

Installation

## MULTICAL® 66-MP & ULTRAFLOW® 65-S

English



# Kamstrup

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# 1. General conditions

⚠ Please read these instructions before installing the heat meter. Kamstrup's guarantee obligations do not apply in case of incorrect installation.

Please note the following installation requirements:

| <b>Max. 16 bar</b>   | <b>Max. 25 bar</b>  |
|--|---|
| Meters with screw-joints<br>All types of temperature sensors | Flange meters only<br>Sensors with stainless steel pockets only |

- Max. ambient temperature: 55°C
- Max. constant water temperature: 150°C for flanged meter and 130°C for threaded meters.
- At water temperature exceeding 90°C, flanged meters and wall mounting of MULTICAL® is necessary.

## 1.1 EMC conditions

MULTICAL® has been designed and CE-marked for installation in domestic and in light industrial environments. All cables from MULTICAL® must be drawn separately - not parallel to power cables. A minimum of 25 cm to any other electrical installation must be respected.

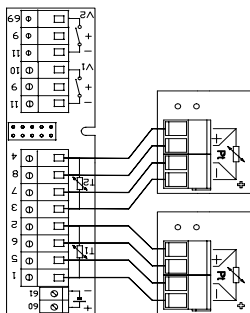
## 2. Mounting of temperature sensors

### 2.1 Electrical mounting

MULTICAL® Type 66-MP is designed for 4-wire Pt500 sensor pairs. Kamstrup's 4-wire sensors, with wetted tube lengths (including thread) of 90, 140 or 180 mm as appropriate, should be used.

| Type No.     | Length |
|--------------|--------|
| 65-56-42-1xx | 90 mm  |
| 65-56-43-1xx | 140 mm |
| 65-56-44-1xx | 180 mm |

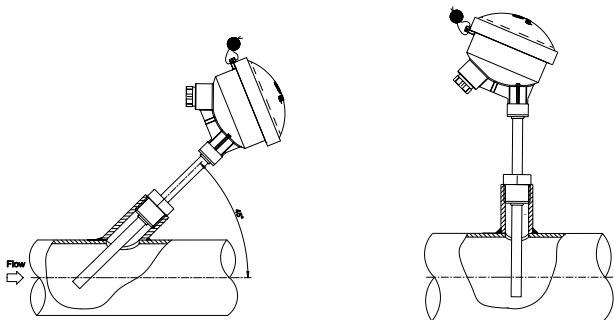
Wiring between MULTICAL® and sensors should follow below drawing and the length of sensors cables must not exceed the figures in the scheme.



| Cross sectional area<br>mm <sup>2</sup> | Outer diameter<br>mm | Max. cable length<br>m |
|---|----------------------|------------------------|
| 4 x 0.15                                | ≈ 4 mm               | 30 m                   |
| 4 x 0.25                                | ≈ 5 mm               | 50 m                   |
| 4 x 0.35                                | ≈ 6 mm               | 70 m                   |

## 2.2 Mechanical mounting

The sensors can either be installed at an angle of  $90^\circ$  or  $45^\circ$  to the pipes. However, the tip of the sensors must always exceed the centre of the pipe. Furthermore, insulation of the pipes increases the measurement accuracy.



Before commissioning, remember to tighten the cable gland and seal the lid.

### 3. Information codes "E"

MULTICAL® constantly monitors a series of important functions. If a serious error occurs in the measuring system or in the installation an "E" appears in the left side of the display and an info-code can be read by activating the right front key until the measuring unit in the right side of the display shows "info".

The info code and the "E" disappears when the error has been corrected (after the response time listed below).

| Info code | Description                                    | Response time |
|-----------|--|---------------|
| 000       | No irregularities                              | -             |
| 001       | No primary supply (battery or net supply)      | 10 sec.       |
| 008       | Temperatur sensor T1 outside measurement range | 1...10 min.   |
| 004       | Temperatur sensor T2 outside measurement range | 1...10 min.   |
| 064       | Leak in cold water system                      | 1 hours       |
| 256       | Leak in heating system                         | 1 hours       |
| 512       | Burst in heating system                        | 90 sec.       |

## 4. Mounting of ULTRAFLOW®

### 4.1 Electrical mounting

ULTRAFLOW® with a cable length of up to 10 metres can be connected directly to MULTICAL®, according to below scheme. The ULTRAFLOW® used for energy calculation should always be connected to V1. Mounting in flow or return pipe must follow the marking on MULTICAL®.

