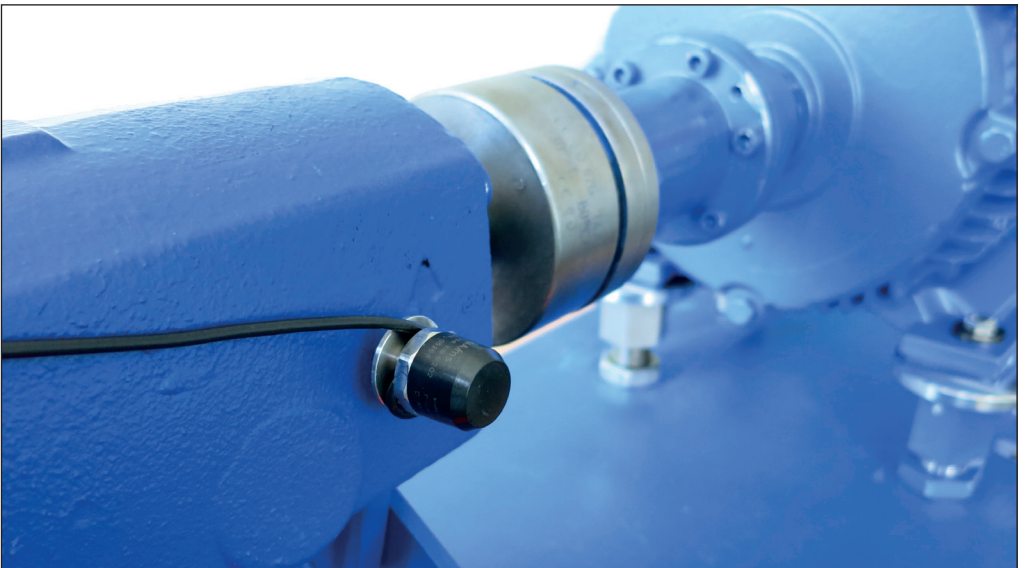


Accelerometer (Mini)

VIB 6.202, VIB 6.203
VIB 6.202 XD, VIB 6.203 XD

Installation and Operation



Sensors of series VIB 6.202 / VIB 6.203 are used in industry to measure the following parameters:

- Vibration acceleration on rotating machines
- Cavitation in pumps
- Shock pulse signals in roller bearings

Sensors of series VIB 6.202 XD / VIB 6.203 XD are permitted for use in the Ex-zone in accordance with ATEX guidelines.

The sensor's compact design means that little space is required for installation.

Safety instructions

- Read these operating instructions carefully and keep them in a safe place.
- Observe the operating instructions of the devices to be connected.
- Only use the sensors as intended and only for the permitted purpose of application.
- Only use original accessories.
- Replace defective sensors and cables.
- Have installation carried out by qualified personnel exclusively.
- Comply with the applicable safety regulations when performing installation tasks on the machine in operation.
- Lay the cables in accordance with the applicable safety regulations.
- Observe the technical specifications and permissible operating conditions. If in doubt, contact PRUFTECHNIK.
- The sensors are compliant with the applicable European directives. The complete Declaration of Conformity is available under www.pruftechnik.com/certificates.

Safety instructions for installation and operation in the **Ex-zone**:

- Only sensors of series VIB 6.202 XD and VIB 6.203 XD are permitted to be operated in the Ex-zone.
- Install sensors at the installation location with the VIB 6.205 protective cap that is supplied. If you choose not to install the protective cap, the sensor must be mounted in such a way that it is not possible to strike the sensor at the installation location.
- Sensors of series VIB 6.202 XD and VIB 6.203 XD are only to be connected to certified intrinsically safe circuits giving due consideration to the following maximum values:
 $U_i = 30 \text{ V}$; $P_i = 300 \text{ mW}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ }\mu\text{H}$

- The permissible ambient temperature range is between -40°C and $+80^\circ\text{C}$.
- The European installation regulations are to be observed (EN 60079-14).
- The information in the type-examination certificate EPS 16 ATEX 1 041 is to be observed: pruftechnik.com/certificates.
- The information in the IECEx certificate IECEx EPS 16.0017 is to be observed: iecex.iec.ch/
- Labeling of the sensors:



II 2G Ex ib IIC T4 Gb

II 2D Ex ib IIIC T135°C Db

Maintenance and repair work

Operation of the sensors does not require any maintenance. Repair work is not possible.

