



# TECHNICAL GUIDANCE

Contamination and corrosion free

## VF-4000

All PFA Vortex Flowmeter

### General

The VF-4000 is a Karman vortex flowmeter, sensing vortices by ultrasonic sensors from outside of the flow pipe. It has no liquid pocket and all wetting part is made of High Quality PFA, specially designed to meet the demands of semiconductor production lines and equipment, where the utmost cleanness and chemical resistivity are required. Flow rate and total flow indication, current, pulse and alarm outputs are available as standard.

### Features

- ❑ Designed for Cleanness  
Sensor body is made of High Quality PFA (NEOFLON®AP-211SH)\*1 and has no cavities inside.
- ❑ Vortex Detection with Ultrasonic Sensors  
Vortices are counted by ultrasound with sensors mounted outside the meter tube.
- ❑ Dual Output with Flow Alarm  
Both current and pulse outputs as well as an alarm contact are provided as standard.
- ❑ Light Weight, Compact Design
- ❑ Built-in Indicator  
Local indicator is integrally mounted for flow rate, totalizer and alarm.
- ❑ CE Marking

### Operating Principle

A bluff body or shedder bar in the flow generates a street of vortices downstream. The VF-4000 Vortex Flowmeter measures the flow by counting the number of vortices by ultrasonic sensors. The ultrasonic sensors are placed outside of the pipe just after the shedder bar. The vortices will modulate the frequency of ultrasound passing across the pipe. The electronics circuit can count the vortices from outside of the pipe

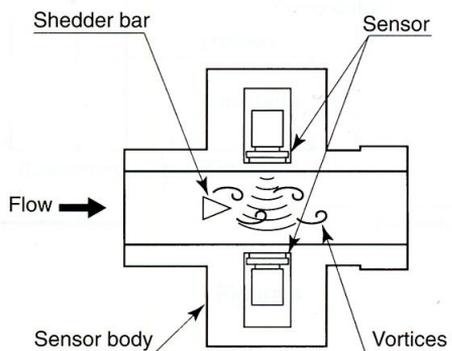


Figure 1.



### Specifications

- Measurable Fluid : Water, Pure water, Ultra-pure water, Chemicals, any liquids with low viscosity
- Flow Range : 3 to 70 L/min or 0.8 to 18 GPM \*2
- Accuracy : (In case of water)\*2 \*3

	Flow rate Q (L/min)	Accuracy
Standard	8 ≤ Q ≤ 70	± 3% of reading
	3 ≤ Q ≤ 8	± 3% of FS
Optional	8 ≤ Q ≤ 70	± 1% of reading
	3 ≤ Q ≤ 8	± 1% of FS

- Repeatability : ± 0.2 % of reading (≥ 8L/min)
- Fluid Temperature : -20 to 100 °C (-4 to 212 °F)  
(No freezing or boiling)
- Fluid Pressure : 0 to 0.5 MPa at 25 °C (77°F)  
(Refer to Figure 2.)
- Ambient Temperature : -20 to 60 °C (-4 to 140 °F) (Refer to Figure 3.)
- Power Supply : 10.8 to 26.4 V DC, 50mA
- Current Output : 4 to 20 mA DC,  
Max. load 670 ohms at 24V DC supply  
(Refer to Figure 5.)
- Pulse Output : Open collector  
Max. 30V DC / 50mA, Pulse width 2 ms  
Pulse weight 1 L/pulse or 1 gallon/pulse

\*1 NEOFLON® is a registered trademark of DAIKIN INDUSTRIES, LTD.

\*2 Flow range and accuracy:

In case of water (kinematic viscosity 10<sup>-6</sup> m<sup>2</sup>/s)

The measurable minimum flow rate varies proportional to the kinematic viscosity of the fluid.

\*3 Conditions for calibration :

Fluid: Water, Fluid temperature: 20 °C,

Ambient temperature: 23°C, Supply voltage: 24V DC

- Alarm Output : 1 point, open collector  
Max. 30V DC / 50mA
- Damping Time Constant : 3 s (63% response)  
Adjustable 1 to 99 sec
- Display : LCD  
4 display modes are selectable by magnet bar:
  - ① Totalizer without reset (8 digits)
  - ② Flow rate / hour (max. 5 digits)
  - ③ Flow rate / minute (max. 5 digits)
  - ④ Totalizer with reset (7 digits)
- Alarm Indication : Red LED
- Cable : 5 cores screened cable 0.25mm<sup>2</sup> (AWG.23),  
3m long, outside diameter 6.3mm
- Protection Class : IP65
- Process Connections : 3/4" (OD 19.05 mm) PFA Tube End  
FLARETECK  
PILLAR [SUPER TYPE PILLARFITTING]  
PILLAR [SUPER 300TYPE PILLARFITTING]  
FINALLOCK  
Flowell  
(Refer to Model Code)

- Min. Straight Pipe Run :  
Upstream;

Conditions	Straight Pipe Run
Elbow, Reducer	Not required.
Valve, Expander	20D

[D: Nominal meter size (15mm)]

Downstream; No straight section is required.

