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Pressure-Converter UNICON-P

Differential pressure – diminished pressure – overpressure – barometric pressure – flow rate

Features

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



Fieldcase
100x100x60 mm (WxHxD)

General

Pressure converters UNICON-P can be used for measuring low pressure, differential pressure in filter- and clean room technologie In connection with orifice plates, impact (dynamic) pressure, venturi nozzle it is suitable for measurement of flow rates of dry and non aggressive gases. The version for moist media (condensate-resistant, measuring range 30-60) is only designed for pure gauge pressure measurement. Within the device dependent full scale range, output and display may be adjusted. The device offers' additional features like a unidirectional (e.g. 0 ... 1 mbar) or bidirectional (e.g. -1 ... 1 mbar) pressure range. The analog output depents to the programmed analog output.

Short information

Programmierung	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 linearize or set to "0", to eliminate astable measurement in this part.
Analog output	Proportional to the pressure (linear) or flow rate (root extracting) 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.

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Programable pressure measuring ranges [mbar]

Device measuring range		1	2	3	4	5	6	9
undirectional	min.	0 – 0.300	0 – 1.00	0 – 3.00	0 – 10.0	0 – 30.0	0 - 100	0 - 200 abs.
	max.	0 – 3.000	0 – 10.00	0 – 30.00	0 – 100.0	0 – 300.0	0 - 1000	0 - 2000 abs.
bidirectional	min.	± 0.150	± 0.50	± 1.50	± 5.0	± 15.0	± 50	–
	max.	± 3.000	±10.00	± 30.00	± 100.0	± 300.0	± 1000	
max. stat. over-pressure		200	200	300	600	1500	3000	4000
Burst pressure between process connectors		400	400	600	900	1500	5000	–
Burst pressure against ambient		600	600	600 (3000)	900	3000	5000	7000

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

Version for moist media (condensate-proof)

Device measuring range		30	40	50	60
unidirectional	min.	0 – 5.0	0 – 10.0	0 – 30.0	0 - 100
	max.	0 – 50.0	0 – 100.0	0 – 300.0	0 - 1000
bidirectional	min.	± 2.50	± 5,0	± 15	± 50
	max.	± 50.00	±100.0	± 300.0	-700 - 1000
max. stat. over pressure and burst pressure		1400	1400	1400	3000

Explanation of overpressure

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.

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Technical data

Power supply

Supply voltage	:	7.5 ... 30 V DC, 2-wire loop powered 4 ... 20 mA 16 ... 30 V DC, 3-wire 0 ... 10 V
Operating temperature	:	0 ... 50 °C basic or. -15 ... 65 °C condensate proof versions
Isolation	:	between Analog output/Alarm output1/Alarm output2
Rated voltage	:	500 V DC, between Analog output/Alarm output1/Alarm output 2

Measuring input

Process connection		
Process materials	:	Condensate proof Silicone, polyethermide, polypropylene, polyurethane
Basic version	:	2 pressure tubes for 4 mm hose (standard), 4 and 6 mm Schott glands available
Version for moist media	:	1 Schott gland 4 or. 6 mm, material polypropylene
Measuring medium	:	see table on page 4
Measuring principle	:	piezoelectric
Rise time t_{90}	:	Parameter 10, input filter (low, med, high)
Basic version	:	low= 300 ms med=7000 ms high = 41000 ms
Version for moist media	:	low=2000 ms med=7000 ms high = 41000 ms

Output pressure

Current output	:	4 ... 20 mA ext. burden RA [Ω] ≤ $\frac{\text{Supply voltage } -7.5\text{ V}}{0.02\text{ A}}$
Voltage output	:	0 ... 10 V load < 3 mA, supply voltage > 16 V load < 10 mA, supply voltage > 20 V

Basic accuracy[1]

Basic version

Basic accuracy	:	0.25 % ± 1 Digit related to the selected device measuring range
Temperature error		
Span	:	0.02 %/°C linear and root extracting
Zero point	:	0.02 %/°C linear bzw. 0.02 ... 0.15 %/°C root extracting[2]

Version for moist media

Basic accuracy	:	0,5 ± 1 Digit related to the selected device measuring range
Temperature error		
Span	:	2 % on the operating temperature range
Zero	:	1 % on the operating temperature range

