Pressure-Converter UNICON®-P

Differential pressure - diminished pressure - overpressure - barometric pressure - flow rate

Features

- Measuring range programmable
  from -0.300 ... 0.300mbar resp. 0... 0.300mbar
  up to -1000 ... 1000mbar resp. 0...1000mbar
  or 0 ... 2000mbar barometrical pressure
- Measuring function programmable
  linear or root extracting
- Measuring unit programmable
  e.g. mbar, Pa, hPa, psi, mmWs
  optionally e.g. l/h, m³/h ....
- Output 4 ... 20mA, 2-wire loop powered
  0 ... 10V, 3-wire connection
- LCD-dot matrix display
- 2 electronic alarm outputs (opto coupler)
- Pressure simulation mode
- Protection IP65

Field case
100x100x60mm (WxHxD)

General

Pressure converter UNICON-P can be used for measuring low pressure, differential pressure or flow rates of dry and non aggressive gases. Within the device dependent full scale range, output and display may be adjusted down to a span of 10%. The device offers' additional features like a bidirectional pressure range and programmable output characteristic.

Short information

Programming	Parameters are programmed via a front side membrane keypad.
Display	The actual pressure/differential pressure will be displayed in the programmed measuring unit
Option 06 (display conversion)	With option 06 the flow rate can be displayed in a programmable unit as well. Further on the initial part of the transfer characteristic can be linearized or set to "0", to eliminate instable measurement in this part.
Analog output	Proportional to the pressure or flow rate an analog output signal 4 ... 20mA or 0 ... 10V DC can be generated.
Zero point correction	Reset to zero via front side keypad possible.
Alarm output	Switching performance of the alarm outputs is programmable as minimum or maximum function. The state of the alarm outputs is shown in the LCD-Display.

Content

Programable pressure measuring ranges [mbar]

Device measuring range		**1**	**2**	**3**	**4**	**5**	**6**	**9**
unidirectional	min.	0 - 0.300	0 - 1.000	0 - 3.00	0 - 10.00	0 - 30.0	0 - 100.0	0 - 200 abs.
	max.	0 - 3.00	0 - 10.00	0 - 30.00	0 - 100.0	0 - 300	0 - 1000	0 - 2000 abs.
bidirectional	min.	± 0.30	± 1.00	± 3.00	± 10.0	± 30.0	± 100	_
	max.	± 3.00	± 10.00	± 30.0	± 100	± 300	± 1000	
max. stat. over-pressure		200	200	300	600	1000	3000	4000
Burst pressure between both process connectors		400	400	600	900	1500	5000	_
Burst pressure against ambient		600 (3000)	600 (3000)	600 (3000)	900 (3000)	3000	5000	7000

Values shown in brackets are optional. See order code page 12, point 4

Explanation of over pressure

The maximum static over pressure can be held for a longer time without damaging the device.
The burst-pressure indicates a limit value which will damages the device in any case, when exceeding.
Max. static over pressure is valid between both process connections and also against the ambient.
Burst-pressure against ambient means same pressure is applied to both process connections.

Technical Data

Power supply

Supply voltage	:	7.5 ... 30V DC, 2-wire loop powered 4 ... 20mA 16 ... 30V DC, 3-wire 0 ... 10V
Operating temperature	:	0 ... 50°C
Isolation	:	between Analog output / Alarm output 1 / Alarm output 2
Rated voltage	:	500V DC, between Analog output / Alarm output 1 / Alarm output 2
CE - conformity	:	EN50022, IEC 1000-4-3 / 4 / 5

Measuring input

Process connection	:	2 pressure tubes for 4mm hose, 4 and 6mm Schott glands available
Measuring medium	:	neutral and dry gases in range of 0...50°C
Measuring principle	:	piezoelectric
Rise time	:	parameter input filter low=120ms, med=1400ms, high=4100ms

Output pressure

Current output	:	4 ... 20mA ext. burden R_A [Ω] $\leq \frac{\text{supply voltage -7.5V}}{0.02\text{A}}$
Voltage output	:	0 ... 10V load < 3mA, supply voltage >16V load < 10mA, supply voltage >20V
Basic accuracy	:	± 0.25% ± 1 Digit, depends on the device measuring range
Temperature coefficient	:	< 0.01% / °C linear or 0.03% / °C ratio
Zero drift	:	< 0.02% / °C linear or 0.04% / °C ratio

