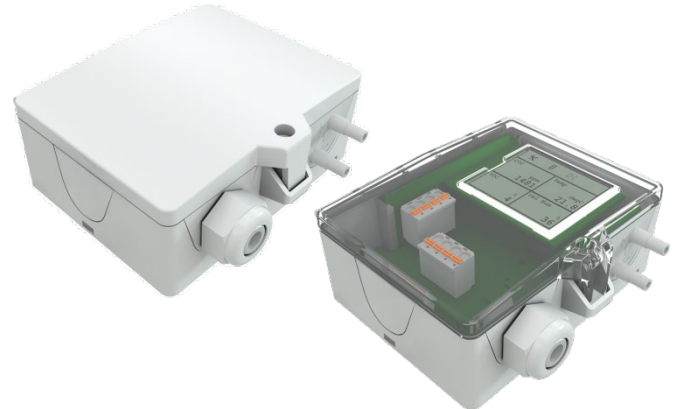# DPA+ (LCD) RS485 BACnet

Differential Pressure Transmitter

**thermokon®**
HOME OF SENSOR TECHNOLOGY

## Datasheet

Subject to technical alteration
Issue date: 20.02.2023 • A123

*The following illustrations show the version with LCD*

## »APPLICATION

Differential pressure and volume flow transducer for monitoring differential pressure and volume flow of air and other non-flammable and non-aggressive gases. Three types with eight different measuring ranges are available for different applications. In addition to differential pressure all variants provide the calculated volume flow as second analog output signal. LCD models with RGB background light have a transparent cover. Display configuration and threshold values for color changes can be parameterized via Thermokon USEapp. The mounting base (included in delivery) allows mounting on a level surface or mounting on DIN rail TS35 (35x7,5 mm) according to EN 60715.

## »TYPES AVAILABLE

**Differential pressure and volume flow transducer <u>optional with display</u> – RS485 BACnet MS/TP**
- DPA250+ (LCD) RS485 BACnet MultiRange <AZ>
- DPA2500+ (LCD) RS485 BACnet MultiRange <AZ>
- DPA7000+ (LCD) RS485 BACnet MultiRange <AZ>

**Differential pressure and volume flow transducer <u>optional with display</u> and 2 digital inputs – RS485 BACnet MS/TP**
- DPA2500+ (LCD) RS485 BACnet MultiRange <AZ> 2IN

MultiRange: Measuring ranges adjustable at the transducer
<AZ>: automatic zero-point adjustment (optional)

## »PRODUCT TESTING AND CERTIFICATION

CE  UK CA

**Declaration of conformity**
The declaration of conformity of the products are available on our website https://www.thermokon.de/ .

## »NOTES ON DISPOSAL

As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

## » SECURITY ADVICE – CAUTION

The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

Please comply with
- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

Before installation, commissioning and operation, make sure that the correct pressure gauge has been selected with regard to measuring range, design and, based on the specific measuring conditions, the suitable medium in contact with the medium. Pressure gauges may only be installed and serviced by trained specialist personnel authorized by the plant operator. Failure to observe the relevant regulations may result in serious physical injury and/or damage to property.
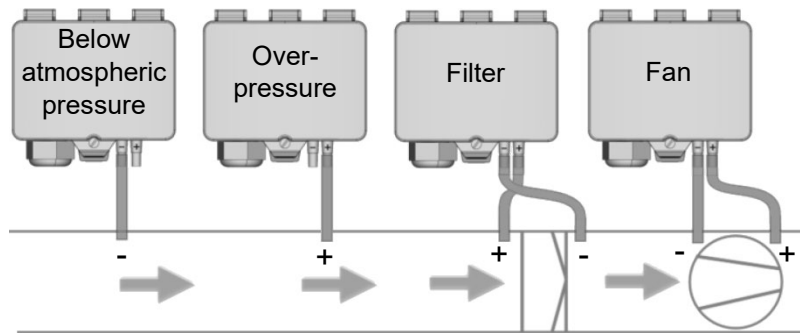
## » TECHNICAL DATA

