

Measuring Instruments



Thermal environment

ISO 7730

2

Low air velocity

5

Humidity, Temperature

7



Air velocity & flow

Anemometer

8



Differential pressure

9



Universal instrument

10-23

Swema 3000

10

Anemometer

12

Differential pressure

13



Ventilation balancing

14

SwemaTwin



Accessories

15

Leakage tester

16



Relative humidity

17



Temperature

18-19



Paper machine

20



Air flow hoods

SwemaFlow

21-23



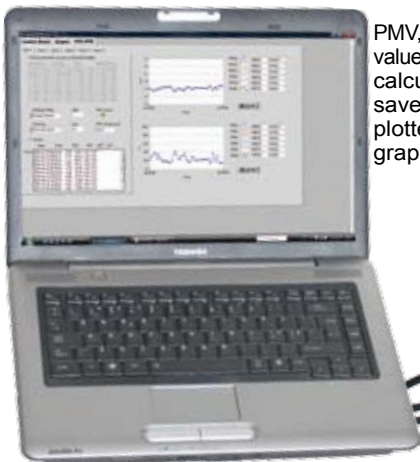
Thermal environments

Swema equipment for the measurement of Moderate Thermal Environments is designed to comply with the standards:

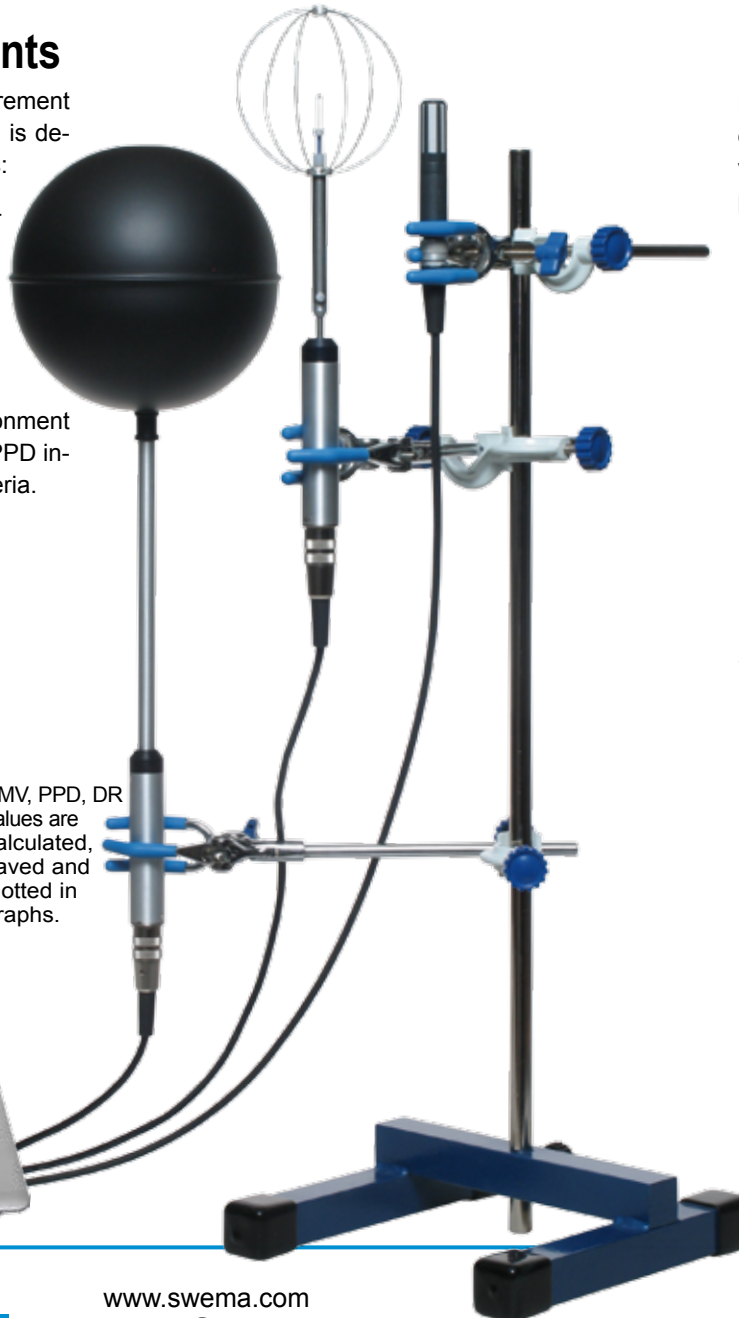
ISO 7726 - Thermal environments - Instruments and methods for measuring physical quantities

ISO 7730 - Ergonomics of the thermal environment - Analytical determination and interpretation of the satisfaction of a thermal environment using calculations of the PMV and PPD indices and local thermal comfort criteria.

- SwemaMultipoint program (763710)
- Swema 03 (767360) air velocity, temperature or Swema 03+ (767361) with barometer
- Swema 05 (767370) black globe temperature
- 2x USB-cable (767300) Swema 03 / 05 to PC
- HC2-S (859447) Humidity, temperature probe
- USB cable (859466) USB: HC2-S to PC
- 3x Probe clamp (767460)
- 3 x Clamp (764550)
- Rod (764540)
- Foot (764530)



PMV, PPD, DR values are calculated, saved and plotted in graphs.



ISO 7730 measurements

Many test data shows that four measured environmental variables and two personal variables determine how warm or cold a person feels:

Environmental variables:

- Air temperature
- Air velocity
- Air humidity
- Mean radiant temperature (measured values).

Personal variables:

- Personal activity
- Clothing insulation (selectable in SwemaMultipoint)

Comfort indices

Thermal comfort is defined as a person's satisfaction of the thermal environment. According to ISO 7730 there are three indices to describe the satisfaction rate in the thermal environment: PMV, PPD and DR.

- PMV:** Predicted Mean Vote, is the sensation of body heat, from +3 (hot) to -3 (cold).
- PPD:** Predicted Percentage Dissatisfied, is the percentage of people dissatisfied with the thermal environment.
- DR:** Draught Rate is the percentage of people predicted to be bothered by draught. Draught is an unwanted local cooling of the body caused by air movements.

