Measuring Specialist

Enhance your capability with sensor technology

Air flow | Humidity | Dew point | Differential pressure

Temperature | Level | Air quality | Signal meter

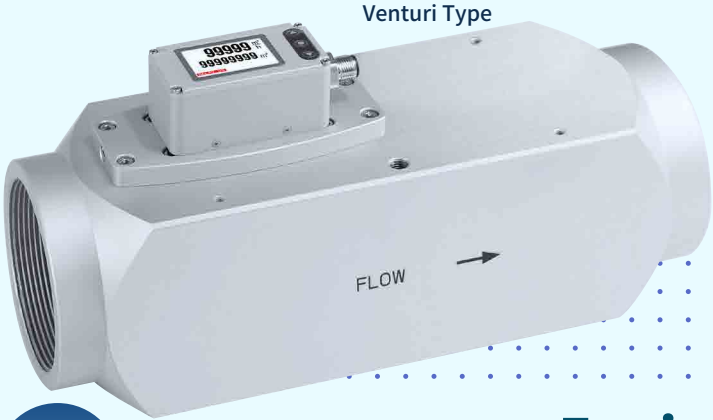
ISO 9001 & ISO/IEC 17025

Average Flow Type

Overflow Type

Laminar Flow Type

Venturi Type



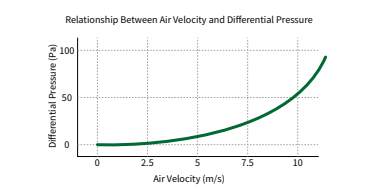
Environmental Monitoring
Process Control

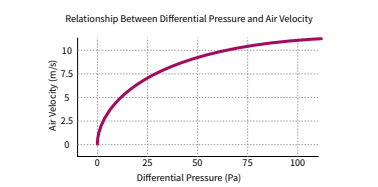
Hot-Wire Airflow with Flow Conditioning Airflow Monitoring Re-evolution

In the field of air velocity and air flow monitoring, achieving stable and repeatable measurements under complex and dynamic airflow conditions has always been a technical challenge. This is especially critical in applications such as process control, cleanroom environments, and compressed air energy management, where airflow data is not just a single parameter—it serves as a fundamental input for system-wide control strategies.

Currently, two primary airflow sensing technologies are commonly used on the market: differential pressure (DP) and hot-wire (thermal) types. While DP sensors feature simple structures and offer stable measurement, they often lack sensitivity in low-velocity ranges. On the other hand, hot-wire sensors are known for their high sensitivity and fast response but can be easily affected by turbulence or installation orientation, which may lead to signal fluctuation and reduced measurement accuracy.

To address these limitations, eyc-tech has re-engineered its airflow measurement architecture with an engineering-oriented approach—integrating hot-wire sensing technology with flow conditioning structures. This solution offers improved signal stability and enhanced measurement resolution.





Air Velocity vs. Differential Pressure:
Figure 1: Shows the parabolic relation ($\Delta P = \frac{1}{2}\rho V^2$):

- Higher velocity → larger pressure difference (quadratic growth).
- At low speeds (< 2 m/s), pressure change is very small, making DP sensors less sensitive.

Figure 2: Shows velocity $\propto \sqrt{\Delta P}$:

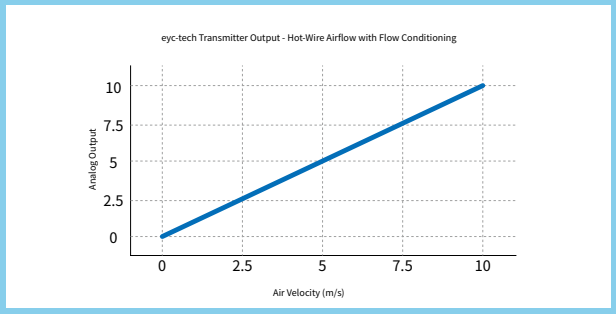
- Velocity rises as pressure increases, but growth rate slows.
- In low ΔP, velocity changes are small, reducing sensitivity.

Technical Advantages of Flow Conditioning

eyc-tech combines Hot-wire sensor with Venturi or Pitot-based flow conditioning. These flow conditioning structures help stabilize airflow direction and velocity distribution, leading to improved measurement accuracy and consistent sensor output. The design is implemented in two key configurations:

- FDM06-P uses a multi-point averaging Pitot tube, which samples airflow across multiple points in the duct to determine a representative average velocity.
- FDM06-I features a Venturi structure, guiding airflow through a contraction-expansion zone to ensure steady and uniform flow across the sensing element.

