

Configuration Instructions UH 106-101c

Safety information:

- ☞ 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 calibration 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 heat meter is used for heat 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

Electronic unit

Storage temperature - 20 to 60°C
Max. height 2000 m above MSL
Ambient temperature 5 to 55°C
Ambient humidity < 93 % rel.
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

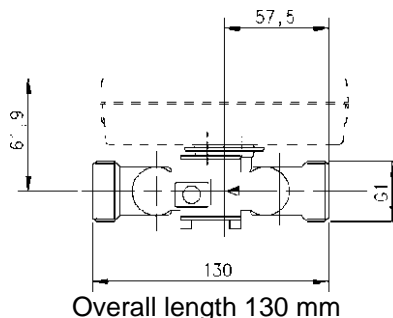
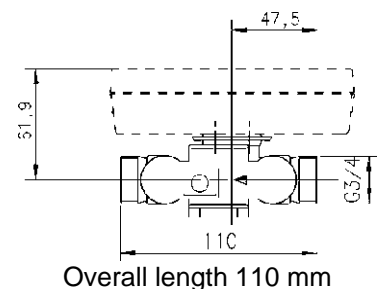
Type Pt500 or Pt100 per EN 60751
Temperature range 0...150°C (< 45 mm overall length)
 0...180°C (> 100 mm overall length)

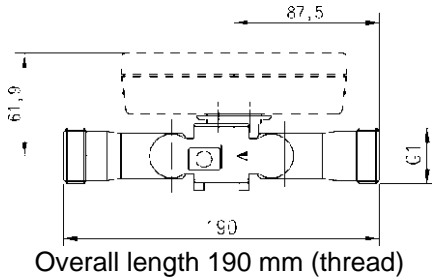
All volume measuring units

Mounting location return of flow
Mounting orientation any
Settling section none
Metrological class 1:100
Temperature range 10 to 130°C
Maximum temperature 150°C for 2000 h
Maximum overload 2.8 x q_p
Nominal pressure **PN16, PN25**

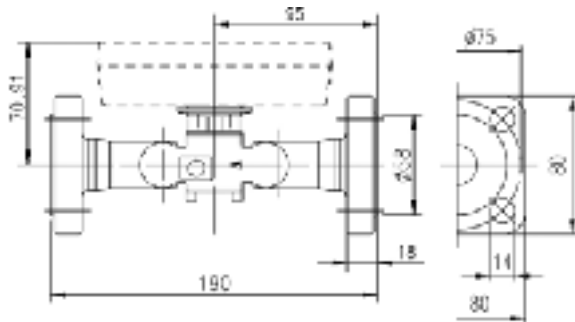
Nominal flowrate q_p	Overall length	Maximum flowrate q_s	Minimum flowrate q_i	Response threshold (variable)	Pressure lost at q_p	Kv flowrate at Δp 1 bar	Kv flowrate at Δp 100 mbar	Weight thread	Weight flange
m ³ /h	mm	m ³ /h	l/h	l/h	mbar	m ³ /h	m ³ /h	kg	kg
0.6	110	1.2	6	2.4	150	1.5	0.5	1	
0.6	190	1.2	6	2.4	150	1.5	0.5	1.5	
0.6	DN20	1.2	6	2.4	125	1.7	0.5		3
1.5	110	3	15	6	150	3.9	1.2	1	
1.5	130	3	15	6	160	3.8	1.2	1.5	
1.5	190	3	15	6	160	3.8	1.2	1.5	
1.5	DN20	3	15	6	160	3.8	1.2		3
2.5	130	5	25	10	200	5.6	1.8	1.5	
2.5	190	5	25	10	200	5.6	1.8	1.5	
2.5	DN20	5	25	10	195	5.7	1.8		3
3.5	260	7	35	14	65	13.7	4.3	3	5
6	260	12	60	24	150	15.5	4.9	3	5
10	300	20	100	40	100	31.6	10	4	
10	DN40	20	100	40	165	24.6	7.8		7
15	270	30	150	60	100	47.4	15		8
25	300	50	250	100	105	77.2	24.4		11
40	300	80	400	160	160	100	31.6		13
60	360	120	600	240	115	176.9	56		22

