Ultrasonic Heat Meter   2WR5

Installation instructions   UH 202-101n

3250 002 101 g

Safety instructions

☞ Never hold and transport the heat meter by the calculator but only by the flanged or threaded joint.

☞ Pay attention to sharp egdes (thread, measuring pipe).

☞ Calibration, maintenance, replacement of components, and repairs must only be performed by a qualified person familiar with the hazards involved.

☞ Assembly and dismantling may be carried out only in a pressureless plant.

☞ After the installation the tightness must be proved by pressurizing with cold water.

☞ Use meter only under the specified operating conditions. Otherwise dangers may arise and the warranty expires.

☞ Calibration-related seals of the heat meter may not be damaged or removed! Otherwise, the warranty of the heat meter becomes void.

☞ The regulations for electrical installations must be complied with!

☞ Return of the Lithium batteries must be carried out professionally.

☞ A lightning protection cannot be ensured; this has to be made sure through the house installation.

General

The calculator is snapped onto a mounting plate and secured with a locking lever.

The packing must be retained so that after the period of validity of the calibration has elapsed, the heat meter can be transported in its original packing.

If the heat meter has not been delivered with a connected battery, the actual date and time have to be updated (see "Parameterisation").

The 110 V / 230 V power supply unit is a device with protection class II, meaning it is not necessary to disconnect the power source when replacing the unit.

All cables must be routed at **a minimum distance of 300 mm** from heavy current and high frequency cables.

Cavitation must be prevented by overpressure in the entire measuring zone, i.e. **at least 1 bar for q_p** and approx. 3 bar for q_s (valid for ca. 80°C).

Installation

Select the installation location (supply or return) in accordance with the labelling on the heat meter. Study and check the table for the dimensions to see whether there is sufficient clearance.

If the heat meter is installed in the common return of two heating circuits, e.g. heating and hot water, the installation location must be sufficiently far (i.e. min.

$10 \times DN$) from the T joint for the different temperatures of water to mix thoroughly.

Before mounting the heat meter flush the circuit thoroughly to remove debris.

Mount the volume measuring part as shown in the examples on Page 2 horizontally or vertically between two cut-off valves such that the arrow points in the direction of flow. The sensors must be installed in the same heating circuit as the volume measuring part. For the installation as **cold meter** see page 3.
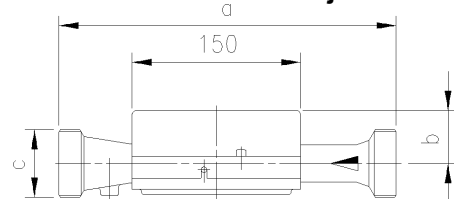
The sensors can be installed in T joints, ball valves, direct immersed or in pockets. The end of the sensors must extend in any case as far as the centre of the pipe cross-section.

