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	Compact Electromagnetic Flowsensor		Model	VN□□R

1. Specifications

Model		VN05R	VN10R	VN20R
Nominal diameter		5mm	10mm	20mm
Accuracy guaranteed flow-rate range		0.05 to 1 L/min	0.5 to 10 L/min	3.0 to 60 L/min
Maximum working flow-rate		3 L/min	25 L/min	100 L/min
Low flow cutoff		0.025 L/min	0.25 L/min	1.5 L/min
Accuracy (at fluid temperature 25°C)	Frequency pulse	±2.5% RS: 20 to 100% of the maximum accuracy guaranteed flow-rate ±0.5% FS: 5 to 20% of the maximum accuracy guaranteed flow-rate		
	Unit pulse	±2.0% RS: 20 to 100% of the maximum accuracy guaranteed flow-rate ±0.4% FS: 5 to 20% of the maximum accuracy guaranteed flow-rate		
Repeat accuracy		±2.0% FS: 3σ under the following conditions (Output deviation per sec, response 2 sec, frequency pulse)		
Temperature characteristics		±2.0% RS: 20 to 100% of the maximum accuracy guaranteed flow-rate ±0.4% FS: 5 to 20% of the maximum accuracy guaranteed flow-rate		
Conductivity characteristics		±1.5% RS: 20 to 100% of the maximum accuracy guaranteed flow-rate ±0.3% FS: 5 to 20% of the maximum accuracy guaranteed flow-rate		
Fluid to be measured		Conductive fluid which does not corrode wetted parts (e.g., cold and warm water)		
Fluid conductivity range		50μS/cm or higher		
Fluid temperature range		0 to +60°C (No freezing)		
Working ambient temperature/humidity range		-20 to +60°C 35 to 85% RH (No dew condensation)		
Storage ambient temperature range		-20 to +70°C		
Maximum working pressure		1MPa		
Pressure drop (at the accuracy guaranteed maximum flow-rate)		20kPa or less		
Common pulse output specifications		NPN open collector pulse Maximum load: 30VDC 20mA ON-time residual voltage: 1V or less		
Output 1 ²	High-density pulse ^{*1}	Duty ratio :50%	Standard 200.0Hz (Adjustable at factory from 20 to 400Hz in 0.1Hz steps) Note: When ASI-100 is connected, select 200.0Hz for Output 1.	
	Unit pulse		0.001L/P (standard)	0.01L/P (standard)
	Alarm ^{*3}	Select from Normal Open (standard) and Normal Close. Alarm can be set at factory for each of "Excitation Error/Memory Error/ Low power supply voltage/No water/Excessive Fluid Noise/ Reverse Flow/Excessive Flow."		
	Switch ^{*4}	Select from Normal Open (standard) and Normal Close. Level judgment value: Adjustable at factory from 0 to 100% of the maximum accuracy guaranteed flow rate in 1% steps		
Output 2 ²	Unit pulse	Same as Output 1		
	Alarm ^{*3}	Same as Output 1 Note: When ASI-100 is connected, select Alert for Output 2.		
	Switch ^{*4}	Same as Output 1		

