# Growatt Power station monitoring OpenAPI Protocol standards

| Version | Updated | Update description |
|---------|---------|--------------------|
| 0.0.1 | 2016-08-26 | Document publishing |
| 0.0.2 | 2016-08-30 | Documentation updates , new user name and collector verification interface, improve the interface to return to the parameters that improve the structure of the document |
| 0.0.3 | 2016-09-18 | Documentation updates , The interface of the device part interface (last_new_data, invs_data) is updated, and two interfaces are added return parameter dataloggerSn (the SN of the inverter) |
| 0.0.4 | 2016-11-30 | Documentation updates , The user registers the interface(user_register) with new parameters "user_country" |
| 1.0.1 | 2016-12-20 | Document update，new energy storage machine detailed data, alarm data acquisition interface，parameter setting interface |
| 1.0.2 | 2017-01-26 | Document update，modify the device_id to device_sn |
| 1.0.3 | 2017-03-28 | Document update，power station list interface return parameter increases latitude_d，latitude_f，power station update interface request parameter increases latitude_d，latitude_f |

| 1.0.4 | 2017-04-01 | Document update，added access to the list of electric-meter and environ minitor interface and detailed data interface，interface number is 4.3.16 - 4.3.21 |
|-------|------------|---------|

# 1 Directory

# 2 Open platform overview

- Growatt's OpenAPI open platform provides standardized RESTful data invocation services for authenticated users.

- Platform interface based on http protocol, using OAuth2.0 authentication mechanism.

- Use the API process :

1、If you have already registered the user on our monitoring platform and have successfully monitored the device, send the company name, the monitoring URL and the registered user account to Shenzhen Growatt New Energy Co., Ltd., apply for the token and the server address; Data can be obtained.

2、If you have not registered the user on our monitoring platform, send the company name to Shenzhen Growatt New Energy Co., Ltd., apply for token and server address; then use the API and get the data as follows :

a、Registered user

b、Create a power station based on registered users

c、Add the datalog according to the user and the power station

d、According to the user and the power station and the datalog information to obtain the device information

f、According to the device information for equipment detailed data acquisition

## 2.1 Flow description

Other

- TOKEN validity period

    Passed Audit: Permanent (tentative)

- Causes of invalidation

    The user cancels authorization

# 3 Interface documentation

## 3.1 Overall description

- Interface support http, see the interface definition

- Use GET / POST, see interface definition, parameters for utf-8 encoding, urlencode processing

- Data are utf-8 encoding

- Support to return to json format

- Return data structure for the data: the main content, error_code: error code, error_msg: error content

- The other adapter calls in the http header in the need to add the token: TOKEN requested from Growatt

- Time format

    Date format YYYY-MM-DD , example : 2015-04-08

    Time format YYYY-MM-DD HH:mm:ss , example : 2015-04-03 00:01:00

# 4 Interface description

## 4.1 User

### 4.1.1 User Registration

Address：*http://domain/v1/user/user_register*

Interface support：http

Request method：POST

Request parameters :

| Parameter | Required | Description |
|-----------|----------|-------------|
| user_email | Yes | Register e-mail |
| user_password | Yes | Password |
| user_type | Yes | User type, available value See user_type ( 1 represents the end user ) |
| user_name | Yes | Username |
| user_country | Yes | User Country (China or Other) |
| user_tel | No | User phone |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| c_user_id | The end user ID |
| error_code | 0: Normal return, 10001: System error, 10002: User name or password is empty, 10003: User name already exists, 10004: User mailbox is empty, 10006: User type is empty, 10008: token is empty,10010: connection error |
| error_msg | Error message |

### 4.1.2 Verify that the user name is unique

Address : *http://domain/v1/user/check_user*

Interface support：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| user_name | Yes | Username |

Returns: supports json

| Parameter | Description |
|---|---|
| error_code | Error code (0: normal return, 10001: server exception, 10002: user name is empty, 10003: user name already exists) |
| error_msg | Specific error messages |

### 4.1.3 Modify the user information

Address : *http://domain/v1/user/modify*

Interface support：http

Request method：POST

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| c_user_id | Yes | The end user ID |
| mobile | No | Phone number |

Returns: supports json

| Parameter | Description |
|---|---|
| error_code | 0: normal return, 10001: system error, 10002: user ID is empty, 10003: user does not exist |
| error_msg | Error message |

### 4.1.4 Get a list of end users under the business

Address : *http://domain/v1/user/c_user_list*

Interface Support : http

Request method : GET

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| page | No | Page number, default 1 |
| perpage | No | Number of pages per page, default 20, maximum 100 |

Returns: supports json

| Parameter | Description |
|---|---|
| c_user_id | The end user ID |
| c_user_email | The end user registers the mailbox |
| c_user_regtime | End user registration date, see the date format |
| c_user_name | End user name |
| c_user_tel | End user phone |
| count | Total number of end users |
| error_code | 0: Normal return, 10001: System error |
| error_msg | Error message |

## 4.2 Power station

### 4.2.1　Obtain a list of users' power stations

Address：*http://domain/v1/plant/list*

Interface Support：http

Request method：GET

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| page | No | Page number, default 1 |
| perpage | No | Number of pages per page, default 20, maximum 100 |
| search_type | No | Search type, available values see  attachment 1:search_type |
| search_keyword | No | Search for the keyword |

Returns: supports json

| Parameter | Description |
|---|---|
| plant_id | Plant ID |
| name | Name of Plant |
| user_id | The user ID to which the plant belongs |
| country | Country name |
| longitude | longitude |
| latitude | latitude |
| peak_power | Peak Power (kWp) |
| create_date | Station date, time format, see the time format |

| installer | Installer name |
|---|---|
| current_power | Current Power (kW) |
| total_energy | Cumulative power generation (kWh) |
| count | Total number of power stations |
| latitude_d | Name of installer |
| latitude_f | Installer area |
| error_code | 0: Normal return, 10001: System error |
| error_msg | Error message |

