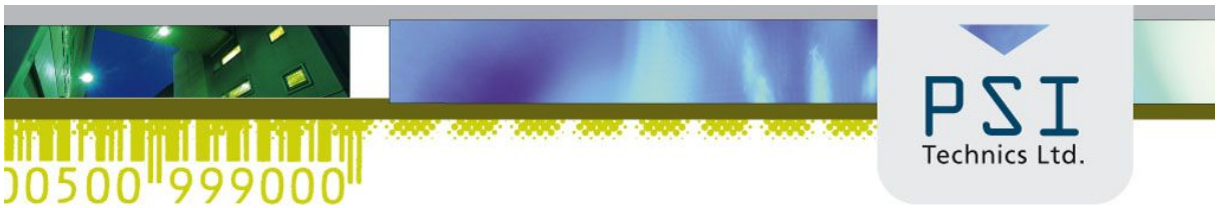


PSITRACK Software

User Guide

Authors:	PSI Technics
Version:	1.10.05.03
Status:	Final
Date:	July 8, 2011

PSI Technics Ltd.
Company Headquarter Germany
Rudolf-Diesel-Str. 21a
D-56220 Urmitz, Germany

Tel +49 (0) 2630 91590-0
Fax +49 (0) 2630 91590-99

support@psi-technics.com
http://www.psi-technics.com/E

Changes and Revisons

Table 1: Changes and Revisons

Version	Date	Author	Changes	Revision
0.1	June 01, 2007	M. Niecknig	Draft	M. Niecknig
0.1	July 23, 2007	M. Niecknig	Quality Control	M. Niecknig
1.0	July 24, 2007	M. Niecknig	Final	M. Niecknig
1.1	July 06, 2011	B. Zimmermann	Changes	M. Niecknig

Preface

Thank you for purchasing a PSI Data Logger and the PSITRACK software. Our data loggers are specifically designed for recording temperatures in industrial installations and facilities as well as in logistics. In addition to providing temperature data collection, the PTHL 23 data logger also records relative humidity. Data loggers are used in areas that are subject to extreme temperatures, from -40°C to +125°C (-40°F to 275°F). Extreme temperature ranges frequently cause components and sensors to malfunction or fail. Laser distance meters, for example, automatically shut down at excessive temperatures to prevent damage to laser diodes. Our products are the perfect choice for users who need to record temperatures and/or relative humidity at components in industrial plants or facilities. Due to their extremely small size (17.35 mm/0.68 inches in diameter), PSI data loggers are ideal for collecting data in locations that do not lend themselves to the use of larger devices. PSI data loggers are completely self-sufficient, which makes them perfect for long-term analyses and autonomous measurements. In addition, the PSITRACK software enables you to create thermal diagrams of your facilities. Thermal imaging helps to identify areas where unprotected sensors can be safely installed as well as areas in which sensors may need thermal protection. Our products, however, are not limited to industrial facilities - they can also be used in logistics, for example. When transporting perishable goods it is important to know if the cooling or refrigeration cycles were interrupted. Keeping track of these cycles used to be cumbersome and time-consuming. Data loggers from PSI Technics greatly improve and facilitate the monitoring process for perishable goods. During transport, our data loggers continuously measure the temperature inside the transport compartment. The data can be analyzed at the destination location using the PSITRACK software, which lets you know for certain, whether your goods were properly refrigerated during transit. These applications not only require powerful hardware, but also intelligent software. The included PSITRACK software enables you to quickly and easily configure a data logger to your individual requirements.

This manual provides an overview of the technical specifications of our PSI data loggers as well as step by step instructions for using our PSITRACK software. It also contains tips for hardware and software troubleshooting. Our service team will help you with any questions you may have and provides professional support.

As part of our service portfolio, we also offer detailed data analysis reports that help you evaluate temperature and humidity data in your facilities.

Table of Contents

1 Introduction

In many industries, immense requirements are placed on modern temperature and humidity recording software packages. These requirements go well beyond simple calculations, saving data or opening files. Users would like to receive optimum support for their applications, and our software was developed with this goal in mind.

Individual support does not require expensive hardware. The PSITRACK software has moderate system requirements and runs on Windows XP or Windows 2000. The intuitive menu navigation makes the software easy to understand and use. Recording start times can be configured manually and the software automatically records the required data for defined periods of time. Alarm logs protect machines from excessive heat and help eliminate undue expenses. Alarm logs help you to analyze periods during which machines or facilities are subject to excessive temperatures or excessive humidity. You can also configure custom profiles for a wide range of tasks as well as individual recording rates and recording start times, so you can be sure your data loggers always collect the data you need. Recorded temperatures can either be displayed in Fahrenheit or Celsius. User-friendly histograms and recording diagrams aid in data analysis.

Apart from the features mentioned above, the software includes common features for saving, loading and exporting data.

2 Data Loggers

2.1 Applications

Typical applications for PSI data loggers and the PSITRACK software include areas where temperatures regularly exceed 50°C (122°F). In such areas, extreme temperatures frequently cause components or sensors to malfunction or fail. Laser distance meters, for example, automatically shut down at excessive temperatures to prevent damage to laser diodes. Most plant operators, however, are not aware of the temperatures that may exist in certain parts of their facilities and, consequently, may not understand the cause of sensor failures that are installed in those areas. PSI data loggers provide an easy and effective way of conducting independent, precise and long-term temperature analyses.

All PSI data loggers are completely self-sufficient, which means that each analysis is performed independently. Based on the analysis, the PSITRACK software can create a thermal image of your facilities to help identify areas in which unprotected sensors can be installed as well as areas where sensors may require thermal protection.

2.2 Compliance with Industrial Standards

Component	Standard	Description
PTL 21G	IP56	Certified according to international standard IEC 60529
PTL 22L	IP56	Certified according to international standard IEC 60529
PTL 22T	IP56	Certified according to international standard IEC 60529
PTHL 23	IP56	Certified according to international standard IEC 60529

(*) The PTL 22E data logger is not yet certified for IP56 according to IEC 60529, but it is identical in construction to the PTL 22L and PTL 22T data loggers.

2.3 Data Loggers - Technical Specifications

PTL 21G - Technical Data

- Data logger type: Temperature data logger
- Temperature recording range: -40°C to +85°C (-40°F to 185°F)
- Resolution: 0.5°C (32.9°F)
- Precision: 1°C (32°F) from -30°C to +85°C (-22°F to 185°F)
- Memory: 2048 bytes
- Recording interval 1 minute up to 255 minutes
- 4 Kbit of writable memory

PTL 22 - Technical Data

- Data logger type: Temperature data logger
- Temperature recording range (PTL 22T): 0°C to +125°C (32°F to 275°F)
- Temperature recording range (PTL 22L): -40°C to +85°C (-40°F to 185°F)
- Temperature recording range (PTL 22E): +15°C to +140°C (59°F to 284°F)
- Relative humidity recording range: 0% to 100%
- Temperature resolution: 0.5°C (32.9°F) 8 bit, or 0.0625°C (32.9°F) 11 bit

- Precision: 0.5°C (32.9°F) from -10°C to +65°C (14°F to 149°F)
- Memory: 8192 bytes
- Recording interval 5 seconds to 273 hours (Resolution: 1 second)
- 512 bytes of writable memory

PTHL 23 - Technical Data

- Data logger type: Temperature and humidity data logger
- Temperature recording range: -20°C to +85°C (-4°F to 185°F)
- Relative humidity recording range: 0% to 100%
- Temperature resolution: 0.5°C (32.9°F) 8 bit, or 0.0625°C (32.9°F) 11 bit
- Humidity resolution: 0.6% (8 bit) or 0.04% (12 bit)
- Precision: 0.5°C (32.9°F) from -10°C to +65°C (14°F to 149°F)
- Memory: 8192 bytes
- Recording interval 5 seconds to 273 hours (Resolution: 1 second)
- 512 bytes of writable memory

