GPRS/3G Card & Box

User’s Manual

Table of Content

1 Overview

1.1 Introduction

GPRS/3G Card can collect the data from various device, and transmit data in GPRS or 3G* system to data center. It's suitable for places where there is no access to Internet. The HTTP service of data center can manage and monitor several devices, and can record all data/events with in data center.

Via the SMS of telecommunication companies, GPRS/3G card supports reminder and alarm service. The users can assign one or multiple numbers to receive the notification. Parameter configuration and firmware upgrade can be completed via SMS.

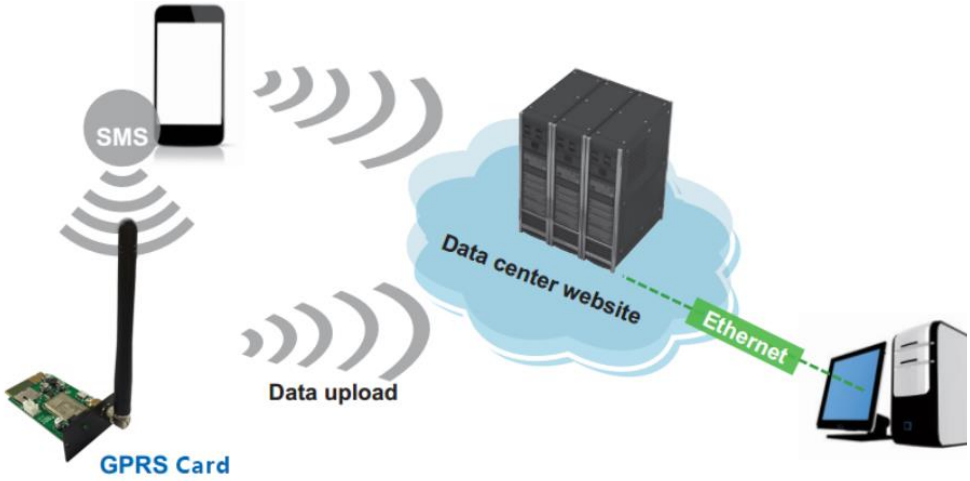


Diagram 1-1

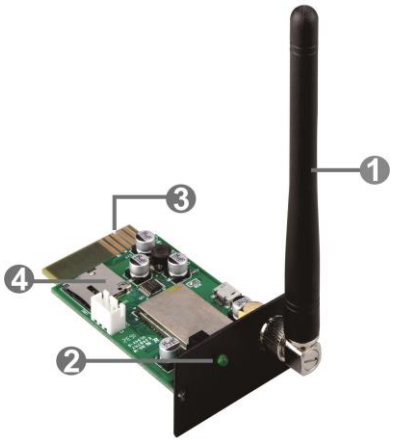
*The usage for GPRS and 3G card is the totally the same. If using 3G card, it will apply 3G system for data transmission as first priority. If there is no 3G signal available, it will automatically switch to GPRS signal.

1.2 Features

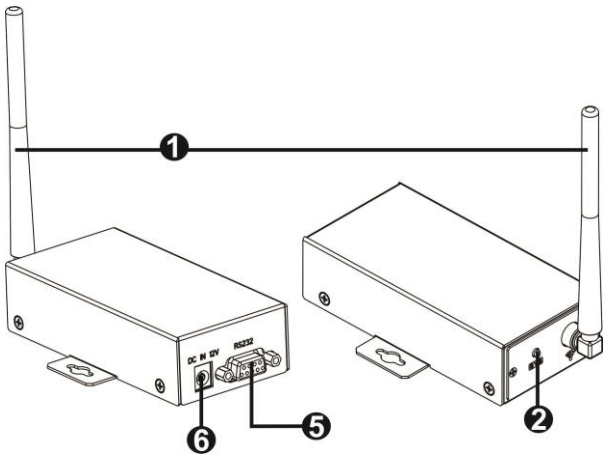
- Upload information to data center via 3G or GPRS signals
- Manage and monitor data in the data center through browser at any time
- Notification via SMS or Email
- Parameter configuration and firmware upgrade through SMS

1.3 Product overview

- **GPRS card**



- **GPRS box**



❶ Antenna
❷ System status LED
❸ Golden Fingers: to connect intelligent slot of connected device
❹ Micro SIM card slot
❺ RS-232 port
❻ 12Vdc DC input

System Status LED:

LED Status	**Description**
10ms on , 990ms off	1. GSM CS data in process or established. 2. GSM CS audio call in process or established.
10ms on , 1990ms off	GSM PS Data transmitting
10ms on , 3990ms off	Online registration succeeded. No call, and no data transmission.
500ms on , 500ms off	Limited Internet service (for example, no SIM card, no PIN authentication, or searching for Internet)

1.4. Package Contents

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged during transportation. You should have received the following items inside of package.

GPRS Card Package	GPRS Box Package
● GPRS card ● Antenna ● User's manual ● Screws x 2 pieces	● GPRS box ● GPRS card ● Antenna ● User's manual ● DB9 to RJ-45 Data cable

2 Preparation

2.1 Prerequisite

The following devices are required if you're using GPRS/3G Card or GPRS/3G Box:
For GPRS/3G Card:

1. GPRS/3G card (Diagram 1-1)
2. Micro SIM Card (12 x 15 mm) as in Diagram 2-1
3. SMS Device such as cell phone
4. Monitored device

GPRS/3G card Micro SIM card

Diagram 2-1

For GPRS/3G Box:

1. GPRS/3G card (Diagram 2-1)
2. Micro SIM Card (12 x 15 mm) as in Diagram 2-1
3. GPRS/3G Box (Diagram2-2)
4. DB9 to RJ-45 Data Cable (Diagram 2-2)
5. SMS Device such as cell phone
6. Monitored device.

GPRS/3G box DB9 to RJ-45 data cable

Diagram 2-2

2.2 Installation

For GPRS/3G Card:

1. Screw the Antenna to GPRS/3G card. (Diagram 2-3)

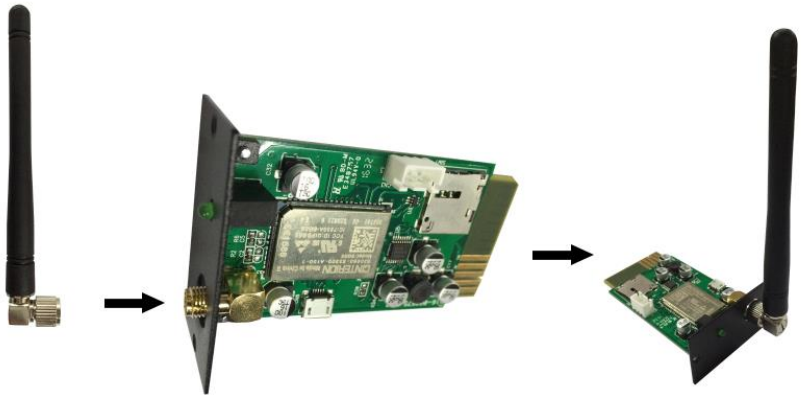


Diagram 2-3

2. Insert SIM card into the slot. Pay attention to the direction of SIM card. (Diagram 2-4)

Diagram 2-4

3. Remove the cover of Intelligent Slot located on Inverter or UPS. Retain the screws for further use. (Diagram 2-5).

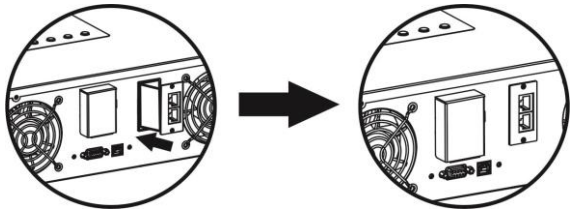


Diagram 2-5

Diagram 2-6

4. Insert SIM Card and fix it with screws.

For GPRS/3G Box:

1. Same Step 1 and 2 as GPRS/3G card.
2. Insert GPRS card into GPRS/3G Box, and fix it with screws. (Diagram 2-6)
3. Connect DB9 terminal of data cable to GPRS/3G Box. (Diagram 2-7)

