Pioneer

Installation Manual (for installing only)

Pedaling Monitor Sensor

SGY-PM910H2
SGY-PM910HL
SGY-PM910HR

Please read the ***Important Information for the User*** in the product box for product warnings and other important safety information.

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This product is ANT+™ certified.
Visit http://www.thisisant.com/directory/
for a list of compatible products and apps.

Features

This product is a sensor system that analyzes the pedaling of a bicycle in real time. It calculates the direction and intensity of the force acting on the pedals and calculates pedaling efficiency.

Description of components

- **Strain gauge unit:**
  Detects the strain on the crank and calculates the direction and intensity of the force on the crank.
- **Magnet:**
  Used to detect the angle of rotation.
- **Transmitters:**
  Send information from the strain gauge unit and the magnet to the Cyclocomputer.

Product mode

- When using SGX-CA500, the firmware version is required to be 201504**.03.4* or higher.

- **Pedaling monitor mode:**
  When paired with Cyclocomputer SGX-CA500, the pedaling efficiency and cadence and other such properties can be measured. You can make maximum use of the functions of this product.

- **Dual power meter mode:**
  Left and right sensors are required. The actual power values of the left and right sensors can be totaled and displayed and the cadence can be measured. Can be used with SGX-CA500 or with a Cyclocomputer that supports ANT+ from another manufacturer.

- **Single power meter mode:**
  The power value of the left or right sensors can be doubled and displayed quickly and the cadence can be measured. Can be used with SGX-CA500 or with a Cyclocomputer that supports ANT+ from another manufacturer.

Switching modes

- When using SGX-CA500, the firmware version is required to be 201504**.03.4* or higher.

- **Pedaling monitor mode**
  Can be switched with SGX-CA500. Cannot be switched with cyclocomputers from other manufacturers. When the mode is switched to pedaling mode, the LEDs on the sensors **light** green for 10 seconds.

Current mode	Method 1 (Right sensor push switch)	Method 2 (SGX-CA500)	LED lighting method
Dual power meter	Cannot be switched	○	The LEDs **light** green for 10 seconds
Single power meter	Cannot be switched	○	

- **Dual power meter mode**
  The mode can be switched on SGX-CA500 or by operating the right sensor push switch. When using with another manufacturer's Cyclocomputer, switch using method 1. When the mode is switched to powermeter mode, the LEDs **light** orange for 10 seconds.

Current mode	Method 1 (Right sensor push switch)	Method 2 (SGX-CA500)	LED lighting method
Pedaling monitor	Cannot be switched	○	The LEDs **light** orange for 10 seconds
Single power meter	○	○	

- **Single power meter mode**
  SGX-CA500 is required to switch from pedaling monitor mode. Cannot be switched with cyclocomputers from other manufacturers. To switch from the dual power meter mode, use SGX-CA500 or press the push switch of the right sensor. When the mode is switched, the LEDs on the sensors **blink** orange for 10 seconds.

Current mode	Method 1 (Right sensor push switch)	Method 2 (SGX-CA500)	LED lighting method
Pedaling monitor	Cannot be switched	○	The LEDs **blink** orange for 10 seconds
Dual power meter	○	○	

Manuals

The product's manuals consist of this User's Manual and an Installation Manual.

- **User's Manual:**
  Explains how to pair the product with the Cyclocomputer and calibrate the sensors.
- **Installation Manual (for dealers):**
  [For American Users] http://www.pioneerelectronics.com
  [For Canadian Users] http://www.pioneerelectronics.ca
  [For European Users] http://www.pioneer.eu
  Explains details about handling methods. The product installation methods (for dealers) are also described as references.
- **Important Information for the User:**
  Important Information for the User provides detailed information related to safety.

Compatibility

■ Crank sets

The product is compatible with the following crank sets.

Crank sets	Remarks
SHIMANO FC-9000	• Crank lengths of 165 mm, 167.5 mm, 170 mm, 172.5 mm, 175 mm, 177.5 mm, 180 mm, crank set of 50-34T, 52-36T, 52-38T, 53-39T, 54-42T, 55-42T are compatible. *
SHIMANO FC-6800	• Crank lengths of 165, 170, 172.5, 175 mm, crank set of 50-34T, 52-36T, 53-39T are compatible. *

* Descriptions in this manual are for a 170 mm crank set.

- When replacing the chain ring, be careful not to disconnect the junction cable of the right pedaling monitor sensor. See the video on how to remove the chain ring first on http://pioneer-cyclesports.com/us-en/support/products/ to confirm the procedure.

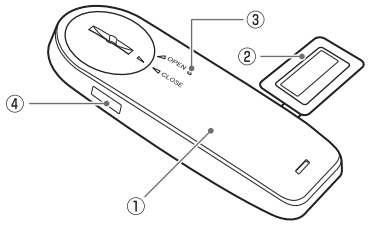
This product is designed to be used for recreational cycling and cycle training applications only and is not designed to withstand racing conditions.
Additionally, this product is designed to be used while cycling on paved roads only. Any damage or malfunction arising from use in racing or riding on dirt roads, cobblestone or any other unpaved roads will not be covered by the manufacturer's limited warranty.

Installing, pairing, and calibrating the product requires specialized techniques and tools. Ask the installation center or distributor to install, pair, and calibrate it.

SGY-PM910H2

This product contains the following parts.

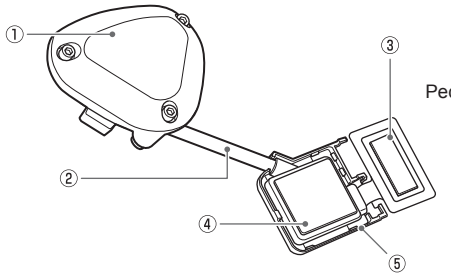
Pedaling monitor sensor (left side)



Pedaling monitor sensor part (left side)

① Left transmitter
② Strain gauge unit
③ LED
④ Device Number

Pedaling monitor sensor (right side)



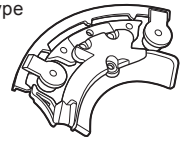
Pedaling monitor sensor part (right side)

① Right transmitter
② Junction cable
③ Strain gauge unit
④ Junction box
⑤ Device Number (Described on the back)

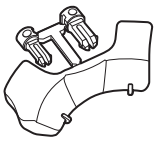
Strain gauge unit cover x 1 for each type

For FC-9000

For FC-6800



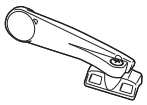
Chain ring Adapter



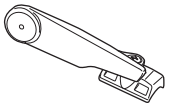
For FC-6800
Adapter base

Magnet

Patch type x 2



Arm type (right side)



Arm type (left side)

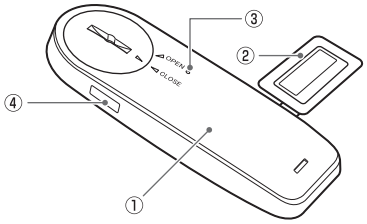
Others

- User's Manual (this document)
- Warranty Card
- Batteries (CR2032) x 2 (preinstalled in the sensors)
- Right transmitter cover (metallic gray)
- Hex screws (M2.6 x 8 mm) x 3 (for the right transmitter x 3)
- Hex screws (M2.6 x 5 mm) x 3 (spare for the right transmitter cover x 3)
- Cable ties x 10 (for the left magnet x 2, for the right magnet x 2, spare x 6)
- Cushions for the arm type magnet installation x 2
- Patch type magnet base × 2
- Tape for installing the chain ring adapter
- Tape for installing the FC-6800 adapter base

SGY-PM910HL

This product contains the following parts.

Pedaling monitor sensor (left side)

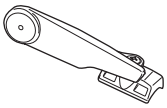


Pedaling monitor sensor part (left side)

① Left transmitter
② Strain gauge unit
③ LED
④ Device Number

Magnet

Patch type



Arm type (left side)

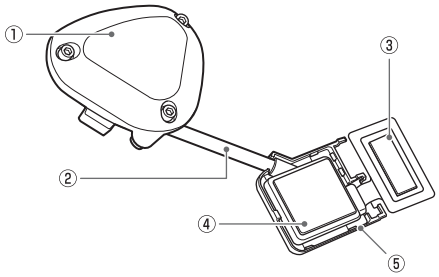
Others

- User's Manual (this document)
- Warranty Card
- Batteries (CR2032) (preinstalled in the sensor)
- Cable ties x 4 (for the left magnet x 2, spare x 2)
- Cushions for the arm type magnet installation
- Patch type magnet base

SGY-PM910HR

This product contains the following parts.

Pedaling monitor sensor (right side)



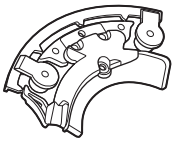
Pedaling monitor sensor part (right side)

① Right transmitter
② Junction cable
③ Strain gauge unit
④ Junction box
⑤ Device Number (Described on the back)

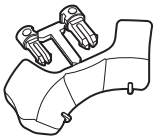
Strain gauge unit cover x 1 for each type

For FC-9000

For FC-6800



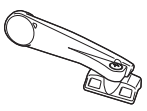
Chain ring Adapter



For FC-6800
Adapter base

Magnet

Patch type



Arm type (right side)

Others

- User's Manual (this document)
- Warranty Card
- Batteries (CR2032) (preinstalled in the sensor)
- Right transmitter cover (metallic gray)
- Hex screws (M2.6 x 8 mm) x 3 (for the right transmitter x 3)
- Hex screws (M2.6 x 5 mm) x 3 (spare for the right transmitter cover x 3)
- Cable ties x 4 (for the right magnet x 2, spare x 2)
- Cushions for the arm type magnet installation
- Patch type magnet base
- Tape for installing the chain ring adapter
- Tape for installing the FC-6800 adapter base

Before Starting Installation

Installing, pairing, and calibrating the product requires specialized techniques and tools. Ask the installation center or distributor to install, pair, and calibrate it.

Preparing for Installation

Prepare the following before installing the product.

1. **Checking the tools you are using (page8)**
2. **Preparing adhesive for sensors (page 9)**
3. **Cleaning the crank (page 10)**

Installation Procedure

The product is installed in the order shown here.

1. **Checking operation of the sensors (page 11)**
2. **Checking the position to install the sensors and setting the guide for installing the sensors (page 14)**
3. **Setting up the pressure bonding tool (page 16)**
4. **Attaching the sensors (page 17)**
5. **Assembling the chainring and installing the right transmitter (page 26)**

* Refer to the “Installation Manual (for dealers)” regarding installing the magnets and calibrating and mounting the magnets.

Eliminating Static Electricity during Installation

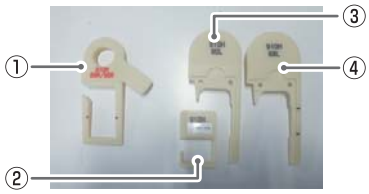
Before starting the installation, touch a large metal object (such as a door knob or metal table) to discharge any static electric charge in your body.
Eliminate static electric charge occasionally while installing the product.

Checking the Tools You are Using

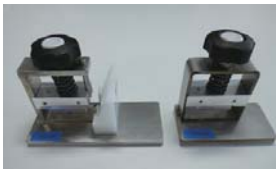
The following tools are necessary for installation, calibration, and repairs. Make sure that you have the tools you need before you start working. Take care of the jigs and tools that you use so they do not rattle or become skewed.

■ Installation

- Sensor guide set (1)
  - ① Right sensor guide for FC-9000/FC-6800 (1)
  - ② Left strain gauge unit guide for FC-9000/FC-6800 (1)
  - ③ Left sensor guide for FC-9000 (1)
  - ④ Left sensor guide for FC-6800 (1)



- Pressure bonding tool set (1)
  - Right pressure bonding tool (1)
  - Left pressure bonding tool (1)



  - Right adapter for FC-9000 (1)
  - Right adapter for FC-6800 (1)
  - Left adapter for FC-9000 (1)
  - Left adapter for FC-6800 (1)

- Clamps (2)

- Tweezers (1)
- Scissors (1)
- Crank installer (1)
- Torque wrench (for T30) (1)

- TORX® bit T30 (1)
- Palette (1)
- Spatula (2) [*]
- Solvent (alcohol etc.) (1) [*]
- Adhesive for sensors (1) [*]
  Loctite® E-20HP™ Hysol® 50ml

- Caulking gun for the sensor adhesive (1)
  LOCTITE No.96001 E-20HP

- Mixing nozzle (1) [*]
  Loctite No. 98455 (E-20HP)

- Double-sided tape for sensor guide (thin) (1) [*]
- Rags (1) [*]
- Masking tape (1) [*]
- Hex wrench (2 mm) (1)
- 2-axis spirit level (1)

- Double-sided tape for spirit level (thick) (1) [*]
- Utility knife (1)
- Degreaser (parts cleaner) (1)
- Durometer TECLOCK GS-720H (1)

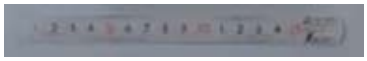
- Grease (2)

■ Calibration

- Calibration weight (1)
  - Weight (1)

  - Calibration pedal bolt (1)

- Ruler (1)



- 2-axis spirit level (1)
- Double-sided tape for spirit level (thick) (1) [*]
- Cyclocomputer SGX-CA500/CA900 for calibration (1)
- Snips (1)
- Needle nose pliers (1)
- Torque screwdriver (30 cN•m supported)

- Torque screwdriver bit (hex, 2 mm)

- Coin Driver TRD-45 (1)
- Torque wrench (for tightening calibration bolt) (1)

Lubricant WD-40 (Pen type applicator if possible)

- Items with an asterisk [*] are consumable.
- Refer to the documentation for your crank set regarding the bicycle tools you need (chainring and crank set installation tools).
- You need to procure adapters for sensor guides (left/right) and pressure bonding tools (left/right) that are suitable for the cranks on which you are installing them.

Preparing Adhesive for Sensors

1 **Heat the adhesive for the sensors in hot water at 60°C for five minutes.**

Before starting work on the day of the installation, heat the adhesive for the sensors in hot water at 60°C (±10°C) for five minutes. Do this once in the morning and once in the afternoon. The adhesive may have crystallized, this will dissolve it. After removing it from the hot water, wipe off all the water from the container before using it.

Example:

Adjust the temperature so it is 60°C (±10°C) by adding hot water from an electric tea kettle or water heater. Use a thermometer to measure the temperature of the water.

