Power Monitor & Management Solution

PMC-5141 User Manual

[Version 2.3.0]

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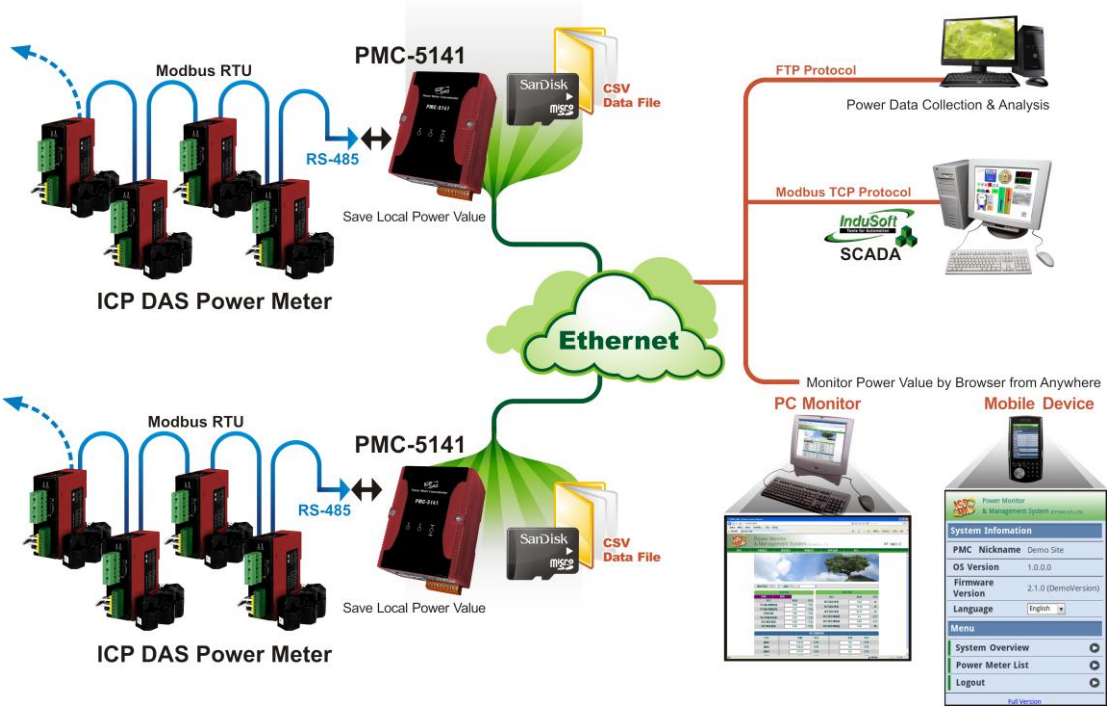
Table of Contents

1 System Description

PMMS (Power Monitor & Management Solution) is a power management system developed by ICP DAS. PMMS mainly consists of two parts: PMC-5141 (Power Meter Concentrator) and ICP DAS Compact Power Meters. PMC-5141 connects to ICP DAS compact power meter PM-213x and PM-311x via RS-485 to read the power data of the devices; and then save the power data and send the data to back-end FTP Server or SCADA software for further data integration or analysis. PMC-5141 also provides power demand management and alarm notification functions. With ICP DAS I/O modules (XW-107), according to the power demand level it allows to turn on/off the devices to manage the power consumption of the devices. In addition, PMC-5141 offers built-in Web Server, it allows users to connect to PMC-5141 via browser to view power data or set up parameters for the controllers or view the real-time or historical power data of the devices. By using Flash HMI Tools function, users could easily design a specific power monitor page by a few clicks on browsers. In addition, PMC-5141 offers Modbus TCP Slave function; it allows SCADA software or HMI devices to connect to PMC-5141 to get the front-end power meter data via Modbus TCP protocol.

During the whole process of system development, no programming is required; it takes a few clicks on web page to complete settings and to store the power data of the devices in the database for further analysis.

System Architecture:



PMC-5141(Power Meter Concentrator) Features:

- Built-in Web Server allows to set up the parameters of the front-end power meters and view power data via browsers
- Immediately display power data in real-time trend or historical trend
- Offers power data report generator function
- Offers alarm notification and power demand management function
- Read power data of the front-end power meters and save the data in CSV file format
- Regularly send back power data to back-end FTP Server software for data aggregation and analysis
- Offers Modbus TCP Slave function that allows seamless integration with SCADA software
- Offers Flash HMI Tools for easy HMI interface design
- Integrate ICP DAS I/O modules (XW-107)
- Offers access management function

This document is intended to provide guidelines for PMC-5141.

2 Before Installation

◆ Before installing PMC-5141, please finish the hardware installation of the PM-2133 / PM-2134 / PM-311x, and make sure all wiring connections are accurate (please refer to PM-2133/PM-2134/PM-311x user manual).

◆ PMC-5141 allows to connect with up to 16 power meters. The Modbus address range of the power meter is from 1~64, please make sure the Modbus address you set does not exceed 64.

◆ Modify PMC-5141‘s network settings to fit current network environment settings, and the default network settings of PMC-5141 is as follow:

- IP：192.168.255.1
- Subnet mask：255.255.0.0
- Gateway address：192.168.0.1
- DNS Server address：n/a

Steps:

(1) Modify the network settings of the PC or Notebook to be the same network segment as PMC-5141. For example：
   - IP：192.168.255.2
   - Subnet mask：255.255.0.0
   - Gateway address：192.168.0.1

(2) Connect PMC-5141 LAN1 with PC by network cable. (PMC-5141 is capable of auto-crossover)

(3) Start the browse and input http://192.168.255.1 in the address bar.

(4) Input default administrator password “Admin” to login into the page.

(5) After login in PMC-5141 web page, go to System Setting→Basic Setting→Network Setting, modify the network setting to fit current network environment.

(6) Save the settings and connect PMC-5141 to the network.

3 System Login

For the best view, when using webpage browsers (Chrome/Firefox/IE) to login PMC-5141 Web Server, 1280x1024 resolutions is recommended. For browser' versions, Firefox3.6 / Chrome14.0.8 / IE8 version (or above) is recommended.

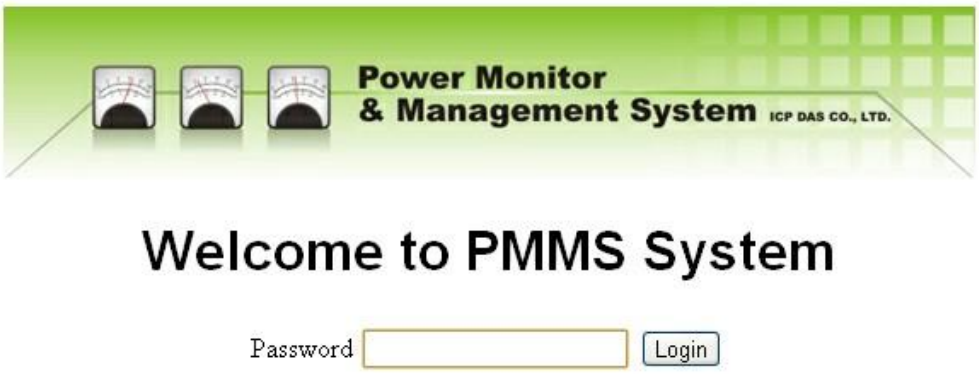


Figure 3-1: System Login Interface

The authority is granted in two levels by different passwords：

- **Administrator (default password: Admin)**
  The system Administrator can modify and view the settings of the system information or the compact power meters. Only one administrator is allowed to login into the system at the same time.
  (If previous administrator session wasn't logout properly, it will take 5 minutes (default) to be able to login again.)

- **General User (default password: User)**
  General users are allowed to view the information of the system or the compact power meters, they are not allowed to modify any settings. There are 5 general users allowed to login into the system at the same time.

Note: please make sure the Java Script function of your browser is enabled and Adobe Flash Player is installed before using this system, otherwise the system will not be able to function properly.

4 System HOME Page

Figure 4-1: Default HOME Page

Figure 4-2: Flash HMI HOME Page

After login into the page, according to different access authority level, you will be directed to different pages:

- **Login as Administrator**：The default home page (figure 4-1) will be loaded, it will display current information of the power meters that are connected to the system; the power information will be updated automatically every 20 seconds. On this page, users could view brief summary of power data and contract capacity in real time. In addition, carbohydrate emission information will be displayed according to the electricity consumption of the power meter.

- **Login as General User**：The default home page will be displayed according to previously set by the administrator. When a Flash HMI home page project is set as the home page (please refer to Flash HMI Tools Quick Start), the system will load the preset HMI home page project as the home page(Figure 4-2). If no Flash HI home page is assigned, the system will load default home page (Figure 4-1).

Please note: if this is your first time login into the system, please search the power meter in advance (please refer to power meter setting section), the power data of the power meters can't be displayed without performing searching in advance.

The 6 function tabs on web page upper region are as below:

- Home
- System
- Power Meter
- Alarm
- Event Log
- Logout

The following section will give more detailed information for each function tab.

5 System

There are 6 pages under the System page: Overview, Basic Setting, Advanced Setting, Security Setting, I/O Module Setting, and Home Page Setting.

5.1 Overview

On the Overview page, it displays overview information for each setting on PMC-5141.

Figure 5-1: System Overview Page

User could check out the information for each setting and perform firmware upgrade on this page. For more detailed information about firmware upgrade function, please refer to chapter 9 Firmware Upgrade section.

5.2 Basic Setting

On Basic Setting page, the user could modify the Nickname, Language, Date/Time of the system, Network Setting and COM Port Setting of the PMC-5141.

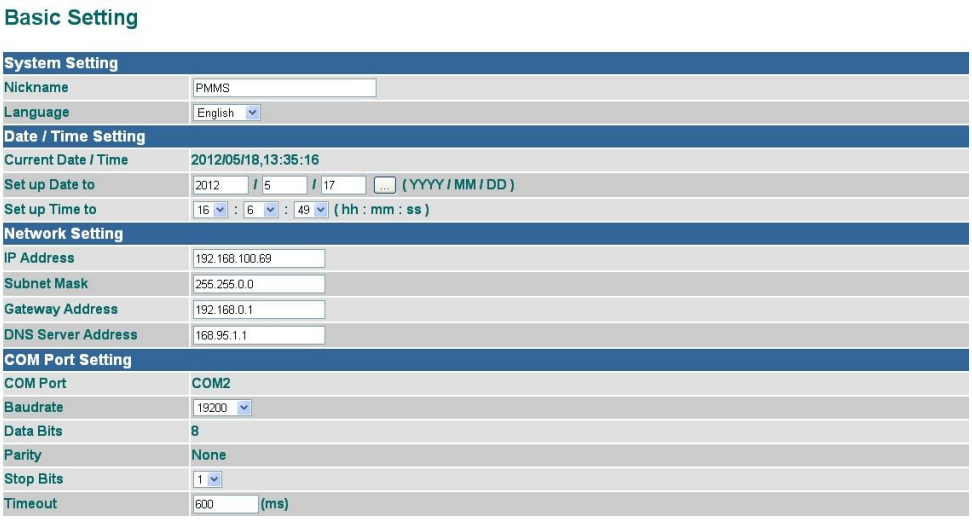


Figure 5-2: Basic Setting Page

◆ Nickname

The user could assign a nickname to the PMC-5141, the nickname could be input and displayed in multiple languages. After you make a change to the nickname, please click “Save” button to save the change.

Figure 5-3: Nickname Setting

◆ Language

The Language setting section allows user to setup the default language display when the user login into the system.

Figure 5-4: Language Setting

◆ Date/Time

Date: Select [...] button to bring up the calendar window (Figure 5-5), click the date on the calendar to set up the date setting.

Time: Select the hour/minute/second from the dropdown list. After you finish the setting, click on "Save" button to save the changes.

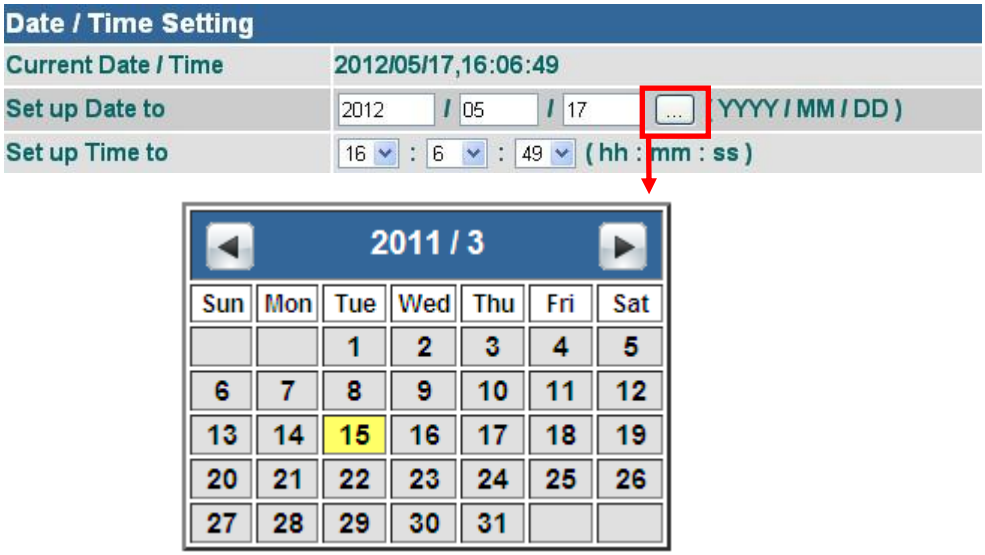


Figure 5-5: Time Setting

◆ Network Setting

Each time when get into this page, it will automatically read and display current network setting of the PMC-5141. After finishing modification of the network setting, click on "Save" button to save the changes.

Figure 5-6: Networking Setting

Note：

1. The terminal for outer network connection on PMC-5141 is LAN1; therefore input the parameters of LAN1 network settings in this section.

2. If fail to setup the network, the network setting will be set as previous value. After successful modifying the network setting, it will automatically logout and transfer to new address. If it doesn't transfer to new address automatically, please input the new address in the address bar and reconnect again.

◆ COM Port Setting

After getting into COM Port Setting page, it will automatically read and display current COM Port Setting on PMC-5141. To modify the COM Port Setting, please input Baudrate, Stop bit and Timeout (greater than 600ms is recommended), and then click on "Save" button to save the changes.

