



Installation & Maintenance Manual

Flow Sensor

Series PFMV5



1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

DANGER	In extreme conditions, there is a possible result of serious injury or loss of life.
WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

WARNING

- Do not disassemble, modify (including change of printed circuit board) or repair the product.**
An injury or product failure may result.
- Do not operate the product beyond the specification range.**
Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- Do not use the product in the presence of flammable, explosive or corrosive gas.**
Fire, explosion or corrosion may result. This product does not have an explosion proof construction.
- When using the product as part of an interlocking system:**
 - Provide a double interlocking system, for example a mechanical system.
 - Check the product regularly to ensure proper operation.
- Before performing maintenance, be sure of the following:**
 - Turn off the power supply.
 - Stop the air supply, exhaust the residual pressure and verify the release of air from the system.
- To avoid fire and explosion, do not use the product for flammable fluid.**
This flow sensor is designed for air. Only dry air, N₂ are applicable.
- Do not use this product near by a place where static electricity is a problem.**
Otherwise it can cause failure or malfunction of a system.

CAUTION

- Always perform a system check after maintenance.**
Do not use the product if any error occurs.
Safety cannot be assured if caused by un-intentional malfunction.
- Provide grounding to ensure correct operation and to improve noise resistance of the product.**
This product should be individually grounded using a short cable.
- Follow the instructions given below when handling the product.**
Failing to do so may result in product damage.
 - Maintenance space should always be provided around the product.
 - Do not remove labels from the product.
 - Do not drop, hit or apply excessive shock to the product.
 - Follow all specified tightening torques.

1 Safety Instructions (continue)

- Do not bend, apply tensile force, or apply force by placing heavy loads, on the cables.
- Connect wires and cables correctly, and do not connect while the power is ON.
- Do not route wires and cables together with power or high-voltage cables.
- Check the insulation of wires and cables.
- Take proper measures against noise, such as noise filters, when the product is incorporated in equipment or devices.
- Select the required protection (IP) rating according to the environment of operation.
- Take sufficient shielding measures when the product is to be used in the following conditions:
 - where noise due to static electricity is generated.
 - where electro-magnetic field strength is high.
 - where radioactivity is present.
 - where power lines are located.
- Do not use the product in a place where electric surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve are to be directly driven.
- Prevent any foreign matter from entering this product.
- Use the product within the specified ambient temperature range.
- Do not expose the product to any heat radiation.
- Use a precision screwdriver with flat blade to adjust the DIP switch.
- Close the cover over the switches before power is applied.
- Do not clean the product with chemicals such as benzene or thinners.
- Do not mount the flow sensor where vibration and impact do not exist to avoid failure and malfunction.
- The Flow sensor must be securely fixed when used.
- Operation under low temperature (5 °C or less) could lead to damage or operation failure due to frozen moisture in the fluid or air.
- The analog output may fluctuate by 2 to 3% for 5 minutes after supplying power to the flow sensor.

Power Supply selection

A UL approved direct current (DC) power supply should be used with this product, as follows:

- A limited voltage / current supply in accordance with UL508.
A circuit from which power is supplied by the secondary coil of a transformer according to the following:
Maximum voltage (no load) : Less than 30Vrms (42.4V peak)
Maximum current : (1) Less than 8A (including when short circuited)
(2) Limited by circuit protection (such as a fuse) with the following rating.

No load voltage (V peak)	Max. current (A)
0 to 20 [V]	5.0
20 to 30 [V]	100 / peak voltage

- A Class 2 power supply unit in accordance with UL1310, or a power supply circuit of maximum 30Vrms (42.4V peak) or less, using a Class 2 transformer in accordance with UL1585 as power source.

