Minnow Logger

User Guide

(Minnow 1.0T & Minnow 1.0TH)

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Contents

1. Document Overview

This guide is provided to distribute the following information:

- the main features of Minnow logger
- how to install the PC Application for the logger
- how to use the PC application for configuration, data extraction and data viewing
- how to mount your Minnow logger
- how to replace the battery for the Minnow logger
- contact information should you have further technical questions

2. Product Overview

The Minnow logger is the most compact logger offering from Senonics measuring just 35mm x 60mm x 15mm. The Minnow logger is commonly used in transport applications including but not limited to transport of:

- sensitive/fragile items
- food
- animal/livestock
- plants
- chemicals
- medicines or organs

The Minnow product today comes in two versions; Minnow 1.0T is a temperature only version and Minnow 1.0TH is a temperature and humidity logger. This document applies for both versions.
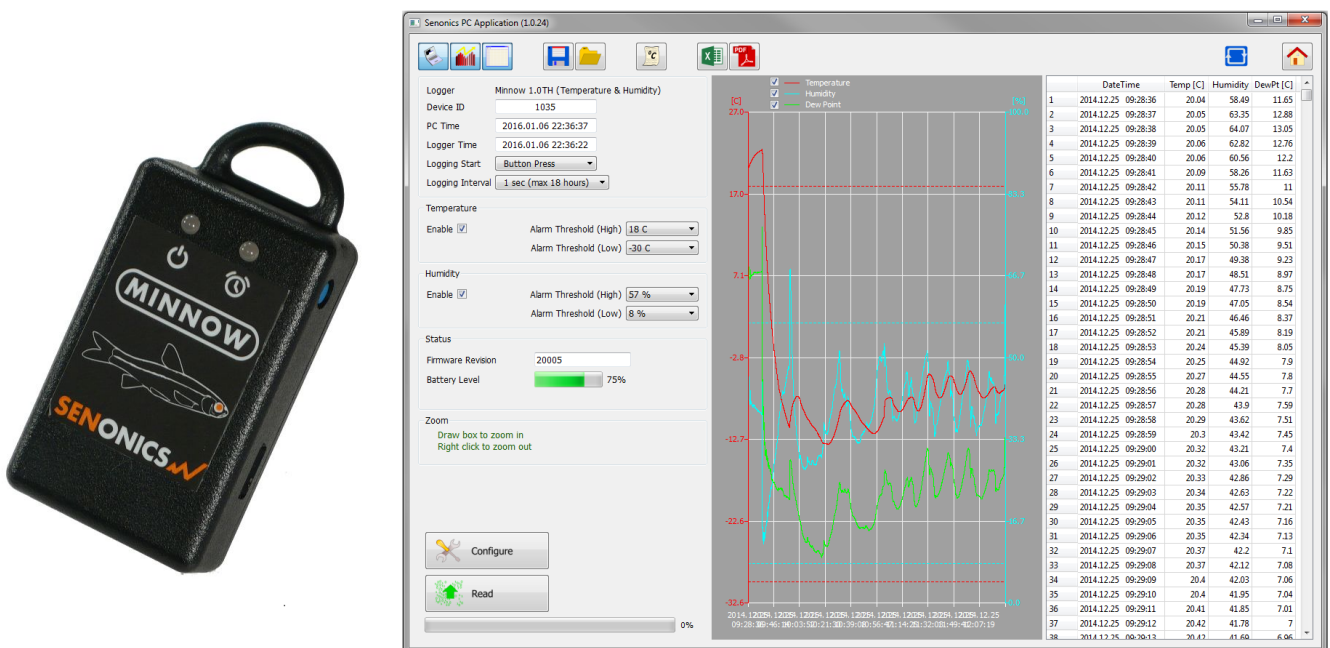

Figure 1: Introducing the Senonics Minnow Logger and PC application

Suppose for example you would like to transport some delicate or fragile cargo from one location to another. By attachment of a Minnow logger one can record temperature and humidity conditions during the journey. At the destination you can then extract the logged data using a very simple Windows PC or Mac application and see graphically or in raw data format the changes in environment over time.

When you would like to guarantee that items are transported within particular environmental limits then one can also set operating ranges above or below which light indicators will be activated so that the user can become aware that the desired transportation conditions have been exceeded.
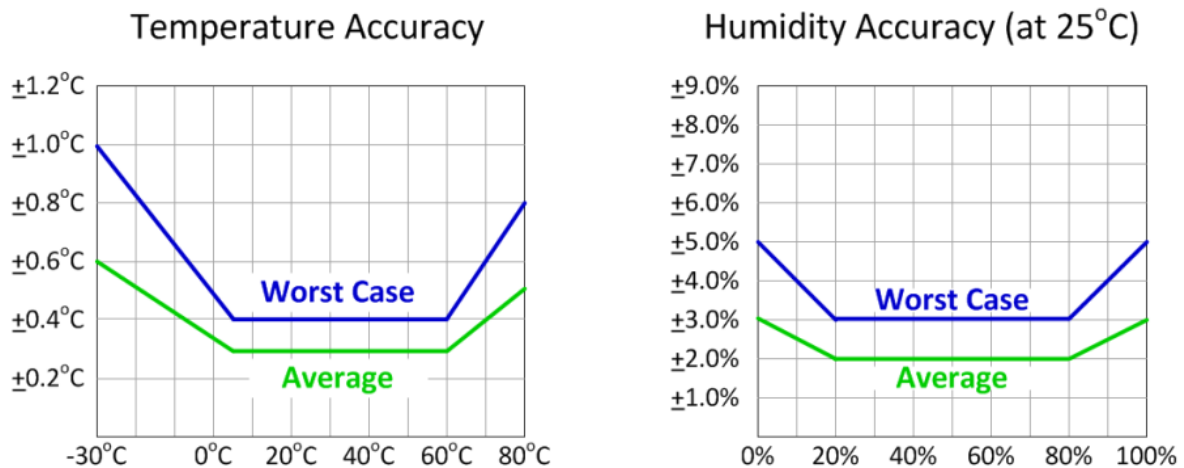
Figure 2: Minnow Alarm Indicators

The Minnow offers accurate and repeatable logging for temperature and relative humidity. Temperature is measured to an accuracy of $\pm$0.3^{o}C over the range +5°C to +60°C. Over the full range -30°C to +80°C the accuracy is $\pm$2.0^{o}C. Relative humidity is measured to an accuracy of $\pm$2.0% over 20% to 80% humidity range and $\pm$3.0% over 0% to 100%. Both temperature and relative humidity are logged at a user configurable logging rate which can be set in a PC application program.

The Minnow logger is equipped with the largest logging memory when compared with comparable portable logging devices currently available. Minnow has provision for an impressive 65520 records, each of which is a time-stamped recording of temperature and humidity.

Senonics logger products are of high quality having been developed by world class engineering teams situated in the United States and Denmark. Our engineers are very proud of the Senonics logger range which is marked by their special design philosophy of ensuring both a feature rich product but simple for the end user. Our designers have a well-deserved reputation for high quality product design ensuring that your logging device will both last for years and exceed your logging requirements!

3. Technical Specifications

- Temperature range — -30ºC to +80ºC (-22º F to 176º F)
- Temperature accuracy (limited range) — $\pm$0.3ºC (+5ºC to +60ºC)
  $\pm$0.5º F (41ºF to 140ºF)
- Temperature accuracy (-30ºC to +80ºC) — see accuracy curve in figure 3
- Temperature resolution — 0.01ºC (0.2º F)

- Humidity range **(only on Minnow 1.0TH)** — 0% to 100%
- Relative humidity accuracy (limited range) — $\pm$2.0% (20% to 80%)
- Relative humidity accuracy (0% to 100%) — see accuracy curve in figure 3
- Relative humidity resolution — 0.01%

- Temperature alarms (minimum & maximum)
- Relative humidity alarms (minimum & maximum)

- Battery — CR2540 coin cell
- Battery life — up to 4 years while logging

- Physical size — 35mm x 60mm x 15mm

- PC application available on Windows XP, Vista, Windows 7, Windows 8 and Mac

- Logger identifier — 16 characters

- Logging space (includes time plus temperature & humidity) — 65520 points

Figure 3: Temperature and Humidity Accuracy

4. Buttons and LED Indicators

The Minnow logger includes one button located on the side of the logger. It is possible by configuration in the PC application to use this button as a way to start and stop logging. See section 7.9 Configuration of a Minnow Logger (Start using Button Press)

Start/Stop Button

Figure 4: Minnow Logger Start/Stop Button

The logger contains two LED indicators - LED left and LED right with the following functionality:

Status LED

- When the logger starts logging then this LED pulses **green** once for 1 second.
- When logging this LED pulses **green** for 7 milliseconds and off for 6 seconds.
- When the logger stops then this LED pulses **red** for 1 second then off forever.