Temperature sensors and fittings need to be sealed in order to prevent manipulation.
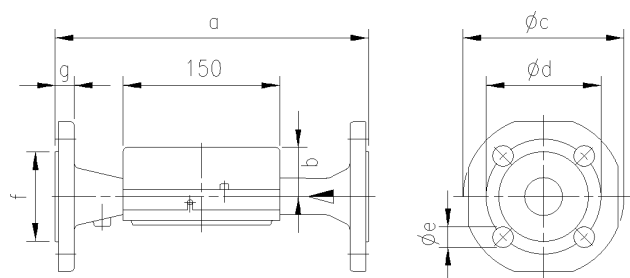
Small heat meter
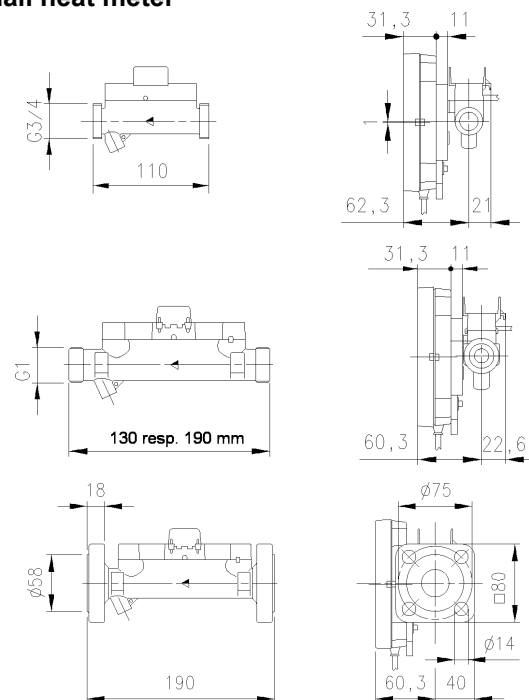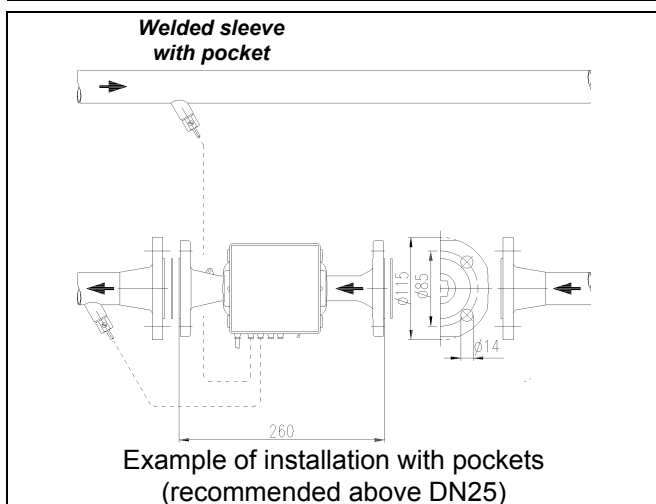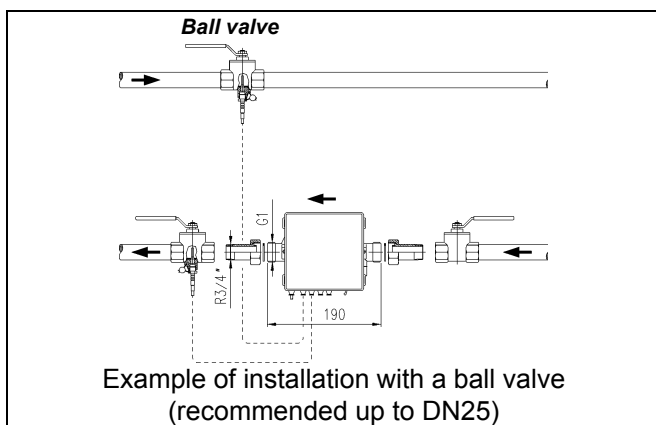

Large heat meter with threaded joint

Order no.	qp m³/h	PN bar	a	b	c
2WR5 45	3.5	16	260	51	G 1¼ B
2WR5 50	6	16	260	51	G 1¼ B
2WR5 60	10	16	300	48	G 2 B

Large heat meter with flanged joint

Order no.	qp m³/h	PN bar	DN	a	b	Øc	Ød	Øe	no. of holes	f	g
2WR5 46	3.5	25	25	260	51	115	85	14	4	68	18
2WR5 52	6	25	25	260	51	115	85	14	4	68	18
2WR5 61	10	25	40	300	48	150	110	18	4	88	18
2WR5 65	15	25	50	270	46	165	125	18	4	102	20
2WR5 70	25	25	65	300	52	185	145	18	8	122	22
2WR5 74	40	25	80	300	56	200	160	18	8	138	24
2WR5 82	60	16	100	360	68	235	180	18	8	158	24
2WR5 83	60	25	100	360	68	235	190	22	8	158	24

Examples of installation

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

Example of installation with pockets
(recommended above DN25)

**Hint for mounting adapter sensor (sensor direct immersed)**

For heat meters with temperature sensor 5,2x45 mm a mounting set is enclosed. Hereby the sensor can be installed direct immersed e.g. in a mounting element or a ball valve.

