

# F90 Series 3

DE-16-MI004-PTB025 (MID heat meter)

DE-16-M-PTB-0097 (National approval cooling meter Germany)

CH-T2-18768-00 (National approval cooling meter Switzerland)

OE18 C340 (National approval cooling meter Austria)

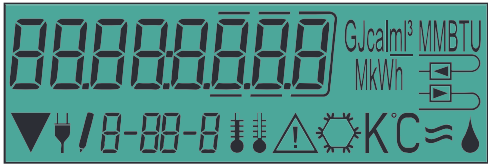
**F90S3 - F90M3 - F90U3**



**brummerhoop®**

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Display symbols and pictograms



- GJcalm³ MMBTU MkWh - Unit of displayed energy, volume, power and flow (GJ, Gcal, MMBTU, MWh, kWh, m³, kW, m³/h)
- Display of place of installation, here return flow (cold leg)
- Display of place of installation, here supply flow (hot leg)
- Radio interface is activated
- The meter is powered by mains supply
- Editing mode
- 8-88-8 - Index: Display of level, value and subsequent values
- Temperature of hot leg sensor (supply flow)
- Temperature of cold leg sensor (return flow)
- Temperature difference
- Attention error
- Cooling energy for combined heat meters with cooling tariff
- K°C - Temperature unit (Kelvin or °C)
- Flow detected
- Not documented
- FLOW - Negative flow: Indicates a false flow direction.

## General information

This manual is intended for trained personnel. Thus basic work steps are not listed. All installation and maintenance work may only be carried out by a trained and authorized specialist.

### **IMPORTANT**

The security seals on the meter are intended to protect the meter against manipulation. However you have to break the seals of the calculator to install an expansion module. Please make sure to replace the broken seals after installation of an expansion module with the seals included in the accessory kit of the expansion module. A damaged seal indicates modification or manipulation.

- Leads of temperature sensors and the connecting cable from calculator to flow sensor must not be kinked, shortened or otherwise altered.
- Applicable standards for the use of heat meters: EN1434 (Part 1 to 6), Directive 2014/32/EU (Annex I and MI-004), PTB TR K8, PTB TR K9 and the relevant calibration legislation of the country where the meter is used.
- The operator is responsible for complying with the legal requirements.
- The register for accumulated cooling energy in combined heat-/ cooling meters has no verification. Therefore it may not be used for billing purposes.
- National regulations for the consumption measurement of cooling energy must be observed.
- The regulations for electrical installations must be observed during installation. The product complies with the essential requirements of the EMC Directive 2014/30 / EU.
- When the calculator is open, the ESD requirements (ESD = electrostatic discharge) according to EN 61340-5-1 must be observed.
- The accuracy of the energy measurement can only be guaranteed if the water quality corresponds to the conditions of the AGFW recommendation FW-510 and the VDI 2035.
- **It is strongly prohibited to ship devices with activated radio signal via airfreight.**
- The place of installation of the heat meter and the flow direction must be observed.
- By properly opening the calculator to install an expansion module or an external power supply and the associated breaking of the adhesive seal, the heat meter does not lose its calibration validity. Other seals on the meter must not be damaged.



## General information

- All cables must be routed to a minimum distance of 50 cm to sources of electromagnetic interference (power switches, regulators, pumps, etc.) and at a distance of at least 10 cm from other current conducting cables.
- The F90 is calibrated with water as a heat conveying medium. Additives are prohibited because they alter the physical properties of water and distort the measurement results.
- The energy unit (MWh, kWh, Gcal, etc.) and the place of installation of the heat meter (supply- or return flow) can be set once by pressing the display-button (see page 11) or alternatively by using the software "Device Monitor".
- F90SSolar only: The type of glycol and the concentration of the heat conveying medium can be set with the software "Device Monitor".
- For configuration and readout of the heat meter with the software "Device Monitor" an opto-coupler is required, which is available under <https://www.brummerhoop.com>.
- The display of the heat meter is generally deactivated to protect the battery. It can be activated by pressing the display button and remains activated for about 2 minutes.
- The meter is equipped with a lithium metal battery. Do not open the battery, do not bring it into contact with water, do not expose it to temperatures above 80 ° C, do not charge it and do not short it.
- Replaced or defective parts must be disposed of in an environmentally sound manner.
- The pictogram on the type plate indicates whether the meter is a heat meter or a cooling meter.



**Heat meter (possibly with cooling tariff)**



**Cooling meter**

## Operation and readout

The F90 has a liquid crystal display (LCD) with 8 digits and special characters. The representable values are summarized in five display loops. All data are queried via the display button.

The display is normally deactivated and can be activated by briefly pressing the display button. Initially, the accumulated heat energy since commissioning will be displayed. This value is located within the main loop (level 1), index 1-01.

By pressing and holding the display key for more than 4 seconds you can invoke the different display loops.


Press and hold the button until you reach the desired display loop. The number of the loop is indicated at the bottom of the display.

Within a display loop or level, you can navigate to the desired value/ index by repeatedly briefly pressing the display button.

If the F90 is idle for at least 2 minutes it will automatically deactivate the display to protect the battery.

The following lists give an overview of the display values/ indexes within the respective levels.

Display level 1 = Main loop

Index	Description
1-01	Accumulated heat energy since commissioning (standard display) and alternating display of accumulated cooling energy (only combined heat and cooling meter);  negative flow; error codes
1-02	Display test (all icons are displayed simultaneously)
1-03-1 to 1-03-9	Reading date followed by heat energy, cooling energy, volume, tariff register 1 and tariff register 2 <sup>1)</sup> . When the module 'pulse input' is installed, the values of the three pulse inputs <sup>2)</sup> follow.
1-04	Accumulated volume in m <sup>3</sup>
1-05-1 / 1-05-2	Current date alternating with current time
1-06-1 / 1-06-2	Error display (binary and hexadecimal display, alternating)
1-07-1 / 1-07-2	Tariff register 1: value alternating with tariff register and criteria <sup>2)</sup>
1-08-1 / 1-08-2	Tariff register 2: value alternating with tariff register and criteria <sup>2)</sup>
1-09-1 / 1-09-2	Pulse input 1: Pulse value alternating with counter reading <sup>2)</sup>
1-10-1 / 1-10-2	Pulse input 2: Pulse value alternating with counter reading <sup>2)</sup>
1-11-1 / 1-11-2	Pulse input 3: Pulse value alternating with counter reading <sup>2)</sup>

<sup>1)</sup> The meter displays a zero for reading date and energy until the last day of the year or month has passed.

<sup>2)</sup> Pulse inputs are optional accessory and can be set with the software "Device Monitor".

Display level 2 = Technical loop

Index	Description
2-01	Current power in kW
2-02	Current flow rate in m³/h (in case of backflow, the value is shown as negative)
2-03	Supply flow temperature in °C
2-04	Return flow temperature in °C
2-05	Temperature difference in K (value has a negative sign in case of cooling metering)
2-06	<u>Before commissioning:</u> Operating days since production
2-06-1 / 2-06-2	<u>After commissioning:</u> Operating days since production alternating with operating days after reaching an energy consumption >10 kWh
2-07	M-Bus address (Primary address)
2-08	Serial number (Secondary address)
2-09	Firmware version

Display level 3 = Statistics loop

Index	Description
3-01-1 to 3-01-6	Semi-monthly values 3-01 to 3-30: Date alternating with heat energy, cooling energy, volume, tariff register 1, tariff register 2. If the module 'pulse input' is installed, then the values of the three pulse inputs <sup>1)</sup> <sup>2)</sup> follow
⋮	
3-30-1 to 3-30-6	

Display level 4 = Maximum values loop

Index	Description
4-01-1 to 4-01-3	Maximum power alternating with date and time
4-02-1 to 4-02-3	Maximum flow alternating with date and time
4-03-1 to 4-03-3	Maximum supply flow temperature alternating with date and time
4-04-1 to 4-04-3	Maximum return flow temperature alternating with date and time
4-05-1 to 4-05-3	Maximum temperature difference alternating with date and time

<sup>1)</sup> The meter displays a zero for reading date and energy until the last day of the year or month has passed.

<sup>2)</sup> Pulse inputs are optional accessory and can be set with the software "Device Monitor".

Display level 5 = Parameterizing loop

Index	Description
5-01	Parameterizing energy unit
5-02	Parameterizing place of installation
5-03	Test mode energy test <sup>1)</sup>
5-04	Test mode energy test with simulated volume <sup>1)</sup>

<sup>1)</sup> For internal test purposes only

## Settings

The following characteristics of the meter can be set on-site via the display-button or via the software "Device Monitor" and an opto-coupler:

- Energy unit (kWh, MWh, GJ, MMBTU, Gcal)
- Place of installation (supply- or return flow).

Energy unit and place of installation can only be changed as long as the cumulated heat energy has not exceeded a maximum of 10 kWh.

**Therefore make sure that the necessary adjustments are made prior to regular heat meter operation.**

To start the editing mode for parameterization, press and hold the key until you reach display level 5.

