

Wireless Heart Rate Module

PS-3566

Wireless Hand Grip Heart Rate Sensor

PS-3206

Wireless Exercise Heart Rate Sensor

PS-3207



PS-3566 Wireless Heart Rate Module

PS-3564 Wireless Exercise Heart Rate Strap

PS-3565 Wireless Hand Grips

PS-3207 Wireless Exercise Heart Rate Sensor

PS-3206 Wireless Hand Grip Heart Rate Sensor

For Educational Use Only! Note: These are not medical devices. They are designed for educational use only and should not be used in any medical process such as life support or patient diagnosis. They are also not intended for use in graduate research or industry including industrial control or any type of industrial testing.

Item	Model	Included Items	Model
Wireless Hand Grip Heart Rate Sensor (See page 3)	PS-3206	Wireless Heart Rate Module Wireless Heart Rate Hand Grips	PS-3566 PS-3565
Wireless Exercise Heart Rate Sensor (See page 7)	PS-3207	Wireless Heart Rate Module Wireless Exercise Heart Rate Strap	PS-3566 PS-3564

Introduction

The PS-3566 Wireless Heart Rate Module is included with the PS-3206 Wireless Hand Grip Heart Rate Sensor and the PS-3207 Wireless Exercise Heart Rate Sensor. The PS-3206 Wireless Hand-Grip Heart Rate Sensor consists of the Wireless Heart Rate Module and the PS-3565 Heart Rate Hand Grips. The PS-3207 Wireless Exercise Heart Rate Sensor consists of the Wireless Heart Rate Module and the PS-3564 Exercise Heart Rate Strap.

Software Required

The Wireless Heart Rate Module connects to a computer, smart phone, or tablet via Bluetooth using the PASCO Data Collection Software, **PASCO Capstone** or **SPARKvue**. See the PASCO web site at:

www.pasco.com/downloads

for information about the latest software.

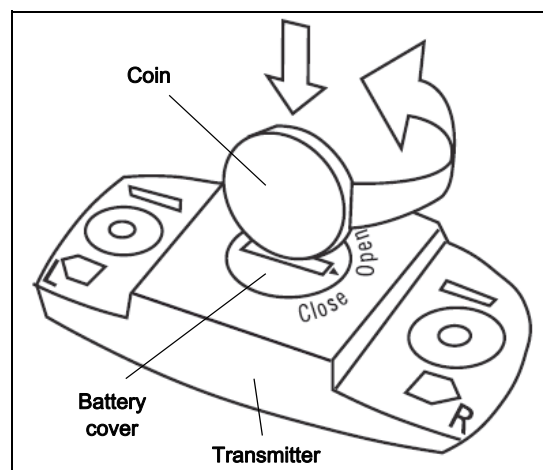
Wireless Heart Rate Module

The module uses a CR2025 battery with an expected usage time of two years (assuming one hour of use per day). The module is water resistant but it is not intended to be used under water. Bluetooth transmission will not work under water. The module has a two year warranty provided by the manufacturer.

Battery

To change the battery, follow these steps.

1. Use a coin to open the battery cover by turning it counterclockwise (to OPEN).
2. Use a small flat blade screwdriver to remove the old battery. Insert the new battery (CR2025) inside the cover with the positive (+) side against the battery cover.
3. Make sure that the "O-ring" that seals the cover is seated in the sealing groove to ensure water resistance.
4. Use the coin to turn the cover clockwise to CLOSE.



NOTE: The module is water resistant, but Immersing it in water will block the Bluetooth transmission. Therefore, it is not recommended for you to use the module in water.

