



# TECHNICAL GUIDANCE

STAINLESS STEEL BODY

## VF-5000

### Vortex Flow Sensor

#### OUTLINE

The VF-5000 Flow Sensor is for the measurement of liquid flow with stainless steel casting (SCS16A).

Simple and compact design with 25mm connection size and the scale range is 20 to 150L/min.

This flowmeter is the most suitable for control of cooling water of various manufacture devices or processes.

Current output model, Pulse output model and Display model with current / alarm outputs are available.



#### FEATURES

##### ❑ Simple and Compact Design

The VF-5000 Flow Sensor is assembled with a few pieces of components. The sensor body and shedder bar (vortex generator) are molded as one component. This design approach has reduced the cost as well as the size and weight of the flowmeter.

Sensor body is made of stainless steel casting (SCS16A) and is designed to eliminate deposits.

##### ❑ No Maintenance Cost

Since the VF-5000 has no moving parts, no maintenance is needed.

##### ❑ 3 models are lined-up.

##### Current output model

4 to 20mA output (3-wire)

##### Pulse output model

Open collector output (Unscaled pulse)

##### Display + Current output model

4 to 20mA output (3-wire), LED indicator, 2 points alarm output (Open collector)

#### OPERATING PRINCIPLE

A bluff body or Shedder bar in the flow generates a street of vortices downstream. The VF-5000 Flow Sensor measures the flow rate by counting the number of vortices with a piezoelectric sensor.

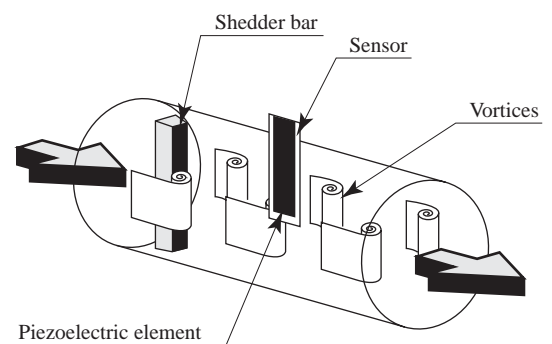


Figure 1

## STANDARD SPECIFICATION

| SPECIFICATION            | TYPE         | Current Output Model  | Pulse Output Model  | Display + Current Output Model  |
|--------------------------|--------------|---|---|---|
|                          |              | VF-5015-E11   | VF-5025-E11   | VF-5035-E11   |
| Measuring fluid          |              | Water, Chemical liquid (low viscosity)  |   |   |
| Flow range               |              | 20 to 150L/min or 5.5 to 40GPM  |   |   |
| Process connection       |              | Rc1 Taper pipe threads (Female)   |   |   |
| Accuracy *1              |              | ±3% F.S.  |   | ±3% F.S. (±1 digit)   |
| Reproducibility          |              | ±0.5% F.S.  |   |   |
| Fluid pressure           |              | 1MPa (Max.)   |   |   |
| Fluid temperature        |              | 0 to 90°C   |   | 0 to 90°C<br>[Refer to Figure 2]  |
| Ambient temperature      |              | 0 to 50°C   |   | 0 to 50°C<br>[Refer to Figure 2]  |
| Ambient humidity         |              | 5 to 90%RH  |   |   |
| Power supply             |              | DC10.8 to 26.4V DC  |   |   |
| Power consumption        |              | 1W  | 0.5W  | 2W  |
| Display                  | Flow rate    | -   |   | 3-digit LED   |
|                          | Alarm        | -   |   | 2 LED   |
| Display resolution       |              | -   |   | 1L/min or 1GPM  |
| Output                   |              | <ul style="list-style-type: none"> <li>● Current output</li> <li>4 to 20mA (3-wire)</li> <li>Load:</li> <li>0 to 250 ohms at 12V DC</li> <li>250 to 600 ohms at 24V DC</li> <li>[Refer to Figure 3]</li> <li>Damping Time Constant:</li> <li>1s (63% Response)</li> </ul> | <ul style="list-style-type: none"> <li>● Pulse output</li> <li>[Unscaled pulse]</li> <li>Open collector</li> <li>Load rating:</li> <li>Max.10mA/30V DC</li> <li>Pulse duty factor:</li> <li>approx. 50%</li> <li>Output frequency:</li> <li>900Hz at 150L/min</li> <li>908Hz at 40GPM *1</li> <li>Damping time constant:</li> <li>Less than 1s</li> <li>(63% Response)</li> </ul> | <ul style="list-style-type: none"> <li>● Current output</li> <li>4 to 20mA (3-wire)</li> <li>Load: 0 to 250 ohms at 12V DC</li> <li>250 to 600 ohms at 24V DC</li> <li>[Refer to Figure 6]</li> <li>Damping time constant:</li> <li>Sampling time 0.5s +</li> <li>Damping time constant 2.5s</li> <li>● Alarm output</li> <li>Alarm-1 and Alarm-2</li> <li>Open collector</li> <li>Load rating: Max.80mA/30V DC</li> <li>Hysteresis: Equal to display resolution</li> </ul> |
| Cable                    |              | 0.2mm <sup>2</sup> × 3C (AWG24), 3m, Outside diameter 3.5mm<br>(Soldered end finish)  |   | 0.2mm <sup>2</sup> × 5C (AWG24), 3m,<br>Outside diameter 4.5mm<br>(Soldered end finish)   |
| Enclosure Classification |              | IP64  |   |   |
| Material                 | Wetted part  | Sensor body   | Stainless steel casting (SCS16A)  |   |
|                          |              | Sensor  | Piezoelectric element molded with PPS   |   |
|                          |              | O-ring  | EPDM  |   |
|                          | Cover        | Poly-butylene terephthalate (PBT)   |   |   |
|                          | Cable sheath | Heat resistant PVC  |   |   |
| Mass                     | Meter        | 910g  |   | 950g  |
|                          | Cable        | 75g   |   | 90g   |
| Min. Straight Pipe Run   |              | Upstream: 10D, Downstream 5D (D: Nominal pipe size = 25mm)  |   |   |

