db PRÜFTECHNIK

VIBCODE
VIB 8.660, VIB 8.660 HEX

Installation and Operation

VIBCODE sensors of series VIB 8.660 are used in industry to measure the following parameters:
– Vibration acceleration on rotating machines
– Cavitation in pumps
– Shock pulse signals in roller bearings

The VIBCODE sensor is operated together with a compatible, portable measuring device. For measurement, the VIBCODE sensor is connected to a coded VIBCODE stud, which is permanently installed on the machine.

VIBCODE sensors of series VIB 8.660 HEX are permitted for use in the Ex-zone in accordance with ATEX guidelines.

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 of the VIBCODE studs carried out by qualified personnel exclusively.
• Comply with the applicable safety regulations when performing installation tasks on the machine in operation.
• Observe the technical specifications and permissible operating conditions. If in doubt, contact PRUFTECHNIK.
• VIBCODE 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 VIBCODE sensors of series VIB 8.660 HEX are permitted to be operated in the Ex-zone.
• Sensors of series VIB 8.660 HEX are only to be connected to certified intrinsically safe circuits giving due consideration to the following maximum values:
U_i = 30 V; I_i = 63 mA; P_i = 300 mW;
C_i = 347 nF; L_i = negligibly small.
• The following devices may also be connected to the VIBCODE VIB 8.660 HEX with their intrinsically safe analogue output circuits. The connection must take place via a cable with a maximum length of 10 m an inductance per unit length of L' $\leq$ 1µH/m and a capacitance per unit length of C' $\leq$ 120 pF/m.
– VIBSCANNER type VIB 5.400 EX / EC-Type Examination Certificate No. TÜV 01 ATEX 1699
– VIBXPERT type VIB 5.300 EX - xx / EC-Type Examination Cert. No. ZELM 07 ATEX 0355 X
• The permissible ambient temperature range is between -20°C and +80°C [-4°F ... + 176°F].
• The European installation regulations are to be observed (EN 60079-14).
• The information in the type-examination certificate is to be observed: TÜV 02 ATEX 1890, incl. 1st supplement, issued october 6th, 2008. Available on www.pruftechnik.com/certificates.
• Labeling of the sensors:

⟨Ex⟩ **II 2G Ex ib IIC T4**

Compatibility

• VIBCODE - VIB 8.660 HEX, **S.N. > 00101**
Device:
– VIBSCANNER EX, firmware $\geq$ 1.66
– VIBXPERT EX, all versions

• VIBCODE - VIB 8.660, **S.N. > 2362**
Device:
– VIBSCANNER, firmware $\geq$ 1.66
– VIBXPERT, all versions

Maintenance and repair work

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

Storage

• Store the VIBCODE sensor in the case of the device.
• 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 sensor in an environmentally friendly manner and in accordance with national provisions.

Function

VIBCODE is a vibration sensor system that uses coded measurement studs for certain identification of measurement locations on the machine. The system consists of the **VIBCODE sensor** and the **VIBCODE measurement stud**.

VIBCODE sensor

The VIBCODE sensor contains a code ring sensor and a vibration sensor. The sensors locks onto the VIBCODE stud via bayonet mount in optimum position and with consistent pressure. Trend readings are taken with perfect repeatability regardless of operator qualification and training. The code ring sensor reads the tooth pattern of the plastic ring in the measurement stud to determine its location so that the correct types of measurement can be taken. Mixups, erroneous trend deviations and time-consuming repeat measurements are all eliminated once and for all.

How the VIBCODE® sensor reads the code ring
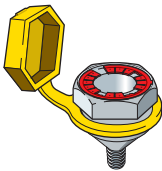
Code ring sensor

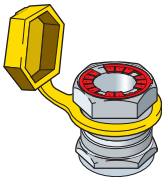Vibration sensor
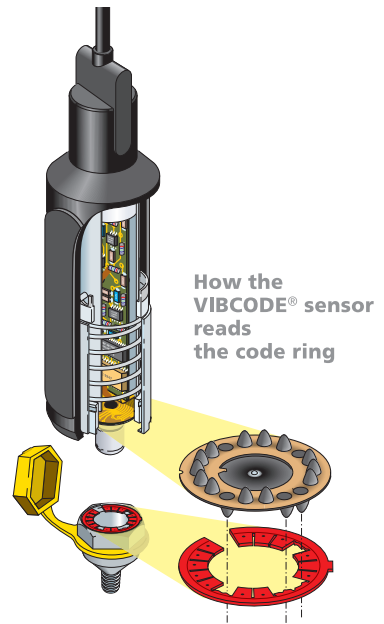
VIBCODE stud

A VIBCODE stud consists of a stainless steel bolt, a protective cap and a coded plastic ring. Coding is achieved by cutting out individual teeth.

