

## Occupational medicine

VM-BODY is applied for measuring human whole-body vibrations. Whole-body vibrations are caused by vibrations or shocks which are transmitted by machines and vehicles in the workplace via seat or feet. If a person is exposed to strong whole-body vibrations, safety and health are endangered and it is proven that backache can be provoked or aggravated.

The "vibration directive" (directive 2002/44/EC) defines minimum requirements for the protection against risks arising from whole-body vibrations.

## Comfort

The measurement modes are based on the international standard ISO 2631. This standard not only covers whole-body vibrations from a medical view, but also comfort assessments, e.g. for passengers in rail vehicles (trains, underground railway, etc.). Thus, the comfort of a person during the transport can be assessed objectively and according to an internationally accepted method.

## Identify causes

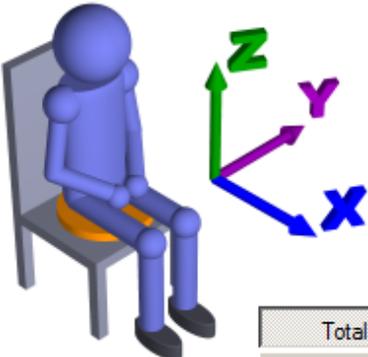
As an extra measurement mode, the identification of transmission characteristics of seats (SEAT value) is available in VM-BODY+. For each measurement, the Pro version additionally offers an analysis in frequency domain - for both, the unweighted signal and also with weighting filters. This way, causes (e.g. structural ones) which contribute to the total vibration value most are detected quickly.

VM-BODY+ 1.9 (1)

Measurement mode | Measurement | Data storage | Analysis | Evaluation | Annunciator

ArbSchV 2007 health seated seat

KS943B.10-X    Ch1 - IBX2D #1 <h2 style="color: blue;">0,070 m/s<sup>2</sup></h2>	KS943B.10-Y    Ch2 - IBX2D #1 <h2 style="color: purple;">0,052 m/s<sup>2</sup></h2>	KS943B.10-Z    Ch1 - IBX2D #2 <h2 style="color: green;">0,119 m/s<sup>2</sup></h2>																																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Acc</td><td>r.m.s.</td><td>G:10</td><td>&lt;1%</td><td>&gt;95%</td></tr> <tr> <td>Wd</td><td>Sf:1,4</td><td colspan="3">MTVV:0,07m/s<sup>2</sup></td></tr> <tr> <td colspan="2">k: 1,400</td><td colspan="3">VDV: 0,13</td></tr> </table>	Acc	r.m.s.	G:10	<1%	>95%	Wd	Sf:1,4	MTVV:0,07m/s <sup>2</sup>			k: 1,400		VDV: 0,13			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Acc</td><td>r.m.s.</td><td>G:10</td><td>&lt;1%</td><td>&gt;95%</td></tr> <tr> <td>Wd</td><td>Sf:1,4</td><td colspan="3">MTVV:0,05m/s<sup>2</sup></td></tr> <tr> <td colspan="2">k: 1,400</td><td colspan="3">VDV: 0,10</td></tr> </table>	Acc	r.m.s.	G:10	<1%	>95%	Wd	Sf:1,4	MTVV:0,05m/s <sup>2</sup>			k: 1,400		VDV: 0,10			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Acc</td><td>r.m.s.</td><td>G:10</td><td>&lt;1%</td><td>&gt;95%</td></tr> <tr> <td>Wk</td><td>Sf:1,4</td><td colspan="3">MTVV:0,12m/s<sup>2</sup></td></tr> <tr> <td colspan="2">k: 1,000</td><td colspan="3">VDV: 0,32</td></tr> </table>	Acc	r.m.s.	G:10	<1%	>95%	Wk	Sf:1,4	MTVV:0,12m/s <sup>2</sup>			k: 1,000		VDV: 0,32		
Acc	r.m.s.	G:10	<1%	>95%																																											
Wd	Sf:1,4	MTVV:0,07m/s <sup>2</sup>																																													
k: 1,400		VDV: 0,13																																													
Acc	r.m.s.	G:10	<1%	>95%																																											
Wd	Sf:1,4	MTVV:0,05m/s <sup>2</sup>																																													
k: 1,400		VDV: 0,10																																													
Acc	r.m.s.	G:10	<1%	>95%																																											
Wk	Sf:1,4	MTVV:0,12m/s <sup>2</sup>																																													
k: 1,000		VDV: 0,32																																													



Vibration total value (Maximum)

