



CMi2130 (gen.3)
User's Manual
English
v 1.0

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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 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.

CMi2130 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.

CMi2130 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 CMi2130, and is intended for field engineers and developers.

3.2 Applicability

This manual applies to generation 3 of CMi2130. For older versions of the user's 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'll also find information about Elvaco's other products and services, and how they can be combined to create versatile metering solutions.

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 advise.

4 Introduction

4.1 Purpose

This chapter provides an application description for the CMi2130 Integrated MCM for Itron CF 51/55/ECHO II. In the next-coming sections you will get to know the product's features and how CMi2130 can be combined with other products to build versatile solutions.

4.2 Application description

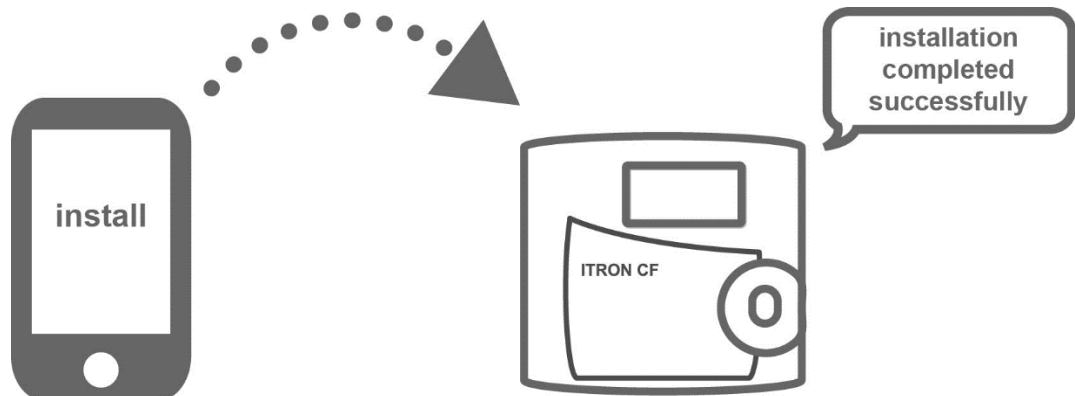
4.2.1 Applications

The CMi2130 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

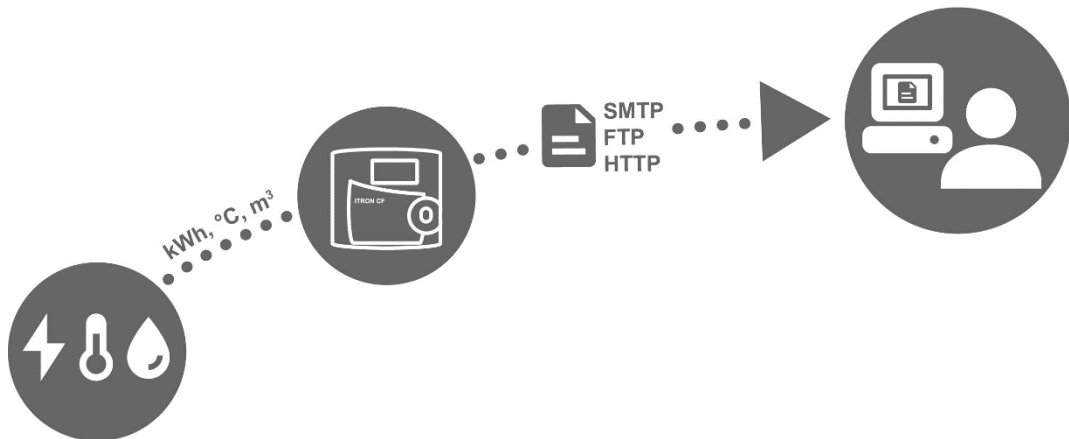
CMi2130 is mounted inside a Itron CF 51/55ECHO II to act as a cost-effective and flexible Gateway for the mobile network. By sending text messages with a cellphone, the MCM can be easily setup without having to visit the site. A single SMS command will have the CMi2130 install the Itron meter and any other meters connected by M-Bus. The product is thereafter ready to perform meter readouts and deliver meter values to all set recipients by a selected protocol and schedule.



