Ingeteam

Solar API for INGECON® SUN inverters

Contents

1   About this manual

This manual describes the HTTP protocol API implemented by Ingeteam's INGECON® SUN inverters and INGECON® SUN EMS devices.

ⓘ INFO

To download the last version of this manual visit www.ingeteam.com.

2 INGECON® SUN STORAGE 1Play TLM

2.1 API request

- **HTTP method**
  HTTP method is POST. GET method is not supported.

- **HTTP url**
  The URL to retrieve the data is `http://<ipaddress>/inverter/properties/read/1`

- **HTTP request body**
  To retrieve the general inverter status the body of the HTTP POST method must be the following

  ```
  {
    "readdb": true
  }
  ```

- **Authentication**
  HTTP basic authentication is used as verification method. The user and password must be the one used to identify on the card web interface.

- **HTTP reply**
  HTTP POST reply has the format *application/json* and contains information about the status of the inverter.

2.2 Data JSON response

Name	Unit	Description
AlarmCode	HEX	Alarm Code (Check ABH2010IMC14)
InverterCode1	HEX	Inverter Code 1 (Check ABH2010IMC14)
InverterCode2	HEX	Inverter Code 2 (Check ABH2010IMC14)
InverterCode3	HEX	Inverter Code 3 (Check ABH2010IMC14)
Vbatt	V	Battery Voltage
Ibatt	A	Battery Current
Pbatt	W	Battery Power
Sbatt	%	Battery SOC (State of Charge)
BmsAlarms	HEX	Battery BMS Alarms
Vdc1	V	MPPT 1 DC voltage
Idc1	A	MPPT 1 DC Current
Pdc1	W	MPPT 1 DC power
Vdc2	V	MPPT 2 DC voltage
Idc2	A	MPPT 2 DC Current
Pdc2	W	MPPT 2 DC power

Pac	W	Active Power
Qac	VAr	Reactive Power
Vc1	V	Critical loads voltage
Pc1	W	Critical loads power
Vac	V	Grid Voltage
Fac	Hz	Grid Frequency
PacGrid	W	Grid Active Power

2.3 Example

- *Curl command line*
  This is the curl command line used to retrieve information from the inverter with IP address 172.19.1.75 protected with the user installer and password installer.

```
curl --user installer:installer -X POST -d "{\"readdb\": true}"
http://172.19.1.75/inverter/properties/read/1
```

ⓘ INFO

Note the scape character \ before the special character ", this is mandatory on linux shell.

- *JSON POST response*

This is an example of a JSON information reported by an inverter, reported variables appear under the "Data" array.

```
{
    "Modbusnode": 1,
    "canid": -1,
    "firmware": "ABH1006_G",
    "Data": [
        {
            "name": "AlarmCode",
            "mask": "",
            "db": true,
            "success": true,
            "type": "flags",
            "value": [],
            "hex-value": "00000000"
        },
        {
            "name": "InverterCode1",
            "mask": "",
            "db": true,
            "success": true,
            "type": "flags",
            "value": [],
            "hex-value": "0000"
        },
        {
            "name": "InverterCode2",
            "mask": "",
```

```
            "db": true,
            "success": true,
            "type": "flags",
            "value": [],
            "hex-value": "0000"
        },
        {
            "name": "InverterCode3",
            "mask": "",
            "db": true,
            "success": true,
            "type": "flags",
            "value": [],
            "hex-value": "0000"
        },
        {
            "name": "Vbatt",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 51.899999999999999,
            "digits": 1
        },
        {
            "name": "Ibatt",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 2
        },
        {
            "name": "Pbatt",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 0
        },
        {
            "name": "Sbatt",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 55.0,
            "digits": 0
        },
        {
            "name": "BmsAlarms",
            "mask": "",
            "db": true,
            "success": true,
            "type": "flags",
            "value": [],
            "hex-value": "0000"
        },
        {
            "name": "Vdc1",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 65.0,
            "digits": 0
```

```
        },
        {
            "name": "Idc1",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 2
        },
        {
            "name": "Pdc1",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 0
        },
        {
            "name": "Vdc2",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 65.0,
            "digits": 0
        },
        {
            "name": "Idc2",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 2
        },
        {
            "name": "Pdc2",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 0
        },
        {
            "name": "Pac",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": -15,
            "digits": 0
        },
        {
            "name": "Qac",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": -39,
            "digits": 0
        },
        {
            "name": "Vc1",
            "mask": "",
            "db": true,
```

```
            "success": true,
            "type": "number",
            "value": 231.0,
            "digits": 0
        },
        {
            "name": "Pcl",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 0.0,
            "digits": 0
        },
        {
            "name": "Vac",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 231.0,
            "digits": 0
        },
        {
            "name": "Fac",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": 49.979999999999997,
            "digits": 2
        },
        {
            "name": "PacGrid",
            "mask": "",
            "db": true,
            "success": true,
            "type": "number",
            "value": -19,
            "digits": 0
        }
    ]
}
```

3 INGECON® SUN EMS

3.1 HTML5 Server-Sent Events (SSE) API

The INGECON® SUN EMS uses a HTML5 Server-Sent Events (SSE) API that returns an event per second with the status variables necessary to perform the plant real time monitoring.

