VCT Series 3-Axis RS-485 Vibration Transmitter



The ProSense VCT-16G-3001 is a 3-axis digital vibration transmitter that simultaneously measures acceleration, velocity, and displacement while also monitoring temperature, making it well suited for continuous equipment condition monitoring. It measures ±16 g peak acceleration across a 10 Hz to 5 kHz frequency range and it calculates RMS and peak values for acceleration, velocity, and displacement on all three axes, with frequency bands aligned to ISO 10816-3 and ISO 20816-3 guidelines. The sensor communicates over a standard RS-485 interface using Modbus RTU protocol, supporting baud rates up to 921,600 bps for fast data transfer. In addition to overall vibration metrics, it outputs true peak values, time waveform data, and FFT spectrum data for deeper diagnostic analysis beyond simple trending. The transmitter operates on 6–24 VDC power, connects via a 4-pin M8 female quick-disconnect, and is rated IP67 for washdown and harsh industrial environments. Configuration, firmware updates, and data viewing are handled through the free ProSense VCT-SOFT utility, which requires the USB-485M USB-to-RS485 communication adapter to connect the sensor to a PC.

Features

- 3-axis (triaxial) synchronous measurement with real-time LED status indication
- Acceleration, velocity, and displacement — both RMS and peak, per ISO 10816-3 and ISO 20816-3 guidelines
- True peak detection for real-time bearing condition prediction
- Time waveform and FFT spectrum extraction (0–5 kHz, 6,145 lines)
- Synchronous temperature measurement (-20 to +70 °C)
- RS485 / Modbus RTU communication, up to 921,600 bps
- IP67 rated for harsh environments and clean-room use
- 6–24 VDC power, 4-pin M8 quick-disconnect connector

Applications

This 3-axis Modbus transmitter is well suited for equipment condition monitoring where more than simple trending is needed — its true-peak detection, time waveform, and FFT spectrum outputs support root-cause diagnosis of bearing wear, imbalance, and misalignment rather than just alarm-threshold trending. Typical targets include motors, pumps, fans, gearboxes, and compressors on production lines where digital integration into a plant network is preferred over a simple analog loop.

Because of its IP67 rating and clean-room suitability, it's a strong fit for semiconductor and advanced process equipment monitoring, as well as machine tools in machining processes where precise, multi-axis vibration characterization matters. It's also well suited to predictive maintenance programs feeding IoT/big-data platforms, since Modbus RTU output integrates directly into SCADA/data historian systems without extra signal conditioning hardware.

CE

5 YEAR WARRANTY



For a variety of cable options see our website www.AutomationDirect.com

ProSense VCT Series 3-Axis RS-485 Vibration Transmitter									
Model	*Price*	*Measuring Range*	*Frequency Range*	*Process Connection*	*Electrical Connection*	*Operating Voltage*	*Output*	*Drawing Link*	*Weight (lb)*
VCT-16G-3001	$755.00	±16g	10 Hz–5 kHz	1/4-28 UNF female	4-pin M8 quick-disconnect	6–24 VDC	Modbus	PDF	0.65

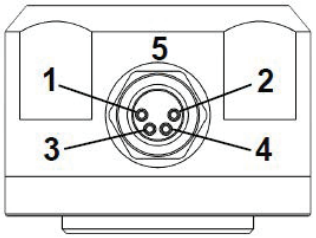
VCT Series 3-Axis RS-485 Vibration Transmitter

