



CMi2110 (gen.3)
User's Manual
English
v 1.0

Contents

1	Document notes	4
1.1	Copyright and trademark	4
1.2	Contacts.....	4
2	Important usage and safety information.....	5
3	Using this manual	6
3.1	Purpose and audience	6
3.2	Applicability	6
3.3	Online resources.....	6
3.4	Symbols.....	6
4	Introduction	7
4.1	Purpose.....	7
4.2	Application description.....	7
4.2.1	<i>Applications.....</i>	<i>7</i>
4.2.2	<i>Convenient setup using the mobile network</i>	<i>7</i>
4.2.3	<i>Quick and simple metering with integrated statistics</i>	<i>7</i>
4.3	Product features	8
4.4	Compatibility and extensions	8
4.4.1	<i>Meter compatibility.....</i>	<i>8</i>
4.4.2	<i>Unit load extension possibilities</i>	<i>8</i>
4.4.3	<i>Wired and Wireless M-Bus</i>	<i>8</i>
5	Getting started	9
5.1	Purpose.....	9
5.2	Product specification	9
5.2.1	<i>CMi2110</i>	<i>9</i>
5.2.2	<i>Power supply WZU-AC 110/230-50</i>	<i>10</i>
5.2.3	<i>Power supply WZU-ACDC24-50</i>	<i>10</i>
5.3	Mount and connect the device	10
5.3.1	<i>Mount the power supply</i>	<i>10</i>
5.3.2	<i>Fixate power cable</i>	<i>11</i>
5.3.3	<i>Connect the power</i>	<i>12</i>
5.3.4	<i>Mount the SIM card in the CMi2110</i>	<i>12</i>
5.3.5	<i>Mount the CMi2110 in the L+G UH50</i>	<i>13</i>
5.3.6	<i>Connect the antenna</i>	<i>13</i>
5.3.7	<i>M-Bus connector</i>	<i>16</i>
5.3.8	<i>USB slave connector</i>	<i>16</i>
5.4	Start up the device	16
5.4.1	<i>Start-up</i>	<i>16</i>
5.4.2	<i>Reset to factory default.....</i>	<i>16</i>
5.4.3	<i>LED indications</i>	<i>16</i>
6	Operations guide	18
7	Technical specifications.....	19
8	Type approvals	21
9	Document history	22

9.1	Versions	22
9.2	Document software and hardware appliance	22
10	References.....	23
10.1	Terms and abbreviations	23
10.2	Number representation.....	23

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 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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CMi Series is a trademark of Elvaco AB, Sweden.

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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 CMi Series product. Users of the product are advised to convey the 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.

CMi2110 receives and transmits radio frequency energy while switched on. Remember that interference can occur if the product 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.

CMi2110 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 CMi2110, and is intended for field engineers and developers.

3.2 Applicability

This manual only applies to generation 3 of CMi2110. For older versions of the product manual, please visit <http://www.elvaco.com/en/download>.

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/en/download>. 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 MCM.



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 to provide information on how the product should be used:

Symbol	Product standard	Description
	-	Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Contact your Local Authority for recycling advice.

4 Introduction

4.1 Purpose

This chapter provides an initial description of the CMi2110 Integrated MCM for L+G UH50. In the next-coming sections you will get to know the product's application areas and how it can be combined with other products to build versatile solutions.

4.2 Application description

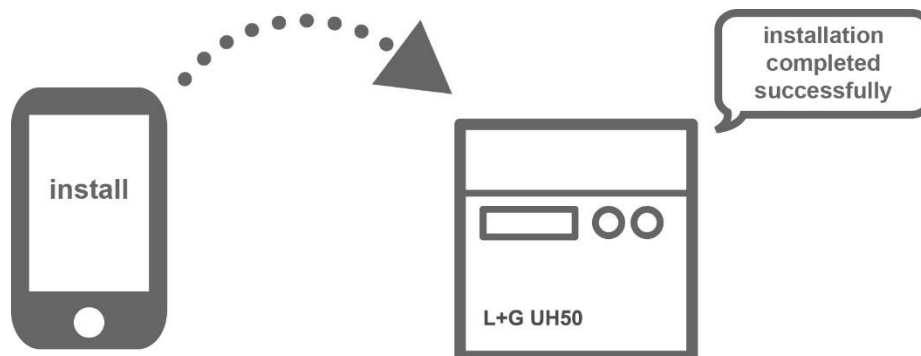
4.2.1 Applications

The CMi2110 is, directly out of the box, a very powerful and versatile MCM. 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

