SIMPLE API
POWER-METER

Software starting 2.1.2, Hardware EUMEL 1.0

1. System Overview

The 3rd party interface in the Power-Meter allows an external application to access specific pieces of information, for example the current energy production or consumption.

2. Communication

In order to communicate with the Power-Meter, the customer application needs to be able to do standard HTTP request including basic authentication to one of the Power-Meter communication interfaces, either WiFi, PLC or wired ethernet.
The default IP address of the Power-Meter for the Ethernet interface is currently set to:

192.168.255.1

Therefore all HTTP requests in examples below are targeting the Ethernet Port of the Power-Meter are sent to:
http://192.168.255.1/
The standard port for all interfaces is 80.

Credentials for basic authentication are:
Username: admin
Password: <login-password of the power-meter UI>

If the Power-Meter is integrated in a LAN via Powerline, WiFi or Ethernet please obtain the IP address from the UI or your router.

- HTML
  The whole system is built upon the standard HTTP protocol as transfer layer protocol. The web address of the HTML interface is http://192.168.255.1/wizard/public/measure.html

- REST/JSON
  Implementing a JSON File via HTTP the web address of the REST/JSON Interface is
  http://192.168.255.1/wizard/public/api/measurements

- REST/XML
  Implementing a XML File via HTTP the web address of the REST/XML Interface is
  http://192.168.255.1/wizard/public/api/rest

3. Discovery of devices / broadcasts

a. Multicast DNS (mDNS)

The hostname of a device is defined as follows: vpm<serialnumber>. The serial number is derived from one of the device's MAC-addresses. mDNS is implemented by using Avahi, which broadcasts the IP-Address and the hostname of the device to all other devices in the LAN.
PLEASE NOTE: The hostname vpm<serialnumber> will be used from Firmware Version 2.0.2 on, earlier releases will only send vpm as mDNS name.

b. UDP

Additionally to Multicast DNS every device sends its hostname via UDP-Broadcast to the port 50053 (e.g. vpmA123456789AB) every 15 seconds.

4. JSON API retrieving information about Software Hardware

The firmware version and the hardware version as well the different hardware models are visible under following link of the VPM
http://192.168.255.1/wizard/public/api/hardware
For this request is no authentication necessary.

Here is an example of the dataset:
```
{"SoftwareVersion":"2.1.2","HardwareVersion":"EUMEL 1.0","HasPLC":true,"HasSD":false}
```

5. Retrieving measurement data REST/JSON

For the retrieval of current energy metering values, the Power-Meter provides data at a rate of 1Hz at the following address:
http://<IP>/wizard/public/api/measurements
The returned, JSON encoded, data file contains a complete set, of all the measurement data, that is collected by the Power-Meter.

Please note that all fundamental and harmonic energy values are experimental! Accuracy is not guaranteed!

