SanPlat™

Data Concentrator
Web Interface Instructions

To Optimize Power Grid Value
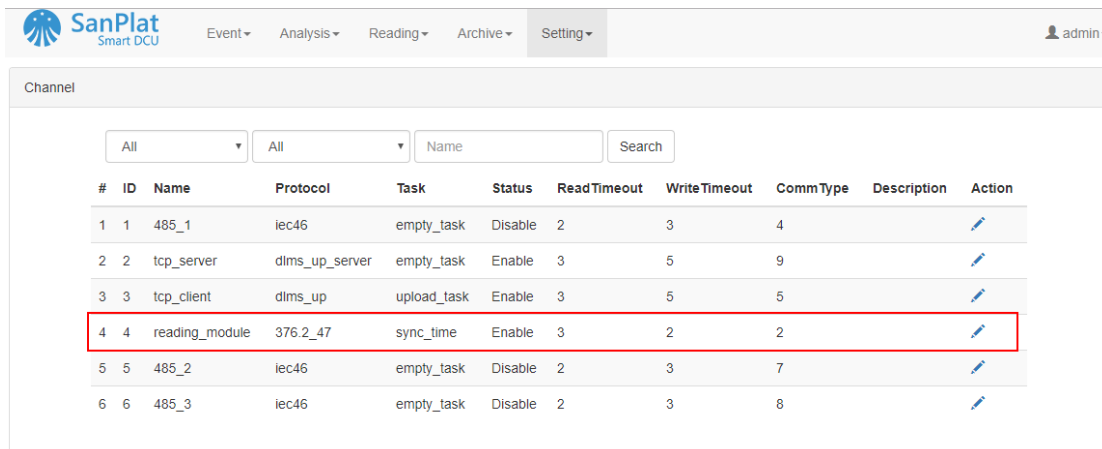
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Content

1. Overview

The main function of DCU (Data Concentrator Unit) is to read and collect data of load profile and events from meters via G3 PLC (Power Line Carrier). The DCU itself stores the captured data and sends data to HES (Head End System) via GPRS or Ethernet. DCU also supports transparent transmission of command frame those come from HES to meters. Thus, HES can control meters remotely.

The configuration of the DCU is described in the following aspects: Communication channel configuration, meter archives configuration, data collection task configuration, HES configuration, communication configuration, manually meter reading and other operations.

2. Configuration of Communication Channel

2.1 Channel List

Click the menu **Setting->Channel** to enter communication channel list page. All the communication channels supported by the DCU are listed in this page.

Click ✏ to edit channel parameters.

Name   channel name

Protocol   communication protocol of this channel

Task   shows which data collection task group is attached to this channel.

Status   shows channel is enabled or disabled

Tips:

"reading_module"   the channel of PLC module

"Tcp_client"   the channel used for DCU connecting with HES in client mode.

"Tcp_server"   the channel used for DCU connecting with client in server mode.

2.2 Communication Channel Parameters

Click the menu **Setting-> Channel Attribution** to configure communication parameters of channels.

Click ✏ on the right side of each parameter to edit values.

For example: for the reading_module channel, there are Serial parameters between DCU and PLC modem, baud rate, databits, stopbits, checksum that need to be configured.

2.3 Communication Protocol

In **Setting->Protocol** page, all the communication protocols supported by the DCU are listed in this page.

"376.2_47" protocol is used for PLC module.

"dlms_up" and **"dlms_up_server"** protocols are used to communicate with HES, respectively for client mode and server mode.

2.4 Communication Protocol Parameters

Click the menu **Setting->Protocol Attribution** to enter protocol parameters configure page.

For example: if you want to modify the timeout value of PLC modem, you can modify the **"send.timeout"** of **"376.2_47"** protocol which is bind to PLC modem.