Now you can invoke the desired index with short keystrokes, e.g. index 5-02 for changing the place of installation.

Then press the button again for approx. 2-3 seconds until the editing icon (pencil) appears in the lower left of the display (see page 3).

Once the pencil is visible, release the button. The current display starts flashing.

Press the button briefly again to toggle between the parameter options. Press and hold the button for another 2-3 seconds to save the desired value.

If no action takes place, the meter deactivates the display without saving any changes.

For the F90SSolar meters, which are designed to measure water-glycol-mixtures, the glycol type and concentration can be set by using an opto-coupler and the software "Device Monitor":

- Glycol type → ethylene glycol or propylene glycol
- Glycol concentration → 20%, 30%, 40% or 50%

## Tariff register (Index 1-07 and 1-08)

The F90 series 3 are equipped with two tariff registers, which can be configured with the software "Device Monitor" and the USB opto-coupler (item no. 50041745).

Energy, power, flow rate and temperatures can be summed up in these tariff registers depending on threshold values or time periods. These criteria can be set individually via the software "Device Monitor". The tariff registers are displayed in the main loop (level 1) alternating with the corresponding criteria (see also page 7).

It is possible to choose from a total of 11 criteria to record energy or time when an entered threshold value is exceeded or undercut.

- Tariff 0 = No tariff defined
- Tariff 1 = Consumed energy measured in between timespan from [hh:mm] to [hh:mm]
- Tariff 2 = Consumed energy when the threshold value for the power is exceeded  
or  
The timespan for which the power is greater than or equal to the set threshold value
- Tariff 3 = Consumed energy when the threshold value for the power is undercut  
or  
The timespan for which the power is less than or equal to the set threshold value
- Tariff 4 = Consumed energy when the threshold value for the flow rate is exceeded  
or  
The timespan for which the flow rate is greater than or equal to the set threshold value
- Tariff 5 = Consumed energy when the threshold value for the flow rate is undercut  
or  
The timespan for which the flow rate is less than or equal to the entered threshold value




- Tariff 6 = Consumed energy when the threshold value for the supply flow temperature is exceeded  
or  
The timespan for which the supply flow temperature is greater than or equal to the set threshold value
- Tariff 7 = Consumed energy when the threshold value for the supply flow temperature is undercut  
or  
The timespan for which the supply flow temperature is less than or equal to the set threshold value
- Tariff 8 = Consumed energy when the threshold value for the return flow temperature is exceeded  
or  
The timespan for which the return flow temperature is greater than or equal to the set threshold value
- Tariff 9 = Consumed energy when the threshold value for the return flow temperature is undercut  
or  
The timespan for which the return flow temperature is less than or equal to the set threshold value
- Tariff 10 = Consumed energy when the threshold value for the temperature difference is exceeded  
or  
The timespan in which the temperature difference is greater than or equal to the set threshold value
- Tariff 11 = Consumed energy when the threshold value for the temperature difference is undercut  
or  
The timespan in which the temperature difference is less than or equal to the set threshold value

Example:


The energy which is generated or consumed at a return flow temperature greater than or equal to 50°C shall be stored and displayed in tariff register 1. For this purpose you have to allocate tariff 8 (energy consumption in conjunction with return flow temperature) and the threshold value for the return flow temperature to tariff register 1 via the software "Device Monitor".

Error codes

If the device detects an error, the error symbol  is indicated in the display.

The error can be called up in the main loop (level 1, index 1-06) by briefly pressing the display button repeatedly. The error code display alternates between hexadecimal and binary values. There are eight possible error codes, which can also occur in combination.


For all errors except

-  (negative flow)
- H80 (low battery)
- H40 (reset)
- H10 (Meaning for ultrasonic meters: air in the measuring tube),

the device has to be replaced and returned for examination.

Error codes binary	hexadecimal	Short description
1 0 0 0 0 0 0 0	H 8 0	Low battery
0 1 0 0 0 0 0 0	H 4 0	Device reset
0 0 1 0 0 0 0 0	H 2 0	Faulty electronic part
0 0 0 1 0 0 0 0	H 1 0	Error in flow sensor
0 0 0 0 1 0 0 0	H 0 8	Short circuit temperature sensor 2
0 0 0 0 0 1 0 0	H 0 4	Cable break temperature sensor 2
0 0 0 0 0 0 1 0	H 0 2	Short circuit temperature sensor 1
0 0 0 0 0 0 0 1	H 0 1	Cable break temperature sensor 1

Temperature sensor 1 is the cable on the right hand side of the calculator (seen from the front side).

The error message  indicates a negative flow. In such case please check the flow direction and make sure that the heat meter is installed the right way round. The error message disappears after regaining the correct flow direction through the heat meter.

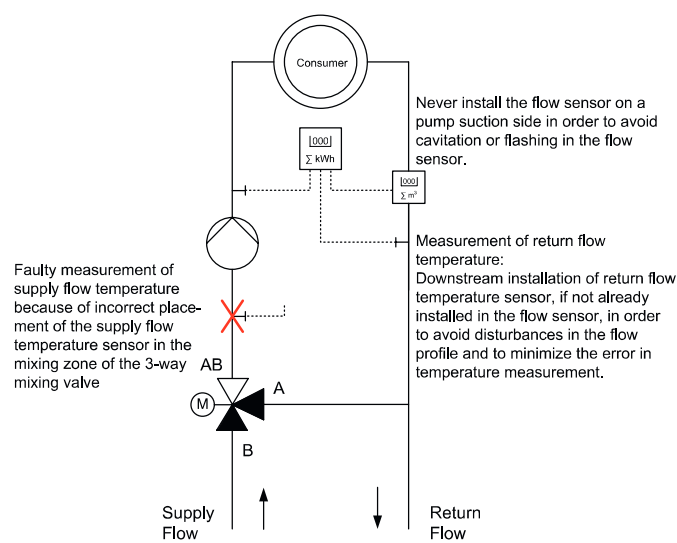
Error descriptions and causes

Error	Description	Cause	Error description
H80	Low battery. This message has no effect on the energy calculation.	Adverse environmental conditions, long service life, frequent readout	Replace the battery or use a 230V AC mains supply
H40	Device reset. This message has no effect on the energy calculation	EMC, electromagnetic interference	Please observe the information on the distance to possible sources of interference under "General information" (page 5).
H20	Faulty electronic part. Energy calculation stops. The register for energy will not change.	Defective component, defect on the circuit board	Device must be replaced by a new one.
H10	Error in the flow sensor. There are no more calculations. The registers for volume and energy do not change.	All devices: Connection cable between the electronics housing and the flow sensor is damaged F90U3: Air, residue or dirt inside the flow sensor F90S3 and F90M3: Faulty volume scanning; residue or dirt inside the flow sensor; impeller blocked	Check if there is air, residue or dirt in the system. Vent the system and, if necessary, change the place of installation of the meter (no installation close to the inlet of a pump, cavitation). Check the device for soiling and any foreign bodies in the flow sensor. If the cable is damaged, the device must be replaced.
H08 H04 H02 H01	Temperature sensor or sensor cable damaged. Energy calculation stops. The register for energy will not change.	The protective sheath of the temperature sensor was deformed due to wrong installation and / or inappropriate sensor seating (maximum immersion depth exceeded). Sensor cable was cut, forcefully kinked, twisted or ripped off the protective sheath or calculator.	Device must be replaced by a new one.

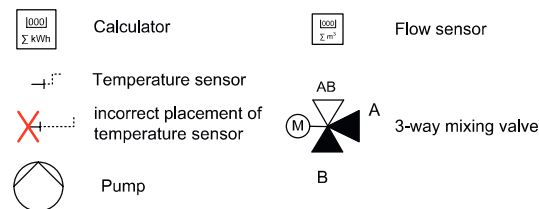
# Correct arrangement of measuring points

The Technical Guideline K9 of the German Physikalisch-Technische Bundesanstalt (PTB) for 'Commissioning of Heat and Cooling Meters' provides examples of installations, to illustrate where to place the temperature sensors and the flow sensor of an energy measuring point accurately.

