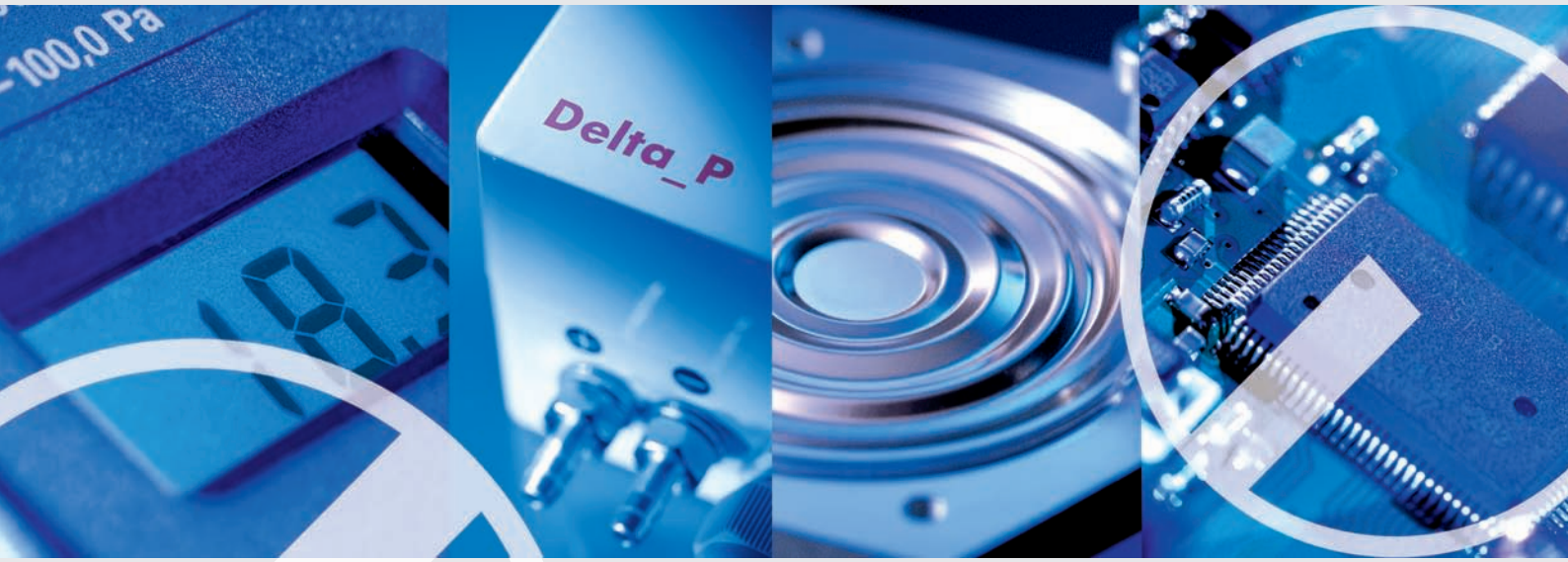
halstrup walcher

It's the detail that counts

**Differential Pressure Transmitters**
**Handheld Pressure Gauges**
**Pressure Calibration Systems**
**Absolute Pressure Gauges**



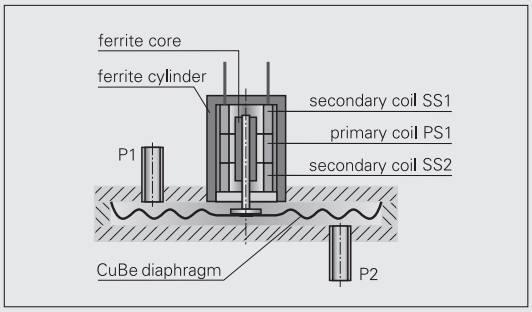
## Properties of pressure gauges

Differential pressure transmitters made by halstrup-walcher GmbH have been designed for non-aggressive, gaseous media. These gauges work according to an inductive measurement principle whereby an inductive displacement transmitter measures the deflection of a beryllium bronze diaphragm without making contact. The diaphragm is situated between two measurement chambers, thereby making it possible to record both positive and negative differential pressures. The measuring cell has no frictional parts or parts subject to mechanical wear. Beryllium bronze is a highly elastic material that is stabile for long periods of time, behaves well under a variety of temperature conditions and is extremely resistant to hysteresis. As a result, this technology can be used to create high-quality pressure gauges capable of taking measurements at pressures as low as a few Pa.

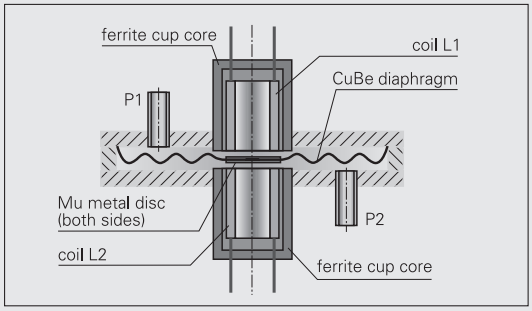
**halstrup-walcher utilizes two different measuring systems:**
Due to the excellent linearity afforded by its design, the linear variable differential transformer (LVDT) is primarily used for pressure calibration devices. The dual inductive pickup system sends a differential signal that is linearized by an electronic analysis unit. This system has been slated for use in manufacturing high-quality differential pressure transmitters and hand-held pressure gauges.

**Advantages**

- perfect for positive or negative differential pressures and for either symmetrical or non-symmetrical measuring ranges
- devices can be calibrated
- especially suitable for very small measuring ranges
- available with a variety of different display unit options
- calibration certificates available in German or English from either the factory or from the German Calibration Service (DKD)




Design of the LVDT

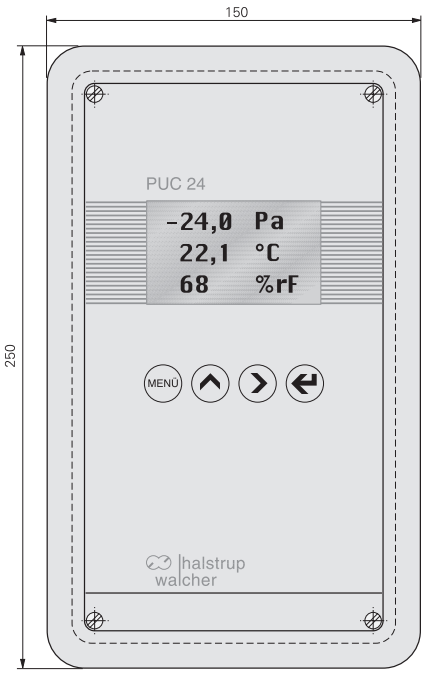


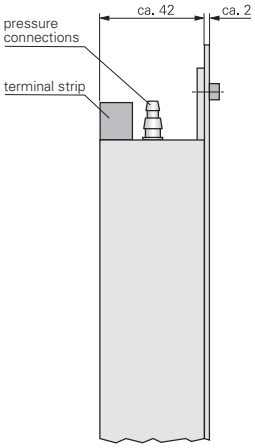

Design of the dual inductive pickup system

Walcher
Meßtechnik GmbH

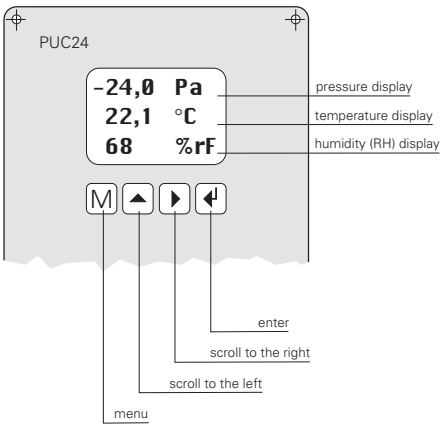
## PUC 24

### Dimension drawing

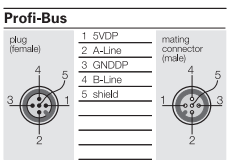


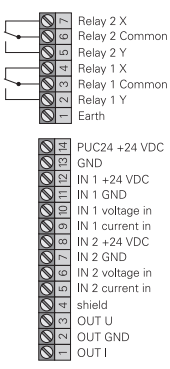

### Operating elements



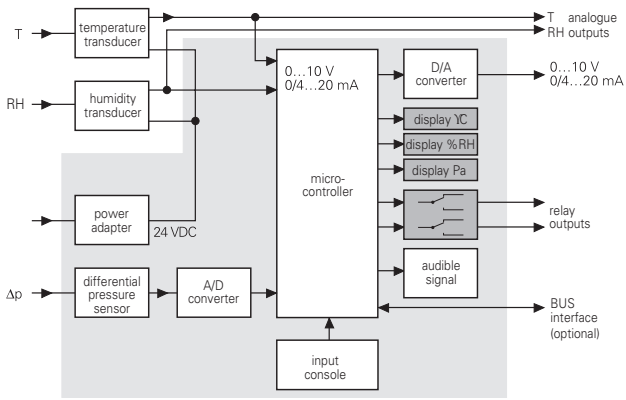

### Connection diagram




### Supply voltage




### Functional block diagram



# PUC 24

## Process monitoring device for clean rooms

### Special features

- particularly suitable for use in clean rooms
- inputs for humidity and temperature sensors
- stable measurements thanks to cyclical self-calibration of the zero point (differential pressure)
- alarm thresholds (switching contacts)
- graphic LC display
- Profibus DP interface (optional)
- surface resistant against solvents
- acustic alarm when alarm thresholds are reached, may be reset by push-button
- bilingual menu (English/German)

### Technical data

| | |
|---|---|
| measurement ranges | ± 100 Pa or ± 250 Pa<br>freely scalable within this range |
| margin of error<br>(0.3 Pa margin of error for reference) | 0.3 Pa + 0.5 % of end value for measurement ranges ≤60 Pa, 0.5% of end value for measurement ranges > 60 Pa |
| deflection drift / temperature | 0.03 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | ± 0 % (cyclical zero-point correction) |
| overload capacity | 200 x |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |
| sensor response time | 25 ms |
| time constants | 25 ms … 60 s (adjustable) |
| input signal humidity/temperature module (galvanically separated) | 0 … 10 V, $R_i$ = 100 kΩ<br>0/4 … 20 mA, $R_L$ = 50 Ω<br>adjustable |
| operating temperature | + 10 °C … + 50 °C |
| storage temperature | – 10 °C … + 70 °C |
| power consumption | approx. 7 VA |
| weight | approx. 1 kg |
| pressure ports | for hose Ø 3...6 mm |
| protection class | IP 65 |
| testing | CE |

| data interface | A |
|---|---|
| none | 0 |
| Profibus DP (optional) | DP |

| supply voltage |
|---|
| 24 VDC, ± 10 % smoothed |

| output signals |
|---|
| 0 … 10 V ($R_i$ > 2 kΩ)<br>0/4 … 20 mA ($R_L$ < 500 Ω) adjustable |
| 2 contact points, 6 A, 230 VAC,<br>may be configured as desired within this pressure range |

### Order key

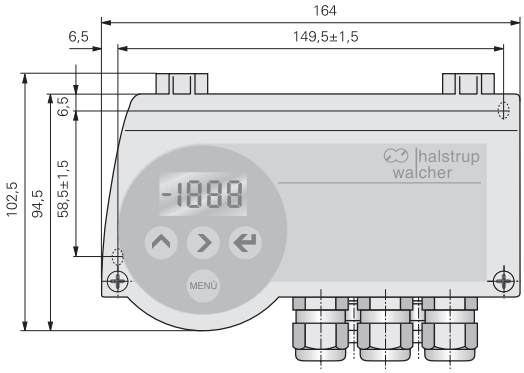
| | A |
|---|---|
| PUC 24 | - |

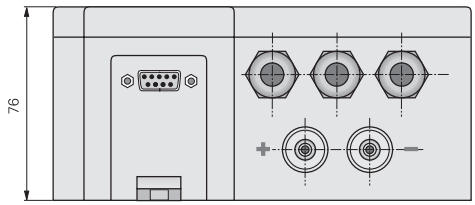
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

