



## Vibration Control Type HE100

MADE IN  
GERMANY



- Vibration Velocity (mm/s, rms)
- ATEX Zone 1/2/21/22
- Analogue Current Output: 4...20 mA
- Frequency Range: 10 Hz...1,000 Hz  
1 Hz...1,000 Hz



# Instruction Manual

## Vibration Control Type HE100

Standard and ATEX

Version: 14/02/2017

### **Caution!**

The instruction manual must be read and understood before the product is commissioned.

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Subject to changes.

Any questions should be addressed to:

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# 1 Safety Information

## General

*The safety information is designed to protect people and property from damage and hazards resulting from unintended use, incorrect operation or other negligent handling of devices, especially in potentially explosive atmospheres. For this reason, you should read this instruction manual carefully before undertaking any work on the product or commissioning it. The instruction manual must be accessible to operating personnel at any time.*

Please check that all documentation is in place prior to commissioning or other work on the product. If not all documentation has been handed over in full, or if further copies are required, then they can also be sourced in other languages.

This product has been constructed in accordance with the current state of technology. Nevertheless, it is impossible to rule out dangers emerging from this product which could endanger people, machines and systems, should it be subject to inappropriate handling, non-intended use or use and maintenance by insufficiently trained persons.

Every person employed by the operator and involved in the set-up, operation and maintenance of this product must have read and understood this instruction manual.

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

## Symbols Used



This symbol indicates risk of explosion.



This symbol indicates a risk of electric shock.



This symbol points to information not relevant to safety.

## 2 Instruction Manual Scope

This instruction manual for the vibration control type HE100 applies to the following variants: Standard and ATEX.

The functionality of the versions is identical. The ATEX versions are also issued with certifications and labels which permit use in potentially explosive atmospheres (see section 7, Application Fields).

## 3 Vibration Control Type HE100

The HE100-type vibration control is used for measuring and monitoring absolute bearing vibrations in machines, in the sense of standard DIN ISO 10816. It has the following features:

- Operating principle: The two-wire system.
- Measurement value: The effective value (rms) of the vibration velocity in mm/s, in accordance with DIN ISO 2954.
- Analogue current output: Interference-free DC signals from 4–10 mA, proportional to the measuring range of the control.
- Cable break to the monitoring cable can be detected by a downstream evaluation device: DC signal value < 3.5 mA.

## 4 Intended Use

The type HE100 is used exclusively for measuring mechanical vibrations in machines and mechanical systems. Its use is only permissible within the specifications named in the data sheet.

**Main fields of application:** Fans, ventilators, blowers, electric motors, pumps, centrifuges, separators, generators, turbines and similar oscillating mechanical systems.

## 5 Documents and Certificates

The following documents and certificates pertaining to the type HE100 can be viewed and downloaded here: [www.hauber-elektronik.de/english/index.html](http://www.hauber-elektronik.de/english/index.html)

- EC type examination certificate ATEX; no.: PTZ 16 ATEX 0029 X



## 6 Transfer of Liability when Operating in ATEX Zones

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.

## 7 Application Fields

Version	Application	Marking
Standard	Non-potentially explosive atmospheres	None
ATEX Pressure-resistant casing, Ex d Protection through housing, Ex tb	Potentially explosive atmospheres of zones 1 and 21 2 and 22	 II 2 G Ex d IIC T4 Gb II 2 D Ex tb IIIC T120 °C Db
ATEX Intrinsic safety Ex ib	Potentially explosive atmospheres of zones 1 and 21 2 and 22	 II 2 G Ex ib IIC T4 Gb II 2 D Ex ib IIIC T125 °C Db

### Applied standards

You can find a list of standards, including the related issue dates, in the EU type examination certificate for the vibration control (see section 5, Documents and Certificates).

## 8 General Conditions for Safe Operation

### Special conditions

1. Expanded temperature range of -40°C to +60°C
2. The HE100.02 vibration control may only be operated in a certified, intrinsically safe electrical circuit Exib IIC/Ex ib IIIC.
3. Equipotential bonding takes place during installation.
4. The instruction manual is to be heeded.
5. The electrical data is to be taken from the EU type examination certificate.

