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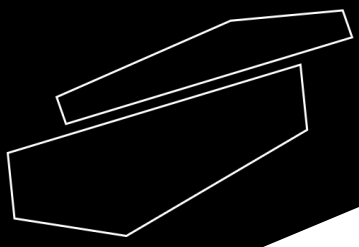
Data Logger for Ultra-Low Temperatures, UL-2

Please read the User Manual carefully before use, and follow all operating and safety instructions!



user manual

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User Manual

EN

UL-2 Data Logger for Ultra-Low Temperatures

Preface

Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

Service

In order to guarantee this equipment works safely and efficiently, it must receive regular maintenance. In case of any faults, do not try to repair it yourself. If help is needed, you can always contact your supplier or Labbox via **www.labbox.com.**

Please provide the customer care representative with the following information:

- Serial number
- Description of problem
- Your contact information

Warranty

This instrument is warranted to be free from defects in materials and workmanship under normal use and service, for a period of 12 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident, or abnormal conditions of operation.

For claim under the warranty please contact your supplier.

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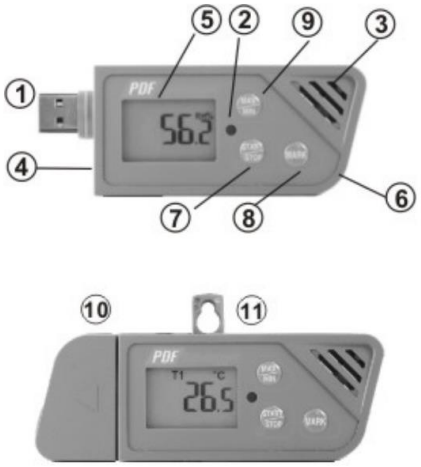
Introduction

Congratulations on your purchase of this ultra-low temperature PDF datalogger. This datalogger is designed for monitoring freezer temperature and air temperature, subject to quality control requirements. Temperature measurements are saved throughout the entire duration of the measurement period.

This datalogger is equipped with a user-defined programming function. The measurement report output is implemented using a PDF file and an Excel file; no unique software and no USB driver are required.

Read through the instruction manual before using this logger. The logger is calibrated before shipment.

Product Description



① USB 2.0 plug-and-play connector. A USB driver is not required.
② LED indicator:
Low/High: The red LED blinks every 10 seconds when the set limit value is exceeded during recording.
OK: When the logging function is started, the green LED blinks once every 10 seconds when no alarm occurs.
③ NTC thermistor for air temperature measuring.
④ External probe socket for RTD external probe.
⑤ LCD (Liquid Crystal Display).

a. Measured temperature: The LCD updates and alternates every 5 seconds.
b. REC flashes every second when the logger is in logging mode. When the logger is programmed with a start delay, REC displays but does not flash during standby.
c. T1 is air temperature; T2 is external probe temperature.
d. H or L displays when the set limit value is exceeded.
e. MX or MI display when checking the MAX or MIN value recorded since the last reset.
f. The low battery icon flashes on the display every second when the battery level is too low to accurately measure and log data.

⑥ Battery cover: Operated by 2 CR2032 batteries. Use a coin and follow the direction indicator to open and close the cover. When installing the batteries, the anode side faces up.
⑦ START/STOP (ON/OFF) key:
After installing the batteries, press the key to power on the logger. The LCD displays for 2 seconds. Press again to turn it off.
After the logger is programmed, press the Start/Stop button for 5 seconds to start logging. To stop logging, press the Start/Stop button again for 5 seconds. In logging mode, a short press of the key will not power off the logger.
⑧ MARK key:
To mark an event manually during the measurement period, press the MARK button for 2 seconds until the measured data flashes three times. This MARK function is usually used when transitioning from one location to another. Up to 8 marks will be identified in the PDF report.
A short press of the MARK button at any time can also display the remaining battery life as a quick reference. However, precise battery life is still determined by operating conditions and battery brand.
⑨ MAX/MIN/RESET key:
Short press the key to check the MAX or MIN data recorded since the last reset. Long press until "rSt" (reset) appears on the LCD to reset the maximum and minimum data.
⑩ Waterproof cover and stand:
To provide a waterproof feature for the USB plug, put on this cover and slightly rotate it to tighten. To make the logger stand on a desktop, rotate this cover to a suitable supporting angle.
⑪ Hanger

Operation

NOTE:

1. ***Adobe Reader software is required.***
2. ***Program the logger and generate the PDF and Excel reports at room temperature. For example, if the logger is removed from a freezer, it should be allowed to return to ambient room temperature before generating the PDF report.***
3. ***The executable file for programming the logger is named "PDF Logger Configuration Tool".***

Step 1: Configuring the Data Logger
Configuration changes can be made at any time before the logging function is started. Once the logger is started, configuration changes cannot be made unless logging is stopped first. If the logger is locked with a password, the password is required to make configuration changes.

