

Specifications

Sensing method	Thermal microflow
Detection range options	E2408DF-50 -50...+50 Pa E2408DF-500 -500...+500 Pa
Resolution	0,025% of the range
Gas flow through sensor	< 0,2 ml / minute / Pa
Zero point accuracy	± 0,2 Pa, stability < 0,1 Pa / year
Span accuracy	±1,5% of reading at +23°C, 1000 hPa
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
Load resistance	$R_L < (U_s - 3 V) / 22 \text{ mA}$ for 4-20 mA $R_L > 100 \text{ k}\Omega$ for 0-10 V mode:
Operating conditions	-20...+70 °C, <99 %RH, without aggressive gases or oil, residential or business spaces
Power supply	11...30 VDC
-with integrated mains supply module	90...265 VAC
Power consumption	< 2 VA
Electromagnetic compatibility	according to 2014/30/EU, 2014/35/EU and EN61326-1 requirements
Enclosure	light-grey ABS 82×85×55 mm, IP65
Relays	2 × SPST, max 5 A, 30 VDC / 250 VAC

Modbus registers (0-based, decimal format)

Reg	Description	RW	Supported values	Default
1	Hardware version	R	0...65535	0
2	Software version	R	-----	-----
3	Product serial number	R	0...65535	0
4	Slave ID (net address)	RW*	0...247	1
5	Baudrate, baud	RW*	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
6	Response delay, ms	RW**	1...255 ms	1
7	Stop bits	RW*	1,2	1
8	Last error code	R	1...255	0
17	Technological: data age in seconds (read) / restart(write)	RW***	0...65535 s (read), 42330(write)	-----
167	Change rate limit for pressure data, pressure units	RW*	1...32000 pressure units, 0=no limit	0
168	Integrating filter time constant for pressure data, s	RW*	1...32000 s, 0=no filter	0
201	Parameter assigned to OUT1	RW**	0=none, 1=temperature, 2=pressure, 9=forced Modbus control, value set in 203	0
202	Parameter assigned to OUT2	RW**	0=none, 1=temperature, 2=pressure, 9=forced Modbus control, value set in 204	0
203	Forced value for OUT1	RW**	0...1000 (0.0%...100.0% of scale)	0
204	Forced value for OUT2	RW**	0...1000 (0.0%...100.0% of scale)	0

211	Parameter assigned to RE1	RW**	0=none, 1=T, 2=P, 9=forced by	2
212	Parameter assigned to RE2	RW**	0=none, 1=T, 2=P, 9=forced by	2
213	Forced state for RE1	RW**	0=off, 1=on (relay control by	0
214	Forced state for RE2	RW**	0=off, 1=on (relay control by	0
215	Switch delay for RE1	RW**	0...1000 s, default 0	0
216	Switch delay for RE2	RW**	0...1000 s, default 0	0
217	Min on/off time for RE1	RW**	0...1000 s, default 0	0
218	Min on/off time for RE2	RW**	0...1000 s, default 0	0
219	Control logic for relay RE1	RW**	0: \downarrow , 1: \downarrow \uparrow , 2: \uparrow \downarrow , 3: \uparrow \downarrow , 4: \downarrow \uparrow	1
220	Control logic for relay RE2	RW**	0: \downarrow , 1: \downarrow \uparrow , 2: \uparrow \downarrow , 3: \uparrow \downarrow , 4: \downarrow \uparrow	1
221	LOW setpoint for relay RE1	RW**	-32000...+32000	user defined
222	HIGH setpoint for relay RE1	RW**	-32000...+32000	user defined
223	LOW setpoint for relay RE2	RW**	-32000...+32000	user defined
224	HIGH setpoint for relay RE2	RW**	-32000...+32000	user defined
255	Sensor control/status	RW*	see Emergency mode paragraph	
257	Raw pressure data	R	-32000...+32000 pressure units	
258	Measured temperature, °Cx100	R	signed integer, -4000...+12500 (-40,00...+125,00 °C)	
259	Measured pressure	R	-32000...+32000 pressure units	
261	0% value of analog OUT1	RW**	-32000...+32000 pressure units	
262	100% value of analog OUT1	RW**	-32000...+32000 pressure units	
263	0% value of analog OUT2	RW**	-32000...+32000 pressure units	
264	100% value of analog OUT2	RW**	-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 interface

Parameter	Supported values	Default
Supported baudrates	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
Data bits	8	8
Parity	none	none
Stop bits	1, 2	1
Supported protocols	Modbus RTU	
Supported Modbus functions	03 - read multiple registers 06 - write single register	
Supported Modbus 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)	



Differential pressure transmitter-regulator
E2408DF

User Manual

Differential pressure transmitter-regulator E2408DF is a member of 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.

E2608 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. Two relays RE1 and RE2 with closing contacts can be used to switch various actuators.

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, oil in the atmosphere. See Specifications table for more details.

Installation and connections

1. 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 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.

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

Make certain that the cable glands are properly tightened to ensure the conformity to IP65 protection class.

The screwless quick connect spring terminals on the PluraSens® instruments are suitable for a wide range of wires with cross-section 0,2...1,5 mm². The recommended wire stripping length is 8...9 mm. Push the spring loaded terminal lever, insert the wire end into terminal hole and release the lever.