By integrating Venturi-based flow conditioning, thermal anemometers achieve stable, linear output with excellent responsiveness across the full velocity range.



Measurement Advantages from Technology Integration

By incorporating Pitot tube or Venturi-based flow conditioning structures, hot-wire air velocity transmitters can minimize output instability caused by flow direction variations or turbulence. Once the airflow is conditioned before reaching the sensing zone, its velocity profile and flow direction are maintained within designed tolerances, allowing the hot-wire sensing element to perform at optimal capacity. This integration brings the following advantages:

- Highly sensitive and linear output
- Maintains excellent signal resolution even at low air velocity
- Improved repeatability and long-term measurement stability

Laboratory-Grade Calibration Enhancing Application Consistency

Through real-flow calibration using wind tunnel systems, Air volume standard calibration system (Sonic Nozzle), the transmitter can reflect air flow characteristics that are closer to real-world conditions. This contributes to more stable data output in applications such as compressed air systems, gas pipelines, and controlled air velocity environments.

Key features of this calibration approach include:

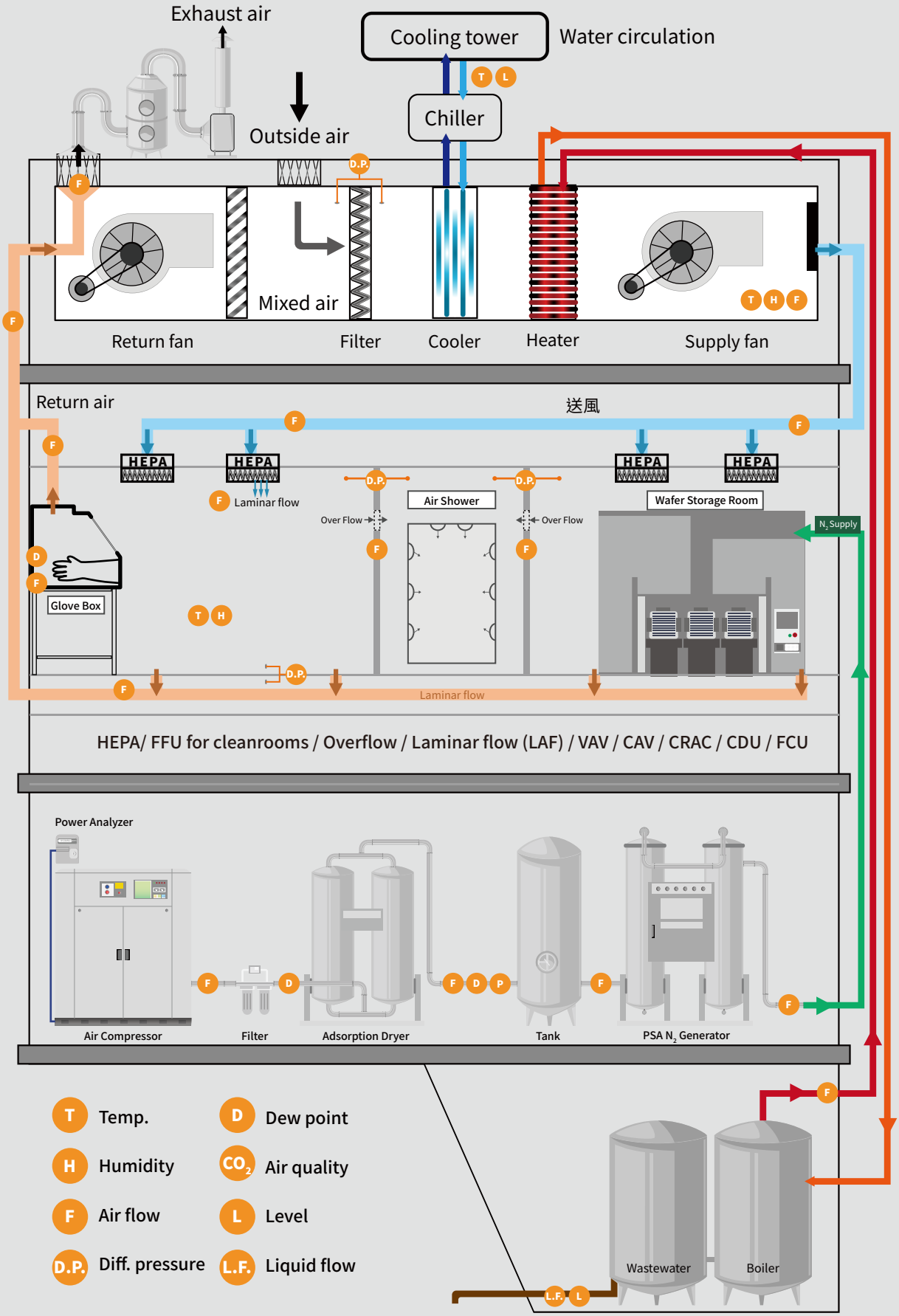
- Simulation of actual duct flow conditions helps improve the transmitter’s response accuracy under field applications.
- Each transmitter undergoes multi-point velocity calibration and compensation profiling, contributing to improved accuracy and repeatability.