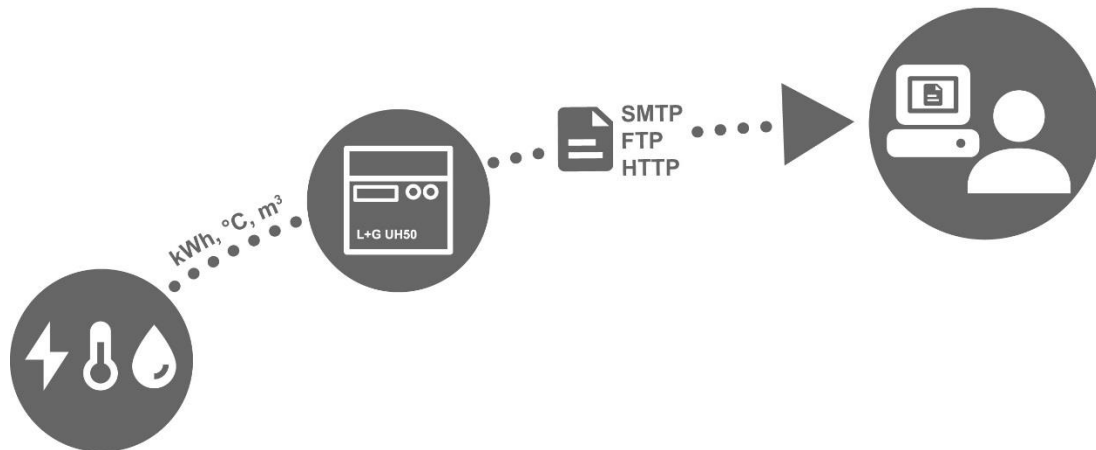
The CMi2110 is mounted inside a Landis+Gyr UH50 heat meter to act as a cost-effective and flexible Gateway for the mobile network. By sending text messages via a cellphone, the MCM can be easily setup without having to visit the site. A single SMS command will have the CMi2110 install the L+G UH50 and other meters connected to the MCM by M-Bus. The product is thereafter ready to perform meter readouts and deliver meter values to set recipients by a selected protocol and schedule.



4.2.3 Quick and simple metering with integrated statistics

Once meters have been installed, the CMi2110 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, CMi2110 can also send a Push Report by SMS, upload a to an HTTP server or as a downloadable file 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 CMi2110, 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 key product features of the CMi2110 include:

- An integrated M-Bus Master which can drive up to eight unit loads (8T), in addition to the L+G UH50 heat meter. By using an M-Bus Master from Elvaco, the number can be extended to up to 256 unit loads (256T)
- Customized Push Reports via HTTP, FTP, e-mail and SMS.
- Remote configuration using the mobile network.

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

CMi2110 can be mounted in any L+G UH50 meter using software version 5-15 or any newer version. Through its integrated M-Bus Master, the product 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.

4.4.2 Unit load extension possibilities

CMi2110 can be used in combination with any M-Bus Master from Elvaco to increase the number of meters it is able to drive (the device can by default drive up to 8 unit loads, where one load equals 1.5 mA). Note that the software limit for the MCM is 256 meters.

4.4.3 Wired and Wireless M-Bus

The CMi2110 supports reading of Wired M-Bus meters, Wireless M-Bus meters or a combination of both. In order to read Wireless M-Bus meters, the MCM will have to be connected to a Wireless M-Bus Receiver, for example Elvaco's CMeX50.

