Condition Monitoring Excellence.

Intelligent advanced warning and vibration diagnostics—up to SIL 2.

Product Overview
Vibration Sensors

Your automation, our passion.

PEPPERL+FUCHS

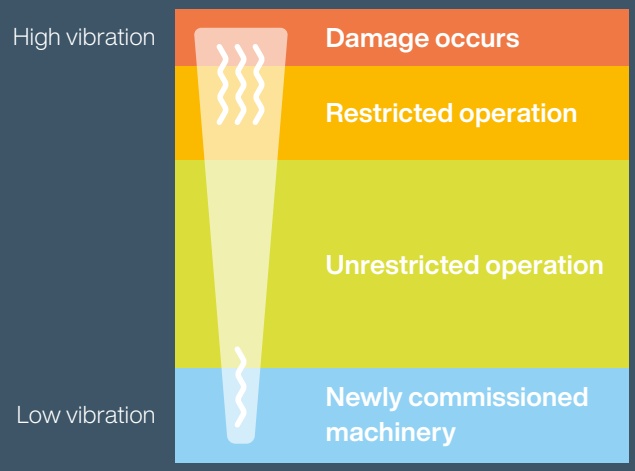
Technology

Reliable Vibration Monitoring for Maximum Machine Protection

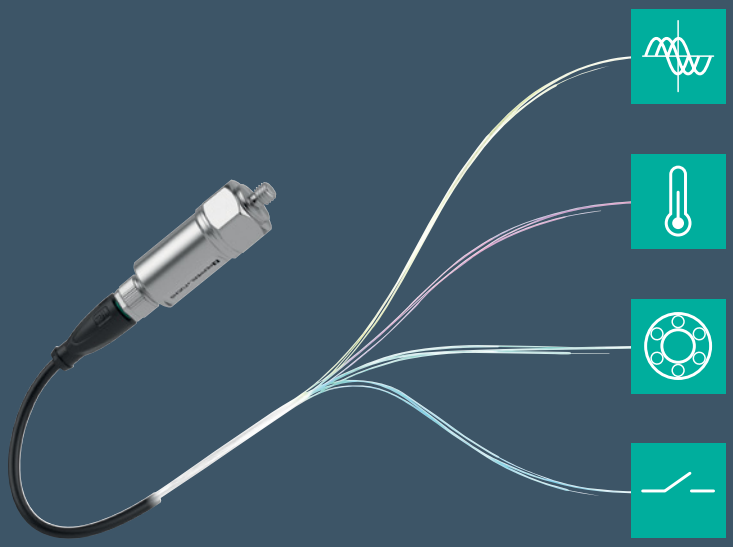
There will always be a level of vibration when machines are in operation, but the intensity of the vibrations may increase significantly over time due to incorrect alignment or imbalance. Pepperl+Fuchs' vibration sensors reliably detect any changes in these measured values, allowing preventive maintenance to be undertaken before any costly damage or failures occur.

Detecting Faults Early to Prevent Downtimes

Every machine will generate a certain degree of vibration when in operation. Changes in the vibration characteristics may indicate misalignment, bearing wear, or impending failures. Pepperl+Fuchs' vibration sensors allow for the safe monitoring and evaluation of this critical machine characteristic. The machine's condition can be continuously measured and reported as a warning to the monitoring controller in the event of characteristic changes. Plant operators can therefore act before costly machine damage and downtimes occur—this is predictive maintenance that guarantees maximum machine availability and process reliability.