- Before using the adhesive for the sensors, use an oil-base pen to mark the cap in one location and the container in two locations as shown in the diagram.
  The container does not have a mechanism to prevent reversed insertion, the cap may be inserted in the reverse orientation when putting it back. The adhesive will harden if the cap is inserted in reverse.
  Align the marks on the container and the mark on the cap when inserting the cap to prevent reverse insertion. Also, if you mark the position in which the cap is locked, you can confirm it is locked just by looking at it

- Store the adhesive in a dry location cooled to between 8 °C to 18 °C, unless otherwise noted. To prevent foreign matter from getting in the adhesive, do not return it to its original container after using it.
- The shelf life of the adhesive is 24 months before opening, unless otherwise noted.
- As a guideline, the adhesive has a six month quality guarantee, if it is used every day.
- Note the date that you first use the adhesive on its containe .
- Read the data sheet and user's guide for the adhesive, regarding how to use it.Use different spatulas for applying adhesive and for doing other work.

Cleaning the Crank

Clean all oil and dirt from the left and right cranks.

1 **Use rags, with solvent (alcohol etc.) that will not damage the cranks, to clean the part of the cranks shown in the diagram, and continue cleaning until no dirt is left on the rag after wiping the crank.**

(1) Remove oil with rag.

(2) Use a rag with alcohol on it to finish up, wipe in one direction onl .
If the rag with alcohol becomes dirty, fold the dirty part over, and use the clean part of the rag for cleaning.

If the dirt is ingrained, clean it until it is smooth when you rub your finger on it.
Use a razor blade to remove any stubborn debris that solvent and rags alone can't remove. When you do this, be careful that you do not scratch the crank.

Left side

Right side

- If you do not remove all the oils from the surface of the crank, it may weaken the adhesive strength of the strain gauge unit.

2 **Use a new rag to finish up by wiping the cranks dry.**
After wiping the rags dry, make sure there are no threads or other materials from the rags left on the cranks.

- Be careful that your fingers do not touch the areas that you cleaned before the sensors are pressure bonded

Installation of the adapter base (only FC-6800)

Install the adapter base(only FC-6800)

Note:

・Attach the adapter base BEFORE sticking on the strain gauge.

・The chain ring adapter(FC-9000/FC-6800) should be applied AFTER the strain gauge has been affixed and the glue has hardened.

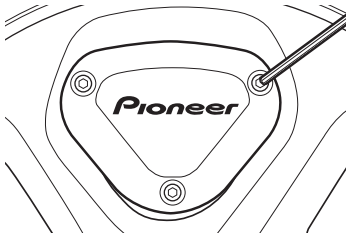
・Refer to the "SGY-PM910H2_ChainRingAdapterInstallationManual.docx"

Checking Operation of the Sensors

Before installing the sensors, confirm that they operate correctl .

1 **Remove the right transmitter's cover.**

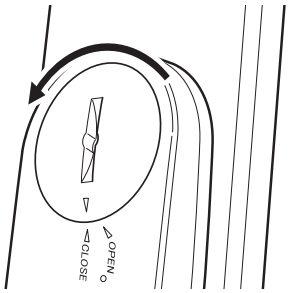
Use a hex wrench (2 mm) to loosen the screw and remove the cover.



- Be careful not to lose the removed screw.

2 **Remove the left transmitter's battery cover.**

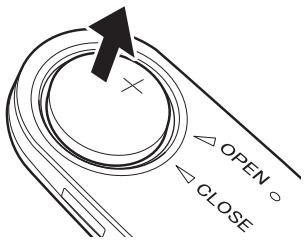
To open the battery cover, use a coin-type screwdriver to turn it to the left until the triangle is in the OPEN position.
Put masking tape on the head of the coin-type screwdriver so it does not damage the cover or the transmitter.



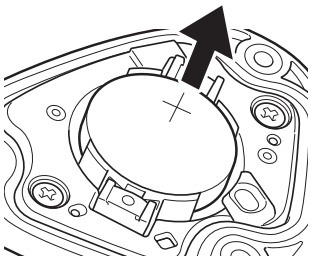
- Be careful not to drop or lose the battery when removing the cover.

3 **Remove the batteries to check the conditions of the LEDs.**

Left side



Right side



- After removing the batteries, do not re-install immediately, wait at least one minute and then install them again.

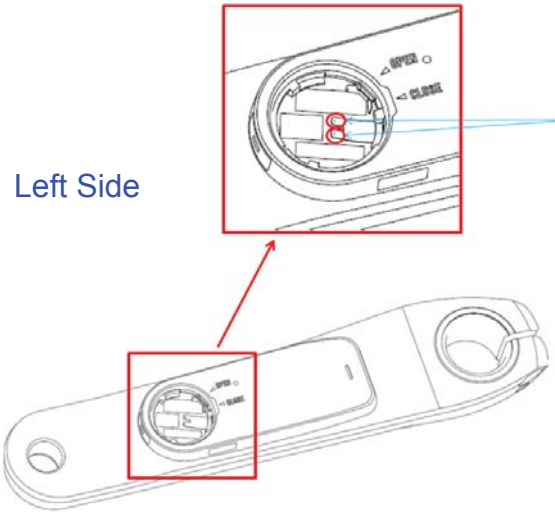
4.Applying Lubricant to the Battery Terminals

Any time the battery cover is removed, or the battery terminals are accessible, apply a small amount of lubricant WD40 to the battery terminals at the points where they contact the battery, using a pen-type applicator such as that shown.

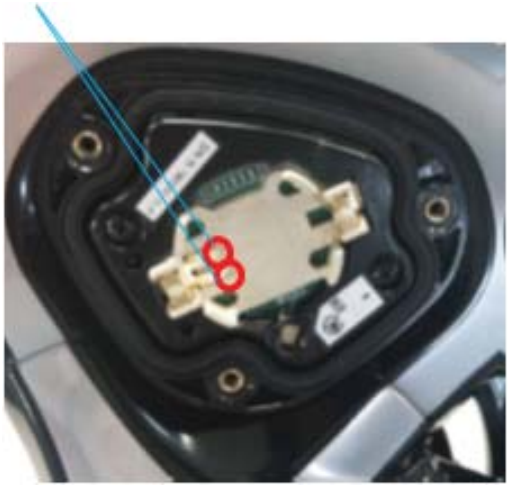
WD-40

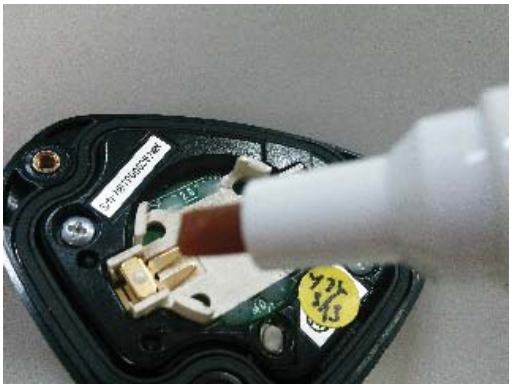
If a pen-type applicator is not available, do not use a spray type applicator directly, but first transfer a small amount of lubricant to a cotton tip and apply it using this. Be careful not to alter the shape of the battery contacts.

Applying lubricant in this way can help to prevent the buildup of residue and dirt on the battery contacts, which may cause incorrect operation. After applying lubricant, replace the battery and close the battery cap.



Right Side

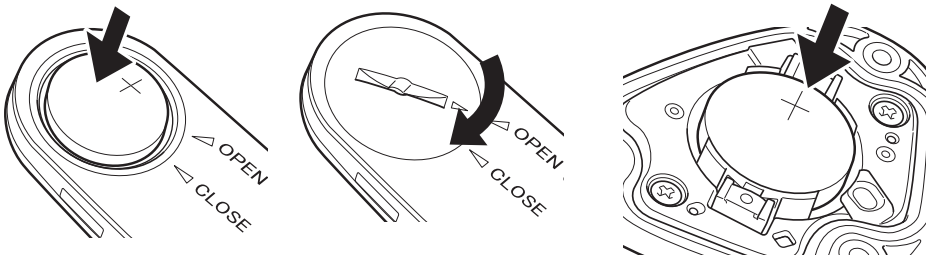




5 Install the batteries

- Right transmitter: Install the battery. However, do not install the battery cover at the moment, so you can check the LED.
- Left transmitter: After installing the battery, place the cover with the triangular arrow pointing to [OPEN], and turn it with coin to [CLOSE].

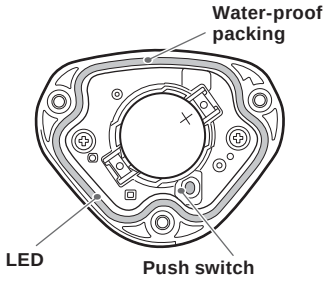
Left side **Right side**



6. Check the LED display.

The transmitter starts when the batteries are installed. The LEDs of the transmitters light as follows depending on the actual sensor mode.

- When it is in pedaling monitor mode:
  The LEDs **light** green for 10 seconds
- When it is in dual power meter mode:
  The LEDs **light** orange for 10 seconds
- When it is in single power meter mode:
  The LEDs **blink** orange for 10 seconds



- If the LEDs do not light for more than 5 seconds after installing the batteries, remove the batteries once, and after more than 1 minute, install them again. If the LEDs still do not light, the battery may be almost empty. Replace the battery with a new one. Dispose of useless batteries as instructed by the local government.

- Be careful not to drop or lose the battery when installing it.
- Do not use batteries other than CR2032.
- Install the cover firmly to ensure water resistant performance
- If the LEDs do not light for more than 5 seconds after installing the batteries, remove the batteries once, and after more than 1 minute, install them again. If the LEDs still do not light, the battery may be almost empty. Replace the battery with a new one.
- If the LEDs light red, refer to Troubleshooting (page 44).

7 Install the right transmitter cover.

While tightening the screws, do not use excessive force or over-tighten them. The plastic cover can crack if you do so.
Use a tool that can measure the torque to tighten the screws.

- Tightening torque: 30 cN•m

- Always keep the cover on the transmitter while working, to prevent any effect from dust.
- Install the cover firmly to ensure water resistant performance

Checking the Position to Install the Sensors and Setting the Guide for Installing the Sensors

Confirm that there are no scratches on the crank when you position the installation guides on the left and right cranks

Right side

1 **Fit the right sensor guide to the right crank.**

2 **Confirm that there are no deep scratches in the area (diagram below) where the strain gauge unit is installed.**

- If there are scratches so deep that the base metal (silver) can be seen, measurements cannot be done and installation is not possible. Installation can be done if the scratches are only shallow scuff marks.

3 **Use tape to lightly fasten the right sensor guide to the crank so the edges do not lift up.**

- Be sure to fasten the sensor guide in place with tape to prevent the strain gauge unit from getting between the sensor guide and the crank during the installation.
- Place the tape that holds the sensor guide so it does not cover the area where the sensor is installed.

Left side

1 **Insert the left crank into the left sensor guide.**

- There are two types of left sensor guides, one for the FC-9000 and one for the FC-6800. (The photos shows the one for the FC-9000.) Select the guide that suits the bicycle's crank.

2 **Fit the left strain gauge unit guide to the left sensor guide.**

3 **Confirm that there are no deep scratches in the area (diagram below) where the strain gauge unit is installed.**

- If there are scratches so deep that the base metal (silver) can be seen, measurements cannot be done and installation is not possible. Installation can be done if the scratches are only shallow scuff marks.

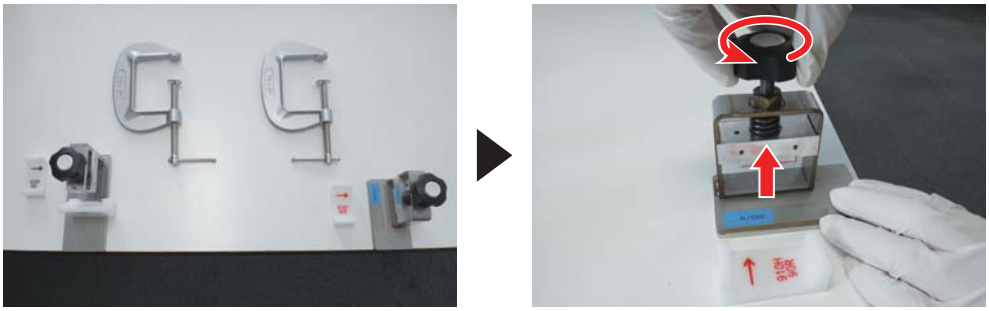
4 **Use tape to lightly fasten the left strain gauge unit guide to the crank so the edges do not lift up.**

- Be sure to fasten the sensor guide in place with tape to prevent the strain gauge unit from getting between the sensor guide and the crank during the installation.
- Place the tape that holds the sensor guide so it does not cover the area where the sensor is installed.

Setting up the Pressure Bonding Tool

1 **Mount the pressure bonding tool on the table, turn the knob counterclockwise to raise the pressure bonding surface to the top.**

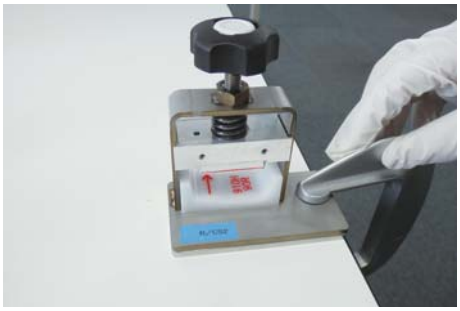
Be sure the spring does not go up the edge when raising the pressure bonding surface.



- When you mount the pressure bonding tools on the edge of the table, separate them by about 30 centimeters.
- If the spring becomes too stiff, put some grease on it.

2 **Insert the adapter so the arrow points to the right and use a clamp to fix it in position.**

There are two types of adapters, a left and a right. Assemble the adapter for the crank on which you are installing the sensor.



Applying the Adhesive

Apply the adhesive for the sensor to the strain gauge unit.

- The adhesive starts to harden after 20 minutes. You must apply the adhesive and finish the bonding process within 20 minutes of dispensing the adhesive.
- Before using the adhesive for the sensors, use an oil-base pen to mark the cap and the container. (page 9)
- Refer to the adhesive's documentation regarding how to use it.