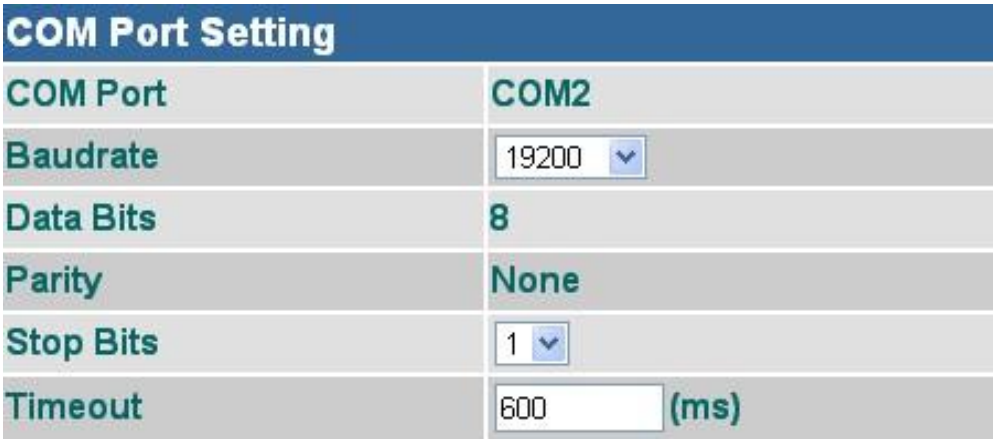


Figure 5-7: COM Port Setting

Note:

(1) PM-213x series product does not support 115200 Baudrate, if you intend to use PM-213x and PM-311x at the same time, please do not set Baudrate to be 115200.

(2) After you finish modifying COM Port settings, please go to "Power Metter" page and perform "Scan" again to renew the latest power meter information and make sure the settings of COM Port is the same as the settings of power meters (such as Baudrate settings). If the settings don't match each other, it might result in failing to scan power meters or getting the wrong power meter information.

5.3 Advanced Setting

The "Advanced Settings" section includes: Data Logging, Event Logging, Remote FTP Setting, Contract Capacity Setting, Demand Interval Setting and Carbon Footprint Setting. The detailed information for each setting is described as follow:

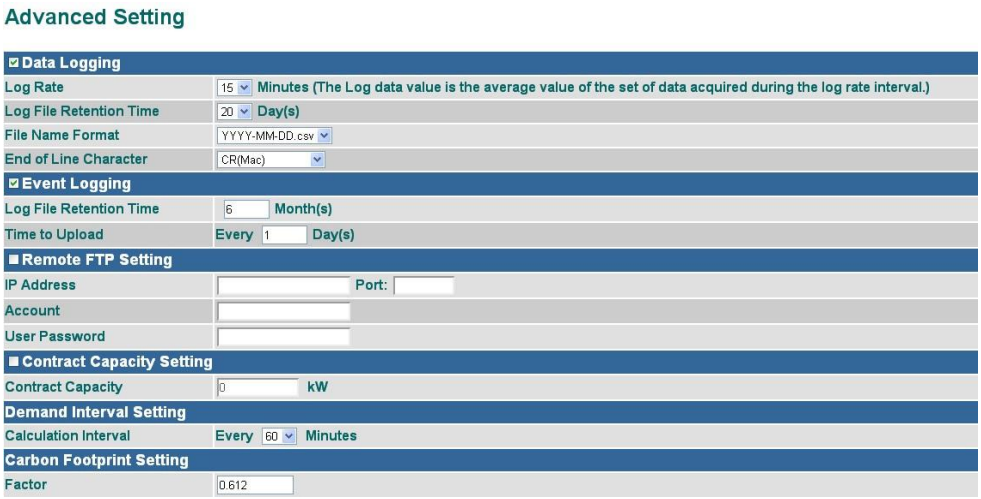


Figure 5-8: Advanced Setting Page

◆ Data Logging

In "Data Logging" section, you can set up the schedule for PMC-5141 to record power values of power meters. To enable Data Logging", please click on the check box in front to enable the function. To disable the function, please uncheck and click on "Save" button. The "Data Logging" interface is shown as below:

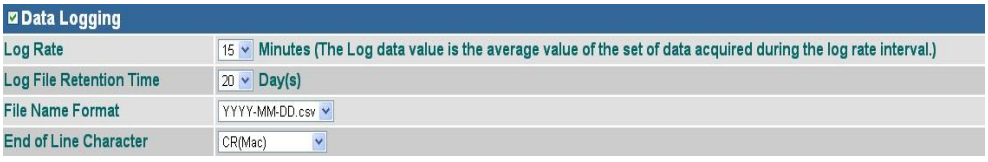


Figure 5-9: Data Logging

➢ Log Rate

In this section you can set up the interval to record each data. The Log data is an average value of a set of data acquired during the log rate interval. You can set the Log Rate as 5/10/15 minutes.

➢ Log File Retention Time

In this section you can set up the retention time of the log file. The files exceed the retention time will be automatically removed. If an error is occurred during the process of sending back the files, the retention time

will be automatically extended 10 more days. After the sending process is back to normal, the retention time will be automatically adjusted to original setting. The “Log File Retention Time” can be set as 10/30/50 days.

➢ File Name Format

Set up the file name format for the data log file. The file name format can be set as YYYY-MM-DD or DD-MM-YYYY formats。
(Y: Year，M: Month，D: Date)

➢ End of Line Character

Set up End of Line Character. The character can be set according to the system is using; it can be set as: CRLF(Windows), LF(Unix or Linux) or CR(Mac) formats.

◆ Event Logging

The Event Logging function allows to record the information about significant system events. To enable “Event Logging”, please click on the check box in front and save the settings to enable the function. To disable this function, uncheck and save the settings. When the Event Logging function is disabled, it will still keep on recording the system events, however, it will not perform any operation to upload or delete the files. The settings of Event Logging are described as below:

Figure 5-10: Event Logging

➢ Log File Retention Time

Set up the retention time of the event log file. If an error is occurred during the process of sending back the files, the retention time will be automatically extended 1 more month. After the sending process is back to normal, the retention time will be automatically adjusted to original setting.

➢ Time to Upload

Set up the days to upload the event log file, the minimum time interval to upload the file is 1 day and the maximum interval is 99 days.

◆ Remote FTP Setting

In the Remote FTP Setting section, it allows to set up the backend server that is going to receive the data log and event log files. To enable this function please click the checkbox in front of the "Remote FTP Setting" and input the IP address, port and password of the remote FTP; save the settings and it is ready for use. If this function is disabled, or there is a mistake of the settings, the data log and event log files will not be able to transferred.

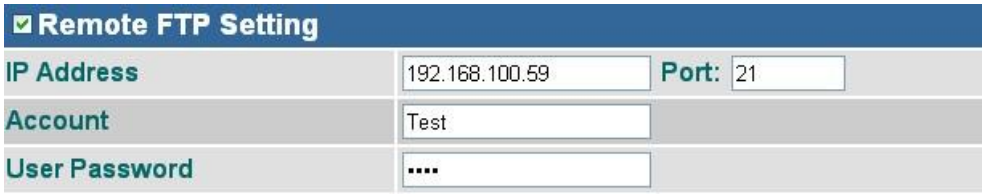


Figure 5-11: Remote FTP Setting

◆ Contract Capacity Setting

The contract capacity with electric utility company can be set in this section. Enable the Contract Capacity Setting, and then the comparison chart of Contract Capacity and the Predicted Demand will be displayed in the Home page.

Figure 5-12: Contract Capacity Setting

◆ Demand Interval Setting

Input the Calculation Interval of the demand, the default interval is 15 minutes. The Calculation Interval of the demand can be set as 15 minutes/ 30 minutes/ 60 minutes.

Figure 5-13: Demand Interval Setting

◆ Carbon Footprint Setting

Set up the factor of Carbon Footprint. Please follow the global statistics data published by International Energy Agency (IEA) to set up the carbon footprint factors.

Figure 5-14：Carbon Footprint Setting

5.4 Security Setting

In the Security Setting section, it allows to：

- Modify the password for administrator or general user
- Change the settings for Login Timeout
- Enable or disable Local FTP Server
- Modify the password of Local FTP Server

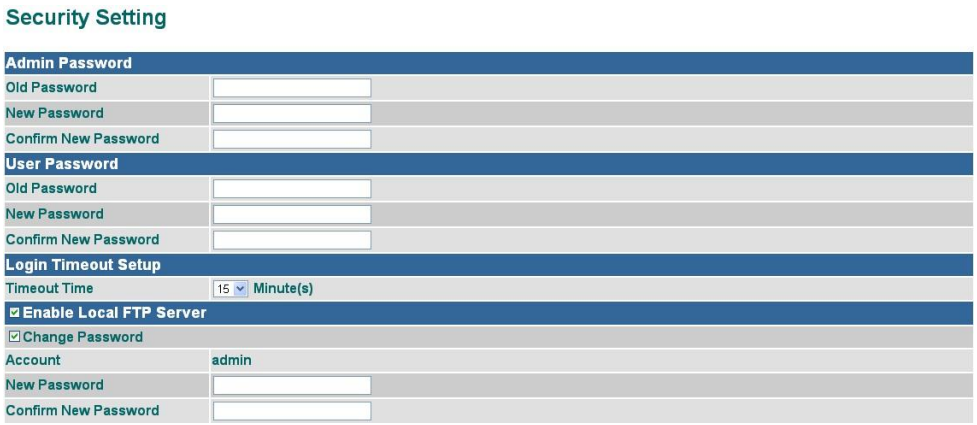


Figure 5-15: Security Setting

◆ Admin Password

The Admin Password is limited to 20 characters, and the default Administrator Password is: "**Admin**".

Note: Avoid using the system characters: "#" and "?" as the password.

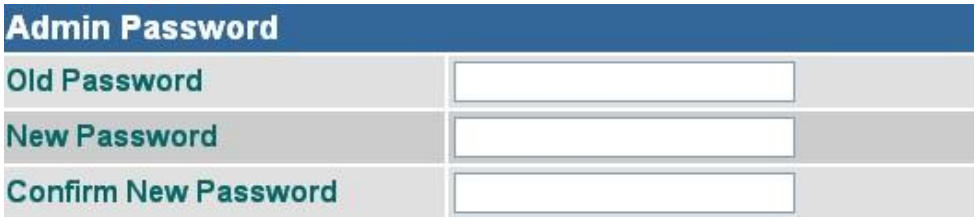


Figure 5-16: Password Setting for Administrator

◆ User Password

The User Password is limited to 20 characters, and the default User Password is: "**User**".

Note: Avoid using the system characters: "#" and "?" as the password.

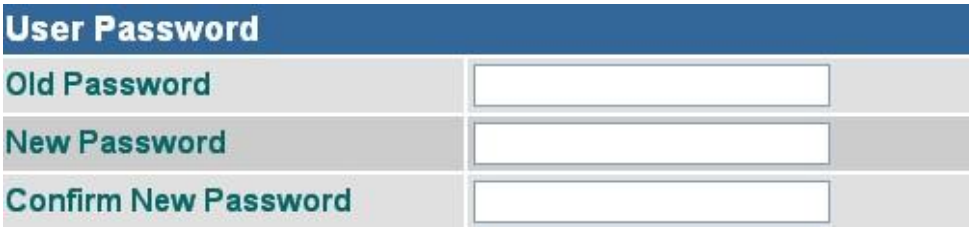


Figure 5-17: Password Setting for User

Please note: If the user modify the Admin Password and the User Password at the same time, it is required to input both password accurately to make the changes effective.

◆ Login Timeout Setup

This section allows to modify login timeout to be 5/10/15/20/30 minutes, when the login idle time exceeds the login timeout interval (the default timeout interval is 5 minutes), the system will logout this user automatically.

Figure 5-18: Login Timeout Setting

◆ Enable Local FTP Server and Change Password

In this section, it allows to enable and set up the FTP Server function of PMC-5141. By using FTP software, it allows to connect to the FTP Server of PMC-5141directly, and enables to retrieve the event log or power data log files from remote FTP Clients. Click the checkbox in front and click "Save" button to enable this function. It also allows to modify the password of the FTP Server in this section; the default login account is "**admin**" and the password is "**admin**".

Figure 5-19: Enable Local FTP Server and Change Password

Please note:

(1) If you would like to delete the event log or data log files via FTP, please make sure the files has been backup, once the log files are deleted, the system will not let you undo that action or restore the files.

(2) For more detailed information about the event log or data log file format, please refer to Appendix I ~ Appendix III.

5.5 I/O Module Setting

The I/O Module Setting page allows to add or remove I/O modules. After adding a new module, it allows to set up the configuration of the module channels. (PMC-5141 currently supports XW-107 module.)

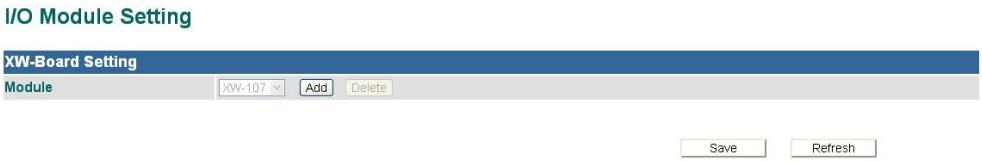


Figure 5-20: I/O Module Setting

◆ Module Setting

Figure 5-21: Add a module

Add a module: click on "Add" button to add an I/O module to the list (using XW-107 as an example).

◆ DI Channel Setting

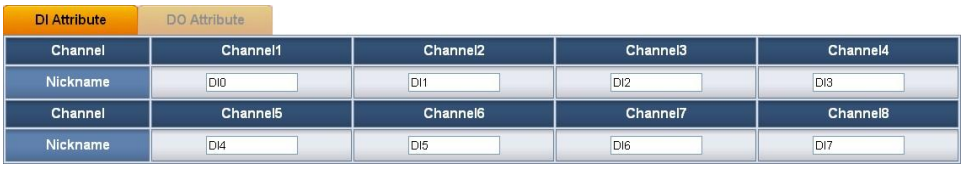


Figure 5-22: DI Channel Setting

➢ Nickname

In this section, the user could give a nickname to a DI channel on the I/O modules. The nickname section allows to input and display the nickname in multiple languages. After you modify or input the nickname, click "Save" button to save the changes.

◆ DO Channel Setting

DI Attribute | DO Attribute

Channel	Channel1	Channel2	Channel3	Channel4
Nickname	DO0	DO1	DO2	DO3
Power On Value	OFF	OFF	OFF	OFF
Enable Pulse Output	☐	☐	☐	☐
Pulse High (Sec.)				
Pulse Low (Sec.)				
Channel	**Channel5**	**Channel6**	**Channel7**	**Channel8**
Nickname	DO4	DO5	DO6	DO7
Power On Value	OFF	OFF	OFF	OFF
Enable Pulse Output	☐	☐	☐	☐
Pulse High (Sec.)				
Pulse Low (Sec.)				