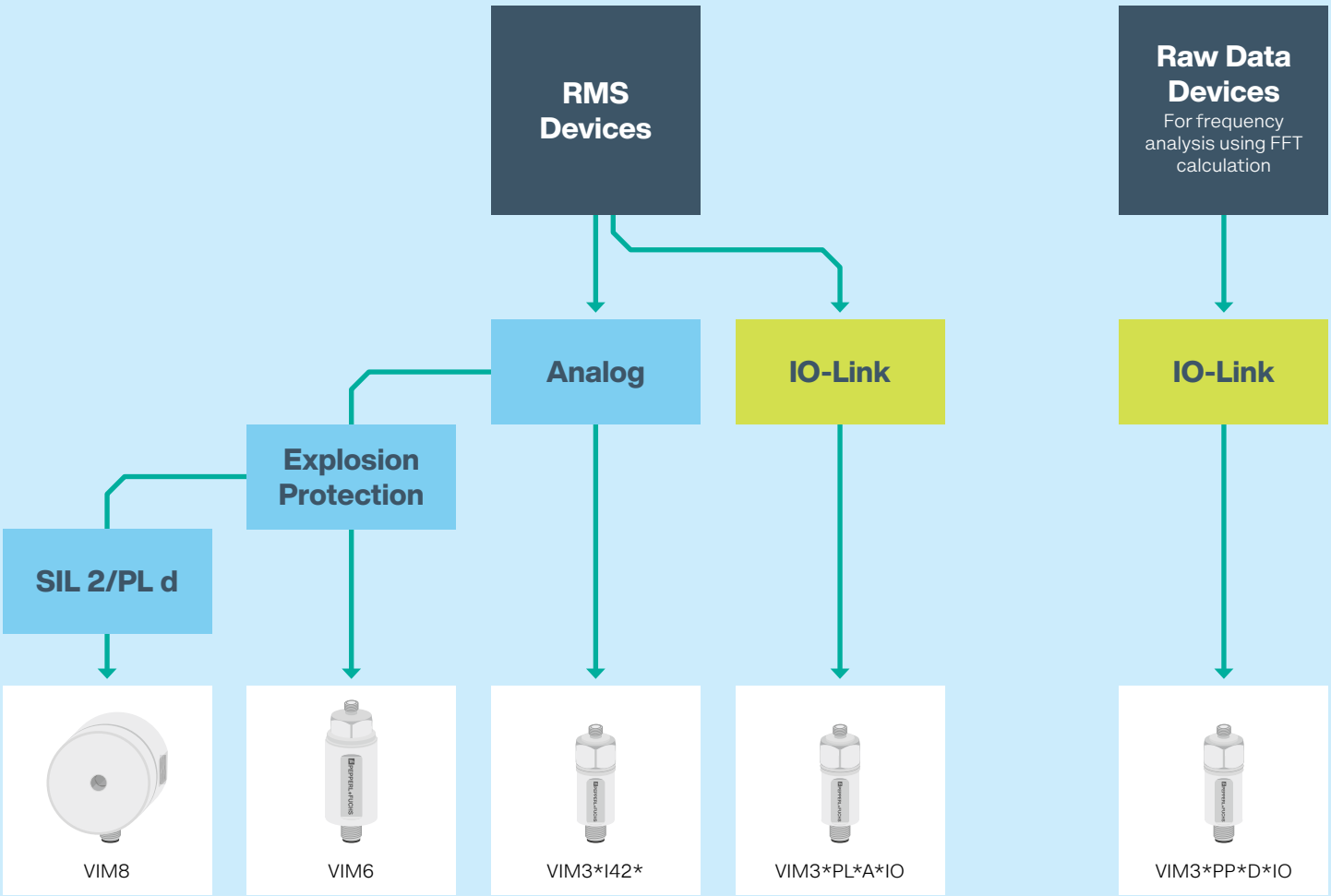
Plant condition according to DIN ISO 10816 (20816) and DIN ISO 13373-3



Vibration values for specific applications can be uniquely interpreted to determine the condition of the machine, while the general standards of DIN ISO 10816 (20816) and DIN ISO 13373-3 provide standardized guidance in evaluating the machine condition. These standards contain precise vibration limits for industrial machines and can be used to assess the condition of the machine, from newly commissioned installation to critical condition. Using these DIN standards as the basis of analysis, the ongoing vibration data can be evaluated to predict the future reliability of the machine function.

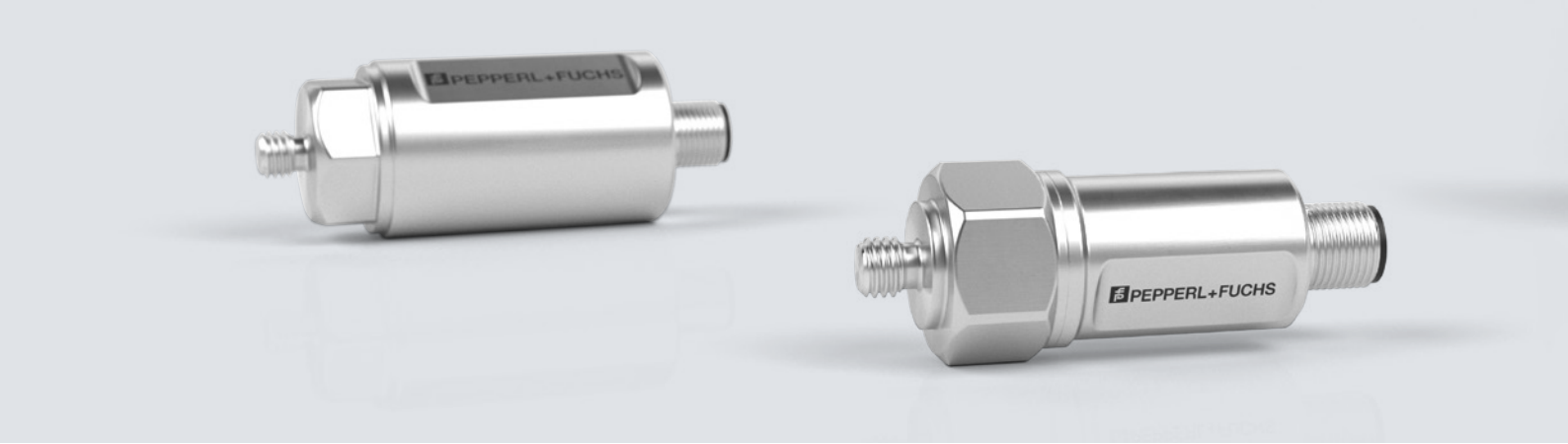
Broad Portfolio, Suitable for All Applications

