SmartPVMS
V500R007C00
Northbound Interface Reference

Issue	**01**
Date	**2021-02-23**

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About This Document

Purpose

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

Intended Audience

This document is intended for:

- Development engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

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

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Symbol	Description
	equipment damage, and environment deterioration.

Change History

Issue	Release Date	Product Version	Description
01	2021-02-23	V500R007C00SPC110 and later version	2 Changes from V300R006C10SPC230 to V500R007C00

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1 Interface Overview

Technical Background

NBIs are designed based on RESTful APIs.

Third-party users communicate with the SmartPVMS in HTTPS mode.

The results of third-party users' access to the SmartPVMS are returned in JSON format.

Access Format and Path

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

Access path: https://*Domain name or IP address of the management system*/

You can contact the system administrator to obtain the domain name or IP address of the management system.

Access Permission

You need to apply to the system administrator for the permission to access NBIs. The system administrator will assign an account with the required permission and password for subsequent login.

Access Restriction

A third-party application can access the same NBI only once a minute.

If the access frequency of a third-party application reaches the limit, the interface returns error code 407.

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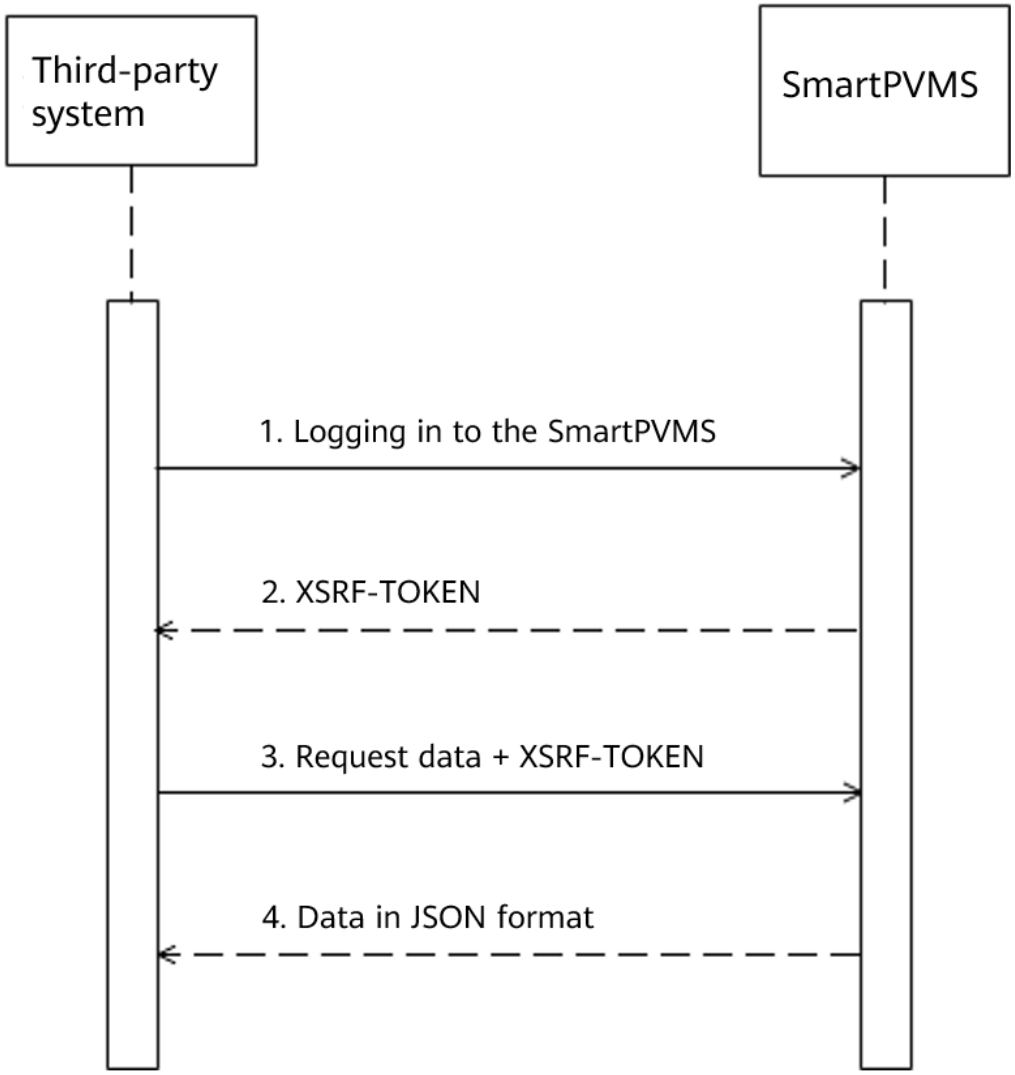
Communication Between a Third-Party System and the SmartPVMS

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



NOTE

1. After the system administrator assigns an account and password to a third-party system, the third-party system uses the account and password to invoke the login interface to obtain the XSRF-TOKEN.
2. The third-party system adds XSRF-TOKEN to the request header to invoke the interface to obtain data.
3. XSRF-TOKEN indicates the cross-site request token. If a user carries a token in a subsequent request, the request is initiated by a logged-in user.

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2 Changes from V300R006C10SPC230 to V500R007C00

2.1 New Interfaces

Interface	Interface Method and Path	Description
Logout interface	POST /thirdData/logout	New interface

2.2 Deleted Interfaces

Interface	Interface Method and Path	Deletion Description	Impact
Device switch interface	POST /thirdData/devOnOff	The function of this interface is not implemented.	The interface is not available in V500R007C00SPC110.
Device upgrade interface	POST /thirdData/devUpgrade	The function of this interface is not implemented.	Not available in V500R007C00SPC110
Device upgrade record interface	POST /thirdData/getDevUpgradeInfo	The function of this interface is not implemented.	The interface is not available in V500R007C00SPC110.
SN registration query interface	POST /thirdData/snIsRegister	The function of this interface is not implemented.	The interface is not available in V500R007C00SPC110.

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2.3 Modified Interfaces

Interface	Interface Method and Path	Interface Change	Data Change	Description	Impact
Login interface	POST /thirdData/login	None	Yes	1. In V300R006C10SPC230, a northbound login request has multiple Set-Cookie headers, with first letters in upper case. The XSRF-TOKEN is put in the second Set-Cookie header. 2. In V500R007C00SPC110, a northbound login request has only one set-cookie header, with all letters in lower case. The XSRF-TOKEN is put in the set-cookie header. An xsrf-token is added to the response header of northbound login requests. The content of the xsrf-token is the same as that of the XSRF-TOKEN in the set-cookie header. You are advised to use the new xsrf-token response header.	-
Device list interface	POST /thirdData/getDevList	None	Yes	Only the following device types are supported: **1**: String inverter **2**: SmartLogger **8**: Transformer **10**: EMI **13**: Protocol converter **16**: General device **17**: Grid meter **22**: PID **37**: Pinnet data logger **38**: Residential inverter **39**: Battery **40**: Backup box **45**: PLC **46**: Optimizer **47**: Power Sensor **62**: Dongle **63**: Distributed SmartLogger	-

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Interface	Interface Method and Path	Interface Change	Data Change	Description	Impact
				70: Safety box	
Real-time device data interface	POST /thirdData/getDevRealKpi	None	Yes	Only the following device types are supported: **1**: String inverter **10**: EMI **17**: Grid meter **38**: Residential inverter **39**: Battery **47**: Power Sensor	-
5-minute device data interface	POST /thirdData/getDevFiveMinutes	None	Yes	Only the following device types are supported: **1**: String inverter **10**: EMI **17**: Grid meter **38**: Residential inverter **39**: Battery **47**: Power Sensor	-
Daily device data interface	POST /thirdData/getDevKpiDay	None	Yes	Only the following device types are supported: **1**: String inverter **38**: Residential inverter **39**: Battery The following indicators cannot be queried for string inverters: Production deviation Production reliability Communication reliability The following indicators cannot be queried for residential inverters: Production deviation Production reliability Communication reliability	-
Monthly device data interface	POST /thirdData/getDevKpiMonth	None	Yes	Only the following device types are supported: **1**: String inverter **38**: Residential inverter **39**: Battery	-

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Interface	Interface Method and Path	Interface Change	Data Change	Description	Impact
Yearly device data interface	POST /thirdData/getDevKpiYear	None	Yes	Only the following device types are supported: **1**: String inverter **38**: Residential inverter **39**: Battery	-

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3 Northbound Interface Format Definition

3.1 Login Interface

Description

Before obtaining data, the login interface must be invoked to obtain the XSRF-TOKEN. The validity period of the 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, the XSRF-TOKEN is returned in the response header.

Request URL

https://*Domain name or IP address of the management system*/thirdData/login

Request Method

HTTP method: POST

Request Parameters

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

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Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following information is included:	-	-	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data		Returned data	Object	-

Examples

Request example:

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

Response example:

Example 1: The login is successful.

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

Example 2: The login fails.

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

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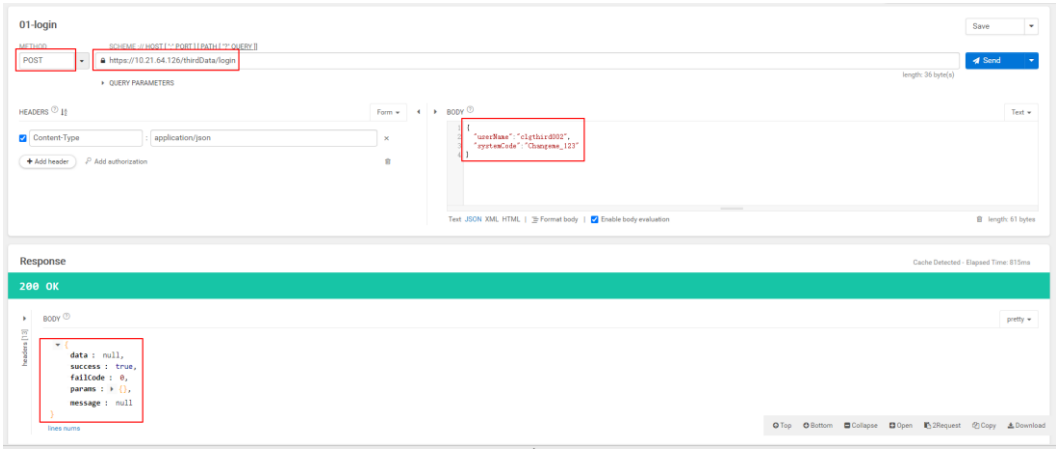
```
    "success":false
}
```

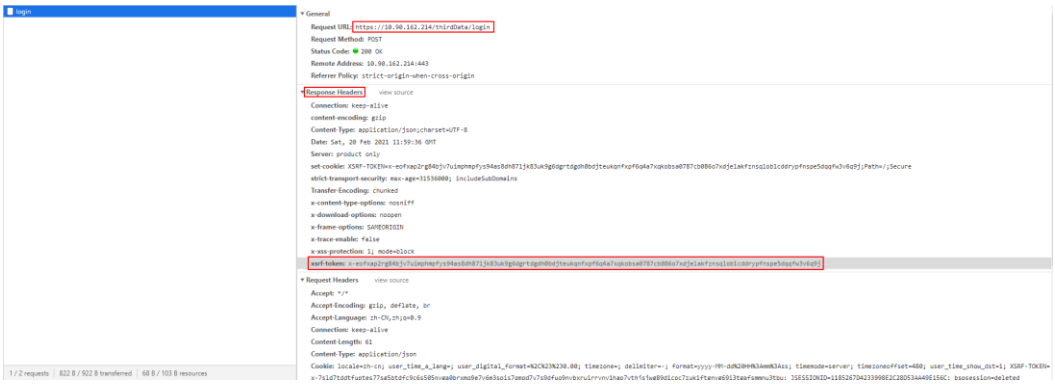
NOTICE

After the login is successful, the XSRF-TOKEN is returned in the response header. This parameter must be reserved. In subsequent data interface requests, this parameter and its value must be included in the request headers and sent to the SmartPVMS.

