

Installation

# MULTICAL® 66-CDE & ULTRAFLOW®

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:

- Ambient temperature: 0...55°C (indoors)
  - Pressure stage of ULTRAFLOW®: PN16/PN25/PN40, see marking.  
Flow part marking does not cover included accessories
  - Pressure stage of Kamstrup sensor set type DS: PN16
  - Pressure stage of Kamstrup stainless steel pockets: PN25
  - Temperature of medium, ULTRAFLOW® type 65-S/R: 15...130°C
- If the temperature of the medium exceeds 90°C, we recommend the use of flange meters as well as wall mounting of MULTICAL®.

### 1.1 EMC conditions

MULTICAL® has been designed and CE-marked for installation in housing units as well as in light industrial environments. All control cables must be drawn separately – not parallel to power cables.

Control cables must be drawn with min. 25 cm distance to other installations.

## 2. Mounting of temperature sensors

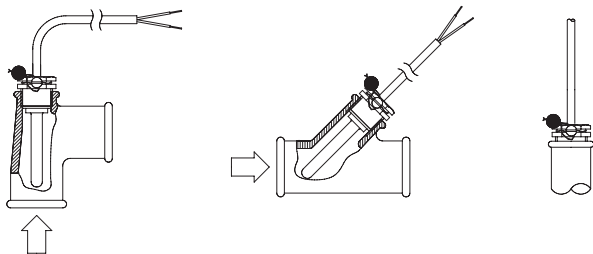
Temperature sensors used to measure forward and return temperatures respectively make out matched pairs of sensors which must never be separated.

Usually MULTICAL® is supplied with mounted temperature sensors. According to EN 1434 or OIML R75 the cable length can be shortened as required, however the two cables must be equally long after shortening. Replacement must always involve both sensors.

The sensor marked with a red sign must be mounted in the forward pipe. The other sensor, which is marked with a blue sign, must be mounted in the return pipe.

### 2.1 Pocket-mounted sensor set

Sensor pockets are best mounted in tee-pipes or in 45° lateral Y-pieces. The tip of the sensor pocket must be placed in the middle of the flow pointing against the flow direction.



Temperature sensors should be inserted to the bottom of the pockets. If a quick response time is required “non-hardening” heat conducting paste can be used.

Push the plastic sleeve on the sensor cable into the sensor pocket and secure the cable with the enclosed M4 sealing screw. Fasten the screw with your fingers only. Seal the pocket using seal and sealing wire.

## 2.2 Short direct temperature sensor set

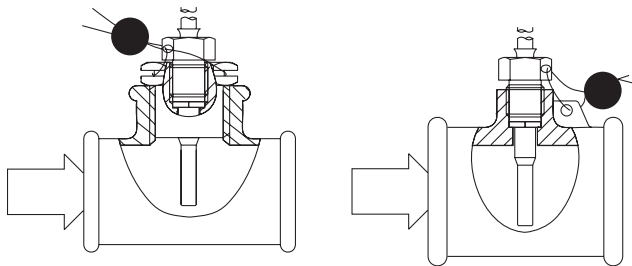
The short direct sensor set can be mounted in special ball valves or in special angle tee-pipes, both with threads up to R1 and built-in M10 union for the short direct sensor.

For mounting in existing heating installations with standard angle tees Kamstrup A/S can furthermore supply R $\frac{1}{2}$  and R $\frac{3}{4}$  brass nipples which fit the short direct sensors.

In addition, please refer to paragraph 4 “Mounting of flow sensor”.

The short direct sensor can also be fitted into all ULTRAFLOW® variations from Kamstrup with G $\frac{3}{4}$  and G1 thread on the meter case.

Fasten the brass unions of the sensors lightly (approx. 4 Nm) by means of a 12 mm face wrench, and then seal the sensors with seal and wire.



### 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 plate button until the measuring unit in the right side of the display shows “info”.

As soon as the error has been corrected, the info-code disappears.

