

iMaster NetEco V600R022C00

Northbound Interface Reference-V6 (SmartPVMS)

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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
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	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.

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	2022-06-16	This issue is the first official release.

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1 Overview

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- [1.2 System Architecture](#)
- [1.3 Interconnection Method](#)
- [1.4 Interface Change Description](#)

1.1 Interface Description

RETSful 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.

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.

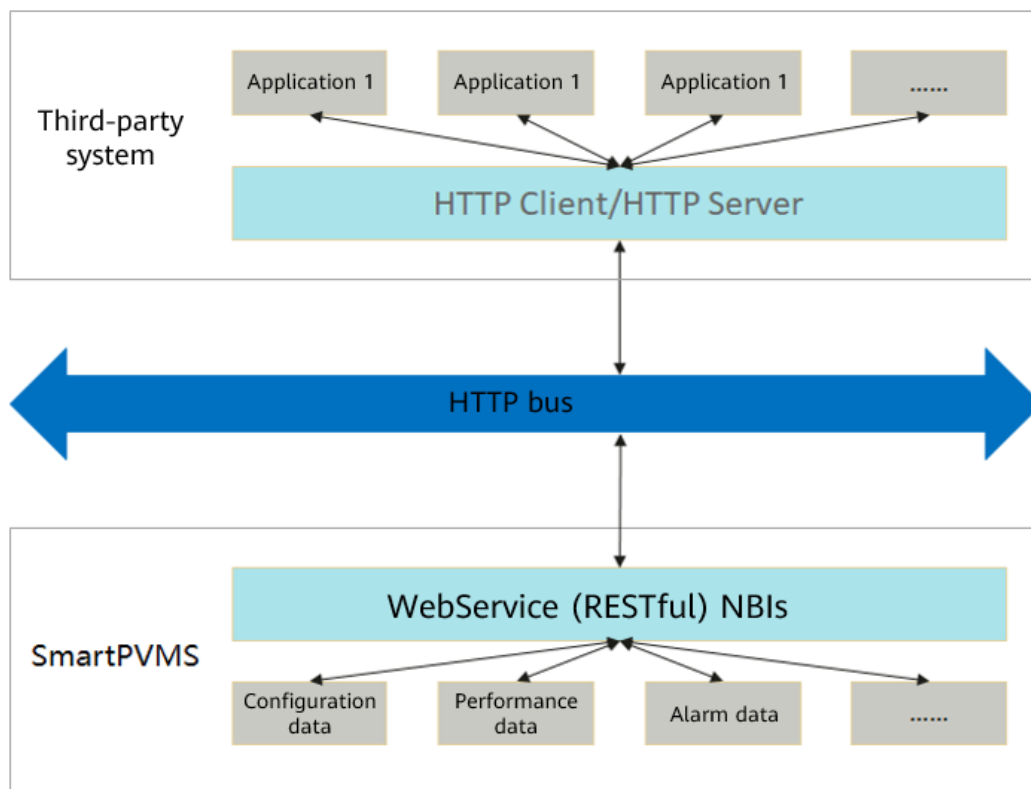
- 1xx message: The request has been received by the server and continues to be processed.
- 2xx success: The request has been received, understood, and accepted by the server.
- 3xx redirection: This request can be completed only after subsequent operations are performed.
- 4xx request error: The request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

1.2 System 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 or IP address 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 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 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

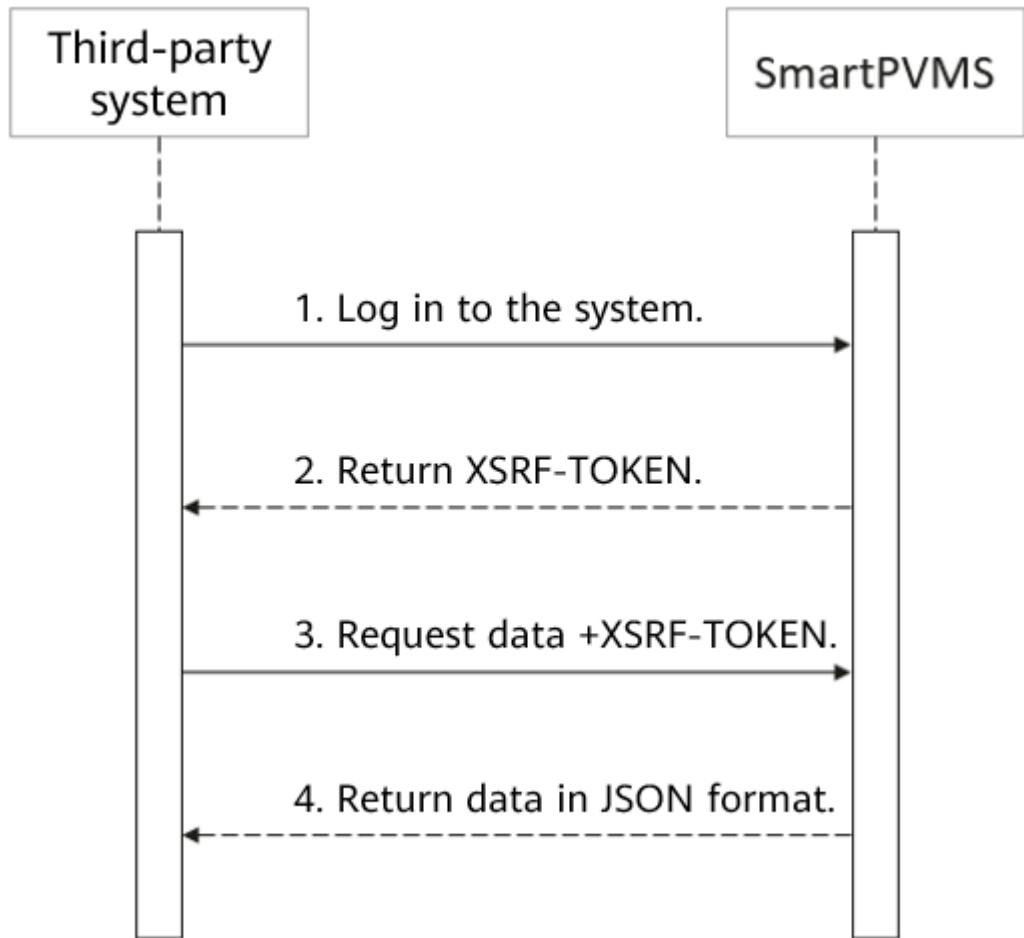
Traffic Limiting Policy

The number of northbound users and the number of plants and devices managed by each northbound user are increasing. To better meet user requirements, the northbound API traffic limiting policy is adjusted. The new traffic limiting policy is based on the number of resources owned by northbound users. A user with more plants and devices is allowed to send more API requests in a period of time.

