



# Cloud API Specification

Revision C

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## 1 Revision History

<b>Revision</b>	<b>History</b>
C	Removed several irrelevant and/or empty fields.
B	Fixed direction of arrow in figure 1
A	Initial Release

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## 2 Global

### 2.1 Measurements

To understand all the measurement points we need to understand that there are three main parts in a system. There is the grid connection, load and the Ferroamp System. For all three parts there can be either production, when the power flow is positive, or consumption, when the power flow is negative. Figure 1 illustrates this, where load can be positive whenever there is another production source than the Ferroamp System.

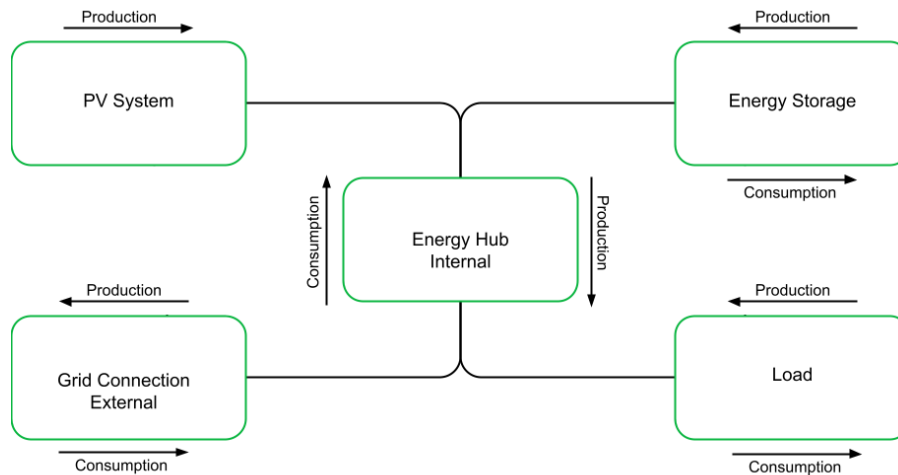


Figure 1: Power and energy flow in the Ferroamp System

### 2.2 Available APIs

Type of API	Explanation	Example
3.1 Energy	An array of energy per given resolution in the given time intervall.	<code>/api?type=energy&amp;resolution=hour&amp;startdate=2017-08-03T00&amp;enddate=2017-08-30T00&amp;api_key=&lt;API_KEY&gt;&amp;fid=&lt;FID&gt;</code>
3.2 totalEnergy	Latest given PV energy	<code>/api?type=totalenergy&amp;api_key=&lt;API_KEY&gt;&amp;fid=&lt;FID&gt;</code>
3.3 Pvdisplay	PV Data to be display directly at a monitor	<code>/api?type=pvdisplay&amp;api_key=&lt;insert api_key&gt;&amp;fid=&lt;insert facility_id&gt;</code>
3.4 Mixed Data	Data to display in a monitor	<code>/api?type=mixeddisplay&amp;api_key=&lt;API_KEY&gt;&amp;fid=&lt;FID&gt;</code>

## 2.3 Query parameters

Definition of the available query parameters.

Param	Explanation	Type	Unique	Example	Required
api_key	Unique generated key at portal	40 char string	Yes	-	Yes
fid	Facility Identification	Int	Yes	1	Yes
type	Type of API requested	String	No	energy	Yes
resolution	If needed resolution of API	String	-	hour	No
startdate	If needed start of timeintervall	ISO8601 Date YYYY-MM-DDTHH	-	2017-03-05T23	No
enddate	If needed end of timeintervall	ISO8601 Date YYYY-MM-DDTHH	-	2017-03-05T23	No

## 2.4 HTTP Response Codes

Status Code	Status Text	Explanation
200	OK	Request is valid
400	Bad Request	Most probably the fault is the query params has wrong format and the api will tell you about the fault.  Example: ?startdate=201-12-3T0 will generate a fault: Date format for startdate is not YYYY-MM-DD
401	Not Authenticated	The API Key do not match the FacilityId or that the IP address are not valid.
404	Not Found	If no api authentication can be found
429	Too many requests	If the daily quota of max 300 requests is exceeded it will respond with too many requests
500	Internal Server Error	This is a problem on the Ferroamp site, if this occurs, please contact support@ferroamp.se

## 3 API

### 3.1 Energy

**Example url** `/api?type=energy&resolution=hour&startdate=2017-08-03T00&enddate=2017-08-30T00&api_key=&fid=`

**Method** GET

**Query Params**

- type=energy
- facility\_id=<INT>
- api\_key=<STRING>
- resolution=hour
- startdate=YYYY-MM-DDTHH
- enddate=YYYY-MM-DDTHH