Figure 5-23: DO Channel Setting

➢ Nickname

In this section, the user could give a nickname to a DO channel on the I/O modules. The nickname section allows to input and display the nicknames in multiple languages. After you modify or input the nickname, click “Save” button to save the changes.

Figure 5-24: Nickname Setting

➢ Power On Value

In this section it allows to set the initial value for the DO channels in the “Power On Value” field. The system will output this value when being powered on. Click “Save” button to save the changes.

Figure 5-25: Power On Value Setting

- Enable Pulse Output

If you check the Enable pulse output checkbox, it will allow this DO channel to perform pulse output and form a periodic pulse cycle. In Pulse Output mode, the selected DO channel will generate a square wave according to specified parameters (Pulse High and Pulse Low). It is required to input the Pulse High and Pulse Low. The unit is 1 second. Pulse High indicates the "ON" time duration and Pulse Low indicates the "OFF" time duration in a periodic Pulse cycle.

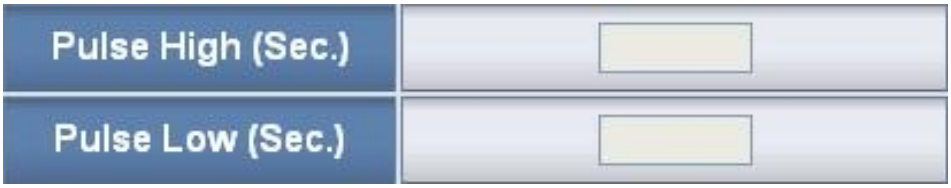


Figure 5-26: Pulse Output Setting

5.6 Home Page Setting

In Home Page Setting page, it allows to perform Home page edition, design and the management of Home page project. For more detailed information, please refer to Flash HMI Tools Quick Start manual.

Figure 5-27: HOME Page Setting

6 Power Meter

On the Power Meter page, a list for all power meters connected to the system will be displayed on the left region (Figure 6-1). Click on one Power meter, there will be three tabs shows on the right region: Overview, Parameter Setting and View Data. For the initialization of the system, please click on "Scan" (Figure 6-2) to perform the first scan of the system in order to build a list of the power meters.

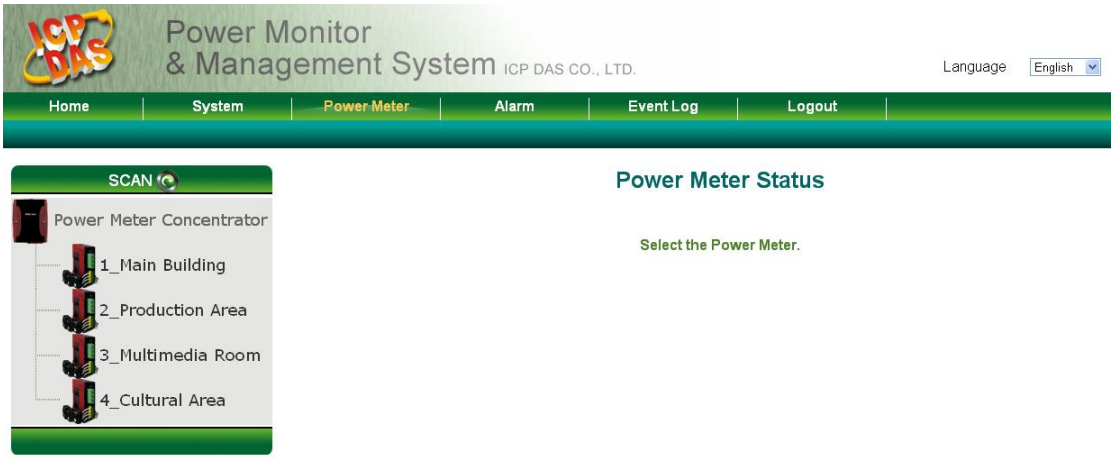


Figure 6-1: Power Meter Page

6.1 Scan the Power Meters

After adding or removing a power meter, please perform "Scan" again to renew the power meter list. If the "Scan" operation is executed accurately, the user would be able to select the power meter for power data query or settings. If it fails to scan the power meters or there is no power meter exists, a "N/A" message will appear and will not be able to perform any review or settings. If adding/removing a power meter without performing the "Scan" operation, the user will not be able to get into the power meter node and an error message will appear.

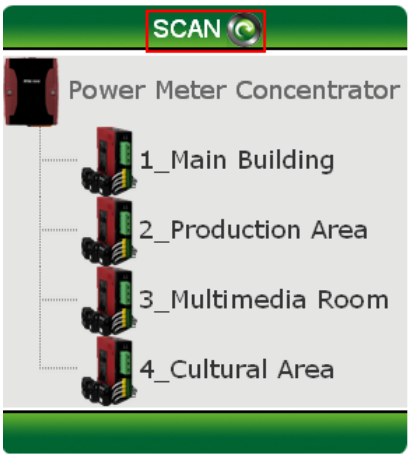


Figure 6-2: Scan the Power Meters

6.2 Overview

The Overview page allows user to view the parameters and the real-time information of the power meter. The information will be refreshed every 20 seconds, the user could also click on "Refresh" button to update the Overview page.

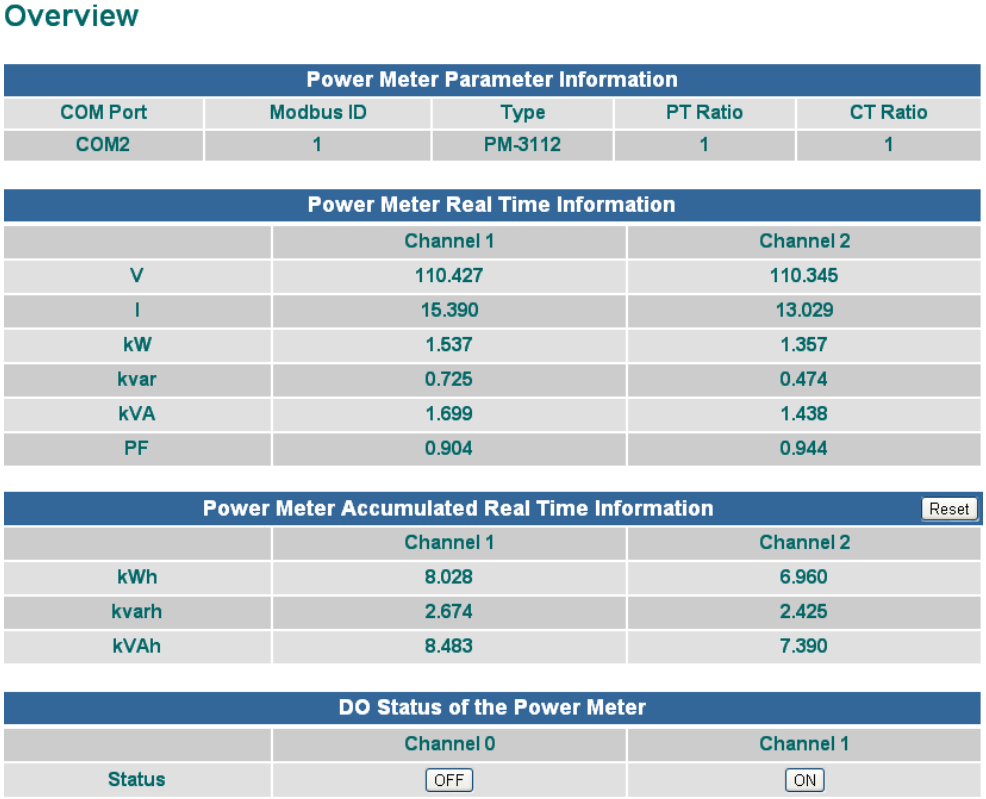


Figure 6-3: Power meter information Overview page (PM-3112)

◆ Power Meter Parameter Information

This section allows to view the parameter settings of the selected power meter, including: COM Port, Modbus ID, Type, PT Ratio and CT Ratio.

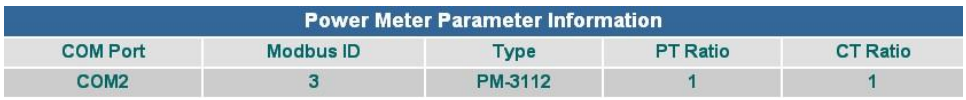


Figure 6-4: Power Meter Parameter Information

◆ Power Meter Real Time Information

Power Meter Real Time Information				
	Phase A	Phase B	Phase C	Average/Total
V	106.925	105.313	105.622	105.953
I	18.158	12.186	25.494	18.612
kW	1.814	1.230	2.592	5.631
kvar	0.691	0.367	0.729	1.815
kVA	1.942	1.283	2.693	5.916
PF	0.934	0.958	0.963	0.952

Power Meter Accumulated Real Time Information				Reset
	Phase A	Phase B	Phase C	Average/Total
kWh	9.728	6.670	12.630	29.033
kvarh	3.252	2.336	4.480	10.218
kVAh	10.284	7.086	13.434	30.804

Figure 6-5: Power Meter Real Time Information (PM-2133)

Power Meter Real Time Information				
	Channel 1	Channel 2	Channel 3	Channel 4
V	108.310	108.310	108.108	108.108
I	10.905	8.627	12.131	6.401
kW	1.084	0.888	1.230	0.660
kvar	0.469	0.292	0.454	0.209
kVA	1.181	0.934	1.311	0.692
PF	0.918	0.950	0.938	0.953

Power Meter Accumulated Real Time Information				Reset
	Channel 1	Channel 2	Channel 3	Channel 4
kWh	5.340	4.297	6.321	3.281
kvarh	1.790	1.514	2.239	1.167
kVAh	5.646	4.569	6.722	3.491

Figure 6-6: Power Meter Real Time Information (PM-2134)

Power Meter Real Time Information		
	Channel 1	Channel 2
V	111.638	111.572
I	15.915	13.330
kW	1.688	1.394
kvar	0.556	0.518
kVA	1.777	1.487
PF	0.950	0.937

Power Meter Accumulated Real Time Information			Reset
	Channel 1	Channel 2	
kWh	8.176	7.091	
kvarh	2.731	2.470	
kVAh	8.643	7.528	

Figure 6-7: Power Meter Real Time Information (PM-3112)

In this section, it allows to view the real time information of the selected power meter. For PM-2133, it will display the real time information of Phase A, Phase B and Phase C (Figure 6-5). For PM-2134, it will display the real time information of Channel 1, Channel 2, Channel 3 and Channel 4 (Figure 6-6). And for PM-3112, it will display the real time information of Channel 1, Channel 2 (Figure 6-7).

◆ Reset Power Meter Accumulated Information

The【Reset】button will appear when login as an administrator; it allows to reset all accumulated information fields to their default values (zero); this function is not available if login as a general user.

◆ Power Meter DO Status (apply to PM-311x series only)

Figure 6-8: Power Meter DO Status

In this section, you can view the DO status of the specified power meter. If you login as Administrator, you can directly control the output value of the DO channels as well. If you login as a general user, you can view the DO status only without being able to perform any modification.

6.3 Parameter Setting

On the "Parameter Setting" page, it allows to modify the nickname and the transformation ratio value of the parameter and its channels, as shown below:

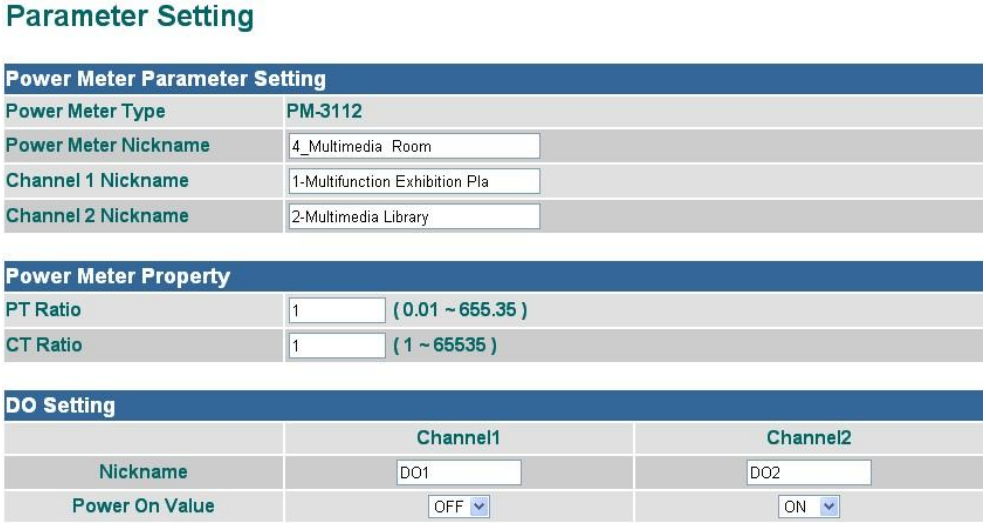


Figure 6-9: Parameter Setting Page (PM-3112)

◆ Power Meter Parameter Setting

In this section, the user could give a nickname to the power meter or its channels, as shown in the following figures: PM-2133(Figure 6-10)、PM-2134(Figure 6-11) and PM-3112(Figure 6-12). The length of the nickname is limited to 30 characters, after finishing the settings, click "Save" to save the changes. The new nicknames will be displayed on screen or in logger data.

Figure 6-10: Nickname Setting (PM-2133)

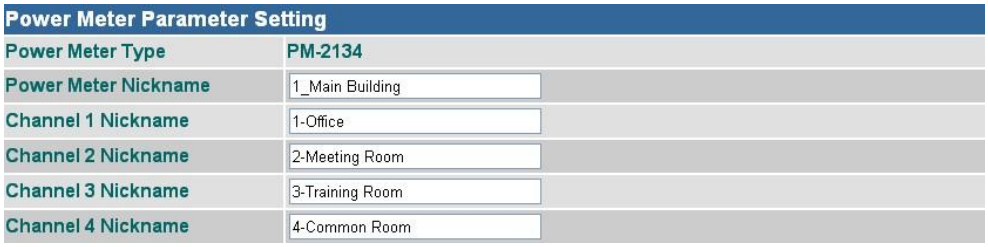


Figure 6-11: Nickname Setting (PM-2134)

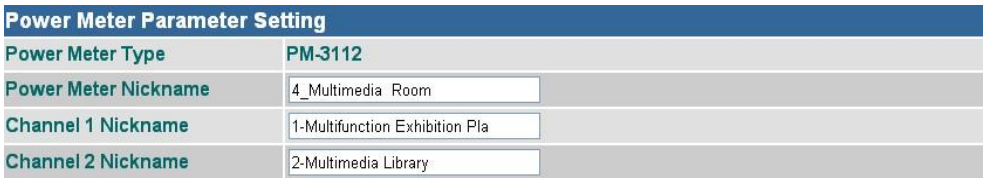


Figure 6-12: Nickname Setting (PM-3112)

◆ Power Meter Property

In this section, it allows to set the PT ratio and CT ratio of the power meter as needed. After finishing setting, click "Save" to save the changes. The PT ratio is ranged from 0.01 ~ 655.35 and the CT ratio is ranged from 1 ~ 65535. If the transformation ratio value exceeds the range, the saving operation will not be allowed.

