Operating Manual

ADLM-PV

🔴 *Content*

● *Safety Instructions*

⚠ 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. A 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.

● *Technical Data*

Input

Kind of pressure:	positive relative pressure (hydrostatic pressure)
Pressure sensor:	Standard: 0...1000 mbar / 0...10 m water column
	Option: See pressure table on page 6
Burst pressure:	Standard: 3 bar
	Option: See pressure table on page 6

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 VDC, ±20%
Residual ripple:	200 mV
Power consumption:	approx. 5 W with options

Environmental Conditions

Operating temperature:	-10...+60°C
Storage temperature:	-20...+70°C

Mechanics

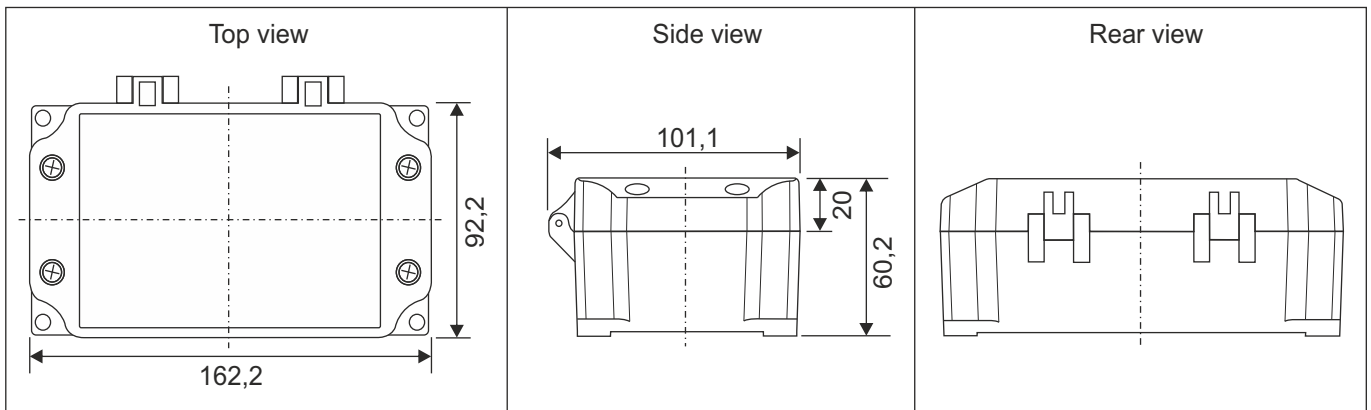|		
Casing aluminum:	Type:	aluCase AC 092 with clip-on design covers
	Dimensions:	160 x 90 x 60 mm
	Material:	die-cast aluminum
	Mounting:	covered screw channels
	Color:	RAL 9006 (aluminum white)
	Weight:	approx. 1,1 kg (with options)
	Cable entry:	2 screwed cable glands M20x1,5
Casing plastics:	Type:	U-CASE 2
	Dimensions:	162,2 x 92,2 (101,1) x 60,2 mm
	Material:	ASA 757G Luran S
	Flammability:	UL94 HB
	Mounting:	4 mounting holes
	Color:	black
	Weight:	approx. 0,7 kg (with options)
	Cable entry:	2 screwed cable glands M20x1,5
	Protective insulation:	according VDE100
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)	

● *Dimensions (in mm) for Casing Aluminum*

top view 90 112 22 160	side view 60 90	front view 20 160
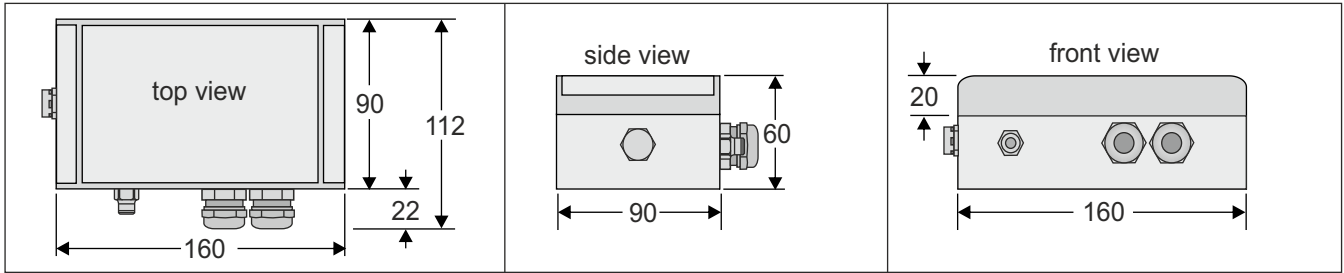
● *Mounting of the Device for Casing Aluminum*

