



SAFETY WARNING



The device is operated by software controlled from a remote source and power can be interrupted and turned ON again without notice. Please ensure that any connected load that can be switched off by the Plogg device can be returned to full power safely whilst unsupervised.

A failure in the operation of the software could result in the random re-instatement of power to the connected load. IF the load cannot be operated unsupervised then either the Plogg unit must be disconnected or the load switched OFF at source once the operation cycle of the load has been completed.

The maximum current that can be operated through the device is 13 Amps and the Plogg is rated for mains alternating current supply, single phase, at 230 V ~ nominal and 50Hz frequency.

The device contains a normally closed relay.

The plug is earthed.

There are no serviceable parts and in the event of a failure please disconnect the device, notify Energy Optimizers Limited and return the device to us for inspection and, if appropriate, replacement. The device contains live MAINS circuitry. Do not attempt to open the device, disassemble, crush, puncture, short external power sockets or plug pins or expose the device to temperatures greater than 60°C.

MEASUREMENT CATEGORY II – the device is intended for measurements performed on circuits directly connected to the low voltage mains installation (230V ~ A.C.) e.g. household appliances, portable tools, personal computer equipment.

CONNECTION

The PLOGG meter must be plugged into a suitable single phase AC mains supply rated at nominal 230V, 50 Hz frequency via a socket complying with BS1363/A. The load (appliance) should be connected to the PLOGG via a 13A plug (BS1363) fitted with 1.2mm² or 1.50mm² 3 core cable in accordance with BS6500.

The PLOGG is activated approximately 3 seconds after the mains supply has been turned on.

The PLOGG contains an embedded transceiver Bluetooth approved RF device operating at 2.4GHz bandwidth.

NORMAL OPERATION

Normal Environmental Conditions:

- a) Indoor use only;
- b) Altitude up to 2000m;
- c) Temperature of 5°C to 40°C;
- d) Maximum relative humidity of 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C;
- e) MAINS supply voltage fluctuations of up to +/- 10% of the nominal voltage;
- f) POLLUTION degree 1, normally only dry, non-conductive pollution.

Connection to the Mains Supply

The Plogg is a type of adaptor and under normal circumstances the Plogg is connected to the mains supply via the Plogg's 13A plug connection. The appliance load is connected via the Plogg's 13A socket. Once connected to the mains supply and the mains supply is switched ON then A.C. power supply at nominal 230V ~ is available at the Plogg socket and a connected load/appliance will receive power as though connected directly to the mains supply socket.

The device is intended for operation in ambient temperatures below a maximum of 60°C

The Plogg meter records electrical power consumption (kWh and kVAR) and, if applicable, electrical power generated. The data is stored within the Plogg's 64kB memory and can be downloaded in a text file format via the RF wireless connection to a Windows enabled PC or Laptop or viewed as instantaneous readings on the installed Plogg Manager software.

A number of electrical parameters are measured including Volts, Amps, Watts, kWh, kVARh and phase angle.

If the device is not operated in the manner and under the conditions specified above then the protection provided by the equipment may be impaired.

Under the Waste Electrical and Electronic Equipment Regulations 2006 this product should be disposed separately from other household waste and in specially designated local authority operated recycling sites.

PROTECTION

The device is protected against electric shock in NORMAL CONDITION and in SINGLE FAULT CONDITION.

The device is protected against excessive energy in the case of a fault in the unit by a fusible resistor.

METERING

The device contains a Teridian meter system chip with the following features:

Wh accuracy over temperature and 2000:1 range <0.5%

Exceeds IEC62053 /ANSIC 12.20

Voltage reference <50ppm/°C

Four quadrant metering

Voltage/current angle

40-70Hz line frequency range with same calibration

22 bit delta-sigma ADC

Battery backup for RTC

8-bit MPU (80515) – 1 clock cycle per instruction

SOFTWARE INSTALLATION PROCEDURE

SOFTWARE DOWNLOAD

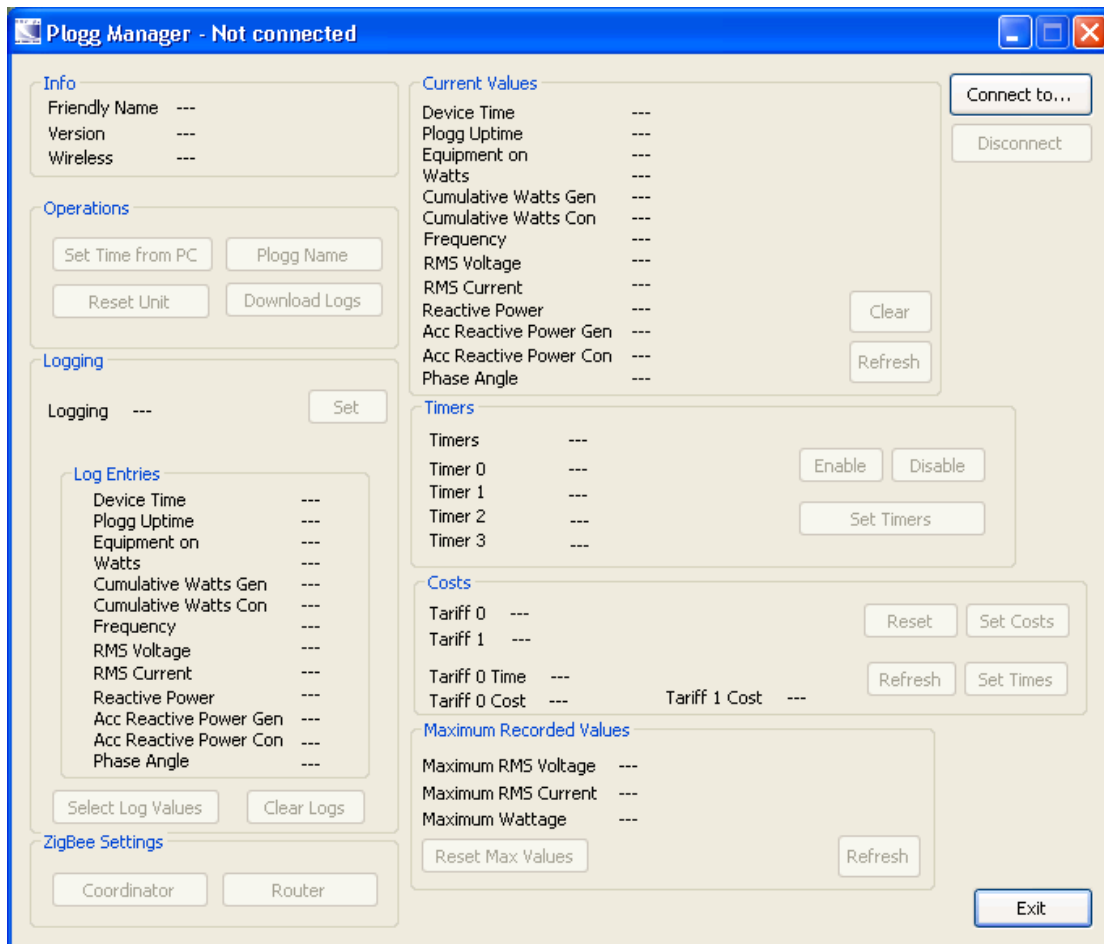
Please go to www.plogg.co.uk and to the Support page, lower section. This is the software download page and you will need to download the Plogg Manager to a convenient folder on your Laptop or PC.

