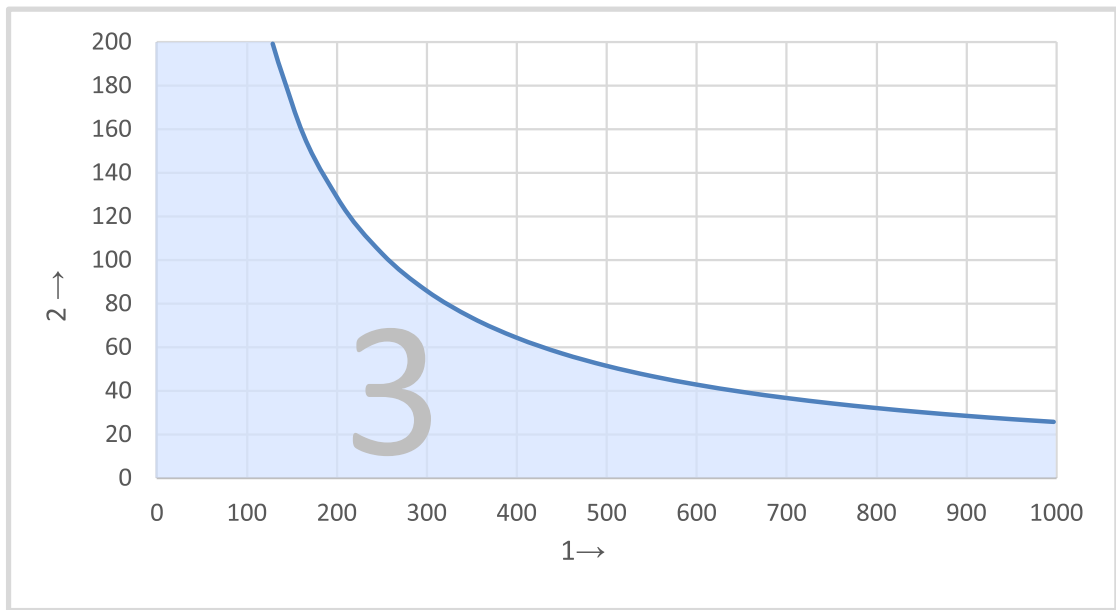


Fig. 1: Operating range diagram

- 1 Frequency in Hz
- 2 Vibration velocity in mm/s
- 3 Operating range of the vibration monitoring unit

**Reading example:**

| Frequency (Hz) | Maximum measurable Vibration velocity (mm/s) |
|----------------|--|
| 250            | 103  |
| 400            | 64   |
| 1000           | 25   |

Tab. 3: Reading example of operating range

### 13.4 Typical frequency response

#### 10 Hz–1,000 Hz (standard)

The frequency response is recorded using a reference sensor.

- 4 Hz. . . 1200 Hz acceleration sensor

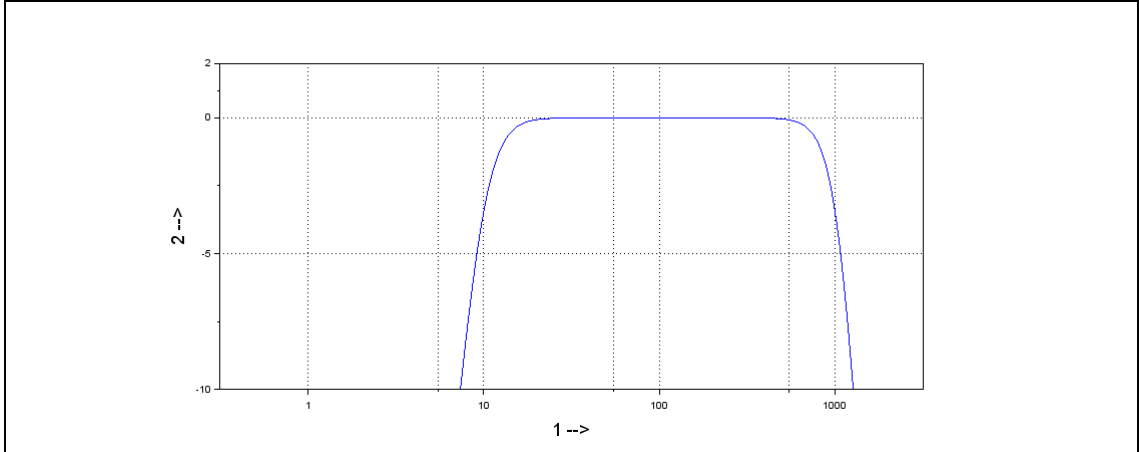


Fig. 2: Typical frequency response 10 Hz–1000 Hz

- 1 Frequency in Hz
- 2 Amplification in dB

#### 1 Hz–1000 Hz

The frequency response is recorded using two reference sensors.

