Low differential pressure transmitter

E2418-DP

User Manual

Evikon

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Specifications

Version	E2418DP-1K	E2418DP-10K
Detection range options	-1...+1 kPa	-10...+10 kPa
Resolution	1 Pa (0,01 mbar)	10 Pa (0,1 mbar)
Max. overpressure	10 kPa	80 kPa
Accuracy	±20 Pa	±200 Pa
Zero point drift	<5 Pa/year	<50 Pa/year
Temperature effect	Compensated within -5...+65 °C range	
Analog outputs	2 × 4-20 mA or 0-10 V, user settable	
Standard output scales	E2418DP-1K	E2418DP-10K
	0-250 Pa, 0-500 Pa, 0-1,0 kPa -250 - +250 Pa -500 - +500 Pa -1,0 - +1,0 kPa	0-2,5 kPa, 0-5 kPa, 0-10 kPa -2,5 - +2,5 kPa -5 - +5 kPa -10 - +10 kPa
Digital interface	RS485, Modbus RTU protocol	
Load resistance	RL < (Us - 3 V) / 22 mA for 4-20 mA RL > 100 kOhm for 0-10 V mode	
Operating conditions	-20...+70 °C, <99 %RH non+condensing, Without dust, aggressive gases, mist or oil; Residential or business spaces	
Power supply options	12...36 VDC (default), 24 VAC as option	
Power consumption	< 1 W	
Electromagnetic compatibility	According to 2014/30/EU: EN 61000-6-3:2020, EN 61326-1:2013(EMC, emissions) EN 61000-6-1:2019, EN 61000-6-2:2019(EMC, Immunity)	
Enclosure	Grey ABS 82 × 80 × 55 mm, IP65	

Product description

Differential pressure transmitter E2418DP is a member of the new PluraSens® family of multifunctional measurement instruments. The transmitter is intended for measurement of differential pressure of clean air or nonflammable gases.

The main HVAC applications for the transmitter are monitoring of fans, filters, valves, dampers, measurement of airflow in ventilation ducts and pressure in cleanrooms. E2418 is based on a fully calibrated, linearised and temperature compensated digital differential pressure sensor with high repeatability, stability and long lifetime.

The instrument provides two independent analog outputs OUT1 and OUT2, user selectable to 4-20 mA or 0-10 V, proportional either to differential pressure or internal temperature. RS485 Modbus RTU digital communication interface allows easy configuration of the transmitter and its integration into various automation systems through the Fieldbus network. If the symbol is marked on the equipment, consult the documentation for further information.

Safety requirements

Misuse will impair the protection of the product. Always adhere to the safety provisions applicable in the country of use.

Do not perform any maintenance operation with the power on. Do not let water or foreign objects inside the device.

Removal of the PCB from the enclosure voids the warranty. Do not touch the electronic components directly, as they are sensitive to static electricity.

Connection diagrams can be found in the installation and connections section. The device might not perform correctly or be damaged if the wrong power supply is connected.

External circuits connected to the equipment should have sufficient insulation rating according to the environmental conditions and equipment power.

A disconnecting device that is marked as such and easily accessible should be included in the installation of this product.

Operating conditions

The device should be used in explosion-safe (indoor areas, without aggressive

gases in the atmosphere. Allowed conditions are:

- temperature in the range of -20...+70 °C
- relative humidity in the range of 0...99% without condensation
- atmospheric pressure in the range of 84...106,7 kPa.

## Installation and connections

Before proceeding with the installation it is mandatory to read carefully the Safety requirements section and make sure to comply with all listed instructions.

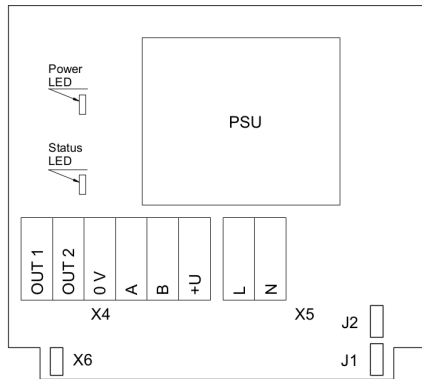The pressure transmitter should be mounted on a wall.
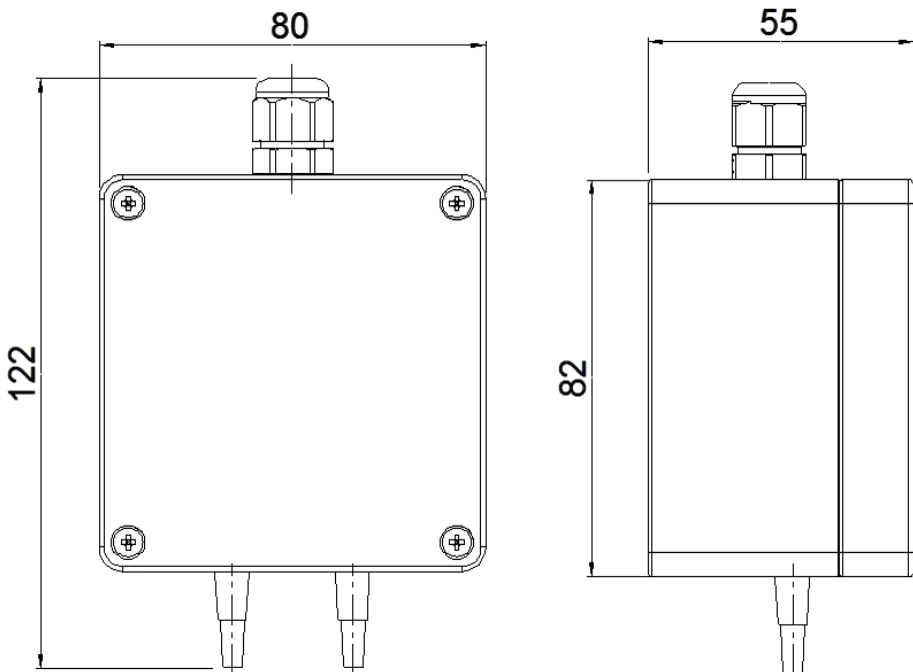
To install the device, proceed as follows:

1. Unscrew four lid screws and detach the lid from the transmitter.

2. Attach the device to a wall with screws passing through mounting holes (for dimensions see the antecedent drawing). This step may be done after step 3, consider your convenience.

3. Use M16 cable gland to let in cables of the power supply and of the external devices. Attach the power cable to the device without turning it on. Using the connection diagram below, connect the analog outputs and digital interface terminals to the relevant devices according to your tasks.
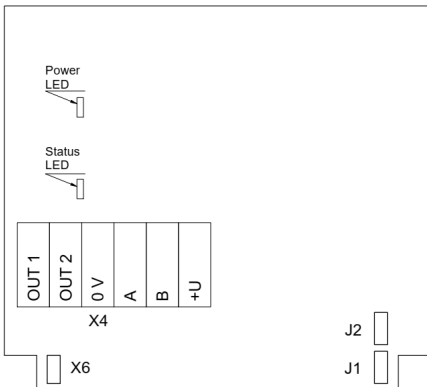
Version without PSU and relays   Version with PSU and without relays

Jumpers	
J1	OUT1 type (open: 4-20 mA; closed 0-10 V)
J2	OUT2 type (open: 4-20 mA; closed 0-10 V)
X6	Reset Modbus network parameters to default
X4 terminals	
OUT1	4-20 mA / 0-10 V output
OUT2	4-20 mA / 0-10 V output
0V	0 V / 24 VAC Neutral (optional)
A	RS485 A / Data +
B	RS485 B / Data -
+U	+24 VDC / 24 VAC Phase (optional)

The screwless quick connect spring terminals on the E2407 are suitable for a wide range of wires with cross-section 0,2...1,5 mm^2. The recommended wire stripping length is 8...9 mm. Push the spring loaded terminal lever, insert the wire end into the terminal hole and release the lever.

Use twisted pair cable, e.g. LiYY TP 2×2×0,5 mm2 or CAT 5, to connect the device to the RS485 network. Use one pair for A and B wires and the second pair for common 0V and power +U wires. to connect the transmitter to the Fieldbus network.polarity must be respected when connecting to an external RS485 network.

Overall length of all connections via the RS485 interface should not exceed 1200 m.

Both analog outputs can be independently changed between 4-20 mA and 0-10 V type using jumpers J1 (OUT1) and J2 (OUT2). By closing pins on a specific jumper the related output is 0-10 V, with an open jumper the output is 4-20 mA. Power restart is required after changing the position of the jumpers.

NOTE! Power restart is required after changing the position of the jumpers.

4. Turn on the power. The operating status is indicated by the LED on the PCB of the device. The LED response to different processes is presented in the following table:

Mode	LED mode
During calibration mode or sensor heating period (if activated)	0.5 Hz (50% on, 50% off)
During the Modbus communication cycle	Short on-off pulses
Normal operating/measurement	Continuously on or off

5. Make sure that the transmitter is properly mounted, the external devices connected, power on and control LED is constantly lit. Place the lid back and fix it with the screws. To connect the device with measurement point use tubes of appropriate diameter (4 or 6 mm) and length.

NOTE! The connecting tubes should not be squeezed or folded.

Delivery set

- Differential pressure transmitter E2418DP
- Set of mounting accessories (4 screws with plastic dowels)

Order code for E2418DP options

E2418DP options	Order code
Differential pressure transmitter-regulator, -1...1 kPa, resolution 0,5 Pa	E2418DP-1K
Differential pressure transmitter-regulator, -2...2 kPa, resolution 1 Pa	E2418DP-2K
Differential pressure transmitter-regulator, -5...5 kPa, resolution 2,5 Pa	E2418DP-5K
Differential pressure transmitter-regulator, -10...10 kPa, resolution 5 Pa	E2418DP-10K
Differential pressure transmitter-regulator, -25...25 kPa, resolution 12,5 Pa	E2418DP-25K
Integrated 90...265 V mains power supply module	E2418DP-230

Configuring

Differential pressure transmitter-regulator E2418DP shares all functionalities of the PluraSens® multifunctional transmitter platform. The features and options include:

- digital output change rate limiting filter
- digital integrating (averaging) filter
- flexible setting of analog output scales for each output

E2418 can be configured through its RS485 interface by Modbus RTU commands. A standard configuration kit includes a USB-RS485 converter and a software pack.

