Interface Reference

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About This Document

Overview

This document describes the functions of the northbound interfaces in the Smart PV Management System. It describes the design and usage of the northbound interfaces, and how to authorize third-party users (applications) to use these interfaces to obtain data within the authorization scope, including the function and URL address of each interface, the parameter format, and usage method.

Intended Audience

This document is intended for:

- R&D engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

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

Symbol	Description
	NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue	Date	Description
06	2020-05-21	Added the device alarm and SN registration query interfaces.
05	2019-09-30	Deleted the open API interfaces and added KPIs that can be obtained over a specific interface.
04	2019-01-15	Modified the communication process between third-party systems and the northbound interfaces. Modified the login interface.
03	2018-05-20	Optimized the communication process between third-party systems and the northbound interfaces. Added descriptions about the login interface.
02	2018-02-06	Added open API interfaces.
01	2017-12-25	This is the first commercial release.

Contents

1 Interface Description

Background

The northbound interfaces are designed based on the RESTful API.

Third-party users communicate with the Smart PV Management System using HTTPS.

The Smart PV Management System sends request results in JSON format to third-party users.

Access Format and Path

Access format: *https://domain name of the management system/specific API interface name+request parameter*

Access path: *https://domain name of the management system/*

Access Rights

The northbound API access permission is independent from the third-party user account. Users must apply for the permission separately.

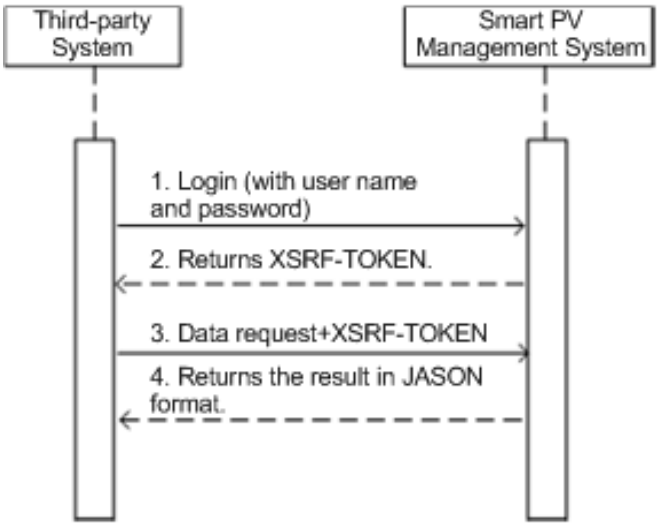
Access Restrictions

When a third-party application accesses the same northbound API, the access frequency limitation is one minute.

If a third-party application's access exceeds the access frequency limitation, the interface returns an error message indicating frequent access.

Communication Between a Third-party System and a Northbound Interface

Figure 1-1 Communication between a third-party system and a northbound interface



1. After configuring the third-party system information in the management system, use the created user name and password to log in.
2. After successful login, send requests to obtain data.

2 Northbound Interface Format Definition

2.1 Login Interface

Interface Description

This is the login interface for northbound management. You must log in to the system through the login interface before obtaining data.

Request Address

https://XXXXX/thirdData/login

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
userName	User name of the third-party system	String	M
systemCode	Password of the third-party system	String	M

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.

Example

▲Request URL example:
{

▲Request URL example:
"userName": "admin4", "systemCode": "Admin@1234" }

▲Response example:

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

NOTICE

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

2.2 Power Plant List Interface

Interface Description

This interface is used to obtain the basic information about the power plant. Before opening other interfaces, you need to configure this interface.

Request Address

https://XXXXX/thirdData/getStationList

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
-	-	-	-

NOTE

- No input parameter is required to obtain the plant list. The background obtains the plant resources of the third-party login user.
- Only logged-in users can obtain the plant list.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional response message		
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the following plant information:			
stationCode	Plant ID, which uniquely identifies a plant.	String	
stationName	Plant name	String	
stationAddr	Detailed address of the plant	String	
capacity	Installed capacity (unit: MW)	Double	
buildState	Plant status 0: Not built, 1: Under construction, 2: Grid-connected	String	
combineType	Grid connection type	String	

Parameter Name	Description	Data Type	Remarks
	1: Utility, 2: C&I plant, 3: Residential plant		
aidType	Poverty alleviation plant flag 0: Poverty alleviation plant, 1: Not poverty alleviation plant	Integer	
stationLinkman	Plant contact	String	
linkmanPho	Contact phone number	String	

Example

▲Request URL example:
{ }

▲Response example:

Example 1: An error code is returned.
{
"success": false,
"data": 20007,
"failCode": 0,
"params": {
"userId": 127,
"currentTime": 1503046597854
},
"message": null
}
},
"message": null
}

Example 2: { "success": true, "data": [{

▲Response example:

"stationCode": "BA4372D08E014822AB065017416F254C",
"stationName": "NM C&I plant 1",
"stationAddr": null,
"capacity": 146.5,
"buildState": "3",
"combineType": "2",
"aidType": 0,
"stationLinkman": "",
"linkmanPho": ""
},
{
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"stationName": "Smart O&M plant",
"stationAddr": null,
"capacity": 123.3,
"buildState": "3",
"combineType": "1",
"aidType": 0,
"stationLinkman": "",
"linkmanPho": ""
}
],
"failCode": 0,
"params": {
"userId": 14,
"currentTime": 1503046597854
},
"message": null
}

2.3 Interface for Real-time Plant Data

Interface Description

This interface is used to obtain the real-time statistics of plants. You can query statistics by plant ID. A maximum of 100 plants can be queried at a time.

Request Address

https://XXXXX/thirdData/getStationRealKpi

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the real-time statistics of each plant.			
stationCode	Plant ID	String	
dataItemMap	The content of each data item is returned in		

Parameter Name	Description	Data Type	Remarks
	key-value format. Map<String,Object>		

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2:

{
"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"

▲Response example:

},
"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
}

2.4 Interface for Hourly Plant Data

Interface Description

This interface is used to obtain the hourly statistics of plants. You can query the hourly statistics by plant ID and time range. You can query hourly statistics of a day for a maximum of 100 plants at a time.

Request Address

https://XXXXX/thirdData/getKpiStationHour

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M
collectTime	Time (ms) Hourly KPI data of a day is queried. (The background processes the number of milliseconds based on the time zone where the plant is located.)	Long	M

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the hourly statistics of each plant.			Hourly KPI data of the plant
stationCode	Plant ID	String	

Parameter Name	Description	Data Type	Remarks
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String,Object>	Map	

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2:

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


▲Response example:


```
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501862400000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501866000000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "BA4372D08E014822AB065017416F254C",
"collectTime": 1501873200000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501876800000
```


▲Response example:


```
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501880400000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501884000000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
"power_profit": 0.0000
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501887600000
},
{
"dataItemMap": {
"radiation_intensity": null,
"theory_power": null,
"inverter_power": 0.000,
"ongrid_power": null,
```


▲Response example:

"power_profit": 0.0000
},
"stationCode": "BA4372D08E014822AB065017416F254C",
"collectTime": 1501887600000
}
],
"failCode": 0,
"params": {
"stationCodes": "BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501862400000,
"currentTime": 1503046597854
},
"message": null
}

2.5 Interface for Daily Plant Data

Interface Description

This interface is used to obtain the daily statistics of plants. You can query the daily statistics by plant ID and time range. You can query daily statistics of a month for a maximum of 100 plants at a time.

Request Address

https://XXXXX/thirdData/getKpiStationDay

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M
collectTime	Time (ms) Daily KPI data of a	Long	M

Parameter Name	Description	Data Type	Mandatory/Optional
	month is queried. (The background processes the number of milliseconds based on the time zone where the plant is located.)		

NOTE

Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the daily statistics of each plant.			Daily KPI data of the plant
stationCode	Plant ID	String	
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format.	Map	

Parameter Name	Description	Data Type	Remarks
	Map<String, Object>		

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2: Data is returned normally.

{
"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,

▲Response example:

"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
}

2.6 Interface for Monthly Plant Data

Interface Description

This interface is used to obtain the monthly statistics of plants. You can query the monthly statistics by plant ID and time range. You can query monthly statistics of a year for a maximum of 100 plants at a time.

Request Address

https://XXXXX/thirdData/getKpiStationMonth

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M
collectTime	Time (ms) Monthly KPI data of a year is queried. (The background processes the number of milliseconds based on the time zone where the plant is located.)	Long	M

NOTE

Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds.	boolean	Request success or failure flag

Parameter Name	Description	Data Type	Remarks
	false: The request fails.		
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the monthly statistics of each plant.			Monthly KPI data of the plant
stationCode	Plant ID	String	
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String, Object>	Map	

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

{

▲Response example:

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

Example 2: Data is returned normally.