Storage

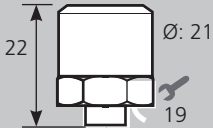
The following instructions are to be observed in relation to temporary storage of the sensors prior to installation:

- Store the sensors in the original packaging.
- Conditions at the storage location:
 - Dry and free of dust
 - Temperatures are within the permissible range
 - Vibration-free
 - No high electromagnetic fields
 - No corrosive materials

Disposal

After use, dispose of the sensors in an environmentally friendly manner and in accordance with national provisions.

Technical data

PARAMETER		VIB 6.202	VIB 6.202 XD	VIB 6.203 XD	VIB 6.203
Measurement	Signaling system	Current Line Drive			
	Transmission factor ± 10%	1.0 $\mu\text{A}/\text{ms}^{-2}$ (Ref.: 159 Hz; 25°C)			
	Frequency range ± 10%	4 Hz ... 8 kHz			
		± 3dB 2 Hz ... 10 kHz			
	Resonance frequency	30 kHz			
	Linearity range ± 10%	± 961 ms^{-2} (±98g)			
	Temperature range	-40°C ... +80°C			-40°C .. +120°C
Electrical	Supply	> 10 mA / 7-18 VDC			
	Temperature sensitivity	< 0.08 ms^{-2}/K			
	Noise, rms	< 0.1 ms^{-2} as of 2 Hz			
	Output impedance	> 250 kOhm			
Mechanical	Housing material	Stainless steel VA 1.4305 / Grivory HTV (resistant - inter alia - to diesel, oil, hydraulic and engine oil, lubricants, tar, turpentine)			
	Degree of protection	IP 65			
	Shock resistance	< 250 kms^{-2}			
	Connector cable	Coaxial, RG 174/U		Coaxial, Raychem Spec. 44	
	Diameter	2.8 mm		2.4 mm	
	Material	PVC - Polyvinyl chloride		PVDF - Polyvinylidene fluoride: Highly resistant to acids, alkalies, solvents with a hydrocarbon base, fuels, lubricants, water, rocket fuels as well as oxidizing substances	
	Weight	22 g			
	Fastening	Mounting adapter with thread UNF 1/4			
	Dimensions in mm	 <p>22 Ø: 21 19</p>			

Installation

The frequency behavior and dynamic range of the sensor can be heavily influenced by installation. Poor coupling with the measurement location dampens the signal and restricts the frequency range. As a general rule, the sensor requires firm, friction-locked, contact and resonance-free attachment to the measurement location. This particularly applies to measurements at high frequencies.

The stabilized coupling can be achieved by **bonding** or **screwing** the sensor onto the measurement location. A magnetic coupling saves time and expenditure on installation. It does however restrict the upper frequency range. Shock pulse (roller bearing condition) and cavitation measurements are not possible with a magnetic coupling.

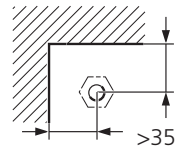
The sensor's compact design as well as the cable guide through the mounting base reduce the space required for installation. Appropriate adapters are available as accessories for installation at the measurement location.

With regard to installation in the **Ex-zone**, the sensor has to be protected from impact effects with the supplied protective cap VIB 6.205. Specific details regarding installation in the Ex-zone can be found in TechNote CM27 which is available on the PRUFTECHNIK homepage.