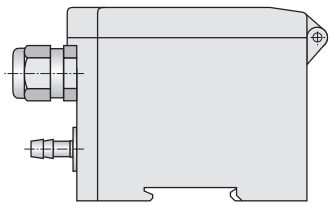
## P 26

### Dimension drawing

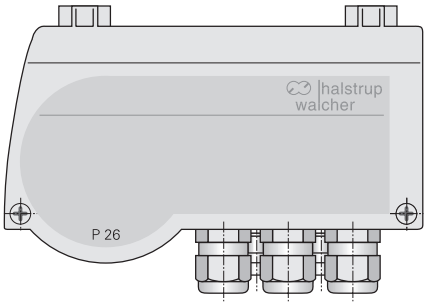
### P 26 with LCD



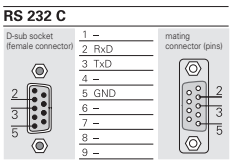



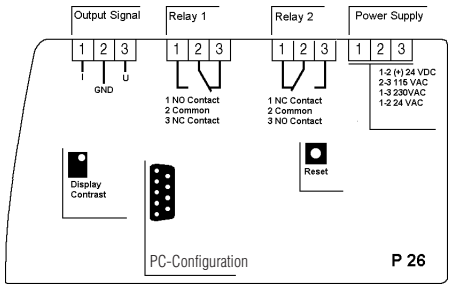



### no LCD




### Connection diagram



# P 26

## Intelligent differential pressure transmitter with scalable range


### Special features

- range and display scalable
- switching contacts with adjustable switching thresholds
- time constants and output characteristics can be configured (root-extraction / linear)
- automatic zero-point calibration prevents zero-point drift
- unit conversion (e.g. $mmH_2O$, mmHg, etc.)
- integrated valve provides a high level of overpressure protection
- available with interface RS232 (optional)
- also for top-hat rail mounting
- multilingual menu (English, German, Italian, French)
- ± measuring ranges

### Technical Data

| | |
|---|---|
| measurement ranges (others available upon request) | 10/50/100/250/500 Pa<br>1/2,5/5/10/20/50/100 kPa<br>free scalable from 10..100% within a range |
| margin of error (0.3 Pa margin of error for reference) | 0.5% + 0.3 Pa of scaled range (40...100% of end value) |
| deflection drift / temperature | 0.03 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | ± 0 % (cyclical zero-point correction) |
| overload capacity | 600 kPa for measurement ranges ≥ 2,5 kPa<br>200x for measurement ranges < 2,5 kPa |
| medium | air, all non-aggressive gases |
| max. line pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |
| sensor response time | 25 ms |
| time constants | 25 ms ... 60 s (adjustable) |
| operating temperature | +10 °C ... +50 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | approx. 6 VA |
| weight | approx. 0,75 kg |
| cable glands | 3 x M 16 |
| pressure ports | for hose NW 6 mm, others available upon request |
| protection class | IP 65 |
| testing | CE, CSA, GOST |

| output | A | power supply | B |
|---|---|---|---|
| 0 ... 10 V ($R_L \geq 2$ kΩ) | 1 | 24 V AC/DC | 24ACDC |
| 0...20 mA ($R_L \leq 500$ Ω) | 0 | 24 VAC with galvanic separation | 24AC |
| 4...20 mA ($R_L \leq 500$ Ω) | 4 | 230/115 VAC | 230/115 |
| ± 5 V ($R_L \geq 2$ kΩ) | 5 | | |

| measurement range | C | margin of error | D |
|---|---|---|---|
| measurement range e. g., 0 – 10 Pa, mbar, mmHg, etc. | | standard | S |
| | | ±0.2 % of end value, but min. 0.3 Pa | 2 |

| LCD | E | contact points | F |
|---|---|---|---|
| none | 0 | none | 0 |
| LCD and buttons for configuration | LT | 2 switching relays max. 230 VAC, 6 A | 2 |

| interface | G |
|---|---|
| none | 0 |
| RS 232 | RS |

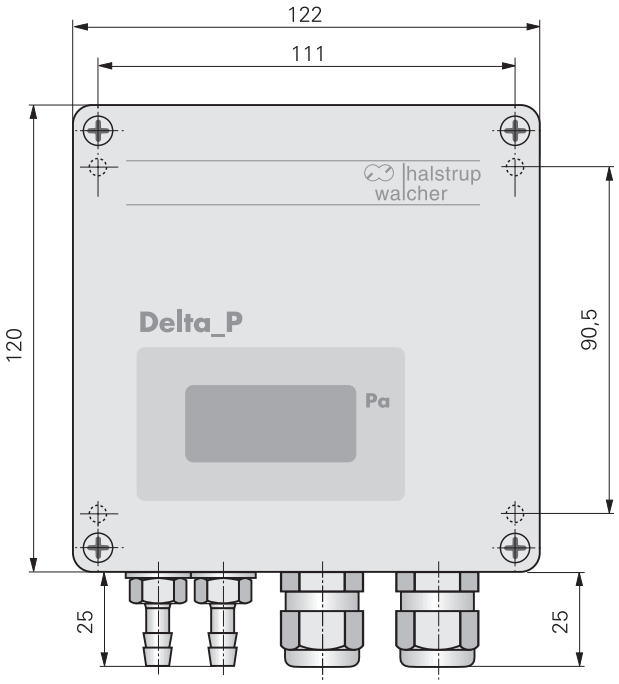
### Order key

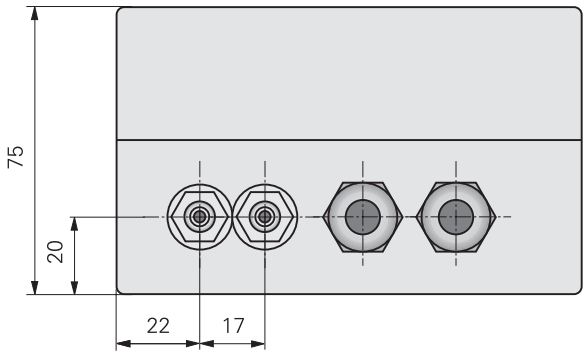
| | A | | B | | C | | D | | E | | F | | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P 26 | - | | - | | - | | - | | - | | - | | - |

| accessories | |
|---|---|
| ☐ RS 232 Cable | 9601.-0085 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## P 82 R

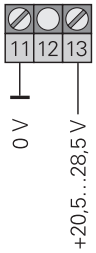
### Dimension drawing



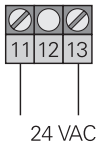




### Connection diagram

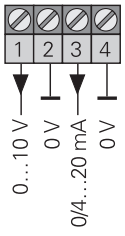
DC power supply




AC power supply




analogue outputs



# P 82 R

## Pressure transmitter with root-extracted output for measuring volume flow


### Special features

- highly accurate and stable for long periods
- very little hysteresis; largely independent of temperature
- differential pressure Δp at the measuring orifice is expressed as either a linear ($U_L$,$I_L$) ) or root-extracted function $U_{RAD} = \sqrt{10\ V} \times \sqrt{U_L}$, $I_R = \sqrt{20\ mA} \times \sqrt{I_L}$ or $I_R = 4\ mA + \sqrt{16\ mA} \times \sqrt{(I_L - 4\ mA)}$

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 100/250/500 Pa<br>1/2.5/5/10/20 kPa |
| margin of error | 1 % of end value |
| deflection drift / temperature | 0.04 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | 0.05 %/K (+10 °C...+50 °C) |
| zero point drift / time | 0.5 %/year |

| | |
|---|---|
| overload capacity | 5x |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |

| | |
|---|---|
| sensor response time | 20 ms |
| leak flow suppression | adjustable from 0 ... 10% of end value |

| | |
|---|---|
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |

| | |
|---|---|
| power consumption | approx. 3 VA |
| weight | approx. 0.8 kg |
| cable glands | 2 x PG 11 |
| pressure ports | for hose Ø 6 mm |
| protection class | IP 65 |
| testing | CE, CSA |

| output | A | power supply | B |
|---|---|---|---|
| 0...10 V ($R_L \geq 5$ kΩ) | 1 | 24 VDC | 24D |
| 0...20 mA ($R_L \leq 500$ Ω) | 0 | 24 VAC | 24A |
| 4...20 mA ($R_L \leq 500$ Ω) | 4 | 115 VAC | 115 |
| | | 230 VAC | 230 |

| measurement range | C |
|---|---|
| measurement range in Pa, kPa, mmHg, etc. (e.g., 0 –100 Pa) | |

| time constants | D |
|---|---|
| none | 0 |
| 1 s | 1 |
| 2 s | 2 |
| 5 s | 5 |

| LCD | E |
|---|---|
| none | 0 |
| 3 1/2 digit | 3 |
| 4 1/2 digit | 4 |

### Order key

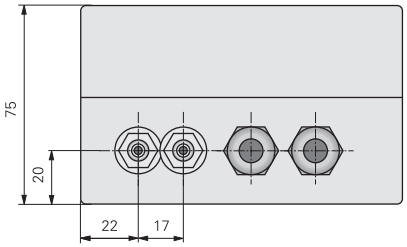
| | A | | B | | C | | D | | E |
|---|---|---|---|---|---|---|---|---|---|
| P 82 R | - | | - | | - | | - | | - |

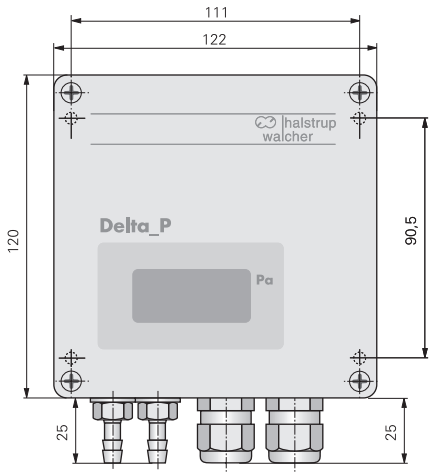
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## PU/PI/PIZ

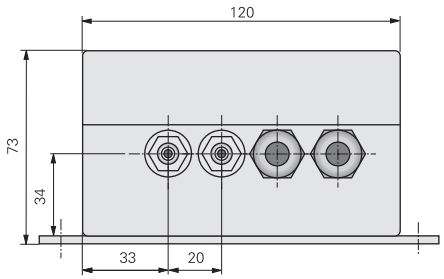
### Dimension drawing

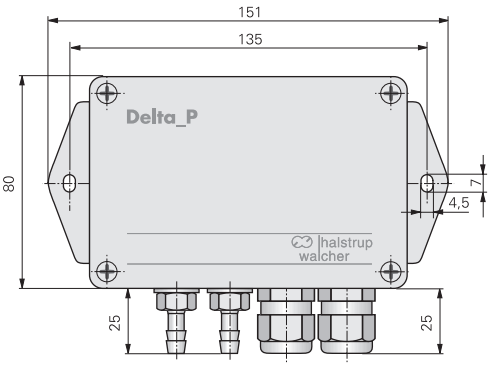
#### PU/PI with LCD



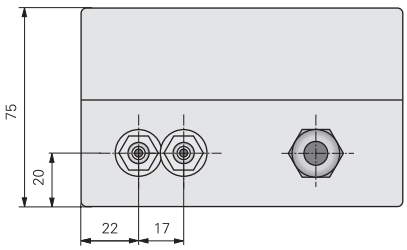



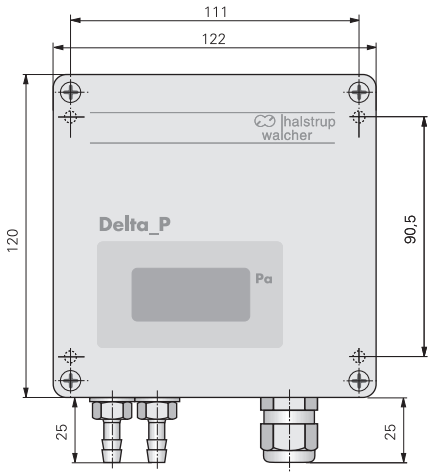

#### no LCD




#### PIZ with LCD

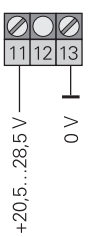


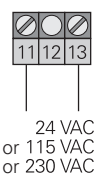

### Connection diagram

#### PU/PI

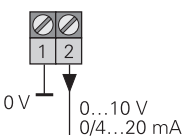
DC power supply




AC power supply

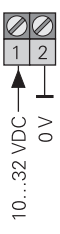



analogue outputs




#### PIZ

DC power supply
4...20 mA output



# PU/PI/PIZ

## For standard applications


### Special features

- for positive and negative differential pressures
- highly accurate and stable for long periods
- little zero point drift or hysteresis; largely independent of temperature
- also available as a two-wire system (PIZ model)