Alarm LED

- When a temperature or humidity alarm is triggered this LED pulses **red** for 7 milliseconds and off for 6 seconds.

Status LED   **Alarm LED**

Figure 5: Minnow LED indicators

5.   Packaging List

Your Senonics Minnow logger comes standard with the following items.

- One Minnow Logger unit (either Minnow 1.0T or Minnow 1.0TH)

Figure 6: Minnow Logger Unit

- One CR2450 coin cell battery

Figure 7: CR2450 Coin Cell Battery

- One USB cable – type A to micro-USB type B

Figure 8: USB Cable

6. Installation of the PC Application

6.1. Windows

Installation of the Senonics Minnow PC application is very simple. The Minnow needs no special drivers since it is a USB HID device and such devices can make use of the standard drivers that come with Windows. Simply download and run the application from the following link:

http://senonics.com/bin/SenonicsPCApplication_Installer.zip

6.2. Mac

To install the Senonics Mac Application simply follow the instructions in the following link:

http://senonics.com/mac-installer.html

The PC application is a single application that can support all Senonics loggers including Minnow1.0T, Minnow 1.0TH and even the wireless version Bluefin 1.0TH.

In order to use this application consult the next section – Section 7 "Using the PC Application".

7. Using the PC Application

7.1. Front Page

When the Senonics PC application is started the welcome screen appears and gives a brief introduction to the Senonics loggers and what they can be used for.

- Click on the Configuration Wizard Button to start configuration of the logger.
- Click on the Graph Button if you want to view data graphically.
- Click on the Raw Data Button if you want to view logger data as a table.

Figure 9: Senonics PC Application

7.2. Main Page

The main page of the application GUI consists of a configuration pane, a graphical pane and a spreadsheet pane. It is possible to have any of these enabled or disabled by the buttons located top left in the window. The panes will automatically start in an enabled or disabled view depending on the viewing mode select from the front page.
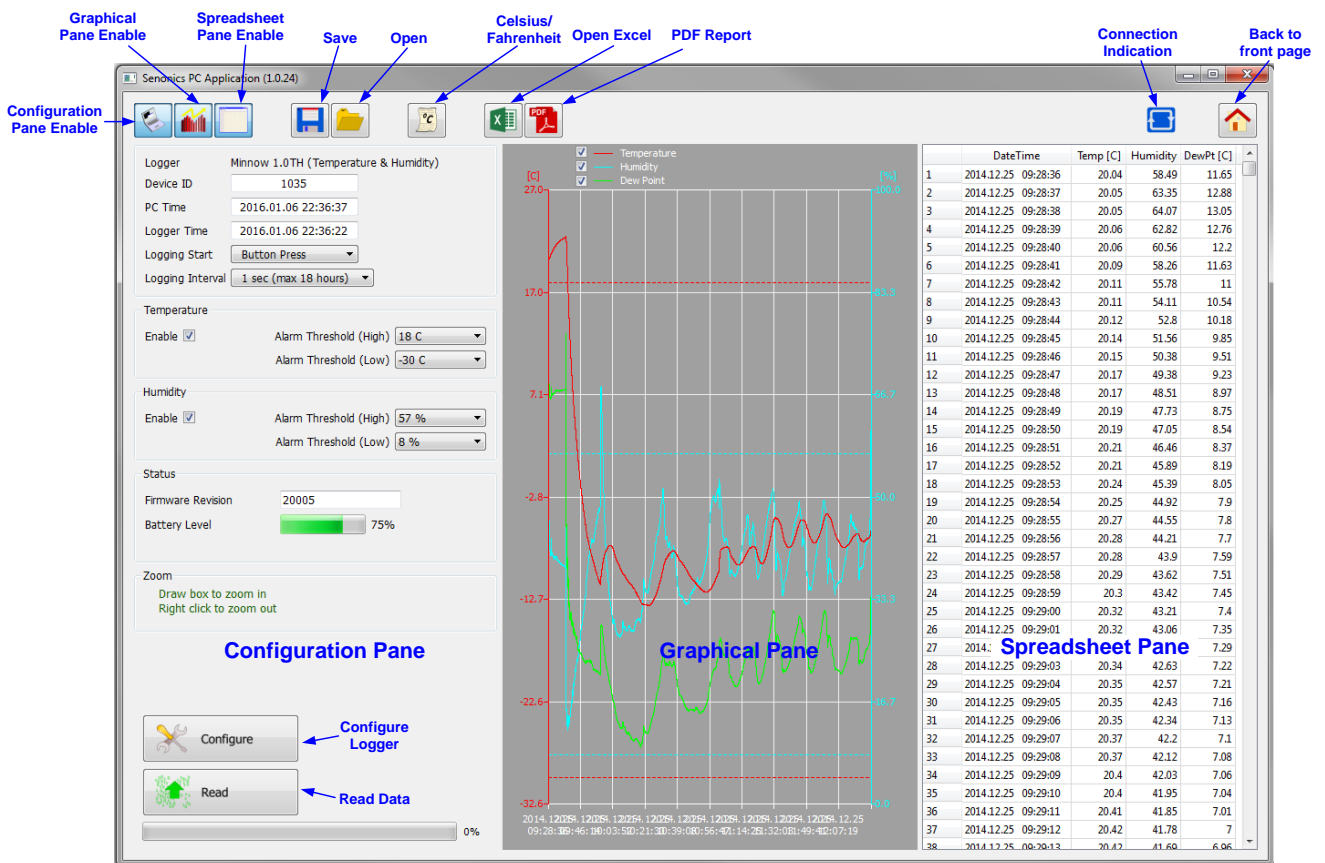

Figure 10: PC Application Main Page

Buttons are also included for saving/loading configuration and logged data to and from file.

There is also a button for selection between Celsius or Fahrenheit temperature scales.

A connection indication on the right hand side becomes blue when your application is connected to a Minnow logger and is greyed-out otherwise.

A home icon provides a link back to the front page.

The graphical pane shows temperature, humidity and dew point. Each of these can be enabled or disabled using check boxes located above the graph.

Icons are provided for opening in Excel and for generating PDF reports.

7.3. Configuration of a Minnow Logger (Start on Disconnection)

Configuration of the Minnow logger starts by specifying the device name. Up to 16 characters is allowed in the name.
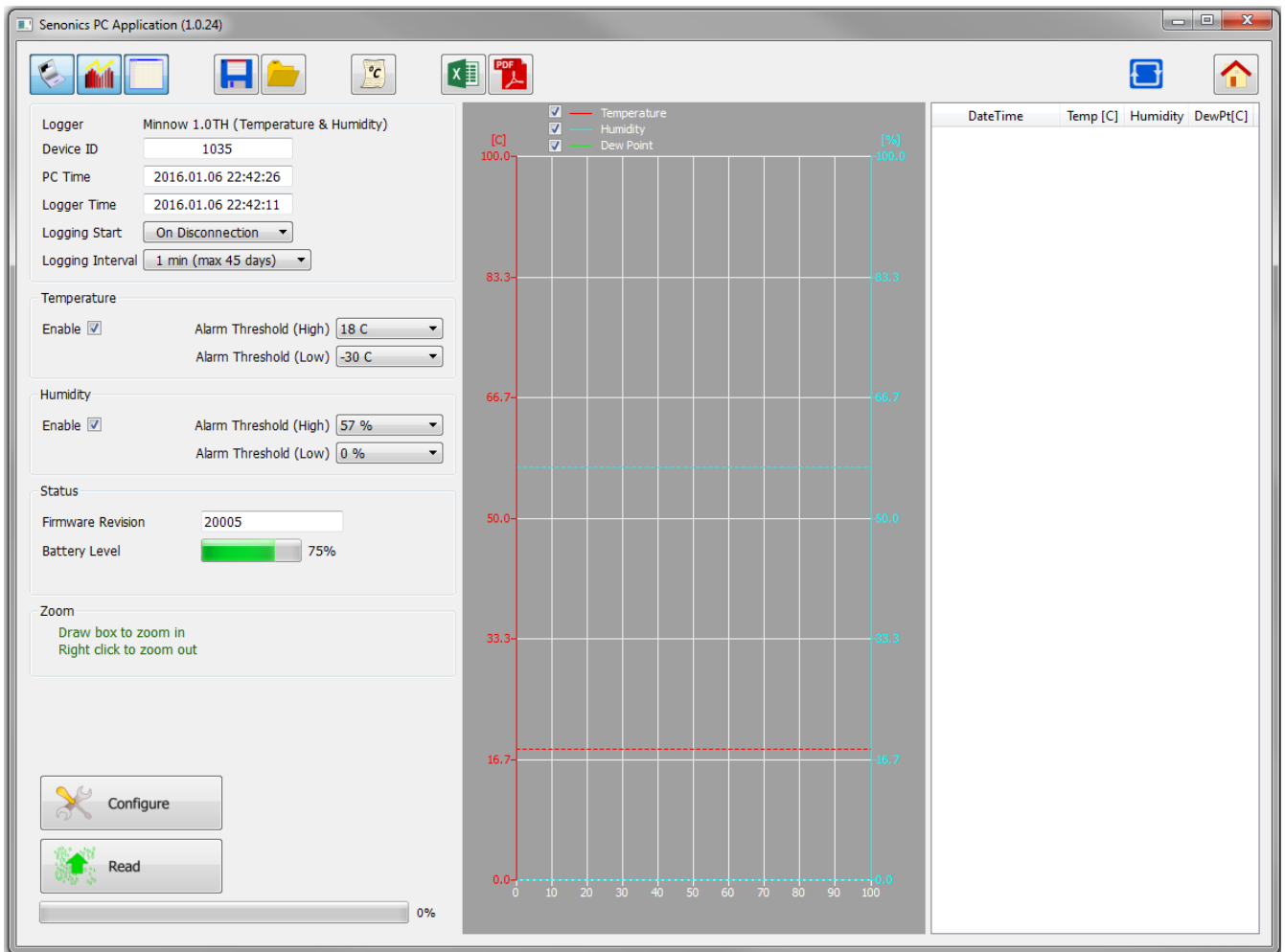
*Figure 11: Configuration Step (Start on Disconnection)*