2.5 Configuration of G3 Module parameters

2.5.1 Basic Configuration

In **Setting-> System** page, parameters with the name beginning with "g3" are used for G3-PLC

module, as shown:

32	32	comm_profile.interval	300	interval of signal strength profile unit:second	
33	33	test.rs485_1_mode	0	0: communication 1: Debug 2: Debug_hw	
34	34	test.rs485_2_state	0	rs485 II state	
35	35	test.rs485_3_state	0	rs485 III state	
36	36	g3.whitelist.enable	0	enable G3 white list	
37	37	g3.encryption.enable	1	enable G3 encryption	
38	38	g3.band.mode	fcc	G3 band mode, fcc or cena	
39	39	g3.masktone.fcc	000000000000000000	G3 fcc mask	
40	40	g3.masktone_fcc.active_time	1970-1-1 0:0:0	fcc mask active time	
41	41	g3.masktone.cena	0000000000	g3 cena mask	
42	42	g3.masktone_cena.active_time	1970-1-1 0:0:0	cena mask active time	
43	43	g3.power backoff	4	G3 power backoff	
44	44	4G_GPRS.workmode	AUTO	4G workmode	
45	45	4G_GPRS.reset_en	1	enable 4G module auto reset	
46	46	4G_GPRS.reset_time	22:20	time of 4G module auto reset	
47	47	4G_GPRS.HeartBeat_enable	1	4G heartbeat enable	

1) **g3.encryption.enable**

   G3 Module Communication Encryption.

   "0": no encryption

   "1": encryption

2) **g3.whitelist.enable**

   G3 module white list switch.

   "0" : disable white list

   "1" : enable white list

   In white list mode, the DCU synchronizes the meter archives as a white list with the G3
   routing module (the G3 module on the DCU) when the module is boot up. Only the meters in
   the white list are allowed to connect to this DCU, others will be rejected. In this way, DCU
   can avoid unwanted meters which are under other transformers.

   When the white list is disabled, all the G3 meters are allowed to register to DCU
   automatically.

3) **g3.band.mode**

   Configure the G3 communication frequency band mode.

"cena": use the European CENELC-A standard frequency band to communicate.

"fcc": use the US FCC standard frequency band to communicate.

The frequency band mode of the G3 module on DCU must be the same as the module on meter.

4) **g3.masktone.fcc**

This parameter only takes effect when frequency band mode is FCC. It is 9 bytes,72 bits. Each bit set to zero in the **"g3.masktone.fcc"** indicates that the associated tone will be used for the communication. Thus, masked subcarriers are not assigned phase symbols and their amplitude is zero. Less the significant bit represents the lowest frequency. The number of useful subcarriers is 72 for FCC bandplan. It is configured by a hexadecimal string, totally 18 characters, each character can be 0-F.

The G3 routing module's frequency mask must be the same as meter's G3 module.

5) **g3.masktone_fcc.active_time**

This parameter only takes effect when frequency band mode is FCC. It is used to configure activate time of **"g3.masktone.fcc"**. If the activate time is earlier than system time, **"g3.masktone.fcc"** will take effect immediately, otherwise it will take effect until the configuration time.

6) **g3.masktone.cena**

This parameter only takes effect when frequency band mode is CENELC-A. It is 5 bytes, 40 bits. The low 36 bits are valid. Each bit set to zero in the **"g3.masktone.cena"** indicates that the associated tone will be used for the communication. Thus, masked subcarriers are not assigned phase symbols and their amplitude is zero. Less the significant bit represents the lowest frequency. The number of useful subcarriers is 36 for CENELC-A bandplan. It is configured by a hexadecimal string, totally 10 characters, each character can be 0-F.

The G3 routing module's frequency mask must be the same as meter's G3 module.
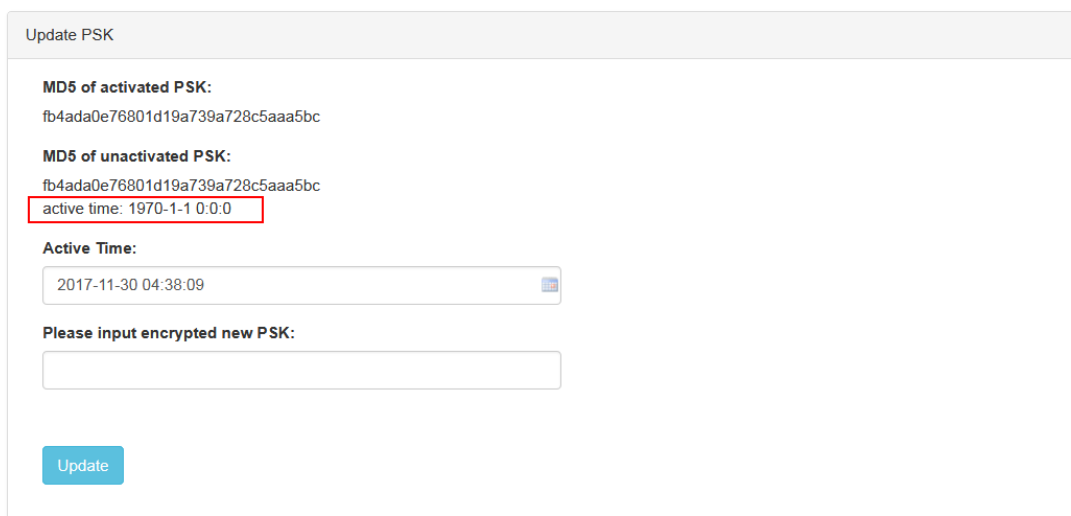
7) **g3.masktone_cena.active_time**