Existing users: For northbound users created on June 30, 2022 or earlier, the original traffic limiting policy applies, and the allowed invoking frequency cannot be increased. **New users:** For northbound 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 traffic limiting policy, API invoking may fail, and the consequences shall be borne by the user.

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 user name 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 user name and password, the system returns this token to the user. If the user adds the token to a subsequent request, 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 V600R022C00 to iMaster NetEco V600R022C00CP1202

[2.1 New Interfaces](#)

[2.2 Deleted Interfaces](#)

[2.3 Modified Interfaces](#)

2.1 New Interfaces

Interface Name	Interface Method and Path	Description
Historical Device Data Interface	<code>https://<i>Management system domain name or IP address</i>/thirdData/getDevHistoryKpi</code>	Obtains 5-minute statistical data of a device in a specified period.
Device Convergence Data Interface	<code>https://<i>Management system domain name or IP address</i>/thirdData/cs/getInverterRealKpi</code>	Obtains inverter running and alarm data.

2.2 Deleted Interfaces

None

2.3 Modified Interfaces

None

3 Changes from V600R021C10 to V600R021C10SPC010

[3.1 New Interfaces](#)

[3.2 Deleted Interfaces](#)

[3.3 Modified Interfaces](#)

3.1 New Interfaces

None.

3.2 Deleted Interfaces

None.

3.3 Modified Interfaces

The V6 query interface of device data supports LUNA 2000 residential battery and C&I, Utility ESS. The involved interfaces are as follows:

Interface Name	Interface Method and Path	Description
Real-Time Device Data Interface	<i>https://Domain name or IP address of the management system/</i> thirdData/getDevRealKpi	Deleted "only LG batteries are supported" because devices of ID 39 support LUNA 2000. Added 41 device types to support C&I, Utility ESS.

Interface Name	Interface Method and Path	Description
5-minute Device Data Interface	https://Domain name or IP address of the management system/ thirdData/getDevFiveMinutes	Deleted "only LG batteries are supported" because devices of ID 39 support LUNA 2000. Added 41 device types to support C&I, Utility ESS.
Daily Device Data Interface	https://Domain name or IP address of the management system/ thirdData/getDevKpiDay	Deleted "only LG batteries are supported" because devices of ID 39 support LUNA 2000. Added 41 device types to support C&I, Utility ESS.
Monthly Device Data Interface	https://Domain name or IP address of the management system/ thirdData/getDevKpiMonth	Deleted "only LG batteries are supported" because devices of ID 39 support LUNA 2000. Added 41 device types to support C&I, Utility ESS.
Yearly Device Data Interface	https://Domain name or IP address of the management system/ thirdData/getDevKpiYear	Deleted "only LG batteries are supported" because devices of ID 39 support LUNA 2000. Added 41 device types to support C&I, Utility ESS.

4 Changes from iMaster NetEco V600R022C00 to SmartPVMS V600R021C10SPC010

[4.1 New Interfaces](#)

[4.2 Deleted Interfaces](#)

[4.3 Modified Interfaces](#)

4.1 New Interfaces

None.

4.2 Deleted Interfaces

None.

4.3 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 or IP address 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.
5-minute Device Data Interface	https://Domain name or IP address 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 or IP address 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 or IP address 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 or IP address 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.

5 Changes from V500R007C00SPC200 to V600R021C10

[5.1 New Interfaces](#)

[5.2 Deleted Interfaces](#)

[5.3 Modified Interfaces](#)

5.1 New Interfaces

None

5.2 Deleted Interfaces

None.

5.3 Modified Interfaces

None.

6 V6 Interface Reference

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

[6.1 New Interfaces](#)

[6.2 Indicators Obtained over Northbound Interfaces](#)

[6.3 Restricted Access Interface](#)

[6.4 To-Be-Offline Interfaces](#)

6.1 New Interfaces

None.

6.1.1 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 or IP address 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 8 Error Code List .	Integer	-
parameters	Parameters	-	-
	currentTime	Current system time, in milliseconds	Long
message	Optional message	String	-
data	Returned data	Object	-

Example

Request example:

```
{
  "userName": "admin4",
  "systemCode": "Admin@1234"
}
```

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 screenshot shows a REST client interface. The request tab is selected, showing a POST method to the URL `https://10.21.64.126/ibndData/login`. The request body is a JSON object: `{ "username": "c1qthia002", "password": "Cbawcaw_123" }`. The response tab shows a 200 OK status with a JSON body: `{ "data": null, "success": true, "failCode": 0, "params": {}, "message": null }`.

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 screenshot shows the response headers of a login request. The 'set-cookie' header is highlighted and contains the XSRF-TOKEN value: `set-cookie: XSRF-TOKEN=cofpaap2r@4d37u1opmpfy3k5sd8m712d3k3gldgrtgmhbdfteuqnfqf647xqo5oa8787c08667vj2kafkrsq00ic00rjfrnsp5d0qfv3d95j7p8hwj;Secure`.

The following is an example compatible with earlier versions.

The screenshot shows the response headers of a login request for an earlier version. The 'set-cookie' header is highlighted and contains the XSRF-TOKEN value: `set-cookie: XSRF-TOKEN=cofpaap2r@4d37u1opmpfy3k5sd8m712d3k3gldgrtgmhbdfteuqnfqf647xqo5oa8787c08667vj2kafkrsq00ic00rjfrnsp5d0qfv3d95j7p8hwj;Secure`.

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

The screenshot displays a REST client interface for a POST request. The request URL is `https://10.21.64.126/thirdData/getStationList`. The request method is POST. The request headers include `XSRF-TOKEN` with a long alphanumeric value. The response status is 200 OK. The response body is a JSON object with the following structure:

```

{
  "data": [
    {
      "aidType": 1, "buildState": null, "capacity": 0.0, "combineType": null, "linkmanPho": ""
    },
    {
      "aidType": 2147483647, "buildState": null, "capacity": 0.0, "combineType": null, "linkmanPho": "154554554455"
    }
  ],
  "failCode": 0,
  "message": null,
  "params": {
    "currentTime": 1608021059561
  },
  "success": true
}

```

Below the response, the client interface shows the request details, including the request URL, request method, status code, remote address, and response headers. The response headers include `Accept`, `Accept-Encoding`, `Accept-Language`, `Connection`, `Content-Length`, `Cookie`, `Origin`, `Sec-Fetch-Mode`, `Sec-Fetch-Site`, and `User-Agent`.