Small heat meters





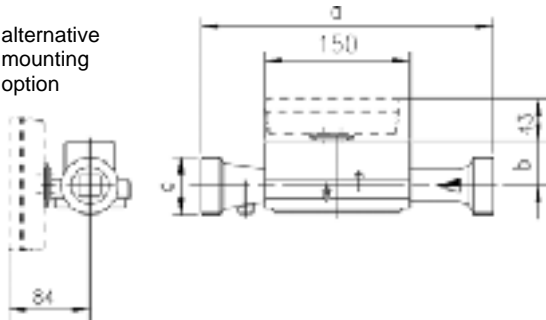
Overall length 190 mm (thread)



Overall length 190 mm (flange)

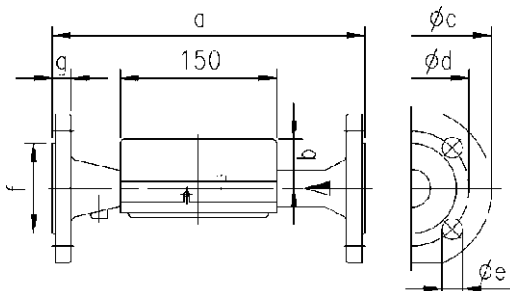
Large heat meters with threaded joint

alternative mounting option



Order no.	qp m ³ /h	PN bar	a	b	c
UH50x 45	3.5	16	260	51	G 1 1/4 B
UH50x 47	3.5	25	260	51	G 1 1/4 B
UH50x 50	6	16	260	51	G 1 1/4 B
UH50x 60	10	16	300	48	G 2 B

Large heat meters with flange joint



Order no.	qp m ³ /h	PN bar	DN	a	b	Øc	Ød	Øe	No. of holes	f	g
UH50x 46	3.5	25	25	260	51	115	85	14	4	68	18
UH50x 52	6	25	25	260	51	115	85	14	4	68	18
UH50x 61	10	25	40	300	48	150	110	18	4	88	18
UH50x 65	15	25	50	270	46	165	125	18	4	102	20
UH50x 70	25	25	65	300	52	185	145	18	8	122	22
UH50x 74	40	25	80	300	56	200	160	18	8	138	24
UH50x 82	60	16	100	360	68	235	180	18	8	158	24
UH50x 83	60	25	100	360	68	235	190	22	8	158	24

Installation

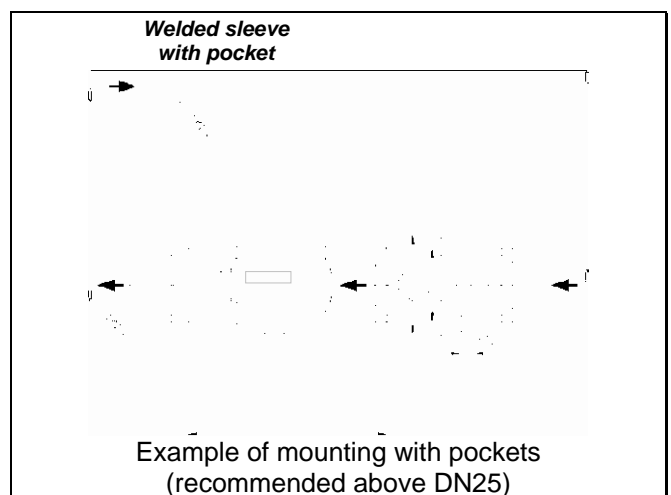
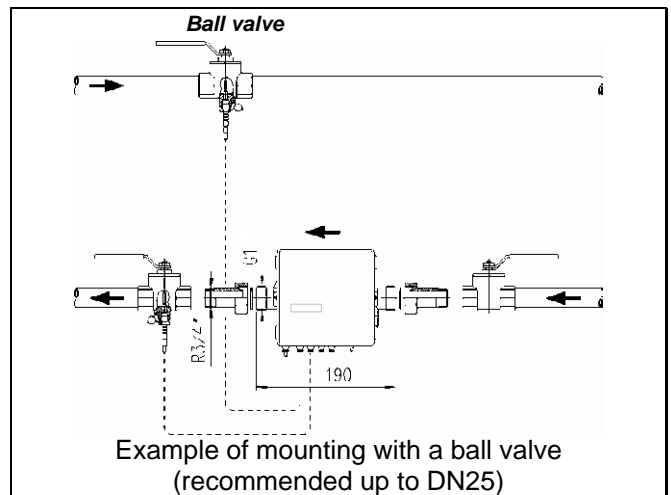
Based on the dimension drawings, choose a mounting location with sufficient clearance. Mount the volume measuring unit between two shut-off valves in accordance with the arrow on the volume measuring unit for the direction of flow.

