The most advanced method of precise heat metering

sensonic® II

Heat meter

Contents

The sensonic II heat meter – innovative and future-oriented technology

Functional description

With its different model ranges, the heat meter generation sensonic II offers a variety of options for combination and application.

The various compact versions come with an integrated calculator, flow sensor and temperature sensor in one device as standard.

The compact version with two external sensors fulfils all requirements of the new European Measuring Instrument Directive, the implementation of which triggers the prescription of significant changes for the new installation of heat meters under the Calibration Order. The compact version with integrated return flow sensor is available for the replacement of installed meters.

The combined heat meters comprise the sensonic II calculator, a flow sensor and a temperature sensor pair and offer almost unlimited application.

The flow sensors of the compact versions and combined heat meter sensonic II flow sensor are designed in accordance with the proven istameter principle and, thus, offer a high degree of flexibility in replacement.

Performance features

The compact devices and flow sensors are available for nominal flow rates of 0.6/1.5/2.5 m3/h. For the calculators of the combined heat meters, flow sensors with nominal flow ratings of 0.6 m3/h to 250 m3/h and temperature sensors with lengths of 3 m and 10 m are available. The temperature difference between forward flow and return flow is measured every 60 seconds by default. The last two effective date figures are stored automatically. The LC display clearly shows all relevant data in five display loops.

Interfaces

Besides direct readout, mobile data recording and programming are also possible via the integrated optical interface. The optical interface allows all heat meters of the sensonic II model range to be directly or subsequently integrated into the ista radio system. Additional services, such as energy data management, can also be implemented without a problem.

Area of application

The compact versions of the sensonic II heat meter are specially tailored to the requirements of heat metering in apartment blocks.

The combined heat meters of the sensonic II model range, with their wide-ranging applications, cover the entire spectrum of heat metering and can be used in conjunction with district heating, for example, as well as in the commercial sector.

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Your benefits

- The ista radio system can be integrated directly or subsequently. This enables the implementation of additional services, such as energy data management.
- High reliability via innovative microchip technology
- Seamless replacement thanks to the istameter principle
- Reliability and durability through sophisticated technology
- Wear-free and corrosion-resistant high-performance battery
- Secure protection against dirt and spray water via high degree of seal-tightness
- Integrated sensor button
- Certain and convenient reading
- Security against manipulation via sealing
- Approved in accordance with European Measuring Instrument Directive or national approval
- Manufacturer certification in accordance with ISO 9001
- CE mark assures electronic compatibility in domestic and industrial environments

Product range

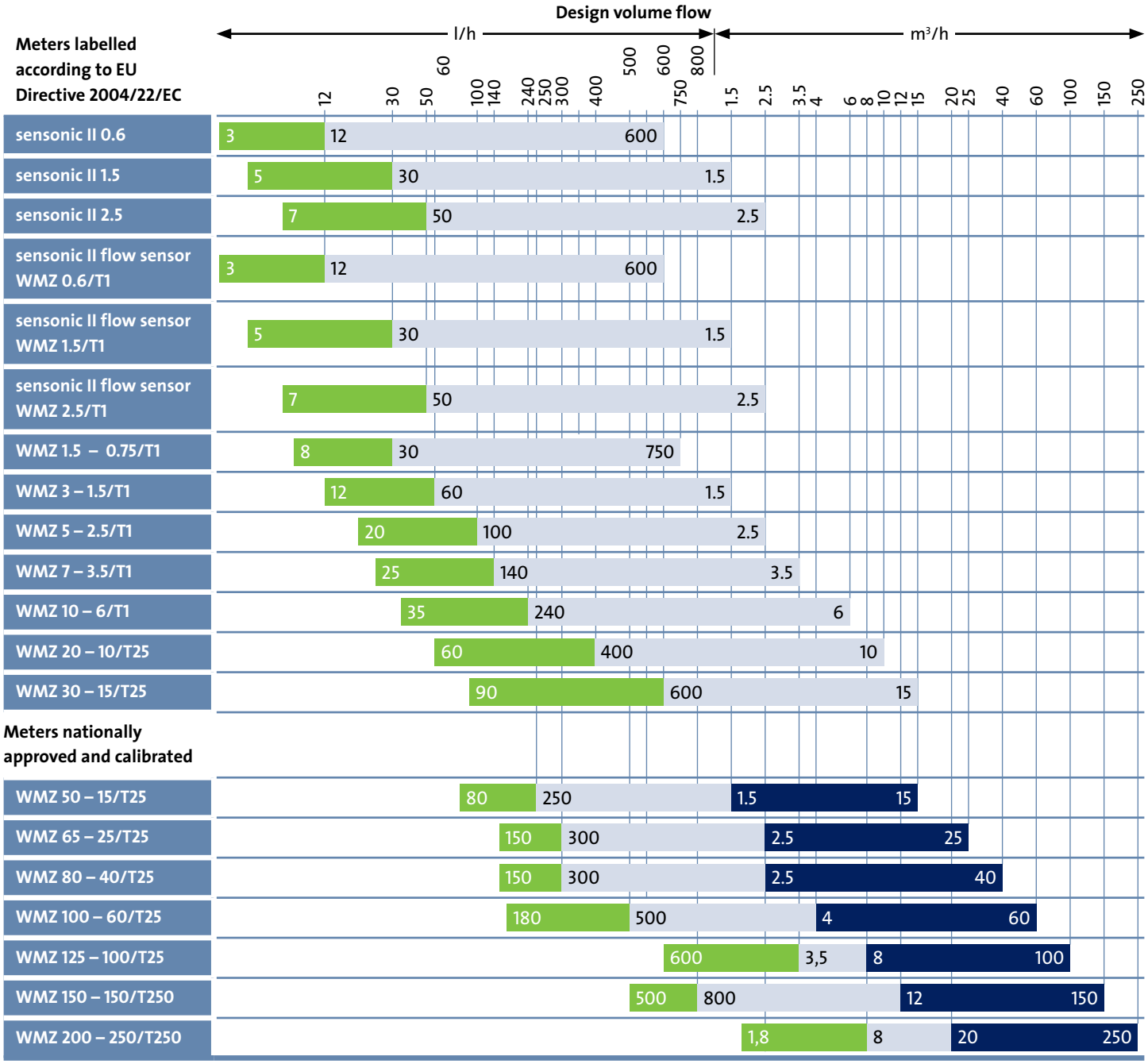
Whether heat meters are required for new installation/initial fitting or replacement, in accordance with legal calibration periods, ista always has the right solution. From compact devices for domestic heat metering to combined heat meters, we can offer you devices with state-of-the-art electronics.

The selection tables on the following pages will help you to easily find the right heat meter for your installation.

The compact devices and sensonic II flow sensors are capable of variable installation thanks to the istameter principle. This also guarantees problem-free replacement of devices from the old sensonic model range.

Whichever sensonic II version you choose, you will always receive a technically sophisticated, top-class device. Simple installation, problem-free replacement, flexible application and reliable metering.

Meter selection – horizontal installation



Measurement range in accordance with EU Directive 2004/22 EC

- Start-up range
- Entire measurement range
- Minimum flow rate = q_i
- Nominal flow rate = q_p
- (Separation limit Q_t not part of the approval)

Measurement range in accordance with national approval

- Start-up range
- Lower measurement range
- Upper measurement range
- Lower measurement range limit = Q_{min}
- Separation limit = Q_t
- Nominal flow rate = Q_n

Technical data

Description, see page	Metering principle		Flow sensors								Microprocessor calculator		
			Nominal flow rate q_p in m^3/h	Pressure loss p	Connection			Nominal values DN in mm	Maximum water temperature °C	Nominal pressure PN 16	Display unit	Temperature range Theta Θ in °C	Temperature difference Delta Theta ΔΘ in K
					Thread acc. to ISO 228/1	Flange acc. to DIN 2501	istameter G 2B						
11	Magnet-free speed measure-ment	Multi-jet impeller (istameter principle)	0.6	0.16			●		15 – 90	●	0.1 kWh	5 – 150	3 – 100
			1.5	0.22			●			●			
			2.5	0.24			●			●			
20	Magnet-free speed measure-ment	Multi-jet impeller (istameter principle)	0.6	0.16			●		15 – 90	●	0.1 kWh	5 – 150	3 – 100
			1.5	0.22			●			●			
			2.5	0.24			●			●			
22	Magnetic/ dry running device/reed contact	Single-jet impeller	0.75	0.25	●	●		20	120	●	0.1 kWh	5 – 150	3 – 100
		Multi-jet impeller	1.5	0.2	●	●		15		●			
			2.5	0.24	●	●		20		●			
			3.5	0.25	●	●		25		●			
			6	0.25	●	●		32/25		●			
			10	0.25	●	●		40		●	0.001 MWh		
			15	0.25		●		50		●			
24		Woltman	15	0.07		●		50	130	●	0.001 MWh	5 – 150	3 – 100
			25	0.06		●		65		●			
			40	0.1		●		80		●			
			60	0.1		●		100		●			
			100	0.06		●		125		●			
			150	0.14		●		150		●	0.1 MWh		
			250	0.03		●		200		●			

How to select the right heat meter

The design volume flow is decisive in selecting a heat meter. The highest possible volumetric flow must be equal to or smaller than the permissible nominal flow rate Q_n/q_p. The lowest volumetric flow must be greater than the minimum flow rate $Q_{mi}n/q_i$.