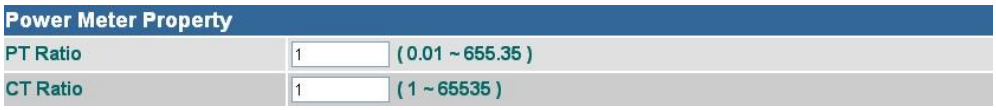


Figure 6-13: Power Meter Property

◆ Power Meter DO setting (PM-311x series)

In this section you can give a nickname and initial power on default DO values to the specified power meter. After finishing the settings, click "Save" to save the nickname and power on default values. The nickname could be input and displayed in multiple languages. After the power on values being set, the system will output the pre-set initial status when being powered on.

Figure 6-14：Power Meter DO Setting

6.4 View Data

On the "View Data" page, it provides a brief overview information of electricity usage information, including: daily report, monthly report, real time chart, historical table and historical chart, as shown below:

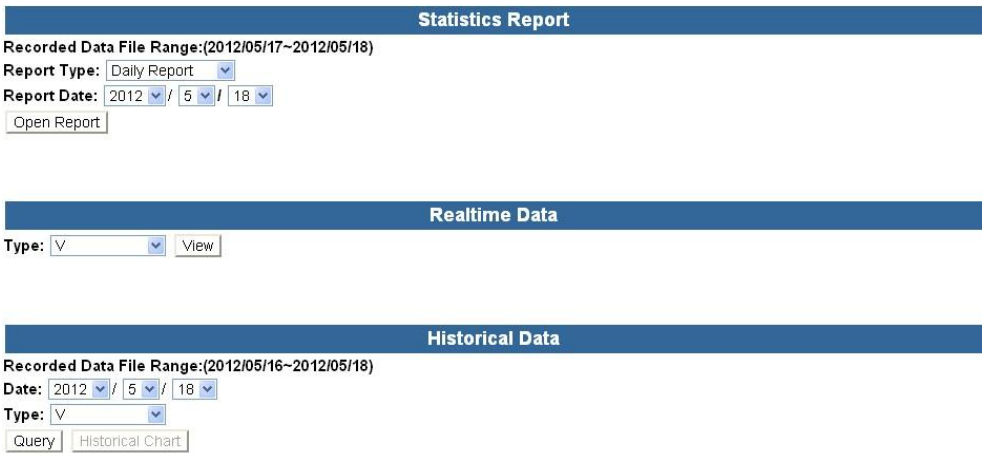


Figure 6-15: View Data

◆ Statistics Report

This function provides daily and monthly report of the power data. To open a report, please select the Report Type (Figure 6-16), and then select the Report Date (Figure 6-17), click on "Open Report". If the file does not exist in the input date or exceeds the date of the range, a message of "File not found" will appear.

For PM-2133、PM-2134 and PM-3112 are equipped with different number of channels, the report format will be different

- PM-2133 report please refer to Figure 6-18
- PM-2134 report please refer to Figure 6-19
- PM-3112 report please refer to Figure 6-20

Figure 6-16: Report Type

Figure 6-17: Report Date

2_QC Area 2012/05/17 Daily Report

Time	kW(Max.)	kWh	PF(Avg.)	I_a	I_b	I_c	V_a	V_b	V_c	kVA(Tot.)	kvar(Tot.)
00	1961.809	1959.266	0.940	629.490	510.160	749.822	1104.945	1105.640	1104.683	2088.035	709.492
01	1962.701	1962.000	0.940	630.431	510.936	750.122	1105.451	1104.453	1104.505	2089.713	707.967
02	1965.295	1964.891	0.939	629.458	510.358	749.608	1105.129	1104.464	1104.344	2087.137	710.398
03	1964.404	1961.984	0.941	630.497	509.885	749.420	1104.913	1102.867	1105.197	2086.971	704.051
04	1962.562	1957.719	0.939	629.910	509.271	748.338	1104.867	1104.948	1104.954	2085.631	709.893
05	1963.184	1964.750	0.939	629.910	510.422	750.489	1104.636	1105.056	1104.819	2089.052	710.841
06	1964.825	1961.891	0.941	630.494	509.155	750.385	1105.200	1105.625	1104.905	2088.942	701.695
07	1965.436	1961.250	0.940	629.370	510.145	749.889	1104.750	1105.583	1104.799	2087.867	706.927
08	1964.701	1961.437	0.940	630.614	509.989	749.594	1105.210	1106.045	1105.784	2089.948	707.984
09	1964.373	1961.250	0.939	630.612	509.931	749.989	1105.135	1105.001	1104.998	2089.116	712.461
10	1964.013	1962.406	0.940	630.542	509.741	750.426	1105.072	1105.031	1104.721	2089.117	706.873
11	1964.888	1962.078	0.940	629.076	509.764	749.754	1105.323	1105.676	1105.727	2087.984	704.962
12	1964.795	1961.047	0.940	629.670	510.621	750.332	1104.053	1104.569	1105.256	2088.438	710.192
13	1962.199	1960.703	0.940	630.777	510.595	749.421	1105.734	1105.390	1105.463	2090.328	709.571
14	1963.935	1961.125	0.940	630.370	509.677	749.599	1105.529	1104.619	1105.693	2088.577	709.997
15	1963.683	1960.828	0.940	630.377	509.329	750.641	1105.242	1104.304	1105.413	2088.816	705.445
16	1965.278	1962.734	0.940	630.227	510.061	749.188	1104.829	1104.875	1105.695	2088.112	704.833
17	1964.481	1601.531	0.942	31.338	25.442	37.395	110.173	110.549	110.526	10.399	3.477
18	9.839	9.828	0.943	31.513	25.455	37.496	110.508	110.492	110.494	10.439	3.462
19	9.855	9.844	0.942	31.482	25.478	37.463	110.518	110.451	110.490	10.432	3.462
20	9.855	9.813	0.942	31.491	25.454	37.484	110.513	110.509	110.544	10.436	3.487
21	9.839	9.844	0.943	31.500	25.455	37.471	110.501	110.467	110.519	10.434	3.443
22	9.852	9.828	0.942	31.508	25.469	37.487	110.490	110.494	110.484	10.437	3.466
23	9.855	9.813	0.942	31.475	25.462	37.488	110.499	110.513	110.502	10.434	3.480

Daily Highest Usage: 1965.436 kW Time: 2012/05/17 07:25:40 Total: 35007.860 kWh

Figure 6-18: PM-2133 Report

1_Main Building 1-Office 2012/05/17 Daily Report

Time	kW(Max.)	kWh	PF	I	V	kVA	kvar
00	324.967	324.578	0.941	310.036	1115.532	345.851	114.151
01	325.006	325.051	0.941	309.788	1114.811	345.354	113.711
02	325.058	324.684	0.942	309.700	1114.504	345.160	113.249
03	325.284	324.947	0.942	309.631	1115.455	345.379	112.889
04	325.543	324.563	0.940	309.735	1114.948	345.342	115.141
05	324.931	325.033	0.940	310.074	1114.726	345.643	115.327
06	325.359	324.934	0.941	309.728	1115.114	345.382	113.601
07	325.534	324.869	0.941	310.231	1114.925	345.883	113.869
08	325.390	325.205	0.942	310.147	1114.917	345.789	112.797
09	325.458	325.518	0.942	310.010	1114.951	345.647	112.594
10	325.300	324.408	0.940	309.834	1115.315	345.564	115.164
11	325.380	324.973	0.943	310.034	1114.307	345.474	112.233
12	325.337	324.930	0.942	309.642	1114.557	345.113	113.153
13	325.380	324.916	0.942	309.542	1114.883	345.101	112.779
14	325.406	324.527	0.939	309.792	1115.166	345.468	115.492
15	325.248	324.652	0.941	309.925	1114.997	345.561	113.989
16	325.494	325.231	0.941	309.962	1114.756	345.532	114.000
17	325.717	265.352	0.944	15.490	111.585	1.728	0.561
18	1.654	1.629	0.944	15.498	111.476	1.728	0.554
19	1.642	1.637	0.946	15.500	111.516	1.729	0.548
20	1.642	1.633	0.946	15.497	111.505	1.728	0.545
21	1.642	1.637	0.947	15.499	111.475	1.728	0.539
22	1.639	1.629	0.944	15.498	111.514	1.728	0.559
23	1.642	1.637	0.948	15.502	111.500	1.728	0.536

Daily Highest Usage: 325.717 kW Time: 2012/05/17 17:36:19 Total: 5798.173 kWh

Figure 6-19: PM-2134 Report

4_Multimedia Room 1-Multifunction Exhibition Pla 2012/05/17 Daily Report

Time	kW(Max.)	kWh	PF	I	V	kVA	kvar
00	392.109	391.000	0.944	389.783	1065.277	415.235	133.995
01	392.609	392.000	0.942	389.712	1064.413	414.824	135.474
02	392.109	391.000	0.944	389.062	1064.784	414.276	133.060
03	392.109	391.000	0.945	389.791	1065.241	415.217	132.595
04	392.218	391.500	0.943	390.104	1065.041	415.468	135.505
05	392.218	391.000	0.942	389.591	1064.730	414.812	135.414
06	392.327	392.000	0.941	390.612	1065.165	416.058	137.848
07	392.218	391.000	0.943	389.311	1065.239	414.704	134.802
08	391.217	390.000	0.942	388.241	1065.268	413.570	136.156
09	391.609	391.500	0.943	389.778	1064.918	415.075	135.057
10	392.218	390.000	0.943	388.228	1065.639	413.715	134.627
11	392.109	392.000	0.943	390.331	1065.359	415.842	135.058
12	392.609	390.500	0.944	389.556	1064.705	414.762	133.290
13	392.718	392.500	0.942	390.036	1065.547	415.603	136.225
14	393.109	392.000	0.943	390.036	1065.475	415.563	134.870
15	392.718	391.000	0.943	389.498	1065.392	414.966	134.983
16	391.718	390.500	0.942	389.023	1064.845	414.247	135.409
17	473.684	367.000	0.949	299.479	830.119	314.180	99.594
18	257.927	2.000	0.944	19.488	106.502	2.076	0.669
19	2.003	2.000	0.946	19.501	106.498	2.077	0.658
20	2.003	2.000	0.947	19.498	106.488	2.076	0.653
21	2.003	2.000	0.945	19.496	106.490	2.076	0.662
22	2.003	2.000	0.947	19.526	106.511	2.080	0.648
23	2.003	2.000	0.945	19.470	106.487	2.073	0.661

Daily Highest Usage: 473.684 kW Time: 2012/05/17 17:49:24 Total: 7029.500 kWh

Figure 6-20: PM-3112 Report

◆ Real Time Data

In this section it allows to query various electricity data. Select the Type (Figure 6-16) and then click on “View”. The data chart will be displayed; as shown on Figure 6-22(PM-213x) and Figure 6-23(PM-3112). It allows to view real time chart one type each time, if a second type is viewed; the previous chart will be closed automatically and will display the real time chart of the second type only. The user could select a specific type to view the real time chart. The refresh rate of the chart is 5 seconds. Click on the “Stop” button on the left, it will stop refreshing the chart and will display the chart data of the previous 25 minutes. The user could drag and move on the chart to adjust the viewing range. Press “Start” to continue to refresh the chart. To view the value on the marker point, move the mouse cursor close to the marker point, the value will be displayed.

Figure 6-21: Types of the Real Time Chart

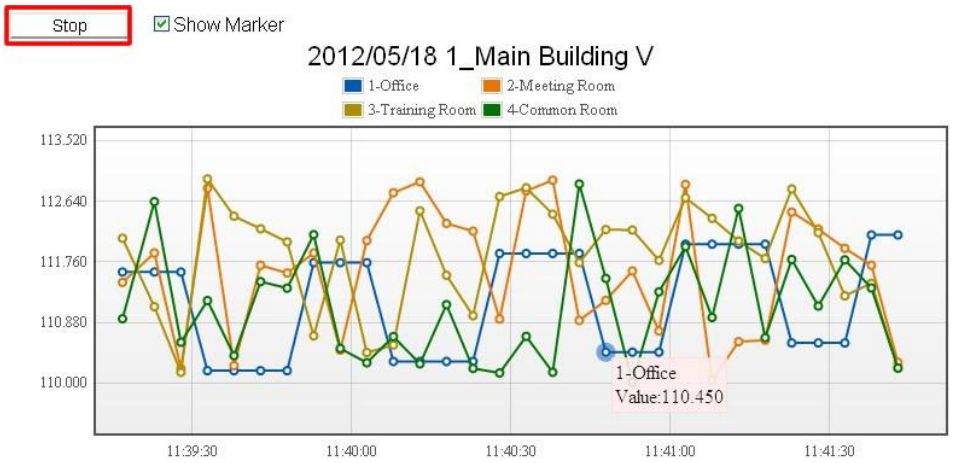


Figure 6-22: Real Time Chart (PM-213x)

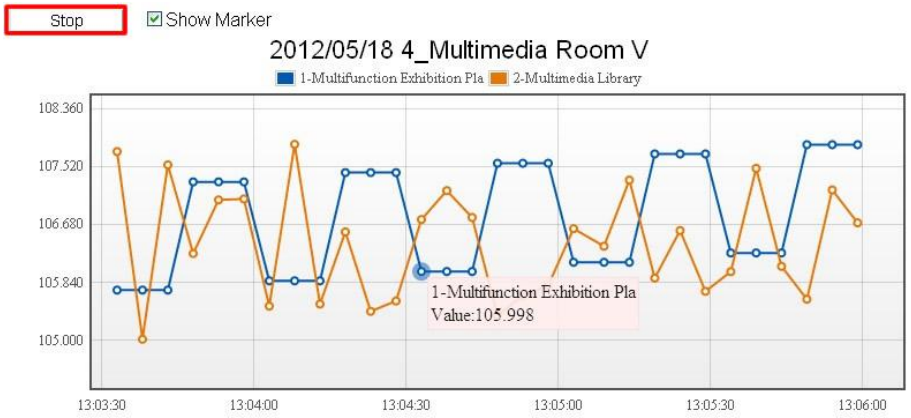


Figure 6-23: Real Time Chart (PM-3112)

