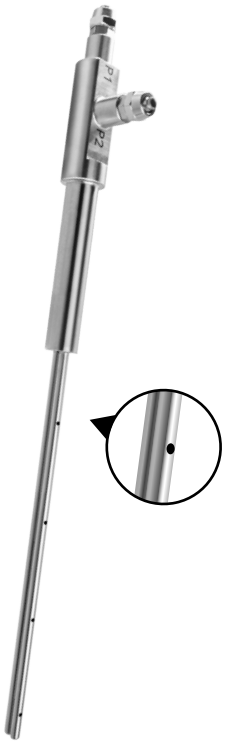
# PHD330
# Industrial Differential Pressure Transmitter

eyc-tech PHD330
Industrial Differential Pressure Transmitter


Match with
eyc-tech AFMT Average Flow Measuring Tube
(Pitot tube)

## | Features |

- Uses piezoresistive differential pressure sensor
- No flow through, pressure ports are not interconnected
- Differential pressure measurement range of ±50 ... ±10,000 Pa
- Aluminum alloy housing, IP65 protection rating
- Includes square root function for converting measurement into air velocity and airflow, and simultaneous display on the screen
- Provides analog output with RS-485 communication function
- DIP switch to adjust range and square root function

## | Introduction |

The eyc-tech PHD330 industrial differential pressure transmitter uses a piezoresistive differential pressure sensor with a wide measurement range and multiple options. Its robust aluminum alloy housing effectively resists external environmental influences, ensuring stable and reliable measurements, making it particularly suitable for use in industrial environments.

## | Applications |

Exhaust air treatment / Differential pressure monitoring / Airflow monitoring / Air handling unit flow

# Differential Pressure-PHD330

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## | Specification |

### Measurement

| | |
|---|---|
| Measuring element | Piezoresistive diff. pressure sensor, no flow-through |
| Measuring range | ±50 ... ±10000 pa |

### Output

| | |
|---|---|
| Output | 4 ... 20 mA / 0 ... 10 V / RS-485 |
| Signal connection | 3-wire |
| Load resistance | Current output : ≦500 Ω |
| | Voltage output : ≧ 10 KΩ |
| Response time | t63 ≦ 2 ms |
| Display type | LCD Module with back light, |
| | double line character |
| Display range | V=Air velocity (at 25°C) |
| | Q=Air quantity (with eyc-tech AFMT) |
| Digit height | 5.56 mm |

### Accuracy

| | |
|---|---|
| Accuracy | ±2.0% F.S. |
| Temperature influence | ±1.75% |

### Environment

| | |
|---|---|
| Measuring medium | Air |
| Operating temperature | -20 ... +80°C(Non-display) |
| | 0 ... +50°C(Display) |
| Operating humidity | 0 ... 95%RH(Non-condensing) |
| Storage temperature | -20 ... +80°C |

### Electrical

| | |
|---|---|
| Power supply | DC 24 V ±10% & AC 24 V ±10% |
| Current consumption | DC 24 V：≦45 mA(Display) / ≦40 mA(Non-display) |
| | AC 24 V：≦95 mA(Display) / ≦90 mA(Non-display) |
| Overvoltage protection | ≦DC 40 V |
| Electrical connection | M12 connector |
| | *with 2 m cable |

### Installation

| | |
|---|---|
| Installation | Wall type |

### Protection

| | |
|---|---|
| IP rating | IP65 |
| Electrical protection | ■ Over-voltage |
| | ■ Reverse polarity |
| | ■ Short circuit |
| Pressure resistance | ±50 ... ±500 pa：0.25 bar |
| | ±1000 ... ±10000 pa：0.5 bar |
| Burst pressure | ±50 ... ±2500 pa：0.75 bar |
| | ±5000 ... ±10000 pa：1.25 bar |