- 1 Hz. . . 10 Hz laser sensor
- 10 Hz. . . 1200 Hz acceleration sensor

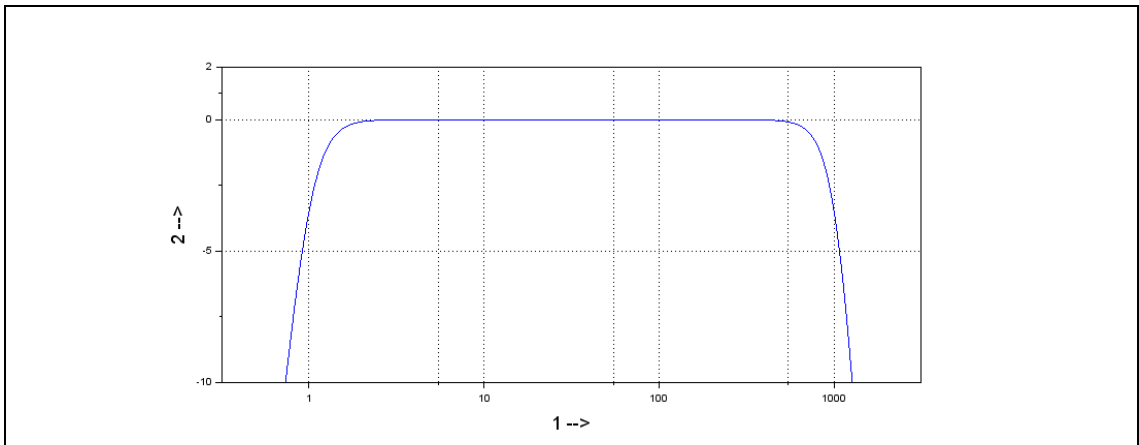


Fig. 3: Typical frequency response 1 Hz–1000 Hz

- 1 Frequency in Hz
- 2 Amplification in dB

13.5 Mechanical data



For more information see Section "Coding" on page 28.

|                          |  |
|--------------------------|--|
| Housing material:        | Stainless steel V2A, material no.: 1.4305 (standard)   |
| Fastening:               | Cylinder head Allen screw M8 x 20 mm<br>Thread pitch: 1.25 mm (standard)   |
| Mounting:                | Housing must be earthed via the M8 fastening   |
| Cover tightening torque: | 5 Nm   |
| Measuring direction:     | Along the fastening axis   |
| Weight:                  | approx. 500 g  |
| Protection class:        | Cover and plug connection closed:<br>IP 66/67<br>Type 4X Enclosure<br>Product is suitable for outdoor applications |
| Max. humidity:           | 100%   |