6.1.2 Logout Interface

Interface Description

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

Request URL

`https://Domain name or IP address 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 8 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-
apepy1f7zuqimep7wuqen9hkb3xaourelbyrx9jio7s09hgk6ca2mdlksjdgldshjaksdfhhsahwedyuio
qwehjkd"
}
```

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:

The screenshot displays a REST client interface for a POST request to `https://10.21.64.126/thirdData/logout`. The request body is a JSON object containing an `xsrfToken`. The response is a 200 OK status with a JSON body: `{data: null, success: true, failCode: 0, params: {}, message: null}`. The interface also shows the request headers and a detailed view of the request payload.

6.1.3 Plant List Interface

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.

Request URL

`https://Domain name or IP address of the management system/thirdData/getStationList`

Request Mode

HTTP method: POST

Request Parameters

None

Access Restrictions

Maximum number of traffic limiting times for each northbound user: 24 times per day.

Only one concurrent request is supported per minute.

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

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 8 Error Code List .	Integer	-
parameters	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

Parameter		Description	Data Type	Remarks
	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	-
	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	-

Example

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  
}
```

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:

The screenshot displays a REST client interface for a POST request to `https://10.21.64.126/thirdData/getStationList`. The request headers include an XSRF-TOKEN. The response is a 200 OK status with a JSON body containing plant data.

```

Request Headers:
XSRF-TOKEN: x-mkc419g1er2k6106bv9cpgpdm0df1g89s5fjprsqerusa1gn1g7j3vy1j1f67zncakdequ06m8s8v66nyhgs7anphc51epejfw6qtj888b40a8beq

Response Body:
{
  "data": [
    {
      "aidType": 1,
      "buildState": null,
      "capacity": 0.0,
      "combineType": null,
      "linkName": ""
    },
    {
      "aidType": 2147483647,
      "buildState": null,
      "capacity": 0.0,
      "combineType": null,
      "linkName": "15455455455"
    }
  ],
  "failCode": 0,
  "message": null,
  "params": {
    "currentTime": 1668021954870
  },
  "success": true
}
    
```

6.1.4 Plant Data Interfaces

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

6.1.4.1 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 [6.2.1 Interface for Real-time Plant Data](#).

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 user manages 20 plants: Number of traffic limiting times every 5 minutes = Roundup (20/100) = 1

If a northbound user manages 120 plants: Number of traffic limiting times every 5 minutes = Roundup (120/100) = 2

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (.). The plant IDs are obtained from 6.1.3 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	Parameters	-	-

Parameter		Description	Data Type	Remarks
	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 6.2.1 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getStationRealKpi`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4f9glar2k600bv9cggpdmqgflg89e5fyrpqeuaalgn1g7jyvj11f6r7zhaakde`. The request body is a JSON object: `{ "stationCodes": "NE+33554441,NE+33554455" }`. The response is a `200 OK` with a JSON body: `{ "data": [{ "stationCode": "NE-33554441", "dataItemMap": { "total_income": 0.0, ... } }] }`. The interface also shows general request details, response headers, and the request payload.

6.1.4.2 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 on the current day. If there is data for n ($0 \leq n \leq 24$) hours of the day, n ($0 \leq n \leq 24$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.2 Hourly Plant Data Interface](#).

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 northbound user manages 20 plants: Number of traffic limiting times per day = Roundup (20/100) + 24 = 1 + 24 = 25

If a northbound user manages 120 plants: Number of traffic limiting times per day = Roundup (120/100) = 2 + 24 = 26

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	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 hourly data object list of each plant.	List	Hourly data list of a plant on 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 6.2.2 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getKpiStationHour`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4f9glie2k6l06bv9cpgpdqm6dflg89s5fypirsqlerusa1g7zjl`. The request body is a JSON object: `{ "stationCodes": "NE-33554441, NE-33564455", "collectTime": 1608023875000 }`. The response is `200 OK` with a JSON body: `{ "data": [[{ "collectTime": 1607961600000, "stationCode": "NE-33554441", "dataItemMap": { "radiation_intensity": null, ... } }]] }`.

6.1.4.3 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 there is data for n ($0 \leq n \leq 31$) days of the month, n ($0 \leq n \leq 31$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.3 Daily Plant Data Interface](#).

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 northbound user manages 20 plants: Number of traffic limiting times per day = Roundup (20/100) + 24 = 1 + 24 = 25

If a northbound user manages 120 plants: Number of traffic limiting times per day = Roundup (120/100) = 2 + 24 = 26

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	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

Parameter		Description	Data Type	Remarks
failCode		Error code 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
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 6.2.3 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request to the endpoint `https://10.21.64.126/thirdData/getKpiStationDay`. The request headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mk04l9glie2k6l06bv9cpgdqmqdflg89s5fypirsqlerusa1gnz1g7zjl`. The request body is a JSON object: `{ "stationCodes": "NE-33554441, NE-33554455", "collectTime": 1608023875000 }`. The response is a 200 OK status with a JSON body: `{ "data": [{ "collectTime": 1607558400000, "stationCode": "NE-33554441", "dataItemMap": { "radiation_intensity": null, ... } }] }`. Below the main interface, the 'Request Headers' and 'Request Payload' sections are expanded, showing the full header list and the request body respectively.

6.1.4.4 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 there is data for n ($0 \leq n \leq 12$) months of the year, n ($0 \leq n \leq 12$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.4 Monthly Plant Data Interface](#).

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 northbound user manages 20 plants: Number of traffic limiting times per day = Roundup (20/100) + 24 = 1 + 24 = 25

If a northbound user manages 120 plants: Number of traffic limiting times per day = Roundup (120/100) = 2 + 24 = 26

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
params	Parameters	-	-

Parameter		Description	Data Type	Remarks
	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 6.2.4 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getKpiStationMonth`. The request headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4l9glier2k6l06bv9cpgpdqm0qdfg89e5fypiraqlerusalgnz1g7zt`. The request body is a JSON object: `{ "stationCode": "NE-33554441", "collectTime": 1608023875000 }`. The response is a 200 OK status with a JSON body: `{ "data": [{ "collectTime": 1604188800000, "stationCode": "NE-33554441", "dataItemMap": { "radiation_intensity": null, ... } }] }`. The interface also shows a 'General' tab with request and response details, and a 'Request Headers' tab with various headers like `Accept: */*`, `Accept-Encoding: gzip, deflate, br`, and `Accept-Language: zh-CN, zh;q=0.9`.

6.1.4.5 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 [6.2.5 Yearly Plant Data Interface](#).

