Simply a question of
better measurement

SCHMIDT® Technology


# Flow sensor HVAC 100
(548000)

## Instructions for Use

Imprint:

Version 547996.02A

Subject to modifications

# Important Information

These instructions for use must be read completely and observed carefully, before putting the unit into operation.

**For more detailled information visit our website:**

**www.schmidt-sensors.com**

**If any questions left contact SCHMIDT Technology directly.**

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. 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 accidental or sequential damage in connection with the delivery, performance or use of this unit.

# Application range

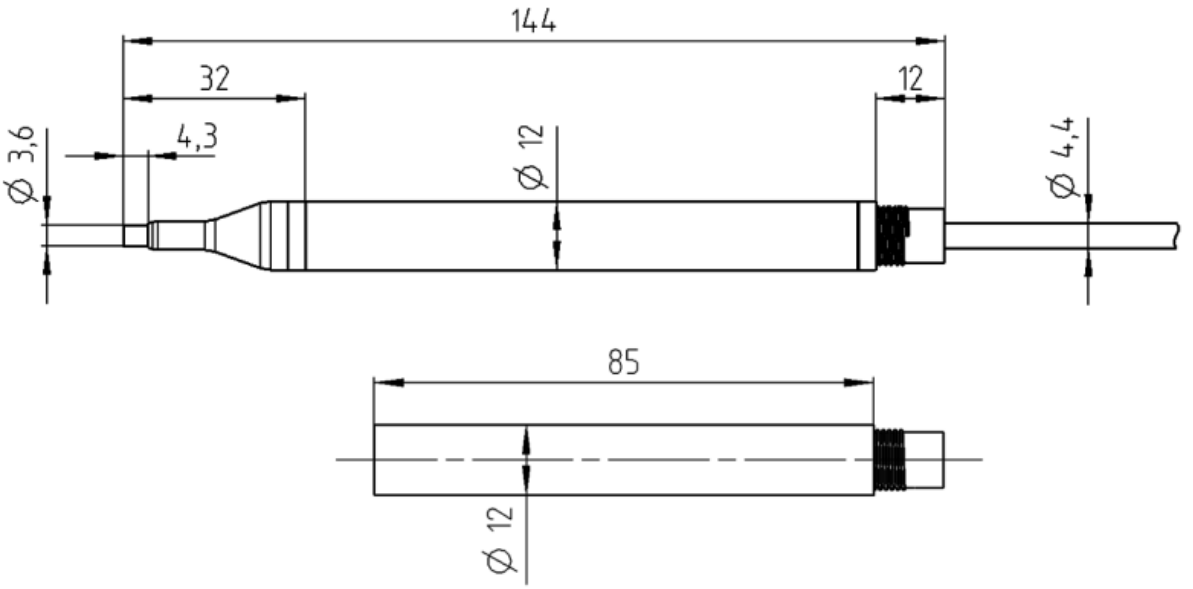
The **SCHMIDT® Flow sensor HVAC 100** is designed for stationary measurement of the flow velocity as well as the temperature of clean air at atmospheric pressure conditions.

It measures the standard velocity $w_N$ [m/s], based on standard conditions of 1013.25 hPa and 20 °C. Thus, the resulting output signal is independent from pressure and temperature of the medium to be measured.

