



## Differential Pressure Sensors

## QBM66...

for air or nonaggressive gases

- Pressure-linear characteristic with selectable pressure measuring range
- Operating voltage AC 24 V or DC 13.5...33 V
- Output signal DC 0...10 V
- Delivery with tubing connection set

### Use

For acquiring the differential pressure of air or nonaggressive gases in ventilation, air conditioning and heating plant.

*The differential pressure sensors are used to:*

- Acquire over- or underpressure in air ducts in relation to ambient pressure
- Monitor filters and to control fans
- Acquire pressure differentials between different rooms

### Type summary

Type reference	Measuring ranges		Output signal
	Range 1	Range 2	
<b>QBM66.201</b>	0... 100 Pa	0... 200 Pa	DC 0...10 V
<b>QBM66.202</b>	0... 250 Pa	0... 500 Pa	DC 0...10 V
<b>QBM66.203</b>	0...1500 Pa	0...3000 Pa	DC 0...10 V
<b>QBM66.204</b>	0...500 Pa	0...1000 Pa	DC 0...10 V

## Ordering and delivery

When ordering, please give name and type reference, e.g. differential pressure sensor **QBM66.201**.

The differential pressure sensor is supplied complete with tubing connection set including 2 air duct probes (ABS), 4 fixing screw and 2m plastic tubing (PVC). Additional accessories are to be ordered separately.

## Accessories

Two sets of air duct probes are available for precise measurements, see datasheet CA1N1589E for details. Mounting brackets are available additionally.

Type reference	Name
<b>AQB2000</b>	Mounting bracket for mounting the sensor on lagged ducts
<b>AQB21.2</b>	Bracket (5 pieces) for top hat rails to DIN, HT 35-7.5
<b>FK-PZ1</b>	Air duct probe, short, stainless steel, with elastic lead-through for simple, quick and airtight mounting
<b>FK-PZ2</b>	Air duct probe, long, aluminium, with orifice plate for precise measurements

## Equipment combinations



Any systems or devices capable of acquiring and handling the sensor's DC 0...10 V output signal.

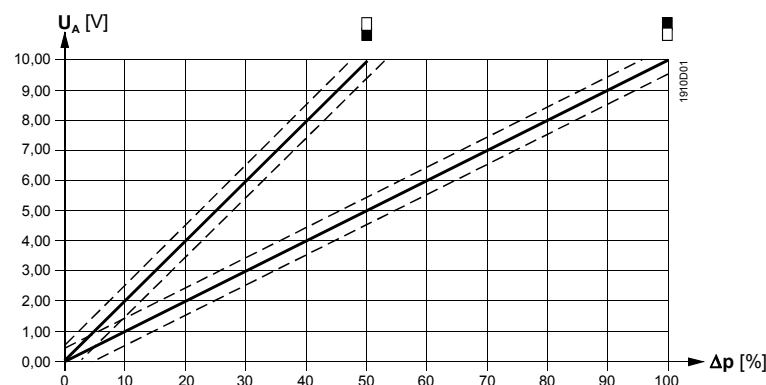
## Mode of operation

The sensor acquires the differential pressure with a silicon rubber diaphragm. The deflection of the diaphragm is sensed and converted to an electrical signal. A DIL switch is used to match the measuring range on an individual basis.



The sensor's electronic circuit generates a pressure-linear signal, which is calibrated and temperature-compensated.

It is delivered by the sensor as an analog DC 0...10 V output signal.

Sensor characteristics of measuring ranges 1 (  ) and 2 (  )



### Legend

$U_A$  Output voltage in V  
 $\Delta p$  Measuring range in percent  
  DIL switch positions

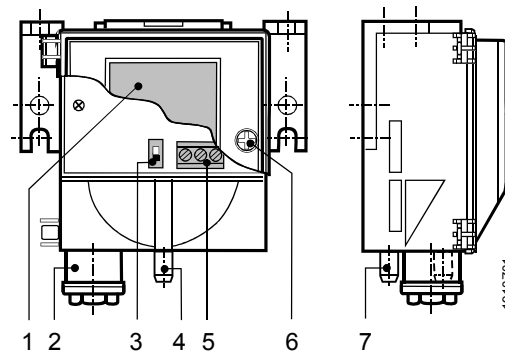
For detailed information on accuracy, refer to "Technical data".

