elvaco

CMe2100 (gen.3/LTE)
User's Manual
English
v 1.1

Contents

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 recommended that customers contact Elvaco AB for the latest product information before purchasing a CMe 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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CMe Series is a trademark of Elvaco AB, Sweden.

1.2   Contacts

Elvaco AB Headquarter
Kabelgatan 2T
434 37 Kungsbacka
SWEDEN
Phone: +46 300 30250
E-Mail: info@elvaco.com

Elvaco AB Technical Support
Phone: +46 300 434300
E-Mail: support@elvaco.se

Online: http://www.elvaco.com

2 Important usage and safety information

The following safety precautions must be observed during all phases of the operation, usage, service or repair of any CMe Series product. Users of the product are advised to convey the following safety information to users and operating personnel and to incorporate these guidelines into all manuals supplied with the product. Failure to comply with these precautions violates safety standards of design, manufacture and intended use of the product. Elvaco AB assumes no liability for customer's failure to comply with these precautions.

CMe2100 receives and transmits radio frequency energy while switched on. Remember that interference can occur if it is used close to TV sets, radios, computers or inadequately shielded equipment. Follow any special regulations and always switch off the product wherever forbidden, or when you suspect that it may cause interference or danger.

CMe2100 operates using the cellular networks. Because of this, connection cannot be guaranteed at all times under all conditions. Therefore, you should never rely solely upon any wireless product for essential communications, for example emergency calls. Remember, in order to make or receive calls, the cellular product must be switched on and be in a service area with adequate cellular signal strength.

3   Using this manual

3.1   Purpose and audience

This manual provides all information needed to mount and connect the CMe2100 and is intended for field engineers and developers.

3.2   Applicability

This manual only applies to CMe2100 gen.3 and CMe2100 LTE. For older versions of the product manual, please visit http://www.elvaco.com.

3.3   Online resources

To download the latest version of this user's manual, or to find information in other languages, please visit http://www.elvaco.com. There, you can also find information about Elvaco's other products and services, and how they can help you to achieve successful metering.

3.4   Symbols

The following symbols are used throughout the manual to emphasize important information and useful tips:

The Note symbol is used to mark information that is important to take into consideration for safety reasons or to assure correct operation of the M-Bus Metering Gateway

The Tip symbol is used to mark information intended to help you get the most out of your product. It can for example be used to highlight a possible customization option related to the current section.

The following symbols are used on the product labels to provide information on how it should be used:

Symbol	Product standard	Description
∿	IEC 60417-5032 (2002-10)	Alternating current.
▣	IEC 60417-5172	Equipment protected throughout by double insulation or reinforced insulation.
⚠	ISO 7000-0434B	Caution, read manual for mounting instructions.
♻	-	Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Contact your Local Authority for recycling advise.

4 Introduction

4.1 Purpose

This chapter provides an initial description of the CMe2100 M-Bus Metering Gateway for Mobile Networks. In the next-coming sections you will get to know the product applications and how the CMe2100 can be combined with other products to build versatile solutions.

4.2 Application description

4.2.1 Applications

The CMe2100 is, directly out of the box, a very powerful and versatile M-Bus Metering Gateway. Applications of the product include:

1. Convenient setup using the mobile network.
2. Quick and simple metering with integrated statistics.

4.2.2 Convenient setup using the mobile network

The CMe2100 is easily installed and configured using the mobile network. By sending text messages via a cellphone, the Metering Gateway can be setup without having to visit the site. A single SMS command will have the CMe2100 automatically search the 2-wire M-Bus line and install all meters it is able to find. The device is thereafter ready to start performing meter readouts and deliver Push Reports to all set recipients and by any selected protocol.
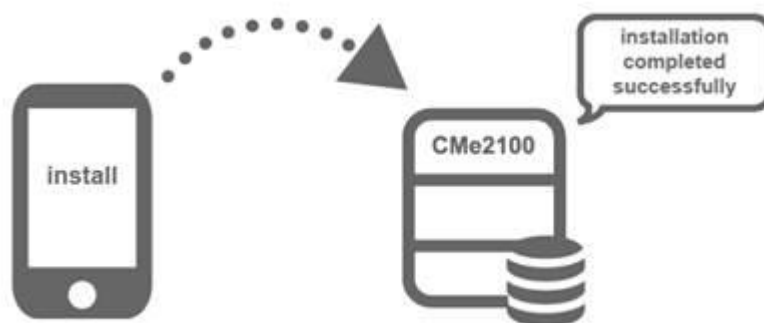
4.2.3 Quick and simple metering with integrated statistics

