

VIBROMETER

Easy-Laser® Vibrometer is used in preventive as well as active maintenance work on rotating machinery. It measures the vibration level and bearing condition of machinery.

When measuring vibration level, Easy-Laser® Vibrometer is measuring the effective velocity (mm/s or inch/s RMS) in the frequency range between 2 and 3200 Hz. This range covers most of the frequencies that will occur for the majority of mechanical malfunctions and imperfections, for example unbalance and misalignment.

When used to measure bearing condition the Easy-Laser Vibrometer is measuring the effective acceleration (RMS) in the frequency range between 3200 and 20000 Hz. Trend analysis of the bearing condition value can be used to determine wear and tear of machine bearings.



See also Technical data > Vibrometer.


Mount directly on machine

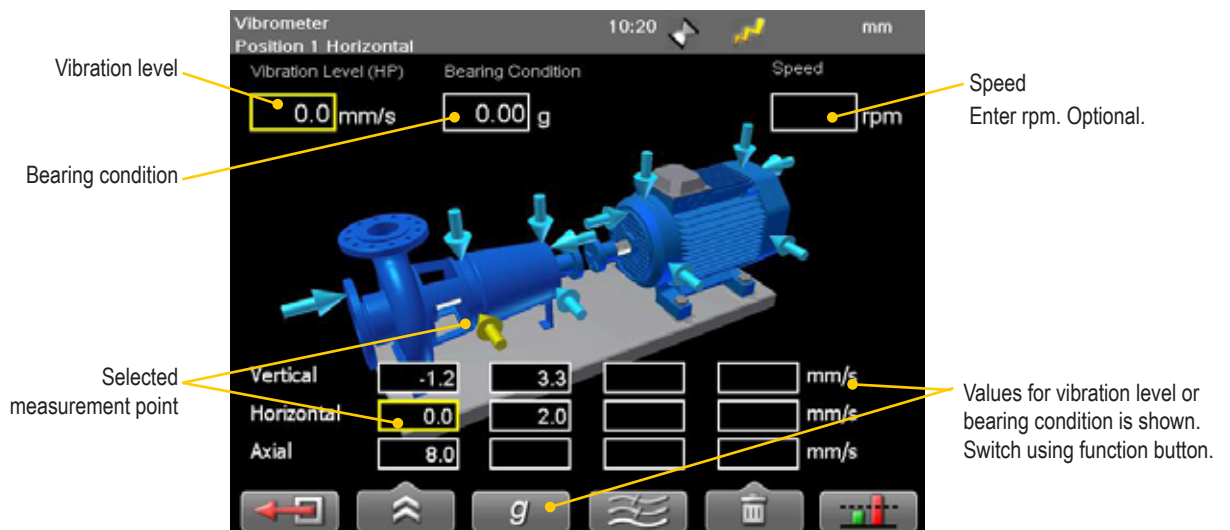
It is possible to remove the magnetic tip and mount the probe directly to the machine, using the M6 threaded stud.

Measuring tip













For measuring points that are hard to reach, use the measuring tip. Simply unscrew the magnetic tip and replace with the measuring tip. When measuring with the measuring tip, place it firmly against the measurement point and hold it as vertical, horizontal or axial as possible. When the measuring tip is used the frequency range is reduced to about 800 to 1500Hz.

Measure

1. Use the standard red cable to connect the Vibrometer directly to the Display unit.
Wireless units cannot be used.
2. Select  to open the Vibrometer program.
 - Enter rpm. Optional.
 - Use the navigation buttons if you want to register another point than is selected by default.
3. Place the vibrometer against the measurement point. Pressing more firmly should not change the reading. If this happens, adjust the measuring point.
4. Wait a few seconds for the value to stabilize.
5. Press **OK** to register value.