{
"success": true,
"data": [
{
"dataItemMap": {
"use_power": 288760,
"radiation_intensity": 0.6968,
"reduction_total_co2": 18.275,
"reduction_total_coal": 7.332,
"inverter_power": null,
"theory_power": 17559.36,
"ongrid_power": 18330,
"power_profit": 34320,
"installed_capacity": 25200,
"perpower_ratio": 0.727,
"reduction_total_tree": 999,
"performance_ratio": 89
},
"stationCode": "5D02E8B40AD342159AC8D8A2BCD4FAB5",
"collectTime": 1501516800000
},
{
"dataItemMap": {
"use_power": null,
"radiation_intensity": 1.4123,
"reduction_total_co2": 0.897,
"reduction_total_coal": 0.36,

▲Response example:

"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
},
"message": null
}

2.7 Interface for Yearly Plant Data

Interface Description

This interface is used to obtain the yearly statistics of the plant. You can query the monthly statistics by plant ID and time range. You can query yearly statistics of 25 years for a maximum of 100 plants at a time.

Request Address

https://XXXXX/thirdData/getKpiStationYear

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M
collectTime	Time (ms) Yearly KPI data of 25 years is queried. (The background processes the number of milliseconds based on the time zone where the plant is located.)	Long	M

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the yearly statistics of each plant.			Yearly KPI data of the plant
stationCode	Plant ID	String	

Parameter Name	Description	Data Type	Remarks
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String, Object>	Map	

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2: Data is returned normally.

```
{
"success": true,
"data": [
{
"dataItemMap": {
"use_power": 288760,
"radiation_intensity": 0.6968,
```


▲Response example:

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

▲Response example:
}, "message": null }

2.8 Device List Interface

Interface Description

This interface is used to obtain basic device information. Before opening the device data interfaces, you must configure this interface. You can query device information by plant ID. A maximum of 100 plants can be queried at a time.

Request Address

https://XXXXX/thirdData/getDevList

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,).	String	M

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error	int	

Parameter Name	Description	Data Type	Remarks
	codes.		
params	Request Parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains device information.			Device information
id	Device ID		
devName	Device name		
stationCode	Plant name		
esnCode	Device SN		
devTypeId	Device type ID 1 Smart String Inverter 2 SmartLogger 3 String 6 Bay 7 Busbar 8 Transformer 9 Transformer meter 10 EMI 11 AC combiner box 13 DPU 14 Central Inverter 15 DC combiner box 16 General device 17 Grid meter 18 Step-up station 19		

Parameter Name	Description	Data Type	Remarks
	Factory-used energy generation area meter 20 Solar power forecasting system 21 Factory-used energy non-generation area meter 22 PID 23 Virtual device of plant monitoring system 24 Power quality device 25 Step-up transformer 26 Photovoltaic grid-connection cabinet 27 Photovoltaic grid-connection panel 37 Pinnet SmartLogger 38 Smart Energy Center 39 Battery 40 Smart Backup Box 45 MBUS 46 Optimizer 47 Power Sensor 52 SAJ data logger 53 High voltage bay of the main transformer 54 Main transformer 55 Low		

Parameter Name	Description	Data Type	Remarks
	voltage bay of the main transformer 56 Bus bay 57 Line bay 58 Plant transformer bay 59 SVC/SVG bay 60 Bus tie/section bay 61 Plant power supply device 62 Dongle 63 Distributed SmartLogger 70 Safety box		
softwareVersion	Software version		
invType	Inverter model (only applicable to the inverter)	String	
longitude	Longitude	Double	
latitude	Latitude	Double	

Example

▲Request URL example:

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

▲Response example:
Example 1: An error code is returned.

▲Response example:

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

Example 2: Data is returned normally.

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

▲Response example:

"params": {
"stationCodes": "BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5"
},
"message": null
}

2.9 Interface for Real-time Device Data

Interface Description

This interface is used to obtain real-time device data. KPI data varies with device types. You can query device data by device type and device ID set. You can query 100 devices of the same type at a time.

Request Address

https://XXXXX/thirdData/getDevRealKpi

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). 100 devices of the same type can be queried at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 100 devices of the same type can be queried at a time.) Real-time data of the following devices can be queried.	Integer	M

Parameter Name	Description	Data Type	Mandatory/Optional
	Smart String Inverter (1), Central Inverter (14), Smart Energy Center (38), DC combiner box (15), EMI (10), Meter (Grid meter [17], Power Sensor [47]), Battery (39), Transformer (8) (Optimizer will be supported in the future.)		

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request Parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		
data contains the real-time KPI statistics of each device.			**data** contains the real-time KPI statistics of each device. (To query related KPI data, you must configure the corresponding KPIs first.)

Parameter Name	Description	Data Type	Remarks
devId	Device ID	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String,Object>	Map	Real-time data of devices is returned.

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2: Data is returned normally.

```
{
"success": true,
"data": [
{
"dataItemMap": {
"pv7_u": 0,
"pv1_u": 0,
"b_u": 0,
"c_u": 0,
```


▲Response example:

"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,

▲Response example:

"mppt_6_cap": 0,
"mppt_7_cap": 0,
"mppt_8_cap": 0,
"mppt_9_cap": 0,
"mppt_10_cap": 0,
"pv4_u": 0,
"close_time": 0,
"day_cap": 0,
"ca_u": 0,
"a_i": 0,
"pv5_u": 0,
"a_u": 0,
"pv3_u": 0,
"pv14_u": 0,
"pv14_i": 0,
"pv15_u": 0,
"pv15_i": 0,
"pv16_u": 0,
"pv16_i": 0,
"pv17_u": 0,
"pv17_i": 0,
"pv18_u": 0,
"pv18_i": 0,
"pv19_u": 0,
"pv19_i": 0,
"pv20_u": 0,
"pv20_i": 0,
"pv21_u": 0,
"pv21_i": 0,
"pv22_u": 0,
"pv22_i": 0,
"pv23_u": 0,
"pv23_i": 0,
"pv24_u": 0,
"pv24_i": 0,
"efficiency": 0,
"pv2_u": 0
},
"devId": 213472461631079
},

▲Response example:

{
"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,

▲Response example:

"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,

▲Response example:

"pv24_i": 0,
"efficiency": 0,
"pv2_u": 0
},
"devId": 214060404588862
}
],
"failCode": 0,
"params": {
"devIds": "214060404588862,213472461631079",
"devTypeId": "1",
"currentTime": 1503046597854
},
"message": null
}

2.10 Interface for 5-minute Device Data

Interface Description

This interface is used to obtain 5-minute device data. Data varies with device types. You can query device data by device type, device ID set, and time period. You can query 5-minute statistics of a day for a maximum of 100 devices of the same type at a time.

Request Address

https://XXXXX/thirdData/getDevFiveMinutes

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 100 devices of the same type can be queried	String	M

Parameter Name	Description	Data Type	Mandatory/Optional
	at a time.		
devTypeId	Device type ID. See device information. (A maximum of 100 devices of the same type can be queried for a specific day at a time.) The data of the following devices can be queried: Smart String Inverter (1), Central Inverter (14), Smart Energy Center (38), DC combiner box (15), EMI (10), Meter (Grid meter [17], Power Sensor [47]), Battery (39), Transformer (8) (Optimizer will be supported in the future.)	Integer	M
collectTime	Time (ms)	Long	

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	

Parameter Name	Description	Data Type	Remarks
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the 5-minute statistics of each device.			5-minute KPI data of the device
stationCode	Plant ID	String	
collectTime dataItemMap	Time (ms) The content of each data item is returned in key-value format. Map<String,Object> The content of each data item varies with devices.	Long Map	The device data for a specific day is returned.

