ProSense® VCTP Series Vibration Transmitters



The ProSense VCTP series (VCTP-0.5-1000 and VCTP-1.0-1000) single-axis vibration transmitters output a 4–20 mA current signal proportional to peak velocity vibration for continuous machine condition monitoring. These sensors cover a 10–1000 Hz frequency range and are available in two full-scale output options — 0–0.5 in/s peak (VCTP-0.5-1000) or 0–1.0 in/s peak (VCTP-1.0-1000) — allowing selection based on the expected vibration severity of the monitored equipment. Both models feature a 1/4-28 UNF female process connection for standard mounting and a 4-pin M12 quick-disconnect connector for simplified field wiring and sensor replacement. The transmitters operate on standard 12–30 VDC power and are rated IP67/IP68, making them suitable for washdown and harsh industrial environments. Designed for easy integration into existing process control systems, these current-output sensors interface directly with standard PLC analog input cards without additional signal conditioning.

Features

- Peak velocity output, current loop signal (4–20 mA)
- Full-scale options: 0–0.5 in/s (VCTP-0.5-1000) or 0–1.0 in/s (VCTP-1.0-1000)
- Frequency range: 10–1000 Hz
- 1/4-28 UNF female process connection
- 4-pin M12 quick-disconnect connector
- 12–30 VDC operating voltage
- IP67/IP68 rated for harsh environments
- Direct PLC integration via standard current loop

Applications

These 4–20 mA peak velocity transmitters work well for continuous condition monitoring on rotating industrial equipment such as motors, pumps, fans, blowers, gearboxes, and compressors. Typical mounting points are bearing housings, where the sensor trends overall vibration severity over time to catch developing problems like imbalance, misalignment, or bearing wear before they cause unplanned downtime. Because they output a simple current loop signal, they integrate easily into existing PLC systems for automatic trending and alarm thresholds, without requiring specialized vibration analysis software.

Common settings include packaging conveyors, HVAC rooftop units and air handlers, material handling systems, and water/wastewater pump stations. The 0.5 in/s model suits smaller or lower-speed equipment where finer resolution at lower vibration levels is useful, while the 1.0 in/s model fits larger machinery with higher baseline vibration — and the 10–1000 Hz frequency range covers most standard rotating speeds.

CE

5 YEAR WARRANTY

ASSEMBLED IN THE USA FROM FOREIGN & DOMESTIC PARTS



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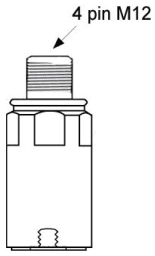
ProSense VCTP Series Vibration Transmitters Selection Guide

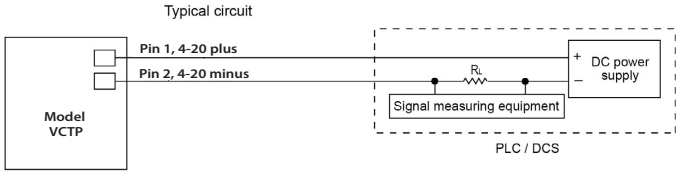
Model	Price	Measuring Range (Peak)	Frequency Range	Process Connection	Electrical Connection	Operating Voltage	Output	Drawing Link	Weight (lb)
VCTP-0.5-1000	$230.00	0–0.5 in/s peak	10–1000 Hz	1/4-28 UNF female	4-pin M12 quick-disconnect	12–30 VDC	4–20 mA	PDF	0.30
VCTP-1.0-1000	$230.00	0–1 in/s peak	10–1000 Hz	1/4-28 UNF female	4-pin M12 quick-disconnect	12–30 VDC	4–20 mA	PDF	0.30

