elvaco

CMe SERIES
The everything meter.

Report Templates Reference Information

CMe2100, CMi2110, CMi2120, CMi2130

Implementation guidelines and reference information for report templates used by CMe and CMi Series products

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1 Document notes

All information in this manual, including product data, diagrams, charts, etc. represents information on products at the time of publication, and is subject to change without prior notice due to product improvements or other reasons. It is therefore recommended that customers contact Elvaco AB for the latest product information before purchasing a CMe/CMi Series product.

The documentation and product are provided on an “as is” basis only and may contain deficiencies or inadequacies. Elvaco AB takes no responsibility for damages, liabilities or other losses by using this product.

1.1 Copyright and Trademark

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2 Using this document

2.1 Purpose and Audience

This document covers reference information and guidelines when selecting and using report templates for CMe/CMi Series products. Use this document together with CMe/CMi Series User's Manual and specific report template documentation.

For customer specific templates, please contact Elvaco AB.

2.2 Models

CMe2100,CMi2110,CMi2120,CMi2130

2.3 Additional and updated information

Latest documentation version is available on Elvaco web site at http://www.elvaco.com.

3 Implementation guidelines

The CMe/CMi Series gives a wide range of implementation possibilities. This chapter covers good implementation practice and method selection depending on customer needs.

Without any development needed, the product may be configured using SMS and Telnet. This may not be the most effective way when handling a high volume of products. Using Elvaco hosted configuration profiles or implementing a product configuration server, the product can be configured using HTTP web server requests. This will be closely described in section 3.5.

This section is a guideline for good implementation practice and serves for starting up an integration process. Please review the CMe/CMi Series User's Manual which covers all the commands, configuration keys, syntax and reference information.

3.1 Implementation level

Elvaco has divided product implementation into four levels. These levels are defined to illustrate the time for implementation and give the developer a good understanding where to start the implementation process and select the correct level of functionality. Please review Table 1 for level description.

Implementation level	Level of functionality	Typical time for implementation
Level 1	Transparent M-Bus communication using GSM CSD or TCP/IP on GPRS network. Configuration of the product is done by predefined configuration profile from Elvaco web server or by using SMS or Telnet.	0 hours Using standard M-Bus master software
Level 2	Handle automatic scheduled pushed (E-Mail, FTP, HTTP) reports to retrieve meter values. Configuration of the product is done by predefined configuration profile from Elvaco web server or by using SMS or Telnet.	8-16 hours
Level 3	Two way communication for configuration and starting commands using SMS. Configuration can also be done by predefined configuration profile from Elvaco web server.	8-16 hours
Level 4	Configuration of the product using HTTP web server from customer implemented configuration server.	8-16 hours

Table 1 Implementation levels

3.2 Implementation level 1

When using transparent M-Bus communication, there are numerous software applications available on the market. The product handles transparent M-Bus communication according to the M-Bus standard, but the request/response time delays must be adjusted to handle GSM/GPRS network response times. Depending on network provider, the response time can differ. A good recommendation for a maximum response time between request/response is approximately 4 seconds.

From factory the product is listening and will answer all incoming GSM CSD calls and open for transparent M-Bus communication. The TCP/IP transparent M-Bus communication must be manually started using command qset tmbus1/tmbus2 on.

3.3 Implementation level 2

Depending on IT structure of implementation platform, reports can be received from the product using E-Mail, FTP and HTTP. In some cases, implementation using E-Mail and FTP may be the preferable. If the goal is to reach implementation level 4, HTTP should be used as the transfer protocol from start.

3.3.1 Receiving reports using E-Mail

When installing the product, the default setting is to send hourly value reports every day. The report format can be configured using command cfg. Please see CMe/CMi Series User's Manuals. When receiving E-Mail reports with meter data, rules can be set up i.e. MS Outlook to organize E-Mails as needed. There are also software applications available on the market, which takes attached files and stores these files in a folder on disk. Watch Directory, http://www.watchdirectory.net, is one of the applications, which can handle these kinds of operations.

3.3.1.1 Requirements

For the product to be able to send E-Mail reports, a SIM card with GPRS enabled must be used. The product also needs an SMTP server to send the reports. The SMTP server is normally automatically detected, but in rare cases the server must be set manually using command qset email, see CMe Series User's Manual. This command is also used to set E-Mail recipients.

3.3.1.2 Report formats

There is a wide range of E-Mail reports available. The major difference between E-Mail reports are:

1. if the meter data should be attached as a file instead of printed in the body
2. if the meter data should be sent in one file or separated in one file per device (meter)
3. if the meter data should be decoded and readable or in raw M-Bus data format

The report template 1104 is a good choice if the report should be in machine friendly decoded format and report template 1103 can be used if the receiving system handles raw M-Bus data format. Review section 4 for an overview of available templates.