Next select the logger start to On Disconnection. There are other options (At Specified Time, Button Press and Real Time Logging) which will be discussed in later sections of this manual.

Select the logging interval (this is the time between samples).

For temperature logging then one needs to enable or disable the logging. In the case the temperature logging is enabled then one can also set alarm thresholds for which the alarm indication will signify that temperature limits have been exceeded.

Similarly for humidity one needs to enable or disable the logging and configure the alarm limits.

Finally to save the configuration setup to the Minnow logger, press the Configure Button.
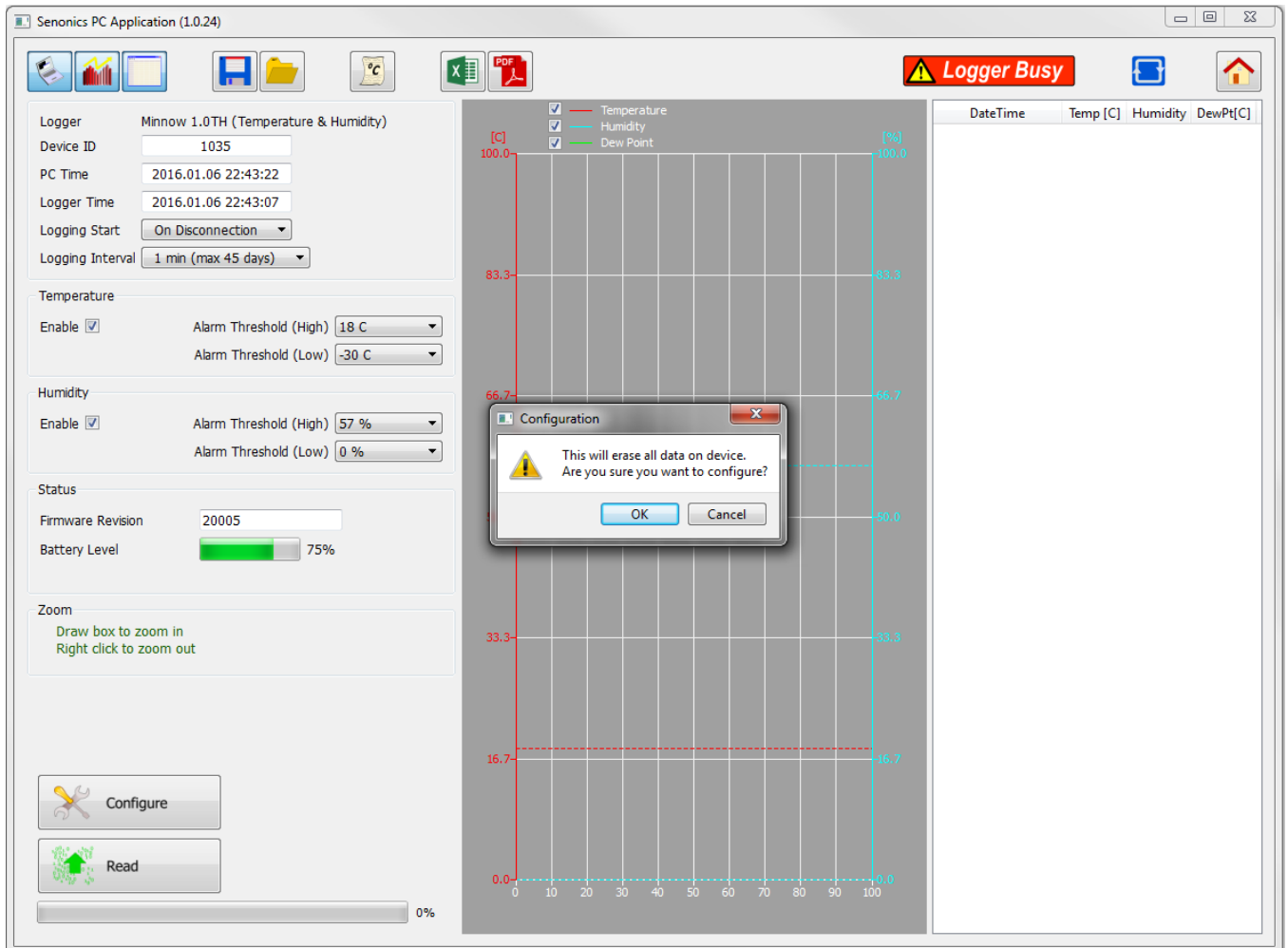
Figure 12: Write Configuration to the Logger

Once configured the PC application will show the logger time will be synchronized to the PC time. The logger firmware revision will also appear in the application.

Once you disconnect the logger from the PC, logging will start automatically and at the configured logging interval. A green light will flash every 6 seconds to indicate that the unit is logging. The red light will flash also in the case that the temperature or humidity goes outside of the allowed limits and triggers the alarms.

If the logger becomes full then all lights will stop flashing.

7.4. Saving a Configuration File

Configurations can be saved to file so that you can use the configuration next time or if you have multiple devices with the same configuration.

Saving a configuration file is just a matter of selecting the save icon and filling out the file name. If the logger contains no logged data then it will only save the configuration settings. Configuration and logged data is stored in Comma Separated Value (CSV) format.
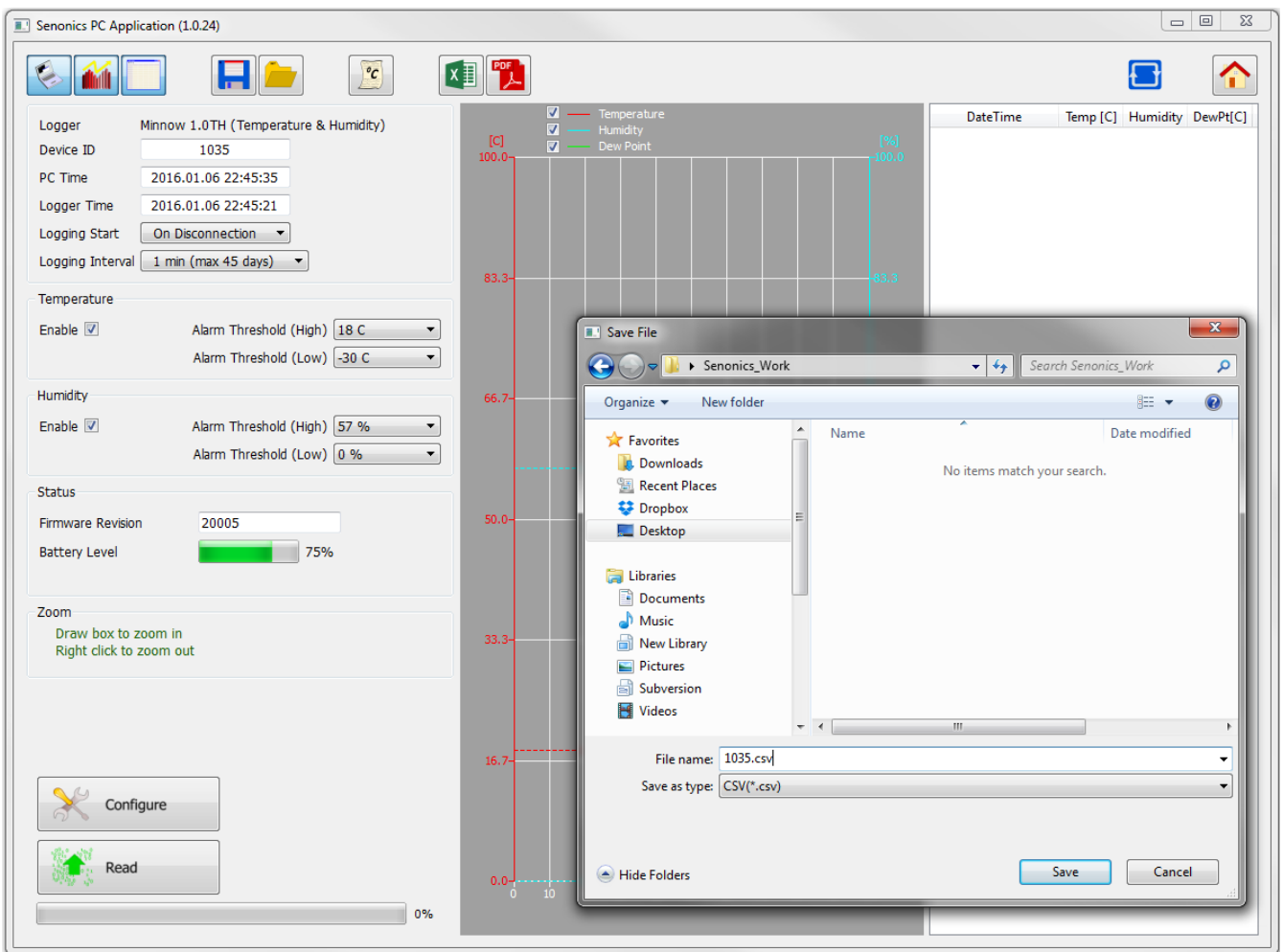
Figure 13: Saving a Configuration to File

