Static Heat- and Cold Meter UH50

Configuration Instructions   UH 106-101I

Static meter for Heating- and Cooling systems

UH50 ULTRAHEAT®
UH50 ULTRACOLD®
UH50 FLOW SENSOR

Version of firmware: 5.15 and higher

Meter for measurement of flow and energy in a heat or cold circuit with water using the ultrasonic principle. Important properties are:

- **Non-wearing due to non-moving parts**
- **Measuring range of flow 1:100 according to EN 1434, 1:1000 total range**
- **Any mounting orientation, in flow or return, no setting sections or flow straighteners.**
- **Power measurement with maximum values, tariffs selectable**
- **Data logger for system monitoring**
- **60 monthly values**
- **Logbook**
- **Battery or mains operated**
- **Optical interface according to EN 62056-21**
- **Big range of communication modules**
- **2 module slots for using 2 communication modules coincidental**
- **Also operable as a flow meter, cold or heat/cold meter**
- **Self-diagnostics**

Note: In the following text the term Meter covers the Heat Meter as well as the Cold Meter and the Flow Sensor if not mentioned otherwise.

Safety information:

☞ The meter is designed for circulating water of heating systems (not for drinking water!).
☞ Do not pick up by the electronic unit
☞ Be careful of sharp edges (thread, flange, measuring tube)
☞ Installation and removal must be performed by qualified personnel only
☞ Mounting and unmounting are only permitted when the system is not under pressure
☞ After installation, a tightness test must be conducted with cold pressure
☞ Only ever use under service conditions, otherwise dangers can arise and the warranty may be voided
☞ Breaking the security seal voids the warranty
☞ The 110 V / 230 V versions must only be connected by an electrician
☞ The lithium batteries must be properly returned
☞ Lightning protection cannot be ensured; this must be provided by the building wiring
☞ Only one compartment for the power supply must be equipped – do not remove the red locking hatch

General information

The UH50 meter is used for energy consumption metering in short and long-distance district heating and in apartment buildings. It is suitable both for cold metering (alone or in conjunction with metering quantities of thermal energy) or for pure flowrate metering in water systems.

Measuring accuracy	Class 2 or 3 (EN 1434)
Environment class	A (EN 1434) for indoor installation
Mechanical class	M1 *)
Electrical class	E1 *)

*) according 2004/22/EG EC directive

Ambient humidity	< 93% r. h. without condensation

Electronic unit

Storage temperature	- 20 to 60°C
Max. altitude	2000 m above MSL
Ambient temperature	5 to 55°C
Housing degree of prot.	IP 54 per EN 60529
Safety class	
Line 110 / 230 V AC	II per EN 61558
Line 24 V ACDC	III per EN 61558
Response threshold f. ΔT	0.2 K
Temperat. difference ΔT	3 K to 120 K
Temperat. meas. range	2...180°C

Sensors

Type	Pt500 or Pt100 per EN 60751
Temperature range	0...150°C (< 45 mm overall length) 0...180°C (> 100 mm overall length)

All volume measuring units

(Consider the details on the meter)

Mounting location	return of flow
Mounting orientation	any
Settling section	none
Metrological class	1:100
Temperature range	5 to 130°C *)
Recommended for…	
…heat application	10 to 130°C
…cooling application	5 to 50°C

*) national approvals may differ

Maximum temperature	150°C for 2000 h
Maximum overload	2.8 x q_p
Nominal pressure	**PN16**, PN25

Nominal flowrate q_p	Overall length	Connection	Maximum flowrate q_s	Minimum flowrate q_i	Response threshold (variable)	Pressure lost at q_p	Kv flowrate at Δp 1 bar	Kv flowrate at Δp 100 mbar	Weight
m³/h	mm	G / DN	m³/h	l/h	l/h	mbar	m³/h	m³/h	kg
0,6	110	G ¾	1,2	6	2,4	150	1,5	0,5	1
	190	G 1				150	1,5		1,5
		DN20				125	1,7		3
1,5	110	G ¾	3	15	6	150	3,9	1,2	1
	130	G 1				160	3,8		1,5
	190	DN20							3
2,5	130	G 1	5	25	10	200	5,6	1,8	1,5
	190	DN20				195	5,7		3
3,5	260	G 1¼	7	35	14	60	14	4,5	3
		DN25							5
6	150	G 1¼	12	60	24	240	12	3,8	3
	260		12	60	24	180	14	4,5	3
		DN25							5
10	200	G 2	20	100	40	130	28	8,8	2,6
	300					100	32	10	4
		DN40				165	25	7,8	7
15	200	DN50	30	150	60	95	48	14	5
	270					100	47	15	8
25	300	DN65	50	250	100	105	77	24,4	11
40	300	DN80	80	400	160	160	100	31,6	13
60	360	DN100	120	600	240	115	177	56	22

Tolerance pressure lost: +/- 5%

Small meters (qp 0,6 – 2,5 m³/h)

Overall length 110 mm (thread)

Overall length 130 mm (thread)

Overall length 190 mm (thread)

Overall length 190 mm (flange)
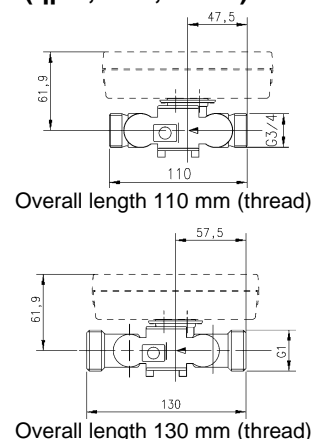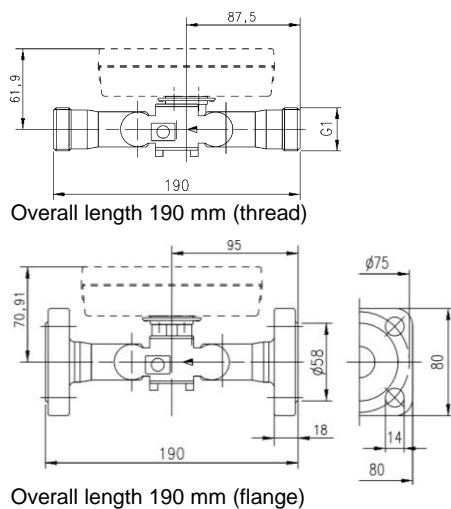
Large meters with threaded joint

alternative mounting option
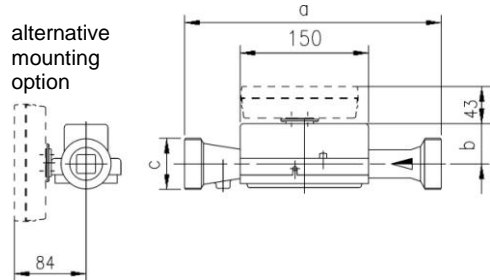
qp m³/h	PN bar	a	b	c
3.5	16 / 25	260	51	G 1¼ B
6	16	260	51	G 1¼ B
6	16	150	27	G 1¼ B
10	16	200 300	48	G 2 B

Large meters with flange joint
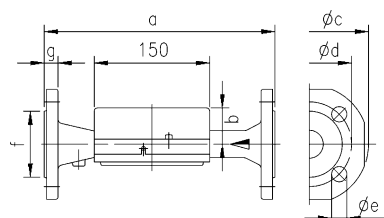
qp m³/h	PN bar	DN	a	b	Øc	Ød	Øe	No. of holes	f	g
3.5	25	25	260	51	115	85	14	4	68	18
6	25	25	260	51	115	85	14	4	68	18
10	25	40	300	48	150	110	18	4	88	18
15	25	50	270 200	46	165	125	18	4	102	20
25	25	65	300	52	185	145	18	8	122	22
40	25	80	300	56	200	160	18	8	138	24
60	16 25	100	360	68	235	180 190	22	8	158	24

