PluraSens®

Differential pressure transmitter

E2418DF

User Manual

Evikon

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Specifications

Sensing method	Thermal microflow
Detection ranges	E2418-DF-50: -50...+50 Pa E2418-DF-500: -500...+500 Pa
Resolution	0,1 Pa
Gas flow through sensor	23 ml/min for ±50 Pa range 100 ml/min for ±500 Pa range
Zero point accuracy	± 0,2 Pa, stability < 0,1 Pa / year
Span accuracy	±3% of reading
Temperature effect	< 0,5% of reading per 10°C
Atmospheric pressure effect	< 0,1 % of reading per hPa
Analog outputs	2 × 4-20 mA or 0-10 V, user settable
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...+80 °C, 35…85%RH, without condensation Aggressive gases or oil, residential or business spaces
Power supply	12…36 VDC (default) 24 VAC as option
Power consumption	< 2 VA
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-regulator E2418DF is a member of the new PluraSens® family of multifunctional measurement instruments. The transmitter is intended for measurement of pressure of air and non-aggressive gases with superb accuracy and no offset drift.

The differential pressure is measured by a thermal sensor element using flow-through technology. Compared with membrane based sensors, the method provides an extended dynamic range, better long-term stability and improved repeatability, especially near zero.

E2418 features two independent analog outputs OUT1 and OUT2 user-selectable to 4-20 mA or 0-10 V. RS485 Modbus RTU digital communication interface allows easy instrument configuration and integration into various automation systems.

Safety requirements

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.

Operating conditions

The device should be used in explosion-safe (non ATEX -rated) indoor areas, without aggressive gases in the atmosphere.

Installation and connections

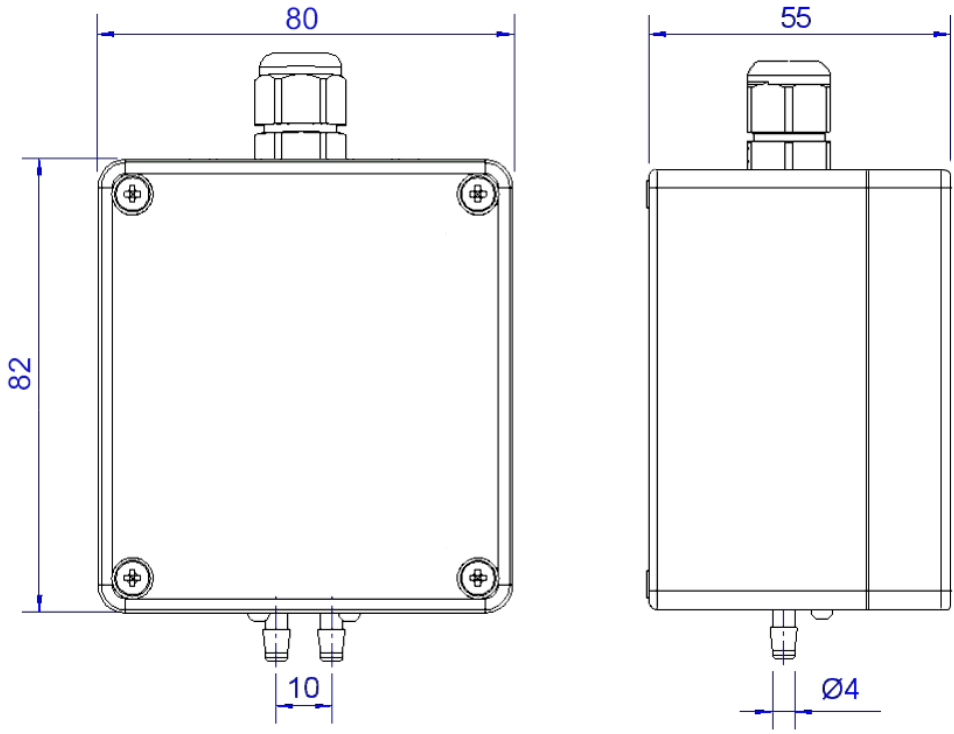
Unscrew four lid screws and detach the lid from the detector.

Fix the detector on a wall by screws, using cross-shaped mounting lugs supplied with the instrument (see dimensional drawings below).

