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Winsen FR03H Flow Sensor User Guide

Flow Sensor
FR03H
Version 1.1
Issue Date 2022.02.16
Zhengzhou Winsen Electronic Technology Co., Ltd

Contents

FR03H Flow Sensor

Statement

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Profile

FR03H flow sensor is an upgrading developed from F1012 . It adopts MEMS Thermal principle to monitor the flow of pipeline gas medium. This product adopts low pressure loss design and is widely used for all kinds of gas measurement.

Features

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    High sensitivity
- Very low pickup flow
- High Accuracy
- Low voltage loss;
- Modular design;
- High measurement repeatability;
- Suitable for customization of various products

Technical Parameters

3.1 Structure Parameters
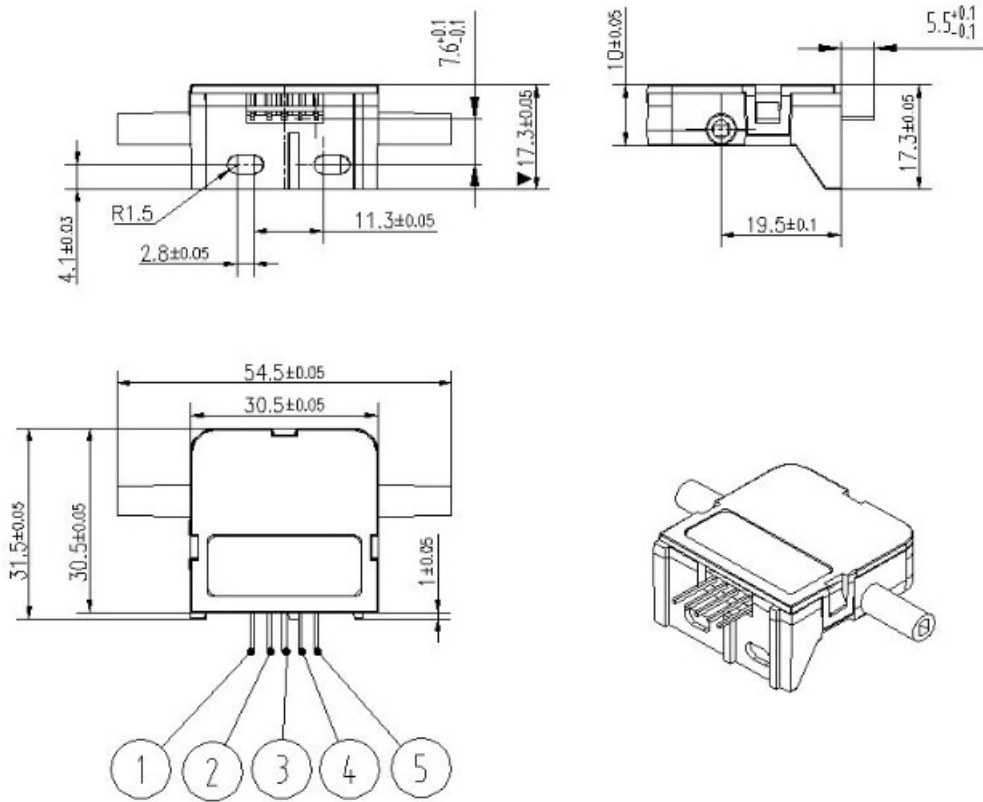
3.2 Electrical Index

Model NO.	FR03H
Full Scale(SLM)	1/2/3/4/5
Drift diameter	DN3
Output Mode	Linearity 0.5V 4.5V(Customization Service)
Output impedance	200Ω
Working Voltage	DC5V 14V
Working Current	≤10mA
Accuracy	±(2+0.5FS)%

Repeatability	0.50%
Output Drift	0.12%/℃
△Pmax	≤600Pa
Working Pressure	≤200kPa
Working Temperature	0℃ 50℃
Storage Temperature	-20℃ 80℃
Measurement Medium	Dry and clean non-corrosive gas
Electrical interface	2.54mm-5P Pin or PH2.0-5PTerminal Optional
Calibration mode	ISO3mm
PIN Definition	Air Calibration 20℃ 101.325kPa

Working Pressure	1	2	3	4	5
		OUT	VCC	GND	

3.2 Calibration
The flow sensor of our company adopts standard condition and air calibration by default. If the user has special requirements, calibrate according to the customer's requirements.