Mounting advice (see figure): Install O-ring with enclosed fit-up aid/fit-up pen in the mounting point. Take both halves of the plastic bolting and put them around the 3 gaps of the sensor, compress and screw in until bedstop (hand-screwed, fastening torque 3 – 5 Nm).
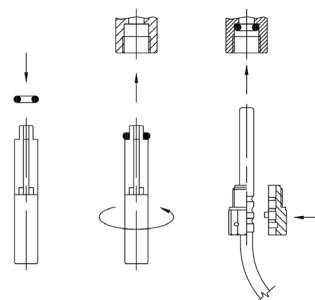
Mounting adapter set

Installation as a cold meter

The transducers must be directed sideward or to the bottom when mounted as a **cold meter** or a **combined heat / cold meter** (condensation of water). The measuring tube has to be installed **always in return**. The calculator must be splitted from the tube and e.g. mounted to the wall. It has to be ensured that no condensated water can run along the wiring into the calculator.


cover of flow sensors
Allowed position of the cold meter
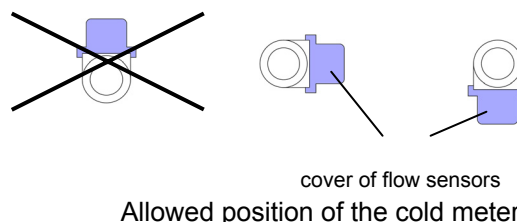
Calculator

The ambient temperature of the calculator unit must not exceed 55°C. Avoid direct sunlight.

For heating water temperatures below 90°C, the calculator can remain on the volume measuring part or be mounted on the wall. The mounting plate can be positioned so that reading the display is easily possible. To do that press the locking lever on the underside of the calculator outward to the right. With a slight pull forward remove the calculator, turn it, hook the topside of the calculator into the mounting plate and, pressing it down gently, snap it in again. It is also possible to screw the mounting plate on the topside of the volume measuring part in such a way that the calculator can be read from above.

For heating water temperatures above 90°C, the calculator must be mounted on the wall. Remove the calculator from the mounting plate, unscrew the mounting from the volume measuring part, and fix it to the wall with plugs. Snap on the calculator again.

Wall mounting
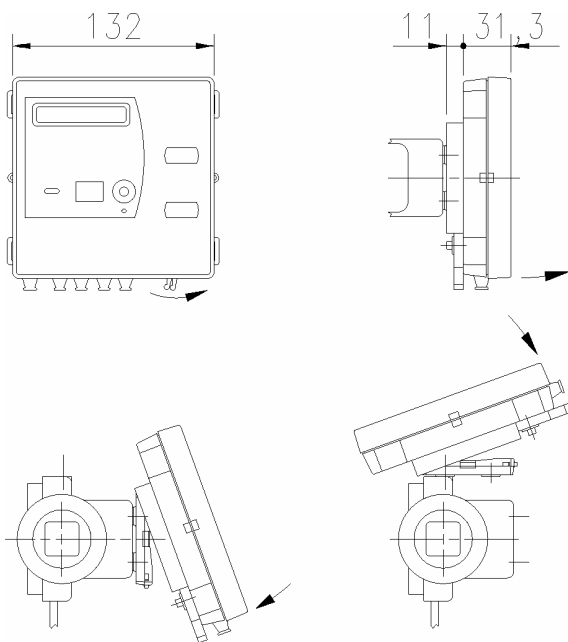
Mounting plate:
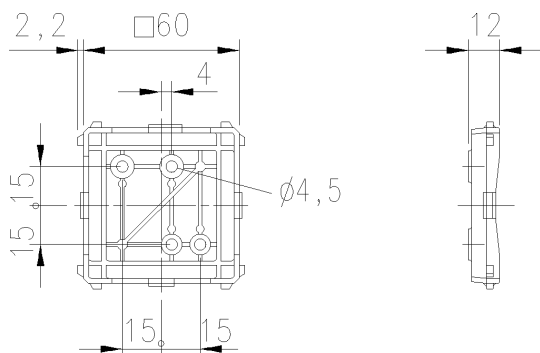
Power supply

In the standard version a battery is installed in the factory. It must not come into contact with water or be exposed to temperature higher than 80°C. Used batteries must be disposed of at suitable collection points. In a special version, power supply modules can also be installed (24 V ACDC, 115 V AC or 230 V AC). In that case, the unit is supplied with a cable which is brought out to be connected as labelled. The 115 V / 230 V power supply unit must be fuse protected with 6 A.