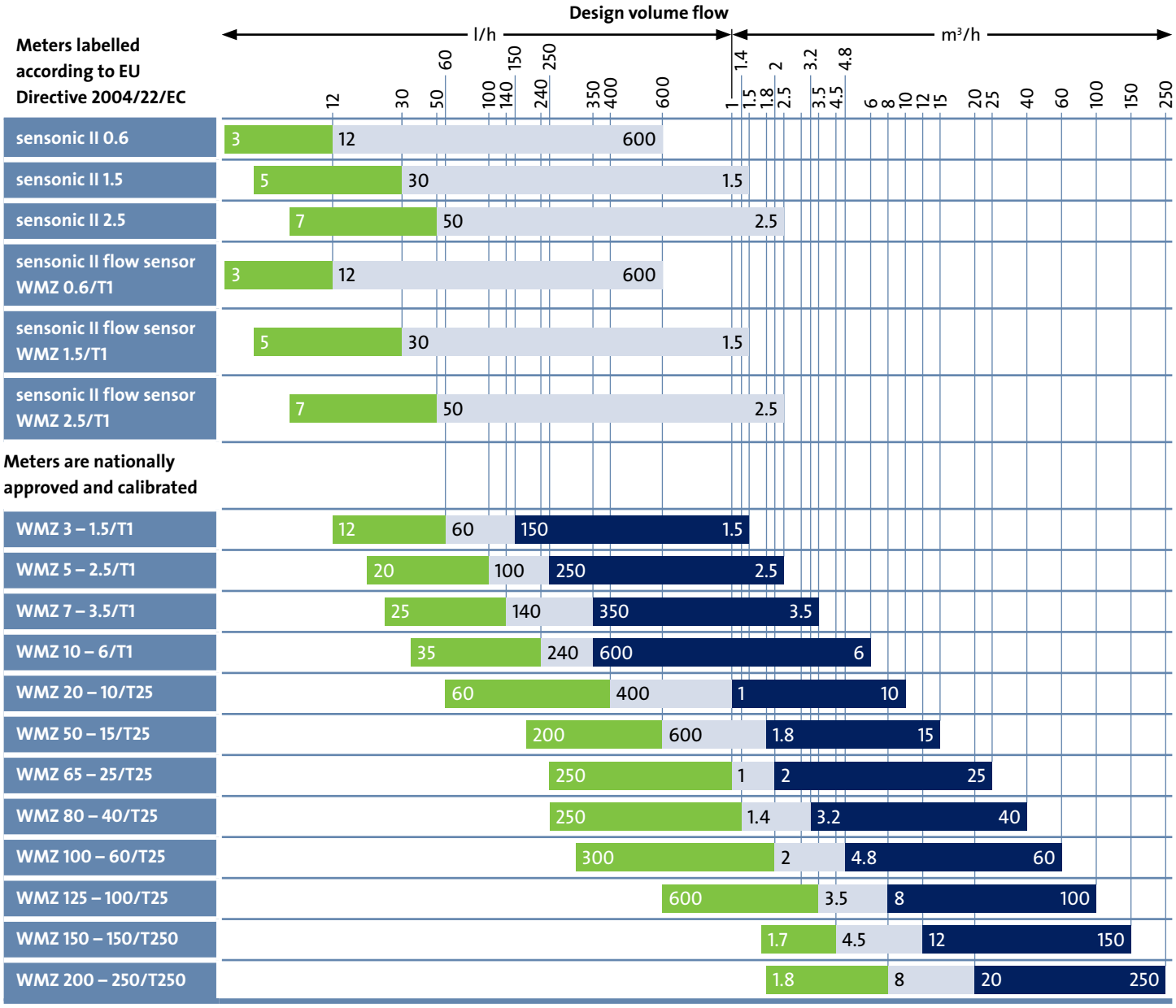
In certain cases, regulating devices, such as allocators, butterfly valves, mixing valves or overflow valves must be adapted.

This is how to use the selection table on page 6

Follow the table from your calculated outflow volume vertically downwards until you reach the light or dark blue bar of a heat meter. This is a suitable heat meter for your purposes.

If you encounter several light or dark blue bars, i.e. if several heat meters are suitable, please make a decision using the criteria of model type, pressure loss and lowest occurring volumetric flow.

Meter selection – vertical installation



Measurement range in accordance with EU Directive 2004/22 EC

- Start-up range
- Entire measurement range
- Minimum flow rate = q_i
- Nominal flow rate = q_p
- (Separation limit Q_t not part of the approval)

Measurement range in accordance with national approval

- Start-up range
- Lower measurement range
- Upper measurement range
- Lower measurement range limit = Q_{min}
- Separation limit = Q_t
- Nominal flow rate = Q_n

Technical data

Description, see page	Measuring method		Flow sensors								Microprocessor calculator		
			Nominal flow rate q_p in m^3/h	Pressure loss p	Connection			Nominal values DN in mm	Maximum water temperature °C	Nominal pressure PN 16	Display unit	Temperature range Theta Θ in °C	Temperature difference Delta Theta ΔΘ in K
					Thread acc. to ISO 228/1	Flange acc. to DIN 2501	istameter G 2B						
11	Magnet-free speed measure-ment	Multi-jet impeller (istameter principle)	0.6	0.16			●		15 – 90	●	0.1 kWh	5 – 150	3 – 100
			1.5	0.22			●			●			
			2.5	0.24			●			●			
20	Magnet-free speed measure-ment	Multi-jet impeller (istameter principle)	0.6	0.16			●		15 – 90	●	0.1 kWh	5 – 150	3 – 100
			1.5	0.22			●			●			
			2.5	0.24			●			●			
22	Magnetic/ dry running device/reed contact	Multi-jet impeller	1.5	0.2	●	●		15	120	●	0.1 kWh	5 – 150	3 – 100
			2.5	0.24	●	●		20		●			
			3.5	0.25	●	●		25		●			
			6	0.25	●	●		32/25		●			
			10	0.25	●	●		40		●	0.001 MWh		
			15	0.25		●		50		●			
24		Woltman	15	0.07		●		50	130	●	0.001 MWh	5 – 150	3 – 100
			25	0.06		●		65		●			
			40	0.1		●		80		●			
			60	0.1		●		100		●			
			100	0.06		●		125		●			
			150	0.14		●		150		●	0.1 MWh		
			250	0.03		●		200		●			

How to select the right heat meter

The design volume flow is decisive in selecting a heat meter. The highest possible volumetric flow must be equal to or smaller than the permissible nominal flow rate Q_n/q_p. The lowest volumetric flow must be greater than the minimum flow rate Q_{min}/q_i.

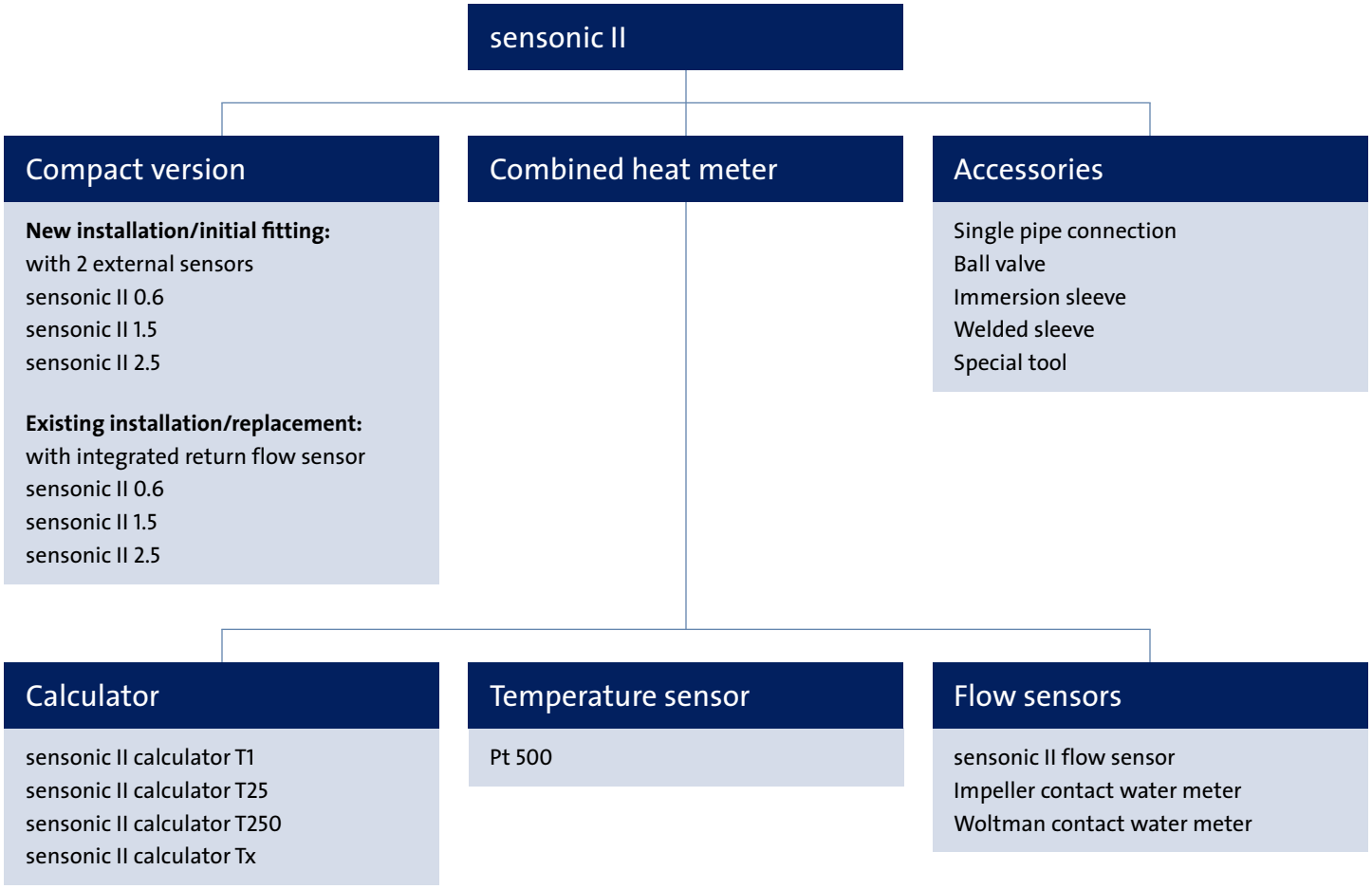
In certain cases, regulating devices, such as allocators, butterfly valves, mixing valves or overflow valves must be adapted.

This is how to use the selection table on page 8

Follow the table from your calculated outflow volume vertically downwards until you reach the light or dark blue bar of a heat meter. This is a suitable heat meter for your purposes.

If you encounter several light or dark blue bars, i.e. if several heat meters are suitable, please make a decision using the criteria of model type, pressure loss and lowest occurring volumetric flow.

sensonic II – overview



The sensonic II generation product range includes compact versions, combined heat meters and extensive accessories.

The use of the proven istameter principle offers you optimal flexibility. Two model ranges with various combination variants offer you a variety of applications in heat metering.

The electronic recording of the impeller rotation guarantees delay-free, precise metering. The scanning is extremely low on wear thanks to the use of a corrosion-protected modulation body.

The integrated electronic microchip (ASIC) calculates the heat quantity consumed from the calculated metered values and various constants for the flowing liquid (so-called K-factor). The cumulated heat quantity is then displayed on the LC display. A total of five different display loops can be called up via the display.

The LC display is dark in normal operation. It is only activated when the sensor button is pressed to save the battery capacity.