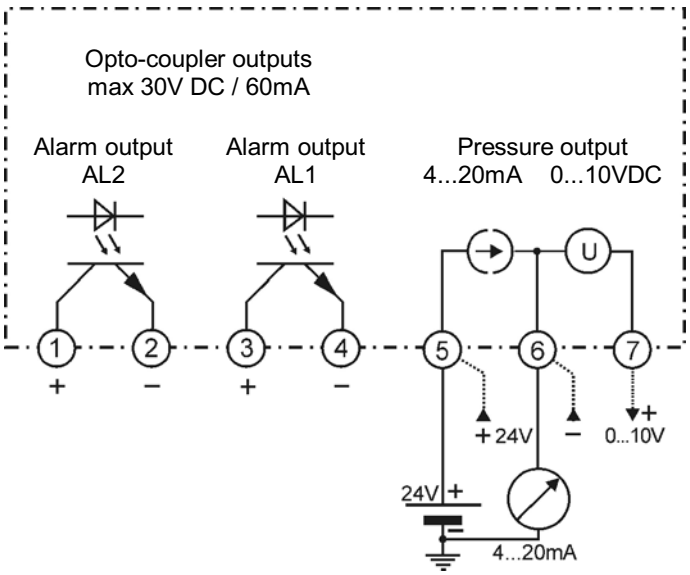
Alarm output

Transistor	:	7.5 ... 30V DC, max. 60mA, with short circuit protection
Voltage drop	:	< 3V (at max. load)

Display	:	LCD-dot matrix, 3.8mm high
Format	:	2 lines, 16 characters each
Measuring ratio	:	Parameter input filter low=8/s, med and high=2/s

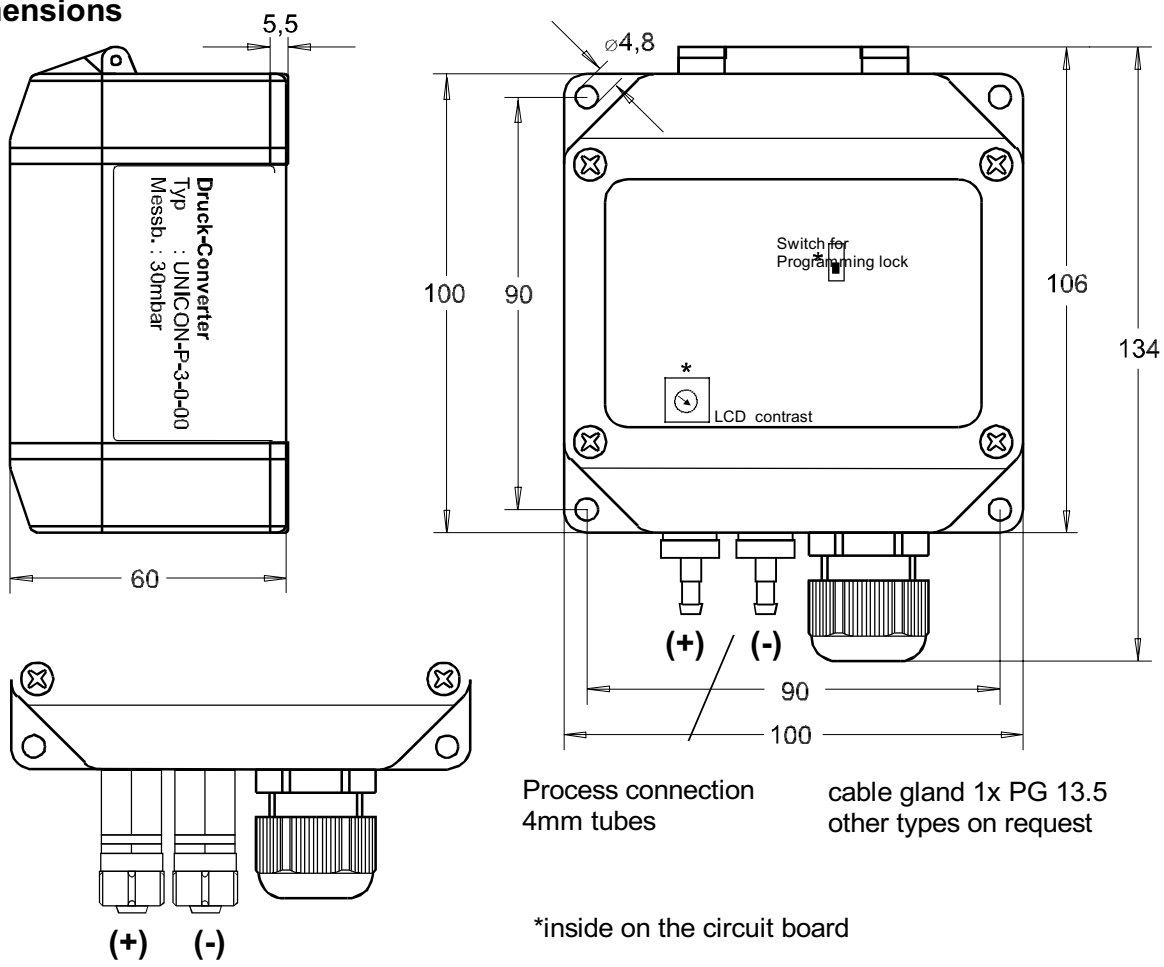
Case	:	Field case
Material	:	case polyamide with fibre-glass PA6-GF/GK 15/15 front foil polyester,
Dimensions	:	100 x 100 x 60mm (WxHxD)
Wight	:	max. 360g
Electrical connection	:	Screw terminal with pressure plate, 2.5mm² flexible, 4mm² wire
Protection	:	IP65, terminals IP20