This parameter only takes effect when frequency band mode is CENELC-A. It is used to configure activate time of **"g3.masktone.cena"**. If the activate time is earlier than system time, **"g3.masktone.cena"** will take effect immediately, otherwise it will take effect until the configuration time.

2.5.2 PSK configuration

Click account **information menu -> Update PSK** to enter PSK configure page:
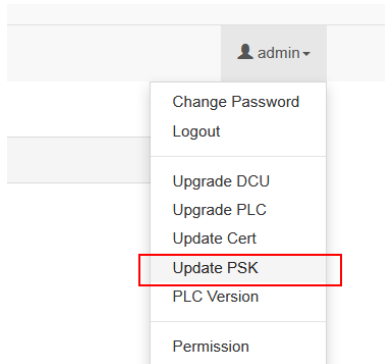
1) MD5 of activated PSK.

Used to display the MD5 code of PSK that is activated within the DCU.

2) MD5 of unactivated PSK

Used to display the MD5 code of PSK that is inactivated within the DCU.

The marked time is the activate time for inactive PSK.

3) Active Time

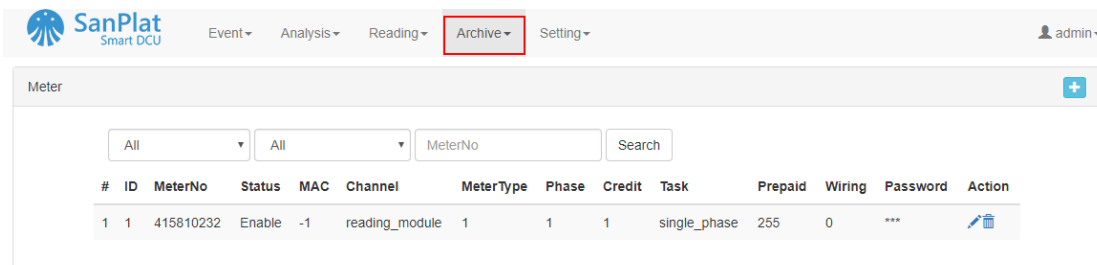It is used to configure the activate time of the PSK.

4) Please input encrypted new PSK

It is used to input PSK string which is encrypted.

3. Meter Archives Configuration

3.1 Meter Archives List

Click the menu **Archive** to enter meter archive management page.

Click to modify the meter archive parameters, click to disable.

There are three methods to generate meter archives:

1) Issuing from HES

2) Create by meter automatic registration.

3) Click to add archive manually

3.2 Edit Meter Archives

Click add button or edit button to enter the meter archive page shown as below:

The following 5 items are the key parameters, the rest can be remained default:

Meter No   is editable when adding meter archive manually, it can not be edited in other situations.

Channel   Communication channel which is connected to meter. The channel name of PLC module is "reading_module"

Task   Data collation task group attached to current meter. Data collation plan can be modified in Setting->Task menu

Password   Password of meter for LLS communication security policy. (not in use as default, default security policy is HLS)

Status   Enable or Disable meter.

Note:

Reboot DCU is required if any meter archive was changed by Web-GUI.