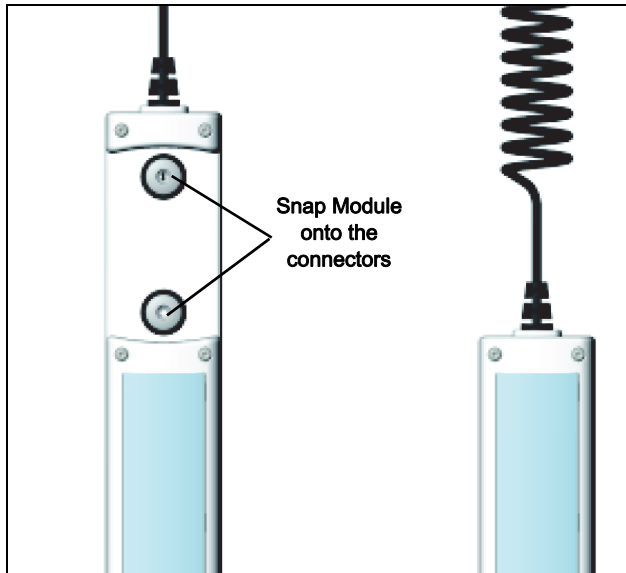
For more information, see the web page at:

https://support.polar.com/us-en/support/H7_heart_rate_sensor

Wireless Hand Grip Heart Rate Sensor (PS-3206)

NOTE: Remove the protective tape from the metallic strips on the front and back of each grip before using.

Snap the Wireless Heart Rate Module onto the connectors near the top of the slightly longer hand grip.



Heart rate is a basic body measurement that can be used to investigate the cardiovascular system and its response to stimulus (exercise, stress, etc.) during relatively simple experiments. The Wireless Hand Grip Heart Rate Sensor can be used to measure heart rate between 0 and 240 beats per minute (bpm) during mild exercise or periods of rest. **NOTE:** The sensor is not a medical instrument. It cannot be used to gauge the health or fitness of a person.

The coiled cable between the two hand-held grips enables users with different shoulder widths to use the sensor comfortably. The grips are designed for a wide range of hand sizes (8 years old to adult).

Measurement Technique

Grasp the hand grips firmly but not too tightly in the palms of the hands so that one of the metallic strips on each grip is in the center of the palm. Measurements will be easier and more accurate if the hands are clean and dry.

Theory of Operation

Like an electrocardiograph (EKG) that monitors the electrical signal of the heart, the Hand-Grip Heart Rate

Sensor measures electrical signals that start at the heart and reach the skin at the palms of the hands.

Sampling

By default, the Wireless Hand-Grip Heart Rate Sensor continuously monitors the time between beats, calculates the beats per minute, and averages the beats per minute within a five second interval. The average is then displayed. This process tends to “smooth” the collected data.

Specifications

Sensor Range	0 to 240 beats per minute
Accuracy	± 1 beat per minute
Resolution	1 beat per minute
Maximum Sample Rate	1 per two seconds
Default Sample Rate	1 per five seconds

Operation

Software Help

NOTE: See the SPARKvue Help or PASCO Capstone Help for information about collecting, displaying, and analyzing data.

- In SPARKvue, select the HELP button in any screen including the Home Screen.
- In PASCO Capstone, select PASCO Capstone Help from the Help menu, or press F1.

Connect the Sensor Wirelessly

Start the PASCO data collection software (such as PASCO Capstone or SPARKvue).

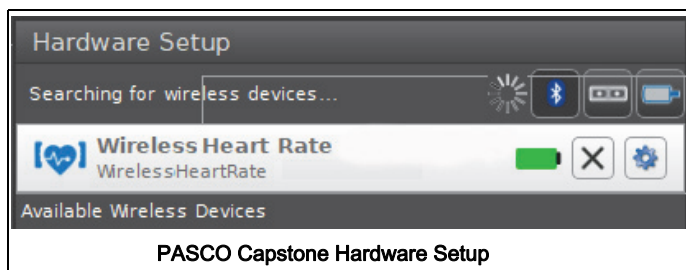
Setup the PASCO Capstone Software

Hold the hand grips firmly in the center of your palms.

PASCO Capstone: Select “Hardware Setup” in the Tools palette.

- The sensors are ordered by proximity to the device.
- In the Hardware Setup window, select the sensor that has the alpha-numeric device ID for the “Polar” module.

- After the module and the software connect, the icon and name of the sensor will appear in the Hardware Setup window.



Close the Hardware Setup window.

