Vibration Monitoring for Rotating and Reciprocating Machines
Transmitters and Monitors
Reliable and cost-effective solutions to protect your machines

Individual machines considered important, essential or even critical for the plant or the process are expected to be monitored and protected. To do so, many different monitoring philosophies can be considered. However, regardless of the philosophy, Brüel & Kjær Vibro have a solution to match your monitoring requirements and ensure optimal protection from potential failures and consequential machine damage.

No matter whether you are looking to monitor the status of your turbines, generators, centrifuges, fans/coolers, motors, pumps, or gearboxes, it is important to choose the right measurements based on the machine bearing types:

<table>
<thead>
<tr>
<th>Bearing Type</th>
<th>Typical Vibration Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling Element Bearings</td>
<td>Casing vibration</td>
</tr>
<tr>
<td></td>
<td>Bearing condition</td>
</tr>
<tr>
<td>Sleeve Bearings</td>
<td>Relative shaft vibration</td>
</tr>
<tr>
<td></td>
<td>Axial position</td>
</tr>
</tbody>
</table>

For the most appropriate way to monitor and protect your machines, choose from our extensive portfolio:

**TRANSMITTERS** (velocity or displacement)
A simple and low-cost entry for general vibration monitoring of rotating equipment. They supply an analog output to existing PLC or DCS systems and allow vibration levels to be externally trended in other systems.

**VIBRATION MONITORS**
From the simplest single-channel to four-channel monitors with enhanced functionality. Multi-channel devices can be a very cost effective method to monitor multiple machines or parameters on a single monitoring device. Vibration monitors can often be the optimal solution for varied machines.

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**Global Industry First**
Unique, simple installation without the need for an external vibration monitor: It is no longer necessary to worry about a safe, protected location for the driver/signal conditioning unit for your displacement transmitter. Uniquely, Brüel & Kjær Vibro can offer the world’s first fully integrated displacement transmitter providing analog output (e.g. 4-20 mA) and allowing for simplified and significantly lower cost of installation and reduced space requirements. The integrated displacement transmitter is an effective and extremely economic solution for displacement monitoring requirements.
### Vibration transmitter and compact monitor portfolio and features – choose your solution...

#### Rolling Element Bearings

<table>
<thead>
<tr>
<th>Selection criteria</th>
<th>Case Vibration Transmitter VT-110/120</th>
<th>VIBROCONTROL 850</th>
<th>VIBROCONTROL 950 / 960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine application</td>
<td>Rolling element bearings</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Sleeve bearings</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Maximum no. of vibration channels</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Machine protection via limit values, OK and alarm relays</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Measurements</td>
<td>Absolute casing vibration</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Rolling element bearing condition</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Relative shaft vibration</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Axial shaft position</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Analog output (e.g. 4-20 mA)</td>
<td>mm/s</td>
<td>mm/s</td>
<td>m/s²; mm/s (VC-950) mm/s (VC-960)</td>
</tr>
<tr>
<td>No. of alarm relays + OK relays</td>
<td></td>
<td>2</td>
<td>2 + 1</td>
</tr>
<tr>
<td>Installation / DIN rail mounting</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Installation in field housing</td>
<td></td>
<td>optional</td>
<td></td>
</tr>
<tr>
<td>Relay types and ratings</td>
<td></td>
<td>Relay driver, 30 Vdc / 100 mA</td>
<td>Relay driver, 30 Vdc / 100 mA</td>
</tr>
</tbody>
</table>

Hazardous areas: Please contact us for explosion-proof versions or consultancy on installation.

#### Vibration sensors

<table>
<thead>
<tr>
<th>Vibration sensors</th>
<th>Power supply for sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loop-powered</td>
</tr>
<tr>
<td>Vibration sensor types</td>
<td>Accelerometer integrated</td>
</tr>
<tr>
<td></td>
<td>AS-062; VS-068/69</td>
</tr>
</tbody>
</table>

#### Highlights

**Super relay compliant to ISO/EN13849-1**

The VIBROCONTROL 18xx series of compact monitors provide exceptionally reliable machine protection by offering two mechanical relays that are coupled in series for redundancy. This configuration allows the unit to be set up specifically as a Safety Monitor in accordance with ISO/EN13849-1 (Safety of Machinery – Safety-related parts of control system). Both danger alarms and system failure alarms can be forwarded to the relays.
### Highlights

**Vibration analysis**

In addition to reliable machine protection, the VIBROCONTROL 18xx series of compact monitors offers condition monitoring and diagnostics functionality. Scalar vibration and process data can be stored and trended as well as the original time waveform signals. Moreover, vibration frequency spectrum plots can be post-processed from the time signals using FFT analysis. All of this data can be remotely accessed for early fault detection and diagnosis of potential failure modes of the machine.

