FLUKE®

# 802EN/802-II

## Vibration Meter

## Users Manual

(English)
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# Introduction

The 802CN/802-II Vibration Meter (the Product) is a screening tool for overall vibration measurements on machines. The Product includes these features:

- Acceleration, Velocity, and Displacement units of measure
- Auto data hold
- Stores 99 records (maximum)
- Audio output
- Flashlight
- External accelerometer support
- Passes 1-meter drop test
- Ships with a soft case

# Safety Information

General Safety Information is in the printed Safety Information document that ships with the Product. More specific safety information is listed where applicable

# Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: www.fluke.com.

To register your product, or to view, print, or download the latest manual or manual supplement, go to our website.

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# Accessories

Table 1 is a list of the accessories available for the Product.

**Table 1. Accessories**

| Description | PN |
|---|---|
| Soft case | 4106625 |
| Battery door | 4684258 |
| Bottom cap | 4684264 |

# Specifications

**Built-in Piezoelectric Accelerometer**

Sensitivity (typical) ..... 10.00 mV / m/s² ±5 %
(1 g = 9.8 m/s²)

**Measurement**

Acceleration

Range. ..... 0.1 m/s² to 199.9 m/s²
Peak $(\text{rms} \bullet \sqrt{2})$

Resolution..... 0.1 m/s²

Accuracy ..... ±(5 % + 2 digits)
(LO: 10 Hz to 1 kHz)
±(10 % + 5 digits)
(HI: 1 kHz to 10 kHz)

Velocity

Range ..... 0.1 mm/s to 199.9 mm/s rms

Resolution..... 0.1 mm/s

Accuracy ..... ±(5 % +2 digits) (10 Hz to 1 kHz)

Displacement

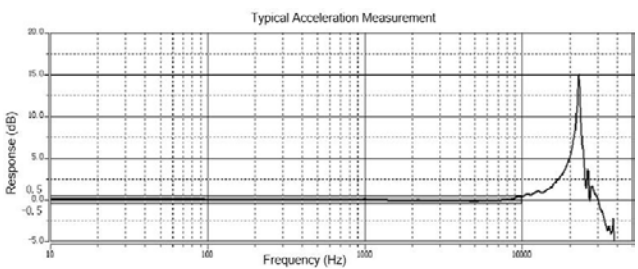
Range ..... 0.001 mm to 1.999 mm Peak-Peak $(\text{rms} \bullet 2\sqrt{2})$

Resolution..... 0.001 mm

Accuracy ..... ±(5 % +2 digits) (10 Hz to 1 kHz)

Piezoelectric Accelerometer

Typical
Frequency Response..... 10 Hz to 15 kHz




hyt011.jpg

**Amplitude Units**

Acceleration ..... g, $m/s^2$

Velocity ..... mm/s

Displacement ..... mm

Battery Type ..... 2 AAA, IEC LR03

**External Piezoelectric Accelerometer**

DC Bias Voltage ..... 6 V dc to 7 V dc

DC Bias Current ..... 3.5 mA

*Note*

*Other specifications are the same as those of the built-in piezoelectric accelerometer.*

Battery Life ..... 25 hours

Size (L x W x H) ..... 24.1 cm x 7.1 cm x 5.8 cm

Weight ..... 220 g

Audio Port ..... Stereo Audio Output Jack (3.5 mm Audio Plug)

External Sensor Port ..... M12 connector

**Environmental**

Operating Temperature ..... -10 °C to 50 °C

Storage Temperature ..... -30 °C to 60 °C

Operating Humidity ..... 30 % to 90 % (non-condensing)

Operating Altitude ..... 2000 m

Storage Altitude ..... 12 000 m

IP Rating ..... IP 40

Vibration Limit ..... 500.0 $m/s^2$ peak

**Electromagnetic Compatibility**

International ..... IEC 61326-1: Portable Electromagnetic Environment

CISPR 11 ..... Group 1, Class A

*Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.*

*Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances. Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object. The equipment may not meet the immunity requirements of this standard when test leads and/or test probes are connected.*

Korea (KCC) ..... Class A Equipment (Industrial Broadcasting & Communication Equipment)

*Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.*

# Before You Start

This section helps you to know the Product parts, controls, and connections.

## Unpack and Inspect

Carefully unpack and inspect the:

- Vibration Meter
- Soft case
- Quick Reference Guide
- 2 AAA, IEC LR03

## Storage

When not in use, always keep the Product in the supplied soft case. The custom interior of the case supplies protection for the Product, documentation, and accessories.