3.3.2 Receiving reports using FTP

FTP (File Transfer Protocol) is widely used all over the world. This may be the choice when there integration platform has an external FTP server available. The product is using **passive** mode FTP, which resolves the problem of NATed TCP/IP traffic from a GPRS network to the internet.

3.3.2.1 Requirements

For the product to be able to send FTP reports, a SIM card with GPRS enabled must be used. The product must be configured where to send FTP reports, which can be set using command qset ftp, see CMe Series User's Manual. Username, password, port and default upload directory can also be set using the command qset ftp.

The receiving FTP server must handle **passive** FTP. This can sometimes be disabled by firewall options. Verify firewall settings for passive FTP and FTP server application for proper configuration.

3.3.2.2 Report formats

There is a wide range of FTP reports available. The major difference between FTP reports are:

1. if the meter data should be sent in one file or separated in one file per device (meter)
2. if the meter data should be decoded and readable or in raw M-Bus data format

The report template 2104 is a good choice if the report should be in machine friendly decoded format and report template 2103 can be used if the receiving system handles raw M-Bus data format. Review section 4 for an overview of available templates.

3.3.3 Receiving reports using HTTP

HTTP (Hypertext Transfer Protocol) is widely used all over the world. This may be the choice when the integration platform has an external web server available. The product is using HTTP POST to send data to the server.

3.3.3.1 Requirements

For the product to be able to send HTTP reports, a SIM card with GPRS enabled must be used. The product must be configured where to send the HTTP reports, which can be set using command qset http, see CMe Series User's Manual. Username, password, port and URL can also be set using the command qset http. HTTPS can be used for securing the connection, which is accomplished by entering http**s** instead of http in the URL of the web server.

The reports sent from the product to the web server are created on the fly, thereby the content length of the post is unknown when the HTTP headers are sent. Thus, the receiving web server must handle chunked transfer encoding. This is normally not an issue when using Microsoft IIS or Apache web server, where chunked transfer encoding is handled automatically.

3.3.3.2 Report formats

There is a wide range of HTTP reports available. The major difference between HTTP reports are:

3. if the meter data should be sent in one post or separated in one post per device (meter)
4. if the meter data should be decoded and readable or in raw M-Bus data format

The report template 3104 is a good choice if the report should be in machine friendly decoded format and report template 3103 can be used if the receiving system handles raw M-Bus data format. Review section 4 for an overview of available templates.

3.4 Implementation level 3

When the product is operational and is sending reports automatically, there still may be situations when the server application needs to request or send data to the product. This can be accomplished by sending SMS to the product. The SMS can be a command to start a report manually, start a configuration process with a web server or to change configuration.

SMS may not be the most reliable communication protocol, but adding extra information to the SMS for identification and using the SMS functionality for correct purposes, it can be a powerful and easy way for integration.

3.4.1 Sending SMS to the product

In the CMe/CMi Series User's Manuals, all commands which can be sent using SMS is tagged with access "SMS". When the product receives an SMS, following process is started:

1. If phone number security is enabled, is the sending phone number accepted?
2. Is the first line of the SMS a password for security level 1,2 or 3? If true, set proper security level.
3. If 1) and 2) is parsed successfully, start parsing SMS command lines which can divided with CRLF or semi-colon ";"
4. If not the configuration key common.sms.response.mode is set to disable responses, respond with the executed command response information. The default value for common.sms.response.mode is "all".

3.4.2 Disable responses

In some cases, the SMS response from the product may not be interesting for the sending part. An example would be if the command is to start sending an HTTP POST report to a web server, which is automatically acknowledged when the report is received by the web server and the SMS response is not giving any extra information. Override the configuration sms.response.mode and set the value to "none".

An example for starting command report1 and disable SMS responses would look like:

```
report1 sms.response.mode=none
```

3.4.3 Requesting meter data between two dates

This example describes how to start a report and send meter data within two dates.

To resend meter data between 2010-09-01 and 2010-09-03 with report template 1104, send the following SMS command:

```
Report 1104 filter.mode=interval filter.param=20100901,20100903
```

3.4.4 Change configuration of retries for report1

This example describes how to change the report retries and the time between the retries.

To set number of retries to ten (9) and time between retries to five (5) minutes, send the following SMS command:

```
set report1.schedule.retrymax=9 report1.schedule.retryoffset=300
```

The CMe/CMi Series User's Manuals covers all this information in more detail. There is also numerous examples for every command which can be sent to the product.

