



## US-S/FFL

### Ultrasonic energy meters

Flanged ultrasonic energy meters, intended for heating or cooling.

- ✓ Size DN25...DN100
- ✓ Nominal flow 3.5...60 m<sup>3</sup>/h
- ✓ For horizontal or vertical mounting
- ✓ No data loss when changing battery
- ✓ No moving parts enable flow measurement at low pressure drops
- ✓ Available with M-Bus, pulse output or M-Bus and 2 pulse inputs

#### Function

The menu system, available in the display, makes it possible to read a large number of parameters, such as heat and cold consumption, total energy spent on heating and cooling, temperatures along with current energy consumption.

Installation is normally in the return pipe.

#### Connection

The energy meter comes equipped with two PT500 temperature sensors. The resistors for the sensors are composed of platinum and maintain a standard of DIN IEC 60751.

#### Mounting

Both temperature sensors have a cable length of 3 m.

The calculator can be wall mounted or DIN-rail mounted.

#### High reliability

The meter offers reliable and accurate performance over long periods of measurement.

The calculator features a high accuracy of measurement, in addition to a long life and robust design. The calculator utilizes EEPROM memory, meaning loss of data does not occur if the battery is changed.

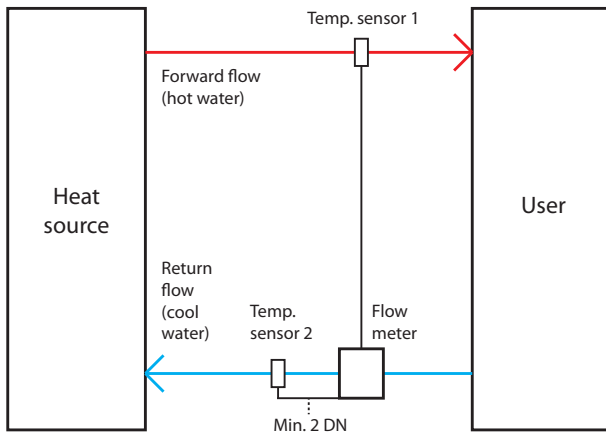
#### Flexible design

Due to the multiple combination options offered by its components, the meters can easily be adapted to suit a large number of individual requirements.

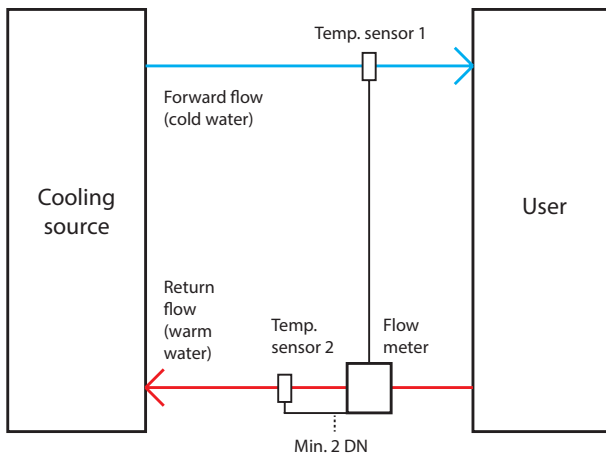
Models with M-Bus, pulse output or M-Bus + pulse input are available.

Energy meters with M-Bus have a default address of "0", which is not a valid primary communication address. This primary address can be changed by searching for secondary addresses (i.e. the ID number of the meter).

### Installation example, heating



### Installation example, cooling



## Technical data, calculator

<b>Power supply</b>	3.6 V lithium battery
<b>Temperature range</b>	1...150 °C
<b>Temperature difference limits</b>	3...100 K (heating), -3...-50 K (cooling)
<b>Temperature resolution</b>	0.01 °C
<b>Ambient temperature</b>	5...55 °C
<b>Storage temperature</b>	-20...+60 °C
<b>Ambient humidity</b>	< 93 % RH
<b>Protection class</b>	IP54 (heating), IP65 (cooling)
<b>Calculation of heat from K</b>	$\Delta\Theta > 0.05$ K
<b>Calculation of cooling from K</b>	$\Delta\Theta < -0.05$ K
<b>Dual purpose heat/cooling meter</b>	$\Delta\Theta_{HC} < -0.5$ K
<b>Measurement frequency at <math>q_p</math></b>	Cycle 30 s
<b>Data storage</b>	EEPROM, daily storage of values
<b>Interfaces</b>	M-Bus, pulse output or M-Bus with 2 pulse inputs
<b>Reading dates</b>	Annual billing date selectable, 24 monthly values
<b>Display</b>	LCD, 8 digits + additional symbols
<b>Display units</b>	MWh, kWh, GJ, m <sup>3</sup> , m <sup>3</sup> /h, l/h, kW, MW, °C
<b>Mechanical class</b>	Class M1 (MID: 31.03.2004 annex I)
<b>EMC</b>	Class E1 (MID: 31.03.2004 annex I)
<b>Environmental class</b>	A (EN 1434)

