

# SHARKY 775

## ULTRASONIC COMPACT ENERGY METER



### APPLICATION

The ultrasonic compact energy meter can be used for measuring the energy consumption in heating / cooling application for billing purposes.

### FEATURES

- Approval for ultrasonic meter with dynamic range up to 1:250 (qi:qp) in class 2 (depends on meter size), standard 1:100
- Improved power consumption --> longer battery lifetime
- Approved according MID in class 2 and 3 and PTB K 7.2 (cooling)
- High long term stability, verified at independent AGFW test
- Insensitive against dirt
- Versatile possibility of power supply
- Optional with integrated radio Open Metering Standard (868 or 434 MHz) Generation 3 Profile A or Generation 4 Profile B
- Individual remote reading (AMR) with add on modules Plug & Play
- Extensive readable data memory
- 3 communication interfaces (e. g. M-Bus + M-Bus + Radio)
- Significantly improved radio performance
- Leakage Detection

## BASIC FEATURES

| SHARKY                        |                                                                                                                                                                    |                                                     |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Application                   | Heating - cooling - heating/with cooling tariff (cooling tariff at -dT and t <sub>flow</sub> <20 °C)                                                               |                                                     |
| Approval                      | MID (DE-10-MI004-PTB013) and PTB K7.2 for cooling (DE-16-M-PTB-0001)                                                                                               |                                                     |
| Environmental class           | Class C                                                                                                                                                            |                                                     |
| Ambient class                 | Class E2 + M2                                                                                                                                                      |                                                     |
| Ambient operating temperature | °C                                                                                                                                                                 | +5 ... +55 (<35 °C have a positive lifetime effect) |
| Ambient storage temperature   | °C                                                                                                                                                                 | -25 ... +60 (>35 °C max. 4 weeks)                   |
| Communication                 | 3 communication interfaces (e. g. M-Bus + M-Bus + Int. Radio; 2 primary addresses, 1 secondary address)                                                            |                                                     |
| Integrated Radio              | Optional                                                                                                                                                           |                                                     |
| Frequency band                | 868 or 434 MHz                                                                                                                                                     |                                                     |
| Type of radio telegram        | Open Metering Standard (OMS), Generation 3 Profile A or Generation 4 Profile B                                                                                     |                                                     |
| Transmission data updating    | Online - no time delay between value measurement and data transmission                                                                                             |                                                     |
| Data transmission             | Unidirectional                                                                                                                                                     |                                                     |
| Sending interval              | With A-cell: 180 s (up to 10.5 years lifetime); with D-cell: ~12 s (up to 16 years lifetime); with mains unit: ~12 s; depending on length of telegram (duty cycle) |                                                     |
| Test possibilities            | Via display, optical test pulses, test output or via NOWA software                                                                                                 |                                                     |

## BASIC FEATURES - CALCULATOR

| SHARKY                                |                                                                                                                                                        |    |                                                                             |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------|
| Protection class                      | IP 54                                                                                                                                                  |    |                                                                             |
| Battery supply                        | 3.6 VDC A-cell up to 10.5 years lifetime (depending on configuration); 3.6 VDC D-cell up to 16 years lifetime                                          |    |                                                                             |
| Mains supply                          | 24 VAC (50 - 60 Hz); 230 VAC (50 - 60 Hz)                                                                                                              |    |                                                                             |
| Temperature sensor type               | Pt 100 or Pt 500 with 2-wire leads; Ø 5.2 / 6 mm or direct sensor                                                                                      |    |                                                                             |
| Cable length of temperature sensor    | Pt 100: 1.9 m; Pt 500: 1.9 / 2.9 / 4.9 / 9.9 m                                                                                                         |    |                                                                             |
| Absolute temperature range calculator | Θ                                                                                                                                                      | °C | 1 ... 180                                                                   |
| Measuring cycle - flow                | With mains supply: 1/8 s; with A-cell battery: 1 s; with D-cell battery: 1 s                                                                           |    |                                                                             |
| Measuring cycle - temperature sensor  | T                                                                                                                                                      | s  | With mains supply: 2 s; with A-cell battery: 16 s; with D-cell battery: 4 s |
| Starting temperature difference       | ΔΘ                                                                                                                                                     | K  | 0.125                                                                       |
| Min. temperature difference           | ΔΘ <sub>min</sub>                                                                                                                                      | K  | 3                                                                           |
| Max. temperature difference           | ΔΘ <sub>max</sub>                                                                                                                                      | K  | 120 / 175 (heating)   50 (cooling)                                          |
| Interfaces standard                   | Optical ZVEI interface 300 ... 2400 Baud (auto Baud detected)                                                                                          |    |                                                                             |
| Interfaces optional                   | 2 Slots for modules with M-Bus, L-Bus, LON works, LoRa, MOD Bus, RS232, RS485, pulse output, pulse input, combined pulse in-/output or analogue output |    |                                                                             |
| Extensive readable data memory        | Periodical log <sup>1</sup> ; 3 history logs; event memory (Flash/E <sup>2</sup> Prom - non-volatile)                                                  |    |                                                                             |

