PCE-VM 22

Vibration Analyzer
User's Manual

2021

CONTENT

General

Safety Precautions

To prevent possible electrical shock, fire, personal injury or the device damage:

• Carefully read user's manual.

• Do not place sensor on the objects which exposed to high voltages. These voltages could cause personal injury or death.

• The Analyzer could not be used in potentially explosive environments.

• Take measures to prevent cables and straps become entangled by rotating part of machines at measurement site.

• Do not expose PCE-VM 22 parts to heavy impacts, high humidity and extreme temperature.

• Do not try to open the display unit – this can damage the system, and your after-sales service warranty will come void

Overview

The PCE-VM 22 Vibration Analyzer (Device, Analyzer) is a compact yet powerful, vibration analyzer designed to measure overall vibration parameters, FFT spectrum analysis of the rotating machinery, immediate evaluation against ISO 10816 standard, condition monitoring by route based measurements and data collection. Route files and data files exchange via email makes it ideal for data collection at remote sites. Simple in use, with free firmware upgrades, comes with data management and reporting software.

Kit Content

The PCE-VM 22 kit includes:
- 1 x Accelerometer PCE-VM 22
- 1 x Vibration sensor with connection cable and magnetic holder
- 1 x Infrared sensor with speed sensor
- 1 x Magnetic holder
- 1 x USB charging adapter
- 1 x Micro USB cable
- 1 x Transport case
- 1 x Instruction manual

Specifications

Inputs – IEPE or charge type accelerometers with known sensitivity, switchable. Optical RPM transducer with IR pyrometer sensor (optional)

AD conversion – 24 bits

Dynamic range – 106 dB

Frequency range – 1…10000 Hz

Vibration measurement range:

Acceleration – 200 m/s^2

Velocity – 200 mm/s

Displacement – 2000 uM

Accuracy – ±5%

Temperature measurement range –   -70°C to 380°C

 Accuracy –   ±0.5% (0…+60°C), ±1% (-40…+120°C), ±2% (-70…+180°C), ±4% (-70…+380°C)

Tachometer measurement range – 10…200,000 rpm

Accuracy –   ±0.1% and ±1rpm

FFT spectrum resolution – 400, 800, 1600 lines

Data storage – 4GB micro SD card, built-in

PC interface – USB

Display – color, sunlight readable 128x160 dots

Battery – Li-Po rechargeable, up to 8 hrs continuous operation

Operating Temperature – 0°C to 50°C

Storage Temperature – -20°C to 60°C

Operating Humidity -

Dimensions – 132 x 70 x 33 mm

Weight – 150 g

Measurement functions

Vibration mode – analyzer measures overall level of vibration acceleration, velocity and displacement and FFT spectrum, route or off-route measurements.

Tachometer – analyzer measures speed of rotation by means of contactless optical sensor. The measurement result is displayed in RPM and Hz.

IR thermometer – contactless measurement of object temperature. The measurement result is displayed in °C and °F.

Operation

Keyboard

– press and hold for 3 sec to turn device ON, short press to turn OFF

– Enter, confirm selection, start measurement

– navigation arrow keys

– Menu
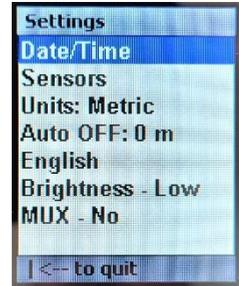
– backspace, quit

– option key

Settings

This menu is used to setup:

- **Date/Time**

- **Sensors** parameters

- **Units** Metric/Imperial units

- **Auto OFF** delay

- **English** interface language

- **Brightness** Low/Mid/High display brightness

- **MUX** input multiplexer to use triaxial sensors (optional)

Date/Time

Use arrow keys ⬅ ➡ ⬆ ⬇ to set date.