By combining Venturi or multi-point Pitot tube flow conditioning with laboratory-grade calibration procedures, and integrating hot-wire air velocity sensing technology, eyc-tech optimizes both measurement stability and reproducibility. This results in a reliable airflow monitoring solution that supports the high-precision and high-consistency needs of diverse industrial applications.

eyc-tech

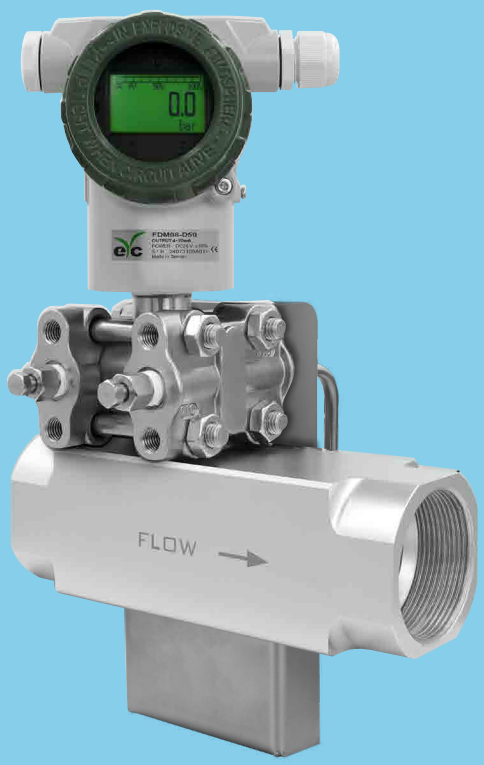
PROCESS SYSTEM DIAGRAM

in Semiconductor & Pharmaceutical Industries



FDM08

Venturi Inline Type Air Flow Transmitter

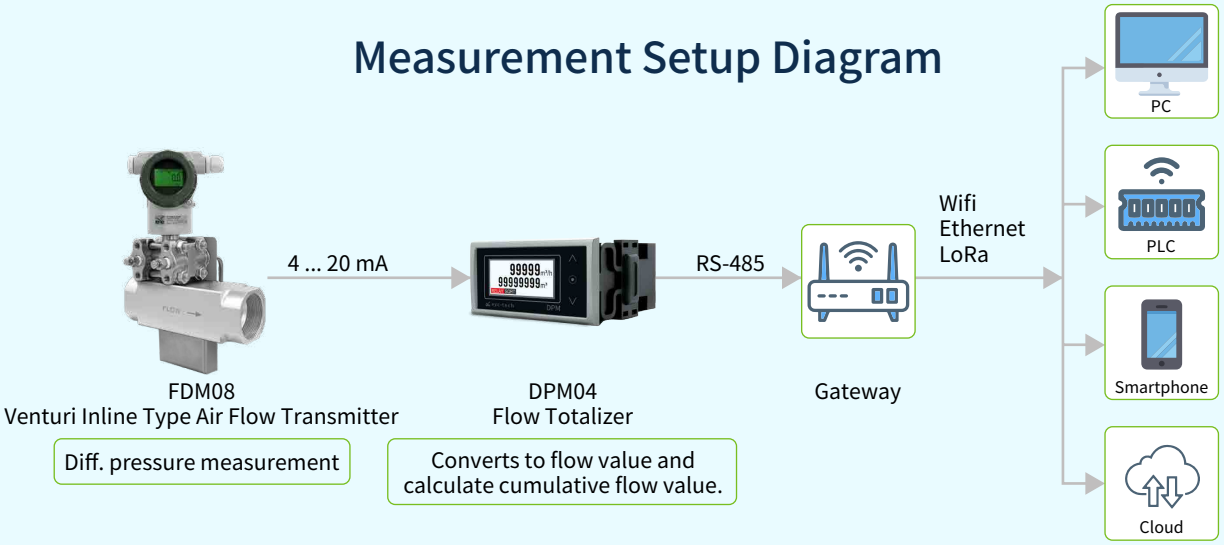


Precise Measurement
FDM08' s Venturi design ensures high accuracy.

