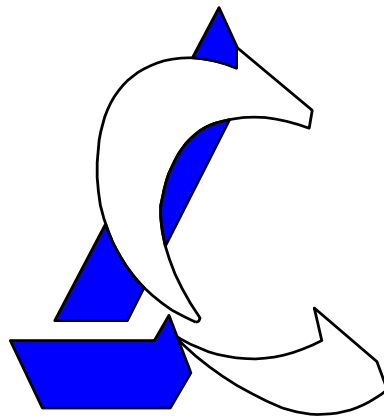


WEB API

ITR 2.0



LACECAL

LACECAL I+D

Edificio UVAINNOVA
Campus Miguel Delibes
Paseo de Belén 11
47011 Valladolid
<http://www.lacecal.es>



Distributed by Amara NZero

Technical Department
☎ +34 91 167 10 52
tecnicos.solar@amaranzero.com
<https://amaranzero.es>

1 IDENTIFIER ASSIGNED TO THE ITR

Each ITR is assigned a unique 16-digit alphanumeric identifier that must be known in order to access the reading of its records through the WEB API described in this document.

You can consult the identifier assigned to an ITR by connecting to the WEB application through your user account and accessing the 'Configuration' -> 'Hardware' option.

The screenshot shows the ITR 2.0 LACECAL web application interface. The top navigation bar includes the LACECAL logo, flags for Spain, Germany, and the UK, and links for 'Preferencias' and 'Cerrar sesión'. Below this is a secondary navigation bar with 'Monitorización planta', 'Producción inversores', 'Informe', and 'Configuración'. The 'Configuración' section is active, showing a 'Hardware' configuration page. The page contains a table of configuration parameters:

Clave de Instalador	
Configuración de medidores	C2 red / C1 consumo (Invertir C1) (Invertir C2)
Primario corriente de red	250
Primario corriente consumo	250
Tension nominal	230
Fabricante	SMA
Número de serie	
Zona horaria	Europe/Madrid
Version del software	
Última configuración	12/02/2015 14:03 (hora local)
ITR 2.0 WEBapp - API id	XXXXXXXXXX

An 'Actualizar' button is located below the table. On the right side, a 'Menú' sidebar lists options: 'Nombre de la planta', 'Alarmas', 'Usuarios', 'Borrar Registros', 'Hardware' (highlighted), 'Control', and 'Copia de seguridad'.



Access to each IRT's API is limited to a maximum of 6 requests for information per minute.

2 LIST OF INVERTERS

Returns a list with the information associated with the inverters installed in the plant.

2.1 REQUEST

https://itr.lacecal.es/APIv1/inverter_list.php

URL parameters	Description
out	Select the output format: json or xml.
id	Identifier assigned by the system to the ITR to be queried.

2.2 REPLY

<Inverter>	Register with the information associated with an inverter
<id/>	Inverter identifier (assigned by the system)
<nombre/>	Inverter name (assigned by the installer)
<fabricante/>	Inverter manufacturer
<modelo/>	Inverter model
<nserie/>	Inverter serial number (optional)
</Inverter>	

2.3 EXAMPLES

https://itr.lacecal.es/APIv1/inverter_list.php?out=json&id=xxxxxxxxxxxxxxxx

```
[
  {
    "id":6,
    "nombre":"Inversor A",
    "fabricante":"SMA",
    "modelo":"STP 25000TL",
    "nserie":"0000000001"
  },
  {
    "id":7,
    "nombre":"Inversor B",
    "fabricante":"SMA",
    "modelo":"STP 25000TL",
    "nserie":"0000000002"
  }
]
```

https://itr.lacecal.es/APIv1/inverter_list.php?out=xml&id=xxxxxxxxxxxxxxxx

```
<Inverters>
  <Inverter>
    <id>6</id>
    <nombre>Inversor A</nombre>
    <fabricante>SMA</fabricante>
    <modelo>STP 25000TL</modelo>
    <nserie>0000000001</nserie>
  </Inverter>
  <Inverter>
    <id>7</id>
    <nombre>Inversor B</nombre>
    <fabricante>SMA</fabricante>
    <modelo>STP 25000TL</modelo>
```

```

        <nserie>0000000002</nserie>
    </Inverter>
</Inverters>

```

3 INVERTER PRODUCTION RECORD

Returns a list with the totalizer records of the energy production of each inverter of the plant in one or more integration periods requested. The energy returned is the production read from each inverter via the communication bus.