### Certification

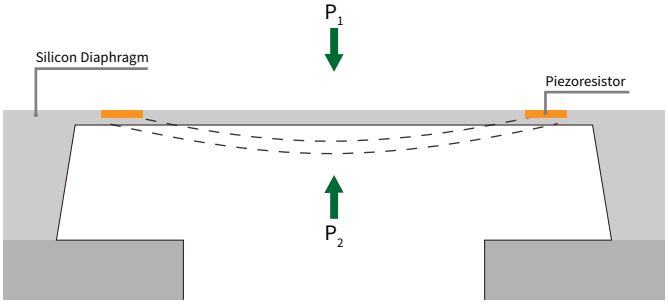
| | |
|---|---|
| Certification | CE |

### Material

| | |
|---|---|
| Housing | Aluminum alloy |
| Weight | Display：497 g；Non-display：478 g |

## | Piezoresistive Differential Pressure Principle |

The working principle of a piezoresistive differential pressure transmitter is based on the piezoresistive effect, a phenomenon where the electrical resistance of a material changes when subjected to stress. The main structure of the sensing element includes a diaphragm made of silicon material and piezoresistive elements integrated on the diaphragm. When there is a pressure difference on the two sides of the sensing element, the diaphragm deforms due to the pressure difference. This deformation causes the piezoresistive elements to change their shape, resulting in a change in their electrical resistance. The amount of resistance change is proportional to the pressure difference between the two sides, and after signal processing, an electrical signal proportional to the pressure difference is obtained.



# | with the eyc-tech Pitot Tube Principle |

eyc-tech PHD330 Industrial Differential Pressure Transmitter is built on the structure of piezoresistive differential pressure flow measurement, with eyc-tech AFMT Average Flow Measuring Tube(Pitot tube), based on the flow continuity formula (the law of conservation of mass) and the Bernoulli formula (the law of conservation of energy), the wind speed calculation formula is deduced to achieve an effective and accurate measurement.

## Flow rate formula

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

## Flow formula

$$qv = K\varepsilon A\sqrt{\frac{2}{\rho}\Delta P}$$

$$qm = qv \times \rho$$

V = Velocity of the liquid(m/s)

Δ P = Difference between total pressure and static pressure (Dynamic pressure)(Pa)

ρ = Flow density(kg/m³)

K = Flow coefficient

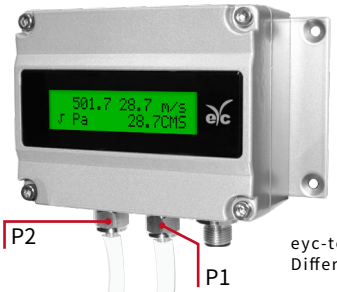
qv = Volume flow of liquid(m³/s)

qm = Mass flow of liquid(kg/s)

K = Flow coefficient of average flow measuring

ε = Inflation coefficient of liquid going thru measuring tube during operation

A = Cross-sectional area of duct during operation(m²)

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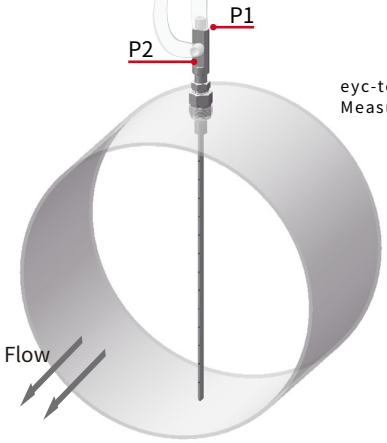
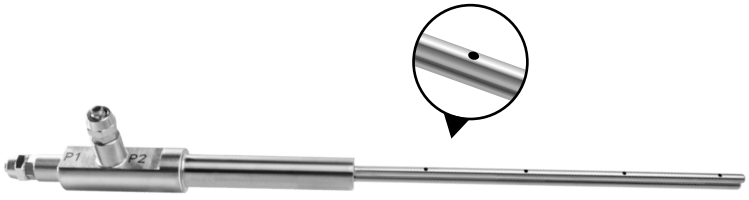



eyc-tech AFMT Average Flow Measuring Tube(Pitot tube)

Note : The opening direction of holes on probe should be parallel to flow direction




eyc-tech AFMT Average Flow Measuring Tube(Pitot tube)