a. Example dataset

An example dataset could look like:

```
{"F":50,"T":34,"VA":232.863671875,"VB":232.254921875,"VC":232.853125,"IA":0.33334375,"IB":0.76921093
75,"IC":0.610328125,"IN":0.014,"IN0":0,"IAA":-25.69999999999999,"IAB":-20.599999999999994,"IAC":-
48.79999999999998,"UAA":120,"UAB":-119.9,"UAC":-
0,"PA":68.78125,"PB":121.9453125,"PC":70.53515625,"PT":261.265625,"PAF":68.69140625,"PBF":123.457031
25,"PCF":71.58984375,"PTF":263.734375,"PAH":0.08984375,"PBH":-1.51171875,"PCH":-1.0546875,"PTH":-
2.46875,"QA":-31.9921875,"QB":-49.09765625,"QC":-81.45703125,"QT":-
162.546875,"SA":77.65234375,"SB":178.73046875,"SC":142.17578125,"ST":398.5625,"PFA":0.886,"PFB":0.68
3,"PFC":0.497,"PFT":0.655,"EFAA":373719.625,"EFAB":609400.34375,"EFAC":246628.25,"EFAT":1229645.5625
,"EFRA":200.90625000000003,"EFRB":120723.84375000001,"EFRC":0.0625,"EFRT":53428.87500000001,"EAA":1
03.28125,"ERAB":0,"ERAC":0,"ERAT":0,"ERRA":298801.125,"ERRB":251578.00000000003,"ERRC":420116.90625,
"ERRT":929802.8125,"ESA":605744.21875,"ESB":935858.46875,"ESC":581712.34375,"EST":2123277.34375,"EVT
":1753607.1875,"EMT":307.5625,"THUA":2.11,"THUB":2.58,"THUC":2.31,"THIA":23.05,"THIB":90.8,"THIC":86
.52,"EFAH":62.68750000000001,"EFBH":4.75,"EFCH":255.78125,"EFTH":26.28125,"EFAF":370488.15625,"EFBF"
:612983.90625,"EFCF":246797.53125000003,"EFTF":1230166.75,"ERAH":103.625,"ERBH":0,"ERCH":0,"ERTH":0,
"ERAF":856.84375,"ERBF":2036.8125,"ERCF":123.65625000000001,"ERTF":672.5625,"ERSA":9762.875,"ERSB":0
,"ERSC":0,"ERST":0,"EFSA":353431.90625,"EFSB":584244.96875,"EFSC":365707.21875,"EFST":1313147.749999
9998,"ERT1":565209.84375,"ERT2":364592.96875,"ERT3":161.875,"ERT4":53267.00000000001,"ERA1":168740.8
75,"ERA2":130060.25000000001,"ERA3":73.53125,"ERA4":127.375,"ERB1":152016.15625,"ERB2":99561.84375,"
ERB3":40429.71875,"ERB4":80294.125,"ERC1":261527.75,"ERC2":158589.15625,"ERC3":0.0625,"ERC4":0,"VT":
232.65723958333334,"VPT":402.9741343482577,"VAB":403.0074254231932,"VBC":402.5924005242377,"VCA":403
.3225770973423,"IADC":0.000061798095703125,"IBDC":0.00012474060058593748,"ICDC":-
0.000235748291015625,"TIME":11175864947,"SAMPLES":34924376,"STATUS":119}
```

b. Data representations

The values of fields in the JSON encoded payload relate to the following values:

Field	Value	Unit
F	Frequency	Hz
T	Internal Temperature	°C
IN0	Current phase N Calculated	
VA	Voltage phase A	V
VB	Voltage phase B	V
VC	Voltage phase C (Supply phase)	V
IA	Current phase A RMS	A
IB	Current phase B RMS	A
IC	Current phase C RMS	A
IN	Current phase N RMS	A
IAA	Phase Angle Current to Voltage of phase A	°
IAB	Phase Angle Current to Voltage of phase B	°
IAC	Phase Angle Current to Voltage of phase C	°
UAA	Phase Angle Voltage phase A to phase C	°
UAB	Phase Angle Voltage phase B to phase C	°
UAC	Phase Angle Voltage phase C to phase C (always zero)	°
THUA	Phase A Voltage THD+N	%
THUB	Phase B Voltage THD+N	%
THUC	Phase C Voltage THD+N	%
THIA	Phase A Current THD+N	%
THIB	Phase B Current THD+N	%
THIC	Phase C Current THD+N	%
PA	Active Power phase A	W
PB	Active Power phase B	W
PC	Active Power phase C	W
PT	Total Active Power	W
PAF	Active Fundamental Power phase A	W
PBF	Active Fundamental Power phase B	W