3.5 Implementation level 4

The implementation level 4 is a combination of implementation level 3 and adding a product configuration server, which handles the distribution/product requests for new or updated configuration. The product connects to the product configuration server when using command sync and using command install with suffix.

Following SMS command will force the product to execute command install and connect to Elvaco distribution server (by default), and download configuration "elvaco".

```
Install 1 elvaco
```

Following SMS command will force the product to execute sync and connect to Elvaco configuration server (by default), and download configuration "elvaco".

```
Sync elvaco
```

Command install is used when installing the product for the first time or when meter configuration has changed. Command sync is used only when new configuration should be downloaded to the product.

The configuration "elvaco" is concatenated with the common.system.cota.urlbase to download the actual file from the configuration server. The actual url for configuration "elvaco" would be: http://dist.elvaco.se/sync/cota/elvaco.cad.

3.5.1 Changing or overriding which configuration server to synchronize configuration with

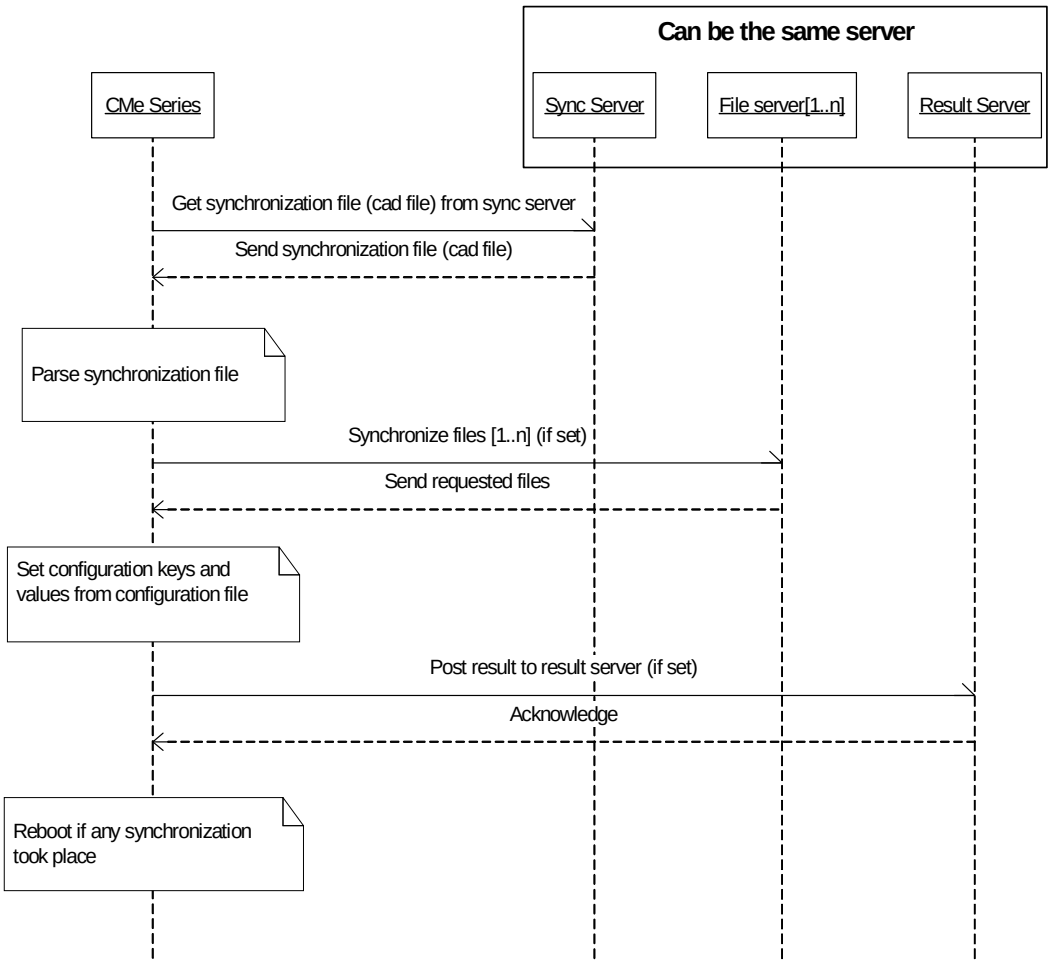
From factory default, the product will connect to http://dist.elvaco.se/ for synchronizing configuration. This server setting can be changed using configuration keys common.system.cota.urlbase, common.system.cota.url, common.system.cota.user, common.system.cota.password, common.system.cota.authmode.