These condition monitoring sensors provide reliable vibration measurement data required for efficient predictive maintenance. One such example is using vibration speed data to identify vibrations caused by mechanical imbalance, loose mechanics, or alignment errors in low-frequency ranges, or using sensor data based on vibration acceleration to monitor vibrations in higher-frequency ranges that could be the result of bearing damage and transmission failure. Some models also provide convenient configurable relay outputs, allowing for simple integration into the machine warning or monitoring systems. Along with this broad portfolio of products, Pepperl+Fuchs boasts a full complement of comprehensive accessories to suit every application.



A Portfolio as Diverse as the Application Requirements

From standard applications to challenging applications in difficult ambient conditions, Pepperl+Fuchs' vibration sensors impress with maximum performance and a wide range of versions. Their certifications make them the perfect choice for global applications up to SIL 2/PL d and Zone 1/21.



VIM3 Series—the Economical All-Rounder

The vibration sensors from the VIM3 series are the perfect choice for all standard applications using IO-Link or analog interface. The exceptionally large measuring range allows for vibration ranges up to 128 mm per second, and the rugged and compact design is synonymous with offering the best value for the money. The 12 kHz device also provides raw acceleration data for high-precision analyses. Depending on the application, the housing is available in V2A, V4A, or duplex steel with encapsulated electronics, ensuring an extra-long service life. The analog version is also certified to SIL 1/PL c for reliable use in safety-relevant applications.

VIM6 Series—Perfect for Extended Temperature Ranges

These sensors can measure data for both temperature and vibration speed and acceleration. Higher-than-normal temperatures may be the result of mechanical wear caused by friction and could result in machine damage. This measured value can therefore provide key information about the machine condition. This sensor series is ideal for use in an extended temperature range from –40 °C to 125 °C and has all the necessary approvals for worldwide use in hazardous areas.

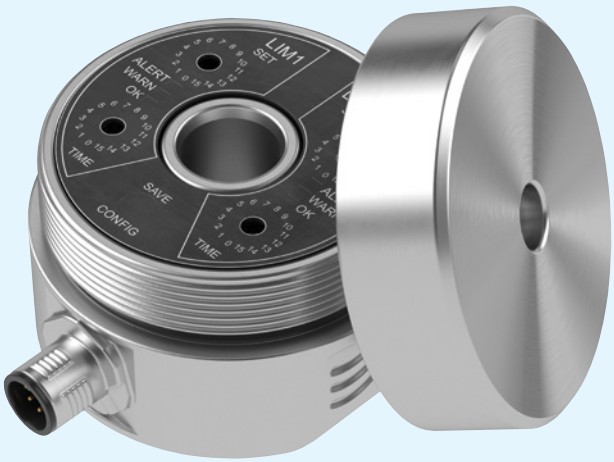
Technical Data	VIM3 	VIM6 	VIM8 
Interface	IO-Link/Analog 4 ... 20 mA	Analog 4 ... 20 mA	Analog 4 ... 20 mA
Temperature range	–40 °C ... +85 °C	–40 °C ... +125 °C	–35 °C ... +125 °C
Output values	Speed/acceleration/temperature/crest/ acceleration raw data	Speed/acceleration/temperature	Speed/acceleration/crest
Switches	Switching output	–	CAM switches manually adjustable
Ex certification	–	Ex (global)	Ex (global)
Safety certification	SIL 1/PL c (analog version)	–	SIL 2/PL d

