



# SwemaAir 5

## Operating instructions

Rev. 1.02 ES20151027



**WARNING! Before start measuring please read chapter 6, Settings. The instrument is delivered with the  $k_2$ -factor and automatic density compensation for atmospheric pressure and temperature set to ON**

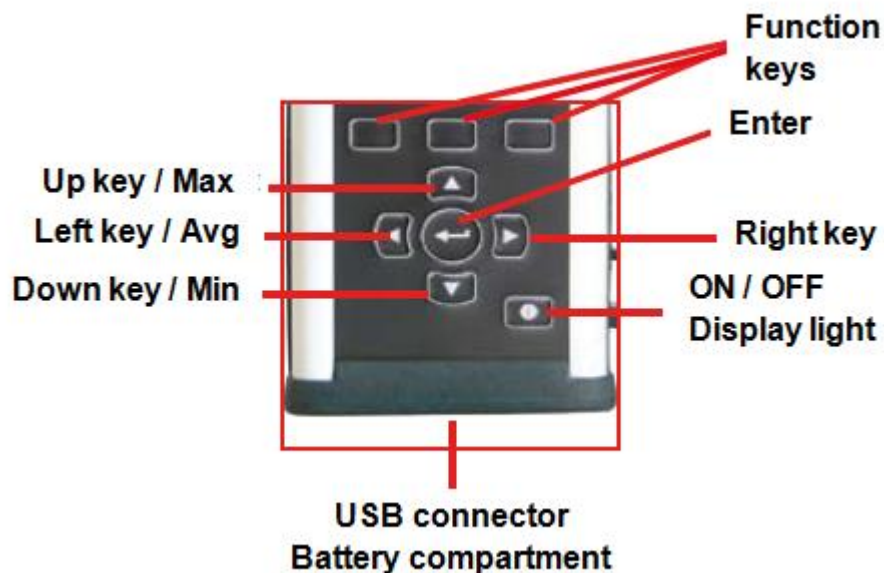
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## 1. Introduction

SwemaAir 5 is a hot wire anemometer for measuring temperature, air velocity and air flow. Temperature is measured in °C or °F, air velocity in m/s or fpm and air flow in l/s, m<sup>3</sup>/h or CFM. SwemaAir 5 compensates for correct air density with the in- built barometer and the measured temperature. The air flow is measured by entering the area in the instrument, either as diameter or as Height x Width. SwemaMan 5 can calculate minimum, maximum and average value. Saved measurements are easily transferred to a PC.

SwemaAir 5 has display light and a USB connection. SwemaAir 5 is delivered with two easily replaceable AA batteries.



## 2. Technical data

Air velocity: 0,1... 12 m/s  
Temperature: -20... 80°C  
Barometer: 600... 1200 hPa  
Measurement uncertainty at 23°C:  
±0,04 m/s at 0,1... 1,33 m/s  
±3% read value at 1,33... 30 m/s  
Temperature: ±0,3°C

95% coverage probability in non condensing, non moist air,  
<80%RH, non aggressive gases.

Ambient temperature: 0... 50°C  
Memory: 300 notes  
PC-communication: USB  
Battery: 2x1,5V AA (standard or rechargeable)  
Size: 195x93X36mm (including probe)  
Weight: 500g  
IP50 (dust)

## 3. Start

When starting the instrument (**ON/OFF-button**), the display shows the battery voltage, firmware revision and calibration date. After a couple of seconds the instrument is in measuring mode. SwemaAir 5 will start in the same measuring mode it was before it was turned off.

**Display light:** The display light can be turned On and Off by pressing the **ON/OFF-button** (when instrument is turned on).

**Turn Off:** To turn off the instrument press and hold down the **ON/OFF-button** for about 2 seconds until the text +OFF+ is shown on the display.

## Measurement

In measuring mode press **Enter** to store a value in the cache memory. The number of measuring points stored in the cache memory is shown on the display directly below the displayed temperature,  $\pm 2P$  (see picture to the right) and it means two measuring points has been saved. When **Enter** is pressed an average of the measuring points is shown for a short time before the measured value is shown in real time again.



## Average, Max & Min

To check on the **average**, **max** or **min** values of the stored measurement points press **Left Key** (Avg), **Up Key** (Max) respective **Down Key** (Min). The values are shown on the display as long as the buttons are hold down

## Save a measurement

Press **Save** to store the measured values in the Notebook of SweaAir 5. The display shows the note number of the saved measurement. (i.e. n3 = note 3). To erase the measurement from the cache memory press **Clear**.

## 4. Unit

Press **Unit** to alternate between the different units.

