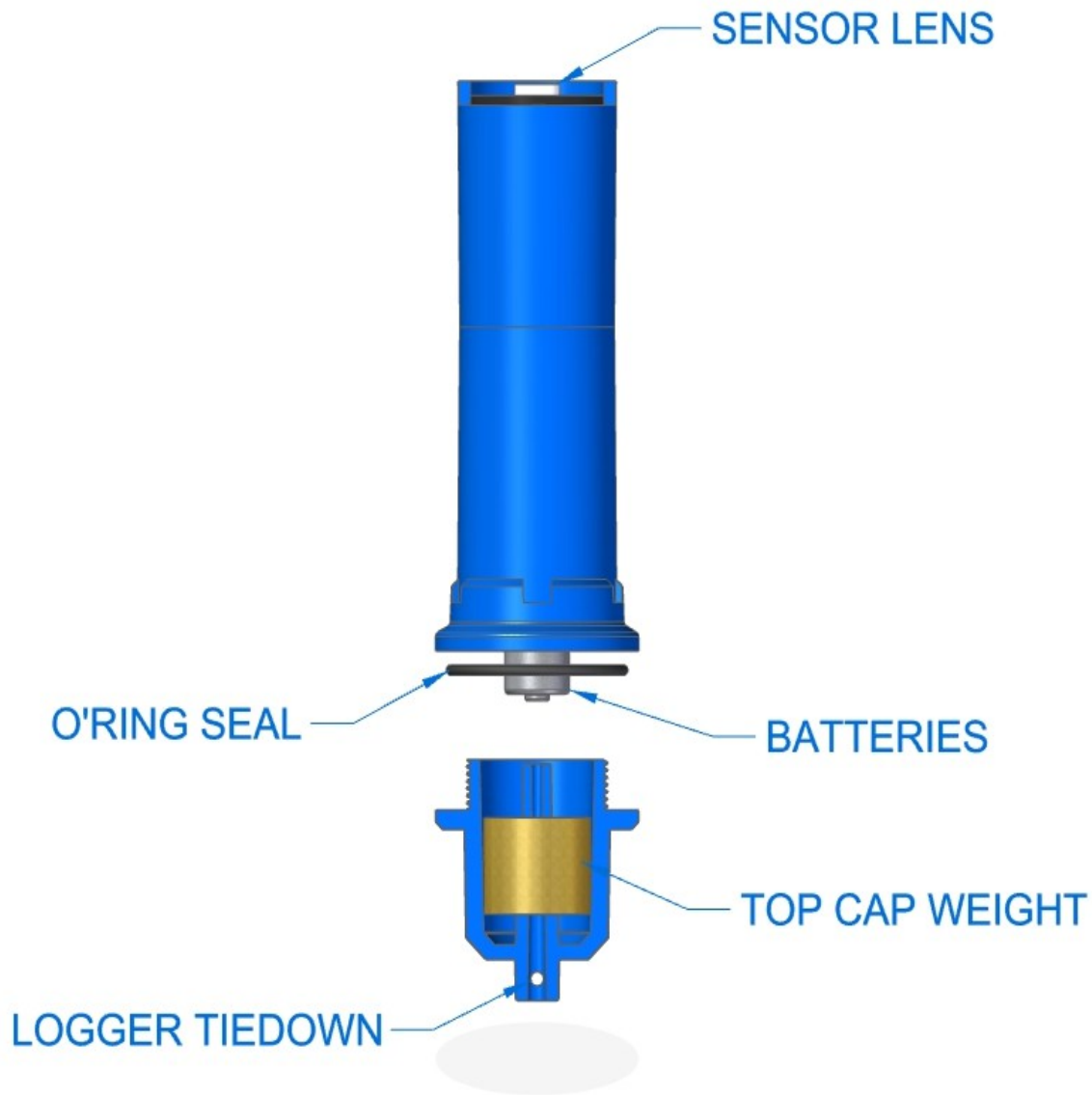
Odyssey® Xtreem PAR Logger User Manual

Xtreem PAR Logger User Diagram



Odyssey® Xtreem PAR Logger User Manual

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Principal of Operation

The photosynthetically active radiation (PAR) logger measures light in the spectral range that plants, and other organisms, use in the process of photosynthesis. Photosynthesis is dependant on the total number of photons in a given time period (interval). The sensor and electronic circuit used in the logger converts light to count value. For normal daylight conditions the interval is typically 5 minutes. The maximum count value is 65535 and we suggest setting the interval with your brightest light to be around 15,000 counts.