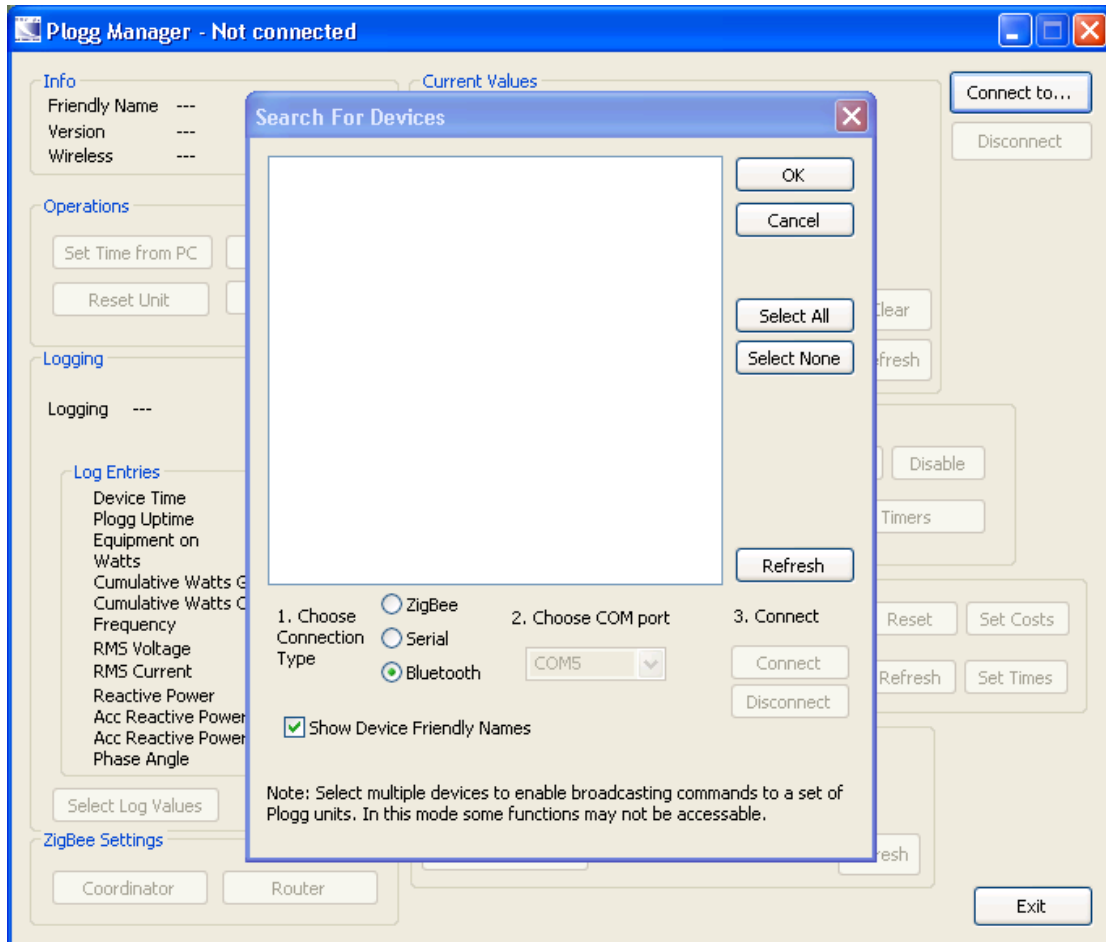
The Plogg Manager programme is the principal operating software package for the Plogg.

The Terminal Manager (optional download) is a support tool that is not normally required but can be downloaded as an alternative control system to aid support issues.

When you have downloaded the Plogg Manager then plug a Bluetooth PLOGG unit into a power socket and switch the mains supply ON. There is no need to connect a load at this stage.

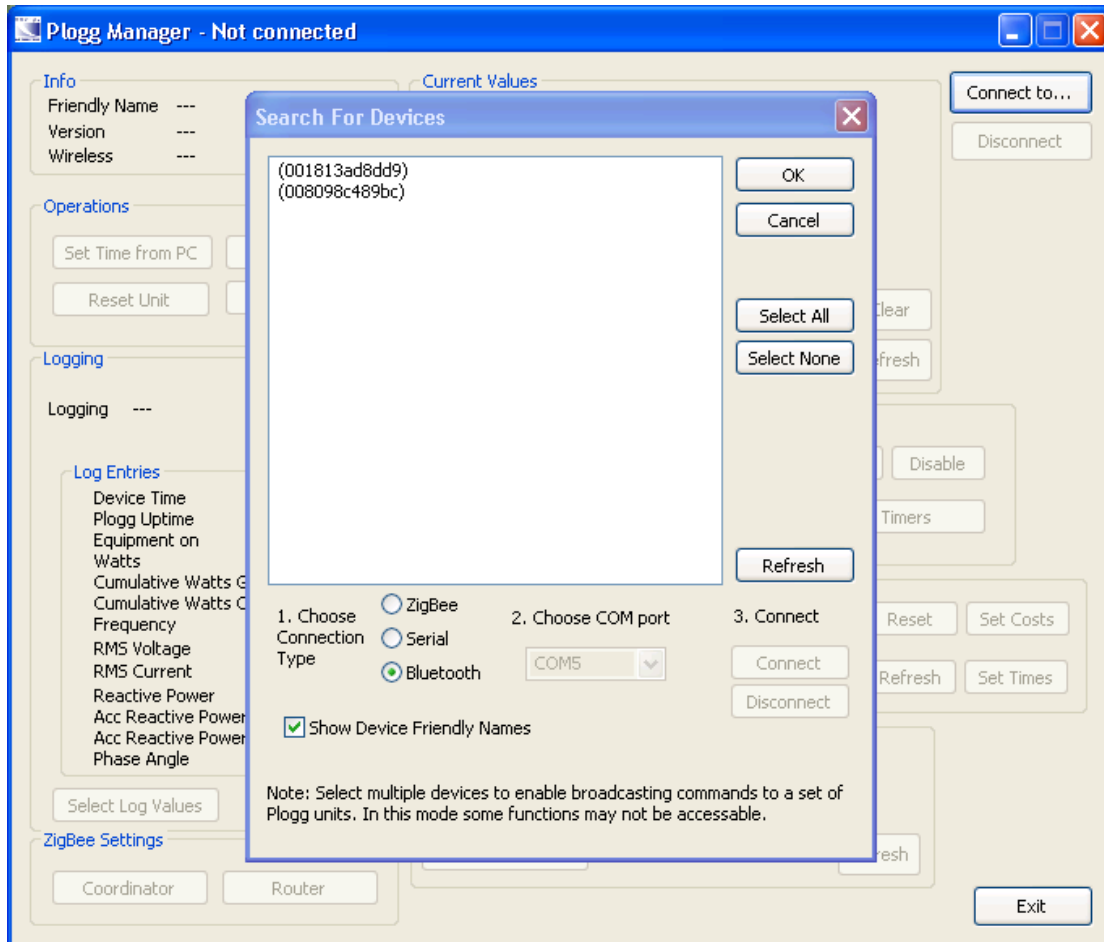
Run the Plogg Manager software by double clicking on the PloggManager.exe file and press "Connect to...".





Select the Bluetooth button and then press either “Connect” in step 3 if available or “Refresh”.

If the “Refresh” button is pressed a second time then the Ploggs' friendly names will be listed.



The Plogg Manager will allow you to list the friendly names of all Bluetooth Plogg devices found although initially, the Plogg units will be identified only by a number. Once located and selected then you should use the Plogg Manager software - Operations section - to adopt a friendly name, which will ensure that future identification is straightforward.

