

VIBRA-series: VIBRA, VIBRA⁺



Profound *VIBRA-series*

Vibrations from pile driving, construction, road or rail traffic, demolition work and blasting can create nuisance or cause damage to buildings and sensitive equipment. These vibrations are accurately quantified with a system of the Profound *VIBRA-series*.

The *VIBRA's* robust aluminium housing is IP65 watertight. The system is easily portable, lightweight and battery-operated which allows for up to 4 weeks of continuous and unmanned operation.

Depending on the chosen model *VIBRA* or *VIBRA⁺*, the system complies with national and international standards and is according to DIN 45669-1:2010. The specific characteristics of each model are further outlined in the *VIBRA* features overview.

Setting up the system on site is easy: attach the 3-dimensional sensor to the structure to be monitored, switch on the system and start measuring. While measuring the *VIBRA* displays date, time, time interval and the current peak vibration values including frequency in all 3 directions. In advance an alarm level can be set.

Peak values including dominant frequencies, are directly stored in memory. For full interpretation measurement signals are transferred via USB to a computer for further analysis. The *VIBRA* pc software automatically generates tables and graphs of peak values and signals for use in reports. The data can also be easily exported as a csv-file.

The *VIBRA⁺* can be set up for wireless automatic data transfer including sms alerts via the integrated 3G modem. Data can also be continuously uploaded to any FTP server for real-time online monitoring. As an alternative Profound offers a turnkey online monitoring service.

Technical specifications <i>VIBRA-series</i>	
Velocity (PPV), frequency and acceleration (PPA)	In x, y, z-direction per time interval
Displacement (<i>VIBRA⁺</i> only)	In x, y, z-direction per time interval
Sensor type	3-channel geophone
Geophone correction	Digital IR filter
Velocity range	0 – 100 mm/s
Resolution display	0.01 mm/s
Resolution AD-converter	0.001 mm/s (24 bits ADC)
Frequency range and accuracy	DIN 45669-1:2010-09 or SBR – part A, B 2002
Storage capacity	4 MB. Fixed or ring memory incl. buffer
Storage interval	1, 2, 5, 10, 20, 30, 60 s
Data save level	Adjustable between 0.01-100.00 mm/s (or always)
Alarm level	Adjustable between 0.01-100.00 mm/s (or none)
Data retention	10 years (minimum) at 25 °C
Clock stability	Within 5 minutes/year at 25 °C
Temperature range (operating)	- 20 °C to + 60 °C
Housing	Robust hard anodized aluminium case
Protection rating	IP65 according to DIN 40 050/IEC 529
Dimensions (l x w x h)	216 x 160 x 50 mm
Weight	2 kg
Display	≥ 4 Lines; display backlight; anti-reflex coating; anti-scratch
Batteries	3 x 1.5 V Alkaline D-size batteries
Battery life	≈ 28 days (continuous operation)
I/O functionality	Geophone, mini-USB
PC operating system	WIN10/WIN8/WIN7
Accessories	VIB.00320 Cable reel (50m) VIB.00407 Alarm beacon VIB.00420 USB adapter. External power via USB adapter: V _{mains} 100 ↔ 240 V, 47 ↔ 63 Hz