4.   Configuration of Data Collection Task
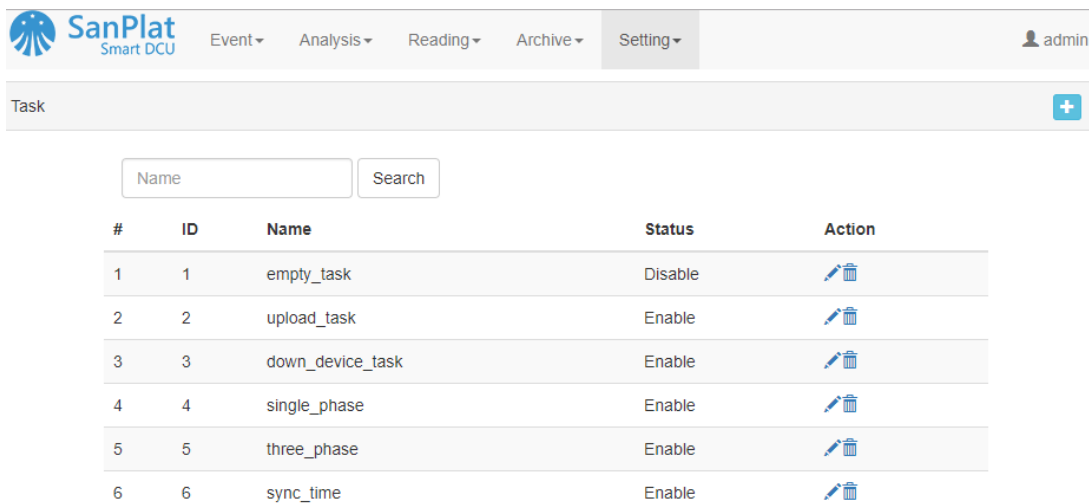
This section will describe how to configure the collection task.

Task item tells DCU when and what data should be collected from meter. "Task group" is composed of multiple task items. Task group (called Task) can be attached to meter archive. Each type of meter can attach different task group.

4.1 Configuration of Task Group

In menu **Setting->Task** different task groups can be configured, as shown:

Click can add task group, click can edit task group, click can delete task group.

Name   Name of task group.

Status   Status of task group, Enable or Disable.

empty_task   Empty task group, reserved.

upload_task   Task group of uploading data to HES (only used in client mode).
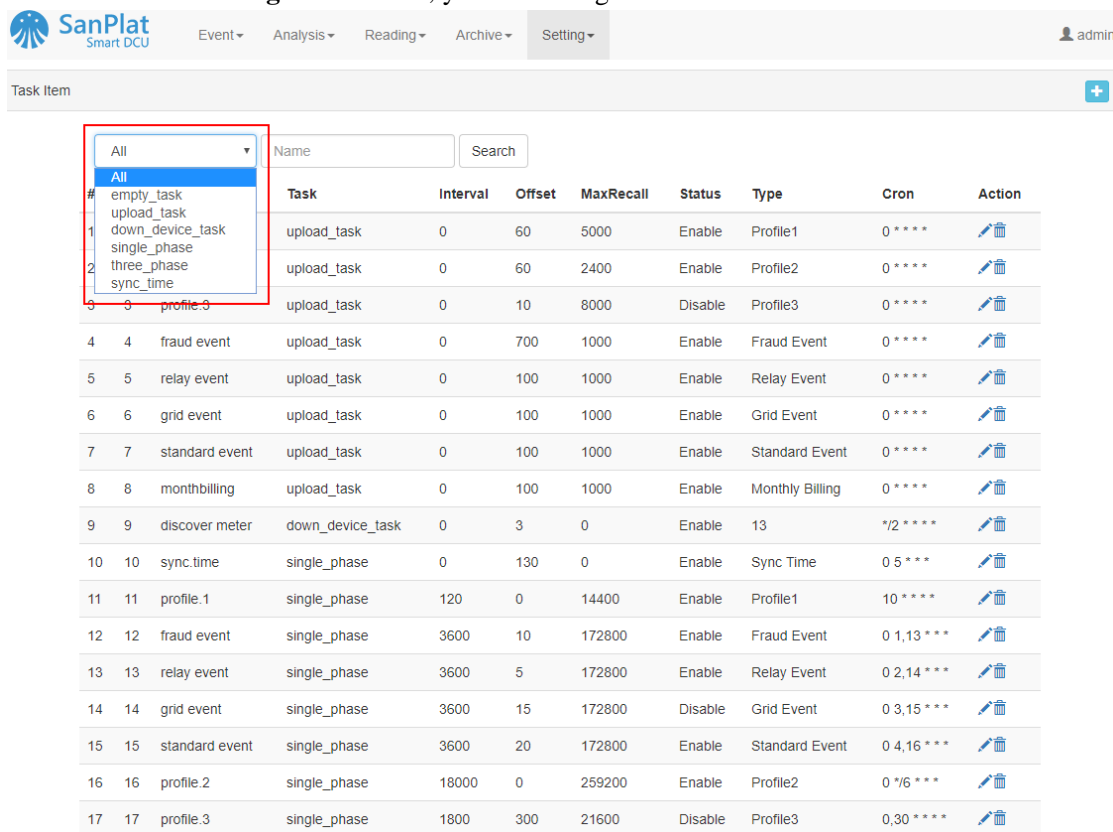
single_phase   Task group of collecting single-phase meter data.

