

EMpro REST API



Application note
109455_en_00

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1 Description

The API Documentation will provide you information about the EMpro REST API. In the examples of the description, the name “device” stands for the IP address of the monitoring device. The monitoring device can receive the IP address from a DHCP server or use a static IP address prior to his configuration. The interface is accessible via the following HTTP URL `http://device:80/api/v1`.

Table of contents

1	Description	1
2	Ordering data	2
3	Versioning	2
4	API Methods	3
5	GET Service Root	3
6	GET Information	4
7	GET Measurements as Single End Point	7
8	GET Measurements	8
9	GET Meters	13
10	GET History Meters	17



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This document is valid for all products listed in the “Ordering data” on page 2.

2 Ordering data

Type	Order No.	Pcs./Pkt.
EEM-MA370	2907983	1
EEM-MA371	2908307	1
EEM-MA370-R	2907980	1
EEM-MA371-R	2907985	1
EEM-MB370	2907954	1
EEM-MB371	2907955	1
EEM-MB370-PN	2907984	1
EEM-MB371-PN	2908308	1
EEM-MB370-EIP	2907971	1
EEM-MB371-EIP	2907976	1
EEM-MA770	2907945	1
EEM-MA771	2908286	1
EEM-MA770-R	2907944	1
EEM-MA771-R	2908285	1
EEM-MA770-PN	2907946	1
EEM-MA771-PN	2908301	1
EEM-MA770-EIP	2907953	1
EEM-MA771-EIP	2908302	1
EEM-MA370-24DC	1127059	1
EEM-MA370-R-24DC	1147529	1
EEM-MA371-24DC	1127058	1
EEM-MA371-R-24DC	1147531	1
EEM-MA770-24DC	1127052	1
EEM-MA770-R-24DC	1147535	1
EEM-MA771-24DC	1127060	1
EEM-MA771-R-24DC	1147537	1

3 Versioning

To support future changes of the API and maintain backwards compatibility, Phoenix Contact keeps different versions of the API available. The different versions can be distinguished by the vX (where the X is the version number) in the URL. The differences between the different versions are explained in the different sections that are dedicated to one version.

4 API Methods

Method Name	Category	Description
GET Service Root	List	Returns a list of resources
GET Information	Group	Returns a group of device information
GET Measurements (U1)	Endpoint	Returns a single item
GET Measurements	Group	Returns a group of measurements
GET Meters	Group	Returns a group of meter readings
GET History Meters	Log	Returns a log of meter readings

5 GET Service Root

Note: Do not end the URL with „/“ to avoid „Resource not found“

1. Resource URL

/api/v1

2. Parameters

-

3. Example

GET http://10.201.1.101/api/v1

4. Example Response

```

{
  "context": "/api/v1",
  "timestamp": "2020-03-02T07:39:21Z",
  "items": [
    {
      "href": "/api/v1/information",
      "description": "Device information"
    },
    {
      "href": "/api/v1/measurements",
      "description": "Instantaneous values"
    },
    {
      "href": "/api/v1/meters",
      "description": "Meter readings"
    },
    {
      "href": "/api/v1/history",
      "description": "Historical data access"
    }
  ]
}

```

6 GET Information

1. Resource URL

/api/v1/information

2. Parameters

-

3. Example

GET http://device:80/api/v1/information

4. Example Response

```
{
  "context": "/api/v1/information",
  "timestamp": "2020-03-02T07:38:59Z",
  "items": [
    {
      "href": "/api/v1/information/name",
      "id": "name",
      "name": "Device",
      "value": "EEM-MA370",
      "description": "Device identifier"
    },
    {
      "href": "/api/v1/information/hw",
      "id": "hw",
      "name": "Hardwareversion",
      "value": "2.0",
      "description": "Hardwarerevisionnumber"
    },
    {
      "href": "/api/v1/information/fw",
      "id": "fw",
      "name": "Firmwareversion",
      "value": "1.1.0",
      "description": "Firmwarerevisionnumber"
    },
    {
      "href": "/api/v1/information/serial-number",
      "id": "serial-number",
      "name": "Serialnumber",
      "value": "1361394185",
      "description": "Serialnumber"
    },
    {
      "href": "/api/v1/information/label",
      "id": "label",
      "name": "Devicelabel",
      "value": "Individual device label",
      "description": "Devicelabel"
    },
    {
      "href": "/api/v1/information/metering-point",
      "id": "metering-point",
      "name": "Metering point",
      "value": "Enter your metering point",
      "description": "Metering point identification"
    },
    {
      "href": "/api/v1/information/uuid",
      "id": "uuid",
      "name": "UUID",
      "value": "534ABB89-A0E7-4129-AF3E-C41D8E8C",
      "description": "Universally Unique Identifier (UUID) consisting of 128 Bit"
    },
    {
      "href": "/api/v1/information/mac",
      "id": "mac",
      "name": "MAC address",

