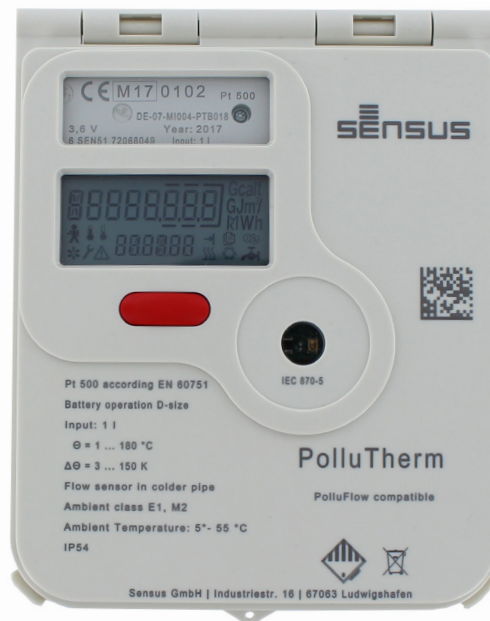# PolluTherm for PolluFlow

Calculator for measuring heating and cooling energy

Main characteristics

- Compatible with the Sensus PolluFlow ultrasonic flow sensor with pulse values 1 litre or 10 litres

- Standard possibility to connect temperature sensors Pt 500 in four- wire technology for quick and economic extension of temperature sensor cables

- High-resolution measuring cycles (2 seconds for temperatures, 4 seconds for power and flowrate)

- Back up of measuring and counting functions of mains-operated instruments for up to 3 months in case of external power failure

- Password-protected parameter setting right at the meter itself without any further peripheral equipment

Available design

The calculator PolluTherm for PolluFlow is applicable for energy consumption measurement in heating or cooling circuits. Optionally PolluTherm is available for the usage in combined heating and cooling systems, where an automatic switch-over point provides storing of heating and cooling energy in separate registers. This switch-over point can be changed in accordance with the heating and cooling system requirements even after the meter has already been installed (e.g. concrete core activation).
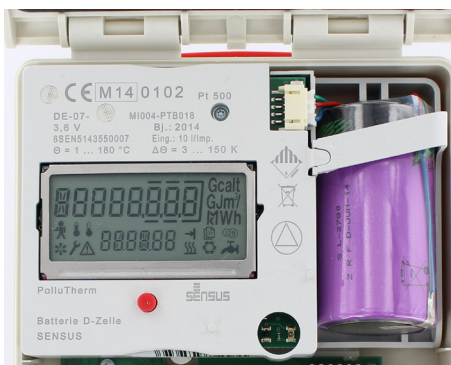
Regarding data communication and remote reading the novel casing conception offers two slots for anytime upgrade with various modules, e.g. M-Bus or remote reading pulses.

Casing Concept

Internal view, type Pt 500, battery-operated

Removable calibrated calculator unit

Spacious terminal box

- High-quality bevel terminal block
- Standard possibility to connect temperature sensors in four-wire technology
- Two slots for various upgrading modules
- Novel cable strain relief with removable preshaped parts

Consumption Registers

In addition to the calibrated main register there are two further registers available:

"Cooling" register – automatic switch-over between heat and cool metering

This option allows a measurement of the heating as well as of the cooling energy in combined heating and cooling systems, where the cooling energy is stored in the "cooling" register.

A so-called „automatic switch-over point", which depends on the supply temperature as well as on the difference between supply and return temperature, specifies when heating or cooling energy is to be measured. Both values are suitably preset in the factory and, in case of need, can be changed on site according to the system requirements (e.g. in case of concrete core activation). The calculator allows a direct control of the active settings:
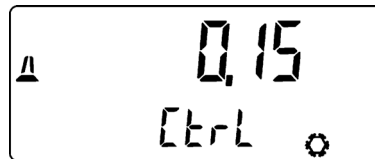
Example: Switch-over of heat to cool metering at a supply flow temperature ≤ 25 °C and a concurrent negative temperature difference of ≥ - 0,15 K

Tariff register 1

This standard tariff register stores the heating and cooling energy respectively, as well as exceeding or falling below programmable limit values for below system parameters:

- Heating cooling power resp.
- Flowrate of heating and/or cooling fluid resp.
- Temperature in the warmer line
- Temperature in the colder line
- Temperature difference

The required settings or changes are possible via optical interface at any time.

