# SmartPVMS 24.5.0 NBI Reference

 Issue
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# Change History

# 24.5.0 Northbound API Changes

### 03

Optimized 3.1.1 Creating an OAuth 2.0 Client for a Third-Party App.

# 02

Added 7.5 Scenario-based Practices of Battery Scheduling.

Optimized **4.2 Flow Control Using the API Account** and **5.2.1 API for Delivering Battery Charge and Discharge Tasks**.

### 01

API Name	Method and Path	Description	Re mar ks
API for Delivering a Task for Setting the Battery Working Mode	https:// <i>Domain name of the management system</i> /rest/ openapi/pvms/nbi/v1/control/ battery/mode/async-task	This API is used to deliver the task of setting the battery working mode based on the plant DN. For the same PV plant, do not call this API repeatedly before a task is complete. The battery working mode can be set to <b>Maximum Self-</b> <b>Consumption</b> or <b>TOU</b> .	Ne W API

API Name	Method and Path	Description	Re mar ks
API for Querying a Task for Setting the Battery Working Mode	https:// <i>Domain name of the management system</i> /rest/ openapi/pvms/nbi/v1/control/ battery/mode/task-info	This API is used to query the execution status of the task for setting the battery working mode. Do not call this API repeatedly before a task is complete.	Ne W API
API for Delivering a Task for Setting Battery Parameters	https:// <i>Domain name of the management system</i> /rest/ openapi/pvms/nbi/v1/control/ battery/configuration/async-task	This API is used to deliver the task of setting the battery parameters based on the plant DN. For the same PV plant, do not call this API repeatedly before a task is complete. Users can set plant-level battery parameters (end-of- charge SOC, end-of- discharge SOC, maximum charge power, and maximum discharge power).	Ne W API
API for Querying a Task for Setting Battery Parameters	https:// <i>Domain name of the management system</i> /rest/ openapi/pvms/nbi/v1/control/ battery/configuration/task-info	This API is used to query the execution status of the task for setting the battery parameters. Do not call this API repeatedly before a task is complete.	Ne w API
API for Delivering an Inverter Active Power Setting Task	https:// <i>Domain name of the management system</i> /rest/ openapi/pvms/nbi/v2/control/ active-power-control/async-task	This API is used to deliver an inverter active power setting task based on the plant DN. For the same plant, do not call this API repeatedly before a task is complete. The active power can be controlled in two modes: unlimited and limited feed-in (kW).	Ne W API

API Name	Method and Path	Description	Re mar ks
API for Querying Inverter Active Power Setting Tasks	https://management system domain name/rest/openapi/ pvms/nbi/v2/control/active- power-control/task-info	Query the execution status of the inverter active power setting task. Do not call this API repeatedly before a task is complete.	Ne w API
Hourly Plant Data API	https://Domain name of the management system/thirdData/ getKpiStationHour	The <b>PVYield</b> and <b>inverterYield</b> fields are added to the returned packet.	Mo difie d API
Daily Plant Data API	https:// <i>{Domain name of the management system}</i> /thirdData/getKpiStationDay	The <b>PVYield</b> and <b>inverterYield</b> fields are added to the returned packet.	Mo difie d API
Monthly Plant Data API	https:// <i>{Domain name of the management system}</i> /thirdData/getKpiStationMonth	The <b>PVYield</b> and <b>inverterYield</b> fields are added to the returned packet.	Mo difie d API
Yearly Plant Data API	https://Domain name of the management system/thirdData/ getKpiStationYear	The <b>PVYield</b> and <b>inverterYield</b> fields are added to the returned packet.	Mo difie d API
API for Delivering an Inverter Active Power Setting Task	https://Management system domain name/rest/openapi/ pvms/nbi/v1/control/active- power-control/async-task	You are not advised to use this API. <b>5.2.7 API</b> for Delivering an Inverter Active Power Setting Task is recommended.	Mo difie d API
API for Querying Inverter Active Power Setting Tasks	https://Management system domain name/rest/openapi/ pvms/nbi/v1/control/active- power-control/task-info	You are not advised to use this API. <b>5.2.8 API</b> for Querying Inverter Active Power Setting Tasks is recommended.	Mo difie d API

# 24.4.0 Northbound API Changes

01

None

# 24.2.0 Northbound API Changes

### 03

Optimized 3.1.2.2 Initiating Authorization to a Third-party App by an Owner, 6.4 Exception Code List, 8.1.1 Handling the Exception Returned by Calling the Authorization Request API, 8.2.1 Why Do I Fail to Create an API Account?, and 8.3 Why Is No Data or Only Part of Data Found When I Call a Northbound API for Data Query?

# 02

Optimized **3.1 OAuth Connect** and **4.1 Flow Control Policy in OAuth Connect Mode**.

Added 8.1.6 How Do I Obtain O&M Support When Open APIs Are Accessed in OAuth Connect Mode?

### 01

# 

During the evolution of open APIs, the original V6 APIs are incorporated into the basic APIs. For details, see **5.1 Basic APIs**. This change does not affect the normal use of the original APIs.

Some APIs are iterated, as listed in the following table. You are advised to use new high-performance APIs instead.

### Added 3.1 OAuth Connect.

Old API	New API	Description
/thirdData/getStationList	/thirdData/stations	The new API supports pagination and data query by grid connection time. For details, see <b>5.1.1.1 Plant List API</b> .
/thirdData/ getDevFiveMinutes	/thirdData/ getDevHistoryKpi	The new API supports a longer time range and better query performance. For details, see <b>5.1.2.3 Historical</b> <b>Device Data API</b> .

Old API	New API	Description
/rest/openapi/ pvms/v1/vpp/ chargeAndDischarge	/rest/openapi/ pvms/nbi/v2/control/ charge-and-discharge/ async-task	The new API can deliver different parameters to each plant. For details, see 5.2.1 API for Delivering Battery Charge and Discharge Tasks.

# **2** Overview

# NOTICE

Please use the latest northbound API reference document by choosing **Company Management > Northbound Management > Developer Guide**.

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# 2.1 Introduction to Northbound Open APIs

# Northbound Open APIs

Northbound open APIs are open interfaces based on the Representational State Transfer (REST) standard and can facilitate integration of third-party systems.

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

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

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

# What Is REST?

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

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

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

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

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

# **HTTP Status Codes**

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

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

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

# 2.2 API Architecture

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



### Figure 2-1 WebService NBI architecture

# 2.3 API Overview

API Cate gory	API Labe l	API Name	Description
Basic APIs	Basic data	Plant List	Returns the static information about the plants on which the current account has permission by page. Some information, such as the plant ID, is the prerequisite for querying other API data. The static information changes only when the plants change. The third-party system must save the information.
		Device List	Returns the device list of a given plant by page. Some information, such as the plant ID, is the prerequisite for querying other API data. The third-party system must save the information.
	Moni torin g data	Real-time plant data	Obtains real-time data such as the energy yield, revenue, and health status of the plant on the current day. The data is updated every 5 minutes. The calling party must save the data.

API Cate gory	API Labe l	API Name	Description
		Real-time device data	Obtains real-time device data. The real-time data varies depending on the device type. The data is updated every 5 minutes. The calling party must save the data.
		Historical device data	Obtains the 5-minute data of a device in a given period. The data items vary depending on the device type. The calling party must save the data.
	Alar m data	Querying active alarms	Queries device active alarms of by plant or query alarms of a specific device.
	Repo rt data	Hourly plant data	Queries the hourly data of a plant in a day. The data items include inverter energy yield and feed- in energy. The data update is delayed. Generally, only the current-day data is updated. The calling party must save the data.
		Daily plant data	Queries the daily data of a plant in a month. The data items include inverter energy yield, feed-in energy, and energy consumption. The data update is delayed. Generally, only the current-day data is updated. The calling party must save the data.
		Monthly plant data	Queries the monthly data of a plant in a year. The data items include inverter energy yield, feed-in energy, and energy consumption. The data update is delayed. Generally, only the current-month data is updated. The calling party must save the data.
		Yearly plant data	Queries the yearly data of a plant in its life cycle. The data items include inverter energy yield, feed-in energy, and energy consumption. The data update is delayed. Generally, only the current-year data is updated. The calling party must save the data.
		Daily device data	Queries the daily data of a device. The data items vary depending on the device. The data update is delayed. Generally, only the current-day data is updated. The calling party must save the data.
		Monthly device data	Queries the monthly data of a device. The data items vary depending on the device. The data update is delayed. Generally, only the current- month data is updated. The calling party must save the data.

API Cate gory	API Labe l	API Name	Description
		Yearly device data	Queries the yearly data of a device. The data items vary depending on the device. The data update is delayed. Generally, only the current- year data is updated. The calling party must save the data.
Cont rol APIs	ESS charg e/ disch arge	Delivering battery charge/ discharge tasks	Delivers battery charge/discharge tasks based on plant codes. For the same plant, do not call this API repeatedly before a task is complete. If there are multiple ESSs in the power plant, the task is executed on every ESS.
		Querying battery charge/ discharge tasks	Queries the delivery result of an asynchronous battery charge/discharge task. Do not call this API repeatedly before a task is complete.
	Inver ter activ e powe r settin g	API for Delivering an Inverter Active Power Setting Task	This API is used to deliver an inverter active power setting task based on the plant DN. For the same plant, do not call this API repeatedly before a task is complete. The active power can be controlled in two modes: unlimited and limited feed-in (kW).
		API for Querying Inverter Active Power Setting Tasks	Query the execution status of the inverter active power setting task. Do not call this API repeatedly before the task is complete.
	Setti ng the batte ry worki ng mode	API for Delivering a Task for Setting the Battery Working Mode	This API is used to deliver the task of setting the battery working mode based on the plant DN. For the same PV plant, do not call this API repeatedly before a task is complete. The battery working mode can be set to <b>Maximum Self-</b> <b>Consumption</b> or <b>TOU</b> .
		API for Querying a Task for Setting the Battery Working Mode	This API is used to query the execution status of the task for setting the battery working mode. Do not call this API repeatedly before a task is complete.

API Cate gory	API Labe l	API Name	Description
	Batte ry para mete r settin g	API for Delivering a Task for Setting Battery Parameters	This API is used to deliver the task of setting the battery parameters based on the plant DN. For the same PV plant, do not call this API repeatedly before a task is complete. Users can set plant- level battery parameters (end-of-charge SOC, end-of-discharge SOC, maximum charge power, and maximum discharge power).
		API for Querying a Task for Setting Battery Parameters	This API is used to query the execution status of the task for setting the battery parameters. Do not call this API repeatedly before a task is complete.

# **3**<sub>API Access</sub>

The SmartPVMS northbound open APIs provide two access modes for third-party systems and third-party developers.

In the scenario where a third-party enterprise platform is interconnected, OAuth Connect is used to access northbound open APIs. Basic APIs and control APIs can be used in the OAuth Connect scenario.

The platforms developed by installers can access the open APIs using API accounts. Basic APIs can be used in the API account access scenario.

### NOTICE

The access to open APIs in OAuth Connect mode is for trial use only in Europe. The policy may change in the future.

# 3.1 OAuth Connect

In OAuth Connect mode, third-party apps need to adapt to the OAuth 2.0 protocol to access northbound open APIs.

OAuth 2.0 is an open authorization protocol that allows third-party apps to access resources authorized by owners without obtaining their usernames and passwords.

A third-party app can apply for creating an OAuth 2.0 client on the FusionSolar. After the FusionSolar owner authorizes the application, the FusionSolar owner account is bound to the client. The third-party app then can access the northbound open APIs to access the resources authorized by the owner.

The following sections describe the process of accessing northbound open APIs in OAuth Connect mode.

# 3.1.1 Creating an OAuth 2.0 Client for a Third-Party App

To enable a third-party app to access northbound open APIs in OAuth Connect mode, you need to apply for and create an OAuth 2.0 client on the FusionSolar. Use the following template to initiate an application and send it to huaweipartners@huawei.com (available only in Europe). FusionSolar will help complete the application. The procedure is as follows.

**Step 1** A third-party app initiates an application based on the following template.

Applicatio n Informatio n	Description	Filled by Third-Party Platform
Agreemen t on Use of Huawei APIs	By initiating an application, you acknowledge and agree to the <i>Agreement on Use of Huawei APIs</i> .	Agree
Company Name	Company name	
Registered Place	Registered place of the company	
Company Address	Company address	
Legal Entity	Legal entity	
Employer Identificati on Number (EIN)	Employer identification number	
Contact Number	Contact number	
Email	Email address for registering a third-party app. After the registration is successful, related information will be sent to this email address. Example: Huawei_Tool@huawei.com	
App Name	Name of a third-party app. The value can contain letters, digits, hyphens (-), and underscores (_). This field displays information about apps authorized by owners. Example: Huawei_Tool	
Descriptio n	Third-party app description. Example: a tool developed by Huawei Digital Power. It is mainly used in residential PV scenarios to provide customers with a convenient home energy management service platform.	

Applicatio n Informatio n	Description	Filled by Third-Party Platform
Redirect URL	Callback URL in the OAuth 2.0 authentication process. The redirect URI cannot contain, <b>redirect</b> , or <b>#</b> .	
	After the owner approves the authorization, an authorization code is generated. The third-party app can obtain the authorization code through <b>RedirectUrl</b> .	
	Example: https://www.huaweitool.com/xxx? somearg=huaweitool.mainpage	

If a third-party app needs to modify **RedirectUrl**, **RedirectUrl** used when the owner initiates authorization and the third-party app obtains the token also needs to be updated.

**Step 2** After completing the application, the FusionSolar returns the following OAuth 2.0 client information to the third-party app.

Parame ter	Dat a Typ e	Description
client_id	Strin g	Client ID. It is the ID allocated by FusionSolar to a third-party app.
client_s ecret	Strin g	Client secret. It is the client secret allocated by FusionSolar to a third-party app.
scope	Strin g	Permission set. It is the permission set opened by FusionSolar to third-party apps, for example, basic APIs (pvms.openapi.basic) and control APIs (pvms.openapi.control).

After receiving **client\_id** and **client\_secret**, the third-party app must keep them secure.

----End

# 3.1.2 Integrating OAuth 2.0 to Third-Party Apps

Third-party apps can integrate the authorization request link of the FusionSolar to manage the authorization request function. When an owner clicks the corresponding function, the authorization request process starts.

# 3.1.2.1 Adaptation Process Overview

Third-party app clients can access northbound open APIs in OAuth Connect mode. The adaptation process is as follows: An owner accesses the authorization request function integrated by a third-party app. The FusionSolar displays the login page and authorization page for the owner to log in and authorize the OAuth 2.0 client of the third-party app, and returns the authorization code generated after the owner's authorization to the third-party app through the redirect URL. After obtaining the authorization code, the third-party app uses it to access the FusionSolar service and obtain the access token and refresh token. The third-party app then uses the access token to access open APIs. The following figure shows the process.



1-2: An owner accesses the FusionSolar through the authorization request link integrated to a third-party app client and **initiates the authorization code request process**.

3: The OAuth service responds to the request (HTTP status code: 302) and returns the authorization page to the third-party app client. If the owner has not logged in to FusionSolar, the OAuth service returns to the FusionSolar login page. After the owner logs in, the authorization page is displayed.

4-5: After the owner confirms the authorization, the third-party app client accesses the OAuth service to initiate an authorization request to the third-party app client (OAuth 2.0 client).

6: The OAuth service responds to the request (HTTP status code: 302) and returns the **redirect URL** and authorization code to the third-party app client.

7: The third-party app client sends a request carrying the authorization code to request the **redirect URL**.

8-9: After obtaining the authorization code, the third-party app server uses the authorization code to **send a request to the OAuth API for obtaining tokens** to obtain the access token and refresh token.

10: The third-party app server uses the access token to access the northbound open APIs for subsequent service processing.

### NOTICE

An authorization code is used to generate an access token of a northbound open API. A refresh token is used for refreshing the access token.

After the owner accesses the OAuth service and initiates authorization to a thirdparty app, an authorization code is generated. The third-party app can use the authorization code to access the OAuth service again to obtain the access token and refresh token.

An authorization code is valid for 5 minutes. After obtaining the authorization code, the third-party app needs to obtain the access token and refresh token as soon as possible. After the authorization code expires, the owner needs to access the OAuth service again to initiate authorization to the third-party app.

When a third-party app accesses the northbound open APIs in OAuth Connect mode, the access token is used for authentication. The refresh token is used to exchange for a new access token. The access token is valid for one hour. After it expires, a third-party app cannot access the open APIs using the expired access token and needs to obtain a new access token using the refresh token. If a refresh token is used to obtain a new access token even when the old access token is still in its validity period, the old access token will become invalid, and the third-party app cannot access the open API through the old access token.

The access token and refresh token are sensitive information. Keep them secure.

# 3.1.2.2 Initiating Authorization to a Third-party App by an Owner

After a third-party app applies for an OAuth 2.0 client on the FusionSolar, an owner initiates authorization to the client, accesses the OAuth service, calls the authorization request API provided by the OAuth service, logs in to the FusionSolar, and selects a permission set. After the authorization is complete and successful, an authorization code is generated. The third-party app obtains the authorization code through **RedirectUrl**.

# **Description of the Authorization Request API**

The authorization request API is provided by the OAuth service for owners to authorize OAuth 2.0 clients of third-party apps.

# **URL of the Authorization Request API**

https://oauth2.fusionsolar.huawei.com/rest/dp/uidm/oauth2/v1/authorize

# **HTTP Method of the Authorization Request API**

HTTP method: GET

# Parameters of the Authorization Request API

Parameter	Ma nda tor y (Ye s/N o)	Dat a Type	Description	
response_t ype	Yes	Strin g	Response type. The value is fixed at <b>code</b> for the OAuth 2.0 authentication mode.	
client_id	Yes	Strin g	Nine-digit <b>client-id</b> returned by the FusionSolar to a third-party app when the third-party app <b>applies for an OAuth 2.0 client</b> .	
redirect_uri	Yes	Strin g	<b>RedirectUrl</b> provided by the third-party app for the FusionSolar when the app <b>applies for an OAuth 2.0 client</b> .	
scope	No	Strin g	Permission set that a third-party app needs to apply for from the owner. If multiple permissions are required, use spaces to separate them. The space is encoded as %20 in the URL. For details about all supported permission sets, see the <b>scope description</b> returned by the FusionSolar to the third-party app when the third-party app <b>applies for an OAuth 2.0</b> <b>client.</b> If the <b>scope</b> parameter is not specified, all permissions authorized by the owner are used by default.	
locale	No	Strin g	default. Language used by the FusionSolar to display the login page and authorization page to the owners. You are advised to leave this parameter blank. If th parameter is left blank, the OAuth service determines the language based on the language supported by the browser used by the owners. The following languages are supported: de-de (German/Germany), en-us (English/United States), es-es (Spanish/Spain), fr-fr (French/France), hu-hu (Hungarian/Hungary), it-it (Italian/Italy), ja-jp (Japanese/Japanese), ko-kr (Korean/Korea), nl-nl (Dutch/Netherlands), pl-pl (Polish/Poland), pt-br (Portuguese/Brazil), tr-tr (Turkish/Türkiye), uk-ua (Ukrainian/Ukraine), vi-vn (Vietnamese/Vietnam), zh-cn (Simplified Chinese/China), and zh-tw (Traditional Chinese/Taiwan).	

# **Response Packet of the Authorization Request API**

Paramete r	Data Type	Description
code	String	Authorization code generated after the owner authorizes the third-party app. The authorization code is returned to the third-party app through <b>RedirectUrl</b> registered by the third-party app. The authorization code can be used to generate an access token of the northbound open API.

# Link Example of the Authorization Request API

Assume that a third-party app creates an OAuth 2.0 client on the FusionSolar. Assume that the provided **RedirectUrl** is https://www.example.com/cn/ and the allocated **client\_id** is **123456789**. The link of the authorization request API combined by the third-party app is as follows:

https://oauth2.fusionsolar.huawei.com/rest/dp/uidm/oauth2/v1/authorize? response\_type=code&client\_id=**123456789**&redirect\_uri=**https://www.example.com/cn/** 

Note that if **RedirectUrl** contains characters such as **&** and is directly used to combine the URL of the authorization request API, a parameter exception page may be returned. As a result, **RedirectUrl** is unavailable. Therefore, URL encoding is required for **RedirectUrl**. For example, when **RedirectUrl** of the third-party app is **https://www.example1.com/cn/?example2=example3&example4=example5** and the URL code is **https%3A%2F%2Fwww.example1.com%2Fcn%2F %3Fexample2%3Dexample3%26example4%3Dexample5**, the URL of the authorization request API combined by the third-party app is as follows:

https://oauth2.fusionsolar.huawei.com/rest/dp/uidm/oauth2/v1/authorize? response\_type=code&client\_id=123456789&redirect\_uri=https%3A%2F%2Fwww.example1.com%2Fcn%2F %3Fexample2%3Dexample3%26example4%3Dexample5

# Usage of the Authorization Request API

A third-party app needs to combine the access link (as shown in **Link Example of the Authorization Request API**) of the authorization request API and integrate the link into the third-party app so that the owner can use the link to access the FusionSolar login page.



Assume that the **AppName** of a third-party app is **Third-party application**. The scope of the permission set that needs to be applied for from the owner includes basic APIs (**pvms.openapi.basic**) and control APIs (**pvms.openapi.control**). After the owner enters the FusionSolar account and password to log in to the FusionSolar, the following authorization page is displayed.



On this page, the owner can select a permission set to authorize the OAuth 2.0 client of the third-party app. After the owner completes the authorization, an authorization code is generated. The third-party app can obtain the authorization code based on the **RedirectUrl** provided for the FusionSolar when **applying for an OAuth 2.0 client**. For example, if the authorization code is B\*\*\*\*\*\*B, the response example is as follows:

https://www.example.com/cn/?code=B\*\*\*\*\*B

If the owner rejects the authorization, the third-party app can obtain the following information through **RedirectUrl**:

https://www.example.com/cn/?error=10002&error\_description=access\_is\_denied

# **Exception Example of the Authorization Request API**

If the **scope** parameter transferred in the combined request link is incorrect and the **RedirectUrl** provided by a third-party app for the FusionSolar when **applying for an OAuth 2.0 client** is **https://www.example.com/cn/**, the third-party app can obtain the following information based on the **RedirectUrl**: https://www.example.com/cn/?error=invalid\_scope&error\_description=OAuth %202.0%20Parameter:%20scope

For more exception examples and troubleshooting methods, see **8.1.1 Handling the Exception Returned by Calling the Authorization Request API**.

# 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App

After obtaining the authorization code from the **RedirectUrl**, the third-party app needs to access the OAuth service again, request the token obtaining API provided by the OAuth service to obtain the access token and refresh token based on the authorization code, and select the permission set to be authorized by the owner to the third-party app.

# **Description of the API for Obtaining Tokens**

The API for obtaining tokens is provided by the OAuth service for third-party apps to obtain the access token and refresh token. This API provides two usage methods, which are distinguished by the **grant\_type** parameter transferred in the request API. When **grant\_type** is set to **authorization\_code**, the API for obtaining tokens can obtain the access token and refresh token based on the authorization code and the permission set selected by the owner to authorize the third-party app. When **grant\_type** is set to **refresh\_token**, the API for obtaining tokens can use the refresh token to obtain the access token and the permission set selected by the owner to authorize the third-party app.

# **Request URL of the API for Obtaining Tokens**

https://oauth2.fusionsolar.huawei.com/rest/dp/uidm/oauth2/v1/token

# **Request Method of the API for Obtaining Tokens**

HTTP method: POST

# **Request Headers of the API for Obtaining Tokens**

Content-Type: application/x-www-form-urlencoded

# **Request Parameters of the API for Obtaining Tokens**

The following table lists the request parameters for obtaining the access token and refresh token using the authorization code.

Parameter	Data Type	Description
client_id	String	Nine-digit <b>client-id</b> returned by the FusionSolar to a third-party app when the third-party app <b>applies for an OAuth 2.0 client</b> .

Parameter	Data Type	Description
code	String	Authorization Code generated in 3.1.2.2 Initiating Authorization to a Third-party App by an Owner. The authorization code is called back to the third-party app through the <b>RedirectUrl</b> provided for the FusionSolar when the third-party app <b>applies for an OAuth 2.0</b> client.
redirect_uri	String	<b>RedirectUrl</b> provided by the third-party app when it <b>applies for an OAuth 2.0 client</b> .
client_secre t	String	<b>client-secret</b> returned by the FusionSolar to a third- party app when the third-party app <b>applies for an</b> <b>OAuth 2.0 client</b> .
grant_type	String	The value is fixed at <b>authorization_code</b> . When <b>grant_type</b> is set to <b>authorization_code</b> , the current API can obtain the open API access token and refresh token based on the authorization code.

The following table describes the request parameters for obtaining the access token using the refresh token.

Parameter	Data Type	Description
client_id	String	Nine-digit <b>client-id</b> returned by the FusionSolar to a third-party app when the third-party app <b>applies for an OAuth 2.0 client</b> .
refresh_toke n	String	Refresh token obtained by a third-party app using an authorization code.
client_secret	String	<b>client-secret</b> returned by the FusionSolar to a third- party app when the third-party app <b>applies for an</b> <b>OAuth 2.0 client</b> .
grant_type	String	The value is fixed at <b>refresh_token</b> , which indicates that the current API can use the refresh token to obtain the access token.

# **Response Packet of the API for Obtaining Tokens**

The following table lists the parameters in the response packet for obtaining the access token and refresh token using the authorization code.

Parameter	Data Type	Description
access_toke n	String	Access token obtained after the third-party app obtains the owner's authorization. It can be used as the access token for accessing northbound open APIs.
refresh_toke n	String	Refresh token obtained after the third-party app obtains the owner's authorization. If the access token expires, you can obtain a new one using the refresh token.
expires_in	Integer	Remaining validity period of the access token, in seconds.
scope	String	Permission group of the token. If there are multiple permission groups, separate them with spaces (").
token_type	String	Type of the returned access token. The value is fixed at <b>Bearer</b> .

The following table describes the parameters in the response packet for obtaining the access token using the refresh token.

Parameter	Data Type	Description
access_toke n	String	New access token obtained by the third-party app using the refresh token. It can be used as the access token for accessing northbound open APIs.
refresh_toke n	String	Refresh token obtained after the third-party app obtains the owner's authorization. If the access token expires, you can obtain a new one using the refresh token.
expires_in	Integer	Remaining validity period of the access token, in seconds.
scope	String	Permission group of the token. If there are multiple permission groups, separate them with spaces (").
token_type	String	Type of the returned access token. The value is fixed at <b>Bearer</b> .

# Example Request and Response for Obtaining the Access Token and Refresh Token Using the Authorization Code

# **Example Request**

Assume that the parameters of the OAuth 2.0 client created by a third-party app on the FusionSolar are as follows: **RedirectUrl** = https://www.example.com/cn/,

**client\_id** = **123456789**, **client\_secret** = **A**\*\*\*\*\***A**, **scope** = **pvms.openapi.basic** and **pvms.openapi.control**. The request example for obtaining the access token and refresh token using the authorization codes is as follows:

POST /rest/dp/uidm/oauth2/v1/token HTTP/1.1 Host: oauth2.fusionsolar.huawei.com Content-Type: application/x-www-form-urlencoded

grant\_type=authorization\_code& code=B\*\*\*\*\*B& client\_id=123456789& client\_secret=A\*\*\*\*\*A& redirect\_uri=https://www.example.com/cn/

### **Response Example**

After the owner authorizes a third-party app, assume that the parameters obtained by the third-party app using the authorization code are as follows: **AT** = **a**\*\*\*\*\***t**, **RT** = **r**\*\*\*\*\***t**, **scope** = **pvms.openapi.basic** and **pvms.openapi.control**. The response example for obtaining the access token and refresh token using the authorization code is as follows:

```
HTTP/1.1 200 OK
{
    "access_token": "a*****t",
    "refresh_token":"r*****t",
    "expires_in": 3600,
    "scope": "pvms.openapi.basic pvms.openapi.control",
    "token_type": "Bearer"
}
```

# Example Request and Response for Using a Refresh Token to Obtain an Access Token

### **Example Request**

Assume that the refresh token obtained by the third-party app using the authorization code in the **preceding procedure** is **r**\*\*\*\*\***t**. An example request for obtaining the access token using the refresh token is as follows:

POST /rest/dp/uidm/oauth2/v1/token HTTP/1.1 Host: oauth2.fusionsolar.huawei.com Content-Type: application/x-www-form-urlencoded

grant\_type=refresh\_token& refresh\_token=r\*\*\*\*\*t& client\_id=123456789& client\_secret=A\*\*\*\*\*\*A

### **Response Example**

If the third-party app uses the refresh token **r**\*\*\*\*\***t** to obtain a new access token and the obtained new access token is **b**\*\*\*\*\***b**, an example response for obtaining the access token using the refresh token is as follows:

```
HTTP/1.1 200 OK
```

```
{
    "access_token": "b*****b",
    "refresh_token":"r*****t",
    "expires_in": 3600,
    "scope": "pvms.openapi.basic pvms.openapi.control",
    "token_type": "Bearer"
}
```

# Handling Request Exceptions of the API for Obtaining Tokens

The following is an example of an exception when the **grant\_type** parameter that is not supported is used to access the API for obtaining tokens:

```
HTTP/1.1 400
{
"error_description": "unsupported_grant_type",
"error": "1111"
}
```

For more exception examples and troubleshooting methods, see **8.1.2 Handling the Exception Returned by Calling the Token Obtaining API**.

# 

After the owner initiates authorization on the third-party app client, the thirdparty app obtains the authorization tokens (access token and refresh token) through the OAuth 2.0 authorization process. When an owner initiates incremental authorization through a third-party app client, the old authorization tokens automatically become invalid after the third-party app successfully obtains new authorization tokens. It is recommended that **an owner performs incremental authorization on third-party apps through the FusionSolar app**.

# 3.1.3 Calling Open APIs by Third-Party Apps

# **API Access**

*https://Domain name of the management system/specific API name+access request parameters* 

# Access Process

After adapting to the OAuth Connect mode, the third-party app obtains the owner's authorization and the access token. The access token must be carried when the app accesses specific data. The third-party app calls APIs to access the specific data as required in the following process.



# **Access Example**

The following uses the **Plant List API** as an example to describe how to access FusionSolar open APIs in OAuth Connect mode. After obtaining the access token, the third-party app carries it to access the plant list API.

Request example:

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

Authorization: access token obtained by the bearer

Content-Type: application/json

Body:

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

Response examples:

Example 1: An error code is returned.

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

Example 2: The plant list data is returned.

```
{
 "success": true,
 "data": {
  "list": [
    {
     "plantCode": "NE=12345678",
      "plantName": "NMplant1",
     "plantAddress": null,
     "longitude": null,
     "latitude": null,
"capacity": 146.5,
     "contactPerson": ""
     "contactMethod": ""
     "gridConnectionDate": "2022-11-21T16:23:00+08:00"
    },
    {
      "plantCode": "NE=23456789",
     .
"plantName": "plant2",
     "plantAddress": null,
     "longitude": null,
     "latitude": null,
     "capacity": 123.3,
     "contactPerson": ""
     "contactMethod": ""
      "gridConnectionDate": "2022-11-21T16:30:28-12:00"
   }
  ],
  "pageCount": 1,
  "pageNo": 1,
  "pageSize": 100,
  "total": 2
 }
 "failCode": 0,
 "message": "get plant list success"
 }
```

Example 3: The access token is invalid and cannot be used to parse the authorization information. The following error information is displayed.

```
"success": false,
"failCode": 305,
"message": "INVALID_CREDENTIAL"
}
```

Example 4: If the access token permission is insufficient, the following error information is displayed.

```
{
    "data": null,
    "failCode": 401,
    "message": "Invalid access to current interface!",
    "params": {
    },
    "success": false
}
```

Examples 1 and 2 show access to the **Plant List API** in OAuth Connect mode. The returned information varies according to the API internal services. Examples 3 and 4 indicate that the access token is invalid and the access token permission is

insufficient, respectively. For details about how to handle these exceptions, see 8.1.3 Why Does the Northbound API Return Error Code 305? and 8.1.4 Why Does the Northbound API Return Error Code 401?