PCF	Active Fundamental Power phase C	W
PTF	Active Fundamental Power	W
PAH	Active Harmonic Power phase A	W
PBH	Active Harmonic Power phase B	W
PCH	Active Harmonic Power phase C	W
PTH	Total Active Harmonic Power	W
QA	Reactive Power phase A	VAr
QB	Reactive Power phase B	VAr
QC	Reactive Power phase C	VAr
QT	Total Reactive Power	VAr
SA	Apparent Power phase A	VA
SB	Apparent Power phase B	VA
SC	Apparent Power phase C	VA
ST	Total Apparent Power	VA
PFA	Power factor phase A	
PFB	Power factor phase B	
PFC	Power factor phase C	
PFT	Total Power factor	
EFAA	Forward Active Energy phase A	Wh
EFAB	Forward Active Energy phase B	Wh
EFAC	Forward Active Energy phase C	Wh
EFAT	Total Forward Active Energy	Wh
EFAF	Forward Active Fundamental Energy phase A	Wh
EFBF	Forward Active Fundamental Energy phase B	Wh
EFCF	Forward Active Fundamental Energy phase C	Wh
EFTF	Total Forward Active Fundamental Energy	Wh
EFAH	Forward Active Harmonic Energy phase A	Wh
EFBH	Forward Active Harmonic Energy phase B	Wh
EFCH	Forward Active Harmonic Energy phase C	Wh
EFTH	Total Forward Active Harmonic Energy	Wh
EFRA	Forward Reactive Energy phase A	varh
EFRB	Forward Reactive Energy phase B	varh
EFRC	Forward Reactive Energy phase C	varh
EFRT	Total Forward Reactive Energy	varh
ERAA	Reverse Active Energy phase A	Wh
ERAB	Reverse Active Energy phase B	Wh
ERAC	Reverse Active Energy phase C	Wh
ERAT	Total Reverse Active Energy	Wh
ERAF	Reverse Active Fundamental Energy phase A	Wh
ERBF	Reverse Active Fundamental Energy phase B	Wh
ERCF	Reverse Active Fundamental Energy phase C	Wh
ERTF	Total Reverse Active Fundamental Energy	Wh
ERAH	Reverse Active Harmonic Energy phase A	Wh
ERBH	Reverse Active Harmonic Energy phase B	Wh
ERCH	Reverse Active Harmonic Energy phase C	Wh
ERTH	Total Reverse Active Harmonic Energy	Wh
ERRA	Reverse Reactive Energy phase A	varh
ERRB	Reverse Reactive Energy phase B	varh
ERRC	Reverse Reactive Energy phase C	varh
ERRT	Total Reverse Reactive Energy	varh
ERSA	Apparent Reverse Energy phase A	VAh
ERSB	Apparent Reverse Energy phase B	VAh
ERSC	Apparent Reverse Energy phase C	VAh
ERST	Total Apparent Reverse Energy	VAh
ESA	Apparent Energy phase A	VAh
ESB	Apparent Energy phase B	VAh
ESC	Apparent Energy phase C	VAh
EST	Total Apparent Energy	VAh
EFSA	Apparent Forward Energy phase A	Wh
EFSB	Apparent Forward Energy phase B	Wh
EFSC	Apparent Forward Energy phase C	Wh
EFST	Total Apparent Forward Energy	Wh

ERA1	Reactive Energy Quadrant 1 phase A	varh
ERB1	Reactive Energy Quadrant 1 phase B	varh
ERC	Reactive Energy Quadrant 1 phase C	varh
ERT1	Total Reactive Energy Quadrant 1	varh
ERA2	Reactive Energy Quadrant 2 phase A	varh
ERB2	Reactive Energy Quadrant 2 phase B	varh
ERC2	Reactive Energy Quadrant 2 phase C	varh
ERT2	Total Reactive Energy Quadrant 2	varh
ERA3	Reactive Energy Quadrant 3 phase A	varh
ERB3	Reactive Energy Quadrant 3 phase B	varh
ERC3	Reactive Energy Quadrant 3 phase C	varh
ERT3	Total Reactive Energy Quadrant 3	varh
ERA4	Reactive Energy Quadrant 4 phase A	varh
ERB4	Reactive Energy Quadrant 4 phase B	varh
ERC4	Reactive Energy Quadrant 4 phase C	varh
ERT4	Total Reactive Energy Quadrant 4	varh
EVT	(Vector Sum) Total Apparent Energy	Varh
EMT	(Vector Sum) Total Apparent Power	VA
VAB	phase A – phase B Voltage	V
VBC	phase B – phase C Voltage	V
VCA	phase C – phase A Voltage	V
VT	Average N – phase Voltage	V
IADC	Direct Current phase A	A
IBDC	Direct Current phase B	A
ICDC	Direct Current phase C	A
TIME	Operating time in milliseconds (last factory reset)	ms
SAMPLES	Counter from the Quadrants updated values	
STATUS	Status of the VPM	