<sup>1</sup> Programmable storage interval (daily, weekly, monthly, ...)

## BASIC FEATURES - FLOW SENSOR

| SHARKY                            |                                                                                                                |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------|
| Mounting position flow sensor     | Any position, calming sections not necessary, inlet installation / outlet installation / in field programmable |
| Protection class flow sensor      | Heating IP 54   Heating with cooling tariff / cooling acc. IP 65                                               |
| Material of the flow sensor body  | Brass or spheroidal cast iron (only $q_p$ 15 up to $q_p$ 100 m <sup>3</sup> /h)                                |
| Temperature range heating         | °C 5 ... 105 / 130 / 150 (depends on meter size and material)                                                  |
| Temperature range cooling         | °C 5 ... 50                                                                                                    |
| Temperature range heating/cooling | °C 5 ... 105                                                                                                   |

## DISPLAY

| SHARKY             |                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------|
| Display indication | LCD, 8-digit                                                                            |
| Units              | MWh - kWh - GJ - Gcal - MBtu - gal - GPM - °C - °F - m <sup>3</sup> - m <sup>3</sup> /h |
| Total values       | 99,999,999 - 9,999,999.9 - 999,999.99 - 99,999.999                                      |
| Values displayed   | Energy - Power - Volume - Flow rate - Temperature and more                              |

## INTERFACES

| SHARKY                    |                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Optical                   | ZVEI interface, for communication and testing, M-Bus protocol                                                                                                                                                                        |
| M-Bus                     | Configurable telegram, according to EN13757-3, two wires with non polarity, auto baud detect (300 and 2400 baud), one M-Bus load                                                                                                     |
| Wireless M-Bus            | Open Metering Standard (OMS), Generation 3 Profile A or Generation 4 Profile B; frequency band 868 or 434 MHz                                                                                                                        |
| L-Bus                     | Adapter for external radio module, configurable telegram, according to EN13757-3, data reading and parametrization are via two wires with polarity reversal protection                                                               |
| Modbus RTU                | Polarity independent, Voltage 12 - 24 V AC/DC, <150 mW; protocol - Modbus RTU, Channel - EIA-485 (galvanic isolated), Baud rate 1200 ... 115200. The default communication: 9600 bps Baud rate, 8N1 data format, Modbus Slave ID - 1 |
| LonWorks                  | Polarity independent; Voltage 12 - 24 V AC/DC, <150 mW; Channel - TP/FT-10, Baud rate - 78 kbits per second, Data format - Differential Manchester Coding                                                                            |
| LoRa                      | Five different telegrams can be selected via OTC App (AppStore Android). Up to 11 years lifetime with own battery and the modern ECO Mode. Transmission interval varies with the connection quality.                                 |
| NB-IoT*                   | Compatible in Slot 1 with internal antenna, with external D-Cell battery, 13+1 years battery lifetime with daily upload of 24 hourly values. Configurable with NFC connection via OTC App (AppStore Android).                        |
| RS232                     | Serial interface for communication with external devices, a special data cable is required, M-Bus protocol, 300 and 2400 baud                                                                                                        |
| RS485                     | Serial interface for communication with external devices, power supply with 12 V ± 5 V, M-Bus protocol, 2400 baud                                                                                                                    |
| Pulse output              | Module with 2 Open Collector pulse outputs (potential-free), output 1: 4 Hz (pulse width 125 ms), pulse or static conditions (e.g. errors), output 2: 200 Hz (pulse width ≥ 5 ms), configurable via IZAR@MOBILE 2 software           |
| Pulse input               | Module with 2 pulse inputs, max. 20 Hz, configurable via IZAR@MOBILE 2 software, data can be transferred remotely                                                                                                                    |
| Combined pulse in-/output | Module with 2 pulse inputs and 1 pulse output, configurable via IZAR@MOBILE 2 software, needed for leak detection                                                                                                                    |
| Analogue output           | Module for 4 ... 20 mA with 2 programmable passive outputs, programmable value in case of error                                                                                                                                      |

\* Starting with August 1, 2025, only devices with firmware F04.006 or newer may be combined with NB-IoT modules with firmware 1.4.0 or newer, in order to ensure compliance with the essential requirements according to art. 3(3) d and art. 3(3) e of Directive 2014/53/EU ("RED Cybersecurity"). The firmware version can be read out with the OTC app.