three_phase   Task group of collecting three-phase meter data.

sync_time   Task group of synchronizing meter time by broadcast.

4.2 Configuration of Task Item

Click menu **Setting-> Task item**, you can configure task items. As shown:

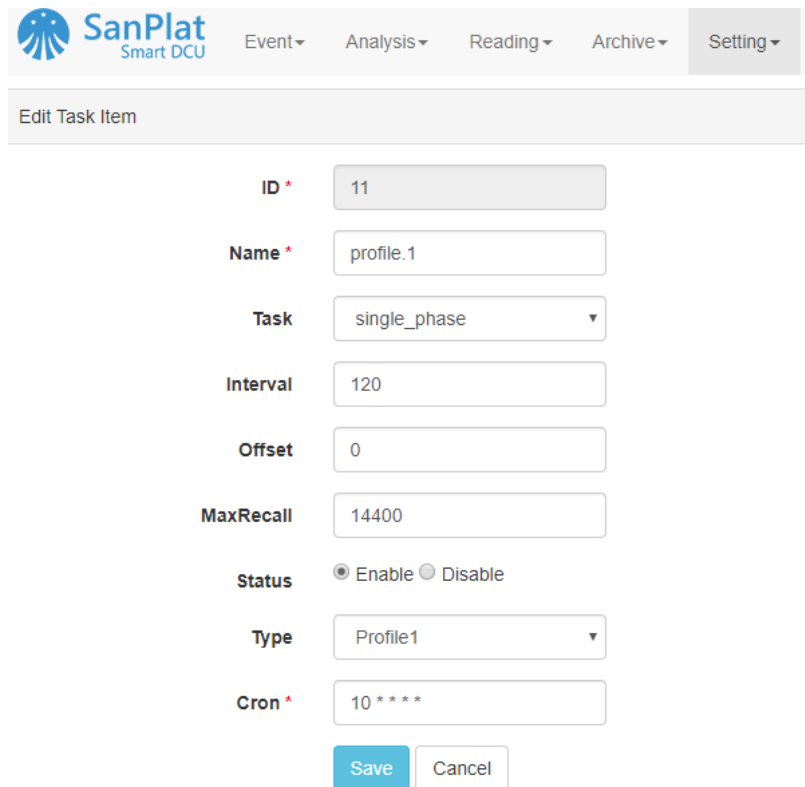Click drop-down menu in the upper left corner of page, select task group, then click "Search" button to filter task groups.

Click " " to add a task item. Click " " to edit the task item. Click " " to delete the task item.

Click " ➕ "or " ✎ " to enter into the edit page. As shown:

Name   The name of the task item.

Task   Select which task group the task item belongs to.

Type   Select which type of data will be collected from meter.

Status   Enable or disable current task item.

Cron   The Cron-expression determines when the task is triggered and the triggering frequency. Minimum unit is minute. Rule of Cron-expression will be shown as follows.

Offset   It defines how long the task will be delayed when task triggers. The time unit is second. You can use "offset" to organize the data collection order for different task items which are in the same task group.

Interval   Set minimum period of task. The unit is second. When the task period is very short, less than Interval, the task will be ignored. This parameter used to limit trigger frequency of task.

MaxRecall   It is a time period for data capture that starts from the task trigger time and counts backwards. This parameter indicates the length of this period. Time unit is second. It will determine the retry times of capturing a single record

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from meter.

Examples of tasks in the above picture are:

1) Collect data Profile1 from single phase meter

2) Collect data at 10th minute of every hour, without delay

3) Collect data of the past 4 hours (14400/3600 = 4)

4) The minimum period of task is 2 minutes

Note: Reboot is required if any parameter changed. The configuration takes effect after the restart.