No inlet or outlet sections are necessary. However, if the heat meter is installed in the shared return of two heating systems, e.g. heating and hot water, the mounting location must be a sufficient distance from the T element that forms the junction (**min. 10 × 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 heat 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.



For use as a cold meter:

- Only mount **in the return**
- Choose the split version because of water condensation

Operating elements



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

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

The calibration button is additionally protected by an adhesive label.

The optical interface permits data communication via a computer with the necessary read-out software, e.g. PappaWin.

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 heat 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”)

LOOP 0	Head of the loop
1234567 kWh	Accumulated quantity of heat with tariff status
T 1234567 kWh	Tariff register 1 (optional)
1234567 m³	Accumulated volume
8888888 kWh	Segment test
F -----	Error message with error code number

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)

LOOP 1	Service loop 1
LOOP 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”)

LOOP 1	Head of the loop
1234 m³	Current flowrate
5000 kW	Current heat power
91.56 °C	Current flow/return temperature
Opd 1234 h	Operating time
Pod 1234 h	Operating time with flowrate
Fd 123 h	Missing time
K 12345678	Property number, 8-digit
D 100506	Date
Sd 3105--	Yearly set day (DD.MM)
1234567 kWh	Quantity of heat previous year on set day
1234567 m³	Volume for previous year on set day
Fw 1.5.00	Firmware version

Service loop 2 (“LOOP 2”)

In service loop 2, the **maxima** are displayed. LCD button 2 calls the displays one after the other.

LOOP 2	Head of the loop
Ma 3059 m³	Max. flowrate, at 2s intervals with date stamp
Sd 131205	
Ma 2000 kW	Max. power, at 2s intervals with date stamp
Sd 111205	
Ma 98.87 °C	Max. temperatures, at 2s intervals with date stamp
Sd 081205	for flow and return maximum
Sd 041205	
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 18 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.

L.OOP 3	Head of the loop
00005 M	Set day for December 2005
01205 M	Set day for November 2005
...	...
00604 M	Set day for July 2004

using LCD button 2: ↓

1234567 kWh	Quantity of heat on the set day
T 1234567 kWh	Tariff register 1 on the set day
1234567 m³	Volume on the set day
Max 3899 m/h	Max. flowrate on the set day, at 2s intervals with date stamp
Max 2889 kW	Max. heat power on the set day, at 2s intervals with date stamp
Max 98 87 °C	Max. temperatures on the set day, at 2s intervals with date stamp for flow and return maximum
Max 041205	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.

Service loop 4 (“LOOP 4”)

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

L.OOP 4	Head of the loop
T2 0000 m/h	Current tariff, at 2s intervals with threshold value 1
FP 200 SEC	Measuring interval for flowrate
TP 30 SEC	Measuring interval for temperature
Modul 1 M-B	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 = heat quantity
Modul 2-2 CV	Channel 2 = volume, at 2s intervals
PO1 12500 kWh	Significance for heat quantity pulses *)
PO2 00250 L/h	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 heat, 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

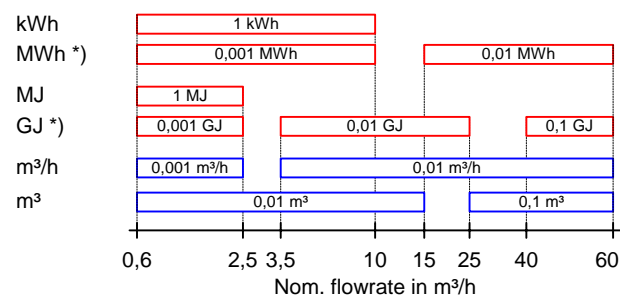
The electronic unit stores the meter readings for quantity of heat, volume, the tariff register, missing time, and flowrate measuring time as well as the monthly maxima for flowrate, power, temperature difference, flow temperature and return temperature

with their date stamp for 18 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



*) 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 type of battery used for battery operation depends on the requirements.

