DPA+ LCD RS485 Modbus

Differential Pressure Transmitter

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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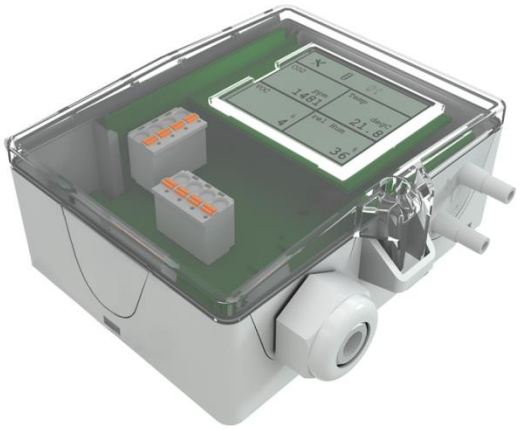


Application

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, k-values for flow calculation (default 1500) 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 with display – RS485 Modbus

DPA250+ LCD RS485 Modbus MultiRange <AZ>
DPA2500+ LCD RS485 Modbus MultiRange <AZ>
DPA7000+ LCD RS485 Modbus MultiRange <AZ>

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

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

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.

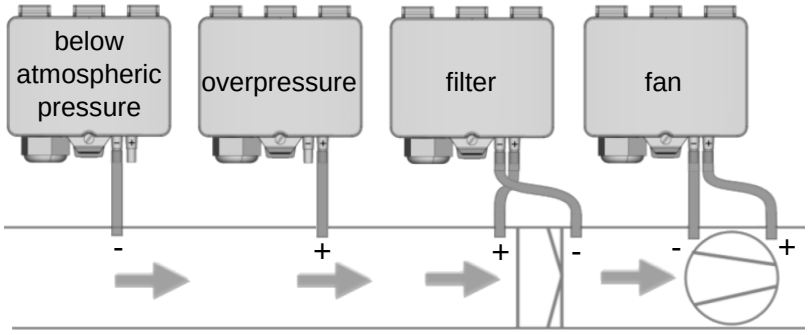
Technical Data

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 configuration via Thermokon USEapp)		
Network technology	RS485 Modbus, RTU, half-duplex, baud rate 9.600, 19.200, 38.400 or 57600, parity: none (2 stopbits), even or odd (1 stopbit)		
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 configured 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)	±1 Pa bei Messbereich <250 Pa	±5 Pa bei Messbereich <500 Pa, ±10 Pa bei Messbereich >500 Pa,	±10 Pa bei Messbereich <2000 Pa, ±25 Pa bei Messbereich >2000 Pa, Abweichung
Max. working overpressure	40 kPa		
Calibration	manually, automatic zero-point calibration (optional)		
Sensor	piezo measuring element		
Display	LCD 29x35 mm with RGB backlight units, pressure: Pa, inchWC, volume flow: m3/h, cfm (configurable)		
Enclosure	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** removeable plug-in terminal, max. 2,5 mm²	**Plug-in card** removeable 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.

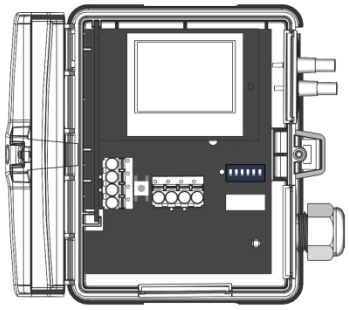
- In order to connect the device, the process lines must be unpressurized
- Consider the suitability of the device for the medium to be measured
- Consider maximum pressures

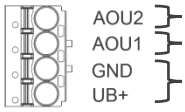


Connection Plan

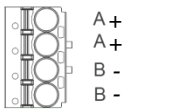
RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.

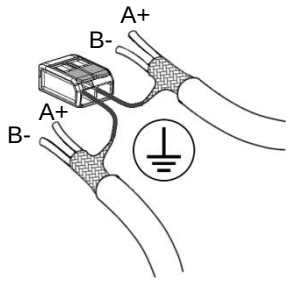
DPA+ **LCD RS485 Modbus MultiRange**





(volume flow | 0..10 V)
(differential pressure | 0..10 V)
(15..35 V = or 19..29 V ~)





