iMaster NetEco
V600R023C00

Northbound Interface Reference-V6(SmartPVMS)

Issue	01
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About This Document

Purpose

This document provides auxiliary description for the northbound interface (NBI) function of the Smart PV Management System (SmartPVMS). This document describes the design and usage of the NBIs, and how authorized third-party users (applications) use the interfaces to obtain data within the authorization scope. In addition, it describes the function, URL, parameter format, and usage of each interface for third-party users to obtain related data.

Intended Audience

This document is intended for:

- Development engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

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Symbol	Description
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue	Release Date	Description
01	2023-01-19	This issue is the first official release.

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1 Overview

1.1 Interface Description

RESTful NBIs

RESTful NBIs are open interfaces based on the Representational State Transfer (REST) standard, facilitating quick integration of third-party systems.

Third-party systems can use RESTful NBIs to access the resources authorized by the SmartPVMS, such as access authentication, configuration, alarm, and performance data.

Interfaces can be used only after authorization and the access is secure. Only HTTPS access is supported.

The JavaScript Object Notation (JSON) data format is used for data interaction. The data format is simple, easy to read and write, and occupies less network traffic than XML.

Application Scenario

The NBI is an open authentication mode. It uses asymmetric encryption technology to authenticate users, obtain resources, and share data between different platforms, enterprises, and entities.

Currently, the NBI is open only to the company administrator. A maximum of five northbound accounts can be created. Owners cannot apply for northbound accounts.

NOTE

An installer account registered through **Installer Registration** on the login page is called the company administrator account.

Interface Traffic Limiting

The system provides the interface traffic limiting mechanism to prevent system performance deterioration caused by improper interface invoking.

For example, the number of traffic limiting times for each northbound user is five times every 10 minutes. That is, each northbound user can invoke the login interface for a maximum of five times every 10 minutes. If the maximum number is exceeded, the interface cannot be invoked and error code 407 is returned.

NOTICE

The traffic limiting mechanism may be modified without notice as the system evolves in the future. Users can obtain the latest interface documentation to view the mechanism.

What Is REST?

REST, short for Representational State Transfer, is a design and development mode for network applications. It simplifies development and improves system scalability.

REST uses resources as its core, and resources are uniquely identified by a uniform resource identifier (URI), for example, /rest/openapi/pvms/v1/plants.

REST uses four types of standard operations to access resources: POST, GET, PUT, and DELETE.

- POST: creates resources.
- GET: queries resources.
- PUT: updates resources.
- DELETE: deletes resources.

The SmartPVMS provides external services using URIs. Users obtain SmartPVMS resources through URIs and obtain services.

HTTP Status Codes

The first line of all HTTP responses is the status line, which contains the current HTTP version number, the status code consisting of three digits, and the phrase that describes the status, which are separated by spaces.

The first digit of the status code indicates the type of the current response.

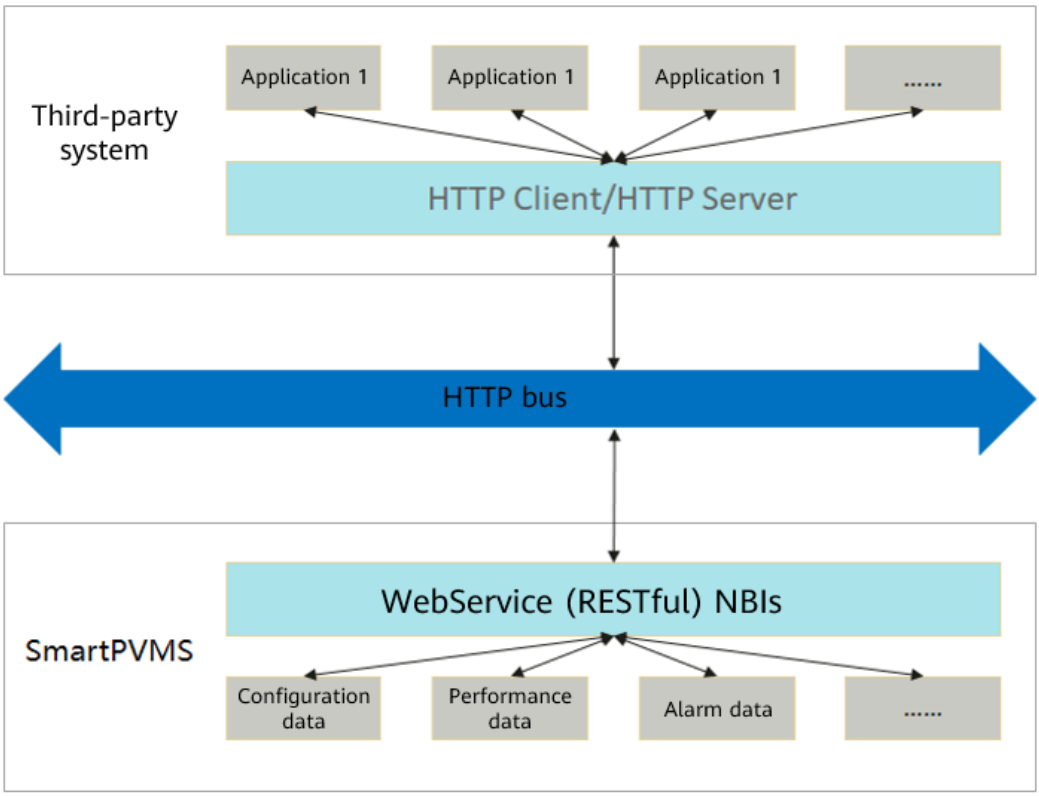
- 1xx message: The request has been received by the server and continues to be processed.
- 2xx success: The request has been received, understood, and accepted by the server.
- 3xx redirection: This request can be completed only after subsequent operations are performed.
- 4xx request error: The request contains a syntax error or cannot be executed.
- 5xx server error: An error occurs when the server processes a correct request.

1.2 Interface Architecture

Interface Architecture

The SmartPVMS provides a set of WebService interfaces for third-party systems and third-party developers, who can construct HTTPS requests to invoke APIs and obtain SmartPVMS resources and data.

Figure 1-1 WebService NBI architecture



1.3 Interconnection Method

Access Format and Path

Access format: https://Domain name of the management system/*Specific API name+Access request parameter*

Access Permission

The northbound API access permission must be applied for separately and assigned by the administrator. Perform the following steps:

Step 1 Choose **System** > **Business Configuration** > **Northbound Management** from the main menu.

Step 2 On the **Northbound Management** page, click **Add**.

Step 3 On the displayed **Add** tab page, set basic information such as the system name, deadline, user name, and password.

Step 4 Select the **Plant list** interface from the interface list, select the plant associated with the user, and bind the plant instance that the northbound API user has access to.

Step 5 (Optional) Select the **Device list** interface from the interface list, select the device associated with the user, and bind the device instance that the northbound API user has access to.

Step 6 (Optional) Select other interfaces from the interface list and select the required information as prompted.

Step 7 Click **OK** to save the settings.

----End

Traffic Limiting Policy

The number of northbound API users and the number of plants and devices managed by each northbound API user are increasing. To better meet user requirements, the northbound API traffic limiting policy is adjusted. The new traffic limiting policy dynamically limits the traffic based on the number of resources owned by northbound API users. A user who manages a larger number of plants and devices is allowed to initiate more northbound API calls in a unit time.

Existing users: For northbound API users created on June 30, 2022 or earlier, the original traffic limiting policy applies, and the allowed frequency of API calls cannot be increased.

New users: For northbound API users created after June 30, 2022, the new traffic limiting policy applies. If a user exceeds the allowed frequency of API calls defined in the new traffic limiting policy, rate limiting is performed, the API calls may fail, and the consequences shall be borne by the user.

To avoid improper API calls, a rate limiting threshold is configured. If the threshold is exceeded, an error message is returned, and the API call is blocked.

In this case, adjust your API call frequency based on the error code. Huawei shall not bear any responsibilities or consequences.

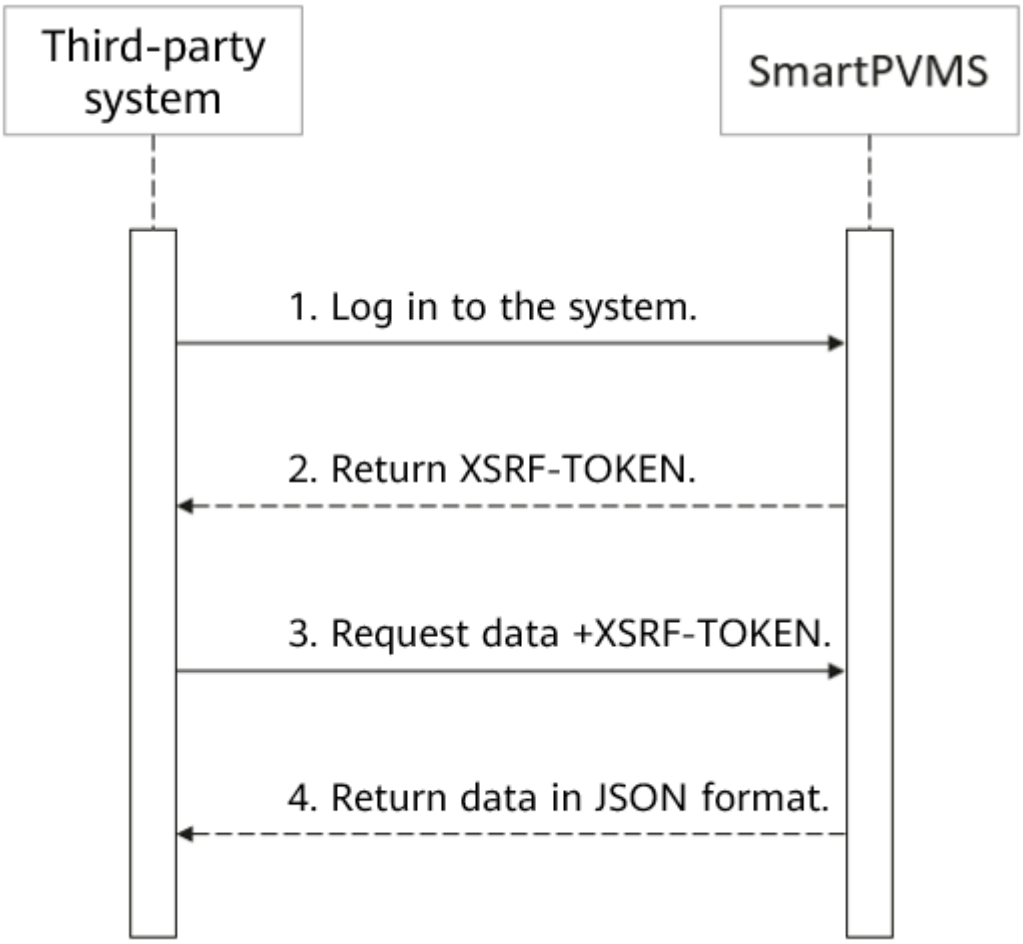
The system has two traffic limiting-related error messages:

Error code 407: The number of API calls of a single user exceeds the upper limit. For details about the limits on API calls, see "Access Restrictions" in the corresponding interface description. When this message is returned by an API, lower your frequency of calls to this API until the frequency drops to the allowed range.

Error code 403 or 429: When a large number of users initiate calls to the same API, the total number of calls to the API exceeds the upper limit at the system level. If this error message is received, wait for 1 minute and try again. If the error persists, wait for a longer time and try again. You can also minimize the number of calls.

Communication Between a Third-party System and the SmartPVMS

Figure 1-2 Communication between a third-party system and the SmartPVMS



NOTE

1. After the third-party system information is configured on the management system, use the username and password to log in to the management system from the third-party system.
2. After successful login, send requests to obtain data.
3. XSRF-TOKEN is a cross-site request token. After a user logs in to the system using the username and password, the system returns this token to the user. If the user adds the token to a subsequent request, it indicates that the request is initiated by a logged-in user.

1.4 Interface Change Description

- All new and modified APIs are described in the change description.
- APIs that are reaching the end of lifecycle will be declared in this document so that you can be prepared.

- New northbound users cannot invoke the APIs whose end-of-lifecycle is declared in this document. Otherwise, an error will be returned during the system upgrade.

2 Changes from iMaster NetEco V600R023C00SPC110 to iMaster NetEco V600R023C00SPC210

2.1 New Interfaces

Interface Name	Interface Method and Path	Description
Interface for Creating a Plant	https://*Domain name of the management system*/thirdData/createStation	Creates a plant.
Plant list	https://*Domain name of the management system*/thirdData/stations	Queries the plant list based on the grid connection time.

2.2 Deleted Interfaces

None

2.3 Modified Interfaces

Interface Name	Interface Method and Path	Description
Interface for 5-minute Device Data	https://https://Domain name of the management system/thirdData/getDevFiveMinutes	Modified the interface access restriction (traffic limiting policy).

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Interface Name	Interface Method and Path	Description
Device alarm	https://https://Domain name of the management system/thirdData/getAlarmList	Added the function of querying device alarms based on the device serial number (SN) list.
Plant list	https://Domain name of the management system/thirdData/getStationList	The interface is about to go offline, and the new interface location is moved here.
Plant DRM Setting Interface	https://Domain name of the management system/rest/openapi/pvms/v1/vpp/drm	The **remoteId** parameter is added to the returned packet. This interface only delivers the DRM setting task. The task execution status needs to be obtained through the plant DRM setting query interface.

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3 Changes from iMaster NetEco V600R023C00SPC001 to iMaster NetEco V600R023C00SPC110

3.1 New Interfaces

None

3.2 Deleted Interfaces

None

3.3 Modified Interfaces

Interface Name	Interface Method and Path	Description
Plant List Interface	https://*Domain name of the management system*/thirdData/getStationList	Added the pagination query capability.

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4 Changes from iMaster NetEco V600R022C00CP1202 to iMaster NetEco V600R023C00SPC001

4.1 New Interfaces

None

4.2 Deleted Interfaces

None

4.3 Modified Interfaces

None

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5 Changes from iMaster NetEco V600R022C00 to iMaster NetEco V600R022C00CP1202

5.1 New Interfaces

Interface Name	Interface Method and Path	Description
Historical Device Data Interface	https://Domain name of the management system/thirdData/getDevHistoryKpi	Obtains 5-minute statistical data of a device in a specified period.
Device Convergence Data Interface	https://Domain name of the management system/thirdData/cs/getInventerRealKpi	Obtains inverter running and alarm data.

5.2 Deleted Interfaces

None

5.3 Modified Interfaces

None

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6 Changes from SmartPVMS V600R021C10SPC010 to iMaster NetEco V600R022C00

6.1 New Interfaces

None.

6.2 Deleted Interfaces

None.

6.3 Modified Interfaces

None.

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7 Changes from SmartPVMS V600R021C10 to SmartPVMS V600R021C10SPC010

7.1 New Interfaces

None.

7.2 Deleted Interfaces

None.

7.3 Modified Interfaces

The device data query interface of the V6 version supports the LUNA 2000 residential energy storage system (ESS) and industrial and commercial string ESSs. The following table lists the involved interfaces.

Interface Name	Interface Method and Path	Description
Real-Time Device Data Interface	https://*Domain name of the management system*/thirdData/getDevRealKpi	Deleted the description that only the data of LG batteries is supported because the value **39** of the device type supports LUNA 2000. Added the value **41** of the device type to support the industrial and commercial string ESSs.

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Interface Name	Interface Method and Path	Description
5-minute Device Data Interface	https://*Domain name of the management system*/thirdData/getDevFiveMinutes	Deleted the description that only the data of LG batteries is supported because the value **39** of the device type supports LUNA 2000. Added the value **41** of the device type to support the industrial and commercial string ESSs.
Daily Device Data Interface	https://*Domain name of the management system*/thirdData/getDevKpiDay	Deleted the description that only the data of LG batteries is supported because the value **39** of the device type supports LUNA 2000. Added the value **41** of the device type to support the industrial and commercial string ESSs.
Monthly Device Data Interface	https://*Domain name of the management system*/thirdData/getDevKpiMonth	Deleted the description that only the data of LG batteries is supported because the value **39** of the device type supports LUNA 2000. Added the value **41** of the device type to support the industrial and commercial string ESSs.
Yearly Device Data Interface	https://*Domain name of the management system*/thirdData/getDevKpiYear	Deleted the description that only the data of LG batteries is supported because the value **39** of the device type supports LUNA 2000. Added the value **41** of the device type to support the industrial and commercial string ESSs.

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8 Changes from SmartPVMS V500R007C00SPC200 to SmartPVMS V600R021C10

8.1 New Interfaces

None

8.2 Deleted Interfaces

None.

8.3 Modified Interfaces

None.

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9 V6 Interface Reference

The following interfaces are inherited from SmartPVMS V300R006C00/V300R006C10/V500R007C00.

9.1 Northbound Interface Format Definition

9.1.1 Login Interface

Interface Description

- Before obtaining data, the login interface must be invoked to obtain the XSRF-TOKEN. The validity period of XSRF-TOKEN is 30 minutes.
- If the XSRF-TOKEN does not expire, it can be reused. If the XSRF-TOKEN has expired, the login interface needs to be invoked again to obtain a new XSRF-TOKEN.
- After this interface is invoked to log in to the system, XSRF-TOKEN is returned in the response header.

Request URL

https://Domain name of the management system/thirdData/login

Request Mode

HTTP method: POST

Access Restrictions

If a user enters incorrect passwords for five consecutive times within 10 minutes, the user will be locked out for 30 minutes.

Number of traffic limiting times for each northbound user: five times every 10 minutes.

If the access frequency exceeds the limit, the interface returns error code 407.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
userName	Username	String	Mandatory
systemCode	Password	String	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data		Returned data	Object	-

Example

Request example:

```
{
    "userName":"*******",
    "systemCode":"*******"
}
```

Response example:

Example 1: successful login

```
{
    "success":true,
    "data":null,
    "failCode":0,
    "params":null,
    "message":null
}
```

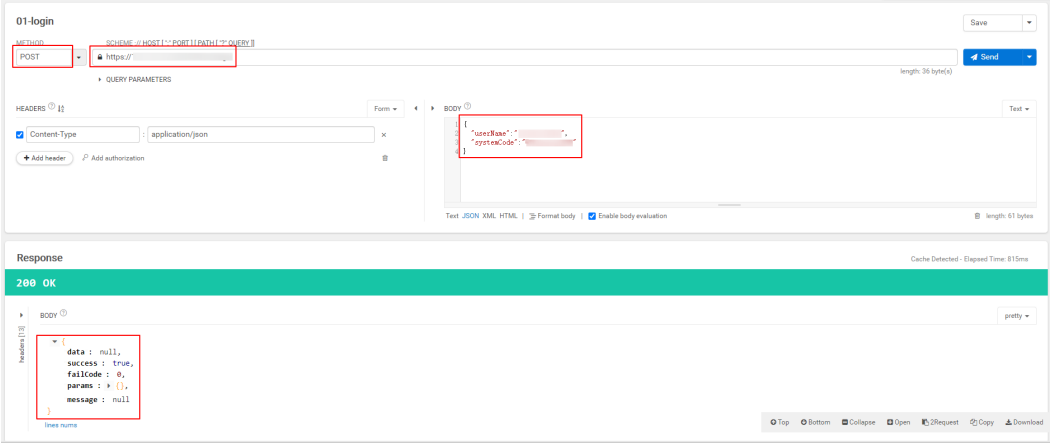
Example 2: failed login

```
{
    "data":null,
    "failCode":20001,
    "message":"",
    "params":{
        "currentTime":1593777870514
    },
    "success":false
}
```

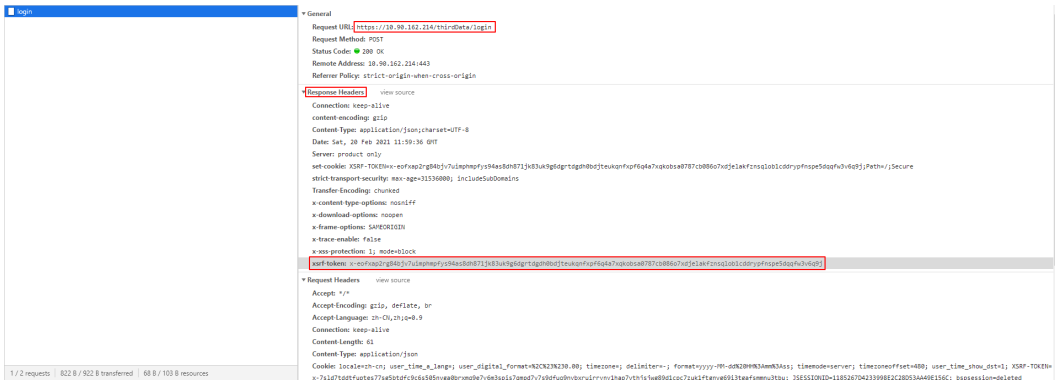
NOTICE

The header of the login success response contains the XSRF-TOKEN that must be retained. In subsequent data interface requests, this parameter and its value must be added to the request header and sent to the management system.

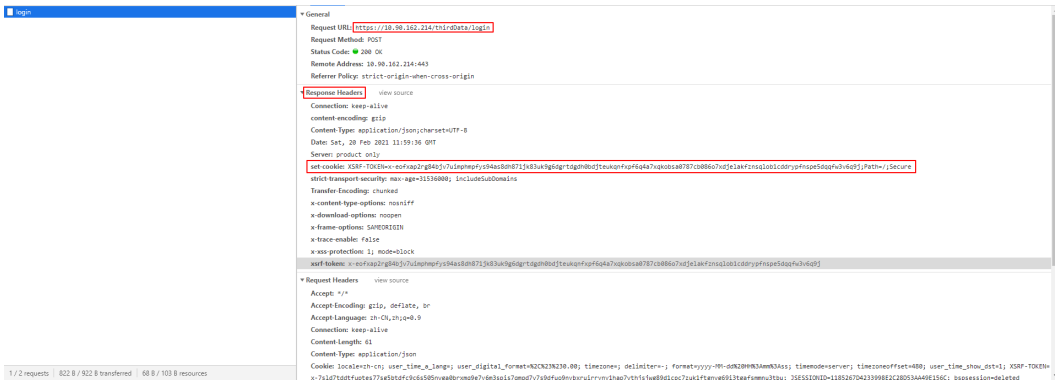
Login example:



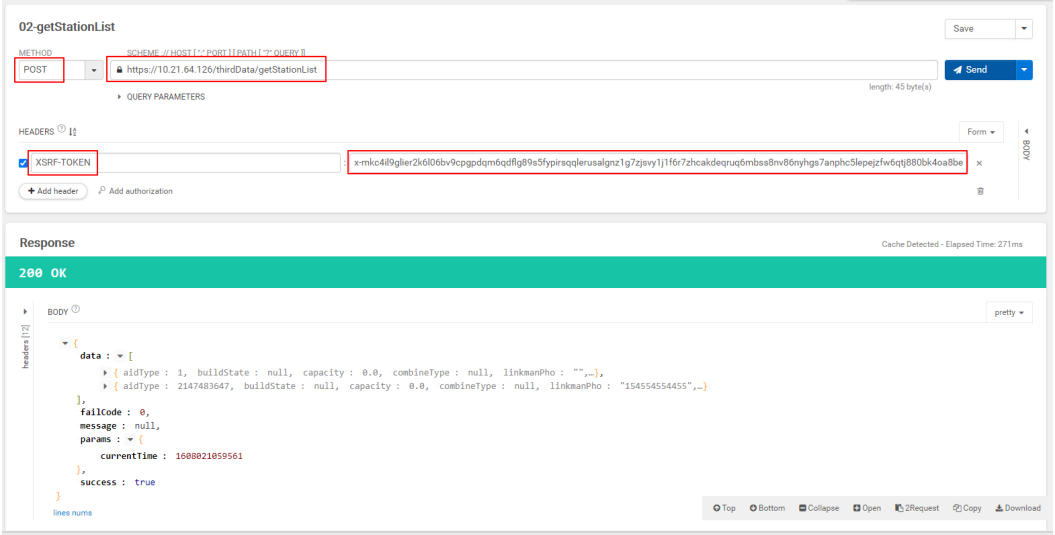
The following are examples of the XSRF-TOKEN returned after a successful login. You can obtain the XSRF-TOKEN using either of the following methods. The first one is recommended.

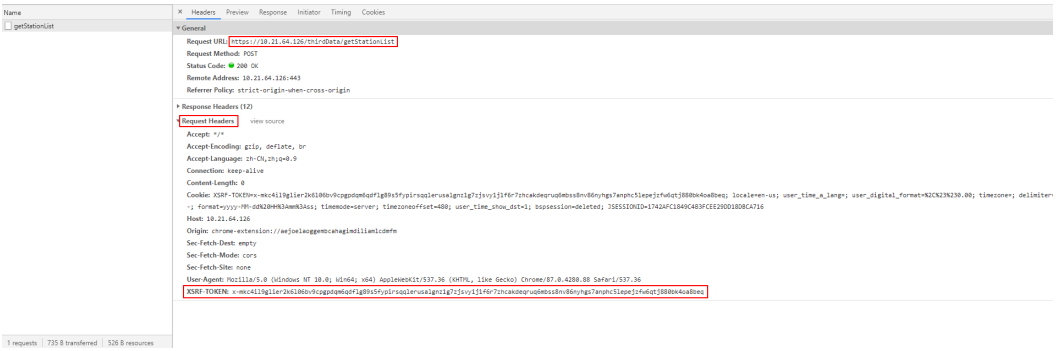


The following is an example compatible with earlier versions.



The following figure shows an example of the XSRF-TOKEN carried in the request header of the data interface.





9.1.2 Logout Interface

Interface Description

If you want the XSRF-TOKEN to expire immediately, you can invoke this interface.

Request URL

https://Domain name of the management system/thirdData/logout

Request Mode

HTTP method: POST

Access Restrictions

Number of traffic limiting times for each northbound user: five times every 10 minutes.

You are advised to invoke this interface only when necessary.