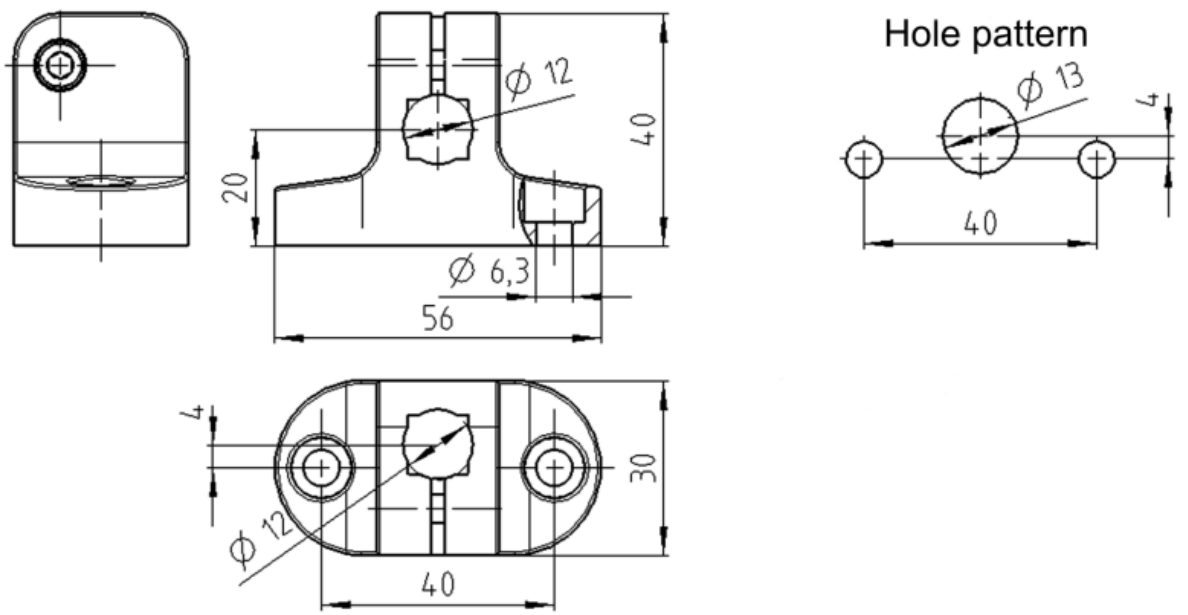
The sensor is designed for the use inside closed rooms and is not suitable for outdoor use.

## Dimensions

Basic sensor and extension tube [mm]:

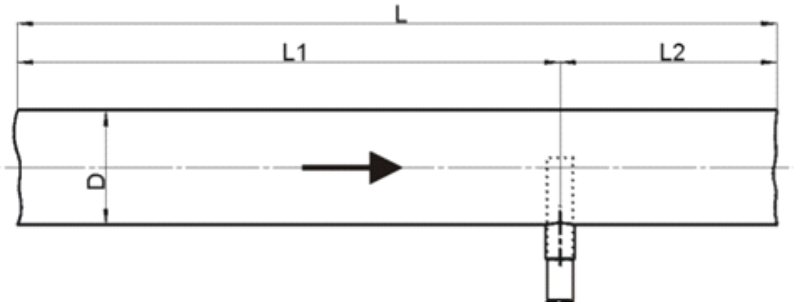



Holder [mm]:



# Mounting instructions

For correct measurement results a quiet (low in turbulence) air flow is needed. To obtain this a sufficiently long distance in front of the sensor (run-in distance) and behind the sensor (run-out distance) is needed (see table below).




The required abatement distances depend on the characteristic dimension A (pipe: inner diameter D / rectangular flow channel: width or hight, whichever is smaller) and of different fault causes (see following table).

| Flow obstacle upstream of sensor position | Distance | |
|---|---|---|
| | Run-in (L1) | Run-out (L2) |
| Light bend (< 90°) | **10 x A** | **5 x A** |
| Reduction / expansion / 90° bend | **15 x A** | **5 x A** |
| Two 90° bends in a plane (2-dimensional) | **20 x A** | **5 x A** |
| Two 90° bends (3-dimensional change of direction) | **35 x A** | **5 x A** |
| Shut-off valve | **45 x A** | **5 x A** |

The sensor tip has to be installed in the middle of the pipe. The temperature measuring sleeve (metallic ring) must be in direct contact with the measured medium, requiring a minimum immersion depth (MID) of 35 mm.

The sensor is mounted by using the included mounting clamp. The insertion depth can be adjusted steplessly. If the sensor is too short it can be extended by using one or more (recommended max. 3 pcs.) extension tubes (one is included; more tubes can be ordered as accessories, Part-No. 551300).

