



SwemaAir 5

Operating instructions

vers 1.13 CW20220404



WARNING! Before start measuring please read chapter 6, "Settings". At delivery, k_2 -factor and automatic density compensation for atmospheric pressure and temperature is 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, m3/h or CFM. SwemaAir 5 has a built in barometer that with the measurement of temperature makes it possible to compensate for correct air density. Air flow is measured by enter the are into the instrument directly, 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, USB connection and are delivered with two easily replaceable AA batteries.



2. Technical data

Measurement range

Air velocity: 0,1...12 m/s, 19...2350 fpm
12...30 m/s, 2350...5900 fpm (extra calibration)
Temperature: -20...80 °C, -4...176 °F
Barometer: 600...1200 hPa

Measurement uncertainty at 23 °C

±3% min ±0.04 m/s, min ±8 fpm
Temperature: ±0,3°C, ±0,5°F

Measurement uncertainty at 10...30 °C

±5%, min ±0,05 m/s, min 10 fpm
Barometer: ±3,5 hPa, ±0,1 inHg

Measurement uncertainty at -20...80 °C

Temperature: ±1,0°C, ±1,8°F

(Uncertainty according to GUM (JCGM 100:2008) using a coverage factor of 2, which for a normal distribution corresponds to a probability of 95%. It is important to correct the measurement values with the corrections stated in the calibration certificate to obtain the above uncertainties.)

Non condensing, non moist air, <80%RH, non aggressive gases.)

General

Resolution: 0,01m/s, 0,1°C, 1hPa
Calculated units: l/s, m3/h, cfm
Operating conditions: Non condensing, non moist air, <80 %RH, non aggressive gases.
Battery: 2 1.5V IEC LR6 AA batteries, standard or rechargeable
Display light
Output: USB to PC, output of online measurement or stored data.
Selectable time constant (0,5, 2, 10 s)
Size: 180x82x36 mm, 195x93x36 mm including probe
Probe size: Ø 8...10 mm probe: 66cm including 1...2 meter Spiral cable.
(Part.No. 768482 66cm probe with 4 m straight cable)
On demand 66 cm probe + 50 cm probe elongation including 1,5...2,5 m spiral cable
Weight: 500g
IP rating: IP50 (protects against dust)

3. Start of instrument

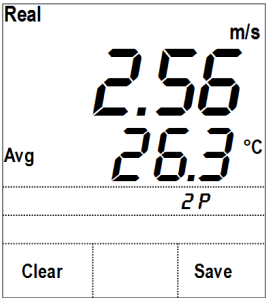
When starting the instrument (**ON/OFF-button**), the display shows the battery voltage, firmware version and calibration date. The instrument enters measuring mode after a couple of seconds. SwemaAir 5 will start in the same measuring mode it was set to before turned off.

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

When in measuring mode, press **Enter** to store a value in the volatile memory. The number of measuring points stored in the volatile memory is shown on the display directly under the measured values, "2P" (see picture to the right) means the two measuring points have been saved. When **Enter** is pressed an average of the measuring points is shown for a short while before the measured values are shown in real time again.



Average, Max & Min

To check the **average**, **max** or **min value** of the stored measurement points press **Left Key** (Average), **Up Key** (Max) or **Down Key** (Min), as long as the button is held down the corresponding value will be shown on the display.

Save a measurement

After a measuring point has been stored it's possible to save the measurement in SwemaAir 5's Notebook by pressing **Save**. The display will show which note number the measurement is saved as (i.e. n3 = note 3). To erase the measurement from the volatile memory press **Clear**.

4. Unit

Press **Unit** to alternate between the different units. SwemaAir 5 can display the following units:

SI units:

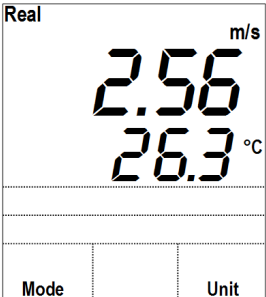
m/s & °C
l/s & °C
m³/h & °C
hPa & °C

US Units:

fpm & °F
cfm & °F
cfm & °F
inHg & °F

Air Velocity (m/s & Pa)

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

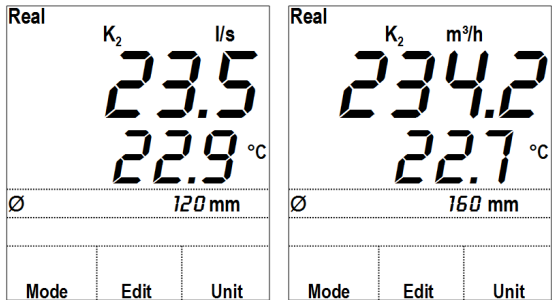
Air Flow (l/s, m³/h or cfm)

SwemaAir 5 can measure air flow via three different methods. SwemaAir 5 measures air flow in:

- Circular ducts with a given diameter
- Rectangular ducts with a given Height x Width
- Ducts with a given transversal area

To measure air velocity, press **Unit** and air flow measurement in l/s will be displayed, press **Unit** once more for air flow in m³/h.