## Battery

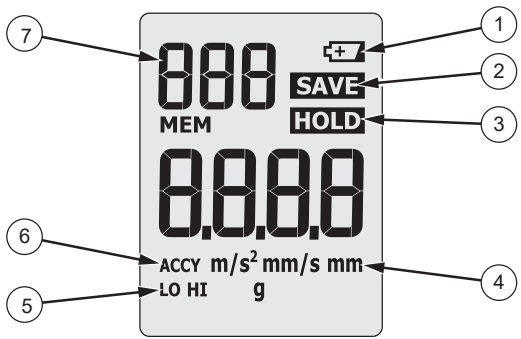
Before you use the Product for the first time, install the two AAA Alkaline batteries (included). See *Battery Replacement* for more information.

shows on the display when battery power is low. Replace the batteries before you continue to use the Product.

# Display

Table 2 shows the typical elements on the Product display.

**Table 2. Typical Elements on the Product Display**

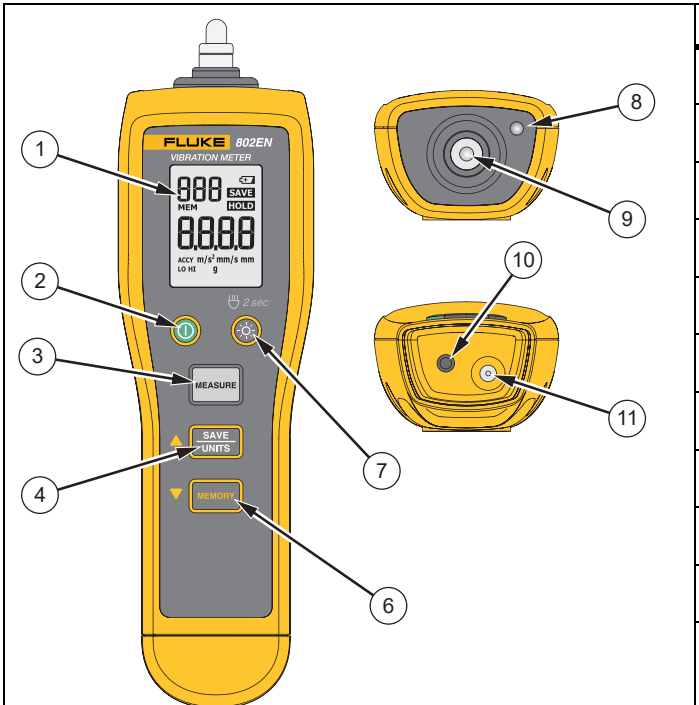



| Item | Description |
|---|---|
| ① | Battery status |
| ② | Save reading |
| ③ | Hold reading |
| ④ | Measurement units |
| ⑤ | LF/HF switch |
| ⑥ | External sensor |
| ⑦ | Record storage |

# Controls and Connections

Table 3 shows the location of the controls and connections for the Product.

**Table 3. Product Controls and Connections**




| Item | Control |
|---|---|
| ① | LCD |
| ② | Power on/off |
| ③ | Measure |
| ④ | Save/mode switch/unit switch |
| ⑤ | Bottom cap |
| ⑥ | View records |
| ⑦ | Backlight on/off and flashlight on/off |
| ⑧ | Flashlight |
| ⑨ | Piezoelectric Accelerometer |
| ⑩ | Audio port |
| ⑪ | External sensor port |

# Power On/Off

Push and hold ⏻ for over one second to turn on/off the Product. See Table 3 for the control location.

When you turn on the Product, the default Measurement screen shows. The screen shows the same measurement units since you last powered off the Product.

# Auto Power Off

After 300 seconds of inactivity, the Product automatically powers off.

# How to Operate

This section is about the operation of the Product. It includes measurement tips and step-by-step instructions.

## Keys

Table 3 shows the keys on the Product.

For general operation:

- Push and hold 测试 to start measurement or release reading hold.
- Push 存储 单位 to change measurement mode/unit or record a reading.
- Push 存储 单位 to view existing reading or clear all stored data.

## Measurement Modes

The units of measure are adjustable for different standards.