HAUBER-Elektronik recommends the following feed/inlet isolating amplifier for intrinsically safe operation:

PHOENIX CONTACT Deutschland GmbH  
feed/inlet isolating amplifier  
MACX MCR-EX-SL-RPSSII - 2865340



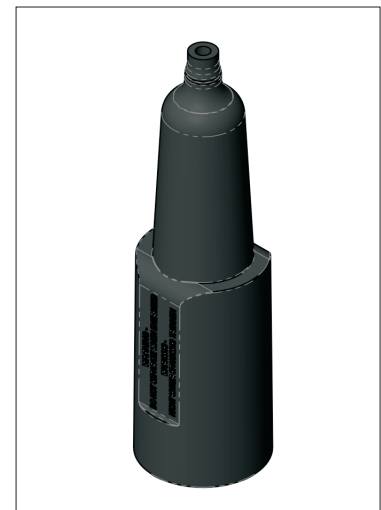
Note: This is just a recommendation. HAUBER-Elektronik is not responsible for changes to the specification of the feed/inlet isolating amplifier.

## 9 Delivery Contents

Version	Delivery Contents
Standard	<ul style="list-style-type: none"> <li>• Vibration Control Type HE100</li> <li>• M12 plug connection</li> <li>• Factory calibration certificate/test report</li> <li>• Instruction manual</li> </ul>
ATEX Pressure-resistant casing, Ex d Protection through housing, Ex tb	<ul style="list-style-type: none"> <li>• Vibration Control Type HE100</li> <li>• Integrated cable</li> <li>• Factory calibration certificate/test report</li> <li>• Instruction manual</li> </ul>
ATEX Intrinsic safety Ex ib	<ul style="list-style-type: none"> <li>• Vibration Control Type HE100</li> <li>• M12 plug connection (Standard) or integrated cable</li> <li>• Factory calibration certificate/test report</li> <li>• Instruction manual</li> </ul>
Available accessories	<ul style="list-style-type: none"> <li>• Evaluation device, types 652, 656</li> <li>• Portable measuring instrument type HE400</li> <li>• ATEX barriers for intrinsic safety Ex i</li> <li>• Various adapters, e.g. M8 -&gt; M10</li> <li>• Configurable mating plug</li> <li>• Connection cable, M12 socket, 4-pole, 0.34 mm<sup>2</sup>, L= 2 m, 5 m or 10 m or bespoke</li> <li>• Magnetic base</li> <li>• Rubber nozzle</li> <li>• Metallic protective hose</li> <li>• EMC adapter</li> </ul>



**For use OUTDOORS or using SPRAY WATER, the vibration control should have the rubber nozzle pulled over it for additional protection (see "Available Accessories").**



*Rubber nozzle*

## 10 Electrical Data

Measurement ranges:	0... 16 mm/s rms (Standard) 0... 32 mm/s rms 0... 64 mm/s rms
Measurement accuracy:	± 10 % (as per DIN ISO 2954)
Cross-sensitivity:	< 5 %
Frequency range:	10 Hz...1,000 Hz (Standard) 1 Hz...1,000 Hz
Output signal:	4 to 20 mA (proportional to the measuring range)
Voltage supply:	10...30 V DC
Power consumption (max.):	25 mA
Burden/load (max.):	500 Ω
Fuse:	Microfuse (medium time lag, 32 mA)