Wide Application
Works with gases, steam, contaminated, and humid air.

Reduced Piping
Needs only 2.5D upstream and 2D downstream.

Measurement Setup Diagram



High-precision digital display, current/voltage I/O, RS-485 communication, square root extraction, and linear interpolation functions provide a stable and reliable signal interface for sensor integration and industrial control applications.

Flow Totalizer

DPM04

FDM06-L

Bi-directional Low Air Flow Thermal Mass Transmitter

Duct type

Bi-directional Ultra-low Air Velocity
Measures as low as 0.1 m/s.

Bi-directional Ultra-low Velocity Measurement
Capable of measuring down to 0.1 m/s.

Remote type

±1.0% High Accuracy
Uses hot-wire sensing, ideal for precise laminar flow and differential pressure control.

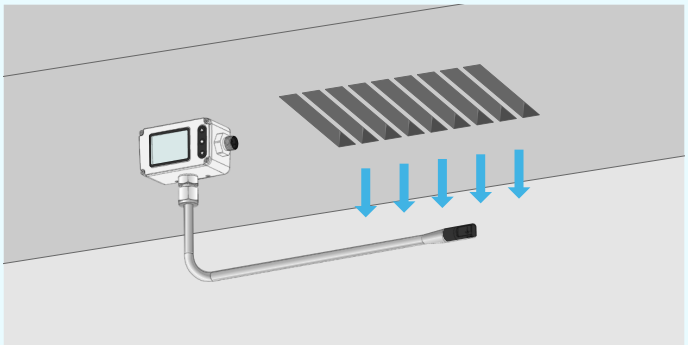
2" LCD Color Display
Clear readout with simple button operation.

Compact Design
Small footprint for easy installation in tight spaces.

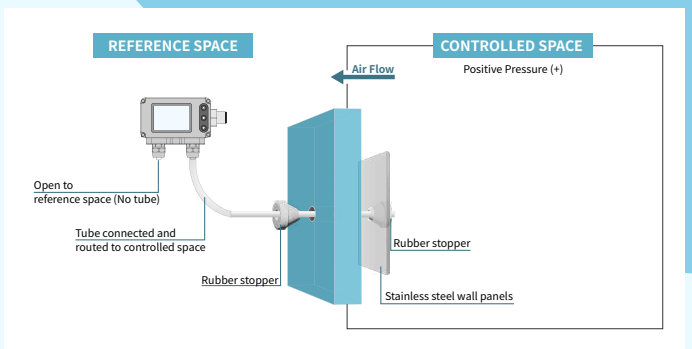
Fast Installation
Mounts quickly with simple accessories, without disturbing airflow.