ProSense VCT Series 3-Axis RS-485 Vibration Transmitter Specifications	
Dynamic Vibration	
Sensor Type	MEMS triaxial accelerometer
Measurement Axes	X, Y, and Z (three orthogonal axes)
Acceleration Range	±16g
Resolution	0.488 mg
Frequency Response (±3 dB)	2 Hz–5 kHz
Resonance Frequency	6.9 kHz
Calculated Vibration Metrics (Per Axis)	
Acceleration, RMS	2 Hz–1 kHz; 10 Hz–5 kHz
Acceleration, Peak	2 Hz–1 kHz; 10 Hz–5 kHz
Velocity, RMS	2 Hz–1 kHz; 10 Hz–1 kHz; 10 Hz–5 kHz
Velocity, Peak	2 Hz–1 kHz; 10 Hz–1 kHz; 10 Hz–5 kHz
Displacement, RMS	2 Hz–1 kHz; 10 Hz–1 kHz
Displacement, Peak	2 Hz–1 kHz; 10 Hz–1 kHz
Other Metrics	Crest factor, standard deviation
Other Digital Outputs	
Temperature	-20 to +70 °C measurement range
True Peak	Fs @ 13,333 Hz
Vibration Spectrum	0 Hz–5 kHz, 6,145 lines
Time Waveform	13,333 samples, 1 second
Standards Compliance	ISO 10816-3 and ISO 20816-3
Communication	
Interface	RS-485
Protocol	Modbus RTU
Recommended Baud Rate	9,600 or 115,200 bps
Maximum Baud Rate	921,600 bps
Electrical	
Power Supply	6–24 VDC
LED Indicator	1 (RGB)
Connector	4-socket M8 female, side exit
Mating Connector	4-pin M8 male
Recommended Cabling	4-conductor, PVC jacket, shielded
Wiring — Pin 1	Power
Wiring — Pin 2	Ground
Wiring — Pin 3	Signal +
Wiring — Pin 4	Signal –

ProSense VCT Series 3-Axis RS-485 Vibration Transmitter

ProSense VCT Series 3-Axis RS-485 Vibration Transmitter Specifications	
Mechanical	
Case Material — Upper	A6061 aluminum
Case Material — Lower	303 stainless steel
Dimensions	35mm dia. × 26mm height
Protection	IP67
Mounting	1/4-28 UNF female (Includes (1) 1/4-28 UNF / M8 x 1.25mm and (1) 1/4-28 UNF threaded adapters)
Mounting Thread	1/4-28 UNF
Environmental	
Operating Temperature	-20 to +70 °C [-4 to 158 °F]
Storage Temperature	-20 to +80 °C [-4 to 176 °F]
Operating Humidity	5–95% RH
Shock Limit	5,000g

Wiring Diagram



Connections	
Function	Connector pin
power	1
ground	2
signal +	3
signal -	4
shield	5 (housing)

Click or scan the above QR code to be taken to the manual for the VCT Series 3-Axis RS-485 Vibration Transmitters

Software

VCT-SOFT is a free Windows-based utility for configuring and monitoring the ProSense VCT-16G-3001 vibration transmitter. It connects to the sensor via RS485 using the USB-485M USB-to-RS485 adapter, allowing users to set communication parameters (baud rate, parity, slave ID), update sensor firmware, and view live vibration data without needing separate Modbus polling software.

Once connected, the software displays real-time overall vibration values (acceleration, velocity, displacement — RMS and peak) across all three axes, along with temperature and trend data over time. It also lets users capture and view time waveform and FFT spectrum data, with adjustable waveform size and FFT bandwidth settings, and export any of this data — overall readings, waveforms, or spectra — directly to CSV for further analysis or record-keeping. Free to download and easy setup, VCT-SOFT is the fastest way to get a VCT-16G-3001 online, verify it's reading correctly, and pull baseline data before integrating it into a PLC/SCADA system via Modbus RTU.

ProSense VCT Series 3-Axis RS-485 Vibration Transmitter Software		
Model	***Description***	***Price***
VCT-SOFT	ProSense Windows configuration and monitoring software, free download only. For use with ProSense VCT-16G-3001 vibration transmitter. Requires USB-485M USB to RS-485 communication adapter.	Free Download

ProSense® Vibration Monitoring

Vibration Monitoring (Machine Condition Monitoring)

Vibration Monitoring, also referred to as Machine Condition Monitoring, is used to monitor, analyze, and identify vibrations of industrial equipment, which may indicate a malfunction, pending failure, or process restriction. Vibration analysis can identify developing problems allowing for timely and predictable maintenance scheduling before major damage or failure, and production downtime. Primarily, it is used to determine the operating and mechanical condition/health of rotating equipment such as pumps, motors, compressors, paper machines, rolling mills, machine tools, and gearboxes. Vibration sensors can also be used to measure vibration as a process variable, for example, material handling/positioning systems looking for an impact/vibration when something is moved or placed.

