CMi1020 Users Manual English

1020020-CMi1020 Integrated MCM for L+G E350, 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 CMi1020 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

CMi1020 is a trademark of Elvaco AB, Sweden.

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

1.2 Contacts

Elvaco AB Headquarter

Teknikgatan 18
434 37 Kungsbacka
SWEDEN

Phone: +46 300 30250
Fax: +46 300 18440

E-Mail: info@elvaco.com

Elvaco AB Technical Support

Phone: +46 300 434300
E-Mail: support@elvaco.se

Online: http://www.elvaco.com

2 Using this manual

2.1 Purpose and Audience

This manual covers the information needed to mount, configure and use the CMi1020 M-Bus slave for Landis+Gyr E350 electricity meter. It is intended for field engineers and developers.

2.2 Models

CMi1020.

2.2.1 Landis+Gyr meter compliance

CMi1020 has successfully been tested with the following Landis+Gyr electricity meters:

- ZCF120 M40
- ZMF120 M13
- ZMF110 M21
- ZMF120 M21
- ZMF120 M23

The meters in the list above are the only meters tested during compliance test.
The CMi1020 is designed to automatically work together with all Landis+Gyr E350 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
CMi1020	M-Bus slave for Landis+Gyr E350 electricity meter

Table 1 Product configuration

3.2 Capabilities

The CMi1020 is an M-Bus slave integrated into Landis+Gyr electricity meters. Landis+Gyr electricity meters covered are E350. The CMi1020 handles the meter disconnector facility, multi-rate and can send information to the display.

3.3 Applications

The CMi1020 is an ideal choice for meter room solutions, where meters are grouped together and also for tenant house associations with meters positioned in the apartments.

4 Getting Started

This chapter covers the steps required for getting the CMi1020 installed and operational. No pre-configuration is needed before using the CMi1020.

4.1 Overview

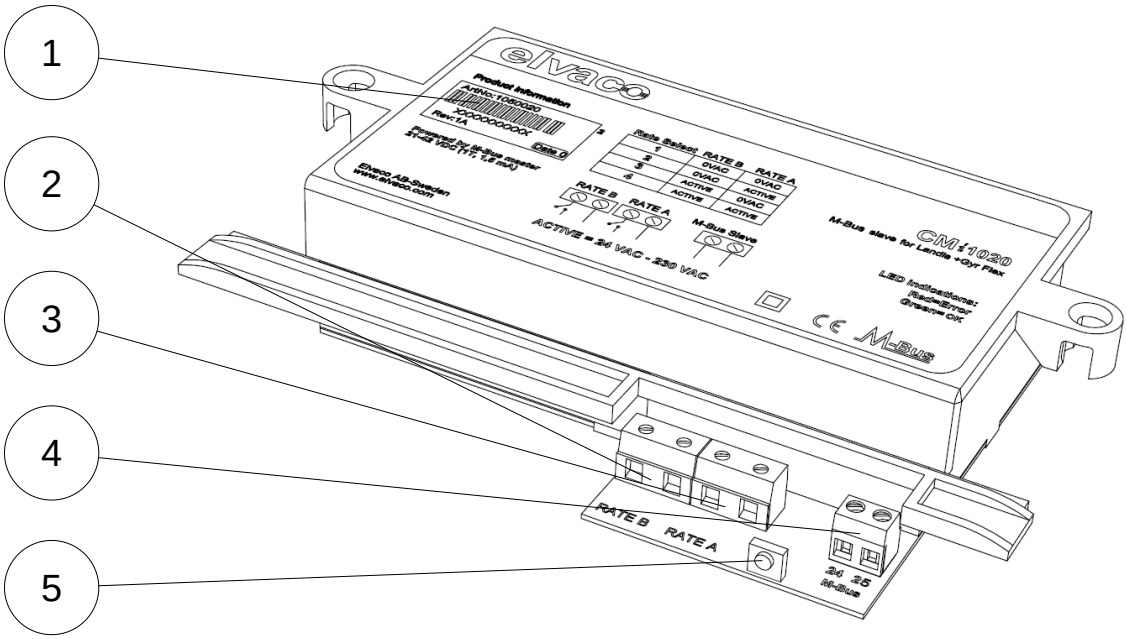

Figure 1 CMi1020 Overview

1. Serial number (Secondary address)
2. Rate input B
3. Rate input A
4. M-Bus
5. Push-Button

4.2 Mounting

The CMi1020 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.

4.2.1 Rate inputs

The CMi1020 has 2 inputs used to select current meter rate. Rate active voltage is from 24 VAC to 230 VAC and is galvanic isolated. The rate input can be configured by M-Bus command Set meter rate mapping table, see 6.7.12. Rates are selected in a binary order, please see table below for default rate input configuration:

Rate select	Rate B	Rate A
1	0 VAC	0 VAC
2	0 VAC	ACTIVE
3	ACTIVE	0 VAC
4	ACTIVE	ACTIVE

Table 2 Default rate input configuration

4.2.2 M-Bus 2-wire bus

M-Bus is a multi-drop 2-wire bus, with no polarity. Use a cable of area 0.25-1.5 mm^2, e.g. a standard telephone cable (EKKX 2x2x0.25). Connect the wiring to the screw terminal (4).

