

Report code
API_Document_20240506_01, Rev.1
06 May 2024

Outbound *API*



creating
trust
*driving
progress*



kiwa ExTEL

Kiwa ExTEL Outbound *API Documentation*

Colophon

Title	Kiwa ExTEL Outbound API Documentation
Project code	API_Document_20240506_01, Rev.1
Project manager	Fred Chen
Contractor	
Author	Phil Yeh

Kiwa ExTEL 艾思特能源

13F-5, No.100, Section 1,
Jiafeng 11th Rd, Zhubei City,
Hsinchu County 302052, Taiwan

This report is not publicly available, but distributed only to the client(s) who commissioned this project.
Distribution of the report outside the project team is done only by and under responsibility of the client.

Issue and Revision Records

Revision	Date	Prepared by	Verified by	Approved by
0	2024/05/06	Phil Yeh	Fred Chen	

Report Code API_Document_20240506_01, Rev.1

All information provided in this document is subject to change without prior notice. Kiwa ExTEL Energy Co., Ltd. retains the right to amend or modify the terms and conditions pertaining to the utilization of this document. This report is protected by copyright and may not be reproduced in whole or in part by any means without the written approval of Kiwa and Kiwa ExTEL Energy. No person, other than the Customer for whom it has been prepared, may place reliance on its contents, and no duty of care is assumed by Kiwa and Kiwa ExTEL Energy towards any person other than the Customer. This Report must be read in its entirety and is subject to any assumptions and qualifications expressed therein. Elements of this report contain detailed technical data intended for analysis only by persons possessing requisite expertise in its subject matter.

Contents

- 1. Introduction..... 1**
 - 1.1. 4G Cellular mode1
 - 1.2. Integrating with a DAS.....1
- 2. Getting Start.....2**
 - 2.1. Outbound API Key and Device ID2
 - 2.2. Rate Limiting2
 - 2.3. Errors2
- 3. Endpoints.....3**
 - 3.1. Requirement Description3
 - 3.2. Get raw irradiance and temperature values.....5

1. Introduction

This document discusses how to download/transfer soiling sensor data from the Kiwa Extel Cloud using the RESTful Outbound API. This is particularly useful for customers who prefer to store and view soiling sensor data on a data acquisition system (DAS) or other platform.

1.1. 4G Cellular mode

In the default state, 4G is an cellular-enabled device that automatically connects to the nearest cellular base station and outputs data to the Kiwa Extel cloud. The customer can view the data on Kiwa Extel Dashboard. The Kiwa Extel Cloud also performs additional data processing. For example, the daily soiling loss and insolation values are calculated (filtered and weighted) as a cloud process. This effectively cleans up the noise from the raw data to help visualize clear trends in soiling.

1.2. Integrating with a DAS

In order to effectively interface the DAS with the Kiwa Extel cloud, a customized integration must be developed to get or request the soiling sensor data (irradiance, temperature, and soiling) using Kiwa Extel Outbound API.

The request can occur at whatever interval you design the integration around, but we would suggest to schedule daily API requests be sent at the end of each day.

Most of the charted data on the Kiwa Extel Dashboard is available via the Outbound API. A list of all daily and raw datapoints is seen in the sections below.

2. Getting Start

2.1. Outbound API Key and Device ID

An Outbound API key is required to get sensor data from the Kiwa Extel Cloud. This unique key must be added as a URL path parameter in the request. **Outbound API Keys are only available by request.** Please reach out to the Kiwa Extel team for API key access.

Only Outbound API Keys can pull sensor data from the Kiwa Extel Cloud. Do not confuse this with Inbound API Keys, which are intended for pushing sensor data from a DAS to the Kiwa Extel Cloud.

Please Contact Kiwa Extel for the API Key and Device ID

2.2. Rate Limiting

In general, the number of API requests should be kept to a minimum. Kiwa Extel Outbound API was designed to provide bulk sets of data for each request. Kiwa Extel Outbound API was not designed for constant API requests less than a minute apart.