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 50/100/250/500 Pa<br>1/2.5/5/10/20/50/100 kPa |
| margin of error | 1 % of end value, 0.5 % of end value for measurement ranges ≥ 250 Pa, 0.2 % of end value for measurement ranges ≥ 250 Pa |
| deflection drift / temperature | 0.04 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | 0.04 %/K (+10 °C...+50 °C) |
| zero point drift / time | 0.5 %/year |
| overload capacity | 10x for measurement ranges ≤ 20 kPa<br>2x for measurement ranges > 20 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |
| sensor response time | 20 ms |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | approx. 3 VA |
| weight | 0.8 kg |
| cable glands | PU/PI: 2x PG 7, others available upon request<br>PIZ: 1x PG 7, others available upon request |
| pressure ports | for hose Ø 6 mm |
| protection class | IP 65 |
| testing | CE, CSA |

| output signals | A |
|---|---|
| 0...10 V ($R_L \geq 2$ kΩ) | U |
| 0...20 mA ($R_L \leq 500$ Ω) | I0 |
| 4...20 mA ($R_L \leq 500$ Ω) | I4 |
| 4...20 mA two-wire ($R_L \leq 50$ [$U_B$ (V) – 10 V] Ω) | IZ |

| measurement range | B | margin of error | C |
|---|---|---|---|
| measurement range (e. g., 0 ...100 Pa, mbar, mmHg etc.) | | 1 % of end value | 1 |
| | | 0.5 %*, ≥250 Pa only | 05 |
| | | 0.2 %*, ≥250 Pa only | 02 |

*of end value

| supply voltage | D |
|---|---|
| 24 VDC, +20 % / –15% | 24D |
| 24 VAC, +6 % / –15% (50/60 Hz) | 24A |
| 115 VAC, +6 % / –15% (50/60 Hz) | 115 |
| 230 VAC, +6 % / –15% (50/60 Hz) | 230 |
| +10...+32 VDC (two-wire system) | PIZ |

| time constants | E | LCD | F |
|---|---|---|---|
| none | 0 | none | 0 |
| 1 s | 1 | 3 1/2 digit | 3 |
| 2 s | 2 | 4 1/2 LCD (PU/PI only) | 4 |
| 5 s | 5 | | |

### Order key

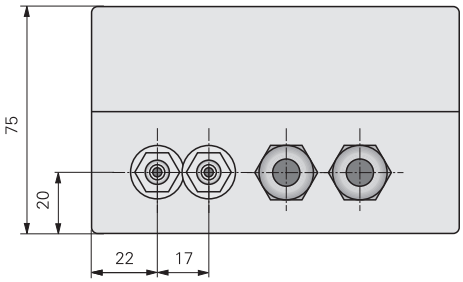
| A | B | C | D | E | F |
|---|---|---|---|---|---|
| P | | | | | |

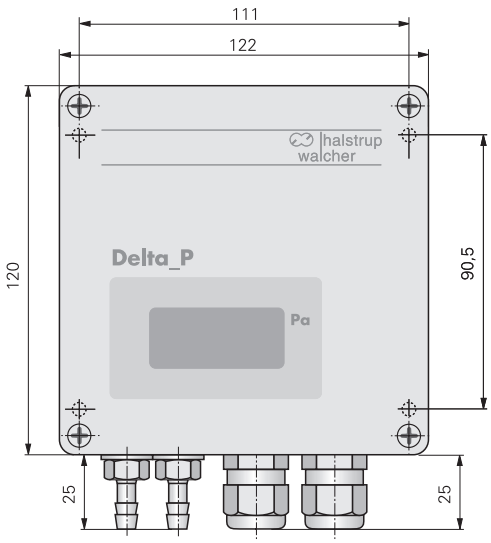
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## PS 10

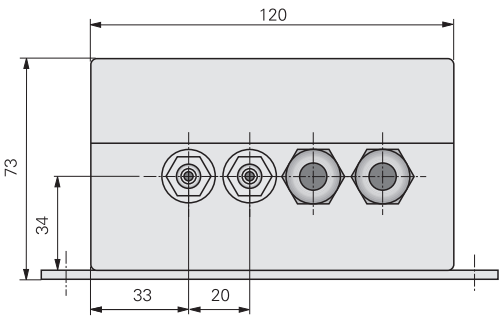
### Dimension drawing

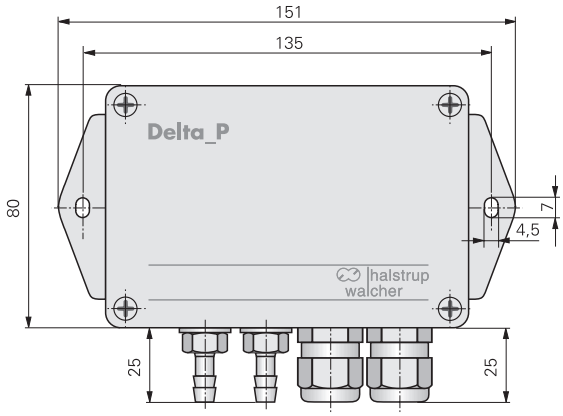
#### with LCD



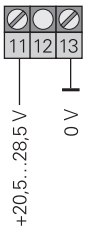

#### no LCD



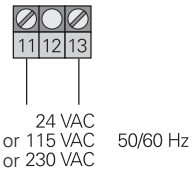




### Connection diagram

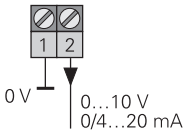
DC power supply




AC power supply




analogue outputs



# PS 10

## Excellent price/performance ratio


### Special features

- for positive and negative differential pressures
- highly accurate and stable for long periods
- little zero point drift or hysteresis; largely independent of temperature
- excellent price/performance ratio

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 250/500 Pa<br>1/2.5/5/10/20/50/100 kPa |
| margin of error | 2 % of end value |
| deflection drift / temperature | 0.1 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | 0.1 %/K (+10 °C...+50 °C) |
| zero point drift / time | 0.5 %/year |
| overload capacity | 10x for measurement ranges ≤ 20 kPa<br>2x for measurement ranges > 20 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |
| sensor response time | 20 ms |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | approx. 3 VA |
| weight | approx. 0.8 kg |
| cable glands | 2 x PG7, others available upon request |
| pressure ports | for hose Ø 6 mm |
| protection class | IP 65 |
| testing | CE, CSA |

| output signals | A |
|---|---|
| 0...10 V ($R_L \geq 2$ kΩ) | 1 |
| 0...20 mA ($R_L \leq 500$ Ω) | 0 |
| 4...20 mA ($R_L \leq 500$ Ω) | 4 |

| measurement range | B |
|---|---|
| measurement range in Pa, kPa, mmHg, etc. (e.g., 0 ... 250 Pa) | |

| power supply | C |
|---|---|
| 24 VDC, +20% / –15% | 24D |
| 24 VAC, +6% / –15% (50/60 Hz) | 24A |
| 115 VAC, +6% / –15% (50/60 Hz) | 115 |
| 230 VAC, +6% / –15% (50/60 Hz) | 230 |

| time constants | D | LCD | E |
|---|---|---|---|
| none | 0 | none | 0 |
| 1 s | 1 | 3 1/2 digit | 3 |
| 2 s | 2 | 4 1/2 digit | 4 |
| 5 s | 5 | | |

### Order key

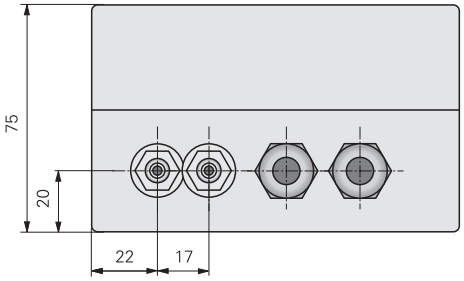
| | A | | B | | C | | D | | E |
|---|---|---|---|---|---|---|---|---|---|
| PS 10 | - | | - | | - | | - | | - |

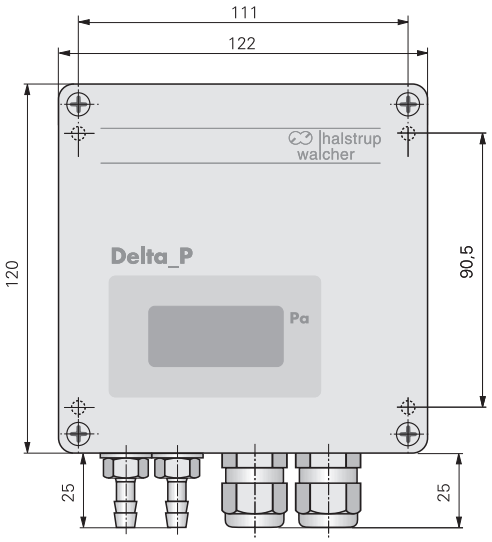
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## PK 15

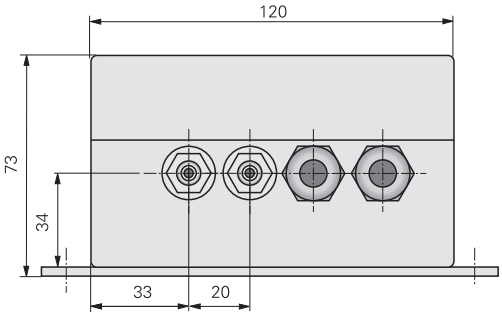
### Dimension drawing

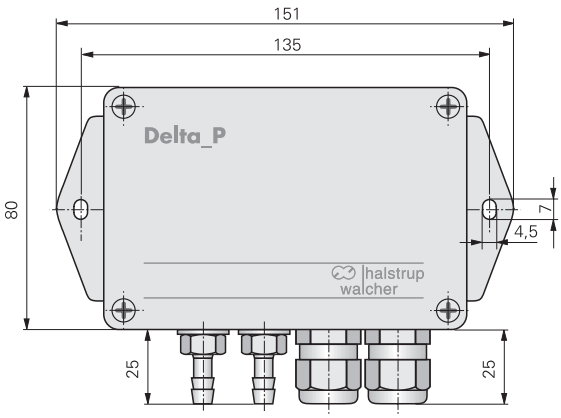
#### with LCD



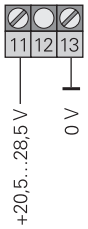

#### no LCD



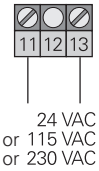




### Connection diagram

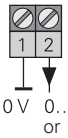
DC power supply



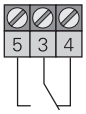

AC power supply



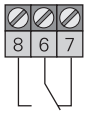

analogue outputs




relay outputs




5 NO contact
3 middle contact
4 NC contact




8 NO contact
6 middle contact
7 NC contact

# PK 15

## Pressure transmitter with adjustable switching contacts


### Special features

- for positive and negative differential pressures
- highly accurate and stable for long periods
- little zero point drift or hysteresis; largely independent of temperature
- switching contacts with adjustable switching thresholds

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 50/100/250/500 Pa<br>1/2.5/5/10/20/50/100 kPa |
| margin of error | 2 % of end value, 1 % of end value (opt.)<br>0.5 % of end value for measurement ranges ≥ 250 Pa (optional) |
| deflection drift / temperature | 0.1 %/K<br>0.04 %/K (+10 °C...+50 °C at 1 % accuracy) |
| zero point drift / temperature | 0.1 %/K<br>0.04 %/K (+10 °C...+50 °C at 1 % accuracy) |
| zero point drift / time | 0.5 %/year |
| overload capacity | 10x for measurement ranges ≤ 20 kPa<br>2x for measurement ranges > 20 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 mbar<br>max. nominal pressure of sensor |
| sensor response time | 20 ms |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | approx. 3 VA |
| weight | approx. 0.8 kg |
| cable glands | 2 x PG 9 |
| pressure ports | for hose Ø 6 mm |
| protection class | IP 65 |
| testing | CE, CSA |

| output | A | power supply | B |
|---|---|---|---|
| 0...10 V ($R_L \geq 2$ kΩ) | 1 | 24 VDC | 24D |
| 0...20 mA ($R_L \leq 500$ Ω) | 0 | 24 VAC | 24A |
| 4...20 mA ($R_L \leq 500$ Ω) | 4 | 115 VAC | 115 |
| | | 230 VAC | 230 |

| measurement range | C | margin of error | D |
|---|---|---|---|
| measurement range (e. g., 0 ... 100 Pa, mbar, mmHg etc.) | | 2 % of end value | 2 |
| | | 1 % of end value (optional) | 1 |
| | | 0.5 % of end value ≥ 250 Pa only (opt.) | 05 |

| time constants | E | LCD | F |
|---|---|---|---|
| none | 0 | none | 0 |
| 1 s | 1 | 3 1/2 digit | 3 |
| 2 s | 2 | 4 1/2 digit | 4 |
| 5 s | 5 | | |

| contact points | G |
|---|---|
| 1 switching relay (standard) max. 230 VAC, 6 A | 1 |
| 2 switching relays (optional) max. 230 VAC, 6 A (required at ± measurement ranges) | 2 |
| adjustable response threshold (via potentiometer) | |