Select the target Plogg device and then press “OK”

Plogg Manager - Connected (Plogg No Name - 008098c489bc)

Info

Friendly Name	Plogg No Name
Version	1.60
Wireless	Bluetooth

Operations

Set Time from PC Plogg Name

Reset Unit Download Logs

Logging

Logging 1 minute(s) Set

Log Entries

Device Time	On
Plogg Uptime	On
Equipment on	On
Watts	On
Cumulative Watts Gen	On
Cumulative Watts Con	On
Frequency	On
RMS Voltage	On
RMS Current	On
Reactive Power	On
Acc Reactive Power Gen	On
Acc Reactive Power Con	On
Phase Angle	On

Select Log Values Clear Logs

ZigBee Settings

Coordinator Router

Current Values

Device Time	2001 JAN 01 01:15:10
Plogg Uptime	0 days 00:14:07
Equipment on	0 days 00:00:32
Watts	0.000 W
Cumulative Watts Gen	0.000 kWh
Cumulative Watts Con	0.000 kWh
Frequency	49.9 Hz
RMS Voltage	245.576 V
RMS Current	0.002 A
Reactive Power	0.000 VAR
Acc Reactive Power Gen	0.000 KVARh
Acc Reactive Power Con	0.000 KVARh
Phase Angle	0 Degrees

Clear Refresh

Timers

Timers disabled Enable Disable

Timer 0	0000-0000
Timer 1	0000-0000
Timer 2	0000-0000
Timer 3	0000-0000

Set Timers

Costs

Tariff 0	0.000kWh, Cost 0.00
Tariff 1	0.000kWh, Cost 0.00

Reset Set Costs

Tariff 0 Time	0000-0000
Tariff 0 Cost	0
Tariff 1 Cost	0

Refresh Set Times

Maximum Recorded Values

Maximum RMS Voltage	245.616 V at 2001 JAN 01 01:15:03
Maximum RMS Current	0.143 A at 2001 JAN 01 01:01:07
Maximum Wattage	32.400 W at 2001 JAN 01 01:01:07

Reset Max Values Refresh

Connect to...

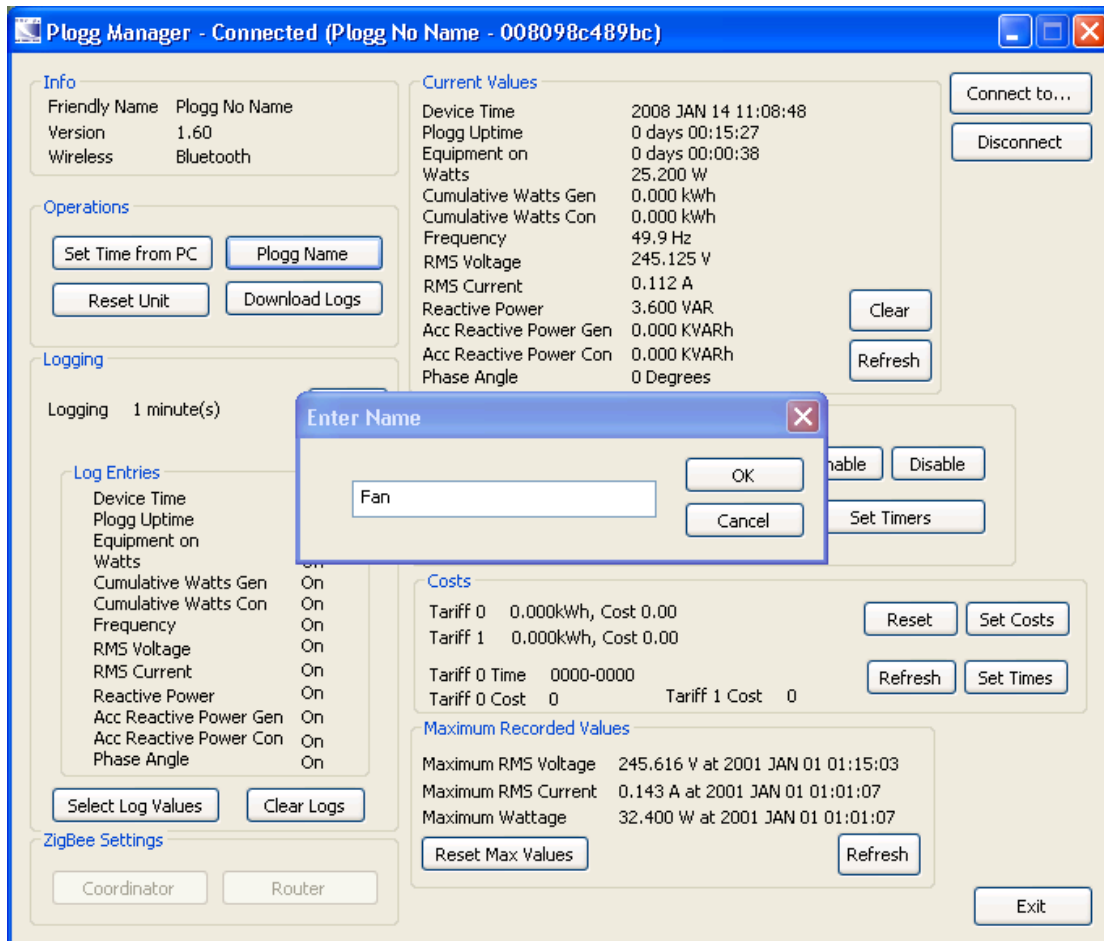
Disconnect

Exit

This brings you to the Main Control page.

Operations:

Set Plogg name



Select Plogg Name and then enter your chosen name in the drop down box and then press “OK”

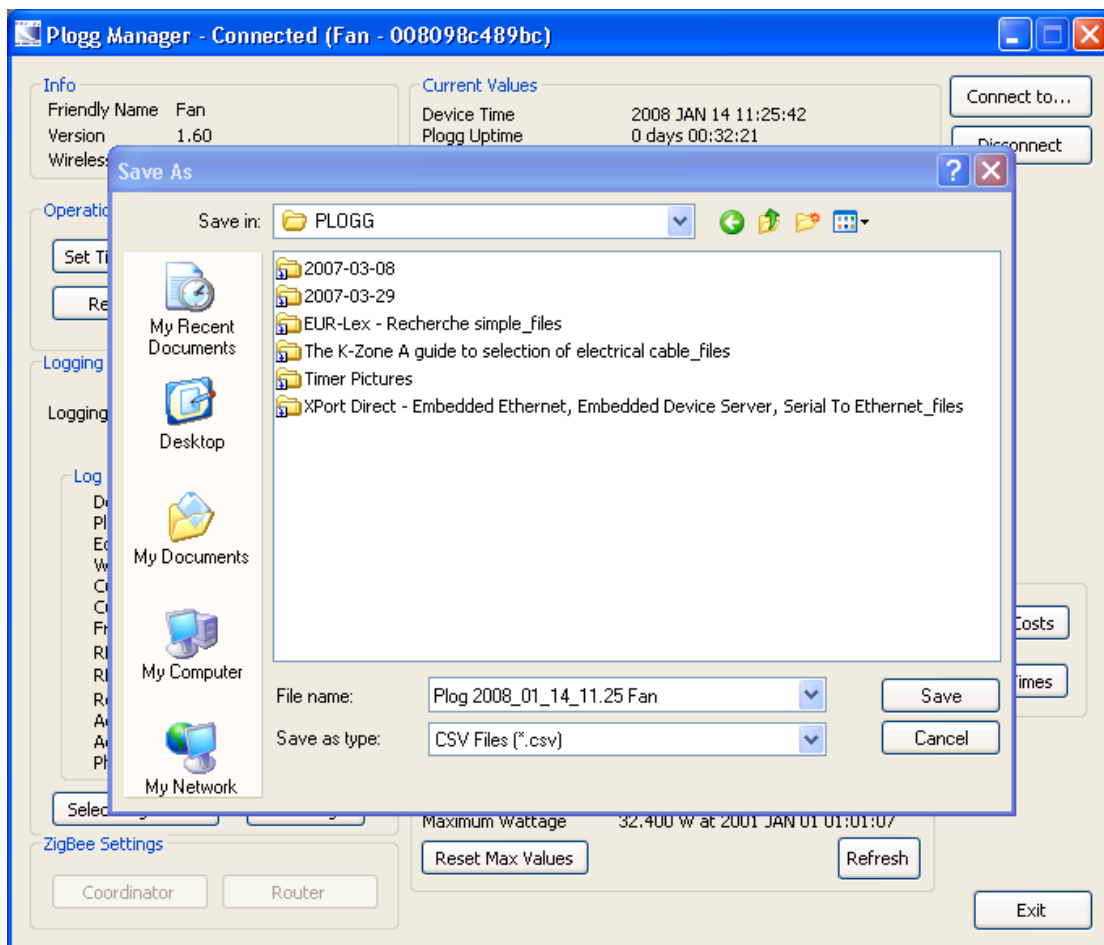
Warning: Resetting the name will disconnect the device. Do not attempt to select any tab until the “Connect to..” tab is highlighted again. Press this tab and repeat the basic connection steps.