4.2.3 Quick and simple metering with integrated statistics

Once meters have been installed, the CMi2130 is ready 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, CMi2130 can also upload Push Reports 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 CMi2130, provides a solid base for its system robustness. All Push Reports have an intelligent retry mechanisms that automatically schedules retries for failed reports and includes all values for which previous transmissions have failed.



4.3 Product features

4.3.1 M-Bus Master

CMi2130 can be equipped with an integrated M-Bus Master which makes the MCM able to drive up to eight unit loads (in addition to the Itron heat meter in which it is mounted). By using an M-Bus Master from Elvaco's CMeX Series, this number can be extended to up to 128 unit loads (128T)

4.4 Compatibility and extensions

4.4.1 Meter compatibility

CMi2130 is compatible with Itron CF 51/55/ECHO II. If equipped with an integrated M-Bus Master, the MCM is further compatible with:

- 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 Wired and Wireless M-Bus

CMi2130 supports meter readouts 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 combined with a Wireless M-Bus Receiver, for example Elvaco's CMeX50.

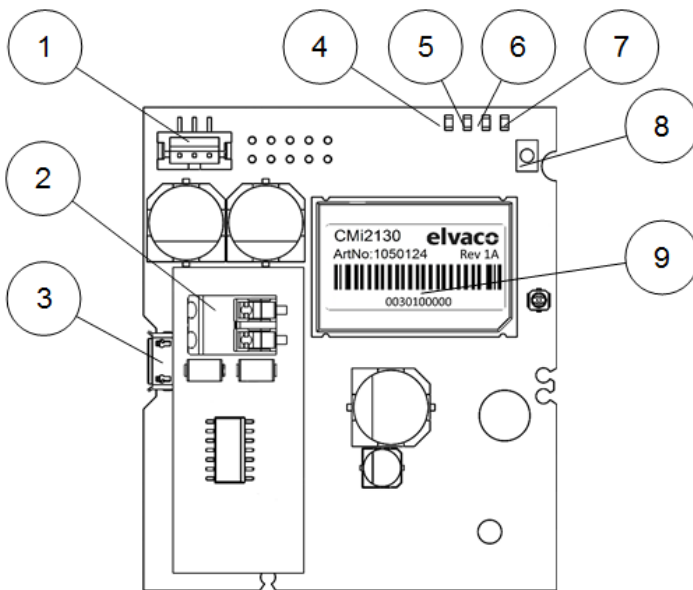
5 Getting started

5.1 Purpose

This chapter provides instructions on how to get started with the CMi2130. After reading and carefully following each step of this chapter, the MCM will be mounted in the Itron meter, connected and started up.

