

SVM MF4 Calculator

DATA SHEET

- For mixed fluids
- 25, 30, 35 or 40 w% ethylene glycol
- Multiple communication outputs
- 2 extra pulse inputs
- 2 pulse outputs for energy and volume
- 2- or 4-wire connection of temperature sensors
- Spacious terminal blocks
- Robust cable glands



Application

MF4 is a special version of the calculator F4, intended for energy measurement in systems with liquids other than water as heat-conveying liquid. MF4 is available in a few different versions, programmed for different concentrations of ethylene glycol, but can also be used in systems with other mixed fluids. The temperature range is extensive, -20°C to +150°C, which makes the MF4 suitable for the low temperatures that can occur in e.g. solar heating systems or in industrial cooling systems.

MF4 has a built-in M-Bus output for remote reading with 2-wire M-Bus, and five slots for connecting option boards for enhanced functionality. Some option boards are not compatible with MF4 since negative temperatures are not supported.

MF4 is delivered with 230 VAC mains supply including a battery for back-up supply, or battery supplied with up to 15 years battery life.

Temperature sensors of the type Pt100 can be installed with both 2-wire or 4-wire connection. Any flow sensor offering a standard REED pulse output or equivalent, and that can handle temperatures down to -20°C can be used with MF4. The pulse value can easily be altered even on site in order to match the pulse value of the flow sensor. This is especially useful when the flow sensor is being replaced for re-verification.

The spacious terminal blocks, superior cable glands and strain-reliefs, will, together with the enclosed documentation make the installation a true pleasure!



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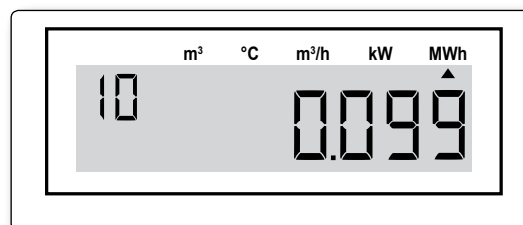
Measurement

For each volume pulse from the flow sensor the MF4 measures the flow and return line temperatures, and uses the volume flow and the temperature difference to calculate the energy. If the flow rate is high and the volume pulses are received more often than every 5 seconds, the volume will accumulate and an energy calculation will be done every five seconds. If the flow rate is low and no pulses are received in 60 seconds, the temperatures will be measured and updated every 60 seconds. As soon as a volume pulse is received, an energy calculation will take place. If no volume pulse is received in 24 hours a “low flow alarm” will appear. This will go away as soon as a volume pulse is received again.

Display

MF4 is equipped with an LCD (Liquid Crystal Display).

The LCD can be equipped with backlight as an option.



Display showing accumulated energy

Pulse outputs/pulse inputs

MF4 is equipped with pulse outputs of the type “open collector” for energy and volume. Relay outputs are also available when an option board FCRC for this purpose is installed.

MF4 is also equipped with two pulse inputs. The inputs can be used to collect pulses from other meters, e.g. cold and hot water meters. These extra pulse registers may also be read via M-Bus.

Communication

MF4 is equipped with a built in M-Bus data output in accordance with EN1434-3.

The meter can be read through the OPTO-interface or the 2-wire bus connection.

Option boards

MF4 is equipped with 5 option board slots.

The option boards that are compatible with MF4 are limited to:

- Relay option board, FCRC
- M-Bus isolation board, FCR2
- M-Bus/RS232 option board, FC2N
- LON/FTT10 option board, FC10

No other option board may be installed in MF4 since the function cannot be guaranteed.

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Displayed data

Accumulated values

- Accumulated energy
- Accumulated total volume
- Accumulated volume according to energy calculation
- Accumulated pulses, pulse input 1
- Accumulated pulses, pulse input 2

Momentary values

- Power
- Flow
- Flow temperature
- Return temperature
- Temperature difference

Calculator settings

- Total operating time
- Real time clock
- Date
- Pulse value
- Flow sensor placing (high or low temperature)
- Calculator number, S/N
- Communication, primary address
- Communication, secondary address (S/N)

Calculator messages

- Error code
- Total error time
- Preceding error code
- Total time for preceding error code
- Recommended date for battery replacement

Historical values

Historical values are stored at the end of each month or period for account days. There are 37 monthly registers + 2 account days in the calculator.