### 4.2.2  Modify the power station

Address：*http://domain/v1/plant/modify*

Interface Support：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| c_user_id | Yes | The user id to which the plant belongs |
| plant_id | Yes | Plant ID |
| name | Yes | Name of Plant |
| peak_power | Yes | Peak Power (kWp) |
| currency | No | Currency Units, Default 1, Available Values：1 RMB |
| longitude | No | longitude |
| latitude | No | latitude |
| timezone_id | No | Data shows the time zone code, the default is PRC |

| Parameter | Required | Description |
|-----------|----------|-------------|
| latitude_d | No | Name of installer |
| latitude_f | No | Installer area |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| error_code | 0: Normal return, 10001: System error , 10002: The user name ID is empty, 10003: The station name is empty, 10004: The peak power is empty, 10005: The user does not exist, 10006: The station name already exists under this user, 10007: The station does not exist. |
| error_msg | Error message |

### 4.2.3  Delete the plant

Address : *http://domain/v1/plant/delete*

Interface Support : http

Request method : POST

Request parameters :

| Parameter | Required | Description |
|-----------|----------|-------------|
| plant_id | Yes | Plant ID |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| error_code | 0: normal return, 10001: system error, 10002: plant ID is empty, 10004: power plant does not exist |
| error_msg | Error message |

### 4.2.4  Get the basic information of a power plant

Address：*http://domain/v1/plant/details*

Interface Support ：http

Request method：GET

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| plant_id | Yes | Plant ID |

Returns: supports json

| Parameter | Description |
|---|---|
| name | Name of Plant |
| user_id | The user ID to which the plant belongs |
| country | Country name |
| longitude | longitude |
| latitude | latitude |
| create_date | Station date, date format see time format |
| image_url | Picture url |
| peak_power | Peak Power (kWp) |
| currency | Currency Unit |
| timezone | Time zone, time zone format see time format |
| error_code | 0: Normal return, 10001: System error, 10002: Plant does not exist, 10003: Plant ID is empty |
| error_msg | Error message |

### 4.2.5 Obtain an overview of the data for a plant

Address：*http://domain/v1/plant/data*

Interface Support：http

Request method : GET

Request parameters :

| Parameter | Required | Description |
|-----------|----------|-------------|
| plant_id | Yes | Plant ID |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| peak_power_actual | Actual peak power (kW) |
| last_update_time | Last received data time, time format, see the time format |
| current_power | Current Power (kW) |
| today_energy | Electricity of the day (kWh) |
| monthly_energy | Monthly power generation (kWh) |
| yearly_energy | Current generation (kWh) |
| total_energy | Cumulative power generation (kWh) |
| carbon_offset | Equivalent reduction in CO2 emissions (ton) |
| timezone | Time zone, time zone format see time format |
| error_code | 0: Normal return, 10001: System error, 10002: Plant does not exist, 10003: Plant ID is empty |
| error_msg | Error message |

## 4.2.6 Obtain the historical power generation of a power plant

Address : *http://domain/v1/plant/energy*

Interface Support : http

Request method : GET

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| plant_id | Yes | Plant ID |
| start_date | Yes | Start date, date format see time format |
| end_date | Yes | End date, date format see time format |
| time_unit | No | Time type, the default is day, the value can be attached to attached 1: time_unit |
| page | No | Page number, default 1 |
| perpage | No | Number of pages per page, default 20, maximum 100 |

Returns: supports json

| Parameter | Description |
|---|---|
| count | The total number of records |
| time_unit | On request time_unit |
| date | Date, format, see the time format |
| energy | Power generation (kWh) |
| error_code | 0: Normal return, 10001: System error, 10002: Plant does not exist, 10003: Plant ID is empty, 10004: Time format is incorrect |
| error_msg | Error message |

### 4.2.7  To obtain a power plant a day of power data

Address : *http://domain/v1/plant/power*

Interface Support  : http

Request method : GET

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| plant_id | Yes | Plant ID |
| date | Yes | Date, date format see time format |
| timezone_id | No | Data shows the time zone code, the default is UTC, the value can be used to see attached 2 |

Returns: supports json

| Parameter | Description |
|---|---|
| count | The total number of records |
| time | Time, time format, see time format |
| power | Power (W) |
| error_code | 0: Normal return, 10001: System error, 10002: Plant does not exist, 10003: Plant ID is empty or time format is incorrect |
| error_msg | Error message |

### 4.2.8  Add the power plant

Address : *http://domain/v1/plant/add*

Interface Support : http

Request method : POST

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| c_user_id | Yes | The end user ID to which the plant belongs |
| name | Yes | Name of Plant |
| peak_power | Yes | Peak Power (kWp) |
| currency | No | Currency Units, Default 1, Available |

| | | Values:1 RMB |
|---|---|---|
| longitude | No | longitude |
| latitude | No | latitude |
| timezone_id | No | Data shows the time zone code, the default is PRC |

Returns: supports json

| Parameter | Description |
|---|---|
| plant_id | Plant ID |
| error_code | 0: normal return, 10001: system error, 10002: user ID is empty, 10003: The station name is empty, 10004: The peak power is empty, 10005: The user does not exist, 10006: The station name already exists under this user. |
| error_msg | Error message |

### 4.2.9 Obtain a list of the users' power stations

Address：*http://domain/v1/plant/user_plant_list*

Interface Support：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| page | No | Page number, default 1 |
| perpage | No | Number of pages per page, default 20, maximum 100 |
| user_name | Yes | User account |