Collect Data

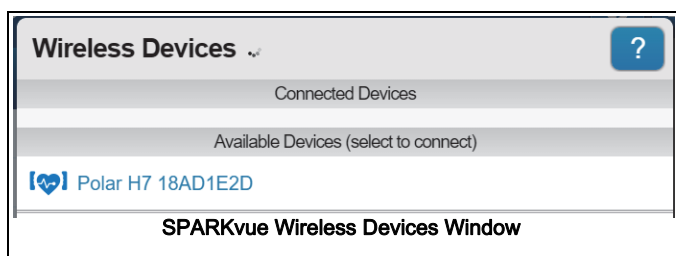
In **PASCO Capstone**, select one of the QuickStart template displays in the main window or click one Display palette. In the display, use the <Select Measurement> menu to pick a measurement to be shown.

Select **Record** to begin collecting data. Click **Stop** to end collecting data.

Setup the SPARKvue Software

Hold the hand grips firmly in the center of your palms.

SPARKvue: In the Home screen, select the “Bluetooth” icon at the top of the screen. The Wireless Devices window opens.



- The sensors are ordered by proximity to the device.
- Select the sensor that has the alpha-numeric device ID for the “Polar” module.
- Select **Done**. A list of measurements appears under the sensor in the Home Screen.

Collect Data

- In the SPARKvue Home Screen, select a measurement such as heart rate (bpm) from the list under the sensor’s name. A graph of the measurement versus time opens.

- In SPARKvue, select the **Start** button to begin collecting data.

Care and Maintenance

Remove the Wireless Heart Rate Monitor from the Hand Grips when the sensor is not in use.

Clean the hand grips after each use with a damp cloth or paper towel. The hand grips can be cleaned with anti-bacterial cleaners. Do not submerge the hand grips in water.

Signal Loss and Electrical Interference

- Erratic measurements or large reading fluctuations (e.g., drop to 0 beats per minute (bpm) or sudden increase to 240 bpm) usually indicate signal loss.
- The most common cause of signal loss is loss of contact between the hands and the hand grips. Keep the hand grips in the palms of both hands.
- If signal loss occurs, check the software and the position of the hands on the hand grips. If necessary, restart the software.
- Avoid computer monitors, magnets, power cords, television sets, or other appliances that emit electromagnetic radiation.

Heart Rate Activity Suggestions

Sit in a chair. Start collecting data. Record your resting heart rate for 60 seconds.

Stand up. Jog in place for three to five minutes and continue to collect data.

Stop running but continue to collect data for another five minutes. After five minutes, stop collecting data.

Use the software to graph your data. Compare your resting heart rate to your heart rate during exercise and during the five minute recovery time after exercise.

Recommended Exercise Heart Rate Levels

Age (yrs.)	Max. Heart Rate (bpm)*	Min. Training Threshold**	Max. Training Threshold***
15	205	123	185
20	200	120	180
25	195	117	176
30	190	114	171

*Maximum estimated heart rate is $220 - \text{age (years)}$.

**Minimum training threshold is equal to 60% of the maximum heart rate.

***Maximum training threshold is equal to 90% of the maximum heart rate.

Ranges are based on the American College of Sports Medicine recommendations for healthy individuals. Ranges will vary.

NOTE: The Wireless Hand Grip Heart Rate Sensor is NOT a diagnostic tool.

Wireless Exercise Heart Rate Sensor (PS-3207)

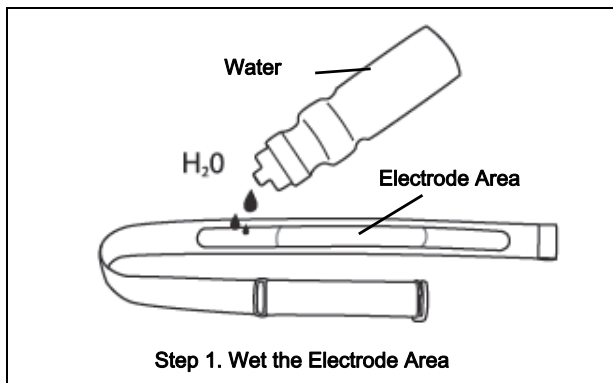
The Wireless Exercise Heart Rate Sensor uses the Wireless Heart Rate Module mounted on the Wireless Exercise Heart Rate Strap. It measures heart rates from 0 to 240 bpm. The sensor can measure the heart rate during exercise without a cable getting in the way because the sensor transmits wirelessly via Bluetooth to the PASCO Data Collection Software.

