



WFQ2...  
MEGATRON2®



WFM2...

## Electronic Heat Meters

**WFM2...  
WFQ2...**

**Electronic, mains-independent meters to acquire heating energy consumption in autonomous heating and domestic hot water plants.**

**Storage and display of the cumulated consumption values on a selectable set day.**

**Available as single-jet meters in «combined» all-in-one or split version**

**Nominal flow rates of single-jet meters 0.6 m<sup>3</sup>/h, 1.5 m<sup>3</sup>/h or 2.5 m<sup>3</sup>/h.**

**MEGATRON2 is a component of the SYNERGYR M-Bus Metering and SYNERGYR Radio Metering Systems.**

### Use

MEGATRON2 meters are used for measuring heating energy. Their major field of use are central heating plants, where heating energy is delivered individually to several consumers.

Plants of this type are used in buildings such as:

- Multi-family houses
- Office and administrative buildings

Typical users are:

- Private building owners
- Property associations
- Building maintenance companies
- Housing estate agents

## Functions

- Acquisition of heating energy consumption based on the measurement of flow rate and temperature differential
- Cumulation of the consumption values
- Storage of the cumulated consumption values on the set day
- Display of the consumption values
- Display of the key operational data
- Self-supervision, with fault indication
- Data transmission via M-bus or radio

## Type summary

### List of heat meters

Nominal flow rate $q_p$	Mounting length	Temperature sensors			Communication	Type ref. **
		Cable length	Immersion	Return sensor		
0.6 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	via M-bus *	<b>WFM21.B111</b>
1.5 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	via M-bus *	<b>WFM21.D111</b>
2.5 m <sup>3</sup> /h	130 mm	1.5 m	directly	integrated	via M-bus *	<b>WFM21.E131</b>
0.6 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	via M-bus *	<b>WFM21.B112</b>
1.5 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	via M-bus *	<b>WFM21.D112</b>
2.5 m <sup>3</sup> /h	130 mm	2.5 m	directly	integrated	via M-bus *	<b>WFM21.E132</b>
0.6 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	via radio	<b>WFM22.B111</b>
1.5 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	via radio	<b>WFM22.D111</b>
2.5 m <sup>3</sup> /h	130 mm	1.5 m	directly	integrated	via radio	<b>WFM22.E131</b>
0.6 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	via radio	<b>WFM22.B112</b>
1.5 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	via radio	<b>WFM22.D112</b>
2.5 m <sup>3</sup> /h	130 mm	2.5 m	directly	integrated	via radio	<b>WFM22.E132</b>
0.6 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	pulse output	<b>WFM24.B111</b>
1.5 m <sup>3</sup> /h	110 mm	1.5 m	directly	integrated	pulse output	<b>WFM24.D111</b>
2.5 m <sup>3</sup> /h	130 mm	1.5 m	directly	integrated	pulse output	<b>WFM24.E131</b>
0.6 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	pulse output	<b>WFM24.B112</b>
1.5 m <sup>3</sup> /h	110 mm	2.5 m	directly	integrated	pulse output	<b>WFM24.D112</b>
2.5 m <sup>3</sup> /h	130 mm	2.5 m	directly	integrated	pulse output	<b>WFM24.E132</b>
1.5 m <sup>3</sup> /h	80 mm	1.5 m	directly	not integrated	via M-bus *	<b>WFQ21.D081</b>
1.5 m <sup>3</sup> /h	80 mm	2.5 m	directly	not integrated	via M-bus *	<b>WFQ21.D082</b>
1.5 m <sup>3</sup> /h	80 mm	1.5 m	directly	not integrated	via radio	<b>WFQ22.D081</b>
1.5 m <sup>3</sup> /h	80 mm	2.5 m	directly	not integrated	via radio	<b>WFQ22.D082</b>
1.5 m <sup>3</sup> /h	80 mm	1.5 m	directly	not integrated	pulse output	<b>WFQ24.D081</b>
1.5 m <sup>3</sup> /h	80 mm	2.5 m	directly	not integrated	pulse output	<b>WFQ24.D082</b>
1.5 m <sup>3</sup> /h	110 mm	1.5 m	indirectly	integrated	via M-bus *	<b>WFM21.D115</b>
2.5 m <sup>3</sup> /h	130 mm	1.5 m	indirectly	integrated	via M-bus *	<b>WFM21.E135</b>
1.5 m <sup>3</sup> /h	110 mm	2.5 m	indirectly	integrated	via M-bus *	<b>WFM21.D116</b>
2.5 m <sup>3</sup> /h	130 mm	2.5 m	indirectly	integrated	via M-bus *	<b>WFM21.E136</b>
1.5 m <sup>3</sup> /h	110 mm	1.5 m	indirectly	integrated	via radio	<b>WFM22.D115</b>
2.5 m <sup>3</sup> /h	130 mm	1.5 m	indirectly	integrated	via radio	<b>WFM22.E135</b>
1.5 m <sup>3</sup> /h	110 mm	2.5 m	indirectly	integrated	via radio	<b>WFM22.D116</b>
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1.5 m <sup>3</sup> /h	110 mm	1.5 m	indirectly	integrated	pulse output	<b>WFM24.D115</b>
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1.5 m <sup>3</sup> /h	110 mm	2.5 m	indirectly	integrated	pulse output	<b>WFM24.D116</b>
2.5 m <sup>3</sup> /h	130 mm	2.5 m	indirectly	integrated	pulse output	<b>WFM24.E136</b>

