

# Kamstrup radio network for heat, cooling and cold water meters



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# 1. Application

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A Kamstrup radio network is used when remote reading of data from Kamstrup energy meters is required.

Dimensioning and projecting of the radio network are made by Kamstrup A/S.

A Kamstrup radio network consists of:

- Kamstrup energy meters with a radio module
- A number of RF Routers to establish radio communication between the RF Concentrators and each individual energy meter.
- One or more RF Concentrators depending on the number of energy meters, the amount of data to be transferred and the geographical distance between the energy meters and the network components.
- A Kamstrup GSM/GPRS Modem to send and receive data between the RF Concentrator and the utility.

## 2. Installation of components

### 2.1. RF Router

An RF Router is a battery-driven network component and is therefore very flexible when it comes to installation.

With an RF Router the utility will be able to establish a network between the individual metering points and the central network unit, RF Concentrator. The RF Router establishes radio connection between the individual energy meters and RF Concentrators for transport of data.

An RF Router handles radio communication for up to 70 other radio units (energy meters, RF Router, RF Concentrator).

An RF Router is delivered with an internal antenna. An external antenna can easily be installed.



### 2.2. RF Concentrator

An RF Concentrator is the central network unit that contains reading jobs and data for up to 680 other radio units, thus the RF Concentrator is mains supplied.

The RF Concentrator sends out an inquiry to the individual energy meters and stores the data read. If the RF Concentrator is not able to communicate directly with the individual energy meters, an RF Router is installed ensuring that data can be transmitted between the individual radio units.

The RF Concentrator must always be installed with an external antenna to provide the best possible radio range.



### 2.3. GSM/GPRS Modem

Kamstrup's radio network uses GSM/GPRS technology to transfer data between the RF Concentrator and the PC used for data acquisition. The GSM/GPRS Modem is connected to the RF Concentrator via the enclosed 3-wire data cable.

To avoid disturbances it is necessary to install GSM/GPRS Modem min. 1 m from the RF Concentrator. If GSM/GPRS Modem uses an external antenna, the same distance between the 2 antennas must be kept.

For further details, see the installation guide for Kamstrup's GSM/GPRS Modem.



*The data connection between the RF Concentrator and the GSM/GPRS Modem is established in the following way:*

- Brown = DAT (62)
- White = REQ (63)
- Green = GND (64)



## 2.4. External antenna, type Triangle 6699-407

This external antenna with 1.5 m RG174 antenna cable is used for the RF Router, for radio modules in heat, cooling and cold water meters and for GSM/GPRS Modem.

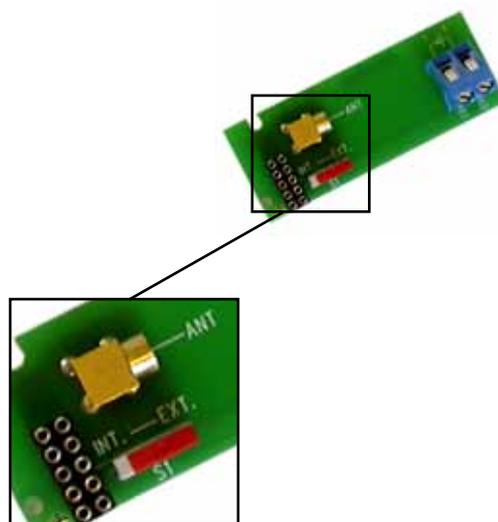
The antenna cable must be lead through the base of RF Router, and the MCX plug is mounted on the connection board without using tools.

The antenna itself must be mounted vertically to obtain the best possible radio range.



**Always** check the antenna change-over switch.

If an external antenna is used, the change-over switch knob must always be placed at "EXT". See picture:



## 2.5. External antenna, type Triangle 6699-408

This external antenna can be used for both RF Router and RF Concentrator together with up to 20 meter of 50 ohm antenna cable (delivered by Kamstrup A/S).

Same procedure is used when mounting the antenna cable in the radio network units and in the external antenna.

If the Triangle antenna is used together with radio modules for heat, cooling and cold water meters or with GSM/GPRS Modem, the Converter box type 6699-417 must be used.

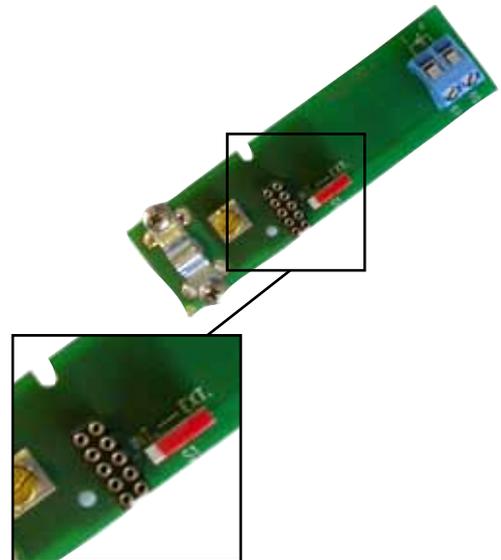
Strip the antenna cable, bend the shield backwards onto the isolated part of the wire. The shield should now be mounted in the wire-arrester to ensure good and proper shield on the antenna cable. Strip the inner core and place this in the screw terminal.