## Technical data, temperature sensor

<b>Cable length</b>	3 m
<b>Sensor element</b>	PT500; separately approved type as per EN60751, unshielded
<b>Diameter, sensor</b>	6 mm
<b>Installation</b>	Direct or indirect in a temperature sensor pocket per EN1434
<b>Temperature sensor requirements, heat meter</b>	EU (MID) identification on the temperature sensors
<b>Temperature sensor requirements, cooling meter</b>	National German approval as a temperature sensor for cooling meters. Requirements in other countries may be different.

## Technical data, flow meter

<b>Connection</b>	Flanged according to EN 1092-3
<b>Pressure rating</b>	PN25
<b>Media</b>	Water
<b>Mounting position</b>	Horizontal or vertical
<b>Mounting position, cooling</b>	Transducers (black housing) to the side of or under the measuring tube
<b>Point of installation</b>	Return flow
<b>Temperature range</b>	5...130 °C (National approvals may differ.)
<b>Temperature range, heating</b>	10...130 °C (20...130 °C for short versions)
<b>Temperature range, cooling</b>	5...50 °C
<b>Recommended minimum system pressure</b>	1 bar (to avoid cavitation problems)

## Models

Article	Nominal diameter	Nominal flow, $q_p$	Maximum flow, $q_s$	Minimum flow, $q_i$	Flow at 0.1 bar pressure drop	Low flow threshold	Pressure drop at $q_p$
US-S/FFL25-3.5...	DN25	3.5 m <sup>3</sup> /h	7 m <sup>3</sup> /h	35 l/h	4.4 m <sup>3</sup> /h	14 l/h	60 mbar
US-S/FFL25-6.0...	DN25	6 m <sup>3</sup> /h	12 m <sup>3</sup> /h	60 l/h	4.4 m <sup>3</sup> /h	24 l/h	180 mbar
US-S/FFL40-10...	DN40	10 m <sup>3</sup> /h	20 m <sup>3</sup> /h	100 l/h	8.9 m <sup>3</sup> /h	40 l/h	130 mbar
US-S/FFL50-15...	DN50	15 m <sup>3</sup> /h	30 m <sup>3</sup> /h	150 l/h	13.3 m <sup>3</sup> /h	60 l/h	110 mbar
US-S/FFL65-25...	DN65	25 m <sup>3</sup> /h	50 m <sup>3</sup> /h	250 l/h	30 m <sup>3</sup> /h	100 l/h	105 mbar
US-S/FFL80-40...	DN80	40 m <sup>3</sup> /h	80 m <sup>3</sup> /h	400 l/h	36 m <sup>3</sup> /h	160 l/h	160 mbar
US-S/FFL100-60...	DN100	60 m <sup>3</sup> /h	120 m <sup>3</sup> /h	600 l/h	50.6 m <sup>3</sup> /h	240 l/h	115 mbar

CE

**Measuring Instruments Directive:** This product conforms to the requirements of the Measuring Instruments Directive 2004/22/EC through product standards OIML R75, EN 1434, EN 60751, EN 14154 and PTB-Richtlinie K 7.1.

**Low Voltage Directive (LVD) standards:** This product conforms to the requirements of the European Low Voltage Directive (LVD) 2006/95/EC through product standards EN 61140, VDE 0140-1, EN 60529 and DIN 40050.

**EMC emissions & immunity standards:** This product conforms to the requirements of the EMC Directive 2004/108/EC through product standards EN 13757-2, EN 13757-3 and DIN 12900-1.

