

HiQ Solar API - Downloading Data



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This document describes requirements for downloading data from the HiQ Solar API (application programming interface).

Accessing the API

HTTPS Address:

- <https://hiqsolar.net/web/apps/api/>

The API is only available via encrypted SSL communication. Non-encrypted HTTP requests are not supported.

Access to the API requires initial administration by the HiQ team, prior to API requests being honored:

- HiQ will need to know which customer solar installation sites require API data access. Each API Key is tied to a specific solar installation site. For multiple site API access, please include a site list in your request to HiQ.
- HiQ will need to know the source network location IP (IPv4) from which the API requests will be coming from.
- After the customer site(s) and network location is provided by the API user, HiQ will issue a private API Key.

Every request to the API requires:

1. Validated API Key
2. Validated source network location IP

The API Key needs to be part of every API request as an appended **APIKey** URL variable:

- <https://hiqsolar.net/apps/web/api/?APIKey=54551591c412c5f009e78ef80bcd06b6a86fe438>

To obtain a valid API key, contact support@hiqsolar.com

URL Schema Structure

The API supports a RESTful architecture. Currently, we support GET requests.

Communications Check:

- <https://hiqsolar.net/apps/web/api/>

Site List:

- <https://hiqsolar.net/apps/web/api/sites>

Site Information:

- <https://hiqsolar.net/apps/web/api/sites/{siteId}>

Hardware List:

- <https://hiqsolar.net/apps/web/api/sites/{siteId}/hardware/>

Hardware Information:

- <https://hiqsolar.net/apps/web/api/sites/{siteId}/hardware/{hardwareId}/>

Network Communications:

- <https://hiqsolar.net/apps/web/api/sites/{siteId}/network>

Weather Report:

- <https://hiqsolar.net/apps/web/api/sites/{siteId}/weather>

Data Formats

JSON data is the most robust output format available, and includes all available API information in each response. JSON responses make use of eliminating repeated data where possible. When initially creating your API queries and refining your data responses, it is easier to do that in JSON format so that you can see debugging information available with each JSON query.

CSV data, due to its flat-file architecture without nested data structures, has some limitations in what API data is included in each response. Note that the CSV response examples below may contain modified fieldname and data structures when compared to the matching JSON response example. In example, for a Communications Check, Parameters for each request are not included. In another example, Hardware Information contains equipment description information like HardwareId, Serial, TypeName in every data row, whereas JSON only repeats the ProductionData records relating to Output Power, etc., as needed.

Communications Check:

- <https://hiqsolar.net/apps/web/api/>

This is the starting point for integrating with the HiQ Solar API, giving you connectivity information to ensure you can connect and communicate successfully with our servers. We recommend you validate your API Key and network connection using this prior to submitting additional API query requests. The key targets here is to attain a "**AuthenticationStatus**" status of "Verified" and "**APIRequestStatus**" of "Valid API Request."

Make sure to include your **APIKey** as a variable parameter in the URL in every API request.

While initially learning how to use and connect to the HiQ Solar API, we recommend using the default response type of JSON, which is achieved by **not** specifying any **responseType** in the URL variable parameters, as documented below in the "Parameters" section of this document. By requesting JSON, you can see the "Parameters" information after the "CommunicationsCheck" and "APIRequestStatus" information. When requesting a CSV or text response from the server, you will not see "Parameters" information.

- JSON:

```
{
  "CommunicationsCheck": {
    "RawTime": 1456776541,
    "RecTime": "2016-02-29T12:09:01Z",
    "Method": "GET",
    "NetworkLocation": "12.23.45.56",
    "Hostname": "clienttester.hiqsolar.net"
    "AuthenticationStatus": "Verified",
    "AuthenticationErrorMessages": "None"
  }
},
"APIRequestStatus": "Valid API request",
"Parameters": {
  "APIKey": "a[...]9",
  "startDate": "2012-01-01T00:00:00Z",
  "endDate": "2012-01-02T00:00:00Z"
}
}
```