c. Status values

	UangleAOK	UangleAOK, UangleBOK	UangleAOK, UangleCOK	Uangle ALL
	64	96	80	112
IrmsAOK	68	100	84	116
IrmsBOK	66	98	82	114
IrmsCOK	65	97	81	113
IrmsAOK, IrmsBOK	70	102	86	118
IrmsAOK, IrmsCOK	69	101	85	117
IrmsBOK, IrmsCOK	67	99	83	115
IrmsALL	71	103	87	119

6. Retrieving measurement data REST/XML

For the retrieval of current energy metering values, the Power-Meter provides data at a rate of 1Hz at the following address:
http://<IP>/wizard/public/api/rest
The returned, XML encoded, data file contains a complete set, of all the measurement data, that is collected by the Power-Meter. Note: the data structure is based on SunSpec definition but the device is not officially certified by the SunSpec Alliance.

a. Example dataset

```
<SunSpecData v="">
<d man="VERBUND" mod="Power-Meter" sn="<SERIAL>" t="2018-03-19T10:45:44Z">
<m id="1">
<p id="Mn">VERBUND</p>
<p id="Md">Power-Meter</p>
<p id="Opt">EUMEL 1.0</p>
<p id="Vr">2.1.2</p>
<p id="SN"><SERIAL></p>
<p id="DA">1</p>
</m>
<m id="213">
<p id="A">0.01</p>
<p id="AphA">0.28</p>
<p id="AphB">0.48</p>
<p id="AphC">0.58</p>
<p id="PhV">233.13</p>
<p id="PhVphA">233.73</p>
<p id="PhVphB">232.30</p>
<p id="PhVphC">233.37</p>
<p id="PPV">403.80</p>
<p id="PPVphAB">403.19</p>
<p id="PPVphBC">403.49</p>
<p id="PPVphCA">404.72</p>
<p id="Hz">49.98</p>
<p id="W">140.05</p>
<p id="WphA">2.04</p>
<p id="WphB">71.59</p>
<p id="WphC">66.42</p>
<p id="VA">313.38</p>
<p id="VAphA">65.96</p>
<p id="VAphB">111.50</p>
<p id="VAphC">135.92</p>
<p id="VAR">-191.59</p>
<p id="VARphA">-65.39</p>
<p id="VARphB">-44.76</p>
<p id="VARphC">-81.45</p>
<p id="PF">0.45</p>
<p id="PFphA">0.03</p>
<p id="PFphB">0.64</p>
<p id="PFphC">0.49</p>
<p id="TotWhExp">0.00</p>
<p id="TotWhExpPhA">103.28</p>
<p id="TotWhExpPhB">0.00</p>
<p id="TotWhExpPhC">0.00</p>
<p id="TotWhImp">1230391.53</p>
<p id="TotWhImpPhA">373917.12</p>
<p id="TotWhImpPhB">609629.66</p>
<p id="TotWhImpPhC">246947.34</p>
<p id="TotVAhExp">0.00</p>
<p id="TotVAhExpPhA">9762.88</p>
<p id="TotVAhExpPhB">0.00</p>
<p id="TotVAhExpPhC">0.00</p>
<p id="TotVAhImp">2124392.34</p>
<p id="TotVAhImpPhA">606046.22</p>
<p id="TotVAhImpPhB">936207.12</p>
<p id="TotVAhImpPhC">582176.69</p>
<p id="TotVArhImpQ1">53267.03</p>
<p id="TotVArhImpQ1phA">127.44</p>
<p id="TotVArhImpQ1phB">80294.12</p>
<p id="TotVArhImpQ1phC">0.00</p>
<p id="TotVArhImpQ2">161.88</p>
<p id="TotVArhImpQ2phA">73.53</p>
```

```
<p id="TotVArhImpQ2phB">40429.72</p>
<p id="TotVArhImpQ2phC">0.06</p>
<p id="TotVArhExpQ3">364592.97</p>
<p id="TotVArhExpQ3phA">130060.25</p>
<p id="TotVArhExpQ3phB">99561.84</p>
<p id="TotVArhExpQ3phC">158589.16</p>
<p id="TotVArhExpQ4">565674.16</p>
<p id="TotVArhExpQ4phA">168892.94</p>
<p id="TotVArhExpQ4phB">152127.88</p>
<p id="TotVArhExpQ4phC">261728.31</p>
<p id="Evt">0</p>
<p id="Temperature">34.00</p>
</m>
</d>
</SunSpecData>
```