1 **Remove the non-adhesive backing paper from the strain gauge units.**

Always hold the base of the strain gauge (cable side) unit while removing the non-adhesive backing paper.

Left side

Right side

2 **Use needle nose pliers to grab the cap of the adhesive, rotate the cap 90 degrees and then pull it off.**

When replacing the cap, confirm the position of the marks so you can replace it in the same orientation

3 **Put the tube of adhesive into the caulking gun for the adhesive for the sensors.**

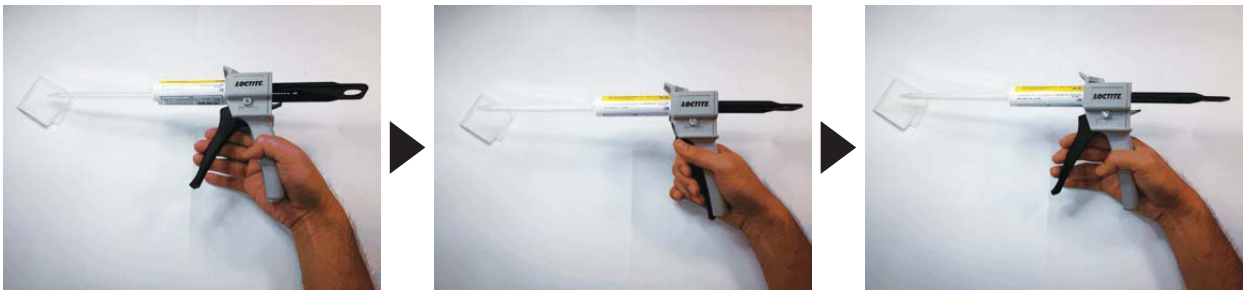
Use the caulking gun for the adhesive for the sensors to squeeze at least 3 centimeters of the base adhesive and the hardener into a plastic bag to make sure they are both coming out together.

Wrap the adhesive in plastic and squish it with your fingers to be sure there are no granules or hardened bits attached. If there are any granules, refer to "Preparing Adhesive for Sensor" on page 9 and heat the adhesive.

After confirming that the adhesive comes out, attach the mixing nozzle

4 **Remove any excess adhesive.**

Squeeze the handle of the caulking gun for the adhesive for the sensors all the way, and then release it.



Squeeze the handle all the way and release it again, then squeeze the handle again half way to squeeze adhesive onto a rag.

5 **Squeeze adhesive onto the palette.**

Prepare two palettes, one for the adhesive and one for confirming hardness. Be sure that there is no oil or dust on the palette.

Squeeze about 20 mm (W) x 10 mm (H) x 5 mm (D) of adhesive onto each palette.

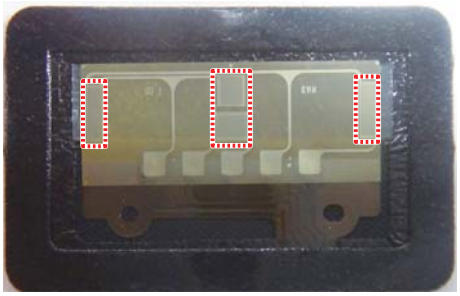
After dispensing the adhesive, remove the mixing nozzle and wipe off the adhesive on the opening and on the inside of the cap with a rag, and replace the cap of the adhesive in its original orientation in line with the marks.

Dispose of the rag and mixing nozzle.

- After using the adhesive, squeeze out a little adhesive and clean off the opening of the adhesive to prevent the base adhesive and the hardener from mixing.

6 **Apply the adhesive to the left and right strain gauge units in the areas within the dotted lines (diagram below).**

Use the spatula to spread adhesive inside the dotted line areas. Fully cover the area inside the dotted lines with adhesive. Do not apply adhesive to the areas where there is two-sided tape.



- Apply enough adhesive so it is slightly rounded on top (about 0.5 mm).

- Be sure that there is no oil or dust on the spatula.
- The two-sided tape is very strong, be careful not to touch it.

Bonding the Sensors

Bond the sensors to the right and left cranks.

- The adhesive for the sensors starts to harden after 20 minutes. You must apply the adhesive and finish the bonding process within 20 minutes of dispensing the adhesive.

Attaching the right strain gauge unit and the junction box

1 **Attach the right strain gauge unit along the right side guide.**
Press the tip of the strain gauge unit against the guide to position it, then attach it.
Be careful that the adhesive does not get anywhere except in the area where the strain gauge unit is attached, then attach it.

2 **Remove the non-adhesive backing paper from the junction box.**

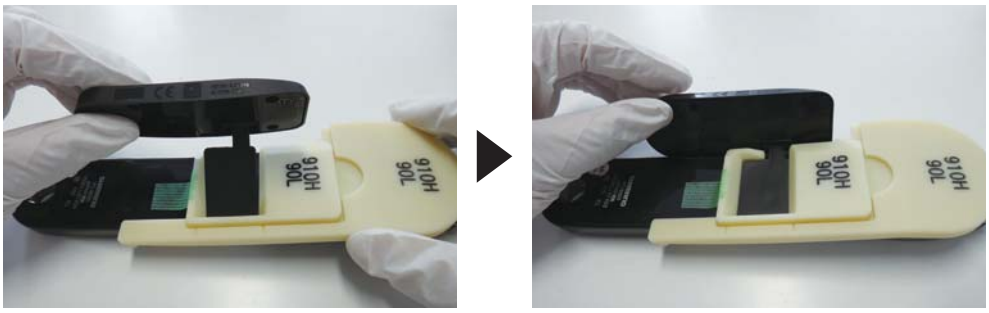
3 **Attach the junction box along the right side guide.**

4 **Remove the right side guide from the right crank, and use your fingers to press down firmly and uniformly on the strain gauge unit and the junction box.**

- Be careful that the junction cable does not get caught when you remove the right side guide from the right crank.

Attaching the left strain gauge unit

1 **Attach the left strain gauge unit along the left strain gauge unit guide straight.**
Be careful that the adhesive does not get anywhere except in the area where the strain gauge unit is attached, then attach it.



2 **Remove the left sensor guide and the left strain gauge unit guide from the left crank.**

3 **After pressing on the two-sided tape part on the edges of the strain gauge unit, use your finger to smooth it out three times to evenly spread the adhesive of the strain gauge unit.**

Bonding with the pressure bonding tool

1 **Insert the right and left crank into the pressure bonding tool that you prepared according to “Setting Up the Pressure Bonding Tool” (page 16).**
Turn the pressure bonding tool’s knob counterclockwise to confirm the pressure bonding surface is at the top
Align the end of the pressure bonding tool and the line (outside the PET (shiny part)) on top of the strain gauge unit within a ± 0.5 mm area, as shown in the red circle in the diagram. When inserting the crank, be careful that you do not scratch the crank against the pressure bonding tool.

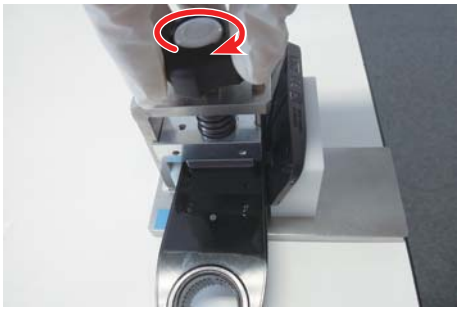
Left side

Right side

- Be careful that the cable of the strain gauge unit does not catch on the pressure bonding tool when you insert the left crank. There is a risk of disconnecting the cable.

2 **Turn the knob on the pressure bonding tool clockwise.**

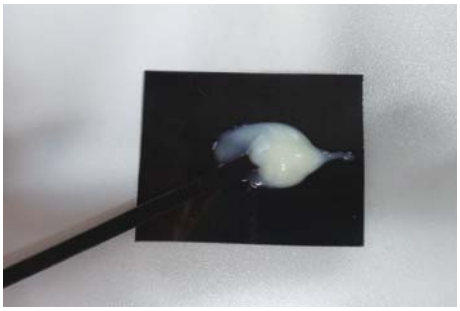
The sensor is being pressure bonded at the specified pressure when the knob becomes loose. Stop turning the knob when it becomes loose.



- There is a risk of damaging the sensor if you turn the knob too much and apply too much pressure.
- If the knob is difficult to turn, grease the screw part of the knob

3 **Keep the pressure bonding tool in place and do not disturb it until the adhesive hardens.**

To confirm the hardness of the adhesive with the durometer , allow the adhesive on the palette to harden in the same environment as the adhesive on the crank. To check the hardness of the adhesive, you need an area of adhesive that is 20 mm (W) x 10 mm (H) x 5 mm (D). Shape the adhesive without leaving a depression, so that the durometer applies easily.



- The hardening time varies depending on the temperature of the room in which the pressure bonding tool is set up.
  - If you are using a heating cabinet or some other arrangement, allow it to harden for 3 to 4 hours at 40 to 50 °C.
- Do not touch the crank while the adhesive is hardening.
- If you need to move the pressure bonding tool, be careful that you do not touch the crank as you loosen the clamp to remove the pressure bonding tool from the table.

4 **Check the hardness of the adhesive on the palette.**

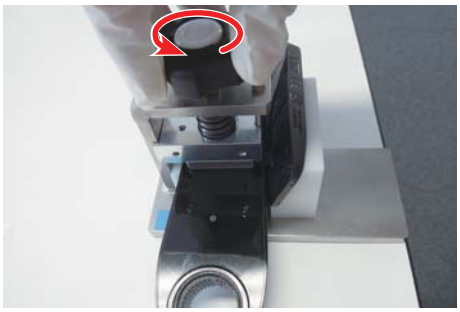
Lightly press the durometer onto the adhesive on the palette, and check if the value is over 70. Check the hardness value three times.

If the value exceeds 70 three times, then the hardening is complete.

If the value is less than 70 even one of the three times, the adhesive may not be hard enough. Use a heating cabinet or some other arrangement again and let it harden for the specified time

Note that the way you press the durometer onto the adhesive may cause some variations in the values. **Lightly** press the durometer onto the adhesive to measure it.

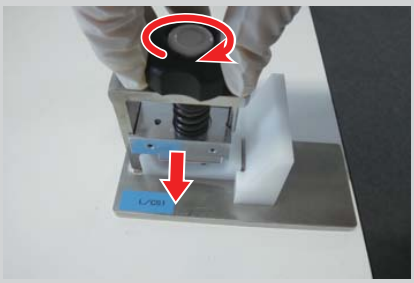
5 **After allowing enough time for the adhesive to harden, turn the knob on the pressure bonding tool counterclockwise to remove the crank.**



- The crank may get stuck on the pressure bonding tool. If this happens, press on the crank to remove it. Also, when pulling out the crank, be careful that you do not scratch the crank against the pressure bonding tool.

Use a square ruler to measure the raised part of where the adhesive was applied, confirm that it is less than 0.5 mm high

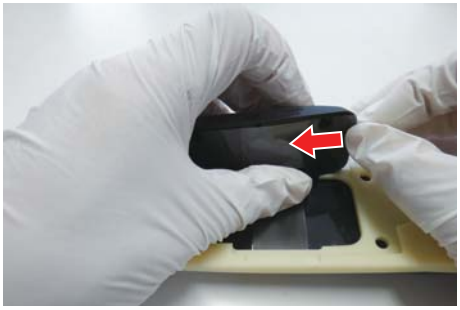
- If the raised part is higher than 0.5 mm, it will press against the sensor cover, and the constant external pressure which may make the amount of strain erratic. Be sure to make it less than 0.5 mm high.
- Before putting away the pressure bonding tool, turn the knob clockwise until it is loose, so the spring is extended and will not become weak.



Installing the right transmitter

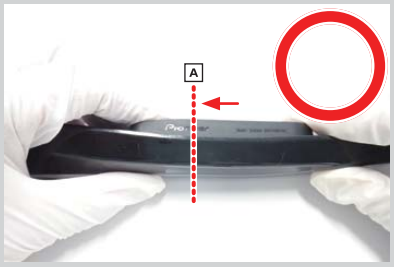
1 **Attach the left sensor guide to the left crank on which the strain gauge unit was installed.**
After installing the left sensor guide, clean the area where you will attach the left transmitter, then degrease it.

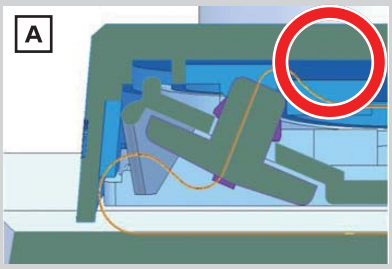
2 **Remove the non-adhesive backing paper from the back of the left transmitter.**
Always remove the non-adhesive backing paper from the cable-side of the strain gauge unit.



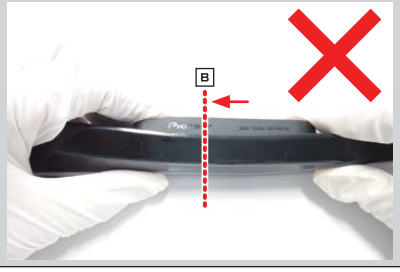
3 **Attach the left transmitter along the left sensor guide.**

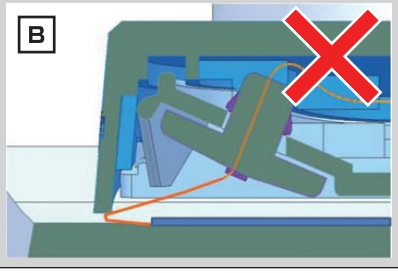
- When attaching the left transmitter, be careful to not touch the two-sided tape.
- Be careful that the strain gauge unit's cable is not pinched between the crank and the transmitter.
  The cable (red line), as shown in cross section A, is installed correctly if it is loosely curved within the space behind the transmitter.





Use a spatula or something to push the cable (red line) in so it is not pinched by the edge of the left transmitter as shown in cross section B.





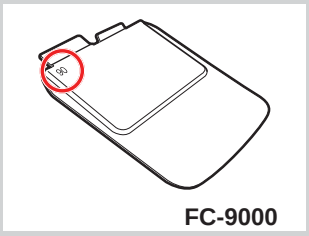
4 **Remove the left sensor guide from the left crank, then tightly grip the transmitter and crank and firmly press the two-sided tape area.**

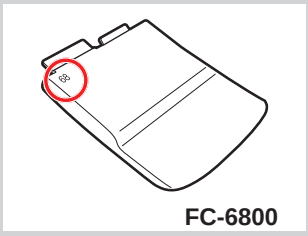
This completes the installation of the sensors on the left crank.