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 northbound user manages 20 plants: Number of traffic limiting times per day = Roundup (20/100) + 24 = 1 + 24 = 25

If a northbound user manages 120 plants: Number of traffic limiting times per day = Roundup (120/100) = 2 + 24 = 26

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
params	Parameters	-	-

Parameter		Description	Data Type	Remarks
	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 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 6.2.5 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getKpiStationYear`. The request headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc419g1er2k6106bv9cpgdqm6qf1g89s5fyprsq1erusa1gnz1g7zvj`. The request body is a JSON object: `{ "stationCode": "NB=33554441", "NB=33554455", "collectTime": 1608023975000 }`. The response is a `200 OK` status with a JSON body: `{ "data": [{ "collectTime": 1546300800000, "stationCode": "NE=33554441", "dataItemMap": { "radiation_intensity": null, ... } }] }`. The interface also shows request and response headers and a general section with request URL, method, status code, and other details.

6.1.5 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.

You can query devices by plant ID set. Devices of a maximum of 100 plants can be queried at a time.

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound 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 northbound user manages 20 plants: Number of traffic limiting times per day = Roundup (20/100) + 24 = 1 + 24 = 25

If a northbound user manages 120 plants: Number of traffic limiting times per day = Roundup (120/100) = 2 + 24 = 26

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
params	Parameters	-	-
	stationCodes	Plant ID list in the request parameter	-
	currentTime	Current system time, in milliseconds	-
message	Optional message	String	-

Parameter		Description	Data Type	Remarks
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 SmartLogger 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 the inverter)	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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getDevList`. The headers include `Content-Type: application/json;charset=UTF-8` and `XSRF-TOKEN: x-mkc4l9glieR2k6l0b0v9cpgdqmq6qllg99s5fypirsqlerusalgnz1g7zj`. The request body is a JSON object: `{ "stationCodes": "NE-33554441,NE-33554455" }`. The response is a 200 OK status with a JSON body: `{ "data": [{ devName: "test10000000", devTypeId: 38, esnCode: "test10000000", ... }] }`. Below the response, the 'Request Headers' and 'Request Payload' sections are expanded, showing the full headers and the request body respectively.

6.1.6 Device Data Interfaces

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

6.1.6.1 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 [6.2.6 Real-Time Device Data Interface](#).

Request URL

`https://Domain name or IP address 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 user. Number of traffic limiting times for each northbound user every 5 minutes = \sum Roundup (Number of devices of type A/100).

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

Example:

- If a northbound user manages 20 inverters and 20 meters, the number of traffic limiting times every 5 minutes is calculated as follows:
Inverters: Roundup (20/100) = 1
Meters: Roundup (20/100) = 1
Total: Number of times for inverters + Number of times for meters = 1 + 1 = 2
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times every 5 minutes is calculated as follows:
Inverters: Round up (120/100) = 2
Meters: Round up (120/100) = 2
Total: Number of times for inverters + Number of times for meters = 2 + 2 = 4

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 6.1.5 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	Parameters	-	-	-
	devIds	Device ID 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	-
data	Parameters	Returned data. The data contains the real-time data object list of each device.	List	-
	devId	Device ID	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 6.2.6 Real-Time Device Data Interface .	Map	Real-time device data

Example

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,  
"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,  
    "efficiency":0,  
    "pv2_u":0  
  },  
  "devId":214060404588862  
}  
],  
"failCode":0,  
"params":{  
  "devIds":"214060404588862,213472461631079",  
  "devType":1,  
  "currentTime":1503046597854  
},  
"message":null  
}
```

NOTE

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

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getDevRealKpi`. The request headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4l9glier2k6l06bv9cpgpdqm6qfjg89s5fypraqleusa1gn21g7zj`. The request body is a JSON object: `{ "devId": "1000000033554447", "devType": 38 }`. The response is a 200 OK status with a JSON body: `{ "data": [{ "devId": 1000000033554447, "dataItemMap": { "pv1_u": 200.0, "pv2_u": 200.0, ... } }] }`. Below the main interface, a 'General' section shows the request URL, method (POST), status code (200 OK), and response headers.

6.1.6.2 Historical Device Data Interface

Interface Description

This interface is used to obtain 5-minute device data in a specified time period. 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 [6.2.8 Historical Device Data Interface](#).

Request URL

`https://Management system domain name or IP address/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 user. Number of traffic limiting times for each northbound user per day = $\sum \text{Roundup}(\text{Number of devices of type A}/10) + 24$.

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 user manages 20 inverters and 20 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: $\text{Roundup}(20/10) = 2$
 Meters: $\text{Roundup}(20/10) = 2$
 Total: Number of times for inverters + Number of times for meters = $2 + 2 + 24 = 28$
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: $\text{Roundup}(120/10) = 12$
 Meters: $\text{Roundup}(120/10) = 12$
 Total: Number of times for inverters + Number of times 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 6.1.5 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	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 on a day
	devId	Device ID	Long	-
	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 6.2.8 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_j":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,
"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,  
"efficiency":null,  
"pv2_u":575.3  
},  
"devId":213472461631079,  
"collectTime":1501862700000  
}  
],
```



```
"failCode":0,
"params":{
  "devIds":"214060404588862,213472461631079",
  "devType":1,
  "startTime":1501862400000,
  "endTime":1501872400000,
  "currentTime":1503046597854
},
"message":null
}
```

NOTE

Prerequisites for obtaining data: The account authorized by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getDevFiveMinutes`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc419glier2k100b9cpgpdqmofg89s5fypirsaqlerusa1gn2g72j3vj1f67zncakdequomss8v86nyngs7anphc31epejfwlqct3880k4oab0eq`. The body is a JSON object: `{ "devIds": "100000033554447", "devType": 38, "collectTime": 1606237462000 }`. The response is `200 OK` with a JSON body: `{ "data": [], "failCode": 0, "message": null, "params": { "currentTime": 1608023731470, ... } }`. The general tab shows request and response details, including headers and cookies.

6.1.6.3 Daily Device Data Interface

Interface Description

This interface is used to obtain daily device data. 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 there is data for n ($0 \leq n \leq 31$) days of the month, n ($0 \leq n \leq 31$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.9 Daily Device Data Interface](#).

Request URL

`https://Domain name or IP address 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 user. Number of traffic limiting times for each northbound user per day = $\sum \text{Roundup}(\text{Number of devices of type A}/100) + 24$.

