

# senso-v+

## Flow rate display, monitor and transmitter with alarm signal



### Features

- easy-to-read main display thanks to large numerals and residual-light reflecting display technology
- Display of volume flow up to 99,999 in the following units: m<sup>3</sup>/h, l/s, ft<sup>3</sup>/min
- Displays the alarm value up to max. flow rate
- Red LED flashes when value falls below alarm value
- Programmable alarm value, K-factor and air density p
- Power: 24V AC at 50/60 Hz or 24V DC

### Technical data

Housing:	High impact ABS
Colour front panel:	white
Colour housing body:	anthracite
Protection:	IP 54
	IP 64 with supplementary seal
Operating temperature:	-10 to +40 °C
Storage temperature:	-20 to +60 °C
Relative humidity:	max. 75 %, non-condensing
Dimensions body:	112 x 58 [Ø x T]
Dimension front panel:	184 x 139 x 20 mm [L x W x H]
Flexible tube connection:	5 to 6 mm internal diameter
Working pressure range:	0 - 5000 Pa
Display range:	0 - 99'999 m <sup>3</sup> /h, l/s, ft <sup>3</sup> /min
Burst pressure:	75 kPa
Protection class:	II (IEC 60536)
Tolerance:	± 1.5 % of the measuring range
Long-term stability:	≤ ± 0,5 % V. EW/a
Approbations:	EMV: EN50081-1, EN50082-2
Power supply:	24V DC, at 50/60 Hz or 24V DC, -20 % +5 %
Analogue outputs:	0-10 V, 0,1 mA or (0) 4-20 mA, max. load 600Ω
Digital outputs:	Relay contact 240V 2A or 12/24V 5mA
Cable connection:	Max. 2 PG M16 with cable clamp

### Function

The differential pressure measured is fed using flexible tubing via the connection nipples to the Piezo-measuring device, electronically interpreted, converted into volume flow according to the selected K-factor and density r and shown on the LCD display.

The basis for the conversion calculations is the following formula:

$$\dot{V}_h = K \sqrt{\frac{2 \times \Delta p}{\rho}}$$

$\dot{V}_h$  = Flow rate [m<sup>3</sup>/h]  
 K = K-factor [m<sup>2</sup>s/h]  
 $\Delta p$  = Differential pressure [Pa]  
 $\rho$  = Air density [kg/m<sup>3</sup>]

### Specification

The **SENSO-V+** consists of a round measurement instrument and a front panel.

The measurement instrument is optimised for mounting in air-handling units and switchboards. The two connections for pressure measurement are mounted on the back of the instrument in recesses to prevent mechanical damage. They are labelled with + (overpressure) and - (underpressure).

A threaded bushing is provided in the centre of the housing. The fixing clamp is attached using the threaded bolt and the wing-nut supplied. The wing-nut is secured against loosening. An O-ring integrated in the flange of the measurement instrument seals it against the panel in which it is mounted. In order to ensure correct mounting, an arrow can be found on the back of the device that must point upwards.

In the front part of the instrument an LCD display which reflects residual light can be found, together with the electronics motherboard, the red LED, the function button as well as the two screw terminal blocks for the electrical wiring.

After the unit has been mounted and any programming done, the front panel can then be clipped onto it. Three guide-grooves ensure that this is only possible when correctly oriented. The front panel can be removed by pulling it with both hands and/or using a screwdriver.

## Activation and operation

All electrical connections must be made before applying the supply of power. To start the installation and programming of the SENSO-V+ the 24V supply should be connected. Take care that the "+24V" and "GND" connections are not transposed. The device is immediately ready for operation (displays on the LCD are active).

The setting of the units displayed and the programming are carried out using the three buttons that are accessible when the front panel is removed.

## Setting the units displayed (Dimension)

By pressing the button during normal operation for a short time, the units displayed change between m<sup>3</sup>/h, l/s and ft<sup>3</sup>/min.

