



High accuracy  
Multi functions  
Communication

# Integral-V

## Heat meters for residential applications



▶ Integral-V MaXX



▶ CF Sensor

Based on its proven know-how of the heat metering business in Europe and China, Actaris provides customers with high quality heat meters always adapted to their needs and requirements.

The Integral heat meters are the most valuable long-term investment for the billing of all the residential heat consumers.

### Integral MaXX

Compact, accurate and user-friendly, the Integral MaXX is ideally designed for billing heat in apartments or houses.

### CF Sensor

The Integral Sensor is a polyvalent meter suitable for billing heat, cooling or even combined applications (installations providing heat in winter and cooling in summer).



	Rank
Accuracy	★★★★★
Endurance	★★★★★
Reparability	★★★★★

### Excellence in Quality

With an experience of more than 30 years in manufacturing heat meters, Actaris has always been pushing its meter quality to further limits.

The Integral heat meters equipped with the V flow-meter obtained the maximum score of 5-stars to each of the three recognized tests carried out by the German Association of heating utilities (AGFW): Accuracy, Endurance and Reparability.

### Technology

The Integral meter is made of:

- ▶ a flow meter using electronic detection principle for high accuracy and durability
- ▶ an advanced calculator providing easy reading and enabling comprehensive data transmission
- ▶ a pair of temperature sensors (one sensor inserted in the meter body)

### Metrological performances

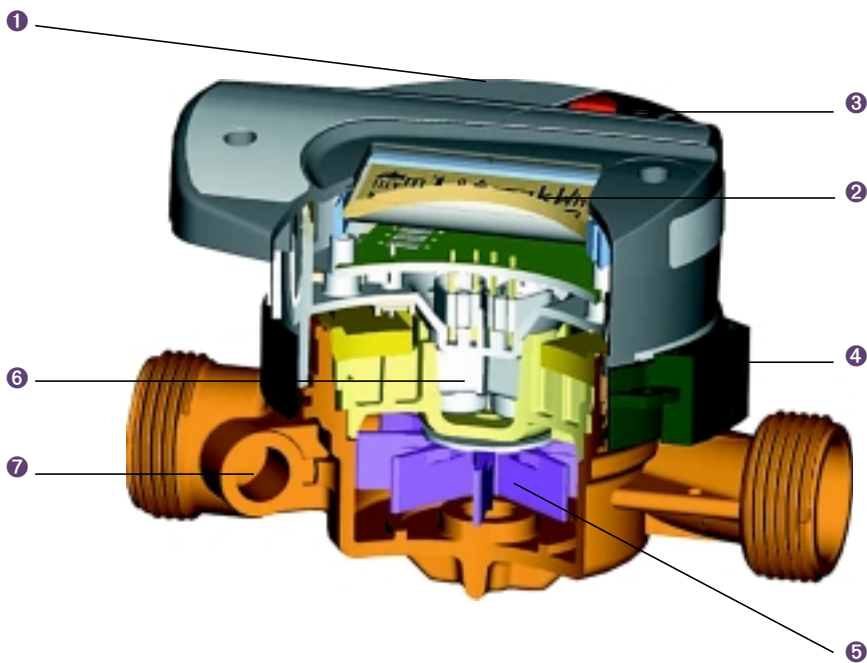
The Integral meter is approved in compliance with:

- ▶ CJ 128-2000 class 2
- ▶ EN 1434 class 2
- ▶ PTB class C
- ▶ OIML R75 class 4

## Description

Integral meter is available in 2 state-of-the-art calculator versions

- ▶ Integral MaXX: compact calculator
- ▶ Integral Sensor: removable calculator for wall mounting



Integral MaXX and Integral Sensor are available with 2 high-accuracy flow meter versions, both based on the Actaris patented electronic detection principle

- ▶ MK flow meter: Capsule flow meter
- ▶ V flow meter: In-line flow meter

### ▶ Integral MaXX calculator

- ① plug-and-play option boards
- ② large LC-Display
- ③ comfortable click button
- ④ 360° rotation ring

### ▶ V flow meter

- ⑤ turbine
- ⑥ detection coils
- ⑦ slot for temperature sensor

#### Note:

The Capsule principle has been specifically designed to improve maintenance operation at the end of the calibration period.