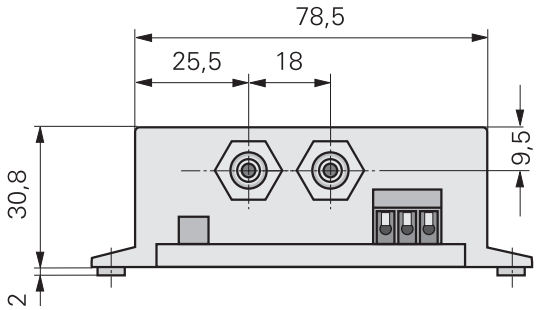
### Order key

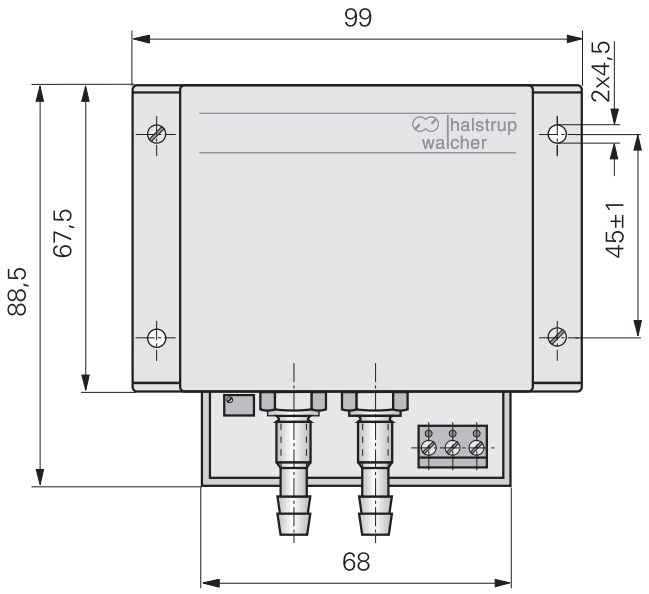
| | A | | B | | C | | D | | E | | F | | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PK 15 | - | | - | | - | | - | | - | | - | | - |

| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

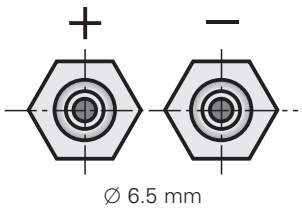
## PS 18

### Dimension drawing

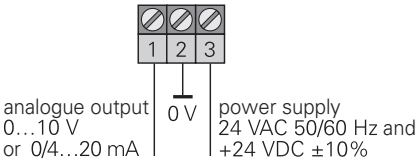



### Pneumatic connection




### Connection diagram



# PS 18

## Pressure transmitter with IP 20


### Special features

- for positive and negative differential pressures
- little zero point drift or hysteresis
- highly accurate and stable for long periods
- excellent price/performance ratio

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 250/500 Pa<br>1/2.5/5/10/20/50/100 kPa |
| margin of error | 2.5 % of end value |
| deflection drift / temperature | 0.1 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | 0.1 %/K (+10 °C...+50 °C) |
| zero point drift / time | 0.5 %/year |

| | |
|---|---|
| overload capacity | 10x for measurement ranges ≤ 20 kPa<br>2x for measurement ranges > 20 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |

| | |
|---|---|
| sensor response time | 20 ms |

| | |
|---|---|
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |

| | |
|---|---|
| power consumption | approx. 3 VA |
| weight | approx. 0.3 kg |
| pressure ports | for hose Ø 6 mm |
| protection class | IP 20 |
| testing | CE |

| output signals | A |
|---|---|
| 0 ... 10 V ($R_L \geq 2$ kΩ) | 1 |
| 0 ... 20 mA ($R_L \leq 500$ Ω) | 0 |
| 4 ... 20 mA ($R_L \leq 500$ Ω) | 4 |

| measurement range | B |
|---|---|
| measurement range in Pa, kPa, mmHg, etc. (e.g., 0 ... 10 kPa) | |

| supply voltage |
|---|
| 24 VDC/24 VAC (50/60 Hz) ±10 %<br>no galvanic separation between<br>power supply and output |

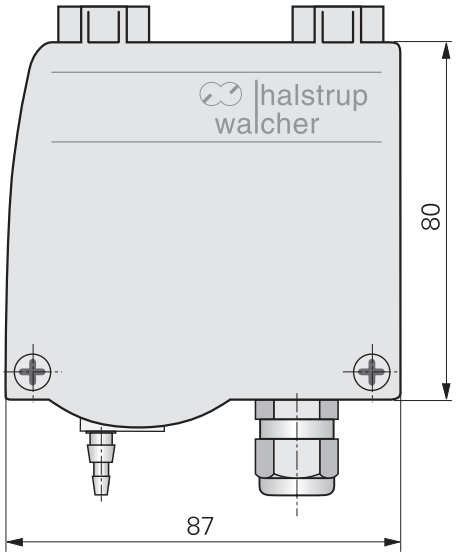
### Order key

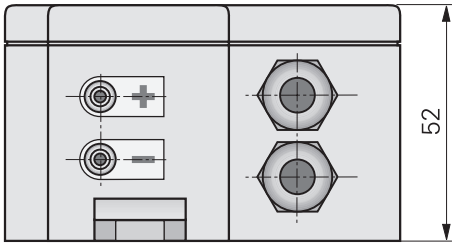
| | A | | B | |
|---|---|---|---|---|
| PS 18 | - | | - | |

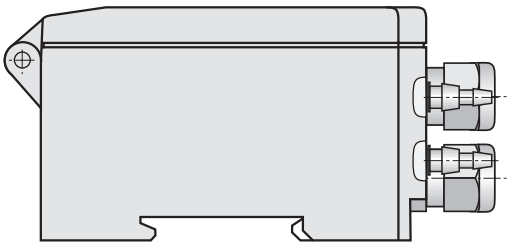
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## PS 27

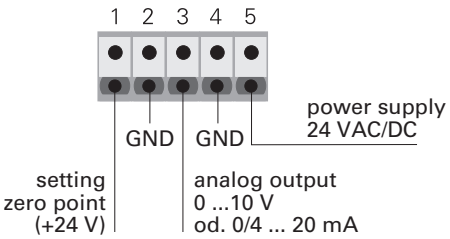
### Dimension drawing



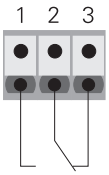



### PS27 connection diagram




### PS27 relay outputs




1 NO contact
2 middle contact
3 NC contact

# PS 27

## Basic sensor for simple applications

### Special features

- for positive and negative differential pressures
- little zero point drift or hysteresis; largely independent oft temperature
- also for top-hat rail mounting
- Zero-point calibration can be run via an external signal
- switching contact with adjustable thresholds (optional)
- output signals selectable via jumper

### Technical datas

| | |
|---|---|
| measurement ranges (others available upon request) | ± 100/± 200/± 500 Pa<br>±1/±2/±5/±10/±20/±50/±100/±200 kPa |
| margin of error | 1,5 % of end value |
| deflection drift / temperature | 0,1 % / K |
| zero point drift / temperature | 0,1 % / K |
| overload capacity | 12x for measurement ranges ≤ 20 kPa<br>4x for measurement ranges ≤ 30 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges 10 kPa max. nominal pressure of sensor |
| sensor response time | 50 ms |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | approx. 1 VA |
| weight | approx. 0,25 kg |
| cable glands | 2 x M12 |
| pressure ports | for hose ø 4-6 mm |
| protection class | IP 65 |
| testing | CE |

| output signals | A |
|---|---|
| 0 ...10 V ($R_L \geq 2$ kΩ) | 1 |
| 0 ... 20 mA ($R_L \leq 500$ Ω) | 0 |
| 4 ... 20 mA ($R_L \leq 500$ Ω) | 4 |

| power supply | B |
|---|---|
| 24 V AC/DC (without galvanic separation) | AC/DC |
| 15 ... 32 VDC (two wire system) | ZWL |

| measurement range | C |
|---|---|
| measurement range (e. g. 0-100 Pa) | |

| contact point (not for two-wire system) | D |
|---|---|
| none | S |
| 1 switch relay max. 230 VAC, 6A (min. required switching capacity 300mW) | 1 |

### Order key

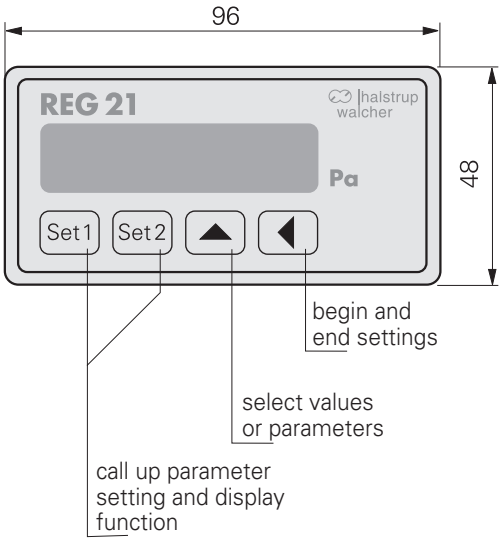
| | A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|---|
| PS 27 | | - | | - | | - | | - |

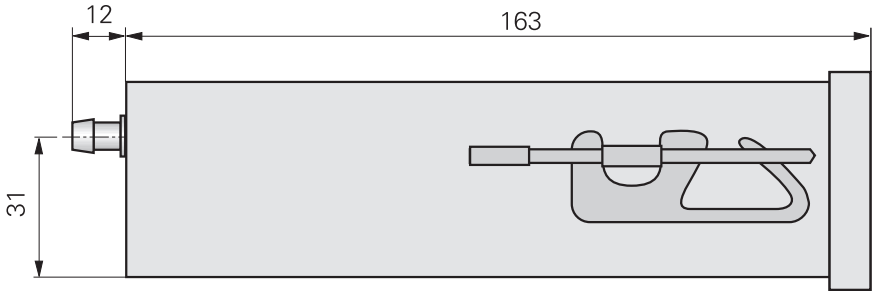
| accessories | |
|---|---|
| ☐ DKD-calibration certificate, German | 9601.-0003 |
| ☐ DKD-calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## REG 21

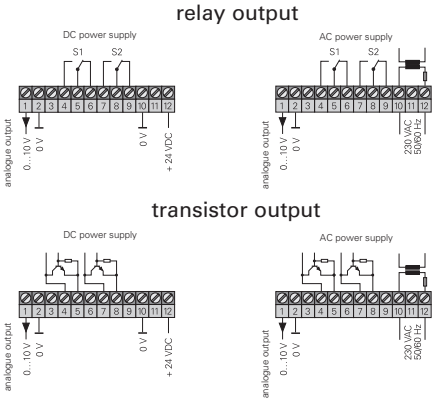
### Dimension drawing

### Panel housing

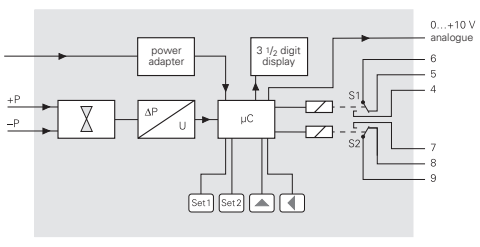


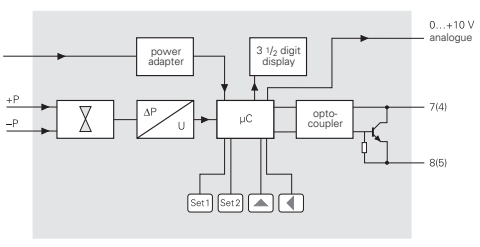

### Connection diagram




### Functional block diagram




REG21/relay output




REG21/transistor output

# REG 21

## Pressure transmitter with 2 switching contacts


### Special features

- for positive and negative differential pressures
- can be used as a two- or three-position controller
- highly accurate and stable for long periods
- very little hysteresis; largely independent of temperature
- automatic zero-point calibration
- switching contacts available as relay or transistor outputs with adjustable switching thresholds
- panel housing

