SCHMIDT® Volume Flow Sensor
IL 30.0xx
Instruction for Use
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Imprint:

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Subject to modifications
1 Important information

The instructions for use contain all required information for a fast commissioning and safe operation of SCHMIDT® volume flow sensors.

- These instructions for use must be read completely and observed carefully, before putting the unit into operation.
- Any claims under the manufacturer's liability for damage resulting from non-observance or non-compliance with these instructions will become void.
- Tampering with the device in any way whatsoever - with the exception of the designated use and the operations described in these instructions for use - will forfeit any warranty and exclude any liability.
- The unit is designed exclusively for the use described below (refer to chapter 2). In particular, it is not designed for direct or indirect protection of personal or machinery.
- SCHMIDT Technology cannot give any warranty as to its suitability for certain purpose and cannot be held liable for errors contained in these instructions for use or for accidental or sequential damage in connection with the delivery, performance or use of this unit.

Symbols used in this manual

The symbols used in this manual are explained in the following section.

Danger warnings and safety instructions. Read carefully!

Non-observance of these instructions may lead to injury of personal or malfunction of the device.

General note

All dimensions are given in mm.
2 Application range

The SCHMIDT® Volume Flow Sensor IL 30.0xx is designed as inline sensor i.e. the tubular measuring section is already integrated in its basic body.

Four variants with different diameters are offered:

<table>
<thead>
<tr>
<th>Type</th>
<th>Inner-Ø [mm]</th>
<th>Thread connection</th>
<th>Volume flow [Norm-m³/h]</th>
<th>Article No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL 30.005</td>
<td>16.1</td>
<td>DN 15 / G½</td>
<td>76.3</td>
<td>550 250</td>
</tr>
<tr>
<td>IL 30.010 MPM</td>
<td>27.3</td>
<td>DN 25 / G1</td>
<td>229</td>
<td>550 251</td>
</tr>
<tr>
<td>IL 30.015 MPM</td>
<td>41.9</td>
<td>DN 40 / G1½</td>
<td>417</td>
<td>550 252</td>
</tr>
<tr>
<td>IL 30.020 MPM</td>
<td>53.1</td>
<td>DN 50 / G2</td>
<td>712</td>
<td>550 253</td>
</tr>
</tbody>
</table>

Table 1

Connection to the pipe system is carried out by the internal threads on both sides of the base body, suitable extended measuring sections are offered by SCHMIDT Technology as optional accessory (see page 7).

The sensor measures both volume flow as well as the temperature of pure¹ air and gas with working pressure up to 16 bar (gauge pressure).

The sensor is based on the measuring principle of a thermal anemometer and measures the standard volume flow of the measuring medium which is output in a linear way as standard (respective: Norm) volume flow $V_N$ (unit: m³/h), referred to standard conditions of $T_N = 1013.25$ hPa and $p_N = 20$ °C. Thus, the resulting output signal is independent of the pressure and temperature of the measured medium.

The sensor features several special properties, notably due to the unique Multi-Point-Measurement design (MPM) of its sensor elements:

- Best measurement results even in not fully smoothened air flows
- Excellent sensitivity
- High measurement dynamics

These properties make the sensor highly suitable for:

- Consumption of compressed air
- Consumption of gases

When using the sensor outdoors, it must be protected against direct exposure to the weather.

¹ No chemically aggressive content / abrasive particles; check suitability in individual cases.
3 Mounting instructions

General information on handling

The volume flow sensor **IL 30.0xx** is a precision instrument with high measuring sensitivity, which can be achieved only by a delicate structure of its measuring probes. Therefore, applying mechanical forces to the probe tips inside the housing should be avoided if possible. In case of cleaning by the customer, this should preferably be made contactless (e.g. with a spray) or only with appropriate care.

⚠️ The sensor probes should not be touched or exposed to any other mechanical effects.

Likewise, a touch can cause electrical damage to the ESD-sensitive sensor elements.

⚠️ The sensor probes can be damaged by ESD.

To protect the sensitive inside, **SCHMIDT Technology** delivers the sensor with protective caps placed into both ends of its body which should be removed only before final installation. And vice versa when dismounting the sensor the protective caps should be attached in place immediately. In general, great care is required when handling the sensor.

The housing of the sensor is made of anodized aluminium. This ensures a low-friction screw-in of the installation pipes into the housing. Due to the softness of the material, however, the thread windings could be irreversibly damaged when tilting the pipes while screwing in.