Additional Data Logger Features (All Models)

- Integrated real-time clock
- Automated recording
- Recording of histograms
- Configurable hysteresis alarm
- Memory holds up to 24 alarm logs
- 1-Wire®compatible
- Unique 64 bit serial number
- RoHS compliant

2.4 Data Logger Memory

Data loggers can register a variety of records, depending on the device configuration. The following table contains a list of the number of temperature and humidity records that can be saved for different configurations:

Data Logger and Recording Type	No. of Records
PTL 21G	2048
PTL 22/PTHL 23 - Either temperature or humidity, 8 bit	8192
PTL 22/PTHL 23 - Either temperature or humidity, 16 bit	4096
PTHL 23 - Temperature and humidity, 8 bit	4096
PTHL 23 - Temperature and humidity, 16 bit	2048
PTHL 23 - Temperature and humidity, different resolutions	2560

The number of measurement records saved in the data logger memory and the recording frequency can be used to determine the maximum recording time. Figure 1 below shows the recording time in relation to recording rates and resolutions for data logger models PTL 22 and PTHL 23.

2.5 Software System Requirements

Either Windows 2000 or Windows XP operating systems are required. Windows XP is recommended.

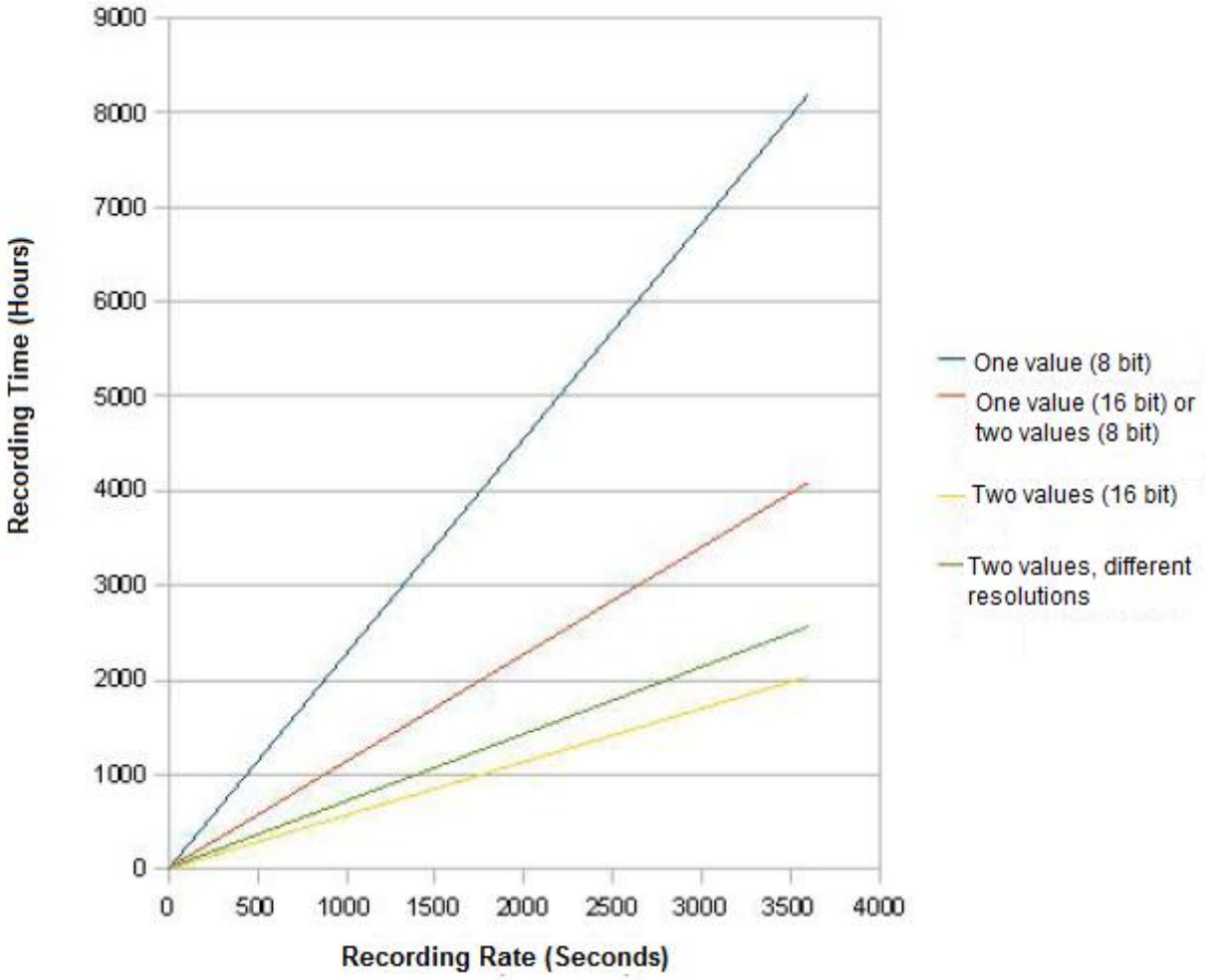


Figure 1: Available Recording Time

3 Installation

3.1 Installing the Hardware

Hardware installation consists of three easy steps:

1. Connect the data logger in Figure 2 to the included USB adapter shown in Figure 3.

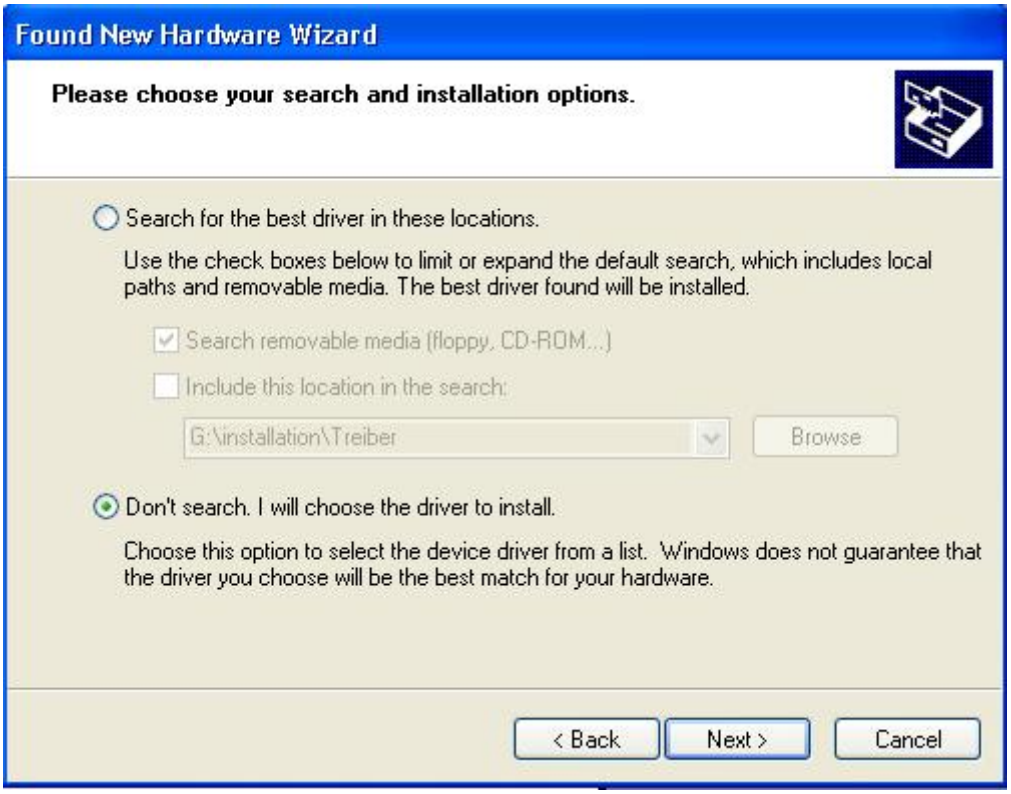
Figure 2: Data Logger

Figure 3: USB Adapter

2. Next, connect the USB adapter with the attached data logger to a USB port on your laptop or desktop computer.

3. Install the required hardware driver 'pusb90r.inf' from the included PSITRACK software CD.

Important: *You need to manually select the 'pusb90r.inf' driver. It is located in the 'Driver' (Treiber) folder on the PSITRACK software CD.*



4. After installing the driver, we recommend that you restart your computer to ensure that the hardware is correctly configured.