```

```

    "value": "A8:74:1D:02:19:93",
    "description": "Device MAC address"
  },
  {
    "href": "/api/v1/information/article-number",
    "id": "article-number",
    "name": "Article number",
    "value": "2907983",
    "description": "Article number"
  },
  {
    "href": "/api/v1/information/vendor-url",
    "id": "vendor-url",
    "name": "Vendor homepage",
    "value": "www.phoenixcontact.com",
    "description": "Vendor URL"
  },
  {
    "href": "/api/v1/information/production-date",
    "id": "production-date",
    "name": "Production date",
    "value": "2019-08-21T09:32:00Z",
    "description": "UTC production date"
  },
  {
    "href": "/api/v1/information/operating-hours",
    "id": "operating-hours",
    "name": "Operating hours",
    "value": 131,
    "unit": "h",
    "description": "Total operating time since commissioning"
  }
]
}

```

5. List of information end points

Id	Name	Description
name	device	Device identifier
hw	Hardware version	Hardware revision number
fw	Firmware version	Firmware revision number
serial	Serial number	Serial number
label	Device label	Device label
metering-point	Metering point	Metering point identification
uuid	UUID	Universally Unique Identifier (UUID) consisting of 128 Bit
mac	MAC address	Device MAC address
article-number	Article number	Article number
vendor	Vendor name	Vendor name
vendor-url	Vendor url	Vendor URL
production-date	Date of production	UTC production date
operating-hours	Operating hours	Total operating time since commissioning

7 GET Measurements as Single End Point

1. Resource URL

```
http://device:80/api/v1/measurements/u1
```

2. Parameters

#	Parameter	Category	Description
1	{u1}	Path parameter	Refers to the list of end points

3. Example

```
GET http://device:80/api/v1/measurements/{u1}
```

4. Example Response

```
{
  "context": "/api/v1/measurements/u1",
  "id": "u1",
  "timestamp": "2020-03-02T07:38:31Z",
  "name": "U1",
  "value": 229.845,
  "unit": "V",
  "description": "Effective value voltage U1"
}
```

5. List of end points

#	Id	Name	Unit	Description
0	f	f	Hz	Frequency
1	u1	U1	V	Effective value voltage U1
2	u2	U2	V	Effective value voltage U2
3	u3	U3	V	Effective value voltage U3
4	u12	U12	V	Effective value voltage U12
5	u23	U23	V	Effective value voltage U23
6	u31	U31	V	Effective value voltage U31
7	i1	I1	A	Effective value current I1
8	i2	I2	A	Effective value current I2
9	i3	I3	A	Effective value current I3
10	in	IN	A	Effective value current IN
11	p1	P1	W	Active power with sign on phase 1. >0: Demand <0: Delivery
12	p2	P2	W	Active power with sign on phase 2. >0: Demand <0: Delivery
13	p3	P3	W	Active power with sign on phase 3. >0: Demand <0: Delivery
14	q1	Q1	var	Reactive power with sign on phase 1. >0: Demand <0: Delivery
15	q2	Q2	var	Reactive power with sign on phase 2. >0: Demand <0: Delivery
16	q3	Q3	var	Reactive power with sign on phase 3. >0: Demand <0: Delivery
17	s1	S1	VA	Apparent power on phase 1 (unsigned)
18	s2	S2	VA	Apparent power on phase 2 (unsigned)
19	s3	S3	VA	Apparent power on phase 3 (unsigned)
20	pf1	PF1	""	Power factor on phase 1 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned
21	pf2	PF2	""	Power factor on phase 2 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned
22	pf3	PF3	""	Power factor on phase 3 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned
23	p	P	W	Sum of active power according to DIN EN 6155712 with sign. >0 : Demand < 0: Delivery
24	q	Q	var	Vectorial total reactive power according to DIN EN 6155712 with sign as sum of the individual reactive powers. >0: Demand <0: Delivery
25	s	S	VA	Vectorial total reactive power according to DIN EN 6155712 with sign as sum of the individual reactive powers. >0: Demand <0: Delivery
26	pf	PF	""	Vectorial total power factor with sign according to IEEE. >0: Inductive <0: Capacitive