Once meters have been installed, the CMe2100 can be configured to perform meter readouts by a selected time schedule. Meter data is compiled in a suitable report format and delivered to a receiving system. If the need of integration is low, the report can be as simple as an e-mail sent at a fixed schedule. However, CMe2100 can also send reports by SMS, upload them to an HTTP server or as downloadable files to an FTP server.

Thanks to the device's built-in M-Bus decoder, meter values can be delivered in a human readable format with correct precision and unit. The built-in database, storing all meter values locally in the CMe2100, provides a solid base for its system robustness. All Push Reports have intelligent retry mechanisms that automatically schedules retries for failed reports including all values for which previous transmissions have failed.
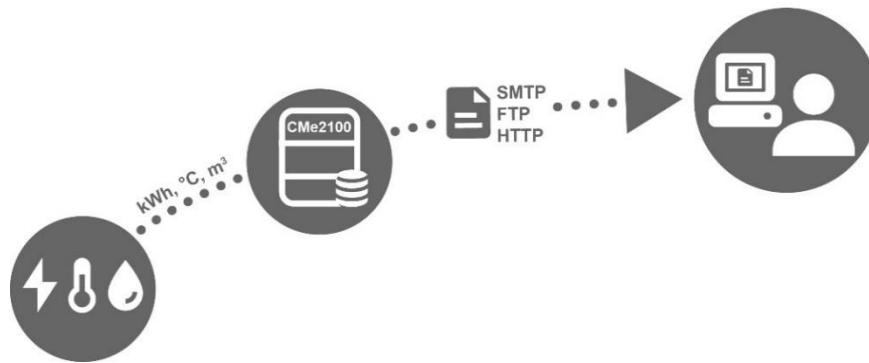
4.3 Product features

The CMe2100 has the potential to perform readouts and deliver meter values from all types of M-bus meters, regardless of manufacturer. This makes the device quick and easy to integrate into an existing M-Bus system.

Key features of the product include:

- CMe2100 gen.3: An integrated M-Bus Master which can drive up to 8 unit loads, 8T. By using an M-Bus Master from Elvaco, the number can be extended to up to 128 unit loads, 128T.

- CMe2100 LTE: An integrated M-Bus Master which can drive up to 16 unit loads, 16T. By using an M-Bus Master from Elvaco, the number can be extended to up to 256 unit loads, 256T

- Customized meter value reports via HTTP, FTP and e-mail.

- Remote configuration of settings using the mobile networks.

For a more extensive technical description of the product, please see chapter 7 (Technical specifications).

4.4 Compatibility and extensions

4.4.1 Meter compatibility

The CMe2100 is compatible with a wide range of meters, including:

- All types of M-Bus meters, regardless of manufacturer.
- The following temperature and humidity sensors, manufactured by Elvaco: CMa10, CMa10W, CMa11, CMa11W, CMa12W, CMa20, CMa20W.
- All ABB electricity meters equipped with IR interface.

4.4.2 Unit load extension possibilities

The CMe2100 can be used with any M-Bus Master from Elvaco to increase the number of meters it is able to drive.

CMe2100 gen.3 can by default drive up to 8 unit loads (where one load equals 1.5 mA) and has a software limit of 128 meters

CMe2100 LTE can by default drive up to 16 unit loads (where one load equals 1.5 mA) and has a software limit of up to 256 meters (depending of software license).

