CaTeC

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PAR-Logger

Handheld Readout Unit
&
datalogger

Introduction

The PAR-logger is a low-cost, high-performance sensor readout unit with integrated datalogger.

The sensor sensitivity can be programmed into the PAR-LOGGER such that the readout will show calibrated engineering units, rather than millivolts or microvolts.

Use of the datalogger functions and programming the sensor sensitivity, requires a USB interface which is used to connect the PAR-LOGGER to a PC.

Specifications

AD conversie		16 bit
Input range	PAR	50…500 µmol/m^2.s per µA
	LUX	2 … 5 klux per µA
Basic accuracy after factory calibration		0.1%
Temperature sensitivity		<0.5% over the full temperature range
Offset drift		<3 µA over the full temperature range
Operation temperature range		-10 … +40°C
Storage temperature range		-20 … +60°C
Relative humidity		<95% RH non-codensing
Input circuit		< 2 MΩ / 680 nF
Input low-pass filter		5 Hz
Input connectors		BNC connector
Display		LCD 4 digits with sign
Display update		at least 1 per second
Computer interface		USB 1.1 / 2.0 low speed
Supply current		< 2 mA
Batteries		2 AA (penlight) alkaline
Battery life (alkaline)		> 600 hours (25 days) continuous use
Data logger memory		3518 samples
Data logger storage interval		2 … 65535 seconds
Logged information		min, max and average over log interval
Software compatibility		Windows 7 or Windows 10

Operation

The PAR-LOGGER accepts two AA size (penlight) batteries. Use alkaline types for best results. New, good quality batteries should give up to 50 days of continuous operation.

Remove the bottom cover of the enclosure to access the battery compartment. Extract the battery holder from the compartment, and install two fresh batteries. Notice the polarization. Replace the bottom cover and connect the sensor. The PAR-LOGGER is now ready for use. Switch the PAR-LOGGER on with the push-button switch on the top.

To prevent that the PAR-LOGGER is switched off while logging, the on/off switched is mounted so that the button has to be pressed quite deep to switch the PAR-LOGGER on or off. You can feel it and hear it when the switch toggles. Press the small black button far enough with your nail or a pencil until you feel and hear it switch.

Software

Use of the sofware requires a PC with Windows 7 en Windows 10 operating system and a USB interface. The software has built-in functionality for:

- programming the sensor sensitivity
- data logging functions

For each of these functions, an interface cable is required. This cable is used to connect a PAR-LOGGER to the USB bus on a PC. If your PAR-LOGGER comes bundled with a sensor, it may be that your supplier already programmed the sensor sensitivity into the PAR-LOGGER, and that this function is disabled in the software. In that case, the optional interface cable and the software give you access to the data logging functions only.

Main window

After installation, the software can be started from the Start menu. The main window allows you to open a previously stored file with logged data.
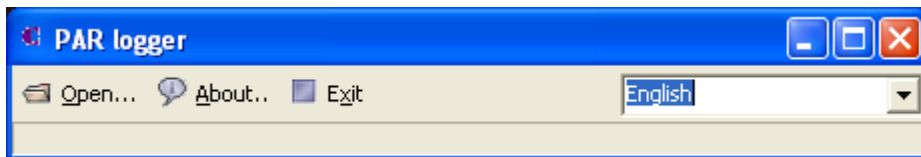