142 mm

hole spacings

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 (Ø6 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

● *Dimensions (in mm) for Casing Plastics*

Top view	Side view	Rear view
92,2 162,2	101,1 20 60,2	
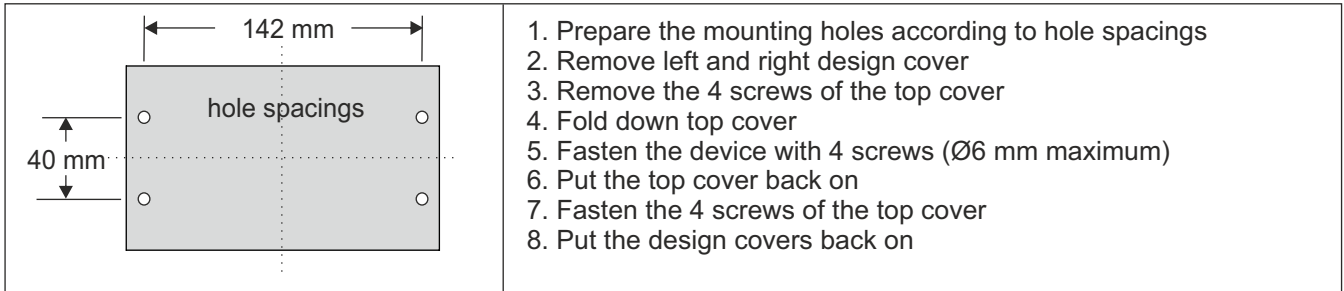
● *Mounting Dimensions (in mm) for Casing Plastics*

Ø6,2 (4x)

76,90

146,90

1. Prepare the mounting holes according to hole spacings
2. Fasten the device with 4 screws (Ø6 mm maximum)

● *View (Without Top Cover)*

airing

interface
PC serial

valve connection

Mounting
hole (4)