\* Prepared for communication via M-bus

\*\* Short-form **MEGATRON2**

## Scope of delivery of heat meters

Item	Temperature sensors, cable length and immersion					Packing
	80 mm	110 mm, directly	110 mm, indirectly	130 mm, directly	130 mm, indirectly	
Flow measuring section	•	•	•	•	•	Box
Electronic unit	•	•	•	•	•	Box
Temperature sensor with fitting	•	•		•		Box
Temperature sensor without fitting			•		•	Box
Bracket	•	•	•	•	•	Box
Protective cap	2	2	2	2	2	Box
Mounting instructions	•	•	•	•	•	Box
Commissioning and operating instructions	•	•	•	•	•	Box
Flat seal	2	2	2	2	2	Bag 1
Sealing wire	3	2	2	2	2	Bag 1
Self-lock seal	3	2	2	2	2	Bag 1
(Adhesive seal)	•	•	•	•	•	Bag 1
Fischer dowel S6	2	2	2	2	2	Bag 2
Screws C4, 2x25	2	2	2	2	2	Bag 2
Blanking screw		•	•			Bag 3
Flat seal for blanking screw		•	•			Bag 3

## List of mounting kits

Scope of delivery, description	Type reference
For 80 mm mounting length, both sensors directly immersed, flow temp. sensor in ball valve	<b>WFZ.E80</b>
For 80 mm mounting length, return temp. sensors directly immersed, flow temp. sensor in ball valve	<b>WFZ.E80G3</b>
For 110 mm mounting length, return temp. sensors directly immersed, flow temp. sensor in ball valve	<b>WFZ.E110-I</b>
For 110 mm mounting length, return temp. sensor indirectly immersed, flow temp. protection pocket	<b>WFZ.E110-IT</b>
For 110 mm mounting length, return temp. sensor directly immersed, flow temp. ball valve	<b>WFZ.E110G3-I</b>
For 110 mm mounting length, return temp. sensor indirectly immersed, flow temp. protection pocket	<b>WFZ.E110G3-IT</b>
For 130 mm mounting length, return temp. sensor directly immersed, flow temp. ball valve	<b>WFZ.E130-I</b>
For 130 mm mounting length, return temp. sensor indirectly immersed, flow temp. protection pocket	<b>WFZ.E130-IT</b>
For 130 mm mounting length, return temp. sensor directly immersed, flow temp. ball valve	<b>WFZ.E130G1-I</b>
For 130 mm mounting length, return temp. sensor indirectly immersed, flow temp. protection pocket	<b>WFZ.E130G1-IT</b>

## Scope of delivery of mounting kits

Accessory	Mounting kit WFZ.E...									
	E80	E80G3	E110-I	E110-IT	E110G3-I	E110G3-IT	E130-I	E130-IT	E130G1-I	E130G1-IT
Spacer	•	•	•	•	•	•	•	•	•	•
Ball valve, internally threaded ½", for use in return pipe, cap nut * ¾", with thread for sensor, flat seal ¾"	•	•								
Ball valve, internally threaded ½", for use in return pipe, cap nut* ¾", flat seal ¾"	•	•	2	2	2	2				
Ball valve, internally threaded ¾", for use in return pipe, fitting ¾" with cap nut 1", flat seal 1"							2	2	2	2