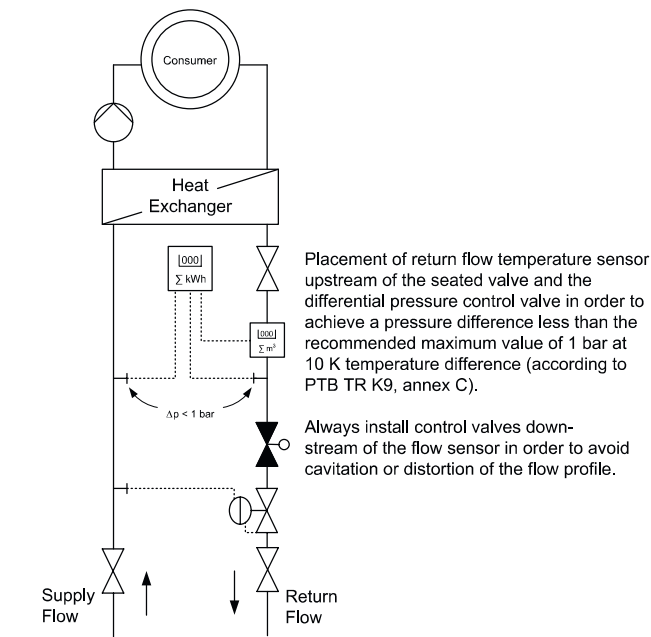
Sketch 1: Heat exchanger circuit with admixture



Key (EN 12792 / EN 806-1 / DIN 2481)



Sketch 2: Heat exchanger circuit with throttle circuit (e.g. district heating)



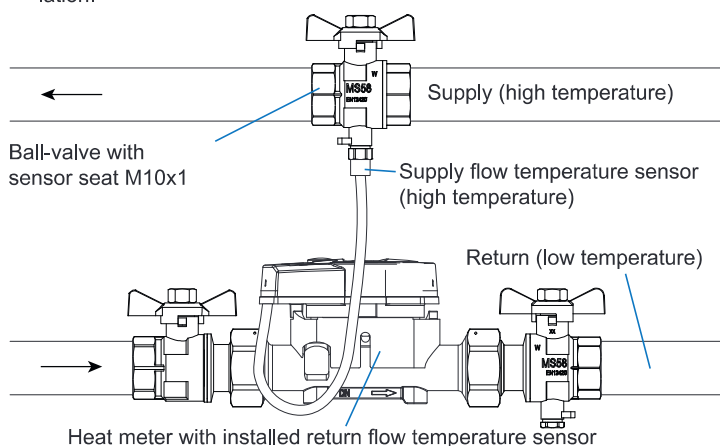
Key (EN 12792 / EN 806-1 / DIN 2481)

- |  |                    |  |                                     |
|--|--------------------|--|-------------------------------------|
|  | Calculator         |  | Flow sensor                         |
|  | Temperature sensor |  | Differential pressure control valve |
|  | Pump               |  | 2-way seated valve                  |

## Installation of F90S3, F90S<sub>Solar</sub> and F90U3 heat meters

**CAUTION: Prevent scalding! Close the shut-off valves and make sure that no hot water can leak through.**

- Thoroughly rinse lines before installing the meter.
- Avoid air accumulation in the meter. For F90U3: An installation position tilted by 90° is recommended for a heating system whose medium may contain small amounts of air.
- Close the shut-off valves, depressurize and empty the meter.
- Unscrew the union nuts on the old heat meter or on the fitting piece of the installation kit, remove old gaskets and thoroughly clean the sealing surfaces.
- Install the heat meter tension-free and use the new gaskets, included in the delivery. The place of installation has to match the meters configuration (supply- or return flow). Pay attention to the flow direction and make sure that the arrow on the flow sensor points into the correct flow direction (arrow marking on the flow sensor).
- After installation, fill the measuring section cautiously in order to protect the meter against damaging water hammers / pressure surges.
- The heat meter must always be filled completely with water.
- Check the installation for leaks.
- Seal the heat meter with the attached security seals to prevent manipulation.

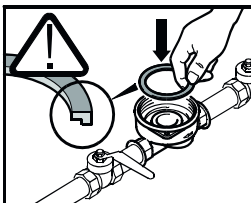


## Installation of F90M3-IST heat meter - system Ista

**CAUTION: Prevent scalding! Close the shut-off valves and make sure that no hot water can leak through.**

The multi-jet heat meter F90M3-IST has a 2" KOAX connection thread according to EN ISO 4064-4 respectively EN 14154-2 for the installation in a correspondingly compatible connection piece and must be installed without a transition adapter.

- Before installing the meter, rinse all pipes thoroughly.
- Install a strainer upstream before the flow sensor to protect the mechanical parts of the flow sensor against soiling or clean an already installed dirt filter.
- Close the shut-off valves, depressurize and empty the meter
- Remove the temperature sensors and detach the old heat meter with a hook wrench (item no. 59940900) from the connection piece.
- Remove the old gasket, clean the sealing surfaces and the thread of the connection piece thoroughly and check for any imperfections.
- Insert the new gasket into the connection piece with the smooth surface facing upwards, see picture.
- Grease the thread of the F90M3-IST lightly with food-safe silicone grease.
- Check the O-ring at the bottom of the F90M3-IST for correct seating.
- Screw the F90M3-IST hand-tight into the connection piece and then tighten it with a hook wrench up to its metallic stop; don't use excessive force.
- Install the temperature sensors as described on page 20.
- After installation, fill the measuring section cautiously in order to protect the meter against damaging water hammers/ pressure shocks.
- Check the installation for leaks.
- The heat meter must always be filled completely with water.
- Seal the heat meter with the attached security seals to prevent manipulation.



## Temperature sensor installation for F90S3, F90U3 and F90M3-IST

**CAUTION: Prevent scalding! Close the shut-off valves and make sure that no hot water can leak through.**

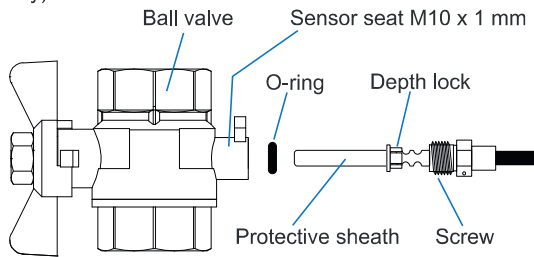
- The free temperature sensor has to be installed into a ball valve with sensor seat, a T-piece with an adapter on M10 x 1 mm (direct immersed installation) or a thermowell.
- Do not shorten or lengthen the cables because this will damage the meter irreversibly.
- Close the shut-off valves, depressurize and empty the fitting.
- Remove the blind screw or the old sensor and O-ring from the ball valve and clean the sealing surfaces.

### **Direct immersed installation:**

- Remove the O-ring from the new temperature sensor and make sure that the depth lock is latched into the first groove as seen from the sensor tip. **The depth lock must not be moved!** The sensor tip must not touch the opposite wall of the ball valve or T-piece.
- Insert the O-ring into the sensor seat of the ball valve or the T-piece adapter, slide the protective sheath into the ball valve or T-piece **by holding the temperature sensor only at the screw** and tighten it afterwards. The sensor should slide through the O-ring with ease.

### **Installation in a thermowell:**

- In case of installing the temperature sensor in a thermowell, remove the O-ring and the depth lock from the protective sheath and slide the sensor into the thermowell completely.
- Open the shut-off valves and check the installation for leaks.
- Secure the sensor against manipulation with the security seal (included accessory).



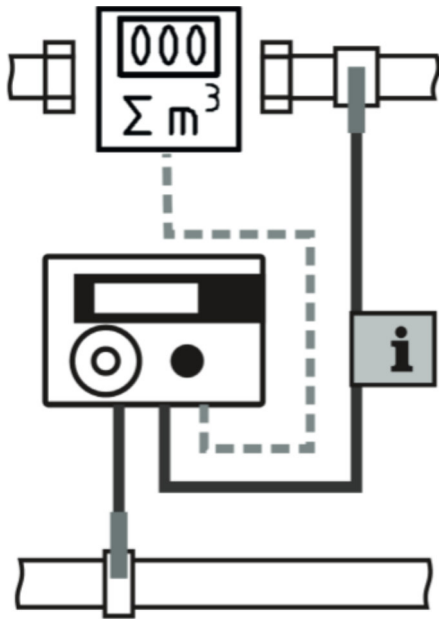


Please note:

For the heat meters F90S3, F90Solar, F90U3 and F90M3-IST, one temperature sensor has already been installed in the flow sensor ex works. For heat meters, configured for installation into the return flow (cold leg), the free sensor must be installed into the supply flow (hot leg). If the meter is configured for installation into the supply flow, the free sensor must be installed into the return flow.

The heat meter F90M3-A comes with two free temperature sensors.

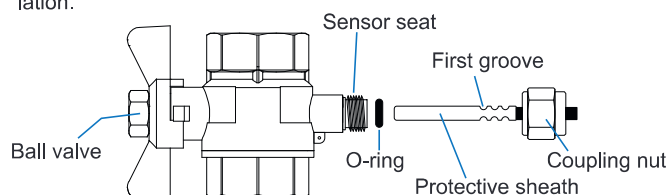
When installing the F90M3-A make sure to install the sensor marked with the flag as shown in the picture into the same pipe as the flow sensor.