The following rate limits are: 30 requests per minute 120 requests per day

2.3. Errors

400	Bad request. Possible reasons: • Malformed request parameters • Missing request parameters • Invalid JSON data provided
401	Unauthorized. Possible reasons: • Basic Authentication failed • No Outbound API key was provided • Invalid Outbound API key provided
404	Endpoint not found. Possible reasons: • URL endpoint is wrong • No Device ID provided • Invalid Device ID provided
405	Method not allowed (See the returned Allow header for the set of methods supported by the resource)
429	Too many requests (the rate limit was exceeded)

3. Endpoints

3.1. Get daily soiling and insolation values

GET /api/device/soiling/<deviceId>

Path Parameters

Property	Format	Description
deviceId required	24 characters	The device ID of the soiling station (provided from Fracsun by request).

Query Parameters

Property	Format	Description
apiKey required	32 characters	The Outbound API key of the device (provided from Fracsun by request)
startDate required	YYYY-MM-DD	The starting date in ISO format (use the date without time for best results)
endDate required	YYYY-MM-DD	The ending date in ISO format (use the date without time for best results)

Request Headers

Name	Type	Description
Content-Type required	application/json	

Response

Property	Type	Description
day	String	Day that the soiling/insolation occurred
device	String	The unique device ID for this ARES unit
insolC	Float	Calculated daily insolation for the clean reference cell
insolD	Float	Calculated daily insolation for the dirty reference cell
soiling	Float	Calculated daily soiling loss (transmission loss)
utc_calcTime	String	The UTC timestamp when the daily calculation occurred.
calculation_time	String	The local timestamp (timezone-adjusted) when the daily calculation occurred.

Example Request

Get all calculated daily soiling and insolation data from August 12, 2018 to August 13, 2019 for CS2- 0003

```
'https://xxxxxxxxxxxxxxxxxx.com/api/device/soiling/2c0031001447373333353132/?apiKey=a07e212acf2e  
c0803807ce3e ab2a3cca&startDate=2018-08-12&endDate=2019-08-13'
```

Example Response

The response is provided in JSON format. Between each { } is the soiling and insolation dataset for each day.

```
[
  {
    "calculation_time": "2019-08-13T00:02:07.080459+07:00",
    "day": "2018-08-12",
    "device": "2c0031001447373333353132",
    "insolC": "8.56",
    "insolD": "8.02",
    "soiling": "6.28",
    "utc_calcTime": "2019-08-13T07:02:07.080459+00:00"
  },
  {
    "calculation_time": "2019-08-14T00:02:07.080459+07:00",
    "day": "2019-08-13",
```


3.2. Get raw irradiance and temperature values

GET

/api/device/data/<deviceId>

Path Parameters

Property	Format	Description
deviceId required	24 characters	The device ID of the soiling station (provided from Fracsun by request).

Query Parameters

Property	Format	Description
apiKey required	32 characters	The Outbound API key of the device (provided from Fracsun by request)
startDate required	YYYY-MM-DDTHH:MM:SSZ	The starting date in ISO format (UTC time, not timezone adjusted)
endDate required	YYYY-MM-DDTHH:MM:SSZ	The ending date in ISO format (UTC time, not timezone adjusted)

Request Headers

Name	Type	Description
Content-Type required	application/js on	

Response

Property	Type	Description
b	Float	Battery voltage (health metric)
iC	Integer	Irradiance of clean cell
iD	Integer	Irradiance of dirty cell
r	Integer	Reset flag (n when a reset occurred)
sl	Float	Soiling loss (transmission loss)
sr	Float	Soiling ratio
tC	Float	Temperature of clean cell
tD	Float	Temperature of dirty cell
tE	Float	Temperature inside enclosure
ts	String	Timestamp in UTC

Example Request

Get raw soiling, irradiance, and temperature data for August 12, 2019 for CS2-0003

```
'https://xxxxxxxxxxxxxx.com/api/device/data/2c0031001447373333353132/?apiKey=a07e212acf2ec0803807ce3eab2 a3cca&startDate=2019-08-12T07:00:01Z&endDate=2019-08-13T07:00:00Z'
```

Example Response

The response is provided in JSON format. Between each { } is the dataset and included timestamp.

```
[
  {
    "b": 4.05,
    "iC": 1,
    "iD": 0,
    "r": 0,
    "sl": 1.2,
    "sr": 0.901,
    "tC": 15.1,
    "tD": 14.9,
    "tE": 17.6,
    "ts": "2019-08-12T13:22:40.839Z"
  },
  {
    "b": 4.05,
    "iC": 1,
    "iD": 1,
    "r": 0,
    "sl": 1.3,
```