# NOTICE

The following figure shows an example of the access token carried in the request header of a northbound open API. (The value of the **Authorization** field consists of **Bearer** and **Access Token**. The **Plant List API** is used as an example.)

	P):\${PORT}(hirdData/stations	
QUERY PA	RAMETERS	
headers $^{\odot}$ $l_z^{a}$		Form - • BODY ®
Content-Type	: application/json	x 1 {
<ul> <li>Authorization</li> </ul>	: Bearer qwfi	<pre></pre>
+ Add header & Add authorizatio	n	÷

In addition to the exception information in **Access Example**, for details about other response information, see the response packet and response example of each open API.

# 3.1.4 Incremental Authorization or Authorization Revocation

Log in to the FusionSolar app as an owner, choose **Me** > **Settings** > **Account security** > **Authorization Management**, and select the third-party app that requires incremental authorization or authorization revocation. Then tap the button on the right of **Basic APIs** or **Control APIs** in the **Authorization Content** area for incremental authorization or tap **Revoke Authorization** for authorization revocation, as shown in the following figure.

← Authorization Management	
Authorized On	
Authorization Content	
Basic APIs Allow you to obtain the real-time monitoring, report, and alarm data of plants and devices for system monitoring, 0&M, and data analysis.	
Control APIs Allow you to remotely control plants, including configuring ESS charge/discharge and inverter active power adjustment.	
Revoke Authorization	

# **3.2 API Account Access**

To use an API account to access northbound open APIs, the company administrator needs to create an API account, obtain the owner's authorization, bind the API account to the plants of the company, and use the API account to call APIs described in **3.2.2.1 Login API** to obtain a token for identity authentication of accessing other APIs.

# Communication Between a Third-party System and the SmartPVMS



Figure 3-1 Communication between a third-party system and the SmartPVMS

# **NOTE**

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

# 3.2.1 Obtaining an Account

The permission to access northbound APIs is created by the company administrator. The procedure is as follows:

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

Home	fonitoring Reports Plants Maintenance Value-Added Servi	ss System	SmartDe	sim (D) 🗃 Q (6)1	inglish 🕕
- 10		Company Management Company Management	Business Configurat Service Settings		Add Company Delete Com
User Management Company Info Mailbox Default Electrici	y Prices Northbound Management (2)	System Settings     Personal Settings	Data Modification		
Developer Guide	Deadline	Delete Account	Announcements	Operation	Add Delete
	1	Privacy Policy	Send Announcement	٩ 2 8	
Total records: 1		Terms of Use			< 1 > 10/page >
		Cookies Policy Version Information			
		Contact Us			

Step 2 Click Add. In the dialog box that is displayed, set basic information, such as Associated account, Username, and Password.



**Step 3** If you enable **Basic APIs** in the **APIs** area, the API account has the permission to access basic API data of northbound open APIs.

**NOTE** 

To select all plants of a company, select the company.

- **Step 4 Optional:** Select the company or plant for which you want to grant permission. After the binding, the API account has permissions of the selected company or plant.
- **Step 5** Click **OK** to save the settings.

----End

# 3.2.2 Authentication API

An account is used to call the login API to obtain a token for identity authentication when accessing other data query APIs and control APIs.

# 3.2.2.1 Login API

# **API Description**

- Before obtaining data, the login API must be called to obtain the XSRF-TOKEN. The validity period of XSRF-TOKEN is 30 minutes.
- If the XSRF-TOKEN does not expire, it can be reused. If the XSRF-TOKEN has expired, the login API needs to be called again to obtain a new XSRF-TOKEN.
- After this API is called to log in to the system, XSRF-TOKEN is returned in the response header.
• A new token is generated each time this API is called, and the previously obtained token becomes invalid.

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Access Restrictions**

If an API account enters incorrect passwords for five consecutive times within 10 minutes, the API account will be locked out for 30 minutes.

Maximum number of API calls for each API account: five times every 10 minutes.

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

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
userName	API account name	String	Mandatory
systemCode	Password	String	Mandatory

#### **Response Packet**

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	currentTime	Current system time, in milliseconds	Long	-

Parameter	Description	Data Type	Remark s
message	Optional message	String	If the login is successf ul, the docume nt link of the current version is returned
data	Returned data	Object	-

#### Example

#### Request example:

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

Response example:

Example 1: successful login

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

Example 2: failed login

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

#### NOTICE

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

Login example:

01-login MTINO POST •		Save •
HEADER <sup>CD</sup> II Tothere Type ( Additionary P Add autorization	Form -         4         B D20**           *         •         •           *         •         •           *         •         •           *         •         •	for -
	Tent JBON XML HTML   >> Format body   22 Enable body evaluation	😤 length: 61 bytes
Response		Cache Detected - Elapsed Time: 815ms
200 OK		
<pre>&gt; mov * det : null, success : true, fildo(: 0, param: &gt; (), param: &gt; (). } werement</pre>		prity • 0 Top O Bottom B Colleger B Specific College & Specific A Specific A

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

elogin 🖉	₹ General
	Request URL: https://18.99.162.214/thirdbata/login
	Request Methodi POST
	Status Code: @ 200 0K
	Remote Address: 10.90.162.214:643
	Referer Policy: strict-origin-when-cross-origin
	Response Headers view source
	Connection: keep-alive
	content-encoding: grip
	Content-Type: application/json;charset=UTF-0
	Date: Set, 20 Feb 2021 21:59:36 DVT
	Server: product only
	set-cookie: XSRF-TOKEI+x-cofxxp2rg84bjv7uimshnofys94as808871jk83uitgp6grtzgprHotojteuko+fxpf6q4a7xqixobsa8787c0886x7xdje1airfznsq1c01cddrypfnspe5dqqfu3v6qbjjPath+/,Secure
	strict-transport-security mex-age-31536000; includeSubDomains
	Transfer-Incoding: churked
	x-content-type-options: noniff
	x-download-options: nocpen
	x-frame-options: SAVEOREGDI
	x-trace-enable: false
	x-xss-protection: 1; mode+block
	xxf-tokxm: x-eofxsp2rgD40jv7uisphmpfysD4asEdh071jk03u6x3gEdgrtdgdh0bdjteukonfxpF6q4a7xqkobse0787cb08667xdje1akfznsqloblcddrypFnspe5dqqfu3v4q0j
	* Report Headers view source
	Accept: */*
	Accept-Encoding: gzip, deflate, br
	Accept-Language: zh-CN,zh;q=0-9
	Connection: keep-alive
	Content-Longth: 61
	Content-Type: application/json
	Cookie locale+zh-cn; user_time_a_lang=; user_sigital_format=%22%23%230.00; timezone=; delimiter==; format=yyyy=M=cd%20HM3AmM03Ass; timemode=server; timezoneoffset=480; user_time_show_dst=1; XSRF=TOKEN
1 / 2 requests 822 8 / 922 8 transferred 68 8 / 103 8 resources	x-7s1d7tddtfustes77se5btdfc8c8585mvem8brande7v585tdfc8c8585mvem8brande7v58dfs09mbcruirrev1hao7vthis1we88d1ccc7zuk1fterve60i3tzefammultbu: 3555510H2D+1185287D4123398822128053AA408159C: buseession-deleted

The following is an example compatible with earlier versions.

login .	* General
	Request URL: https://10.50.162.214/thirdDeta/login
	Request Method: POST
	Status Code:
	Remote Address: 10.99.162.2141443
	Referent Policy: strict-origin-when-cross-origin
	Response Headers view source
	Connection: keep-alive
	context-excoding: gzip
	Content-Type: application/json;charset=UTF-8
	Date: Set, 28 Feb 2821 11:59:36 GWT
	Server: product only
	set-cookie: XSR-T0KEixx-eofxap2rgb4bjV7u3aphmpFyS94a586H871jk83uk3g6dgrtagpH0bbjtexkapfxpF6q4a7vqkxbbsal787cb886c7xsje1akfzxsqlob1cdsrypFnspe5dqq4u3v6q5jjPtth=/jSecure
	strict-transport-security: max-age=31536000; includeSubDomains
	Transfer-Encoding: churked
	x-content-type-options: nosrdff
	x-download-options: roopen
	x-frame-options: SAMEORIGIN
	x-trace-mable: false
	x-wss-protection: 1; mode=block
	xxrf-takem: x-eofxapirg84bjv7uimptmofys94as8m871j1x83w1g66grtsgdm0bdjteukanfxpf6q4a7xqkobsa0787c8086a7xdjelakfinsalobicddrypfnspe5dqqfni3v6q8j
	* Request Headers view source
	Accept: */*
	Accept-Encoding: grip, deflate, br
	Accept-Language: zh-Oi, zh;q=0.9
	Connection: keep-alive
	Content-Length: 61
	Content-Type: application/json
	Cookie locale=th-cn; user_time_e_lang=; user_digital_format=NICXE3N238.08; timezone=; delimiter=:; format=yyyy=YM-dHI20HHSAmMSAss; timemode=server; timezoneoffset=488; user_time_show_dst=1; XSHF=TOKE9=
1 / 2 requests 822 8 / 922 8 transferred 68 8 / 103 8 resources	

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

02-getStationList		Save
-		
	2// HOST 1/ 2/ DOFT 1/ PATH 1/2* DUERY II	
POST • A https://	0.21.64.126/thirdData/getStationList	A Send
QUERY P	ARAMETERS length: 45 byte(	)
EADERS <sup>(1)</sup> I		Form +
XSRF-TOKEN	: x-mkc4ll9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjsvy1j1f6r7zhcakdeqruq6mbss8rv86rvyhgs7anphc5lepejzfw6qtl880b	k4oa8be ×
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#### 3.2.2.2 Logout API

#### **API Description**

If you want the XSRF-TOKEN to expire immediately, you can call this API.

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Access Restrictions**

Maximum number of API calls for each API account: five times every 10 minutes.

You are advised to call this API only when necessary.

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

#### **Request Parameters**

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

#### **Response Packet**

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message String		-
data		Returned data	Object	-

#### Example

Request example:

```
{
"xsrfToken":"x-
```

apepjy1fpd2ptete1f7zuqimep7wuqen9hkb3xaourelbyrx9jio7s09hgk6ca2mdlksjdglasdhjaklsdfhhdsahwedyuio qwehjkd" }

Response example:

Example 1: successful logout

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

	"currentTime":1503046597854
}	}, "message":null
E	xample 2: failed logout
{	"data":null, "success":false, "failCode":20004, "params":{ "currentTime":1503046597854 }, "message":null
I	
	Logout example:
	16-logout METHOD SCHEME_// HOST [ ' * PORT ] [ PATH [ * * QUERY ]]
	POST
	NEADERS 11
	Content-Type : application/json × 2 1 f raref Token': "x=nkc 42
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16-logout         SCHEME // HOST [ ^* PORT ] [ PATH [ 7' QUEW ]]           Vertico         SCHEME // HOST [ ^* PORT ] [ PATH [ 7' QUEW ]]           POST <ul> <li>Integr// 10.21.64.126/thirdData/coord</li> </ul>		Save -
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Content-Type : application/json	× 2 (xrfToken': 'x-mkc4il9glier2k6106bv9cpgpdqm6qdf1g89s5fypirsqqlerusalgnzig7xjsvy1j1f6r7shcakds	eqruq6mbss8nv86nyhgs7aa
+ Add header $P$ Add authorization		
	Text JSON XML HTML   > Format body   C Enable body evaluation	e length: 150 bytes
Persona		
Response	Cache Detect	ed - Elapsed Time: 577ms
> BODY ①		pretty 👻
<pre>     K     data : null, success : true, failCode : 0, params : {]</pre>	, message : null_}	
lines nums		length: 68 bytes
<pre>w General Request URL: https://10.21.64.126/thirdData/logout</pre>		
Request OKI_nttps://laile+ile/thirdusts/idgout Request Method: POST Status Code: ● 200 0K		
Remote Address: 10.21.64.126:443 Referent Policy: strict-origin-when-cross-origin		
Response Headers (12)		
Request Headers view source     Accept: */*		
Accept-Encoding: gzip, deflate, br Accept-Language: zh-CN,zh;q=0.9		
Connection: keep-alive Content-Length: 150		
Content Type: application/json Conkie: XSE-TOKENux-mkr4il9glier2k6186bv9rngndom6odflg8955fvpirsoplerusalgnz1g7zis	yljlf6r7zhcakdeqruq6mbss8nv86nyhgs7anphc5lepejzfw6qtj880bk4oa8beq; user_time_a_lang=; user_digital_format=%2C%23%230.00; timezone	es: delimitera-: formatavvvv
-HN-dd%20HH%3Amm%3Ass; timemode=server; timezoneoffset=480; user_time_show_dst=1; 1		
Host: 10.21.64.126		
Origin: chrome-extension://aejoelaoggembcahagimdiliamlcdmfm Sec-Fetch-Dest: empty		
Sec-Fetch-Mode: cors		
Sec-Fetch-Site: none		
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, 11	e Gecko) Chrome/87.0.4280.88 Səfəri/537.36	
* Request Payload view parsed		
{ "xsrfToken":"x-mkc4i19glier1k6106bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnzig7zjsvy1;	1f6r7zhcakdeqruq6mbssBnv8Gnyhgs7anphc5lepejzfw6qtj800044oaBbeq"	

#### 3.2.3 Calling an API

#### **API Access**

https://Domain name of the management system/specific API name+access request parameters

#### **Access Process**

Log in to the API on the third-party system and obtain the xsrf-token used for identity authentication. The xsrf-token must be carried when specific data is accessed. The third-party app calls APIs to access the specific data as required in the following process.



#### **Access Example**

- Step 1 Create an API account on the management system and bind the account to a PV plant. For details, see 3.2.1 Obtaining an Account.
- **Step 2** Obtain the login credential xsrf-token by referring to **3.2.2.1 Login API**. The xsrftoken can be reused if it is valid. For details about the validity period of the xsrftoken, see **API Description**.
- Step 3 Content-Type: application/json

Enter the login credential xsrf-token in the request header to access the corresponding API to obtain data.

POST • https://	\$@P) \${PORT}/thirdData/stations				of Send
+ QUERY	PARAMETERS			length: 40 shards	45 byte(s)
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## **4** Flow Control Description

The system provides the API flow control mechanism to prevent system performance deterioration caused by improper API invoking. If the maximum flow volume is exceeded, this API cannot be called and the error code 407 is returned.

#### NOTICE

The flow control mechanism may be modified with the system evolution in the future without notice. Obtain the latest API document to view the API flow control mechanism.

When the API flow is limited, the system displays the reason for the flow control through the error code (failCode). Wait until the API returns a normal response and call the API again.

- Error code 407: The number of API calls of a single user exceeds the upper limit. For details about the limits on API calls, see "Access Restrictions" in the corresponding API description. When this error code is returned by an API, lower your frequency of calls to this API until the frequency drops to the allowed range.
- Error code 403/429: When a large number of users initiate calls to the same API, the total number of calls to the API exceeds the upper limit at the system level. If this error message is received, wait for 1 minute and try again. If the error persists, wait for a longer time and try again. You can also minimize the number of calls.

Northbound open APIs support the following access modes. For details about flow control in OAuth Connect mode, see **4.1 Flow Control Policy in OAuth Connect Mode**. For details about flow control using an API account, see **4.2 Flow Control Using the API Account**.

#### 4.1 Flow Control Policy in OAuth Connect Mode

The API flow control is accumulated based on the API category. Call APIs properly based on the flow control description.

API Categor y	Flow Control Description
Basic APIs	1000 times/day/owner. The number of flow control times is counted independently for each owner. Example:
	<ul> <li>If an owner authorizes a third-party app, the third-party app can access the owner's resources through the API for up to 1000 times a day.</li> </ul>
	• If 100 owners authorize a third-party app, the third-party app can access the resources of each owner through the API for up to 1000 times a day.
Control APIs	100 times/day/owner. The number of flow control times is counted independently for each owner. Example:
	<ul> <li>If an owner authorizes a third-party app, the third-party app can access the owner's resources through the API for up to 100 times a day.</li> </ul>
	• If 100 owners authorize a third-party app, the third-party app can access the resources of each owner through the API for up to 100 times a day.

### 4.2 Flow Control Using the API Account

The following table describes the flow control of unrestricted northbound APIs. Call APIs properly based on the flow control description.

API Cat ego ry	API Label	API Name	Flow Control Description
Bas ic API s	Basic data	Plant list	<ul> <li>Maximum number of API calls for each API account per day = Roundup (Number of plants/100) x 10 + 24</li> <li>Example:</li> <li>If an API account manages 20 plants, the maximum number of API calls per day = Roundup (20/100) x 10 + 24 = 1 x 10 + 24 = 34.</li> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) x 10 + 24 = 2 x 10 + 24 = 44.</li> </ul>

API Cat ego ry	API Label	API Name	Flow Control Description
		Device list	<ul> <li>Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account per day = Roundup (Number of plants/100) + 24</li> <li>Example:</li> <li>If an API account manages 20 plants, the maximum number of API calls per day = Device (20(102) + 24)</li> </ul>
			<ul> <li>Roundup (20/100) + 24 = 1 + 24 = 25.</li> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.</li> </ul>
	Moni torin g data	Real-time plant data	Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account every 5 minutes = Roundup (Number of plants/100) Example:
			<ul> <li>If an API account manages 20 plants: Maximum number of API calls every 5 minutes = Roundup (20/100) = 1</li> </ul>
			<ul> <li>If an API account manages 120 plants: Maximum number of API calls for each API account every five minutes = Roundup (120/100) = 2</li> </ul>

API Cat ego ry	API Label	API Name	Flow Control Description
		Real-time device data	Flow control is performed based on the number of devices of each type managed by an API account. Maximum number of API calls for each API account every 5 minutes = $\Sigma$ Roundup (Number of devices of each type/100).
			Example:
			<ul> <li>If an API account manages 20 inverters and 20 meters, the maximum number of API calls every 5 minutes is calculated as follows: Inverters: Roundup (20/100) = 1</li> </ul>
			Meters: Roundup (20/100) = 1
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 1 + 1 = 2
			<ul> <li>If an API account manages 120 inverters and 120 meters, the maximum number of API calls every 5 minutes is calculated as follows: Inverters: Roundup (120/100) = 2</li> </ul>
			Meters: Roundup (120/100) = 2
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 2 + 2 = 4

API Cat ego ry	API Label	API Name	Flow Control Description
		Historical device data	Flow control is performed based on the number of devices of each type managed by an API account. Maximum number of API calls for each API account per day = $\Sigma$ Roundup (Number of devices of each type/10) + 24.
		<ul> <li>Example:</li> <li>If an API account manages 20 inverters meters, the maximum number of API caday is calculated as follows: Inverters: Roundup (20/10) = 2</li> </ul>	
			Meters: Roundup (20/10) = 2 Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 2 + 2 + 24 = 28
			<ul> <li>If an API account manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (120/10) = 12</li> </ul>
			Meters: Roundup (120/10) = 12
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 12 + 12 + 24 = 48

API Cat ego ry	API Label	API Name	Flow Control Description
	Alar m data	Querying active alarms	Flow control is performed based on the number of plants managed by API accounts and the number of devices of each type.
			Maximum number of API calls for each API account every 30 minutes = MAX (Roundup (Number of plants/100), $\Sigma$ Roundup (Number of devices of each type/100))
			Example:
			<ul> <li>If an API account manages 20 plants, 20 inverters, and 20 meters, the maximum number of API calls every 30 minutes is calculated as follows:</li> </ul>
			Roundup (Number of plants/100) = Roundup (20/100) = 1
			$\Sigma$ Roundup (Number of devices of each type/100) = Number of inverters + Number of meters = Roundup (20/100) + Roundup (20/100) = 1 + 1 = 2
			Total: MAX (1,2) = 2
			<ul> <li>If an API account manages 120 plants, 120 inverters, and 120 meters, the maximum number of API calls every 30 minutes is calculated as follows:</li> </ul>
			Roundup (Number of plants/100) = Roundup (120/100) = 2
			$\Sigma$ Roundup (Number of devices of each type/100) = Number of inverters + Number of meters = Roundup (120/100) + Roundup (120/100) = 2 + 2 = 4
Total: MAX (2,4) = 4		Total: MAX (2,4) = 4	
	Repo Hourly pla rt data data		Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account per day = Roundup (Number of plants/100) + 24 Example:
			<ul> <li>If an API account manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.</li> </ul>
			<ul> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.</li> </ul>

API Cat ego ry	API Label	API Name	Flow Control Description
		Daily plant data	<ul> <li>Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account per day = Roundup (Number of plants/100) + 24</li> <li>Example:</li> <li>If an API account manages 20 plants, the</li> </ul>
			<ul> <li>maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.</li> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.</li> </ul>
		Monthly plant data	Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account per day = Roundup (Number of plants/100) + 24 Example:
			<ul> <li>If an API account manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.</li> </ul>
maximum number of API calls pe		<ul> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.</li> </ul>	
		Yearly plant data	Flow control is performed based on the number of plants managed by API accounts. Maximum number of API calls for each API account per day = Roundup (Number of plants/100) + 24
			<ul> <li>Example:</li> <li>If an API account manages 20 plants, the maximum number of API calls per day = Roundup (20/100) + 24 = 1 + 24 = 25.</li> </ul>
			<ul> <li>If an API account manages 120 plants, the maximum number of API calls per day = Roundup (120/100) + 24 = 2 + 24 = 26.</li> </ul>

API Cat ego ry	API Label	API Name	Flow Control Description
		Daily device data	Flow control is performed based on the number of devices of each type managed by an API account. Maximum number of API calls for each API account per day = $\Sigma$ Roundup (Number of devices of each type/100) + 24.
			Example:
			<ul> <li>If an API account manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (20/100) = 1</li> </ul>
			Meters: Roundup (20/100) = 1
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 1 + 1 + 24 = 26
			<ul> <li>If an API account manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (120/100) = 2</li> </ul>
			Meters: Roundup (120/100) = 2
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 2 + 2 + 24 = 28

API Cat ego ry	API Label	API Name	Flow Control Description
		Monthly device data	Flow control is performed based on the number of devices of each type managed by an API account. Maximum number of API calls for each API account per day = $\Sigma$ Roundup (Number of devices of each type/100) + 24.
			Example:
			<ul> <li>If an API account manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (20/100) = 1</li> </ul>
			Meters: Roundup (20/100) = 1
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 1 + 1 + 24 = 26
			<ul> <li>If an API account manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (120/100) = 2</li> </ul>
			Meters: Roundup (120/100) = 2
			Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 2 + 2 + 24 = 28

API Cat ego ry	API Label	API Name	Flow Control Description
	Yearly device data       Flow control is performed based on t devices of each type managed by an Maximum number of API calls for ea account per day = ∑ Roundup (Numb of each type/100) + 24.         Example:       • If an API account manages 20 invo meters, the maximum number of day is calculated as follows: Inverters: Roundup (20/100) = 1 Meters = 1 + 1 + 24 = 26         • If an API account manages 120 im 120 meters, the maximum number of API call inverters + Maximum number of API call inverters = 1 + 1 + 24 = 26         • If an API account manages 120 im 		<ul> <li>Example:</li> <li>If an API account manages 20 inverters and 20 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (20/100) = 1 Meters: Roundup (20/100) = 1 Total: Maximum number of API calls for inverters + Maximum number of API calls for meters = 1 + 1 + 24 = 26</li> <li>If an API account manages 120 inverters and 120 meters, the maximum number of API calls per day is calculated as follows: Inverters: Roundup (120/100) = 2</li> </ul>
Con trol API s	Batte ry confi gurat ion	Delivering battery charge/ discharge tasks	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
		Querying battery charge/ discharge tasks	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
	Invert er activ e powe r contr ol	API for delivering an inverter active power setting task	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.

API Cat ego ry	API Label	API Name	Flow Control Description
		API for querying an inverter active power setting task	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
	Settin API for g the Delivering batte Task for ry Setting th worki Battery ng Working mode Mode		Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
		API for Querying a Task for Setting the Battery Working Mode	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
	Batte ry para mete r settin g	API for Delivering a Task for Setting Battery Parameters	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.
		API for Querying a Task for Setting Battery Parameters	Call the API only when necessary to reduce the access frequency. For the same plant, do not call this API repeatedly before a task is complete. Maximum number of API calls for each API account: once per minute.

# **5** API Reference

#### 5.1 Basic APIs

Allow you to obtain the real-time monitoring, report, and alarm data of plants and devices for system monitoring, O&M, and data analysis.

#### 5.1.1 Basic

#### 5.1.1.1 Plant List API

#### **API Description**

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

#### **▲** CAUTION

If no data is queried or only some data is returned when the plant list API is used, rectify the fault by referring to 8.3 Why Is No Data or Only Part of Data Found When I Call a Northbound API for Data Query?

If the returned plant ID is inconsistent with that displayed on the SmartPVMS, rectify the fault by referring to **8.8 Why Is the Plant ID Returned by the Plant List Inconsistent with That Displayed on the SmartPVMS?** 

If the plant IDs returned vary depending on open API users, rectify the fault by referring to 8.9 Why Do the Plant IDs Returned for the Same Plant Vary Depending on Open API Users?

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
pageNo	Page No. of the results	Integer	Mandato ry
gridConnect edStartTime	Grid connection start time (ms)	Long	Optional
gridConnect edEndTime	Grid connection end time (ms)	Long	Optional

#### **Response Packet**

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
message	Optional response message	-	-
data	Returned data, which contains the following information:	Мар	-
> total	Total number of results	Long	-
> pageCount	Total number of pages	Long	-
> pageNo	Page No. of the results	Integer	-

Parameter	Description	Data Type	Remarks
> pageSize	Number of query results displayed on each page	Integer	-
> list	Plant information list. The plant information is as follows:	List	Plant information
>> plantCode	Plant ID, which uniquely identifies a plant.	String	-
>> plantName	Plant name	String	-
>> plantAddress	Detailed address of the plant	String	-
>> longitude	Plant longitude	Double	-
>> latitude	Plant latitude	Double	-
>> capacity	Total string capacity	Double	kWp
>> contactPerson	Plant contact	String	-
>> contactMethod	Contact information of the plant contact, such as the mobile phone number or email address	String	-
>> gridConnectionD ate	Grid connection time of the plant, including the time zone	String	2020-02-06T00:00:0 0+08:00

#### Examples

Request example:

```
{

"pageNo": 1,

"gridConnectedStartTime":1664718569000,

"gridConnectedEndTime":1667396969000

}
```

Response examples:

Example 1: An error code is returned.

```
{

"success": false,

"data": null,

"failCode": 20605,

"message": "The time cannot be a negative number."

}
```

Example 2: The plant list data is returned.

{
 "success": true,

```
"data": {
 "list": [
  {
    "plantCode": "NE=12345678",
"plantName": "NMplant1",
    "plantAddress": null,
    "longitude": null,
    "latitude": null,
"capacity": 146.5,
    "contactPerson": ""
    "contactMethod": ""
    "gridConnectionDate": "2022-11-21T16:23:00+08:00"
  },
   {
    "plantCode": "NE=23456789",
    "plantName": "plant2",
    "plantAddress": null,
    "longitude": null,
    "latitude": null,
    "capacity": 123.3,
    "contactPerson": ""
    "contactMethod": ""
    "gridConnectionDate": "2022-11-21T16:30:28-12:00"
  }
 ],
  "pageCount": 1,
 "pageNo": 1,
 "pageSize": 100,
 "total": 2
},
"failCode": 0,
"message": "get plant list success"
}
```

#### 5.1.1.2 Device List API

#### **API Description**

This API is used to obtain basic device information. Before invoking other APIs to obtain device data, you need to call this API to obtain the device ID.

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

#### 

If no data is queried or only some data is returned when the device list API is used, rectify the fault by referring to 8.3 Why Is No Data or Only Part of Data Found When I Call a Northbound API for Data Query?

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry

#### **Response Packet**

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag <b>true</b> : The request succeeded. <b>false</b> : The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For definitions of other error codes, see <b>6.1 Error Code</b> <b>List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the object parameter list of each device.	List	-
	id	Device ID	Long	-
	devDn	Unique device ID in the system	String	
	devName	Device name	String	-
	stationCode	Plant ID	String	-

esnCodeDevice SNString-devTypeldDevice type ID The following device types are supported: 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet data logger 38: residential inverter 39: battery 40: backup box 41: ESS 45: PLC 46: optimizer 47: power sensor 62: Dongle 63: distributed SmartLogger 70: safety box 60001: mains 60003: genset 60003: genset 60003: genset 60004: SSU group 60044: SSU 60001: mains 60003: genset 60012: Dorgle 70: safety power converter 60014: lithium battery rack 60010: AC output power distribution 23070: EMMAString-softwareVersionSoftware versionString-optimizerNumber unvTypeQuantity of optimizers Norter Inverter model (only applicable to inverters)String-longitudeLongitudeLongitudeDouble-	Paramet	ter	Description	Data Type	Remark s
The following device types are supported:The following device types are supported:1: string inverter2: SmartLogger8: STS10: EMI13: protocol converter16: general device17: grid meter22: PID37: Pinnet data logger38: residential inverter39: battery40: backup box41: ESS45: PLC46: optimizer47: power sensor62: Dongle63: distributed SmartLogger 70: safety box 60001: mains 60003: genset 60003: genset 		esnCode	Device SN	String	-
60010: AC output power distribution 23070: EMMA-softwareVersionSoftware versionStringoptimizerNumberQuantity of optimizersIntegerinvTypeInverter model (only applicable to inverters)String			Device type ID The following device types are supported: 1: string inverter 2: SmartLogger 8: STS 10: EMI 13: protocol converter 16: general device 17: grid meter 22: PID 37: Pinnet data logger 38: residential inverter 39: battery 40: backup box 41: ESS 45: PLC 46: optimizer 47: power sensor 62: Dongle 63: distributed SmartLogger 70: safety box 60001: mains 60003: genset 60044: SSU 60092: power converter		
distribution 23070: EMMAdistribution 23070: EMMAsoftwareVersionSoftware versionStringoptimizerNumberQuantity of optimizersIntegerinvTypeInverter model (only applicable to inverters)String			60014: lithium battery rack		
softwareVersionSoftware versionStringoptimizerNumberQuantity of optimizersIntegerinvTypeInverter model (only applicable to inverters)String			distribution		
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invType Inverter model (only applicable to inverters) String -				-	-
applicable to inverters)		optimizerNumber		Integer	
longitude Longitude –		invType		String	-
		longitude	Longitude	Double	-

Paramet	ter	Description	Data Type	Remark s
	latitude	Latitude	Double	-

#### **Examples**

Request example:

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

Response examples:

Example 1: An error code is returned.

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

Example 2: The device list is returned.

```
"success":true,
  "data":[
    {
       "id":-214543629611879,
       "devDn":"NE=45112560",
       "devName":"5fbfk4",
       "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
       "esnCode":"5fbfk4",
       "devTypeId":1,
       "softwareVersion":"V100R001PC666",
       "invType":"SUN2000-17KTL",
       "longitude":null,
       "latitude":null
    },
    {
       "id":-214091680973855,
       "devDn":"NE=4511256",
       "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
}
```

#### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:



#### 5.1.2 Monitoring

#### 5.1.2.1 Real-Time Plant Data API

#### **API Description**

This API 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 through this API, see the realtime plant data list below.

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry

#### **Response Packet**

Parame	ter	Description	Туре	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter	String	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the real-time data object list of each plant.	List	-
	stationCode	Plant ID	String	-
	dataltemMap	Content of each data item, which is returned in the key- value format. For details about the data item list, see the real-time plant data list below.	Мар	-

Real-Time Plant Data List

Кеу	Name	Unit	Return Value Type
day_power	Yield today	kWh	Double
month_power	Yield this month	kWh	Double
total_power	Total yield	kWh	Double
day_income	Revenue today	The currency specified in the management system	Double
total_income	Total revenue	The currency specified in the management system	Double
real_health_state	Plant health status The following plant health states are supported: 1: disconnected 2: faulty 3: healthy	None	Integer

#### Example

Request example:

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

Response example:

ł

{

Example 1: An error code is returned.

```
"success":false,
  "data":null,
  "failCode":20009,
  "params":{
     "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
    "currentTime":1503046597854
  },
"message":null
3
```

Example 2: Real-time plant data is returned.

