

## Ultrasonic meter 4.1.3

Measure energy consumption more accurately.

**The ultrasonic meter is calculator unit, volume measuring part and temperature sensor in one, basically coming with radio 4 radio technology and with the option to connect an M-Bus or pulse output module. The volume is measured by means of ultrasonic flow measurement – with maximum precision and minimum installation effort. The 4.1.3 is available in the versions heating (qp 0.6 – 800 m<sup>3</sup>/h), cooling (qp 0.6 – 100 m<sup>3</sup>/h) and air-conditioning (heating/cooling, qp 0.6 – 60 m<sup>3</sup>/h).**

### In a nutshell

- A radio module is integrated; an optional M-Bus or pulse output module can also be connected
- Temperature sensor (Pt 500) can be replaced on site
- Removable calculator unit, optical interface
- OMS-certified telegram configurable
- Any mounting position possible, also overhead
- Heating, air-conditioning (heating/cooling) meter: type examination certificate (BPB) according to MID (regulations for installation of temperature sensors must be observed)
- Cooling meter: type examination certificate (BPB) according to Annex 4 Module B of the Measuring and Calibration Ordinance
- Up to qp 6 m<sup>3</sup>/h return temperature sensor mounted in the connection piece; from qp 10 m<sup>3</sup>/h 2 free temperature sensors
- Basis for the measurement stability is a water quality in accordance with the AGFW FW 510 worksheet and VDI 2035



377230  
power supply  
230 V

377232  
pulse output  
module

377235  
M-Bus module



### Versatile

The heat meter is perfectly suited for use in the residential sector, but also for transfer stations for local and district heating. The cooling meter is intended for cooling circuits. The air-conditioning meter (heating/cooling) registers both heating and cooling energy in one unit.

### Interfaces for further applications

The optional **pulse output module** (order number 377232) enables the connection to control systems and remote displays.

The optional **M-Bus module** (order number 377235) is fully connectable and complies with DIN EN 1434 (300 or 2,400 baud). Meter data and measured values are transmitted via the M-Bus line. If the meter is to send its values both via radio and via M-Bus, a power supply unit (order number 377230) must also be connected.

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## Technical data Basic meter

Nominal flow rate $q_p$	(m <sup>3</sup> /h)	0.6 ... 2,5	3.5 ... 600
<b>Calculator unit</b>			
Display units		kWh	MWh
Display		LCD, 8 digits	
Environment classes		E1 + M1, class A	
Ambient temperature	(°C)	5 ... 55	
Storage temperature	(°C)	-25 ... +55*	
Protection category		Heat meter: IP54 Cooling/air-conditioning meter: IP65	
Power supply		Lithium battery 5 + 1 years (standard), 21.9 grams or 230 V, 50/60 Hz (retrofitable mains adapter)	
<b>Dimensions</b>			
Control cable length	(m)	1.5	
Calculator unit length L1	(mm)	150	
Calculator unit height R	(mm)	50	
Calculator unit width B	(mm)	99	
*Higher than 35 °C max. 4 weeks			

## Technical data Radio

Radio mode		unidirectional; standard: mode C1 according to OMS V4
Radio data transmission		Standard: – annual reference date value (as OMS data point) – consumption data of 12 mid-month and end-of-month valu
Transmission centre frequency	(MHz)	868.95
Transmission power	(W)	0.003 ... 0.015
Transmission period	(sec.)	0.008 ... 0.014
CE conformity		according to directive 2014/53/EU (RED)
Data security		Encryption according to OMS standard; approved according to BSI TR-03109
Future viability		prepared for the EED (directive 2012/27/EU)