Ball valve, internally threaded ½", for use in flow pipe, with thread for sensor	•		•							
Ball valve, internally threaded ¾", for use in flow pipe, with thread for sensor		•		•		•				
Ball valve, internally threaded 1", for use in flow pipe, with thread for sensor								•		
T-piece, internally threaded ½", for use in flow pipe				•						
T-piece, internally threaded ¾", for use in flow pipe						•		•		
T-piece, internally threaded 1", for use in flow pipe										•
Protection pocket M10x1				•		•		•		•

\* Cap nut integrated in ball valve (cannot be removed)

### List of accessories

Accessory	Description, scope of delivery	Type reference
Spacer	For mounting length 80 mm (¾" male)	<b>WFZ.R80</b>
Spacer	For mounting length 110 mm (¾" male))	<b>WFZ.R110</b>
Spacer	For mounting length 130 mm (1" male)	<b>WFZ.R130</b>
Ball valve	Connecting thread ½", with thread for sensor	<b>WFZ.K16</b>
Ball valve	Connecting thread ¾", with thread for sensor	<b>WFZ.K19</b>
Ball valve	Connecting thread 1", with thread for sensor	<b>WFZ.K22</b>
T-piece	Internally threaded ½", with protection pocket M10x1	<b>WFZ.T15</b>
T-piece	Internally threaded ¾", with protection pocket M10x1	<b>WFZ.T18</b>
T-piece	Internally threaded 1", with protection pocket M10x1	<b>WFZ.T22</b>
M-bus connection kit	1 plug with cable (1 m long), 1 adhesive label	<b>WFZ.MBUSSET</b>
Bezel	Only for surface mounting, when the electronic unit is installed separately from the volume meter	<b>WFZ.B4</b>

### Ordering

When ordering, please give type reference according to «Type summary».

MEGATRON2 comes standard with an M-bus output. If the heat meter is connected to a SYNERGYR M-Bus Metering System, the M-bus connection kit is required. For the pulse output version the M-bus connection kit is also required.

If a set day other than 31 December is required, the desired month is to be added to the type reference when ordering (normally, the last day of the month is the set day).

Ordering example for a heat meter, 130 mm mounting length, set day 30 April:

**WFM21.E131, set day: April.**

### Technical design

#### Measurement principle

The meter operates based on the single-jet measurement principle where the water jet hits the impeller tangentially. The impeller's speed is sensed electronically without producing a magnetic field.

The temperatures in the flow and return pipes are measured with immersion type platinum sensing elements (Pt 500).

## Acquisition of heat consumption

The heat meter is designed for mounting in the return pipe. The flow measuring section measures the flow continuously and the flow and return temperatures at least once per minute. A microprocessor in the flow measuring section determines the temperature differential, which the microprocessor uses along with the mean flow rate and the heat coefficient, to calculate the amount of heat consumed.

## Storage of consumption values

The heating energy consumption values are continuously cumulated. At 23:59 hours of the next set day, the actual meter reading will be stored. The set day is factory-set, the standard setting being 31 December (also refer to «Ordering»). At the same time the annual consumption values are stored, the meter calculates a verification code. Tenants who make their own reading need to give this code to the billing center, along with the set day reading. This enables the billing center to verify the reading. The stored set day value will be retained for one year.

## Display

The heat meter has three display levels which show the following values and variables:

- Cumulated heating energy consumption since the last set day
- Segment test
- Actual heating energy output
- Actual flow rate
- Actual flow temperature
- Actual return temperature
- Actual temperature differential
- Meter's number of operating hours since it was first installed
- Set day and set month
- Stored heating energy consumption of previous year
- Stored heating energy consumption of the last 13 month
- Verification code
- Cumulated heating energy consumption since the meter was first installed
- Indication of faults (also refer to section below)

The units displayed are °C or K, kWh (or GJ on request), m<sup>3</sup>/h, kW, and hours. Standard display is the cumulated heating energy consumption.

## Fault status signals

The meter monitors itself and can display faults it has detected. It differentiates between two categories of faults.

- Temporary faults: they have no impact on the correct functioning of the meter. In that case, the display flashes for 32 seconds and then returns to the standard display.
- Severe functional faults: the measurements have been stopped. In that case, the display alternates between error code and date the fault occurred the first time. The values that have been cumulated until the fault first occurred remain stored.