Reset Unit

The Reset Unit is a support only function and undertakes a soft restart – equivalent of switching the mains supply to the Plogg device OFF and ON.

Download logs

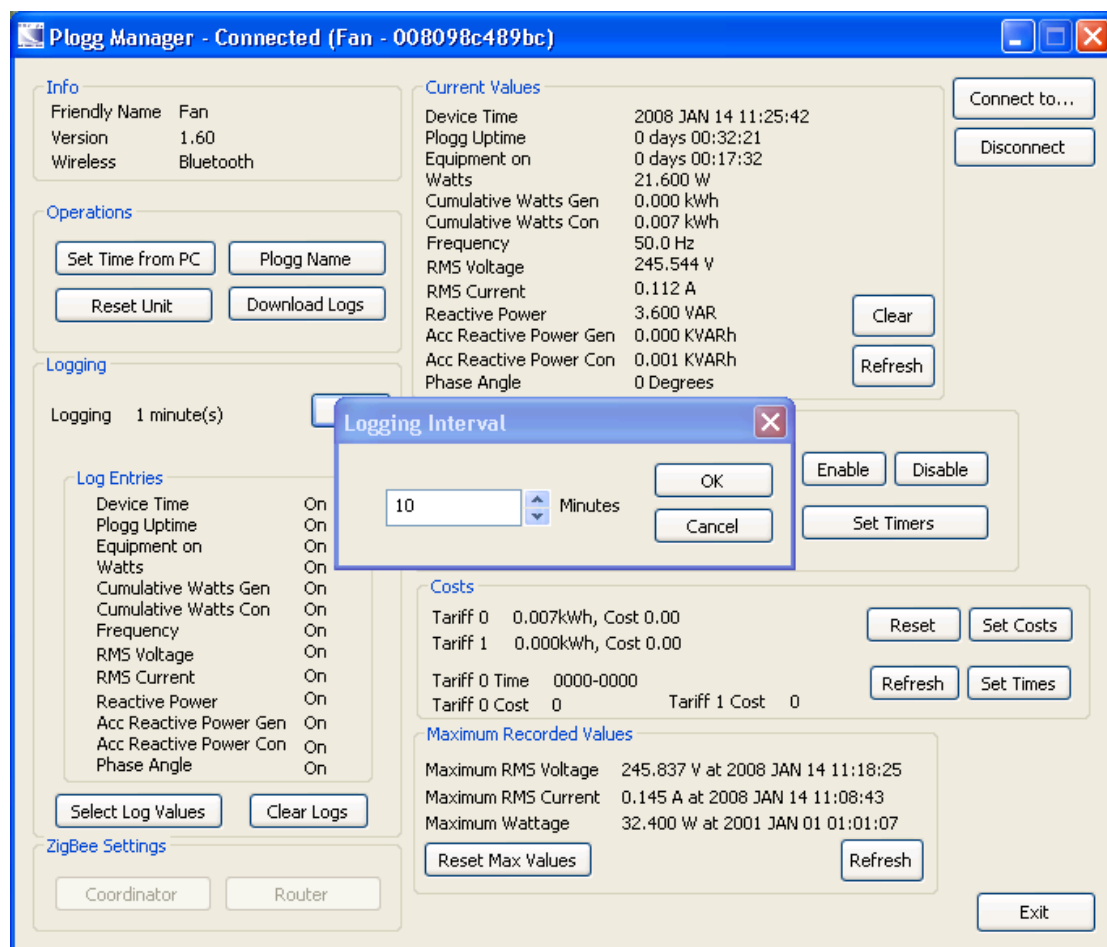
Press “Download Logs” and the drop down menu will ask for a location and file name for the logs. The logs are saved in .csv file format, which can be accessed from an Excel application for further analysis and charting functions.



The downloaded logs provide the basis for the Graphing feature but these must be saved in their original .csv format and do not save them using Excel.

Logging

Set the logging interval required and the data fields that you wish to log e.g. the cumulative values for kWh and the Device Time and Plogg Uptime.

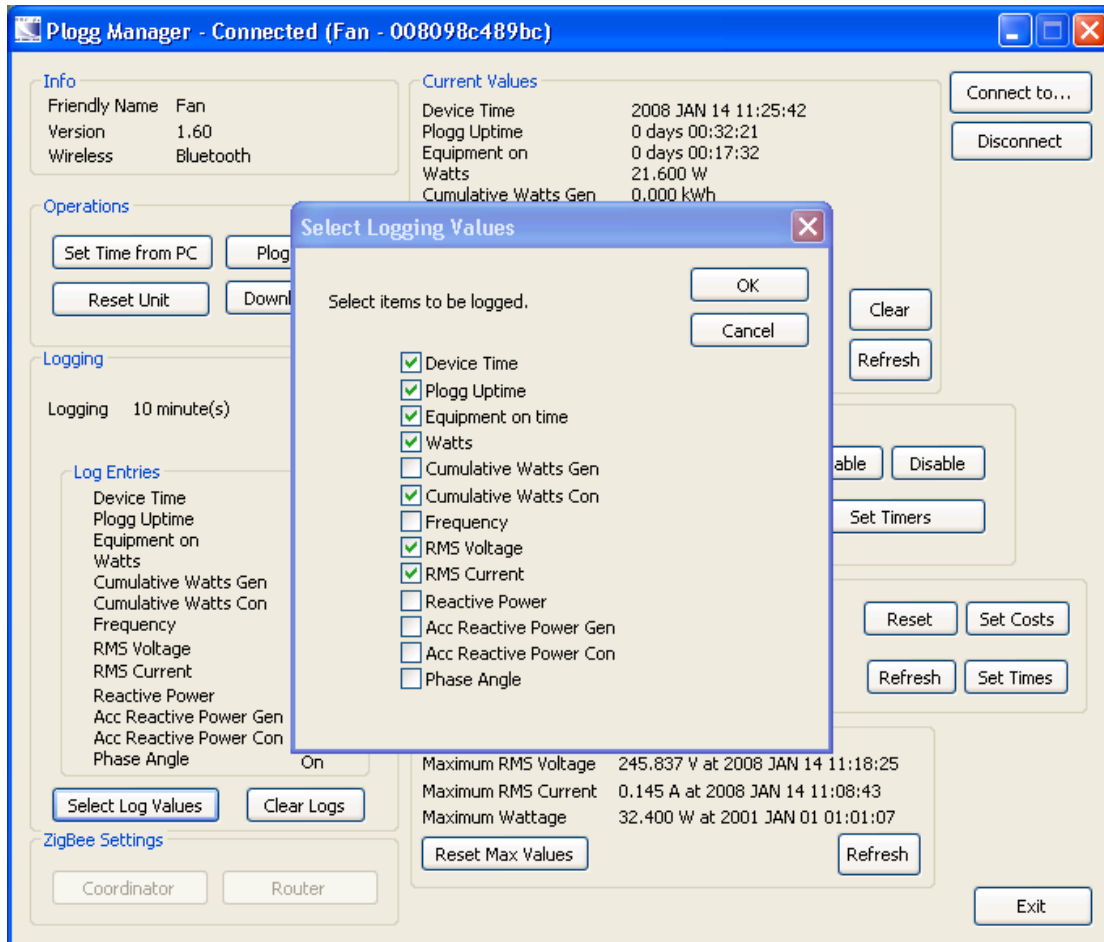


The screenshot shows the 'Plogg Manager - Connected (Fan - 008098c489bc)' window. A 'Logging Interval' dialog box is open, showing a value of 10 minutes. The main window has several sections:

- Info:** Friendly Name: Fan, Version: 1.60, Wireless: Bluetooth.
- Operations:** Buttons for 'Set Time from PC', 'Plogg Name', 'Reset Unit', and 'Download Logs'.
- Logging:** Logging interval set to 1 minute(s). A 'Logging Interval' dialog box is open, showing a value of 10 minutes.
- Log Entries:** A list of data fields with checkboxes to select or deselect logging for each. All are currently checked (On).
- Current Values:** Real-time data including Device Time (2008 JAN 14 11:25:42), Plogg Uptime (0 days 00:32:21), Equipment on (0 days 00:17:32), Watts (21.600 W), Cumulative Watts Gen (0.000 kWh), Cumulative Watts Con (0.007 kWh), Frequency (50.0 Hz), RMS Voltage (245.544 V), RMS Current (0.112 A), Reactive Power (3.600 VAR), Acc Reactive Power Gen (0.000 KVARh), Acc Reactive Power Con (0.001 KVARh), and Phase Angle (0 Degrees).
- Costs:** Tariff 0 (0.007kWh, Cost 0.00), Tariff 1 (0.000kWh, Cost 0.00). Includes buttons for 'Reset', 'Set Costs', 'Refresh', and 'Set Times'.
- Maximum Recorded Values:** Maximum RMS Voltage (245.837 V at 2008 JAN 14 11:18:25), Maximum RMS Current (0.145 A at 2008 JAN 14 11:08:43), Maximum Wattage (32.400 W at 2001 JAN 01 01:01:07). Includes 'Reset Max Values' and 'Refresh' buttons.
- ZigBee Settings:** Buttons for 'Coordinator' and 'Router'.
- Buttons:** 'Connect to...', 'Disconnect', 'Clear', 'Refresh', 'Enable', 'Disable', 'Set Timers', 'Exit'.

The logging interval can be set in minutes form 1 minute to 65535 minutes (45 days).

Press "OK" to confirm set the input interval.



Select Log values

To alter the fields that you wish to log simply press the "Select Log Values" button and then select with a tick (or deselect) the fields that you wish to log.

Instantaneous values will be shown in the Plogg Manager and the logs can be downloaded as a .csv file for capture by Excel on your PC.

Please note that the rechargeable batteries will take 24 hours to reach full charge - i.e. to support the full memory function.

Device Time – this is the Real Time Clock setting for the device that is set from your PC or Laptop clock.

Plogg Uptime – this is the time that the Plogg unit has been activated – this value cannot be reset.

Equipment On – this is the total amount of time that a load has been connected to the Plogg and has been drawing power.

Watts is the measurement of real power that results in the net transfer of energy in one direction. The Plogg calculates this by taking the product of the r.m.s. values of the fundamental frequency components of voltage and current multiplied by the cosine of the phase angle between them.

Cumulative Watts Gen – this is the cumulative value of Watts generated expressed in kWh. The Plogg has four quadrant metering and is able to measure the amount of energy exported, gross, e.g. from a wind turbine or CHP unit.

Cumulative Watts Con – this is the cumulative value of Watts consumed expressed in kWh

Frequency – this the frequency at which voltage and current are transmitted in A.C. supplies – usually 50Hz

RMS Voltage - is the [difference of electrical potential](#) between two points of an electrical or [electronic circuit](#), expressed in [volts](#).

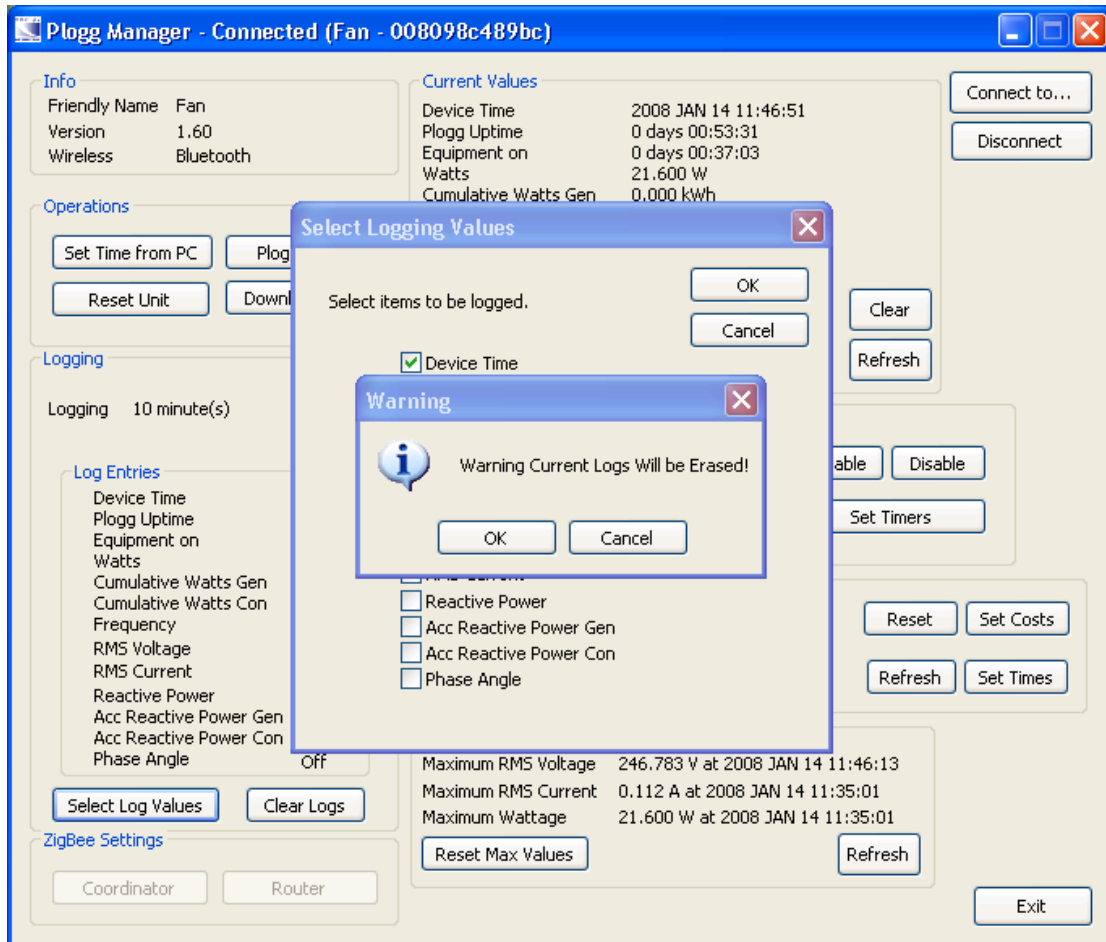
RMS Current - The amount of electric current is the amount of electric charge (measured in coulombs) flowing through that surface over time and is expressed in Amperes.

Reactive Power - The Plogg calculates this by taking the product of the r.m.s. values of the fundamental frequency components of voltage and current multiplied by the sine of the phase angle between them and is expressed in VAR.

Acc Reactive Power Con – this is the cumulative amount of Reactive Power consumed and is expressed in kVARh

Acc Reactive Power Gen – this is the cumulative amount of Reactive Power generated and is expressed in kVARh

Phase Angle - the phase angle (φ) between the current and voltage sinusoid waveforms.