The temperature difference is measured by default every 60 seconds regardless of the flow rate. The maximum values for flow rate and performance are updated automatically every 15 minutes.

sensonic II – compact version

The sensonic II compact heat meter combines a calculator, flow sensor and temperature sensor pair in a single device. For new installations, the compact version is available with two external sensors. For replacements in existing installations, where necessary, we offer a version with integrated return flow sensor.

A 30-cm-long cable between the flow sensors and calculator means that the calculator can be mounted separately without a problem with both versions.

sensonic II new installation

The heat meter with two external sensors can be mounted onto all single pipe connections from ista. Installation of the sensors in ball valves fulfils the legal requirements of the Calibration Order with regard to the new installation of heat meters. The compact dimensions of the sensonic II enable problem-free installation, even in difficult installation conditions.

The sensonic II is a multi-jet impeller meter with which the rotation of the impeller is recorded electronically. Since the impeller and bearing pin are loaded equally with water pressure owing to the multi-jet principle, the ista heat meter has very high metering stability throughout its entire service life.

New installation/initial fitting – technical data

Devices with 2 external sensors Meters labelled according to EU Directive 2004/22/EC (symmetrical sensor installation)		**sensonic II 0.6**		**sensonic II 1.5**		**sensonic II 2.**	
Forward flow sensor length	m	1.5	3	1.5	3	1.5	3
Return flow sensor length	m	1	1	1	1	1	1
Part No.		**59152**	**59158**	**59154**	**59160**	**59156**	**59161**
Flow sensor, **also applies for sensonic II flow sensor**							
Nominal flow rate q_p	m³/h	0.6		1.5		2.5	
Pressure loss* Δp at q_p	bar	0.16		0.23		0.24	
Minimum flow rate q_i	l/h	12		30		50	
Horizontal installation starting value	l/h	3		5		7	
Vertical installation starting value	l/h	4		7		10	
Nominal pressure PN	bar	16					
Temperature range limit values	Θ	15–90					
Inflow and outflow sections		Not required					
Microprocessor calculator							
Temperature range limit values Θ		5–150					
Temperature difference limit values ΔΘ		3–100					
Temperature difference suppression		< 0.2					
Measuring sensitivity		< 0.01					
Heat coefficient K		Temperature-dependent, variable					
Ambient temperature	°C	5–55					
Ambient conditions		Acc. to DIN EN 1434 class E1/M2					
Display of heat consumption		8-digit including one decimal place					
Power supply		Integrated 6-year battery**					
Protection class		IP 54 according to EN 60529					

* In combination with EAS Rp 3/4.

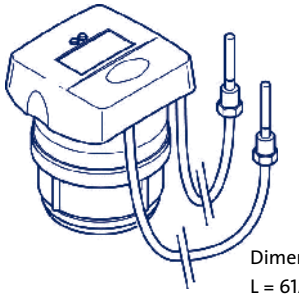
** For Switzerland and Luxembourg, other battery lives and conditions apply.

Additional accessories

45221 Wall installation adapter

45222 Wall installation adapter with magnet

sensonic II
with two external sensors



Dimensions in mm:
L = 61/W = 76/H = 80

Existing installation/replacement – technical data

Devices with integrated return flow sensors Meters in accordance with national approval and calibration (asymmetrical sensor installation)		**sensonic II 0.6**		**sensonic II 1.5**		**sensonic II 2.5**	
Forward flow sensor length	m	1.5	3	1.5	3	1.5	3
Return flow sensor length	m	1	1	1	1	1	1
Part No.		**19120**	**19123**	**19121**	**19124**	**19122**	**19125**
Flow sensor, **also applies for sensonic II flow sensor**							
Nominal flow-rate Q_n	m^3/h	0.6		1.5		2.5	
Pressure loss* Δp at Q_n	bar	0.16		0.23		0.24	
Minimum flow rate Q_{min}	l/h	24		60		100	
Separation limit** Q_t	l/h	60		120		200	
Horizontal installation starting value	l/h	3		5		7	
Vertical installation starting value	l/h	4		7		10	
Nominal pressure PN	bar	16					
Temperature range limit values	Θ	15–90					
Inflow and outflow sections		Not required					
Microprocessor calculator							
Temperature range limit values Θ		5–150					
Temperature difference limit values ΔΘ		3–100					
Temperature difference suppression		< 0.2					
Measuring sensitivity		< 0.01					
Heat coefficient K		Temperature-dependent, variable					
Ambient temperature	°C	5–55					
Ambient conditions		Acc. to DIN EN 1434 class C					
Display of heat consumption		8-digit including one decimal place					
Power supply		Integrated 6-year battery***					
Protection class		IP 54 according to EN 60529					

* In combination with EAS Rp 3/4.

** The table shows the type-approved measurement ranges in Germany in accordance with national approval by the Physikalisch-Technische Bundesanstalt (PTB).

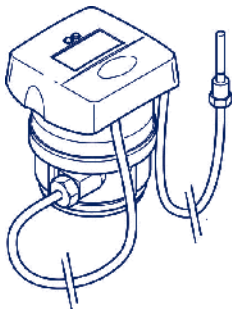
*** For Switzerland and Luxembourg, other battery lives and conditions apply.

Additional accessories

45221 Wall installation adapter

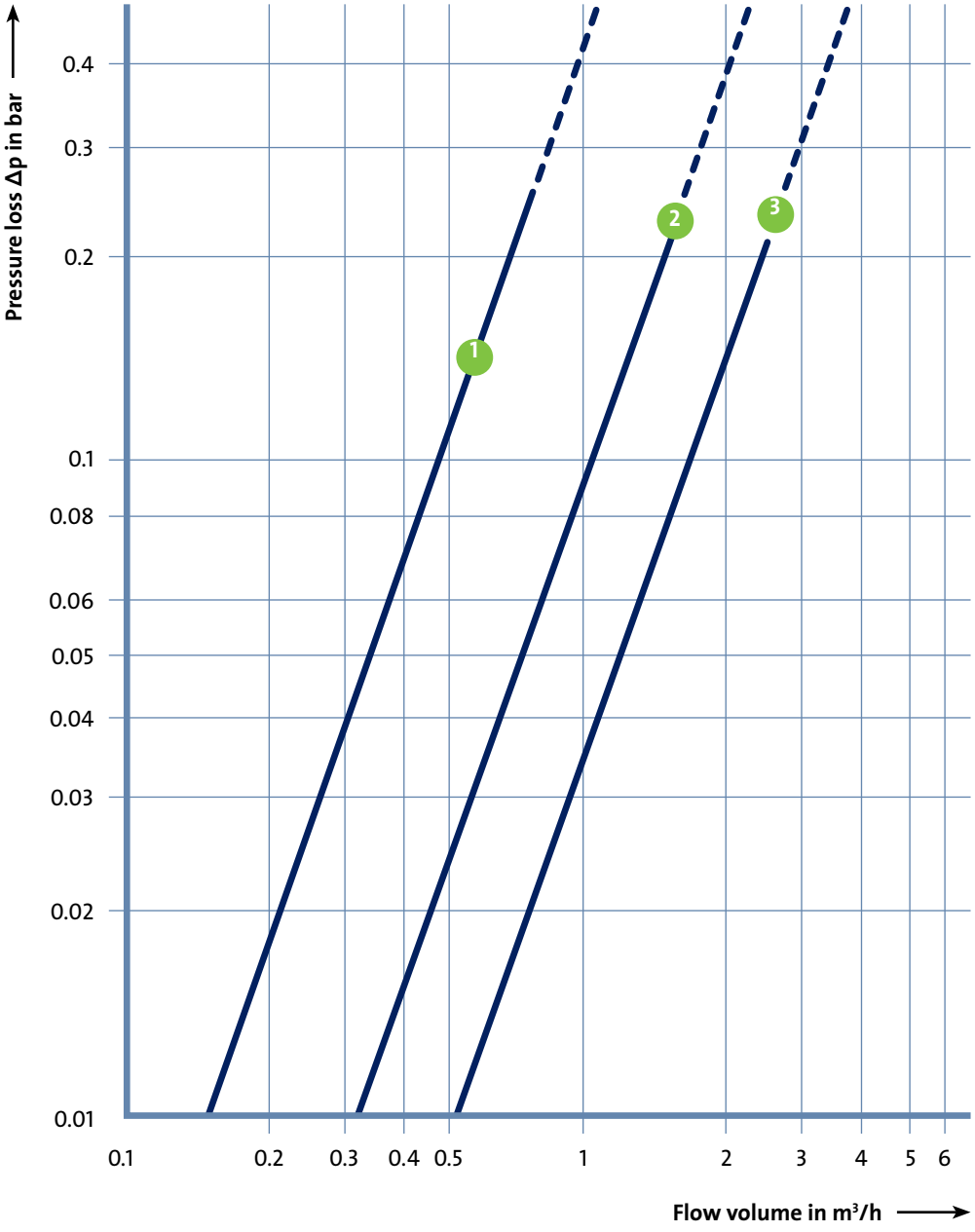
45222 Wall installation adapter with magnet

sensonic II with integrated return flow sensor



Dimensions in mm:
L = 61/W = 76/H = 80

Pressure loss curves sensonic II – compact version



Pressure loss at Q_n/q_p

1 = Q_n/q_p 0.6 m³/h
2 = Q_n/q_p 1.5 m³/h
3 = Q_n/q_p 2.5 m³/h

Same values for meters with two external sensors and those with integrated return flow sensor.

sensonic II – calculator

- sensonic II
  - Compact version
  - Combined heat meter
    - Calculator
      - sensonic II calculator T1
      - sensonic II calculator T25
      - sensonic II calculator T250
      - sensonic II calculator Tx
    - Temperature sensor
    - Flow sensors
  - Accessories

As a combined heat meter, the sensonic II calculator can be combined with various flow sensors and temperature sensors.

The calculator is available in three different versions with values of 1/25/250 litres per pulse. In the sensonic II calculator Tx version, the pulse value can be set during production.

The base plate of the calculator has the same dimensions as the previous model meaning that this can be replaced easily without replacing the mounting plate.