◆ Historical Data

Select the Date and Type that is going to query the data and then click on the "Query" button, the data of the specified date and type will be displayed. If the file does not exist in the input date or exceeds the date of the file storage range, a message of "File not found" will appear. To view the historical chart, please click on "Historical Chart". (Note: it has to successfully query the file to view the historical chart)

Figure 6-24: Historical Data

Index	Date	Time	1-Office	2-Meeting Room	3-Training Room	4-Common Room
1	2012/05/17	00:04:58	1114.728	1116.947	1115.339	1115.708
2	2012/05/17	00:09:59	1114.831	1114.473	1114.482	1116.250
3	2012/05/17	00:14:56	1115.232	1115.776	1115.299	1114.069
4	2012/05/17	00:19:57	1114.459	1116.572	1117.180	1116.106
5	2012/05/17	00:24:59	1117.132	1114.612	1115.065	1115.741
6	2012/05/17	00:29:55	1115.617	1115.319	1115.673	1116.771
7	2012/05/17	00:34:57	1117.900	1113.437	1114.643	1115.023
8	2012/05/17	00:39:59	1115.179	1114.503	1113.081	1114.465
9	2012/05/17	00:44:55	1115.500	1113.202	1114.676	1114.874
10	2012/05/17	00:49:57	1114.589	1115.303	1115.689	1114.494
11	2012/05/17	00:54:59	1115.067	1115.167	1114.772	1113.199
12	2012/05/17	00:59:55	1116.148	1117.082	1113.117	1117.192

Figure 6-25: Historical Data Table (PM-213x)

Historical Data

Data File Recording Range:(2012/05/14~2012/05/18)

Date: 2012 / 5 / 17

Type: V

Query | Historical Chart

4_Multimedia Room V

Index	Date	Time	1-Multifunction Exhibitic	2-Multimedia Library
1	2012/05/17	00:04:58	1064.768	1064.629
2	2012/05/17	00:09:55	1064.124	1064.468
3	2012/05/17	00:14:56	1064.908	1065.334
4	2012/05/17	00:19:58	1067.377	1066.784
5	2012/05/17	00:25:00	1066.245	1065.738
6	2012/05/17	00:29:56	1068.445	1065.488
7	2012/05/17	00:34:58	1064.486	1066.131
8	2012/05/17	00:39:59	1065.585	1066.235
9	2012/05/17	00:44:56	1062.903	1066.834
10	2012/05/17	00:49:58	1065.689	1063.376
11	2012/05/17	00:54:59	1064.559	1066.098
12	2012/05/17	00:59:56	1064.236	1064.400

Figure 6-26: Historical Data Table (PM-3112)

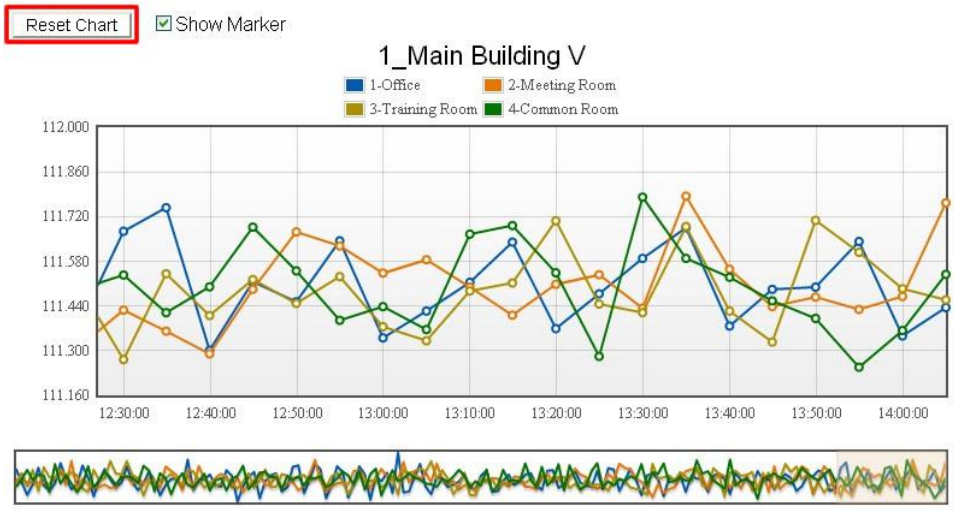


Figure 6-27: Historical Chart (PM-213x)

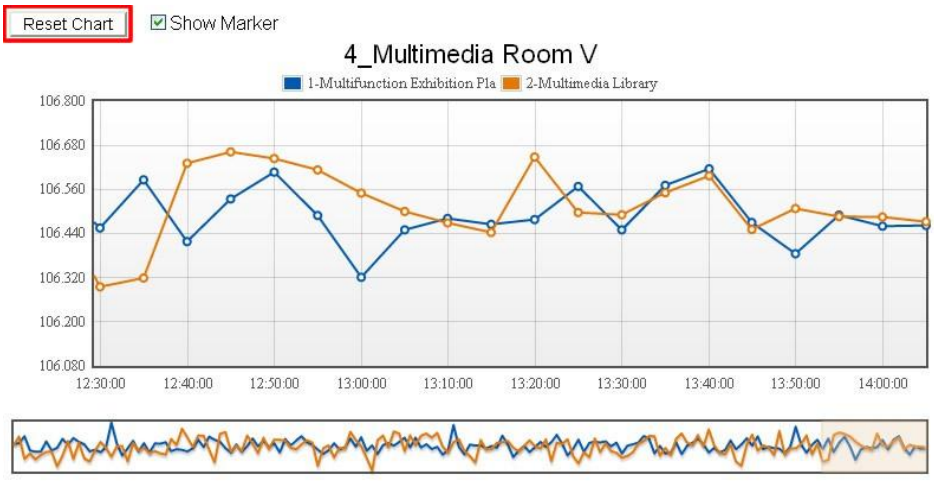


Figure 6-28: Historical Chart (PM-3112)

It allows to view historical data chart of specific type. The user could select the range on the below region or drag and move on the chart to adjust the viewing range. To reset the chart to original view, click on the “Reset” button on the left upper region. Move the mouse cursor close to the marker point, the value will be displayed.

7 Alarm

It allows to set up to 6 IF-THEN-ELSE Alarm Rules. When the Alarm Rule condition is satisfied, it will send out the pre-set Alarm message or perform the pre-set Action. There are 5 types of Alarm triggered condition: Power Meter Disconnection Alarm, FTP Alarm, Disk Alarm, Power Meter Alarm and I/O Module Alarm. The Alarm setup page is shown as below:

Figure 7-1: Alarm Setting Page

Please follow the steps below to set up the Alarm settings:

i. In the "Alarm Amount" field, specify the total number of alarm rule you are going to use from the dropdown list.

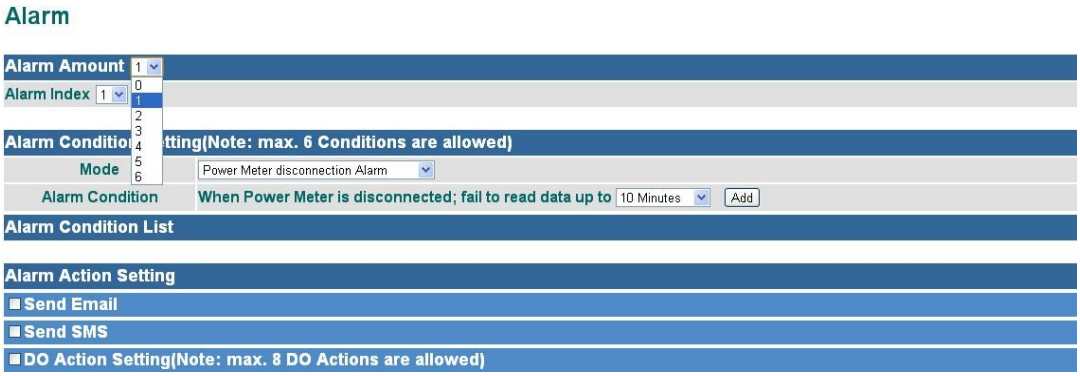


Figure 7-2: Setup total number of alarms

ii. In the "Alarm Index" field, specify the alarm index number to be set up from the dropdown list.

iii. In the "Alarm Condition Setting" section, select the alarm condition mode, the alarm condition mode includes the following options: Power Meter Disconnection Alarm, FTP Alarm, Disk Alarm, Power Meter Alarm and I/O Module Alarm. After finishing the setting, click on "Add" button to add the new condition to the Alarm Condition List (Figure 7-3). It is required to add at least

one condition or it will fail to save the condition, maximum 6 sets of conditions is allowed.

Figure 7-3: Add Power Meter Alarm Condition

iv. To delete the condition, click on the "Delete" button next to the Alarm condition in the "Alarm Condition List" section.

Figure 7-4: Delete Power Meter Alarm Condition

PMC-5141 offers 5 Alarm Condition options; the detail of each condition will be described below:

■ Power Meter Disconnection Alarm

After successfully add the Power Meter Disconnection Alarm condition, when Power Meter is disconnected and fail to read data up to the specified time period (10 minutes/20 minutes/30 minutes/1 hour/ 6 hours), the alarm condition will be True.

Figure 7-5: Power Meter Disconnection Alarm

■ FTP Alarm

After successfully adding a FTP Alarm, when FTP fails to transmit up to 12 hours/ 24 hours/48 hours, the alarm condition will be True.

Figure 7-6: FTP Alarm

■ Disk Alarm

After successfully adding a Disk Alarm, when the disk space is less than 50MB/100MB/500MB, the alarm condition will be True.

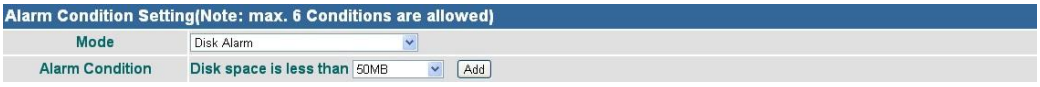


Figure 7-7: Disk Alarm

■ Power Meter Alarm

The condition of Power Meter Alarm can be set as Predicted Demand, Voltage or Current. Set up the expression statement for the power meter alarm. Select an operator from "=","<=" or "<=", and an evaluation value has to be specified; if the power meter alarm match the evaluation criteria, the result of this alarm condition will be "True"

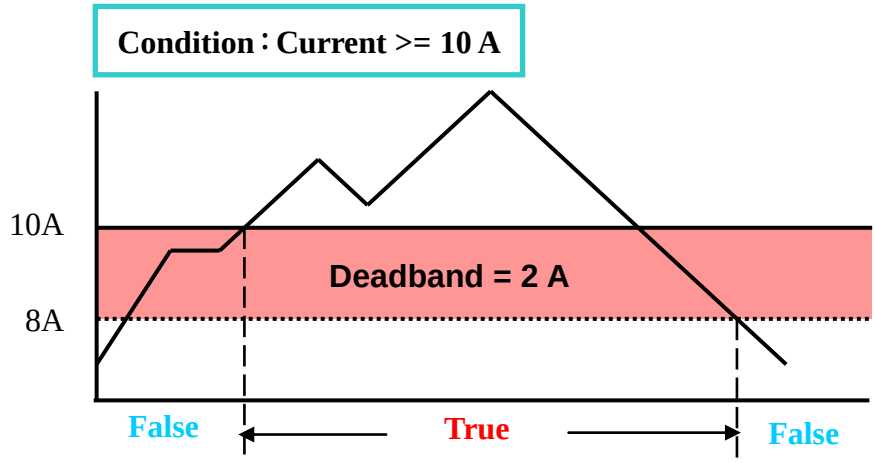
Figure 7-8: Power Meter Alarm

【About **Deadband** Setting】

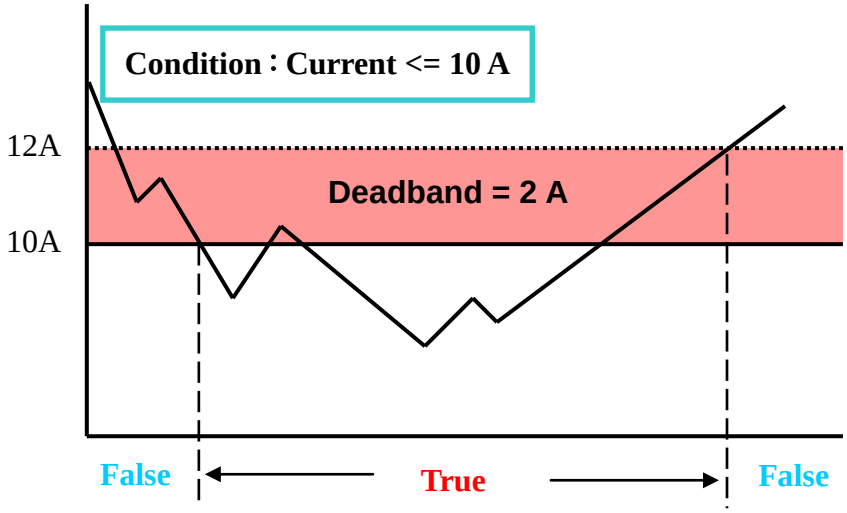
In order to avoid the signal oscillation of the Predicted Demand/Voltage/ Current that may causes the instability of the status changes and result in the alarm being triggered too easily, you can set up a Deadband value to reduce the oscillation effect.