## Mechanical design

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The heat meter is comprised of flow measuring section, electronic unit and two temperature sensors. The flow measuring section is mounted in the piping with the help of fittings. It is made of nickel-plated brass and contains the measuring chamber with the single-jet impeller. The inlet has a strainer to retain larger dirt particles.

The meter is supplied as a compact all-in-one unit, but the electronic unit can be detached if required (split version).

## Electronic display unit

The electronic display unit houses the electronics and the eight-digit LCD. The operating voltage of DC 3 V is supplied by a lithium battery. Below the display, there is a button for advancing the display.

The electronic display unit on the flow measuring section can be swiveled through 360° and tilted by 90°.

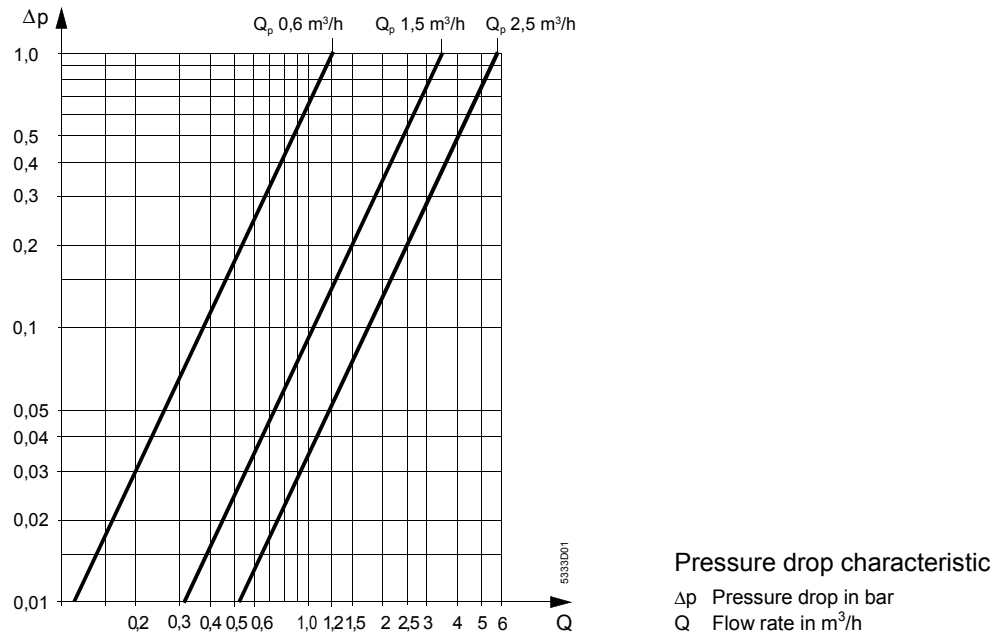
## Temperature sensors

The temperature sensors are immersion type sensors. They are immersed either indirectly or directly. The temperature sensors consist of an immersion rod the end of which carries the sensing element (Pt 500), the threaded nipple, and the shielded silicon cable which establishes the connection to the electronic display unit.

The temperature sensors are designed for fitting in ball valves (direct immersion) or protection pockets (indirect immersion).

The temperature sensors used are ready mounted, approved, mounted as pairs, or certified.

## Sizing



## Mounting notes

- The local regulations for the use of heat meters (mounting, sealing, operation, etc.) must be complied with.
- The heat meter must be mounted in the return pipe between two shutoff valves. To facilitate readout and service work, it should be easily accessible.
- A settling path is required just upstream of the meter:
  - 150 mm with the mounting lengths 80 mm and 110 mm
  - 200 mm with the mounting length 130 mm
- If the meter is only used at the time of commissioning, it is possible to fit the spacer first.
- Prior to mounting the meter, the piping must be thoroughly flushed; for this purpose, the spacer is to be used.
- When mounting the meter, the direction of flow (indicated by an arrow on the body) must be observed.
- If T-pieces of other manufacture are used, it must be ensured that they are compliant with EN1434!
- The electronic display unit can be mounted away from the flow measuring section (split version). If the hole in the wall is too large for the display unit, it can be mounted with the help of the mounting cover. If required, a chromium-plated covering plate can be used.
- The display unit should be located such that it is easy to read.
- After mounting, the required test pressure must be applied to the plant.
- The display unit, the two temperature sensors and the fittings must be sealed to ensure protection against tampering.  
If required, the M-bus service interface must also be sealed.
- The piece of piping where the temperature sensors are located should be lagged.