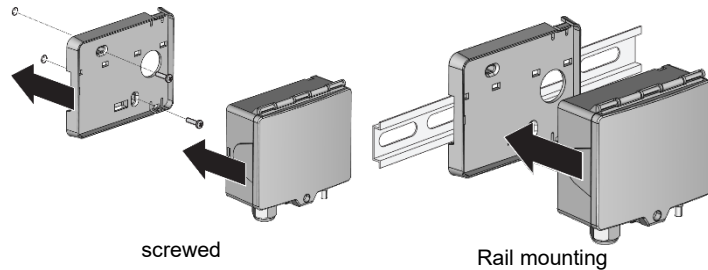| | | | |
|---|---|---|---|
| **Measuring values** | differential pressure, volume flow | | |
| **Medium** | air or other non-flammable/non-aggressive gases | | |
| **Output voltage** | 0..10 V or 0..5 V, min. load 10 kΩ, (live-zero Konfiguration über Thermokon USEapp) | | |
| **Network technology** | RS485 BACnet MS/TP, **Fail-safe Biasing required** | | |
| **Power supply** | 15..35 V = or 19..29 V ~ | | |
| **Power consumption** | max. 2,3 W (24 V =) \| max. 4,3 VA (24 V ~) | | |
| **Measuring range velocity** | 0… 750.000 m³/h (default), optionally configurable via Thermokon USEapp | | |
| **Measuring range pressure** *selectable at the device* | **type 250** 0..+25 \| 0..+50 \| 0..+100 \| 0..+250 \| -25..+25 \| -50..+50 \| -100..+100 \| -150..+150 Pa | **type 2500** -100..+100 \| 0..+100 \| 0..+250 \| 0..+500 \| 0..+1000 \| 0..+1500 \| 0..+2000 \| 0..+2500 Pa | **type 7000** 0..+1000 \| 0..+1500 \| 0..+2000 \| 0..+2500 \| 0..+3000 \| 0..+4000 \| 0..+5000 \| 0..+7000 Pa |
| **Accuracy pressure** *deviation from calibration reference device (calibrator)* | at range <250 Pa: ±1 Pa | at range <500 Pa: ±5 Pa, at range >500 Pa: ±10 Pa | at range <2000 Pa: ±10 Pa, at range >2000 Pa: ±25 Pa |
| **Zero-point adjustment** *(manual)* | 3 month | at range <500 Pa: 6 month at range >500 Pa: 12 month | 12 month |
| **Zero-point adjustment** *(automatic)* | automatic zero-point adjustment (optional) | | |
| **Max. working overpressure** | 40 kPa | | |
| **Sensor** | piezo measuring element | | |
| **Inputs** *(optional)* | **2IN** 2x input for NTC10k or floating contact | | |
| **Display** *(optional)* | LCD 29x35 mm with RGB backlight units, pressure: Pa, inchWC, volume flow: m3/h, cfm (configurable) | | |
| **Enclosure** *(type-dependent)* | **without LCD** enclosure USE-L, PC, pure white, with removable cable entry | | **with LCD** enclosure USE-L, PC, pure white, cover PC, transparent, with removable cable entry |
| **Protection** | IP65 according to EN 60529 | | |
| **Cable entry** | M25, for wire max. Ø=7 mm, seal insert for fourfold cable entry | | |
| **Connection electrical** | **Mainboard** removable plug-in terminal, max. 2,5 mm² | | **Plug-in card** removable plug-in terminal, max. 1,5 mm² |
| **Connection mechanical** | pressure connection male Ø=5,0 mm / Ø=6,3 mm, connection tube: PVC, soft | | |
| **Ambient condition** | -10..+50 °C, max. 85% rH short term condensation | | |
| **Mounting** | screw mounted onto flat surface, prepared for mounting on DIN rail TS35 (35x7,5 mm) according to EN 60715 | | |

## »MOUNTING ADVICES

Before installing the device, please check the leak tightness of the pressure lines. A prerequisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurized connection line.
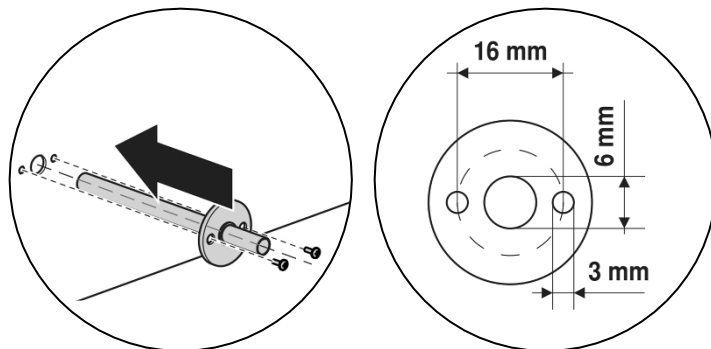
- In order to connect the device, the process lines must be unpressurized
- Consider the suitability of the device for the medium to be measured
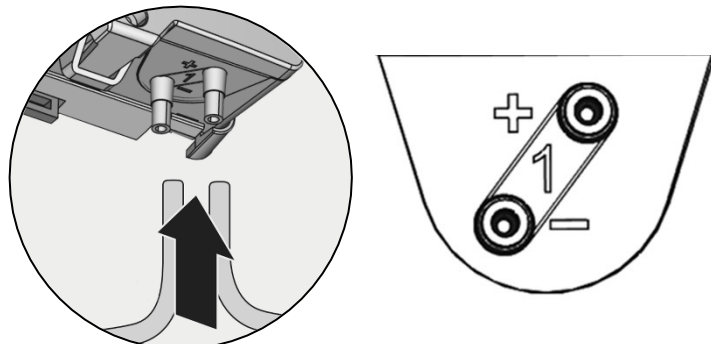- Consider maximum pressures