Highlights

- Optimized system reliability: vibration velocity, acceleration, and crest factor provide the most reliable information about the machine condition
- Acceleration raw data devices for frequency ranges up to 12 kHz with a unique sampling rate of up to 64 kHz for high-precision analyses
- Long service life: V2A/V4A and duplex steel variants with extremely robust housing and encapsulated electronics
- Integration in safety-relevant applications: variants with certifications according to SIL 1/PL c and SIL 2/PL d
- Simple commissioning without programming effort: sensors for parameterization directly on the device
- Suitable for use in hazardous areas up to Zone 1/21

VIM8 Series—for Challenging Outdoor Applications

This series is the ideal choice for applications in the mining or offshore sectors. Providing precise information about the machine condition, this series can measure the crest value of the vibration conditions to better classify bearing condition and potential wear in these applications. Rotary switches provide a convenient method for setting limits and delay times, allowing the device to be easily used without the need of an additional analyzer or controller. Features such as an extended temperature range (–35 °C to 125 °C), certifications to SIL 2/PL d, and all the necessary approvals for global use in hazardous areas make this series the ideal choice for these more demanding applications.

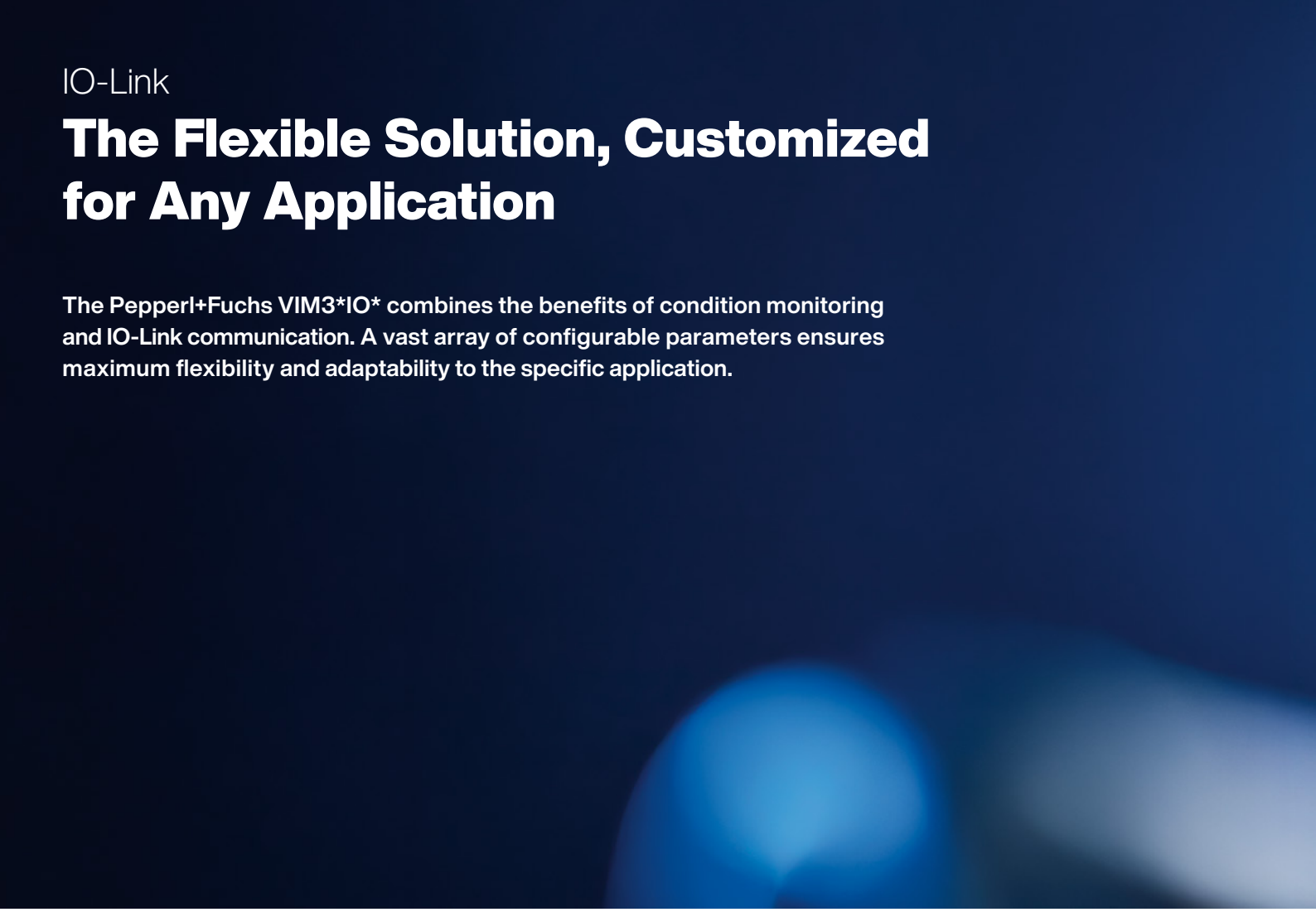


For more information, visit
pepperl-fuchs.com/pf-vim

IO-Link

The Flexible Solution, Customized for Any Application

The Pepperl+Fuchs VIM3*IO* combines the benefits of condition monitoring and IO-Link communication. A vast array of configurable parameters ensures maximum flexibility and adaptability to the specific application.



