



OPERATING MANUAL PCE-WVS 50 VIBRATION METER



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Introduction

The operation manual is intended to familiarize users with the description and operation, intended use, completeness, maintenance and repair, storage, transportation, disposal, acceptance certificate, and manufacturer's warranties for the PCE-WVS 50 vibration meter then the device or vibrometer.

We recommend that personnel authorized to work with a vibration meter undergo special training in the field of vibration control and diagnostics of machines in accordance with ISO 10816-1:2007, ISO 20816-1:2016.

1. Description and operation

1.1 Purpose of the product

PCE-WVS 50 is a portable diagnostic device that allows you to quickly diagnose the vibration state of various industrial equipment.

In accordance with ISO 10816-1:2007, the device allows you to measure and control vibration by the root mean square value (RMS) of vibration velocity, vibration acceleration peak and vibration displacement range. A separate advantage is an ability to determine the thermal state of the control object.

The main areas of application of the device are the operational control of the mechanical and thermal condition of the equipment during operation, repair and maintenance. Diagnostics of bearings, gear wheels, turbines, generators, fans, pumps, electric motors, various rotors, structures in general and their individual elements.

The advantages of using this device are:

- universality - measurement of vibration;
- compactness;
- ease of use - vibration measurement is carried out by pressing one button;
- measurement speed;
- quick change of measurement parameter;
- wireless transmission of measurement data via Bluetooth;

- the ability to quickly charge the battery from a standard USB charger;
- a bright screen that allows you to take measurements in low light conditions;

1.2 Technical specifications

Specifications are shown in table 1.

Table 1

№	Parameter	Value
1.	Range of measured parameters:	
	- RMS value of vibration velocity, mm/s	0,01 - 200
	- Peak value of vibration acceleration, m/s ²	0,1 - 200
	- The scope of vibration displacement, μm	2 - 2000
	Operating frequency range, Hz	10 - 1000
2.	Relative measurement error, %	± 5
3.	Type, screen diagonal, inches	OLED, 0,91"
4.	Battery type, voltage, V	Li-Po, 3,7
5.	Battery capacity, mAh	370
6.	Communication module	Bluetooth LE 5.3
7.	Connector	USB type-C
8.	Time of continuous operation, hours	8
9.	Environmental conditions:	
	- temperature, °C/°F	0–55/32–131
	- relative humidity, %	<85
10.	Dimensions, mm/in	30×28×90/1.81×1.1×3.54
11.	Weight, g / lbs	70 / 0.15