Attaching the strain gauge unit cover

Position and attach the cover on the strain gauge unit on the right crank.

- There are two types of strain gauge unit covers; for the FC-9000 and the FC-6800. The strain gauge unit cover cannot be taken off and replaced, you must confirm the model number printed on the cover and attach it to the correct crank



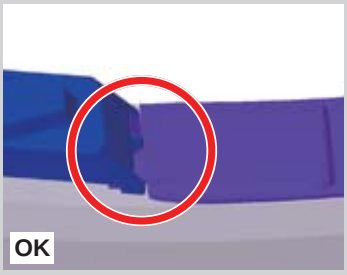


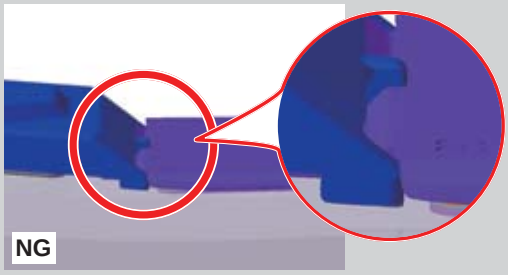
1 **Remove the non-adhesive backing paper from the back of the strain gauge unit cover.**
Always remove the non-adhesive backing paper from the part of the two-sided tape with the large surface area (in the direction of the arrow in the figure)

2 **Align the protrusion on the strain gauge unit cover with the groove on the junction box, and insert it.**

3 **Attach the strain gauge unit cover to the crank.**

- Keep the strain gauge unit cover centered as you attach it, so it does not stick over the edge of the crank.
- Be sure that the strain gauge unit cover is not on top of the junction box and that there is no gap, when you stick it on.





4 **Use your fingers to press firmly on the two-sided tape on the strain gauge unit cover.**

This completes the installation of the transmitter and junction box on the right crank set.
Next, assemble the chainring and mount the right transmitter on the right crank.

Assembling the Chainring and Installing the Right Transmitter

Install The chain ring adapter(FC-9000/FC-6800)
Note:
・Attach the adapter base BEFORE sticking on the strain gauge.
・The chain ring adapter(FC-9000/FC-6800) should be applied AFTER the strain gauge has been affixed and the glue has hardened.
・Refer to the "SGY-PM910H2_ChainRingAdapterInstallationManual.docx"

Before Pairing and Calibrating

This section describes how to pair and calibrate the pedaling monitor sensor that is installed on the bicycle to the Cyclocomputer SGX-CA500.

- See the User's Manual or the User's Guide (online manual) of the Cyclocomputer SGX-CA500 regarding how to operate it.

Pairing and Calibrating Procedure

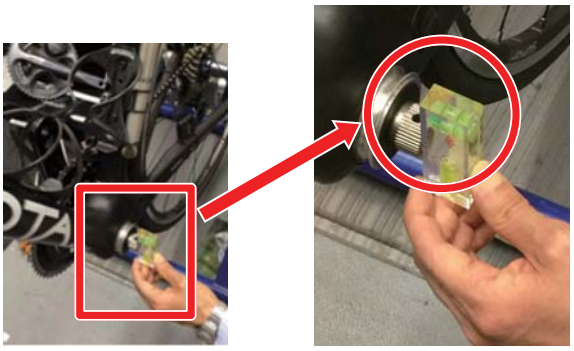
Use the following procedure to pair and calibrate the product.

1. **Anchoring the bicycle and installing the crank (page 27)**
2. **Switching the modes of the Cyclocomputer SGX-CA500 (page 28)**
3. **Pairing the pedaling monitor sensor (page 29)**
4. **Calibrating a highly precise zero point (page 33)**
5. **Setting the crank length and calibrating weight (page 35)**
6. **Calibrating the with a load on the pedals (page 37)**
7. **Checking the calibration (page 39)**

Anchoring the Bicycle and Installing the Crank

Place the bicycle in a level place so the difference in height between the front and back wheels is the same (within 5 mm), and mount it on something like a trainer.
Be sure to secure it so that it will not fall while you are working.

Install the right crank to the frame, and then confirm that the crank is not tilted to the left or right by pressing the level onto the end of the crankshaft. (Be sure that the air bubble in the level is between the two lines [lateral lean is within ±0.5°].)



- Confirm the lateral lean every time you do calibrations. Be sure that the air bubble in the level is between the two lines (lateral lean is within ±0.5°).
- Confirm the height of the bicycle s front and rear wheels once each week.

After that, install the left crank.

- Tightening torque: 12 N•m

Switching the Modes of the Cyclocomputer SGX-CA500

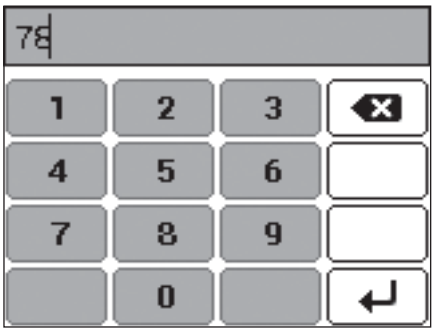
This section explains about switching the modes of the Cyclocomputer SGX-CA500.

1 **Press the [START/STOP] button of the Cyclocomputer SGX-CA500 for at least 2 seconds to turn on the power.**

2 **After starting the CycloMeter, press the [MENU] button.**

3 **Tap [Settings] - [System] - [Service Code].**

4 **Enter “78” in the service code input screen and then tap ↵.**
A message appears, and the mode switches to dealer mode.



- To exit the service mode, turn off the power to the Cyclocomputer SGX-CA500.

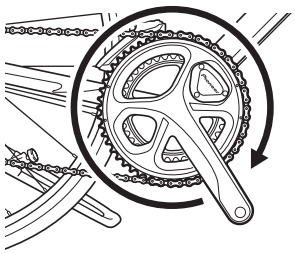
Pairing the Pedaling Monitor Sensor

This section describes how to pair the pedaling monitor sensor to the Cyclocomputer SGX-CA500.
It is necessary to pair the sensors on both the left and right sides. The right-side pedaling monitor sensor is used as an example in this description. The procedure to pair the left side is the same as for the right side.

1 **Check that the right transmitter and the left transmitter are in “Pedaling monitor mode”.**

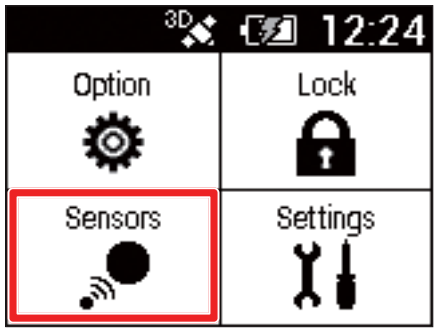
- See page 13 to switch the modes.

2 **Rotate the bicycle’s crank set more than three rotations to start the left and right transmitters.**

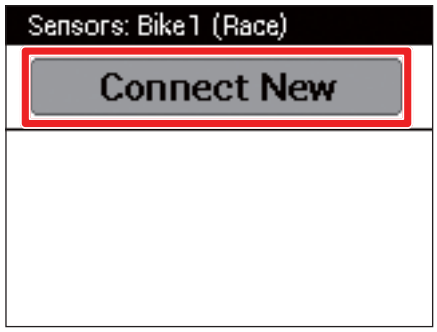


- You have only 5 minutes to pair to the Cyclocomputer. If the transmitter stops while you are pairing, turn the crank set one revolution to start the transmitter and continue the pairing.

3 **Press the [MENU] button on the SGX-CA500 and then tap [Sensors].**

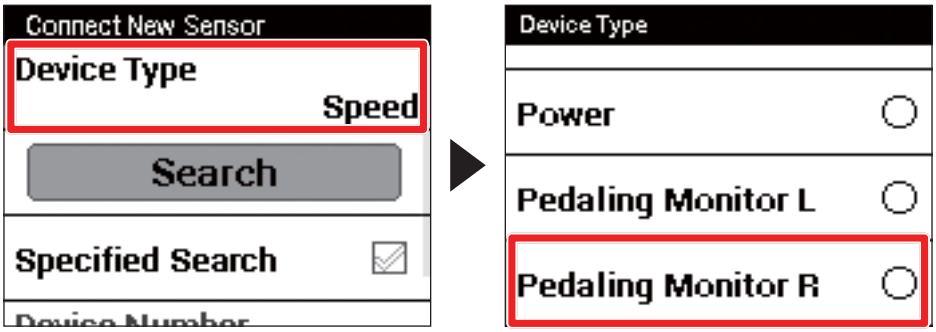


4 **Tap [Connect New].**



5 **Tap [Device Type] and then [Pedaling Monitor R].**

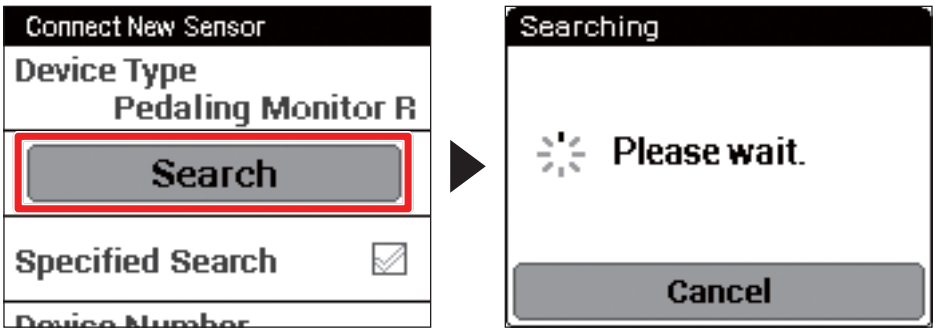
A list appears when you tap [Device Type]. Scroll down the list and then tap [Pedaling Monitor R].



- For the left pedaling monitor sensor, press [Pedaling Monitor L].

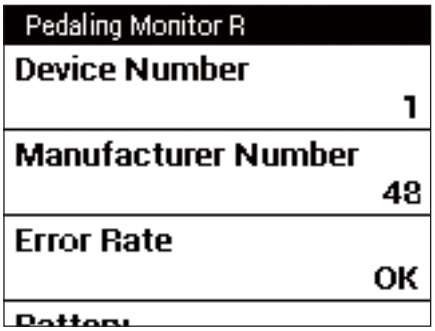
6 **Tap [Search].**

A [Searching. Please wait.] message appears. The information about the sensor appears when the sensor is found.



7 **Check the information about the sensor.**

The pairing is successful if the transmitters' device numbers and the number in [Device Number] match and if "OK" appears in [Error Rate].



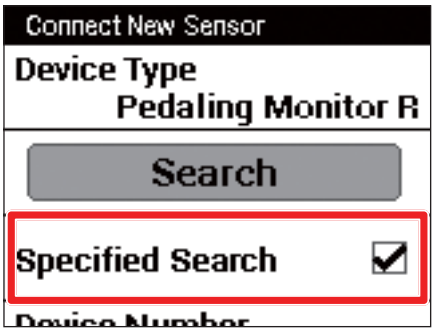
- See page 32 regarding the device numbers of the transmitters.
- If "Processing…" appears in [Error Rate], the information from the sensor is not being received correctly because transmission conditions are bad. Make sure that the sensor you are pairing is activated, then bring the SGX-CA500 closer to the sensor and do the pairing operation again.
- Pairing may fail because of interference in the 2.4 GHz band. If "Processing…" appears even while holding the sensor near the SGX-CA500 during pairing, try pairing it again in a location separated from any microwave ovens, wireless LAN, Wi-Fi, or other interference.

You may not be able to pair the sensor you want to pair if multiple sensors are activated. If this is the case specify the device number. (page 31)

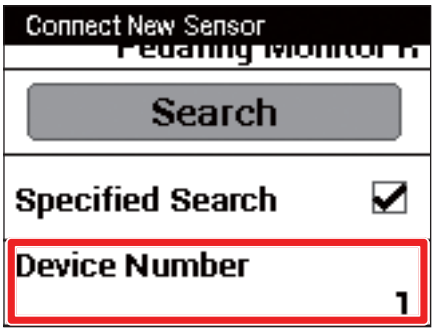
Specifying the Device Number to Pair it

To specify the device number of the sensor, do the following procedure before searching for the sensor.

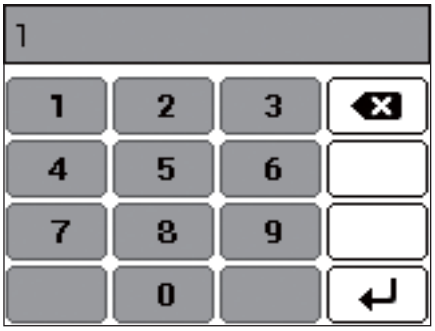
1 **Check [Specified Search] in the sensor's pairing menu.**



2 **Tap [Device Number].**



3 **Enter the device number and tap ↵.**



- See page 32 regarding the device numbers of the transmitters.
- When you input the device number, make sure that the number you specify is displayed in [Device Number] on the sensor's information confirmation screen

Checking Device Numbers

Device numbers are used when you specify the sensor's device number to pair it to the Cyclocomputer.

Left side: Transmitter

No.: 00001

Device number

Right side: Junction box

Calibration

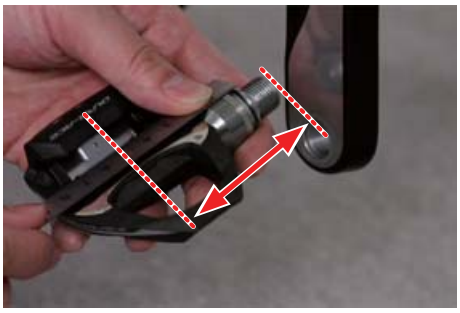
This section describes calibrating (calibrating for the zero point for higher precision while there is a load on the pedals and while there is no load on the pedals.
It is necessary to calibrate the sensors on both the left and right sides. The right-side pedaling monitor sensor is used as an example in this description. The procedure to calibrate the left side is the same as for the right side. Do this after calibrating the right side and checking the calibration.