8 GET Measurements

1. Resource URL

/api/v1/measurements

2. Parameters

-

3. Example

GET http://device:80/api/v1/measurements

4. Example Response

```
{
  "context": "/api/v1/measurements",
  "timestamp": "2020-03-02T07:38:09Z",
  "items": [
    {
      "href": "/api/v1/measurements/f",
      "id": "f",
      "name": "f",
      "value": 50.000,
      "unit": "Hz",
      "description": "Frequency"
    },
    {
      "href": "/api/v1/measurements/u1",
      "id": "u1",
      "name": "U1",
      "value": 230.042,
      "unit": "V",
      "description": "Effective value voltage U1"
    },
    {
      "href": "/api/v1/measurements/u2",
      "id": "u2",
      "name": "U2",
      "value": 229.805,
      "unit": "V",
      "description": "Effective value voltage U2"
    },
    {
      "href": "/api/v1/measurements/u3",
      "id": "u3",
      "name": "U3",
      "value": 229.853,
      "unit": "V",
      "description": "Effective value voltage U3"
    },
    {
      "href": "/api/v1/measurements/u3",
      "id": "u3",
      "name": "U3",
      "value": 229.853,
      "unit": "V",
      "description": "Effective value voltage U3"
    },
    {
      "href": "/api/v1/measurements/u12",
      "id": "u12",
      "name": "U12",
      "value": 398.237,
      "unit": "V",
      "description": "Effective value voltage U12"
    },
    {
      "href": "/api/v1/measurements/u23",
      "id": "u23",
      "name": "U23",
      "value": 398.078,
      "unit": "V",