**RoHS:** This product conforms to the Directive 2011/65/EU of the European Parliament and of the Council.

## Ordering code selection table

Options	US-S/FFL...	-...	-...
<b>Flow (DN) (length) (flange)</b>			
3.5 m <sup>3</sup> /h (DN25) (260 mm) (PN25 flange with 4 bolt holes)	US-S/FFL25-3.5		
6.0 m <sup>3</sup> /h (DN25) (260 mm) (PN25 flange with 4 bolt holes)	US-S/FFL25-6.0		
10 m <sup>3</sup> /h (DN40) (300 mm) (PN25 flange with 4 bolt holes)	US-S/FFL40-10		
15 m <sup>3</sup> /h (DN50) (270 mm) (PN25 flange with 4 bolt holes)	US-S/FFL50-15		
25 m <sup>3</sup> /h (DN65) (300 mm) (PN25 flange with 8 bolt holes)	US-S/FFL65-25		
40 m <sup>3</sup> /h (DN80) (300 mm) (PN25 flange with 8 bolt holes)	US-S/FFL80-40		
60 m <sup>3</sup> /h (DN100) (360 mm) (PN25 flange with 8 bolt holes)	US-S/FFL100-60		
<b>Type of measurement and installation point</b>			
Heating, installation of flow meter in return pipe (MID approval)		-HR	
Cooling <sup>1</sup> , installation of flow meter in return pipe		-CR	
Heating and cooling in combination <sup>2</sup> , installation of flow meter in return pipe		-HCR	
<b>Communication interface</b>			
M-Bus			-M
M-Bus with 2 pulse inputs <sup>3</sup>			-MPI
Pulse output for energy			-PO

<sup>1</sup> National German approval.

<sup>2</sup> MID approval for heating, not for cooling

<sup>3</sup> The standard setting for the pulse counters is 1 l/pulse. Please contact Regin if other values (10 l/pulse or 100 l/pulse) are needed.

If any further requirements or options are needed, please contact Regin.

### Example 1:

Desired application: Meter with 10 m<sup>3</sup>/h. Heating, installation in return pipe. M-Bus.

Resulting item ordering number: **US-S/FFL40-10-HR-M**

#### Possible accessories needed:

- Sensor pockets (2 pcs): TH-85-½

### Example 2:

Desired application: Meter with 60 m<sup>3</sup>/h. Cooling, horizontal installation in return pipe. M-Bus + pulse input.

Resulting item ordering number: **US-S/FFL100-60-CR-MPI**

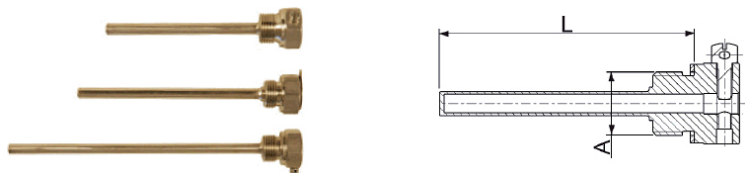
#### Possible accessories needed:

- Sensor pockets (2 pcs): TH-120-½

## Accessories

Temperature sensor pocket for installation of universal temperature sensor with 6 mm sheath diameter

Article	Connection A	Compatible with	Installation length
TH-85-1/2	G $\frac{1}{2}$	$q_p$ 3.5...10 m $^3$ /h	85 mm
TH-120-1/2	G $\frac{1}{2}$	$q_p$ 15...100 m $^3$ /h	120 mm

