



## Principle characteristics

Hot principle, gas mass flowmeter, display direction can be reversed 180°, easy to set and watch color crystal display, cumulative flow data at a glance instant monitoring

## Technical specification

Display accuracy  $\pm 3\%$  F.S.

Repeatability  $\pm 1\%$  F.S.

Electronic display of instantaneous flow

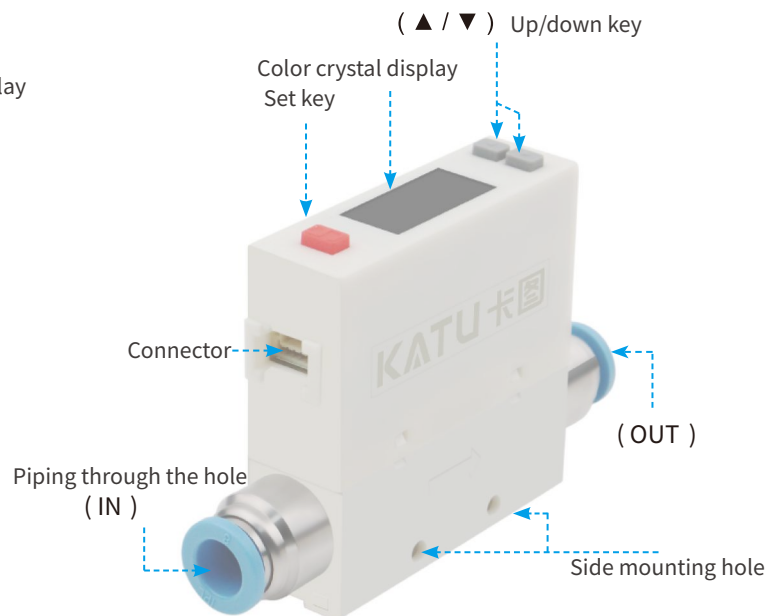
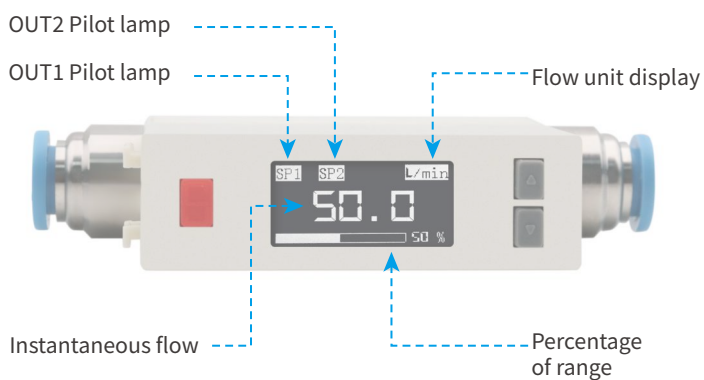
Cumulative flow

Switch output PNP/NPN output

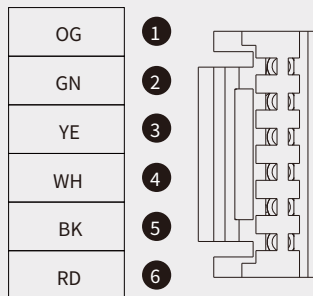
Analog output

Frequency pulse output

## Panel description



## Wiring diagram



## Two switches + one analog (voltage output 1-5V)

| color | stitch      | Instructions                                       |
|-------|-------------|----------------------------------------------------|
| RD    | 6           | power supply (+)                                   |
| OG    | 1           | power supply (-)                                   |
| BK    | 5<br>(OUT1) | SP1 switch PNP (Factory default)<br>SP1 switch NPN |
| WH    | 4<br>(OUT2) | SP2 switch PNP (Factory default)<br>SP2 switch NPN |
| YE    | 3<br>(OUT3) | /                                                  |
| GN    | 2<br>(OUT4) | Analog voltage output: 1-5V                        |

## Two switches + one analog (current output 4-20mA)

| color | stitch      | Instructions                                       |
|-------|-------------|----------------------------------------------------|
| RD    | 6           | power supply (+)                                   |
| OG    | 1           | power supply (-)                                   |
| BK    | 5<br>(OUT1) | SP1 switch PNP (Factory default)<br>SP1 switch NPN |
| WH    | 4<br>(OUT2) | SP2 switch PNP (Factory default)<br>SP2 switch NPN |
| YE    | 3<br>(OUT3) | /                                                  |
| GN    | 2<br>(OUT4) | Analog voltage output: 4-20mA                      |