**1.** Mount the DPA+ mounting base in a suitable location and attach the DPA+. *Note alignment!*
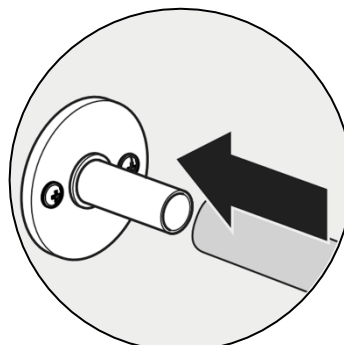
screwed

Rail mounting

**2.** Prepare the duct for mounting and mount the duct connection piece. *Attention! Observe dimensions!*

16 mm

6 mm

3 mm

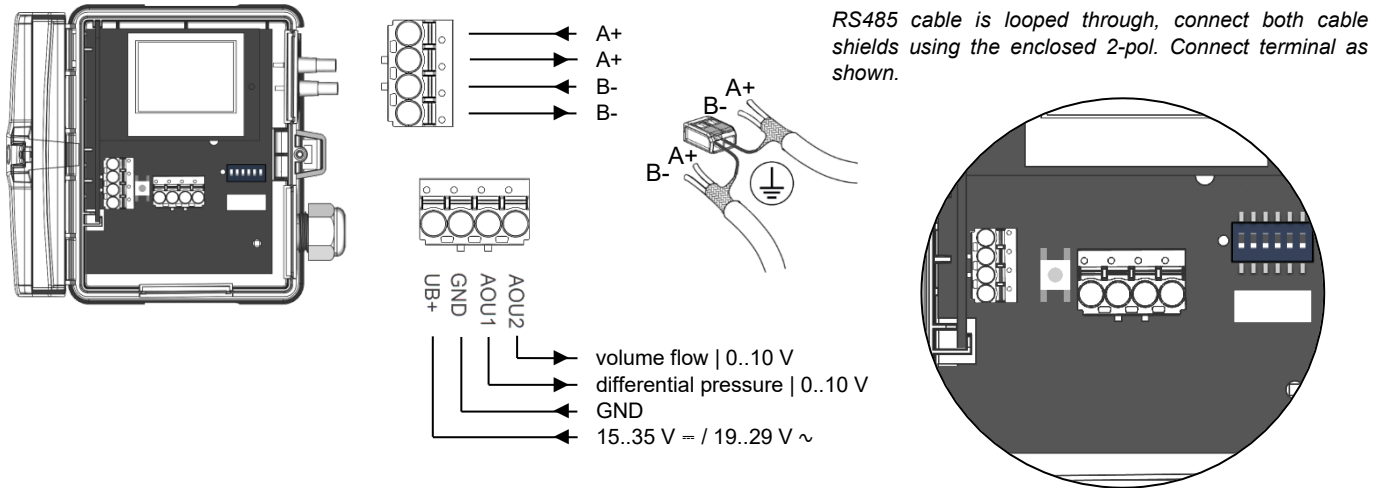**3.** Connect pressure tubes to the device. *Attention! Oserve labeling!*