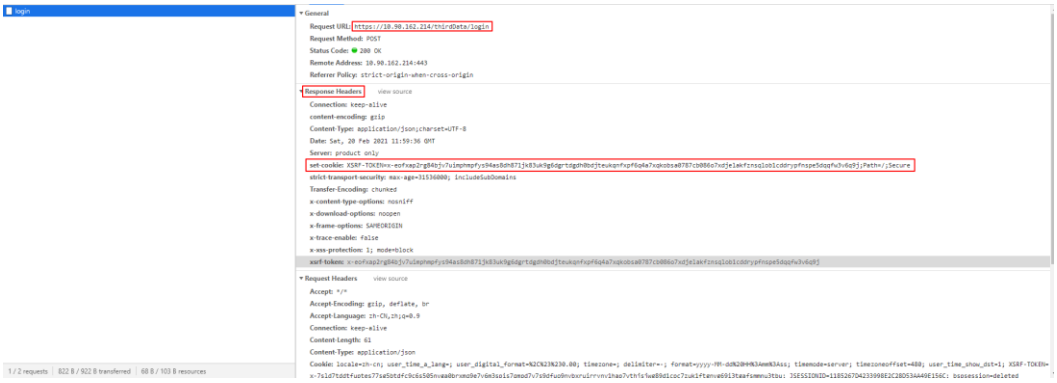
Login example:



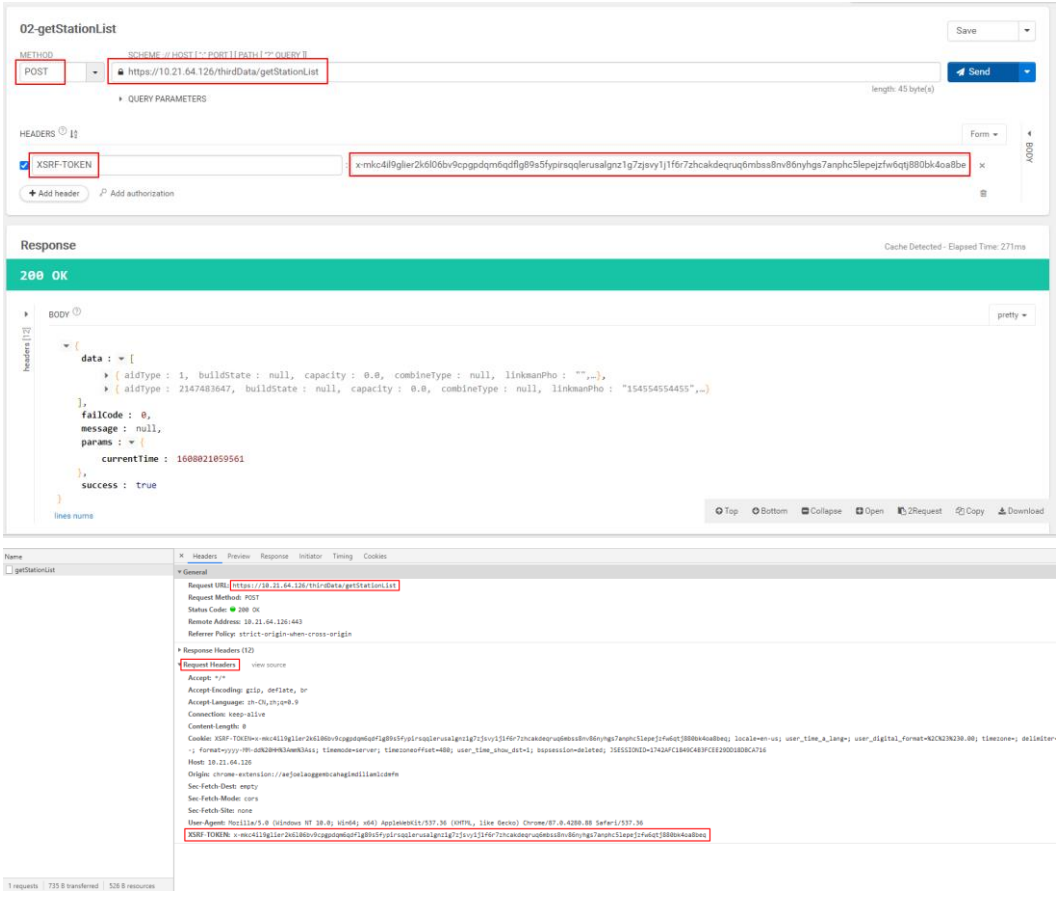
The following is an example of the XSRF-TOKEN returned after a successful login. The following method is recommended for obtaining the XSRF-TOKEN.



If you need compatibility with the old version, you can use the following method.



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



3.2 Logout 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 Method

HTTP method: POST

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
xsrfToken	XSRF-TOKEN is returned in the response header after the login interface is successfully invoked.	String	Mandatory

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Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. The options are as follows: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data		Returned data	Object	-

Examples

Request example:

```
{

"xsrfToken":"x-apepjy1fpd2ptete1f7zuqimep7wuqen9hkb3xaourelbyrx9jio7s09hgk6ca2mdlk
sjdglasdhjaklsdfhhdsahwedyuioqwehjkd"
}
```

Response example:

Example 1: The logout is successful.

```
{
   "success":true,
   "data":null,
   "failCode":0,
   "params":{
      "currentTime":1503046597854
   },
   "message":null
}
```

Example 2: The logout fails.

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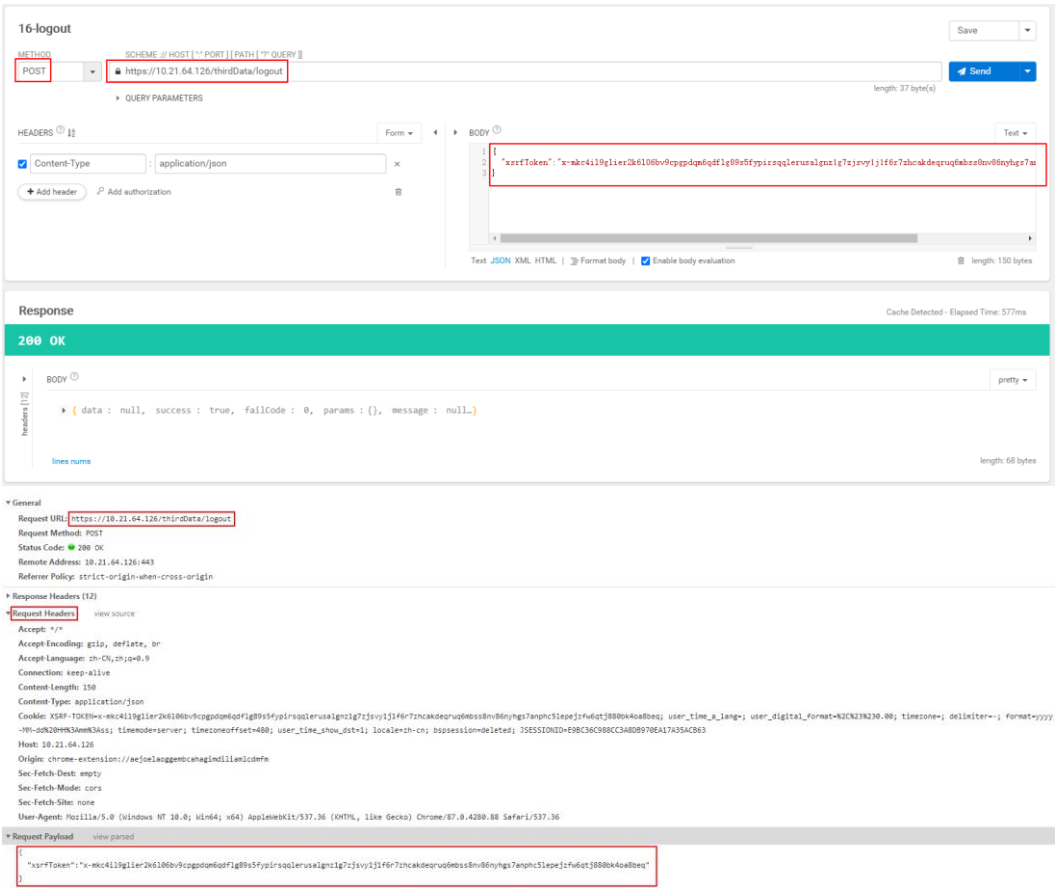
```
{
    "data":null,
    "success":false,
    "failCode":20001,
    "params":{
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

Logout example:



3.3 Plant List 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 Method

HTTP method: POST

Request Parameters

N/A

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional response message	String	-
data	The following parameters are included:	Returned data. The data contains the object parameter list of each plant.	List	-
	stationCode	Plant ID, which uniquely identifies a plant.	String	-
	stationName	Plant name	String	-
	stationAddr	Detailed address of the plant	String	-
	capacity	Installed capacity (unit: MW)	Double	-
	buildState	Plant status. The following plant states are supported: **0**: not constructed; **1**: under construction; **2**: grid-connected	String	-
	combineType	Grid connection type. The following grid connection types are supported:	String	-

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Parameter		Description	Data Type	Remarks
		1: utility; **2**: commercial & industrial; **3**: residential		
	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 person	String	-
	linkmanPho	Telephone number of the contact person	String	-

Examples

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":""
```