Optionally another ULTRAFLOW® can be connected to V2 for leakage survey.

|               | V1 | V2 |        |
|---------------|----|----|--------|
| -             | 11 | 11 | Blue   |
| +             | 9  | 9  | Red    |
| <b>SIGNAL</b> | 10 | 69 | Yellow |

When installing ULTRAFLOW® with a cable length exceeding 10 metres a pulse transmitter is required. The cable length between ULTRAFLOW® and pulse transmitter must not exceed 10 metres, and between the pulse transmitter and MULTICAL® the cable length must not exceed 50 metres.

Connections via the pulse transmitter should follow below scheme:

| <b>ULTRAFLOW® to pulse transmitter</b><br>Max. 10 metres of cable |    |
|---|----|
| Blue  | 11 |
| Red   | 9  |
| Yellow  | 10 |

| <b>Pulse transmitter to MULTICAL®</b><br>Max. 50 metres of cable |    |
|--|----|
| 11A  | 11 |
| 9A   | 9  |
| 10A  | 10 |

## 4.2 Mechanical mounting

Before mounting ULTRAFLOW®, flush the system thoroughly and remove plugs/plastic membranes from the flow meter.

Correct flow meter position (flow or return pipe) appears from MULTICAL®'s front label.

The flow direction is indicated by an arrow on the side of the flow meter.

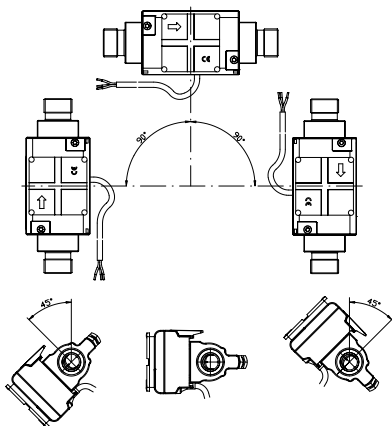
Mounting can be vertically, horizontally or at any angle in between.

### Straight inlet requirements

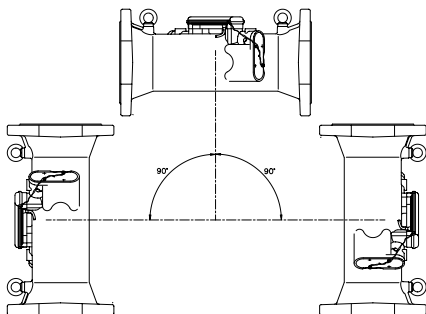
For ULTRAFLOW® less than or equal to  $q_p 3 \text{ m}^3/\text{h}$  ( $< \text{DN } 20$  or  $< \text{G1}$ ) there are no requirements as to straight inlet.

For ULTRAFLOW® bigger than or equal to  $q_p 3.5 \text{ m}^3/\text{h}$  ( $> \text{DN } 25$  or  $> \text{G5/4}$ ) the straight inlet should be  $3...5 \times \text{DN}$ .

## ULTRAFLOW® < DN100

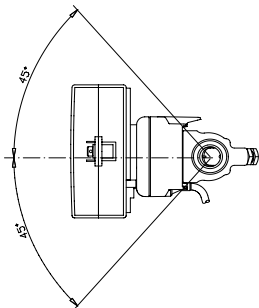


## ULTRAFLOW® > DN150



## 5. Mounting of MULTICAL®

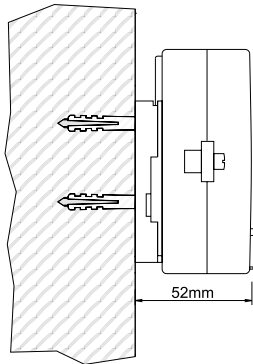
The MULTICAL® integrating unit can be mounted in three different ways:



### 5.1 Pipe/Compact mounting

The calculator is fitted on ULTRAFLOW® by means of the integrated bracket. MULTICAL® may be turned  $\pm 45^\circ$  with respect to the pipe axis.

Pipe/Compact mounting is recommended when MULTICAL® is installed in environments with a high relative humidity or risk of condensation. The heat radiated from the pipe will reduce the risk of condensation in MULTICAL®.



### 5.2 Wall mounting

By means of the wall bracket (Type 3026-207), MULTICAL® can be mounted on the wall. Use the bracket as a template to mark two holes and use a 6 mm drill.

Wall mounting is only recommended where MULTICAL® is installed in heated and dry environments without the risk of condensation.