## Two switches + RS485

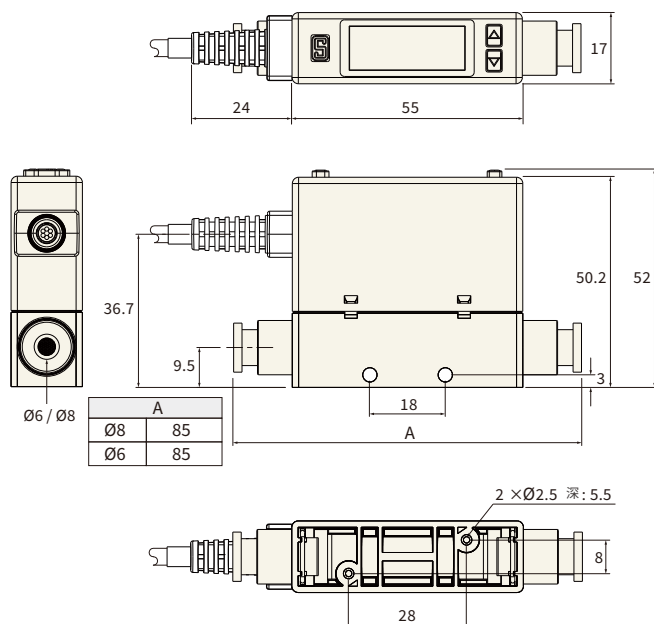
| color | stitch      | Instructions                                       |
|-------|-------------|----------------------------------------------------|
| RD    | 6           | power supply (+)                                   |
| OG    | 1           | power supply (-)                                   |
| BK    | 5           | RS485(A)                                           |
| WH    | 4           | RS485(B)                                           |
| YE    | 3<br>(OUT1) | SP1 switch PNP (Factory default)<br>SP1 switch NPN |
| GN    | 2<br>(OUT2) | SP2 switch PNP (Factory default)<br>SP2 switch NPN |