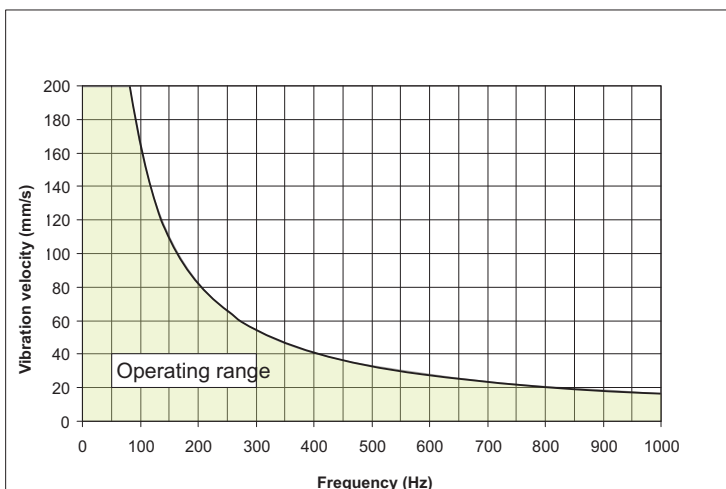


Each type HE100 possesses **one** of the measuring ranges listed. Further measuring ranges on request. Please specify the measurement and frequency range in your query.

### Permitted Operating Temperature Ranges

Version	Ambient Temperature (Ta)	Measuring Head Temperature (in the fixing area)
Standard	-40 °C ... +125 °C	-40 °C ... +125 °C
ATEX Pressure-resistant casing, Ex d Protection through housing, Ex tb	-40 °C ... +60 °C	-40 °C ... +125 °C
ATEX Intrinsic safety Ex ib	-40 °C ... +60 °C	-40 °C ... +125 °C

### Operating Range of the Type HE100 Vibration Control



#### Reading examples:

Frequency (Hz)	Maximum measurable vibration velocity
250	65
400	40
1,000	18

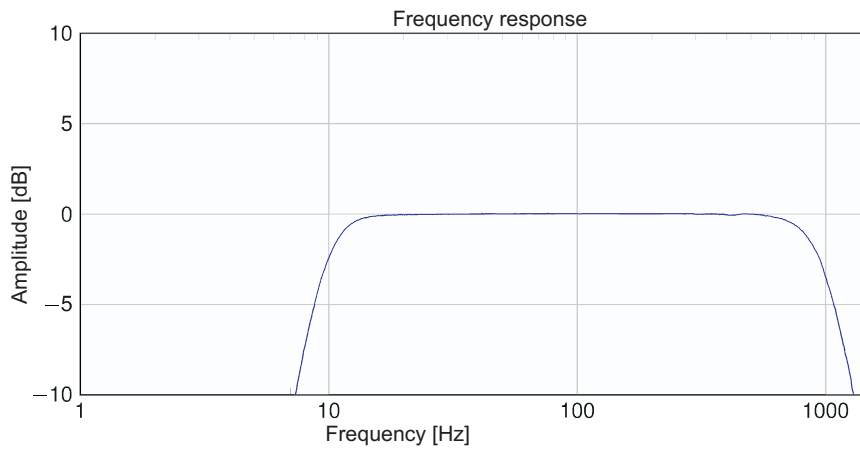
The operating range depends on the measuring range. The diagram shows that the rate of measurable vibration velocity falls as the frequency increases.



### Typical Frequency Response 10 Hz...1,000 Hz (Standard)

The frequency response is recorded using one reference sensor.

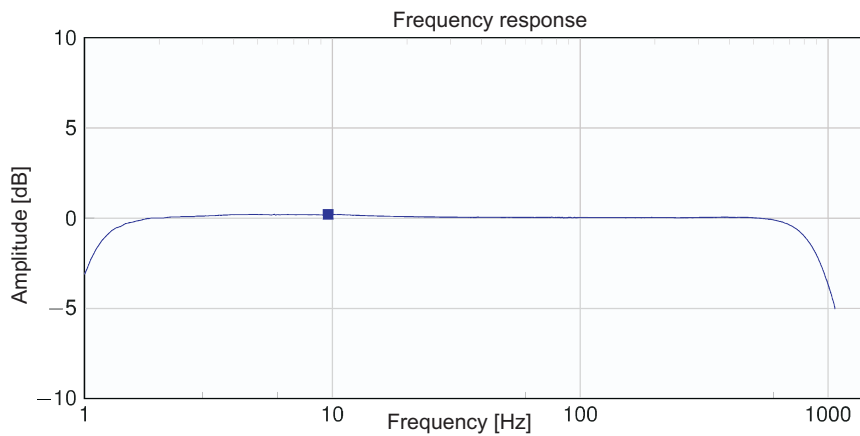
- 4 Hz. . . 1,200 Hz acceleration sensor



### Typical Frequency Response 1 Hz...1,000 Hz

The frequency response is recorded using two reference sensors

- 1 Hz. . . 10 Hz laser sensor
- 10 Hz. . . 1,200 Hz acceleration sensor



### Calibration

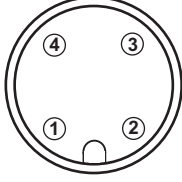
The calibration of the type HE100 vibration control is conducted at 90% of measuring range. The calibration frequency is 159.2 Hz.