SwemaMultipoint

For ISO 7730 the SwemaMultipoint PC program collects data from the three sensors below:

- Swema 03 - air velocity and temperature
- Swema 05 - black globe temperature
- HC2-S - air humidity and temperature

Recommended ISO 7730 setup with SwemaMultipoint: sampling frequency: 10 Hz, time constant: 0.1s.

SwemaMultipoint has three separate windows: one for the setup and data storage in files, one for presenting data in online graphs and one for presenting graphs PMV, PPD, Operative temperature and Wet Bulb Globe temperature for an averaging period.

Swema 03 values are selectable to calculate the Draught rate according to ISO 7730. From the Swema 03 and Swema 05 mean radiant temperature and operative temperature can be calculated. From the HC2-S humidity and temperature sensor dew point, mixing ratio and wet bulb temperature can be calculated. From HC2-S and Swema 05 the wet bulb globe temperature can be calculated. Selected measured and calculated values can be presented in online graphs and saved into files. SwemaMultipoint communicates with all the sensors via USB. Saved data can be analyzed in a separate SwemaMultipoint Analyze program or in a standard spreadsheet program.

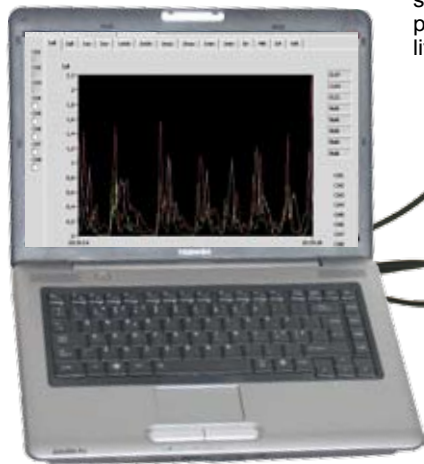
Multiple probes to PC

Swema equipment for measuring air velocity at many points in order to evaluate the air velocity pattern from ventilation outlets in rooms or vehicles.

The Swema 03 sensors are directional independent and measure air with up to 100 Hz. Draught can be calculated according ISO 7730 in the SwemaMultipoint program for each sensor during selectable time.

- Setup according to picture:
- SwemaMultipoint program (763710)
 - 4 x Swema 03 (767360) air velocity, temperature or 4 x Swema 03+ (767361) with barometer
 - 4 x USB cable (767300) Swema 03 / 05 to PC
 - 4 x Probe clamp (767460)
 - 4 x Clamp (764550)
 - 1 x Rod (764540)
 - 1 x Foot (764530)

Air velocity values are saved and plotted in live graphs.



SwemaMultipoint

Swema 03 low air velocity sensors connect to the SwemaMultipoint PC program. Either through USB or RS 485. Air velocity and temperature values are shown, logged and presented in live graphs. Draught rate calculation (DR) according to ISO 7730 can be calculated for each probe.

Multiple location of air velocity is available with up to six Swema 03 sensors with the standard SwemaMultipoint program and up to 255 probes with a customised program can be connected. SwemaMultipoint communicates with the sensors via USB or RS485. Saved data can be analyzed in a included SwemaMultipoint Analyze program or in a standard spread sheet program. SwemaMultipoint can log and save data for each sensor at a recommended rate of 10 times per second.

Alternative four sensors setup with RS 485:

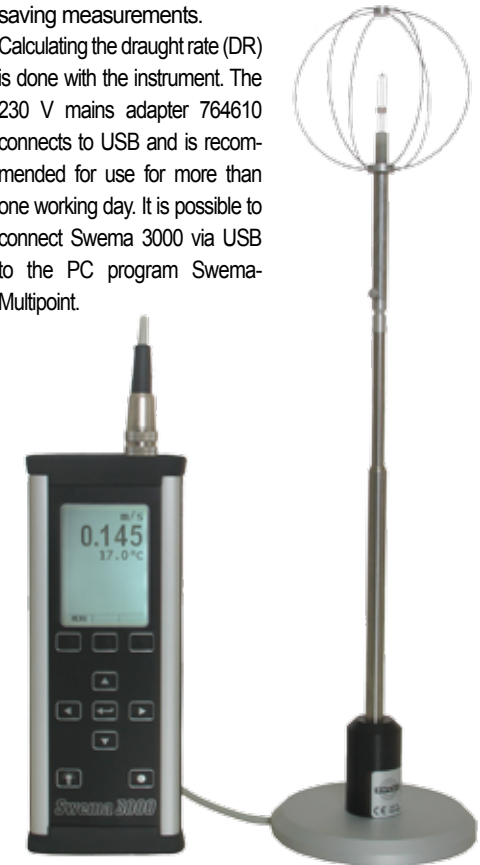
- 4 x Swema 03 (767360)
- 4 x RS 485 Swema cable (767630)
- 4 x RS 485 3-way-splitter (767660)
- 1 x RS 485 terminator (767690)
- 3 x RS 485 cable 2m (767670)
- 1 x USB-RS485 (767300) to PC
- 4 x Probe clamp (767460)
- 4 x Clamp (764550)
- 1 x Rod (764540)
- 1 x Foot (764530)
- 4 x Probe clamp (767460)
- 4 x Clamp (764550)
- 1 x Rod (764540)
- 1 x Foot (764530)
- 1 x SwemaMultipoint (763710)



Instrument

The omni-directional low air velocity sensor is also available as SWA 03 for use with the universal instrument Swema 3000. This is useful for field measurements where a computer setup is time and space consuming. For example in vehicles. Any Swema 3000 model is useful for logging and saving measurements.

Calculating the draught rate (DR) is done with the instrument. The 230 V mains adapter 764610 connects to USB and is recommended for use for more than one working day. It is possible to connect Swema 3000 via USB to the PC program SwemaMultipoint.