### 5.3 Panel mounting

MULTICAL® can be mounted directly on panels by means of Kamstrup's 192 x 144 mm panel mounting kit (Type 66-99-104).

## 6. Power Supply

MULTICAL® can be power supplied by means of a built-in lithium battery, a 24 VAC/DC internal mains module or an internal 230 VAC mains module.

The two wires from battery or mains module are to be mounted in terminals 60 and 61 of the integrating unit.

**⚠** The polarity has to be correct; connect the red wire to terminal no. 60 (+) and the black wire to terminal no. 61(-).

### 6.1 Battery supply

MULTICAL® is connected to a lithium battery, D-cell. The battery is marked with the year it was mounted, e.g. 2000, as well as the production year.

The optimal battery life is obtained by keeping the battery temperature below 35°C, e.g. through wall mounting.

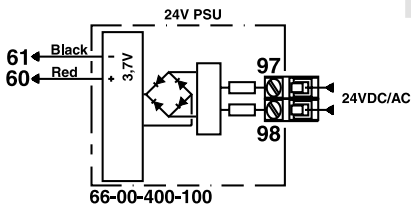
The voltage of a lithium battery is almost constant throughout the whole lifetime of the battery (approx. 3.65 V). Therefore, it is not possible to determine the remaining capacity by means of voltage measurement.

The battery cannot and must not be charged and must not be short-circuited. Used batteries must be handed in for approved destruction.

### 6.2 Mains modules

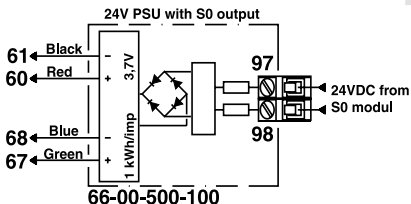
The modules are protection class II and are connected via a two-wire cable (without earth connection) through the cable bush of the integrating unit placed in the right side of the bottom of the connection base. Use connection cable with an outer diameter of 5-10 mm and be aware of correct dismantling as well as correct mounting of cable relief.

National installation regulations must be obeyed.



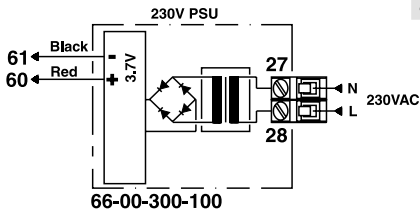
## 24 VAC/DC

In connection with the 24 VAC/DC supply module a transformer is needed, e.g. type 66-99-400.



## 24 V from S0-module

If MULTICAL® is supplied from an S0 module, the two extra pulse wires are to be connected to the pulse input module.



## 230 VAC

This module is used for direct mains connection.

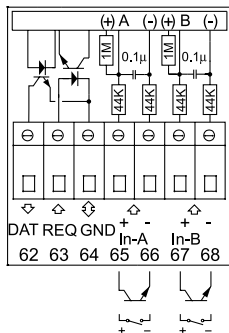
## 7. Operational Check

Carry out an operational check when the energy meter has been fully mounted. Open the thermo-regulators and cocks in order to establish a water flow through the heating system. Activate the right push-button of MULTICAL® and check that the display values of temperatures and water flow are probable.

## 8. Plug-in Modules

MULTICAL® can be retrofitted with a series of extra functions in the form of plug-in modules. Below please find a brief description of the individual modules.

### 8.1 Data/pulse inputs



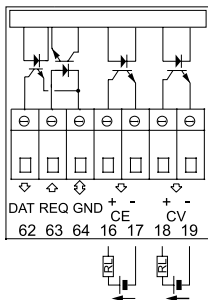
|    |       |
|----|-------|
| 62 | Brown |
| 63 | White |
| 64 | Green |

E.g. the data terminals are used for connecting a computer or a MULTITERM hand-held terminal via an external reading plug, which is connected as shown below. The signal is passive and galvanically separated through optocouplers. The conversion to RS232 level requires the connection of data cable 66-99-106 with the following connections.

|         |         |                    |
|---------|---------|--------------------|
| 65 - 66 | Input A | $f < 0,5\text{Hz}$ |
| 67 - 68 | Input B | $f < 3\text{ Hz}$  |

The pulse inputs can be used for connecting electricity and water meters. Please be aware of the maximum pulse frequency and the correct pulse coding (l/imp. and Wh/imp.) which are selected by means of the FF and GG configuration.

