RAY®-HEAT

## APPLICATION

❑ Horizontal installation with flange

❑ For warm water up to 90 °C

❑ Fully electronic compact heat meter of Woltmann design

❑ Highly accurate recording of all billing data in heating circuits

## FEATURES

❑ Electronically controlled measurements

❑ Magnetic coupling and electronic sensor control for recording flow rate

❑ Nominal sizes: 15/25/40 and 60 m³/h

❑ Woltman measuring process

❑ Measuring accuracy meets the requirements of EN 1434 class 3

❑ Lithium battery guarantees longer lifetime than calibration interval

❑ Optical interface to ZVEI as standard
   Optional: M-Bus interface
   Optional: Pulse output for energy and volume

❑ Adjustable reading date for billing

❑ Dynamics ($q_p/q_i$) 50 : 1

❑ Rotating integrator

❑ Service-friendly meter design

❑ Temperature sensors permanently connected

## COMPONENTS

❑ Volume measuring component

❑ Integrator – contains hardware and software for measuring flow rate, temperature and energy consumption

❑ Temperature sensors

## INTEGRATOR

❑ Integration of all necessary circuits for recording flow rate and temperature and for calculating, logging and dis playing data

❑ Compact design for simple installation of unit

❑ Single-line, 7-digit display for easy meter reading

❑ User-friendly control of various display loops

❑ Power supply from built-in lithium battery



EN 1434

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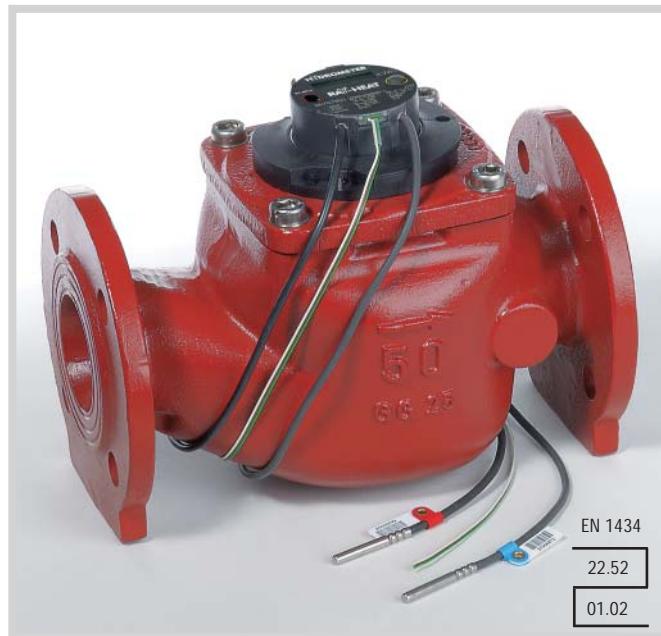
## TYPICAL ERROR GRAPH

