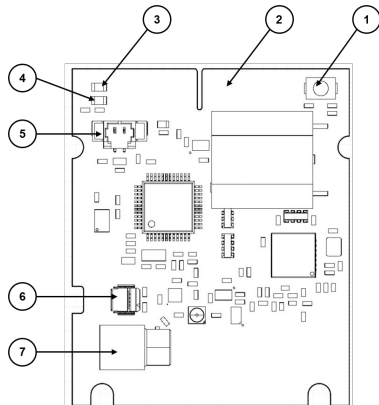


Introduction

CMi4160 is a meter connectivity module mounted inside a Diehl SHARKY 775 heating/cooling meter, or a Diehl SCYLAR INT 8 energy calculator, enabling meter data to be transmitted to a server via a LoRaWAN® network. CMi4160 can be retrofitted into deployed meters and is suitable for applications requiring long-range wireless data transmission. The module is easily configured using the Elvaco OTC mobile app.

For a complete description of the product, or for information in other languages, visit the Elvaco AB support website, <https://support.elvaco.com>.

Parts overview



1. Push button
2. Meter interface (meter interface cable not shown)
3. Green LED
4. Red LED
5. Power connector
6. NFC antenna connector
7. Antenna connector (MCX, used for both internal and external antennas)

Mounting the meter connectivity module

Mount the module in a Diehl SHARKY 775 or Diehl SCYLAR INT 8 by following the procedure below.

1. **Open the meter housing** using the two hatches on the short sides of the meter.
2. **Connect the meter interface cable** to meter slot 1 (see image below).
3. **Install the module** into meter slot 1 (see image below). The guiding pins help position the module correctly.



Note

To be able to align the NFC antenna correctly, only meter slot 1 can be used.

4. **Connect the NFC antenna to the module** (if not already connected). Remove the protective film covering the adhesive on the back of the NFC antenna.



Tip

After connecting the antenna and removing the film, it is recommended to first position the larger part, followed by pressing the thin part of the antenna into position.

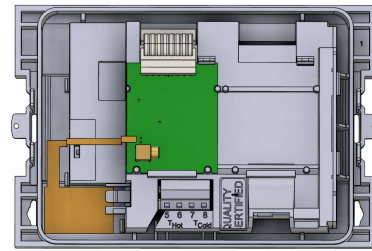
5. **Connect the meter interface cable** to the module.
6. **Connect the selected antenna** to the MCX connector.



Note

The following sections describe how to connect either an internal or an external antenna. Follow the antenna connection procedure before connecting power and closing the lid.

7. **Connect the power connector** to the module.
8. **Close the meter housing.**



Caution

This is an electrostatic-sensitive product. Observe the necessary ESD protective measures when installing the product.



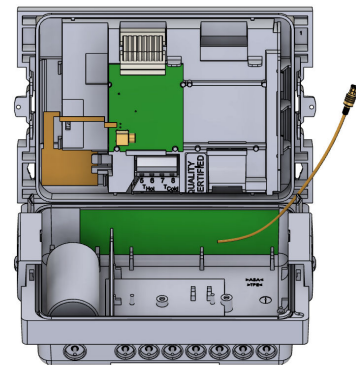
Warning

Installations must be performed in the order listed in this manual, by qualified personnel only, and in accordance with national electrical specifications and applicable local regulations.

Connecting the antenna

Using internal antenna

1. Place the antenna in the meter housing as shown below.



2. Connect the antenna cable to the MCX antenna connector on the module.



Note

Make sure not to clamp the antenna cable when closing the lid.

Using external antenna

1. Make a hole in the rubber grommet or seal and push the MCX connector through. Ensure that the thicker part of the antenna cable is positioned inside the grommet.
2. Connect the antenna cable to the MCX antenna connector on the module.

Activating the module

Upon delivery, the module is set to inactive mode, meaning no messages are transmitted. The module can be activated in one of the following ways:

Via the Activation at flow feature

1. Make sure the module is configured with the Automatic activation at flow feature enabled. Use the Elvaco OTC App to check that the correct configuration is applied. To have the function enabled, **Power mode** should be set to **Standby**.
2. Once the meter has registered sufficient water flow, the module will be activated and start delivering meter data. The module checks hourly for sufficient water flow.



Note

Sufficient water flow is when the meter has registered continuous water flow for 3 hours.