Installation

Based on the dimension drawings, choose a mounting location with sufficient clearance. Mount the volume measuring unit between two shut-off valves in accordance with the arrow on the volume measuring unit for the direction of flow.
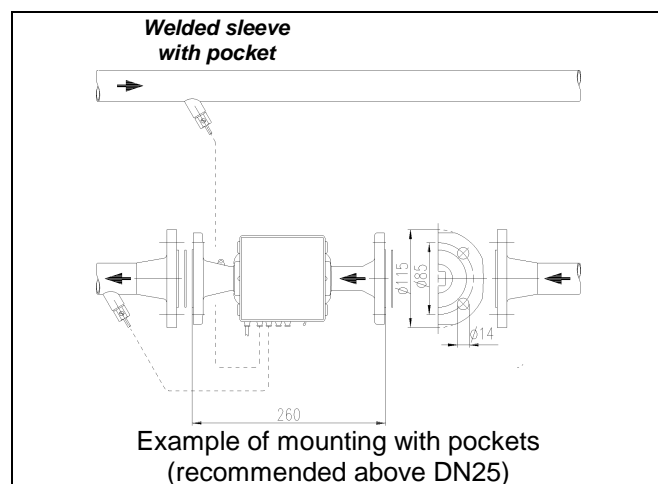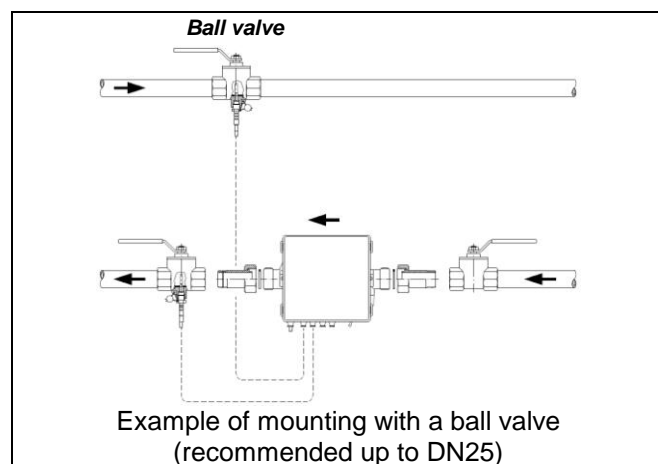
No inlet or outlet sections are necessary. However, if the meter is installed in the shared return of two systems, the mounting location must be a sufficient distance from the T element that forms the junction (**min. $10 \times DN$**) to allow the different water temperatures to mix well.

The sensor can be mounted in ball valves or in pockets. The sensors must be inserted at least up to the center of the pipe cross-section.

Cavitation must be avoided over the entire measuring range by overpressure, i.e. at least 1 bar at q_p and approx. 3 bar at q_s (at 80°C).

If the **water temperature is below 10°C or above 90°C**, a split mounting is necessary. In this case the electronic unit is to be mounted separately from the volume measuring unit.

A meter with a **removable control cable** may be separated during the installation. When installation is done be sure that only paired parts (volume part, calculator) are connected together.

Ball valve

Example of mounting with a ball valve (recommended up to DN25)

Welded sleeve with pocket

Example of mounting with pockets (recommended above DN25)

Mounting as a cold meter

When mounting a **cold meter** or **combined heat/cold meter**, make sure the black cover on the measuring tube is oriented to the side or downward (because of water condensation). The immersion sleeves should also mounted to the side or downwards.
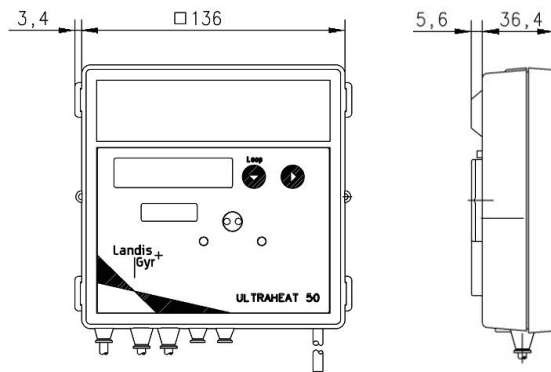
The electronic unit must be separated from the flowrate measuring tube and, for example, mounted on the wall (split mounting). Make sure that condensed water cannot run along the connected pipes into the electronic unit (building a loop downwards).
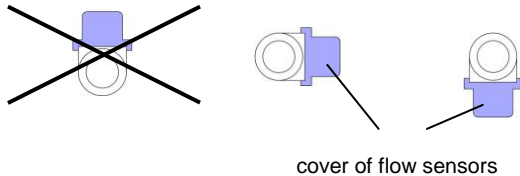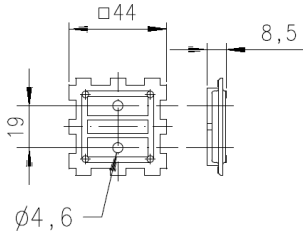

cover of flow sensors

Allowed position of the cold meter
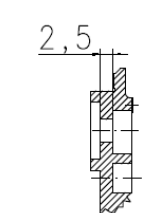
Electronic unit

Electronic unit: top view   side view
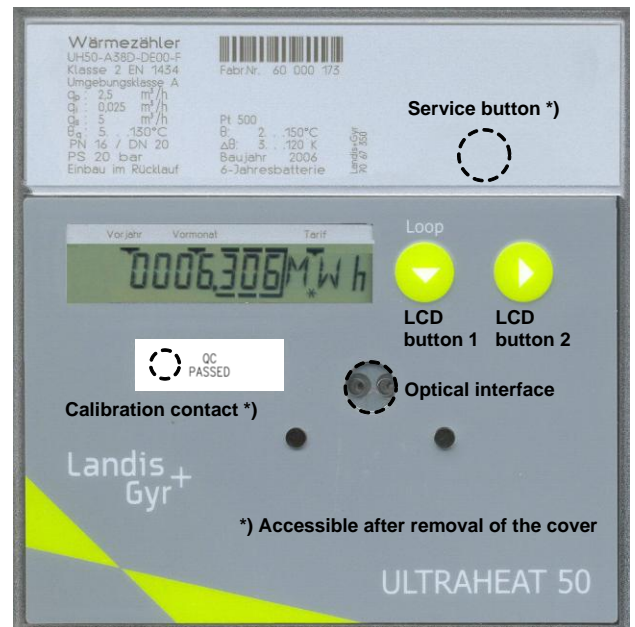

Adapter plate   cross-section

Operating elements

The service button and calibration contact are not accessible until the housing cover is removed.

The calibration contact is additionally protected by a security seal.

The optical interface permits data communication via a computer with the necessary service software.

- LCD button 1 ("Loop"); advances to the next loop
- LCD button 2; advances to the next line within a loop
- Service button, inside
- Calibration contact, inside (to be operated with a service tool – not included in scope of supply)

The service button and calibration contact are not accessible until the housing cover is removed.

The calibration contact is additionally protected by an security seal.

The optical interface permits data communication via a computer with the necessary service software.

Displays

The places after the decimal point of displayed values are indicated by a surrounding border.

Calibrated values can be recognized by the star symbol shown in addition to the value.

The displays of the meter are arranged on several levels (LOOPs). LCD button 2 advances the display of the user loop (LOOP 0) cyclically.