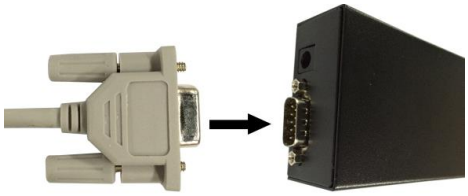


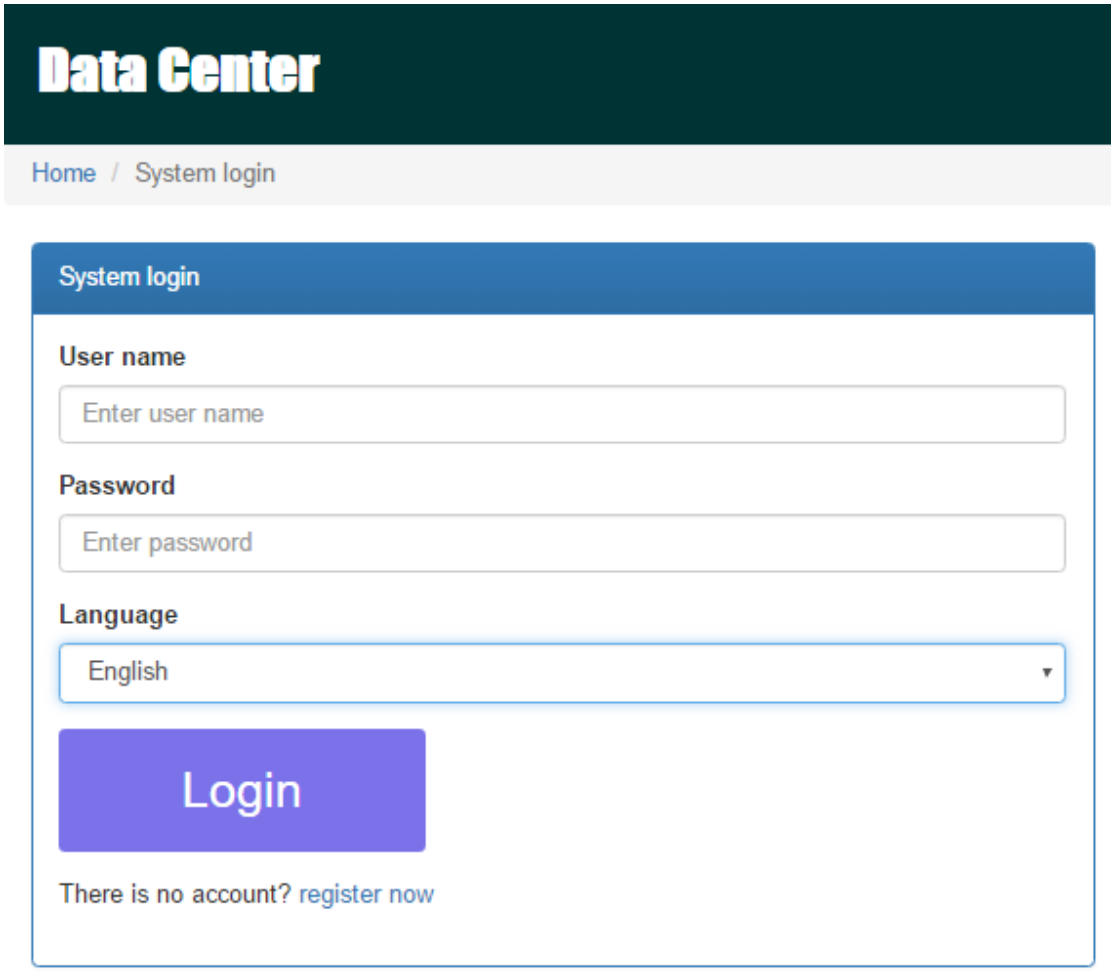
Diagram 2-7

Diagram 2-8

4. Connect data cable RJ-45 to Inverter or UPS. Please refer to the terminal of DB9 in Diagram 2-7 and RJ-45 in Diagram 2-8.
5. Use one input power cable to connect to ❻ of GPRS Box.

3 Monitor

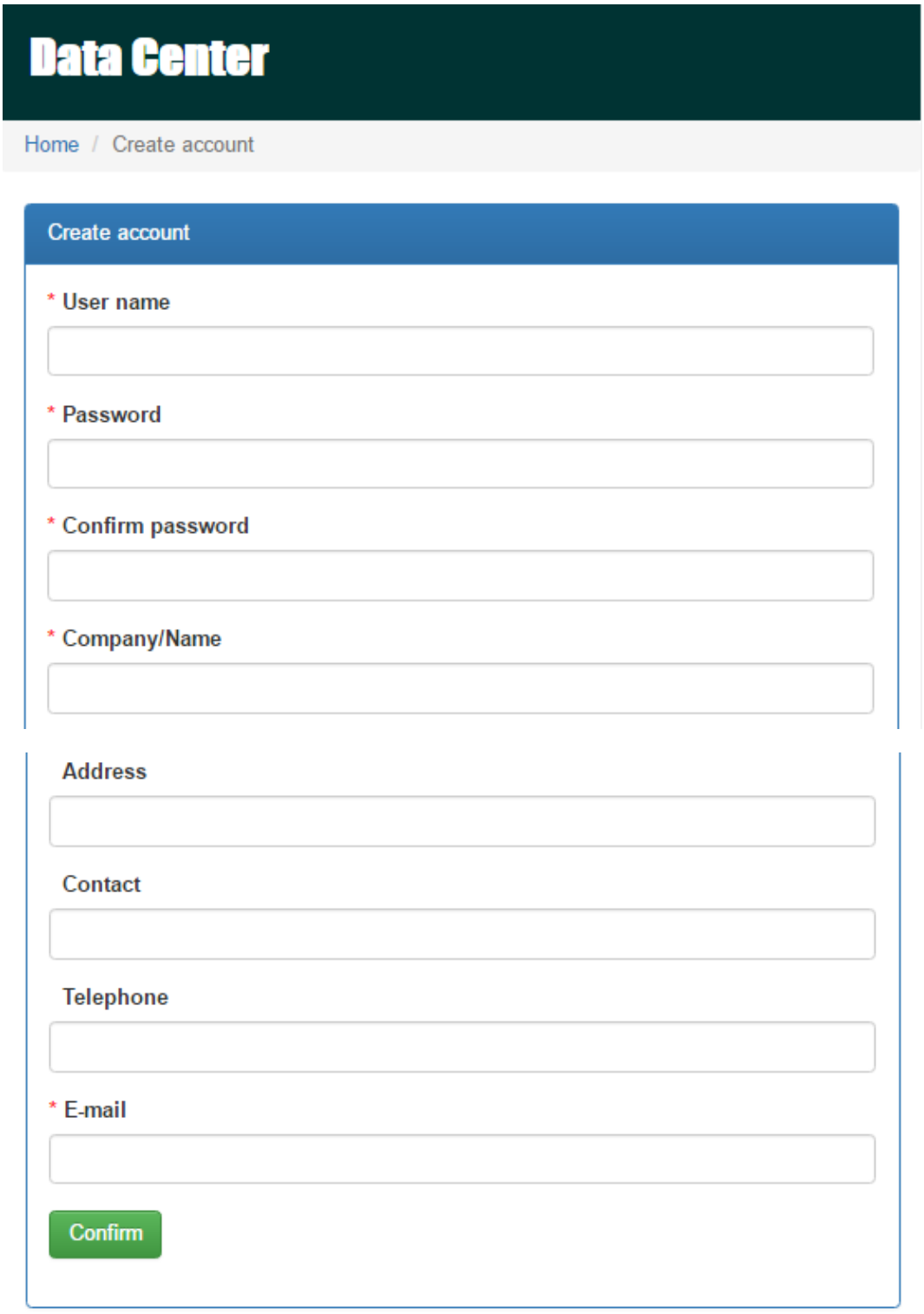
If GPRS operates normally, it will transmit data via SIM card to data center http://power-datacenter.com. Users have to register to monitor the operating status and bind the serial number of the monitored device with the registered account.



In order to optimize the user's experience, you are suggested to view the information via suggested browser including: Chrome 6+, IE10+, Firefox 4.0+, Safari. Besides, smart phones and tablets can also access to the data.

3.1 Registration

1. Click “register now” located below the Login button to go to registration page.



- User name：Please enter user name and remember it for further use.

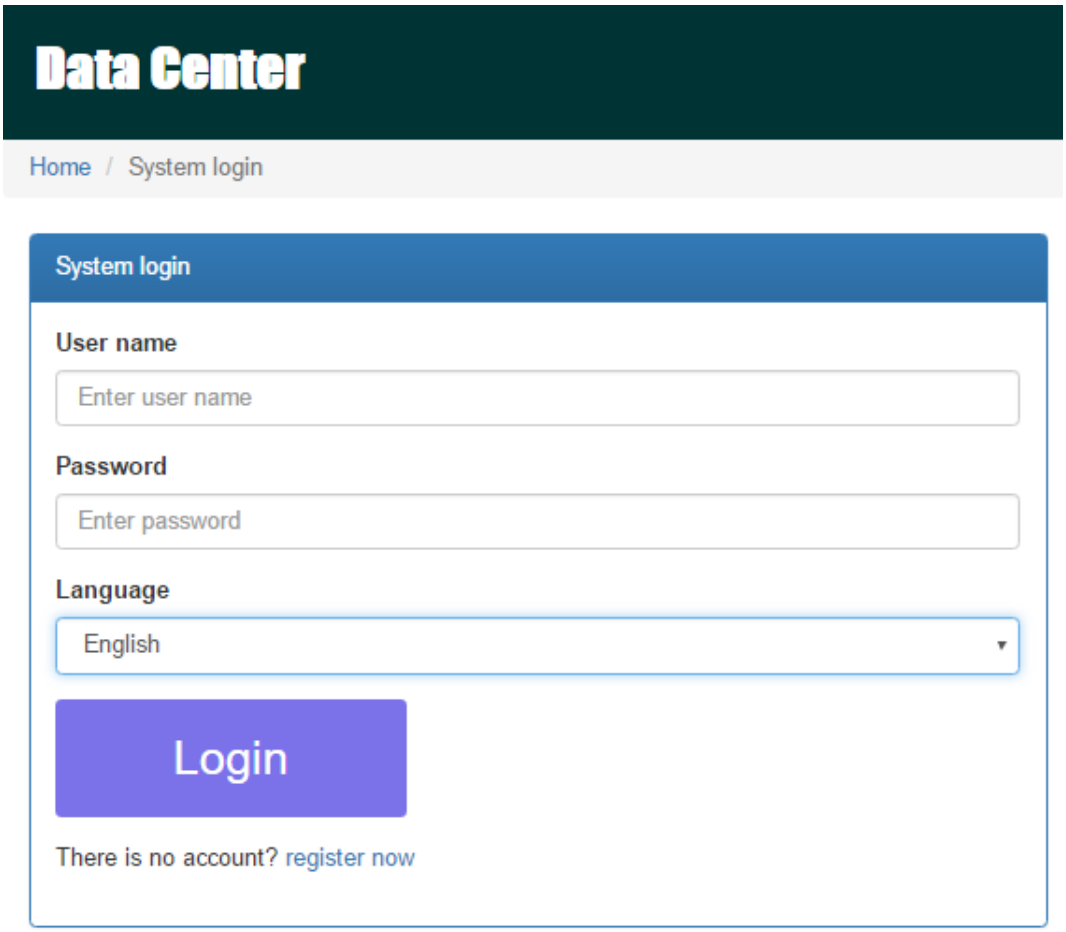
- Password：It contains 6 ASCII characters, including number, capital letter and lower case letters.
- Confirm password：Re-enter the password which should be consistent with the one in Password.