CMi4160 Quick Manual

Via the module push button

1. Carefully press the module push button for at least five seconds.
2. Release the button when the green LED lights up.
3. Wait up to 10 seconds for the module to start.

Start-up is indicated by flashing red and green LEDs for one second.

Via Elvaco OTC App

1. Open the Elvaco OTC App (available for Android and iOS).
2. Scan the device (make sure NFC is enabled on the phone).
3. Go to **Apply mode**.
4. Set the power mode to **Active**.
5. Select **Apply settings**.
6. Scan the device again to apply new settings.
To verify that it has been activated, go to **Inspect**, scan the device, and make sure that power mode is set to **Active**.



Tip

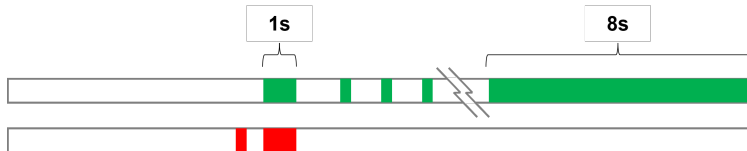
With the meter closed and the display facing you, the NFC antenna is located in the upper left corner of the meter.

Joining the LoRaWAN® network

When activated, the product will attempt to join the LoRaWAN® network by the following sequence:

1. Red LED – One flash
2. Green and Red LED – Light up simultaneously 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 the module succeeds in joining the LoRaWAN® network

The network join sequence is illustrated in the figure below:



Network join LED indication

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 per day. A new join attempt cycle can be manually started at any time by using the push button to reboot the module or by deactivating and reactivating the module using the Elvaco OTC App.

When the module has joined the LoRaWAN® network, it will perform three quick transmissions (regardless of transmit interval settings) before starting to use its configured transmit interval settings. By using the Elvaco OTC App, you can easily verify that the module is successfully communicating with the meter ("Meter communication") and is connected to the LoRaWAN® network ("Network joined").

LoRaWAN® end-device activation

Before being able to transmit data over a LoRaWAN® network, the device must be personalized and activated. This can be done in two ways: Over-the-air activation (OTAA) or Activation by Personalization (ABP). For security reasons, Elvaco strongly recommends using OTAA, where all network keys are generated each time the device joins the LoRaWAN® network.

In contrast, for ABP, all keys are set manually and stay constant over time. The tables below list the required information depending on the activation mode.

In OTAA mode

Device EUI	16-digit unique identification number (not configurable).
Application key	The application key of each device is generated by Elvaco and used in OTAA mode to generate network keys when it joins the LoRaWAN® network.
JoinEUI	Sets the identification number of the join server. The identification number is set to a default value in all devices. The default value is presented in Elvaco OTC configuration options.

In ABP mode

Device EUI	16-digit unique identification number (not configurable).
Application session key	Used for payload encryption and decryption.
Network session key	Used by both the device and the network server.

Key device settings (summary)

The table below lists key settings required for commissioning. For the full configuration reference, see the User Manual.

Configuration	Note
Activation type	OTAA or ABP. For security reasons, Elvaco strongly recommends using OTAA.
Message format	CMi4160 supports several different message formats. The chosen format decides what meter registers are sent from the module.
Transmit interval	Determines how often messages are transmitted from the module.
EcoMode	To ensure a battery lifetime of 11 years, EcoMode must be enabled. EcoMode adapts the transmit interval depending on the radio conditions.
Configuration Lock	Enabling the configuration lock prevents unauthorized access to the module. When enabled, the user must have the PAK (product access key) in possession to configure the device.
JoinEUI	CMi4160 Internal antenna (G1): 94193A0303000001 CMi4160 External antenna (G1): 94193A0304000001 CMi4160 G2: 94193A0310000001



Note

Configuration changes can be made locally using the Elvaco OTC App, or remotely using LoRaWAN® downlink commands.

Simplified Declaration of Conformity

Hereby, Elvaco declares that CMi4160 is in compliance with the following directives:

EU	UK
2014/53/EU (RED)	2017 No. 1206 (RED)
2014/30/EU (EMC)	2016 No. 1091 (EMC)
2014/35/EU (LVD)	2016 No. 1101 (LVD)
2011/65/EU + 2015/863 (RoHS)	2012 No. 3032 (RoHS)
See EU Declaration of Conformity for a complete EU DoC.	
See UK Declaration of Conformity for a complete UK DoC.	