Comprehensive Machine Condition Data, Reliable Analysis

The IO-Link vibration sensor VIM3*IO* from Pepperl+Fuchs provides a wide range of measurement values and output data. Values are transmitted cyclically to the controller via the process data, providing in-depth analysis of the machine's current condition on a continuous basis. Predictive maintenance is therefore guaranteed, allowing the plant operator to take the appropriate maintenance actions in a timely manner. The wide range of information issued via the sensor includes temperature data, vibration measurements, operating-hours counter, and measurement scaling, enabling data to be interpreted remotely. In addition, the following measured values are transmitted:

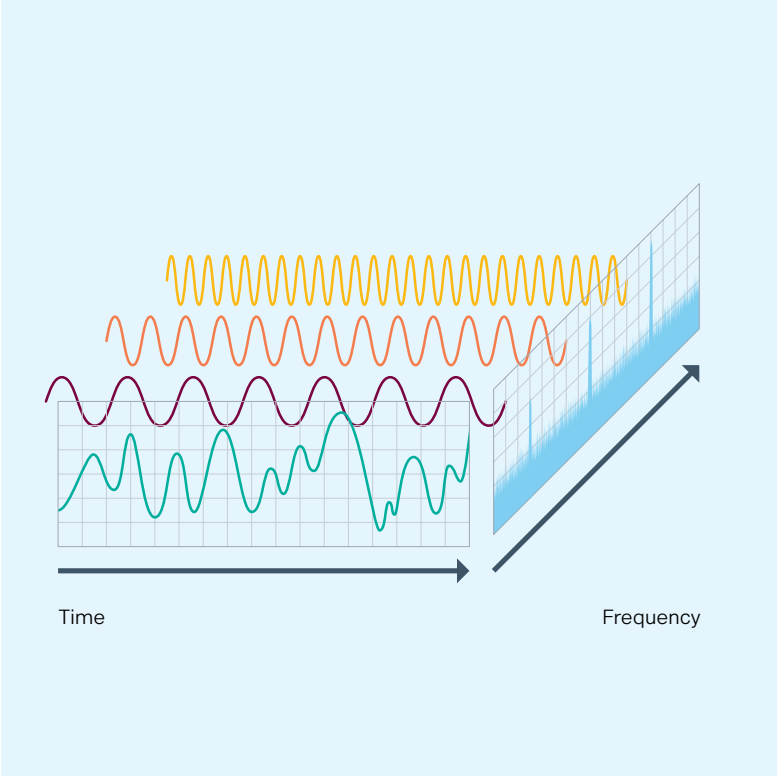
- Vibration speed (RMS in mm/s) up to 128 mm/s
- Vibration acceleration (RMS in g) up to 34 g
- Max. vibration acceleration (peak in g) up to 48 g
- Temperature
- Crest factor scaled according to DIN ISO 13373-3

Individual Modification via IO-Link Communication

Hardly any machine is the same as another, so the sensors must meet very specific requirements to ensure reliable monitoring. The Pepperl+Fuchs vibration sensor offers customizable parameters that can be modified via IO-Link communication. One example is the adjustment of the frequency range to be monitored and the vibration threshold levels related to machine maintenance cycles. Settings can also be input for critical limits for each type of measured value.

High-Precision Frequency Analysis

The VIM3 12 kHz provides raw acceleration data up to 12 kHz with a sampling rate of 64 kHz and transmits it via IO-Link BLOB transfer, as the data volume is too large for continuous IO-Link transmission. The raw data is stored in the internal memory and can be retrieved in packets. Using mathematical FFT calculation (Fast Fourier Transformation), high precision frequency analyses can be performed. Continuous transmission of RMS values also takes place. The VIM3 12 kHz also meets the requirements of the DIN ISO 13373 standard,which defines critical threshold values for ball bearings, and can be used to directly calculate the bearing condition parameter.