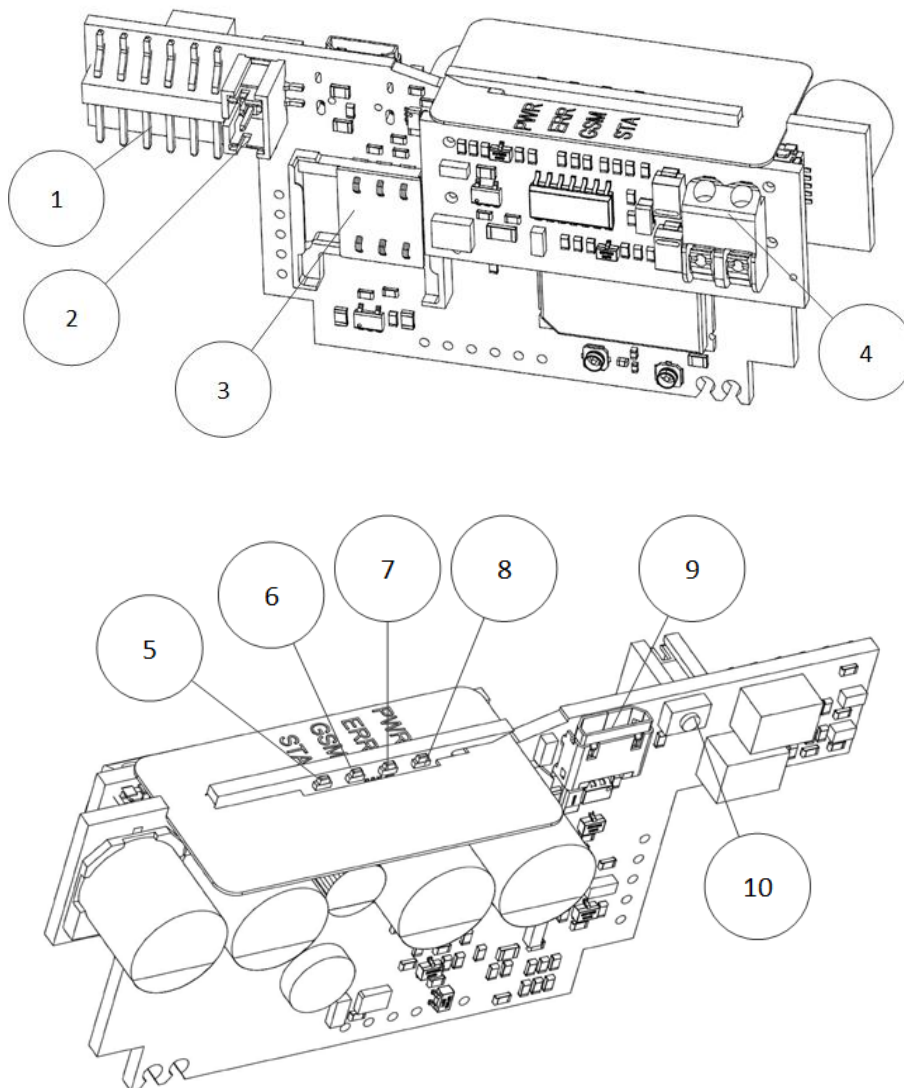
5 Getting started

5.1 Purpose

This chapter provides instructions on how to get started with the CMi2110. After reading and carefully following each step of this chapter, the MCM will be mounted in the L+G UH50, connected and started up.

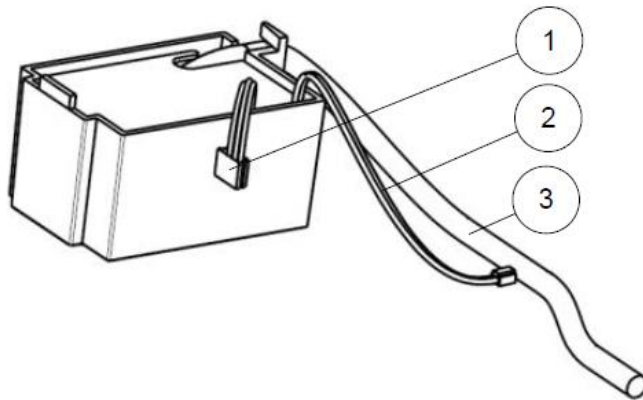
5.2 Product specification

5.2.1 CMi2110



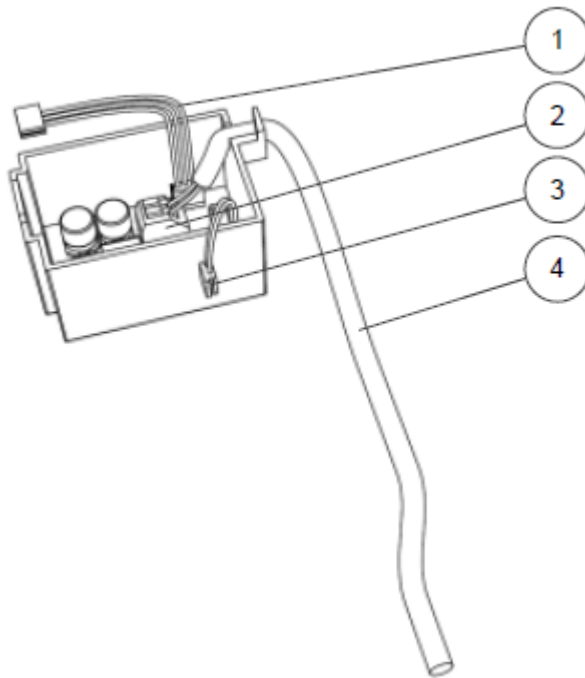
1. L+G UH50 interface
2. Power connector
3. SIM card slot
4. M-Bus terminal
5. STA LED (blue)
6. GSM LED (yellow)
7. ERR LED (red)
8. PWR LED (green)
9. USB slave port
10. Push button

5.2.2 Power supply WZU-AC 110/230-50



1. L+G UH50 power connector
2. CMi2110 power connector
3. 230 VAC power cable

5.2.3 Power supply WZU-ACDC24-50



1. L+G UH50 power connector
2. Spring terminal block
3. CMi2110 power connector
4. Power cable

5.3 Mount and connect the device

The CMi2110 is mounted in the module slot of a L+G UH50 heat meter. Follow the step-by step instructions below to ensure successful mounting of the MCM.

5.3.1 Mount the power supply

There are two different power supply options, 230 VAC and 24 VAC/VDC. For safety reasons they will need to be fused with a 10A (230V) or a 5A (24 VAC/VDC) fuse. The power will have 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 must be performed by a qualified electrician or someone with the equivalent knowledge.