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

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

#### **NOTE**

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

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#### 5.1.2.2 Real-Time Device Data API

#### **API Description**

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

For details about the data list that can be queried through this API, see the realtime device data list below.

#### **Request URL**

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

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
devlds	List of device IDs. The device IDs are obtained from <b>id</b> in <b>5.1.1.2 Device List</b> <b>API</b> . Use commas (,) to separate multiple device IDs. Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional

Parameter	Description	Data Type	Mandato ry/ Optional
devTypeld	Device type ID. The values of <b>devTypeld</b> obtained in <b>5.1.1.2 Device List API</b> are used.	Integer	Mandato ry
	The following device types are supported:		
	1: string inverter		
	10: EMI		
	17: grid meter		
	38: residential inverter		
	39: battery		
	41: ESS		
	47: power sensor		
	60001: mains		
	60003: genset		
	60043: SSU group		
	60044: SSU		
	60092: power converter		
	60014: lithium battery rack		
	60010: AC output power distribution		

#### **Response Packet**

Parameter		Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param s	Parameters	-	-	-
	devIds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-

Parameter		Description	Data Type	Remark s
	devTypeId	Device type ID in the request parameter	Integer	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the real-time data object list of each device.	List	-
	devld	Device ID	Long	-
	sn	Device SN	String	
	dataltemMap	Content of data items, which are returned in the key-value format. Content of each data item, which is returned in the key-value format. The data item content varies depending on the device type. For details about the data item list, see the real-time device data list below.	Мар	Real- time device data

#### Real-Time Device Data List

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
ID: 1 String inverter	inverter_state	Inverter state. For details, see <b>Table 5-1</b> .	None	Do ubl e	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage	V	Do ubl e	
	b_u	Phase B voltage	V	Do ubl e	
	c_u	Phase C voltage	V	Do ubl e	
	a_i	Phase A current of grid	A	Do ubl e	
	b_i	Phase B current of grid	A	Do ubl e	
	c_i	Phase C current of grid	A	Do ubl e	
	efficiency	Inverter conversion efficiency (manufacturer)	%	Do ubl e	
	temperature	Internal temperature	°C	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	elec_freq	Grid frequency	Hz	Do ubl e	
	active_power	Active power	kW	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	reactive_power	Output reactive power	kVar	Do ubl e	
	day_cap	Yield today	kWh	Do ubl e	
	mppt_power	MPPT total input power	kW	Do ubl e	
	pv1_u	PV1 input voltage	V	Do ubl e	
	pv2_u	PV2 input voltage	V	Do ubl e	
	pv3_u	PV3 input voltage	V	Do ubl e	
	pv4_u	PV4 input voltage	V	Do ubl e	
	pv5_u	PV5 input voltage	V	Do ubl e	
	pv6_u	PV6 input voltage	V	Do ubl e	
	pv7_u	PV7 input voltage	V	Do ubl e	
	pv8_u	PV8 input voltage	V	Do ubl e	
	pv9_u	PV9 input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv10_u	PV10 input voltage	V	Do ubl e	
	pv11_u	PV11 input voltage	V	Do ubl e	
	pv12_u	PV12 input voltage	V	Do ubl e	
	pv13_u	PV13 input voltage	V	Do ubl e	
	pv14_u	PV14 input voltage	V	Do ubl e	
	pv15_u	PV15 input voltage	V	Do ubl e	
	pv16_u	PV16 input voltage	V	Do ubl e	
	pv17_u	PV17 input voltage	V	Do ubl e	
	pv18_u	PV18 input voltage	V	Do ubl e	
	pv19_u	PV19 input voltage	V	Do ubl e	
	pv20_u	PV20 input voltage	V	Do ubl e	
	pv21_u	PV21 input voltage	V	Do ubl e	
Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
-------------	--------	-----------------------	------	-------------------------------------	---------
	pv22_u	PV22 input voltage	V	Do ubl e	
	pv23_u	PV23 input voltage	V	Do ubl e	
	pv24_u	PV24 input voltage	V	Do ubl e	
	pv25_u	PV25 input voltage	V	Do ubl e	
	pv26_u	PV26 input voltage	V	Do ubl e	
	pv27_u	PV27 input voltage	V	Do ubl e	
	pv28_u	PV28 input voltage	V	Do ubl e	
	pv1_i	PV1 input current	A	Do ubl e	
	pv2_i	PV2 input current	A	Do ubl e	
	pv3_i	PV3 input current	A	Do ubl e	
	pv4_i	PV4 input current	A	Do ubl e	
	pv5_i	PV5 input current	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv6_i	PV6 input current	A	Do ubl e	
	pv7_i	PV7 input current	A	Do ubl e	
	pv8_i	PV8 input current	A	Do ubl e	
	pv9_i	PV9 input current	A	Do ubl e	
	pv10_i	PV10 input current	A	Do ubl e	
	pv11_i	PV11 input current	A	Do ubl e	
	pv12_i	PV12 input current	A	Do ubl e	
	pv13_i	PV13 input current	A	Do ubl e	
	pv14_i	PV14 input current	A	Do ubl e	
	pv15_i	PV15 input current	A	Do ubl e	
	pv16_i	PV16 input current	A	Do ubl e	
	pv17_i	PV17 input current	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv18_i	PV18 input current	A	Do ubl e	
	pv19_i	PV19 input current	A	Do ubl e	
	pv20_i	PV20 input current	A	Do ubl e	
	pv21_i	PV21 input current	A	Do ubl e	
	pv22_i	PV22 input current	A	Do ubl e	
	pv23_i	PV23 input current	A	Do ubl e	
	pv24_i	PV24 input current	A	Do ubl e	
	pv25_i	PV25 input current	A	Do ubl e	
	pv26_i	PV26 input current	A	Do ubl e	
	pv27_i	PV27 input current	A	Do ubl e	
	pv28_i	PV28 input current	A	Do ubl e	
	total_cap	Total yield	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	open_time	Inverter startup time	ms	Do ubl e	
	close_time	Inverter shutdown time	ms	Do ubl e	
	mppt_total_cap	Total DC input energy	kWh	Do ubl e	
	mppt_1_cap	MPPT 1 DC total yield	kWh	Do ubl e	
	mppt_2_cap	MPPT 2 DC total yield	kWh	Do ubl e	
	mppt_3_cap	MPPT 3 DC total yield	kWh	Do ubl e	
	mppt_4_cap	MPPT 4 DC total yield	kWh	Do ubl e	
	mppt_5_cap	MPPT 5 DC total yield	kWh	Do ubl e	
	mppt_6_cap	MPPT 6 DC total yield	kWh	Do ubl e	
	mppt_7_cap	MPPT 7 DC total yield	kWh	Do ubl e	
	mppt_8_cap	MPPT 8 DC total yield	kWh	Do ubl e	
	mppt_9_cap	MPPT 9 DC total yield	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	mppt_10_cap	MPPT 10 DC total yield	kWh	Do ubl e	
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
ID: 38 Residential inverter	inverter_state	Inverter state. For details, see <b>Table 5-1</b> .	None	Do ubl e	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage	V	Do ubl e	
	b_u	Phase B voltage	V	Do ubl e	
	c_u	Phase C voltage	V	Do ubl e	
	a_i	Phase A current of grid	A	Do ubl e	
	b_i	Phase B current of grid	A	Do ubl e	
	c_i	Phase C current of grid	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	efficiency	Inverter conversion efficiency (manufacturer)	%	Do ubl e	
	temperature	Internal temperature	°C	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	elec_freq	Grid frequency	Hz	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	reactive_power	Output reactive power	kVar	Do ubl e	
	day_cap	Yield today	kWh	Do ubl e	
	mppt_power	MPPT total input power	kW	Do ubl e	
	pv1_u	PV1 input voltage	V	Do ubl e	
	pv2_u	PV2 input voltage	V	Do ubl e	
	pv3_u	PV3 input voltage	V	Do ubl e	
	pv4_u	PV4 input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv5_u	PV5 input voltage	V	Do ubl e	
	pv6_u	PV6 input voltage	V	Do ubl e	
	pv7_u	PV7 input voltage	V	Do ubl e	
	pv8_u	PV8 input voltage	V	Do ubl e	
	pv1_i	PV1 input current	A	Do ubl e	
	pv2_i	PV2 input current	A	Do ubl e	
	pv3_i	PV3 input current	A	Do ubl e	
	pv4_i	PV4 input current	A	Do ubl e	
	pv5_i	PV5 input current	A	Do ubl e	
	pv6_i	PV6 input current	A	Do ubl e	
	pv7_i	PV7 input current	A	Do ubl e	
	pv8_i	PV8 input current	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	total_cap	Total yield	kWh	Do ubl e	
	open_time	Inverter startup time	ms	Do ubl e	
	close_time	Inverter shutdown time	ms	Do ubl e	
	mppt_1_cap	MPPT 1 DC total yield	kWh	Do ubl e	
	mppt_2_cap	MPPT 2 DC total yield	kWh	Do ubl e	
	mppt_3_cap	MPPT 3 DC total yield	kWh	Do ubl e	
	mppt_4_cap	MPPT 4 DC total yield	kWh	Do ubl e	
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
ID: 10 Environment al	temperature	Temperature	°C	Do ubl e	
monitoring instrument (EMI)	pv_temperature	PV temperature	°C	Do ubl e	
	wind_speed	Wind speed	m/s	Do ubl e	
	wind_direction	Wind direction	Degree	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	radiant_total	Daily irradiation	MJ/m <sup>2</sup>	Do ubl e	
	radiant_line	Irradiance	W/m <sup>2</sup>	Do ubl e	
	horiz_radiant_lin e	Horizontal irradiance	W/m <sup>2</sup>	Do ubl e	Invalid field. The default value is <b>null</b> .
	horiz_radiant_tot al	Horizontal irradiation	MJ/m <sup>2</sup>	Do ubl e	Invalid field. The default value is <b>null</b> .
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
ID: 17 Grid meter	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage (AC output)	V	Do ubl e	
	b_u	Phase B voltage (AC output)	V	Do ubl e	
	c_u	Phase C voltage (AC output)	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	a_i	Phase A current of grid (IA)	A	Do ubl e	
	b_i	Phase B current of grid (IB)	A	Do ubl e	
	c_i	Phase C current of grid (IC)	A	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	active_cap	Active energy (positive active energy)	kWh	Do ubl e	
	reactive_power	Reactive power	kVar	Do ubl e	
	reverse_active_c ap	Negative active energy	kWh	Do ubl e	
	forward_reactive _cap	Positive reactive energy	kWh	Do ubl e	
	reverse_reactive_ cap	Negative reactive energy	kWh	Do ubl e	
	active_power_a	Active power PA	kW	Do ubl e	
	active_power_b	Active power PB	kW	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	active_power_c	Active power PC	kW	Do ubl e	
	reactive_power_ a	Reactive power QA	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ b	Reactive power QB	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ c	Reactive power QC	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	total_apparent_p ower	Total apparent power	kVA	Do ubl e	
	grid_frequency	Grid frequency	Hz	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p eak	Negative active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p ower	Negative active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	reverse_active_v alley	Negative active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_t op	Negative active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p eak	Positive active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p ower	Positive active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_v alley	Positive active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_t op	Positive active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ peak	Negative reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ power	Negative reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	reverse_reactive_ valley	Negative reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ top	Negative reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _peak	Positive reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _power	Positive reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _valley	Positive reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _top	Positive reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
ID: 47 Power sensor	meter_status	Meter state (0: offline; 1: normal)	None	Do ubl e	
	meter_u	Phase A voltage (AC output)	V	Do ubl e	
	meter_i	Phase A current of grid (IA)	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	active_power	Active power	W	Do ubl e	
	reactive_power	Reactive power	Var	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	grid_frequency	Grid frequency	Hz	Do ubl e	
	active_cap	Active energy (positive active energy)	kWh	Do ubl e	
	reverse_active_c ap	Negative active energy	kWh	Do ubl e	
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	
	ca_u	C-A line voltage of grid	V	Do ubl e	
	b_u	Phase B voltage (AC output)	V	Do ubl e	
	c_u	Phase C voltage (AC output)	V	Do ubl e	

Device Type	Key	Name	Unit	Ret urn Val ue Typ e	Remarks
	b_i	Phase B current of grid (IB)	A	Do ubl e	
	c_i	Phase C current of grid (IC)	A	Do ubl e	
	forward_reactive _cap	Positive reactive energy	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ cap	Negative reactive energy	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	active_power_a	Active power PA	kW	Do ubl e	
	active_power_b	Active power PB	kW	Do ubl e	
	active_power_c	Active power PC	kW	Do ubl e	
	reactive_power_ a	Reactive power QA	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ b	Reactive power QB	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Key	Name	Unit	Ret urn Val ue Typ e	Remarks
	reactive_power_ c	Reactive power QC	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	total_apparent_p ower	Total apparent power	kVA	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p eak	Negative active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p ower	Negative active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_v alley	Negative active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_t op	Negative active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p eak	Positive active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p ower	Positive active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_active_v alley	Positive active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_t op	Positive active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ peak	Negative reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ power	Negative reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ valley	Negative reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ top	Negative reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _peak	Positive reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _power	Positive reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_reactive _valley	Positive reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _top	Positive reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
ID: 39 Residential battery	battery_status	Battery running state (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Do ubl e	
	max_charge_po wer	Maximum charge power	W	Do ubl e	
	max_discharge_ power	Maximum discharge power	W	Do ubl e	
	ch_discharge_po wer	Charge/ Discharge power	W	Do ubl e	
	busbar_u	Battery voltage	V	Do ubl e	
	battery_soc	Battery SOC	%	Do ubl e	
	battery_soh	Battery SOH (supported only by LG batteries)	None	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	ch_discharge_m odel	Charge/ Discharge mode (0: none; 1: forced charge/ discharge; 2: time-of-use price; 3: fixed charge/ discharge; 4: automatic charge/ discharge; 5: fully fed to grid; 6: TOU; 7: remote scheduling-max. self- consumption; 8: remote scheduling-fully fed to grid; 9: remote scheduling-TOU; 10: EMMA)	None	Do ubl e	
	charge_cap	Charged energy	kWh	Do ubl e	
	discharge_cap	Discharged energy	kWh	Do ubl e	
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
ID: 41 C&I and utility ESS	ch_discharge_po wer	Charge/ Discharge power	W	Do ubl e	
	battery_soc	Battery SOC	%	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	battery_soh	Battery SOH	None	Do ubl e	
	charge_cap	Charged energy	kWh	Do ubl e	
	discharge_cap	Discharged energy	kWh	Do ubl e	
	run_state	State (0: Disconnected 1: Connected)	None	Lon g	
ID: 60001 Mains (supported only in the	mains_state	Mains status (0: mains unavailable; 1: mains available)	None	Do ubl e	
Power-M scenario)	ac_voltage	AC voltage	V	Do ubl e	
	ac_current	AC current	A	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	ac_frequency	AC frequency	Hz	Do ubl e	
	grid_quality_gra de	Power grid quality level (0: Unknown; 1: Class 1; 2: Class 2; 3: Class 3; 4: Class 4)	None	Do ubl e	
	total_energy_co nsumption	Total energy consumption	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	supply_duration_ per_total	Total power supply duration	h	Do ubl e	
ID: 60003 Genset (supported only in the	running_state	Running status (0: unknown; 1: stopped; 2: running)	None	Do ubl e	
Power-M scenario)	output_power	Output power	kW	Do ubl e	
	load_rate	Load rate	%	Do ubl e	
ID: 60043 SSU group (supported	total_output_cur rent	Total output current	A	Do ubl e	
only in the Power-M scenario)	total_output_po wer	Total output power	kW	Do ubl e	
D: 60044 SSU (supported	input_voltage	Input voltage	V	Do ubl e	
only in the Power-M scenario)	output_voltage	Output voltage	V	Do ubl e	
	output_current	Output current	A	Do ubl e	
	on_off_state	Power-on/off status (0: on; 1: off)	None	Do ubl e	
ID: 60092 Power converter (supported only in the Power-M scenario)	total_runtime	Total runtime	h	Do ubl e	
	pv_input_voltage	PV input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv_input_current	PV input current	A	Do ubl e	
	pv_input_power	PV input power	kW	Do ubl e	
	inverter_voltage	Inverter voltage	V	Do ubl e	
	inverter_frequen cy	Inverter frequency	Hz	Do ubl e	
	ac_output_volta ge	AC output voltage	V	Do ubl e	
	ac_output_curre nt	AC output current	A	Do ubl e	
	ac_output_frequ ency	AC output frequency	kW	Do ubl e	
	ac_output_appar ent_power	AC output apparent power	kVA	Do ubl e	
ID: 60014 Lithium battery rack (supported only in the Power-M scenario)	battery_state	Battery status (0: initial power-on; 1: power-off; 2: float charging; 3: boost charging; 3: boost charging; 5: charging; 6: testing; 7: hibernation; 8: standby)	None	Do ubl e	
	soc	SOC	%	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	charge_discharg e_power	Charge/ Discharge power	kW	Do ubl e	
	total_discharge	Total energy discharged	kWh	Do ubl e	
	voltage	Voltage	V	Do ubl e	
	current	Current	A	Do ubl e	
	remaining_back up_time	Remaining power reserve duration	h	Do ubl e	
	total_discharge_ times	Total discharge times	times	Do ubl e	
	total_capacity	Total capacity	kWh	Do ubl e	
ID: 60010 AC output power	ac_voltage	AC voltage	V	Do ubl e	
distribution (supported only in the Power-M scenario)	ac_current	AC current	A	Do ubl e	
	ac_frequency	AC frequency	Hz	Do ubl e	
	active_power	Active power	kW	Do ubl e	

State Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start
512	Grid-connected
513	Grid-connected: power limited
514	Grid-connected: self-derating
768	Shutdown: on fault
769	Shutdown: on command
770	Shutdown: OVGR
771	Shutdown: communication interrupted
772	Shutdown: power limited
773	Shutdown: manual startup required
774	Shutdown: DC switch disconnected
1025	Grid scheduling: cosψ-P curve
1026	Grid scheduling: Q-U curve
1280	Ready for terminal test
1281	Terminal testing
1536	Inspection in progress
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no irradiation
45056	Communication interrupted (written by SmartLogger)
49152	Loading (written by SmartLogger)

# Examples

Request example:

{

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

#### Example 1: An error code is returned.

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

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

```
{
  "success":true,
  "data":[
     {
        "dataItemMap":{
           "pv7_u":0,
           "pv1_u":0,
           "b_u":0,
           "c_u":0,
           "pv6_u":0,
           "temperature":0,
           "open_time":0,
           "b_i":0,
           "bc_u":0,
           "pv9_u":0,
           "pv8_u":0,
           "mppt_total_cap":0,
           "pv9_i":0,
           "mppt_3_cap":0,
           "run_state":0,
           "mppt_2_cap":0,
           "inverter_state":0,
           "pv8_i":0,
           "mppt_1_cap":0,
           "pv6_i":0,
          "mppt_power":0,
           "pv1_i":0,
           "total_cap":0,
           "ab_u":0,
           "pv7_i":0,
           "pv13_u":0,
           "reactive_power":0,
           "pv10_u":0,
           "pv12_i":0,
           "pv11_i":0,
           "pv3_i":0,
           "pv11_u":0,
           "pv2_i":0,
           "pv13_i":0,
           "power_factor":0,
           "pv12_u":0,
           "pv5_i":0,
           "active_power":0,
           "elec_freq":0,
           "pv10_i":0,
           "pv4_i":0,
           "mppt_4_cap":0,
           "mppt_5_cap":0,
           "mppt_6_cap":0,
```

"mppt\_7\_cap":0, "mppt\_8\_cap":0, "mppt\_9\_cap":0, "mppt\_10\_cap":0, "pv4\_u":0, "close\_time":0, "day\_cap":0, "ca\_u":0, "a\_i":0, "pv5\_u":0, "a\_u":0, "pv3\_u":0, "pv14\_u":0, "pv14\_i":0, "pv15\_u":0, "pv15\_i":0, "pv16\_u":0, "pv16\_i":0, "pv17\_u":0, "pv17\_i":0, "pv18\_u":0, "pv18\_i":0, "pv19\_u":0, "pv19\_i":0, "pv20\_u":0, "pv20\_i":0, "pv21\_u":0, "pv21\_i":0, "pv22\_u":0, "pv22\_i":0, "pv23\_u":0, "pv23\_i":0, "pv24\_u":0, "pv24\_i":0, "pv25\_u":0, "pv25\_i":0, "pv26\_u":0, "pv26\_i":0, "pv27\_u":0, "pv27\_i":0, . "pv28\_u":0, "pv28\_i":0, "efficiency":0, "pv2\_u":0 }, "devld":213472461631079 "dataItemMap":{ "pv7\_u":0, "pv1\_u":0, "b\_u":0, "c\_u":0, "pv6\_u":0, "temperature":0, "open\_time":0, "b\_i":0, "bc\_u":0, "pv9\_u":0, "pv8\_u":0, . "c\_i":0, "mppt\_total\_cap":0, "pv9\_i":0, "mppt\_3\_cap":0, "run\_state":0, "mppt\_2\_cap":0, "inverter\_state":0, "pv8\_i":0, "mppt\_1\_cap":0,

}, {

"pv6\_i":0, "mppt\_power":0, "pv1\_i":0, "total\_cap":0, "ab\_u":0, "pv7\_i":0, . "pv13\_u":0, "reactive\_power":0, "pv10\_u":0, . "pv12\_i":0, "pv11\_i":0, "pv3\_i":0, "pv11\_u":0, . "pv2\_i":0, "pv13\_i":0, "power\_factor":0, "pv12\_u":0, "pv5\_i":0, "active\_power":0, "elec\_freq":0, "pv10\_i":0, "pv4\_i":0, "mppt\_4\_cap":0, "mppt\_5\_cap":0, "mppt\_6\_cap":0, "mppt\_7\_cap":0, "mppt\_8\_cap":0, "mppt\_9\_cap":0, "mppt\_10\_cap":0, "pv4\_u":0, "close\_time":0, "day\_cap":0, "ca\_u":0, "a\_i":0, "pv5\_u":0, "a\_u":0, "pv3\_u":0, "pv14\_u":0, "pv14\_i":0, "pv15\_u":0, . "pv15\_i":0, "pv16\_u":0, "pv16\_i":0, "pv17\_u":0, "pv17\_i":0, "pv18 u":0, "pv18\_i":0, "pv19\_u":0, "pv19\_i":0, "pv20\_u":0, "pv20\_i":0, "pv21\_u":0, "pv21\_i":0, "pv22\_u":0, "pv22\_i":0, "pv23\_u":0, "pv23\_i":0, "pv24\_u":0, "pv24\_i":0, "pv25\_u":0, "pv25\_i":0, "pv26\_u":0, "pv26\_i":0, "pv27\_u":0, "pv27\_i":0, "pv28\_u":0, "pv28\_i":0, "efficiency":0, "pv2\_u":0

```
"devid":214060404588862

}

],

"failCode":0,

"params":{

    "devids":"214060404588862,213472461631079",

    "devTypeId":"1",

    "currentTime":1503046597854

},

"message":null
```

### 

3

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

09-getDevRealKpi			Save -	
METHOD SCHEME :// HO	IST [ "!" PORT ] [ PATH [ "?" QUERY ]]			
POST - B https://10.21.	.64.126/thirdData/getDevRealKpi		🚽 Send 📼	
			length: 44 byte(s)	
<ul> <li>QUERY PARAMI</li> </ul>	IETERS		angles ( ) su(s)	
HEADERS <sup>⑦</sup> I≙		Form + 4	4 ► BODY <sup>(1)</sup> Text ▼	
			1	
Content-Type	: application/json	×	2 "devIds" : "1000000033554447",	
		-	3 "devTypeId": 38	
XSRF-TOKEN	x-mkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7	zje ×		
+ Add header		8		
+ Add header P Add authorization		8		
			Text JSON XML HTML   > Format body   Z Enable body evaluation	
			Text Sabit Ame Hime   Promacody   Presidence obly evaluation   I rengul st bytes	· .
Response			Elapsed Time: 182ms	
200 OK				
▶ BODY <sup>③</sup>			pretty +	
			provy -	
€ • { data : [ { devId : 1	1000000033554447, dataItemMap : { pv1_u : 200.0, pv2_u :	200.0		
2	research arrange of her a restor her a	200103]		
<u>Ř</u>				
lines nums			length: 813 byte	18
* General				
Request URL: https://10.21.64.126/third	dData/getDevRealKpi			
Request Method: POST				
Status Code: 单 200 OK				
Remote Address: 10.21.64.126:443				
Referrer Policy: strict-origin-when-cross	s-origin			
Response Headers (12)				
Accept: */* Accept-Encoding: gzip, deflate, br				
Accept-Encoding: grip, deviate, br Accept-Language: zh-CN, zh;q=0.9				
Connection: keep-alive				
Content-Length: 51				
Content-Type: application/json				
	Shullcogedom6odf]a80s5funicson]erusa]en:1a7risuu1i1f6r7rhrakdenrun6wb	ss8nu86nuhes7ani	nphc5lepejzfw6qtj888bk4oa8beq; user_time_a_lang+; user_digital_format+%2C%23%230.00; timezone+; delimiter+-; format	
	; timezoneoffset=480; user_time_show_dst=1; locale=zh-cn; bspsessio			
Host: 10.21.64.126				
Origin: chrome-extension://aejoelaoggem	mbcahagindiliamlcdmfm			
Sec-Fetch-Dest: empty				
Sec-Fetch-Mode: cors				
Sec-Fetch-Site: none				
User-Agent: Mozilla/5.0 (Windows NT 10.	.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4	280.88 Safari/53	537.36	
XSRF-TOKEN: x-mkc4i19glier2k6106bv9cpg	gpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjsvy1j1f6r7zhcakdeqruq6mbss8nv8	6nyhgs7anphc51e	epejzfw6qtj880bk4oa8beq	
Request Payload view parsed				
1				
"devIds" : "1000000033554447",				
"devTypeId":38				
)				

### 5.1.2.3 Historical Device Data API

### **API Description**

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

For details about the data list that can be queried through this API, see the historical device data list below.

#### **Request URL**

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

### **Request Mode**

HTTP method: POST

### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
devlds	List of device IDs. The device IDs are obtained from <b>id</b> in <b>5.1.1.2 Device List</b> <b>API</b> . Use commas (,) to separate multiple device IDs. Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
devTypeld	Device type ID. Use the device type ID obtained in <b>5.1.1.2 Device List API</b> . The following device types are supported: 1: string inverter 10: EMI 17: grid meter 38: residential inverter 39: battery 41: ESS 47: power sensor 60001: mains 60003: genset 60043: SSU group 60014: lithium battery rack 60010: AC output power distribution	Integer	Mandato ry
startTime	Start time, in milliseconds	Long	Mandato ry
endTime	End time, in milliseconds	Long	Mandato ry

# **Response Packet**

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	_
param	Parameters	-	-	-
S	devlds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	startTime	Start time, in milliseconds	Long	-
	endTime	End time, in milliseconds	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the 5-minute data object list of each device.	List	5- minute data of a device in a day
	devld	Device ID	Long	-
	sn	Device SN	String	
	collectTime	Collection time in milliseconds in the request parameter	Long	-

Paramet	er	Description	Data Type	Remark s
	dataltemMap	Content of each data item, which is returned in the key- value format. The data item content varies depending on the device type. For details about the data item list, see the historical device data list below.	Мар	5- minute device data