2. Click 

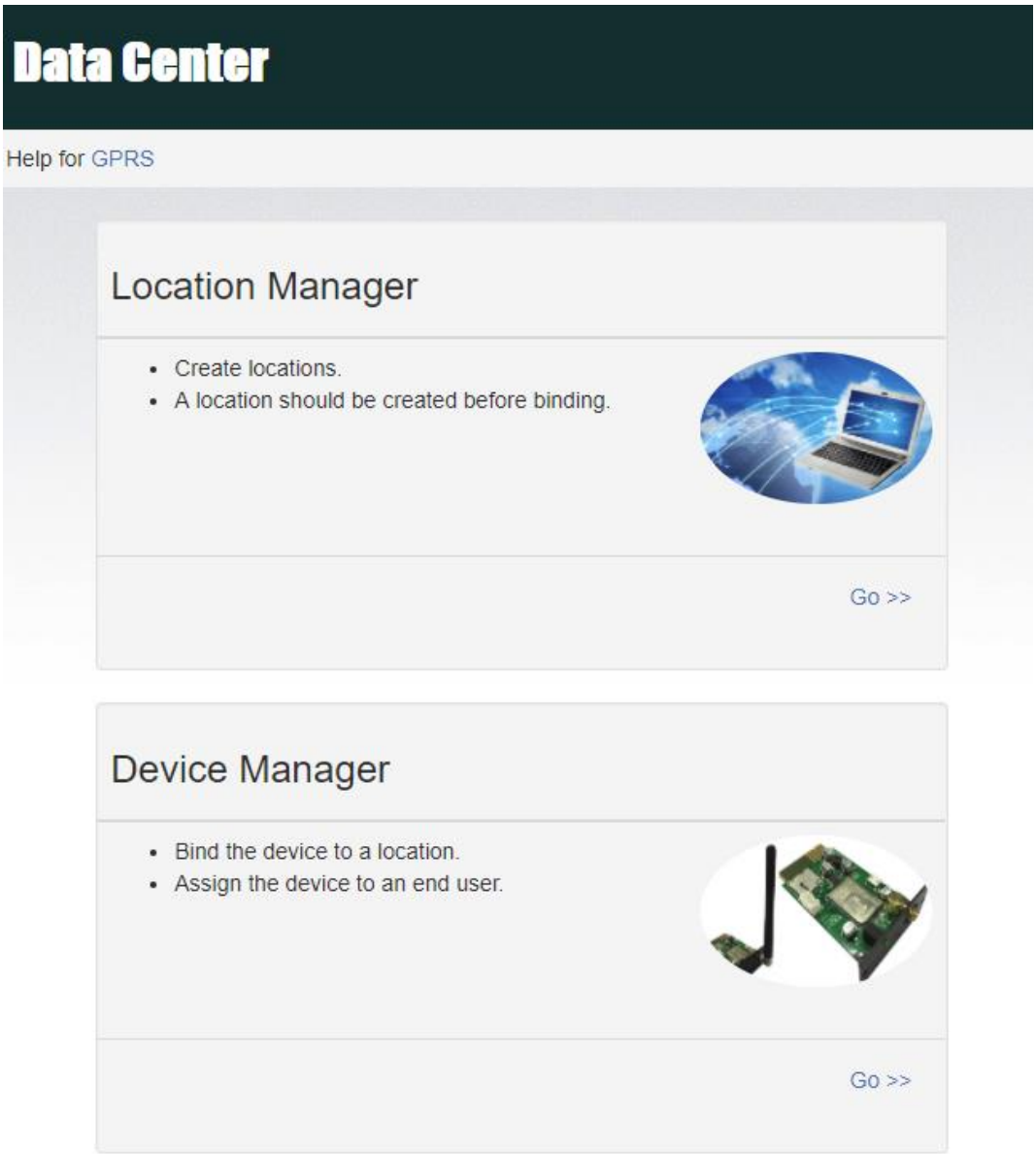
button to complete the registration

3.2 Login

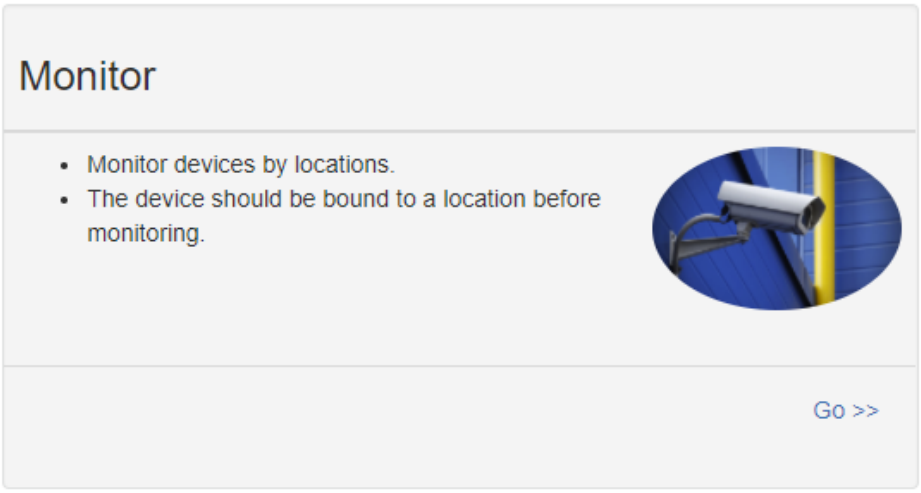
After registration, you can log in the data center. The login page is shown as follow:



After logging in, the main page of data center will be shown as below:

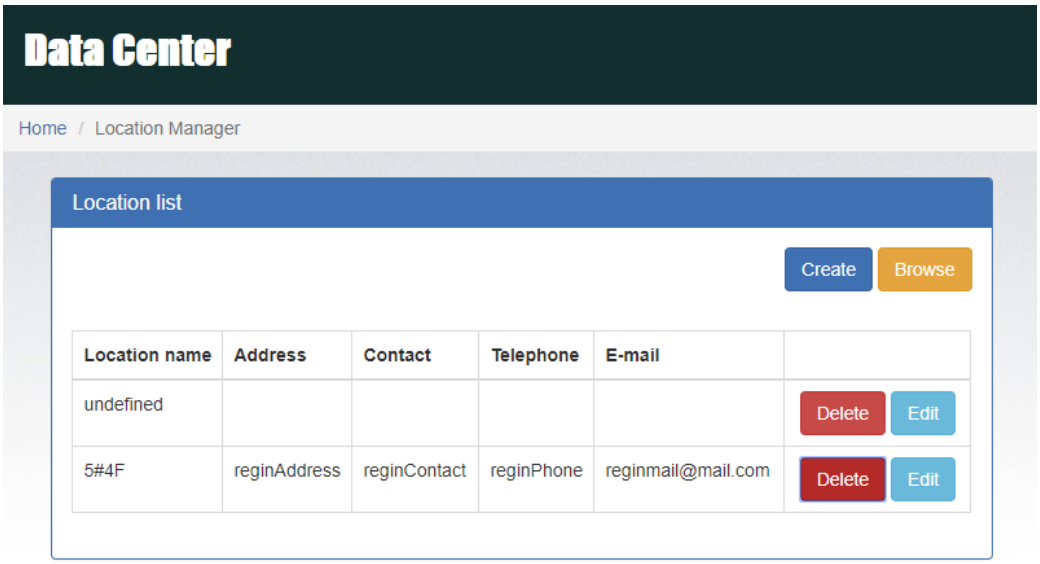


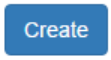
- Location Manager: The users can monitor all device in various locations.
- Device Manager: The users can bind device(s) to designated location and assign to users.

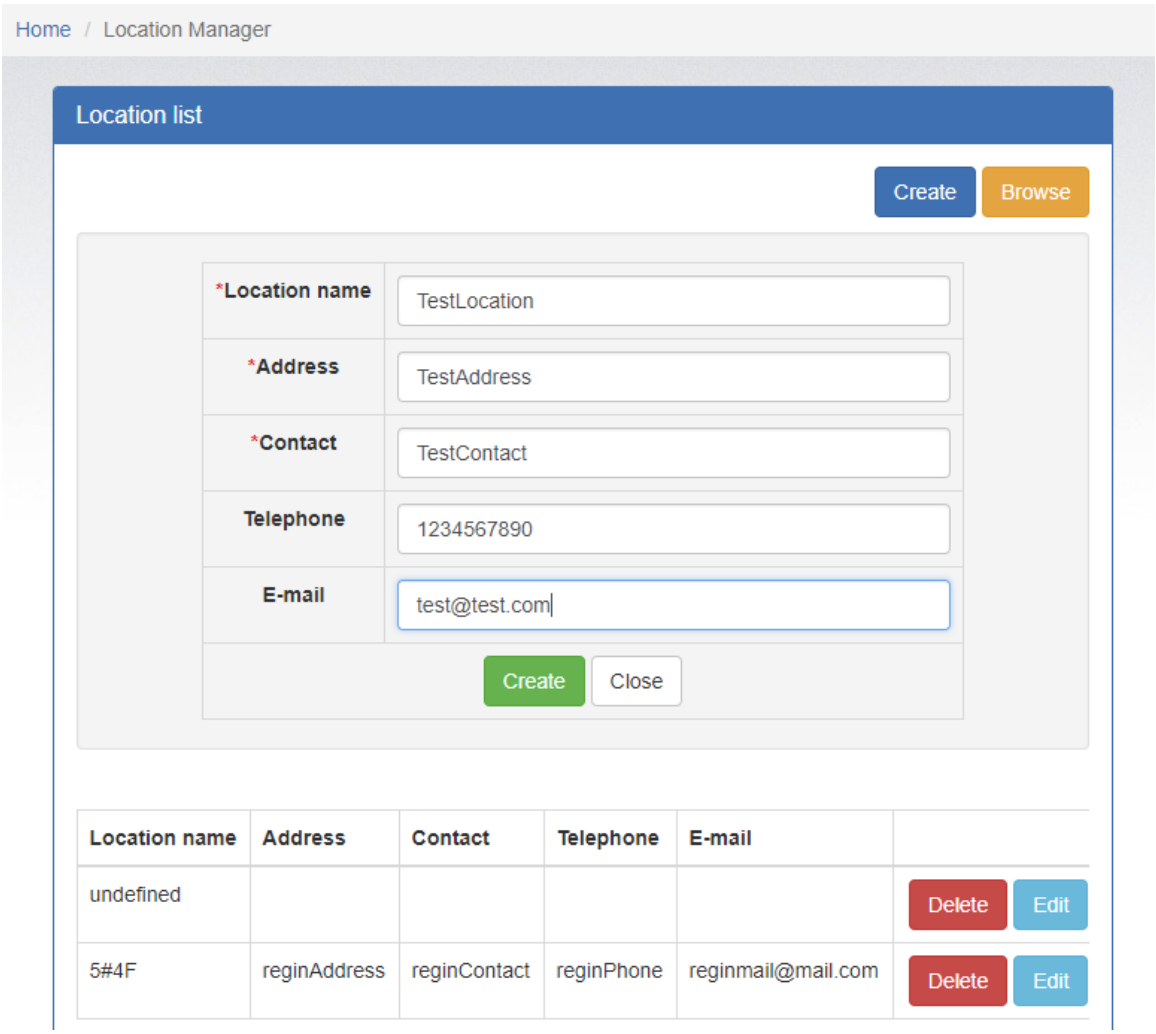


- Monitor: It is grouped by location, and all devices with assigned location will be listed.
- User Manager: Where you create additional users for the account.