## Mechanical design

The differential pressure sensor is designed for wall or ceiling mounting. It consists of the following components:

- Sensor housing with mounting bracket, cable entry and removable snap-on cover with safety screw
- Pressure chamber with diaphragm and ceramic lever
- Printed circuit board with connection terminals and DIL switch for selecting the measuring range

### Display, setting and connection elements



### Legend

- 1 Label with sensor characteristics for measuring ranges 1 and 2
- 2 Cable gland entry Pg 11 (without cable strain relief)
- 3 DIL switch for selecting the measuring range:  
Measuring range 1 = bottom position   
Measuring range 2 = top position   
Factory-set calibration position = top
- 4 Nipple for tubing connection (-), for the lower pressure side (higher vacuum)
- 5 Terminal block
- 6 Safety screw for hinged cover
- 7 Nipple for tubing connection (+) for the higher pressure side (lower vacuum)

## Engineering notes

The transformer used must be suited for safety extra low voltage (SELV); it must have separate windings and be designed for 100 % duty.

Transformers are to be sized and fused in compliance with local safety regulations.

The permissible cable lengths must be observed.

If cable lengths exceed 50 meters and run parallel to mains cables, shielded cable should be used!

## Mounting notes

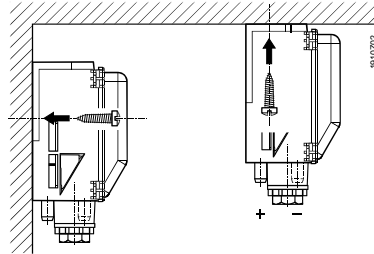
The differential pressure sensor is suited for direct mounting on air ducts, walls or ceilings and in control panels.

The sensor should be mounted vertically.

To ensure the degree of housing protection specified in "Technical data", the pressure connecting nipples must be pointing downward and should always be located higher than the air duct probes.

Horizontal mounting (with the hinged cover at the top or bottom) IS NOT RECOMMENDED. If horizontal mounting is a requirement, measured value deviations must be taken into consideration (refer to "Factory calibration" below).

**⚠ Caution**



If the pressure connection nipples point upward or are at a lower level than the air duct probes, condensation can collect inside the sensor, causing damage to the device.

When mounting on 35 x 7.5 top hat rails to DIN, mounting bracket **AQB21.2** is required which is available as an accessory item. The sensor snaps on the bracket.  
 For direct mounting on lagged ducts, the sensor can be fitted with an **AQB2000** mounting bracket (see "Accessories").  
 A 2 m length of plastic tubing is supplied with the sensor and can be adapted to the duct probes on site. The tubing with the higher pressure (lower vacuum) must be connected to nipple "P1" or "+" while the tubing with the lower pressure (higher vacuum) must be connected to nipple "P2" or "-".  
 The sensor is supplied with mounting instructions.

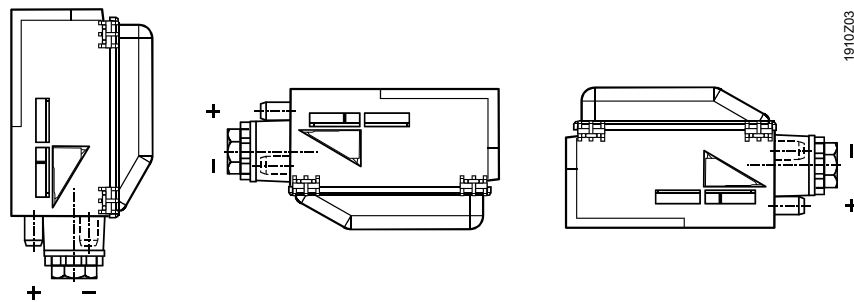
**Factory calibration**

The values specified in "Technical data" are valid only if the sensor is mounted vertically.  
 Should it be necessary to mount the sensor horizontally (with the hinged cover at the top or bottom, not recommended), measured value deviations must be taken into account.