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VIBRA-series: VIBRA, VIBRA+



Detailed features overview			VIBRA	VIBRA+
Maximum velocity v and frequency	In x-, y- and z-direction per time interval		●	●
Maximum acceleration a	In x-, y- and z-direction per time interval		●	●
Maximum displacement u	In x-, y- and z-direction per time interval			●
Trace option	Velocity versus time curve		●	●
AD-converter	24 bits delta sigma data conversion		●	●
Resolution display	0.01 mm/s		●	●
Resolution AD-converter	0.001 mm/s		●	●
DIN	Accuracy	DIN 45669-1:2010-09	●	●
	Frequency characteristic	Lower limit: 1 Hz	●	●
		Upper limit I: 80 Hz	●	●
		Upper limit II: 315 Hz		●
	Dominant frequency determination	Zero Crossing Method FFT (Hanning window)	●	●
Data processing	DIN 4150-2		●	
	DIN 4150-3	●	●	
SBR	Accuracy	Part A and B, 2002 $0.85 \leq \Delta \leq 1.15$		●
	Frequency characteristic	Part A: Lower limit (-3 dB): 0.8 Hz Upper limit (-3 dB): 125 Hz		●
		Part B: Lower limit (-3 dB): 0.8 Hz Upper limit (-3 dB): 100 Hz		●
	Dominant frequency determination	Method I, Method II		●
Data processing	SBR Part A, SBR Part B		●	
Sample frequency	1024 Hz		●	●
Velocity data save level	Adjustable between 0.01-100 mm/s (or always)		●	●
Alarm level velocity v	Adjustable between 0.01-100 mm/s (or none)		●	●
Alarm level displacement u	Adjustable in mm (or none)			●
Alarm level acceleration a	Adjustable in m/s ² (or none)			●
Clock stability	≈ 5 minutes/year at 25 °C		●	●
Smart alarm level	Frequency dependent velocity alarm, complying with DIN/SBR			●
Optical signal device	Flashing wireless alarm beacon		●	●
External power	5 Volt supplied to the VIBRA USB connector		●	●
Wireless data transmission including FTP, SMS, e-mail	Transfer via integrated GPRS/3G modem			●
Ring memory	Including ring buffer in FTP mode			●
VIBRA PC Trace Recorder	Continuous time/velocity trace recording			●

VIBRA geophone			VIBRA	VIBRA+
Digital ID			●	●
Geophone detection			●	●
Digital correction of the sensitivity			●	●
Digital correction of the f_{res} and Q				●
Automatic inclination check				●
Automatic calibration check				●

PC software			VIBRA	VIBRA+
WIN 10/WIN 8/WIN 7			●	●
Processing according to SBR-guidelines				●
Processing according to a.o. DIN-guidelines			●	●
Extensive graphical data presentation including precise date time axis. Various data exporting options, e.g. as ASCII-(*.csv) file			●	●
VIBRA PC Remote Control			●	●



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VIBRA geophone



Profound *VIBRA* geophone

The Profound geophone for the *VIBRA*-series has been designed for high-performance vibration monitoring.

Advanced mounting

The ball joint in combination with the wall bracket facilitates precise orientation of the geophone in the correct x-, y- or z-direction, as well as enabling fine tuning of the vial.

Digital ID

The geophone has an electronic datasheet, which also includes the serial number. Therefore, the source of measurement data can always be traced.

High-performance

Besides continuously monitoring the x-, y- and z-direction, the *VIBRA* also automatically corrects the measurement data for the individual sensitivity of each geophone channel. This guarantees high-quality measurements and performance.

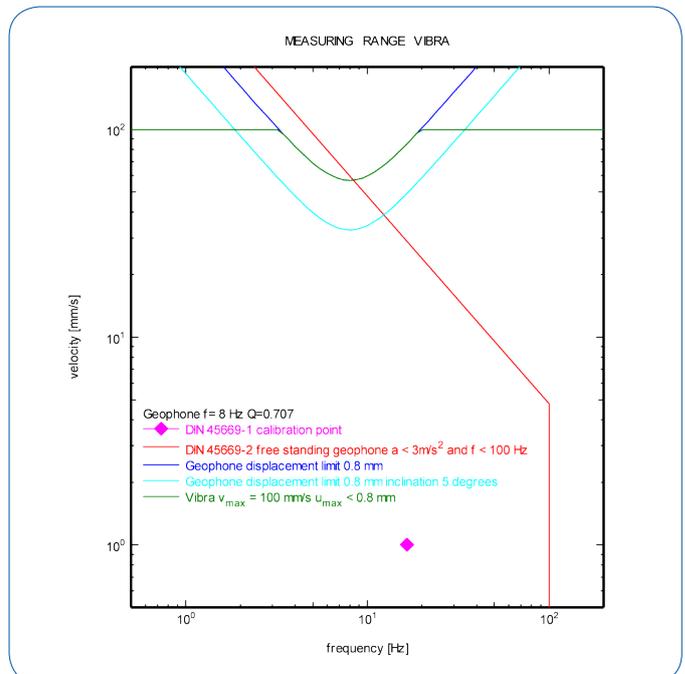
VIBRA⁺

The *VIBRA* geophone in combination with the *VIBRA*⁺ offers the following extras:

- Detection of the geophone's inclination, assuring that measurements are carried out with a correctly positioned geophone.
- Based on data from the electronic datasheet, the *VIBRA*⁺ not only corrects the sensitivity, but also the resonance frequency and the quality factor with the help of digital correction filters.