3.2.1 Standard Condition
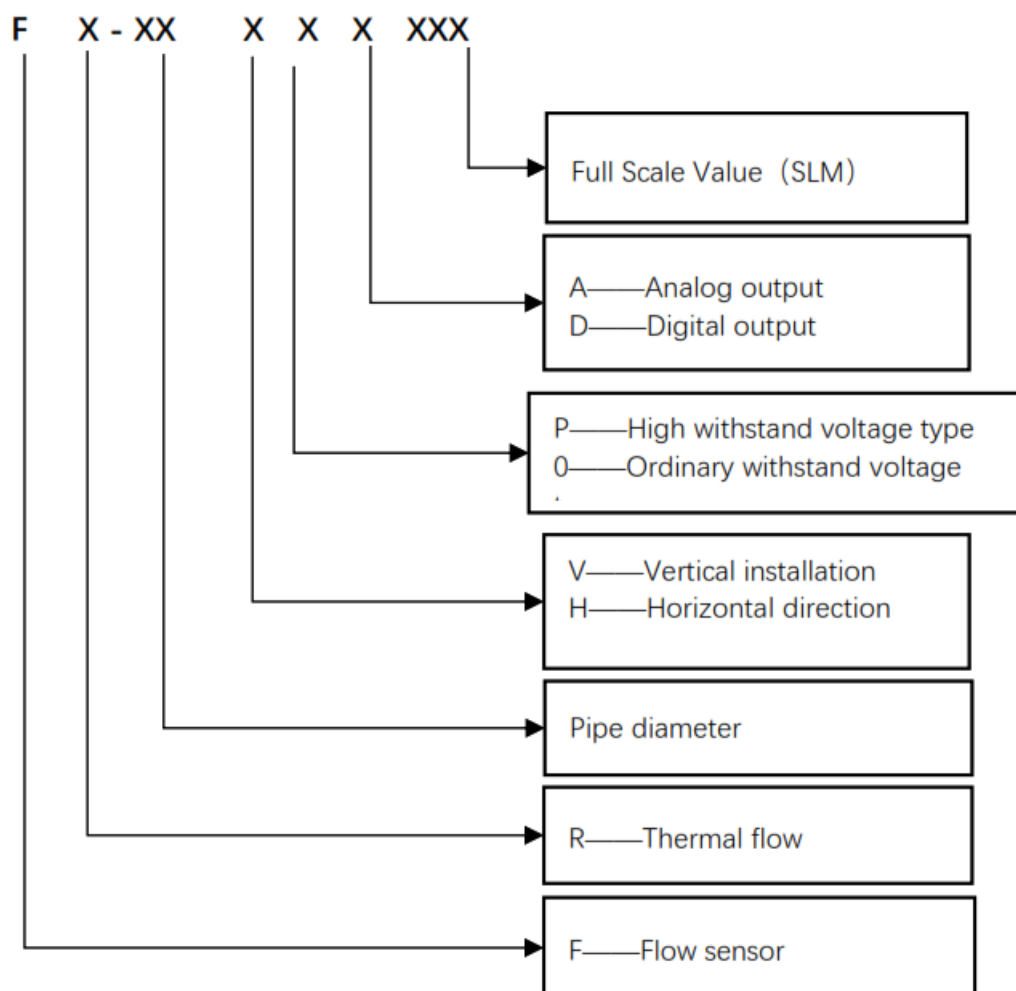Temperature :0℃ Air Pressure: 101.325kPa
SCCM Standard mL/min
SLM Standard L/min
3.2.2Manufacture Environment
Manufactured and calibrated in environment with temperature of 22±2℃,Purify and 30% 35% RH.

