

Profound - Vibration Monitoring



VIBRA
VIBRA-sbr
VIBRA⁺

Profound VIBRA-series

(VIB.00100/..110/..120/..130)

With the Profound VIBRA you can easily monitor vibrations, which may cause damage to buildings and sensitive equipment.

The 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 undisturbed operation.

The Profound VIBRA-series comprises the VIBRA, the VIBRA-sbr and the VIBRA⁺. The specific characteristics of each system are further outlined in the VIBRA features list.

Depending on the chosen version of the VIBRA, the system is of national and international standards, such as the SBR 2002, the DIN 4150 and the DIN 45669.

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 vibration values including frequency in all 3 directions.

The remaining battery capacity and available memory are permanently shown on the display. During measuring it is also possible to view maximum vibration levels. In advance an alarm level can also be set.

For full interpretation options the VIBRA is connected via USB to a Windows PC.

Technical specifications VIBRA-series

Maximum $ \dot{v} $ Maximum $ a $ and frequency	In x, y, z-direction per time interval
Velocity range	0 – 100 mm/s
Resolution display	0.01 mm/s
Resolution AD-converter	0.001 mm/s (24 bits ADC)
Geophone correction	Digital IR filter
Frequency range and accuracy	DIN 45669-1 June 1995, accuracy class 1 or SBR – part A, B 2002
Graphical display	≥ 4 Lines; display backlight; anti-reflex coating; anti-scratch
Sensor type	3-Channel geophone (x-, y-, z-direction)
Storage capacity	4 MB
Storage interval	1, 2, 5, 10, 20, 30, 60 s; 1, 2, 5, 10, 15 min.
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)
Clock stability	≈ 5 minutes/year at 25°C
Temperature range (operating)	- 20°C to + 60°C
Protection rating	IP65 according to DIN 40 050/IEC 529
Casing	Aluminium
Batteries	3 x 1.5 V Alkaline D-size batteries
Battery life	≈ 28 Days (continuous operation)
Data retention	10 Years (minimum) at 25°C
PC software program	Windows 2000/XP
Communication port	USB data transfer
Size	216 x 160 x 50 mm
Weight	2 Kg
Accessories	50 m cable reel Kensington® Security Cable Flashing alarm beacon External power via USB adapter: V _{mains} 100 ↔ 240 V, 47 ↔ 63 Hz



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Main characteristics *VIBRA*-series

- ✓ Fully continuous and automatic registration of the vibration peak values during a long period of time.
- ✓ The *VIBRA*-series is in accordance with national and international standards 'Vibration in buildings' - Effects on structures' and 'Effects on persons in buildings', such as the DIN 4150 – part 2 and 3, DIN 45669 and the SBR.
- ✓ Real-time interpretation and verification of the vibration levels against ruling codes.
- ✓ Unattended vibration measuring for weeks due to the high-tech, low power consumption electronic design in combination with software intelligence.
- ✓ Compact, robust field-computer that is very easy to operate.
- ✓ Professional and fast (graphical) presentation of the monitoring results.
- ✓ Adjustable alarm for velocity (mm/s).
- ✓ The option to connect an external (wireless) alarm beacon to the system.
- ✓ Includes *VIBRA* PC remote control. Remote log in to your *VIBRA* system if the system is connected via USB to a PC in the field.
- ✓ Easy comparison of measuring results: more than one *VIBRA* can be installed at the same location and the units are easily synchronized.



Specific advantages of the *VIBRA*⁺

- ✓ Full compliance with DIN 4150 - part 2, 3 and SBR - part A, B including:
 - Simultaneous measurements
 - Dominant frequency determination with FFT method
 - Software processing
 - KB_{FT} and $KB_{Fmax}/v_{eff,max}$
- ✓ Smart alarm (frequency dependent alarm)
- ✓ Daily status and data e-mail via GPRS/internet
- ✓ Alarm on acceleration (m/s^2) or displacement (mm)
- ✓ E-mail Alarm via GPRS/internet
- ✓ Peak displacement recorded for each channel
- ✓ Automatic level- and calibration checks
- ✓ *VIBRA* PC Trace Recorder (for continuous trace time/velocity trace recording)



