

MANUAL + DATASHEET

# Micro Flow Float Flowmeter



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## Overview

The micro flow float flowmeter is designed based on the principle of magnetic coupling, suitable for measuring small-volume flow rates of liquids and gases. Each flow rate of the measured medium corresponds to a fixed position of the magnetic float inside the measuring tube. This position is indicated by a pointer in the indicator through magnetic coupling, and the volume flow rate of the liquid or gas passing through the measuring tube can be obtained by reading the scale on the dial.

In addition to being equipped with an on-site indicator, the micro flow float flowmeter can accommodate up to two switch signal outputs for flow over-limit control. The remote indicator features an LCD that displays the instantaneous flow rate of the measured medium and supports 4–20mA two-wire current output and HART® protocol digital communication.

The micro flow float flowmeter can also be equipped with a flow control valve at its inlet or outlet, integrating the flow control valve with the flowmeter for convenient adjustment of small flow rates. In applications with significant medium pressure fluctuations, a constant flow valve can be installed at the inlet or outlet to ensure stable and accurate measurements.

Thanks to its compact size, lightweight design, stable and reliable operation, minimal maintenance requirements, low straight pipe section requirements, and diverse installation options, the micro flow float flowmeter is widely used in industries such as petroleum, chemical, and steel for small-flow measurement and process control.

## Characteristics

- Ultra-low Full Scale Range:
  - For water (20°C): Full scale as low as 3 L/h
  - For air (20°C, 0.1013 MPa): Full scale as low as 50 NL/h
- Compact and Lightweight with Diverse Connection Options:

The flowmeter offers process connections such as threaded or flanged options, allowing horizontal or vertical installation based on the on-site piping system.
- Supports Two Switch Signal Outputs:
  - One adjustable bistable reed switch outside the indicator
  - One or two NAMUR switches inside the indicator for convenient on-site flow monitoring
- Optional flow control valve

A needle valve can be installed at the inlet or outlet of the flowmeter, enabling precise and convenient micro-flow adjustments.
- Constant Flow Valve for Pressure Fluctuations:

In applications with frequent medium pressure fluctuations at the flowmeter inlet or outlet, a constant flow valve (PE or PA type) can be installed. These valves ensure stable flow output even when the inlet or outlet pressures vary.

## Main Technical Parameters

- Measuring medium: liquid and gas
- Flowmeter model: G22 horizontal connection, G24 vertical connection
- Measuring range (100% full scale): Water (20°C): 3 to 100 L/h; Air (20°C, 0.1013 MPa): 50 to 3400 L/h
- Range ratio: 10:1
- Measurement accuracy:  $\pm 4\%$  F.S. Special  $\pm 2.5\%$  F.S
- Medium temperature range: -25°C to +120°C for field indicators, -20°C to +70°C for remote indicators, maximum temperature  $\leq 200^\circ\text{C}$
- Maximum medium pressure:  $\leq 13$  MPa
- Ambient temperature: -25°C to +70°C
- Switch signal output:
  - Bistable reed switch signal
  - 2-Wire NAMUR limit switch SJ2-S1N
- Electrical remote signal output: 2-Wire 4-20 mA output superimposed HART Protocol Digital Communications

■ Connection type:

G22: Standard 1/4" NPT female thread, mounting center distance 125 mm

G24: Standard 1/2" NPT female thread, mounting height 160 mm

Optional:  $\varnothing$ 6 mm,  $\varnothing$ 8 mm,  $\varnothing$ 10 mm,  $\varnothing$ 12mm clamp

DN15 PN4.0 (GB 9119-2000), 1/2" ANSI 150LB flange, mounting height 250 mm

Special: According to the user's requirements

■ Medium flow direction:

Standard: bottom in – top out (G24), bottom back side in – top back side out (G22)

Special: bottom in – top back side out, bottom back side in – top out

■ Indicator shell material and protection level: cast aluminum, epoxy resin electrostatic spraying, protection grade IP65

