

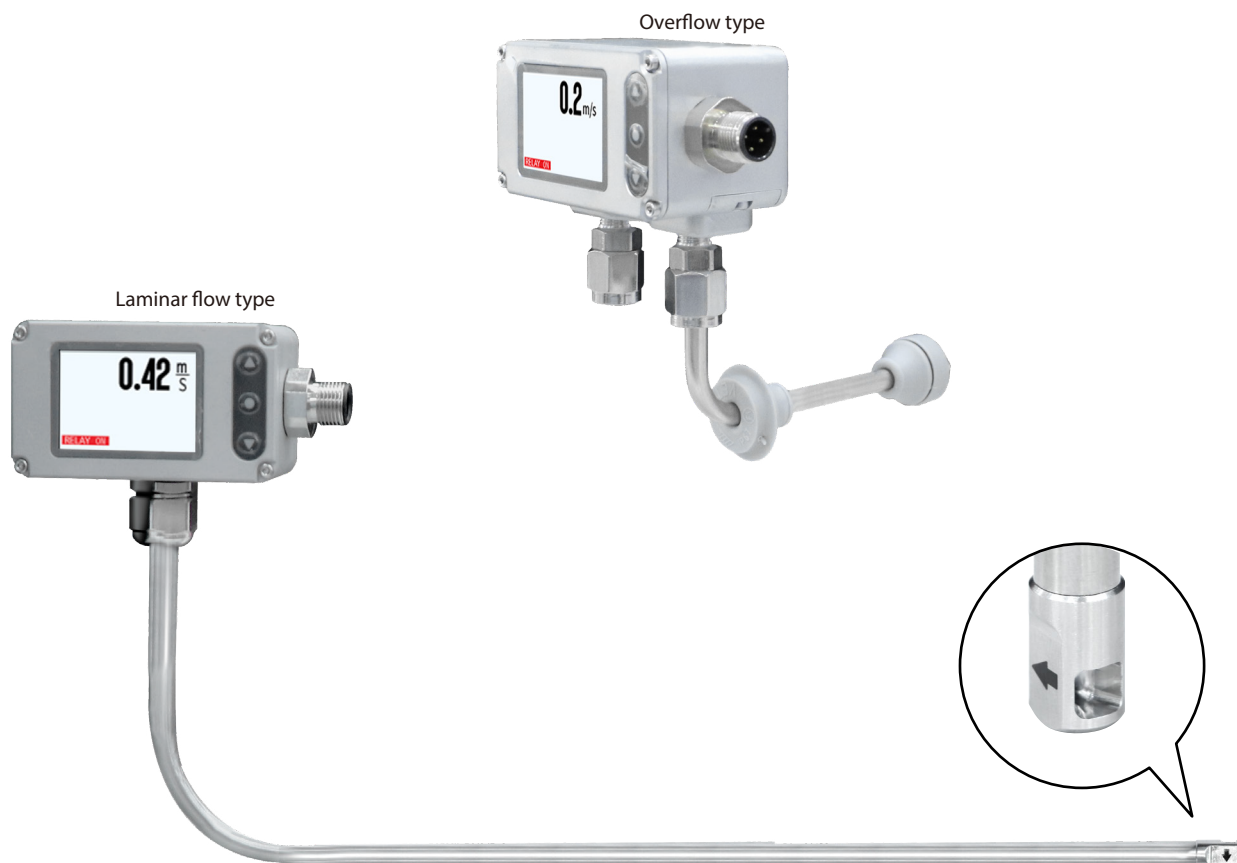


FDM06-L

Bi-directional Low Air Flow Thermal Mass Transmitter  
( Laminar flow type / Overflow type )

[www.eyc-tech.com](http://www.eyc-tech.com)

**RST** MEASUREMENT CONTROL  
TECHNOLOGIES

[www.rst-elektronik.com](http://www.rst-elektronik.com)