Tab. 4: Mechanical data

13.6 Housing dimensions

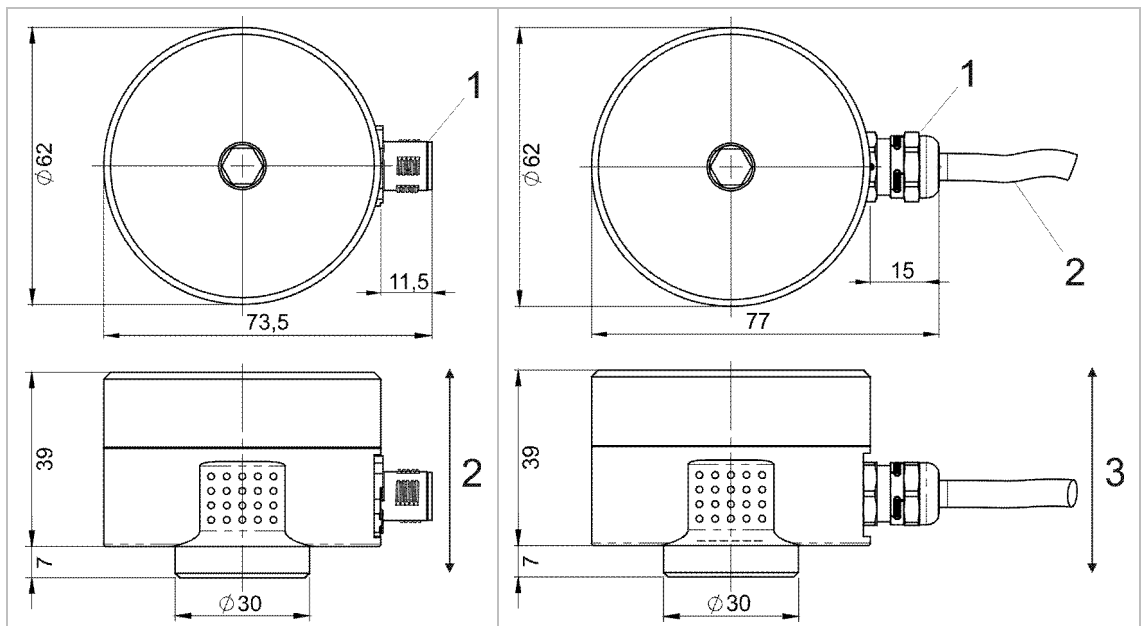


Fig. 4: Housing with M12 connector

- 1 M12 connector
- 2 Measuring direction

Fig. 5: Housing with integrated cable

- 1 Cable gland
- 2 Connecting cable
- 3 Measuring direction

All measurements  
in mm

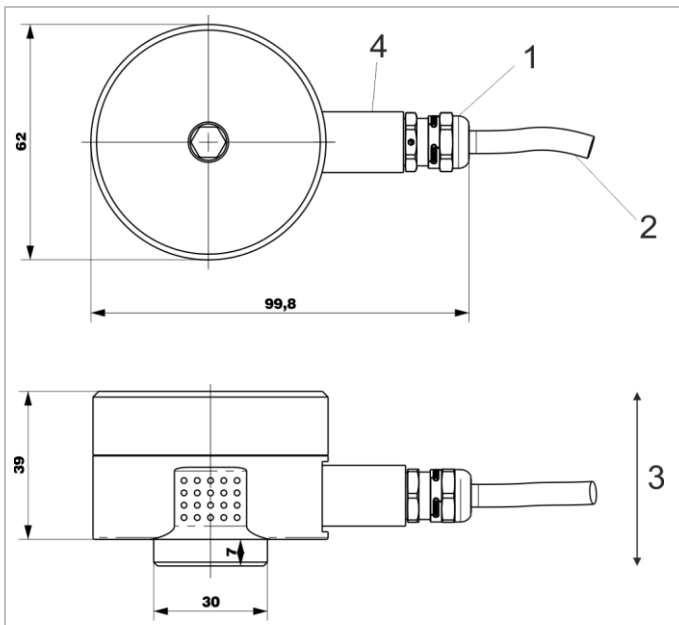


Fig. 6: Housing with integrated cable and clamp sleeve base for protective metal hose

- 1 Cable gland
- 2 Connecting cable
- 3 Measuring direction
- 4 Clamp sleeve base for protective metal hose

14 Connection


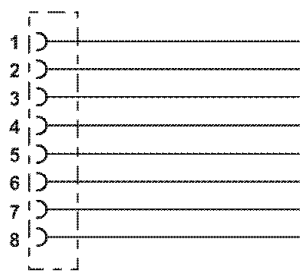
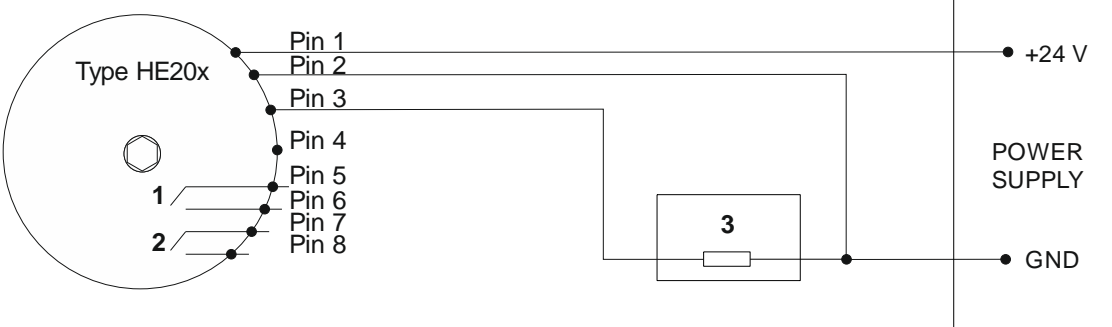
|  |        |   |  |
|--|--------|---|--|
| <b>Version:</b>  |        | <b>M12 connector</b>                      |  |
|     | Pin 1: | 24 V DC                                   |  |
|  | Pin 2: | GND                                       |  |
|  | Pin 3: | 4-20 mA output signal                     |  |
|  | Pin 4: | NC (Not connected)                        |  |
|  | Pin 5: | Potential-free switching contact 1 +      |  |
|  | Pin 6: | Potential-free switching contact 1 -      |  |
|  | Pin 7: | Potential-free switching contact 2 +      |  |
|  | Pin 8: | Potential-free switching contact 2 -      |  |
| <b>Version:</b>  |        | <b>Integrated cable</b>                   |  |
|    | Pin 1: | white 24 V DC                             |  |
|  | Pin 2: | brown GND                                 |  |
|  | Pin 3: | green 4-20 mA output signal               |  |
|  | Pin 4: | yellow NC (Not connected)                 |  |
|  | Pin 5: | grey Potential-free switching contact 1 + |  |
|  | Pin 6: | pink Potential-free switching contact 1 - |  |
|  | Pin 7: | blue Potential-free switching contact 2 + |  |
|  | Pin 8: | red Potential-free switching contact 2 -  |  |
| <b>Wiring diagram:</b>   |        |   |  |
|  |        |   |  |