The module snaps onto the strap and the strap wraps around your chest with the module positioned over the center of the chest. The software averages the heart rate in five second intervals.

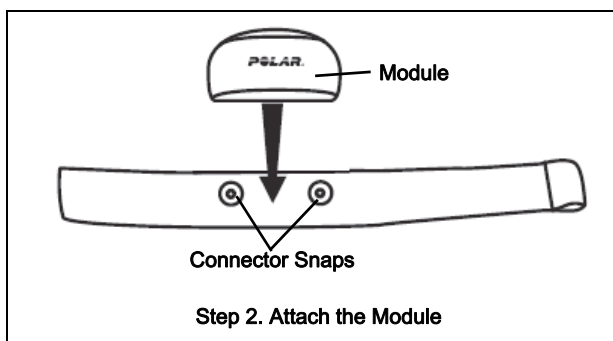
Wearing the Exercise Heart Rate Strap

The strap has an electrode area on the underside that detects electrical signals from the cardiac muscle.

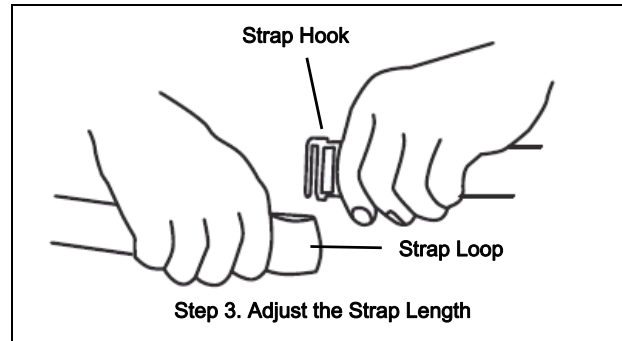
1. Wet the electrode area with water and make sure that it is well moistened.



2. Attach the Wireless Heart Rate Module to the connector snaps on the front side of the strap.

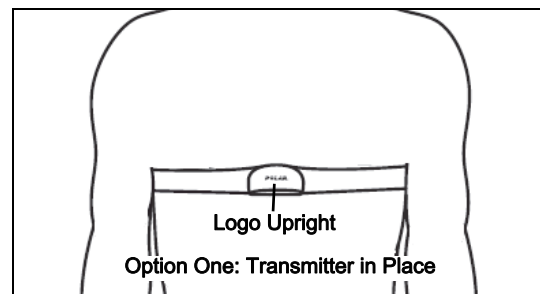


3. Adjust the strap length to fit snugly and comfortably around your chest just below the chest muscles.



Transmitter Strap Options

Option One - Under a Shirt: Follow steps 1, 2, and 3 above. Put the strap around your chest and connect the strap hook to the loop in the other end of the strap. Make sure that the wet electrode areas are firmly against your skin and that the module is in a central location and the Polar logo on the transmitter is upright (see Option One).



Option Two - Over a Shirt: To use the sensor over the top of a T-shirt or tank top, follow steps 1, 2, and 3 above. Put the strap around your chest on top of the shirt and connect the strap hook to the loop. Then, wet the shirt beneath the electrode areas of the strap so that the shirt and the skin beneath the shirt are well moistened.



Option Three - Hold in Both Hands: Wet the electrode area and connect the module to the strap, but hold the strap with both hands so that the palm area of each hand touches the wet electrode area. [NOTE: With this option, the data quality may vary.]

Specifications

Sensor Range	0 to 240 beats per minute
Accuracy	± 1 beat per minute
Resolution	1 beat per minute
Maximum Sample Rate	1 per two seconds
Default Sample Rate	1 per five seconds

Operation

Software Help

NOTE: See the SPARKvue Help or PASCO Capstone Help for information about collecting, displaying, and analyzing data.

- In SPARKvue, select the HELP button in any screen including the Home Screen.
- In PASCO Capstone, select PASCO Capstone Help from the Help menu, or press F1.