Note: Depending on how the unit is parameterized, the number of items displayed and the data shown may differ from this description. Certain button functions may also be disabled.

User loop ("LOOP 0")

`L.OOP    0`	Head of the loop
`F --------`	Error message with error code number (only in case of error)
`.. 1234567 k.W h`	Accumulated quantity of energy with tariff status
`T ' 1234567 k.W h`	Tariff register 1 (optional)
`1234567 .m³`	Accumulated volume
`8.8.8.8.8.8.8 k.W h`	Segment test

LCD button 1 is used to switch the display from the user loop to the selection of service loops (LOOP 1..n).

Service loop (selection)

`L.OOP    1`	Service loop 1
`L.OOP    2`	Service loop 2

...

| LOOP   n | Service loop n |

LCD button 1 advances the display to the next loop. After the last loop, the user loop (LOOP 0) appears again.

LCD button 2 displays the content of the selected service loop.

Within a loop, the LCD button 2 is used to advance to the next line of the display. After the last line of the display, the first display line appears again.

Service loop 1 ("LOOP 1")

Display	Description
LOOP 1	Head of the loop
1234 m/h	Current flowrate
90,4 kW	Current power
TV 91,6 ℃	Current flow/return temperature
TR 56,2 ℃	at 2s intervals
Bd 1234 h	Operating time
Pd 1234 h	Operating time with flowrate
Fd 123 h	Missing time
K 12345678	Property number, 8-digit
D 10,05,06	Date
SD 3105,--	Yearly set day (DD.MM)
1234567 kWh	Quantity of energy previous year on set day
1234567 m³	Volume for previous year on set day
FW1 5-00	Firmware version

Service loop 2 ("LOOP 2")

In service loop 2, the measuring period for maximum calculation is displayed.

Display	Description
LOOP 2	Head of the loop
MP 60 min	Measuring period for maximum calculation

Service loop 3 ("LOOP 3")

Service loop 3 shows the **monthly values**. LCD button 1 is used to select a month out of the previous months. The data for that month are then opened with LCD button 2. Each further press of LCD button 2 shows the next value for the selected month.

Display	Description
LOOP 3	Head of the loop
	...
0 101,06 M	Set day for December 2005
01 12,05 M	Set day for November 2005
	...

using LCD button 2: ⇩

Display	Description
1234567 kWh	Quantity of energy on the set day
T' 1234567 kWh	Tariff register 1 on the set day
1234567 m³	Volume on the set day
Ma 3899 m/h	Max. flowrate on the set day,
St 1312,05	at 2s intervals with date stamp
Ma 2889 kW	Max. power on the set day,
St 1 12,05	at 2s intervals with date stamp
MV 98,8 ℃	Max. temperatures on the set day,
St 08 12,05	at 2s intervals with date stamp for flow and return maximum

Display	Description
MR 87,7 ℃	
St 04 12,05	
Fd 123 h	Missing time count on the set day

After the last display, the previously selected set day is displayed again. Pressing LCD button 1 selects the next set day.

Notice: If the number of months to be read out is changed with the service software, this will have an impact on the number of retrievable months in the LCD.

Service loop 4 ("LOOP 4")

Service loop 4 shows the **unit parameters**. LCD button 2 calls the displays one after the other.

Display	Description
LOOP 4	Head of the loop
T2 0,000 m/h	Current tariff,
' 0,000 m/h	at 2s intervals with threshold value 1
FP 2,00 SEC	Measuring interval for flowrate
TP 30 SEC	Measuring interval for temperature
Modul 1 M3	Module 1: M-bus module
AP1 127	M-bus primary address 1
A 12345678	M-bus secondary address 8-digit
Modul 2-1 CE	Module 2: pulse module; chan. 1 = energy
Modul 2-2 CV	quantity, Channel 2 = volume, at 2s intervals
PO1 125,00 Wh/I	Significance for energy quantity pulses *)
PO2 0,0250 L/I	Significance for volume pulses *)
PO3 2mS	Pulse duration in ms *)
	*) for "fast pulses"

Previous year's values

The electronic unit stores the meter readings for quantity of energy, volume, the tariff register, missing time, and flowrate measuring time as well as the current maxima for flowrate, power, temperature difference, flow temperature, and return temperature with their date stamps on a yearly set day.

Monthly values

The electronic unit stores the meter readings for quantity of energy, volume, the tariff register, missing time, and flowrate measuring time as well as the monthly maxima for flowrate, power, temperature difference, flow temperature and return temperature with their date stamp for up to 60 months on the set day of each month.
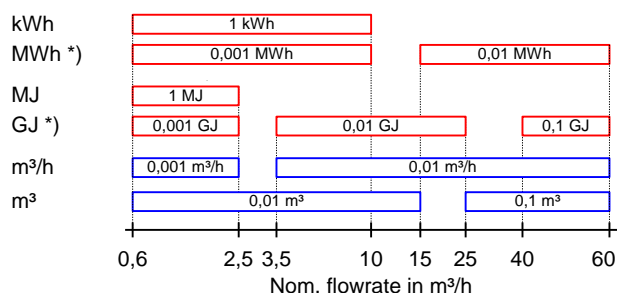
Note: The standard time used is Central European Time (CET). If daylight-saving time is activated, storage will be performed accordingly.

The monthly values can also be read out via the optical and the 20 mA interface.

Resolution of the display

kWh — 1 kWh
MWh *) — 0,001 MWh | 0,01 MWh
MJ — 1 MJ
GJ *) — 0,001 GJ | 0,01 GJ | 0,1 GJ
m³/h — 0,001 m³/h | 0,01 m³/h
m³ — 0,01 m³ | 0,1 m³

0,6   2,5 3,5   10   15   25   40   60
Nom. flowrate in m³/h

*) Places after decimal point "blinking", "static" or "suppressed"

The number of places after the decimal point of a value is based on the chosen measurement path and the chosen dimension.

Power supply

The *UH50* can be powered from a power supply module or with a battery.

The lifetime of battery depends on the type of battery and on the requirements (e.g. short timebase, analog module etc.).

Requirements (for measuring timebase Q = 4 s and measuring timebase T = 30 s)	6 years	11 years	16 years
Standard pulses M-bus read-out (max. each 15 min.), CL module	2x AA	C	D
M-bus fast read-out, fast pulses, analog module, radio module	D	--	--

Automatic power supply detection

The power supply unit detects whether a line voltage is applied. This signal is routed to the *UH50*. That enables the device to detect automatically whether it is being powered from a battery or power supply unit.

Power supply modules

24 V AC/DC   110 V AC, 230 V AC

Pollution degree   per EN 61010
                          (no or only dry, non-conductive soiling)
Ambient temperature   + 5 .. + 50°C
Storage temperature   - 20.. + 60°C
Back-up time during power failure
(power reserve)   > 20 minutes

24 V safety extra-low voltage

Voltage   12..36 V AC or 12..42 V DC
Frequency   50 / 60 Hz or DC
Galvanic isolation   1000 V DC
Power consumption   maximal 0.8 VA
Terminals   2 x 1.5 mm²
For connecting cable about, Ø 5.0..6.0 mm

110 V or 230 V alternating voltage

Voltage   85..121 V AC
   or   196..253 V AC
Type   Safety class II
Frequency   50 / 60 Hz
Line voltage   max. 10% of the nom.
fluctuations   voltage
Overvoltage category II
per EN60010   2500 V impulse voltage
Power consumption   maximal 0.8 VA
Relative humidity   less than 93 % for T < 50°C
Cable length   1.5 / 5 / 10 m
Fuse protection   6 A MCB

Interfaces of the electronic unit

The UH50 meters are equipped with an optical interface per EN 62056-21:2002 as standard. Moreover, up to two of the following communication modules can be used for remote reading (for restrictions pay attention):

- Pulse module (pulses for quantity of energy / volume / unit status / tariff register 1 / tariff register 2; isolated, bounce-free)
- CL module (passive 20 mA current loop per EN 62056-21:2002)
- M-bus module per EN 1434-3, fixed and extended, variable protocol (also for coupling with a suitable controller)
- M-bus module G4
- M-bus module G4-MI with 2 pulse inputs
- Analog module
- Radio module

These modules are have no effect on consumption metering and can therefore also be replaced at any time without violating the security seal.