Fig. 7: Wiring diagram

- 1 Potential-free switching contact 1 (pin 5: + , Pin 6: -)
- 2 Potential-free switching contact 2 (pin 7: + , Pin 8: -)
- 3 Evaluation unit





The wiring diagram shows the alarm status or the current status!  
Potential-free switching contacts 1 and 2 are open.

## 15 Functional description



In an explosive atmosphere the vibration monitoring unit HE200 will only be opened in a de-energized state.

The HE200 type has two limit values Lim1 and LIM2 and the corresponding delay times, which can be adjusted separately. If the defined limit value is exceeded and after the set delay time has expired, the corresponding potential-free switching contact is opened. This can be used to generate a pre-alarm and a main alarm.

A subsequent fall below the limit value is also signalled at potential-free switching contacts 1 and 2, i.e. the respective switching contact automatically closes.

The HE200 type also has an analogue current output. This supplies direct current of 4-20 mA proportional to the vibration amplitude.

### 15.1 Operating conditions

| Operating state | Reading                           | Switching contacts | LED status           |
|-----------------|-----------------------------------|--------------------|----------------------|
| OK              | ≤ Limit value                     | Closed             | green                |
| WARNING         | > Limit value, delay time runs    | Closed             | green + yellow       |
| ALARM           | > Limit value, delay time expired | Open               | red                  |
| Fail Safe State | 0 mA                              | Open               | red + yellow + green |
| De-energized    | 0 mA                              | Open               | All LEDs off         |

Tab. 5: Operating conditions

### 15.2 Alarm and limit setting



While the sensor is in configuration mode, the safety functions are deactivated.

By pressing the "Save Config" button, the current configuration is displayed by the LEDs around the HEX switches. For further information, see chapter "Limit values and delay times" on page 19.

The limit values and delay times are calibrated using the respective HEX switch. As soon as a switch position is changed, all LEDs start flashing. Press and hold the "Save Config" button for three seconds to save the configuration. Acceptance of the configuration is signalled by steady lighting up of the LEDs in the selected HEX switch position.

The configuration will only be accepted if LIM1 ≤ LIM2.

After about five minutes the LEDs turn off automatically.

**15.3 Limit values and delay times**

The **SET rotary button** has 16 positions, representing the limit value of an alarm. The measuring range of the vibration monitoring unit is divided into 16 linear steps.

In general:  $Threshold\ value = \frac{top\ limit\ of\ measuring\ range}{16} \times SET\ Position$

**Example:** Limit setting

Measuring range: 0-32 mm/s

SET rotary button Pos.: 8 (9)

Limit value: 16 mm/s (18 mm/s)

| SET-Position ↓ | Limit values (mm/s)       |               |                |                |                |                |                |                |                |                 |
|----------------|---------------------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
|                | Measu-<br>ring<br>range → | 0 – 8<br>mm/s | 0 – 10<br>mm/s | 0 – 16<br>mm/s | 0 – 20<br>mm/s | 0 – 25<br>mm/s | 0 – 32<br>mm/s | 0 – 50<br>mm/s | 0 – 64<br>mm/s | 0 – 128<br>mm/s |
| 0              |                           | 0.0           | 0              | 0              | 0              | 0              | 0              | 0.00           | 0              | 0               |
| 1              |                           | 0.5           | 0.625          | 1              | 1.25           | 1.563          | 2              | 3.13           | 4              | 8               |
| 2              |                           | 1.0           | 1.25           | 2              | 2.5            | 3.125          | 4              | 6.25           | 8              | 16              |
| 3              |                           | 1.5           | 1.875          | 3              | 3.75           | 4.688          | 6              | 9.38           | 12             | 24              |
| 4              |                           | 2.0           | 2.5            | 4              | 5              | 6.25           | 8              | 12.50          | 16             | 32              |
| 5              |                           | 2.5           | 3.125          | 5              | 6.25           | 7.813          | 10             | 15.63          | 20             | 40              |
| 6              |                           | 3.0           | 3.75           | 6              | 7.5            | 9.375          | 12             | 18.75          | 24             | 48              |
| 7              |                           | 3.5           | 4.375          | 7              | 8.75           | 10.938         | 14             | 21.88          | 28             | 56              |
| 8              |                           | 4.0           | 5              | 8              | 10             | 12.5           | 16             | 25.00          | 32             | 64              |
| 9              |                           | 4.5           | 5.625          | 9              | 11.25          | 14.063         | 18             | 28.13          | 36             | 72              |
| 10             |                           | 5.0           | 6.25           | 10             | 12.5           | 15.625         | 20             | 31.25          | 40             | 80              |
| 11             |                           | 5.5           | 6.875          | 11             | 13.75          | 17.188         | 22             | 34.38          | 44             | 88              |
| 12             |                           | 6.0           | 7.5            | 12             | 15             | 18.75          | 24             | 37.50          | 48             | 96              |
| 13             |                           | 6.5           | 8.125          | 13             | 16.25          | 20.313         | 26             | 40.63          | 52             | 104             |
| 14             |                           | 7.0           | 8.75           | 14             | 17.5           | 21.875         | 28             | 43.75          | 56             | 112             |
| 15             |                           | 7.5           | 9.375          | 15             | 18.75          | 23.438         | 30             | 46.88          | 60             | 120             |