#### Historical Device Data List

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
ID: 1 String inverter	inverter_state	Inverter state. For details, see the following: <b>Table 5-2</b>	None	Do ubl e	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage	V	Do ubl e	
	b_u	Phase B voltage	V	Do ubl e	
	c_u	Phase C voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	a_i	Phase A current of grid	A	Do ubl e	
	b_i	Phase B current of grid	A	Do ubl e	
	c_i	Phase C current of grid	A	Do ubl e	
	efficiency	Inverter conversion efficiency (manufacturer)	%	Do ubl e	
	temperature	Internal temperature	°C	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	elec_freq	Grid frequency	Hz	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	reactive_power	Output reactive power	kVar	Do ubl e	
	day_cap	Yield today	kWh	Do ubl e	
	mppt_power	MPPT total input power	kW	Do ubl e	
	pv1_u	PV1 input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv2_u	PV2 input voltage	V	Do ubl e	
	pv3_u	PV3 input voltage	V	Do ubl e	
	pv4_u	PV4 input voltage	V	Do ubl e	
	pv5_u	PV5 input voltage	V	Do ubl e	
	pv6_u	PV6 input voltage	V	Do ubl e	
	pv7_u	PV7 input voltage	V	Do ubl e	
	pv8_u	PV8 input voltage	V	Do ubl e	
	pv9_u	PV9 input voltage	V	Do ubl e	
	pv10_u	PV10 input voltage	V	Do ubl e	
	pv11_u	PV11 input voltage	V	Do ubl e	
	pv12_u	PV12 input voltage	V	Do ubl e	
	pv13_u	PV13 input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv14_u	PV14 input voltage	V	Do ubl e	
	pv15_u	PV15 input voltage	V	Do ubl e	
	pv16_u	PV16 input voltage	V	Do ubl e	
	pv17_u	PV17 input voltage	V	Do ubl e	
	pv18_u	PV18 input voltage	V	Do ubl e	
	pv19_u	PV19 input voltage	V	Do ubl e	
	pv20_u	PV20 input voltage	V	Do ubl e	
	pv21_u	PV21 input voltage	V	Do ubl e	
	pv22_u	PV22 input voltage	V	Do ubl e	
	pv23_u	PV23 input voltage	V	Do ubl e	
	pv24_u	PV24 input voltage	V	Do ubl e	
	pv25_u	PV25 input voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv26_u	PV26 input voltage	V	Do ubl e	
	pv27_u	PV27 input voltage	V	Do ubl e	
	pv28_u	PV28 input voltage	V	Do ubl e	
	pv1_i	PV1 input current	A	Do ubl e	
	pv2_i	PV2 input current	A	Do ubl e	
	pv3_i	PV3 input current	A	Do ubl e	
	pv4_i	PV4 input current	A	Do ubl e	
	pv5_i	PV5 input current	A	Do ubl e	
	pv6_i	PV6 input current	A	Do ubl e	
	pv7_i	PV7 input current	A	Do ubl e	
	pv8_i	PV8 input current	A	Do ubl e	
	pv9_i	PV9 input current	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv10_i	PV10 input current	A	Do ubl e	
	pv11_i	PV11 input current	A	Do ubl e	
	pv12_i	PV12 input current	A	Do ubl e	
	pv13_i	PV13 input current	A	Do ubl e	
	pv14_i	PV14 input current	A	Do ubl e	
	pv15_i	PV15 input current	A	Do ubl e	
	pv16_i	PV16 input current	A	Do ubl e	
	pv17_i	PV17 input current	A	Do ubl e	
	pv18_i	PV18 input current	A	Do ubl e	
	pv19_i	PV19 input current	A	Do ubl e	
	pv20_i	PV20 input current	A	Do ubl e	
	pv21_i	PV21 input current	A	Do ubl e	
Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
-------------	----------------	---------------------------	------	-------------------------------------	---------
	pv22_i	PV22 input current	A	Do ubl e	
	pv23_i	PV23 input current	A	Do ubl e	
	pv24_i	PV24 input current	A	Do ubl e	
	pv25_i	PV25 input current	A	Do ubl e	
	pv26_i	PV26 input current	A	Do ubl e	
	pv27_i	PV27 input current	A	Do ubl e	
	pv28_i	PV28 input current	A	Do ubl e	
	total_cap	Total yield	kWh	Do ubl e	
	open_time	Inverter startup time	ms	Do ubl e	
	close_time	Inverter shutdown time	ms	Do ubl e	
	mppt_total_cap	Total DC input energy	kWh	Do ubl e	
	mppt_1_cap	MPPT 1 DC total yield	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	mppt_2_cap	MPPT 2 DC total yield	kWh	Do ubl e	
	mppt_3_cap	MPPT 3 DC total yield	kWh	Do ubl e	
	mppt_4_cap	MPPT 4 DC total yield	kWh	Do ubl e	
	mppt_5_cap	MPPT 5 DC total yield	kWh	Do ubl e	
	mppt_6_cap	MPPT 6 DC total yield	kWh	Do ubl e	
	mppt_7_cap	MPPT 7 DC total yield	kWh	Do ubl e	
	mppt_8_cap	MPPT 8 DC total yield	kWh	Do ubl e	
	mppt_9_cap	MPPT 9 DC total yield	kWh	Do ubl e	
	mppt_10_cap	MPPT 10 DC total yield	kWh	Do ubl e	
ID: 38 Residential inverter	inverter_state	Inverter state. For details, see <b>Table 5-2</b> .	None	Do ubl e	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage	V	Do ubl e	
	b_u	Phase B voltage	V	Do ubl e	
	c_u	Phase C voltage	V	Do ubl e	
	a_i	Phase A current of grid	A	Do ubl e	
	b_i	Phase B current of grid	A	Do ubl e	
	c_i	Phase C current of grid	A	Do ubl e	
	efficiency	Inverter conversion efficiency (manufacturer)	%	Do ubl e	
	temperature	Internal temperature	°C	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	elec_freq	Grid frequency	Hz	Do ubl e	
	active_power	Active power	kW	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	reactive_power	Output reactive power	kVar	Do ubl e	
	day_cap	Yield today	kWh	Do ubl e	
	mppt_power	MPPT total input power	kW	Do ubl e	
	pv1_u	PV1 input voltage	V	Do ubl e	
	pv2_u	PV2 input voltage	V	Do ubl e	
	pv3_u	PV3 input voltage	V	Do ubl e	
	pv4_u	PV4 input voltage	V	Do ubl e	
	pv5_u	PV5 input voltage	V	Do ubl e	
	pv6_u	PV6 input voltage	V	Do ubl e	
	pv7_u	PV7 input voltage	V	Do ubl e	
	pv8_u	PV8 input voltage	V	Do ubl e	
	pv1_i	PV1 input current	A	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	pv2_i	PV2 input current	A	Do ubl e	
	pv3_i	PV3 input current	A	Do ubl e	
	pv4_i	PV4 input current	A	Do ubl e	
	pv5_i	PV5 input current	A	Do ubl e	
	pv6_i	PV6 input current	A	Do ubl e	
	pv7_i	PV7 input current	A	Do ubl e	
	pv8_i	PV8 input current	A	Do ubl e	
	total_cap	Total yield	kWh	Do ubl e	
	open_time	Inverter startup time	ms	Do ubl e	
	close_time	Inverter shutdown time	ms	Do ubl e	
	mppt_1_cap	MPPT 1 DC total yield	kWh	Do ubl e	
	mppt_2_cap	MPPT 2 DC total yield	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	mppt_3_cap	MPPT 3 DC total yield	kWh	Do ubl e	
	mppt_4_cap	MPPT 4 DC total yield	kWh	Do ubl e	
ID: 10 EMI	temperature	Temperature	°C	Do ubl e	
	pv_temperature	PV temperature	°C	Do ubl e	
	wind_speed	Wind speed	m/s	Do ubl e	
	wind_direction	Wind direction	Degree	Do ubl e	
	radiant_total	Daily irradiation	MJ/m <sup>2</sup>	Do ubl e	
	radiant_line	Irradiance	W/m <sup>2</sup>	Do ubl e	
	horiz_radiant_lin e	Horizontal irradiance	W/m <sup>2</sup>	Do ubl e	Invalid field. The default value is <b>null</b> .
	horiz_radiant_tot al	Horizontal irradiation	MJ/m <sup>2</sup>	Do ubl e	Invalid field. The default value is <b>null</b> .
ID: 17 Grid meter	ab_u	A-B line voltage of grid	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	bc_u	B-C line voltage of grid	V	Do ubl e	
	ca_u	C-A line voltage of grid	V	Do ubl e	
	a_u	Phase A voltage (AC output)	V	Do ubl e	
	b_u	Phase B voltage (AC output)	V	Do ubl e	
	c_u	Phase C voltage (AC output)	V	Do ubl e	
	a_i	Phase A current of grid (IA)	A	Do ubl e	
	b_i	Phase B current of grid (IB)	A	Do ubl e	
	c_i	Phase C current of grid (IC)	A	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	active_cap	Active energy (positive active energy)	kWh	Do ubl e	
	reactive_power	Reactive power	kVar	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	reverse_active_c ap	Negative active energy	kWh	Do ubl e	
	forward_reactive _cap	Positive reactive energy	kWh	Do ubl e	
	reverse_reactive_ cap	Negative reactive energy	kWh	Do ubl e	
	active_power_a	Active power PA	kW	Do ubl e	
	active_power_b	Active power PB	kW	Do ubl e	
	active_power_c	Active power PC	kW	Do ubl e	
	reactive_power_ a	Reactive power QA	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ b	Reactive power QB	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ c	Reactive power QC	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	total_apparent_p ower	Total apparent power	kVA	Do ubl e	

Device Type	Key	Name	Unit	Ret urn Val ue Typ e	Remarks
	grid_frequency	Grid frequency	Hz	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p eak	Negative active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p ower	Negative active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_v alley	Negative active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_t op	Negative active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p eak	Positive active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p ower	Positive active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_v alley	Positive active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_active_t op	Positive active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ peak	Negative reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ power	Negative reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ valley	Negative reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ top	Negative reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _peak	Positive reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _power	Positive reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _valley	Positive reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_reactive _top	Positive reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
ID: 47 Power sensor	meter_status	Meter state (0: offline; 1: normal)	None	Do ubl e	
	meter_u	Grid voltage	V	Do ubl e	
	meter_i	Grid current	A	Do ubl e	
	active_power	Active power	W	Do ubl e	
	reactive_power	Reactive power	Var	Do ubl e	
	power_factor	Power factor	None	Do ubl e	
	grid_frequency	Grid frequency	Hz	Do ubl e	
	active_cap	Active energy (positive active energy)	kWh	Do ubl e	
	reverse_active_c ap	Negative active energy	kWh	Do ubl e	
	ab_u	A-B line voltage of grid	V	Do ubl e	
	bc_u	B-C line voltage of grid	V	Do ubl e	

Device Type	Key	Name	Unit	Ret urn Val ue Typ e	Remarks
	ca_u	C-A line voltage of grid	V	Do ubl e	
	b_u	Phase B voltage (AC output)	~	Do ubl e	
	c_u	Phase C voltage (AC output)	V	Do ubl e	
	b_i	Phase B current of grid (IB)	A	Do ubl e	
	c_i	Phase C current of grid (IC)	A	Do ubl e	
	forward_reactive _cap	Positive reactive energy	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ cap	Negative reactive energy	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	active_power_a	Active power PA	kW	Do ubl e	
	active_power_b	Active power PB	kW	Do ubl e	
	active_power_c	Active power PC	kW	Do ubl e	

Device Type	Key	Name	Unit	Ret urn Val ue Typ e	Remarks
	reactive_power_ a	Reactive power QA	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ b	Reactive power QB	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reactive_power_ c	Reactive power QC	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	total_apparent_p ower	Total apparent power	kVA	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p eak	Negative active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_p ower	Negative active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_v alley	Negative active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_active_t op	Negative active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_active_p eak	Positive active energy (peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_p ower	Positive active energy (shoulder)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_v alley	Positive active energy (off- peak)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_active_t op	Positive active energy (sharp)	kWh	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ peak	Negative reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ power	Negative reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ valley	Negative reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	reverse_reactive_ top	Negative reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	positive_reactive _peak	Positive reactive energy (peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _power	Positive reactive energy (shoulder)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _valley	Positive reactive energy (off- peak)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
	positive_reactive _top	Positive reactive energy (sharp)	kVar	Do ubl e	Invalid field. The default value is <b>null</b> .
ID: 39 Residential battery	battery_status	Battery running state (0: offline; 1: standby; 2: running; 3: faulty; 4: hibernating)	None	Do ubl e	
	max_charge_po wer	Maximum charge power	W	Do ubl e	
	max_discharge_ power	Maximum discharge power	W	Do ubl e	
	ch_discharge_po wer	Charge/ Discharge power	W	Do ubl e	
	busbar_u	Battery voltage	V	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
	battery_soc	Battery SOC	%	Do ubl e	
	battery_soh	Battery SOH	None	Do ubl e	
	ch_discharge_m odel	Charge/ Discharge mode (0: none; 1: forced charge/ discharge; 2: time-of-use price; 3: fixed charge/ discharge; 4: automatic charge/ discharge)	None	Do ubl e	
	charge_cap	Charged energy	kWh	Do ubl e	
	discharge_cap	Discharged energy	kWh	Do ubl e	
ID: 41 C&I and utility ESS	ch_discharge_po wer	Charge/ Discharge power	W	Do ubl e	
	battery_soc	Battery SOC	%	Do ubl e	
	charge_cap	Charged energy	kWh	Do ubl e	
	discharge_cap	Discharged energy	kWh	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
ID: 60001 Mains (supported only in the	mains_state	Mains status (0: mains unavailable; 1: mains available)	None	Do ubl e	
Power-M scenario)	ac_voltage	AC voltage	V	Do ubl e	
	ac_current	AC current	A	Do ubl e	
	active_power	Active power	kW	Do ubl e	
	ac_frequency	AC frequency	Hz	Do ubl e	
ID: 60003 Genset (supported	load_rate	Load rate	%	Do ubl e	
only in the Power-M scenario)	running_state	Running status (0: unknown; 1: stopped; 2: running)	None	Do ubl e	
ID: 60043 SSU group (supported	total_output_cur rent	Total output current	A	Do ubl e	
only in the Power-M scenario)	total_output_en ergy	Total output energy	kWh	Do ubl e	
ID: 60014 Lithium battery rack (supported only in the Power-M scenario)	SOC	SOC	%	Do ubl e	
	voltage	Voltage	V	Do ubl e	
	average_temper ature	Average temperature	°C	Do ubl e	

Device Type	Кеу	Name	Unit	Ret urn Val ue Typ e	Remarks
ID: 60010 AC output power	ac_frequency	AC frequency	Hz	Do ubl e	
distribution (supported only in the Power-M scenario)	total_load_active _power	Total load active power	kW	Do ubl e	

Table 5-2 Inverter state (inverter\_state) description

State Value	Description
0	Standby: initializing
1	Standby: insulation resistance detecting
2	Standby: irradiation detecting
3	Standby: grid detecting
256	Start
512	Grid-connected
513	Grid-connected: power limited
514	Grid-connected: self-derating
768	Shutdown: on fault
769	Shutdown: on command
770	Shutdown: OVGR
771	Shutdown: communication interrupted
772	Shutdown: power limited
773	Shutdown: manual startup required
774	Shutdown: DC switch disconnected
1025	Grid scheduling: cosφ-P curve
1026	Grid scheduling: Q-U curve
1280	Ready for terminal test

State Value	Description
1281	Terminal testing
1536	Inspection in progress
1792	AFCI self-check
2048	I-V scanning
2304	DC input detection
40960	Standby: no irradiation
45056	Communication interrupted (written by SmartLogger)
49152	Loading (written by SmartLogger)

## **Examples**

Request example:

```
{
	"devlds":"214060404588862,213472461631079",
	"devTypeld":1,
	"startTime":1501862400000,
	"endTime":1501872400000
}
```

**Response examples:** 

Example 1: An error code is returned.

```
{
    "success":false,
    "data":null,
    "failCode":20009,
    "params":{
        "devIds":"214060404588862,213472461631079",
        "devTypeId":1,
        "startTime":1501862400000,
        "endTime":1501872400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: 5-minute device data is returned.

```
"success":true,

"data":[

{

    "dataItemMap":{

    "pv7_u":null,

    "pv1_u":575.3,

    "b_u":286.1,

    "c_u":286.9,

    "pv6_u":576.1,

    "temperature":44.6,

    "open_time":null,

    "b_i":24.9,

    "bc_u":495.6,

    "pv9_u":null,
```

{

"pv8\_u":null, "c\_i":25, "mppt\_total\_cap":null, "pv9\_i":null, "mppt\_3\_cap":null, "mppt\_2\_cap":null, "inverter\_state":512, "pv8\_i":null, "mppt\_1\_cap":null, "pv6\_i":7.1, "mppt\_power":21.962, "pv1\_i":7.1, "total\_cap":655.37, "ab\_u":495.4, "pv7\_i":null, "pv13\_u":null, "reactive\_power":20.95, "pv10\_u":null, "pv12\_i":null, "pv11\_i":null, "pv3\_i":7.1, "pv11\_u":null, "pv2\_i":7.1, "pv13\_i":null, "power\_factor":0, "pv12\_u":null, "pv5\_i":7.2, "active\_power":21.05, "elec\_freq":50.05, "pv10\_i":null, "pv4\_i":7, "mppt\_4\_cap":null, "mppt\_5\_cap":0, "mppt\_6\_cap":0, "mppt\_7\_cap":0, "mppt\_8\_cap":0, "mppt\_9\_cap":0, "mppt\_10\_cap":0, "pv4\_u":577.8, "close\_time":null, "day\_cap":159.26, "ca\_u":496.9, "a\_i":24.9, "pv5\_u":576.1, "a\_u":286, "pv3 u":577.8, "pv14\_u":null, "pv14\_i":null, "pv15\_u":0, "pv15\_i":0, "pv16\_u":0, "pv16\_i":0, "pv17\_u":0, "pv17\_i":0, "pv18\_u":0, "pv18\_i":0, "pv19\_u":0, "pv19\_i":0, "pv20\_u":0, "pv20\_i":0, "pv21\_u":0, "pv21\_i":0, "pv22\_u":0, "pv22\_i":0, "pv23\_u":0, "pv23\_i":0, "pv24\_u":0, "pv24\_i":0, "pv25\_u":0,

```
"pv25_i":0,
     "pv26_u":0,
     "pv26_i":0,
     "pv27_u":0,
      "pv27_i":0,
     "pv28_u":0,
     "pv28_i":0,
     "efficiency":null,
     "pv2_u":575.3
  },
   "devId":213472461631079,
   "collectTime":1501862400000
},
{
  "dataItemMap":{
     "pv7_u":null,
     "pv1_u":575.3,
     "b_u":286.1,
     "c_u":286.9,
     "pv6 u":576.1,
     "temperature":44.6,
     "open_time":null,
     "b_i":24.9,
     "bc_u":495.6,
     "pv9_u":null,
     "pv8_u":null,
     "c_i":25,
     "mppt_total_cap":null,
     "pv9_i":null,
     "mppt_3_cap":null,
     "mppt_2_cap":null,
     "inverter_state":512,
      "pv8_i":null,
     "mppt_1_cap":null,
     "pv6_i":7.1,
     "mppt_power":21.962,
     "pv1_i":7.1,
     "total_cap":655.37,
     "ab_u":495.4,
     "pv7_i":null,
     "pv13_u":null,
     "reactive_power":20.95,
     "pv10_u":null,
     "pv12_i":null,
     "pv11_i":null,
     "pv3_i":7.1,
     "pv11_u":null,
     "pv2_i":7.1,
     "pv13_i":null,
      "power_factor":0,
     "pv12_u":null,
     "pv5_i":7.2,
     "active_power":21.05,
     "elec_freq":50.05,
     "pv10_i":null,
     "pv4_i":7,
"mppt_4_cap":null,
     "mppt_5_cap":0,
     "mppt_6_cap":0,
      "mppt_7_cap":0,
      "mppt_8_cap":0,
     "mppt_9_cap":0,
     "mppt_10_cap":0,
"pv4_u":577.8,
     "close_time":null,
     "day_cap":159.26,
      "ca_u":496.9,
     "a_i":24.9,
     "pv5_u":576.1,
```

<pre>"a_u":286, "pv3_u":577.8, "pv14_u":null, "pv14_u":null, "pv15_u":0, "pv15_u":0, "pv16_u":0, "pv16_u":0, "pv17_u":0, "pv17_u":0, "pv18_u":0, "pv18_u":0, "pv19_u":0, "pv20_u":0, "pv20_u":0, "pv20_u":0, "pv21_u":0, "pv21_u":0, "pv21_u":0, "pv22_u":0, "pv22_u":0, "pv23_u":0, "pv24_u":0, "pv24_u":0, "pv24_u":0, "pv25_u":0, "pv25_u":0, "pv26_u":0, "pv26_u":0, "pv26_u":0, "pv26_u":0, "pv26_u":0, "pv28_i":0, "collectTime":1501862700000 }</pre>
"failCode":0,
"devTypeld":1,
"startTime":1501862400000, "endTime":1501872400000,
"currentTime":1503046597854 },
"message":null
}

Prerequisites for obtaining data: The API account has the permission to access this API.

# 5.1.3 Alarm

# 5.1.3.1 API for Querying Active Alarms

# **API Description**

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

queried based on the plant ID list. If the plant ID list is empty and the device SN list is not empty, device alarm information is queried based on the device SN list.

## **Request URL**

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

# **Request Mode**

HTTP method: POST

## **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Optional
	At least one of the <b>stationCodes</b> and <b>sns</b> parameters must be set. If both parameters are set, alarms are queried by <b>stationCodes</b> .		
sns	Device SN list. Multiple device SNs are separated by commas (,). At least one of the <b>stationCodes</b> and <b>sns</b> parameters must be set. If both parameters are set, alarms are queried by <b>stationCodes</b> .	String	Optional
beginTime	Query start time, in milliseconds	Long	Mandato ry
endTime	Query end time, in milliseconds	Long	Mandato ry

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

Parameter	Description	Data Type	Mandato ry/ 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 inverter2: SmartLogger8: STS10: EMI13: protocol converter16: general device17: grid meter22: PID37: Pinnet data logger38: residential inverter39: battery40: backup box45: PLC46: optimizer47: power sensor62: Dongle63: distributed SmartLogger70: safety box60001: mains60003: genset60043: SSU group60044: SSU60092: power converter60014: lithium battery rack	String	Optional
	60010: AC output power distribution		

# **Response Packet**

Parameter		Description	Data Type	Remark s
success		Request success or failure flag. Value: <b>true</b> : The request succeeded. <b>false</b> : The request failed.	Boolean	Request success or failure flag. Value:
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter.	String	-
	sns	Device SN list in the request parameter.	String	-
	beginTime	Start time in the request parameter, in milliseconds.	Long	-
	endTime	End time in the request parameter, in milliseconds.	Long	-
	language	Language in the request parameter.	String	-
	levels	Alarm severity in the request parameter.	String	-
	devTypes	Device type in the request parameter.	String	-
	currentTime	Current system time, in milliseconds.	Long	-
message	5	Optional message.	String	-
data	Parameters	Returned data. The data contains the alarm information list.	List	-
	stationCode	Plant ID, which uniquely identifies a plant.	String	-
	alarmName	Alarm name.	String	-
	devName	Device name.	String	-

Paramet	ter	Description	Data Type	Remark s
	repairSuggestion	Suggestions.	String	-
	esnCode	Device SN.	String	-
	devTypeId	Device type ID.	Integer	-
		The following device types are supported:		
		1: string inverter		
		2: SmartLogger		
		8: STS		
		10: EMI		
		13: protocol converter		
		16: general device		
		17: grid meter		
		22: PID		
		37: Pinnet data logger		
		38: residential inverter		
		39: battery		
		40: backup box		
		45: PLC		
		46: optimizer		
		47: power sensor		
		62: Dongle		
		63: distributed SmartLogger		
		70: safety box		
		60001: mains		
		60003: genset		
		60043: SSU group		
		60044: SSU		
		60092: power converter		
		60014: lithium battery rack		
		60010: AC output power distribution		
	causeld	Cause ID.	Integer	-
	alarmCause	Alarm cause.	String	-

Parame	ter	Description	Data Type	Remark s
	alarmType	Alarm type. The following alarm types are supported: 0: other alarms 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 supported: 1: not processed (active)	Integer	-

# Example

Request example:

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

Response examples:

Example 1: An error code is returned.

'data": null,

{

}

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

#### Example 2: Alarm data of the device is returned.

```
{
  "data": [
     {
        "alarmCause": "An unrecoverable fault has occurred in the internal circuit of the device.",
        "alarmId": 2064,
"alarmName": "The device is abnormal.",
        "alarmType": 2,
        "causeld": 5,
        "devName": "Inverter-1",
        "devTypeId": 38,
        "esnCode": "Inverter05",
        "lev": 2,
        "raiseTime": 1667179861000.
        "repairSuggestion": "Turn off the AC and DC switches, wait for 5 minutes, and then turn on the AC
and DC switches. If the fault persists, contact your dealer or technical support.",
        "stationCode": "NE=33554792",
        "stationName": "hzhStation02",
        "status": 1
     },
{
        "alarmCause": "1. The voltage of a battery expansion module is low.",
        "alarmId": 3011,
        "alarmName": "Battery expansion module undervoltage",
        "alarmType": 2,
        "causeld": 2,
        "devName": "Inverter-2",
        "devTypeId": 38,
        "esnCode": "Inverter01",
        "lev": 4,
        "raiseTime": 1665264943000,
        "repairSuggestion": "1. If the sunlight is sufficient or AC reverse charging is allowed, the Battery
[CNo] battery expansion module [SNo] (in the fault location information) can be charged when the
inverter is running.",
        "stationCode": "NE=33554785",
        "stationName": "hzhStation01",
        "status": 1
     }
  ],
  "failCode": 0,
  "message": null,
  "params": {
     "currentTime": 1667399432812,
     "sns": "Inverter01"
     "language": "zh_CN",
     "beginTime": 1664553600000,
     "devTypes": "1,2,38,46,62",
"endTime": 1667231999000,
     "levels": "1,2,3,4",
     "stationCodes": "NE=33554785,NE=33554792"
  },
   'success": true
}
```

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

14-getAlarmList				ii 4 🗸
Add a description				
METHOD SC	HEME ((HOST [ PORT ] [ PATH [ OUERY.]]			
POST - A htt	ps://			2
+ QL	ERY PARAMETERS			length: 44 byte(s)
HEADERS <sup>(1)</sup> I <sup>1</sup>		Form +	► BODY ①	Text -
Content-Type	: application/json	× ×		1
XSRF-TOKEN	x-867t6nga3z49umeq6nrwukrxtfmnar6o9g2lek	× * 1	<pre>3 dns : SLV3_SKZA1_001 ; 4 "beginTime": "1680339678000". </pre>	
+ Add header	having	*	<pre>2</pre>	
T Abd Header	Intradium	8	"devTypes": "1, 2, 38, 46, 62"	
			Text JSON XML HTML   > Format body   Z Enable body ev	valuation a length: 205 bytes
			Text JSON XML HTML   _ Format body	aluation B lengin: 205 tytes
				Request preview
			0	
200 OK			•	×
HEADERS ()		pretty + 4	► BODY <sup>®</sup>	pretty -
Server:	product only			1.1.1
Date:	product only Thu, 06 Apr 2023 09:08:20 GMT		▼ ( data : ▼ [	
Content-Type:	application/json;charset=UTF-8 chunked		A alarmCause : "The optimizer outp	ut voltage is abnormal.", alarmId : 180018, alarmName : "Abnorm:
Transfer-Encoding: Connection:	keep-alive		A galarmCause : "The optimizer outp	ut voltage is abnormal.", alarmId : 180018, alarmName : "Abnorm: wackfeed occurred.", alarmId : 180017, alarmName : "Output backfe
x-frame-options:	SAMEORIGIN		AlarmCause : "Optimizer output b	ackfeed occurred.", alarmId : 180017, alarmName : "Output backfe
x-content-type-options: x-xss-protection:	1; mode=block		AlarmCause : null, alarmId : 18	80016, alarmName : "Version mismatch alarm", alarmType : 2,}, occurred in the optimizer.", alarmId : 180015, alarmName : "Inte
strict-transport-securit. x-download-options:	<pre>max-age=31536000; includeSubDomains noopen</pre>		I alarmCause : "The temperature of	the optimizer output terminal is abnormal.", alarmId : 180020,
	default-src https: data: blob: ws: 'self' 'uns	afe-inline' 'u	A alarmCause : null, alarmId : 18 A alarmCause : "The temperature of	80016, alarmName : "Version mismatch alarm", alarmType : 2,}, the optimizer output terminal is abnormal.", alarmId : 180020,
	nsafe-eval'		AlarmCause : "Ontimizer outout b	ackfeed occurred.". alarmTd : 180017. alarmName : "Outout backfi
Request Method: POS Status Code:  200 0 Remote Address:	< *****			
▶ Response Headers			(21)	
▼ Request Headers			View source	
	96a841f4-6990-4241-b310-c5b319bd93b	6		
Accept: */*				
Accept-Encoding: gzi	p, deflate, br			
Accept-Language: zh-	CN, zh;q=0.9			
Connection: keep-ali	ve			
Content-Length: 205				
content-type: applica				
				<pre>:heme=lightday; serverTimezone=Asia%2FShanghai; formatVersion=1 anguage=true; locale=zh-cn; bspsession=x-jv7uapcalg84aoepbyjtjy</pre>
				OKEN=x-867t6nga3z49umeq6nrwukrxtfmnar6o9g2lekqnmoteelrvrwekg8rv
			dpd; JSESSIONID=ADB1217321C0CA2CD740242677660	
Host: \$2000000000				
Origin: chrome-exten	sion://aejoelaoggembcahagimdiliamlcd	mfm		
sec-ch-ua: "Chromium"	";v="110", "Not A(Brand";v="24", "Go	ogle Chrome";v	="110"	
sec-ch-ua-mobile: ?0				
sec-ch-ua-platform: "				
Sec-Fetch-Dest: empty				
Sec-Fetch-Mode: cors Sec-Fetch-Site: none				
	5 0 (Western NT 10 0, Wester (64) As	-1-11-14/24 (5.27	36 (KHTML, like Gecko) Chrome/110.0.0.0 Safar	1/57 36
			<pre>ifk75jtgpj05k4jz7uuofsdivuka3w07dgbwvt3u079c3y</pre>	
Auto concine Arooy cong		wekgorvo		
▼ Request Payload vi	ew source			
	=33555573,NE=33554463", sns: "SLV3_S	N2K1_001". her	inTime: "1680339678000"}	
beginTime: "16803	39678000"			
devTypes: "1,2,38				
endTime: "1680771 language: "en_US"	678850"			
levels: "1,2,3,4"				
sns: "SLV3_SN2K1_				
stationCodes: "NE	=335555573,NE=33554463"			

# 5.1.4 Report

# 5.1.4.1 Hourly Plant Data API

# **API Description**

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

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

the plant is located. Then, you can query the hourly data of the plant by plant ID in the current day. If data is generated for  $n (0 \le n \le 24)$  hours of the day,  $n (0 \le n \le 24)$  results are returned.

For details about the data list that can be queried through this API, see the hourly plant data list below.

# **Request URL**

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

## **Request Mode**

HTTP method: POST

## **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

# **Response Packet**

Parameter		Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param s	Parameters	-	-	-
	stationCodes	Plant ID list in the request parameter	String	-

Parameter		Description	Data Type	Remark s
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the hourly data object list of each plant.	List	List of hourly plant data in a day
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataltemMap	Content of each data item, which is returned in key- value format. For details about the data item list, see the hourly plant data list below.	Мар	-

#### Hourly Plant Data List

Кеу	Name	Unit	Return Value Type	Remarks
radiation_intens ity	Global irradiatio n	kWh/m²	Double	
theory_power	Theoretic al yield	kWh	Double	
inverter_power	Inverter yield	kWh	Double	The calculation of this indicator is inaccurate. The <b>inverterYield</b> is preferred.
ongrid_power	Feed-in energy	kWh	Double	

Кеу	Name	Unit	Return Value Type	Remarks
power_profit	Revenue	The currency specified in the management system	Double	
chargeCap	Charged energy	kWh	Double	
dischargeCap	Discharg ed energy	kWh	Double	
selfProvide	Energy consume d from PV	kWh	Double	
PVYield	PV yield	kWh	Double	
inverterYield	Inverter yield	kWh	Double	

# Example

Request example:

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

Response example:

}

Ł

Example 1: An error code is returned.

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

Example 2: Hourly plant data is returned.

```
"success":true,

"data":[

{

"dataItemMap":{

"radiation_intensity":null,

"theory_power":null,

"inverter_power":0,
```

```
"ongrid_power":null,
      "power_profit":0,
     "chargeCap":null,
     "dischargeCap":null,
      "selfProvide":null,
  },
"stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
   "collectTime":1501862400000
},
{
  "dataItemMap":{
     "radiation intensity":null,
     "theory_power":null,
      "inverter_power":0,
     "ongrid_power":null,
     "power_profit":0,
      "chargeCap":null,
     "dischargeCap":null,
     "selfProvide":null,
  },
   "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
  "collectTime":1501866000000
},
{
  "dataItemMap":{
     "radiation_intensity":null,
     "theory_power":null,
     "inverter_power":0,
     "ongrid_power":null,
     "power_profit":0,
      "chargeCap":null,
     "dischargeCap":null,
     "selfProvide":null,
  },
"stationCode":"BA4372D08E014822AB065017416F254C",
  "collectTime":1501873200000
},
{
  "dataItemMap":{
     "radiation_intensity":null,
     "theory_power":null,
     "inverter_power":0,
     "ongrid_power":null,
     "power_profit":0,
     "chargeCap":null,
     "dischargeCap":null,
     "selfProvide":null,
  },
"stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
  "collectTime":1501876800000
},
{
  "dataItemMap":{
     "radiation_intensity":null,
     "theory_power":null,
"inverter_power":0,
     "ongrid_power":null,
     "power_profit":0,
     "chargeCap":null,
     "dischargeCap":null,
     "selfProvide":null,
  },
"stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
  "collectTime":1501880400000
},
{
  "dataltemMap":{
     "radiation_intensity":null,
```

```
"theory_power":null,
           "inverter_power":0,
          "ongrid_power":null,
          "power_profit":0,
"chargeCap":null,
          "dischargeCap":null,
          "selfProvide":null,
        },
        "stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501884000000
     },
{
        "dataItemMap":{
          "radiation_intensity":null,
           "theory_power":null,
          "inverter_power":0,
          "ongrid_power":null,
           "power_profit":0,
          "chargeCap":null,
          "dischargeCap":null,
          "selfProvide":null,
       },
"stationCode":"5D02E8B40AD342159AC8D8A2BCD4FAB5",
        "collectTime":1501887600000
     },
{
        "dataItemMap":{
          "radiation_intensity":null,
          "theory_power":null,
          "inverter_power":0,
          "ongrid_power":null,
          "power_profit":0,
"chargeCap":null,
          "dischargeCap":null,
          "selfProvide":null,
        },
        "stationCode":"BA4372D08E014822AB065017416F254C",
        "collectTime":1501887600000
     }
  ],
"failCode":0,
  "params":{
     "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
     "collectTime":1501862400000,
     "currentTime":1503046597854
  },
  "message":null
}
```

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

04-getKpiStationHour		Save 💌
METHOD SCHEME	// HOST [1] PATH [12: OUERY]]	
POST • A https://1	0.21.64.126/thirdData/getKplStationHour	<table-cell-columns> Send 👻</table-cell-columns>
QUERY PA	RAMETERS	ngth: 48 byte(s)
HEADERS () 12	Form - • BODY <sup>(1)</sup>	Text -
Content-Type	: application/json x 2 "stationCodes" : "NE+33554441, NE+335544455",	
	3 "collectTime" : 1608023875000	
XSRF-TOKEN	z x-mkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjt x 4	
◆ Add header	ion B	
	Text JSON XML HTML   🚍 Format body   🛂 Enable body evaluation	😑 length: 81 bytes
Response		Elapsed Time: 121ms
		Expect time terms
200 OK		
BODY ®		pretty 🕶
N sap sap sap sap sap	ctTime : 1607961600000, stationCode : "NE=33554441", dataItemMap :{ radiation intensity : null,}	
heade		
lines nums		length: 3 kilobytes
N 11-1-1 D. 1-1 D. 1-1-1		
× Headers Preview Response In * General	tator liming cookes	
Request URL: https://10.21.64.126	/thirdDeta/getKpiStationHour	
Request Method: POST		
Status Code: 🖷 200 OK		
Remote Address: 10.21.64.126:443		
Referrer Policy: strict-origin-when > Response Headers (12)	cross-origin	
Request Headers view source		
Accept: */*		
Accept-Encoding: gzip, deflate, b		
Accept-Language: zh-CN,zh;q+0.9		
Connection: keep-alive		
Content-Length: 81		
Content Type: application/json	2k5106bv9cpgpdqm6qdf1g89s5fypirsqqlerusalgnz1g7zjsvy1j1f6r7zhcakdeqruq6mbss8mv86nyhgs7anphc5lepejzfw6qtj880bk4oa8beq; user_time_a_lang+; user_digital_format+W2CW23W23	0.00. Alexandra (1.1/1/1/10.0.)
	AALGOVISUDGUGUTADEDSTYDIISUUTUADEDIIGIISIYJIITTIIAAAAA UKEESSANNOONYDEISENNÖÖNYDEISENNÖÖNYDEISENNÖÖNEN LUUTUADE Server: tiesennöfistet480 uurtime, hokust-1 losela-tion beseision-delteteisi JSESSIONID-CAAAACABBEPS015FESESB060	stoo; timetone=; delimiter=-; format=;;;
Host: 10.21.64.126		
Origin: chrome-extension://aejoela	soggenblahagindiliamlidmfm	
Sec-Fetch-Dest: empty		
Sec-Fetch-Mode: cors		
Sec-Fetch-Site: none		
	NT 10.0; Win64; x64) AppleWebKit/537.36 (WHTML, like Gecko) Chrome/87.0.4280.88 Safari/537.36	
	bv9cpgpdqm6qdflg80s5fypirsqlerusalgnzig7zjsvy1j1f6r7zhcakdeqruq6mbss8nv86nyhgs7amphc5lepejzfw6qtj880bk4oa8beq	
* Request Payload view parsed		
"stationCodes" : "NE=33554441,	NE-33554455",	
"collectTime" : 1608023875000		
)		

# 5.1.4.2 Daily Plant Data API

#### **API Description**

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

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

For details about the data list that can be queried through this API, see the daily plant data list below.

### **Request URL**

https://{Domain name of the management system}/thirdData/getKpiStationDay

### **Request Mode**

HTTP method: POST
# **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag. <b>true</b> : The request succeeded. <b>false</b> : The request failed.	boolean	Request success or failure flag
failCode		Error code. Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter.	String	-
	collectTime	Collection time in milliseconds in the request parameter.	Long	-
	currentTime	Current system time, in milliseconds.	Long	-
message	2	Optional message.	String	-
data	Parameters	Returned data. The data contains the daily data object list of each plant.	List	Daily data list of a plant in a month
	stationCode	Plant ID.	String	-

Parame	ter	Description	Data Type	Remark s
	collectTime	Collection time, in milliseconds.	Long	-
	dataltemMap	Content of each data item, which is returned in key- value format. For details about the data item list, see the daily plant data list below.	Мар	-

## Daily Plant Data List

Кеу	Name	Unit	Return Value Type	Remarks
installed_capacit y	Installed capacity	kW	Double	
radiation_intensi ty	Global irradiation	kWh/m²	Double	
theory_power	Theoretical yield	kWh	Double	
performance_rat io	Performance ratio	%		
inverter_power	Inverter yield	kWh	Double	The calculation of this indicator is inaccurate. The <b>inverterYield</b> is preferred.
ongrid_power	Feed-in energy	kWh	Double	
use_power	Consumption	kWh	Double	
power_profit	Revenue	The currency specified in the manageme nt system	Double	
perpower_ratio	Specific energy (kWh/ kWp)	h	Double	

Кеу	Name	Unit	Return Value Type	Remarks
reduction_total_ co2	CO <sub>2</sub> emission reduction	Ton	Double	
reduction_total_ coal	Standard coal saved	Ton	Double	
reduction_total_ tree	Equivalent trees planted	N/A	Double	The indicator is reserved and the value cannot be obtained.
buyPower	Energy from grid	kWh	Double	
chargeCap	Charged energy	kWh	Double	
dischargeCap	Discharged energy	kWh	Double	
selfUsePower	Consumed PV energy	kWh	Double	
selfProvide	Energy consumed from PV	kWh	Double	
PVYield	PV yield	kWh	Double	
inverterYield	Inverter yield	kWh	Double	

## Example

Request example:

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

Response examples:

Example 1: An error code is returned.