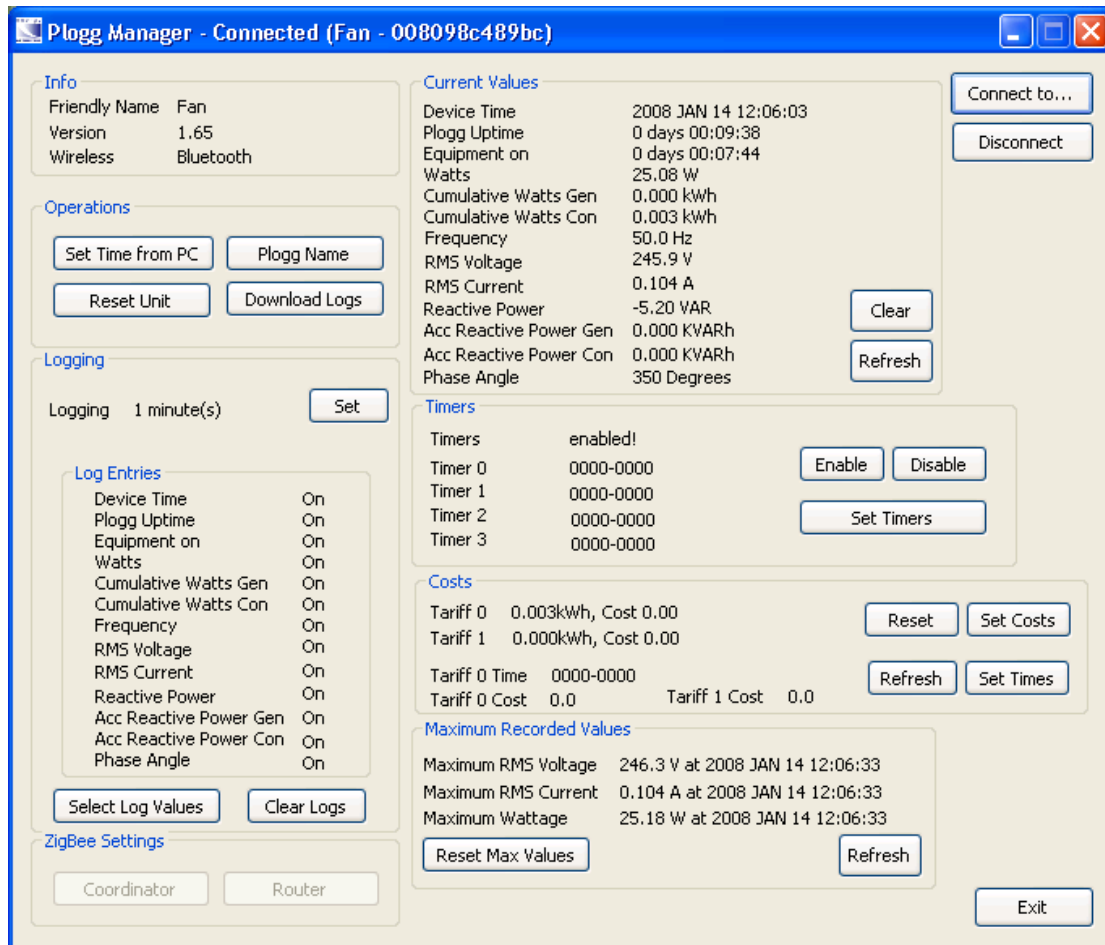
Warning : Resetting the logged fields will cause the current logs to be erased. IF the historical data is to be retained then first download the logs and then reset the fields.

ZigBee Settings

This section applies only to the Plogg ZigBee versions and is inaccessible for Bluetooth versions.

Current Values

This section of the screen shows the instantaneous values against each of the listed parameters for the device time shown.



Plogg Manager - Connected (Fan - 008098c489bc)

Info
 Friendly Name: Fan
 Version: 1.65
 Wireless: Bluetooth

Operations
 Set Time from PC | Plogg Name
 Reset Unit | Download Logs

Logging
 Logging: 1 minute(s) [Set]

Log Entries

Device Time	On
Plogg Uptime	On
Equipment on	On
Watts	On
Cumulative Watts Gen	On
Cumulative Watts Con	On
Frequency	On
RMS Voltage	On
RMS Current	On
Reactive Power	On
Acc Reactive Power Gen	On
Acc Reactive Power Con	On
Phase Angle	On

Select Log Values | Clear Logs

ZigBee Settings
 Coordinator | Router

Current Values

Device Time	2008 JAN 14 12:06:03
Plogg Uptime	0 days 00:09:38
Equipment on	0 days 00:07:44
Watts	25.08 W
Cumulative Watts Gen	0.000 kWh
Cumulative Watts Con	0.003 kWh
Frequency	50.0 Hz
RMS Voltage	245.9 V
RMS Current	0.104 A
Reactive Power	-5.20 VAR
Acc Reactive Power Gen	0.000 KVARh
Acc Reactive Power Con	0.000 KVARh
Phase Angle	350 Degrees

Clear | Refresh

Timers

Timers: enabled! [Enable] [Disable]

Timer 0	0000-0000
Timer 1	0000-0000
Timer 2	0000-0000
Timer 3	0000-0000

Set Timers

Costs

Tariff 0	0.003kWh, Cost 0.00
Tariff 1	0.000kWh, Cost 0.00

Reset | Set Costs

Tariff 0 Time	0000-0000
Tariff 0 Cost	0.0
Tariff 1 Cost	0.0

Refresh | Set Times

Maximum Recorded Values

Maximum RMS Voltage	246.3 V at 2008 JAN 14 12:06:33
Maximum RMS Current	0.104 A at 2008 JAN 14 12:06:33
Maximum Wattage	25.18 W at 2008 JAN 14 12:06:33

Reset Max Values | Refresh

Connect to... | Disconnect | Exit

The **“Clear”** button resets the Cumulative registers for Watts Gen, Watts Con, Reactive Power Gen and Reactive Power Con.

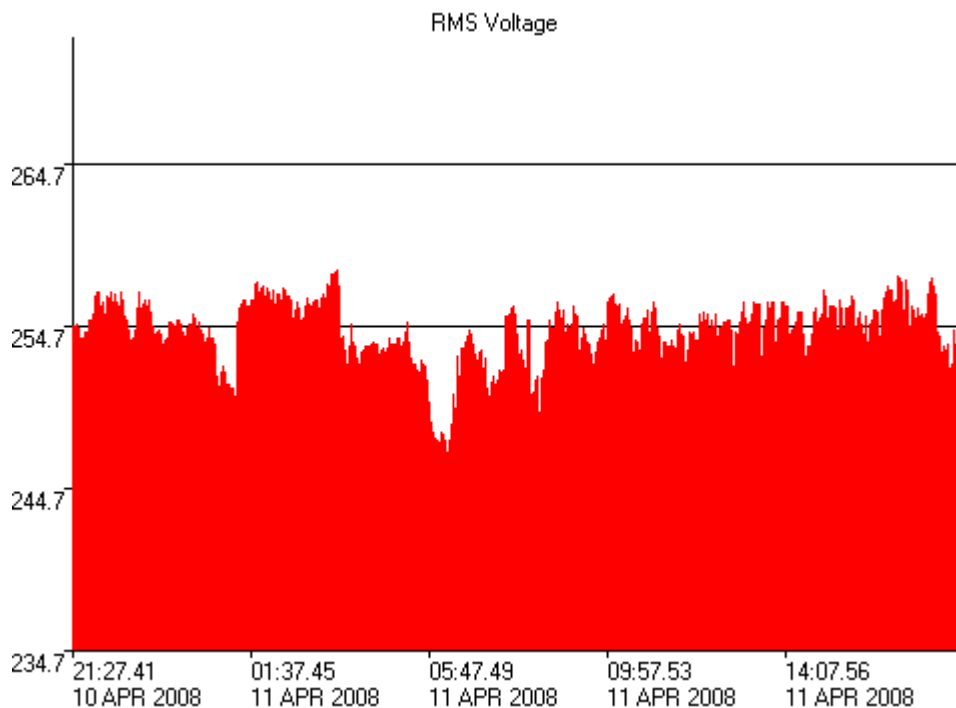
The **“Refresh”** button requests an update of all of the Current Values.

Show Graph

This feature uses the data log files retrieved from the Ploggs , which must have been stored in their original .csv format.

The Y-axis can be changed by selecting one of the logged parameters from the pop-down menu. The X-axis offers either a date value or a log number.

