

Experiment HC-6: Effects of Temperature on Peripheral Oxygen Saturation Levels

Equipment Required

PC or Mac Computer

IWX/214, USB cable, IWX/214 power supply

C- AAMI-504 ECG cable and electrode lead wires

PO2-100 Pulse oximeter

Alcohol swabs

Disposable ECG electrodes

Ice, cold and hot water, plastic bag

Start the Software

1. Click on LabScribe
2. Click Settings → Human Heart → ECG-PulseOx
3. Once the settings file has been loaded, click the **Experiment** button on the toolbar to open any of the following documents:
 - Appendix
 - Background
 - Labs
 - Setup (opens automatically)

ECG Cable and Pulse Oximeter Setup

1. Locate the C-AAMI-504 ECG cable and electrode lead wires ([Figure HC-6-S1](#)) in the iWorx kit.



Figure HC-6-S1: The C-AAMI-504 ECG cable with three lead wires attached.

2. Insert the black AAMI connector on the end of the ECG cable into the isolated inputs of Channels 1 and 2 of the IWX/214 ([Figure HC-6-S2](#)).
3. Instruct the subject to remove all jewelry from their fingers, wrists and ankles.
4. Insert the connectors on the red, black, and green electrode lead wires into the matching sockets on the ECG cable.
5. Use an alcohol swab to clean and scrub a region with little or no hair, on the inside of the subject's right wrist. Let the area dry. Another option is to use the area just under each clavicle which will give a better recording.
6. Remove a disposable ECG electrode from its plastic shield, and apply the electrode to the scrubbed area on the wrist/clavicle.
7. Repeat Steps 6 and 7 for the inside of the left wrist/clavicle and the inside of the right ankle/abdomen.



Figure HC-6-S2: A C-AAMI-504 ECG cable with 3 lead wires connected to an IWX/214.

8. Snap the lead wires onto the electrodes, so that:
 - The red (+1) lead is attached to the right wrist or under the right clavicle,
 - The black (-1) lead is connected to the left wrist or under the left clavicle,
 - The green (C or ground) lead is connected to the right leg or on the abdomen.
9. Locate the PO2-100 pulse oximeter ([Figure HC-6-S3](#)).



Figure HC-6-S3: The PO2-100D pulse oximeter.

10. Plug one end of the male-male DIN cable into the DIN8 connector of the pulse oximeter. Plug the other end of the same cable into the Channel 3 input of the iWorx 214.
11. Connect a BNC-BNC cable between the BNC output of the pulse oximeter and the BNC input of Channel 2 on the iWorx 214 ([Figure HC-6-S4](#)).
12. Clip the photoplethysmograph sensor over the end of the subject's left middle finger. An embossed diagram on the sensor indicates the position of the finger within the clip. The indicator light on the pulse oximeter amplifier will stop blinking when the sensor is working properly.

Warning: The photoplethysmograph sensor passes two wavelengths of light through the subject's fingernail. For proper recording, the subject's fingernail should not be covered with nail polish, artificial nails, or any coating, clear or otherwise.

13. Instruct the subject to sit quietly with their hands in their lap. If the subject moves, the ECG trace will move off the top or bottom of the screen. If the subject moves any muscles in the arms or upper body, electromyograms (EMGs) from the muscles will appear on the ECG recording as noise.



Figure HC-6-S4: A PO2100 pulse oximeter connected to an IWX/214.

Units Conversion for the PO2-100D Pulse Oximeter

The settings file, ECG-PulseOx-LS2, programs the LabScribe2 software to express the units on the Y-axis of the Oxygen Saturation channel as %O2 Sat.

1. If LabScribe2 needs to be programmed to convert the voltage recorded on the O2 Saturation channel to the percentage of oxygen in blood:
 - Click on V2-V1 on the O2 Saturation to open the channel menu.
 - Select Units
 - Select Simple to open the Simple Units Conversion dialogue window.
 - Select slope and offset from the pull-down menu in the upper-left corner of the window.
 - Set the slope equal to 10, the offset equal to 80, and the Name of the units on the Y-axis equal to %O2 Sat.
 - Put a check in the box next to Apply Units to All Blocks.
 - Click on the OK button.