## Flow Rate

Table 1 Flow Rate

Serial Number	Valve Plug Diameter (mm)	Water Flow Rate (L/h)	Air Flow Rate (L/h)	$\Delta$ P Pressure Loss (kPa)
C005	1.0	–	50	3.1
C010	1.0	3	100	6.6
C015	2.5	5	150	1.9
C040	2.5	10	400	2.7
C080	2.5	25	800	5.5
C125	4.5	40	1,250	4.2
C200	4.5	60	2,000	8.5
C250	4.5	80	2,500	11.7
C340	4.5	100	3,400	16.6

Notes:

■ Reference conditions: water 20°C, air 20°C, 0.1013 MPa

■ 100% flow rate, range ratio 10 :1

■ If the full scale flow selected by the user is lower than the minimum value listed in the table or higher than the maximum value listed in the table, consult the manufacturer.

## Flow Control Valve

An optional flow control valve can be integrated with the flowmeter or installed separately. Unless specified otherwise, the flow control valve is typically installed at the flowmeter's inlet but can also be installed at the outlet based on the user's requirements. For micro-flow measurement applications, it is recommended to opt for the installation of a flow control valve. It is suggested to install a shut-off valve at the flowmeter's inlet, with the flow control valve used solely for flow regulation.

Table 2 Flow Control Valve Parts Material

SN	Name	Material	Description
1	Valve plug parts	316	
2	Hand shank	Plastic or black anodized aluminum	
3	Handle locking socket screw	304	Please check with the manufacturer for higher pressures and special applications.
4	Valve plug sealing	Fluorine rubber O-ring	
5	Valve stem seal	PTFE + Fluorine rubber O-ring	

## Switch Signal Output

### Reed Switch Signal Output

The flowmeter can be equipped with a bistable reed switch. The switch is installed behind the flowmeter indicator, and its switching point should be adjusted when the flowmeter is in operation. The cable length for the switch should be specified by the user at the time of order. If no special requirements are provided, the standard cable length is 0.5 meters. If a junction box is needed for the switch connection, please consult the manufacturer.

Main Technical Parameters of the Reed Switch:

- Switch type: bistable reed switch
- Maximum operating voltage: 100 VDC
- Maximum working current: 0.5 A
- Maximum power: 10 W
- Working temperature: -20°C to +60°C
- Protection grade: IP65
- Control point repeatability: < 5% F.S.

## 2-Wire NAMUR Limit Switch SJ2-S1N

The indicator can be equipped with two NAMUR limit switches. The flow control points can be set throughout the entire measurement range and are indicated on the dial

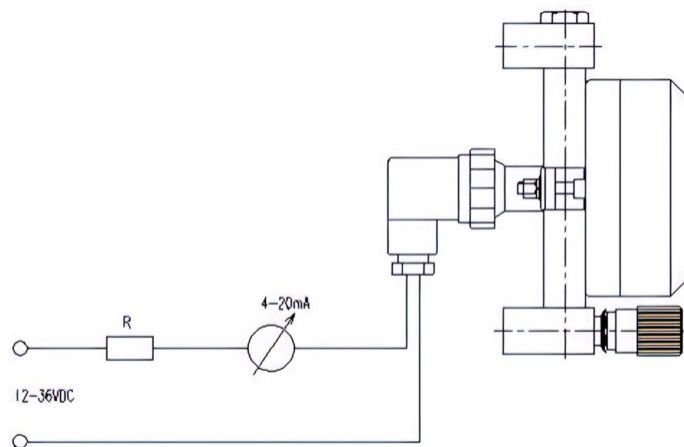
Main technical parameters of 2-Wire NAMUR Switch Signal SJ2-S1N:

- Switch type: inductive proximity switch
- Switch element function: normally open
- Rated voltage: 8 VDC
- Effective area open output current:  $\leq 1 \text{ mA}$
- Effective area off output current:  $\geq 3 \text{ mA}$

## Electronic Remote Signal Output

The magnetic field sensor installed inside the flowmeter indicator converts the position of the float in the measuring tube into an electrical signal through a non-contact method. After processing by the circuitry, the sensor outputs a 4-20 mA current signal corresponding to the flow rate and displays the current flow value on the LCD screen.