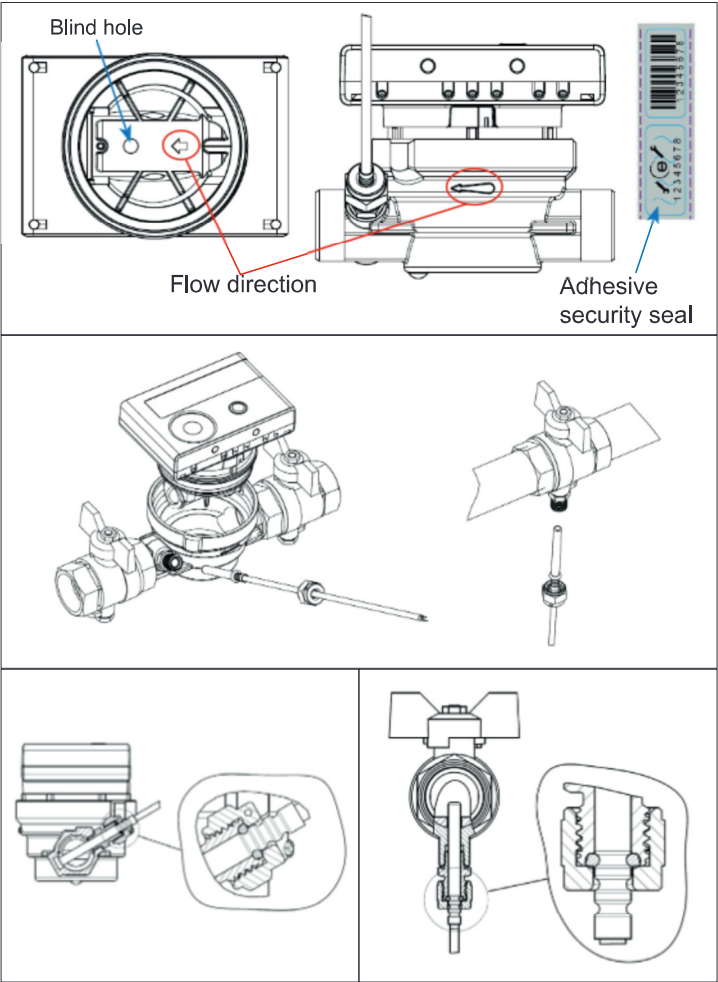
## Installation of F90M3-A heat meter - system Allmess/Itron

The multi-jet heat meter F90M3-A - system Allmess/Itron has a M77 x 1.5 mm connection thread for installation into a connection piece according to EN ISO 4064-4 respectively EN 14154-2 and must be installed without a transition adapter.

- Before installing the meter, rinse all pipes thoroughly.
- Install a strainer upstream before the meter to protect the mechanical parts of the flow sensor against soiling or clean an already installed dirt filter.
- Close the shut-off valves, depressurize and empty the meter
- Remove the temperature sensors and detach the old heat meter with a hook wrench (item no. 59940900) from the connection piece.
- Remove the old gasket, clean the sealing surfaces and the thread of the connection piece thoroughly and check for any imperfections.
- Grease thread and O-ring of the F90M3-A lightly with food-safe silicone grease and put it into the connection piece. Please observe the flow direction, indicated by an arrow on both the connection piece and the bottom of the meter and make sure that the blind hole of the meter and the pin of the connection piece are matching.
- Screw the F90M3-A hand-tight into the connection piece and then tighten it with a hook wrench up to its metallic stop; don't use excessive force.
- Slide the O-rings of the temperature sensors into the first groove of the protective sheaths (see picture).
- Insert the temperature sensors into the corresponding sensor seats of the connection piece and the ball valve (please note page 21) and tighten the coupling nut.
- After installation, fill the measuring section cautiously in order to protect the meter from damaging water hammers / pressure surges.
- The heat meter must always be filled completely with water.
- Check the installation for leaks.
- Seal the heat meter with the attached security seals to prevent manipulation.



CAUTION: Prevent scalding! Close the shut-off valves and make sure that no hot water can leak through.



## Wall mounting of the calculator

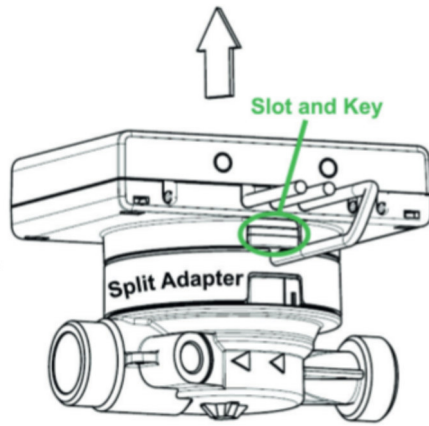
The calculator can be detached from the flow sensor and can then be mounted on a wall. The calculator should always be mounted above the flow sensor. It has to be accessible without tools and the display has to be readable at all times.

Use the included wall bracket for mounting the calculator onto an even wall. The wall bracket sits on the split adapter of the flow sensor, between calculator and flow sensor. It can be released and installed after detaching the calculator according to the following steps.

1. Pull the calculator off of the flow sensor by gently tilting it back and forth.
2. Hold the split adapter, rotate the wall bracket counterclockwise and lift it off the flow sensor.
3. Attach the wall bracket to an even, dry and clean wall, so that the key at the outer radius of the bracket points either upwards or downwards - depending on the direction in which the slot of the existing version of the calculator housing is pointing to.
4. Place the calculator on the wall bracket so that the slot engages with the key and push it with slight pressure onto the bracket until it clicks.
5. Fasten the cables with cable clamps or cable ties.

We recommend you to always operate the heat meter with a detached calculator.

For cooling meters and combined heat- / cooling meters it is obligatory to detach the calculator from the flow sensor to prevent damage through condensation.



## Electrical connection, power supply

All F90 energy meters are equipped with a battery and therefore do not require any connection to an external power supply.

The energy consumption of the meter is optimized so that the battery provides a more than sufficient reserve for the meter to operate within the intended lifetime. Nevertheless, it may be useful or necessary to connect the meter to an external power supply or, if necessary, to replace the battery with a new original manufacturer replacement.

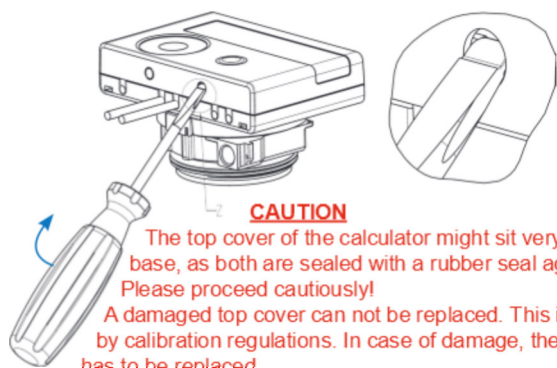
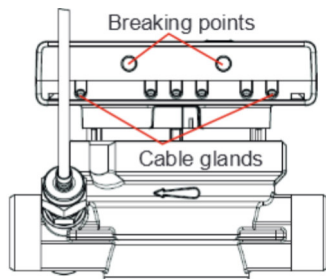
The calculator must be opened for retrofitting it with the optionally available mains module, for replacing the battery or for installing an expansion module.

### **Only original manufacturer equipment and spare parts must be used.**

Use a flathead screwdriver (4 - 5 mm) and push the two round predetermined breaking points, which are located above the cable glands, inwards

until you get a free opening.

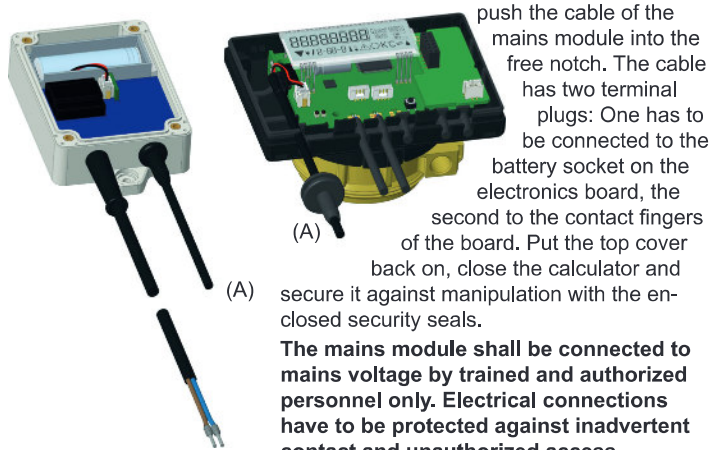
Then use the screwdriver as a lever to lift the top cover cautiously upwards. To do so, insert the screwdriver at an angle of approx. 45°, as shown below, one after another into each of the two openings and lever repeatedly and alternately until the top cover comes loose.



**When the calculator is open, the ESD requirements (ESD = electrostatic discharge) according to EN 61340-5-1 must be observed.**

Open the top cover like you would open a hinged door until the rear latches will unsnap and the top cover can be lifted completely off the base. Remove the battery from the calculator and plug it into the battery socket of the mains module. The battery continues to serve as a backup power supply in case of power failure. Attach the service plug, which is connected to the mains module, to the contact fingers on the left side of the electronics board.

After removing the rubber plug off the cable gland at the far left of the base,



When the meter detects a connected external power supply, the plug icon will appear on the display at the bottom left.



After installation the power supply must be secured against unauthorized opening with the enclosed numbered adhesive seal (to be placed over the destroyed seal). The barcode label can be used for documentation purposes.

Please note:

By properly opening the calculator to install an expansion module or an external power supply and the associated breaking of the adhesive seal, the heat meter does not lose its calibration validity. Other seals on the meter must not be damaged.