Connection diagram



* For supplying the converter use terminals (5) and (6) as shown. If the converter is used for monitoring only, terminals (5) and (6) can be connected directly to supply voltage.

Dimensions



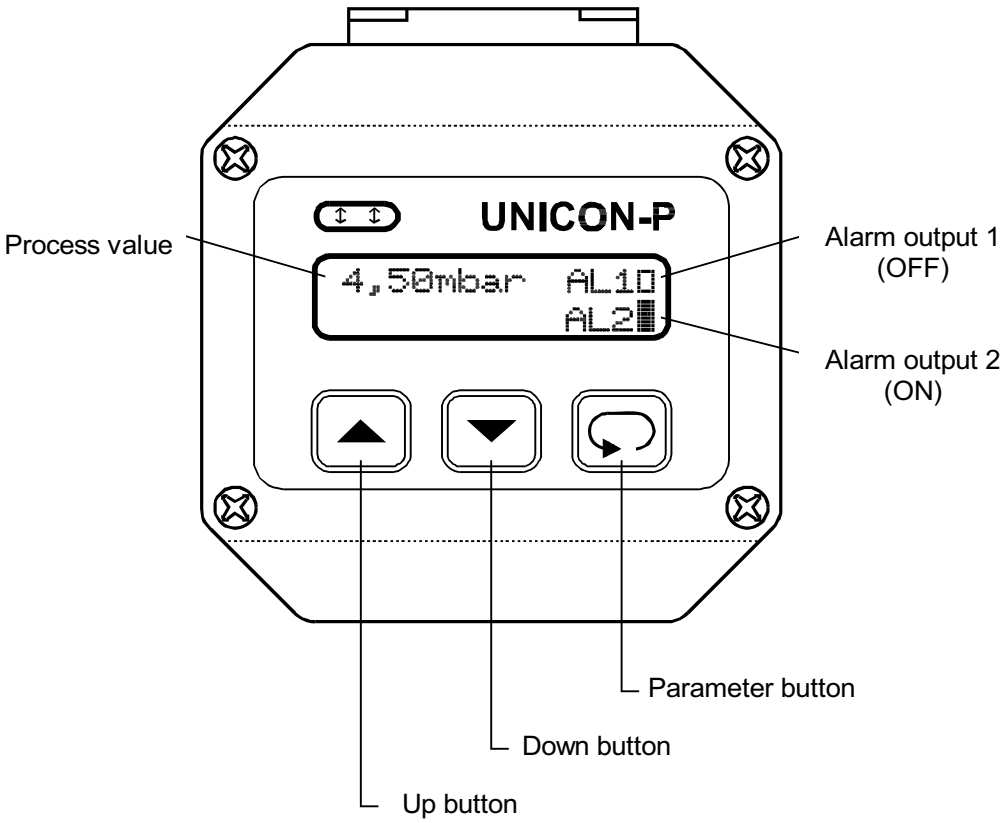
Process connection
4mm tubes

cable gland 1x PG 13.5
other types on request

*inside on the circuit board

Process connection
6mm Schott glands

Controls and indicators



Programming description

The desired parameter can be called by ↻ -button. For selection within a parameter use button ▲ and ▼. Parameters are stored in an EEPROM, zero voltage safe.

Button combinations:

↻ + ▼ 1 Parameter back

↻ + ▲ Parameter reset to “0" or min value. (pressing both button at the same time)

After switching on the supply voltage, the converter initializes itself. The display shows the device type UNICON-P and software version. After the initializing procedure the converter is located in the **working level**. The actual measured values are shown in the display.

The **configuration level** is called by pressing the ↻ -button. Now all the parameters defining the function of the converter can be programmed.

After finishing the configuration or when no button was pushed for more than 90 seconds , the program returns back to the working level. Leaving the configuration level is possible at any time by pushing the button ↻ for 2 seconds.

Installation note!

Before the device is ready for using, it must be configurated for the intended application.

Programming
Notes to presentation