**Format** JSON

**Limitations** Max 32 days

#### 3.1.1 Response

For a full JSON example see 4.1 Energy response example

Name	Type	Description
Facility Id	Int	Unique System Identifier
max_requests	Int	Allowed max requests per 24 hours
requests	Int	Request made within allowed max requests, if requests >=max_requests returns 401
unit	String	wH
type	String	energy
resolution	String	hour
startdate	String	YYYY-MM-DDTHH:mm:ss.000Z ,ex: 2017-08-03T00:59:00.000Z
enddate	String	YYYY-MM-DDTHH:mm:ss.000Z ,ex: 2017-08-03T00:59:00.000Z
data	Object[]	Energy measured per hour within time interval. See 4.7 Energy data Definition , where type is Number and Ts is defined

## 3.2 TotalEnergy

<b>Example url</b>	/api?type=totalenergy&api_key=<API_KEY>&fid=<FID>
<b>Method</b>	GET
<b>Query Params</b>	<ul style="list-style-type: none"> <li>• type=totalenergy</li> <li>• facility_id=&lt;INT&gt;</li> <li>• api_key=&lt;STRING&gt;</li> </ul>
<b>Format</b>	JSON

### 3.2.1 Response

Name	Type	Description
Facility Id	Int	Unique System Identifier
max_requests	Int	Allowed max requests per 24 hours
requests	Int	Request made within allowed max requests, if requests >=max_requests returns 401
unit	String	wH
type	String	totalenergy
data	Object	{"wPv": Float, "ts": String, ...} For full example see TotalEnergy example below.

## 3.3 Pvdisplay

<b>Example url</b>	/api?type=pvdisplay&api_key=<API_KEY>&fid=<FID>
<b>Method</b>	GET
<b>Query Params</b>	<ul style="list-style-type: none"> <li>• type=pvdisplay</li> <li>• facility_id=&lt;INT&gt;</li> <li>• api_key=&lt;STRING&gt;</li> </ul>
<b>Format</b>	JSON

### 3.3.1 Response

Name	Type	Description
Facility Id	Int	Unique System Identifier
max_requests	Int	Allowed max requests per 24 hours
requests	Int	Request made within allowed max requests, if requests >=max_requests returns 401
unit	String	wH
type	String	totalenergy
data	Object	<pre>{   "pve": { "val": ,, "unit": "Wh" },   "pvp": { "val": ,, "unit": "W" },   "pvetoday": { "val":, "unit": "Wh" } }</pre>

### 3.4 Mixed data

<b>Example url</b>	/api?type=mixeddisplay&api_key=<>&fid=<>
<b>Method</b>	GET
<b>Query Params</b>	<ul style="list-style-type: none"> <li>• type=mixeddisplay</li> <li>• facility_id=&lt;INT&gt;</li> <li>• api_key=&lt;STRING&gt;</li> </ul>
<b>Format</b>	JSON



### 3.4.1 Response

For a full JSON example see 4.4 Mixed data response example

Name	Type	Description
Facility Id	Int	Unique System Identifier
max_requests	Int	Allowed max requests per 24 hours
unit	String	
type	String	Mixeddisplay
data	Object	JSON

Mixed data , data Object

Name	Type	Description
totalenergy	Object	Total mesasured energy, see 4.7 Energy data definition
uidata	Object	Currents, Voltages, Power. See 4.5 Uidata definition
batterydata	Object	Aggregated state of energystorage, See 4.6 Battery data definition

## 4 Appendix

### 4.1 Energy response example

```

{
  "facility_id": 1,
  "requests": 0,
  "max_requests": 300,
  "enddate": "2017-08-03T00:59:00.000Z",
  "startdate": "2017-08-03T00:59:00.000Z",
  "resolution": "hour",
  "unit": "wH",
  "type": "energy",
  "data": [
    {
      "ep1": 0,
      "ep2": 0,
      "ep3": 0,
      "ec1": 114.77539000008255,
      "ec2": 628.553087499924,
      "ec3": 489.7865705555305,
      "ip1": 0,
      "ip2": 0.005437777377665043,
      "ip3": 0.00727444514632225,
      "ic1": 114.50452416666667,
      "ic2": 113.06467194444122,
      "ic3": 116.28260388888884,
      "lp1": 7.289098611101508,
      "lp2": 0,
      "lp3": 0,
      "lc1": 7.55994555586949,
      "lc2": 515.4933683332056,
      "lc3": 373.5107474999968,
      "ts": "2017-08-03T00:59:00.000Z",
      "pve": 0
    },
    ...
  ]
}