## 8.2 Data/pulse outputs



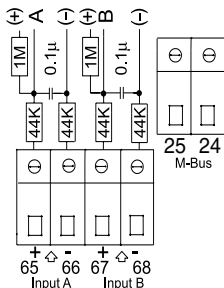
The pulse outputs can e.g. be used for remote counting of energy and volume. For both energy and volume 1 pulse is emitted per display count, e.g. 1 pulse/kWh and 1 pulse/10 l if MULTICAL® has been programmed for a flow meter of qp 1.5 m<sup>3</sup>/h.

|         |           |   |   |
|---------|-----------|---|---|
| 16 - 17 | CE Energy | Config FF and GG must both be set to "00" | I < 10mA<br>U < 30V<br>Pulse time < 30msec. |
| 18 - 19 | CV Volume |   |   |

Furthermore, the pulse outputs can be used for monitoring three-point motorized valves on the basis of the power and flow limits of the meter. If connecting the Flow Controller module 79 64 419 both 24 VAC and 230 VAC motorized valves can be used.

|         |      |   |   |
|---------|------|---|---|
| 16 - 17 | UP   | The tariff type must be set to PQ Controller. "A" | I < 10mA<br>U < 30V<br>Pulse time < 30msec. |
| 18 - 19 | DOWN |   |   |

## 8.3 M-bus/pulse inputs



M-Bus can be mounted in star, ring or bus topology. Depending on the power supply of the master as well as the total cable resistance up to 250 heat meters can be connected.

Cable resistance < 29 ohm

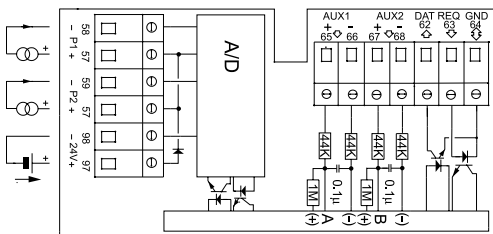
Cable capacity < 180 nF

The M-Bus network is to be connected to terminals 24 and 25. The polarity is unimportant.

## 8.4 4...20 mA/data/pulse inputs

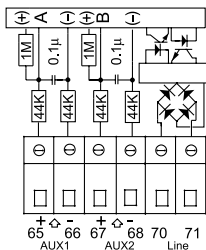
For monitoring the forward and return pressure, two pressure transmitters with an 4...20 mA output can be connected to the module, which requires up to 70 mA from an external 24 VDC supply.

The measuring range of the pressure transmitters is adjusted by means of the DIP-switch on the module. During test and commissioning the module can be adjusted to a test mode which allows direct output of P1 and P2 in mA with an update time of 2-4 sec.



| P1 (P2) |       |       |       | Range            |
|---------|-------|-------|-------|------------------|
| 1 (5)   | 2 (6) | 3 (7) | 4 (8) |                  |
| OFF     | OFF   | OFF   | OFF   | <b>mA (Test)</b> |
| ON      | OFF   | OFF   | OFF   | <b>1 bar</b>     |
| OFF     | ON    | OFF   | OFF   | <b>6 bar</b>     |
| OFF     | OFF   | ON    | OFF   | <b>10 bar</b>    |
| OFF     | OFF   | OFF   | ON    | <b>16 bar</b>    |
| OFF     | OFF   | ON    | ON    | <b>25 bar</b>    |
| ON      | ON    | ON    | ON    | <b>40 bar</b>    |

## 8.5 Modem/pulse inputs



The modem module can be connected directly to the standard telephone line of the household without needing extra supply. When the module has been connected it must be checked that the voltage between terminals 70 and 71 is minimum 48 VDC.

Always complete the installation by carrying out an "installation call". Activate both front plate buttons simultaneously for at least 10 sec. until "call" is displayed, the modem calls up the selected telephone number (e.g. the district heating station).

During an "installation call" the modem always calls up twice, the second call is called approx. 2 min. after the first one. The modem is active after the second call-up.

The service technician should always call the station to make sure that the modem call has been registered.

## 8.6 LonWorks FTT 10-A/pulse inputs

The LON module can be connected directly to the LonWorks network with twisted pair and FTT/LPT nodes. During installation the polarity of terminals 55 and 56 is unimportant.

The module includes the facilities Service, Reset and Wink. The module normally requires approx. 21 mA, but during commissioning approx. 70 mA, which must be supplied from an external 24 VAC/DC supply.

Neuron type            3150  
 Clock frequency      5 MHz  
 Transceiver            FTT-10A