If the access frequency exceeds the limit, the interface returns error code 407.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
xsrfToken	XSRF-TOKEN returned in the response header after a successful login through the login interface.	String	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data		Returned data	Object	-

Example

Request example:

```
{
    "xsrfToken":"x-apepjy1fpd2ptete1f7zuqimep7wuqen9hkb3xaourelbyrx9jio7s09hgk6ca2mdlksjdglasdhjaklsdfhhdsahwedyuioqwehjkd"
}
```

Response example:

Example 1: successful logout

```
{
    "success":true,
    "data":null,
    "failCode":0,
    "params":{
```

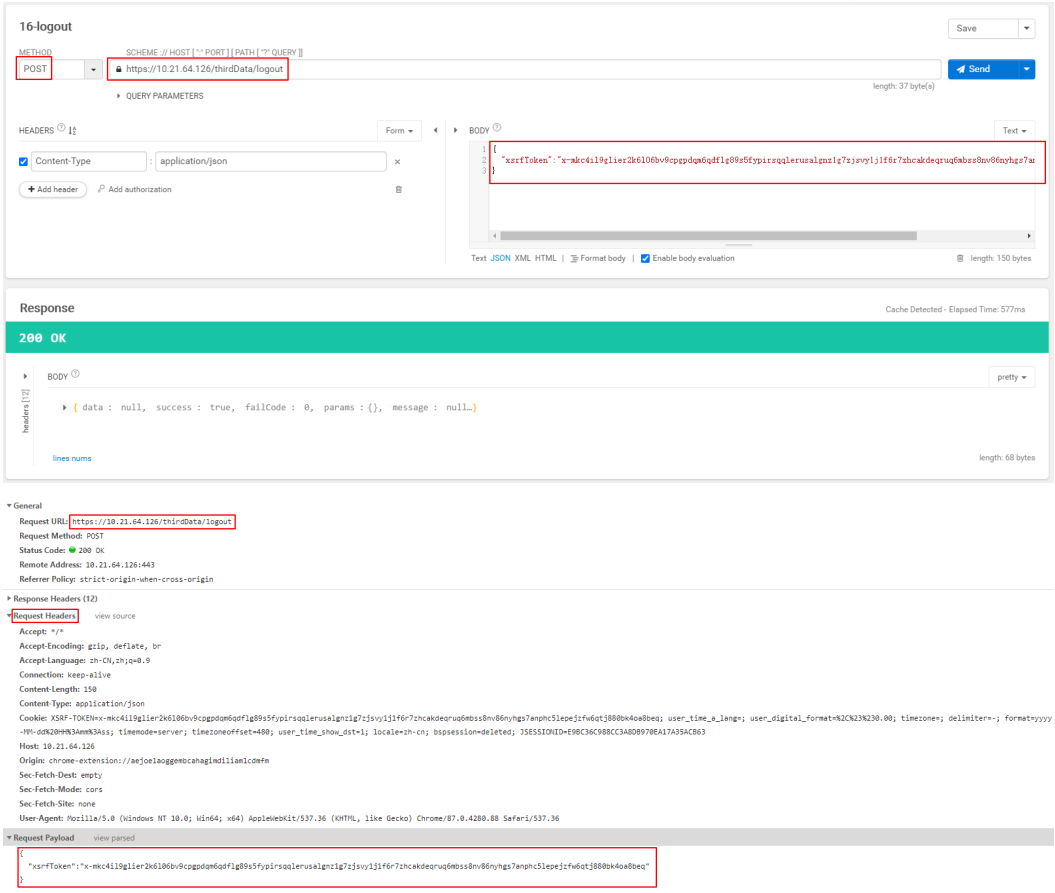
```
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: failed logout

```
{
    "data":null,
    "success":false,
    "failCode":20001,
    "params":{
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Logout example:



9.1.3 Plant List Interface

NOTICE

iMaster NetEco V600R023C00SPC210 and later versions support this interface. For versions earlier than iMaster NetEco V600R023C00SPC210, use the **Plant List Interface** in **Historical Interfaces**. For details about how to check the current software version, see **How to Check the Software Version**. The latest release time indicates the newest version.

Interface Description

This interface is used to query the plant list. When the pagination parameters (a maximum of 100 records can be displayed on each page) and grid connection time are transferred (if only the grid connection start time is transferred, the grid connection end time is the current time by default; if only the grid connection end time is transferred, the default grid connection start time is 1970-01-01 08:00:00), the plant list is queried in pages based on the grid connection time. When only the pagination parameter is transferred, the plant list is queried in pages.

Request URL

https://*Domain name of the management system*/thirdData/stations

Request Mode

HTTP method: POST

Access Restrictions

Maximum number of northbound API calls per user per day = Roundup (Number of plants/100) x 10 + 24

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) x 10 + 24 = 1 x 10 + 24 = 34.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) x 10 + 24 = 2 x 10 + 24 = 44.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
pageNo	Page No. of the results	Integer	Mandatory
gridConnectedStartTime	Grid connection start time (ms)	Long	Optional
gridConnectedEndTime	Grid connection end time (ms)	Long	Optional

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
message	Optional response message	-	-
data	Returned data, which contains the following information:	Map	-
> total	Total number of results	Long	-
> pageCount	Total number of pages	Long	-
> pageNo	Page No. of the results	Integer	-
> pageSize	Number of query results displayed on each page	Integer	-
> list	Plant information list. The plant information is as follows:	List	Plant information
>> plantCode	Plant ID, which uniquely identifies a plant.	String	-
>> plantName	Plant name	String	-
>> plantAddress	Detailed address of the plant	String	-
>> longitude	Plant longitude	Double	-
>> latitude	Plant latitude	Double	-
>> capacity	Total string capacity	Double	kWp
>> contactPerson	Plant contact	String	-

Parameter	Description	Data Type	Remarks
>> contactMethod	Contact information of the plant contact, such as the mobile phone number or email address	String	-
>> gridConnectionDate	Grid connection time of the plant, including the time zone	String	2020-02-06T00:00:00+08:00

Examples

Request example:

```
{
  "pageNo": 1,
  "gridConnectedStartTime":1664718569000,
  "gridConnectedEndTime":1667396969000
}
```

Response examples:

Example 1: An error code is returned.

```
{
  "success": false,
  "data": null,
  "failCode": 20605,
  "message": "The time cannot be a negative number."
}
```

Example 2: The plant list data is returned.

```
{
  "success": true,
  "data": {
    "list": [
      {
        "plantCode": "NE=12345678",
        "plantName": "NMplant1",
        "plantAddress": null,
        "longitude": null,
        "latitude": null,
        "capacity": 146.5,
        "contactPerson": "",
        "contactMethod": "",
        "gridConnectionDate": "2022-11-21T16:23:00+08:00"
      },
      {
        "plantCode": "NE=23456789",
        "plantName": "plant2",
        "plantAddress": null,
        "longitude": null,
        "latitude": null,
        "capacity": 123.3,
        "contactPerson": "",
        "contactMethod": "",
        "gridConnectionDate": "2022-11-21T16:30:28-12:00"
      }
    ],
    "pageCount": 1,
```

```
    "pageNo": 1,
    "pageSize": 100,
    "total": 2
  },
  "failCode": 0,
  "message": "get plant list success"
  }
```

9.1.4 Plant Data Interfaces

Before invoking the following plant data interfaces, you need to invoke the plant list interface to obtain the plant ID.

9.1.4.1 Real-Time Plant Data Interface

Interface Description

This interface is used to obtain real-time plant data by plant ID set. Data of a maximum of 100 plants can be queried at a time.

For details about the data list that can be queried using this interface, see **9.2.1 Interface for Real-time Plant Data**.

Request URL

https://*Domain name of the management system*/thirdData/getStationRealKpi

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user every 5 minutes = Roundup (Number of plants/100)

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a northbound API user manages 20 plants: Maximum number of northbound API calls per user every five minutes = Roundup (20/100) = 1

If a northbound API user manages 120 plants: Maximum number of northbound API calls per user every five minutes = Roundup (120/100) = 2

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the real-time data object list of each plant.	List	-
	stationCode	Plant ID	String	-
	dataItemMap	Content of each data item, which is returned in the key-value format. For details about the data item list, see **9.2.1 Interface for Real-time Plant Data**.	Map	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5"
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "currentTime":1503046597854
    },
    "message":null
}
```

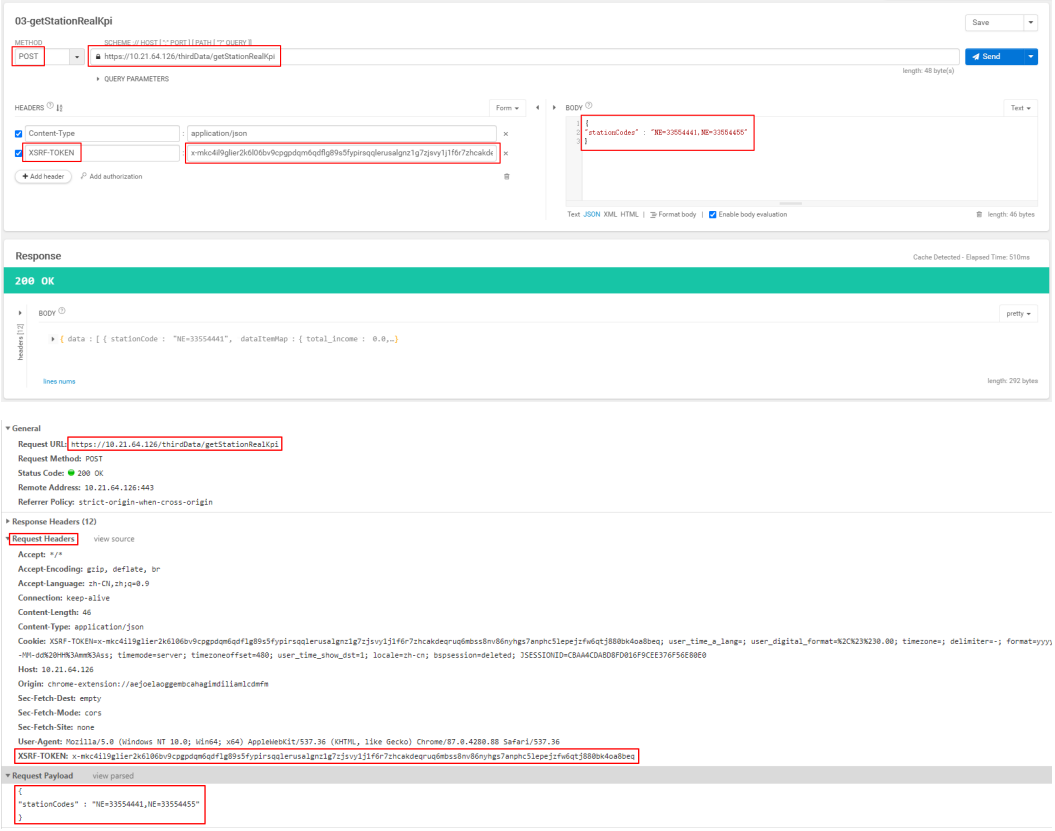
Example 2: Real-time plant data is returned.

```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "real_health_state":"3",
                "day_power":"10000",
                "total_power":"900.000",
                "day_income":"0.000",
                "month_power":"900.000",
                "total_income":"2088.000"
            },
            "stationCode":"BA4372D08E014822AB065017416F254C"
        },
        {
            "dataItemMap":{
                "real_health_state":"1",
                "day_power":"16770.000",
                "total_power":"35100.000",
                "day_income":"26832.000",
                "month_power":"35100.000",
                "total_income":"61152.000"
            },
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5"
        }
    ],
    "failCode":0,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.4.2 Hourly Plant Data Interface

Interface Description

This interface is used to obtain hourly plant data. Data of a maximum of 100 plants can be queried at a time.

The backend calculates the date of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the plant is located. Then, you can query the hourly data of the plant by plant ID in the current day. If data is generated for *n* ($0 \le n \le 24$) hours of the day, *n* ($0 \le n \le 24$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.2 Hourly Plant Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getKpiStationHour

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user per day = Roundup (Number of plants/100) + 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-

Parameter		Description	Data Type	Remarks
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the hourly data object list of each plant.	List	List of hourly plant data in a day
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in the key-value format. For details about the data item list, see **9.2.2 Hourly Plant Data Interface**.	Map	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: Hourly plant data is returned.

```
{
    "success":true,
```

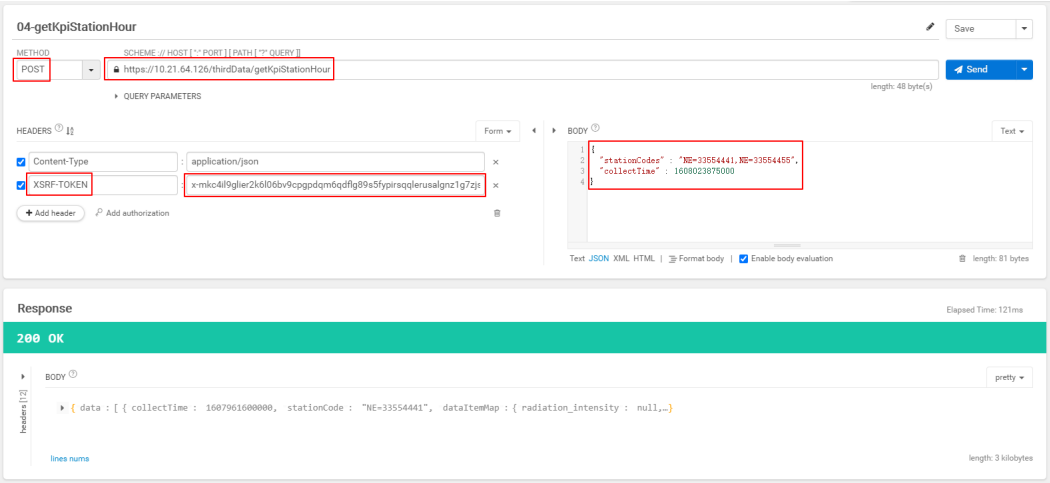
```
"data":[
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501866000000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"BA4372D08E014822AB065017416F254C",
        "collectTime":1501873200000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501876800000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501880400000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501884000000
    },
    {
        "dataItemMap":{
```

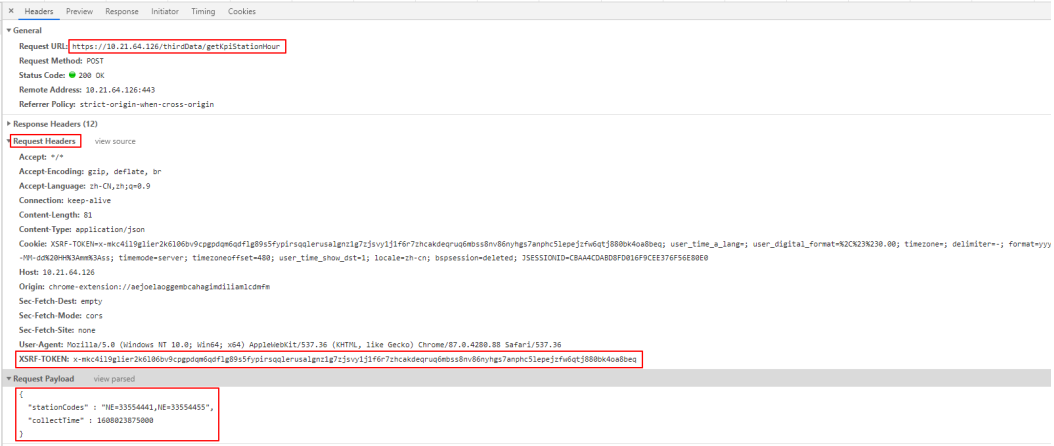
```
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501887600000
    },
    {
        "dataItemMap":{
            "radiation_intensity":null,
            "theory_power":null,
            "inverter_power":0,
            "ongrid_power":null,
            "power_profit":0
        },
        "stationCode":"BA4372D08E014822AB065017416F254C",
        "collectTime":1501887600000
    }
],
"failCode":0,
"params":{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000,
    "currentTime":1503046597854
},
"message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:





9.1.4.3 Daily Plant Data Interface

Interface Description

This interface is used to obtain daily plant data. Data of a maximum of 100 plants can be queried at a time.

The backend calculates the month of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the plant is located. Then, you can query the daily data of the plant by plant ID in the current month. If data is generated for *n* ($0 \le n \le 31$) days of the month, *n* ($0 \le n \le 31$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.3 Daily Plant Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getKpiStationDay

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user per day = Roundup (Number of plants/100) + 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-

Parameter		Description	Data Type	Remarks
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the daily data object list of each plant.	List	Daily data list of a plant in a month
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in the key-value format. For details about the data item list, see **9.2.3 Daily Plant Data Interface**.	Map	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Example 2: Daily plant data is returned.

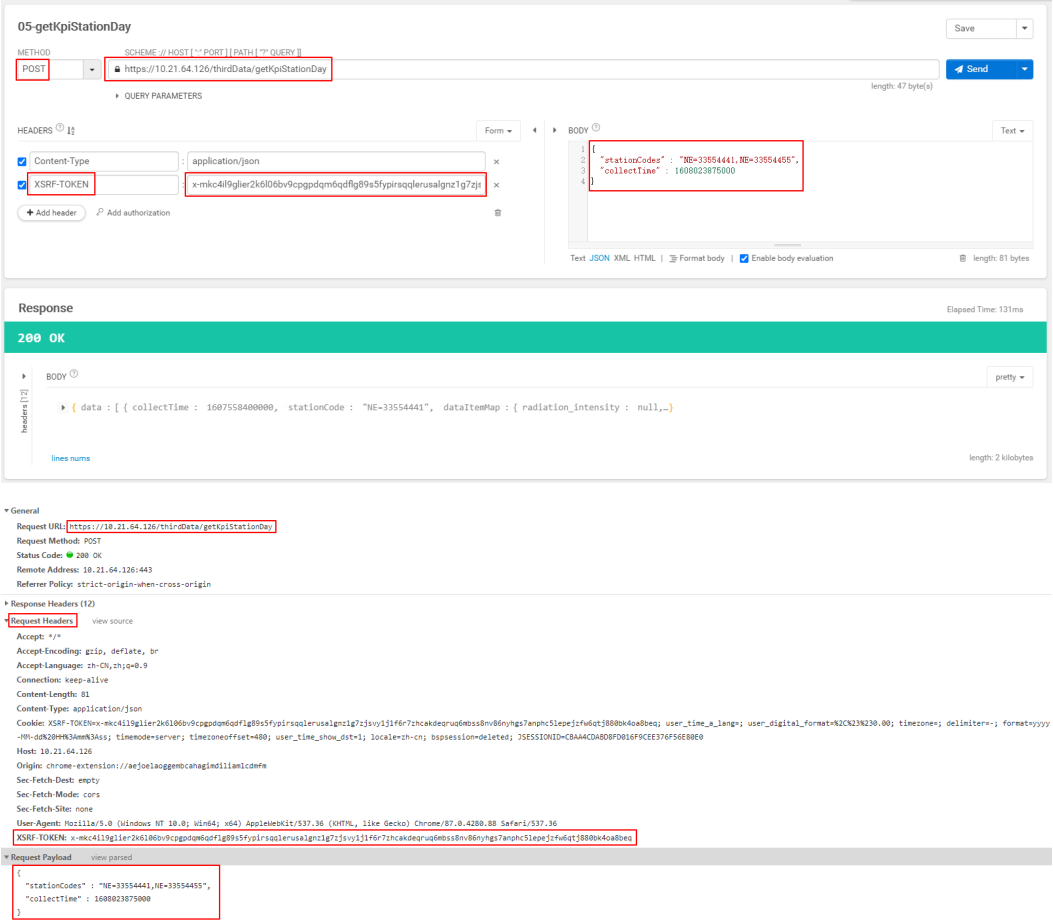
```
{
    "success":true,
    "data":[
        {
```

```
            "dataItemMap":{
                "use_power":288760,
                "radiation_intensity":0.6968,
                "reduction_total_co2":18.275,
                "reduction_total_coal":7.332,
                "theory_power":17559.36,
                "ongrid_power":18330,
                "power_profit":34320,
                "installed_capacity":25200,
                "perpower_ratio":0.727,
                "inverter_power":18330,
                "reduction_total_tree":999,
                "performance_ratio":89
            },
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "collectTime":1501776000000
        },
        {
            "dataItemMap":{
                "use_power":null,
                "radiation_intensity":1.4123,
                "reduction_total_co2":0.897,
                "reduction_total_coal":0.36,
                "theory_power":659.6,
                "ongrid_power":null,
                "power_profit":2088,
                "installed_capacity":467.04,
                "perpower_ratio":1.927,
                "inverter_power":18330,
                "reduction_total_tree":49,
                "performance_ratio":89
            },
            "stationCode":"BA4372D08E014822AB065017416F254C",
            "collectTime":1501776000000
        }
    ],
    "failCode":0,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.4.4 Monthly Plant Data Interface

Interface Description

This interface is used to obtain monthly plant data. Data of a maximum of 100 plants can be queried at a time.

The backend calculates the year of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the plant is located. Then, you can query the monthly data of the plant by plant ID in the current year. If data is generated for *n* ($0 \le n \le 12$) months of the year, *n* ($0 \le n \le 12$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.4 Monthly Plant Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getKpiStationMonth

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user per day = Roundup (Number of plants/100) + 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-

Parameter		Description	Data Type	Remarks
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the monthly data object list of each plant.	List	Monthly data list of a plant in a year
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in the key-value format. For details about the data item list, see **9.2.4 Monthly Plant Data Interface**.	Map	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Example 2: Monthly plant data is returned.

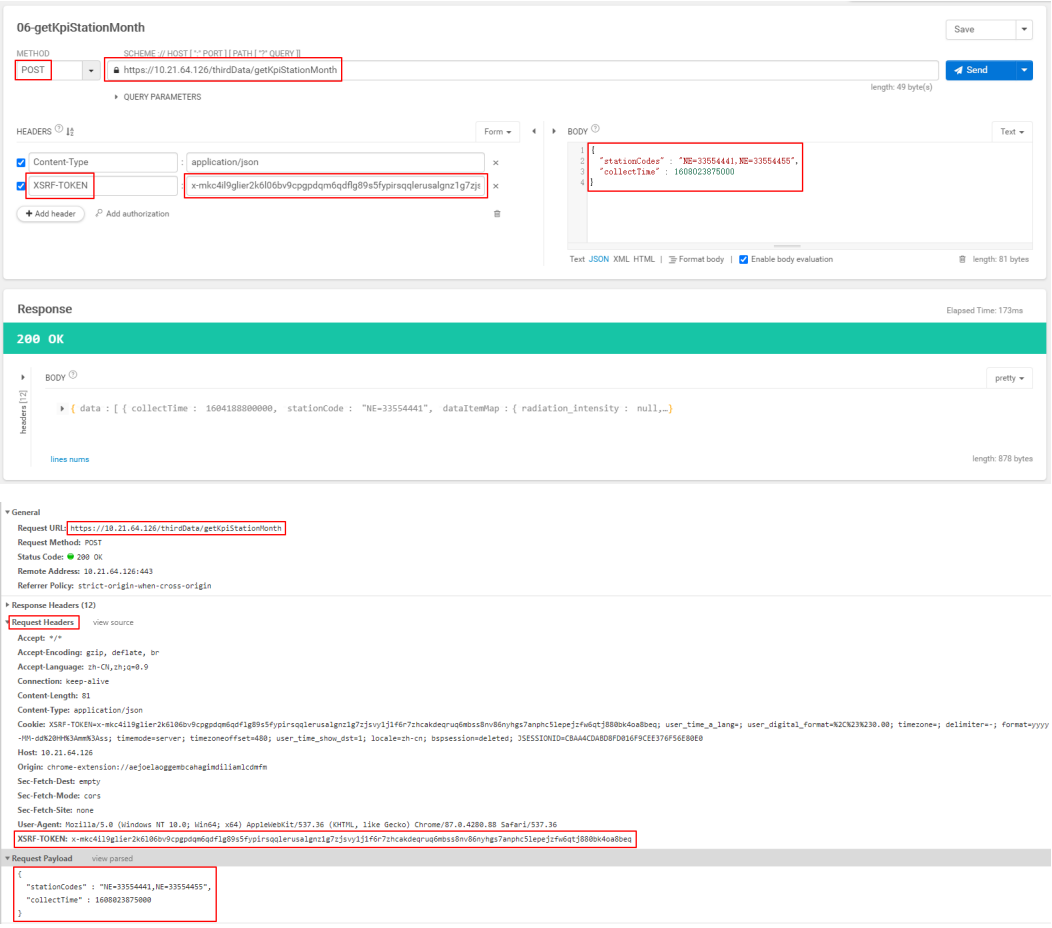
```
{
    "success":true,
    "data":[
        {
```

```
            "dataItemMap":{
                "use_power":288760,
                "radiation_intensity":0.6968,
                "reduction_total_co2":18.275,
                "reduction_total_coal":7.332,
                "inverter_power":null,
                "theory_power":17559.36,
                "ongrid_power":18330,
                "power_profit":34320,
                "installed_capacity":25200,
                "perpower_ratio":0.727,
                "reduction_total_tree":999,
                "performance_ratio":89
            },
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "collectTime":1501516800000
        },
        {
            "dataItemMap":{
                "use_power":null,
                "radiation_intensity":1.4123,
                "reduction_total_co2":0.897,
                "reduction_total_coal":0.36,
                "inverter_power":null,
                "theory_power":659.6,
                "ongrid_power":null,
                "power_profit":2088,
                "installed_capacity":467.04,
                "perpower_ratio":1.927,
                "reduction_total_tree":49,
                "performance_ratio":89
            },
            "stationCode":"BA4372D08E014822AB065017416F254C",
            "collectTime":1501516800000
        }
    ],
    "failCode":0,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.4.5 Yearly Plant Data Interface

Interface Description

This interface is used to obtain yearly plant data. Data of a maximum of 100 plants can be queried at a time.

Based on the plant ID, the backend queries the data of each year since the plant was constructed (including the current year).

For details about the data list that can be queried using this interface, see **9.2.5 Yearly Plant Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getKpiStationYear

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user per day = Roundup (Number of plants/100) + 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-

Parameter		Description	Data Type	Remarks
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the yearly data object list of each plant.	List	Yearly data list of the plant since its construction
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in the key-value format. For details about the data item list, see **9.2.5 Yearly Plant Data Interface**.	Map	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

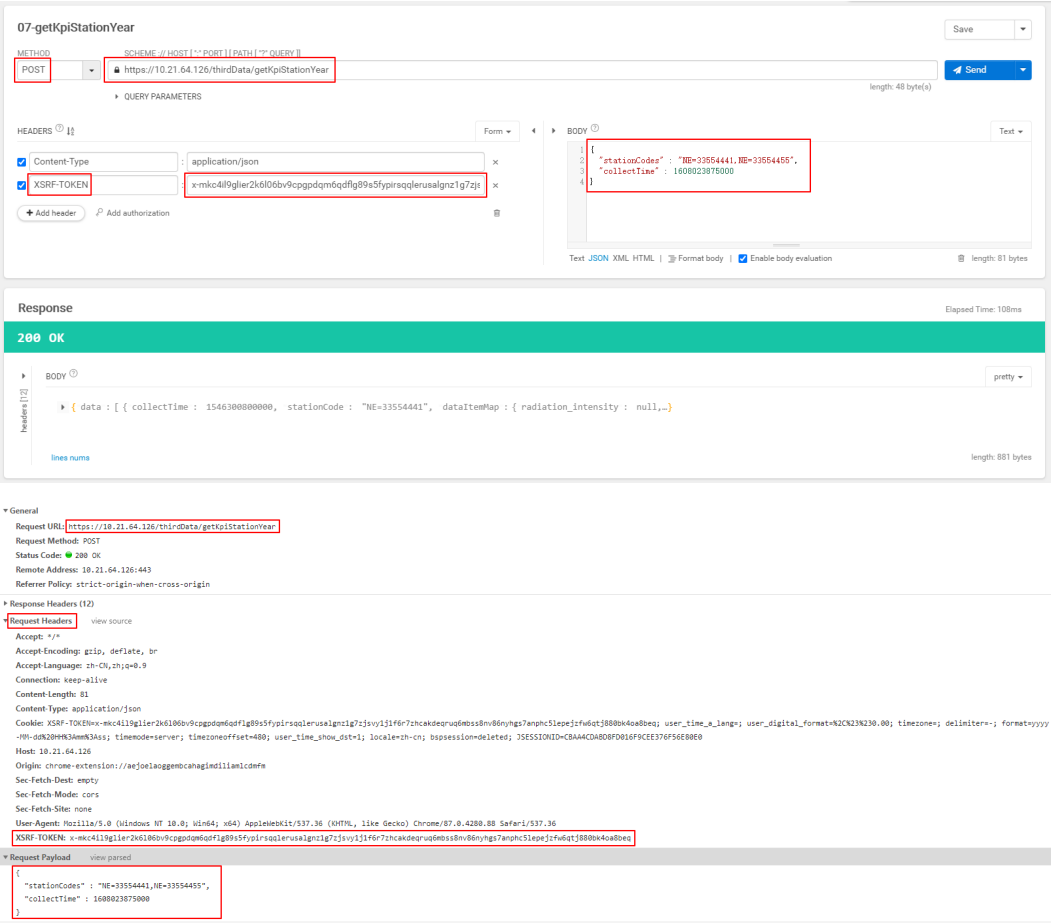
Example 2: Yearly plant data is returned.