## | Features |

- Based on the thermal mass flow sensing principle, featuring bi-directional measurement.
- Highly sensitive to low airflow, using dual temperature sensors for detection; designed for laminar flow and differential pressure (positive/negative) control.
- 2 LCD color screen with easy configuration via buttons.
- Displays air velocity and airflow, integrated with UI settings.
- Accuracy :  $\pm 1.0\%$
- Multiple Outputs: Analog output / Relay / RS-485

## | Applications |

Overflow Flow Monitoring ( 0.20 m/s ) / Laminar Flow Monitoring ( 0.20 ... 0.50 m/s ) / Semiconductor / Pharmaceutical / Food and Beverage / Laminar Flow Control / Overflow Control / Positive and Negative Pressure Control / Energy / Environmental Protection / Factory Automation / Pharmaceutical

\*Recommended range : 0.00 ... 2.00 m/s for laminar and overflow monitoring.



## | Specification |

### Input

|                 |                                    |
|-----------------|------------------------------------|
| Sensor type     | Hot-wire sensor                    |
| Turndown ratio  | 100 : 1                            |
| Measuring range | $\pm(0.00 \dots 1.00 \text{ m/s})$ |
|                 | $\pm(0.00 \dots 2.00 \text{ m/s})$ |

\*Deadband : 0... -0.5 m/s

\*Recommended range : 0.00 ... 2.00 m/s for laminar and overflow monitoring.

\*Default setting: Forward direction

### Output

|                   |                                           |
|-------------------|-------------------------------------------|
| Output signal     | 4 ... 20 mA / 0 ... 10 V / Relay / RS-485 |
| Signal connection | 3-wire                                    |
| Warm-up time      | 60 sec                                    |
| Response time     | t90 5 sec                                 |
| Load resistance   | Current output : 500 $\Omega$             |
|                   | Voltage output : 10 K $\Omega$            |

### Communication

|                                  |                                   |
|----------------------------------|-----------------------------------|
| Communication methods & protocol | RS-485 Modbus RTU                 |
| RS-485 baud rate                 | 960Q 1920Q 3840Q 5760Q 115200 bps |

### Accuracy

|                                                                  |                                                                 |
|------------------------------------------------------------------|-----------------------------------------------------------------|
| Accuracy (Including hysteresis, non-linearity and repeatability) | 0.05 ... 1.00 m/s : $\pm(1\% \text{ of mv} + 0.05 \text{ m/s})$ |
|                                                                  | 0.05 ... 2.00 m/s : $\pm(1\% \text{ of mv} + 0.1 \text{ m/s})$  |
| Uncertainty of factory calibration                               | $\pm 1\%$                                                       |
| Installation angle effect                                        | $< 3\% \text{ mv for } \alpha < 10^\circ$                       |
| Temp. influence                                                  | 0.2%/°C                                                         |

\*The measurement range is defined at the standard condition (1013 mbar, 20°C).

\*mv = measured value

### Environmental

|                          |                                            |
|--------------------------|--------------------------------------------|
| Medium                   | Air                                        |
| Operating Temp. & Humid. | 0 ... 50°C / 20 ... 90%RH (Non-condensing) |
| Storage Temp.            | -25 ... +60°C                              |

### Electrical

|                       |                                     |
|-----------------------|-------------------------------------|
| Power supply          | DC 24 V $\pm 10\%$                  |
| Current consumption   | 24 V : 110 mA                       |
| Relay capacity        | Max current : 6 A                   |
|                       | Max voltage : DC 24 V (DC 36 V Max) |
| Electrical connection | M12 8P connector                    |

### Installation

|              |                        |
|--------------|------------------------|
| Installation | PT 1/4" movable thread |
|--------------|------------------------|

### Display

|                                |                                                          |
|--------------------------------|----------------------------------------------------------|
| Display readout                | -99.99 ... +99.99 (Air velocity)                         |
|                                | 0 ... 99999 (Air volume)                                 |
| Decimal point                  | Button                                                   |
| Sampling time                  | 1 cycle/sec                                              |
| Flow unit                      | m/s, ft/s, L/min, m <sup>3</sup> /min, m <sup>3</sup> /h |
| Response time adjustment range | 0.5 ... 300 sec                                          |