- Instrument setup
- 1 x SWA 03 (764730) air velocity, temperature
 - 1 x Swema 3000 (764200) inc. USB cable
 - 1 x One channel freeware - SwemaTerminal 2



www.swema.com
swema@swema.com
Tel. +46 8 94 00 90



www.swema.com
swema@swema.com
Tel. +46 8 94 00 90

Swema 03

(767360)
ISO 7726 gives all the required and desirable characteristics of measuring instruments for thermal comfort ISO 7730.

Swema 03 is an omnidirectional anemometer designed with a fast microcontroller and a small sensing element to achieve particularly good dynamic qualities for response time and turbulence. Swema 03 has exceptionally low self-convection. Swema 03 fullfills ISO 7726 requirements. Swema 03+ (767361) has an additional inbuilt barometer for automatic compensation of air density depending of the temperature and air atmospheric pressure. The barometric pressure can be set in Swema 03 for the same compensation. The maximum number of recorded values is 100 per second. With more probes connected less values per probe may be obtained due to computer limitations. Swema 03 can be set up with multiple probes with SwemaMultipoint PC-program.



SWA 03

Swema 3000 with SWA 03 low air velocity sensor for measurement, logging and draught calculation in the field.



Technical data:

Swema 03, Swema 03+ & SWA 03

Measuring range:

Air velocity: 0.05- 3.00 m/s at 15...30°C
Temperature: 10...40°C
Barometer: 600... 1200 hPa (Swema 03+ only)

Measurement uncertainty:

at 20...25°C: ±0.03 m/s at 0.05...1.0 m/s
±3% read value at 1.0...3.0 m/s
at 15...30°C: ±0.04 m/s at 0.05...1.00 m/s
±4% read value at 1.00...3.00 m/s
Temperature: ±0.1°C
Barometer: ±3.5 hPa (Swema 03+ only)
Response time (90 %): 0.2s

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

SwemaMultipoint connection:

Swema 03/ 03+ USB and RS 485
SWA 03 via Swema 3000 to USB, RS 232

Sampling frequency: Recommended 10 Hz
(up to 100 Hz for one sensor)

Included:
Traceable calibration certificate

Fullfills ISO 7726

Relative Humidity

HC2-S (859447) measures humidity & temperature using Rotronic sensing element and digital calibration. Dewpoint and water content (g water / kg dry air) is calculated in SwemaMultipoint.



Technical data:

Measuring range:

Relative humidity: 0...100 %RH
Temperature: -40...+60 °C

Measurement uncertainty:

±0,8 %RH at 23 °C
± 0.3 °C at 23 °C

SwemaMultipoint connection:

USB. Sampling frequency: Recommended 10 Hz, Included: Traceable calibration certificate

Fullfills ISO 7726



ISO 7730 Setup:

SwemaMultipoint program (763710)
HC2-S (859447) Humidity, temperature
USB-cable (859466) USB: HC2-S to PC
Swema 03 (767360) air velocity, temperature or **Swema 03+** (767361) with barometer
Swema 05 (767370) black globe temperature
2x **USB-cable** (767300) Swema 03 / 05 to PC
3x **Probe clamp** (767460)
3 x **Clamp** (764550)
Rod (764540)
Foot (764530)

Black Globe temperature

Swema 05 (767.370)

Ø150 mm Black Globe sensor. Together with air velocity from Swema 03 the mean radiant temperature can be calculated.



Technical data:

Measuring range:

at 0...50 °C

Measurement uncertainty:

±0.1 °C

SwemaMultipoint connection:

USB and RS 485. Sampling frequency: Recommended 10 Hz (up to 100 Hz on some PC-installations)
Included: Traceable calibration certificate
Fullfills ISO 7726



SwemaAir 5, 40

SwemaAir 5 and 40 are accurate anemometers for air movements measurements, such as checking of ventilation, searching for building and duct leakage spots and checking clean rooms and laminar air flow cabinets.

SwemaAir 5, 40:

- Air velocity: m/s, fpm and temperature: °C, °F
- Online PC connection (RS232 on 40)
- Protective aluminium casing and rubber ends.

SwemaAir 5:

- Air flow in l/s, m³/h or CFM. Area for duct and grill multiple points measurements.
- Average, max and min
- Actual or standard (1013hPa, 20 °C) velocity / flow
- Memory for USB transfer to PC
- Automatic duct factor, k₂, compensation.
- Barometer - air density compensation.
- In-built connector for temperature probe
- Display light.



Part no.	SwemaAir 5, certificate, USB-cable
768.480	SwemaAir 40, certificate
763.000	Option 12...30 m/s, calibration 20, 30 m/s
763.010	Case for SwemaAir 5 or 40
767.190	220V adapter
763.050	PC cable to SwemaAir 40 (RS232)
763.040	Adapter, USB to PC cable
583.225	

Technical data:

Measuring range:

Air velocity 0,1...12 m/s (12...30 m/s option)
 Temperature: -20...+80 °C
 Barometer: 600...1200 hPa (SwemaAir 5 only)

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
 At 10...30 °C (12...30m/s at 23...45 °C):
 ±0,05 m/s at 0,1...1 m/s
 ±5% read value at 1...30 m/s
 At 23 °C: ±0,3 °C, at -20...+80 °C: ±1,0 °C
 ±2,5 hPa
 Units: m/s, fpm, °C or °F.
 Extra units SwemaAir 5: l/s, m³/h, CFM, hPa

Time constants: 0.25, 0.5, 2, 8/10 seconds
 PC output: USB / RS232 on SwemaAir 40
 2xAA / standard / rechargeable



SwemaMan 8, 7, 60

SwemaMan 8, 7 and 60 are suitable for accurate differential measurements, such as ventilation balancing, checking and research.

SwemaMan 8, 7, 60:

- Differential pressure and air velocity: Pa, m/s, fpm
- Online PC connection (RS232 on 60)

SwemaMan 8, 7:

- Air flow - Area - multiple points
- Average, max, min
- K-factor flow
- l/s, m³/h or CFM.
- Actual or standard velocity / flow
- Display light
- Memory for USB transfer to PC
- Automatic duct factor, k₂, compensation.
- Selectable temperature and barometric pressure



SwemaMan 8 :

- Automatic zeroing by in-built valve
- In-built barometer
- Select flow and K-factor is suggested.
- In-built connector for temperature probe
- Connector for SwemaTwin reference. p.