PAR-LOGGER window
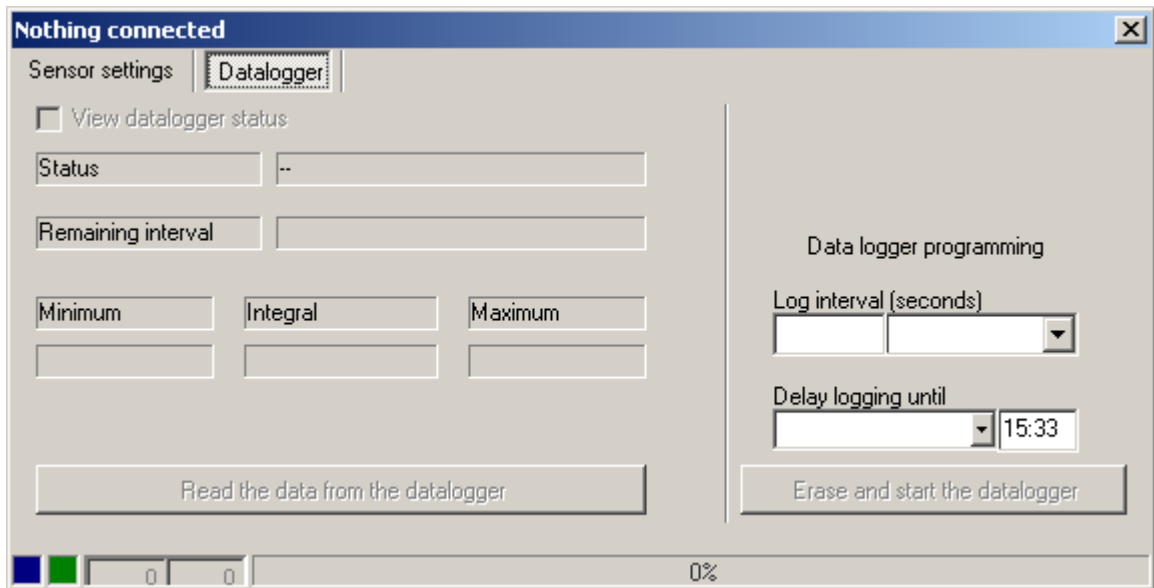
All other functions related to the PAR-LOGGER are available in special windows, that will open once you connect an PAR-LOGGER to the PC. You can connect more than one PAR-LOGGER to your PC, and for each of the devices a separate window will open. These windows may be on top of each other, move them around on your screen to reveal the ones that are covered.

The PC will automatically detect the PAR-LOGGER. If the PC does not detect the PAR-LOGGER, then check if the PAR-LOGGER is switched on, and check the batteries.

Once the PAR-LOGGER is detected, the caption of the window will show the serial number of the PAR-LOGGER that was connected.
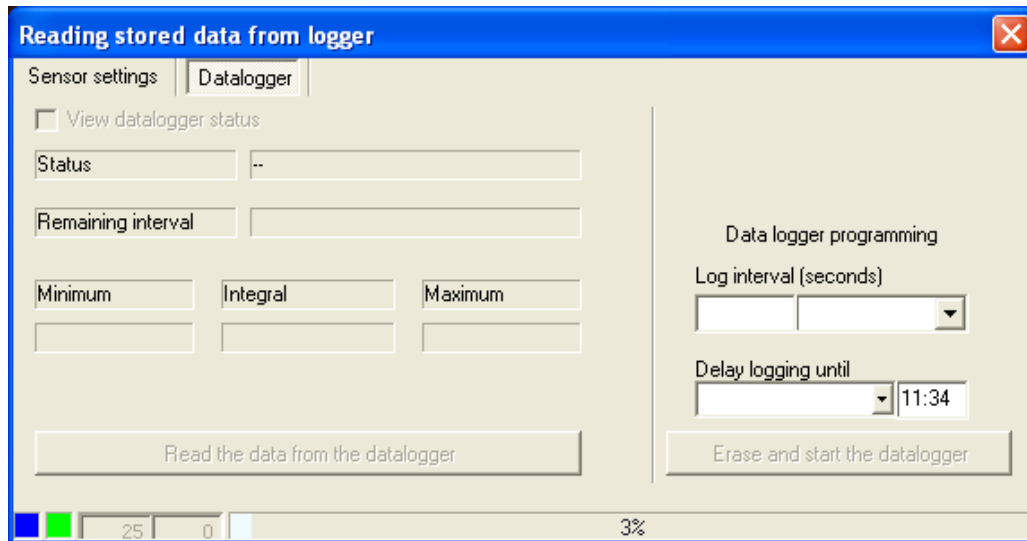