## Expansion modules

### Installing and removing an expansion module

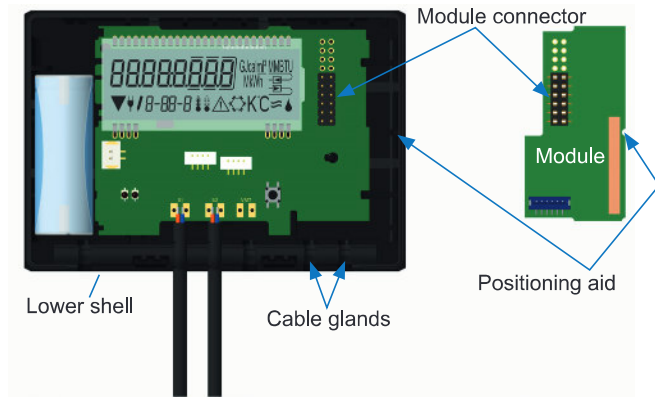
**When the calculator is open, the ESD requirements (ESD = electrostatic discharge) according to EN 61340-5-1 must be observed.**

For retrofitting an expansion module, the heat meter's calculator needs to be opened cautiously as described on page 25 and 26.

To remove an already installed expansion module, the top shell must be pressed carefully against the rear wall of the lower shell whilst the calculator is going to be opened. The rear latches of the top shell lever off the module from the board.

The expansion module has to be plugged in on the right side of the electronics board. The cable of the respective module (if a cable is included) has to be put through the cable glands on the right side of the calculator. For this purpose the rubber plug has to be removed from the respective cable gland. The cable must sit tight in the cable gland in order to protect the electronics of the calculator against moisture and to serve as a strain relief.

After successfully plugging in the module, the message 'Mod' followed by a number appears on the display. The number indicates the respective module number.



After closing the top shell the calculator must be secured against manipulation with the adhesive seal (delivered with expansion module). The barcode label can be used for documentation purposes.

Radio-interface, wireless M-Bus OMS (module 8, item no. 50041624)

The F90..3 can be retrofitted with a wireless M-Bus interface according to the OMS standard (Open Metering System).

Operating frequency: 868 MHz

Transmission power: up to 12 dBm

Protocol: wireless M-Bus in accordance with EN13757-3

Operating mode: T1, S1 or C1

Telegram:

- short; AMR compliant (energy, volume, flow, power, error code, return flow temperature, temperature difference)
- long; for walk-by readout (energy, volume, error code, 15 monthly or 30 semi-monthly values (compact mode))

Encryption: AES; 128 bit (OMS-Standard 3.0.1 or 4.0.2)

Radio interface parameter values

Parameter	Possible settings (only via software)	Default settings
Transmission mode	S1 / T1 / C1; unidirectional	T1; unidirectional
Transmission time	from 0 am - 12 pm	from 8 am - 6 pm
Transmission interval	10 seconds to 240 minutes; once per month	120 seconds
Days of week	Monday - Sunday	Monday - Friday
Weeks	1 - 4	1 - 4
Month	1 - 12	1 - 12
Radio switch-on date	01.01. - 31.12.	not set
AES encryption	<ul style="list-style-type: none"><li>- unencrypted</li><li>- encrypted (AES-Mode 5 or 7):</li><li>- master key</li><li>- key per device</li></ul>	master key
Telegram type	short telegram long telegram	long telegram



## Radio configuration and commissioning

The meter time is set ex works to winter time (GMT + 1). There is no automatic switch to daylight saving time.

Please note that the readout times may need to be adjusted during the summer time period.

The radio interface is deactivated as a standard factory setting and can be activated after installation as follows:

- a) Without additional software and opto-coupler the radio signal can be activated via the display button. To do so, navigate to display loop 6 (module loop) by pressing and holding the button and then to the index 6-02 (rAd oFF) with a short keystroke. The radio interface can then be activated (rAd on) with a long keystroke (press until edit icon appears) and, along with the activation, the meter will load its radio factory settings. The activated radio is indicated by a black triangle showing on the display.
- b) The radio interface can be activated and configured with the software 'Device Monitor' and the USB opto-coupler (item no. 50041745).

After activating the radio interface or changing the radio parameters, the meter is in installation mode for one hour.

When using the compact mode, the meter alternately sends a format and a compact telegram after the activation of the radio interface and during the installation mode. During this time, at least one meter of the device type supply flow / return flow, heat or heat / cooling, pulse inputs and display units must be read out with the Readout Software. The formats are stored locally on the PC in an xml file. After completing the installation mode, only the compact telegram is transmitted.

### **Please Note:**

The calculator with radio interface must not be installed between or behind heating pipes. Metallic material like sheet metal encasing the calculator should be avoided. Boxes or housings which encase the meter, must be equipped with non-metallic covers, lids or doors. Please take into account that the radio range of the meter is limited by other devices with a radio interface, such as Wi-Fi routers, baby monitors, radio remote controls, etc. and that the structure of the building can have a huge adverse effect on the radio range.

Additional activation of radio encryption

The AES encryption is not mandatory and can also be activated at a later date. To activate the encryption proceed as follows:

- a) Activation via display button: Navigate to display loop 6 (module loop) by pressing and holding the button and then to the index 6-03 (AES oFF) with short keystrokes. The encryption can then be activated (AES on) with a long keystroke (press until edit icon appears) and, along with the activation, the meter will load its encryption factory settings.
- b) Activation via software: Use the software 'Device Monitor' in conjunction with the USB opto-coupler (item no. 50041745) to activate and configure encryption.

Display level 6 = module loop (radio interface; module 8)

Index	Description
6-01	Display module type; here module 8
6-02	Activate radio signal
6-03	Activate encryption

Optical infrared interface (Standard)

The F90..3 can be read out and configured via the optical infrared interface with the optionally available USB opto-coupler and the software "Device Monitor" (protocol: M-Bus, baud rate: 2400 Bd). The optical infrared interface is activated by the automatic transmission of a header (according to EN 13757-3). The number of readings per day via the optical interface is limited. For daily reading at least 4 communications are possible; with less frequent readings, the possible number of communications increases.

**When the calculator is open, the ESD requirements (ESD = electrostatic discharge) according to EN 61340-5-1 must be observed.**

The F90..3 can be equipped or retrofitted with an optionally available M-Bus interface.

The M-Bus is a galvanically isolated interface for the transmission of meter data (absolute values).

During installation, all recognized rules of technology and the relevant legal regulations and standards must be observed. The installation may only be carried out by trained and authorized personnel.

It must be ensured that the topology of the M-Bus network (cable length, cable cross section) is designed according to the baud rate (2400 Bd) of the terminals.

Recommended cable type: Telephone cable J-Y (ST) Y2 x 2 x 0.8 mm²

Specifications

Max. voltage M-Bus:	42 V
Min. voltage M-Bus:	24 V
Max. ripple voltage:	200 mV (EN 13757-2_2004; 4.3.3.6)
Max. potential difference:	2 V
Baud rate:	2400 (default) or 300
Length connection cable:	1 m
Number of read-outs	unlimited
Data refresh:	120 s with battery 2 s with mains supply

Display level 6 = module loop (M-Bus; module 9)

Index	Description
6-01	Display module type; here module 9

Structure of the M-Bus telegram

The M-Bus telegram (RSP-UD) can be configured via the software ‘Device Monitor’. The following telegram is set ex works and will be transmitted over the M-Bus as a standard:

Meter ID (Secondary address)	Serial number of the meter (ex works), adjustable via Device Monitor
Address (Primary address)	0 (ex works), adjustable via Device Monitor
Manufacturer, version, medium, access number, status, signature, serial number	Manufacturer, device and M-Bus specific values according to EN13757 and EN1434
Current: main energy	
Current: volume	
Current: power	
Power (maximum value)	
Current: flow rate	
Flow rate (maximum value)	
Current: supply flow temperature	
Current: return flow temperature	
Current: temperature difference	
Operating days	Number of days since first commissioning
Current: time and date	
Recording date: main energy	
Recording date: volume	
Recording date: date	
Error code (binary)	
Device type / device version	
Current: cooling energy	only for combined heat / cooling meters
Recording date: cooling energy	only for combined heat / cooling meters
Current: energy tariff register 1	
Recording date: energy tariff register 1	
Current: energy tariff register 2	
Recording date: energy tariff register 2	
Current: pulse input 1	only if M-Bus module with pulse input is installed
Recording date: pulse input 1	only if M-Bus module with pulse input is installed
Current: pulse input 2	only if M-Bus module with pulse input is installed
Recording date: pulse input 2	only if M-Bus module with pulse input is installed
Current: pulse input 3	only if M-Bus module with pulse input is installed
Recording date: pulse input 3	only if M-Bus module with pulse input is installed

## M-Bus: Relevant Standards and Literature

IEC 60364-4-41 (2005-12)	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
IEC 60364-4-44 (2007-08)	Low-voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electro-magnetic disturbances
IEC 60364-5-51 (2005-04)	Electrical installations of buildings - Part 5-51: Selection and erection of electrical equipment - Common rules
IEC 60364-5-54 (2011-03)	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors
EN 50310 (2011)	Application of equipotential bonding and earthing in buildings with information technology equipment
EN 13757-1_2015, -2_2004, -3_2013	Communication systems for meters and remote reading of meters
The M-Bus	A Documentation, Version 4.8, M-Bus user group

Three pulse inputs (included in module 8 and 9, 6-wire connection cable item no. 50041621 required)

The expansion modules M-Bus and radio contain three pulse inputs and can thus accumulate the pulses of up to three external meters (water, electricity or gas meters) and transmit these values via radio or M-Bus. For this, the respective pulse inputs can be configured via the software Device Monitor and the USB opto-coupler (Part No. 50041745) according to the connected external meters.