- Accumulated energy
- Accumulated total volume
- Accumulated volume according to energy calculation
- Accumulated pulses, pulse input 1
- Accumulated pulses, pulse input 2
- Error code at date of storage
- Error time at date of storage

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Technical data

Flow sensor

| | |
|----------------|------------------|
| – Frequency | Max. 12 Hz |
| – Pulse length | Min. 40 ms |
| – Voltage | Max. 3V |
| – Cable length | Max. 15m |
| – Pulse value | 0.001 – 9999 l/p |

Power supply

| | |
|-----------|--|
| – Battery | 3.6V – 2×2.75 Ah, 10 years battery life |
| – Mains | 230VAC ± 10%, 45-65 Hz, battery back-up 3.6V |

Data output

| | |
|---------------------|---|
| – M-Bus (EN-1434-3) | OPTO-interface (EN60870-5), and 2 wire bus connection |
| – LON FTT10 | With option board |

Temperature sensors

Approved and matched pairs, Pt100

| | |
|--------------------|--|
| – Max cable length | 2.5 m at 0.22 mm ² cross section 5.0 m at 0.50 mm ² cross section 7.5 m at 0.75 mm ² cross section 15 m at 1.5 mm ² cross section |
| – Sensor current | 4 µA (RMS) |

Temperature

| | |
|--------------|-----------|
| – Range | 0 – 190°C |
| – Difference | 2 – 120 K |

Ambient temperature

| | |
|---------------------|--------------|
| – Operation | 5°C – 55°C |
| – Storage/transport | -20°C – 70°C |

Protection class

IP54

Environmental class

C according to EN1434

Display

7 + 2 digits LCD

Pulse Outputs

| | |
|----------------|----------------|
| – Type | Open collector |
| – Pulse length | 125 ms |
| – Voltage | Max. 30 V |
| – Current | Max. 20 mA |

Pulse inputs

| | |
|----------------|------------|
| – Frequency | Max. 12Hz |
| – Pulse length | Min. 40 ms |
| – Voltage | Max. 3V |

Alarm output

| | |
|----------------|----------------|
| – Type | Open collector |
| – Pulse length | 125 ms |

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Service

MF4 has a built-in service function that facilitates alteration of certain parameters in the field without a special service tool.

The following parameters can be altered:

- Time and date
- Pulse value
- Account days
- Communication address
- Flow sensor placing, high or low temperature
- Recommended date for battery replacement

The total error time can be reset. Using the service software Flex Serv, all the parameters can be altered.

Delivery

MF4 is delivered in transport mode where only the real time clock is active. The power consumption is kept at a minimum in transport mode. This enables storage for many months without affecting the battery life.

