OCTOGON

MANUAL

FEMA

BUBBLING-THROUGH PRESSURE TRANSDUCER WITH VALVE

Operating manual



Document	Version	Date	Applies to
Operating manual	V00x	10/2026	FEMA, aluminium and plastic casing

This operating manual describes mounting, connection, function and settings of the FEMA bubbling-through pressure transducer with valve.

octogon GmbH · Roseggerstrasse 16 · 8700 Leoben · Austria · office@octogon.org

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1 About this manual

1.1 Notices

Notice	Meaning
Caution	Risk of injuries and/or damages.
Important	Pay particular attention.

1.2 Device

Feature	Version
Casing	aluminium or plastics (section 4)
Pressure sensor	standard 0 ... 1000 mbar, options see pressure table (section 8.2)
Interface	RS232, option CAN-Bus or Profibus
Manufacturer type	ADLM-PV

2 Safety instructions

Caution When mounting, starting up and operating this pressure transducer, observe safety precautions and regulations. Only personnel with a corresponding qualification is allowed to work with the pressure transducer. Non-compliance with safety regulations may cause serious injuries and/or damages. Check the suitability of the pressure transducer for this application before start-up. Comply with the technical data of this operating manual.

3 Technical data

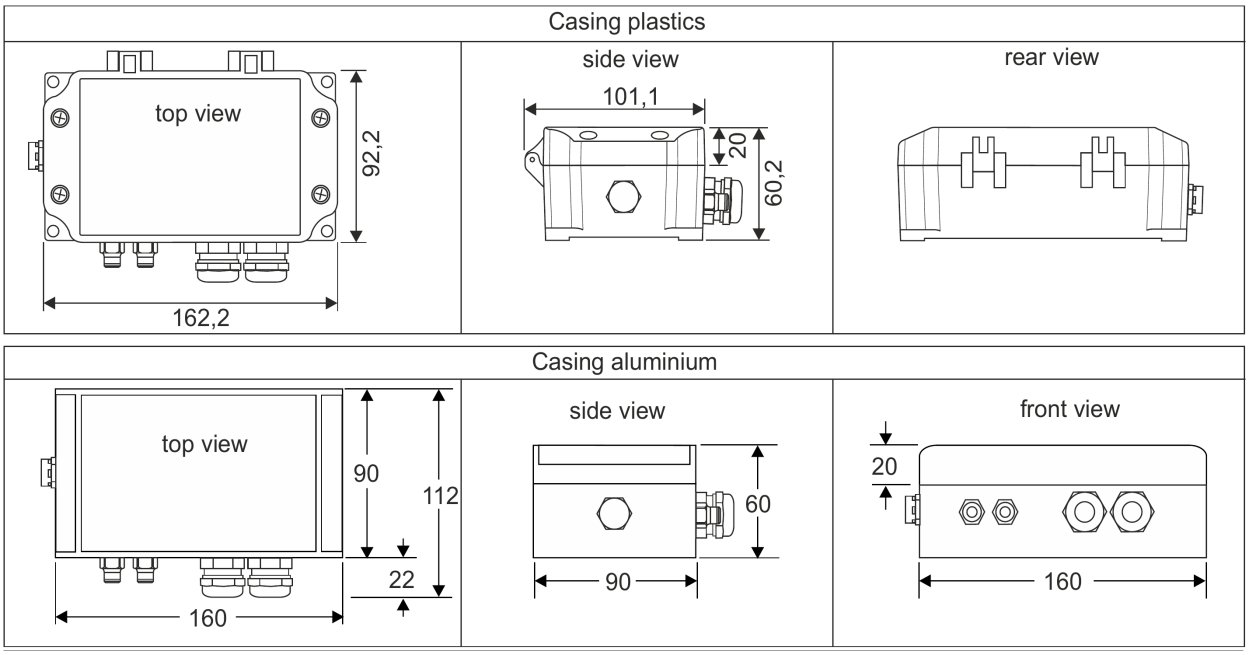
Item	Value
Input	
Kind of pressure	positive relative pressure (hydrostatic pressure)
Pressure sensor	standard: 0 ... 1000 mbar / 0 ... 10 m water column; option: see pressure table (section 8.2)
Burst pressure	standard: 3 bar; option: see pressure table (section 8.2)
Output	
Analog	0 ... 10 V and 4 ... 20 mA
Current	load < 500 Ω
Voltage	load resistance > 10 kΩ
Interface	RS232 (option: CAN-Bus / Profibus)
Indication	
Display	multifunction indicator for current values / switch points / diagnostic values
Function	4 programming keys
Adjustment	
Settings	4 keys on display unit
Tare	key on front or externally
Volume calculation	20 calibration points for linearization
Accuracy	
Resolution	12 bit (pressure sensor)
Combined error	± 1 % FS
TC	< 50 ppm/K
Power supply	
Voltage	24 V DC, ± 20 %
Residual ripple	200 mV
Power consumption	approx. 5 W with options
Environmental conditions	
Operating temperature	–10 ... +60 °C
Storage temperature	–20 ... +70 °C