- Remote management via handheld and PC configuration debugging software
- 4–20 mA output with HART protocol digital communication (2-wire system)
- Working environment temperature: with backlight, with LCD display  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$



## Product Model

	□	/□	/□	/□	/□	/□	/□	/□	Description
Type	HT57								1/4 "NPT horizontal connection, mounting center distance 125 mm 1/2 "NPT vertical connection, mounting height 160 mm
Material		RR							304
		R0							316
		SM							Special materials
Indicator type		M							The mechanical pointer indicates the instantaneous flow rate on site
		E							24 VDC power supply, 2-Wire 4-20 mA
Flow regulating needle valve			N						No flow regulating needle valve
			VE						The flow regulating needle valve is installed at the inlet of the flow meter
			VA						The flow regulating needle valve is installed at the outlet of the flowmeter (optional)
Process connection				N2					1/2" NPT female thread
				N4					1/4" NPT female thread
				N8					1/8" NPT female thread
				F					Flange connection (flange standard optional, total installation height 250 mm)
				6					ø6 mm clamp connection
				8					ø8 mm clamp connection
				10					ø10 mm clamp connection
				12					ø12 mm clamp connection
			M					Panel mounting	
Constant flow valve type				P					Without constant flow valve
				PE					With inlet constant flow valve
				PA					With outlet constant flow valve
Switch signal type and quantity				K					No switch signal output
				R1					1 bistable reed switch signal output
				D1					1 NAMUR switch signal output
				D2					2 NAMUR switches signal output
Explosion-proof type				X					None
				Ex					Intrinsically safe and explosion-proof

## Selection Examples

HT57/RR/M/VE/8/PE/K/X: Material is 304 stainless steel, mechanical pointer for on-site instantaneous flow indication, process connection uses ø8 compression fitting, flow control needle valve installed at the inlet, includes inlet constant flow valve, no switch signal output, not explosion-proof.



## Selection Instructions

If the user requires accessories such as a filter, check valve, adjustable pressure reducing valve, pressure gauge, etc., to be supplied with the flowmeter or assembled with the flowmeter at the factory, please specify the parameters and materials of each accessory when placing the order. For special specifications, please consult the manufacturer at the time of order.

## PE Inlet and PA Outlet Constant Flow Valves

### Constant Flow Valve

- If the pressure of the measured medium fluctuates frequently on-site, a constant flow valve can be installed at the inlet or outlet of the micro-flow float flowmeter to ensure stable and accurate measurement.
- PE type constant flow valve is suitable for gases or liquids. It is installed at the flowmeter's inlet to compensate for pressure variations at the inlet, ensuring stable flowmeter indication and output. For liquids, the PE type constant flow valve can also be used to stabilize pressure fluctuations at the outlet.
- PA type constant flow valve is installed at the flowmeter's outlet. It is specifically designed for gas applications and compensates for pressure fluctuations at the outlet.
- Additionally, the blowing device, consisting of a constant flow valve and micro-flow float flowmeter, forms a mechanical small-flow controller. This system typically includes the micro-flow float flowmeter, filter, adjustable pressure reducing valve, check valve, pressure gauge, constant flow valve, piping, and fittings. Regardless of pressure fluctuations at the pipeline's inlet or outlet, the constant flow valve ensures a steady flow rate output from the flowmeter.
- With its unique constant flow characteristics, the blowing device can not only measure flow but also be used in conjunction with other instruments to measure parameters such as liquid level, interface, and density. It is widely used in industries like chemical and steel for measuring high-viscosity, highly corrosive media.