3.3 Location Manager



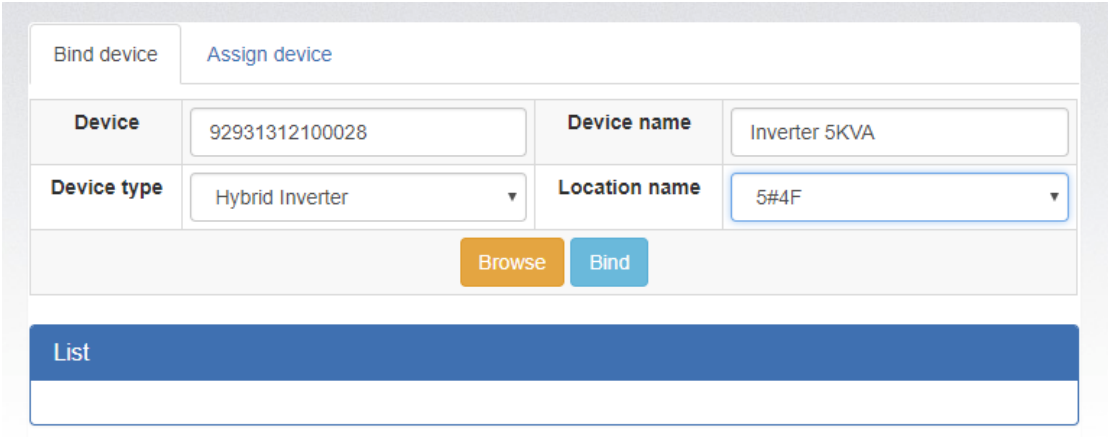
1. Users can create, delete and edit locations.
2. After registration, the system will assigned the user an “undefined” location, which can be deleted or edited.
3. Click on  to start a new location as illustrated below.



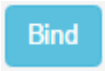
4. After filling out required fields, click on Create to complete the new location.

5. Click on Close to terminate creation.

3.4 Device Manager



1. Bind Device:Assign device to the location.
   - Device: Fill in the serial numbers of the monitored device. (Serial number label is on the monitored device).
   - Device name: Assign a name so that the users can directly identify which card or device it is.
   - Device type: Select the type of monitoring device.
   - Location name: Select the bound location of monitored device.

Click 

to complete the assignment.

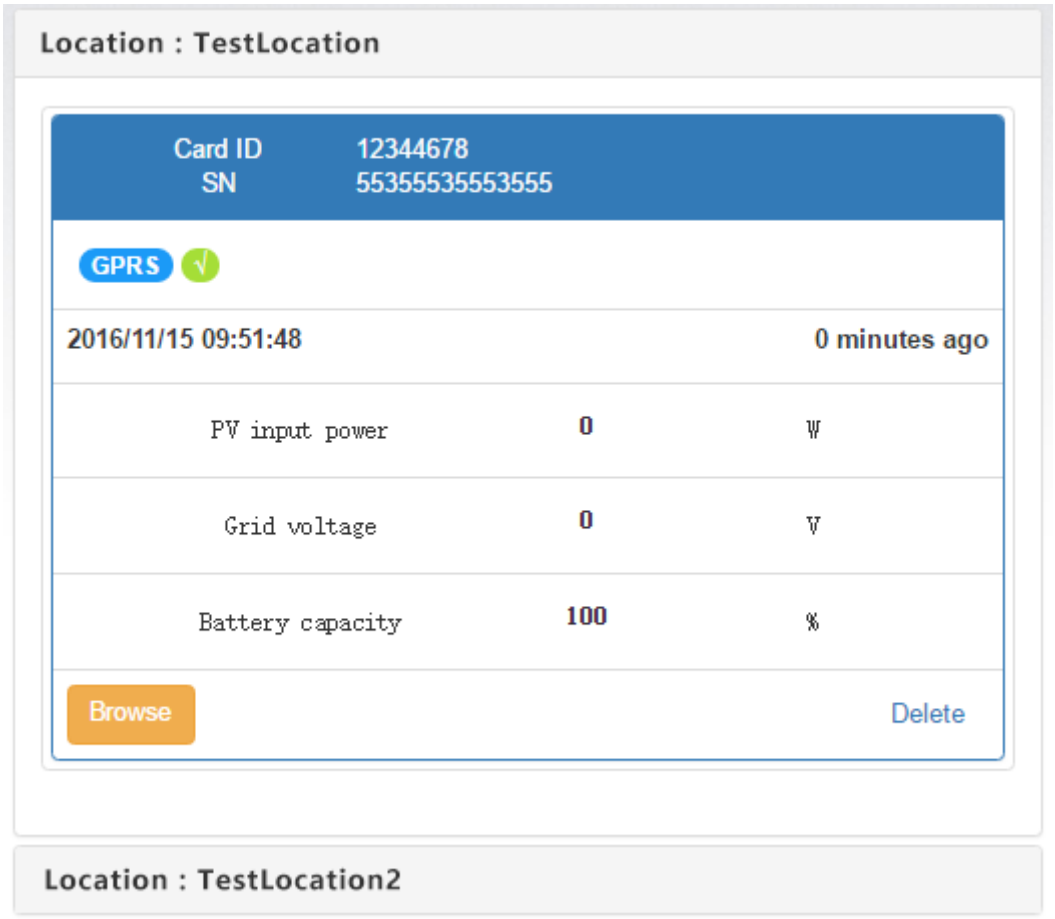
Click 

to list the information of bound device.

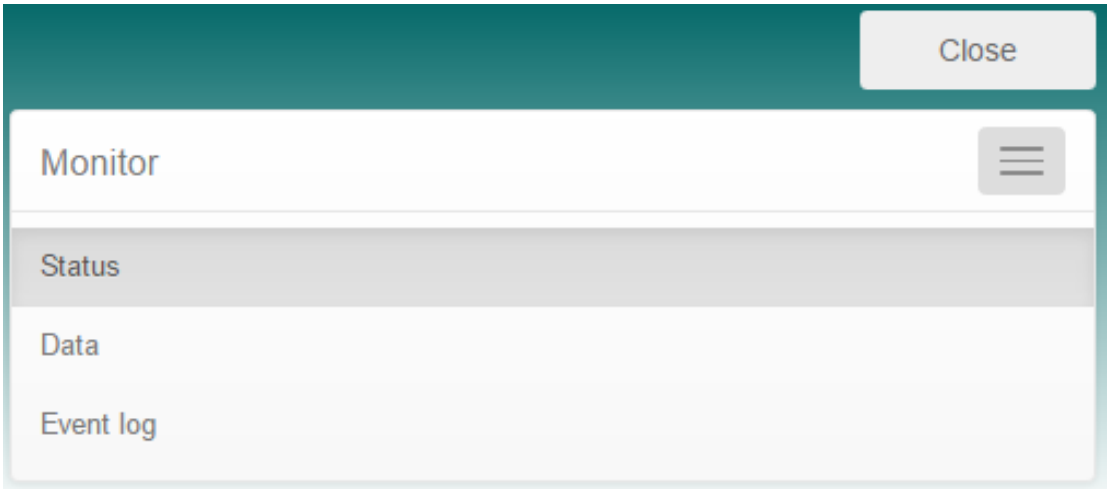
2. Assign device

Please refer to section 3.6 under User management for detail instruction.

3.5 Monitor



1. It's grouped by locations, and all device in that location will be listed.
2. The message will be updated once every 5 minutes.
3. Click on Browse to show detail information on a new page.



- Click on Close to close the window.

- Status: Current operation status of monitored device.
- Status Display:

  It shows the status of the monitored device in a graphical representation. The serial number is shown on the top of the window and operational status indicator is shown as a color dot to the right.

a) Basic information:

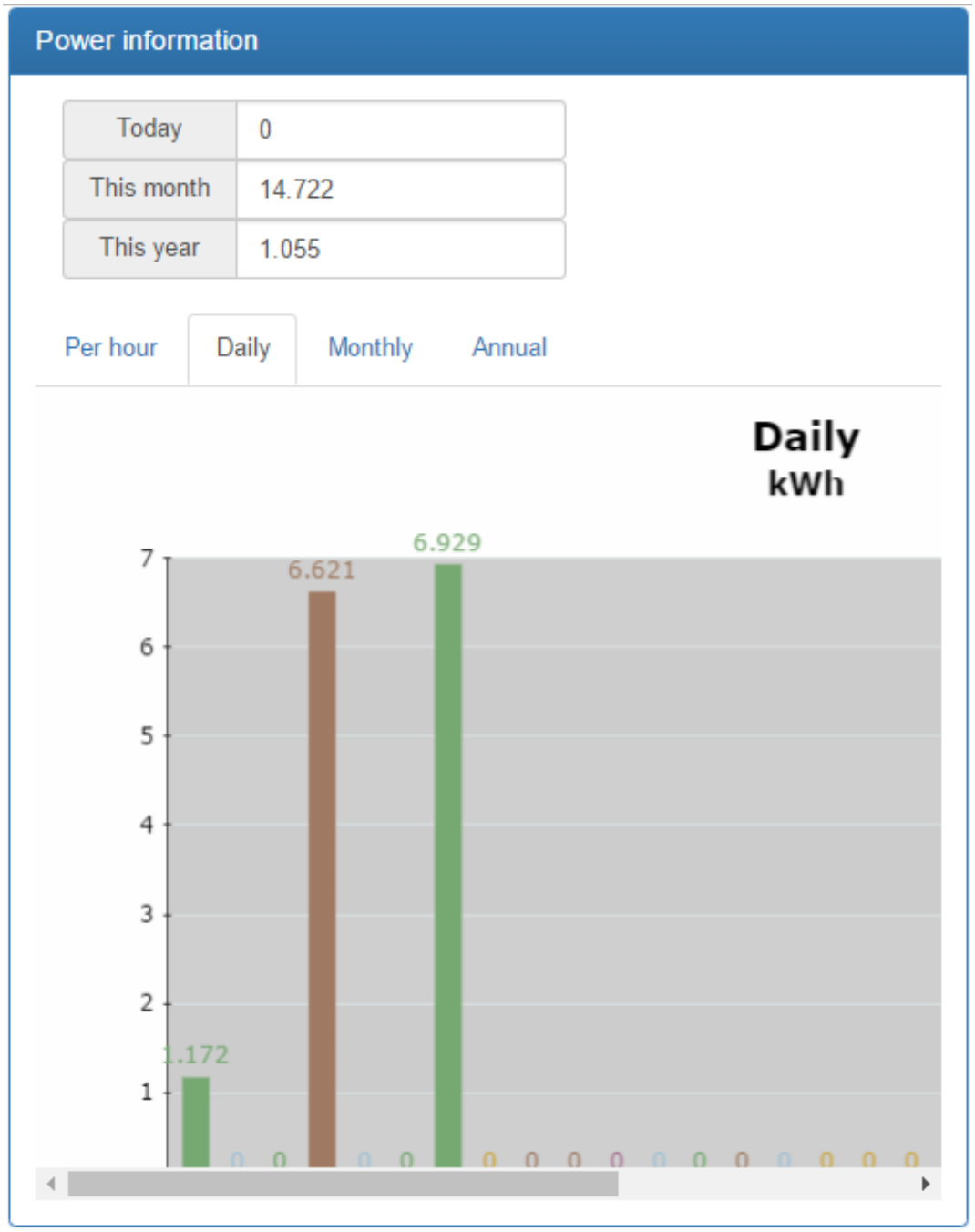
It displays basic information including the voltage, current, loading, temperature, etc.