The units of this measurement are normally mol $m^{-2}s^{-1}$ and the Xtreem PAR logger can easily be calibrated against a reference standard to give results in SI units typically µmol $m^{-2}s^{-1}$.

The logger also includes an integrated temperature sensor to measure the ambient temperature around the logger. For above ground situations sun loading will prevent this sensor being accurate during daylight hours. For submersible situations this sensor will record the surrounding water temperature.

Installation Methods

The Xtreem PAR logger is extremely versatile so can be used outside, in glass houses or in the ocean at depths up to 30m.

The logger should be mounted vertically with the sensor pointing up. In a typical situation the sensor should not be shaded by surrounding objects.

A low cost saddle clamp is available from Odyssey for mounting the logger to a wooden post or a metal plate.

As an added precaution, use the tie hole in the cap to secure the logger to the clamp.

Sensor Cleaning

The sensor should be kept as clean as possible to get reliable and repeatable results. For above ground installations there is a water drain hole beside the sensor which must be clean. This allows any water to drain away from the sensor.

For submersible installations use a mechanical wiper available from Odyssey.

Installing the Xtract Application

Search Google playstore for the Xtract Application and install as usual. It can also be downloaded from www.OdysseyDataRecoding.com. The application must have access to both Bluetooth and GPS location services.
In the Settings Menu ☰ enter your username and password provided by Dataflow Systems.

Press the Sync to Server button to load the Xtreem logger(s) and configuration(s) from the Xpert Web Portal.

Download the full Odyssey® Xtract user manual from www.OdysseyDataRecoding.com.

Identifying the Logger

By default the Xtreem Logger will arrive with its name being a hexidecimal representation of its serial number. In the Xtract Application select View Menu ☰. Once scanned, the Xtreem loggers located will be shown in the list. The Xtreem logger with the highest signal (also coloured green if it is very close) is the logger that is closest to the tablet / phone.

Setting Up the Logger

The first time the logger is used, unscrew the top cap and remove the battery insulation disc. All user configuration is carried out in the Xpert Web portal. The tablet / phone running the Xtract application transfers the logged data from the Xtreem logger to the Xpert web portal and transfers the configuration into the Xtreem logger. Using a web browser (Firefox is preferred) navigate to www.xpert.nz, then enter your username and password provided by Dataflow Systems. On the Map page (default), select Home from the drop down selection box, then select a logger from the logger selection drop down box. An icon for the selected logger will display on the Map. Click on this icon and an information box above it will pop up. To locate the icon it may be necessary to zoom the Map out to find the Logger.

Download the full Odyssey® Xpert user manual from www.OdysseyDataRecoding.com.

Logger Configuration

1. Select the Logger Config Tab. Enter a Logger Name that will be used to Identify the Logger from now on. The serial number can be used however this is very long and difficult to remember.
2. For most situations use continuous logging. This means once the memory is full it will start overwriting the oldest data first. Start and stop times can also be entered.
3. Choose a logging Interval in Hours, Minutes and Seconds. Intervals selected below 1 minute will force continuous logging to be disabled. At an interval of 10 minutes the logger will not overwrite data for more than a year.
4. In the Site box, add some brief location information to help locate the logger in the future. In the Notes box add any information that may be of use.
5. Select the Time Zone the Logger is deployed at. This is important as it may be different from the time zone where the data is viewed.
6. Press the Submit button to apply the Logger Configuration.

Calibration

1. Select the Calibration Tab.
2. Enter the logger reading in minutes. The logger interval will be calculated from the interval set on the Logger Config page.
3. Enter the Reference reading minutes.
4. Select the units used on the reference. This will be used on the chart and reports.
5. Press the Submit button to apply the Calibration.

Transfer Configuration to Logger

The configuration will be sent to the logger automatically (typically less than 10 minutes) through the tablet / phone running the Xtract Application. To apply this immediately, press the 'Sync to Server' button in the Settings Menu ☰. Once the button has been pressed the time below the button will display the word 'Never', then once synced, it will change to a valid time.

Select the History Menu ☰ in the Xtract Application to view the Logger name(s) entered for the Xtreem logger(s).

The next time the tablet / phone sees the Logger it will connect to it and automatically apply the settings.

User Calibration

Equipment:

- Tablet / Phone with internet connection.
- Reference PAR integrating meter.