3.1 REQUEST

<https://itr.lacecal.es/APIv1/inverter.php>

URL parameters	Description
out	Select the output format: json or xml.
id	Identifier assigned by the system to the ITR to be queried.
d	Initial moment of the first integration period to be returned. Format: yyyyMMddhhmm yyyyyear with four digits MMmes with two digits day of the month with two digits hhhour (in 24-hour format with two digits) mmminute with two digits
t	Initial time of the first integration period to be returned in UNIX TIMESTAMP numeric format.
n	Number of records (integration periods) to be returned. The maximum value that can be indicated is 144 (one day with integration periods of 10 minutes).

- The first record returned will be dated on or after the date requested.
- If neither 'd' nor 't' is specified, the last available record is returned.
- Parameters 'd' and 't' should not be used simultaneously. In this case, the date indicated by the 't' parameter will take precedence.
- If 'n' is not specified, a single record will be returned.

3.2 REPLY

<InvertersRecord>	Energy production record (read from inverters).
<unix_time/>	Timestamp of the start of the integration period
<date/>	Date and time in text of the beginning of the integration period
<interval/>	Duration of integration period in seconds
<Esum/>	Sum of the energy produced by the inverters [kWh]
<Inverters>	Inverter energy records
<Inverter/>	Energy register of one of the inverters
<id/>	Inverter identifier
<E/>	Energy produced by the inverter [kWh]
</Inverter>	
</Inverters>	
</InvertersRecord>	

3.3 EXAMPLES

<https://itr.lacecal.es/APIv1/inverter.php?out=json&id=xxxxxxxxxxxxxxxx&d=201706051300&n=2>

```
[
  {
    "unix_time":1496660400,
    "date":"2017-06-05 13:00:00 +0200",
    "interval":600,
    "Esum":7.625,
    "Inverters":
    [
      {
        "id":6,
        "E":3.808
      },
      {
        "id":7,
        "E":3.817
      }
    ]
  },
  {
    "unix_time":1496661000,
    "date":"2017-06-05 13:10:00 +0200",
    "interval":600,
    "Esum":7.463,
    "Inverters":
    [
      {
        "id":6,
        "E":3.74
      },
      {
        "id":7,
        "E":3.723
      }
    ]
  }
]
```

<https://itr.lacecal.es/APIv1/inverter.php?out=xml&id=xxxxxxxxxxxxxxxx&d=201706051300&n=2>

```
<InvertersRecords>
  <InvertersRecord>
    <unix_time>1496660400</unix_time>
    <date>2017-06-05 13:00:00 +0200</date>
    <interval>600</interval>
    <Esum>7.625</Esum>
    <Inverters>
      <Inverter>
        <id>6</id>
        <E>3.808</E>
      </Inverter>
      <Inverter>
        <id>7</id>
        <E>3.817</E>
      </Inverter>
    </Inverters>
  </InvertersRecord>
```

```

<InvertersRecord>
  <unix_time>1496661000</unix_time>
  <date>2017-06-05 13:10:00 +0200</date>
  <interval>600</interval>
  <Esum>7.463</Esum>
  <Inverters>
    <Inverter>
      <id>6</id>
      <E>3.74</E>
    </Inverter>
    <Inverter>
      <id>7</id>
      <E>3.723</E>
    </Inverter>
  </Inverters>
</InvertersRecord>
</InvertersRecords>

```

4 ITR MEASUREMENT RECORD

Returns a list with the measurement records of the ITR energy meters in one or more requested integration periods.

4.1 REQUEST

<https://itr.lacecal.es/APIv1/meter.php>

URL parameters	Description
out	Select the output format: json or xml.
id	Identifier assigned by the system to the ITR to be queried.
d	Initial moment of the first integration period to be returned. Format: yyyyMMddhhmm yyyyyear with four digits MMmes with two digits day of the month with two digits hhhour (in 24-hour format with two digits) mmminute with two digits
t	Initial time of the first integration period to be returned in UNIX TIMESTAMP numeric format.
n	Number of records (integration periods) to be returned. The maximum value that can be indicated is 144 (one day with integration periods of 10 minutes).