The configuration key urlbase is used to set the base url when using short names in command install and sync. The configuration key url can be used to point out a specific location of a configuration file.

Example of executing sync and download a configuration file called myconfig.cad at http://myserver.com:

```
Sync system.cota.url=http://myserver.com/myconfig.cad.
```

3.5.2 Synchronization flow



The CMe/CMi Series starts with requesting a synchronization file. The synchronization file contains parameters to synchronize files and configuration keys to set in the product. When the synchronization of files and configuration are complete (or incomplete), the product will send a result to a specified result server. The result server can be specified in the cad file.

3.5.3 HTTP GET/POST

To identify the product, the HTTP header User-Agent is filled with the following information:

```
User-Agent=TC65i/<imei> Profile/IMP-NG Configuration/CLDC-1.1
Model/<model> Hardware/<hw> Firmware/<fw> Application/<sw>
Serial/<serial>
```

Parameter description

<imei>
15 digit product module IMEI number
<model>
Product model, i.e. CMe1000, CMe1100, CMe2000, CMe2100
<hw>

Product hardware version, i.e R4A
<fw>
Product module firmware version, i.e. 01.100
<sw>
Product software version, i.e. 1.1.0
<serial>
10 digit product serial number, i.e. 0006000000

3.5.4 Synchronization file (cad file)

The cad file contains the actual information to synchronize. See Table 2 for synchronization parameters. All cad files must have the extension .cad.

Parameter	Description
Sync-Mode	Synchronization mode, must be set to "server" Syntax: Sync-Mode: server
Sync-Notify-URL	Result server URL. Notifications will be sent to this server address. Can be left out. Syntax: Sync-Notify-URL: <notify url>
Sync-File-[0..n]-URL	Files to synchronize. The index must start at 0 and be continuous. Can be left out. Syntax: Sync-File-[0..n]-URL: <remote url>,<local file>
Sync-Config-[0..n]	Configuration keys and values to synchronize. The index must start at 0 and be continuous. Can be left out. Syntax: Sync- Config-[0..n]: <key>=<value>
Sync-Id	Identification which will be parsed into the result notification. Can be left out. Syntax: Sync-Id: <id>

Parameter descriptions for cad-files
<notify url>
URL where to post notifications
<remote file>

URL where to get remote file
<local file>
Local path and filename where to put downloaded file
<key>
Configuration key to set
<value>
Configuration key value
<id>
User specific identification for this synchronization
Example of cad file
Sync-Mode: server Sync-Id: 1 Sync-Notify-URL: http://dist.elvaco.se/RequestLogger/index.aspx Sync-Config-0: common.branding.company=Elvaco AB Sync-Config-1: common.branding.address1=Energigatan 9

Table 2 Synchronization file (cad file)

3.5.5 Result notifications

If the parameter Sync-Notify-Url is set in the cad file, the product will post result information to given URL. The post is a standard HTTP post with a body containing the result information. Please see possible results in Table 3.

Result	Description
900 Success	Synchronization completed successfully
920 Incompatible synchronizing mode	The Sync-Mode was not set to “server”
921 Error synchronizing files. <error>	Generic synchronization error.
Example of a notify post result body	
900 Success Sync-Id: 1	

Table 3 Result notification post

3.5.6 Configuration keys and valid values

The configuration keys and values set in the configuration file must be valid. If any key or value is invalid, the configuration process will quit and an error message will be sent to initiator and to the result server.

3.5.7 Example of starting synchronization using SMS with customer specified configuration server

This example shows how to start a synchronization process using SMS.

Following configuration keys will be set:

- report1.schedule.retrymax
- report1.schedule.retryoffset

The Sync-Id is set to 1234 and will be posted back to the result server for identifying the configuration.

The configuration file url is set to http://myserver.com/config/myconfig.cad.

The result server url is set to http://myserver.com/result/result.html

SMS to the product to start synchronization:

Sync system.cota.url=http://myserver.com/config/myconfig.cad

SMS from the product indicating synchronization started:

```
Sync started.
OK
```

The product will download the configuration file using HTTP GET and set the configuration keys as specified.

The file myconfig.cad contents which will be downloaded to the product:

```
Sync-Mode: server
Sync-Id: 1234
Sync-Notify-URL: http://myserver.com/result/result.html
Sync-Config-0: report1.schedule.retrymax=10
Sync-Config-1: report1.schedule.retryoffset=600
```

After the configuration file is processed, the product will send a HTTP POST with the result information.