Terminals

Multipolar terminals are used for connecting external cables to the modules.

Strip-back length: 5 mm
Connection capacity
- rigid or flexible, 0.2 – 2.5 mm²
- flexible with end ferrules, 0.25 - 1.5 mm²
- conductor sizes 26 - 14 AWG

Multiple-conductor connection (2 conductors of same cross-section)
- rigid or flexible, 0.2 – 0.75 mm²
- flexible with end ferrules without plastic sleeve, 0.25 – 0.34 mm²
- flexible with TWIN ferrules with plastic sleeve, 0.5 – 0.75 mm²

Recommended screwdriver: 0.6 x 3.5 mm
Tightening torque: 0.4 Nm

Permissible combinations of modules

AM = Analog module
MB; MB G4, MB MI = M-bus module
CL = CL module
RM = Radio module

|		AM (5)	Pulse module "standard"	Pulse module "fast *)"	MB	MB G4	CL	RM
Slot for module #1 can be equipped with …	AM	yes	yes	yes	yes (4)	yes	yes	yes
	Pulse module ** "standard"	yes	yes (3)	yes (2)	yes (4)	yes	yes	yes
	"fast"	no	no	no	no	no	no	no
	MB	yes	yes	yes	yes (4)	yes	yes (1)	yes
	MB G4	yes	yes	yes	yes	yes	yes (1)	yes
	MB MI	yes	yes	yes	yes	yes	yes (1)	yes
	CL	yes	yes	yes	yes (1)	yes (1)	no	yes
	RM	no	no	no	no	no	no	no

Restrictions:

*) only 1 module with fast pulses is possible;
only permissible on slot 2;
min. pulse duration :
- 2 ms, if pulse module 1 not fitted
- 5 ms, if pulse module 1 fitted

**) Subsequent mounting of a further pulse module in module slot 1 can result in changed output values for module 2!

(1)   For M-bus with fast read out, the CL read-out can take up to 40 s

(2)   Pulse length of the fast pulses min. 5 ms

(3)   The first and second channel can be parameterized individually

(4)   The secondary address for both modules can only be changed via module No. 1

(5)   The analog module is not possible in module slot 2, when the meter has a power supply module 110 V / 230 V.

Pulse module
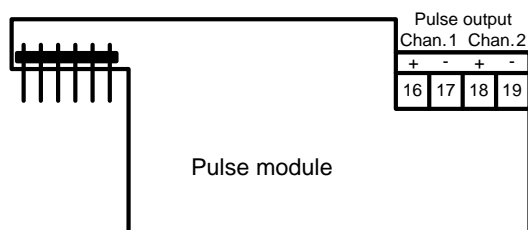
The pulse module permits the output of pulses that can be derived from the quantity of energy, the volume, tariff register 1 or tariff register 2. Two channels are available whose functions can be parameterized with the service software.

Output takes the form of standard pulses or "fast pulses". The pulse duration is identical for channel 1 and channel 2.

Note: If two pulse modules are plugged, please note the restrictions!

Parameter setting for standard pulses

	Output mode	Output value
Chan.1	CE (count energy)	Pulses for quantity of energy
	C2 (count tariff 2)	Pulses for tariff register 2
Channel 2	CV (count volume)	Pulses for volume
	CT (count tariff 1)	Pulses for tariff register 1
	RI (ready indication)	Pulses for the operating states "Ready / Fault"

Parameter setting for "fast pulses"

Channel 1	Channel 2
CE (count energy)	CV (count volume)
	- (no function)
CV (count volume)	CV (count volume)
	- (no function)
CE / CV *) (count energy / count volume)	CV (count volume)
	- (no function)

*) automatic output of the higher pulse rate

Labeling	pulse module
Display in LCD	CE, C2, CV, CT or RI
Type	open collector
Voltage	maximal 30 V =
Current	maximal 30 mA
Dielectric strength	500 V_{rms} against ground
Classification	OB (per EN 1434-2)
Voltage drop	approx. 1.3 V at 20 mA
Classification	OC (per EN 1434-2)
Voltage drop	approx. 0.3 V at 0.1 mA
Output connection (standard version):	16 + 17 – Channel 1 / 18 + 19 - Channel 2

A special version of the pulse module is available with an Opto-MOS output.
Advantages: low voltage drop and polarized (bipolar).

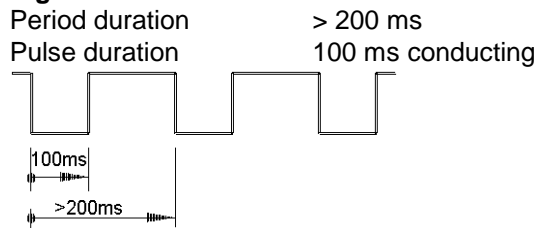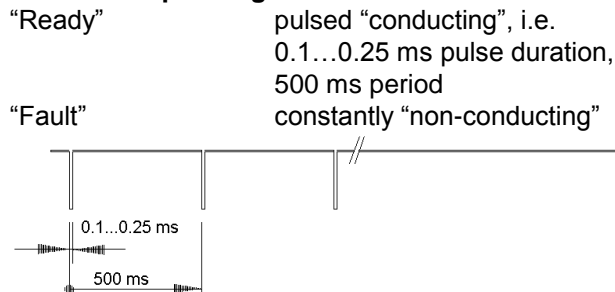## Standard pulses

Standard pulse significances
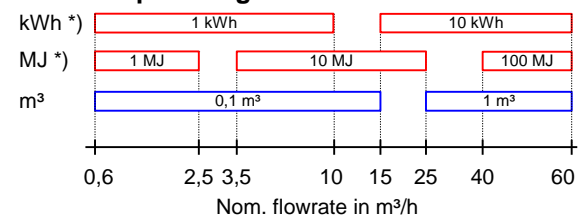
*) depending on the unit for heat display

Pulses for quantity of energy, volume, tariff register

Period duration   > 200 ms
Pulse duration   100 ms conducting

Pulses for operating states:

"Ready"   pulsed "conducting", i.e.
                 0.1…0.25 ms pulse duration,
                 500 ms period
"Fault"   constantly "non-conducting"

Fast pulses

Note: In battery operation, a D cell is required!
For applications, such actuating controllers or as flowrate transmitters, higher pulse rates are required. The parameters required for this (pulse significance, pulse duration), can be configured with the service software.
The maximum pulse frequency is 33 Hz.
The following can be set:

- Pulse type: "linear" or "scaled" pulses *)
- Pulse output: energy or volume
- Pulse duration, if only 1 pulse module is fitted:
     from 2 ms to 100 ms in steps of 1 ms;
  Pulse duration, if 2 pulse modules are fitted:
     von 5 ms to 100 ms in steps of 5 ms