More information about the *VIBRA*-series can be found in the datasheets.

Technical specifications <i>VIBRA</i> geophone	
Channels	3 (x-, y-, z-direction)
Sensitivity	23.3 Vs/m
Resonance frequency (<i>f_{res}</i>)	8 Hz ± 0.5 Hz
Output Resistance (<i>R_{out}</i>)	330 Ohm
Quality factor (<i>Q</i>)	0.75
Distortion at 18 mm/s and 12 Hz	< 0.2 %
<i>f_{res}</i> within tolerance	< 15°
Sensitivity of the vial	53 arc minutes (R130 mm)
Electronic datasheet (ID)	Serial number; calibration date; sensitivity; <i>f_{res}</i> ; <i>R_{out}</i> ; <i>Q</i>
Temperature range (operating)	- 20°C to + 60°C
Protection rating	IP65 according to DIN 40 050/IEC 529
Size	Ø 74 mm
Mass	0.48 kg
Moving mass	11 ± 0.5 g (each channel)
Accessories	VIB.00320 Cable reel of 50 m VIB.00340 Geophone DIN mounting plate

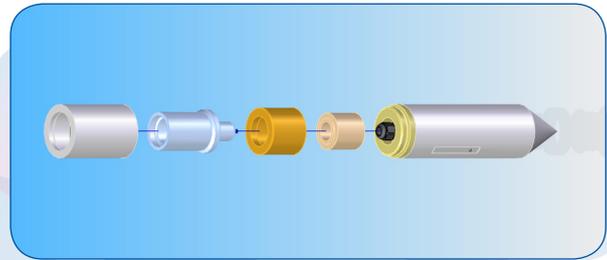


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VIBRA geophone cone



Profound *VIBRA* geophone cone

The Profound geophone cone for the *VIBRA* range has been designed for high-performance ground vibration monitoring, measuring dynamic soil parameters. Installation of the geophone cone with standard cone penetration rods can be done by pushing it to the desired depth. When the desired depth has been reached, the rod is slightly retracted to minimise the vibration influence of the penetration rods.

Digital ID

The geophone cone has an electronic datasheet including the serial number. Therefore, the source of measurement data can always be traced.

High-performance

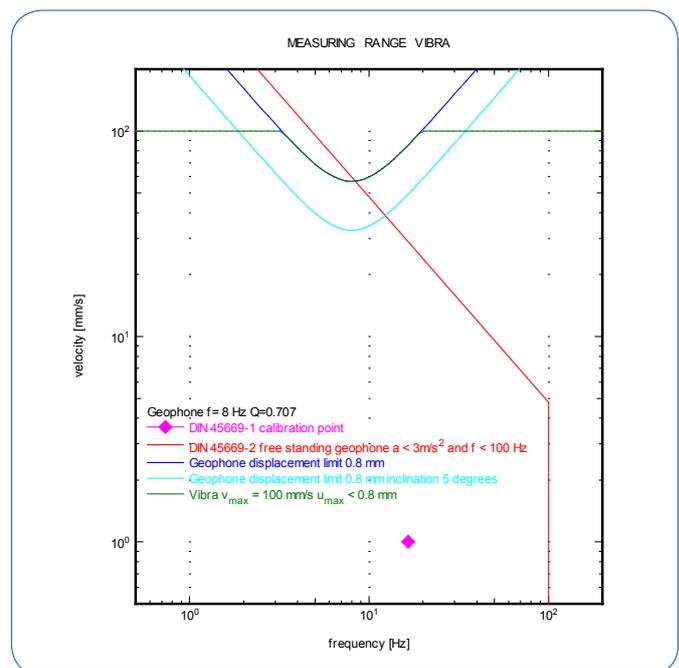
Besides continuously monitoring the x-, y- and z-direction, the *VIBRA* also automatically corrects the measurement data for the individual sensitivity of each geophone channel. This guarantees high-quality measurements and performance.

VIBRA⁺

The *VIBRA* geophone cone in combination with the *VIBRA*⁺ offers the following extras:

- Detection of the geophone's inclination, assuring that measurements are carried out with a correctly positioned geophone.
- Based on data from the electronic datasheet, the *VIBRA*⁺ not only corrects the sensitivity, but also the resonance frequency and the quality factor with the help of digital correction filters.