## Technical parameter

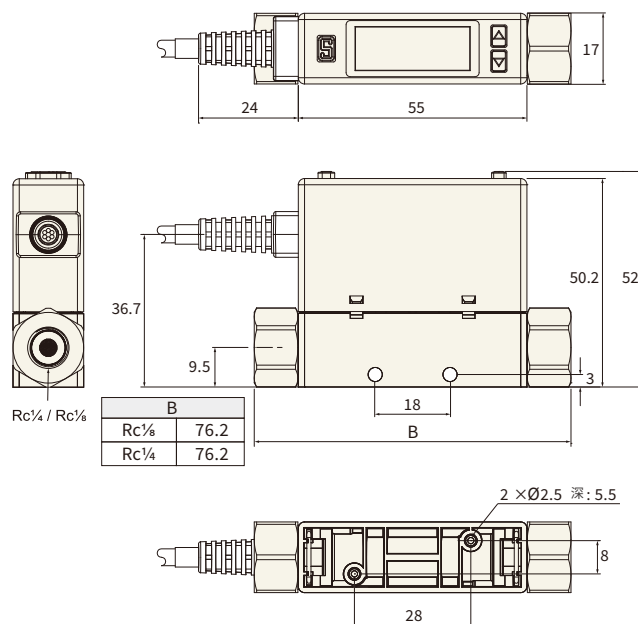
| Model number                   |                                       |                            |                              | 01                                                                                                                               | 02              | 03             | 04                                                                                                                               | 05             | 06              | 07            |  |
|--------------------------------|---------------------------------------|----------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|---------------|--|
| Applicable gas                 |                                       |                            |                              | Dry air, nitrogen (N2), non-corrosive, non-flammable                                                                             |                 |                |                                                                                                                                  |                |                 |               |  |
| Sensing element                |                                       | Rated flow range           |                              | 0 ~ 500 mL/min                                                                                                                   | 0 ~ 1000 mL/min | 0 ~ 5 L/min    | 0 ~ 10 L/min                                                                                                                     | 0 ~ 50 L/min   | 0 ~ 100 L/min   | 0 ~ 200 L/min |  |
|                                |                                       | Detection direction        |                              | unidirectional                                                                                                                   |                 |                |                                                                                                                                  |                |                 |               |  |
| display                        | Instantaneous flow                    | Display range              |                              | 0 ~ 525 mL/min                                                                                                                   | 0 ~ 1050 mL/min | 0 ~ 5.25 L/min | 0 ~ 10.50 L/min                                                                                                                  | 0 ~ 52.5 L/min | 0 ~ 105.0 L/min | 0 ~ 210 L/min |  |
|                                |                                       | Display range              | LPM                          | 1 mL/min                                                                                                                         | 1 mL/min        | 0.01 L/min     | 0.01 L/min                                                                                                                       | 0.1 L/min      | 0.1 L/min       | 1 L/min       |  |
|                                |                                       | Minimum unit               | CFM                          | 0.01 ft3/min                                                                                                                     | 0.01 ft3/min    | 0.1 ft3/min    | 0.1 ft3/min                                                                                                                      | 1 ft3/min      | 1 ft3/min       | 1 ft3/min     |  |
|                                | Cumulative flow                       | Display range              |                              | 99999999 mL                                                                                                                      | 99999999 mL     | 999999.99 L    | 999999.99 L                                                                                                                      | 9999999.9 L    | 9999999.9 L     | 99999999 L    |  |
|                                |                                       | Display minimum units * 1  |                              | 1 mL                                                                                                                             | 1 mL            | 0.01 L         | 0.01 L                                                                                                                           | 0.1 L          | 0.1 L           | 1 L           |  |
|                                |                                       |                            |                              | 0.01 ft3                                                                                                                         | 0.01 ft3        | 0.1 ft3        | 0.1 ft3                                                                                                                          | 1 ft3          | 1 ft3           | 1 ft3         |  |
|                                |                                       | Accuracy guarantee range   |                              | 2 ~ 100 % F.S.                                                                                                                   |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | Display accuracy           |                              | ± 3% F.S. , ± 1 digit                                                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | Analog output accuracy     |                              | ± 5 % F.S.                                                                                                                       |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | repeatability              |                              | ± 1% F.S. , ± 1 digit                                                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
| precision                      |                                       |                            | Linear form                  |                                                                                                                                  | ± 3 % F.S.      |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | Temperature characteristic |                              | ± 2 % F.S. ( 15 ~ 35 °C ) ; ± 5 % F.S. ( 0 ~ 15 °C , 35 ~ 50 °C ) (Compare )                                                     |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | Pressure characteristic    |                              | ± 5 % F.S. ± 1 digit                                                                                                             |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       |                            |                              | 2 NPN open collector output<br>Maximum load current: 125 mA<br>Maximum supply voltage: 24 V DC<br>Internal voltage drop: ≤ 1.5 V |                 |                | 2 PNP open collector output<br>Maximum load current: 125 mA<br>Maximum supply voltage: 24 V DC<br>Internal voltage drop: ≤ 1.5 V |                |                 |               |  |
| Switch output is adjustable    | Reaction time                         |                            |                              | Adjustable filtering damping                                                                                                     |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Output mode                           |                            |                              | Hysteresis mode, window mode, cumulative flow pulse output mode                                                                  |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Return difference                     |                            |                              | tunable                                                                                                                          |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Output short-circuit protection       |                            |                              | yes                                                                                                                              |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Cumulative pulse output is adjustable |                            |                              | 5 mL/Pulse                                                                                                                       | 10 mL/Pulse     | 0.05 L/Pulse   | 0.1 L/Pulse                                                                                                                      | 0.5 L/Pulse    | 1 L/Pulse       | 2 L/Pulse     |  |