Requirements (for measuring timebase Q = 4 s and measuring timebase T = 30 s)	6 years	11 years
No M-bus fast read-out, without controller function	2x AA	D
M-bus fast read-out or fast pulses or analog module or 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

> 20 minutes

(power reserve)

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 mm ²
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 fluctuations	max. 10% of the nom. voltage
Overvoltage category per EN60010	II 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 heat 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, see Page 5):

- Pulse module (pulses for quantity of heat / 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 heating controller)
- Analog module
- Radio module
- Multi-module (external)

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

Terminals

2-pole and 4-pole 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

		Slot for module #2 is equipped with...						
		AM	Pulse module		MB	CL	RM	
			“standard”	“fast”*)				
Slot for module #1 can be equipped with ...	AM	yes	yes	yes	yes (4)	yes	yes	
	Pulse module **)	“standard”	yes (3)	yes (2)	yes (4)	yes	yes	yes
		“fast”	no	no	no	no	no	no
	MB	yes	yes	yes	yes (4)	yes (1)	yes	
	CL	yes	yes	yes	yes (1)	no	yes	
RM	no	no	no	no	no	no		

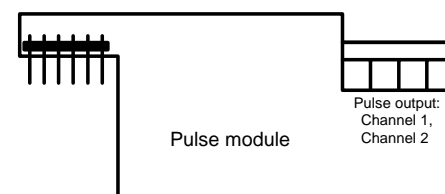
Restrictions:

- *) 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 controller coupling, 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

Pulse module



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

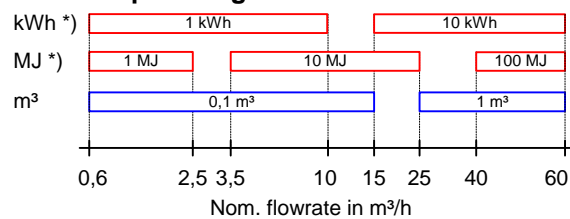
Labeling	pulse module
Type	open collector
Voltage	maximal 30 V =
Current	maximal 30 mA
Dielectric strength	500 V _{rms} against ground
Classification	OB (per EN 1434-2)
Voltage drop	approx. 1.3 V at 20 mA
Classification	OC (per EN 1434-2)
Voltage drop	approx. 0.3 V at 0.1 mA
Output connection (standard version):	

A special version of the pulse module is available with an Opto-MOS output.

Advantages: low voltage drop and polarized (bipolar).

Standard pulses

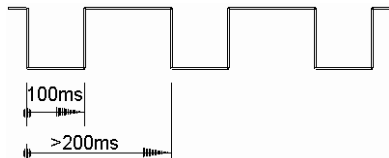
Standard pulse significances



*) depending on the unit for heat display

Pulses for quantity of heat, volume, tariff register

Period duration > 200 ms
Pulse duration 100 ms conducting

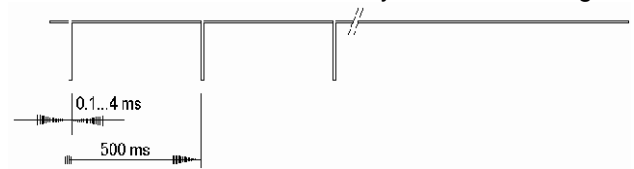


Pulses for operating states:

"Ready" pulsed "conducting", i.e.
100 ... 200 μs 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 *PappaWin* software.