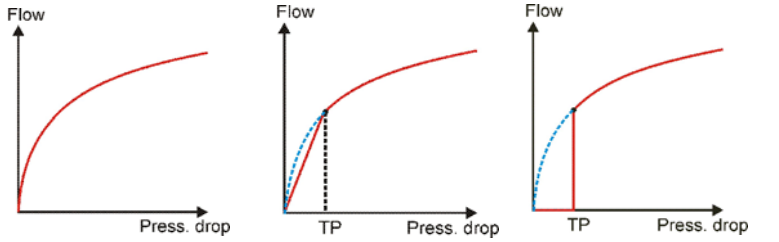
Parameter only appears if configured

Parameter only appears at appropriate model (see order code)

Note! During the configuration only those parameters will be displayed, which are not excluded by other parameter settings. If parameter length exceeds 16 characters, the remainder is available by pushing buttons ▲ or ▼.

Button	Display	Description
	(shown values are factory settings)	
	4.4mbar AL1□	Process value pressure. Alarm output indication (only if activated). □ = OFF und ■ = ON
	1 ■deutsch □english	**Language** of the operating instructions deutsch, english Selection with buttons ▲ or ▼.
	2 Measuring fnc. Pressure linear▼	**Measuring function** (option 06 needed) Pressure linear (standard) Flow root fnc. e.g. orifice plates, impact (dynamic) pressure, venturi nozzle Flow linear fnc. e.g. LFE (Laminar Flow Elements) Selection with buttons ▲ or ▼.
	3 Pressure unit <- ■mbar □Pa ->	**Pressure unit** Selection with buttons ▲ or ▼. Following units are available: **Device measuring range ≤ 300mbar** mbar, Pa, hPa, kPa, psi, mm WS, cm WS, in H2O, kg/m², mm Hg, cm Hg, in Hg, torr, l/s **device measuring range ≥300mbar**: mbar, bar, hPa, kPa, psi, cm WS, in H2O, m WS, kg/cm², mm Hg, cm Hg, in Hg, torr. In case of modification pressure range and alarm outputs are recalculated. The number of decimals may be adapted also. **Following units are available in conjunction with option 06 and flow measuring only:** l/s, l/min, l/h, m³/s, m³/min, m³/h, cuin/s, cuin/h, cuft/s, cuft/h, kg/s, kg/min, kg/h

