PC - Remote Monitoring System

USER Guide

Revision 2.1, 2015

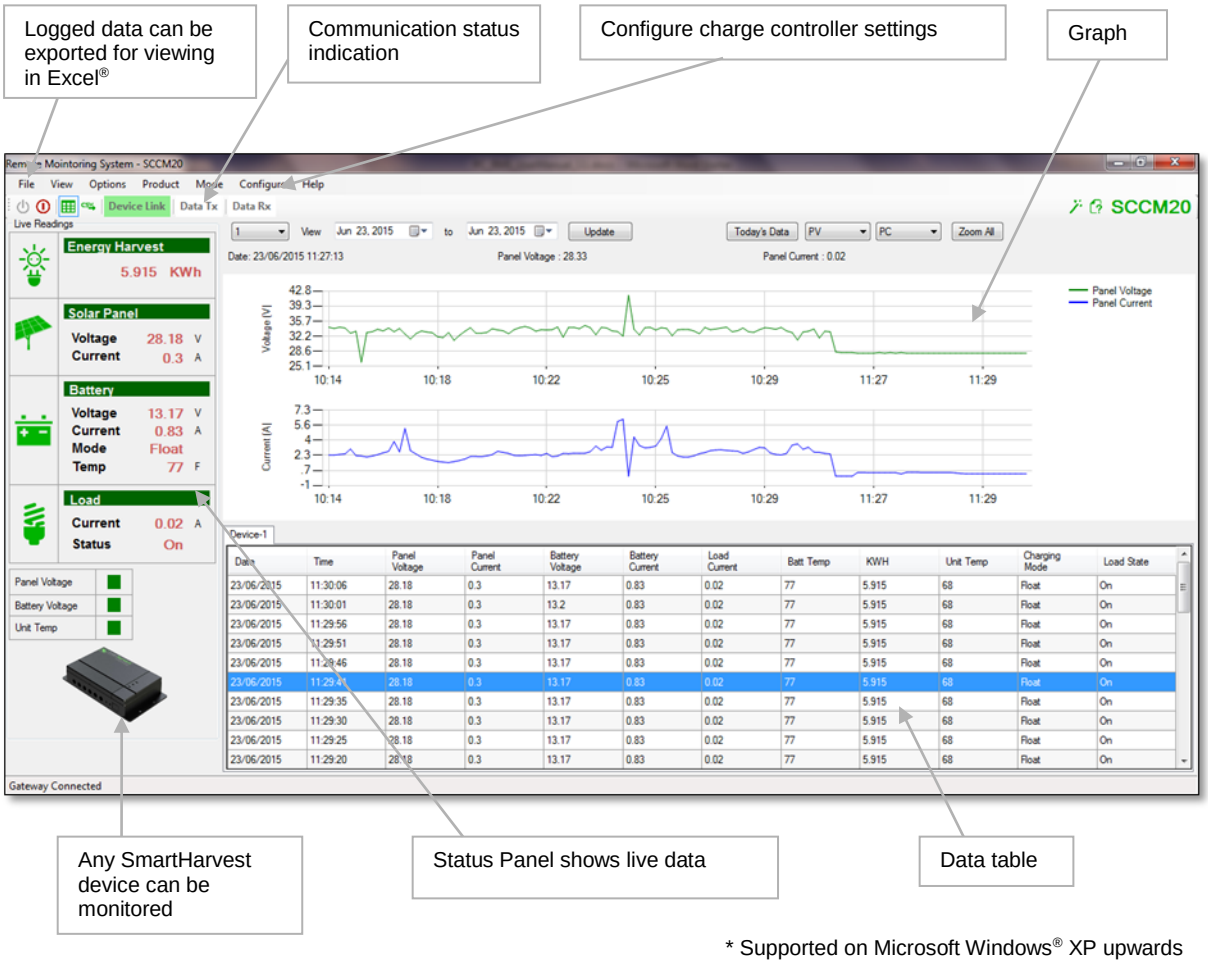
1 Contents

2 Overview

The PC-Remote Monitoring System (PC-RMS) is used to monitor and display the working parameters of an MPP or PWM Charge Controller, or a PCU. Certain charge controllers also support user settable parameters, which can be configured through PC-RMS. This application runs on Microsoft Windows®, workstation or notebook. It is supported by custom communication hardware to interface with the device to be monitored.

3 Introduction and key features

PC-RMS is used to monitor and log the target Charge Controller's working data like the Energy harvested, Panel and Battery parameters, Load current and Temperature. The target being monitored can be a single device, or several devices connected to an RS-485 bus. The user can select which devices need to be monitored, and also the interval in which the data polling occurs.

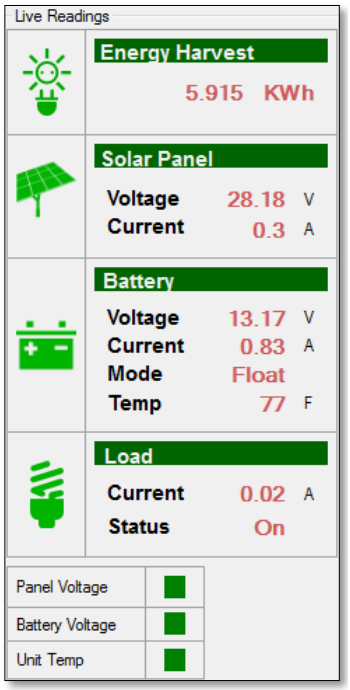


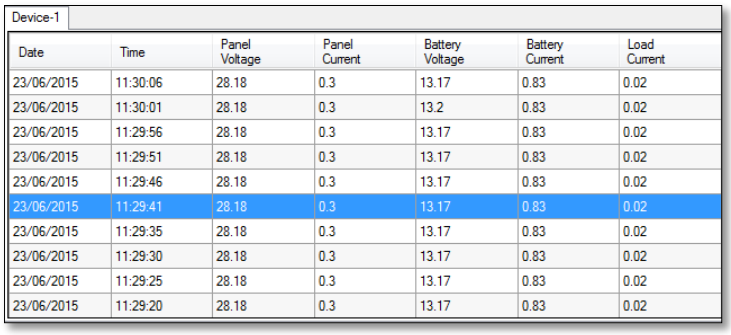
* Supported on Microsoft Windows® XP upwards

Some of the key highlights of PC-RMS are -

Feature- Status panel

- The most recent data obtained by polling a device is shown in the Status panel on the left. The panel contains live readings and alerts. The poll data can also be optionally shown in a tabular format in the main window. This table is refreshed as new data is obtained. The data is also simultaneously saved into a database.



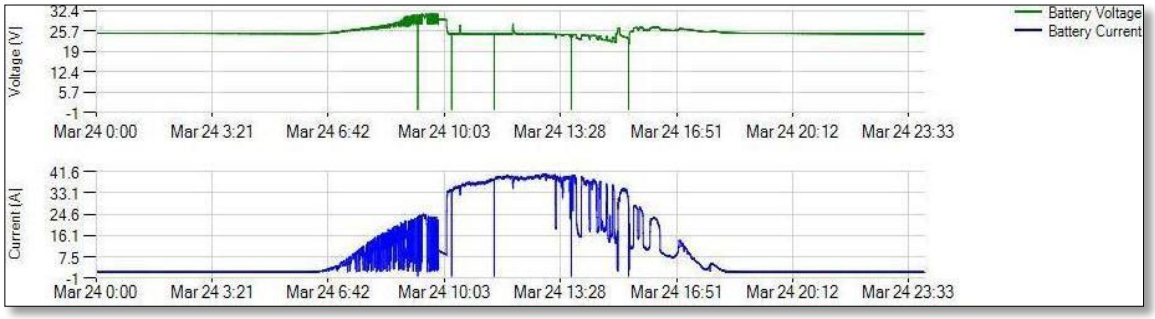


Device-1

Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	Load Current
23/06/2015	11:30:06	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:30:01	28.18	0.3	13.2	0.83	0.02
23/06/2015	11:29:56	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:51	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:46	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:41	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:35	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:30	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:25	28.18	0.3	13.17	0.83	0.02
23/06/2015	11:29:20	28.18	0.3	13.17	0.83	0.02

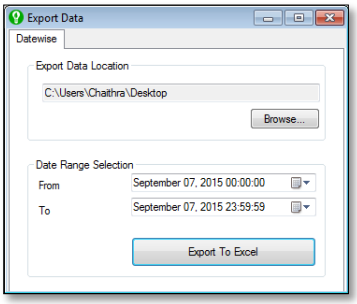
Feature- Graph view

- The logged data can be viewed as a graph. It is possible to select two parameters and compare their respective graphs.



Feature- Exporting data

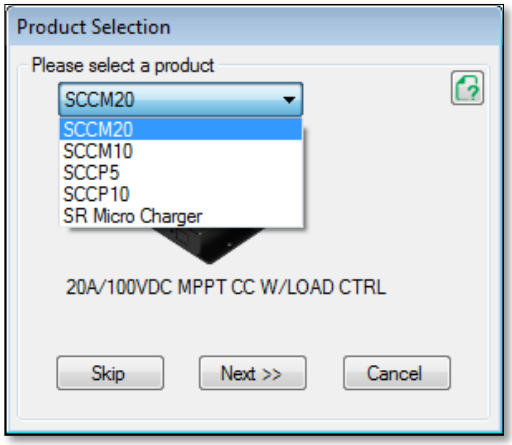
- The user can select a date range and export the log data into a file, which can later be opened and viewed on Microsoft Excel® or equivalent spread sheet application.



