

Description

The chest band has three embedded sensors and one acquisition system. The sensors are an ECG (Electrocardiography), Respiration sensor and tri-axial accelerometer that are situated in the chest of the wearer. All the embedded electronics are easily removable and reassembled, to allow the wearer to machine wash the chest band when the need arises.



Figure 1: Chest band

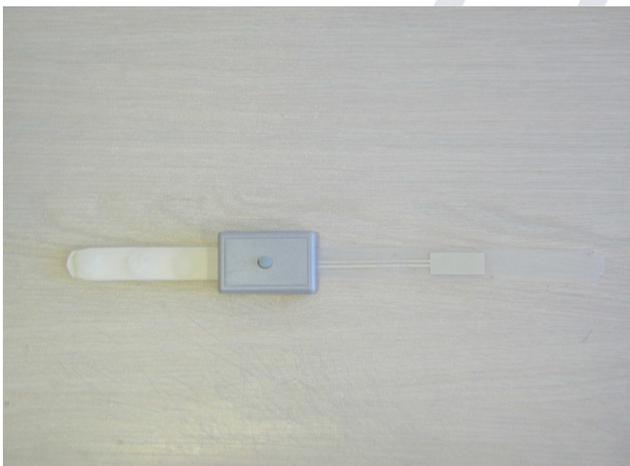


Figure 2: Sensors and acquisition system top view

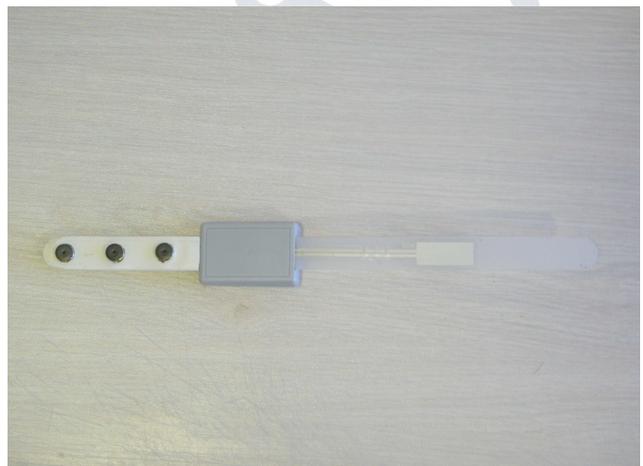


Figure 3: Sensors and acquisition system bottom view

How to Use

Sensors and acquisition system placement

The acquisition system and the sensors must be placed in the correct location before the user puts the chest band on. The chest band form factor allows an easy and seamless placement of the acquisition system and sensors. In the following pictures, the acquisition system and the sensors are embedded inside the textile band.



Figure 4

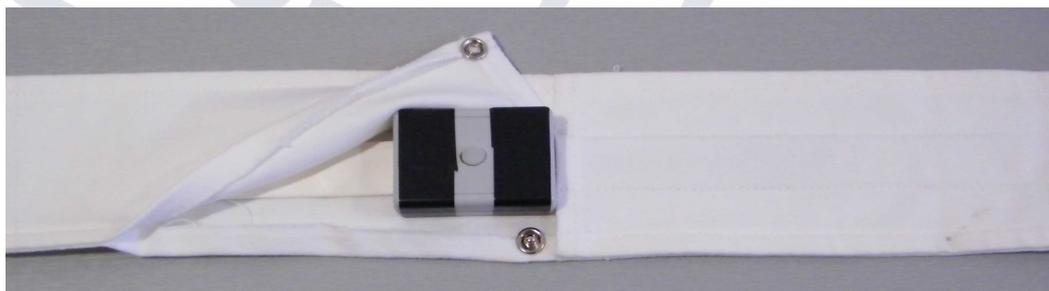


Figure 5



Figure 6



Figure 7

The respiration sensor must be slid in the narrow space between two seams. This creates the needed stability to obtain a good respiration signal (Figure 4 and Figure 5). The chest band opening that houses the acquisition system and the sensors, will be closed by means of a metallic snap or a zipper (Figure 6).

The three electrodes of the ECG sensor must be aligned with the three small holes in the textile and then the snaps must be closed. This is essential to obtain the ECG signal and it will help also in maintaining the system in its place while in use (Figure 7).

Wearing the Chest Band

The chest band must be correctly worn if quality signals are expected. The chest band must be used below the chest line as shown in Figure 8.