Part no.	SwemaMan 8, certificate, USB-cable
768.300	SwemaMan 7, certificate, USB-cable
763.362	SwemaMan 60, certificate
763.350	Case for SwemaMan 8, 7 or 60
767.190	220V adapter for SwemaMan 60
763.050	PC cable to SwemaMan 60
763.040	PC cable converter to USB
583.225	



Technical data: rv=read value

Measuring range:

SwemaMan 8: -100...1500 Pa, (2-49 m/s, 400...9.800 fpm)
 Barometer: 600...1200 hPa (±3,5 hPa)
 Temperature: 0...50 °C (±0,5 °C)

SwemaMan 7: -1000...9999 Pa, (2-129 m/s, 400...25.400 fpm)

SwemaMan 60: -300...5000 Pa, (2-91 m/s, 400...17.900 fpm)

Measurement uncertainty:

at 23 °C:
 SwemaMan 8: ±0,3 % rv, min.±0,4 Pa
 SwemaMan 7: ±1 % rv, min.±1,5 Pa
 SwemaMan 60: ±1 % rv, min ±1,5Pa

Units: Pa, m/s
 Extra units SwemaMan 7/8: l/s, m³/h, CFM
 Extra units SwemaMan 8: °C, hPa

Resolution 0,1 Pa up to 999,9 Pa

Time constants: 0.25, 0.5, 2, 8/10 seconds
 PC output: SwemaMan 7/8: USB
 SwemaMan 60: RS232
 Memory: SwemaMan 7/8: 999 measurements

2xAA Alkaline battery life: 75 hours

Swema 3000

Swema 3000 is a series of professional universal instruments and loggers for HVAC and industrial measurements of temperature, differential pressure, air flow, air velocity, draught and humidity. Leakage testing and balancing "SwemaTwin" are connectable. Every sensor and instrument mode is developed for a specific measurement or logging task. The instrument connects to PC to transfer saved measurement data, calibration protocols and to update the firmware. (To program Swema 3000)

- Interchangeable sensors designed with highest accuracy and reliability: Air velocity, air flow, differential pressure, temperature, relative humidity and draught.
- Leakage testers and Blue tooth modems.
- Calibration data in each sensor.
- Seperate readjustment of sensors possible.
- Measuring results and probe calibration protocols are easily transferred to PC.
- Built-in data logger, sampling interval: 0,1 second...24 hours.
- Real or standard air flow density compensation
- 10 different Menu operating languages

Technical data:

0...50°C, USB, RS232,
2x1,5V IEC LR6, AA, standard / rechargeable
Memory: 1600 protocols or 12000 pairs or
20.000 single logged values.
Option: Barometer: 600...1200 hPa: ±2,5 hPa
Type K: -40...1200 °C



SwemaTwin
page 14

Three different models:

Swema 3000 (764.200) Base version, five year calibration interval

Swema 3000md (764.202) As Swema 3000 additionally with built-in differential pressure, -300...1.500 Pa, one year calibration interval

Swema 3000mdH+ (764.203) As Swema 3000md but with higher range: ±10 000Pa



SWA 31 & SWA 31E 0,1...30 m/s, -20...80°C
Air velocity, flow

page 12



SWA 10 -300...1500 Pa
Differential pressure
Air velocity, flow

page 13



HC2-S 0...100 %RH, -40...+60°C

page 17



SWHP 28 0...100%RH, -40...+85°C
Air, air ducts

page 17



SWA 03 0,05...3,0 m/s
+10...+40 °C
Omnidirectional Air velocity

page 5



SWA 52 Black Globe temperature

Page 19



Temperature sensors: -50...+450°C

page 19



page 19, 20



Building and Duct leakage tester

page 16



SwemaFlow 4000

page 22

SwemaFlow 125D

page 23

Anemometer

SWA 31 and SWA 31E are anemometers for Swema 3000 for measuring air velocity and temperature. To display air flow (l/s, m³/h or CFM), the duct or surface dimension, is easily inserted into Swema 3000 as a diameter, height and width or area. Average, maximum and minimum are automatically calculated. For diffusers, an auto-sampling and a cross-sweeping technique is used.



Due to friction at the duct wall, there is a k_2 reduction factor, that can be selected to reduce the calculated flow. Standard or real flow can be selected thanks to an in-built barometer that corrects for the air density.

- | | |
|---------------------|---------------------------------------------------------------------------------------|
| Part no.
758.150 | SWA 31, 0,1...10 m/s
Ø 8...10mm, 66 cm long, with scale
calibration certificate |
| 760.090 | SWA 31E, 0,1...10 m/s
extendable to 116cm,
calibration certificate |
| 763.010 | Optional calibration 10...30 m/s |

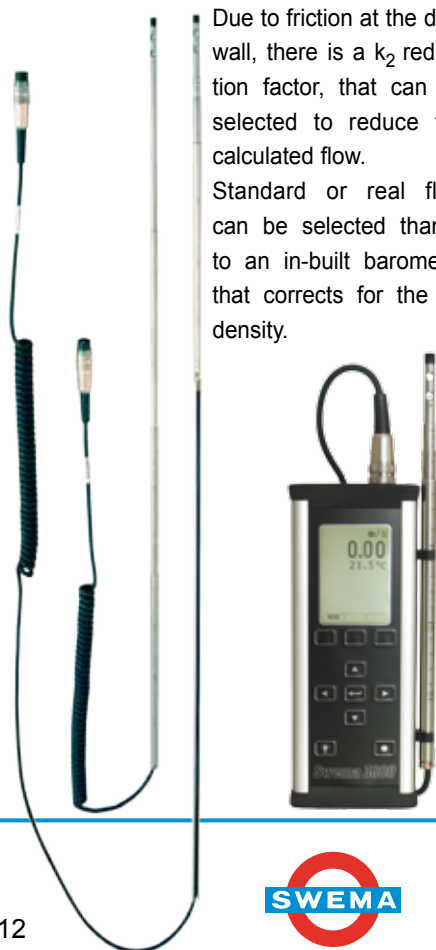
Technical data:

Measuring range:
0,1...10 m/s (10...30 option)
-20...+80°C

Measurement uncertainty:
±0,04 m/s at 0,1...1,33 m/s
±3% read value at 1,33...30 m/s
at 23 °C

±0,05 m/s at 0,1...1,10 m/s
±4,5% read value at 1,10...30 m/s
at -10...+45°C (10...30 m/s at 23...45 °C)

± 0,3 °C at 23 °C
± 1,0 °C at -20...+80 °C



www.swema.com
swema@swema.com
Tel. +46 8 94 00 90

Differential pressure

Swema 3000md, Swema 3000mdH+ handhelds have inbuilt differential pressure sensors. SWA 10 is an external differential pressure sensor that connects to Swema 3000 handhelds. To ensure the high accuracy an inbuilt valve automatically zero checks the pressure before saving the values. This function gives fully position independent measurement instruments, suitable for field and laboratory use.

Air velocity & Air flow

The sensors measure pressure differences across ventilation diffusers, valves, fans and filters. Air velocity or air flow is calculated and displayed. By connecting a pitot static pipe Swema 3000 measures air velocity. The instrument can automatically calculate the air flow. For ducts the duct cross section is entered into the instrument directly as an area, diameter or height x width. Flow can also be displayed directly by the use of the valve pressure drop and K-factor, the latter supplied by the manufacturer of ventilation valves and diffusers.



- | | |
|----------|---------------------------------------------------|
| Part no. | |
| 761.430 | SWA 10 |
| 764.760 | Holder for SWA10
on Swema 3000,
2 is needed |
| 764.870 | Stop for holders,
1 is needed |
| 764.202 | Swema 3000md |
| 764.203 | Swema 3000mdH+ |
| 756.410 | 280mm pitot static
tube |

Technical data:

Measuring range:
-300...1 500 Pa (Swema 3000md, SWA 10)
± 10 000 Pa (Swema 3000mdH+)
2...49 m/s (Swema 3000md, SWA 10)
3...129 m/s (Swema 3000mdH+)

Measurement uncertainty:
±0,3% read value, min ±0,3 Pa (3000md)
±1% read value, min. ± 0,3Pa (SWA 10)
±1% read value, min ± 0,4 Pa (Swema 3000mdH+)

Max overload
±20 000 Pa (Swema 3000md, SWA 10)
±100 000 Pa (Swema 3000mdH+)
Media: Clean air
Instrument temperature 0...50 °C
Resolution: selectable down to 0,01 Pa

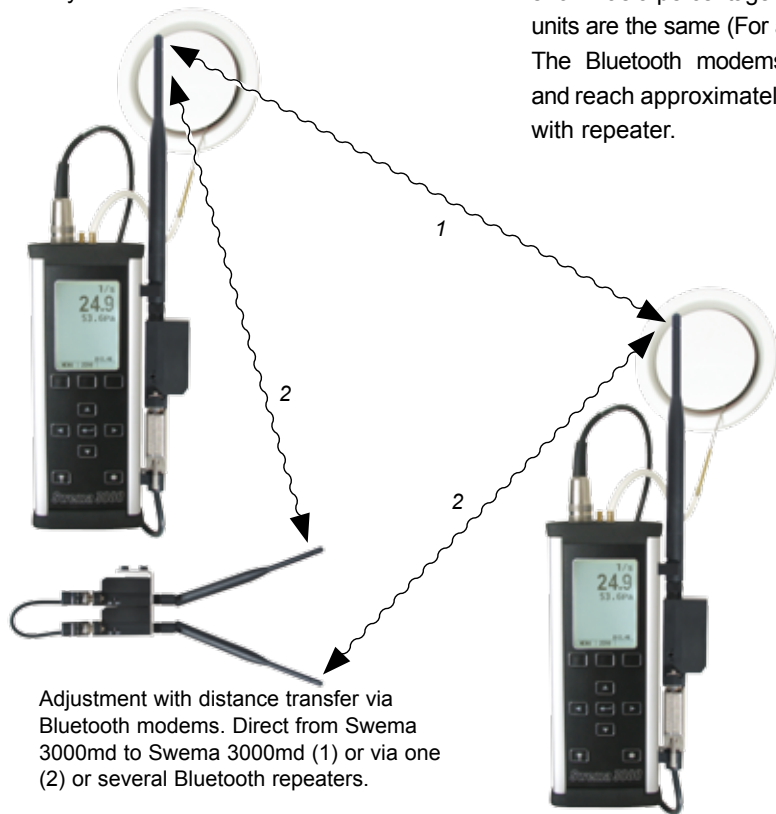


www.swema.com
swema@swema.com
Tel. +46 8 94 00 90

SwemaTwin

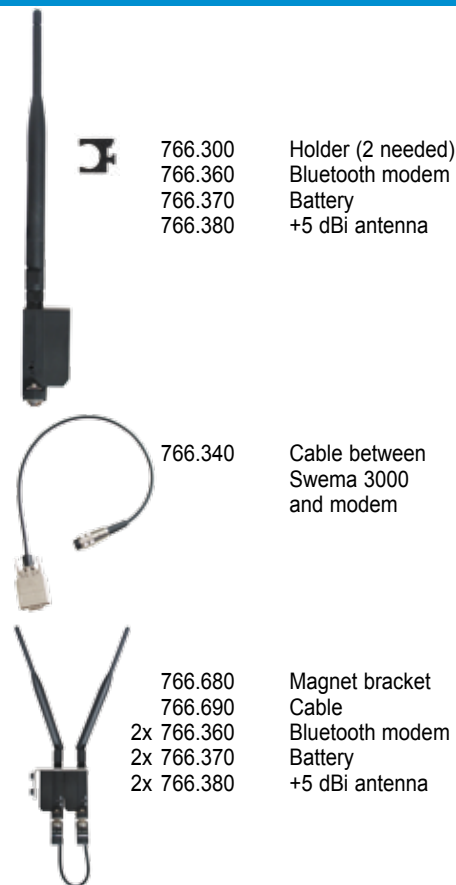
Ventilation balancing by modems makes the proportional method an easy task for just one person. SwemaTwin transfers measured values on the reference valve from one Swema 3000 to another through Bluetooth modem. Both Swema 3000md are equipped with modems and built-in pressure probes for air flow measurement. Any Swema 3000 model can be used.

