

# Gaitup<sup>+</sup>

Movement analysis and measurement

The Physilog<sup>®</sup> wearable measurement unit



User Manual and Specifications

Version 1.3  
Release Date: 22.12.2015

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Patent WO2012/007855 A1

## Physilog<sup>®</sup> 4

Gaitup<sup>+</sup>  
Movement analysis and measurement



Multicolor LED

Membrane button

Sensor Type (Silver, Gold...)

CE certification Mark

Micro USB port

Reset button

Optional fixation buckles

Fixation Straps

Inside electronics and battery




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# Recording with *Physilog*<sup>®</sup>

Start
Attach
Sense
Stop


- Put all of your sensors on a table
- Press on the ON/OFF button for 1-2 seconds (green LED on and off again)
- The LED is blinking **green** every second - For synchronous measurement, refer to the "Practical considerations" page.
- > **Physilog<sup>®</sup> is recording**




- Fix the Physilog<sup>®</sup> on the subject



- Ask the subject to perform a movement according to your protocol



- Once the subject has finished, press again on the button for a few seconds
- The LED shines **orange**, then blinks 3 times **green** and then turns off
- > **Physilog<sup>®</sup> has created one file and stopped recording**




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# Charging and Data Transfer

Plug
Charging
Connect
Transfer

- Plug the micro USB to the Physilog<sup>®</sup>
- Plug the USB to the Computer or Charger\*




- When connected to the computer via USB port or a charger\*, the LED blinks **orange**
- > **Physilog is charging**
- When it is fully charged, it shines **green**

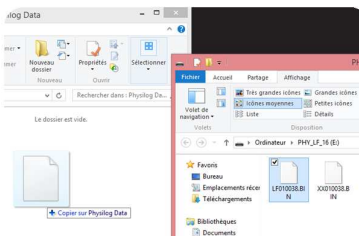


\*Charger is not provided by Gait Up. Gait Up declines any responsibility due to charger usage. Please refer to supply voltage in the product specification section.

- When connected to a computer, the LED is blinking **multicolor**
- Wait for few seconds
- > **Physilog<sup>®</sup> is connected to your computer**



- Copy and paste Physilog<sup>®</sup> files (\*.bin) to your preferred destination



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# Practical considerations

- Make sure *Physilog*<sup>®</sup> sensors are fully **charged before doing measurements** (LED shines green when connected to computer or charger, you can also check with RTK>check>Battery level) to benefit from the maximal battery life (given in autonomy section).
- For **synchronous measurements** with several sensors, make sure to switch them ON at the same time (5-10sec delay) when they are close to each other. For example, put them all on a table and switch them ON one after the other. Make sure that they blink green synchronously before placing them on the subject.
- Make sure to **know which «.bin» file corresponds to which trial** for your analysis – Last digits of file name are automatically incremented. Note that date of file generation (recorded between one start and stop of the *Physilog*<sup>®</sup>) is visible in the XLS or CSV file.
- **Copy trial recordings to your computer**, *Physilog*<sup>®</sup>4 is not the best place to keep and save important data.
- For Gait Analysis with Gait Up's Gait Analyser (only), sensors can be placed in any **orientation**, it will not influence measurements.
- The *Physilog*<sup>®</sup> can be used outside. Warning: the sensor is not waterproof.

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# Handling

- *Physilog*<sup>®</sup>4 should be handled carefully. In particular, it should not receive shocks, such as fall, crushing, being hit, ...
- Storage: Store in a cool (0°C – 30°C) and dry place. The provided suitcase is the perfect place for your sensor.
- Cleaning: Sensors can be cleaned gently using alcohol wipes. Before you clean the device make sure it is turned off and disconnect all cables. Caution: Do not put any liquid nearby the micro USB port. Excess of liquid may damage the sensor. Straps can be washed in a washing-machine.
- Make sure to plug the USB cable in the right way: contact pins should be centered
- Sensors do not need yearly recalibration.

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# Product Specifications

## Electrical characteristics

<b>Internal Storage</b>	4 Gb – Physilog <sup>®</sup> Silver: 9 days at 200Hz
<b>Battery</b>	Rechargeable Lithium Ion Polymer <b>Battery life up to 23 hours*</b>
<b>Supply Voltage</b>	DC min: 4.2V – max: 6V min: 125mA – max: 250mA
<b>Port</b>	Micro-USB for charging and data transfer
<b>Operating Temperature</b>	From -40°C to 45°C

\* Depending on Physilog<sup>®</sup> model and configuration, see autonomy table below

## Mechanical Characteristics

<b>Dimensions</b>	50 x 37 x 9.2 mm Anatomical curved shape
<b>Weight</b>	19 grams (including battery)
<b>Button</b>	Start/Stop membrane switch with dual-color LED
<b>Material</b>	ABS plastic (same as LEGO <sup>®</sup> )
<b>Fixation</b>	Double side Velcro or optional buckles with elastic straps

## Physilog<sup>®</sup> 4 Silver Characteristics

Sensor Specifications	10 D Measurement			
	3D Accelerometer	3D Gyroscope	3D Magnetometer	Barometer
<b>Measure</b>	Linear acceleration	Angular Velocity	Magnetic field strength	Atmospheric pressure
<b>Programmable range of measurement</b>	±2g, ±4g, ±8g and ±16g	±250, ±500, ±1000, and ±2000°/sec	±1000 µT	10 mBar to 1200 mBar
<b>Sampling rate</b>	Programmable from 1 to 500 Hz (Magnetometer: max. 50Hz, Barometer: max. 100Hz)			
<b>Wireless Synchronization</b>	Radio frequency synchronization – as many Physilog <sup>®</sup> sensors as you wish			

