ComfortSense Mini

Robust and compact anemometer for ventilation and draught measurements

Features

- Draught rate according to ISO 7730
- Measures velocities from 0.05 m/s to 30 m/s
- High accuracy, fast response and temperature compensated
- Stainless steel stem with protection cover for the sensors
- Analog voltage output
- Optional A/D converter with USB 2.0 interface
- Individual calibration certificate traceable to national standards with each transducer

Applications

- Mapping of air velocity distribution in open and confined spaces
- Velocity recordings in wind tunnels
- Measurements around diffusers and grilles
- Measurements in ventilation ducts
- Testing of fans and blowers
- Calibration reference for anemometers

Velocity and temperature probes for the ComfortSense Mini

Introduction

The ComfortSense Mini is a compact and robust single point anemometer that covers a wide range of applications. With an easy exchange of probes the ComfortSense Mini covers both high velocity measurements in ventilation ducts as well as draught measurements in offices for example.
The velocity probes are based on the well-proven technology of thermal anemometry, which offers the following benefits: wide velocity range, increasing sensitivity as velocity decreases and fast response. This makes it particularly suitable for very low velocities, at which other methods either fail or become too inaccurate.

Description

High velocity probe – 54T35
The 54T35 Robust high velocity and temperature probe is together with the 54N95 anemometer, a complete temperature compensated thermal anemometer.
It covers velocities from 0.1 m/s to 30 m/s in the temperature range from -20°C to 80°C. It is therefore a true alternative to a Pitot-static tube at low to medium velocities, while at very low velocities, say below 2 m/s; it is the only realistic choice. The 5435 high velocity probe is delivered with traceable calibration certificate.

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The velocity sensor and temperature compensator are made of nickel wire coils clad in stainless steel to give a robust probe and reduce sensitivity to contamination. The temperature sensor is a precision thermistor which is also encapsulated in stainless steel. All sensors are protected from mechanical damage by a cage and a shield that can be raised to protect the probe tip when not in operation. Due to the automatic temperature compensation the anemometer actually measures mass flux, which divided by density provides velocity in m/s.
As all calibrations are referred to standard conditions (20°C and 101.3 kPa) corrections for barometric changes can easily be made using the ComfortSense application software.

Draught probes – 54T33 and 54T34 manikin version
The 54T33 Draught probe and the 54T34 draught probe for built-in applications are equipped with an omnidirectional thin film sensor for measuring air velocity and a small fast response thermistor for measuring air temperature.
The velocity sensor consists of two quartz spheres 3 mm in diameter, coated with a thin-film of nickel and covered by a quartz layer. One of the spheres is kept at a constant overtemperature relative to the other and the energy needed for maintaining this over-temperature is measured. A unique transfer function converts the measured heat loss into air velocity. The sensors are all well protected by a robust cage. Due to the slim-line probe design, blockage of the flow is minimal.
The 54T33 draught probe is suitable for indoor climate applications such as testing of ventilation components and draught measurements in the occupied zone. The 54T34 draught probe is very compact, with a flexible cable connection to the probe tip, making it suitable for building into a manikin for passenger comfort applications.

The probes are connected directly to the anemometer to form an integrated unit, but can optionally also be connected with a cable. Power input and output signals are accessible from connectors on the anemometer unit.

Calibration Certificate
Each transducer is delivered with a transfer function for linearization of velocity together with a calibration certificate traceable to national standards.