```
{
    "data": null,
    "failCode": 20012,
    "message": null,
    "params": {
        "currentTime": 1687788735543,
        "collectTime": -1677051223000,
        "stationCodes": "BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5"
    },
```

"success": false

}

Example 2: Daily plant data is returned.

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

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

	05-getKpiStationDay	Save 💌
	METHOD SCHEME // HOST [ ' PORT ] [ PATH [ ' QUERY ]]	
	Internadu <u>acrease</u> Jossi _ room [ Intern ] _ Jossi Form ] _ Form [ Internal ] _ Jossi _ Jossi Jossi _ Jossi _ Jossi _ Jossi Jossi _ Jossi Jossi Jossi Jossi _ Jos	🖌 Send 🔍
	E or inspan for a set that an advantage graph and on a set of a se	length: 47 byte(s)
	QUERY PARAMETERS	iengui. 47 byte(b)
	HEADERS <sup>(1)</sup> 12 Form + 4 > BODY <sup>(1)</sup>	Text 👻
	Content-Type : spplication/json × 2 "stationCodes" : "NE=33554455",	
	XSRF-TOKEN         :         x-mkc4il9glier2k6l066v9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjt         x         4	
	XSRF-TOKEN x-mkc4il9glier2k6l06bv9cpgpdqm6qdfg89s5fypirsqqlerusalgnz1g7zjt x 4	
	+ Add header 2 <sup>P</sup> Add authorization B	
	Text JSON XML HTML   ] Format body   2 Enable body evaluation	🖹 length: 81 bytes
	Response	Flammed Terrary 191mm
L	nesponse	Elapsed Time: 131ms
	200 OK	
L		
	▶ BODY <sup>®</sup>	pretty 👻
	EV ▶ { data : [ { collectTime : 1607558400000, stationCode : "NE-33554441", dataItemMap : { radiation_intensity : null,_}	
	f data: [{collectTime: 1607558400000, stationCode: "NE-33554441", dataItemMap: {radiation_intensity: null,_}	
	hee	
	lines nums	length: 2 kilobytes
*	r General	
	Request URL: https://10.21.64.126/thirdData/getKpiStationDay	
	Request Method: POST	
	Status Code: 🖷 200 OK	
	Remote Address: 10.21.64.126:443	
	Referrer Policy: strict-origin-when-cross-origin	
Þ	* Response Headers (12)	
4	Request Headers view source	
1	Accept: */*	
	Accept-Encoding: grip, deflate, br	
	Accept-Language: zh-CN,zh;q=0.9	
	Connection: keep-alive	
	Content-Length: 81	
	Content-Type: application/json	
	Cookie: XSRF-TOKEN=x-skc4ilgglier2k6106bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjsvy1jif6r7zhcakdeqruq6mbss8nv86nyhgs7anphc5lepejzfu6qtj880bk4oa8beq; user_time_a_lang=; user_digital_format=k2C#23%	230.00; timezone=; delimiter=-; format=yyyy
	-WH-odkRXWHKBJAmmKBJAss; tlmemode-server; tlmezoneoffset+480; user_time_show_dst=1; locale=zh-cn; bspsession=delete; JSESSIONID=CBAA4CDA8D8FD016F9CEE376F56E80E0	
	Host: 10.21.64.126 Origin: chrome-extension://aejoelaoggembcahagimdilianicdmfm	
	Ongue Enrowe extension://wejuetabgemotanegimutimentcomm	
	sec-fetch/welder.coms	
	Sec-Fetch-Site: none	
	User-Agent: Mozilla/5.0 (Windows NT 18.0; Win64; x64) AppleWebKit/537.36 (KMTML, like Gecko) Chrome/87.0.4280.88 Safari/537.36	
	XSRF-TOKEN: x-mkc4i19g1ier2x6J86bv9cpgpdqm6qdf1g8955fypirsqqlerusaJgnz1g7zj5xy1j1f6r7zhcakdeqruq6mbss8nv86nyhgg7anphc5lepejzfm6qtj8808k4oa8beq	
¥	Request Payload view parsed	
	' "stationCodes" : "NE-33554441,NE-33554445",	
	"collectTime" : 1608023875000	

## 5.1.4.3 Monthly Plant Data API

### **API Description**

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

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

For details about the data list that can be queried through this API, see the monthly plant data list below.

### **Request URL**

https://{Domain name of the management system}/thirdData/getKpiStationMonth

## **Request Mode**

HTTP method: POST

# **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag. <b>true</b> : The request succeeded. <b>false</b> : The request failed.	boolean	Request success or failure flag
failCode		Error code. Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter.	String	-
	collectTime	Collection time in milliseconds in the request parameter.	Long	-
	currentTime	Current system time, in milliseconds.	Long	-
message	2	Optional message.	String	-

Parame	ter	Description	Data Type	Remark s
data	Parameters	Returned data. The data contains the monthly data object list of each plant.	List	Monthly data list of a plant in a year
	stationCode	Plant ID.	String	-
	collectTime	Collection time, in milliseconds.	Long	-
	dataltemMap	Content of each data item, which is returned in key- value format. For details about the data item list, see the monthly plant data list below.	Мар	-

### Monthly Plant Data List

Кеу	Name	Unit	Return Value Type	Remarks
installed_capacit y	Installed capacity	kW	Double	
radiation_intensi ty	Global irradiation	kWh/m²	Double	
theory_power	Theoretical yield	kWh	Double	
performance_rat io	Performance ratio	%		
inverter_power	Inverter yield	kWh	Double	The calculation of this indicator is inaccurate. The <b>inverterYield</b> is preferred.
ongrid_power	Feed-in energy	kWh	Double	
use_power	Consumption	kWh	Double	

Кеу	Name	Unit	Return Value Type	Remarks
power_profit	Revenue	The currency specified in the managem ent system	Double	
perpower_ratio	Specific energy (kWh/kWp)	h	Double	
reduction_total_ co2	CO <sub>2</sub> emission reduction	Ton	Double	
reduction_total_ coal	Standard coal saved	Ton	Double	
reduction_total_ tree	Equivalent trees planted	N/A	Double	The indicator is reserved and the value cannot be obtained.
buyPower	Energy from grid	kWh	Double	
chargeCap	Charged energy	kWh	Double	
dischargeCap	Discharged energy	kWh	Double	
selfUsePower	Consumed PV energy	kWh	Double	
selfProvide	Energy consumed from PV	kWh	Double	
PVYield	PV yield	kWh	Double	
inverterYield	Inverter yield	kWh	Double	

# Example

Request example:

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

Response examples:

Example 1: An error code is returned.

י data": null,

{

```
"failCode": 20012,

"message": null,

"params": {

    "currentTime": 1687788735543,

    "collectTime": -1677051223000,

    "stationCodes": "BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5"

},

"success": false

}
```

Example 2: Monthly plant data is returned.

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

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

06-getKpiStationMonth		Save 💌
METHOD SCHEME :// HOST	ST [ '' PORT ] [ PATH [ '' QUERY ]]	
POST • https://10.21.6	64.126/thirdData/getKpiStationMonth	🛿 Send 🔍 👻
	length: 49 byte(s)	
QUERY PARAMET	TERS action of the second s	
HEADERS $^{\textcircled{O}}$ $I_{z}^{a}$	Form - K > BODY <sup>®</sup>	Text 🕶
Content-Type :	application/ison × 2 'stationCodes': 'NE=33554441, NE=33554455',	
Content-Type	: application/json × 2 "station/otes": "NE-3355441, NE-3355445", 3 "collective": 10002387000	
XSRF-TOKEN :	x-mkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjt × 4	
+ Add header Add authorization	÷	
	Text JSON XML HTML   🛬 Format body   🗹 Enable body evaluation	B length: 81 bytes
		B lengue or bytes
Response	Ela	ipsed Time: 173ms
200 OK		
▶ BODY <sup>③</sup>		pretty 🕶
5		
<pre>     { data : [ { collectTime     get     get     get     get     f     get     get     f     get     f     get     get     f     get     get     f     get     get     f     get     get     get     f     get     get</pre>	me : 1604188800000, stationCode : "NE-33554441", dataItemMap : { radiation_intensity : null,}	
ade		
he		
lines nums		length: 878 bytes
lines nums		length: 878 bytes
lines nums		length: 878 bytes
		length: 878 bytes
▼ General		length: 878 bytes
▼ General Request URL: https://10.21.64.126/thirdf	Reta/get0jStationUnit	length: 878 bytes
<pre>w General Request URL https://10.21.64.126/thirdl Request Method: POST</pre>	Beta/getQuisterLowborth	length: 878 bytes
▼ General Request URL https://10.21.64.126/third Request Method: POST Status Code ● 200 0K	DerargettejStelioNonth	length: 878 bytes
▼ General Request URL nttps://10.21.64.126/third Request Method: POST Status Code: ♥ 200 OK Remote Address 10.21.64.126:443		length: 878 bytes
▼ General Request URL https://10.21.64.126/third Request Method: POST Status Code ● 200 0K		length: 878 bytes
▼ General Request URL nttps://10.21.64.126/third Request Method: POST Status Code: ♥ 200 OK Remote Address 10.21.64.126:443		length: 878 bytes
<pre>* General Request URL</pre>		length: 878 bytes
General     Request URL https://10.21.64.126/tbird Request Method: POT Suture Code & 900 OC Remote Address: 10.21.64.125.443 Referer Policy: trict:origl=uben-cross- Persponse Headers: (12) Request Headers:     View source		length: 878 bytes
V General Request URL_nttps://10.21.64.326/third Request Methods POST Sutuce Code: 9 200 0 Remote Address 10.21.64.326.433 Referer Policy articlosing in-uben-cross- > Reguest Headers (12) Request Headers (22) Versioner Accept * 7		length: 878 bytes
* General Request URL=https://10.11.64.126/third Request URL=https://10.11.64.126/third Restants Code & 000 OC Remote Address: 10.21.64.128:443 Referer Policy: strict-origio-unen-cross- > Response Headers: Response Headers: Response Headers: Accept-rowadding: gisp, deflate, br		length: 878 bytes
General     Request URE_ <u>https://10.21.64.126/third</u> Request URE_ <u>https://10.21.64.126/third</u> Request Method: POST     Subta Code: © 200 C6.125.43     Remore Address: 10.21.64.126.443     Referer Policy artiticity figurate-incodes-     Request Headers (12)     Request Headers     Re		length: 878 bytes
<ul> <li>General Request URL5 https://10.21.04.10/third Request Method: POST Suito Code &amp; 900 OC Remote Address 10.21.04.126:433 Referer Policy strict-origin-when-cross- Referer Policy strict-origin-when-cross- Referer Rolling strict.com/com/com/com/com/ Accept Finceding: glip, deflate, br Accept shoulding: glip, deflate, br Accept shoulding: glip, deflate, br Accept set-slive</li> </ul>		length: 878 bytes
<ul> <li>General Request (Heldon #751 Status Cole: ● 300 OK Remote Address: 10.11.64.126.443 Referer Foliog: artitic origil=when-cross- leaders: Foliog: artitic origil=when-cross- leaders: Foliog: artitic origil=when-cross- leaders: Foliog: articleaders: a</li></ul>		length: 878 bytes
<ul> <li>General Request URL<sup>1</sup> https://10.21.64.126/third Request URL<sup>2</sup> https://10.21.64.126/third Request URL<sup>2</sup> https://10.21.64.126.421 Remove Neaders 10.21.64.126.423 Referer Nellog stitlc.ordgin=when-cross- Referer Nellog stitlc.ordgin=when-cross- Response Headers (12)</li> <li>Request Headers (1</li></ul>	-origin	
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<pre>* General Request URL</pre>	-origin	
General     Request Hild <u>https://i0.21.64.126/thtel</u> Request Hildmon Post     Status Code: <b>0</b> :200 0C     Remote Address: 10.11.64.126.413     Referer Folgic strict-origin-uken-cross-     Request Headers (12)     Request Headers (12)     Request Headers     Accept Jrg. doi:10.10.10.10.10.10     Context-longing gip, dof1ate, br     Accept Angeues theaders (12)     Context-longing gip, dof1ate, br     Accept Angeues theaders     Context-longing gip, dof1ate, br     Accept Angeues the Sile Context-Contigning     Context-longing gip, dof1ate, br     Headers     Heade	-origin Bodcogpdam6of1g855/ypirsqirvsalgrild7j5yy1j16f72bcakdegruqdmbs8m080m/gs7anghc3ispejchdqt3880a4aaBeeg; user_time_a_iang=; user_digitai_format+%2CM2303.00; timezome=; dd ; timezomes/fet=480; user_time_abou_atti; locale=h-cn; supersion=delete; JSSSJ001D-CBAA4CMAB0F001697C13707548000	
<pre>v General Request URL[<u>http://18.11.64.126/third</u> Request Method: PGT Sutus Code: 90 0 Remote Address: 10.11.64.126/third Referer Policy strictorig[in-uben-cross- PReprint Headers] Vers Surce Accept + 7m Accept Headers Vers Surce Content Ingent S1 Content Type scolicstion/joon Content S1 Content S1 C</pre>	-origin Bodcogpdam6of1g855/ypirsqirvsalgrild7j5yy1j16f72bcakdegruqdmbs8m080m/gs7anghc3ispejchdqt3880a4aaBeeg; user_time_a_iang=; user_digitai_format+%2CM2303.00; timezome=; dd ; timezomes/fet=480; user_time_abou_atti; locale=h-cn; supersion=delete; JSSSJ001D-CBAA4CMAB0F001697C13707548000	
* General Request Wild, <u>https://i0.21.64.126/t51rd</u> Request Wild, <u>https://i0.21.64.126/t51rd</u> Request Medice Post Static Oct © 200 OC Remote Address 10.21.64.126 Meters Filders strict.cord.glin.uken.cross- Megnest Hadder (12) Request Hadder (12) Request Hadder (12) Request Hadder (12) Content Length 17 Accept Lengings the Action of Accept Language the Output Accept Language the Output Accept Language the Output State Content Length 121 Content System State Content Length 121 Content System State Matt 10.21.46.128 Origin: cross-actes/Sat/Medicageets Sec-feth Deats enty	-origin Bodcogpdam6of1g855/ypirsqirvsalgrild7j5yy1j16f72bcakdegruqdmbs8m080m/gs7anghc3ispejchdqt3880a4aaBeeg; user_time_a_iang=; user_digitai_format+%2CM2303.00; timezome=; dd ; timezomes/fet=480; user_time_abou_atti; locale=h-cn; supersion=delete; JSSSJ001D-CBAA4CMAB0F001697C13707548000	
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* General Request Wild, <u>https://i0.21.64.126/t51/d</u> Request Wild, <u>https://i0.21.64.126/t51/d</u> Request Median PSdT Status Gode <b>\$25</b> Remote Address: 10.21.64.126 Meerar Moles strict.coriglinuden:cross- Meerar Moles strict.coriglinuden:cross- Meerar Moles strict.coriglinuden: <u>Meerar Moles strict.coriglinuden:</u> <u>Meerar Moles with strict.coriglinuden: AcceptFinceGode grip, def12te, br AcceptFinceGode grip, def12</u>	-origin Bończgstodnigf1g85:Mypirzepierusłanią7-joy/j1/4073ncadeprudmeisBno66nyg37anpc1iseg1f40dzj88804da8beej use_time_#_lang=; user_digital_formet=M2CM3N330.00; timezone=; doj j; timezoneoffset=480; user_time_bou_dyt-tj; locale=th-cn; bygsesion=delete; JSESSIONID=CBA4CD000F0010FSCE170F56E8000 Bcamagindilimicdofn	
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<pre>V General Request URL_ntts://10.21.64.126/thfrd Request URL_ntts://10.21.64.126/thfrd Request Method: POI Status Code: 0 = 00 0 Remote Address: 10.21.64.126.43 Referer Policy: artitic-origin-when-cross- Negrouse Headers (12) Request Headers: Over Source Accept 4-70 Accept 4-70 Connection: kees-alive Content-length: 0.01,20:pc-0.9 Connection: kees-alive Content-length: 0.1000-0.9 Connection: sees-alive Content-length: 0.1000-0.9 Connection: SeeSereet Host: 0.1100-0.0 See-fetch Mode cors See-fetch Mode cors See-fetch Ster newe</pre>	-origin Bończgstodnigf1g85:Mypirzepierusłanią7-joy/j1/4073ncadeprudmeisBno66nyg37anpc1iseg1f40dzj88804da8beej use_time_#_lang=; user_digital_formet=M2CM3N330.00; timezone=; doj j; timezoneoffset=480; user_time_bou_dyt-tj; locale=th-cn; bygsesion=delete; JSESSIONID=CBA4CD000F0010FSCE170F56E8000 Bcamagindilimicdofn	
* General Request WHG_MTEXP(JB.21.66.120/15/rdf Request WHGMTP/JD.21.66.120/15/rdf Status Code © 200 OF Remote Anderson 10.1.66.120:433 Referrer Policy strict-origin-sten-cross- P Regrams Hadders (12) (Regrams Hadder (12) (Regrams Hadder (12)) when source Accept :// Accept.incoding_gis, deflate, br Accept.incoding_gis, deflate,	-origin DorkogpdamkafigBSSS/yErsqlerussignig715vy1514672hCandeqruqdmbsBrn86nyhg72mpClipejinkdq188BankaBbeq user_tim_a_lmq=user_digital_format=R2CR3N230.00; timezom=; del u timezomerFret=48; user_time_nhow_diti; locale=n-cn; boyession=delete; JSSSSDND=CBAAKDA80070016FCEE374F566888 boxhaqindilimicoffn 8; Minde; x4) Applehebit/1537.36 (00THz, like Gecu) Chrome/87.d.4280.88 54fer1/377.36	
<pre>V General Request URL_ntts://10.21.64.126/thfrd Request URL_ntts://10.21.64.126/thfrd Request Method: POI Status Code: 0 = 00 0 Remote Address: 10.21.64.126.43 Referer Policy: artitic-origin-when-cross- Negrouse Headers (12) Request Headers: Over Source Accept 4-70 Accept 4-70 Connection: kees-alive Content-length: 0.01,20:pc-0.9 Connection: kees-alive Content-length: 0.1000-0.9 Connection: sees-alive Content-length: 0.1000-0.9 Connection: SeeSereet Host: 0.1100-0.0 See-fetch Mode cors See-fetch Mode cors See-fetch Ster newe</pre>	-origin DorkogpdamkafigBSSS/yErsqlerussignig715vy1514672hCandeqruqdmbsBrn86nyhg72mpClipejinkdq188BankaBbeq user_tim_a_lmq=user_digital_format=R2CR3N230.00; timezom=; del u timezomerFret=48; user_time_nhow_diti; locale=n-cn; boyession=delete; JSSSSDND=CBAAKDA80070016FCEE374F566888 boxhaqindilimicoffn 8; Minde; x4) Applehebit/1537.36 (00THz, like Gecu) Chrome/87.d.4280.88 54fer1/377.36	
* General Request Willing ************************************	-origin boʻrggpdamiqdigB95Yypirsqlervslgrig7j5vyjj146r?thcakdeorusAmsiBnv&hymg7zmphcSlapsjfrAdqtjB8BakdaaBaeq user_timslamp; user_digital_format=AlCNI3NI30.00; timezone; del ; timezonefriet=480; user_time_show_strl] locale=th-on; bypession=deleted; JSESSIONID=CBAAACDAB09701692CEJ709545800 boshagintilimicamtm 8; kin44; x41) Aqpikmexity737.36 (ONTW., like decko) Chrome/87.0.4280.00 Saferi/377.36 godamdaf71g9955fylirsqlerusalgnig7[j1yj1]f6r?thcakdearusAmsion-860ymg37mmhc31apdj1fd00446aBoeq	
* General Request WHG_MTEXP(JB.21.66.120/15/rdf Request WHGMTP/JD.21.66.120/15/rdf Status Code © 200 OF Remote Anderson 10.1.66.120:433 Referrer Policy strict-origin-sten-cross- P Regrams Hadders (12) (Regrams Hadder (12) (Regrams Hadder (12)) when source Accept :// Accept.incoding_gis, deflate, br Accept.incoding_gis, deflate,	-origin boʻrggpdamiqdigB95Yypirsqlervslgrig7j5vyjj146r?thcakdeorusAmsiBnv&hymg7zmphcSlapsjfrAdqtjB8BakdaaBaeq user_timslamp; user_digital_format=AlCNI3NI30.00; timezone; del ; timezonefriet=480; user_time_show_strl] locale=th-on; bypession=deleted; JSESSIONID=CBAAACDAB09701692CEJ709545800 boshagintilimicamtm 8; kin44; x41) Aqpikmexity737.36 (ONTW., like decko) Chrome/87.0.4280.00 Saferi/377.36 godamdaf71g9955fylirsqlerusalgnig7[j1yj1]f6r?thcakdearusAmsion-860ymg37mmhc31apdj1fd00446aBoeq	

## 5.1.4.4 Yearly Plant Data API

### **API Description**

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

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

For details about the data list that can be queried through this API, see the yearly plant data list below.

### **Request URL**

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

### **Request Mode**

HTTP method: POST

# **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
stationCode s	Plant ID list. Multiple plant IDs are separated by commas (,). The plant IDs are obtained from <b>plantCode</b> in <b>5.1.1.1</b> <b>Plant List API</b> .	String	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

Parameter		Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	stationCodes	Plant ID list in the request parameter	String	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data	Parameters	Returned data. The data contains the yearly data object list of each plant.	List	Yearly data list of the plant since its construc tion

Parame	ter	Description	Data Type	Remark s
	stationCode	Plant ID	String	-
	collectTime	Collection time, in milliseconds	Long	-
	dataltemMap	Content of each data item, which is returned in key- value format. For details about the data item list, see the yearly plant data list below.	Мар	-

## Yearly Plant Data List

Кеу	Name	Unit	Retur n Value Type	Remarks
installed_capacit y	Installed capacity	kW	Doubl e	
radiation_intensi ty	Global irradiation	kWh/m²	Doubl e	
theory_power	Theoretical yield	kWh	Doubl e	
performance_rat io	Performance ratio	%		
inverter_power	Inverter yield	kWh	Doubl e	The calculation of this indicator is inaccurate. The <b>inverterYield</b> is preferred.
ongrid_power	Feed-in energy	kWh	Doubl e	
use_power	Consumption	kWh	Doubl e	
power_profit	Revenue	The currency specified in the management system	Doubl e	

Кеу	Name	Unit	Retur n Value Type	Remarks
perpower_ratio	Specific energy (kWh/kWp)	h	Doubl e	
reduction_total_ co2	CO <sub>2</sub> emission reduction	Ton	Doubl e	
reduction_total_ coal	Standard coal saved	Ton	Doubl e	
reduction_total_ tree	Equivalent trees planted	N/A	Doubl e	
buyPower	Energy from grid	kWh	Doubl e	
chargeCap	Charged energy	kWh	Doubl e	
dischargeCap	Discharged energy	kWh	Doubl e	
selfUsePower	Consumed PV energy	kWh	Doubl e	
selfProvide	Energy consumed from PV	kWh	Doubl e	
PVYield	PV yield	kWh	Doubl e	
inverterYield	Inverter yield	kWh	Doubl e	

## Example

Request example:

```
{
```

}

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

Response examples:

Example 1: An error code is returned.

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

}

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

Example 2: Yearly plant data is returned.

```
ł
  "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":148320000000
     },
{
        "dataltemMap":{
          "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":148320000000
     }
  ],
"failCode":0,
  "params":{
     "stationCodes":"BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
     "collectTime":1501862400000,
     "currentTime":1503046597854
  },
   "message":null
}
```

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

	07-getKpiStationYear	Save 👻
	METHOD. SCHEME // HOST   '> PORT     PATH   '> QUERY	
	POST	🛪 Send 💌
	OUERY PARAMETERS	length: 48 byte(s)
	<ul> <li>QUERT PARAMETERS</li> </ul>	
	HEADERS 🗇 🔓 Form 👻 4 🕨 BODY 😳	Text 👻
	Content-Type     : application/json     x     2     "station/des": 108-3356441, IM=23564457     "collection": 16090237600	
	XSRF-TOKEN : x-mkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjt × 4	
	( + Add header ) P Add authorization	
	Text JSON XML HTML   🛬 Format body   🖬 Enable body evaluation	窗 length: 81 bytes
	Response	Elapsed Time: 108ms
H		Engrada Title, Tootha
	200 OK	
Г		
	> BODY <sup>(1)</sup>	pretty 👻
	전 • { data : [ { collectTime : 1546300000000, stationCode : "NE=33554441", dataItemMap : { radiation_intensity : null,}	
	A nara : [{ contectime : issosososososo, startonoue : ne=ssssawar, uarartemmap : { ranarton_incensity : noil,=}     S	
	22	
	lines nums	length: 881 bytes
Ŧ	General	
	Request URL: https://10.21.64.126/thirdData/getKpiStationYear Request Method: POST	
	Neuros mentos Posi- Status Code: © 200 0K	
	Remote Address: 10.21.64.126:443	
	Referer Policy: strict-origin-when-cross-origin	
	Response Headers (12)	
T.	Request Headers View source	
	Accept*/* Accept*nooding: grip, deflate, br	
	Accept-Language: :h-CN,:h;q=0.9	
	Connection: keep-alive	
	Content-Ength: 81 Content-Type: application/json	
	Contern ypre application juan Contern ypre application juan Cookier XSF-TVORINx-mkcilgelierkkild6bv9cpgsdem6gdflg895fypirsqlerusalgnz1g7zjsvj1j1f6r7zhcakdeqruq6mbs88nv86nvhgs7anphc5lepejrfu6qtj8808k40e8beq; user_time_a_lange; user_digital_format=%2KX3M2	30.00; timezone=; delimiter=-; format=vvv
	-10%-dd%20Mt%R3Amm%3Ass; timemode=server; timezoneoffset=480; user_time_show_dst=1; locale=zh-cn; bspsession=deleted; JSESSIONID+CBA44CD48D8FD816F9CEE376F56E80E0	
	Host: 10.21.64.126	
	Origin: chrome-extension://adjoelaoggembcanagindlilanicdmfm See-fetch-Deut: empty	
	Sec-Feth-Mode cors	
	Sec-Fetch-Sites none	
	User-Agent: Mozills/S.0 (Windows MT 10.0; Wind4; x64) AppleNebKit/337.36 (001%, like Gecko) Chrome/87.0.4280.88 Safari/S37.36	
	KSHF-TOKIN x-mcc4ll9glisr2k6l060v9cpgdqm6q6fjg8955fyirsqlerusalgn1g72jivyj1if6r72thcakeqruq60b380v66nyhg57mphc5lepsjzfw6qtj880b46a8Deq	
Y	Request Psyload view parsed	
	\ "stationCodes" : "NE-33554441,NE-3355445",	
	"collectTime" : 1688023875000	

## 5.1.4.5 Daily Device Data API

### **API Description**

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

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

For details about the data list that can be queried through this API, see the daily device data list below.

### **Request URL**

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

## **Request Mode**

HTTP method: POST

# **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
devlds	List of device IDs. The device IDs are obtained from <b>id</b> in <b>5.1.1.2 Device List</b> <b>API</b> . Use commas (,) to separate multiple device IDs. Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
devTypeld	Device type ID. The values of <b>devTypeld</b> obtained in <b>5.1.1.2 Device List API</b> are used. The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param s	Parameters	-	-	-

Parame	ter	Description	Data Type	Remark s
	devlds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
messag	e	Optional message	String	-
data	Parameters	Returned data. The data contains the daily data object list of each device.	List	List of daily device data in a month
	devId	Device ID	Long	-
	sn	Device SN	String	
	collectTime	Collection time, in milliseconds	Long	-
	dataltemMap	Content of each data item, which is returned in the key- value format. The data item content varies depending on the device type. For details about the data item list, see the daily device data list below.	Мар	Data of a device in a day

#### Daily Device Data List

Device Type	Кеу	Name	Unit	Return Value Type
ID: 39 Residential battery	charge_cap	Charged energy	kWh	Double
	discharge_cap	Discharged energy	kWh	Double
	charge_time	Charging duration	h	Double

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

## Examples

Request example:

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

Response example:

Example 1: An error code is returned.

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

Example 2: Daily device data is returned.