To minimize possible ESD damage, grab the CMi2110 by the outer board edges to avoid unnecessary touching of components.

Start by removing the top cover of the L+G UH50 heat meter and mount the power supply as illustrated by Figure 1.

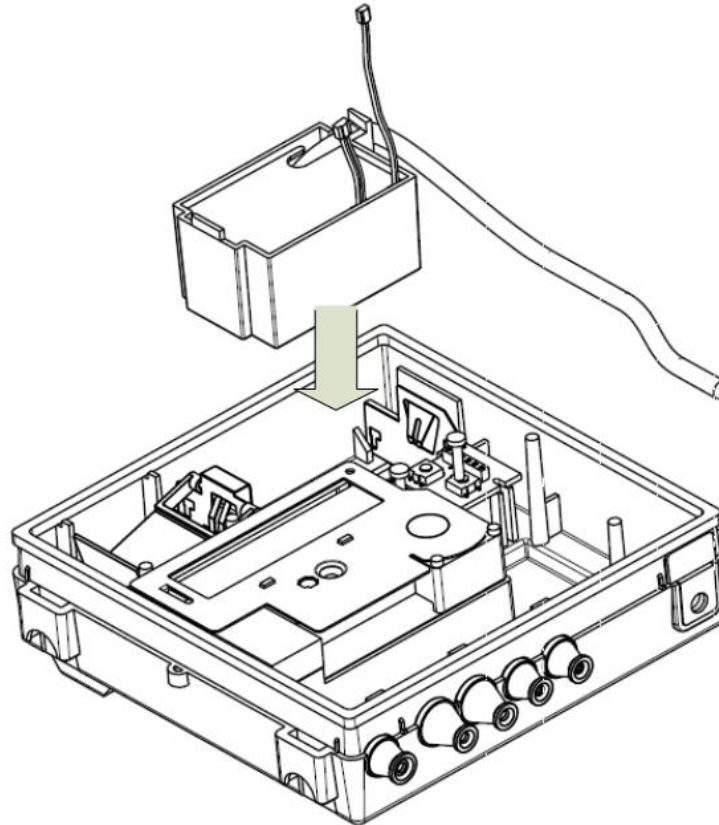


Figure 1: Mount the power supply

5.3.2 Fixate power cable

When the power supply has been installed, make sure to fixate its power cable (1). Remove the plastic seal to create a hole (2) in the L+G UH50 enclosure, and bring the power cable through that hole.

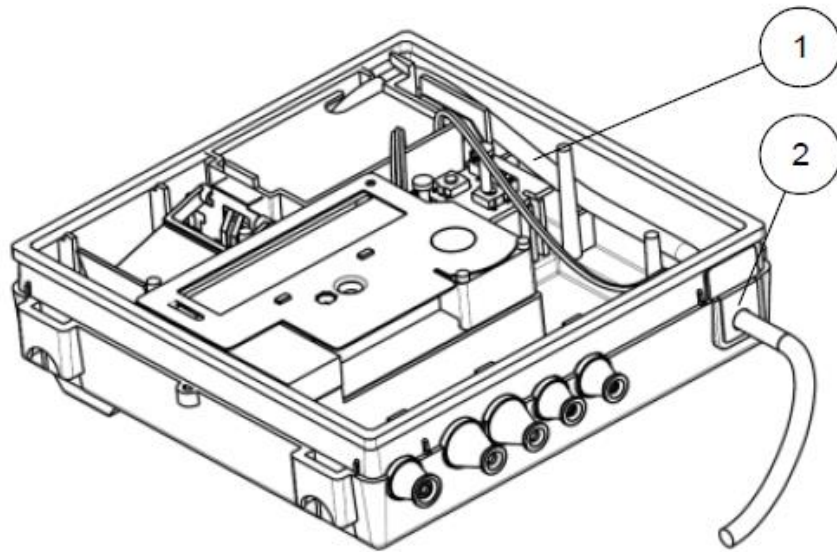


Figure 2: Fixate power cables

5.3.3 Connect the power

Connect the L+G UH50 power connector (1) to the on-board connector as illustrated by Figure 3. Make sure to cut the wiring to a proper length and attach it to a main plug.