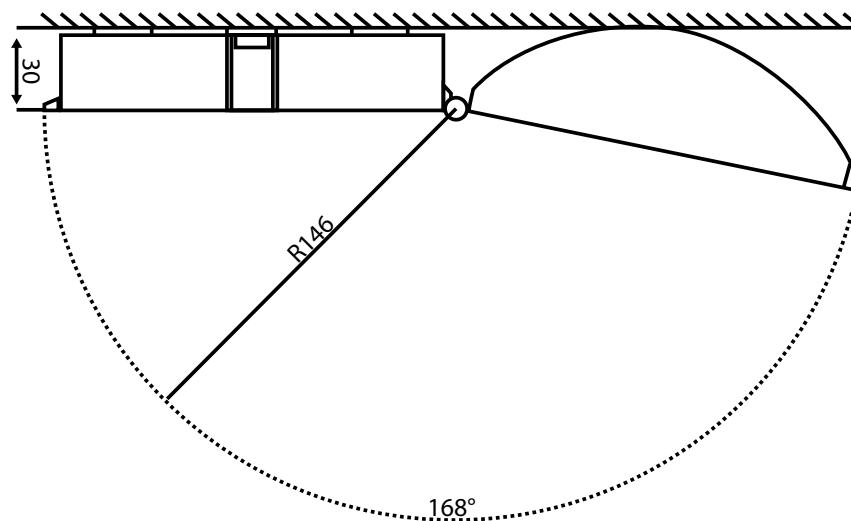
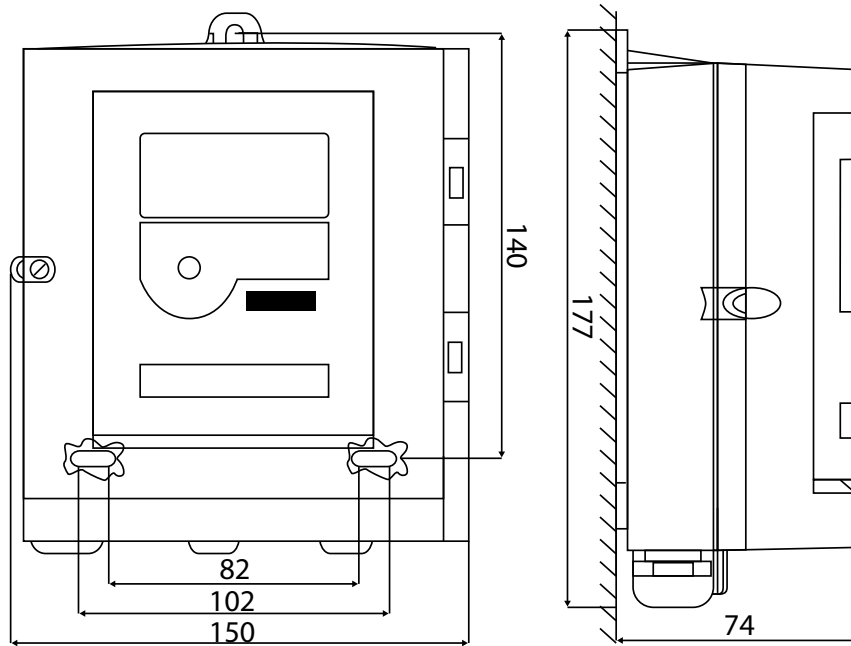
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Dimensions

All dimensions are in [mm].
MF4 is designed for wall mounting.



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MF4 Article number ABCDEFGHIJKLM