- The first record returned will be dated on or after the date requested.
- If neither 'd' nor 't' is specified, the last available record is returned.
- Parameters 'd' and 't' should not be used simultaneously. In this case, the date indicated by the 't' parameter will take precedence.
- If 'n' is not specified, a single record will be returned.

4.2 REPLY

<MetersRecord>	Energy totalizer record of meters
<unix_time/>	Timestamp of the start of the integration period
<date/>	Date and time in text of the beginning of the integration period
<interval/>	Duration of integration period in seconds
<GRID_meter>	Exchange meter totalizers with the power grid
<RST>	Three-phase totalizers
<Eimp/>	Energy imported (consumed) from the power grid [kWh]
<Eexp/>	Energy exported (ceded) to the power grid [kWh]
<Q1/>	Reactive energy consumed in quadrant Q1 [kVARh]
<Q2/>	Reactive energy consumed in quadrant Q2 [kVARh]
<Q3/>	Reactive energy consumed in quadrant Q3 [kVARh]
<Q4/>	Reactive energy consumed in quadrant Q4 [kVARh]
</RST>	
<R>	Phase R totalizers
<Eimp/>	Energy imported (consumed) from the power grid [kWh]
<Eexp/>	Energy exported (ceded) to the power grid [kWh]
</R>	
<S>	Phase S totalizers
<Eimp/>	Energy imported (consumed) from the power grid [kWh]
<Eexp/>	Energy exported (ceded) to the power grid [kWh]
</S>	
<T>	Phase T totalizers
<Eimp/>	Energy imported (consumed) from the power grid [kWh]
<Eexp/>	Energy exported (ceded) to the power grid [kWh]
</T>	
</GRID_meter>	
<LOAD_meter>	Load consumption meter totalizers
<RST>	Three-phase totalizers
<E/>	Energy consumed by loads [kWh]
</RST>	
<R>	Phase R totalizer
<E/>	Energy consumed by loads [kWh]
</R>	
<S>	Phase S totalizer
<E/>	Energy consumed by loads [kWh]
</S>	
<T>	Phase T totalizer
<E/>	Energy consumed by loads [kWh]
</T>	
</LOAD_meter>	
<RENO_meter>	Renewable sources production meter totalizers
<RST>	Three-phase totalizer
<E/>	Renewable energy generated [kWh]
</RST>	
<R>	Phase R totalizer
<E/>	Renewable energy generated [kWh]
</R>	
<S>	Phase S totalizer
<E/>	Renewable energy generated [kWh]
</S>	
<T>	Phase T totalizer
<E/>	Renewable energy generated [kWh]
</T>	
</RENO_meter>	
</MetersRecord>	

4.3 EXAMPLES

<https://itr.lacecal.es/APIv1/meter.php?out=json&id=xxxxxxxxxxxxxxxx&d=201706051300&n=2>

```
[
  {
    "unix_time":1496660400,
    "date":"2017-06-05 13:00:00 +0200",
    "interval":600,
    "GRID_meter":{
      "RST":{
        "Eimp":0.50605,
        "Eexp":0.03554,
        "Q1":4.23642,
        "Q2":1.32818,
        "Q3":0,
        "Q4":0
      },
      "R":{
        "Eimp":0.31219,
        "Eexp":0.00419
      },
      "S":{
        "Eimp":0.39717,
        "Eexp":0.00308
      },
      "T":{
        "Eimp":0.04457,
        "Eexp":0.27614
      }
    },
    "LOAD_meter":{
      "RST":{
        "E":8.14814
      },
      "R":{
        "E":2.87004
      },
      "S":{
        "E":2.95591
      },
      "T":{
        "E":2.32219
      }
    },
    "RENO_meter":{
      "RST":{
        "E":7.67763
      },
      "R":{
        "E":2.56204
      },
      "S":{
        "E":2.56182
      },
      "T":{
        "E":2.55376
      }
    }
  },
  {