- Blind hole thread cutter, M5 / M6 / M8
- Socket spanner or open-end spanner, size 13, with torque limiting; Allen key set
- Compressed air.

- Select the point of installation:

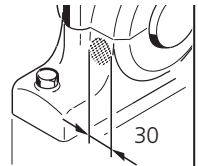
The minimum distance between the drilled hole and protruding edges of the housing must be 35 mm. Allow adequate clearance to attach the wrench and to rotate it in order to tighten the adapter.



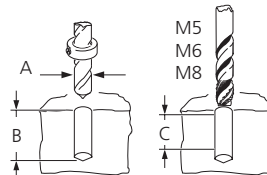
Note

Ensure that a hole can be made at the chosen location. If necessary, contact the machine manufacturer or refer to the machine documentation.

- Flatten and roughen the point of installation: Grind down existing coats to the bare metal ($\varnothing > 30$ mm). If necessary, grind down the point of installation.



- Drill the mounting hole and cut the thread.



	M5	M8
A	4.2	6.8
B	>7	>17
C	>6	>12

Installing the screw adapter

Required tools:

- Hand drill
- Drill bits (4.2 mm / 6.8 mm) with depth gage ring

- Clean the drill hole and outer area with compressed air; sand with sand paper (type 220).

Mounting adapter	VIB 3.417-M5 / -M6	VIB 3.480	VIB 3.418	VIB 3.423
Space requirement, \varnothing mm	> 30	> 30	> 30	> 25
Install. height w/ sensor, mm	33	22	28	32
Fastening	M5/M6 thread	M8 thread	Adhesive	Magnet
Schema				

- Clean the contact surfaces on the adapter and on the machine with a solvent.
- Thinly apply LOCTITE 243 to the dried-off contact surfaces of the screw lock to improve signal transmission.
- Screw in the adapter:
 - Insert VIB 3.417-M5/6 in the drill hole and tighten with a socket spanner or open-end spanner.
 - Screw VIB 3.480 into the sensor with an Alley key so that it is hand-tight.
- Check the adapter for tight mechanical fit.



Notes

A torque that is too high can damage the thread of the machine housing. If the torque is too low, the adapter can become loose and cause measurement errors!

The sensor must be protected against static charging if it is installed on a machine that is not earthed (e.g. belt-driven fan).

Installing the adhesive adapter

Required tools and resources:

- Hand drill
- Drill bit (3.5 mm) with depth gage ring
- File
- Compressed air
- 2-Component adhesive (WEICON HB 300,...)

Note

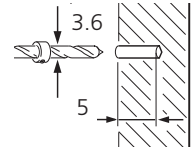
Switch off the machine and secure it against a restart. Do not put the machine back in to operation until the adhesive has hardened (approx. 24 hours).

- Select the point of installation:
Allow sufficient space for applying the adhesive with a wooden spatula.
- Flatten and roughen the point of installation:
Grind down existing coats to the bare metal ($\varnothing > 30$ mm).
If necessary, grind down the point of installation.

Sand down the point of installation with a file and file several grooves in a diamond pattern for greater adhesive strength.

Optionally, and only if drilling is possible:

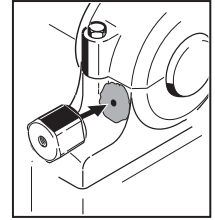
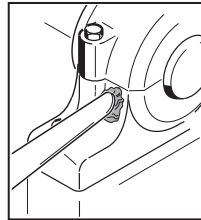
- Position the hole for the fixing pin.
Remove the fixing pin if drilling is not possible.



- Clean the point of installation:

Clean the point of installation and adhesive socket with a residue-free degreasing agent and a clean cloth. Afterwards, allow the two metal surfaces to dry thoroughly.

- Prepare the adhesive for use.
- Apply the adhesive:
Apply the adhesive with a wooden spatula evenly on the base and the point of installation (approx. 1 mm thick).
- Stick on the adapter:
Lightly press the adapter against the point of installation and turn it slightly to evenly distribute the adhesive. Do not remove pre-swollen adhesive. If necessary, apply additional adhesive around the adhesion points for greater stability.