0,119 m/s<sup>2</sup>

Remaining	Elapsed
00:03:12	00:00:35

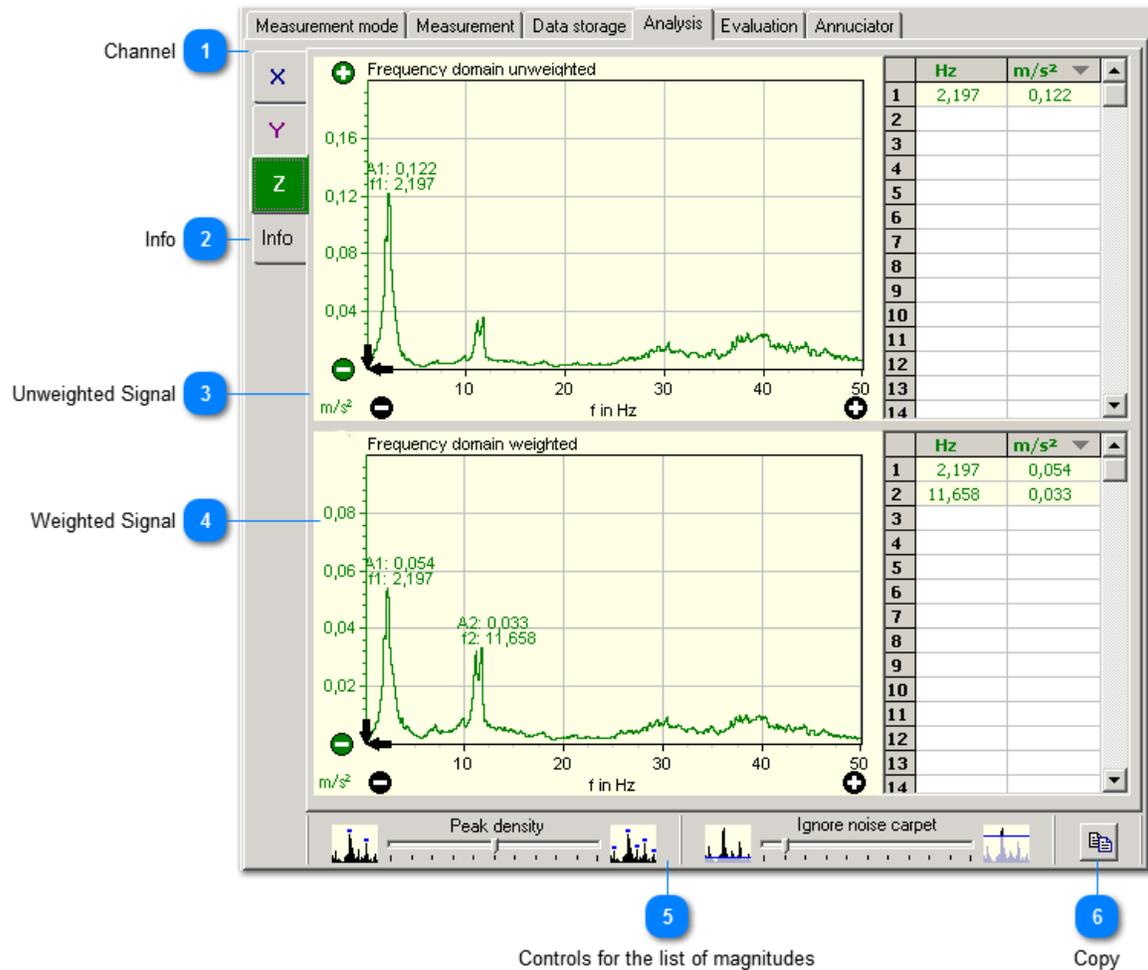
measurement in progress. When the aimed duration has elapsed, the measured values will be copied to the data storage.

Signal input

<p style="color: blue; font-weight: bold; margin: 0;">X</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Ch1 - IBX2D #1</div> <div style="border: 1px solid gray; padding: 2px;">G : 10</div>	<p style="color: purple; font-weight: bold; margin: 0;">Y</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Ch2 - IBX2D #1</div> <div style="border: 1px solid gray; padding: 2px;">G : 10</div>	<p style="color: green; font-weight: bold; margin: 0;">Z</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Ch1 - IBX2D #2</div> <div style="border: 1px solid gray; padding: 2px;">G : 10</div>
---	---	--

## ANÁLISIS

VM-BODY+ allows a frequency analysis for both, the unweighted and weighted vibration signal. This way you can detect causes of too high vibration values.



### 1. Channel



Graphical analysis is provided for each measuring channel.