The pulses can be received and evaluated with a suitable device. The settings must be made in accordance with the information on the data sheet of the controller.
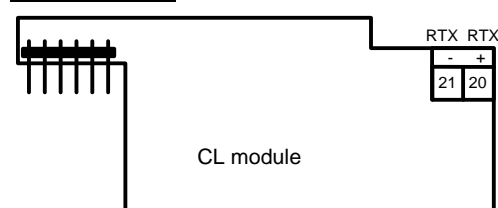
*) Linear pulses are output proportionally to the measured value. In the case of scaled pulses, the number of pulses at the upper and lower end of the range can be defined. In this case, the pulse receiving device can detect, for example, a connection error.
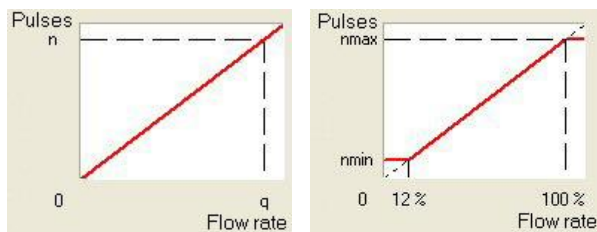
Linear pulses   Scaled pulses (example)

CL module

The CL module can be used to set up a point-to-point link enabling the meter to be read remotely, for example, at the front door.

Display in LCD   **CL** (current loop)
Standard   per EN 1434-3
Type   passive current loop
Baudrate   2400 Baud, fest
Isolation   galvanic
Polarity   yes
Voltage   30 V maximal
Current   30 mA maximum
Voltage drop   < 2 V at 20 mA
Literature   TKB 3415

Data scope
- Update on each read-out

Property number; unit number; firmware version; fault messages; missing time; operating time; quantity of energy; tariff register; volume; mounting location; adjustment values; unit configuration data; measuring range; M-bus addresses; system date and time; previous year's values with set day for quantity of energy, tariff and volume; maximum power; fault duration and 18 monthly values for quantity of energy, tariff register, volume, missing time, maximum power, maximum flowrate, measuring period with maxima for power, flowrate and temperatures; actual values for power, flowrate and temperatures.

M-bus module G4
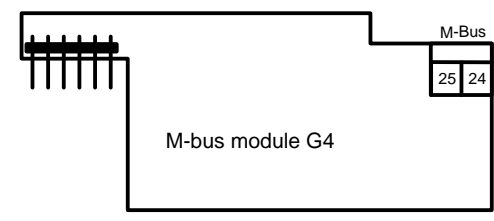
Display in LCD   MB, G4 alternating
Please read the appropriate instructions manual for more information (attached to the meter/module).

M-bus module MI
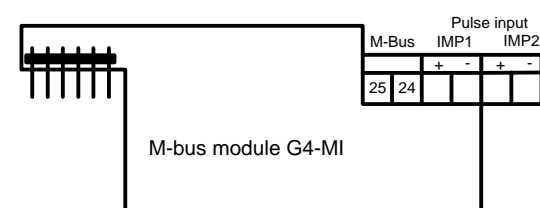
Display in LCD   MI, G4 alternating
Please read the appropriate instructions manual for more information (attached to the meter/module).

Analog module

Display on LCD   **AM** (analog module)

Please read the appropriate instructions manual for more information (attached to the meter/module).

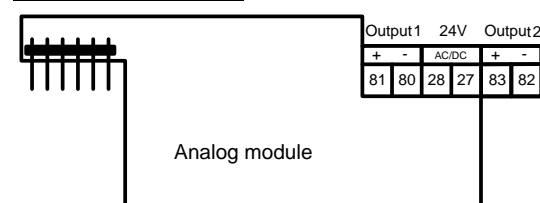The analog module converts a selectable measured value of the meter into an analog output signal (2 output signals, channel 1, channel 2).
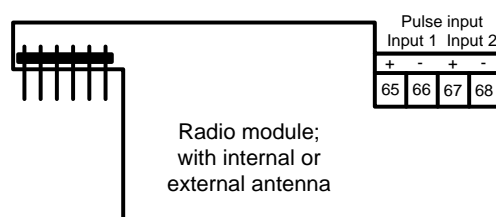The following measured values can be selected:
- power
- Flowrate
- Flow temperature
- Return temperature
- Temperature difference

The following can be selected as the output signal:
- 0..20 mA
- 4..20 mA
- 0..10 V

Radio module

Display on LCD   R**M** (radio module)
Please read the appropriate instructions manual for more information (attached to the meter/module)**.**

Technical data radio

Frequency	433 MHz
Range	up to 200 meters (with integrated antenna)
Read-out frequency	max. 1 read-out per day (average)

Technical data pulse counters

Pulse counters:	2 inputs for external pulses
Counter range:	0..99,999,999
Pulse significance:	0.001...999.99
Counter identifier:	8-digit
Min. pulse length:	50 ms
Max. pulse rate:	5 pulse/s when using both channels
Max. pulse rate:	10 pulse/s when using only one channel

The radio module reads the data either when data is requested or only once per day.
The meter must be functioning in normal mode.
The data are packed and output in various telegram types.

Tariff control (optional)
The following options are available for tariff control.
Note: The summation of the quantity of energy and volume in the standard registers is performed independently of the tariff situation!

Threshold value tariff (tariffs T2, 3, 4, 5, 6)
Tariff registers 1, 2 and 3 can be controlled via up to 3 threshold values.
Either the quantity of energy or the volume can be summated in the tariff registers.
The threshold values can be derived from the flowrate (tariff T2), the power (tariff T3), the return temperature (tariff T4), the flow temperature (tariff T5) or the temperature difference (tariff T6).

Supplied quantity of energy (tariff T7)
In tariff register 1, a quantity of energy is summated that is calculated from the flow temperature (instead of from the temperature difference).
Returned quantity of energy (tariff T8)
In tariff register 1, a quantity of energy is summated that is calculated from the return temperature (instead of from the temperature difference).
Heat/cold meter (tariff T9)
In tariff register 1, the measured quantity of cold; in tariff register 2, the measured quantity of energy is summated. In both cases a threshold can be defined via the flow temperature ("cold threshold", "heat threshold").
Temperature above "heat threshold" and temperature difference > +0.2 K --> quantity of heat is acquired
Temperature below "cold threshold" and temperature difference < -0.2 K --> quantity of cold is acquired
Tariff control via timer switch (tariff T10)
For tariff control, one switch-off time and one switch-on time per day can be defined. At the switch-on time, summation of the quantity of energy or volume is started in tariff register 1; at the switch-off time, it is ended.
Tariff control via M-bus (tariff T11)
In tariff registers 1, 2 and 3, either the quantity of energy or the volume can be summated. With the relevant M-bus command, one of the 3 tariffs can be activated or all tariffs can be deactivated.
Surcharge quantity tariff by means of return temperature (tariff T12)
The quantity of energy is summated depending on the return temperature in tariff registers 1 or 2.
The summated quantity of energy is calculated from the difference of the return temperature from the defined return temperature threshold (instead of from the temperature difference).
Above return threshold: T1 is summated
Below return threshold: T2 is summated
Display of the tariff situation on the LCD
The current tariff status is shown in the user loop together with the quantity of energy or the volume.
No tariff status is shown for tariffs T7 and T8.

for tariffs T2, T3, T4, T5, T6, T10, T11 and T12

`1234567 kWh`	no tariff register active
`1234567 kWh`	tariff register 1 active
`1234567 kWh`	tariff register 2 active
`1234567 kWh`	tariff register 3 active

for tariff T9 (cold/heat meter)

`1234567 kWh`	no tariff register active
`1234567 kWh`	tariff register 1 active
`1234567 kWh`	tariff register 2 active

The type of tariff and the associated parameters are displayed in service loop LOOP 4.

