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

<table>
<thead>
<tr>
<th>Type reference</th>
<th>Measuring ranges</th>
<th>Output signal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range 1</td>
<td>Range 2</td>
</tr>
<tr>
<td>QBM66.201</td>
<td>0... 100 Pa</td>
<td>0... 200 Pa</td>
</tr>
<tr>
<td>QBM66.202</td>
<td>0... 250 Pa</td>
<td>0... 500 Pa</td>
</tr>
<tr>
<td>QBM66.203</td>
<td>0...1500 Pa</td>
<td>0...3000 Pa</td>
</tr>
<tr>
<td>QBM66.204</td>
<td>0...500 Pa</td>
<td>0...1000 Pa</td>
</tr>
</tbody>
</table>

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Building Technologies
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.

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

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 (□□)

<table>
<thead>
<tr>
<th>$U_A$ [V]</th>
<th>$\Delta p$ [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>4.00</td>
<td>4.00</td>
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<tr>
<td>5.00</td>
<td>5.00</td>
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<tr>
<td>6.00</td>
<td>6.00</td>
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<tr>
<td>7.00</td>
<td>7.00</td>
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<tr>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td>10.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

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".
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**

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)

**Legend**

**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.

<table>
<thead>
<tr>
<th>Recommended orientation:</th>
<th>NOT RECOMMENDED:</th>
<th>NOT RECOMMENDED:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinged cover in vertical position.</td>
<td>Hinged cover facing downward.</td>
<td>Hinged cover facing upward.</td>
</tr>
<tr>
<td>Signal: As per factory calibration</td>
<td>Signal: Approximately 13 Pa higher than the effective pressure</td>
<td>Signal: Approximately 13 Pa lower than the effective pressure</td>
</tr>
</tbody>
</table>

Technical data

<table>
<thead>
<tr>
<th>Electrical interface</th>
<th>Power supply</th>
<th>Safety extra low voltage (SELV, PELV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>AC 24 V ± 15 %, 50/60 Hz or DC 13.5...33 V</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>&lt;0.5 VA</td>
<td></td>
</tr>
<tr>
<td>Current draw</td>
<td>&lt;10 mA</td>
<td></td>
</tr>
<tr>
<td>Output voltage</td>
<td>DC 0 ...10 V</td>
<td></td>
</tr>
<tr>
<td>Burden (R&lt;sub&gt;Load&lt;/sub&gt;)</td>
<td>&gt;10 kΩ</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>not galvanically separated, 3-wire connection, short-circuit-proof, protected against reversed polarity</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional data</th>
<th>Measuring range</th>
<th>see &quot;Type summary&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing element</td>
<td>piezoresistive (silicone diaphragm, ceramic lever)</td>
<td></td>
</tr>
<tr>
<td>Measuring accuracy when mounted in recommended orientation and at ambient temperature of 25 °C, measuring range 2</td>
<td>(FS = Full Scale)</td>
<td></td>
</tr>
<tr>
<td>Total error</td>
<td>≤±3 % FS</td>
<td></td>
</tr>
<tr>
<td>TC zero point</td>
<td>≤±0.1 % FS / °C</td>
<td></td>
</tr>
<tr>
<td>TC sensitivity</td>
<td>≤±0.05 % FS / °C</td>
<td></td>
</tr>
<tr>
<td>Time constant t&lt;sub&gt;63&lt;/sub&gt;</td>
<td>&lt;1 s</td>
<td></td>
</tr>
</tbody>
</table>
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

Connections
Electrical connections
Screw terminals for max. 3 × 1.5 mm² cable entry gland Pg 11, (without strain relief)
Pressure connections plastic nozzles 6.2 mm dia.

Protective data
Degree of protection (in recommended position) IP 42 to IEC 60 529
Safety class III to EN 60 730

Environmental conditions
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

Directive and standards
Electromagnetic compatibility
Immunity to EN 61 000-6-2, EN 61 326-1
Emissions to EN 61 000-6-3, EN 61 326-1
C-conformity to EMC directive 2004/108/EC
C-tick conformity (EMC) to EN 61 000-6-3

Environmental compatibility
Environmental product declaration CE1E1910en provides information on environmentally compatible product design and assessment (RoHS compliance, composition of substances, packaging, environmental benefit, and disposal).

Fire safety
Fire class to UL94
Hinged cover HB
Pressure chamber (complete) V-0
Plastic tubing V-2
Air duct probe HB

Materials
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

Weight
Weight (incl. packaging) 0.183 kg

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

Dimensions
Air duct probe (ABS)
Bracket for top hat rail
AQB21.2

AQB2000

Dimensions in mm

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