## 12 Connections

**Version: Standard and ATEX intrinsic safety Ex ib**

**Plug, M12, 4-pole**

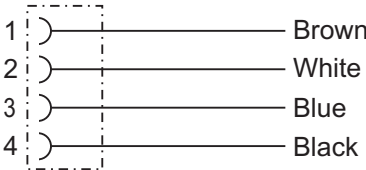


Pin 1: 10...30 V DC  
 Pin 3: 4...20 mA  
 Pin 2: NC  
 Pin 4: NC

NC: Not Connected

**Version: ATEX pressure-resistant casing, Ex d  
 ATEX protection through housing, Ex tb**

**integrated cable**

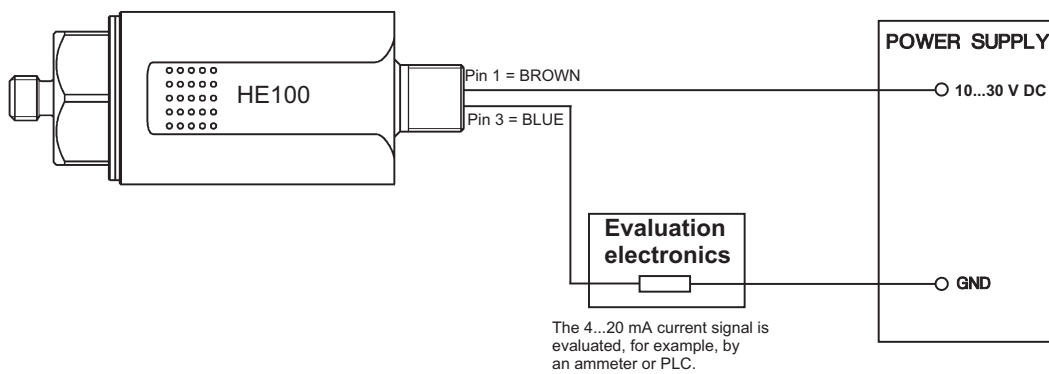


Pin 1: 10...30 V DC  
 Pin 3: 4...20 mA  
 Pin 2: NC  
 Pin 4: NC

NC: Not Connected

*PUR sheathed cable; Ø: approx. 6.5 mm,  
 4-pole, 0.34 mm<sup>2</sup>*

### Connection Plan for all Variants



The system operates according to the two-wire principle. I.e. the entire function (voltage supply and current signal) is achieved using 2 wires (Pin 1 and Pin 3).

To avoid capacitive interference, pins 2 and 4 must remain **open/unoccupied**.

## 13 Assembly and Disassembly

**Assembly and disassembly work on and with the vibration control may only be performed by an authorised specialist familiar with the safety regulations governing handling electrical components.**



The housing of the vibration control must be earthed via the fixing – through the machine earth of the mounting surface or through a separate protective conductor (PE)!

### Fixing the vibration control to the mounting surface

#### Prerequisites

- Mounting surface is clean and flat; i.e. free of paint, rust, etc.
- Measuring head surface of the vibration control must lie flat on the mounting surface.

#### Tool

- Hex key, width A/F 24

#### Work steps and instructions

- Screw vibration control **friction-locked** into the threaded hole of the mounting surface. The tightening torque should be 8 Nm.



To obtain precise measurement values, the vibration control must be **friction-locked** to the mounting surface.

Auxiliary structures for fixing are to be avoided. If unavoidable, make them as firm as possible!

## 14 Installation and Commissioning

Vibration control installation and commissioning may only be performed by an authorised specialist familiar with the safety regulations governing handling electrical components.