Returns: supports json

| Parameter | Description |
|---|---|
| plant_id | Power plant ID |
| name | Name of plant |
| user_id | The user ID to which the plant belongs |
| country | Country name |
| longitude | latitude |
| latitude | Longitude |
| peak_power | Peak power ( kWp ) |
| create_date | Station date, time format, see the time format |
| installer | Installer name |
| current_power | Current power ( kW ) |
| total_energy | Cumulative power generation ( kWh ) |
| count | Total number of power stations |
| error_code | 0: Normal return, 10001: System error |
| error_msg | Error message |

## 4.3 Euipment

### 4.3.1   Obtain a list of collectors for a plant

Address : *http://domain/v1/device/datalogger/list*

Interface Support   : http

Request method : GET

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| plant_id | Yes | Plant ID |

| page | No | Page number, default 1 |
|------|-----|------------------------|
| perpage | No | Number of pages per page, default 20, maximum 100 |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| count | Total number of collectors |
| sn | Collector SN |
| manufacturer | Collector manufacturers |
| type | Collector type, available value see attached 1: type |
| last_update_time | Last received data time, time format, see the time format |
| error_code | 0: Normal return, 10001: System error, 10002: Plant ID is empty, 10003: Plant does not exist |
| error_msg | Error message |

### 4.3.2 Add a collector

Address：*http://domain/v1/device/datalogger/add*

Interface Support ：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|-----------|----------|-------------|
| plant_id | Yes | Plant ID |
| sn | Yes | Collector SN |
| c_user_id | Yes | The user id |

Returns: supports json

| Parameter | Description |
| --- | --- |
| error_code | 0: normal return, 10001: system error, 10002: power station ID is empty or the collector serial number is wrong, 10003: Collector already exists, 10004: Power station does not exist, 10005: User does not exist, 10006: User ID is empty. |
| error_msg | Error message |

### 4.3.3  Delete the collector

Address：*http://domain/v1/device/datalogger/delete*

Interface Support  ：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
| --- | --- | --- |
| plant_id | Yes | Plant ID |
| sn | Yes | Collector SN |

Returns: supports json

| Parameter | Description |
| --- | --- |
| error_code | 0: normal return, 10001: system error, 10002: power station id is empty or the collector serial number is wrong, 10004: collector does not exist, 10003: power station does not exist |
| error_msg | Error message |

### 4.3.4  Obtain a list of devices for a plant

Address：*http://domain/v1/device/list*

Interface Support  ：http

Request method：GET

Request parameters :

| Parameter | Required | Description |
|-----------|----------|-------------|
| plant_id | Yes | Plant ID |
| page | No | Page number, default 1 |
| perpage | No | Number of pages per page, default 20, maximum 100 |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| count | The total number of devices |
| device_id | The device unique ID |
| datalogger_sn | Equipment corresponding to the collector SN |
| device_sn | Equipment SN |
| manufacturer | Equipment manufacturers |
| model | Device model |
| type | Device type (1: inverter, 2: energy storage, 3: other equipment) |
| last_update_time | Last received data time, time format, see the time format |
| lost | Whether the device is online or not (0:Online , 1: Disconnect) |
| status | Device status , if the device is 1 (Inverter) , then status(0: disconnect, 1:online, 2:standby, 3:malfunction) , if the device is 2(Storage) , then status(0:standby, 1:charge, 2:discharge, 3: malfunction, 4:burn) |
| error_code | 0: normal return, 10001: system error, 10002: plant ID is empty, 10003: power plant does not exist |
| error_msg | Error message |

### 4.3.5 Obtains the historical data of an inverter

Address : *http://domain/v1/device/inverter/data*

Interface Support ： http

Request method ：GET

Request parameters :

| Parameter | Required | Description |
|---|---|---|
| device_sn | Yes | The device unique serial number ( SN ) |
| start_date | Yes | Start date, date format see time format |
| end_date | Yes | End date, date format see time format, start / end time up to an interval of 7 days |
| timezone_id | No | Data shows the time zone code, the default is UTC, the value can be used to see attached 2 |
| perpage | No | Number of pages per page, default 20, maximum 1000 |

Returns: supports json

| Parameter | Description |
|---|---|
| datalogger_sn | Equipment corresponding to the collector SN |
| next_page_start_id | Next Start ID |
| sn | Equipment SN |
| ipv1 | Input current 1 channel (A) |
| ipv2 | Input current 2-way (A) |
| vpv1 | Input voltage 1 channel (V) |
| vpv2 | Input voltage 2-way (V) |
| iac1 | Output current 1 channel (A) |

| | |
|---|---|
| iac2 | Output current 2 way (A) |
| iac3 | Output current 3-way (A) |
| vac1 | Output voltage 1 channel (V) |
| vac2 | Output voltage 2-way (V) |
| vac3 | Output voltage 3-way (V) |
| power | Output power (W) |
| today_energy | Electricity of the day (kWh) |
| total_energy | Cumulative power generation (kWh) |
| temperature | Temperature (℃) |
| fac | Frequency (Hz) |
| power_factor | Power Factor |
| time | Data time, time format, see time format |
| error_code | 0: normal return, 10001: system error, 10002: device serial number error, 10003: date format error, 10004: date interval more than seven days |
| error_msg | Error message |

### 4.3.6   Obtains the alarm data of a certain inverter

Address：*http://domain/v1 device/inverter/alarm*

Interface Support  : http

Request method：GET

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| device_sn | Yes | The device unique serial number（SN） |
| page | No | Page number, default 1 |

| | | |
|---|---|---|
| perpage | No | Number of pages per page, default 20, maximum 100 |

Returns: supports json

| Parameter | Description |
|---|---|
| count | The total number of alarms |
| sn | Equipment SN |
| alarm_code | Alarm code |
| alarm_message | alarm information |
| start_time | Alarm start time, time format see time format |
| end_time | Alarm end time, time format see time format |
| error_code | 0: normal return, 10001: system error, 10002: device serial number error |
| error_msg | Error message |