- Press ON/OFF to power on the logger.
- Connect the data logger to a PC via the USB port. The green LED will turn ON while establishing the connection with the computer.
- The Windows folder management window will appear.
- If the correct file folder is not open, click on the Folder icon to view files.
- Open the file "PDF Logger Configuration Tool.exe."
- The default language is English, but the user may change it to one of several alternate languages: English, German, French, Italian, Spanish, or Portuguese.
- User-programmable parameters are as follows:

Sampling Rate
Select the sampling interval you need, from 30 seconds to 2 hours.

Start Delay
Select the start delay from 0 minutes to 24 hours. For example, if the delay is 5 minutes and the sampling rate is 10 minutes, the first temperature measurement will be logged 5 minutes after the START button is pressed. All subsequent measurements will occur at 10-minute (or the selected) intervals.

Unit of Measurement (UoM)
Select the unit that will be displayed on the PDF report and LCD. The options are Metric or Imperial. In Metric, the unit is Celsius for temperature. In Imperial, the unit is Fahrenheit for temperature.

Password
The Password function is OFF by default. The user may enable it to prevent unauthorized reprogramming before the START button is pressed. A password may consist of up to 16 alphanumeric characters.

Company Name
A user-defined name or descriptor can be entered under Company Name. It will be displayed as the title on the PDF report, with a maximum of 20 characters.

Alarm Types
Regardless of the alarm type, if the red LED is triggered, it will not stop even if the reading returns to the normal range or logging is stopped. To stop the red alarm LED, plug the logger into a computer to generate a report or power off the logger.
Single: An alarm is triggered immediately when the measured value exceeds the alarm threshold.
Cumulative: An alarm is not triggered when the measured value first exceeds the alarm threshold but only when the overall average value during the alarm delay exceeds the alarm threshold.
Deactivated: No alarm function is active during the logging process.

Alarm Delay
The preset alarm delay interval for a single alarm type is always set to ZERO.
The adjustable alarm delay interval for a cumulative alarm type can range from 5 minutes to 2 hours.

Alarm Limits
Select the alarm threshold values. For example, if 2 - 8 °C is selected, an alarm condition will occur if the temperature drops below 2 °C or rises above 8 °C. The programmable alarm limit for each parameter is limited to one decimal place.
To summarize: To activate an alarm when the 30-minute average value during the alarm delay period exceeds 8 °C, set the alarm delay to 30 minutes, the alarm type to cumulative, and the range to 2 - 8 °C.

Time Zone
Before programming the logger, ensure that the PC is set to the correct time zone.
The logger will automatically synchronize to the PC's time zone when "Save" is pressed. Time zone changes during transit are not adjusted in the logged data.

The default values for the parameters are:
Sampling rate: 5 minutes
Alarm type: deactivated
Start delay: 0 minutes
Alarm delay: 0 minutes
Temperature unit: °C
Alarm limits: blank
Password: deactivated
Temperature: blank
Company name: blank
Temperature: blank
Language: English

Once all programming is complete, press "Save" to confirm the settings. You may then close the setup window and remove the logger from the PC USB port.

Step 2: Start Logging

- Press the "START" key for 5 seconds to begin logging.
- "REC" will appear and flash on the LCD to indicate that logging is activated. Measured parameters will update and alternate on the LCD every 5 seconds.
- If the logger is programmed with a start delay, "REC" will appear (without flashing) after pressing the start key, indicating that logging has started, and the logger is in standby status.
- During logging, the green LED will blink every 10 seconds if no alarm occurs. If an alarm occurs, the LED will turn red and flash.
- If the red LED is triggered, it will continue flashing even if the readings return to the normal range or logging is stopped. To stop the red alarm LED, plug the logger into a computer to generate a report or power off the logger.
- To place a bookmark manually during a delivery transition, press and hold the MARK key until the measured reading flashes three times.
- Short press the MAX/MIN/RESET key at any time to review the maximum and minimum data recorded since the last reset.
- Press and hold the MAX/MIN/RESET key to reset the maximum and minimum data. "rSt" will appear on the LCD to indicate that the reset is complete.
- Press the MARK key to review the approximate remaining battery life.