### Certification

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

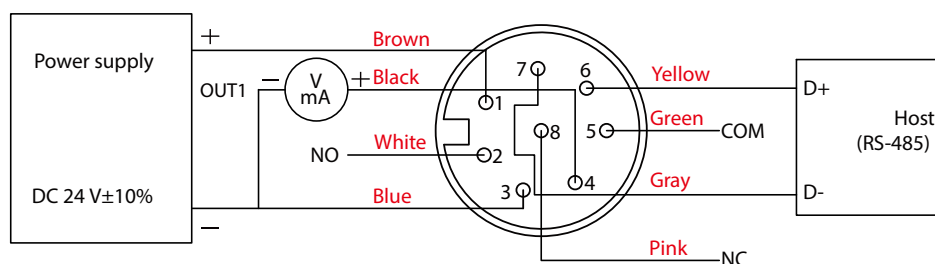
### Protection

|                       |                              |
|-----------------------|------------------------------|
| IP rating             | IP65(Housing)                |
| Electrical protection | Reverse polarity Over-voltag |

### Material

|            |                           |
|------------|---------------------------|
| Housing    | Aluminum alloy / Plastic  |
| Probe      | SUS316                    |
| Probe head | SUS304                    |
| Weight     | Laminar flow type : 300 g |
|            | Overflow type : 290 g     |

## | Diagram |



\*Please make sure the product and the device which connect with

RS-485 are on common ground, avoid damaged product.

## | Wind Tunnel Calibration System |



The wind tunnel calibration system provides a stable and standardized environment for calibration, is not affected by external factors, and has an automated detection system to greatly improve calibration accuracy and reliability. It follows the operating standards of ISO/IEC 17025 and a calibration report can be purchased separately.

The wind tunnel calibration system provides a stable and standardized environment for calibration, is not affected by external factors, and has an automated detection system to greatly improve calibration accuracy and reliability. It follows the operating standards of ISO/IEC 17025 and a calibration report can be purchased separately.

## | Low Air Flow vs. Differential Pressure |

Using Bernoulli's equation, the conversion formula between air standard conditions (1013 mbar, 20°C), the relationship between air velocity and differential pressure is shown in the figure below.

Using Bernoulli's equation, the conversion formula between air standard conditions (1013 mbar, 20°C), the relationship between air velocity and differential pressure is shown in the figure below.

In applications such as cleanrooms, laboratory airflow monitoring, and detection of weak airflows, the FDM06-L thermal mass flow sensor performs especially well under ultra-low velocity conditions where differential pressure is difficult to identify.

In applications such as cleanrooms, laboratory airflow monitoring, and detection of weak airflows, the FDM06-L thermal mass flow sensor performs especially well under ultra-low velocity conditions where differential pressure is difficult to identify.

Formula

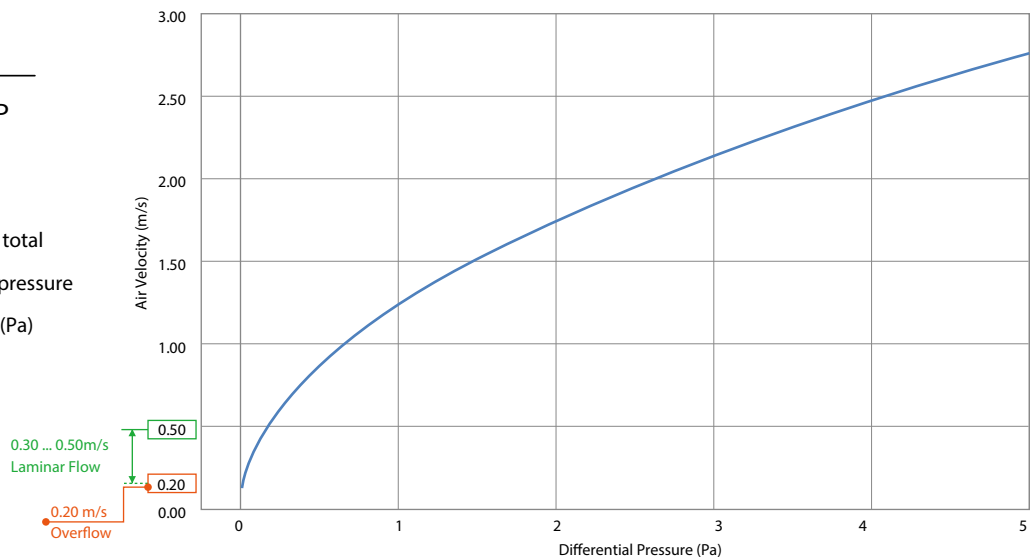
$$K \sqrt{\frac{2}{\rho}} \sqrt{\Delta P}$$

