
4 Quick Start Guide

NOTE ₁ - This manual includes hyperlinked instructional videos to complement each major section for both practical operation and software function. These videos are located on the ICT YouTube channel. You will require internet access to view the videos. Alternatively, the videos are supplied on a USB Stick together with the manual when you purchased the PSY1 Stem Psychrometer. Videos on DVD can be supplied by ICT upon request.

WARNING 1 – The Thermocouples of the Stem Psychrometer Chamber are made from very fine wire only 25 µm in diameter. NOTE: Human hair is, on average, 100 µm thick. You will require a 20 x dissection microscope to view thermocouples. You cannot see them or manipulate their position with the naked eye. Thermocouples are easily broken if handled incorrectly by unprepared operators. Please READ section 8 - [Handling the Psychrometer](#) and WATCH VIDEO 1: [SP13 Adjustment](#) before removing the chamber's calibration lid.

4.1 Charge the PSY1 Internal Battery

The PSY1 is a self-contained instrument that incorporates a lithium polymer battery. Before using the instrument, this battery MUST be charged. To choose from a range of charging options see section 7 – [Charging - Powering the Instrument](#).

4.2 Clean the Psychrometer Chamber

The Stem Psychrometer consists of two very small welded thermocouples using very fine wire only 25 µm in diameter. This makes the sensor very sensitive to measuring water potential but equally as sensitive to dirt and even mild oxidation. It is recommended that before starting any measurements you clean the thermocouples following the instructions in section 10 - [Cleaning the Psychrometer](#) and watch VIDEO 2: [SP12 Cleaning](#).

4.3 Install the PSY1 Software & USB Driver

Insert the supplied CD into the computer. The CD will auto-run to present a menu. Choose install software; see section 11 - [Software & USB Driver Installation](#) for details.

4.4 Turn the Instrument On

The PSY1 can either be turned on manually by pressing the power button (see section 12 - [Turn the Instrument On](#)) or automatically by connecting an external power supply (see section 7 – [Charging - Powering the Instrument](#)).

4.5 Connect to the Instrument

Connect the USB cable to the instrument. The PSY1 will automatically be detected by the computer as with any USB device. Double click the PSY icon on the desktop to open the software and click the icon “Connect to PSY”, then search for and select the named instrument from the connections Window. See section 13 – [Communications - Connect to the Instrument](#) for details.

4.6 Set the Measurement Protocols

Each installation will be different if only slightly. For this reason measurement protocols such as the Sensor Calibration slope and intercept, Peltier Cooling Pulse options or Chamber Heating schedule should be set before deploying the instrument and checked periodically throughout the experiment. See section 14 - [Measurement Protocols](#) for details.

4.7 Calibrate the Sensor

The Stem Psychrometer MUST BE calibrated before each measurement. The calibration employs a 6 point measurement protocol using known NaCl molality solutions. Watch **VIDEO 3: [SP10 - Calibration Procedure](#)**. The calibration must be done under isothermal conditions (Watch **VIDEO 4 [SP09 Calibration Chamber](#)**) at a controlled temperature of 25°C to generate a specific slope and intercept that characterises the specific response of the individual thermocouples. A detailed calibration function is provided within the PSY1 software that can be used to generate and automatically load your new calibration into the PSY1 firmware. See section 15 – [Calibration Procedure](#) for details and watch **VIDEO 5: [SP 14 Calibration](#)** The calibration is applied and tracked via the four-digit serial number of the psychrometer chamber and will remain in the instrument in non-volatile RAM until changed by the user. This number must be manually entered into the instrument firmware. See sub section 17.1 –[Instrument Information](#) in section 17 - [Instrument Setup & Configuration](#).

4.8 Install the Sensor

Care must be taken to prepare the site for installation. See section 16 – [Installation Procedure](#) for details and watch **VIDEO 6: [SP05 Installation](#)** and **VIDEO 7: [SP04 Installation Preparation](#)** and **VIDEO8 [SP03 Installation Issues](#)**. **NOTE:** Any living tissue or cells left behind will grow into the chamber and cause terminal damage to the thermocouples of the psychrometer chamber. If this happens the psychrometer needs to be returned to ICT International for repair. Please [Request an RMA#](#) before returning anything to ICT.

4.9 Set the Logging Interval

The stem psychrometer has a minimum temporal logging resolution of 10 minutes. This limit is imposed by the thermodynamics of the Psychrometric principle. The stem psychrometer chamber must be allowed time to dissipate all thermal gradients and re-equilibrate with the stem prior to commencing a new measurement. See section 18 - [Measurement Control](#) for details

4.10 Download Data

Data can be downloaded in a number of ways. The simplest is to click the green Download Data icon on the main window under [Instrument Information](#) section 17.1. If a data file exists on the MicroSD card then a Windows Explorer window automatically loads providing a choice of directories to save the data file to. Alternatively, the MicroSD card can be physically removed and read by a computer. See section 20 - [Downloading Data](#) for details.

4.11 Analyse Data

Data is saved in a CSV file and can be analysed using your preferred spread sheet or statistics software. An upgrade for SFT [Sap Flow Tool](#) Software is being written to enable analysis of stem water potential data from the PSY1 that will facilitate direct comparison with measured sap flow data where applicable. [Contact ICT International](#) for more information.