



3 Axis Vibration Sensor

M-A542VR10

- Capable of measuring velocity, velocity RMS, and velocity P-P (ISO10816 / ISO20816 compliant)
- Frequency response characteristics: 10 Hz to 1,000 Hz (-3dB)
- Insensitive to magnetic influences
- High dynamic range: ± 100 mm/s (110 dB)
- 3-axis digital output RS422
- Waterproof and dustproof IP67

Recommended Application

- MHM (Machine Health Monitoring) • Condition Based Maintenance (CBM) • Motion analysis and control
- SHM (Structural Health Monitoring) • Vibration analysis, control and stabilization • Lissajous analysis



Product number
M-A542VR10 : E91E614120



Recommended Operating Condition

Parameter	Condition	Min	Typ	Max	Unit
V_{IN} to GND		9	12	32	V
Input Voltage	RD+ / RD-		5		V
Operating Temperature Range		-30		70	°C

Specifications

$T_A = -30^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.15\text{V} \sim 3.45\text{V}$, $\leq \pm 1\text{G}$, unless otherwise noted.

Parameter	Test Conditions / Comments	Min	Typ	Max	Unit
VELOCITY					
Sensitivity					
Output Dynamic Range	$f = 10\text{ Hz} \sim 1000\text{ Hz}$			± 100	mm/s
Scale Factor	2^{-22} m/s/LSB		2.38×10^{-4}		mm/s/LSB
Sensitivity Error	25°C , $\leq 1\text{ G}$	-1550		1550	$\times 10^{-6}$ (ppm)
Nonlinearity	$\leq 1\text{ G}$, Best fit straight line, RT	-0.15		0.15	% of FS
Cross Axis Sensitivity	No alignment correction		± 0.9 *3		%
Noise					
Noise Density	25°C , Avg, $f = 200\text{ Hz} \sim 1000\text{ Hz}$		1.4×10^{-4}		mm/s/ $\sqrt{\text{Hz}}$, rms
Cantilever Resonance Frequency	25°C , $V_{CC} 3.3\text{ V}$		4,460		Hz
Frequency Property					
Frequency Range	-3 dB at 25°C		10~1,000		Hz
DISPLACEMENT					
Sensitivity					
Dynamic Range	$f = 1\text{ Hz} \sim 100\text{ Hz}$			± 200	mm
Scale Factor	2^{-22} m/LSB		2.38×10^{-4}		mm/LSB
Nonlinearity	$\leq 1\text{ G}$, Best fit straight line, RT	-0.15		0.15	% of FS
Cross Axis Sensitivity			± 0.9 *3		%
Noise					
Noise Density	25°C , Avg, $f = 20\text{ Hz} \sim 100\text{ Hz}$		0.7×10^{-5}		mm/ $\sqrt{\text{Hz}}$, rms
Frequency Property					
Frequency Range	-3 dB at 25°C		1~100		Hz
TEMPERATURE SENSOR					
Output Range		-40		85	°C
16bit Scale Factor *1	Output=2634(0x0A4A) at 25°C		-0.0037918		°C/LSB
8bit Scale Factor *1	Output=2634(0x0A4A) at 25°C		-0.9707008		°C/LSB
RELIABILITY					
MTBF *2	JIS-C5003 $T_A = 25^\circ\text{C}$	87,600			hour

*1) This is a reference value used for the internal temperature correction, and is not guaranteed to accurately output the interior temperature.

*2) The MTBF is an estimated value derived from the result of high temperature operation with a system requirement of $T_A = 25^\circ\text{C}$ and a 60% reliability level.

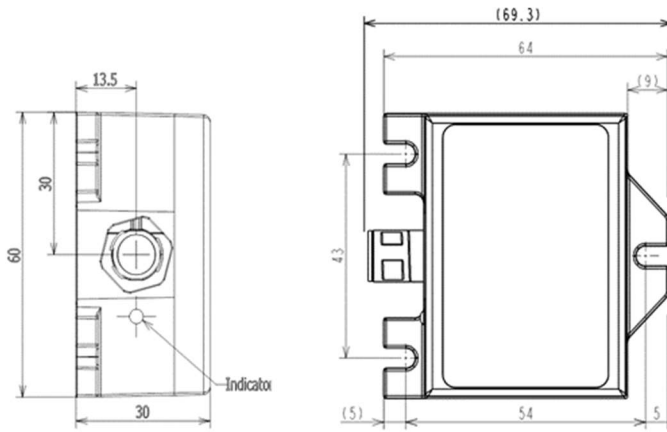
*3) When the alignment is corrected by the host, the other axis sensitivity is Typ. 0.1 %.

Note) The values in the specifications are based on the data calibrated at the factory. The values may change according to the way the product is used.

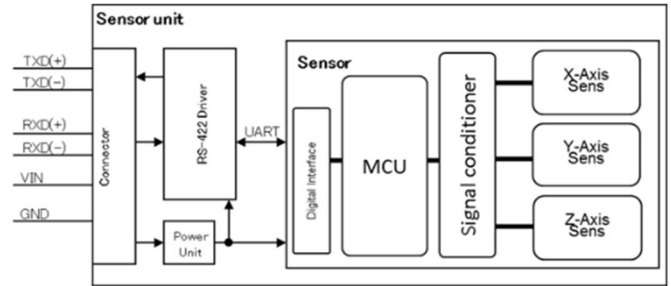
Note) The Max/Min value is the maximum/minimum value of the design or factory shipment examination, unless otherwise specified.

Note) The calibrated standard 1G gravitational acceleration value is 9.80665 m/s²

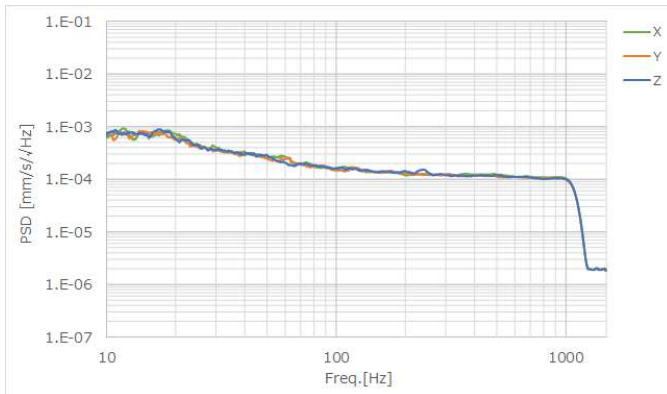
Outline Dimensions



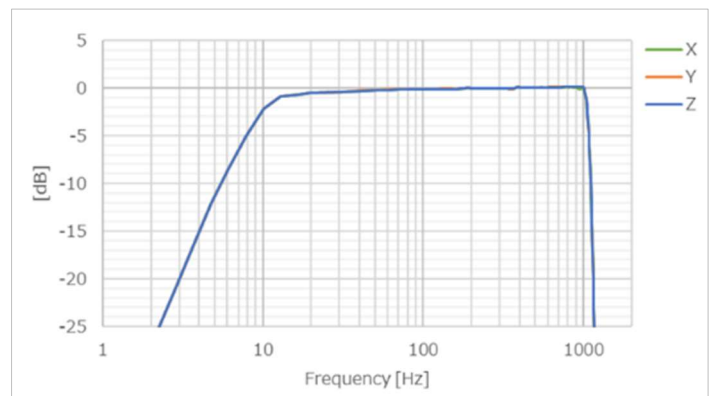
Block Diagram



Noise Density (Velocity Output)



Frequency Response (Velocity Output)



The product characteristics shown above are just examples and are not guaranteed as specifications

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