	A	B	C	D	E	F	G	H
1	SNo	Date	Time	Panel Vol	Panel Cur	Battery Vo	Unit Temp	KWH
2	1	07/09/2015	9:08:21	42.3	0	41.55	32	16.413
3	2	07/09/2015	9:08:22	40.2	0.65	59.46	37	14.623
4	3	07/09/2015	9:08:23	40.86	0.39	59.3	35	15.53
5	4	07/09/2015	9:08:24	40.86	0.8	59.3	41	31.246
6	5	07/09/2015	9:08:25	41.41	0.23	58.62	42	25.6
7	6	07/09/2015	9:08:30	42.3	0	41.63	32	16.413
8	7	07/09/2015	9:08:31	40.26	0.62	59.38	37	14.623

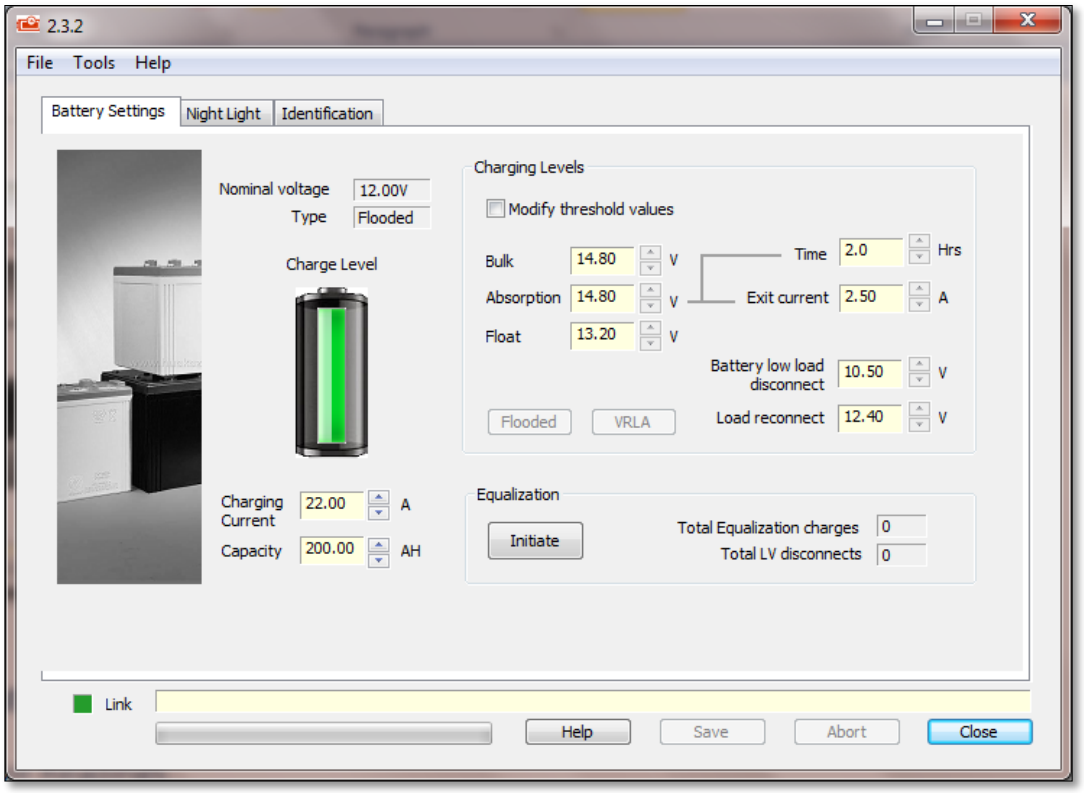
Feature- Product selection wizard

- PC-RMS is a standard front end tool for several Charge Controllers. The user can select which target device needs to be monitored.



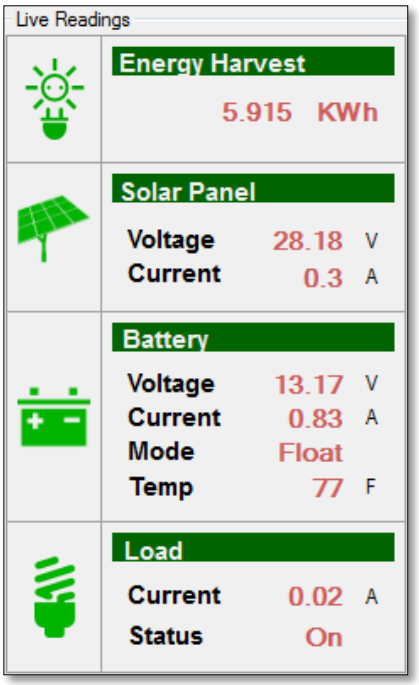
Feature- Product configuration

- In certain charge controllers, PC-RMS can be used to *configure* key user settable parameters like battery thresholds, night-light settings and several others. This allows the user or distributor to customize the charge controller for local deployment.



4 Status Panel

4.1 Live Readings



The live readings panel shows all operating parameters of the device at a glance

- **Energy Harvest:**

The life time energy harvested by the device

- **Solar Panel:**

Shows the panel voltage and panel current

- **Battery:**

Shows the battery voltage, battery current, battery charging mode and battery temperature.

The battery charging mode can either:

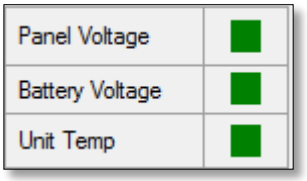
Bulk, Absorption or Float.

- During Bulk charging the unit operates at the *maximum power point* to deliver the maximum power.
- When the battery is almost full, or charged over 80% of its capacity, the charging mode changes to Absorption
- When the battery is completely filled, the charging mode changes to Float

- **Load:**

Shows the load current and the load On/Off status.

4.2 Alerts



The Alerts panel indicates whether certain parameters are operating within band or outside. For example-

- Panel voltage is within operating range or outside.

- Battery voltage is within operating within range or Outside.

- Unit temperature is normal or high.

The Alert will be shown as Green when within band and in Red when out of band.

5 Graph

Any two parameters can be selected and displayed as two graphs within this window. The Y-axis shows a selectable parameter (voltage, current etc), and the X-axis the Date/Time. The graph for a specific duration can also be selected by changing the date range.

A parameter can be selected on the Y-axis from the drop-down list on the top. In the figure below, the top window shows battery voltage and the bottom window shows battery current.

Graph View 1- Basic View

In this graph a battery charging curve is being displayed. The three battery charging modes (Bulk, Absorption and Float) can be seen.

The different selections available in the graph window are explained below:

1. The Device id whose data is being viewed.

2. Select a date range and click on 'Update' to change the graph being displayed.

3. While moving the cursor over the graph the corresponding reading is shown here.

4. This option will fill the graph with the current day's data.

5. Battery voltage and battery current are shown in the above graph. However any two parameters can be selected and viewed.

6. ‘Zoom all’- Displays all the data logged in the database.

7. The Legend of the graphs selected is displayed here.

8. Battery Voltage: The parameter selected in the first drop-down list is displayed in this graph.

9. Battery Current: The parameter selected in the second drop-down list is displayed in this graph.

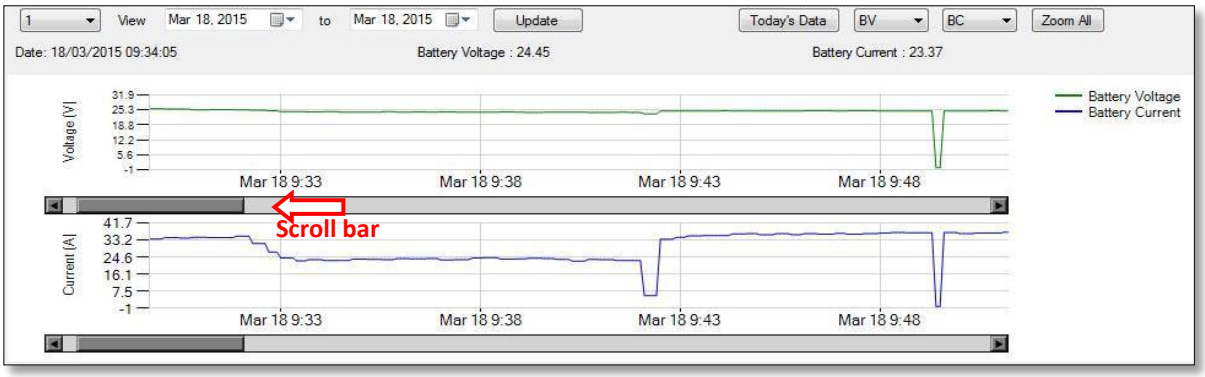
10. The x-axis displays the date/time.

11. The y-axis will display values corresponding to the selected parameter.

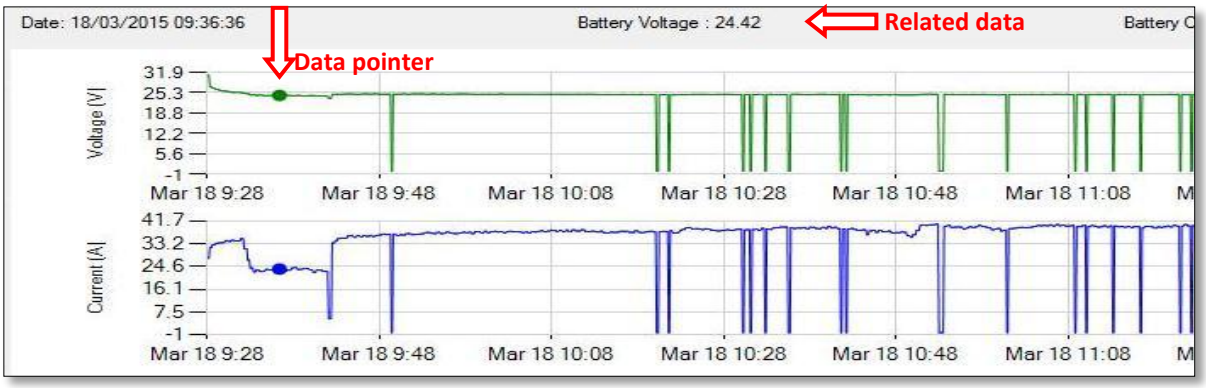
12. The legend for each chart is shown here.

The graph window supports a zoom-in / zoom-out feature. The user can view the data in finer detail when its zoomed in. To do this, position the cursor on the graph at the first point of interest, and drag for the duration needed. It is possible to navigate the graph using the scroll bar at the bottom to view data over a longer range.

Graph View 2- Zoomed Data between 9:29 am to 9:51 am (from Graph View 1)

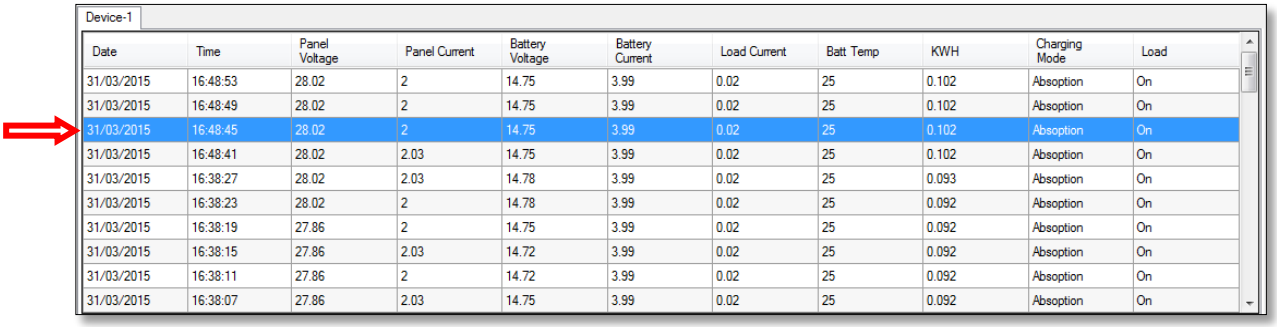


Graph View 3: As the cursor is moved on the graph the values at different points can be viewed. The data point of interest is shown as a dot in the graph; also known as the ‘Data Pointer’.