1.3 Structure and operation

1.3.1 The general view of the device is shown in the figure 1.1.

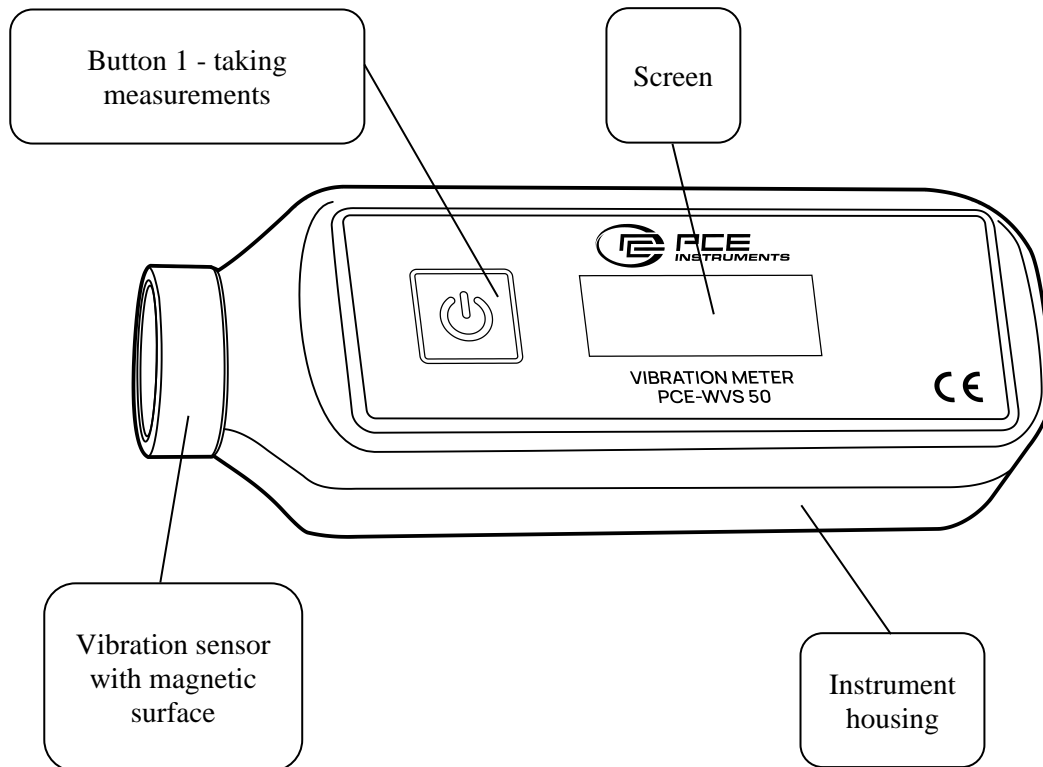


Figure 1.1 - General view of the device

1.3.2 General view of the device.


Button 1 - a short press of the button turns on the device, and measurements are taken by holding the button. A short press of the button, when the vibration meter is turned on, allows you to select the required measurement parameter: vibration velocity, vibration acceleration, and span-vibration displacement.

The measurement data will be automatically transmitted to the receiver device by 3 parameters at once: RMS vibration velocity (mm/s), peak vibration acceleration (m/s^2), span-vibration displacement (μm), and some service data will also be transmitted.

To work with the device, install the vibration sensor on the controlled surface and hold button 1 (Fig. 1.1). On the screen of the instrument, readings regarding the vibration of the control surface will appear.

Hold the instrument perpendicular to the surface to be measured. Start measuring with the push of a button. Vibration is measured after holding button 1 (Fig. 1.1).

After the button is released, the display will show the last measurement result, which is displayed for 30 seconds, after which the device will automatically turn off.

When the battery charge indicator  falls below the allowable limit, you need to charge the battery using the cable and power supply that come with the kit.

2. Intended use

2.1 Operating restrictions

Persons who have studied this operating manual, as well as the safety regulations for working with control and measuring equipment and have been instructed in labor protection, are allowed to work with the device.

2.1.1 At the place of operation.

If acceptance tests are carried out on-site, then the rotors must be mounted on standard supports. At the same time, it is important that during the acceptance tests all the main elements of the machine are mounted; for basic machines, this requirement is mandatory, and for serial machines, if this is not possible, the evaluation criteria must be adjusted accordingly. The results of comparing the vibration state of machines of the same type installed on different foundations can only be compared if the dynamic characteristics of the foundations are similar.

2.1.2 On the test bench.

It is necessary to create conditions under which the coincidence of the natural frequencies of the test setup with the speed of rotation of the machine or with any of its powerful harmonics is excluded. It is considered that this requirement is met if the magnitude of the horizontal and vertical vibration of the bearing elements of the foundation near the bearing supports does not exceed 50% of the vibration value of the corresponding bearing in the same direction. The test setup should also not change the value of any of its fundamental frequencies while the machine is running. If support resonances cannot be eliminated, acceptance testing of the fully assembled machine must be carried out on-site.

2.2 Preparing the product for use

Before use, carefully inspect the device for external damage. Check the battery charge of the device and check the attachment of the sensor tip.

2.3 Use of the product

As a rule, measurements are carried out at different points in two or three mutually perpendicular directions, which makes it possible to obtain a set of vibration parameter values. The vibration level of a machine is understood as the maximum value of vibration, which is measured at one specific point or group of points in selected directions, under certain conditions, and in a stable mode of operation.

2.3.1 The vibration state of many types of machines can be assessed from the vibration level at a single measurement point. However, for some machines, this approach is unacceptable and vibration levels must be determined based on independent measurements at a number of points.

2.3.2 Measurement points.

Measurements should be carried out on bearings, bearing housings or other structural elements that respond to dynamic forces as much as possible and characterize the overall vibration state of the machine. Typical examples of the arrangement of measuring points are shown in the figures 2.1a - 2.1d. (for details see ISO 10816-1:2007).

