

# Data exports of Ethernet to M-Bus SMART converters

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# How to enable the exports

Information on how to enable each export can be found in the *M-Bus export settings* chapter of the *Web Interface for Ethernet to M-Bus converters* manual or the *Telnet menu for Ethernet to M-Bus converters* manual.

## CSV export

This is a standard CSV file used in any office spreadsheet application. It is a simple UTF-8 text file with values separated by semicolons ";"

Usage: [\[converter ip address\]/mbus.csv](#)

Link example: 169.254.100.11/mbus.csv

CSV structure:

- Converter info section  
First row. Contains converter Name, IP and MAC address.
- Meter info section  
Row with info labels: Meter\_id;Status;Mbus Address;OK;ERR;SN;Type;Manuf.;Version;Meter status  
Followed by rows with individual meter info data. A row is filled for each available meter.
- Empty row
- Meter data section.  
Row with data labels: Meter\_id;Value name;Value;Units;Storage;Tarrif;Sub unit;Type;Data  
Followed by meter data. Each data available from a meter is on a new row. Meter data is grouped by Meter\_id. There are no empty rows between groups of Meter\_ids.

CSV export example:

```
Name: Samplename; IP: 169.254.100.11; MAC: 00:80:A3:91:EF:31
Meter_id;Status;Mbus Address;OK;ERR;SN;Type;Manuf.;Version;Meter status
1;1;126;2;13;14935550;Heat;SON;14;48

Meter_id;Value name;Value;Units;Storage;Tarrif;Sub unit;Type;Data
1;Energy;3917410;Wh;0;0;0;_;1
1;Flow temp.;35.510;°C;0;0;0;_;5
1;Return temp.;29.480;°C;0;0;0;_;5
1;Volume flow;0.9042;m^3/h;0;0;0;_;5
1;Power;6307;W;0;0;0;_;5
1;Timepoint;19.11.2014 14:57;date;0;0;0;_;6
```

## XML export

There are several options available for what the export should contain and how to format the data in the export. These options are available through URL parameters. All parameters are optional and can be in any order. Standard URL convention is used to pass the parameters. First parameter must be preceded by a question mark character "?" and the remaining parameters must be separated by an ampersand character "&"

Usage: [\[converter ip address\]/mbus.xml?t=\[x\]&a=\[x\]&f=rest&list](#)

Simple link example: 169.254.100.11/mbus.xml

Description of parameters:

- `t=[x]` - XML data with M-Bus frame. Helpful for debugging or special conversion. Where `[x]` is a decadic number with the following bit meaning:

[x] bits				XML optimization
3	2	1	0	
			1	Enables frame attribute <sup>[1]</sup> in the element <unit>. t=1.
		1		Enables frame attribute <sup>[1]</sup> in the element <val>. t=2.
	1			Disables optimization of value and units on the basis of pow <sup>[2]</sup> . t=4.
1				Enable extended attributes. t=8.

Optimization of the value is enabled by default.

Example of value optimization:

M-Bus frame: value 453, units J, exponent 10e7 which translates to: 4 530 000 000 J or 4530 MJ

*Not optimized:* val="453" units\_s="J" units="8" pow="7"

*Optimized:* val="4530" units\_s="MJ" units="8" pow="1" (don't care)

M-Bus frame: value 2583, units W, exponent 10e-2 which translates to: 25,83 W

*Not optimized:* val="2583" units\_s="W" units="40" pow="-2"

*Optimized:* val="25,83" units\_s="W" units="40" pow="-2" (don't care)

**Note:** <sup>[1]</sup> Frame attribute contains raw data bytes in hex format from the M-Bus frame.

<sup>[2]</sup> pow attribute, represents the exponent value for the power of 10.

- `a=[x]` - XML export for a single M-Bus meter where `[x]` is equal to its M-Bus address.
- `list` - Meter list. XML export without <val> elements.  
The list parameter can have a value assigned to it but it will be ignored.  
`mbus.xml?list` is same as `mbus.xml?list=true`
- `f=rest` - Representational State Transfer (REST) compatible XML format.