- CSV:

```
"RawTime","RecTime","NetworkLocation","Hostname","Method","AuthenticationStatus","AuthenticationErrorMessages","APIRequestStatus",
"1457384043","2016-03-07T20:54:03Z","12.23.45.56",
clienttester.hiqsolar.net","GET","Verified","","Valid API request.",
```

Site List:

- <https://hiqsolar.net/apps/web/api/sites>

- JSON:

```
{
  "SiteList": [
    {
      "SiteId": "1",
      "SiteName": "Momentum Microsystems"
    },
    {
      "SiteId": "2",
      "SiteName": "HiQ Solar"
    },
    {
      "SiteId": "3",
      "SiteName": "Test Site"
    }
  ]
}
```

- CSV:

```
SiteId,SiteName,
"1","Momentum Microsystems",
"2","HiQ Solar",
"3","Test Site",
```

Site Information:

- <https://hiqsolar.net/apps/web/api/sites/1>

- JSON:

```
{
  "SiteInformation": [
    {
      "SiteId": "1",
      "SiteName": "Momentum Microsystems",
      "AddressLine1": "2030 Duane Ave",
      "AddressLine2": "Suite 100",
      "City": "Santa Clara",
      "State": "CA",
      "Zipcode": "95054",
      "Country": "USA",
      "Timezone": "America/Los_Angeles",
      "PVInstallationGPSLatitude": "37.380494",
      "PVInstallationGPSLongitude": "-121.960555",
    }
  ]
}
```

- CSV:

```
"SiteId","SiteName","AddressLine1","AddressLine2","City","State","Zipcode","Country","Timezone","PVInstallationLatitude","PVInstallationLongitude",
"26","Momentum Microsystems","2030 Duane Ave","","Santa Clara","CA","95054","USA","America/Los_Angeles","37.380494","-121.960555",
```

Hardware List:

- <https://hiqsolar.net/apps/web/api/sites/1/hardware>

- JSON:

```
{
  "HardwareList": [
    {
      "SiteId": "1",
      "Gateways": [
        {
          "HardwareId": "1",
          "TypeName": "Gateway",
          "Serial": "13659",
          "Inverters": [
            {
              "HardwareId": "2",
              "TypeName": "TrueString 208V Inverter",
              "Serial": "576815"
            },
            {
              "HardwareId": "3",
              "TypeName": "TrueString 208V Inverter",
              "Serial": "638467"
            },
            {
              "HardwareId": "4",
              "TypeName": "TrueString 208V Inverter",
              "Serial": "468791"
            }
          ]
        }
      ]
    }
  ]
}
```

- CSV:

```
"SiteId","HardwareId","TypeName","ShortTypeName","Abbreviation","Serial","Name","Location","isOnline",
"1","1","Communications Gateway","Gateway","GW","1","","","1",
"1","2","TrueString 480V Inverter","Inverter","TS480","1","","","1",
"1","3","TrueString 480V Inverter","Inverter","TS480","2","","","1",
"1","4","TrueString 480V Inverter","Inverter","TS480","3","","","1",
```

Hardware Information:

- <https://hiqsolar.net/apps/web/api/sites/1/hardware/1>

- JSON:

- Gateway:

```
{
  "HardwareInformation": [
    {
      "SiteId": "1",
      "HardwareId": "1",
      "TypeName": "Gateway",
      "ShortTypeName": "Gateway",
      "Abbreviation": "GW",
      "Serial": "13659",
      "Name": Null,
      "Location": Null,
      "IsOnline": True,
      "ProductionData": [
        {
          "RawTime": "1449530940",
          "RecTime": "2015-12-07T15:00:00Z",
          "OutputPower": "56049.4",
          "OutputPowerUnits": "W",
          "EnergyProduced": "252459.88",
          "EnergyProducedUnits": "kWh",
          "StatusId": "0",
          "StatusName": "HEALTHY",
          "Temperature": "20",
          "TemperatureUnits": "C"
        }
      ]
    }
  ]
}
```

- CSV:

- Gateway:

```
"SiteId","HardwareId","TypeName","ShortTypeName","Abbreviation","Serial","Name","Location","isOnline","RawTime","RecTime","OutputPower","OutputPowerUnits","EnergyProduced","EnergyProducedUnits","StatusId","StatusName","Temperature","TemperatureUnits",
"1","1","Communications Gateway","Gateway","GW","1","","","1","1459980900","2016-04-06T22:15:00Z","27.357","kW","125555.149","kWh","0","HEALTHY","","",
```

- <https://hiqsolar.net/apps/web/api/sites/1/hardware/2>

AC and health data are sampled at a different rate than DC production data, with the rates depending on the total number of inverters at the site. DC production data (IE: output power, energy produced, string voltages and currents) is typically recorded at a higher rate, whereas AC data (IE: phase voltages and currents) and health data (IE: temperature) are sampled at lower rate. When any type of data is not available, those results will be listed as "null".

- JSON:

- String Inverter:

```

{
  "HardwareInformation": [
    {
      "SiteId": "1",
      "HardwareId": "2",
      "TypeName": "TrueString 480V Inverter",
      "ShortTypeName": "Inverter",
      "Abbreviation": "TS480",
      "Serial": "576815",
      "Name": Null,
      "Location": Null,
      "IsOnline": True,
      "ProductionData": [
        {
          "RawTime": "1459980900",
          "RecTime": "2016-04-06T22:15:00Z",
          "Frequency": null,
          "Phase1_Voltage": "287.355",
          "Phase2_Voltage": "289.825",
          "Phase3_Voltage": "284.597",
          "Phase1_Current": "5.542",
          "Phase2_Current": "5.530",
          "Phase3_Current": "5.548",
          "OutputPower": "3.225",
          "OutputPowerUnits": "kW",
          "EnergyProduced": "14574.727",
          "EnergyProducedUnits": "kWh",
          "StatusId": "0",
          "StatusName": "HEALTHY",
          "ModeId": "2",
          "ModeName": "GENERATING",
          "String1_OutputPower": "1841.600",
          "String1_Voltage": "437.428",
          "String2_OutputPower": "1419.172",
          "String2_Voltage": "445.824",
          "String_OutputPowerUnits": "W",
          "Temperature": "74.000",
          "TemperatureUnits": "C"
        }
      ]
    }
  ]
}

```

- CSV:

- String Inverter:

```

"SiteId","HardwareId","TypeName","ShortTypeName","Abbreviation","Serial","Name","Location","isOnline","RawTime","RecTime","Frequency","Phase1_Voltage","Phase2_Voltage","Phase3_Voltage","Phase1_Current","Phase2_Current","Phase3_Current","OutputPower","OutputPowerUnits","EnergyProduced","EnergyProducedUnits","StatusId","StatusName","ModeId"

```

```
, "ModeName", "String1_OutputPower", "String1_Voltage", "String2_OutputPower", "String2_Voltage", "String_OutputPowerUnits", "Temperature", "TemperatureUnits",  
"1", "2", "TrueString 480V  
Inverter", "Inverter", "TS480", "1", "", "", "1", "1459980900", "2016-04-  
06T22:15:00Z", "", "287.355", "289.825", "284.597", "5.542", "5.530", "5.548", "3.439", "kW", "  
14574.860", "kWh", "0", "HEALTHY", "2", "GENERATING", "1969.652", "441.692", "1503.168", "451.  
168", "W", "74.000", "C",
```

Network Communications:

- <https://hiqsolar.net/apps/web/api/sites/1/network>

- JSON:

```
{
  "Network": [
    {
      "SiteId": "1",
      "Transmissions": [
        {
          "RawTime": "1449530940",
          "RecTime": "2015-12-07T15:00:00Z",
          "IPAddress": "12.34.56.78"
        }
      ]
    }
  ]
}
```

- CSV:

```
"SiteId","RawTime","RecTime","IPAddress",
"1","1449530940","2015-12-07T15:00:00Z","12.34.56.78",
```

Weather Report:

- <https://hiqsolar.net/apps/web/api/sites/1/weather>

- JSON:

```
{
  "Weather": [
    {
      "SiteId": "1",
      "ReportedConditions": [
        {
          "RawTime": "1449530940",
          "RecTime": "2015-12-07T15:00:00Z",
          "PrecipIntensity": "0.000",
          "PrecipProbability": "0.000",
          "Temperature": "9.21",
          "TemperatureUnits": "C",
          "WindSpeed": "1.88",
          "WindSpeedUnits": "m/s",
          "CloudCover": ".95",
          "CloudCoverUnits": "%"
        }
      ]
    }
  ]
}
```

- CSV:

```
"SiteId","RawTime","RecTime","PrecipIntensity","PrecipProbability","Temperature","TemperatureUnits","WindSpeed","WindSpeedUnits","CloudCover","CloudCoverUnits",
"1","1449530940","2015-12-07T15:00:00Z","0.000","0.000","30.043","C","1.217","m/s","16.700","%",
```

Parameters

Additional parameters can be supplied to API requests as URL variables to modify the output received. The order of these optional parameters is arbitrary.

Parameters which are specified, but do not match any of the following listed, are ignored by the server.

Response Type:

The API can output multiple types of data formats:

- CSV
- JSON
- Text
- XML

By default, every response is encoded in JSON format.

Optionally specifying the following URL will change the type of data format returned by the API request:

- [responseType](#)

Valid [responseType](#) values:

- csv
- json
- text
- xml

Start Date and End Date:

By default, site and hardware information will contain information about only the last known status (a single database record).

Optionally specifying these URL variable criterion for hardware queries will give you a complete hardware dataset spanning from the specified start timestamp to the stop timestamp:

- [startDate](#)
- [endDate](#)

Format:

- YYYY-MM-DDTHH:MM:SSZ
- The syntax above can be deconstructed into "YYYY-MM-DD" + "T" + "HH:MM:SS" + "Z"
- Date & timestamps are in UTC in 24 hour format.

Example:

- <http://hiqsolar.net/apps/web/api/sites/{siteId}/hardware/{siteId}?APIKey=54551591c412c5f009e78ef80bcd06b6a86fe438&startDate=2010-01-01T00:00:05Z&endDate=2010-01-02T00:05:30Z>

Sort Order:

By default, the production data returned for each hardware, network communication, or weather report query with a start date and end date is sorted in descending order by timestamp, with the latest production record first.

Optionally specifying the following URL variable for queries with a start date and end date will alter the timestamp order of production records:

- `sortOrder`

Valid `sortOrder` values:

- `asc`
- `desc`

"asc" is an abbreviation for ascending, and "desc" is an abbreviation for descending.

Resolution:

By default, the data returned for each query is averaged to 15 minute segments.

Optionally specifying the following URL variable for hardware queries will alter the granular resolution of data returned for the query:

- `resolution`

Valid `resolution` values:

- `15minutes`
- `1hour`
- `1day`
- `1month`

Temperature:

By default, temperature is returned in degrees Celsius.

For each site location, temperature reported aggregated by a local weather service for each location. This is the **SiteInformation > Weather > Temperature** measurement.

For each inverter and gateway, temperature reported is measured by internal instruments within the hardware. This is the **HardwareInformation > ProductionData > Temperature** measurement.

Optionally specifying the following URL variable for hardware queries will alter the unit of temperature measurement of data returned for the query:

- [temperature](#)

Valid [temperature](#) values:

- fahrenheit
- celsius

Record Count:

By default, the data returned for each query contains a maximum of 5000 rows. This maximum number is to safeguard against "runaway" database queries that can degrade server query performance.

Optionally specifying the following URL variable for hardware queries will alter the number of rows returned for the query:

- [recordCount](#)

Valid [recordCount](#) values:

- Any number (an integer) between 1 and 5000

Data Descriptions

- **EnergyProduced:** This is the complete lifetime kWh count of the hardware at all sites, including burn-in and testing at HiQ.
- **Date/Time** formats are in UTC in the listed 24 hour format: YYYY-MM-DDTHH:MM:SSZ.