1. (Go to the 'Sensor settings' page). The full range output voltage of the sensor should be less than or equal to the full scale input voltage of the PAR-LOGGER. The full range output voltage is used to select the maximum input stage amplification factor of the PAR-LOGGER in the software. In the box that says 'Input amplifier' you can select (LI190, LI191 or LI210) the amplification that corresponds to the required full scale input.
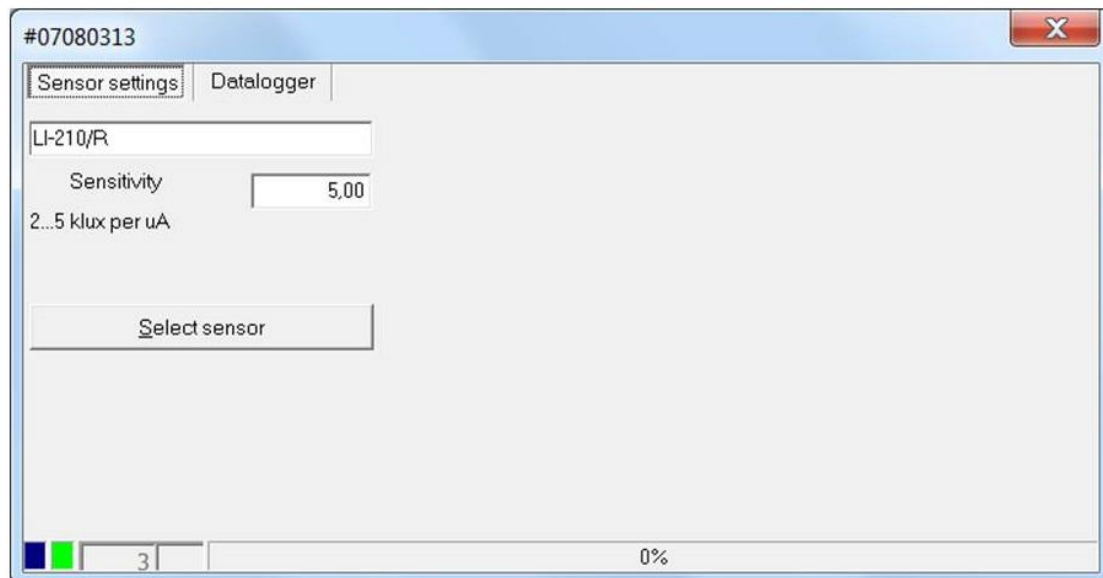
Wizard

Sensor select through the Wizard. Depending on the sensor sensitivity, the Wizard will select the optimal input stage amplification for the PAR-LOGGER, and store appropriate values in the multiplier and divider fields. After the wizard is used, the PAR-LOGGER only has to be programmed to make it suitable for use with the specified sensor.

Use the 'Select sensor' button to access the wizard. The Wizard accommodates 3 different sensors.
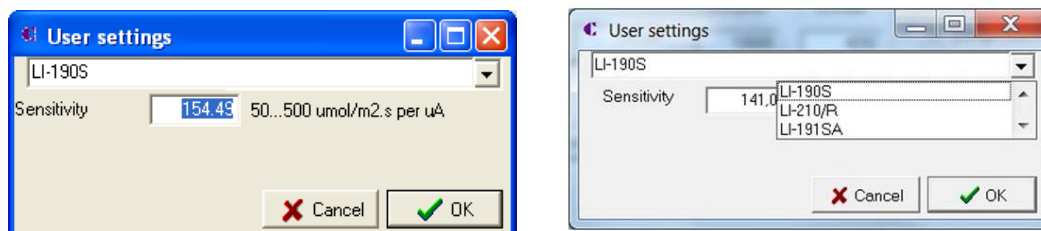

Use the wizard to select the sensor model that is to be used, and then enter the sensitivity of the sensor. The PAR-LOGGER is then ready to be programmed with the new settings. To do that, click the 'Program' button.

Data logger

The PC software is used to enter the data logger setup, and to transfer the setup to the PAR-LOGGER.