More examples:

`mbus.xml`

Standard XML export of all M-Bus meters. Optimization of value units is enabled. Extended attributes are hidden. Meter value is: val + units\_s. For example 450MJ: val="450" units\_s="MJ".

`mbus.xml?t=12`

Extended XML export of all M-Bus meters. Optimization of value units is disabled and extended attributes are shown. Meter value is: val \* 10pow + units\_s. Example 452,5kW val="4525" units\_s="W" pow="2"

`mbus.xml?t=15&a=1`

Extended XML export of an M-Bus meter with M-Bus address 1. Export include all frame attributes. This export is useful for debugging purposes.

`mbus.xml?list`

XML export without <val> elements. This is a simple meter list with their attributes.

`mbus.xml?f=rest`

XML export formatted for compatibility with REST technology.

## XML data format

Elements + attributes:

- **<root> + <root/>** Base element with information about M-Bus converter.
  - ver - XML schema version [ number, 1 Byte ].
  - name - Name of the converter [ string ].
  - ip - IP address of Ethernet converter. Format: xxx.yyy.zzz.sss.  
Decimal numbers are without leading zeros.
  - mac - MAC address of Ethernet converter. Format: AA:BB:CC:DD  
Hexadecimal numbers are with leading zeros.
- **<unit> + <unit/>** Meter status and values element.
  - id - Meter sequential number. Starts from 1, 2,... [ number, 1 Byte ].
  - st - Status of M-Bus meter reading [ number, 1 Byte ].
    - 0 - not read
    - 1 - communication is ok
    - 2 - first attempt to read meter wasn't successful
    - 3 - second attempt to read meter wasn't successful
    - 4 - no meter response.

**Note:** If st = 0 or 4, the XML will contain no data.  
If st = 2 or 3, the XML will contain last successfully read out data.  
If st = 1 the XML will contain current data.
  - adr - Primary M-Bus address of a meter [ number, 1 Byte ].
  - ok - Count of successful reads of a meter [ number, 1 Byte ].
  - err - Count of bad and no response from a meter [ number, 1 Byte ].
  - err\_s - Error string [ string ]:
    - "no data" - no additional attributes.
    - "bad/no data" - M-Bus frame too short.
  - sn - Serial number / secondary communication address, [ number, 4 Bytes ].
  - frame - Hexadecimal list of the whole M-Bus frame. Only if allowed.
  - type - Type of meter [ number, 1 Byte ].
  - type\_s - Type of meter [ string ].

type	type_s
0	Other
1	Oil
2	Electricity
3	Gas
4	Heat
5	Steam
6	Hot Water
7	Water
8	H.C.A.
9	Compressed Air
10, 11	Cooling load meter

12	Heat
21	Hot water
22	Cold water
23	Hot/Cold water
24	Pressure
...	unknown - all other types of values

- man - Three letters of manufacturer identification [ string ].
- ver - Meter version [ number, 1 Byte].
- stat - Meter status [ number, 1 Byte].

bits						Meter status
7-5	4	3	2	1	0	
				0	0	No error
				0	1	Application Busy
				1	0	Any Application Error
				1	1	Reserved
			1			Power is low
		1				Permanent error
	1					Temporary error
...						Specific to manufacturer

• **<val ... /> Meter values element**

- id - Value's sequential number. Starts at 1. [ number, 1 Byte ].
- sub\_unit - Number of sub units of the meter [ number, 1 Byte - 8 bits ].  
(M-Bus protocol supports 10 bits in 10 DIFE Bytes)
- tariff - Tariff of the value, [ number, 2 Bytes - 16 bits ].  
(M-Bus protocol support 20 bits in 10 DIFE Bytes)
- storage - Storage number of the value [ number 2 Bytes - 16 bits ].  
(M-Bus protocol support 41 bits in 10 DIFE Bytes)
- data\_type - Data type of the M-Bus value. Extracted from DIF [ number, 1 Byte ].