2 How to order

PFM □ □ - □ - □ □

Type

Model	Contents
V5	Remote type sensor

Measurement flow range

Model	Contents
05	0.0 to 0.5 l/min
10	0.0 to 1.0 l/min
30	0.0 to 3.0 l/min
05F	-0.5 to 0.5 l/min
10F	-1.0 to 1.0 l/min
30F	-3.0 to 3.0 l/min

Output specification

Model	Contents
1	Analogue (1 to 5V)

Operation manual

Model	Contents
Nil	With Operation manual (in Japanese and English)
N	Without Operation manual

Option(Included in the same package)

Model	Contents
Nil	Without L-type bracket
A	With 2 L-type brackets and 2 mount screws M3 x 15L included for 1station

L-type bracket

When optional parts are required by part alone, or to be mounted to the manifold, please order the following part number below.

ZS - 36 - A □

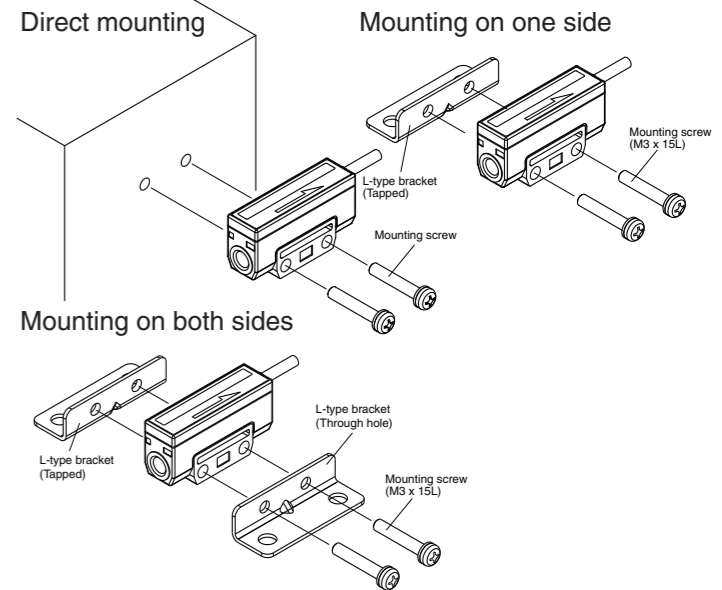
Stations

1	1 stn	2 L-type brackets, 2 mount screws M3 x 15L included
2	2 stns	2 L-type brackets, 2 mount screws M3 x 25L included
3	3 stns	2 L-type brackets, 2 mount screws M3 x 35L included
4	4 stns	2 L-type brackets, 2 mount screws M3 x 45L included
5	5 stns	2 L-type brackets, 2 mount screws M3 x 55L included