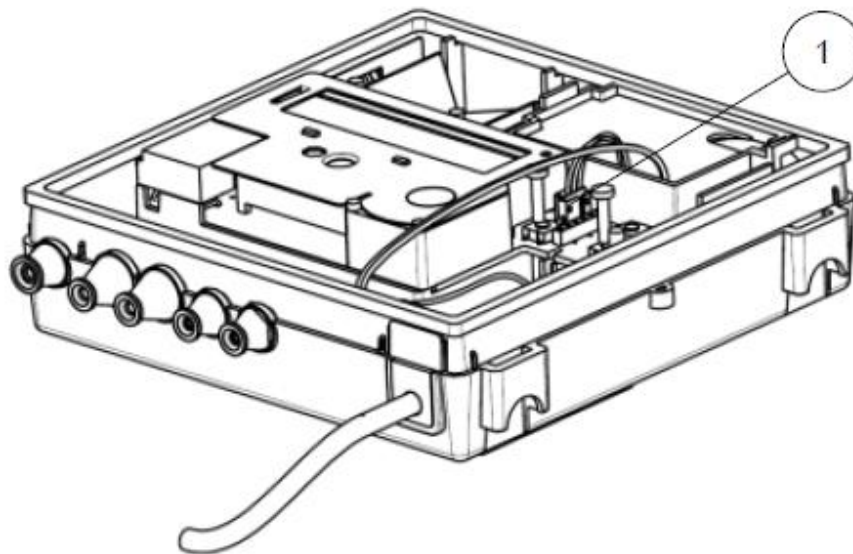


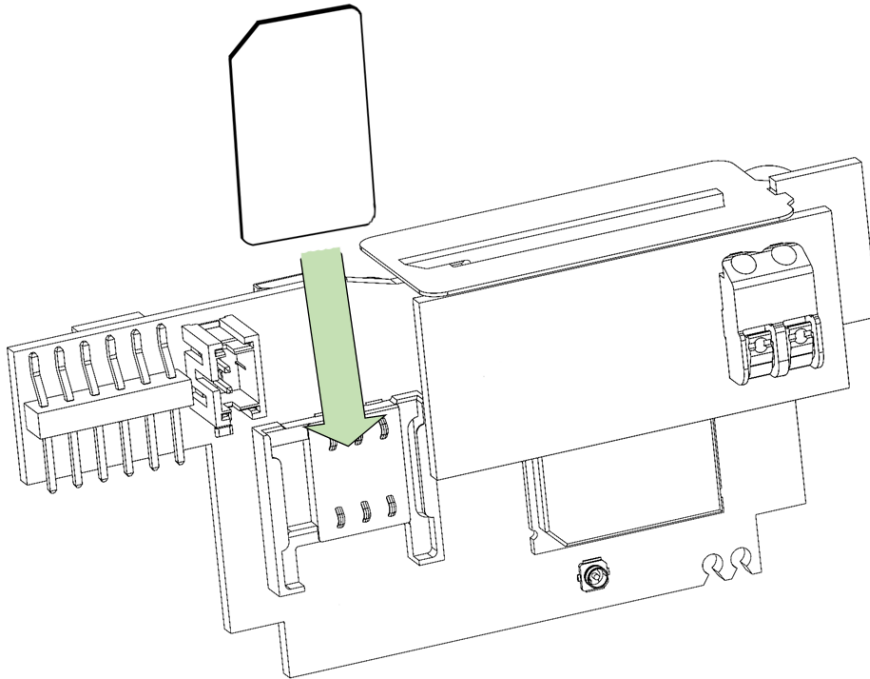
Figure 3: Connect the power

5.3.4 Mount the SIM card in the CMi2110

A SIM card will have to be installed in the CMi2110 in order for it to use the mobile network. Slide the SIM card into the SIM card holder. If a prepaid SIM card is used, make sure that it has enough credit to be able to respond to SMS commands.

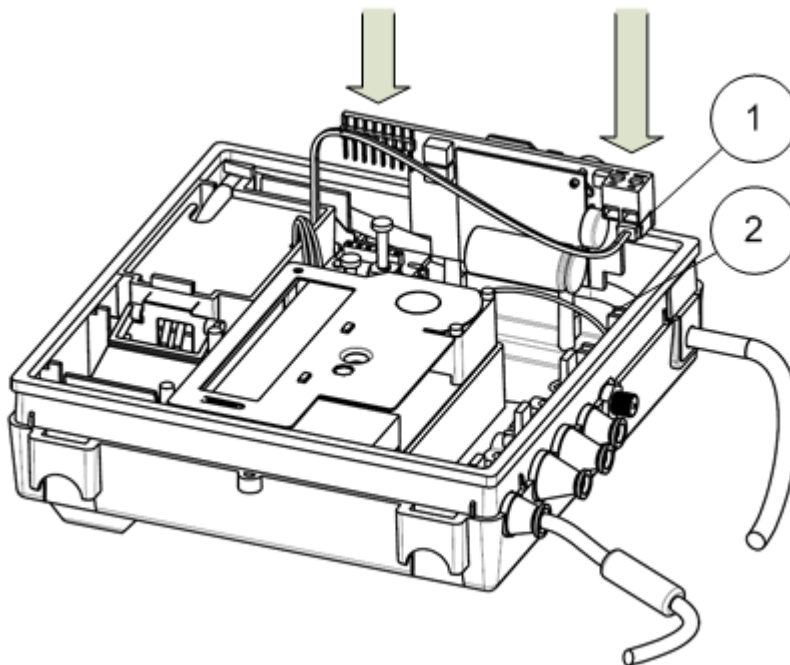


The SIM card must have GPRS internet access activated for full functionality and should not have any PIN code activated.