|                                |                                       |                            |                              | 0.02 ft3/Pulse                                                                                                                   | 0.04 ft3/Pulse  | 0.2 ft3/Pulse  | 0.4 ft3/Pulse                                                                                                                    | 2 ft3/Pulse    | 4 ft3/Pulse     | 7 ft3/Pulse   |  |
| Analog output                  |                                       |                            |                              | Adjustable                                                                                                                       |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Voltage output                        |                            |                              | Output voltage range: 1 ~ 5 V                                                                                                    |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       |                            |                              | Output impedance: 1 KΩ                                                                                                           |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Current output                        |                            |                              | Output current range : 4 ~ 20 mA                                                                                                 |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       |                            |                              | Load impedance : ≤ 300 Ω                                                                                                         |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       |                            | ≤ 100 ms                     |                                                                                                                                  |                 |                |                                                                                                                                  |                |                 |               |  |
| Communication interface        |                                       |                            |                              | RS485                                                                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
| Power source                   |                                       | Supply voltage             |                              | 12 ~ 24 V DC ± 10%, ripple peak ≤ 10%                                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       | No-load current            |                              | ≤ 50 mA                                                                                                                          |                 |                |                                                                                                                                  |                |                 |               |  |
| Environmental requirement      | Service pressure range                |                            |                              | -0.09 ~ 0.8 MPa                                                                                                                  |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Pressure resistance                   |                            |                              | 1 MPa                                                                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Class of protection                   |                            |                              | IP40                                                                                                                             |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Medium temperature                    |                            |                              | 0 ~ 50 °C (no water dew and no ice)                                                                                              |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | temperature                           |                            |                              | Action: 0 ~ 50 °C, storage: -10 ~ 60 °C (no water dew and no ice)                                                                |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | humidness                             |                            |                              | Operation and preservation: 35 ~ 85% R.H. (waterless dew)                                                                        |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Insulation impedance                  |                            |                              | ≥ 50 MΩ (500 V DC, between leads and plastic housing)                                                                            |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Withstand voltage                     |                            |                              | 1000 V AC 1 min (between leads and plastic housing)                                                                              |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Vibration resistance                  |                            |                              | The amplitude is 1.5 mm or 10 G, 10 Hz ~ 55 Hz ~ 10 Hz every 1 minute, 2 hours in each direction X, Y and Z                      |                 |                |                                                                                                                                  |                |                 |               |  |
|                                | Impact resistance                     |                            |                              | 100 m/s2 (10 G), measured 3 times in X, Y and Z directions                                                                       |                 |                |                                                                                                                                  |                |                 |               |  |
|                                |                                       |                            | IEC 61000-6-2, IEC 61000-6-4 |                                                                                                                                  |                 |                |                                                                                                                                  |                |                 |               |  |
| Wire specification             |                                       |                            |                              | Ø4 oil-proof PVC - 26 AWG ( 0.15 mm2 ) - 6 core                                                                                  |                 |                |                                                                                                                                  |                |                 |               |  |
| Weight (including 2 m of wire) |                                       |                            |                              | Approx. 109.3g (Ø6 connector); Approx. 112.7g (Ø8 connector); Approx. 118 g (Rc¼ connector); Approx. 128.5g (Rc½ connector)      |                 |                |                                                                                                                                  |                |                 |               |  |