Technical data – sensonic II calculator

Device type		sensonic II calculator T1	sensonic II calculator T25	sensonic II calculator T250	sensonic II calculator Tx
Part No.		**59135**	**59136**	**59137**	**59138**
Temperature sensor connection technology		2 conductor/ 4 conductor	2 conductor/ 4 conductor	22 conductor/ 4 conductor	2 conductor/ 4 conductor
Input pulse value	l/pulse	1	25	250	X*
Display of heat consumption		0.1 kWh	0.001 MWh	0.1 MWh	Variable**
Temperature range limit values	Θ	5–150			
Temperature difference limit values ΔΘ	K	3–100			
Temperature difference suppression	K	< 0.2			
Measuring sensitivity	K	< 0.01			
Heat coefficient K		Temperature-dependent, variable			
Ambient temperature	°C	0–55			
Ambient conditions		According to DIN EN 1434 class E1/M2			
Power supply		Integrated 6-year battery***			
Protection class		IP 54 according to EN 60529			

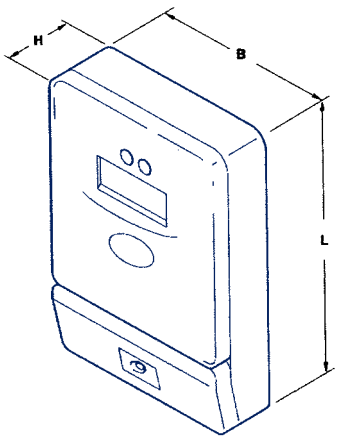
All ista sensonic II calculators are labelled in accordance with EU Directive 2004/22/EC. These can be combined with all flow sensors and temperature sensors supplied by ista, regardless of whether these are nationally approved or CE marked.

* The following pulse values are possible for the Tx version: 2.5/10/100/1,000/2,500 litres per pulse. Please ensure that you state pulse value when ordering.

** The display type is dependent on the pulse value.

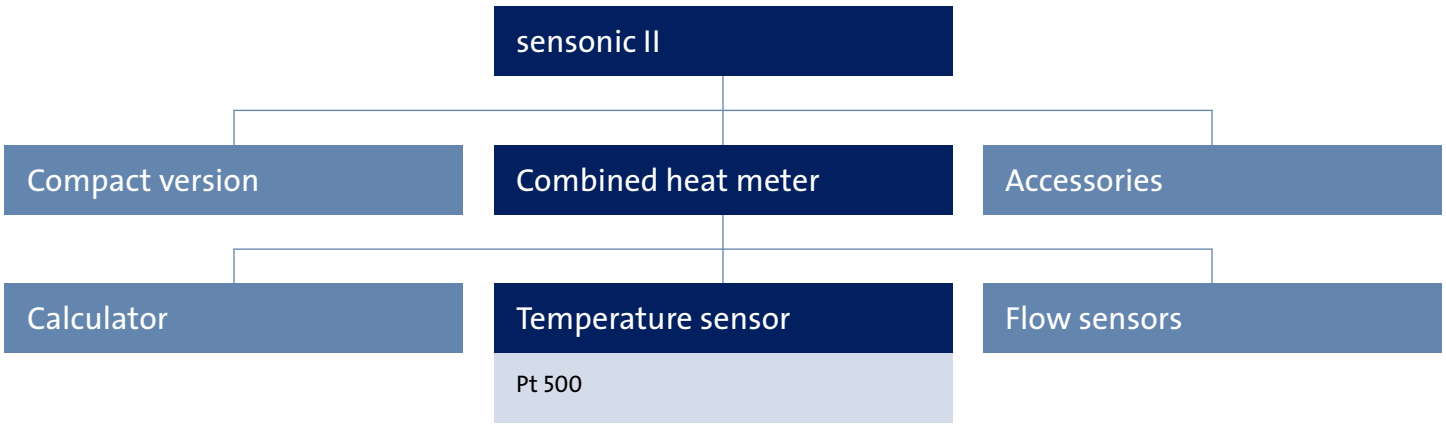
*** For Switzerland and Luxembourg, other battery lives and conditions apply.

sensonic II calculator



Dimensions in mm: L = 134/W = 93/H = 35

sensonic II – temperature sensor



The temperature in the forward flow and return flow is measured by platinum temperature sensors, which guarantee optimal precision in calculating the temperature difference. With the combined heat meters, these are not connected directly to the calculator but must be separately ordered and connected. The temperature sensors are available in 3 m length with 2-conductor technology and in 10 m length with 4-conductor technology.

The temperature sensors are installed directly in conjunction with ball valves or with the help of immersion sleeves. For the new installation of heat meters, in accordance with the specifications of the Calibration Order, installation of temperature sensors in pipes up to DN 25 is only permissible directly.

Temperature sensor pairs

Device type		Temperature sensor Pt 500	
Part No. with national approval		**19142**	**19143**
Part No. in accordance with EU Directive 2004/22/EC		**59142**	**59143**
Length	m	3	10
Connection technology		2-conductor	4-conductor
Platinum resistance thermometer		Acc. to DIN IC 751 Pt 500	
Temperature range limit values	°C	0–150	
Temperature sensor installation		Ø 5 mm, direct installation or immersion sleeve installation	

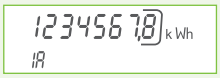
sensonic II – display loops

The sensonic II has a high-precision LC display with eight digits and various special characters. The display is activated via pressing the sensor button. Pressing this again briefly cycles through the various displays. Holding the button (for longer than two seconds) switches from one main loop to the next. To save battery capacity, the display switches off automatically 60 seconds after the last push of the button.

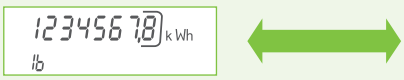
All relevant data is displayed in five display loops: metering, diagnosis, type plate, statistics and tariff. The metered values are displayed on an 8-digit LC display. The decimal places are marked with a frame. Some special characters can only be activated during particular applications. These can only be seen during the LCD test following activation of the display.

Metering

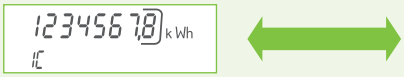
LCD-Test



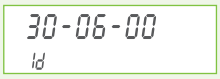
Current consumption



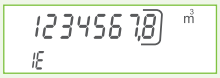
Consumption on last effective date



Consumption on effective date before last

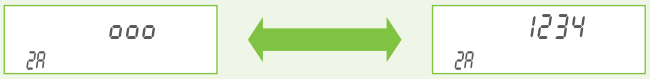


Next effective date

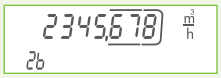


Flow volume

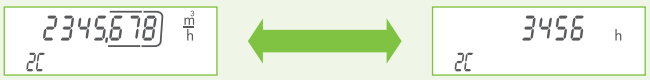
Diagnostics



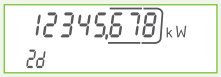
Error code / Number of operating days



Current flow rate



Max. flow rate / Hours with increased flow



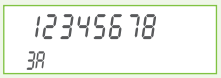
Current performance

Forward flow temperature

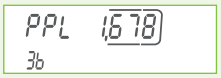
Return flow temperature

Temperature differential

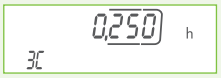
Type plate



Serial number

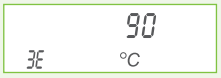


Pulse value



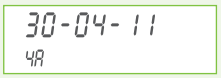
Averaging time

M-bus address

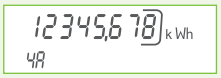


Constant temperature

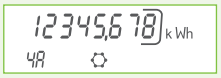
Statistics



Date of month end



Heat at month end

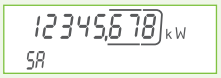


Cold at month end

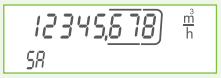
Twelve month-end figures: Change of display to heat quantities of previous months

Tariff

Date of month end



Max. performance in month

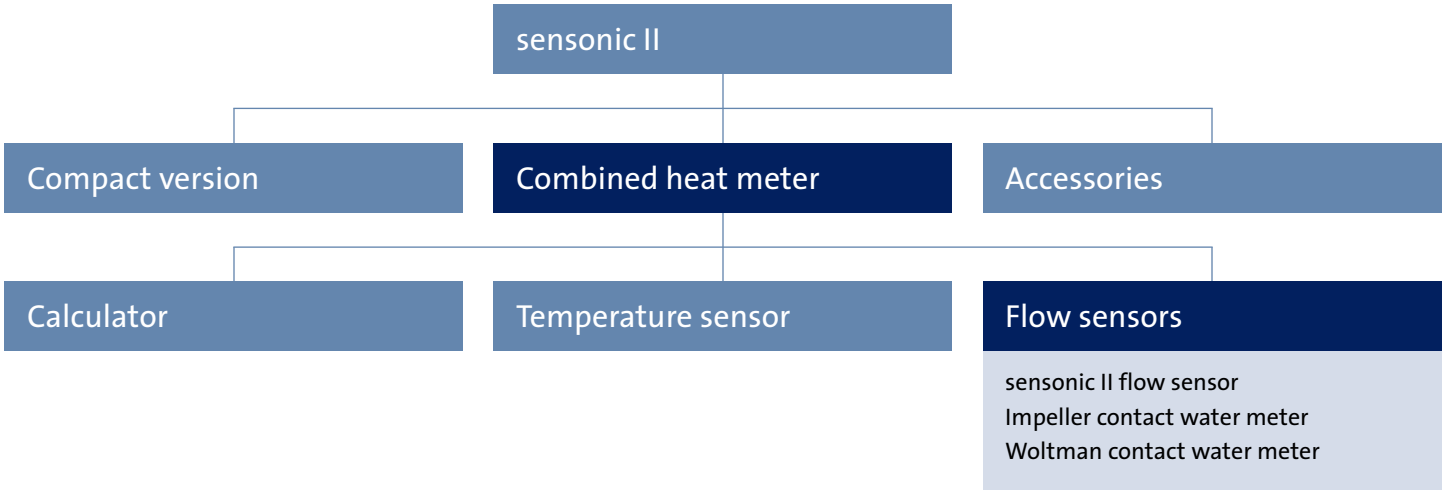


Max. flow rate in month

Twelve month-end figures: Change of display to maximum performance and flow rate figures of previous months

Error checklist	
Error C	calculator (hardware): gen. electronic error
Error t	temperature sensor: Temperature sensor defective
Error F	flow sensor: Volume scanning defective

sensonic II – combined heat meter



The calculators can be combined with different flow sensors – sensonic II flow sensor, impeller or Woltman meters.

Combination with sensonic II flow sensor
As multi-jet impeller meters in accordance with the proven istameter principle, the ista flow sensor offers optimal flexibility and security. The electronic recording of the impeller rotation guarantees delay-free, precise metering.

Flow sensor*

Part No.	Q_n in m³/h	With calculator	Produces			
59132	0.6	sensonic II T1	WMZ	0.6	–	0.6/T1
59133	1.5	sensonic II T1	WMZ	1.5	–	1.5/T1
59134	2.5	sensonic II T1	WMZ	2.5	–	2.5/T1

* For technical data, see page 12 under flow sensor. For dimensions, see page 23.