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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


▲Response example:

},
"message": null
}
Example 2: Data is returned normally.
{
"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,

▲Response example:

"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,

▲Response example:

"pv21_i": 0,
"pv22_u": 0,
"pv22_i": 0,
"pv23_u": 0,
"pv23_i": 0,
"pv24_u": 0,
"pv24_i": 0,
"efficiency": null,
"pv2_u": 575.3
},
"devId": 213472461631079,
"collectTime": 1501862400000
},
{
"dataItemMap": {
"pv7_u": null,
"pv1_u": 575.3,
"b_u": 286.1,
"c_u": 286.9,
"pv6_u": 576.1,
"temperature": 44.6,
"open_time": null,
"b_i": 24.9,
"bc_u": 495.6,
"pv9_u": null,
"pv8_u": null,
"c_i": 25,
"mppt_total_cap": null,
"pv9_i": null,
"mppt_3_cap": null,
"mppt_2_cap": null,
"inverter_state": 512,
"pv8_i": null,
"mppt_1_cap": null,
"pv6_i": 7.1,
"mppt_power": 21.962,
"pv1_i": 7.1,
"total_cap": 655.37,
"ab_u": 495.4,
"pv7_i": null,

▲Response example:

"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,

▲Response example:

"pv18_i": 0,
"pv19_u": 0,
"pv19_i": 0,
"pv20_u": 0,
"pv20_i": 0,
"pv21_u": 0,
"pv21_i": 0,
"pv22_u": 0,
"pv22_i": 0,
"pv23_u": 0,
"pv23_i": 0,
"pv24_u": 0,
"pv24_i": 0,
"efficiency": null,
"pv2_u": 575.3
},
"devId": 213472461631079,
"collectTime": 1501862700000
}
],
"failCode": 0,
"params": {
"devIds": "214060404588862,213472461631079",
"devTypeId": "1",
"collectTime": "1501862400000"
},
"message": null
}

2.11 Interface for Daily Device Data

Interface Description

This interface is used to obtain daily device data. Data varies with device types. You can query device data by device type, device ID set, and time period. You can query daily statistics of a month for a maximum of 100 devices of the same type at a time.

Request Address

https://XXXXX/thirdData/getDevKpiDay

Request Mode

HTTP method: POST

Request Parameters

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 100 devices of the same type can be queried at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 100 devices of the same type can be queried for a specific month at a time.) The data of the following devices can be queried: Battery (39) Smart String Inverter (1) Central Inverter (14) Smart Energy Center (38)	Integer	M
collectTime	Time (ms)	Long	

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code	int	

Parameter Name	Description	Data Type	Remarks
	0: Normal. For other error codes, see the description of error codes.		
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the daily statistics of each plant.			Daily KPI data of the device
stationCode	Plant ID	String	
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String, Object> The content of each data item varies with devices.	Map	The device data for a specific month is returned.

Example

▲Request URL example:

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

▲Response example:
Example 1: An error code is returned. { "success": false,

▲Response example:

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

Example 2: Data is returned normally.

{
"success": true,
"data": [
{
"dataItemMap": {
"aoc_ratio": 39.931,
"yield_deviation": 0,
"installed_capacity": 30.24,
"perpower_ratio": 9.921,
"product_power": 300,
"total_aop": 5
},
"devId": 213472461631079,
"collectTime": 1501776000000
},
{
"dataItemMap": {
"aoc_ratio": 35.069,
"yield_deviation": 0,
"installed_capacity": 30.24,
"perpower_ratio": 0.543,
"product_power": 16.43,
"total_aop": 88.889
},
"devId": 214060404588862,
"collectTime": 1501776000000
}
],

▲Response example:

"failCode": 0,
"params": {
"devIds": "214060404588862,213472461631079",
"devTypeId": "1",
"collectTime": "1501862400000"
},
"message": null
}

2.12 Interface for Monthly Device Data

Interface Description

This interface is used to obtain monthly device data. Data varies with device types. You can query device data by device type, device ID set, and time period. You can query monthly statistics of a year for a maximum of 100 devices of the same type at a time.

Request Address

https://XXXXX/thirdData/getDevKpiMonth

Request Mode

HTTP method: POST

Request Parameters

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 100 devices of the same type can be queried at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 100 devices of the same type can be queried for a specific year at a time.)	Integer	M

Parameter Name	Description	Data Type	Mandatory/Optional
	The data of the following devices can be queried: Battery (39) Smart String Inverter (1) Central Inverter (14) Smart Energy Center (38)		
collectTime	Time (ms)	Long	

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the monthly statistics of each plant.			Monthly KPI data of the device
stationCode	Plant ID	String	
collectTime	Time (ms)	Long	
dataItemMap	The content of each	Map	The device data for

Parameter Name	Description	Data Type	Remarks
	data item is returned in key-value format. Map<String,Object> The content of each data item varies with devices.		a specific year is returned.

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

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

Example 2: Data is returned normally.

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


▲Response example:

"product_power": 300
},
"devId": 213472461631079,
"collectTime": 1501516800000
},
{
"dataItemMap": {
"installed_capacity": 30.24,
"perpower_ratio": null,
"product_power": 16.43
},
"devId": 214060404588862,
"collectTime": 1501516800000
}
],
"failCode": 0,
"params": {
"devIds": "214060404588862,213472461631079",
"devTypeId": "1",
"collectTime": "1501862400000"
},
"message": null
}

2.13 Interface for Yearly Device Data

Interface Description

This interface is used to obtain yearly device data. Data varies with device types. You can query device data by device type, device ID set, and time period. You can query yearly statistics of 25 years for a maximum of 100 devices of the same type at a time.

Request Address

https://XXXXX/thirdData/getDevKpiYear

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 100 devices of the same type can be queried at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 100 devices of the same type can be queried for 25 years at a time.) The data of the following devices can be queried: Battery (39) Smart String Inverter (1) Central Inverter (14) Smart Energy Center (38)	Integer	M
collectTime	Time (ms)	Long	

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		

Parameter Name	Description	Data Type	Remarks
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the yearly statistics of each plant.			Yearly KPI data of the device
stationCode	Plant ID	String	
collectTime	Time (ms)	Long	
dataItemMap	The content of each data item is returned in key-value format. Map<String,Object> The content of each data item varies with devices.	Map	The device data for 25 years is returned.

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.
{
"success": false,
"data": null,
"failCode": 20009,
"params": {
"stationCodes": "BA4372D08E014822AB065017416F254C,5D02E8B40AD342159AC8D8A2BCD4FAB5",

▲Response example:

"collectTime": 1501862400000,
"currentTime": 1503046597854
},
"message": null
}

Example 2: Data is returned normally.

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

2.14 Device Upgrade Interface

Interface Description

This interface is used to upgrade devices. A maximum of 10 devices of the same type can be upgraded at a time.

Request Address

https://XXXXX/thirdData/devUpgrade

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 10 devices of the same type can be upgraded at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 10 devices of the same type can be upgraded at a time.) The following devices are supported: Smart String Inverter (1)\Smart Energy Center (38)	Integer	M

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag true: The request succeeds. false: The request fails.	boolean	Request success or failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		

Parameter Name	Description	Data Type	Remarks
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the upgrade result of each device.			**data** contains the upgrade result of each device.
devId	Device ID	Long	
result	Upgrade command delivery result **true**: The device upgrade command is successfully delivered. **false**: The device upgrade command is not successfully delivered.	Boolean	true
failCode	Failure error code. **0** indicates no error. For details about other error codes, see the error code description.		

Example

▲Request URL example:

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

▲Response example:

Example 1: An error code is returned.

```
{
"success": false,
"data": null,
```


▲Response example:

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

Example 2: Data is returned normally.

{
"success": true,
"data": [
{
"devId": 213472461631079,
"result": false,
"failCode": 20020
},
{
"devId": 214060404588862,
"result": true,
"failCode": 0
}
],
"failCode": 0,
"params": {
"devIds": "213472461631079,214060404588862",
"devTypeId": "1",
"collectTime": "1501862400000",
"currentTime": 1503046597854
},
"message": null
}

2.15 Device Upgrade Record Interface

PS:You can call this interface only if you have 2.14 permission

Interface Description

This interface is used to query the device upgrade records of the system. A maximum of 10 devices of the same type can be queried at a time.