In the calibration tab press the Reset button then the submit button. Make sure that this configuration is transferred into the Xtreem PAR logger.

Set the reference meter to any known interval. We suggest 5 minutes or more for this interval.

Place the logger and the reference in the same location in sunlight, making sure that they do not shade each other.

Best results are achieved if this test is started before the sun comes up and finishes once the sun goes down however it can be done with shorter test durations.

Once the tablet has uploaded the readings to the server these will be visible on the chart page.

Export these readings by pressing the Send Report button on the chart page.

Once you have opened the exported file, add all the readings together for the entire test duration. This is the value to enter into the **Logger Reading Total** box on the calibration Page. Enter the entire duration of the test into the **Test Duration** box on the calibration page. The interval is set on the Logger Config page and is automatically filled into **Logger Interval** box on the calibration page but

can't be changed here.

For the reference logger, average the readings for the duration of the test. Enter this value into the **Reference Reading Average** box on the calibration page. Also enter the **Reference Units** used into the units box on the calibration page.

Submit these values and make sure that this configuration is transferred into the Xtreem PAR logger.

The logger is now ready to use. It is possible to check the result by repeating this test for another period.

The calibration is applied when the chart is displayed so if the calibration is changed or the logger Interval is changed the results displayed on the chart will change when refreshed.

If the logger interval is changed it is not necessary to perform another calibration however any data collected with a different logger interval than that shown on the calibration page will not display correctly on the chart.

Collecting Data

Bring the tablet / phone with the Xtract application running within range of the logger and the application will automatically find, connect and collect the logs from the logger. This can be seen happening on the main screen of the Xtract application. If any configuration changes have been made since the logger was last connected, these will be applied at this time. If there is a firmware update for the logger this will also be sent to the logger (this takes several minutes to complete).

To confirm the date of the last log that has been collected, select the History Mode from the Menu ☰ then tap on the logger name.

Viewing Data

Using a web browser (Firefox is preferred) navigate to www.xpert.nz then enter your username and password provided by Dataflow Systems. On the Map page (default) select Home from the drop down box then select a logger to be configured. An Icon for the logger will display on the Map. Click on the icon. (It may be necessary to Zoom the Map out to find the Logger).

ICON pop-up

This pop up shows brief data on the selected logger

Selected Logger Box

This shows the logger which has been selected on the Map tab.

Latest Information Box

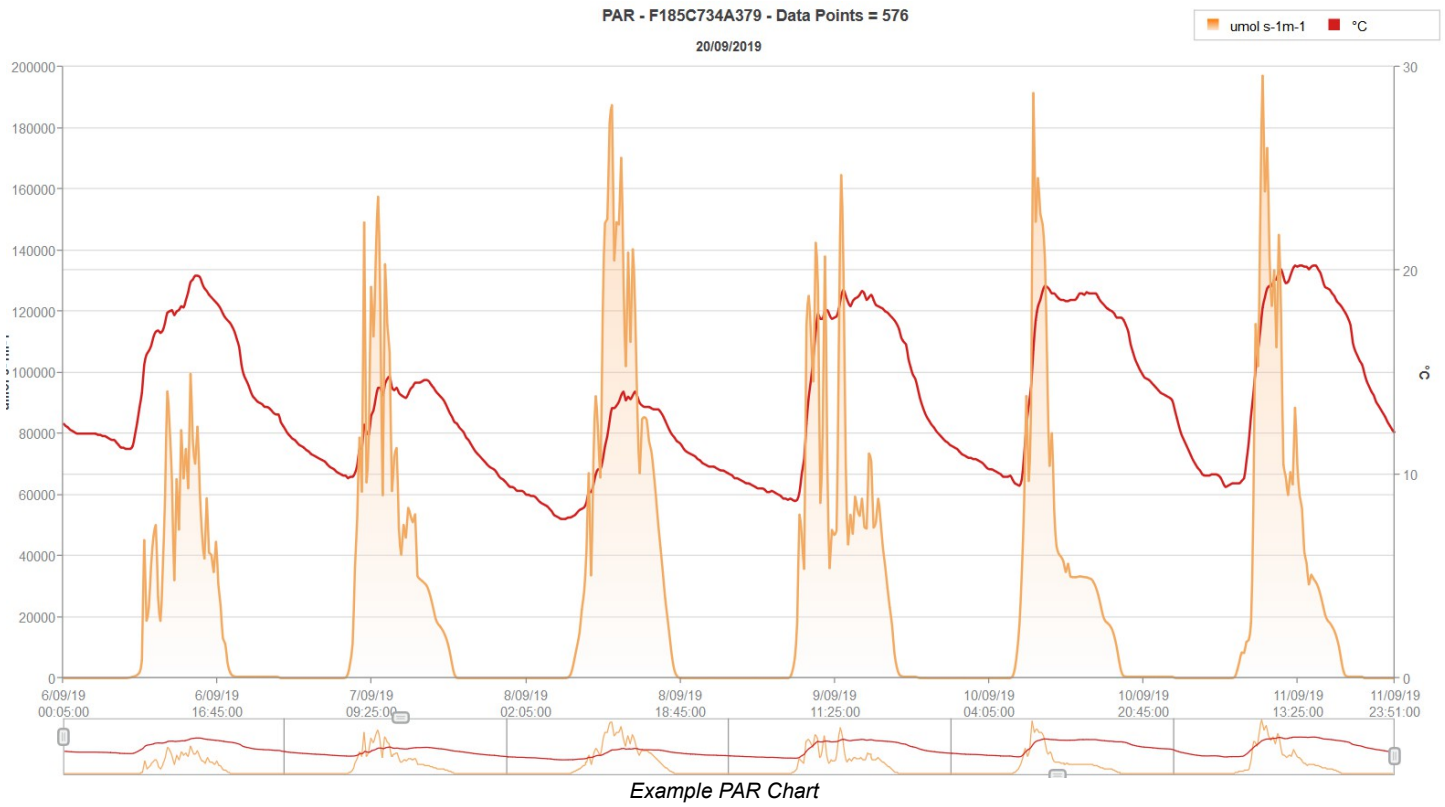
This shows the latest known information about the logger.