Deadband Examples:

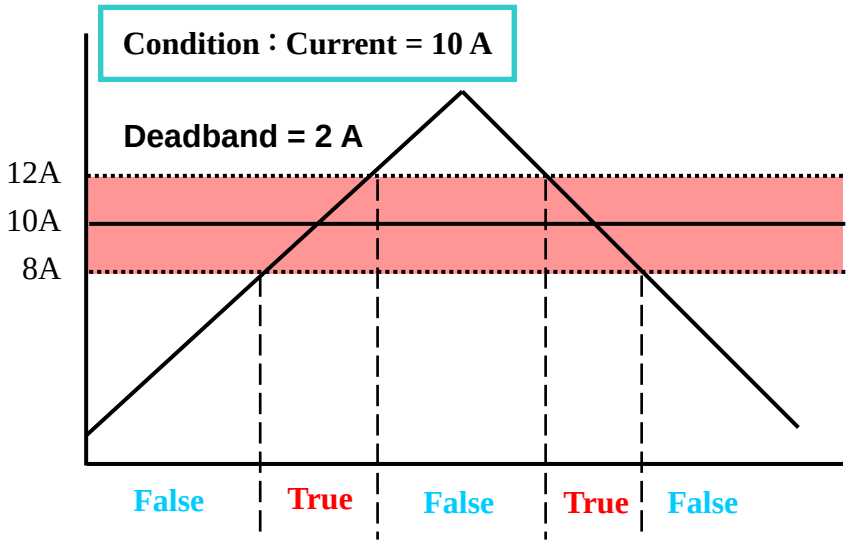
- Assume the Current Condition is set as [Current >=10A, Deadband : 2A], when current exceeds 10A, the alarm will be triggered and the alarm won't be dismissed until the current drop below 8A.



- Assume the Current Condition is set as [Current <=10A, Deadband : 2A], when current is lower than 10A, the alarm will be triggered and the alarm won't be dismissed until the current reaches 12A.



- Assume the Current Condition is set as [Current =10A, Deadband : 2A], when current falls between 8A to 12A, the alarm will be triggered.



■ I/O Module Alarm

After successfully adding an I/O Module Alarm, when the status of the channel value matches the condition setting, the alarm condition will be True. If there is no pre-set I/O module, the DI status can't be set as a condition, and a message "Fails to set up the Alarm Condition due to no I/O module exists" will appears. To set up the I/O module, please refer to I/O Module Setting Section.

Please Note: Currently PMC-5141 support XW-107 I/O module only.

Figure 7-9: I/O Module DI Alarm

v. In the Alarm Action setting, it requires to enable at least one Action, otherwise the Rule setting will not be completed. PMC-5141 offers 3 Alarm Action options; the detail of each action will be described below:

■ Email Alarm Action

Follow the steps below to complete Email Alarm Action Settings:

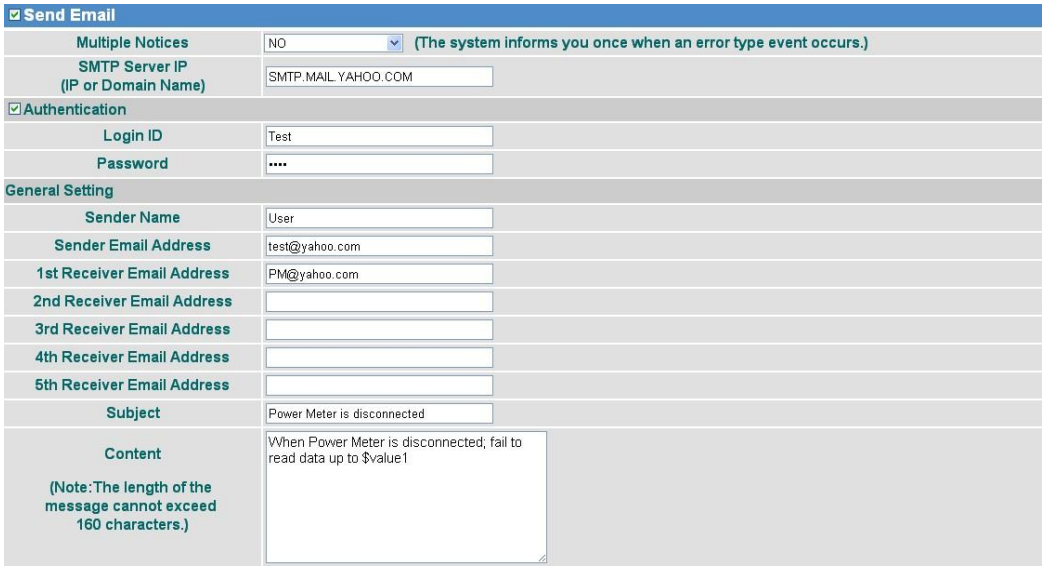


Figure 7-10: Email Alarm Action Setting

1. Specify if the Email sending requires Multiple Notices mechanism. Select “No”, the alarm will be sent once only. Select “Yes”, the alarm will be sent when it matches the condition setting, and if the error persist, the status continues to stay True, the alarm will be re-sent again after 24 hours and 48 hours.
2. Enter the IP or the domain name of the SMTP server in the “SMTP Server” field.
3. If SMTP server requires account and password validation, please select the Authentication Checkbox, and continue steps 4~5 to login into the SMTP server. If SMTP server doesn’t need account and password validation, uncheck the Authentication Checkbox and skip steps 4~5, go to step 6 directly.
4. Enter the SMTP server login ID in the “Login ID” field.
5. Enter the SMTP server password in the “Password” field.
6. Enter the sender’s name in the “Sender Name” field.
7. Enter the sender’s email address in the “Sender Email Address” field.
8. Enter the receiver’s email address in the “1st ~5th Receiver Email address” field. You can input up to 5 receivers; at least one email address has to be entered. Please enter the email address in sequence to avoid possible error.

9. Enter the email subject in the “Subject” field.
10. Enter the Email content in the “Content” field. Please note: the length of the content cannot exceed 160 characters. In addition, Email provides an encoded string for you to add current channel value into Email content. The encoding tag is shown as below:
    - $value1 indicates the current Alarm Value of the 1st condition.
    - $value2 indicates the current Alarm Value of the 2nd condition.
    - $value3 indicates the current Alarm Value of the 3rd condition.
    - $value4 indicates the current Alarm Value of the 4th condition.
    - $value5 indicates the current Alarm Value of the 5th condition.
    - $value6 indicates the current Alarm Value of the 6th condition.
    - The Alarm Value includes the following 5 Alarm types:
        - Power Meter Disconnection Alarm: The minutes that the Power Meter is disconnected
        - FTP Alarm: The hours the FTP transmission continues to fail
        - Disk Alarm: Free disk space in MB
        - Power Meter Alarm: Predicted Demand, Voltage or Current
        - I/O Module Alarm: DI channel status (show as ON or OFF)

■ SMS Alarm Action

Follow the steps below to complete SMS Settings:

(It requires to work with ICP DAS GTM-201-USB modem to send SMS messages)

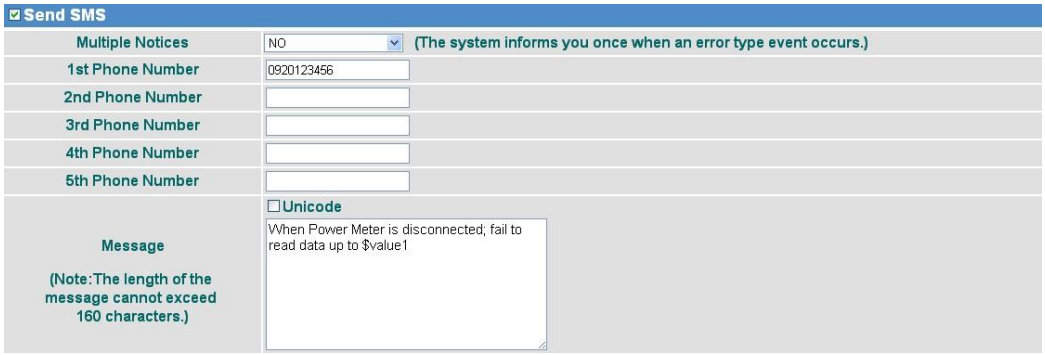


Figure 7-11: SMS Alarm Action Setting

1. Specify if the Email sending requires Multiple Notices mechanism. Select “No”, the alarm will be sent once only. Select “Yes”, the alarm will be sent when it matches the condition setting, and if the error persist, the status continues to stay True, the alarm will be re-sent again after 24 hours and 48 hours.
2. Enter the receiver’s phone number in the “1st ~5th Phone Number” field.

You can input up to 5 phone numbers, at least one phone number has to be entered. Please enter the phone number in sequence to avoid possible error.

3. If the content of the message includes English and numbers only, it doesn't require to enable the Unicode option. If the content of the message includes characters other than English and numbers, please enable the Unicode option.
4. Enter the SMS content in the "Content" field. Please note: the length of the content cannot exceed 160 characters. If the Unicode mode is adopted, the length of the content cannot exceed 70 characters. In addition, SMS provides an encoded string for you to add current channel value into SMS content. The encoding tag is shown as below:
   - $value1 indicates the current Alarm Value of the 1st condition.
   - $value2 indicates the current Alarm Value of the 2nd condition.
   - $value3 indicates the current Alarm Value of the 3rd condition.
   - $value4 indicates the current Alarm Value of the 4th condition.
   - $value5 indicates the current Alarm Value of the 5th condition.
   - $value6 indicates the current Alarm Value of the 6th condition.
   - The Alarm Value includes the following 5 Alarm types:
     - Power Meter Disconnection Alarm: The minutes that the Power Meter is disconnected
     - FTP Alarm: The hours the FTP transmission continues to fail
     - Disk Alarm: Free disk space in MB
     - Power Meter Alarm: Predicted Demand, Voltage or Current
     - I/O Module Alarm: DI channel status (show as ON or OFF)

■ DO Alarm Action

Follow the steps below to enable DO Action settings:

1. Select the output status of the specified DO channel to be OFF, ON or Pulse Output, and then click "Add". If there is no pre-set I/O module or connected PM-311x, the DO status can't be set as a Alarm Action, and a message "Fails to set up the DO Alarm Action due to no I/O module exists" will appears. To set up the I/O module, please refer to I/O Module Setting Section.

Figure 7-12: Add a DO Alarm Action

2. To delete the action, click on the “Delete” button in the “DO Action List” to delete the DO Action (Figure 7-13).

Figure 7-13: Delete a DO Alarm Action

8 Event Log

PMC-5141 provides page to view the Event logger information. You can visit the page for the system messages or operation information for your reference. The information PMC-5141 will record in the log file are as follows:

(1) The Login/Logout events for Administrator.
(2) The events to modify the PMC-5141 system settings.
(3) The event that PMC-5141 is failed to get the power meter data.
(4) The event to modify the CT/PT values of the power meters by PMC-5141.
(5) The event that PMC-5141 is failed to send the alarm messages by Email or SMS.
(6) The event that PMC-5141 is failed to send back the power data files to FTP server.
(7) The event about the status of the firmware download process..
(8) The event of successful or failed update attempts of the PMC-5141 firmware upgrade.

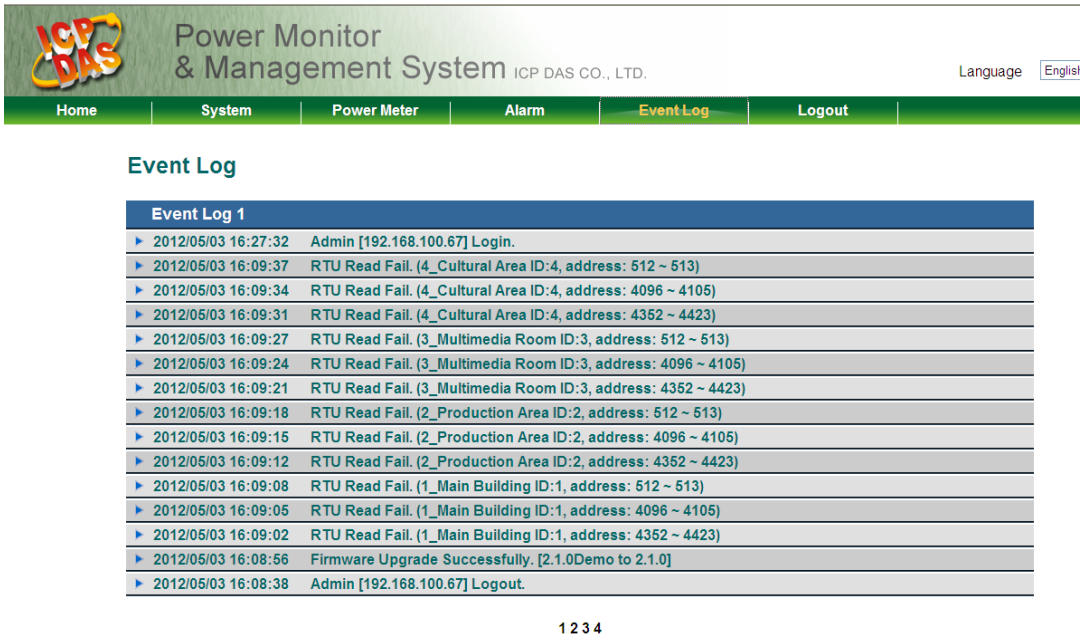


Figure 8-1: Event Log page

9 Firmware Update

You can use browser to connect with PMC-5141 WEB page to update the PMC-5141 Firmware directly. After the completion of Firmware update process, it doesn't require to reboot PMC-5141 again. The PMC-5141 Firmware update process is described as below:

1. Please contact with ICP DAS for the latest version of PMC-5141 firmware.

2. Go to the System Overview Page, and click the "Upgrade" button in the Firmware Version field.

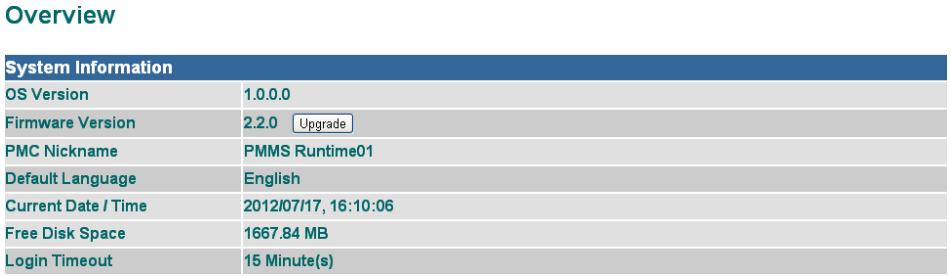


Figure 9-1: Firmware Upgrade page

3. Click "Download" button; select the latest version of PMC-5141 Firmware you get.

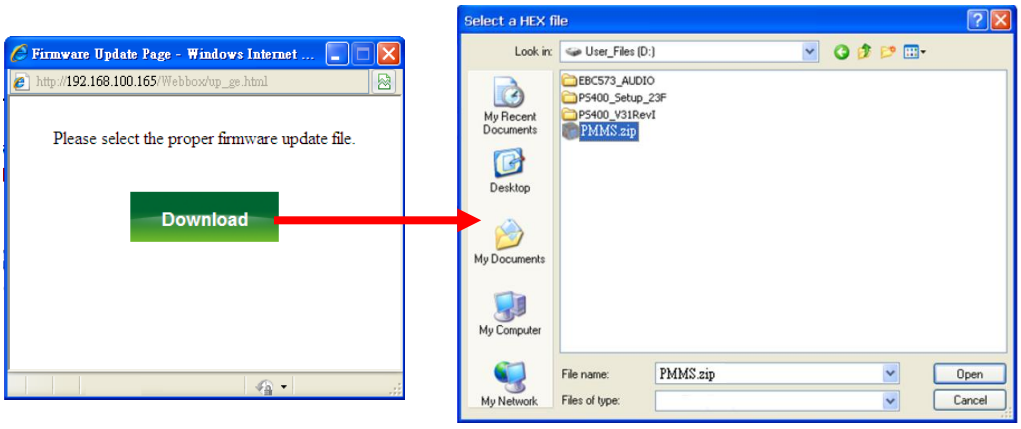


Figure 9-2: Firmware Download to PMC-5141(1)

4. When the process of Firmware download to PMC-5141 is in progress, please don't close the window. If the download process is successful, PMC-5141 will start to update the Firmware to the new version. If the download process is failed, the message will be logged and system will display the Download window again.