The following settings can be assigned to the pulse inputs for the external meters:

- Serial number of the meter
- Manufacturer code
- Version
- Medium
- Pulse value of the meter (1 | 2.5 | 10 | 25 | 100 | 250 | 1000)
- Starting value from which the accumulation shall start (current meter reading)
- Pulse units (litres / kWh / without)

Pulse input class: IB according to EN 1434-2:2016

Length connecting cable: 1 m

Voltage supply: + 3 V DC

Source current: 1.5  $\mu$ A

High level input threshold U:  $\geq 2$  V

Low level input threshold U:  $\leq 0,5$  V

Pull-up resistor: 2 M $\Omega$

Pulse length:  $\geq 100$  ms

Pulse frequency:  $\leq 5$  Hz

The pulse outputs of the external meters must correspond to the classes OA (for example reed relay) or OC (open collector, open drain) according to EN 1434-2:2016.

**The pulse cables must not be supplied with an external voltage!**

When connecting external meters with open collector output, pay attention to the polarity. The cores of the pulse inputs must not touch each other during the installation, otherwise input pulses are counted in the F90. When setting up the F90, the meter reading of the connected external meter and its pulse value must be adjusted in the F90 with the software “Device Monitor” if necessary.

In order to transmit the values of the pulse inputs via radio interface, the pulse inputs must be activated with the software “Device Monitor”, unless the pulse inputs have not already been activated.

To activate the pulse inputs on the radio interface, connect the meter to an USB opto-coupler. Open “Device Monitor”, select the meter, then the menu item “Parameterization of the module” and then “Read module type”. Under the item “Transmission of values for the pulse inputs” select each of the three pulse inputs and save your settings by clicking on “Set”.

The pulse inputs on the M-Bus interface are activated by default. To utilise the pulse inputs of the M-Bus interface a 6-core connection cable is needed.

Core colour	Assignment
white	IE 3 (⊥)
brown	IE 3 (+)
green	IE 2 (⊥)
yellow	IE 2 (+)
grey	IE 1 (⊥)
pink	IE 1 (+)

Terminal assignment pulse inputs

Pulse inputs: Relevant Standards and Literature

IEC 60364-4-41 (2005-12)	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
IEC 60364-4-44 (2007-08)	Low-voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electro-magnetic disturbances
IEC 60364-5-51 (2005-04)	Electrical installations of buildings - Part 5-51: Selection and erection of electrical equipment - Common rules
IEC 60364-5-54 (2011-03)	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors
EN 50310 (2011)	Application of equipotential bonding and earthing in buildings with information technology equipment
EN 1434-2 (2016)	Heat Meters - Part 2: Constructional requirements



One pulse output (Module 5, Item No. 50041620)

**Important note:** The “One Pulse Output” expansion module can be used in all F90 Series 3 heat meters as of firmware 1.03. As of firmware 1.03, the meter recognizes the nominal size and energy display and thus adjusts itself to the pulse values for energy (default) or volume.

Potential-free pulse outputs are electronic switches which transmit the value of one unit with each pulse and can be used for a wide variety of applications.

The pulse output (module 5) can be set as an output for heat energy, cooling energy for cooling meters or as an output for the volume.

The pulse output closes according to its pulse value for 100ms and remains open for at least 100ms.

Pulse values module 5

Display in Nominal flow rate Qp	kWh / MWh	Gcal	GJ	MMBTU	m³
0.6	1 kWh/p	1 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p
1.5	1 kWh/p	1 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p
2.5	1 kWh/p	1 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p
3.5	10 kWh/p	10 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p
6.0	10 kWh/p	10 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p
10.0	10 kWh/p	10 Mcal/p	10 MJ/p	10 MMBTU/p	0.1 m³/p

The pulse value can also be queried via the module loop 6.

The pulse output can be deactivated with the software “Device Monitor” and the USB opto-coupler (Item No. 50041745).

Display level 6 = module loop (Pulse outputs: module 5 and module 10)

Index	Description
6-01	Display module type; Module 5 or 10
6-02	Pulse output 1 (e.g. 0.001 MWh)
6-03	Pulse output 2 (e.g. 0.010 m³)

Two pulse outputs (module 10, Item No. 50041619)

The expansion module 10 (two pulse outputs) can be set as indicated in the table.

	Heat Meter	Cooling Meter	Heat and Cooling Meter
Pulse output 1	Heat Energy	Cooling Energy	Heat Energy
Pulse output 2	Volume	Volume	Cooling Energy

The pulse outputs close for 100ms according to their pulse value and remain open for at least 100ms.

Characteristics pulse outputs (module 5 and module 10)

Pulse outputs class:	OA (electronic switch) according to EN 1434-2:2016
Length connecting cable:	1 m
Switching voltage:	30 V
Switching current:	27 mA
Contact resistance (on):	74 Ω
Contact resistance (off):	6 MΩ
Closure time:	100 ms
Interval between pulses:	100 ms

For module 10, the pulse value for the energy always corresponds to the last digit of the energy display. The pulse value for the volume always corresponds to the penultimate digit of the volume display.

The pulse value can also be queried via the module loop 6 (see page 37).

The pulse outputs can be deactivated with the software “Device Monitor” and the USB opto-coupler (Part No. 50041745).

Terminal assignment expansion modules pulse outputs

Core colour	Assignment module 5	Assignment module 10
yellow	IA 1	IA 1
green	IA 1	IA 1
brown	not used	IA 2
white	not used	IA 2

Technical data

Calculator

Approvals:	DE-16-MI004-PTB025 (MID Heat), DE-16-M-PTB-0097 (national approval cooling meter Germany), CH-T2-18768-00 (national approval cooling meter Switzerland), OE18 C340 (national approval cooling meter Austria)
Protection class:	IP65
Display:	LCD; 8 digits and special characters
Energy display:	up to 3 decimals
Units:	MWh - kW - m³ - m³/h Optional: kWh - GJ - MMBTU - Gcal
Interface:	Optical infrared interface and 1 free slot for expansion modules
Expansion modules:	M-Bus incl. 3 pulse inputs; wireless M-Bus incl. 3 pulse inputs; 1 pulse output for energy or volume; 2 pulse outputs for energy and volume
Power supply:	3V Lithium metal battery (replaceable) Optional: 230V AC mains module with backup battery and 24V AC mains module with backup battery
Battery life:	10 years (without pulse output), otherwise 6 + 1 years
Memory:	Solid state memory
Reading dates:	freely selectable annual date; 15 monthly and semi-monthly values via display or radio (compact mode); 24 monthly and semi-monthly values via optical interface or M-Bus
Tariff register:	2 individually adjustable tariff registers
Maximum values:	Flow rate, power and temperature (supply flow, return flow, temperature difference) and the respective maximum values of the last 15 months
Temperature range:	0...150°C (heat meter), 0...50°C (cooling meter, not Qp 0.6)
Ambient temp.:	5...55°C at 95% rH
Transport temp.:	-25...+70°C (for a maximum of 168 hours)
Storage temp.:	-25...+55°C
Temp. difference:	3...100 K (heat meter), 3 .. 50 K (cooling meter)
Min. temp. difference:	> 0.05 K
Temp. resolution:	0.01 K
Measuring cycle:	Battery operation: 2 and 60 seconds dynamically Mains operation: 2 seconds continuously
Dimensions:	75 x 110 x 34.5 mm (H x W x D)