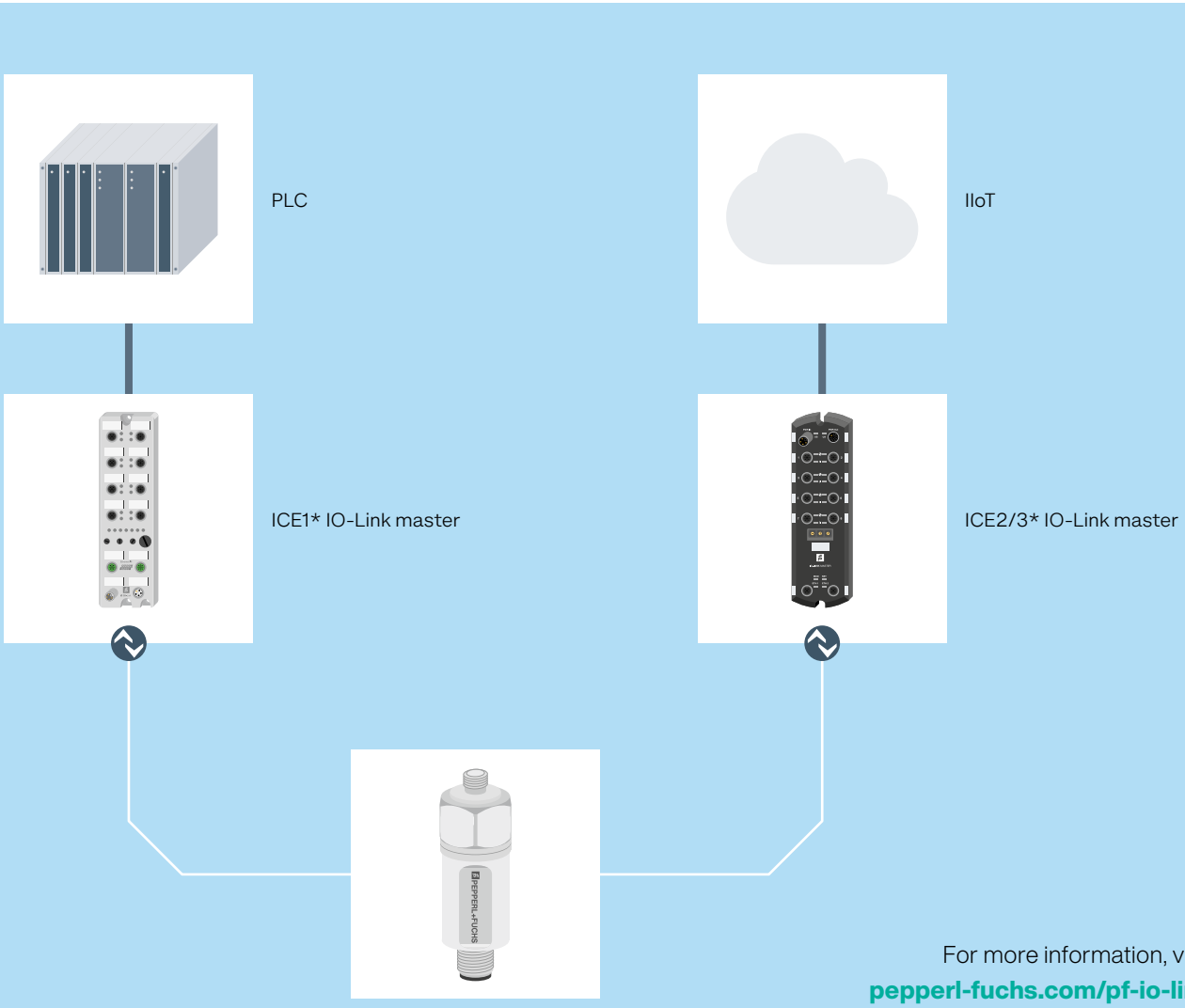


FFT method for frequency calculation

Simple Connection of IO-Link Vibration Sensors

Pepperl+Fuchs offers various IO-Link masters for connecting vibration sensors with IO-Link in the most efficient way possible. Designed for traditional PLC-based applications, the ICE1* modules offer greater process reliability. The integrated web server can be activated or deactivated as needed. This means the module is only accessible via the PLC—external access is blocked.

