

# TK TECHNICAL GUIDANCE

Cost-effective instrument

## VF-2000

Vortex Flow Sensor

The VF-2000 Flow Sensor offers a cost-effective instrument for the measurement of liquid flow.

A simple and compact design makes the VF-2000 a good choice for the measurement of water, pure water, cooling water.

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



### Features

#### □ Simple and Compact Design

The VF-2000 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 PPS (Polyphenylene sulfide) and is designed to eliminate deposits.

#### □ No Maintenance Cost

Since the VF-2000 has no moving parts, no maintenance is needed.

#### □ Low Pressure Loss

A combination of straight flow path and Shedder bar gives a lower pressure loss compared with other types of flowmeters.

#### □ Display Model with Current and Alarm Output

3-digit LED display for flow rate, current output and alarm outputs (2-point) are provided in compact design.

#### □ CE Marking

The VF-2000 meets the EC directive for CE mark.

### Operating Principle

A bluff body or Shedder bar in the flow generates a street of vortices downstream. The VF-2000 Flow Sensor measures the flow rate by counting the number of vortices with a piezoelectric sensor.

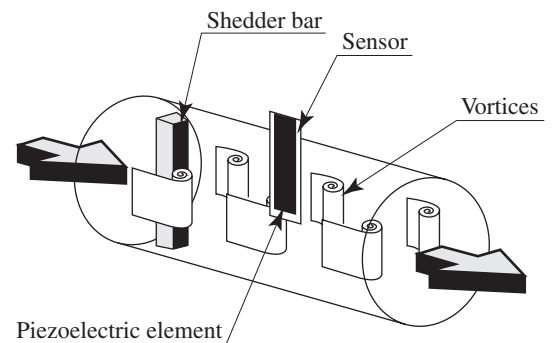


Figure 1

### Construction

●VF-201□

●VF-202□

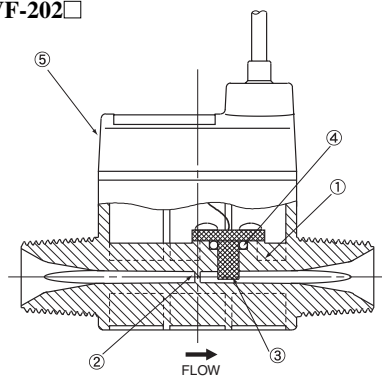


Figure 2

Part No.	Name
1	Sensor body
2	Shedder bar (cast with Sensor body)
3	Sensor
4	O-ring
5	Cover

## Specifications

Specifications		Model			
		Current Output Model	Pulse Output Model		Display and Current Output Model
		VF-201□	VF-202□		VF-203□
<b>Measurable Fluid</b>		Pure water, Water			
<b>Accuracy *1</b>		±3%F.S.		±3%F.S (1 digit)	
<b>Repeatability</b>		±0.5%F.S			
<b>Fluid Pressure</b>		0 to 1MPa			
<b>Fluid Temperature</b>		0 to 70°C		0 to 70°C (Refer to Figure 3)	
<b>Ambient Temperature</b>		0 to 50°C			
<b>Ambient Humidity</b>		5 to 90%RH			
<b>Power Supply</b>		10.8 to 26.4 VDC			
<b>Rated Power</b>		1W	0.5W	2W	
<b>Display</b>	<b>Flowrate</b>	-		3-digit LED	
	<b>Alarm</b>	-		2 LED (Alarm-1, Alarm-2)	
<b>Display Resolution</b>	<b>VF-2031</b>	-		0.01 L/min or 0.01 GPM	
	<b>VF-2032</b>	-		0.1 L/min or 0.01 GPM	
	<b>VF-2033</b>	-		0.1 L/min or 0.1 GPM	
<b>Output</b>		Current output 4 to 20mA (3-wire) (0 to maximum flow) Load: 0 to 250 ohms at 12VDC 250 to 600 ohms at 24VDC (Refer to Figure 4) Damping Time Constant 1 sec (63% response)	Unscaled pulse output Open collector, Max. 10mA/30VDC Pulse duty factor; approx. 50%		Current output 4 to 20mA (3-wire) (0 to maximum flow) Load: 0 to 250 ohms at 12V DC 250 to 600 ohms at 24V DC (Refer to Figure 4) Damping Time Constant 1 sec (63% response) Alarm output Alarm-1 and Alarm-2 Open collector, Max. 80mA/30V DC Hysteresis; equal to display resolution
			Output frequency at 100% flow		
			VF-2021 - F01	800Hz at 4 L/min	
			VF-2021 - F02	757Hz at 1 GPM	
			VF-2022 - F01	800Hz at 16 L/min	
			VF-2022 - F02	757Hz at 4 GPM	
			VF-2023 - F01	584Hz at 40 L/min	
VF-2023 - F02	553Hz at 10 GPM				
<b>Cable</b>		0.2mm <sup>2</sup> x 3C (AWG24), 3m, Outside diameter 3.5mm (Soldered end finish)		0.2mm <sup>2</sup> x 5C (AWG24), 3m, Outside diameter 4.5mm, (Soldered end finish)	
<b>Mass</b>	<b>Meter</b>	60g		80g	
	<b>Cable</b>	75g		90g	
<b>Enclosure Classification</b>		IP64			
<b>Flow Range</b>	<b>VF-20□1</b>	0.5 to 4 L/min or 0.13 to 1 GPM			
	<b>VF-20□2</b>	2 to 16 L/min or 0.5 to 4 GPM			
	<b>VF-20□3</b>	4 to 40 L/min or 1 to 10 GPM			
<b>Max. Pressure loss</b>		40kPa			
<b>Min. Straight Pipe Run</b>		Upstream : 10D, Downstream : 5D (D : Nominal pipe size)			
<b>Process Connection</b>	<b>VF-20□1</b>	Taper pipe threads (JIS B 0203 / ISO 7/1) : Equivalent to R3/8"			
	<b>VF-20□2</b>	Taper pipe threads (JIS B 0203 / ISO 7/1) : Equivalent to R1/2"			
	<b>VF-20□3</b>	Taper pipe threads (JIS B 0203 / ISO 7/1) : Equivalent to R1/2"			
<b>Materials</b>	<b>Wetted part</b>	<b>Sensor body</b>	Polyphenylene sulfide (PPS)		
		<b>Sensor</b>	Piezoelectric element molded with PPS		
		<b>O-ring</b>	Fluorine rubber (FKM)		
		<b>Cover</b>	Poly-butylene terephthalate (PBT)		
		<b>Cable sheath</b>	Heat-resistant PVC		