Basic information

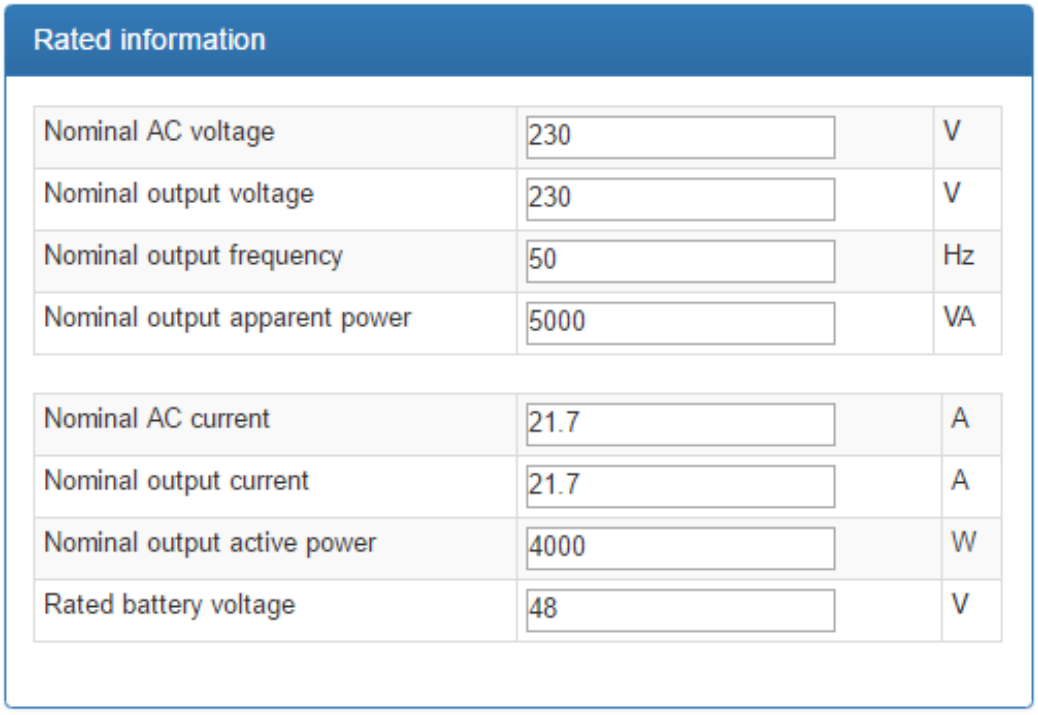
PV input voltage	0	V
Battery voltage	55.6	V
Charging current	0.0	A
Grid voltage	0	V
Grid output voltage	230	V
AC output apparent power	0	VA
Output load percent	0	%
Total AC output apparent power	0	VA
Total output load percent	0	%

b) Power Information:

It displays power generation statistics separated into “per hour,” “Daily,” “Monthly,” “Annual” basis.

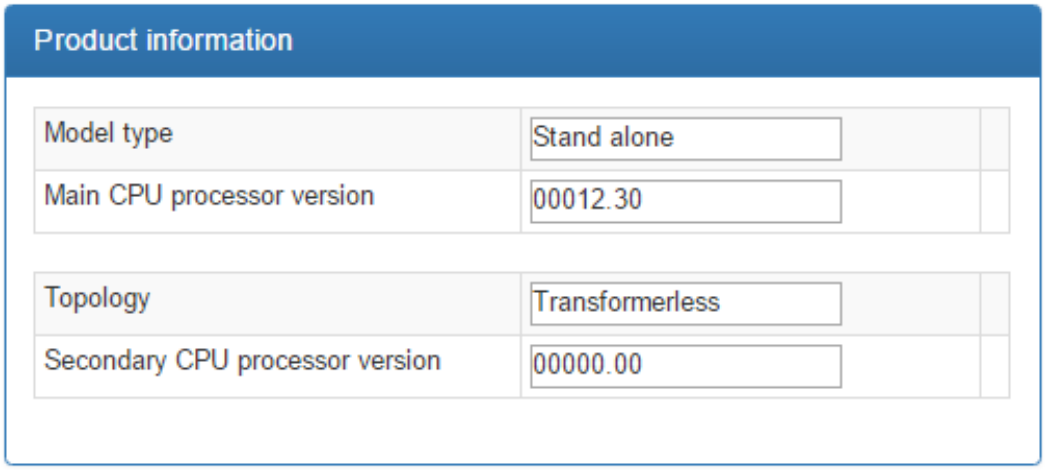


c) Rated information:
It shows the nominal rated information including input voltage, output voltage, frequency, battery voltage, etc.



d) Product Information

It shows the product information including model type, Main CPU processor version, voltage, etc.



➢ Data: Historical data of currently monitored device.

	Begin time	End time
Year 2016 Per page 15	2016/11/15 00:00	2016/11/15 23:59
		Browse

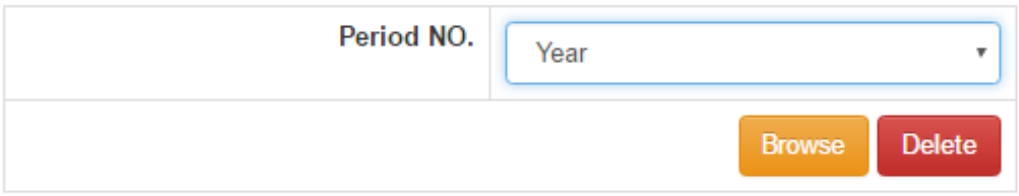
	Device mode	Time	PV input voltage	PV input power	Grid voltage	Grid frequency	Battery voltage	Bat capa
1	Battery	2016/11/15 09:56:57	0.0	0	0.0	0.0	55.6	1(
2	Battery	2016/11/15 09:51:48	0.0	0	0.0	0.0	55.6	1(
3	Battery	2016/11/15 09:46:45	0.0	0	0.0	0.0	55.5	1(

➢ Event log: Historical events of currently monitored device.

	Begin time	End time
Year 2016 Per page 15	2016/11/15 00:00	2016/11/15 23:59
		Browse

	Level	Time	Event	
1	⚠	2016/11/15 09:46:45	LINE_FAIL	Delete

➢ Power generation data log：Power generation data of currently monitored device.

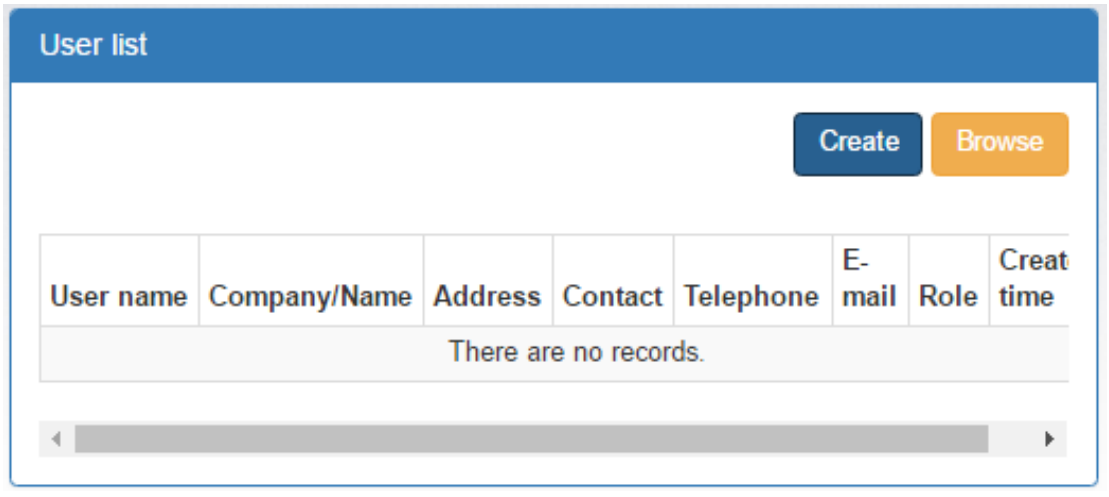


Time	Output power
2016/11/01	1.172
2016/11/02	0.0
2016/11/03	0.0
2016/11/04	6.621
2016/11/05	0.0
2016/11/06	0.0