7.5. Loading a Configuration from File

Loading a configuration file from disk is just a matter of selecting the open icon and selecting the configuration file name. This upload presents a simple way to configure multiple loggers with the same configuration. This ensures a common configuration and saves time/effort when configuring multiple devices.
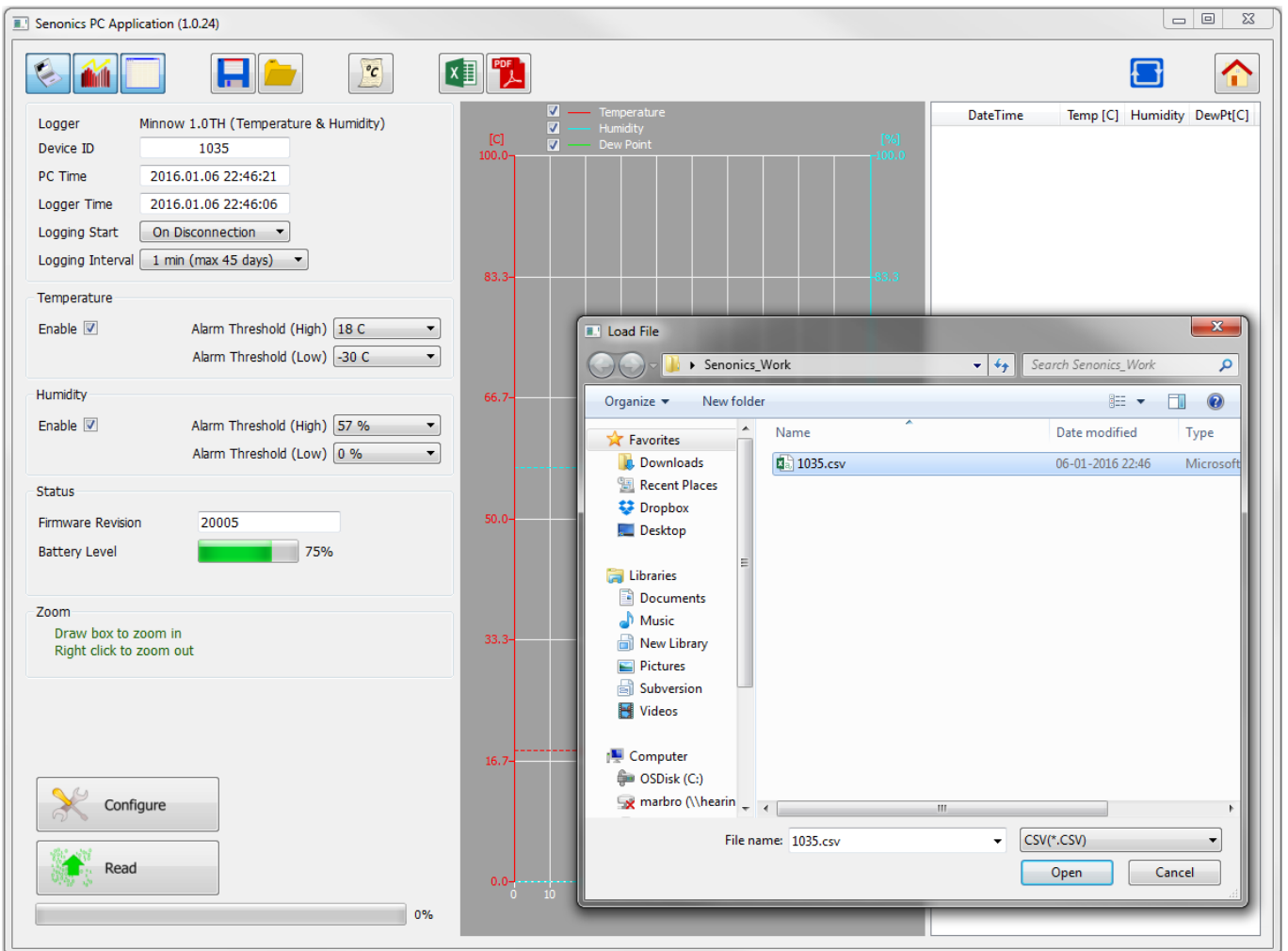
Figure 14: Loading a Configuration from File

Remember to press the configuration button if you want the configuration data held in the GUI to be written to your Minnow logger.

7.6. Retrieving Logged Data

Data can be retrieved from the logger by connecting to the logger and then pressing the read button at the bottom left of the GUI.

Both the device configuration and logged data will immediately become uploaded and viewable in the configuration, graphical and spreadsheet views.

Zooming in and out of the graphs can be achieved by the following controls:
- To Zoom In - Drag the left mouse button
- To Zoom Out - Click the right mouse button
- When zoomed in you can move around using the key-board arrows or the mouse scroll wheel