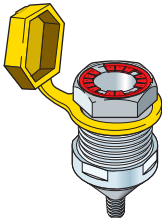VIBCODE studs are available in various types as an accessory.
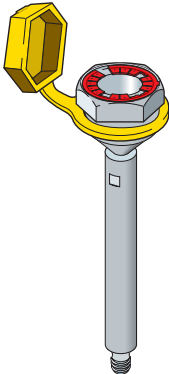
VIBCODE stud,

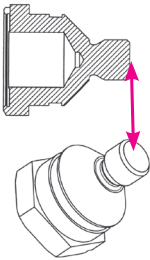**for threaded mounting**

for adhesive mounting
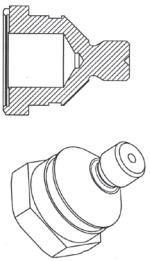

... with locking nut

... with extension post
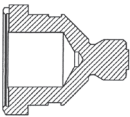
Distinctive feature

VIBCODE studs with screw thread are available in two thread sizes and stainless steel qualities. For better differentiation, the threaded bolts are marked accordingly:
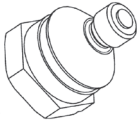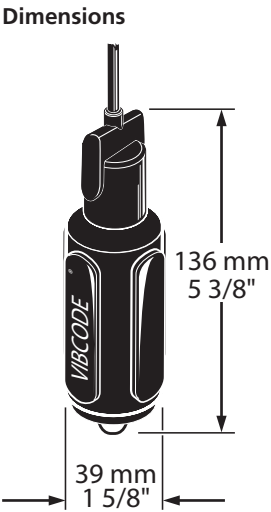

M8 – VA1.4571

M8 – VA1.4305

UNC5/16 – VA1.4305

Technical data

PARAMETER		VIBCODE sensor
Measurement	Signalling system	Current Line Drive (CLD)
	Transmission factor (Ref.: 159 Hz; 25 °C [77°F])	1.0 µA/ms^{-2} ± 4%
	Frequency range ± 3dB	1.5 Hz ... 20 kHz
	Measurement range r.m.s.	961 ms^{-2} [98 g]
	Resonance frequency	36 kHz
	Linearity range ± 10%	± 50 ms^{-2} [± 5 g]
Electrical	Power supply	> 10 mA / 7-18 VDC
	Noise, rms	< 1 mms^{-2} / Hz$^{-1/2}$ at 10 Hz
	Output impedance	> 500 kOhm
Environment	Degree of protection	IP 65, w/ cable connected
	Transverse sensitivity	< 10 % of axial value
	Temperature sensitivity	< 0.3 ms^{-2}/K
	Magnetic sensitivity	< 14 ms^{-2}/T bei 50 Hz
	Temperature range, VIB 8.660	- 10 °C ... + 70 °C [14°F ... +158°F]
	Temperature range, VIB 8.660 HEX	- 20 °C ... + 80 °C [-4°F ... +176°F]
Mechanical	Mounting	bayonet mount
	Weight	390 g
	Cable connector	TNC

Dimensions

136 mm
5 3/8"

39 mm
1 5/8"

PARAMETER		VIBCODE stud
Bolt	Mounting	Screw thread, adhesive, locking nut, extension post
	Material	Stainless steel (VA1.4305 / VA1.4571)
Code ring	Material	Hostaform®
	Resistance	Oil, coolant
	Temperature range	-40°C ... +130°C [-40°F ... +270°F]
Protective cap	Material	Desmopan®
	Resistance	Oil, coolant
	Temperature range	-30°C ... +100°C [-22°F ... +212°F]

Installation

The frequency behavior and dynamic range of the VIBCODE sensor can be heavily influenced by installation of the **VIBCODE stud**. 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.

Basically, the following applies:

$$10 \times \text{Weight}_{Sensor} < \text{Weight}_{object\ to\ be\ measured}$$

The most stable coupling to the measurement location can be achieved by screw mounting. If screw mounting is not possible, the VIBCODE stud can be glued to the measurement location.

Screw mounting

Applies to VIBCODE threaded studs M8 / UNC 5/16.

Required tools and resources
– Hand-held drill
– Drill bits (3.5 mm / 6.8 mm) with depth gage ring
– 90° countersink bit (VIB 8.694)
– Thread tap M8 or UNC 5/16-18
– Torque wrench with 19 mm / 3/4" hex socket
– Compressed air for cleaning out the hole
– Solvent for degreasing
– Threadlocker (LOCTITE 243)

Select the point of installation
• The drilled hole must have direct connection to the bearing carrier if the sensor should measure shock pulse signals.
• Minimum distance between the drilled hole and protruding edges of the housing must be 35 mm (**A**). Allow adequate clearance to attach the wrench.
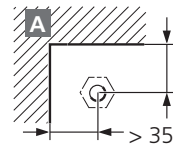
Note

Ensure that a hole can be drilled at the chosen location.