## Size drawing (mm)

Joint aperture :  $\varnothing 6, \varnothing 8$

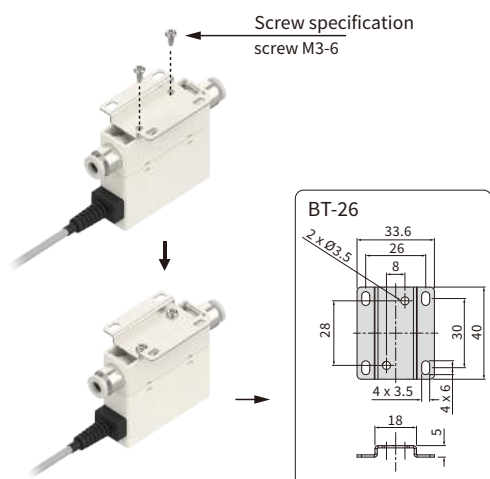


Joint aperture :  $Rc\frac{1}{8}, Rc\frac{1}{4}$

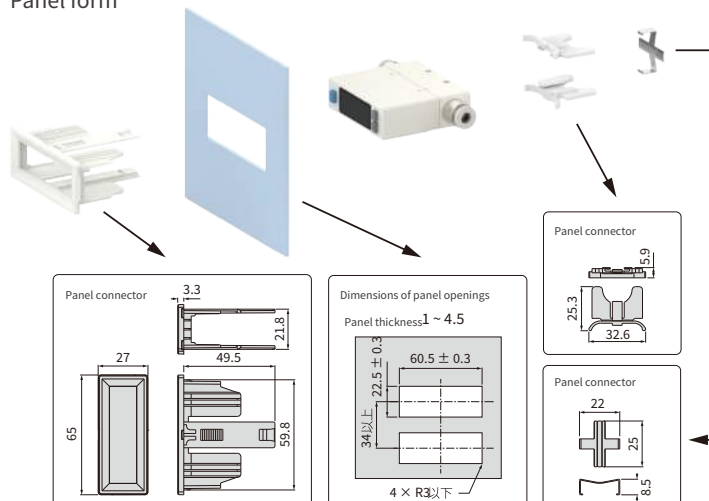


## Mounting accessories

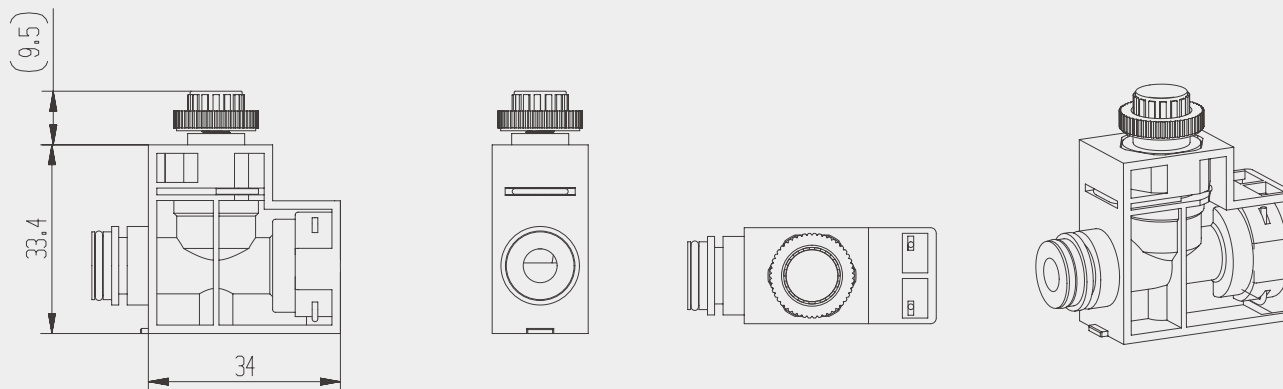
### 1 Fixed bracket



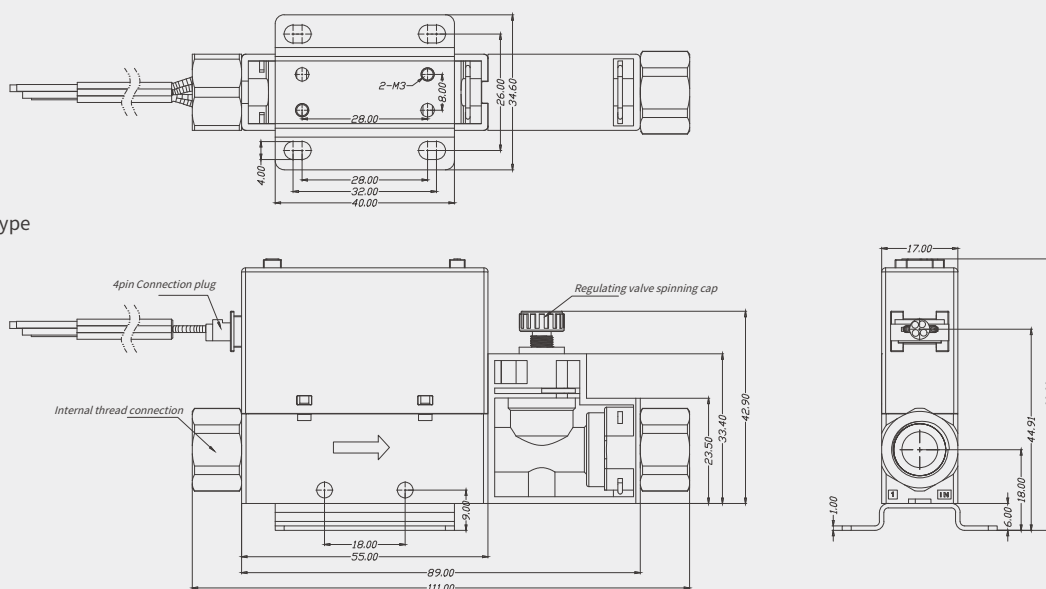
### 2 Panel form



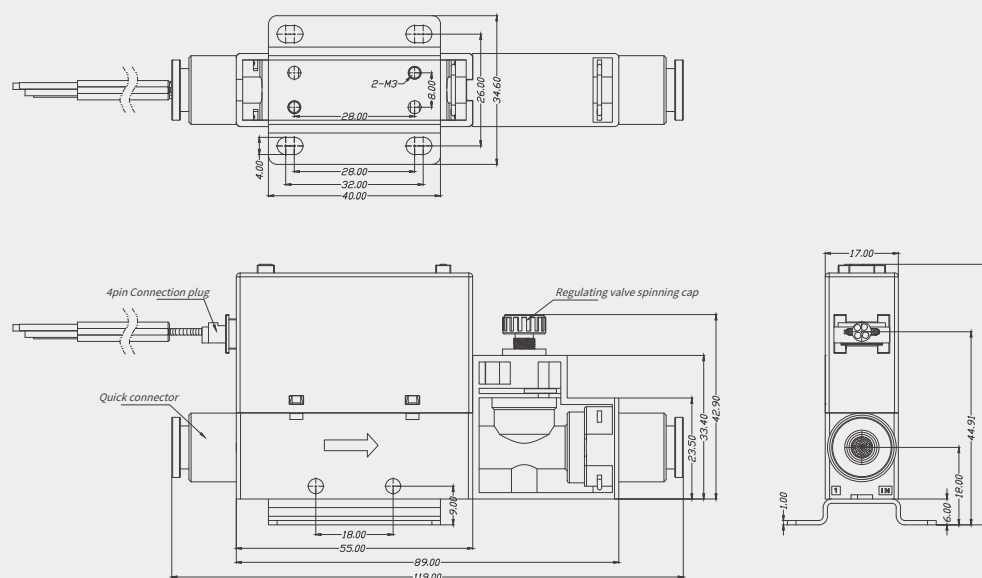
## Regulating valve size diagram (mm)



Internal thread type



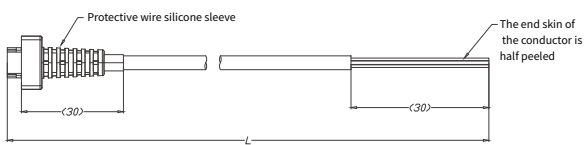
Piping type



## Selection list

| FM 312- | 01 | SV | D6  | - | - | expatiate                                                                          |
|---------|----|----|-----|---|---|------------------------------------------------------------------------------------|
| FM 312- |    |    |     |   |   | FM 312 Gas flow sensor                                                             |
|         | 01 |    |     |   |   | Flow range: 500 mL/min                                                             |
|         | 02 |    |     |   |   | Flow range: 1000 mL/min                                                            |
|         | 03 |    |     |   |   | Flow range: 5 L/min                                                                |
|         | 04 |    |     |   |   | Flow range: 10 L/min                                                               |
|         | 05 |    |     |   |   | Flow range: 50 L/min                                                               |
|         | 06 |    |     |   |   | Flow range: 100 L/min                                                              |
|         | 07 |    |     |   |   | Flow range: 200 L/min                                                              |
|         |    | SV |     |   |   | Output signal: 2 switches + analog 1 ~ 5 V                                         |