Impeller/Woltman contact water meter

Combination with impeller contact water meters

With these dry runners with magnetic coupling, the roller counter is fully evacuated and is also rotatable. The voluminous part is made from brass while the bearing for the moving parts is made from carbide.

The meters are available with threaded connection for standard screw connections and, depending on the version ordered, are suitable for installation in horizontal risers or downpipes. A version with flange connection is also available for installation in horizontal pipes.

	Q_{max} in m³/h		Q_n in m³/h	With calculator	Produces		
Size	1.5	–	0.75	sensonic II T1	WMZ	1.5	– 0.75/T1
	3	–	1.5	sensonic II T1	WMZ	3	– 1.5/T1
	5	–	2.5	sensonic II T1	WMZ	5	– 2.5/T1
	7	–	3.5	sensonic II T1	WMZ	7	– 3.5/T1
	10	–	6	sensonic II T1	WMZ	10	– 6/T1
	20	–	10	sensonic II T25	WMZ	20	– 10/T25
	30	–	15	sensonic II T25	WMZ	30	– 15/T25

Combination with Woltman contact water meters

These completely dry runners have a hermetically encapsulated roller counter. To facilitate reading, the counter can be rotated by almost 360°. The counters are available for horizontal installation in the WS model and for horizontal or vertical installation in the WP model.

	DN in mm		Q_n in m³/h	With calculator	Produces		
Size	50	–	15	sensonic II T25	WMZ	50	– 15/T25
	65	–	25	sensonic II T25	WMZ	65	– 25/T25
	80	–	40	sensonic II T25	WMZ	80	– 40/T25
	100	–	60	sensonic II T25	WMZ	100	– 60/T25
	125	–	100	sensonic II T25	WMZ	125	– 100/T25
	150	–	150	sensonic II T250	WMZ	150	– 150/T250
	200	–	250	sensonic II T250	WMZ	200	– 250/T250

Technical data
Impeller contact water meter

Impeller contact water meter with threaded connection in accordance with ISO 228/1, PN = 16 bar, t_{max} = 120 °C

			Single-jet technology	Multi-jet technology				
Part No. horizontal version	**Dimension drawing 1**		**18815**	**18816**	**18817**	**18818**	**18819**	**18829**
Part No. adapter set			**17030**	**17031**	**17032**	**17033**	**17034**	**17035**
Part No. riser version	**Dimension drawing 2**		**–**	**18850**	**18851**	**18852**	**18853**	**18854**
Part No. downpipe version	**Dimension drawing 2**		**–**	**18859**	**18860**	**18861**	**18862**	**18863**
Part No. adapter set			**–**	**17036**	**17036**	**17037**	**17038**	**17039**
Nominal flow rate Q_n/q_p		m³/h	0.75	1.5	2.5	3.5**	6*/**	10**
Pressure loss Δp at Q_n/q_p		bar	0.25	0.2	0.24	0.25	0.24	0.25
Lower measurement range limit Q_{min}/q_i		l/h	30	60	100	140	240	400
Separation limit Q_t		m³/h	0.075	0.15	0.25	0.35	0.6	1.0
Weight		kg	1.6	2.1	2.1	3.1	3.1	5.5
Pulse value		l/pulse	1	1	1	1	1	25
Combinable with sensonic II calculator			T1	T1	T1	T1	T1	T25
Dimensions								
Nominal width		DN	20	20 (waag. 15)	20	25	32	40
Dimension drawing 1, horizontal version	Length L/L	mm	150/248	165/245	190/288	260/378	260/378	300/438
	Height H/h	mm	135/30	135/40	135/40	140/45	140/45	155/50
	Width (not pictured)	mm	96	96	96	102	102	137
	Connection thread according to ISO 228/1		G 1 B	G 3/4 B	G 1 B	G 11/4 B	G 11/2 B	G 2B
	Connection thread of screw connection acc. to DIN 2999		R 3/4	R 1/2	R 3/4	R 1	R 11/4	R 11/2
Dimension drawing 2, Riser/downpipe version	Length L/L	mm	–	105/203	105/203	150/268	150/268	150/268
	Height H/h	mm	–	135/18	135/18	140/22	140/22	106/46
	Width (not pictured)	mm	–	82/96	82/96	95/102	95/102	120/136
	Connection thread according to ISO 228/1		–	G 1 B	G 1 B	G 11/4 B	G 11/2 B	G 2 B
	Connection thread of screw connection acc. to DIN 2999		–	R 3/4	R 3/4	R 1	R 11/4	R 11/2

* Q_n 6 m³/h can be supplied with a connection thread on the meter of G 1 1/4 B upon request.

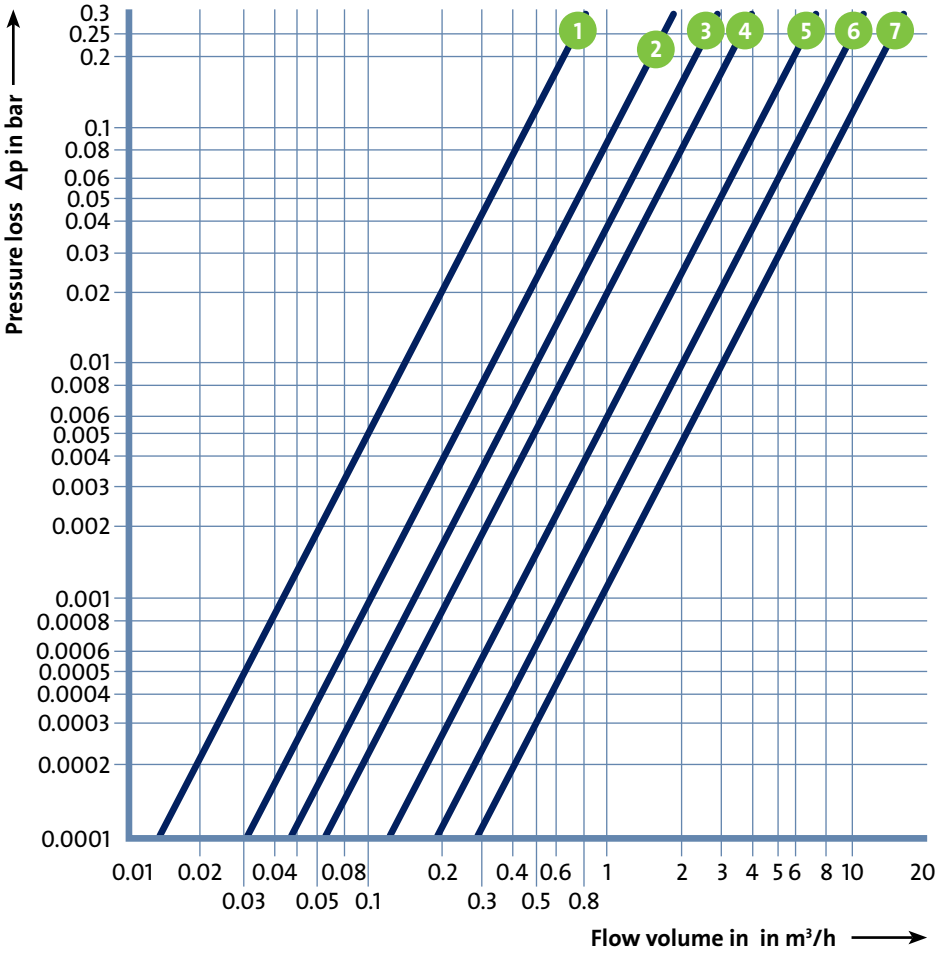
** Upon request, the nominal width DN 25/DN 32 can be supplied in a length of 135 mm and DN 40 in a length of 200 mm.

Impeller contact water meter with flange connection in accordance with DIN 2501, PN = 16 bar, t_{max} = 120 °C

			Single-jet technology	Multi-jet technology					
Part No. horizontal version	**Dimension drawing 1**		**18820**	**18821**	**18822**	**18823**	**18824**	**18825**	**18830**
Nominal flow rate Q_n/q_p		m³/h	0.75	1.5	2.5	3.5	6	10	15
Pressure loss Δp at Q_n/q_p		bar	0.25	0.2	0.24	0.25	0.24	0.25	0.24
Lower measurement range limit Q_{min}/q_i		l/h	30	60	100	140	240	400	600
Separation limit Q_t		m³/h	0.075	0.15	0.25	0.35	0.6	1.0	3.0
Weight		kg	1.6	2.1	2.1	3.1	3.1	5.5	12.5
Pulse value		l/pulse	1	1	1	1	1	25	25
Combinable with sensonic II calculator			T1	T1	T1	T1	T1	T25	T25
Dimensions									
Nominal width		DN	20	15	20	25	25	40	40
Dimension drawing 1, horizontal version	Length L/L	mm	150	165	190	260	260	300	270
	Height H/h	mm	135/30	135/40	135/40	140/45	140/45	155/50	180/83
	Width (not pictured)	mm	96	96	96	102	102	137	166
	Connection thread according to ISO 228/1		105	95	105	115	115	150	165
	Connection thread of screw connection acc. to DIN 2999		75	65	75	85	85	110	125

All meters in horizontal version are approved in accordance with EU Directive 2004/22/EC, riser and downpipe meters are nationally approved and calibrated.
With impeller contact water meters, a free, straight pipe section of the nominal width of the meter must be fitted upstream of the meter in the direction of flow.