### 2. Info



Information concerning the storage location of the measured data for analysis etc.

### 3. Unweighted Signal



The unweighted signal only contains the bandpass filter before it is transmitted to the frequency analysis. The displayed vibration frequencies do not have a special weighting with regard to health, comfort or perception of humans.

Scaling (spreading and compressing the measurement curve) is carried out by means of the buttons and Scrolling is carried out by clicking on the scroll arrows.

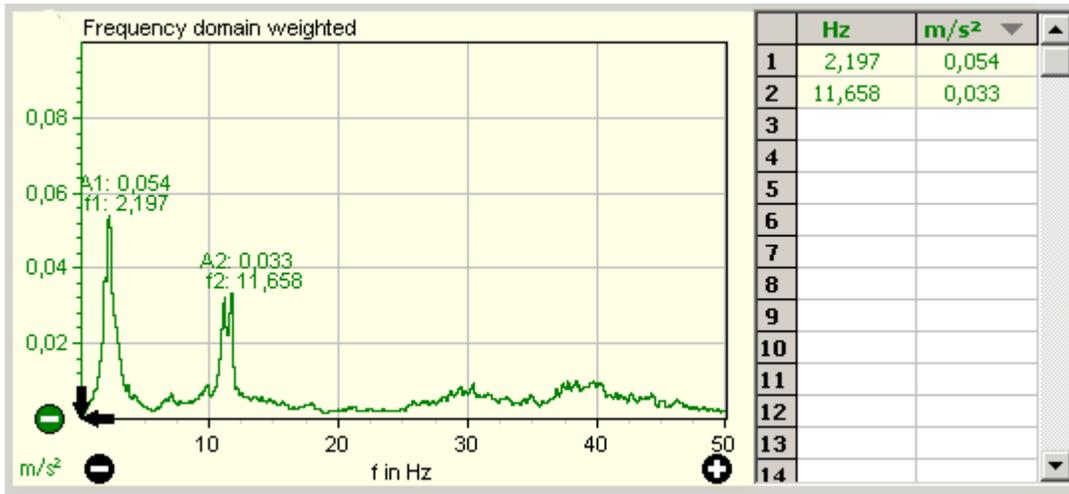
Scaling with the mouse

By means of the mouse, the chart can be zoomed or scrolled on the frequency axis. The chart is scrolled with the left mouse button held down. By holding down the right mouse button, you choose an area to be zoomed.

List of magnitudes

The highest magnitudes are detected automatically and they are presented with frequency and value. Frequency and value are indicated directly in the chart as well as in the list next to the chart. The detection algorithm can be configured.

#### 4. Weighted Signal



The weighted signal contains the bandpass filter and weighting filter for human vibration before it is transmitted to the frequency analysis. Thus, the displayed vibration frequencies are weighted with regard to health, comfort or perception of humans.

Scaling (spreading and compressing the measurement curve) is carried out by means of the buttons and Scrolling is carried out by clicking on the scroll arrows.

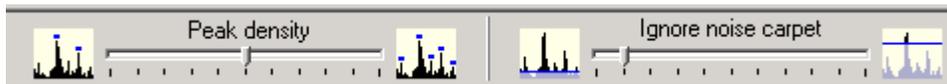
Scaling with the mouse

By means of the mouse, the chart can be zoomed or scrolled on the frequency axis. The chart is scrolled with the left mouse button held down. By holding down the right mouse button, you choose an area to be zoomed.

List of magnitudes

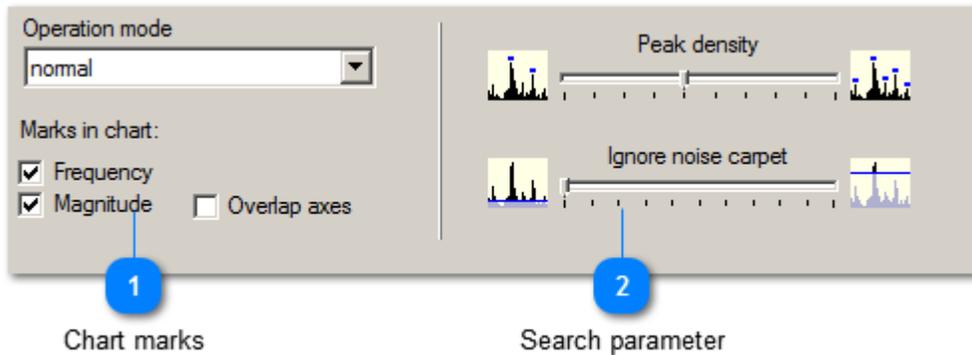
The highest magnitudes are detected automatically and they are presented with frequency and value. Frequency and value are indicated directly in the chart as well as in the list next to it to graphic. The detection algorithm can be configured.