Request Address

https://XXXXX/thirdData/getDevUpgradeInfo

Request Mode

HTTP method: POST

Request Parameter

Parameter Name	Description	Data Type	Mandatory/Optional
devIds	Device ID list. Devices are separated by commas (,). A maximum of 10 devices of the same type can be queried at a time.	String	M
devTypeId	Device type ID. See device information. (A maximum of 10 devices of the same type can be upgraded at a time.) The following devices are supported: Smart String Inverter (1)\Smart Energy Center (38)	Integer	M

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or	boolean	Request success or

Parameter Name	Description	Data Type	Remarks
	failure flag true: The request succeeds. false: The request fails.		failure flag
failCode	Error code 0: Normal. For other error codes, see the description of error codes.	int	
params	Request parameter		
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data		Currently, only login success or failure is returned. No other data is returned.
data contains the device upgrade records of each system.			**data** contains the device upgrade records of each system.
devId	Device ID	Long	
lastUpgradeTime	Last upgrade time	Long	Millisecond
sourceVersion targetVersion process upgradeResult	Version before upgrade Target version Upgrade progress Upgrade result: 0: Not started 1: Success 2: Failure 3: Canceled 4: Upgrading 5: Time-out	String String Double Integer	

Example

▲Request URL example:
{ "devIds" : "213472461631079,214060404588862", "devTypeId":"1"

▲Request URL example:

```
}
```

▲Response example:

Example 1: An error code is returned.

```
{
"success": false,
"data": null,
"failCode": 20022,
"params": {
"devIds": "214060404588862,213472461631079",
"devTypeId": "1",
"currentTime": 1503046597854
},
"message": null
}
```

Example 2: Data is returned normally.

```
{
"success": true,
"data": [
{
"devId": 214060404588862,
"lastUpgradeTime": 1501862400000,
"sourceVersion": "V100R002C00B030",
"targetVersion": "V100R002C00B040",
"process": 60,
"upgradeResult": 4
},
{
"devId": 213472461631079,
"lastUpgradeTime": 1501862400000,
"sourceVersion": "V100R002C00B030",
"targetVersion": "V100R002C00B040",
"process": 60,
"upgradeResult": 4
}
],
"failCode": 0,
"params": {
```


▲Response example:
"devIds": "214060404588862,213472461631079", "devTypeId": "1" }, "message": null }

2.16 Device Alarm Interface

Interface Description

This interface is used to query alarm information about devices. You can query alarms for a maximum of 100 PV plants or 1000 devices at a time.

Request Address

https://XXXXX/thirdData/getAlarmList

Request Mode

HTTP method: POST

Request Parameters

Parameter Name	Description	Data Type	Mandatory/Optional
stationCodes	Plant ID list. Plants are separated by commas (,). (You can query alarms for a maximum of 100 plant IDs at a time.)	String	M
beginTime	Start timestamp	Long	M
endTime	End timestamp	Long	M
language	Language. The value must be **zh_CN**, **en_UK**, **ja_JP**, **it_IT**, **nl_NL**, **pt_BR**, **de_DE**, **fr_FR**, **es_ES**, or **po_PO**.	String	M
status	Alarm status. Multiple alarm statuses are	String	O

Parameter Name	Description	Data Type	Mandatory/Optional
	separated by commas (,), for example, **1,2**. **1**: not handled (active); **2**: acknowledged (by a user); **3**: being handled (transferred to a defect ticket); **4**: handled (defect handling has ended); **5**: cleared (by a user); **6**: cleared (automatically by the device)		
levels	Alarm severity. Multiple alarm severities are separated by commas (,), for example, **1,2**. **1**: critical; **2**: major; **3**: minor; **4**: warning	String	O
devTypes	Device type. Multiple device types are separated by commas (,), for example, **1,38**. **1**: Smart String Inverter; **2**: SmartLogger; **8**: transformer; **10**: EMI; **13**: protocol converter; **14**: Central Inverter; **15**: DC combiner box; **16**: general device; **17**: grid meter; **37**: Pinnet data logger; **38**: Smart Energy Center; **39**: battery; **40**: Smart Backup Box; **45**: MBUS; **47**: Power Sensor; **52**: SAJ data logger; **53**: high voltage bay of the main transformer; **54**: main transformer; **55**: low voltage bay	String	O

Parameter Name	Description	Data Type	Mandatory/Optional
	of the main transformer; **56**: bus bay; **57**: line bay; **58**: plant transformer bay; **59**: SVC/SVG bay; **60**: bus tie/section bay; **61**: plant power supply device; **62**: Dongle; **63**: distributed SmartLogger; **70**: safety box; **71**: collector		
types	Alarm type. Multiple alarm types are separated by commas (,), for example, **1,2**. **1**: transposition signal; **2**: exception alarm; **3**: protection event; **4**: notification status; **5**: alarm information	String	O
devName	Device name	String	O

Note: Before obtaining data, you must configure related KPIs.

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag **true**: The request succeeds. **false**: The request fails.	boolean	Request success or failure flag
failCode	Error code **0**: Normal. For other error codes, see the description of error codes.	int	
params	Request parameters		

Parameter Name	Description	Data Type	Remarks
currentTime	Current time	Long	
message	Optional message	String	
data	Returned data	Map	

Data contained in **data**

Parameter Name	Description	Data Type	Remarks
stationCode	Plant ID	String	
alarmName↵	Alarm name	String↵	↵
devName	Device name	String	↵
repairSuggestion	Handling suggestion	String	↵
esnCode	Device SN	String	↵
devTypeId	Device type ID **1**: Smart String Inverter; **2**: SmartLogger; **8**: transformer; **10**: EMI; **13**: protocol converter; **14**: Central Inverter; **15**: DC combiner box; **16**: general device; **17**: grid meter; **37**: Pinnet data logger; **38**: Smart Energy Center; **39**: battery; **40**: Smart Backup Box; **45**: MBUS; **47**: Power Sensor; **52**: SAJ data logger; **53**: high voltage bay of the main transformer; **54**: main transformer; **55**: low voltage bay of the main transformer; **56**: bus bay; **57**: line bay; **58**: plant transformer bay; **59**: SVC/SVG bay; **60**: bus tie/section bay; **61**: plant power supply device; **62**: Dongle; **63**:	String	Currently, only login success or failure is returned. No other data is returned.

Parameter Name	Description	Data Type	Remarks
	distributed SmartLogger; **70**: safety box; **71**: collector		
causeId	Cause ID. The value is obtained from the point list imported by the user.	String	
alarmCause	Alarm cause	String	
alarmType	Alarm type **1**: transposition signal; **2**: exception alarm; **3**: protection event; **4**: notification status; **5**: alarm information	String	
raiseTime	Occurrence time	String	
alarmId	Alarm ID. The value is obtained from the point list imported by the user.	String	
stationName	Plant name	String	
lev	Severity **1**: critical; **2**: major; **3**: minor; **4**: warning	String	
status	Alarm status **1**: not handled (active); **2**: acknowledged (by a user); **3**: being handled (transferred to a defect ticket); **4**: handled (defect handling has ended); **5**: cleared (by a user); **6**: cleared (automatically by the device)	String	

↵

Example

▲Request URL example:

▲Request URL example:

{

"stationCodes":"AA50C014A88C40A39AD09A0F9EBF27FE,899E68ADFE044FB9A399287C3FFBC7D3",

"beginTime":1562336856065,

"endTime":1572458978076,

"language":"zh_CN",

"types":"2",

"devName":"1",

"devTypes":"2,38",

"levels":"2",

"status":"1, 2"

}

▲Response example:

Example 1: An error code is returned.

{

"success": false,

"data": null,

"failCode": 20024,

"params": {

"devIds": "214060404588862,213472461631079",

"devTypeId": "1",

"currentTime": 1503046597854

},

"message": null

}

Example 2: Data is returned normally.

```
{
   "buildCode": "2",
   "data": [
      {
         "stationCode": "AA50C014A88C40A39AD09A0F9EBF27FE",
         "alarmName": "Device communication interruption",
         "devName": "ttt01",
         "repairSuggestion": "Scene one: 485 communication is used in
inverter and number recovery\n1. check whether the 485 communication cable
that converse the converter monitor module is connected with abnormal /
damaged.\n2. check the failure of the inverter monitoring module.\n\nScene
two: inverter and data acquisition through MBUS communication\n1. check
whether the inverter branch circuit breaker is tripping in the junction
box.\n2. check the failure of the inverter monitoring module.\n3. check the
```


▲Response example:


```
failure of the inverter MBUS-STA module.\n\nScene three: the inverter is
connected through the 4G network. Please check whether the links between
the inverters are normal",
          "esnCode": "ttt01",
          "devTypeId": 38,
          "causeId": 1,
          "alarmCause": "1. Device communication interruption",
          "alarmType": 2,
          "raiseTime": 1572366656065,
          "alarmId": 65534,
          "stationName": "Test plant",
          "lev": 2,
          "status": 1
       },
       {
          "stationCode": "899E68ADFE044FB9A399287C3FFBC7D3",
          "alarmName": "Device communication interruption",
          "devName": "1AAGGDAFGEW0",
          "repairSuggestion": "1. Check the normal power supply;2, check
whether the connection between data acquisition and monitoring background
is normal;3. Check if the fault still exists, please contact the service
hotline",
          "esnCode": "1AAGGDAFGEW0",
          "devTypeId": 2,
          "causeId": 1,
          "alarmCause": "1. Communication interruption between inverters
and smartLogger",
          "alarmType": 2,
          "raiseTime": 1572286778076,
          "alarmId": 65534,
          "stationName": "Sample plant",
          "lev": 2,
          "status": 1
       }
    ],
    "failCode": 0,
    "message": "",
    "params": null,
    "success": true
}
```


2.17 SN Registration Query Interface

Interface Description

This interface is used to enter the email address or phone number and the device SN to check whether the SN has been registered by the user.

