HEART RATE SENSOR W28

USER GUIDE

cma-science.nl

Short description

CMA Wireless Heart Rate sensor W28 monitors a person's heartbeat within a range of 0 to 200 beats per minute (BPM). It consists of a pair of wireless hand grips designed to measure heart rate by detecting the electrical signals produced by the heart.
When the user firmly grips the handles, embedded electrodes capture the tiny electrical impulses generated with each heartbeat. These signals are then processed to determine heart rate in beats per minute. This method, known as bioelectric impedance, is non-invasive and provides real-time heart rate data without the need for adhesive electrodes or chest straps.

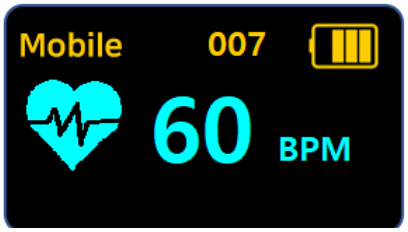
The power button, located on the top of the right grip, allows you to turn the sensor on and off. The sensor is equipped with an OLED color display which shows sensor information and the measured values. This makes it suitable to use as a standalone measuring instrument.

The sensor can be used wirelessly via Bluetooth or wired via USB with the Coach 7 or Coach 7 lite programs/apps on computers (Windows and Mac), Chromebooks and mobile devices (Android and iOS).

Calibration

The Heart Rate sensor W14 is supplied calibrated with a factory calibration in BMP. Additional calibration is not needed.

How to Use the Heart Rate Sensor



1. Hold the hand grips firmly, ensuring that the grip with the sticker is in your right hand. Place your palms on the metal contacts on both sides of the sensor bar, but avoid squeezing too tightly.
2. Once positioned correctly, a heart symbol will blink on the screen, indicating that your heart rate is being measured.
3. If an X appears over the heart symbol, the sensor may not be making full contact with your skin, resulting in an inaccurate reading. Adjust your grip to ensure both palms are in proper contact with the metal strips.
4. To improve accuracy, you can lightly moisten your palms with salt water to enhance conductivity.
5. After each use, clean the hand grips with a damp cloth or paper towel. Do not submerge them in water.
6. Keep the sensor steady while measuring your heart's electrical signals. If you move or do not hold the grips firmly, the sensor may not provide an accurate reading. For the best results, stay still and maintain full palm contact with the grips.

Software

You can use the Heart Rate sensor W28 with Coach 7 or Coach 7 Lite (free) program on computers (Windows and Mac) or Coach 7 and Coach 7 Lite (free) app on mobile devices (Android and iOS). For Chromebooks, we offer a special Android app. The support for the wireless Heart Rate sensor is added starting from Coach version 7.12.

Check the CMA website for the latest installations. https://cma-science.nl/downloads_en

Collecting data without software connection

1. Turn the Heart Rate sensor on by pressing its power button.
2. The sensor briefly displays its Bluetooth identification code. This ID code is also printed on the sticker located on the bottom side of the sensor box.
3. Then the display shows:
   - the Bluetooth mode, 'Mobile' or 'PC'.
     Mobile indicates Bluetooth Low Energy mode which should be used when working with mobile devices (Android, iOS), Chromebook and Apple computers.
     PC indicates Bluetooth Classic which should be used for Windows computers.
   - the battery level, and
   - the current measured value.
4. Now you can use the sensor as an independent measuring instrument.
5. To turn off the sensor press and hold its power button for 3 sec. To save its battery the sensor automatically turns off after a few minutes of inactivity (no connection to power, no communication).

Collecting data via the Bluetooth connection

Mobile devices, Chromebooks, and Apple computers

For mobile devices (Android, iOS), Chromebooks and Apple computers Bluetooth Low Energy technology is used for wireless communication. For these devices **do not pair** the sensor just use it directly in the Coach software.

1. Turn the Heart Rate sensor on by pressing its power button.
2. Ensure your sensor is set to Mobile mode.
   If the display shows in the top-left corner 'PC' first you must set the sensor to the Mobile mode. Turn off the sensor. Then press and hold the power button until the text 'Bluetooth mode Change Mobile' is shown, then release the button. The mode is set to 'Mobile' which means that Bluetooth Low Energy is used.
3. Start the Coach 7 or Coach 7 Lite program/app.
4. Select the Dashboard Activity 'Measurement with Wireless sensors'.
5. On opening of the Activity Coach starts searching for sensors which are turned on and in the Mobile mode. The found sensors appear in the list.
6. Select the Heart Rate sensor you want to connect to. If needed check the sensor's

Bluetooth ID which is located on the sensor's bottom label.

7. When the connection is established, the Bluetooth symbol will appear in the top-left corner of the sensor's display, and the sensor's icon will be displayed in Coach, showing the values measured by the sensor.
8. Now you are ready to use the Heart Rate sensor for your measurement.