b. Data representations REST/XML

Name	Label	Type	Unit
man	VERBUND	String	
mod	Power-Meter	String	
Sn	<SerialNumber>	String	
T	Time UTC	Time	
A	AC Total Current value	float32	A
AphA	AC Phase-A Current value	float32	A
AphB	AC Phase-B Current value	float32	A
AphC	AC Phase-C Current value	float32	A
PhV	AC Voltage Average Phase-to-neutral value	float32	V
PhVphA	AC Voltage Aphase-A-to-neutral value	float32	V
PhVphB	AC Voltage Aphase-B-to-neutral value	float32	V
PhVphC	AC Voltage Aphase-C-to-neutral value	float32	V
PPV	AC Voltage Average Phase-to-phase value	float32	V
PPVphAB	AC Voltage Average Phase-AB value	float32	V
PPVphBC	AC Voltage Average Phase-BC value	float32	V
PPVphCA	AC Voltage Average Phase-CA value	float32	V
Hz	AC Frequency value	float32	Hz
W	AC Power value	float32	W
WphA	AC power Phase A value	float32	W
WphB	AC power Phase B value	float32	W
WphC	AC power Phase C value	float32	W
VA	AC Apparent Power value	float32	VA
VAphA	AC Apparent Power Phase A value	float32	VA
VAphB	AC Apparent Power Phase B value	float32	VA
VAphC	AC Apparent Power Phase C value	float32	VA
VAR	AC Reactive Power value	float32	var
VARphA	AC Reachtive Power Phase A value	float32	var
VARphB	AC Reachtive Power Phase B value	float32	var
VARphC	AC Reachtive Power Phase C value	float32	var
PF	Power Factor value	float32	PF
PFphA	Power Factor Phase A value	float32	PF
PFphB	Power Factor Phase B value	float32	PF
PFphC	Power Factor Phase C value	float32	PF
TotWhExp	Total Watt-hours Exported	float32	Wh
TotWhExpPhA	Total Watt-hours Exported phase A	float32	Wh
TotWhExpPhB	Total Watt-hours Exported phase B	float32	Wh
TotWhExpPhC	Total Watt-hours Exported phase C	float32	Wh
TotWhImp	Total Watt-hours Imported	float32	Wh