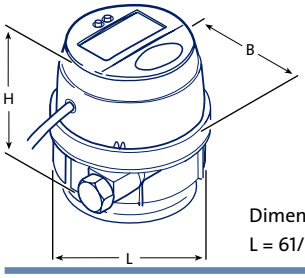
Pressure loss curves
Impeller contact water meter



Pressure loss at Q_n/q_p

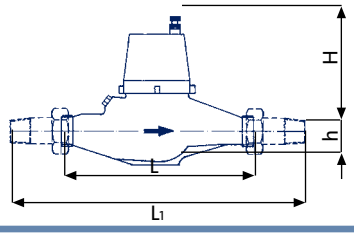
1 = Q_n/q_p 0.75 m³/h
2 = Q_n/q_p 1.5 m³/h
3 = Q_n/q_p 2.5 m³/h
4 = Q_n/q_p 3.5 m³/h
5 = Q_n/q_p 6.0 m³/h
6 = Q_n/q_p 10.0 m³/h
7 = Q_n/q_p 15.0 m³/h

sensonic II flow sensor

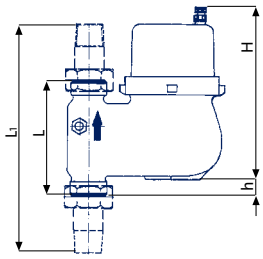


Dimensions in mm:
L = 61/W = 68/H = 67

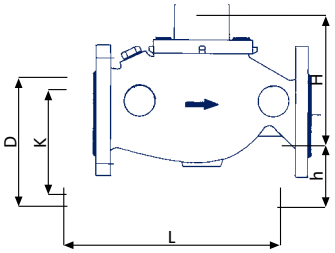
Dimension drawing 1 (horizontal version)



Dimension drawing 2 (riser/downpipe version)



Dimension drawing 3 (horizontal version)



Technical data
Woltman contact water meter

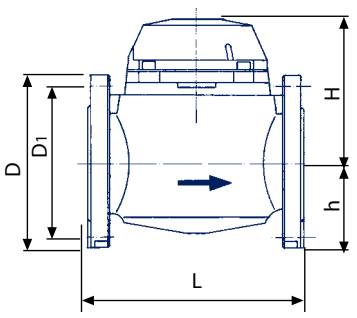
Woltman contact water meter with flange connection, PN = 16 bar, t_{max} = 130 °C

Part No. horizontal version		**WS**		**18757**	**18836**	**18759**	**18761**	**18763**	**18765***	**18766**	**18768***
Part No. adapter set				**17040**	**17040**	**17060**	**17041**	**17042**	**17061**	**17043**	**17044**
Part No. riser version		**WP**		**18758**		**18760**	**18762**	**18764**	**18765**	**18767**	**18768**
Part No. downpipe version		**WP**		**18758**		**18760**	**18762**	**18764**	**18765**	**18767**	**18768**
Part No. adapter set				**17045**		**17059**	**17046**	**17047**	**17061**	**17048**	**17044**
Nominal flow rate Q_n			m^3/h	15	15	25	40	60	100	150	250
Horizontal version	Pressure loss Δp at Q_n		bar	0.07	0.04	0.06	0.1	0.1	0.06	0.14	0.01
	Lower measuring range limit Q_{min}		m^3/h	0.25	0.3	0.3	0.3	0.5	3.5	0.8	8
	Separation limit Q_t		m^3/h	1.5	1.5	2.5	2.5	4	8	12	20
	Weight		kg	13.5	13.9	17.5	19.5	32.5	21	91.5	51
Riser/ downpipe version	Pressure loss Δp at Q_n		bar	0.015		0.034	0.03	0.03	0.06	0.025	0.01
	Lower measuring range limit Q_{min}		m^3/h	0.6		1	1.4	2	3.5	4.5	8
	Separation limit Q_t		m^3/h	1.8		2	3.2	4.8	8	12	20
	Weight		kg	8		10	14	18	21	36	51
Pulse values			l/pulse	25	25	25	25	25	25	250	250
Combinable with sensonic II calculator				T25	T25	T25	T25	T25	T25	T250	T250
Installation dimensions											
Nominal width			DN	50	50	65	80	100	125*	150	200*
Dimension drawing 1 WS model	Length L		mm	270	270	300	300	360	250	500	350
	Height H/h		mm	151/80	195/84	161/100	161/100	191/110	106/46	301/180	206/162
	Width (not pictured)		mm	170	165	200	200	260	250	320	340
Dimension drawing 1, WP model	Length L		mm	200		200	225	250	250	300	350
	Height H/h		mm	120/73		120/85	150/95	150/105	160/118	117/135	206/162
	Width (not pictured)		mm	175		185	200	220	250	285	340
Flange diameter			D	165	165	185	200	220	250	285	340
Pitch circle diameter			D1	125	125	145	160	180	210	240	295
Number of screws/threads				4/M16	4/M16	4/M16	8/M16	8/M16	8/M16	8/M20	12/M20

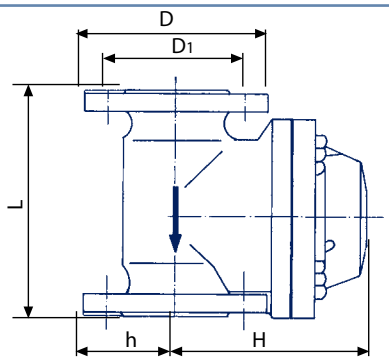
All meters are nationally approved and calibrated.
* Only available as WP.
WS = Woltman vertical
WP = Woltman parallel

The values stated at Qt and Qmin are performance data that significantly exceed the requirements in accordance with the Calibration Order for metrological classes A and B. With Woltman meters, a free, straight pipe section of at least five times the nominal width of the meter must be observed upstream of the meter in the direction of flow.

Dimension drawing 1 (WS model)

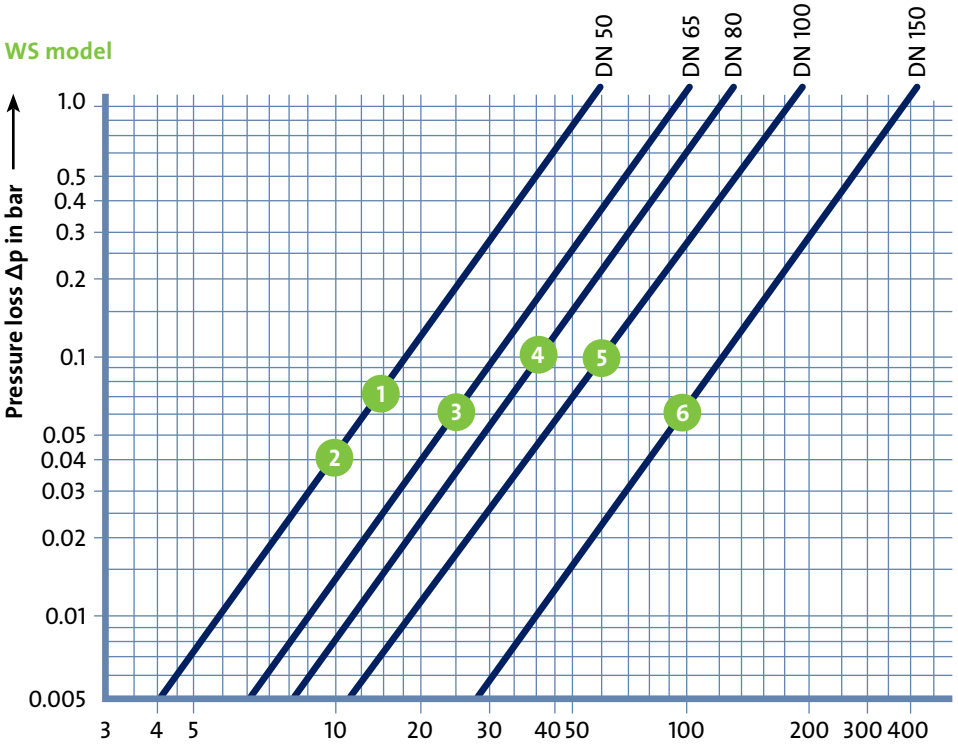


Dimension drawing 2 (WP model)



Pressure loss curves
Woltman contact water meter

WS model

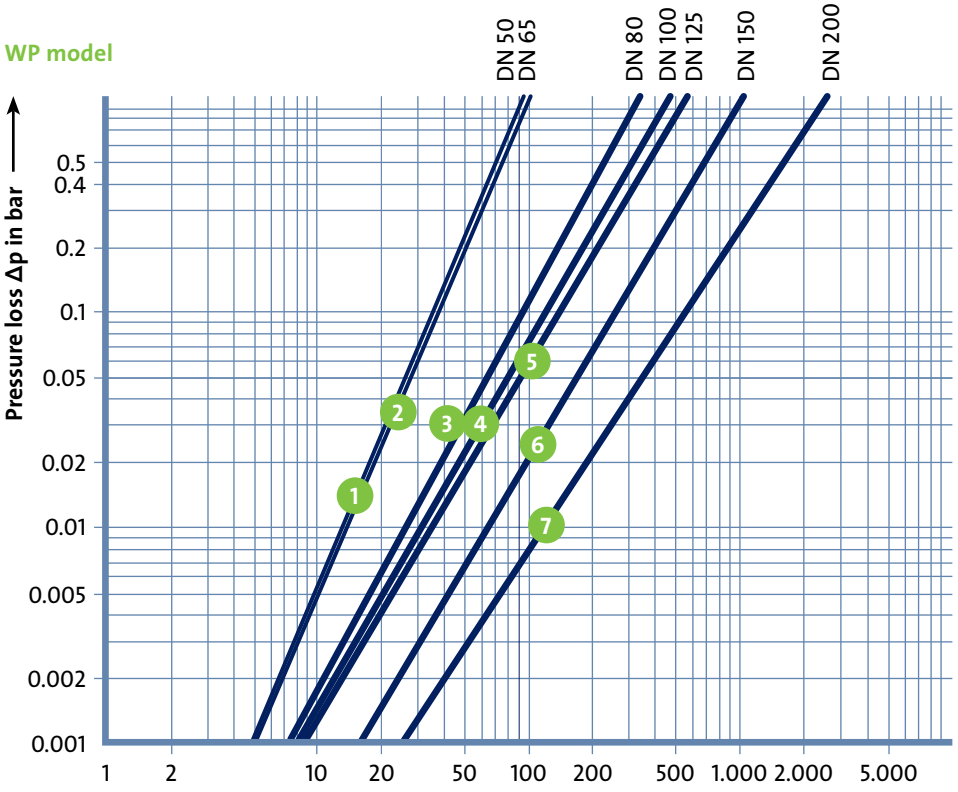


Flow volume in m³/h

Pressure loss at Q_n

1 = Q_n 15 m³/h (Part No. 18757)
2 = Q_n 15 m³/h (Part No. 18836)
3 = Q_n 25 m³/h
4 = Q_n 40 m³/h
5 = Q_n 60 m³/h
6 = Q_n 100 m³/h

WP model



Flow volume in m³/h

Pressure loss at Q_n

1 = Q_n 15 m³/h
2 = Q_n 15 m³/h
3 = Q_n 40 m³/h
4 = Q_n 60 m³/h
5 = Q_n 100 m³/h
6 = Q_n 150 m³/h
7 = Q_n 250 m³/h

sensonic II – accessories

sensonic II

Compact version

Combined heat meter

Accessories

Single pipe connection
Ball valve
Immersion sleeve
Welded sleeve
Special tool

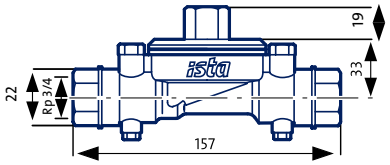
In addition to our extensive product range, naturally we also offer you a comprehensive range of accessories. From our single pipe connection (SPC) for the installation of heat meters in accordance with the istameter principle to ball valves, immersion sleeves, welded sleeves and the right special tools. We can offer you the right solution for every situation.