### 4.3.7  Inverter parameter setting

Address：*http://domain/v1/inverterSet*

Interface Support  : http

Request method：POST

Request parameters：

| Parameter | Required | Type of data | Description |
|---|---|---|---|
| device_sn | Yes | String | Inverter SN |
| paramId | Yes | String | The parameter Id |
| command_1 | Yes | String | Parameter value 1 |
| command_2 | Yes | String | Parameter value 2, with the value of the need to pass the value, the value |

| | | | of the transmission of empty string "" |
|---|---|---|---|

**Description**：Basic settings

| The parameter Id | Parameter value 1 | Parameter value 2 | Parameter name |
|---|---|---|---|
| pv_on_off | "0000": shutdown and the next does not automatically and network<br><br>"0101": power on and the next automatic grid | | Set the inverter switch |
| pv_pf_cmd_memory_state | "1"：on<br><br>"0"：off | | Sets whether the PF command is stored |
| pv_active_p_rate | 0~100(%) | | Set the active power |
| pv_reactive_p_rate | 0~100(%) | "Over": capacitive<br><br>"Under": Inductive | Set the reactive power |
| pv_power_factor | -0.8~-1/0.8~1 | | Set the PF value |
| pf_sys_year | Format：2016-01-03 12:00:00 | | Set the inverter time |
| pv_grid_voltage_high | Such as：240.7(up to one decimal) | | Set the mains voltage limit |
| set_any_reg | See the table below for details | | Register Settings (Advanced Settings) |

Advanced Settings Description：

| Parameter | Register address | Value | Precautions |
|---|---|---|---|
| Mains voltage lower limit | 19 | 185-285 | The register settings for the |

| | | | |
|---|---|---|---|
| | | | engineering mode require a 10-fold value, such as 221.5V, for input 2215 |
| Mains voltage upper limit | 20 | 185-285 | The register settings for the engineering mode require a 10-fold value, such as 221.5V, for input 2215 |
| Mains frequency lower limit | 21 | 40-65 | The register setting for the engineering mode requires a value of 100, such as 50.15Hz, and 5015 for input |
| Mains frequency upper limit | 22 | 40-65 | The register setting for the engineering mode requires a value of 100, such as 50.15Hz, and 5015 for input |
| Inverter communication address | 30 | 1-250 | |
| Switch | 0 | | 0 shutdown, 257 boot |
| Set the active power | 3 | 0-100 | Percentage of rated power |

Returns: supports json

| Parameter | Description |
|---|---|
| error_code | 0: normal return, 10001: system error, 10002: inverter server error, 10003: inverter dropped, 10004: Collector serial number is empty, 10005: Collector dropped, 10006: set the parameter type does not exist, 10007: parameter value is empty, 10008: Parameter value is out of range. 10009: DateTime format is incorrect |
| error_msg | Error message |

### 4.3.8 Access to the latest real-time data inverter

Address：*http://domain/v1/ device/inverter/last_new_data*

Interface Support ：http

Request method：GET

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| device_sn | Yes | Inverter SN |

Returns: supports json

| Parameter | Description |
|---|---|
| device_sn | Equipment SN |
| inverterId | Equipment SN |
| dataloggerSn | The collector of the inverter SN |
| status | Inverter status (0: Waiting, 1: Normal, 3: Fault) |
| ipv1 | Input current 1 channel (A) |
| ipv2 | Input current 2-way (A) |
| vpv1 | Input voltage 1 channel (V) |

| | |
|---|---|
| vpv2 | Input voltage 2-way (V) |
| ppv1 | Input power 1 channel (W) |
| ppv2 | Input power 2 way (W) |
| iacr | Output current 1 channel (A) |
| iacs | Output current 2 way (A) |
| iact | Output current 3-way (A) |
| vacr | Output voltage 1 channel (V) |
| vacs | Output voltage 2-way (V) |
| vact | Output voltage 3-way (V) |
| pacr | Output power 1 channel (W) |
| pacs | Output power 2 way (W) |
| pact | Output Power 3 Way (W) |
| ppv | Input PV power (W) |
| pac | Output power (W) |
| powerToday | Electricity of the day (kWh) |
| powerTotal | Cumulative power generation (kWh) |
| temperature | Temperature (℃) |
| fac | Frequency (Hz) |
| pf | Power Factor |
| time | Data time, time format, see time format |
| faultType | Error code |
| timeTotal | Operation hours |
| ipmTemperature | IPM temperature |
| epv1Today | Input 1-day power generation (kWh) |

| | |
|---|---|
| epv1Total | Input 1 Road Total Power Generation (kWh) |
| epv2Today | Input 2-day power generation (kWh) |
| epv2Total | Input 2-channel total power generation (kWh) |
| epvTotal | Input Total Power Generation (kWh) |
| eRacToday | Reactive power of the day (kWh) |
| eRacTotal | Total Reactive Power (kWh) |
| pBusVoltage | P BUS Voltage (V) |
| nBusVoltage | N BUS Voltage (V) |
| dwStringWarningValue1 | dwStringWarn Alarm |
| wStringStatusValue | wStringStatusValue Error code |
| wPIDFaultValue | wPIDFaultValue Error code |
| vPidPvape | PID PVAPE Volt |
| iPidPvape | PID PVAPE Curr |
| pidStatus | PID Status |
| vPidPvbpe | PID PVBPE Volt |
| iPidPvbpe | PID PVBPE Curr |
| strFault | PID strFault |
| vString1 | First voltage (V) |
| vString2 | Second voltage (V) |
| vString3 | Third voltage (V) |
| vString4 | Fourth voltage (V) |
| vString5 | Fifth voltage (V) |
| vString6 | Sixth voltage (V) |

| | |
|---|---|
| vString7 | Seventh road voltage (V) |
| vString8 | Eighth voltage (V) |
| currentString1 | First current (A) |
| currentString2 | Second current (A) |
| currentString3 | Third current (A) |
| currentString4 | Fourth current (A) |
| currentString5 | Fifth current (A) |
| currentString6 | Sixth current (A) |
| currentString7 | Seventh current (A) |
| currentString8 | Eighth current (A) |
| warnCode | Alarm code |
| error_code | 0: Normal return, 10001: System error |
| error_msg | Error message |