4.4.3 Wired and Wireless M-Bus

The CMe2100 can perform readouts of Wired M-Bus meters, Wireless M-Bus meters, or a combination of both. To read Wireless M-Bus meters, the Metering Gateway will have to be combined with a Wireless M-Bus receiver, for example Elvaco's CMeX50.

ℹ	All extension devices (Wireless M-Bus Receivers and M-Bus Masters) from Elvaco are equipped with IR interface to enable communication without any cabling.

|	
ℹ	Elvaco offers box-build turnkey solutions, containing all necessary products preconfigured, directly from factory.

5 Getting started

5.1 Purpose

This chapter provides instructions on how to get started with the CMe2100. After reading and carefully following each step of this chapter, the Metering Gateway will be mounted, connected, and started up.

5.2 Product specification

1. Serial number
2. Push button
3. M-Bus terminal
4. Antenna SMA connector
5. IR interface
6. PWR LED, green)
7. ERR LED, red
8. GSM LED, yellow (CMe2100 gen.3)
   NET LED, yellow (CMe2100 LTE)
9. STA LED, blue
10. SIM card holder
11. USB slave connector
12. USB master connector
13. Power supply L
14. Power supply N
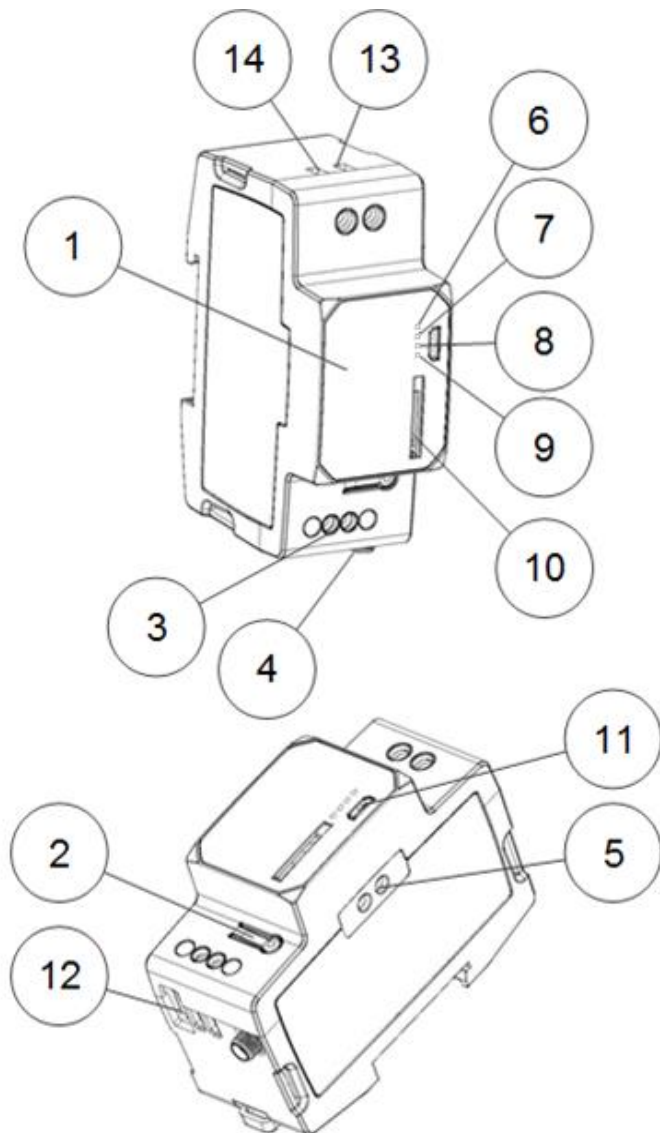
5.3 Mount the device

The CMe2100 is mounted on a DIN rail. The blue clip on the back is used to attach and detach the device. For safety reasons, A DIN-rail enclosure must cover the terminals.

5.4 Install the SIM card

A SIM card will have to be installed in the CMe2100 for it to use the mobile network. Use a SIM card of standard size and gently press it into the SIM card holder with the chip facing right. If a prepaid SIM card is used, make sure that it has enough credit to be able to respond to SMS commands.