Prior to commissioning, fuse the voltage supply with a microfuse (medium time lag, 32 mA)!

Protect the connection cable and any extension cables from electrical interference or mechanical damage. Comply with the local regulations and directives.

## 15 Maintenance and Repair

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



Replace defective cables immediately.  
A defective vibration control must be completely replaced!



The type HE100 vibration control is maintenance-free.

### Error Table

Fault	Cause	Measure
No measured value (4-20 mA)	No voltage supply	Check voltage source and/or supply line
	Connection cable interrupted	Replace connection cable
	Fuse defective	Replace fuse
	Connection has incorrect polarity	Establish correct connection polarity
	Vibration control defective	Replace vibration control
Incorrect measurement value	Vibration control not friction-locked.	Mount vibration control unit in a friction-locked manner.
	Vibration control mounted in wrong position.	Mount vibration control unit in correct position.
EMC problems		See section 15: Earthing Concepts

## 16 Earthing Concepts to avoid Earth/Ground Loops

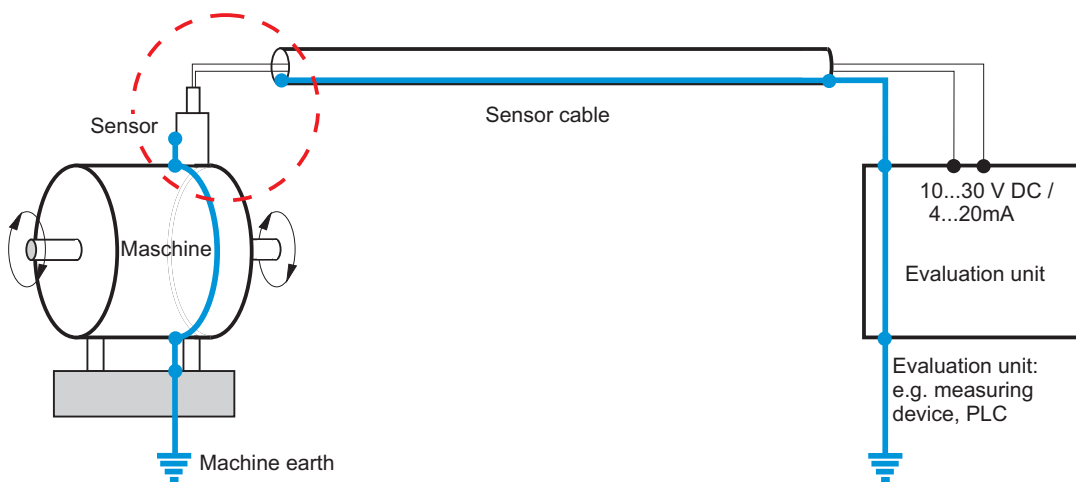
Earth/ground loops are amongst the most common problems in measurement set-ups with sensitive sensor technology. These issues arise due to unintentional differences in potential in the electrical circuit between the sensor and evaluation unit. As a countermeasure, we recommend our **standard earthing concept** or, depending on the application, our **alternative earthing concept**.



Ensure that the earth connection is electrically secure.