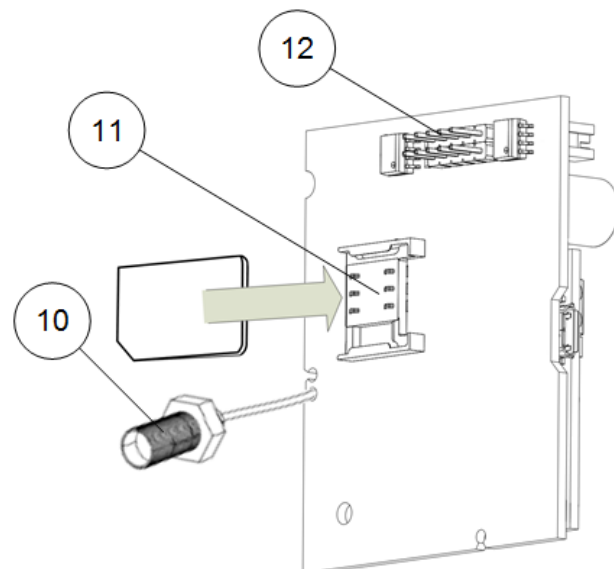
5.2 Product specification

5.2.1 CMi2130

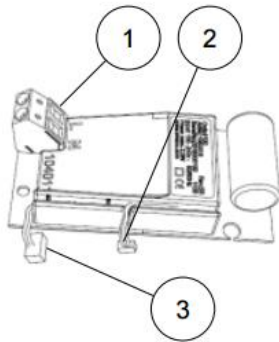


1. Power connector
2. M-Bus connector*
3. USB connector
4. PWR LED (green)
5. GSM LED (yellow)
6. ERR LED (red)
7. STA LED (blue)
8. Push button
9. Serial number
10. SMA antenna connector
11. SIM card holder
12. Itron meter interface

* Only CMi2130s equipped with M-Bus Master



5.2.2 Power supply



1. Screw terminal 100-240 VAC
2. Itron meter power connector
3. CMi2130 power connector

5.3 Mount and connect the device

The CMi2130 is mounted in a Itron CH 51/55/ECHO II. Follow the step-by step instructions below to ensure successful mounting of the MCM.

5.3.1 Mount the power supply

Removing the top cover of the Itron CF 51/55/ECHO II and mount the power supply according to Figure 1. For safety reasons, the supply voltage must be connected via a 10A fuse as well as 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.

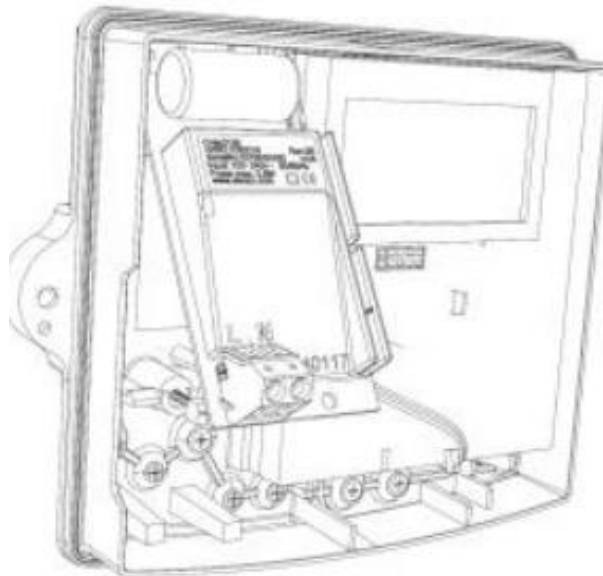


Figure 1: Mounting of the power supply

5.3.2 Connect the power supply

Use a 2-wire cable with cable area 1-1.5 mm² to connect the power supply. The outer diameter of the cable (1) should be in the range of 4.5 to 9 mm and approved for the intended environment. Strip the cable and connect it to the screw terminal. Tighten the strain relief and connect the Itron power connector (2) to the CF 51/55/ECHO II. Figure 2 illustrated what the end-result should look like.

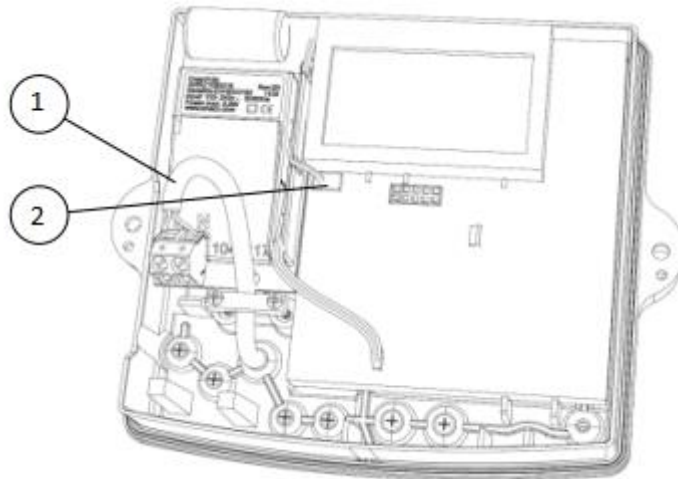


Figure 2: Connecting the power supply

5.3.3 Mount the SIM card in the CMi2130

A SIM card will have to be installed in the CMi2130 in order for the MCM to be able to use the mobile network. Gently 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.