ProSense® VCTP Series Vibration Transmitters

ProSense VCTP Series Vibration Transmitter Specifications		
Model	***VCTP-0.5-1000***	***VCTP-1.0-1000***
Output		
Output Type 4–20 mA	Calculated peak velocity	
Full Scale (20 mA), Peak	0.5 in/s [12.7 mm/sec]	1.0 in/s [25.4 mm/sec]
Full Scale Accuracy	±5%	
Repeatability	±2%	
Transverse Sensitivity	5%	
Frequency Response		
±10%	10 Hz–1.0 kHz	
±3 dB	3.5 Hz–2.0 kHz	
Power		
Power Type	2-wire loop powered	
Supply Voltage (at sensor)	12–30 VDC	
Loop Resistance at 24 VDC	700Ω	
Turn-On Time	30s	
Output Connector		
Connector Type	4-pin M12	
Pin 1	Loop positive (+)	
Pin 2	Loop negative (–)	
Sensing Element		
Element Design	PZT, shear	
Grounding	Case isolated, internally shielded	
Mechanical		
Case Material	316L stainless steel	
Mounting	1/4-28 UNF female (Includes (1) 1/4-28 UNF / M8 x 1.25mm and (1) 1/4-28 UNF threaded adapters)	
Sensor Sealing	Hermetic	
Integral Cable Sealing	IP68	
Environmental		
Operating Temperature	-40 to +105 °C [-40 to 221 °F]	
Vibration Limit	250g peak	
Shock Limit	2,500g peak	

Wiring Diagram





Connections (-M12 models)	
Function	Connector pin
loop positive (+)	1
loop negative (-)	2
N/C	3
N/C	4
ground	shell

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.

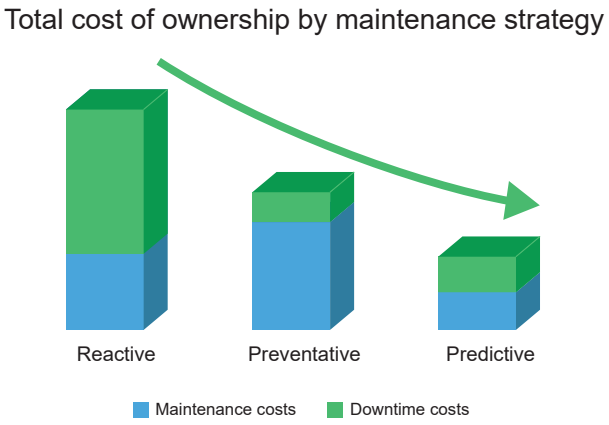
Common Industrial Maintenance Strategies

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

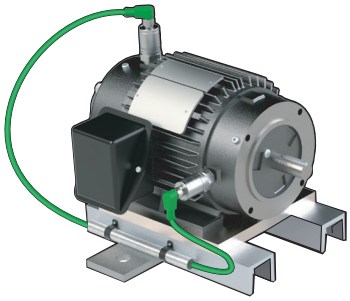
For industrial companies, operational worthiness in real-time is key to improving OEE (Overall Equipment Effectiveness) and increasing profits. Applying Real-time Maintenance technologies such as continuous vibration monitoring to production equipment increases equipment availability, maintains machine 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.

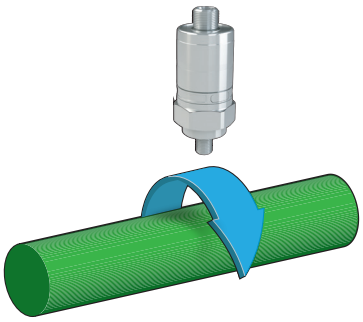
Standard DIN ISO 10816: Mechanical Vibration - Evaluation of Machine Vibration by Measurements on Non-Rotating Parts

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.

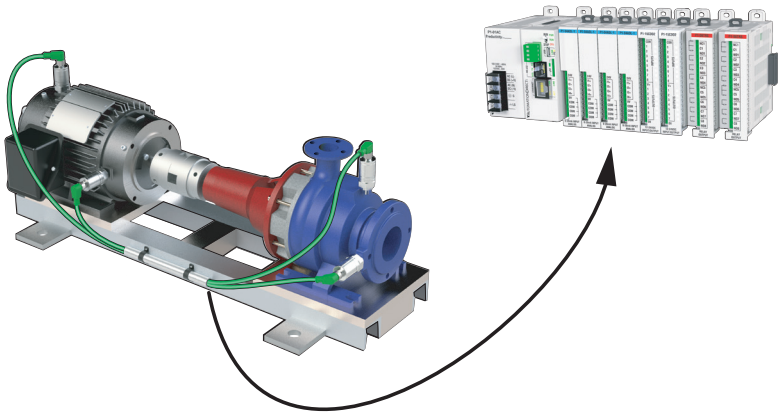
Zone D: Vibration values within this zone are normally considered to be of sufficient severity to cause damage to the machine.

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.