After closing the upstream and downstream valves, a simple torque on the flow meter ring and the measuring part can be quickly exchanged.

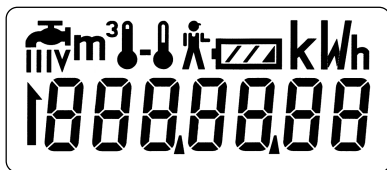
The flow-meter body stays on site, making the maintenance operation fast and cost-effective.



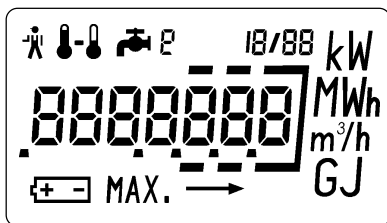
### ▶ Capsule Version

## LCD

### Integral MaXX



### CF Sensor



## Energy calculator

Calculator	Integral MaXX	Integral Sensor
Application	Heating	Heating, cooling or combined*
temperature range	TR	20°C...90°C (140°C as option)
temperature difference	ΔT	3°C...70°C (120°C as option)
environmental class (EN 1434)	class C	
ambient temperature	in operation	0°C...50°C
	stocks & transport	-10°C...+70°C
protection class (IEC 1010-1)	IP 54	
operating time of lithium battery	10(+1) years	
back-up memory	EEPROM	
calculator mounting	compact	removable
cable length from flow meter to calculator	-	1.2 m
Temperature sensors		
resistance thermometer (IEC 751)	Pt 100	
length of the coiled cables (standard)	2 x 1.2 m	
length of the silicon cables (optional)	2 x 1.75 m	

\* When configured in combined version, the Integral sensor is automatically detecting if the network is operated for heating (in winter) or for cooling (in summer). The energy is then calculated according to the correct enthalpy correction coefficient. The heating energy and the cooling energy indexes are stored in separate registers which can be both displayed and transmitted through M-BUS or separate pulse outputs.

## Display Integral Maxx

- ▶ Level 1
  - Energy (kWh)
  - Volume (m³)
  - LCD segment test
  - 13 monthly energy indexes

- ▶ Level 2
  - Instantaneous flow (m³/h)
  - Temperature difference (°K)
  - Inlet temperature (°C)
  - Outlet temperature (°C)
  - Failure time
  - Operating time (day, year)
  - Version

- (Optional)
  - M-BUS primary address
  - M-BUS secondary address
  - Pulse weight water meters
  - Volume of water meter #1
  - Volume of wm#1 (month n-1)
  - Volume of wm#1 (year n-1)

- Volume of water meter #4
- Volume of wm#4 (month n-1)
- Volume of wm#4 (year n-1)

## Display CF Sensor

- ▶ Level 1
  - Energy (MWh / GJ)
  - Energy cooling (MWh / GJ) (option)
  - Volume (m³)
  - Energy index (year n-1)
  - Energy index (year n-2)
  - LCD segment test

- ▶ Level 2
  - Volume of water meter #1
  - Volume of water meter #2
  - Volume of wm#1 (year n-1)
  - Volume of wm#2 (year n-1)
  - Volume of wm#1 (year n-2)
  - Volume of wm#2 (year n-2)

- ▶ Level 3
  - Volume (m³)
  - Instantaneous flow (m³/h)
  - Peak flow (m³/h) + date & time
  - Temperature difference (°K)
  - Inlet temperature (°C)
  - Outlet temperature (°C)
  - Instantaneous power (kW)
  - Peak power (kW) + date & time
  - Operating time (day, year)
  - Failure time