## Temperature sensors

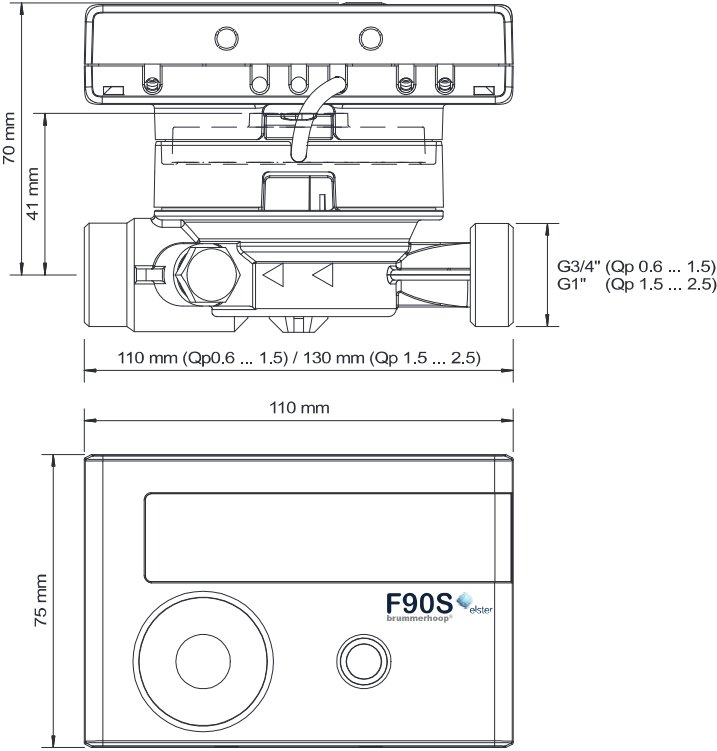
Sensor type:	2-wire, firmly connected
Sensor resistance:	Platinum Pt1000, Class B
Diameter:	5.2 mm (F90S3, F90SSolar und F90U3) 5.0 mm (F90M3-IST) 6.0 mm (F90M3-A)
Cable length:	1.5 m
Connection cable:	Silicone, unshielded
Protection class:	IP65

## Flow Sensor

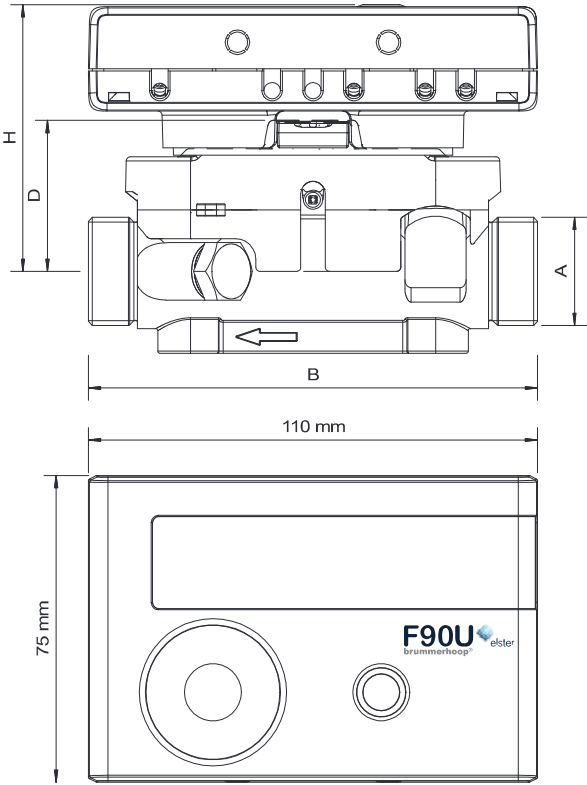
Measuring method:	Single-jet, impeller (F90S3 / F90SSolar) Multi-jet, impeller (F90M3-IST /-A) Ultrasonic, transit time (F90U3)
Metrological class:	Class 3 (F90S3 / F90SSolar) Class 3 (F90M3-IST /-A) Class 2 (F90U3)
Max. flow rate Qs/Qp:	2:1
Mechanical class:	M2
Electromagnetic class:	E2
Environmental class:	C
Place of installation:	Return flow (cold leg) or supply flow (hot leg); adjustable once-off
Installation position:	Arbitrary if not declared on the type label
Protection class:	IP65
Heat conveying medium:	Water For F90SSolar: Water-Glycol-Mixture (Propylene or Ethylene, without approval); 20%, 30%, 40% or 50%
Temperature range:	15...90°C (heat meter) 5...50°C (cooling meter, not Qp 0.6)
Nominal pressure PN:	16 bar

			F90S3 and F90SSolar / F90U3 / F90M3-IST / F90M3-A					F90U3		
Nominal flow rate Q <sub>p</sub>			m <sup>3</sup> /h	0.6	1.5		2.5	3.5	6.0	10.0
Nominal diameter DN		mm	15	15	20	20	20	20	25	40
Pressure loss F90S3 at Q <sub>p</sub>		mbar	155	210	225	165	-	-	-	-
Pressure loss F90U3 at Q <sub>p</sub>		mbar	30	210	40	120	210	210	200	110
Pressure loss F90M3-IST at Q <sub>p</sub>		mbar	30	190	190	250	-	-	-	-
Pressure loss F90M3-A at Q <sub>p</sub>		mbar	30	190	190	250	-	-	-	-
Starting value F90S3		l/h	4	7	7	10	-	-	-	-
Starting value F90U3		l/h	6	6	6	12	14	30	30	50
Starting value F90M3		l/h	4	4	4	5.5	-	-	-	-
Dynamic range Qi/Qp F90S3		l	1 : 25	1 : 25	1 : 25	1 : 25	-	-	-	-
Dynamic range Qi/Qp F90U3		l	1 : 50	1 : 125	1 : 125	1 : 100	1 : 125	1 : 100	1 : 100	1 : 100
Dynamic range Qi/Qp F90M3		l	1 : 25	1 : 50	1 : 50	1 : 50	-	-	-	-
Connection thread F90S3 / F90U3		Inch	G 3/4 B	G 3/4 B	G 1 B	G 1 B	G 1 B	G 1 B	G 5/4 B	G 2 B
Connection thread F90M3-IST			KOAX 2"	KOAX 2"	KOAX 2"	KOAX 2"	-	-	-	-
Connection thread F90M3-A		mm	M77x1.5	M77x1.5	M77x1.5	M77x1.5	-	-	-	-
Overall length F90S3		mm	110	110	130	130	-	-	-	-
Overall length F90U3		mm	110	110	130	130	130	130	260	300
Cable length calculator to flow sensor F90S3 and F90M3		m	0.5	0.5	0.5	0.5	-	-	-	-
Cable length calculator to flow sensor F90U3		m	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Dimensions F90S3 and F90S<sub>Solar</sub>

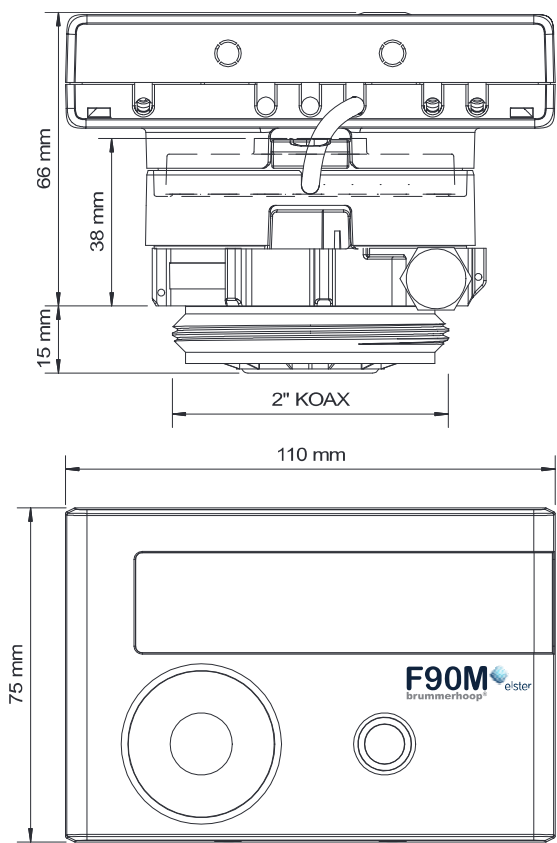


Dimensions F90U3



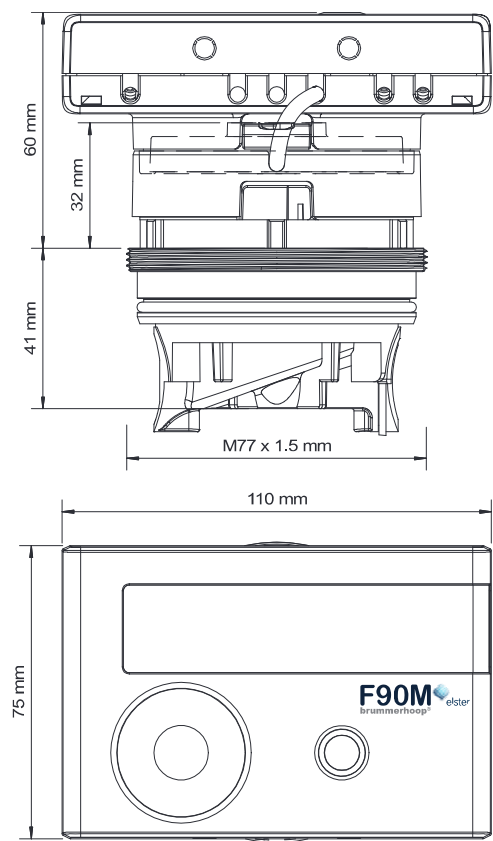
Qp		0.6	1.5		2.5	3.5	6.0	10.0
H	mm	65	65		65	65	67.5	73
D	mm	37	37		37	37	39.5	45
B	mm	110	110	130	130	130	260	300
A	Inch	G3/4B	G3/4B	G1B	G1B	G1B	G5/4B	G2B

