

Profound Vibration Monitoring



VIBRA
VIBRA-sbr
VIBRA+

Profound VIBRA-series

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 $ 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: $V_{\text{mains}} 100 \leftrightarrow 240 \text{ V}$, 47 \leftrightarrow 63 Hz



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VIB010/05/2006

Main characteristics/advantages 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 2002
- ✓ 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.
- ✓ The option to connect an external alarm beacon to the system.
- ✓ 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 and 3/SBR – part A, B including:
 - Simultaneous measurements
 - Dominant frequency determination with FFT method
 - Software processing
 - K_{Bft} and K_{bfmax}/V_{eff,max}
- ✓ Smart alarm (frequency dependent alarm)
- ✓ Daily status and data e-mail via GPRS/internet
- ✓ 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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VIBRA
VIBRA-sbr
VIBRA+

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	•	•	•
	Frequency characteristic	•	•	•
	Dominant frequency determination	•	•	•
	Data processing	•	•	•
SBR	Accuracy	•	•	•
	Frequency characteristic	•	•	•
	Dominant frequency determination	•	•	•
	Data processing	•	•	•
Sample frequency	1024 Hz	•	•	•
Velocity data save level	Adjustable between 0.01-100 mm/s (or always)	•	•	•
Alarm level	Adjustable between 0.01-100 mm/s (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	•	•	•
GSM/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	•	•	•
	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	•	•	•



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VIBRA geophone



Profound VIBRA geophone

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.

Plus

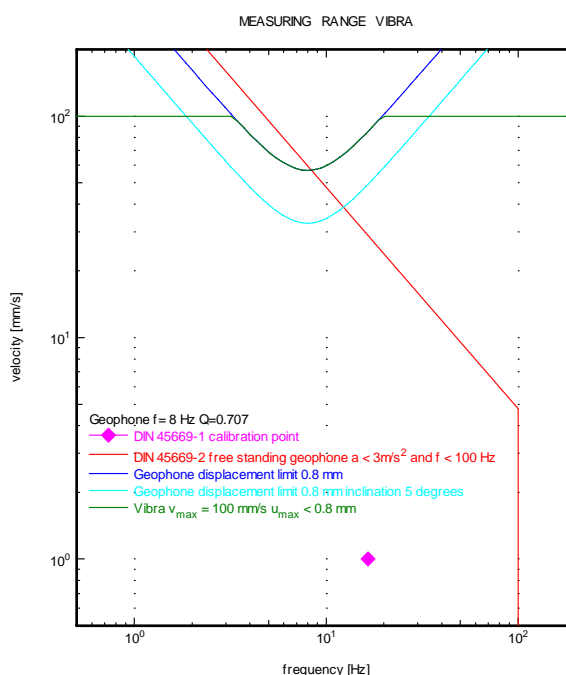
The VIBRA geophone in combination with the VIBRA⁺ offers the following extras:

- Digital measurement 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 Profound VIBRA range can be found in the technical specifications of the VIBRA.

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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VIB030/01/2006

Profound Vibration Monitoring

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.

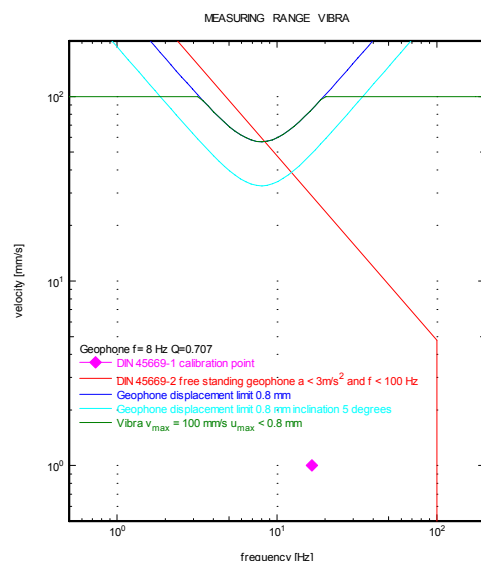
VIB.00350 VIBRA geophone cone

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 alarm beacon

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The VIBRA alarm beacon is a self powered portable alarm that can easily be connected to a system from the VIBRA range. As soon as a preset threshold is exceeded, a clearly visible alarm signal is activated.

The high intensity flashing LEDs quickly notify personnel, independent of the weather circumstances.

You set the alarm level and interval for the beacon with the VIBRA. Proper operation of the beacon can also be tested anytime. After commencing the measurement and upon exceeding the preset alarm threshold, the system will automatically show an alarm text on the display and also activate the alarm beacon. The beacon will keep flashing for the preset duration.

Long operating life

The internal batteries guarantee a long operating life. If the batteries need to be changed, the flashing frequency will increase. The alarm beacon is operated by the same current batteries as the VIBRA.

Flexible

If the project requires another kind of alarm, the internal relays offers a flexible opportunity to link to other alarm systems.

Technical specifications

Flashing frequency	$f_{flash} = 1.5 \text{ Hz}$
LEDs	8 (4 back-, 4 front side)
Total luminous intensity	2 x 40 cd
Colour signal light	High intensity red
Alarm threshold range	Set with the VIBRA: 0.1 to 99.9 mm/s (or none)
Alarm duration	Set with the VIBRA: manually switching off or during 1, 2, 5, 10, 15, 30, 60 minutes
Batteries	2 x 1.5 V Alkaline D-size batteries
Operating life	> 40 hours
Battery-low indication	$f_{flash} = 15 \text{ Hz}$
Size	220 x 120 x 90 mm
Weight	1.4 kg
Temperature range	- 10°C tot + 50°C
Protection rating	IP65 according to DIN 40 050/IEC 529
Housing	Black aluminium; red polycarbonate lens
Carrying	Integrated handle
Cable length	3 m
Connector	USB
Internal relays	< 24 V , < 1 A
Extra function	Alarm test



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VIB040/01/2006