| SVM M4 | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|-----|
| Sensor type | | | | | | | | | | | | | |
| Pt100 2/4-wired. Flow meter in low temperature. | 3 | | | | | | | | | | | | |
| Pt100 2/4-wired. Flow meter in high temperature. | 4 | | | | | | | | | | | | |
| Power supply | | | | | | | | | | | | | |
| None | 0 | | | | | | | | | | | | |
| Battery std. | 1 | | | | | | | | | | | | |
| Mains 230 VAC (w. backup batt.) | 3 | | | | | | | | | | | | |
| Pulse value | | | | | | | | | | | | | |
| Kt: 2.5 l/p | | | 1 | | | | | | | | | | |
| Kt: 25 l/p | | | 2 | | | | | | | | | | |
| Kt: 250 l/p | | | 3 | | | | | | | | | | |
| Kt: 2500 l/p | | | 4 | | | | | | | | | | |
| Kt: 1 l/p | | | 5 | | | | | | | | | | |
| Kt: 10 l/p | | | 6 | | | | | | | | | | |
| Kt: 100 l/p | | | 7 | | | | | | | | | | |
| Kt: 1000 l/p | | | 8 | | | | | | | | | | |
| Energy type | | | | | | | | | | | | | |
| Energy type: KWh | | | | 0 | | | | | | | | | |
| Energy type: MWh | | | | 1 | | | | | | | | | |
| Energy type: GJ | | | | 2 | | | | | | | | | |
| Energy type: MBTU | | | | 3 | | | | | | | | | |
| Energy type: MBTU (kUSG kW USG/m) | | | | 4 | | | | | | | | | |
| Configuration | | | | | | | | | | | | | |
| 0 w.% ethylene glycol. Extra information may be found in order text! | | | | | 0 | | | | | | | | |
| 25 w.% ethylene glycol. Extra information may be found in order text! | | | | | 2 | | | | | | | | |
| 30 w.% ethylene glycol. Extra information may be found in order text! | | | | | 3 | | | | | | | | |
| 40 w.% ethylene glycol. Extra information may be found in order text! | | | | | 4 | | | | | | | | |
| 35 w.% ethylene glycol. Extra information may be found in order text! | | | | | 5 | | | | | | | | |
| In/Outlets | | | | | | | | | | | | | |
| Pulse inlets: 2,5 l/p + Pulse outlets | | | | | | | | A | | | | | |
| Pulse inlets: 25 l/p + Pulse outlets | | | | | | | | B | | | | | |
| Pulse inlets: 250 l/p + Pulse outlets | | | | | | | | C | | | | | |
| Pulse inlets: 2500 l/p + Pulse outlets | | | | | | | | D | | | | | |
| Pulse inlets: 1 l/p + Pulse outlets | | | | | | | | E | | | | | |
| Pulse inlets: 10 l/p + Pulse outlets | | | | | | | | F | | | | | |
| Pulse inlets: 100 l/p + Pulse outlets | | | | | | | | G | | | | | |
| Pulse inlets: 1000 l/p + Pulse outlets | | | | | | | | H | | | | | |
| Display | | | | | | | | | | | | | |
| Backlight with Opto and M-Bus | | | | | | | | | 0 | | | | |
| No backlight. With Opto and M-Bus | | | | | | | | | 1 | | | | |
| Montage | | | | | | | | | | | | | |
| For wall mounting | | | | | | | | | | 0 | | | |
| Connections | | | | | | | | | | | | | |
| Both connectors mounted | | | | | | | | | | | 1 | | |
| Communication | | | | | | | | | | | | | |
| M-Bus, 300 baud | | | | | | | | | | | | 1 | |
| M-Bus, 2400 baud | | | | | | | | | | | | 2 | |
| Country | | | | | | | | | | | | | |
| English standard | | | | | | | | | | | | | 300 |