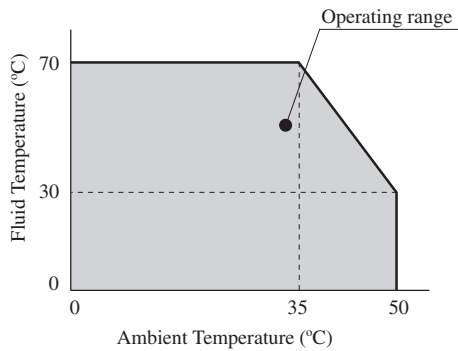
### \*1 Conditions for calibration

Fluid : Water, Fluid temperature : 20°C

Ambient temperature : 23 °C, Supply voltage : 24 VDC

**Fluid and Ambient Temperature Range**

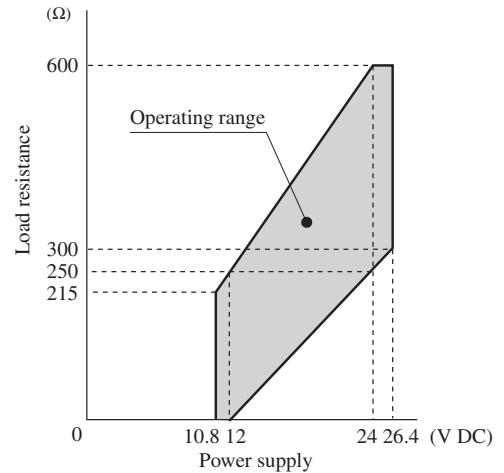
(only for Display type VF-203□)



**Figure 3**

**Range of load resistance**

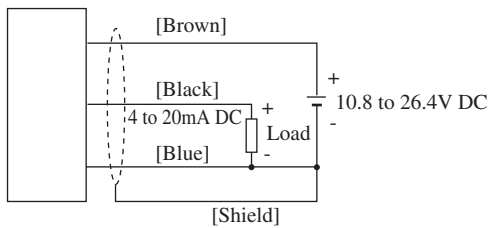
(VF-201□, VF-203□)



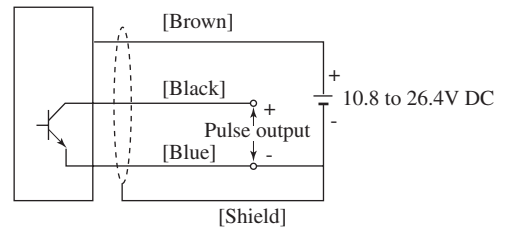
**Figure 4**

**Wiring Diagram**

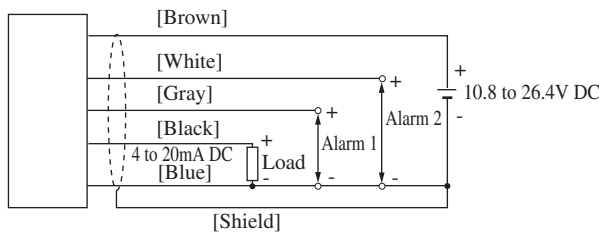
● Current Output Model (VF-201□)