```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "use_power":288760,
                "radiation_intensity":0.6968,
                "reduction_total_co2":18.275,
                "reduction_total_coal":7.332,
                "inverter_power":null,
                "theory_power":17559.36,
                "ongrid_power":18330,
                "power_profit":34320,
                "installed_capacity":25200,
                "perpower_ratio":0.727,
                "reduction_total_tree":999,
                "performance_ratio":89
            },
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "collectTime":1483200000000
        },
        {
            "dataItemMap":{
                "use_power":null,
                "radiation_intensity":1.4123,
                "reduction_total_co2":0.897,
                "reduction_total_coal":0.36,
                "inverter_power":null,
                "theory_power":659.6,
                "ongrid_power":null,
                "power_profit":2088,
                "installed_capacity":467.04,
                "perpower_ratio":1.927,
                "reduction_total_tree":49,
                "performance_ratio":89
            },
            "stationCode":"BA4372D08E014822AB065017416F254C",
            "collectTime":1483200000000
        }
    ],
    "failCode":0,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.5 Device List Interface

Interface Description

This interface is used to obtain basic device information. Before invoking other interfaces to obtain device data, you need to invoke this interface to obtain the device ID.

When you query devices by plant ID set, devices of a maximum of 100 plants can be queried at a time.

Request URL

https://*Domain name of the management system*/thirdData/getDevList

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users. Number of northbound API calls per user per day = Roundup (Number of plants/100) + 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a user manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.

If a user manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**.	String	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, in milliseconds	Long	-

Parameter		Description	Data Type	Remarks
message		Optional message	String	-
data	Parameters	Returned data. The data contains the object parameter list of each device.	List	-
	id	Device ID	Long	-
	devName	Device name	String	-
	stationCode	Plant ID	String	-
	esnCode	Device SN	String	-
	devTypeId	Device type ID The following device types are supported: 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet data logger 38: residential inverter 39: battery 40: backup box 41: ESS 45: PLC 46: optimizer 47: power sensor 62: Dongle 63: distributed SmartLogger 70: safety box	Integer	-
	softwareVersion	Software version	String	-
	invType	Inverter model (only applicable to inverters)	String	-
	longitude	Longitude	Double	-
	latitude	Latitude	Double	-

Example

Request example:

```
{
    "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5"
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "currentTime":1503046597854
    },
    "message":null
}
```

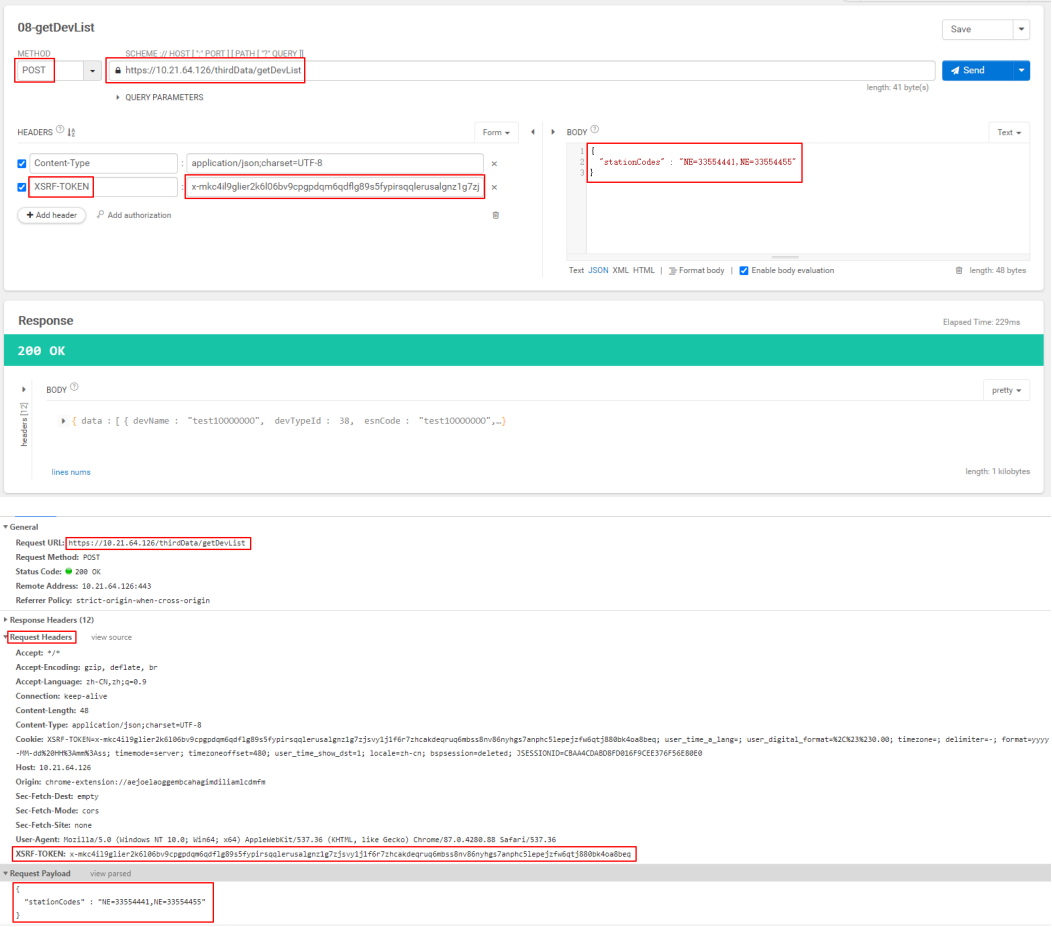
Example 2: The device list is returned.

```
{
    "success":true,
    "data":[
        {
            "id":-214543629611879,
            "devName":"5fbfk4",
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "esnCode":"5fbfk4",
            "devTypeId":1,
            "softwareVersion":"V100R001PC666",
            "invType":"SUN2000-17KTL",
            "longitude":null,
            "latitude":null
        },
        {
            "id":-214091680973855,
            "devName":"6fbfk11",
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "esnCode":"6fbfk11",
            "devTypeId":1,
            "softwareVersion":"V100R001PC666",
            "invType":"SUN2000-17KTL",
            "longitude":null,
            "latitude":null
        }
    ],
    "failCode":0,
    "params":{
        "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.6 Device Data Interfaces

Before invoking the following device data interfaces, you need to invoke the device list interface to obtain the device ID.

9.1.6.1 Real-Time Device Data Interface

Interface Description

This interface is used to obtain real-time device data by device type and device ID set. The data varies depending on device types. Data of a maximum of 100 devices of the same type can be queried at a time.

For details about the data list that can be queried using this interface, see **9.2.6 Real-Time Device Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getDevRealKpi

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user every 5 minutes = ∑ Roundup (Number of devices of each type/100).

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls every 5 minutes is calculated as follows:

  Inverters: Roundup (20/100) = 1

  Meters: Roundup (20/100) = 1

  Total: Number of API calls for inverters + Number of API calls for meters = 1 + 1 = 2
- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls every 5 minutes is calculated as follows:

  Inverters: Roundup (120/100) = 2

  Meters: Roundup (120/100) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 = 4

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional

Parameter	Description	Data Type	Mandatory/ Optional
devTypeId	Device type ID. Use the device type ID obtained in **9.1.5 Device List Interface**. The following device types are supported: 1: string inverter 10: EMI 17: grid meter 38: residential inverter 39: battery 41: ESS 47: power sensor	Integer	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-

Parameter		Description	Data Type	Remarks
data	Parameters	Returned data. The data contains the real-time data object list of each device.	List	-
	devId	Device ID	Long	-
	sn	Device SN	String	
	dataItemMap	Content of data items, which are returned in the key-value format. The content of data items varies according to device types. For details about the data item list, see **9.2.6 Real-Time Device Data Interface**.	Map	Real-time device data

Examples

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":"1"
}
```

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20006,
    "params":{
        "devIds":"214233501711677,214060404588862",
        "devTypeId":"1",
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: Real-time data of devices is returned.

```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "pv7_u":0,
                "pv1_u":0,
                "b_u":0,
                "c_u":0,
                "pv6_u":0,
                "temperature":0,
                "open_time":0,
                "b_i":0,
                "bc_u":0,
                "pv9_u":0,
                "pv8_u":0,
```

"c_i":0,
"mppt_total_cap":0,
"pv9_i":0,
"mppt_3_cap":0,
"run_state":0,
"mppt_2_cap":0,
"inverter_state":0,
"pv8_i":0,
"mppt_1_cap":0,
"pv6_i":0,
"mppt_power":0,
"pv1_i":0,
"total_cap":0,
"ab_u":0,
"pv7_i":0,
"pv13_u":0,
"reactive_power":0,
"pv10_u":0,
"pv12_i":0,
"pv11_i":0,
"pv3_i":0,
"pv11_u":0,
"pv2_i":0,
"pv13_i":0,
"power_factor":0,
"pv12_u":0,
"pv5_i":0,
"active_power":0,
"elec_freq":0,
"pv10_i":0,
"pv4_i":0,
"mppt_4_cap":0,
"mppt_5_cap":0,
"mppt_6_cap":0,
"mppt_7_cap":0,
"mppt_8_cap":0,
"mppt_9_cap":0,
"mppt_10_cap":0,
"pv4_u":0,
"close_time":0,
"day_cap":0,
"ca_u":0,
"a_i":0,
"pv5_u":0,
"a_u":0,
"pv3_u":0,
"pv14_u":0,
"pv14_i":0,
"pv15_u":0,
"pv15_i":0,
"pv16_u":0,
"pv16_i":0,
"pv17_u":0,
"pv17_i":0,
"pv18_u":0,
"pv18_i":0,
"pv19_u":0,
"pv19_i":0,
"pv20_u":0,
"pv20_i":0,
"pv21_u":0,
"pv21_i":0,
"pv22_u":0,
"pv22_i":0,
"pv23_u":0,
"pv23_i":0,
"pv24_u":0,
"pv24_i":0,
"pv25_u":0,

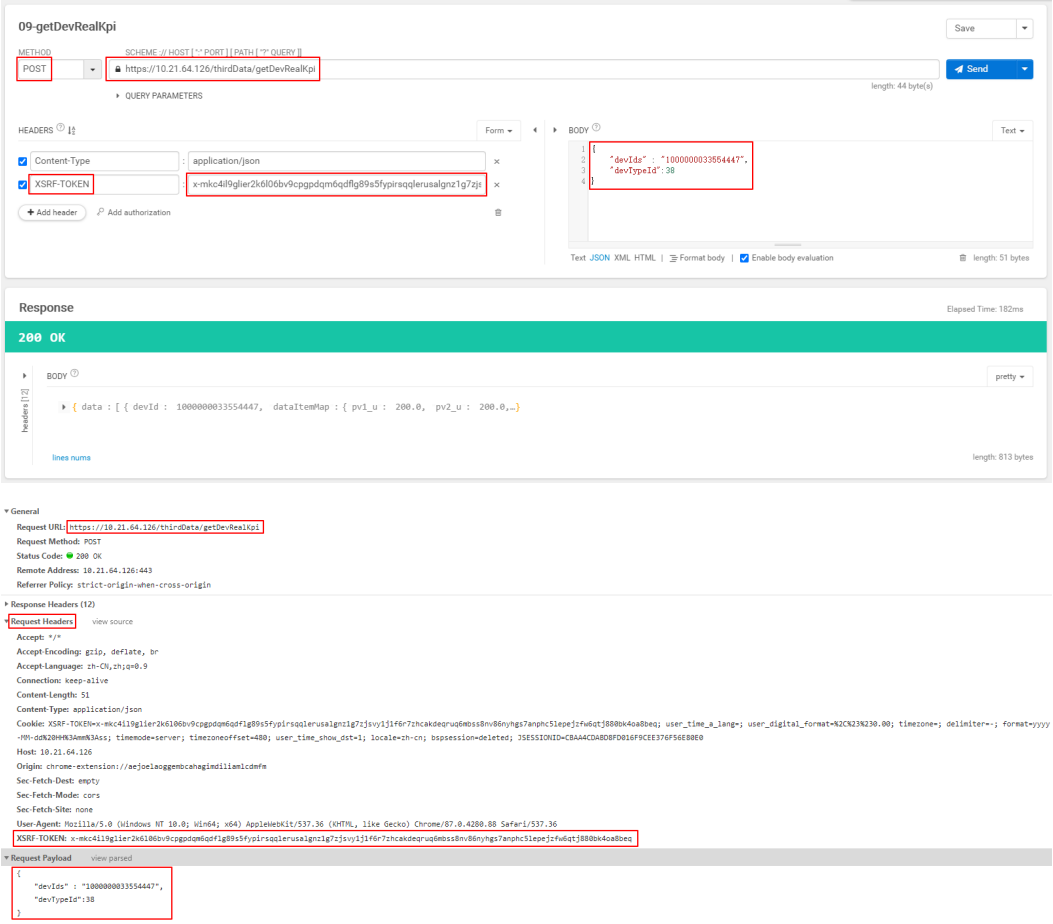
```
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":0,
            "pv2_u":0
        },
        "devId":213472461631079
    },
    {
        "dataItemMap":{
            "pv7_u":0,
            "pv1_u":0,
            "b_u":0,
            "c_u":0,
            "pv6_u":0,
            "temperature":0,
            "open_time":0,
            "b_i":0,
            "bc_u":0,
            "pv9_u":0,
            "pv8_u":0,
            "c_i":0,
            "mppt_total_cap":0,
            "pv9_i":0,
            "mppt_3_cap":0,
            "run_state":0,
            "mppt_2_cap":0,
            "inverter_state":0,
            "pv8_i":0,
            "mppt_1_cap":0,
            "pv6_i":0,
            "mppt_power":0,
            "pv1_i":0,
            "total_cap":0,
            "ab_u":0,
            "pv7_i":0,
            "pv13_u":0,
            "reactive_power":0,
            "pv10_u":0,
            "pv12_i":0,
            "pv11_i":0,
            "pv3_i":0,
            "pv11_u":0,
            "pv2_i":0,
            "pv13_i":0,
            "power_factor":0,
            "pv12_u":0,
            "pv5_i":0,
            "active_power":0,
            "elec_freq":0,
            "pv10_i":0,
            "pv4_i":0,
            "mppt_4_cap":0,
            "mppt_5_cap":0,
            "mppt_6_cap":0,
            "mppt_7_cap":0,
            "mppt_8_cap":0,
            "mppt_9_cap":0,
            "mppt_10_cap":0,
            "pv4_u":0,
            "close_time":0,
            "day_cap":0,
            "ca_u":0,
            "a_i":0,
            "pv5_u":0,
```

```
            "a_u":0,
            "pv3_u":0,
            "pv14_u":0,
            "pv14_i":0,
            "pv15_u":0,
            "pv15_i":0,
            "pv16_u":0,
            "pv16_i":0,
            "pv17_u":0,
            "pv17_i":0,
            "pv18_u":0,
            "pv18_i":0,
            "pv19_u":0,
            "pv19_i":0,
            "pv20_u":0,
            "pv20_i":0,
            "pv21_u":0,
            "pv21_i":0,
            "pv22_u":0,
            "pv22_i":0,
            "pv23_u":0,
            "pv23_i":0,
            "pv24_u":0,
            "pv24_i":0,
            "pv25_u":0,
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":0,
            "pv2_u":0
        },
        "devId":214060404588862
    }
],
"failCode":0,
"params":{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":"1",
    "currentTime":1503046597854
},
"message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.6.2 Historical Device Data Interface

NOTICE

iMaster NetEco V600R022C00CP1202 and later versions support this interface. For versions earlier than iMaster NetEco V600R022C00CP1202, use the **5-minute Device Data Interface** in **Historical Interfaces**. For details about how to check the current software version, see **How to Check the Software Version**. The latest release time indicates the newest version.

Interface Description

This interface is used to obtain 5-minute device data in a specified time period. The 5-minute data of a maximum of 10 devices of the same type in three days can be queried at a time.

For details about the data list that can be queried using this interface, see **9.2.8 Historical Device Data Interface**.

Request URL

https://Domain name of the management system/thirdData/getDevHistoryKpi

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user per day = ∑ Roundup (Number of devices of each type/10) + 24.

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (20/10) = 2

  Meters: Roundup (20/10) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 + 24 = 28
- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (120/10) = 12

  Meters: Roundup (120/10) = 12

  Total: Number of API calls for inverters + Number of API calls for meters = 12 + 12 + 24 = 48

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional

Parameter	Description	Data Type	Mandatory/ Optional
devTypeId	Device type ID. Use the device type ID obtained in **9.1.5 Device List Interface**. The following device types are supported: 1: string inverter 10: EMI 17: grid meter 38: residential inverter 39: battery 41: ESS 47: power sensor	Integer	Mandatory
startTime	Start time, in milliseconds	Long	Mandatory
endTime	End time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-

Parameter		Description	Data Type	Remarks
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the 5-minute data object list of each device.	List	5-minute data of a device in a day
	devId	Device ID	Long	-
	sn	Device SN	String	
	startTime	Start time, in milliseconds	Long	-
	endTime	End time, in milliseconds	Long	
	dataItemMap	Content of each data item, which is returned in the key-value format. The data item content varies depending on the device type. For details about the data item list, see **9.2.8 Historical Device Data Interface**.	Map	5-minute device data

Example

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "startTime":1501862400000,
    "endTime":1501872400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "startTime":1501862400000,
        "endTime":1501872400000,
```

```
        "currentTime":1503046597854
    },
    "message":null
}
```


Example 2: 5-minute device data is returned.


```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "pv7_u":null,
                "pv1_u":575.3,
                "b_u":286.1,
                "c_u":286.9,
                "pv6_u":576.1,
                "temperature":44.6,
                "open_time":null,
                "b_i":24.9,
                "bc_u":495.6,
                "pv9_u":null,
                "pv8_u":null,
                "c_i":25,
                "mppt_total_cap":null,
                "pv9_i":null,
                "mppt_3_cap":null,
                "mppt_2_cap":null,
                "inverter_state":512,
                "pv8_i":null,
                "mppt_1_cap":null,
                "pv6_i":7.1,
                "mppt_power":21.962,
                "pv1_i":7.1,
                "total_cap":655.37,
                "ab_u":495.4,
                "pv7_i":null,
                "pv13_u":null,
                "reactive_power":20.95,
                "pv10_u":null,
                "pv12_i":null,
                "pv11_i":null,
                "pv3_i":7.1,
                "pv11_u":null,
                "pv2_i":7.1,
                "pv13_i":null,
                "power_factor":0,
                "pv12_u":null,
                "pv5_i":7.2,
                "active_power":21.05,
                "elec_freq":50.05,
                "pv10_i":null,
                "pv4_i":7,
                "mppt_4_cap":null,
                "mppt_5_cap":0,
                "mppt_6_cap":0,
                "mppt_7_cap":0,
                "mppt_8_cap":0,
                "mppt_9_cap":0,
                "mppt_10_cap":0,
                "pv4_u":577.8,
                "close_time":null,
                "day_cap":159.26,
                "ca_u":496.9,
                "a_i":24.9,
                "pv5_u":576.1,
                "a_u":286,
                "pv3_u":577.8,
                "pv14_u":null,
                "pv14_i":null,
```

```
            "pv15_u":0,
            "pv15_i":0,
            "pv16_u":0,
            "pv16_i":0,
            "pv17_u":0,
            "pv17_i":0,
            "pv18_u":0,
            "pv18_i":0,
            "pv19_u":0,
            "pv19_i":0,
            "pv20_u":0,
            "pv20_i":0,
            "pv21_u":0,
            "pv21_i":0,
            "pv22_u":0,
            "pv22_i":0,
            "pv23_u":0,
            "pv23_i":0,
            "pv24_u":0,
            "pv24_i":0,
            "pv25_u":0,
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":null,
            "pv2_u":575.3
        },
        "devId":213472461631079,
        "collectTime":1501862400000
    },
    {
        "dataItemMap":{
            "pv7_u":null,
            "pv1_u":575.3,
            "b_u":286.1,
            "c_u":286.9,
            "pv6_u":576.1,
            "temperature":44.6,
            "open_time":null,
            "b_i":24.9,
            "bc_u":495.6,
            "pv9_u":null,
            "pv8_u":null,
            "c_i":25,
            "mppt_total_cap":null,
            "pv9_i":null,
            "mppt_3_cap":null,
            "mppt_2_cap":null,
            "inverter_state":512,
            "pv8_i":null,
            "mppt_1_cap":null,
            "pv6_i":7.1,
            "mppt_power":21.962,
            "pv1_i":7.1,
            "total_cap":655.37,
            "ab_u":495.4,
            "pv7_i":null,
            "pv13_u":null,
            "reactive_power":20.95,
            "pv10_u":null,
            "pv12_i":null,
            "pv11_i":null,
            "pv3_i":7.1,
            "pv11_u":null,
            "pv2_i":7.1,
```