⚠️ The threads of the sensor body can take irreversible damage if handled incorrectly, i.e. by tilting pipes when screwing in.

If the sensor is installed without the extended measurement sections which are offered by **SCHMIDT Technology**, the dimensions and tolerances prescribed by the manufacturer must be observed strictly for the customized installation.

Corresponding dimensional drawings are available as download from [www.schmidt-sensors.com](http://www.schmidt-sensors.com).
Systems with overpressure

The IL 30.0xx is designed for a maximum working pressure of 16 bar. As long as the measuring medium is operated with overpressure, make sure that:

- Only appropriately pressure-tight mounting accessories are used.
- All connections to pressurized systems are checked for pressure tightness from time to time.

Mounting and dismounting of the sensor can be carried out only as long as the system is in depressurized state.

The extended measuring sections, which are optionally available from SCHMIDT Technology (see subchapter Accessories), are delivered with two O-Rings which are intended as pressure seals for easy installation (must be applied by customer). If the customer uses his own pipes, suitable installation and sealing equipment must be used (e.g. sealing tape). In any case take care that the threads are screwed into the housing without tilting, to avoid damaging of the sensor body. Furthermore, before applying pressure, the sensor must be checked for a safe and firm installation. After pressurization check for any leakages and eliminate them immediately if there are some.

Before applying pressure, make sure that all screw connections are firmly seated and cannot be loosened. Unscrewing while the system is under pressure can damage the sensor and can also result in serious harm to your health.

The pressure sealing parts of the installation have to be checked regularly for pressure tightness and safe installation.

Flow characteristics

Local turbulences of the medium can cause distortion of measurement results. The resulting measurement distortions are reduced to a minimum by the special sensor design “MPM” (Multi-Point-Measurement – all variants except IL 30.005). In order to get maximum accuracy it’s nevertheless advisable to smooth turbulences of the gas flow before applying it to the sensor.

The simplest method is to provide a sufficiently long distance both in front of (run-in distance) as well as behind the sensor (run-out distance) absolutely straight and without disturbances.

The absolute length of the respective distances is indicated as a multiple of the inner diameter D of the pipe.
For types with MPM it is recommended to provide at least 10xD in front of the sensor and 5xD after the sensor. Concerning the **IL 30.005** (without MPM) the standard lengths (up to 45xD inlet) should be used.

If this is not possible the run-in distance should take up 2/3 of the available measuring length and the run-out distance 1/3 of it.

**Accessories for installation**

For mounting of the **SCHMIDT® Volume Flow Sensor IL 30.0xx**, an extensive assembly of accessories is available to cover a wide range of applications (see Table 2).

<table>
<thead>
<tr>
<th>Type / article No.</th>
<th>Drawing</th>
<th>Mounting</th>
</tr>
</thead>
</table>
| Connecting cable fixed length: 5 m 523 565 | ![Diagram](image) | - Threaded ring, hexagon
- Plug injection-moulded
- Wires: 5 x 0.34 mm²
- Material: Stainless steel PUR, PVC |
| Connecting cable optional length: x m 523 566 x = 2 ... 100 m Step: 0.1 m | ![Diagram](image) | - Threaded ring, hexagon
- Wires: 5 x 0.34 mm²
- Material: Stainless steel PA, PUR, PP
- Free of halogen² |
| Coupler socket Thread locking system (VA) 523 562 | ![Diagram](image) | - Threaded ring, hexagon
- Material: Stainless steel PA, PUR, PP
- Connection of leads: Bolted (5 x 0.75 mm²) |
| Extended measuring sections ½": 556 954 1": 556 955 1½": 556 956 2": 556 957 | ![Diagram](image) | - Type of thread: G and R
- Material: Stainless steel (pipe) NBR 70 (O-rings) |

Table 2

² According to IEC 60754
4 Electrical connection

The sensor features two connectors:

- **Main connector:**
  - Connection of voltage supply
  - Output of measuring signals

- **Module connector:**
  For connection of an optional extension module.

**Main connector**

This connector is a 5-pin plug, type M12 (male, A-coded) with a thread for the connecting cable\(^3\) (pin assignment: Figure 2 and Table 3).