# | Pressure Unit Conversion Table |

| Unit | Pa | mbar | hPa | kPa | mmWS | in$H_2O$ | mmHg |
|---|---|---|---|---|---|---|---|
| Range | ±50 / 100 | 0.5 / 1 | 0.5 / 1 | 0.05 / 0.1 | 5 / 10 | 0.2 / 0.4 | 0.375 / 0.75 |
| | ±300 / 500 | 3 / 5 | 3 / 5 | 0.3 / 0.5 | 30 / 50 | 1.2 / 2 | 2.25 / 3.75 |
| | ±1000 / 1600 / 2500 | 10 / 16 / 25 | 10 / 16 / 25 | 1 / 1.6 / 2.5 | 100 / 160 / 250 | 4 / 6.4 / 10 | 7.5 / 12 / 18.75 |
| | ±5000 / 7500 / 10000 | 50 / 75 / 100 | 50 / 75 / 100 | 5 / 7.5 / 10 | 500 / 750 / 1000 | 20 / 30 / 40 | 37.5 / 56.25 / 75 |

# Differential Pressure-PHD330

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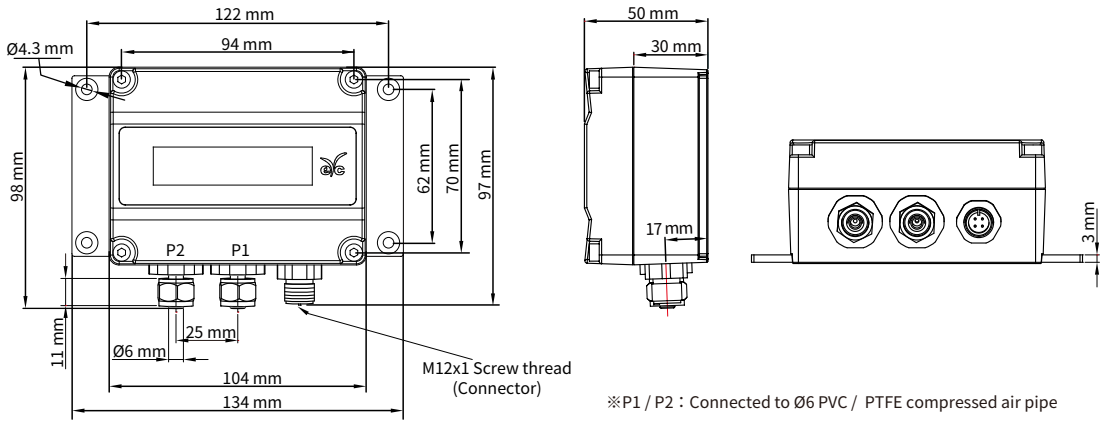
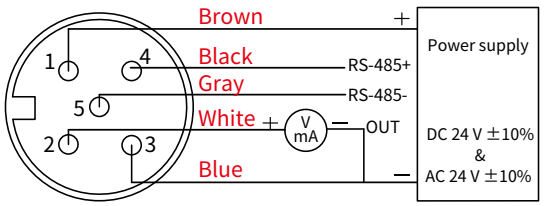
## | Dimension |




※P1 / P2：Connected to Ø6 PVC / PTFE compressed air pipe

## | Connection Diagram |




5P M12 Connector+RS-485

*Please make sure the product and the device which connect with RS-485 are on common ground, avoid damaged product.

## | Ordering Guide |

| Installation | Range | Output | Electrical connection | Optional |
|---|---|---|---|---|
| PHD 330 | 20 | 1 | M | D1 |
| 330：Wall | 10：±50 / 100 pa<br>20：±300 / 500 pa<br>30：±1000 / 1600 / 2500 pa<br>40：±5000 / 7500 / 10000 pa | 1：4 ... 20 mA<br>6：0 ... 10 V | M : M12x1 connector<br>*with 2m cable | D1 : Display (LCD)<br>1 : Non-display |

## | Additional Option Test Report | For more detailed information please contact us.

## ■ISO 9001

| Project | Measurand level or range |
|---|---|
| Pressure | Differential pressure：0 ... 500 Pa / 0 ... 1000 Pa / 0 ... 10000 Pa |