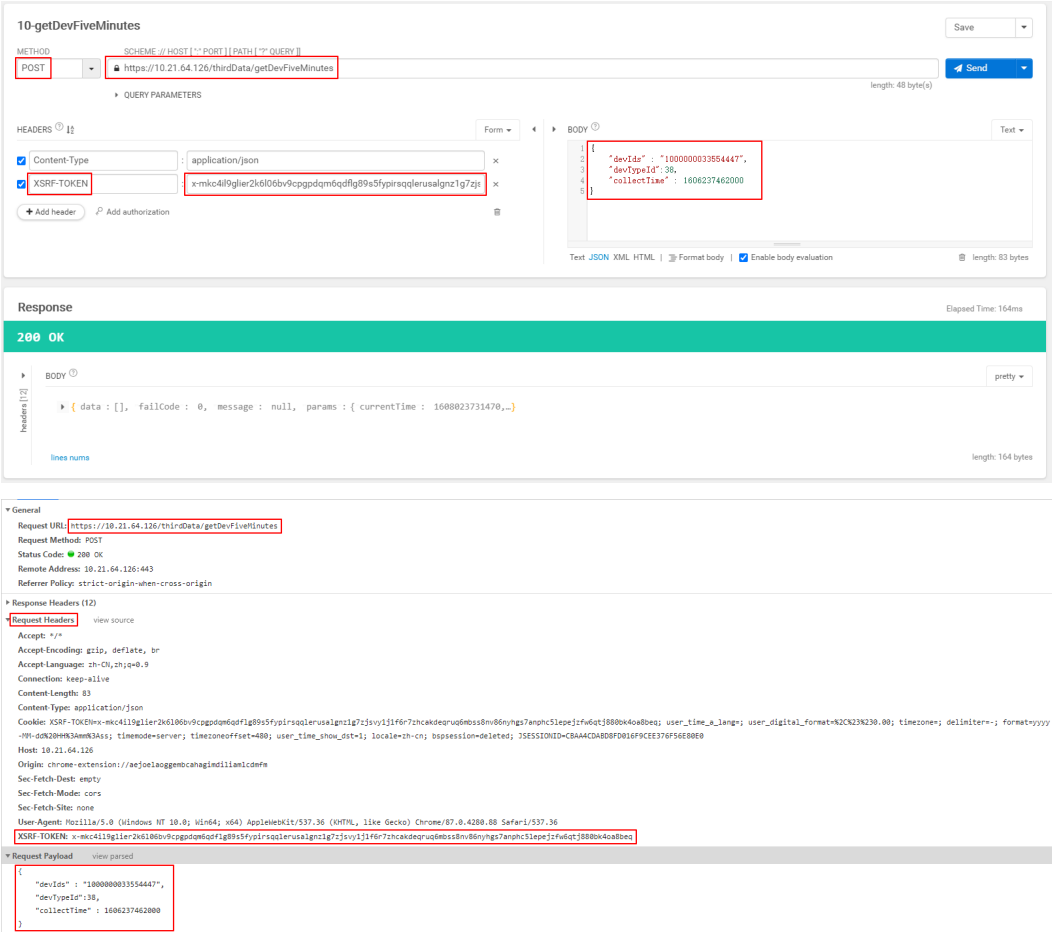
```
            "pv13_i":null,
            "power_factor":0,
            "pv12_u":null,
            "pv5_i":7.2,
            "active_power":21.05,
            "elec_freq":50.05,
            "pv10_i":null,
            "pv4_i":7,
            "mppt_4_cap":null,
            "mppt_5_cap":0,
            "mppt_6_cap":0,
            "mppt_7_cap":0,
            "mppt_8_cap":0,
            "mppt_9_cap":0,
            "mppt_10_cap":0,
            "pv4_u":577.8,
            "close_time":null,
            "day_cap":159.26,
            "ca_u":496.9,
            "a_i":24.9,
            "pv5_u":576.1,
            "a_u":286,
            "pv3_u":577.8,
            "pv14_u":null,
            "pv14_i":null,
            "pv15_u":0,
            "pv15_i":0,
            "pv16_u":0,
            "pv16_i":0,
            "pv17_u":0,
            "pv17_i":0,
            "pv18_u":0,
            "pv18_i":0,
            "pv19_u":0,
            "pv19_i":0,
            "pv20_u":0,
            "pv20_i":0,
            "pv21_u":0,
            "pv21_i":0,
            "pv22_u":0,
            "pv22_i":0,
            "pv23_u":0,
            "pv23_i":0,
            "pv24_u":0,
            "pv24_i":0,
            "pv25_u":0,
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":null,
            "pv2_u":575.3
        },
        "devId":213472461631079,
        "collectTime":1501862700000
    }
],
"failCode":0,
"params":{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "startTime":1501862400000,
    "endTime":1501872400000,
    "currentTime":1503046597854
},
```

```
  "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.6.3 Daily Device Data Interface

Interface Description

This interface is used to obtain daily device data. The daily data of a maximum of 100 devices of the same type can be queried at a time.

The backend calculates the month of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the device is located. Then, you can query the daily data of the device by device ID in the current month. If data is generated for *n* ($0 \le n \le 31$) days of the month, *n* ($0 \le n \le 31$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.9 Daily Device Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getDevKpiDay

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user per day = ∑ Roundup (Number of devices of each type/100) + 24.

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (20/100) = 1

  Meters: Roundup (20/100) = 1

  Total: Number of API calls for inverters + Number of API calls for meters = 1 + 1 + 24 = 26
- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (120/100) = 2

  Meters: Roundup (120/100) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 + 24 = 28

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
devTypeId	Device type ID. Use the device type ID obtained in **9.1.5 Device List Interface**. The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandatory

Parameter	Description	Data Type	Mandatory/ Optional
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the daily data object list of each device.	List	List of daily device data in a month
	devId	Device ID	Long	-
	sn	Device SN	String	

Parameter		Description	Data Type	Remarks
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of data items, which are returned in the key-value format. The content of data items varies according to device types. For details about the data item list, see **9.2.9 Daily Device Data Interface**.	Map	Data of a device in a day

Examples

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: Daily device data is returned.

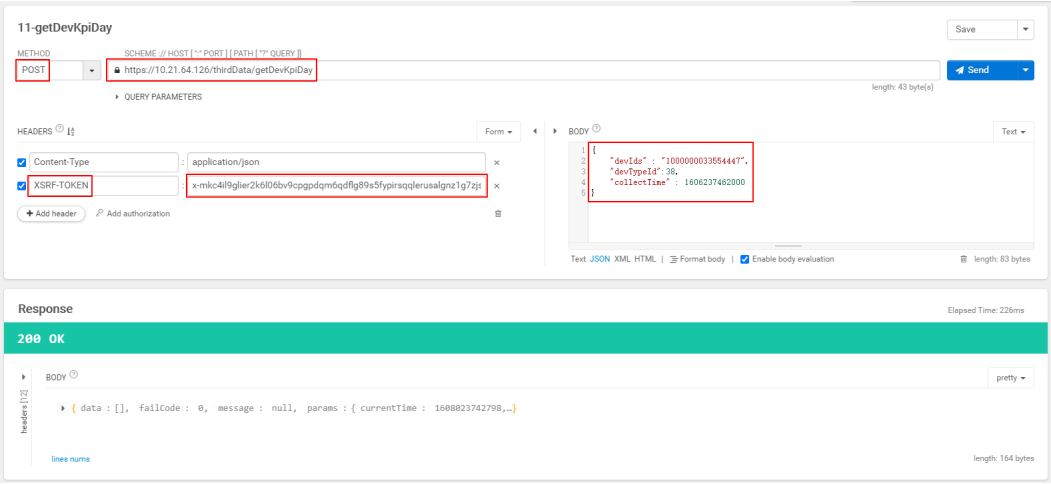
```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "aoc_ratio":39.931,
                "yield_deviation":0,
                "installed_capacity":30.24,
                "perpower_ratio":9.921,
                "product_power":300,
                "total_aop":5
            },
            "devId":213472461631079,
            "collectTime":1501776000000
        },
        {
            "dataItemMap":{
                "aoc_ratio":35.069,
```

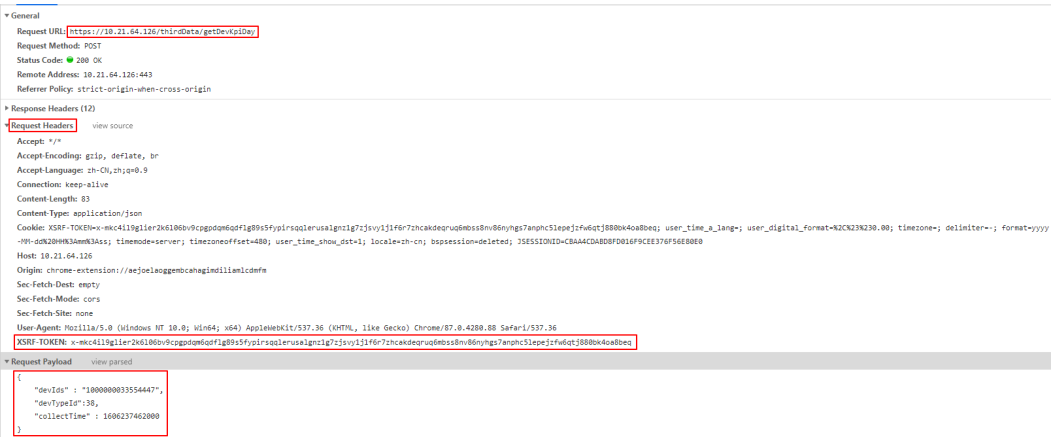
```
            "yield_deviation":0,
            "installed_capacity":30.24,
            "perpower_ratio":0.543,
            "product_power":16.43,
            "total_aop":88.889
        },
        "devId":214060404588862,
        "collectTime":1501776000000
    }
  ],
  "failCode":0,
  "params":{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000,
    "currentTime":1503046597854
  },
  "message":null
}
```


NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:





9.1.6.4 Monthly Device Data Interface

Interface Description

This interface is used to obtain monthly device data. The monthly data of a maximum of 100 devices of the same type can be queried at a time.

The backend calculates the year of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the device is located. Then, you can query the monthly data of the device by device ID in the current year. If data is generated for n ($0 \le n \le 12$) months of the year, n ($0 \le n \le 12$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.10 Monthly Device Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getDevKpiMonth

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user per day = ∑ Roundup (Number of devices of each type/100) + 24.

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (20/100) = 1

  Meters: Roundup (20/100) = 1

  Total: Number of API calls for inverters + Number of API calls for meters = 1 + 1 + 24 = 26

- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (120/100) = 2

  Meters: Roundup (120/100) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 + 24 = 28

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
devTypeId	Device type ID. Use the device type ID obtained in **9.1.5 Device List Interface**. The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-

Parameter		Description	Data Type	Remarks
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the monthly data object list of each device.	List	List of monthly device data in a year
	devId	Device ID	Long	-
	sn	Device SN	String	
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of data items, which are returned in the key-value format. The content of data items varies according to device types. For details about the data item list, see **9.2.10 Monthly Device Data Interface**.	Map	Data of a device in a month

Examples

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
```

```
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

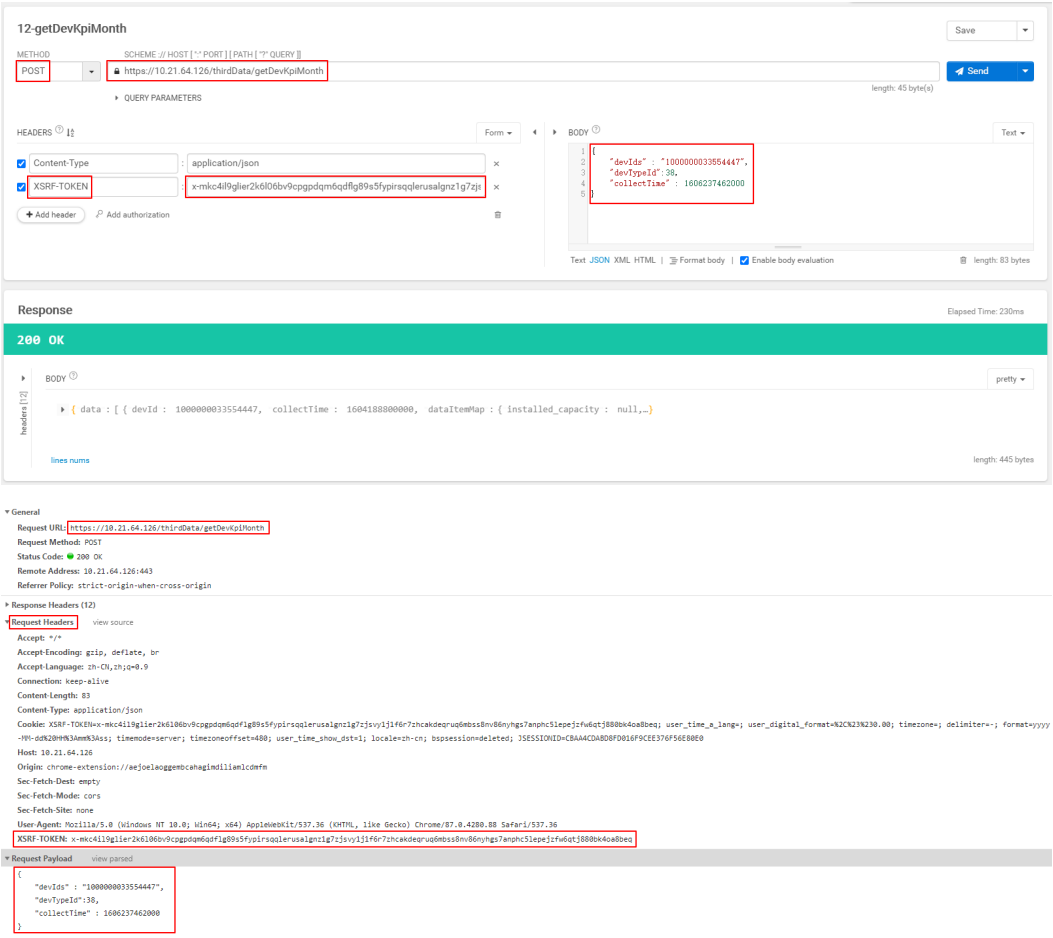

Example 2: Monthly device data is returned.


```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "installed_capacity":30.24,
                "perpower_ratio":null,
                "product_power":300
            },
            "devId":213472461631079,
            "collectTime":1501516800000
        },
        {
            "dataItemMap":{
                "installed_capacity":30.24,
                "perpower_ratio":null,
                "product_power":16.43
            },
            "devId":214060404588862,
            "collectTime":1501516800000
        }
    ],
    "failCode":0,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:



9.1.6.5 Yearly Device Data Interface

Interface Description

This interface is used to obtain yearly device data. The yearly data of a maximum of 100 devices of the same type can be queried at a time.

The backend queries the data of each year since the device was connected based on the device ID.

For details about the data list that can be queried using this interface, see **9.2.11 Yearly Device Data Interface**.

Request URL

https://*Domain name of the management system*/thirdData/getDevKpiYear

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user per day = ∑ Roundup (Number of devices of each type/100) + 24.

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (20/100) = 1

  Meters: Roundup (20/100) = 1

  Total: Number of API calls for inverters + Number of API calls for meters = 1 + 1 + 24 = 26
- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (120/100) = 2

  Meters: Roundup (120/100) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 + 24 = 28

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either **sns** or **devIds** must be set.	String	Optional
devTypeId	Device type ID The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

NOTE

Before obtaining data, you must configure related counters.

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message	-	Optional message	String	-
data	Parameters	Returned data. The data contains the yearly data object list of each device.	List	Data list of each year since the device is connected
	devId	Device ID	Long	-
	sn	Device SN	String	

Parameter		Description	Data Type	Remarks
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of data items, which are returned in the key-value format. The content of data items varies according to device types. For details about the data item list, see **9.2.11 Yearly Device Data Interface**.	Map	Data of a device in a year

Examples

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: Yearly device data is returned.

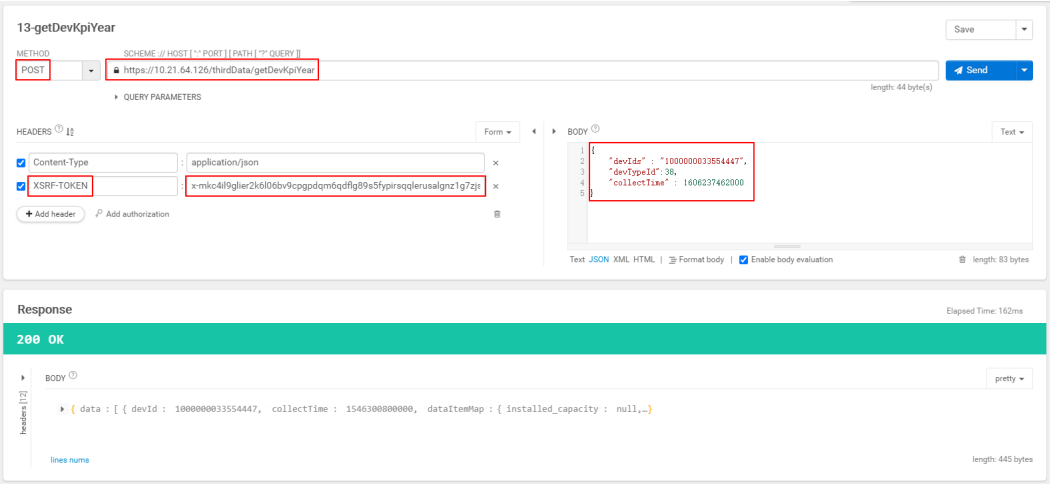
```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "installed_capacity":30.24,
                "perpower_ratio":null,
                "product_power":300
            },
            "devId":213472461631079,
            "collectTime":1501516800000
        }
    ],
    "failCode":0,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
```

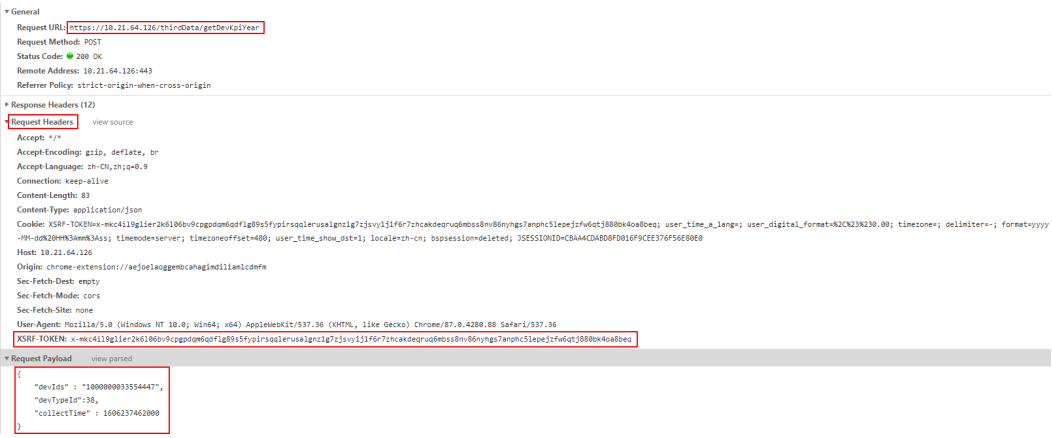
```
    "currentTime":1503046597854
  },
  "message":null
}
```

NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:





9.1.7 Device Alarm Interface

Interface Description

This interface is used to query the current (active) alarm information of a device. If the query is based on plants, a maximum of 100 plants can be queried at a time. If the query is based on device SNs, a maximum of 100 devices can be queried at a time. If the transferred plant ID list is not empty, device alarm information is queried based on the plant ID list. If the plant ID list is empty and the device SN list is not empty, device alarm information is queried based on the device SN list.

Request URL

https://*Domain name of the management system*/thirdData/getAlarmList

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of plants managed by northbound API users and the number of devices of each type.

Number of northbound API calls per user every 30 minutes = MAX (Roundup (Number of plants/100),∑ Roundup (Number of devices of each type/100))

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

If a northbound API user manages 20 plants, 20 inverters, and 20 meters, the maximum number of API calls every 30 minutes is calculated as follows:

Roundup (Number of plants/100) = Roundup (20/100) = 1

∑ Roundup (Number of devices of each type/100) = Number of inverters + Number of meters = Roundup (20/100) + Roundup (20/100) = 1 + 1 = 2

Total: MAX (1,2) = 2

If a northbound API user manages 120 plants, 120 inverters, and 120 meters, the maximum number of API calls every 30 minutes is calculated as follows:

Roundup (Number of plants/100) = Roundup (120/100) = 2

∑Roundup (Number of devices of each type/100) = Number of inverters + Number of meters = Roundup (120/100) + Roundup (120/100) = 2 + 2 = 4

Total: MAX (2,4) = 4

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,). Plant IDs are obtained from **plantCode** in **9.1.3 Plant List Interface**. At least one of the **stationCodes** and **sns** parameters must be set. If both parameters are set, alarms are queried by **stationCodes**.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). At least one of the **stationCodes** and **sns** parameters must be set. If both parameters are set, alarms are queried by **stationCodes**.	String	Optional

Parameter	Description	Data Type	Mandatory/ Optional
beginTime	Query start time, in milliseconds	Long	Mandatory
endTime	Query end time, in milliseconds	Long	Mandatory
language	Language. The value must be **zh_CN**, **en_US**, **ja_JP**, **it_IT**, **nl_NL**, **pt_BR**, **de_DE**, **fr_FR**, **es_ES**, or **pl_PL**. zh_CN: Chinese en_US: English ja_JP: Japanese it_IT: Italian nl_NL: Dutch pt_BR: Portuguese de_DE: German fr_FR: French es_ES: Spanish pl_PL: Polish	String	Mandatory
levels	Alarm severity. Multiple alarm severities are separated by commas (,), for example, **1,2**. If this parameter is not transferred or is left empty, alarms of all severities are queried by default. The following alarm severities are supported: 1: critical 2: major 3: minor 4: warning	String	Optional

Parameter	Description	Data Type	Mandatory/ Optional
devTypes	Device type. Multiple device types are separated by commas (,), for example, **1,38**. If this parameter is not transferred or is left empty, alarms of all device types are queried by default. The following device types are supported: 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet data logger 38: residential inverter 39: battery 40: backup box 45: PLC 46: optimizer 47: power sensor 62: Dongle 63: distributed SmartLogger 70: safety box	String	Optional

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag

Parameter		Description	Data Type	Remarks
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	beginTime	Start time in the request parameter, in milliseconds	Long	-
	endTime	End time in the request parameter, in milliseconds	Long	-
	language	Language in the request parameter	String	-
	levels	Alarm severity in the request parameter	String	-
	devTypes	Device type in the request parameter	String	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the alarm information list.	List	-
	stationCode	Plant ID, which uniquely identifies a plant	String	-
	alarmName	Alarm name	String	-
	devName	Device name	String	-
	repairSuggestion	Solution	String	-
	esnCode	Device SN	String	-

Parameter		Description	Data Type	Remarks
	devTypeId	Device type ID The following device types are supported: 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet data logger 38: residential inverter 39: battery 40: backup box 45: PLC 46: optimizer 47: power sensor 62: Dongle 63: distributed SmartLogger 70: safety box	Integer	-
	causeId	Cause ID	Integer	-
	alarmCause	Alarm cause	String	-
	alarmType	Alarm type The following alarm types are supported: 1: transposition signal 2: exception alarm 3: protection event 4: notification status 5: alarm information	Integer	-
	raiseTime	Alarm generation time in milliseconds	Long	-
	alarmId	Alarm ID	Integer	-
	stationName	Plant name	String	-

Parameter		Description	Data Type	Remarks
	lev	Alarm severity The following alarm severities are supported: 1: critical 2: major 3: minor 4: warning	Integer	-
	status	Alarm status The following alarm states are supported: 1: not processed (active)	Integer	-

Examples

Request example:

```
{
    "stationCodes":"NE=33554785,NE=33554792",
    "sns":"Inverter01",
    "beginTime":"1664553600000",
    "endTime":"1667231999000",
    "language":"zh_CN",
    "levels":"1,2,3,4",
    "devTypes":"1,2,38,46,62"
}
```

Response example:

Example 1: An error code is returned.

```
{
    "data": null,
    "failCode": 20055,
    "message": null,
    "params": {
        "currentTime": 1667399781133,
        "sns": "",
        "language": "zh_CN",
        "beginTime": 1664553600000,
        "devTypes": "1,2,38,46,62",
        "endTime": 1667231999000,
        "levels": "1,2,3,4",
        "stationCodes": ""
    },
    "success": false
}
```

Example 2: Alarm data of the device is returned.

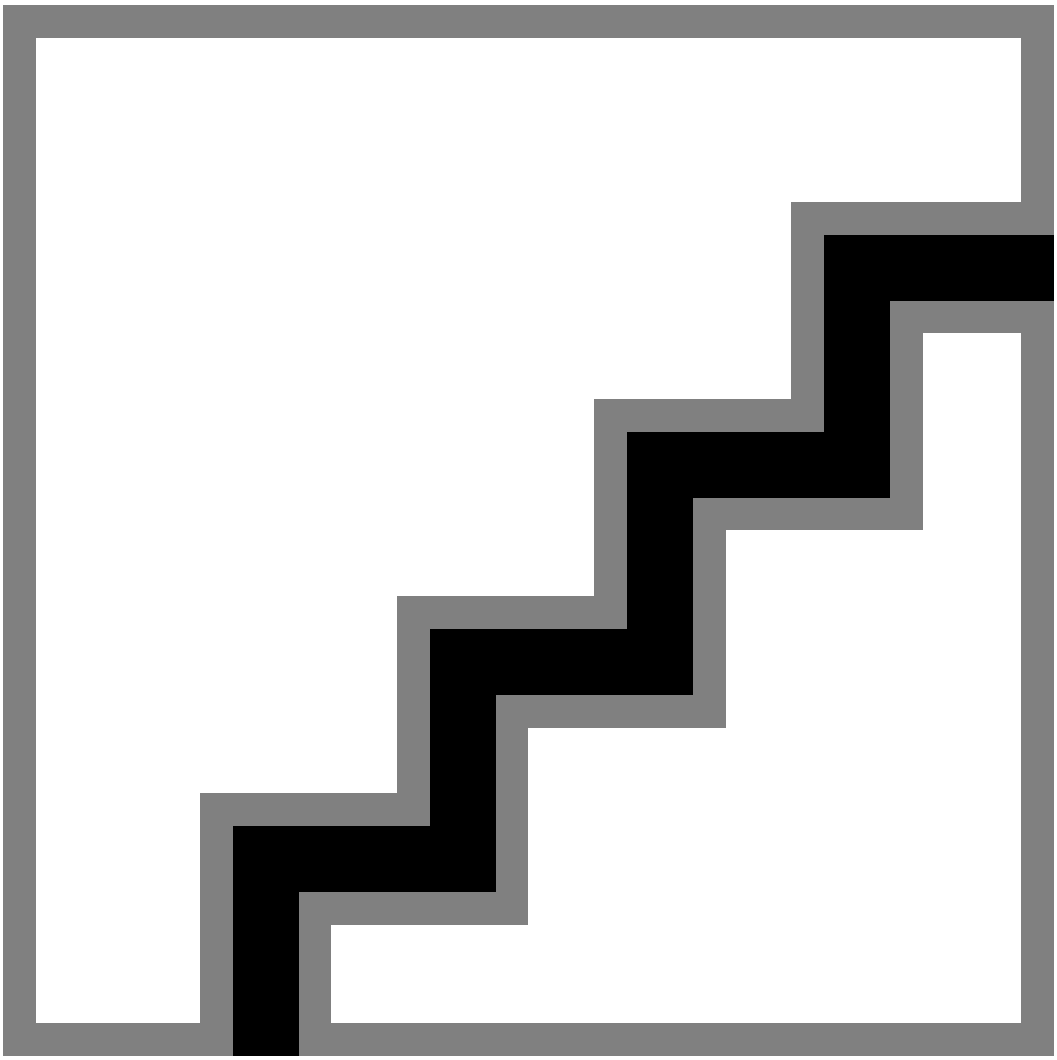
```
{
    "data": [
        {
            "alarmCause": "An unrecoverable fault has occurred in the internal circuit of the device.",
            "alarmId": 2064,
"alarmName": "The device is abnormal.",
```

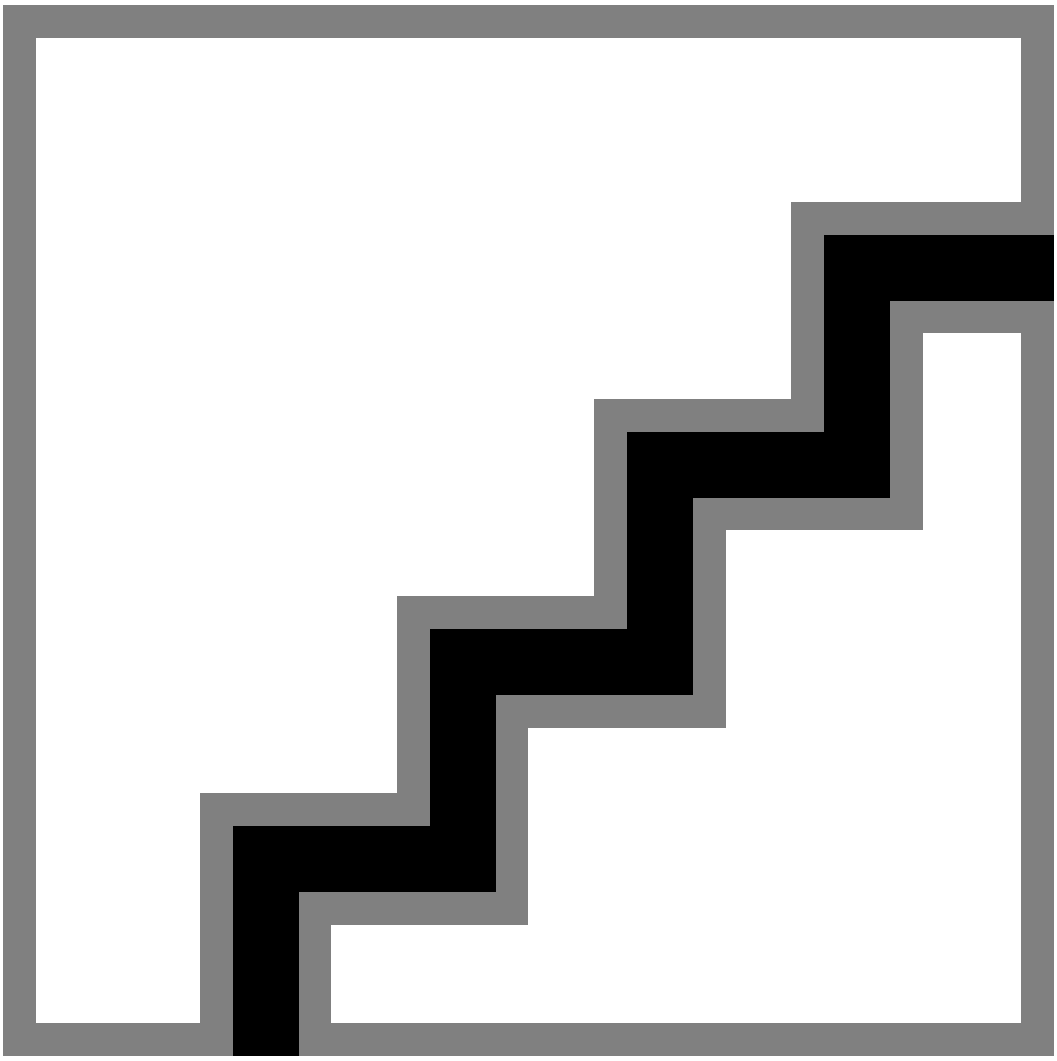
```
            "alarmType": 2,
            "causeId": 5,
            "devName": "Inverter-1",
            "devTypeId": 38,
            "esnCode": "Inverter05",
            "lev": 2,
            "raiseTime": 1667179861000,
            "repairSuggestion": "Turn off the AC and DC switches, wait for 5 minutes, and then turn on the AC
and DC switches. If the fault persists, contact your dealer or technical support.",
            "stationCode": "NE=33554792",
            "stationName": "hzhStation02",
            "status": 1
        },
        {
            "alarmCause": "1. The voltage of a battery expansion module is low.",
            "alarmId": 3011,
            "alarmName": "Battery expansion module undervoltage",
            "alarmType": 2,
            "causeId": 2,
            "devName": "Inverter-2",
            "devTypeId": 38,
            "esnCode": "Inverter01",
            "lev": 4,
            "raiseTime": 1665264943000,
            "repairSuggestion": "1. If the sunlight is sufficient or AC reverse charging is allowed, the Battery
[CNo] battery expansion module [SNo] (in the fault location information) can be charged when the
inverter is running.",
            "stationCode": "NE=33554785",
            "stationName": "hzhStation01",
            "status": 1
        }
    ],
    "failCode": 0,
    "message": null,
    "params": {
        "currentTime": 1667399432812,
        "sns": "Inverter01",
        "language": "zh_CN",
        "beginTime": 1664553600000,
        "devTypes": "1,2,38,46,62",
        "endTime": 1667231999000,
        "levels": "1,2,3,4",
        "stationCodes": "NE=33554785,NE=33554792"
    },
    "success": true
}
```