Request Address

https://XXXXX/thirdData/snIsRegister

Request Mode

HTTP method: POST

Request Parameters

Parameter Name	Description	Data Type	Mandatory/Optional
SN	SN of the device to be queried. A maximum of 20 SNs are supported. Multiple SNs are separated by commas (,).	String	M
userName	Phone number or email address to be queried	String	M
key	Parameter transferred by the customer, which is directly returned by the interface. The value contains a maximum of 256 characters.	String	O

Response Packet

Parameter Name	Description	Data Type	Remarks
success	Request success or failure flag **true**: The request succeeds. **false**: The request fails.	boolean	Request success or failure flag
failCode	Error code **0**: Normal. For other error codes, see the description of error codes.	int	
params	Request parameters		

Parameter Name	Description	Data Type	Remarks
currentTime	Current time	Long	
message	Access error message, which is optional	String	
data	Returned data, including **key** and **Bold**	Map	

Data contained in **data**

Parameter Name	Description	Data Type	Remarks
detail	Details. The value is of the map type. **key** indicates the device SN, and **value** indicates whether the device is registered.	Map	
key	Key transferred by the interface invoker	String	↵

↵

Example

▲Request URL example:

{
"SN":"1rrrrrrrrr1,1rrrrrrrrr2",
"userName":"admin@qq.com",
"key":"1293849606739215"
}

▲Response example:

Example 1: An error code is returned.
{
"buildCode": "2",
"data": {
"SN": "1rrrrrrrrr1,1rrrrrrrrr2",

▲Response example:

"userName": "admin@qq.com1",
"key": "1293849606739215"
},
"failCode": 0,
"message": "user does not exist",
"params": null,
"success": false
}

Example 2: Data is returned normally.

{
"buildCode": "2",
"data": {
"detail": {
"1rrrrrrrrr1": true,
"1rrrrrrrrr2": true
},
"key": "1293849606739215"
},
"failCode": 0,
"message": "",
"params": {
"SN": "1rrrrrrrrr1,1rrrrrrrrr2",
"userName": "admin@qq.com",
"key": "1293849606739215"
},
"success": true
}

Example 3: The returned data indicates that some SNs are registered and some are not.

{
"buildCode": "2",
"data": {
"detail": {
"1rrrrrrrrr1": true,
"1rrrrrrrrr2": false
},
"key": "1293849606739215"
},
"failCode": 0,
"message": "",
"params": {

▲Response example:

"SN": "1rrrrrrrrr1,1rrrrrrrrr2",
"userName": "admin@qq.com",
"key": "1293849606739215"
},
"success": true
}

3 KPIs Obtained over Northbound Interfaces

3.1 Interface for Real-time Plant Data

Key	Name	Unit
day_power	Daily energy	kWh
month_power	Monthly energy	kWh
total_power	Lifetime energy	kWh
day_income	Daily revenue	¥ (Currency conversion is not performed.)
total_income	Total revenue	¥ (Currency conversion is not performed.)
real_health_state	Plant status	None (Plant status: 1: Disconnected 2: Faulty 3: Healthy)

3.2 Interface for Hourly Plant Data

Key	KPI	Unit
radiation_intensity	Total irradiation	kWh/m²
theory_power	Theoretical energy	kWh
inverter_power	Inverter energy	kWh
ongrid_power	Feed-in energy	kWh
power_profit	Energy revenue	¥ (Currency conversion is not performed.)

3.3 Interface for Daily Plant Data

Key	KPI	Unit
installed_capacity	Installed capacity	kW
radiation_intensity	Total irradiation	kWh/m²
theory_power	Theoretical energy	kWh
performance_ratio	Electricity generation efficiency	kWh
inverter_power	Inverter energy	kWh
ongrid_power	Feed-in energy	kWh
use_power	Power consumption	kWh
power_profit	Energy revenue	¥ (Currency conversion is not performed.)
perpower_ratio	Equivalent utilization hours	h
reduction_total_co2	CO_2 reduction	Ton
reduction_total_coal	Standard coal savings	Ton
reduction_total_tree	Equivalent tree planting	Tree

3.4 Interface for Monthly Plant Data

Key	KPI	Unit
installed_capacity	Installed capacity	kW
radiation_intensity	Total irradiation	kWh/m²
theory_power	Theoretical energy	kWh
performance_ratio	Electricity generation efficiency	kWh
inverter_power	Inverter energy	kWh
ongrid_power	Feed-in energy	kWh
use_power	Power consumption	kWh
power_profit	Energy revenue	¥ (Currency conversion is not performed.)
perpower_ratio	Equivalent utilization hours	h
reduction_total_co2	CO_2 reduction	Ton
reduction_total_coal	Standard coal savings	Ton
reduction_total_tree	Equivalent tree planting	Tree

3.5 Interface for Yearly Plant Data

Key	KPI	Unit
installed_capacity	Installed capacity	kW
radiation_intensity	Total irradiation	kWh/m²
theory_power	Theoretical energy	kWh
performance_ratio	Electricity generation efficiency	kWh
inverter_power	Inverter energy	kWh
ongrid_power	Feed-in energy	kWh
use_power	Power consumption	kWh
power_profit	Energy revenue	¥ (Currency conversion is not performed.)
perpower_ratio	Equivalent utilization hours	h
reduction_total_co2	CO_2 reduction	Ton

Key	KPI	Unit
reduction_total_coal	Standard coal savings	Ton
reduction_total_tree	Equivalent tree planting	Tree

3.6 Interface for Real-time Device Data

Device Type	Key	KPI	Unit
Smart String Inverter	inverter_state	Inverter status	Decimal digits For details about the status, see the following inverter status description.
	ab_u	Grid AB voltage	V
	bc_u	Grid BC voltage	V
	ca_u	Grid CA voltage	V
	a_u	Phase A voltage	V
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A
	efficiency	Inverter conversion efficiency (manufacturer)	%
	temperature	Device internal temperature	°C
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz
	active_power	Active power	kW
	reactive_power	Output reactive power	kVar
	day_cap	Daily energy	kWh
	mppt_power	MPPT total input power	kW
	pv1_u	PV1 input voltage	V

Device Type	Key	KPI	Unit
	pv2_u	PV2 input voltage	V
	pv3_u	PV3 input voltage	V
	pv4_u	PV4 input voltage	V
	pv5_u	PV5 input voltage	V
	pv6_u	PV6 input voltage	V
	pv7_u	PV7 input voltage	V
	pv8_u	PV8 input voltage	V
	pv9_u	PV9 input voltage	V
	pv10_u	PV10 input voltage	V
	pv11_u	PV11 input voltage	V
	pv12_u	PV12 input voltage	V
	pv13_u	PV13 input voltage	V
	pv14_u	PV14 input voltage	V
	pv15_u	PV15 input voltage	V
	pv16_u	PV16 input voltage	V
	pv17_u	PV17 input voltage	V
	pv18_u	PV18 input voltage	V
	pv19_u	PV19 input voltage	V
	pv20_u	PV20 input voltage	V
	pv21_u	PV21 input voltage	V
	pv22_u	PV22 input voltage	V
	pv23_u	PV23 input voltage	V
	pv24_u	PV24 input voltage	V
	pv1_i	PV1 input current	A
	pv2_i	PV2 input current	A
	pv3_i	PV3 input current	A
	pv4_i	PV4 input current	A
	pv5_i	PV5 input current	A
	pv6_i	PV6 input current	A
	pv7_i	PV7 input current	A
	pv8_i	PV8 input current	A

Device Type	Key	KPI	Unit
	pv9_i	PV9 input current	A
	pv10_i	PV10 input current	A
	pv11_i	PV11 input current	A
	pv12_i	PV12 input current	A
	pv13_i	PV13 input current	A
	pv14_i	PV14 input current	A
	pv15_i	PV15 input current	A
	pv16_i	PV16 input current	A
	pv17_i	PV17 input current	A
	pv18_i	PV18 input current	A
	pv19_i	PV19 input current	A
	pv20_i	PV20 input current	A
	pv21_i	PV21 input current	A
	pv22_i	PV22 input current	A
	pv23_i	PV23 input current	A
	pv24_i	PV24 input current	A
	total_cap	Cumulative energy	kWh
	open_time	Inverter startup time	Time (ms)
	close_time	Inverter shutdown time	Time (ms)
	mppt_total_cap	Total DC input energy	kWh
	mppt_1_cap	MPPT 1 DC cumulative energy	kWh
	mppt_2_cap	MPPT 2 DC cumulative energy	kWh
	mppt_3_cap	MPPT 3 DC cumulative energy	kWh
	mppt_4_cap	MPPT 4 DC cumulative energy	kWh
	mppt_5_cap	MPPT 5 DC cumulative energy	kWh
	mppt_6_cap	MPPT 6 DC cumulative energy	kWh
	mppt_7_cap	MPPT 7 DC cumulative energy	kWh