⚠	The SIM card must have internet access activated for full functionality and should not have any PIN code activated.

5.5 Connect the device

5.5.1 Power supply

Screw terminal (13) and (14) are used to supply the CMe2100 with power. The main supply voltage should be in the range of 100-240 VAC, with a frequency of 50/60Hz. Use a cable of cross-sectional area 1.0-1.5 mm^2 to connect the CMe2100 to the power supply. The power needs to be connected by a clearly marked and easily accessible switch (IEC 60947-1 and IEC 60947-3) to make sure the device can be switched off during service work.

⚠	The installation shall be performed by a qualified electrician or another professional with the required knowledge.

⚠	The power supply must be protected with a 10 A circuit breaker of characteristics C or slow blow fuse.

5.5.2 M-Bus terminal

M-Bus is a multi-drop 2-wire M-Bus with no polarity. The M-Bus terminal (3) can be used to connect up to 8 (CMe2100 gen. 3)/16 (CMe2100 LTE) M-Bus meters to the CMe2100. The number can be extended to up to 128 (CMe2100 gen.3)/256 (CMe2100 LTE) by using an Elvaco M-Bus Extender. Use a cable of cross-sectional area 0.25-1.5 mm^2, for example a standard telephone cable (EKKX 2x2x0.5), to connect the meters to the M-Bus terminal (3).

⚠	All equipment connected to the M-Bus terminal must have doubled or reinforced insulation from mains to prevent the risk of electric shocks.

⚠	Do not exceed the maximum cable length of 1000 m.

5.5.3 Antenna

CMe2100 gen.3: Connect the included stub antenna to the SMA connector (4). If the device is mounted inside of a metal cabinet or if the signal strength is insufficient (3 or less), an external antenna should be used. Please visit http://www.elvaco.com/ to find a suitable antenna option that can increase the mobile network coverage.

CMe2100 LTE: CMe2100 LTE needs to be connected to an external antenna, which is not included. Please visit http://www.elvaco.com/ to find a suitable antenna option for mobile network coverage.

5.5.4 IR interface

By using the IR interface, CMe2100 can communicate with Elvaco M-Bus Masters and Wireless M-Bus Receivers (CMeX Series) as well as ABB electricity meters without using any cables. Mount the CMe2100 next to the other device with the IR interfaces of the two products facing each other. Before attempting to use the IR interface, make sure to remove the IR shield (5).

5.5.5 USB master connector

CMe2100 is equipped with a USB master port, which will be used for upcoming product features.

| ⚠️	It is important that the USB master connector is <u>NOT</u> used to connect the CMe2100 to a computer. For that purpose, use the USB slave connector.

⚠️	All equipment connected to the USB port must have doubled or reinforced insulation from mains to prevent the risk of electric shocks.

5.5.6 USB slave connector

CMe2100 is equipped with a USB slave port, which will be used for upcoming product features.

