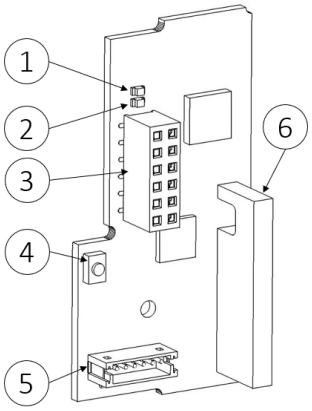
CMi4170

Integrated MCM for Engelmann Sensostar S3/S3C, LoRaWAN

INTRODUCTION

CMi4170 is an integrated meter connectivity module that is mounted inside an Engelmann Sensostar S3/SC3 heating/cooling meter to deliver meter data via a LoRaWAN network. For a complete description of the product or for information in other languages, please visit the Elvaco AB website, https://www.elvaco.com.



1. Green LED
2. Red LED
3. Interface Connector
4. Push Button
5. Pulse Input
6. LoRaWAN Antenna

Note: The NFC antenna is located in the edge of the PCB

MOUNTING

CMi4170 is mounted in the module slot of an Engelmann Sensostar S3/S3C meter. Grab the device by the outer edges and gently press it into position.

Please make sure that the module's push button (4) is facing upwards and that the interface connector of the meter fits the interface connector of the module (3).

NOTE

Electrostatic-sensitive device. Please observe the necessary ESD protective measures when installing the module.

ACTIVATION

By default, CMi4170 is set to passive mode, which means no messages will be transmitted from the module until it is activated. The module can be activated in one of the following ways:

By using the Elvaco OTC App: Open the Elvaco OTC app (available in Google Play).
1. Scan the module, make sure NFC is activated on the phone.
2. In Elvaco OTC App, go to the "APPLY" tab,
3. Set "Power mode" to "Active"
4. Click "APPLY" in the bottom of the screen
5. Scan the module to apply new settings.

By using the module push button: Press down the push button of the module for at least five seconds until the green LED lights up.

By using the Engelmann optical interface configuration tool "Device monitor" or **By using using the meter menu** (for further information please refer to Engelmann documentation).

When activated, CMi4170 will attempt to join the LoRaWAN network by the following sequence:
1. Red LED – One flash
2. Green and Red LED – Lights simultaneously up for 1 second
3. Green LED – Several flashes while trying to connect to the LoRaWAN network
4. Green LED – Lights up for 8 seconds when module succeeds in joining the LoRaWAN network.

If the module fails to join the LoRaWAN network, it will perform retries until it succeeds. The time between each attempt will increase for every attempt until it is performed once every day.

A new join attempt cycle can be manually started at any time by rebooting the module (press and hold the push button (4) for 5-15 seconds, release the button when the green LED is lit) or by deactivating and activating the module using the Elvaco OTC App.

INITIAL DATA RATE CALIBRATION

When activated, CMi4170 will initially transmit messages every minute in order to let the LoRaWAN network adjust to an optimal data rate. After three minutes, the module will start using its normal settings where the message transmit interval is determined by the device configuration.

DEVICE CONFIGURATION

Before configuring the module, please make sure to apply the correct configuration settings or profile by using the Elvaco OTC App. Settings are transferred to the device using NFC.

Join EUI – The Join EUI sets the identification number of the application server where data from the module will be delivered. The Join EUI is by default set to 94193A030C000001 in all CMi4170 modules.

Activation type – There are two different activation types for LoRaWAN: Over-the-air activation (OTAA) and Activation by personalization (ABP). Elvaco strongly recommends using OTAA, where all network keys are generated each time the module joins the LoRaWAN network. In contrast, for ABP, all keys are set manually and stay constant over time.

Application key – The application key of each CMi4170 device is generated by Elvaco and used in OTAA mode to generate network keys when the module joins the LoRaWAN network. Keys are managed in a secure way using Elvaco's OTC (One Touch Commissioning) solution which includes the Elvaco OTC App for configuration.