TotWhImpPhA	Total Watt-hours Imported phase A	float32	Wh
TotWhImpPhB	Total Watt-hours Imported phase B	float32	Wh
TotWhImpPhC	Total Watt-hours Imported phase C	float32	Wh
TotVAhExp	Total VA-hours Exported	float32	VAh
TotVAhExpPhA	Total VA-hours Exported phase A	float32	VAh
TotVAhExpPhB	Total VA-hours Exported phase B	float32	VAh
TotVAhExpPhC	Total VA-hours Exported phase C	float32	VAh
TotVAhImp	Total VA-hours Imported	float32	VAh
TotVAhImpPhA	Total VA-hours Imported phase A	float32	VAh
TotVAhImpPhB	Total VA-hours Imported phase B	float32	VAh
TotVAhImpPhC	Total VA-hours Imported phase C	float32	VAh
TotVArhImpQ1	Total VAR-hours Imported Q1	float32	varh
TotVArhImpQ1phA	Total VAR-hours Imported Q1 phase A	float32	varh
TotVArhImpQ1phB	Total VAR-hours Imported Q1 phase B	float32	varh
TotVArhImpQ1phC	Total VAR-hours Imported Q1 phase C	float32	varh
TotVArhImpQ2	Total VAR-hours Imported Q2	float32	varh
TotVArhImpQ2phA	Total VAR-hours Imported Q2 phase A	float32	varh
TotVArhImpQ2phB	Total VAR-hours Imported Q2 phase B	float32	varh
TotVArhImpQ2phC	Total VAR-hours Imported Q2 phase C	float32	varh
TotVArhExpQ3	Total VAR-hours Exported Q3	float32	varh
TotVArhExpQ3phA	Total VAR-hours Exported Q3 phase A	float32	varh
TotVArhExpQ3phB	Total VAR-hours Exported Q3 phase B	float32	varh
TotVArhExpQ3phC	Total VAR-hours Exported Q3 phase C	float32	varh
TotVArhExpQ4	Total VAR-hours Exported Q4	float32	varh
TotVArhExpQ4phA	Total VAR-hours Exported Q4 phase A	float32	varh
TotVArhExpQ4phB	Total VAR-hours Exported Q4 phase B	float32	varh
TotVArhExpQ4phC	Total VAR-hours Exported Q4 phase C	float32	varh
Evt	Event	bitfield32	
Temperature	Temperature of the Device	float32	°

7. Retrieving measurements data Modbus/TCP

The Power-Meter has implemented SunSpec meter-models 211 (Single Phase Meter) and 213 (Wye Connect Meter). The registers start at 40000 and the implementation is referenced to the SunSpec-information models (status December 2017). For further information please visit www.sunspec.org.

Factory settings for Modbus/TCP are:
- Device Address: 1
- Modbus port: 502

These settings can be changed in the UI (Settings --> Interfaces --> Modbus/TCP).
The Device Address can be written over Modbus/TCP the Register address 40068.

Start	End	R/W	Name	Label	Type	Unit	Description	Example value
40000	40001	R	SunSpec ID				SunSpec ID	0x53756e53
40002	40002	R	ID	Common	uint16		Common Model	1
40003	40003	R	L		uint16		Model Lenght	66
40004	40019	R	Mn	Manufacturer	string		Manufacturer	Verbund
40020	40035	R	Md	Model	string		Product Name	Power-Meter
40036	40043	R	Opt	Option	string		Hardware version	EUMEL 1.0
40044	40051	R	Vr	Version	string		Software Version	2.1.0
40052	40067	R	SN	Serial Number	string		Serial Number	
40068	40068	R/W	DA	Device Address	uint16		Modbus device address	1
40069	40069	R	PAD	Pad Register	pad		Force even Alignment	
40070	40070	R	ID	phase meter ((AN or AB) or (abcn))	uint16		Uniquely identifies this as a SunSpec Meter Modbus Map; 211:	211, 213