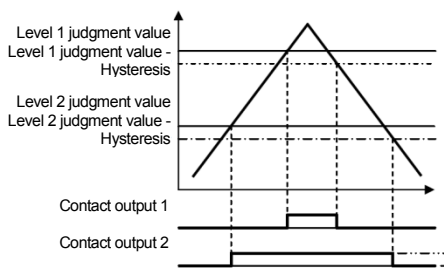
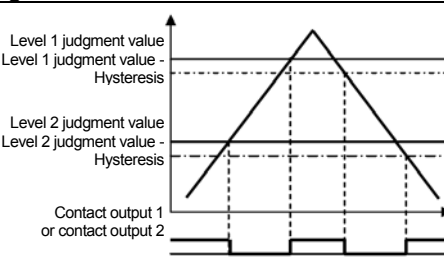
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Model		VN05R	VN10R	VN20R
Response-ability		63% response Dumping time: 2 seconds (standard) Adjustable at factory from 1 to 99 seconds in 1second steps.		
Cable	Basic specifications	Cable length: 500mm, 4-core AWG28, outer diameter Φ2.8, shielded		
	Terminal processing	Coating is peeled off and core wires are twisted.		
	Wiring	Red: Power supply+ Blue: GND White: Output 1 Yellow: Output 2		
LED display		Single LED on the flowsensor, bicolor LED(green/red) Green: Indicates the flow rate by three blinking speeds Red: Indicates the error status by the number of blinks		
Standard installation position		The position that the LED surface is parallel or perpendicular (from bottom to top) to the ground. (No air shall be in the fluid)		
Flow direction		Arrow direction indicated on the product		
Pipe connection		R 1/4	R 1/2	R 1
Protection grade		Indoor specification (equivalent to IP64)		
Power supply		12 to 24VDC ±10% It is recommended to supply power from an isolated power supply and connect a separate power supply to each VN.		
Current consumption		100mADC or less		
Weight		Approximately 190g	Approximately 190g	Approximately 290g
Main materials (Circled parts are wetted.) ^{*5}		Top and bottom covers	PPS	
	○	Main body casing	PPS	
	○	Electrode	SUS316L	
	○	Grounding ring	SUS316	
	○	O-ring	FKM	
Others		CE Marking product, RoHS directive compliant		

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2. Selection Sheet

* Check of each item to select or enter a value as necessary.

Model		<input type="checkbox"/> VN05R <input type="checkbox"/> VN10R <input type="checkbox"/> VN20R	
Low flow cutoff <small>(In case flow-rate is lower than the specified flow-rate, it is calculated as 0.)</small>		<input type="checkbox"/> Yes (standard): 2.5% FS <input type="checkbox"/> No For "Yes": VN05R: 0.025 L/min, VN10R: 0.25 L/min, VN20R: 1.5 L/min	
Dumping <small>(Enter the number of seconds.)</small>		<input style="width: 50px; height: 20px; border: 2px solid black;" type="text"/> sec	Choose from 1 to 99 seconds (standard: 2 seconds) ★Enter a value in 1-second steps. <small>(In case the product is to be used for batch processing, consult us separately.)</small>
Output type <small>*2</small> Output 1	Output format	<input type="checkbox"/> Normal Open (N.O.: Standard) <input type="checkbox"/> Normal Close (N.C.)	
	<input type="checkbox"/> Frequency pulse* ¹ <small>(In case of use with ASI-100, frequency pulse of 200Hz is recommended.)</small>	<input style="width: 50px; height: 20px; border: 2px solid black;" type="text"/> Hz	20.0 to 400.0Hz (Standard: 200.0Hz) ★The frequency is selectable by 0.1Hz steps.
	<input type="checkbox"/> Unit pulse	●VN05R: <input type="checkbox"/> 0.001L/P(Standard) <input type="checkbox"/> 0.01L/P <input type="checkbox"/> 0.1L/P ●VN10R: <input type="checkbox"/> 0.01L/P(Standard) <input type="checkbox"/> 0.1L/P <input type="checkbox"/> 1L/P ●VN20R: <input type="checkbox"/> 0.1L/P(Standard) <input type="checkbox"/> 1L/P <input type="checkbox"/> 10L/P	
	<input type="checkbox"/> Alarm* ³	For each alert judgment item, the state is normal if nothing is detected and abnormal if any item is detected. Choose items to trigger alerts in 2-1. Alarm Judgment Items below. * In case Alarm is selected for Output 1, choose other than Alarm for Output 2.	
	<input type="checkbox"/> Switch level judgment* ⁴	 <p>This is to judge as normal condition when flow-rate is not more than the set Level1 Judgment Value and as abnormal condition when flow-rate is above the set Level 1 Judgment Value. → Enter the level judgment values in 2-2.Level Judgment Values.</p>	
<input type="checkbox"/> Switchwindow judgment* ⁴	 <p>This is to detect whether flow-rate is within the set upper limit and the set lower limit or falls outside of the range, and to judge as normal condition when flow-rate is not more than the set upper limit and not less than the set and as abnormal condition when flow-rate falls outside of the range. Setting of the upper limit value and the lower limit value can be with either of Level 1 Judgment Value and Level 2 Judgment Value. → Enter the level judgment values in 2-2.Level Judgment Values.</p>		