The application software
The versatile application program incorporates a probe library from which the probes to be used in the measurement are selected. In the graphical presentation of results, a warning indication is shown in the positions where the air velocity or temperature exceeds a user-defined level.
The software performs linearization of air velocity and temperature inputs, calculation of statistical values and presentation of results in a table or graphical plot. Results are presented in tabular form and as an Excel compatible file.
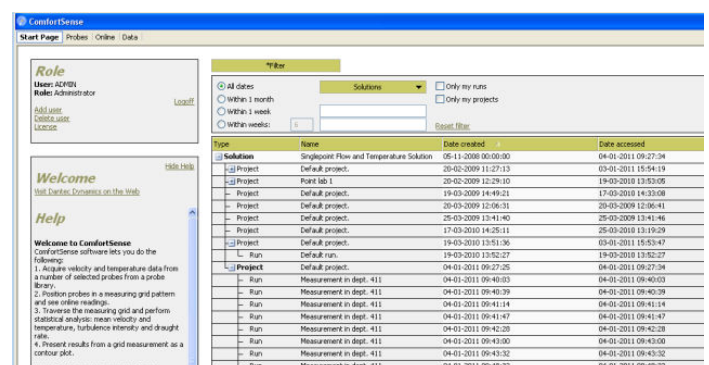Calculated statistical values include:
• Mean air velocity and temperature
• Standard deviation of air velocity
• Turbulence intensity
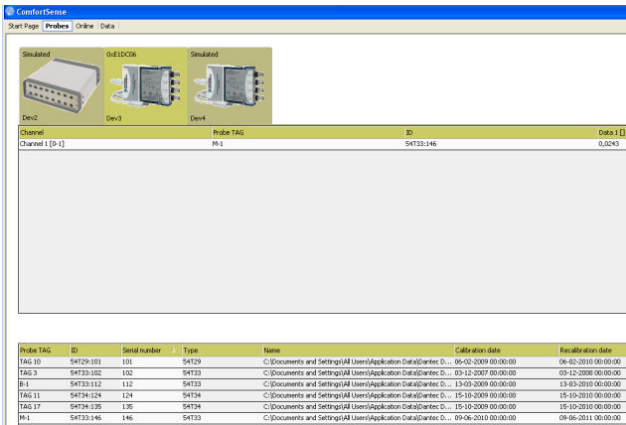• Draught rate according to ISO 7730

ComfortSense Mini anemometer with direct connection of probe. Alternatively a probe cable can be mounted in between.
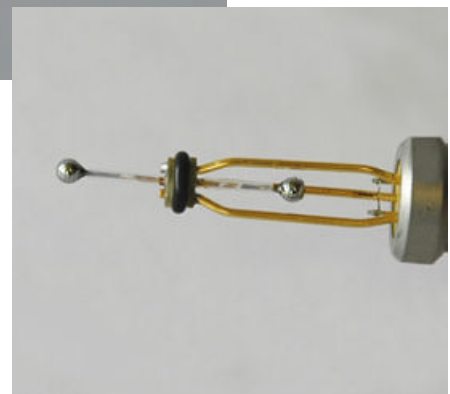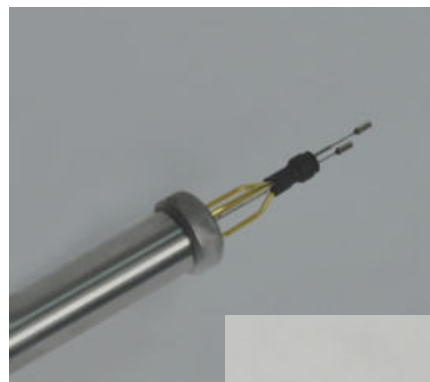

Close-up of probe tips with omnidirectional and steel clad sensors.

Measurement manager with possibility to set filters for easy access to recent measurements.

ComfortSense Mini

Assignment of a specific probe from library to ComfortSense Mini. When the probe is connected, drag and drop the probe from library to the A/D converter, and probe ID and on-line data are presented.
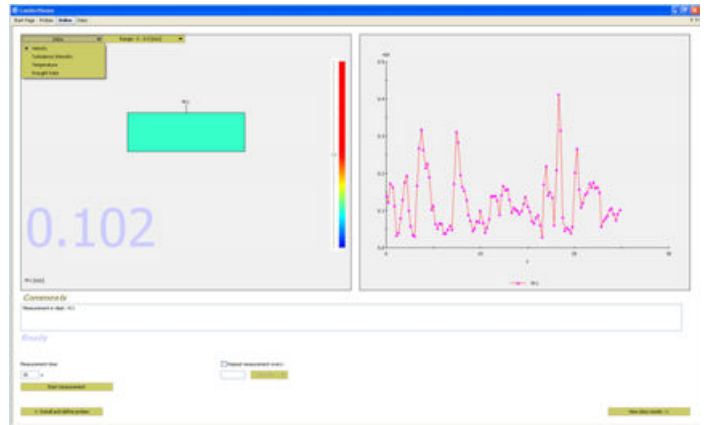
On-line display of probe data during data acquisition. A user defined warning indicator can be set to show when the velocity or temperature exceeds a given level.

