CMi1020W User's Manual English

1050021-CMi1020W Integrated MCM for L+G E350, Wireless M-Bus

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 therefore recommended that customers contact Elvaco AB for the latest product information before purchasing a CMi1020W 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.

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CMi1020W is a trademark of Elvaco AB, Sweden.

E350 is a trademark of Landis+Gyr AG, Switzerland.

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2 Using this manual

2.1 Purpose and Audience

This manual covers the information needed to mount, configure and use the CMi1020W integrated meter connectivity module (MCM) which enables a Landis+Gyr E350 electricity meter to communicate as a wireless M-Bus slave.

Intended audience is field and application engineers.

2.2 Models

CMi1020W, Integrated Meter Communication Module for Landis+Gyr E350, Wireless M-Bus. 3-Phase and 1-Phase versions.

2.2.1 Landis+Gyr meter compliance

The CMi1020W is designed to automatically work together with all Landis+Gyr E350 Series 2 Electricity Meters.

2.3 Additional and updated information

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

3 Introduction

3.1 Product configuration

Use the table below to find out the capabilities of your product.

Product name	Comments
CMi1020W	Wireless M-Bus slave for “Landis+Gyr E350 Series 2 Electricity Meter”.

Table 1 Product configuration

3.2 Capabilities

The CMi1020W can be ordered with a default or a custom configuration. The default configuration is suitable for most applications and optimized for excellent range performance.

CMi1020W has the capability to handle multiple Wireless M-Bus communication modes as well as externally triggered tariff changes through hardwired rate inputs. Please see technical specifications in chapter 8 for more details.

3.3 Applications

The CMi1020W is an ideal choice for projects where a high flexibility is needed at an attractive price point, for example within sub-metering or meter rooms. With its capability to allow wireless readouts it can also enable meters to be read through drive by solutions.

It is designed to automatically work together with all Landis+Gyr E350 electricity meters. The standardized interface for sending metering information makes it compatible with all Wireless M-Bus receivers on the market that complies with standard EN13757.

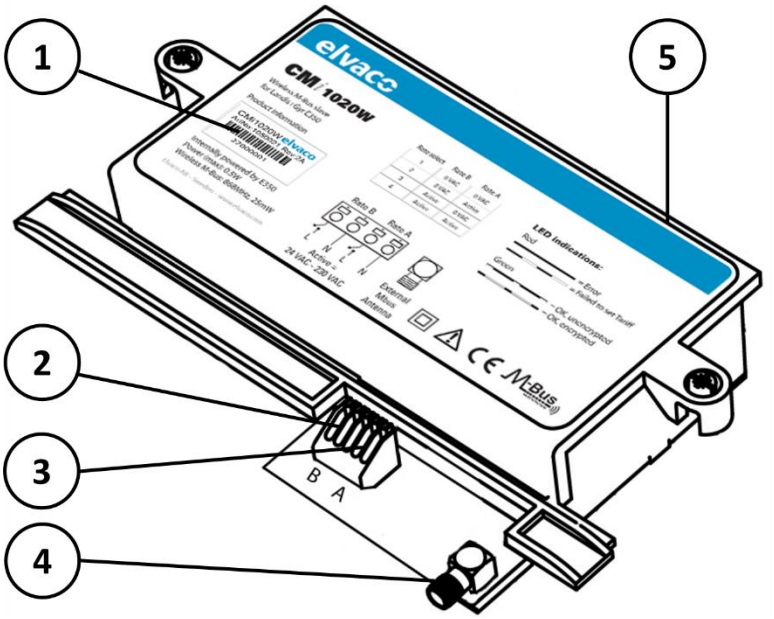
4 Getting Started

This chapter covers the steps required for getting the CMi1020W installed and operational. No pre-configuration is needed before installing the CMi1020W. However, make sure to check CMi1020W's default configuration and the meter's configuration to assure that they match your needs.