Dimensions F90M3-IST - System Ista





Dimensions F90M3-A - System Allmess/Itron





**EG-Konformitätserklärung**  
**EC-Declaration of Conformity**

Für das Produkt *For the product*

**Kompaktkältezähler**  
*Compact Cooling Meter*

**S3**

**bestätigen wir als Hersteller**  
*we confirm as the manufacturer*

**Engelmann Sensor GmbH, Rudolf-Diesel-Straße 24-28, D-69168 Wiesloch-Baiertal**

dass das Produkt die Anforderungen erfüllt, die in den folgenden Richtlinien der Europäischen Gemeinschaft genannt werden, soweit diese Anwendung auf das Produkt finden:

*that the product meets the requirements according to the following directives of the European Parliament as far as these are applied on the product:*

**RoHS-Richtlinie 2011/65/EU vom 8.6.2011 (ABl. L 174/88 1.7.2011)** *RoHS Directive 2011/65/EU*

**EMV-Richtlinie 2014/30/EU vom 26.2.2014 (ABl. L 96/79 29.3.2014)** *EMC Directive 2014/30/EU*

**Zusätzlich für Geräte mit Funk: Additionally for devices with radio communication:**

**Funkanlagen-Richtlinie 2014/53/EU vom 16.4.2014 (ABl. L 153/62 22.5.2014)** *Radio Equipment Directive 2014/53/EC*

Weiterhin entspricht das Produkt den folgenden harmonisierten Normen, normativen Dokumenten, Technischen Richtlinien und sonstigen Rechtsvorschriften, soweit diese Anwendung auf das Produkt finden:

*Furthermore the product complies with the following harmonised standards, normative documents, technical guidelines and other regulations as far as these are applied on the product:*

<b>EN 1434 (2015)</b>	<b>EN 300220-2 V3.1.1 (2017-02)</b>	<b>EN 61000-4-3 (2006+A1:2008+A2:2010)</b>
<b>DIN EN ISO 4064 (2014)</b>	<b>EN 13757-2, -3 (2005)</b>	<b>EN 61000-4-4 (2004+A1:2010)</b>
<b>OIML R75 (2002/2006)</b>	<b>EN 60751 (2009)</b>	<b>EN 61000-4-6 (2014)</b>
<b>EN 301489-1 V1.9.2 (2011-09)</b>	<b>EN 62479 (2010)</b>	<b>EN 61000-4-8 (2010-11)</b>
<b>EN 301489-3 V1.6.1 (2013-08)</b>	<b>DIN EN 60529 (2000)</b>	<b>PTB-Richtlinie K 7.1, K7.2 (2006)</b>

Der Hersteller trägt die alleinige Verantwortung für die Ausstellung der Konformitätserklärung.

*The manufacturer is solely responsible for issuance of the declaration of conformity.*

Wiesloch-Baiertal, 07.01.2019  
Engelmann Sensor GmbH

  
U. Kunstein / CE-Beauftragter *CE Manager*

**Konformitätserklärung**

für Geräte, die nicht europäischen Vorschriften unterliegen

Für das Produkt

**Kompaktkältezähler**

**S3**

**Innerstaatliche Bauartzulassung**

**DE-16-M-PTB-0097**

**Benannte Stelle, Modul, Zertifikat**

**0102, Physikalisch-Technische Bundesanstalt, D-38116 Braunschweig, Modul D, DE-M-AQ-PTB015**

**bestätigen wir als Hersteller**

**Engelmann Sensor GmbH, Rudolf-Diesel-Straße 24-28, D-69168 Wiesloch-Baiertal**

dass das Produkt die Anforderungen erfüllt, die im Mess- und Eichgesetz (MessEG vom 25.07.2013 (BGBl. I S. 2722)), zuletzt geändert durch Artikel 1 des Gesetzes vom 11.04.2016 (BGBl. I S. 718) sowie in der sich darauf stützenden Mess- und Eichverordnung (MessEV vom 11.12.2014 (BGBl. I S. 2010)), zuletzt geändert durch Artikel 1 der Verordnung vom 10.08.2017 (BGBl. I S. 3098), genannt werden.


Weiterhin entspricht das Produkt den folgenden harmonisierten Normen, normativen Dokumenten, Technischen Richtlinien und sonstigen Rechtsvorschriften, soweit diese Anwendung auf das Produkt finden:

<b>EN 1434 (2015)</b>	<b>EN 300220-2 V3.1.1 (2017-02)</b>	<b>EN 61000-4-3 (2006+A1:2008+A2:2010)</b>
<b>DIN EN ISO 4064 (2014)</b>	<b>EN 13757-2, -3 (2005)</b>	<b>EN 61000-4-4 (2004+A1:2010)</b>
<b>OIML R75 (2002/2006)</b>	<b>EN 60751 (2009)</b>	<b>EN 61000-4-6 (2014)</b>
<b>EN 301489-1 V1.9.2 (2011-09)</b>	<b>EN 62479 (2010)</b>	<b>EN 61000-4-8 (2010-11)</b>
<b>EN 301489-3 V1.6.1 (2013-08)</b>	<b>DIN EN 60529 (2000)</b>	<b>PTB-Richtlinie K 7.1, K7.2 (2006)</b>

Der Hersteller trägt die alleinige Verantwortung für die Ausstellung der Konformitätserklärung.

Wiesloch-Baiertal, 07.01.2019  
Engelmann Sensor GmbH

  
U. Kunstein / Metrologie-Beauftragter



EG-Konformitätserklärung

EC-Declaration of Conformity

Für das Produkt *For the product*

Kompaktwärmehöler

*Compact Heat Meter*

EG-Baumusterprüfbescheinigungen

*EC examination certificate no.*

Benannte Stelle, Modul, Zertifikat

*notified body number, modul, certificate*

bestätigen wir als Hersteller

*we confirm as the manufacturer*

dass das Produkt die Anforderungen erfüllt, die in den folgenden Richtlinien der Europäischen Gemeinschaft genannt werden, soweit diese Anwendung auf das Produkt finden:

*that the product meets the requirements according to the following directives of the European Parliament as far as these are applied on the product:*

Messgeräte-Richtlinie 2014/32/EU vom 26.2.2014 (ABl. L 96/149 29.3.2014), zuletzt geändert durch die Berichtigung vom 20.01.2016 (ABl. L 13 S. 57)

*Measuring Instruments Directive 2014/32/EU*

RoHS-Richtlinie 2011/65/EU vom 8.6.2011 (ABl. L 174/88 1.7.2011)

*RoHS Directive 2011/65/EU*

EMV-Richtlinie 2014/30/EU vom 26.2.2014 (ABl. L 96/79 29.3.2014)

*EMC Directive 2014/30/EU*

Zusätzlich für Geräte mit Funk: *Additionally for devices with radio communication:*

Funkanlagen-Richtlinie 2014/53/EU vom 16.04.2014 (ABl. L 153/62 22.5.2014)

*Radio Equipment Directive 2014/53/EC*

Weiterhin entspricht das Produkt den folgenden harmonisierten Normen, normativen Dokumenten, Technischen Richtlinien und sonstigen Rechtsvorschriften, soweit diese Anwendung auf das Produkt finden:

*Furthermore the product complies with the following harmonised standards, normative documents, technical guidelines and other regulations as far as these are applied on the product:*

EN 1434 (2015)

EN 300220-2 V3.1.1 (2017-02)

EN 61000-4-3 (2006+A1:2008+A2:2010)

DIN EN ISO 4064 (2014)

EN 13757-2, -3 (2005)

EN 61000-4-4 (2004+A1:2010)

OIML R75 (2002/2006)

EN 60751 (2009)

EN 61000-4-6 (2014)

EN 301489-1 V1.9.2 (2011-09)

EN 62479 (2010)

EN 61000-4-8 (2010-11)

EN 301489-3 V1.6.1 (2013-08)

DIN EN 60529 (2000)


PTB-Richtlinie K 7.1 (2006)

Der Hersteller trägt die alleinige Verantwortung für die Ausstellung der Konformitätserklärung.

*The manufacturer is solely responsible for issuance of the declaration of conformity.*

Wiesloch-Baiertal, 13.12.2018

Engelmann Sensor GmbH



U. Kunstein / CE-Beauftragter

CE Manager

Manufacturer:  
Engelmann Sensor GmbH  
Rudolf-Diesel-Str. 24-28  
69168 Wiesloch-Baiertal  
Germany

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## **Brummerhoop & Grunow**

Industrievertretungen GmbH  
Kurt-Schumacher-Allee 2  
28329 Bremen, Germany

Phone: +49 421 435-600  
eMail: [info@brummerhoop.com](mailto:info@brummerhoop.com)  
Internet: [www.brummerhoop.com](http://www.brummerhoop.com)



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