Measuring accuracy to PTB class B
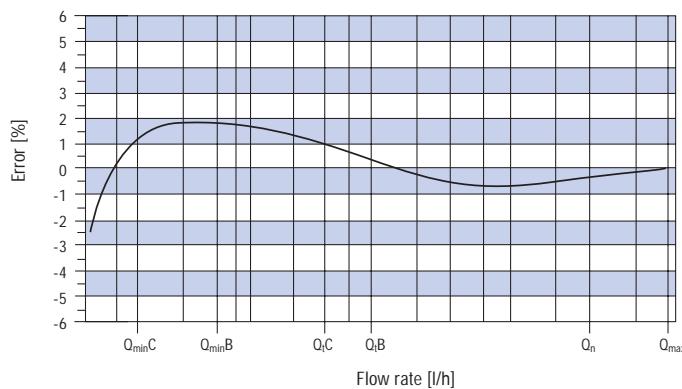


## HEAD LOSS DIAGRAM
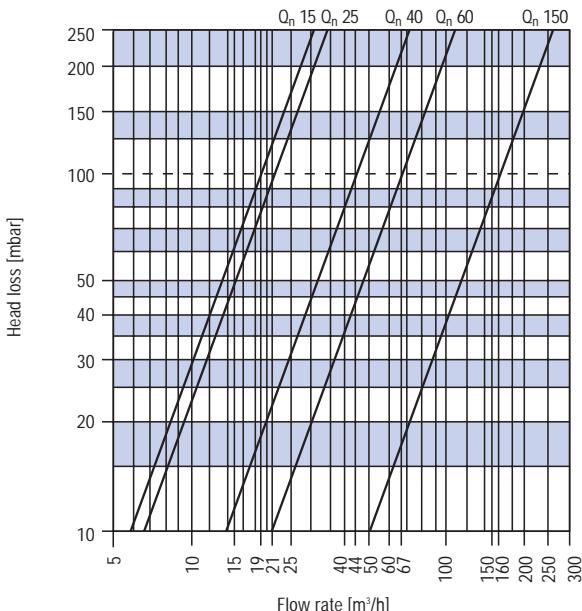
## VOLUME MEASURING COMPONENT

The volume measuring component is based on the Woltmann meter principle, which achieves very high measuring accuracy. Its size corresponds to the maximum flow rate of the heating circuit system. It can be used in forward or return line. The volume measuring component complies with the requirements of EN 1434.

## TEMPERATURE SENSORS

Type Pt 500 temperature sensors to DIN EN 60751 are used as standard. The temperature sensors are permanently connected to the integrator and have a cable length of 6 m on both the meter and line side.

## ACCESSORIES/SOFTWARE

❏ **HYDRO-SET**

Software parametrization tool based on the M-Bus and

optical interface. It is used for:

❏ reading out measured values

❏ printing out meter logs

❏ meter configuration

## OVERVIEW OF LOOPS
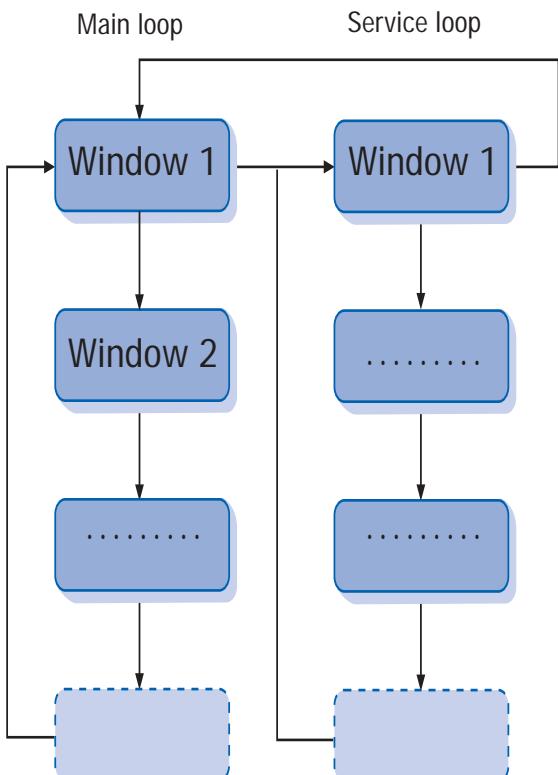


## LOOP STRUCTURE

The heat meter display has two loops.

**Example of main loop:**

❏ Window 1 (3 s): Total energy consumption

❏ Window 2 (1 s): Reading date

**Example of service loop:**

❏ Window 1: Flow rate

The first loop is called the "main loop" and the second loop the "service loop". The loops have no specific symbol in the display.

The main loop is configured to display the data for current energy and energy on reading date. The service loop displays the current data for flow rate, temperatures, power, volume and next reading date.

## OPERATION

A button mounted on the front panel of the meter is used to switch to the next display. The button can be pressed for a short or long time. A short press of the button switches to the next display within a loop and a long press switches to the next loop.

The "Current energy" window in the main loop is the basic display.