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 user manages 20 inverters and 20 meters, the number of traffic limiting times per day is calculated as follows:
Inverters: $\text{Roundup}(20/100) = 1$
Meters: $\text{Roundup}(20/100) = 1$
Total: Number of times for inverters + Number of times for meters = $1 + 1 + 24 = 26$
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times per day is calculated as follows:
Inverters: $\text{Roundup}(120/100) = 2$
Meters: $\text{Roundup}(120/100) = 2$
Total: Number of times for inverters + Number of times 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 (,).	String	Mandatory

Parameter	Description	Data Type	Mandatory/Optional
devTypeId	Device type ID. Use the device type ID obtained in 6.1.5 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 0 indicates that the status is normal. For definitions of other error codes, see 8 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	-	

Parameter		Description	Data Type	Remarks
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	-
	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 6.2.9 Daily Device Data Interface .	Map	Data of a device on a day

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

NOTE

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

Request example:

The screenshot displays a REST client interface for a POST request to the endpoint `https://10.21.64.126/thirdData/getDevKpiDay`. The request headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4l1glier2k6l0b9v9cpgpdmqf1g89s5fyprsqlerusa1gnz1g7zjt`. The request body is a JSON object: `{ "devId": "1000000033854447", "devType": 38, "collectTime": 1606237462000 }`. The response is `200 OK` with a JSON body: `{ "data": [], "failCode": 0, "message": null, "params": { "currentTime": 1608023742798, ...} }`. Below the main interface, a detailed log shows the request URL, method, status code, headers, and payload.

6.1.6.4 Monthly Device Data Interface

Interface Description

This interface is used to obtain monthly device data. 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 there is data for n ($0 \leq n \leq 12$) months of the year, n ($0 \leq n \leq 12$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.10 Monthly Device Data Interface](#).

Request URL

`https://Domain name or IP address 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 user. Number of traffic limiting times for each northbound user per day = $\sum \text{Roundup}(\text{Number of devices of type A}/100) + 24$.

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 user manages 20 inverters and 20 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: $\text{Roundup}(20/100) = 1$
 Meters: $\text{Roundup}(20/100) = 1$
 Total: Number of times for inverters + Number of times for meters = $1 + 1 + 24 = 26$
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: $\text{Roundup}(120/100) = 2$
 Meters: $\text{Roundup}(120/100) = 2$
 Total: Number of times for inverters + Number of times 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 (,).	String	Mandatory
devTypeId	Device type ID. Use the device type ID obtained in 6.1.5 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	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 monthly data object list of each device.	List	List of monthly device data in a year
	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 6.2.10 Monthly Device Data Interface .	Map	Data of a device in a month

Example

Request example:

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

Response example:

Example 1: An error code is returned.

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

NOTE

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

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getDevKpiMonth`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc4l9gler2k6l06bv9cpgdqmqdfig89s5fypirsaqlerusalgnz7g7zjr`. The request body is a JSON object: `{ "devId": "1000000033554447", "devType": "38", "collectTime": "1606237462000" }`. The response is a 200 OK status with a JSON body: `{ "data": [{ "devId": "1000000033554447", "collectTime": "1604188800000", "dataItemMap": { "installed_capacity": null, ... } }] }`. Below the main interface, a 'General' section shows request details, and a 'Request Headers' section lists various headers like `Accept: */*`, `Accept-Encoding: gzip, deflate, br`, and `XSRF-TOKEN: x-mkc4l9gler2k6l06bv9cpgdqmqdfig89s5fypirsaqlerusalgnz7g7zjr`. The 'Request Payload' section shows the JSON body of the request.

6.1.6.5 Yearly Device Data Interface

Interface Description

This interface is used to obtain yearly device data. 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 [6.2.11 Yearly Device Data Interface](#).

Request URL

`https://Domain name or IP address 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 user. Number of traffic limiting times for each northbound user per day = $\sum \text{Roundup}(\text{Number of devices of type A}/100) + 24$.

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 user manages 20 inverters and 20 meters, the number of traffic limiting times per day is calculated as follows:
Inverters: Roundup (20/100) = 1
Meters: Roundup (20/100) = 1
Total: Number of times for inverters + Number of times for meters = 1 + 1 + 24 = 26
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times per day is calculated as follows:
Inverters: Roundup (120/100) = 12
Meters: Roundup (120/100) = 12
Total: Number of times for inverters + Number of times 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 (,).	String	Mandatory
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 0 indicates that the status is normal. For definitions of other error codes, see 8 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 yearly data object list of each device.	List	Data list of each year since the device is connected
	devId	Device ID	Long	-
	collectTime	Collection time, in milliseconds	Long	-

Parameter		Description	Data Type	Remarks
	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 6.2.11 Yearly Device Data Interface .	Map	Data of a device in a year

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: 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 account allocated by the system administrator must have the permission to invoke this interface.

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getDevKpiYear`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc419glie2k6106bv9cpgpdqm6qdfg89s5fyprsqleusa1gnz1g7zjl`. The request body is a JSON object: `{ "devId": "100000003354447", "devType": "36", "collectTime": "1606237462000" }`. The response is a 200 OK status with a JSON body: `{ "data": [{ "devId": "100000003354447", "collectTime": "1546300800000", "dataItemMap": { "installed_capacity": null, ... } }] }`. Below the main interface, a detailed log shows the request and response details, including headers and the request payload.

6.1.7 Device Alarm Interface

Interface Description

This interface is used to query the current (active) alarm information of the device. A maximum of 100 plants can be queried at a time.

Request URL

`https://Domain name or IP address 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 users. Number of traffic limiting times for each northbound user every 30 minutes = Roundup (Number of plants/100)

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

Example:

If a northbound user manages 20 plants: Number of traffic limiting times every 30 minutes = Roundup (20/100) = 1

If a northbound user manages 120 plants: Number of traffic limiting times every 30 minutes = Roundup (120/100) = 2

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
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

Parameter	Description	Data Type	Mandatory/Optional
status	<p>Alarm status. Multiple alarm states are separated by commas (,), for example, 1,2. If this parameter is not transferred or is left empty, alarms in all states are queried by default.</p> <p>The following alarm states are supported:</p> <ul style="list-style-type: none">1: not processed (active)2: acknowledged (by the user)3: being handled (transferred to a defect elimination ticket)4: handled (defect handling has ended)5: cleared (by the user)6: cleared (automatically by the device)	String	Optional
levels	<p>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.</p> <p>The following alarm severities are supported:</p> <ul style="list-style-type: none">1: critical2: major3: minor4: warning	String	Optional