							single phase, 213: three phase	
40071	40071	R	L		uint16		Model Length	124
40072	40073	R	A	AC Total Current value	float32	A	AC Total Current value	
40074	40075	R	AphA	AC Phase-A Current value	float32	A	AC Phase-A Current	
40076	40077	R	AphB	AC Phase-B Current value	float32	A	AC Phase-B Current	
40078	40079	R	AphC	AC Phase-C Current value	float32	A	AC Phase-C Current	
40080	40081	R	PhV	AC Voltage Average Phase-to-neutral value	float32	V	AC Voltage Average Phase-to-neutral	
40082	40083	R	PhVphA	AC Voltage Aphase-A-to-neutral value	float32	V	AC Voltage A phase-A-to-neutral	
40084	40085	R	PhVphB	AC Voltage Aphase-B-to-neutral value	float32	V	AC Voltage A phase-B-to-neutral	
40086	40087	R	PhVphC	AC Voltage Aphase-C-to-neutral value	float32	V	AC Voltage A phase-C-to-neutral	
40088	40089	R	PPV	AC Voltage Average Phase-to-phase value	float32	V	AC Voltage Average Phase-to-phase	
40090	40091	R	PPVphAB	AC Voltage Average Phase-AB value	float32	V	AC Voltage Average Phase-AB	
40092	40093	R	PPVphBC	AC Voltage Average Phase-BC value	float32	V	AC Voltage Average Phase-BC	
40094	40095	R	PPVphCA	AC Voltage Average Phase-CA value	float32	V	AC Voltage Average Phase-CA	
40096	40097	R	Hz	AC Frequency value	float32	Hz	AC Frequency	
40098	40099	R	W	AC Power value	float32	W	AC Power	
40100	40101	R	WphA	AC power Phase A value	float32	W	AC power Phase A	
40102	40103	R	WphB	AC power Phase B value	float32	W	AC power Phase B	
40104	40105	R	WphC	AC power Phase C value	float32	W	AC power Phase C	
40106	40107	R	VA	AC Apparent Power value	float32	VA	AC Apparent Power	
40108	40109	R	VAphA	AC Apparent Power Phase A value	float32	VA	AC Apparent Power Phase A	
40110	40111	R	VAphB	AC Apparent Power Phase B value	float32	VA	AC Apparent Power Phase B	
40112	40113	R	VAphC	AC Apparent Power Phase C value	float32	VA	AC Apparent Power Phase C	
40114	40115	R	VAR	AC Reactive Power value	float32	VAr	AC Reactive Power	
40116	40117	R	VARphA	AC Reachtive Power Phase A value	float32	VAr	AC Reactive Power Phase A	
40118	40119	R	VARphB	AC Reachtive Power Phase B value	float32	VAr	AC Reactive Power Phase B	
40120	40121	R	VARphC	AC Reachtive Power Phase C value	float32	VAr	AC Reactive Power Phase C	
40122	40123	R	PF	Power Factor value	float32	PF	Power Factor	
40124	40125	R	PFphA	Power Factor Phase A value	float32	PF	Power Factor Phase A	
40126	40127	R	PFphB	Power Factor Phase B value	float32	PF	Power Factor Phase B	
40128	40129	R	PFphC	Power Factor Phase C value	float32	PF	Power Factor Phase C	
40130	40131	R	TotWhExp	Total Watt-hours Exported	float32	Wh	Total Watt-hours Exported	
40132	40133	R	TotWhExpPhA	Total Watt-hours Exported phase A	float32	Wh	Total Watt-hours Exported phase A	
40134	40135	R	TotWhExpPhB	Total Watt-hours Exported phase B	float32	Wh	Total Watt-hours Exported phase B	
40136	40137	R	TotWhExpPhC	Total Watt-hours Exported phase C	float32	Wh	Total Watt-hours Exported phase C	
40138	40139	R	TotWhImp	Total Watt-hours Imported	float32	Wh	Total Watt-hours Imported	
40140	40141	R	TotWhImpPhA	Total Watt-hours Imported phase A	float32	Wh	Total Watt-hours Imported phase A	
40142	40143	R	TotWhImpPhB	Total Watt-hours Imported phase B	float32	Wh	Total Watt-hours Imported phase B	
40144	40145	R	TotWhImpPhC	Total Watt-hours Imported phase C	float32	Wh	Total Watt-hours Imported phase C	