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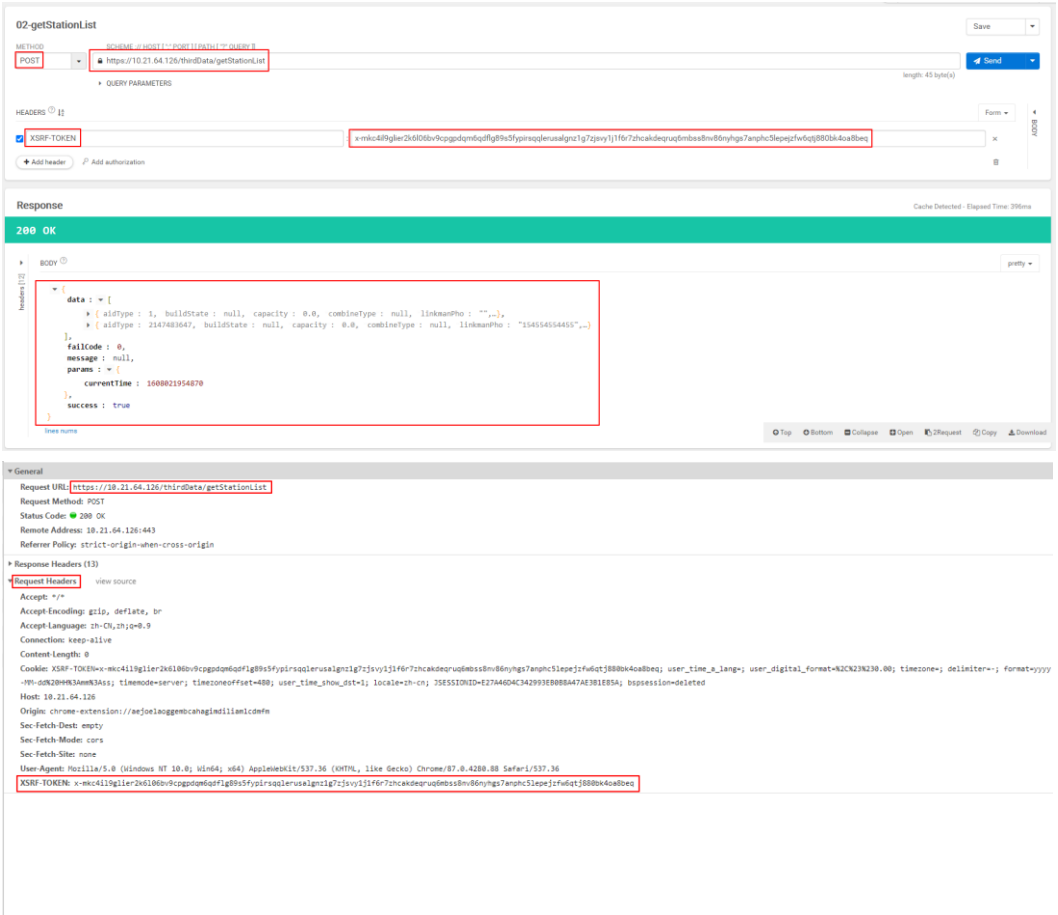
```
        },
        {
            "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
            "stationName":"station2",
            "stationAddr":null,
            "capacity":123.3,
            "buildState":"3",
            "combineType":"1",
            "aidType":0,
            "stationLinkman":"",
            "linkmanPho":""
        }
    ],
    "failCode":0,
    "params":{
        "currentTime":1503046597854
    },
    "message":null
}
```


NOTE

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

Request example:



3.4 Plant Data Interfaces

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

3.4.1 Real-Time Plant Data 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 4.1 Real-Time Plant Data Interface.

Request URL

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

Request Method

HTTP method: POST

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 3.3 Plant List Interface.	String	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-

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Parameter		Description	Data Type	Remarks
	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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 key-value format. For details about the data item list, see 4.1 Real-Time Plant Data Interface.	Map	-

Examples

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 real-time plant data is returned.

```
{
   "success":true,
   "data":[
      {
         "dataItemMap":{
            "real_health_state":"3",
```

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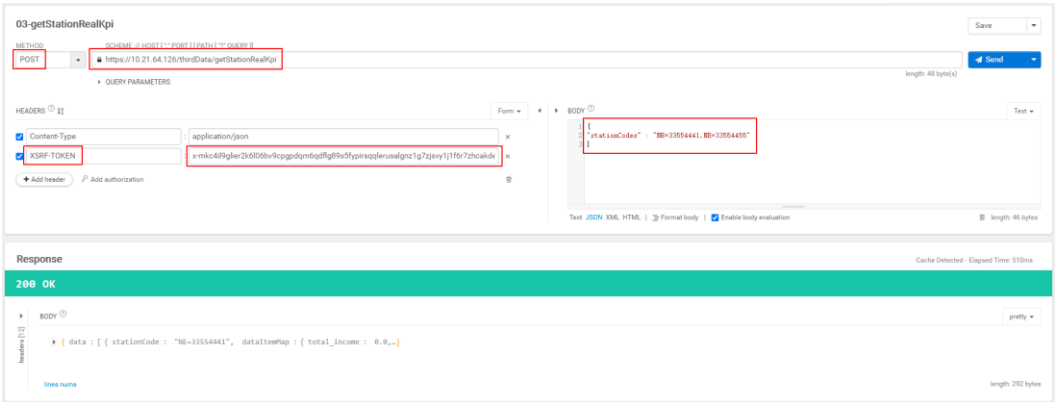
```
                "day_power":"10000",
                "total_power":"900.000",
                "day_income":"0.000",
                "month_power":"900.000",
                "total_income":"2088.000"
            },
            "stationCode":"BA4372D08E014822AB065017416F254C"
        },
        {
            "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:



3.4.2 Hourly Plant Data 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 background calculates the date of the collection time based on the request parameter **collectTime** (collection time expressed by 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 4.2 Hourly Plant Data Interface.

Request URL

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

Request Method

HTTP method: POST

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

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Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in key-value format. For details about the data item list, see 4.2 Hourly Plant Data Interface.	Map	-

Examples

Request example:

```
{

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

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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: The 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":{
```


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```
            "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,
```

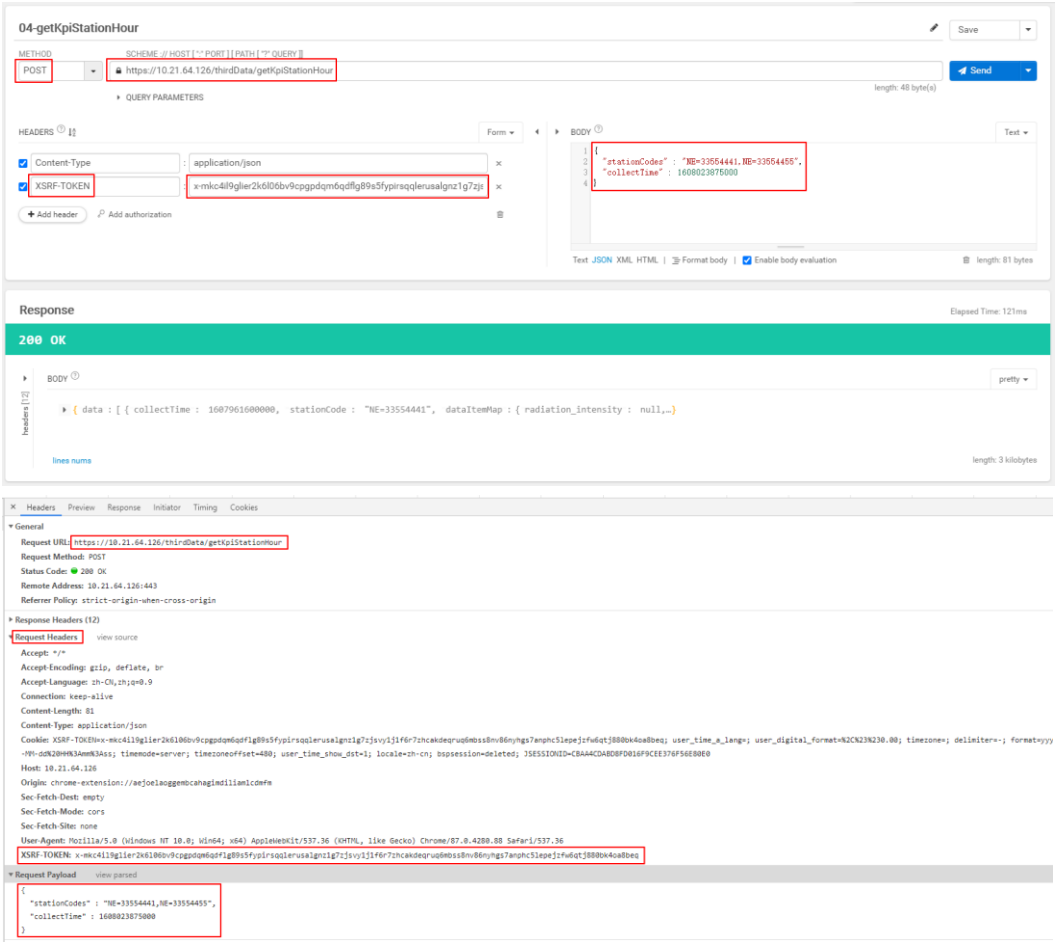
```
    "params":{

"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:



3.4.3 Daily Plant Data 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 background calculates the month of the collection time based on the request parameter **collectTime** (collection time expressed by 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.

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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 4.3 Daily Plant Data Interface.

Request URL

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

Request Method

HTTP method: POST

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, expressed by milliseconds	Long	-

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Parameter		Description	Data Type	Remarks
message		Optional message	String	-
data	The following parameters are included:	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, expressed by milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in key-value format. For details about the data item list, see 4.3 Daily Plant Data Interface.	Map	-

Examples

Request example:

```
{

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

Response example:

Example 1: An error code is returned.

```
{

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

Example 2: The 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,
```

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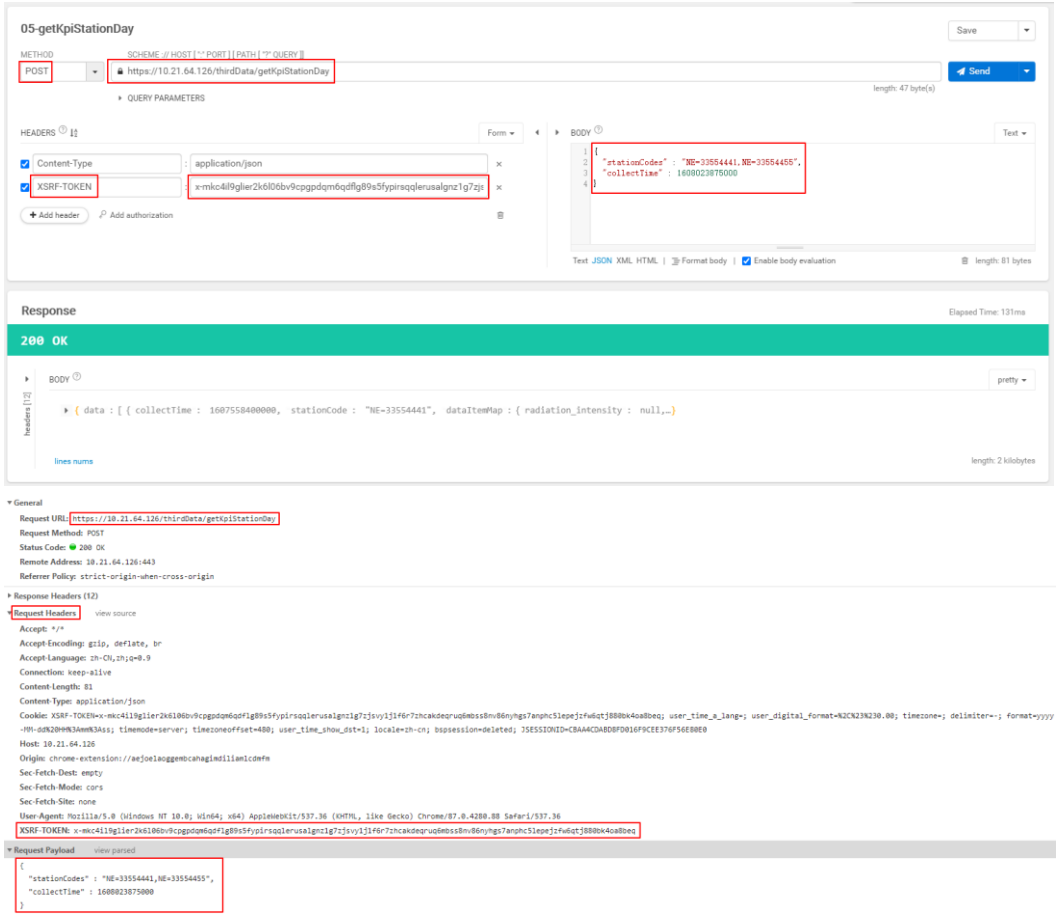
```
            "installed_capacity":25200,
            "perpower_ratio":0.727,
            "inverter_power":18330,
            "reduction_total_tree":999,
            "performance_ratio":89
         },
         "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
         "collectTime":1501776000000
      },
      {
         "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:



3.4.4 Monthly Plant Data 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 background calculates the year of the collection time based on the request parameter **collectTime** (collection time expressed by 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 4.4 Monthly Plant Data Interface.

Request URL

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

Request Method

HTTP method: POST

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Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in key-value format. For details about the	Map	-

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Parameter		Description	Data Type	Remarks
		data item list, see 4.4 Monthly Plant Data Interface.		

Examples

Request example:

```
{

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

Response example:

Example 1: An error code is returned.

```
{

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

Example 2: The 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,
```

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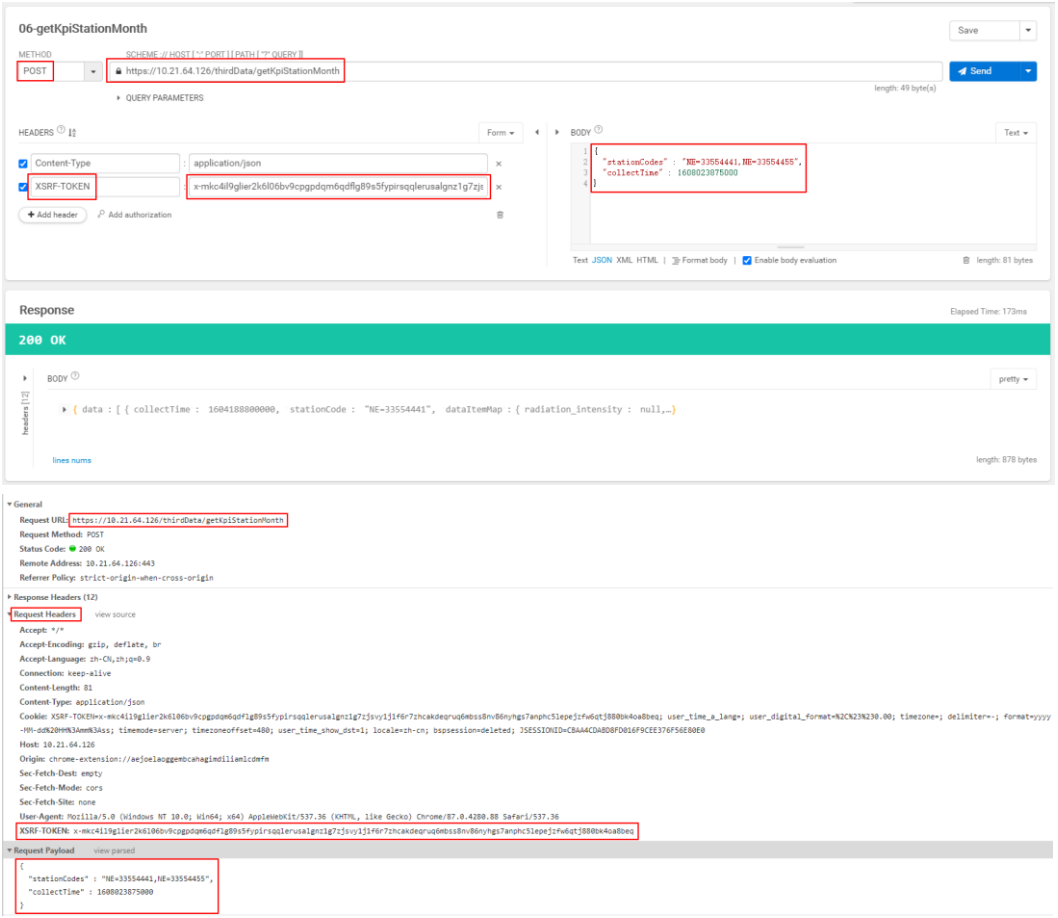
```
                "inverter_power":null,
                "theory_power":659.6,
                "ongrid_power":null,
                "power_profit":2088,
                "installed_capacity":467.04,
                "perpower_ratio":1.927,
                "reduction_total_tree":49,
                "performance_ratio":89
            },
            "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:



3.4.5 Yearly Plant Data 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 background 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 4.5 Yearly Plant Data Interface.

Request URL

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

Request Method

HTTP method: POST

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-

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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, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by milliseconds	Long	-
	dataItemMap	Content of each data item, which is returned in key-value format. For details about the data item list, see 4.5 Yearly Plant Data Interface.	Map	-

Examples

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
```

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

Example 2: The yearly plant data is returned.

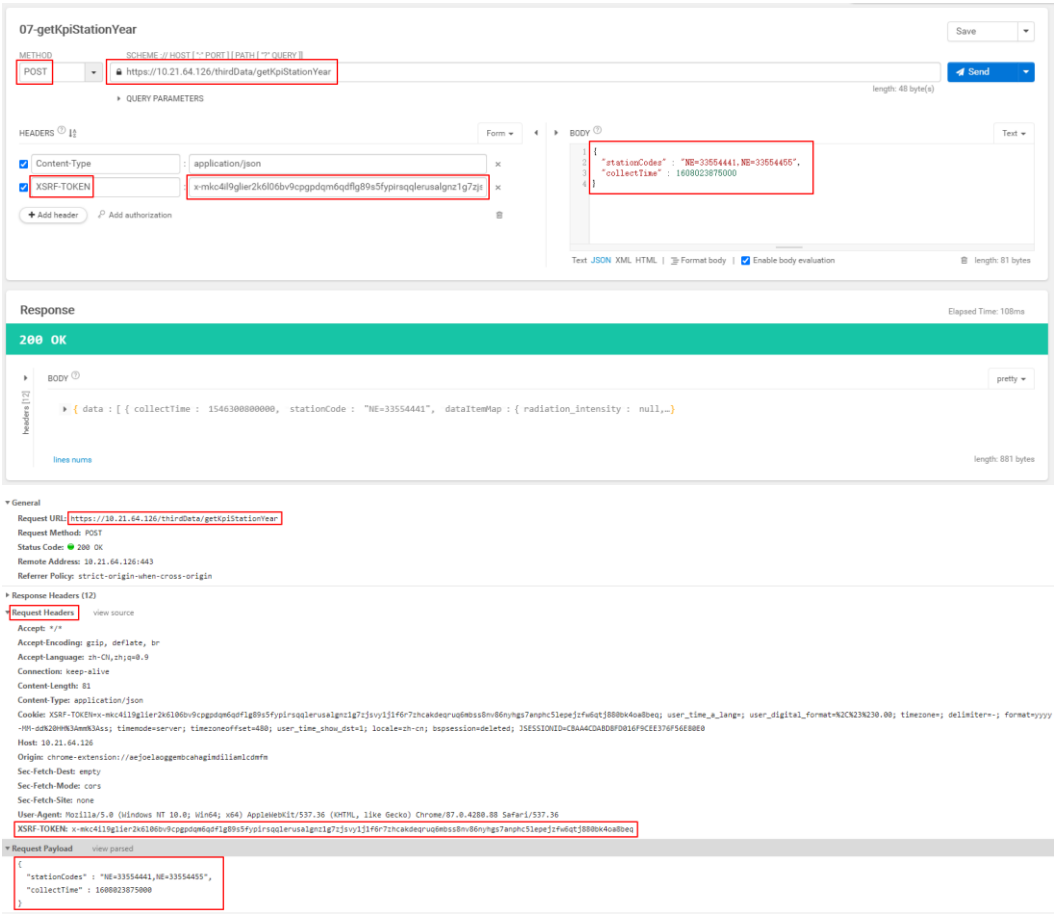
```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "use power":288760,
                "radiation intensity":0.6968,
                "reduction_total_co2":18.275,
                "reduction_total_coal":7.332,
                "inverter_power":null,
                "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:



3.5 Device List 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 Method

HTTP method: POST

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. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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. Value: The following device types are supported: **1**: String inverter **2**: SmartLogger	Integer	-

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Parameter		Description	Data Type	Remarks
		8: Transformer **10**: EMI **13**: Protocol converter **16**: General device **17**: Grid meter **22**: PID **37**: Pinnet data logger **38**: Residential inverter **39**: Battery **40**: Backup box **45**: PLC **46**: Optimizer **47**: Power Sensor **62**: Dongle **63**: Distributed SmartLogger **70**: Safety box		
	softwareVersion	Software version	String	-
	invType	Model (only for inverters)	String	-
	longitude	Longitude	Double	-
	latitude	Latitude	Double	-

Examples

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
   },
```

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```
    "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:

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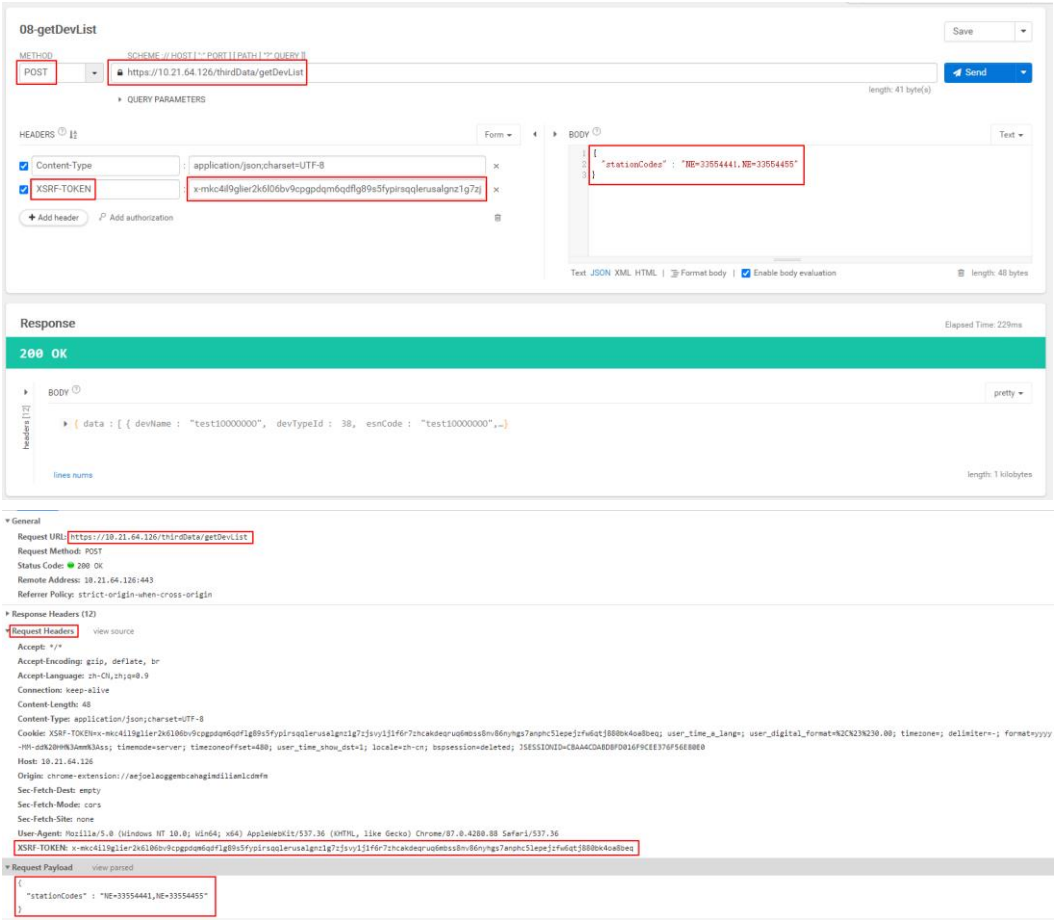

3.6 Device Data Interfaces

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

3.6.1 Real-Time Device Data Interface

Description

This interface is used to obtain real-time device data by device type and device ID set. The data varies according to 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 4.6 Real-Time Device Data Interface.

Request URL

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

Request Method

HTTP method: POST

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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 3.5 Device List Interface. The following device types are supported: **1**: String inverter **10**: EMI **17**: Grid meter **38**: Residential inverter **39**: Battery **47**: Power Sensor	Integer	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	devIds	Device ID list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	Returned data. The data contains the real-time data object list of each device.	List	-

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Parameter		Description	Data Type	Remarks
	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 4.6 Real-Time Device Data Interface.	Map	Real-time device data

Examples

Request example:

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

Example 1: An error code is returned.

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

Example 2: The real-time device data 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,
```

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```
            "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,
```

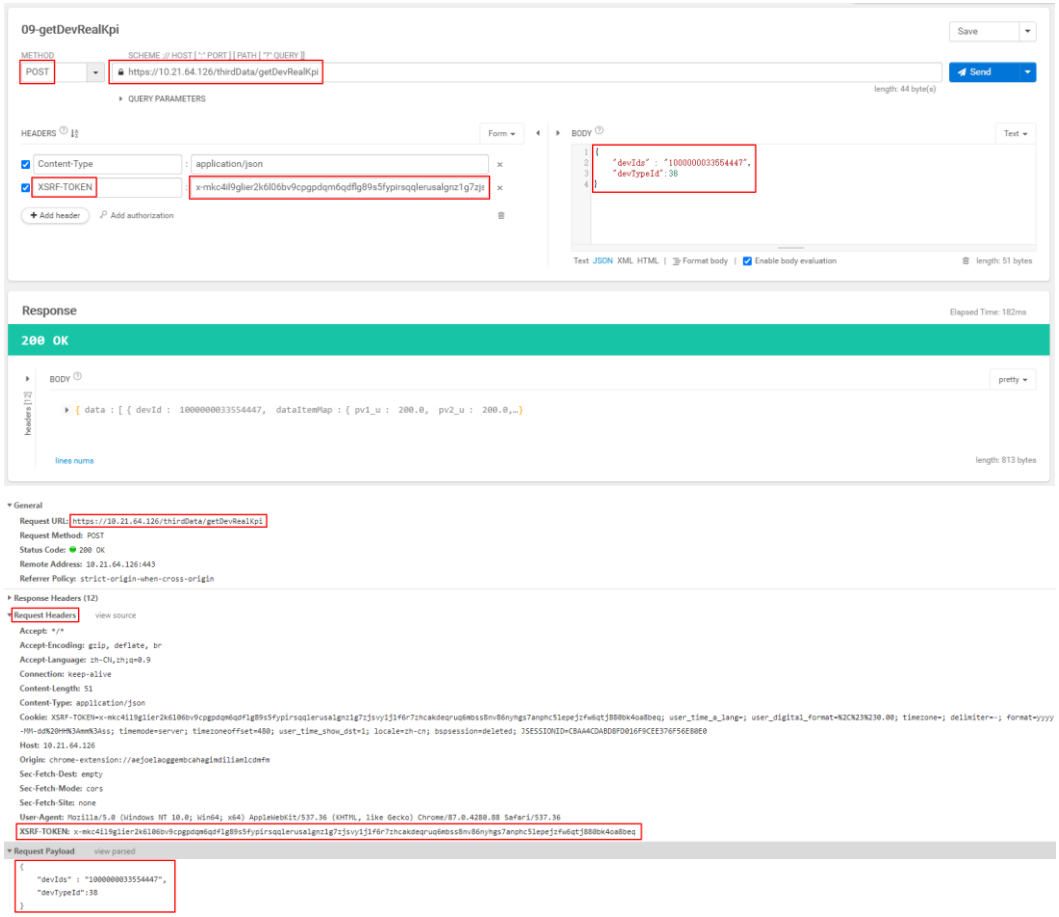
```
            "pv12_u":0,
            "pv5_i":0,
            "active_power":0,
            "elec_freq":0,
            "pv10_i":0,
            "pv4_i":0,
            "mppt_4_cap":0,
            "mppt_5_cap":0,
            "mppt_6_cap":0,
            "mppt_7_cap":0,
            "mppt_8_cap":0,
            "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",
    "devTypeId":"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:



3.6.2 5-minute Device Data 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 background calculates the date of the collection time based on the request parameter **collectTime** (collection time expressed by 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 ($0 \leq n \leq 288$) 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 4.7 5-minute Device Data Interface.

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Request URL

https://*Domain name or IP address of the management system*/thirdData/getDevFiveMinutes

Request Method

HTTP method: POST

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 3.5 Device List Interface. The following device types are supported: **1**: String inverter **10**: EMI **17**: Grid meter **38**: Residential inverter **39**: Battery **47**: Power Sensor	Integer	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	devIds	Device ID list in the request	String	-

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Parameter		Description	Data Type	Remarks
		parameter		
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by 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 4.7 5-minute Device Data Interface.	Map	5-minute data of a device

Examples

Request example:

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

Response example:

Example 1: An error code is returned.

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

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


Example 2: The 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,
```


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```
            "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,
```

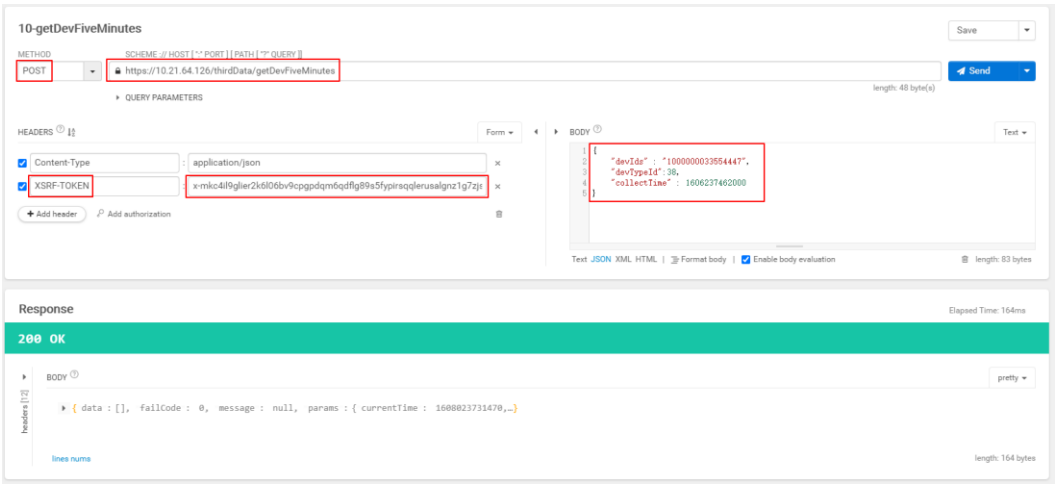
```
            "mppt_3_cap":null,
            "mppt_2_cap":null,
            "inverter_state":512,
            "pv8_i":null,
            "mppt_1_cap":null,
            "pv6_i":7.1,
            "mppt_power":21.962,
            "pv1_i":7.1,
            "total_cap":655.37,
            "ab_u":495.4,
            "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,
```

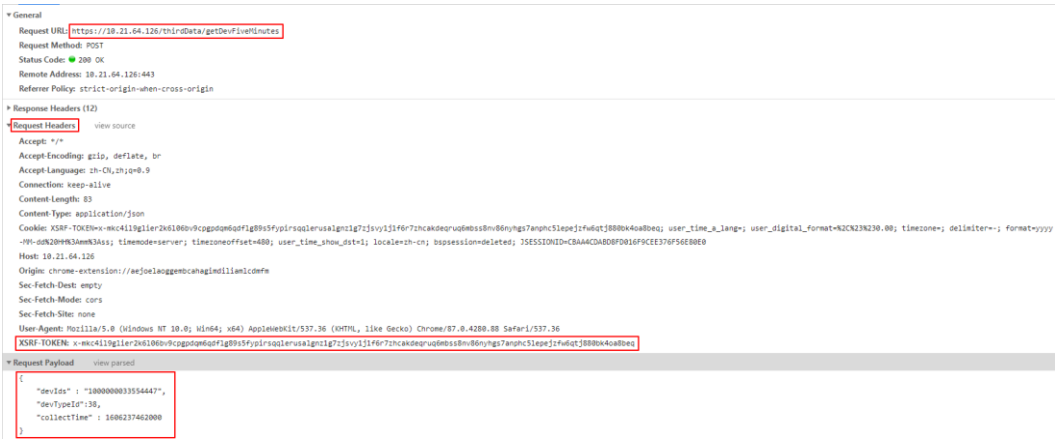
```
                "pv20_i":0,
                "pv21_u":0,
                "pv21_i":0,
                "pv22_u":0,
                "pv22_i":0,
                "pv23_u":0,
                "pv23_i":0,
                "pv24_u":0,
                "pv24_i":0,
                "efficiency":null,
                "pv2_u":575.3
            },
            "devId":213472461631079,
            "collectTime":1501862700000
        }
    ],
    "failCode":0,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "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:





3.6.3 Daily Device Data 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 background calculates the month of the collection time based on the request parameter **collectTime** (collection time expressed by milliseconds) and the time zone where the device is located.

Then, you can query the daily data of the device in the month based on the device ID.

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 4.8 Daily Device Data Interface.