To write data and configuration to file, press the save icon. Data and configuration is then stored in Comma Separated Value (CSV) format which can be edited by third party software such as Microsoft Excel or read back into the Minnow Logger PC application at a later point.
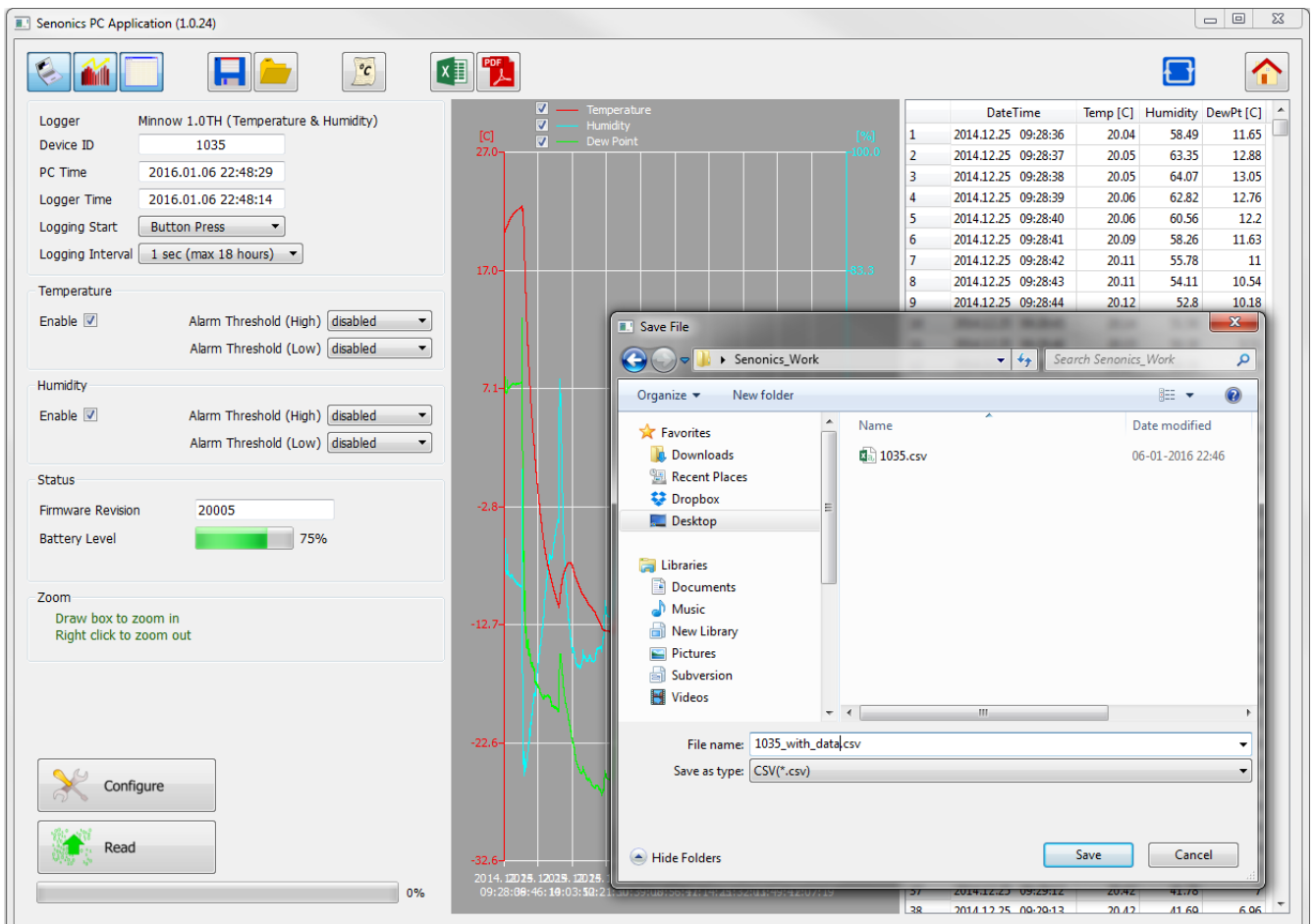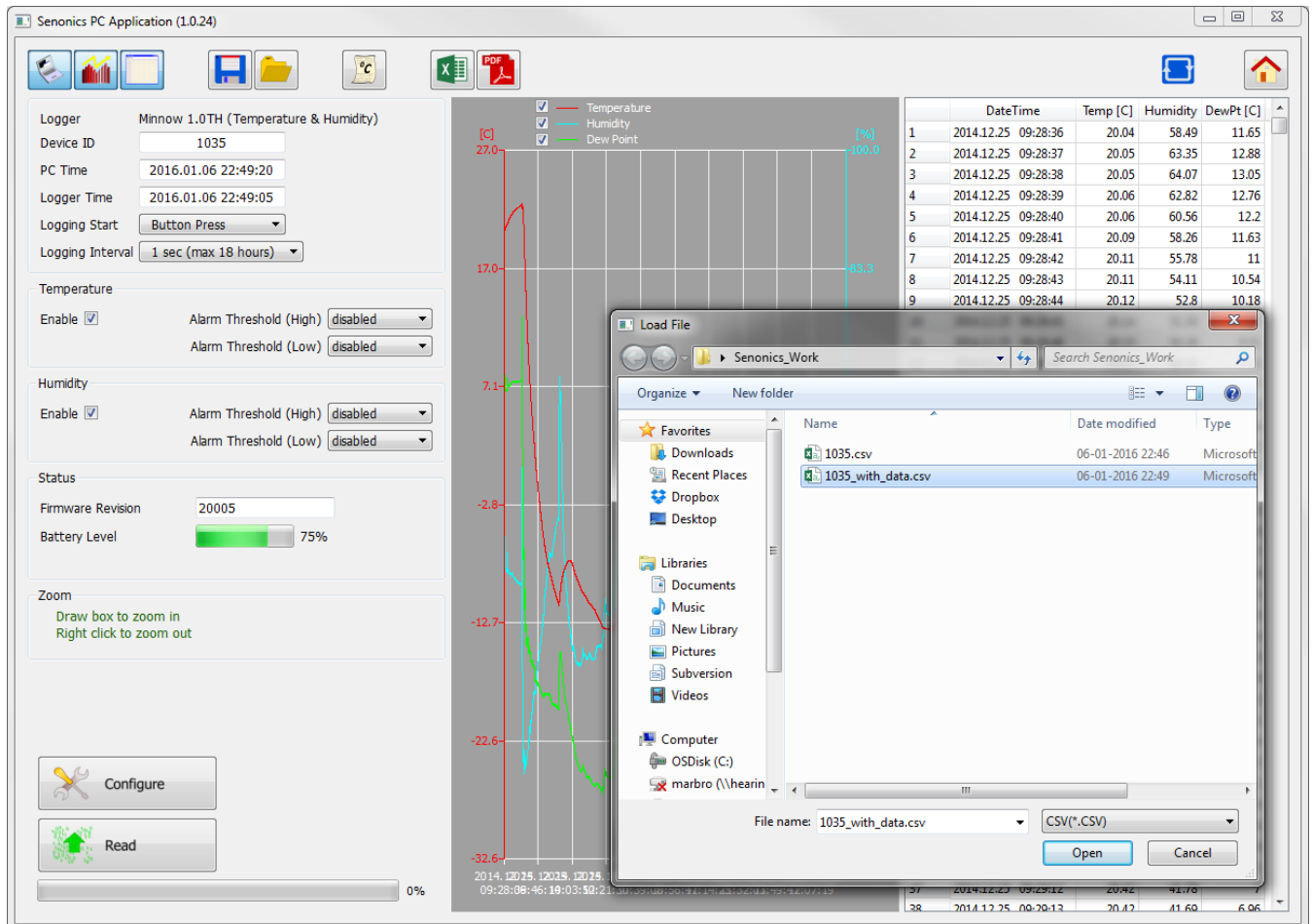

Figure 15: Saving Logged Data to File

7.7.   Viewing Logged Data from File

It is a simple matter to read back data from file (CSV format) into the GUI and view previous logs graphically or using the spreadsheet views. Simply press the open icon and then select the file which you would like to view.
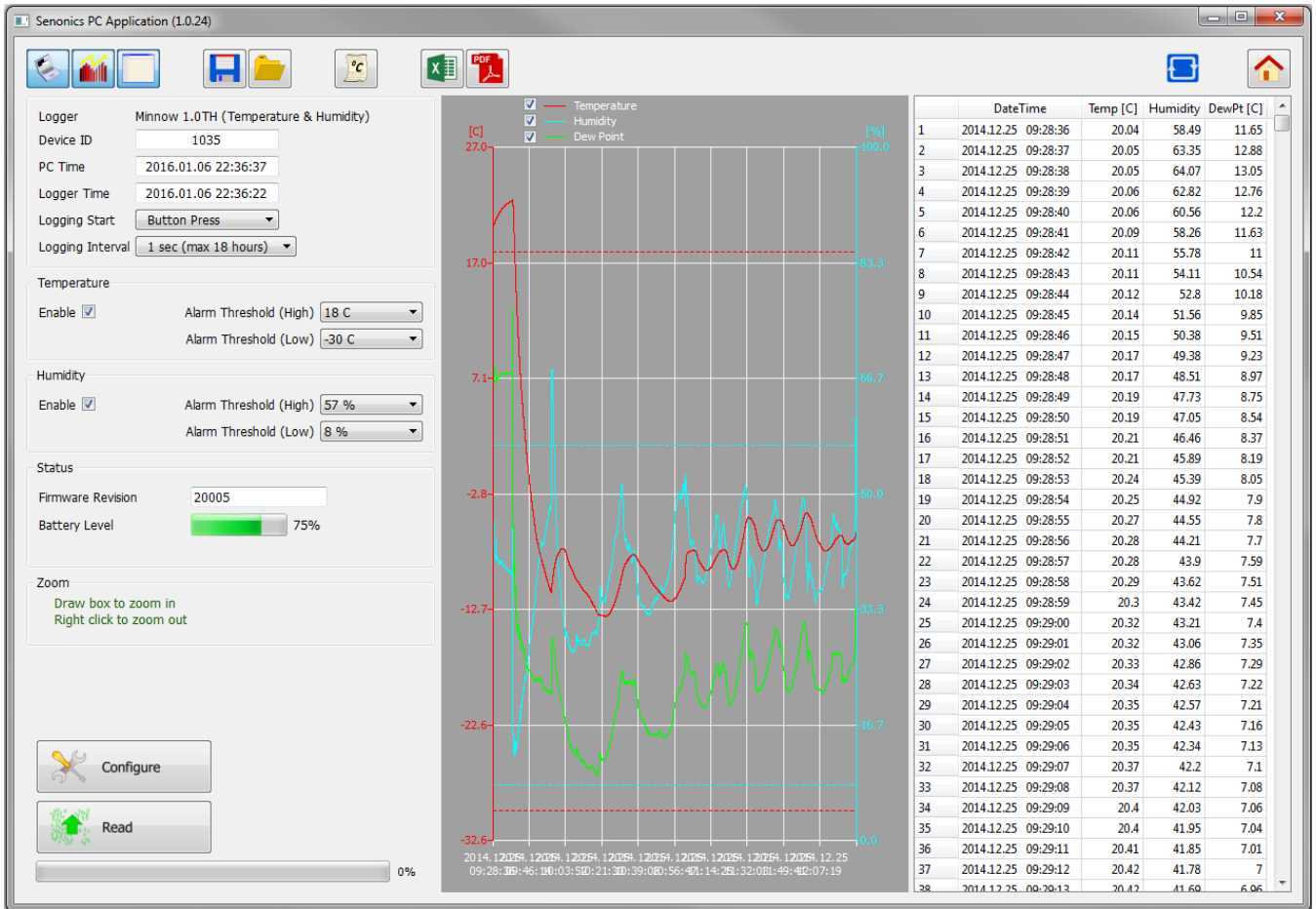

Figure 16: Retrieving Logged Data from File

Figure 17: Retrieving Logged Data from File (complete)

7.8. Configuration of a Minnow Logger (Start at Specified Time)

You can configure a device so that it starts at a specific time. Configure as per section 7.3 but select At Specified Time. Fill in the exact month, day, hour, minute and seconds when you want the logging to start.