Tab. 6: Limit values for vibration velocities

| SET-<br>Position ↓ | Limit values (g)          |       |       |       |       |       |
|--------------------|---------------------------|-------|-------|-------|-------|-------|
|                    | Measu-<br>ring<br>range → | 0-1 g | 0-2 g | 0-4 g | 0-6 g | 0-8 g |
| 0                  | 0                         | 0     | 0     | 0     | 0     | 0     |
| 1                  | 0.063                     | 0.125 | 0.25  | 0.375 | 0.5   | 0.625 |
| 2                  | 0.125                     | 0.25  | 0.5   | 0.75  | 1     | 1.25  |
| 3                  | 0.188                     | 0.375 | 0.75  | 1.125 | 1.5   | 1.875 |
| 4                  | 0.25                      | 0.5   | 1     | 1.5   | 2     | 2.5   |
| 5                  | 0.313                     | 0.625 | 1.25  | 1.875 | 2.5   | 3.125 |
| 6                  | 0.375                     | 0.75  | 1.5   | 2.25  | 3     | 3.75  |
| 7                  | 0.438                     | 0.875 | 1.75  | 2.625 | 3.5   | 4.375 |
| 8                  | 0.5                       | 1     | 2     | 3     | 4     | 5     |
| 9                  | 0.563                     | 1.125 | 2.25  | 3.375 | 4.5   | 5.625 |
| 10                 | 0.625                     | 1.25  | 2.5   | 3.75  | 5     | 6.25  |
| 11                 | 0.688                     | 1.375 | 2.75  | 4.125 | 5.5   | 6.875 |
| 12                 | 0.75                      | 1.5   | 3     | 4.5   | 6     | 7.5   |
| 13                 | 0.813                     | 1.625 | 3.25  | 4.875 | 6.5   | 8.125 |
| 14                 | 0.875                     | 1.75  | 3.5   | 5.25  | 7     | 8.75  |
| 15                 | 0.938                     | 1.875 | 3.75  | 5.625 | 7.5   | 9.375 |

Tab. 7: Vibration acceleration limit values

**Delay times**

| TIME Position     | 0 | 1 | 2 | 3 | 4 | 5 | 6   | 7  | 8    | 9  | 10   | 11 | 12 | 13 | 14 | 15 |
|-------------------|---|---|---|---|---|---|-----|----|------|----|------|----|----|----|----|----|
| Delay time (secs) | 0 | 1 | 2 | 3 | 4 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 | 25 | 30 | 45 | 60 |

Tab. 8: Delay times

## 16 Assembly and disassembly

### 16.1 General notes

Assembly and disassembly work on and with the monitoring unit may only be performed by an authorised specialist familiar with the safety regulations governing handling electrical components! When using EX-certified monitoring units in potentially explosive atmospheres, the professional must also be familiar with the relevant safety regulations!



Before assembly and disassembly disconnect the monitoring unit from the power supply! Separate plug connections must always be de-energized! If EX-certified monitoring is operated in a potentially explosive atmosphere, there is otherwise an explosion hazard, due to spark formation!



The monitoring unit housing must be earthed via the fastening - through the machine earth of the mounting surface or through a separate protective conductor (PE)!