5.5.7 Wiring diagram
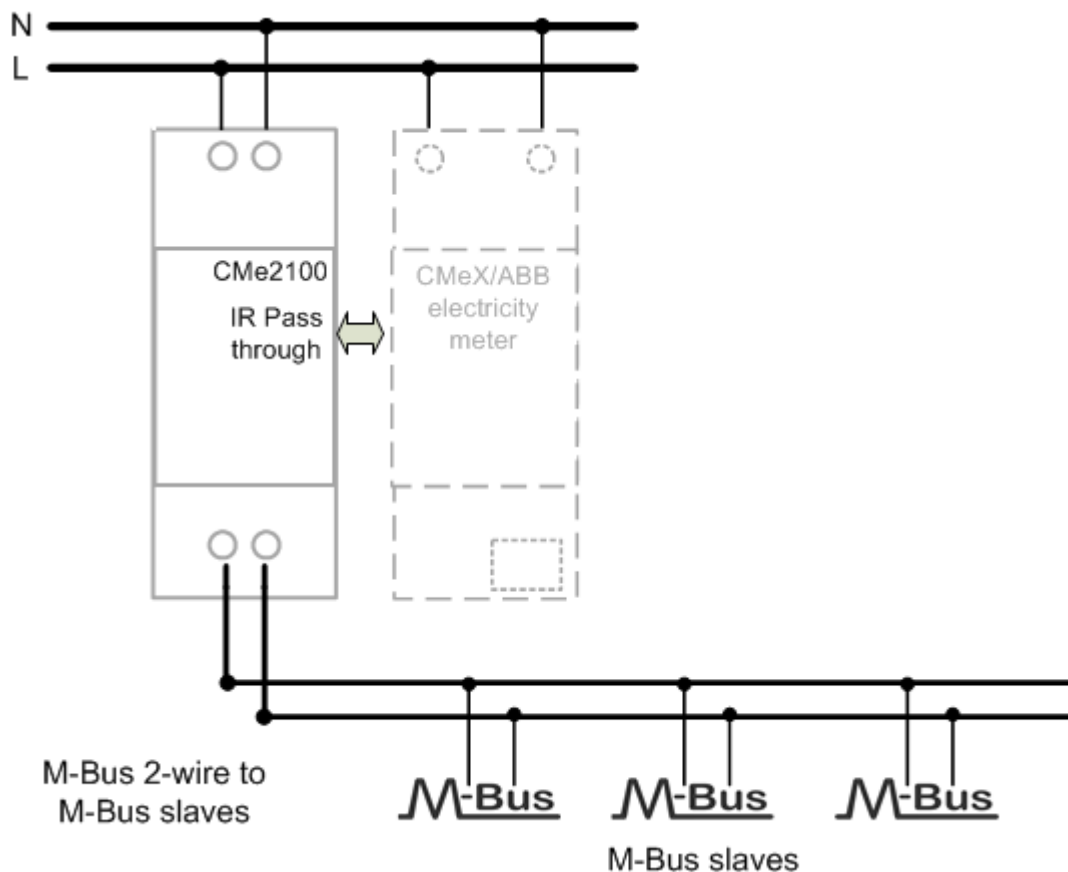
5.6 Start up the device

5.6.1 Start-up

On successful connection of power, the CMe2100 will be ready to use after undergoing a booting session of approximately 30 seconds to one minute.

5.6.2 Reset to factory default

In order to reset the product configurations to factory default, press and hold the push button (2). The CMe2100 will restart and the settings will be reset to factory default. The reset can also be performed remotely by sending the command *Factoryreset* to the phone number of the SIM card installed in the Metering Gateway.

5.6.3 LED indications

The product is equipped with four different LED lights. Table 1-4 below provides an explanation of each LED indication.
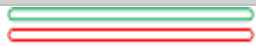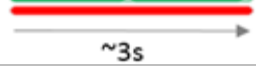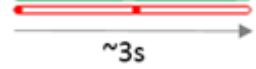
Green LED	Red LED	Product state	Visual
Permanently off	Permanently off	Power off or performing restart.	
Permanently on	Permanently on	Power on.	
1500 ms on / 100 ms off	Permanently off	Normal operation.	~3s
1500 ms on / 100 ms off	Permanently on	Short circuit or overcurrent on M-Bus.	~3s
1500 ms on / 100 ms off	800 ms on / 800 ms off	No SIM card installed.	~3s
1500 ms on / 100 ms off	100 ms on / 1500 ms off	Not connected to network.	~3s

Table 1: Green and red LED indications
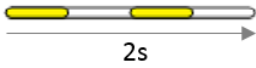
Yellow LED	Product state	Visual
Permanently off	Power off or ongoing restart	
500 ms on / 500 ms off	Limited network service due to one of the following reasons: • No SIM card installed. • PIN code error. • Network search in progress.	2s
10 ms on / 990 ms off (Only for CMe2100 gen. 3)	GSM CS data call or GSM voice call in progress or established.	2s
10 ms on / 1990 ms off	Ongoing data transfer.	4s
10 ms on / 3990 ms off	Product registered on a network and no ongoing data transfer.	8s

Table 2: Yellow LED

Blue LED	Product state	Visual
Permanently off	Upcoming features.	