pressure
connection

● *Electrical Connection*

+	⊥	+	+	⊥			⊥	+	+
1	2	3	4	5	6	7	8	9	10

24 V

voltage
supply
24 V DC

analog output
(0)4...20 mA
0...10 V

External tare

Valve control
manually
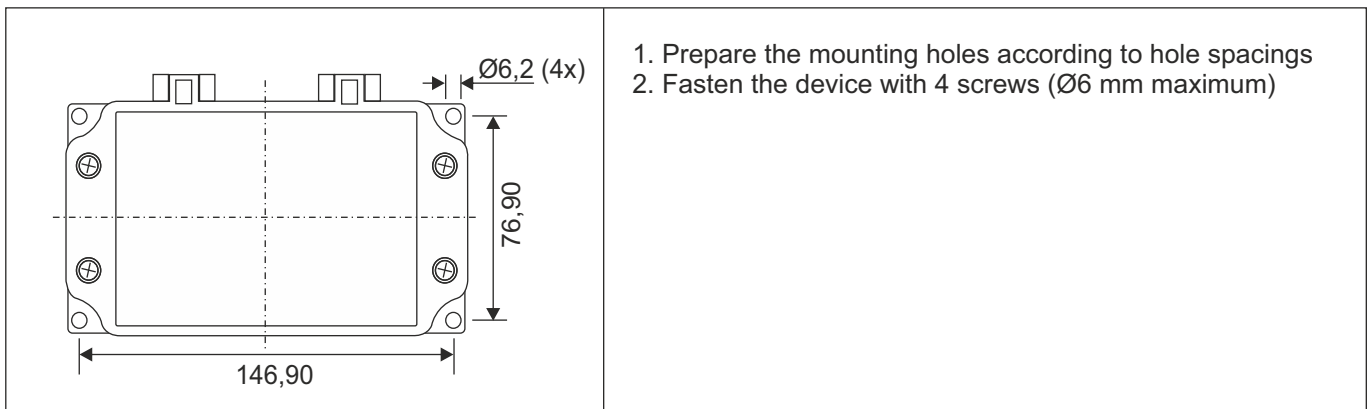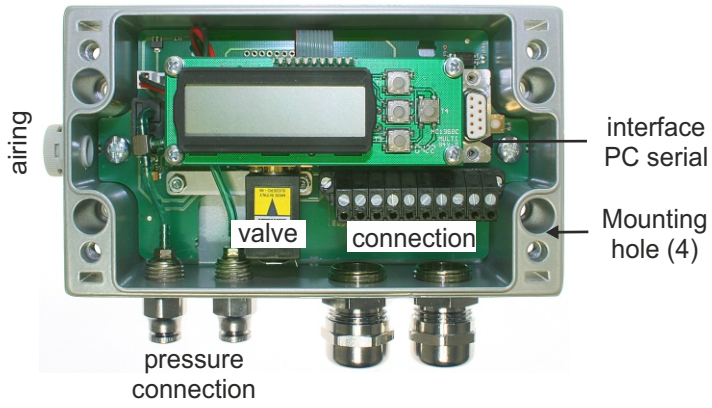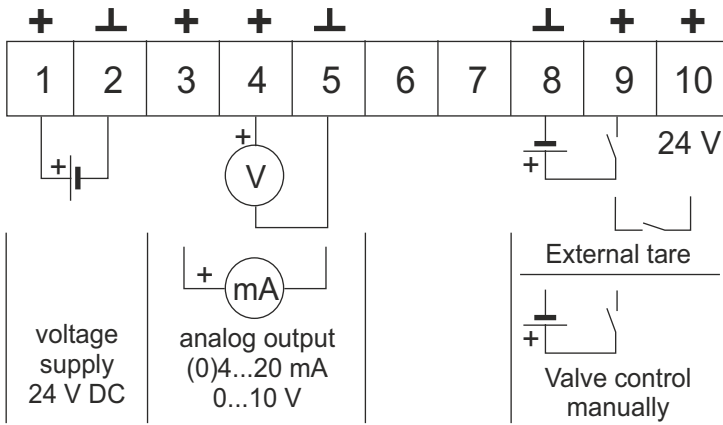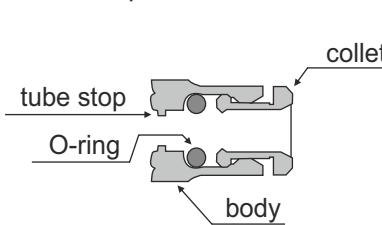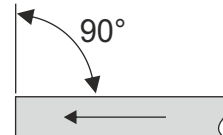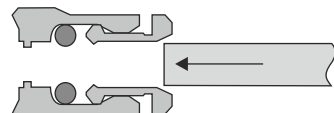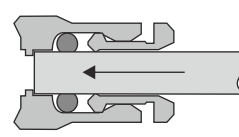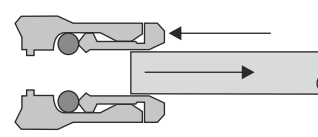
● *External Tare*