## 16.2 Fixing the vibration monitoring unit to the mounting surface

### Prerequisites

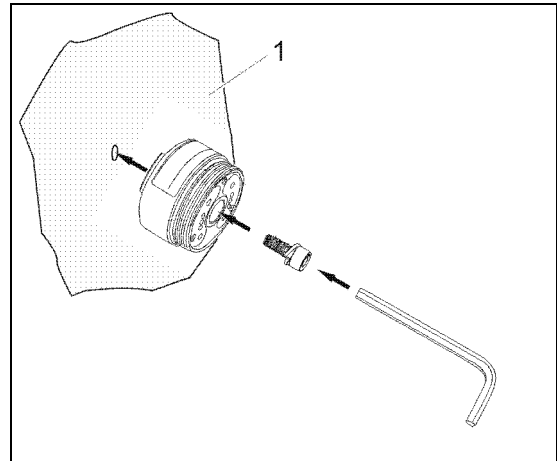
- Mounting surface is clean and flat; i.e. free of paint, rust, etc.
- Threaded hole in mounting surface:  
15 mm, M8

### Tools and material

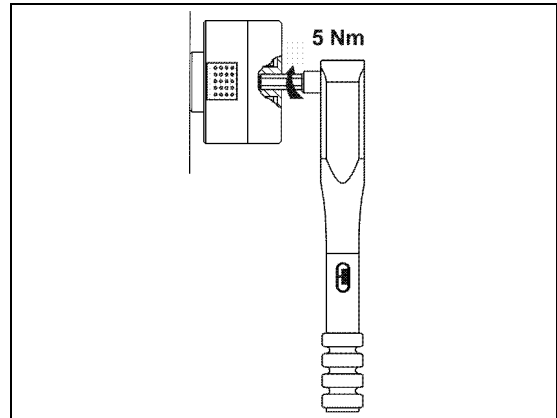
- Hex socket key SW 6, SW 8
- Torque wrench SW 6, SW 8
- Cylinder head screw with hex socket  
M8x20
- Spring washers for M8

### Work steps and instructions

- Unscrew housing cover from housing base;  
hex socket key SW 8
- Attach monitoring unit using cylinder head screws and spring washers with 8 Nm on mounting surface;  
Torque wrench SW 6
- Screw the housing cover back onto the housing base and tighten to 5 Nm;  
Torque wrench SW 8



Fastening on mounting surface (1)



Tighten housing cover with torque wrench (2)



In order to avoid cold welding of the housing cover to the housing base, the thread is treated ex-works with an assembly paste for stainless steel connections.

### 16.3 Variant HE200.02 (Zone 2 / 22) - Fastening Safety Clip / Protective Cover



Always operate model Zone 2 / 22 with the safety clip to avoid accidental disconnection of the plug connection! Otherwise, there is an explosion hazard from sparking when operating this control in potentially explosive atmospheres!

#### 16.3.1 Fastening Safety Clip

1. Fully insert the connection cable socket into the M12 connector.  
(Pay attention to the code cam position!)
2. Tightly fasten the lock nut of the connection cable socket by hand.
3. Mount the safety clip to avoid accidental disconnection of the plug connection:
  - Place both shell halves of the safety clip around the plug connection.
  - Press both shell halves of the safety clip together by hand until the catch lock engages.
  - Place the arrow connected to both shell halves around the cable, then thread it through the eye on the other end so that the notice sign is legible alongside the cable.

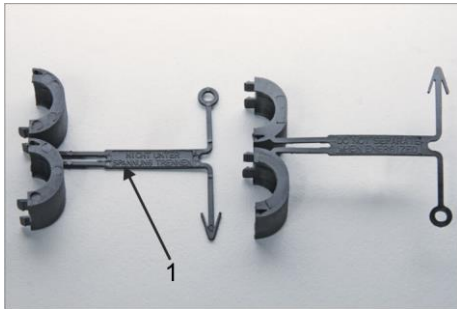


Fig. 8: Protective Cover

1 Notice sign

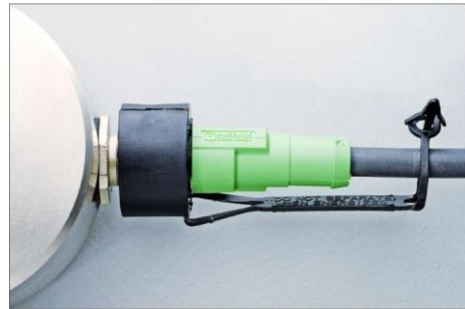


Fig. 9: Fastened Protective Cover

#### 16.3.2 Fastening Protective Cover

Fasten the protective cover using the M12 connector after disconnecting the plug connection!  
Disassemble the safety clip and fasten the protective cover:

1. Disconnect the control from the mains.
2. Separate both shell halves of the fuse clip using a screwdriver.
3. Use the M12 connector to firmly close the protective cover.