The air flow unit displayed is the last unit SwemaAir 5 was set to. See chapter "5. Mode" for more information on the different air flow measurements and how to change settings.



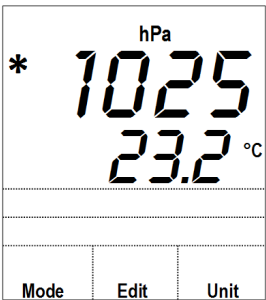
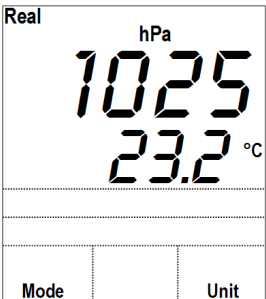
Air flow measurements in l/s and m³/h with set diameters.

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 uses to compensate for the density of air (air density compensation is used on air velocity and air flow measurements).

When SwemaAir 5 is switched ON, it shows the measured barometric pressure and Temperature as standard.

When measurements are performed using air density compensation, the text "Real" is displayed in the top left corner of the display, otherwise the text "Std" or "*" is displayed.



Real = Real density (measured barometric pressure and temperature)

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

***** = Barometric pressure set manually

See chapter 6, "Settings" for more information on how to change between Real, Std and *.

5. Mode

When SwemaAir 5 is in measuring mode (any measuring mode) it is possible to press **Mode**. In Mode it is possible to select the type of duct, Settings (**Set**) or Notebook (saved measurements), press **Enter** to confirm or **Esc** to cancel. Press the **Up/Down** or **Right/left Arrow keys** to change between the duct dimensions, units (Set) or Notebook (top figure to the right).

Ø = Measurement in circular duct (set Diameter)

↕↔ = Measurement in rectangular duct (set Height x Width)

□ = Measurement in duct (set Area)

Set = Settings

Notebook = Saved measurements

SwemaAir 5 is by default set to compensate for the **k₂**-factor (reduces the area of a duct). When the **k₂**-factor is turned on the symbol **K₂** is displayed above the measured air flow, see chapter 6, "Settings" for more information regarding the **k₂**-factor and how to turn it On/Off.

Ø Air flow measurement in circular duct

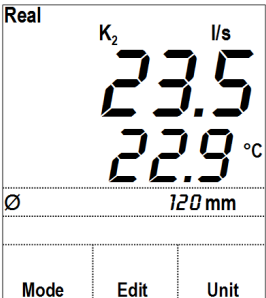
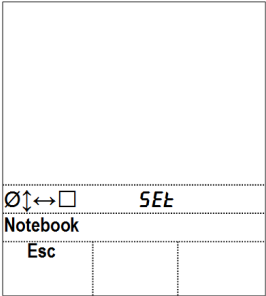
Press **Mode** and select Ø. Press **Enter** to edit the diameter of the duct (middle figure to the right). The diameter is displayed under the measured temperature. There are 13 preselected diameters to choose from, using the Up and Down keys. These diameters are between 80 and 1250mm (standard diameters for circular ducts in the Scandinavian countries).

NOTE! During measuring it is not possible to change a diameter before the measurement has been saved or erased.

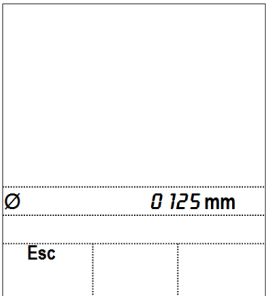
To edit a diameter press **Edit**, move between the positions of the digits with the **Right** and **Left arrow keys**, change the value of the digits with the Up and Down keys.

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

Press **Unit** to change between l/s and m³/h.



Air flow measuring mode with a set diameter.



Editing of a duct diameter.

Air flow measurement in rectangular duct

Press **Mode** and select 

Press **Enter** to measure air flow in rectangular ducts by setting Height x Width. The chosen dimensions are displayed directly under the measured temperature (the display toggles between showing set height and width).

To change height or width press **Edit**. Use the **Arrow keys** to set the height and press **Enter** to set the width, when finished press **Enter** again and SwemaAir 5 returns to measuring mode.

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

Press **Unit** to change between l/s and m³/h.