# Remote reading

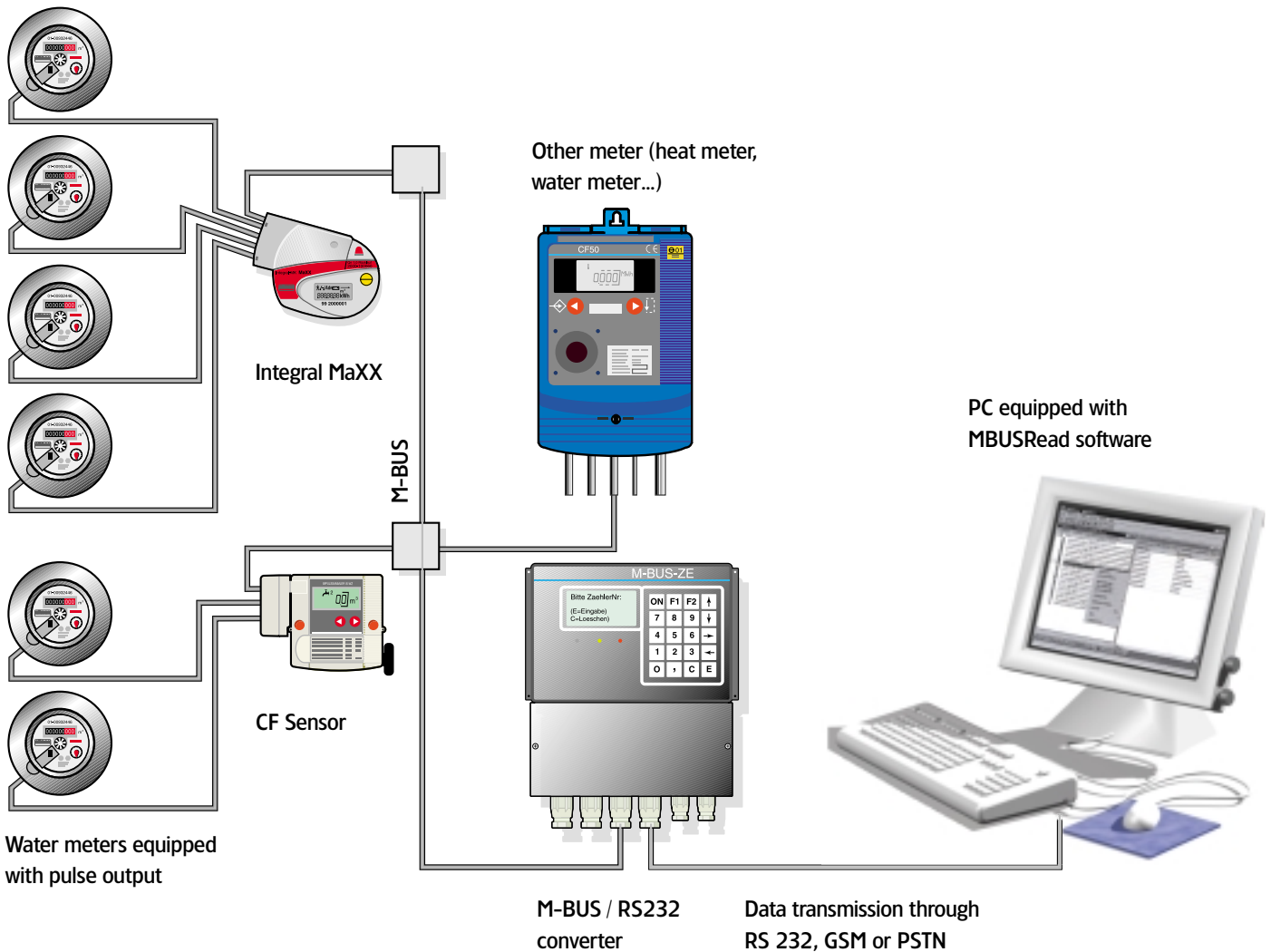
Option plug	Integral MaXX	Integral Sensor
Option 1	M-Bus + 4 water meters	M-Bus + 2 water meters
Option 2	Energy / Volume pulses	Energy pulses