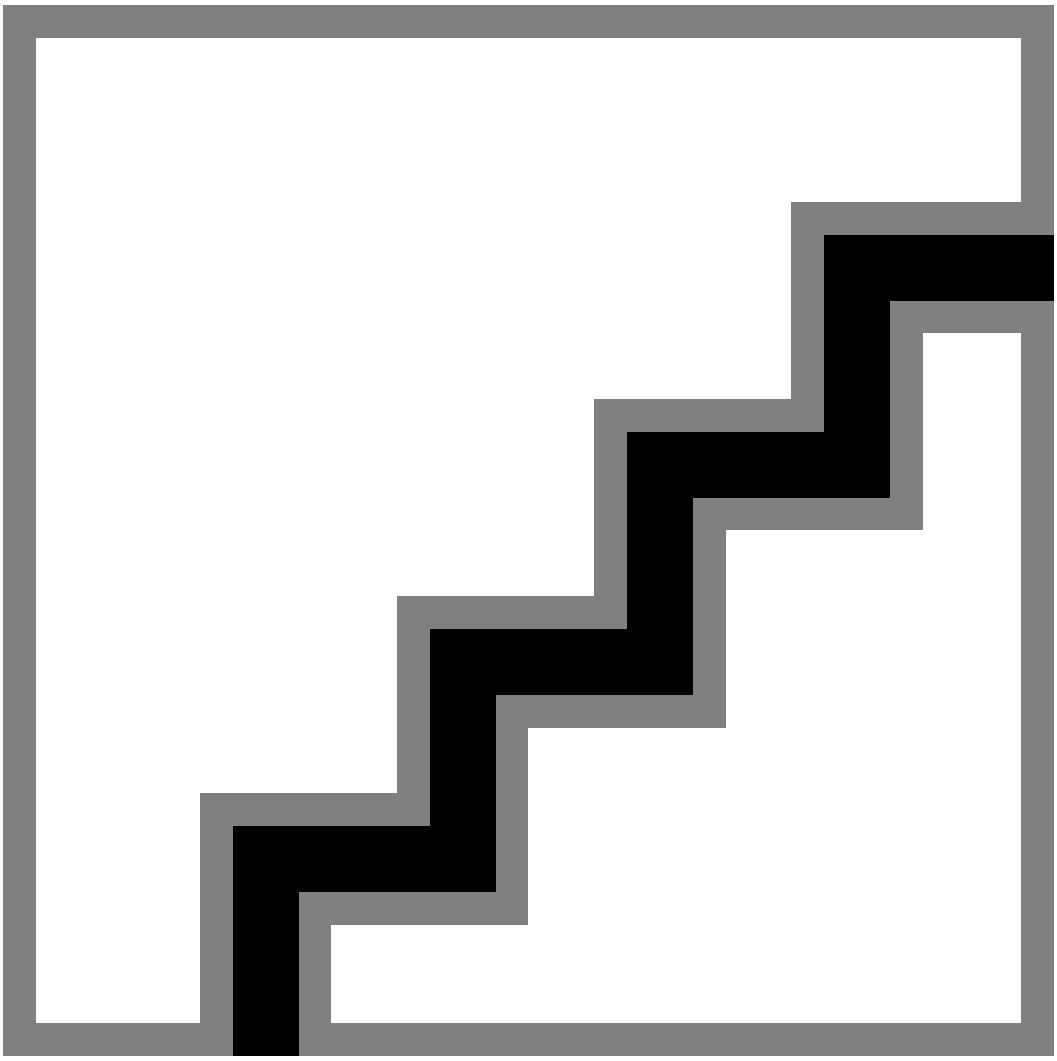
NOTE

Prerequisites for obtaining data: The user has the permission to access this interface.

Request example:







9.2 Indicators Obtained over Northbound Interfaces

9.2.1 Interface for Real-time Plant Data

Key	Name	Unit	Return Value Type
day_power	Yield today	kWh	Double
month_power	Yield this month	kWh	Double
total_power	Total yield	kWh	Double
day_income	Revenue today	The currency specified in the management system	Double

Key	Name	Unit	Return Value Type
total_income	Total revenue	The currency specified in the management system	Double
real_health_state	Plant health status The following plant health states are supported: 1: disconnected 2: faulty 3: healthy	None	Integer

9.2.2 Hourly Plant Data Interface

Key	Name	Unit	Return Value Type
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Feed-in energy	kWh	Double
power_profit	Revenue	The currency specified in the management system	Double

9.2.3 Daily Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double

Key	Name	Unit	Return Value Type
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Feed-in energy	kWh	Double
use_power	Consumption	kWh	Double
power_profit	Revenue	The currency specified in the management system	Double
perpower_ratio	Specific energy (kWh/kWp)	h	Double
reduction_total_co2	CO_2 emission reduction	Ton	Double
reduction_total_coal	Standard coal saved	Ton	Double
reduction_total_tree	Equivalent trees planted	N/A	Double

9.2.4 Monthly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Feed-in energy	kWh	Double

Key	Name	Unit	Return Value Type
use_power	Consumption	kWh	Double
power_profit	Revenue	The currency specified in the management system	Double
perpower_ratio	Specific energy (kWh/kWp)	h	Double
reduction_total_co2	CO_2 emission reduction	Ton	Double
reduction_total_coal	Standard coal saved	Ton	Double
reduction_total_tree	Equivalent trees planted	N/A	Double

9.2.5 Yearly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Feed-in energy	kWh	Double
use_power	Consumption	kWh	Double
power_profit	Revenue	The currency specified in the management system	Double

Key	Name	Unit	Return Value Type
perpower_ratio	Specific energy (kWh/kWp)	h	Double
reduction_total_co2	CO_2 emission reduction	Ton	Double
reduction_total_coal	Standard coal saved	Ton	Double
reduction_total_tree	Equivalent trees planted	N/A	Double

9.2.6 Real-Time Device Data Interface

Device Type	Key	Item	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter state. For details, see **Table 9-1**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double

Device Type	Key	Item	Unit	Return Value Type
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv9_u	PV9 input voltage	V	Double
	pv10_u	PV10 input voltage	V	Double
	pv11_u	PV11 input voltage	V	Double
	pv12_u	PV12 input voltage	V	Double
	pv13_u	PV13 input voltage	V	Double
	pv14_u	PV14 input voltage	V	Double
	pv15_u	PV15 input voltage	V	Double
	pv16_u	PV16 input voltage	V	Double

Device Type	Key	Item	Unit	Return Value Type
	pv17_u	PV17 input voltage	V	Double
	pv18_u	PV18 input voltage	V	Double
	pv19_u	PV19 input voltage	V	Double
	pv20_u	PV20 input voltage	V	Double
	pv21_u	PV21 input voltage	V	Double
	pv22_u	PV22 input voltage	V	Double
	pv23_u	PV23 input voltage	V	Double
	pv24_u	PV24 input voltage	V	Double
	pv25_u	PV25 input voltage	V	Double
	pv26_u	PV26 input voltage	V	Double
	pv27_u	PV27 input voltage	V	Double
	pv28_u	PV28 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	pv9_i	PV9 input current	A	Double
	pv10_i	PV10 input current	A	Double

Device Type	Key	Item	Unit	Return Value Type
	pv11_i	PV11 input current	A	Double
	pv12_i	PV12 input current	A	Double
	pv13_i	PV13 input current	A	Double
	pv14_i	PV14 input current	A	Double
	pv15_i	PV15 input current	A	Double
	pv16_i	PV16 input current	A	Double
	pv17_i	PV17 input current	A	Double
	pv18_i	PV18 input current	A	Double
	pv19_i	PV19 input current	A	Double
	pv20_i	PV20 input current	A	Double
	pv21_i	PV21 input current	A	Double
	pv22_i	PV22 input current	A	Double
	pv23_i	PV23 input current	A	Double
	pv24_i	PV24 input current	A	Double
	pv25_i	PV25 input current	A	Double
	pv26_i	PV26 input current	A	Double
	pv27_i	PV27 input current	A	Double
	pv28_i	PV28 input current	A	Double
	total_cap	Total yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_total_cap	Total DC input energy	kWh	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
	mppt_5_cap	MPPT 5 DC total yield	kWh	Double
	mppt_6_cap	MPPT 6 DC total yield	kWh	Double
	mppt_7_cap	MPPT 7 DC total yield	kWh	Double
	mppt_8_cap	MPPT 8 DC total yield	kWh	Double
	mppt_9_cap	MPPT 9 DC total yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total yield	kWh	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long
ID: 38 Residential inverter	inverter_state	Inverter state. For details, see **Table 9-1**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double

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Device Type	Key	Item	Unit	Return Value Type
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	total_cap	Total yield	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long
ID: 10 EMI	temperature	Temperature	°C	Double
	pv_temperature	PV temperature	°C	Double
	wind_speed	Wind speed	m/s	Double
	wind_direction	Wind direction	Degree	Double
	radiant_total	Daily irradiation	MJ/m^2	Double
	radiant_line	Irradiance	W/m^2	Double
	horiz_radiant_line	Horizontal irradiance	W/m^2	Double
	horiz_radiant_total	Horizontal irradiation	MJ/m^2	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long
ID: 17 Grid meter	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double

Device Type	Key	Item	Unit	Return Value Type
	a_u	Phase A voltage (AC output)	V	Double
	b_u	Phase B voltage (AC output)	V	Double
	c_u	Phase C voltage (AC output)	V	Double
	a_i	Phase A current of grid (IA)	A	Double
	b_i	Phase B current of grid (IB)	A	Double
	c_i	Phase C current of grid (IC)	A	Double
	active_power	Active power	kW	Double
	power_factor	Power factor	None	Double
	active_cap	Active energy (positive active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double
	reverse_active_cap	Negative active energy	kWh	Double
	forward_reactive_cap	Positive reactive energy	kWh	Double
	reverse_reactive_cap	Negative reactive energy	kWh	Double
	active_power_a	Active power PA	kW	Double
	active_power_b	Active power PB	kW	Double
	active_power_c	Active power PC	kW	Double
	reactive_power_a	Reactive power QA	kVar	Double
	reactive_power_b	Reactive power QB	kVar	Double
	reactive_power_c	Reactive power QC	kVar	Double
	total_apparent_power	Total apparent power	kVA	Double
	grid_frequency	Grid frequency	Hz	Double

Device Type	Key	Item	Unit	Return Value Type
	reverse_active_peak	Negative active energy (peak)	kWh	Double
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double
	reverse_active_top	Negative active energy (sharp)	kWh	Double
	positive_active_peak	Positive active energy (peak)	kWh	Double
	positive_active_power	Positive active energy (shoulder)	kWh	Double
	positive_active_valley	Positive active energy (off-peak)	kWh	Double
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double
	reverse_reactive_power	Negative reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Negative reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Negative reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Positive reactive energy (peak)	kVar	Double
	positive_reactive_power	Positive reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Positive reactive energy (off-peak)	kVar	Double
	positive_reactive_top	Positive reactive energy (sharp)	kVar	Double
ID: 47 Power sensor	meter_status	Meter state (0: offline; 1: normal)	None	Double
	meter_u	Phase A voltage (AC output)	V	Double

Device Type	Key	Item	Unit	Return Value Type
	meter_i	Phase A current of grid (IA)	A	Double
	active_power	Active power	W	Double
	reactive_power	Reactive power	Var	Double
	power_factor	Power factor	None	Double
	grid_frequency	Grid frequency	Hz	Double
	active_cap	Active energy (positive active energy)	kWh	Double
	reverse_active_cap	Negative active energy	kWh	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	b_u	Phase B voltage (AC output)	V	Double
	c_u	Phase C voltage (AC output)	V	Double
	b_i	Phase B current of grid (IB)	A	Double
	c_i	Phase C current of grid (IC)	A	Double
	forward_reactive_cap	Positive reactive energy	kWh	Double
	reverse_reactive_cap	Negative reactive energy	kWh	Double
	active_power_a	Active power PA	kW	Double
	active_power_b	Active power PB	kW	Double
	active_power_c	Active power PC	kW	Double

Device Type	Key	Item	Unit	Return Value Type
	reactive_power_a	Reactive power QA	kVar	Double
	reactive_power_b	Reactive power QB	kVar	Double
	reactive_power_c	Reactive power QC	kVar	Double
	total_apparent_power	Total apparent power	kVA	Double
	reverse_active_peak	Negative active energy (peak)	kWh	Double
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double
	reverse_active_top	Negative active energy (sharp)	kWh	Double
	positive_active_peak	Positive active energy (peak)	kWh	Double
	positive_active_power	Positive active energy (shoulder)	kWh	Double
	positive_active_valley	Positive active energy (off-peak)	kWh	Double
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double
	reverse_reactive_power	Negative reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Negative reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Negative reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Positive reactive energy (peak)	kVar	Double
	positive_reactive_power	Positive reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Positive reactive energy (off-peak)	kVar	Double

Device Type	Key	Item	Unit	Return Value Type
	positive_reactive_top	Positive reactive energy (sharp)	kVar	Double
ID: 39 Residential battery	battery_status	Battery running state (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Double
	max_charge_power	Maximum charge power	W	Double
	max_discharge_power	Maximum discharge power	W	Double
	ch_discharge_power	Charge/Discharge power	W	Double
	busbar_u	Battery voltage	V	Double
	battery_soc	Battery SOC	%	Double
	battery_soh	Battery SOH	None	Double
	ch_discharge_model	Charge/Discharge mode (0: none; 1: forced charge/discharge; 2: time-of-use price; 3: fixed charge/discharge; 4: automatic charge/discharge)	None	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long
ID: 41 C&I and utility ESS	ch_discharge_power	Charge/Discharge power	W	Double
	battery_soc	Battery SOC	%	Double
	battery_soh	Battery SOH	None	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	run_state	State (0: Disconnected 1: Connected)	None	Long

Table 9-1 Inverter state (inverter_state) description

State Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start
512	Grid-connected
513	Grid-connected: power limited
514	Grid-connected: self-derating
515	Off-grid operation
768	Shutdown: on fault
769	Shutdown: on command
770	Shutdown: OVGR
771	Shutdown: communication interrupted
772	Shutdown: power limited
773	Shutdown: manual startup required
774	Shutdown: DC switch disconnected
775	Shutdown: rapid shutdown
776	Shutdown: input underpower
777	Shutdown: NS protection
778	Shutdown: commanded rapid shutdown
1025	Grid scheduling: cosϕ-P curve
1026	Grid scheduling: Q-U curve
1027	Power grid scheduling: PF-U characteristic curve

State Value	Description
1028	Grid scheduling: dry contact
1029	Power grid scheduling: Q-P characteristic curve
1280	Ready for terminal test
1281	Terminal testing...
1536	Inspection in progress
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
2560	Off-grid charging
40960	Standby: no irradiation
40961	Standby: no DC input
45056	Communication interrupted (written by SmartLogger)
49152	Loading... (written by SmartLogger)

9.2.7 5-minute Device Data Interface

Device Type	Key	Item	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter state. For details, see **Table 9-2**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double

Device Type	Key	Item	Unit	Return Value Type
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv9_u	PV9 input voltage	V	Double
	pv10_u	PV10 input voltage	V	Double
	pv11_u	PV11 input voltage	V	Double
	pv12_u	PV12 input voltage	V	Double

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Device Type	Key	Item	Unit	Return Value Type
	pv13_u	PV13 input voltage	V	Double
	pv14_u	PV14 input voltage	V	Double
	pv15_u	PV15 input voltage	V	Double
	pv16_u	PV16 input voltage	V	Double
	pv17_u	PV17 input voltage	V	Double
	pv18_u	PV18 input voltage	V	Double
	pv19_u	PV19 input voltage	V	Double
	pv20_u	PV20 input voltage	V	Double
	pv21_u	PV21 input voltage	V	Double
	pv22_u	PV22 input voltage	V	Double
	pv23_u	PV23 input voltage	V	Double
	pv24_u	PV24 input voltage	V	Double
	pv25_u	PV25 input voltage	V	Double
	pv26_u	PV26 input voltage	V	Double
	pv27_u	PV27 input voltage	V	Double
	pv28_u	PV28 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double

Device Type	Key	Item	Unit	Return Value Type
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	pv9_i	PV9 input current	A	Double
	pv10_i	PV10 input current	A	Double
	pv11_i	PV11 input current	A	Double
	pv12_i	PV12 input current	A	Double
	pv13_i	PV13 input current	A	Double
	pv14_i	PV14 input current	A	Double
	pv15_i	PV15 input current	A	Double
	pv16_i	PV16 input current	A	Double
	pv17_i	PV17 input current	A	Double
	pv18_i	PV18 input current	A	Double
	pv19_i	PV19 input current	A	Double
	pv20_i	PV20 input current	A	Double
	pv21_i	PV21 input current	A	Double
	pv22_i	PV22 input current	A	Double
	pv23_i	PV23 input current	A	Double
	pv24_i	PV24 input current	A	Double
	pv25_i	PV25 input current	A	Double
	pv26_i	PV26 input current	A	Double
	pv27_i	PV27 input current	A	Double
	pv28_i	PV28 input current	A	Double
	total_cap	Total yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double

Device Type	Key	Item	Unit	Return Value Type
	mppt_total_cap	Total DC input energy	kWh	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
	mppt_5_cap	MPPT 5 DC total yield	kWh	Double
	mppt_6_cap	MPPT 6 DC total yield	kWh	Double
	mppt_7_cap	MPPT 7 DC total yield	kWh	Double
	mppt_8_cap	MPPT 8 DC total yield	kWh	Double
	mppt_9_cap	MPPT 9 DC total yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total yield	kWh	Double
ID: 38 Residential inverter	inverter_state	Inverter state. For details, see **Table 9-2**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double

Device Type	Key	Item	Unit	Return Value Type
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double

Device Type	Key	Item	Unit	Return Value Type
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	total_cap	Total yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
ID: 10 EMI	temperature	Temperature	°C	Double
	pv_temperature	PV temperature	°C	Double
	wind_speed	Wind speed	m/s	Double
	wind_direction	Wind direction	Degree	Double
	radiant_total	Daily irradiation	MJ/m^2	Double
	radiant_line	Irradiance	W/m^2	Double
	horiz_radiant_line	Horizontal irradiance	W/m^2	Double
	horiz_radiant_total	Horizontal irradiation	MJ/m^2	Double
ID: 17 Grid meter	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage (AC output)	V	Double

Device Type	Key	Item	Unit	Return Value Type
	b_u	Phase B voltage (AC output)	V	Double
	c_u	Phase C voltage (AC output)	V	Double
	a_i	Phase A current of grid (IA)	A	Double
	b_i	Phase B current of grid (IB)	A	Double
	c_i	Phase C current of grid (IC)	A	Double
	active_power	Active power	kW	Double
	power_factor	Power factor	None	Double
	active_cap	Active energy (positive active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double
	reverse_active_cap	Negative active energy	kWh	Double
	forward_reactive_cap	Positive reactive energy	kWh	Double
	reverse_reactive_cap	Negative reactive energy	kWh	Double
	active_power_a	Active power PA	kW	Double
	active_power_b	Active power PB	kW	Double
	active_power_c	Active power PC	kW	Double
	reactive_power_a	Reactive power QA	kVar	Double
	reactive_power_b	Reactive power QB	kVar	Double
	reactive_power_c	Reactive power QC	kVar	Double
	total_apparent_power	Total apparent power	kVA	Double
	grid_frequency	Grid frequency	Hz	Double
	reverse_active_peak	Negative active energy (peak)	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double
	reverse_active_top	Negative active energy (sharp)	kWh	Double
	positive_active_peak	Positive active energy (peak)	kWh	Double
	positive_active_power	Positive active energy (shoulder)	kWh	Double
	positive_active_valley	Positive active energy (off-peak)	kWh	Double
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double
	reverse_reactive_power	Negative reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Negative reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Negative reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Positive reactive energy (peak)	kVar	Double
	positive_reactive_power	Positive reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Positive reactive energy (off-peak)	kVar	Double
	positive_reactive_top	Positive reactive energy (sharp)	kVar	Double
ID: 47 Power sensor	meter_status	Meter state (0: offline; 1: normal)	None	Double
	meter_u	Grid voltage	V	Double
	meter_i	Grid current	A	Double
	active_power	Active power	W	Double

Device Type	Key	Item	Unit	Return Value Type
	reactive_power	Reactive power	Var	Double
	power_factor	Power factor	None	Double
	grid_frequency	Grid frequency	Hz	Double
	active_cap	Active energy (positive active energy)	kWh	Double
	reverse_active_cap	Negative active energy	kWh	Double
ID: 39 Residential battery	battery_status	Battery running state (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Double
	max_charge_power	Maximum charge power	W	Double
	max_discharge_power	Maximum discharge power	W	Double
	ch_discharge_power	Charge/Discharge power	W	Double
	busbar_u	Battery voltage	V	Double
	battery_soc	Battery SOC	%	Double
	battery_soh	Battery SOH	None	Double
	ch_discharge_model	Charge/Discharge mode (0: none; 1: forced charge/discharge; 2: time-of-use price; 3: fixed charge/discharge; 4: automatic charge/discharge)	None	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
ID: 41 C&I and utility ESS	ch_discharge_power	Charge/Discharge power	W	Double
	battery_soc	Battery SOC	%	Double
	charge_cap	Charged energy	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	discharge_cap	Discharged energy	kWh	Double

Table 9-2 Inverter state (inverter_state) description

State Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start
512	Grid-connected
513	Grid-connected: power limited
514	Grid-connected: self-derating
768	Shutdown: on fault
769	Shutdown: on command
770	Shutdown: OVGR
771	Shutdown: communication interrupted
772	Shutdown: power limited
773	Shutdown: manual startup required
774	Shutdown: DC switch disconnected
1025	Grid scheduling: cosϕ-P curve
1026	Grid scheduling: Q-U curve
1280	Ready for terminal test
1281	Terminal testing...
1536	Inspection in progress
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no irradiation

State Value	Description
45056	Communication interrupted (written by SmartLogger)
49152	Loading... (written by SmartLogger)

9.2.8 Historical Device Data Interface

Device Type	Key	Item	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter state. For details, see **Table 9-3**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double

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Device Type	Key	Item	Unit	Return Value Type
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv9_u	PV9 input voltage	V	Double
	pv10_u	PV10 input voltage	V	Double
	pv11_u	PV11 input voltage	V	Double
	pv12_u	PV12 input voltage	V	Double
	pv13_u	PV13 input voltage	V	Double
	pv14_u	PV14 input voltage	V	Double
	pv15_u	PV15 input voltage	V	Double
	pv16_u	PV16 input voltage	V	Double
	pv17_u	PV17 input voltage	V	Double
	pv18_u	PV18 input voltage	V	Double
	pv19_u	PV19 input voltage	V	Double

Device Type	Key	Item	Unit	Return Value Type
	pv20_u	PV20 input voltage	V	Double
	pv21_u	PV21 input voltage	V	Double
	pv22_u	PV22 input voltage	V	Double
	pv23_u	PV23 input voltage	V	Double
	pv24_u	PV24 input voltage	V	Double
	pv25_u	PV25 input voltage	V	Double
	pv26_u	PV26 input voltage	V	Double
	pv27_u	PV27 input voltage	V	Double
	pv28_u	PV28 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	pv9_i	PV9 input current	A	Double
	pv10_i	PV10 input current	A	Double
	pv11_i	PV11 input current	A	Double
	pv12_i	PV12 input current	A	Double
	pv13_i	PV13 input current	A	Double
	pv14_i	PV14 input current	A	Double

Device Type	Key	Item	Unit	Return Value Type
	pv15_i	PV15 input current	A	Double
	pv16_i	PV16 input current	A	Double
	pv17_i	PV17 input current	A	Double
	pv18_i	PV18 input current	A	Double
	pv19_i	PV19 input current	A	Double
	pv20_i	PV20 input current	A	Double
	pv21_i	PV21 input current	A	Double
	pv22_i	PV22 input current	A	Double
	pv23_i	PV23 input current	A	Double
	pv24_i	PV24 input current	A	Double
	pv25_i	PV25 input current	A	Double
	pv26_i	PV26 input current	A	Double
	pv27_i	PV27 input current	A	Double
	pv28_i	PV28 input current	A	Double
	total_cap	Total yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_total_cap	Total DC input energy	kWh	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
	mppt_5_cap	MPPT 5 DC total yield	kWh	Double

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Device Type	Key	Item	Unit	Return Value Type
	mppt_6_cap	MPPT 6 DC total yield	kWh	Double
	mppt_7_cap	MPPT 7 DC total yield	kWh	Double
	mppt_8_cap	MPPT 8 DC total yield	kWh	Double
	mppt_9_cap	MPPT 9 DC total yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total yield	kWh	Double
ID: 38 Residential inverter	inverter_state	Inverter state. For details, see **Table 9-3**.	None	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double
	c_u	Phase C voltage	V	Double
	a_i	Phase A current of grid	A	Double
	b_i	Phase B current of grid	A	Double
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature	°C	Double
	power_factor	Power factor	None	Double
	elec_freq	Grid frequency	Hz	Double