The antenna itself must be mounted vertically to obtain the best possible radio range.



**Always** check the antenna change-over switch.

If an external antenna is used, the change-over switch knob must always be placed at "EXT".  
See picture:



## 2.6. Converter box type 6699-417

This converter box is used when an antenna cable of more 1.5 meter should be used for the RadioRouter module.

Is delivered with 1.5 m RG174 antenna cable terminated with an MCX plug in both ends. Mount the antenna cable between module and converter box without using tools.

Remember to mount the antenna cable in the wire-arrester.

- The antenna cable is not jammed between the meter and top cover
- The best possible strain relief is obtained

Antenna cable type 6699-460 is mounted in the following way:

Strip the antenna cable, bend the shield backwards onto the isolated part of the wire. The shield should now be mounted in the wire-arrester to ensure good and proper shield on the antenna cable. Strip the inner core and place this in the screw terminal.

Converter box



1.5 m RG174 terminated with MCX

50 ohm antenna cable type 6699-460

## 2.7. External antenne, type Discus 6699-416

This external antenna is delivered with 1.5 m of RG174 antenna cable with an MCX plug in both ends. The antenna is used in the RF Router. The antenna cable is lead through the base of the RF Router, and the MCX plug is mounted on the connection board without using tools.

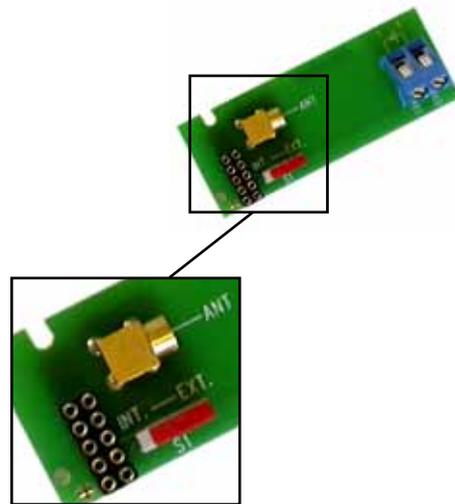
The antenna itself must be mounted vertically to obtain the best possible radio range.



**Always** check the antenna change-over switch.

If an external antenna is used, the change-over switch knob must always be placed at "EXT".

See picture:



## 2.8. External antenna, type Cavity wall 6699-452

This external antenna with 1.5 m of RG174 antenna cable is used for the RF Router.

The antenna cable is lead through the base of the RF Router, and the MCX plug is mounted on the connection board without using tools.

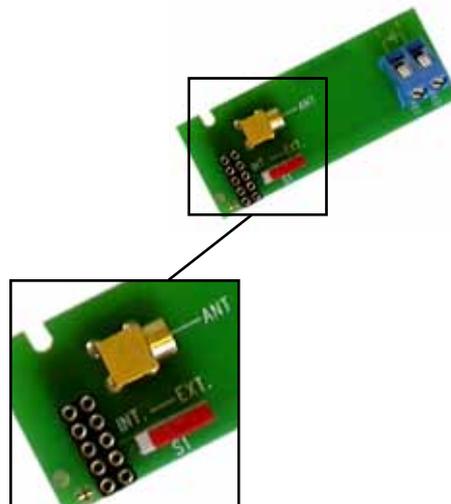
The antenna itself must be mounted vertically to obtain the best possible radio range.



**Always** check the antenna change-over switch.

If an external antenna is used, the change-over switch knob must always be placed at "EXT".

See picture:



### 3. Basic rules of network installation

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In connection with installation of energy meters and radio network components, the following basic rules must be observed:

- Meters placed in basements must be equipped with an external antenna preferably near a window
- Meters mounted in a steel cabinet/locked cabinet must be equipped with an external antenna outside the steel cabinet/locked cabinet
- Meters that are likely to be covered/locked up must be mounted with an external antenna
- RF Routers should be installed in the same room as the meter
- If the meter is mounted in a basement, the RF Router must be placed above basement level
- An RF Router must be mounted near the meter at all large-scale consumers'
- The RF Router must not be installed too close to the floor
- RF Routers must not to be mounted too far into a corner
- RF Concentrators must have an external antenna

## 4. Network installation and registration

To be able to use below as status indication on the radio network, you must install one or more Kamstrup energy meters and network units in the area.

### 4.1. RF Router – Installation test

Mount the RF Router top after installation, and keep pressing the front key until the LED turns on in the right side marked “Meters”.

Release the front key and the RF Router starts creating its local list via radio communication. The LED’s no. 1 and 2 flash on and off for max. 2 minutes. The local list contains information on other Kamstrup radio units within the range of this RF Router. When the LED’s go out the local list has been created and can be read either directly on the RF Router, see “RF Router - Local list test” or via a hand-held terminal with radio flash 6699-161.



