

# Four Channel Human and Universal Vibration Meter

VM31



Sn	No.	Date	Time	Comment	Filter	Detection	Filter (weighting factor)	Weighting	X	Y	Z	A	B	C	Units
10	00001	07.09.14	19:09:36	STAPLER HALLE SCHMIDT	WB	RMS	Wd (1.40) Wd (1.40) Wk (1.00)	health	0.31	0.39	1.26	1.55	1.50	1.50	m/s <sup>2</sup>
11	00002	07.09.14	12:19:51	STAPLER HOF SCHMIDT	WB	RMS	Wd (1.40) Wd (1.40) Wk (1.00)	health	0.34	0.35	1.18	1.19	1.19	1.19	m/s <sup>2</sup>
12	00003	07.09.14	12:30:01	STAPLER HALLE MEIER	WB	RMS	Wd (1.80) Wd (1.80) Wk (1.00)	health	0.50	0.54	1.84	1.91	1.91	1.91	m/s <sup>2</sup>
13	00004	07.09.14	13:10:11	STAPLER HOF MEIER	WB	RMS	Wd (1.80) Wd (1.80) Wk (1.00)	health	0.54	1.06	2.81	2.81	2.81	2.81	m/s <sup>2</sup>

1. Calculation of Daily Exposure A(8) for Whole-Body Vibrations (based on RMS input)															
In accordance with: EU Directive 2002/44/EC and ISO 2631-1: 1997															
1	Operating person:		Person 1	Activities:	Activity 1										
2	(overwrite "Person")		Person 2	(overwrite "Activity")	Activity 2										
3	with names		Person 3	with descriptive text	Activity 3										
4			Person 4		Activity 4										
5			Person 5		Activity 5										
6			Person 6		Activity 6										
7			Person 7		Activity 7										
8			Person 8		Activity 8										
9			Person 9		Activity 9										
10			Person 10		Activity 10										
Exposure limit value: 1.15 m/s <sup>2</sup>															
Exposure action value: 0.5 m/s <sup>2</sup>															
A(8) calculation															
1. Whole-Body vibration values imported from VM31 in m/s <sup>2</sup> (only interval RMS - no VDV):															
2. Assign persons and activities:															
3. A(8) calculation results:															
No.	RMS values X/Y/Z	Vector sum	Max. RMS	Comment	Date	Time	(as entered in VM31)	dd mm yy	hh mm ss	(select)	(select)	hrs	min	Person	A(8)
15	0.31 0.39 1.26	1.55	1.50		07.09.14	10:09:36	Person 1			Activity 1		02	00	Person 1	1.01 m/s <sup>2</sup> Near exposure limit!
17	0.0022 0.24 0.70	3.18	3.18		07.09.14	12:19:51	Person 1			Activity 2		00	30	Person 2	1.62 m/s <sup>2</sup> Above exposure limit!!!
18	0.0003 0.50 0.40	1.70	1.71		07.09.14	12:30:01	Person 2			Activity 1		02	30		
19	0.0004 0.54 1.06	2.81	2.81		07.09.14	13:10:11	Person 2			Activity 2		01	45		

## Application

- Versatile tool for vibration measurement during product development and for health and safety at the workplace to EU guideline
- Measurement of hand-transmitted vibration
- Measurement of whole-body vibration
- SEAT measurement at driver seats
- Vibrations on passenger and merchant ships
- Condition monitoring of rotating machinery in three axes
- Vibration measurement in vehicles
- Supported standards: ISO 8041; ISO 2631; ISO 5349; ISO 10326; ISO 20816; ISO 20238-5; ISO 28927; ISO/TR 18570; 2002/44/EC

## Properties

- Four independent measuring channels
- Weighting filters to ISO 8041 Wh for hand-arm vibration and Wb, Wc, Wd, Wj, Wk, Wm for whole-body vibration
- Interval and running RMS, maximum RMS (MTVV), vibration dose value (VDV), vector sum, peak and maximum peak
- Measurement of vibration acceleration, velocity and displacement
- FFT of acceleration with 125 lines
- TEDS sensor detection
- Memory for 10000 measurements and 1000 FFTs with date and comment
- USB interface
- Excel macro included for data transfer and calculation of daily exposure A(8)
- Clear user guidance with colored OLED
- Very compact design
- 10 hours operation with 3 Micro (AAA) batteries
- Available as hand-arm kit and whole-body kit including suitable sensors and accessories

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## Technical Data

### Measurands and Ranges

Vibration measurands	Vibration acceleration	
	Vibration velocity/severity	
	Vibration displacement	
Overall values	True RMS value	
	Maximum transient vibration value MTVV	
	Interval RMS value; unlimited averaging time	
	Vector sum of X, Y, Z	
	Vibration dose value VDV	
	True pak value	
	Maximum peak value	
Measuring range acceleration	0.01 to 600 (Transducer sensitivity 10 mV/ms <sup>-2</sup> )	m/s <sup>2</sup>
	0.1 to 6000 (Transducer sensitivity 1 mV/ms <sup>-2</sup> )	m/s <sup>2</sup>
Measuring range velocity	0.01 to 5000 (Transducer sensitivity 10 mV/ms <sup>-2</sup> )	mm/s
Measuring range displacement	0.1 to 7500 (Transducer sensitivity 10 mV/ms <sup>-2</sup> )	µm
Linear amplitude range	>75 (±6 % error)	dB
ADC resolution	24	Bit
Noise	<0.003 m/s <sup>2</sup>	
Lower frequency limit acceleration	0.2; 1	Hz
Lower frequency limit velocity	1; 2; 10	Hz
Lower frequency limit displacement	5	Hz
Upper frequency limit acceleration	1000; 1500	Hz
Upper frequency limit velocity	100; 1000	Hz
Upper frequency limit displacement	250	Hz
Weighting filters	Wb; Wc; Wd; Wh; Wj; Wk; Wm; unweighted	
Frequency analysis	FFT; 125 points for X/Y/Z	
	Acceleration spectrum	
	3 to 240; 6 to 480; 12 to 960; 24 to 1920 Hz	
Indicators	OLED; RGB; 128 x 160 pixels	

### Connectors

Input channels	4	
Input signals	IEPE	
Input connector	Socket Binder 711; 4 poles; channel 4: Socket Binder 711; 8 poles	
IEPE constant current	0.7 to 1	mA
TEDS support	IEEE 1451.4; template 25	
Digital interfaces	USB 2.0 FS; CGC mode; ASCII command set; Binder 712; 8 poles	

### Power Supply

Battery	3 x LR03 / HR03 / AAA	
Battery operating time	10 to 14	h
External supply voltage	5 (USB)	VDC

### Case Data

Dimensions without connectors	125 x 65 x 27 (H x W x D)	mm
Case material	ABS	
Weight	140 (without sensor)	g
Operating temperature range	-20 to 60 (95 % rel. humidity without condensation)	°C

### Scope of delivery

Carrying case ; USB cable  
VM31-HA: VM31; KS963B10; 091-CMR-B711-3; 141B; 143B; 027  
VM31-WB: VM31; KS963B100-S; 027  
VM31-HAWB: VM31; KS963B10; 091-CMR-B711-3; 141B; 143B; 027; KS963B100-S

### Notice

For data import and calculation of vibration exposure A(8) and VDV(8) an Excel macro file is provided

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