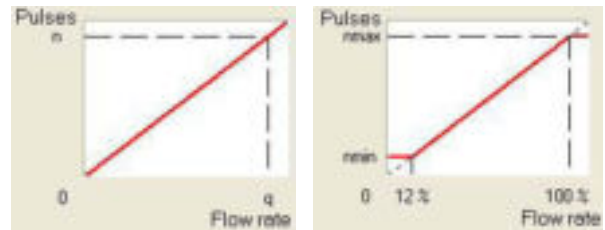
The maximum pulse frequency is 33 Hz.

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.

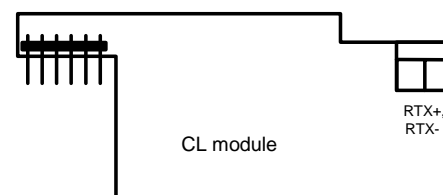
*) Linear pulses are output proportionally to the measured value. In the case of scaled pulses, the number of pulses at the upper and lower end of the range can be defined. In this case, the pulse receiving device can detect, for example, a connection error.



Linear pulses

Scaled pulses (example)

CL module



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

Display in LCD

Standard

Type

Baudrate

Isolation

Polarity

Voltage

Current

Voltage drop

Literature

CL (current loop)

per EN 1434-3

passive current loop

2400 Baud, fest

galvanic

yes

30 V maximal

30 mA maximum

< 2 V at 20 mA

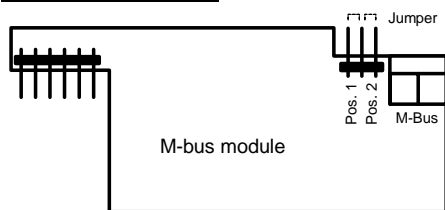
TKB 3415

Data scope

- Update on each read-out

Property number; unit number; firmware version; fault messages; missing time; operating time; quantity of heat; 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 heat, tariff and volume; maximum power; fault duration and 18 monthly values for quantity of heat, 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



With the M-bus module, it is possible to read several heat meters from a central station.

The data frame can be defined with a jumper.

Jumper in pos. 1 "fixed frame"
Jumper in pos. 2 "guaranteed frame"
Jumper in "center" "variable frame"

Note: If two M-bus modules are plugged, note the restrictions on Page 5!

Display in LCD	MB (meter bus)
Standard	per EN 1434-3
Isolation	galvanic
Connection	with galvanic isolation
Voltage	50 V maximal
Current consump.	1 M-bus load (1.5 mA)
Addressing	primary or secondary
Transmission rate	300/1200/ 2400 /4800 Baud
Literature	TKB 3417

Read-out frequency any, also with battery

Data scope with fixed data frame:

- Update after every 15 minutes

Property number; quantity of heat; volume; setting and resetting a user lock; setting of date and time and setting of the primary and secondary address.

Data scope with variable/guaranteed data frame:

- Update after every 15 minutes *)

Property number; unit number; manufacturer's identifier; medium; firmware version, fault messages; missing time; operating time; quantity of heat; volume; previous month's values for quantity of heat, tariff register, volume, maximum power and missing time; previous year's values for quantity of heat, volume and maximum power; measuring period with maxima for power, flowrate and temperatures; actual values for power, flowrate and temperatures; F0 pre-warning; setting and resetting a user lock; setting the date and time, and the primary and secondary address.

*) Special version with minimum update rate of 30 s can be supplied (WZU-MB-30); but it has a shorter battery life

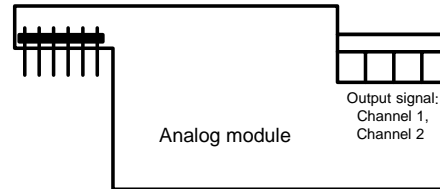
Data scope for fast readout:

- Update after a minimum of 4 s

Property number; quantity of heat; volume; actual values for power, flowrate and temperatures, and setting the date and time.

Fast read-out via the M-Bus is only permissible with the appropriate battery (D cell for 6 years) or a power supply module.

Analog module



The analog module converts a selectable measured value of the heat meter into an analog output signal (channel 1, channel 2).

The following measured values can be selected:

- Heat 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

A minimum value can be defined for each channel, below which the output does not fall, irrespective of the measured value. This enables detection of a wire break, for example.