Drill threaded hole
• Drill pilot hole: 3.5 mm / 15 mm deep (**B**).
• Bore out hole: 6.8 mm / 15 mm deep (**C**).
• Contersink hole: 90° / 3 mm deep (**D**).
• Blow out the hole.
• Grease thread tap.
• Tap thread: 12 mm deep (**E**).
• Blow out the hole.

Mount stud
• Clean the contact surfaces of the stud and the machine with solvent.
• Allow contact surfaces to dry.
• Thinly apply LOCTITE 243 to improve signal transmission.
• Affix the protective cap to the stud and, if available, insert the code ring into the stud.
• Screw in the stud and tighten with a torque wrench (11 Nm, **F**).
• Check the stud for tight mechanical fit.

Abmessungen in mm
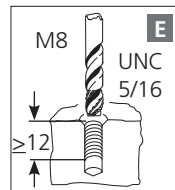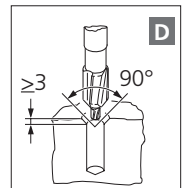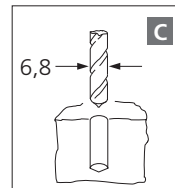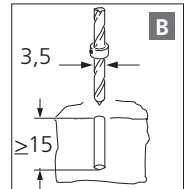
Excessive torque can damage the thread or the machine housing. Too little torque can allow the stud to work loose. Incorrect torque always causes measurement errors!

The tapered shank section must seat perfectly into the countersunk hole so that proper signal transfer from the machine to the sensor (left) can take place over a large area of the shank.

If there is only partial contact, then transmission will be poor (right).
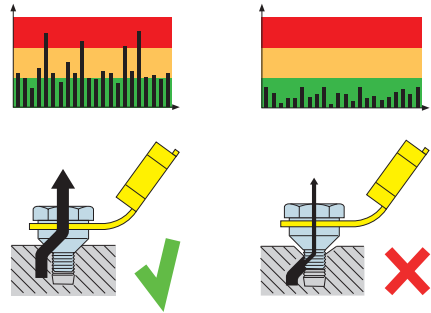
Extension bar

The VIBCODE stud with extension bar is ideal for situations such as motor housings where there is much clearance between the actual mounting location (e.g. the bearing housing) and the housing cowling. This stud is available in various lengths with an M8 or UNC 5/16 thread at its bottom.

To ensure optimal signal transmission, the housing cowling and extension bar may not come into contact. Therefore, the feed-through for the extension bar must have a diameter of at least 15 mm.

The longest extension (170 mm and 6 5/8") may be used only for taking shock pulse readings and not for vibration measurement!

Ø ≥ 15 mm
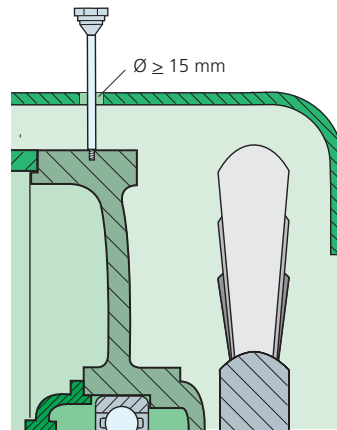
Locking nut

The VIBCODE stud with locking nut is suitable for measurement locations which are covered by a housing cowling and can be reached without extension. The stud can also replace existing housing screws.

To ensure optimum signal transmission, the bolt must not touch the housing cowling. The bore must therefore be drilled in such a way that the bolt has a sufficient distance to the housing cowling and at the same time the housing cowling can be tightened with the locking nut.
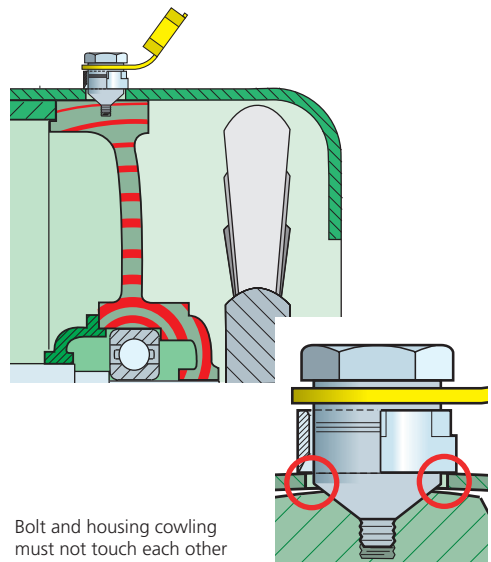
Bolt and housing cowling must not touch each other