**NOTE**
**If the display is switched off, this basic display appears the first time the button is pressed. The display switches off automatically if the button is not pressed for 5 minutes.**

## LOOP SETTINGS

| Loop | Window 1 (3 s) | Window 2 (1 s) |
|---|---|---|
| Main loop | Energy since taking into operation | (Basic display) |
| | Selftest - segments off | Selftest - segments on |
| | Energy on last reading date | Last reading date |
| Service loop | Flow rate | -3- |
| | Forward temperature | -4- |
| | Return temperature | -5- |
| | Temperature difference | -6- |
| | Power | -7- |
| | Volume | -8- |
| | Next reading date | -9- |
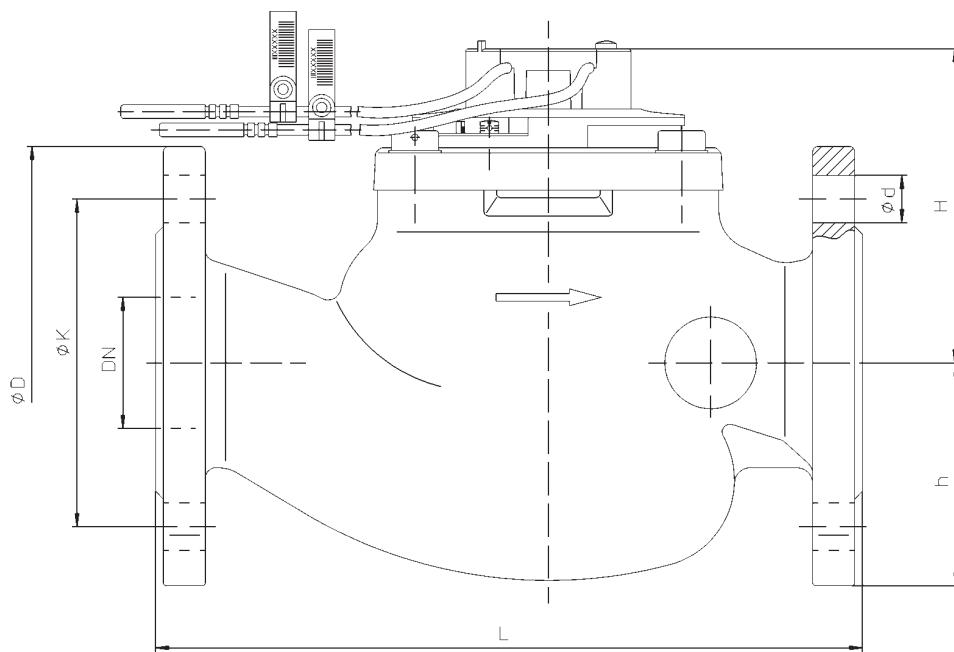
## DIMENSIONS

|  | $q_p$ = 15 m³/h | $q_p$ = 25 m³/h | $q_p$ = 40 m³/h | $q_p$ = 60 m³/h |
|---|---|---|---|---|
| DN | 50 | 65 | 80 | 100 |
| Flange ø [mm] | 165 | 185 | 200 | 220 |
| Hole circle ø [mm] | 125 | 145 | 160 | 180 |
| L [mm] | 270 | 300 | 300 | 360 |
| H [mm] | 125 | 125 | 160 | 170 |
| h [mm] | 84 | 97 | 102 | 113 |

## TEMPERATURE SENSORS PT 500

|  |  | M-MKWZR | M-MKWZV |
|---|---|---|---|
| Cable length forward sensor | L [m] | 6 | 6 |
| Cable length return sensor | L [m] | 6 | 6 |
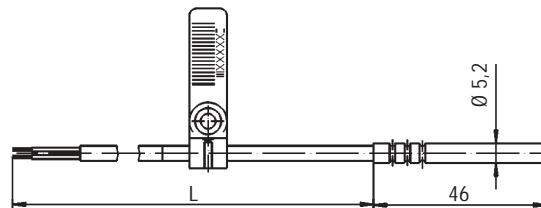


## TECHNICAL DATA/FLOW SENSOR

| Flow sensor |  |  |  |  | 50 | 65 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|
| Flow rate | Maximum flow rate |  | $q_s$ | m³/h | 50 | 50 | 110 | 140 |
| ranges | Nominal flow rate |  | $q_p$ | m³/h | 15 | 25 | 40 | 60 |
|  | Minimum flow rate |  | $q_i$ | l/h | 300 | 500 | 800 | 1200 |
| Head loss | At $q_p$ |  | $\Delta p$ | mbar | 62 | 142 | 80 | 100 |
| Operating pressure | Maximum |  | PN | bar | 16 | | | |
| Connection | Flange | Outer ø | D | mm | 165 | 185 | 200 | 220 |
|  |  | Hole circle ø | K | mm | 125 | 145 | 160 | 180 |
|  |  | Nominal diameter | DN | mm | 50 | 65 | 80 | 100 |
| Overall length |  |  |  | mm | 270 | 300 | 300 | 360 |
| Medium | Working range |  |  | °C | 15...90 | | | |
| Installation | Installation position |  |  |  | Horizontal | | | |
| Weight |  |  |  | kg | 14.2 | 18 | 24 | 28 |