|         |    | SA |     |   |   | Output signal: 2 switches + analog 4 ~ 20 mA                                       |
|         |    | SR |     |   |   | Output signal: 2 switches + RS485                                                  |
|         |    |    | D6  |   |   | Nozzle diameter: Ø6mm quick connector, flow range $\leq 50$ L/min                  |
|         |    |    | D8  |   |   | Nozzle diameter: Ø8mm quick connector, flow range 100/200L/min                     |
|         |    |    | R18 |   |   | Nozzle diameter: Rc $\frac{1}{8}$ pipe tooth connector, flow range $\leq 50$ L/min |
|         |    |    | R14 |   |   | Nozzle diameter: Rc $\frac{1}{4}$ pipe tooth joint, flow range 100/200L/min        |
|         |    |    |     | - |   | optional                                                                           |
|         |    |    |     | T |   | BT-26: Fixed bracket                                                               |
|         |    |    |     | M |   | PA-G: panel connector                                                              |
|         |    |    |     |   | - | Unregulated valve                                                                  |
|         |    |    |     |   | F | With regulating valve                                                              |

## Optional accessories - Electrical accessories

| name                                            | Dimensions drawing (unit: mm)                                                       | material | Model number |
|-------------------------------------------------|-------------------------------------------------------------------------------------|----------|--------------|
| Two meter line with six pin buckle plug (FM312) |  | PVC      | XH6PC02G     |