## Technical data Calculator unit and temperature sensor

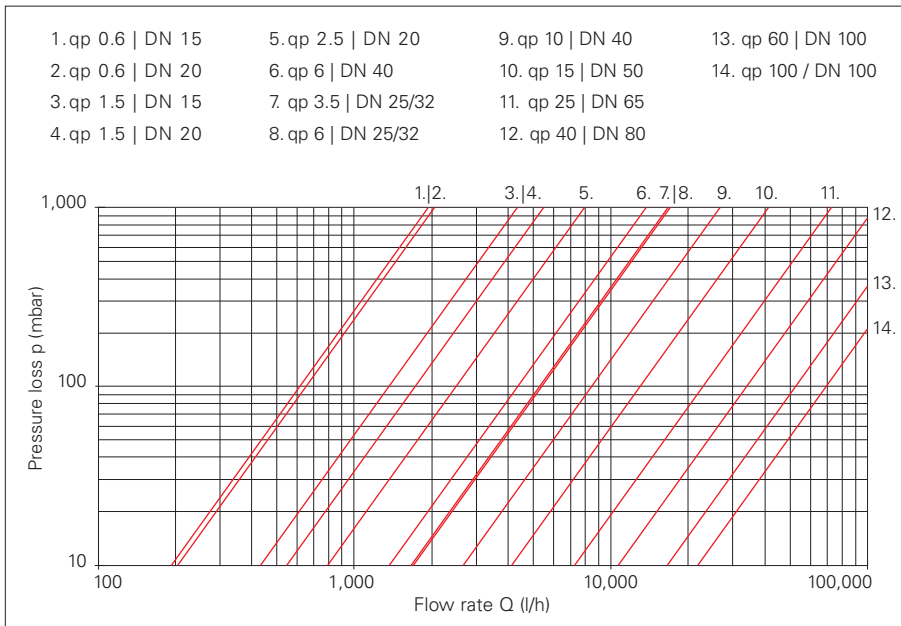
Temperature sensor type		Pt 500
Temperature sensor diameter	(mm)	5.2
Temperature sensor cable length (standard)	(m)	2
Consumption calculation $\Delta\Theta$	(K)	from 0.125
Temperature measurement cycle	(sec.)	Standard: 32 Optional: 4
Protection category		IP65
<b>Heat meter</b>		
Temperature range	(°C)	1 ... 150
Calculator unit $\Delta\Theta$		
Temperature difference $\Delta\Theta$	(K)	3 ... 145
<b>Cooling meter</b>		
Temperature range	(°C)	5 ... 50
Calculator unit		
Temperature difference $\Delta\Theta$	(K)	3 ... 45
<b>Heat/cooling meter</b>		
Temperature range	(°C)	1 ... 90
Calculator unit		
Temperature difference $\Delta\Theta$	(K)	3 ... 85

## Accessories

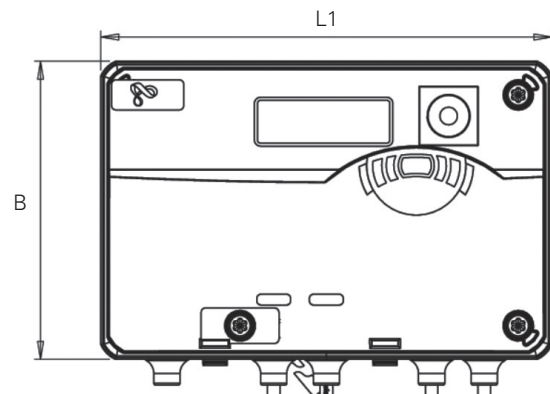
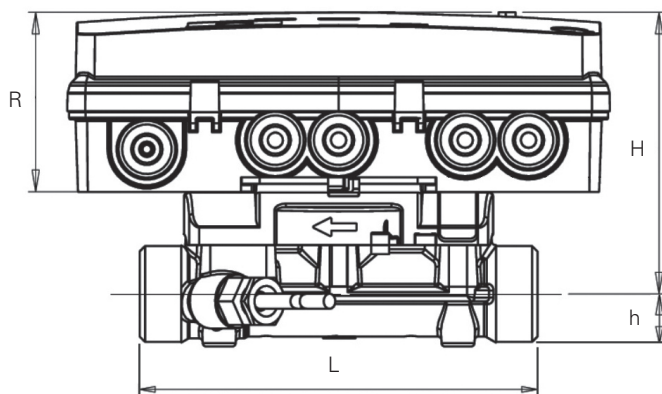
<b>Pulse output module</b>		
		Pulse output for energy and volume
		Pulse value corresponds to last digit displayed, e. g. display 0.001 MWh = output pulse 1 kWh
External supply		$V_{cc} = 3 - 30$ V DC
Output current	(mA)	$\leq 20$
Residual voltage	(V)	$\leq 0,5$
Open collector (drain)		
Galvanically separated		
Output 1 and 2		Frequency $\leq 5$ Hz, Pulse duration/pulse pause approx. 1:1; pulse duration/pulse pause 100 ms $\pm 10$ %
Weight	(g)	23
<b>M-Bus module</b>		
		complies with DIN EN 1434-3, 300 or 2,400 baud (automatic baud rate detection)
Weight	(g)	12
<b>Mains adapter</b>		
		230 V AC, +15 %/-30 %, 50/60 Hz
Weight	(g)	54