V = Velocity (m/s)

$\Delta P$  = Difference between total pressure and static pressure (dynamic pressure) (Pa)

$\rho$  = Density (kg/m<sup>3</sup>)

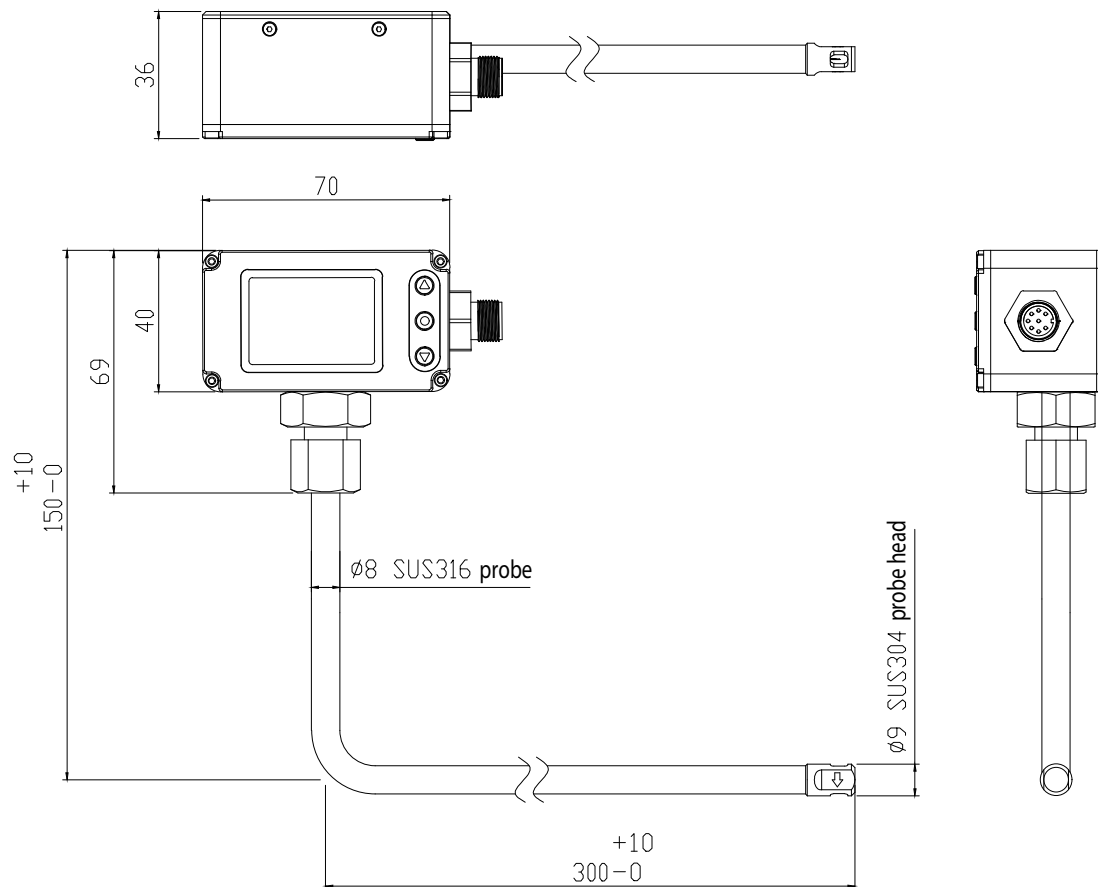
K = Coefficient



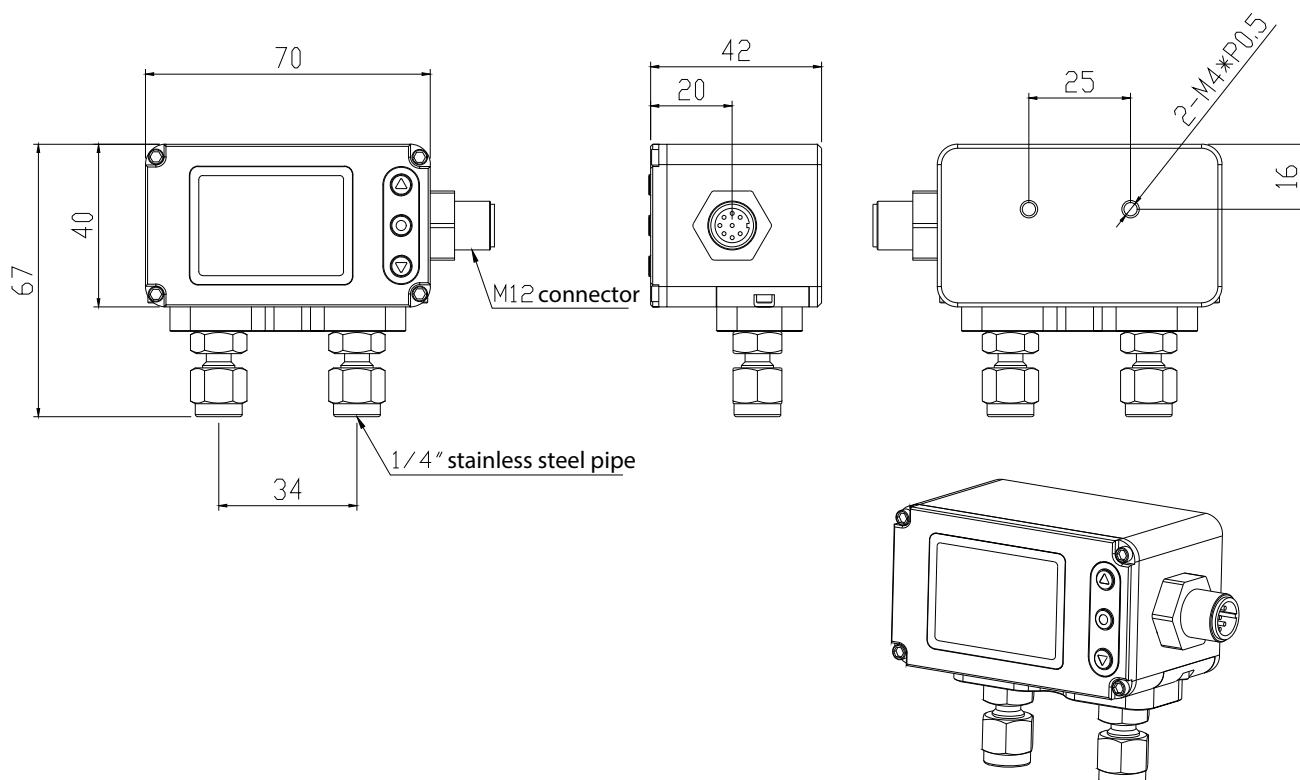
\*Recommended range : 0.00 ... 2.00 m/s for laminar and overflow monitoring.