solder
bridge

without solder bridge
tare active
drive 24 VDC

8	⊥ external
9	+ 24 VDC
10	

with solder bridge
tare passive
drive contact

8	
9	external
10	potential free contact

● *Pressure Connection (Push-In Tube Fitting)*

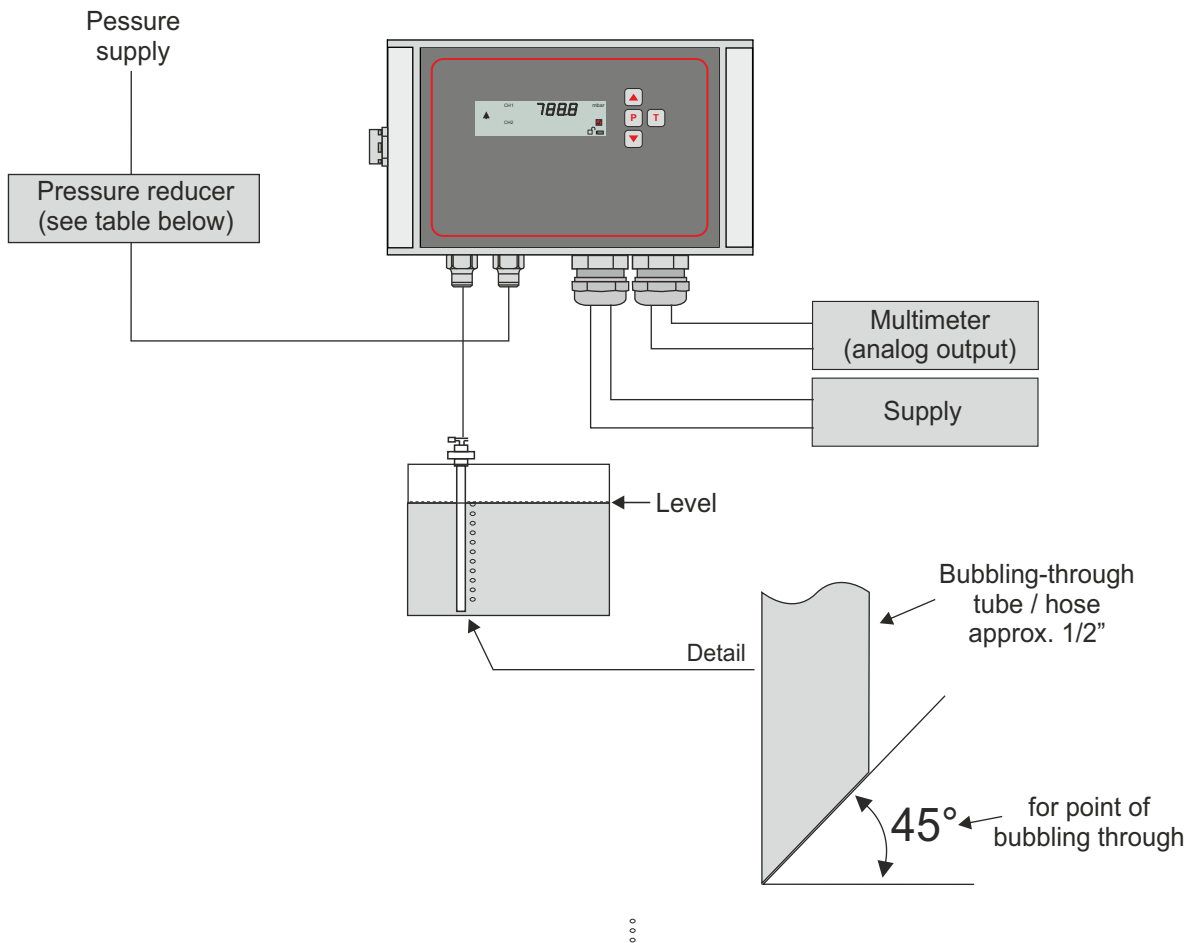|		
Details pressure connection collet tube stop O-ring body	90° 1. Ensure that the end of the tube is cut square and is free from burrs. Tube: 6 mm O/D (nylon, PA, PUR, Hytrel)	2. Push the tube through the collet into the fitting
3. Push the tube firmly through the O-ring until it bottoms on the tube stop then pull back	4. To disconnect, push the tube into the fitting, hold down the collet and withdraw the tube	

● *Functional Description*

Functional description

1. The system is in break time: A change of the level of liquid causes a propotional 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 and depending on tube / hose diameter and also 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 x filling height).

3. End of pulse time (valve is closed) = break time: After a certain time the pressure in the system is in balance (pressue 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.

Application Example

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

Pessure supply

Pressure reducer (see table below)

Multimeter (analog output)

Supply

Level

Detail

Bubbling-through tube / hose approx. 1/2"

45°

for point of bubbling through

Pressure table

Nominal pressure	50 mbar	100 mbar	200 mbar	350 mbar	500 mbar	1 bar	2 bar
Output reducing valve	75 mbar	150 mbar	300 mbar	525 mbar	750 mbar	1,5 bar	3 bar
Maximum pressure	550 mbar	550 mbar	1 bar	1 bar	1 bar	2 bar	4 bar
Burst pressure	800 mbar	800 mbar	1,5 bar	1,5 bar	1,5 bar	3 bar	6 bar

Note: Older models of the ADLM-P can also come equipped with 500 mbar or 2 bar pressure sensors. In these cases, please refer to the gray-colored columns.