## TECHNICAL DATA FLOW SENSOR

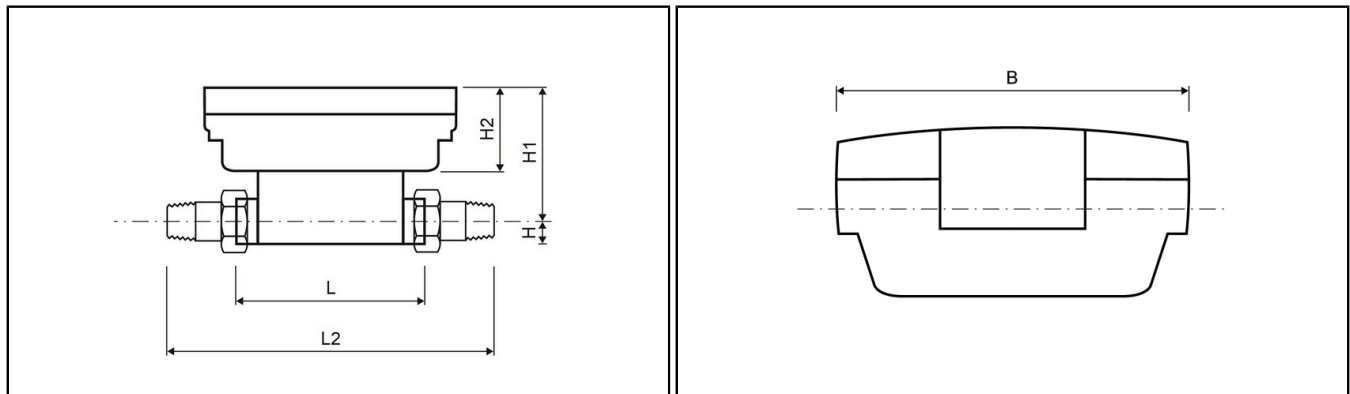
| Nominal flow rate                               | q <sub>p</sub> | m <sup>3</sup> /h | 0.6       | 1.5       | 1.5       | 2.5       | 6         | 6         | 6         |
|-------------------------------------------------|----------------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Nominal diameter                                | DN             | mm                | 15        | 15        | 20        | 20        | 25        | 32        | 40        |
| Overall length                                  | L              | mm                | 110       | 110       | 130       | 130       | 260       | 260       | 150       |
| Starting flow rate                              |                | l/h               | 1         | 2.5       | 2.5       | 4         | 10        | 10        | 10        |
| Minimum flow rate (DR 1:250)                    | q <sub>i</sub> | l/h               | -         | 6         | 6         | 10        | 24        | 24        | -         |
| Minimum flow rate (DR 1:100)                    | q <sub>i</sub> | l/h               | 6         | 15        | 15        | 25        | 60        | 60        | 60        |
| Maximum flow rate                               | q <sub>s</sub> | m <sup>3</sup> /h | 1.2       | 3         | 3         | 5         | 12        | 12        | 12        |
| Overload flow rate                              |                | m <sup>3</sup> /h | 2.5       | 4.6       | 4.6       | 6.7       | 18.4      | 18.4      | 18.4      |
| Operating pressure                              | PN             | bar               | 16/25     | 16/25     | 16/25     | 16/25     | 16/25     | 16/25     | 16/25     |
| Pressure loss at q <sub>p</sub>                 | Δp             | mbar              | 95        | 130       | 115       | 110       | 190       | 190       | 190       |
| Temp. range heating - brass body                |                | °C                | 5 ... 130 | 5 ... 130 | 5 ... 130 | 5 ... 130 | 5 ... 150 | 5 ... 150 | 5 ... 150 |
| Temp. range heating - spheroidal cast iron body |                | °C                | -         | -         | -         | -         | -         | -         | -         |
| kv value                                        |                | m <sup>3</sup> /h | 1.95      | 4.16      | 4.42      | 7.54      | 13.76     | 13.76     | 13.76     |