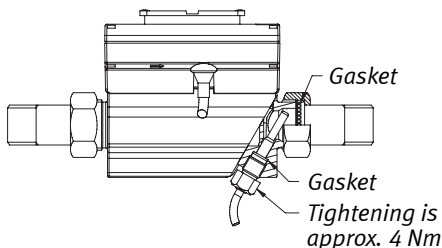
Info-Code	Description	Response time
000	No irregularities	-
001	No primary supply (battery or net supply)	10 sec.
008	Temperature sensor T1 outside measuring range	1...10 min.
004	Temperature sensor T2 outside measuring range	1...10 min.
032	Temperature sensor T3 outside measuring range	1...10 min.
064	Leak in cold-water system	24 hours
256	Leak in heating system	24 hours
512	Burst in heating system	90 sec.

## 4. Mounting of flow sensor

Before mounting the flow sensor, flush the system thoroughly and remove protection plugs/plastic membranes from the flow sensor.

Correct flow sensor position (forward or return pipe) appears from the front label of MULTICAL®.

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



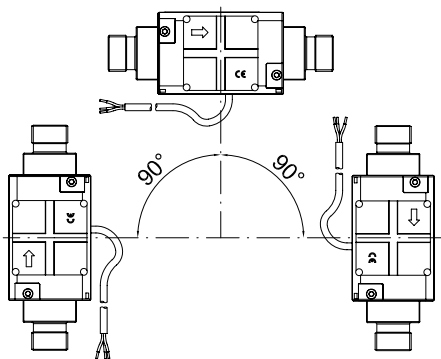
Glands and gaskets must be mounted as shown in the above drawing.

ULTRAFLOW® up to 3 m<sup>3</sup>/h do not require straight inlet, whereas flow sensors 3.5...40 m<sup>3</sup>/h must be installed with straight inlet of 3...5 x DN. Class 2 ULTRAFLOW® up to 3 m<sup>3</sup>/h require straight inlet of min 5 x DN, whereas flow sensors 3.5...40 m<sup>3</sup>/h must be supplied with straight inlet of min. 10 x DN.

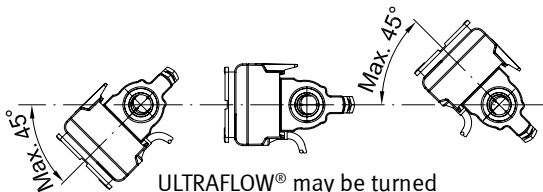
To prevent cavitation the operating pressure at ULTRAFLOW® must be min. 1.5 bar at  $q_p$  and min. 2.5 bar at  $q_s$  (4.5 bar for DN80). This applies to temperatures up to approx. 80°C.

ULTRAFLOW® must not be exposed to pressures below ambient pressure (vacuum).

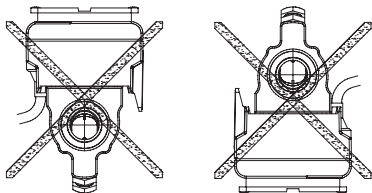
## 4.1 Mounting of ULTRAFLOW®



ULTRAFLOW® can be mounted vertically, horizontally or at any angle in between.

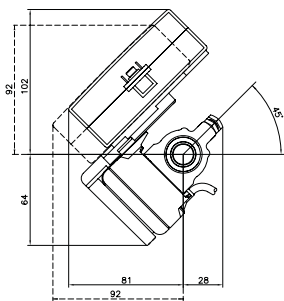
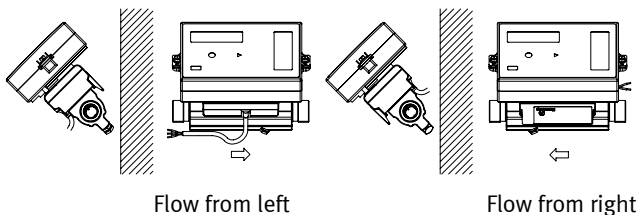


ULTRAFLOW® may be turned up to  $\pm 45^\circ$  in relation to the pipe axle.



The black box of ULTRAFLOW® should not point up or down.

Examples of mounting:



By means of the angle bracket MULTICAL® can be mounted in two positions.

Angle bracket type 3026-252 is to be ordered separately.

## 4.2 Mounting of vane wheel meter

The multi-jet vane wheel meters of Kamstrup A/S must always be mounted horizontally with the pick-up unit pointing upwards. Single-jet vane wheel meters can be mounted either horizontally with the pick-up unit pointing upwards, or vertically. However, the dynamic range of the single-jet vane wheel meter will be reduced if mounted vertically.