4.3 Cron Expression

The Cron expression is a string, separated by 4 spaces, divided into 5 fields, each representing a different time unit.

Cron expression format：

```
10   *   *   *   *
|    |   |   |   +——week
|    |   |   +———month
|    |   +————day
|    +————hour
+————minute
```

The range of values allowed in each field are as follows:

minutes	0-59 , * /
hours	0-23 , * /
days	1-31 , * /
months	1-12 , * /
weeks	0-6 , * / 0 means Sunday

Numbers	Indicates the trigger time of task.
,	Commas are used to separate items of a list.
*	Means any time
/	Slashes can be combined with ranges to specify step values.

Example of Cron expression:

0 1 * * *	means task will be executed at 1:00 am every day
30 23 * * *	means task will be executed at 23:30 every day
0 1 1 * *	means task will be executed at 1:00 am on the 1st of each month

*/5 * * * *	means task executed every 5 minutes
0 */2 * * *	means task executed every 2 hours
0 2/4 * * *	means task starts at 2:00 and is executed every 4 hours
26,29,33 * * * *	means task executed at 26th minute, 29th minute and 33th minute every hour
0 0,13,18,21 * * *	means task executed at 0:00, 13:00, 18:00 and 21:00 every day

5. Configuration of HES Communication

5.1 Configuration of HES IP address

In **Setting-> Channel Attribution** page

tcp_client	
ip.1	IP address of HES
ip.port	Service port of HES
tcp_server	
listen.port	Service port when DCU works as server mode

idle.timeout   Timeout on client socket connection. If idle time is longer than this value, socket will be disconnected. The unit of value is second

5.2 Server Mode/Client Mode

In **Setting->Protocol Attribution** page, there is parameter list of protocols.

The parameter **"server.mode"** in **"dlms_up"** protocol determines whether the DCU works in client mode or server mode .

"0":   client mode

"1":   server mode

6. Configuration of Communication

6.1 Configuration of Ethernet

In **Setting->System** page, parameters with the name beginning with "eth" is for Ethernet:

eth.ipv4   IP address of DCU. This parameter will enable DHCP function if it is set to lower-case "dhcp". IP address will be set by DHCP server
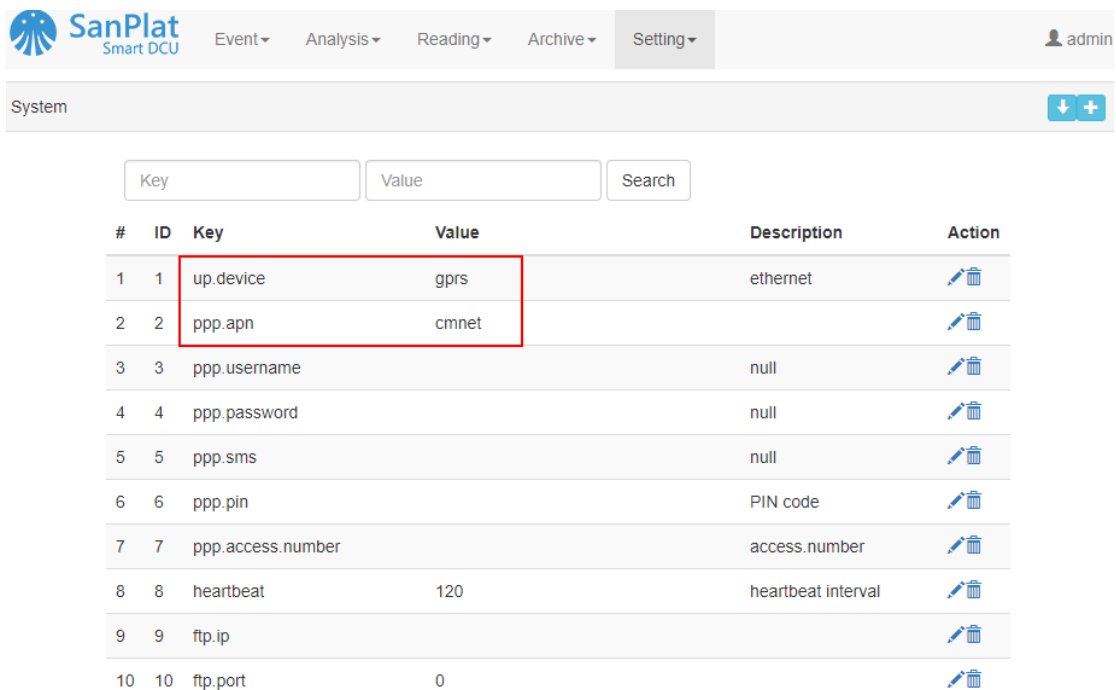
dynamically.

eth.netmask   Subnet mask of DCU. If DHCP function turns on, this parameter will be

invalid

eht.default.gateway   Gateway of DCU. If DHCP function turns on, this parameter will be

invalid

Note: Before turn on DHCP function, please make sure that there is available DHCP server in network.