Interfaces of the Calculator

2WR5 heat meters are all equipped with an optical interface to EN 61107 as a standard. In addition, one of the following **communications modules** can be added for remote readout:

- **Pulses (heat and volume/ cold/ unit status)**, isolated, bounce-free
- **20mA current loop** (CL) to EN 61107
- **Combination of pulses and 20mA**

- **M-bus to EN 1434-3**, fixed and extended variable protocol (also for connection to a suitable heating controller)
- **Combination M-bus and pulse output**
- **Modem module**
- **Analog module**
- **Radio module**

These modules do not affect acquisition of the consumption and can therefore be retrofitted at any time without affecting the calibration mark.

Communication modules

In the bottom, right-hand corner, a communication module can be installed and must be connected. To do that cut off the right-hand grommet to match the cross-section of the connecting cable, route the cable from outside through the grommet and strip the cable. If cable is shielded the shield must not be connected on the heat meter side (connect on one side only). Connect the cores as shown on the connection diagram printed on the module.
For technical details pay attention to document UH 102-101 *Configuration 2WR5*.

Factory-installed sensors

With factory-installed sensors, do not split, shorten, or extend the cables. If the screw terminals are accessible on the calculator, to facilitate installation cables can be temporarily disconnected at the terminals and reconnected afterwards.

Customer sensors

With already installed sensors, please first cut the second and third grommets from left to match the cross-section of the cables. Remove the cover by pressing the lateral releases. Route the supply sensor from outside through the second grommet, that of the return sensor through the third grommet. Strip both cables as shown in the illustration.
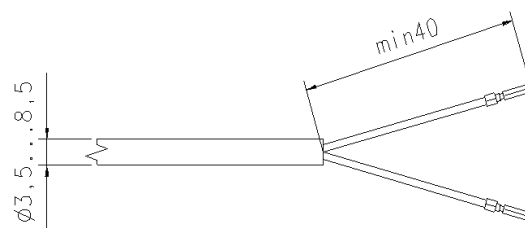
wire end ferrules

Connect the cores as shown in the printed connection diagram. The 2-conductor connection is made at terminals 5 / 6 and 7 / 8. If cable is shielded the shield must not be connected on the heat meter side (connect on one side only). After that fit the sensors into the pockets or ball valves or T joints and seal them against manipulation.
If the meter shows „F.8" reset this error message via „Parameterisation" (see page 4).
Attach the cover by pressing it slightly down until it snaps safely into the body.

Parameterisation
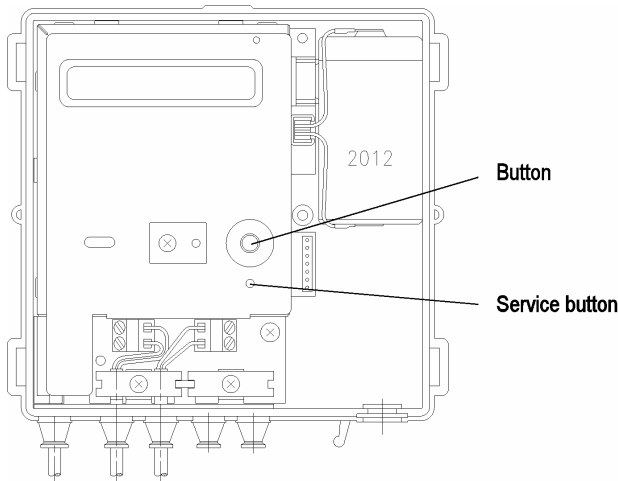
Meters with power supply module or freshly connected battery on site may start directly in the setting menu for date and time. In this case proceed with step 2.

Step 1: Activating "PArA" mode
Press the service button for 3 s. The display shows the modes "PrUEF", "PArA" and "Nb". Press the advance button when „PArA" is displayed.
You can perform the following parameterizations:

Display	Description
$F\ 8$	Reset F8 error
M	Reset maxima
$S\ 01.01.--$	Yearly set day (dd.mm) (01.01. --) *)
$D\ 15.10.04$	Date (dd.mm.yy) (15.10.04)
$T\ 15.49.06$	Time (15:33:06)
$K\ 0000000$	Property No, or M BUS secondary address
$A\ 0$	Primary address of the M BUS
$Modul\ R1$	Set CV/CT/RI function in pulse module
$P\ 7.5\ min$	Set measuring period (7.5/15/30/60min)
Ft	Reset missing time
$Nb------$	Return to normal mode

*) see comment about the yearly set day on page 6

As soon as the required function is displayed, press the advance button to accept the required function.