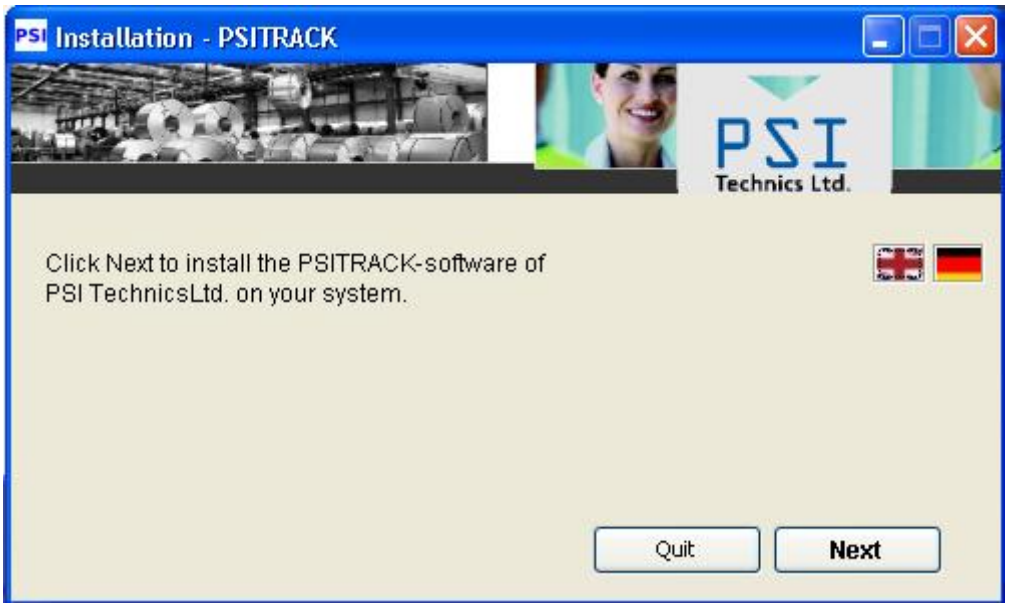
The data logger is now ready for use.

3.2 Installing the Software

You need administrator rights to install the PSITRACK software on your computer.

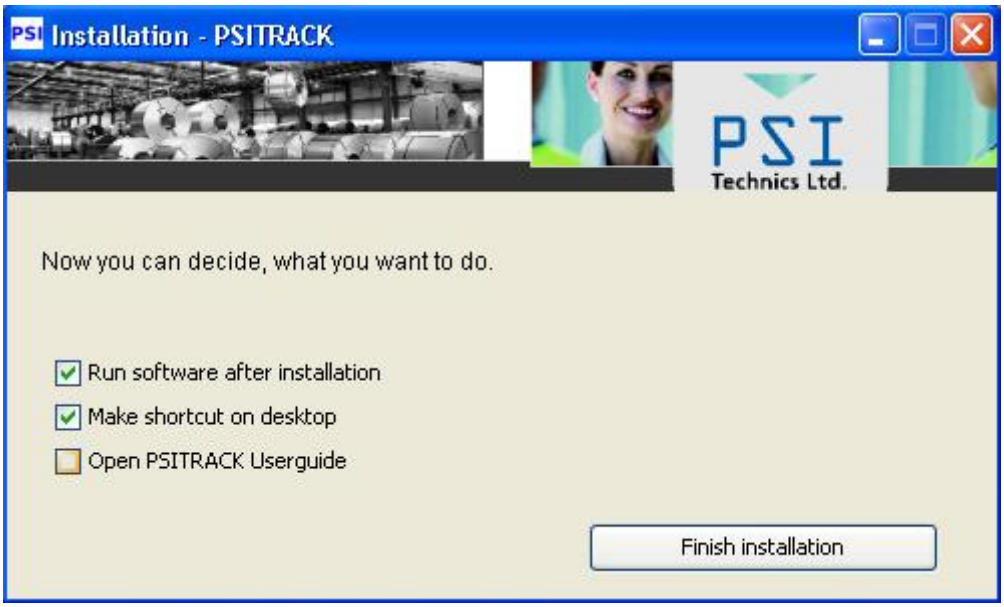
To install the software, insert the PSITRACK software CD in the CD or DVD drive of your computer. The install wizard starts and will guide you through the installation process. Software installation only takes three easy steps. The following graphics demonstrate the software installation process.

1. The PSITRACK installation screen appears. Click ‘Next’.



2. Select a software installation directory on your hard drive and click ‘Next’.

3. Next, click ‘Finish Installation’.



After the installation is complete, you can:

(a) Start the software.

(b) Create a desktop shortcut.

(c) View the PSITRACK User Guide.

4 Using the PSITRACK Software

4.1 Start-up Screen

The following screen appears, when you start the software:

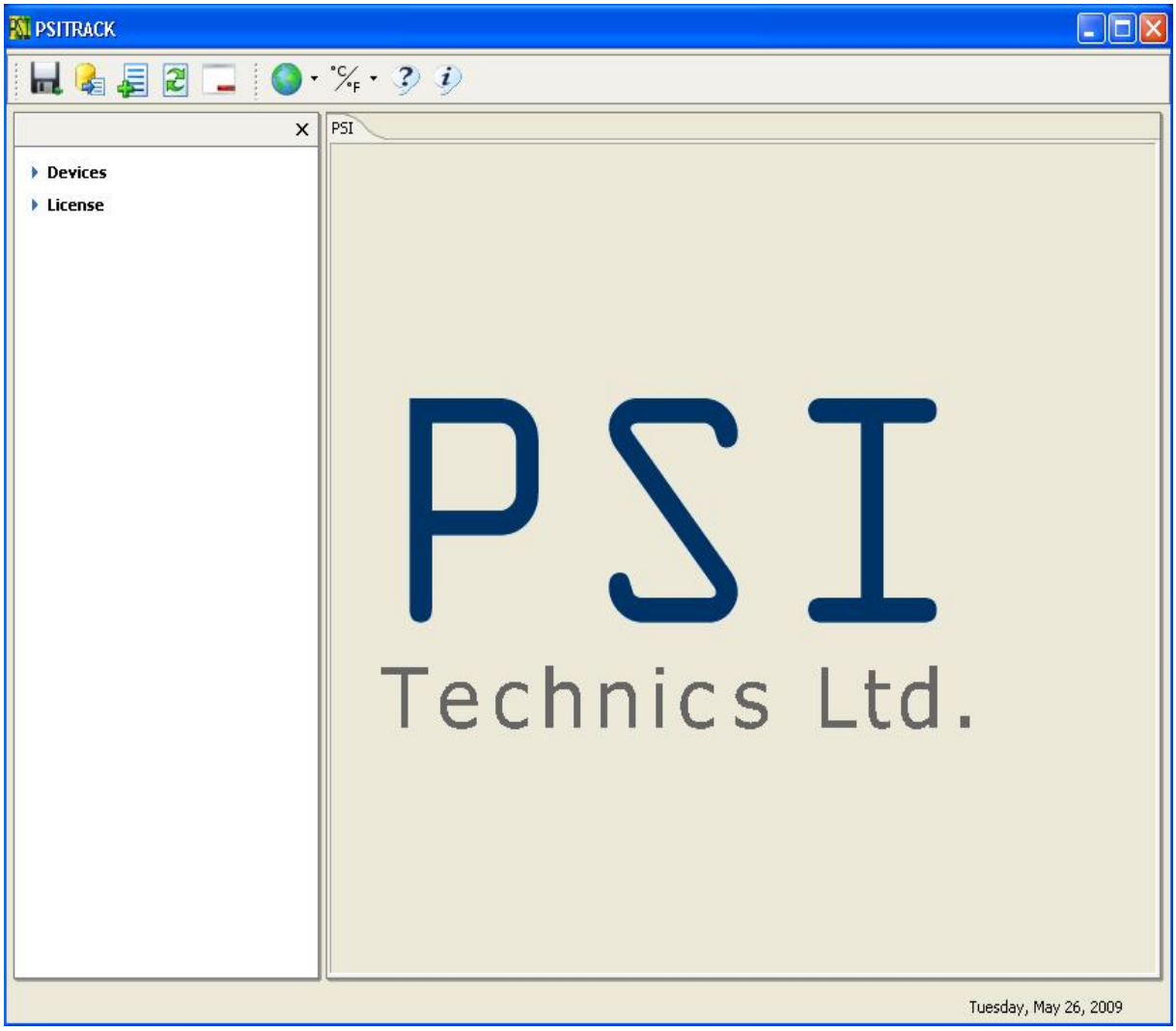


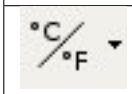
Figure 4: Start-up Screen

4.2 Icons in the Menu Bar

The menu bar contains the following icons. Table 2 contains a description of each icon:

Figure 5: Icons in the Menu Bar

Table 2: Menu Bar Icons and Descriptions

Icon	Name	Description
	Save Logger	Click this icon to save the recorded data from your data logger on your computer.
	Export measuring data	Click this icon to save the recorded data from your data logger as a .txt file.
	Load log file	Click this icon to open a log file with recorded data.
	Refresh	Click this icon to update the data and refresh the current view.
	Navigation panes	Click this icon to open or close the navigation panes on the left of right.
	Language	Click this icon to select a different language.
	Units	Click this icon to select the temperature units (Celsius or Fahrenheit).
	Help	Click to open the Help.
	About	Click to view the software version as well as general software information.

The 'Export measuring data' option saves the recorded raw data of the selected data loggers as .txt files. To save the raw data for a particular data logger, select the corresponding check box for each device. The data is now ready for processing.

Figures 6 and 7 show the main window with open and closed navigation pane.

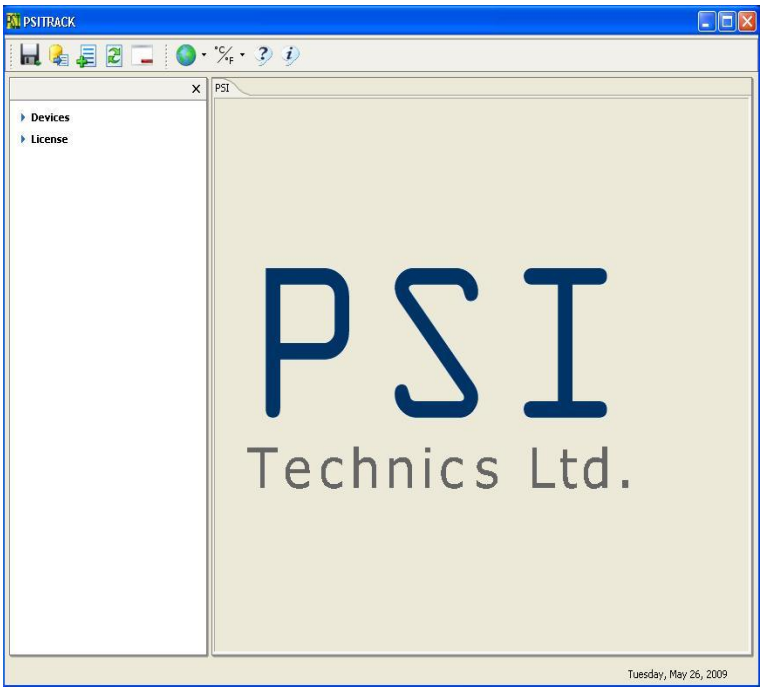


Figure 6: Main Window with Navigation Pane (on left)

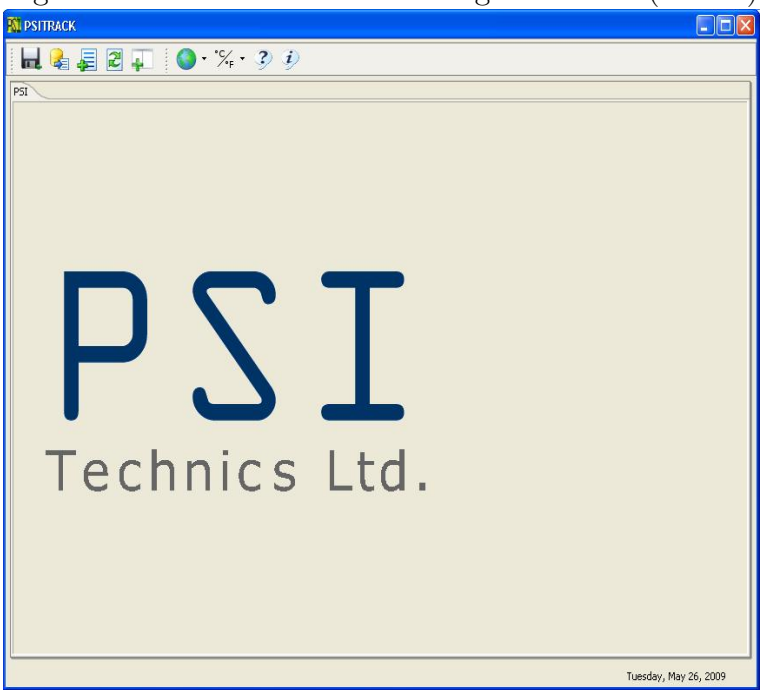


Figure 7: Main Window with Closed Navigation Pane

4.3 Licensing Your Software

To be able to use all features of the PSITRACK software, you need to license your software. Please contact PSI Technics Ltd. for a software license. If you have any questions about licensing, please contact support@psitechnics.com.

Once you receive a valid software license from PSI Technics, install the license file.
To install the license:

1. In the Navigation pane on the left of the start-up screen, click 'License'.
2. Next, click the 'Information' option below.
3. In the the 'Information' tab, click 'License registration'.
4. Click the PSI Technics license file to install the license.