Device Type	Key	KPI	Unit
	mppt_8_cap	MPPT 8 DC cumulative energy	kWh
	mppt_9_cap	MPPT 9 DC cumulative energy	kWh
	mppt_10_cap	MPPT 10 DC cumulative energy	kWh
	run_state	Status (0: Disconnected 1: Connected)	None
Central inverter	inverter_state	Inverter status	For details, see the following description.
	day_cap	Daily energy	kWh
	total_cap	Cumulative energy	kWh
	temperature	Device internal temperature	kWh
	center_u	DC voltage	V
	center_i	DC current	A
	center_i_1	#1 current value	A
	center_i_2	#2 current value	A
	center_i_3	#3 current value	A
	center_i_4	#4 current value	A
	center_i_5	#5 current value	A
	center_i_6	#6 current value	A
	center_i_7	#7 current value	A
	center_i_8	#8 current value	A
	center_i_9	#9 current value	A
	center_i_10	#10 current value	A
	mppt_power	DC input power	kW
	a_u	Phase A voltage	V
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A

Device Type	Key	KPI	Unit
	power_factor	Power factor	None
	elec_freq	Grid connection frequency	Hz
	active_power	AC output power	kW
	reactive_power	Output reactive power	kVar
	open_time	Inverter startup time	Millisecond
	close_time	Inverter shutdown time	Millisecond
	aop	Production reliability	%
	run_state	Status (0: Disconnected 1: Connected)	
Smart Energy Center	inverter_state	Inverter status	For details, see the following description.
	ab_u	Grid AB voltage	V
	bc_u	Grid BC voltage	V
	ca_u	Grid CA voltage	V
	a_u	Phase A voltage	V
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A
	efficiency	Inverter conversion efficiency (manufacturer)	%
	temperature	Device internal temperature	°C
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz
	active_power	Active power	kW
	reactive_power	Output reactive power	kVar
	day_cap	Daily energy	kWh
	mppt_power	MPPT total input power	kW

Device Type	Key	KPI	Unit
	pv1_u	PV1 input voltage	V
	pv2_u	PV2 input voltage	V
	pv3_u	PV3 input voltage	V
	pv4_u	PV4 input voltage	V
	pv5_u	PV5 input voltage	V
	pv6_u	PV6 input voltage	V
	pv7_u	PV7 input voltage	V
	pv8_u	PV8 input voltage	V
	pv1_i	PV1 input current	A
	pv2_i	PV2 input current	A
	pv3_i	PV3 input current	A
	pv4_i	PV4 input current	A
	pv5_i	PV5 input current	A
	pv6_i	PV6 input current	A
	pv7_i	PV7 input current	A
	pv8_i	PV8 input current	A
	total_cap	Cumulative energy	kWh
	open_time	Inverter startup time	Time (ms)
	close_time	Inverter shutdown time	Time (ms)
	mppt_1_cap	MPPT 1 DC cumulative energy	kWh
	mppt_2_cap	MPPT 2 DC cumulative energy	kWh
	mppt_3_cap	MPPT 3 DC cumulative energy	kWh
	mppt_4_cap	MPPT 4 DC cumulative energy	kWh
	run_state	Status (0: Disconnected 1: Connected)	
DC combiner box	dc_i1	#1 current value	A
	dc_i2	#2 current value	A
	dc_i3	#3 current value	A
	dc_i4	#4 current value	A

Device Type	Key	KPI	Unit
	dc_i5	#5 current value	A
	dc_i6	#6 current value	A
	dc_i7	#7 current value	A
	dc_i8	#8 current value	A
	dc_i9	#9 current value	A
	dc_i10	#10 current value	A
	dc_i11	#11 current value	A
	dc_i12	#12 current value	A
	dc_i13	#13 current value	A
	dc_i14	#14 current value	A
	dc_i15	#15 current value	A
	dc_i16	#16 current value	A
	dc_i17	#17 current value	A
	dc_i18	#18 current value	A
	dc_i19	#19 current value	A
	dc_i20	#20 current value	A
	photc_i	PV current	A
	photc_u	PV voltage	V
	temprature	Temperature	°C
	thunder_count	Number of lightning strikes	Times
	run_state	Status (0: Disconnected 1: Connected)	None
EMI	temperature	Temperature	°C
	pv_temperature	PV temperature	°C
	wind_speed	Wind speed	m/s
	wind_direction	Wind direction	Degree
	radiant_total	Total irradiation	MJ/m^2
	radiant_line	Irradiation intensity	W/m^2
	horiz_radiant_line	Horizontal irradiation intensity	W/m^2
	horiz_radiant_total	Horizontal irradiation	MJ/m^2

Device Type	Key	KPI	Unit
	run_state	Status	
Gateway power meter	ab_u	Grid AB line voltage	V
	bc_u	Grid BC line voltage	V
	ca_u	Grid CA line voltage	V
	a_u	Phase A voltage (AC output)	V
	b_u	Phase B voltage (AC output)	V
	c_u	Phase C voltage (AC output)	V
	a_i	Grid phase A current (IA)	A
	b_i	Grid phase B current (IB)	A
	c_i	Grid phase C current (IC)	A
	active_power	Active power	kW
	power_factor	Power factor	None
	active_cap	Active power (Kilowatt hour of positive active power)	kWh
	reactive_power	Reactive power	kVar
	reverse_active_cap	Kilowatt hour of negative active power	kWh
	forward_reactive_cap	Kilowatt hour of positive reactive power	kWh
	reverse_reactive_cap	Kilowatt hour of negative reactive power	kWh
	active_power_a	Active power Pa	kW
	active_power_b	Active power Pb	kW
	active_power_c	Active power Pc	kW
	reactive_power_a	Reactive power Qa	kVar
	reactive_power_b	Reactive power Qb	kVar
	reactive_power_c	Reactive power Qc	kVar
	total_apparent_power	Total apparent power	kVA

Device Type	Key	KPI	Unit
	grid_frequency	Grid frequency	Hz
	reverse_active_peak	Kilowatt hour of negative active power (peak)	kWh
	reverse_active_power	Kilowatt hour of negative active power (off)	kWh
	reverse_active_valley	Kilowatt hour of negative active power (shoulder)	kWh
	reverse_active_top	Kilowatt hour of negative active power (sharp)	kWh
	positive_active_peak	Kilowatt hour of positive active power (peak)	kWh
	positive_active_power	Kilowatt hour of positive active power (off)	kWh
	positive_active_valley	Kilowatt hour of positive active power (shoulder)	kWh
	positive_active_top	Kilowatt hour of positive active power (sharp)	kWh
	reverse_reactive_peak	Kilowatt hour of negative reactive power (peak)	kVar
	reverse_reactive_power	Kilowatt hour of negative reactive power (off)	kVar
	reverse_reactive_valley	Kilowatt hour of negative reactive power (shoulder)	kVar
	reverse_reactive_top	Kilowatt hour of negative reactive power (sharp)	kVar
	positive_reactive_peak	Kilowatt hour of positive reactive power (peak)	kVar
	positive_reactive_power	Kilowatt hour of positive reactive power	kVar

Device Type	Key	KPI	Unit
		(off)	
	positive_reactive_valley	Kilowatt hour of positive reactive power (shoulder)	kVar
	positive_reactive_top	Kilowatt hour of positive reactive power (sharp)	kVar
Power Sensor	meter_status	Meter status	0: Offline 1: Normal
	meter_u	Grid voltage	V
	meter_i	Grid current	A
	active_power	Active power	W
	reactive_power	Reactive power	Var
	power_factor	Power factor	None
	grid_frequency	Grid frequency	Hz
	active_cap	Active power (Kilowatt hour of positive active power)	kWh
	reverse_active_cap	Kilowatt hour of negative active power	kWh
	run_state	Status	0: Disconnected 1: Connected
Battery	battery_status	Battery operating status	None
	max_charge_power	Maximum charging power	W
	max_discharge_power	Maximum discharging power	W
	ch_discharge_power	Charging/Discharging power	W
	busbar_u	Battery voltage	V
	battery_soc	Battery SOC	%
	battery_soh	Battery SOH	None
	ch_discharge_model	Charging & discharging mode	0: None 1: Forced discharging/charging 2: Time of use electricity price 3: Fixed discharging/charging 4: Maximum

