

Introduction

CMi4240 is a meter connectivity device mounted inside a Kamstrup MULTICAL® 403/603/803 heating/cooling meter, enabling meter data to be sent to a server via a LoRaWAN® network. CMi4240 can be retrofitted into deployed meters and is suitable for applications requiring long-range wireless data transmission. The device 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>.

Mounting the product

CMi4240 can be used in a Kamstrup MULTICAL® 403/603/803 heating/cooling meter (check the support site for a complete compatibility list). If the product is not mounted in the meter upon delivery, it is easily installed by following the procedure below:



Caution

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

1. **Open the meter housing.**
2. **Apply ESD precautions.** Make sure you are grounded (e.g., by touching the meter's metal pipe or a metal part which is electrically connected to it).
3. **Install the device.** Hold the device by the outer edges and gently press it into position in an available slot in the meter.
4. **Attach the LoRaWAN® antenna.** Route the antenna cable using the guiding pins in the meter housing. Connect the antenna to the MCX connector on the device.



Caution

When using an external antenna, make sure to mount it at least 0,5 meters away from the meter to avoid interference.

5. **Close the lid of the meter.** When closed, the device will receive power from the meter.

Activating the product



Note

Before activating the device, and trying to join a LoRaWAN® network, make sure the LoRaWAN® network server in use is prepared with necessary device- and security-related information. Security keys for Elvaco devices can be accessed in Elvaco EVO, [Elvaco EVO Login](#).

Upon delivery, the device is set to inactive mode, which means no messages will be transmitted from it before being activated. It can be activated in two ways: via the buttons on the meter, or via the Elvaco OTC App:

Activation via the meter buttons

- **On MULTICAL® 403**, press and hold both buttons on the front of the meter until “CALL” is displayed.

- **On MULTICAL® 603 and MULTICAL® 803**, press and hold the two arrow buttons on the front of the meter until “CALL” is displayed.

Activation via the 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 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**.



NFC scanning position

MULTICAL® 403: Place the phone in the center of the raised section on the back of the meter.

MULTICAL® 603: The meter has two slots:

- Left slot: Middle of the raised back section
- Right slot: Right side of the raised back section

MULTICAL® 803: Open the meter and place the phone close to the device.

Joining the LoRaWAN® network

When activated, the device will attempt to join a LoRaWAN® network. If it fails, it will perform retries until it succeeds. The time between each attempt will increase for every attempt until it's performed once per day. A new join attempt cycle can be manually triggered by deactivating and activating the device using the Elvaco OTC App.

When the device has joined a LoRaWAN® network, meter data will initially be transmitted every minute (regardless of transmit interval settings) in order to set the right data rate. After three minutes of calibration, the device will start delivering meter data using its configured settings. By using the Elvaco OTC App, you can verify that the device 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).

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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.

Technical specifications

Mechanics	Value
Dimensions (W x H x D)	90 x 12 x 35 mm
Weight	33 g
Mounting	In available slot of Kamstrup MULTICAL® 403/603/803
External antenna connector	MCX

Electrical connections	Value
Supply voltage	Powered via the meter.

Electrical characteristics	Value
Nominal voltage	3.0 VDC
Power consumption (max)	50 mA
Power consumption (sleep mode)	2.5 µA

Environmental specifications	Value
Operating temperature	+5 - +55 °C
Operating humidity	0 - 93 % RH, no condensation
Operating altitude	2000 m
Pollution degree	Degree 1
Usage environment	Indoors
Storage temperature	-20 - 60 °C

Radio characteristics	Value
Frequency	915 MHz
Output power	20 dBm
Receiver sensitivity	-135 dBm

LoRaWAN® characteristics	Value
Device class	Class A, bi-directional
LoRaWAN® version	1.0.2
Regional parameters	US915
Activation	OTAA or ABP
Data rate	DR0 - DR3
JoinEUI	94193A0312000001

User interface	Value
Push button	Start-up / reboot / switch off device
Configuration	NFC via Elvaco OTC app or via downlink

Approvals	Value
LoRa Alliance®	LoRaWAN Certified ^{CM}
EMC	EN 301489-1, EN 301489-3

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Caution

The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.



Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF exposure statement

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and any part of your body.

Canadian Compliance Statement

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada license-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF exposure statement

This equipment meets the exemption from the routine evaluation limits in section 6 of RSS-102. It should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

Cet équipement est conforme à l'exemption des limites d'évaluation habituelle de la section 6 de la norme RSS-102. Il doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et toute partie de votre corps.