In standby mode (when the main screen shows ----):

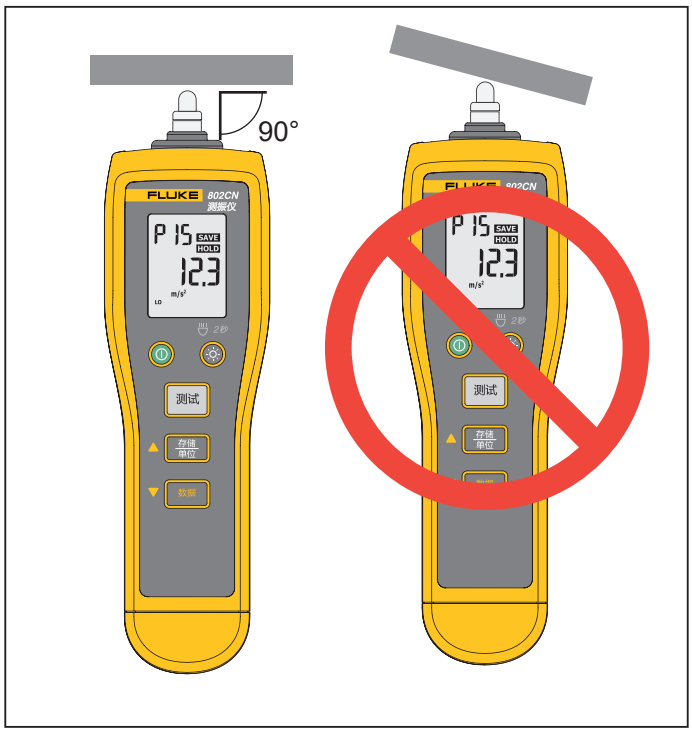
Push 存储 单位 to switch between measurement modes (acceleration/velocity/displacement) and measurement units (LO m/s², Hi m/s², mm/s, and mm).

## Quick Measurement

*Note*

*Push the sensor tip onto the test surface vertically. Otherwise measurement accuracy is affected. See Figure 1.*

**Figure 1. Correct and Incorrect Measurement Angles**




After startup, the Product is in standby mode. The main screen shows "----" and the last set measurement unit.

1. Push and hold 测试 to enter measurement mode and view measurement reading.
2. When the reading is stable, release 测试. The reading is automatically held. The screen shows HOLD and flashes SAVE, reminding you to save the reading.
3. Push 测试 again to switch to the main screen in standby mode.

*Note*

*The Product cannot measure frequency, because the vibration frequency is unknown. Change the measurement mode between LO and HI. If the two readings are different, use the greater reading to determine the vibration status.*

## Save Measurement Reading

After the measurement is completed, the measurement reading is automatically held. The screen flashes SAVE.

Push 存储 单位 to save the reading. SAVE no longer flashes on the screen. Instead, the memory location shows on the upper-left of the screen. Quick measurements are saved as sequential files that start at 01. For example, P03 means the reading is saved in the 3rd file.

A maximum of 99 measurement readings can be stored in the memory. When the memory is full, the Product automatically deletes the earliest reading.

## View Memory

When the Product is on:

1. Push 数据 to enter View Memory mode. The screen shows the latest stored position.
2. Push 存储 单位 to switch to the last stored position.
3. Push 数据 to switch to the next stored position.
4. Push 测试 to switch to Measurement mode.

   The last viewed storage position is automatically saved and will be shown when you enter View Memory mode next time.
5. Push and hold 存储 单位 for more than one second to view the last stored reading.

## Clear All Data

In View Memory mode, push and hold 数据 for over 5 seconds to clear all stored data.

## Backlight

When the Product is on, push ☼ to turn on/off the backlight.

*Note*

*The backlight automatically turns off after 120 seconds of inactivity.*

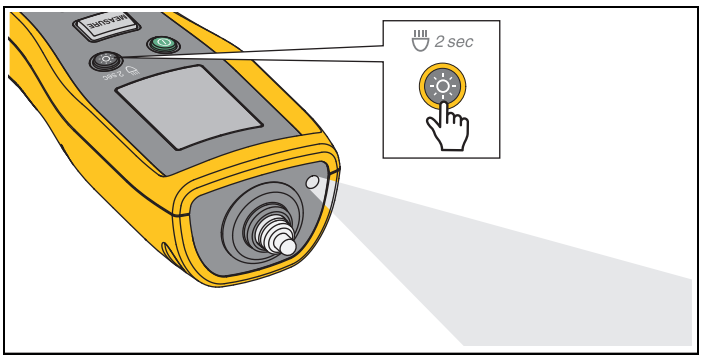
## Flashlight

The Product has a built-in flashlight to illuminate the measurement area on the machine. Push and hold ⏻ for 2 seconds to turn on or turn off the flashlight. See Figure 2.