6 Data Table

The data table is updated with data after every poll. A moving blue cursor indicates the new data being added to the table. Each line of data also has a date and time stamp. The parameters shown here are the same as that on the live readings, but the variation in parameter readings can also be observed by scrolling down. The data table will be erased when PC-RMS is restarted- however previously logged data can be downloaded and viewed as described in section 9.

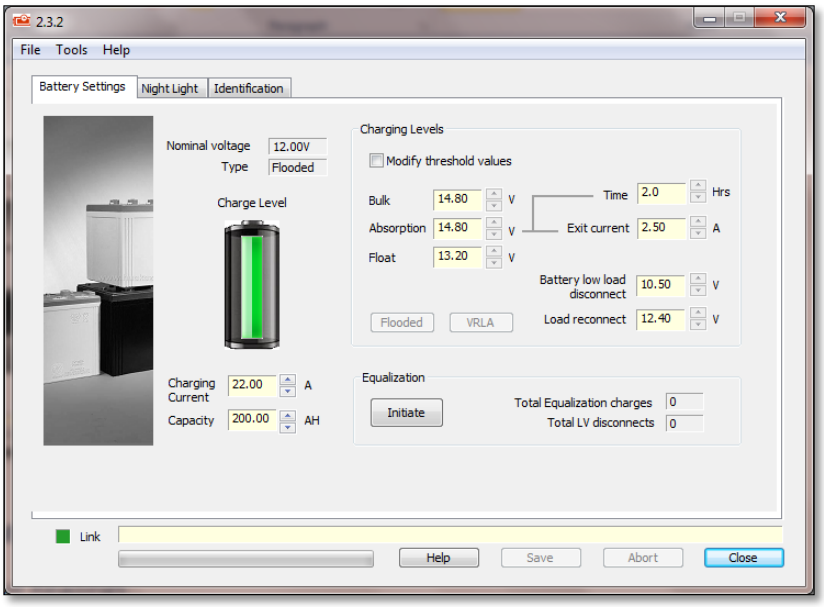


Device-1

Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	Load Current	Batt Temp	KWH	Charging Mode	Load
31/03/2015	16:48:53	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:49	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:45	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:41	28.02	2.03	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:38:27	28.02	2.03	14.78	3.99	0.02	25	0.093	Absoption	On
31/03/2015	16:38:23	28.02	2	14.78	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:19	27.86	2	14.75	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:15	27.86	2.03	14.72	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:11	27.86	2	14.72	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:07	27.86	2.03	14.75	3.99	0.02	25	0.092	Absoption	On

7 Device configuration dialog

7.1 Battery Settings



This dialog is displayed on selecting the menu option – Configure – Change controller settings.

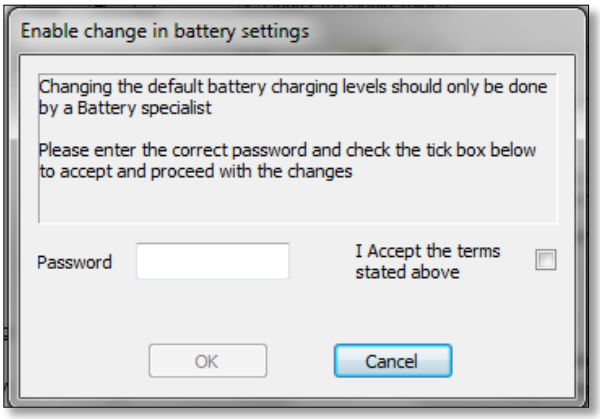
The nominal voltage indicates whether a 12 or a 24V battery is being used. The battery type shown depends on the jumper selection (if present) on the front panel of the unit.

The charging current can be set less than or equal to the maximum capacity of the charge controller. The capacity of the battery connected to the system will have to be set here- this is important for accurate indication of the battery's 'state-of-charge'.

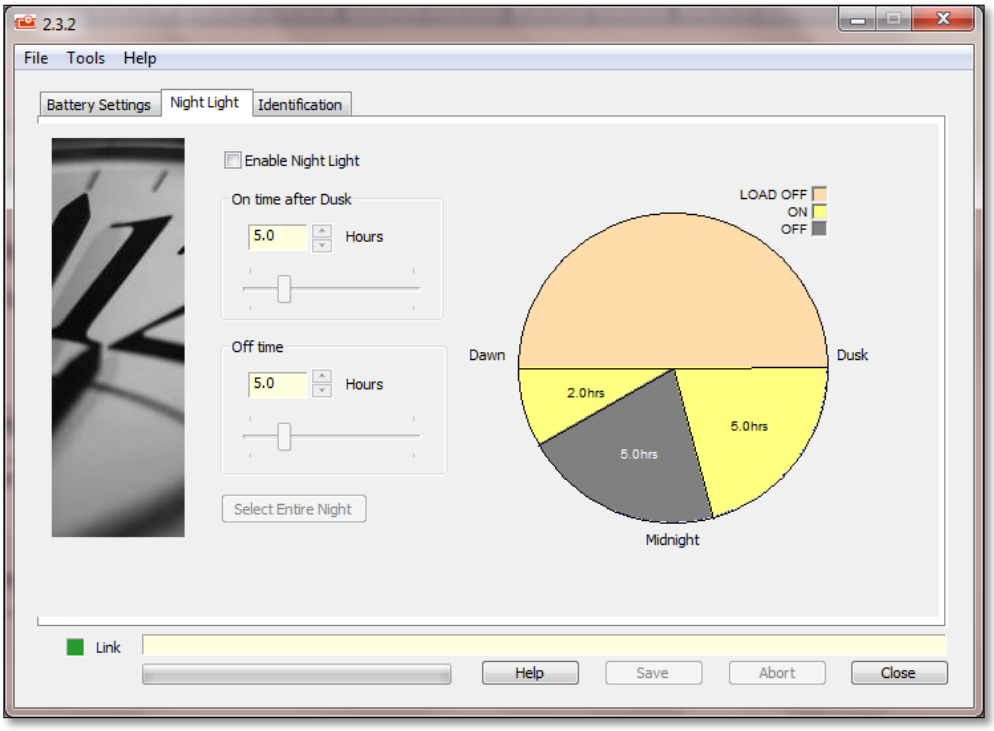
A battery equalization charge can be manually initiated by the user. Note that the charge controller will also initiate an equalization charge at regular intervals.

The battery charging threshold levels can optionally be changed by the user or distributor. Please note that the existing default levels preset on the charge controller should work fine for most installations. Only a qualified battery specialist should attempt to change the default settings. When 'Modify threshold values' is selected it will show the dialog box shown below. Here an appropriate password will need to be entered, and the acceptance box ticked, to proceed with the changes.

When a setting is changed the 'Save' and 'Abort' buttons will be enabled. Click on 'Save' to write the new settings back to the charge controller. Click on 'Abort' to revert back to the previous settings. Click on 'Close' to return back to the RMS data window.



7.2 Night Light Settings



Certain charge controllers support night-light control feature. In this case the controller can be configured to turn on a light in a preset sequence between dusk and dawn.

The 'Enable Night Light' check box should be selected to activate this mode. The steps to configure night-light are explained in the example below. *Please refer to the previous screen-shot-*

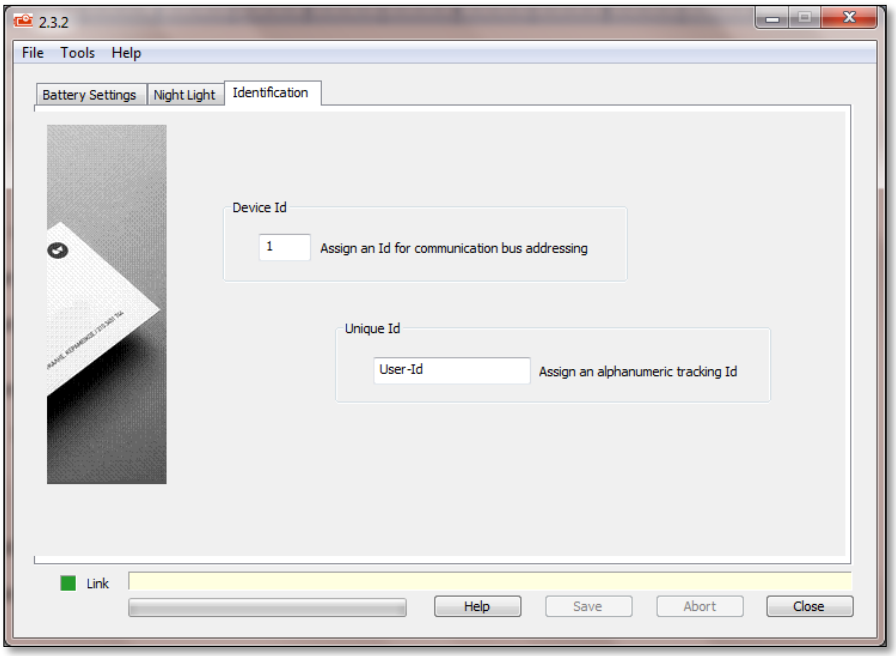
On sensing Dusk – Block 1 time	Block 2 time	Before sensing Dawn
Turns *On* Load for 5 hours	Turn *Off* Load for 5 hours	Remaining time – Turn *On* Load for 2 hours

In the example the initial turn on time is specified as 5hrs; on detecting dusk, the charge controller will turned on for this block of time.

The subsequent turn off time is specified as 5hrs; after the elapse of first 5hrs after dusk, the load will be turned off for 5hrs.

The balance time is the residual time before dawn (which depends on the geographic location and local time), during which the load will be turned on again.

7.3 Identity Settings



Device Id is a unique numeric value assigned to the charge controller on an RS-485 bus. When multiple devices are connected to the same bus, the user will have to ensure that each device has a unique ID.

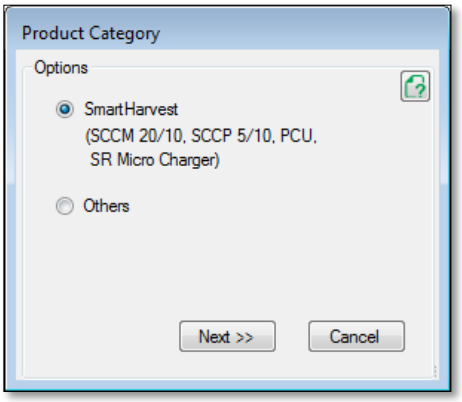
Also, for correct bus addressing by PC-RMS, the Ids should be numbered sequentially without gaps. For example if there are 4 devices on the bus, they should be numbered as 1, 2, 3 & 4.

The user or distributor can also assign an internal alpha-numeric ID for device tracking and stocking keeping purposes.