## Operating notes

For recalibration, the local regulations must be observed.

## Technical data

### General Data

Measurement accuracy class	3 to EN 1434			
Environmental class	A to EN 1434			
Unit of energy				
Standard	kWh			
On request	GJ			
Flow rates	0.6 m <sup>3</sup> /h	1.5 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h	
Min. flow rate $q_i$ ( $Q_{min}$ ) H / V	6 / 12 l/h	15 / 30 l/h	25 / 50 l/h	
Nominal flow rate $q_p$ ( $Q_{nenn}$ )	600 l/h	1,500 l/h	2,500 l/h	
Max. flow rate $q_s$ ( $Q_{max}$ )	1,200 l/h	3,000 l/h	5,000 l/h	
Starting flow, horizontal	1.2 l/h	3 l/h	5 l/h	
Max. perm operating pressure	10 bar			
Range of use of flow measuring section	1... 90 °C			
Temperature measurement				
Sensor measurement range	20...110 °C			
Temperature differential	3...90 K			
Output signal				
under measuring conditions	optional M-bus (EN 1434)			
in test mode	optional M-bus (EN 1434) optional voltage pulses (DC 3 V)			
Behavior in the event of excessive flow				
flow rate = 2 $q_s$	linear			
flow rate > 2 $q_s$	constant			
Perm. ambient temperature				
Transport and storage	5...55 °C			
Operation	55 °C max.			
Battery life	>8 years (>7 years for units with radio-based data transmission)			
Connections and weight	0.6 m <sup>3</sup> /h	1.5 m <sup>3</sup> /h	1.5 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h
Pipe connection (inlet and outlet)	3/4"	3/4"	3/4"	1"
Mounting length	110 mm	80 mm	110 mm	130 mm
Weight	0.73 kg	0.65 kg	0.71 kg	0.8 kg
Temperature sensors				
Sensing element	Pt 500 $\Omega$ to EN 60751			
Connecting cable	1.5 or 2.5 m			

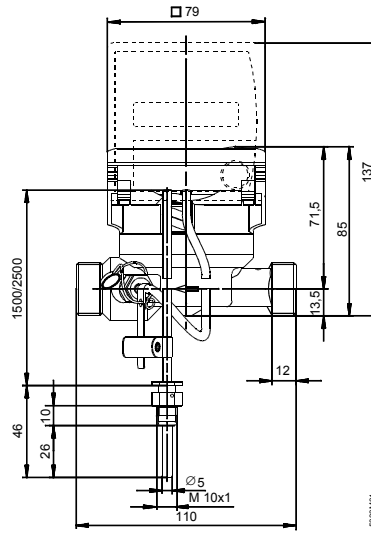
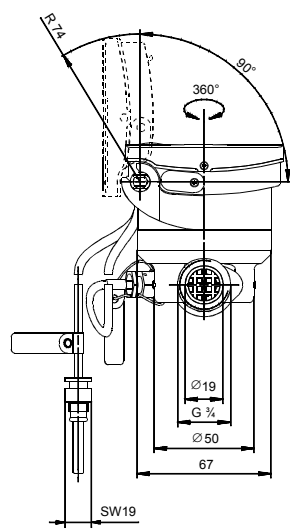
### Pulse output (WF...24... )

Pulse output	Open collector protection resistor 2440 $\Omega$ $\pm$ 10 %
Polarity reversal	not possible
Pulse length	$\geq$ 100 ms
Pulse pause	$\geq$ 100 ms
Max. voltage	<30 V
Current	$\leq$ 0.1 mA
Impedance to ground (water pipe)	10 nF (50 V)
Pulse valency	1 kWh per pulse (heat energy)

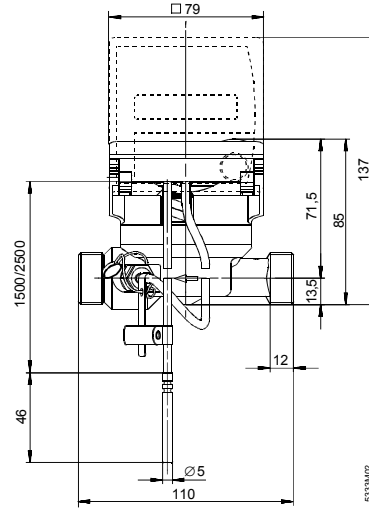
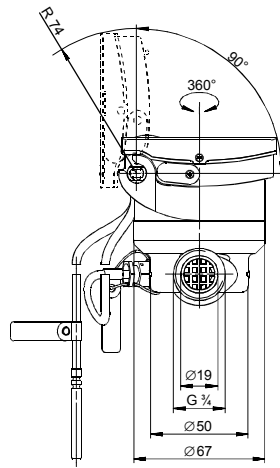
### Advice

The service tools ACC210, AZS210 and ABS210 can not be used with the pulse output meter!