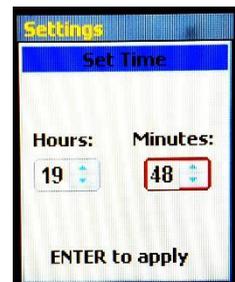Hold F1 then press ⬅ or ➡ for month decrement/increment.

Confirm by ↵ when correct date is set.

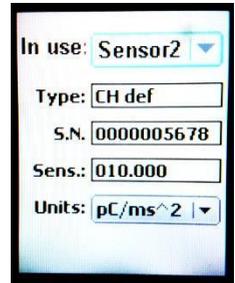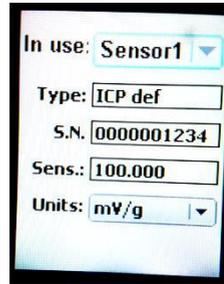Use ⬆ ⬇ keys to set minutes and hours.

Use ▤ key to switch focused field. Focused field is indicated by red frame.

Confirm by ↵ when correct time is set.

Sensors

Use ⬆️ ⬇️ keys to choose sensor, which will be used for measurements. Drop down menu offers two types – IEPE or charge type sensors to choose from.
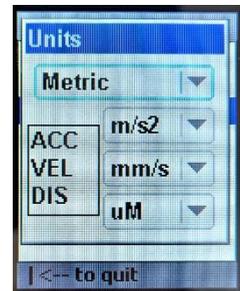
In use: Sensor1 ▾
Type: ICP def
S.N. 0000001234
Sens.: 100.000
Units: mV/g ▾

In use: Sensor2 ▾
Type: CH def
S.N. 0000005678
Sens.: 010.000
Units: pC/ms^2 ▾

Confirm choice by ↵ key.

Type, S.N. and **Sensitivity** fields are editable.

Use ▤ key to choose field to edit.

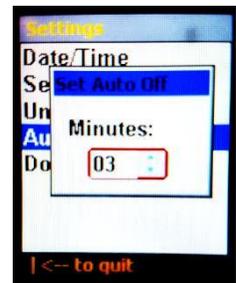Then use arrow keys ⬅️ ➡️ ⬆️ ⬇️ to edit the field value.

Units

Metric/Imperial units setup

Units
Metric ▾
ACC m/s2 ▾
VEL mm/s ▾
DIS uM ▾
| <-- to quit

Auto OFF

Use ⬆️ ⬇️ keys to set auto OFF delay (minutes).

Press ▤ or ↤ key to confirm and quit menu.

Settings
Date/Time
Se Set Auto Off
Un
Au Minutes:
Do   03 ⬍
| <-- to quit

Vibration

Analyzer measures vibration **Acceleration, Velocity** and **Displacement**. In **ISO 10816** mode measurement result is compared to the built-in table of vibration severity grades according to ISO 10816-3.
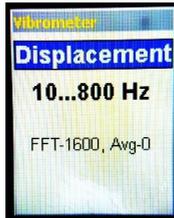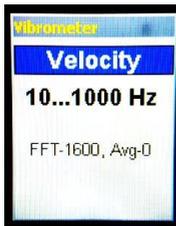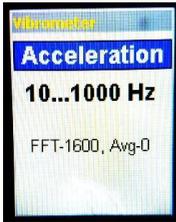
Use ⬆️ ⬇️ keys to choose measurement mode.

Vibration measurement settings

Press ⊜ key to enter Settings menu.

Use ⬆ ⬇ to choose parameter to setup.

Use ⬅ ➡ to change parameter value.

Low Freq – lower frequency limit. Can be set to 1, 2, 10 Hz.

Hi Freq – upper frequency limit. Can be set:

- from 200 to 10000 Hz for Acceleration;

- from 200 to 5000 Hz for Velocity;

- from 200 to 800 Hz for Displacement;

**FFT lines** – FFT spectrum resolution. Can be set to 400, 800, 1600 lines.

Trigger – *not implemented yet..*

Averaging – measurement averaging. Can be set in range of 0 to 64. Zero means that averaging is OFF.