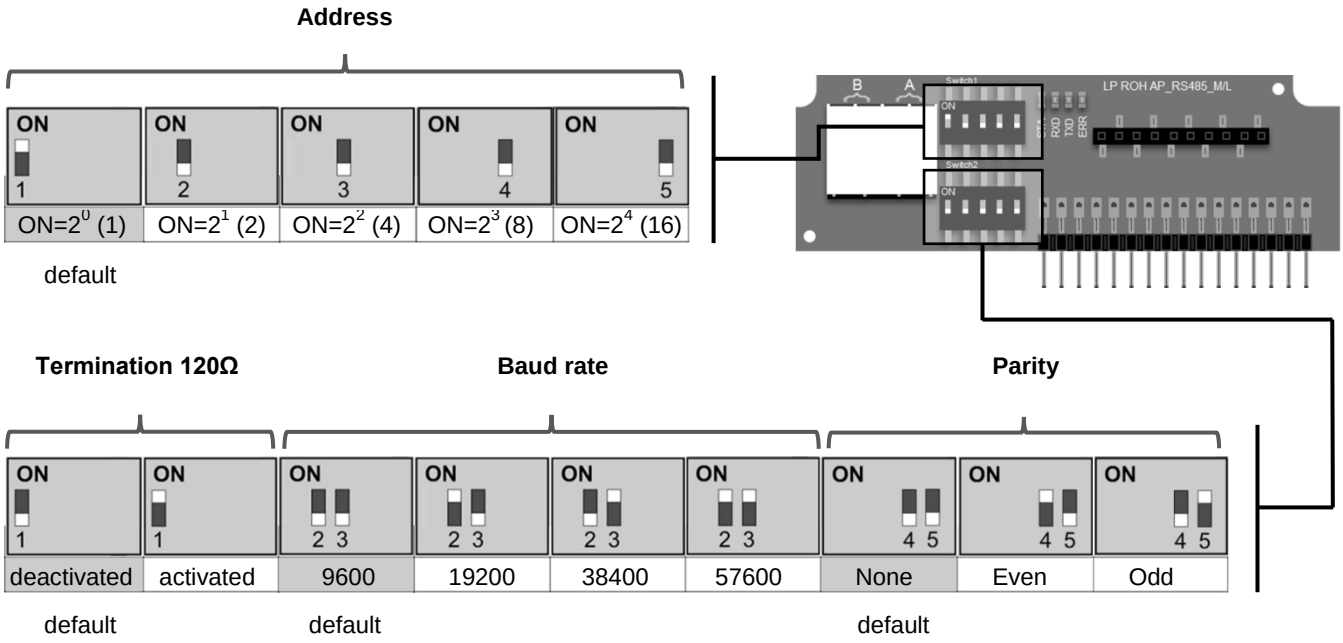
Measuring range adjustment – type 250 | 2500 | 7000

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	



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.

Register 400 = 1 (Unit SI)

Address	Access	Description	Resolution / Unit		
8	R / s16	**Differential pressure 1**	SI	1.0	Pa
9	R / u16	**Volumetric flow 1 (16 Bit)** (if register address 404 is set to the value 2, the value scales the unit m³/s)	SI	100.0	m³/h m³/s
50 Low 51 High	R / u32	**Volumetric flow 1 (32 Bit)** (if register address 404 is set to the value 2, the value scales the unit m³/s) *This register is available since firmware V1.6 (see register 505)*	SI	1.0	m³/h m³/s

Register 400 = 2 (Unit Imperial)

Address	Access	Description	Resolution / Unit		
8	R / s16	**Differential pressure 1**	Imperial	0.001	inWC
9	R / u16	**Volumetric flow 1 (16 Bit)** (if register address 404 is set to the value 2, the value scales the unit m³/s)	Imperial	10.0	cfm
50 Low 51 High	R / u32	**Volumetric flow 1 (32 Bit)** (if register address 404 is set to the value 2, the value scales the unit m³/s) *This register is available since firmware V1.6 (see register 505)*	Imperial	1.0	cfm

The modbus address of the device is set in the range of 1 ... 31 (binary encoded) using a 5-pole DIP switch. With address 0 via DIP, an extended address range (32..247) is available via USEapp.

Modbus addresses:
USE-RS485 Modbus Interface

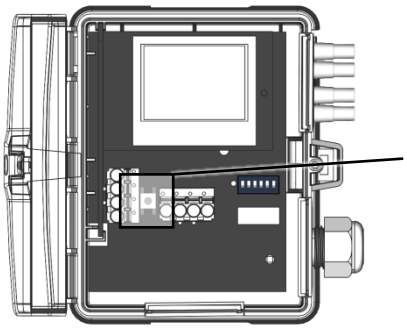
A detailed description of the Modbus addresses can be found under the following link:
→ **Download**

Automatic zero-point correction - (optional)

Transmitters equipped with the auto-zero correction are maintenance free.