Device Type	Key	Item	Unit	Return Value Type
	active_power	Active power	kW	Double
	reactive_power	Output reactive power	kVar	Double
	day_cap	Yield today	kWh	Double
	mppt_power	MPPT total input power	kW	Double
	pv1_u	PV1 input voltage	V	Double
	pv2_u	PV2 input voltage	V	Double
	pv3_u	PV3 input voltage	V	Double
	pv4_u	PV4 input voltage	V	Double
	pv5_u	PV5 input voltage	V	Double
	pv6_u	PV6 input voltage	V	Double
	pv7_u	PV7 input voltage	V	Double
	pv8_u	PV8 input voltage	V	Double
	pv1_i	PV1 input current	A	Double
	pv2_i	PV2 input current	A	Double
	pv3_i	PV3 input current	A	Double
	pv4_i	PV4 input current	A	Double
	pv5_i	PV5 input current	A	Double
	pv6_i	PV6 input current	A	Double
	pv7_i	PV7 input current	A	Double
	pv8_i	PV8 input current	A	Double
	total_cap	Total yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total yield	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
ID: 10 EMI	temperature	Temperature	°C	Double
	pv_temperature	PV temperature	°C	Double
	wind_speed	Wind speed	m/s	Double
	wind_direction	Wind direction	Degree	Double
	radiant_total	Daily irradiation	MJ/m^2	Double
	radiant_line	Irradiance	W/m^2	Double
	horiz_radiant_line	Horizontal irradiance	W/m^2	Double
	horiz_radiant_total	Horizontal irradiation	MJ/m^2	Double
ID: 17 Grid meter	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double
	ca_u	C-A line voltage of grid	V	Double
	a_u	Phase A voltage (AC output)	V	Double
	b_u	Phase B voltage (AC output)	V	Double
	c_u	Phase C voltage (AC output)	V	Double
	a_i	Phase A current of grid (IA)	A	Double
	b_i	Phase B current of grid (IB)	A	Double
	c_i	Phase C current of grid (IC)	A	Double
	active_power	Active power	kW	Double
	power_factor	Power factor	None	Double

Device Type	Key	Item	Unit	Return Value Type
	active_cap	Active energy (positive active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double
	reverse_active_cap	Negative active energy	kWh	Double
	forward_reactive_cap	Positive reactive energy	kWh	Double
	reverse_reactive_cap	Negative reactive energy	kWh	Double
	active_power_a	Active power PA	kW	Double
	active_power_b	Active power PB	kW	Double
	active_power_c	Active power PC	kW	Double
	reactive_power_a	Reactive power QA	kVar	Double
	reactive_power_b	Reactive power QB	kVar	Double
	reactive_power_c	Reactive power QC	kVar	Double
	total_apparent_power	Total apparent power	kVA	Double
	grid_frequency	Grid frequency	Hz	Double
	reverse_active_peak	Negative active energy (peak)	kWh	Double
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double
	reverse_active_top	Negative active energy (sharp)	kWh	Double
	positive_active_peak	Positive active energy (peak)	kWh	Double
	positive_active_power	Positive active energy (shoulder)	kWh	Double
	positive_active_valley	Positive active energy (off-peak)	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double
	reverse_reactive_power	Negative reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Negative reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Negative reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Positive reactive energy (peak)	kVar	Double
	positive_reactive_power	Positive reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Positive reactive energy (off-peak)	kVar	Double
	positive_reactive_top	Positive reactive energy (sharp)	kVar	Double
ID: 47 Power sensor	meter_status	Meter status (0: offline; 1: normal)	None	Double
	meter_u	Grid voltage	V	Double
	meter_i	Grid current	A	Double
	active_power	Active power	W	Double
	reactive_power	Reactive power	Var	Double
	power_factor	Power factor	None	Double
	grid_frequency	Grid frequency	Hz	Double
	active_cap	Active energy (positive active energy)	kWh	Double
	reverse_active_cap	Negative active energy	kWh	Double
	ab_u	A-B line voltage of grid	V	Double
	bc_u	B-C line voltage of grid	V	Double

Device Type	Key	Item	Unit	Return Value Type
	ca_u	C-A line voltage of grid	V	Double
	b_u	Phase B voltage (AC output)	V	Double
	c_u	Phase C voltage (AC output)	V	Double
	b_i	Phase B current of grid (IB)	A	Double
	c_i	Phase C current of grid (IC)	A	Double
	reverse_active_cap	Negative active energy	kWh	Double
	forward_reactive_cap	Positive reactive energy	kWh	Double
	reverse_reactive_cap	Negative reactive energy	kWh	Double
	active_power_a	Active power PA	kW	Double
	active_power_b	Active power PB	kW	Double
	active_power_c	Active power PC	kW	Double
	reactive_power_a	Reactive power QA	kVar	Double
	reactive_power_b	Reactive power QB	kVar	Double
	reactive_power_c	Reactive power QC	kVar	Double
	total_apparent_power	Total apparent power	kVA	Double
	reverse_active_peak	Negative active energy (peak)	kWh	Double
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double
	reverse_active_top	Negative active energy (sharp)	kWh	Double
	positive_active_peak	Positive active energy (peak)	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	positive_active_power	Positive active energy (shoulder)	kWh	Double
	positive_active_valley	Positive active energy (off-peak)	kWh	Double
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double
	reverse_reactive_power	Negative reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Negative reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Negative reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Positive reactive energy (peak)	kVar	Double
	positive_reactive_power	Positive reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Positive reactive energy (off-peak)	kVar	Double
	positive_reactive_top	Positive reactive energy (sharp)	kVar	Double
ID: 39 Residential battery	battery_status	Battery running state (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Double
	max_charge_power	Maximum charge power	W	Double
	max_discharge_power	Maximum discharge power	W	Double
	ch_discharge_power	Charge/Discharge power	W	Double
	busbar_u	Battery voltage	V	Double
	battery_soc	Battery SOC	%	Double
	battery_soh	Battery SOH	None	Double

Device Type	Key	Item	Unit	Return Value Type
	ch_discharge_model	Charge/Discharge mode (0: none; 1: forced charge/discharge; 2: time-of-use price; 3: fixed charge/discharge; 4: automatic charge/discharge)	None	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
ID: 41 C&I and utility ESS	ch_discharge_power	Charge/Discharge power	W	Double
	battery_soc	Battery SOC	%	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

Table 9-3 Inverter state (inverter_state) description

State Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start
512	Grid-connected
513	Grid-connected: power limited
514	Grid-connected: self-derating
768	Shutdown: on fault
769	Shutdown: on command
770	Shutdown: OVGR
771	Shutdown: communication interrupted
772	Shutdown: power limited

State Value	Description
773	Shutdown: manual startup required
774	Shutdown: DC switch disconnected
1025	Grid scheduling: cosϕ-P curve
1026	Grid scheduling: Q-U curve
1280	Ready for terminal test
1281	Terminal testing...
1536	Inspection in progress
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no irradiation
45056	Communication interrupted (written by SmartLogger)
49152	Loading... (written by SmartLogger)

9.2.9 Daily Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Residential battery	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
	charge_time	Charging duration	h	Double
	discharge_time	Discharging duration	h	Double
ID: 1 String inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double
ID: 38 Residential inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double

Device Type	Key	Name	Unit	Return Value Type
ID: 41 C&I and utility ESS	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

9.2.10 Monthly Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Residential battery	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
	charge_time	Charging duration	h	Double
	discharge_time	Discharging duration	h	Double
ID: 1 String inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double
ID: 38 Residential inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double
ID: 41 C&I and utility ESS	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

9.2.11 Yearly Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Residential battery	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

Device Type	Key	Name	Unit	Return Value Type
	charge_time	Charging duration	h	Double
	discharge_time	Discharging duration	h	Double
ID: 1 String inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double
ID: 38 Residential inverter	installed_capacity	Installed capacity	kW	Double
	product_power	Yield	kWh	Double
	perpower_ratio	Specific energy (kWh/kWp)	h	Double
ID: 41 C&I and utility ESS	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double

9.3 Restricted Access Interface

The interfaces in this section are restricted. To use them, contact Huawei technical support.

9.3.1 Device Convergence Data Interface

Interface Description

Used to query the running and alarm data of a maximum of 100 inverters at a time.

Request URL

https://Domain name of the management system/thirdData/cs/getInventerRealKpi

Request Mode

HTTP method: POST

Access Restrictions

This interface can be invoked once every hour.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
sns	Inverter SN list. Multiple device IDs are separated by commas (,).	String	Mandatory

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Request input parameter, including the following information:	-	-
>sns	Inverter SNs in the request parameter	String	-
message	Optional message	String	-
data	Returned data. The data contains the query result list of each inverter, including the following information:	List	Real-time, alarm, and historical inverter data
>sn	Inverter SN	String	
>kpis	Real-time or historical inverter data, including the following information:	Map	5-minute device data
>>activePower	Active power	Double	
>>collectorSN	Collector SN	String	
>>controlVersion	Control board version	String	
>>createTime	Data collection time	Integer	
>>eDay	Yield today	Double	

Parameter	Description	Data Type	Remarks
>>eMonth	Energy yield of this month	Double	
>>eTotal	Total energy yield	Double	
>>errorCode	Error code and alarm ID	String	When historical data is queried, the value is null.
>>fac	Frequency	Double	
>>iac1	Phase A current of output current 1	Double	
>>iac2	Phase B current of output current 2	Double	
>>iac3	Phase C current of output current 3	Double	
>>inverterSN	Inverter SN	String	
>>inverterManufacturer	Inverter manufacturer	String	

Parameter	Description	Data Type	Remarks
>>ipvs	String input current list	List	The length of the list indicates the number of strings which are sorted in sequence. If data is missing, the corresponding data is populated with null. For example, if the number of strings cannot be queried, inverters are classified by type (residential or string inverter). The missing data is populated with null. The length of the list is as follows: Residential inverter: 8 String inverter: 24
>>nationalStandard	National standards	String	
>>pac	Output power	Double	
>>powerFactor	Power factor	Double	
>>reactivePower	Reactive power	Double	

Parameter	Description	Data Type	Remarks
>>status	Alarm status	Interger	For real-time data, this parameter specifies whether the device has alarms. If an alarm is generated, this parameter is set to 0. If no alarm is generated, this parameter is set to 1. For historical data, this parameter is set to null.
>>temperature	Temperature	Double	
>>vac1	Phase A voltage of output voltage 1	Double	
>>vac2	Phase B voltage of output voltage 2	Double	
>>vac3	Phase C voltage of output voltage 3	Double	

Parameter	Description	Data Type	Remarks
>>vpvs	String input voltage list	Double	The length of the list indicates the number of strings which are sorted in sequence. If data is missing, the corresponding data is populated with null. For example, if the number of strings cannot be queried, inverters are classified by type (residential or string inverter). The missing data is populated with null. The length of the list is as follows: Residential inverter: 8 String inverter: 24

Example

Request example:

```
{
    "sns": "LKSN2KL,SLV1_SN2KL_001"
}
```

Response example:

Example 1: An error code is returned.

```
{
    "data": null,
    "failCode": 20046,
    "message": null,
    "params": {
        "sns": "LKSN2KL,SLV1_SN2KL_001"
    },
    "success": false
}
```


Example 2: The real-time and alarm data of the device is returned.


```
{
    "data": [
        {
            "kpis": [
                {
                    "activePower": 30.0,
                    "collectorSN": "SLV1_001_1158",
                    "controlVersion": "V100R001C00SPC334",
                    "createTime": 1650441600,
                    "eDay": 405.0,
                    "eMonth": 0.0,
                    "eTotal": 9605.0,
                    "errorCode": "",
                    "fac": 56.16,
                    "iac1": 50.0,
                    "iac2": 50.0,
                    "iac3": 50.0,
                    "inventerSN": "SLV1_SN2KL_001",
                    "inverterManufacturer": "Huawei",
                    "ipvs": [
                        26.16,
                        26.16,
                        26.16,
                        26.16,
                        20.0,
                        20.0,
                        20.0,
                        20.0,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null,
                        null
                    ],
                    "nationalStandard": "NB32004",
                    "pac": 30.0,
                    "powerFactor": -0.384,
                    "reactivePower": 6.616,
                    "status": 1,
                    "temperature": 11.6,
                    "vac1": 261.6,
                    "vac2": 261.6,
                    "vac3": 261.6,
                    "vpvs": [
                        261.6,
                        261.6,
                        261.6,
```

```
                261.6,
                200.0,
                200.0,
                200.0,
                200.0,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null,
                null
            ]
        }
    ],
    "sn": "SLV1_SN2KL_001"
  }
],
"failCode": 0,
"message": null,
"params": {
  "sns": "LKSN2KL,SLV1_SN2KL_001"
},
"success": true
}
```


NOTE

This interface is restricted. Before obtaining data, the system administrator must authorize the northbound user.

9.3.2 Interface for Creating a Plant

Interface Description

This interface is used to create a plant. One plant is created at a time. Before accessing this interface, the northbound user needs to authorize a company to bind the created plant to the company. If multiple companies are authorized, the plant is bound to the first company by default.

Request URL

https://*Domain name of the management system*/thirdData/createStation

Request Mode

HTTP method: POST

Access Restrictions

Maximum number of API calls per user per minute: 10. If the access frequency exceeds the limit, the interface returns error code 407.

Each user can create a maximum of 1000 plants per day. If the creation frequency exceeds the limit, the interface returns error code 26001.

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
basicConfig	Basic information configuration	Object	Mandatory
>stationName	Plant name. It cannot be empty and must contain a maximum of 80 characters, excluding the following special characters: ' < > , / & | or null.	String	Mandatory
>stationType	Plant type **1**: residential power plant **2**: C&I power plant **3**: utility plant	Integer	Mandatory
>pureChange	Indicates whether the plant is an EV-charger-only plant. The default value is 0. It can be set to 1 only for residential power plants. **0**: no **1**: yes	Integer	Optional
>connectTime	Grid connection time (second). The API call time is used by default. The grid connection time cannot be set for an EV-charger-only plant.	Long	Optional
>linkman	Contact person. It can contain a maximum of 30 characters. (A Chinese character occupies two characters.)	String	Optional
>linkmanPho	Contact information. Provide the mobile number, fixed-line number, or email address.	String	Optional
deviceConfig	Connected device configuration. Devices connected to multiple communication modules are supported.	List	Mandatory
>esn	Device SN. For devices connected to the same communication module, you only need to enter the SN of any device (including the communication module).	String	Mandatory

Parameter	Description	Data Type	Mandatory/ Optional
>registerCode	Device registration code. It is mandatory for non-directly connected inverters and devices that require a registration code outside China.	String	Optional
storageConfig	String capacity configuration. It cannot be set for an EV-charger-only plant.	Object	Optional
>totalStorage	String capacity of a plant (unit: kWp) String capacity of a plant or PV device must be specified. If both of them are specified, the string capacity of the plant is prioritized. The string capacity of a plant is evenly allocated to the PV strings connected to devices, and the allocated PV string capacity ranges from 0 to 150 kWp.	Double	Leave it empty/ Fill in either **>totalStorage** or **>PVParams**.
>PVParams	PV device string capacity. The value must be consistent with the number of connected inverters.	List	Leave it empty/ Fill in either **>totalStorage** or **>PVParams**.
>>deviceSn	Inverter SN	String	Mandatory
>>PVStorage	PV string capacity of an inverter (unit: Wp). The values of multiple PV strings are separated by comma (,). The number of values must be the same as the number of PV strings connected to the device, and the values range from 0 to 150,000 Wp.	String	Mandatory
priceConfig	Electricity price configuration. It cannot be set for an EV-charger-only plant.	Object	Optional
>useCompanyPrice	Indicates whether to use the company's electricity price. The default value is 0. **0**: no **1**: yes	Integer	Optional

Parameter	Description	Data Type	Mandatory/ Optional
>definePrice	User-defined electricity price. If it is not specified, the electricity price is not set. If both the company electricity price and user-defined electricity price are specified, the company electricity price is prioritized.	Object	Optional
>>ongridPrice	Feed-in electricity price. The time for the feed-in electricity price must cover the whole year and must not overlap.	List	Optional
>>>beginMonth	Begin month	Integer	Mandatory
>>>beginDay	Begin day	Integer	Mandatory
>>>endMonth	End month	Integer	Mandatory
>>>endDay	End day	Integer	Mandatory
>>>hourRange	Hour range configuration. It must cover continuous 24 hours and must not overlap.	List	Mandatory
>>>>beginHour	Begin hour	Integer	Mandatory
>>>>endHour	End hour	Integer	Mandatory
>>>>price	Feed-in electricity price. The value must be greater than or equal to 0 and can contain a maximum of seven integers and four decimal places. If the decimal part contains more than four digits, only the first four digits will be retained by default.	Double	Mandatory
>>purchasePrice	Electricity purchase price. The date must cover the whole year and must not overlap.	List	Optional
>>>beginMonth	Begin month	Integer	Mandatory
>>>beginDay	Begin day	Integer	Mandatory

Parameter	Description	Data Type	Mandatory/ Optional
>>>endMonth	End month	Integer	Mandatory
>>>endDay	End day	Integer	Mandatory
>>>hourRange	Hour range configuration. It must cover continuous 24 hours and must not overlap.	List	Mandatory
>>>>beginHour	Begin hour	Integer	Mandatory
>>>>endHour	End hour	Integer	Mandatory
>>>>price	Feed-in electricity price. The value must be greater than or equal to 0 and can contain a maximum of seven integers and four decimal places. If the decimal part contains more than four digits, only the first four digits will be retained by default.	Double	Mandatory
additionConfig	Additional information configuration	Object	Mandatory
areaCode	Area code	Integer	Mandatory
address	Plant address	String	Mandatory
longitude	Longitude. The value ranges from –180 to +180 and can contain a maximum of seven decimal places.	Double	Mandatory
latitude	Latitude. The value ranges from –90 to +90 and can contain a maximum of seven decimal places.	Double	Mandatory
timeZoneCode	Time zone code	Integer	Mandatory
safeRunningTime	Safe running start time (unit: second). The API call time is used by default.	Long	Optional
introduction	Plant introduction. It can contain a maximum of 128 characters.	String	Optional

Parameter	Description	Data Type	Mandatory/ Optional
loadStatus	Indicates whether any load is connected. The default value is 1. **0**: no **1**: yes	Integer	Optional

Area Codes

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
1	Ascension Island	65	Algeria	129	Cayman Islands	193	Réunion
2	Andorra	66	Ceuta and Melilla	130	Kazakhstan	194	Romania
3	United Arab Emirates	67	Ecuador	131	Laos	195	Serbia
4	Afghanistan	68	Estonia	132	Lebanon	196	Russia
5	Antigua and Barbuda	69	Egypt	133	Saint Lucia	197	Rwanda
6	Anguilla	70	Western Sahara	134	Liechtenstein	198	Saudi Arabia
7	Albania	71	Eritrea	135	Sri Lanka	199	Solomon Islands
8	Armenia	72	Spain	136	Liberia	200	Seychelles
9	Angola	73	Ethiopia	137	Lesotho	201	Sudan
10	Antarctica	74	Finland	138	Lithuania	202	Sweden

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
11	Argentina	75	Fiji	139	Luxembourg	203	Singapore
12	American Samoa	76	Falkland Islands	140	Latvia	204	Saint Helena
13	Austria	77	Micronesia	141	Libya	205	Slovenia
14	Australia	78	Faroe Islands	142	Morocco	206	Svalbard and Jan Mayen
15	Aruba	79	France	143	Monaco	207	Slovakia
16	Aland Islands	80	Gabon	144	Moldova	208	Sierra Leone
17	Azerbaijan	81	United Kingdom	145	Montenegro	209	San Marino
18	Bosnia and Herzegovina	82	Granada	146	Saint Martin	210	Senegal
19	Barbados	83	Georgia	147	Madagascar	211	Somalia
20	Bangladesh	84	French Guiana	148	Marshall Islands	212	Suriname
21	Belgium	85	Guernsey	149	Republic of North Macedonia	213	South Sudan
22	Burkina Faso	86	Ghana	150	Mali	214	São Tomé and Príncipe
23	Bulgaria	87	Gibraltar	151	Myanmar	215	El Salvador

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
24	Bahrain	88	Greenland	152	Mongolia	216	Sint Maarten
25	Burundi	89	Gambia	153	Macao (China)	217	Syria
26	Benin	90	Guinea	154	Northern Mariana Islands	218	Eswatini
27	Saint Barthélemy	91	Guadeloupe	155	Martinique	219	Tristan da Cunha
28	Bermuda	92	Equatorial Guinea	156	Mauritania	220	Turks and Caicos Islands
29	Brunei	93	Greece	157	Montserrat	221	Chad
30	Bolivia	94	South Georgia and the South Sandwich Islands	158	Malta	222	French Southern and Antarctic Lands
31	Caribbean Netherlands	95	Guatemala	159	Mauritius	223	Togo
32	Brazil	96	Guam	160	Maldives	224	Thailand
33	Bahamas	97	Guinea-Bissau	161	Malawi	225	Tajikistan
34	Bhutan	98	Guyana	162	Mexico	226	Tokelau
35	Bouvet Island	99	Hong Kong (China)	163	Malaysia	227	East Timor

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
36	Botswana	100	Heard Island and McDonald Islands	164	Mozambique	228	Turkmenistan
37	Belarus	101	Honduras	165	Namibia	229	Tunisia
38	Belize	102	Croatia	166	New Caledonia	230	Tonga
39	Canada	103	Haiti	167	Niger	231	Türkiye
40	Cocos (Keeling) Islands	104	Hungary	168	Norfolk Island	232	Trinidad and Tobago
41	Democratic Republic of the Congo	105	Canary Islands	169	Nigeria	233	Tuvalu
42	Central African Republic	106	Indonesia	170	Nicaragua	234	Taiwan (China)
43	Republic of the Congo	107	Ireland	171	Netherlands	235	Tanzania
44	Switzerland	108	Israel	172	Norway	236	Ukraine
45	Côte d'Ivoire	109	Isle of Man	173	Nepal	237	Uganda
46	Cook Islands	110	India	174	Nauru	238	United States Minor Outlying Islands

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
47	Chile	111	British Indian Ocean Territory	175	Niue	239	United States
48	Cameroon	112	Iraq	176	New Zealand	240	Uruguay
49	Chinese mainland	113	Iran	177	Oman	241	Uzbekistan
50	Colombia	114	Iceland	178	Panama	242	Vatican City State
51	Clipperton Island	115	Italy	179	Peru	243	Saint Vincent and the Grenadines
52	Costa Rica	116	Jersey	180	French Polynesia	244	Venezuela
53	Cuba	117	Jamaica	181	Papua New Guinea	245	British Virgin Islands
54	Cape Verde	118	Jordan	182	Philippines	246	United States Virgin Islands
55	Curacao	119	Japan	183	Pakistan	247	Vietnam
56	Christmas Island	120	Kenya	184	Poland	248	Vanuatu
57	Cyprus	121	Kyrgyzstan	185	Saint Pierre and Miquelon	249	Wallis and Futuna
58	Czech	122	Cambodia	186	Pitcairn Islands	250	Samoa

Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region	Area Code	Country/ Region
59	Germany	123	Kiribati	187	Puerto Rico	251	Kosovo
60	Diego Garcia	124	Comoros	188	Palestinian Territories	252	Yemen
61	Djibouti	125	Saint Kitts and Nevis	189	Portugal	253	Mayotte
62	Denmark	126	North Korea	190	Palau	254	South Africa
63	Dominica	127	South Korea	191	Paraguay	255	Zambia
64	Dominican Republic	128	Kuwait	192	Qatar	256	Zimbabwe

Time Zone Codes

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
54	(UTC-12:00) International Date Line West	102	(UTC-03:00) Araguaína	13	(UTC+03:00) Minsk	36	(UTC+08:00) Singapore
85	(UTC-11:00) Coordinated Universal Time-11	103	(UTC-03:00) Greenland	77	(UTC+03:00) Ankara	37	(UTC+08:00) Perth

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
55	(UTC-10:00) Hawaii	104	(UTC-03:00) Punta Arenas	17	(UTC+03:00) Baghdad	38	(UTC+08:00) Taipei
86	(UTC-10:00) Aleutian Islands	105	(UTC-03:00) Salvador	19	(UTC+03:00) Kuwait, Riyadh	39	(UTC+08:00) Irkutsk
87	(UTC-09:30) Marquesas Islands	106	(UTC-03:00) Saint Pierre and Miquelon	20	(UTC+03:00) Moscow, Saint Petersburg	78	(UTC+08:00) Kuala Lumpur
56	(UTC-09:00) Alaska	107	(UTC-02:00) Coordinated Universal Time-2	21	(UTC+03:00) Nairobi	134	(UTC+08:00) Ulaanbaatar
88	(UTC-09:00) Coordinated Universal Time-9	84	(UTC-01:00) Azores	79	(UTC+03:00) Riyadh	135	(UTC+08:45) Eucla
57	(UTC-08:00) Tijuana	108	(UTC-01:00) Cape Verde	119	(UTC+03:00) Istanbul	40	(UTC+09:00) Osaka, Sapporo, Tokyo
58	(UTC-08:00) Pacific Time (United States and Canada)	4	(UTC) Coordinated Universal Time	22	(UTC+03:30) Tehran	41	(UTC+09:00) Seoul

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
89	(UTC-08:00) Baja California	1	(UTC+00:00) Dublin, Edinburgh, Lisbon	18	(UTC+04:00) Tbilisi	42	(UTC+09:00) Yakutsk
90	(UTC-08:00) Coordinated Universal Time-8	3	(UTC+00:00) Monrovia, Reykjavik	23	(UTC+04:00) Muscat	136	(UTC+09:00) Chita
59	(UTC-07:00) Chihuahua, La Paz, Mazatlan	82	(UTC+00:00) London	24	(UTC+04:00) Yerevan	137	(UTC+09:00) Pyongyang
60	(UTC-07:00) Mountain Time (United States and Canada)	109	(UTC+00:00) São Tomé	25	(UTC+04:00) Baku	43	(UTC+09:30) Adelaide
61	(UTC-07:00) Arizona	2	(UTC+01:00) Casablanca	83	(UTC+04:00) Abu Dhabi	44	(UTC+09:30) Darwin
62	(UTC-06:00) Central Standard Time (United States and Canada)	5	(UTC+01:00) Berlin	120	(UTC+04:00) Astrakhan, Ulyanovsk	45	(UTC+10:00) Brisbane

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
63	(UTC-06:00) Central America	6	(UTC+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague	121	(UTC+04:00) Volgograd	46	(UTC+10:00) Guam, Port Moresby
91	(UTC-06:00) Easter Island	7	(UTC+01:00) Brussels, Copenhagen, Madrid	122	(UTC+04:00) Port Louis	47	(UTC+10:00) Hobart
92	(UTC-06:00) Guadalajara, Mexico City, Monterrey	8	(UTC+01:00) Sarajevo, Skopje, Warsaw, Zagreb	123	(UTC+04:00) Saratov	48	(UTC+10:00) Canberra, Melbourne, Sydney
93	(UTC-06:00) Saskatchewan	74	(UTC+01:00) Paris	124	(UTC+04:00) Izhevsk, Samara	138	(UTC+10:00) Vladivostok
64	(UTC-05:00) Bogotá, Lima, Quito, Rio Branco	80	(UTC+01:00) Amsterdam, Bern, Stockholm, Vienna	26	(UTC+04:30) Kabul	139	(UTC+10:30) Lord Howe Island