Windows computers

For Windows computers, Bluetooth Classic technology is used for wireless communication. Before you start to use the sensor for measurement in Coach **you have to pair it**.

1. Turn the Heart Rate sensor on.
2. Ensure your sensor is set to PC mode.
   If the display shows in the top-left corner 'Mobile' first you must set the sensor to the PC mode. Turn off the sensor. Then press and hold the power button until the text 'Bluetooth mode Change PC' is shown, then release the button. The mode is set to 'PC' which means that Bluetooth Classic is used.
3. Pair your sensor.
   - Go to the Windows Settings **Bluetooth and other devices** and select **Add Bluetooth or other devices**. Select **Bluetooth device**.
   - Windows looks for Bluetooth devices and after a while lists discovered devices. The wireless sensors are listed with their Bluetooth IDs.
   - Select the sensor you want to connect to. If needed check the sensor's Bluetooth ID which is located on the bottom label of your sensors.
   - When the connection is successfully established Windows indicates that the sensor is paired and ready to go.
   - Click **Done** to accept it. The sensor appears in the list of paired Bluetooth devices.
4. Start the Coach 7 or Coach 7 Lite program.
5. Select the Dashboard Activity 'Measurement with Wireless sensors'.
6. Coach starts searching and displays the list with detected sensors, even if they are not paired.
7. Select the Heart Rate sensor you want to connect to. If needed check the sensor's Bluetooth ID which is located on the sensor's bottom label. If the sensor was not paired yet Coach will force you to pair the sensor first via Windows Settings.
8. When the connection is established, the Bluetooth symbol will appear in the top-left corner of the sensor's display, and the sensor's icon will be displayed in Coach, showing the values measured by the sensor.
9. Now you are ready to use the Heart Rate sensor for your measurement.

Collecting data via the USB connection

The Heart Rate sensor can also be used as a USB sensor for both Windows and Mac computers.

1. Turn the Heart Rate sensor on.
2. Use the provided USB cable to connect the sensor to a USB port.
3. Start the Coach 7 or Coach 7 Lite program.
4. Select the Dashboard Activity 'Measurement with Wireless sensors'.
5. The connected Heart Rate sensor should be detected automatically, and its icon appears on the first empty sensor position in the Wireless sensors panel.
6. When the connection is established the USB symbol appears in the top-left corner of the sensor's display and the icon shows measured data.
7. Now you are ready to use the Heart Rate sensor for your measurement.

Care and Maintenance

After each use, clean the hand grips with a damp cloth or paper towel. You can also use antibacterial cleaners for added hygiene. Do not submerge the hand grips in water.

Charging a battery

An internal rechargeable battery (Li-Poly 3.7 V, 700 mAh) powers the sensor. The battery symbol located in the top-right corner of the sensor's display shows the battery level. When the battery level becomes critical, the battery gauge shows an empty battery. Use the provided cable to connect the sensor to a USB port for charging. A fully discharged battery requires up to 2 hours of charge time to become fully charged again. To prolong battery life, automatic power down turns the sensor off after a few minutes of inactivity.

To replace the battery, use **only** the approved rechargeable batteries provided by CMA.

Suggested experiments

- Compare the heart rate of different individuals.
- Check the person's heart rate before, during and after a short period of vigorous activity.
- Monitor the recovery rate: that is how quickly a person's heart rate returns to normal after exercises.
- Investigate the baroreceptor reflex by observing changes in heart rate as a person transition from lying down to sitting and standing, caused by the body's need to pump blood to different levels.
- Measure a person's heart rate before and after caffeine consumption.
- Check a person's heart rate before and after eating.
- Monitor your own heart rate at different times of the day.
- Observe a person's heart rate while holding their breath.

Technical Specifications

Measurement range	0 to 250 BMP
Resolution	1 BPM
Maximal sampling rate	100 Hz (typical 1 Hz)
Condition	20 ~ 60℃, ~85%RH
Display	OLED 0.96" (128*64 px)
Battery	Li-Poly Rechargeable Battery (3,7 V 700 mAh)
Battery life after full charge	Approximately 8 hours after full charge Battery life varies by use, configuration, temperature, and many other factors; actual results will vary.
Connection	Bluetooth 5, Low Energy (Mac, Android, iOS) Bluetooth 2.1, Classic (Windows) USB 2.0 (type C)
Bluetooth ID	W28HEAR-xxx

Warranty

The Heart Rate sensor W28 is warranted to be free from defects in materials and workmanship for a period of 3 years from the date of purchase provided that it has been used under normal laboratory conditions. This warranty does not apply if the sensor has been damaged by accident or misuse.

The sensor battery is consumable and is warranted to be free from defects in materials and workmanship for a period of 12 months from the date of purchase.

Discard batteries according to local regulations.

Note: *This product is to be used for educational purposes only.*
It is not intended for industrial, medical, research, or commercial applications.

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