⚠ **IMPORTANT**

Please take the following in consideration:

- All connected M-Bus slave devices must have unique M-Bus secondary or primary addresses depending on addressing mode.
- Measure voltage over M-Bus slave connection to verify M-Bus master connection. Voltage should be between 21-42 VDC.

5 Application description

This chapter covers general application description of the product.

5.1 Purpose

The main purpose of the product is to enable 2-wire M-Bus communication to the Landis+Gyr electricity meters. The product can be used with meters equipped with disconnector or regular meters with no disconnector.

The CMi1020 has an OBIS to M-Bus interpreter, which enables readout of all OBIS codes available from the meter in M-Bus format. Depending on meter configuration of the readout list, the M-Bus frame can contain varying information.

When using the CMi1020 with a meter equipped with disconnector, the meter passwords P1 and P2 must be set. This can be done using regular M-Bus commands.

All configuration and parameterization are stored in EEPROM, which prevents any loss of stored information.

5.2 Operation

The product has different operation states depending on the current operation mode. The operation state, disconnector on/off state and current rate selector are maintained during reboot and power cycling.

5.2.1 Power On

When powered on (connected to the M-Bus master), the product will try to readout the meter. The disconnector and rate state is also unknown after power on, which will force the product to set both disconnector and rate state.

5.2.2 Normal operation

During normal operation, the following tasks are executed:

- Read meter every 30 second
- Receive and execute any M-Bus command addressed to the product
- Monitor button for disconnector handling
- Monitor rate inputs for rate handling
- Status indication (LED)

5.3 Local disconnector control

Pressing the meter disconnector button in normal operation, the disconnector will toggle state. The local disconnector control can be enabled/disabled using M-Bus commands, preventing unwanted disconnector control by unauthorized users.

The disconnector is disabled for press during capacitor charging, approximately 10 seconds after last toggling of the disconnector.

5.3.1 Indications

The product is equipped with two LEDs, which show information of M-Bus master connection and successful meter readout.

Please review table below for indication description.

LED	Product state	Visual
100 ms on / 5000 ms off	Short flash every five second. M-Bus master connected but no connection with meter.	
100 ms on / 5000 ms off	Short flash every five second. M-Bus master connected and communication with meter	

Table 3 LED description – Status LED

5.4 Reset to factory default

In order to reset the product configuration to factory default, press and hold the button on power-up for 10 seconds. The LED indication will first be off, then flash for 10 seconds and then turn off again when it is time to release the button. The product configuration will reset to factory default and restart. Reset to factory defaults can also be made using M-Bus command Application reset, see 6.7.4.

6 Administration of the product

This chapter covers the configuration and M-Bus implementation of the product. The M-Bus slave implementation is according to the new M-Bus standard EN13757.

6.1 M-Bus product identification

The product can be identified by the following information:

- Manufacturer string = ELV
- Medium = Electricity
- Generation = 01-09

The Generation field between product releases will **only** change (increase by 1) if the M-Bus protocol information changes between versions. Use the software version field in the M-Bus telegram to identify current software version.

6.2 M-Bus addressing mode

The product implements both primary and secondary addressing mode. The primary and secondary addresses can be changed using M-Bus standard command. Primary address from factory is **0** and secondary address from factory is the fabrication number (serial number).

6.2.1 Secondary address priority and handling

The product has an internal priority list of which secondary address should be used. Please review Table 4 for priority handling:

Mode	Communication with meter	Manually set secondary address	Secondary address
Factory default	No	No	CMi1020 serial number
Communication with meter, no manually set secondary address	Yes	No	1. Meter OBIS code 0.0 2. Meter OBIS C.1.0 OBIS code 0.0 (customer number) is primary used as secondary address if the last 8 characters can be casted to an 8 digit BCD, otherwise OBIS code C.1.0 (meter manufacturer number) is used.
Manually set secondary address	Yes or No	Yes	Manually set secondary address is used.

Table 4 Secondary address priority and handling

6.3 M-Bus baud rate

The product can handle 300 or 2400 baud. No auto-baud detection is available. The baud rate can be changed using M-Bus standard commands. Baud rate from factory is **2400** baud.

6.4 M-Bus break

M-Bus master break signals are handled according to the M-Bus standard. Any ongoing communication from M-Bus slave to master will be aborted on break detection from the M-Bus master.

6.5 FCB-bit toggling (multi-telegram)

Multi-telegram or FCB-bit toggling is implemented (FCB bit is taken care of). Depending on meter type and configuration, the CMi1020 will create one or more M-Bus telegrams which can be individually read using the FCB-bit toggling mechanism. Please see section 6.6 for more information.

6.6 OBIS code to M-Bus interpreter

The CMi1020 will build appropriate M-Bus telegrams depending on meter communication status. The available M-Bus information depends on the configuration of the meter. Please refer to a Landis+Gyr salesperson regarding which information is available on the meter using standard meter readout.

The first M-Bus telegram always contains information described in Table 5. This information is describing the CMi1020 product and current status. All other M-Bus fields interpreted from the meter are optional and depends on meter configuration.