Alarm outputs

Transitor output	:	7.5 ... 30 VDC, 60 mA, max. with integrated current limitation
Votalge drop	:	< 3 V (at max. load)
Display	:	LCD-dot matrix, 3.8 mm high
Format	:	2 lines, 16 characters
True value	:	Standard -9999 ... 9999 Digit Display conversion -99999 ... 99999 digit (option 06)
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 60 mm (WxHxD)
Wight	:	max. 360 g
Electrical connection	:	Screw terminal with pressure plate, 2.5 mm^2 flexible, 4 mm^2 wire
Protection	:	IP65, terminals IP20 German BGV A3

[1]) see also the notes on the device measuring range on the last page

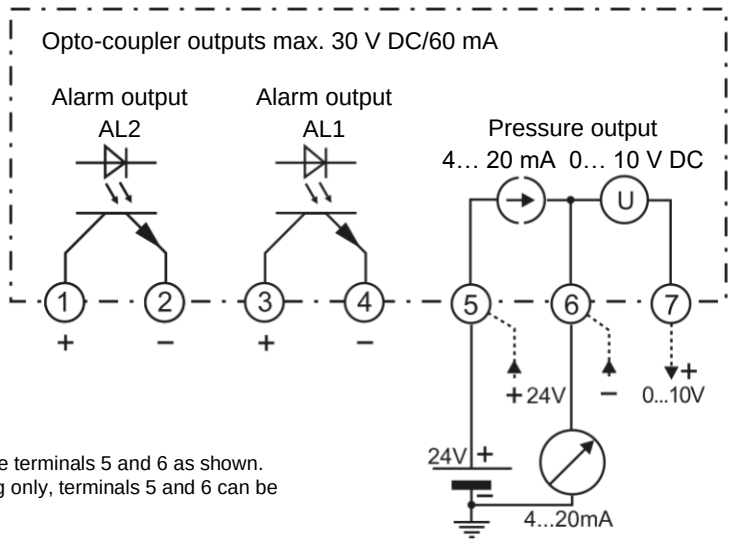
[2]) root extracting : start of curve linear up to 20% of the measuring range

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Measurement Types / Process Media

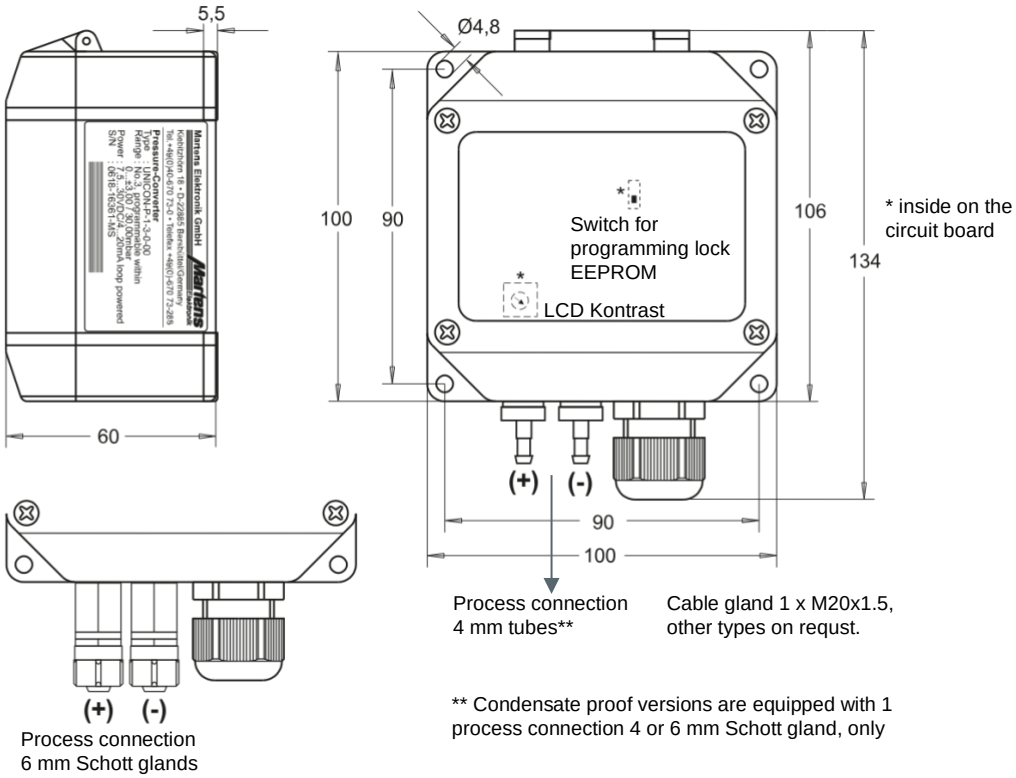
	UNICON-P basic	UNICON-P condensate proof
Measurement types	Pressure relative, absolute, difference, flow radiating/linear	Pressure, relative
Process materials	Silicone, Nylon, Ceramic, Gold	Silicone, polyethermide, polypropylene, polyurethane
Media reliability	dry, non-agressive gases	Water, alcohol, alkaline detergents, weak acids (e.g. acetic acid) and many corresponding gases
Media intolerance	All others	many hydrocarbons (oil, gasoline..), little diluted acids, corresponding solvents