Please contact your Seller for more information.

Return to default settings

To reset the device's Slave ID, baud rate and stop bit number to factory settings, proceed as follows:

1. De-energize the device
2. Connect the X6 jumper
3. Turn on the device
4. De-energize the device
5. Disconnect the X6 jumper
6. Turn on the device

NOTE! Cables should be connected / disconnected from PCB when the power supply is unplugged. Connecting o Disconnecting Live wires can result in Corrupt Firmware.

Emergency mode

The current outputs of the detector may be programmed via Modbus commands (register 255) to signal if the connection with the sensor is lost. The signal may be set to 3,8 mA (low current) or 21,5 mA (high current).

Bites	Functions	Notes	Default
bit[0]=0/1	sensor present/absent	Read-only	
bit[1]=0/1	analog outputs activated/deactivated		1
bit[2]=0/1	in case of sensor absence, turn signalling off/on (OUT 1)		1
bit[3]=0/1	In case of sensor absence turn on signalling with low/high current on OUT 1	if bit [2]=0, this bit is ignored	0
bit[4]=0/1	in case of sensor absence, turn signalling off/on (OUT 2)		1
bit[5]=0/1	In case of sensor absence turn on signalling with low/high current on OUT 2	if bit [4]=0, this bit is ignored	0
bit[6]=0/1	Current/voltage output detected on OUT 1	Read-only	User defined
bit[7]=0/1	Current/voltage output detected on OUT 2	Read-only	User defined
bit[8]=0/1	LED deactivated/activated		1

Modbus RTU Communication

Modbus main holding registers (00xxx or 40xxx): 0-based, decimal

Reg	RW	Description	Supported values
1	R	hardware version	0...65535
2	R	software version	
3	R	product serial number	0...65535
4	RW*	Slave ID [1...247]	0...247
5	RW*	baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600
6	RW**	Response delay, ms	1...255 ms
7	RW*	Stop bits	1, 2, 3, 4
8	R	Last error code	1...255
17	RW***	Technological: data age in seconds (read) / restart(write)	0...65535 s (read), 42330(write)
167	RW*	Change rate limit for pressure data, pressure units	1...32000 pressure units,0=no limit
168	RW*	Integrating filter time constant for pressure data, s	1...32000 s, 0=no filter
201	RW**	Parameter assigned to OUT1	0=none, 1=temperature, 2=pressure, 9=forced Modbus control, value set in 203
202	RW**	Parameter assigned to OUT2	0=none, 1=temperature, 2=pressure, 9=forced Modbus control, value set in 204
203	RW**	Forced value for OUT1	0...1000 (0.0%...100.0% of scale)
204	RW**	Forced value for OUT2	0...1000 (0.0%...100.0% of scale)
255	RW**	Sensor control/status	see Emergency mode paragraph
257	R	Raw pressure data	-32000...+32000 pressure units
258	R	Measured temperature, °Cx100	signed integer, -4000...+12500 (-40,00...+125,00 °C)
259	R	Measured pressure	-32000...+32000 pressure units
261	RW**	0% value of analog OUT1	-32000...+32000 pressure units
262	RW**	100% value of analog OUT1	-32000...+32000 pressure units

| 263 | RW** | 0% value of analog OUT2 | -32000...+32000 pressure units |
| 264 | RW** | 100% value of analog OUT2 | -32000...+32000 pressure units |

* - the new value is applied after restart.

** - the new value is applied immediately.

*** -writing 42330 restarts the device immediately, no response on Modbus.

Broadcast ID=0 may be used to assign a new ID to a device with unknown ID.

RS485 Communication parameters

Parameter	Permitted values	Default
Supported baud rates	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
Data bits	8	8
Parity	none / odd / even	none
Stop bits	1, 2	1
Protocol	Modbus RTU	
Modbus functions	03 - Read multiple registers 06 - Write a single register	
Error codes	01 – Illegal function 02 – Illegal data address 03 – Illegal data value 04 – Slave device failure (details of last error 04 can be read from register 0x0008)	

Factory settings

Pressure unit	depending on the range
OUT1 parameter and scale	2: pressure, scale set by user
OUT2 parameter and scale	2: pressure, scale set by user

Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of the original sale. During this warranty period, the Manufacturer will, at its option, either repair or replace a product that proves to be defective. This warranty is void if the product has been operated in conditions outside ranges specified by the Manufacturer or damaged by customer error or negligence or if there has been an unauthorized modification.

Manufacturer contacts

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