To connect the device with measurement point, use the hoses of appropriate diameter (4 or 6 mm) and length. Put one end of the hose on the fitting in the bottom part of the device and fix the other end in the selected measurement area. The port marked with + (plus) should be connected with the area of higher pressure (e.g. before air filter), the one marked with - (minus) should be connected to the lower pressure area (e.g. behind air filter).

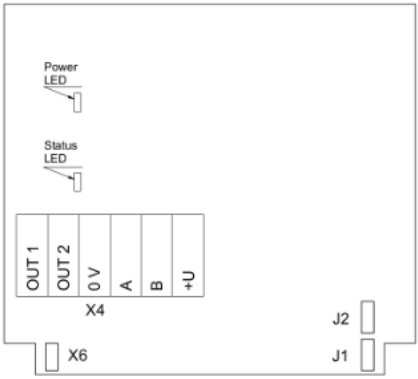
NB! The connecting hoses should not be squeezed or folded.

The connection diagram of the device is shown below.



NOTE! All dimensions are in millimeters.

Plug the power cable and connect the analog outputs and/or digital interface terminals to the relevant devices according to the connection diagram and table.



PCB without PSU and 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)

Make certain that the cable gland is properly tightened to ensure the conformity to IP65 protection class.

The screwless quick connect spring terminals on the E2418 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! The outputs are not galvanically isolated from the external power supply and share a common 0V. Allowed load resistance limits are stated in the Specifications table. To power the instrument from an external power source, connect terminals 0V and +U to the source.

When the detector is fixed and the external devices connected, place the lid back and fix it with the screws.

Delivery set

- Differential pressure transmitter-regulator E2418DF
- Mounting accessories:
    - 4 cross-shaped mounting lug with screws and 4 screws with plastic dowels

Order code for E2418DF options

E2418DF options	Order code
Differential pressure transmitter-regulator, mass flow, -50...50 Pa, resolution 0,025 Pa	E2418DF-50
Differential pressure transmitter-regulator, mass flow, -500...500 Pa, resolution 0,25 Pa	E2418DF-500
Integrated 24 VAC power supply module	E2418-24VAC

Configuring

Differential pressure transmitter-regulator E2418DF shares all functionalities of the PluraSens® multifunctional transmitter platform. The features and options include:

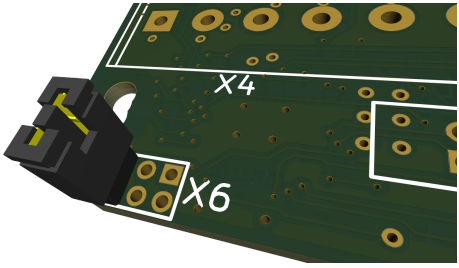
- Digital output change rate limiting filter
- Digital integrating (averaging) filter
- Temperature measurement channel with internal sensor
- Free assignment of each analog output to chosen parameter
- Flexible setting of analog output scales for each output

E2418 can be configured through its RS485 interface by Modbus RTU commands.

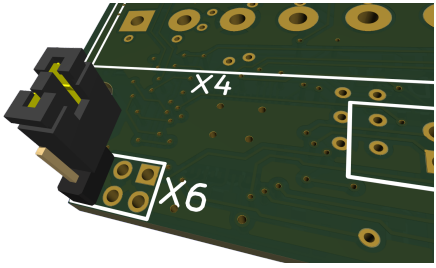
Return to default settings

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



X6 Jumper Closed (Connected)



X6 Jumper Open (Disconnected)

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 or Disconnecting Live wires can result in Corrupt Firmware.

NOTE! Cables should only be connected / disconnected from the device when the power supply is switched off. Connecting / disconnecting live wires to the device can cause sparks which in result can affect device performance during operations. Electrical installation should always be done by a qualified Technician.

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	Always 1 for 2418DF	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 – No parity bit, 1 stop bit (default after factory reset)

			2 – No parity bit, 2 stop bits 3 – Odd parity, 1 stop bit 4 – Even parity, 1 stop bit
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 device with unknown ID
For registers 203, 204, 213, 214 the value is dynamic and not kept in EEPROM
Pressure unit is 10 Pa

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)	

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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