```
"success":true,
"data":[
{
"dataItemMap":{
"installed_capacity":30.24,
"perpower_ratio":9.921,
```

{

```
"product_power":300
        },
        "devld":213472461631079,
        "collectTime":1501776000000
     },
{
        "dataltemMap":{
           "installed_capacity":30.24,
          "perpower_ratio":0.543,
"product_power":16.43
       },
"devid":214060404588862,
        "collectTime":1501776000000
     }
  ],
"failCode":0,
  "params":{
     "devlds":"214060404588862,213472461631079",
     "devTypeId":1,
     "collectTime":1501862400000,
     "currentTime":1503046597854
  },
"message":null
}
```

### D NOTE

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

11-getDevKpiDay		Save -
	AE // HOST [ ^ PORT ] [ PATH [ ^ P QUERY ]]	
POST - A https	//10.21.64.126/thirdData/getDevKpiDay lengtit: 43 byte(s)	🖪 Send 🔫
▶ QUER	PARAMETERS aurgust> oy re(-)	
HEADERS <sup>(1)</sup> I <sup>A</sup>	Form - + BODY <sup>(1)</sup>	Text +
Content-Type	: application/json × 2 "devIds" : "100000033554447",	
	3 "devTypeId": 38.	
XSRF-TOKEN	: x=mkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgnz1g7zjt × 5	
+ Add header P Add author	zation 😭	
	Text JSON XML HTML   ⇒ Format body   ♥ Enable body evaluation	😑 length: 83 bytes
D		
Response		Elapsed Time: 226ms
200 OK		
<ul> <li>BODY <sup>(3)</sup></li> </ul>		pretty 👻
[13]		
전 9	<pre>ilCode : 0, message : null, params : { currentTime : 1608023742798,}</pre>	
2		
lines nums		length: 164 bytes
* General		
Request URL: https://10.21.64.1 Request Method: POST	<i>lő/thirdBata/getDevKpIDay</i>	
Status Code: • 200 OK		
Remote Address: 10.21.64.126:44	3	
Referrer Policy: strict-origin-wh	m-cross-origin	
Response Headers (12)		
Request Headers view source		
Accept: "/" Accept-Encoding: gzip, deflate,	br	
Accept-Language: zh-CN, zh;q=0.1		
Connection: keep-alive		
Content-Length: 83		
Content-Type: application/json	erikklößöväcpgdamäapfigössöfysirsaalerusalgarig7zisvylijför7zhcakdegruadmissömvödnyhgz7anphc5lepejifwäctjööökkdaaBbeaj user_time_a_langu; user_digital_format+R2CK13N230.00; timezone-	. delimiteres: formateur
	<pre>centre: the control of the cont</pre>	,
Host: 10.21.64.126		
Origin: chrome-extension://aejo	:laoggembcahagimdilamlcdmfm	
Sec-Fetch-Dest: empty		
Sec-Fetch-Mode: cons Sec-Fetch-Site: none		
	s NT 10.0; Win64; x64) AppleMebKit/537.36 (WHTML, like Gecko) Chrome/87.0.4280.88 Safar1/537.36	
	080v9cpgpdqmdq4fg89s5fypirsqlerusalgnz1g7zjsvylj1f46r7zhcakoeqruq0mbss8nv86nymgs7anphc5lepejsFnkqtj880bk6o80beq	
Request Payload view parsed		
{		
"devIds" : "10000000335544 "devTypeId":38,	<i>d</i> *,	
"collectTime" : 1606237462	89	
)		

# 5.1.4.6 Monthly Device Data API

## **API Description**

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

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

For details about the data list that can be queried through this API, see the monthly device data list below.

## **Request URL**

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

### **Request Mode**

HTTP method: POST

### **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
devlds	List of device IDs. The device IDs are obtained from <b>id</b> in <b>5.1.1.2 Device List</b> <b>API</b> . Use commas (,) to separate multiple device IDs. Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
devTypeld	Device type ID. The values of <b>devTypeld</b> obtained in <b>5.1.1.2 Device List API</b> are used. The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error</b> <b>Code List</b> .	Integer	-
param	Parameters	-	-	-
S	devlds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
message	2	Optional message	String	-
data Parameters		Returned data. The data contains the monthly data object list of each device.	List	List of monthly device data in a year
	devld	Device ID	Long	-
	sn	Device SN	String	
	collectTime	Collection time, in milliseconds	Long	-

Parameter		Description	Data Type	Remark s
data	ltemMap	Content of each data item, which is returned in the key- value format. The data item content varies depending on the device type. For details about the data item list, see the monthly device data list below.	Мар	Data of a device in a month

### Monthly Device Data List

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

# Examples

Request example:

{

}

```
"devids":"214060404588862,213472461631079",
"devTypeId":1,
"collectTime":1501862400000
```

Response example:

Example 1: An error code is returned.

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

Example 2: Monthly device data is returned.

```
{
  "success":true,
  "data":[
    {
       "dataltemMap":{
          "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
       "collectTime":1501516800000
    }
 ],
"failCode":0,
  "params":{
     "devIds":"214060404588862,213472461631079",
     "devTypeId":1,
    "collectTime":1501862400000,
     "currentTime":1503046597854
  },
"message":null
}
```

### **NOTE**

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:



## 5.1.4.7 Yearly Device Data API

### **API Description**

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

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

For details about the data list that can be queried using this API, see **#EN-US\_TOPIC\_0000001701648221/p2057810145254**.

### **Request URL**

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

### **Request Mode**

HTTP method: POST

## **Request Parameters**

Parameter	Description	Data Type	Mandato ry/ Optional
devlds	List of device IDs. The device IDs are obtained from <b>id</b> in <b>5.1.1.2 Device List</b> <b>API</b> . Use commas (,) to separate multiple device IDs. Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
sns	Device SN list. Multiple device SNs are separated by commas (,). Either <b>sns</b> or <b>devIds</b> must be set.	String	Optional
devTypeId	Device type ID The following device types are supported: 1: string inverter 38: residential inverter 39: battery 41: ESS	Integer	Mandato ry
collectTime	Collection time, in milliseconds	Long	Mandato ry

## **NOTE**

Before obtaining data, you must configure related counters.

Parame	ter	Description	Data Type	Remark s
success		Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode		Error code Value <b>0</b> indicates that the status is normal. For definitions of other error codes, see <b>6.1 Error Code</b> <b>List</b> .	Integer	-
param s	Parameters	-	-	-

Parame	ter	Description	Data Type	Remark s
	devlds	Device ID list in the request parameter	String	-
	sns	Device SN list in the request parameter	String	-
	devTypeId	Device type ID in the request parameter	Integer	-
	collectTime	Collection time in milliseconds in the request parameter	Long	-
	currentTime	Current system time, in milliseconds	Long	-
messa ge	-	Optional message	String	-
data	Parameters	Returned data. The data contains the yearly data object list of each device.	List	Data list of each year since the device is connect ed
	devId	Device ID	Long	-
	sn	Device SN	String	
	collectTime	Collection time, in milliseconds	Long	-
	dataltemMap	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 <b>#EN-</b> <b>US_TOPIC_0000001701648</b> <b>221/p2057810145254</b> .	Мар	Data of a device in a year

Yearly Device Data List

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

## 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":"2140604045888862,213472461631079",
        "devTypeId":1,
        "collectTime":1501862400000,
        "currentTime":1503046597854
    },
    "message":null
}
```

Example 2: Yearly device data is returned.

{
 "success":true,

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

### **NOTE**

Prerequisites for obtaining data: The API account has the permission to access this API. Request example:

13-getDevKpiYear			Save
			Save
METHOD SCHEME :// HOST [ '.' PORT ] [ PATH [ '7' QUERY ]]			
POST - https://10.21.64.126/thirdData/getDevKpiYear			🖪 Send 👻
QUERY PARAMETERS			length: 44 byte(s)
HEADERS <sup>(1)</sup> 12	Form 👻 4	▶ BODY <sup>©</sup>	Text +
Content-Type : application/json	×	1 { 2 'devIds' : "1000000033554447",	
XSRF-TOKEN     Xmkc4il9glier2k6l06bv9cpgpdqm6qdflg89s5fypirsqqlerusalgna		3 [devTypeId":38, 4 [collectTime": 1606237462000	
XSR-LOKEN	zig/zje x	5	
+ Add header P Add authorization	8		
		Text JSON XML HTML   > Format body   Z Enable body evaluation	😰 length: 83 bytes
Response			Elapsed Time: 162ms
200 OK			
▶ BODY <sup>(1)</sup>			pretty 👻
<pre></pre>	tombor ( [setallo	f constitute will 1	
07 ■ { data : [ { devId : 1000000033554447, collectTime : 1546300800000, data]	commp : ( instanto	copacity : marrief	
2			
lines numa			length: 445 bytes
* General			
Request URL: https://10.21.64.126/thirdData/getDevKpiYear			
Request Method: POST Status Code: • 280 0K			
Status Code: • 200 UK Remote Address: 10.21.64.126:443			
Referrer Policy: strict-origin-when-cross-origin			
▶ Response Headers (12)			
Request Headers view source			
Accept: */*			
Accept-Encoding: gzip, deflate, br			
Accept-Languages zh-CN,zh;q=0.9 Connection: keep-slive			
Content-Length: 83			
Content-Type: application/json			
Cookie: XSRF-TOKEN+x-mkc4i19glier2k6106bv9cpgpdqm6qdf1g89s5fypirsqqlerusalgnz1g7zjsvy1j1f6r7zhcakdeqru			\$230.00; timezone=; delimiter=-; format=yy;
-VM-dd%20HH%3Amm%3Ass; timemode=server; timezoneoffset=480; user_time_show_dst=1; locale=zh-cn; bspse Host 10.21.64.126	ssion-deleted; JSESSIO	ID+CBAA4CDABD8FD016F9CEE3/6F56E88E0	
Origin: chrome-extension://aejoelaoggembcahagimdiliamlcdmfm			
Sec-Fetch-Dest: empty			
Sec-Fetch-Mode: cons			
Sec-Fetch-Site: none User-Agent: Mozilla/5.0 (Windows NT 10.0; Win54; x64) AppleWebKit/537.36 (WHTML, like Gecko) Chrome/87	. 0 4280 88 Safar1/537	16	
XSRF-TOKEN: x-mcc4i19glier2k6106bv9cpgpdqm6qdf1g89s5fypirsqqlerusalgnz1g7zjsvy1j1f6r7zhcakdeqruq6mbs			
* Request Payload view parsed			
{			
"devIds" : "100000033554447",			
"devTypeId":38, "collectTime" : 1606237462000			

# **5.2 Control APIs**

Plants and devices can be remotely controlled through open APIs. This function is available only in OAuth Connect mode.

# 5.2.1 API for Delivering Battery Charge and Discharge Tasks

## **API Description**

This API is used to deliver battery charge and discharge tasks based on plant codes. A task can be delivered to a maximum of 100 plants at a time. If there are multiple ESSs in the power plant, the task is executed on every ESS.

The battery charge and discharge task does not change the original working mode of the battery. After the task is complete, the battery continues to work in the original working mode.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

For details about the scenario-based practices of this API, see **7.5 Scenario-based Practices of Battery Scheduling**.

### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v2/ control/charge-and-discharge/async-task

### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
tasks	List of battery charge and discharge tasks. A maximum of 100 plants can be delivered at a time.	List	Μ
> plantCode	Plant code, which is obtained from <b>plantCode</b> in <b>5.1.1.1 Plant List</b> <b>API</b> .	String	Μ

Parameter	Description	Data Type	Mandatory/ Optional
> dispatchSwitch	Charge/Discharge switch. 0: stop forced charge and discharge 1: forced charge 2: forced discharge	Integer	M
> controlType	1: SOC control. The target SOC is set in the forced charge/discharge command. Legacy versions may need an update to support SOC control. 2: duration control. The duration is set in the forced charge/ discharge command.	Integer	Optional for stopping forced charge/discharge.
> targetSOC	Target SOC for charge/discharge, in percentage.	Double	Optional. This parameter is mandatory for SOC control.
> dispatchTime	Charge/Discharge duration in minutes. Value range: [0,1440]	Integer	Optional. This parameter is mandatory for time control.
> powerDispatch	Power of forced charge and discharge in watt. If the value exceeds the range, the maximum value is used. The value should be greater than 0 during forced charge and smaller than 0 during forced discharge.	Integer	Optional. If this parameter is left blank, the default power is used for charge and discharge. Range of <b>powerDispatch</b> : [– maximum discharge power, maximum charge power]

### NOTICE

- This API will change the device running parameters. Exercise caution when invoking this API.
- The LG battery does not support SOC control.
- When a task is not complete (that is, the status bit is 1), the same signals cannot be sent to the device corresponding to the task.
- This API can only be used to control the residential ESS.
- When the battery is disconnected, charge and discharge tasks cannot be delivered to the battery.

Parameter	Description	Data Type	Remarks
success	Request success or failure flag <b>true</b> : The request succeeded. <b>false</b> : The request failed.	Boolean	Request success or failure flag
failCode	Error code <b>0</b> : successful; <b>1</b> : partially successful; <b>2</b> : failed	Integer	-
message	Description of the API returned content	String	-
data	Returned data for each request.	-	-
> requestID	Unique ID of a requested task, which can be used to query the task delivery result.	Long	-
> result	Task result	List	-
>> plantCode	Plant ID	String	-
>> sn	Inverter SN	String	-
>> dispatchResult	Charge/Discharge task delivery result	Integer	<ul> <li>0: The task is received successfully.</li> <li>1: The task fails to be received.</li> </ul>
>> subTaskId	Unique subtask ID	String	-

Parameter	Description	Data Type	Remarks
>> description	Delivery result description	String	-

## **API Error Code List**

No.	Error Code	Description
1	305	You are not online and need to log in again.
2	401	You do not have the related data API permission.
3	407	The API access frequency is too high.
4	1	The task is partially successful.
5	2	The task fails.

### **Examples**

Request example (the first task is time control and the second task is SOC control.)

```
{
 "tasks": [
   {
    "plantCode": "NE=12345678",
    "dispatchSwitch": 1,
    "controlType": 2,
"dispatchTime": 600,
    "powerDispatch": 5000
   },
   {
    "plantCode": "NE=23456789",
    "dispatchSwitch": 1,
    "controlType": 1,
"targetSOC": 100,
    "powerDispatch": 5000
  }
]
}
```

Response examples:

Example 1: The task fails.

```
{
	"data": null,
	"failCode": 2,
	"message": "Battery charge and discharge task list is empty.",
	"success": false
}
```

Example 2: The task fails.

{
 "data": {
 "requestID": null,

```
"result": [
        {
           "plantCode": "NE=12345678",
           "sn": null,
           "dispatchResult": 1,
           "subTaskId": null,
           "description": "PowerDispatch is illegal. The value should be greater than 0 during forced charge
(dispatchSwitch = 1) and smaller than 0 during forced discharge (dispatchSwitch = 2)."
        },
        {
           "plantCode": "NE=23456789",
           "sn": null,
           "dispatchResult": 1,
           "subTaskId": null,
           "description": "DispatchSwitch is illegal, valid value: 0 or 1 or 2"
        }
     ]
  },
"failCode": 2,
  "message": "Failed to deliver the battery charge/discharge task.",
  "success": false
}
```

Example 3: The task is partially successful.



Example 4: The task is successful.

```
"data": {
  "requestID": 9694030627470695,
  "result": [
     {
        "plantCode": "NE=12345678",
        "sn": "5fbfk4"
        "dispatchResult": 0.
        "subTaskId": "4203991658344402",
        "description": null
     },
     {
        "plantCode": "NE=23456789",
        "sn": "6fbfk11"
        "dispatchResult": 0,
        "subTaskId": "1828180425476906",
        "description": null
```

```
}
]
},
"failCode": 0,
"message": "The battery charge/discharge task is delivered successfully.",
"success": true
```

# 5.2.2 API for Querying Battery Charge and Discharge Tasks

## **API Description**

This API is used to query the execution status of battery charge and discharge tasks based on requestID. One task can be queried at a time.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

### **Request URL**

https://Domain name of the management system/rest/openapi/pvms/v1/vpp/ chargeAndDischargeStatus

### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
requestID	Unique ID of the requested task. The value can be obtained from <i>requestID</i> in 5.2.1 API for Delivering Battery Charge and Discharge Tasks.	Long	Μ

#### NOTICE

• If the charging and discharging task information of the battery in the plant changes, the task is processed as an exception (**status** is **0**). The exception information is described in **message**.

Parameter	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeded. false: The request failed.	Boolean	Request success or failure flag
failCode	Error code Value <b>0</b> indicates that the status is normal. For other error codes, see <b>API</b> <b>Error Code List</b> .	Integer	-
message	Optional message	String	-
data	Returned data for each request.	Мар	-
> plantCode	Plant ID	String	-
> sn	Inverter SN	String	-
> remoteID	Unique subtask ID	String	-
> status	Event status. The execution status is updated every 3 minutes. If the task is not completed within 24 hours, the task times out.	Integer	<ul><li>0: complete</li><li>1: in progress</li><li>2: timeout or failure</li></ul>
> chargedCapacity	Amount of power that has been forcibly charged into batteries. If <b>dispatchSwitch</b> is not 1, null is returned.	Double	kWh
> dischargedCapaci- ty	Amount of power that has been forcibly discharged from batteries. If <b>dispatchSwitch</b> is not 2, null is returned.	Double	kWh
> execStartTime	Time when a task is received, including the time zone information	String	2020-02-06T00:00: 00+08:00

Parameter	Description	Data Type	Remarks
> execEndTime	Time when a task is completed, including the time zone information. If a task is not completed, null is returned.	String	2020-02-06T00:00: 00+08:00
> message	Task result description	String	-

## **API Error Code List**

No.	Error Code	Description
1	305	You are not online and need to log in again.
2	401	You do not have the related data API permission.
3	407	The API access frequency is too high.
4	20044	The unique ID of a charge/discharge task cannot be empty.
5	20050	The charge/discharge task query parameter does not exist.

## **Examples**

Request example:

{ "requestID": 432523532523 }

Response examples:

Example 1: An error code is returned.

```
{
    "success": false,
    "data": null,
    "failCode": 20008,
    "message": null
}
```

Example 2: The task status data is returned.

```
{
    "success":true,
    "failCode":0,
    "message":null,
    "data":[
        {
            "plantCode":"NE=12345678",
            "sn":"5fbfk4",
            "remoteID":"12345678",
            "status":0,
            "chargedCapacity":1000,
```


# 5.2.3 API for Delivering a Task for Setting the Battery Working Mode

#### **API Description**

This API is used to set the working mode of plant-level batteries based on the plant DN. A task supports a maximum of 10 plants. Different parameters can be delivered to each plant.

The networking of a single controller (Dongle, EMMA, distributed SmartLogger, and direction connection of inverters) in a plant is supported. The battery working mode can be set to **maximumSelfConsumption** or **TOU**.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v1/ control/battery/mode/async-task

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
tasks	List of the tasks for setting the battery working mode. A task can be delivered to a maximum of 10 plants at a time.	List	Μ
> plantCode	Plant DN.	String	Μ

Parameter	Description	Data Type	Mandatory/ Optional
> operationMode	Working mode.	String	М
	TOU: time of use		
	maximumSelfConsum ption: maximum self- consumption		
	If this parameter is set to <b>TOU</b> , you can manually set the charge and discharge time segments. This mode applies to the PV+ESS system and ESS-only system where electricity prices at peak and off-peak hours are different and power meters are available.		
	If this parameter is set		
	to maximumSelfConsu mption, PV power is preferentially supplied to loads and the surplus power is used to charge batteries. If the ESS is fully charged or is being charged at full power, the surplus PV energy is fed to the power grid. When PV power is insufficient or no PV power can be generated at night, the ESS discharges power to loads. This improves the self- consumption rate and energy self-sufficiency rate, and reduces electricity costs. The grid cannot charge the ESS but can supply power to loads. This mode applies to areas		

Parameter	Description	Data Type	Mandatory/ Optional
	where the FIT subsidy is low or unavailable. The PV+ESS system generates sufficient PV power for loads and uses the surplus PV power to charge the ESS (if the PV power is insufficient for loads, the TOU mode is recommended).		

Parameter	Description	Data Type	Mandatory/ Optional
Parameter    redundantPVEner- gyPriority	Preferred use of String		
	scenario where the FIT is higher than the electricity price and the grid cannot charge the ESS. <b>chargePreference</b> : When the PV power is		
	greater than the load power, the surplus PV energy is used to charge the batteries. After the maximum charge power is reached or the batteries are fully charged, the surplus PV energy is fed to the grid.		

Parameter	Description	Data Type	Mandatory/ Optional
> allowedAcCharge- Power	Maximum power for charging batteries from grid (kW).	Double	Optional (This parameter is available when
	The value range of this parameter is related to the controller in the plant. The value ranges are as follows:		operationMode is set to TOU.)
	Dongle: [0.000, 30.000]		
	EMMA: [0.000, 50.000]		
	SmartLogger: [0.000, 50000.000]		
	Inverter: [0.000, upper limit for the maximum power for charging batteries from grid]		
	This parameter is used to set the maximum power for charging batteries from the power grid.		
> chargingAndDisch argingTimeWindo w	Charge/Discharge time window. Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set.	List	Optional (This parameter must be set when <b>operationMode</b> is set to <b>TOU</b> .)
	For the same plant, multiple overlapped time segments cannot be set on the same day.		
>> startTime	Start time, in HH:MM format. Value range: 00:00– 23:59	String	М
>> endTime	End time, in HH:MM format. Value range: 00:00– 23:59	String	М

Parameter	Description	Data Type	Mandatory/ Optional
>> chargeOrDischarg e	Charge/Discharge Charge Discharge	String	М
>> repeat	Repeat date. A maximum of seven dates can be set for each plant.	List	Μ
	1: Monday		
	2: Tuesday		
	3: Wednesday		
	4: Thursday		
	5: Friday		
	6: Saturday		
	7: Sunday		

#### NOTICE

- This API will change the device running parameters. Exercise caution when calling this API.
- Do not send a new task to the same plant when the task is not complete (that is, the status is **RUNNING**).
- For the same plant, multiple overlapped time segments cannot be set on the same day.
- The battery working mode cannot be set for LG batteries.
- For a PV plant, if **operationMode** is set to **TOU**, the **chargingAndDischargingTimeWindow** parameter must be set.
- When the controller in the plant is disconnected, the task of setting the battery working mode cannot be delivered to the plant.

Parameter	Description	Data Type	Remarks
success	Request success or failure flag.	boolean	Request success or failure flag
	<b>true</b> : The request succeeded.		
	false: The request failed.		

Parameter	Description	Data Type	Remarks
failCode	Error code. 0: successful; 1: partially successful; 2: failed	Integer	-
message	Description of the API returned content.	String	-
data	Returned data for each request, including the following information:	-	-
> taskld	Unique ID of a requested task, which can be used to query the task delivery result.	String	-
> result	Task delivery result.	List	-
>> plantCode	Plant DN.	String	-
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. FAIL: The task
			fails to deliver to the plant.
>> message	Delivery result description.	String	-

{

Request example (The first task is set to **maximumSelfConsumption** and the second task is set to **TOU**.):

```
"tasks":[
  {
     "plantCode":"NE=123456789",
      "operationMode":"maximumSelfConsumption"
  },
  {
     "plantCode":"NE=234567891",
     "operationMode":"TOU",
     "redundantPVEnergyPriority":"fedToGridPreference",
     "allowedAcChargePower":10,
"chargingAndDischargingTimeWindow":[
        {
           "startTime":"00:00",
"endTime":"02:00",
           "chargeOrDischarge":"charge",
           "repeat":[
              2,
3
           ]
        },
```

```
{
    "startTime":"00:00",
    "endTime":"05:00",
    "chargeOrDischarge":"charge",
    "repeat":[
        5,
        6
    ]
    }
  ]
}
```

Response example:

}

Example 1: The task fails.

```
{
    "failCode": 2,
    "success": false,
    "message": "Exist no permission resources. plantCodes: [NE=123456789, NE=234567891]",
    "data": null
}
```

Example 2: The task fails.

```
"failCode": 2.
  "success": false,
  "message": "Failed to deliver the battery mode control task.",
  "data": {
     "taskId": null,
     "result": [
        {
          "plantCode": "NE=123456789",
          "status": "FAIL",
           "message": "The input parameter is out of the valid range, operationMode in:
[maximumSelfConsumption, TOU]"
        },
        {
           "plantCode": "NE=234567891",
          "status": "FAIL",
          "message": "The startTime and endTime of multiple days overlap."
        }
     ]
  }
}
```

Example 3: The task fails.

```
{
    "exceptionId":"framwork.remote.Paramerror",
    "exceptionType":"ROA_EXFRAME_EXCEPTION",
    "descArgs":null,
    "reasonArgs":[
        "tasks"
    ],
    "detailArgs":[
        "tasks size must be between 1 and 10"
    ],
    "adviceArgs":null
}
```

Example 4: The task is partially successful.

"failCode": 1, "success": true,

{

```
"message": "The battery mode task is partially delivered successfully.",
"data": {
   "taskId": "5882491459219785",
   "result": [
     {
        "plantCode": "NE=123456789",
        "status": "FAIL",
        "message": "The configured value is the same as the current value."
     },
     {
        "plantCode": "NE=234567891",
        "status": "RUNNING",
        "message": null
     }
  ]
}
```

Example 5: The task is successful.

```
"failCode": 0.
"success": true,
"message": "The battery mode task is delivered successfully.",
"data": {
   "taskld": "2839011389499814",
  "result": [
     {
        "plantCode": "NE=123456789",
        "status": "RUNNING",
        "message": null
     },
     {
        "plantCode": "NE=234567891",
        "status": "RUNNING",
        "message": null
     }
  ]
}
```

# 5.2.4 API for Querying a Task for Setting the Battery Working Mode

#### **API Description**

This API is used to query the execution status of the task for setting the battery working mode based on the task ID. Only one task can be queried at a time.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v1/ control/battery/mode/task-info

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
taskld	Unique ID of the requested task, which can be obtained from taskId in 5.2.3 API for Delivering a Task for Setting the Battery Working Mode. The value contains 16 characters.	String	Μ

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. The value <b>true</b> indicates that the request is successful, and the value <b>false</b> indicates that the request fails.	boolean	Request success or failure flag
failCode	Error code. Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error Code</b> List.	Integer	-
message	Request description. When the value of <b>failCode</b> is <b>0</b> , the request failure description is returned. In other cases, null is returned.	String	-
data	Returned data for each request, including the following information:	Object	-
> dispatchResult	dispatchResult contains the list of returned information about request execution, including the following information:	List	-
>> plantCode	Plant DN.	String	-

Parameter	Description	Data Type	Remarks
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. SUCCESS: The task is successfully delivered to the plant. FAIL: The task fails to deliver to the plant.
>> message	Request description. When the value of <b>status</b> is <b>FAIL</b> , the description of the plant delivery failure is returned. In other cases, no description is returned.	String	FAILURE: The delivery fails. TIMEOUT: A timeout occurs. BUSY: The device is busy. INVALID: The device is invalid. EXCEPTION: An exception occurs.
>> operationMode	Working mode.	String	TOU: time of use maximumSelfCon sumption: maximum self- consumption
>> redundantPVEner- gyPriority	Preferred use of surplus PV power.	String	fedToGridPrefer- ence: The power is fed to the grid preferentially. chargePreference: Charging is preferred.
>> allowedAcCharge- Power	Maximum power for charging batteries from grid (kW).	Double	-
>> chargingAndDisch argingTimeWindo w	Charge/Discharge time window.	List	-
>>> startTime	Start time.	String	Format: HH:MM
>>> endTime	End time.	String	Format: HH:MM

Parameter	Description	Data Type	Remarks
>>> chargeOrDischarg e	Charge/Discharge	String	Charge Discharge
>>> repeat	Repeated date.	List	1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
> startTime	Time when a task is received, including the time zone information.	String	2020-02-06T00:00 :00+08:00
> endTime	Time when a task is completed, including the time zone information. If a task is not completed, null is returned.	String	2020-02-06T00:00 :00+08:00

Request example:

```
{
"taskld": "3051190140256431"
}
```

Response examples:

{

Example 1: An error code is returned.

```
"failCode": 20620,
"success": false,
"message": "The taskId is not exist.",
"data": null
```

Example 2: An exception is returned.

```
{
    "exceptionId": "framwork.remote.Paramerror",
    "exceptionType": "ROA_EXFRAME_EXCEPTION",
    "descArgs": null,
    "reasonArgs": [
        "taskId"
    ],
    "detailArgs": [
        "taskId may not be null"
    ],
    "adviceArgs": null
}
```

```
"failCode": 0,
  "success": true,
  "message": "The battery mode task status queried successfully.",
  "data": {
     "dispatchResult": [
        {
           "plantCode": "NE=234567891",
           "status": "RUNNING",
           "message": null,
           "operationMode": "TOU",
          "redundantPVEnergyPriority": "fedToGridPreference",
           "allowedAcChargePower": 10,
           "chargingAndDischargingTimeWindow": [
             {
                "chargeOrDischarge": "charge",
                "repeat": [
                  2,
                  3
                ],
                "startTime": "00:00",
                "endTime": "02:00"
             },
             {
                "chargeOrDischarge": "charge",
                "repeat": [
                  5,
                  6
                ],
                 "startTime": "00:00",
                "endTime": "05:00"
             }
          ]
        }
     ],
     "startTime": "2024-02-29T23:02:49+08:00",
     "endTime": null
  }
}
```

Example 3: The returned task status is **RUNNING**.

Example 4: The returned task status is FAIL.

```
"failCode": 0,
"success": true,
"message": "The battery mode task status queried successfully.",
"data": {
   "dispatchResult": [
     {
        "plantCode": "NE=234567891",
        "status": "FAIL",
        "message": "TIMEOUT",
        "operationMode": "TOU"
        "redundantPVEnergyPriority": "fedToGridPreference",
        "allowedAcChargePower": 10,
        "chargingAndDischargingTimeWindow": [
          {
              "chargeOrDischarge": "charge",
              "repeat": [
                2,
                3
             ],
             "startTime": "00:00",
             "endTime": "02:00"
          },
{
             "chargeOrDischarge": "charge",
             "repeat": [
```

```
5,
                   6
                ],
                "startTime": "00:00",
"endTime": "05:00"
             }
          ]
        }
     ],
     "startTime": "2024-02-29T23:02:49+08:00",
     "endTime": "2024-02-29T23:02:55+08:00"
  }
}
Example 5: The returned task status is SUCCESS.
  "failCode": 0,
  "success": true,
  "message": "The battery mode task status queried successfully.",
  "data": {
      "dispatchResult": [
        {
           "plantCode": "NE=234567891",
          "status": "SUCCESS",
           "message": null,
           "operationMode": "TOU",
           "redundantPVEnergyPriority": "fedToGridPreference",
          "allowedAcChargePower": 10,
           "chargingAndDischargingTimeWindow": [
             {
                "chargeOrDischarge": "charge",
                "repeat": [
                   2.
                   3
                1,
                "startTime": "00:00",
                "endTime": "02:00"
             },
                "chargeOrDischarge": "charge",
                "repeat": [
                   5,
                   6
                ],
                "startTime": "00:00",
                "endTime": "05:00"
             }
          ]
       }
     ],
     "startTime": "2024-02-29T23:02:49+08:00",
      "endTime": "2024-02-29T23:02:55+08:00"
  }
```

# 5.2.5 API for Delivering a Task for Setting Battery Parameters

#### **API Description**

This API is used to deliver the task for setting plant-level energy battery parameters (end-of-charge SOC, end-of-discharge SOC, maximum charge power, and maximum discharge power) based on plant DNs. A task supports a maximum of 10 plants. Different parameters can be delivered to each plant.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v1/ control/battery/configuration/async-task

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
tasks	List of battery parameter setting tasks. A task can be delivered to a maximum of 10 plants at a time.	List	М
> plantCode	Plant DN.	String	М
> batteryConfigur- ationInfo	Valid parameters for setting battery parameters.	Object	М
>> endOfChargeSoc	End-of-charge SOC (unit: %). Value range: [90.0, 100.0]	Double	Optional (At least one of the four parameters must be set.)
>> endOfDischargeSo c	End-of-discharge SOC (unit: %). Value range: [0.0, 20.0]	Double	
>> maximumChargeP ower	Maximum charge power (unit: W). Value range: [0, upper limit of maximum charge power] If the delivered maximum charge power is greater than the upper limit of the maximum charge power, the upper limit is used by default.	Integer	

Parameter	Description	Data Type	Mandatory/ Optional
>> maximumDischar gePower	Maximum discharge power (unit: W).	Integer	
	Value range: [0, upper limit of maximum discharge power]		
	If the delivered maximum discharge power is greater than the upper limit of the maximum discharge power, the upper limit is used by default.		