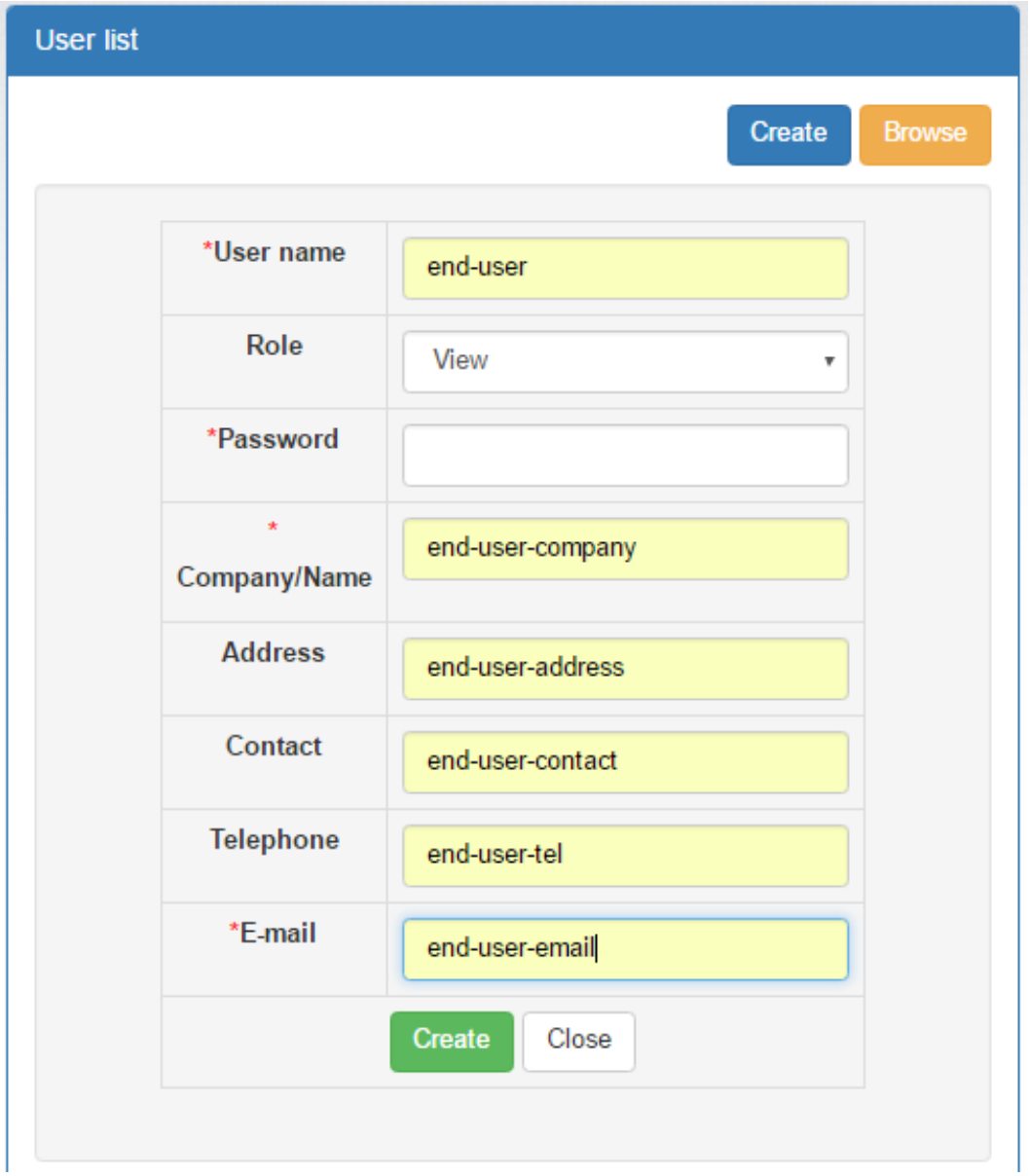
3.6 User Manager

Users can creat additional logins and assign specific GPRS/3G card to a particular login. The end-user can monitor the device by logging into the data server via assigned GPRS/3G cards.

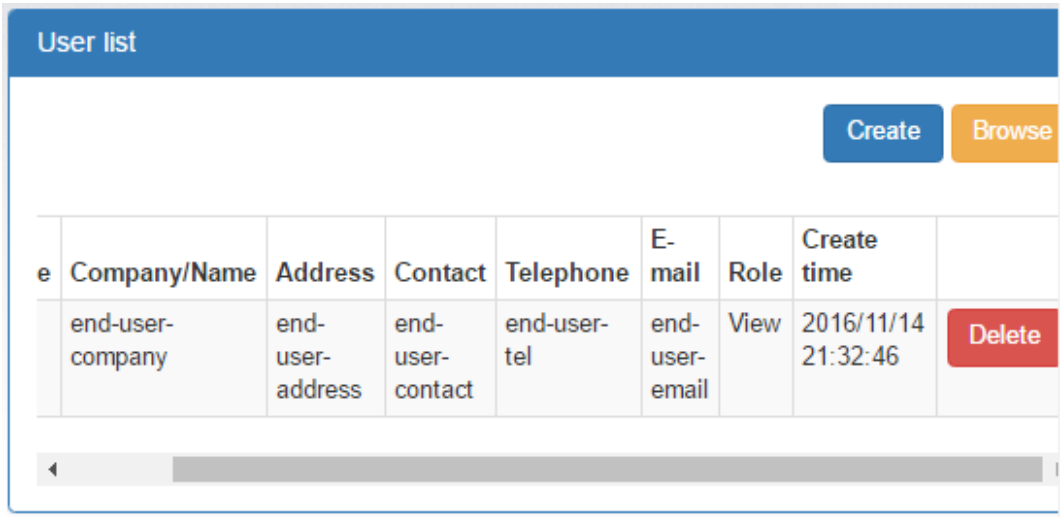
1. Create User



➢ Click on  to show the login creation window.



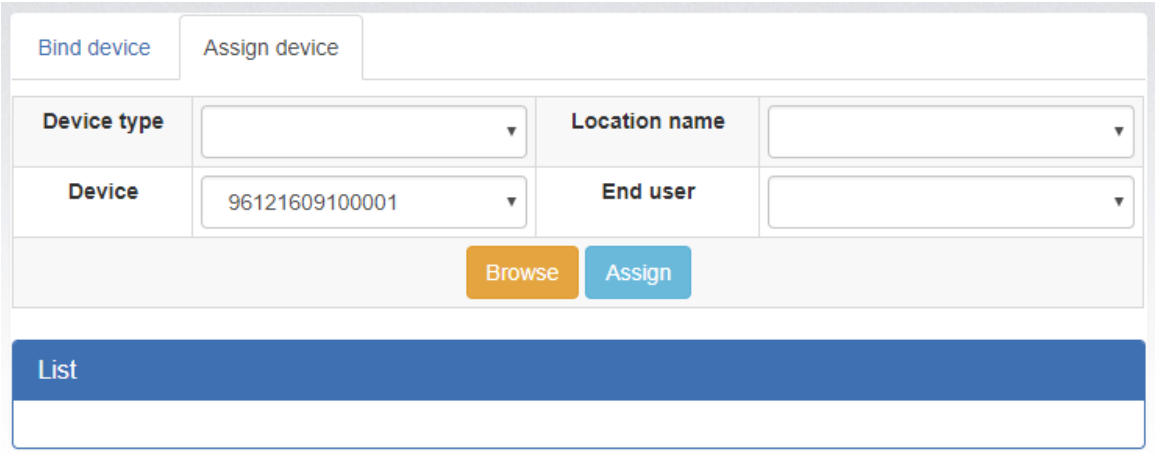
- After filling in the required fields, click on Create to complete the operation.



- Click on Close to end the creation process.
- Click on Delete to remove existing user(s).

2. Assign device

The GPRS/3G card can be assigned to specific end-user/login.

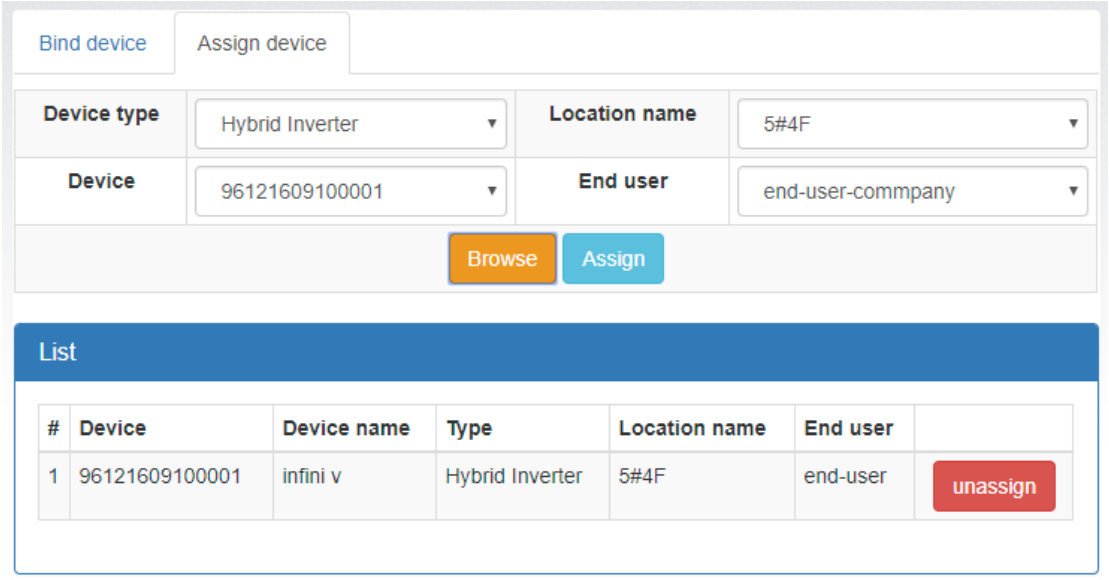


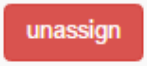
Device type/ Location name: The pull-down value may vary depending on different devices.

Device: Select Device.

End user: Select one of the end-users.

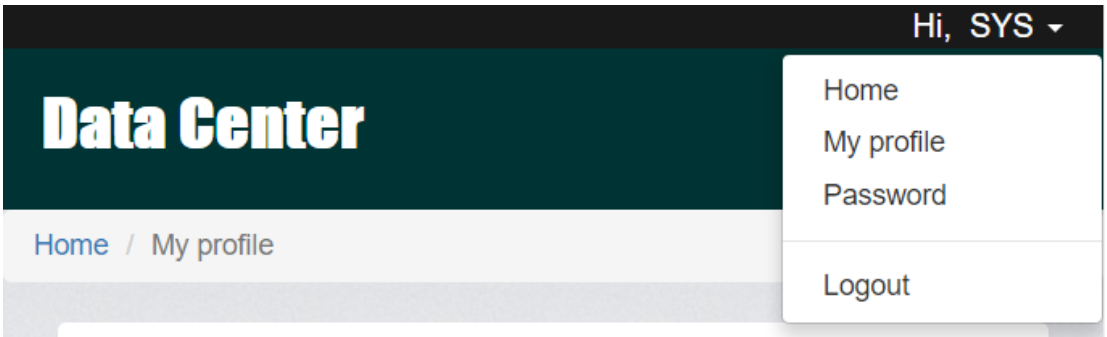
Click on Assign to complete the assignment.



Click on  to unbind the GPRS/3G card assignment.