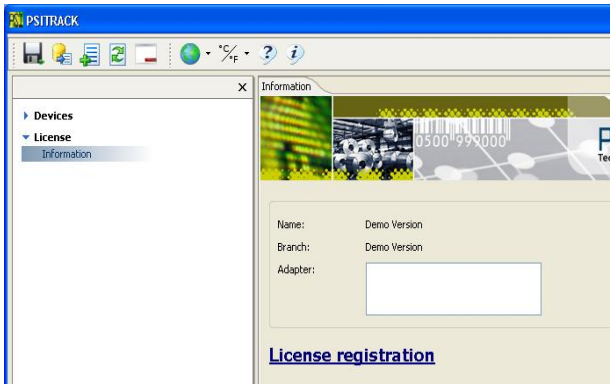


Figure 8: No license installed

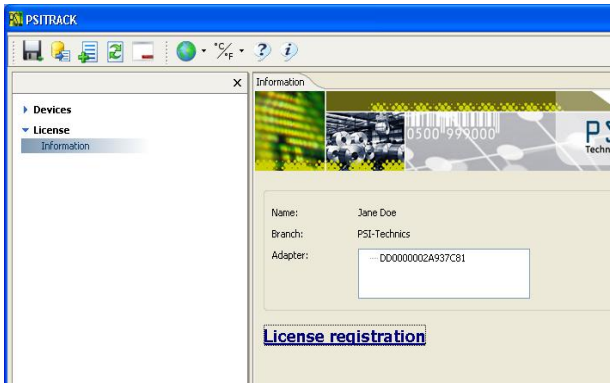


Figure 9: License successfully installed

The screen shown in Figure 9 appears after the license file has been successfully installed. If your name is displayed on screen instead of 'demo version', the license is correctly installed.

4.4 Viewing Device Configurations

To view the configuration of your data logger device:

1. Select a data logger from the 'Devices' pane on the left.

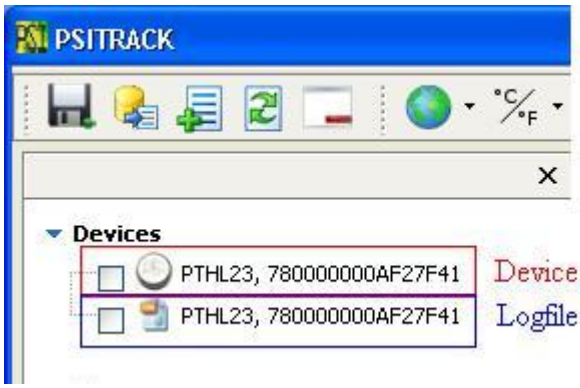


Figure 10: Data Logger and Log File

2. Click the 'Description' tab in the main window.

The following window appears:

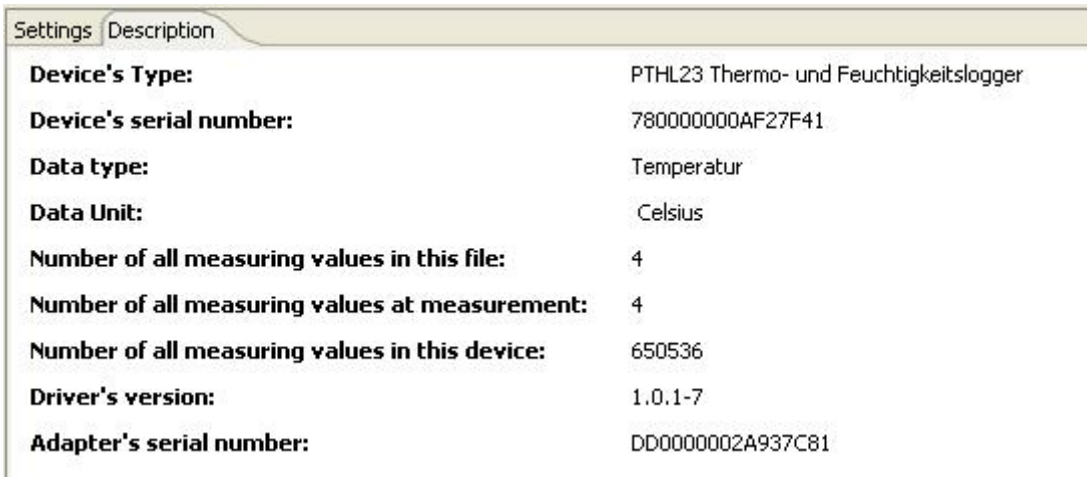


Figure 11: Description Tab with Device Configuration

4.5 Settings

Your PSI data logger is configured and ready for use with a few simple clicks.

1. Select your data logger from the 'Devices' pane on the left.
2. Click the 'Settings' tab in the main window.

The screen shown in Figure 12 appears. Table 3 contains a description of the fields in this dialog.

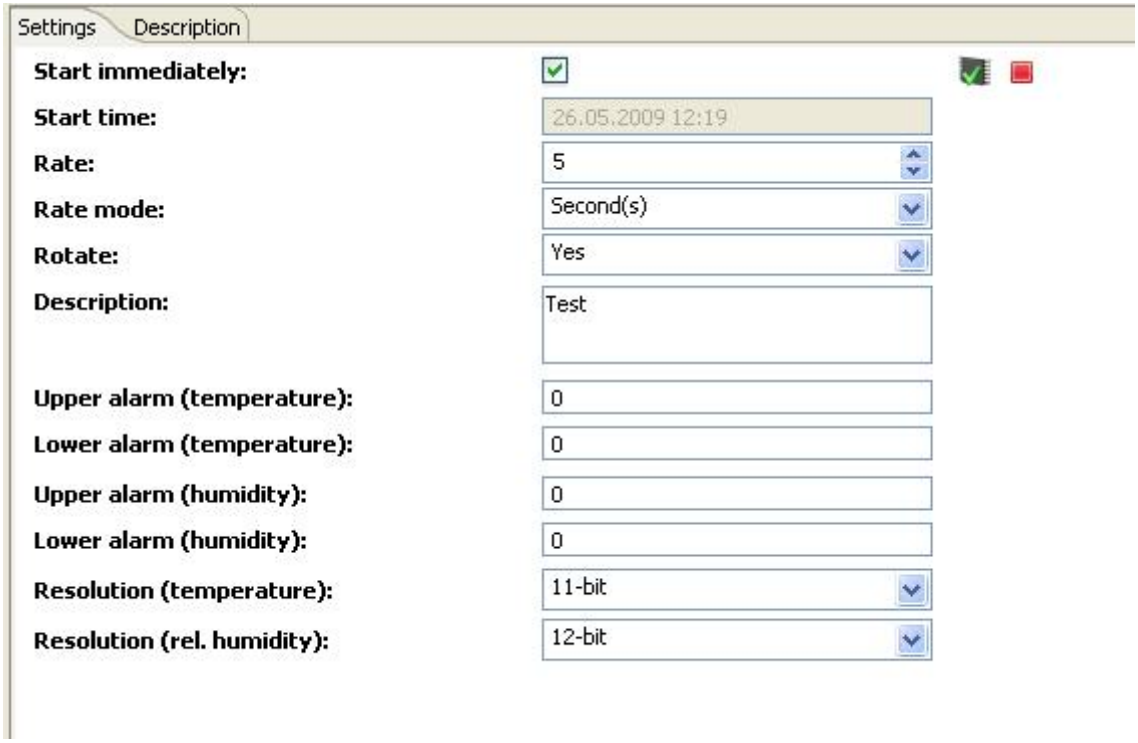


Figure 12: Data Logger Settings Tab

Table 3: Data Logger Settings Dialog

Option	**Description**
Start immediately	The data logger immediately starts recording data.
Start time	Defined recording start time (dd.MM.yyyy HH:mm).
Rate	The desired recording rate
Rate mode	The recording units (minutes or seconds; seconds only for PTL 21G).
Description	Use this field to enter a short description for the current settings.
Upper alarm (temperature)	Records an alarm when the temperature exceeds the defined limit.
Lower alarm (temperature)	Records an alarm when the temperature falls below the defined limit.
Upper alarm (humidity)	Records an alarm when the humidity exceeds the defined limit.
Lower alarm (humidity)	Records an alarm when the humidity falls below the defined limit.
Resolution (temperature)	The desired resolution (least count) for temperature recordings (not available for PTL21G. PTHL 23 can be configured to record only humidity values).
Resolution (rel. humidity)	The desired resolution (least count) for humidity recordings (not available for PTL21G. PTHL 23 can be configured to record only temperature values).