**4.** Connect pressure tubes to the duct connection pieces

## »CONNECTION PLAN
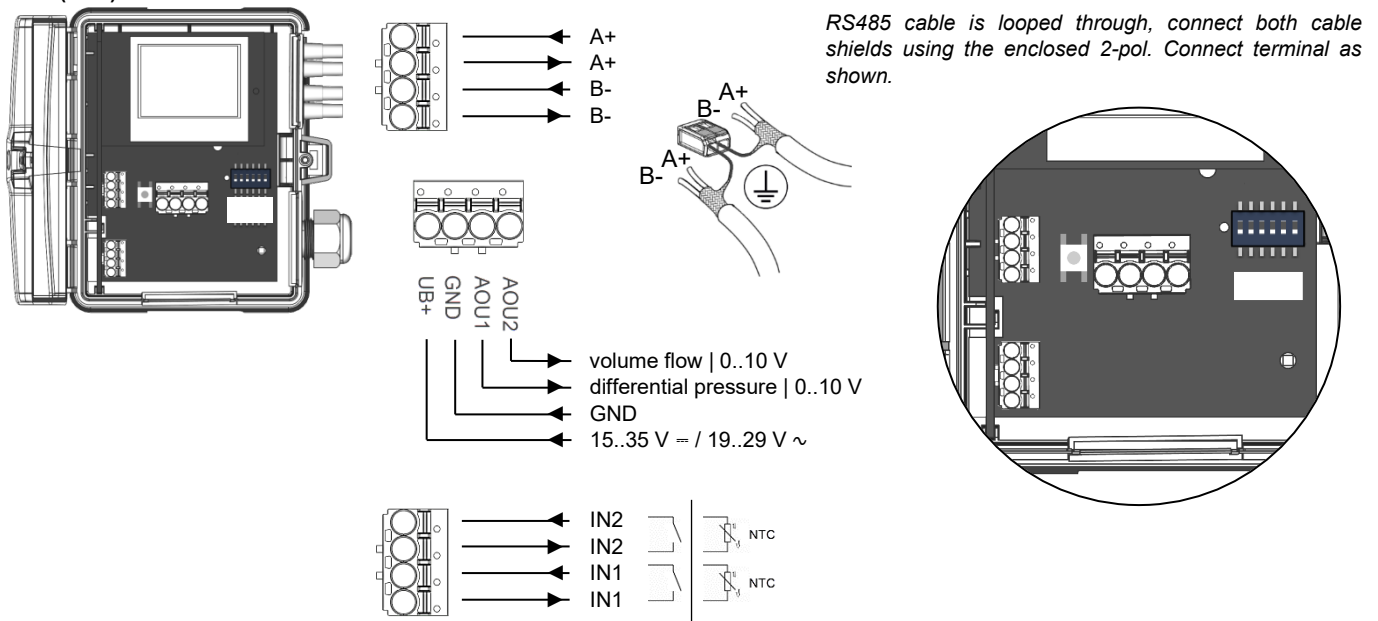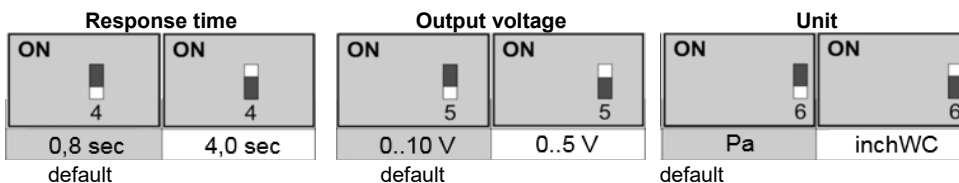
### DPA+ (LCD) RS485 BACnet



- A+
- A+
- B-
- B-

A+
B-
A+
B-

*RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.*

UB+
GND
AOU1
AOU2

- volume flow | 0..10 V
- differential pressure | 0..10 V
- GND
- 15..35 V ⎓ / 19..29 V ∼

### DPA+ (LCD) RS485 BACnet 2IN



- A+
- A+
- B-
- B-

A+
B-
A+
B-

*RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.*

UB+
GND
AOU1
AOU2

- volume flow | 0..10 V
- differential pressure | 0..10 V
- GND
- 15..35 V ⎓ / 19..29 V ∼

- IN2
- IN2 — NTC
- IN1
- IN1 — NTC

## »DIP SWITCHES, BASE BOARD

### Measuring range adjustment – Typ 250 | 2500 | 7000

| ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ON 1 2 3 | ■ = ON / ■ = OFF |
|---|---|---|---|---|---|---|---|---|
| 0..+250 | 0..+100 | 0..+50 | 0..+25 | -25..+25 | -50..+50 | -100..+100 | -150..+150 | Pa |
| 0..+2500 | 0..+2000 | 0..+1500 | 0..+1000 | 0..+500 | 0..+250 | 0..+100 | -100..+100 | Pa |
| 0..+7000 | 0..+5000 | 0..+4000 | 0..+3000 | 0..+2500 | 0..+2000 | 0..+1500 | 0..+1000 | Pa |
| 0..+1 | 0..+0.4 | 0..+0.2 | 0..+0.1 | -0.1..+0.1 | -0.2..+0.2 | -0.4..+0.4 | -0.6..+0.6 | inchWC |
| 0..+10 | 0..+8 | 0..+6 | 0..+4 | 0..+2 | 0..+1 | 0..+0.4 | -0.4..+0.4 | inchWC |
| 0..+28 | 0..+20 | 0..+16 | 0..+12 | 0..+10 | 0..+8 | 0..+6 | 0..+4 | inchWC |