To minimize possible ESD damage, grab the CMi2130 by the outer board edges to avoid unnecessary touching of components.

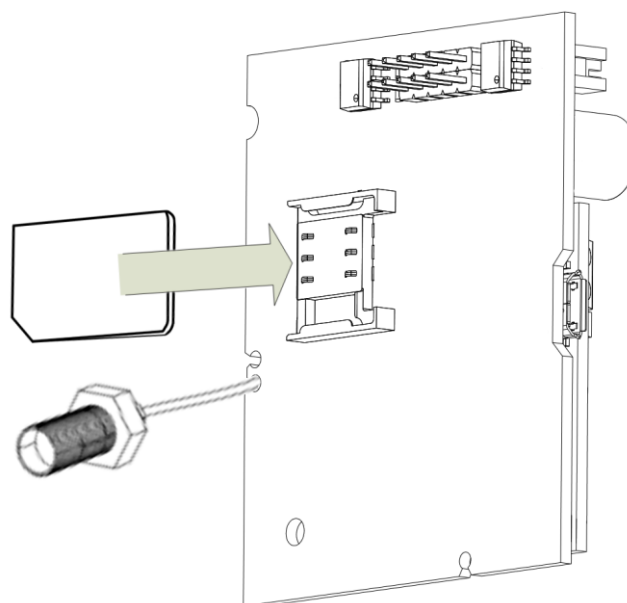


Figure 2: Inserting SIM card

5.3.4 Connect the antenna

Use a screw driver to remove the rubber gasket (1).

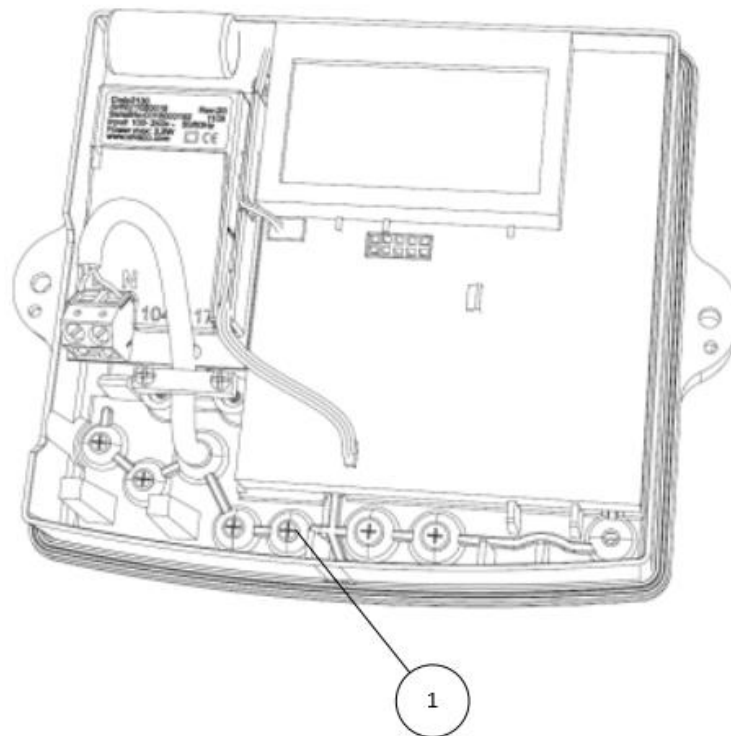


Figure 3: Removing the rubber gasket

Connect the SMA connector according to Figure 4. Make sure to tighten the nut (1) properly before the SMA connector (2) is attached.