```

## 4.2 Pvdisplay example response

```
{
  "facility_id": 1,
  "requests": 24,
  "max_requests": 300,
  "unit": "Wh / W",
  "type": "pvdisplay",
  "data": {
    "pve": {
      "val": 1415886.3279830555,
      "unit": "Wh"
    },
    "pvp": {
      "val": 1546.4100341796875,
      "unit": "W"
    },
    "pvetoday": {
      "val": 3058.5674780556,
      "unit": "Wh"
    }
  }
}
```

## 4.3 Mixeddisplay data response example

```
{
  "facility_id": 2045,
  "requests": 2,
  "max_requests": "9000",
  "unit": "W/Wh",
  "type": "mixeddisplay",
  "data": {
    "totalenergy": {
      "wExtProdQ1": {
        "ts": "2024-10-22T06:30:00.000Z",
        "val": 6942145.12
      },
      "wExtProdQ2": {
        "ts": "2024-10-22T06:30:00.000Z",
        "val": 6126780.75
      },
      "wExtProdQ3": {
        "ts": "2024-10-22T06:30:00.000Z",
        "val": 6128465.11
      },
      "wExtConsQ1": {
        "ts": "2024-10-22T06:30:00.000Z",
        "val": 7287724.99
      }
    }
  }
}
```

```
"wExtConsQ2": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 6126780.75
},
"wExtConsQ3": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 6128465.11
},
"wInvProdQ1": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 9709672.17
},
"wInvProdQ2": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 9573060.44
},
"wInvProdQ3": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 9194872.94
},
"wInvConsQ1": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 1893648.53
},
"wInvConsQ2": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 1839632.98
},
"wInvConsQ3": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 1981244.39
},
"wLoadProdQ1": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 476.73
},
"wLoadProdQ2": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 576.65
},
"wLoadProdQ3": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 682.57
},
"wLoadConsQ1": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 4598095.78
},
"wLoadConsQ2": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 5752337.55
},
```

```
"wLoadConsQ3": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 5043906.79
},
"wPv": {
  "ts": "2024-10-22T06:30:00.000Z",
  "val": 25528574.09
},
"wBatProd": {
  "val": 0
},
"wBatCons": {
  "val": 0
}
},
"uidata": {
  "pvPower": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 70.68699645996094
  },
  "batPower": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 0
  },
  "extPower": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 576.8079833984375
  },
  "invPower": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": -106.88300323486328
  },
  "loadPower": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 683.6920166015625
  },
  "pLoadQ1": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 65.26799774169922
  },
  "pLoadQ2": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 348.7829895019531
  },
  "pLoadQ3": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": 269.6409912109375
  },
  "pInvQ1": {
    "ts": "2024-10-22T06:55:51.044Z",
    "val": -38.316001892089844
  }
},
```

```
"pInvQ2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": -35.44499969482422
},
"pInvQ3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": -33.12200164794922
},
"pExtQ1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 26.951000213623047
},
"pExtQ2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 313.3380126953125
},
"pExtQ3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 236.5189971923828
},
"iExtRms1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.0169999599456787
},
"iExtRms2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.5329999923706055
},
"iExtRms3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.2920000553131104
},
"iInvD1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.9789999723434448
},
"iInvD2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.9750000238418579
},
"iInvD3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.9729999899864197
},
"iInvQ1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": -0.23600000143051147
},
"iInvQ2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": -0.21899999678134918
},
```

```
"iInvQ3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": -0.20600000023841858
},
"iInvRms1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.7749999761581421
},
"iInvRms2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.7670000195503235
},
"iInvRms3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.765999972820282
},
"u1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 229.60800170898438
},
"u2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 228.88800048828125
},
"u3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 227.38800048828125
},
"iExtQ1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.16599999368190765
},
"iExtQ2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.9359999895095825
},
"iExtQ3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.4709999561309814
},
"iExtD1": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 1.2089999914169312
},
"iExtD2": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.007000000216066837
},
"iExtD3": {
  "ts": "2024-10-22T06:55:51.044Z",
  "val": 0.5080000162124634
},
```

```

    "uPos": {
      "ts": "2024-10-22T06:55:51.044Z",
      "val": 376.6440124511719
    },
    "uNeg": {
      "ts": "2024-10-22T06:55:51.044Z",
      "val": -376.1090087890625
    }
  },
  "batterydata": {
    "ratedCapacity": 28416,
    "soc": 31,
    "soh": 100,
    "ts": "2024-10-22T06:55:00.000Z",
  }
}
}
}