3.1 Mechanics

Item	Casing aluminum	Casing plastics
Type	aluCase AC 092 with clip-on design covers	U-CASE 2
Dimensions	160 × 90 × 60 mm	162.2 × 92.2 (101.1) × 60.2 mm
Material	die-cast aluminum	ASA 757G Luran S
Flammability	–	UL94 HB
Mounting	covered screw channels	4 mounting holes
Color	RAL 9006 (aluminum white)	black
Weight	approx. 1.1 kg (with options)	approx. 0.7 kg (with options)
Cable entry	2 screwed cable glands M20 × 1.5	2 screwed cable glands M20 × 1.5
Protective insulation	–	according VDE100

Item	Value
Protection	IP65
Connection	plug-in terminal strip, lockable, up to maximum 2.5 mm²
Pressure connection	for tube 6 mm O/D (made of nylon, PA, PUR, Hytrel); sealing: O-ring (silicone free)
Airing	pressure compensation part (PA6)

4 Dimensions and mounting



Dimensions in mm. Top: casing plastics, bottom: casing aluminum.

4.1 Mounting of the device, casing aluminum

Hole spacings: 142 mm × 40 mm.

1. Prepare the mounting holes according to hole spacings
2. Remove left and right design cover
3. Remove the 4 screws of the top cover
4. Fold down top cover
5. Fasten the device with 4 screws (Ø 6 mm maximum)
6. Put the top cover back on
7. Fasten the 4 screws of the top cover
8. Put the design covers back on

4.2 Mounting of the device, casing plastics

Mounting dimensions: 146.90 mm × 76.90 mm, 4 holes Ø 6.2 mm.

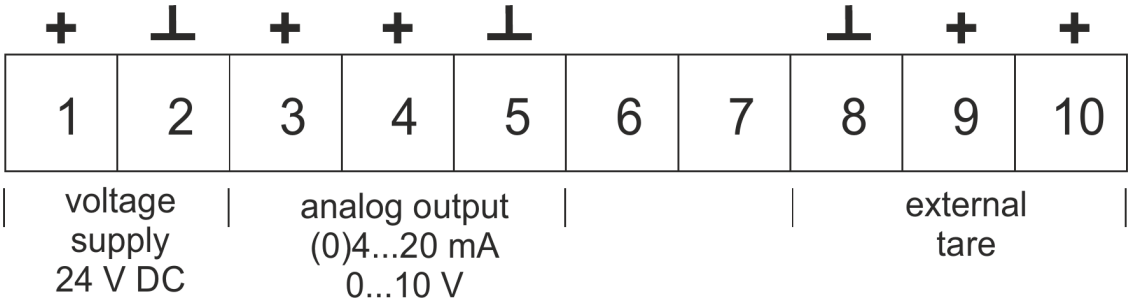
1. Prepare the mounting holes according to hole spacings
2. Fasten the device with 4 screws (Ø 6 mm maximum)

5 View and electrical connection

5.1 View (without top cover)

Under the top cover: valve, connection terminals, interface PC (serial), 4 mounting holes; on the outside of the casing: pressure connections and airing.