Parameter	Description	Data Type	Mandatory/Optional
devTypes	<p>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.</p> <p>The following device types are supported:</p> <ul style="list-style-type: none"> 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet SmartLogger 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
types	<p>Alarm type. Multiple alarm types are separated by commas (,), for example, 1,2. If this parameter is not transferred or is left empty, alarms of all types are queried by default.</p> <p>The following alarm types are supported:</p> <ul style="list-style-type: none"> 1: transposition signal 2: exception alarm 3: protection event 4: notification status 5: alarm information 	String	Optional
devName	Device name. If this parameter is not transferred or is left empty, the device names in the alarms are not filtered.	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
failCode		Error code 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	Parameters	-	-	-
	stationCodes	Plant ID 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	-
	status	Status in the request parameter	String	-
	levels	Alarm severity in the request parameter	String	-
	devTypes	Device type in the request parameter	String	-
	types	Alarm type in the request parameter	String	-
	devName	Device name 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	-

Parameter		Description	Data Type	Remarks
	alarmName	Alarm name	String	-
	devName	Device name	String	-
	repairSuggestion	Solution	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 SmartLogger 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	-

Parameter		Description	Data Type	Remarks
	raiseTime	Alarm generation time in milliseconds	Long	-
	alarmId	Alarm ID	Integer	-
	stationName	Plant name	String	-
	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) 2: acknowledged (by the user) 3: being handled (transferred to a defect elimination ticket) 4: handled (defect handling has ended) 5: cleared (by the user) 6: cleared (automatically by the device)	Integer	-

Example

Request example:

```
{
  "stationCodes": "NE=33554434,NE=33554467",
  "beginTime": 1505337987000,
  "endTime": 1607447501000,
  "language": "zh_CN",
  "status": "1,2,3,4,5,6",
  "levels": "1,2,3,4",
  "devTypes": "1,2,38,46,62",
  "types": "1,2,3,4,5"
}
```

Response example:

Example 1: An error code is returned.

```
{
  "data": null,
}
```

```

    "failCode":20010,
    "message":null,
    "params":{
      "currentTime":1606479094342,
      "types":"1,2,3,4,5",
      "language":"zh_CN",
      "beginTime":1505337987000,
      "devTypes":"1,2,38,46,62",
      "endTime":1607447501000,
      "devName":"",
      "levels":"1,2,3,4",
      "stationCodes":"",
      "status":"1,2,3,4,5,6"
    },
    "success":false
  }
}

```

Example 2: Alarm data of the device is returned.

```

{
  "data": [
    {
      "alarmCause": "The PV string arcs or is in poor contact. (string-level precise detection)",
      "alarmId": 2003,
      "alarmName": "DC arc fault",
      "alarmType": 2,
      "causeId": 1,
      "devName": "ESN03337000000000001",
      "devTypeId": 38,
      "esnCode": "ESN03337000000000001",
      "lev": 2,
      "raiseTime": 1606418089000,
      "repairSuggestion": "Check whether the PV string has arcs or is in poor contact. \n The following is
the mapping between PV strings and alarm cause IDs:\n ID1: string 1";
      "stationCode": "NE=33554434",
      "stationName": "myStation",
      "status": 1
    },
    {
      "alarmCause": "1. The flash memory space is insufficient. \n 2. The flash memory has bad sectors",
      "alarmId": 61440,
      "alarmName": "The monitoring unit is faulty",
      "alarmType": 2,
      "causeId": 1,
      "devName": "ESN03337000000000001",
      "devTypeId": 38,
      "esnCode": "ESN03337000000000001",
      "lev": 2,
      "raiseTime": 1606418089000,
      "repairSuggestion": "Turn off the AC output switch and DC input switch, and then turn them on
after 5 minutes. If the fault persists, replace the monitoring board or contact your dealer or Huawei
technical support",
      "stationCode": "NE=33554434",
      "stationName": "myStation",
      "status": 1
    }
  ],
  "failCode": 0,
  "message": null,
  "params": {
    "currentTime": 1606479126223,
    "types": "1,2,3,4,5",
    "language": "zh_CN",
    "beginTime": 1505337987000,
    "devTypes": "1,2,38,46,62",
    "endTime": 1607447501000,
    "devName": "",
    "levels": "1,2,3,4",
    "stationCodes": "NE=33554434,NE=33554467",
    "status": "1,2,3,4,5,6"
  }
}

```

```
},
"success": true
}
```

NOTE

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

Request example:

The screenshot displays a REST client interface for a POST request. The URL is `https://10.21.64.126/thirdData/getAlarmList`. The headers include `Content-Type: application/json` and `XSRF-TOKEN: x-mkc419glier2k6l06bv9cpgpdqm6qdfg9s5fjrsqqlerusalgnz1g7z`. The request body is a JSON object: `{ "stationCodes": "NE=33554441,NE=33554455", "beginTime": 1585337987000, "endTime": 160747581000, "language": "zh_CN", "status": "1,2,3,4,5,6", "server": "1,2,3,4", "devTypes": "1,2,38,46,62", "types": "1,2,3,4,5" }`. The response is `200 OK` with a JSON body: `{ "data": [], "failCode": 0, "message": null, "params": { "currentTime": 1608023843383, ...} }`. Below the interface, the 'Request Headers' and 'Request Payload' sections are expanded, showing the raw headers and the JSON body respectively.

6.2 Indicators Obtained over Northbound Interfaces

6.2.1 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

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

6.2.2 Hourly Plant Data Interface

Key	Name	Unit	Return Value Type
radiation_intensity	Global irradiation	kWh/m ²	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

6.2.3 Daily Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m ²	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

6.2.4 Monthly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m ²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double

Key	Name	Unit	Return Value Type
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

6.2.5 Yearly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m ²	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

Key	Name	Unit	Return Value Type
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

6.2.6 Real-Time Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter state. For details, see Table 6-1 .	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

Device Type	Key	Name	Unit	Return Value Type
	c_i	Phase C current of grid	A	Double
	efficiency	Inverter conversion efficiency (manufacturer)	%	Double
	temperature	Internal temperature in inverter	°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

Device Type	Key	Name	Unit	Return Value Type
	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
	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

Device Type	Key	Name	Unit	Return Value Type
	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
	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
	mppt_6_cap	MPPT 6 DC total yield	kWh	Double

Device Type	Key	Name	Unit	Return Value Type
	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 6-1 .	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
	temperature	Internal temperature in inverter	°C	Double
	power_factor	Power factor	None	Double

Device Type	Key	Name	Unit	Return Value Type
	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
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_1_cap	MPPT 1 DC total yield	kWh	Double

Device Type	Key	Name	Unit	Return Value Type
	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
	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

Device Type	Key	Name	Unit	Return Value Type
	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
	reverse_active_power	Negative active energy (shoulder)	kWh	Double
	reverse_active_valley	Negative active energy (off-peak)	kWh	Double

Device Type	Key	Name	Unit	Return Value Type
	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
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

Device Type	Key	Name	Unit	Return Value Type
	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
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 charging power	W	Double
	max_discharge_power	Maximum discharging 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	ch_discharge_power	Charge/Discharge power	W	Double

Device Type	Key	Name	Unit	Return Value Type
C&I and utility ESS	battery_soc	Battery SOC	%	Double
	battery_soh	Battery SOH	None	Double
	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
	run_state	State (0: Disconnected 1: Connected)	None	Long

Table 6-1 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
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: cos ϕ -P curve
1026	Grid scheduling: Q-U curve
1280	Ready for terminal test
1281	Terminal testing...