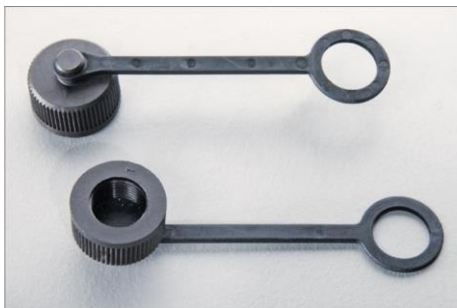


Fig. 10: Protective Cover



Fig. 11: Fastened Protective Cover

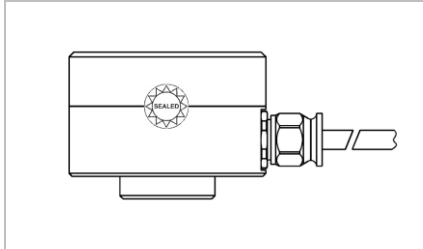
## 16.4 Tamper protection

### Attach seal labels

The "SEALED" seal label reveals any unauthorized opening of the housing cover.

After installation of the housing cover by the system operator, the seal label shall be attached to the side above the housing joint.

If any tampering is attempted, the seal label is destroyed, and the tampering will be visible to the system operator



*Fig. 12: Seal label*



## 17 Installation and commissioning

### 17.1 General notes

Installation and commissioning of the vibration monitoring unit may only be performed by an authorised specialist familiar with the safety regulations governing handling electrical components. When installing and commissioning EX-certified monitoring units in potentially explosive atmospheres, the professional must also be familiar with the relevant safety regulations!



The commissioning will only be carried out with the housing cover correctly screwed on (tightening torque = 5 Nm)! If EX-certified monitoring is operated in a potentially explosive atmosphere, there is otherwise an explosion hazard, due to spark formation!



Protect the connection cable and any extension cable from electrical interference and mechanical damage! Local regulations and instructions must be observed in doing so!

### 17.2 Earthing concept

The earthing concept intends that the shielding of the cable is electrically connected to the housing of the sensor via the knurled nut and is at earth potential at the evaluation unit or at the control cabinet. In case of long cable lengths, it is recommended to disconnect the shield at the evaluation unit (4) to avoid compensating currents via the shield.

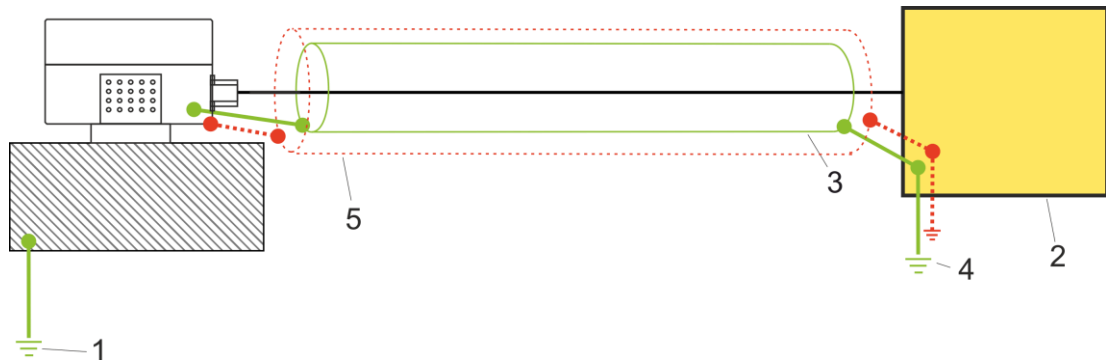


Fig. 13: Earthing concept HE200

- 1 Machine earth
- 2 Evaluation unit (measuring device, PLC, etc.)
- 3 Cable shielding
- 4 Earth potential evaluation unit
- 5 Optional protective metal hose (Only available for variants with an integrated cable)

## 18 Maintenance and repair

### 18.1 General notes



Repair and cleaning work on vibration monitoring units may only be performed by an authorised specialist familiar with the safety regulations governing handling electrical components.



Before repair and cleaning disconnect the monitoring unit from the power supply! Separate plug connections must always be de-energized!



Immediately replace defective connection cables!  
A defective vibration monitoring unit must be completely replaced!



The vibration monitoring unit HE200 is maintenance-free!