DATA SHEET

Ultrasonic meter 4.1.3



Pressure loss graph 4.1.3



## Ultrasonic meter 4.1.3

## Technical data Heat

Nominal flow rate qp	(m <sup>3</sup> /h)	0.6	1.5	2.5	3.5	3.5	3.5	6	6	6	
Maximum flow rate qs	(m <sup>3</sup> /h)	1.2	3	5	7	7	7	12	12	12	
Minimum flow rate qi	(l/h)	6	15	25	35	35	35	60	60	60	
Start horizontal	(l/h)	1	2.5	4	10	10	10	10	10	10	
Start vertical	(l/h)	1	2.5	4	10	10	10	10	10	10	
Operating temperature	(°C)	5...130					5...150				
Nominal width DN	(mm)	15	15	20	25	25	25	25	25	25	
Nominal pressure PN	(bar)	16	16	16	16	16	16	16	16	16	
Pressure loss at qp	(mbar)	95	120	100	44	44	44	128	128	128	
Pressure loss at qs	(mbar)	380	480	400	176	176	176	512	512	512	
Cv values (Δp = 1 bar)	(l/h)	1.95	4.33	7.91	16.69	16.69	14.29	13.76	16.77	16.77	
Weight	(g)	760	760	850	1,100	1,150	1,500	1,100	1,150	1,500	
<b>Dimensions</b>											
Standard connection		G 3/4 B	G 3/4 B	G 1 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B	
Flange diameter	(mm)	—	—	—	—	—	—	—	—	—	
Bolt circle diameter	(mm)	—	—	—	—	—	—	—	—	—	
Number of screw holes		—	—	—	—	—	—	—	—	—	
Volume transducer length	(mm)	110	110	130	135	150	260	135	150	260	
Height H	(mm)	78	78	80	85	85	85	85	85	85	
Height h	(mm)	14.5	14.5	18	23	23	23	23	23	23	
Order number		791000	791100	791200	791300	791310	791320	791400	791410	791420	

Nominal flow rate qp	(m <sup>3</sup> /h)	10	10	15	25	40	60	100	300	800
Maximum flow rate qs	(m <sup>3</sup> /h)	20	20	30	50	80	120	200	600	1.600
Minimum flow rate qi	(l/h)	100	100	150	250	400	600	1.000	3.000	8.000
Start horizontal	(l/h)	20	20	40	50	80	120	120	1.500	4.000
Start vertical	(l/h)	20	20	40	50	80	120	120	1.500	4.000
Operating temperature	(°C)	5...150								
Nominal width DN	(mm)	40	40	50	65	80	100	100	150	250
Nominal pressure PN	(bar)	16	16	25	25	25	25	25	40	25
Pressure loss at qp	(mbar)	140	140	134	120	140	130	210	0	0
Pressure loss at qs	(mbar)	560	560	536	480	560	520	840	0	0
Cv values (Δp = 1 bar)	(l/h)	26.73	26.73	40.09	91.29	141.42	219.09	218.22	—	—
Weight	(g)	2,900	3,100	7,450	9,450	11,900	18,900	18,900	33,500	77,500
<b>Dimensions</b>										
Standard connection		G2B	G2B	Flange	Flange	Flange	Flange	Flange	Flange	Flange
Flange diameter	(mm)	—	—	163	184	200	235	235	285	405
Bolt circle diameter	(mm)	—	—	125	145	160	190	190	240	355
Number of screw holes		—	—	4	8	8	8	8	8	12
Volume transducer length	(mm)	200	300	270	300	300	360	360	500	500
Height H	(mm)	90	90	95	103	110	120	120	390	440
Height h	(mm)	33	33	73.5	85	92.5	108	108	142.5	202.5
Order number		791520	791530	791604	791704	791804	791904	791990	791997	791998