Device Type	Key	KPI	Unit
			Self-consumption energy
	charge_cap	Charging capacity	kWh
	discharge_cap	Discharging capacity	kWh
	run_state	Status	0: Disconnected 1: Connected
Transformer	ab_u	Grid AB line voltage	V
	bc_u	Grid BC line voltage	V
	ca_u	Grid CA line voltage	V
	a_u	Phase A voltage (AC output)	V
	b_u	Phase B voltage (AC output)	V
	c_u	Phase C voltage (AC output)	V
	a_i	Grid phase A current (IA)	A
	b_i	Grid phase B current (IB)	A
	c_i	Grid phase C current (IC)	A
	active_power	Active power	kW
	reactive_power	Reactive power	kVar
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz
	run_state	Status	0: Disconnected 1: Connected

Inverter Status (**inverter_state**) Description

Value	Description
0x0000	Standby: initializing
0x0001	Standby: insulation resistance detection
0x0002	Standby: sunlight detection
0x0003	Standby: power grid detection

Value	Description
0x0100	Startup
0x0200	On-grid
0x0201	Grid connection: power limited
0x0202	Grid connection: self-derating
0x0300	Shutdown: unexpected shutdown
0x0301	Shutdown: commanded shutdown
0x0302	Shutdown: OVGR
0x0303	Shutdown: communication disconnection
0x0304	Shutdown: limited power
0x0305	Shutdown: manual startup is required
0x0306	Shutdown: DC switch disconnected
0x0401	Grid schedule: cosφ-P curve
0x0402	Grid schedule: Q-U curve
0x0500	Spot-check ready
0x0501	Spot-checking
0x0600	Inspecting
0X0700	AFCI self-test
0X0800	I-V scanning
0X0900	DC input detection
0xA000	Standby: No sunlight
0xB000	Communication disconnection (written by the SmartLogger)
0xC000	Loading (written by the SmartLogger)

3.7 Interface for 5-minute Device Data

Device Type	Key	KPI	Unit
Smart String Inverter	inverter_state	Inverter status	For details about the status, see the description in 3.6 Interface for Real-time Device

Device Type	Key	KPI	Unit
			Data.
	ab_u	Grid AB voltage	V
	bc_u	Grid BC voltage	V
	ca_u	Grid CA voltage	V
	a_u	Phase A voltage	V
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A
	efficiency	Inverter conversion efficiency (manufacturer)	%
	temperature	Device internal temperature	℃
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz
	active_power	Active power	kW
	reactive_power	Output reactive power	kVar
	day_cap	Daily energy	kWh
	mppt_power	MPPT total input power	kW
	pv1_u	PV1 input voltage	V
	pv2_u	PV2 input voltage	V
	pv3_u	PV3 input voltage	V
	pv4_u	PV4 input voltage	V
	pv5_u	PV5 input voltage	V
	pv6_u	PV6 input voltage	V
	pv7_u	PV7 input voltage	V
	pv8_u	PV8 input voltage	V
	pv9_u	PV9 input voltage	V
	pv10_u	PV10 input voltage	V
	pv11_u	PV11 input voltage	V
	pv12_u	PV12 input voltage	V

Device Type	Key	KPI	Unit
	pv13_u	PV13 input voltage	V
	pv14_u	PV14 input voltage	V
	pv15_u	PV15 input voltage	V
	pv16_u	PV16 input voltage	V
	pv17_u	PV17 input voltage	V
	pv18_u	PV18 input voltage	V
	pv19_u	PV19 input voltage	V
	pv20_u	PV20 input voltage	V
	pv21_u	PV21 input voltage	V
	pv22_u	PV22 input voltage	V
	pv23_u	PV23 input voltage	V
	pv24_u	PV24 input voltage	V
	pv1_i	PV1 input current	A
	pv2_i	PV2 input current	A
	pv3_i	PV3 input current	A
	pv4_i	PV4 input current	A
	pv5_i	PV5 input current	A
	pv6_i	PV6 input current	A
	pv7_i	PV7 input current	A
	pv8_i	PV8 input current	A
	pv9_i	PV9 input current	A
	pv10_i	PV10 input current	A
	pv11_i	PV11 input current	A
	pv12_i	PV12 input current	A
	pv13_i	PV13 input current	A
	pv14_i	PV14 input current	A
	pv15_i	PV15 input current	A
	pv16_i	PV16 input current	A
	pv17_i	PV17 input current	A
	pv18_i	PV18 input current	A
	pv19_i	PV19 input current	A

Device Type	Key	KPI	Unit
	pv20_i	PV20 input current	A
	pv21_i	PV21 input current	A
	pv22_i	PV22 input current	A
	pv23_i	PV23 input current	A
	pv24_i	PV24 input current	A
	total_cap	Cumulative energy	kWh
	open_time	Inverter startup time	Time (ms)
	close_time	Inverter shutdown time	Time (ms)
	mppt_total_cap	Total DC input energy	kWh
	mppt_1_cap	MPPT 1 DC cumulative energy	kWh
	mppt_2_cap	MPPT 2 DC cumulative energy	kWh
	mppt_3_cap	MPPT 3 DC cumulative energy	kWh
	mppt_5_cap	MPPT 5 DC cumulative energy	kWh
	mppt_6_cap	MPPT 6 DC cumulative energy	kWh
	mppt_7_cap	MPPT 7 DC cumulative energy	kWh
	mppt_8_cap	MPPT 8 DC cumulative energy	kWh
	mppt_9_cap	MPPT 9 DC cumulative energy	kWh
	mppt_10_cap	MPPT 10 DC cumulative energy	kWh
Central inverter	inverter_state	Inverter status	For details, see the following description.
	day_cap	Daily energy	kWh
	total_cap	Cumulative energy	kWh
	temperature	Device internal temperature	kWh
	center_u	DC voltage	V
	center_i	DC current	A

Device Type	Key	KPI	Unit
	center_i_1	#1 current value	A
	center_i_2	#2 current value	A
	center_i_3	#3 current value	A
	center_i_4	#4 current value	A
	center_i_5	#5 current value	A
	center_i_6	#6 current value	A
	center_i_7	#7 current value	A
	center_i_8	#8 current value	A
	center_i_9	#9 current value	A
	center_i_10	#10 current value	A
	mppt_power	DC input power	kW
	a_u	Phase A voltage	V
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A
	power_factor	Power factor	None
	elec_freq	Grid connection frequency	Hz
	active_power	AC output power	kW
	reactive_power	Output reactive power	kVar
	open_time	Inverter startup time	Millisecond
	close_time	Inverter shutdown time	Millisecond
	aop	Production reliability	%
Smart Energy Center	inverter_state	Inverter status	For details, see the following description.
	ab_u	Grid AB voltage	V
	bc_u	Grid BC voltage	V
	ca_u	Grid CA voltage	V
	a_u	Phase A voltage	V

Device Type	Key	KPI	Unit
	b_u	Phase B voltage	V
	c_u	Phase C voltage	V
	a_i	Grid phase A current	A
	b_i	Grid phase B current	A
	c_i	Grid phase C current	A
	efficiency	Inverter conversion efficiency (manufacturer)	%
	temperature	Device internal temperature	℃
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz
	active_power	Active power	kW
	reactive_power	Output reactive power	kVar
	day_cap	Daily energy	kWh
	mppt_power	MPPT total input power	kW
	pv1_u	PV1 input voltage	V
	pv2_u	PV2 input voltage	V
	pv3_u	PV3 input voltage	V
	pv4_u	PV4 input voltage	V
	pv5_u	PV5 input voltage	V
	pv6_u	PV6 input voltage	V
	pv7_u	PV7 input voltage	V
	pv8_u	PV8 input voltage	V
	pv1_i	PV1 input current	A
	pv2_i	PV2 input current	A
	pv3_i	PV3 input current	A
	pv4_i	PV4 input current	A
	pv5_i	PV5 input current	A
	pv6_i	PV6 input current	A
	pv7_i	PV7 input current	A
	pv8_i	PV8 input current	A
	total_cap	Cumulative energy	kWh

Device Type	Key	KPI	Unit
	open_time	Inverter startup time	Time (ms)
	close_time	Inverter shutdown time	Time (ms)
	mppt_1_cap	MPPT 1 DC cumulative energy	kWh
	mppt_2_cap	MPPT 2 DC cumulative energy	kWh
	mppt_3_cap	MPPT 3 DC cumulative energy	kWh
	mppt_4_cap	MPPT 4 DC cumulative energy	kWh
DC combiner box	dc_i1	#1 current value	A
	dc_i2	#2 current value	A
	dc_i3	#3 current value	A
	dc_i4	#4 current value	A
	dc_i5	#5 current value	A
	dc_i6	#6 current value	A
	dc_i7	#7 current value	A
	dc_i8	#8 current value	A
	dc_i9	#9 current value	A
	dc_i10	#10 current value	A
	dc_i11	#11 current value	A
	dc_i12	#12 current value	A
	dc_i13	#13 current value	A
	dc_i14	#14 current value	A
	dc_i15	#15 current value	A
	dc_i16	#16 current value	A
	dc_i17	#17 current value	A
	dc_i18	#18 current value	A
	dc_i19	#19 current value	A
	dc_i20	#20 current value	A
	photc_i	PV current	A
	photc_u	PV voltage	V