Remember to write the setup to the logger by pressing the Configure Button.

When you have disconnected the logger and the time reaches the desired start time for the logging then the logger will begin to log. This is a perfect way to have multiple loggers start logging at exactly the same time.
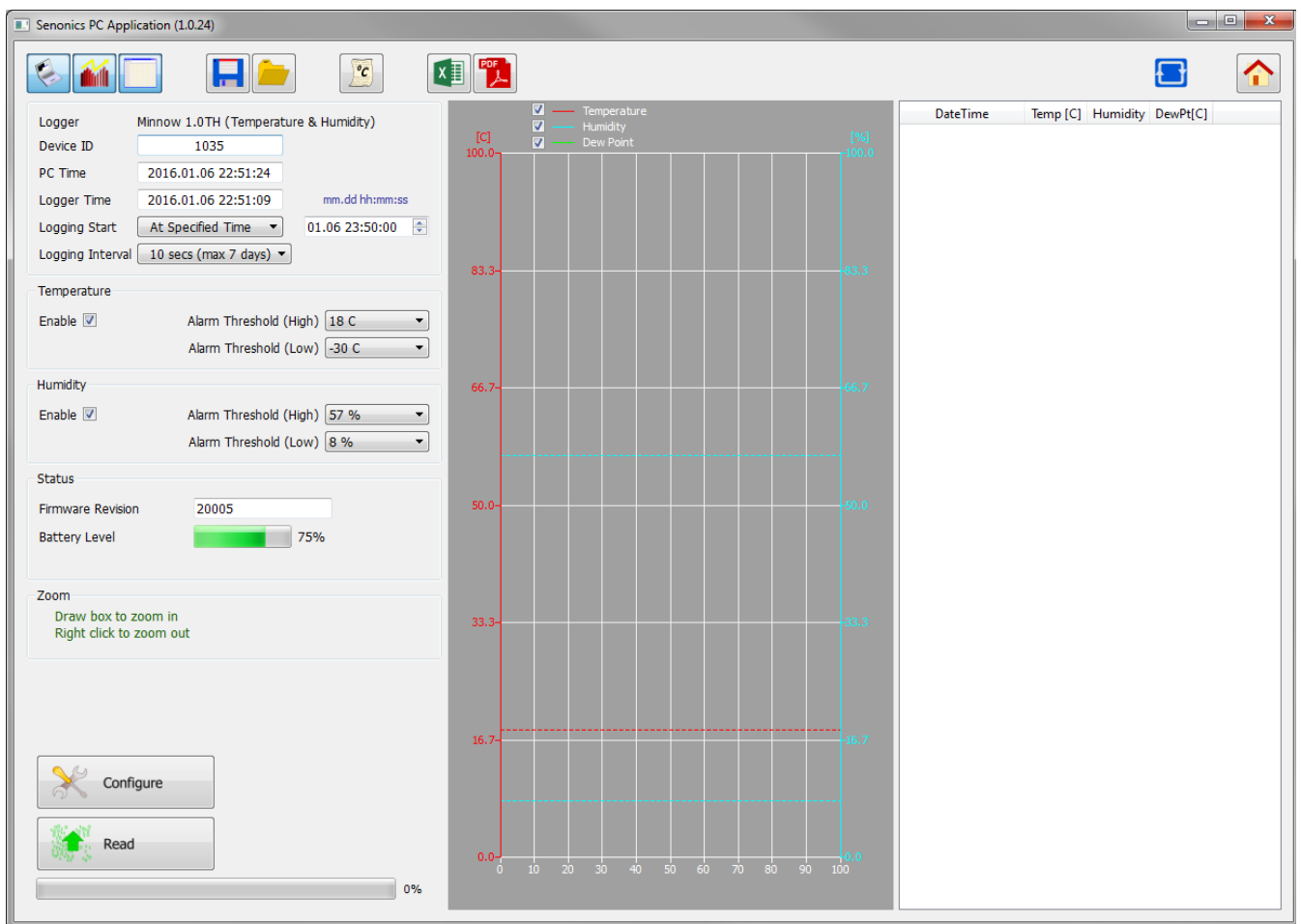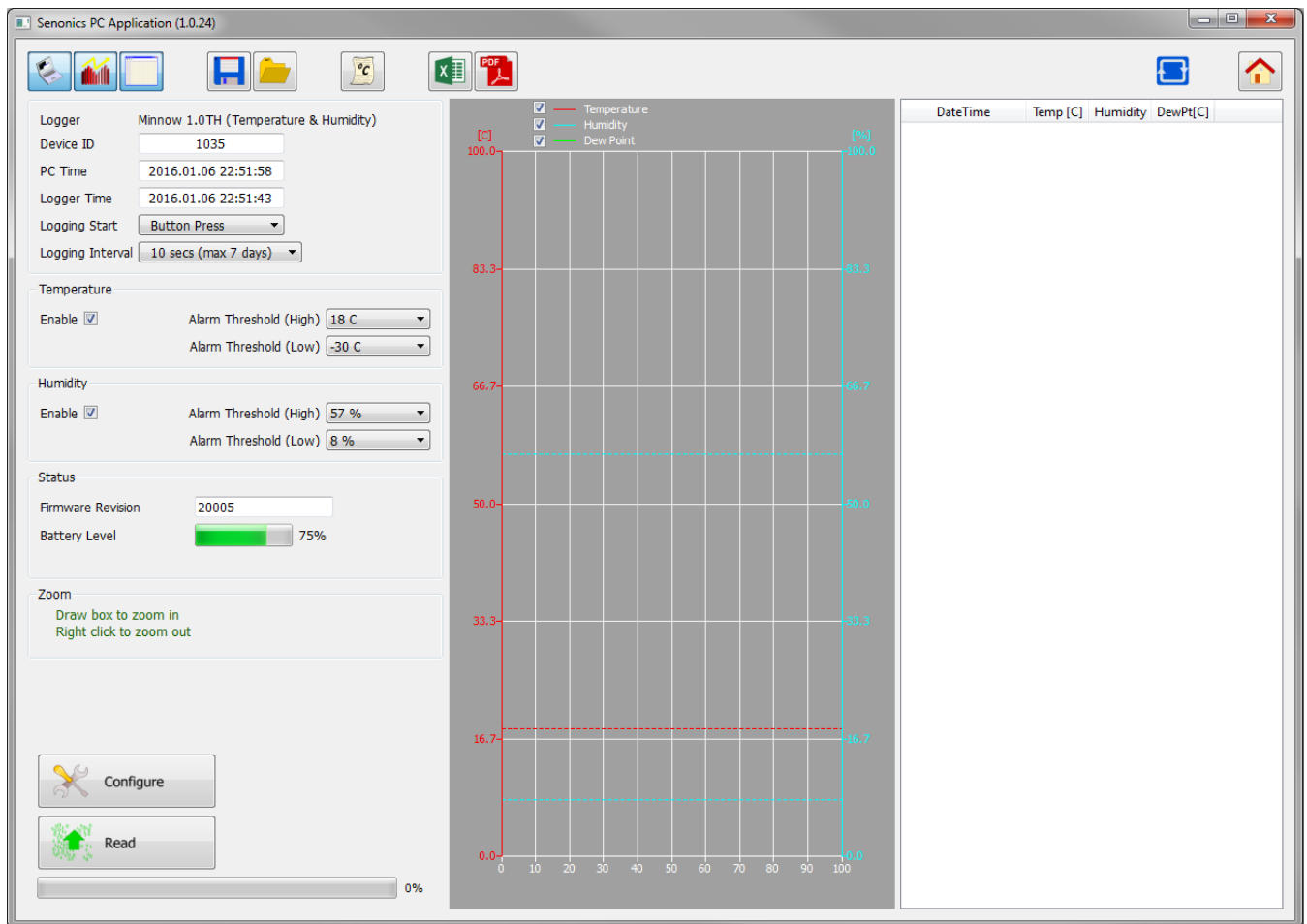

Figure 18: Configuration Step (Start at Specified Time)

7.9. Configuration of a Minnow Logger (Start using Button Press)

You can also configure the device so that it starts logging on a button press. Configure as per section 7.3 but select Button Press.