### 4.3.9 Batch access to the latest real-time data inverter

Address：*http://domain/v1/ device/inverter/invs_data*

Interface Support ：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|---|---|---|
| pageNum | Yes | The maximum number of pages |
| inverters | Yes | Inverter serial number (SN) array, up to 100 |

Returns: supports json

| Parameter | Description |
|---|---|
| inverters | Returns an array of inverter serial numbers for the current query in the inverter array |
| pageNum | current page |
| inverterId | Equipment SN |
| dataloggerSn | The collector of the inverter SN |
| status | Inverter state ( 0 : Waiting , 1 : Normal , 3 : Fault ) |
| ipv1 | Input current 1 channel (A) |
| ipv2 | Input current 2-way (A) |
| vpv1 | Input voltage 1 channel (V) |
| vpv2 | Input voltage 2-way (V) |
| ppv1 | Input power 1 channel (W) |
| ppv2 | Input power 2 way (W) |
| iacr | Output current 1 channel (A) |
| iacs | Output current 2 way (A) |
| iact | Output current 3-way (A) |
| vacr | Output voltage 1 channel (V) |
| vacs | Output voltage 2-way (V) |
| vact | Output voltage 3-way (V) |
| pacr | Output power 1 channel (W) |
| pacs | Output power 2 way (W) |
| pact | Output Power 3 Way (W) |
| ppv | Input PV power (W) |
| pac | Output power (W) |

| | |
|---|---|
| powerToday | Electricity of the day (kWh) |
| powerTotal | Cumulative power generation (kWh) |
| temperature | Temperature (℃) |
| fac | Frequency (Hz) |
| pf | Power factor |
| time | Data time, time format, see time format |
| faultType | Error code |
| timeTotal | Operation hours |
| ipmTemperature | IPM temperature |
| epv1Today | Input 1-day power generation (kWh) |
| epv1Total | Input 1 Road Total Power Generation (kWh) |
| epv2Today | Input 2-day power generation (kWh) |
| epv2Total | Input 2-channel total power generation (kWh) |
| epvTotal | Input Total Power Generation (kWh) |
| eRacToday | Reactive power of the day (kWh) |
| eRacTotal | Total Reactive Power (kWh) |
| pBusVoltage | P BUS Voltage (V) |
| nBusVoltage | N BUS Voltage (V) |
| dwStringWarningValue1 | dwStringWarn alarm |
| wStringStatusValue | wStringStatusValue error code |
| wPIDFaultValue | wPIDFaultValue error code |
| vPidPvape | PID PVAPE Volt |
| iPidPvape | PID PVAPE Curr |

| | |
|---|---|
| pidStatus | PID Status |
| vPidPvbpe | PID PVBPE Volt |
| iPidPvbpe | PID PVBPE Curr |
| strFault | PID strFault |
| vString1 | First voltage (V) |
| vString2 | Second voltage (V) |
| vString3 | Third voltage (V) |
| vString4 | Fourth voltage (V) |
| vString5 | Fifth voltage (V) |
| vString6 | Sixth voltage (V) |
| vString7 | Seventh voltage (V) |
| vString8 | Eighth voltage (V) |
| currentString1 | Frst current (A) |
| currentString2 | Second current (A) |
| currentString3 | Third current (A) |
| currentString4 | Fourth current (A) |
| currentString5 | Fifth current (A) |
| currentString6 | Sixth current (A) |
| currentString7 | Seventh current (A) |
| currentString8 | Eighth current (A) |
| warnCode | Alarm code |
| error_code | 0: Normal return, 10001: System error |
| error_msg | Error message |

## 4.3.10 Check the collector SN and check code is qualified

Address：*http://domain/v1/device/datalogger/validate*

Interface Support ：http

Request method：POST

Request parameters：

| Parameter | Required | Description |
|-----------|----------|-------------|
| datalogSn | Yes | Collector SN |
| valiCode | Yes | Verification Code |

Returns: supports json

| Parameter | Description |
|-----------|-------------|
| dataloggerSn | Collector SN |
| valiCode | Verification Code |
| plant_id | When the collector exists, the plant ID to which the collector belongs, if the collector does not exist, there is no return parameter |
| user_id | When the collector exists, the user ID to which the collector belongs, if the collector does not exist, there is no return parameter |
| datalogger_sn | When the collector exists, the collector SN, if the collector does not exist, there is no return parameter |
| error_code | Error code (0: Normal return, 10001: Collector serial number is empty or wrong length, 10002: Collector serial number and check code do not match,10003: Collector serial number is exist. |
| error_msg | Specific error messages |

## 4.3.11 Access to a storage energy of the alarm data

Address:*http://domain/v1 device/storage/ alarm_data*

Interface Support:http

Request method:POST

Request parameters:

| Parameter | Required | Description |
|---|---|---|
| storage_sn | Yes | Device unique SN |
| date | Yes | A date , date format : See time format |
| page | No | Page number , default 1 |
| perpage | No | Quantity per page , default 20 , maximum100 |

