

# Four Channel Human and Universal Vibration Meter

VM31



Sr#	No.	Date	Time	Comment	Filter	Detection	Filter (w/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	1.52		m/s²
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		m/s²
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	2.11		m/s²
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	3.96		m/s²

1. Calculation of Daily Exposure A(8) for Whole-Body Vibrations (based on RMS input)														
In accordance with: EU Directive 2002/44EC and ISO 2631-1: 1997														
Operating person:			Person 1	Activities:		Activity 1								
(overwrite "Person")			Person 2	(overwrite "Activity")		Activity 2								
with names:			Person 3	with descriptive text:		Activity 3								
			Person 4			Activity 4								
			Person 5			Activity 5								
			Person 6			Activity 6								
			Person 7			Activity 7								
			Person 8			Activity 8								
			Person 9			Activity 9								
			Person 10			Activity 10								
Exposure limit value: 1.15 m/s²														
Exposure action value: 0.5 m/s²														
A(8) calculation														
1. Whole-Body vibration values imported from VM31 in m/s² (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	Person	Activity	Duration	Person	A(8)
15	0.31 0.39 1.26	1.55	1.52		07.09.14	19:09:36	Person 1		02:00	Person 1	Activity 1	02:00	Person 1	1.01 m/s² Near exposure limit!
17	0.34 0.35 1.18	1.19	1.19		07.09.14	12:19:51	Person 1		00:30	Person 2	Activity 2	00:30	Person 2	1.62 m/s² Above exposure limit!!!
19	0.50 0.54 1.84	1.91	2.11		07.09.14	12:30:01	Person 2		02:30	Person 2	Activity 1	02:30	Person 2	1.62 m/s² Above exposure limit!!!
21	0.54 1.06 2.81	2.81	3.96		07.09.14	13:10:11	Person 2		01:45	Person 2	Activity 2	01:45	Person 2	1.62 m/s² Above exposure limit!!!

## 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

## Technical Data

### Measurement functions

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	
Measuring range acceleration	0.01 to 600 (Transducer sensitivity 10 mV/ms-2 )	m/s <sup>2</sup>
	0.1 to 6000 (Transducer sensitivity 1 mV/ms-2 )	m/s <sup>2</sup>
Measuring range velocity	0.01 to 5000 (Transducer sensitivity 10 mV/ms-2 )	mm/s
Measuring range displacement	0.1 to 7500 (Transducer sensitivity 10 mV/ms-2 )	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 (human vibration)	Wb; Wc; Wd; Wh; Wj; Wk; Wm; Wp; 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	
Indication	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

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  
 Carrying case ; USB cable

### Notice

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

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