| Nominal flow rate                               | q <sub>p</sub> | m <sup>3</sup> /h | 10              | 15              | 25               | 40        | 60               | 100              |
|-------------------------------------------------|----------------|-------------------|-----------------|-----------------|------------------|-----------|------------------|------------------|
| Nominal diameter                                | DN             | mm                | 40              | 50              | 65               | 80        | 100              | 100              |
| Overall length                                  | L              | mm                | 300             | 270             | 300              | 300       | 360              | 360              |
| Starting flow rate                              |                | l/h               | 20              | 40              | 50               | 80        | 120              | 120              |
| Minimum flow rate (DR 1:250)                    | q <sub>i</sub> | l/h               | 40 <sup>1</sup> | 60 <sup>1</sup> | 100 <sup>1</sup> | 160       | 240 <sup>1</sup> | 240 <sup>1</sup> |
| Minimum flow rate (DR 1:100)                    | q <sub>i</sub> | l/h               | 100             | 150             | 250              | 400       | 600              | 1000             |
| Maximum flow rate                               | q <sub>s</sub> | m <sup>3</sup> /h | 20              | 30              | 50               | 80        | 120              | 120              |
| Overload flow rate                              |                | m <sup>3</sup> /h | 24              | 36              | 60               | 90        | 132              | 132              |
| Operating pressure                              | PN             | bar               | 16/25           | 16/25           | 16/25            | 16/25     | 16/25            | 16/25            |
| Pressure loss at q <sub>p</sub>                 | Δp             | mbar              | 140             | 165             | 75               | 80        | 75               | 210              |
| Temp. range heating - brass body                |                | °C                | 5 ... 150       | 5 ... 150       | 5 ... 150        | 5 ... 150 | 5 ... 150        | 5 ... 150        |
| Temp. range heating - spheroidal cast iron body |                | °C                | -               | 5 ... 105       | 5 ... 105        | 5 ... 105 | 5 ... 105        | 5 ... 105        |
| kv value                                        |                | m <sup>3</sup> /h | 26.73           | 36.93           | 91.29            | 141.42    | 219.09           | 218.22           |