When the PAR-LOGGER is programmed with a new datalogger setup, the logger memory in the PAR-LOGGER is erased, and then the new settings are used to start a new logging sequence. The PC software can be used to check the logging activities of the PAR-LOGGER, and the PAR-LOGGER also shows some display characters to indicate what it is doing.
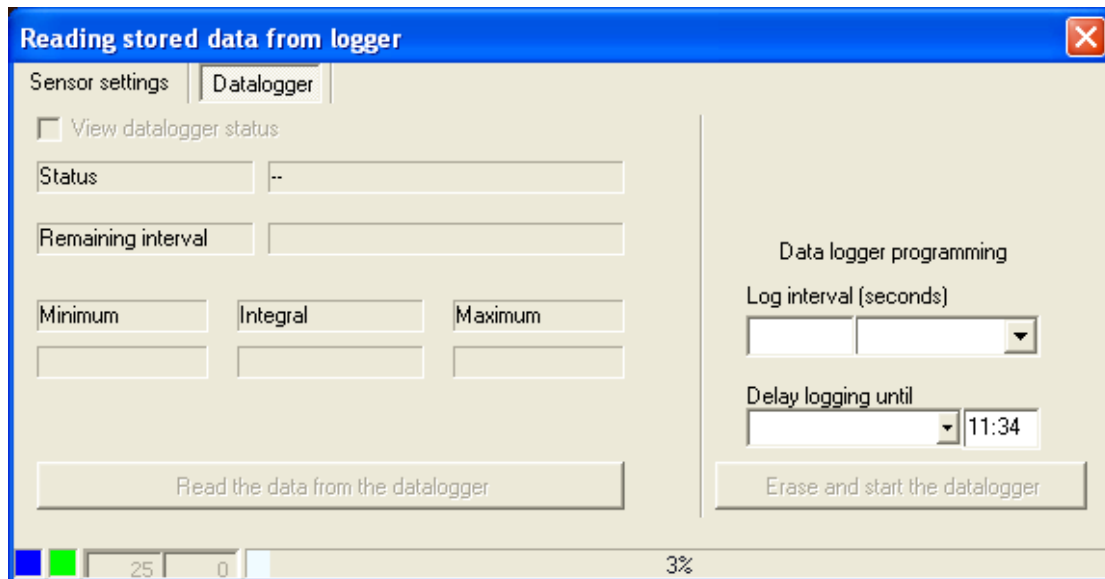
Log interval

The log interval is entered in seconds. The pull-down box can be used to preset the correct number of seconds for some popular log intervals. Note that the pull-down is only used for selecting a preset, the number on the left is the log interval that will be transferred to, and used by, the data logger in the PAR-LOGGER.

Initial delay

When logging starts, an optional delay is used to postpone the start of the first logging interval until a specified date and time. This date and time at which the first interval will start, can be entered in the PC software. When the logger is busy counting down the delay for the first logging interval, the LCD on the PAR-LOGGER shows an 'l' that flashes at a slow (1 second on, one second off) rate.

Logging

Once the initial delay has elapsed (the initial delay can be 0) the first logging interval is started. The PAR-LOGGER is now actually logging, and the 'l' on the LCD flashes rapidly (½ second on, ½ second off)
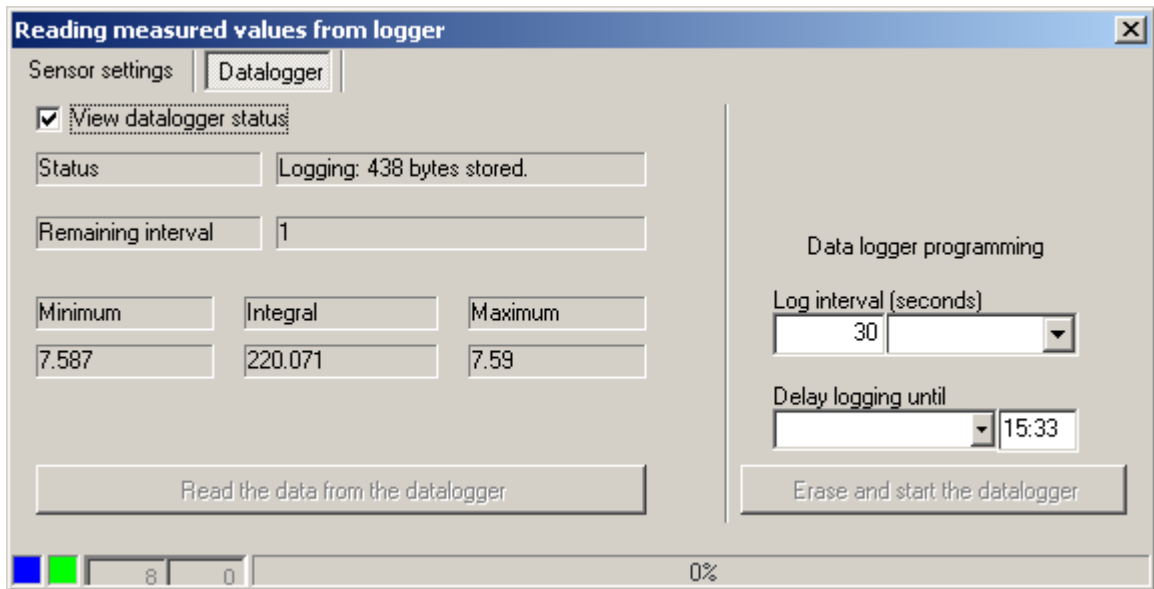
Logged values