The HTTP POST body contents sent to the result server:

```
900 Success
Sync-Id: 1234
```

4 Report templates

Report templates are description files how to format and send data from CMe/CMi Series product to an external source. Templates are available for SMS, FTP, HTTP and E-Mail.

The report engine in CMe/CMi Series is very powerful and can format almost any output data. Example of data format is csv formatted files, xml based data and human readable html reports. The report data can be events, meter data, system log reports etc.

CMe/CMi Series products are released with a standard set of reports, but can be enhanced by Elvaco provided add-ons and customer specific add-ons. Customer specific add-ons are not listed in this document.

Please see Table 4 for current standard set of reports.

Please see Table 5 for current add-on set of reports.

4.1 Assigned report template identifications

Range	Name
0001-0999	Standard SMS reports
1000-1099	Standard E-Mail system reports
1100-1199	Standard E-Mail value reports
1500-1599	Add-on E-Mail reports
2000-2099	Standard FTP system reports
2100-2199	Standard FTP value reports
2500-2599	Add-on FTP reports
3000-3099	Standard HTTP system reports
3100-3199	Standard HTTP value reports
3500-3599	Add-on HTTP reports
xx0001-xx0999	Customer specific SMS reports
xx1000-xx1099	Customer specific E-Mail system reports
xx1100-xx1199	Customer specific E-Mail value reports
xx2000-xx2099	Customer specific FTP system reports
xx2100-xx2199	Customer specific FTP value reports
xx3000-xx3099	Customer specific HTTP system reports
xx3100-xx3199	Customer specific HTTP value reports

Where xx is an Elvaco assigned customer number, two digits 00-99.

4.2 Standard report template list

These templates are included in the default setup from factory.

Id	Name	Version	Description
1	SMS Installation report	1.0	SMS report sent upon installation containing status information of last installation process. See Report Template Description 1

1001	Email installation report - html	1.0	E-Mail report sent upon installation containing status information of last installation process in html format. See Report Template Description 1001
1002	Email installation report - plain	1.0	E-Mail report sent upon installation containing status information of last installation process in plain text format. See Report Template Description 1002
1003	Email system report - html	1.1	E-Mail report containing system settings and status in html format. See Report Template Description 1003
1004	Email log report - html	1.0	E-Mail report containing system log in html format. See Report Template Description 1004
1005	Email event report - html	1.0	E-Mail report sent upon a system event in html format. See Report Template Description 1005
1006	Email log report - attached file - html	1.1	E-Mail report containing system log as attached file. Body in html format. See Report Template Description 1006
1101	Email value report - html	1.0	E-Mail report containing value data from active devices in a human readable format. Body in html format. See Report Template Description 1101
1102	Email value report raw - html	1.0	E-Mail report containing value data from active devices in raw data format. Body in html format. See Report Template Description 1102
1103	Email value report raw - attached file per device - html	1.1	E-Mail report containing value data from active devices in raw data format as attached file. Body in html format. See Report Template Description 1103
1104	Email value report - attached file per device - html	1.1	E-Mail report containing value data from active devices in human readable format as attached file per device. Body in html format. See Report Template Description 1104
1105	Email value report extended - attached file per device - html	1.1	E-Mail report containing value data from active devices in human readable format as attached file per device. Report column header data has prefix #. Body in html format. See Report Template Description 1105
1106	Email value report extended - attached file per device -	1.1	E-Mail report containing value data from active devices in human readable format as attached file per device. Report column header data has prefix #. The attached files have zip extensions for possible spam filter

	zip extension - html		problems. Body in html format. See Report Template Description 1106
1107	Email value report energy consumption - attached file per device - html	1.1	E-Mail report containing energy consumption value data from active devices in human readable format as attached file per device. Report column header data has prefix #. This report only work together with devices having field energy. Body in html format. See Report Template Description 1107
1108	Email value report extended - single file - html	1.0	E-Mail report containing value data from active devices in human readable format in a single attached file. Report column header data has prefix #. Body in html format. See Report Template Description 1108
2001	FTP install report - single file - plain	1.1	FTP report sent upon installation containing status information of last installation process. See Report Template Description 2001
2005	FTP event report - single file - plain	1.0	FTP report sent upon a system event. See Report Template Description 2005
2006	FTP log report - single file - plain	1.1	FTP report containing system log. See Report Template Description 2006
2007	FTP status report - single file - plain	1.0	FTP report containing current status of product. See Report Template Description 2007
2101	FTP value report - single file - plain	1.1	FTP report containing value data from active devices in a human readable format. See Report Template Description 2101
2102	FTP value report raw - single file - plain	1.1	FTP report containing value data from active devices in raw data format. See Report Template Description 2102
2103	FTP value report raw - file per device - plain	1.1	FTP report containing value data from active devices in raw data format a file per device. See Report Template Description 2103
2104	FTP value report - file per device - plain	1.1	FTP report containing value data from active devices in human readable format as file per device. See Report Template Description 2104
2105	FTP value report extended - file per device - plain	1.1	FTP report containing value data from active devices in human readable format as file per device. Report column header data has prefix #. See Report Template Description 2105
2108	FTP value report extended - single file -	1.1	FTP report containing value data from active devices in human readable format in a single file. Report column header data has prefix #. See Report Template Description 2108