continue
page 7

Button	Display	Description
↓	4 Decimals n=?...? n=1	**Decimal point position** Selection with buttons ▲ or ▼. The possible number of decimal points is dependent of the selected pressure unit. If no decimal point is available, this parameter is not visible.
↻		
↓	5 Start of curve root function ▼	Needs option 06 and measuring function Flow root fnc. **Start of curve** In its origin the root function has a great elevation, what can produce deflections in the display and output. To prevent this, the UNICON-P offers the possibility to transfer the curve at the beginning linearly or set to "0". On a programmed threshold point the root function is continued (see diagram).
↻		 Start with root function Start with linear Start with set to zero
↓	6 Threshold point 10.0%	Needs option 06 and Start of curve linear or set to zero **Threshold point TP** Setting possible from 0.1 ... 20.0% of the device measuring range with buttons ▲ or ▼. Before this point an appropriate measuring error will be produced.
↻		
↓	7 Display conv. Factor: 1.000	Needs option 06 and measuring function Pressure linear **Conversion factor for the display** Setting possible in range 0.001 ... 999.999 digit with buttons ▲ or ▼. Note: The following parameters depend on the converted device measuring range.
↻		
↓	8 Pressure drop 1.0 mbar	Needs option 06 and measuring function Flow root fnc or Flow linear **Pressure drop** (differential pressure) at the measuring device at a nominal flow. Setting possible in the (positive) device measuring range with buttons ▲ or ▼.
↻		

continue page 8

Button	Display	Description
↓	9 Nominal flow 100.0 m³/h	Needs option 06 and measuring function Flow root fnc or Flow linear **Nominal flow** at a programmed pressure drop. Setting possible with buttons ▲ or ▼. Note: Following parameters depend on the converted device measuring range. Process value and parameters can be displayed and programmed in range of max. −99999 ... 99999 digit
↻		
↓	10 Input filter □LOW ■MED □HIGH	3-step **input filter** LOW low filter effect (fast response time) MED medium filter effect (normal response time) HIGH high filter effect (slow response time) for smoothing display and output signal while pressure will wobble. Selection with buttons ▲ or ▼.
↻		
↓	11 Proc. value = 0 by key ▲ : 0.0	**Zero correction** (not displayed on devices with barometrical measuring range 9) Pressing the button ▲ will set the actual value to 0 **Note! Don´t use this parameter with any process connection.** On flow measuring with parameter Start of curve is set to zero a linear function is selected for the displayed value. For lower pressure measuring range, selected with high resolution (e.g. measuring unit mbar with 2 decimals), the zero correction is only possible for input filter MED or HIGH.
↻		
↓	12 Output ■4–20mA □0–10V	**Output signal** 4 ... 20mA or 0 ... 10V DC Selection with button ▲ or ▼. Device type UNICON-P-2-X-X-XX only
↻		
↓	13 Start range (4mA) 0.0mbar	**Start value** of measuring range (value for 4 mA or 0 V output) Setting possible within device measuring range with buttons ▲ or ▼.
↻		

continue
page 9

Button	Display	Description
↓	14 End range (20mA) 10.0mbar	**End value** of measuring range (value for 20 mA or 10V output) Setting possible within device measuring range with buttons ▲ or ▼. **Note:** If Start range > End range the output works with decreasing characteristic.
↻		
↓	15 Range < 0.5mbar correct with ↻	**Correction of the pressure range** (only displayed if the programmed measuring span is too small) The minimum allowable span will be displayed. Please return to parameter Start range with button ↻ and correct Start range or End range for minimum span.
↻		
↓	16 Alarm AL1 ■OFF □MIN □MAX	**Switching performance for alarm output AL1** Selection with button ▲ or ▼.
↻		
↓	17 Limit value AL1 4.0mbar	**Setpoint alarm for output AL1** Setting possible within device measuring range with buttons ▲ or ▼.
↻		
↓	18 Hysteresis AL1 0.5mbar	**Hysteresis alarm for output AL1** Setting possible from 1 Digit ... device measuring range with button ▲ or ▼ .
↻		
↓	19 Alarm AL2 ■OFF □MIN □MAX	**Switching performance for alarm output AL2** Selection with button ▲ or ▼.
↻		
↓	20 Limit value AL2 4.5mbar	**Setpoint alarm for output AL2** Setting possible within device measuring range with buttons ▲ or ▼.
↻		
↓	21 Hysteresis AL2 0.50mbar	**Hysteresis for AL2** Setting possible from 1 Digit ... device measuring range with button ▲ or ▼ .
↻		