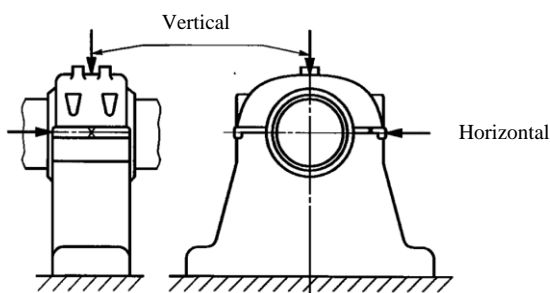


Figure 2.1a - Measuring points on the bearing pedestal

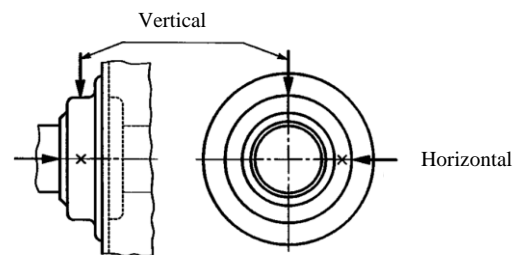


Figure 2.1b - Measurement points on the bearing housing

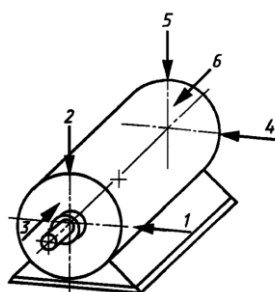


Figure 2.1c - Measuring points on small electrical machines

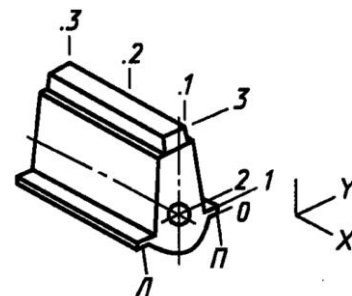


Figure 2.1d - Measuring points on the engine

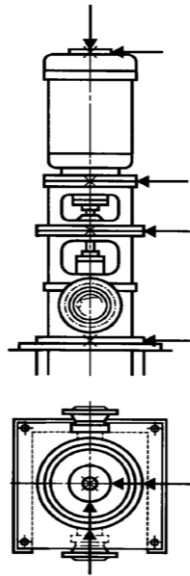


Figure 2.1e - Measurement points on a vertically installed machine

A complete assessment of the vibrational state of large aggregates is given by the results of measurements at controlled points in three mutually perpendicular directions, as shown in Fig. 2.1a - 2.1e. As a rule, such completeness of measurements is needed only for acceptance tests. In operational control, one or two measurements are usually made in the radial direction (usually horizontal and/or vertical). In addition, it is also possible to measure axial vibration, usually at the location of the thrust bearing.

The location of measuring points for specific types of machines must be specified in the relevant standards for these types of machines.

3. Completeness

№	Name	Quantity, pcs.
1.	Vibration meter	1
2.	Operating manual	1
3.	USB-C cable	1

4. Maintenance and repair

Checking the technical condition of the device in order to ensure its performance throughout the entire period of operation is carried out at least once a year in the following sequence:

- 1) Check the completeness of the vibration meter in accordance with paragraph 3 "Completeness";
- 2) Conduct an external inspection of the device, and make sure that there is no mechanical damage to the electronic unit, sensor tip, or screen;
- 3) Check the performance;
- 4) If deficiencies have been identified, contact PCE Instruments.

Important! Opening the electronic unit by a person not authorized by PCE Instruments and self-repair of the device is not allowed.

5. Storage

The device is stored in a case in a closed, heated room with air temperature (25 ± 15)°C/55 to 104°F, relative humidity from 45 to 80% and atmospheric pressure from 630 to 800 mm Hg/0.84 bar to 1.07 bar. Art. The room should be free of mold, acid fumes, reagents, paints and other chemicals. The room should not allow sudden changes in temperature and humidity that cause dew.

6. Transportation

The device in a transport package that ensures its safety is transported by rail, road, sea, or air transport in compliance with the relevant rules for the carriage of goods applicable to these modes of transport.

7. Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.



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