	plain		
3001	HTTP install report - single post - plain	1.1	HTTP report sent upon installation containing status information of last installation process. See Report Template Description 3001
3005	HTTP event report - single post - plain	1.1	HTTP report sent upon a system event. See Report Template Description 3005
3006	HTTP log report - single post - plain	1.1	HTTP report containing system log. See Report Template Description 3006
3007	HTTP status report - single post - plain	1.0	HTTP report containing current status of product See Report Template Description 3007
3101	HTTP value report - single post - plain	1.1	HTTP report containing value data from active devices in a human readable format. See Report Template Description 3101
3102	HTTP value report raw - single post - plain	1.1	HTTP report containing value data from active devices in raw data format. See Report Template Description 3102
3103	HTTP value report raw - post per device - plain	1.1	HTTP report containing value data from active devices in raw data format as post per device. See Report Template Description 3103
3104	HTTP value report - post per device - plain	1.1	HTTP report containing value data from active devices in human readable format as post per device. See Report Template Description 3104
3105	HTTP value report extended - post per device - plain	1.1	HTTP report containing value data from active devices in human readable format as post per device. Report column header data has prefix #. See Report Template Description 3105
3108	HTTP value report extended – single post - plain	1.0	HTTP report containing value data from active devices in human readable format in a single post. Report column header data has prefix #. See Report Template Description 3108

Table 4 Standard report template list

4.3 Add-on report template list

These templates must be bought and downloaded to the product. Visit www.elvaco.com and login to buy add-ons to CMe/CMi Series products.

Id	Name	Version	Description
3501	HTTP value report - single	1.0	HTTP report containing value data from active devices in XML based format.

	post – XML format		See Report Template Description 3501

Table 5 Add-on report template list

5 Definitions

This chapter covers definitions used to describe report data sent from CMe/CMi Series products.

5.1 Properties of a report value

Value reports contain meter report data. The CMe/CMi Series products can handle any standard M-Bus meter, which forces the product to dynamically assign properties for each available value for a meter. The properties are build up upon the internal M-Bus decoder. The properties are taken from the standard M-Bus EN13757.

A combination of all properties for a value for a specific meter within one telegram **shall** be unique, but sometimes M-Bus slave implementations don't follow these recommendations. In those cases one or more values can have the exact same properties, but the position of the value is not unique which must be used to distinguish the values.

The property names are globally used in all CMe/CMi Series documentation to describe i.e. report formats.

Following properties are describing the origin of a value:

Name	Description
Serial-number	The product serial number which has read and stored the value of a meter.
Device-identification	The M-Bus slave secondary identification which a value belongs to.
Date	The create date of a value.
Value-data-count	The M-Bus telegram in which a value was found.

Table 6 Properties describing the origin of a value

Following properties are describing the definition of a specific value:

Name	Description
Description	Description of the value. This property is usually defining the type of the value, i.e. energy, flow temperature etc.
Unit	Unit of the value. This property defines the unit, i.e kWh, °C etc.
Function	Function of the value describing i.e min value, max value etc.
Tariff	The tariff of the value.
Sub unit	The sub unit of the value, i.e. a numeric value for extended information of a value.
Storage number	The storage number of the value. Normally describing historic values.

Table 7 Properties describing the definition of a value

5.1.1 Serial-number property

The serial number is an 10-digit long numeric value. The first 4-digits identifies the product type. An example of a serial-number from a CMe2100 product would look like: 0006xxxxxxxx, where xxxxxxxx is the actual serial number of the product.

See Table 8 for current product type numbers:

Product	4-digit type number
CMe2100	0006
CMi2110	0012
CMi2120 *Internal antenna*	0029
CMi2120 *External antenna*	0027
CMi2130	0030

Table 8 Product type numbers

5.1.2 Device-identification property

Device-identification is the unique meter id (M-Bus secondary address) which the meter value was read from. The device-identification is an 8-digit number. This number can normally be changed by the customer on demand.

