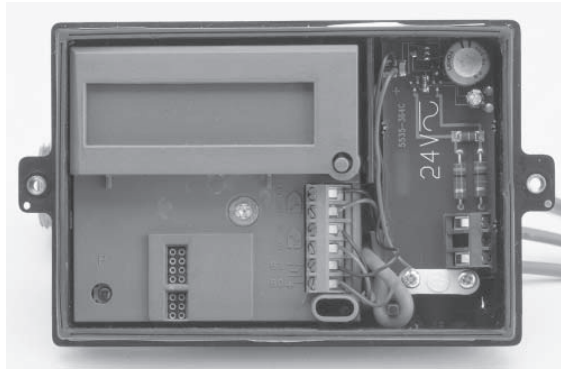


5. Voltage supply



MULTICAL® Compact with D-cell lithium battery.



MULTICAL® Compact with 24 VAC/DC supply module.

9. Commissioning

Once the meter has been installed, check meter operation. Open thermostats and taps so that water flows through the heating system. Depress the key on the front panel of MULTICAL® Compact – check that the temperatures and water flow are displayed as you would expect.

If you wish to use a target date, check that the date and time in the meter are set correctly. You will need special equipment from Kamstrup A/S to do this.

When you have checked meter operation, the meter should be sealed. Seal the top cover on both sides using sealing thread and seal.

10. Service and trouble shooting

MULTICAL® Compact is designed for quick and simple installation plus long and reliable operation.

Should problems occur during operation, a solution can be found in the following table.

Symptom	Possible reason	Proposal for correction
No display function. (Display blank)	No supply power; 3.6 V DC on terminals 60-61	Replace battery. Check power supply.
No energy (e.g. MWh) or m³ accumulation	Read "Info" from the display if "info" = 000 if "info" > 000	Check flow meter direction and connection of temperature sensors. Check the error indicated by the Info-Code.
Accumulation of m³, but not energy (e.g. MWh)	Forward and return sensors have been reversed, either during installation or connection	Mount sensors correctly.
No m³ accumulation. Incorrect accumulation of m³.	Flow meter incorrectly mounted.	Check flow meter direction.
Incorrect temperature indication.	Defective temperature sensor.	Replace temperature sensor pair.
Temperature indication or accumulation of energy a little too low (e.g. MWh)	Bad thermal sensor contact. Heat dissipation.	The sensors can only be used in ½" and ¾" pipes. Use fittings which are intended for direct sensors according to EN 1434. Insulate around the sensors.

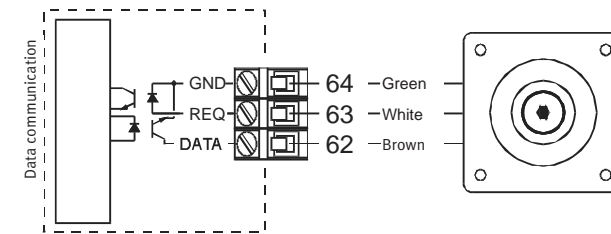
Should service be required, we would suggest that you only replace the battery and temperature sensors. Alternatively the complete meter should be replaced.

Repairing the print card - or other repairs that necessitate breaking the seal - can only be done by Kamstrup A/S.

6. Data Communication

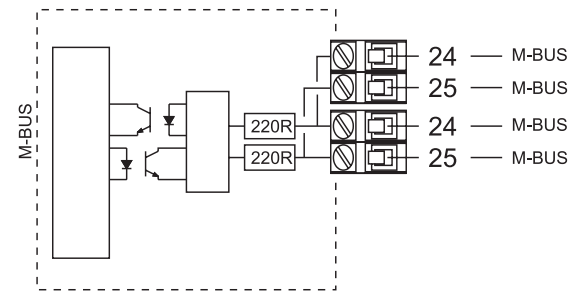
The plug-in module 66-0R-000-100 have a connection for serial data communication.

E.g. an external reading plug for MULTITERM can be connected.



7. M-Bus

M-bus can be mounted in star, ring or bus topology. Up to 250 meters can be connected, depending on the power supply of the master and the total cable resistance. The maximum cable resistance must not exceed 29 Ω and the capacity must be below 180 nF.