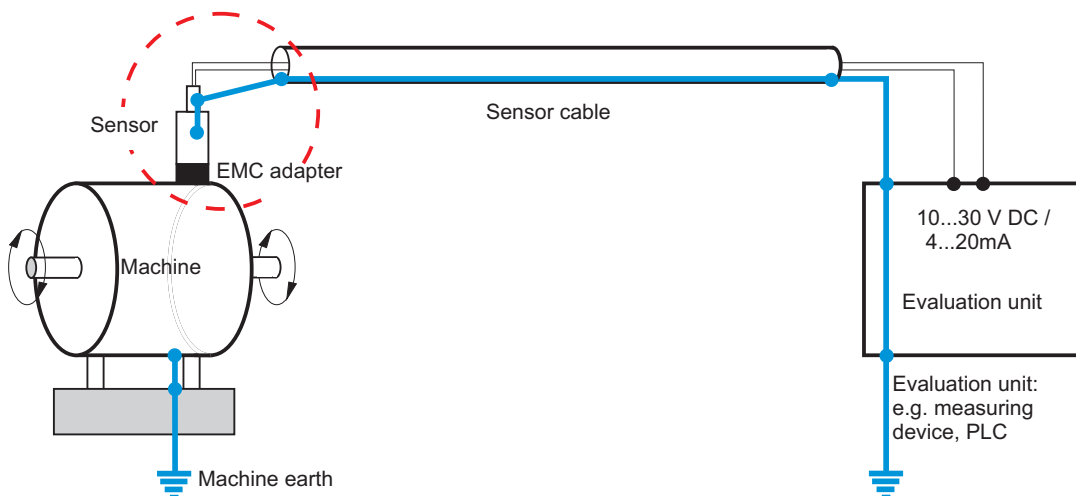
### Standard Earthing Concept

With the standard earthing concept, the sensor cable shield has no connection to the sensor housing (dashed circle). The sensor housing has the same potential as the machine earth.