![Figure 2](image)

**Table 3 Pin assignment**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Function</th>
<th>Wire colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power</td>
<td>+U_S (+24 V)</td>
<td>brown</td>
</tr>
<tr>
<td>2</td>
<td>Analogue ( \dot{V}_N )</td>
<td>Volume flow</td>
<td>white</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>GND</td>
<td>blue</td>
</tr>
<tr>
<td>4</td>
<td>Analogue T_M</td>
<td>Medium temperature</td>
<td>black</td>
</tr>
<tr>
<td>5</td>
<td>Impulse</td>
<td>Volume</td>
<td>grey</td>
</tr>
</tbody>
</table>

The specified lead colours are valid for connecting cables from **SCHMIDT Technology** (see subchapter *Accessories*).

⚠️ During electrical installation ensure that no voltage is applied and inadvertent activation is not possible.

The plug housing, and thus also a possibly screen of a plugged connection cable, is electrically connected to the metal housing of the sensor.

⚠️ The appropriate protection class III (SELV) respective PELV (EN 50178) has to be considered.

---

\(^3\) Spigot nut is on connecting cable
Power supply

For proper operation the sensor requires direct voltage with a nominal value of 24 V with permitted tolerance of ±10 %. Deviating values lead to deactivation of measuring the volume flow or even to defects and, therefore, should be avoided. As far as it is functionally possible, the LED indication reports the faulty operational conditions (see chapter 5).

Only operate sensor within the defined range of operating voltage \((U_S = 24 V_{DC} \pm 10 \%)\).

Undervoltage\(^4\) may result in malfunction; overvoltage can lead to irreversible damage.

Operating current of the sensor (impulse output current not included) is typically 90 (40) mA, maximum 300 (120) mA \((\text{IL 30.005 in brackets})\).

Specifications for operating voltage apply to the connection at the sensor. Voltage drops generated due to line resistances must be considered by the customer.

Wiring of analogue outputs

Both analogue outputs (volume flow and temperature of medium) are designed as short-circuit protected current interfaces \((4 \ldots 20 \text{ mA})\). The respective load \(R_L\) must be connected to the reference potential \((\text{GND})\) of the sensor.

Load specification: \(R_L \leq 500 \Omega; C_L \leq 10 \text{ nF}\)

Wiring of impulse output

The pulse output (volume) is designed as highside driver \((\text{P-MOSFET, open drain})\) connected to the (reverse protected) operating voltage. It is protected by two methods, a serial diode against higher external voltage as well as generally by an analogue current limitation with a limit current of typical 50 mA \((\text{max. 65 mA})\).

The load has to be connected to GND.

Module connector

The SCHMIDT\textsuperscript{	extregistered} Volume Flow Sensor IL 30.0xx comes with an additional connector \((\text{M12, female, A-coded, 5-pin})\) for connecting optional expansion modules \((\text{see Figure 1})\).

Don’t connect anything other to this port than expansion modules from SCHMIDT Technology.

\(^4\) For \(U_S < 15 \text{ V}\) the electronics shuts down.
5 Signalling

Light emitting diodes

The SCHMIDT® Volume Flow Sensor IL 30.0xx has four Duo-LEDs (see Figure 3) to indicate its operational status (Table 4):

- In error-free operation: Volume flow (bar graph mode)
- Problems in operation: Detected error cause

![Figure 3](Image)

<table>
<thead>
<tr>
<th>No.</th>
<th>State</th>
<th>LED 1</th>
<th>LED 2</th>
<th>LED 3</th>
<th>LED 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operational &amp; volume flow ≤ 5 %</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Volume flow &gt; 5 %</td>
<td>LED shines orange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Volume flow &gt; 20 %</td>
<td>LED shines green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Volume flow &gt; 50 %</td>
<td>LED flashes red</td>
<td>2 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Volume flow &gt; 80 %</td>
<td>LED shines green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Volume flow &gt; 100 % (= Overflow)</td>
<td>LED shines orange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sensor element defective</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Supply voltage too low</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Supply voltage too high</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Temperature of electronics too low</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Temperature of electronics too high</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Temperature of medium too low</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Temperature of medium too high</td>
<td>LED off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend

- LED off
- LED shines orange
- LED shines green
- LED flashes red (approx. 2 Hz)

Table 4

5 “%” of final value of measuring range of volume flow
Analog outputs

- Representation of measuring range
  The measuring range of the corresponding measuring value is mapped in a linear way to the signal range.
  For volume flow measurement the measuring ranges from zero to the variant-specific end of the measuring range $\dot{V}_{N,\text{max}}$ (see Table 5).