Overflow type

Laminar flow type



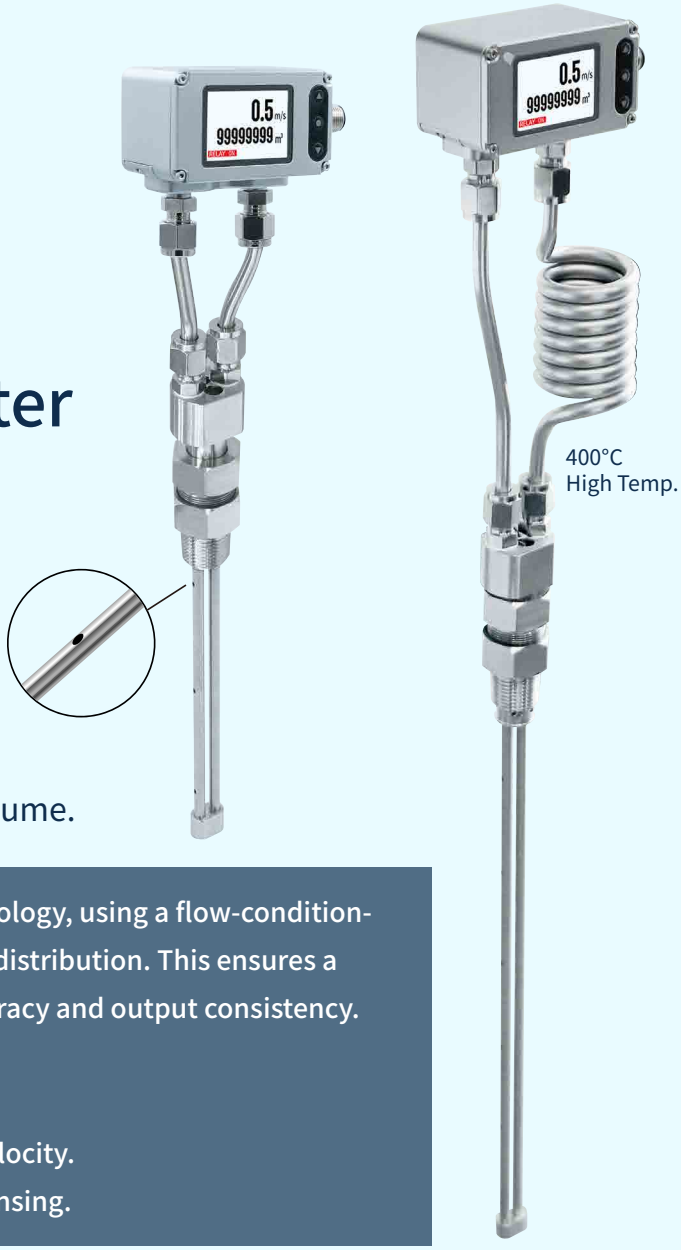
Laminar flow type installation diagram



Overflow type installation diagram

FDM06-P

Average Flow Thermal Mass Transmitter



Wide Velocity Range
Measures from 0.5 ... 60 m/s.

High Pressure & Temp. Resistance
Rated 16 Bar, withstands 400°C.

Color LCD Display
Intuitively shows velocity, flow rate, and total volume.

eyc-tech combines hot-wire sensing with Venturi technology, using a flow-conditioning structure to stabilize airflow direction and velocity distribution. This ensures a more uniform flow field, improving measurement accuracy and output consistency. Two structure types are available:

- FDM06-P – Multi-point Pitot tube for average duct velocity.
- FDM06-I – Venturi design guides airflow for stable sensing.

Instant and Total Flow Display
2″ LCD provides real-time readings.

Multiple Pipe Sizes
DN15 ... DN100 for flexible use in compressed air systems.

Various Output Options
Analog output, RS-485, and relay control.

Venturi Thermal Mass Flow Meter

FDM06-I

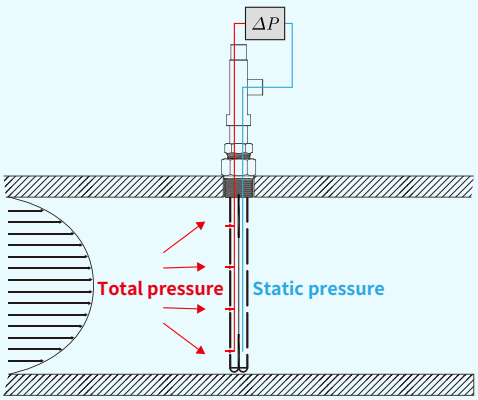
PMM06-D

Ultra-low Differential Pressure Transmitter

High-precision Sensing
Resolution up to 0.01.

Ultra-low Differential Pressure
Sensitive hot-wire sensing measures as low as ±10 ... ±25 Pa.

2″ LCD Color Display
Easy button setup with built-in relay output.