Step 2: By **keeping the button pressed** you can make the flashing display change continuously or reset error F8 or maxima. By pressing the button **briefly**, you can accept the flashing value set. After that, the next lowest digit flashes and again you can set it by keeping the button pressed and accepting the value with a brief press of the button. The * character is output briefly as an end acknowledgment of a display line.

If you make a mistake while entering you must run through the loop again.

You can exit para mode:

- By pressing the advance key when "Nb------" appears on the display
- Automatically after 15 hours

Tariffs and fast pulses can be parametrised only with the software PappaWin and after pushing the service button for 3 s (until meter firmware version 2.03 only via pushing the calibration button).
Attention: fast pulses and battery use for 6 and more years require a D-cell.

Starting up

Replace the housing cover and press it gently from above until you hear the straps engage. Open the locking slider. Check the heating system for tightness and vent it thoroughly. After no more than 100 s the message F0 disappears. After that, check the measured values "Temperatures" and "Flow rate" for plausibility. Continue venting until the displayed flow rate is stable. Regulate the flow rate for the system again (update in display every 4 s).
Seal the sensors. Attach the user protections on the calculator and on the sensors. Remove the transparent foil from the calculator. We recommend to reset the maximum values and the missing hours (see parameterisation). Read and note down the meter readings for the quantity of heat / volume and hours of operation / downtime.
If the meter in installed in wrong direction of flow, neither volume nor energy will be accumulated. This is indicated by the sign of the shown flowrate (in service loop 1). In this case the volume part must be turned into correct position.

Display

The heat meter display is subdivided into several levels and may differ from the standard shown below. The user loop display (level 1) is advanced cyclically each time the button is pressed briefly.

User loop

Display	Description
$1594967 MWh$	Accum. qty of thermal energy
$C\ 0012.456 MWh$	Tariff register, here, e.g. cold
$1307148\ m^3$	Accumulated volume
$8.8.8.8.8.8.8. MWh$	Segment test
$F-------$	Error with/without error digit

The tariff displays can vary depending on the tariff type. The displays shown here are for a combined heat/cold meter. The valid tariff status is displayed together with the thermal energy as $_$, $=$ or $\equiv$.
With a **pure flow meter** the heat and tariff registers are not displayed.

If button is held pressed for three seconds, the display switches from the user loop to the service loops (level 2).

Service loops

`L OOP 1`	Service loop 1
`L OOP 2`	Service loop 2
`L OOP 3`	Service loop 3

One of the service loops is preselected by pressing the button briefly. By pressing the button for another 3 s the contents of the selected service loop will be displayed.
Each time the button is pressed briefly the next information is displayed.

The service loops are exited by holding the button pressed for 3 s or automatically after 30 minutes.

Service loop 1 („LOOP 1")

`8,324 m³/h`	Current flowrate
`30,6 kW`	Current heat output
`92 55 ℃`	Current flow and return temperature
`T9 00020 ℃`	Threshold value for the tariff, e.g. T$_V$
`K 0000000`	Property number, 7-digit
`D 15,10,04`	Date
`S 01,01,--`	Annual set day (dd.mm) *)
`V 1594967 MWh`	Heat for previous year on set day *)
`C 0012,456 MWh`	Tariff register for previous year on set day *)
`V 1307148 m³`	Volume for previous year on set day *)
`2-03 FW`	Version of firmware

*) see comment about the yearly set day on page 6

Service loop 2 („LOOP 2")

In service loop 2 the **monthly values** are displayed. One of the previous 36 monthly values can be selected by pressing the button briefly. The corresponding data are then opened by pressing the button for 3s. Each time the button is pressed briefly the next value for the selected month is displayed.

`01,09,04 M`	Set day previous month Sep. 2004
`01,08,04 M`	Set day previous month Aug. 2004
...	Set day previous month xxxx 200y

pressing the button for more than 3s: ⇩

`1594967 MWh`	Qty of thermal energy on this set day
`C 0012,456 MWh`	Tariff register on this set day, e.g. cold
`1307148 m³`	Volume on this set day
`M 8,324 m³/h` `S 01,07,04 M`	Max. flowrate in Jul. 2004, changing with date stamp every 2s
`M 30,6 kW` `S 01,07,04 M`	Maximum heat output in Jul., changing with date stamp every 2s

| `M 95 65 ℃` `S 01,07,04 M` `S 01,07,04 M` | Max. temperatures in Jul., changing with date stamps of flow and return every 2s |
| `F 0 h` | Status of missing hour counter on this set day |

After the last item is shown, the current set day is again displayed. The next set day can be selected by pressing the button briefly.