4.1 Overview

Figure 1 CMi1020W Overview

1. Serial number (Secondary address)
2. Rate input B
3. Rate input A
4. Antenna connection
5. LED-indication, one red and one green



4.2 Mounting

The mounting must be performed by a qualified electrician or installer with required knowledge. Always disconnect the power to the electricity meter and rate inputs before mounting or performing service work. The CMi1020W is mounted in the dedicated module slot of the meter. Be careful when placing the product in the slot to prevent accidental pin damages on the meter's connectors. Press the CMi1020W firmly into place until it is fully inserted and secure the module using the screws on each side. Make sure that the CMi1020W is mounted correctly!

4.3 Rate inputs

CMi1020W has two galvanically isolated rate inputs. Active voltage for inputs is between 24VAC and 230VAC. The voltage from the inputs must be fused with a 10A fuse and connected through an easily accessed and clearly marked switch. When the installation of the rate inputs is completed, secure the wiring with cable ties.

4.4 Operation and function

After power up, the CMi1020W will start to communicate with the electricity meter (E350). It will take a few seconds before the communication is established with the meter. During this period the red LED is constantly lit. When the red LED is no longer lit, the communication has been established and CMi1020W starts to transmit wireless M-Bus messages with meter readings.

CMi1020W can be configured to either send encrypted or unencrypted messages. Encrypted messages are protected by a 128bit AES key encryption. The green LED indicates normal operation. Its flash duration indicates which encryption mode that is currently in use (encrypted/unencrypted).

5 Application description

This chapter covers general application description of the product.

5.1 Purpose

The main purpose of the product is to enable Wireless M-Bus readouts from Landis+Gyr E350 electricity meters.

The CMi1020W has a built in OBIS to M-Bus converter. When the meter sends out the metering fields (OBIS codes and values) the CMi1020W converts them to corresponding M-Bus fields and sends out a Wireless M-Bus telegram.

5.2 Operation

All configuration and current operation mode are stored in non-volatile memory and are preserved during power cycles.

5.2.1 Power On

After power up, the CMi1020W will start to communicate with the electricity meter (E350). It will take a few seconds before the communication is established with the meter. During this period the red LED is constantly lit. When the red LED is no longer lit, the communication has been established and CMi1020W starts to transmit wireless M-Bus messages with meter readings.

If rate change is enabled, the CMi1020W will also set the rate that corresponds to the voltage on the rate inputs and the rate configuration.

5.2.2 Normal operation

During normal operation, the following tasks are executed:

- Read meter
- Convert from OBIS fields to M-Bus fields and send out Wireless M-Bus telegrams at configured intervals
- Monitor external rate inputs and act if a state change is triggered

5.3 Rate inputs

In CMi1020W's default configuration as a safety feature, the rate inputs are disabled to prevent any misconfigured product to accidently change the tariff information.

5.4 Wireless M-Bus message

CMi1020W transmits the metering fields in the same order as they are sent out from the meter. Depending on how the CMi1020W is configured (which fields to convert) and how the meter is configured (which fields to send out and in what order) the Wireless M-Bus telegram will have different content.

The CMi1020W will only send single telegram (no multi-telegram). Please note that the maximum data size of a Wireless M-Bus message is 154 bytes unencrypted and 136 bytes encrypted (20-25 metering fields) depending on encryption mode. If the metering data exceeds this length, the message will be truncated and one or more fields will not be transmitted. This status is also available through reading bit 5 in the status byte.

5.5 LED indications

The product is equipped with two LEDs, which show information about current status and operation mode. Please see “Table 2 Status LED” for a detailed description.

LED	Description	Visual
Green	Normal operation unencrypted mode. Short flashes (100ms on / 900ms off).	
Green	Normal operation encrypted mode. Long flashes (900ms on / 100ms off).	
Red steady on	CMi1020W doesn’t transmit any wireless messages. CMi1020W failed to establish contact with electricity meter or the data available from the meter does not contain the OBIS-code ‘C.1.0’ or ‘C.1’(Meter ID). This field must be available from the meter so that CMi1020W can identify the meter. Please note that after power up, the red LED will be constantly lit for around 15 seconds during product initialization.	
Red flashing	CMi1020W failed to set a new tariff. This status is also available through reading bit 6 in the status byte.	