*Figure 4: Mount the SIM card*

5.3.5 Mount the CMi2110 in the L+G UH50

The CMi2110 is mounted in the module slot of the L+G UH50, as illustrated by Figure 5. Connect the power connector (1) from the power supply to the CMi2110 and carefully press the MCM into the slide (2).

*Figure 5: Mount the CMi2110*

5.3.6 Connect the antenna

The antenna is used to increase the mobile network coverage of the CMi2110. Use a scalpel (1) to cut off and remove the rubber seal (2) from the L+G UH50 enclosure, as illustrated by Figure 6.

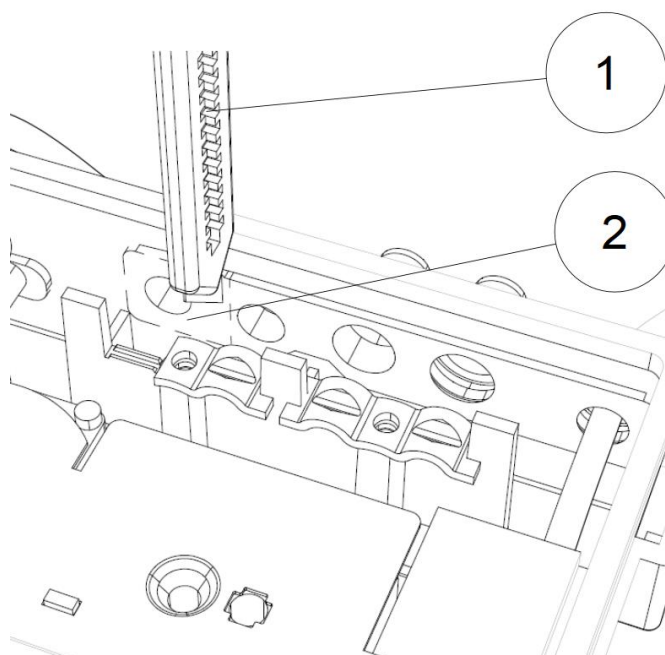


Figure 6: Remove rubber seal

Figure 7 illustrates what the result will look like.

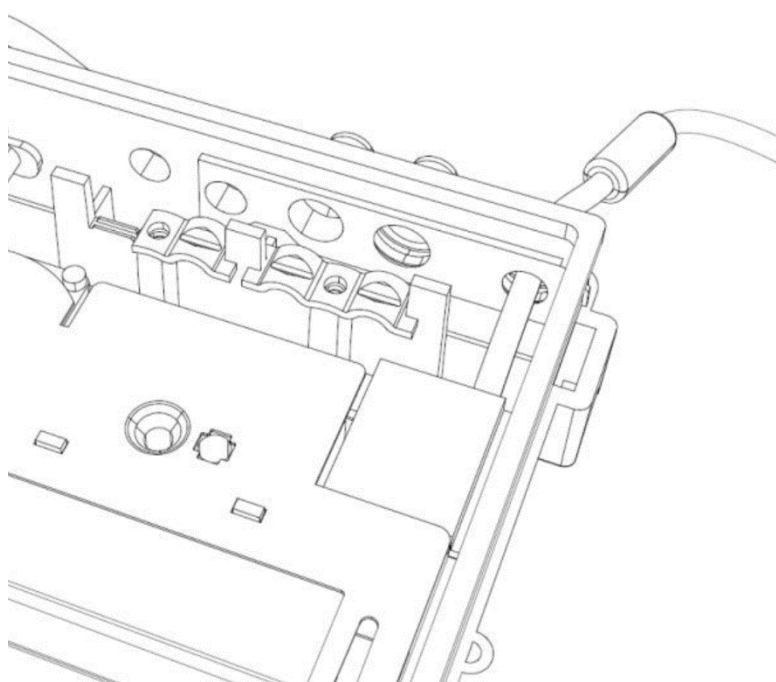


Figure 7: Rubber seal removed

Bring the SMA connector of the CMi2110 through the hole with a plate on the inside (3) and a plate on the outside (4) of the enclosure. Attach the antenna connector nut to the SMA connector to fixate it.

