



Chemical flow rate measurement

Micro Flow Rate Liquid Flow Meter suitable for measuring chemicals for low-concentration cleaning fluids

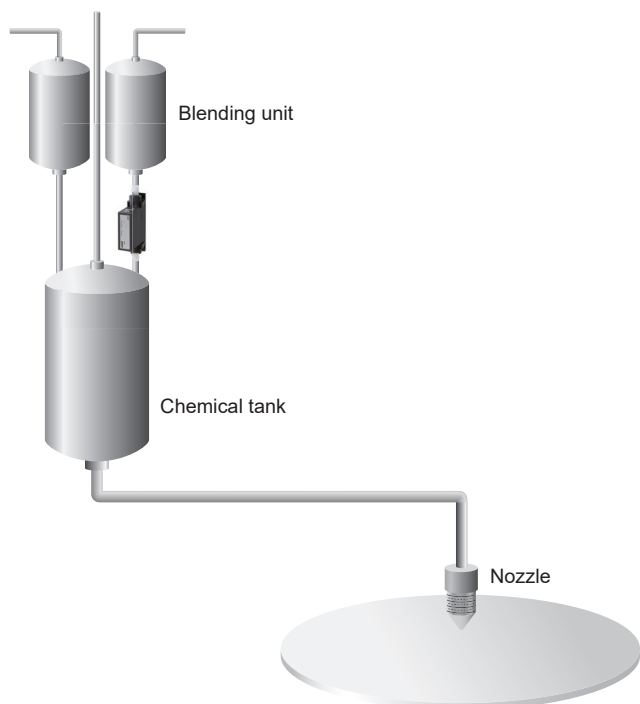


Product name	Process sensor Micro Flow Rate Liquid Flow Meter
Model No.	F7M

Process and equipment name	Front-end process, single wafer cleaning equipment
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Current Situation

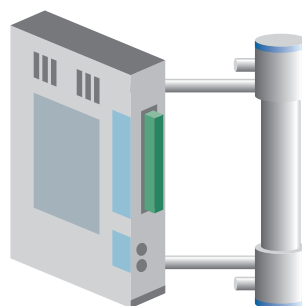
- Since the concentration of chemicals in cleaning fluids is lower than it used to be, micro flow rates must now be measured.
- Many cleaning fluids tend to have air bubbles. (Hydrogen peroxide bubbles prevent measurement with high repeatability.)
- Conventional flowmeters are difficult to install, partly because the detector and converter are separate.



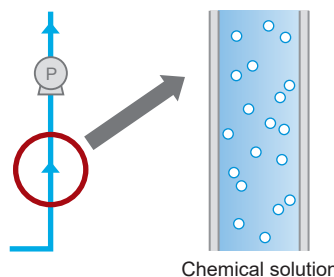
Current Issues

- No flowmeter can measure micro flow rates of several mL/min with high repeatability.
- Ultrasonic flowmeters are affected by air bubbles, so their measurements are not reliable.
- There are no micro flowmeters that are easy to install.

General ultrasonic flowmeter



Separate units  
Installation is difficult



Air bubbles  
cause problems

## Solution 1

**Formerly difficult measurement of micro flow rates of several mL/min is now possible.**

Flowmeter uses a thermal principle and Azbil's proven MEMS sensing technology.

## Solution 2

**Use of a measurement method that is less affected by air bubbles.**

Azbil's thermal flowmeter is less affected by air bubbles than ultrasonic flowmeters, enabling reliable measurement. Its straight flow path allows air bubbles to escape.

## Solution 3

**Compact, light-weight, and easy to install**

This flowmeter is more compact and lighter than its predecessors, has an IP65 enclosure rating, and can be installed anywhere. Because the exterior has no metal parts, it can be used without worry, even if it is splashed by drops of corrosive fluid.



### Measures micro flow rates of several mL/min

Operates on the thermal measurement principle using MEMS sensing technology. The measurement of micro flow rates of several mL/min, which traditionally has been difficult, is now possible (Measurement range: 0.1 to 10 mL/min, 0.3 to 30 mL/min, 0.5 to 50 mL/min).

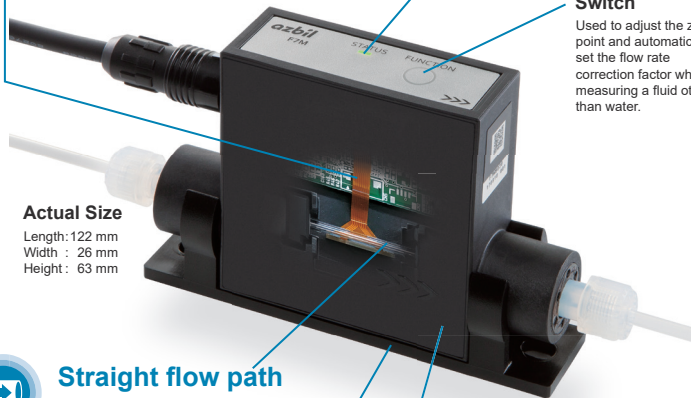
#### LED indicator

- : Operating normally
- : Warning
- : Alarm
- : Error

#### Switch

Used to adjust the zero point and automatically set the flow rate correction factor when measuring a fluid other than water.

**Actual Size**  
Length: 122 mm  
Width : 26 mm  
Height : 63 mm



### Straight flow path

The straight flow channel means pressure loss is lower and cleaning is easier, with no puddles of liquid.



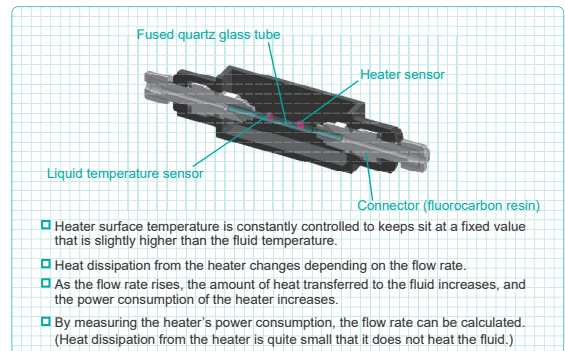
### Compact, light-weight, and easy to install

- This model is more compact and lighter than its predecessors.
- By using the included mounting bracket, it can be easily installed on a surface (for horizontal pipe connection).
- It can also be installed for vertical pipe connection. A separate converter (amplifier) is not required.

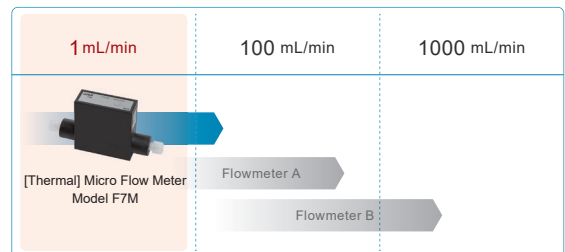


### Flexible installation and wide range of fluids

- Compliant with IP65 protection rating.
- Exterior contains no metal, providing improved resistance to corrosive fluids, allowing use in environments with liquid spray.
- Can be used for a variety of fluids, so long as they do not corrode fused quartz glass (the material of the flow path) or fluororesin (the material of the fitting). The sensor does not come into contact with any fluids.



- Heater surface temperature is constantly controlled to keep it at a fixed value that is slightly higher than the fluid temperature.
- Heat dissipation from the heater changes depending on the flow rate.
- As the flow rate rises, the amount of heat transferred to the fluid increases, and the power consumption of the heater increases.
- By measuring the heater's power consumption, the flow rate can be calculated. (Heat dissipation from the heater is quite small that it does not heat the fluid.)



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**Azbil Corporation**  
Advanced Automation Company

Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

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