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
65	(UTC-05:00) Eastern Time (United States and Canada)	81	(UTC+01:00) Rome	27	(UTC+05:00) Ashgabat, Tashkent	49	(UTC+11:00) Magadan
94	(UTC-05:00) Havana	110	(UTC+01:00) West Africa Time	28	(UTC+05:00) Islamabad, Karachi	140	(UTC+11:00) Bougainville Island
95	(UTC-05:00) Haiti	9	(UTC+02:00) Amman	125	(UTC+05:00) Kyzylorda	141	(UTC+11:00) Norfolk Island
96	(UTC-05:00) Chetumal	10	(UTC+02:00) Harare	126	(UTC+05:00) Yekaterinburg	142	(UTC+11:00) Chokurdakh
97	(UTC-05:00) Turks and Caicos Islands	11	(UTC+02:00) Helsinki, Kyiv, Riga, Sofia, Tallinn, Vilnius	29	(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi	143	(UTC+11:00) Sakhalin
98	(UTC-05:00) Indiana (Eastern Time)	12	(UTC+02:00) Cairo	127	(UTC+05:30) Sri Jayawardenepura Kotte	144	(UTC+11:00) Solomon Islands, New Caledonia
66	(UTC-04:00) Caracas	14	(UTC+02:00) Windhoek	30	(UTC+05:45) Kathmandu	50	(UTC+12:00) Auckland, Wellington

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
67	(UTC-04:00) Atlantic Time (Canada)	15	(UTC+02:00) Athens, Bucharest	32	(UTC+06:00) Dhaka	51	(UTC+12:00) Anadyr, Petropavlovsk-Kamchatsky
68	(UTC-04:00) Guyana	16	(UTC+02:00) Jerusalem	128	(UTC+06:00) Astana	52	(UTC+12:00) Fiji
69	(UTC-04:00) Santiago	75	(UTC+02:00) Cape Town	129	(UTC+06:00) Omsk	145	(UTC+12:00) Coordinated Universal Time+12
99	(UTC-04:00) Cuiabá	111	(UTC+02:00) Beirut	33	(UTC+06:30) Yangon	146	(UTC+12:45) Chatham Islands
100	(UTC-04:00) Georgetown, La Paz, Manaus, San Juan	112	(UTC+02:00) Damascus	31	(UTC+07:00) Novosibirsk	53	(UTC+13:00) Tongatapu
101	(UTC-04:00) Asunción	113	(UTC+02:00) Tripoli	34	(UTC+07:00) Bangkok, Hanoi, Jakarta	147	(UTC+13:00) Nuku‘alofa
70	(UTC-03:30) Newfoundland	114	(UTC+02:00) Harare, Pretoria	130	(UTC+07:00) Barnaul, Gorno-Altaysk	148	(UTC+13:00) Samoa

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
71	(UTC-03:00) Brasilia	115	(UTC+02:00) Chisinau	131	(UTC+07:00) Khovd	149	(UTC+13:00) Coordinated Universal Time+13
72	(UTC-03:00) Cayenne, Fortaleza	116	(UTC+02:00) Kaliningrad	132	(UTC+07:00) Krasnoyarsk	150	(UTC+14:00) Kiritimati Island
73	(UTC-03:00) Montevideo	117	(UTC+02:00) Gasha, Hebron	133	(UTC+07:00) Tomsk		
76	(UTC-03:00) Buenos Aires	118	(UTC+02:00) Khartoum	35	(UTC+08:00) Beijing		

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
message		Optional message	String	-
data	The following information is included:	Returned data	Object	-

Parameter		Description	Data Type	Remarks
	dn	Unique plant ID	String	-
	name	Plant name	String	-
	result	Plant creation result 0: succeeded 1: failed	Integer	-

Examples

Request example:


```
{
 "basicConfig": {
  "stationName": "station",
  "stationType": 1,
  "pureCharge": 0,
  "connectTime": 1501862400,
  "linkman": "linkman",
  "linkmanPho": 12345678
 },
 "deviceConfig": [{
   "esn": "SLV3",
   "registerCode": ""
  },
  {
   "esn": "SLV2",
   "registerCode": ""
  }
 ],
 "storageConfig": {
  "totalStorage": 10.0,
  "PVParams": [{
    "deviceSn": "SLV3_SN2K3_001",
    "PVStorage": "1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24"
   },
   {
    "deviceSn": "SLV3_SN2KL_001",
    "PVStorage": "1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24"
   }
  ]
 },
 "priceConfig": {
  "useCompanyPrice": 0,
  "definePrice": {
   "ongridPrice": [{
     "beginMonth": 1,
     "beginDay": 1,
     "endMonth": 12,
     "endDay": 1,
     "hourRange": [{
       "beginHour": 0,
       "endHour": 12,
       "price": 5
      },
      {
       "beginHour": 12,
       "endHour": 24,
       "price": 5
      }
```

```
    ]
   },
   {
    "beginMonth": 12,
    "beginDay": 2,
    "endMonth": 12,
    "endDay": 31,
    "hourRange": [{
      "beginHour": 0,
      "endHour": 12,
      "price": 5
     },
     {
      "beginHour": 12,
      "endHour": 24,
      "price": 5
     }

    ]
   }
  ],
  "purchasePrice": [{
   "beginMonth": 1,
   "beginDay": 1,
   "endMonth": 12,
   "endDay": 31,
   "hourRange": [{
    "beginHour": 0,
    "endHour": 24,
    "price": 1
   }]
  }]
 }
},
"additionConfig": {
 "areaCode": 49,
 "address": "xian",
        "longitude": 117.3112268,
 "latitude": 35.3672079,
 "timeZoneCode": 35,
 "introduction": "station",
 "loadStatus": 1,
 "safeRunningTime": 1501862400
}
}
```


Response examples:

Example 1: An error code is returned.


```
{
    "data": null,
    "failCode": 22000,
    "message": "Device does not exist.",
    "success": false
}
```


Example 2: The information indicating that the creation is successful is returned.


```
{
 "data": {
  "dn": "NE = 33564176",
  "name": "station"
 },
 "failCode": 0,
 "message": "Create station success.",
 "success": true
}
```

NOTE

This interface is restricted. Before obtaining data, the system administrator must authorize the northbound user.

9.4 Historical Interfaces

9.4.1 5-minute Device Data Interface

NOTICE

- iMaster NetEco V600R022C00CP1202 and later versions do not support this interface. Use the new **Historical Device Data Interface**. For details about how to check the current software version, see **How to Check the Software Version**. The latest release time indicates the newest version.
- If you have used this interface, you can still use it. The new interface is optimized to offer better experience. You are advised to switch to the new interface at a proper time.

Interface Description

This interface is used to obtain 5-minute device data. Data of a maximum of 100 devices of the same type can be queried at a time.

The backend calculates the date of the collection time based on the request parameter **collectTime** (collection time in milliseconds) and the time zone where the device is located.

Then, you can query the 5-minute data of the device in the day based on the device ID.

If data is generated for n ($0 \le n \le 288$) 5-minute periods of the day, n ($0 \le n \le 288$) results are returned.

For details about the data list that can be queried using this interface, see **9.2.7 5-minute Device Data Interface**.

Request URL

https://Domain name of the management system/thirdData/getDevFiveMinutes

Request Mode

HTTP method: POST

Access Restrictions

Traffic limiting is performed based on the number of devices of each type managed by a northbound API user. Maximum number of northbound API calls per user per day = ∑ Roundup (Number of devices of each type/10) + 24.

If the access frequency exceeds the limit, the interface returns error code 407.

Example:

- If a northbound API user manages 20 inverters and 20 meters, the maximum number of API calls per device type per day is calculated as follows:

  Inverters: Roundup (20/10) = 2

  Meters: Roundup (20/10) = 2

  Total: Number of API calls for inverters + Number of API calls for meters = 2 + 2 + 24 = 28
- If a northbound API user manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows:

  Inverters: Roundup (120/10) = 12

  Meters: Roundup (120/10) = 12

  Total: Number of API calls for inverters + Number of API calls for meters = 12 + 12 + 24 = 48

Request Parameters

Parameter	Description	Data Type	Mandatory/ Optional
devIds	Device ID list. Multiple device IDs are separated by commas (,).	String	Mandatory
devTypeId	Device type ID. Use the device type ID obtained in **9.1.5 Device List Interface**. The following device types are supported: 1: string inverter 10: EMI 17: grid meter 38: residential inverter 39: battery 41: ESS 47: power sensor	Integer	Mandatory
collectTime	Collection time, in milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional message	String	-
data	Parameters	Returned data. The data contains the 5-minute data object list of each device.	List	5-minute data of a device in a day
	devId	Device ID	Long	-
	collectTime	Collection time, in milliseconds	Long	-
	dataItemMap	Content of data items, which are returned in the key-value format. The content of data items varies according to device types. For details about the data item list, see **9.2.7 5-minute Device Data Interface**.	Map	5-minute device data

Example

Request example:

```
{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000
}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: 5-minute device data is returned.

```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "pv7_u":null,
                "pv1_u":575.3,
                "b_u":286.1,
                "c_u":286.9,
                "pv6_u":576.1,
                "temperature":44.6,
                "open_time":null,
                "b_i":24.9,
                "bc_u":495.6,
                "pv9_u":null,
                "pv8_u":null,
                "c_i":25,
                "mppt_total_cap":null,
                "pv9_i":null,
                "mppt_3_cap":null,
                "mppt_2_cap":null,
                "inverter_state":512,
                "pv8_i":null,
                "mppt_1_cap":null,
                "pv6_i":7.1,
                "mppt_power":21.962,
                "pv1_i":7.1,
                "total_cap":655.37,
                "ab_u":495.4,
                "pv7_i":null,
                "pv13_u":null,
                "reactive_power":20.95,
                "pv10_u":null,
                "pv12_i":null,
                "pv11_i":null,
                "pv3_i":7.1,
                "pv11_u":null,
                "pv2_i":7.1,
                "pv13_i":null,
                "power_factor":0,
```

```
            "pv12_u":null,
            "pv5_i":7.2,
            "active_power":21.05,
            "elec_freq":50.05,
            "pv10_i":null,
            "pv4_i":7,
            "mppt_4_cap":null,
            "mppt_5_cap":0,
            "mppt_6_cap":0,
            "mppt_7_cap":0,
            "mppt_8_cap":0,
            "mppt_9_cap":0,
            "mppt_10_cap":0,
            "pv4_u":577.8,
            "close_time":null,
            "day_cap":159.26,
            "ca_u":496.9,
            "a_i":24.9,
            "pv5_u":576.1,
            "a_u":286,
            "pv3_u":577.8,
            "pv14_u":null,
            "pv14_i":null,
            "pv15_u":0,
            "pv15_i":0,
            "pv16_u":0,
            "pv16_i":0,
            "pv17_u":0,
            "pv17_i":0,
            "pv18_u":0,
            "pv18_i":0,
            "pv19_u":0,
            "pv19_i":0,
            "pv20_u":0,
            "pv20_i":0,
            "pv21_u":0,
            "pv21_i":0,
            "pv22_u":0,
            "pv22_i":0,
            "pv23_u":0,
            "pv23_i":0,
            "pv24_u":0,
            "pv24_i":0,
            "pv25_u":0,
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":null,
            "pv2_u":575.3
        },
        "devId":213472461631079,
        "collectTime":1501862400000
    },
    {
        "dataItemMap":{
            "pv7_u":null,
            "pv1_u":575.3,
            "b_u":286.1,
            "c_u":286.9,
            "pv6_u":576.1,
            "temperature":44.6,
            "open_time":null,
            "b_i":24.9,
            "bc_u":495.6,
            "pv9_u":null,
```

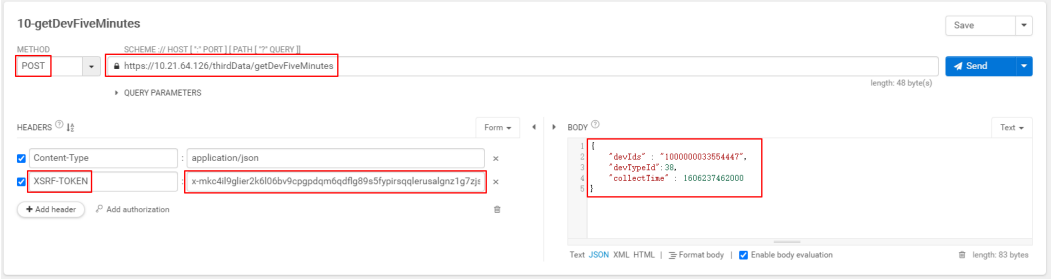
"pv8_u":null,
"c_i":25,
"mppt_total_cap":null,
"pv9_i":null,
"mppt_3_cap":null,
"mppt_2_cap":null,
"inverter_state":512,
"pv8_i":null,
"mppt_1_cap":null,
"pv6_i":7.1,
"mppt_power":21.962,
"pv1_i":7.1,
"total_cap":655.37,
"ab_u":495.4,
"pv7_i":null,
"pv13_u":null,
"reactive_power":20.95,
"pv10_u":null,
"pv12_i":null,
"pv11_i":null,
"pv3_i":7.1,
"pv11_u":null,
"pv2_i":7.1,
"pv13_i":null,
"power_factor":0,
"pv12_u":null,
"pv5_i":7.2,
"active_power":21.05,
"elec_freq":50.05,
"pv10_i":null,
"pv4_i":7,
"mppt_4_cap":null,
"mppt_5_cap":0,
"mppt_6_cap":0,
"mppt_7_cap":0,
"mppt_8_cap":0,
"mppt_9_cap":0,
"mppt_10_cap":0,
"pv4_u":577.8,
"close_time":null,
"day_cap":159.26,
"ca_u":496.9,
"a_i":24.9,
"pv5_u":576.1,
"a_u":286,
"pv3_u":577.8,
"pv14_u":null,
"pv14_i":null,
"pv15_u":0,
"pv15_i":0,
"pv16_u":0,
"pv16_i":0,
"pv17_u":0,
"pv17_i":0,
"pv18_u":0,
"pv18_i":0,
"pv19_u":0,
"pv19_i":0,
"pv20_u":0,
"pv20_i":0,
"pv21_u":0,
"pv21_i":0,
"pv22_u":0,
"pv22_i":0,
"pv23_u":0,
"pv23_i":0,
"pv24_u":0,
"pv24_i":0,
"pv25_u":0,

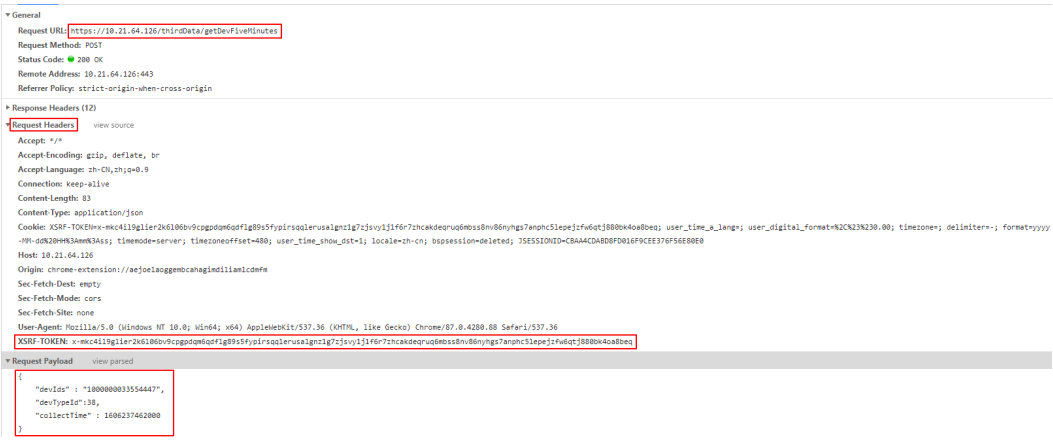
```
            "pv25_i":0,
            "pv26_u":0,
            "pv26_i":0,
            "pv27_u":0,
            "pv27_i":0,
            "pv28_u":0,
            "pv28_i":0,
            "efficiency":null,
            "pv2_u":575.3
        },
        "devId":213472461631079,
        "collectTime":1501862700000
    }
  ],
  "failCode":0,
  "params":{
    "devIds":"214060404588862,213472461631079",
    "devTypeId":1,
    "collectTime":1501862400000,
    "currentTime":1503046597854
  },
  "message":null
}
```


NOTE

Prerequisites for obtaining data: The account allocated by the system administrator has the permission to invoke this interface.

Request example:





9.4.2 Plant List Interface

NOTICE

- iMaster NetEco V600R023C00SPC210 and later versions do not support this interface. Use the new **Plant List Interface**. For details about how to check the current software version, see **How to Check the Software Version**. The latest release time indicates the newest version.
- If you have used this interface, you can still use it. The new interface is optimized to offer better experience. You are advised to switch to the new interface at a proper time.

Interface Description

This interface is used to obtain basic plant information. Before invoking other interfaces to obtain plant data, you need to invoke this interface to obtain the plant ID.

This interface supports pagination query and batch query.

Request URL

https://Domain name of the management system/thirdData/getStationList

Request Mode

HTTP method: POST

Request Parameters

Batch query: None

Pagination query

Parameter	Description	Data Type	Mandatory/ Optional
pageNo	Page No. of the results	Integer	Mandatory
pageSize	Number of results on each page. The value can be **50** or **100**.	Integer	Mandatory

Access Restrictions

Maximum number of northbound API calls per user per day: 24

Only one concurrent request is supported per minute.

If the access frequency exceeds the limit, the interface returns error code 407.

Response Packet

Full query

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **10 Error Code List**.	Integer	-
params	Parameters	-	-	-
	currentTime	Current system time, in milliseconds	Long	-
message		Optional response message	String	-
data	Parameters	Returned data. The data contains the object parameter list of each plant.	List	-
	stationCode	Plant ID, which uniquely identifies a plant	String	-
	stationName	Plant name	String	-
	stationAddr	Detailed address of the plant	String	-
	capacity	Installed capacity (unit: MW)	Double	-
	buildState	Plant status The following plant states are supported: 0: not constructed; 1: under construction; 2: grid-connected	String	-

Parameter		Description	Data Type	Remarks
	combineType	Grid connection type The following grid connection types are supported: 1: utility; 2: commercial & industrial; 3: residential	String	-
	aidType	Poverty alleviation plant ID The following poverty alleviation plant identifiers are supported: 0: poverty alleviation plant 1: non-poverty alleviation plant	Integer	-
	stationLinkman	Plant contact	String	-
	linkmanPho	Contact phone number	String	-

Pagination query

Parameter		Description	Data Type	Remarks
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value 0 indicates that the status is normal. For definitions of other error codes, see **11-Error Code List**.	Integer	-
params	Parameters	-	-	-

Parameter		Description	Data Type	Remarks
	currentTime	Current system time, in milliseconds	Long	-
message		Optional response message	String	-
data	Parameters	Returned data. **data** contains the query result by page, including the following information:	List	-
	> total	Total number of results	Long	
	> pageCount	Total number of pages	Long	
	> pageNo	Page No. of the results	Integer	
	> pageSize	Number of query results displayed on each page	Integer	
	> list	Plant information, which is as follows:	List	Plant information
	>> stationCode	Plant ID, which uniquely identifies a plant	String	-
	>> stationName	Plant name	String	-
	>> stationAddr	Detailed address of the plant	String	-
	>> capacity	Installed capacity (unit: MW)	Double	-

Parameter		Description	Data Type	Remarks
	>> buildState	Plant status The following plant states are supported: 0: not constructed; 1: under construction; 2: grid-connected	String	-
	>> combineType	Grid connection type The following grid connection types are supported: 1: utility; 2: commercial & industrial; 3: residential	String	-
	>> aidType	Poverty alleviation plant ID The following poverty alleviation plant identifiers are supported: 0: poverty alleviation plant 1: non-poverty alleviation plant	Integer	-
	>> stationLinkman	Plant contact	String	-

Parameter		Description	Data Type	Remarks
	>> linkmanPho	Contact phone number	String	-

Example

Batch query

Request example:

```
{}
```

Response example:

Example 1: An error code is returned.

```
{
    "success":false,
    "data":20007,
    "failCode":20003,
    "params":{
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: The plant list is returned.

```
{
    "success":true,
    "data":[
        {
            "stationCode":"BA4372D08E014822AB065017416F254C",
            "stationName":"NMstation1",
            "stationAddr":null,
            "capacity":146.5,
            "buildState":"3",
            "combineType":"2",
            "aidType":0,
            "stationLinkman":"",
            "linkmanPho":""
        },
        {
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "stationName":"station2",
            "stationAddr":null,
            "capacity":123.3,
            "buildState":"3",
            "combineType":"1",
            "aidType":0,
            "stationLinkman":"",
            "linkmanPho":""
        }
    ],
    "failCode":0,
    "params":{
        "currentTime":1503046597854
    },
    "message":null
}
```

Pagination query

Request example:

```
{
  "pageNo":1,
  "pageSize":100
}
```

Response example:

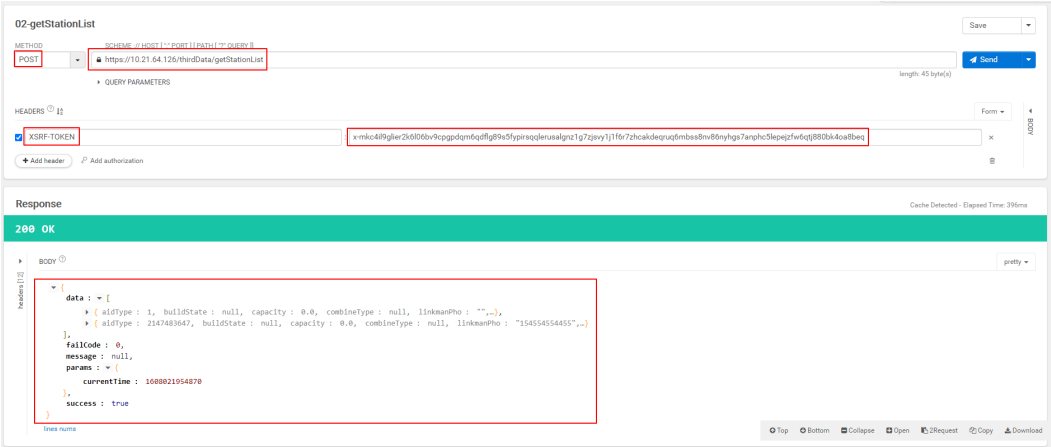
Example 1: Plants are displayed in multiple pages.

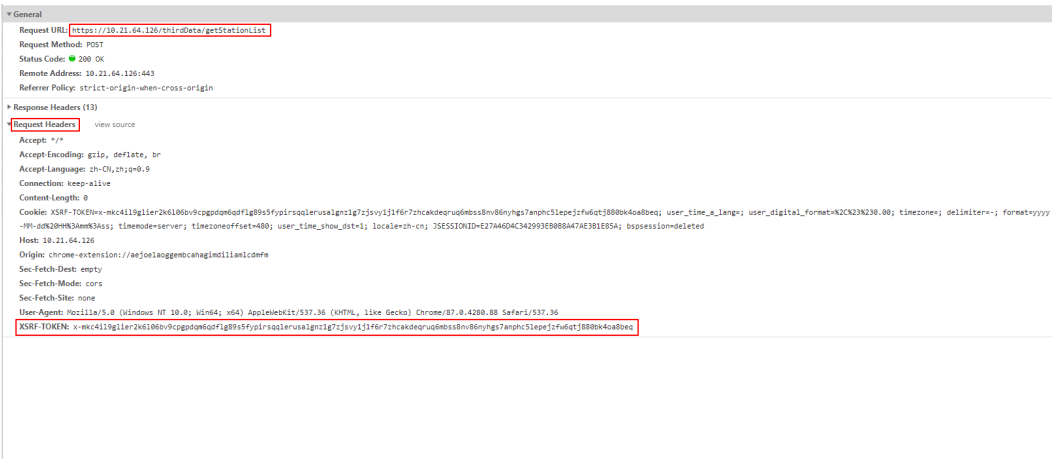

```
{
    "data": {
        "list": [
            {
                "aidType": 2147483647,
                "buildState": null,
                "capacity": 0.0,
                "combineType": null,
                "linkmanPho": "",
                "stationAddr": "12",
                "stationCode": "NE=33554435",
                "stationLinkman": "",
                "stationName": "test"
            },
            {
                "aidType": 2147483647,
                "buildState": null,
                "capacity": 0.0,
                "combineType": null,
                "linkmanPho": "",
                "stationAddr": "Xi'an, Shaanxi, China",
                "stationCode": "NE=33554440",
                "stationLinkman": "",
                "stationName": "test2"
            }
        ],
        "pageCount": 1,
        "pageNo": 1,
        "pageSize": 100,
        "total": 2
    },
    "failCode": 0,
    "message": null,
    "params": {
        "currentTime": 1663851483997
    },
    "success": true
}
```

NOTE

No input parameter is required to obtain the plant list. The backend obtains the plant resources of the corresponding user based on the XSRF-TOKEN.

Request example:





10 Error Code List

No.	Error Code	Description
1	20001	The third-party system ID does not exist.
2	20002	The third-party system is forbidden.
3	20003	The third-party system has expired.
4	20004	The server is abnormal.
5	20005	The device ID cannot be empty.
6	20006	Some devices do not match the device type.
7	20007	The system does not have the desired power plant resources.
8	20008	The system does not have the desired device resources.
9	20009	Queried KPIs are not configured in the system.
10	20010	The plant list cannot be empty.
11	20011	The device list cannot be empty.
12	20012	The query time cannot be empty.
13	20013	The device type is incorrect. The interface does not support operations on some devices.
14	20014	A maximum of 100 plants can be queried at a time.
15	20015	A maximum of 100 plants can be queried at a time.
16	20016	A maximum of 100 devices can be queried at a time.
17	20017	A maximum of 100 devices can be queried at a time.
18	20018	A maximum of 10 devices can be operated at a time.

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No.	Error Code	Description
19	20019	The switch type is incorrect. 1 and 2 indicate switch-on and switch-off respectively.
20	20020	The upgrade package corresponding to the device version cannot be found.
21	20021	The upgrade file does not exist.
22	20022	The upgrade records of the devices in the system are not found.
23	305	You are not in the login state. You need to log in again.
24	401	You do not have the related data interface permission.
25	407	The interface access frequency is too high.
26	20023	The query start time cannot be later than the query end time.
27	20024	The language cannot be empty.
28	20025	The language parameter value is incorrect.
29	20026	Only data of the latest 365 days can be queried.
30	20027	The query time period cannot span more than 31 days.
31	20028	The system does not have related user information.
32	20030	Failed to create the I-V curve diagnosis task.
33	20034	The task does not exist.
34	20035	MPPT devices do not support backfeed current.
35	20036	The backfeed current duration of the MPPT device exceeds the maximum limit.
36	20037	The backfeed current of the MPPT device is out of range. The allowed value is (0, 15].
37	20038	In the input parameters, the authorization code list is empty (null), or the number of authorization codes is out of range. The allowed range is [0, 1000].
38	20039	In the input parameters, the DOD value is out of range. The allowed range is [0, 100].
39	20040	The charge/discharge switch parameter value is invalid.
40	20041	The control type cannot be empty for forced charge and discharge.
41	20042	The target SOC for charge/discharge is empty or invalid.