State Value	Description
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)

6.2.7 5-minute Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter state. For details, see Table 6-2 .	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
	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	Name	Unit	Return Value Type
	temperature	Internal temperature in inverter	°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

Device Type	Key	Name	Unit	Return Value Type
	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
	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	Name	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
	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
	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

Device Type	Key	Name	Unit	Return Value Type
	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 6-2 .	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
	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 in inverter	°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	

Device Type	Key	Name	Unit	Return Value Type
	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
	mppt_3_cap	MPPT 3 DC total yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total yield	kWh	Double
ID: 10	temperature	Temperature	°C	Double

Device Type	Key	Name	Unit	Return Value Type
EMI	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
	active_cap	Active energy (positive active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double

Device Type	Key	Name	Unit	Return Value Type
	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
	positive_active_top	Positive active energy (sharp)	kWh	Double
	reverse_reactive_peak	Negative reactive energy (peak)	kVar	Double

Device Type	Key	Name	Unit	Return Value Type
	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
	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 charging power	W	Double
	max_discharge_power	Maximum discharging power	W	Double

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

Table 6-2 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

State Value	Description
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: $\cos\phi$ -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)

6.2.8 Historical Device Data Interface

Device Type	Key	Item	Unit	Return Value Type
ID: 1 String inverter	inverter_state	Inverter status. For details, see Table 6-3 .	None	Double
	ab_u	Grid AB voltage	V	Double
	bc_u	Grid BC voltage	V	Double
	ca_u	Grid CA voltage	V	Double
	a_u	Phase A voltage	V	Double
	b_u	Phase B voltage	V	Double

Device Type	Key	Item	Unit	Return Value Type
	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
	reactive_power	Output reactive power	kVar	Double
	day_cap	Daily energy yield	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

Device Type	Key	Item	Unit	Return Value Type
	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
	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
	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

Device Type	Key	Item	Unit	Return Value Type
	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
	total_cap	Total energy 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 energy yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total energy yield	kWh	Double
	mppt_3_cap	MPPT 3 DC total energy yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total energy yield	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	mppt_5_cap	MPPT 5 DC total energy yield	kWh	Double
	mppt_6_cap	MPPT 6 DC total energy yield	kWh	Double
	mppt_7_cap	MPPT 7 DC total energy yield	kWh	Double
	mppt_8_cap	MPPT 8 DC total energy yield	kWh	Double
	mppt_9_cap	MPPT 9 DC total energy yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total energy yield	kWh	Double
ID: 38 Residential inverter	inverter_state	Inverter status. For details, see Table 6-3 .	None	Double
	ab_u	Grid AB voltage	V	Double
	bc_u	Grid BC voltage	V	Double
	ca_u	Grid CA voltage	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	Daily energy yield	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 energy yield	kWh	Double
	open_time	Inverter startup time	ms	Double
	close_time	Inverter shutdown time	ms	Double
	mppt_1_cap	MPPT 1 DC total energy yield	kWh	Double
	mppt_2_cap	MPPT 2 DC total energy yield	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	mppt_3_cap	MPPT 3 DC total energy yield	kWh	Double
	mppt_4_cap	MPPT 4 DC total energy 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	Air flow	Degree	Double
	radiant_total	Daily irradiance	MJ/m ²	Double
	radiant_line	Irradiation intensity	W/m ²	Double
	horiz_radiant_line	Horizontal irradiation intensity	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

Device Type	Key	Item	Unit	Return Value Type
	power_factor	Power factor	None	Double
	active_cap	Active energy (forward active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double
	reverse_active_cap	Reverse active energy	kWh	Double
	forward_reactive_cap	Forward reactive energy	kWh	Double
	reverse_reactive_cap	Reverse 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	Reverse active energy (peak)	kWh	Double
	reverse_active_power	Reverse active energy (shoulder)	kWh	Double
	reverse_active_valley	Reverse active energy (off-peak)	kWh	Double
	reverse_active_top	Reverse active energy (sharp)	kWh	Double
	positive_active_peak	Forward active energy (peak)	kWh	Double
	positive_active_power	Forward active energy (shoulder)	kWh	Double
	positive_active_valley	Forward active energy (off-peak)	kWh	Double

Device Type	Key	Item	Unit	Return Value Type
	positive_active_to_p	Forward active energy (sharp)	kWh	Double
	reverse_reactive_peak	Reverse reactive energy (peak)	kVar	Double
	reverse_reactive_power	Reverse reactive energy (shoulder)	kVar	Double
	reverse_reactive_valley	Reverse reactive energy (off-peak)	kVar	Double
	reverse_reactive_top	Reverse reactive energy (sharp)	kVar	Double
	positive_reactive_peak	Forward reactive energy (peak)	kVar	Double
	positive_reactive_power	Forward reactive energy (shoulder)	kVar	Double
	positive_reactive_valley	Forward reactive energy (off-peak)	kVar	Double
	positive_reactive_top	Forward 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 (forward active energy)	kWh	Double
	reverse_active_cap	Reverse active energy	kWh	Double
ID: 39 Battery (household energy storage)	battery_status	Battery running status (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Double

Device Type	Key	Item	Unit	Return Value Type
	max_charge_power	Maximum charging power	W	Double
	max_discharge_power	Maximum discharging 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 ESS (commercial and industrial usage and commercial energy storage)	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 6-3 Inverter status (inverter_state) description

Status Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start

Status Value	Description
512	Grid-connected
513	Grid connection: power limited
514	Grid connection: self-derating
768	Shutdown: fault
769	Shutdown: command
770	Shutdown: OVGR
771	Shutdown: communication disconnected
772	Shutdown: power limited
773	Shutdown: manual startup required
774	Shutdown: DC switches disconnected
1025	Grid scheduling: $\cos\phi$ -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 disconnection (written by the SmartLogger)
49152	Loading (written by the SmartLogger)

6.2.9 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

Device Type	Key	Name	Unit	Return Value Type
	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

6.2.10 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	charge_cap	Charged energy	kWh	Double