LC Display

PolluTherm is equipped with a comfortable LC display with eight-digit main reading line and six-figure subordinate reading line. Moreover 12 additional symbols support the read-out.
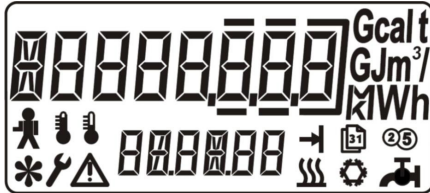
Segment test

One of many useful features of this conception is the simultaneous display of stored consumption values together with the associated date – an important contribution to avoid misreadings:

Example: monthly value for heating energy

Wherever it is appropriate, the display shows additional letters in the six-figure subordinate line in order to increase the read-out comfort:

Example: M-Bus secondary address

The available display items are clearly structured in 6 menus and include in substance:

L 1: User menu

- Accumulated consumptions

- Segment test

- Instantaneous values (power, flowrate, temperatures)

- Customer's reference number

L 2: Target day menu

Consumption values at a programmable annual target day

L 3: Archive menu

Rolling monthly storage of the following values for the last 16 months:

- Consumptions

- Volumine of the heating resp. cooling liquid

- Maxima for power and flowrate

- Potential failure hours

L 4: Service menu

- Maximum values since operational start-up

- Date and time

- Next target day

- Operation days

- M-Bus addresses

L 5: Control menu

- Set tariff parameters

- Switch-over point between heat and cool metering

- Correction factor in case of using water-antifreeze-mixtures (only in combination with a mechanical flow sensor)

L 6: Parameter menu

This is the menu where, among other possibilities, following items can be set right at the meter itself (protected by password):

- M-Bus addresses

- Customer's reference number

- Date and time

- Next target date

- Reset of maximum values

For details of the complete scope of display possibilities please refer to the installation and operation instructions MH 7410 INT.

Upgrade Plugin Modules

For electronic reading and connection to building automation systems a variety of anytime upgrade plugin modules are available for the PolluTherm:

M-Bus according to EN 1434-3
Order number: 68504020

This plugin module allows reading the meter via its primary or secondary address with an M-Bus level converter (300 and 2400 Baud, automatic recognition). The secondary address is preset in the factory to the eight-digit meter serial number. If required both M-Bus addresses can be changed at the meter itself. Because of the short updating time for temperatures of 2 secons only as well as for power and flowrate values of 4 seconds only, the mains-operated PolluTherm is excellently suitable for the connection to district heating regulators.

Suitable read-out software:
DOKOM CS (leaflet LS 1300)

Suitable read-out hardware:
See leaflet LS 1100

M-Bus with two inputs for external consumption meters
Order number: 68504686

This plug-in module allows the additional connection of up to two external consumption meters (cold water, warm water, electricity, gas, „others") with passive remote reading pulse output (reed switch, open collector). The consumptions of those meters can then be read out via the M-Bus interface of the PolluTherm.

Required pulse duration:	> 100 ms
Pulse input frequency:	< 3 Hz
Terminal voltage :	3 V

Remote reading pulses energy
For battery-operated PolluTherm
Order number: 68503922

Remote reading pulses energy and volume
For mains-operated PolluTherm
Order number: 68503920

Those two plugin modules provide potential-free and bounce-free remote reading pulses, which can be added up by a remote totalizer.

Closing time:	125 ms
Bounce time:	none
Max. voltage:	28 V DC or AC
Max. power:	0.1 A

The pulse values depend on the size of the connected flow sensor:

Input pulse value in l	1	10
Display of the calculator with decimal digits for MWh, GJ and m^3	00000.000	000000.00
Pulse value in case of remote energy reading in MWh	0.001	0.01
Pulse value in case of remote volume reading in m^3	0.001	0.01

USB interface

Order number: 68504688

This plugin unit allows the connection of the meter to a USB interface of a PC or a notebook.

USB-Port:	1.1 or 2.0
Connection plug:	type A
Cable length:	ca. 1.5 m
Baud rate:	19,200

LONWORKS®-FTT10A
Order number: 68505078

This plug-in module is used to implement the meter via LONTALK® protocol into a building automation system. For detailed informations please refer to data sheet LH 6130 INT.

Modbus RTU Plugin Unit
Référence pour commande: 08009144

The Modbus RTU option module is used to connect the PolluTherm heat calculator to the Modbus RTU network using EIA-485 channel. For details please see the Manual MH 6123.

Further Options

Integrated data logger

By this factory-set option the following values are stored in a selectable time interval (3 to 1440 minutes):

- Consumption (incl. tariff consumption and, if applicable, consumptions of the two external meters)

- Volume of the heating and cooling liquid resp.

- Flowrate of the heating and cooling liquid

- Heating and cooling power resp.

- Temperature in the warmer line

- Temperature in the colder line

- Temperature difference

- Potential failure hours

The capacity is ca. 1300 data records, i.e. for example covering ca. 54 days in case of hourly logger intervals.

The logger values are read out with the service software MiniCom, version 3.6.0.28 or higher.

