

Tri-Axial Velocity Sensor with Built-In Amplifier MST-1031



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1 Technical Data for Sensor MST-1031

1.1 Measuring Principle

In the sensor case is for each of the three measuring directions an electrodynamic velocity pickup with a natural frequency from 4.5Hz (Geofone) built-in. The electronic network built-in in the same case extends the lower frequency range to 1 Hz while the upper frequency range is limited at 315 Hz and the signal is amplified in accordance with the selected measuring range.

1.2 Accuracy Class

The device corresponds to accuracy class 1 appropriately to DIN-standard DIN 45 669 edition Sep 2010.

1.3 Working Frequency Range

The working frequency range is 1...315 Hz according to DIN-standard DIN 45 669 edition Sep 2010.

1.4 Upper Measuring Limit and Detection Limit

Upper measuring limit: 100 mm/s, (in measuring range 1)
with restrictions at low frequencies

Detection limit: 0.01 mm/s or lower (0.0001 in measuring range 1 mm/s)

1.5 Measuring Ranges

The following measuring ranges can be chosen by selecting a jumper on the electronic network built-in in the sensor case:

Measuring range 1	up to	100 mm/s	Sensitivity:	0.1 V/mm/s
Measuring range 2	up to	10 mm/s	Sensitivity:	1.0 V/mm/s
Measuring range 3	up to	1 mm/s	Sensitivity:	10.0 V/mm/s

Voltage at end of measuring range: 10 V

1.6 Reference Measuring Range

The reference measuring range is the measuring range 2 (10 mm/s)

Reference conditions:

Reference frequency	f_r	16 Hz
Amplitude	v	10 mm/s
Signal		sine-wave, Harmonic distortion $\leq 2\%$
Transverse motions	$v_{Q_{RMS}}$	< 0.5 mm/s
Temperature	T_{amb}	23 ± 2 °C

1.7 Exceeding of the Measuring Range

A small exceeding of the measuring range limit around approx. 10% is permissible and the measured values before and after the exceeding of the measuring range limit can be considered to be correct. During a greater exceeding of the measuring range limit ($>20\%$), the measured values during a certain time after exceeding of the measuring range limit must also be considered to be than not correct. The exceeding of the measuring range limit of an individual component has no influence onto the other components.

1.8 Amplitude Frequency Response

The amplitude frequency response corresponds to the DIN-standard DIN 45 669 edition Sep 2010. To every sensor, a corresponding test record is supplied.

1.9 Output Signal

Output signal:	Instantaneous value of the velocity (PPV).
Voltage at end of measuring range:	10 V
Output impedance	50 Ohm
Permissible load impedance	10 kOhm
Permissible length of cable	300 m

1.10 Warm-Up Duration

Within the permissible working temperature, no warm-up periods are to be considered.

1.11 Environmental Conditions

Operating temperature	-20...60°C
Storage temperature	-20...60°C
Case IP65 is splash-water proof, limited waterproof	

1.12 Power Supply

An external 12 V DC power supply is required for supply the sensors.

The electric circuits of DC power supply and the signals are galvanically separated from each other so that no influencing is to be expected. Several sensors can be operated with same DC power supply.

Working Voltage	11...27 V
Current consumption (at 12 V)	85 mA
Power consumption	1 Watt

With the recommended extension cable (6 x 0,34 mm²) and a cable length of 150m must not be exceeded with a 12 V of supply voltage. For the maximal permissible cable length of 300m the supply voltage must not less than 15 V or a larger conductor cross section must be chosen.

1.13 Weight and Dimensions

Dimensions WxHxD	over all: 150 x 68 x 125 mm Case: 80 x 57 x 125 mm (T = 140 with cable gland) Ground plate: 150 x 10 x 125 mm
Connecting cable	1.5 m
Weight approx.	1.6 kg

1.14 Transportation

The MST1031 must be treated always with care.

1.15 Notes for the Set Up and Fastening of the Sensor

See to this: Standards sheet DIN 45 669 part 2 edition Jan 84
measurement of vibration immission, method of measurement.
Chapter 3 points of measurement and Chapter 5 coupling.

The sensor must be arranged precisely leveled.