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Output 2 ^{*2}	Output	<input type="checkbox"/> Normal Open (N.O.: Standard) <input type="checkbox"/> Normal Close (N.C.)	
	Kind of output Choose one of the options. * Standard is Alert.	<input type="checkbox"/> Alarm ^{*3}	Same as Output 1
		*In case of use with ASI-100, Alarm is recommended.	
		<input type="checkbox"/> Unit pulse	Same as Output 1
		<input type="checkbox"/> Switch level judgment ^{*4}	Same as Output 1
<input type="checkbox"/> Switch window judgment ^{*4}	Same as Output 1		

2-1. Alert Judgment Items^{*6}

Excitation Error detection	"Output" only for both LED operation and switch output	
Memory Error detection	"Output" only for both LED operation and switch output	
Low power voltage detection	"Output" only for both LED operation and switch output	
No-water detection	LED operation	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
	Switch output	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
Excessive fluid noise detection	LED operation	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
	Switch output	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
Reverse-flow detection	LED operation	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
	Switch output	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
Excessive flow-rate detection	LED operation	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive
	Switch output	<input type="checkbox"/> Active (Standard) <input type="checkbox"/> Inactive (When a flow-rate which is in between the upper limit flow-rate of the accuracy guaranteed flow-rate range and maximum working flow-rate is always used,)

2-2. Level Judgment Values^{*7}

Level 1 judgment value	<input type="text" value=""/> %	0 to 100% (Standard: 50%) ★ This is selectable by 1% steps.
Level 2 judgment value	<input type="text" value=""/> %	0 to 100% (Standard: 30%) ★ This is selectable by 1% steps.
Hysteresis	<input type="text" value=""/> %	0 to 9% (Standard: 3%) ★ This is selectable by 1% steps.

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*1: Indicates the frequency at the maximum accuracy guaranteed flow rate.

*2: Output 1 and 2 values and selected items are fixed at factory and cannot be changed after installation.

*3: Alarm can be selected for either Output 1 or Output 2 only.

*4: Window judgment is calculated and output by using the set values for Output 1 and 2