Replacing the housing screw

Required tools and resources
– Hand-held drill
– Drill bit (≥ 19 mm)
– 90° countersink bit (VIB 8.694)
– Thread tap M8 or UNC 5/16-18
– Torque wrench with 19 mm / 3/4" hex socket
– Compressed air for cleaning out the hole
– Solvent for degreasing
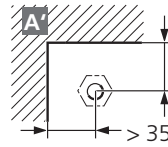– Threadlocker (LOCTITE 243)

Select the point of installation
• The drilled hole must have direct connection to the bearing carrier if the sensor should measure shock pulse signals.
• Minimum distance between the drilled hole and protruding edges of the housing must be 35 mm (**A'**). Allow adequate clearance to attach the wrench.

Prepare mounting bore
• Remove housing cowling (**B'**).
• Contersink hole: 90° / 3 mm deep (**C'**).
• Blow out the hole.
• Bore out housing cowling, d > 19 mm (**C'**). VIB-CODE bolt and cowling must not be in contact after mounting. The cowling is held in place by the locking nut only!

Mount stud
• Clean the contact surfaces of the stud and the machine with solvent.
• Allow contact surfaces to dry.
• Thinly apply LOCTITE 243 to improve signal transmission.
• Affix the protective cap to the stud and, if available, insert the code ring into the stud.
• Reinstall the cowling.
• At the appropriate location, the VIBCODE stud is connected to the cowling as follows:
• Screw in the stud and tighten with a torque wrench (11 Nm, **D'**).
• Then tighten the locking nut against the cowling (**E'**).
• Check the stud for tight mechanical fit.

Dimensions in mm
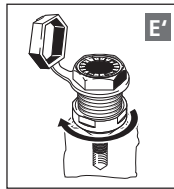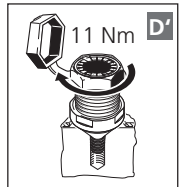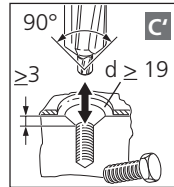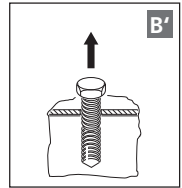
Adhesive mounting

Applies to VIBCODE studs with bonding base.

Required tools and resources
– Hand-held drill and drill bit (3.5 mm)
– Angle grinder and rasp
– Compressed air for cleaning out the hole.
– Solvent for degreasing
– 2-Component adhesive (WEICON HB 300,..)

Note

Switch off the machine and secure it against a restart. Do not switch on the machine until the adhesive has hardened (approx. 24 hours).

Select the point of installation
• The point of installation must have direct connection to the bearing carrier if the sensor should measure shock pulse signals.
• Allow sufficient space for applying the adhesive with a wooden spatula.

Prepare bonding location
• Grind down existing coats to the bare metal (Ø > 30 mm, **G**).
• If necessary, grind down the location (**G**).
• Sand down the point of installation with a rasp and file several grooves in a diamond pattern for greater adhesive strength (**G**).

Optionally, and only if drilling is possible:
• Drill hole for centering pin: 3.5 mm / 5 mm deep (**H**). Remove the centering pin from the stud if drilling is not possible.
• Blow out the hole.
• Clean the contact surfaces of the stud and the machine with solvent.
• Allow contact surfaces to dry.

Apply adhesive
• Prepare the adhesive for use.
• Apply the adhesive with a wooden spatula evenly to the base of the stud and the bonding location (approx. 1 mm thick, **I**).

Affix VIBCODE stud
• Affix the protective cap to the stud and, if available, insert the code ring into the stud.
• Press the stud gently against the bonding location and turn it to evenly distribute the adhesive. If applicable, screw in the centering pin (**J**).
• Do not remove excess adhesive. If necessary, apply additional adhesive around the bonding location for greater stability.
• If necessary, use adhesive tape to hold the stud in place during hardening (**K**).