### 18.2 Troubleshooting Table

| Fault                            | Cause   | Action  |
|----------------------------------|---|---|
| No measured value<br>(4-20 mA)   | No power supply   | Check power source and/or supply                            |
|                                  | Discontinuity in connecting cable                                 | Replace connecting cable                                    |
|                                  | Fuse defective  | Replace fuse  |
|                                  | Connection has incorrect polarity                                 | Connection of correct pole                                  |
|                                  | Vibration monitoring unit faulty                                  | Replace Vibration Monitoring Unit                           |
| Switching contact doesn't switch | Wrong limit value set   | Set correct limit value                                     |
|                                  | No power supply   | Check power source and/or supply                            |
|                                  | Discontinuity in connection                                       | Replace connecting cable                                    |
|                                  | Fuse defective  | Replace fuse  |
|                                  | Connection has incorrect polarity                                 | Connection of correct pole                                  |
|                                  | Defective monitoring unit   | Replace monitoring unit                                     |
| Incorrect Reading                | Vibration monitoring unit not mounted in a friction-locked manner | Mount vibration monitoring unit in a friction-locked manner |
|                                  | Vibration monitoring unit installed in wrong place                | Install vibration monitoring unit in correct place          |
|                                  | EMC problems  | See "Earthing concept" on page 25.                          |

Tab. 9: Troubleshooting Table

## **19 Transport, storage and disposal**

The sensor must be protected from damaging environmental factors and mechanical damage during transport with the use of adequate packing.

The sensor may not be stored in ambient temperatures outside the permitted operating temperature.

The product contains electronic components and must be disposed of properly in accordance with local laws and regulations.

**20 Coding HE200**

|        |     |     |     |     |     |     |
|--------|-----|-----|-----|-----|-----|-----|
| HE200. | 00. | 16. | 01. | 00. | 00. | 000 |
|--------|-----|-----|-----|-----|-----|-----|

**HE series**

200 = Monitoring SIL2  
4-20 mA ~ mm/s rms + free limit values

**ATEX / IECEX / EACEx**

00 = no ATEX / IECEX / EACEx  
01 = ATEX / IECEX / EACEx (Zone 1 / 21)  
02 = ATEX / IECEX / EACEx (Zone 2 / 22) / UL DIV2

**Measuring range**

- 8 = 8 mm/s rms
- 10 = 10 mm/s rms
- 16 = 16 mm/s rms
- 20 = 20 mm/s rms
- 25 = 25 mm/s rms
- 32 = 32 mm/s rms
- 50 = 50 mm/s rms
- 64 = 64 mm/s rms
- 128 = 128 mm/s rms
- 1g = 1 g rms
- 2g = 2 g rms
- 4g = 4 g rms
- 6g = 6 g rms
- 8g = 8 g rms
- 10g = 10 g rms

**Frequency range**

00 = 10 – 1000 Hz (standard)  
01 = 1 – 1000 Hz

**Housing material**

00 = 1.4305 (V2A) (standard)  
01 = 1.4404 (V4A)  
50 = 1.4305 (V2A) with adaptation for metal protection hose  
51 = 1.4404 (V4A) with adaptation for metal protection hose

**Temperature range**

00 = -40°C to 85°C  
01 = -35°C to 125°C  
02 = -20°C to 125°C

**Connection**

000 = M12 connector (standard)  
020 = 2 m integrated cable  
050 = 5 m integrated cable  
100 = 10 m integrated cable



Is your desired configuration not listed? Please contact us and we can offer you a solution for your specific needs.

## 21 EU declaration of conformity

### Declaration of conformity

HAUBER-Elektronik GmbH  
 Fabrikstraße 6  
 D-72622 Nürtingen

declares under our sole responsibility that the products listed below that relate to this declaration meet the basic health and safety requirements of the norms and directives below.

### Product series

HE200, HE205, HE250, HE250

### ATEX Annex



UL International Demko A/S certifies as **Notified Body No. 0539** according to the Directive of the Council of the European Community of 26 February 2014 (2014/34/EU) that the manufacturer maintains a quality assurance system for production that complies with **Annex IV** of this Directive.

### Affixed CE marking



 0539

### Marking and certificates

HE200.02 / HE205.02 / HE250.02 / HE255.02

| Marking  | Certificate       |
|--|-------------------|
|  II 3G Ex ec IIC T4 Gc<br> II 3D Ex tc IIIC 135°C Dc | UL 21 ATEX 2570 X |

HE200.01 / HE205.01 / HE250.01 / HE255.01

| Marking  | Certificate              |
|--|--------------------------|
|  II 2G Ex db IIC T4 Gb<br> II 2D Ex tb IIIC 135°C Db | UL 20 ATEX 2421 X Rev. 0 |

### Signature

Nürtingen, 02/25/2022

Place and date



Tobias Bronkal, Managing Owner

### Norms and directives

| EU Directive | Norms  |
|--------------|--|
| 2014/30/EU   | EN 61000-6-7:2015<br>EN 61000-6-3:2007 + A1:2011<br>EN55011:2016 + A1:2017   |
| 2014/34/EU   | IEC 60079-0:2017 + Corr.1:2020 + I-SH01:2019 + I-SH02:2019<br>IEC 60079-1:2014 + Corr. 1:2018 + I-SH01:2020<br>IEC 60079-7:2017<br>IEC 60079-31:2013 |