- Calibrate the pedals under load within 5 minutes after calibrating a high accuracy zero point. Recalculate the high accuracy zero point again if more than 5 minutes elapses.
- Please do not push the push switch in the right transmitter while calibrating the sensor or showing [Force Preview] with the Cyclocomputer SGX-CA500.

Calibrating a Highly Precise Zero Point

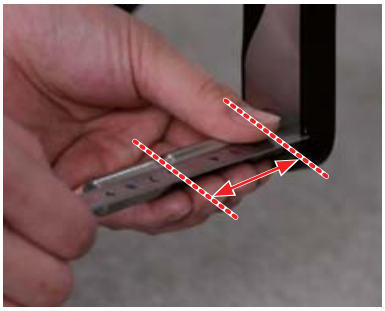
1 **Confirm the distance from the face of the crank arm to the center of the pedal to be used with the system.**

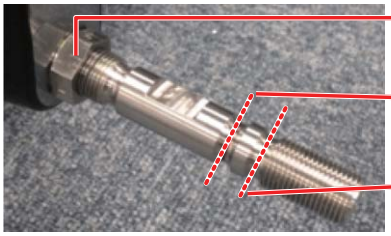
Match the length of the pedal shaft to the value noted on the order form or other documents sent from the customer. Confirm the length of the pedal shaft using the model number and name of the pedal's manufacturer as noted on the order form, to be sure the values are the same.



- Regarding the length of the pedal shaft
  For cranks provided by the user, match them to the value noted on the order form.
  Pre-installed models are matched to 52 mm.

2 **Screw the "R" end of the calibration pedal bolt into the pedal hole of the crank, adjust it so the length from the surface of the crank to the outer groove is the length confirmed in step 1.**





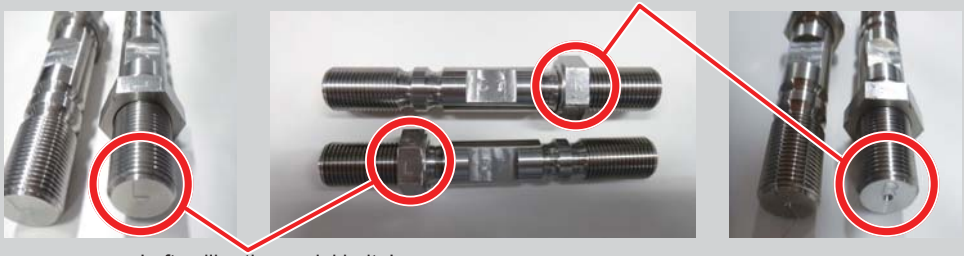
Tightening torque for nut: 25 N•m

Groove for hanging the weight if the pedal shaft is shorter than 57 mm.

Groove for hanging the weight if the pedal shaft is longer than 57 mm.
The weight can be hung in either groove if the pedal shaft is 57 mm.

- Screw it into the left (L) side to calibrate the left side.
- The left side calibration pedal bolt and the right side calibration pedal bolt are different.
- "R" and "L" are engraved on the ends of the bolts for calibrating. Refer to the following figures, and be careful to not mistake the bolts. Check the letter stamped on the end of the shaft that has one groove and the nut.

Right calibration pedal bolt: R



Left calibration pedal bolt: L

3 **Hang the calibration weight onto the outer groove of the calibration pedal bolt.**
If the bicycle is mounted on a roller stand when you apply the weight, allow the back wheel to spin freely, so there is no load from the rollers on the back wheel.

- There are two grooves on the bolt. Hang the weight in the groove according to the length of the pedal shaft (page 33).

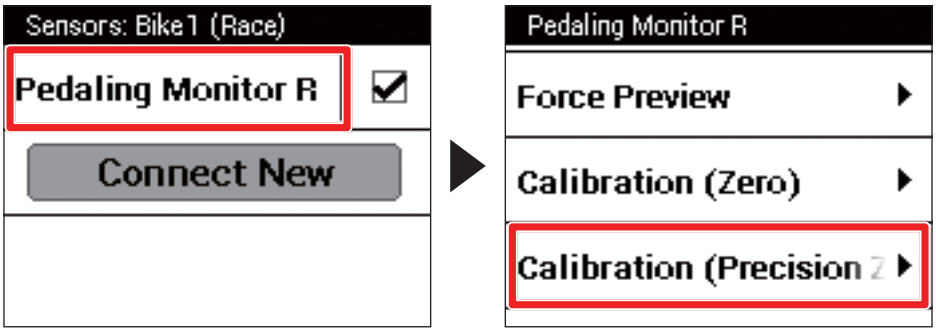
4 **Use double-sided tape to attach a spirit level to the center of the spider arm.**
Attach it so the air bubble is in the center of the level.

- Attach the spirit level near the crank shaft to calibrate the left side.

5 **Remove the calibration weight.**

6 **Point the crank arm down and adjust the angle so the level indicates it is perpendicular.**
Be sure that the air bubble in the level is between the two lines (lateral lean is within ±0.5°). (within ±0.5°)

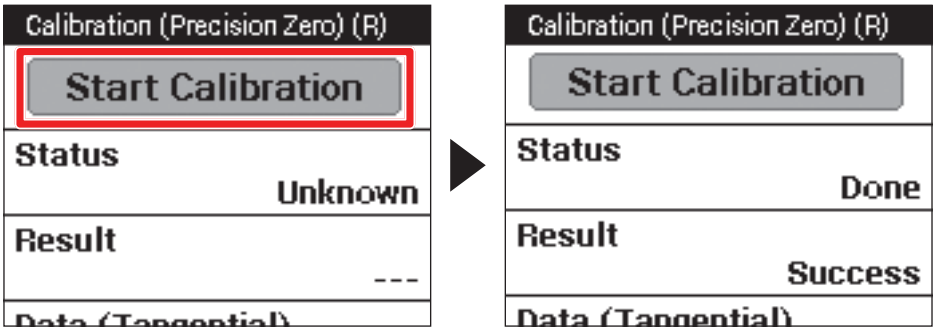
7 **In the sensor screen of the SGX-CA500, tap [Pedaling Monitor R] and then [Calibration (Precision Zero)] in order.**



- This product has a correction function for the zero point gap caused by varying temperatures.
The accuracy of this function improves when the sensor is recalibrated for different temperature conditions. The result is initialized by calibrating a highly precise zero point.

8 **Tap [Start Calibration].**

The calibration starts. If the calibration is successful, “Success” appears in [Result]. It may take a up to 1 minute for the calibration.



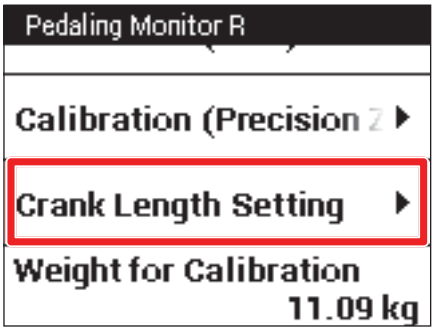
If “Failure” appears, the batteries may be dead or the sensors may have malfunctioned. See Troubleshooting (page 44).

Next, input the mass of the calibration weight and the crank length in the Cyclocomputer SGX-CA500 to calibrate the pedal under load.

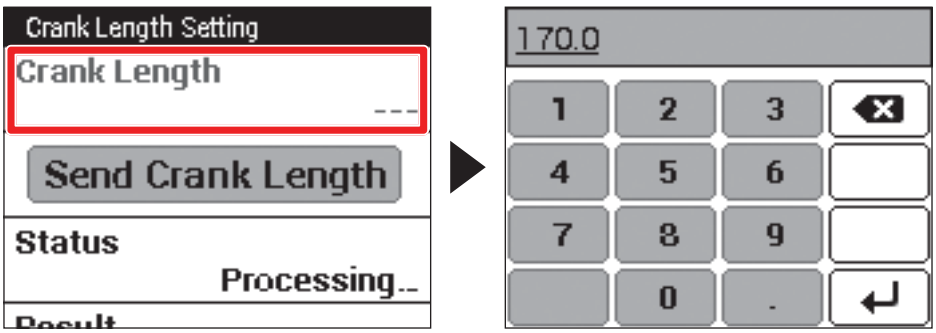
Setting the Crank Length and Calibrating Weight

The crank length that is set here is transmitted to the pedaling monitor sensor.
The calibration weight (mass of the weight) is recorded in the Cyclocomputer SGX-CA500, and transmitted to the pedaling monitor sensor as loads are applied to the pedal during calibration.

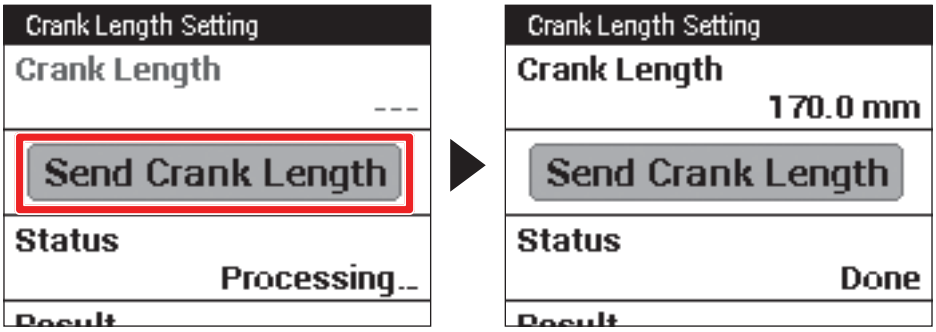
1 **After performing the high accuracy zero point calibration press and hold the [MENU] button to return to the previous screen and then tap [Crank Length Setting].**



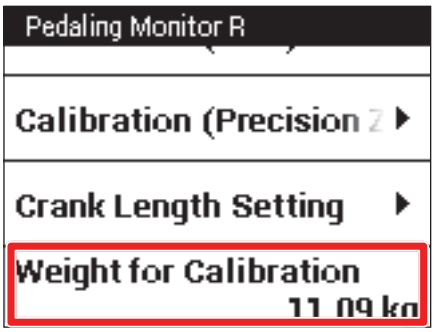
2 **Tap [Crank Length] and enter the length of the crank, then tap ↵.**



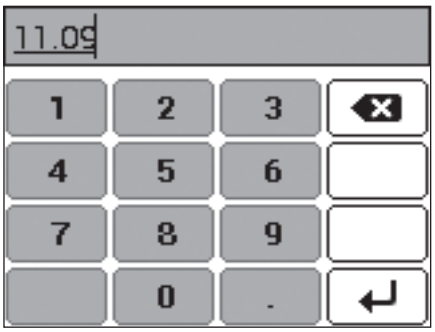
3 **Tap [Send Crank Length] to send the length of the crank to the pedaling monitor sensors.**
If the transmission is finished, “Done” appears in [Status] and “Success” appears in [Result]



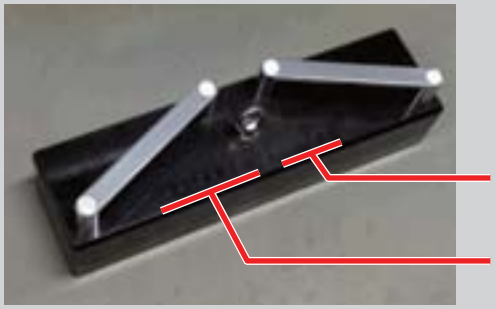
4 **Press and hold the [MENU] button to return to the previous screen and then tap [Weight for Calibration].**



5 **Input the total weight of the weight and the calibration pedal bolt, then tap ↵.**
If you are using a dumbbell or something as a weight, input the total weight including the handle.



- The left picture shows a calibration weight. The weight for calibration (kg) and the confirmation number (three digits) are noted in the position shown in the picture.
  The right picture shows a weight made of such as a dumbbell. When inputting the weight for calibration, use the total mass of the calibration bolt and weight. (If you use a dumbbell or things like that as a calibration weight, make it to have a mass of between 10 kg and 15 kg.)



Example using a dumbbell

- The numerical value (109) for confirming the calibration weight and the weight (1.09 kg) for calibrating, include the weight of the calibration bolt.
- If the confirmation number is not noted, calculate it using the formula below
  Confirmation number = (mass of weight + calibration bolt [kg]) x 9.8066

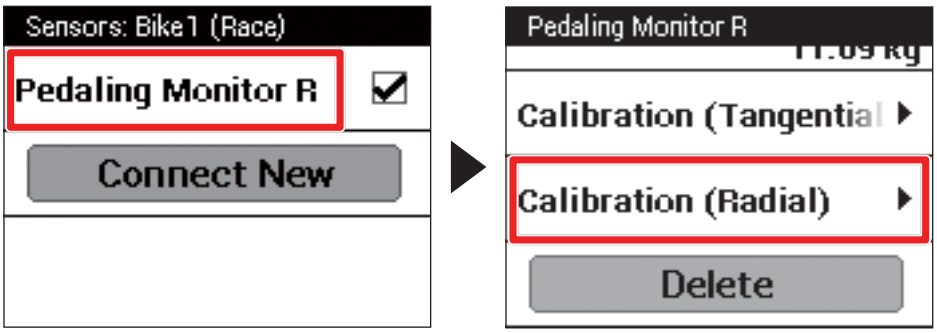
This completes the crank length and calibrating weight settings.
Next, do the calibrations with a load on the pedals.

Calibrating with a Load on the Pedals

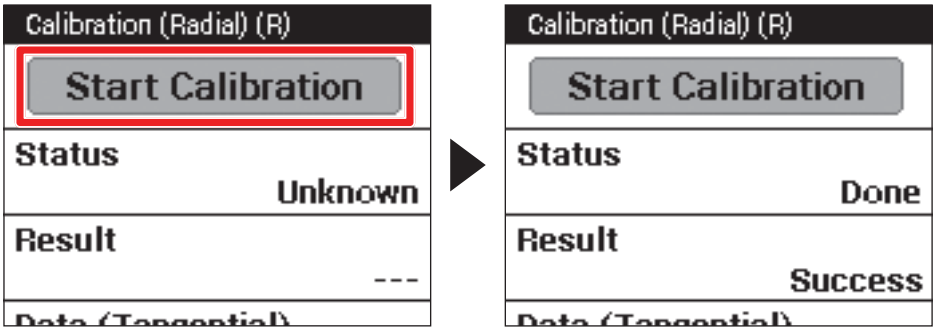
1 **Hang the calibration weight in the groove on the calibration pedal bolt so it does not swing.**
The groove on which to hang the pedal, depends on the length of the pedal shaft (page 33).