Connection diagram



Note: 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.

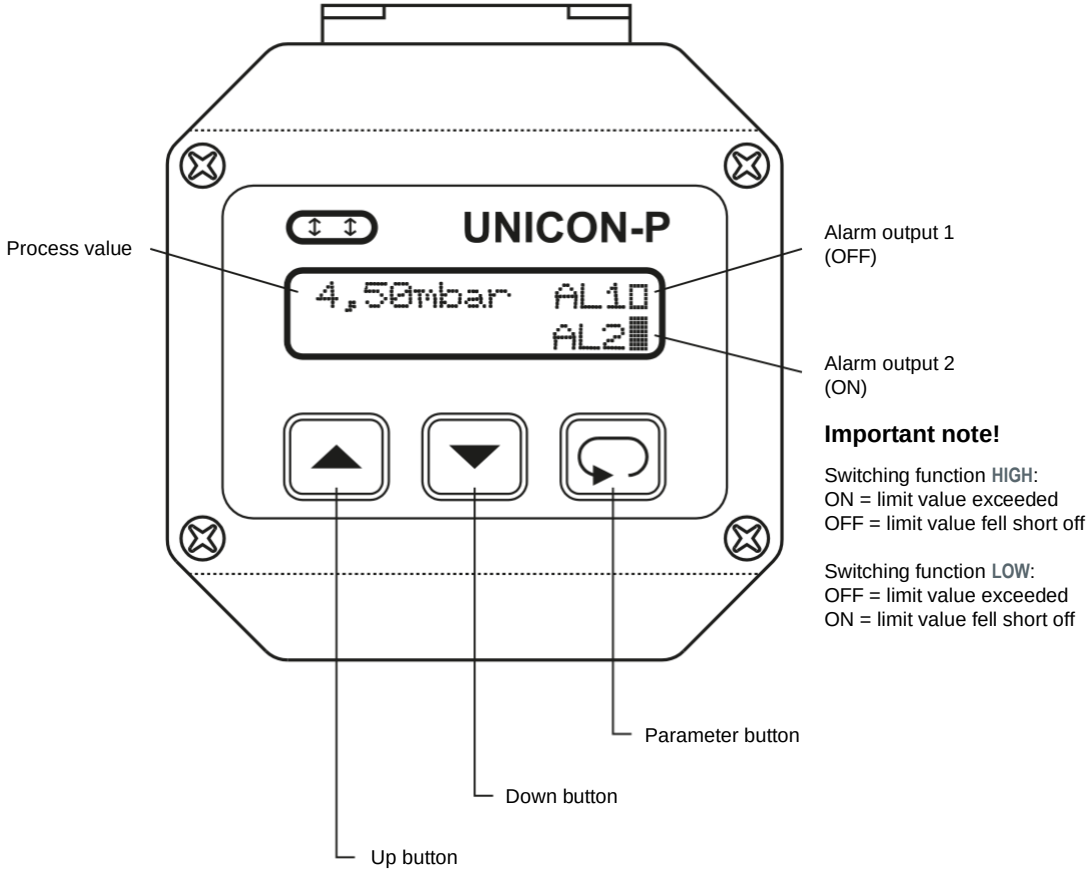
Dimensions



** Condensate proof versions are equipped with 1 process connection 4 or 6 mm Schott gland, only

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Controls and indicators



Important note!