```

```
    "description": "Effective value voltage U23"
  },
  {
    "href": "/api/v1/measurements/u31",
    "id": "u31",
    "name": "U31",
    "value": 398.279,
    "unit": "V",
    "description": "Effective value voltage U31"
  },
  {
    "href": "/api/v1/measurements/i1",
    "id": "i1",
    "name": "I1",
    "value": 2.533,
    "unit": "A",
    "description": "Effective value current I1"
  },
  {
    "href": "/api/v1/measurements/i2",
    "id": "i2",
    "name": "I2",
    "value": 2.468,
    "unit": "A",
    "description": "Effective value current I2"
  },
  {
    "href": "/api/v1/measurements/i3",
    "id": "i3",
    "name": "I3",
    "value": 2.476,
    "unit": "A",
    "description": "Effective value current I3"
  },
  {
    "href": "/api/v1/measurements/in",
    "id": "in",
    "name": "IN",
    "value": 0.063,
    "unit": "A",
    "description": "Effective value current IN"
  },
  {
    "href": "/api/v1/measurements/p1",
    "id": "p1",
    "name": "P1",
    "value": 582.610,
    "unit": "W",
    "description": "Active power with sign on phase 1. >0: Demand <0: Delivery"
  },
  {
    "href": "/api/v1/measurements/p2",
    "id": "p2",
    "name": "P2",
    "value": 567.180,
    "unit": "W",
    "description": "Active power with sign on phase 2. >0: Demand <0: Delivery"
  },
}
```

```
{
  "href": "/api/v1/measurements/p3",
  "id": "p3",
  "name": "P3",
  "value": 569.138,
  "unit": "W",
  "description": "Active power with sign on phase 3. >0: Demand <0: Delivery"
},
{
  "href": "/api/v1/measurements/q1",
  "id": "q1",
  "name": "Q1",
  "value": 0.000,
  "unit": "var",
  "description": "Reactive power with sign on phase 1. >0: Demand <0: Delivery"
},
{
  "href": "/api/v1/measurements/q2",
  "id": "q2",
  "name": "Q2",
  "value": 3.187,
  "unit": "var",
  "description": "Reactive power with sign on phase 2. >0: Demand <0: Delivery"
},
{
  "href": "/api/v1/measurements/q3",
  "id": "q3",
  "name": "Q3",
  "value": 0.000,
  "unit": "var",
  "description": "Reactive power with sign on phase 3. >0: Demand <0: Delivery"
},
{
  "href": "/api/v1/measurements/s1",
  "id": "s1",
  "name": "S1",
  "value": 582.610,
  "unit": "VA",
  "description": "Apparent power on phase 1 (unsigned)"
},
{
  "href": "/api/v1/measurements/s2",
  "id": "s2",
  "name": "S2",
  "value": 567.189,
  "unit": "VA",
  "description": "Apparent power on phase 2 (unsigned)"
},
{
  "href": "/api/v1/measurements/s3",
  "id": "s3",
  "name": "S3",
  "value": 569.138,
  "unit": "VA",
  "description": "Apparent power on phase 3 (unsigned)"
},
}
```

```

    {
      "href": "/api/v1/measurements/pf1",
      "id": "pf1",
      "name": "PF1",
      "value": 1.000,
      "unit": " ",
      "description": "Power factor on phase 1 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned"
    },
    {
      "href": "/api/v1/measurements/pf2",
      "id": "pf2",
      "name": "PF2",
      "value": 1.000,
      "unit": " ",
      "description": "Power factor on phase 2 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned"
    },
    {
      "href": "/api/v1/measurements/pf3",
      "id": "pf3",
      "name": "PF3",
      "value": 1.000,
      "unit": " ",
      "description": "Power factor on phase 3 acc. to IEEE: with sign >0: Demand <0: Delivery acc. to IEC: unsigned"
    },
    {
      "href": "/api/v1/measurements/p",
      "id": "p",
      "name": "P",
      "value": 1718.928,
      "unit": "W",
      "description": "Sum of active power according to DIN EN 61557-12 with sign. >0: Demand <0: Delivery"
    },
    {
      "href": "/api/v1/measurements/q",
      "id": "q",
      "name": "Q",
      "value": 3.187,
      "unit": "var",
      "description": "Vectorial total reactive power according to DIN EN 61557-12 with sign as sum of the individual reactive powers. >0: Demand <0: Delivery"
    },
    {
      "href": "/api/v1/measurements/s",
      "id": "s",
      "name": "S",
      "value": 1718.928,
      "unit": "VA",
      "description": "Vectorial total apparent power according to DIN EN 61557-12 with sign. >0: Demand <0: Delivery"
    },
  ],

```

```
{
  "href": "/api/v1/measurements/pf",
  "id": "pf",
  "name": "PF",
  "value": 1.000,
  "unit": " ",
  "description": "Vectorial total power factor with sign according to IEEE. >0: In
ductive <0: Capacitive"
}
]
```

9 GET Meters

1. Resource URL

http://device:80/api/v1/meters

2. Parameters

-

3. Example

GET http://device:80/api/v1/meters

4. Example Response

```
{
  "context": "/api/v1/meters",
  "timestamp": "2020-03-02T07:37:48Z",
  "items": [
    {
      "href": "/api/v1/meters/ea-pos-total",
      "id": "ea-pos-total",
      "name": "Ea+",
      "value": 5090571.500,
      "unit": "Wh",
      "description": "Total active energy demand"
    },
    {
      "href": "/api/v1/meters/ea-neg-total",
      "id": "ea-neg-total",
      "name": "Ea-",
      "value": 37.909,
      "unit": "Wh",
      "description": "Total active energy delivery"
    },
    {
      "href": "/api/v1/meters/er-pos-total",
      "id": "er-pos-total",
      "name": "Er+",
      "value": 568987.250,
      "unit": "varh",
      "description": "Total reactive energy demand"
    },
    {
      "href": "/api/v1/meters/er-neg-total",
      "id": "er-neg-total",
      "name": "Er-",
      "value": 327927.156,
      "unit": "varh",
      "description": "Total reactive energy delivery"
    },
    {
      "href": "/api/v1/meters/es-total",
      "id": "es-total",
      "name": "Es",
      "value": 5286491.000,
      "unit": "VAh",
      "description": "Total apparent energy"
    }
  ]
}
```

```
{
  "href": "/api/v1/meters/er-total",
  "id": "er-total",
  "name": "Er",
  "value": 1267171.875,
  "unit": "varh",
  "description": "Total unsigned reactive energy"
},
{
  "href": "/api/v1/meters/ea-pos",
  "id": "ea-pos",
  "name": "Ea+",
  "value": 5042264.500,
  "unit": "Wh",
  "description": "Active energy demand since last reset"
},
{
  "href": "/api/v1/meters/ea-neg",
  "id": "ea-neg",
  "name": "Ea-",
  "value": 37.238,
  "unit": "Wh",
  "description": "Active energy delivery since last reset"
},
{
  "href": "/api/v1/meters/er-pos",
  "id": "er-pos",
  "name": "Er+",
  "value": 545202.438,
  "unit": "varh",
  "description": "Reactive energy demand since last reset"
},
{
  "href": "/api/v1/meters/er-neg",
  "id": "er-neg",
  "name": "Er-",
  "value": 327920.438,
  "unit": "varh",
  "description": "Reactive energy delivery since last reset"
},
{
  "href": "/api/v1/meters/es",
  "id": "es",
  "name": "Es",
  "value": 5230819.000,
  "unit": "VAh",
  "description": "Apparent energy since last reset"
}
]
}
```