## Programming the SENSO-V+

By pressing the lower button for a long time, the unit goes into programming mode (menu). By pressing this button repeatedly, the menu items change as follows:

### Alarm value - max. Range (signalling range) - mA - K-factor - Air density ρ

When the appropriate menu item flashes, the top left (-) and top right (+) buttons can be used to adjust the programmed values:

Short press → single step

Long press → increasing rate of change.

The following values should be selected: the low-alarm value in the chosen unit, the flow-rate corresponding to 10V or 20 mA, either 0-20 mA or 4-20 mA (if the current output is used), the K-factor (defined by the instrument manufacturer) and the air density, which is multiplied by the factor 100 (default value 112 = 1.12 kg/m<sup>3</sup>).

### Save (OK)

If the button is not pressed within 5 sec., the value currently shown is automatically stored and programming mode is left.

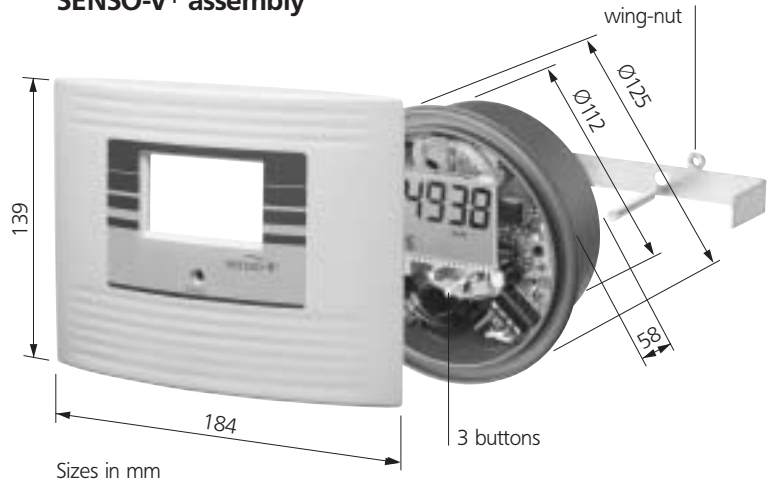
### Zero-point correction

If no differential pressure is applied and power supply is removed for a short time, the device calibrates itself automatically.

### Display of differential pressure for testing purposes

By pressing both of the top buttons at the same time, the differential pressure measured is displayed in Pa as long as the buttons are pressed.

## SENSO-V+ assembly



Sizes in mm

## Electrical connections

### Scope of delivery

The standard version comprises the measurement instrument, a front panel, a threaded bolt, a mounting bracket, a wing-nut, two PG M16 cable bushings and the fitting instructions. The operating instructions can be found inside the front panel.

### Fitting

A 115 mm Ø hole is drilled in the sandwich plate or the control cabinet door and the measurement instrument is slid into the aperture from the front side. The correct alignment of the instrument is indicated by an upwards-pointing arrow on the rear of instrument. Using a screwdriver, the threaded bolt is firmly screwed into the threaded bushing; the mounting bracket is placed over it and secured with the wing-nut. When connecting the pressure tubing, great care should be taken that the correct polarity is adhered to (+ overpressure, - underpressure). The front panel can then be snapped on.

## Overview of the SENSO range of products

Model	Display range	Units	Alarm value	Voltage	Analogue output	Relay contact
SENSO-P	0÷1000 Pa, 0÷100 %	Pa, %	exceeds	2 pcs. Mignon AA	-	-
SENSO-P+	0÷250 Pa 0÷500 Pa 0÷750 Pa 0÷1000 Pa -50÷ +50 Pa* 0÷100%	Pa, %	exceeds	24 V, 50÷60 Hz 24 V DC	4÷20 mA 0÷20 mA 0÷10 V, 0,1 mA	EPU 8 A at 240 V
SENSO-V	100÷99'999	m <sup>3</sup> /h, l/s, ft <sup>3</sup> /min	falls below	2 pcs. Mignon AA	-	-
SENSO-V+	100÷99'999	m <sup>3</sup> /h, l/s, ft <sup>3</sup> /min	falls below	24 V, 50÷60 Hz 24 V DC	4÷20 mA, 0÷20 mA 0÷10 V, 0,1 mA	EPU 8 A at 240 V

\* special version

Technical details subject to change