The averaging pitot tube

$$V = K\sqrt{\frac{2}{\rho}\Delta P}$$

$$Q_v = K\epsilon A\sqrt{\frac{2}{\rho}\Delta P}$$

$$Q_m = Q_v \times \rho$$

V = Velocity

ΔP = Difference between total pressure and static pressure

ρ = Density

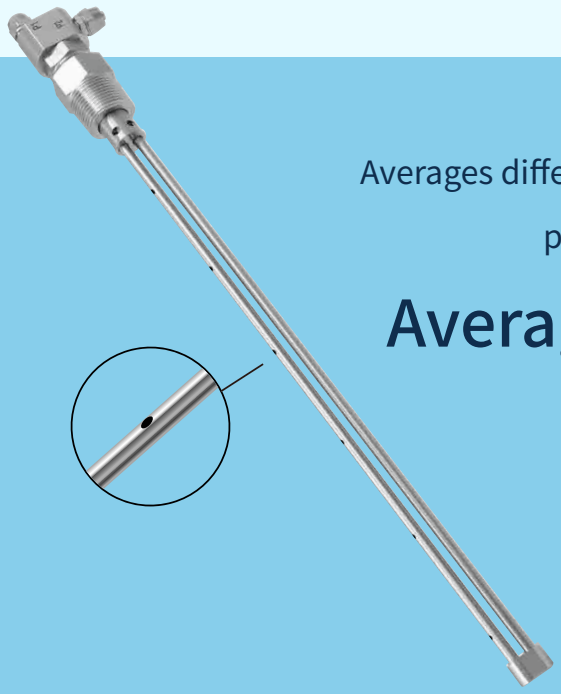
K = Calibration factor

Q_v = Volumetric flow rate

Q_m = Mass flow rate

ϵ = Inflation coefficient

A = Cross-sectional area



Averages differential pressure from multiple sensing points for precise low-pressure measurement, down to 1 Pa.

Average Flow Measuring Tube (Pitot tube)

AFMP

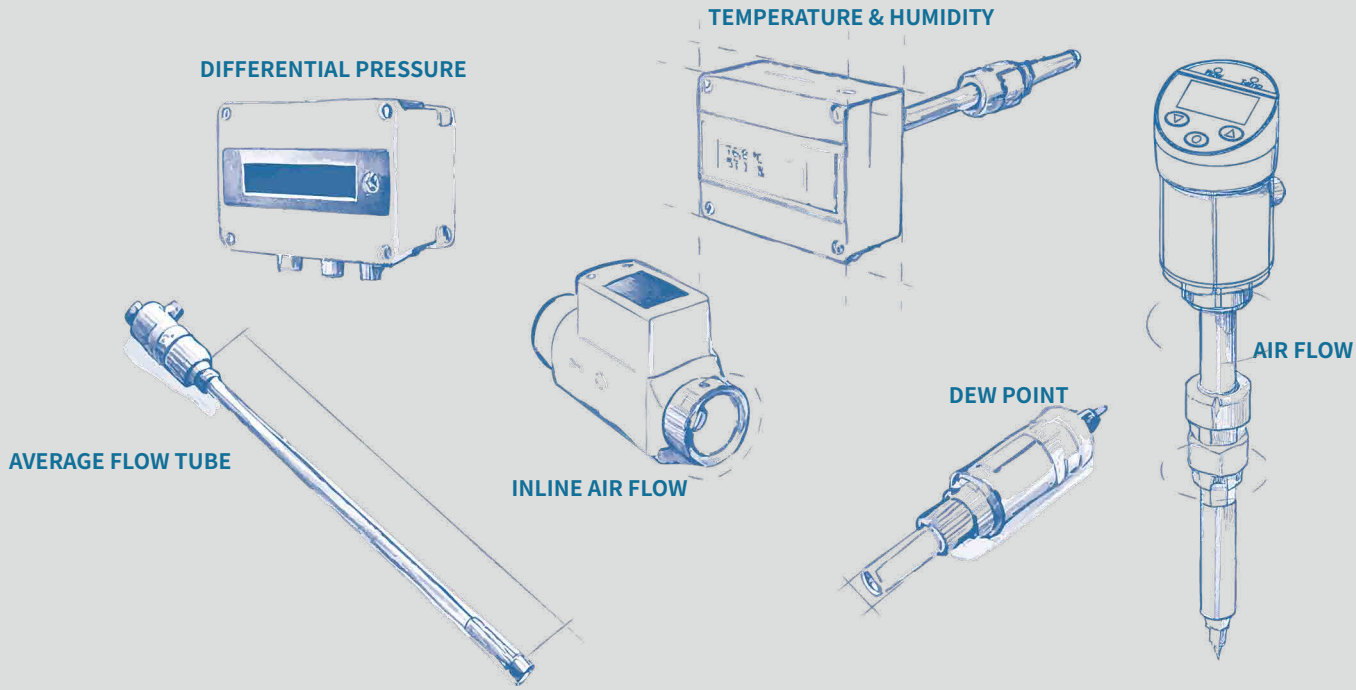
eyc-tech

Measuring Specialist

Enhance your capability with sensor technology

Air flow | Humidity | Dew point | Differential pressure

Temperature | Level | Air quality | Signal meter



YUDEN-TECH CO., LTD. (eyc-tech)

Website : www.eyc- tech. com

Tel : +886-2-8221-2471

Mail : info@eyc- tech. com

New Taipei City, Taiwan(R.O.C)