During a logging interval, the PAR-LOGGER accumulates minimum input value, maximum input value, and average input value. Once the logging interval has elapsed, the values are stored in the logger memory and the next interval is started. Each time the PAR-LOGGER stores a new set of values in the logger memory, it flashes the 'm' sign on the display. Logging only stops when the logger memory is full, when the batteries are depleted, or when the PAR-LOGGER is switched off.
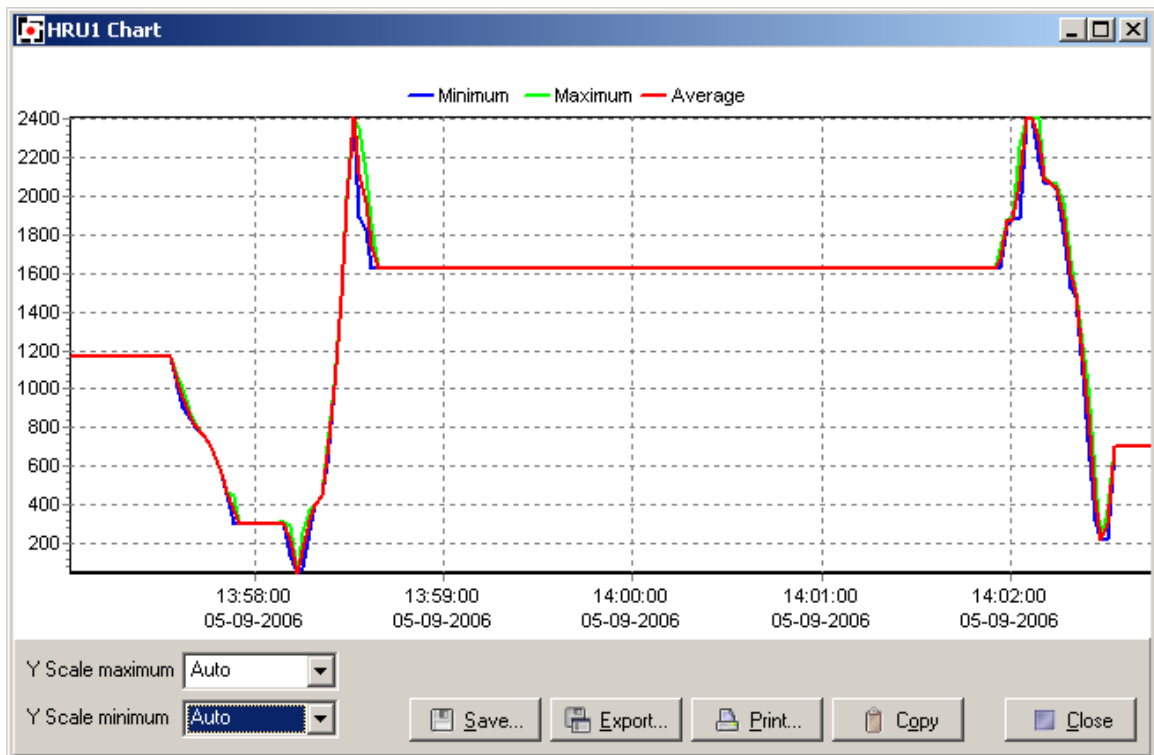
Read status

You can view the logger status while the logger is active. Reading the status will not interfere with the logging process.

The status will show what the logger is doing, how much time remains in the current interval (if the logger is logging) and what the measured values are. The logger measures an integral over the logging interval. The PC software uses the integral and the interval period to calculate an average value over the logging interval.