8 Running RMS for the first time

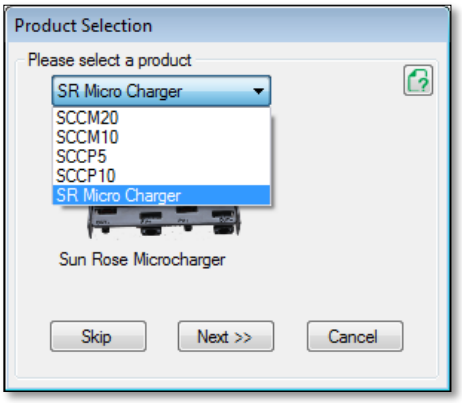
The *product wizard* walks the user through the steps to establish a connection between PC-RMS and the charge controller via a communication interface.

8.1 Product category



This window gives user the option to select only SmartHarvest products for monitoring. If the user wants to monitor products other than SmartHarvest, then 'Others' can be selected.

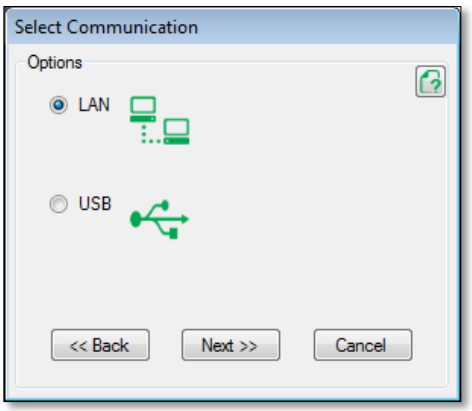
8.2 Product selection



This window shows a list of devices supported by PC-RMS.

Select the product which is going to be monitored. Then click 'Next' button to proceed.

8.3 Communication interface



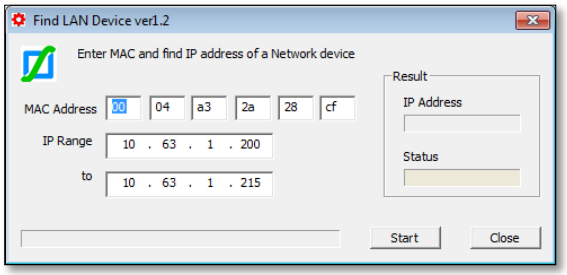
Depending on the communication interface hardware, the user will have to select either USB or LAN.

Then click 'Next' button to proceed.

8.4 Gateway

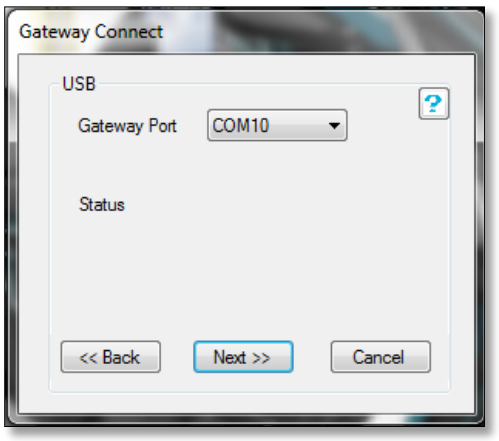
This window will be displayed if the LAN interface has been previously selected. The IP address of the device should be entered (if it is known). Then click 'Next' button to proceed.

If the IP is not known by the user, then click on 'Help Finding IP', as described below.



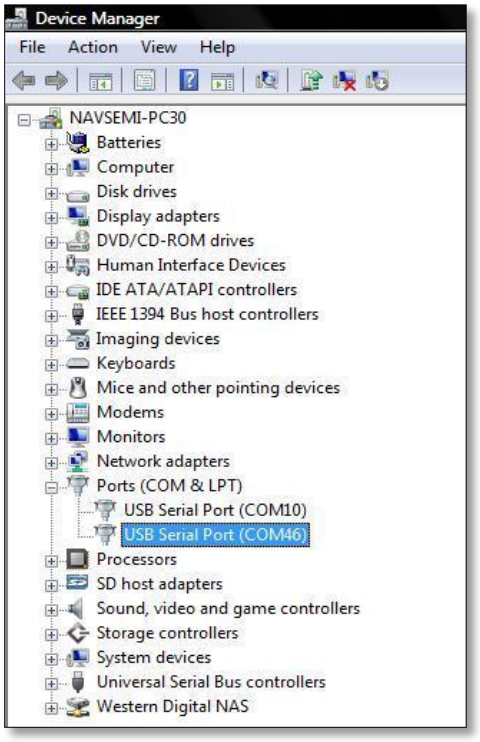
Here, the user needs to enter the MAC address of the LAN converter (which can be found written on the device).
Then an IP range should be given.

Then click on 'Start' to scan the IP range. If the converter is found on the network then its IP address will be displayed.



This window will be displayed if the USB interface had been previously selected.
If the 'COM' port is known then it can be selected in the drop-down box. However if the port is not known then follow the steps described below to identify it.

Then click 'Next' button to proceed.

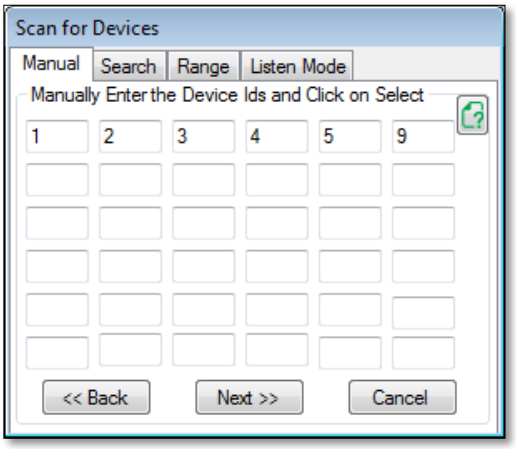


Identifying the 'COM' port-

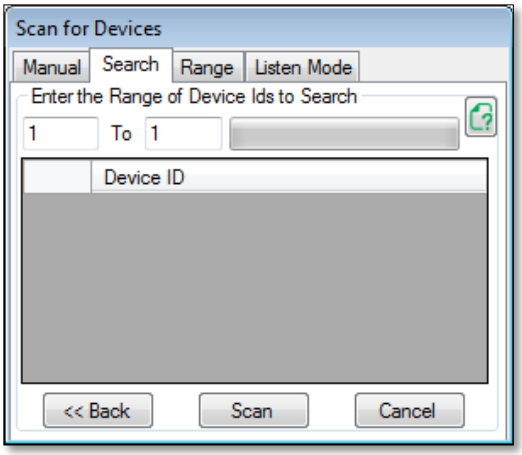
- In Windows desktop select 'Run' and enter *devmgmt.msc*
- The device manager windows should pop-up.
- Open the Ports (COM & LPT) branch- the port number should be listed here.

8.5 Device scan

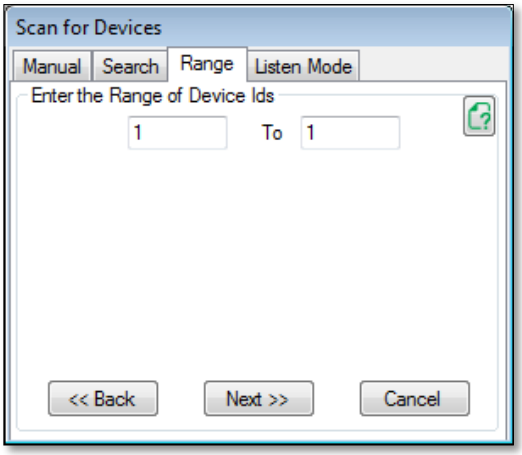
The device Scan window consists of four sections to specify which device IDs needs to be selected and polled.



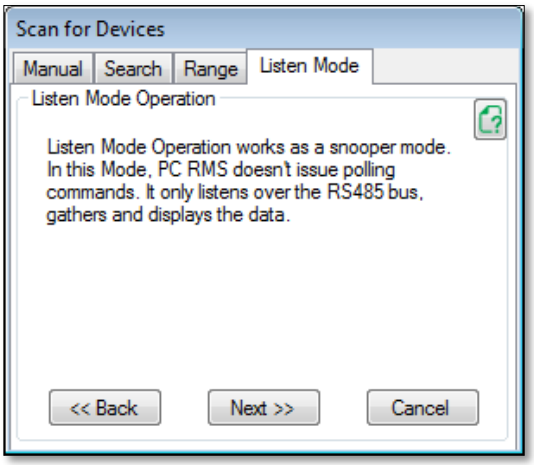
If the IDs present in the network are known in prior, the Manual selection can be used. Here the user should enter the IDs to be polled and click on 'Next' to proceed to the next step.



If the IDs present in the network are not known in prior, the automatic selection can be used. The user can enter the range of IDs to be scanned and click 'Scan' button. The application displays a status window during the scan, and when complete, the devices found are shown.

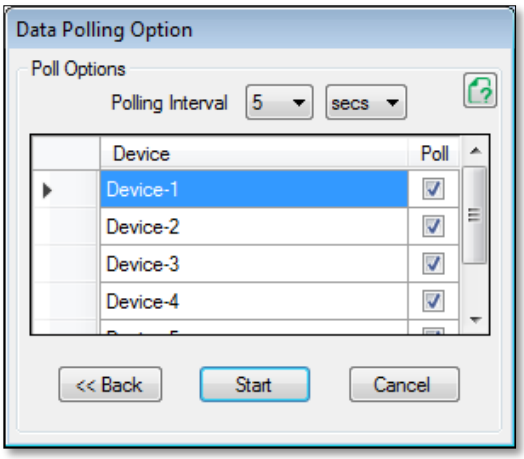


If the range of ID's in the network are known in prior, this tab can be used. This will log the data for all the devices within the range given.



This window can be used when another device is acting as an RS-485 bus-master. PC-RMS listens to the commands and logs the data. We can enable Listen mode by clicking on 'Next'.

8.6 Polling interval

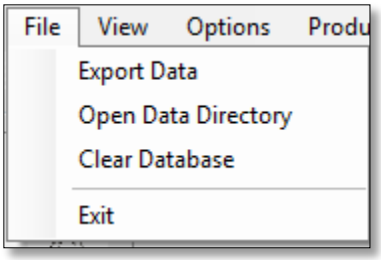


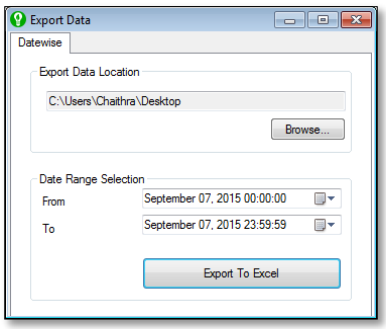
The Polling Interval sets the time between two polling sessions. The data polling option lists all the devices found after a scan. Uncheck the poll box for devices that need not be monitored.