Table 2 Status LED

6 Administration of the product

This chapter covers the Wireless M-Bus implementation and wired M-Bus implementation of the product. The M-Bus implementation is according to the new M-Bus standard EN13757-2, EN13757-3, EN13757-4 (2011) and the OMS specification.

6.1 Configuration

The CMi1020W can be ordered with a default or a custom configuration. The default configuration is suitable for most applications and optimized for excellent range performance. The information that is transmitted with the default configuration will contain the fields in Table 3 and will be transmitted in the same order as configured in the electricity meter.

C.1.0 / C.1	Meter ID
C.5.0 / C.5	Status Flag
C.7.0 / C.7	Power Fail Count
1.8.0 / 1.8	Active Energy - Import [+A] {+kWh}
2.8.0 / 2.8	Active Energy - Export [-A] {-kWh}
15.8.0 / 15.8	Active Energy - Absolute Value [|+A|+|-A|] {+kWh}
16.7.0 / 16.7	Total (R+S+T) kW

Table 3 Default configuration for transmitted fields

A custom configuration allows for a complete customization of all configuration parameters and transmitted meter data. Together with a meter configuration tool from Landis+Gyr, e.g. MAP110, you may configure what fields to transmit and the order of transmission by changing priority. Due to the laws of physics, a shorter message has a longer range which is worth considering when deciding on how many fields that should be transmitted.

The contents of the transmitted wireless message is determined by:

1. What fields that are available in the electricity meter and in which order they are sent to the CMi1020W. This is configured in the electricity meter.
2. What fields that are configured to be converted from OBIS to Wireless M-Bus. This is configured in CMi1020W using its standard or a custom configuration. Please refer to Table 8 for a complete listing of all available fields and their M-Bus conversion.

Please note that both the electricity meter and CMi1020W needs to have a matching configuration in order to obtain the desired wireless message content. The maximum data size of a Wireless M-Bus message is 154 bytes unencrypted and 136 bytes encrypted. This corresponds to (20-25 metering fields) depending on encryption mode and field types. If the metering data exceeds this length the message will be truncated and one or more fields will not be transmitted.

6.2 Operation mode

The product can operate in encrypted or unencrypted mode (both in T1 and C1 mode). In encrypted mode, a 128 bit AES key is used for all telegrams.

6.3 Rate

CMi1020W has two galvanically isolated rate inputs. Active voltage for inputs is between 24VAC and 230VAC. In CMi1020W's default configuration as a safety feature, the rate inputs are disabled to prevent any misconfigured product to accidently change the tariff information.

Rates are selected in a binary order, please see Table 4 for default rate input configuration:

Rate input B	Rate input A	Select rate
0 VAC	0 VAC	1
0 VAC	ACTIVE	2
ACTIVE	0 VAC	3
ACTIVE	ACTIVE	4

Table 4 Default rate input configuration

The rate change is toggled when a new state (rate input A and B) changes. Please note that the state must be steady for at least one second in order to trigger the rate change (and rate change must be enabled).

For a product with custom configuration it is possible to use up to six different rates (1 to 6) and to assign them freely to each combination of rate input states.

6.3.1 Problems setting a new rate

If the CMi1020W doesn't have rate enabled but detects a rate change or something else prevents a successful rate change, it will start flashing the red LED and toggle the status bit indicating this error.

Possible causes are:

1. Rate change detected but rate change is not enabled in CMi1020W.
2. The rate input is mapped to a tariff that the meter does not support (for example, meter only supports rate 1&2, but CMi1020W requests rate 4).
3. CMi1020W is configured with a faulty key (P1/P2) which prevents the rate change from being accepted by the meter.

As soon as the error has been resolved, the red LED will turn off and the status bit indicating this error will be cleared.