Remember to write the setup to the logger by pressing the Configure Button.

When you have disconnected the logger you can start logging by a simple button press. You will then see it is logging because the green light starts flashing every 6 seconds. You can also stop it using a button press – and all lights will stop flashing.


Figure 19: Configuration Step (Start using Button Press)

7.10. Configuration of a Minnow Logger (Real Time Logging)

You may also use your Minnow Logger in Real Time Logging mode. Select the start logging to Real Time Logging with the appropriate logging interval. Next press start. You will then see the PC application take samples from the logger directly and display them on the table and graphs. This is a way to monitor temperature and humidity conditions directly from your PC instead of using the remote logging.

In real time logging mode the last sample of temperature, humidity and dew point is displayed on the top banner.
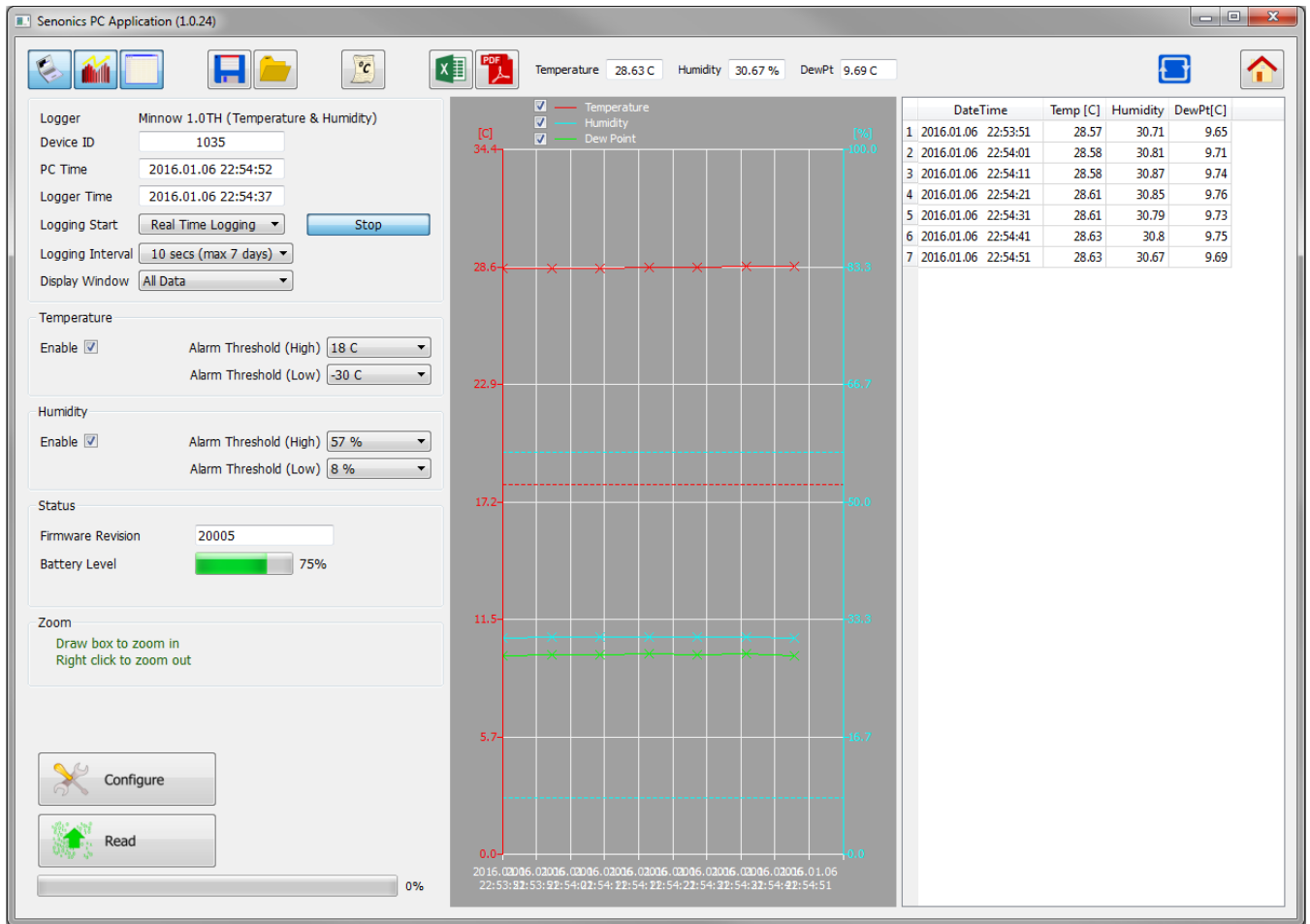

Figure 20: Configuration Step (Real Time Logging)

7.11. Opening Excel

When the Senonics GUI has data, it is possible to press the Excel button to show the data in Microsoft Excel. During this process the user needs to select if your version of Excel is expecting and "." or "," to represent the number decimal point.

This capability assumes that Microsoft excel is installed on your PC. If not, then the option will not work. This option is not available on the Mac version of the GUI.
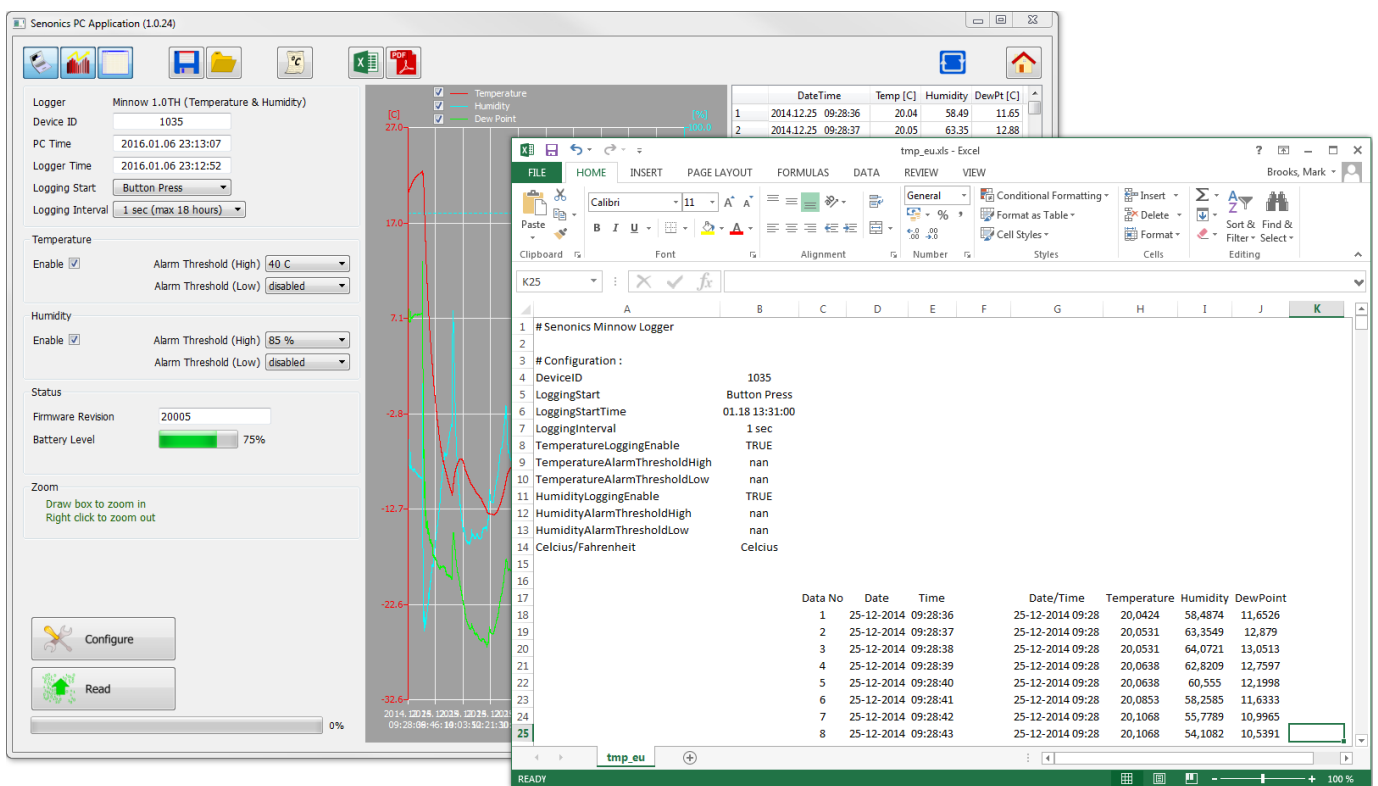
Figure 21: Opening Excel from the Senonics GUI