3.7 Email Notification

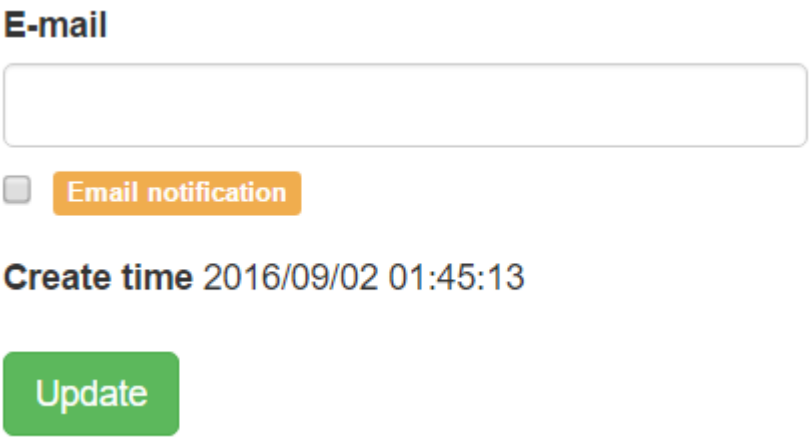
Users can set up e-mail notification when warning or fautls of any kind occurred in the inverter. Data server will send alarm notification(s) to specific e-mail addresses. Click on the pull-down indicator on the upper right-hand corner of the screen to begin.



Select “My profile”

It will prompt you with the following screen and please enter the email address of

intended recever. Check"Email notification" box and then click on Update to confirm your input.



4 System Configuration

4.1 SMS Setting

4.1.1 SMS Format

The SMS starts with "GPRS+password" and ends with "APPLY." The default password is "12345678," and it is adjustable through "C^CPWD". One SMS can include several commands, and every command should be independently listed in single row. The response message will start with "GPRS" and its content might vary depending on different commands.

4.1.2 Command Format

Every command starts with "C^" or "C+." The setting starting with "C^" will be saved and permanently valid. The setting starting with "C+" is normal command, and will be invalid after GPRS/3G card resumes.
Every command has three possible applied methods. "CMD" stands for concrete commands, and "C_VALUE" stands for current value. "VALUE" represents setting value.

1. "CMD" or "CMD?" means you can search for the current value and trigger command set as default. For example: "C^CPWD" or "C^PWD?" means you can search for current passwords for SMS setting. "C^RESTART" or "C^RESTART?" is an executive command which will restart GPRS/3G card.
2. Set "CMD=VALUE" as the top of the page.
   For example, "C^CPWD=12345678" means the password is "12345678."

3. “CMD=?” is used to search for the acceptable parameter range.
   For example, after placing the command “C^CPWD=?” the system replies “CPWD:(4-10)” which means the acceptable parameter range is at least 4, and at most 10 ASCII characters. The details of range format and its definition will be introduced below.
   The special character “*” is to represent all items.
   1. “C^*” or “C^*?” can be used to inquire the current value of all commands starting with “C^.”
   2. “C^” can be used to inquire the setting range of all commands starting with “C^”
   3. “C^” or “C+*?” can search for which normal command is available to use.

4.1.3 Range format

The value range included in “( ).” If there is any corresponding description, it will be put outside “( ).” There are four formats in setting value.

1. (A,B,C)
   This format indicates the setting value is one of them in the setting range.
2. (A-B)
   A and B are numbers, which indicates the length of ASCII character strings ranges from ≥A to ≤B.
   For example, the return value of “C^CID=?” is “C^CID=?” which indicates the acceptable range is 1 to 100 ASCII characters.
3. (A,B…C)
   A and B are numbers, which indicates the setting range is larger than A, but smaller than B. The interval is a value of arithmetic sequence between B-A.
   For example, The return value of “C^UPS=?” is “UPS:(5,10...86400)” which indicates the initial value is 5, and its maximum is 86400, and the tolerance is 5, so 5, 10, or 15 is acceptable value, but 16 is unacceptable.
4. (!)
   It indicate the value can’t be set by the user manually, but set by system automatically.
   For example, the return value is from “C^FWV=?” to “FWV:(!)” which indicates the value is set by system automatically.

4.1.4 Response Format

1. “CMD” or “CMD ?”
   If it’s an inquiry command, the return value is “CMD:C_VALUE.” If it’s an order command, it replies “OK” for successful execution, or “ERROR” for unsuccessful execution.
2. “CMD=VALUE”
   If it’s set successfully, it replies “OK.” If not, it replies “ERROR.”

3. “CMD=?”

According to different command, it indicate the ranges of setting value (Refer to 4.1.3).

4.1.5 Command List

Command	Description	CMD/CMD? (Default)	CMD=?	CMD=VALUE
C^CID	ID of GPRS/3G Card	CID: XXXXXXX[1]	CID:(1-100)	OK/ERROR
C^SURL	IP Address of server	SURL:http://www.power-datacenter.com/cmmq/dataCenter	SRUL:(8-100)	OK/ERROR
C^UPS	Duration of data update (second)	UPS:300	UPS:(5,10...86400)	OK/ERROR
C^BURL	IP address of transmitting update data	BURL:power-datacenter.com:58081	BRUL:(3-100)	OK/ERROR
C^BPS	Duration of transmitting data update (Second)	BPS:30	BPS:(5,10...600)	OK/ERROR
C^SNTP	SNTP Server	SNTP:time-a.nist.gov	SNTP:(1-100)	OK/ERROR
C^DBGL	Adjusted Level. It is not suggested to adjust.	DBGL:0	DBGL:(0,1...10)	OK/ERROR
C^FWV	Firmware version	FWV: XXXXXX[1]	FWV:(!)	ERROR
C^SMMG	Message Management. Multiple telephone numbers can be set to send the alarm and version update notification. Different numbers are separated by “,” .	SMMG:	SMMG:(0-100)	OK/ERROR
C^SMAD	Messages contains added information. When GPRS/3G Card automatically sends messages to Message Management, it will add extra information.	SMAD:	SMAD:(0-100)	OK/ERROR
C^SMAR	Switch of alarm notification	SMAR:OFF	SMAR:(ON,OFF)	OK/ERROR
C^CPWD	Password for message. When the password is correct, the message will be read by GPRS/3G card.	CPWD:12345678	CPWD:(4-10)	OK/ERROR
C^UURL	Update address of firmware. After sending C+UPDATE, the system will get the device’s firmware and update it.	URL:http://www.power-datacenter.com/fw/gprs/GPRSFW.jad	UURL:(10-100)	OK/ERROR
C^NITZ	Acquire system time with NITZ protocol.	NITZ:ON	NITZ:(ON,OFF)	OK/ERROR
C^TIMZ	Set up time zone. If **C^NITZ** is OFF, it will get GMT time from assigned time server through SNTP server (C^SNTP command). It will auto transfer to local time zone.	TIMZ:GMT+00:00	TIMZ:(3-9)	OK/ERROR

C^APN	Set up access point name.	APN:	APN:(0-65)	OK/ERROR
C^AUPH	Auto firmware updated interval. The unit is hour.0 means disable.	AUPH:24	AUPH:(0,1…720)	OK/ERROR
C^PDCD	Parallel data collection	PDCD:ON	PDCD:(ON,OFF)	OK/ERROR
C^*	Executive all C^-type operation commands	Return with all information above.	Return with all information above.	ERROR
C+QED	Inquiry of daily generated power	QED:XXXXXX[1,2]	QED:(!)	ERROR
C+UPDATE	Firmware update. The system will get the device's firmware and update it from the assigned address of "C^UURL."	UPDATE: OK/ERROR	UPDATE:(!)	ERROR
C+RESTART	GPRS/3G card restarts.	RESTART: OK/ERROR	RESTART:(!)	ERROR
C+STATUS	System status query. REG: Check if SIM card is successfully registered to network operator. COM: Check if GPRS/3G card get communication with device. UPD: Check if GPRS/3G Card upload data to server successful at last time. HCR: Check if the http service in GPRS/3G card is running and can upload data to server. SPT: Check if GPRS/3G card is compatible to current device.	STATUS: REG:0 or 1[3] COM:0 or 1[3] HCR: 0 or 1[3] UPD:0 or 1[3] SPT: 0 or 1[3]	STATUS:(!)	ERROR
C+SPTD	All system parameters restore to default settings.	SPTD:OK/ERROR	SPTD:(!)	ERROR
C+CARD	Check card type.	CARD:GPRS/3G	CARD:(!)	ERROR
C+GATT	The connection status of Packet Domain service.	GATT:OK/ERROR	GATT:(!)	ERROR
C+QSN	The serial number of monitored device.	QSN:-	QSN:(!)	ERROR
C+*?	List all C+ typed operation command	Return with all available C+ typed commands.	ERROR	ERROR

Note:

1：This value will be changed.

2：The format of return value for QED is "ED,SN,Year,Month,Data00,Data01…,Data31."

ED: It shows the daily generated power.

SN: Serial Number of monitored device

Year：Current year

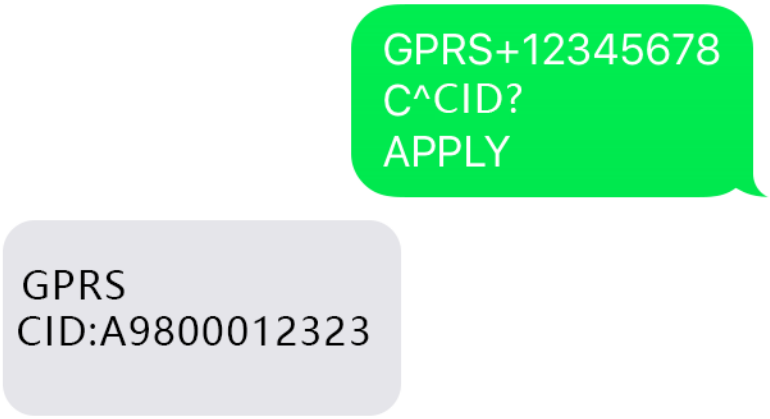
Month：Current month

Data00,Data01…,Data31：Generated Power by day. The date you don't inquire shows "-."

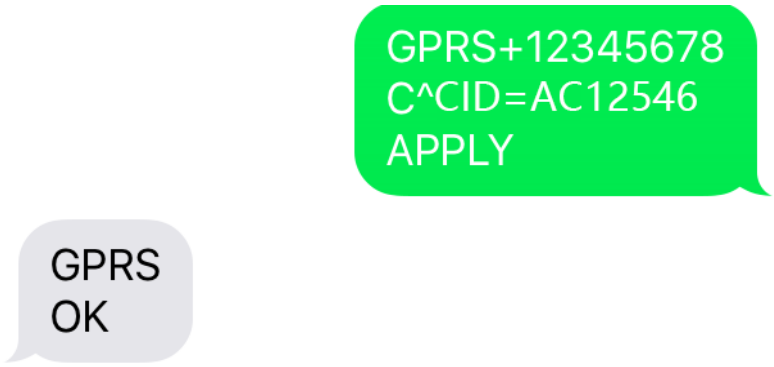
3 : 1 represents it's ok. 0 represents it's not ok.