SwemaAir 5 can display the following units:

### SI Units

m/s & °C  
l/s & °C  
m<sup>3</sup>/h & °C  
hPa & °C

### US Units

fpm & °F  
cfm & °F  
cfm & °F  
inHg & °F

## Air Velocity (m/s & °C)

Press **UNIT** until SwemaAir 5 shows the units m/s and °C. The measurements with average, max and min can be saved.



Air velocity measurement

## Air flow (l/s or m<sup>3</sup>/h)

SwemaAir 5 measures Air flows in:

- Circular duct with given diameter.
- Rectangular ducts with given Height and Width (H x W).
- Ducts with given transversal area.

To measure air velocity press **Unit** and Air flow measurement in l/s is displayed. Press **Unit** once again to measure Air flow in m<sup>3</sup>/h

The air flow unit displayed is the last unit SwemaAir 5 was set to. Refer to chapter 5 **Mode** for further information. On the different air flow measurements and how to change the settings.



Air flow measurements in l/s and m<sup>3</sup>/h and given diameters

## Barometric pressure & Temperature (hPa & °C)

Press **Unit** until hPa & °C is displayed.

The barometric pressure and temperature shown on the display will be the values SwemaAir 5 calculates with, to compensate for the density of the air (air density compensation is used on air velocity and airflow measurements).

When SwemaAir 5 is switch ON, it shows the measured barometric pressure and Temperature.

When measurements are performed with air density compensation, the text **%Real+** is displayed on the top and left corner of the display, otherwise the text **%Std+** or a star **%\*+** is displayed.



**Real** = Real density (measured barometric pressure and temperature)

**Std** = Standard density (1013 hPa & 20°C)

\* = Barometric pressure set manually

Refer to chapter 6 Settings (**Set**) for further information on how to change between **Real**, **Std** and \*.

## 5. Mode

Press **Mode** in measuring mode to select the type of duct, Settings (**Set**) or Notebook(saved measurements), press **Enter** to confirm or **Esc** to cancel. Press the **Up/Down** and **Right/Left Arrow Keys** to change between the duct dimensions, units (Set) or Notebook (top figure to the right).

∅ : Measurement in circular duct (set Diameter)

↕ ↔ : Measurement in rectangular duct (set Height X Width)

□ : Measurement in duct (set Transversal Area)

**Set:** Settings

**Notebook:** Saved measurements

SwemaAir 5 is by default set to compensate with the **K<sub>2</sub>**-factor (reduces the area of a duct). When the **K<sub>2</sub>**-factor is turned on the symbol **K<sub>2</sub>** is displayed above the measured airflow, see chapter #6. Settings (Set)+for more information about the **K<sub>2</sub>**-factor and how to turn it On/Off.

### Air flow measurement in circular duct

Press **Mode** and select ∅

Press **Enter** to edit the diameter of the duct (middle figure to the right). The diameter is displayed under the measured temperature. There are 13 preselected diameters to chose between, using the **Up** and **Down** keys. Those diameters are between 80 and 1250mm (standard diameters for circular ducts in the Scandinavian countries). Please note! During measuring It is not possible to change a diameter before the measurement has been saved or erased.

To edit a diameter press **Edit**, move between the positions of the digits with the **Right** and **Left** keys, change the value of the digits with the **Up** and **Down** keys.

Press **Enter** or **Esc** to confirm and return to measuring mode.

Press **Unit** to change between l/s and m<sup>3</sup>/h.



Air flow measuring with given diameter



Editing diameter of a duct

### Air flow measurement in rectangular duct

Press **Mode** and select  $\updownarrow \leftrightarrow$

Press **Enter** to measure airflow in rectangular ducts by setting Height x Width.

The chosen dimensions of Height x Width are displayed in SwemaAir 5 below the measured temperature (the display toggles between the symbols of Height and Width).

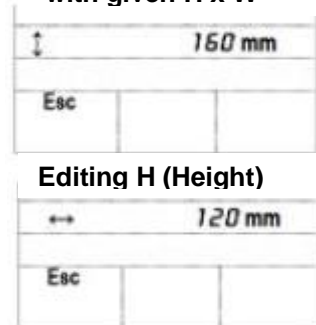
Press **Edit** to change between Height and Width, the

symbol  $\updownarrow$  is shown and the first digit position starts blinking. Change the value of the digit with **Up** and **Down** keys and change between the positions with **Right** and **Left** keys. Press **Enter** again to edit the Width and the symbol  $\leftrightarrow$  is shown. Repeat the steps above. Press **Enter** or **Esc** to return to measuring mode.

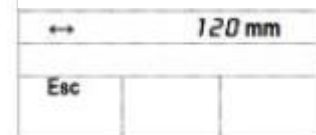
Press **Unit** to change between l/s and m<sup>3</sup>/h.