<sup>1</sup> Only for horizontal installation

## DIMENSIONS THREAD VERSION

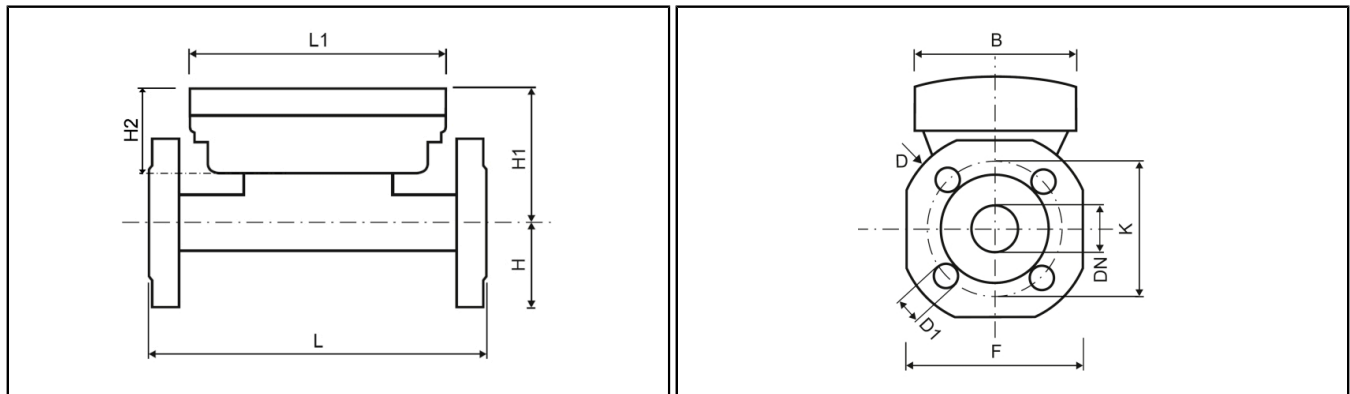


| Nominal flow rate             | q <sub>p</sub> | m <sup>3</sup> /h | 0.6  | 1.5  | 1.5  | 2.5  | 6    | 6    | 6    |
|-------------------------------|----------------|-------------------|------|------|------|------|------|------|------|
| Nominal diameter              | DN             | mm                | 15   | 15   | 20   | 20   | 25   | 32   | 40   |
| Overall length                | L              | mm                | 110  | 110  | 130  | 130  | 260  | 260  | 150  |
| Overall length with coupling  | L2             | mm                | 190  | 190  | 230  | 230  | 380  | 380  | -    |
| Length of calculator          | L1             | mm                | 150  | 150  | 150  | 150  | 150  | 150  | 150  |
| Height                        | H              | mm                | 14.5 | 14.5 | 18   | 18   | 23   | 23   | 23   |
| Height                        | H1             | mm                | 82   | 82   | 84   | 84   | 88.5 | 88.5 | 88.5 |
| Height of calculator          | H2             | mm                | 54   | 54   | 54   | 54   | 54   | 54   | 54   |
| Width of calculator           | B              | mm                | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| Connection thread on meter    |                | Inch              | G¾B  | G¾B  | G1B  | G1B  | G1¼B | G1½B | G2B  |
| Connection thread of coupling |                | Inch              | R½   | R½   | R¾   | R¾   | R1   | R1¼  | R1½  |
| Weight <sup>1</sup>           |                | kg                | 0.76 | 0.76 | 0.85 | 0.85 | 1.5  | 1.5  | 1.52 |

| Nominal flow rate             | q <sub>p</sub> | m <sup>3</sup> /h | 10  | 15  | 25  | 40  | 60  | 100 |
|-------------------------------|----------------|-------------------|-----|-----|-----|-----|-----|-----|
| Nominal diameter              | DN             | mm                | 40  | 50  | 65  | 80  | 100 | 100 |
| Overall length                | L              | mm                | 300 | 270 | 300 | 300 | 360 | 360 |
| Overall length with coupling  | L2             | mm                | 440 | -   | -   | -   | -   | -   |
| Length of calculator          | L1             | mm                | 150 | -   | -   | -   | -   | -   |
| Height                        | H              | mm                | 33  | -   | -   | -   | -   | -   |
| Height                        | H1             | mm                | 94  | -   | -   | -   | -   | -   |
| Height of calculator          | H2             | mm                | 54  | -   | -   | -   | -   | -   |
| Width of calculator           | B              | mm                | 100 | -   | -   | -   | -   | -   |
| Connection thread on meter    |                | Inch              | G2B | -   | -   | -   | -   | -   |
| Connection thread of coupling |                | Inch              | R1½ | -   | -   | -   | -   | -   |
| Weight <sup>1</sup>           |                | kg                | 3.1 | -   | -   | -   | -   | -   |

<sup>1</sup> Meter with A-cell, without modules, 1.4 m cable length, 1.9 m cable length of temperature sensor Ø 5.2 mm

## DIMENSIONS FLANGE VERSION

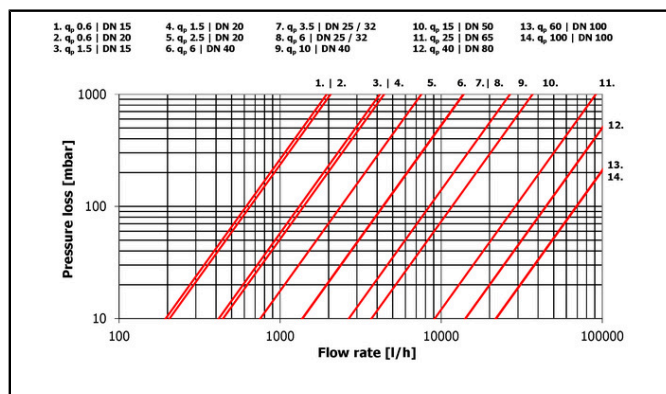


| Nominal flow rate                             | q <sub>p</sub> | m <sup>3</sup> /h | 0.6 | 1.5 | 1.5 | 2.5 | 6    | 6    | 6   |
|-----------------------------------------------|----------------|-------------------|-----|-----|-----|-----|------|------|-----|
| Nominal diameter                              | DN             | mm                | 15  | 15  | 20  | 20  | 25   | 32   | 40  |
| Overall length                                | L              | mm                | 110 | 110 | 130 | 130 | 260  | 260  | 150 |
| Length of calculator                          | L1             | mm                | -   | -   | -   | -   | 150  | 150  | -   |
| Height                                        | H              | mm                | -   | -   | -   | -   | 50   | 62.5 | -   |
| Height                                        | H1             | mm                | -   | -   | -   | -   | 88.5 | 88.5 | -   |
| Height of calculator                          | H2             | mm                | -   | -   | -   | -   | 54   | 54   | -   |
| Width of calculator                           | B              | mm                | -   | -   | -   | -   | 100  | 100  | -   |
| Flange dimension                              | F              | mm                | -   | -   | -   | -   | 100  | 125  | -   |
| Flange diameter                               | D              | mm                | -   | -   | -   | -   | 114  | 139  | -   |
| Hole circle diameter                          | K              | mm                | -   | -   | -   | -   | 85   | 100  | -   |
| Screw hole diameter                           | D1             | mm                | -   | -   | -   | -   | 14   | 18   | -   |
| Number of screw holes                         |                | pcs               | -   | -   | -   | -   | 4    | 4    | -   |
| Weight brass body <sup>2</sup>                |                | kg                | -   | -   | -   | -   | 3.5  | 4.8  | -   |
| Weight spheroidal cast iron body <sup>2</sup> |                | kg                | -   | -   | -   | -   | -    | -    | -   |