\*1 Conditions for calibration

Fluid: Water, Fluid temperature: 25°C, Ambient temperature: 25°C, Supply voltage: 24V DC

**Fluid and Ambient Temperature Range**

(only for Display + Current Output Model VF-5035)

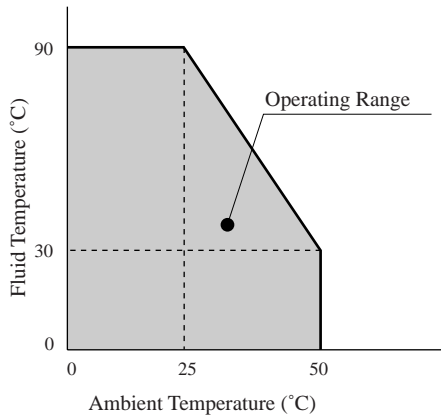


Figure 2

**Load Resistance Range**

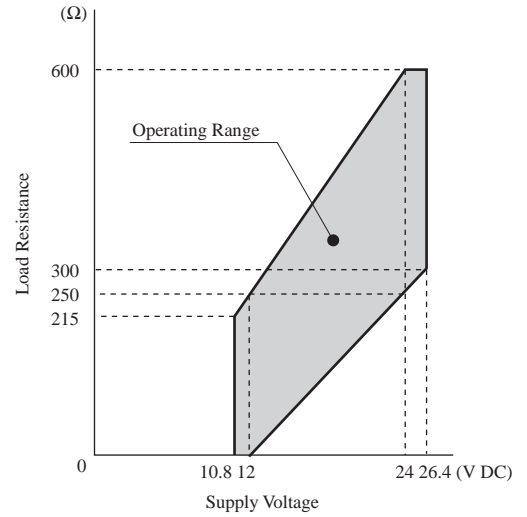
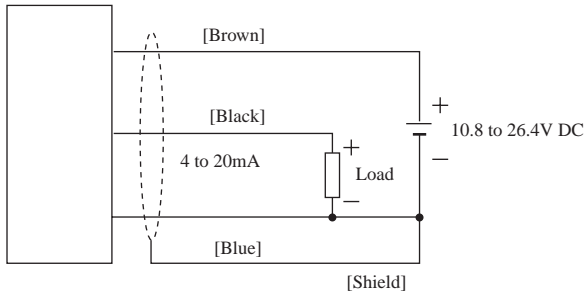


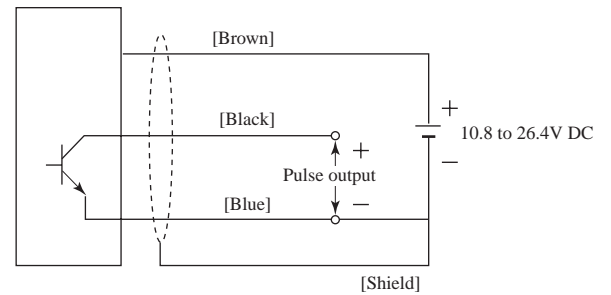
Figure 3

**WIRING DIAGRAM**

● Current Output Model [VF-5015]



● Pulse Output Model [VF-5025]