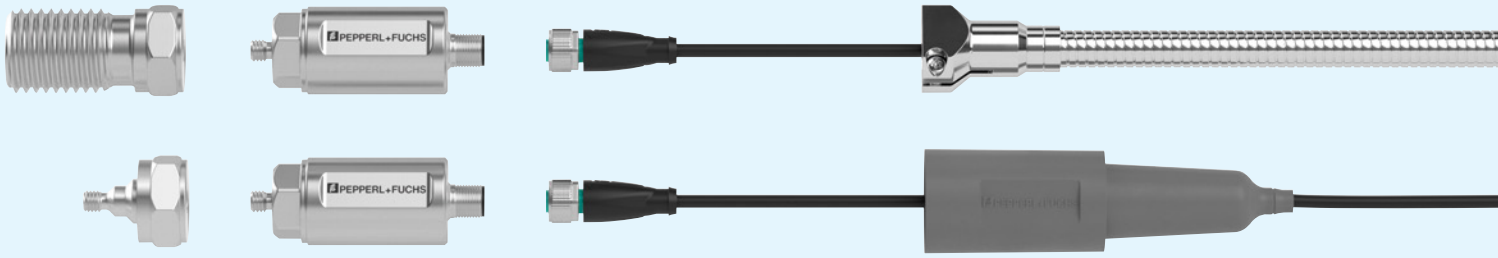
IoT-optimized ICE2* and ICE3* modules offer everything that flexible cloud applications need. With MultiLink™, multiple sources can access the device in parallel and make the right data available wherever it is needed. Whether with a traditional PLC and an industrial PC or as a purely cloud-based application, IO-Link masters from Pepperl+Fuchs offer the most flexibility and planning reliability.



For more information, visit
pepperl-fuchs.com/pf-io-link

Extensive Accessories, for an Extended Range of Applications

Choice accessories successfully round off the portfolio of high-end vibration sensors. From protective sleeves and conduits to suitable mounting adapters—we think of everything down to the last detail.



High-Quality Accessories, Extensive Range of Applications

High-quality protective rubber sleeves made of silicone are available for vibration sensors of all sizes (VIM3, 6, 8, and VIM3*IO*). The sensors themselves and the cabling connections are therefore additionally protected against mechanical and chemical influences and moisture.

For use in harsh industrial environments, Pepperl+Fuchs offers V4A stainless-steel flexible metal conduits (two, five, and ten meters in length) to provide extremely rugged protection for all cable models.

Mounting adapters in a wide variety of thread sizes ensure that the sensor perfectly adapts to the machine-mounted requirement.

In addition to screw adapters, magnetic adapters are also available for applications where direct screw mounting is not possible. This allows the vibration sensors to be easily attached magnetically to the relevant machine part for testing purposes, for example