### Technical data

| | |
|---|---|
| measurement ranges (others available upon request) | 50/100/250/500 Pa<br>1/2.5/5/10/20/50/100 kPa |
| margin of error | 1 % of end value, 0.5 % of end value for measurement ranges ≥ 250 Pa |
| deflection drift / temperature | 0.04 %/K (+10 °C...+50 °C) |
| zero point drift / temperature | ± 0 % (cyclical zero-point correction) |
| overload capacity | 200 x for measurement ranges < 2.5 kPa<br>600 kPa for measurement ranges ≥ 2.5 kPa |
| medium | air, all non-aggressive gases |
| max. system pressure | 10 kPa for measurement ranges ≤ 10 kPa<br>for measurement ranges > 10 kPa<br>max. nominal pressure of sensor |
| sensor response time | 20 ms |
| time constants | adjustable up to 10 s |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | ca. 5 VA |
| weight | ca. 0.8 kg |
| pressure ports | for hose Ø 6 mm |
| The following may be adjusted from the keyboard | zero-point calibration for sensor control<br>method (two- or three-position controller)<br>switching point and hysteresis<br>switching signal inversion<br>response delay of relay outputs and<br>analogue output |
| testing | CE |

| output signals | A |
|---|---|
| 0...10 V ($R_L$ ≥ 2 kΩ) | 1 |
| ± 5 V ($R_L$ ≥ 2 kΩ) | 5 |
| 0...20 mA ($R_L$ ≤ 500 Ω) | 0 |
| 4...20 mA ($R_L$ ≤ 500 Ω) | 4 |

| measurement range | B | margin of error | C |
|---|---|---|---|
| measurement range (e. g., 0...100 Pa, mbar, mmHg, etc.) | | 1 % of end value | 1 |
| | | 0.5 % of end value ≥ 250 Pa only | 05 |

| supply voltage | D |
|---|---|
| 24 VDC, +20 %/–15% | 24D |
| 24 VAC, +6 %/–15% (50/60 Hz) | 24A |
| 115 VAC, +6 %/–15% (50/60 Hz) | 115 |
| 230 VAC, +6 %/–15% (50/60 Hz) | 230 |

| switching contacts | E |
|---|---|
| 2 relays with floating changeover contacts 230 VAC (50/60 Hz), 6 A | R |
| 2 transistors with open collector $U_{CE}$ ≤ 50 V; $I_C$ ≤ 200 mA, floating | T |

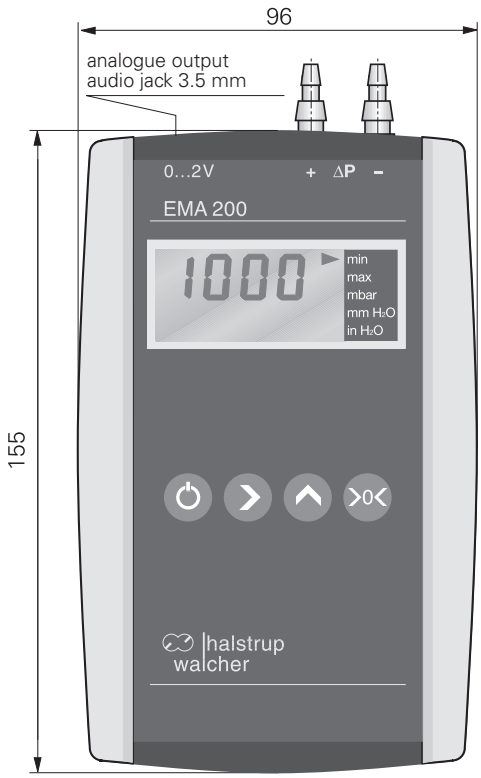
### Order key

| | A | | B | | C | | D | | E |
|---|---|---|---|---|---|---|---|---|---|
| REG 21 | | - | | - | | - | | - | |

| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

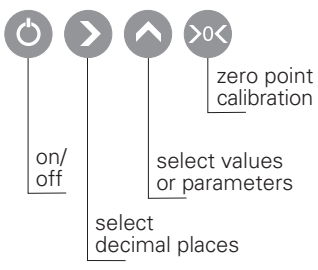
## EMA 200

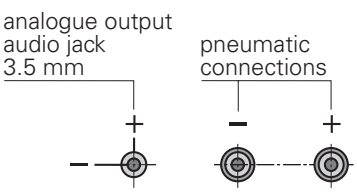
### Dimension drawing





### Connection diagram



# EMA 200

## Portable, digital pressure gauge with min./max. value memory


### Special features

- flow-rate measurements taken in conjunction with a pitot tube
- displays pressure and flow rate
- stores min. and max. value
- scalable analogue output of 0 – 2 V
- can convert between Pa, kPa, mmHg, $mmH_2O$, $inH_2O$
- temperature measurement
- ± measuring ranges
- measuring range change-over

### Technical data

| | |
|---|---|
| accuracy | 0.5 % of end value |
| overload capacity | 10 x for measurement ranges ≤ 10 kPa<br>2 x for measurement ranges > 10 kPa<br>1.2 x in the 200 kPa measurement range |
| air-speed calculation | $v = 1.291 * \sqrt{\Delta p}$<br>air-speed given in m/s and<br>Δp = differential pressure at pitot tube in Pa |
| zero point calibration | electronically by pressing zero point key |
| medium | air, all non-aggressive gases |
| analogue output | 0…2 V ($R_L \geq 2$ kΩ) only for positive range<br>0…1…2 V ($R_L \geq 2$ kΩ) for negative and positive range |
| display | 3 1/2 digit LCD, character height = 10 mm |

| | |
|---|---|
| operating temperature | 0 °C … +50 °C |
| storage temperature | –10 °C … +70 °C |

| | |
|---|---|
| power supply | 9 V battery<br>(display reads “low bat” when power falls below a certain minimum level)<br>power automatically switches off after approx. 20 min. |
| weight | approx. 0.4 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement range | | | A |
|---|---|---|---|
| ± 200 Pa | (±2 mbar) | 0 (1.5) …18 m/s | 0 |
| ± 2 kPa | (±20 mbar) | 0 (5) …58 m/s | 1 |
| ± 20 kPa | (±200 mbar) | 0 (15) …180 m/s | 10 |
| ± 200 kPa | (±2000 mbar) | | 100 |

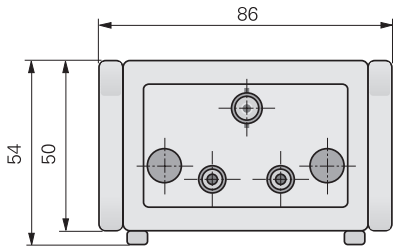
### Order key

| | A | |
|---|---|---|
| EMA 200 | - | |

| accessories | |
|---|---|
| ☐ carrying bag | 9074.-0001 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## EMA 84

### Dimension drawing

# EMA 84

## Portable digital pressure gauge

### Special features

- highly accurate and stable for long periods
- extremely durable
- little zero point drift or hysteresis; largely independent of temperature
- analogue output of 0 – 1 V (optional)
- easy to operate

### Technical data

| | |
|---|---|
| margin of error | 1 % of end value<br>0.5 % of end value for measurement ranges ≥ 1 kPa (optional)<br>0.2 % of end value for measurement ranges ≥ 1 kPa (optional) |
| overload capacity | 10x for measurement ranges ≤ 10 kPa<br>2x for measurement ranges > 10 kPa |
| zero point calibration | via potentiometer on front face |
| medium | air, all non-aggressive gases |
| analogue output | 0 ... 1 V ($R_L$ ≥ 2 kΩ) BNC connector |
| display | 3 1/2 digit LCD, character height = 13 mm |
| time constants | toggles between 0.02 s; 0.2 s; 1 s |

| | |
|---|---|
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |

| | |
|---|---|
| operating position | preferably horizontal |
| power supply | 9 V battery |
| weight | approx. 0.8 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement ranges | | A |
|---|---|---|
| 0 ... 100 Pa | (0 ... 1 mbar) | 0 |
| 0 ... 1 kPa | (0 ... 10 mbar) | 1 |
| 0 ... 10 kPa | (0 ... 100 mbar) | 10 |
| 0 ... 100 kPa | (0 ... 1000 mbar) | 100 |

| accuracy | B |
|---|---|
| 1 % of end value | 1 |
| 0.5 % of end value (only for measurement ranges ≥ 1 kPa) | 5 |
| 0.2 % of end value (only for measurement ranges ≥ 1 kPa) | 2 |

| analogue output | C |
|---|---|
| none | 0 |
| 0...1 V (optional) | 1 |

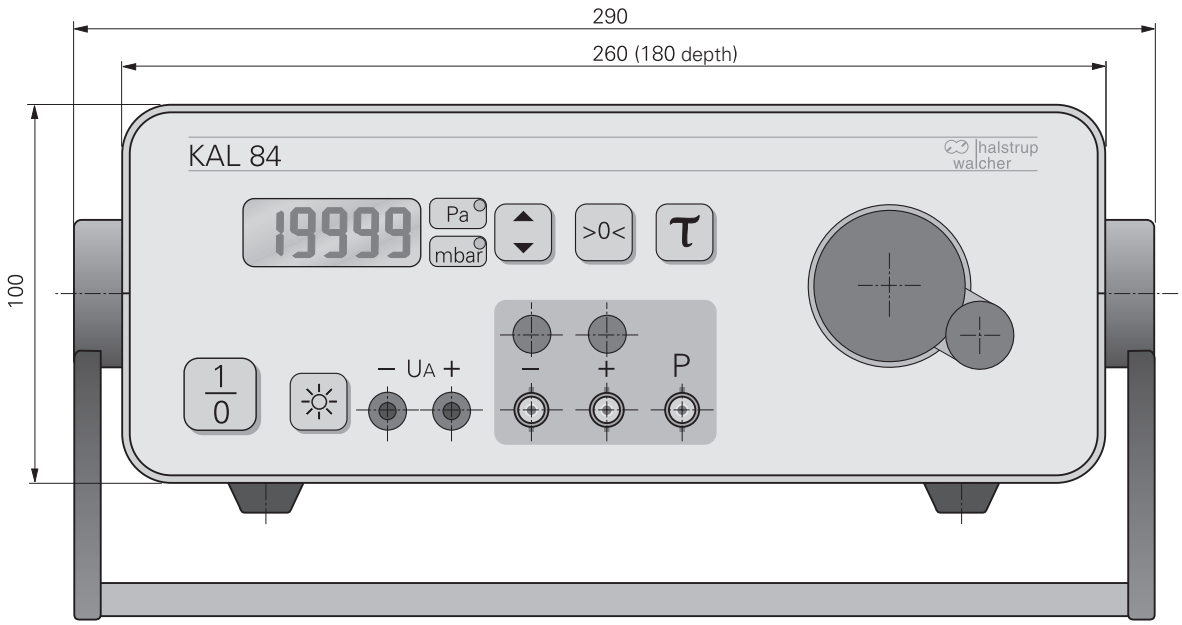
### Order key

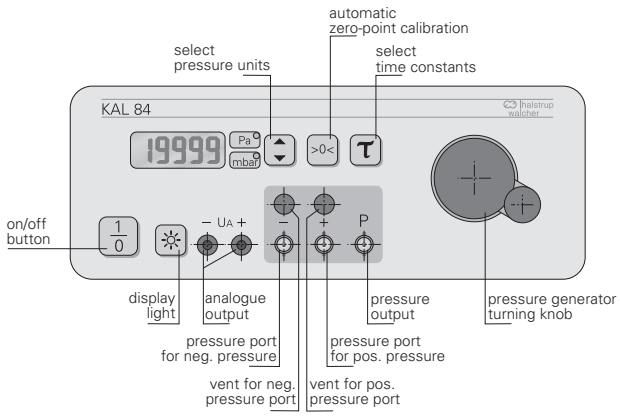
| | A | | B | | C |
|---|---|---|---|---|---|
| EMA 84 | - | | - | | - |

| accessories | |
|---|---|
| ☐ carrying bag | 9063.-0001 |
| ☐ shoulder bag | 9064.-0001 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## KAL 84

### Dimension drawing



# KAL 84

## Portable pressure calibration device


### Special features

- highly accurate, reproducible results
- internal pressure generation
- extremely durable; excellent for service applications
- unit conversion, e.g. mmHg/kPa, mbar/kPa
- rechargeable battery allows for portable operation

### Technical data

| | |
|---|---|
| margin of error | 0.5 % of end value ± 1 digit<br>0.2 % of end value ± 1 digit<br>for measurement ranges ≥ 1 kPa<br>All measurement ranges have<br>a 99 % overrange. Linearity data<br>pertains to a measurement<br>range of 0 – 100 %. |
| hysteresis | 0.1 % |
| temperature effect (zero point) | not applicable; panel button available for resetting zero point |
| temperature effect (span) | 0.04 %/K (+10 °C ... +50 °C) |
| calibration temperature | +22 °C |
| medium | air, all non-aggressive gases |
| displacement volume | pressure transmitter, approx. 100 $cm^3$<br>(1, 10, 100 kPa) approx. 200 $cm^3$ (100 Pa) |
| analogue output | 0 ... 1 V ($R_L$ ≥ 2 kΩ) two connectors Ø 4 mm |
| display | 4 1/2 digit LCD, character height = 10 mm |
| time constants | toggles between 0.1 s; 1 s |
| operating temperature | +10 °C ... +40 °C |
| storage temperature | –10 °C ... +70 °C |
| power supply | NiCd rechargeable 9 V battery<br>with AC adaptor |
| weight | approx. 3 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement ranges | | A |
|---|---|---|
| 0...100 Pa | (0...1 mbar) | 0 |
| 0...1 kPa | (0...10 mbar) | 1 |
| 0...10 kPa | (0...100 mbar) | 10 |
| 0...100 kPa | (0...1000 mbar) | 100 |
| 0...300 mmHg | (0...400 mbar) | 300 |
| 0...750 mmHg | (0...1000 mbar) | 750 |