40146	40147	R	TotVAhExp	Total VA-hours Exported	float32	VAh	Total VA-hours Exported	
40148	40149	R	TotVAhExpPhA	Total VA-hours Exported phase A	float32	VAh	Total VA-hours Exported phase A	
40150	40151	R	TotVAhExpPhB	Total VA-hours Exported phase B	float32	VAh	Total VA-hours Exported phase B	
40152	40153	R	TotVAhExpPhC	Total VA-hours Exported phase C	float32	VAh	Total VA-hours Exported phase C	
40154	40155	R	TotVAhImp	Total VA-hours Imported	float32	VAh	Total VA-hours Imported	
40156	40157	R	TotVAhImpPhA	Total VA-hours Imported phase A	float32	VAh	Total VA-hours Imported phase A	
40158	40159	R	TotVAhImpPhB	Total VA-hours Imported phase B	float32	VAh	Total VA-hours Imported phase B	
40160	40161	R	TotVAhImpPhC	Total VA-hours Imported phase C	float32	VAh	Total VA-hours Imported phase C	
40162	40163	R	TotVArhImpQ1	Total VAR-hours Imported Q1	float32	VArh	Total VAR-hours Imported Q1	
40164	40165	R	TotVArhImpQ1phA	Total VAR-hours Imported Q1 phase A	float32	VArh	Total VAR-hours Imported Q1 phase A	
40166	40167	R	TotVArhImpQ1phB	Total VAR-hours Imported Q1 phase B	float32	VArh	Total VAR-hours Imported Q1 phase B	
40168	40169	R	TotVArhImpQ1phC	Total VAR-hours Imported Q1 phase C	float32	VArh	Total VAR-hours Imported Q1 phase C	
40170	40171	R	TotVArhImpQ2	Total VAR-hours Imported Q2	float32	VArh	Total VAR-hours Imported Q2	
40172	40173	R	TotVArhImpQ2phA	Total VAR-hours Imported Q2 phase A	float32	VArh	Total VAR-hours Imported Q2 phase A	
40174	40175	R	TotVArhImpQ2phB	Total VAR-hours Imported Q2 phase B	float32	VArh	Total VAR-hours Imported Q2 phase B	
40176	40177	R	TotVArhImpQ2phC	Total VAR-hours Imported Q2 phase C	float32	VArh	Total VAR-hours Imported Q2 phase C	
40178	40179	R	TotVArhExpQ3	Total VAR-hours Exported Q3	float32	VArh	Total VAR-hours Exported Q3	
40180	40181	R	TotVArhExpQ3phA	Total VAR-hours Exported Q3 phase A	float32	VArh	Total VAR-hours Exported Q3 phase A	
40182	40183	R	TotVArhExpQ3phB	Total VAR-hours Exported Q3 phase B	float32	VArh	Total VAR-hours Exported Q3 phase B	
40184	40185	R	TotVArhExpQ3phC	Total VAR-hours Exported Q3 phase C	float32	VArh	Total VAR-hours Exported Q3 phase C	
40186	40187	R	TotVArhExpQ4	Total VAR-hours Exported Q4	float32	VArh	Total VAR-hours Exported Q4	
40188	40189	R	TotVArhExpQ4phA	Total VAR-hours Exported Q4 phase A	float32	VArh	Total VAR-hours Exported Q4 phase A	
40190	40191	R	TotVArhExpQ4phB	Total VAR-hours Exported Q4 phase B	float32	VArh	Total VAR-hours Exported Q4 phase B	
40192	40193	R	TotVArhExpQ4phC	Total VAR-hours Exported Q4 phase C	float32	VArh	Total VAR-hours Exported Q4 phase C	
40194	40195	R	Evt	Events	uint32	Bitfield	Events	
40196	40197	R	End	End	float32		End Model	0xFFFF