Naming Rule

F X - XX X X X XXX

Field	Description
Full Scale Value (SLM)	
A——Analog output D——Digital output	
P——High withstand voltage type 0——Ordinary withstand voltage	
V——Vertical installation H——Horizontal direction	
Pipe diameter	
R——Thermal flow	
F——Flow sensor	

Output Calculation

Actual flow=full scale * (sensor actual output voltage-zero output voltage) / (full scale output voltage-zero output voltage) For example: the sensor full scale is 2 SLM, the sensor zero output voltage is 0.5V and full scale output voltage is 4.5V, and the actual output is 2.5V. Then the actual flow=2 SLM * (2.5V – 0.5V)/(4.5V- 0.5V) = 0.75SLM

Cautions

6.1 The gas used must be purified to avoid dust, liquid and oil stain. If necessary, a filtering device can be installed in the gas circuit.
6.2 The medium used must be dry and clean non-corrosive gas.
6.3 The pressure of the medium used shall not exceed 1.2 times of the maximum working pressure of the product.
6.4 In order to ensure the measurement accuracy of the sensor, it is recommended to install a straight pipe section at least 5 times the nominal diameter at the inlet of the sensor and at least 3 times the nominal diameter at the outlet.

Fault Diagnosis

7.1 Preliminary inspection
7.1.1 Check the opening of air source and inlet.
7.1.2 Ensure the correct connection of communication lines.
7.1.3 Check whether the medium pressure and ambient temperature meet the product technical indicators.
7.2 Fault Check

No.	Symptoms	Possible Causes	Solutions
1	No signal output in case of no ventilation	Sensor damage	Return for Maintenance
	Output 10-12v without ventilation	Reverse terminal insertion	Check whether the terminal is inserted correctly
2	Without ventilation, the output deviation at zero point exceeds the maximum tolerance	Zero Point Drift	Zero Point Calibration/ Return for Maintenance

No.	Symptoms	Possible Causes	Solutions
3	No signal output during ventilation	Reversed air inlet installation	Replace the installation direction
		Sensor damage	Return for maintenance
4	Flow out of tolerance during ventilation	Output Drift	Return for maintenance
		Incorrect reference standard	Use mass flow method or higher accuracy flow meters for testing

Disclaimer

Our company is not responsible for the damage caused by the following circumstances:

- Natural disasters.
- Incorrect operation or unreasonable use.
- Operate or store in unsuitable or harsh environment.
- Unauthorized modification or disassembly of products.
- Violent means lead to product damage.

Appendix

get gas flow =Sensor Reading Value ×Conversion coefficient

Target Gas	Code SEMI52-0 302	Specific Heat calorie/gram °C	Density gram/L0°C	Conversion coefficient
He	001	1.242	0.179	1.420
Ne	002	0.246	0.900	1.431
Ar	004	0.125	1.784	1.420
Xe	006	0.038	5.858	1.431
H2	007	3.422	0.090	1.010
Air	008	0.240	1.293	1.001
CO	009	0.249	1.250	1.000
HBr	010	0.086	3.610	0.999
HCl	011	0.191	1.627	0.988

HF	012	0.348	0.893	1.001
N2	013	0.249	1.25	1.000
O2	015	0.220	1.427	0.981
NO	016	0.238	1.339	0.978
F2	018	0.197	1.695	0.931
Cl2	019	0.115	3.163	0.858
H2S	022	0.228	1.520	0.802
CO2	025	0.202	1.964	0.739
NO2	026	0.192	2.052	0.737
CH4	028	0.532	0.715	0.722
NH3	029	0.501	0.760	0.719
SO2	032	0.149	2.858	0.687
AsH3	035	0.117	3.478	0.673
C2H4	038	0.366	1.251	0.597
C2H2	042	0.405	1.162	0.596
BF3	048	0.178	3.025	0.508
C2H6	054	0.424	1.342	0.482
B2H6	058	0.502	1.235	0.441
CF4	063	0.166	3.964	0.420
C3H4	068	0.363	1.787	0.421
C3H6	069	0.366	1.877	0.411
C3H8	089	0.399	1.967	0.358
C4H6	093	0.352	2.413	0.322
CCl4	101	0.130	6.860	0.306
C4H8	104	0.372	2.503	0.299
C4H10	117	0.404	2.650	0.261
C2H6	136	0.340	2.055	0.392
CH3O	176	0.328	1.430	0.584
C5H12	240	0.392	3.219	0.217

Documents / Resources

 Winsen FR03H Flow Sensor [pdf] User Guide
FR03H Flow Sensor, FR03H, Flow Sensor, Sensor