Table 3: Blue LED

6 Operations guide

CMe2100 uses an operations guide, available in a separate document, which can be downloaded from the Elvaco website, http://www.elvaco.com.

7   Technical specifications

Type	Value	Unit	Comments
Mechanics			
Casing material	Polyamide	-	
Protection class	IP20	-	
Dimensions (w x h x d)	36 x 100 x 65	mm	2 DIN modules
Weight	120	g	
Mounting	DIN-rail	-	DIN 50022, 35 mm
Antenna	SMA female	-	
SIM card	Push-push type	-	
Electrical connections			
Supply voltage	Screw terminal	-	Cable 1.0-1.5 mm^2, 0.5 Nm tightening torque
M-Bus master port	Screw terminal	-	Cable 0.5-1.5 mm^2, 0.5 Nm tightening torque
USB master port	Type A	-	
USB slave port	Type micro B	-	
Network	Mobile	-	Radio
Electrical characteristics			
Nominal voltage	100-240	VAC	+/- 10%
Frequency	50/60	Hz	
Power consumption (max)	<6	W	
Power consumption (nom)	<1	W	
Installation category	CAT 3	-	
Environmental specifications			
Operating temperature	-20 to +55	°C	
Operating humidity max	80 % RH at temperatures up to 31 °C, decreasing linearly to 50 % RH at 55 °C	-	
Operating altitude	0-2000	m	
Pollution degree	Degree 2	-	
Usage environment	Indoors	-	Can be extended with IP67 enclosure for outdoor use
Storage temperature	-40 to +85	°C	
User interface			
Green LED	Power	-	
Red LED	Error	-	
Yellow LED	Network status	-	
Blue LED	Permanently off (Upcoming features)	-	

Push button	Factory reset	-	
Configuration	SMS, HTTP, GSM CSD, Telnet	-	
M-Bus			
Interfaces	IR, integrated M-Bus Master	-	
Maximum number of M-Bus devices (software limit)	128 (CMe2100 gen.3)/256 (CMe2100 LTE)	-	
Transparent M-Bus	GSM and TCP/IP	-	Software limit does not apply to Transparent M-Bus mode
Decryption	No	-	
Integrated M-Bus Master			
M-Bus standard	EN 13757	-	Full M-Bus decoder implemented
M-Bus baud rate	2400 and 9600	Bit/s	
Nominal voltage	28	VDC	
Maximum unit loads	8/12	T/mA	Can be extended with CMeX10-13S Series
M-Bus search modes	Primary, secondary	-	
Maximum cable length	1000	m	100 nF/km, maximum 90 Ω
General			
Real time clock backup	12	h	
Real time clock accuracy	<2	s/day	
Script engine	Intelligent script engine for active content generation	-	
Software/firmware update	HTTP	-	
Measurement reports	HTTP, FTP, SMTP (e-mail), SMS	-	
Data storage (examples)			
15 minute values	Meters Days 1 200 32 6 64 3 128 1	-	
Hourly values	Meters Days 1 800 32 25 64 12 128 6	-	
Mobile network			
GPRS class	Up to 12	-	
Band	850/900/1800/1900	MHz	

8 Type approvals

Approval	Description
EMC	EN 61000-6-2, EN 61000-6-3, EN 301 489-1, EN 301 489-7
Safety	EN 61010-1, CAT 3

9 Document history

9.1 Versions

Version	Date	Description	Author
1.0	2020-04	First version (merged)	David Svensson
1.1	2021-02	Updated version for software 3.2.5	David Svensson

9.2 Document software and hardware appliance

Type	Version	Date	Comments
Hardware	Rev 1B		
Software	3.2.5		

10 References

10.1 Terms and abbreviations

- List all abbreviations used in the manual and what they represent.

Abbreviation	Description
PDP	Packet Data Protocol

10.2 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)