M-Bus implementation			
DIF	**VIF**	**Type**	**Note**
01	FD1A	Uint8	Disconnector status. 8-bit integer value with following bit-mask: Bit 7,6: - 00 (DC) - 01 = EEPROM setting is on - 10 = EEPROM setting is off - 11 (DC) Bit 5,4: - 00 (DC) - 01 = Push-button turn-on enabled - 10 = Push-button turn-on disabled - 11 (DC) Bit 3,2: - 00 (DC) - 01 = Push-button turn-off enabled - 10 = Push-button turn-off disabled - 11 (DC) Bit 1,0: - 00 = Actual status is unknown - 01 = Actual status is on - 10 = Actual status is off - 11 = Actual status is unknown The RSP_UD disconnector status byte is mapped exactly like the corresponding SND_UD disconnector control byte except for bits 1 and 0.

			After power-on, the disconnector actual state will be reported as unknown until the disconnector has been pulsed to the state saved in EEPROM.
01	FD1B	Uint8	Rate status. 8-bit integer value with following bit-mask: Bit 7-2: Not used Bit 1: Rate input A status (1=230 VAC) Bit 0: Rate input B status (1=230 VAC)
8340	FD17	Uint24	Metering communication error flags (CMi1020). 24-bit integer value with following bit-mask: Bit 23 - Error during P1/P2 sign-on sequence Bit 22-19: - Unused Bit 18: - Error during LCD write meter command 0xFF29 Bit 17: - Error during LCD write meter command 0xFF28 Bit 16: - Error during LCD write meter command 0xFF27 Bit 15: - Error during LCD write meter command 0xFF26 Bit 14: - Error during LCD write meter command 0xFF25 Bit 13: - Error during LCD write meter command 0xFF24 Bit 12: - Error during LCD write meter command 0xFF23 Bit 11 - Error during LCD write meter command 0xFF22 Bit 10: - Error during disconnector control with meter command 0xFF21 Bit 9: - Error during rate control with meter command 0xFF05 Bit 8: - Error during meter data readout Bit 7-6: - Unused

			Bit 5: - Meter has not been polled yet. This code is sent only after CMi1020 power-on reset and remains until first successful meter readout. Bit 4: - Receive error on meter readout data (framing error, parity error, BCC error etc) Bit 3: - Timeout on meter read-out data Bit 2: - Unexpected character in meter ID string Bit 1: - Receive error on meter ID string (framing error, parity error, BCC error, buffer overflow) Bit 0: - Timeout on ID-String from meter during readout sign-on
0D	FD0F	(05)(TEXT)	Software version (CMi1020). In plain text in following format: Major.Minor.Patchlevel
8C40	78	BCD8	Fabrication number (CMi1020).

Table 5 First M-Bus telegram static data

Following table is showing the optional M-Bus fields added to the M-Bus telegram data on successful OBIS code to M-Bus field interpretation. Fields will be added accordingly to the meter configuration readout list, i.e. following data **may** not be added in the following order.

OBIS implementation			**M-Bus implementation**			
Sel. Bit	**OBIS**	**Note**	**DIF**	**VIF**	**Type**	**Note**
0	1.8.0	Active Energy - Import [+A] {+kWh}	04	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow
1	1.8.1	Energy Register Channel 1 - Rate 1	8410	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 1

2	1.8.2	Energy Register Channel 1 - Rate 2	8420	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 2
3	1.8.3	Energy Register Channel 1 - Rate 3	8430	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 3
4	1.8.4	Energy Register Channel 1 - Rate 4	848010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 4
5	1.8.5	Energy Register Channel 1 - Rate 5	849010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 5
6	1.8.6	Energy Register Channel 1 - Rate 6	84A010	(83-86)3B	Uint32	Energy + kWh + Scale + Forward Flow + Rate 6
7	2.8.0	Active Energy - Export [-A] {-kWh}	04	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow
8	2.8.1	Energy Register Channel 2 - Rate 1	8410	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 1
9	2.8.2	Energy Register Channel 2 - Rate 2	8420	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 2
10	2.8.3	Energy Register Channel 2 - Rate 3	8430	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 3

11	2.8.4	Energy Register Channel 2 - Rate 4	848010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 4
12	2.8.5	Energy Register Channel 2 - Rate 5	849010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 5
13	2.8.6	Energy Register Channel 2 - Rate 6	84A010	(83-86)3C	Uint32	Energy + kWh + Scale + Backward Flow + Rate 6
14	3.8.0	Reactive Energy - Import (Q1+Q2) [+R] {+kVArh}	04	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow
15	3.8.1	Energy Register Channel 3 - Rate 1	8410	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 1
16	3.8.2	Energy Register Channel 3 - Rate 2	8420	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 2
17	3.8.3	Energy Register Channel 3 - Rate 3	8430	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 3
18	3.8.4	Energy Register Channel 3 - Rate 4	848010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 4

19	3.8.5	Energy Register Channel 3 - Rate 5	849010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 5
20	3.8.6	Energy Register Channel 3 - Rate 6	84A010	FB82(F3-F6)3B	Uint32	Reactive Energy + kVarh + Scale + Forward Flow + Rate 6
21	4.8.0	Reactive Energy - Export (Q3+Q4) [-R] {-kVArh}	04	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow
22	4.8.1	Energy Register Channel 4 - Rate 1	8410	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 1
23	4.8.2	Energy Register Channel 4 - Rate 2	8420	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 2
24	4.8.3	Energy Register Channel 4 - Rate 3	8430	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 3
25	4.8.4	Energy Register Channel 4 - Rate 4	848010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 4
26	4.8.5	Energy Register Channel 4 - Rate 5	849010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 5