<table>
<thead>
<tr>
<th>Volume flow</th>
<th>Temperature of medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{\text{Out}}$ [mA]</td>
<td>$I_{\text{Out}}$ [mA]</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

$\dot{V}_{N} = \frac{\dot{V}_{N,\text{max}}}{16 \text{ mA}} \cdot (I_{\text{Out}} \cdot \dot{V}_{N} - 4 \text{ mA})$

$T_{M} = \frac{80 ^\circ \text{C}}{16 \text{ mA}} \cdot (I_{\text{Out,TM}} - 4 \text{ mA}) - 20 ^\circ \text{C}$

Table 5

The measuring range of the medium temperature $T_{M}$ is specified between -20 °C and +60 °C.

Note regarding commissioning:
Normally the temperature output indicates approx. 12 mA because the typical prevailing room temperature of 20 °C corresponds to about half of the measuring range.

- Error signalling
  The interface outputs 2 mA.

- Exceeding measuring range of volume flow
  Measuring values higher than $\dot{V}_{N,\text{max}}$ are output linearly up to 110 % of the signalling range (this corresponds to the maximum output of 21.6 mA, see left image in Table 5). For higher values the output signal remains constant. Error signalling doesn’t take place because damage of the sensor is unlikely.

---

6 In accordance to NAMUR specification
• Medium temperature beyond specification range
  Operation beyond specified limits\(^7\) can damage the measuring probes and, therefore, is seen as a critical error:
  o Medium temperature below \(-20 \, ^\circ\text{C}\):
    The analogue output for \(T_M\) switches to error signalling (2 mA).
    The measuring function of volume flow is switched off; its analogue output also reports an error (2 mA).
  o Medium temperature above \(+60 \, ^\circ\text{C}\):
    Up to 65 \(^\circ\text{C}\) the temperature is still output linearly (corresponds to 21 mA), e.g. to enable an overshooting of a heating control. The volume flow is measured and displayed further on. Above this critical limit the measurement of volume flow is switched off and its outputs are going to error (2 mA / locked). The output for \(T_M\) jumps directly to its maximum value of 22 mA which differs from standard error signalling.

**Impulse output**

• Signalling
  One impulse represents a defined volume that has flowed. During the pulse signal itself, the output transistor switches through for a fixed time (conducting) otherwise the transistor is locked (high impedance).
  ▪ Pulse valence:
    \[
    \text{IL 30.005; IL 30.010 MPM:} \quad 0.1 \text{ Norm-m}^3 \\
    \text{IL 30.015 MPM; IL 30.020 MPM:} \quad 1.0 \text{ Norm-m}^3 \\
    \]
  ▪ Pulse duration (fix): \(1 \, \text{s}\)

• Error signalling
  As long as the analogue flow volume output signals error (2 mA), the pulse output is locked (high impedance).

\(^7\) Switching hysteresis for the threshold is approx. 2 K.
6 Commissioning

Before applying supply voltage to the SCHMIDT® Volume Flow Sensor IL 30.0xx the following checks have to be carried out:

- Mechanical mounting:
  - All screws are tightened properly.
  - Suitable pressure protection measures are carried out (e.g. sealing tape in the threads).

  For measurements in media with overpressure check if all screws are tightened properly and all mechanical connections are pressure tight.

- Connecting cable:
  - Proper connection in the field (switch cabinet or similar).
  - Tight fit of spigot nut of the connector of the connecting cable at sensor enclosure.

If the sensor is in the correct operational state after initialization it switches into measuring mode. The indication of volume flow (both LEDs and signal outputs) jumps for a short period to maximum and settles after approx. one second at the correct measuring value provided the sensor probe has medium temperature already. Otherwise, the process will prolong until the sensor has reached medium temperature.

7 Information concerning operation

Ambient condition temperature

The SCHMIDT® Volume Flow Sensor IL 30.0xx monitors the temperature of both medium and electronics. As soon as one limit of the specified operation ranges is exceeded, the sensor switches off one or both measuring functions associated with the medium depending on the situation and report the corresponding error. As soon as proper operational conditions are restored, the sensor resumes normal function.

Even a short-term over- or undershooting of the safety limit values can lead to permanent damage of the sensor which must be avoided by all means.

Even short-term exceedance or undershooting of operating temperatures can cause irreversible damage to the sensor.
Ambient condition pressure

The SCHMIDT® Volume Flow Sensor IL 30.0xx is suitable for clean, non-combustible air and gases that contain neither dust, abrasive particles or vapours nor gaseous oils or chemical aggressive components. Depending on the consistency and composition, deposits or other contaminants may lead to falsification of the measured value and should be avoided coercively (see chapter 8).