Clicking the 'Start' button will begin polling the devices. Or click 'Cancel' to abort.

9 File Menu

9.1 Export Data





Export to Excel menu item opens up a date range selection dialog box as shown above, to export the logged data as a.CSV file. This format is suitable for viewing on Microsoft Excel®, or any standard spread sheet application.

	A	B	C	D	E	F	G	H	I	J
1	SNo	Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	Data	Temperature	Device ID
2	35	30/06/2011	12:55:07	30.99	4.76	55.04	2.66	Good	42	26
3	36	30/06/2011	12:55:08	29.95	4.85	54.56	2.69	Good	33	40
4	37	30/06/2011	12:55:24	31.05	4.78	55.04	2.66	Good	42	26
5	38	30/06/2011	12:55:25	29.95	4.87	54.62	2.7	Good	33	40
6	39	30/06/2011	12:55:41	31.1	4.8	55.1	2.68	Good	42	26
7	40	30/06/2011	12:55:42	29.95	4.91	54.62	2.72	Good	33	40
8	41	30/06/2011	12:55:58	31.1	4.83	55.1	2.69	Good	42	26
9	42	30/06/2011	12:55:59	30.01	4.96	54.62	2.74	Good	33	40

Illustration of exported CSV data

9.2 Open Data Directory

This option opens the directory where the exported CSV file gets saved. This is a user selectable directory.

9.3 Clear Database

This option deletes all logged data from the internal database.

9.4 Exit

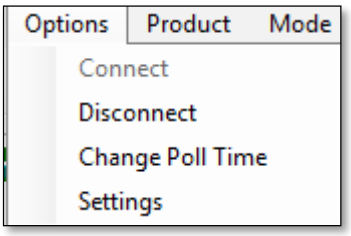
This option shows a dialog to confirm exiting from the application.

10 View Menu

10.1 Data Table

This will display the incoming data in a tabular spreadsheet form, if selected (refer to section 6).

11 Options Menu



11.1 Connect

This option can be used to reconnect a previously established connection. See section 8 for more details.

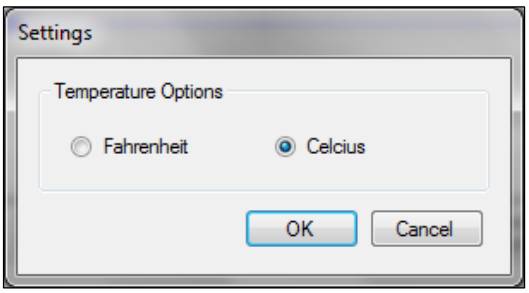
11.2 Disconnect

If a communication interface has already been established then selecting this option will disconnect it.

11.3 Change Poll time

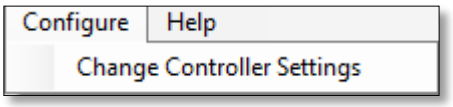
Changes the polling interval between two sessions.

11.4 Settings



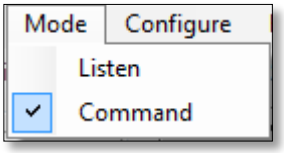
This option can be used to change the temperature measurement.

12 Configure Options



Opens up the device configuration dialog (see section 7). If more than one device is being polled then the user will have to select the specific device to be configured.

13 Mode Menu



When 'Command' mode is selected PC-RMS acts as an RS-485 bus-master; and when 'Listen' mode is selected it acts as an RS-485 bus snooper.

13.1 Command

This is the default operating mode where PC-RMS acts as a bus-master. It sends commands to target devices, receives data, displays it and saves it into the database.

13.2 Listen

In Listen mode, PC-RMS snoops (monitors) data on the RS485 bus and also logs it into the database. This feature can be used when another device is acting as an RS-485 bus-master. PC-RMS acts as a passive listener, observing and logging data. In Listen mode PC-RMS will not issue any commands and thereby not interfere with the data flow on the communication bus.

14 Help Menu

14.1 Help

Open a copy of this user manual.

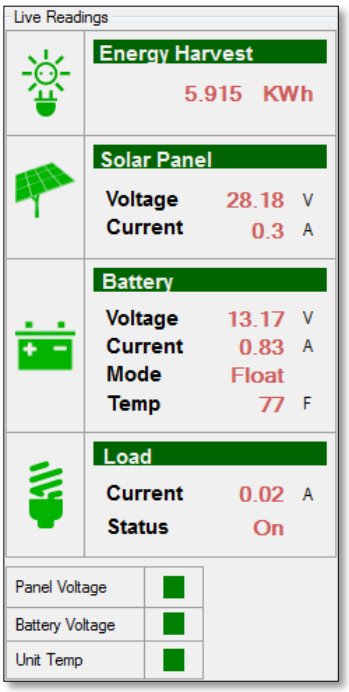
14.2 About

Displays the Company Information and PC-RMS revision

15 Product specific screens

15.1 Smart harvest SCCM 20/10

Status Panel:



In status panel, live readings for SCCM 20/10 displays the following readings:

- Energy harvest,
- Panel voltage, Panel current
- Battery voltage, Battery current
- Battery charging mode, Temperature
- Load current and Load On/Off status

The following alerts are shown:

- Panel voltage Ok/ High
- Battery voltage Ok / Low
- Unit temperature Ok / High

where green color indicates good and red indicates out-of-band.

Data table:

Device-1

Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	Load Current	Batt Temp	KWH	Charging Mode	Load
31/03/2015	16:48:53	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:49	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:45	28.02	2	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:48:41	28.02	2.03	14.75	3.99	0.02	25	0.102	Absoption	On
31/03/2015	16:38:27	28.02	2.03	14.78	3.99	0.02	25	0.093	Absoption	On
31/03/2015	16:38:23	28.02	2	14.78	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:19	27.86	2	14.75	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:15	27.86	2.03	14.72	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:11	27.86	2	14.72	3.99	0.02	25	0.092	Absoption	On
31/03/2015	16:38:07	27.86	2.03	14.75	3.99	0.02	25	0.092	Absoption	On

Configuration settings:

This product also supports user configuration (Refer to section 7).

Export data:

	A	B	C	D	E	F	G	H	I	J
1	SNo	Date	Time	Panel Vol	Panel Cur	Battery Vo	Battery Cu	Load Curre	Batt Temp	KWH
2	14256	9/4/2015	10:22:08	30.08	0.84	13.08	2.37	0	0	0.446
3	14257	9/4/2015	10:22:13	29.92	0.86	13.08	2.37	0	0	0.446
4	14258	9/4/2015	10:22:19	30.23	0.84	13.08	2.34	0	0	0.446
5	14259	9/4/2015	10:22:25	30.23	0.84	13.08	2.32	0	0	0.446
6	14260	9/4/2015	10:22:31	29.92	0.81	13.08	2.32	0	0	0.446
7	14261	9/4/2015	10:22:37	30.23	0.79	13.08	2.25	0	0	0.446
8	14262	9/4/2015	10:22:43	30.08	0.81	13.08	2.27	0	0	0.446
9	14263	9/4/2015	10:22:49	30.08	0.79	13.08	2.23	0	0	0.446
10	14264	9/4/2015	10:22:56	29.92	0.77	13.08	2.2	0	0	0.446

The exported data for SCCM 20/10 shows the following readings:

-Panel voltage, Panel current

-Battery voltage, Battery current

-Load current

-Battery Temperature, KWH, Unit temperature

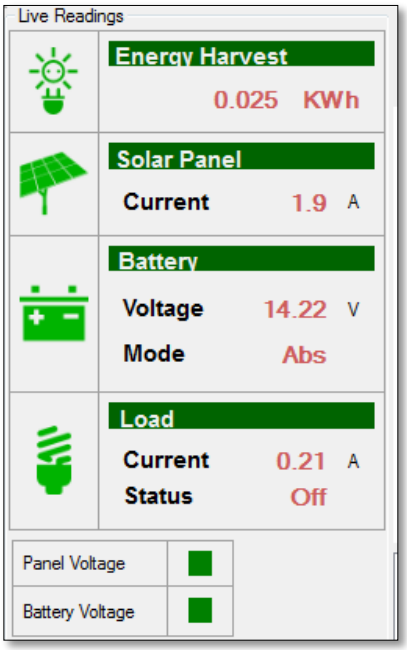
-Charging mode

-Panel voltage status, Battery voltage status, Load status

-Thermal cutoff, Device id

15.2 Smart harvest SCCP 5/10

Status Panel:



In status panel, live readings for SCCP 5/10 displays the following readings:

- Energy harvest,
- Panel current
- Battery voltage
- Battery charging mode
- Load current and Load On/Off status

The following alerts are shown:

- Panel voltage Ok/ High
- Battery voltage Ok / Low

where green color indicates good and red indicates out-of-band.

Data Table:

Device-1

Date	Time	Panel Current	Battery Voltage	Load Current	KWH	Unit Temp	Charging Mode	Load State
15/09/2015	15:13:07	1.9	14.22	0.21	0.025	35	Abs	Off
15/09/2015	15:13:02	1.93	14.21	0.21	0.025	35	Abs	Off
15/09/2015	15:12:57	1.97	14.41	0.21	0.025	30	Abs	Off
15/09/2015	15:12:52	1.97	14.41	0.21	0.025	30	Abs	Off
15/09/2015	15:12:47	1.94	14.22	0.21	0.025	35	Abs	Off
15/09/2015	15:12:42	1.97	14.41	0.21	0.025	30	Abs	Off
15/09/2015	15:12:37	1.97	14.21	0.21	0.025	35	Abs	Off
15/09/2015	15:12:32	1.82	14.33	0.21	0.025	35	Abs	Off
15/09/2015	15:12:26	1.98	14.24	0.21	0.025	35	Abs	Off
15/09/2015	15:12:21	1.93	14.27	0.21	0.025	35	Abs	Off

Export data:

	A	B	C	D	E	F	G	H	I
1	SNo	Date	Time	Panel Curi	Battery Vc	Load Curre	KWH	Unit Temp	Charging M
2	1	15/09/201	15:11:57	1.97	14.29	0.21	0.025	35	Abs
3	2	15/09/201	15:12:01	1.93	14.27	0.21	0.025	35	Abs
4	3	15/09/201	15:12:06	1.93	14.21	0.21	0.025	35	Abs
5	4	15/09/201	15:12:11	1.97	14.19	0.21	0.025	35	Abs
6	5	15/09/201	15:12:16	1.9	14.31	0.21	0.025	35	Abs
7	6	15/09/201	15:12:21	1.93	14.27	0.21	0.025	35	Abs
8	7	15/09/201	15:12:26	1.98	14.24	0.21	0.025	35	Abs
9	8	15/09/201	15:12:32	1.82	14.33	0.21	0.025	35	Abs
10	9	15/09/201	15:12:37	1.97	14.21	0.21	0.025	35	Abs

The exported data for SCCP 5/10 shows the following readings:

-Panel current, Battery voltage

-Load current, KWH

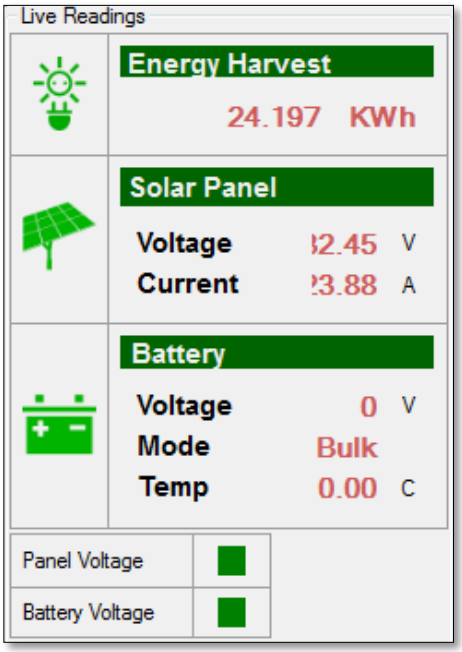
-Unit temperature, charging mode

-Panel voltage status, Battery voltage status, Load status

-Device id

15.3 SR-Micro-charger

Status panel:



In status panel, live readings for SR-Micro-charger displays the following readings:

- Energy harvest,
- Solar panel voltage and current
- Battery voltage
- Battery charging mode, temperature.