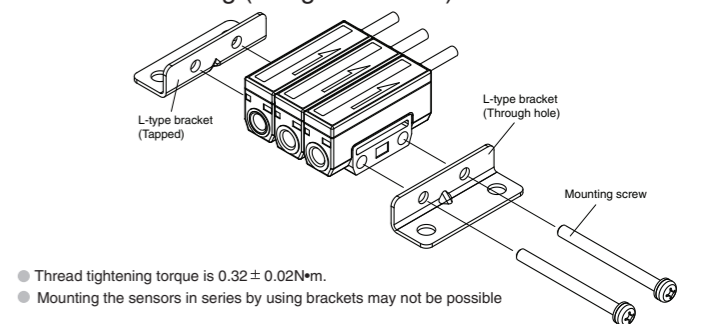
3 Specifications

Model	PFMV505	PFMV510	PFMV530	PFMV505F	PFMV510F	PFMV530F
Measured fluid	Dry air, N ₂ (Air quality class is ISO 8573-1 1.1.2 to 1.6.2 : 2001)					
Flow rate (measurement range)	0 to 0.5	0 to 1	0 to 3	-0.5 to 0.5 ^{Note3)}	-1 to 1 ^{Note3)}	-3 to 3 ^{Note3)}
Repeatability	± 2%F.S. or less ^{Note5)}					
Pressure characteristic (0kPa reference) ^{Note4)}	±2%F.S. or less (0 to 300kPa) ± 5%F.S. or less (-70 to 0kPa)					
Temperature characteristics (25 °C reference)	± 2% F.S. or less (15 to 35 °C) ± 5% F.S. or less (0 to 50 °C)					
Pressure rate ^{Note5)}	-70kPa to 300kPa					
Operating pressure range ^{Note6)}	-100kPa to 400kPa					
Proof pressure	500kPa					
Analogue output (Non-linear output)	Voltage output : 1 to 5V Output impedance : approx. 1k Ω					
Response time	5ms or less (Response 90%)					
Source voltage	12 to 24VDC ± 10%, ripple(p-p) 10% or less (Protected against reverse connection)					
Power consumption	16mA or less					
Enclosure	IP40 (to IEC60529)					
Operating fluid temp.	0 to 50 °C (No freezing or condensation)					
Operating temp. range	0 to 50 °C (No freezing or condensation)					
Storage temp. range	-10 to 60 °C (No freezing or condensation)					
Operating humidity range	35 to 85%R.H. (No condensation)					
Storage humidity range	35 to 85%R.H. (No condensation)					
Withstand voltage	1000V AC, 1min Between battery and the body					
Insulation resistance	50M Ω or more(500V DC Mega) Between battery and the body					
Vibration resistance	10 to 150Hz 1.5mm amplitude 98m/s ² acceleration in X, Y, Z directions for 2 hours(Power is not supplied)					
Impact resistance	980m/s ² X, Y, Z directions 3 times for each(Power is not supplied)					

4 Mounting and Installation



Manifold mounting (using ZS-36-A □)

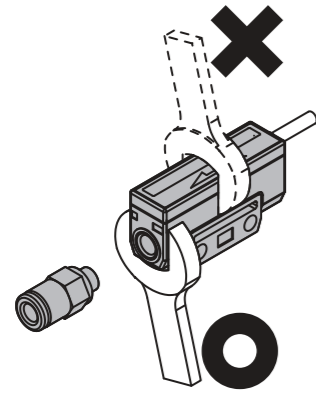


Port size	M5×0.8 (tightening torque : 1 to 1.5N•m or less)
Materials in contact with Fluid	PPS, Si, Au, SUS316, C3604(Electroless nickel plating)
Lead wire	3 core vinyl cabtire cable φ 2.6, 0.15mm ² , 2m
Weight	10g (without lead wire)

- Note 1) Converted value of volume flow at ANR (20 °C, 101.3kPa, 65%R.H.).
Note 2) Analogue output shows 3V when flow is zero, then increases to 5V when flow direction is IN → OUT and decreases to 1V when OUT → IN.
Note 3) %F.S. in the table assumes 4V (1-5V) as the full scale.
Note 4) 0kPa means release to the atmosphere.
Note 5) Applicable pressure range.
Note 6) Pressure range satisfies product specification.

5 Piping

During installation of the flow sensor to the pipe, hold the body with specified spanner



Tightening torque to mount the fitting is 1 to 1.5N·m

6 Recommended fitting list

PFMV5 series recommended fitting list

One-Touch fitting

- Male Connector (One-Touch Male Connector)/KQ2H04-M5
- Hexagon Socket head Male Connector/KQ2S04-M5
- Male Elbow/KQ2L04-M5

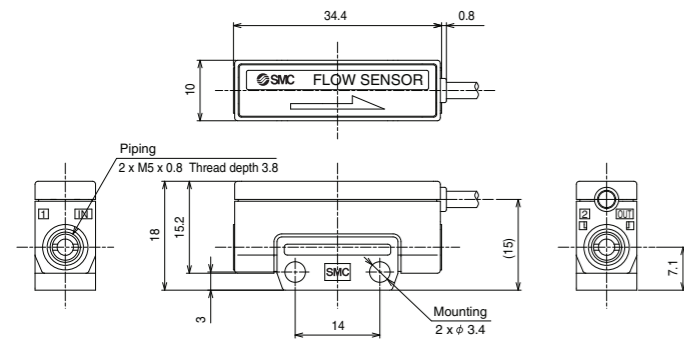
One-Touch mini fittings

- Male Connector/KJH04-M5
- Hexagon Socket head Male Connector/KJS04-M5
- Male Elbow/KJL04-M5