Use twisted pair cable, e.g. LiYY TP 2x2x0,5 mm² or CAT 5, to connect the device to RS485 network. Use one pair for A and B wires and the second pair for common 0 V and power +U wires to connect the transmitter to Fieldbus network. Respect polarity. Overall length of all connections via RS485 interface should not exceed 1200 m.

Note The outputs are not galvanically isolated from 24 V power supply and share common 0V. Allowed load resistance limits are stated in Specifications table. To power the instrument from an external 24 VDC source, connect terminals 0V and +U to the source. If the integrated mains power supply module is used, connect terminals L and N to the mains.

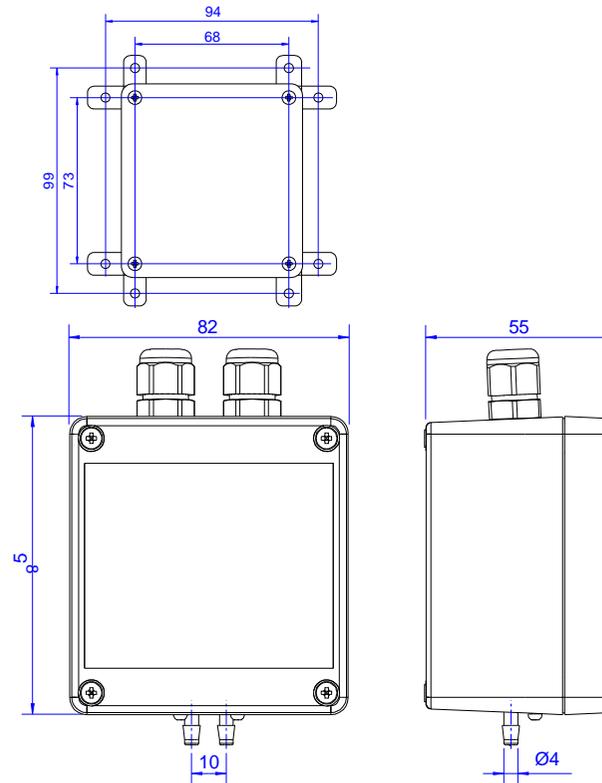
Note If the instrument is powered from mains, connect to 0V and +U terminals only light external loads, which consume less than 30 mA in total, as the integrated mains supply module capacity is limited.

Note Actuator short-circuits should be avoided, to protect the instrument relays use external fuses or safety switches.

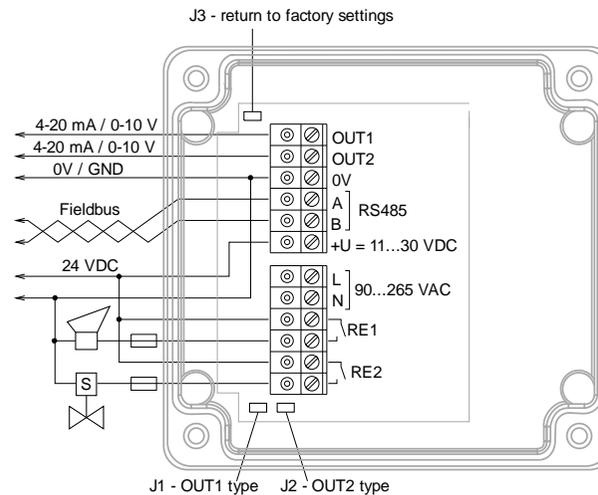
The type of each analog output can be independently selected with the appropriate jumper (J1 for OUT1 and J2 for OUT2). With jumper open, the output type is 4-20 mA. With jumper closed, the output type is 0-10 V.

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

E2408DF. Mounting dimensions



E2408DF. Connection diagram



Configuring

Differential pressure transmitter-regulator E2408DF 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
- free assignment of each of two relays to chosen parameter
- several relay control logic modes (HI or LO with hysteresis, U or FI)
- switch delays and minimum on/off state durations for each relay
- Modbus controlled forced state option for analog outputs and relays.

E2408 can be configured through its RS485 interface by Modbus RTU commands.

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).

Bit	Function	Notes	Default
bit{0}=0/1	sensor present/absent	read-only	
bit{1}=0/1	analog outputs deactivated/activated		1
bit{2}=0/1	in case of sensor absence, turn signaling off/on (OUT1)		1
bit{3}=0/1	in case of sensor absence, turn on signaling with low / high current on OUT1	if bit{2}=0 this bit is ignored	0
bit{4}=0/1	in case of sensor absence, turn signaling off/on (OUT2)		1
bit{5}=0/1	in case of sensor absent, turn on signaling with low / high current on OUT2	if bit{4}=0 this bit is ignored	0
bit{6}=0/1	current/voltage output detected on OUT1	read-only	user defined
bit{7}=0/1	current/voltage output detected on OUT2	read-only	user defined
bit{8}=0/1	LED deactivated/activated	always 0 for E2408DF	0
bit{9}=0/1	buzzer deactivated/activated	always 0 for E2408DF	0

Return to default settings

To reset the device's Slave ID, baudrate and sbt number to factory settings, proceed as follows:

1. De-energize the device
2. Connect the J3 jumper
3. Turn on the device
4. De-energize the device
5. Disconnect the J3 jumper
6. Turn on the device

Delivery set

-Differential pressure transmitter-regulator E2408DF

- Mounting accessories:

-4 cross-shaped mounting lug with screws and 4 screws with plastic dowels

Warranty

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