NI LabVIEW Toolbox for ComfortSense
We have made it easy for LabVIEW users to implement ComfortSense to their measuring environment. Although the Toolbox does not contain executable programs, it does include high-level VI's, which are very close to ready-made program blocks. These include for. e.g. signal conversion of a probe signal, which would include linearization, and handling of calibration files.

Data presentation and calculation of statistical values at each measurement position.
A measurement report can be generated by selecting one of the two report options.

Examples of pre-programmed functions included in the Toolbox

Technical specifications

ComfortSense Mini 54N95.

54N95 ComfortSense Mini

Analog output, velocity and temperature	2 BNC connectors
Velocity output	0-5 Volts (non-linear LogSqr.transfer function)
Input	54T33, 54T34 and 54T35
Optional temperature input	90P10 Temperature probe
Power requirement	7-12 VDC, 150 mA Power Supply included
Dimensions	32 x 63 x 113 mm
Weight	0,3 kg

*54T35 Robust Velocity and Temperature probe and
54T33 Draft probe.*

54T34 Draft probe – manikin version.

Additional information

For additional information and ordering please contact your Dantec Dynamics representative.

Dantec Dynamics undertakes a continuous and intensive product development programme to ensure that its instruments perform to the highest technical standards. As a result the specifications in this document are subject to change without notice.

Publication No.: pi_242_v1

54T33 Draft probe

Velocity range	0.05-5 m/s, indicates up to 10m/s
Accuracy	0-1m/s: ±2% OR* ±0.02 m/s 1-5m/s: ±5% OR* 5-10m/s: ±10% OR*
Time constant	< 0.1 s
Frequency response (90%)	2 Hz
Acceptance angle - relative to probe axis	0-1 m/s : ±160° 1-5 m/s: +50° to +130°
Temperature reading range	-20 to 80°C
Accuracy at velocities above 0.1 m/s, radiation excluded	0°C to +45°C: ± 0.2K -20°C to +60°C: ± 0.3K +60°C to 80°C: ± 0.5K
Storage temperature	-30°C to +80°C
Overall probe length without cage	296 mm

54T35 Robust Velocity and Temperature probe

Velocity range	0.1-30 m/s
Accuracy	0.2 – 20 m/s: ±2% OR* ±0.02 m/s 20 –30 m/s: ±5% OR*
Time constant - velocity	Typically 2 - 3 sec.
Time constant - temperature	Typically 4 - 5 sec.
Frequency response (90%)	2 Hz
Temperature compensation error on velocity, in the temperature range 0°C to 45°C	Less than 0.2% of reading per 1°C change in air temperature
Temperature reading range	-20 to 80°C
Accuracy at velocities above 0.1 m/s, radiation excluded	0°C to +45°C: ± 0.2K -20°C to +60°C: ± 0.3K +60°C to 80°C: ± 0.5K
Storage temperature	-30°C to +80°C
Overall probe length without cage	296 mm

54T34 Draft probe – Manikin version

Velocity range	0.05-5 m/s, indicates up to 10m/s
Accuracy	0-1m/s: ±2% OR* ±0.02 m/s 1-5m/s: ±5% OR* 5-10m/s: ±10% OR*
Time constant	< 0.1 s
Frequency response (90%)	2 Hz
Acceptance angle - relative to probe axis	0-1 m/s : ±160° 1-5 m/s: +50° to +130°
Temperature reading range	-20 to 80°C
Accuracy at velocities above 0.35 m/s, radiation excluded	0°C to +45°C: ± 0.4K -20°C to +60°C: ± 0.4K +60°C to 80°C: ± 0.5K
Storage temperature	-30°C to +85°C

ComfortSense Application Software

Single point Flow & Temperature solution	54S71
LabVIEW toolbox for ComfortSense	54S63

Optional Accessories

Probe cables available in lengths of 5, 10 and 20 m	54B35, 54B40 and 54B45
USB A/D Unit 4 ch. Differential, 16 Bit, 100 kS/s	9138A0261

*) Of Reading

DANTEC DYNAMICS

www.dantecdynamics.com

Prager Elektronik

Traunstraße 21, A-2120 Wolkersdorf
T:+43 2245 6725 F:+43 2245 559633
office@prager-elektronik.at
www.prager-elektronik.at

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