Parameter setting (selection of the measured value, output measuring range, and minimum value) is performed via the heat meter using the PappaWin software.

The output signal is updated in a 4-second timebase.


An LED (ERR) indicates the current operating state.

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

Power supply

The power supply of the module is drawn from an external connector power supply unit (not included in the scope of supply). If the heat meter is operated with a battery, a 6-year battery of type D ("for all applications") is required.

Note: CE compatibility ("CE mark") is only ensured in conjunction with the intended power supply unit.

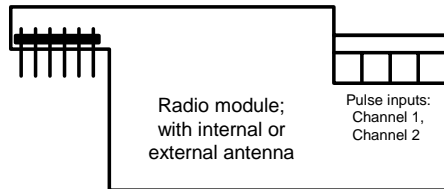
 Use only the **specified power supply unit!**
Use of an unsuitable power supply unit can result in malfunctions or destruction of the heat meter or module.

Analog output

For the current output, a maximum burden (load) of 100 ohm is permissible.

The voltage output is not short-circuit-proof.

Radio module



With its integrated antenna, the radio module permits wireless read-out from a distance of up to 100 meters. For special mounting situations, the radio module can be supplied as a version with an external antenna.

The module is programmed via radio telegrams. With a button, the transmit parameters can be reset to default values.

Two LEDs indicate the current operating state.

The power supply of the module is drawn from the heat meter. If the heat meter is operated with a battery, a 6-year battery of type D (“for all applications”) is required.

The module contains an additional two pulse counters to acquire external counting pulses.

The following must be noted concerning the inputs for the pulse counters:

- Only connect isolated contacts (Reed contact, no open collector)
- No galvanic isolation of the electronics of the heat meter
- External power source or grounding not permissible

Display on LCD **RM** (radio module)

Technical data radio

Frequency 433 MHz
 Range up to 100 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 heat meter must be functioning in normal mode. The data are packed and output in various telegram types.

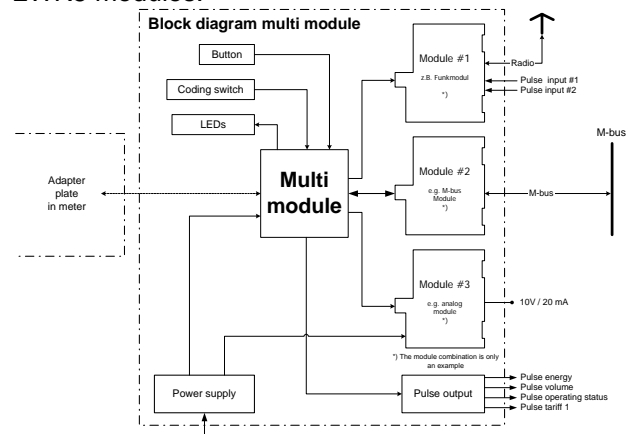
Data content

All telegrams are preceded by the time stamp (date and time) and the property number.

Telegram type:	Content:
“Basic”	Cumulated values and error status
“Previous year”	Cumulated previous year’s values and error status
“Previous month”	Cumulated previous month’s values and error status
“Extended”	Current instantaneous values, stored maximum values and error status
“Pulse and service”	Data of the pulse counter

Multi module

The external multi module extends the heat meter by another three module slots for 2WR5 modules. That enables operation with a UH50 module and three 2WR5 modules.



Display on LCD **MM** (multi module)

The following modules of type 2WR5 can be used without restriction:

- M-bus module
- Analog module
- Radio module

If several M-bus modules are used, one module functions as the master. The addresses of the M-bus modules can be changed independently via the M-bus system. If the master address is changed it is written back to the heat meter.

The bus address of the master can also be changed via the heat meter.

The multi module has one pulse output each as standard for energy, volume, operating status and tariff register 1.

The multi module is configured using the 3 button and the 2 coding switch.

The operating state is displayed on LEDs, further LEDs indicate the status of the output pulses.

For further details and a separate description, see “WZX-MM Multimodule Installation and Service Instructions”.