```

#### 4.4 TotalEnergy data response example

```

{
  "facility_id": 1,
  "requests": 45,
  "max_requests": 300,
  "unit": "wH",
  "type": "totalenergy",
  "data": {
    "wExtProdQ1": {
      "val": 87152126535794,
      "ts": "2024-10-22T06:15:00.000Z"
    },
    "wExtProdQ2": {
      "val": 92620971900921,
      "ts": "2024-10-22T06:15:00.000Z"
    },
    "wExtProdQ3": {
      "val": 102116178582936,
      "ts": "2024-10-22T06:15:00.000Z"
    },
    "wExtConsQ1": {
      "val": 120851710742806,
      "ts": "2024-10-22T06:15:00.000Z"
    },
    "wExtConsQ2": {
      "val": 92620971900921,
      "ts": "2024-10-22T06:15:00.000Z"
    }
  },
}

```



```
"wExtConsQ3": {
  "val": 102116178582936,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvProdQ1": {
  "val": 151939554097057,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvProdQ2": {
  "val": 151385589939081,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvProdQ3": {
  "val": 151571523788806,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvConsQ1": {
  "val": 6284058668274,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvConsQ2": {
  "val": 6487012133990,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wInvConsQ3": {
  "val": 6579133518274,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wLoadProdQ1": {
  "val": 122352731632,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wLoadProdQ2": {
  "val": 128107250104,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wLoadProdQ3": {
  "val": 194760551150,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wLoadConsQ1": {
  "val": 178469364113429,
  "ts": "2024-10-22T06:15:00.000Z"
},
"wLoadConsQ2": {
  "val": 175937125019878,
```

```
  "ts": "2024-10-22T06:15:00.000Z"  
},  
"wLoadConsQ3": {  
  "val": 127986835796067,  
  "ts": "2024-10-22T06:15:00.000Z"  
},  
"wPV": {  
  "val": 3021711090285708,  
  "ts": "2024-10-22T06:15:00.000Z"  
},  
"wBatProd": {  
  "val": 0  
},  
"wBatCons": {  
  "val": 0  
}  
}  
}
```

## 4.5 Uidata definition

valTs = Object<<{val : , ts : Date}>>

Param	Type	Description
wExtProdQ1	ValTs   Number	External Production (Grid) Active Energy, Phase 1, [kWh]
wExtProdQ2	ValTs   Number	External Production (Grid) Active Energy, Phase 2, [kWh]
wExtProdQ3	ValTs   Number	External Production (Grid) Active Energy, Phase 3, [kWh]
wExtConsQ1	ValTs   Number	External Consumption (Grid) Active Energy, Phase 1, [kWh]
wExtConsQ2	ValTs   Number	External Consumption (Grid) Active Energy, Phase 2, [kWh]
wExtConsQ3	ValTs   Number	External Consumption (Grid) Active Energy, Phase 3, [kWh]
wInvProdQ1	ValTs   Number	Inverter (Energyhub) Production Active Energy, Phase 1, [kWh]
wInvProdQ2	ValTs   Number	Inverter (Energyhub) Production Active Energy, Phase 2, [kWh]
wInvProdQ3	ValTs   Number	Inverter (Energyhub) Production Active Energy, Phase 3, [kWh]
wInvConsQ1	ValTs   Number	Inverter (Energyhub) Consumption Active Energy, Phase 1, [kWh]
wInvConsQ2	ValTs   Number	Inverter (Energyhub) Consumption Active Energy, Phase 2, [kWh]
wInvConsQ3	ValTs   Number	Inverter (Energyhub) Consumption Active Energy, Phase 3, [kWh]
wLoadProdQ1	ValTs   Number	Load Production Active Energy, Phase 1, [kWh]
wLoadProdQ2	ValTs   Number	Load Production Active Energy, Phase 2, [kWh]
wLoadProdQ3	ValTs   Number	Load Production Active Energy, Phase 3, [kWh]
wLoadConsQ1	ValTs   Number	Load Consumption Active Energy, Phase 1, [kWh]
wLoadConsQ2	ValTs   Number	Load Consumption Active Energy, Phase 2, [kWh]
wLoadConsQ3	ValTs   Number	Load Consumption Active Energy, Phase 3, [kWh]
wPv	ValTs   Number	PV Production Energy, [kWh]
wBatProd	ValTs   Number	Energy Storage, Produced Energy, [kWh]
wBatCons	ValTs   Number	Energy Storage, Consumed Energy, [kWh]
ts	String	Optional Param if response is an array with time-serie. Format:YYYY-MMDDTHH:hh:dd.OOOZ