2 **Point the crank arm downward, and confirm that the level indicates it is perpendicular.**

3 **In the sensor screen of the SGX-CA500, tap [Pedaling Monitor R] and then [Calibration (Radial)] in order.**



4 **Tap [Start Calibration].**
The calibration starts. If the calibration is successful, “Success” appears in [Result]. It may take a up to 1 minute for the calibration.

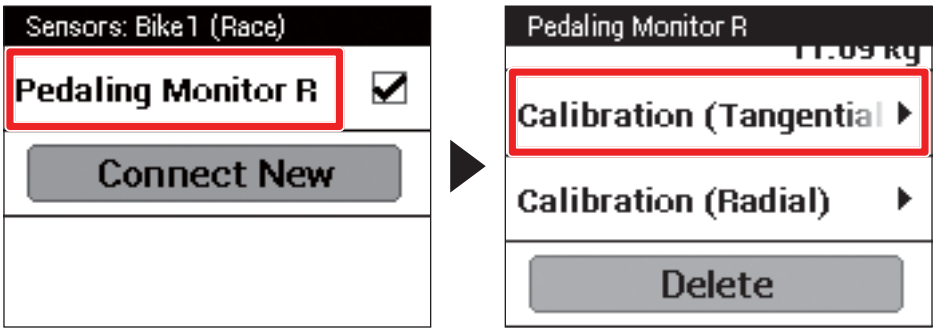


If “Failure” appears, the batteries may be dead or the sensors may have malfunctioned. See Troubleshooting (page 44).

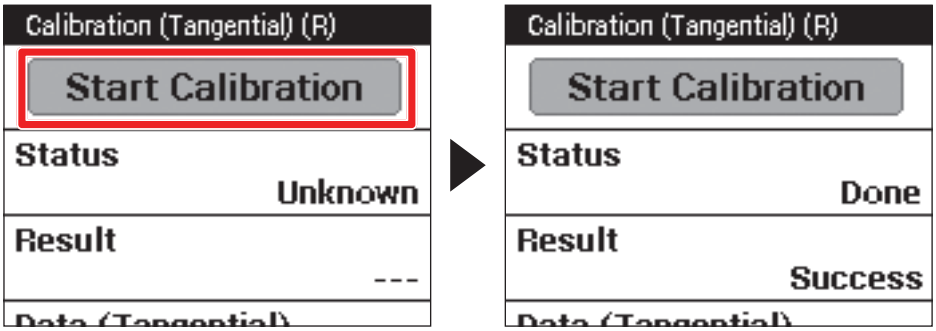
5 **Point the crank arm forward, rotate the rear wheel so the spirit level is horizontal and use the rear brake to lock the rear wheel in place.**

- Be careful that the weight does not bump the surrounding parts, the tires, cranks, or level.
- The calibration weight may fall off causing injury if the rear brake is released too quickly or if the calibration pedal bolt is not screwed in completely.
  Be careful to keep hands and feet away from the area below the calibration weight in case it accidently falls.
  Safety can be increased by adding a rotational load by pressing the roller of the trainer against the back wheel and by placing the bicycle in the highest (top) gear ratio (outermost gear).

6 **In the sensor screen of the SGX-CA500, tap [Pedaling Monitor R] and then [Calibration (Tangential)] in order.**



7 **Tap [Start Calibration].**
The calibration starts. If the calibration is successful, “Success” appears in [Result]. It may take a up to 1 minute for the calibration.



If “Failure” appears, the batteries may be dead or the sensors may have malfunctioned. See Troubleshooting (page 44).

8 **Gradually loosen the rear brake, and point the crank downward.**

9 **Carefully remove the calibration weight, the calibration pedal bolt and the spirit level.**

This completes the calibration of the pedaling monitor sensors. Next, confirm the calibration .
Calibrate the left side after confirming the calibration of the right side

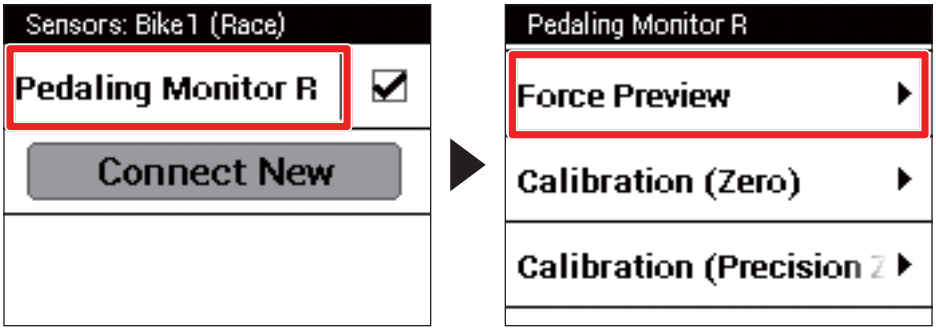
Checking the Calibration

Check that the sensors were calibrated correctly.
It is necessary to check the calibration of the sensors on both the left and right sides. The right-side pedaling monitor sensor is used as an example in this description. The procedure to check the left side is the same as for the right side.

Force Preview

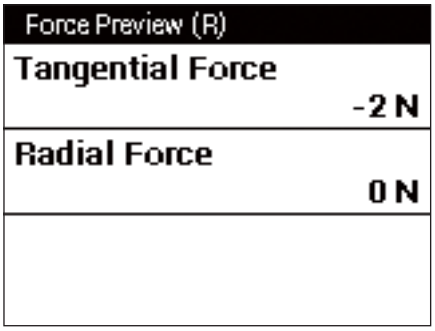
1 **Point the crank arm down and adjust the angle so the level indicates it is perpendicular.**

2 **In the sensor screen of the SGX-CA500, tap [Pedaling Monitor R] and then [Force Preview] in order.**



3 **Confirm that the values that appear on the SGX-CA500 Force Preview are within the range shown below.**

- Tangential Direction Force: 0 ± 2 N
- Radial Direction Force: 0 ± 3 N



4 **Hang the calibration weight onto the outer groove of the calibration pedal bolt.**

5 **Confirm that the values that appear on the SGX-CA500 Force Preview are within the range shown below.**
- Tangential Direction Force: 0 ± 2 N
- Radial Direction Force: (Confirmation number of calibration weight) ± 3

- See page 33 regarding the confirmation number of calibration weight
- Adhesion may have failed if the values in the Force Preview continue moving for more than a minute as you check them. Check the adhesive you are using and the adhesive's recommended hardening time and temperature while hardening.

6 **Point the crank arm forward, rotate the rear wheel so the spirit level is horizontal and use the rear brake to lock the rear wheel in place.**

- Be careful that the weight does not bump the surrounding parts, the tires, cranks, or level.
- The calibration weight may fall off causing injury if the rear brake is released too quickly or if the calibration pedal bolt is not screwed in completely.
  Be careful to keep hands and feet away from the area below the calibration weight in case it accidently falls.
  Safety can be increased by adding a rotational load by pressing the roller of the trainer against the back wheel and by placing the bicycle in the highest (top) gear ratio.

7 **Confirm that the values that appear on the SGX-CA500 Force Preview are within the range shown below.**
- Tangential Direction Force: (Confirmation number of calibration weight) ± 2
- Radial Direction Force: 0 ± 3 N

- See page 33 regarding the confirmation number of calibration weight
- Adhesion may have failed if the values in the Force Preview continue moving for more than a minute as you check them. Check the adhesive you are using and the adhesive's recommended hardening time and temperature while hardening.

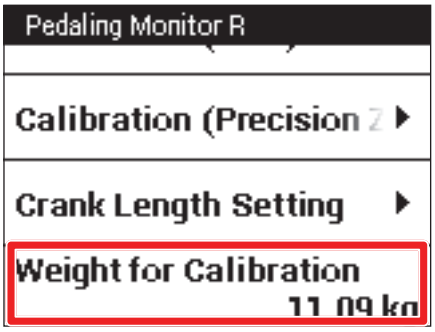
8 **Gradually loosen the rear brake, and point the crank downward.**

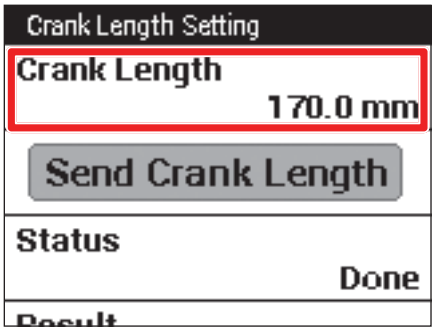
9 **Remove the calibration weight.**

10 **Point the crank arm down and adjust the angle so the level indicates it is perpendicular.**

11 **Confirm that the calibration weight and crank length are set correctly.**

If the settings are wrong, do the calibration again.



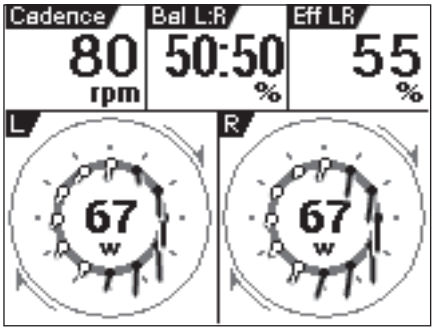


Checking the calibration of the right side is finished. Next, calibrate the left side and then check the calibration

Checking the Pedaling Display

- You need to calibrate the magnets before checking the pedaling display. Refer to the "SGY-PM910H2 Installation Manual (for dealers)"

After completing the calibration for the left and right pedaling monitor sensor, mount the bicycle in the roller stand and add a rotational load. Sit on the bicycle and pedal it, and confirm that the pedaling vectors appear on the Cyclocompute 's screen. Next, confirm that the vectors that are displayed are in the correct direction.
Also, confirm that the right and left power values are not extremely di ferent, while pedaling with the same force on both pedals. Pedal the bicycle at 80 rpm and 5-speed (5th gear from the rear wheel side).



Settings when shipped to Dealers

1.Check Firmware Version
2.Update Firmware
3.Clear Magnet Calibration and Mode Change

1.Check Firmware Version

Using the PMSTestTool2.exe(Ver.1.7 or higher), press the [Get FW Ver] button to read the current firmware version. confirm that it is Ver.2015041401 or higher.

Example：H2

```
CHANNEL ID: (12/64/5)
CHANNEL ID: (12/65/5)
L : 2015041401
R : 2015041401
```

2. Update Firmware

If the firmware is old, use pmsupd_1bank.exe to update it to the latest version.

3.Clear Magnet Calibration and Mode Change

Using PMSTestTool2.exe(Ver.1.7 or later)Clear the Magnet Calibration and Change the Mode.

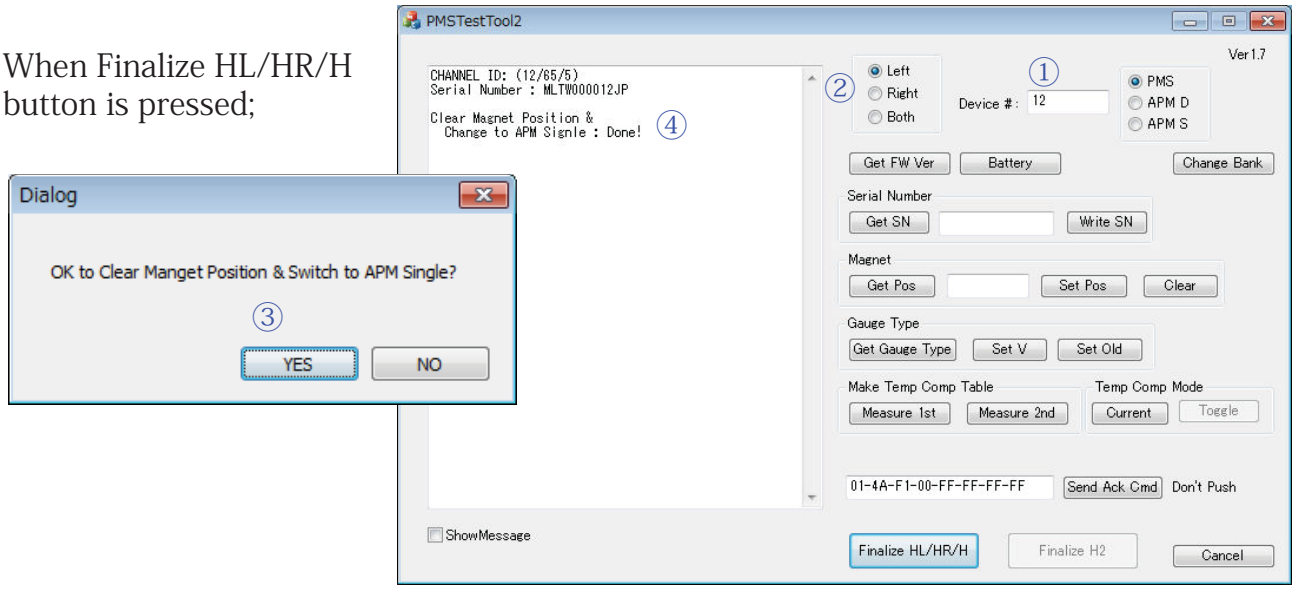
Enter the product Device Number in ①Device#: Select the sensor side in ②)Left/Right/Both:
(Both is OK for the 910H2: For the 910H do the Left side first, then the Right side.)

In order to inform the tool of what type of sensor is connected, press the [Get FW Ver] button again.
(This is not necessary if the version reported in Step 1 was Ver.2015041401 or higher.)
THe next step depends on the type of sensor being initialised.