The flexibility of Swema 3000 makes it possible to use for example a differential pressure probe with k-factor on the reference valve and balancing the other valves by a flow hood. The communication between Swema 3000 is made through Bluetooth modems. The proportions between the two Swema 3000 will be shown as a percentage when the measuring units are the same (For air flow: l/s or m³/h). The Bluetooth modems are rechargeable and reach approximately 100m in buildings with repeater.



Balancing with distance transfer via Bluetooth modem. Flow measuring with differential pressure with a "tube hook" over a valve.

Adjustment with distance transfer via Bluetooth modems. Direct from Swema 3000md to Swema 3000md (1) or via one (2) or several Bluetooth repeaters.



766.300 Holder (2 needed)
766.360 Bluetooth modem
766.370 Battery
766.380 +5 dBi antenna

766.340 Cable between Swema 3000 and modem

766.680 Magnet bracket
766.690 Cable
2x 766.360 Bluetooth modem
2x 766.370 Battery
2x 766.380 +5 dBi antenna

Technical data:

Bluetooth modem:

Sending distance:
Approx. 100 metres in building with booster
Operating time: Approx. 16h (900mAh)

Accessories

- 758.210 Measuring hook for pressure (k-factor), Ø 4mm
- 758.220 Measuring tip for pressure, Ø 4mm
- 765.070 Pitot static tube 150 mm stainless steel, Ø 2,5mm
- 756.410 Pitot static tube 280 mm stainless steel, Ø 4 mm
- 756.530 Pitot static tube 500 mm chromed, Ø 7 mm
- 756.531 Pitot static tube 750 mm chromed, Ø 7 mm
- 756.532 Pitot static pipe 1000 mm chromed, Ø 7 mm
- 756.533 Pitot static tube 1500 mm chromed, Ø 7 mm
- 762.470 Silicon hose Ø 4...7 mm, per metre
- 763.680 Squeezable differential pressure hose patent 9800447-6
- 570.132 Smoke pen, including 6 smoke rods
- 759.670 Plug Ø 8 mm (1 piece)
- 758.540 Plug Ø 9 mm (1 piece)
- 758.810 Plug Ø 10 mm (1 piece)
- 758.550 Plug Ø 12 mm (1 piece)
- 758.560 Step drill for ducts 4-12 mm

Building leakage tester

According to the standard EN13829 for tightness testing of buildings/rooms the tightness should be tested at different pressures. Swema 3000md will do this test automatically and will regulate the fan from for example 50 Pa down to 0 Pa in steps and save the values.



765.910 Leakage tester for building, incl. Ø 190mm flange, 3 m hose



Accessories:
766.200 Flange
Ø 110mm (10-30 l/s)
766.210 Flange
Ø 30mm (2-10 l/s)



765.080 Bladder for max Ø 250mm
765.090 Bladder for max Ø 400mm
765.100 Bladder for max Ø 600mm

Technical data:

Measuring range:

Max flow at under pressure:
295 l/s at -100 Pa, (max pressure)
328 l/s at -50 Pa,
343 l/s at -25 Pa
Min flow with supplied flange: 30 l/s

Measurement uncertainty:

<±7 % read value
Size including flange:
L=75 cm, W=35 cm, H=36 cm
Weight: 15kg
220 VAC

Duct leakage tester

The duct leakage tester connects to Swema 3000md with SWA 10. Swema 3000md controls the tester to test at selected pressure level up to 1900Pa. The duct leakage tester is used according to European standard EN 12237 and EN 1507.



765.900 Leakage tester for duct, with hose
Ø100mm, measuring tube
764.202 Swema 3000md instrument
761.430 SWA 10 Differential pressure sensor

Technical data:

Measuring range:

Max Flow at underpressure:
128 l/s at -500 Pa,
120 l/s at -750Pa,
Max Flow at overpressure:
16 l/s at 1900 Pa,
50 l/s at 1500 Pa,
85 l/s at 1000 Pa,
122 l/s at 200 Pa

Measurement uncertainty:

<±7 % read value:
Weight: 18kg, Power: 0,37 kW, 220 VAC

Relative Humidity

Swema 3000 measures relative humidity and temperature. Dew point and water content (g water / kg dry air) are calculated.



SWHP 28-HC2 HC2-S

In free air

For free air humidity HC2-S is the best choice.

Part.no.
859.447 HC2-S Ø15 mm air
766.250 Cable HC2-S to Swema 3000

In duct and material

In drying or humidifying processes SWHP28 measures the humidity inside a chamber or ventilation duct. Can also be used to measure relative humidity in material.

Part.no.
767.560 SWHP 28-HC2 Ø10 x 280 mm

At high temperature

HC2-IM105

HC2-IM105 is perfect for relative humidity measurements 0...100%RH up to 200°C inside paper machines. High humidity values indicates a humidity pocket with poor ventilation. At high humidity and temperature the instrument is kept away by the 2m plus 5m cable to avoid condensation. The sensor can be used three times at 200°C without damaging the uncertainty. See page 20.