27	4.8.6	Energy Register Channel 4 - Rate 6	84A010	FB82(F3-F6)3C	Uint32	Reactive Energy + kVarh + Scale + Backward Flow + Rate 6
28	15.8.0	Active Energy - Absolute Value [|+A|+|-A|] {+kWh}	04	(03-06)	Uint32	Energy + kWh + Scale
29	16.7	Total (R+S+T) kW	03	(2B-2E)	Uint24	Power Total + W + Scale
30	36.7	Phase R kW	8340	(2B-2E)	Uint24	Power L1 + W + Scale
31	56.7	Phase S kW	838040	(2B-2E)	Uint24	Power L2 + W + Scale
32	76.7	Phase T kW	83C040	(2B-2E)	Uint24	Power L3 + W + Scale
33	131.7	Total (R+S+T) kVar	03	FB82A2(73-76)	Uint24	Reactive Power Total + kVarh/h + Scale
34	151.7	Phase R kVar	8340	FB82A2(73-76)	Uint24	Reactive Power L1 + kVarh/h + Scale
35	171.7	Phase S kVar	838040	FB82A2(73-76)	Uint24	Reactive Power L2 + kVarh/h + Scale
36	191.7	Phase T kVar	83C040	FB82A2(73-76)	Uint24	Reactive Power L3 + kVarh/h + Scale
37	13.7	Power Factor Phase Summation	02	FC06696850736F43(73-76)	Uint16	Power Factor Total + CosPhi + Scale
38	33.7	Power Factor Phase R	8240	FC06696850736F43(73-76)	Uint16	Power Factor L1 + CosPhi + Scale
39	53.7	Power Factor Phase S	828040	FC06696850736F43(73-76)	Uint16	Power Factor L2 + CosPhi + Scale
40	73.7	Power Factor Phase T	82C040	FC06696850736F43(73-76)	Uint16	Power Factor L3 + CosPhi + Scale
41	32.7	VRMS Phase R	8340	FD(46-49)	Uint24	Voltage L1 + Volt + Scale

42	52.7	VRMS Phase S	838040	FD(46-49)	Uint24	Voltage L2 + Volt + Scale
43	72.7	VRMS Phase T	83C040	FD(46-49)	Uint24	Voltage L3 + Volt + Scale
44	31.7	IRMS Phase R	8340	FD(59-5C)	Uint24	Current L1 + Ampere + Scale
45	51.7	RMS Phase S	838040	FD(59-5C)	Uint24	Current L2 + Ampere + Scale
46	71.7	IRMS Phase T	83C040	FD(59-5C)	Uint24	Current L3 + Ampere + Scale
47	C.7.0	Power Fail Count	02	FD75	Uint24	Times meter has been stopped
48	C.7.1	Phase R Fail Count	8240	FD75	Uint24	Times meter has been stopped
49	C.7.2	Phase S Fail Count	828040	FD75	Uint24	Times meter has been stopped
50	C.7.3	Phase T Fail Count	82C040	FD75	Uint24	Times meter has been stopped
51	14.7	Mains Frequency	03	FC027A48(73-76)	Uint24	Frequency + Hz + Scale
52	C.5.0	Status Flag	02	7C024353	Uint16	Status flags + SC - As in E350 manual
53	F.F	Error (always first in readout list)	02	FD17	Uint16	Error flags binary - device type specific (Error code bits as E350 manual)
54	82.8.1	Terminal cover removal counter	02	7C024354	Uint16	Terminal cover removal counter + TC
55	82.8.2	DC Field Count	02	7C02434D	Uint16	DC Field Count + MC
56	C.1.0	Meter ID	0C	78	BCD8	Fabrication No

57	C.1.1	Manufacturing ID	0D	FD0A	(01-08)(TEXT)	Enhanced identification + Text
58	0.0	Customer ID	HEADER	HEADER	HEADER	Lower 8 character as M-Bus meter Id in header. Fallback on C.1.0
59	0.2.0	Software Version	0D	FD0E	(01-nn)(TEXT)	Metrology (firmware) version + Text
60	0.2.1	Scheme ID / Parameter identification	0D	FD0B	(01-nn)(TEXT)	Parameter set identification + Text
61	128.8.0	Active Energy - Sum Phase Absolute Value ['SUM'|ALi|] {+kWh}	848040	(03-06)	Uint32	Energy + kWh + Scale + Device unit 2
62	130.8.0	Reactive Energy - Absolute Value [|+R|+|-R|] {+kVArh}	04	FB82(F3-F6)	Uint32	Reactive Energy + kVarh + Scale
63	131.8.0	Reactive Energy - Absolute Value [|+R|-|-R|] {+/-kVArh}	8440	FB82(F3-F6)	Uint32	Reactive Energy + kVarh + Scale + Device unit 1
64	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
65	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
66	16.8.0	Active Energy - Absolute Value [|+A|-|-A|] {+/-kWh}	8440	(03-06)	Uint32	Energy + kWh + Scale + Device unit 1

67	9.8.0	Apparent Energy [S] {+kVAh}	04	FC046841566B(73-76)	Uint32	Apparent Energy + "kVah" + Scale

Table 6 OBIS Code to M-Bus interpretation table

6.7 M-Bus commands

6.7.1 Initialize product (SND_NKE)

6.7.1.1 Master to slave

Byte index	Data	Description
0	0x10	Start character
1	0x40	C-Field = SND_NKE
2	0xnn	A-Field = Address of slave
3	0xnn	Checksum
4	0x16	Stop character

6.7.1.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.2 Request user data (REQ_UD2)

Request user data from product and wait for slave response.