You can now collect automatically all data from your meters at a very low cost:

- ▶ Using a plug-and-play option board, the Integral meter can be easily connected to any M-BUS network, compliant with the EN 1434-3 standard.
- ▶ Furthermore, the Integral meter can register pulses coming from 2 or 4 external water meters and transmit the indexes through the M-Bus network.
- ▶ As an alternative, it is possible to connect the Integral meter to other networks using a basic pulse output.



▶ Integral MaXX Option plug



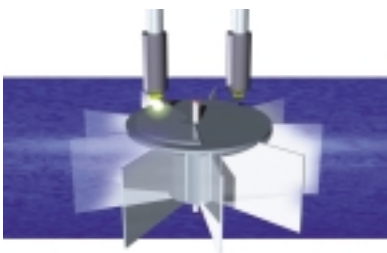
## Flow meter

Flow meter MK		Q <sub>n</sub> 1.0	Q <sub>n</sub> 2.5
EN 1434 class		Class 2	
PTB class		C all positions	
overload flow rate	q <sub>s</sub>	1.2 m <sup>3</sup> /h	3.0 m <sup>3</sup> /h
permanent flow rate	q <sub>p</sub>	1.0 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h
minimum flow rate	q <sub>i</sub>	10 l/h	25 l/h
starting flow	q <sub>start</sub>	3 l/h	5 l/h
Connection thread		G <sup>3</sup> / <sub>4</sub> B	G1B
head loss at Qp	bar	0.25	0.25
maximum admissible pressure	MAP	16	16
maximum admissible temperature	MAT	90°C	90°C

Flow meter V		Q <sub>n</sub> 0.6	Q <sub>n</sub> 1.5	Q <sub>n</sub> 2.5
EN 1434 class		Class 2		
PTB class	horizontal vertical	C B	C B	C C
overload flow rate	q <sub>s</sub>	1.5 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h	3.75 m <sup>3</sup> /h
permanent flow rate	q <sub>p</sub>	0.6 m <sup>3</sup> /h	1.5 m <sup>3</sup> /h	2.5 m <sup>3</sup> /h
minimum flow rate	q <sub>i</sub>	6 l/h	15 l/h	25 l/h
starting flow	q <sub>start</sub>	3 l/h	5 l/h	5 l/h
connection thread		G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B	G1B
head loss at Qp	bar	0.13	0.12	0.24
maximum admissible pressure	MAP	16	16	16
maximum admissible temperature	MAT	90°C	90°C	90°C

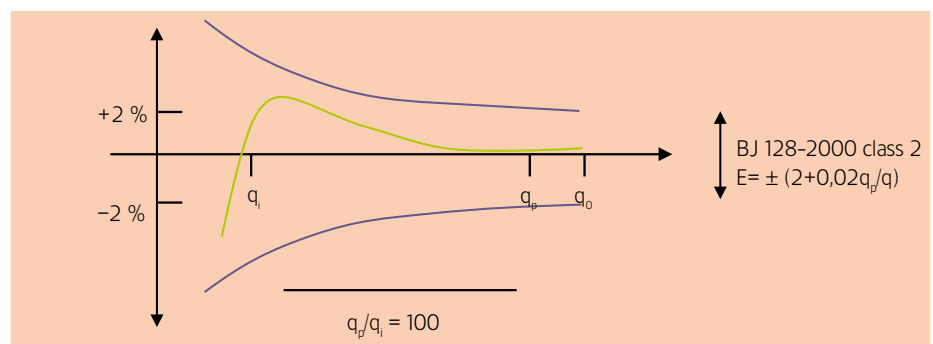
### ► Electronic detection

- The turbine is the only component moving in water
- a non-magnetic but conductive target is located on top of the turbine
- the rotation of the target is detected (using Eddy current principle) by two coils located on the dry side of the pressure plate