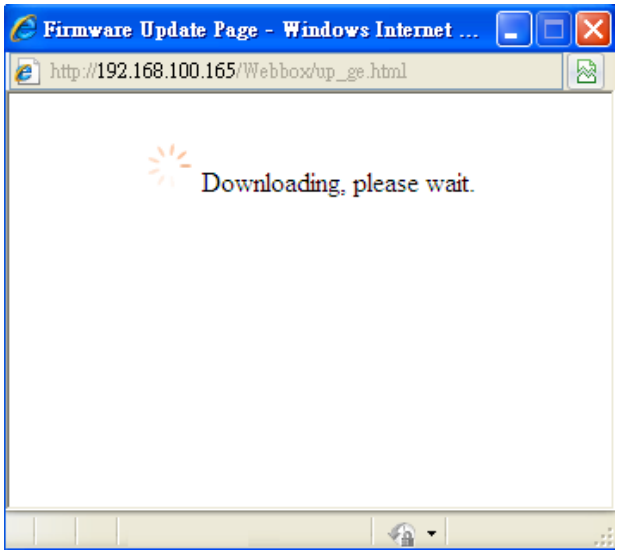


Figure 9-3: Firmware Download to PMC-5141(2)

5. After the process of Firmware download to PMC-5141 is completed, please click "Upgrade" button to upgrade the PMC-5141 firmware. Please don't close the "Firmware Update" window during the process. After the process is completed, please click the "OK" button, remove the temporary files of the Browser, and clear the cache of the Browser. Now the Firmware upgrade process is finished, and the new updated firmware will take effect. If the Firmware upgrade process is failed during the process, please try it again.

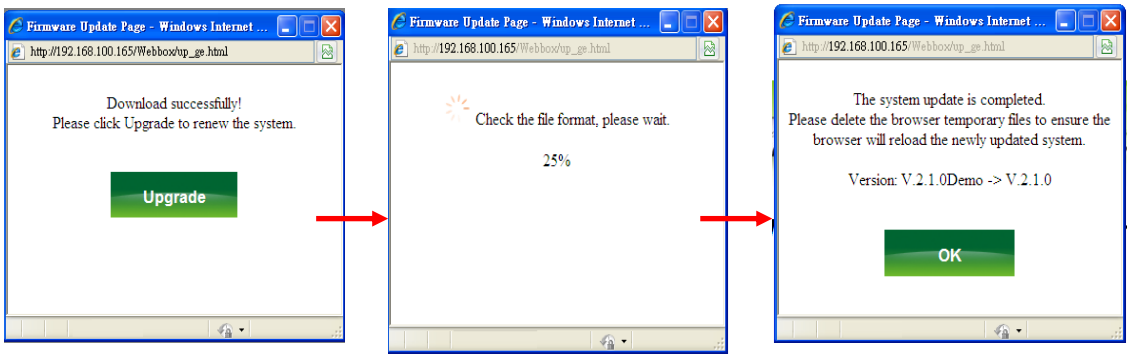


Figure 9-4: PMC-5141 Firmware Update

Please note: When the Firmware upgrade process is in progress, please don't close any window or modify the PMC-5141 setting at the same time to avoid possible errors.

10 Mobile device viewing

When you connect to PMC-5141 Web Page by mobile device, it will automatically be directed to the PMMS login page, the PMMS login page is shown as below:

10.1 Login Page

The Login page of PMC-5141 for mobile devices is shown as below. For more detailed information regarding system login process, please refer to section "System Login".

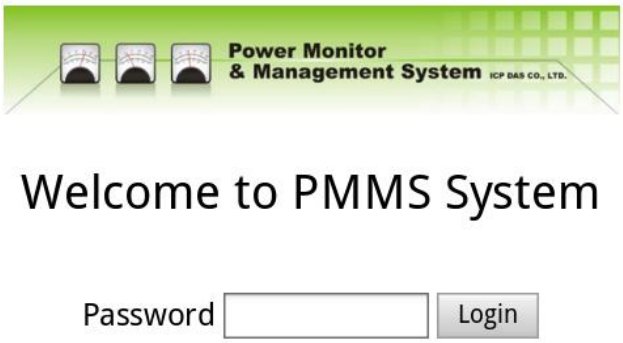


Figure 10-1: Login page

10.2 HOME Page

If the login process is success. The first page will be shown and display information such as: PMC-5141 nickname, OS version, Firmware version, and Language setting. User can modify the Language setting on this page. In the lower part of the page, there are three function buttons:

- System Overview
- Power Meter List
- Logout

More detailed information for each function will be given in the following sections.

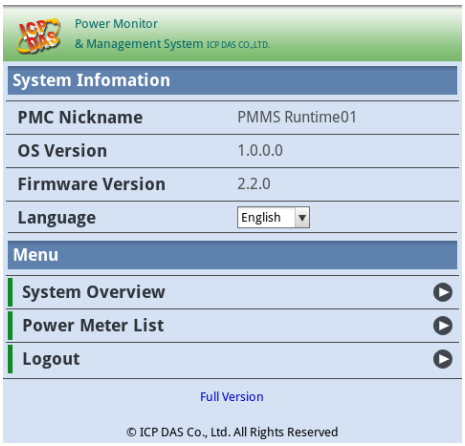


Figure 10-2: System page

10.3 System Overview

In the System Overview page, you can get the detailed system information of PMC-5141 controller shown as below. To leave this page, click on the "Back" button in the lower part to return to the System page.

Figure 10-3: System Overview page

10.4 Power Meter List

When you enter the Power Meter List page, a list of the power meters that are currently connected with the PMC-5141 will show:

Figure 10-4: Power Meter List page

Click the power meter on the list, and then the Power Meter Overview page for that meter will be shown. There are four buttons in the page: "Power Meter Information", "Realtime chart", "Back" and "Home". "Power Meter Information" and "Realtime chart" buttons are for power meter value display.

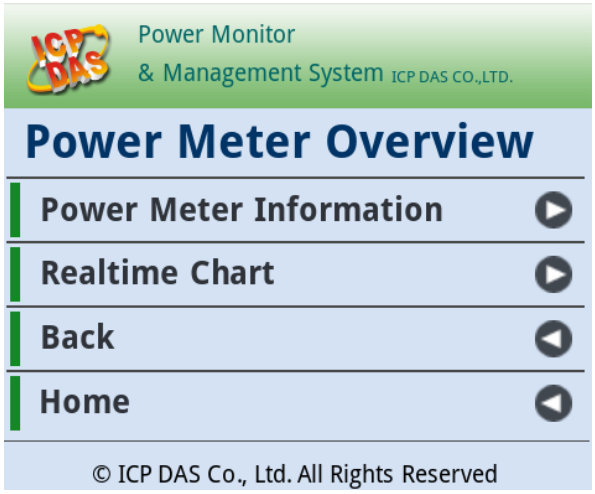


Figure 10-5: Power Meter Overview page

Click on the button to view the power value of the specified power meter. Detailed description is as below:

◆ Power Meter Information

After getting into the Power Meter Information page, the parameters of the specified power meter will be displayed in the upper part of this page. The

lower part is for the power value display section. It offers two options: “Channel” or ”Type” mode for power value display. If the “Channel” mode is selected, the interface will be shown like Figure 10-6. You can select any channel on the channel list, and then the real time power value of that specified channel for the power meter will be shown as Figure 10-7. If you select “Type” mode, the interface will be shown like Figure 10-8. All data is the power value display section will be updated automatically every 20 seconds.

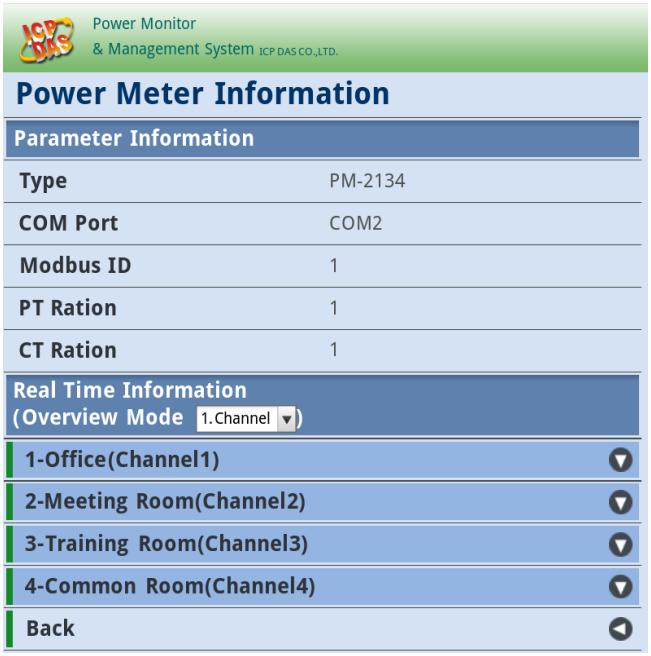


Figure 10-6: Power Meter Information page

Figure 10-7: Channel mode

Figure 10-8: Type mode

◆ Realtime chart

User can select Realtime Chart to display the realtime power value by specified Chart component. Get into the Realtime Chart page, you will see a list of various power value type options shown as Figure 10-9. It only allows to show one Realtime Chart for a specified power value type at the same time, shown as Figure 10-10. If you already open a Realtime Chart for a power value type, and then you continue to open the second Realtime Chart for other power value type, the first Realtime Chart will be closed automatically. The data update rate in Realtime Chart is about 5 seconds. You can click the ”Stop” button in the upper-left part of the Chart to suspend the data updating. To resume the update process, click “Start” button to continue the data update of the Realtime Chart.

Figure 10-9: Realtime Chart (1)

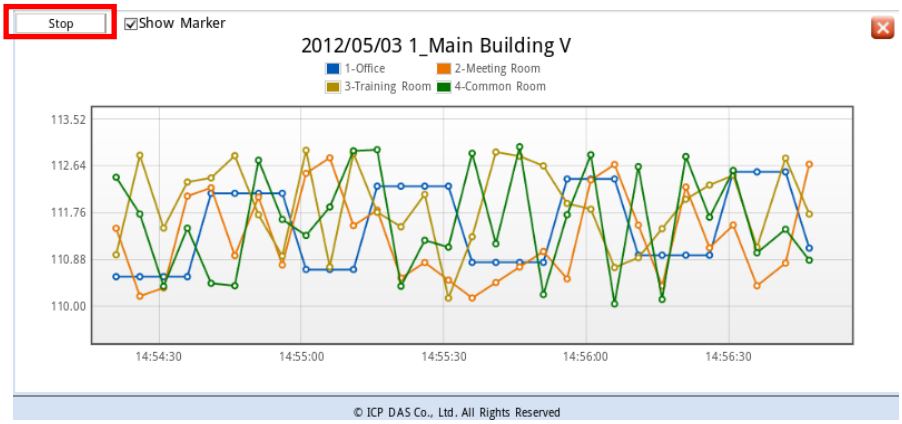


Figure 10-10: Realtime Chart (2)

Appendix I：The file structure of the data file directory

The power data logger files, power report files and event logger files that are generated by PMC-5141 will all be saved in the Micro-SD card. It allows to connect with PMC-5141's built-in FTP server to retrieve these data files at PC side via FTP utility. The default FTP login directory is the root directory of the Micro-SD card.

- **Power data logger files** are saved in the "Log" directory. Based on the power meter ID, each power meter has its own directory for the data logger files saving. The following is an example of the file structure in the data logger file directory.

  Power meter information file

  Log \ **01A3851F140000D3[2133]7** _info.txt

  History power meter data file

  Log \ **01A3851F140000D3[2133]7** \ 2011-9-19.csv ←Power meter data file for 2011/9/19

  Daily Report

  Log \ **01A3851F140000D3[2133]7** \ 2011-9-19Rpt.csv ←Daily power report for 2011/9/19

  Monthly Report

  Log \ **01A3851F140000D3[2133]7** \ 2011-9Rpt.csv ← Monthly power report for 2011/9

  01A3851F140000D3[2133]7 is the unique identification number for the power meter. [2133] indicates the type of power meter ("2133" is for PM-2133, "2134" is for PM-2134, "3112" is for PM-3112), 7 is the Modbus address of the power meter. A date tag "2011-9-19"(the date the file being created) is appended ahead of the file name . The file "_info.txt" is used to record the nicknames of the power meters that are connected to the PMC-5141 and their mapping data with PMC-5141.

- **Event logger files** are saved in the "EventLog" directory. The following is an example of the file structure in the event logger file directory.
  EventLog \ Event_20110805143506

  20110805143506 indicates that the first record time of the file starts from 2011/08/05 14:35:06.