#### NOTICE

- This API will change the device running parameters. Exercise caution when calling this API.
- Do not send a new task to the same plant when the task is not complete (that is, the status is **RUNNING**).
- Battery parameters cannot be set for LG batteries.
- When the battery is disconnected, the parameter setting task cannot be delivered to the battery.

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. <b>true</b> : The request succeeded. <b>false</b> : The request failed.	boolean	Request success or failure flag
failCode	Error code. 0: successful; 1: partially successful; 2: failed	Integer	-
message	Description of the API returned content.	String	-
data	Returned data for each request, including the following information:	-	-

Parameter	Description	Data Type	Remarks
> taskld	Unique ID of a requested task, which can be used to query the task delivery result.	String	-
> result	Task delivery result.	List	-
>> plantCode	Plant DN.	String	-
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. FAIL: The task
			fails to deliver to the plant.
>> message	Delivery result description.	String	-

#### Request example:

ł

}

```
"tasks": [
    "batteryConfigurationInfo": {
"endOfDischargeSoc" : 18,
      "endOfChargeSoc": 98,
"maximumDischargePower": 48,
       "maximumChargePower": 22
     }
    },
    {
     "plantCode": "NE=23456789",
     "batteryConfigurationInfo": {
       "endOfDischargeSoc" : 18
     }
    },
   {
     "plantCode": "NE=34567890",
     "batteryConfigurationInfo": {
       "endOfChargeSoc": 98
     }
    },
   {
     "plantCode": "NE=45678901",
     "batteryConfigurationInfo": {
       "maximumDischargePower": 48,
       "maximumChargePower": 22
     }
    }
]
```

Response examples: Example 1: The task fails.

```
{
	"failCode": 2,
	"success": false,
	"message": "Exist no permission plants, plantCodes: [NE=45111870, NE=56433603]"
}
```

#### Example 2: The task fails.

Example 3: The task fails.

```
{
    "exceptionId": "framwork.remote.Paramerror",
    "exceptionType": "ROA_EXFRAME_EXCEPTION",
    "descArgs": null,
    "reasonArgs": [
        "tasks"
    ],
    "detailArgs": [
        "tasks size must be between 1 and 10"
    ],
    "adviceArgs": null
}
```

Example 4: The task is partially successful.

```
{
  "failCode": 1,
  "success": true,
  "message": "The battery configuration task is partially delivered successfully.",
  "data": {
     "taskId": "1276820029354826",
     "result": [
        {
           "plantCode": "NE=12345678",
           "status": "FAIL",
           "message": "No resource permission."
        },
        {
           "plantCode": "NE=23456789",
           "status": "RUNNING"
        }
     ]
  }
```

Example 5: The task is successful.

```
"plantCode": "NE=12345678",
"status": "RUNNING"
}
]
}
}
```

# 5.2.6 API for Querying a Task for Setting Battery Parameters

#### **API Description**

This API is used to query the execution status of the task for setting the battery parameters based on the task ID. Only one task can be queried at a time.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v1/ control/battery/configuration/task-info

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
taskld	Unique ID of the requested task, which can be obtained from <b>taskId</b> in <b>5.2.5</b> API for <b>Delivering a Task for</b> <b>Setting Battery</b> <b>Parameters</b> . The value contains 16 characters.	String	Μ

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. The value <b>true</b> indicates that the request is successful, and the value <b>false</b> indicates that the request fails.	boolean	Request success or failure flag

Parameter	Description	Data Type	Remarks
failCode	Error code. Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error Code</b> List.	Integer	-
message	Request description. When the value of <b>failCode</b> is <b>0</b> , the request failure description is returned. In other cases, null is returned.	String	-
data	Returned data for each request, including the following information:	Object	-
> dispatchResult	dispatchResult contains the list of returned information about request execution, including the following information:	List	-
>> plantCode	Plant DN.	String	-
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. SUCCESS: The task is successfully delivered to the plant. FAIL: The task fails to deliver to the plant.
>> message	Request description. When the value of <b>status</b> is <b>FAIL</b> , the description of the plant delivery failure is returned. In other cases, no description is returned.	String	<ul> <li>FAILURE: The delivery fails.</li> <li>TIMEOUT: A timeout occurs.</li> <li>BUSY: The device is busy.</li> <li>INVALID: The device is invalid.</li> <li>EXCEPTION: An exception occurs.</li> </ul>

Parameter	Description	Data Type	Remarks
>> batteryConfigura- tionInfo	Valid parameters for setting battery parameters.	Object	-
>>> endOfChargeSoc	End-of-charge SOC.	Double	-
>>> endOfDischargeS oc	End-of-discharge SOC.	Double	-
>>> maximumChargeP ower	Maximum charge power.	Integer	-
>>> maximumDischar gePower	Maximum discharge power.	Integer	-
> startTime	Time when a task is received, including the time zone information.	String	2020-02-06T00:00 :00+08:00
> endTime	Time when a task is completed, including the time zone information. If a task is not completed, null is returned.	String	2020-02-06T00:00 :00+08:00

Request example:

```
{
"taskId": "3051190140256431"
}
```

Response examples:

{

Example 1: An error code is returned.

```
{

"failCode": 20620,

"success": false,

"message": "The taskld is not exist.",

"data": null

}
```

Example 2: An exception is returned.

```
"exceptionId": "framwork.remote.Paramerror",
"exceptionType": "ROA_EXFRAME_EXCEPTION",
"descArgs": null,
"reasonArgs": [
"taskId"
```

], "detailArgs": [ "taskId may not be null" ], "adviceArgs": null

Example 3: The returned task status is RUNNING.

```
"failCode": 0,
  "success": true.
  "message": "The battery configuration task status queried successfully.",
  "data": {
     "dispatchResult": [
       {
           "plantCode": "NE=12345678",
           "status": "RUNNING",
           "message": null,
          "batteryConfigurationInfo": {
             "endOfChargeSoc": 91.2,
             "endOfDischargeSoc": 11.0,
             "maximumChargePower": 59,
             "maximumDischargePower": 48
          }
       }
     ],
"startTime": "2024-02-29T18:49:42+08:00",
     "endTime": null
  }
3
```

Example 4: The returned task status is FAIL.

```
"failCode": 0,
  "success": true,
  "message": "The battery configuration task status gueried successfully.",
  "data": {
     "dispatchResult": [
        {
           "plantCode": "NE=12345678",
           "status": "FAIL",
"message": "TIMEOUT",
           "batteryConfigurationInfo": {
              "endOfChargeSoc": 91.0,
             "endOfDischargeSoc": 11.0,
              "maximumChargePower": 32,
              "maximumDischargePower": 68
          }
       }
     ],
"startTime": "2024-02-29T15:49:45+08:00",
     "endTime": "2024-02-29T17:17:18+08:00"
  }
}
```

Example 5: The returned task status is SUCCESS.

```
"failCode": 0,

"success": true,

"message": "The battery configuration task status queried successfully.",

"data": {

    "dispatchResult": [

    {

        "plantCode": "NE=12345678",

        "status": "SUCCESS",

        "message": null,

        "batteryConfigurationInfo": {

        "endOfChargeSoc": 90.0,
```



## 5.2.7 API for Delivering an Inverter Active Power Setting Task

#### **API Description**

This API is used to deliver the inverter active power setting tasks at the plant level. A task supports a maximum of 10 plants. Different parameters can be delivered to each plant.

The networking of a single controller (Dongle, EMMA, distributed SmartLogger, and direction connection of inverters) in a plant is supported. The active power can be controlled in two modes: unlimited and limited feed-in (kW).

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://*Domain name of the management system*/rest/openapi/pvms/nbi/v2/ control/active-power-control/async-task

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
tasks	List of the tasks for setting the battery working mode. A task can be delivered to a maximum of 10 plants at a time.	List	М
> plantCode	Plant DN.	String	М

Parameter	Description	Data Type	Mandatory/ Optional
> controlMode	Active power control mode. 0: unlimited 6: limited feed-in (kW) If this parameter is set to <b>Unlimited</b> , the output power of the inverter is not limited and the inverter can connect to the grid at the rated power.	String	Μ
> controlInfo	Parameter for setting the active power.	Object	O If <b>controlMode</b> is set to <b>6</b> , you can set this parameter to set the active power. If <b>controlMode</b> is set to <b>0</b> , ignore this parameter.

Parameter	Description	Data Type	Mandatory/ Optional
>> maxGridFeedInPo	Maximum grid feed-in power (kW).	Double	0
wer	The value range of this parameter is related to the controller in the plant. The value ranges are as follows:		
	Dongle: [-1000.000, 5000.000]		
	EMMA: [-1000.000, inverter rated power]		
	SmartLogger: [-1000.000, 5000.000]		
	Distributed SmartLogger: [-1000.000, 50000.000]		
	Inverter: [-1000.000, 5000.000]		
	It specifies the maximum active power transmitted from the grid- connection point to the power grid.		
>>	Limitation mode.	String	0
limitationMode	0: total power		
	1: single-phase power <b>Total power</b> : controls the total power at the grid-connection point to limit the power fed to the power grid.		
	Single-phase power: controls the power of each phase at the grid-connection point to limit the power fed to the power grid.		

#### NOTICE

- This API will change the device running parameters. Exercise caution when calling this API.
- Do not send a new task to the same plant when the task is not complete (that is, the status is **RUNNING**).
- For a PV plant, if **controlMode** is set to **0**, **controlInfo** will be ignored during task delivery.
- When the SmartLogger is used, SmartLogger (devTypeId = 2) and the distributed SmartLogger (devTypeId = 63) are distinguished. The devTypeId can be queried in 5.1.1.2 Device List API. The maximum grid feed-in power of the SmartLogger falls in the range of [-1000.000, 5000.000], and that of the distributed SmartLogger falls in the range of [-1000.000, 50000.000].
- For a plant where SmartLogger is used, if **controlMode** is set to **6**, **Start control** is set to **Yes** by default after a task is delivered.
- When the controller in the plant is disconnected, the active power setting task cannot be delivered to the plant.

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. <b>true</b> : The request succeeded. <b>false</b> : The request failed.	boolean	Request success or failure flag
failCode	Error code. 0: successful; 1: partially successful; 2: failed	Integer	-
message	Description of the API returned content.	String	-
data	Returned data for each request, including the following information:	-	-
> taskld	Unique ID of a requested task, which can be used to query the task delivery result.	String	-
> result	Task delivery result.	List	-
>> plantCode	Plant DN.	String	-

Parameter	Description	Data Type	Remarks
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. FAIL: The task fails to deliver to the plant.
>> message	Delivery result description.	String	-

Example request (The active power control mode of the first task is **Unlimited**, and that of the second task is **Limited feed-in (kW).**):

```
{
  "tasks":[
     {
       "plantCode":"NE=123456789",
        "controlMode":"0"
     },
     {
       "plantCode":"NE=234567891",
        .
"controlMode":"6",
        "controlInfo":{
          "maxGridFeedInPower":53,
          "limitationMode":"1"
       }
     }
  ]
}
```

#### Response examples:

Example 1: The task fails.

```
{
	"failCode": 2,
	"success": false,
	"message": "Exist no permission resources. plantCodes: [NE=123456789, NE=234567891]",
	"data": null
}
```

Example 2: The task fails.

{

```
"failCode": 2,

"success": false,

"message": "Failed to deliver the active power control task.",

"data": {

"taskld": null,

"result": [

{

"plantCode": "NE=123456789",

"status": "FAIL",

"message": "The input parameter is out of the valid range, limitationMode in: [0, 1]"

},

{

"plantCode": "NE=234567891",

"status": "FAIL",
```

```
"message": "The configured value is the same as the current value."
}
]
}
```

Example 3: The task fails.

}

{

}

```
{
    "exceptionId": "framwork.remote.Paramerror",
    "exceptionType": "ROA_EXFRAME_EXCEPTION",
    "descArgs": null,
    "reasonArgs": [
        "tasks"
    ],
    "detailArgs": [
        "tasks size must be between 1 and 10"
    ],
    "adviceArgs": null
}
```

Example 4: The task is partially successful.

```
"failCode": 1,
"success": true,
"message": "The active power control task is partially delivered successfully.",
"data": {
   "taskId": "1556481834749924",
  "result": [
     {
        "plantCode": "NE=123456789",
        "status": "FAIL",
        "message": "The configured value is the same as the current value."
     },
     {
        "plantCode": "NE=234567891",
        "status": "RUNNING",
        "message": null
     }
  ]
}
```

Example 5: The task is successful.

```
"failCode": 0,
  "success": true,
  "message": "The active power control task is delivered successfully.",
  "data": {
     "taskId": "8193701385705709",
     "result": [
        {
          "plantCode": "NE=123456789",
           "status": "RUNNING",
           "message": null
        },
        {
           "plantCode": "NE=234567891",
           "status": "RUNNING",
           "message": null
       }
     ]
  }
}
```

# 5.2.8 API for Querying Inverter Active Power Setting Tasks

#### **API Description**

This API is used to query the execution status of the inverter active power setting task based on the task ID. Only one task can be queried at a time.

Call the API only when necessary to reduce the access frequency. For the same PV plant, do not call this API repeatedly before a task is complete.

#### **Request URL**

https://management system domain name/rest/openapi/pvms/nbi/v2/control/ active-power-control/task-info

#### **Request Mode**

HTTP method: POST

#### **Request Parameters**

Parameter	Description	Data Type	Mandatory/ Optional
taskld	Unique ID of the requested task, which can be obtained from <b>taskId</b> in <b>5.2.7</b> API for <b>Delivering an Inverter</b> Active Power Setting Task. The value contains 16 characters.	String	Μ

Parameter	Description	Data Type	Remarks
success	Request success or failure flag. The value <b>true</b> indicates that the request is successful, and the value <b>false</b> indicates that the request fails.	boolean	Request success or failure flag
failCode	Error code. Value <b>0</b> indicates that the status is normal. For other error codes, see <b>6.1 Error Code</b> <b>List</b> .	Integer	-

Parameter	Description	Data Type	Remarks
message	Request description. When the value of <b>failCode</b> is <b>0</b> , the request failure description is returned. In other cases, null is returned.	String	-
data	Returned data for each request, including the following information:	Object	-
> dispatchResult	dispatchResult contains the list of returned information about request execution, including the following information:	List	-
>> plantCode	Plant DN.	String	-
>> status	Status of the task delivered to the plant.	String	RUNNING: The task delivered to the plant is running. SUCCESS: The task is successfully delivered to the plant. FAIL: The task fails to deliver to the plant.
>> message	Request description. When the value of <b>status</b> is <b>FAIL</b> , the description of the plant delivery failure is returned. In other cases, no description is returned.	String	<ul> <li>FAILURE: The delivery fails.</li> <li>TIMEOUT: A timeout occurs.</li> <li>BUSY: The device is busy.</li> <li>INVALID: The device is invalid.</li> <li>EXCEPTION: An exception occurs.</li> </ul>
>> controlMode	Active power control mode.	String	0: unlimited 6: limited feed-in (kW)

Parameter	Description	Data Type	Remarks
>> controlInfo	Parameter for setting the active power.	Object	This parameter is returned when <b>controlMode</b> is set to <b>6</b> .
>>> maxGridFeedInPo wer	Maximum grid feed-in power (kW). It specifies the maximum active power transmitted from the grid-connection point to the power grid.	Double	The value range of this parameter is related to the controller in the plant. The value ranges are as follows: Dongle: [-1000.000, 5000.000] EMMA: [-1000.000, inverter rated power] SmartLogger: [-1000.000, 5000.000] Distributed SmartLogger: [-1000.000, 5000.000] Inverter: [-1000.000, 5000.000]
>>> limitationMode	Limitation mode. <b>Total power</b> : controls the total power at the grid- connection point to limit	String	0: total power 1: single-phase power
	the power fed to the power grid. Single-phase power: controls the power of each phase at the grid- connection point to limit the power fed to the power grid.		
> startTime	Time when a task is received, including the time zone information.	String	2020-02-06T00:00 :00+08:00

Parameter	Description	Data Type	Remarks
> endTime	Time when a task is completed, including the time zone information. If a task is not completed, null is returned.	String	2020-02-06T00:00 :00+08:00

Request example:

```
{
"taskld": "3051190140256431"
}
```

Response examples:

Example 1: An error code is returned.

```
{
"failCode": 20620,
"success": false,
"message": "The taskld is not exist.",
"data": null
}
```

Example 2: An exception is returned.

```
{
    "exceptionId": "framwork.remote.Paramerror",
    "exceptionType": "ROA_EXFRAME_EXCEPTION",
    "descArgs": null,
    "reasonArgs": [
        "taskId"
    ],
    "detailArgs": [
        "taskId may not be null"
    ],
    "adviceArgs": null
}
```

Example 3: The returned task status is RUNNING.

```
"failCode": 0,
"success": true,
"message": "The active power control task status queried successfully.",
"data": {
   "dispatchResult": [
     {
        "plantCode": "NE=234567891",
        "controlMode": "6",
        "status": "RUNNING",
        "message": null,
        "controlInfo": {
           "maxGridFeedInPower": 53,
          "limitationMode": "1"
       }
     }
  ],
"startTime": "2024-03-07T09:36:13+08:00",
  "endTime": null
```

#### } }

Example 4: The returned task status is FAIL.

```
{
   "failCode": 0,
   "success": true,
   "message": "The active power control task status queried successfully.",
   "data": {
      "dispatchResult": [
         {
            "plantCode": "NE=234567891",
            "controlMode": "6",
            "status": "FAIL",
            "message": "FAILURE",
            "controlInfo": {
               "maxGridFeedInPower": 53,
               "limitationMode": "1"
           }
        }
     ],
"startTime": "2024-03-07T09:36:13+08:00",
"endTime": "2024-03-07T09:36:23+08:00"
  }
}
```

Example 5: The returned task status is SUCCESS.

```
{
   "failCode": 0,
   "success": true,
   "message": "The active power control task status queried successfully.",
   "data": {
      "dispatchResult": [
        {
           "plantCode": "NE=234567891",
"controlMode": "6",
           "status": "SUCCESS",
           "message": null,
           "controlInfo": {
              "maxGridFeedInPower": 53,
              "limitationMode": "1"
           }
        }
     ],
      "startTime": "2024-03-07T09:38:58+08:00",
      "endTime": "2024-03-07T09:38:58+08:00"
  }
}
```

# **6**<sub>References</sub>

# 6.1 Error Code List

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

No.	Error Code	Description
18	20018	A maximum of 10 devices can be operated at a time.
19	20019	The switch type is incorrect. 1 and 2 indicate switch-on and switch-off respectively.
20	20020	The upgrade package corresponding to the device version cannot be found.
21	20021	The upgrade file does not exist.
22	20022	The upgrade records of the devices in the system are not found.
23	305	You are not online and need to log in again.
24	401	You do not have the related data API permission.
		• For details about how to locate the fault in the OAuth Connect scenario, see 8.1.4 Why Does the Northbound API Return Error Code 401?
		• For details about how to check the API account access scenario, see 8.2.5 Why Does the Northbound API Return Error Code 401?
25	407	The API access frequency is too high.
26	20023	The query start time cannot be later than the query end time.
27	20024	The language cannot be empty.
28	20025	The language parameter value is incorrect.
29	20026	Only data of the latest 365 days can be queried.
30	20027	The query time period cannot span more than 31 days.
31	20028	The system does not have related user information.
32	20029	Invalid user information.
33	20030	Failed to create the I-V curve diagnosis task.
34	20034	The task does not exist.
35	20035	MPPT devices do not support backfeed current.
36	20036	The backfeed current duration of the MPPT device exceeds the maximum limit.
37	20037	The backfeed current of the MPPT device is out of range. The allowed value is (0, 15].
38	20038	In the input parameters, the authorization code list is empty (null), or the number of authorization codes is out of range. The allowed range is [0, 1000].

No.	Error Code	Description
39	20039	In the input parameters, the DOD value is out of range. The allowed range is [0, 100].
40	20040	The charge/discharge switch parameter value is invalid.
41	20041	The control type cannot be empty for forced charge and discharge.
42	20042	The target SOC for charge/discharge is empty or invalid.
43	20043	The charge/discharge duration is empty or invalid.
44	20044	The unique ID of a charge/discharge task cannot be empty.
45	20045	Unauthorized PV plants exist in the input parameters.
46	20046	Unauthorized PV plants exist in the input parameters.
47	20047	The forced charge/discharge power in the input parameters is invalid.
48	20048	Duplicate charge and discharge task ID.
49	20049	Failed to deliver the charging and discharging task.
50	20050	The charging and discharging task query parameter does not exist.
51	20051	Failed to set the battery DOD.
52	20055	The plant list and device list parameters cannot be empty at the same time.
53	20056	Resources that are not authorized by the owner exist.
54	20116	The inverter control parameter is incorrect. (The number of PV plants is greater than 100 or equal to 0, or the total number of inverters in the PV plants is greater than 200 or equal to 0.)
55	20200	The system is busy. Try again later.
56	20400	<ul> <li>The API account name or password is incorrect.</li> <li>The API account is locked.</li> <li>The password has expired.</li> <li>The number of online sessions reaches the upper limit.</li> <li>The third-party system ID does not exist.</li> </ul>
57	20403	The API account login is restricted.
58	20604	The time parameter is incorrect. The start time cannot be later than or equal to the end time.
No.	Error Code	Description
-----	---------------	--
59	20605	The time parameter is incorrect. The time parameter contains a negative value.
60	20606	If only the start time is entered and the end time is empty, the start time cannot be later than or equal to the current time.
61	20607	The task list is empty.
62	20608	Duplicate plant IDs exist in the input parameters.
63	20609	The plant networking is abnormal.
64	20610	The plant does not support default configuration.
65	20611	The values of input parameters exceed the valid range.
66	20612	The value of an input parameter is empty.
67	20613	The default setting task fails to be sent for all plants.
68	20614	The network communication is abnormal.
69	20615	The same task is being executed in the current plant.
70	20616	The task ID is empty.
71	20617	The query result of the default plant setting task is empty.
72	20618	The number of API calls has reached the maximum number per API account per day.
73	20619	The number of task IDs exceeds 100.
74	20620	The task ID does not exist.
75	20621	The resource is not authorized by the owner.
76	20622	The plant DN is invalid or the account does not have permission on the plant.
77	20623	The plant DN does not belong to the company or subsidiary of the owner.
78	20624	The owner has been bound to the plant.
79	20625	It is not allowed to bind a plant whose sharing request has been accepted by the owner.
80	20626	Failed to bind the plant due to an internal error.
81	21000	The basic information for the plant creation is empty.
82	21001	The plant name is empty or in an incorrect format.
83	21002	The plant type is empty or incorrect.

No.	Error Code	Description
84	21003	The grid connection time must be a positive number.
85	21004	The format of the contact name is incorrect.
86	21005	The format of the contact information is incorrect.
87	21006	The C&I plant and utility plant cannot be EV-charger-only plants.
88	21007	The grid connection time cannot be set for an EV-charger- only plant.
89	21008	The string capacity cannot be set for an EV-charger-only plant.
90	21009	The electricity price cannot be set for an EV-charger-only plant.
91	21010	>pureChange can only be set to 0 or 1.
92	21011	The plant name already exists.
93	22000	No related data of connected devices was found.
94	22001	The device registration code is empty.
95	22002	The device is an unauthorized device.
96	22003	The device registration code is incorrect.
97	22004	You will be locked out for 5 minutes due to five consecutive incorrect registration codes.
98	22005	Devices other than chargers are connected to an EV- charger-only plant.
99	22006	The device SN is empty.
100	22007	The device has been bound to another plant.
101	22008	The parameters of connected devices are empty.
102	22009	iSitePower-M cannot be connected.
103	22010	The plant with the iSitePower-M cannot connect to other devices.
104	23000	The plant-level string capacity and PV-level string capacity cannot be empty at the same time.
105	23001	The format of the plant string capacity is incorrect.
106	23002	The inverter SN does not exist.
107	23003	The number of inverter SNs is incorrect.
108	23005	The inverter PV string capacity is incorrectly set.

No.	Error Code	Description					
109	23006	The inverter SN or PV string capacity is empty.					
110	23007	The quantity in the inverter PV string capacity setting is incorrect.					
111	24000	The electricity price must be a positive number.					
112	24001	The electricity price date settings must cover a complete year and without overlapping.					
113	24002	The electricity price time segments must cover 24 hours of the day without overlapping.					
114	24003	The date range is invalid.					
115	24004	The time range is invalid.					
116	24005	The company electricity price is empty.					
117	24006	>useCompanyPrice can only be set to 0 or 1.					
118	25000	Additional information configuration is empty.					
119	25001	The area code is empty or in an incorrect format.					
120	25002	The plant address is empty.					
121	25003	The longitude and latitude are empty or in incorrect format.					
122	25004	The safe running time of the plant must be a positive number.					
123	25005	The time zone is empty or the format is incorrect.					
124	25006	loadStatus can only be set to 0 or 1.					
125	25007	The plant introduction can contain a maximum of 128 characters.					
126	26000	Failed to create plants.					
127	26001	A maximum of 1000 plants can be created in a day.					
128	26002	The company authorized by the API account does not exist.					
129	26003	Failed to bind the API account to the device.					
130	26004	Failed to unbind the API account from the device.					
131	30001	The device ESN list cannot be empty.					
132	30002	The ESNs queried at a time cannot exceed 50.					
133	30003	The account cannot be empty in the input parameter.					
134	30004	The value of <b>pageNo</b> cannot be empty.					

No.	Error Code	Description
135	30005	The value of <b>pageSize</b> cannot be empty.
136	30006	The value of <b>pageSize</b> is out of range. The allowed range is {10, 20, 30, 50, 100}.
137	30007	The values of <b>startTime</b> and <b>endTime</b> must be both provided or empty.
138	30008	Failed to call the internal API.
139	30009	The value of <b>taskName</b> is empty.
140	30010	The value of <b>dns</b> is empty.
141	30011	The value of <b>cleanStatus</b> is empty or invalid.
142	30012	The value of <b>environmentalParameters</b> is empty or invalid.
143	30013	The value of <b>modulePlaneIrradiance</b> or <b>moduleBackSurfaceTemperature</b> is empty when <b>environmentalParameters</b> is set to 1.
144	30014	The value of <b>scanPointNum</b> must be set to 128.
145	30015	The value of <b>taskId</b> is empty.
146	30016	The value of <b>dn</b> is empty.
147	30017	The value of <b>dns</b> is invalid. The number of devices exceeds 100 or devices on which the API account does not have permission exist.
148	30018	The value of <b>taskName</b> is invalid (for example, null field).
149	30019	The value of <b>moduleBackSurfaceTemperature</b> is out of range. The allowed range is [0.0, 100.0].
150	30020	The value of <b>modulePlaneIrradiance</b> is out of range. The allowed range is [600.0, 1500.0].
151	30021	The value of <b>pageNo</b> is smaller than 0.
152	30022	The value of <b>timestamp</b> is empty.
153	30023	The command type is invalid (for example, null).
154	30024	The power supply duration is invalid.
155	30025	The MPPT list is empty.
156	30026	The value of <b>mppts</b> is empty.
157	30027	The number of MPPTs connected to a single inverter exceeds the maximum limit (3), or the total number of MPPTs in a single task exceeds the maximum limit (32).

No.	Error Code	Description
158	30028	The backfeed current input value is invalid.
159	30029	Authentication failed. The entered plant or device parameter is invalid.
160	30030	The input parameter is incorrect.
161	30031	A maximum of 10 devices can be queried at a time.
162	30032	The time parameter is invalid. The query time segment cannot be longer than three days.
163	30033	The task is in progress.
164	30034	The returned list is empty.
165	30035	The task is to be executed.
166	30036	The task has been canceled.
167	30037	The number of reservation tasks exceeds the maximum (10).
168	30040	The PV string is not configured.
169	1	The task is partially successful.
170	2	The task fails.

### 6.2 Old Policy for API Flow Control

The following table describes the flow control of unrestricted northbound APIs. Call APIs properly based on the flow control description.