● Pulse Output Model (VF-202□)



● Display / Current Output Model (VF-203□)



**Figure 5**

**Model Code**

Model Code						Description
VF - 20	□	□	- □	□	□	
Type/Output	1					Current output : 4 to 20mA DC
	2					Pulse output : Open collector (Unscaled)
	3					Display : Flow rate (3-digit LED), Alarm (2 LED) Current output : 4 to 20mA DC Alarm output : Open collector (2 points)
Nominal Size :	1					6 mm : 0.5 - 4 L/min or 0.13 - 1GPM ; 3/8"
Flow Range ;	2					10 mm : 2 - 16 L/min or 0.5 - 4GPM ; 1/2"
Connection Size	3					15 mm : 4 - 40 L/min or 1 - 10GPM ; 1/2"
O-ring Material			- F			Fluorine rubber (FKM)
Process Connection				0		Taper Pipe Threads Equivalent to R3/8 or Eguivalent. to R1/2 (JIS B 0203 / ISO 7/1)
Flow Unit				1		L/min
				2		GPM

● Accessory Code

/RCT	Rc / Rc (Internal thread) Adapter [Material : 316 Stainless Steel]
/NPT	Rc / NPT (Internal thread) Adapter [Material : 316 Stainless Steel]

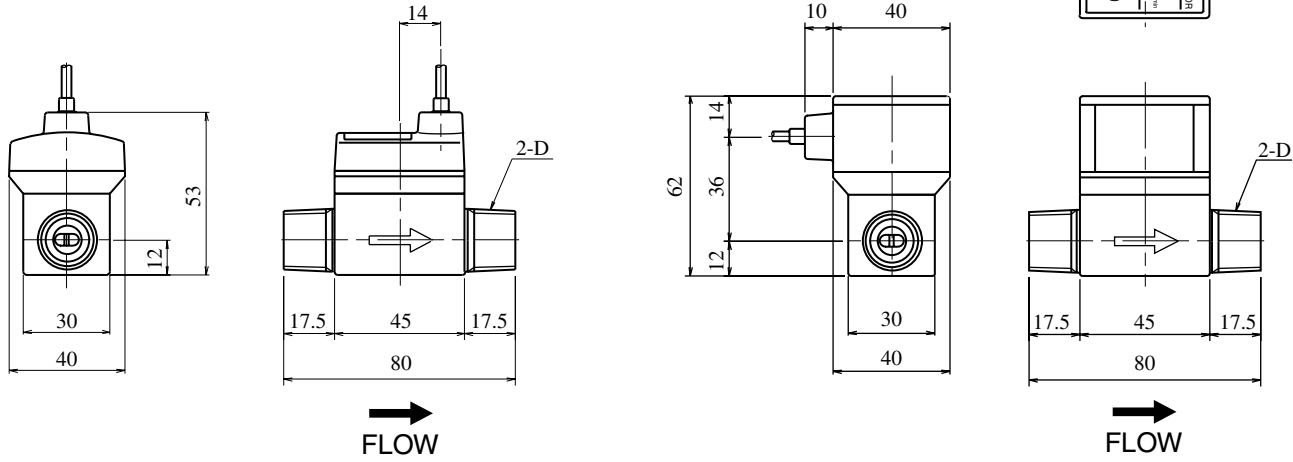
■ Model Code Example : VF-2011-F01 / NPT

## Outline Dimensions

●VF-201□

●VF-202□

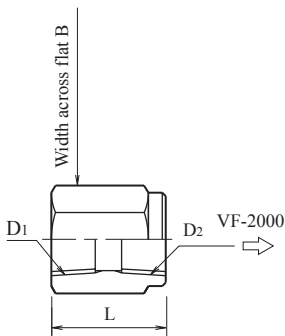
●VF-203□



Model	Thread D
VF-20□1	Equivalent to R3/8
VF-20□2	Equivalent to R1/2
VF-20□3	Equivalent to R1/2

Figure 6

## Adapter



□ Model □	L □	B □	D1 □	D2 □	Mass(g)/1pc. □
VF-20□1 □	28 □	22 □	Rc3/8 or 3/8NPT □	Rc3/8 □	50 □
VF-20□2 □	33 □	27 □	Rc1/2 or 1/2NPT □	Rc1/2 □	85 □
VF-20□3					

Figure 7

## Ordering Instructions

Specify the following when ordering:

1. Model code
2. Fluid name

\* Specification is subject to change without notice.

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