`T2      0,000  m/h`	for T2, T3, T4, T5, T6
`'       0,000  m/h`	at intervals of 2s with threshold value 1/2/3
`T7         0  ℃`	for T7
`T8         0  ℃`	for T8
`T9c       18  ℃`	for T9;
`T9h       45  ℃`	at intervals of 2s
`T10   -----`	for T10;
`01   00,00  0`	switching times at intervals of 2s

`02 12.00 1`

`T 11 -----` for T11
`T 12   50 ℃` for T12

The contents of the tariff registers are displayed in the user loop after the quantity of energy.

for tariffs T2, T3, T4, T5, T6, T10, T11 and T12

`T' 1234567 kWh` tariff register 1
`T'' 1234567 kWh` tariff register 2
`T''' 1234567 kWh` tariff register 3 (not for T12)

`IH 1234567 kIJh` for tariff T7
`RH 1234567 kIJh` for tariff T8
`HE 1234567 kWh`
`Co 1234567 kWh` for tariff T9

Error messages

The meter constantly performs self-diagnostics and can display various error messages.

Error code: Error / action to be taken:

F0	No flow; air in measuring unit / pipe, vent pipe
F1	Interruption of flow sensor
F2	Interruption of return sensor
F3	Electronic for temperature evaluation defective
F4	Battery empty; replace!
F5	Short-circuit flow sensor
F6	Short-circuit return sensor
F7	Fault in the internal memory
F8	F1, F2, F3, F5 or F6 pending for longer than 8 hours. No more measurements are performed.
F9	Error in the electronics

Message F8 has to be reset in parameter setting mode (manually or service software). All other error messages are cleared automatically once the error has been corrected.

Log functions

Logbook

In the internal logbook, metrologically relevant events (errors, states, actions) are stored in chronological order with their time of occurrence. The events acquired are predefined. The data of the logbook cannot be deleted.

Each event is stored in a separate 4-level shift register; the overflows are transferred to a 25-level circulating buffer. Therefore, at least the last 4 times can be traced for each event.

In a monthly register, the error states are stored for the current month and for the past 18 months (without time stamp).

Ser No.	Type	Description
1	Error occurs or back-to normal	F0 = Air in measuring tube
2		F1 = Interruption flow sensor
3		F2 = Interruption return sensor
4		F3 = Error temperature electronics
5		F5 = Short-circuit flow sensor
6		F6 = Short-circuit return sensor
7		F8 = Sensor error > 8 hours
8		F9 = ASIC error
9	State occurs or ends	Above max. temperature in the volume measuring unit
10		Below min. temperature in the volume measuring
11		Max. flowrate qs was exceeded
12		Soiling prewarning
13		Line voltage off
14		CRC error occurred
15	Event occurs	Adjustment values parameterized
16		F7-(EEPROM) pre-warning
17		Reset made
18		Date / time parameterized
19		Yearly set day parameterized
20		Monthly set day parameterized
21		Master reset performed
22		All times deleted
23		Missing time deleted
24		Maxima deleted

Read-out is performed via the optical interface with the service software.

__Data logger__ (optional)

The data logger permits the archiving of data that the user can select from a predefined set of values. The data logger contains four archives whose 8 channels can be assigned.

The data can be assigned to any of the channels.

Archive	Timebase	Storage depth	Averaging time for maximum
Hourly archive	1 hour	45 days	1 hour *)
Daily archive	1 day	65 days	1 hours
Monthly archive	1 month	15 months	1 hours
Yearly archive	1 year	15 years	1 hours / 24 hours

*) For a shorter measuring period than 1 hour, the largest value from the maximum values calculated within one hour applies.

The data are recorded with the value and time stamp.

Parameterizing and read-out is performed via the optical interface with the service software .

Note: Data transmission is in a manufacturer-specific format.

Value set for data to be recorded	
Meter readings at the end of the period for...	Quantity of energy Tariff register 1, 2, 3 Volume Operating duration *) Fault duration *) Pulse input 1 Pulse input 2 *) depending on parameter setting: hours or days
Instantaneous values at the end of the period for...	Power Flowrate Flow temperature Return temperature Temperature difference Error display
Maximum for...	Power Flowrate Flow temperature Return temperature Temperature difference

Order codes (type number key)

Mandatory data for the order designation (label plate data)	Mandatory data for Hardware-dependent features

Type code: U H 5 0 - X Y Y X - Y Y X X - Y   X X - Y X Y X - Y Y X

1. Meter type and mounting location
2. Nominal flowrate
3. Control cable/type/electronic unit
4. Country / where used
5. Manufacturer's label
6. Sensor type and connection method

7. Sensor design
8. Power supply
9. Communication 1 / module 1
10. Communication 2 / module 2
11. Data logger
12. Calibration/conformity
13. Energy unit

Order codes for label plate data	
1. Type of meter and mounting location	**Code**
Heat meter for two wire temperature measurement and for mounting in return	A
Heat meter for two wire temperature measurement and for mounting in flow	B
Combined heat/cold meter for two wire temperature measurement and for mounting in return (only in connection with temperature sensor Pt500)	C
Flow sensor	D
Cold meter for two wire temperature measurement and for mounting in return (only in connection with temperature sensor Pt500)	G
Heat meter for four wire temperature measurement and for mounting in return	L
Heat meter for four wire temperature measurement and for mounting in flow	M
Combined heat/cold meter for four wire temperature measurement and for mounting in return (only in connection with temperature sensor Pt500)	N
Cold meter for four wire temperature measurement and for mounting in return (only in connection with temperature sensor Pt500)	T
2. Nominal flowrate	**Code**
Nominal flowrate 0.6 m³/h, length 110mm, nominal pressure PN16, connection G ¾ B	05
Nominal flowrate 0.6 m³/h, length 110mm, nominal pressure PN25, connection G ¾ B	06
Nominal flowrate 0.6 m³/h, length 190mm, nominal pressure PN16, connection G 1 B	07
Nominal flowrate 0.6 m³/h, length 190mm, nominal pressure PN25, connection flanged DN 20	08
Nominal flowrate 0.6 m³/h, length 190mm, nominal pressure PN25, connection G 1 B	09
Nominal flowrate 1.5 m³/h, length 110mm, nominal pressure PN16, connection G ¾ B	21
Nominal flowrate 1.5 m³/h, length 110mm, nominal pressure PN25, connection G ¾ B	22
Nominal flowrate 1.5 m³/h, length 190mm, nominal pressure PN16, connection G 1 B	23
Nominal flowrate 1.5 m³/h, length 190mm, nominal pressure PN25, connection flanged DN 20	24
Nominal flowrate 1.5 m³/h, length 190mm, nominal pressure PN25, connection G 1 B	25