#### 5. Controls for the list of magnitudes

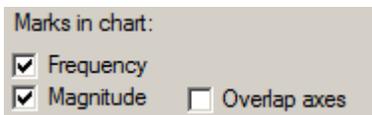


These controls work like the ones in the VM-FFT.

Settings in operation mode "normal"

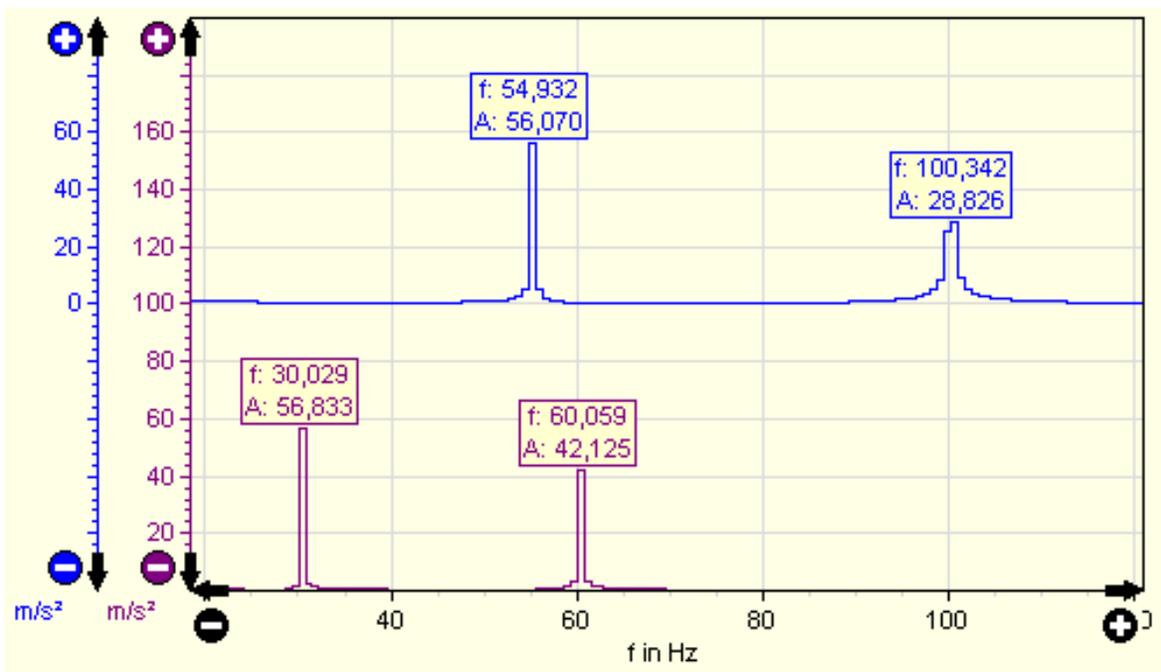


### 5.1. Chart marks

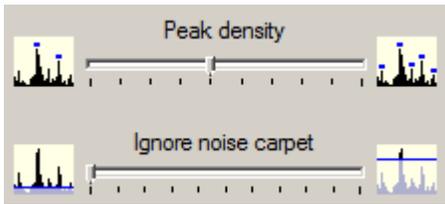


The found magnitudes can be marked in the measurement chart. You can select whether frequency and/or magnitude values are displayed numerically in the mark.

By the function Overlap axes markers are displayed in the foreground, if they are overlapped by an axis.



## 5.2. Search parameter



The search parameters define whether only the highest (and thus few) magnitudes or many magnitudes are to be found.

Peak density determines the number of found magnitudes. The more you move the controller to the right side, the more magnitudes will be found.

Ignore noise carpet determines which level is to be ignored as noise carpet during the finding of magnitudes. The more you move the controller to the right, the more is ignored and fewer magnitudes will be found.

## 6. Copy



By means of this button the graphical presentation of both signals is copied to the clipboard. Afterwards, the chart can be entered into a word processing or other programs.

## Supported standards

VM-BODY offers 21 different measurement modes, based on 2002/44/EC

ISO 2631-1:1997 (whole-body vibration) health assessment

ISO 2631-1:1997 (whole-body vibration) comfort assessment

ISO 2631-2:2003 (vibration in buildings) comfort assessment

ISO 2631-4:2001 (rail vehicles) comfort assessment