Connect the M-bus module to the M-bus net through terminal 24 & 25. The connection is polarity independent. The M-bus module has two parallel connected terminals to make M-bus net loop through the M-bus module possible.

11. Information codes "E"

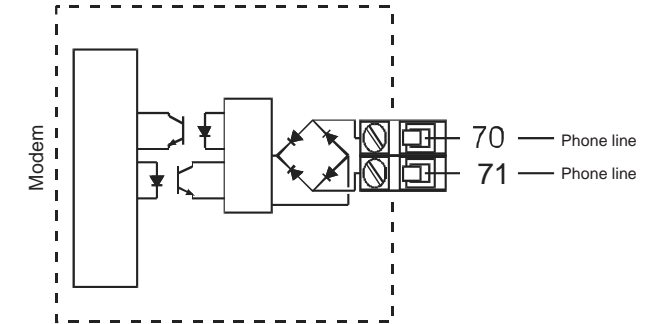
During normal operation the meter will display "000 info". If one or more of the following errors occurs, the sum of errors will be displayed. - An error in both temperature sensors will be displayed as information code "012 info", i.e. code 4 plus code 8.

- +0 No errors detected.
- +2 The information code for flow meter error is activated when the actual water flow has been below cut-off for a period of 48 hours at the same time that Δt has been more than 20 K.
- +4*) The sensor in the return pipe has exceeded the measuring range of 0...150°C. The sensor may be shorted or deactivated.
- +8*) The sensor in the flow pipe has exceeded the measuring range of 0...150°C. The sensor may be shorted or deactivated.
- +16*) Air has been detected in the flow meter (this code is only displayed while the error is active).
- +128 The battery is low and needs replacing. The code is activated 9 years after the hour counter has been reset.

*) These information codes may be activated during transport at temperatures below freezing or whilst the meter is in storage.

8. Modem

A modem can be connected direct to a standard telephone connection without needing extra supply. Connect the telephone wire to terminals 70 and 71.



Always end the installation by carrying out a compulsory call. Press the button of MULTICAL® Compact for at least 10 seconds. When "Call" is shown in the display the modem calls up the entered telephone number (e.g. the district heating station). The modem always calls up twice at intervals of approx. 2 min. when making a compulsory call. The modem is active after the second call-up.

The service technician should always call the station to have confirmed that the modem call has been registered.



Installation English

MULTICAL® COMPACT

MULTICAL® Compact displays consumed thermal energy. The display changes when the front button is activated. 2 1/2 minutes after the button has been released, the display reverts automatically to the drawings shown here indicate typical displays. Your energy meter may have a different set up.

12. Display

Indicates the actual return temperature.
 Indicates the actual differential temperature, i.e. the amount of power consumed in the installation.
 Indicates the actual flow temperature.
 Indicates the actual power, i.e. the amount of power consumed in the installation.
 Indicates the actual flow temperature.
 Indicates the actual peak power.
 Indicates the actual differential temperature, i.e. the amount of power consumed in the installation.
 Indicates the actual return temperature.
 Indicates the actual flow temperature.
 Indicates the actual power, i.e. the amount of power consumed in the installation.
 Indicates the actual flow temperature.
 Indicates the actual peak power.
 Indicates the actual differential temperature, i.e. the amount of power consumed in the installation.
 Indicates the actual return temperature.
 Indicates the actual flow temperature.
 Indicates the actual power, i.e. the amount of power consumed in the installation.
 Indicates the actual flow temperature.
 Indicates the actual peak power.

If an E appears at the far left of the display, please contact your district heating station without delay, as your meter may be faulty.
 Should you have further questions concerning the functions of the meter, please contact the heat supplier.

1. General

Important: Please read this guide before installing the energy meter. Operational problems caused by incorrect installation are not covered by Kamstrup's guarantee.

Note: The following restrictions must be observed.

Plant pressure:	Max. 16 bar
Ambient temperature:	0...55°C with reduced battery lifetime.
Ambient temperature:	0...35°C providing optimal battery lifetime.
Medium/water temp:	20...90°C constant
Medium/water temp:	5...120°C short term

1.1 EMC conditions

MULTICAL® Compact is designed for installation in private homes and light industry. The meter is marked with CE.