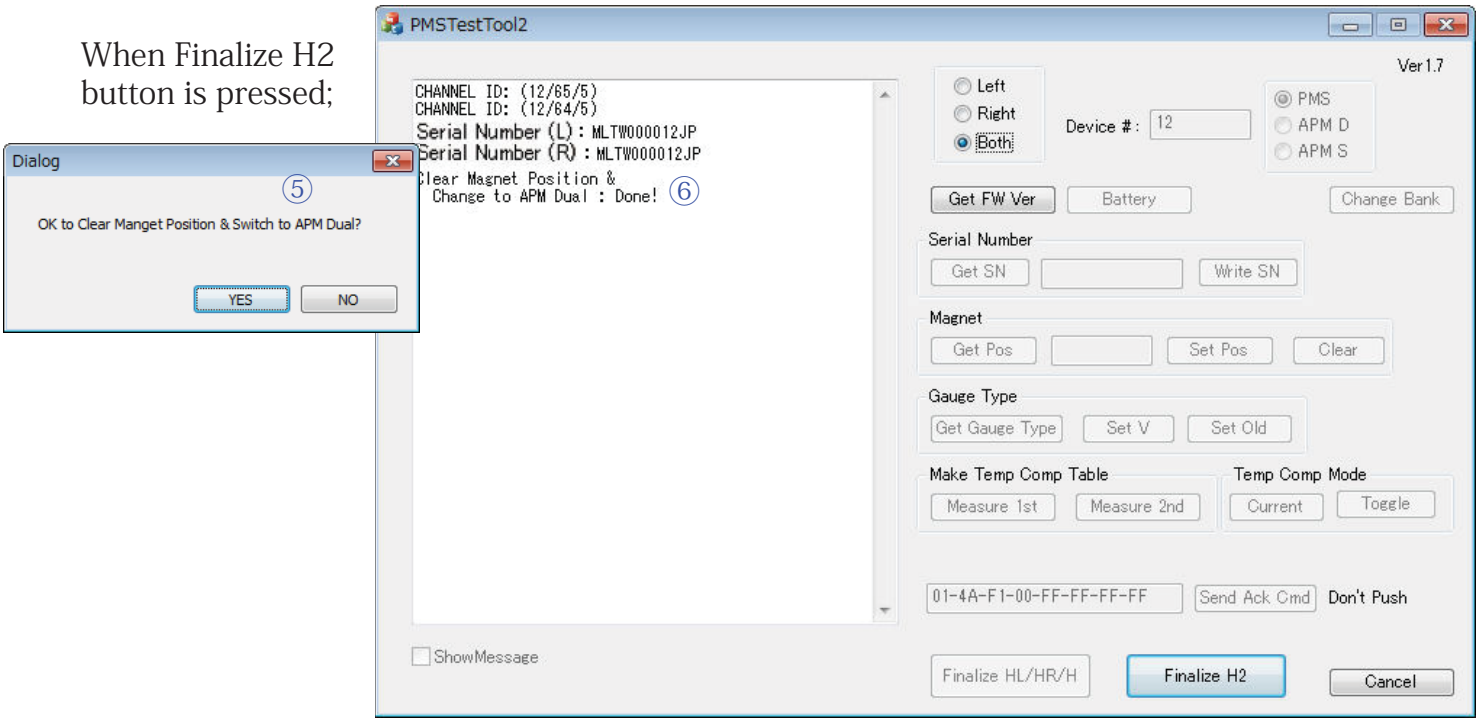
For SGY-PM910HL/HR/H: Press [Finalize HL/HR/H].
In the popup confirmation window, Press button ③, [Yes]
The message is shown in the window ④ will be shown.
After clearing the Magnet Calibration, the system will automatically switch to single power meter mode.
(No switching done for SGY-PM910H)

For the SGY-PM910H2: Press [Finalize H2]
(Note: When the device number of the left and right isn't even, a button doesn't become active.)
A popup window with the message shown in ⑤ will appear so press [Yes].
The message is shown in the window ⑥ will be shown.
After clearing the Magnet Calibration, the system will automatically switch to dual power meter mode.

When Finalize HL/HR/H button is pressed;



When Finalize H2 button is pressed;

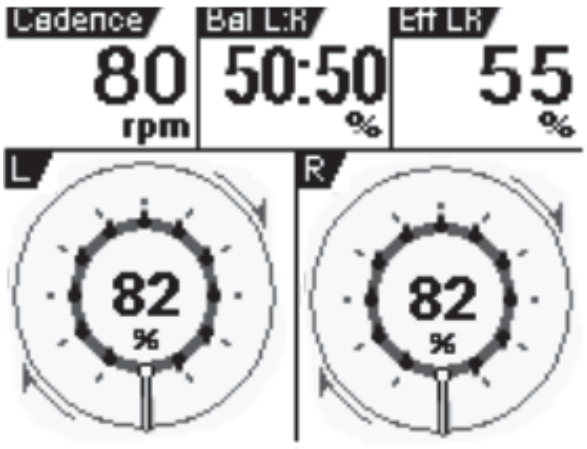


In the folder in which the tool is installed, a log file is created monthly of all devices for which the Finalize button was pressed, showing the date, time, serial number, left or right device information, and the tool version.
Example:

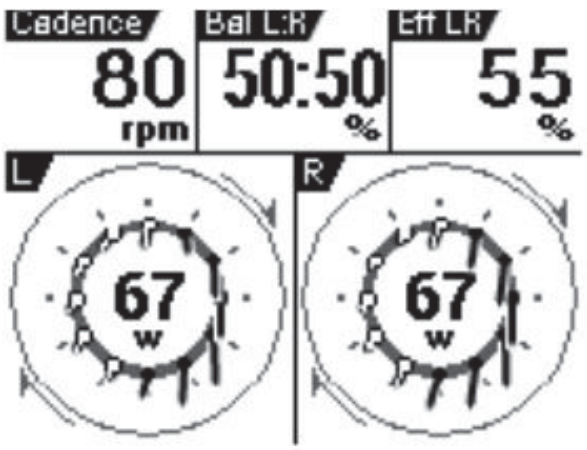
2015/05/13 11:31:16. NGTP000987JP 2015041401 R APM_S 1.7

The purpose of Clearing Magnet Calibration is to ensure that the dealer carries out Magnet Calibration on the user's bicycle.
It also allows detection of non-calibrated sensors when they are sent in for repair.

The following is provided for information purposes only.
In the image on the left, with Magnet Calibration cleared, there is only a single vector shown pointing downward at the lowest position in the rotation.
In the image on the right, with Magnet Calibration carried out, all twelve pedaling vectors are shown.



Magnet Calibration Cleared



Magnet Calibration Completed

Troubleshooting

Refer to the following suggestions if you have any problems installing or using the product.
If you cannot solve the problem, please contact your dealer or visit our web site.

■ Installation

Symptom	Cause	Solution		
		User	Dealer	Installation Center
A sensor installed on the crank set is coming into contact with the frame, Di2 battery, brake, or other provided component.	The frame is not supported. Depending on the shape of the frame being used, a crank that has sensors installed may not be installable because it comes into contact with the frame. Even when two frames have the same model number, a difference in size and/or year may make installation impossible. When the Di2 battery is under the chain stay, installation that causes contact with the Di2 battery may not be possible.	Take your bicycle to your retailer and have its size measured to check whether the frame is supported. Since actual measurement is required, a judgment about whether a frame is supported cannot be made before the frame is sold.		—
The crank set is obstructing the transmitter and cover.	The crank set is not supported.	Contact your dealer.	Before selling the product, confirm that the crank set is supported. Shimano genuine chainrings are supported.	—
	The installation has been done incorrectly.	—	—	Check if it is installed correctly.
I cannot attach the strain gauge unit cover. The strain gauge unit is installed crookedly.	The strain gauge unit is not correctly installed.	—	—	Use the sensor guide set to check that the strain gauge unit is in the correct position. If it is not installed correctly, it may be impossible to install the cover. Or, it could reduce the accuracy. If you want to re-install the strain gauge unit, you need a new strain gauge unit.
I cannot assemble the outer chainring correctly.	The installation has been done incorrectly.	Contact your dealer.	The gap between the junction box and the outer chainring is too narrow. Refer to the documentation for the crank set when assembling the chain ring, and install it so the spider arm does not contact the junction box.	—
There is a noise when I am riding. The transmitter and cover rattle.	The screws for installing the sensor have become loose. The double-sided tape or the parts of the sensors have deteriorated.	Contact your dealer. You may need to replace the double-sided tape or the parts of the sensors if they deteriorate. (This is a paid service.)	Check the screws for fixing the right transmitter, and then retighten them. Check if the parts of the sensors are installed correctly. If replacements are needed, please visit our website.	—
The chain ring rattles.	The crank set is not correctly assembled. The chain ring adapter is not correctly installed. The chain ring bolt has become loose.	Contact your dealer.	Check if the chain ring adapter is installed correctly. Press on the chainring in a clockwise direction to eliminate any play as you tighten the chainring bolts to the specified torque. Retorque the chain ring bolt periodically. Refer to the documentation for the crank set. Fix the position of the right transmitter after assembling the chainring.	—

Symptom	Cause	Solution		
		User	Dealer	Installation Center
When the right transmitter's cover and left battery's cover were installed, the seal was weak.	The rubber gasket is deteriorating.	We recommend periodically replacing the rubber gaskets inside the right transmitter and left transmitter's battery cover. (This is a paid service.) Using the equipment while the rubber gaskets have deteriorated may damage the product. Contact your dealer.	Replace the rubber gaskets. If replacements are needed, please visit our website.	—
There is sand or oil on the rubber gasket in the transmitter.	—	It is necessary to replace the rubber gaskets if bicycle oil, cleaner, mud, or sand has gotten on them, even if they are not deteriorated. (This is a paid service.) Contact your dealer.	Replace the rubber gaskets. If replacements are needed, please visit our website.	—

■ Magnet

Symptom	Cause	Solution	
		User	Dealer
I cannot install the magnet on the chainstay.	The installation of the magnet or the selected magnet type is incorrect.	—	There are two types of magnets, patch type and arm type. You need to choose the appropriate type depending on the distance between the magnet and the left transmitter or the junction box, and the shape of the frame.
The left transmitter and chain ring adapter are obstructing the magnet.	The installation of the magnet or the selected magnet type is incorrect.	—	Measure the distance from the sensor to the magnet, and install the magnet correctly.
The arm type magnet rattles.	The cable ties for fixing the magnet arm in place have become loose. Or, the screws for adjusting it have become loose. Or, the cushions for installation have deteriorated.	Contact your dealer.	Check if the magnet is installed correctly. The cable ties and cushions are consumables. Replace them if they have stretched or become loose because of age or deterioration. If replacements are needed, please visit our website.
The magnet is rubbing.	A stone or something is stuck in the gap between the magnet, transmitter, and junction box.	Remove any stones or other things stuck in the gap and use a damp rag to clean the magnet and the sensor. Stones or other things stuck in the equipment may damage it.	
Magnet calibration fails.	The magnet calibration was not finished while in the magnet calibration mode.	—	Check the magnet calibration mode. The system exits this mode automatically after 30 minutes. Also, pushing the push switch on the right transmitter during the magnet calibration mode cancels this mode and the LEDs blink orange 5 times.
The left and/or right LEDs light red when the magnet calibration is finished	The magnet has been detected correctly less than 6 times.	—	Confirm that the LEDs of the left and right transmitters light green more than 7 times.
During magnet calibration, the red LED lights when a magnet passes a sensor.	Crank rotation is too fast.	—	The crank rotation speed should be less than one rotation per second.
During magnet calibration, the LED does not light when a magnet passes a sensor.	The installation of the magnet has been done incorrectly.	—	Check the magnet installation. The LED will not light when the crank is rotated if magnets are not positioned correctly and/or if they are too far from the sensor.
	A magnet other than the provided magnets is attached to the frame.	—	Check if there is a magnet other than the provided magnets attached to the frame. This product will not operate properly if there are magnets installed for another brand of power meter, etc.

■ Sensor Connection

Symptom	Cause	Solution	
		User	Dealer
The pedaling monitor sensor cannot pair to the Cyclocomputer.	The sensor is in sleep state.	Activate the transmitter by rotating the bicycle's crank set at least three times. The sensor automatically enters a sleep state if it is still for five minutes	
	There are no batteries in the sensors. Or, the positive and negative terminals of the batteries are reversed.	Confirm that the batteries (CR2032, 3V) are correctly installed in the left and right pedaling monitor sensors. Insert the batteries with the + mark visible. Press on the right transmitter until you hear a click. After loading a battery into the left transmitter, rotate the battery cover to its proper position. After loading batteries, check to confirm that the LED is lit green	
	The sensors' batteries are dead.	Replace the batteries. If the LED does not light for more than five seconds after batteries are loaded, remove the batteries, wait for at least one minute, and then re-load them. If the LED still remains unlit, it means that battery power is low. Replace the batteries with new ones. Use Cyclocomputer sensor information to check the batteries. If the battery level is 2.5 V or less under normal temperature, replace the batteries. Battery voltage is reduced by low temperatures, which may result in unstable operation.	
	The sensor's operating mode is not correct.	Check the operating modes of the left and right pedaling monitor sensors.	
	The device numbers are not set correctly.	Check the device numbers of the left and right sensors, and then pair them again.	
	There is a different 2.4 GHz wireless device or a microwave nearby.	Pairing may fail or require a long time because of the interference from microwave ovens or other wireless devices. Move away from any other wireless devices and move the sensor closer to the Cyclocomputer. The attempt to pair to the sensor times out after 30 seconds. If they do not pair after 30 seconds, move to a location where there is no electronic interference and try to pair again.	
	The sensor and Cyclocomputer are too far apart.	The sensors have a wireless range of about 10 meters, but this could be limited by the existing radio wave environment. Move the sensor as close as possible to the Cyclocomputer.	
	The Cyclocomputer does not operate normally.	Check the Cyclocomputer's charge and operations. Confirm if a di ferent ANT+ sensor can be paired.	
	The magnet is not installed correctly.	Contact your dealer.	Replace the batteries and check the connection. Wait for at least five minutes until the sensor enters the sleep state. Next, rotate the crank at least three times and check the connection again. If a magnet is detected but does not result in activation, check to make sure that the magnet is installed correctly. An incorrectly installed magnet may result in improper operation.
	The magnetic field of the magnet is weakening.	Contact your dealer.	Check the distance between magnets and the sensor. Magnetism may have gotten weaker due to age-related deterioration. If operation is possible only when the distance between magnets and the sensor is closer than what is prescribed, replace the magnets with new ones. Please visit our website for more information.
	The magnetic field detector is broken. The junction cable of the right sensor has been cut.	Contact your dealer.	See "Calibrating the Magnets and Fixing Them in Place" of the Installation Manual (for dealers). If the sensor's LED does not light, please visit our website.
	The circuit board in the transmitter is broken.	Contact your dealer.	See "Checking Operation of the Sensors" of the Installation Manual (for dealers) . If the sensor's LED does not light, please visit our website.