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Profound VIBRA-series: detailed features overview		VIBRA	VIBRA-sbr	VIBRA ⁺
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 June 1995, accuracy class 1		
	Frequency characteristic	Lower limit (-3dB): 0.8 Hz (12 dB/oct.) Upper limit (-3dB): 100 Hz (12 dB/oct.)		
	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)			•
Acceleration $ a $	Adjustable in m/s^2 (or none)			•
Clock stability	≈ 5 minutes/year at 25°C	•	•	•
Smart alarm level	Frequency dependent maximum velocity, complying with the SBR or DIN levels			•
Optical signal device	Flashing alarm beacon (via USB cable)	•	•	•
External power	5 Volt supplied to the VIBRA USB connector	•	•	•
GPRS/internet mail function	Wireless data transmission			•
Maximum displacement $ u $	$u_x u_y u_z$ per time interval			•
VIBRA PC Trace Recorder	Continuous time/velocity trace recording			•
VIBRA geophone	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	Windows 2000/XP/Vista/7	•	•	•
	Processing according to SBR-guidelines		•	•
	Processing according to 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 (VIB.00300)

The Profound geophone for the VIBRA range 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.

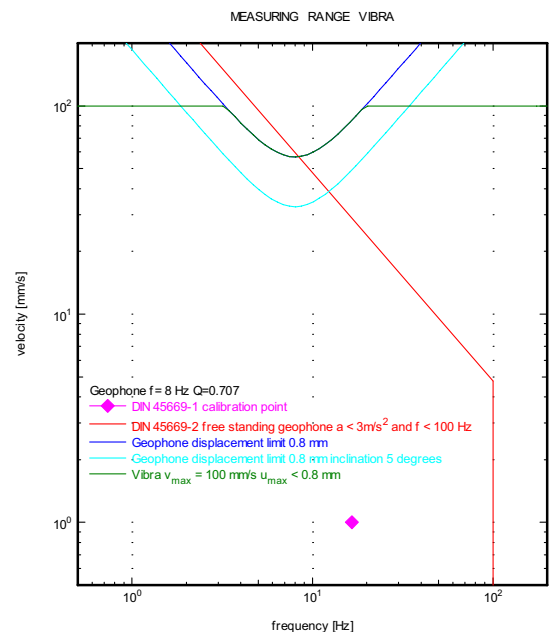
VIBRA+

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 range can be found in the technical specifications.

Technical specifications VIBRA geophone	
Channels	3 (x-, y-, z-direction)
Sensitivity	23.3 Vs/m
Resonance frequency (f_{res})	8 Hz \pm 0.5 Hz
Output Resistance (R_{out})	330 Ohm
Quality factor (Q)	0.75
Distortion at 18 mm/s and 12 Hz	< 0.2 %
f_{res} within tolerance	< 15°
Sensitivity of the vial	53 arc minutes (R130 mm)
Electronic datasheet (ID)	Serial number; calibration date; sensitivity; f_{res} ; R_{out} ; Q
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 \pm 0.5 g (each channel)
Extra on VIBRA+	Inclination measurement
Accessories	Cable reel of 50 m

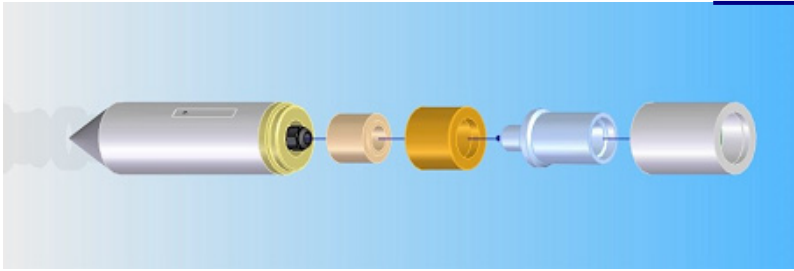


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VIBRA geophone cone



Profound VIBRA geophone cone (VIB.00350)

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.