# Electrical connection

The sensor is equipped with a non-detachable 4-pin cable (pigtail) of 2 m length.

| Function | Wire color |
|---|---|
| Operating voltage: $+U_B$ | **Brown** |
| Output signal: Flow velocity $w_N$ | **Yellow** |
| Output signal: Temperature of medium $T_M$ | **Green** |
| Operating voltage: GND | **White** |

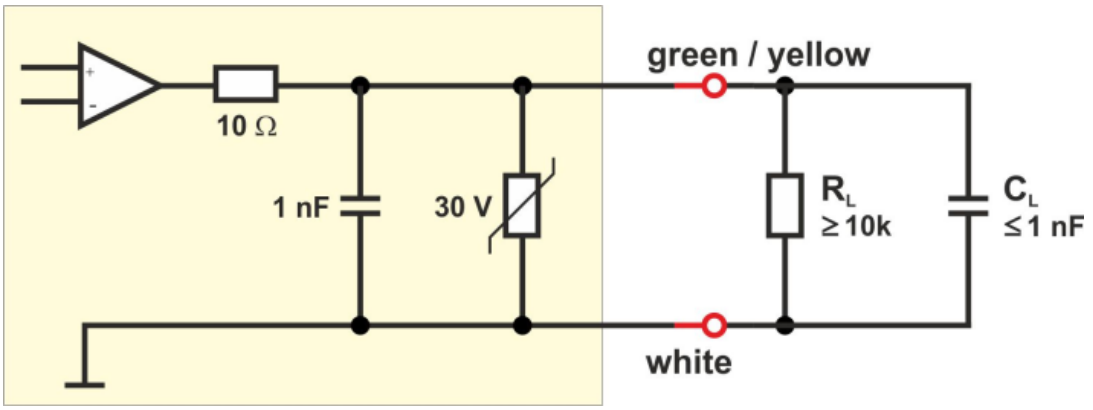
During electrical installation ensure that no supply voltage is applied and its inadvertent activation is not possible.

For proper operation the sensor requires a power supply of

24 $V_{DC}$ ± 20 %, drawing a typical current of 35 mA and at maximum 80 mA.

Both analog outputs are realised as voltage interface with a signal range of 0 ... 10 V related to GND.

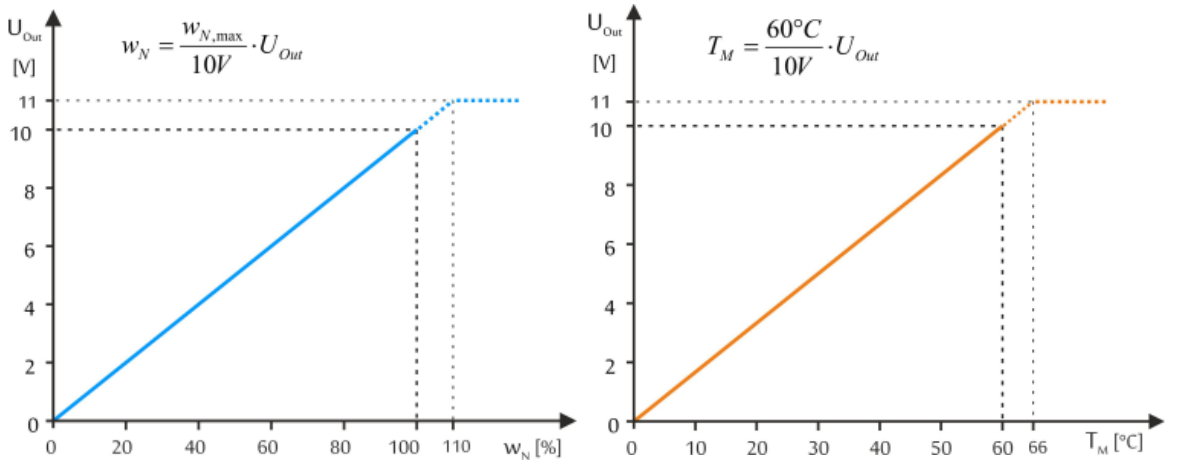
The connected burden must be at least 10 kΩ with a maximum capacity of 1 nF.