data_type	type of M-Bus value	type of attribute val
1	Integer value. Supported 1, 2, 3 and 4 Byte length values. 6B and 8B only in hex export (val_h="0x....") or 4 Bytes if possible.	number
2	BCD value.	number
3	Minus BCD value.	number
4	String. Supported only 19 character long strings.	string
5	Real value. Scientific format x.yyyyyyye±zz x leading number plus sign, yyyyyyy 7 decimal number, ±zz exponent for power of ten	number
6	Date and time.	yyyy-mm-ddThh:mm
7	Date.	yyyy-mm-dd

- val - Value [ string, date, time, numbers ].  
Date with time format: *year-month-dayThour:minute*. Example: 2014-02-08T15:05

Date format: *year-month-day*. Example: 2014-02-28

Decimal number: *abcde..* Example: 15625.

**Note:** If it is allowed to optimize the units of the value on the basis of "pow" (see [page 2](#)), the number could be with a decimal point.

- val\_h - Value, number in hexadecimal format Example: "0x0200000103F2"
- name - Type of value [ string ].

Type of M-Bus value
"Energy"
"Volume"
"Mass"
"On time"
"Operating time"
"Averaging duration"
"Actuality duration"
"Power"
"Volume flow"
"Mass flow"
"Temp. difference"
"External temp."
"Flow temp."
"Return temp."
"Reserved"
"Units for H.C.A."
"Time point"
"Pressure"
"Fabrication no."
"Identification"
"Bus address"
"Debit-currency"
"Credit-currency"
"Volts"
"Current"
"Access number"
"Device type"
"Manufacturer"
"Identification"
"Model/version"
"Hardware version"
"Customer location"
"Customer"
"Special u" - u is VIFE number if VIF was 0xfd

- units<sup>[3]</sup> - Type of value units [ number, 1 Byte ].  
Value is equal to VIF = 0xfd, 0xfb or VIF without "nnn" and without extension bit.

- `units_s` - Type of value units [ string ].
- `units_e[3]` - Extended type of value units [ number, 1 Byte ]. Value is equal to VIFE value.

<code>units_s</code>	<code>units</code>	<code>units_e</code>
Wh	0x00	
kWh	0x00 <sup>[4]</sup>	
J	0x08	
kJ	0x08 <sup>[4]</sup>	
MJ	0x08 <sup>[4]</sup>	
m <sup>3</sup>	0x10	
l	0x10 <sup>[4]</sup>	
kg	0x18	
t	0x18 <sup>[4]</sup>	
sec	0x20, 0x70, 0x74	
min	0x21, 0x71, 0x75	
hour	0x22, 0x72, 0x76	
day	0x23, 0x73, 0x77	
W	0x28	
kW	0x28 <sup>[4]</sup>	
J/h	0x30	
kJ/h	0x30 <sup>[4]</sup>	
MJ/h	0x30 <sup>[4]</sup>	
m <sup>3</sup> /h	0x38	
l/h	0x38 <sup>[4]</sup>	
m <sup>3</sup> /min	0x40	
l/min	0x40 <sup>[4]</sup>	
m <sup>3</sup> /sec	0x48	
l/sec	0x48 <sup>[4]</sup>	
ml/sec	0x48 <sup>[4]</sup>	
kg/h	0x50	
t/h	0x50 <sup>[4]</sup>	
"°C"	0x58, 0x5c, 0x60, 0x64	
date	0x6c	
bar	0x68	
V	0xfd,	0x40
mV	0xfd,	0x40 <sup>[4]</sup>
uV	0xfd,	0x40 <sup>[4]</sup>
A	0xfd,	0x40
mA	0xfd,	0x40 <sup>[4]</sup>
uA	0xfd,	0x40 <sup>[4]</sup>
MW/h	0xfb,	0x00
GJ	0xfb,	0x08
m <sup>3</sup>	0xfb,	0x10
t	0xfb,	0x18
MW	0xfb,	0x28

GJ/h	0xfb,	0x30
------	-------	------

<sup>[3]</sup> If optimization of units is enabled value of pow is changed to a new exponent. `mbus.xml?t=4-7`

<sup>[4]</sup> If optimization of units is enabled value of pow is changed to a new exponent. `t=bit.2`