Soiling or other deposits on the sensing elements cause false measurement results.

Therefore, the sensor should be checked for contaminations regularly and, if necessary, has to be cleaned or send in for maintenance.

When cleaning, use only mild agents (such as isopropanol) and avoid direct contact of the sensor elements as far as possible.

The suitability of the sensor for use in any non-clean media must be checked in individual cases.

Condensing liquid fractions in gases or even immersion into liquids can damage the probe and therefore must be avoided strictly. Also, the significantly higher heating capacity of liquids distorts the measuring results seriously (in this case a much higher volume flow is detected and will be signalled).

(Condensing) liquid on the measuring probes causes serious measurement distortions and can also damage the sensor irreversibly.

8 Service information

Troubleshooting

Possible errors (error images) are listed in Table 6.

Furthermore several causes and measures to eliminate the error are described.

Causes of any error signaling have to be eliminated immediately. Exceeding or falling below the permitted operating parameters can result in permanent damage to the sensor.
<table>
<thead>
<tr>
<th>Error image</th>
<th>Possible causes</th>
<th>Troubleshooting</th>
</tr>
</thead>
</table>
| No LED is shining | Problems with supply $U_S$:  
  - No $U_S$ available  
  - Wrong polarity (DC)  
  - $U_S < 15$ V  
  Sensor is defective |  
  - Connector screwed on correctly?  
  - Supply voltage connected correctly?  
  - Supply voltage at sensor plug available (cable break)?  
  - Power supply sufficient? |
| All signal outputs are at zero | $U_S$ unstable:  
  - Power unit cannot supply switch-on current  
  - Other consumers over-load power source  
  - Wire resistance too high |  
  - Supply voltage at sensor stable?  
  - Power supply sufficient?  
  - Voltage losses over cable negligible? |
| Sensor element defective | | Send in sensor for repair |
| Supply voltage $U_S < 21.6$ V | Increase supply voltage |
| Supply voltage $U_S > 26.4$ V | Decrease supply voltage |
| Electronic temperature too low | Increase temperature of environment |
| Electronic temperature too high | Decrease temperature of environment |
| Medium temperature too low | Increase medium temperature |
| Medium temperature too high | Reduce medium temperature |
| Signal $\dot{V}_n$ is too large / small | Measuring medium does not correspond to air  
  Sensor elements are soiled  
  Sensor elements are moistened | Gas correction considered?  
  Send in sensor for cleaning / maintaining  
  Dry sensor elements |
| Signal $\dot{V}_n$ is fluctuating | $U_S$ unstable  
  Installation conditions:  
  - Run-in or run-out distance is too short  
  - Strong fluctuations of pressure or temperature | Check voltage supply  
  Check installation conditions  
  Check operating parameters |
| Analogue signal permanently at maximum | Load resistance of signal output is at $+U_S$ | Connect load resistance to GND |

**Table 6**

| LED off | LED shines orange | LED shines green | LED flashes red (approx. 1 Hz) |
Transport / shipment of the sensor

For transportation or dispatching of the sensor, it must be well protected against vibrations and shocks. Ideally, the sensor is shipped with fitted protective caps and in its original packaging. Soiling, mechanical stress and / or touching the sensor elements should be avoided.

Calibration

If the customer has made no other provisions, we recommend repeating the calibration at a 12-month interval. For this purpose the sensor must be sent in to the manufacturer. A calibration can be carried out only if the basic sensor, i.e. without mounted extended sections or other pipes, is sent in. Also make sure that there are no damages especially concerning the sensor elements and the inner mounting threads.

Spare parts or repair

No spare parts are available, since a repair is only possible at the manufacturer's facility. In case of defects, the basic sensor must be sent in to the supplier for repair. Any other installed parts like pipes or measurement extensions have to be removed. 

**Also a completed declaration of decontamination, in conjunction with all shipping documents, must be attached at the outside of the shipment package.**

The appropriate form “Declaration of decontamination” is enclosed to the sensor. Alternatively it can be downloaded from [www.schmidt-sensors.com](http://www.schmidt-sensors.com).

If the sensor is used in systems important for operation, we recommend keeping a replacement sensor in stock.

Test and material certificates

Every new sensor is accompanied by a certificate of compliance according to EN 10204-2.1. Material certificates are not available.