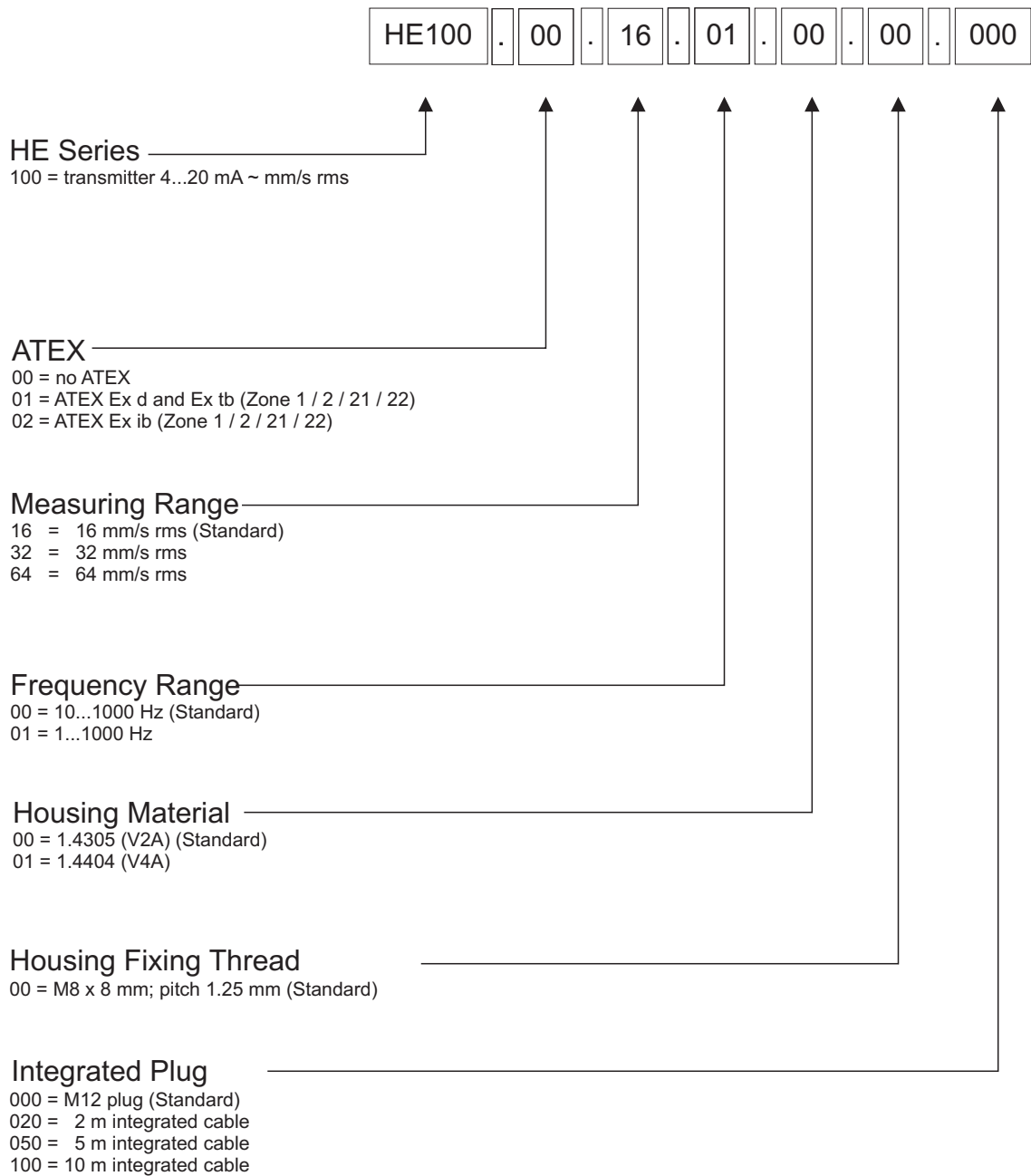
### Alternative Earthing Concept

With the alternative earthing concept, the sensor cable shield is connected to the sensor housing (dashed circle). The sensor housing is uncoupled from the machine earth by means of an EMC adapter (black). With the alternative earthing concept, an electrically secure earth connection can only be ensured for versions with an M12 plug connection. For versions with an integrated cable, the alternative earthing concept cannot be used.



Please indicate in your enquiry if you are opting for the **alternative earthing** concept. We will offer you the relevant sensor cable and the EMC adapter.

## 17 Encoding for Type HE100



Example:  
HE100.00.16.01.00.00.000

A transmitter 4...20 mA mm/s rms, without ATEX,  
 with 16 mm/s at 1...1,000 Hz, from V2A 1.4305  
 M8x8 mm fixing thread & pitch 1.25 mm, with plug,  
 M12





## 18 EU Konformitätserklärung / EU Declaration of Conformity

<b>Wir</b> <i>We</i>	HAUBER-Elektronik GmbH Fabrikstrasse 6 D-72622 Nürtingen-Zisishausen
<b>erklären in alleiniger Verantwortung, dass das Produkt</b> <i>hereby declare, bearing sole responsibility, that the product</i>	<b>Schwingungsüberwachung</b> <i>Vibration Control</i>
<b>auf das sich diese Erklärung bezieht, die grundlegenden Sicherheits- und Gesundheitsschutzanforderungen der untenstehenden Richtlinien und Normen erfüllt.</b> <i>to which this declaration refers, the essential health and safety requirements accords with the following standards or normative documents.</i>	

<b>Richtlinie 2014/30/EU</b> <b>Elektromagnetische Verträglichkeit</b> <i>Directive 2014/30/EU</i>	EN 61000-6-3:2007 + A1:2011 EN 61000-6-2:2005
<b>NG (nicht explosionsgefährliche Bereiche)</b> <i>Not potentially atmospheres</i>	<b>Typenreihe / Type series</b> HE100

<b>Explosionsgefährliche Bereiche</b> <i>Potentially atmospheres</i>	<b>Kategorie</b>  II 2 G /  II 2 D <i>Category</i>
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<b>Richtlinie 2014/34/EU</b> <b>Geräte und Schutzsysteme zur bestimmungsgemässen Verwendung in explosionsgefährdeten Bereichen</b> <i>Directive 2014/34/EU</i> <i>Equipment and protective systems intended for use in potentially atmospheres</i>
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<b>Typ</b> <i>Type</i>	<b>HE100</b>	 II 2 G Ex d IIC T4 Gb  II 2 D Ex tb IIIC T120 °C Db  II 2 G Ex ib IIC T4 Gb  II 2 D Ex ib IIIC T125 °C Db	PTZ 16 ATEX 0029 X NB 2572
<b>Konformität mit der Bauart Anhang VI</b> <i>Conformity to type Annex VI</i>  CE 2572	<b>Norm(en)</b> <i>Standards</i>	EN 60079-0:2012 + A11:2013 EN 60079-1:2014 EN 60079-11:2012 EN 60079-31:2014	

Nürtingen, den 17.01.2017	 Tobias Bronkal
Ort und Datum <i>Place and date</i>	Geschäftsführender Inhaber <i>Managing Proprietor</i>