Technical specifications <i>VIBRA</i> geophone cone	
Channels	3 (X-, Y-, Z-direction)
Sensitivity (typical)	23.3 Vs/m
Resonance frequency (<i>f</i> _{res})	8 Hz ± 0.5 Hz
Output Resistance (<i>R</i> _{out})	330 Ohm
Quality factor (<i>Q</i>)	0.75
Distortion at 18 mm/s and 12 Hz	< 0.2 %
<i>f</i> _{res} within tolerance	< 15°
Max. inclination	≤ 5°
Electronic datasheet (ID)	Serial number; calibration date; sensitivity; <i>f</i> _{res} ; <i>R</i> _{out} ; <i>Q</i>
Protection rating	IP66 according to DIN 40 050/IEC 529
Material	42CrMo4V
Density	4500 kg/m ³
Cone diameter	∅ 49.5 mm
Cone length	190 mm
Weight	1.28 kg
Moving mass	11 ± 0.5 g (each channel)
Screw thread	GeoMil standard for CPT tubes
<i>VIBRA</i> connector	LEMO K Series
Cable length	15 m cable
Accessory	VIB.00320 cable reel 50 m



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VIBRA wireless alarm beacon 2.0



Profound *VIBRA* alarm beacon

The *VIBRA* wireless alarm beacon is a rechargeable battery powered portable alarm that provides a visible alarm signal for a vibration monitoring system from the *VIBRA*-series.

After starting a measurement and upon exceeding a preset alarm threshold, the *VIBRA* system will automatically show an alarm text on the display. Simultaneously the *VIBRA* system transmits a wireless alarm signal to the alarm beacon.

The high intensity LED's of the alarm beacon effectively notify personnel of an exceeded vibration threshold.

Flexible use

The *VIBRA* wireless alarm beacon will receive alarm signals from all *VIBRA* systems within range, but can also be programmed to solely receive alarm signals from specifically linked *VIBRA* systems. Several beacons can also be linked to one *VIBRA* system.

Due to the wireless design and the integrated mounting options the beacon can easily be placed at clearly visible locations.

If another alarm device is required, the internal relay of the *VIBRA* wireless alarm beacon offers a flexible opportunity to link to other alarm devices.

Long operating life

The internal battery guarantees a long operating life. To indicate that the battery needs to be charged, the beacon will give a clearly visible red signal.

Technical specifications <i>VIBRA</i> wireless alarm beacon 2.0	
Flashing frequency	$f_{\text{flash}} = 0.5 \dots 5 \text{ Hz}$ Various signal patterns for different status
LED colours	Red, orange, green
Max. luminous intensity	3 x 25 cd
Alarm colour	High intensity red
Alarm threshold range	0.1 to 99.9 mm/s (set with the <i>VIBRA</i>)
Alarm duration	During 1, 2, 5, 10, 15, 30, 60 minutes or manual switch off (set with the <i>VIBRA</i>)
Max. distance between beacon and <i>VIBRA</i>	≤ 30 metres
Internal battery	Lithium-ion battery Charger 12V [charging time: 1 hour (80%)]
Operating life: standby	± 14 days
Operating life: flashing	± 15 hours
Auto shut-off	> 12 hours after last operation and no wireless signal received
Battery-low indication	$f_{\text{flash}} = 2 \text{ Hz}$ (during alarm) $f_{\text{flash}} = 1 \text{ Hz}$ (in standby mode) additional red flash during green or orange signal
Temperature range	- 10 °C to + 50 °C
Housing	Body: Black Pom Lens: PMMA
Protection rating	IP65 according to DIN 40 050/IEC 529
Dimensions	85 mm, Ø 110 mm
Weight	0.8 kg
Mounting options	Bottom side : 5/8" screw thread
Connector	M12 speedcon, 5-pos.
Relais contact	≤ AC 125V/1A
Linking option for all models	Up to 100 <i>VIBRA</i> systems to one beacon or several beacons to a single <i>VIBRA</i>
Accessories	<ul style="list-style-type: none"> Charger 12V 0.3A Car charger VIB.00434 Connection cable between <i>VIBRA</i> mini USB and alarm beacon VIB.00436 Fly-lead cable for connection to internal relay