Service loop 3 („LOOP 3")

`P1 ----- Wh/I`	Parameter of fast pulses, significance of energy pulses
`P2 ----- L/I`	Significance of volume pulses
`P3 --- mS`	Pulse length in ms
`TP 30 SEC`	Interval of temperature measurement
`--,--,-- F0`	Date stamp for F0 warning
`Modul MB`	Type of built in module
`A 0`	M-bus primary address **)
`A 0000000`	M-bus secondary address **)

**) only shown if module is of type MB

Monthly values
The calculator stores for 36 months at the set day at 00:00h the values of
- Heat (meter reading)
- Tariff (register reading)
- Volume (reading)
- Max. flowrate (monthly maximum averaged across the measurement period, standard (60 min), with date stamp
- Max. demand (monthly maximum averaged across the measuring period), with date stamp
- Max. temperatures (monthly maximum) with date stamp each for flow and return
- Missing time counter

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

The heat meater can be delivered in various versions. As a consequence the display loops may be shorter or longer or arranged in a different way as shown above.

Error codes / operational details
The heat meter performs self-diagnostics continuously and can thus display various errors.

Errorcode:	Error / activities:
F0	there is air in volume measurement part; it is necessary to vent the heating system thoroughly
F1	break in supply sensor
F2	break in return sensor
F3	fault in electronic or contact between shield of sensor cable and sensor connector
F4	batterie needs to be replaced
F5	short circuit in supply sensor
F6	short circuit in return sensor
F7	fault in electronic
F8	F1, F2, F3, F5 or F6 persisting longer than 8 hours; no more measurements are taken
F9	fault in electronic

Operational details

If the response limits are exceeded and the flow rate and temperature difference are positive, the **quantity of heat** and the **volume** are summated. With the **segment test,** all segments of the display are activated to test the display itself.

On the **yearly set day** the meter readings for the quantity of heat and volume are placed in a **previous year's memory** identified with a **V**.
*) With firmware versions 2.12 and 2.13 this function is not possible together with fast pulses! The display of S 00,01,-- means that the yearly set day is deactivated).

The **flow rate,** the **heat output**, and the **differential** (temperature difference) are acquired with the correct sign. If the lower response limit is violated, a *u* is displayed in front of the value. The current **temperatures** are displayed as integer values in °C together on one display line.

The heat output and flow rate are averaged over the **measuring period** of, say, 60 min. The **maximum values** of mean value calculation are marked with an M in the leading position.

The 8-digit **property number** (secondary address for M bus operation) can be set in parameterisation mode. The most significant position is not displayed and will be set to zero in this case. The **unit number** is assigned by the manufacturer.

The **time of operation** is counted from initial connection of the power supply. **Time of downtime** is summated if a fault prevents the heat meter from measuring. The **date** is incremented every day.

The **module type** is displayed. If an M bus module is installed, the primary address is displayed on the next line. A modem, analog modul or radio module is also displayed as M bus module.
The number of the **firmware version** is assigned by the manufacturer.

Engineering

- The regulations for the use of heat meters must be complied with, see EN1434 part 6! Especially cavitation must be avoided.

- Heat meters up to DN25 may only be installed with direct immersed sensors according to German calibration law!

- It must be ensured that in normal use no water may intrude into the electronic.

- All information given in the data sheet of the heat meter must be observed.

- User seals may only be removed by authorized staff carrying out service work. They must be replaced afterwards.

- The module is supplied with installation and operating instructions.

- No later than 4 seconds after mounting, the heat meter automatically detects the plugged-in module and is ready for communication or pulse output.

- The type of module plugged in can be displayed depending on the display parameterization in the service loop.

- Setting the parameters of the heat meter for the fast pulses can be done by using the PappaWin software.

- Latest information you may find in the internet: **www.landisgyr.com**

<div align="right">

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

</div>