The device-identification for a meter is internally used in CMe/CMi Series to bind information for one meter connected to a CMe/CMi Series product. Thus all meters connected to CMe/CMi Series product must have unique device-identification (secondary address).

5.1.3 Date property

Date is the timestamp of the meter value readout. Date/Time used in the CMe/CMi Series products can be configured with UTC offset to set any time zone.

5.1.4 Value-data-count property

The value-data-count property is used to distinguish value data read from one telegram to another. The CMe/CMi Series products implement automatic FCB-bit toggling, which means that the product will automatically read all available data telegrams from a meter. A value of 0 means the value was found in telegram 0, a value of 1 means that the value was found in telegram 1.

5.1.5 Description property

This property describes the type of a value. A type can be i.e. energy, power, flow temperature etc. Description can be one or a combination of names as listed in Table 9. The description can also be a custom specified string describing the value, which can contain any character string.

Descriptions listed in Table 9 are taken from the M-Bus standard EN13757. All spaces in description names are replaced with character – (hyphen). Combination of description names are separated with space character. This helps finding the primary description of the value, i.e. the first word in the description name.

Name
energy
volume
mass
on-time

op-time
power
volume-flow
volume-flow-ext
mass-flow
flow-temp
return-temp
diff-temp
ext-temp
pressure
date
datetime
units-for-HCA
avg-duration
act-duration
fabrication-no
enhanced-id
address
reactive-energy
cold/warm-temp-limit
cum-cnt-max-power
credit
debit
access-number
device-type
manufacturer
parameter-set-id
model/version
hw-version
fw-version
other-sw-version
customer-location
Customer
access-code-user
access-code-operator
access-code-system-operator
access-code-developer
password
error-flags-dev-spec
error-mask

digital-output
digital-input
baudrate
response-delay-time
retry
remote-control-dev-spec
first-storage-for-cyclic-storage
last-storage-for-cyclic-storage
size-of-storage-block
storage-interval
time-point
duration-since-last-readout
start-of-tariff
duration-of-tariff
period-of-tariff
dimensionless
Voltage
Current
reset-counter
cum-counter
control-signal
day-of-week
week-number
time-point-of-day-change
state-of-param-activation
special-supplier-information
duration-since-last-cum
operation-time-battery
datetime-of-battery-change
day-light-saving
listening-window-management
cold/warm-temp-limit
remaining-battery-lifetime
count-meter-stop
Reserved
manufacturer-specific
no-error
too-many-DIFE
storage-number-not-impl
unit-number-not-impl

tariff-number-not-impl
function-not-impl
data-class-not-impl
data-size-not-impl
too-many-VIFE
illegal-VIF-group
illegal-VIF-exponent
VIF/DIF-mismatch
unimpl-action
no-data-available
data-overflow
data-underflow
data-error
premature-end-of-record
inc-per-input-pulse-on-input-channel-0
inc-per-input-pulse-on-input-channel-1
inc-per-output-pulse-on-input-channel-0
inc-per-output-pulse-on-input-channel-1
start-date/time-of
uncorrected-unit
acc-only-if-pos-contr
acc-of-abs-value-only-if-neg-contr
lower-limit-value
exceeds-lower-limit-value
datetime-of-begin-of-first-lower-limit-exceeded
datetime-of-end-of-first-lower-limit-exceeded
datetime-of-begin-of-last-lower-limit-exceeded
datetime-of-end-of-last-lower-limit-exceeded
upper-limit-value
exceeds-of-upper-limit-value
datetime-of-begin-of-first-upper-limit-exceeded
datetime-of-end-of-first-upper-limit-exceeded
datetime-of-begin-of-last-upper-limit-exceeded
datetime-of-end-of-last-upper-limit-exceeded
duration-of-first-lower-limit-exceeded
duration-of-last-lower-limit-exceeded
duration-of-first-upper-limit-exceeded
duration-of-last-upper-limit-exceeded
duration-of-lower-limit-exceeded
duration-of-upper-limit-exceeded

value-during-lower-limit-exceeded
leak-values
datetime-of-first-begin
datetime-of-first-end
value-during-upper-limit-exceeded
overflow-values
datetime-of-last-begin
datetime-of-last-end
future-value

Table 9 Standard description property values

5.1.6 Unit property

This property describes the unit of a value. A unit can be i.e. Wh, kWh, °C etc. Units can be one or a combination of names as listed in Table 10 The unit can also be a custom specified string describing the value, which can contain any character string.