```



```

"unix_time":1496661000,
"date":"2017-06-05 13:10:00 +0200",
"interval":600,
"GRID_meter":{
  "RST":{
    "Eimp":0.89335,
    "Eexp":0.05905,
    "Q1":4.93231,
    "Q2":0.90921,
    "Q3":0,
    "Q4":0
  },
  "R":{
    "Eimp":0.33382,
    "Eexp":0.02352
  },
  "S":{
    "Eimp":0.39951,
    "Eexp":0.01662
  },
  "T":{
    "Eimp":0.24086,
    "Eexp":0.09975
  }
},
"LOAD_meter":{
  "RST":{
    "E":8.36849
  },
  "R":{
    "E":2.82367
  },
  "S":{
    "E":2.89638
  },
  "T":{
    "E":2.64844
  }
},
"RENO_meter":{
  "RST":{
    "E":7.53419
  },
  "R":{
    "E":2.51337
  },
  "S":{
    "E":2.51349
  },
  "T":{
    "E":2.50733
  }
}
}

```

1

<https://itr.lacecal.es/APIv1/meter.php?out=xml&id=xxxxxxxxxxxxxxxx&d=201706051300&n=2>

```
<MetersRecords>
  <MetersRecord>
    <unix_time>1496660400</unix_time>
    <date>2017-06-05 13:00:00 +0200</date>
    <interval>600</interval>
    <GRID_meter>
      <RST>
        <Eimp>0.50605</Eimp>
        <Eexp>0.03554</Eexp>
        <Q1>4.23642</Q1>
        <Q2>1.32818</Q2>
        <Q3>0</Q3>
        <Q4>0</Q4>
      </RST>
      <R>
        <Eimp>0.31219</Eimp>
        <Eexp>0.00419</Eexp>
      </R>
      <S>
        <Eimp>0.39717</Eimp>
        <Eexp>0.00308</Eexp>
      </S>
      <T>
        <Eimp>0.04457</Eimp>
        <Eexp>0.27614</Eexp>
      </T>
    </GRID_meter>
    <LOAD_meter>
      <RST>
        <E>8.14814</E>
      </RST>
      <R>
        <E>2.87004</E>
      </R>
      <S>
        <E>2.95591</E>
      </S>
      <T>
        <E>2.32219</E>
      </T>
    </LOAD_meter>
    <RENO_meter>
      <RST>
        <E>7.67763</E>
      </RST>
      <R>
        <E>2.56204</E>
      </R>
      <S>
        <E>2.56182</E>
      </S>
      <T>
        <E>2.55376</E>
      </T>
    </RENO_meter>
  </MetersRecord>
  <MetersRecord>
    <unix_time>1496661000</unix_time>
    <date>2017-06-05 13:10:00 +0200</date>
```

```
<interval>600</interval>
<GRID_meter>
  <RST>
    <Eimp>0.89335</Eimp>
    <Eexp>0.05905</Eexp>
    <Q1>4.93231</Q1>
    <Q2>0.90921</Q2>
    <Q3>0</Q3>
    <Q4>0</Q4>
  </RST>
  <R>
    <Eimp>0.33382</Eimp>
    <Eexp>0.02352</Eexp>
  </R>
  <S>
    <Eimp>0.39951</Eimp>
    <Eexp>0.01662</Eexp>
  </S>
  <T>
    <Eimp>0.24086</Eimp>
    <Eexp>0.09975</Eexp>
  </T>
</GRID_meter>
<LOAD_meter>
  <RST>
    <E>8.36849</E>
  </RST>
  <R>
    <E>2.82367</E>
  </R>
  <S>
    <E>2.89638</E>
  </S>
  <T>
    <E>2.64844</E>
  </T>
</LOAD_meter>
<RENO_meter>
  <RST>
    <E>7.53419</E>
  </RST>
  <R>
    <E>2.51337</E>
  </R>
  <S>
    <E>2.51349</E>
  </S>
  <T>
    <E>2.50733</E>
  </T>
</RENO_meter>
</MetersRecord>
</MetersRecords>
```