4.1.6 Examples of SMS

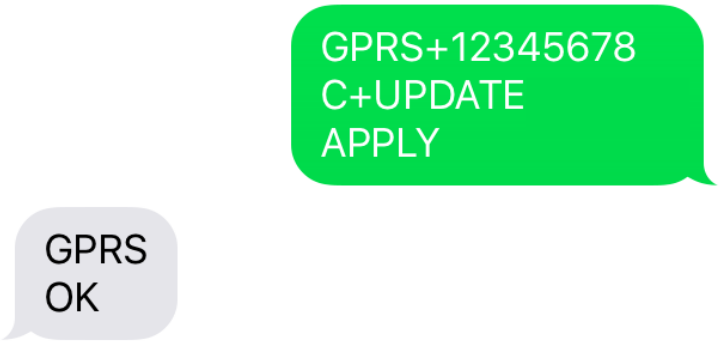
1. Inquire ID no. of GPRS/3G card



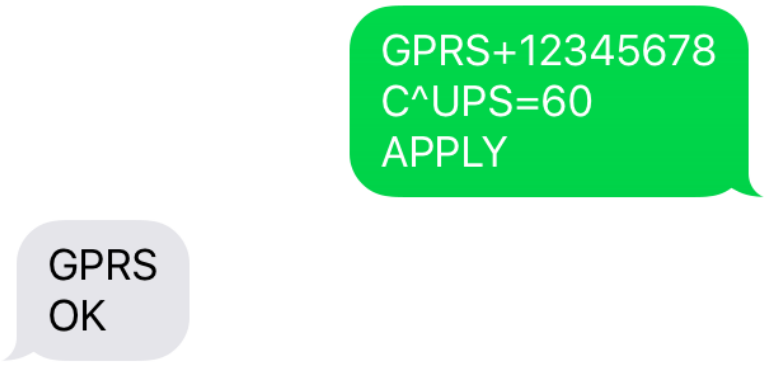
2. Set card ID:



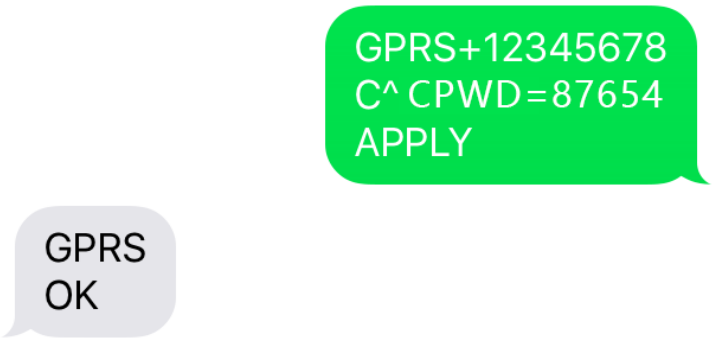
3. Firmware update:



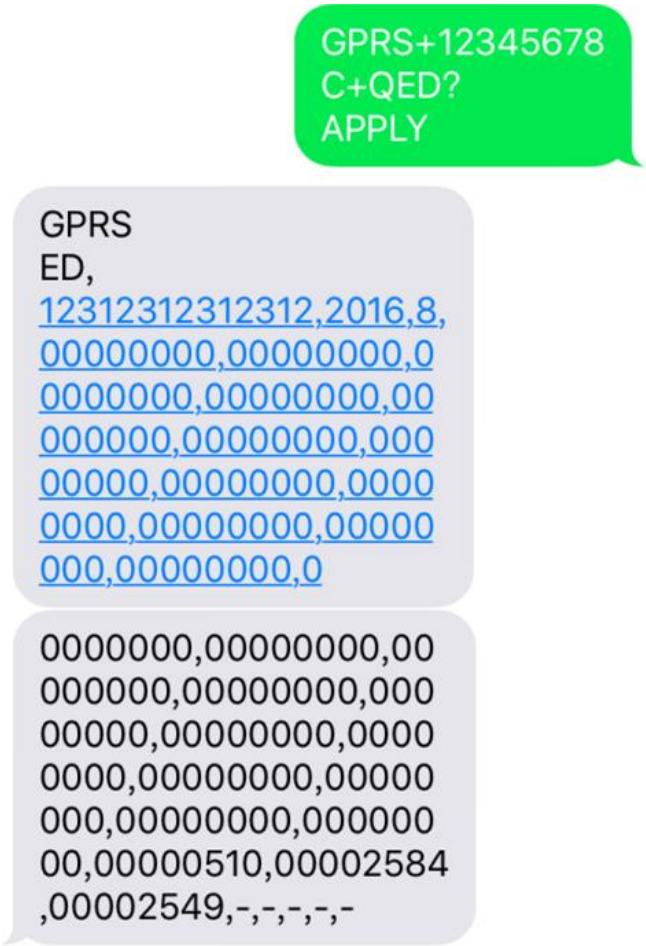
4. Set the interval time of uploading the data.



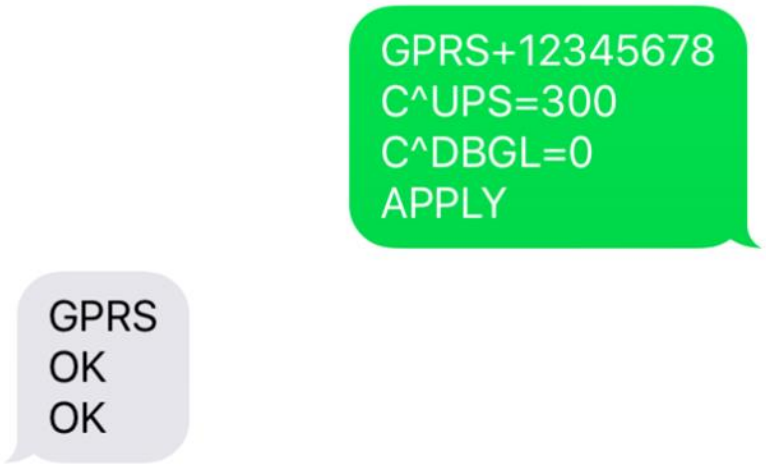
5. Set the password of SMS



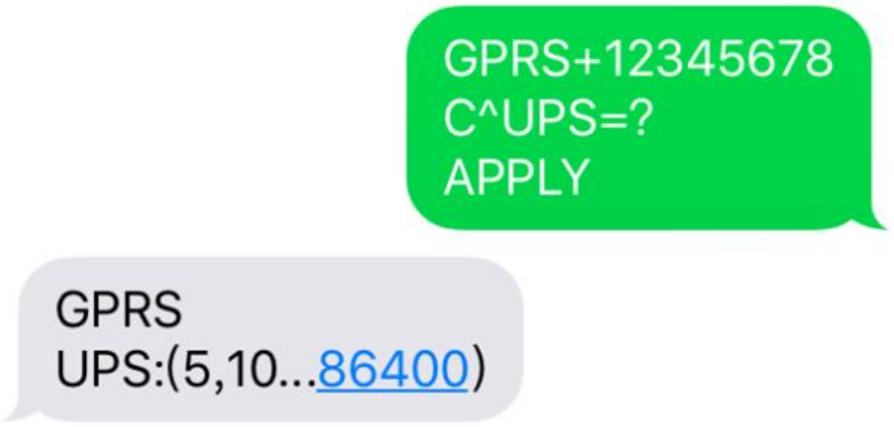
6. Inquiry of daily generated power.



7. Multiple commands



8. Set the queries upon range.



5 SMS Notification

5.1 Notification of firmware

Users need to use “C^SMMG” commands to set the SMS management numbers. If there are more than one number, they should be separated by “,”. If the firmware changes, all the numbers in the management group will be notified by SMS notification. Please refer to Diagram 5-1 for the example of SMS notification.
The format of SMS notification for updating firmware.

ID: XXXXXXXXXXXXXX
TOPIC: FW UPDATE
X.X.X->X.X.X

1. ID: GPRS/3G card ID.
2. TOPIC: Remind the firmware update via SMS notification.
3. The version of firmware is X.X.X ◦ “->” It indicates the alternation of version.

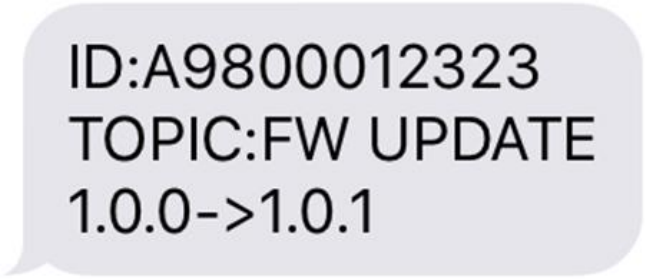


Diagram 5-1

5.2 Prompt Alarm Notification

1. Users have to set the numbers for Management Group through C^SMMG command. If there are more than one numbers, they should be separated by ",".
2. Users should turn on prompt alarm notification through C^SMAR=ON command. The prompt alarm notification is OFF in default. Refer to Diagram 5-2 for the SMS example.
   Format for alarm notification is:
   ID: XXXXXXXXXXXXXX
   TOPIC: ALARM
   SN, CODE,DETAIL

   (1.) ID: GPRS/3G card ID
   (2.) TOPIC: Notify the message is an alarm notification
   (3.) SN: Serial Number of monitored device
   (4.) CODE: There are four formats. WO means there are warnings. FO means there are faults. WR means the warnings cancel. The code number will follows "WO," "FO," "WR," and "FR."
   (5.) DETAIL: English description of warning or fault.

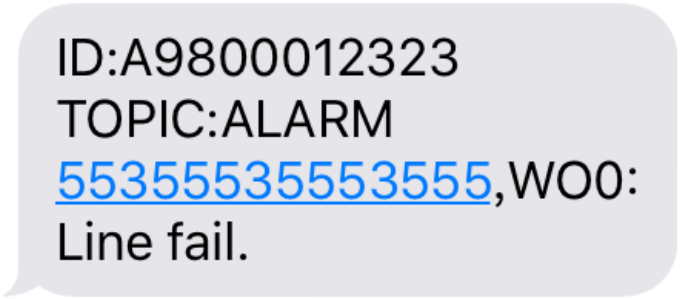


Diagram 5-2

6 Trouble Shooting

If any abnormal situation occurs, please follow below chart to find out the reasons.