Example: `pow=4 str_units="Wh"` becomes `pow=1(don't care) str_units="kWh"`

- `value_t` - Type of value [ string ].  
If not defined - Instantaneous value.  
"maximum" - Maximum value.  
"minimum" - Minimum value.  
"during error" - Value during error state.
- `pow[5]` - Decimal multiplier of the value [ number, 1 Byte ]. `value x 10pow`.  
If value units optimization is enabled ignore this value.
- `err_s` - error messages [ string ].  
"unsupported VIF, DIF" - Unsupported VIF or DIF.  
This ends decoding of the M-Bus packed.  
"not supported LVAR DIF" - Unsupported type of variable length VIF.  
"wrong data length for time var." - Wrong length of variable for date format - probably corrupted M-Bus frame.  
"unsupported int value" - Unsupported long integer value. 6B and 8B long variable are exported only hexadecimal.  
"wrong BCD number" - One of the numbers was higher then 9 -probably corrupted M-Bus frame.  
"unresolved type" - Unresolved type of value.  
"bad/no data" - No or bad M-Bus data.
- `val_len[5]` - Byte length of the M-Bus variable [ number, 1 Byte ].
- `date_d` - Extended date variable, string. Ignore day value from date. It means every day.  
Example: `units_s="date" date_y="every day" val="2014-01-00"`
- `date_m` - Extended date variable, string. Ignore month value from date. It means every month.  
Example: `units_s="date" date_y="every month" val="2014-00-31"`
- `date_y` - Extended date variable, string. Ignore year value from date. It means every year.  
Example: `units_s="date" date_y="every year" val="0000-12-31"`
- `frame` - Part of the M-Bus frame which is relevant to the val element. Only if allowed.  
String in the hexadecimal format.

<sup>[5]</sup> Extended values. These values are in the XML export only if attribute `t` has the 3rd bit set.

Example: `mbus.xml?t=8`

#### XML export examples:

`mbus.xml?list` - list of configured M-Bus meters

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE mbus_meters SYSTEM "mbus_meters.dtd">
<root ver="1" name="M-Bus converter" ip="169.254.100.10" mac="00:80:A3:91:EF:31">
<unit id="0" st="1" adr="1" ok="142" err="0"></unit>
<unit id="1" st="1" adr="2" ok="142" err="0"></unit>
```

## mbus.xml - full XML export

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE mbus_meters SYSTEM "mbus_meters.dtd">
<root ver="1" name="M-Bus converter" ip="169.254.100.10" mac="00:80:A3:91:EF:31">
<unit id="1" st="1" adr="2" ok="235" err="0" sn="5625297" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<val id="1" name="Volume" pow="-1" units="16" units_s="m^3" val="14" val_len="4" data_type="2" />
<val id="2" name="On time" pow="0" units="34" units_s="hour" val="21071" val_len="3" data_type="2" />
<val id="3" name="Time point" pow="1" units="108" units_s="date" val="2014-
09-12T10:05:00" val_len="4" data_type="6" />
<val id="4" name="Time point" pow="0" units="108" units_s="date" type="during error" date_
m="every month" date_y="every year" val="0000-00-31" val_len="2" data_type="7" />
<val id="5" name="Fabrication no." pow="0" units="120" units_s="" val="5625297" val_len="4" data_type="2" />
<val id="6" name="Customer location" pow="0" units="253" units_s="" units_
e="16" val="5625297" val_len="4" data_type="2" />
<val id="7" name="Model/version" pow="0" units="253" units_s="" units_e="12" err_
s="unsupported int value" val_h="0x0200000103F2" val_len="6" data_type="1" />
<val id="8" name="Identification" pow="0" units="253" units_s="" units_
e="11" val="AEW31" val_len="5" data_type="4" />
<val id="9" storage="1" name="Time point" pow="0" units="108" units_s="date" date_
y="every year" val="0000-12-31" val_len="2" data_type="7" />
<val id="10" storage="1" name="Volume" pow="-1" units="16" units_s="m^3" val="0" val_len="4" data_type="2" />
<val id="11" storage="1" name="Time point" pow="0" units="108" units_
s="date" val="2013-12-31" val_len="2" data_type="7" />
<val id="12" err_s="unsupported VIF, DIF" />
</unit>
</root>
```