Request URL

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

Request Method

HTTP method: POST

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 3.5 Device List Interface. The following device types are supported: **1**: String inverter **38**: Residential inverter	Integer	Mandatory

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Parameter	Description	Data Type	Mandatory/Optional
	39: Battery		
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	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, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by milliseconds	Long	-
	dataItemMap	Content of data items, which are returned in the key-value	Map	Data of a device on

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Parameter		Description	Data Type	Remarks
		format. The content of data items varies according to device types. For details about the data item list, see 4.8 Daily Device Data Interface.		a day

Examples

Request example:

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

Response example:

Example 1: An error code is returned.

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

Example 2: The 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":{
```

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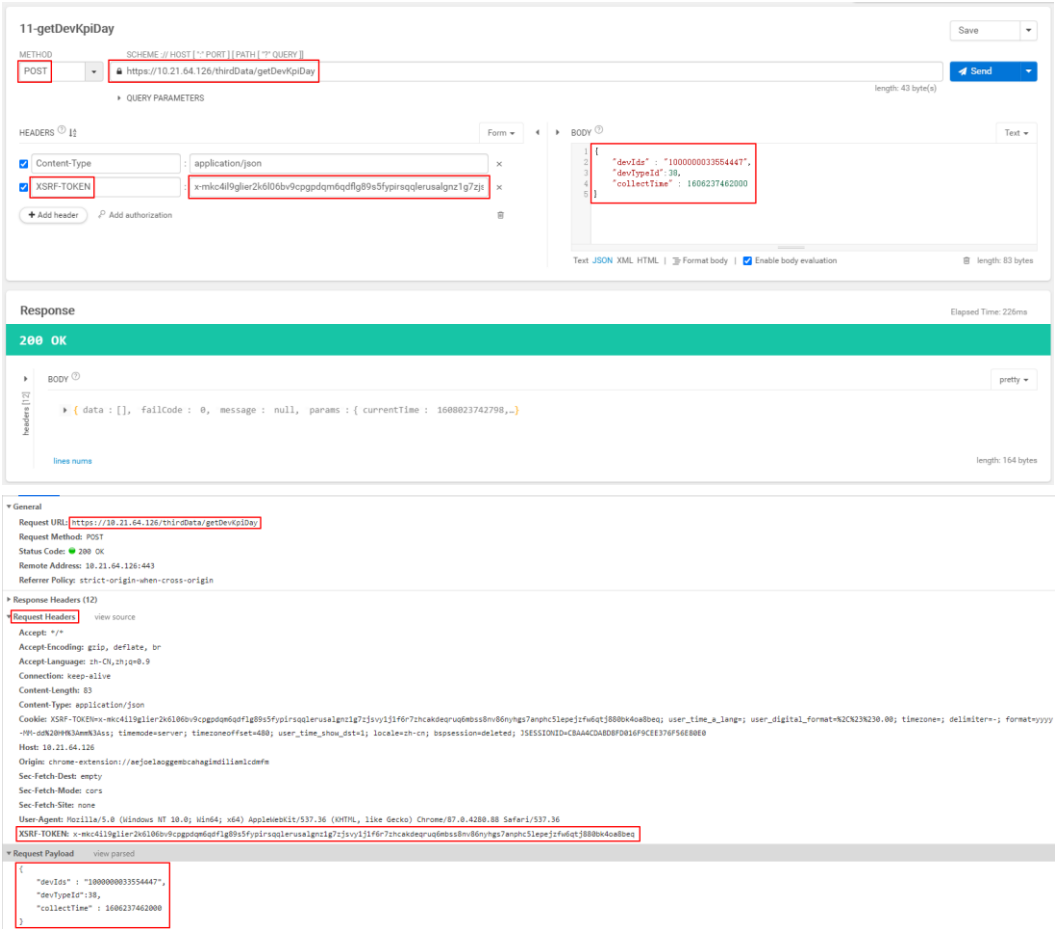
```
                "aoc_ratio":35.069,
                "yield_deviation":0,
                "installed_capacity":30.24,
                "perpower_ratio":0.543,
                "product_power":16.43,
                "total_aop":88.889
            },
            "devId":214060404588862,
            "collectTime":1501776000000
        }
    ],
    "failCode":0,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```


NOTE

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

Request example:



3.6.4 Monthly Device Data 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 background calculates the year of the collection time based on the request parameter **collectTime** (collection time expressed by milliseconds) and the time zone where the device is located.

Then, you can query the daily data of the device in the year based on the device ID.

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 4.9 Monthly Device Data Interface.

Request URL

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

Request Method

HTTP method: POST

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 3.5 Device List Interface. The following device types are supported: **1**: String inverter **38**: Residential inverter **39**: Battery	Integer	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

Response Packet

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. Value:	boolean	Request success

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Parameter		Description	Data Type	Remarks
		true: The request is successful. **false**: The request fails.		or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	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, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	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, expressed by 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 4.9 Monthly Device Data Interface.	Map	Data of a device in a month

Examples

Request example:

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

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```
    "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: The monthly device data is returned.

```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "installed capacity":30.24,
                "perpower ratio":null,
                "product power":300
            },
            "devId":213472461631079,
            "collectTime":1501516800000
        },
        {
            "dataItemMap":{
                "installed capacity":30.24,
                "perpower ratio":null,
                "product power":16.43
            },
            "devId":214060404588862,
            "collectTime":1501516800000
        }
    ],
    "failCode":0,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

NOTE

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

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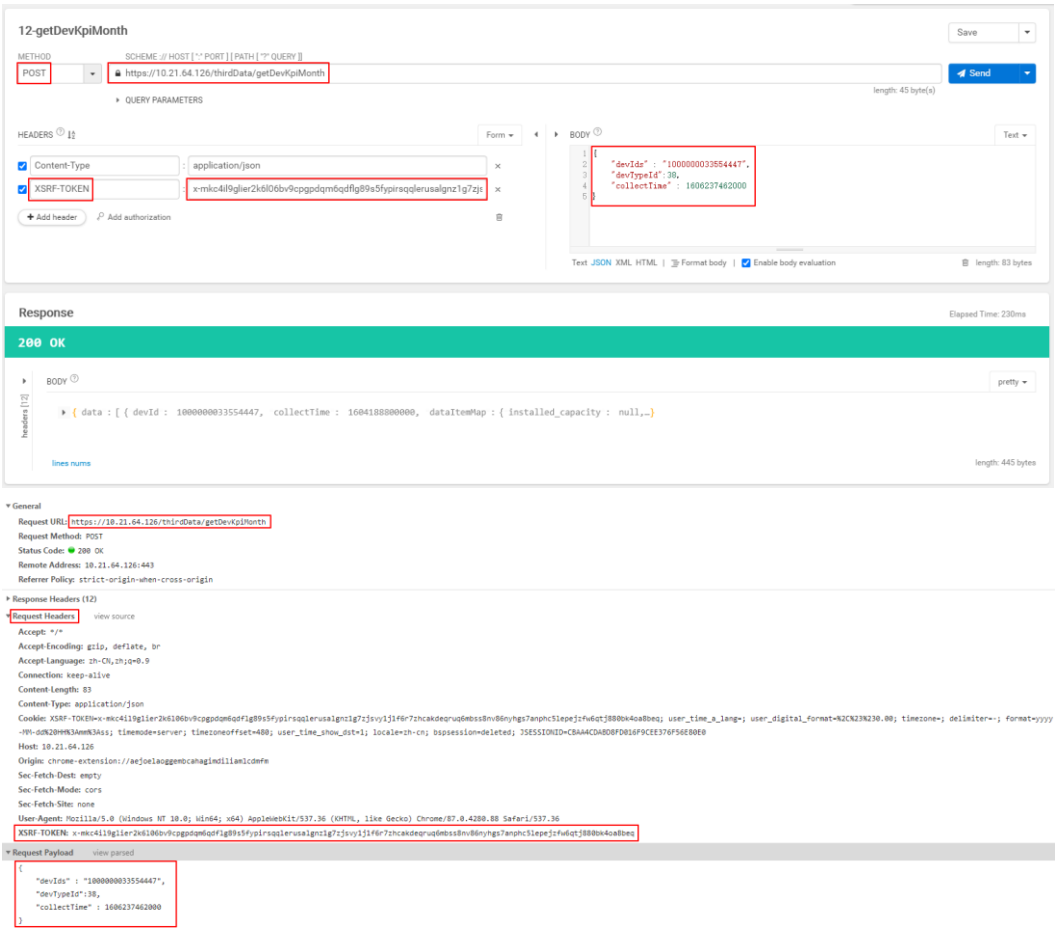
Request example:



3.6.5 Yearly Device Data 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 background 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 4.10 Yearly Device Data Interface.

Request URL

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

Request Method

HTTP method: POST

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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	Integer	Mandatory
collectTime	Collection time, expressed by milliseconds	Long	Mandatory

NOTE

Related KPIs must be configured before data can be obtained.

Response Packet

Parameter		Description	Data Type	Remarks
success		Request success or failure flag. Value: **true**: The request is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0** indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following parameters are included:	-	-	-
	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, expressed by milliseconds	Long	-
messag	-	Optional message	String	-

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Parameter		Description	Data Type	Remarks
e				
data	The following parameters are included:	Returned data. The data contains the yearly data object list of each device.	List	List of data of each year since the device is connected.
	devId	Device ID	Long	-
	collectTime	Collection time, expressed by 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 4.10 Yearly Device Data Interface.	Map	Data of a device in a year

Examples

Request example:

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

Response example:

Example 1: An error code is returned.

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

Example 2: The yearly device data is returned.

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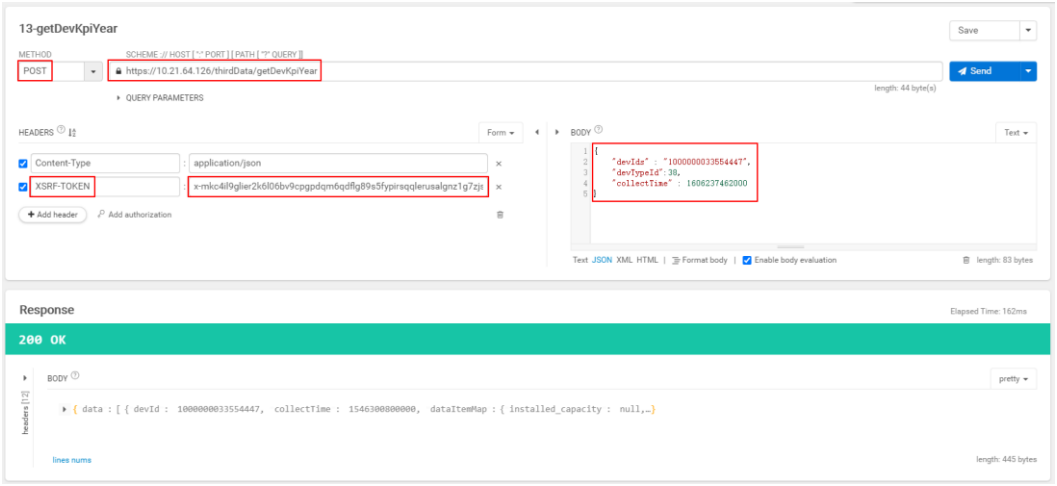
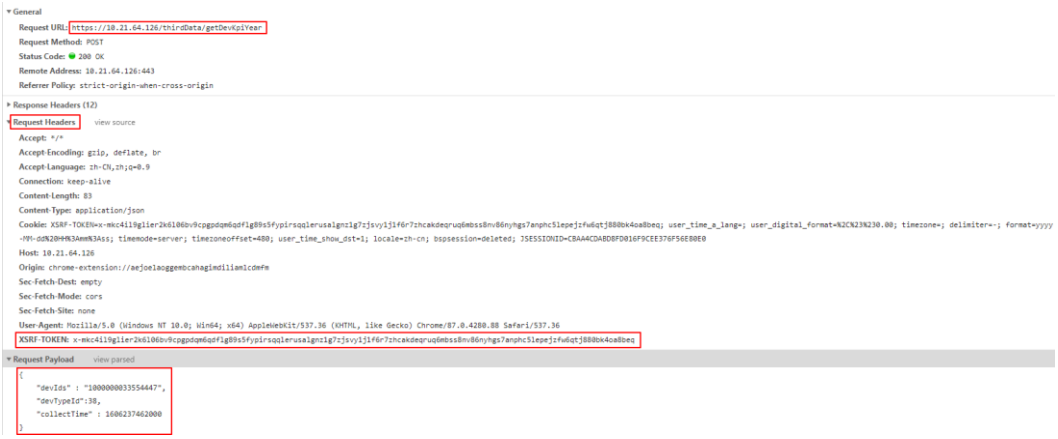
```
{
    "success":true,
    "data":[
        {
            "dataItemMap":{
                "installed_capacity":30.24,
                "perpower_ratio":null,
                "product_power":300
            },
            "devId":213472461631079,
            "collectTime":1501516800000
        }
    ],
    "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:





3.7 Device Alarm Interface

Description

This interface is used to query device alarms. 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 Method

HTTP method: POST

Request Parameters

Parameter	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Multiple plant IDs are separated by commas (,).	String	Mandatory
beginTime	Start time in milliseconds	Long	Mandatory
endTime	End time in milliseconds	Long	Mandatory
language	Language. The value must be **zh_CN**, **en_UK**, **ja_JP**, **it_IT**, **nl_NL**, **pt_BR**, **de_DE**, **fr_FR**, **es_ES**, or **po_PO**. zh_CN: Chinese en_UK: English ja_JP: Japanese it_IT: Italian	String	Mandatory

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Parameter	Description	Data Type	Mandatory/Optional
	nl_NL: Dutch pt_BR: Portuguese de_DE: German fr_FR: French es_ES: Spanish po_PO: Polish		
status	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. 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)	String	Optional
levels	Alarm severity. Multiple alarm severities are separated by commas (,), for example, **1,2**. If this parameter is not transferred or is left empty, alarms of all severities are queried by default. The following alarm severities are supported: **1**: critical **2**: Major **3**: Minor **4**: Warning	String	Optional
devTypes	Device type. Multiple device types are separated by commas (,), for example, **1,38**. If this parameter is not transferred or is left empty, alarms of all device types are queried by default. The following device types are supported: **1**: String inverter **2**: SmartLogger **8**: Transformer **10**: EMI **13**: Protocol converter **16**: General device	String	Optional

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Parameter	Description	Data Type	Mandatory/Optional
	17: Grid meter **22**: PID **37**: Pinnet data logger **38**: Residential inverter **39**: Battery **40**: Backup box **45**: PLC **46**: Optimizer **47**: Power Sensor **62**: Dongle **63**: Distributed SmartLogger **70**: Safety box		
types	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. The following alarm types are supported: **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 is successful. **false**: The request fails.	boolean	Request success or failure flag
failCode		Error code **0**: indicates normal. For details about other error codes, see 5 Error Code List.	Integer	-
params	The following	-	-	-

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Parameter		Description	Data Type	Remarks
	parameters are included:			
	stationCodes	Plant ID list in the request parameter	String	-
	beginTime	Start time in milliseconds in the request parameter	Long	-
	endTime	End time in milliseconds in the request parameter	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, expressed by milliseconds	Long	-
message		Optional message	String	-
data	The following parameters are included:	Returned data. The data contains the alarm information list.	List	-
	stationCode	Plant ID, which uniquely identifies a plant.	String	-
	alarmName	Alarm name	String	-
	devName	Device name	String	-
	repairSuggestion	Repair suggestion	String	-
	esnCode	Device SN	String	-
	devTypeId	Device type ID The following device types are supported: **1**: String inverter **2**: SmartLogger **8**: Transformer	Integer	-

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Parameter		Description	Data Type	Remarks
		10: EMI **13**: Protocol converter **16**: General device **17**: Grid meter **22**: PID **37**: Pinnet data logger **38**: Residential inverter **39**: Battery **40**: Backup box **45**: PLC **46**: Optimizer **47**: Power Sensor **62**: Dongle **63**: Distributed SmartLogger **70**: Safety box		
	causeId	Cause ID	Integer	-
	alarmCause	Alarm cause	String	-
	alarmType	Alarm type The following alarm types are supported: **1**: transposition signal **2**: exception alarm **3**: protection event **4**: notification status **5**: alarm information	Integer	-
	raiseTime	Alarm generation time in milliseconds	Long	-
	alarmId	Alarm ID	Integer	-
	stationName	Plant name	String	-
	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	Integer	-

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Parameter		Description	Data Type	Remarks
		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)		

Examples

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.

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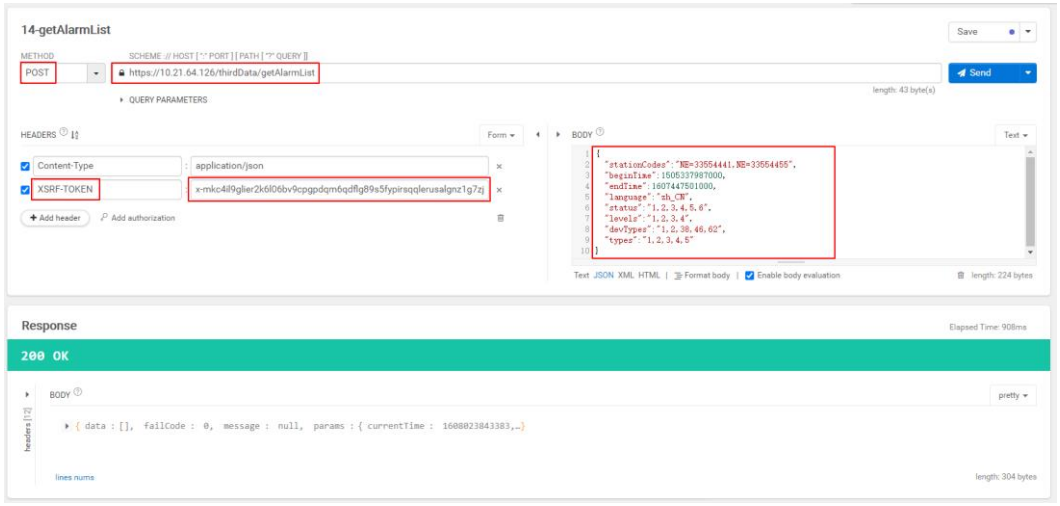
```
{
   "data": [
      {
"alarmCause": "The PV string arcs or is in poor contact. (string-level precise
detection)"
         "alarmId": 2003,
"alarmName": "DC arc fault"
         "alarmType": 2,
         "causeId": 1,
         "devName": "ESN03337000000000001",
         "devTypeId": 38,
         "esnCode": "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"
   },
```

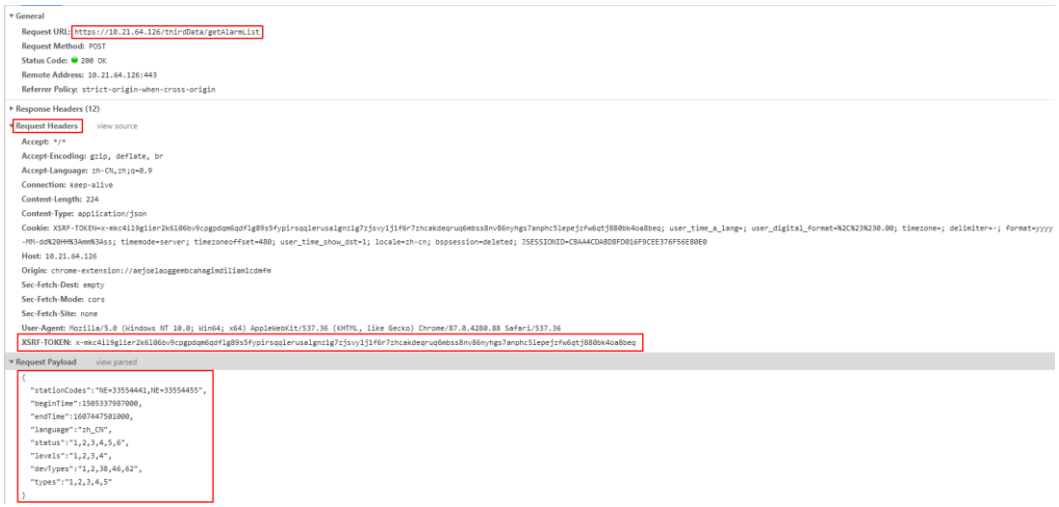
```
    "success": true
}
```

NOTE

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

Request example:





4 List of Northbound Interface Indicators

4.1 Real-Time Plant Data Interface

Key	Name	Unit	Return Value Type
day_power	Yield today	kWh	Double
month_power	Yield this month	kWh	Double
total_power	Total yield	kWh	Double
day_income	Revenue today	The value changes with the currency type (exchange rate conversion is not performed).	Double
total_income	Total revenue	The value changes with the currency type (exchange rate conversion is not performed).	Double
real_health_state	Plant health status The following plant health states are supported: **1**: disconnected **2**: faulty 3: healthy	N/A	Integer

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4.2 Hourly Plant Data Interface

Key	Name	Unit	Return Value Type
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Grid feed-in	kWh	Double
power_profit	Revenue	The value changes with the currency type (exchange rate conversion is not performed).	Double

4.3 Daily Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Grid feed-in	kWh	Double
use_power	Consumption	kWh	Double
power_profit	Revenue	The value changes with the currency type (exchange rate	Double

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Key	Name	Unit	Return Value Type
		conversion is not performed).	
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 tree planted	N/A	Double

4.4 Monthly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Grid feed-in	kWh	Double
use_power	Consumption	kWh	Double
power_profit	Revenue	The value changes with the currency type (exchange rate conversion is not performed).	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

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Key	Name	Unit	Return Value Type
reduction_total_tree	Equivalent tree planted	N/A	Double