- **HTTP SSE start request**

The HTTP request to start receiving the event stream is:

```
GET http://{ems_ip_address}/system/events/sse/stream
```

For more information about Server-Sent Events SSE visit

https://www.w3schools.com/html/html5_serversentevents.asp

- **SSE event response**
  The SSE event response has the format *application/json* and contains information about the status of the plant.

3.2 Data JSON SSE event response

There event structure changes according to the controlled inverters. The tables below shows details the properties returned in SSE events.

Some data can be 0, when are not used by the EMS strategy.

- **INGECON® SUN EMS**

Variable	Units	Description
Phase		Phase Code: 1 - R, 2 - S, 3 - T, 4 - Three Phases
W	W	Grid Active power
Pac	W	Photovoltaic Active Power generated
PacCharge	W	Battery charging power
PacDischarge	W	Battery discharge power
PacPVBatt	W	Active power generated by ISS 1Play inverters
PdcPVStorage	W	DC Power on the photovoltaic input of ISS 1Play inverters
WattDigitalInput		Readings of the wattmeter digital input
PacRev	W	Power consumed by car chargers
PacCLoads	W	Power consumed by critical loads in ISS 1Play inverters
EMS_SOC	%	Battery charge status

EMS_VBAT   V   Battery voltage

- **INGECON® SUN STORAGE 1Play TLM**

Variable	Units	Description
Phase		Phase Code: 1 - R, 2 - S, 3 - T, 4 - Three Phases
W	W	Grid Active power
pv	W	Photovoltaic Active Power generated
S1P_Status		ISS 1Play status description
S1P_StatusCode		ISS 1Play status code
StatusBat		Battery Status code
S1P_Alarms		Alarm description read from ISS 1Play inverter
S1P_AlarmsCodes		Alarm codes read from ISS 1Play inverter
S1P_Setpoint	W	Setpoint Power sent to ISS 1Play inverters
_pv_grid	W	Photovoltaic generated power injected to the grid
_diesel_cons	W	Consumption in loads from diesel grid
_grid_cons	W	Consumption in loads from grid
_grid_sto	W	Power stored in batteries from grid
_pv_cons	W	Consumption in loads from photovoltaic sources
_pv_sto	W	Power stored in batteries from photovoltaic sources
_plant_rev	W	Power consumed by car chargers
_publicgrid_cons	W	Consumption in loads from public grid
_sto_cons	W	Consumption in loads from storage
sc_ratio	%	Self-consumption ratio
cons	W	Total power consumed in loads
total_cons	W	Total power consumed in the plant (loads + battery charge)
total_grid_cons	W	Total power consumed in the plant from grid
soc	%	Battery charge status
vbat	V	Battery voltage

3.3 Example

- **INGECON® SUN EMS**

```
{
    "Phases": [
```

AAA0060IMB05_.docx

```
        {
            "Phase": 1,
            "W": 2510,
            "Pac": 0,
            "PacCharge": 0,
            "PacDischarge": 0,
            "PacPVBatt": 80,
            "PdcPVStorage": 0,
            "EMS_SOC": 13,
            "EMS_VBAT": 49,
            "WatDigitalInput": 0,
            "PacRev": 0
        },
        {
            "Phase": 2,
            "W": 0,
            "Pac": 0,
            "PacCharge": 0,
            "PacDischarge": 0,
            "PacPVBatt": 0,
            "PdcPVStorage": 0,
            "EMS_SOC": 13,
            "EMS_VBAT": 49,
            "WatDigitalInput": 0,
            "PacRev": 0
        },
        {
            "Phase": 3,
            "W": 0,
            "Pac": 0,
            "PacCharge": 0,
            "PacDischarge": 0,
            "PacPVBatt": 0,
            "PdcPVStorage": 0,
            "EMS_SOC": 13,
            "EMS_VBAT": 49,
            "WatDigitalInput": 0,
            "PacRev": 0
        }
    ]
}
```

- **INGECON® SUN STORAGE 1Play TLM**

```
{
    "Phases": [
        {
            "Phase": 4,
```

```
            "W": 1987,
            "Pac": 462,
            "PacCharge": 0,
            "PacDischarge": 27,
            "PacPVBatt": -1,
            "PdePVStorage": 3,
            "EMS_SOC": 15,
            "EMS_VBAT": 414,
            "pv": 459,
            "cons": 2445,
            "_pv_grid": 0,
            "_diesel_cons": 0,
            "_grid_cons": 1987,
            "_grid_sto": 0,
            "_pv_cons": 458,
            "_pv_sto": 0,
            "_plant_rev": 0,
            "_pubgrid_cons": 1987,
            "_sto_cons": 0,
            "sc_ratio": 18.73,
            "total_cons": 2445,
            "total_grid_cons": 1987,
            "soc": 15,
            "vbat": 414,
            "PacCLoads": 0,
            "S1P_Status": "On-grid",
            "S1P_StatusCode": 3,
            "StatusBat": 1,
            "S1P_Alarms": "",
            "S1P_AlarmCodes": "",
            "S1P_SetPoint": 1000
        }
    ]
}
```