(other measurement ranges and units available upon request)

| margin of error | B |
|---|---|
| 0.5 % of end value | 1 |
| 0.2% of end value (measurement ranges ≥ 1 kPa) (opt.) | 2 |

| supply voltage | C |
|---|---|
| 230 VAC adapter | 230 |
| 115 VAC adapter | 115 |

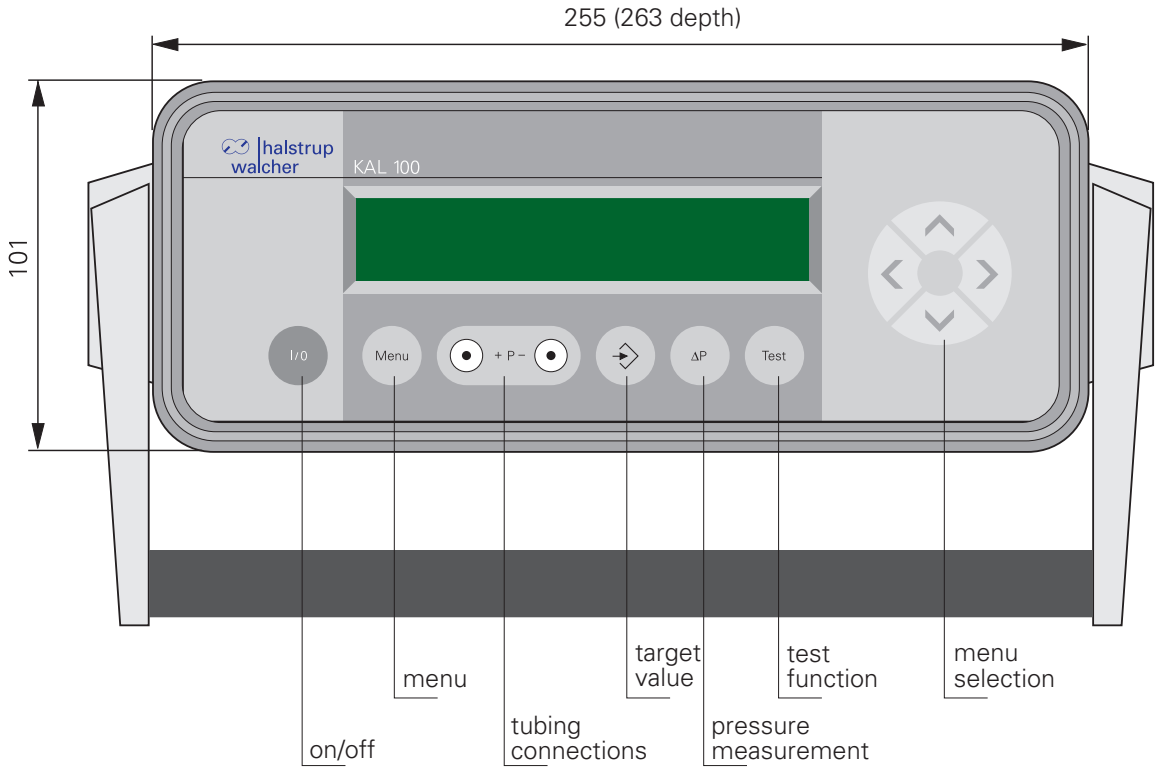
### Order key

| | A | | B | | C |
|---|---|---|---|---|---|
| KAL 84 | - | | - | | - |

| accessories | |
|---|---|
| ☐ carrying bag | 9062.-0001 |
| ☐ hand pump | 9601.-0036 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

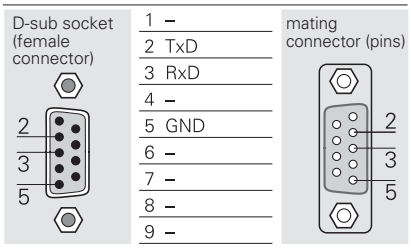
## KAL 100

### Dimension drawing




### PC connection (optional)

**RS 232 C interface**



# KAL 100

## Pressure calibration device with integrated pressure generation


### Special features

- portable, i.e. suitable for on-site calibration
- automatic zero point calibration provides high zero-point stability
- quickly provides positive or negative differential pressures up to 100 kPa
- RS232 Interface (optional)
- unit conversion (e.g., mmHg, $mmH_2O$, psi etc.)
- excellent price/performance ratio
- multilingual menu (English, German, Italian, French, Spanish)

### Technical data

| | |
|---|---|
| margin of error | 0.5 % of end value ± 1 digit (100 Pa measurement range)<br>0.2 % of end value ± 1 digit (only for 1, 10 and 100 kPa measurement ranges) |
| hysteresis | 0.1 % |
| overload capacity | 600 kPa for 10 kPa and 100 kPa measurement ranges<br>200 kPa for 100 Pa and 1 kPa measurement ranges |
| temperature effect (zero point) | ± 0 % (cyclical zero-point correction) |
| temperature effect (span) | 0,04 %/K (+10 °C ... +50 °C) |
| calibration temperature | +22 °C |
| medium | air, all non-aggressive gases |

| | |
|---|---|
| interface | RS232 (optional) |
| display | alphanumerical display with 2x20 characters |

| | |
|---|---|
| operating temperature | +10 °C ... +40 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | 10 VA |
| weight | approx. 4.5 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement ranges | | A |
|---|---|---|
| 0...100 Pa | (0...1 mbar) | 0 |
| 0...1 kPa | (0...10 mbar) | 1 |
| 0...10 kPa | (0...100 mbar) | 10 |
| 0...100 kPa | (0...1000 mbar) | 100 |

| supply voltage | B |
|---|---|
| 230 VAC, +6 %/–15 % (50/60 Hz) | 230 |
| 115 VAC, +6 %/–15 % (50/60 Hz) | 115 |

| data interface | C |
|---|---|
| none | 0 |
| RS232 C (optional) | 1 |

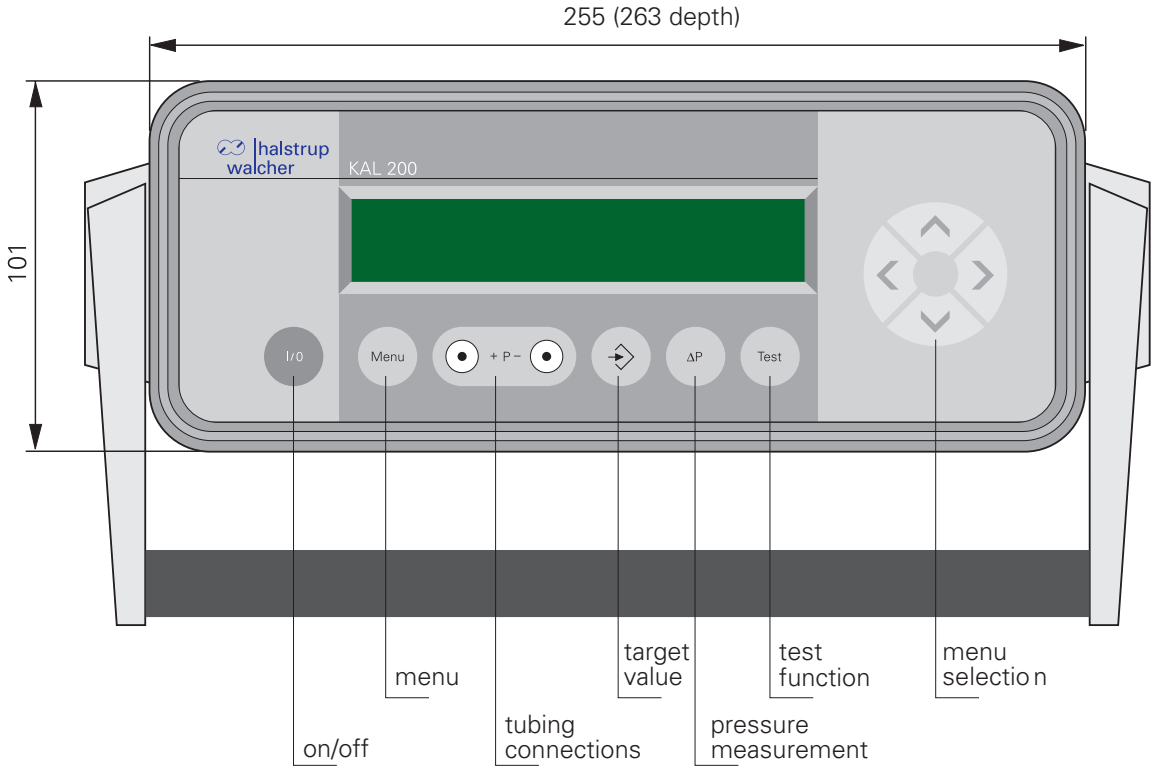
### Order key

| | A | | B | | C |
|---|---|---|---|---|---|
| KAL 100 | - | | - | | - |

| accessories | |
|---|---|
| ☐ carrying case | 9220.-0001 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

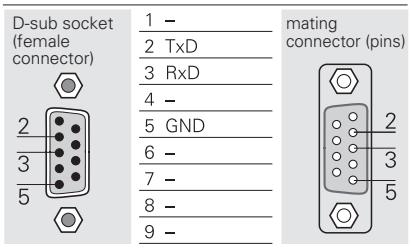
## KAL 200

### Dimension drawing




### PC connection

**RS 232 C interface**



# KAL 200

## Pressure calibration device with integrated pressure generation


### Special features

- portable, i.e. suitable for on-site calibration
- automatic zero point calibration provides high zero-point stability
- quickly provides positive or negative differential pressures up to 100 kPa
- RS232 interface makes it easy to record measured values
- unit conversion (e.g., mmHg, $mmH_2O$, psi etc.)
- excellent price/performance ratio
- multilingual menu (English, German, Italian, French, Spanish)

### Technical data

| | |
|---|---|
| margin of error | 0.3% of end value ± 1 digit (100 Pa measurement range)<br>0.1 % of end value ± 1 digit (only for 1, 10 and 100 kPa measurement ranges) |
| hysteresis | 0.1 % |
| overload capacity | 600 kPa for 10 kPa and 100 kPa measurement ranges<br>200 kPa for 100 Pa and 1 kPa measurement ranges |
| temperature effect (zero point) | ± 0 % (cyclical zero-point correction) |
| temperature effect (span) | 0.03 %/K (+10 °C ... +50 °C) |
| calibration temperature | +22 °C |
| medium | air, all non-aggressive gases |

| | |
|---|---|
| interface | RS232 |
| display | alphanumerical display with 2x20 characters |

| | |
|---|---|
| operating temperature | +10 °C ... +40 °C |
| storage temperature | –10 °C ... +70 °C |
| power consumption | 10 VA |
| weight | approx. 4.5 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement ranges | | A |
|---|---|---|
| 0...100 Pa | (0...1 mbar) | 0 |
| 0...1 kPa | (0...10 mbar) | 1 |
| 0...10 kPa | (0...100 mbar) | 10 |
| 0...100 kPa | (0...1000 mbar) | 100 |

| supply voltage | B |
|---|---|
| 230 VAC, +6 %/–15 % (50/60 Hz) | 230 |
| 115 VAC, +6 %/–15 % (50/60 Hz) | 115 |

### Order key

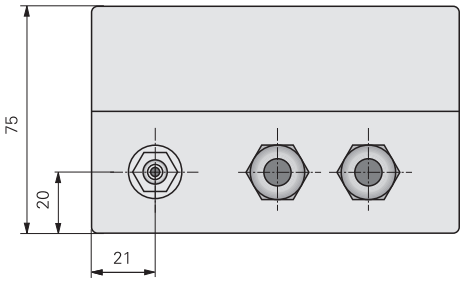
| | A | | B |
|---|---|---|---|
| KAL 200 | - | | - |