API Label	API Name	Flow Control Description		
Basic data	Plant list	Maximum number of API calls for each API account: 10/minute		
	Device list	Maximum number of API calls for each API account: 10/minute		
Monit oring	Real-time plant data	Maximum number of API calls for each API account: 30/minute		
data	Real-time device data	Maximum number of API calls for each API account: 10/minute		
	Historical device data	Maximum number of API calls for each API account: 1/minute		

API Label	API Name	Flow Control Description			
Alarm data	Querying active alarms	Maximum number of API calls for each API account: 10/minute			
Repor t data	Hourly plant data	Maximum number of API calls for each API account: 10/minute			
	Daily plant data	Maximum number of API calls for each API account: 10/minute			
	Monthly plant data	Maximum number of API calls for each API account: 10/minute			
	Yearly plant data	Maximum number of API calls for each API account: 10/minute			
	Daily device data	Maximum number of API calls for each API account: 10/minute			
	Monthly device data	Maximum number of API calls for each API account: 10/minute			
	Yearly device data	Maximum number of API calls for each API account: 10/minute			
Contr ol API	Delivering battery charge/ discharge tasks	Maximum number of API calls for each API account: 10/minute			
	Querying battery charge/ discharge tasks	Maximum number of API calls for each API account: 10/minute			

### 6.3 Time Zone Code List

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
54	(UTC-1 2:00) Internat ional Date Line West	102	(UTC-0 3:00) Araguaí na	13	(UTC +03:00) Minsk	36	(UTC +08:00) Singapo re

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
85	(UTC-1 1:00) Coordin ated Univers al Time-1 1	103	(UTC-0 3:00) Greenla nd	77	(UTC +03:00) Ankara	37	(UTC +08:00) Perth
55	(UTC-1 0:00) Hawaii	104	(UTC-0 3:00) Punta Arenas	17	(UTC +03:00) Baghda d	38	(UTC +08:00) Taipei
86	(UTC-1 0:00) Aleutia n Islands	105	(UTC-0 3:00) Salvado r	19	(UTC +03:00) Kuwait, Riyadh	39	(UTC +08:00) Irkutsk
87	(UTC-0 9:30) Marque sas Islands	106	(UTC-0 3:00) Saint Pierre and Miquel on	20	(UTC +03:00) Mosco w, Saint Petersb urg	78	(UTC +08:00) Kuala Lumpur
56	(UTC-0 9:00) Alaska	107	(UTC-0 2:00) Coordin ated Univers al Time-2	21	(UTC +03:00) Nairobi	134	(UTC +08:00) Ulaanb aatar
88	(UTC-0 9:00) Coordin ated Univers al Time-9	84	(UTC-0 1:00) Azores	79	(UTC +03:00) Riyadh	135	(UTC +08:45) Eucla
57	(UTC-0 8:00) Tijuana	108	(UTC-0 1:00) Cape Verde	119	(UTC +03:00) Istanbul	40	(UTC +09:00) Osaka, Sappor o, Tokyo

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
58	(UTC-0 8:00) Pacific Time (United States and Canada )	4	(UTC) Coordin ated Univers al Time	22	(UTC +03:30) Tehran	41	(UTC +09:00) Seoul
89	(UTC-0 8:00) Baja Californ ia	1	(UTC +00:00) Dublin, Edinbur gh, Lisbon	18	(UTC +04:00) Tbilisi	42	(UTC +09:00) Yakutsk
90	(UTC-0 8:00) Coordin ated Univers al Time-8	3	(UTC +00:00) Monrov ia, Reykjav ik	23	(UTC +04:00) Muscat	136	(UTC +09:00) Chita
59	(UTC-0 7:00) Chihua hua, La Paz, Mazatla n	82	(UTC +00:00) London	24	(UTC +04:00) Yerevan	137	(UTC +09:00) Pyongy ang
60	(UTC-0 7:00) Mounta in Time (United States and Canada )	109	(UTC +00:00) São Tomé	25	(UTC +04:00) Baku	43	(UTC +09:30) Adelaid e
61	(UTC-0 7:00) Arizona	2	(UTC +01:00) Casabla nca	83	(UTC +04:00) Abu Dhabi	44	(UTC +09:30) Darwin

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
62	(UTC-0 6:00) Central Standar d Time (United States and Canada )	5	(UTC +01:00) Berlin	120	(UTC +04:00) Astrakh an, Ulyanov sk	45	(UTC +10:00) Brisban e
63	(UTC-0 6:00) Central Americ a	6	(UTC +01:00) Belgrad e, Bratisla va, Budape st, Ljubljan a, Prague	121	(UTC +04:00) Volgogr ad	46	(UTC +10:00) Guam, Port Moresb y
91	(UTC-0 6:00) Easter Island	7	(UTC +01:00) Brussels , Copenh agen, Madrid	122	(UTC +04:00) Port Louis	47	(UTC +10:00) Hobart
92	(UTC-0 6:00) Guadal ajara, Mexico City, Monter rey	8	(UTC +01:00) Sarajev o, Skopje, Warsaw , Zagreb	123	(UTC +04:00) Saratov	48	(UTC +10:00) Canberr a, Melbou rne, Sydney
93	(UTC-0 6:00) Saskatc hewan	74	(UTC +01:00) Paris	124	(UTC +04:00) Izhevsk, Samara	138	(UTC +10:00) Vladivo stok

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
64	(UTC-0 5:00) Bogotá, Lima, Quito, Rio Branco	80	(UTC +01:00) Amster dam, Bern, Stockho lm, Vienna	26	(UTC +04:30) Kabul	139	(UTC +10:30) Lord Howe Island
65	(UTC-0 5:00) Eastern Time (United States and Canada )	81	(UTC +01:00) Rome	27	(UTC +05:00) Ashgab at, Tashken t	49	(UTC +11:00) Magad an
94	(UTC-0 5:00) Havana	110	(UTC +01:00) West Africa Time	28	(UTC +05:00) Islamab ad, Karachi	140	(UTC +11:00) Bougai nville Island
95	(UTC-0 5:00) Haiti	9	(UTC +02:00) Amman	125	(UTC +05:00) Kyzylor da	141	(UTC +11:00) Norfolk Island
96	(UTC-0 5:00) Chetum al	10	(UTC +02:00) Harare	126	(UTC +05:00) Yekateri nburg	142	(UTC +11:00) Chokur dakh
97	(UTC-0 5:00) Turks and Caicos Islands	11	(UTC +02:00) Helsinki , Kyiv, Riga, Sofia, Tallinn, Vilnius	29	(UTC +05:30) Chennai , Kolkata, Mumba i, New Delhi	143	(UTC +11:00) Sakhali n

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
98	(UTC-0 5:00) Indiana (Easter n Time)	12	(UTC +02:00) Cairo	127	(UTC +05:30) Sri Jayawar denepu ra Kotte	144	(UTC +11:00) Solomo n Islands, New Caledon ia
66	(UTC-0 4:00) Caracas	14	(UTC +02:00) Windho ek	30	(UTC +05:45) Kathma ndu	50	(UTC +12:00) Aucklan d, Welling ton
67	(UTC-0 4:00) Atlantic Time (Canad a)	15	(UTC +02:00) Athens, Buchare st	32	(UTC +06:00) Dhaka	51	(UTC +12:00) Anadyr, Petropa vlovsk- Kamcha tsky
68	(UTC-0 4:00) Guyana	16	(UTC +02:00) Jerusale m	128	(UTC +06:00) Astana	52	(UTC +12:00) Fiji
69	(UTC-0 4:00) Santiag o	75	(UTC +02:00) Cape Town	129	(UTC +06:00) Omsk	145	(UTC +12:00) Coordin ated Univers al Time +12
99	(UTC-0 4:00) Cuiabá	111	(UTC +02:00) Beirut	33	(UTC +06:30) Yangon	146	(UTC +12:45) Chatha m Islands
100	(UTC-0 4:00) Georget own, La Paz, Manaus , San Juan	112	(UTC +02:00) Damasc us	31	(UTC +07:00) Novosib irsk	53	(UTC +13:00) Tongata pu

Time Zone	Details	Time Zone	Details	Time Zone	Details	Time Zone	Details
101	(UTC-0 4:00) Asunció n	113	(UTC +02:00) Tripoli	34	(UTC +07:00) Bangko k, Hanoi, Jakarta	147	(UTC +13:00) Nukual ofa
70	(UTC-0 3:30) Newfou ndland	114	(UTC +02:00) Harare, Pretoria	130	(UTC +07:00) Barnaul , Gorno- Altaysk	148	(UTC +13:00) Samoa
71	(UTC-0 3:00) Brasilia	115	(UTC +02:00) Chisina u	131	(UTC +07:00) Khovd	149	(UTC +13:00) Coordin ated Univers al Time +13
72	(UTC-0 3:00) Cayenn e, Fortalez a	116	(UTC +02:00) Kalining rad	132	(UTC +07:00) Krasnoy arsk	150	(UTC +14:00) Kiritima ti Island
73	(UTC-0 3:00) Montev ideo	117	(UTC +02:00) Gasha, Hebron	133	(UTC +07:00) Tomsk		
76	(UTC-0 3:00) Buenos Aires	118	(UTC +02:00) Khartou m	35	(UTC +08:00) Beijing		

### 6.4 Exception Code List

No.	Status Code	Description	Example	
1	400	Parameter verification failed.	Reported  Reported	<ul> <li>DDT <sup>0</sup> <pre>             for any set of the set of the</pre></li></ul>
2	500	System error.	Response Sol Internal Sarvar Frene  Response Res	<ul> <li>&gt; X000<sup>®</sup></li> <li>**( exprimed, "Ver.sources", during := { 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,</li></ul>

# **Best Practices**

### 7.1 Obtaining a Token

A token is required for the API account created by the administrator to access northbound data. This section describes how to obtain a valid token.

The method and precautions for calling a northbound login API in HTTPS mode are as follows:

1. Method: POST

2. URL: https://xxx.fusionsolar.huawei.com/thirdData/login (Enter the actual URL of the NMS.)

3. Request body: API account name and password (Use **systemCode** instead of **password** as the password parameter.)

4. HTTP status code: The response status code 200 indicates that the API is successfully called.

5. Response body: If failCode is 0, the API login is successful.

6. Header: After successful login, find the **xsrf-token** field in the response header and its value is the credential information required for accessing northbound APIs.

#### NOTICE

1. The validity period of a token is 30 minutes. If you continuously call a token within 30 minutes, the validity period will be automatically extended. Therefore, you must keep the token secure carefully to prevent disclosure.

2. An account can have only one online session. Repeated login will invalidate the generated token. If a token is invalid, check to eliminate the repeated login issue.

METHOD SCHEME :// H	IOST [ '.' PORT ] [ PATH [ '?' QUERY ]]		
	p):\${openapiport/thirdData/login		
► QUERY PAR HEADERS <sup>©</sup> I2		Form 💌	< → BCDY <sup>©</sup>
			1 [ "userName": "x 35",
Content-Type	: application/json	×	3 "systemCode":"t 1"
◆ Add header P Add authorization	a	8	4 ]3 Text_stOH_XOL_HTML   ≱ Formatibody   Ø trable body evaluation
Response			
200 OK			
HEADERS <sup>®</sup>		pretty 👻	♦ BODY <sup>①</sup>
upcase-conversion-headers:	accessSession, accessSession		* {
server:	product only		data: null,
x-trace-enable:	false		success: true,
x-frame-options:	SAMEORIGIN	5	failCode: 0,
Connection:	keep-alive, keep-alive		
lubanops-gtrace-id:	1726035-1698475736021-461		params: > (),
x-download-options:	noopen		message: null
x-sampling:	true		
x-parent-id:	8432023082076819916		linea numa (2) copy
x-sysprops-sampling:	8432023082076819916		and rank (Coop)
x-autotask-sampling:	1		
date:	Sat, 28 Oct 2023 06:41:55 GMT -7m 1s		
lubanops-ntrace-id:	1726035-1698475736021-461		
strict-transport-security:	max-age=31536000; includeSubDomains		
lubanops-nenv-id:	170270		
content-security-policy:	default-src https: data: blob: ws: 'self' 'unsafe-inline' 'unsafe-eval'		
x-trace-id:	8432023082076819916		
x-content-type-options:	nosniff		
x-xss-protection:	1; mode=block		
x-span-id:	8432023082076819916		
xsrf-token: 6	x-3s		
	49c9		
content-type:	application/json;charset=UTF-8		
Content-Length:	68 bytes		
keep-alive:	timeout=20		
set-cookie:	XSRF-TOKEN=131 B, session /		

#### 7.2 Querying the Plant List

Before querying the plant information, you need to query the plants on which the current API account has the permission as follows:

#### 1. Method: POST

2. URL: https://xxx.fusionsolar.huawei.com/thirdData/stations (Enter the actual URL of the NMS.)

3. Request body: Enter the page No. of the plant list API. The following example queries page No. 1. By default, a maximum of 100 records can be returned for each page.

4. XSRF-TOKEN: Enter the token information obtained through the **/thirdData/login** API.

5. HTTP status code: The response status code 200 indicates that the API is successfully called.

6. Response body: If **failCode** is 0, the query is successful.

7. Response body: The **data** field indicates the information about the plants that you have permission to query.

METHOD SCHEME (	/ HOST [ 11 PORT ] [ PKTH [ 12 QUERY ]]	
	\$(ip):\$(openapiport)/thirdData/stations	
K + QUERY P	WRAMETERS	height D d
EADERS <sup>©</sup> I	- 2	Form * 🔸 BODY 🛇
ENDERG II		
XSRF-TOKEN	):[xç:	. 3b1 × 🚄 4 2 "page#o": t
Content-Type	: application/)son	× 1 × 1
Add header     P Add authorizat	tion	8
		Test JON XM, HTM, I 📡 Fermetoldy I 🔯 Stable boly mulator
esponse		
200 ОК 🔶		
	5	<b>4 →</b> 800V <sup>O</sup>
HEADERS <sup>(1)</sup>		prety + ( + > 1000 ° 7. 7
EADERS <sup>()</sup> pcase-conversion-headers:	accessesion,accessesion	7
EADERS <sup>©</sup> posse-conversion-headers: prver:	accession,accession product only	7
EADERS <sup>©</sup> posse-conversion-teaders: prven: -trace-enable:	accessfersion, accessfersion product only faite	
EADERS case-conversion-headers: srver: -frame-coptions:	accessesion,accessesion product only faire Surgarday	7 ▼{ dat ▼{ list ×{ [(opacity: 0.0, contectwethed: ndl, contectwersen: ndl, gridOnmectinOdte: "302)-07-34T40-0051-1100",],
EADERS <sup>©</sup> scase-conversion-headers: srver: -trace-enable: -frame-options: smeetion:	ncentenio, scenion practo 2017 Anis Santa	<pre>7x * {     duta: * {         list: * {             list: * {</pre>
EADERS <sup>©</sup> ccase-conversion-besders: -trace-enable: -trace-enable: -trace-collons: somection: bandos-gtrace-id:	eccententin_accententin product miy second second terp-alle terp-alle terp-alle terp-alle terp-alle	<pre>7</pre>
EADERS <sup>(1)</sup> cose-conversion-headers: rver: trace-comble: trace-oble: trace-toble: banops-gtrace-id: dowload-options:	eccenidasion,eccenidasion product coly foite Seconidasi Seconidasi 17880-156801793356-1113 romagem	<pre>7</pre>
EADERS <sup>©</sup> ccase-conversion-beaders: rveri trace-reable: frame-options: morection: banops-gtrace-id: download-options: sampling:	accessionsion,accessionsion product only data Sections Sections Trade-1-Sections Trade-1-SectionSection Trade Trad	<pre>7</pre>
EADERS <sup>©</sup> icase-conversion-Meaders: trace-mable: trace-mable: trace-mable: trace-consist innettion: bandsatco-fd: idownload-options: sampling: parent-fd;	accession.accession.ios product miy Sevenine Sevenine Margoline, margoline Transmi Janeous Portes Po	<pre>7</pre>
EADERS © REASE-CONVERSION-INVALUES REASE-CONVERSIONS INVERSION	accessionsion,accessionsion product only data Sections Sections Trade-1-Sections Trade-1-SectionSection Trade Trad	7 • ( • filt • { • [ (opacty: 0.0, contactWethod: null, contactWerson: null, gridConnectionGate: "2023-07-20710-00151-11100",], • papetion: 2, • papetion: 1, • papetion: 100, • (otil: 00, • (otil: 0,
EADERS © ECADERS © trace-rowrite-tweders: trace-rowbit: -free-rowbit: -free-rowbit: -bonized-options: -semilar; -	<pre>#createsian_acreatesian product say accession rescalator resc</pre>	<pre>7  *(     define ( [copacity: 0.0, contactwithed: will, contactwinen: will, prid/connection/are: "2023-07-34T14-00:51-11:00",],     pageternat: 3,     pageternat: 1,     pageternat: 2,     pageternat: 3,     pageter</pre>
EADERS © EAAERS THE CONTINUES - Medders : trace-romerics - Medders : trace-mable: - Monas-galicos : - M	m contractions and a constant list model of the second se	<pre>7</pre>
EADENS Construction - Maderal SEAR-CONSTICT - Maderal Searce - Construction - Searce - Sear	Accessional Accession (Accession) product only Accession Access	<pre>7</pre>
ADDERS 0 HADDERS 0 H	m contractions and a constant list model of the second se	<pre>7</pre>

#### **NOTE**

Expand the details in the **data** field to obtain the basic information about a plant, including **plantCode**, the unique identifier for data query. You can save the information for future use.



### 7.3 Querying the Real-Time Plant Data

You can query the real-time and historical data and reports of plants. The method to obtain real-time plant data is as follows:

1. Method: POST

2. URL: https://xxx.fusionsolar.huawei.com/thirdData/getStationRealKpi (Enter the actual URL of the NMS.)

3. Request body: Enter the value in **plantCode** obtained from the plant list API. If multiple values are used, separate them using commas (,). A maximum of 100 values are supported.

4. XSRF-TOKEN: Enter the token information obtained through the **/thirdData/login** API.

5. HTTP status code: The response status code 200 indicates that the API is successfully called.

6. Response body: If failCode is 0, the query is successful.

7. Response body: The queried real-time plant data is shown in the **data** field.



# 7.4 Using the Access Token to Query the Real-Time Plant Data

The method for querying real-time plant data in OAuth Connect mode is the same as that using an API account. The OAuth Connect mode is used as an example.

1. Method: POST

2. URL: https://xxx.fusionsolar.huawei.com/thirdData/getStationRealKpi (Enter the actual URL of the NMS.)

3. Request body: Enter the value in **plantCode** obtained from the plant list API. If multiple values are used, separate them using commas (,). A maximum of 100 values are supported.

4. Authorization: The value of **Authorization** consists of **Bearer** and an access token.

5. HTTP status code: The response status code 200 indicates that the API is successfully called.

- 6. Response body: If failCode is 0, the query is successful.
- 7. Response body: The queried real-time plant data is shown in the **data** field.



#### 7.5 Scenario-based Practices of Battery Scheduling

The following APIs are provided for setting battery charge and discharge:

- API 1: **5.2.1 API for Delivering Battery Charge and Discharge Tasks**, which is used to set forcible battery charge and discharge, including the charge and discharge power, duration, and target SOC.
- API 2:. 5.2.3 API for Delivering a Task for Setting the Battery Working Mode, which can be used to set the battery working mode to TOU or maximumSelfConsumption.

Through these APIs, the following practices can be completed.

#### Practice 1: Scenarios Where Temporary Charge and Discharge Are Required

API 1 is used to deliver a single forcible charge and discharge task. This method is easy to use.

**Step 1** Use API 1 for forcible battery charge and discharge. The charge and discharge power, duration, and target SOC can be set.

#### ----End

- 1. The API allows users to set the target SOC and charge/discharge duration for residential batteries.
- 2. API 1 does not change the original working mode of the battery. After the task is complete, the battery continues to work in the original working mode.

#### Practice 2: Scenarios Where Battery Charge and Discharge Need to Be Controlled Independently Without the Impact of Working Modes

APIs 1 and 2 are used to deliver forcible charge and discharge tasks. API 2 needs to be called only once for setting, and only API 1 needs to be used later.

This mode is applicable to the scenario where the charge and discharge of the battery need to be controlled independently and the working mode does not affect charge and discharge.

Step 1 Use API 2 to set operationMode to TOU, redundantPVEnergyPriority to fedToGridPreference (to avoid charging batteries using surplus PV energy), and allowedAcChargePower to any valid value. Set the charge and discharge time range to 1 minute. For example, set only one time window, set startTime to 00:05 and endTime to 00:06, set chargeOrDischarge to charge, and set the repeat date to Monday. In this way, the working mode does not affect charge and discharge.

For example, for **NE=123456789**, you can deliver the setting according to the following parameters:



**Step 2** Use API 1 for forcible battery charge and discharge. The charge and discharge power, duration, and target SOC can be set.

----End

# **8** FAQs

### 8.1 FAQs About the OAuth Connect Mode

### 8.1.1 Handling the Exception Returned by Calling the Authorization Request API

If the following page is returned after an owner calls the authorization request API described in Link Example of the Authorization Request API, check whether the input client\_id, redirect\_uri, and response\_type are correct. For details about how to set the request parameters, see their descriptions in Parameters of the Authorization Request API of 3.1.2.2 Initiating Authorization to a Third-party App by an Owner. If redirect\_uri contains characters such as & and redirect\_uri is not URL-encoded when the URL of the authorization request API is combined, the following page may be returned when the authorization request API is called. In this case, perform URL-encoding on redirect\_uri. For details, see the description of RedirectUrl in Link Example of the Authorization Request API of 3.1.2.2 Initiating Authorization to a Third-party App by an Owner.

### Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Mon Dec 25 10:00:18 GMT+08:00 2023 There was an unexpected error (type=Bad Request, status=400).

• If the exception "?error=invalid\_scope&error\_description=OAuth %202.0%20Parameter:%20scope" is returned in the callback URL when an owner calls the authorization request API (the scope parameter is required), check whether the input scope parameter is correct and whether scopes are separated by spaces.

# 8.1.2 Handling the Exception Returned by Calling the Token Obtaining API

If the following error information is returned when you call the API for obtaining a token, check whether the value of grant\_type is correct. For details about how to configure the request parameter, see the grant\_type description in Request Parameters of the API for Obtaining Tokens of 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App. HTTP/1.1 400

```
"error_description": "unsupported_grant_type",
"error": "1111"
}
```

 If the authentication fails and the following error information is returned when you call the API for obtaining tokens, check whether client\_id and client\_secret are correct. For details about how to configure the request parameters, see the description of client\_id and client\_secret in Request Parameters of the API for Obtaining Tokens of 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App. HTTP/1.1 401 {

```
י
"error": "invalid_client"
}
```

• If the following error information is returned when you call the API for obtaining a token, the input parameter verification fails.

If the value of grant\_type is authorization\_code, check whether the execution interval of the operations in 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App exceeds 5 minutes after the authorization code is obtained in 3.1.2.2 Initiating Authorization to a Third-party App by an Owner. If the interval exceeds 5 minutes, the authorization code has expired. In this case, the owner needs to send an authorization request again to obtain a new authorization code. Operations in 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App must be performed to obtain the access token and refresh token using the new authentication code within 5 minutes. If the interval does not exceed 5 minutes, check whether the values of code and redirect\_uri are correct. For details about how to set the request parameters, see the description of code and redirect\_uri in the access token and refresh token request parameters obtained using an authorization code in 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App must be performed to a more the values of code and redirect\_uri are correct. For details about how to set the request parameters, see the description of code and redirect\_uri in the access token and refresh token request parameters obtained using an authorization code in 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App.

If grant\_type is refresh\_token, check whether refresh\_token is correct. For details about how to configure request parameters, see refresh\_token in the request parameters for using the refresh token to obtain the access token in 3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App. HTTP/1.1 400

```
"error_description": "invalid_grant",
"error": "1110"
```

#### 8.1.3 Why Does the Northbound API Return Error Code 305?

If error code 305 is returned when you call a northbound API, as shown in the following figure, the access token is invalid. That is, the owner's authorization information cannot be parsed through the access token. The possible cause is that

the access token has expired (validity period: one hour). In this case, you need to use the refresh token to obtain the access token again. For details, see **3.1.2.3 Obtaining the Access Token of the Open API by a Third-Party App**.

#### 8.1.4 Why Does the Northbound API Return Error Code 401?

If error code 401 is returned when you call a northbound API, as shown in the following figure, you do not have sufficient access token permissions. That is, the permission set authorized by the owner to the OAuth 2.0 client does not contain the requested open API. In this case, the owner needs to authorize the permission group to which the open API belongs. For details, see **3.1.2.2 Initiating Authorization to a Third-party App by an Owner**.

### 8.1.5 Why Does the Northbound API Return Error Code 407 or 429?

If error code 407 or 429 is returned when you call a northbound API, as shown in the following figure, the API is called too frequently in a period of time, triggering API flow control. See **4.1 Flow Control Policy in OAuth Connect Mode** for the flow control policies in OAuth Connect mode.

D			
data : null, failCode : 4 message :			
success : fa	lse		
ums <i>ප</i> ු copy			

•	BODY <sup>(2)</sup>
	▼ {
	data : null, failCode : 429,
	message : ',
	success : false
	}
	lines nums 🛙 Copy

#### 8.1.6 How Do I Obtain O&M Support When Open APIs Are Accessed in OAuth Connect Mode?

#### NOTICE

BODY <sup>(2)</sup>

lines nums 🛛 🖓 copy

Connecting to open APIs in OAuth Connect mode is for trial use only in Europe. The following O&M support modes are available only to European customers.

Based on the interconnection status between the third-party system and FuisonSolar SmartPVMS, two phases are involved: commissioning phase and operation phase. The O&M support policies vary depending on the phases.

Int erc on nec tio n Sta tus	Phase Definition	O&M Supp ort Polic y	Description
Co m mis sio nin g	Commission the interconnection between a third- party system and FusionSolar SmartPVMS.	Dedic ated supp ort	Customers can send service requests to the Huawei service contact person or dedicated email address. Huawei rapidly responds to and handles problems in special channels. 1. Service contact person: regional manager/FR 2. Dedicated email address: EU_DP_ServiceOperation <huaweipartners@hua wei.com&gt;</huaweipartners@hua 

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Op era tio n	The third-party system has been interconnected with FusionSolar SmartPVMS and is running	Remo te techn ical supp ort	Customers submit service requests through the hotline and obtain solutions from Huawei. In addition, customers can perform self-service O&M through online technical support provided by Huawei. 1. Hotline service: Customers contact the
	properly and stably.		service contact person (frontline service manager or FR), customer service hotline (00800336666666), or customer service email address (eu_inverter_support@huawei.com) and Huawei will respond to the customer service request.
			2. Remote troubleshooting: includes technical consulting services and problem handling services. Huawei provides a solution to the customer based on the service request submitted by the customer.
			3. Online technical support: Customers can access the Digital Power Smart Chatbot in either of the following methods to obtain product documents and technical support:
			<ul> <li>(1) Log in to https://solar.huawei.com, click ≡</li> <li>in the upper right corner, and choose Support</li> <li>&gt; Online Support.</li> </ul>
			(2) Log in to the FusionSolar app and choose Services > Customer Service Chabot.

### 8.2 FAQs About the API Account Mode

#### 8.2.1 Why Do I Fail to Create an API Account?

An administrator can create a certain number of API accounts to access open APIs. The app permissions belong to the administrator's company. An app can be granted multiple plant resource permissions.

If you fail to create an API account, check whether the number of created API accounts exceeds the upper limit (five by default).

## 8.2.2 What Is the New or Old Flow Control Policy for Northbound APIs?

As the number of API accounts increases, a single API account manages an increasing number of plants and devices. To better meet user requirements, the system updates the old flow control policy for northbound APIs and launched a new policy. By default, new API accounts adopt the new policy. The differences between the new and old flow control policies are as follows:

**Old policy**: The static flow control policy is adopted, which means that each API account is allowed to send the same number of calling requests for one API. For details, see **6.2 Old Policy for API Flow Control**.

**New policy**: The dynamic flow control policy is adopted, which means that the new policy is based on the number of resources owned by API accounts. An API account with more plants and devices is allowed to send more API calling requests in a period of time. For details, see **4.2 Flow Control Using the API Account**.

## 8.2.3 Why Does the Login Fail After I Enter the Correct Username and Password?

If the login still fails after you enter the correct username and password, try the following steps:

- **Step 1** Check whether parameter names are correct.
- **Step 2** Check whether the API account has expired.
- **Step 3** Check whether the API account is disabled.
- **Step 4** Check whether the API account is locked. If you enter incorrect login passwords for five consecutive times, the account will be locked.

----End

### 8.2.4 Why Do I Need to Log In Again When I Use the Token to Call an API?

If you encounter this issue, try the following steps:

1. Check whether your token is not used for more than 30 minutes because the validity period of a token is 30 minutes. If you continuously call a token within 30 minutes, the validity period will be automatically extended.

2. An account can have only one online session. Repeated login will invalidate the generated token. If a token is invalid, check to eliminate the repeated login issue.

#### 8.2.5 Why Does the Northbound API Return Error Code 401?

This error code is returned when you call the northbound API, as shown in the following figure.

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▼ {			
data : nul <u>l,</u>			
failCode : 4	1		
message : "		,	
params : 🕨 🚼	,		
success : fai	se		
}			
lines nums 🛯 🖓 copy			

In this case, you need to check whether the API account has the permission to access the API. You can try the following steps to check the permissions for basic and control APIs:

- **Step 1** Log in to the NMS as an administrator and choose **System > Company Management > Northbound Management**.
- **Step 2** Locate the API account and click **Modify** in the **Operation** column. On the displayed page, check whether the corresponding APIs option is enabled.

----End

If the API you access is within the basic and control API ranges, you have not granted the permission on the restricted APIs.

### 8.2.6 Why Does the Northbound API Return Error Code 407 or 429?

If error code 407 or 429 is returned when you call a northbound API, as shown in the following figure, the API is called too frequently in a period of time, triggering API flow control.

BODY <sup>(2)</sup>
<pre>   {     data : null,     failCode : 407,     message :     success : false </pre>
}
lines nums
BODY <sup>(2)</sup>
<pre>   {     data : null,     failCode : 429,     message : '',     success : false } Ines nums @ copy</pre>

There are new and old policies for API accounts. For details about the new policy, see **4.2 Flow Control Using the API Account**. For details about the old policy, see **6.2 Old Policy for API Flow Control**.

# 8.3 Why Is No Data or Only Part of Data Found When I Call a Northbound API for Data Query?

If no data or part of data about the plant or device is found when you call the API for accessing the northbound plant list to query data, try the following steps:

**Step 1** Check whether the target plant or device exists and whether the plant or device is bound to the corresponding OAuth 2.0 client of the API account or third-party app by comparing the parameters returned in **5.1.1.1 Plant List API** or **5.1.1.2 Device List API**.

- **Step 2** Find the corresponding northbound API in **5 API Reference**, check whether the API supports the target device type, and check whether the device type is correct.
- **Step 3** Check whether the target device is disconnected.
- Step 4 If Configure Owner Authorization is enabled for the company to which the plant or device belongs and the company has been bound to the OAuth 2.0 client of the API account or third-party app, as shown in the following figure, choose Plants > Operation. In the Set Permissions dialogue box, check whether API Access is enabled.



Owners can log in to the FusionSolar app, choose **Me** > **Plant management** on the toolbar at the bottom, select a plant, choose **Set Permissions**, and check whether to enable **API Access**.

#### Figure 8-1

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<b>?</b> γ	VLAN Configuration	>
Ēb C	company info	>
•) •	customer Service Chatbot	>
@ ⊦	lelp and Feedback	>
(i) A	bout	>
© s	ettings	>
ŀ	fome Devices	Me

#### Figure 8-2

0922_3	♥ № 2 11:05
Service provider	1000
Plant type	Residential
EV-charger-only plant	No
Plant name	0922_3
Total string capacity (kWp)	0.000
Grid connection date	22/09/2023
Start date of safe running	22/09/2023
Plant address	•
Plant time zone	(UTC+08:00)Beijing
Set Permissions	>
Remote startup/shutdown authorization code (NMI)	
Plant overview	
Basic info	Add devices String capacity

#### Figure 8-3



# 8.4 How Long Is the Data Collection Time of the API for Real-Time Plant Data?

The time for the API to return collected data is usually 5 minutes.

### 8.5 Why Do the Hourly/Daily/Monthly/Yearly Data APIs of the Plant or the Daily/Monthly/Yearly Data APIs of the Device Sometimes Return Small Data Value?

When you call the hourly/daily/monthly/yearly data APIs of the plant or the daily/ monthly/yearly data APIs of the device to query data, the data value returned by the APIs is small.

The issue occurs because data queries through these APIs are based on reports, but there is a delay in summarizing data from reports.

# 8.6 Why Do I Fail to Query Historical Alarms by Calling the Alarm Query API?

Currently, this API can be used to query only the current (active) alarm information of the device.

# 8.7 Why Does the /thirdData/getStationList API Return Error Code 401 or 402?

The reason is that APIs in Plant List API have been pre-offline. We provide the new APIs for replacement (see **5.1.1.1 Plant List API**). You are advised to replace APIs in Plant List API with APIs in **5.1.1.1 Plant List API**.

### 8.8 Why Is the Plant ID Returned by the Plant List Inconsistent with That Displayed on the SmartPVMS?

During the evolution of the management system, the plant IDs change. To ensure user experience of existing open API users, the management system is compatible with the plant IDs of these open API users.

# 8.9 Why Do the Plant IDs Returned for the Same Plant Vary Depending on Open API Users?

During the evolution of the management system, the plant IDs change. To ensure user experience of existing open API users, the management system is compatible with the plant IDs of these open API users. If you have multiple open API accounts applied for in different periods, their plant IDs may be different.

# 8.10 How Do I Compare and Obtain Plants That Are Not Returned by the Plant List API?

If you find that the number of returned plants decreases when you call the API for accessing the northbound plant list, perform the following steps to obtain the plant information that is not returned:

Step 1 Log in to the management system as a company administrator and choose System > Company Management > Northbound Management to view the company bound to the API account.

**Figure 8-4** If the page shown in the following figure is displayed, view the company bound to the API account in the plant list API.



**Figure 8-5** If the page shown in the following figure is displayed, view the company bound to the API account in the selected company area.



**Step 2** Choose **Plants > Plant Management**, select the company bound to the API account, and click **Export** to obtain all the plants of the company. If there are a

large number of plants, you are advised to adjust the records displayed on each page.

Figure 8	8-6							
🎁 FusionSolar	i ŵ	Home M	onitoring Reports Plants Maintenance W	lue Added Services System	SmanDesig	- @ # Q	@ English	0 0
Plants	Enter a company name. Q	Pant name:	Contact method:	ich Reset				<b>X</b>
Plant Management Plant Migration	E yangtompany	Plant Name	Total Plant String Capacity (KWp)	Address	Contact method	the Carcol Share	Shan Shan Dill Orid Connection Op	Export Add Plant
Plant Authorization			0.000				2023-11-07	
Plan Additionation			0.000				2023-08-19 🖉	
			1,000.000	۵			2022-03-28	อ
			0.000				2023-08-15 🖉	8
		•	0.000				2023-08-16 🖉	io -
			0.000				2023-08-15 🖉	Ð
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			0.000		1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	1.1	2023-08-15 🖉	
		Total records 0						< []     10 / page -

**Step 3** Compare the plants exported from the page with those returned by the plant list API to obtain the plants that are not returned.

----End