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### Table: VIBROCONTROL Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Sensors/Transmitters</th>
<th>Voltage/Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIBROCONTROL 1000</td>
<td>Compact monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBROCONTROL 1100</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBROCONTROL 1500</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBROCONTROL 6000</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBROCONTROL 1850 / 1860 / 1870</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Displacement Transmitter**

| DT-121-RV; DT-121-AP |

**Loop powered**

| Mechanical relay, 150 Vdc / 500 mA; 250 Vac / 1 A | Mechanical relay, 24 Vdc / 400 mA; 48 Vdc / 200 mA; 250 Vac / 5 A | Mechanical relay, 24 Vdc / 5A | Mechanical relay, 50 Vdc / 500 mA | Relay driver for alarm relays 30 Vdc / 100 mA; redundant mechanical relay for Ok +/-28V dc / 100 mA |

**Velocity sensors**

| Accelerometers | Velocity sensors | Accelerometers | Velocity sensors |

**Displacement sensors**

| AS-062; VS-068/69 | AS-062; VS-068; ds-821; TS-012 (tacho/speed) |

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*CCS = Constant Current Supply*
**Case Vibration Transmitter VT-110 and VT-120**

The easiest and lowest-installed-cost solution for DCS / PLC based vibration measurement and trending of the case vibration level of a machine.

- Loop powered
- Simple mounting
- Ex-proof versions available

**Unique Innovation**

**Fully integrated Displacement Transmitter DT-121-RV and DT-121-AP**

The easiest and lowest-installed-cost way to monitor shaft vibration and axial positioning. The fully integrated displacement transmitters DT-121-RV and DT-121-AP combining all components of an eddy-current measuring chain and a signal conditioning device providing analog output (e.g. 4-20 mA).

- Reduced cost for wiring and installation based on unique single-unit design
- No need for additional housings/mounting space and protection
- Buffered output
- Loop-powered
- Installation: forward; reverse mounted; angled
- Ex-proof versions available

**VIBROCONTROL 950 / 960:**

Single-channel machine protection units for case vibration monitoring.

- Accelerometers CCS* (VIBROCONTROL 950) or velocity sensors (VIBROCONTROL 960) can be connected.
- DIN rail mounting in machine cabinets or in optional field housings.

**VIBROCONTROL 1000:**

Single-channel machine protection system.

- Casing vibration monitoring
- Input from velocity sensors
- Field housing (IP 65)

**VIBROCONTROL 1800 Series:**

Cost-effective protection for most rotating equipment with either rolling element bearings or sleeve bearings.

- Up to four vibration channels,
- Additional two channels (one process data channel and one tacho/spread reference channel)
- Time waveform recording and data storage on PC/Server
- Four outputs configurable between relays and analog outputs
- Communication via Ethernet, USB, RS-485 and offering OPC UA, Modbus TCP/RTU protocol
- Extremely flexible with modular link concept for process inputs, buffered output, communication options
- User-definable frequency bands
- Optional software giving a wide range of vibration analyzing and diagnostic functions

**VIBROCONTROL 1850**

- Casing vibration (acceleration sensors CCS*)

**VIBROCONTROL 1860**

- Casing vibration (velocity sensors)

**VIBROCONTROL 1870**

- Relative shaft vibration, axial position

**VIBROCONTROL 1500:**

Protection of two bearings of rolling element bearing machines by monitoring of up to six machine condition parameters: absolute casing vibration, rolling element bearing condition and temperature with just two accelerometers using integrated temperature sensors.

- Input: Two accelerometers (CCS*) with integrated temperature elements (AS-062T1)
- Measurement: Casing vibration overall values in mm/s rms according to ISO 10816; bearing condition unit, temperature
- Two alarm and danger limit (shutdown) relays
- Frequency analysis of casing vibration
- Internal trend measurement
- Post mortem analysis
- Remote monitoring via Control-Center-Software

**VIBROCONTROL 1100:**

Casing vibration monitoring with accelerometers or velocity sensors. A dual-channel protection system which covers the most critical parameters on rolling element bearing machines.

- Two-channel input of accelerometers or velocity sensors
- Rolling element bearing condition unit – BCU
- Two limit relays, one OK relay
- Flexible, freely programmable outputs (limit values and analog outputs)

**VIBROCONTROL 6000® Compact monitor:**

Sophisticated, flexible three-channel diagnostic machine protection system for all types of rotating equipment.

- Casing vibration, shaft vibration (relative and absolute), axial position
- Variable band pass filtering
- Tracking filters for 1X, 2X, nX
- Measuring of process parameters such as temperature or pressure (up to six channels)
- Up to 12 analog outputs or relays
- Variable number of alarm and danger limits which can be assigned to relays
- 2oo3 voting logic
- Remote monitoring via OPC

*CCS = Constant Current Supply - For additional information, please contact your Brüel & Kjær Vibro sales representative. Additional product details and information on the full product and service portfolio are available at www.bkvibro.com