

NB-IoT and 2G/4G modules

HC-003-56 and HC-003-80



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In general

The purpose of this guide is to describe how to mount an NB-IoT module and 2G/4G Network Module, HC-003-56 and HC-003-80, in MULTICAL® 403, MULTICAL® 603 and MULTICAL® 803 as well as how to mount an external antenna and troubleshoot the installation. Both modules are covered in this guide.

Note HC-003-80 is not available for MULTICAL® 403.

NB-IoT module

<https://www.kamstrup.com/en-en/heat-solutions/meters-devices/modules/hc00356-nb-iot>

2G/4G Network Module

<https://www.kamstrup.com/en-en/heat-solutions/meters-devices/modules/hc00380-2g4g-network>

Further information about compatible meters is available here:

MULTICAL® 403

<https://www.kamstrup.com/en-en/heat-solutions/meters-devices/meters/multical-403>

MULTICAL® 603

<https://www.kamstrup.com/en-en/heat-solutions/meters-devices/meters/multical-603>

MULTICAL® 803

<https://www.kamstrup.com/en-en/heat-solutions/meters-devices/meters/multical-803>

Contact info for Kamstrup Support

Kamstrup Support can be contacted by phone, email or by creating a case via My Kamstrup:

Tel: +45 8993 1110

Email: supportdk@kamstrup.com

Log in via My Kamstrup: <https://apps.kamstrup.com/>

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1 Prerequisites

Before installing a meter, the TEK and DEK keys must be imported into READY. The TEK key is the module's encryption key and the DEK key is the meter's encryption key.

In READY, navigate to Configuration and Infrastructure to see if a TEK key has been imported for a P2P module. In this guide, the module with NB-IoT S/N: 79719092 is used. It can be seen in figure 1 that several devices have been imported. The date of the last reception of data is shown, and if there is a problem with the device, a red triangle appears. For the marked module, there has not been contact yet, and therefore, the field Last seen is empty.

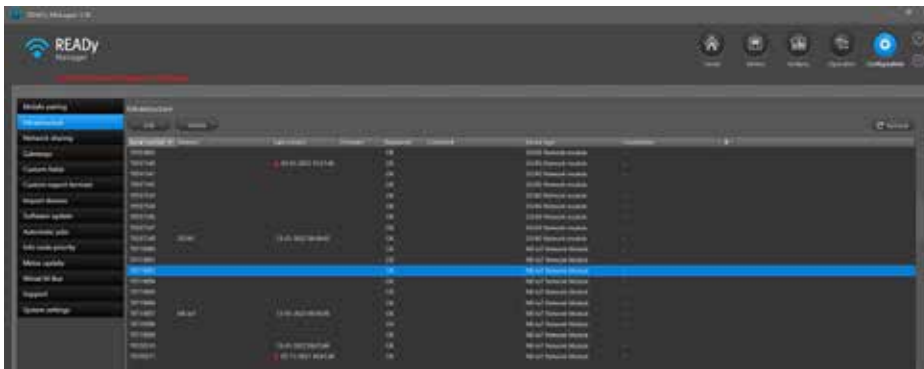


Figure 1 Overview of imported infrastructure devices

The DEK key appears as an imported meter under Meters. In this guide, the MULTICAL® 603 meter with S/N: 80954289 is used. Once the module has transmitted data for the first time, the connection between the module and the meter is established automatically in READY. The address under Infrastructure reflects the address provided for the attached meter.

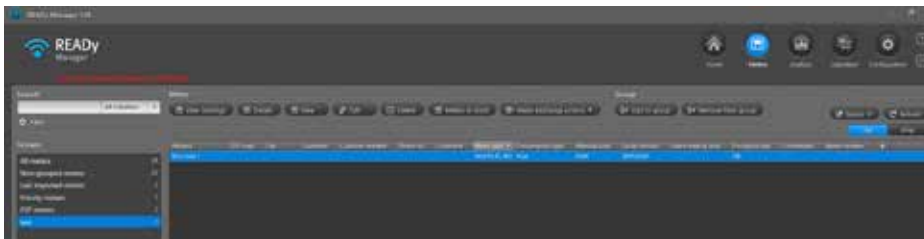




Figure 2 Imported meters


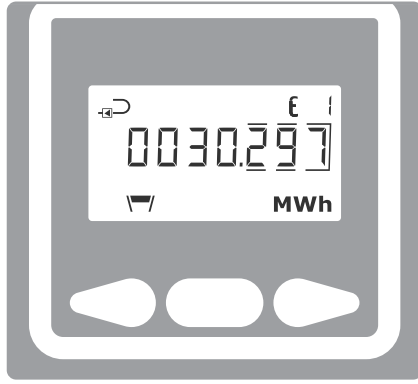
2 Mounting the meter and the antenna

When mounting the antenna, the cable must be mounted without sharp bends. It must not be twisted around the cable relief as this can damage the cable and the performance of the antenna.