Part.no.
859779 HygroClip HC2-IM105, relative humidity and temperature, 5 m cable
766840 2 m cable, connects HygroClip HC2-IM105 to Swema 3000



Technical data:

Measuring range:

Relative humidity: 0...100 %RH
Temperature:
HC2-S: -40...+60 °C (-50...+100 °C)
SWHP 28-HC2: -40...+85 °C
HC2-IM105: -40...+200 °C

Measurement uncertainty:

±0,8 %RH at 10...30 °C
±1,3 %RH at 30...60 °C, -10...+10 °C
± 1,8%RF vid 60...100°C
± 2,8%RF vid 100...170°C
± 2,3%RF vid -30...-10°C
± 3,3%RF vid -40...-30°C
± 0,3 °C at 10...30 °C
± 0,4 °C at 30...100 °C, -20...+10 °C
± 0,5 °C at 100...150 °C, -40...-20 °C

Temperature

Two highly accurate temperature instruments. Choose between several different Pt-100 temperature sensors for various application areas.

Swema 3000 is a temperature reference instrument with high accuracy and 0,01 °C resolution. Swema 3000 can also store and log measurements with transfer to PC.

SwemaTemp 20 is a temperature instrument for Pt100 / Ni100 sensor with 0,1 °C resolution.



Part.no.
765.110 SwemaTemp 20
767.190 Case



Tap water temperature with SwemaTemp 20 with T51

Technical data:

Swema 3000 with
SWA 14 / 50 / 51 / 52 / 54 / 55 / 56:

Measurement uncertainty:
at 0...50 °C: ±0,1 °C
at -50...0 °C: ±0,1°C + 0,2 % read value
at 50...850 °C: ±0,2 % read value

SwemaTemp 20 with
T14 / 50 / 51 / 52 / 54 / 55 / 56:

Measurement uncertainty:
at 0...50°C: ±0,3 °C
at -50...0°C: ±(0,3 °C + 0,5 % read value)
at 50...850 °C: ±(0,3 °C + 0,3 % read value)



Mean radiation temperature:

T52 (765.280) / SWA 52 (765.560)
Foot to black glob (764.410)
Black Globe sensor for measuring mean radiation temperature. Ø150 mm stainless cap.
-20...+70 °C

Air:

T14 (765.250) / SWA 14 (765.530)
Very fast Pt100 sensor, response time:
T₉₀ = 15 seconds in 0,5m/s air.
Perfect for indoor air temperature measurements.
-50...+60 °C

Liquids and powders:

T54 (765.300) / SWA 54 (765.580)
Insertion sensor for liquids, powders and air. Ø3 x 300 mm.
-50...+450 °C

Surface:

T56 (765.500) / SWA 56 (765.600)
Surface sensor, Ø6 x 150 mm.
Response time: T₉₀ = 45 seconds.
-40...+300 °C



Liquid & Air:

T50 (765.260) / SWA 50 (765.540)
2 m cable sensor, Ø6 mm.
Response time: T₉₀ = 13 seconds in liquid.
-50...+70 °C

Oven / tap water sensor:

T51 (765.270) / SWA 51 (765.550)
2 m PTFE cable, L= 110mm, Ø4 mm. Response time: T₉₀ = 16 seconds in liquid, T₉₀ = 73 seconds in air (1 m/s)
-50...+250 °C

Liquids and powders:

T55 (765.310) / SWA 55 (765.590)
Insertion sensor for liquids, powders and air. Ø3 x 150 mm.
-50...+350 °C

Paper cylinder:

SWT 315 (760.660)
Contact temperature sensor for paper cylinders. Telescopic shaft 1... 2m.
Response time: T₉₀ = 7 seconds.
0...+200 °C, ±2 °C, See page 20.



Paper Machine



SWT 315 is a probe for surface temperature of a drying cylinder temperature in a paper machine.

See Page 19

SWT 315 connects to Swema 3000 universal instrument or SwemaTemp 20. SwemaTemp 20 is only a temperature instrument. For air humidity Swema 3000 connects also to probe HC2-IM105. See page 17.

For air velocity with Pitot Static tube Swema 3000mdH+ has a built-in differential pressure sensor, see page 10.

760.660 SWT 315 drying cylinder temperature probe
765.110 SwemaTemp 20
764.860 0,5m cable to SwemaTemp 20



762.222 10m elongation cable

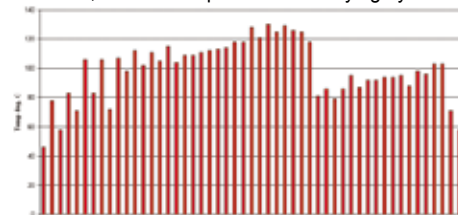
764.200 Swema 3000
764.203 Swema 3000mdH+ with in-built barometer, Type K connector ±10.000 Pa differential pressure

759.950 0,5m cable to Swema 3000

756.860 Case for SWT 315 & instrument



SWT 315, surface temperature of a drying cylinder.



Temperature profile of a 51 cylinder paper machine

It is easy to transfer data to a computer and create a diagram in a spreadsheet.

SWT 315 Technical data:

Measuring range: 0...200°C, 32...392°F

Measurement uncertainty: ±2 °C / ±4 °F or ±1,5% R.V.

Max speed SWT 315: 2000 m/min, 6500 fpm

Response time: SWT 315: T₉₀ = 7 sek

Min cylinder diameter: 150 mm, 6 in

Telescopic shaft: 1...2 m, 3,3...6,6 ft

Three parts to fit SWT 315 onto instrument

✚ 764.760 Holder

✚ 764.760 Holder

✚ 764.870 Stop

760.800 Spare part: Contact element for SWT 315

923.201 Spare part: Set of 4 wheels

All SwemaFlows measure quickly and accurately the flow over air terminal devices using the well-known Swema measurement principle - a net of hot wires. The principle allows for a big cross section which minimizes the restriction of the flow. The principle also result in a wide measurement range and enables the SwemaFlows to measure air flow, even from angled diffusers.



Telescopic handle

The angle and handle length are adjustable. This makes it easy to measure outlets and inlets, both on the ceiling and high up on the wall without using a ladder.

SwemaFlow 234

Air flow hood with telescopic handle for quick and accurate flow measurement over ventilation exhaust valves. The foldable supply air adapter is used for measurements of supply flows. The large digital display shows the flow with one decimal place. There is a hold function and it is possible to display l/s or m³/h and to turn the digits upside down. By pressing both buttons the display light is activated.