6.4 Wireless M-Bus telegram

Once the communication with the electricity meter is established, the product will automatically start sending messages with measurement data. The messages are sent at regular intervals, configurable between every 16 to 510 seconds (default is 16 seconds).

During normal operation (default), a Wireless M-Bus telegram of the type SND_NR ("Send, No Reply") is sent by default every 16 seconds in mode T1.

6.4.1 Product identification

The data from the meter (E350) to the CMi1020W MUST have a meter ID (OBIS C.1 or C.1.0) available as it is used to identify the meter in the wireless telegram. If this is missing the red LED will be constantly lit.

6.4.2 Secondary address priority and handling

CMi1020W uses 2 different secondary addresses, its own, and the meter's. When it transmits in unencrypted mode, it sends out the meter's secondary address. When it transmits in encrypted mode it sends out its own secondary address (the meter's secondary address is then embedded in the encrypted part of the message).

CMi1020W also always includes its own serial number (secondary address) as the first part of the payload data.

The product is identified by the following information:

Unencrypted / Encrypted mode

- Manufacturer string = LUG (Landis+Gyr)
- DEVICE TYPE (Medium) = 0x02 (Electricity meter)
- Version (Generation) = VV

The version field (noted VV) indicates the M-Bus protocol format. It will **only change if the M-Bus protocol information changes** but usually remain the same across different software versions. The field is used to determine if there is any changes that can lead to compability issues due to changes in the message format.

To identify the software version in the CMi1020W, use the software version field in the M-Bus telegram.

6.4.3 Data telegram (SND_NR)

All bytes from index 0 (L-field) are 4-to-6-bit coded according to the standard for Wireless M-Bus mode T1 & C1. CRC byte and 4/8-bit post amble are also sent according to the standard but are not shown in the table below.

Byte index 2..9 is “Link layer address” that contains the address of the meter.

Unencrypted mode
Byte index 11..14 is “short application header”.

Byte index	Data	Description
0	0xnn	L-field
1	0x44	C-field, 0x44 = SND-NR
2..3	0xnnnn	Manufacturer field from the meter’s telegram, e.g. “xxx”
4..7	0xnnnnnnnn	ID-field from the meter’s telegram
8	0xnn	Version field from meter’s telegram
9	0xnn	DeviceType field from meter’s telegram
10	0x7A	CI-field, 0x7A = “Short header follows”
11	0xnn	ACC = increment number from CMi1020W
12	0xnn	STATUS = status byte from meter’s telegram See section 6.4.4
13..14	0x2000	CONFIG word = synchronous, unencrypted
15….		Meter’s payload data. See section 0

Table 5 Unencrypted data telegram

Encrypted mode
Byte index 11..22 is “long application header” where index 11..18 is “application layer address” here contains the meter’s address.

Byte index	Data	Description
0	0xnn	L-field
1	0x44	C-field, 0x44 = SND-NR
2..3	0x1596	Manufacturer field, 0x1596 = “ELV”
4..7	0xnnnnnnnn	ID-field, CMi1020W serial number
8	0xnn	Version field, CMi1020W version number (01 to 09 decimal).
9	0x37	DeviceType-field, “Radio converter, meter side”
10	0x72	CI-field, 0x72 = “Long header follows”
11..14	0xnnnnnnnn	ID-field from meter’s telegram
15..16	0xnnnn	Manufacturer field from meter’s telegram
17	0xnn	Version field from meter’s telegram
18	0x02	DeviceType-field from meter’s telegram
19	0xnn	ACC = increment number from CMi1020W
20	0xnn	STATUS = status byte from meter’s telegram See section 6.4.4
21..22	0x25n0	CONFIG word = “encryption mode 5”, n = number of encrypted blocks
23..24	0x2F2F	“Decryption verification bytes”
25….		Meter’s payload. See section 0

Table 6 Encrypted data telegram

6.4.4 Status byte

The status byte is a field of bit flags indicating current operating status. A field value equal to 0x00 indicates status OK. Please note that it is important that the Wireless M-Bus master forwards this byte so meter status becomes available in receiving systems.