Wrong installation	Correct installation
	
<p>The antenna cable is twisted around the cable relief and thus has a sharp bend.</p>	<p>The antenna cable is mounted without sharp bends.</p>

It is important that the antenna is mounted as high as possible and with large distance to other antennas and steel pipes to avoid noise and disturbances. If the meter is mounted in a metal cabinet, the antenna must be mounted outside the metal cabinet, otherwise, the transmission power of the meter will be increased causing a reduced battery lifetime. When the antenna has been mounted, close the calculator, and activate the CALL function.

1 Mounting the module

	
<p>When the module has been correctly mounted, you must attach the disconnected calculator and let the meter start up correctly until KWh or MWh is shown in the display.</p>	

2 The CALL function

<p>1 Press and hold down the two outermost push buttons on the calculator until the display shows "CALL", and release the buttons after 3 seconds.</p>	<p>2 After maximum 1 minute, the display must show "OK" in the bottom left corner, indicating connection with REAdy Manager.</p>

You can use the meter’s display to read out the meter’s connection information. If the second digit in display menu 47 is 1 or below, you must move the antenna to a better location. In some circumstances, it may be necessary to extend the cables and to use an antenna with SMA connector as shown in Table 1 on page 7.

3 Accessing "TECH loop"

<p>1 Press and hold the middle button down until the display shows "1-User".</p>	<p>2 Push the right arrow button until the display shows "2-Tech" and confirm by pressing the middle button to access "TECH loop".</p>

4 Accessing connection information

<p>1 Press the buttons to access menu 2-101-03 and to read out menu index 47.</p>	<p>2 Verify the data in the table below.</p>

2.4.1 2-x01-3: Connection information

Menu	Menu index	Information	Example of display reading
2-x01-3	47	Connection information with 2 digits of information	

The first digit indicates the mobile connection:

- 2: Connected to the 2G mobile infrastructure
- 4: Connected to the 4G mobile infrastructure
- 9: Connected to the NB-IoT infrastructure

The second digit indicates the connection quality:

- 0: Very poor
- 1: Poor
- 2: Fair
- 3: Good
- 4: Excellent

1 Note that this information is a snapshot at one point in time. Kamstrup Support has access to log data for a thorough analysis.

The antenna cable can be extended as shown in the below table. Be aware that when using the extension cables, another antenna than the standard mini triangle antenna is needed.

MULTICAL® 603	5000 292	5000 429: 5 m 5000 441: 10 m 5000 442: 15 m 5000 443: 20 m 5000 444: 55 m	6699 484

Table 1

3 Connecting to READy Manager

When the CALL function in the meter has been activated, the meter will try to establish contact to the READy servers. If the call is successful, the Last seen time in READy for the module under Infrastructure, like in figure 1, now affects the time of the CALL. When the module sends data for the first time, READy automatically recognizes which meter is connected to which module.

4 Troubleshooting

If no OK appears in the meter display after the CALL function has been activated, you can see further information in the display.

You can also test if the meter has been read via your mobile phone:

- 1 Open a browser, and enter <https://check.kamstrup.com/>.
- 2 Enter the serial number of the meter or the module.
- 3 Press the button "Test the connection".

Display information

Menu index 49 can also be helpful in troubleshooting.

4.4.1 2-x01-4: Module status

Menu	Menu index	Information	Example of display reading
2-x01-4	49	Module status	

Typical status codes during installation:

- 255 No connection attempted yet
- 0 Transfer OK and all data sent
- 1 Waiting for the network registration to complete
- 2 Registration of network declined
- 3 Waiting for a receipt from server
- 4 Registration of network failed
- 5 Missing antenna
- 6 Connection error due to low voltage
- 7 Data delivery timeout
- 8 Data delivery timeout without an ACK
- 9 Could not connect
- 10 Waiting for transfer
- 11 DNS lookup error
- 16 Flash write error
- 32 Server error (possibly missing/wrong TEK)
- 33 Waiting for connection
- 34-35 Internal error

If no connection can be established, please contact Kamstrup Support with the following information:

Meter serial no.

2G/4G or NB-IoT serial no.

Display index 47 and 49