The minimum recording interval is 5 seconds. No value of less than 5 seconds can be defined because a lower value could lead to recording errors. If a value of less than 5 seconds is entered, the recording interval will be automatically adjusted.

4.6 Creating a Data Logger Profile

Once you configured the required settings, you can save these settings as a profile for later use. To create a profile:

1. Select the PSI data logger for which you would like to create a profile.
2. Click the 'Data Logger' tab in the main window.
3. Next, click 'Mission' (profile) in the 'Data Logger' tab.
4. Click the Pen icon  next to the 'Mission' window to enter a profile name.
5. Then, click the green check mark icon to save the profile. The saved profile appears in the 'Mission' (profile) window on the right.

Once the profile has been saved, the screen shown in Figure 13 appears. Table 4 contains a description of the options available in the Data Logger tab.

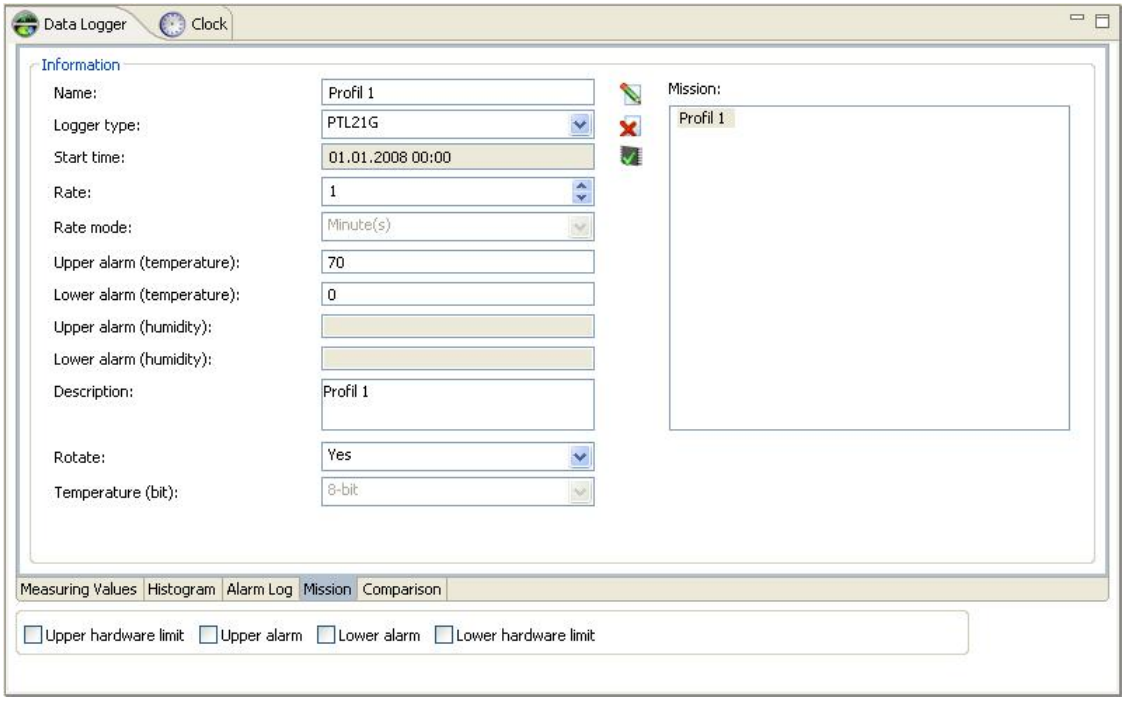


Figure 13: Creating a Data Logger Profile

To load a profile, simply click the desired profile in the 'Mission' window. To delete a profile, first click the profile in the 'Mission' window, then click the Delete icon.

Table 4: Creating a Data Logger Profile

Option	**Description**
Name	The profile name.
Data logger type	Data logger description.
Start time	Desired recording start time.
Rate	Sets the data logger's recording rate.
Rate mode	Recording units (minutes or seconds).
Upper alarm (temperature)	Records an alarm when the temperature exceeds the defined limit.
Lower alarm (temperature)	Records an alarm when the temperature falls below the defined limit.
Upper alarm (humidity)	Records an alarm when the humidity exceeds the defined limit.
Lower alarm (humidity)	Records an alarm when the humidity falls below the defined limit.
Description	A short profile description.
Rotate	The data logger overwrites previous records and starts recording new data when the maximum memory capacity has been reached.
Resolution (temperature)	Temperature resolution (least count).
Resolution (rel. humidity)	Humidity resolution (least count).

4.7 Clock

To synchronize the data logger time with the time of your laptop or desktop computer, click the 'Clock' tab in the main window, see Figure 14. Table 5 contains a description of available icons. This feature is only enabled for the PTL21G data logger. All other data logger models are automatically synchronized when they start recording data.

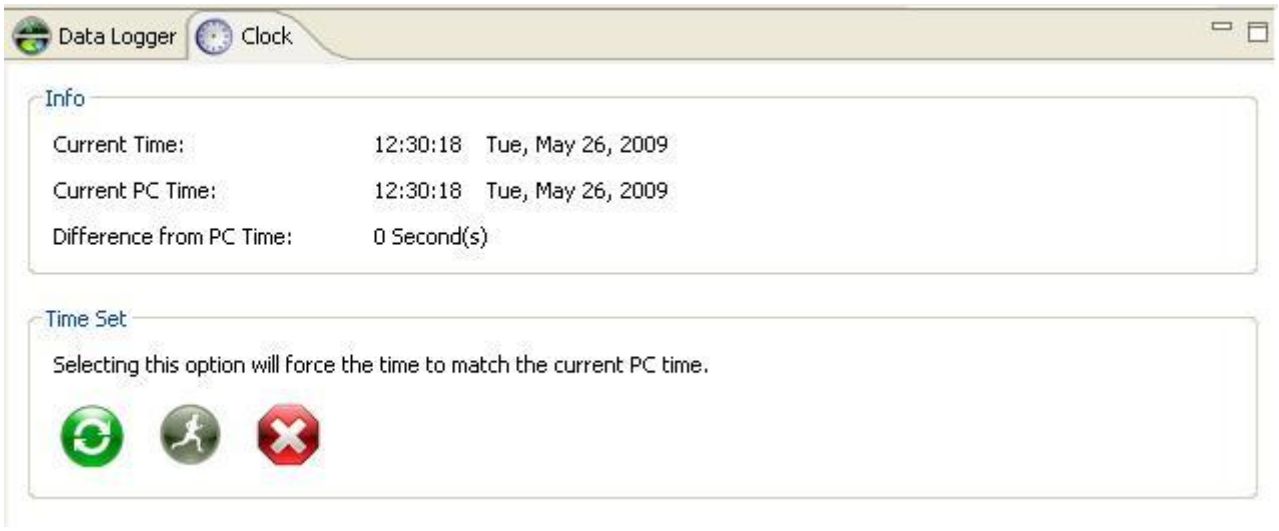


Figure 14: Clock

Table 5: Clock Icons and Descriptions

Icon	Name	Description
	Synchronize	Synchronizes the data logger clock with the clock of your laptop or desktop.
	Show current time	Displays the current data logger and computer time.
	Hide current time	Hides the current time.