Connect the Sensor Wirelessly

Start the PASCO data collection software (such as PASCO Capstone or SPARKvue).

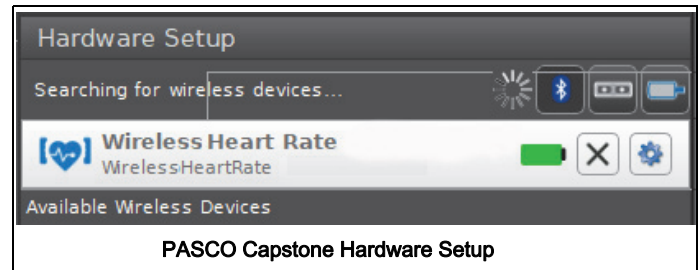
Setup the PASCO Capstone Software

Wet the electrode area and put the strap around your chest.

PASCO Capstone: Select “Hardware Setup” in the Tools palette.

- The sensors are ordered by proximity to the device.
- In the Hardware Setup window, select the sensor that has the alpha-numeric device ID for the “Polar” module.

- After the module and the software connect, the icon and name of the sensor will appear in the Hardware Setup window.



Close the Hardware Setup window.

Collect Data

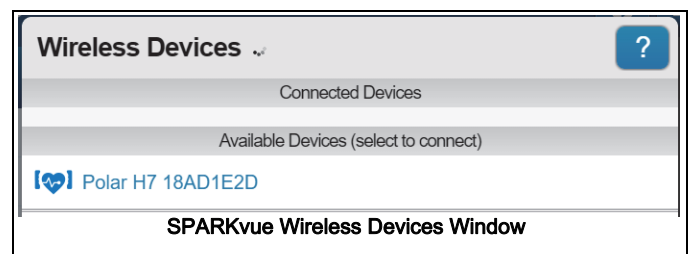
In **PASCO Capstone**, select one of the QuickStart template displays in the main window or click one Display palette. In the display, use the <Select Measurement> menu to pick a measurement to be shown.

Select **Record** to begin collecting data. Click **Stop** to end collecting data.

Setup the SPARKvue Software

Wet the electrode area and put the strap around your chest.

SPARKvue: In the Home screen, select the “Bluetooth” icon at the top of the screen. The Wireless Devices window opens.



- The sensors are ordered by proximity to the device.
- Select the sensor that has the alpha-numeric device ID for the “Polar” module.
- Select **Done**. A list of measurements appears under the sensor in the Home Screen.

Collect Data

- In the SPARKvue Home Screen, select a measurement such as heart rate (bpm) from the list

under the sensor's name. A graph of the measurement versus time opens.

- In SPARKvue, select the Start button to begin collecting data.

Care and Maintenance

Remove the Wireless Heart Rate Monitor from the strap when the sensor is not in use.

Clean the strap thoroughly after each use. Washing instructions can be found on the fabric tab at the hook end of the strap.

Signal Loss and Electrical Interference

- Erratic measurements or large reading fluctuations (e.g., drop to 0 beats per minute (bpm) or sudden increase to 240 bpm) usually indicate signal loss.
- The most common cause of signal loss is loss of contact with the electrode area. Keep the electrode area moist.
- If signal loss occurs, check the software and the position of the strap. If necessary, restart the software.
- Avoid computer monitors, magnets, power cords, television sets, or other appliances that emit electromagnetic radiation.

Heart Rate Activity Suggestions

Sit in a chair. Start collecting data. Record your resting heart rate for 60 seconds.

Stand up. Jog in place for three to five minutes and continue to collect data.

Stop running but continue to collect data for another five minutes. After five minutes, stop collecting data.

Use the software to graph your data. Compare your resting heart rate to your heart rate during exercise and during the five minute recovery time after exercise.

Recommended Exercise Heart Rate Levels

Age (yrs.)	Max. Heart Rate (bpm)*	Min. Training Threshold**	Max. Training Threshold***
15	205	123	185
20	200	120	180
25	195	117	176
30	190	114	171

*Maximum estimated heart rate is $220 - \text{age (years)}$.