Make sure that the flow meter is free of impurities, swarf etc. Now press the pick-up unit into place in the flow meter, whereby it is both sealed and mechanically fastened.

When the vane wheel meter has been mounted the water flow can be turned on. Open the valve on the inlet side of the meter first.

## 5. Mounting of calculator

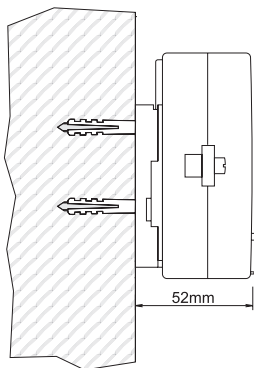
The MULTICAL® calculator can be mounted in three different ways.

### 5.1 Compact mounting

The calculator is fitted direct onto the flow meter, possibly by means of an angle bracket. Once the calculator has been mounted you can seal it using seal and wire.

In addition, please refer to paragraph 4.1 “Mounting of ULTRAFLOW®.”

### 5.2 Separate/wall mounting



By means of the wall bracket you can mount MULTICAL® on an even wall. Use the bracket as a template to mark two holes of 6 mm diameter on the wall.

### 5.3 Panel mounting

MULTICAL® can be mounted directly on panels by means of Kamstrup's panel mounting kit, no. 66-99-104 (192 x 144).

## 6. Power supply

MULTICAL® can be power supplied by means of a built-in lithium battery, a 24 VAC 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. 2005, as well as the production year.

The optimal battery life is obtained by keeping the battery temperature below 30°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.

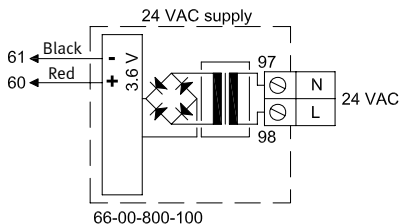
The battery cannot and must not be charged and must not be short-circuited. Used batteries must be handed in for approved destruction.

### 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 calculator placed in the right side of the bottom of the con-nection 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.

Max. permitted fuse: 6 A.

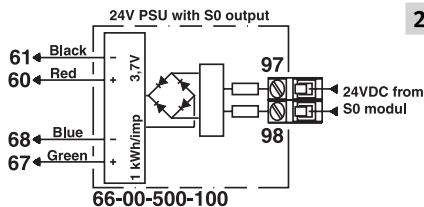
National installation regulations must be obeyed.



## 24 VAC

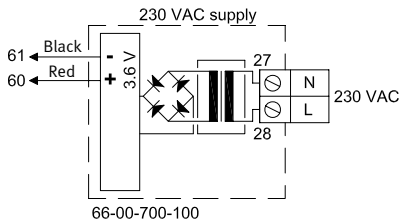
A transformer must be used, e.g. type 66-99-403, for a 24 VAC supply module.

**NB!** This module cannot be supplied from 24 VDC.



## 24 V from S0-modul

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



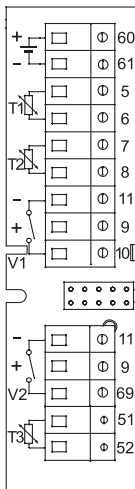
## 230 VAC

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. Electrical connection



The polarity of temperature sensors T1, T2 and T3 is unimportant.

Concerning flow meters V1 and V2 the below-mentioned colours must be used when connecting ULTRAFLOW<sup>®</sup> and electronic pick-up units.

Flow meters with reed-switch output must be connected to terminals 11–10 and 11–69 respectively.