Units listed in Table 10 are taken from the M-Bus standard EN13757. All spaces in description names are replaced with character – (hyphen). Combination of units names are separated with space or slash (/) character. This helps finding the primary unit of the value, i.e. the first word in the unit name.

Name
Wh
J
m3
Kg
second(s)
minute(s)
hour(s)
day(s)
W
m3/h
m3/min
m3/sec
kg/h
°C
K
Bar
MWh
kVARh
GJ
Ton
feet^3

USgallon
USgallon/min
USgallon/h
MW
GJ/h
°F
local-curreny-unit(s)
Baud
Bittimes
month(s)
year(s)
V
A
reserved
/s
/min
/h
/day
/week
/month
/year
/revol/measurem
/liter
/m3
/kg
/K
/kWh
/GJ
/kW
/k*liter
/V
/A
*s
*s/V
*s/A
*s/A

Table 10 Standard unit property values

5.1.7 Function property

This property describes the function of a value. A function can be i.e. minimum value, maximum value etc

Functions listed in Table 11 are taken from the M-Bus standard EN13757.

Name	Description
inst-value	The value is an instantaneous value (Current value)
max-value	The value is a maximum value at a specific date/time
min-value	The value is a minimum value at a specific date/time
err-value	The value contains error and should not be treated as qualified value.

Table 11 Standard function property values

5.1.8 Tariff property

Tariff property is a numeric value describing the tariff of a value.

5.1.9 Sub-unit property

Sub-unit property is a numeric value describing the sub-unit of a value. Sub-unit is often used to distinguish almost identical values, i.e. software version from a meter can be of sub-unit 0 and software version of the M-Bus module used to communicate with the meter can be of sub-unit 1.

5.1.10 Storage-number property

Storage-number property is a numeric value describing the storage-number of a value. Storage-number is normally used to identify a load profile or other historical value.

5.2 Identifying the properties and using correct meter values

Depending on meter used, a wide range of data can be available. A standard electricity meter normally provides numerous of extra information besides i.e. energy and power.

This section describes how to find and identify commonly used information from standard M-Bus meters. Please note that depending on meter, this information may vary.

5.2.1 Electricity meters

Please review Table 12 for commonly used values from electricity meters.

Value of interest	Description	Unit	Function	Tariff	Sub-unit	Storage number
Current energy meter stand	energy	Wh	inst-value	0	0	0
Current power	power	W	inst-value	0	0	0
Current energy meter stand – Tariff 1	energy	Wh	inst-value	1	0	0
Maximum power	power	W	max-value	0	0	0

Table 12 Commonly used properties for electricity meters

5.2.2 Water meters

Please review Table 13 for commonly used values from water meters.

Value of interest	Description	Unit	Function	Tariff	Sub-unit	Storage number
Current volume meter stand	volume	m3	inst-value	0	0	0

Table 13 Commonly used properties for water meters

5.2.3 District heat and cold meters

Please review for commonly used values from district heat and cold meters.

Value of interest	Description	Unit	Function	Tariff	Sub-unit	Storage number
Current energy meter stand	energy	Wh	inst-value	0	0	0
Current volume meter stand	volume	m3	inst-value	0	0	0
Current power	power	W	inst-value	0	0	0
Current forward temperature	flow-temp	°C	inst-value	0	0	0
Current backward temperature	return-temp	°C	inst-value	0	0	0
Current temperature difference	diff-temp	K	inst-value	0	0	0
Current volume flow	volume-flow	m3/h	inst-value	0	0	0

Table 14 Commonly used properties for district heat and cold meters

5.2.4 Gas meters

Please review for commonly used values from gas meters.

Value of interest	Description	Unit	Function	Tariff	Sub-unit	Storage number
Current volume meter stand	volume	m3	inst-value	0	0	0
Current volume flow	volume-flow	m3/h	inst-value	0	0	0

Table 15 Commonly used properties for gas meters

6 Document History

Version	Date	Description	Author
1.0	2010-09-27	First release	David Vonasek

6.1 Document software and hardware appliance

Type	Version	Date	Comments
Hardware	-	-	-
Software	>1.1.0	2009-11	

7 References

7.1 References

[1] CMe Series User's Manual

[2] CMi2110 User's Manual

[3] CMi2120 User's Manual

[4] CMi2130 User's Manual

[5] Report Template Description [n], where n is the report template id

7.2 Terms and Abbreviations

Abbreviation	Description

7.2.1 Number representation

Decimal numbers are represented as normal number, i.e. 10 (ten).

Hexadecimal numbers are represented with prefix 0x, i.e. 0x0A (ten)

Binary numbers are represented with prefix 0b, i.e. 0b00001010 (ten)