Device Type	Key	Name	Unit	Return Value Type
C&I and utility ESS	discharge_cap	Discharged energy	kWh	Double

6.2.11 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
	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

6.3 Restricted Access Interface

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

6.3.1 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 or IP address of the management system/thirdData/cs/getInverterRealKpi

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 0 indicates that the status is normal. For definitions of other error codes, see 8 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	

Parameter	Description	Data Type	Remarks
>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 duration	Integer	
>>eDay	Energy yield of the current day	Double	
>>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	<p>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.</p> <p>For example, if the number of strings cannot be queried, classify the strings by household and string inverter. The missing data is populated with null. The length of the list is as follows: Residential inverter: 8 String inverter: 24</p>
>>nationalStandard	National standards	String	
>>pac	Output power	Double	
>>powerFactor	Power factor	Double	
>>reactivePower	Reactive power	Double	

Parameter	Description	Data Type	Remarks
>>status	Alarm status	Integer	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	<p>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.</p> <p>For example, if the number of strings cannot be queried, classify the strings by household and string inverter. The missing data is populated with null. The length of the list is as follows: Residential inverter: 8 String inverter: 24</p>

Example

Request example:

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

Response example:

Example 1: An error code is returned.

```
{
  "data": null,
```


Table 6-4 To-be-offline interfaces

Interface Name	Request URL	Estimated Offline Date	Offline Reason	New Interface	Request URL
Historical Device Data Interface	https:// Domain name or IP address of the manageme nt system/ thirdData/ getDevFive Minutes	2023-06-30	The function is enhanced.	Historical Device Data Interface	https:// Domain name or IP address of the manageme nt system/ thirdData/ getDevHist oryKpi

6.4.1 Historical Device Data Interface

Interface Description

This interface is used to obtain 5-minute device data. 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 on the day based on the device ID.

If there is data for n ($0 \leq n \leq 288$) multiples of 5 minutes of the day, n ($0 \leq n \leq 288$) records will be returned.

For details about the data list that can be queried using this interface, see [6.2.7 5-minute Device Data Interface](#).

Request URL

[https://Domain name or IP address of the management system/thirdData/
getDevFiveMinutes](https://Domain name or IP address 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 user. Number of traffic limiting times for each northbound user per day = $\sum \text{Roundup}(\text{Number of devices of type A}/100) + 24$.

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

Example:

- If a northbound user manages 20 inverters and 20 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: Roundup (20/10) = 2
 Meters: Roundup (20/10) = 2
 Total: Number of times for inverters + Number of times for meters = 2 + 2 + 24 = 28
- If a northbound user manages 120 inverters and 120 meters, the number of traffic limiting times per day is calculated as follows:
 Inverters: Roundup (120/10) = 12
 Meters: Roundup (120/10) = 12
 Total: Number of times for inverters + Number of times 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 6.1.5 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 0 indicates that the status is normal. For definitions of other error codes, see 8 Error Code List .	Integer	-
parameters	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 on 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 6.2.7 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,  
"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,  
"efficiency":null,  
"pv2_u":575.3  
},  
"devId":213472461631079,  
"collectTime":1501862700000  
}  
],  
"failCode":0,  
"params":{
```



```

"devIds": "214060404588862,213472461631079",
"devType": 1,
"collectTime": 1501862400000,
"currentTime": 1503046597854
},
"message": null
}
    
```

NOTE

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

Request example:

The screenshot displays a REST client interface for a POST request to the endpoint `https://10.21.64.126/thirdData/getDevFiveMinutes`. The request body is a JSON object:

```

{
  "devIds": "1000000033554447",
  "devType": 38,
  "collectTime": 1606237462000
}
    
```

The response is `200 OK` with the following JSON body:

```

{
  "data": [],
  "failCode": 0,
  "message": null,
  "params": {
    "currentTime": 1608023731470, ...
  }
}
    
```

The screenshot also shows the request headers, including `Content-Type: application/json` and `XSRF-TOKEN`, and the request payload.

7 Device Type List

No.	Device Type	Device Type ID	Supported Interface
1	MPPT	20811	
2	PV	20812	
3	PV module	20813	
4	Optimizer	20814	
5	Battery	20815	
6	Meter	20816	
7	Backup Box	20817	
8	Safety box	20818	
9	Communication module	20819	
10	SmartLogger	20821	
11	Inverter	20822	
12	Environmental monitoring instrument	20824	
13	PID	20825	
14	PLC	20826	

No.	Device Type	Device Type ID	Supported Interface
15	Central inverter	20827	
16	DC combiner box	20828	
17	STS	20829	
18	STS meter	20830	
19	AC combiner box	20831	
20	Communication management unit	20833	

8 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.

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	20200	The system is busy. Try again later.
52	20400	The username or password of the third-party system is incorrect.
53	20403	The login of the third-party system user is restricted.
54	30001	The device ESN list cannot be empty.
55	30002	The ESNs queried at a time cannot exceed 50.
56	30003	The account cannot be empty in the input parameter.
57	30004	The value of pageNo cannot be empty.
58	30005	The value of pageSize cannot be empty.
59	30006	The value of pageSize is out of range. The allowed range is {10, 20, 30, 50, 100}.
60	30007	The values of startTime and endTime must be both provided or empty.
61	30008	Failed to invoke the internal interface.
62	30009	The value of taskName is empty.
63	30010	The value of nds is empty.
64	30011	The value of cleanStatus is empty or invalid.
65	30012	The value of environmentalParameters is empty or invalid.
66	30013	The value of modulePlanelrradiance or moduleBackSurfaceTemperature is empty when environmentalParameters is set to 1.

No.	Error Code	Description
67	30014	The value of scanPointNum must be set to 128.
68	30015	The value of taskId is empty.
69	30016	The value of dn is empty.
70	30017	The value of dns is invalid. The number of devices exceeds 100 or devices on which the user does not have permission exist.
71	30018	The value of taskName is invalid (for example, null field).
72	30019	The value of moduleBackSurfaceTemperature is out of range. The allowed range is [0.0, 100.0].
73	30020	The value of modulePlaneIrradiance is out of range. The allowed range is [600.0, 1500.0].
74	30021	The value of pageNo is smaller than 0.
75	30022	The value of timestamp is empty.
76	30023	The command type is invalid (for example, null).
77	30024	The power supply duration is invalid.
78	30025	The MPPT list is empty.
79	30026	The value of mppts is empty.
80	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).
81	30028	The backfeed current input value is invalid.
82	30029	Authentication failed.
83	30030	The input parameter is incorrect.
84	30031	A maximum of 10 devices can be queried at a time.
85	30032	The time parameter is invalid. The query time segment cannot be longer than three days.