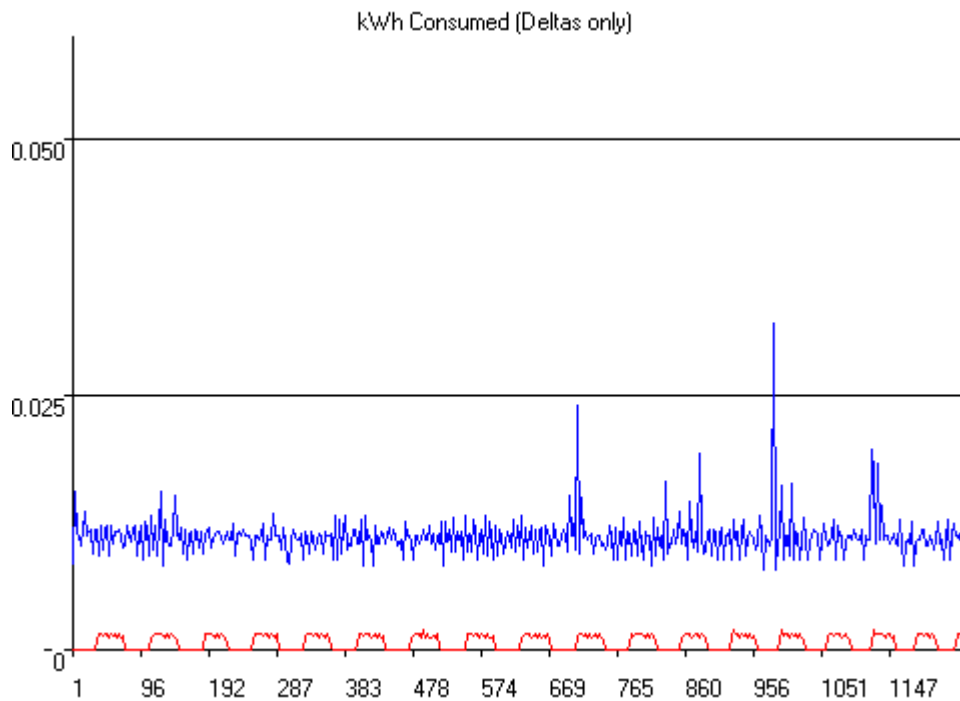
Under the Options menu the graph can be displayed in bar chart or line format. A copy of the graph can be copied to the Clipboard for insertion into either a text editor or a spreadsheet.



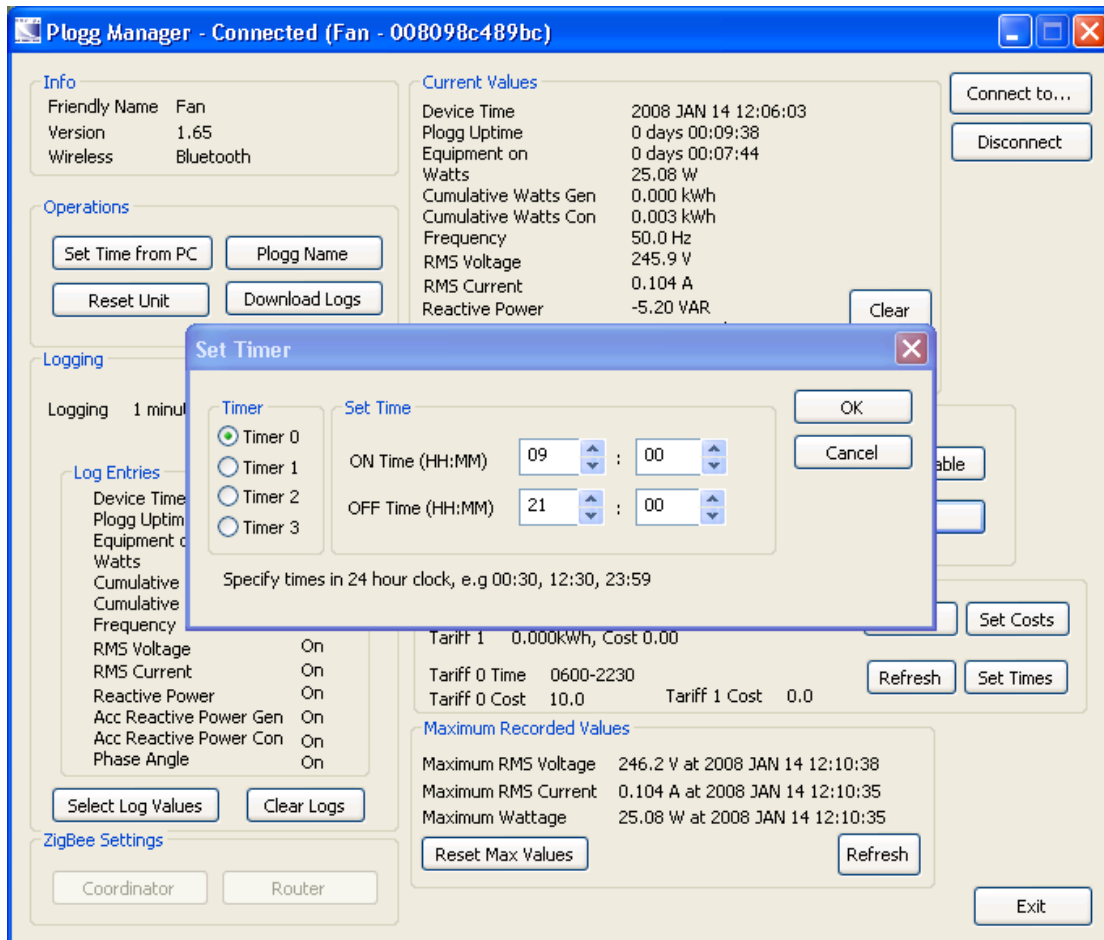
Compare Graphs

Use this option if you wish to compare the results from two sets of data for similar loads over a similar evaluation period. The data can only be presented with the X-axis showing the log number.

When selecting the data logs to be shown in a chart select the first log from the pop-down menu, click on Open, then repeat this step for the second data log.



Timers



The "Enable" and "Disable" buttons are global command settings and the latter will override individual timers, if set. Toggling between these buttons will turn the connected load ON and OFF.

If no timers have been set then activating the "Enable" button will turn the connected load, OFF.

Select "Enable" prior to setting the timers.

IF the timers are enabled and there are valid timer settings then the Plogg device will turn ON the connected load when the Plogg "Device Time" is within any of the timer settings. If the Device Time lies outside all of the timer settings then the connected load will be turned OFF.

Timers can overlap e.g. timer 0 is set to 12:30->18:00 and timer 1 is set to 16:00 -> 20:00 will result in the power being ON to the connected load between 12:30 and 20:00.