Note: Maximum distance to bubbling-through point: 50 m
Level measuring possible in all liquids
Aggressive and abrasive media are no problem
During 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)

● *Transducer Settings*

Keys on Display PCB
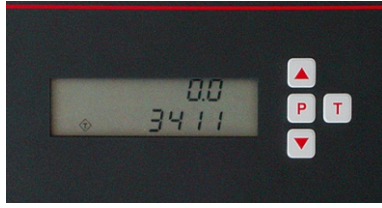
Function of keys (programming mode)

▲   increase address or value

P   ESC (leave editing mode / programming mode or reject input)

▼   decrease address or value

T   enter (accept address or value)

Special Functions (Operation Mode)

P key: valve is open as long as key is pressed (pulse)

T key: tare ON/OFF (symbol for tare is shown in the display)

▼ key: pulse time and break time of the valve is shown in the display

Entering Programming Mode

To enter programming mode, press keys ▲ and ▼ simultaneously. The display indicates this mode with **Prog**.

Selecting Address

Pressing the ▲ or ▼ key the address is selected. 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 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 when pressing the ▲ or ▼ key. With key **T** this value is stored. The display indicates the proper transfer of data with ☑. If the transfer of data was faulty this is indicated with ☒ . Pressing the **T** key the editing mode is left and by pressing the ▲ or ▼ key another address can be selected.

The editing mode can be left when pressing the **P** key, too. In this case all changings with this address will not be stored and a new address can be selected by pressing the ▲ or ▼ key.

When pressing the ▲ or ▼ key (in editing mode) a longer time the unit position changes first (20 counts) , then the tens digit, the hundreds digit and in the end thousands digit (each 20 counts).

Leaving Programming Mode

To leave the programming mode, press the **P** key.

● *Addresses*

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	2	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	No calibration point (CP)	2	2...20	2
11	R/W	decimal place	2	0...4	1
51	R/W	indication CP1	2	0...65000	0%
52	R/W	indication CP2	2	0...65000	100%
53	R/W	indication CP3	2	0...65000	-
54	R/W	indication CP4	2	0...65000	-
55	R/W	indication CP5	2	0...65000	-
56	R/W	indication CP6	2	0...65000	-
57	R/W	indication CP7	2	0...65000	-
58	R/W	indication CP8	2	0...65000	-
59	R/W	indication CP9	2	0...65000	-
60	R/W	indication CP10	2	0...65000	-
61	R/W	indication CP11	2	0...65000	-
62	R/W	indication CP12	2	0...65000	-
63	R/W	indication CP13	2	0...65000	-
64	R/W	indication CP14	2	0...65000	-
65	R/W	indication CP15	2	0...65000	-
66	R/W	indication CP16	2	0...65000	-
67	R/W	indication CP17	2	0...65000	-
68	R/W	indication CP18	2	0...65000	-
69	R/W	indication CP19	2	0...65000	-
70	R/W	indication CP20	2	0...65000	-
71	R/W	AD-value CP1	2	-	-
72	R/W	AD-value CP2	2	-	-
73	R/W	AD-value CP3	2	-	-
74	R/W	AD-value CP4	2	-	-
75	R/W	AD-value CP5	2	-	-
76	R/W	AD-value CP6	2	-	-
77	R/W	AD-value CP7	2	-	-
78	R/W	AD-value CP8	2	-	-
79	R/W	AD-value CP9	2	-	-
80	R/W	AD-value CP10	2	-	-
81	R/W	AD-value CP11	2	-	-
82	R/W	AD-value CP12	2	-	-
83	R/W	AD-value CP13	2	-	-
84	R/W	AD-value CP14	2	-	-
85	R/W	AD-value CP15	2	-	-
86	R/W	AD-value CP16	2	-	-
87	R/W	AD-value CP17	2	-	-
88	R/W	AD-value CP18	2	-	-
89	R/W	AD-value CP19	2	-	-
90	R/W	AD-value 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