For more information, visit
pepperl-fuchs.com/pf-vim-acc

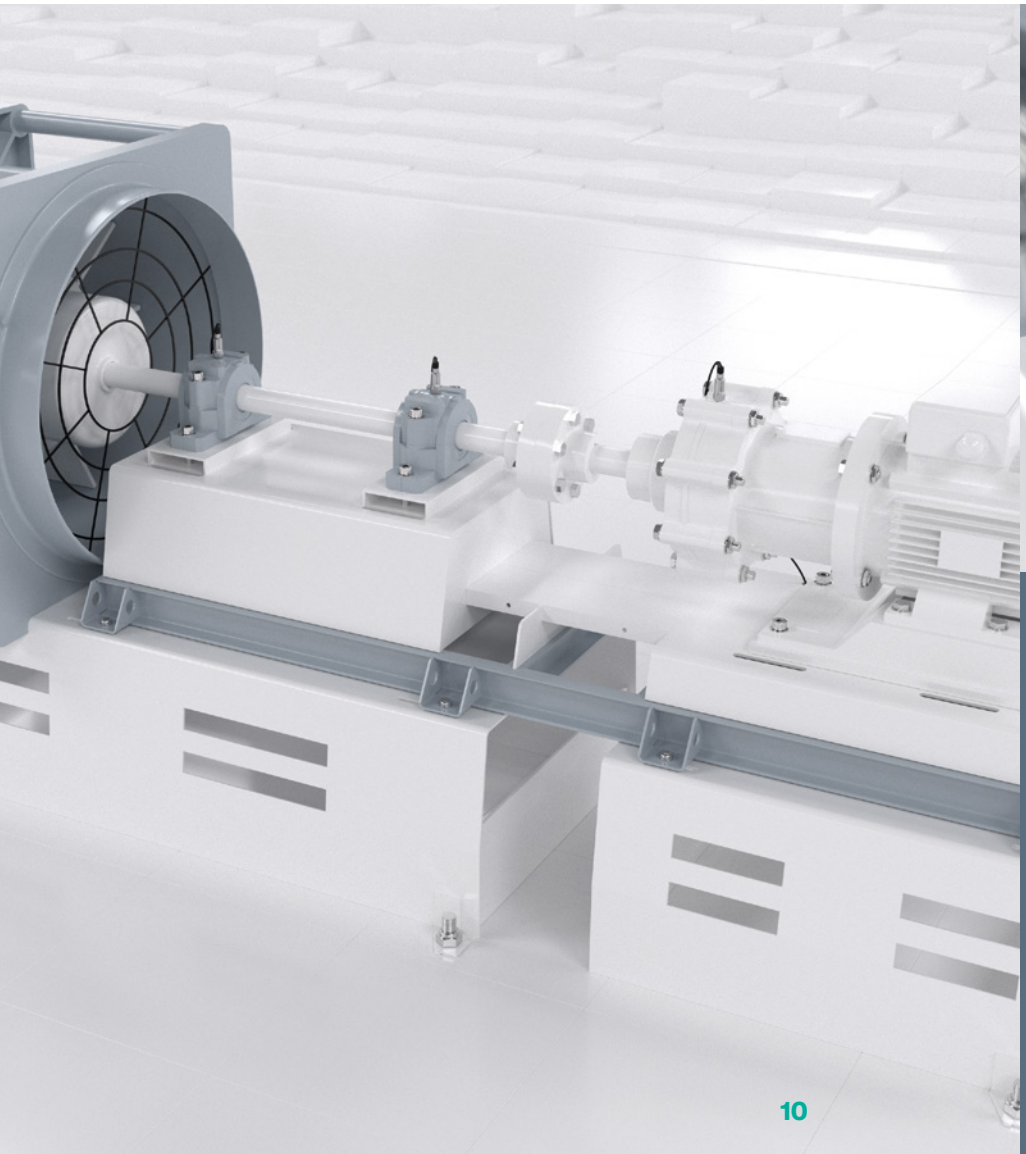
Applications

Reliable Monitoring, Maximum Plant Availability

Vibration sensors collect vital measurement values for reliable condition monitoring. Possible damage is therefore detected before failure occurs. This forms the basis for efficient and predictive maintenance.

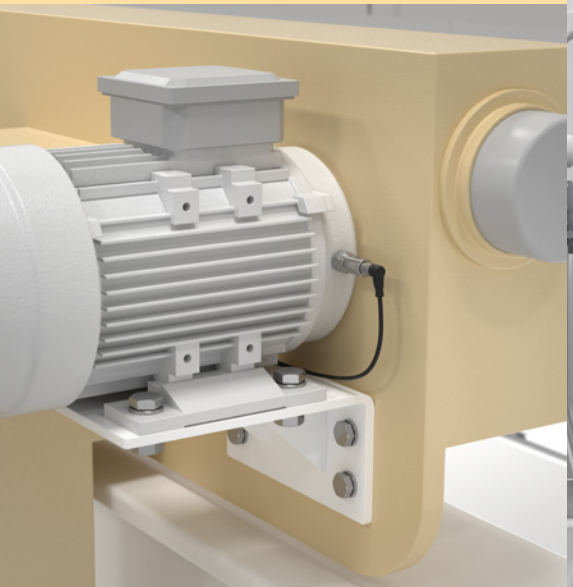
Guarantee a Long Service Life, Ensure Efficient Operation

One key area of use for vibration sensors is pumps and fans, which are required in virtually all industrial sectors. Even in perfect condition, these machines generate vibrations that can be detected by the vibration sensor. Over time, friction or changes in balance will cause wear on the shaft, gear, or other parts. In these cases, if the permissible range of vibrations is exceeded, the threat of wear or expensive machine damage and failures increases. To monitor this, Pepperl+Fuchs' sensors are mounted on parts such as the bearing unit to monitor the machine condition. Here, the devices provide valuable vibration measurement and analysis data required for condition monitoring and predictive maintenance. In this way, downtimes can be kept to a minimum and efficient operation of the plant can be ensured throughout the entire life cycle.



Continuous Condition Monitoring for Indoor Crane Motors

Indoor cranes move heavy loads and therefore play a central role in production logistics in numerous industries. Among other things, they are used in the metal industry, for example in a plant for aluminum fused-salt electrolysis. The proper functioning of all crane motors is an essential prerequisite for smooth processes; any unplanned interruption could cause high consequential costs. The VIM3 vibration sensor is attached to the motors either by a screw thread or using a magnetic adapter. This reliably displays imbalances, bearing damage, and resonances. A trend analysis shows changes caused by wear in detail.



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- Industrial Sensors
- Industrial Communication and Interfaces
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