Type	Bit X = 1	Description
Error	6	Error setting a new rate, see section “6.3.1 Problems setting a new rate” for more information.
Warning	5	The metering data exceeds maximum message length and is truncated, one or more fields will not be transmitted.

Table 7 Status byte

6.4.5 Payload data

CMi1020W always includes its secondary address and firmware version as part of the payload data. It can also be configured, using custom configuration, to include the meter's product name (default configuration omits this part).

Byte index *in payload*	**Data**	**Description**
1	0x0C	Secondary address CMi1020W DIF, (8 digit BCD)
2	0x78	Secondary address CMi1020W VIF
3..6	4 bytes	Secondary address, CMi1020W
7	0x0D	Firmware version DIF
8..9	0xFD0C	Firmware version VIF
10	0x05	Length of firmware string (varying)
11..15	5 bytes	Firmware version string in format: Major.Minor.Patch
16…		Converted OBIS fields See section 0
OPTIONAL: If CMi1020W is configured (custom configuration) to include model and version information about the meter.		
16	0x0D	DIF model / version
17..18	0xFD0F	VIF model / version
19	0xLL	Length of model / version string
20..X	0xLL bytes	Model / version information
X+1…		Converted OBIS fields See section 0

6.5 OBIS code to M-Bus conversion

The CMi1020W constructs the Wireless M-Bus telegram through using the conversion Table 8 OBIS Code to M-Bus conversion table.

Please read section 6.1 carefully as it explains what needs to be fulfilled to obtain the desired message content.

Regarding which information is available from the meter, please refer to a Landis+Gyr salesperson.

All fields listed in the table are available for conversion and transmission using a custom configuration in the CMi1020W.

OBIS representation		Wireless M-Bus representation			
OBIS	**Note**	**DIF**	**VIF**	**Type**	**Note**
1.8.0	Active Energy - Import [+A] {+kWh}	04	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow
1.8.1	Energy Register Channel 1 - Rate 1	8410	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 1
1.8.2	Energy Register Channel 1 - Rate 2	8420	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 2
1.8.3	Energy Register Channel 1 - Rate 3	8430	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 3
1.8.4	Energy Register Channel 1 - Rate 4	848010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 4
1.8.5	Energy Register Channel 1 - Rate 5	849010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 5
1.8.6	Energy Register Channel 1 - Rate 6	84A010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 6
2.8.0	Active Energy - Export [-A] {-kWh}	04	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow
2.8.1	Energy Register Channel 2 - Rate 1	8410	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 1
2.8.2	Energy Register Channel 2 - Rate 2	8420	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 2
2.8.3	Energy Register Channel 2 - Rate 3	8430	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 3
2.8.4	Energy Register Channel 2 - Rate 4	848010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 4
2.8.5	Energy Register Channel 2 - Rate 5	849010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 5
2.8.6	Energy Register Channel 2 - Rate 6	84A010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 6
3.8.0	Reactive Energy - Import (Q1+Q2) [+R] {+kVArh}	04	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow
3.8.1	Energy Register Channel 3 - Rate 1	8410	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 1
3.8.2	Energy Register Channel 3 - Rate 2	8420	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 2
3.8.3	Energy Register Channel 3 - Rate 3	8430	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 3
3.8.4	Energy Register Channel 3 - Rate 4	848010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 4
3.8.5	Energy Register Channel 3 - Rate 5	849010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 5