Tariff control (optional)

The following options are available for tariff control.

Note: The summation of the quantity of heat 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 heat or the volume can be summated in the tariff registers.

The threshold values can be derived from the flowrate (tariff T2), the heat power (tariff T3), the return temperature (tariff T4), the flow temperature (tariff T5) or the temperature difference (tariff T6).

Supplied quantity of heat (tariff T7)

In tariff register 1, a quantity of heat is summated that is calculated from the flow temperature (instead of from the temperature difference).

Returned quantity of heat (tariff T8)

In tariff register 1, a quantity of heat 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 heat 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 heat 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 heat 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 heat is summated depending on the return temperature in tariff registers 1 or 2.

The summated quantity of heat 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 heat or the volume.

No tariff status is shown for tariffs T7 and T8.

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

	no tariff register active
	tariff register 1 active
	tariff register 2 active
	tariff register 3 active

for tariff T9 (cold/heat meter)

	no tariff register active
	tariff register 1 active
	tariff register 2 active

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

	for T2, T3, T4, T5, T6
	at intervals of 2s with threshold value 1/2/3
	for T7
	for T8
	for T9;
	at intervals of 2s
	for T10;
	switching times at intervals of 2s
	for T11
	for T12

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

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

	tariff register 1
	tariff register 2
	tariff register 3 (not for T12)

	for tariff T7
	for tariff T8
	for tariff T9,
	at intervals of 2s

Error messages

The heat 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, PappaWin). 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 warning
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 PappaWin 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.

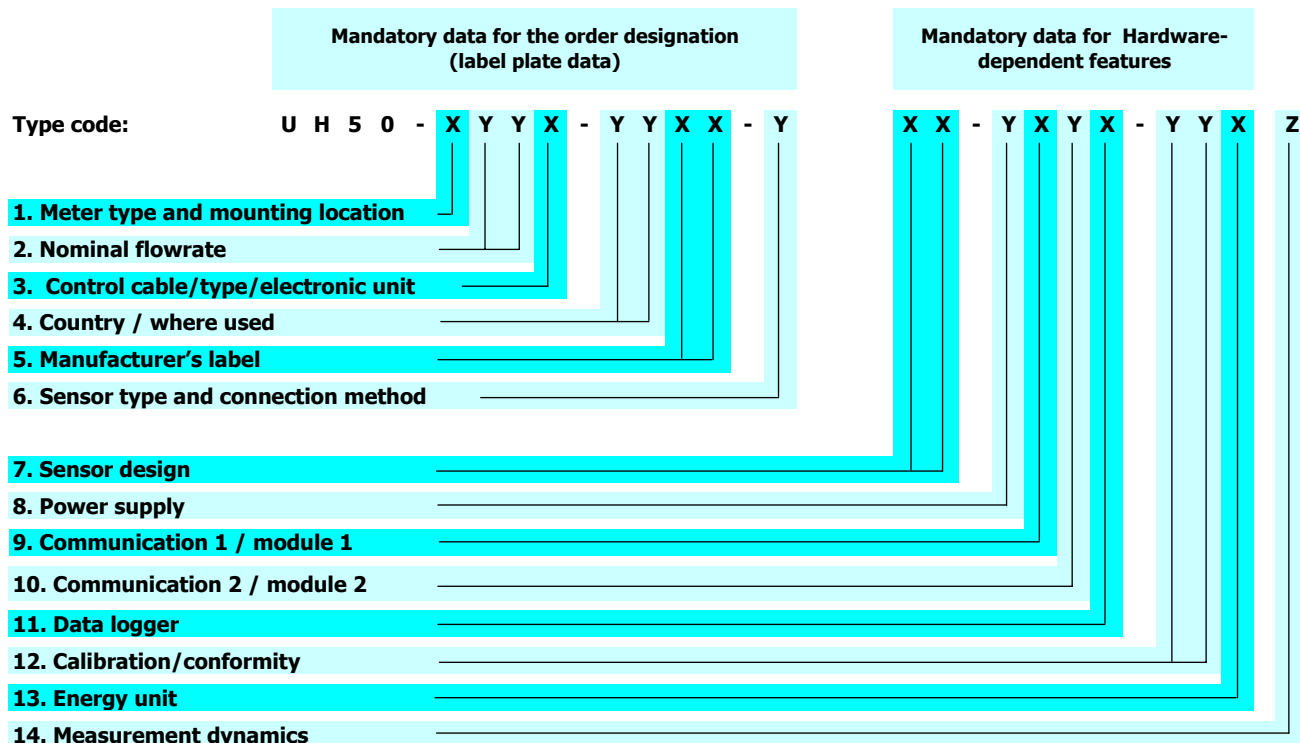
The data are recorded with the value and time stamp.