Note: A flow control valve should be installed in the downstream side of the flowmeter.

- Material :

Parts		Material
Wetted part	Sensor body	PFA (NEOFLON®AP-211SH)
Cover		Polycarbonate
Cable gland		Polystyrene
Cable sheath		PVC

- Mass : Meter: 270 to 340 g  
(depending on type of fitting)  
Cable: 180 g

### Fluid Pressure and Temperature Range

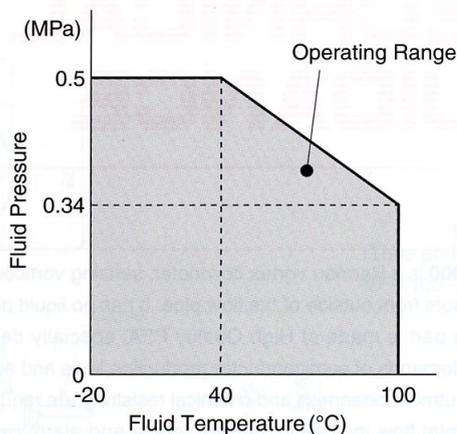


Figure 2.

### Ambient Temperature Range

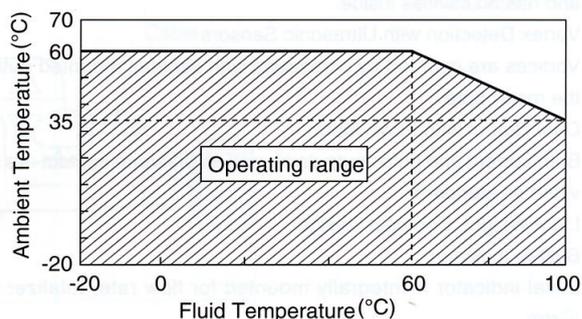
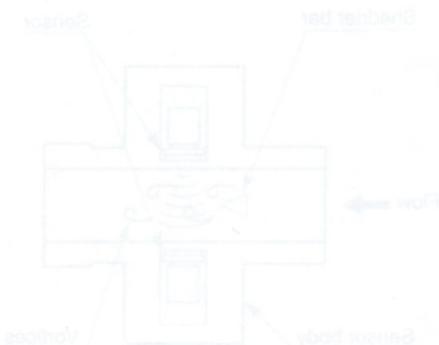


Figure 3.

### Accessories

- Magnet bar for display change and parameters set : 1 piece



**Model Code**

Model Code				Description	
VF-41	0	3	- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Type/Output	0			With Display : 4 to 20 mA DC, Pulse and Alarm output	
Nominal Size ; Connection Size		3		15 mm ; 3/4"	
Accuracy		- 0		Standard (± 3 % of reading)	
		- 1		Special calibration (± 1 % of reading)	
Process Connection		0		PFA Tube End	[Standard]
		1		FLARETECK	
		2		PILLAR [SUPER TYPE PILLARFITTING]	
		3		FINALLOCK	
		4		Flowell [ 20 Series Tube Fittings ]	
		5		Flowell [ 20A Series Tube Fittings ]	
		6		Flowell [ 60 Series Tube Fittings ]	
		7		PILLAR [SUPER 300 TYPE PILLARFITTING]	
Flow Unit		1		L/min	
		2		GPM	

**Wiring Diagram**

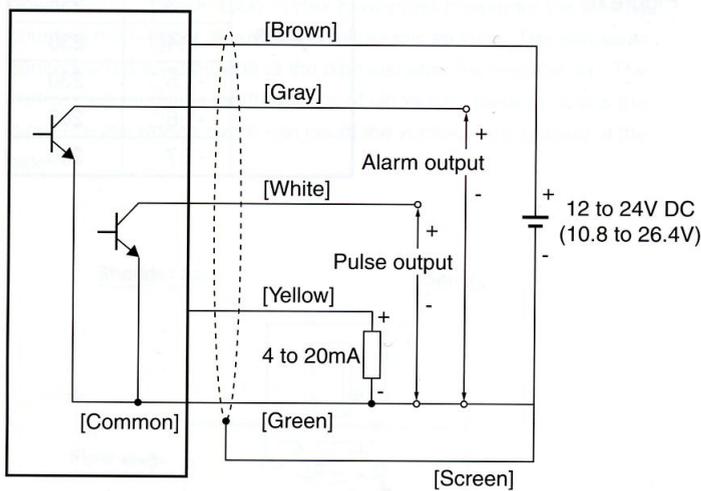


Figure 4.