6.7.2.1 Master to slave

Byte index	Data	Description
0	0x10	Start character
1	0x4b | 0x5b | 0x6b | 0x7b	C-Field = REQ_UD2
2	0xnn	A-Field = Address of slave
3	0xnn	Checksum
4	0x16	Stop character

6.7.2.2 Slave to master

Byte index	Data	Description
0	0x68	Start character 1
1	0xnn	L-Field 1
2	0xnn	L-Field 2
3	0x68	Start character 2
4	0x08	RSP_UD
5	0xnn	A-Field = Address of slave
6	0x72	Variable data respond, mode 1 = LSByte first
7-10	0xnnnnnnnn	Secondary address

11-12	0x9615	Manufacturer id “ELV”
13	0xnn	Generation field In the range from 01 to 09.
14	0x00	Device type / medium = electricity
15	0xnn	Access number
16	0xnn	Status byte 0x00 = Ok (no error) 0x12 = Error (temporary error + application error) Status byte will indicate an error on the following conditions: - No communication with meter The status byte will be cleared to 0x00 as soon as both error conditions disappear i.e. it is a non-latching error alarm.
17-18	0x0000	Signature, 16 bit binary
19..N	Data added as described in Table 5. (Only added on first telegram, not on sequential data readout using FCB-bit toggling)	
19..N+1 or N+1..N2	Optional dynamic data as in Table 6.	
N2+1	0x0F or 0x1F	End of telegram. More data available: 0x1F No more data available: 0x0F
N2+2	0xnn	Checksum
N2+3	0x16	Stop character

6.7.3 Set baud rate

Set baud rate of slave.

6.7.3.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x03	L-Field 1
2	0x03	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave

6	0xnn	CI-Field = Baud rate selection code: 0xb8 = 300 baud 0xb9 = 600 baud 0xbA = 1200 baud 0xbb = 2400 baud 0xbc = 4800 baud (note 1) 0xbd = 9600 baud (note 1) 0xbe = no change (note 2) 0xbf = no change (note 2) Baud rates > 2400 baud do work but have not been tested to comply with the timing specifications in the M-BUS standard. Baud rate codes 0xbe and 0xbf are ACKed with 0xe5 although they do not change the baud rate (this is in accordance with the M-BUS specification).
7	0xnn	Checksum
8	0x16	Stop character

6.7.3.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.4 Application reset

Restore all information to factory defaults, see Table 7. Sending Application reset without subcode will only reset the latched communication error flags.

6.7.4.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x04	L-Field 1
2	0x04	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x50	CI-Field = Application reset
7	0xb0	Application reset sub-code
8	0xnn	Checksum
9	0x16	Stop character

6.7.4.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.5 Set primary address

Change M-Bus primary address.

6.7.5.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x06	L-Field 1
2	0x06	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field
7	0x01	Primary address DIF
8	0x7A	Primary address VIF
9	0xnn	New primary address (0x00-0xfa)
10	0xnn	Checksum
11	0x16	Stop character

6.7.5.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.6 Set secondary address

Change M-Bus secondary address.

6.7.6.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x09	L-Field 1
2	0x09	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field

7	0x0c	Secondary address DIF
8	0x79	Secondary address VIF
9-12	0xnnnnnnnn	New Secondary address, 8-bit packed BCD
13	0xnn	Checksum
14	0x16	Stop character

6.7.6.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.7 Select slave

Select slave for further secondary addressing. After successful selection, the slave can be addressed using primary address 253.

6.7.7.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0xnn	L-Field 1 Variable depending on selection mask. The selection mask can have any size in the range 0..8 bytes except 5 (Manufacturer id requires a full 16-bit mask).
2	0xnn	L-Field 2 Variable depending on selection mask
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x52	CI-Field = Slave selection The slave will be deselected if there is any mismatch.
7-10	0xnnnnnnnn	*Optional* M-Bus secondary address mask, packed BCD The M-Bus ID mask can use the nibble 0xf as a wildcard in any of the eight BCD digit positions.

11-12	0xnnnn	*Optional* M-Bus manufacturer id mask, 16-bit binary The M-Bus manufacturer id mask can use 0xff as wildcard for one or both bytes.
13	0xnn	*Optional* M-Bus generation mask, 8-bit binary The M-Bus generation mask can use 0xff as wildcard.
14	0xnn	*Optional* M-Bus medium mask, 8-bit binary The M-Bus meter medium mask will match if 0x00 ("unknown") or 0xff (wildcard).
15	0xnn	Checksum
16	0x16	Stop character

6.7.7.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.8 Disconnector control

This command implements disconnector control configuration. Use this command to enable/disable disconnector and to set current disconnector state. This command only works if the meter has an internal disconnector, which is indicated by the identification string received from the connected meter.