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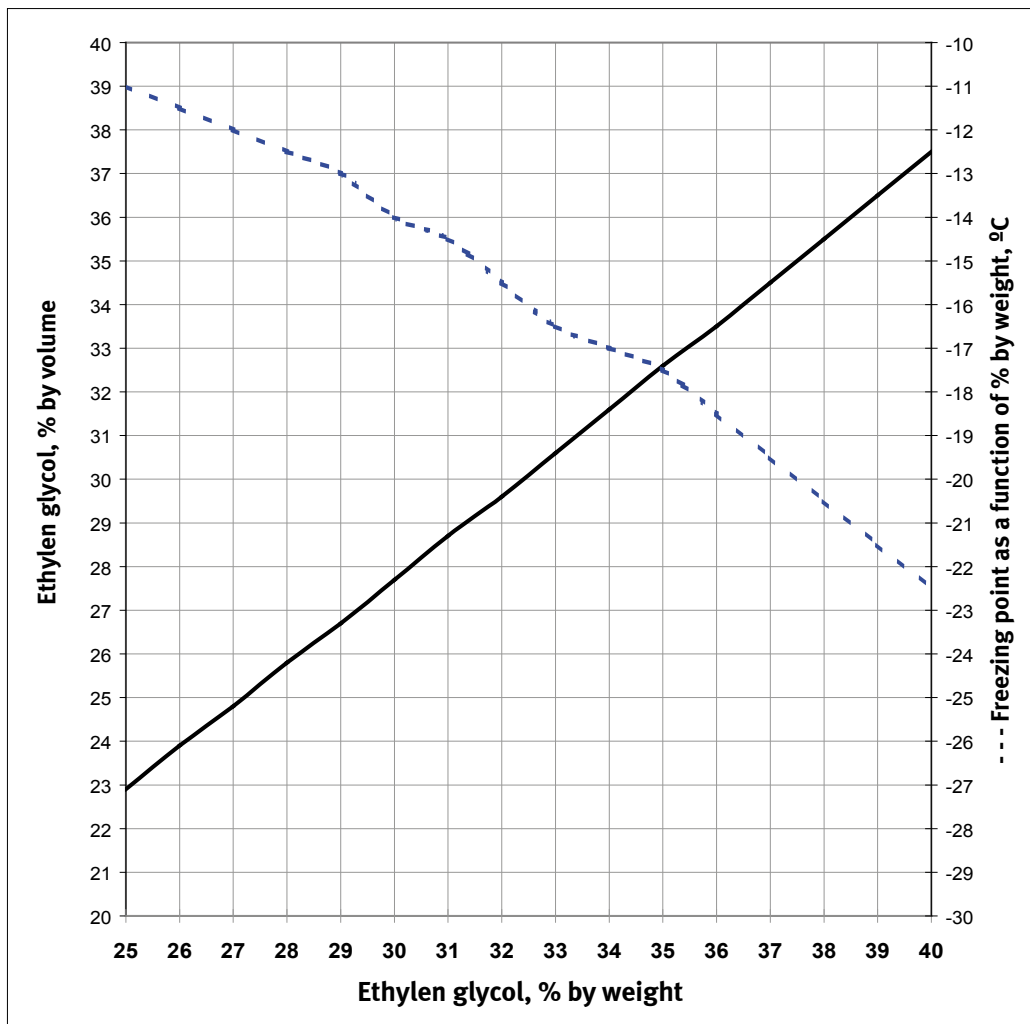


MF4 Article number key

To acquire the correct article number, just fill out the blanks.

| MF4 | A | B | C | D | E | F | G | H | I | J | KLM |
|-----|---|---|---|---|---|---|---|---|---|---|-----|
| | | | | | | | | 0 | 1 | | 300 |