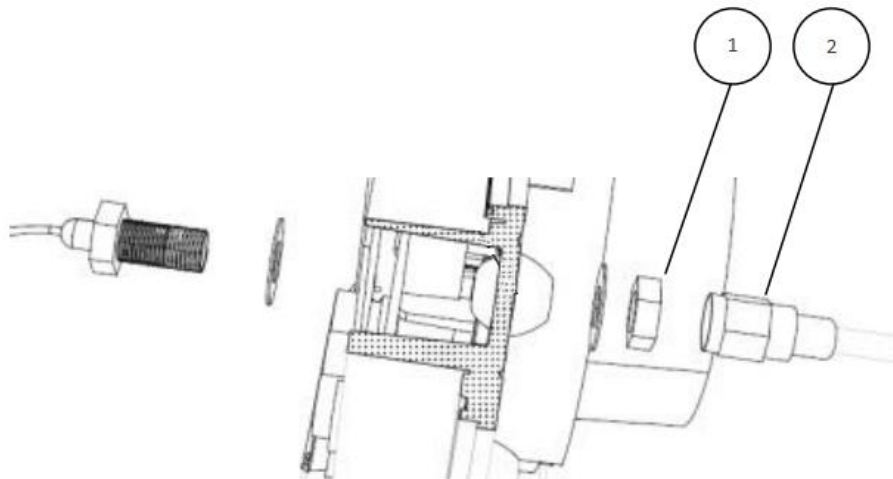


Figure 4: Connecting the antenna



If the integrator is mounted on a wall support, an angled SMA connector might have to be used.

Figure 5 illustrates what the connected antenna should look like.

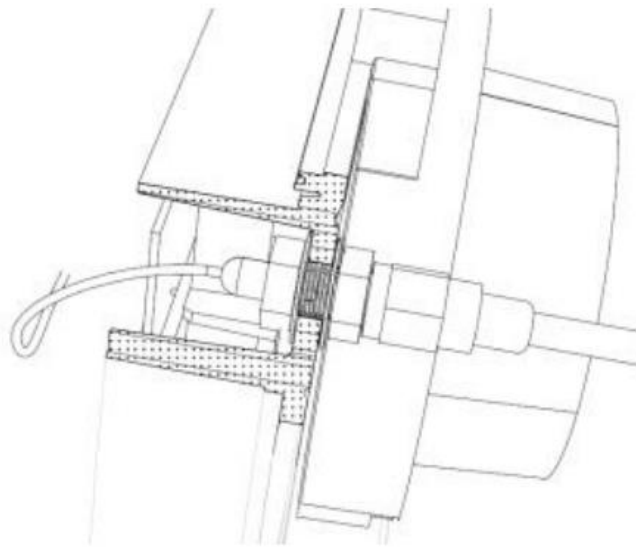


Figure 5: Connected antenna



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

5.3.5 Mount the CMi2130 in the Itron CF 51/55/ECHO II

The CMi2130 is mounted in the Itron CF 51/55/ECHO II, as illustrated by Figure 6. Make sure that the pins are placed in the board-to-board connector (1).