Other special variants (e. g. qp 1.5 m<sup>3</sup>/h with 130 mm overall length or qp 6 m<sup>3</sup>/h with flange) on request

## Ultrasonic meter 4.1.3

## Technical data Cooling ✱

Nominal flow rate qp	(m <sup>3</sup> /h)	0.6	1.5	2.5	3.5	3.5	3.5	6	6	6
Maximum flow rate qs	(m <sup>3</sup> /h)	1.2	3	5	7	7	7	12	12	12
Minimum flow rate qi	(l/h)	6	15	25	35	35	35	60	60	60
Start horizontal	(l/h)	1	2.5	4	10	10	10	10	10	10
Start vertical	(l/h)	1	2.5	4	10	10	10	10	10	10
Operating temperature	(°C)	5 ... 50								
Nominal width DN	(mm)	15	15	20	25	25	25	25	25	25
Nominal pressure PN	(bar)	16	16	16	16	16	16	16	16	16
Pressure loss at qp	(mbar)	95	120	100	44	44	44	128	128	128
Pressure loss at qs	(mbar)	380	480	400	176	176	176	512	512	512
Cv values (Δp = 1 bar)	(l/h)	1.95	4.33	7.91	16.69	16.69	14.29	13.76	16.77	16.77
Weight	(g)	780	780	870	1,120	1,170	1,520	1,120	1,170	1,520
<b>Dimensions</b>										
Standard connection		G 3/4 B	G 3/4 B	G 1 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B	G 5/4 B
Flange diameter	(mm)	—	—	—	—	—	—	—	—	—
Bolt circle diameter	(mm)	—	—	—	—	—	—	—	—	—
Number of screw holes		—	—	—	—	—	—	—	—	—
Volume transducer length	(mm)	110	110	130	135	150	260	135	150	260
Height H	(mm)	78	78	80	85	85	85	85	85	85
Height h	(mm)	14.5	14.5	18	23	23	23	23	23	23
Order number		793000	793100	793200	793300	793310	793320	793400	793410	793420

Nominal flow rate qp	(m <sup>3</sup> /h)	10	10	15	25	40	60	100
Maximum flow rate qs	(m <sup>3</sup> /h)	20	20	30	50	80	120	200
Minimum flow rate qi	(l/h)	100	100	150	250	400	600	1,000
Start horizontal	(l/h)	20	20	40	50	80	120	120
Start vertical	(l/h)	20	20	40	50	80	120	120
Operating temperature	(°C)	5 ... 50						
Nominal width DN	(mm)	40	40	50	65	80	100	100
Nominal pressure PN	(bar)	16	16	25	25	25	25	25
Pressure loss at qp	(mbar)	140	140	134	120	140	130	210
Pressure loss at qs	(mbar)	560	560	536	480	560	520	840
Cv values (Δp = 1 bar)	(l/h)	26.73	26.73	40.09	91.29	141.42	219.09	218.22
Weight	(g)	2,920	3,120	7,470	9,470	11,920	18,920	18,920
<b>Dimensions</b>								
Standard connection		G2B	G2B	Flange	Flange	Flange	Flange	Flange
Flange diameter	(mm)	—	—	163	184	200	235	235
Bolt circle diameter	(mm)	—	—	125	145	160	190	190
Number of screw holes		—	—	4	8	8	8	8
Volume transducer length	(mm)	200	300	270	300	300	360	360
Height H	(mm)	90	90	95	103	110	120	120
Height h	(mm)	33	33	73.5	85	92.5	108	108
Order number		793500	793510	793604	793704	793804	793904	793990