5. List of end points of meters

#	ID	Name	Value	Description
0	ea-pos-total	Ea+	Wh	Total active energy demand
1	ea-neg-total	Ea-	Wh	Total active energy delivery
2	er-pos-total	Er+	varh	Total reactive energy demand
3	er-neg-total	Er-	varh	Total reactive energy delivery
4	es-total	Es	VAh	Total apparent energy
5	er-total	Er	varh	Total unsigned reactive energy
6	ea-pos	Ea+	Wh	Active energy demand since last reset
7	ea-neg	Ea-	Wh	Active energy delivery since last reset
8	er-pos	Er+	varh	Reactive energy demand since last reset
9	er-neg	Er-	var	Reactive energy delivery since last reset
10	es	Es	VAh	Apparent energy since last reset

10 GET History Meters

The meter history is a collection of the meter readings of the resettable energy meters for the last 14-days.

In a 5-minute interval, a record is put to the history. If the reserved memory of 14-days is reached, the oldest record is removed from the collection.

1. Resource URL

```
http://device:80/api/v1/history/meters?top=5
```

2. Parameters

Parameter	Category	Description
top	Query Parameter	Limit the recordings transmitted to the amount of TOP. If no top value is available, all records will be returned.
period	Query Parameter	Filter the recordings to a multiple of 5-minute period. If no period value is available, a 15-minute period will be returned.
isComplete	Response Parameter	Boolean that indicates the completeness of a measurement period. Example 1: 09:30-09:45: "isComplete": true Example 2: 09:30-09:45 with interruption of the device: "isComplete": false

3. Example

```
GET http://10.201.1.101/api/v1/history/meters?top=5
```

4. Example Response

```
{
  "context": "/api/v1/history/meters?top=5",
  "timestamp": "2020-03-04T12:03:29Z",
  "names": [
    "Ea+",
    "Ea-",
    "Er+",
    "Er-"
  ],
  "units": [
    "Wh",
    "Wh",
    "varh",
    "varh"
  ],
  "records": [
    {
      "timestamp": "2020-03-04T12:00:00Z",
      "isComplete": true,
      "values": [
        5041447.500,
        37.238,
        545202.438,
        327920.438
      ]
    },
    {
      "timestamp": "2020-03-04T11:45:00Z",
      "isComplete": true,
      "values": [
        5037116.500,
        37.238,
        545202.438,
        327920.438
      ]
    },
    {
      "timestamp": "2020-03-04T11:30:00Z",
      "isComplete": true,
      "values": [
        5032786.500,
        37.238,
        545202.438,
        327920.438
      ]
    },
    {
      "timestamp": "2020-03-04T11:15:00Z",
      "isComplete": true,
      "values": [
        5028454.000,
        37.238,
        545202.438,
        327920.438
      ]
    },
    {

```

```
"timestamp": "2020-03-04T11:00:00Z",  
"isComplete": true,  
"values": [  
    5024225.500,  
    37.238,  
    545202.438,  
    327920.438  
  ]  
}  
]  
}
```