Chart

Once the logger has been selected choose the chart option from the menu.

To view a graph of the logged data select a date range, then press the Go button. For a quick view press one of the Last Day, Last 7 Days, or Last 30 Days buttons. To export the data right mouse click on the graph then select the export format required. Alternately, enter a date range then press the Send Report button. A link to download the file will be sent to the registered email address. To view other data collected from the logger, in the drop down box showing 'Primary Data', select 'Diagnostic Data', then select a date range or press one of the quick Day buttons.

In the example chart below, the red trace shows the temperature in C and the orange trace shows the light in umol s^{-1} m^{-2}.



Example PAR Chart

Memory Storage Capacity

The memory is capable of recording at least 60000 records. The number of recording days before the memory is full can be calculated using the following formulae. If continuous logging is enabled the oldest will overwritten first. If continuous logging is disabled no more data will be collected.

$$Recording\ Days = \frac{60000}{Records\ per\ day}$$

The extra two are for the logger temperature and time record.
Examples.

Interval (mins)	Records per Day	Recording Days
60	24	2500
30	48	1250
15	96	625
10	144	416.67
5	288	208.33

It is recommended to use the longest interval required as this reduces the collection time and speeds up the graphing process.

Batteries

Life

The battery life is dependant on a number of variables, including the sampling interval and operating temperature. The remaining battery life is indicated in the Xpert web portal. In typical conditions (25ºC), battery life is expected to be approximately 2 years.

Replacement

To replace the batteries, unscrew the cap and lift out the 2 batteries. Over time the cap can become very tight, so use the special Odyssey® spanner for opening the cap which is available from www.OdysseyDataRecoding.com. As the batteries are non-hazardous, disposal is with your normal rubbish. We recommend with temperatures greater than 0ºC to use the Energizer Max E91 with PowerSeal Technology batteries as these have been tested in our Xtreem products to give the best life and are least likely to leak. At 0ºC the battery life is reduced to half of its calculated life and it further reduces to 1/8th of its life at -20ºC.
For temperatures below 0ºC we recommend Energizer Lithium L91 batteries and these will have a life of greater than 2 years even at -20ºC. Replace the batteries in the logger in the indicated orientation in the battery holder. (Note the unit will not be damaged if the batteries are inserted incorrectly). Before replacing the cap check the O-Ring seal is present, clean and free from dirt. If required apply some silicon grease (available from www.OdysseyDataRecoding.com). Replace the cap and tighten by hand. Do Not use any tools to tighten the cap.

If the logger is not to be used for more than a year, then remove the batteries to prevent any chance of leaking.