Single pipe connection, SPC	Connection	Length	Part No.	
			Brass	Red brass
SPC with 2 integrated ball valves (with mounting for the return flow temperature sensor)	Rp 3/4	157 mm		**14450**
	Rp 1	169 mm		**14451**
SPC with shut-off, without picture (with 1 integrated ball valve)	Rp 3/4	105 mm	**14949**	
	Rp 1	105 mm	**14950**	
SPC with press-fit connection	15 mm	145 mm		**14008**
	18 mm	145 mm		**14009**
	22 mm	145 mm		**14010**
SPC with external thread	G 3/4 B	110 mm	**14103**	
	G 1 B	105 mm	**14403**	
	G 1 B	130 mm	**14414**	**14404**
	G 1 B	190 mm		**14408**
SPC with internal thread	Rp 1/2	94 mm	**14000**	**14011**
	Rp 3/4	100 mm	**14100**	**14012**
SPC with solder connection	15 mm	94 mm	**14200**	
	18 mm	100 mm	**14300**	
	22 mm	105 mm	**14000**	
	28 mm	190 mm		**14402**

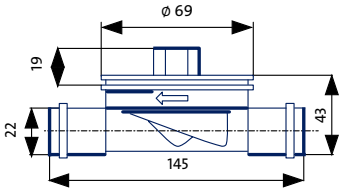
Single pipe connection, SPC

The single pipe connection can be installed both vertically and horizontally in all customary pipe types and installations. The SPC is available in brass and, in certain cases, in the high-quality red brass version. The SPC remains connection to the installation for the long term. All sensonic II heat meters and the sensonic II flow sensors following the istameter principle can be installed in this service-friendly way. Before installation or after removal, the overflow cap is fitted instead of the heat meter. This enables problem-free pressure testing or flushing of the pipes.

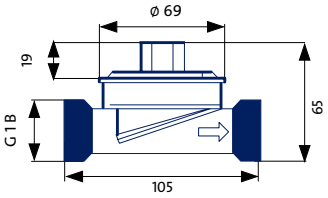
SPC with 2 integrated ball valves (with mounting for the return flow temperature sensor)*



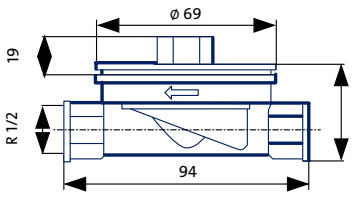
SPC with press-fit connection*



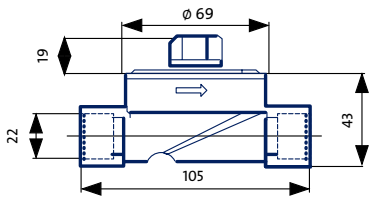
SPC with external thread*



SPC with internal thread*



SPC with solder connection*



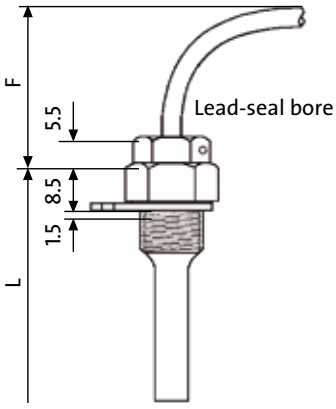
* All dimensions stated in mm.

Immersion sleeves and welded sleeves

The ista immersion sleeves for holding the temperature sensors can be mounted with pinpoint accuracy. The immersion sleeves can be supplied individually or as a set with a welded sleeve.

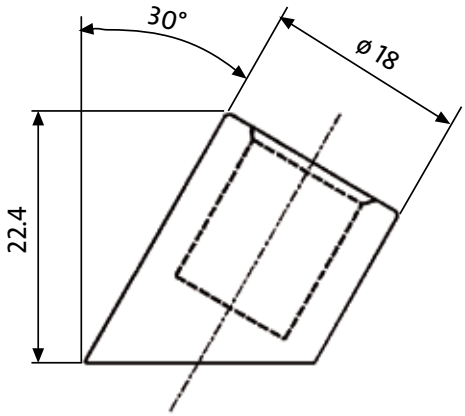
Immersion sleeve set 5 mm*

View with inserted temperature sensor



Length L	Free space F	Part No.
50 mm	70 mm	**18380**
80 mm	100 mm	**18381**
150 mm	170 mm	**18382**

Immersion sleeve set 5 mm with welded sleeve



Nominal pipe width	Immersion sleeve length	Part No.
32–40 mm	50 mm	**18391**
50–120 mm	80 mm	**18392**
150–300 mm	150 mm	**18393**

* All dimensions in mm.

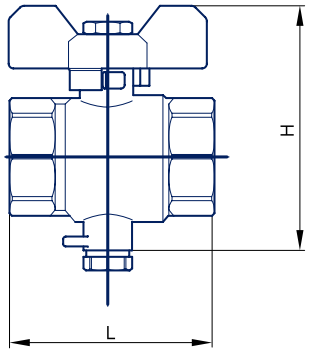
Ball valves and tool

The temperature sensors can be installed directly in conjunction with the corresponding ball valves. For the new installation of heat meters, in accordance with the Calibration Order, installation of temperature sensors in pipes up to DN 25 is only permissible directly. If corresponding ball valves are installed in the forward flow and return flow pipe of the heating system, the meter can be exchanged regularly without a problem.

Performance features

- Ball valves for hot water heating systems with sensor connection M 10 x 1.
- Metal butterfly handle with stop, hard chrome-plated ball with Teflon seal and spindle with double O-ring seal.
- Housing in nickel-plated brass, internal thread on both sides.

Ball valve with screw-in connector in temperature sensor



Connection	Length dimension L	Height dimension H	Part No.
R_P 1/2	51.8 mm	75.9 mm	**18529**
R_P 3/4	57.5 mm	76.1 mm	**18527**
R_P 1	67.0 mm	91.6 mm	**18528**

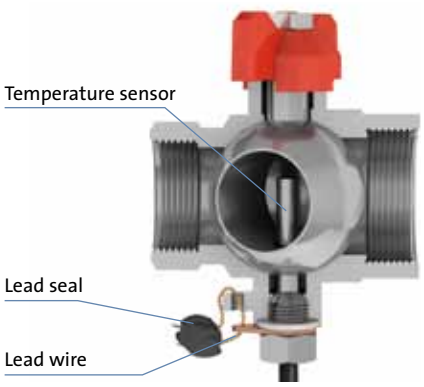
Technical data

Max. pressure	Max. temperature		Internal thread on both sides	Sensor connection
	Long-term	Short-term		
25 bar	100 °C	150 °C	Rp 1/2; Rp 3/4; Rp 1 acc. to DIN ISO 228	M 10 x 1 mm

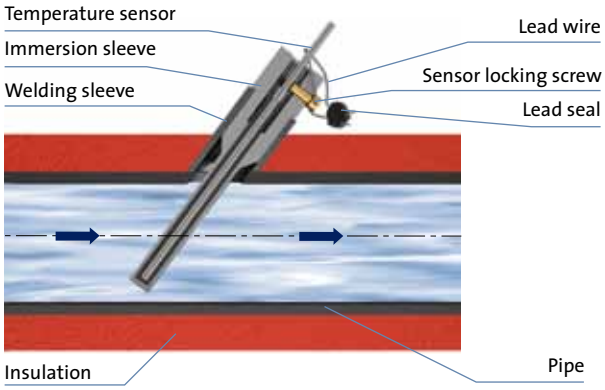
Tool	Part No.
Hook spanner, small	**80008**
Hook spanner, large	**80518**

Installation of temperature sensor

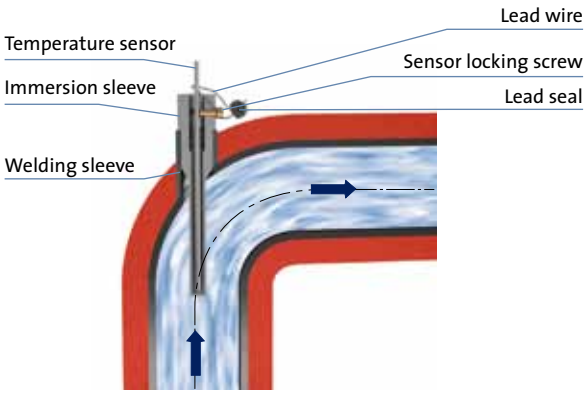
Installation of temperature sensor directly via ball valve



Installation of temperature sensor via immersion sleeve in straight pipe section



Installation of temperature sensor via immersion sleeve in pipe bends of 90°



The correct installation of the temperature sensor in the forward flow and return flow pipe of the heating system is of decisive importance for the metering outcome. With new installation of heat meters in pipes smaller than or equal to DN 25, in accordance with the Calibration Order, the temperature sensor must be installed with direct immersion. With larger pipes, installation in conjunction with immersion sleeves is permissible. Here, it is important to select the right immersion sleeve, which is independent of the nominal pipe width. The pipe walls and installation locations are to be fitted with thermal insulation in order to minimise the temperature gradient between the measuring resistors and installation locations.

The temperature sensors flow in the direction of the arrow. The correct immersion depth of the temperature sensors can be precisely determined using the immersion sleeve set selection table.

Advice on measures in existing heating systems

The future-oriented installation of heat meters and their temperature sensors – in pipes smaller than or equal to DN 25 – is only guaranteed in conjunction with the installation of ball valves. If work on the heating system is required – replacing the boiler, modernisation, renovation etc. – ball valves should also be installed at the same time (for mounting the temperature sensors) in the forward flow and return flow pipes of the system. Advantage: The expenditure is manageable and it is ensured that the installation locations will continue to fulfill all legal requirements in the future.