3.8.6	Energy Register Channel 3 - Rate 6	84A010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 6
4.8.0	Reactive Energy - Export (Q3+Q4) [-R] {-kVArh}	04	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow
4.8.1	Energy Register Channel 4 - Rate 1	8410	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 1
4.8.2	Energy Register Channel 4 - Rate 2	8420	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 2
4.8.3	Energy Register Channel 4 - Rate 3	8430	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 3
4.8.4	Energy Register Channel 4 - Rate 4	848010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 4
4.8.5	Energy Register Channel 4 - Rate 5	849010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 5
4.8.6	Energy Register Channel 4 - Rate 6	84A010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 6
15.8.0	Active Energy - Absolute Value [|+A|+|-A|] {+kWh}	04	(03-06)	Uint32	Energy + kWh + Scale
16.7	Total (R+S+T) kW	03	(2B-2E)	Uint24	Power Total + W + Scale
36.7	Phase R kW	8340	(2B-2E)	Uint24	Power L1 + W + Scale
56.7	Phase S kW	838040	(2B-2E)	Uint24	Power L2 + W + Scale
76.7	Phase T kW	83C040	(2B-2E)	Uint24	Power L3 + W + Scale
131.7	Total (R+S+T) kVar	03	FB82A2(73-76)	Uint24	Reactive Power Total + kVarh/h + Scale
151.7	Phase R kVar	8340	FB82A2(73-76)	Uint24	Reactive Power L1 + kVarh/h + Scale
171.7	Phase S kVar	838040	FB82A2(73-76)	Uint24	Reactive Power L2 + kVarh/h + Scale
191.7	Phase T kVar	83C040	FB82A2(73-76)	Uint24	Reactive Power L3 + kVarh/h + Scale
13.7	Power Factor Phase Summation	02	FF80(73-76)	Uint16	Power Factor Total + Scale
33.7	Power Factor Phase R	02	FF81(73-76)	Uint16	Power Factor L1 + Scale
53.7	Power Factor Phase S	02	FF82(73-76)	Uint16	Power Factor L2 + Scale
73.7	Power Factor Phase T	02	FF83(73-76)	Uint16	Power Factor L3 + Scale
32.7	VRMS Phase R	8340	FD(46-49)	Uint24	Voltage L1 + Volt + Scale
52.7	VRMS Phase S	838040	FD(46-49)	Uint24	Voltage L2 + Volt + Scale
72.7	VRMS Phase T	83C040	FD(46-49)	Uint24	Voltage L3 + Volt + Scale
31.7	IRMS Phase R	8340	FD(59-5C)	Uint24	Current L1 + Ampere + Scale
51.7	IRMS Phase S	838040	FD(59-5C)	Uint24	Current L2 + Ampere + Scale
71.7	IRMS Phase T	83C040	FD(59-5C)	Uint24	Current L3 + Ampere + Scale
C.7.0	Power Fail Count	02	FD75	Uint24	Times meter has been stopped
C.7.1	Phase R Fail Count	8240	FD75	Uint24	Times meter has been stopped
C.7.2	Phase S Fail Count	828040	FD75	Uint24	Times meter has been stopped

C.7.3	Phase T Fail Count	82C040	FD75	Uint24	Times meter has been stopped
14.7	Mains Frequency	03	FC027A48(73-76)	Uint24	Frequency + Hz + Scale
C.5.0	Status Flag	02	7C024353	Uint16	Status flags + SC - As in E350 manual
F.F	Error (always first in readout list)	02	FD17	Uint16	Error flags binary - device type specific (Error code bits as E350 manual)
82.8.1	Terminal cover removal counter	02	7C024354	Uint16	Terminal cover removal counter + TC
82.8.2	DC Field Count	02	7C02434D	Uint16	DC Field Count + MC
82.8.3	Supply control switch tamper count	02	7C024352	Uint16	Supply control switch tamper count
C.1.0	Meter ID	0C	78	BCD8	Fabrication No
C.1.1	Manufacturing ID	0D	FD0A	(01-08)(TEXT)	Text (up to 8 characters)
0.0	Customer ID	0D	79	(01-nn)(TEXT)	Up to 16 characters
0.0.1	Customer ID_1	8D40	79	(01-nn)(TEXT)	Customer ID_1 characters 1..8
0.0.2	Customer ID_2	8D8040	79	(01-nn)(TEXT)	Customer ID_2 characters 9..16
0.2.0	Software Version	0D	FD0E	(01-nn)(TEXT)	Metrology (firmware) version + Text
0.2.1	Scheme ID / Parameter identification	0D	FD0B	(01-nn)(TEXT)	Parameter set identification + Text
128.8.0	Active Energy - Sum Phase Absolute Value ['SUM'|ALi|] {+kWh}	848040	(03-06)	Uint32	Energy + kWh + Scale + Device unit 2
130.8.0	Reactive Energy - Absolute Value [|+R|+|-R|] {+kVArh}	04	FB82(F3-F6)	Uint32	Reactive Energy + kVarh + Scale
131.8.0	Reactive Energy - Absolute Value [|+R|-|-R|] {+/-kVArh}	8440	FB82(F3-F6)	Uint32	Reactive Energy + kVarh + Scale + Device unit 1
132.8.0	Reactive Energy - Import [+R(Q1+Q4)] {kVArh(+)}	8440	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Device unit 1
133.8.0	Reactive Energy - Export [-R(Q2+Q3)] {kVArh(-)}	8440	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Device unit 1
16.8.0	Active Energy - Absolute Value [|+A|-|-A|] {+/-kWh}	8440	(03-06)	Uint32	Energy + kWh + Scale + Device unit 1