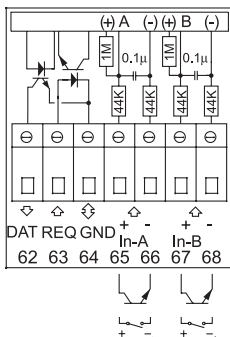
	V1	V2	
-	11	11	Blue/11A
+	9	9	Red/9A
<b>SIG</b>	10	69	Yellow/10A

	Terminal No.	Standard measurement of heat and cooling	Heat metering and leak monitoring	Energy measurement in open systems
T1	5–6	Sensor in flow (red)	Sensor in flow (red)	Sensor in flow (red)
T2	7–8	Sensor in return (blue)	Sensor in return (blue)	Reference sensor (grey)
V1	11–9–10	Sensor in flow or return	Sensor in flow	Sensor in flow
V2	11–9–69	-	Sensor in return	Sensor in return
T3	51–52	-	Possible tank/heat exchange temp.	Sensor in return (blue)

## 9. 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.

### 9.1 Data/pulse inputs



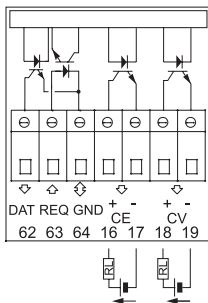
E.g. the data terminals are used for connecting a computer or a MULTITERM hand-held terminal via an external reading plug, which is connected as shown below. The signal is passive and galvanically separated through optocouplers. The conversion to RS232 level requires the connection of data cable 66-99-106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

62	Brown
63	White
64	Green

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/pulse and Wh/pulse) which are selected by means of the FF and GG configuration.

65 - 66	Input A	$f < 0.5 \text{ Hz}$
67 - 68	Input B	$f < 3 \text{ Hz}$

## 9.2 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  $q_p$  1.5 m<sup>3</sup>/h.

### 16-17 CE Energy

Config FF and GG must both be set at "00"	I < 10 mA U < 30 V Pulse time = 32 ms
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### 18-19 CV Volume

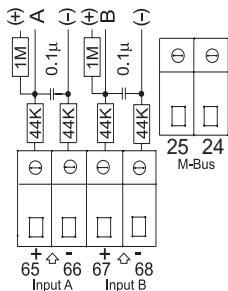
Furthermore, the pulse outputs can be used for monitoring three-point motorized valves on the basis of the power and flow limits of the meter. If connecting the Flow Controller module S7590006 a 24 VAC motorized valve can be used.

### 16-17 UP

The tariff type must be set at PQ Controller "A"	I < 10 mA U < 30 V Pulse time = 32 ms
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### 18-19 DOWN

## 9.3 M-Bus



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

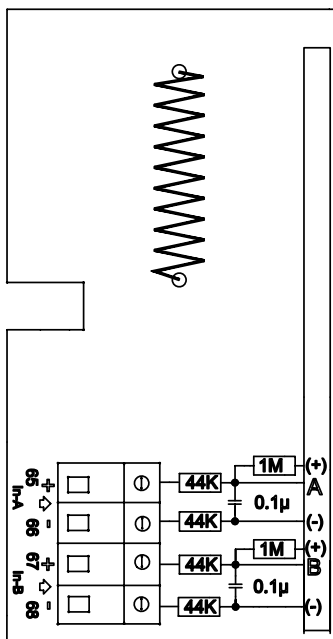
M-Bus is available either with pulse inputs as illustrated, or with pulse outputs.

## 9.4 Radio/Pulse inputs/outputs

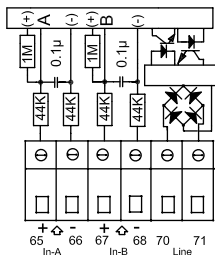
The radio module is used for wireless communication within a license-free radio band and is available for internal or external antenna.

For further information please refer to *Technical Description* of radio (5512-013).

Pulse inputs/outputs in this module are identical to those described earlier.



## 9.5 Modem



The modem module is connected directly to the standard telephone point without requiring extra power supply. When the module has been connected it must be checked that the voltage between terminals 70 and 71 is minimum 24 VDC.

Always complete the installation by carrying out a “manual call”: Activate both front plate buttons simultaneously for 10 sec. until “Call” is displayed and the modem calls the reprogrammed telephone number (e.g. the utility).

During a “manual call” the modem module always calls twice at an interval of 2 minutes. After the second call the module is active. The service technician should always call the utility after the second call to ensure that the modem call has been registered.

The modem module is available either with pulse inputs as illustrated, or with pulse outputs.

## 9.6 LonWorks FTT 10-A/pulse inputs/outputs

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