Technical Data

Temperature measuring range	1 ... 180 °C (-20 … 180 °C uncalibrated)
Temperature difference	3 ... 150 K
Cut-off threshold	0.15 K
Measuring accuracy	better than ± (0,5 + $\Delta\Theta min / \Delta\Theta$)
Approval	acc. EN 1434, Class 2 Directive 2014/32/EU (MID)
Updating times and integration cycles resp. Temperatures Flowrate, Power Energy, Volume	 2 sec 4 sec 4 sec (16 sec *) * for battery-operated instruments
Buffering of measuring and counting functions in case of power failure	≤ 3 months
Optical data interface	Physical acc. to EN 61107 Data telegram acc. to EN 1434-3
Permissible environmental temperature	5 ... 55 °C
Battery lifetime	6 years + 1 year storing reserve optional: 11 years
Electromagnetic environment	Class E 1
Mechanical environment	Class M 2
Storing temperature	- 20 °C ... + 65 °C
Dimensions (wall mounting)	ca. 125 x 159 x 52 mm (WxHxD)
Wall mounting	C-rail
Suitable types of temperature sensors	Pt 500 Two- or four-wire connection
Input pulse values for flow sensors	1 / 10
Type of the pulsers	Reed switch, open collector
Input pulse frequency	≤ 3 Hz
Protection class	IP 54

Dimensional Drawings
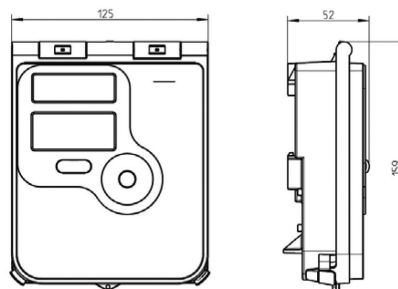
Standard variants for complete instruments and internal calculator modules

- Adjusted for flow sensors in colder or warmer pipe

- Battery or mains operation

- Physical unit MWh or GJ

Further variants on enquiry

Order details for accessories

Regarding the plugin unit for remote reading of energy pulses (order no. 68503922) we recommend to use a new plugin unit after expiry of the verification period because of the soldered-on battery.

For further accessories please refer to our present price list for heating / cooling meters and system technology.

Description		Order no.
Power supply unit 230 V AC for modification from battery to mains operation		68504532
Junction box for four-wire extension of temperature sensor cables		88599001
Upgrading plugin units		
Remote reading of energy and volume pulses * for mains-operated PolluTherm only		68503920
Remote reading of energy pulses * for battery-operated PolluTherm only		68503922
M-Bus interface acc. to EN 1434-3 *		68504020
Accessories for data communication		
USB interface for connection to PC or notebook		68504688
Optical data coupler with USB connection		184023

* These plugin units are compatible to the former version of PolluTherm and can, as far as already available, reused in the present PolluTherm.

![Sensus a xylem brand logo]

Order details for complete measuring points

A complete measuring point includes following components:

- Calculator PolluTherm (battery or mains operated)
- One pair of temperature sensors Pt 500
- One pair of wells (stainless steel V4A)
- PolluFlow ultrasonic flow sensor with volume pulse output

For the order numbers for the complete kits (including the a.m. components) please refer to the present price list for heating / cooling meters.

Suitable flow sensor

Nominal flowrate from 0.6 to 60 m³/h(Qp 0,6 to 60), nominal size DN 15 to DN 100: ultrasonic flow sensor PolluFlow, leaflet: LH7140

Technical specifications PolluFlow

Nominal flow rate	q_p	m³/h	0.6	0.6	1.5	1.5	2.5	2.5	3.5	3.5
Nominal diameter	DN	mm	15	20	15	20	20	20	25	25
Overall length	L	mm	110	190	110	190	130	190	150	260
Starting flow rate		l/h	1	1	2.5	2.5	4	4	10	10
Minimum flow rate (DR 1:250)	q_i	l/h	6	6	6	6	10	10	-	-
Minimum flow rate (DR 1:100)	q_i	l/h	6	6	15	15	25	25	35	35
Maximum flow rate	q_s	m³/h	1.2	1.2	3	3	5	5	7	7
Overload flow rate		m³/h	2.5	2.5	4.6	4.6	6.7	6.7	18.4	18.4
Pressure loss at q_p	Δp	mbar	95	85	120	75	100	100	44	60
Temp. range heating		°C	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 150[3]	5 ... 150[3]
Kvs value ($\Delta p=Q^2/Kvs^2$)			1.95	2.06	4.33	5.48	7.91	7.91	16.69	14.29