9.8.0	Apparent Energy [S] {+kVAh}	04	FC046841 566B(73-76)	Uint32	Apparent Energy + "kVah" + Scale
C.90	Special supplier information	0D	FD67	(01-nn)(TEXT)	Special supplier information
C.90.1	IEC address od meter	8DC040	79	(01-nn)(TEXT)	IEC address of meter
5.8.0	Reactive energy import, quadrant 1	848040	FB82(F3-F6)3B	Uint32	Reactive energy import, quadrant 1
6.8.0	Reactive energy import, quadrant 2	84C040	FB82(F3-F6)3B	Uint32	Reactive energy import, quadrant 2

Table 8 OBIS Code to M-Bus conversion table

7 Troubleshooting

7.1 Red LED is flashing

Please verify rate configuration:

- CMi1020W's rate configuration is matching the meter's configuration and available rates.
- P1/P2 passwords are correctly set in CMi1020W (if required by the meter).

7.2 Red LED is constantly lit

Please verify the connection and meter configuration:

- Mounting and connection between E350 and CMi1020W.
- Meter is configured so that OBIS-code C.1 or C.1.0 (meter ID) is available.

7.3 Red LED is off but receiver doesn't receive any messages

Please verify receiver configuration and radio reception:

- Check receiver's configuration, matching transmission mode and encryption settings.
- CMi1020W might need an external antenna to reach the receiver.
- Try adjusting the position of the receiver's antenna.

7.4 Messages don't contain all metering fields

Please verify the number of fields that CMi1020W are configured to transmit. The message data can be truncated if the data being
transmitted from the meter is too long to fit in a single message.

This status is also available through reading bit 5 in the status byte.

A specific OBIS-code must contain data to be transmitted. If OBIS data field is empty, or only contains "spaces" (from the meter), then this will not be transmitted by the CMi1020W.

8 Technical specifications

8.1 Characteristics

Type	Value	Unit	Comments
Mechanics			
Casing material	Polycarbonate	-	
Protection class	IP20	-	Mounted in meter
Dimensions (w x h x d)	166 x 92 x 35	mm	
Weight	125	g	
Mounting	In Landis+Gyr E350 meter	-	
Antenna	Built-in		Optionally external via SMA-f
Electrical connections			
Supply voltage	Supplied from E350	-	
Rate inputs	Screw terminal	-	0.25-1.5 mm²
Electrical characteristics			
Nominal voltage	220-240	VAC	+/- 10%
Frequency	50/60	Hz	
Power consumption (max)	<0.5	W	
Power consumption (nom)	<0.3	W	
Installation category	CAT 4	-	
Rate input low voltage	<10	VAC	
Rate input high voltage	>24	VAC	
Rate input max voltage	230	VAC	
Rate input minimum detection time	1	s	
Environmental specifications			
Operating temperature	-40 to +70	°C	
Operating humidity max	80 % RH at temperatures up to 31°C, decreasing linearly to 50 % RH at 40°C	-	
Operating altitude	0-2000	m	
Pollution degree	Degree 3	-	
Usage environment	Indoors	-	
Storage temperature	-40 to +70	°C	
User interface			
Green LED	Power	-	
Red LED	Error	-	
M-Bus			