1.16 Measuring Direction

See to this: Standards sheet DIN 45 669 part 2 edition Jun 2005
measurement of vibration immission, method of measurement.
Chapter 4 measuring direction

On the case of the sensor, the corresponding measuring directions (X,Y,Z) are marked.

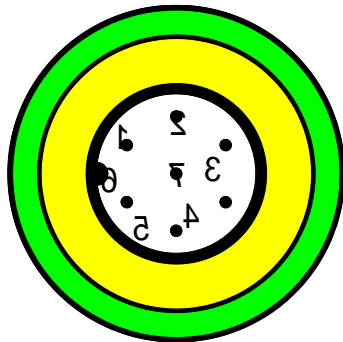
1.17 Information of possible Disturbance through Electromagnetic Fields

See to this: Standards sheet DIN 45 669 part 2 edition Jun 2005
measurement of vibration immission, method of measurement.
Chapter 8 interference sources

Placing of the connecting cables parallel or together with high power lines has to be avoided.
The electrodynamic velocity pickups in the sensor are sensible of magnetic fields.

2 Electrical Connection

The connecting cable has a 7-pol plug with the following pin assignment:



1	white	Signal X component
2	brown	Signal Y component
3	green	Signal Z component
4	yellow	Signal Ground
5	gray	Power Supply – (GND)
6	pink	Power Supply + (+11V...27V)
7	black (blank)	Cable Shield (connected to case)

To avoid crosstalk from main power, connect pin 4 and 5 together near to the recording equipment.

fitting counterpart to the plug:
 (also available from Amphenol)

for cable:
 for case:

Binder Type 09-0234-00-07
 Binder Type 09-0236-00-07

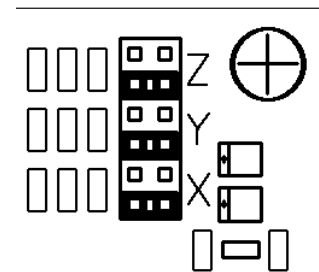
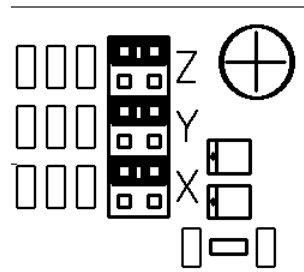
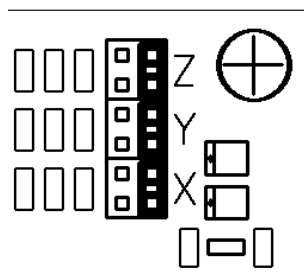
3 Changing the Measuring Range

For the change of the measuring range, the sensor case must be opened. Loosen the four screws at the cover and open it. The following illustrations show a section of the electronic network on that the red jumpers for the measuring range are. Now position the red jumpers in accordance with the illustrations mentioned below (illustrations marked the red jumpers as black) in accordance with the desired measuring range. Close the cover again and ensure that no cables are wedged in. Control during tighten of the screws whether the seal is cleanly available between case bottom part and cover fittingly. Do not let the case open unnecessarily for a long time since otherwise the desiccant becomes inactive

measuring range 100 mm/s

measuring range 10 mm/s

measuring range 1 mm/s



Measuring Range

Value		100 mm/s	10 mm/s	1 mm/s
10V	=	100.00 mm/s	10.000 mm/s	1.0000 mm/s
1V	=	10.00 mm/s	1.000 mm/s	0.1000 mm/s
100mV	=	1.00 mm/s	0.100 mm/s	0.0100 mm/s
10mV	=	0.10 mm/s	0.010 mm/s	0.0010 mm/s
1mV	=	0.01 mm/s	0.001 mm/s	0.0001 mm/s

4 Specific Notes

Because of the power supply of the amplifiers is isolated with a switch mode regulator, residues of the switching frequency are in the measuring signal still (approx. 100kHz) existing.

Is the measuring signal digitized in such a way, the usually available alias filter in the measuring equipment guarantees that these interference are cut off before the analog/digital conversion.

In other cases, it is recommend to use a two pole low-pass filter with a typically cutoff frequency of 1...2 kHz.

5 Dimensions