Device Type	Key	KPI	Unit
	temprature	Temperature	℃
	thunder_count	Number of lightning strikes	Times
EMI	temperature	Temperature	℃
	pv_temperature	PV temperature	℃
	wind_speed	Wind speed	m/s
	wind_direction	Wind direction	Degree
	radiant_total	Total irradiation	MJ/m^2
	radiant_line	Irradiation intensity	W/m^2
	horiz_radiant_line	Horizontal irradiation intensity	W/m^2
	horiz_radiant_total	Horizontal irradiation	MJ/m^2
Gateway power meter	ab_u	Grid AB line voltage	V
	bc_u	Grid BC line voltage	V
	ca_u	Grid CA line voltage	V
	a_u	Phase A voltage (AC output)	V
	b_u	Phase B voltage (AC output)	V
	c_u	Phase C voltage (AC output)	V
	a_i	Grid phase A current (IA)	A
	b_i	Grid phase B current (IB)	A
	c_i	Grid phase C current (IC)	A
	active_power	Active power	kW
	power_factor	Power factor	None
	active_cap	Active power (Kilowatt hour of positive active power)	kWh
	reactive_power	Reactive power	kVar
	reverse_active_cap	Kilowatt hour of negative active power	kWh

Device Type	Key	KPI	Unit
	forward_reactive_cap	Kilowatt hour of positive reactive power	kWh
	reverse_reactive_cap	Kilowatt hour of negative reactive power	kWh
	active_power_a	Active power Pa	kW
	active_power_b	Active power Pb	kW
	active_power_c	Active power Pc	kW
	reactive_power_a	Reactive power Qa	kVar
	reactive_power_b	Reactive power Qb	kVar
	reactive_power_c	Reactive power Qc	kVar
	total_apparent_power	Total apparent power	kVA
	grid_frequency	Grid frequency	Hz
	reverse_active_peak	Kilowatt hour of negative active power (peak)	kWh
	reverse_active_power	Kilowatt hour of negative active power (off)	kWh
	reverse_active_valley	Kilowatt hour of negative active power (shoulder)	kWh
	reverse_active_top	Kilowatt hour of negative active power (sharp)	kWh
	positive_active_peak	Kilowatt hour of positive active power (peak)	kWh
	positive_active_power	Kilowatt hour of positive active power (off)	kWh
	positive_active_valley	Kilowatt hour of positive active power (shoulder)	kWh
	positive_active_top	Kilowatt hour of positive active power (sharp)	kWh
	reverse_reactive_peak	Kilowatt hour of negative reactive power (peak)	kVar
	reverse_reactive_power	Kilowatt hour of negative reactive power (off)	kVar

Device Type	Key	KPI	Unit
	reverse_reactive_valley	Kilowatt hour of negative reactive power (shoulder)	kVar
	reverse_reactive_top	Kilowatt hour of negative reactive power (sharp)	kVar
	positive_reactive_peak	Kilowatt hour of positive reactive power (peak)	kVar
	positive_reactive_power	Kilowatt hour of positive reactive power (off)	kVar
	positive_reactive_valley	Kilowatt hour of positive reactive power (shoulder)	kVar
	positive_reactive_top	Kilowatt hour of positive reactive power (sharp)	kVar
Power Sensor	meter_status	Meter status	0: Offline 1: Normal
	meter_u	Grid voltage	V
	meter_i	Grid current	A
	active_power	Active power	W
	reactive_power	Reactive power	Var
	power_factor	Power factor	None
	grid_frequency	Grid frequency	Hz
	active_cap	Active power (Kilowatt hour of positive active power)	kWh
	reverse_active_cap	Kilowatt hour of negative active power	kWh
Battery	battery_status	Battery operating status	None
	max_charge_power	Maximum charging power	W
	max_discharge_power	Maximum discharging power	W
	ch_discharge_power	Charging/Discharging power	W
	busbar_u	Battery voltage	V
	battery_soc	Battery SOC	%
	battery_soh	Battery SOH	None

Device Type	Key	KPI	Unit
	ch_discharge_model	Charging & discharging mode	0: None 1: Forced discharging/charging 2: Time of use electricity price 3: Fixed discharging/charging 4: Maximum Self-consumption energy
	charge_cap	Charging capacity	kWh
	discharge_cap	Discharging capacity	kWh
Transformer	ab_u	Grid AB line voltage	V
	bc_u	Grid BC line voltage	V
	ca_u	Grid CA line voltage	V
	a_u	Phase A voltage (AC output)	V
	b_u	Phase B voltage (AC output)	V
	c_u	Phase C voltage (AC output)	V
	a_i	Grid phase A current (IA)	A
	b_i	Grid phase B current (IB)	A
	c_i	Grid phase C current (IC)	A
	active_power	Active power	kW
	reactive_power	Reactive power	kVar
	power_factor	Power factor	None
	elec_freq	Grid frequency	Hz

Inverter Status (**inverter_state**) Description

Value	Description
0x0000	Standby: initializing
0x0001	Standby: insulation resistance detection
0x0002	Standby: sunlight detection

Value	Description
0x0003	Standby: power grid detection
0x0100	Startup
0x0200	On-grid
0x0201	Grid connection: power limited
0x0202	Grid connection: self-derating
0x0300	Shutdown: unexpected shutdown
0x0301	Shutdown: commanded shutdown
0x0302	Shutdown: OVGR
0x0303	Shutdown: communication disconnection
0x0304	Shutdown: limited power
0x0305	Shutdown: manual startup is required
0x0306	Shutdown: DC switch disconnected
0x0401	Grid schedule: cosφ-P curve
0x0402	Grid schedule: Q-U curve
0x0500	Spot-check ready
0x0501	Spot-checking
0x0600	Inspecting
0X0700	AFCI self-test
0X0800	I-V scanning
0X0900	DC input detection
0xA000	Standby: No sunlight
0xB000	Communication disconnection (written by the SmartLogger)
0xC000	Loading (written by the SmartLogger)

3.8 Interface for Daily Device Data

Device Type	Key	KPI	Unit
Battery	charge_cap	Charging capacity	kWh
	discharge_cap	Discharging capacity	kWh

Device Type	Key	KPI	Unit
	charge_time	Charging duration	h
	discharge_time	Discharge duration	h
Smart String Inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
	yield_deviation	Production deviation	%
	total_aop	Production reliability	%
	aoc_ratio	Communication reliability	%
Central inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
	yield_deviation	Production deviation	%
	total_aop	Production reliability	%
	aoc_ratio	Communication reliability	%
Smart Energy Center	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
	yield_deviation	Production deviation	%
	total_aop	Production reliability	%
	aoc_ratio	Communication reliability	%

3.9 Interface for Monthly Device Data

Device Type	Key	KPI	Unit
Battery	charge_cap	Charging capacity	kWh

Device Type	Key	KPI	Unit
	discharge_cap	Discharging capacity	kWh
	charge_time	Charging duration	h
	discharge_time	Discharge duration	h
Smart String Inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
Central inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
Smart Energy Center	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h

3.10 Interface for Yearly Device Data

Device Type	Key	KPI	Unit
Battery	charge_cap	Charging capacity	kWh
	discharge_cap	Discharging capacity	kWh
	charge_time	Charging duration	h
	discharge_time	Discharge duration	h
Smart String Inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h
Central inverter	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h

Device Type	Key	KPI	Unit
Smart Energy Center	installed_capacity	Installed capacity	kW
	product_power	Energy	kWh
	perpower_ratio	Equivalent utilization hours	h

4 Error Code List

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

No.	Error Code	Description
		found.
21	20021	The upgrade file does not exist.
22	20022	The upgrade records of the devices in the system are not found.
23	305	You are not in the login state. You need to log in again.
24	401	You do not have the related data interface permission.
25	407	The interface access frequency is too high.
26	20023	The query start time cannot be later than the query end time.
27	20024	The language cannot be empty.
28	20025	The language parameter value is incorrect.
29	20026	Only data of the latest 365 days can be queried.
30	20027	The query time period cannot span more than 31 days.