Other special variants (e.g. qp 6 m<sup>3</sup>/h with flange) on request

## Ultrasonic meter 4.1.3

## Technical data Heating/cooling

Nominal flow rate qp	(m <sup>3</sup> /h)	0.6	1.5	2.5	3.5	3.5	6	6	6	10
Maximum flow rate qs	(m <sup>3</sup> /h)	1.2	3	5	7	7	12	12	12	20
Minimum flow rate qi	(l/h)	6	15	25	35	35	35	60	60	60
Start horizontal	(l/h)	1	2,5	4	10	10	10	10	10	10
Start vertical	(l/h)	1	2,5	4	10	10	10	10	10	10
Operating temperature	(°C)	5 ... 90								
Nominal width DN	(mm)	15	15	20	25	25	25	25	25	40
Nominal pressure PN	(bar)	16	16	16	16	16	16	16	16	16
Pressure loss at qp	(mbar)	95	120	100	44	44	128	128	128	140
Pressure loss at qs	(mbar)	380	480	400	176	176	512	512	512	560
Cv values (Δp = 1 bar)	(l/h)	1.95	4.33	7.91	16.69	14.29	13.76	16.77	16.77	26.73
Weight	(g)	780	780	870	1,120	1,520	1,120	1,170	1,520	3,120
<b>Dimensions</b>										
Standard connection		G <sup>3</sup> / <sub>4</sub> B	G <sup>3</sup> / <sub>4</sub> B	G1B	G <sup>5</sup> / <sub>4</sub> B	G <sup>5</sup> / <sub>4</sub> B	G <sup>5</sup> / <sub>4</sub> B	G <sup>5</sup> / <sub>4</sub> B	G <sup>5</sup> / <sub>4</sub> B	G2B
Flange diameter	(mm)	—	—	—	—	—	—	—	—	—
Bolt circle diameter	(mm)	—	—	—	—	—	—	—	—	—
Number of screw holes		—	—	—	—	—	—	—	—	—
Volume transducer length	(mm)	110	110	130	135	260	135	150	260	300
Height H	(mm)	78	78	80	85	85	85	85	85	90
Height h	(mm)	14.5	14.5	18	23	23	23	23	23	33
Order number		795000	795100	795200	795300	795321	795401	795411	795420	795531

Nominal flow rate qp	(m <sup>3</sup> /h)	15	25	40	60
Maximum flow rate qs	(m <sup>3</sup> /h)	30	50	80	120
Minimum flow rate qi	(l/h)	100	100	150	250
Start horizontal	(l/h)	20	20	40	50
Start vertical	(l/h)	20	20	40	50
Operating temperature	(°C)	5 ... 90			
Nominal width DN	(mm)	50	65	80	100
Nominal pressure PN	(bar)	25	25	25	25
Pressure loss at qp	(mbar)	134	120	140	130
Pressure loss at qs	(mbar)	536	480	560	520
Cv values (Δp = 1 bar)	(l/h)	40.09	91.29	141.42	219.09
Weight	(g)	7,470	9,470	11,920	18,920
<b>Dimensions</b>					
Standard connection		Flange	Flange	Flange	Flange
Flange diameter	(mm)	163	184	200	235
Bolt circle diameter	(mm)	125	145	160	190
Number of screw holes		4	8	8	8
Volume transducer length	(mm)	270	300	300	360
Height H	(mm)	95	103	110	120
Height h	(mm)	73.5	85	92.5	108
Order number		795604	795704	795804	795904

Other special variants (e.g. qp 6 m<sup>3</sup>/h with flange) on request