Upon request, we shall prepare, at a charge, a calibration certificate for new devices or in case of a re-calibration. The certificate is traceable to national standards.
## 9 Technical data

<table>
<thead>
<tr>
<th>Sensor technology</th>
<th>Thermal inline volume flow sensor (with MPM(^8))</th>
</tr>
</thead>
</table>
| Measurands                         | Standard\(^9\) volume flow \(\dot{V}_N\)  
Temperature of medium \(T_M\) |
| Measuring ranges\(^{10}\) \(\dot{V}_N\) | \(\frac{1}{2}^\circ\): 0.15 … 76.3 Norm-m\(^3\)/h  
\(1^\circ\): 0.50 … 229 Norm-m\(^3\)/h  
\(1\frac{1}{2}^\circ\): 1.00 … 417 Norm-m\(^3\)/h  
\(2^\circ\): 2.00 … 712 Norm-m\(^3\)/h |
| Measuring accuracy \(\dot{V}_N\)     | ±(3 % of measured value + 0.3 % of fmr\(^{11}\))  
Response time \(t_{90}\) \(\dot{V}_N\) | Approx. 5 s |
| Measuring accuracy \(T_M\)         | \(\leq \pm 2\) K (volume flow > 2 % of fmr) |
| Measurement direction              | Unidirectional |
| Medium to be measured              | Clean (compressed-) air, nitrogen; other gases on request |
| Compression strength               | 16 bar (overpressure) |
| Humidity range                     | \(\leq 95\) % rel. humidity, non-condensing |
| Operating temperature              | -20 °C … +60 °C |
| Installation                       | Inner threads DN 15 … DN 50 (G\(\frac{1}{2}\) … G2) |
| Analogue output                    | Current interface (short circuit protected)  
Signal range: 4 … 20 mA (2 mA error signal)  
Load: \(R_L \leq 500\ \Omega / C_L \leq 10\) nF |
| Impulse output                     | Highside driver (open drain, short circuit protected)  
Pulse valence: 0.1 / 1.0 Norm-m\(^3\)  
Pulse duration: 1 s (transistor conducting)  
Pulse high level\(^{12}\): > \(U_S \) – 1 V  
Current limit: typ. 50 mA (max. 65 mA) |
| Display                            | 4 dual LED (quasi-analogue display of \(\dot{V}_N\) / sensor status) |
| Supply Voltage \(U_S\)             | 24 V DC \(\pm 10\) % |
| Current consumption \(\text{IL 30.005}\) \(\text{(without impulse output)}\) | typ. 40 mA, max. 120 mA  
\(\text{IL 30.0xx MPM}\) | typ. 90 mA, max. 300 mA |
| Electrical Connection              | Main connector: M12, male, A-coded, 5-pin  
Module connector: M12, female, A-coded, 5-pin |
| Length of connection cable         | Max. 100 m (recommended; observe wire resistance) |
| Type / class of protection         | IP 64 (housing) / III (SELV) or PELV (EN 50178) |
| Material                           | Anodized aluminium |

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\(^8\) MPM: Multipoint-Measurement; except IL 30.005 with only one measurement point  
\(^9\) Based on standard (Norm) conditions \(T_N = 20\) °C and \(p_N = 1013.25\) hPa  
\(^{10}\) Minimal value of measuring range = lower detection limit  
\(^{11}\) fmr: final value of measuring range  
\(^{12}\) Current limiting not active
10 Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>$H_{ges.}$</th>
<th>$H_1$</th>
<th>$B$</th>
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<tr>
<td>IL 30.005</td>
<td>59</td>
<td>27</td>
<td>75</td>
<td>550 250</td>
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<td>IL 30.010 MPM</td>
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</table>

All dimensions in mm
11 Declaration of Conformity

EU-Declaration of conformity

SCHMIDT Technology GmbH herewith declares that the products

SCHMIDT® Flow Sensor
IL 30.005, IL 30.010 MPM, IL 30.015 MPM, IL 30.020 MPM
Part-Nos. 550 250, 550 251, 550 252, 550 253

are in compliance with the following European guideline:

No.: 2014/30/EU

The following European standards were used for assessment of the product therefore:

This declaration certifies the compliance with the mentioned directive but comprises no confirmation of attributes. The security advices of the included product documentation have to be observed. The above mentioned product was tested in a typical configuration.

St. Georgen, 10.07.2018

Helmar Scholz
Head of R&D Division Sensors