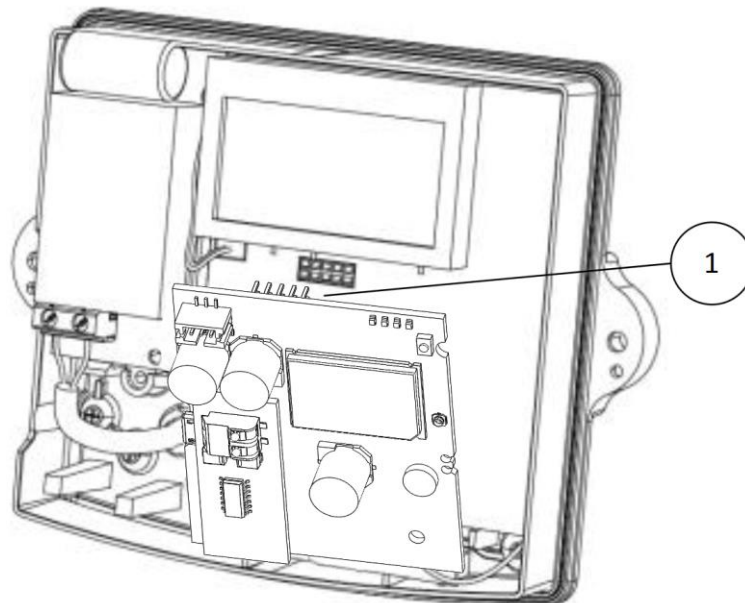


Figure 6: Mounting the CMi2130

Connect the power connector (1) from the power supply to the CMi2130, as illustrated by Figure 7.

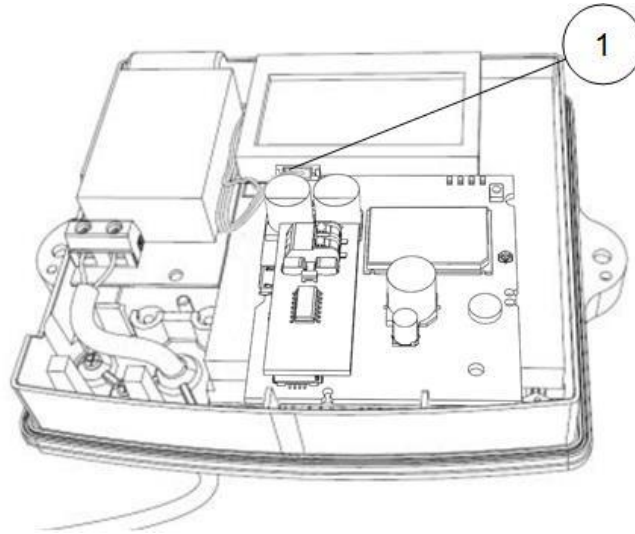


Figure 7: Connecting the power

5.3.6 M-Bus connector (only on CMi2130s equipped with M-Bus Master)

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 Itron CF 51/55/ECHO II. The number of meters can be extended to up to 128 by using a CMEx Series 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.

5.3.7 USB slave connector

CMi2130 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 CMi2130 will be ready to use after undergoing a booting session of approximately 30 seconds to one minute.

5.4.2 Reset to factory default settings

In order to reset the product configurations to factory default settings, press and hold the push button. The CMi2130 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	IP64	-	
Dimensions (w x h x d)	56 x 65 x 21	mm	
Weight	40	g	
Mounting	In Itron CF 51/55/ECHO II	-	
Antenna	Built-in	-	Optionally external via SMA-f
SIM card	Slide	-	Standard size
Electrical connections			
Supply voltage	Internal power supply	-	
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			
Nominal voltage	100-240	VAC	+/- 10%
Frequency	50/60	Hz	
Power consumption (max)	<6	W	
Power consumption (nom)	<1	W	
Installation category	CAT 2	-	
Environmental specifications			
Operating temperature	-20 to +55	°C	
Operating humidity max	5 to 90	% RH	Non-condensing
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	-	
M-Bus standard	EN 13757	-	

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 baud rate	2400 and 9600	Bit/s	
Nominal voltage	28	VDC	
Maximum number of M-Bus devices (software limit)	128	-	
Maximum number of unit loads (hardware limit)	8/12	T/mA	Can be extended using the 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	GSM/GPRS/HTTP	-	
Measurement reports	HTTP, FTP, SMTP (e-mail)	-	
Data storage (examples)			
Number of meters: 1	500	days	
Number of meters: 8	63	days	
Number of meters: 32	16	days	
Number of meters: 64	8	days	
Number of meters: 128	4	days	
Mobile network			
GPRS class	Up to 12	-	
Band	850/900/1800/1900	MHz	
Integration			
Meter implementation	Itron CF 51/55/ECHO II	-	

*Only applicable to CMi2130 equipped with M-Bus Master

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)