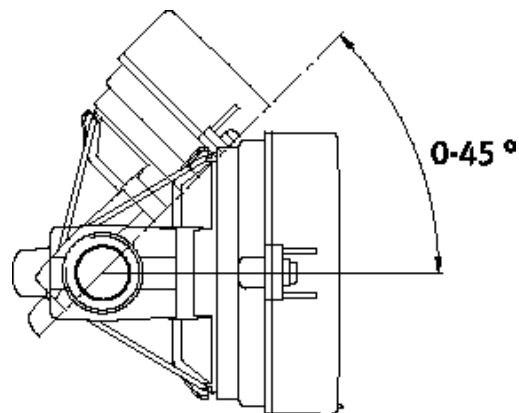
All signal cables must be lead separately and not parallel to high-voltage cables. Signal cables must have a distance of not less than 25 cm in respect to other installations.

If the installation is particularly noisy, we would recommend that you install Kamstrup's MAXICAL® III meter instead.

2. Fitting the flow part

Before fitting the flow part, install a pipe length in place of the meter and flush the system. Remove the protective caps from both ends of the flow part and fit by means of glands and gaskets.

MULTICAL® Compact is recommended to be mounted with the display vertical or at an angle of max 45°. When mounted in heating systems with water treatment and minimal risk of air, e.g. directly connected district heating systems, the display may be mounted horizontally. Straight inlet conditions are not required.

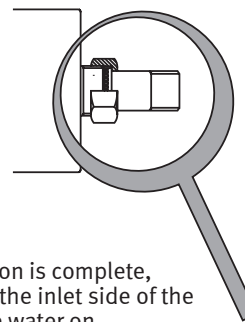


MULTICAL® Compact can be mounted in horizontal, vertical and sloping pipes.

After being mounted the display can be turned up to 270° to obtain a better reading.

The label on the side of the flow part indicates whether the meter should be installed in the flow or return pipe. The arrow moulded in the brass housing indicates the flow direction.

Glands and gaskets should be fitted as shown below:



Once the installation is complete, open the valve on the inlet side of the meter and turn the water on.

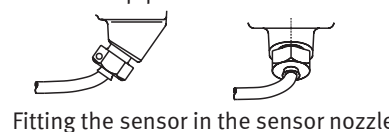
MULTICAL® Compact must not be subjected to a vacuum.

3. Fitting the sensors

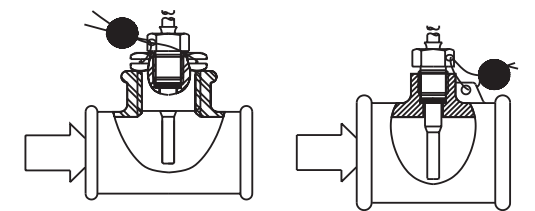
The temperature sensors, used for measuring the flow and return temperatures, are a set that has been paired very carefully – they may not be separated.

MULTICAL® Compact is supplied with temperature sensors of standard length. Do not shorten the cables. If there is an excess of cable, roll it up and secure it underneath the meter by means of cable retainers.

The sensor with the red label should be fitted in the flow pipe. The sensor with the blue label should be fitted in the return pipe. One of the sensors must be fitted in the flow part. If the meter is programmed for installation in the flow pipe, the sensor with the red label should be fitted in the flow part and the sensor with the blue label fitted in the return pipe.



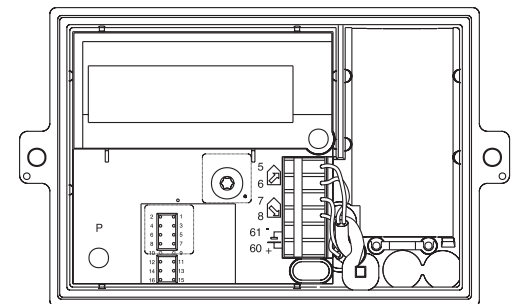
Once installed, the brass coupling should be gently tightened (approx. 6 Nm) with a 12 mm wrench. The sensors can then be sealed with sealing thread and seal.



Sealing the sensors

4. Connections

When you remove the top cover from the MULTICAL® Compact, 6 screw terminals become visible. They have the following functions:



Connection in screw terminal:

Flow sensor:	terminals 5 and 6
Return sensor:	terminals 7 and 8
Supply:	terminals 60 and 61