Switching function HIGH:
ON = limit value exceeded
OFF = limit value fell short off

Switching function LOW:
OFF = limit value exceeded
ON = limit value fell short off

Instructions

Programming of the device is arranged in the **configuration level**. The desired parameter can be called by button . For selection within a parameter use buttons and .

Button combinations (press buttons at the same time):

+ 1 Parameter back

+ Parameter to **"0"** or minimum value

When the power supply is switched on, the UNICON initializes itself. The display shows the device type and software version. After initializing, the current measured values are displayed.

The configuration level is called-up by pressing the button . Now all the parameters defining the function of the UNICON can be programmed. After pressing the button again, the entered data will be stored.

When the configuration is finished, or when no button is pressed for more than 90 seconds, the program jumps back to the working level. Leaving the configuration level is possible at any time when pushing the button for 2 seconds.

Installation note:
After installation, the device must be configurated for the intended use. See page 6.

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Programming

Notes to representation



Parameter is only displayed if configured



Parameter is only displayed if included (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 ▲ and ▼ .

Configuration level

Display

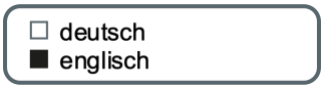
Description (the display graphic contents factory settings)



Process value pressure
Alarm output indication (only if activated).
☐ = OFF and ■ = ON



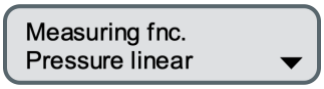
1



Language of the operating instructions
Selection with buttons ▲ and ▼.



2



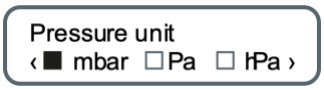
Measuring function (option 06 needed)

PRESSURE LINEAR	(standard)
FLOWROOT FNC.	e.g. orifice plates, impact (dynamic) pressure, venturi nozzle
FLOW LINEAR FNC.	e.g. LFE (Laminar Flow Elements)

Selection with buttons ▲ and ▼.



3



Pressure unit
Selection with buttons ▲ and ▼.

Following units are available:
Device measuring range ≤ 300mbar
mbar, Pa, hPa, kPa, psi, mm WS, cm WS, in H2O, kg/m^2, mm Hg, cm Hg, in Hg, torr, l/s.

Device measuring range ≥ 300mbar:
mbar, bar, hPa, kPa, psi, cm WS, in H_2O, m WS, kg/cm^2, mm Hg, cm Hg, in Hg, torr.

In case of modification, pressure range and alarm outputs are recalculated. The number of decimal places may be adapted also.

Following units are available in conjunction with option 06 and FLOW measurement only:
l/s, l/min, l/h, m^3/s, m^3/min, m^3/h, cuin/s, cuin/h, cuft/s, cuft/h, kg/s, kg/min, kg/h.

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Display

Description (the display graphic contents factory settings)

4

Decimals
n=? ... ? n=1

Decimal point position
Selection with buttons ▲ and ▼.

The possible number of decimal points is dependent of the selected pressure unit.
If no decimal point is available, this parameter is not visible.

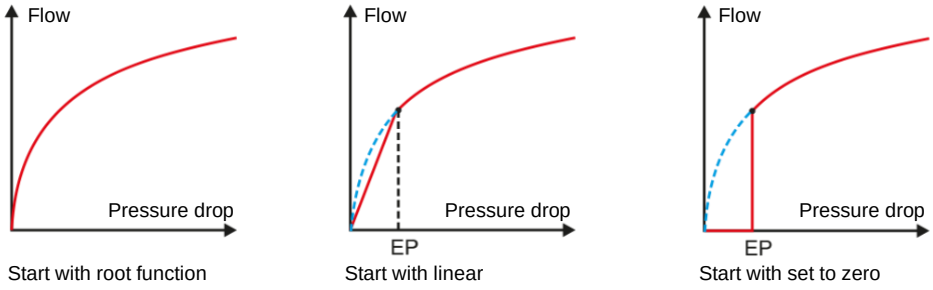
5

Start of curve
root function

Needs option 06 and measuring function **FLOWROOT FNC.**

Start of curve
Selection with buttons ▲ and ▼.