Foldable exhaust adapter (762.330)
Opening: 300x300 mm
Height: 100 mm

Foldable supply adapter (459.096)
Opening: 330x300 mm
Height 560 mm

SwemaFlow 234 (761.960)
incl. instrument, handle, 220V battery charger, case and calibration certificate

Techical data:

Measuring range:
2-65 l/s / 7-234 m³/h

Measurement uncertainty:
±4% read value, minimum 1 l/s at:
2...65 l/s at +18...+25 °C and
2...30 l/s at -10...+40 °C,
±6% read value, minimum 1 l/s at:
30...65 l/s at 0...+40 °C

Charging time 1,5 hours
Shaft adjustable length: 45...80 cm
Weight: 1,75 kg
Opening: 190x200 mm, Height: 330 mm



www.swema.com
swema@swema.com
Tel. +46 8 94 00 90



www.swema.com
swema@swema.com
Tel. +46 8 94 00 90

AIR FLOW HOOD

AIR FLOW HOOD

SwemaFlow 125D



Designed for offices and residential ventilation, SwemaFlow 125D measures airflows of 2-125 l/s. Flow is displayed instantly. Use the "back pressure method" to compensate for restriction to obtain high accuracy, even in systems with low pressure. Two measurements are taken, one with a restriction ring and one without. The use of a Flow Factor is also possible, which is useful when balancing. Measurements can be saved, viewed and transferred to PC.



Supply and exhaust adapters.
SwemaFlow 125D can connect to Swema 3000 by ordering an adaption (767.170).

- Part no.
767.000 SwemaFlow 125D including exhaust air adapter 300x300 mm, restriction ring, 220V charger, USB-cable, carrying case and calibration certificate
758.950 Supply & exhaust air adapter 650x650 mm
760.740 Supply & exhaust air adapter 650x250 mm
761.550 Exhaust air adapter, 300x300xh130 mm total height = 280 mm

Technical data:

Measuring range:
Air flow: 2-125 l/s, 7 - 450 m³/h, 4...260 CFM
Temperature: 0...+50 °C, 32...122 °F
Barometer: 600... 1200 hPa, 18...35 inHg

Measurement uncertainty:
± 3,5% read value, min ± 0,4 l/s / 0,8 CFM
Temperature: ± 0,5 °C, ± 1 °F
Barometer: ±3,5 hPa

Memory: 9999 measurements
Weight incl. exhaust adapter 300x300 mm: 2,0 kg
Charging time: approx. 2 hours

SwemaFlow 4000

SwemaFlow 4000 is for high air flow as well as low and measures with high accuracy both supply and exhaust 5...1300 l/s. Flow is displayed instantly and if selected the user can directly compensate the read-out by the use of a Flow Factor (FF), which can be useful when balancing. Measurements can be saved, viewed and transferred to PC. SwemaFlow 4000 can be used with SwemaTwin ventilation balancing equipment by connecting a Swema 3000 with modem. An adaption (767.170) of SwemaFlow 4000 is needed. Measurements can be saved and viewed on the display or transferred to a PC by the use of USB cable.



766.700 SwemaFlow 4000 measuring unit, supply/exhaust air flow capture 650x650 mm, 220 V battery charger, USB-cable, carrying case and calibration certificate
764.420 Additional flow capture 1200x250 mm



Technical data:

Measuring range:
Air flow: 5...1300 l/s, 20...4600 m³/h, 10...2700 CFM
Temperature: 0...50 °C, 32...122 °F
Barometer: 600... 1200 hPa, 18...35 inHg

Measurement uncertainty:
Air Flow: ±3,5% read value, min ±0,5 l/s
Temperature: ±0,4 °C above 50 l/s
±0,6 °C below 50 l/s
Barometer: ±3,5 hPa

Memory: 9999 measurements
Weight incl. capture 650x650 mm: 4,0 kg
Battery charge time: max 4 hours

Instrument	Sensor for PC or Swema 3000	Air Flow (l/s)	Air Velocity (m/s)	Differential pressure (Pa)	Barometer (hPa)	Temperature (°C)	Humidity (%RH)	Page
	Swema 03		0,05...3			10...40		6
	Swema 03+		0,05...3		X	10...40		6
	Swema 05					0...50		7
Swema 3000mdH+		CALC	2...130*	±10.000	X	EXT, TC	EXT	10, 13, 20
Swema 3000md		CALC	2...50*	-300...1.500	X	EXT, TC	EXT	10, 13
Swema 3000		EXT	EXT	EXT	-	EXT	EXT	10
	SWA 03	-	0,05...3	-	-	10...40	-	5
	SWA 31	CALC	0,1...30	-	-	-20...80	-	12
	SWA 10	CALC	2...50*	-300...1.500	-	-	-	13
	HC2-S	-	-	-	-	-40...60	0...100	17
	SWHP 28-HC2	-	-	-	-	-40...85	0...100	17
	HC2-IM105	-	-	-	-	-20...200	0...100	17
	Temperature sensors	-	-	-	-	-50...450	-	19
SwemaFlow 234		2...65	-	-	-	-	-	21
SwemaFlow 125D		2...125	-	-	X	0...50	-	22
SwemaFlow 4000		5...1.300	-	-	X	0...50	-	23
SwemaMan 8		CALC	2...50*	-300...1.500	X	TC	-	9
SwemaMan 7		CALC	2...129*	-1.000...9.999	-	-	-	9
SwemaMan 60		-	2...90*	-300...5.000	-	-	-	9
SwemaAir 5		CALC	0,1...30	-	X	-20...80	-	8
SwemaAir 40		-	0,1...30	-	-	-20...80	-	8
SwemaTemp 20		-	-	-	-	EXT	-	18

CALC = Calculated from air velocity or differential pressure

EXT = With external sensor

TC = ThermoCouple type K

* = A pitot static tube is needed to measure air velocity



swema@swema.com www.swema.com
 Pepparvägen 27, SE 123 56 FARSTA, SWEDEN
 Tel. +46 8 94 00 90 Fax. +46 8 93 44 93