Reading measured values from logger

Sensor settings | Datalogger

☑ View datalogger status

| Status | Logging: 438 bytes stored. |
| Remaining interval | 1 |

Data logger programming

| Minimum | Integral | Maximum |
| 7.587 | 220.071 | 7.59 |

Log interval (seconds)
30

Delay logging until
15:33

Read the data from the datalogger   Erase and start the datalogger

| 8 | 0 | 0%

Read data

Use the PC software to read the logger memory from the PAR-LOGGER. You can do this while the PAR-LOGGER is logging, reading data will not interfere with the logging process. When the data from the logger memory is collected, it will be presented in a chart.

HRU1 Chart

— Minimum   — Maximum   — Average

Y Scale maximum Auto
Y Scale minimum Auto

Save...   Export...   Print...   Copy   Close

The Y scale can be manually set, and you can also use the mouse to zoom in on a specific area of the chart. Drag the mouse pointer from the top left corner of the area of interest, to the bottom right corner of the area of interest. When the mouse is released, the chart will zoom in on the selected area.
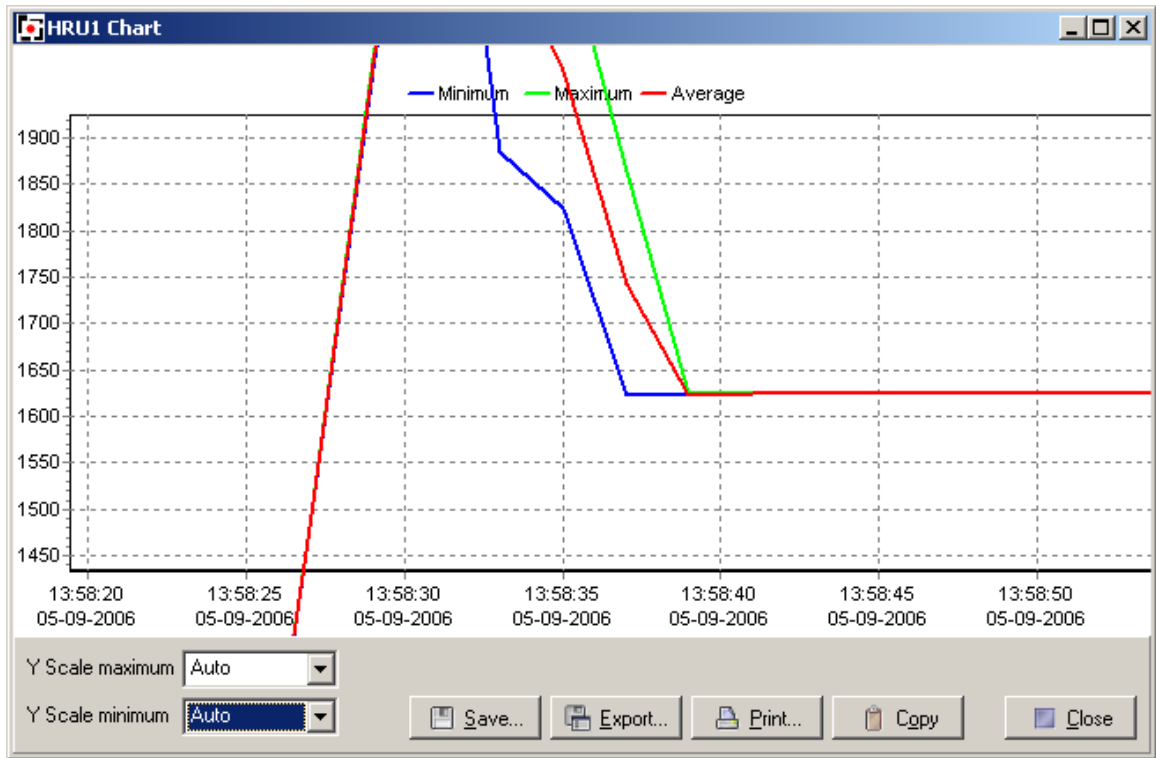
Drag the mouse from bottom right to top left to zoom out again.

Save the data in a logger data file, or export the data in a text format that can be imported in a spreadsheet.
Use the Copy button to place the chart on the clipboard, ready to be pasted into a word document.