4.8 Viewing Temperature Records

To view individual temperature records:

1. Select the PSI data logger that was used for recording temperature data.
2. Click the 'Data Logger' tab in the main window.
3. Next, click 'Measuring Values' in the 'Data Logger' tab.

The record will be displayed as a temperature diagram.

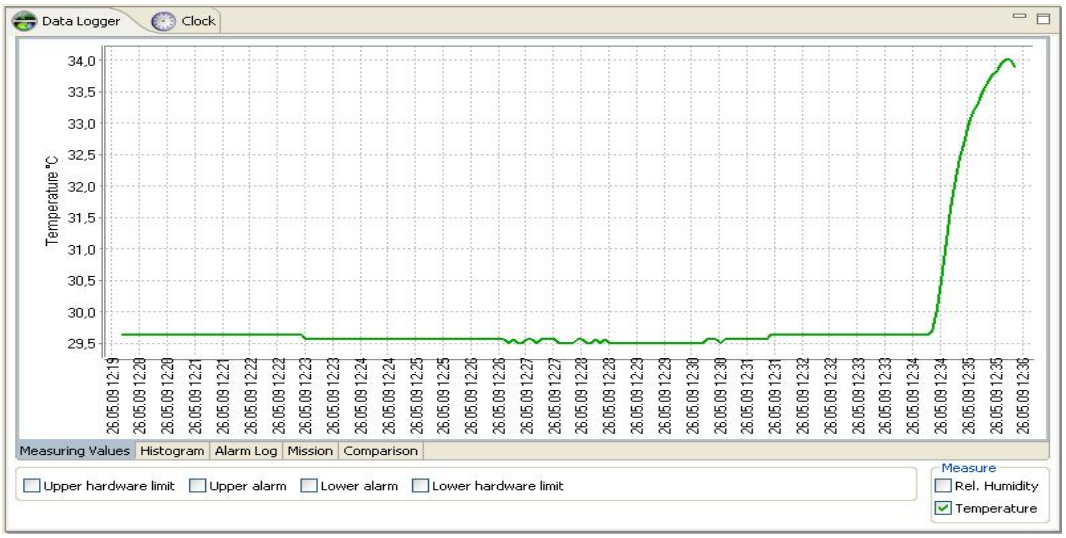


Figure 15: Temperature Diagram

1. The dashed red line represents the maximum limit of the linear recording range.
2. The solid red line represents the defined upper alarm limit.
3. The dotted blue line represents a value of 0 (zero).
4. The green line represents the temperature recording.
5. The dashed blue line represents the lower limit of the linear recording range.
6. The solid blue line represents the defined lower alarm limit.

To zoom in on a particular area of the graph, simply position the cursor over the desired area. Next, hold down the left mouse button and draw a selection rectangle (from upper left to lower right). Release the mouse button. The software zooms in on the selected area.

To zoom out, hold down the left mouse button and draw another rectangle (from lower right to upper left). To view the recording time for a particular temperature, simply position the mouse pointer over the desired area. The corresponding temperature and the recording time will be displayed. You can also view or hide certain limits or display all limits by selecting or deselecting the corresponding check boxes underneath the diagram.

4.9 Viewing Relative Humidity Records

You can use the PTHL 23 data logger to record relative humidity in addition to temperature. To display relative humidity recordings:

1. Select the PTHL 23 data logger that was used for recording relative humidity data.
2. Click the 'Data Logger' tab in the main window.
3. Next, click 'Measuring Values' in the 'Data Logger' tab.
4. Select the 'Rel. Humidity' check box in the 'Measure' group on the right.

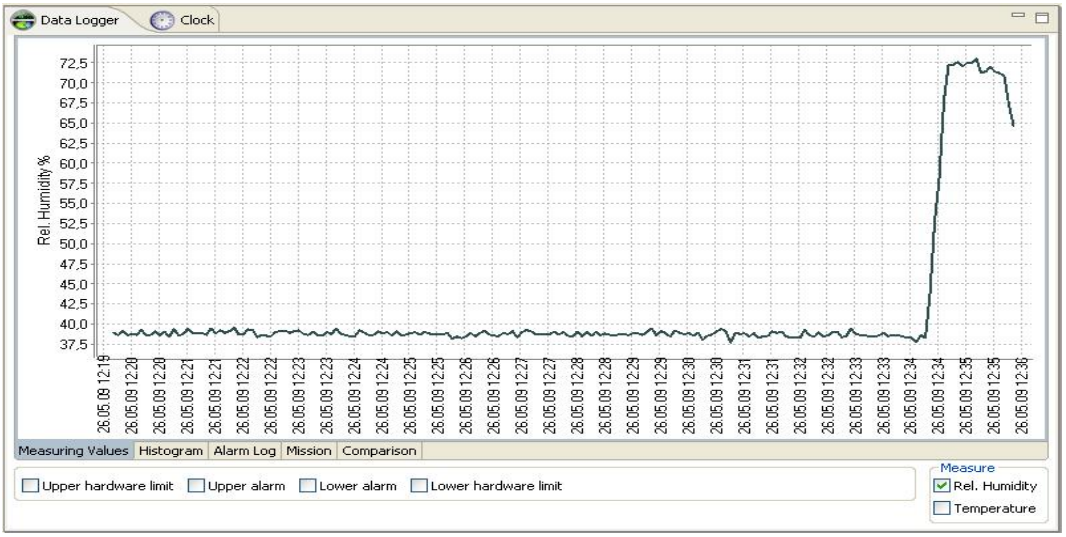


Figure 16: Relative Humidity Diagram

You can also zoom in on a particular area. To do this, position the mouse pointer over the desired area and draw a selection rectangle. (For a detailed description, see Viewing Temperature Records).

4.10 Viewing a Combined Diagram

In addition to viewing the temperature or relative humidity data recorded with a PTHL 23 data logger, you can display both values in a combined diagram.

1. Select the PTHL 23 data logger that was used for recording relative humidity and temperature data.
2. Click the 'Data Logger' tab in the main window.
3. Next, click 'Measuring Values' in the 'Data Logger' tab.
4. Select the 'Rel. Humidity' and 'Temperature' check boxes in the 'Measure' group on the right.

The green line represents the temperature; the gray line represents the humidity.

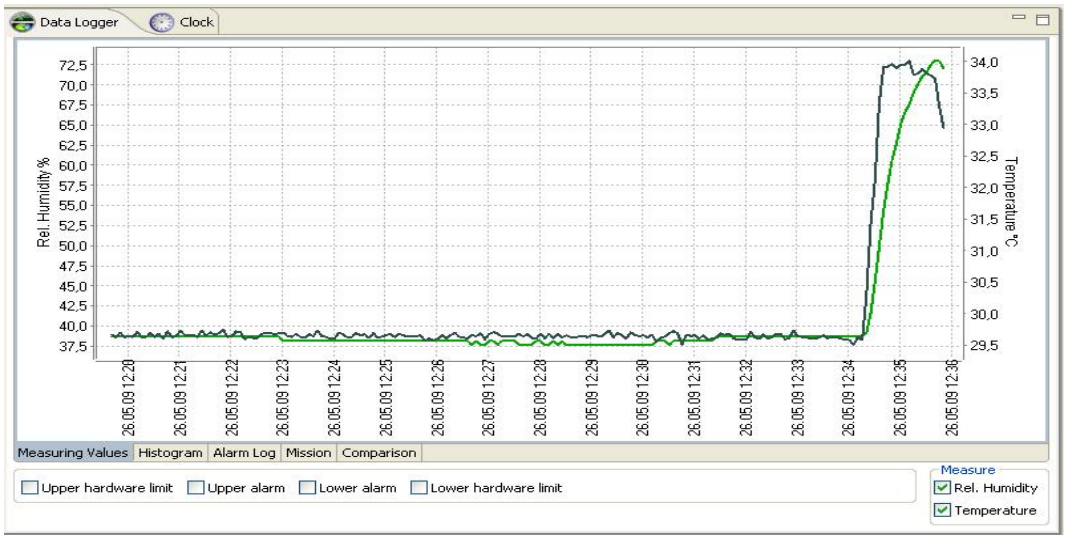


Figure 17: Combined Diagram

4.11 Viewing a Histogram

You can use the PSITRACK software to display the recorded values as a histogram.