Voltage drops across the supply lines, in particular on the GND wire (mass offset), have to be considered.

# Signalizations

The respective measured variable is mapped linearly to the signal range and up to max. 10 % beyond it, at even higher measured values the signal value remains constant.




If the sensor is in the correct operational state, it is ready for measurement approx. 30 s after switching on the supply voltage. Its status is signalized by an LED:

| Symbol | Light | Status |
|---|---|---|
| ○ | Off | Power supply: Not connected / pole-reversed / too low |
| ● | Green flashing | 1 x : Sensor operational & $w_N$ < 25 % of meas. range<br>2 x : Sensor operational & $w_N$ = 25 … 75 % of meas. range<br>3 x : Sensor operational & $w_N$ > 75 % of meas. range |
| ◐ | Red blinking | Sensor defective / supply voltage too high |

# Calculation of volume flow

To calculate the standard volume flow the measured standard air velocity has to be multiplied with the cross section area of the pipe A and the corresponding profile factor PF, which is depending on the pipe diameter (e.g. PF = 0.827 at a pipe diameter of 200 mm).

Detailed Information as well as a helpful flow calculation tool is available on the website of **SCHMIDT Technology**:

www.schmidt-sensors.com

# Technical Data

| | |
|---|---|
| Measuring parameters | Standard velocity $w_N$ of air, based on standard conditions 20 °C and 1013.25 hPa<br>Medium temperature $T_M$ |
| Medium to be measured | Clean air |
| Measuring range $w_N$<br>(Measuring accuracy[1] $w_N$) | 0 … 2.5 m/s (±(4 % of meas. value + 0.05 m/s))<br>0 … 10 m/s (±(4 % of meas. value + 0.2 m/s))<br>0 … 20 m/s (±(4 % of meas. value + 0.4 m/s)) |
| Lower detection limit $w_N$ | 0.2 m/s |
| Reproducibility $w_N$ | ±1.5 % of measured value |
| Response time ($t_{90}$) $w_N$ | 10 s (jump from 0 to 5 m/s) |
| Temperature gradient $w_N$ | < 1.5 K/min at 5 m/s |
| Measuring range $T_M$ | 0 ... +60 °C |
| Measuring accuracy $T_M$<br>($w_N$ > 2 m/s) | ±1 K (10 ... 30 °C); ±2 K in remaining intervall |
| Operating temperature | -10 … 60 °C |
| Humidity range | 0 ... 95 % rel. humidity (RH), non-condensing |
| Operating pressure | Atmospheric (700 ... 1,300 hPa) |
| Operating voltage $U_B$ | 24 $V_{DC}$ ± 20 % |
| Current consumption | Typ. < 35 mA, max. 80 mA |
| Analog outputs<br>- Signal type<br>- Mininum burden<br>- Maximum load capacity | Flow velocity, medium temperature<br>0 ... 10 V<br>10 kΩ<br>1 nF |
| Electrical connection | Non-detachable connecting cable, pigtail, length 2 m, PVC, 4 x 0.25 $mm^2$ |
| Type of protection | IP40 |
| Protection class | III (SELV) |
| Min. immersion depth (MID) | 35 mm |
| Mounting | Clamp (included) |
| Standard probe | Length: 144 mm<br>Weight: Approx. 50 g<br>Materials: PC, ABS, Brass nickel plated |
| Extension tube | Length: Extending length 85 mm<br>Material: ABS |

[1] Under conditions of the reference.

# Declarations of conformity

**SCHMIDT Technology GmbH** herewith declares in its sole responsibility, that the product

**SCHMIDT® Flow Sensor HVAC 100**

Part-No. **548 000**

is in compliance with the appropriate

CE European Guidelines and Standards

and

UKCA UK statutory requirements and designated standards.

The corresponding declarations of conformity can be downloaded from the SCHMIDT® Homepage:

www.schmidt-sensors.com

www.schmidttechnology.de