**Minimum training threshold is equal to 60% of the maximum heart rate.

***Maximum training threshold is equal to 90% of the maximum heart rate.

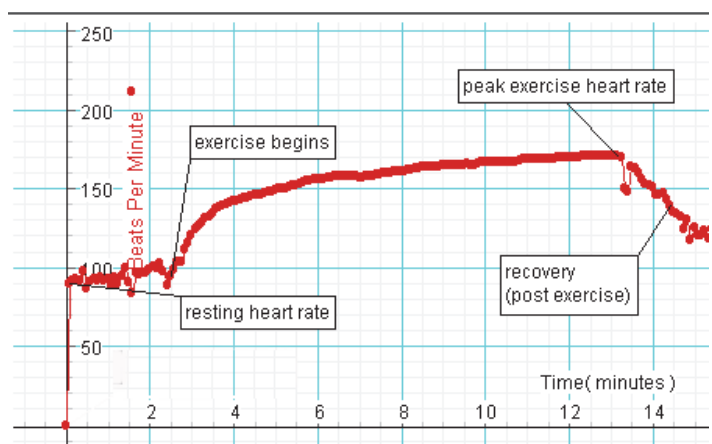
Ranges are based on the American College of Sports Medicine recommendations for healthy individuals. Ranges will vary.

NOTE: The Wireless Exercise Heart Rate Sensor is NOT a diagnostic tool.

Experiment Suggestions

- Heart rate, respiration, and skin temperature during exercise.
- Effect on exercise heart rate for various forms of exercise (e.g., aerobic vs. anaerobic).
- Exercise recovery rates for individuals with different fitness.
- Exercise heart rate in healthy and diseased populations.

Sample Data: Heart Rate Changes During and After Exercise



General Information

Battery Life

Battery Usage

Battery life is very important to making the Wireless Heart Rate Module always ready to use.

Maximizing Battery Life

One of the factors that affects battery life is the storage temperature. Therefore, avoid storing the Wireless Heart Rate Module in very cold or very hot environments.

Replacement Items

Replacement items are:

- PS-3566 Wireless Heart Rate Module
- PS-3565 Wireless Heart Rate Hand Grips
- PS-3564 Wireless Exercise Heart Rate Strap

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: +1 916 462 8384 (worldwide)
8700-772-8700 (U.S.)

Web: www.pasco.com/support

Email: support@pasco.com

The Reference Guide will be updated periodically. For the latest revision of this Reference Guide, visit the PASCO Web site at

www.pasco.com/manuals

and enter the product number (e.g., PS-3566) in the text window.

Limited Warranty

For a description of the product warranty, see the PASCO catalog. For more information visit www.pasco.com/legal

Copyright

This PASCO scientific *Reference Guide* is copyrighted with all rights reserved. Permission is granted to non-profit educational institutions for reproduction of any part of this manual, providing the reproductions are

used only in their laboratories and classrooms, and are not sold for profit. Reproduction under any other circumstances, without the written consent of PASCO scientific, is prohibited. Version 23-07-2016.

Trademarks

PASCO, PASCO scientific, PASCO Capstone, and SPARKvue are trademarks or registered trademarks of PASCO scientific, in the United States and/or in other countries. All other brands, products, or service names are or may be trademarks or service marks of, and are used to identify, products or services of their respective owners. For more information visit www.pasco.com/legal.

FCC Statement

This Class B digital device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

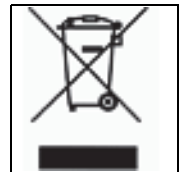
CE Statement

This device has been tested and found to comply with the essential requirements and other relevant provisions of the applicable EU Directives.

Product End of Life Disposal Instructions:

This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment. To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle/disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol (to the right) and on the product or its packaging indicates that this product must not be disposed of in a standard waste container.



Battery Disposal Instructions:

Batteries contain chemicals that, if released, may affect the environment and human health. Batteries should be collected separately for recycling, and recycled at a local hazardous material disposal location adhering to your country and local government regulations. To find out where you can drop off your waste battery for recycling, please contact your local waste disposal service, or the product representative..