## mbus.xml?t=3 - enable frame attribute

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE mbus_meters SYSTEM "mbus_meters.dtd">
<root ver="1" name="M-Bus converter" ip="169.254.100.10" mac="00:80:A3:91:EF:31">
<unit id="1" st="1" adr="2" ok="149" err="0" frame="68.66.66.68.08.01.72.96.52.62.05.65.32.04.06.C7.00.00.00.0
C.15.00.00.00.00.0B.22.71.10.02.04.6D.08.0A.CC.19.32.6C.FF.FF.0C.78.96.52.62.05.0C.FD.10.96.52.62.05.06.FD.0C.
F2.03.01.00.00.02.0D.FD.0B.05.31.33.57.45.41.42.EC.7E.FF.FC.4C.15.00.00.00.00.42.6C.BF.1C.0F.37.FD.17.00.00.00.00
.00.00.00.00.02.7A.35.00.02.78.35.00.EF.16." sn="5625296" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<val id="1" name="Volume" units_s="m^3" val="0.3" frame="0C.15.03.00.00.00." data_type="2" />
<val id="2" name="On time" units_s="hour" val="21071" frame="0B.22.71.10.02." data_type="2" />
<val id="3" name="Time point" units_s="date" val="2014-09-12T10:08:00" frame="04.6D.08.0A.CC.19." data_type="6" />
<val id="4" name="Time point" units_s="date" type="during error" date_m="every month"
date_y="every year" val="0000-00-31" frame="32.6C.FF.FF." data_type="7" />
<val id="5" name="Fabrication no." units_s="" val="5625296" frame="0C.78.96.52.62.05." data_type="2" />
<val id="6" name="Customer location" units_s="" val="5625296" frame="0C.FD.10.96.52.62.05." data_type="2" />
<val id="7" name="Model/version" units_s="" err_s="unsupported int value" val_
h="0x0200000103F2" frame="06.FD.0C.F2.03.01.00.00.02." data_type="1" />
<val id="8" name="Identification" units_s="" val="AEW31" frame="0D.FD.0B.05.31.33.57.45." data_type="4" />
<val id="9" storage="1" name="Time point" units_s="date" date_y="every year"
val="0000-12-31" frame="42.EC.7E.FF.FC." data_type="7" />
<val id="10" storage="1" name="Volume" units_s="m^3" val="0" frame="4C.15.00.00.00.00." data_type="2" />
<val id="11" storage="1" name="Time point" units_s="date" val="2013-12-31" frame="42.6C.BF.1C." data_type="7" />
<val id="12" err_s="unsupported VIF, DIF" /></unit>
<unit id="2" st="1" adr="1" ok="149" err="0" frame="68.66.66.68.08.01.72.96.52.62.05.65.32.04.06.C7.00.00.00.0
C.15.00.00.00.00.0B.22.71.10.02.04.6D.08.0A.CC.19.32.6C.FF.FF.0C.78.96.52.62.05.0C.FD.10.96.52.62.05.06.FD.0C.
F2.03.01.00.00.02.0D.FD.0B.05.31.33.57.45.41.42.EC.7E.FF.FC.4C.15.00.00.00.00.42.6C.BF.1C.0F.37.FD.17.00.00.00.00
.00.00.00.00.02.7A.35.00.02.78.35.00.EF.16." sn="5625296" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<val id="1" name="Volume" units_s="m^3" val="0.3" frame="0C.15.03.00.00.00." data_type="2" />
<val id="2" name="On time" units_s="hour" val="1569600" frame="0B.22.71.10.02." data_type="2" />
<val id="3" name="Time point" units_s="date" val="2014-09-12T10:08:00" frame="04.6D.08.0A.CC.19." data_type="6" />
<val id="4" name="Time point" units_s="date" type="during error" date_m="every month"
date_y="every year" val="0000-00-31" frame="32.6C.FF.FF." data_type="7" />
<val id="5" name="Fabrication no." units_s="" val="5625296" frame="0C.78.96.52.62.05." data_type="2" />
<val id="6" name="Customer location" units_s="" val="5625296" frame="0C.FD.10.96.52.62.05." data_type="2" />
<val id="7" name="Model/version" units_s="" err_s="unsupported int value" val_
h="0x0200000103F2" frame="06.FD.0C.F2.03.01.00.00.02." data_type="1" />
```