● Display + Current Output Model [VF-5035]

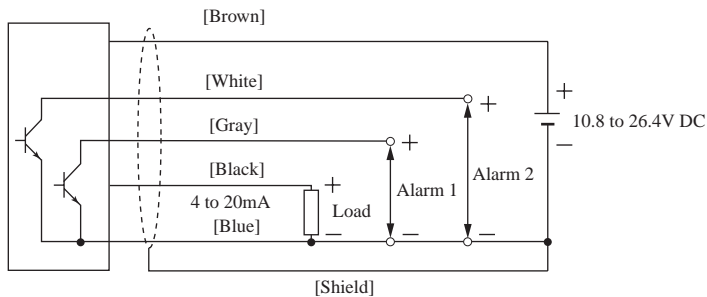


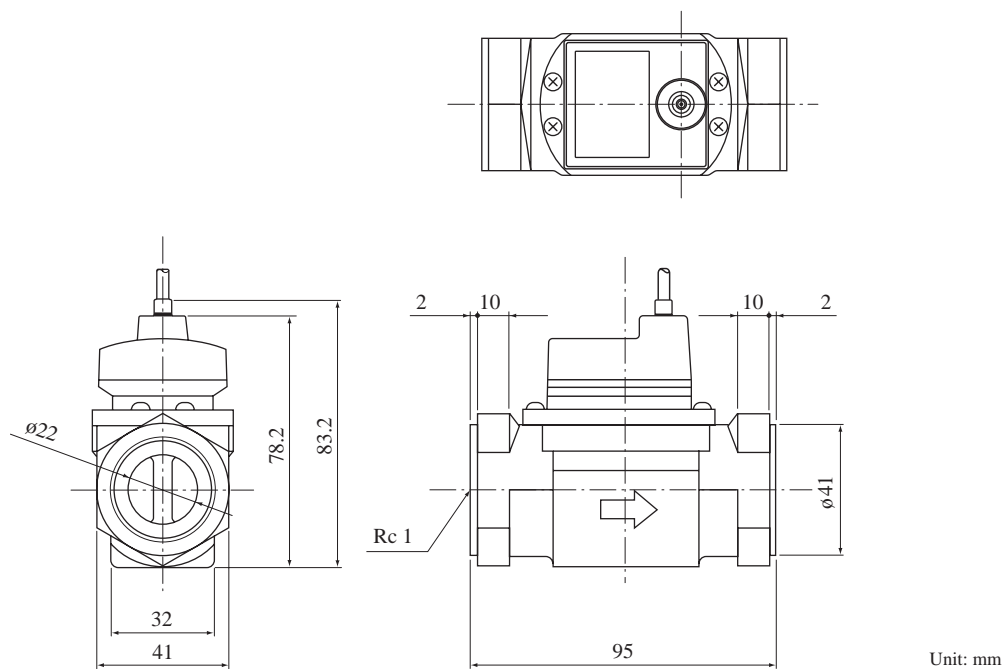
Figure 4

## MODEL CODE

|                    |                          |   |    |   |   |   |
|--------------------|--------------------------|---|----|---|---|---|
| VF-50              | <input type="checkbox"/> | 5 | -E | 1 | 1 |   |
| Output             | 1                        |   |    |   |   | Current output: 4 to 20mA   |
|                    | 2                        |   |    |   |   | Pulse output: Open collector (Unscaled pulse)   |
|                    | 3                        |   |    |   |   | Display: Flow rate (3-digit LED), Alarm (2 LED)<br>Current output: 4 to 20mA, Alarm output: Open collector (2 points) |
| Flow range         | 5                        |   |    |   |   | 20 to 150L/min or 5.5 to 40GPM  |
| O-ring             |                          |   | -E |   |   | EPDM  |
| Process connection |                          |   |    | 1 |   | Taper Pipe Threads Rc1  |
| Flow unit          |                          |   |    | 1 |   | L/min   |
|                    |                          |   |    | 2 |   | GPM   |

## OUTLINE DIMENSIONS

(Current output model, Pulse output model)



Unit: mm

## ORDERING INSTRUCTIONS

Specify the following when ordering:

1. Model code
2. Fluid name

\*Specification subject to change without notice

**TOKYO KEISO CO., LTD.**

Head Office : Shiba Toho Building, 1 - 7 - 24 Shibakoen, Minato-ku, Tokyo 105 - 8558

Tel : 03 - 3431 - 1625 (KEY) ; Fax : 03 - 3433 - 4922

e-mail : overseas.sales@tokyokeiso.co.jp ; URL : <http://www.tokyokeiso.co.jp>