Returns: supports json

| Parameters | Description |
|---|---|
| count | The total number of alarms |
| storage_sn | Energy storage equipment SN |
| alarm_code | Alarm code |
| alarm_message | Alarm information |
| start_time | Alarm start time , date format : See time format |
| end_time | Alarm end time , date format : See time format |
| error_code | 0 : Normal return , 10001 : System error,10002 : Device serial number is incorrect ,10003 : Date format is incorrect ,10005 : Energy storage machine does not exist |
| error_msg | Error message |

### 4.3.12 Energy storage machine parameter setting

Address:*http://domain/v1/storageSet*

Interface Support:http

Request method:POST

Request parameters:

| Parameters | Required | Type of data | Description |
|---|---|---|---|
| storage_sn | Yes | String | Energy storage machine SN |
| type | Yes | String | Parameter type Id |
| param1 | Yes | String | Parameter value 1 |
| param2 | Yes | String | Parameter value 2, there is a need to pass value , an empty pass-through string ""  |
| param3 | Yes | String | Parameter value 3, there is a need to pass value , an empty pass-through string ""  |
| param4 | Yes | String | Parameter value 4, there is a need to pass value , an empty pass-through string ""  |

**Description：Basic settings**

| Parameter type Id | Parameter value 1 | Parameter value 2 | Parameter value 3 | Parameter value 4 | parameter name |
|---|---|---|---|---|---|
| storage_cmd_on_off | 0000：Shutdown and the next does not automatic grid<br><br>0101：Shutdown and the next automatic grid | | | | Energy storage machine set switch machine |
| storage_cmd_mode | 1：Free mode<br><br>0：Standard mode | | | | System mode |
| storage_cmd_forced_d | 0：Enable | | | | Forced discharge |

| ischarge_enable | 1：Prohibited | | | | enabled |
|---|---|---|---|---|---|
| storage_lithium_battery | 0-10 | | | | Lithium battery SOC lower limit setting |
| storage_fdt_open_voltage | Open circuit voltage：300V-500V | MPP voltage：Open circuit voltage 0.55-0.9 | | | SP Group-series voltage |
| storage_cmd_forced_discharge_time1 | 0-24 | 0-59 | 0-24 | 0-59 | Forced discharge period |
| storage_cmd_sys_year | Format：2016-01-03 12:00 | | | | Set the energy storage time |
| storage_ac_charge_enable_disenable | 0：Prohibited 1：Enable | | | | Charge enable |
| storage_ac_charge_hour_start | 0-24 | 0-59 | 0-24 | 0-59 | Charging time period |
| storage_ac_charge_soc_limit | 10-80（%） | | | | Rechargeable battery SOC setting（percentage） |

Returns: supports json

| Parameters | Description |
|---|---|
| error_code | 0 : Normal return , 10001 : System error , 10002 : Storage machine server error , 10003 : Storage machine dropped , 10004 : The energy storage machine serial number is empty , 10005 : Collector dropped , 10006 : The set parameter type does not exist , 10007 : The parameter value is null , 10008 : The parameter value is not in the range ,10009 :The date and time format is incorrect , 10012 : Energy storage machine does not exist , 10013 : The end time can not be less than the start time |
| error_msg | Error message |

### 4.3.13 Access to the latest energy storage machine real-time data

Address:*http://domain/v1/ device/storage/storage_last_data*

Interface Support:http

Request method:POST

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| storage_sn | Yes | Energy storage machine only SN |

Returns: supports json

| Parameters | Description |
|---|---|
| storage_sn | Energy storage equipment SN |
| dataloggerSn | Energy storage machine belongs to the collector SN |
| status | Energy storage machine state( 0 : Operating , 1 : Charge , 2 : Discharge , 3 : Fault , 4 : Flash ) |
| deviceType | Type of energy storage ( 0 : SP2000,1 : SP3000 ) |

| | |
|---|---|
| pCharge | Charging power ( W ) |
| pDischarge | Discharge power ( W ) |
| vpv | Enter the PV voltage ( V ) |
| ipv | Enter the PV current ( A ) |
| iCharge | PV-side charging current ( A ) |
| iDischarge | PV-side discharge current ( A ) |
| ppv | Panel input power ( W ) |
| vBuck | vBuk ( A ) |
| vac | Grid voltage ( V ) |
| iacToUser | User-side current ( A ) |
| pacToUser | User-side power ( V ) |
| iacToGrid | Grid side current ( A ) |
| pacToGrid | Grid side power ( W ) |
| vBat | Battery voltage ( V ) |
| capacity | Battery capacity ( 百分比 ) |
| ipmTemperature | IPM temperature ( ℃ ) |
| epvToday | Day panel charge ( kWh ) |
| epvTotal | Total panel charge ( kWh ) |
| temperature | Temperature ( ℃ ) |
| eChargeToday | Charge energy on that day ( kWh ) |
| eChargeTotal | Total charge energy ( kWh ) |
| time | Data time , date format : See time format |
| eDischargeToday | Discharge energy on that day ( kWh ) |
| eDischargeTotal | Total discharge energy ( kWh ) |

| | |
|---|---|
| eToUserToday | How much electricity is on that day (grid-user) ( kWh ) |
| eToUserTotal | Total (grid - user) how much electricity ( kWh ) |
| eToGridToday | The day (user - grid) how much electricity ( kWh ) |
| eToGridTotal | Total (user - grid) how much power ( kWh ) |
| faultCode | Error code |
| vpv2 | SP3000 Enter the PV voltage ( V ) |
| ppv2 | SP3000 Panel input power ( W ) |
| pCharge2 | SP3000 Charging power ( W ) |
| pDischarge2 | SP3000 Discharge power ( W ) |
| vBuck2 | vBuck2 ( A ) |
| epvToday2 | SP3000 Day panel charge ( kWh ) |
| epvTotal2 | SP3000 Panel cumulative power ( kWh ) |
| eChargeToday2 | SP3000 Charge today ( kWh ) |
| eChargeTotal2 | SP3000 Accumulated charge power ( kWh ) |
| eDischargeToday2 | SP3000 Discharge today ( kWh ) |
| eDischargeTotal2 | SP3000 Cumulative discharge ( kWh ) |
| normalPower | Current power ( W ) |
| errorCode | Error code |
| warnCode | Alarm code |
| error_code | 0 : Normal return , 10001 : System error , 10002 : Energy storage machine does not exist , 10003 : Device SN error |
| error_msg | Error message |