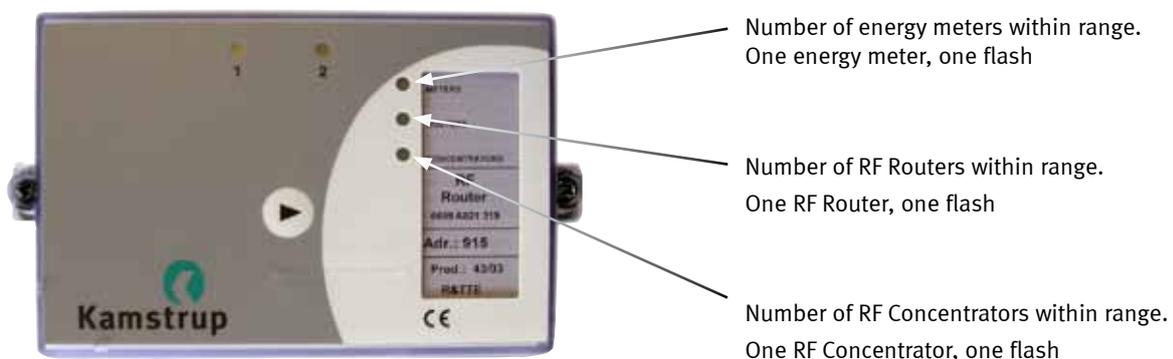
### 4.2. RF Router – Sign up for the radio network

Keep pressing the front key until the LED’s turn on in the right side marked “Meters” and “Routers”. The RF Router sends a sign up inquiry to the nearest RF Concentrator. The LED’s no. 1 and 2 flash on and off.

If all 3 LED’s then turn on, the RF Router is signed up for the radio network.

### 4.3. RF Router - Local list test

Keep pressing the front key until the LED’s turn on in the right side marked “Meters”, “Routers” and “Concentrators”. The local list is displayed when the LED’s flash on and off, see next picture.



#### 4.4. RF Concentrator - Installation test

Mount the RF Concentrator top after installation, and keep pressing the front key until the LED turns on in the right side marked "Meters".

Release the front key and the RF Concentrator starts creating its local list via radio communication. The LED's no. 1 and 2 flash on and off for max. 2 minutes.

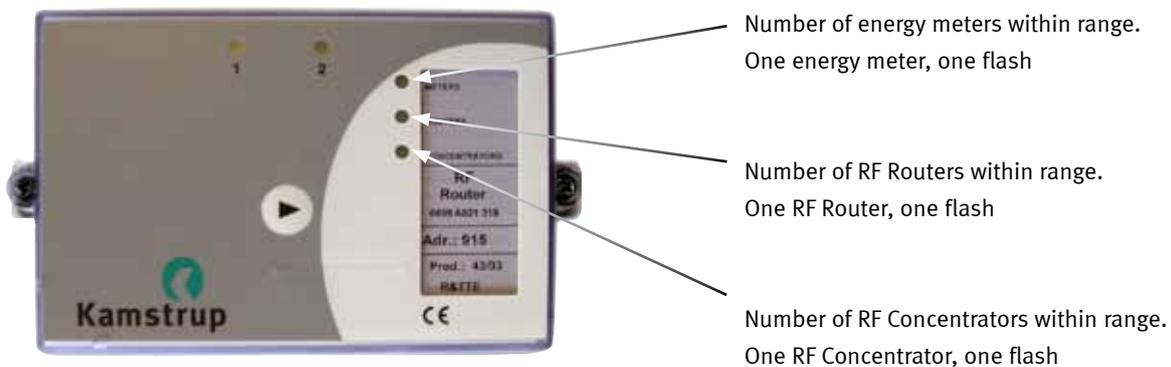
The local list contains information on other Kamstrup radio units within the range of this RF Router.

When the LED's go out the local list has been created and can be read either directly on the RF Concentrator, see "RF Concentrator - Local list test" or via a hand-held terminal with radio flash 6699-161.



#### 4.5. RF Concentrator – Local list test

Keep pressing the front key until the LED's turn on in the right side marked "Meters", "Routers" and "Concentrators". The local list is displayed when the LED's flash on and off, see next picture.



## 5. Trouble shooting

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- **Radio module:** If the radio module is defective, data from the energy meter cannot be transferred to the network. A simple check can be made by making a signal/noise measurement by means of MULTITERM Pro hand-held terminal. For further details, see the enclosed manual for MULTITERM Pro.
- **External antenna:** Check the antenna change-over switch. If the RF Router or the RF Concentrator are mounted with an external antenna, the change-over switch knob must be placed at “EXT”
- **RF Router:** If none of the LED’s are flashing when making an “Installation test”, check that the connection is mounted correctly. Red in terminal 60, black in terminal 61. If the unit is supplied by battery, check the voltage of the battery.
- **RF Concentrator:** If none of the LED’s are flashing when making an “Installation test”, check that the connection is mounted correctly. Red in terminal 60, black in terminal 61.
- **GSM/GPRS Modem:** For further details on trouble shooting, see the manual for the GSM/GPRS Modem.