**Load Resistance Range for Current Output**

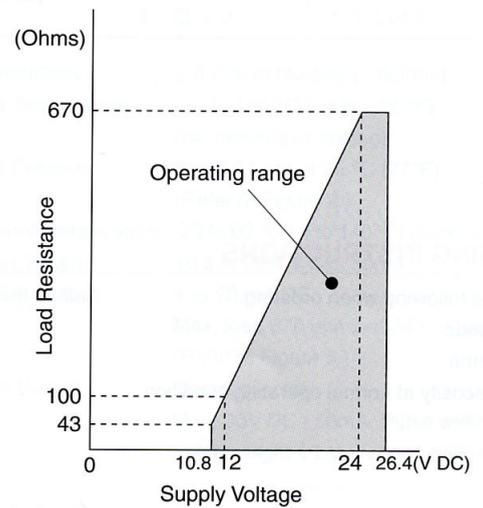


Figure 5.

Outline Dimensions

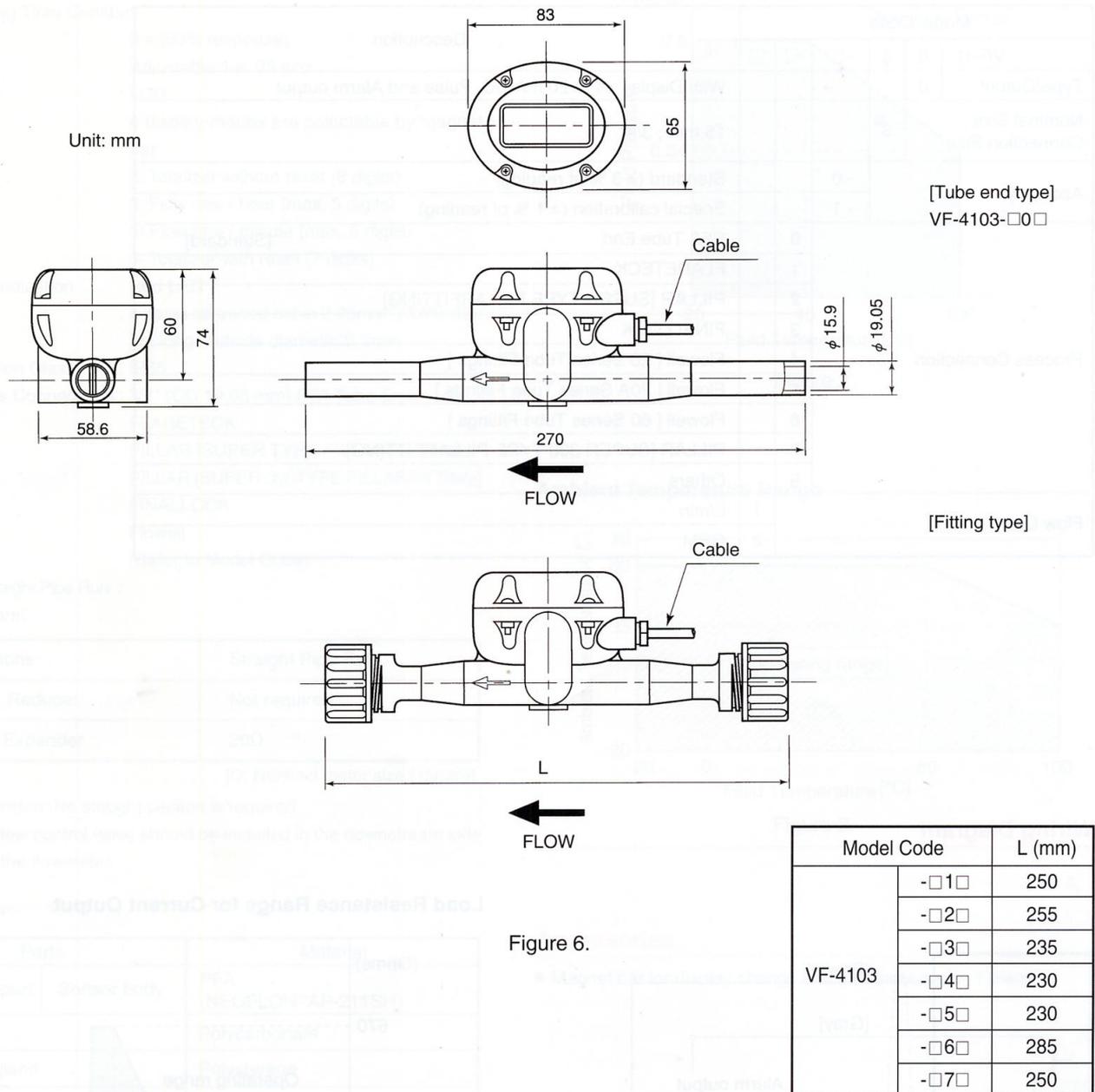


Figure 6.

ORDERING INSTRUCTIONS

Specify the following when ordering:

1. Model code
2. Fluid name
3. Fluid viscosity at normal operating condition

\* Specification subject to change without notice

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