Diagram of water/ethylene glycol mixtures

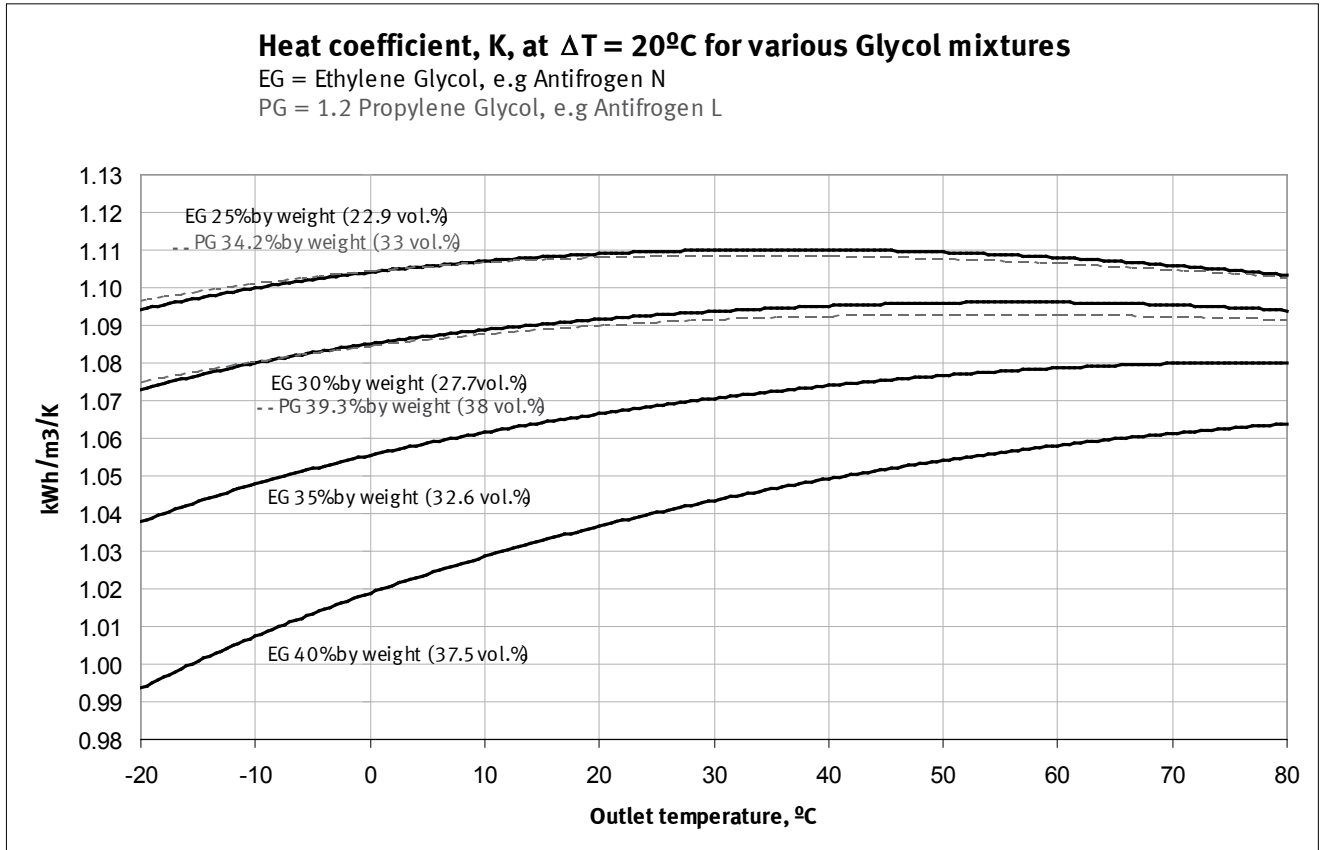


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Heat coefficient for glycol mixtures



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Systematical error (%) for various mixtures

Relative EG 30% by weight

| Temperature Inlet / Outlet °C | 3 / 0 | 23 / 20 | 43 / 40 | 10 / 0 | 20 / 10 | 60 / 40 | 90 / 40 |
|---|-------|---------|---------|--------|---------|---------|---------|
| Temperature difference (K) | 3 | 3 | 3 | 10 | 10 | 20 | 50 |
| EG 20% by weight (18.1 vol%) | -3 | -2.5 | -2 | -2.5 | -2.5 | -2 | -2 |
| EG 25% by weight (22.9 vol%) | -1.5 | -1.5 | -1 | -1 | -1 | -1 | -1 |
| EG 40% by weight (37.5 vol%) | +1.5 | +5.5 | +4.5 | +6 | +6 | +4 | +4.5 |
| Antifrogen N, 30% by volume (32.4 weight%) | +3 | +2 | +2 | +2 | +3 | +3 | +4 |
| Antifrogen N, 40% by volume (42.6 weight%) | +5 | +5 | +5 | +5 | +5 | +5 | +4 |
| Antifrogen L, 40% by volume (41.3 weight%) | +1 | +1 | +1 | +0.5 | 0 | +0.5 | 0 |
| 1.2 PropyleneGlycol 50% by weight (48.7 vol%) | +4 | +4.5 | +4.5 | +7 | +6 | +4 | +3.5 |
| PKL 30 | -2 | -5 | -6 | -3 | -3 | -6 | -7 |
| PKL 40 | +2.5 | +2 | +1 | +1.5 | +2 | +1 | 0 |
| Ethyl alcohol 15% by weight | -10 | -14 | | | -10 | | |
| Ethyl alcohol 25% by weight (30 vol%) | -2.5 | -5.5 | | | -4 | | |
| CalciumChloride 15% by weight | +3 | | | +3 | +3 | | |
| CalciumChloride 25% by weight | +8 | | | +8 | +8 | | |
| Water 100% | -7 | -6 | -5.5 | -7 | -7 | -5 | -4.5 |