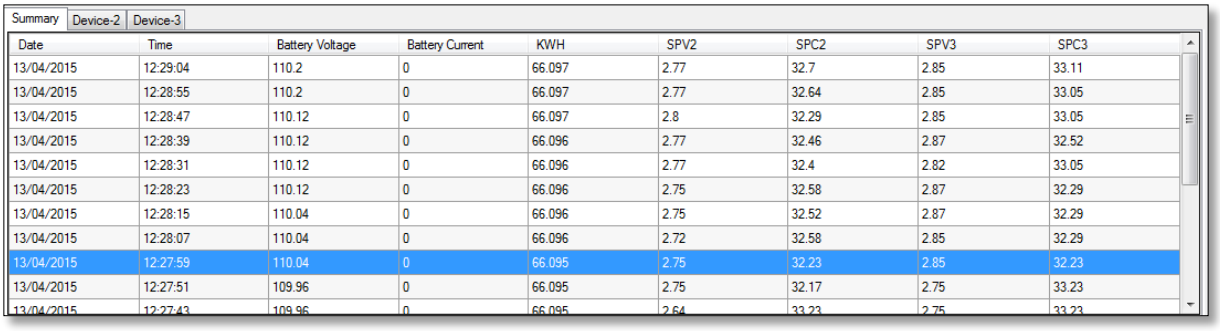
The following alerts are shown:

- Panel voltage Ok/ High
- Battery voltage Ok / Low

where green color indicates good and red indicates out-of-band.

Data table:

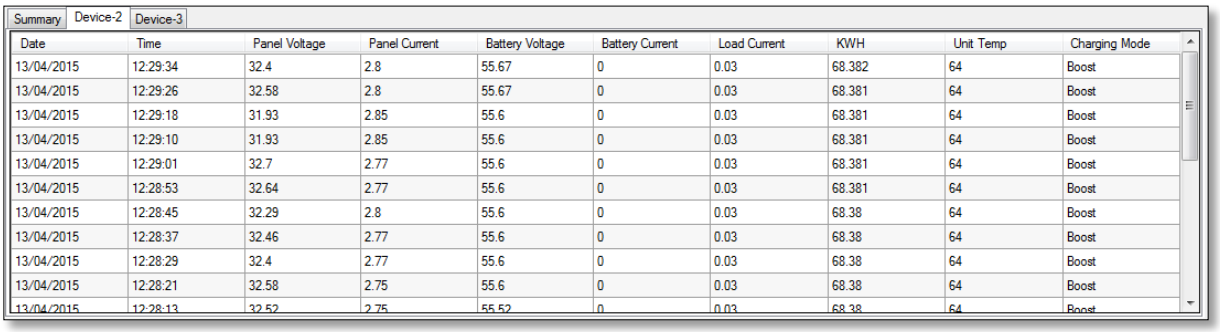
The data table for SR-Micro device consists of two sections- a summary tab which lists a few important parameters of the devices being polled as shown in Fig. (1), and individual device data tabs, with data specific to the ID's being polled as shown in Fig. (2).



Summary | Device-2 | Device-3

Date	Time	Battery Voltage	Battery Current	KWH	SPV2	SPC2	SPV3	SPC3
13/04/2015	12:29:04	110.2	0	66.097	2.77	32.7	2.85	33.11
13/04/2015	12:28:55	110.2	0	66.097	2.77	32.64	2.85	33.05
13/04/2015	12:28:47	110.12	0	66.097	2.8	32.29	2.85	33.05
13/04/2015	12:28:39	110.12	0	66.096	2.77	32.46	2.87	32.52
13/04/2015	12:28:31	110.12	0	66.096	2.77	32.4	2.82	33.05
13/04/2015	12:28:23	110.12	0	66.096	2.75	32.58	2.87	32.29
13/04/2015	12:28:15	110.04	0	66.096	2.75	32.52	2.87	32.29
13/04/2015	12:28:07	110.04	0	66.096	2.72	32.58	2.85	32.29
13/04/2015	12:27:59	110.04	0	66.095	2.75	32.23	2.85	32.23
13/04/2015	12:27:51	109.96	0	66.095	2.75	32.17	2.75	33.23
13/04/2015	12:27:43	109.96	0	66.095	2.64	33.23	2.75	33.23

Fig. (1)

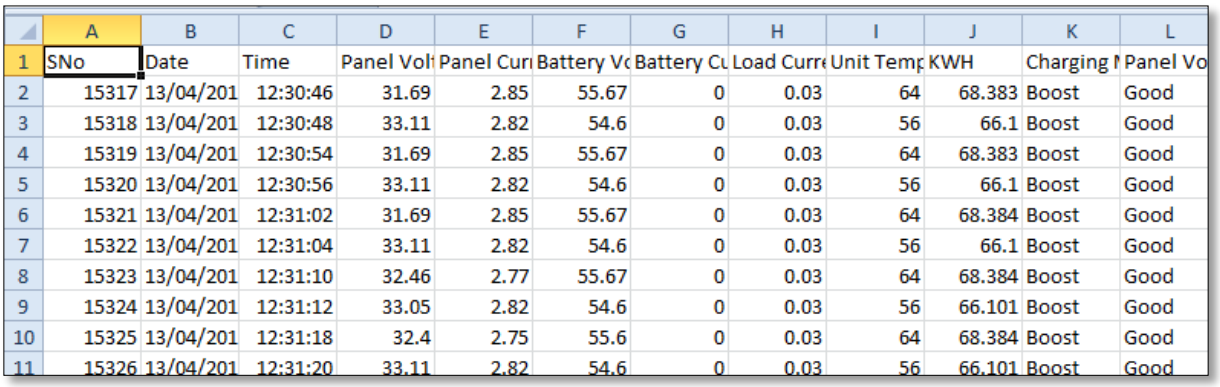


Summary | Device-2 | Device-3

Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	Load Current	KWH	Unit Temp	Charging Mode
13/04/2015	12:29:34	32.4	2.8	55.67	0	0.03	68.382	64	Boost
13/04/2015	12:29:26	32.58	2.8	55.67	0	0.03	68.381	64	Boost
13/04/2015	12:29:18	31.93	2.85	55.6	0	0.03	68.381	64	Boost
13/04/2015	12:29:10	31.93	2.85	55.6	0	0.03	68.381	64	Boost
13/04/2015	12:29:01	32.7	2.77	55.6	0	0.03	68.381	64	Boost
13/04/2015	12:28:53	32.64	2.77	55.6	0	0.03	68.381	64	Boost
13/04/2015	12:28:45	32.29	2.8	55.6	0	0.03	68.38	64	Boost
13/04/2015	12:28:37	32.46	2.77	55.6	0	0.03	68.38	64	Boost
13/04/2015	12:28:29	32.4	2.77	55.6	0	0.03	68.38	64	Boost
13/04/2015	12:28:21	32.58	2.75	55.6	0	0.03	68.38	64	Boost
13/04/2015	12:28:13	32.52	2.75	55.52	0	0.03	68.38	64	Boost

Fig. (2)

Export data:



	A	B	C	D	E	F	G	H	I	J	K	L
1	SNo	Date	Time	Panel Vol	Panel Cur	Battery Vo	Battery Cu	Load Curr	Unit Temp	KWH	Charging M	Panel Vo
2	15317	13/04/201	12:30:46	31.69	2.85	55.67	0	0.03	64	68.383	Boost	Good
3	15318	13/04/201	12:30:48	33.11	2.82	54.6	0	0.03	56	66.1	Boost	Good
4	15319	13/04/201	12:30:54	31.69	2.85	55.67	0	0.03	64	68.383	Boost	Good
5	15320	13/04/201	12:30:56	33.11	2.82	54.6	0	0.03	56	66.1	Boost	Good
6	15321	13/04/201	12:31:02	31.69	2.85	55.67	0	0.03	64	68.384	Boost	Good
7	15322	13/04/201	12:31:04	33.11	2.82	54.6	0	0.03	56	66.1	Boost	Good
8	15323	13/04/201	12:31:10	32.46	2.77	55.67	0	0.03	64	68.384	Boost	Good
9	15324	13/04/201	12:31:12	33.05	2.82	54.6	0	0.03	56	66.101	Boost	Good
10	15325	13/04/201	12:31:18	32.4	2.75	55.6	0	0.03	64	68.384	Boost	Good
11	15326	13/04/201	12:31:20	33.11	2.82	54.6	0	0.03	56	66.101	Boost	Good

The exported data for SR-Micro shows the following readings:

-Panel voltage, Panel current

-Battery voltage, battery current

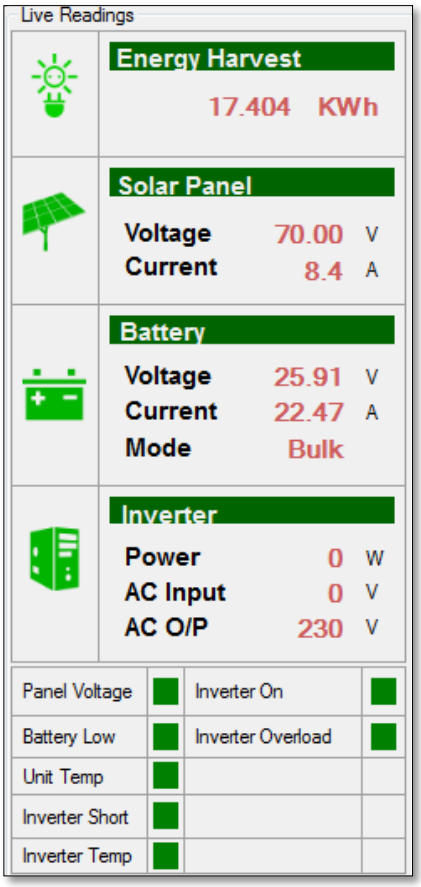
-Load current, Unit temperature, KWH

-Charging mode, Panel voltage status, Battery voltage status

-Device Id

15.4 PCU / SMU

Status Panel:



In status panel, live readings for PCU displays the following readings:

- Energy harvest
- Solar panel voltage and current
- Battery voltage, current
- Battery charging mode
- Inverter power, AC in and AC out

The following alerts are shown:

- Panel voltage Ok/ High
- Battery low Ok / Low
- Unit temperature (Charge controller) Ok / High
- Inverter Short circuit Ok/Short
- Inverter Temperature Ok/High
- Inverter On/Off
- Inverter Overload Ok/Overload

where green color indicates good (Ok) and red indicates out-of-band.