Interfaces	M-Bus slave	-	
M-Bus slave interface			
M-Bus standard	EN 13757-4	-	Communication by T1 (default) or C1
Frequency	868.95	MHz	
Addressing modes	Electricity meter's secondary address	-	
M-Bus information	Default or custom configuration	-	
Transmit power	25	mW	
Transmit interval	16 to 510	s	Default: 16 s
Encryption	Unencrypted (default) or encrypted	-	
Integration			
Meter implementation	Landis+Gyr E350	-	
Maximum number of connected devices	1	-	

Table 7 Technical specifications

8.2 Factory defaults

Name	Value	Comments
M-Bus secondary address	Electricity meter's secondary address	
P1/P2 method selection mask	All commands are set to use P2 access	
OBIS selection mask	C.1.0 / C.1 Meter ID C.5.0 / C.5 Status Flag C.7.0 / C.7 Power Fail Count 1.8.0 / 1.8 Active Energy - Import [+A] {+kWh} 2.8.0 / 2.8 Active Energy - Export [-A] {-kWh} 15.8.0 / 15.8 Active Energy - Absolute Value [|+A|+|-A|] {+kWh} 16.7.0 / 16.7 Total (R+S+T) kW	These are default on, all other OBIS-codes is by default not transmitted.
Rate change	Disabled	

Table 8 Factory default values

9 Type approvals

CMi1020W is designed and tested to compliance with the directives and standards listed below.

Approval	Description
EMC	EN 31489-1, EN31489-3
ESD	EN61000-4-2, (15 kV)
Immunity HF-fields	80MHz – 2.7GHz @10V/m, (IEC61000-4-3)
Fast trans. burn test 4 kV	(IEC 61000-4-4)
Surge	EN61000-4-5, (4 kV 1.2/50 µs)
Immunity conducted	IEC 61000-4-6, (0.15kHz – 80 MHz)
Immunity to voltage dips/short interruptions and variations	(IEC 61000-4-11)
Impulse voltage test	IEC 62052-11, (6 kV 1.2/50us)
Radio	EN300220-1
Safety	EN 61010-1-2010, CAT 4
SELV	6 kV

Table 9 Type approvals

10 Safety and environment

10.1 Safety precautions

The following safety precautions must be observed during all phases of the operation, usage, service or repair of any CMi1020W 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.

Do not operate the product in the presence of flammable gases or fumes. Switch off the product when you are near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.

Do not use any chemicals or water to clean the product. No care required after installation is needed.

10.2 Symbols explanation

Symbol	Explanation
	Indicates that the current situation needs operator awareness or operator action in order to avoid undesirable consequences.
	CE-mark. This mark ensures that we meet the applicable EC directives.
	Double insulated
	WEEE

11 Document History

Version	Date	Description	Author
1.0	2016-07-08	First release	Nicklas Alnström
2.0	2016-08-25	Updated technical specification	Anton Larsson

11.1 Document software and hardware appliance

Type	Version	Date	Comments
Hardware	>= R2A	2016-04-29	
Software	v1.0.0	2016-08-08	

12 References

12.1 References

[1] EN-13757-1, EN-13757-2, EN-13757-3, EN-13757-4
Communication System for meters and remote reading of meters, Part1, Part2, Part3 and Part 4

[2] D000046268 – E350 Module Specification ver2-5b.pdf

[3] D000027979 E350 ZxF100Ax Cx series 2 User Manual.pdf

12.2 Terms and Abbreviations

Abbreviation	Description
Product	In this document CMi1020W
DIF	Data Information Field (Wireless M-Bus data clock information)
VIF	Value Information Field (Wireless M-Bus value block information)

12.2.1 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)