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).



6

Thresholdpoint
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 ▲ and ▼.
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 ▲ and ▼.
Note: The following parameters depend on the converted device measuring range.

8

Pressure drop
1.0mbar

Needs option 06 and measuring function **FLOW**

Pressure drop (differential pressure) at the measuring device at a nominal flow (see parameter 9).

Setting possible in the (positive) device measuring range with buttons ▲ and ▼.

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Display **Description** (the display graphic contents factory settings)

9

Nominal flow
100.0 m³/h

Needs option 06 and measuring function **FLOW**

Nominal flow at a programmed pressure drop.
Setting possible with buttons ▲ and ▼.

Note: Following parameters depends 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 ▲ and ▼.

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
■ 4-20 mA ☐ 0-10 V

Output signal selection
4 ... 20mA or 0 ... 10V DC (Device type UNICON-P-2-X-X-XX, only)

Selection with buttons ▲ and ▼.

13

Start range (4 mA)
0.0 mbar

Start value of measuring range (value for 4 mA or 0 V output)
Setting possible within device measuring range with buttons ▲ and ▼.

14

Endrange (20 mA)
10.0 mbar

End value of measuring range (value for 20 mA or 10V output)
Setting possible within device measuring range with buttons ▲ and ▼.

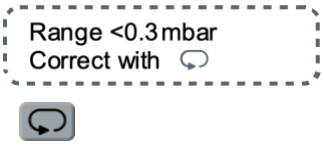
Note: **IF START RANGE > END RANGE** the output works with decreasing characteristic.

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Display **Description** (the display graphic contents factory settings)

15



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



Switching function AL1
Selection with buttons ▲ and ▼.

17



Setpoint AL1
Setting possible in the device measuring range with buttons ▲ and ▼.

18



Hysteresis AL1
Setting possible from 1 digit ... End range with button ▲ and ▼.

19



Switching function AL2
Selection with button ▲ and ▼.

20



Setpoint AL2
Setting possible in the device measuring range with buttons ▲ and ▼.

21



Hysteresis AL2
Setting possible from 1 digit ... End range with button ▲ and ▼.

22



Simulation of the pressure (manual operation)
The converter works in simulation mode. The output current changes within 4 ... 20 mA (or 0 ... 10 V) according to programmed pressure range. Setting possible with the buttons ▲ and ▼.

Please note: This parameter will not be left automatically after 90 seconds.

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Display	**Description** (the display graphic contents factory settings)
23 Corr. P-output Initial: 4.00 mA	**Correction of analog output initial value** Setting possible from ≈ 3.70 ... 7.50mA with the buttons ▲ and ▼. (Not available with output 0 ... 10 V DC)
24 Corr. P-output End: 20.00 mA	**Correction of analog output end value** Setting possible from ≈ 16.80 ... 21.00 mA with buttons ▲ and ▼. (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 by pressing button ▲ or ▼ longer then 2 sec.
26 Factory setting Code = 0	**Parameter for factory setting**
27 4.4 mbar AL1 ☐ AL2 ■	**Return to the working level**

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Error codes

Display	Description (the display graphic contents factory settings)
Display flashing	Overrange of the measuring range
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).

Programming 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 200 m^2/h volume flow	
	Maximum flow 250m /h is corresponding with the output signal.	
	Device measuring range 3mbar	
2	Measuring func.	: FLOW RATE RAD.
3	Display unit	: m3/h
4	Decimals	: 1
5	Start of curve	: LINEAR
6	Thresholdpoint	: 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	: 0.0 m3/h
15	End range	: 250.0 m

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Ordering code

UNICON-P - [1.] - [2.] - [3.] - [4.]

1. Type

1 Output 4...20 mA,
2 electronic alarm outputs,
supply voltage 7,5 ... 30 V DC, 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]

Standard version

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

Version for moist media (condensate proof)

30	±	50	rel.
40	±	100	rel.
50	±	300	rel.
60	- 700…1000		rel.

3. Process connection

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

4. Options

00 without options
06[2] Display conversion (e.g. flow rate)
11[2] extended flow pressure (max. 3000 mbar) for measuring range 3

[1]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.
[2]Not available for moist media version

Example:

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

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