Window – weighting function. Can be set to Hanning or Rectangular.

Taking measurements

Choose vibration parameter e.g. **Velocity**, edit

settings if needed, then press ⏎ key to start

measurement.
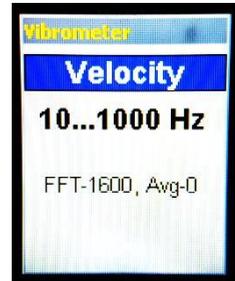
When measurement is running:

  Use ⬆ key to toggle FFT
spectrum / waveform display.

Press ⏎ key to stop/resume
measurement.

When measurement is stopped:

Press ☰ key for **Options**:

Save.. – to save measurement data. Press ⏎ key to proceed.

Format – Linear/Logarithmic amplitude display. Use ⬅ ➡ to
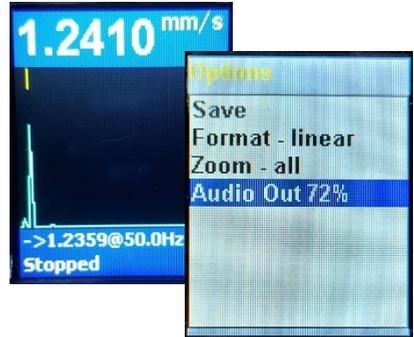change parameter value.

Zoom – frequency axis display zoom change. Use ⬅ ➡ to change
parameter value

To save measurements

Press ⏎ key to stop measurement

Press ▶≡ key for **Options**
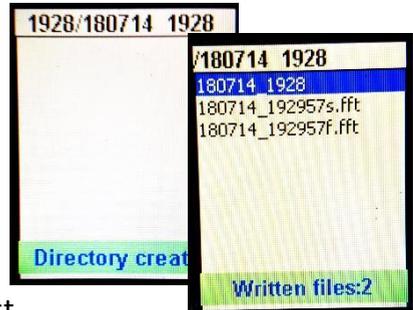
Choose **Save..** and press ⏎ key

Device will enter **My documents** menu

Browse to the destination folder, then press ▶≡ key save measurement.

Device writes two files at a time – FFT spectrum file and waveform file.

Device remembers path to the last written files.

To create new folder – press F1 key. Date/time stamp is used as a default name for new folder.

To create folders with meaningful names – connect device to the PC via USB as external flash drive, then create folders using PC keyboard.
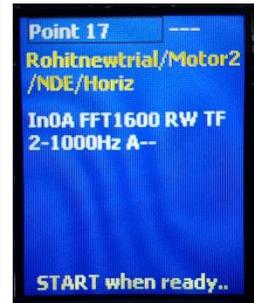
Route based measurements

- Using ConSpect software create route file and download it to the device
- Go to **Documents** menu, move cursor to the route file and press key
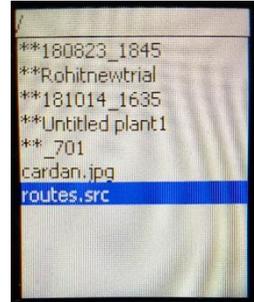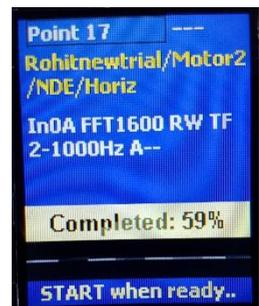

- Use   to browse route points

- Attach sensor at the measurement point and press key. Device takes measurement with preset parameters and saves files to proper destination folder

Tachometer

Connect optical probe to the device

Enter **Tachometer** menu

Aim optical probe to the rotating machine part with attached reflective tape.

Press ⏎ key to start/stop measurement.

Device displays measurement result in **RPM** and **Hz**

Thermometer

Connect optical probe to the device

Enter **Thermometer** menu

Aim optical probe to the machine.

Press ⏎ key to start/stop measurement.

Device displays measurement result in °**C** and °**F**