6.7.8.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x07	L-Field 1
2	0x07	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field
7	0x01	Disconnector DIF
8	0xfd	Disconnector VIF
9	0x1a	Disconnector VIFE, digital output

10	0xnn	8-bit integer value with following bit-mask: Bit 7,6: - 00 = Do not change disconnector - 01 = EEPROM setting is ON - 10 = EEPROM setting is OFF - 11 (DC) Bit 5,4: - 00 = Do not change push-button turn-on enable - 01 = Push-button turn-on enabled - 10 = Push-button turn-on disabled - 11 (DC) Bit 3,2: - 00 = Do not change push-button turn-off enable - 01 = Push-button turn-off enabled - 10 = Push-button turn-off disabled - 11 (DC) Bit 1,0: DC The SND_UD disconnector status byte is mapped exactly like the corresponding RSP_UD disconnector control byte except for bits 1 and 0. After power-on, the disconnector actual state will be reported as unknown until the disconnector has been pulsed to the state saved in EEPROM. This does not happen until the disconnector drive capacitor has been fully charged.
11	0xnn	Checksum
12	0x16	Stop character

6.7.8.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.9 Set P1 sign-on password

Set meter P1 sign-on password. P1 password is obtained by Landis+Gyr on delivery and can be specified by customer.

6.7.9.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1

1	0x0D	L-Field 1
2	0x0D	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x01	Elvaco command byte – Set P1 password
9-16	0xnnnnnnnnnnnnnnnn	8 ASCII digits in the same order as the meter expects
17	0xnn	Checksum
18	0x16	Stop character

6.7.9.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.10 Set P2 sign-on key

Set meter P2 sign-on key. P2 key is obtained by Landis+Gyr on delivery and can be specified by customer.

6.7.10.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x15	L-Field 1
2	0x15	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x02	Elvaco command byte – Set P2 key
9-25	0xnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn	128-bit binary key (16 bytes), MSByte first
26	0xnn	Checksum
27	0x16	Stop character

6.7.10.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.11 Set meter rate

Used to manually set meter rate or to enable rate input usage on rate input A and B.

6.7.11.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x06	L-Field 1
2	0x06	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x03	Elvaco command byte – Set meter rate
9	0xnn	Rate selection, 8-bit binary as follows: 0x00: - Do not use rate selection 0x01 - 0x06: - Set rate 1..6 0xFF: - Use rate input A and B for rate selection
10	0xnn	Checksum
11	0x16	Stop character

6.7.11.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.12 Set meter rate mapping table for hardware rate input A nd B

Used to change the default rate input configuration for rate input A and B.

6.7.12.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x06	L-Field 1
2	0x06	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave

6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x00	Elvaco command byte – Set meter rate mapping
9	0xnn	Meter rate to use when input rate B=0 VAC A=0 VAC 8-bit binary in the range defined by the meter configuration. **Note**: Meter rate must be set to 0xFF, see 6.7.11.
10	0xnn	Meter rate to use when input rate B=0 VAC A=ACTIVE 8-bit binary in the range defined by the meter configuration. **Note**: Meter rate must be set to 0xFF, see 6.7.11.
11	0xnn	Meter rate to use when input rate B=ACTIVE A=0 VAC 8-bit binary in the range defined by the meter configuration. **Note**: Meter rate must be set to 0xFF, see 6.7.11.
12	0xnn	Meter rate to use when input rate B=ACTIVE A=ACTIVE 8-bit binary in the range defined by the meter configuration. **Note**: Meter rate must be set to 0xFF, see 6.7.11.
13	0xnn	Checksum
14	0x16	Stop character

6.7.12.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.13 Clear meter communication error flags

This command will clear CMi1020 meter communication error flags. Communication error flags can also be cleared using Application reset without sub code, see section 6.7.4.

6.7.13.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x05	L-Field 1
2	0x05	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x04	Elvaco command byte – Clear communication error flags
9	0xnn	Checksum
10	0x16	Stop character

6.7.13.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.14 Write OBIS code selection list

This command can be used to change which OBIS codes received from meter to include in OBIS to M-Bus telegram data interpretation. From factory, all OBIS codes received from meter will be interpreted.

6.7.14.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x0F	L-Field 1
2	0x0F	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x05	Elvaco command byte – Write OBIS selection list
9-18	0xnnnnnnnnnnnnnnnnnn	10 bytes of bitmask for OBIS code selection as follows:

		Mask[0] bit 0 = OBIS sel. bit 0 flag in bit 0 Mask[0] bit 7 = OBIS sel. bit 7 flag in bit 7 … Mask[9] bit 0 = OBIS sel. bit 72 flag in bit 0 Mask[9] bit 7 = OBIS sel. bit 79 flag in bit 7 See Table 6 (Sel. Bit column) for corresponding selection bit.
19	0xnn	Checksum
20	0x16	Stop character

6.7.14.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.15 Write P1/P2 sign-on method selection list

The Landis+Gyr meter configuration supports different sign-on methods depending on command to be executed. This command is used to set the sign-on method to use for different meter commands.