Appendix II：The format of the Power Logger Data file

The power data logger files generated by PMC-5141 are saved in CSV file format. Each line represents one record; each field in the line is separated by a comma. The data sequences from left to right in the line of the power data are as follows:

Date, Time, Power meter ID, Voltage(Ch1 or Phase A), Current(Ch1 or Phase A), kW(Ch1 or Phase A), kvar(Ch1 or Phase A), kVA(Ch1 or Phase A), PF(Ch1 or Phase A), kWh(Ch1 or Phase A), kvarh(Ch1 or Phase A), kVAh(Ch1 or Phase A), Daily tot. Electricity(kWh;Ch1 or Phase A), Current demand(15/30/60mins;Ch1 or Phase A), Voltage(Ch2 or Phase B), Current(Ch2 or Phase B), kW(Ch2 or Phase B), kvar(Ch2 or Phase B), kVA(Ch2 or Phase B), PF(Ch2 or Phase B), kWh(Ch2 or Phase B), kvarh(Ch2 or Phase B), kVAh(Ch2 or Phase B), Daily tot. Electricity(kWh;Ch2 or Phase B), Current demand(15/30/60mins;Ch2 or Phase B), Voltage(Ch3 or Phase C), Current(Ch3 or Phase C), kW(Ch3 or Phase C), kvar(Ch3 or Phase C), kVA(Ch3 or Phase C), PF(Ch3 or Phase C), kWh(Ch3 or Phase C), kvarh(Ch3 or Phase C), kVAh(Ch3 or Phase C), Daily tot. Electricity(kWh;Ch3 or Phase C), Current demand(15/30/60mins;Ch3 or Phase C), Voltage(Ch4 or Average), Current(Ch4 or Average), kW(Ch4 or Average), kvar(Ch4 or Total), kVA(Ch4 or Total), PF(Ch4 or Average), kWh(Ch4 or Total), kvarh(Ch4 or Total), kVAh(Ch4 or Total), Daily tot. Electricity(kWh;Ch4 or Total), Current demand(15/30/60mins;Ch4 or Total),

The description above illustrates: Ch0/Ch1/Ch2/Ch3 is for 4/2 Loops (Channels) 1 Phase power meter (PM-2134/PM-311x), Average/Total is for 3 Phase power meter (PM-2133).

`

Appendix III：The format of the Power Report file

The power reports generated by PMC-5141 are saved in CSV file format. Each line represents one record; each field in the line is separated by a comma. The data sequences from left to right in the line of the power report are as follows.

PM-2133 Daily Report

Index of hour, Date, Power meter ID, Timing of hourly max kW, hourly max kW, Hourly total Electricity, Average hourly PF, Average hourly current(Phase A), Average hourly current(Phase B), Average hourly current(Phase C), Average hourly voltage(Phase A), Average hourly voltage(Phase B), Average hourly voltage(Phase C), Total hourly kVA, Total hourly kvar.

PM-2133 Monthly Report

Index of Date, Date, Power meter ID, Timing of daily max kW, Daily max kW, Daily total Electricity, Average daily PF, Average daily current(Phase A), Average daily current(Phase B), Average daily current(Phase C), Average daily voltage(Phase A), Average daily voltage(Phase B), Average daily voltage(Phase C), Total daily kVA, Total daily kvar.

PM-2134 Daily Report

Index of hour, Date, Power meter ID, Timing of hourly max kW(Ch1), hourly max kW(Ch1), Hourly total Electricity(Ch1), Average hourly PF(Ch1), Average hourly current(Ch1), Average hourly voltage(Ch1), Average hourly kVA(Ch1), Average hourly kvar(Ch1), Timing of hourly max kW(Ch2), hourly max kW(Ch2), Hourly total Electricity(Ch2), Average hourly PF(Ch2), Average hourly current(Ch2), Average hourly voltage(Ch2), Average hourly kVA(Ch2), Average hourly kvar(Ch2), Timing of hourly max kW(Ch3), hourly max kW(Ch3), Hourly total Electricity(Ch3), Average hourly PF(Ch3), Average hourly current(Ch3), Average hourly voltage(Ch3), Average hourly kVA(Ch3), Average hourly kvar(Ch3), Timing of hourly max kW(Ch4), hourly max kW(Ch4), Hourly total Electricity(Ch4), Average hourly PF(Ch4), Average hourly current(Ch4), Average hourly voltage(Ch4), Average hourly kVA(Ch4), Average hourly kvar(Ch4).

PM-2134 Monthly Report

Index of date, Date, Power meter ID, Timing of daily max kW(Ch1), daily max kW(Ch1), daily total Electricity(Ch1), Average daily PF(Ch1), Average daily current(Ch1), Average daily voltage(Ch1), Average daily kVA(Ch1), Average daily kvar(Ch1). Timing of daily max kW(Ch2), daily max kW(Ch2), daily total Electricity(Ch2), Average daily PF(Ch2), Average daily current(Ch2), Average daily voltage(Ch2), Average daily kVA(Ch2), Average daily kvar(Ch2), Timing of daily max kW(Ch3), daily max kW(Ch3), daily total Electricity(Ch3), Average daily PF(Ch3), Average daily current(Ch3), Average daily voltage(Ch3), Average daily kVA(Ch3), Average daily kvar(Ch3), Timing of daily max kW(Ch4), daily max kW(Ch4), daily total Electricity(Ch4), Average daily PF(Ch4), Average daily current(Ch4), Average daily voltage(Ch4), Average daily kVA(Ch4), Average daily kvar(Ch4).

PM-3112 Daily Report

Index of hour, Date, Power meter ID, Timing of hourly max kW(Ch1), hourly max kW(Ch1), Hourly total Electricity(Ch1), Average hourly PF(Ch1), Average hourly current(Ch1), Average hourly voltage(Ch1), Average hourly kVA(Ch1), Average hourly kvar(Ch1), Timing of hourly max kW(Ch2), hourly max kW(Ch2), Hourly total Electricity(Ch2), Average hourly PF(Ch2), Average hourly current(Ch2), Average hourly voltage(Ch2), Average hourly kVA(Ch2), Average hourly kvar(Ch2)

PM-3112 Monthly Report

Index of date, Date, Power meter ID, Timing of daily max kW(Ch1), daily max kW(Ch1), daily total Electricity(Ch1), Average daily PF(Ch1), Average daily current(Ch1), Average daily voltage(Ch1), Average daily kVA(Ch1), Average daily kvar(Ch1). Timing of daily max kW(Ch2), daily max kW(Ch2), daily total Electricity(Ch2), Average daily PF(Ch2), Average daily current(Ch2), Average daily voltage(Ch2), Average daily kVA(Ch2), Average daily kvar(Ch2)

Appendix IV：Modbus Address Table

PMC-5141 allows SCADA software or HMI device to retrieve the power data via Modbus TCP protocol. PMC-5141 register addresses are specified according to Modbus register mapping tables (more detailed information will follow).

Please Note:

- The addresses are in **Base 0** format
- The addresses are in **Decimal** format
- The **default value of NetID is 1**.
- If the data is displayed in Floating format, each record of data will take two registers to hold the data. The following code example demonstrates how to join the two registers into one floating point value.

```
float register_to_float(short r1, short r2)
{
    float f;
    int *a = &f;
    *a = r1;
    a++;
    *a = r2;
    return f;
}
```

Please note: for the compilers are different (big endian or little endian) the floating point composing order might be different. For example: if r1 represent the address of 30100 register and r2 represent the address of 30101 register, to join r1 and r2 to a floating point, in the system is big endian system you will need to call:

float value = register_to_float(r1, r2);

Instead, if the system is little endian system, you will need to call:

float value = register_to_float(r2, r1);

Please note:

1. If you are not sure your compiler belongs to which system, try both ways to find the accurate one.

PMC-5141 Modbus Address Table

Modbus Address	0xxxx **(Coil Output)**	1xxxx **(Discrete Input)**
0-99	XW-107 DO value	XW-107 DI value
100-199	Power Meter DO value (RS-485 address=1)	Power Meter DI value (RS-485 address=1)
200-299	Power Meter DO value (RS-485 address=2)	Power Meter DI value (RS-485 address=2)
300-399	Power Meter DO value (RS-485 address=3)	Power Meter DI value (RS-485 address=3)
400-499	Power Meter DO value (RS-485 address=4)	Power Meter DI value (RS-485 address=4)
100+(N-1)*100~ 99+N*100	Power Meter DO value (RS-485 address=N, N<=64)	Power Meter DI value (RS-485 address=N, N<=64)
The RS-485 address setting for PM-213x/PM-311x power meter is between 1~64, but the PMC-5141 only can connect with up to 16 ICP DAS power meters at one time.		

Modbus Address	3xxxx **(Input Register)**	4xxxx **(Holding Register)**
0000~0099	PMC-5141System Data	
0100~0299	Power Meter Data (RS-485 address=1)	
0300~0499	Power Meter Data (RS-485 address=2)	
0500~0699	Power Meter Data (RS-485 address=3)	
0700~0899	Power Meter Data (RS-485 address=4)	
0900~1099	Power Meter Data (RS-485 address=5)	
100+(N-1)*200~ 99+N*200	Power Meter Data (RS-485 address=N, N<=64)	
The RS-485 address setting for PM-213x/PM-311x power meter is between 1~64, but the PMC-5141 only can connect with up to 16 ICP DAS power meters at one time.		

PMC-5141 System Data

This block stores the system information of PMC-5141, shown as below:

Parameter Name	Modbus Address	Length	Data Type	Range
Input Register, Unit : Register(16 Bits)				
Firmware Version	30000	2	Float	Floating Point
Free Disk Space	30002	2	Float	Floating Point
Contract Capacity	30004	2	Float	Floating Point
Calculation Interval for Demand(kW)	30006	1	Int	15/30/60
Connect status of Power meter	30007	1	Int	1：OK 0：Failed -1：Not Initialized
FTP Upload status	30008	1	Int	1：OK 0：Failed

Power Meter Data

The block stores the power data of the power meters that are connected with the PMC-5141. PMC-5141 can connect with PM-213x and PM-311x. For each type of power meter has different properties, the following sub-blocks are representing 3 Phase power meter (PM-2133) or 4/2 Loops (Channels) 1 Phase power meter (PM-2134/PM-3112).

Channel/ Phase	Parameter Name	Modbus Address	Length	Data Type
Input Register, Unit :Register(16 Bits) **N: RS-485 Address**				
Channel1(2134,3112) /Phase A(2133)	V	30100 + (N-1)*200	2	Float
	I	30102 + (N-1)*200	2	Float
	kW	30104 + (N-1)*200	2	Float
	kvar	30106 + (N-1)*200	2	Float
	kVA	30108 + (N-1)*200	2	Float
	PF	30110 + (N-1)*200	2	Float
	kWh	30112 + (N-1)*200	2	Float
	kvarh	30114 + (N-1)*200	2	Float
	kVAh	30116 + (N-1)*200	2	Float
	15/30/60 mins current demand	30118 + (N-1)*200	2	Float
	15/30/60 mins Predicted demand	30120 + (N-1)*200	2	Float

	Max. demand (Hourly)	30122 + (N-1)*200	2	Float
	Max. demand (Daily)	30124 + (N-1)*200	2	Float
	Max. demand (Monthly)	30126 + (N-1)*200	2	Float
	Daily Tot. Electricity	30128 + (N-1)*200	2	Float
	Monthly Tot. Electricity	30130 + (N-1)*200	2	Float
	Yearly Tot. Electricity	30132 + (N-1)*200	2	Float
Channel2(2134,3112) /Phase B(2133)	V	30134 + (N-1)*200	2	Float
	I	30136 + (N-1)*200	2	Float
	kW	30138 + (N-1)*200	2	Float
	kvar	30140 + (N-1)*200	2	Float
	kVA	30142 + (N-1)*200	2	Float
	PF	30144 + (N-1)*200	2	Float
	kWh	30146 + (N-1)*200	2	Float
	kvarh	30148 + (N-1)*200	2	Float
	kVAh	30150 + (N-1)*200	2	Float
	15/30/60 mins current demand	30152 + (N-1)*200	2	Float
	15/30/60 mins Predicted demand	30154 + (N-1)*200	2	Float
	Max. demand (Hourly)	30156 + (N-1)*200	2	Float
	Max. demand (Daily)	30158 + (N-1)*200	2	Float
	Max. demand (Monthly)	30160 + (N-1)*200	2	Float
	Daily Tot. Electricity	30162 + (N-1)*200	2	Float
	Monthly Tot. Electricity	30164 + (N-1)*200	2	Float
	Yearly Tot. Electricity	30166 + (N-1)*200	2	Float
	V	30168 + (N-1)*200	2	Float

Channel3(2134) /Phase C(2133)	I	30170 + (N-1)*200	2	Float
	kW	30172 + (N-1)*200	2	Float
	kvar	30174 + (N-1)*200	2	Float
	kVA	30176 + (N-1)*200	2	Float
	PF	30178 + (N-1)*200	2	Float
	kWh	30180 + (N-1)*200	2	Float
	kvarh	30182 + (N-1)*200	2	Float
	kVAh	30184 + (N-1)*200	2	Float
	15/30/60 mins current demand	30186 + (N-1)*200	2	Float
	15/30/60 mins Predicted demand	30188 + (N-1)*200	2	Float
	Max. demand (Hourly)	30190 + (N-1)*200	2	Float
	Max. demand (Daily)	30192 + (N-1)*200	2	Float
	Max. demand (Monthly)	30194 + (N-1)*200	2	Float
	Daily Tot. Electricity	30196 + (N-1)*200	2	Float
	Monthly Tot. Electricity	30198 + (N-1)*200	2	Float
	Yearly Tot. Electricity	30200 + (N-1)*200	2	Float
Channel4(2134) /Total or Average value(2133)	V	30202 + (N-1)*200	2	Float
	I	30204 + (N-1)*200	2	Float
	kW	30206 + (N-1)*200	2	Float
	kvar	30208 + (N-1)*200	2	Float
	kVA	30210 + (N-1)*200	2	Float
	PF	30212 + (N-1)*200	2	Float
	kWh	30214 + (N-1)*200	2	Float
	kvarh	30216 + (N-1)*200	2	Float
	kVAh	30218 + (N-1)*200	2	Float
	15/30/60 mins current demand	30220 + (N-1)*200	2	Float
	15/30/60 mins Predicted demand	30222 + (N-1)*200	2	Float

	Max. demand (Hourly)	30224 + (N-1)*200	2	Float
	Max. demand (Daily)	30226 + (N-1)*200	2	Float
	Max. demand (Monthly)	30228 + (N-1)*200	2	Float
	Daily Tot. Electricity	30230 + (N-1)*200	2	Float
	Monthly Tot. Electricity	30232 + (N-1)*200	2	Float
	Yearly Tot. Electricity	30234 + (N-1)*200	2	Float

Other Information of Power Meter

This block stores other information of power meters which connect with PMC-5141.

Parameter Name	Modbus Address	Length	Data Type	Range
Input Register, Unit : Register(16 Bits) N: RS-485 Address				
PT Value	30290 + (N-1)*200	2	Float	0.01~655.35
CT Value	30292 + (N-1)*200	1	Unsigned Int	1~65535
Power Meter Type	30293 + (N-1)*200	1	Int	2133/2134/3112
Error Code	30294 + (N-1)*200	1	Int	1：OK 0：Failed -1：Not Initialized