4.5 Yearly Plant Data Interface

Key	Name	Unit	Return Value Type
installed_capacity	Installed capacity	kW	Double
radiation_intensity	Global irradiation	kWh/m²	Double
theory_power	Theoretical yield	kWh	Double
performance_ratio	Performance ratio	kWh	Double
inverter_power	Inverter yield	kWh	Double
ongrid_power	Grid feed-in	kWh	Double
use_power	Consumption	kWh	Double
power_profit	Revenue	The value changes with the currency type (exchange rate conversion is not performed).	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 tree planted	N/A	Double

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4.6 Real-Time Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 1 String inverter	inverter_state	For details about inverter status, see Table 4-1.	N/A	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	A	Double
	b_i	Phase B current	A	Double
	c_i	Phase C current	A	Double
	efficiency	Inverter efficiency (manufacturer)	%	Double
	temperature	Inverter internal temperature	℃	Double
	power_factor	Power factor	N/A	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Reactive output 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

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Device Type	Key	Name	Unit	Return Value Type
	pv8_u	PV8 input voltage	V	Double
	pv9_u	PV9 input voltage	V	Double
	pv10_u	PV10 input voltage	V	Double
	pv11_u	PV11 input voltage	V	Double
	pv12_u	PV12 input voltage	V	Double
	pv13_u	PV13 input voltage	V	Double
	pv14_u	PV14 input voltage	V	Double
	pv15_u	PV15 input voltage	V	Double
	pv16_u	PV16 input voltage	V	Double
	pv17_u	PV17 input voltage	V	Double
	pv18_u	PV18 input voltage	V	Double
	pv19_u	PV19 input voltage	V	Double
	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

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Device Type	Key	Name	Unit	Return Value Type
	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	MPPT6 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

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Device Type	Key	Name	Unit	Return Value Type
	mppt_9_cap	MPPT9 DC total yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total yield	kWh	Double
	run_state	Status (**0**: disconnected; **1**: connected)	N/A	Long
ID: 38 Residential inverter	inverter_state	For details about inverter status, see Table 4-1.	N/A	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	A	Double
	b_i	Phase B current	A	Double
	c_i	Phase C current	A	Double
	efficiency	Inverter efficiency (manufacturer)	%	Double
	temperature	Inverter internal temperature	°C	Double
	power_factor	Power factor	N/A	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Reactive output 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

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Device Type	Key	Name	Unit	Return Value Type
	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
	run_state	Status (0: disconnected; 1: connected)	N/A	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	How	Double

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Device Type	Key	Name	Unit	Return Value Type
	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	Status (**0**: disconnected; **1**: connected)	N/A	Long
ID: 17 Grid meter	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 (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 (IA)	A	Double
	b_i	Phase B current (IB)	A	Double
	c_i	Phase C current (IC)	A	Double
	active_power	Active power	kW	Double
	power_factor	Power factor	N/A	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

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Device Type	Key	Name	Unit	Return Value Type
	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
	positive_active_top	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_va	Forward reactive	kVar	Double

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Device Type	Key	Name	Unit	Return Value Type
	lley	energy (off-peak)		
	positive_reactive_top	Forward reactive energy (sharp)	kVar	Double
ID: 47 Power sensor	meter_status	Meter status (**0**: offline; **1**: normal)	N/A	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	N/A	Double
	grid_frequency	Grid frequency	Hz	Double
	active_cap	Active energy (forward active energy)	kWh	Double
	reverse_active_cap	Reverse active energy	kWh	Double
	run_state	Status (**0**: disconnected; **1**: connected)	N/A	Long
ID: 39 Battery (only LG batteries are supported)	battery_status	Battery running status (**0**: offline; **1**: standby; **2**: running; **3**: faulty; **4**: hibernation)	N/A	Double
	max_charge_power	Maximum charge power	W	Double
	max_discharge_power	Maximum discharge power	W	Double
	ch_discharge_power	Charge/Discharge power	W	Double
	busbar_u	Battery voltage	V	Double
	battery_soc	Battery state of charge (SOC)	%	Double
	battery_soh	Battery state of health (SOH)	N/A	Double
	ch_discharge_model	Charge/Discharge mode (**0**: none; **1**:	N/A	Double

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Device Type	Key	Name	Unit	Return Value Type
		forced charge/discharge; **2**: time-of-use price; **3**: fixed charge/discharge; **4**: automatic charge/discharge)		
	charge_cap	Charging capacity	kWh	Double
	discharge_cap	Discharging capacity	kWh	Double
	run_state	Status (**0**: disconnected; **1**: connected)	N/A	Long

Table 4-1 Inverter status (**inverter_state**)

Status Value	Description
0	Standby: initializing
1	Standby: insulation resistance detection
2	Standby: sunlight detection
3	Standby: power grid detection
256	Start
512	Grid connection
513	Grid connection: limited power
514	Grid connection: self-derating
768	Shutdown: unexpected shutdown
769	Shutdown: commanded shutdown
770	Shutdown: OVGR
771	Shutdown: communication disconnection
772	Shutdown: limited power
773	Shutdown: manual startup is required
774	Shutdown: DC switch disconnected
1025	Grid scheduling: cosψ-P curve
1026	Grid scheduling: Q-U curve

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Status Value	Description
1280	Spot-check ready
1281	Spot-checking
1536	Inspecting
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no sunlight
45056	Communication disconnection (written by the SmartLogger)
49152	Loading (written by the SmartLogger)

4.7 5-minute Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 1 String inverter	inverter_state	For details about inverter status, see Table 4-2.	N/A	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	A	Double
	b_i	Phase B current	A	Double
	c_i	Phase C current	A	Double
	efficiency	Inverter efficiency (manufacturer)	%	Double
	temperature	Inverter internal temperature	°C	Double
	power_factor	Power factor	N/A	Double

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

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Device Type	Key	Name	Unit	Return Value Type
	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
	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	kWh	Double

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Device Type	Key	Name	Unit	Return Value Type
		energy		
	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	MPPT6 DC total yield	kWh	Double
	mppt_7_cap	MPPT 7 DC total yield	kWh	Double
	mppt_8_cap	MPPT 8 DC total yield	kWh	Double
	mppt_9_cap	MPPT9 DC total yield	kWh	Double
	mppt_10_cap	MPPT 10 DC total yield	kWh	Double
ID: 38 Residential inverter	inverter_state	For details about inverter status, see Table 4-2.	N/A	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	A	Double
	b_i	Phase B current	A	Double
	c_i	Phase C current	A	Double
	efficiency	Inverter efficiency (manufacturer)	%	Double

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Device Type	Key	Name	Unit	Return Value Type
	temperature	Inverter internal temperature	°C	Double
	power_factor	Power factor	N/A	Double
	elec_freq	Grid frequency	Hz	Double
	active_power	Active power	kW	Double
	reactive_power	Reactive output 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

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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
ID: 10 EMI	temperature	Temperature	°C	Double
	pv_temperature	PV temperature	°C	Double
	wind_speed	Wind speed	m/s	Double
	wind_direction	Wind direction	How	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	Grid AB voltage	V	Double
	bc_u	Grid BC voltage	V	Double
	ca_u	Grid CA voltage	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 (IA)	A	Double
	b_i	Phase B current (IB)	A	Double
	c_i	Phase C current (IC)	A	Double
	active_power	Active power	kW	Double
	power_factor	Power factor	N/A	Double
	active_cap	Active energy (forward active energy)	kWh	Double
	reactive_power	Reactive power	kVar	Double

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Device Type	Key	Name	Unit	Return Value Type
	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
	positive_active_top	Forward active energy (sharp)	kWh	Double
	reverse_reactive_peak	Reverse reactive energy (peak)	kVar	Double
	reverse_reactive_power	Reverse reactive energy (shoulder)	kVar	Double

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Device Type	Key	Name	Unit	Return Value Type
	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)	N/A	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	N/A	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 (only LG batteries are supported)	battery_status	Battery running status (**0**: offline; **1**: standby; **2**: running; **3**: faulty; **4**: hibernation)	N/A	Double
	max_charge_power	Maximum charge power	W	Double
	max_discharge_power	Maximum discharge power	W	Double
	ch_discharge_power	Charge/Discharge power	W	Double
	busbar_u	Battery voltage	V	Double

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Device Type	Key	Name	Unit	Return Value Type
	battery_soc	Battery state of charge (SOC)	%	Double
	battery_soh	Battery state of health (SOH)	N/A	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)	N/A	Double
	charge_cap	Charging capacity	kWh	Double
	discharge_cap	Discharging capacity	kWh	Double

Table 4-2 Inverter status (**inverter_state**)

Status Value	Description
0	Standby: initializing
1	Standby: insulation resistance detection
2	Standby: sunlight detection
3	Standby: power grid detection
256	Start
512	Grid-connected
513	Grid connection: limited power
514	Grid connection: self-derating
768	Shutdown: unexpected shutdown
769	Shutdown: commanded shutdown
770	Shutdown: OVGR
771	Shutdown: communication disconnection
772	Shutdown: limited power
773	Shutdown: manual startup is required
774	Shutdown: DC switch disconnected

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Status Value	Description
1025	Grid scheduling: cosψ-P curve
1026	Grid scheduling: Q-U curve
1280	Spot-check ready
1281	Spot-checking
1536	Inspecting
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no sunlight
45056	Communication disconnection (written by the SmartLogger)
49152	Loading (written by the SmartLogger)

4.8 Daily Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Battery (only LG batteries are supported)	charge_cap	Charging capacity	kWh	Double
	discharge_cap	Discharging capacity	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

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4.9 Monthly Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Battery (only LG batteries are supported)	charge_cap	Charging capacity	kWh	Double
	discharge_cap	Discharging capacity	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

4.10 Yearly Device Data Interface

Device Type	Key	Name	Unit	Return Value Type
ID: 39 Battery (only LG batteries are supported)	charge_cap	Charging capacity	kWh	Double
	discharge_cap	Discharging capacity	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

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5 Error Code List

Error Code	Description
20001	The third-party system ID does not exist.
20002	The third-party system has been disabled.
20003	The third-party system has expired.
20004	The server is faulty.
20005	The device ID cannot be empty.
20006	Some devices do not match the device type.
20007	The system does not have related plant resources.
20008	The system does not have related device resources.
20009	The system does not have the permission to query related interfaces. Contact the system administrator to configure the permission.
20010	The plant list cannot be empty.
20011	The device list cannot be empty.
20012	The query time cannot be empty.
20013	The device type is incorrect. The interface does not support operations on the device.
20015	Data of a maximum of 100 plants can be queried at a time.
20017	Data of a maximum of 100 devices can be queried at a time.
20018	A maximum of 10 devices can be operated at a time.
20019	The switch type is incorrect. (**1**: switch-on; **2**: switch-off)
20020	The upgrade package corresponding to the device version cannot be found.
20021	The upgrade file does not exist.
20022	No upgrade record of the related device is found.
305	You are not in the login state. You need to log in again.

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Error Code	Description
401	You do not have the permission on the related data interface.
407	The interface access frequency is too high.
20023	The query start time cannot be later than the query end time.
20024	The language cannot be empty.
20025	The value of the language parameter is incorrect.
20026	Only data of the latest 365 days can be queried.
20027	The query period cannot be longer than 31 days.

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