6.7.15.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x07	L-Field 1
2	0x07	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x06	Elvaco command byte – Write P1/P2 sign-on method list
9-10	0xnnnn	2 bytes of bitmask for P1/P2 sign-on method. Bit set indicates use of P2 sign-on method, otherwise P1. Bitmask as follows: Bit 15 – Bit 11: - Not used Bit 10: - Command 0xFF29, Write “Value, unit and OBIS” to LCD Bit 9: - Command 0xFF28, Write “Text

		message" to LCD Bit 8: - Command 0xFF27, Write "Generic status indicator" to LCD Bit 7: - Command 0xFF26, Write "Electricity status indicator" to LCD Bit 6: - Command 0xFF25, Write "Rate indicator" to LCD Bit 5: - Command 0xFF24, Write "OBIS code" to LCD Bit 4: - Command 0xFF23, Write "Unit" to LCD Bit 3: - Command 0xFF22, Write "Value" to LCD Bit 2: - Command 0xFF21, Disconnector control Bit 1: - Command 0xFF05, Rate control Bit 0: - Not used
11	0xnn	Checksum
12	0x16	Stop character

6.7.15.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.16 Write "Value" to meter LCD

This command sends "Value" to meter LCD according to meter command 0xFF22.

6.7.16.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x0B	L-Field 1
2	0x0B	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send

7	0x0F	Start of manufacturer specific DIF
8	0x22	Elvaco command byte – Write “Value” to meter
9	0xnn	Index
10-13	0xnnnnnnnn	32 bit mantissa, LSByte first
14	0xnn	Format
15	0xnn	Checksum
16	0x16	Stop character

6.7.16.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.17 Write “Unit” to meter LCD

This command sends “Unit” to meter LCD according to meter command 0xFF23.

6.7.17.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x07	L-Field 1
2	0x07	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x23	Elvaco command byte – Write “Unit” to meter
9	0xnn	Index
10	0xnn	Unit
11	0xnn	Checksum
12	0x16	Stop character

6.7.17.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.18 Write “OBIS code” to meter LCD

This command sends “OBIS code” to meter LCD according to meter command 0xFF24.

6.7.18.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x0B	L-Field 1
2	0x0B	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x24	Elvaco command byte – Write “OBIS code” to meter
9	0xnn	Index
10	0xnn	OBIS A
11	0xnn	OBIS B
12	0xnn	OBIS C
13	0xnn	OBIS D
14	0xnn	OBIS E
15	0xnn	Checksum
16	0x16	Stop character

6.7.18.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.19 Write “Rate indicator” to meter LCD

This command sends “Rate indicator” to meter LCD according to meter command 0xFF25.

6.7.19.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x07	L-Field 1
2	0x07	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x25	Elvaco command byte – Write “Rate indicator” to meter

9	0xnn	Index
10	0xnn	Rate
11	0xnn	Checksum
12	0x16	Stop character

6.7.19.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.20 Write “Electricity status” to meter LCD

This command sends “Electricity status” to meter LCD according to meter command 0xFF26.

6.7.20.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x08	L-Field 1
2	0x08	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x26	Elvaco command byte – Write “Electricity status” to meter
9	0xnn	Index
10-11	0xnnnn	16 bit, Electricity status bit mask. LSByte first.
12	0xnn	Checksum
13	0x16	Stop character

6.7.20.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.21 Write “Generic status” to meter LCD

This command sends “Generic status” to meter LCD according to meter command 0xFF27.

6.7.21.1 Master to slave

Byte index	Data	Description

0	0x68	Start character 1
1	0x07	L-Field 1
2	0x07	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x27	Elvaco command byte – Write “Generic status” to meter
9	0xnn	Index
10	0xnn	8 bit electricity status bitmask
11	0xnn	Checksum
12	0x16	Stop character

6.7.21.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.22 Write “Text message” to meter LCD

This command sends “Text message” to meter LCD according to meter command 0xFF28.

6.7.22.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0xnn	L-Field 1. Depending on text length
2	0xnn	L-Field 2. Depending on text length
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x28	Elvaco command byte – Write “Text message” to meter
9	0xnn	Index, 0-12
10	0xnn	Timeout
10-N	0xnn	1..14 characters including (optional) <CR>
N+1	0xnn	Checksum
N+2	0x16	Stop character

6.7.22.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

6.7.23 Write “Value+OBIS+Unit” to meter LCD

This commands sends “Value+OBIS+Unit” to meter LCD according to meter command 0xFF29.

6.7.23.1 Master to slave

Byte index	Data	Description
0	0x68	Start character 1
1	0x11	L-Field 1
2	0x11	L-Field 2
3	0x68	Start character 2
4	0x43 | 0x53 | 0x63 | 0x73	C-Field = SND_UD
5	0xnn	A-Field = Address of slave
6	0x51	CI-Field = Data send
7	0x0F	Start of manufacturer specific DIF
8	0x29	Elvaco command byte – Write “Value+OBIS+Unit” to meter
9	0xnn	Index, 0-12
10-13	0xnnnnnnnn	32 bit mantissa, LSByte first
14	0xnn	Format
15	0xnn	Unit
16	0xnn	OBIS A
17	0xnn	OBIS B
18	0xnn	OBIS C
19	0xnn	OBIS D
20	0xnn	OBIS E
21	0xnn	Checksum
22	0x16	Stop character