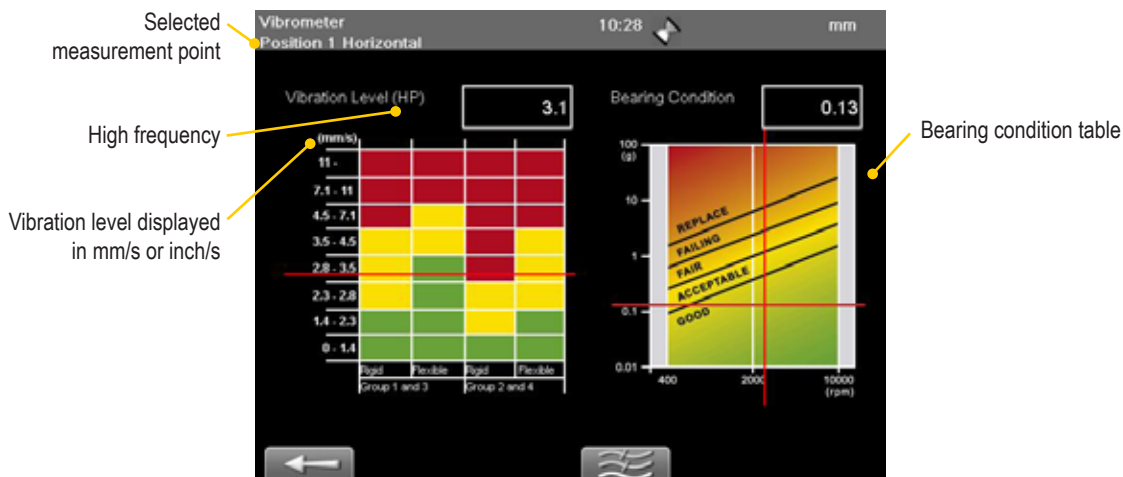
Function buttons

	Leave program.
	Contains a submenu
	Open Control panel.
	Save. See also <i>Measurement file handling.</i>
 	Toggle button. Show values for bearing condition or vibration level.
 	Toggle button. Show high frequency (10–3200 Hz) or low frequency (2–3200 Hz).
	Contains a submenu
	Clear selected measurement point.
	Clear all measurement points.
	Tolerance. Show tolerance table for vibration level and bearing condition value.

Vibration level

In the Display unit, a table from ISO 10816-3 standard is shown. This standard is used for machines with power above 15kW and nominal speeds between 120–15000 rpm.

1. Use navigation buttons to select a measurement point.
2. Select  to open the tolerance table. It displays the values for the selected point.



Rigid or flexible

The ISO standard is classifying the machines differently if the machines have flexible or rigid foundations. Usually this is determined from drawings and calculations of the machine.

Groups

- Group 1. Large machines with rated power above 300kW. Electrical machines with shaft height $H > 315\text{mm}$. Operating speed ranges from 120 to 15000 rpm
- Group 2. Medium-sized machines with a rated power above 15kW up to and including 300kW. Electrical machines with shaft height between $160 < H < 315\text{ mm}$. Operating speed normally above 600 rpm.
- Group 3. Pumps with multivane impeller and with separate driver with rated power above 15kW.
- Group 4. Pumps with multivane impeller and with integrated driver with rated power above 15kW.

Guideline

Another standard you can use is ISO 2372 class 4, for large machines on flexible foundations.

0 – 3 mm/s 0 – 0.12inch/s	Small vibrations. None or very small bearing wear. Low noise level.
3 – 7 mm/s 0.12 – 0.27 inch/s	Noticeable vibration levels often concentrated to some specific part as well as direction of the machine. Noticeable bearing wear. Seal problems occur in pumps etc. Increased noise level. Plan action during next regular stop. Keep the machine under observation and measure at smaller time intervals than before to detect a deterioration trend if any. Compare vibrations to other operating variables.
7 – 18 mm/s 0.27 – 0.71 inch/s	Large vibrations. Bearings running hot. Bearing wear-out cause frequent replacements. Seals wear out, leakage of all kinds evident. Cracks in weldings and concrete foundations. Screws and bolts are loosening. High noise level. Plan action soonest.
> 18 mm/s > 0.71 inch/s	Very large vibrations and high noise levels. This is detrimental to the safe operation of the machine. Stop operation if technically or economically possible considering the plant stop cost.


Bearing condition value

Bearing condition value is used for trend analysis. If the bearing condition value increases over time, it can be a sign of that the bearing is poorly lubricated, overloaded due to misalignment or has a damaged surface. A high bearing condition value can however appear in gearboxes, converting machines with cutters and similar machines without any bearing fault. This is because this type of machinery naturally produces high frequency vibrations that are similar to the vibrations produced by a machine with a bearing fault.

The bearing condition value is the quadratic mean, RMS value, of all high frequency vibrations between 3200 Hz to 20000 Hz. This value is an acceleration average measured in multiples of the standard gravity constant, g.

The diagram below is only a guide to interpret the bearing condition value. A high bearing condition value should always be used as a request to make detailed frequency analysis. Do not change bearings before this is done.

Open tolerance table for bearing condition

1. Select a measurement point.
2. Select  to open the tolerance table.