Legal calibration conditions

European and German law*

As part of new European calibration regulations on 30 October 2006 and the specifications of the European Measuring Instruments Directive (MID), 2004/22/EC, there are new requirements, which include those relating to the installation of heat meters. The requirements were enshrined in national law with the fourth order for the amendment of the Calibration Order and are thus binding for new installations. Requirements for accurate and consistent recording with heat meters include the precise determination of the temperature difference between the forward flow and return flow of the heating system. The type and method of installation of the temperature sensor is of decisive importance. The legislators therefore prescribe as follows in the Calibration Order: With new installations (of heat meters) in pipes smaller than or equal to DN 25, short temperature sensors must only be installed with direct immersion. The installation of temperature sensors in immersion sleeves in this case is no longer permitted.

In practice, this means: During heating, the heating medium must flush directly around the temperature sensor. This is ensured by installing ball valves in the forward and return flow pipe of the heating system. The installation of sensors in conjunction with two ball valves is also the ideal solution for replacement in the context of the validity period of five years. Since 30 October 2006, new approvals of heat meters can only be carried out in accordance with the specifications of the MID.

Transitional regulation for existing systems

A requirement for the calibration of heat meters was the national type approval via the Physikalisch-Technische Bundesanstalt (PTB). The current applicable legal requirements at the time of approval of the meter are authoritative for the use of heat meters. Heat meters that conform to the Directives applicable to 12 February 2007 may only be installed up to the expiry of the type approval, or by 30 October 2016 at the latest. The transitional regulation ensures that the replacement of heat meters with appropriate meters within calibration periods is also secured.

National approval symbol for a meter

Heat meters for all requirements

ista supplies the right heat meter for all applications.

New installation of heat meters

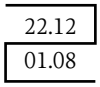
For new/initial installations of heat meters, the compact version is available with two external sensors. In this version, the temperature sensors are installed in conjunction with two ball valves. The symmetrical installation of the sensors fulfils the requirements of the European Measuring Instrument Directive (MID). Heat meters of this model type can be found on page 12. The heat meters are labelled with the CE mark.

CE = Conformité Européenne
= "conformity with EU Directives"

Example of a CE mark:
CE M10 0102
M = Metrology label
10 = curr. year of conformity
0102 = four-digit identifier for the designated authority, here the PTB

Replacement of heat meters

Previously, heat meters in the compact version were primarily installed with a return flow sensor integrated in the flow sensor. In addition, in many cases, temperature sensors were installed via immersion sleeves and not directly in conjunction with ball valves. A compact version of our heat meters remains available for this application. Heat meters of this model type can be found on page 13. The national approval by the PTB is labelled via the national approval symbol.



22.12 = Approval for a compact heat meter;
22 = Heat meter,
12 = Complete heat meter
99.02 = Year and consecutive number of the approval from the PTB

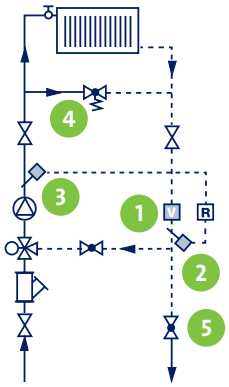
Calibration obligation for heat meters

Regardless of the approval of a heat meter, in accordance with the MID or PTB, the period of validity of the initial calibration or CE mark is five years. After this, replacement of the heat meter is necessary.

* For Switzerland and Luxembourg, other battery lives and conditions apply

Installation examples

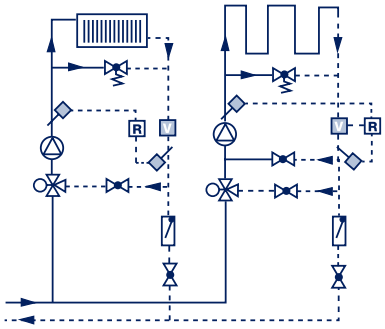
Control group



Example of a complete control group

1. Flow sensor of the heat meter in the return, the colder section. Shut-off devices must always be present.
2. Return flow temperature sensor in the area of a good water mix, immediately downstream of the water meter
3. Forward flow temperature sensor in the area of a good water mix, behind the circulation pump.
4. Overflow device to guarantee a flow greater than Q_{min}.
5. Butterfly valve or balancing valve in constant volumetric flow for setting the required temperature spread.

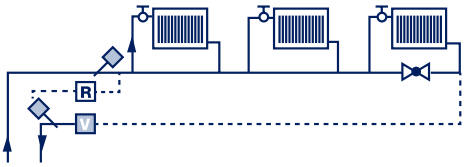
Heating group



Example of two heating groups with radiators and underfloor heating

Installation of heat meters in the consumption circuit, in which the circulation pump ensures constant water volume. The butterfly valve can be omitted if there is a maximum limitation of the forward flow in the controls. The operating conditions of the two consumption circuits are different. When selecting the heat meter, ensure that the volumetric flow is low for radiator heating and high for underfloor heating.

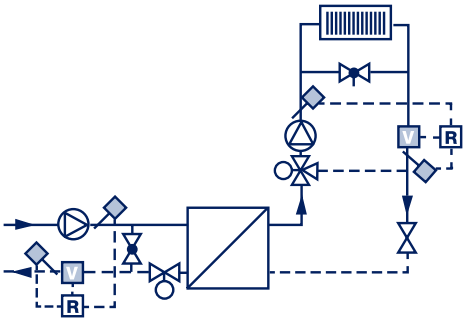
Radiators



Example of individual radiators of a user

Heat consumption metering of the individual radiators of a user within a domestic unit. The individual radiators are connected to a ring main.

Heating system



Example of a heating system with heat exchanger

On the one hand there is the scenario of metering upstream of the heat exchanger. In this case, the losses of the heat exchanger are taken into account and higher pressures and temperatures occur.

On the other hand, installation of the heat meter in the consumption circuit allows metering downstream of the heat exchanger. An almost constant volumetric flow is often opposed with only small temperature differences.

Explanation of symbols

- Flow sensor
- Calculator
- Return temperature sensor
- Forward flow temperature sensor
- Circulation pump
- Three-way valve
- Globe control valve
- Overflow valve
- Butterfly valve with fixed setting
- Shut-off valve
- Swing check valve
- Dirt trap
- Radiator heating

Installation instructions

Heat meters are precision-electronic meters that must be handled properly. When installing the devices, please observe the enclosed installation instructions. In principle, heat meters should only be installed in a circuit (primary or secondary).

Flow sensors

Flow sensors are, in principle, installed in the return flow pipe, the colder section. Shut-off valves must be installed upstream of and behind the installation location to enable easy replacement of the meter..

Temperature sensors

Temperature sensors in the forward flow and return flow must be installed in the same circuit as the flow sensor and against the direction of flow. Forward flow sensors are marked red and return flow sensors blue. The sensor cables must not be shortened or extended. ista temperature sensors have a sensor connection of M 10 x 1, which enables direct installation in ball valves.

When temperature sensors are used in conjunction with immersion sleeves, the sensors must be inserted into the immersion sleeves down to the stop and fixed in place. The installation location of the temperature sensor should be insulated.
Compact heat meters and part components of combined heat meters, such as calculators, flow sensors and temperature sensors, should always be sealed.

Terminology, abbreviations, units – a selection

Term, size	Characters	Explanation
External temperature sensor	–	External temperature sensor, installation location in the pipe.
Pressure loss	Δp	Pressure loss is the difference in pressure caused by wall friction and internal friction in pipes, moulded parts, fittings etc. Unit of measurement: Pa (Pascal) Other permitted units of measurement: bar, mbar
Flow sensor	V	Designation for the sub-device of the heat meter, which measures the flow volume (in accordance with EU Directive 2004/22/EC); old designation: volumetric flow meter.
Calibration	–	Official determination of conformity of a meter with its approval and, thus, the requirements of the Calibration Act. Calibration and marking must only be performed by a calibration authority (verification authority, calibration office or nationally recognised testing authority).
Calibration Act	–	The Calibration Act requires meters used commercially and in other areas to be approved and calibrated. The Calibration Act enacts the Measuring Instruments Directive 2004/22/EC in German law.
Calibration Order	–	The Calibration Order supplements the Calibration Act in, for instance, regulating details for the calibration of meters, such as permissible error tolerances. The Calibration Order covers heat meters, water meters etc.
Pulse value	–	Indicates the volume of water for which the flow sensor emits 1 pulse. This specification can be found on the type plate and in the installation instructions. This should be observed to ensure the right combination of flow sensor and calculator.
Internal temperature sensor	–	With asymmetrical temperature sensor pair: Installation in the housing of the heat meter.
Kelvin	K	Unit of measurement for the thermodynamic temperature; temperature differences Δt are specified in Kelvin.
Contact water meter	KTZ	Used with combined heat meters as a flow sensor.
Measuring Instruments Directive	MID	EU Directive 2004/22/EC.
Minimum flow rate	q_i	Minimum flow value of q permissible for the correct function of the heat meter. Unit of measurement: m^3/h Old abbreviation: Q_{min}

Term, size	Characters	Explanation
Nominal flow rate	q_p	Maximum flow value of q, permissible for the long term with correct function of the heat meter. Unit of measurement: m^3/h Old abbreviation: Q_n
Nominal width; nominal diameter	DN	Expression used in DIN standards for the internal diameter of pipes.
Upper measurement range	q_s	Maximum flow value of q, permissible in the short term with correct function of the heat meter. Unit of measurement: m^3/h Old abbreviation: Q_{max}
Physikalisch-Technische Bundesanstalt	PTB	The PTB is a federal authority in the business unit of the Federal Ministry of Economics and Technology that supervises metrology.
Platinum	Pt	Precious metal, material for temperature sensors.
Calculator	R	Sub-device or a heat meter.
Symmetrical temperature sensor pair	–	With compact heat meters: Temperature sensor pair with 2 external temperature sensors, mounted in the same installation situation.
Temperature, thermodynamic	Θ, T	Also known as absolute temperature or Kelvin temperature; measured from absolute zero (–272.15 °C); Θ (= Theta, Greek letter) is the symbol for the dimension; T is the symbol for the physical size; unit of measurement: K (Kelvin).
Temperature difference	Δt	Specially for heat meters: Difference between forward flow and return flow temperature. Specified in K (Kelvin).
Asymmetrical temperature sensor pair	–	With compact heat meters: Temperature sensor pair with 1 external temperature sensor and 1 temperature sensor in the flow sensor.
Heat volume	Q	Specified in GJ (Gigajoule). Additional units: kWh (kilowatt hours) MWh (megawatt hours)
Heat meter	WMZ	Definition in accordance with MID: A heat meter is a device designed to measure the heat in a heat exchanger circuit, which is emitted by a fluid designated as a heat transfer fluid in heating operation (WMZ is not a regular abbreviation).

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