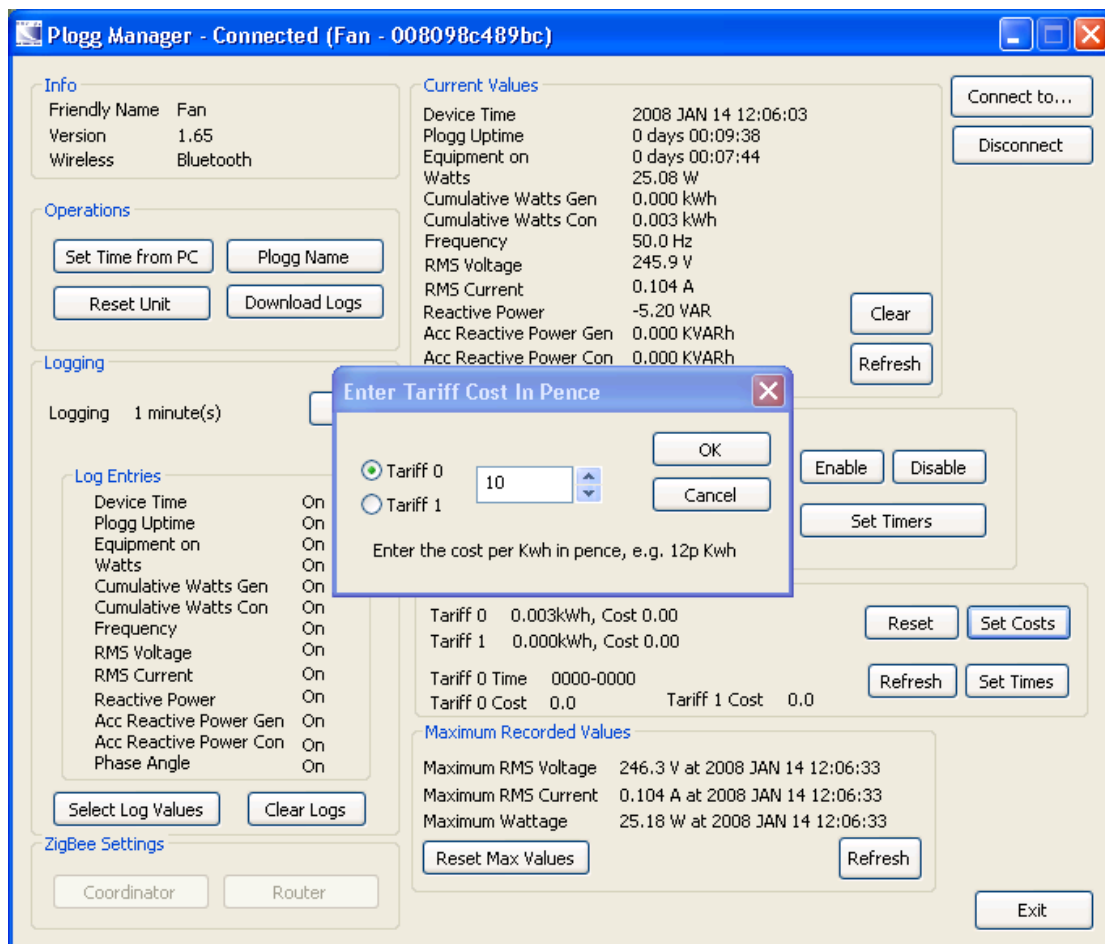
RELAY

The Plogg contains an appropriately 16A rated, normally closed relay.

The relay is normally closed which means that when the mains supply to the Plogg is turned ON this results in the mains supply being connected to the appliance, provided that the Timer function has not been enabled.

Warning: If the Plogg device has the Timers enabled and the relay has been activated then the connected load will be turned OFF. If subsequently, there is a fault in the unit or the Plogg is switched OFF then the relay will be deactivated. Upon power being restored, the connected appliance will also have power returned and the device will be turned ON.

Costs



The screenshot shows the 'Plogg Manager - Connected (Fan - 008098c489bc)' window. A dialog box titled 'Enter Tariff Cost In Pence' is open, allowing the user to set the cost per kWh in pence. The dialog has two radio buttons for 'Tariff 0' (selected) and 'Tariff 1'. A text input field contains the value '10'. Below the input field, it says 'Enter the cost per Kwh in pence, e.g. 12p Kwh'. There are 'OK' and 'Cancel' buttons.

The background interface includes several sections:

- Info:** Friendly Name: Fan, Version: 1.65, Wireless: Bluetooth.
- Operations:** Buttons for 'Set Time from PC', 'Plogg Name', 'Reset Unit', and 'Download Logs'.
- Logging:** Logging interval set to 1 minute(s).
- Log Entries:** A list of parameters with checkboxes, all currently checked (On).
- ZigBee Settings:** Buttons for 'Coordinator' and 'Router'.
- Current Values:** A table of real-time data:

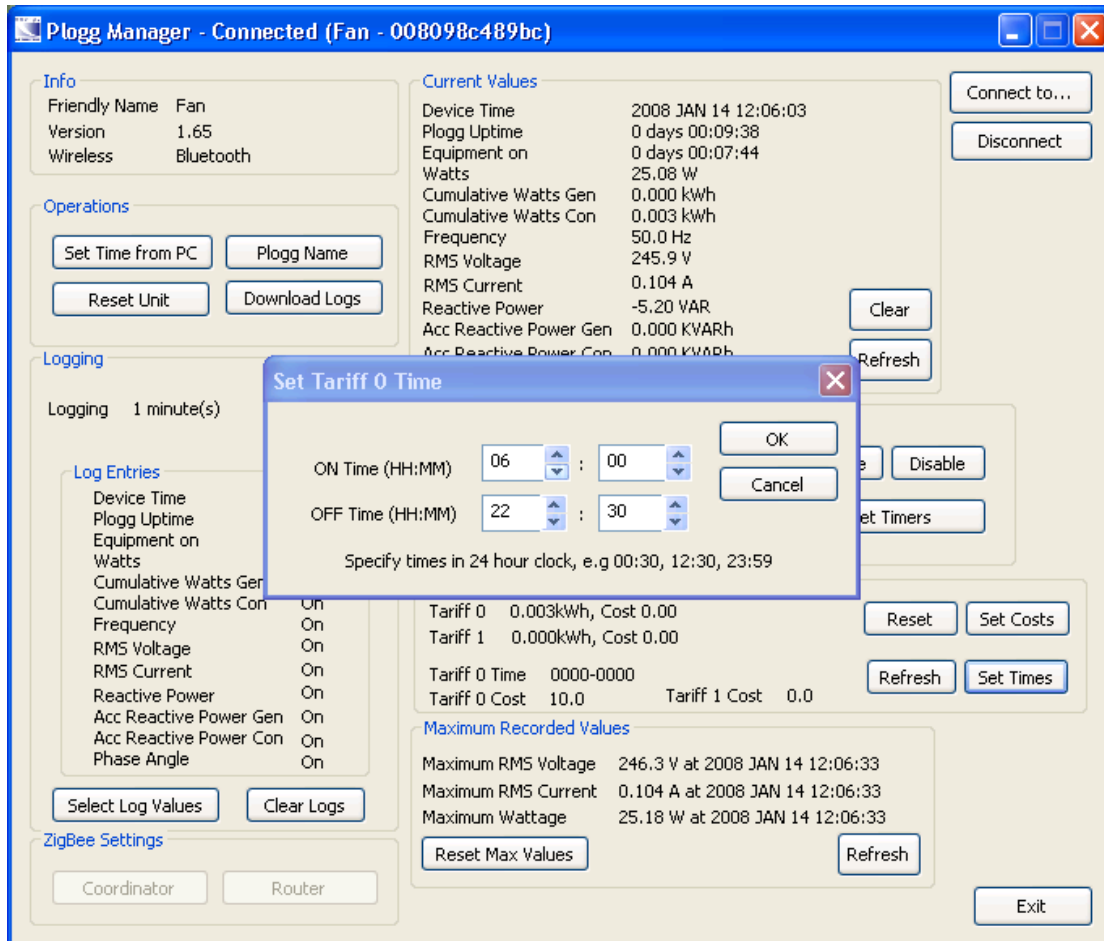
Device Time	2008 JAN 14 12:06:03
Plogg Uptime	0 days 00:09:38
Equipment on	0 days 00:07:44
Watts	25.08 W
Cumulative Watts Gen	0.000 kWh
Cumulative Watts Con	0.003 kWh
Frequency	50.0 Hz
RMS Voltage	245.9 V
RMS Current	0.104 A
Reactive Power	-5.20 VAR
Acc Reactive Power Gen	0.000 KVARh
Acc Reactive Power Con	0.000 KVARh
- Tariff Summary:**

Tariff 0	0.003kWh, Cost 0.00
Tariff 1	0.000kWh, Cost 0.00
Tariff 0 Time	0000-0000
Tariff 0 Cost	0.0
Tariff 1 Cost	0.0
- Maximum Recorded Values:**

Maximum RMS Voltage	246.3 V at 2008 JAN 14 12:06:33
Maximum RMS Current	0.104 A at 2008 JAN 14 12:06:33
Maximum Wattage	25.18 W at 2008 JAN 14 12:06:33

The Plogg unit accepts two tariff rates and the cost level is set in whole pence values only.

If further degrees of accuracy in the tariff prices are required then the log values can be adjusted in Excel.



Setting tariff 0 time sets the converse time for tariff 1.

Maximum Recorded Values

The date and time stamps for the maximum recorded values for Voltage, Current and Wattage and their associated values are shown for the period since these values were last reset.

To obtain the latest values press "Refresh"

To reset the registers to zero press "Reset Max Values"

SUPPORT ASSISTANCE

Please call our support line on +44 (0) 1472 266731 if you have any questions.