Note

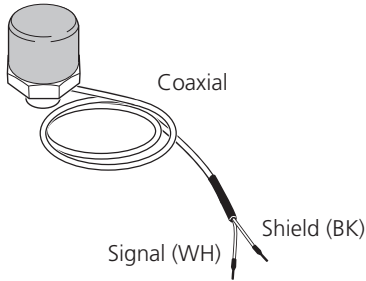
If necessary, fix the adapter in place with adhesive tape while the adhesive is hardening.

Installing the sensor

- Screw the sensor onto the installed adapter (VIB 3.417-M5/6 or VIB 3.418) (3 Nm).
- Or
- Insert the sensor with the M8 threaded adapter into the drill hole and tighten with an open-end spanner (3 Nm).

Electrical connection

The connector cable is firmly connected to the sensor. The open end is designed for connection to a Condition Monitoring System (CMS) with wire end ferrules.



Laying the connector cable

- Have the electrical connection established by a qualified electrician exclusively.
- Observe the regulations for setting up electrical systems.
- Do not kink, pinch, knot, twist or mechanically overload the cables. Bending radius: > 25 mm.
- It is preferable to lay the cable in a cable duct or protective tube.
- Use cable ties and Velcro fasteners to fix the cables in place.
- Do not lay cables parallel to power lines. Adhere to the minimum spacing (> 1 m).
- Lay a loop with sufficient reserve traction ahead of a cable feedthrough.
- Label the cable ends to avoid getting them mixed up.
- Observe the terminal assignment on the CMS (see the CMS installation manual).

Extending the connector cable

- Observe the maximum cable lengths (see the CMS installation manual).
- Use appropriate coaxial cables for extension purposes.
- Connect the cable ends inside a protective terminal housing.
- Mount the metallic protective terminal housing so that it is electrically insulated. With regard to installation **outside** the Ex-zone, lay the shield wire of the incoming and outgoing line on the protective terminal housing.

EMC protection

- Use triaxial cables in environments subject to a strong electromagnetic load.
- Keep the coaxial cable a short distance from the sensor.
- Connect the triaxial cable and the coaxial cable in a protective terminal housing.
- Mount the protective terminal housing in the vicinity of the sensor.

Ex-zone

If the cable ends are connected **inside** the Ex-zone, the ignition protection type must not be impaired with due consideration being given to the intended use.

Prerequisites for safe operation of the signal analysis units and the sensors:

- Responsibility for installation of Ex-systems:
 - There is a Ex-protection officer for every Ex-zone facility. It is only he who knows which conditions and standards must be observed in his facility. Only expert personnel briefed by him may work in the plant.

The following suggested installation must be approved by the Ex-protection officer:

- Limiting device VIB 3.550
 - The limiting device is to be installed in a switch cabinet or housing (at least IP 20).
 - The intrinsic connections for the limiting device must be installed at a distance of at least 50 mm from non-intrinsically safe circuits.
 - Potential equalization is to be applied first and must not be looped through.
 - The signal analysis unit must be grounded with potential equalization at the location of the limiting device.
 - The limiting device is the only grounded point of the intrinsically safe circuit in the Ex-zone.
 - Potential equalization is to be established between the limiting device and monitored machines.
- Sensor
 - The sensor is electrically insulated. The exposed metallic surfaces are insulated from the sensor and are at measurement point potential.
- Wiring to potential equalization
 - A line resistance of <120 mOhm is recommended for interference protection reasons (=1.5 mm²/10 m).

- Due consideration is to be given to personnel, goods, lightning, explosion protection - as well as other protection types where appropriate - for the respective customer, trade association, insurer, state, federal government etc.
- In this regard, the relevant implementation provisions are to be observed. This also applies to provisions relating to the safety of the connection type. In accordance with these provisions, wiring is only to be carried out by an approved specialist who is insured for such purposes.