No.	Error Code	Description
42	20043	The charge/discharge duration is empty or invalid.
43	20044	The unique ID of a charge/discharge task cannot be empty.
44	20045	Unauthorized PV plants exist in the input parameters.
45	20046	Unauthorized PV plants exist in the input parameters.
46	20047	The forced charge/discharge power in the input parameters is invalid.
47	20048	Duplicate charging and discharging task ID
48	20049	Failed to deliver the charging and discharging task.
49	20050	The charging and discharging task query parameter does not exist.
50	20051	Failed to set the battery DOD.
51	20055	The plant list and device list parameters cannot be empty at the same time.
52	20116	The inverter control parameter is incorrect. (The number of PV plants is greater than 100 or equal to 0, or the total number of inverters in the PV plants is greater than 200 or equal to 0.)
53	20200	The system is busy. Try again later.
54	20400	● The username or password of the third-party system is incorrect. ● The user is locked. ● The password has expired. ● The number of online sessions reaches the upper limit.
55	20403	The login of the third-party system user is restricted.
56	20604	The time parameter is incorrect. The start time cannot be later than or equal to the end time.
57	20605	The time parameter is incorrect. The time parameter contains a negative value.
58	20606	If only the start time is entered and the end time is empty, the start time cannot be later than or equal to the current time.
59	20607	The task list is empty.
60	20608	Duplicate plant IDs exist in the input parameters.
61	20609	The plant networking is abnormal.
62	20610	The plant does not support default configuration.

No.	Error Code	Description
63	20611	The values of input parameters exceed the valid range.
64	20612	The value of an input parameter is empty.
65	20613	The default setting task fails to be sent for all plants.
66	20614	The network communication is abnormal.
67	20615	The same task is being executed in the current plant.
68	20616	The task ID is empty.
69	20617	The query result of the default plant setting task is empty.
70	20618	The calls to API have reached the maximum number per user per day.
71	20619	The number of task IDs exceeds 100.
72	20620	The task ID does not exist.
73	21000	The basic information for the plant creation is empty.
74	21001	The plant name is empty or in an incorrect format.
75	21002	The plant type is empty or incorrect.
76	21003	The grid connection time must be a positive number.
77	21004	The format of the contact name is incorrect.
78	21005	The format of the contact information is incorrect.
79	21006	The C&I plant and utility plant cannot be EV-charger-only plants.
80	21007	The grid connection time cannot be set for an EV-charger-only plant.
81	21008	The string capacity cannot be set for an EV-charger-only plant.
82	21009	The electricity price cannot be set for an EV-charger-only plant.
83	21010	**>pureChange** can only be set to **0** or **1**.
84	21011	The plant name already exists.
85	22000	No related data of connected devices was found.
86	22001	The device registration code is empty.
87	22002	The device is an unauthorized device.
88	22003	The device registration code is incorrect.

No.	Error Code	Description
89	22004	You will be locked out for 5 minutes due to five consecutive incorrect registration codes.
90	22005	Devices other than chargers are connected to an EV-charger-only plant.
91	22006	The device SN is empty.
92	22007	The device has been bound to another plant.
93	22008	The parameters of connected devices are empty.
94	23000	The plant-level string capacity and PV-level string capacity cannot be empty at the same time.
95	23001	The format of the plant string capacity is incorrect.
96	23002	The inverter SN does not exist.
97	23003	The number of inverter SNs is incorrect.
98	23005	The inverter PV string capacity is incorrectly set.
99	23006	The inverter SN or PV string capacity is empty.
100	23007	The quantity in the inverter PV string capacity setting is incorrect.
101	24000	The electricity price must be a positive number.
102	24001	The electricity price date settings must cover a complete year and without overlapping.
103	24002	The electricity price time segments must cover 24 hours of the day without overlapping.
104	24003	The date range is invalid.
105	24004	The time range is invalid.
106	24005	The company electricity price is empty.
107	24006	**>useCompanyPrice** can only be set to **0** or **1**.
108	25000	Additional information configuration is empty.
109	25001	The area code is empty or in an incorrect format.
110	25002	The plant address is empty.
111	25003	The longitude and latitude are empty or in incorrect format.
112	25004	The safe running time of the plant must be a positive number.
113	25005	The time zone is empty or the format is incorrect.

No.	Error Code	Description
114	25006	**loadStatus** can only be set to **0** or **1**.
115	25007	The plant introduction can contain a maximum of 128 characters.
116	26000	Failed to create plants.
117	26001	A maximum of 1000 plants can be created in a day.
118	26002	The company authorized by the northbound user does not exist.
119	30001	The device ESN list cannot be empty.
120	30002	The ESNs queried at a time cannot exceed 50.
121	30003	The account cannot be empty in the input parameter.
122	30004	The value of **pageNo** cannot be empty.
123	30005	The value of **pageSize** cannot be empty.
124	30006	The value of **pageSize** is out of range. The allowed range is {10, 20, 30, 50, 100}.
125	30007	The values of **startTime** and **endTime** must be both provided or empty.
126	30008	Failed to invoke the internal interface.
127	30009	The value of **taskName** is empty.
128	30010	The value of **nds** is empty.
129	30011	The value of **cleanStatus** is empty or invalid.
130	30012	The value of **environmentalParameters** is empty or invalid.
131	30013	The value of **modulePlaneIrradiance** or **moduleBackSurfaceTemperature** is empty when **environmentalParameters** is set to 1.
132	30014	The value of **scanPointNum** must be set to 128.
133	30015	The value of **taskId** is empty.
134	30016	The value of **dn** is empty.
135	30017	The value of **dns** is invalid. The number of devices exceeds 100 or devices on which the user does not have permission exist.
136	30018	The value of **taskName** is invalid (for example, null field).

No.	Error Code	Description
137	30019	The value of **moduleBackSurfaceTemperature** is out of range. The allowed range is [0.0, 100.0].
138	30020	The value of **modulePlaneIrradiance** is out of range. The allowed range is [600.0, 1500.0].
139	30021	The value of **pageNo** is smaller than 0.
140	30022	The value of **timestamp** is empty.
141	30023	The command type is invalid (for example, null).
142	30024	The power supply duration is invalid.
143	30025	The MPPT list is empty.
144	30026	The value of **mppts** is empty.
145	30027	The number of MPPTs connected to a single inverter exceeds the maximum limit (3), or the total number of MPPTs in a single task exceeds the maximum limit (32).
146	30028	The backfeed current input value is invalid.
147	30029	Authentication failed.
148	30030	The input parameter is incorrect.
149	30031	A maximum of 10 devices can be queried at a time.
150	30032	The time parameter is invalid. The query time segment cannot be longer than three days.
151	30033	The task is in progress.
152	30034	The returned list is empty.

11 Recommended Solutions for Error Codes

No.	Error Code	Description
1	20607	The task list is empty. You are advised to add the parameters for the task list in "Request Parameters" of the interface.
2	20608	Duplicate plant IDs exist in the input parameters. You are advised to delete the duplicate plant IDs from "Request Parameters" of the interface.
3	20609	The plant networking is abnormal. You are advised to check whether each plant has communications devices and whether each plant has only one communications device.
4	20610	The plant does not support the default configuration.
5	20611	The values of input parameters exceed the valid range. You are advised to check "Request Parameters" of the interface in this document to determine the value range of each input parameter.
6	20612	The values of input parameters are empty. You are advised to add the values in "Request Parameters" of the interface.
7	20613	The default setting task fails to be sent for all plants. You are advised to view the error code of each plant in "Response Packet" of the interface and rectify the fault based on the error code.
8	20614	The network communication is abnormal. You are advised to check whether the network connection is normal.
9	20615	The same task is being executed in the plant. You are advised to wait for 3 minutes and try again.

No.	Error Code	Description
10	20616	The task ID is empty. You are advised to add the parameters for the task ID in "Request Parameters" of the interface.
11	20617	The query result of the default plant setting task is empty. You are advised to check whether **requestId** and **plantCodes** are correctly set, and then check whether the plants corresponding to **requestId** contain the plants corresponding to **plantCodes**.
12	20618	The number of times that an API is called on a single day exceeds the limit. For details about the maximum number of northbound API calls, see "Access Restrictions" in the corresponding interface description in this document.
13	20619	The number of task IDs exceeds 100. You are advised to reduce the number of task IDs transferred in a single request to less than 100.
14	20620	The task ID does not exist. Check whether the entered task ID is correct.

12 FAQ

12.1 Failed to invoke the northbound interface

12.1.1 Importing a New Certificate When Certificate Verification Fails

Problem Description

When a client accesses the northbound API of FusionSolar using HTTPS, the access fails because the server certificate cannot be verified.

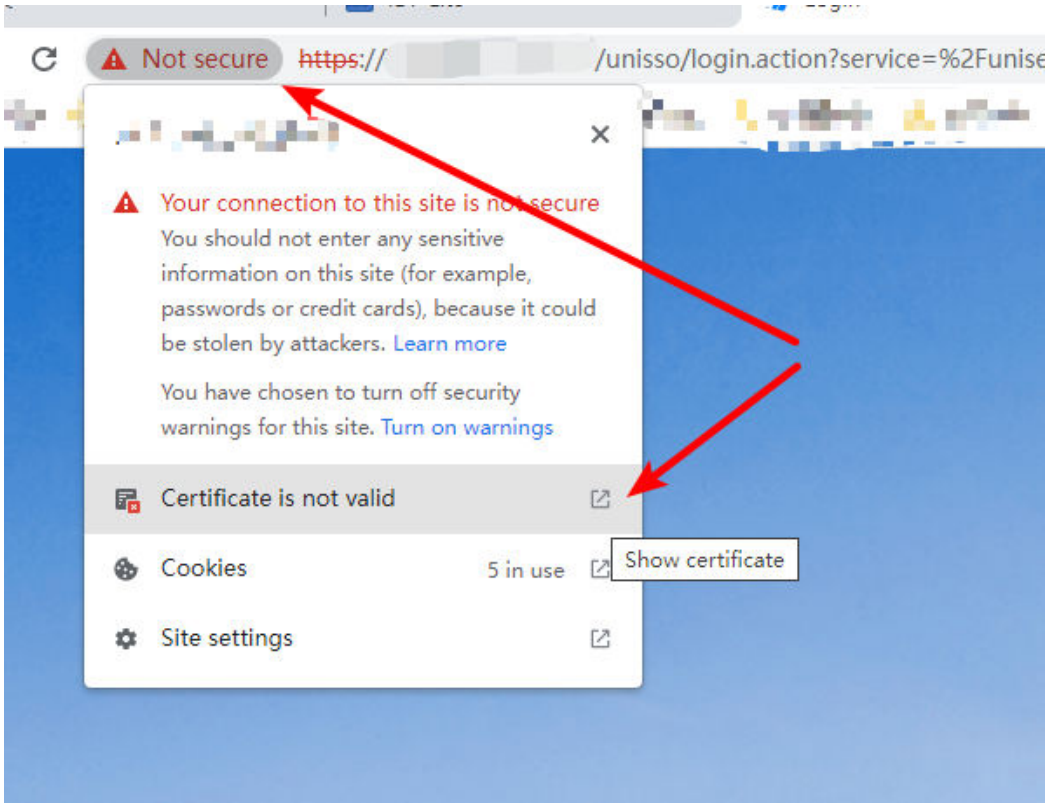
Solution

Import a trusted certificate again.

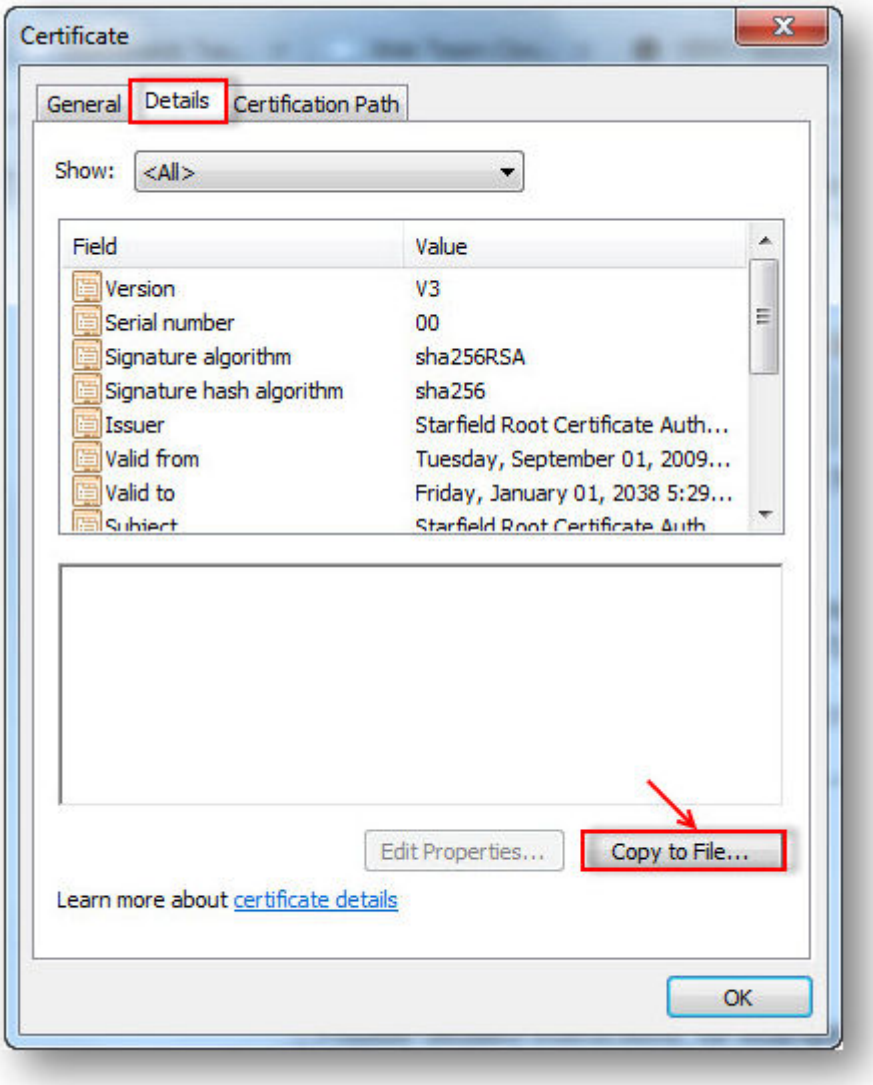
Procedure

Step 1 Obtain a new trusted certificate.

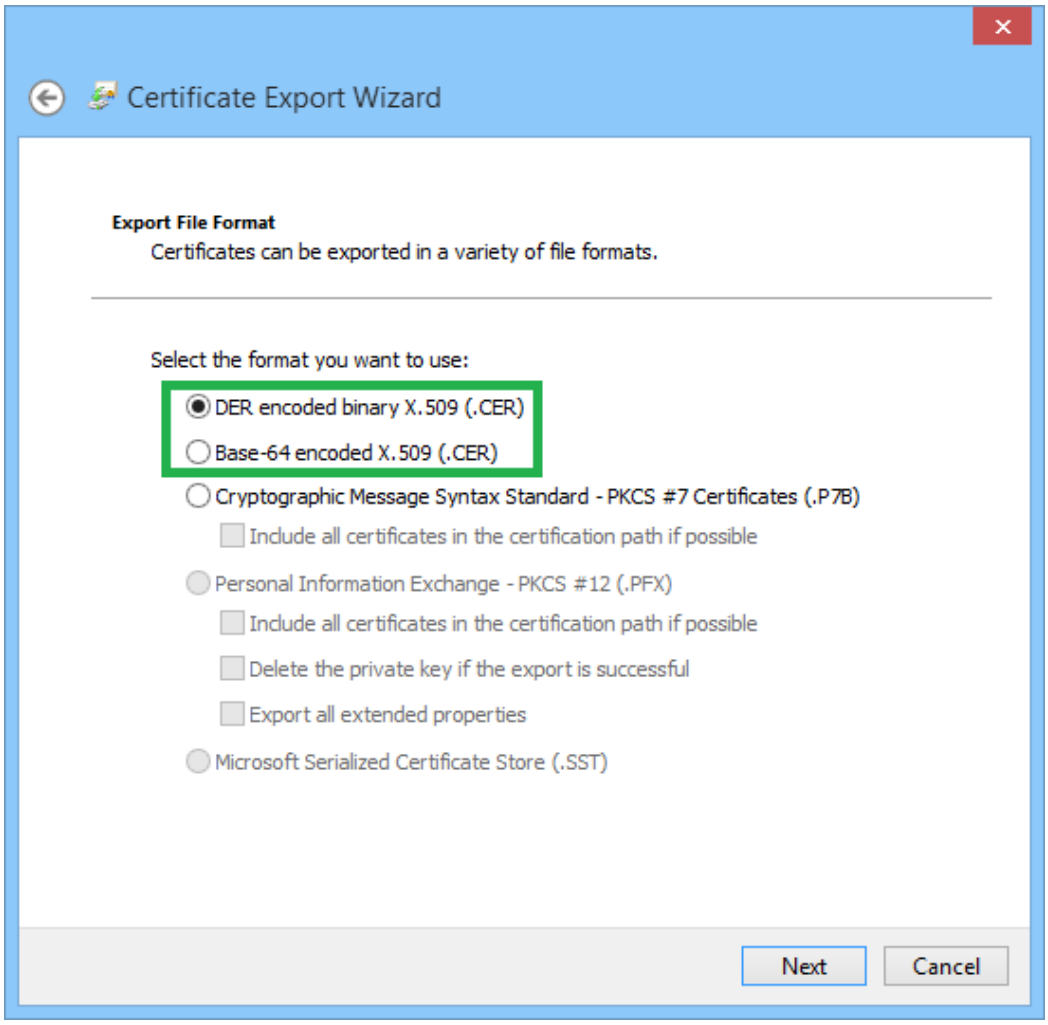
Log in to the FusionSolar WebUI.

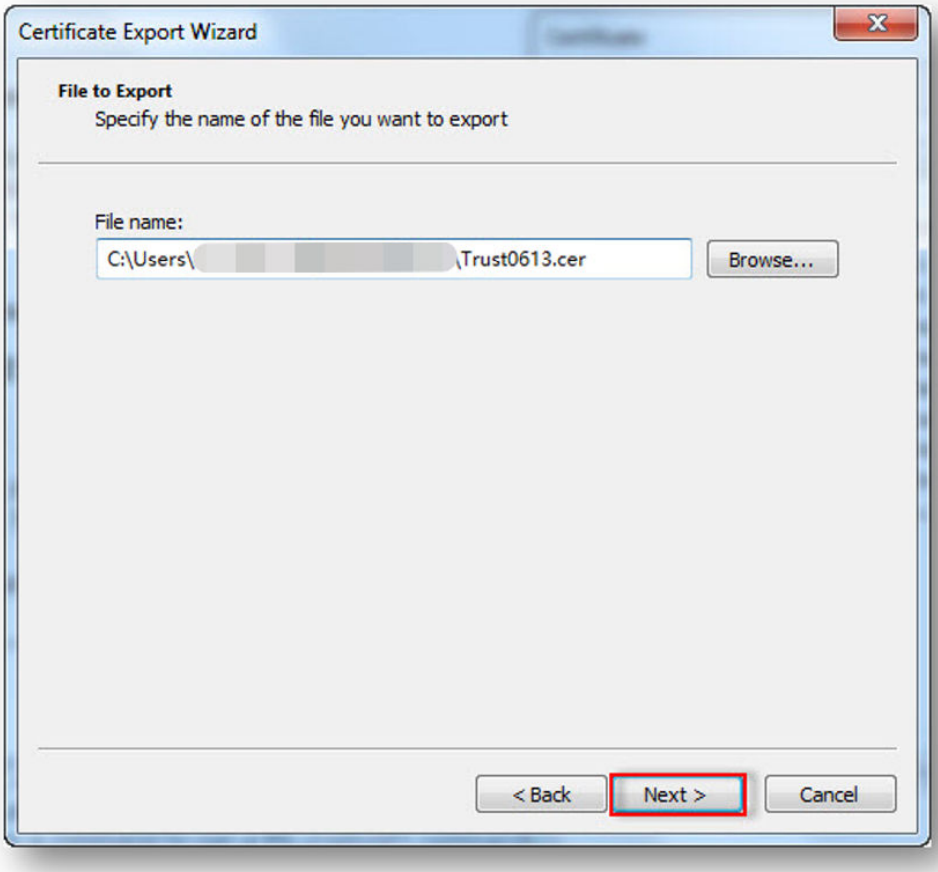


On the **Details** tab page of the certificate, click **Copy to File...** to download the new certificate.



Select **DER encoded binary X.509 (.CER)** to export and save the certificate.


Certificate Export Wizard
Export File Format
Certificates can be exported in a variety of file formats.
Select the format you want to use:
DER encoded binary X.509 (.CER)
Base-64 encoded X.509 (.CER)
Cryptographic Message Syntax Standard - PKCS #7 Certificates (.P7B)
Include all certificates in the certification path if possible
Personal Information Exchange - PKCS #12 (.PFX)
Include all certificates in the certification path if possible
Delete the private key if the export is successful
Export all extended properties
Microsoft Serialized Certificate Store (.SST)
Next
Cancel



Step 2 Import the certificate.

The JRE environment is used as an example. Import the trusted certificate to the security directory of the JRE environment.

Run the **keytool -import -alias abc -keystore cacerts -file /opt/hd/Trust0613.cer** command.

Set the password of the certificate.

```
[root@dggphisprm07344 security]# keytool -import -alias abc -keystore cacerts -file /opt/hd/Trust0613.cer
Enter keystore password:
Owner: CN=*.fusionsolar.huawei.com, O="Huawei Technologies Co., Ltd", L=Shenzhen, ST=Guangdong, C=CN
Issuer: CN=Actalis Organization Validated Server CA G3, O=Actalis S.p.A., L=Ponte San Pietro, ST=Bergamo, C=IT
Serial number: 74743e222cf6f1819cf86c224ec223e4
```

When the system asks you whether to trust the certificate, enter **Y** and press **Enter**. The system displays a message indicating that the certificate has been added to the certificate library.

```
]

#5: ObjectId: 2.5.29.31 Criticality=false
CRLDistributionPoints [
  [DistributionPoint:
     [URIName: http://crl09.actalis.it/Repository/AUTHOV-G3/getLastCRL]
]]

#6: ObjectId: 2.5.29.32 Criticality=false
CertificatePolicies [
  [CertificatePolicyId: [1.3.159.1.19.1]
[PolicyQualifierInfo: [
  qualifierID: 1.3.6.1.5.5.7.2.1
  qualifier: 0000: 16 24 68 74 74 70 73 3A   2F 2F 77 77 77 2E 61 63  .$https://www.ac
0010: 74 61 6C 69 73 2E 69 74   2F 61 72 65 61 2D 64 6F  talis.it/area-do
0020: 77 6E 6C 6F 61 64                                  wnload

]]  ]
  [CertificatePolicyId: [2.23.140.1.2.2]
[]  ]
]

#7: ObjectId: 2.5.29.37 Criticality=false
ExtendedKeyUsages [
  clientAuth
  serverAuth
]

#8: ObjectId: 2.5.29.15 Criticality=true
KeyUsage [
  DigitalSignature
  Key_Encipherment
]

#9: ObjectId: 2.5.29.17 Criticality=false
SubjectAlternativeName [
  DNSName: *.fusionsolar.huawei.com
  DNSName: fusionsolar.huawei.com
]

#10: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: FF 98 3D 8B D1 F0 AD 48   C9 E5 E0 11 A4 62 87 B6  ..=....H.....b..
0010: 64 D8 1B CC                                        d...
]
]

Trust this certificate? [no]:  y
Certificate was added to keystore
[root@aggpnisprm07344 security]#
```

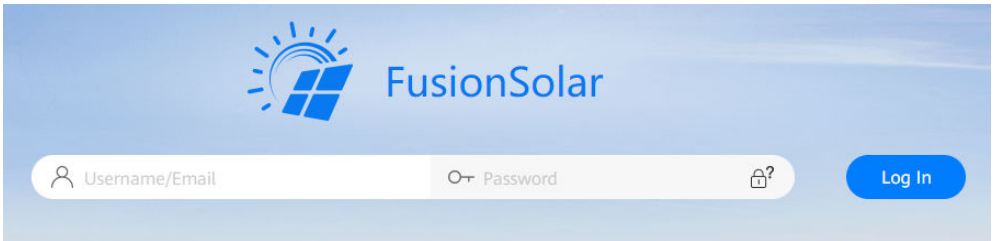
Step 3 Access the interface again and check whether the server certificate verification is successful.

----End

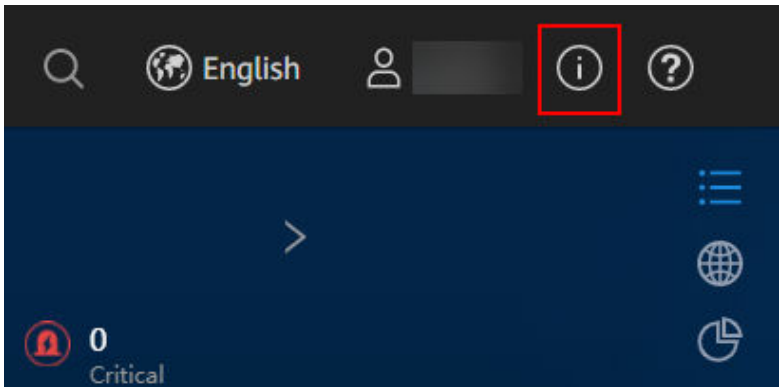
12.2 How to Check the Software Version

Procedure

1. Open a web browser, enter **https://intl.fusionsolar.huawei.com** in the address box, and press **Enter**. The login page is displayed.
2. Enter the username or email address and password, and click **Log In**.



3. Click in the upper right corner of the home page.



4. Check the software version in the dialog box that is displayed.

Version Evolution

NOTE

- The first release time of a version indicates that the software version goes live for the first time. The software go-live time varies depending on regions.
- The latest release time indicates the newest version.

Software Version	Release Time
iMaster NetEco V600R023C00CP2101	2023-02-03
iMaster NetEco V600R023C00SPC210	2023-01-14
iMaster NetEco V600R023C00SPC110	2022-10-28
iMaster NetEco V600R023C00CP0010	2022-09-07
iMaster NetEco V600R022C00CP1301	2022-07-14
iMaster NetEco V600R022C00CP1202	2022-06-16
iMaster NetEco V600R022C00SPC120	2022-04-11