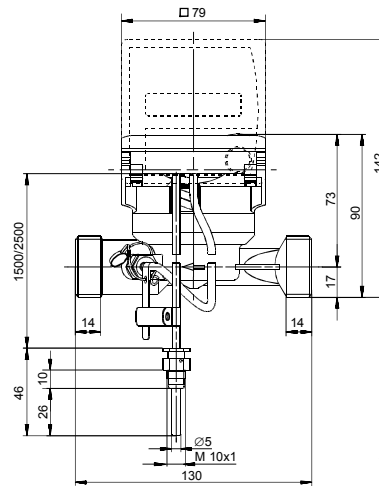
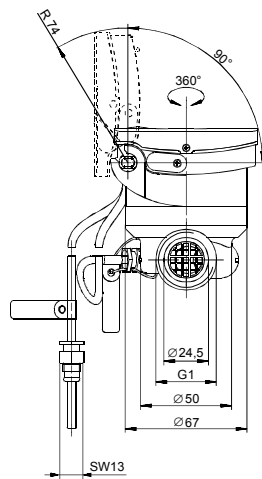
Dimensions



5333M01  
Mounting length  
110 mm, direct im-  
mersion of sensor

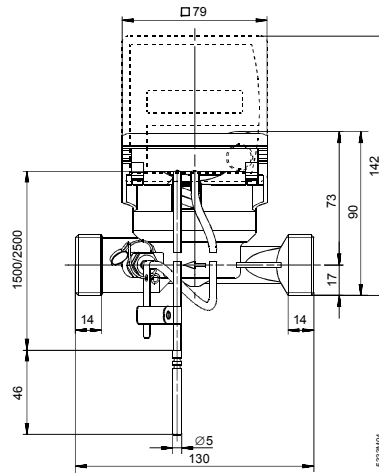
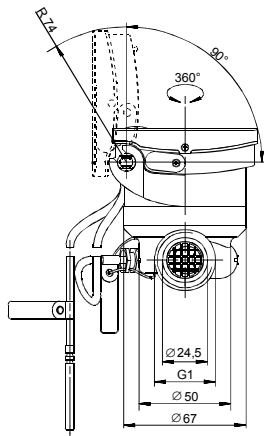


5333M02  
Mounting length  
110 mm, indirect im-  
mersion of sensor

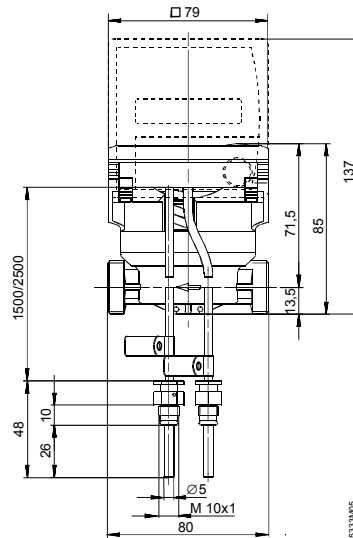
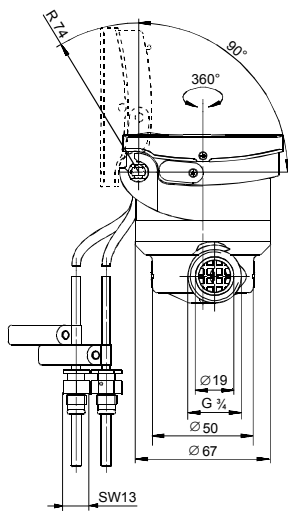


5333M03  
Mounting length  
130 mm, direct immer-  
sion of sensor





Mounting length  
130 mm, indirect im-  
mersion of sensor



Mounting length  
80 mm,  
direct immersion of  
sensors