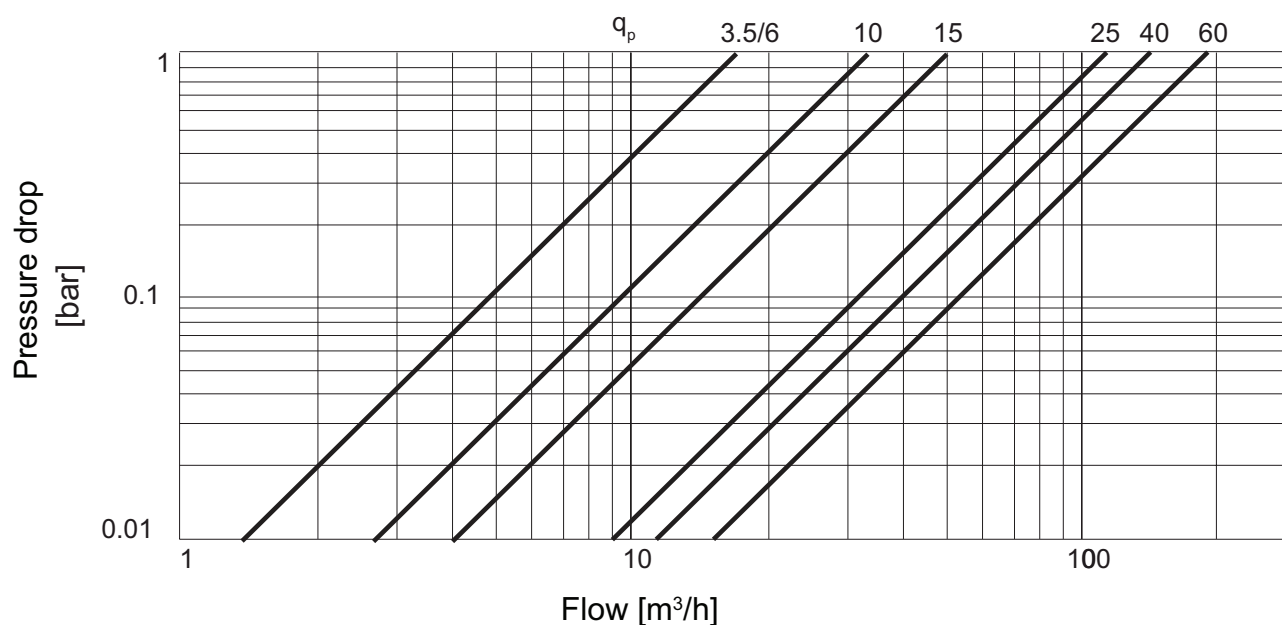


## Optical interface and read-out software

Article	Description
OPTO-CABLE-USB	Optocoupler with USB interface
OPTO-TOOL	Software device monitor

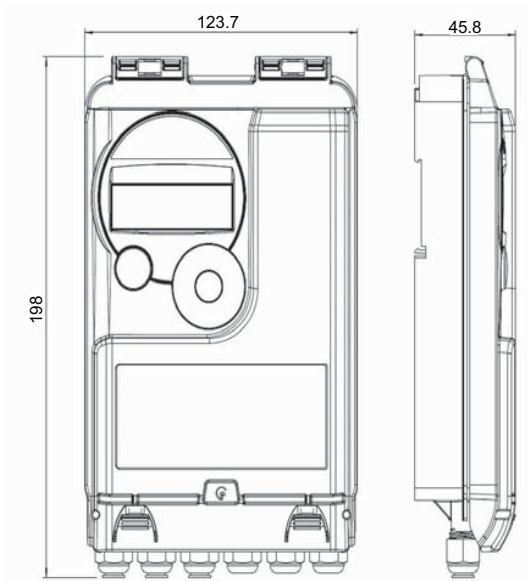


## Pressure drop curves

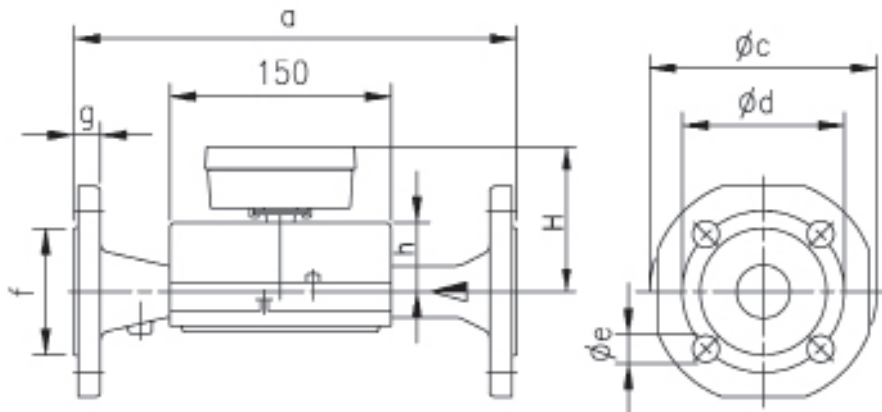


## Dimensions

### Calculator



### Flow meter



$q_p$ (m <sup>3</sup> /h)	PN bar	DN	a	b	$\varnothing c$	$\varnothing d$	$\varnothing e$	No. of holes	f	g	h
3.5	25	25	260	51	115	85	14	4	68	18	96
6.0	25	25	260	51	115	85	14	4	68	18	96
10	25	40	300	48	150	110	18	4	88	18	93
15	25	50	270	46	165	125	18	4	102	20	91
25	25	65	300	52	185	145	18	8	122	22	97
40	25	80	300	56	200	160	18	8	138	24	101
60	25	100	360	68	235	190	22	8	158	24	113

Measurements in mm unless otherwise specified.