```
<val id="8" name="Identification" units_s="" val="AEW31" frame="0D.FD.0B.05.31.33.57.45." data_type="4" />
<val id="9" storage="1" name="Time point" units_s="date" date_y="every year"
val="0000-12-31" frame="42.EC.7E.FF.FC." data_type="7" />
<val id="10" storage="1" name="Volume" units_s="m^3" val="0" frame="4C.15.00.00.00.00." data_type="2" />
<val id="11" storage="1" name="Time point" units_s="date" val="2013-12-31" frame="42.6C.BF.1C." data_type="7" />
<val id="12" err_s="unsupported VIF, DIF" />
</unit></root>
```

mbus.xml?a=2&t=12 - meter with M-Bus address 2, no value optimization, extended attributes

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE mbus_meters SYSTEM "mbus_meters.dtd">
<root ver="1" name="M-Bus converter" ip="169.254.100.10" mac="00:80:A3:91:EF:31">
<unit id="1" st="1" adr="2" ok="235" err="0" sn="5625297" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<val id="1" name="Volume" pow="-1" units="16" units_s="m^3" val="14" val_len="4" data_type="2" />
<val id="2" name="On time" pow="0" units="34" units_s="hour" val="21071" val_len="3" data_type="2" />
<val id="3" name="Time point" pow="1" units="108" units_s="date" val="2014-
09-12T10:05:00" val_len="4" data_type="6" />
<val id="4" name="Time point" pow="0" units="108" units_s="date" type="during error" date_
m="every month" date_y="every year" val="0000-00-31" val_len="2" data_type="7" />
<val id="5" name="Fabrication no." pow="0" units="120" units_s="" val="5625297" val_len="4" data_type="2" />
<val id="6" name="Customer location" pow="0" units="253" units_s="" units_
e="16" val="5625297" val_len="4" data_type="2" />
<val id="7" name="Model/version" pow="0" units="253" units_s="" units_e="12" err_
s="unsupported int value" val_h="0x0200000103F2" val_len="6" data_type="1" />
<val id="8" name="Identification" pow="0" units="253" units_s="" units_
e="11" val="AEW31" val_len="5" data_type="4" />
<val id="9" storage="1" name="Time point" pow="0" units="108" units_s="date" date_
y="every year" val="0000-12-31" val_len="2" data_type="7" />
<val id="10" storage="1" name="Volume" pow="-1" units="16" units_s="m^3" val="0" val_len="4" data_type="2" />
<val id="11" storage="1" name="Time point" pow="0" units="108" units_
s="date" val="2013-12-31" val_len="2" data_type="7" />
<val id="12" err_s="unsupported VIF, DIF" />
</unit>
</root>
```