- Connector cable

The following applies to the firmly installed **coaxial** cable:

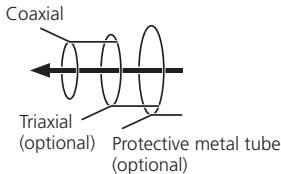
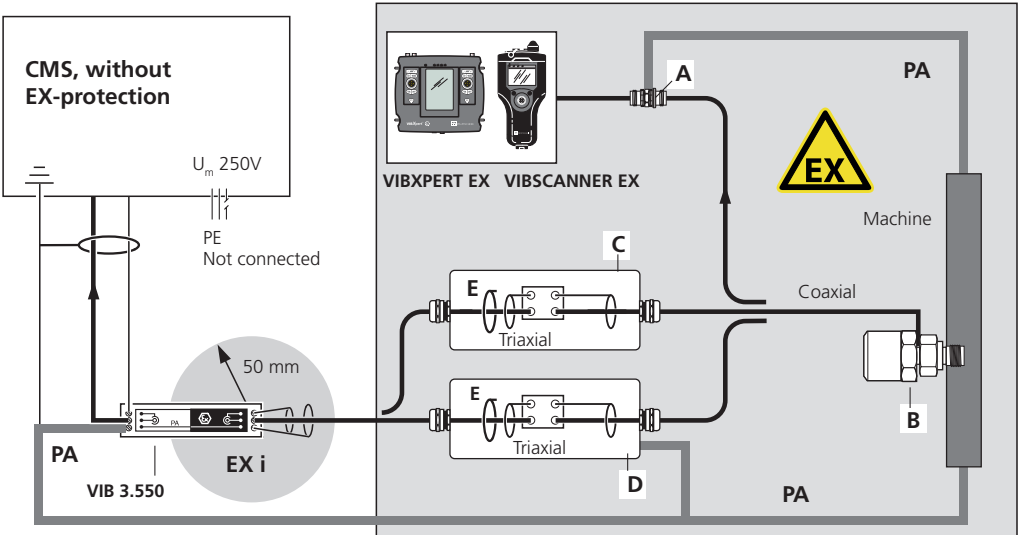
- The shield is laid on the shield terminal of the limiting device. The potential equalization (PA) and the shield terminal are connected with each other.

- With regard to extension by means of a protective terminal housing, the shield must not have any electrical contact with the protective terminal housing. The shield is also to be electrically insulated.
- The metallic protective terminal housing is to be protected against being touched by means of heat-shrink tubing.

The following applies to **triaxial** extension:

- The outer shield is laid on PA of the limiting device.
- With regard to extension by means of a metallic protective terminal housing, the outer shield is not laid on the protective terminal housing but is reliably insulated. Alternatively, the metallic housing can be insulated by means of heat-shrink tubing.
- With regard to outward-facing cable interfaces, the outer shield is insulated by means of heat-shrink tubing or with an insulating cap.

Connection examples for the Ex-zone



A: VIB 93036 S / VIB 93036 F / VIB 91000

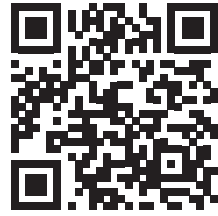
B: VIB 6.202 XD / VIB 6.203 XD

C: Protective terminal housing, plastic

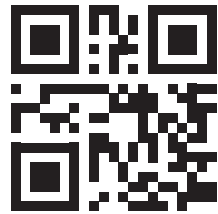
D: Protective terminal housing, metallic, mounted and insulated, housing at PA

E: Outer shield not laid

PA = potential equalization



<https://pruftechnik.com/com/About-us/Company/Certificates-and-Material-Safety/>



iecex.iec.ch/

TechNote CM27: Mini-Sensor EX



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Productive maintenance technology