*Recommended orientation:* Hinged cover in vertical position.  
 Signal: As per factory calibration

*NOT RECOMMENDED:*  
 Hinged cover facing downward.  
 Signal: Approximately 13 Pa higher than the effective pressure

*NOT RECOMMENDED:*  
 Hinged cover facing upward.  
 Signal: Approximately 13 Pa lower than the effective pressure

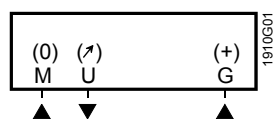


**Technical data**

<b>Electrical interface</b>	Power supply	Safety extra low voltage (SELV, PELV)
	Supply voltage	AC 24 V ± 15 %, 50/60 Hz or DC 13.5...33 V
	Power consumption	< 0.5 VA
	Current draw	< 10 mA
	Output voltage	DC 0 ...10 V
	Burden ( $R_{Load}$ )	> 10 kΩ
	Output	not galvanically separated, 3-wire connection, short-circuit-proof, protected against reversed polarity
<b>Functional data</b>	Measuring range	see "Type summary"
	Sensing element	piezoresistive (silicone diaphragm, ceramic lever)
	Measuring accuracy when mounted in recommended orientation and at ambient temperature of 25 °C, measuring range 2	(FS = Full Scale)
	Total error	< ± 3 % FS
	TC zero point	< ± 0.1 % FS / °C
TC sensitivity	< ± 0.05 % FS / °C	
Time constant $t_{63}$	< 1 s	

	Tolerable overload on one side	10 000 Pa
	Rupture pressure	2 × overload at room temperature 1.5 × overload at 70 °C
	Media	air and nonaggressive gases
	Perm. temperature of medium	0...70 °C
	Maintenance	maintenance-free
<b>Connections</b>	Electrical connections	
	Screw terminals for	max. 3 × 1.5 mm <sup>2</sup>
	Cable entry	cable entry gland Pg 11, (without strain relief)
	Pressure connections	plastic nozzles 6.2 mm dia.
<b>Protective data</b>	Degree of protection (in recommended position)	IP 42 to IEC 60 529
	Safety class	III to EN 60 730
<b>Environmental conditions</b>	Operation to	IEC 60 721-3-3
	Climatic conditions	class 3K5
	Temperature	0...+70 °C
	Humidity	<90 % r. h. (noncondensing)
	Mechanical conditions	class 3M2
	Transport/storage to	IEC 60 721-3-2
	Climatic conditions	class 2K3
	Temperature	-10...+70 °C
	Humidity	<95 % r. h. (noncondensing)
	Mechanical conditions	class 2M2
<b>Directive and standards</b>	Electromagnetic compatibility	
	Immunity to	EN 61 000-6-2, EN 61 326-1
	Emissions to	EN 61 000-6-3, EN 61 326-1
	CE conformity to EMC directive	2004/108/EC
	C-tick conformity (EMC) to	EN 61 000-6-3
<b>Environmental compatibility</b>	Environmental product declaration CE1E1910en provides information on environmentally compatible product design and assessment (RoHS compliance, composition of substances, packaging, environmental benefit, and disposal).	ISO 14001 (environment) ISO 9001 (quality) SN 36350 (environ. compat. products) RL 2002/95/EG (RoHS)
<b>Fire safety</b>	Fire class to	UL94
	Hinged cover	HB
	Pressure chamber (complete)	V-0
	Plastic tubing	V-2
	Air duct probe	HB
<b>Materials</b>	Housing	PC (Polycarbonate)
	Hinged cover	ABS
	Pressure chamber	PC with 10 % glassfiber
	Diaphragm with disk	silicon and PA66 ±GF 25 %
	Plastic tubing	PVC (Polyvinylchloride, soft)
	Air duct probe	ABS
<b>Weight</b>	Weight (incl. packaging)	0.183 kg