Nominal flow rate	q_p	m³/h	6	6	10	10	15	25	40	60
Nominal diameter	DN	mm	25	25	40	40	50	65	80	100
Overall length	L	mm	150	260	200	300	270	300	300	360
Starting flow rate		l/h	10	10	20	20	40	50	80	120
Minimum flow rate (DR 1:250)	q_i	l/h	24	24	40[1]	40[1]	60[1]	100[1]	160[1]	240[1]
Minimum flow rate (DR 1:100)	q_i	l/h	60	60	100	100	150	250	400	600/1200[2]
Maximum flow rate	q_s	m³/h	12	12	20	20	30	50	80	120
Overload flow rate		m³/h	18.4	18.4	24	24	36	60	90	132
Pressure loss at q_p	Δp	mbar	128	128	140	140	140	75	80	75
Temp. range heating		°C	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]	5 ... 150[3]
Kvs value ($\Delta p=Q^2/Kvs^2$)			16.77	16.77	26.73	26.73	40.09	91.29	141.42	219.09

1) Valid for horizontal installation only
2) Up side down installation
3) 150 °C in vertical installations or tilted installation with bigger than 45 degree tilted angle

Dimensions Thread Version PolluFlow

Nominal flow rate	q_p	m³/h	0.6	0.6	1.5	1.5	2.5	2.5
Nominal diamter	DN	mm	15	20	15	20	20	20
Overall length	L	mm	110	190	110	190	130	190
Overall lenght with coupling	L2	mm	190	288	190	288	230	288
Height	H	mm	14.5	18	14.5	18	18	18
Height	H1	mm	54.5	56.5	54.5	56.5	56.5	56.5
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
Connection thread on meter		Inch	G¾B	G1B	G¾B	G1B	G1B	G1B
Connection thread of coupling		Inch	R½	R¾	R½	R¾	R¾	R¾
Operating Pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.6	0.63	0.6	0.63	0.61	0.63

Nominal flow rate	q_p	m³/h	3.5	3.5	6	6	10	10
Nominal diamter	DN	mm	25	25	25	25	40	40
Overall length	L	mm	150	260	150	260	200	300
Overall lenght with coupling	L2	mm	270	380	270	380	340	440
Height	H	mm	23	23	23	23	33	33
Height	H1	mm	61	61	61	61	66.5	66.5
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
Connection thread on meter		Inch	G1¼B	G1¼B	G1¼B	G1¼B	G2B	G2B
Connection thread of coupling		Inch	R1	R1	R1	R1	R1½	R1½
Operating Pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.93	1.35	0.93	1.35	2.4	2.6
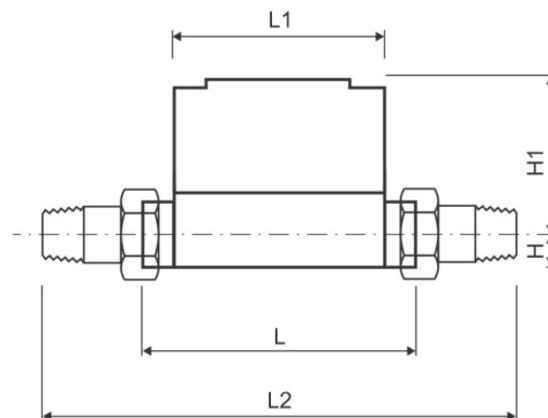
Dimensions Flange Version PolluFlow

Nominal flow rate	q_p	m³/h	0.6	1.5	2.5	3.5	6
Nominal diamter	DN	mm	20	20	20	25	25
Overall length	L	mm	190	190	190	260	260
Height	H	mm	47.5	47.5	47.5	50	50
Height	H1	mm	56.5	56.5	56.5	61	61
Length of electronic	L1	mm	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5
Flange dimension	F	mm	95	95	95	100	100
Flange diameter	D	mm	105	105	105	114	114
Hole circle diameter	K	mm	75	75	75	85	85
Screwhole diameter	D1	mm	14	14	14	14	14
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25
Number of screwholes		pcs	4	4	4	4	4
Weight brass body		kg	2.7	2.7	2.7	3.35	3.35
Weight grey cast iron body		kg	-	-	-	-	-

Nominal flow rate	q_p	m³/h	10	15	25	40	60
Nominal diamter	DN	mm	40	50	65	80	100
Overall length	L	mm	300	270	300	300	360
Height	H	mm	69	73.5	85	92.5	108
Height	H1	mm	66.5	71.5	79	86.5	96.5
Length of electronic	L1	mm	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5
Flange dimension	F	mm	138	147	170	185	216
Flange diameter	D	mm	148	163	184	200	235
Hole circle diameter	K	mm	110	125	145	160	180[1] / 190
Screwhole diameter	D1	mm	18	18	18	19	19[1] / 22
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25
Number of screwholes		pcs	4	4	8	8	8
Weight brass body		kg	6.6	7.45	9.45	11.1	16.9
Weight grey cast iron body		kg	-	6.31	8.08	10.01	15.76

1) Values for PN 16 housing

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