### Accuracy

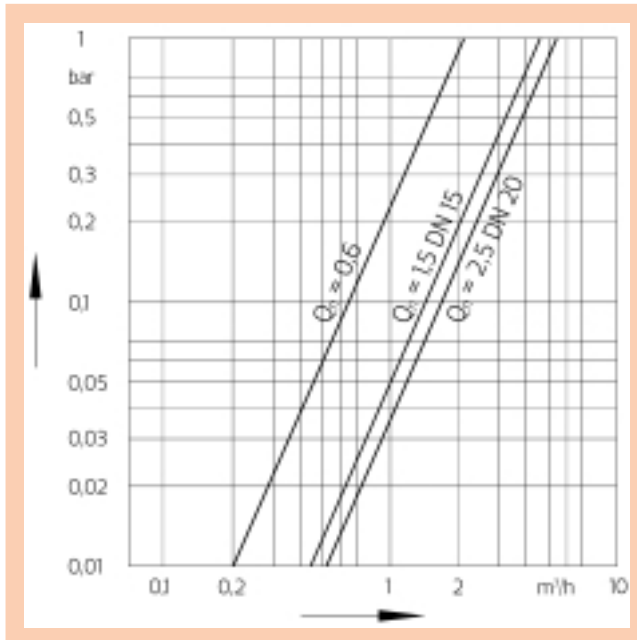
Based on the patented Actaris detection system, Integral provides a highly accurate metrology over its large measuring range. With its very low starting flow, the meter registers even very low heating energy.



### Endurance

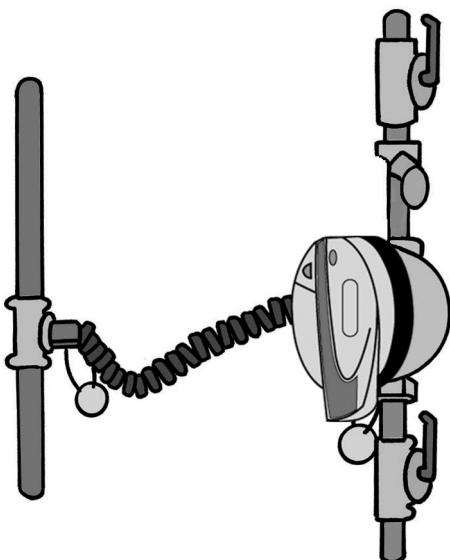
- The perfect metrology of the Integral is very stable over time. Even after the accelerated ageing tests of AGFW simulating a full meter lifetime, the metrology of the Integral V was unaltered.
- Often in heating water, it comes to problems with magnetite. It deposits on the turbine magnets of the magnetic coupling. The electronic detection system of Actaris does not know those problems!
- The Integral meter cannot be influenced by external magnetic fields owing to the patented electronic detection system. Manipulation by magnetic impacts is consequently chanceless. This means a plus of security!

## Pressure loss

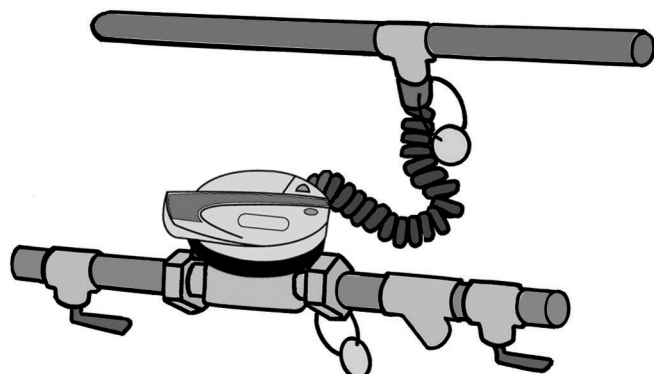


## Easy to install

- ▶ The register can be freely rotated of 360°
- ▶ The Integral MaXX has a very compact dimension. As a result, it fits even into smallest cabinets (85 mm depth).
- ▶ In hard to read locations, the Integral Sensor provides a dismountable calculator that can be wall-mounted at a more convenient place.
- ▶ The meter can be installed either in horizontal or vertical position.
- ▶ A special slot is included in the meter body to insert one of the temperature sensors.