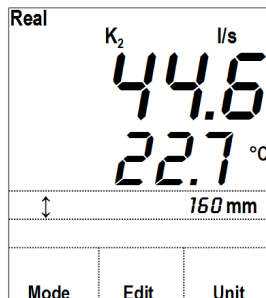
☐ **Air flow measurement in duct with set Area**

Press **Mode** and select ☐

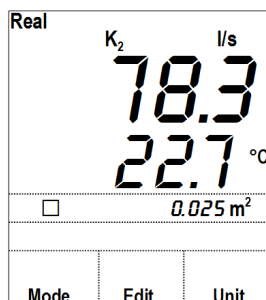
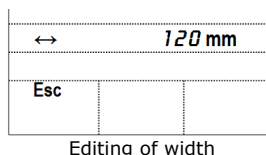
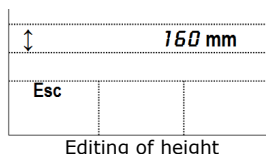
Press **Enter** to measure air flow in a duct with a given transversal area. The selected area is displayed under the measured temperature.

Press **Edit** to change the transversal area, use the **Arrow keys** to change it between 0,001... 9,999 m². Press **Esc** or **Enter** to return to measuring mode.

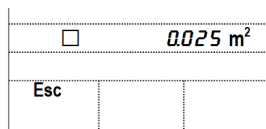
Press **Unit** to change between l/s and m³/h.



Air flow measuring mode with set Height x Width.



Air flow measuring mode with a set area



Editing of area

6. Settings (Set)

For settings; press **Mode**, go to "Set" and press **Enter**. Use **Left/Right keys** to see the following settings:

Units (SI or US); Density setting Standard (Std), Real (Real) or Manual (*); Duration; K₂-factor.

To change a setting press **Edit** or the **Up/Down keys**. When changes are done, press **Esc** or **Enter** to confirm and go back to measuring mode. The following settings are available:

Unit syst

Set units to SI- or US-unit system.

SI units:

m/s & °C

l/s & °C

m³/h & °C

hPa & °C

US Units:

fpm & °F

cfm & °F

cfm & °F

inHg & °F

Density

Set how SwemaAir 5 should calculate and compensate 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: For barometric pressure the measurements from the built-in brometer are used. For temperature the measured temperature is used. "Real" is the default setting so if SwemaAir 5 is turned off and on again it will go back to this setting.

Std: Barometric pressure is set to 1013hPa and temperature is set to 20°C to mimic "standard" conditions.

***:** Barometric pressure can be set manually.

Duration

Set how long the averaging of the displayed values should be. Possible settings are 0.5, 1, 2, & 10 seconds. Higher averaging time will give a slower but more stable change of the displayed measured values. As default the averaging time is set to 2 seconds.

k₂-factor (K₂)

Turn the k₂-factor On or Off. If the k₂-factor is turned "On" SwemaAir 5 reduces the area of the duct depending on the duct dimensions when calculating the air flow. Calculation of air flow:

k₂-factor Off: $q = \text{area} \times \text{air velocity}$

k₂-factor On: $q = k_2 \times \text{area} \times \text{air velocity}$

The following k₂-factor values are used by SwemaAir 5.

Circular ducts, depending on the diameter of the duct:

$\varnothing \leq 160 \text{ mm} \gg k_2 = 0.92$

$160 < \varnothing \leq 400 \text{ mm} \gg k_2 = 0.96$

$400 < \varnothing \leq 1250 \text{ mm} \gg k_2 = 0.98$

Rectangular ducts: Height > Width » $k_2 = 0.94$
Height < Width » $k_2 = 0.98$

Square ducts: Height = Width » $k_2 = 0.96$

According to EN 16211.

Display light (Bac. light)

On or Off. The display light can also be turned On and Off by pressing the **ON/OFF-button** (with a short press).

Auto Shut: Minutes after last key is pressed until the instrument shuts itself off. Select setting with arrows.

7. Notebook

In Notebook it is possible to see and print stored measurements. For Notebook press **Mode**, go to "Notebook" and press **Enter**.

Use **Left/Right Keys** to choose which saved note to display, the note number for the stored measurement (n1, n2, n3 etc.) is displayed directly below the stored measurement value. The saved value displayed in Notebook is the average of the measurement. To see the maximum and minimum value of the measurement use the **Up & Down Keys**. If **Enter** is pressed SwemaAir 5 will display some more information of the saved measurement. The extra information displayed is the barometric pressure and temperature used. If an air flow measurement has been saved the k-factor or duct dimension used will also be shown here.

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

Stored measurement in notebook with note number 2 (n2).

With **Erase** it is possible to erase all stored measurements. If pressed, the text "Erase?" will be displayed, to erase the stored measurements press **All**. To abort press **Esc**.

Instead of erasing all stored measurements it's possible to erase the last saved note. In notebook go to the last saved note, when it is displayed press **Erase**. Now two options will be available, press **Note** to erase the last saved note or press **All** to erase all stored measurements.

n 2		
Notebook Erase?		
Esc	Note	All

Erase the last saved note or all the stored measurements?