Step 3: Download Data

- Press the "STOP" key for 5 seconds to stop logging.
- Plugging the logger into the PC USB port will also stop logging.
- Open the file "PDF Logger Configuration Tool.exe."
- Choose the function "Convert to PDF" or "Convert to Excel" to generate the report in your preferred format. The default language is English, but you may change it to one of several alternate languages.
- Select the preferred location to save the generated report.
- The created Excel report contains all data shown in the PDF report, except for the graph.

NOTE: The generated Excel file is a tab-delimited ASCII text file, which can be easily read by many programs. However, when opening the file in Microsoft Excel, a warning message may be displayed because the file is named with a ".csv" extension but the contents are similar to a ".txt" file. It can be safely opened.

Technical Data

Model	
Air Temperature	By an NTC thermistor
External Temperature	By a PT1000 RTD sensor with a 3.8 mm diameter x 20 mm long stainless probe, and a 200 cm long cable with a 3.5 mm diameter earphone jack
Air Measurement	-30.0 °C to 70.0 °C (-22.0°F to 158.0 °F)
External Measurement	-100.0 °C to 120.0 °C (-148.0°F to 248.0 °F)
Temperature Resolution	0.1 °C (0.1 °F)
Temperature Accuracy	Full range: ±0.5 °C (±0.9 °F)
T90 Response Time	<5 minutes
Logging Type	Multiple use
Sampling Points	24,000 temperature + 24,000 external temperature
Battery Life	3 months (when the alarm function is deactivated)
Operating Temperature	-30 °C to 70 °C (during logging); room temperature (PC status)
Operating Relative Humidity	<80 %
Storage Temperature	-40 °C to 85 °C
Storage Relative Humidity	<90 %
Weight	Approximately 90g
Battery	2 x 3.0V CR2032
Sampling Interval	30 seconds, 5, 10, 30, 60, 90, 120 minutes
Start Delay	0, 5, 30, 45, 60, 90, 120 minutes, 24 hours

Alarm Range	Air: -30.0 °C to 70.0 °C External: -100.0 °C to 120.0 °C
Alarm Delay	0, 5, 30, 45, 60, 90, 120 minutes
Alarm Type	Single, Cumulative, Deactivated
Operation Keys	3 Keys: Start/Stop, Mark, and MAX/MIN
LED Indicator	REC, High/Low Alarm
Protection Class	IP65
Directives	EN12830
Operating System	Windows only

Error Code

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Why?	The external probe is unplugged.
Solution	Check the connection between the probe and the logger.
E02	
Why?	The measured value is below the specified range.
Solution	Place the logger within the specified range.
E03	
Why?	The measured value is above the specified range.
Solution	Place the logger within the specified range.
E31	
Why?	Microprocessor is failing.
Solution	Contact the distributor for service.
Why is the red LED flashing but the recorded data is okay?	
Why?	The alarm detection occurs every 10 seconds, but data logging may be programmed to occur every 2 hours. In this case, if an alarm happens between two logging points, the recorded data might still appear okay, but the red LED will flash, especially if the alarm mode is set to "Single."
Solution	To reduce this situation, program the alarm function as cumulative.
Why is my datalogger not recording a second time?	
Solution	After downloading the data, return to the configuration page to review all settings and press "SAVE" to confirm. Then, long-press the start key again to begin recording. You should see the green LED blink, indicating that recording has started. The new data will overwrite the old data in the logger's memory IC.

Nota importante para los aparatos electrónicos vendidos en España

Important note for electronic devices sold in Spain

Remarque importante pour les appareils électroniques vendus en Espagne

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:

Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden desecharse en vertederos.
De conformidad con la Directiva 2002/96/ CE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la oportunidad de retornar el instrumento para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

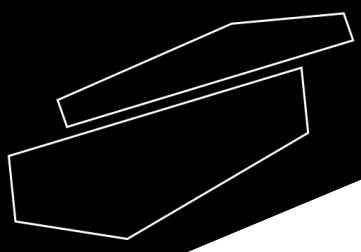
Nota importante para los aparatos electrónicos vendidos en Francia

Important note for electronic devices sold in France

Remarque importante pour les appareils électroniques vendus en France

Informations sur la protection du milieu environnemental et élimination des déchets électroniques :

Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.
En réponse à la règlementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de Récylum dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur www.recylum.com).
L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.



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