## Physilog<sup>®</sup> 4 Gold options

- GPS module
- Droplet deposited IMU
- ECG – heart rate monitor
- Bluetooth
- Synchronization with other systems

## Certifications

Physilog is:

- CE marked
- FCC certified
- RoHS compliant

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# Autonomy of the Physilog<sup>®</sup> 4 Silver

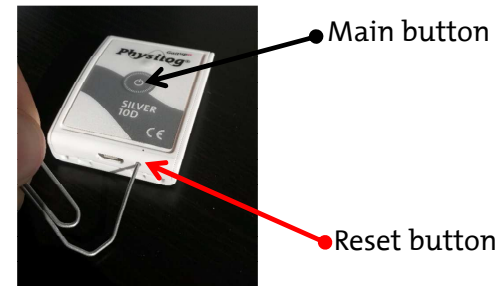
Measuring channels				Radio signal	Recording frequency Hz	Approx. Autonomy* Hours
3D Accel	3D Gyro	3D Magneto	Barometric Pressure			
♦	♦	♦	♦	(Master, 1s interval)	50	21
♦	♦		♦	-	100	23
♦	♦		♦	-	125	23
♦	♦	♦	♦	(Master, 1s interval)	200	17
♦	♦		♦	-	200	21
♦	♦			(Master, 1s interval)	200	21
♦	♦	♦	♦	(Master, 1s interval)	500	15
♦	♦			(Master, 1s interval)	500	19



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# Troubleshoot

1. First, Visit FAQ on the download section of our website:  
<http://www.gaitup.com/support/> (from 10.2015)
2. If Physilog<sup>®</sup> is not working properly, please do a simple reset:  
Press the reset button once. LED shines **ORANGE** and then blinks



3. If Physilog<sup>®</sup> is really not working, please do a master reset:  
Maintain the reset button, then maintain main button, release the reset button, and once LED has stopped to shine **ORANGE**, release main button. LED blinks **ORANGE 3 times**

**Warning: this operation formats the device and all data stored on the Physilog<sup>®</sup> will be erased**

The Master reset also deletes Physilog's date and time information. Simply connect the Physilog to the computer and open the RTK software. If you don't have RTK, create a new text document using a basic text editing program such as notepad. Leave it empty and call it TIME.BIN. Check that no other file called TIME is present on the Physilog (also check hidden files). Copy-paste the TIME.BIN file you created to Physilog.

4. If the problem persists, email it to: [contact@gaitup.com](mailto:contact@gaitup.com),  
Please indicate Physilog<sup>®</sup>'s number and attach problematic .bin files if any

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# Safety information

- Physilog<sup>®</sup>4 includes a lithium battery. This battery may only be charged over a limited temperature range. Never attempt to dock or charge your Physilog<sup>®</sup> when the temperature is outside the range of 0 to 45°C.
- Physilog<sup>®</sup> should be charged through USB connection with the computer. An external charger may be used ; note that no charger is provided by Gait Up. Gait Up declines any responsibility due to charger usage. Supply voltage should be as follows: DC, 5V. Current consumption is 100mA.
- All external circuits connected to the Physilog<sup>®</sup> should be «Safety Extra Low Voltage» and «limited Power Sources» circuits as described in the following standards: IEC60950-1:2005+/A1:2010 and EN60950-1:2006+/A11:2009+/A1:2010+/A12:2011

## Warnhinweise:

- Physilog<sup>®</sup> 4 enthält eine Lithium Batterie. Die Batterie soll nur in einer definierten Temperaturspanne aufgeladen werden. Versuchen Sie nie Ihren Physilog<sup>®</sup> an den Computer anzuschließen oder aufzuladen, wenn die Aussentemperatur nicht zwischen 0°C und 45°C ist.
- Physilog<sup>®</sup> Sensoren sollen durch eine USB Verbindung mit einem Computer aufgeladen werden. Ein externes Ladegerät kann benutzt werden; Gait Up empfiehlt und liefert aber kein externes Ladegerät. Gait Up übernimmt keine Haftung falls ein Ladegerät gebraucht wird. Die erlaubte Netzspannung ist: DC, 5V. Stromaufnahme beträgt 100 mA.
- Alle an den Physilog angeschlossenen externen Stromkreise sollen die «Sicherheitskleinspannung» und «mit begrenzter Leistung» Regeln erfüllen, die in den folgenden Normen beschrieben sind: IEC60950-1:2005+/A1:2010 und EN60950-1:2006+/A11:2009+/A1:2010+/A12:2011

## Informations relatives à la sécurité:

- Physilog<sup>®</sup> 4 contient une batterie lithium. La batterie ne doit être chargée uniquement si la température extérieure est dans les limites définies. N'essayez jamais de connecter ou charger votre Physilog<sup>®</sup> si la température ambiante est en dehors des limites de 0 à 45°C.
- Physilog<sup>®</sup> devrait être chargé par une connexion USB avec un ordinateur. Un chargeur externe peut être utilisé; par contre Gait Up ne livre et ne recommande pas de chargeur. Gait Up refuse toute responsabilité lié au chargeur externe. La tension de réseau devrait être: DC, 5V. La consommation de courant est de 100mA.
- Tout circuits connectés à Physilog<sup>®</sup> doivent être «très basse tension de protection» et «source à tension limité» comme décrit dans ces normes: IEC60950-1:2005+/A1:2010 et EN60950-1:2006+/A11:2009+/A1:2010+/A12:2011

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At Gait Up, we welcome your feedback and questions.

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