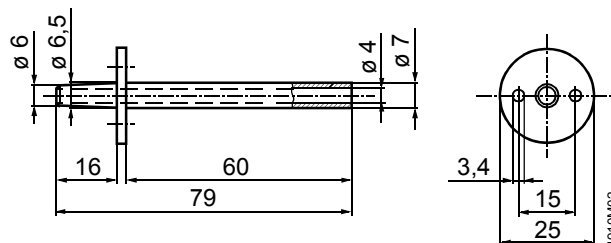
## Connection terminals



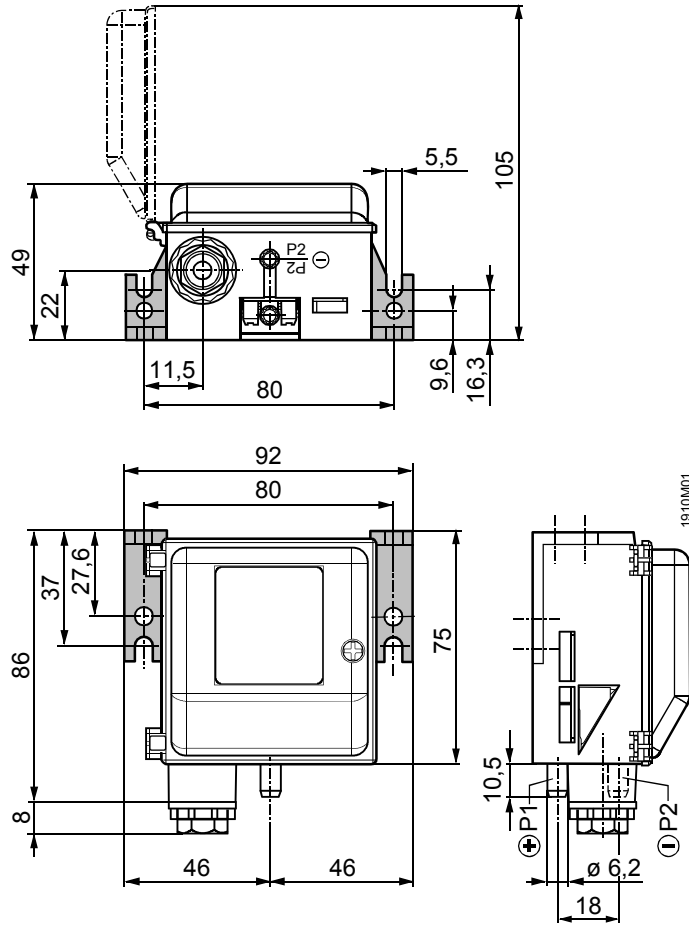
G (+) Operating voltage AC 24 V or DC 13.5...33 V  
M (0) GND, measuring neutral  
U (∇) Measuring signal DC 0...10 V

## Dimensions

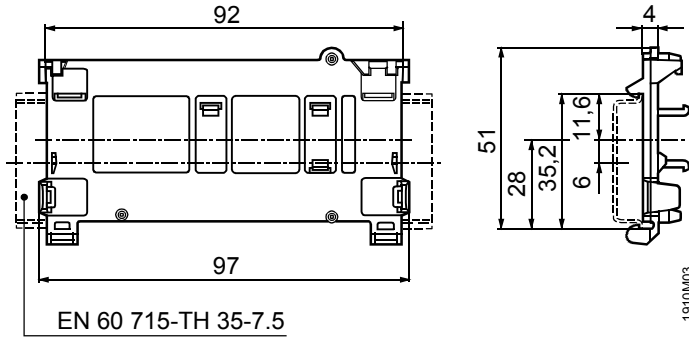
### Air duct probe (ABS)



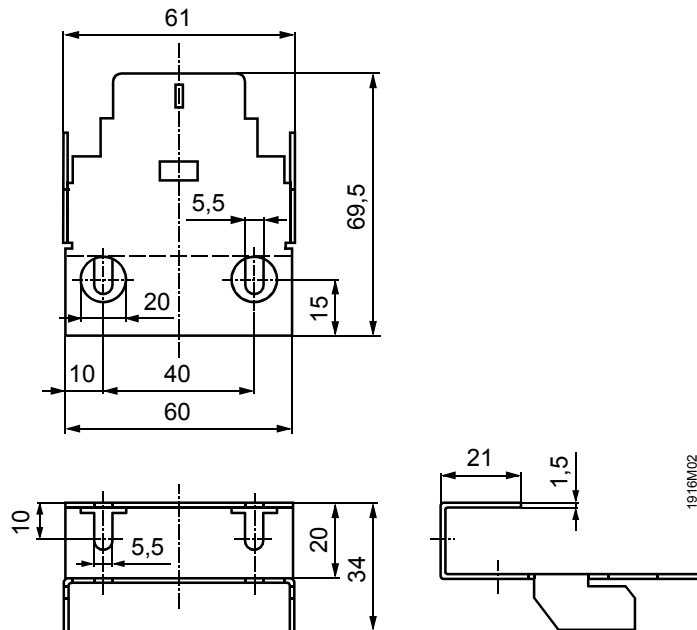
**QBM66...**



**Bracket for top hat rail  
AQB21.2**



**AQB2000**



Dimensions in mm