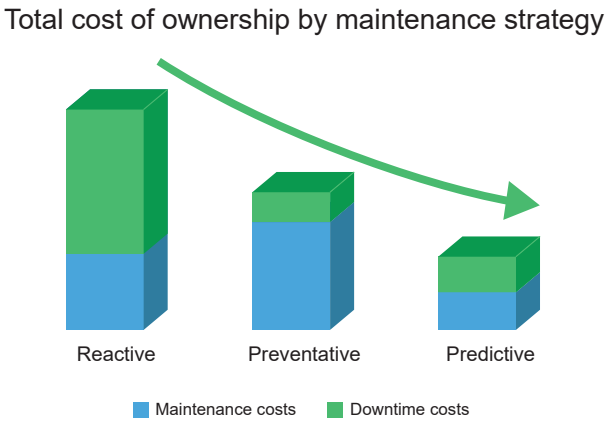
Common Industrial Maintenance Strategies

There are 3 basic types of industrial maintenance processes and each have costs associated with them.

Reactive maintenance - highest total cost of ownership. Run-to-failure strategy and unplanned downtime is usually more expensive than planned downtime and typically there is secondary damage to other components.

Preventative maintenance - downtime is scheduled prior to failure, but it carries a high cost because parts and labor are consumed prematurely.

Predictive or Condition-based maintenance - uses real-time (continuous) monitoring technology to optimize equipment use. Maintenance is performed only when necessary, based on the actual condition and health of the machine, and without production loss.



Real-time Maintenance (RtM) Technologies for Predictive Maintenance

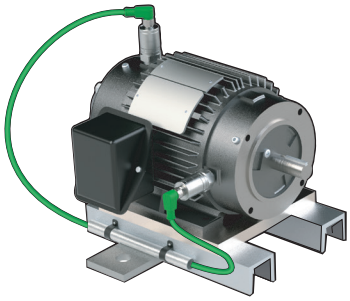
For industrial companies, operational worthiness in real-time is key to improving OEE (Overall Equipment Effectiveness) and increasing profits. Applying Real-time Maintenance technologies such as continuous vibration monitoring to production equipment increases equipment availability, maintains machine throughput, and minimizes material losses. With RtM vibration monitoring products, machines are continuously monitored and have their operational status communicated in real-time, allowing for automatically planned maintenance, reduced downtime, and improved quality.....all improving the bottom line.

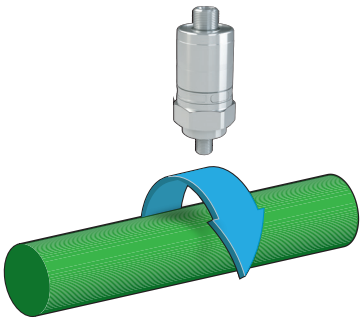
Standard DIN ISO 10816: Mechanical Vibration - Evaluation of Machine Vibration by Measurements on Non-Rotating Parts

According to DIN ISO 10816, the vibration of a machine depends on its size, vibrating body characteristics, mounting system, and purpose. For most machines, regardless of the type of bearings used, measurements of the broad-band RMS vibration velocity on structural parts, such as bearing housings, adequately characterize the running conditions of the rotating shaft elements with respect to their trouble-free operation.

Standard DIN ISO 10816: Mechanical Vibration - Continued

Measurements should be taken on the bearings, bearing support housing or other structural parts which significantly respond to the dynamic forces transmitted from the rotating elements at the bearing locations and characterize the overall vibration of the machine. For most machine types, measuring vibration at a single location will characterize the vibratory state of that machine. However, for some machines it may be necessary to measure vibration at various positions, possibly in two or three directions. The forces on a rotating device, such as a motor armature or a bearing, are predominately found radially to the direction of rotation. Failure modes like unbalance, misalignment and bearing damage are first detected in the radial direction. Therefore, measuring a single axis in the radial direction is the most common and effective method of vibration measurement.