*5: Material symbols

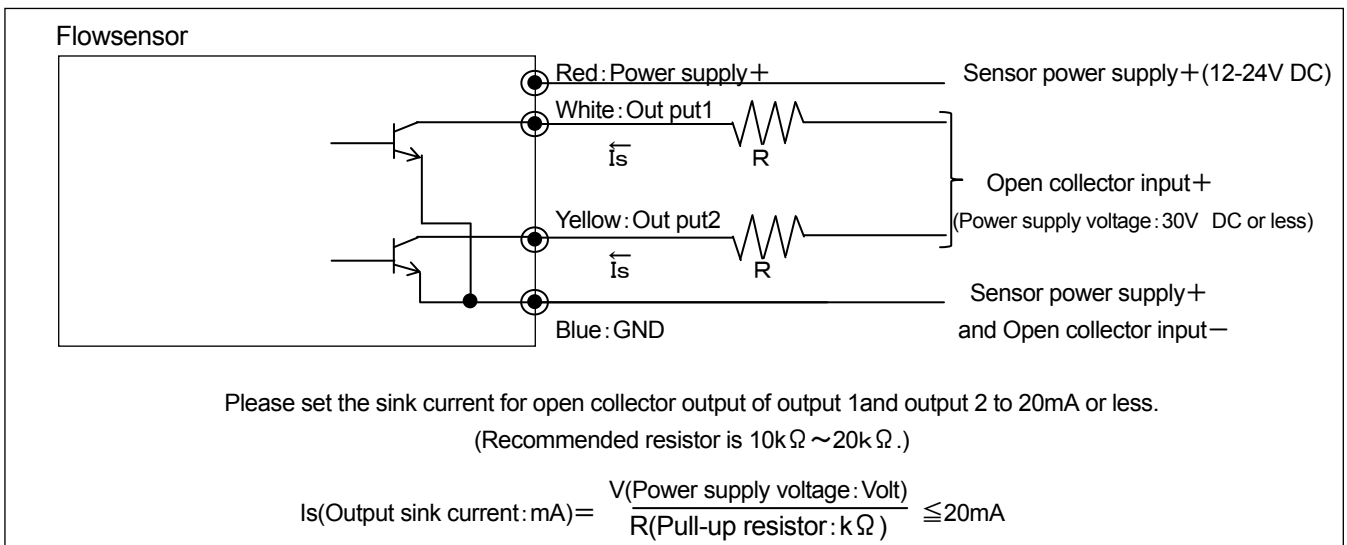
PPS	Polyphenylene Sulfide
FKM	Fluoro Rubber
SUS316	Stainless
SUS316L	Stainless


*6: Description of Alert items

Excitation Error detection	When current does not flow through the excitation coil correctly
Memory Error detection	When a memory data error has occurred
Low power voltage detection	When the power supply voltage has gone lower
No-water detection	When the flowsensor's measuring pipe portion is not fulfilled with water.
Excessive fluid noise detection	When correct fluid measurement is not possible because electricity is flowing through the fluid or bubble is contained in the fluid
Reverse-flow detection	When the fluid is flowing in the direction opposite to the arrow on the flowsensor
Excessive flow-rate detection	When the flow rate exceeds 125% of the upper limit of the accuracy guaranteed flow rate

*7: The maximum flow-rate of the accuracy guaranteed flow-rate range is 100%.

3. Wiring technique



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4. Precautions for handling

Before handling the product, be sure to read the handling manual carefully. And, use the product correctly.

4-1. Working environment, fluid to be measured

- (1) Ensure that the wetted parts' materials have corrosion resistance against fluid to be measured.
- (2) The product cannot be used for non-conducting fluid such as purified water, oil, etc.
- (3) Flowing of electric current in the fluid to be measured may lead to incorrect operation.
- (4) Keep the product away from a strong magnetic field or a source of electric noise.
- (5) The product is not explosion-proof specification. Do not use the product in an explosive atmosphere such as flammable gas, etc.
- (6) Avoid installation at a place exposed to direct sunlight and/or rain (Indoor specification).

4-2. Precautions for piping

- (1) In case of parallel installation of plural pieces of the product, to decrease wavering of flow detection by electromagnetic interference, distance each of them 20cm or more.
- (2) No air shall be in the fluid to be measured. The measurement accuracy is to be affected.
Do not install the product at a place where air accumulation can easily occur (e.g. upstream side of a falling pipe). Also, before start measurement, remove air sufficiently.
- (3) For the installation position of the flowsensor, to avoid influence of air bubbles, dust, dirt, etc., the orientation that makes the flow direction be from bottom to top is recommended.
- (4) Devices such as a flow-rate adjusting valve, etc., which disturb flow shall be installed in the downstream of the flowsensor.
- (5) Avoid installing the product where it is exposed to excessive pressure, such as water hammer, etc.
- (6) In case foreign substances, oil, etc., exist in the piping, install the flowsensor after cleaning inside of the pipe.
- (7) Make sure to align the flow direction of the fluid with the flow direction indicated by the arrow on the main body.
- (8) Around the place of installation, provide enough space for maintenance.

4-3. Wiring

- (1) For a power supply and a remote counter, it is recommended to electrically isolate them from others.