6.2 GPRS Parameter

In **Setting->System** page, GPRS parameters are shown as below:

up.device   This parameter will enable the GPRS module if it is set to lower-case

"gprs". DCU will connect to GPRS network automatically after it starts

up (SIM card is required). If set this parameter to other value, the GPRS

module will be turned off.

ppp.apn   APN server address

ppp.username   GPRS user name

ppp.password   GPRS password

heartbeat   GPRS heartbeat interval (only take effect in client mode)

| 27 | 4G_GPRS.workmode | AUTO | 4G workmode | ✎🗑 |
28	4G_GPRS.reset_en	0	enable 4G module auto reset	✎🗑
29	4G_GPRS.reset_time	11:15	time of 4G module auto reset	✎🗑
30	4G_GPRS.HeartBeat_enable	1	4G heartbeat enable	✎🗑

4G_GPRS.work mode GPRS network mode. Can be set as AUTO/4G/3G/2G

4G_GPRS.reset_en GPRS module daily reset function switch.

4G_GPRS.reset_time GPRS module daily reset time.

4G_GPRS.HeartBeat_enable GPRS heartbeat switch. Reserved parameter, only take effect in

client mode. It will be invalid in server mode.

7. Manually Reading Meter

In **Reading->Meter** page, we can read data from meter manually. This function can be used to test the connection between meter and DCU.
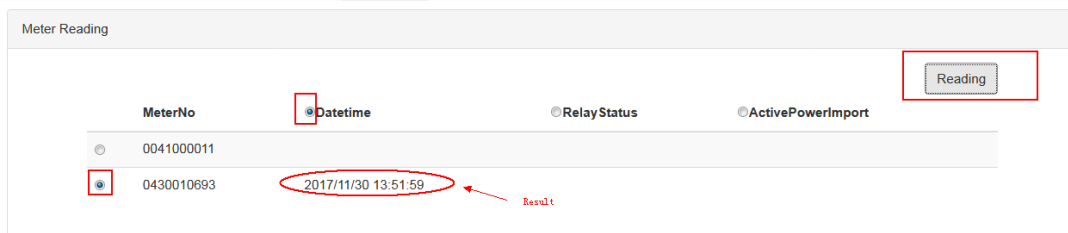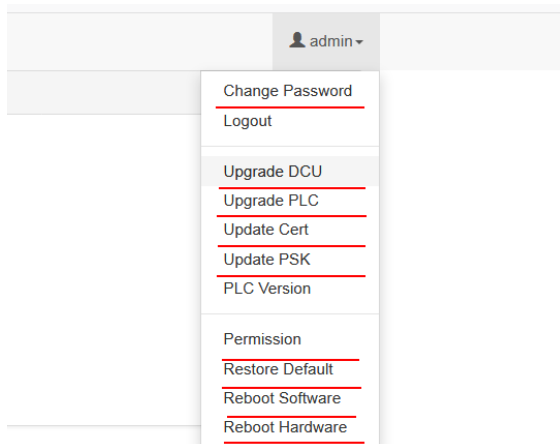

Operation procedure:
1) Select meter number and data type.
2) Click "Reading" button to read date from meter.

8. Other Operations

Account information menu shows other DCU functions as follow:

1) Change Password

Modify password of tech account.

2) Upgrade DCU

Upgrade DCU firmware locally.

3) Upgrade PLC

Upgrade G3-PLC firmware locally.

4) Update PSK

Set PSK and activate time.

5) Permission

Configure permissions of tech account.

6) Restore Default

Restore DCU parameters as factory default.

Note: This operation will clear all the data in DCU. Please make sure that all the useful data has been uploaded to HES before make this action.

7) Reboot Software

Restart DCU software

8) Reboot Hardware

Restart DCU hardware