Nominal flowrate 1.5 m³/h, length 130mm, nominal pressure PN16, connection G 1	26
Nominal flowrate 1.5 m³/h, length 130mm, nominal pressure PN25, connection G 1	27
Nominal flowrate 2.5 m³/h, length 130mm, nominal pressure PN16, connection G 1 B	36
Nominal flowrate 2.5 m³/h, length 130mm, nominal pressure PN25, connection G 1 B	37
Nominal flowrate 2.5 m³/h, length 190mm, nominal pressure PN16, connection G 1 B	38
Nominal flowrate 2.5 m³/h, length 190mm, nominal pressure PN25, connection flanged DN 20	39
Nominal flowrate 2.5 m³/h, length 190mm, nominal pressure PN25, connection G 1 B	40
Nominal flowrate 3.5 m³/h, length 260mm, nominal pressure PN16, connection G 1¼ B	45
Nominal flowrate 3.5 m³/h, length 260mm, nominal pressure PN25, connection flanged DN 25	46
Nominal flowrate 3.5 m³/h, length 260mm, nominal pressure PN25, connection G 1¼ B	47
Nominal flowrate 6.0 m³/h, length 260mm, nominal pressure PN16, connection G 1¼ B	50
Nominal flowrate 6.0 m³/h, length 260mm, nominal pressure PN25, connection flanged DN 25	52
Nominal flowrate 6,0 m³/h, length 150mm, nominal pressure PN16, connection G 1 ¼ B	55
Nominal flowrate 10 m³/h, length 300mm, nominal pressure PN16, connection G 2 B	60
Nominal flowrate 10 m³/h, length 300mm, nominal pressure PN25, connection flanged DN 40	61
Nominal flowrate 10 m³/h, length 200mm, nominal pressure PN16, connection G 2 B	63
Nominal flowrate 15 m³/h, length 270mm, nominal pressure PN25, connection flanged DN 50	65
Nominal flowrate 15 m³/h, length 200mm, nominal pressure PN25, connection flanged DN 50	69
Nominal flowrate 25 m³/h, length 300mm, nominal pressure PN25, connection flanged DN 65	70
Nominal flowrate 40 m³/h, length 300mm, nominal pressure PN25, connection flanged DN 80	74
Nominal flowrate 60 m³/h, length 360mm, nominal pressure PN16, connection flanged DN 100	82
Nominal flowrate 60 m³/h, length 360mm, nominal pressure PN25, connection flanged DN 100	83
3. Control cable / type / electronic unit	**Code**
Compact version (until 90°C, with 0.3m control cable)	A

Split version with 1.5m control cable	C
Split version with 3.0m control cable	D
Split version with 5.0m control cable	E
Compact version (until 90°C, with 0.3m control cable),control cable removable	M
Split version with 1.5m control cable, control cable removable	P
Split version with 3.0m control cable, control cable removable	Q
Split version with 5.0m control cable, control cable removable	R

4. Country / where used	Code
Dial plate for Armenia (Armenian)	AM
Dial plate for Austria (German)	AT
Dial plate for Bosnia-Herzegovina (Croatian)	BA
Dial plate for Belgium (French/Flemish)	BE
Dial plate for Bulgaria (Bulgarian)	BG
Dial plate for Belarus (Russian)	BY
Dial plate for Switzerland (German/French)	CH
Dial plate for China (Chinese)	CN
Dial plate for Serbia and Montenegro (Serbian)	CS
Dial plate for Czech Republic (Czech)	CZ
Dial plate for Germany (German)	DE
Dial plate for Denmark (Danish)	DK
Dial plate English neutral	EN
Dial plate for Spain (Spanish)	ES
Dial plate for Finland (Finnish)	FI
Dial plate for Great Britain (English)	GB
Dial plate for Greece (English)	GR
Dial plate for Croatia (Croatian)	HR
Dial plate for Hungary (Hungarian)	HU
Dial plate for Iceland (Icelandic)	IS
Dial plate for Italy (Italian)	IT
Dial plate for Japan (Japanese)	JP
Dial plate for Kazakhstan (Russian)	KZ
Dial plate for Lithuania (Lithuanian)	LT
Dial plate for Macedonia (Macedonian)	MK
Dial plate for Mongolia (Mongolian)	MN
Dial plate for The Netherlands (Dutch)	NL
Dial plate for Poland (Polish)	PL
Dial plate for Romania (Romanian)	RO
Dial plate for Russia (Russian)	RU
Dial plate for Sweden (Swedish)	SE
Dial plate for Slovak Repuplic (Slovakian)	SK
Dial plate for Southern Tyrol	I2
Dial plate for Ukraine (Ukrainian)	UA
Dial plate for Uzbekistan (Russian)	UZ

5. Manufacturer's label	Code
Logo Landis+Gyr	00
other labels on request	xx

6. Sensor type and method of connection	Code
Flow sensor (without temperature sensors)	0
Sensor Pt100, removable, not mounted in the tube	A
Sensor Pt100, removable, mounted in the tube	B
Sensor Pt100, removable, mounting in the tube as an option	C
Sensor Pt100, removable, mounted in the tube within a pocket	D
Sensor Pt500, removable, not mounted in the tube	E
Sensor Pt500, removable, mounted in the tube	F
Sensor Pt500, removable, mounting in the tube as an option	G
Sensor Pt500, removable, mounted in the tube within a pocket	H
Sensor Pt100, not removable, not mounted in the tube	N
Sensor Pt100, not removable, mounted in the tube	P
Sensor Pt100, not removable, mounting in the tube as an option	R

Sensor Pt100, not removable, mounted in the tube within a pocket	S

Hardware-dependent features	

7. Sensor type	Code
Without temperature sensors	00
Type DS, 25 bar/150°C/ M10x1 / length 27,5mm, cable length 1,5m	0B
Type DS, 25 bar/150°C/ M10x1 / length 27,5mm, cable length 2,5m	0C
Type DS, 25 bar/150°C/ M10x1 / length 38mm, cable length 1,5m (only Pt500)	0D
Type DS, 25 bar/150°C/ M10x1 / length 38mm, cable length 2,5m (only Pt500)	0E
Type PS, 16 bar/150°C/ Ø5,2x45mm, cable length 1,5m	0H
Type PS, 16 bar/150°C/ Ø5,2x45mm, cable length 5m	0J
Type PL, 25 bar/180°C/ Ø6x100mm, cable length 2m	0M
Type PL, 25 bar/180°C/ Ø6x100mm, cable length 5m (only Pt500)	0N
Type PL, 25 bar/180°C/ Ø6x150mm, cable length 2m	0P
Type PL, 25 bar/180°C/ Ø6x150mm, cable length 5m (only Pt500)	0Q

8. Power supply	Code
Without power supply	0
Standard battery for 6 years	A
Battery for 6 years for all applications	B
Battery for 11 years (C cell)	C
Battery for 11 years	E
Battery for 16 years (d cell)	F
Battery without printing of the year	G
Power supply 24V AC/DC with plug	M
Power supply 230V AC with 1.5m cable	N
Power supply 230V AC with 5m cable	P
Power supply 230V AC with 10m cable	Q
Power supply 110V AC with 1.5m cable	R
Power supply 110V AC with 5m cable	S
Power supply 110V AC with 10m cable	T

9. Communication module 1	Code
No module in slot1	0
Analog module in slot1	A
M-Bus module G4 in slot1	B
CL-module in slot1	C
M-bus 30s module in slot1	D
M-bus module G4-MI with 2 pulse inputs	N
Pulse module with OptoMOS in slot1	L
Pulse module in slot1	P

10. Communication module 2	Code
No module in slot2	0
Analog module in slot2	A
M-Bus module G4 in slot2	B
CL-module in slot2	C
M-bus 30s module in slot2	D
Pulse module with OptoMOS in slot2	L
Pulse module in slot2	P
Radio module in slot2	R
Radio module with external antenna in slot2	X

11. Data logger	Code
Without data logger	0
Data logger with 8 channels	8

12. Calibration / conformity	Code
certified acc. to national regulations	CL
compliant to MID class 2	M2
compliant to MID class 3	M3
compliant with CEN 1434, class 2	T2
compliant with CEN 1434, class 3	T3
compliant acc. to national regulations	TL