Data Table:

Device-1

Date	Time	Panel Voltage	Panel Current	Battery Voltage	Battery Current	KWH	Charging Mode	Inverter Power(W)	ACIn	ACOut
16/09/2015	11:43:41	70.00	8.4	25.91	22.47	17.404	Bulk	0	0	230
16/09/2015	11:43:36	70.00	8.36	25.91	22.35	17.403	Bulk	0	0	230
16/09/2015	11:43:31	70.00	8.38	25.88	22.42	17.402	Bulk	0	0	230
16/09/2015	11:43:26	70.00	5.37	25.66	14.36	17.402	Bulk	0	0	230
16/09/2015	11:43:21	70.00	8.38	25.91	22.37	17.4	Bulk	0	0	230
16/09/2015	11:43:16	70.00	8.4	25.91	22.47	17.4	Bulk	0	0	230
16/09/2015	11:43:11	70.00	8.36	25.88	22.37	17.399	Bulk	0	0	230
16/09/2015	11:43:06	70.00	8.38	25.91	22.4	17.398	Bulk	0	0	230
16/09/2015	11:43:01	70.00	5.67	25.69	15.23	17.398	Bulk	0	0	230
16/09/2015	11:42:55	70.00	8.38	25.91	22.4	17.396	Bulk	0	0	230

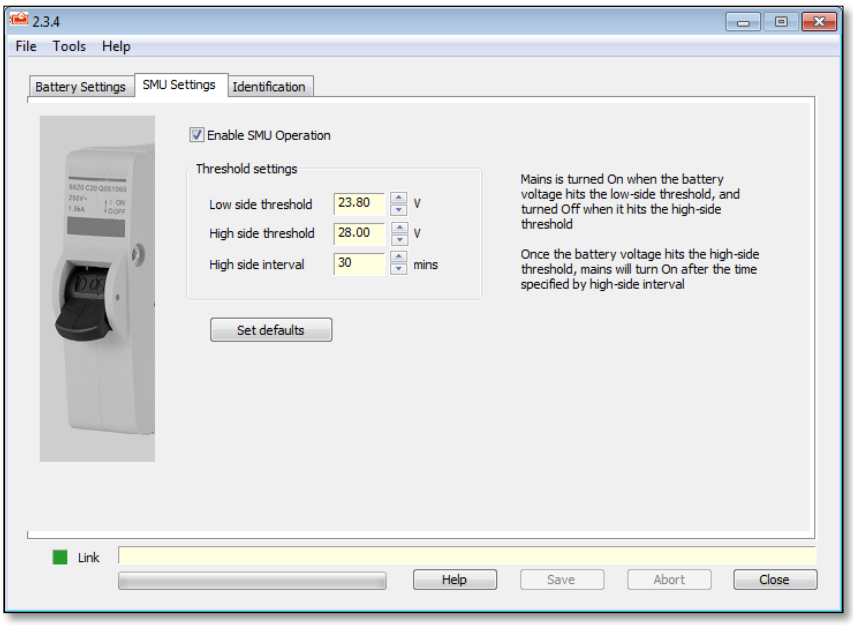
SMU settings:

The Solar management unit (SMU) setting controls the way a battery is charged via Panel and Mains.

To maximize energy harvesting the battery should be charged by Panel whenever possible. However if the Solar power is insufficient, and the inverter is driving a load continuously, then to avoid deep discharge of the battery it is necessary to switch over charging to Mains.

The SMU operation defines an upper or high side threshold setting for the battery voltage, when the Mains charging will be turned off, after a preset interval.

It also defines a lower or low-side threshold setting for the battery voltage, when the Mains charging will be turned on.



Other user defined configuration settings are described in section 7

Export data:

	A	B	C	D	E	F	G	H	I	J	K	L
1	SNo	Date	Time	Panel Vol	Panel Cur	Battery Vc	Battery Cu	KWH	Charging M	Panel Vol	SMU Relay	Thermal C
2	14889	13/04/201	10:10:28	58	7.56	26.79	17.09	43.364	Boost	Good	Mains On	Ok
3	14890	13/04/201	10:10:31	58	7.77	26.86	17.59	43.366	Boost	Good	Mains On	Ok
4	14891	13/04/201	10:10:35	58	7.77	26.86	17.59	43.366	Boost	Good	Mains On	Ok
5	14892	13/04/201	10:10:39	58	7.77	26.86	17.59	43.366	Boost	Good	Mains On	Ok
6	14893	13/04/201	10:10:43	58	8.17	26.95	18.5	43.367	Boost	Good	Mains On	Ok
7	14894	13/04/201	10:10:47	58	8.17	26.95	18.5	43.367	Boost	Good	Mains On	Ok
8	14895	13/04/201	10:10:51	58	8.17	26.95	18.5	43.367	Boost	Good	Mains On	Ok
9	14896	13/04/201	10:10:55	58	7.7	26.89	17.39	43.369	Boost	Good	Mains On	Ok
10	14897	13/04/201	10:10:59	58	7.7	26.89	17.39	43.369	Boost	Good	Mains On	Ok
11	14898	13/04/201	10:11:04	58	7.7	26.89	17.39	43.369	Boost	Good	Mains On	Ok
12	14899	13/04/201	10:11:08	58	7.7	26.89	17.39	43.369	Boost	Good	Mains On	Ok

The exported data for PCU shows the following readings:

-Panel voltage, Panel current

-Battery voltage, Battery current

-KWH, Charging mode

-Panel voltage status, SMU relay state

-Thermal cutoff, Inverter Power

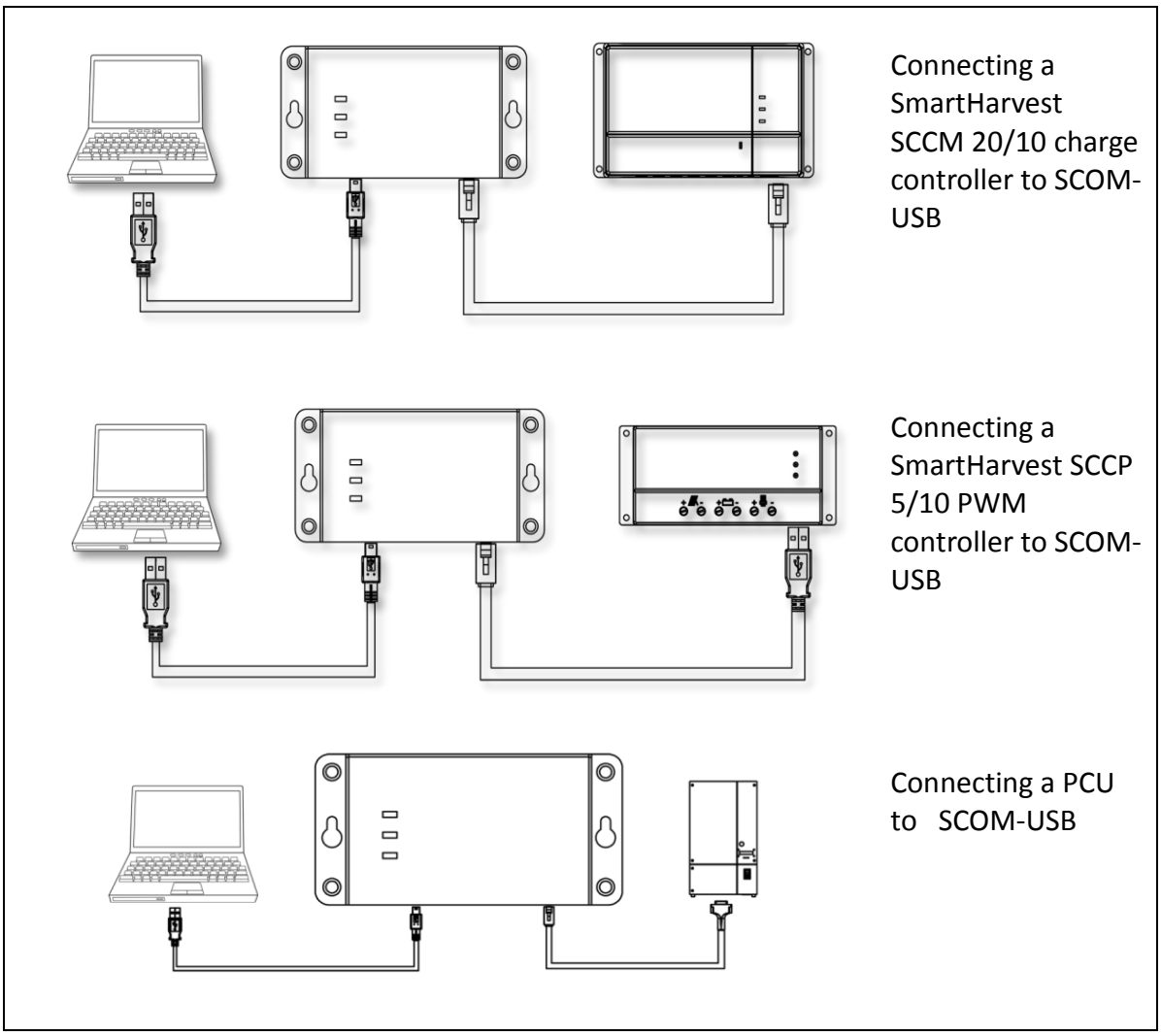
-AC-In, AC-Out

-Battery voltage status, Inverter running state

-Inverter over temperature, Short circuit indication,

-Overload indication, Device Id.