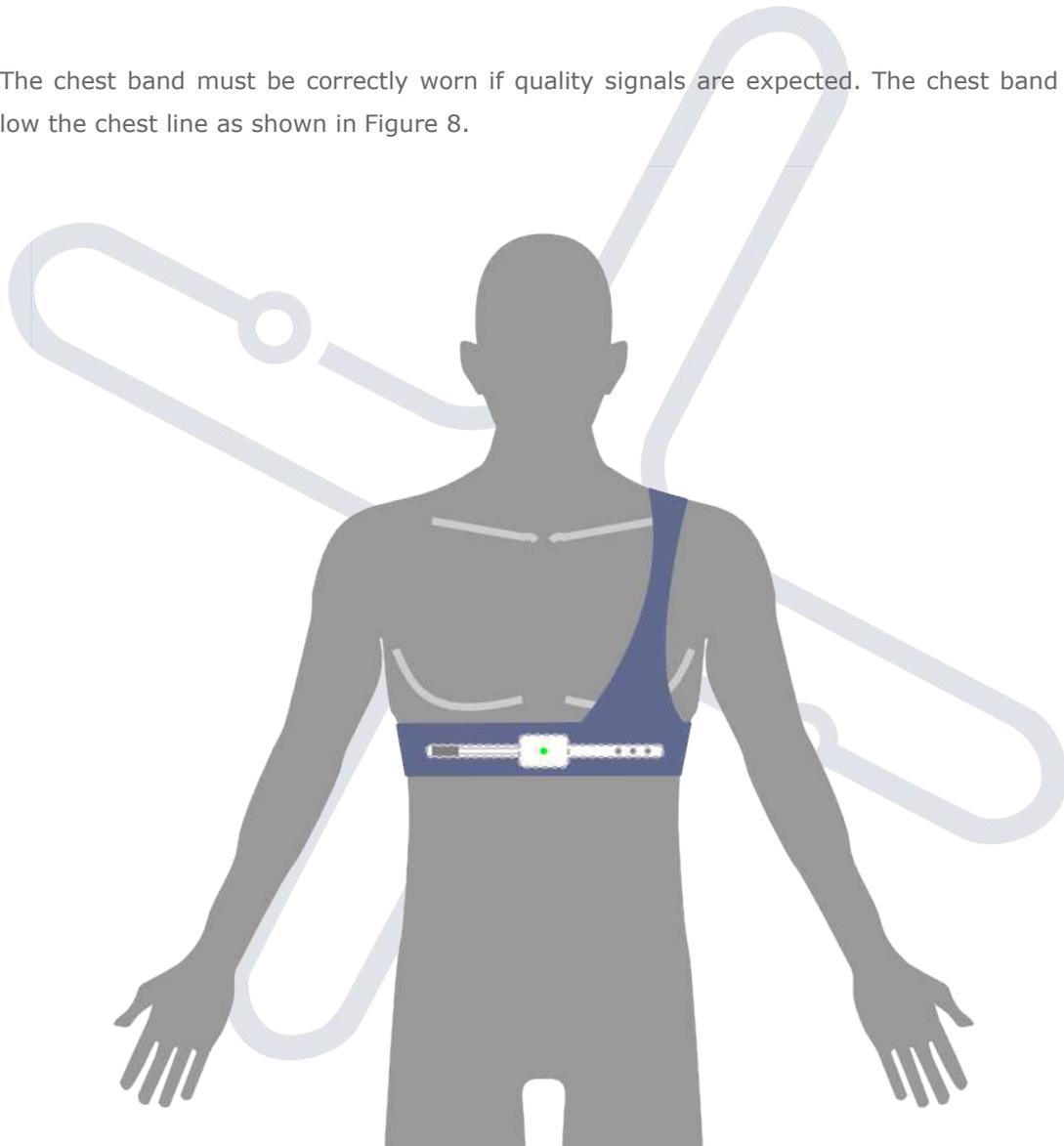


Figure 8: Chest Band correct wear position

Acquisition and charging

To start the acquisition, the button in the acquisition system, must be pressed. The system will start to blink a green light once per second. When the acquisition starts, the green light will blink twice per second. The chest strap autonomy at 36 Hz of sampling frequency is about 17 hours and 30 minutes and at 1000 Hz of sampling frequency is about 9 hours and 40 minutes.

If the system has low battery, a red light (instead of the green light) will start blinking and the charger should be connected as soon as possible and as seen in Figure 9. The red light will warn the user of the low battery condition for an average of 30 minutes. After this time, the system will enter in shutdown mode and will turn itself off.

While charging, the green light will be permanently on and acquisitions cannot be made. When the system has completed the charging process which takes an average of two hours, the green light will turn off, and the system will be ready to make a new acquisition session. While the system is being charged, it's normal that it heats up a bit. If the system safety control detects any problem during charging, the red light will be permanently turned on. In this situation, the user must disconnect the charger from the system and then connect it again.



Figure 9: Charging the acquisition system

Washing and Drying

To wash the chest strap, the sensors and acquisition system must be removed from the textile. The chest band can be machine or hand washed at low temperatures of no more than 30°C but preferably with cold water. This will avoid the deterioration of the elastic properties of the textiles. It's also very important to close all the velcro's in the chest band, before wash and when drying (if a drying machine is used). This will avoid the appearing of lint, maintain the overall quality of the textiles and extend the product life.