Primary direction of force for rotating equipment is radial to rotation.

Vibration Evaluation Zones

DIN ISO 10816 defines typical evaluation zones used for qualitative assessment of the vibration on a given machine.

Zone A: The vibration of newly commissioned machines would normally fall within this zone.

Zone B: Machines with vibration within this zone are normally considered acceptable for unrestricted long-term operation.

Zone C: Machines with vibration within this zone are normally considered unsatisfactory for long-term continuous operation. Generally, the machine may be operated for a limited period in this condition until a suitable opportunity arises for remedial action.

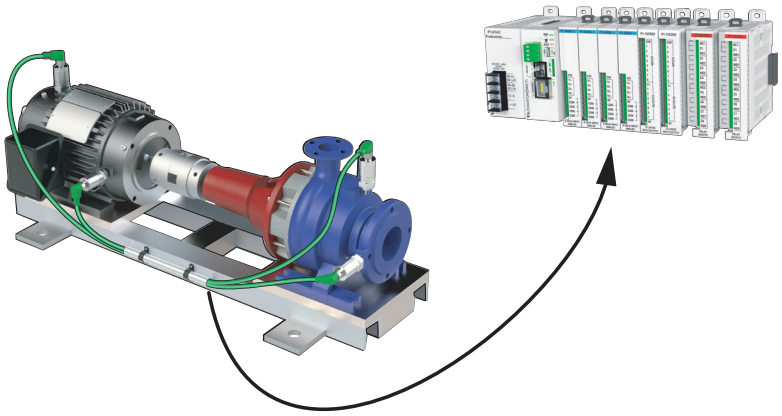
Zone D: Vibration values within this zone are normally considered to be of sufficient severity to cause damage to the machine.

Zone boundary limits for specific machine types are provided in DIN ISO 10816. For machine types not defined in the standard, DIN ISO 10816 includes the following table of typical zone boundary ranges. In general, small machines (electric motors with power up to 15 kW) tend to lie at the lower end of the range and larger machines (prime movers with flexible supports in the direction of measurement) tend to lie at the upper end of the range. Caution should be exercised when applying the typical values given in the table as there may be specific factors (position and direction of measurement, frequency range, support flexibility and operating conditions) associated with a particular machine which would require the use of different values.

	Range of typical zone boundary values RMS vibration velocity mm/s			
0.28				0.28
0.45				0.45
0.71	Zone boundary A/B 0.71 to 4.5			0.71
1.12				1.12
1.8		Zone boundary B/C 1.8 to 9.3		1.8
2.8				2.8
4.5			Zone boundary C/D 4.5 to 14.7	4.5
7.1				7.1
9.3				9.3
11.2				11.2
14.7				14.7
18				18
28				28
45				45

Vibration Velocity Transmitter or Switch and a PLC

A PLC can continuously monitor the 4-20mA output of a vibration velocity transmitter. The analog 4-20mA output allows detection of rising vibration levels before reaching a warning or alarm point and can be used to easily trend overall machine health over time. The digital output of a vibration switch allows for remote or local vibration warning or alarm limit indication and can be used to initiate equipment shut down. With analog or digital inputs from the vibration sensor, the PLC can be programmed for ALARM and TRIP points to notify plant personnel that action is required or to initiate equipment shut down.



ALARMS: Used to provide a warning that action may be necessary when vibration limits have been reached, or a significant change has occurred, at which action may be necessary. The ALARM values can vary considerably, up or down, for different machines. The values chosen will normally be set relative to a baseline value determined from experience for the measurement position for that particular machine. Where there is no established baseline (e.g. with a new machine), the initial ALARM setting should be based either on experience with other similar machines or relative to agreed acceptance values based on DIN ISO 10816.

TRIPS: Used to specify the magnitude of vibration beyond which further operation of the machine can cause damage. The values used are generally the same for all machines of similar design and would not normally be related to the steady-state baseline value used for setting ALARMS.