5.2 Electrical connection



Terminal assignment

Terminal	Polarity	Function
1	+	voltage supply 24 V DC
2	ground	voltage supply 24 V DC
3	+	analog output current (0)4 ... 20 mA
4	+	analog output voltage 0 ... 10 V
5	ground	analog output, common ground
6, 7	–	not assigned
8	ground	external tare / valve control manually
9	+	external tare / valve control manually
10	+	external tare (with solder bridge, section 5.3)

The tare input can also control the valve: operation mode 1 (address 3) opens the valve while the tare input = 1.

5.3 External tare

Solder bridge	Tare	Drive	Wiring
without solder bridge	active	24 V DC	terminal 8 ground, terminal 9 + external 24 V DC
with solder bridge	passive	contact	external potential free contact between terminals 9 and 10

The solder bridge is located on the PCB next to the serial interface.

6 Pressure connection (push-in tube fitting)

1. Ensure that the end of the tube is cut square and is free from burrs. Tube: 6 mm O/D (nylon, PA, PUR, Hytrel).
2. Push the tube through the collet into the fitting.
3. Push the tube firmly through the O-ring until it bottoms on the tube stop, then pull back.
4. To disconnect, push the tube into the fitting, hold down the collet and withdraw the tube.

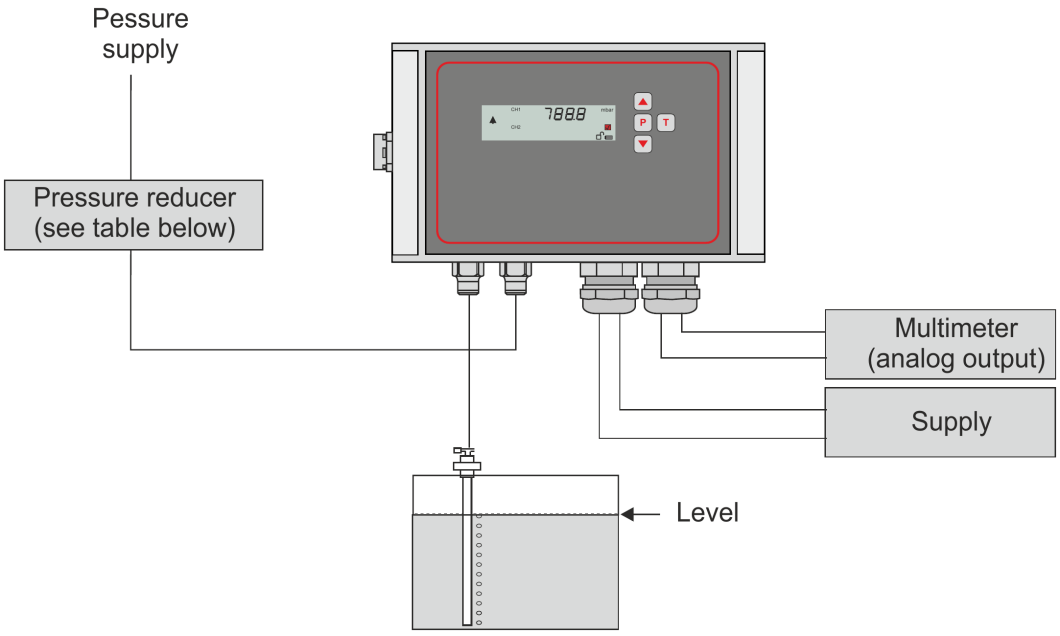
7 Functional description

Phase	Description
1. Break time	A change of the level of liquid causes a proportional change of the pressure in the system and therefore also a change of the analog output signals.
2. Pulse time (valve open)	The analog output signal holds the value it had when pulse time started. This value will not change during pulse time. The input pressure from the pressure reducer is switched via the opened valve to the pressure output for the bubbling-through unit. After a certain time, depending on tube/hose diameter and the distance of the bubbling-through point, air will escape at the end of the bubbling-through unit when the hydrostatic pressure is reached (density × filling height).
3. End of pulse time	Valve is closed = break time: after a certain time the pressure in the system is in balance (pressure at the bubbling-through point = pressure at the pressure sensor). The analog output will now be released again. The pressure applied on the sensor will now cause a proportional signal again at the current/voltage output. A change of the liquid level will then cause a change of the system pressure and therefore also a change of the analog output signals.