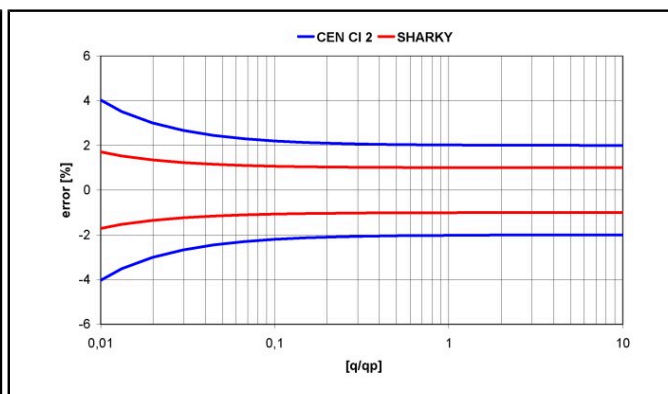
| Nominal flow rate                             | q <sub>p</sub> | m <sup>3</sup> /h | 10  | 15   | 25    | 40   | 60                    | 100                   |
|-----------------------------------------------|----------------|-------------------|-----|------|-------|------|-----------------------|-----------------------|
| Nominal diameter                              | DN             | mm                | 40  | 50   | 65    | 80   | 100                   | 100                   |
| Overall length                                | L              | mm                | 300 | 270  | 300   | 300  | 360                   | 360                   |
| Length of calculator                          | L1             | mm                | 150 | 150  | 150   | 150  | 150                   | 150                   |
| Height                                        | H              | mm                | 69  | 73.5 | 85    | 92.5 | 108                   | 108                   |
| Height                                        | H1             | mm                | 94  | 99   | 106.5 | 114  | 119                   | 119                   |
| Height of calculator                          | H2             | mm                | 54  | 54   | 54    | 54   | 54                    | 54                    |
| Width of calculator                           | B              | mm                | 100 | 100  | 100   | 100  | 100                   | 100                   |
| Flange dimension                              | F              | mm                | 138 | 147  | 170   | 185  | 216                   | 216                   |
| Flange diameter                               | D              | mm                | 148 | 163  | 184   | 200  | 235                   | 235                   |
| Hole circle diameter                          | K              | mm                | 110 | 125  | 145   | 160  | 180 <sup>1</sup> /190 | 180 <sup>1</sup> /190 |
| Screw hole diameter                           | D1             | mm                | 18  | 18   | 18    | 19   | 19/22                 | 19/22                 |
| Number of screw holes                         |                | pcs               | 4   | 4    | 8     | 8    | 8                     | 8                     |
| Weight brass body <sup>2</sup>                |                | kg                | 6.4 | 7.0  | 8.9   | 10.9 | 16.4                  | 16.4                  |
| Weight spheroidal cast iron body <sup>2</sup> |                | kg                | -   | 5.9  | 7.7   | 9.6  | 15.2                  | 15.2                  |

<sup>1</sup> Value for PN 16 housing<sup>2</sup> Meter with A-cell, without modules, 1.4 m cable length, 1.9 m cable length of temperature sensor Ø 5.2 mm

## PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

## REACH

Information pursuant to Article 33 (1) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006:

This product series contains components with the following substances in a concentration of more than 0.1% weight by weight (w/w):

- Lead (CAS no.: 7439-92-1)
- Lead titanium zirconium oxide (CAS no.: 12626-81-2)

## Economic Actor Information

Applicable regulation and legal obligations for products may change.

DIEHL METERING monitors applicable regulation to ensure their products comply at the date of placing on the market.

Each economic actor making products available on the market thereafter must independently keep informed about the current applicable regulation.

For questions, please contact: [metering-germany-info@diehl.com](mailto:metering-germany-info@diehl.com)

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