*Note*

*The flashlight automatically turns off after 120 seconds of inactivity.*

**Figure 2. Flashlight**




## Accessory Connectors

The Product has two accessory connectors:

- External Sensor
- Audio

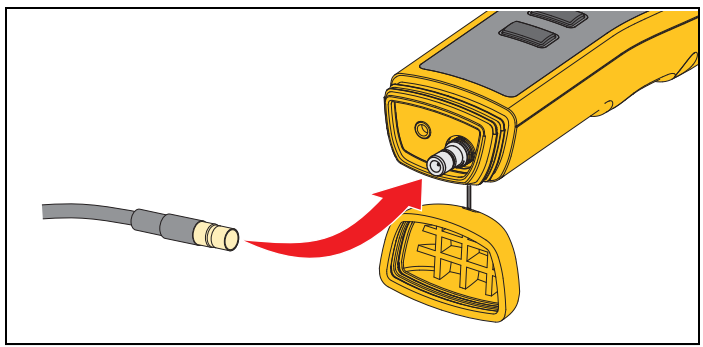
### External Sensor

In addition to the built-in piezoelectric accelerometer, an optional external sensor connects to the Product. The connector type for the external sensor is a Subminiature version B (SMB). Figure 3 shows how to connect an external sensor to the Product.

*Note*

*The Product supports but does not provide an external accelerometer. Go to http://www.fluke.com.cn/ to purchase an external accelerometer.*

**Figure 3. External Accelerometer**



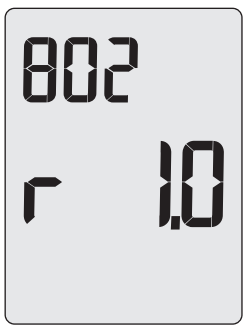
*Note*

*When the external sensor is connected to the Product, the screen shows ACCY after you push and hold 测试 for 2 seconds. This means the external sensor is working and the built-in sensor is automatically turned off.*

To set the sensitivity for the external sensor:

1. Turn on the Product while pushing [测试] at the same time.

   The screen shows the model number and software version number.




2. Push [测试] again to enter the sensitivity setting.

   The screen below shows that the initial value is 10.00, which means 10.00 mV/m/s².




*Note*

*You must set the sensitivity in mV/m/s² units.*

3. Push ▲ ([存储 单位]) or ▼ ([数据]) to enter setting mode. 10.00 flashes.
4. In setting mode (when the reading flashes), push ▲ to increase 0.01, or push ▼ to decrease 0.01. The unit is mV/m/s².
5. When you get the required sensitivity, push [测试] to save the setting and exit setting mode.

*Note*

*The external sensor can be purchased separately. Set the sensitivity according to the reference data that is shipped with the external sensor.*

## Audio

The Product has an audio connector for headphones. Headphones are useful to detect unusual machine sounds.

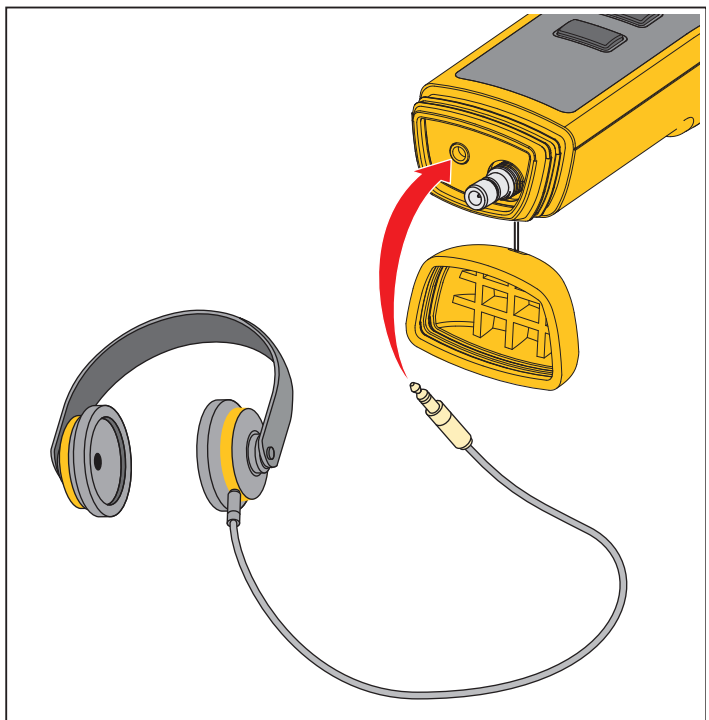
To listen to a machine:

1. Open the bottom cap of the Product and connect the audio connector.
2. Put on the earphones.
3. Push the sensor tip onto the test surface.
4. Push and continue to hold 测试.

As you continue to hold 测试, the audio channel is active. The Product also takes a measurement at this time.

Figure 4 shows the audio connection to the Product.