Miniature fitting

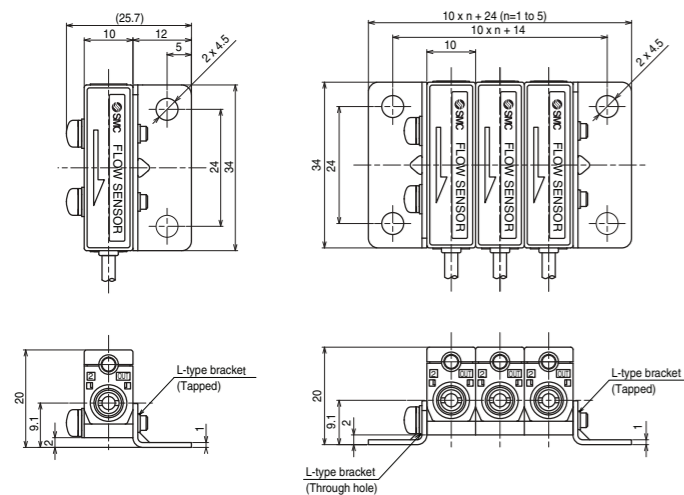
- Barb fittings for nylon tubing/M-5AN-4/M-5AN-6

7 Dimensions and Names of Individual Parts (unit: mm)

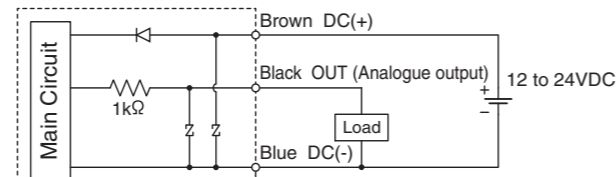


With L-type bracket

Mounting on one side Mounting on both sides

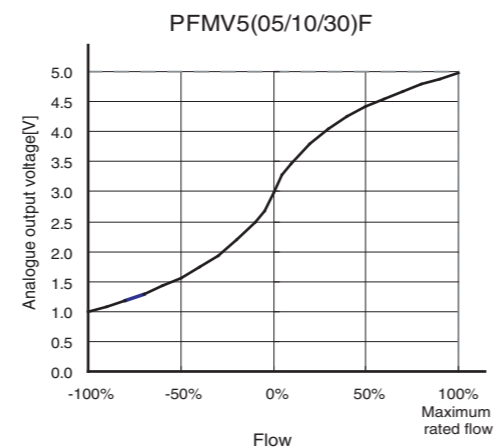
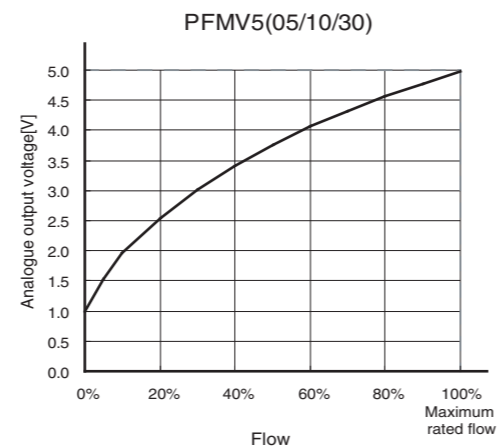


8 Internal Circuit



Analogue output : 1 to 5V
Output impedance : Approx. 1kΩ

9 Flow characteristic chart (Reference)



Refer to catalogue for details of flow characteristic.

Contact

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FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
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