Air flow measuring with given H x W



Editing H (Height)



Editing W (Width)

### Air flow measurement with a given transversal area

Press **Mode** and select

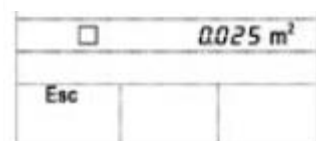
Press **Enter** to measure air flow in a duct with a given transversal area. The selected area is displayed under the measured temperature

Press **Edit** to change the transversal area, press the **Arrow keys** to change it between 0,001... 9,999 m<sup>2</sup>. Press **Enter** or **Esc** to return to measuring mode.

Press **Unit** to change between l/s and m<sup>3</sup>/h.



Air flow measuring with given transversal area



Editing area

## 6. SETTING (SEt)

Press **Mode**, select **+Set+** and press **Enter**. Press **Left/Right keys** to see the following settings:

Units (SI or US); Density setting Standard (Std), Real (rEAL) or Manual (\*); Duration; K<sub>2</sub> faktor

to change a setting press **Edit** or press **Up/Down keys**. To confirm the change press **Esc** or **Enter** and SwemaAir 5 returns to measuring mode.

The following settings are available:

### Unit systems

SI Units	US Units
m/s & °C	fpm & °F
l/s & °C	cfm & °F
m <sup>3</sup> /h & °C	cfm & °F
hPa & °C	inHg & °F

### Density:

SwemaAir 5 calculates and compensates for the air density depending on barometric pressure and air temperature (air density is used on air velocity and air flow measurements). The different settings to select between are:

**Real** = Real density (measured barometric pressure and temperature)

**Std** = Standard density (1013 hPa & 20°C)

\* = Barometric pressure set manually

### Duration:

To select the averaging time of the displayed values, the possible settings are 0.5, 1, 2, & 10 seconds. Higher averaging time will give a slower but stable change of the displayed measured values. The default averaging time is 2 sec.

### K<sub>2</sub>-factor (K<sub>2</sub>) ON or OFF:

If **+ON+**, SwemaAir 5 reduces the area of the duct depending on the dimension of the duct when calculating the air flow.

Calculation of the air flow (Q):

K<sub>2</sub>-factor Off:  $Q = \text{area} \times \text{air velocity}$

K<sub>2</sub>-factor On:  $Q = K_2 \times \text{area} \times \text{air velocity}$

The following K<sub>2</sub>-factor values are used by SwemaAir 5:

Circular ducts, depending on the diameter of the duct:

Ø m 160 mm	>> K <sub>2</sub> = 0.92
160 < Ø m 400 mm	>> K <sub>2</sub> = 0.96
400 < Ø m 1250 mm	>> K <sub>2</sub> = 0.98



Rectangular ducts:

Height > Width >>  $K_2 = 0.94$

Height < Width >>  $K_2 = 0.98$

Square ducts:

Height = Width >>  $K_2 = 0.96$

Source: Metoder för mätning av luftflöden in ventilationsinstallationer (T09)/ Methods for measuring Air flow in ventilation installation (T09) with correction from NBI:s rapport nordtest Proj. 1463-99 rev. 23-05-01.

### Display light (Bac. light):

On or Off. The display light can also be turned On and Off by pressing the **ON/OFF**-button.

### Automatic switch ON/OFF (Auto Shut)

SwemaAir 5 is switched off automatically after a number of minutes it has not been attended. The possible selections are in minutes 1, 5, 10, 30, 60, otherwise Off.

## 7. NOTEBOOK

Press **MODE** and select **Notebook**, press **Enter** to see and print saved measurements. Press **Left/Right Keys** to choose the saved note to be displayed.

The note number for the saved measurement (n1, n2, n3, etc.) is displayed below the displayed temperature.

The value displayed in Notebook is the average of the measurement.

To see **maximum** and **minimum** values of the measurement press the **Up & Down Keys**. Press **Enter** to display some more information for the saved measurements. The extra information displayed is the barometric pressure and temperature during the measurement.

The  $K_2$ -factor or duct dimension for the saved measurements are shown too.

Press **Erase** to delete saved measurements. Once Erase has been pressed, the text **+Erase?+** is displayed. There are two options either to press **All** to delete the saved measurements or to press **Note** to delete the last saved note, otherwise press **Esc** to cancel.

Real	m/s
6.6	
Avg	26.3 °C
n 2	
Notebook	
Esc	Print Erase

Saved measurement in notebook with note no. 2 (n 2)

n 2	
Notebook Erase?	
Esc	Note All

Erase the last saved note or all the saved measurements?