

EXERCISES HEART RATE SENSOR

Description D0375bt



Figure 1. The Exercises Heart Rate Sensor

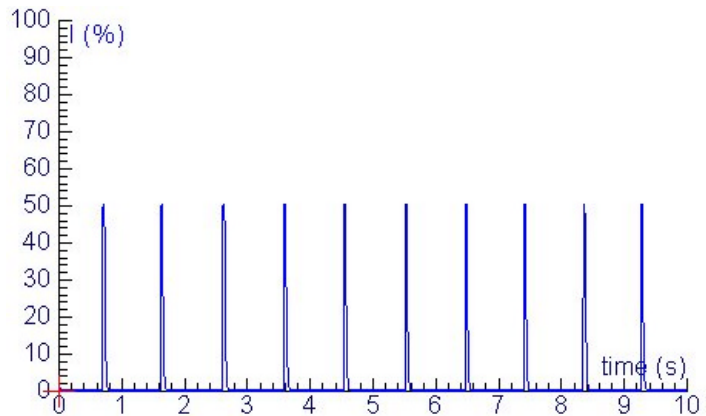
Short description

The Exercises Heart Rate Sensor monitors a person's heartbeat. Similar to electrocardiogram (EKG), this sensor monitors the electrical signal of the heart. Each time the heart beats, an electrical signal is generated.

This signal is measured at the surface of the skin by electrodes embedded in the chest belt of the sensor. By graphing this signal the heart rate can be determined.

The Exercises Heart Rate Sensor is delivered with 4-mm plugs and can be connected to the following interfaces:

- UIA/UIB through Measuring console (via 0520 adapter)
- CoachLab
- CoachLab II
- SMI (via 0520 adapter)
- Texas Instruments CBL™ data-logger.



Graph of the electrical signal of the heart.

There is an adapter (art. 0520) to connect sensors with BT plugs to 4-mm inputs.

How the Exercise Heart Rate Sensor works

The system consists of a transmitter belt, plug-in receiver, and a large and a small elastic strap. The transmitter belt is worn just below the chest and held in a place by an elastic strap. The transmitter detects each heartbeat through two electrodes with EKG accuracy and transmits the heart rate information to the plug-in receiver with the help of a low frequency electromagnetic field.

The plug-in receiver wirelessly receives the transmission, and passes a 3-volt pulse for each heart beat detected to the interface. The reception range of the plug-in receiver is 80-100 cm.

The transmitter switches off automatically as soon as there is no skin contact between electrodes and the belt. Store the belt dry. The battery in the belt has life span about 2500 transmit hours. Then the belt has to be replaced.

In general, you can use the Exercises Heart Rate Sensor as you would any other sensors connected to your interface. In Coach 5 you can plot a pulse for each heartbeat and analyse the time between peaks to determine the heart rate. Often it is more convenient to use a program that simply displays the heart rate in beats per minute on the screen. This is possible in CoachLab II project program, which is delivered together with CoachLab II interface (art. 006).

The name of the exercises heart rate sensor in the sensor library of Coach 5 program is **Exercises Hart rate sensor (0375) (CMA)**.

NOTE:

The Exercises Heart Rate Sensor is to be used for educational purposes only. It is not appropriate for medical or research applications. Specifically, it may not be used for patient diagnosis.

Suggestions for experiments

- Compare the heart rate of different individuals.
- Check the person's heart rate before, during and after a short period of vigorous activity.
- Monitor the recovery rate: that is how fast a person's heart rate returns to normal after exercises.
- Check for *baroreceptor reflex*: that is, changes in heart rate for a person when reclined, sitting, and standing caused by the need for the heart pump blood to different levels.
- Check a person's heart rate before and after caffeine consumption.
- Check a person's heart rate before and after eating.
- Check your own heart rate at different times of the day.
- Monitor a person's heart rate as they hold their breath.

Using of the Exercises Heart Rate Sensor

1. Connect the receiver to the one of the inputs on the interface.
2. Depending on the size of a test subject select a small or large size elastic strap. Secure one of the plastic ends of the elastic strap to the transmitter belt of the sensor. It is important that the strap provide a snug fit to the transmitter.
3. Wet each of the electrodes (the two grooved rectangular areas on the underside of the transmitter belt) with 3 drops of saline solution.
4. Secure the transmitter belt against the skin directly over the base of the rib cage. THE POLAR logo on the front of the belt should be positioned in the centre of your chest. Adjust the elastic strap to ensure a tight fit.

It is important to have a good contact between the transmitter belt and the test subject when using the Exercises Heart Rate Sensor. The belt must fit snugly, but not too tight. Both electrodes should be wet with either saline solution or contact lens solution (most conductive solutions will work). A 5% salt solution works well and can be prepared by adding 5g of NaCl per 100 ml of solution. The range of the transmitter in the chest belt is 80 cm.


Computer monitors can be source of electrical interference. Keep the receiver module as far as possible from any computer monitors in the class.

The receiver module will receive signals from the closest transmitter source.

To avoid confusion or erroneous readings, have test subjects from different lab teams stay at least 2 meters apart.

Typical symptoms of the inadequate contact with the electrodes are a noisy signal with erroneous peaks, missing heartbeat readings, or a flat-line display. If the students receive a flat reading with no heart rate detected then the transmitter and the receiver have to be moved closer together. If there is still no a good pattern tight the transmitter belt and/or place 2-3 drops of saline solution on each of the electrodes of the belt.

Technical data

Receiver	
Range	80 – 100 cm
Current consumption	30 – 55 μ A
Transmitter	
Frequency	5 kHz \pm 10%
Operating temperature	0 – 60 °C
Life span	about 2500 transmit hours (with dry storage of the belt)
Connections	 BT (British Telecom) plug

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