mbus.xml?a=1&t=3 - meter with M-Bus address 1, frame attributes enabled

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE mbus_meters SYSTEM "mbus_meters.dtd">
<root ver="1" name="M-Bus converter" ip="169.254.100.10" mac="00:80:A3:91:EF:31">
<unit id="0" st="1" adr="1" ok="252" err="0" frame="68.66.66.68.08.01.72.96.52.62.05.65.32.04.06.C7.00.00.00.0
C.15.00.00.00.00.0B.22.71.10.02.04.6D.08.0A.CC.19.32.6C.FF.FF.0C.78.96.52.62.05.0C.FD.10.96.52.62.05.06.FD.0C.
F2.03.01.00.00.02.0D.FD.0B.05.31.33.57.45.41.42.EC.7E.FF.FC.4C.15.00.00.00.00.42.6C.BF.1C.0F.37.FD.17.00.00.00.00
.00.00.00.02.7A.35.00.02.78.35.00.EF.16." sn="5625296" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<val id="1" name="Volume" units_s="m^3" val="0" frame="0C.15.00.00.00.00." data_type="2" />
<val id="2" name="On time" units_s="hour" val="21071" frame="0B.22.71.10.02." data_type="2" />
<val id="3" name="Time point" units_s="date" val="2014-09-12T10:08:00" frame="04.6D.08.0A.CC.19." data_type="6" />
<val id="4" name="Time point" units_s="date" type="during error" date_m="every month"
date_y="every year" val="0000-00-31" frame="32.6C.FF.FF." data_type="7" />
<val id="5" name="Fabrication no." units_s="" val="5625296" frame="0C.78.96.52.62.05." data_type="2" />
<val id="6" name="Customer location" units_s="" val="5625296" frame="0C.FD.10.96.52.62.05." data_type="2" />
<val id="7" name="Model/version" units_s="" err_s="unsupported int value" val_
h="0x0200000103F2" frame="06.FD.0C.F2.03.01.00.00.02." data_type="1" />
<val id="8" name="Identification" units_s="" val="AEW31" frame="0D.FD.0B.05.31.33.57.45." data_type="4" />
<val id="9" storage="1" name="Time point" units_s="date" date_y="every year"
val="0000-12-31" frame="42.EC.7E.FF.FC." data_type="7" />
<val id="10" storage="1" name="Volume" units_s="m^3" val="0" frame="4C.15.00.00.00.00." data_type="2" />
<val id="11" storage="1" name="Time point" units_s="date" val="2013-12-31" frame="42.6C.BF.1C." data_type="7" />
<val id="12" err_s="unsupported VIF, DIF" />
</unit>
</root>
```

## mbus.xml?f=rest - full XML export in REST compatible format

```
<?xml version="1.0" encoding="UTF-8"?>
<root ver="1" name="" ip="169.254.100.10" mac="00:80:A3:A2:5C:3B">
<unit id="1" st="1" adr="1" ok="8" err="0" sn="5625296" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<volume units_s="m^3">0</volume>
<on-time>PT24914H</on-time>
<time-point units_s="date">2015-02-19T13:36:00</time-point>
<time-point units_s="date" type="during error" date_m="every month" date_y="every year" d="31"/>
<fabrication-no units_s="">5625296</fabrication-no>
<customer-location units_s="">5625296</customer-location>
<model-version units_s="" err_s="unsupported int value">0x0200000103F2</model-version>
<identification units_s="">AEW31</identification>
<time-point storage="1" units_s="date" date_y="every year" d="31" m="12"/>
<volume storage="1" units_s="m^3">0</volume>
<time-point storage="1" units_s="date">2014-12-31</time-point>
<unsupported/></unit>
<unit id="2" st="1" adr="2" ok="7" err="0" sn="5625297" type="6" type_s="Hot Water" man="LSE" ver="4" stat="0">
<volume units_s="m^3">9.2</volume>
<on-time>PT24914H</on-time>
<time-point units_s="date">2015-02-19T13:35:00</time-point>
<time-point units_s="date" type="during error" date_m="every month" date_y="every year" d="31"/>
<fabrication-no units_s="">5625297</fabrication-no>
<customer-location units_s="">5625297</customer-location>
<model-version units_s="" err_s="unsupported int value">0x0200000103F2</model-version>
<identification units_s="">AEW31</identification>
<time-point storage="1" units_s="date" date_y="every year" d="31" m="12"/>
<volume storage="1" units_s="m^3">1.5</volume>
<time-point storage="1" units_s="date">2014-12-31</time-point>
<unsupported/></unit></root>
```

## mbus\_meters.dtd

This file is a document type definition (DTD) schema for formatting the standard XML export. It is possible to download it from the M-Bus converter at [\[converter ip address\]/mbus\\_meters.dtd](#)

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT root (unit*)>
<!ELEMENT unit (val*)>
<!ELEMENT val EMPTY>

<!ATTLIST root
ver CDATA #REQUIRED
name CDATA #REQUIRED
ip CDATA #REQUIRED
mac CDATA #REQUIRED
>

<!ATTLIST unit
id ID #REQUIRED
st CDATA #REQUIRED
adr CDATA #REQUIRED
ok CDATA #REQUIRED
err CDATA #REQUIRED
err_s CDATA #IMPLIED
sn CDATA #IMPLIED
type CDATA #IMPLIED
type_s CDATA #IMPLIED
man CDATA #IMPLIED
ver CDATA #IMPLIED
stat CDATA #IMPLIED
frame CDATA #IMPLIED
>

<!ATTLIST val
id CDATA #REQUIRED
sub_unit CDATA #IMPLIED
tariff CDATA #IMPLIED
storage CDATA #IMPLIED
name CDATA #IMPLIED
pow CDATA #IMPLIED
units CDATA #IMPLIED
units_s CDATA #IMPLIED
units_e CDATA #IMPLIED
type CDATA "instantaneous"
err_s CDATA #IMPLIED
date_d CDATA #IMPLIED
date_m CDATA #IMPLIED
date_y CDATA #IMPLIED
val CDATA #IMPLIED
val_h CDATA #IMPLIED
length CDATA #IMPLIED
frame CDATA #IMPLIED
data_type CDATA #IMPLIED
>
```