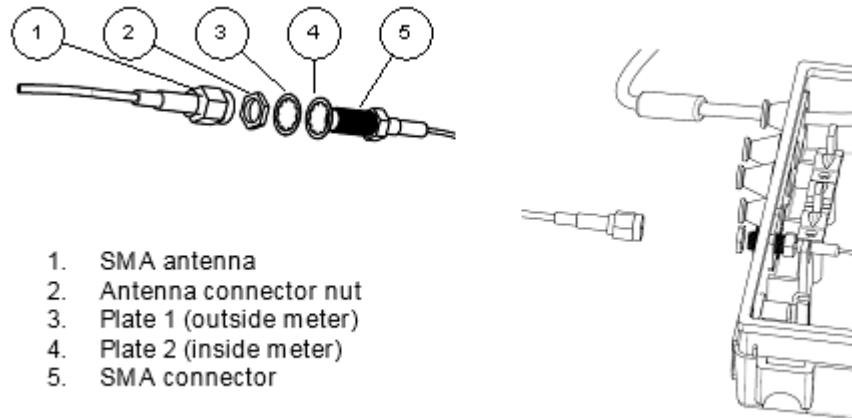


Figure 8: Connect the antenna

Use an 8 mm U-wrench (1) to fixate the SMA connector. Use an 8 mm socket and a torque screwdriver (2) to tighten the antenna connector nut to about 120 Ncm. Attach the antenna to the SMA connector by hand. The torque should be no more than finger tight.

After executing each step of the mounting instructions, the CMi2110 should be mounted in and connected to the L+G UH50 in the way Figure 9 illustrates.

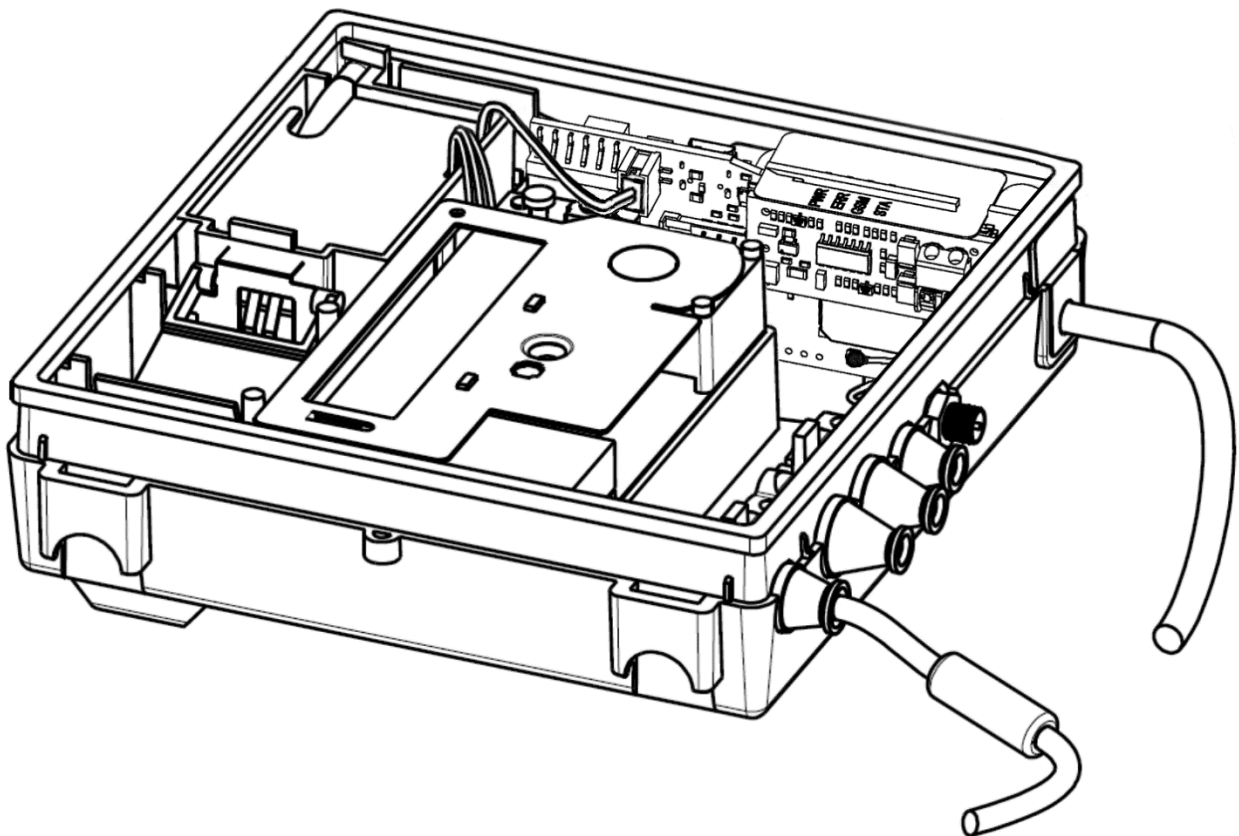


Figure 9: End-result



The antenna should be placed at a minimum of one meter from the L+G UH50. Make sure that the antenna cable is at least that long.



Do not place the antenna close to any metallic objects, the M-Bus 2-wire or inside a metallic cabinet.