The auto-zero correction electronically adjusts the transmitter zero every 10 minutes. The function eliminates all output signal drift due to thermal, electronic or mechanical effects. The auto-zero correction 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 correction (for devices without auto-zero function)



In normal operation zero point correction should be executed every 12 months.

Attention! For executing zero point correction 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 -)

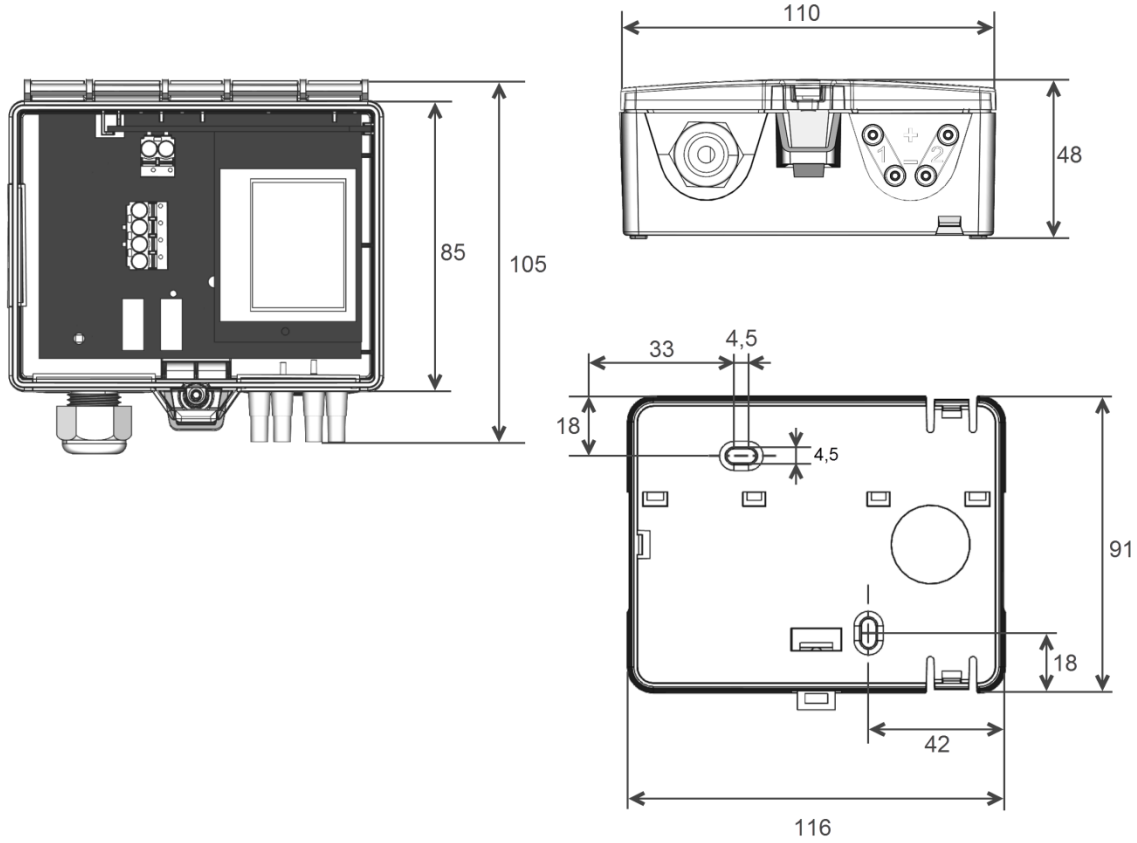
Configuration

The Thermokon bluetooth dongle with micro-USB is required for communication between USEapp and USE-M / USE L (Item No..: 668262). 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.

Dimensions (mm)



Accessories (included in delivery)

Mounting base enclosure USE-L	Item No. 668361
2 m PVC connection tube	Item No. 484268
KKS40 kit • 2 plastic duct flanges • 4 mounting screws 4x20	Item No. 430135
Mounting kit 4 • Cable entry M25 • Wago twofold terminal • Cover screw • 2 Screws (countersunk head)	Item No. 674140

Accessories (optional)

Bluetooth dongle USE for USEapp	Item No. 668262
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