Symptom	Cause	Solution	
		User	Dealer
The pedaling monitor sensor in the power meter mode cannot pair to a different company's cyclocomputer.	The other company's cyclocomputer does not support ANT+ power meter.	Check that the Cyclocomputer being used supports pairing with the ANT+ power meter. If it does, check the sensor operation mode. If the sensor is in the pedaling monitor mode, set it to the power meter mode and connect it. When the sensor is connected to another brand of Cyclocomputer, total power and left/right balance can be displayed. Applied forces and pedal direction at each rotation angle, and left/right pedaling efficiency cannot be displayed. For more information about this type of configuration, refer to the other brand of Cyclocomputer's user documentation.	
	The pairing of the left and right sensors failed.	Press the right transmitter switch and check the sensor operation mode. After confirming that the left/right LEDs light orange, connect the sensor to the Cyclocomputer. If the LEDs do not light orange, change the operation mode. After you load batteries, the sensors start in the pedaling monitor mode.	
The red LEDs light for 10 seconds when batteries are inserted.	Something is wrong with the strain gauge unit. The circuit board in the transmitter is broken. There is something wrong with the circuit board of the junction box or junction cable for the right sensor.	Contact your dealer.	Please visit our website.

■ Calibration

Symptom	Cause	Solution		
		User	Dealer	Installation Center
Calibration under load fails.	The sensors' batteries are dead.	—	—	Replace them with new batteries. The calibration may fail if the batteries are depleted.
	The specialized calibration weight was not used. Or, the angle of the crank during calibration was wrong.	—	—	Use the specialized calibration weight and set the crank at the specified angle and then do the calibration.
The value in the force preview after calibrating under load is not within the range of ±3 N of the confirmation number of calibration weight.	The zero point calibration was not done correctly. Or, the zero point is incorrect.	—	—	Correctly calibrate the zero point.
	The calibrations of two directions (tangential and radial) were not done.	—	—	Calibrate a high accuracy zero point and calibrate both the tangential direction and radial direction for the left and right sensors. If you do not calibrate both, the correct value will not appear.
	The angle of the crank during calibration was wrong.	—	—	Set the crank at the specified angle and then do the calibration. The calibration cannot be done correctly if the angle shifts.
	Something is wrong with the strain gauge unit.	—	—	If you want to re-install the strain gauge unit, you need a new strain gauge unit.

Symptom	Cause	Solution		
		User	Dealer	Installation Center
Crank length setting fails.	The sensor and Cyclocomputer pairings are not stable.	—	—	Information may not be sent correctly to the sensor depending on the radio wave environment and the distance between the Cyclocomputer and the sensor. Stop the crank length setting and move the Cyclocomputer closer to the sensor or do the setting again in a location with a better radio wave environment.
	The sensors' batteries are dead.	—	—	Replace them with new batteries. Information may not be transmitting to the sensor correctly if the batteries are depleted.
Zero point calibration fails.	There are loads on the cranks or pedals.	Stop the bicycle, remove any load from the cranks and pedals, and then calibrate it. It may fail if a load is applied.		—
	Water inside the sensors.	Water can get into the sensors when the right transmitter cover and/or the left transmitter battery cover are not attached correctly. Remove the batteries. After the interior of the sensors are sufficiently dr , perform zero point calibration again.		—
	Something is wrong with the strain gauge unit. The circuit board in the transmitter is broken. There is something wrong with the circuit board of the junction box or junction cable for the right sensor.	Contact your dealer.	Please visit our website.	—
Zero point calibration does not finish	The sensor and Cyclocomputer pairings are not stable.	Information may not be sent correctly to the sensor depending on the radio wave environment and the distance between the Cyclocomputer and the sensor. Stop the zero point calibration and move the Cyclocomputer closer to the sensor or do the calibration again in a location with a better radio wave environment.		—
The force preview is not near 0 N after calibrating the zero point in pedaling monitor mode.	There are loads on the cranks or pedals.	Stop the bicycle, remove any load from the cranks and pedals, and then calibrate it. The zero point may be incorrect if a load is applied.		—
Zero point calibration fails in power meter mode.	There are loads on the cranks or pedals.	Position either the left or right crank at 6 o'clock before calibrating from the Cyclocomputer. For more information about calibration, refer to the other brand of Cyclocomputer's user documentation. Check that there are no loads on either the left or right cranks or pedals. Calibration fails if there is a load on either the left or right cranks or pedals, because the left and right zero point is calibrated at the same time for the power meter mode.		—
	This is a problem with either the left or right sensor.	Contact your dealer.	The zero point calibrations are done at the same time for the power meter mode. The zero point calibrations may fail if either the left or right sensor is faulty. Please visit our website.	—

Symptom	Cause	Solution		
		User	Dealer	Installation Center
The torque chart is not near 0 N after calibrating zero point in power meter mode.	There are loads on the cranks or pedals.	Position either the left or right crank at 6 o'clock before calibrating from the Cyclocomputer. For more information about calibration, refer to the other brand of Cyclocomputer's user documentation. Remove any load from the left and right cranks and pedals, and then calibrate the zero point. The zero point may be incorrect if a load is applied. The zero point may be incorrect if there is a load on either the left or right cranks or pedals. Because the left and right zero point is calibrated at the same time for the power meter mode. The value that is displayed following calibration with another brand of Cyclocomputer is the total of the left/right calibration values. Values may vary somewhat due to temperature and the crank angle, but this is normal.		—
The torque value does not appear correctly if there are loads on the cranks or pedals when paired to a different company's cyclocomputer while in the power meter mode.	The crank length is not set correctly.	Contact your dealer.	Please visit our website.	Change the left and right sensors to the pedaling monitor mode, and set the crank length.
	The calibration may not have been done correctly.	Contact your dealer.	Please visit our website.	Change the left and right sensors to the pedaling monitor mode, and correctly calibrate the zero point and do a calibration under load.

■ Display

Symptom	Cause	Solution		
		User	Dealer	Installation Center
The power value is not correct. The left and right sides of the vector chart or efficiency display are obviously different. The proportions of the left and right power values are obviously different. When pedaling with only one leg, the side not being pedaled is extremely far from 0 W.	The zero point is incorrect.	Installing the cranks and pedals can cause a slight change in the zero point. Be sure to calibrate the zero point after installing cranks and pedals. When using the pedaling monitor mode, calibrate the zero point for both the left and right sensors. Calibrate the zero point with pedals installed.		—
	Temperature (air temperature) learning is not performed.	If there has been a change in temperature of 4°C or more since the last zero point calibration, calibrate the zero point again. Also, accurate measurement will not be possible if calibration is performed before the sensor is acclimated to external air temperature. It takes at least 20 minutes for the sensor to become acclimated to the current outside temperature. This device uses a temperature (air temperature) learning function to automatically calibrate its zero point as the temperature changes. This function maintains accuracy as the temperature changes during a ride. As the temperature varies, it is necessary to calibrate the zero point more than twice, so the most recent six times are used for calibrating using this function. The results of the zero point calibration are recorded if the temperature varies more than 4°C from the zero point calibration recorded previously.		—
	There is a problem with the temperature (air temperature) learning result.	Check if a change in temperature has caused a change in the zero point. After the crank has become sufficiently acclimated to the external temperature, check the Force Preview. Next, move to a location where the external temperature is different, wait for 20 minutes, and then check the Force Preview again. If there is a major difference between the zero points, it could mean there is a problem with the learning function. If this happens, use the ZeroCal application to initialize the sensor whose zero point is off. Learning function results are stored in a log file, and can be checked using the Cyclo-Sphere screen and the device information window.		—

Symptom	Cause	Solution		
		User	Dealer	Installation Center
The power value is not correct. The left and right sides of the vector chart or efficiency display are obviously different. The proportions of the left and right power values are obviously different. When pedaling with only one leg, the side not being pedaled is extremely far from 0 W.	The calibration under load may not have been done correctly.	Contact your dealer.	Please visit our website.	Check the calibration. If the calibration has shifted, change the left and right sensors to the pedaling monitor mode, and correctly calibrate a high accuracy zero point and do a calibration under load.
	This is a problem with either the left or right sensor.	Contact your dealer.	Please visit our website.	—
The power value and/or vector are not displayed occasionally.	The sensors' batteries are dead.	Replace the batteries. If the LED does not light for more than five seconds after batteries are loaded, remove the batteries, wait for at least one minute, and then re-load them. If the LED still remains unlit, it means that battery power is low. Replace the batteries with new ones. Use Cyclocomputer sensor information to check the batteries. If the battery level is 2.5 V or less under normal temperature, replace the batteries. Battery voltage is reduced by low temperatures, which may result in unstable operation. Frequent replacement of batteries is recommended during winter.		—
	A magnet other than the provided magnets is attached to the frame.	Contact your dealer.	Check if there is a magnet other than the provided magnets attached to the frame. This product will not operate properly if there are magnets installed for another brand of power meter, etc.	—
The vector chart is rotating.	The magnet calibration may not have been done correctly.	Contact your dealer.	Check if the magnets are installed correctly. Correctly calibrate magnets.	—
The vector data does not update every few seconds.	The sensor and Cyclocomputer pairings are not stable.	The sensor information may not be received correctly, depending on the radio wave environment. Confirm it in a location that has a good radio wave environment.		—
When one of the pedals is pushed, the vector display of the other pedal becomes inconsistent.	This is according to the specifications	A vector may be displayed based on the pedal's weight and centrifugal force.		—
There is a deviation of several watts when compared to the power values from a different brand of power meter.	This is according to the specifications	Certain measurement methods and/or use conditions may generate deviation with another brand of power meter.		—
The cadence does not appear on the Cyclocomputer when rotating the cranks slowly.	This is according to the specifications	It is not possible to measure the cadence if cranks are rotating very slowly.		—
The display remains on the Cyclocomputer even when the bike is stopped and the cranks are stopped.	This is according to the specifications	Information may be displayed for 2 to 3 seconds after stopping.		—
The display does not appear on the Cyclocomputer immediately after I start pedaling.	This is according to the specifications	When you start pedaling, the crank needs to rotate to detect the magnet more than two times. After that, a packet of data is sent for every rotation of the crank when the crank is pointing directly up (12 o'clock). Also, a maximum of a 2 second delay may occur from when data is sent to the Cyclocomputer to when it is displayed.		—

Symptom	Cause	Solution		
		User	Dealer	Installation Center
Occasionally, only the left/right power value is displayed, without vector data on the Cyclocomputer and/or Cyclo-Sphere.	This is according to the specifications	The product uses three ANT transmissions to send power values and vector data. The first transmission sends the power value, while the second and third transmissions send vector data. The Cyclocomputer refreshes information every second. If data for all three transmissions is available both the power value and vector data are displayed, but transmission timing may result in only the power value being displayed. This is because the product is designed to display and record information as quickly as possible, even if only a power value is available. When pedaling starts out after a stop at a traffic light or after the crank is paused while riding, only the power value may be displayed due to poor wireless LAN connection conditions. Depending on the crank start position when pedaling is started, display of either the left or right pedal may be delayed.		—
The initial display of the left and right sensors are different on the Cyclocomputer.	This is according to the specifications	The left and right displays may be 1 to 2 seconds out of sync depending on the angle when pedaling starts.		—
The display does not update every second when rotating the cranks slowly.	This is according to the specifications	If the cranks are rotating at less than 60 rpm the update will not happen every second because data is sent for each rotation.		—
The display of the length of the vectors is not consistent.	This is according to the specifications	The reference for the maximum length of the vector is the largest force applied in one rotation. The vector display may not be consistent if the force is small.		—
The efficiency value falls if I pedal on the outside of the pedals.	This is according to the specifications	Pedaling with your weight on the inside or outside of the pedal reduces the accuracy of the measurement of the force in the radial direction because the reference is the length of the pedal that was set when calibrating (radial direction) with load. The efficiency value may drop when pedaling with your weight on the outside because the force measured in the radial direction is larger than normal.		—

Error codes

An error code is displayed if an error occurs while setting the crank length or doing calibrations.

Code	Description of error	Data (radial)	Data (tangential)
1	Parameter deviation (mass of load is 0)	-	-
2	Insufficient battery powe	-	-
3	Failed to calibrate zero point (tangential and radial)	1: Error 0: Normal	1: Error 0: Normal
4	The zero point calibration is very different from the desired value.	Multiple of detected value of force	Multiple of detected value of force
5	Not used	-	-
6	Large disruption detected due to vibration during calibration	Degree of instability of detected value of force	Degree of instability of detected value of force
7	Calibration with load was done before high accuracy zero point calibration	-	-
8	Exceeded measurement limit during load calibration	Multiple of detected value of force	Multiple of detected value of force

Care, Maintenance, and Storage

- Use a soft dry cloth or a cloth that has been dampened and wrung out to wipe dirt from the left and right transmitters, the strain gauge unit cover, the magnet, and other accessories.
- Do not use benzene, paint thinner, or other volatile chemicals, cleansers, or chemically treated cloths. Doing so could damage the product or cause the paint to peel off.
- If you are not going to use the product for a long period of time, remove the batteries.

Specifications

Weight : **SGY-PM910H2 right side + left side About 62 g**
: **SGY-PM910HL left side About 22 g**
: **SGY-PM910HR right side About 40 g**
Dimensions : **right side**
- **ight transmitter**
  58.3 mm(W) × 46.1 mm(H) × 21.3 mm(D)
- **unction box, Strain gauge unit cover**
  78 mm(W) × 36.7 mm(H) × 7.3 mm(D)

: **left side**
92.5 mm(W) × 34.7 mm(H) × 8.6 mm(D)
Water resistant : **This device has a water resistance rating of IPX-6/IPX-7**
Communications method (sensors): ANT+ wireless
Batteries : **CR2032**
Operation temperature: –10 °C to 50 °C

- **ANT+ is a Wireless Personal Network protocol with very low power requirements using 2.4 GHz frequency band.**
  For more information, visit http://www.thisisant.com/.
- **Specifications and design are subject to change without notice.**
- **Illustrations used in this manual may be different from actual appearance.**

http://www.pioneerelectronics.com
http://www.pioneerelectronics.ca
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