5.3.7 M-Bus connector

M-Bus is a multi-drop 2-wire M-Bus with no polarity. The M-Bus connector can be used to connect up to 8 M-Bus meters, in addition to the L+G UH50, to the CMi2110. The number can be extended to up to 256 by using an Elvaco M-Bus Master. Use a cable of cross-sectional area 0.2-0.75 mm², for example a standard telephone cable (EKKX 2x2x0.5), to connect the meters to the M-Bus connector of the MCM.



All equipment connected to the M-Bus port 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.

5.3.8 USB slave connector

CMe2100A is equipped with a USB slave port, which will be used for upcoming product features.

5.4 Start up the device

5.4.1 Start-up

On successful connection of power, the CMi2110 will be ready to use after undergoing a booting session of approximately 30 seconds to one minute.

5.4.2 Reset to factory default

In order to reset the product configurations to factory default, press and hold the push button (2). The CMi2110 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 MCM.

5.4.3 LED indications

The product is equipped with four different LED lights. Table 1-4 below provides an explanation of each LED indication.

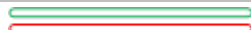


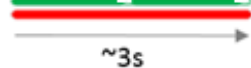



Green LED	Red LED	Product state	Visual
Permanently off	Permanently off	Power off or performing restart.	
Permanently on	Permanently on	Power on.	
1500 ms on / 100 ms off	Permanently off	Normal operation.	
1500 ms on / 100 ms off	Permanently on	Short circuit or overcurrent on M-Bus.	
1500 ms on / 100 ms off	800 ms on / 800 ms off	No SIM card installed.	
1500 ms on / 100 ms off	100 ms on / 1500 ms off	Not connected to GSM network.	

Table 1: Green and red LED indications

Yellow LED	Product state	Visual
Permanently off	Power off or ongoing restart	

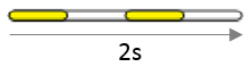
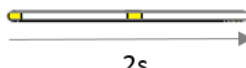


500 ms on / 500 ms off	Limited network service due to one of the following reasons: <ul style="list-style-type: none"> No SIM card installed. PIN code error. Network search in progress. 	
10 ms on / 990 ms off	GSM CSD data call or GSM voice call in progress or established.	
10 ms on / 1990 ms off	Ongoing GSM data transfer.	
10 ms on / 3990 ms off	Product registered on a network and no ongoing GSM data transfer.	

Table 2: Yellow LED


Blue LED	Product state	Visual
Permanently on	Upcoming features.	

Table 3: Blue LED

6 Operations guide

CMe2100, CMi2110 and CMi2130 use a common operations guide, available in a separate document. It can be downloaded from the Elvaco website, <http://www.elvaco.com/en/download>.

7 Technical specifications

Type	Value	Unit	Comments
Mechanics			
Protection class	IP54	-	
Dimensions (w x h x d)	85 x 38 x 28	mm	
Weight	30	g	
Mounting	In Landis+Gyr UH50 module slot	-	
Antenna	Built-in	-	Optionally external via SMA-f
SIM card	Slide	-	
Electrical connections			
Supply voltage	WZU-AC 110/230-50 or WZU-ACDC24-50	-	
M-Bus master port	Push-pull connector	-	Cable area 0.2-0.75 mm ²
USB slave port	Type micro B	-	
Network	Mobile	-	Radio
Electrical characteristics, WZU-AC 110/230-50			
Nominal voltage	100-240	VAC	+/- 10%
Frequency	50/60	Hz	
Power consumption (max)	<6	W	
Power consumption (nom)	<1	W	
Installation category	CAT 2	-	
Electrical characteristics, WZU-ACDC24-50			
Nominal voltage AC	12-35	VAC	
Nominal voltage DC	12-48	VDC	
Frequency	50/60	Hz	Or DC
Power consumption (max)	<6	W	
Power consumption (nom)	<1	W	
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	-	
Storage temperature	-40 to +85	°C	
User interface			

Green LED	Power	-	
Red LED	Error	-	
Yellow LED	GSM status	-	
Blue LED	USB active	-	
Push button	Factory reset	-	
Configuration	SMS, HTTP, GSM CSD, Telnet	-	
M-Bus			
Interfaces	Integrated M-Bus Master	-	
Maximum number of M-Bus devices (software limit)	128	-	
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	In addition to the L+G UH50. 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	<u>Meters</u>	<u>Days</u>	-
	1	200	
	32	6	
	64	3	
	128	1	
Hourly values	<u>Meters</u>	<u>Days</u>	-
	1	800	
	32	25	
	64	12	
	128	6	
Mobile network			
GPRS class	Up to 12	-	

Band	850/900/1800/1900	MHz	
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8 Type approvals

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

9 Document history

9.1 Versions

Version	Date	Description	Author
1.0		First draft	Anton Larsson

9.2 Document software and hardware appliance

Type	Version	Date	Comments
Hardware			
Software			

10 References

10.1 Terms and abbreviations

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

Abbreviation	Description
MCM	Meter Connectivity Module
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)