16 Setting up SCOM-USB, USB communication module

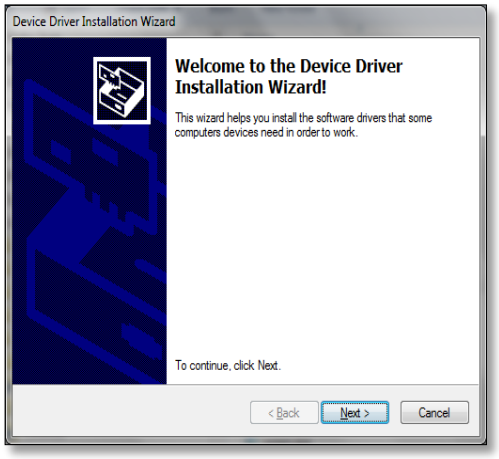


16.1 Driver installation

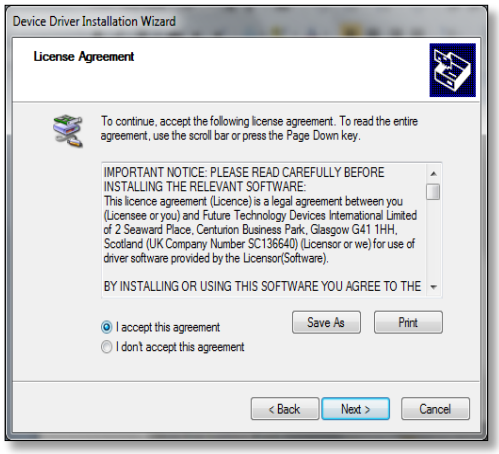
- Follow the URL below to download the USB driver

  http://www.navsemi.com/remotemonitoringsystem.html

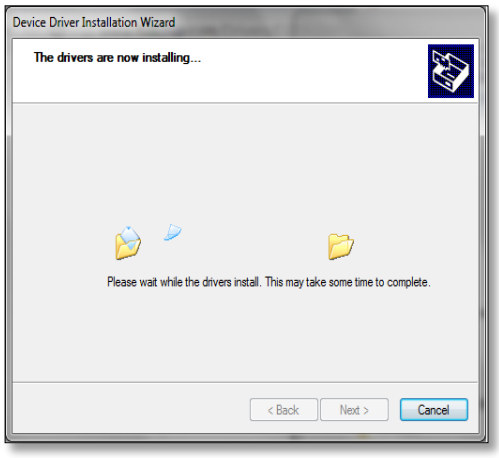
- Install the driver before connecting SCOM-USB to the laptop or workstation.
    - Run the driver installer *CDM xxxx.exe*



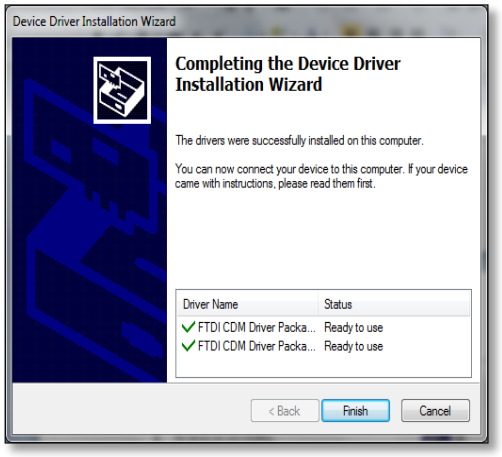
Click on Next to start installation



Select ‘I accept this agreement’ and click on Next



Please wait while the driver installs. A Windows security warning may pop up- please accept it and proceed with the installation.



Select Finish

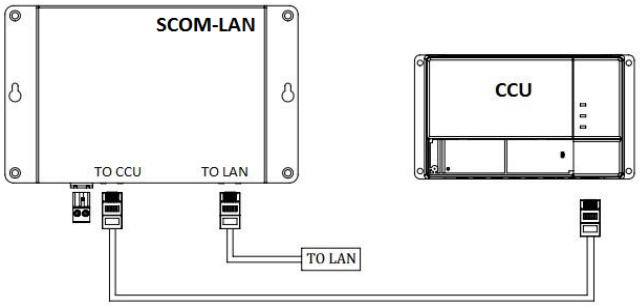
Driver installation has completed successfully

Connect the USB mini cable between the laptop/workstation and SCOM-USB. A message may popup indicating that a new hardware is found

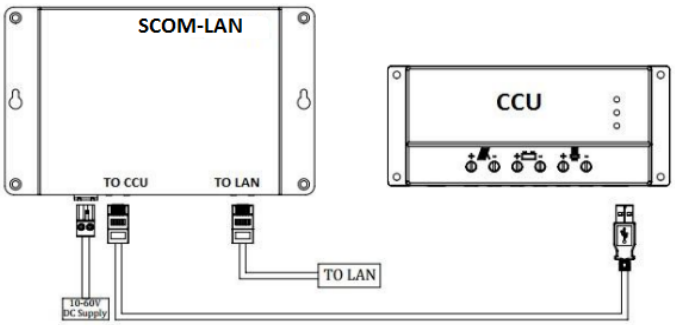
16.2 Using with RMS

Please refer to section 8 on connecting and using RMS with SCOM-USB.

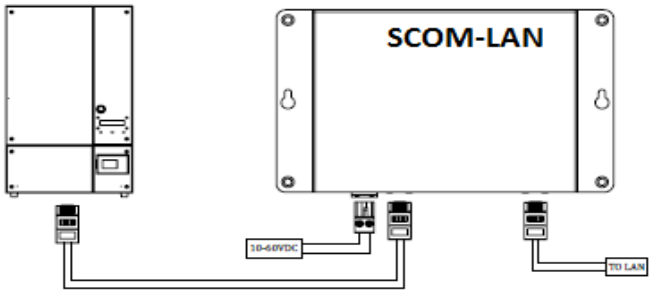
17 Setting up SCOM-LAN, LAN communication module



Connecting a SmartHarvest SCCM 20/10 charge controller to SCOM-LAN



Connecting a SmartHarvest SCCP 5/10 PWM controller to SCOM-LAN



Connecting a PCU to SCOM-LAN

Please refer to section 8 on connecting and using RMS with SCOM-LAN.

18 PC-RMS installation

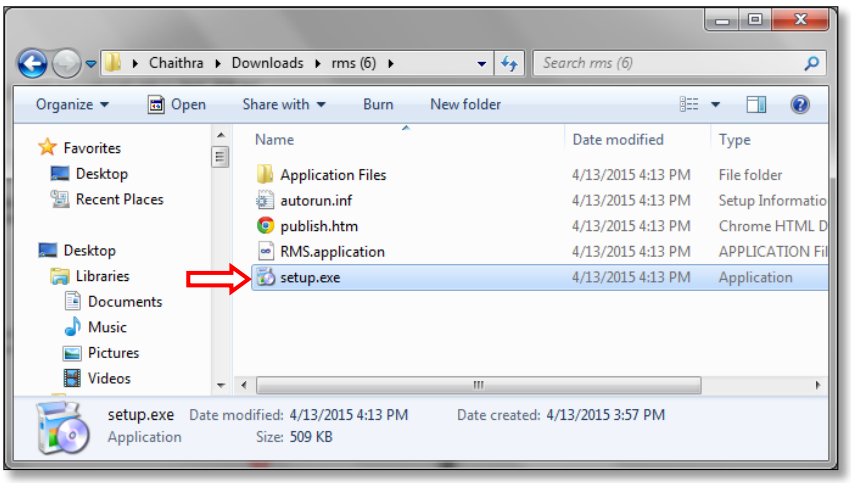
Steps to install PC-RMS:

Step 1: Download the PC-RMS software from

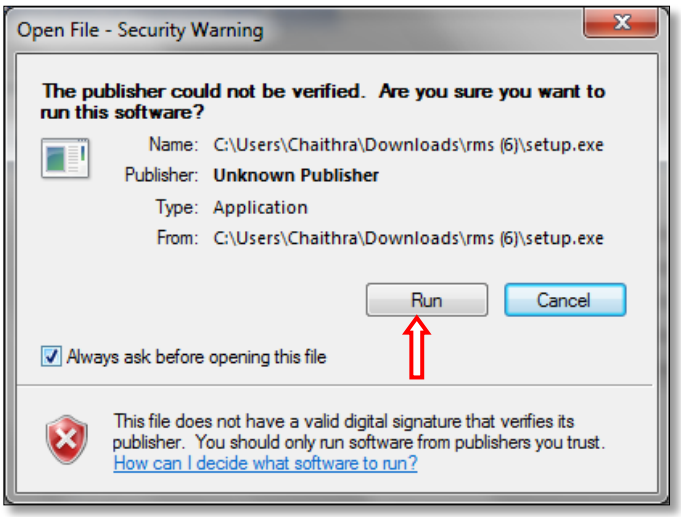
http://www.navsemi.com/remotemonitoringsystem.html

and extract the zip file.

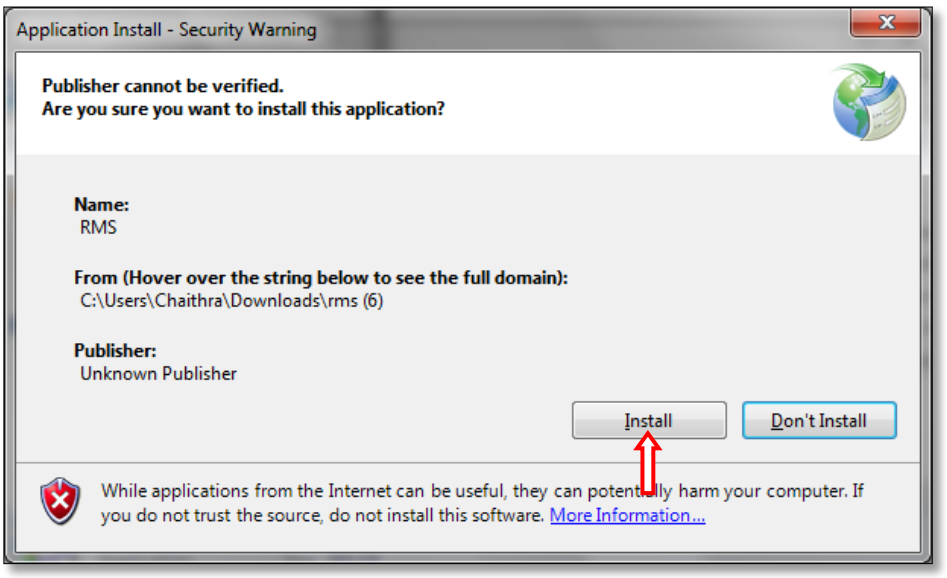
Step 2: Run *setup.exe*



Step 3: Click on Run.



Step 4: Click “Install” to start the PC-RMS.



Disclaimer

All hardware, software and process described in this document are subjected to change without prior notice.

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