## TECHNICAL DATA/INTEGRATOR

| Integrator | | | | |
|---|---|---|---|---|
| Basic features | Ambient class | | | EN 1434 class C |
| | Protection class | | | IP 54 |
| | Type | | | Compact heat meter to EN 1434 |
| | Metrological class | | | EN 1434: class 3 |
| Display indication | Display | | | LCD, 7-digit |
| | Unit | | | MWh - kWh - GJ - MJ - kW - m³/h - l/h - m³ - l |
| | Total values | | | 9 999 999 - 999 999.9 - 99 999.99 - 9 999.999 |
| | Values displayed | | | Power - energy - flow rate - temperature |
| Temperature input | Temperature sensor type | | | Pt 500 / 2-wire |
| | Measuring cycle | T | s | 32 |
| | Maximum temperature difference | $\Delta\Theta_{max}$ | K | + 147 |
| | Minimum temperature difference | $\Delta\Theta_{min}$ | K | + 3 |
| | Starting temperature difference | $\Delta\Theta$ | K | + 0.25 |
| | Absolute temperature measurement range | $\Theta$ | °C | 0...150 |
| Volume/ energy pulse (contact or open collector) | Volume pulse values | | Pulse | Value of last display |
| | energy pulse values | | Pulse | Value of last display |
| | Frequency | $f_{max}$ | Hz | Approx. 4 |
| | Pulse width | $t_p$ | ms | 125 ± 16 |
| | Input voltage (contact open) | | V | 24 |
| | Input voltage (contact closed) at 0.1 mA | max. | mV | 250 |
| | Input impedance | min. | kΩ | 2.2 |
| Supply voltage | Operating voltage | $U_N$ | VDC | 3.0 (lithium battery) |
| | Nominal power | $P_N$ | µW | 30 |

The WS-TWZ range comprises heat meters to EN 1434 with nominal sizes $q_p$ = 15 m³/h, 25 m³/h, 40 m³/h and 60 m³/h.

## ORDER REFERENCES

### Extract from the full range (EN 1434 / certified class 3)

| $q_p$ [m³/h] | Type designation | Overall length [mm] | Connection | Nominal diameter [mm] | Cable length of temperature sensors | Display | Variant | Article number |
|---|---|---|---|---|---|---|---|---|
| 15 | WS-TWZR | 270 | FL50 | 50 | 6 m / 6 m | MWh | Standard | 44200001 |
| 25 | WS-TWZR | 300 | FL65 | 65 | 6 m / 6 m | MWh | Standard | 44200002 |
| 40 | WS-TWZR | 300 | FL80 | 80 | 6 m / 6 m | MWh | Standard | 44200003 |
| 60 | WS-TWZR | 360 | FL100 | 100 | 6 m / 6 m | MWh | Standard | 44200004 |
| 15 | WS-TWZR | 270 | FL50 | 50 | 6 m / 6 m | MWh | M-BUS | 44200005 |
| 25 | WS-TWZR | 300 | FL65 | 65 | 6 m / 6 m | MWh | M-BUS | 44200006 |
| 40 | WS-TWZR | 300 | FL80 | 80 | 6 m / 6 m | MWh | M-BUS | 44200007 |
| 60 | WS-TWZR | 360 | FL100 | 100 | 6 m / 6 m | MWh | M-BUS | 44200008 |
| 15 | WS-TWZR | 270 | FL50 | 50 | 6 m / 6 m | MWh | Pulse output | 44200009 |
| 25 | WS-TWZR | 300 | FL65 | 65 | 6 m / 6 m | MWh | Pulse output | 44200010 |
| 40 | WS-TWZR | 300 | FL80 | 80 | 6 m / 6 m | MWh | Pulse output | 44200012 |
| 60 | WS-TWZR | 360 | FL100 | 100 | 6 m / 6 m | MWh | Pulse output | 44200013 |

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