### 4.3.14 Obtain historical data of an energy storage machine

Address:*http://domain/v1/device/storage/storage_data*

Interface Support:http

Request method:POST

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| storage_sn | Yes | Energy storage equipment SN |
| start_date | Yes | The start date , date format : See time format |
| end_date | Yes | The end date , date format : See time format , the start / end time can be up to 7 days apart |
| timezone_id | No | The time zone code for the data display , the default is UTC , Available values see attached 2 |
| perpage | No | Quantity per page , default 20 , maximum 1000 |

Returns: supports json

| Parameters | Description |
|---|---|
| storage_sn | Energy storage equipment SN |
| next_page_start_id | Next page starts ID |
| datalogger_sn | Device corresponding to the collector SN |
| status | Energy storage machine state( 0 : Operating , 1 : Charge , 2 : Discharge , 3 : Fault , 4 : Flash ) |
| deviceType | Type of energy storage ( 0 : SP2000,1 : SP3000 ) |
| pCharge | Charging power ( W ) |
| pDischarge | Discharge power ( W ) |

| vpv | Enter the PV voltage ( V ) |
|---|---|
| ipv | Enter the PV current ( A ) |
| iCharge | PV-side charging current ( A ) |
| iDischarge | PV-side discharge current ( A ) |
| ppv | Panel input power ( W ) |
| vBuck | vBuk ( A ) |
| vac | Grid voltage ( V ) |
| iacToUser | User-side current ( A ) |
| pacToUser | User-side power ( V ) |
| iacToGrid | Grid side current ( A ) |
| pacToGrid | Grid side power ( W ) |
| vBat | Battery voltage ( V ) |
| capacity | Battery capacity ( 百分比 ) |
| ipmTemperature | IPM temperature ( ℃ ) |
| epvToday | Day panel charge ( kWh ) |
| epvTotal | Total panel charge ( kWh ) |
| temperature | Temperature ( ℃ ) |
| eChargeToday | Charge energy on that day ( kWh ) |
| eChargeTotal | Total charge energy ( kWh ) |
| time | Data time , date format : [See time format](#) |
| eDischargeToday | Discharge energy on that day ( kWh ) |
| eDischargeTotal | Total discharge energy ( kWh ) |
| eToUserToday | How much electricity is on that day (grid-user) ( kWh ) |
| eToUserTotal | Total (grid - user) how much electricity ( kWh ) |

| | |
|---|---|
| eToGridToday | The day (user - grid) how much electricity ( kWh ) |
| eToGridTotal | Total (user - grid) how much power ( kWh ) |
| faultCode | Error code |
| vpv2 | SP3000 Enter the PV voltage ( V ) |
| ppv2 | SP3000 Panel input power ( W ) |
| pCharge2 | SP3000 Charging power ( W ) |
| pDischarge2 | SP3000 Discharge power ( W ) |
| vBuck2 | vBuck2 ( A ) |
| epvToday2 | SP3000 Day panel charge ( kWh ) |
| epvTotal2 | SP3000 Panel cumulative power ( kWh ) |
| eChargeToday2 | SP3000 Charge today ( kWh ) |
| eChargeTotal2 | SP3000 Accumulated charge power ( kWh ) |
| eDischargeToday2 | SP3000 Discharge today ( kWh ) |
| eDischargeTotal2 | SP3000 Cumulative discharge ( kWh ) |
| normalPower | Current power ( W ) |
| errorCode | Error code |
| warnCode | Alarm code |
| error_code | 0 : Normal return , 10001 : System error,10002 : Device serial number is incorrect , 10003 :Date format is incorrect ,10004 : The date interval is more than 7 days ,10005 :Energy storage machine does not exist |
| error_msg | Error message |

### 4.3.15  Get the inverter basic information

Address:*http://domain/v1/device/inverter/inv_data_info*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|------------|----------|-------------|
| device_sn | Yes | Inverter SN |

Returns: supports json

| Parameters | Description |
|------------|-------------|
| device_sn | Device SN |
| serialNum | Device SN |
| dataloggerSn | The collector of the inverter SN |
| lost | Whether the device is online or not (0:Online， 1: Disconnect) |
| status | Device status，status(0:Disconnect, 1:Online, 2:Standby, 3:Malfunction, others are dropped) |
| alias | Alias |
| location | Address |
| dataLogSn | The serial number of the collector |
| nominalPower | Rated power |
| power | Current power |
| eToday | Electricity production today |
| eTotal | Total power generation |
| lastUpdateTime | Last updated |
| tcpServerIp | Server address |
| fwVersion | Inverter version |
| error_code | 0 : Normal return，10001 : System error |

| | |
|---|---|
| error_msg | Error message |

### 4.3.16 Get the electric-meter list based on the datalog SN

Address:*http://domain/v1/device/ammeter/meter_list*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |
| page | No | Number of pages |
| perpage | No | Number of pages per page |

Returns: supports json

| Parameters | Description |
|---|---|
| device_name | Device name |
| device_type | Device type（64：electric-meter ） |
| datalog_sn | Electric-meter belongs to the datalog SN |
| lost | Device is online or not(0:online，1:dropped) |
| address | Device address |
| lastUpdateTime | Last updated |
| datalogger_sn | Serial number of the datalog |
| error_code | 0：Normal return，10001：System error，10002：Datalog SN error，10003：Datalog does not exist |
| error_msg | Error message |