# Dimension | Unit : mm

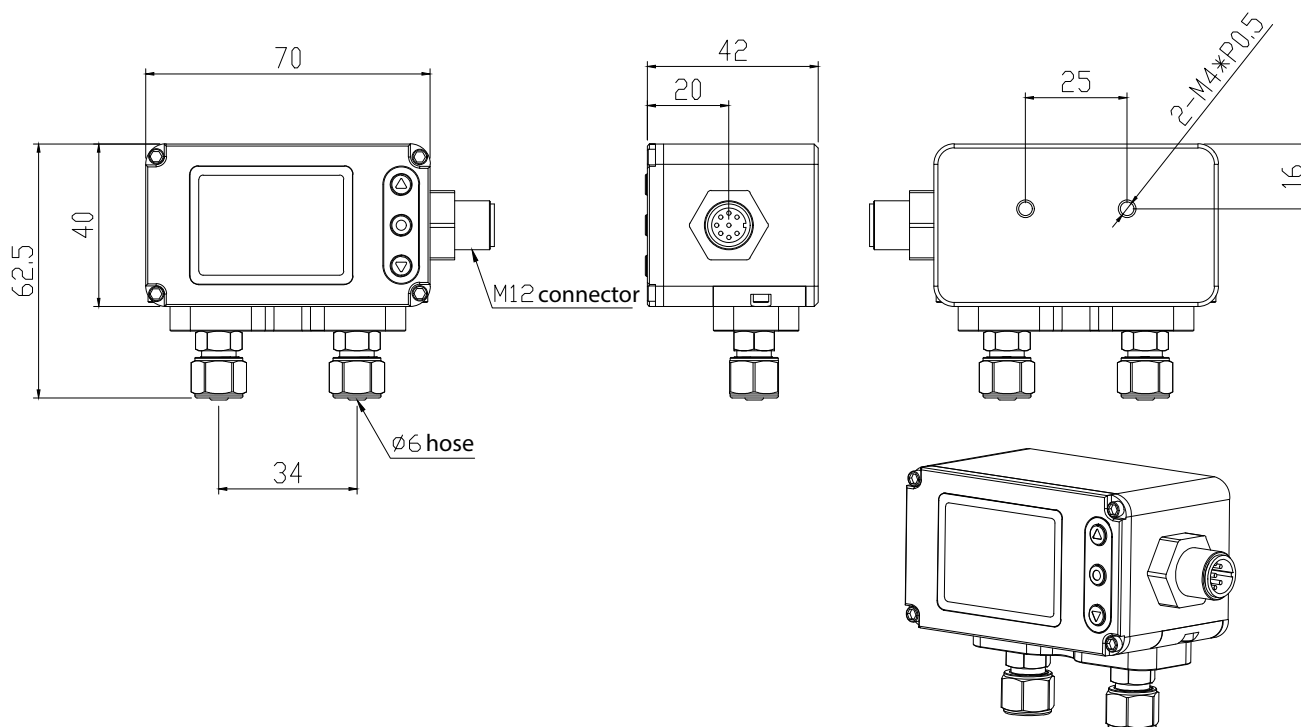
Laminar flow type



Overflow type (Stainless steel pipe)



Overflow type (PVC hose)



## | Ordering Guide |

| Product ordering number | Product Specifications                                       |
|-------------------------|--------------------------------------------------------------|
| FDM06-L-L1-022          | Laminar flow type, $\pm 2$ m/s, 4 ... 20 mA + RS-485 + Relay |
| FDM06-L-L1-023          | Laminar flow type, $\pm 2$ m/s, 0 ... 10 V + RS-485 + Relay  |
| FDM06-L-L2-022          | Overflow type, $\pm 2$ m/s, 4 ... 20 mA + RS-485 + Relay     |
| FDM06-L-L2-023          | Overflow type, $\pm 2$ m/s, 0 ... 10 V + RS-485 + Relay      |

## | Additional Option Test Report |

For more detailed information please contact us.

### ILAC / TAF

YUDEN-TECH CO.,LTD. Calibration Laboratory - ( ILAC / TAF ) Test report.

(TAF accreditation : 3032, complying with ISO / IEC 17025 ) TAF has mutual recognition arrangement with ILAC MRA

| Project                  | Measurand level or range |
|--------------------------|--------------------------|
| Air velocity transmitter | 0.2 m/s ... 60 m/s       |

### ISO 9001

| Project                   | Measurand level or range                                      |
|---------------------------|---------------------------------------------------------------|
| Air velocity / Air volume | Air velocity : 120 m/s                                        |
|                           | Air volume : 0.5 m <sup>3</sup> /h ... 1000 m <sup>3</sup> /h |