Message format – CMi4170 supports several different message formats. Please refer to the CMi4170 user's manual for more information about the structure and payload of each message format.

Transmit interval – The transmit interval parameter is used to set the module transmits messages.

EcoMode – EcoMode can be enabled to achieve a battery life of 10+1 or 6+1 years. The EcoMode table is then used to determine how often the module is allowed to transmit data for each data rate. If the transmit interval exceeds the limit in the EcoMode table, it will be lowered accordingly.

Configuration lock – CMi4170 has a configuration lock feature which can be used to prevent unauthorized users to access the module. When configuration lock has been enabled, a user needs the device-specific Product Access Key in order to access the device. Keys are managed in a secure way using Elvaco's OTC solution which includes the mobile application for configuration.

After you have set the configuration parameters, place the phone next to the meter and click Apply settings. Hold the phone still until it vibrates three times, this confirms that new settings have successfully been transferred to the device via NFC.

SERVER CONFIGURATION

Before CMi4170 is able to transmit messages on the LoRaWAN network, device information needs to be added to the network server. More specifically, the following parameters needs to be registered (in OTAA mode) in order to enable the network server to receive messages from the module:

- Device EUI (16-digit number printed on the device label)
- Application key
- Join EUI

NOTE

If activation mode is set to "ABP" the following information will be needed: Network session key, Application session key and Device address.

TECHNICAL SPECIFICATIONS

Mechanics	
Dimensions	29 x 56 x 12 mm
Weight	9 g
Mounting	In module slot of Engelmann Sensostar S3/S3C
Electrical connections	
Supply voltage	Internal meter battery or PSU (Engelmann External Power Supply)
Electrical characteristics	
Nominal voltage	3.0 VDC
Power consumption (max)	50 mA
Power consumption (sleep mode)	~2.5 µA
Environmental specifications	
Operating temperature	+5 °C to +55 °C
Operating humidity	0 - 93 % RH, no condensation
Operating altitude (max)	2000 m
Usage environment	Indoors
Storage temperature	-20 °C to 60 °C
Radio characteristics	
Frequency	868 MHz
Output power	14 dBm
Receiver sensitivity	-135 dBm
LoRaWAN characteristics	
Device class	Class A, Bi-directional
LoRa version	1.0.2 Rev B
Activation	OTAA or ABP
Data rate	DR0-DR5 (250 bit/s-5470 bit/s)
User interface	
Green LED & Red LED	Indication for start-up / reboot / switch-off
Push button	Start-up / reboot / switch off module
Configuration	Elvaco OTC app, Downlink or Engelmann optical configuration tool "Device Monitor"
Approvals	
EMC	EN 301 489-1, EN 301 489-3
LoRa Alliance	LoRaWAN® Certified

SIMPLIFIED DECLARATION OF CONFORMITY

Hereby, Elvaco declares that the product is in compliance with the following directives:

EU:

- 2014/53/EU (RED)
- 2014/30/EU (EMC)
- 2014/35/EU (LVD)
- 2011/65/EU + 2015/863 (RoHS)

UK:

- 2017 No. 1206
- 2016 No. 1091
- 2016 No. 1101
- 2012 No. 3032

The complete Declaration of Conformity can be found at www.elvaco.se/en > Search on product.

SAFETY

The warranty does not cover damage to the product caused by usage in any other way than described in this manual. Elvaco AB can not be liable for personal injury or property damage caused by usage in any other way than described in this manual.

CONTACT INFORMATION

Elvaco AB Technical support:

E-mail: support@elvaco.com
Online: www.elvaco.com

© 2022, Elvaco AB. All rights reserved. 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. No part of the contents of this manual may be transmitted or reproduced in any form by any means without the written permission of Elvaco AB. Printed in Sweden.

CMi4170 Quick Manual English
Document id: 1090150
Version: 1.1

RG2i Spécialiste IoT & M2M
14 rue Edouard Petit
42000 St-Etienne
Tel : +33 477 92 03 56
Email : contact@rg2i.com
www.rg2i.com