6.7.23.2 Slave to master

Byte index	Data	Description
0	0xe5	Acknowledge

7 Troubleshooting

7.1 Pressing push-button does not toggle disconnector output

Please verify meter and CMi1020 configuration:

- Disconnector control configuration, see M-Bus command disconnector control chapter 6.7.7.2.
- P1 and P2 password configuration of the meter
- P1 and P2 specific command usage, see section 6.7.15.
- Verify correct meter type (must be a disconnector equipped meter)

7.2 Rate input does not change meter rate

Please verify meter and CMi1020 configuration:

- Rate control configuration, see section 6.7.11.
- P1 and P2 password configuration of the meter.
- P1 and P2 specific command usage, see section 6.7.15.
- Verify correct meter type (must be a rate configured meter)

7.3 There is a delay when toggling disconnector

There is an internal process for toggling the disconnector which takes approximately 10 seconds, i.e. toggling disconnector cannot be done faster than 10 seconds. This also applies to when pushing the push-button.

7.4 Product does not respond to M-Bus master commands

Please verify your M-Bus slave configuration and connection:

- Voltage over M-Bus connection should be between 21 VDC and 42 VDC.
- All M-Bus slaves connected to the M-Bus master must have unique primary addresses or secondary addresses depending on addressing mode used.
- Verify M-Bus slave baud rate used by M-Bus master. M-Bus master baud rate must be identical to M-Bus slave baud rate.

8 Technical specifications

8.1 Characteristics

Type	Value	Unit	Comments
Mechanics			
Casing material	Polycarbonate	-	
Protection class	IP20	-	
Dimensions (w x h x d)	166 x 92 x 35	mm	
Weight	108	g	
Mouting	In Landis+Gyr E350 meter	-	
Electrical connections			
Supply voltage	From M-Bus	-	
Rate inputs	Screw terminal	-	Cable 0.25-1.5 mm², 0.5 Nm tightening torque
Connection M-Bus	Screw terminal	-	Cable 0.25-1.5 mm², 0.5 Nm tightening torque
Electrical characteristics			
Nominal voltage	21-42	VDC	Independent of wiring polarity
Installation category	CAT 4	-	CAT 3 for rate inputs
Unit loads	1/1.5	T/ mA	
Rate input low voltage	<24	VAC	
Rate input high voltage	>24	VAC	
Rate input max voltage	230	VAC	
Rate input minimum detection time	5	s	
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 40°C	-	
Operating altitude	0-2000	m	
Pollution degree	Degree 2	-	
Usage environment	Indoors	-	
Storage temperature	-40 to +70	°C	
User interface			
Green LED	Communication with meter	-	
Red LED	Error	-	
Tryckknapp	Breaker functionality	-	Keep pressed down for at least 1 second.

M-Bus			
Interfaces	M-Bus slave	-	
M-Bus slave interface			
M-Bus standard	EN 13757	-	
M-Bus baud rate	300 and 2400	bit/s	
Addressing modes	Primary, secondary	-	
M-Bus information	All OBIS fields from meter		
Integration			
Meter implementation	Landis+Gyr E350	-	
Maximum number of connected meters	1	-	

Table 7 Technical specifications

8.2 Factory defaults

Name	Value	Unit	Comments
M-Bus Baud rate	2400	Bit/s	M-Bus slave baud rate
M-Bus primary address	0	-	Slave not installed
M-Bus secondary address	Fabrication number	-	Will use meter OBIS code 0.0 and C.1.0 after first successful readout
Disconnector	On	-	Disconnector status
Push-button turn-off	Enabled	-	User can press button to turn off disconnector
Push-button turn-on	Enabled	-	User can press button to turn on disconnector
P1/P2 method selection mask	All commands are set to use P1 access	-	
OBIS selection mask	All OBIS codes received from meter are included in OBIS to M-Bus interpreter		
Rate	Disabled (=0)		
P1	88888888		
P2	16 byte with 0x99		

Table 7 Factory default values

9 Type approvals

CMi1020 is designed to comply with the directives and standards listed below.

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

Table 8 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 CMi1020 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.

11 Document History

Version	Date	Description	Author
1.0	2010-06-01	First release	David Vonasek
2.0	2010-10-27	Release web. Updated Flex->E350. Minor fixes.	David Vonasek
3.0	2011-01-11	Added document id in footer. Minor fixes	David Vonasek
4.0	2011-06-15	- Added Elvaco command 0x00, Set meter rate mapping table. - Corrected byte index in command Set meter rate	David Vonasek
5.0	2016-08-25	Updated the technical specifications	Anton Larsson

11.1 Document software and hardware appliance

Type	Version	Date	Comments
Hardware	R2B	2010-07-02	
Software	>=1.2.0	2010-05-30	

12 References

12.1 References

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

D000027979 E350 ZxF100Ax Cx series 2 User Manual.pdf
ZxF100Ax/Cx E350 series 2 User Manual

12.2 Terms and Abbreviations

Abbreviation	Description
Product	In this document CMi1020
DIF	Data Information Field (M-Bus data clock information)
VIF	Value Information Field (M-Bus value block information)
M-Bus slave	General in this document CMi1020

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)