Read-out is performed via the optical interface with the PappaWin 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 heat Tariff register 1 Tariff register 2 Tariff register 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)



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	C
Cold meter for two wire temperature measurement and for mounting in return	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	N
Cold meter for four wire temperature measurement and for mounting in return	T
2. Nominal flowrate	Code
Nominal flowrate 0.6 m³/h, length 110mm, nominal pressure PN16, connection G ¼ B	05
Nominal flowrate 0.6 m³/h, length 110mm, nominal pressure PN25, connection G ¼ 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 ¼ B	21
Nominal flowrate 1.5 m³/h, length 110mm, nominal pressure PN25, connection G ¼ 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 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 10 m³/h, length 300mm, nominal pressure PN16, connection G 2"	60
Nominal flowrate 10 m³/h, length 300mm, nominal pressure PN25, connection flanged DN 40	61
Nominal flowrate 15 m³/h, length 270mm, nominal pressure PN25, connection flanged DN 50	65
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(Greek)	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 Republic(Slovakian)	SK
Dial plate for Ukraine(Ukrainian)	ST
Dial plate for Uzbekistan(Russian)	UA
Dial plate for Armenia(Armenian)	ZU
5. Manufacturer's label	Code
Logo Landis+Gyr	00
Logo Neovac	01
Logo Minol	02
Logo ista	04
Logo Heimer Concept	05
Logo Siemens	06
Logo Brunata	08
Logo Refuna	10
Logo Nuon	11
Logo District heating Prague	12
Logo Aarhus	13
Logo Teplokom	14
Logo Technoprylad	15
Logo Southern Tyrol	16
Logo Aqua Ukraine	17
6. Sensor type and method of connection	Code
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	0D
Type DS, 25 bar/150°C/ M10x1 / length 38mm, cable length 2,5m	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, 40 bar/180°C/ Ø6x100mm, cable length 2m	0M
Type PL, 40 bar/180°C/ Ø6x100mm, cable length 5m	0N
Type PL, 40 bar/180°C/ Ø6x150mm, cable length 2m	0P
Type PL, 40 bar/180°C/ Ø6x150mm, cable length 5m	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	E
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 in slot1	B
CL-module in slot1	C
M-bus 30s module in slot1	D
M-bus guar. Data frame module in slot1	G
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 in slot2	B
CL-module in slot2	C
M-bus 30s module in slot2	D
M-bus guar. Data frame module in slot2	G
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, no seal	N2
compliant with CEN 1434, class 3, no seal	N3
compliant acc. to national regulations, no seal	NL
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), flashing	H
Display: GJ with 3 decimal places (as of qp 6 with 2 decimal places), flashing	K
Display: m ³ (for the flow meter) with 2 decimal places (as of qp 40 with 1 decimal place)	V
Further features	
14. Measurement dynamics	Code
Dynamic range 1:50	B
Dynamic range 1:100	C
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	WZU-MB
M-bus module with 30s minimum reading cycle	WZU-MB-30
M-bus module with guaranteed data set	WZU-MB-GR
Pulse module	WZU-P2
Pulse module with OptoMOS	WZU-P2L
Radio module	WZU-RM
Radio module with external antenna	WZU-RM-EXT

Notes

- Regulations on the use of heat meters must be observed, see EN 1434, Part 6!
In particular, cavitation in the system must be avoided.
- Heat 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.
- All information given on the data sheet of the heat meter must be observed.
- 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 heat 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 PappaWin 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