default

| Response time | | Output voltage | | Unit | |
|---|---|---|---|---|---|
| ON 4 | ON 4 | ON 5 | ON 5 | ON 6 | ON 6 |
| 0,8 sec | 4,0 sec | 0..10 V | 0..5 V | Pa | inchWC |
| default | | default | | default | |

## »DIP SWITCHES, PLUG-IN CARD

The BACnet address of the device is set binary coded in the range of 1 ... 127 via 7 dip-switches. (the address 0 is reserved and cannot be selected).

**\*factory default settings**



**Termination 120 Ω**
**Not active\***    active

**Baud**
**9600\***    19200
38400    76800

**BACnet adress**
ON=$2^0$ (1)\*   ON=$2^1$ (2)   ON=$2^2$ (4)   ON=$2^3$ (8)   ON=$2^4$ (16)

ON=$2^5$ (32)   ON=$2^6$ (64)

Adress-Bsp.:
2+8+16+32+64=122

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## »BACNET KONFIGURATION



**BACnet Objects, PICS and BIBBs:**
USE-RS485 BACnet interface
A detailed description of the BACnet interface can be found at the following link: **Download**

| Object | Access | Description | Object AV-38 = 1 (Unit SI) | | Object AV-38 = 2 (Unit Imperial) | |
|--------|--------|-------------|------------|------|------------|------|
| | | | COV Increment | Unit | COV Increment | Unit |
| AI-8 | R | **Differential pressure 1** | 0..7000 | Pa | 0..28 | inWC |
| AI-9 | R | **Volumetric flow 1 (16 Bit)** (if the Present Value in Objekt AV-41 is set to the value 2, the value scales the unit m³/s) | 0..999 999 | m³/h m³/s | 0..999 999 | cfm |

**Optional (IN1 | IN2)**
NTC10k temperature sensors or floating contacts can be connected to the inputs (IN1 & IN2)

| Object | Access | Description | | COV Increment | Unit |
|--------|--------|-------------|--|---------------|------|
| AI-18 | R | Input 1– Binary signal | | 1 | - |
| AI-19 | R | Input 2 – Binary signal | | 1 | - |

| Object | Access | Description | Object AV-38 = 1 (Unit SI) | | Objekt AV-38 = 2 (Unit Imperial) | |
|--------|--------|-------------|------------|------|------------|------|
| | | | COV Increment | Unit | COV Increment | Unit |
| AI-16 | R | Input 1 - Temperatur NTC10k | 1.0 | °C | 2.0 | °F |
| AI-17 | R | Input 2 - Temperatur NTC10k | 1.0 | °C | 2.0 | °F |

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## »FLOW CALCULATION: (DEFAULT PARAMETERS)

$q = k * \sqrt{2 * \frac{\Delta p}{\rho}}$ with k=1500, fan manufacturer Rosenberg, Comefri, Nicotra Gebhardt, default measuring range 0..750.000 m³/h. **Further calculation formulas, fan manufacturers and k-values can be selected via the USEapp.**

| Rosenberg · Comefri ·Gebhardt ·Nicotra | Ziehl-Abegg ·EBM-Papst | Fläkt Woods |
|----------------------------------------|------------------------|-------------|
| $q = k * \sqrt{2 * \frac{\Delta p}{\rho}}$ | $q = k * \sqrt{\Delta p}$ | $q = \frac{1}{k} * \sqrt{\Delta p}$ |

## » CONFIGURATION

**The Thermokon bluetooth dongle with micro-USB (Item No.: 668262) is required for communication between USEapp and USE-M / USE L products. Commercial bluetooth dongles are not compatible.**

Application-specific reconfiguration of the devices can be carried out using the Thermokon USEapp. The configuration is carried out in the voltage-supplied state.