13. Energy unit	Code
Display: kWh (until qp 10)	A

Display: MWh with 3 decimal places (as of qp 15 with 2 decimal places)	B
Display: MJ (until qp 3)	C
Display: GJ with 3 decimal places (as of qp 3.5 with 2 decimal places)	D
Display: kWh (until qp 10), flashing	G
Display: MWh with 3 decimal places (as of qp 15 with 2 decimal places), flashinh	H
Display: GJ with 3 decimal places (as of qp 6 with 2 decimal places), flashing	K
Display: m³ (for the flow meter) with 2 decimal places (as of qp 40 with 1 decimal place)	V

Further features	
Measurement dynamics	**Code**
Dynamic range 1:100	C
other ranges on request	

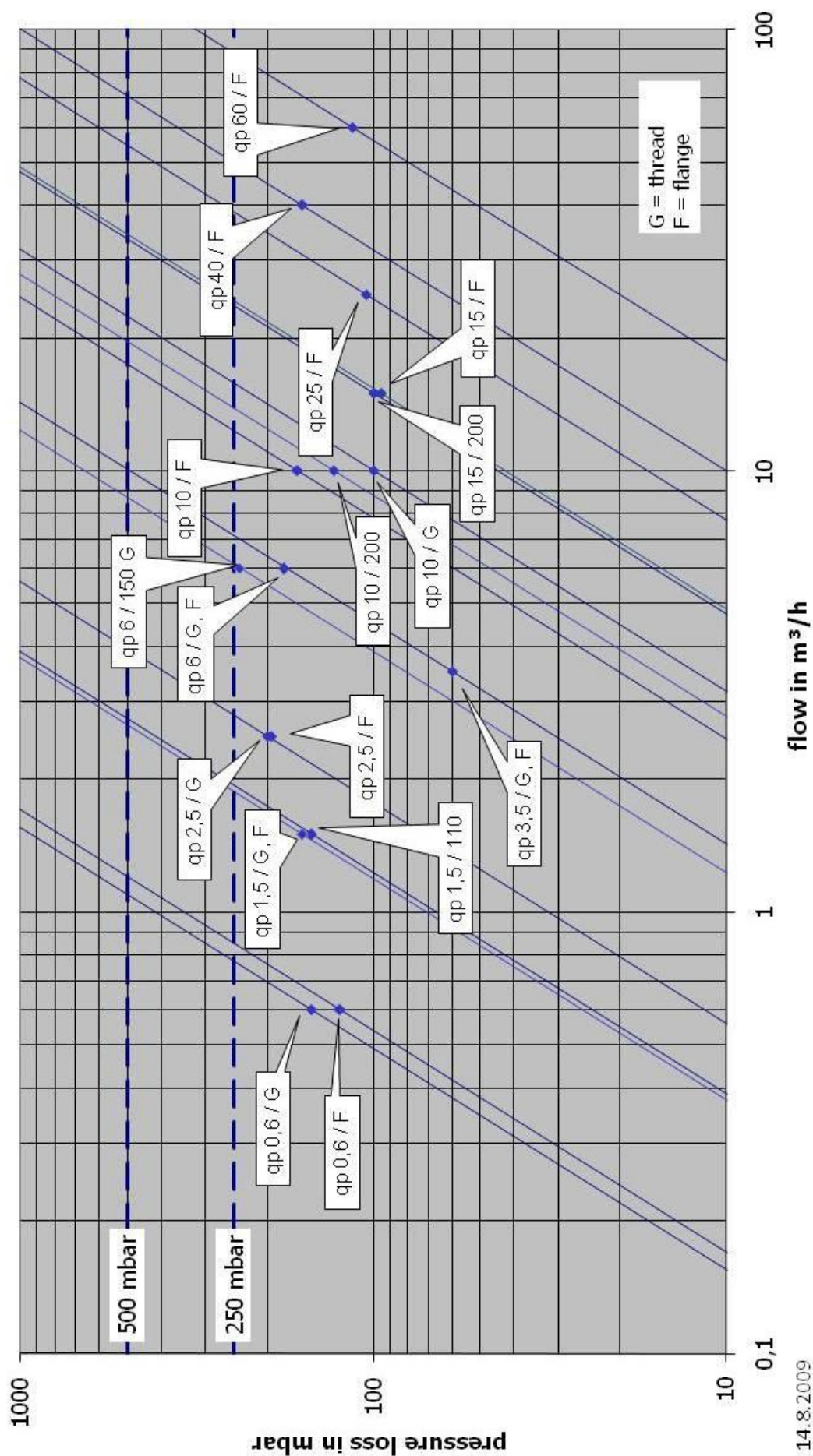| Modules as accessories	
Power supply modules	**Code**
Power supply 110V AC with 10m cable	WZU-AC110-100
Power supply 110V AC with 1.5m cable	WZU-AC110-15
Power supply 110V AC with 5m cable	WZU-AC110-50
Power supply 230V AC with 10m cable	WZU-AC230-100
Power supply 230V AC with 1.5m cable	WZU-AC230-15
Power supply 230V AC with 5m cable	WZU-AC230-50
Power supply 24V AC/DC with plug	WZU-ACDC24-00
Communication modules	**Code**
Analog module	WZU-AM
CL-Module	WZU-CL
M-Bus module acc. to DIN 1434-3 (G2-generation 2 – recommended until meter FW 5.14)	WZU-MB
M-bus module (G2) with 30s minimum reading cycle	WZU-MB-30
M-bus module (G2) with guaranteed data set	WZU-MB-GR
M-Bus module G4 acc. to EN 13757 and DIN 1434-3 (G4 - Generation 4 - FW 5.15 and higher)	WZU-MB-G4
M-Bus module G4 acc. to EN 13757 and DIN 1434-3 (G4 - Generation 4 - FW 5.15 and higher) with 2 pulse inputs	WZU-MI
Pulse module	WZU-P2
Pulse module with OptoMOS	WZU-P2L
GSM Module with 2 pulse inputs, with battery; SMS support	WZU-GM
GPRS module with ext. antenna (magnetic attachment) and UH50 power pack 110..230V / cable 5m; with interface for up to 8 M-Bus meter to be read over GPRS; amongst others Email support	WZU-GPRS
Radio module	WZU-RM
Radio module with external antenna	WZU-RM-EXT

Notes

- All regulations on the use of meters must be observed.
- Cavitation in the system must be avoided.
- Meters up to DN25 may only be installed with directly immersed sensors according to German calibration law!
- Install the unit in such a way that no water can enter the electronic unit during operation.
- User seals may only be removed by authorized persons for service purposes and must be replaced afterwards.
- The unit is supplied with Installation and Service Instructions and with Operating Instructions.
- No later than 30 seconds after installation, the meter detects the plugged modules automatically and is ready for communication or pulse output.
- The type of modules plugged can be displayed in the service loop depending on how the display is parameterized.
- For fast pulses, the parameters must be set accordingly with the service software.
- Up-to-date versions of all instructions can be found in the Internet at **www.landisgyr.com**

Landis+Gyr GmbH
Humboldtstr. 64
D-90459 Nuremberg
Germany

pressure loss

flow in m³/h

pressure loss in mbar

G = thread
F = flange

qp 60 / F
qp 40 / F
qp 25 / F
qp 15 / F
qp 15 / 200
qp 10 / F
qp 10 / 200
qp 10 / G
qp 6 / 150 G
qp 6 / G, F
qp 2,5 / G
qp 2,5 / F
qp 1,5 / G, F
qp 1,5 / 110
qp 3,5 / G, F
qp 0,6 / G
qp 0,6 / F

500 mbar
250 mbar

14.8.2009