# Status and control of the M-Bus readout process - state.xml

## State export format

The state.xml export contains the current meter readout status information. The file can be requested continuously to find out whether the meter readout has finished after a readout command has been issued.

Usage: `[converter ip address]/state.xml`

Link example: `169.254.100.11/state.xml`

The information is exported as parameter values in the `<root>` tag of the XML file.

Following parameters are available:

- `read_cnt` - Total count of read cycles. 1 Byte long counter. This value will be incremented by 1 after a readout has been performed.
- `time_norm` - Time counter for the normal readout timer. When it reaches zero, normal readout of the meters will start.
- `time_ext` - Time counter for the extended readout timer. When it reaches zero, extended readout of the meters will start.
- `units` - Units of the time counters. "s" stands for seconds, "m" stands for minutes.
- `state` - Indicator of the readout process state.
  - "wait" - Waiting for timeout.
  - "readout" - Ongoing meters readout.
  - "search" - Ongoing meters search process.

Export example:

```
<?xml version="1.0" encoding="utf-8"?>
<root read_cnt="157" time_norm="46" time_ext="46" units="s" state="wait">
</root>
```

## Control of the readout process

A simple HTTP GET request for state.xml with an URL parameter allows readout control. The *Smart M-Bus application* mode reads the meters automatically and does not require control. Data in the exports represents the last readout which is fully sufficient in most cases. This feature was designed for special cases when obtaining the current meter values immediately is necessary.

Usage: `[converter ip address]/state.xml?[command]`

Commands:

- `f=all` - Start immediate readout of all meters.
- `f=norm` - Start the readout process using the default read timeout period.
- `f=ext` - Start the readout process using the extended read timeout period.
- `f=heal` - Start the readout process only for meters which were not read out in the last readout cycle. These are meters reported with the status `st=2,3` or `4`. The `st` state is the attribute of the `<unit>` element in the `mbus.xml` export, see [page 3](#). This feature is available in firmware version 2.0 and upwards.

**Note:** These commands do not influence the internal timers of the converter. The automatic readout cycle will not be influenced.

- **f=reset** - Set the default and extended readout timers of the converter to their preset values.  
This command only initializes the timers. It doesn't start meter readout.
- **f=all\_r** - Set the default and extended readout timers of the converter to their preset values and start the meter readout immediately.

Examples:

To start the meter readout the following HTTP GET request must be sent to the converter:

```
<ip address>/state.xml?f=all
```

To start the meter readout and reset the automatic readout timers this HTTP GET request must be sent:

```
<ip address>/state.xml?f=all_r
```

In both cases the obtained state.xml file will contain the information `state="readout"` and `read_cnt="x"`.

It is possible to monitor when the readout will be finished by issuing further GET requests for

```
<ip address>/state.xml
```

A finished readout will be shown in the XML parameters as `state="wait"` and `read_cnt="x+1"`.

Then the data exports will contain new data.