**The configuration-app and the app description can be found in the Google Play Store or in the Apple App Store.**

## » APPLICATION NOTICE

The Bluetooth dongle snaps into the socket easily. When removing, please fix the plug-in card (option PCB) so that it is not unintentionally pulled out.
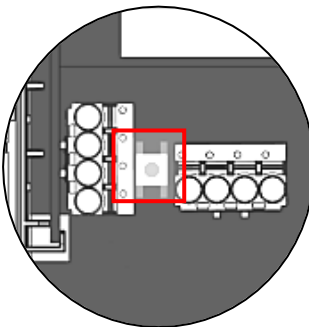
## » AUTOMATIC ZERO-POINT ADJUSTMENT - (OPTIONAL)

**Transmitters equipped with the auto-zero adjustment are maintenance free.**
The auto-zero adjustment electronically adjusts the transmitter to zero every 10 minutes. The function eliminates all output signal drift due to thermal, electronic or mechanical effects. The auto-zero adjustment takes approx. 4 seconds after which the device returns to its normal measuring mode. During the 4 second correction period, the output and display values will freeze to the latest measured value.

## » MANUAL ZERO-POINT ADJUSTMENT (FOR DEVICES WITHOUT AUTO-ZERO FUNCTION)
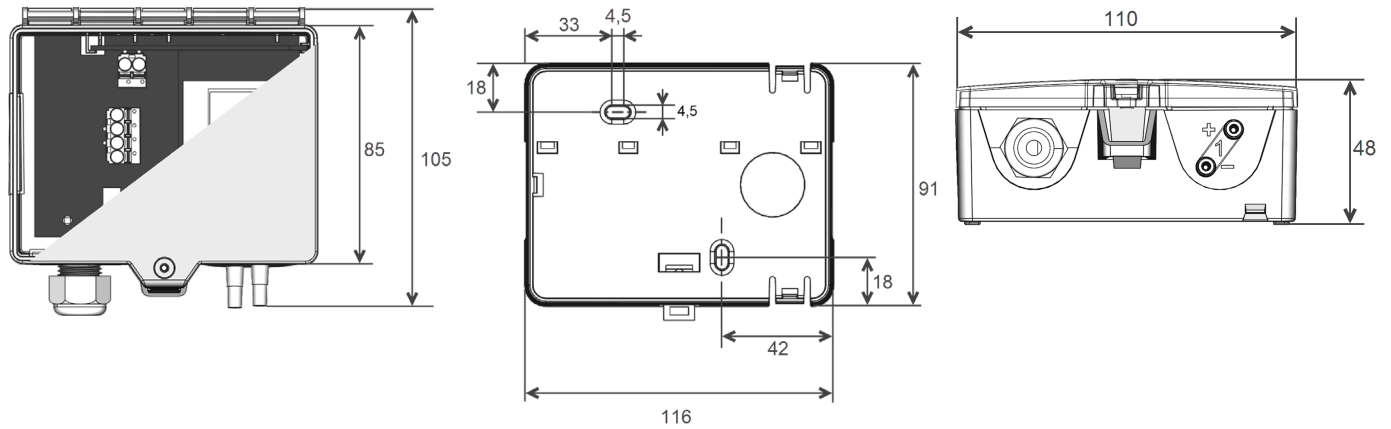
In normal operation zero point adjustment should be executed depending on the device and the measuring range.

**Attention! For executing zero point adjustment the power supply must be connected one hour before.**

- Release both connection tubes from the pressure terminals + and -
- Press the button until the LED lights permanently
- Wait until the LED flashes again and reinstall the connection tubes to the pressure ports (note + and -)

## » DIMENSIONS (MM)



## » ACCESSORIES (INCLUDED IN DELIVERY)

| | |
|---|---|
| Mounting base enclosure USE-L | Item No. 668361 |
| 2 m PVC connection tube | Item No. 484268 |
| KKS40 kit | Item No. 430135 |
| • 2 plastic duct flanges • 4 mounting screws 4x20 | |
| | |
| Mounting kit universal | Item No. 698511 |
| • Cover screw + screw cover• 2 Rawlplugs • 2 Screws (countersunk head) • 2 Screws (rounded head) | |

## » ACCESSORIES (OPTIONAL)

| | |
|---|---|
| Bluetooth dongle USE for USEapp | Item No. 668262 |
| RS485 Biasing Adapter | Item No. 811378 |
| | |
| T-hose connector for pressure hoses Ø=4 mm (10 pcs) | Item No. 668323 |
| Adapter 90° angle for pressure hoses Ø=4 mm | Item No. 668330 |
| Metal duct connectors 40 mm | Item No. 265138 |
| Metal duct connectors 100 mm | Item No. 302531 |