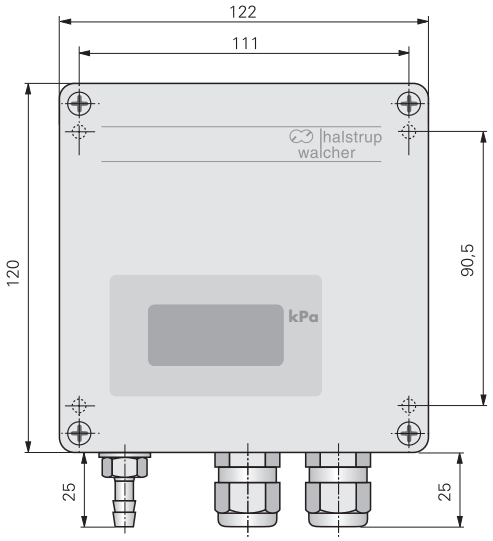
| accessories | |
|---|---|
| ☐ carrying case | 9220.-0001 |
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate (inclusive for first orders) | 9601.-0002 |

## AD 1000/BA1000

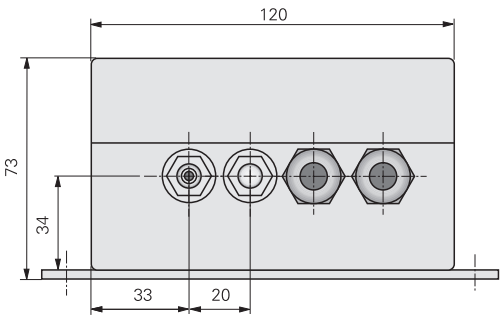
### Dimension drawing

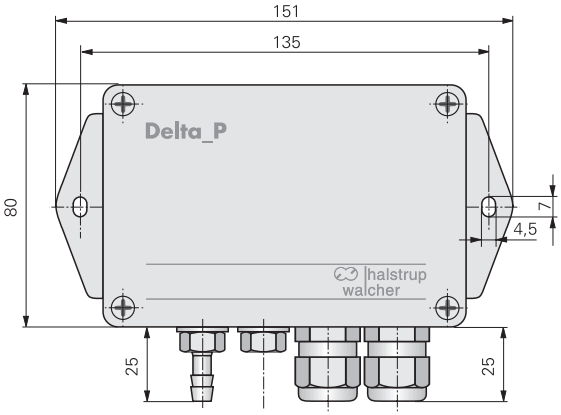
#### with LCD



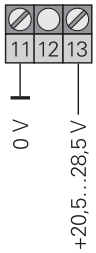

#### no LCD



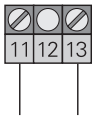




### Connection diagram

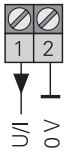
DC power supply




AC power supply




analogue outputs



# AD 1000/BA 1000

## Electronic barometer

### Special features

- highly accurate and stable for long periods
- little zero point drift or hysteresis; largely independent of temperature
- display can be adjusted (reduced) to correspond to the height of installation site (see DIN ISO 2533)
- AD 1000 with pressure port for measuring absolute pressure
- BA 1000 for measuring barometric pressure

### Technical data

| | |
|---|---|
| margin of error | ± 1 %, reference ± 0.5 hPa with respect to sea level |
| temperature effect | 0.04 %/K (+10 °C ... +50 °C) |
| calibration temperature | +22 °C |
| operating temperature | +10 °C ... +60 °C |
| storage temperature | –10 °C ... +70 °C |
| long-term drift | 0.3 hPa/year |
| reduction | 0 – 850 m above sea level (please indicate when placing your order) |

| | |
|---|---|
| power consumption | approx. 3 VA |
| cable glands | 2 x PG 7 (for a 80 x 120 housing)<br>2 x PG11 (for a 120 x 122 housing) |

| | |
|---|---|
| protection class | IP 65 |
| weight | approx. 0.6 kg |
| pressure ports | for hose Ø 6 mm |
| testing | CE |

| measurement ranges | A |
|---|---|
| 80...120 kPa [1] | 80B |
| 85...115 kPa [1] | 85B |
| 90...110 kPa [1] | 90B |
| 95...115 kPa [1] | 95B |
| 0...50 kPa [2] | 50A |
| 0...100 kPa [2] | 100A |
| 80...120 kPa [2] | 80A |
| 90...110 kPa [2] | 90A |
| 100...0 kPa [2] | 0A |

1) BA 1000 w/o pressure port  2) AD 1000 (w. pressure port)

| output signals | B | power supply | C |
|---|---|---|---|
| 0...10 V ($R_L \geq 2$ kΩ) | 1 | 24 VDC | 24D |
| 0...20 mA ($R_L \leq 500$ Ω) | 0 | 24 VAC | 24A |
| 4...20 mA ($R_L \leq 500$ Ω) | 4 | 115 VAC | 115 |
| | | 230 VAC | 230 |

| LCD | D |
|---|---|
| none | 0 |
| 3 1/2 digit | 3 |
| 4 1/2 digit | 4 |

| reduction | E |
|---|---|
| none | 0 |
| (please indicate in meters) | |

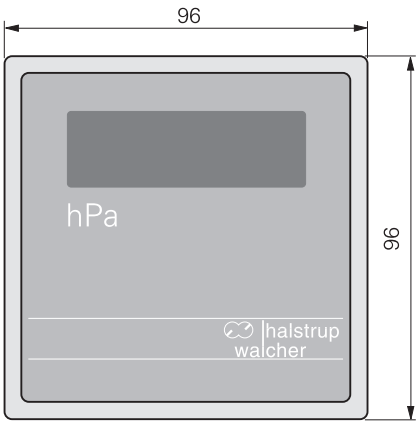
### Order key

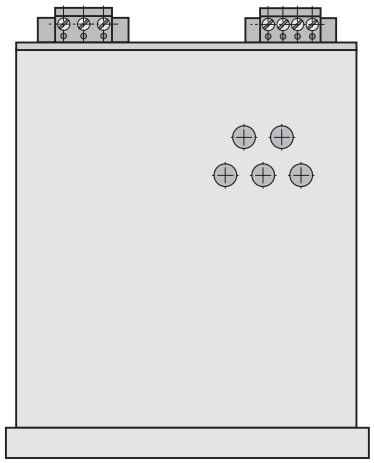
| | A | | B | | C | | D | | E |
|---|---|---|---|---|---|---|---|---|---|
| AD-BA 1000 | | - | | - | | - | | - | |

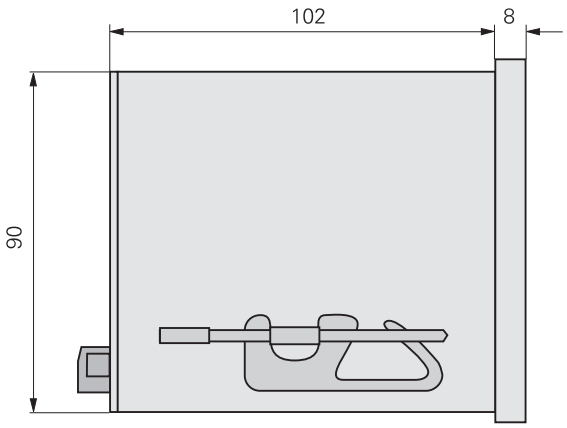
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## BA 90

### Dimension drawing

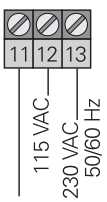


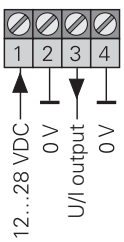



### Connection diagram

AC power supply




DC power supply
analogue outputs



# BA 90
## Digital precision barometer


### Special features

- a potentiometer can be used to adjust (reduce) display to correspond to the height of installation site (see DIN ISO 2533)
- highly accurate and stable for long periods
- little zero point drift or hysteresis; largely independent of temperature
- 3 supply voltages in one unit

### Technical data

| | |
|---|---|
| measurement range | 913.3 – 1113.3 hPa |
| margin of error | ± 0.4 hPa ± 1 digit, reference ± 0.5 hPa with respect to sea level |
| resolution | 0.1 hPa |
| temperature effect | ± 0.2 hPa / °C, for temperatures ranging between +20 °C…+50 °C |
| calibration temperature | + 22 °C |
| operating temperature | 0 °C … +50 °C (temperature compensation between + 20 °C...+50 °C) |
| storage temperature | – 10 °C... + 70 °C |
| long-term drift | 0.3 hPa/year |
| supply voltage | 230 VAC +6/–15 % or 115 VAC +6/–15 % or 12 … 28 VDC (universal voltage adapter) |
| reduction | 0...850 m above sea level, via potentiometer |
| power consumption | approx. 5 VA |
| weight | approx. 0.8 kg |
| testing | CE |

| output signals | A |
|---|---|
| – 2 … + 2 V ($R_L \geq 5$ kΩ) | 1 |
| 0...20 mA ($R_L \leq 250$ Ω) | 0 |
| 4...20 mA ($R_L \leq 250$ Ω) | 4 |

### Order key

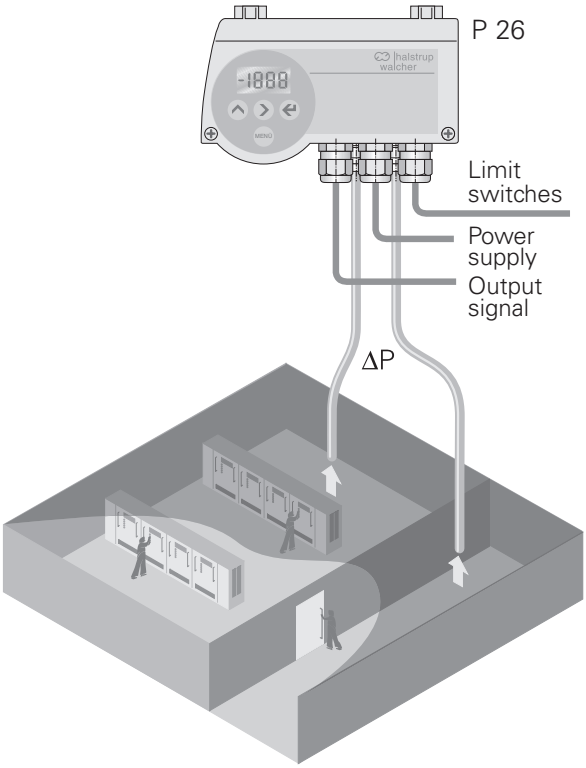
| | A |
|---|---|
| BA 90 - | |

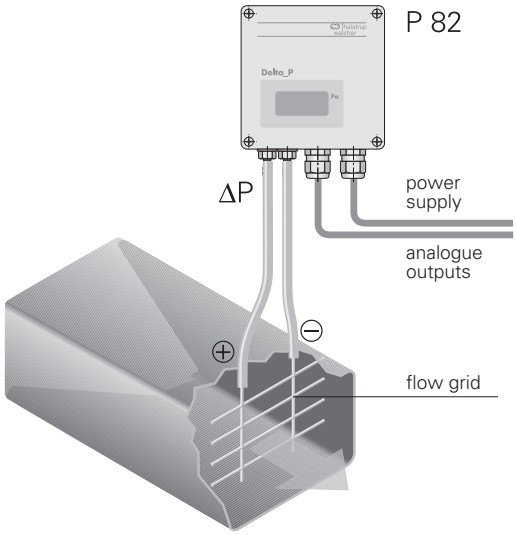
| accessories | |
|---|---|
| ☐ DKD calibration certificate, German | 9601.-0003 |
| ☐ DKD calibration certificate, English | 9601.-0004 |
| ☐ factory calibration certificate | 9601.-0002 |

## Sample applications

### Volume flow measurement

If measured in conjunction with a differential pressure transmitter (measuring orifice, Wilson flow grid, pitot tube, etc.), the recorded differential pressure will be directly proportional to the volume flow as a result of the root-extracted function of the P 82 R / P 26 model pressure transmitter. The resulting value is then displayed on the built-in LCD. The output signal is also proportional to the volume flow, thereby eliminating the need for time-consuming calculations in the master control module.




### Measuring differential pressure

Monitoring static room pressure, as is done, for instance, in clean rooms or operating rooms, requires a pressure transmitter that can operate within very small measurement ranges, often only a few Pascals. The P 26 pressure transmitter is perfectly suited for this type of task, as it is designed to operate in measurement ranges as small as 0…10 Pa.