**Figure 4. Audio Connection**



## ISO 10816 Standards

As an alternative to the Overall Vibration Severity Scale included in the Product, you can use the ISO Standard 10816-1 to evaluate the severity of overall vibration levels. Table 4 is a chart that contains the values from this standard. Compare the overall vibration value measured with the Product to this table to identify the vibration severity.

**Table 4. Vibration Severity - ISO 10816-1**

| Machine | | Class I | Class II | Class III | Class IV |
|---|---|---|---|---|---|
| Vibration Velocity Vrms | mm/s | Small Machines | Medium Machines | Large Rigid Foundation | Large Soft Foundation |
| | 0.28 | | | | |
| | 0.45 | | | | |
| | 0.71 | | GOOD | | |
| | 1.12 | | | | |
| | 1.80 | | | | |
| | 2.80 | | SATISFACTORY | | |
| | 4.50 | | | | |
| | 7.10 | | UNSATISFACTORY | | |
| | 11.20 | | | | |
| | 18.00 | | | | |
| | 28.00 | | UNACCEPTABLE | | |
| | 45.9 | | | | |

### ISO 10816-1

This standard contains general guidelines for machine vibration measurements on non-rotating parts.

## Important Terms

**Class I**: Individual parts of engines and machines integrally connected to the machine in normal operation. Production electrical motors at a maximum of 15 kW are examples of machines in this category.

**Class II**: Medium-sized machines (typically electrical motors with 15 kW to 75 kW output) without special foundations, rigidly mounted engines or machines (up to 300 kW) on special foundations.

**Class III**: Large prime-movers and other large machines with rotating masses mounted on rigid and heavy foundations that are relatively stiff in the direction of the vibration measurements.

**Class IV**: Large prime-movers and other large machines with rotating masses mounted on foundations that are relatively soft in the direction of vibration measurements (for example, turbo generator sets and gas turbines with outputs greater than 10 MW).

# General Maintenance

Maintenance is not necessary for the Product.

**⚠ Caution**

**No part of the Product is serviceable by the user. Do not try to open the Product.**

**⚠ Caution**

**To prevent damage to the Product or any performance loss, do not put the Product in temperature extremes. The ambient operating temperature is -10 °C to 50 °C with a humidity of 30 % to 90 % RH (non-condensing).**

## Care

**⚠ Caution**

**To prevent damage to the piezoelectric accelerometer, do not hit, shake, or drop the Product. A damaged sensor decreases the diagnostic quality.**

## How to Clean

Clean the external case of the Product at regular intervals with a moist cloth and a weak detergent solution.

**⚠ Caution**

**To prevent damage or performance loss, keep the Product dry. Do not put the Product into any liquid. The Product is not waterproof.**

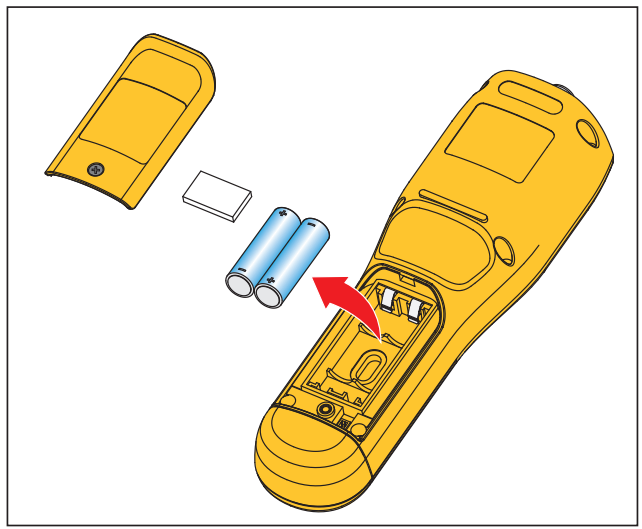
## Battery Replacement

The Product operates on two AAA batteries.

To replace the batteries:

1. Turn the Product over and loosen the battery cover screw.
2. Remove the battery cover from the Product, see Figure 5.
3. Align the batteries into the battery slot with the correct polarity.
4. Replace the battery cover and tighten the screw.

**Figure 5. Battery Replacement**



## How to Troubleshoot

Table 5 is a list of problems, causes, and corrective actions for the Product.If the problem continues, contact the Fluke Service Center for technical support. See *Contact Fluke*.

**Table 5. Troubleshooting**

| Symptom | Cause | Corrective Action |
|---|---|---|
| The Product does not turn on. | The battery voltage is too low.<br>The battery connection is loose. | 1. Replace the batteries. See *Battery Replacement*.<br>2. Make sure the batteries are properly aligned and secured. |
| Buttons do not operate.<br>Product does not operate. | | Restart the Product. |