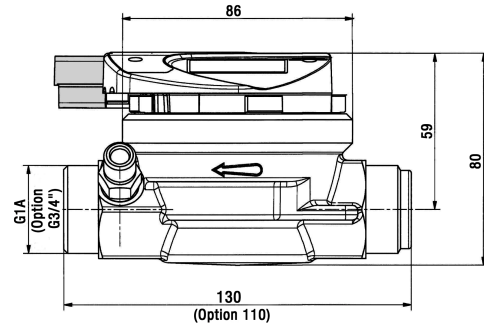
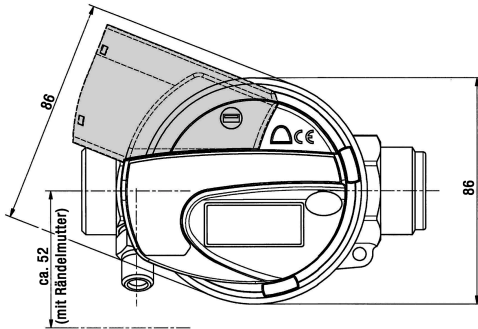
▶ Vertical installation



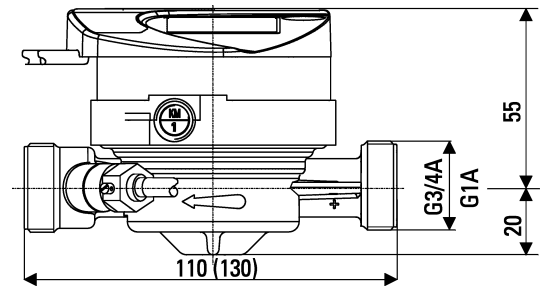
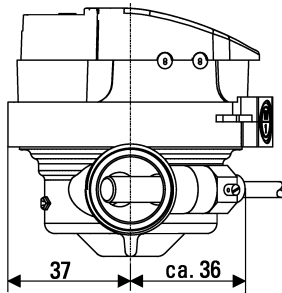
▶ Horizontal installation

## Dimensions

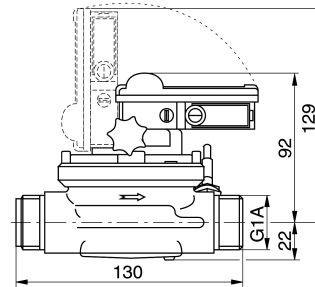
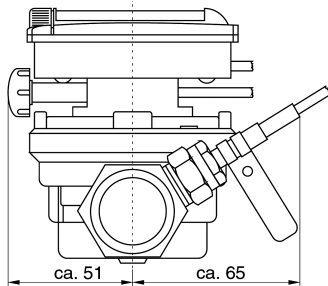
### ▶ Integral-MK MaXX



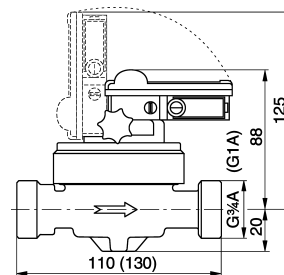
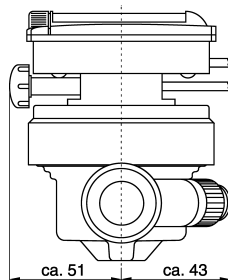
### ▶ Integral-V MaXX



### ▶ CF Sensor-MK



### ▶ CF Sensor-V



For more information, see [www.actaris.com](http://www.actaris.com)