8 Application example

Important Ensure that the pressure connections (device, junctions and bubbling-through construction) are sealed tight and absolutely free of any leakage.

8.1 Set-up



Bubbling-through tube/hose approx. 1/2″, end cut at 45°.

8.2 Pressure table

Nominal pressure	Output reducing valve	Maximum pressure	Burst pressure	Note
50 mbar	75 mbar	550 mbar	800 mbar	
100 mbar	150 mbar	550 mbar	800 mbar	
200 mbar	300 mbar	1 bar	1.5 bar	
350 mbar	525 mbar	1 bar	1.5 bar	
500 mbar	750 mbar	1 bar	1.5 bar	older models only
1 bar	1.5 bar	2 bar	3 bar	
2 bar	3 bar	4 bar	6 bar	older models only

Older models can also come equipped with 500 mbar or 2 bar pressure sensors. In these cases, please refer to the rows marked accordingly.

8.3 Notes

- Maximum distance to bubbling-through point: 50 m.
- Level measuring possible in all liquids.
- Aggressive and abrasive media are no problem.
- During the bubbling-through period the output signal is held.
- Bubbling-through tube and tube or hose can be made of every possible material.
- The end of the bubbling-through tube should have an angle of 45° (to have a defined point of bubbling).

9 Transducer settings

9.1 Keys on the display PCB

Key	Function (programming mode)	Special function (operation mode)
UP (triangle up)	increase address or value	–
P	ESC (leave editing mode / programming mode or reject input)	Valve is open as long as the key is pressed (pulse).
DOWN (triangle down)	decrease address or value	Pulse time and break time of the valve are shown in the display.
T	enter (accept address or value)	Tare ON/OFF (symbol for tare is shown in the display).

9.2 Programming mode

To enter programming mode, press the keys UP and DOWN simultaneously. The display indicates this mode with **Prog**.

Selecting an address

Pressing the UP or DOWN key selects the address. The display indicates the address in the top line; the stored value of this address is indicated in the lower line. To change the stored value, press key T to enter editing mode.

Editing mode

The editing mode is indicated with the symbol of two arrows (up/down). The top line of the display indicates the value which is stored with the selected address; this indication is for support. The value of the lower line can be changed by pressing the UP or DOWN key. With key T this value is stored. The display indicates the proper transfer of data with a box with a tick; if the transfer of data was faulty, this is indicated with a box with a cross. Pressing the T key leaves the editing mode, and another address can be selected with the UP or DOWN key.

The editing mode can be left with the P key, too. In this case all changes at this address will not be stored, and a new address can be selected with the UP or DOWN key.

When the UP or DOWN key is pressed for a longer time in editing mode, the unit position changes first (20 counts), then the tens digit, the hundreds digit and in the end the thousands digit (each 20 counts).

Leaving programming mode

To leave the programming mode, press the P key.

10 Addresses (program numbers)

Addr.	Status	Function	Bytes	Value	FS*
0	R	software version	2	(x.xx)	
1	R	sensor type	2	1 = standard	1
2	R/W	mode	2	0 = input AD value manually; 1 = input AD value auto	1
3	R/W	operation mode		0 = timer controlled; 1 = valve open, when tare input = 1	0
4	R/W	valve open > pulse (s)	2	–	10
5	R/W	valve closed > break (s)	2	–	3600
6	R	tare offset	2	0	0
7	R/W	sensor temperature (°C)	2	–	–
10	R/W	number of calibration points (CP)	2	2 ... 20	2
11	R/W	decimal place	2	0 ... 4	1
51 ... 70	R/W	indication CP1 ... CP20	2	0 ... 65000	CP1: 0 %, CP2: 100 %, others –
71 ... 90	R/W	AD value CP1 ... CP20	2	–	–
100	R/W	CurrentMinCal	2	0 ... 4095	750
101	R/W	CurrentMaxCal	2	0 ... 4095	3600
102	R/W	VoltageMinCal	2	0 ... 4095	0
103	R/W	VoltageMaxCal	2	0 ... 4095	3600

* FS = factory settings.