### 4.3.17 Get the environ monitor list based on the datalog SN

Address:*http://domain/v1/device/env/env_list*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |
| page | No | Number of pages |
| perpage | No | Number of pages per page |

Returns: supports json

| Parameters | Description |
|---|---|
| device_name | Device name |
| device_type | Device type（48：environ monitor） |
| datalog_sn | Environ monitor belongs to the datalog SN |
| lost | Device is online or not(0:online，1:dropped) |
| address | Device address |
| lastUpdateTime | Last updated |
| datalogger_sn | Serial number of the datalog |
| error_code | 0：Normal return，10001：System error，10002：Datalog SN error，10003：Datalog does not exist |
| error_msg | Error message |

### 4.3.18 According to the datalog SN and electric-meter address to obtain electric-meter data

Address:*http://domain/v1/device/ammeter/meter_data*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |
| address | Yes | Device address |
| start_date | Yes | Start date |
| end_date | Yes | End date（Date interval can not exceed 7 days） |
| page | No | Number of pages |
| perpage | No | Number of pages per page |

Returns: supports json

| Parameters | Description |
|---|---|
| dataLogSn | Electric-meter belongs to the datalog SN |
| datalogger_sn | Datalog SN |
| addr | Electric-meter device address |
| timeText | Last updated |
| reactivePower | Reactive power |
| reactiveEnergy | Reactive electricity |
| gridEnergy | Grid side power |
| totalEnergy | Total electricity consumption |
| feiLvGuZEnergy | Rate Valley positive active power |
| activeEnergy | Active electricity |

| | |
|---|---|
| activePower | Active power |
| feiLvBoZEnergy | The rate is positive for active power |
| powerFactor | Power factor |
| userEnergy | User side power |
| apparentPower | Inspecting power |
| feiLvFengZEnergy | Rate Peak Positive active power |
| feiLvPingZEnergy | The rate is positive for positive power |
| error_code | 0：Normal return，10001：System error，10002：Datalog SN error，10003：Start date error，10004：Starting date is more than 7 days，10005：Device address is null，10006：Datalog does not exist |
| error_msg | Error message |

### 4.3.19 According to the datalog SN and environ monitor address to obtain environ monitor data

Address:*http://domain/v1/device/env/env_data*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |
| address | Yes | Environ monitor device address |
| start_date | Yes | Start date |
| end_date | Yes | End date（Date interval can not exceed 7 days） |
| page | No | Number of pages |

| Parameters | | Description |
|---|---|---|
| perpage | No | Number of pages per page |

Returns: supports json

| Parameters | Description |
|---|---|
| dataLogSn | Environ monitor belongs to the datalog SN |
| datalogger_sn | Datalog SN |
| addr | Device address |
| timeText | Last updated |
| radiant | Irradiation intensity |
| windAngle | Wind direction |
| envTemp | Ambient temperature |
| windSpeed | Wind speed |
| panelTemp | Panel temperature |
| error_code | 0：Normal return，10001：System error，10002：Datalog SN error，10003：Start date error，10004：Starting date is more than 7 days，10005：Device address is null，10006：Datalog does not exist |
| error_msg | Error message |

## 4.3.20 Obtain **electric-meter** real-time data according to datalog SN and **electric-meter** address

Address:*http://domain/v1/device/ammeter/meter_last_data*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |

| | | |
|---|---|---|
| address | Yes | Device address |

Returns: supports json

| Parameters | Description |
|---|---|
| dataLogSn | Electric-meter belongs to the datalog SN |
| datalogger_sn | Datalog SN |
| addr | Electric-meter equipment address |
| timeText | Last Updated |
| reactivePower | Reactive power |
| reactiveEnergy | Reactive power |
| gridEnergy | Grid side power |
| totalEnergy | Total electricity consumption |
| feiLvGuZEnergy | Rate Valley positive active power |
| activeEnergy | Active electricity |
| activePower | Active power |
| feiLvBoZEnergy | The rate is positive for active power |
| powerFactor | Power factor |
| userEnergy | User side power |
| apparentPower | Inspecting power |
| feiLvFengZEnergy | Rate Peak Positive active power |
| feiLvPingZEnergy | The rate is positive for positive power |
| error_code | 0 :Normal return ,10001 :System error ,10002 :Datelog SN error , 10003 : Device address is null , 10004 : Datalog does not exist |

| | |
|---|---|
| error_msg | Error message |

## 4.3.21 Obtain the real time data of the **environ monitor** according to the datalog SN and the **environ monitor** address

Address:*http://domain/v1/device/env/env_last_data*

Interface Support:http

Request method:GET

Request parameters:

| Parameters | Required | Description |
|---|---|---|
| datalog_sn | Yes | Datalog SN |
| address | Yes | Environ monitor address |

Returns: supports json

| Parameters | Description |
|---|---|
| dataLogSn | Environ monitor belongs to the datalog SN |
| datalogger_sn | Datalog SN |
| addr | Device address |
| timeText | Last update |
| radiant | Irradiation intensity |
| windAngle | Wind direction |
| envTemp | Ambient temperature |
| windSpeed | Wind speed |
| panelTemp | Panel temperature |
| error_code | 0：Normal return，10001：System error，10002：Datelog SN error，10003：Device address is null，10004：Datalog does not exist |

| error_msg | Error message |
|-----------|---------------|

## 5 Error code

| 0 | Normal (Universal) |
|-----|---------------------------------|
| 10011 | Permission denied (Universal) |

## 6 Appendix 1: Available values

- locale : language

    en-US : English

    zh-Hans : Simplified Chinese

- search_type : Search type

    name:Name of Plant

- time_unit : Time type

    day: By day

    month:By month

    year:By year

- type : type of facility

    1: inverter

- user_type : user type

    1: the end user