### Conversion table for the most common pressure units

| | Pa | hPa/mbar | kPa | bar | psi | $mmH_2O$ | $inH_2O$ | mmHg | inHg |
|---|---|---|---|---|---|---|---|---|---|
| Pa | 1 | 0.010 | 0.001 | 0.00001 | 0.0001 | 0.102 | 0.004 | 0.008 | 0.0003 |
| hPa/mbar | 100 | 1 | 0.100 | 0.001 | 0.015 | 10.197 | 0.401 | 0.750 | 0.030 |
| kPa | 1000 | 10 | 1 | 0.010 | 0.145 | 101.968 | 4.014 | 7.502 | 0.295 |
| bar | 100000 | 1000 | 100 | 1 | 14.514 | 10196.798 | 401.445 | 750.188 | 29.499 |
| psi | 6891.799 | 68.966 | 6.894 | 0.069 | 1 | 703.235 | 27.701 | 51.813 | 2.036 |
| $mmH_2O$ | 9.804 | 0.098 | 0.010 | 0.000098 | 0.001 | 1 | 0.039 | 0.073 | 0.003 |
| $inH_2O$ | 249.004 | 2.490 | 0.249 | 0.00249 | 0.036 | 25.381 | 1 | 1.865 | 0.073 |
| mmHg | 133.316 | 1.333 | 0.133 | 0.00133 | 0.019 | 13.624 | 0.536 | 1 | 0.039 |
| inHg | 3386.387 | 33.898 | 3.386 | 0.03386 | 0.491 | 345.901 | 13.624 | 25.381 | 1 |

## DKD pressure calibration laboratory

Germany's national metrology institute (the Physikalische Technische Bundesanstalt, or PTB) has certified Walcher Meßtechnik GmbH – a member of the halstrup-walcher group of companies – to perform pressure calibrations in accordance with DIN EN ISO / IEC 17025.
This allows Walcher Meßtechnik GmbH to issue DKD calibration certificates for differential pressure transmitters, calibration devices, absolute pressure transmitters and portable pressure gauges.
Absolute pressures between 0.25 and 20 bar can be measured here, as can negative and positive differential pressures of 0 to 20 bar between gases. Measuring and calibration devices are calibrated independently of the manufacturer.

Services also include recalibration of all of the products listed above as directed by the ISO 9000 quality management system for measuring equipment.

DEUTSCHER KALIBRIERDIENST

Kalibrierlaboratorium für die Messgröße Druck
*Calibration laboratory for pressure measuring instruments*

DKD

Akkreditiert durch die / *accredited by the*
Akkreditierungsstelle des DKD bei der
PHYSIKALISCH-TECHNISCHEN BUNDESANSTALT (PTB)

Walcher Meßtechnik

DKD-K-22101

Kalibrierschein
*Calibration Certificate*

Kalibrierzeichen
*Calibration label*

2060015
DKD-K-22101
2006-03

| | |
|---|---|
| Gegenstand *Object* | **Pressure calibration instrument** |
| Hersteller *Manufacturer* | **halstrup-walcher GmbH** |
| Typ *Type* | **KAL 84** |
| Fabrikat/Serien- Nr. *Serial number* | **9095.-0009 KF10165** |
| Auftraggeber *Customer* | **Muster**<br>**Musterweg 1**<br>**D – 12345 Musterhausen** |
| Auftragsnummer *Order No.* | **2060015** |
| Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate* | **3** |
| Datum der Kalibrierung *Date of calibration* | **16. März 2006** |

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).
Der DKD ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
*This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).*
*The DKD is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.*
*The user is obliged to have the object recalibrated at appropriate intervals.*

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Akkreditierungsstelle des DKD als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.
*This calibration certificate may not be reproduced other than in full except with the permission of both the Accreditation Body of the DKD and the issuing laboratory. Calibration certificates without signature and seal are not valid.*

| Stempel *Seal* | Datum *Date* | Leiter des Kalibrierlaboratoriums *Head of the calibration laboratory* | Bearbeiter *Person in charge* |
|---|---|---|---|
| | 16. März 2006 | R. Heizler | R. Heizler |

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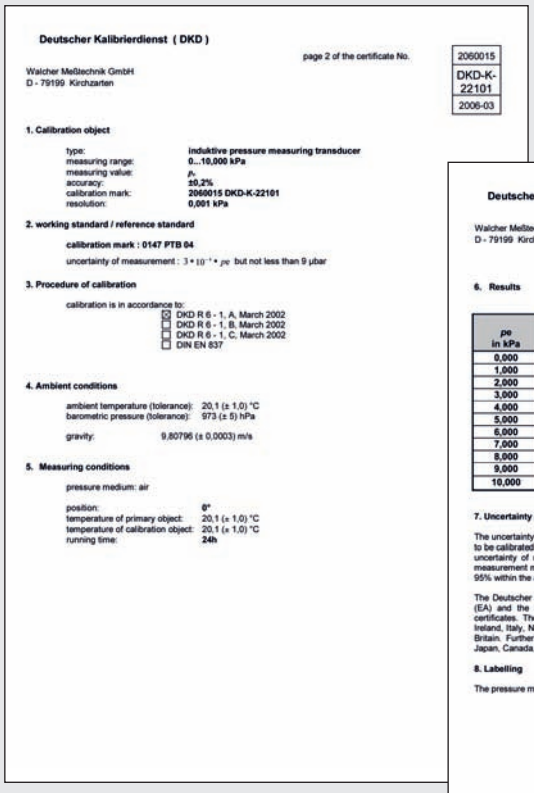


**Deutscher Kalibrierdienst ( DKD )**

page 2 of the certificate No. 2060015 / DKD-K-22101 / 2006-03

Walcher Meßtechnik GmbH
D - 79199 Kirchzarten

**1. Calibration object**

type: **induktive pressure measuring transducer**
measuring range: **0...10,000 kPa**
measuring value: $p_e$
accuracy: **±0,2%**
calibration mark: **2060015 DKD-K-22101**
resolution: **0,001 kPa**

**2. working standard / reference standard**

**calibration mark : 0147 PTB 04**

uncertainty of measurement : $3 * 10^{-4} * p_e$ but not less than 9 µbar

**3. Procedure of calibration**

calibration is in accordance to:
- ☒ DKD R 6 - 1, A, March 2002
- ☐ DKD R 6 - 1, B, March 2002
- ☐ DKD R 6 - 1, C, March 2002
- ☐ DIN EN 837

**4. Ambient conditions**

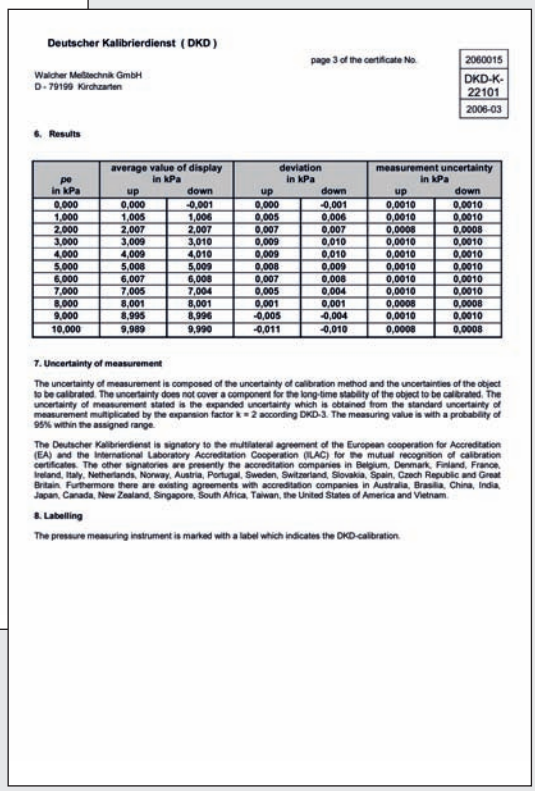
ambient temperature (tolerance): 20,1 (± 1,0) °C
barometric pressure (tolerance): 973 (± 5) hPa

gravity: 9,80795 (± 0,0003) m/s

**5. Measuring conditions**

pressure medium: air

position: **0°**
temperature of primary object: 20,1 (± 1,0) °C
temperature of calibration object: 20,1 (± 1,0) °C
running time: **24h**



**Deutscher Kalibrierdienst ( DKD )**

page 3 of the certificate No. 2060015 / DKD-K-22101 / 2006-03

Walcher Meßtechnik GmbH
D - 79199 Kirchzarten

**6. Results**

| $p_e$ in kPa | average value of display in kPa up | average value of display in kPa down | deviation in kPa up | deviation in kPa down | measurement uncertainty in kPa up | measurement uncertainty in kPa down |
|---|---|---|---|---|---|---|
| 0,000 | 0,000 | -0,001 | 0,000 | -0,001 | 0,0010 | 0,0010 |
| 1,000 | 1,005 | 1,006 | 0,005 | 0,006 | 0,0010 | 0,0010 |
| 2,000 | 2,007 | 2,007 | 0,007 | 0,007 | 0,0008 | 0,0008 |
| 3,000 | 3,009 | 3,010 | 0,009 | 0,010 | 0,0010 | 0,0010 |
| 4,000 | 4,009 | 4,010 | 0,009 | 0,010 | 0,0010 | 0,0010 |
| 5,000 | 5,008 | 5,009 | 0,008 | 0,009 | 0,0010 | 0,0010 |
| 6,000 | 6,007 | 6,008 | 0,007 | 0,008 | 0,0010 | 0,0010 |
| 7,000 | 7,005 | 7,004 | 0,005 | 0,004 | 0,0010 | 0,0010 |
| 8,000 | 8,001 | 8,001 | 0,001 | 0,001 | 0,0008 | 0,0008 |
| 9,000 | 8,996 | 8,996 | -0,005 | -0,004 | 0,0010 | 0,0010 |
| 10,000 | 9,989 | 9,990 | -0,011 | -0,010 | 0,0008 | 0,0008 |

**7. Uncertainty of measurement**

The uncertainty of measurement is composed of the uncertainty of calibration method and the uncertainties of the object to be calibrated. The uncertainty does not cover a component for the long-time stability of the object to be calibrated. The uncertainty of measurement stated is the expanded uncertainty which is obtained from the standard uncertainty of measurement multiplicated by the expansion factor k = 2 according DKD-3. The measuring value is with a probability of 95% within the assigned range.

The Deutscher Kalibrierdienst is signatory to the multilateral agreement of the European cooperation for Accreditation (EA) and the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The other signatories are presently the accreditation companies in Belgium, Denmark, Finland, France, Ireland, Italy, Netherlands, Norway, Austria, Portugal, Sweden, Switzerland, Slovakia, Spain, Czech Republic and Great Britain. Furthermore there are existing agreements with accreditation companies in Australia, Brasilia, China, India, Japan, Canada, New Zealand, Singapore, South Africa, Taiwan, the United States of America and Vietnam.

**8. Labelling**

The pressure measuring instrument is marked with a label which indicates the DKD-calibration.

halstrup walcher

It's the detail that counts



**Our expertise in pressure measuring technology**

For decades halstrup-walcher has always stood for quality and reliability concerning pressure measuring technology for differential pressures between 0-10 Pa and 0-100 kPa. Our inductive sensor element with its copper beryllium membrane guarantees a high degree of independence from varying temperature as well as long-term stability.
For measuring volume flow and mass flow, we offer models with digital displays that have been precalibrated for these parameters. All pressure transmitters are available with a display and calibration protocol, alternatively in German or English.
In addition to pressure transmitters, we also produce extremely cost-effective pressure calibration devices, e.g. to be used for medical engineering.

**Our expertise in mechatronics**

The most remarkable feature of our mechatronic positioning systems is the integration of engine, gear, performance electronics, measuring system, controls, and interfaces on a very confined space.

**Our expertise in drive technology**

Our focal point in manufacturing spur Gears always lies on customer specific solutions offering a maximum of cost-effectiveness for every application.
Our scope of delivery includes complete solutions including motor control gear with position feedback signal and/or adjustable limit switches. You can also have your gearbox produced according to your specific requirements.

**halstrup-walcher GmbH –
precision for your success**

halstrup-walcher GmbH was founded as Erwin Halstrup Company in 1946. It was renamed Erwin Halstrup Multur GmbH in 1981 and assumed the name halstrup-walcher GmbH in the year 2000. It became a subsidiary of the Walcher Meßtechnik GmbH in 1990. Halstrup-walcher's technical solutions stand out for their extraordinary quality, precision and innovative nature.

**Our product range covers
the following devices**

- differential pressure transmitter for low pressures
- handheld pressure gauges
- pressure calibration systems
- absolute pressure measuring systems
- barometers
- spur gearboxes
- actuators
- linear drives
- positioning systems

**Distribution**

In-house salesmen and commercial agents take care of national sales; appointed retailers carry out international sales of our precision measuring instruments.

**Manufacturing**

Modern machines for fitting and soldering circuit boards are used for the manufacture of the electronic modules.
Climatic chambers are available for burn-ins as well as air-controlled labs for quality control and/or calibration of the end products.
The mechanical manufacturing process involves punches, milling cutters (CNC), lathes (CNC) as well as electronically controlled presses to mount the gear wheels.
Production cells are responsible for portions of the assembly process and perform the final inspection of mechanical parts.

# Your competent partner
## in pressure measuring technology between 10 Pa and 100 kPa

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halstrup walcher

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