continue
page 10

Button	Display	Description
↓	22 Simul. Pressure 0.0 mbar	**Simulation of the pressure** (manual operation). The converter works in simulation mode. The output current changes within 4...20mA according to programmed pressure range. Setting possible with the buttons ▲ or ▼. Please note: This parameter will **not** be leaved automatically after 90 seconds.
↓	23 Corr. P-output Initial: 4.00mA	**Correction of analog output initial value** Setting possible from ≈ 3.70 ... 7.50mA with the buttons ▲ or ▼. (Not available with output 0...10 V DC)
↓	24 Corr. P-output End: 20.00mA	**Correction of analog output end value** Setting possible from ≈ 16.80 ... 21.00mA with buttons ▲ or ▼. (Not available with output 0...10 V DC)
↓	25 Parameter lock ■OFF □ON	**Parameter lock** If activated only the setpoint of the alarm outputs AL1 and AL2 will be displayed (if enabled). Selection with buttons ▲ or ▼ by pressing longer then 2 sec.
↓	26 Factory setting Code=00	Parameter for factory setting
	4.4mbar AL1□ AL2■	Return to the working level

Error codes

Display	Description and remedy
Display flashes	Overrange of the measuring rang
Write protect!!	A changed parameter setting can not be stored, because the write protection is activated by internal slide switch at position ON. Set the switch at position OFF and modify settings again.
Parameter error -> Please check	While examination of parameter memory XX, errors were detected. Quit display message with button ↻ and check parameter settings. If the errors occurs again, a factory check is necessary.
Range < X correct with ↻	The minimal range (X) according to the device measuring range fall below while configuration. Check and change measuring range (see parameter 15).

Examples

No. / Parameter : Parameter values

Absolute pressure measuring

Device measuring range 2000 mbar/hPa abs.
800...1200 hPa is corresponding with the output signal 4...20mA

3	Display unit	: hPa
10	Input filter	: MED
14	Start range (4mA)	: 800
15	End range (20mA)	: 1200

Flow rate measuring with Impact-pressure sensor needs option 06
Pressure drop 1.6 mbar at 200m³/h volume flow
Maximum flow 250m³/h is corresponding with the output signal .
Device measuring range 3mbar

2	Measuring function	: Flow rate rad.
3	Display unit	: m³/h
4	Decimals	: 1
5	Start of curve	: linear
6	Threshold point	: 10.0%
8	Pressure drop	: 1.60 mbar
9	Nominal flow	: 200.0 m³/h
10	Input filter	: MED
11	Proc. value = 0	: Controlling is necessary at pressure-less system or open process inputs . If necessary set to "0.000".
14	Start range (4mA)	: 0.0m³/h
15	End range (20mA)	: 250.0m³/h

Order code

	1.	2.	3.	4.
UNICON-P -	☐	**-** ☐	**-** ☐	**-** ☐

1. Type

1	Output 4...20mA 2 electronic alarm outputs, supply voltage 7.5 ... 30V DC, 2-wire loop powered,
2	same as 1, with additional output 0 ... 10V DC selectable, supply voltage 16 ... 30V DC, 3-wire connection

2. Device measuring range [mbar]*

1	3 rel.
2	10 rel.
3	30 rel.
4	100 rel.
5	300 rel.
6	1000 rel.
9	2000 abs. (barometrical pressure)

3. Process connection

0	4mm tubes (standard)
2	4mm Schott glands
3	6mm Schott glands

4. Option

00	without option
06	Display conversion (e.g. flow rate)
11	Extended burst pressure (max. 3000mbar) for measuring ranges 1 ... 4

*the required pressure range is programmable down to 10% of full scale within the selected device measuring range. Please consider that measuring error is increased with amplification.

Example:

Device measuring range 3	→ 30mbar
programmed pressure range	→ 0...10mbar
Amplification [V]	→ 3x
Measuring error V x accuracy	→ = 3 x 0.25% = 0.75%

Variation of temperature while operating will produce additional temperature errors (see technical data).