To view a histogram:

1. Select the PSI data logger that was used for recording data.
2. Click the 'Data Logger' tab in the main window.
3. Next, click 'Histogram' on the bottom of the 'Data Logger' tab.

The selected recording is displayed as a histogram.

To zoom in on a particular area of the histogram, position the mouse pointer over the desired area. Next, hold down the left mouse button and draw a selection rectangle (from upper left to lower right). Release the mouse button. To zoom out, hold down the left mouse button and draw another rectangle (from lower right to the upper left).

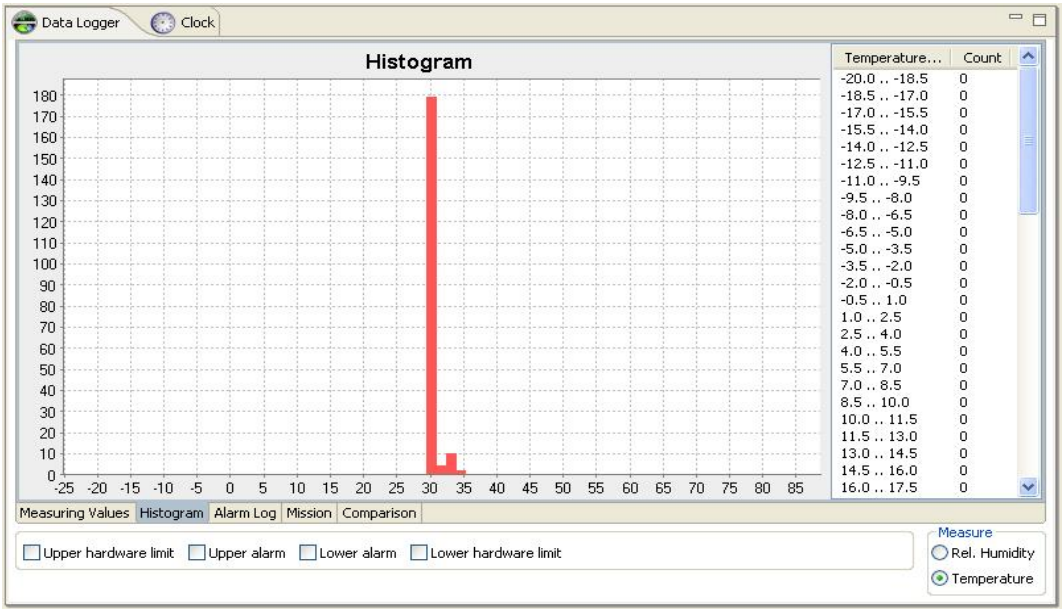


Figure 18: Histogram View

4.12 Alarm Log

The PSITRACK software allows you to view alarm logs for temperatures that exceeded or fell below the defined alarm limits:

1. Select the required data logger(s) from the 'Devices' pane on the left.
2. Next, click 'Alarm Log' on the bottom of the 'Data Logger' tab.

The following screen appears:

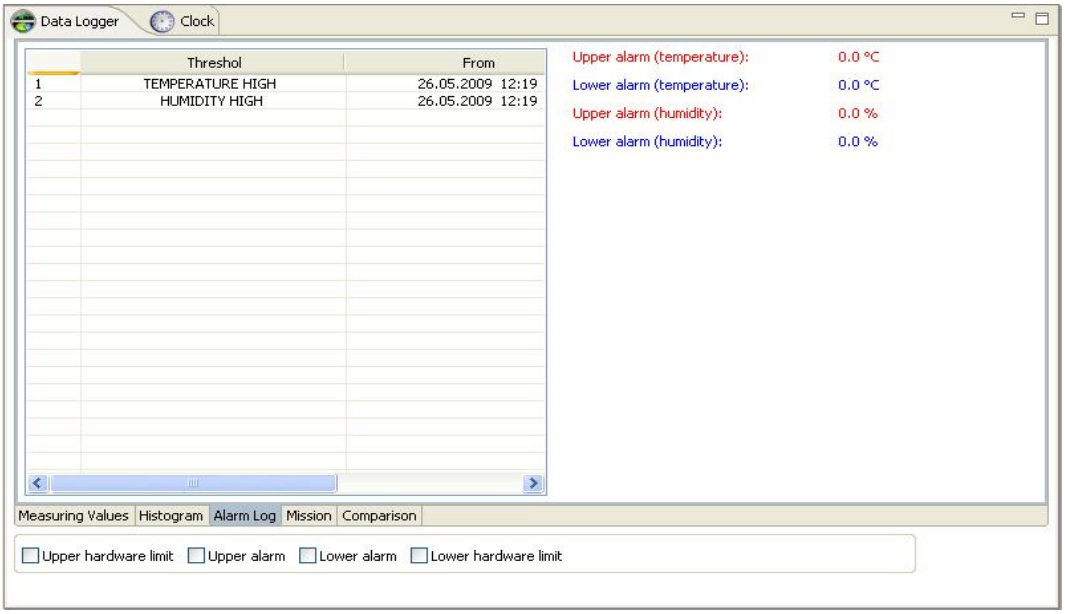


Figure 19: Alarm Log Window with Max/Min Limits

Temperatures that exceeded the defined upper limit are shown in red; temperatures below the defined lower limit are shown in blue. The time periods during which a particular temperature was exceeded or fell below the defined lower limit are displayed in the 'From' and 'To' columns.

4.13 Comparison Chart

To select a data logger or a particular log, click a data logger in the Devices pane on the left.

The previously selected settings in the Measuring Values, Histogram, Alarm Log and Mission (profile) tabs will be used.

In addition, you can select the check boxes for several data loggers to view a comparison chart of the selected devices. To do this, first select the required data loggers. Then, click the 'Comparison' tab.

A comparison chart similar to the one below appears:

Figure 20: Comparison Chart Showing Different Temperature Records

The above figure contains a standardized view of various recordings. The time in minutes (starting at 0) is displayed on the x axis. The recorded values are displayed irrespective of the recording time. That means that the data for each logger always starts at 0 (zero).

Click the other tabs to display the corresponding data. Please note that the data shown in these tabs do not apply to all data loggers, but only to the currently selected device logger. This enables you to use all software features, irrespective of the selected devices.

To view the device or alarm limits for a particular data logger in the comparison chart, select the corresponding device check box below the chart. The data shown applies only to

the currently selected device. In the 'Comparison' tab, you can also change the data logger in the Devices pane by clicking on a different device. The updated values are displayed.

When a PTHL 23 data logger is connected to your computer, or at least one log file has been loaded, you have the option of comparing temperature and humidity or you can compare both values from different data loggers. When comparing both temperature and humidity values, each data logger and log file will be assigned a particular color. Temperature values are displayed as a solid line. Relative humidity values are shown as a dashed line.

5 Appendix

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