Dimensions in mm
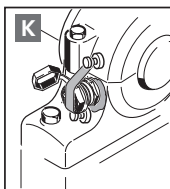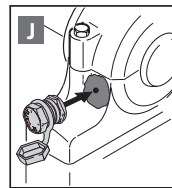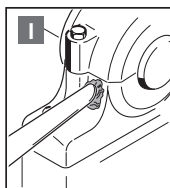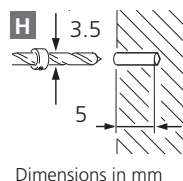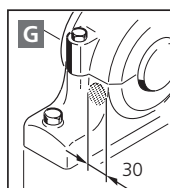
Performing measurement

After VIBCODE is inserted in the coded measure-
ment stud, the measuring device recognizes the
measurement location and automatically calls up
the measurement tasks for this location. Measure-
ment either begins automatically or must be start-
ed by pressing a button on the measuring device.
Additional details can be found in the measuring
device documentation.

Attach the VIBCODE sensor

• Open the protective cap of the VIBCODE stud.
• If necessary, remove the protective cap from the
  VIBCODE sensor.
• Place the VIBCODE sensor on the VIBCODE
  stud.
• Press the VIBCODE sensor lightly and tighten
  it clockwise until stop. The sensor is locked by
  means of a bayonet connection.
• Check whether the sensor is fixed correctly in
  the stud.
• To unplug, turn the sensor counterclockwise
  until the lock is released. Do not pull the cable.

Notes

Never use the VIBCODE sensor to take a mea-
surement directly from the machine surface. This
sensor must always be locked onto the VIBCODE
stud!

Do not remove the VIBCODE sensor from the VIB-
CODE stud during measurement.

Do not unplug the VIBCODE sensor from the mea-
suring device when the code ring is being read.

Only leave the VIBCODE sensor attached to the
VIBCODE stud for as long as necessary as, other-
wise, the spring tension of the sensor will be too
heavily stressed.

Before mounting the VIBCODE sensor on the
stud, measure the temperature of the stud with
a temperature probe. VIBCODE studs may not
exceed a maximum temperature of 70°C / 158°F
during measurement. If the measurement takes
no longer than five minutes, the temperature may
reach a maximum of 80°C / 176°F.

Cleaning

- Slight soiling on the sensor can be washed off using soap solution or isopropyl and a cotton cloth.

- To prevent damage to the delicate components in the head of the sensor, use a paintbrush for cleaning them.

- If you use compressed air for cleaning, only use a weak jet of air.
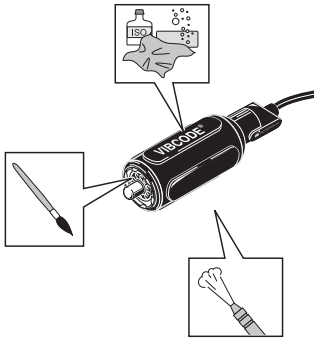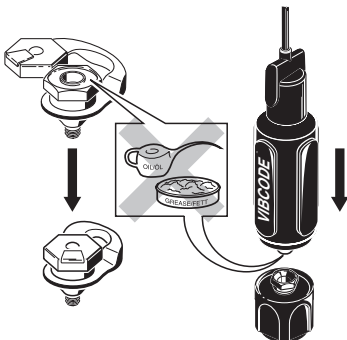

Notes

Never use solvent for cleaning!

Do not scratch off any soiling using screwdriver blades or other hard objects !

To prevent damage to the VIBCODE sensor and avoid soiling, please observe the following instructions:

- Do not apply lubricating oil or grease to the VIBCODE stud or sensor.
- After the measurement, always replace the protective caps.


Encoding

The stud contains a plastic code ring that obtains an unique identity - similar to a fingerprint - through the removal of individual teeth. The 4-digit coded patterns are defined with the aid of the PC software (OMNITREND / OMNITREND Center) and are cut out with the VIBCODE ring encoding tool (VIB 8.692).

Cut out code pattern

- Insert the code ring into the appropriate slot of the encoding tool (**1**).
- Insert the plunger (**2**).
- Set the first code number (**3**).
- Slowly press down the plunger (**4**).
- Repeat the procedure for the next code numbers accordingly.
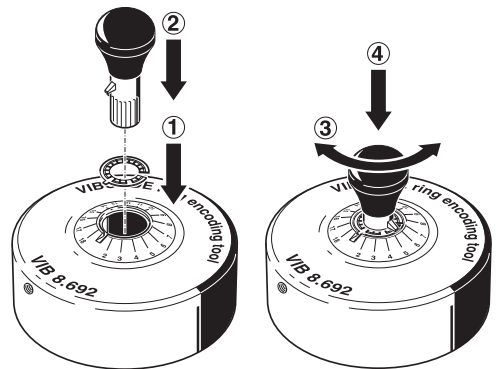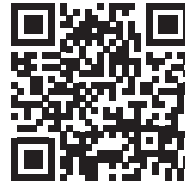
CE 〈Ex〉 →

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