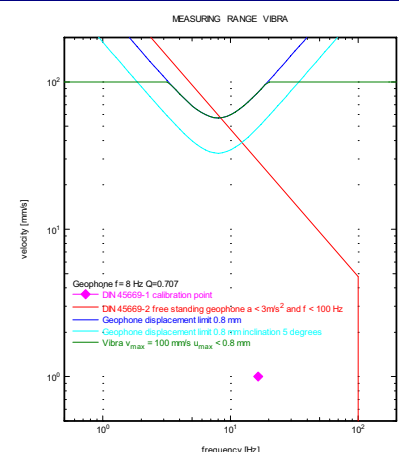
VIBRA+

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 VIBRA geophone cone

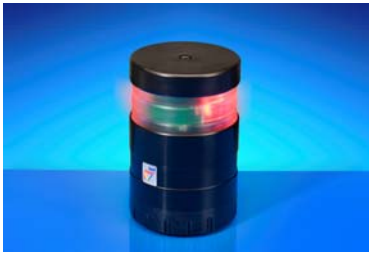
Channels	3 (X-, Y-, Z-direction)
Sensitivity (typical)	23.3 Vs/m
Resonance frequency (f_{res})	8 Hz \pm 0.5 Hz
Output Resistance (R_{out})	330 Ohm
Quality factor (Q)	0.75
Distortion at 18 mm/s and 12 Hz	< 0.2 %
f_{res} within tolerance	< 15°
Max. inclination	\leq 5°
Electronic datasheet (ID)	Serial number; calibration date; sensitivity; f_{res} ; R_{out} ; Q
Protection rating	IP66 according to DIN 40 050/IEC 529
Material	42CrMo4V
Density	4500 kg/m ³
Cone diameter	\varnothing 49.5 mm
Cone length	190 mm
Mass	1.280 kg
Moving mass	11 \pm 0.5 g (each channel)
Screw thread	GeoMil standard for CPT tubes
VIBRA connector	LEMO K Series
Cable length	10 m cable
Accessory	VIB.00320 cable reel 50 m



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VIBRA wireless alarm beacon

Profound VIBRA wireless alarm beacon (VIB.00405)

The VIBRA wireless alarm beacon is a 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 type is required, the internal relay of the VIBRA wireless alarm beacon offers a flexible opportunity to link to other alarm systems.

Long operating life

The internal batteries guarantee a long operating life. To indicate that the batteries need to be changed, the beacon will give a clearly visible signal.

Technical specifications VIBRA alarm beacon	
Flashing frequency	$f_{flash} = 0.5 \dots 5 \text{ Hz}$ 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 VIBRA)
Alarm duration	During 1, 2, 5, 10, 15, 30, 60 minutes or manual switch off (set with the VIBRA)
Max. distance between beacon and VIBRA	≤ 30 metres
Batteries	2x 1.5 V Alkaline D-size batteries
Operating life: standby	> 30 days
Operating life: flashing alarm	> 25 hours
Auto shut-off	> 12 hours after last operation and no received signal
Battery-low indication	$f_{flash} = 2 \text{ Hz}$ (during alarm) $f_{flash} = 1 \text{ Hz}$ (in standby mode)
Overall dimensions	195 mm, \varnothing 125 mm
Weight	1.6 kg
Temperature range	- 10°C to + 50°C
Protection rating	IP65 according to DIN 40 050/IEC 529
Housing materials	Body : Black POM Lens : PMMA
Mounting options	Top side : M8 thread (covered with cap) Bottom side : 5/8" screw thread
Connector	M12 speedcon, 5-pos.
Relais contact	$\leq \text{DC } 60\text{V}/1\text{A}$ $\leq \text{AC } 125\text{V}/1\text{A}$
Linking option for all models	Up to 100 VIBRA systems to one beacon or several beacons to a single VIBRA
Compatibility	Systems with serial number \geq VIBRA VIB01714 VIBRA-sbr VIB01300 VIBRA-sbr+ VIB01000 VIBRA+ VIB01400 Use connection cable (VIB.00432 or VIB.00434) for systems with s/n < above listed
Accessories (optional)	<ul style="list-style-type: none">▪ VIB.00432 Connection cable between VIBRA USB and alarm beacon▪ VIB.00434 Connection cable between VIBRA mini USB and alarm beacon▪ VIB.00436 Fly-lead cable for connection to internal relay



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