7.12. Writing PDF reports

When the Senonics GUI has data, a simple one-page PDF report can be written to summarize the data in the logger by way of statistics and as a graph. The PDF can be written either in US Letter page size of A4 page size. The user can enter one's own notes at the footer of the PDF. PDFs are written to file and can be opened by any standard PDF reader.
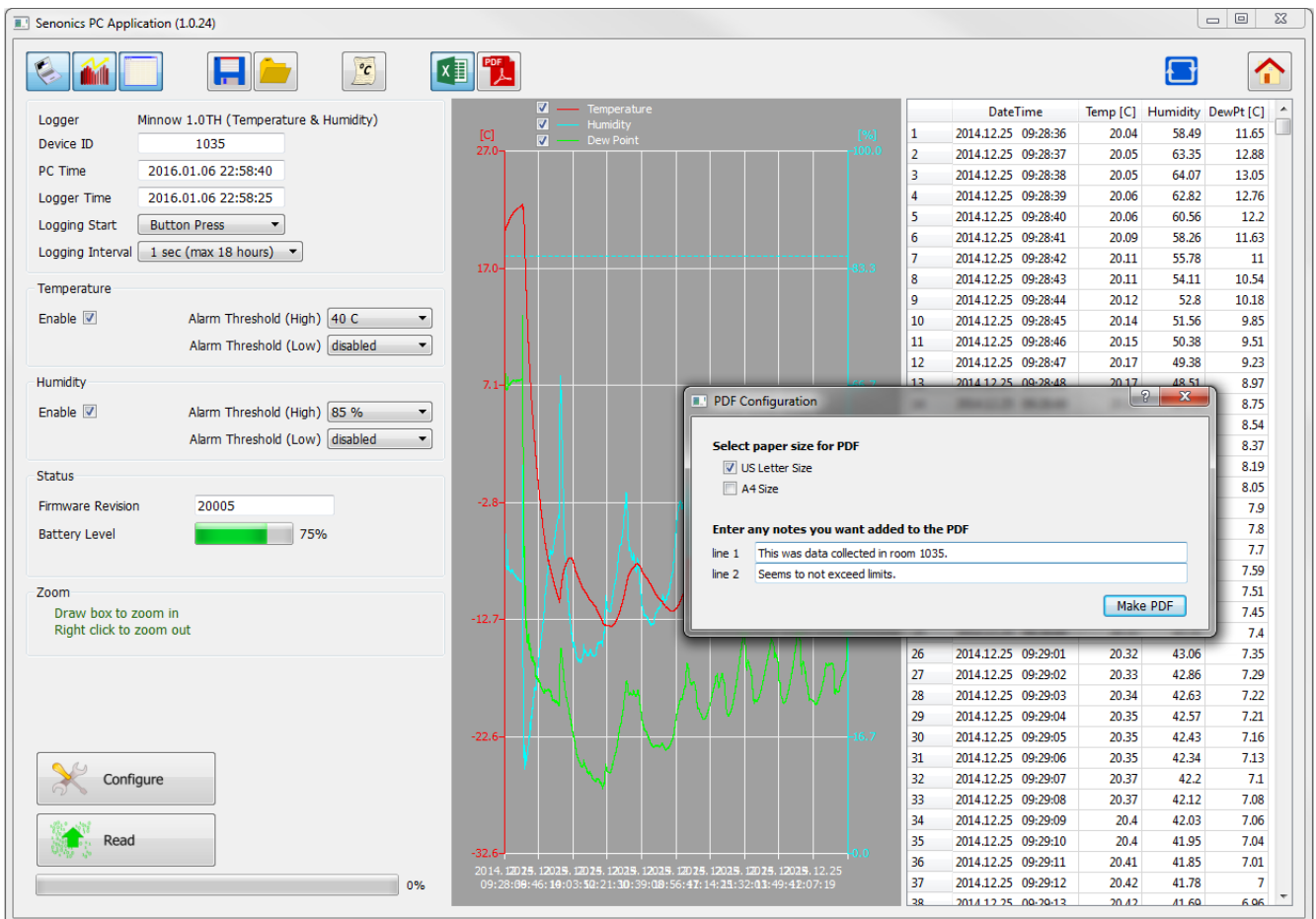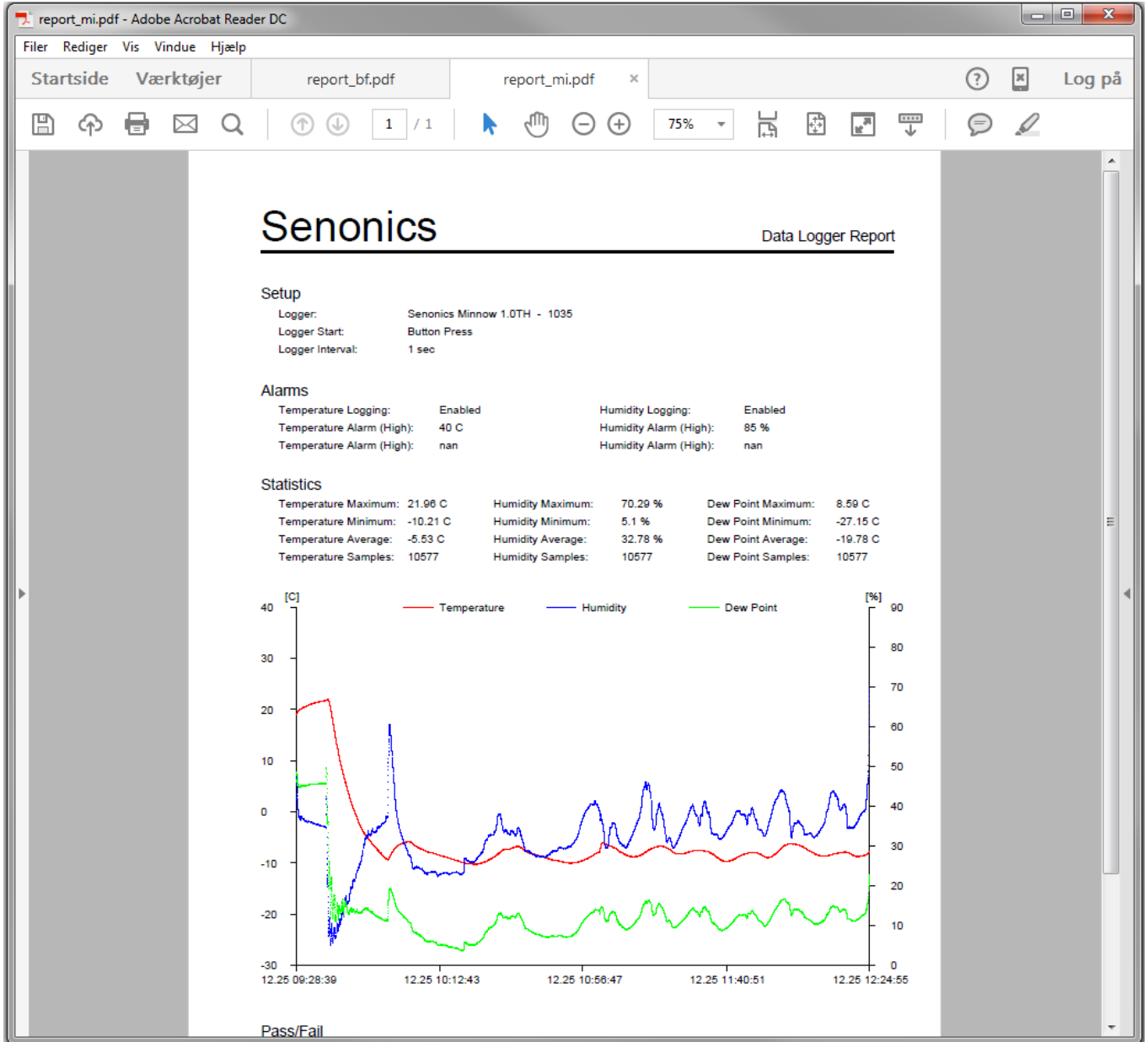

Figure 22: Writing a PDF report from the Senonics GUI

Figure 23: A typical Senonics PDF report

8.   Mounting Guidelines

There is no particular limitation with regard to transporting your Senonics Minnow logger. The logger may be fastened to a transportation container or loosely packed.

It is recommended however to keep some air space around the ventilation slots on the logger or else the logger may take longer to track humidity and temperature changes.

9.   Battery Replacement

Your Senonics Minnow logger uses a CR2450 3V Lithium-Ion battery.

In order to replace the battery:
- First un-mount the logger.
- Next the cover needs to unscrewed and removed.
- The old battery should then be removed and a new battery inserted. **Please try not to touch any exposed electronics in the process.**
- Finally attach the cover again with screws.