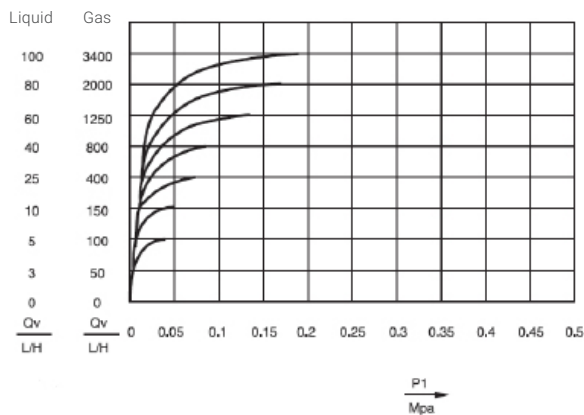


## Main Parameters of Constant Flow Valve

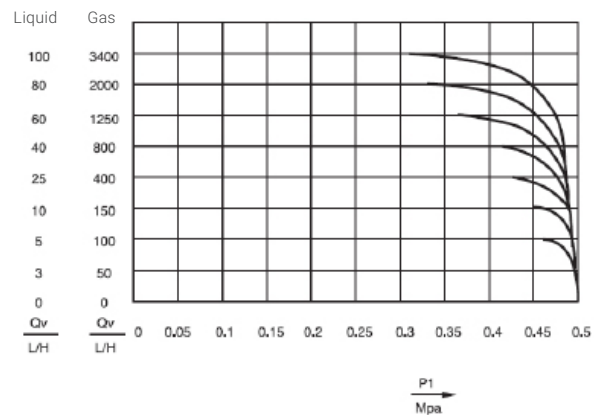
Constant Flow Valve Model	PE Type	PA Type
Application conditions	The inlet pressure varies and the outlet pressure is stable.	The inlet pressure is stable and the outlet pressure is changing.
Medium state	Gas or liquid	Gas
Medium temperature	Standard ≤ 80°C, Special ≤ 150°C	Standard ≤ 80°C, Special ≤ 150°C
Medium pressure	Standard ≤ 2.5 MPa, Special ≤ 6.4 MPa	Standard ≤ 2.5 MPa Special ≤ 6.4 MPa
Controllable pressure range	0.02 to 0.5 MPa	0.02 to 0.5 MPa
Differential pressure	0.02 to 0.05 MPa	0.02 to 0.05 MPa
Minimum working pressure	See inlet pressure change constant flow valve characteristic curve	See the characteristic curve of constant flow valve with outlet pressure change

## Characteristic Curves of PE Inlet and PA Outlet constant flow valves

Inlet Pressure Variation Constant Flow Valve Characteristic



Outlet Pressure Variation Constant Flow Valve Characteristic



## Connection Size and Material of Constant Flow Valve

Standard connection type	1/4" NPT female thread, installation center distance 70mm.
Special connection type	1/2" NPT, 3/4" NPT female thread, installation center distance 70mm. Other connection types optional
Ferrule connection	Ø6, Ø8, Ø10, Ø12, material 304, 316.
Valve body	304, 316
Sealing gasket	PTFE
Diaphragm	Rubber, PTFE
Bolt	Carbon steel or 304
Clamp tubing	304, 316

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## Installation Precautions and Operation

### Precautions for Flow Purge Device Installation

- The flow purge device should be installed in a location that allows easy adjustment, cleaning, and disassembly..
- Since the micro-flow float flowmeter in the flow purge device operates based on magnetic coupling, the magnetic field generated by surrounding equipment should not interfere with the normal measurement of the flowmeter.
- To ensure proper operation, the flowmeter in the flow purge device must be installed vertically. The device should be securely mounted, and if necessary, auxiliary supports such as brackets can be installed at appropriate positions.
- The installation dimensions should not deviate significantly from the specified size to avoid applying tensile or compressive forces on the flow purge device.

### Commissioning of Flow Purge Device

- Before putting the flow purge device into operation, ensure that the flow direction of the medium matches the required direction for the device. During installation, be sure to close the flow control needle valve.
- If the measured medium contains solid particles or ferromagnetic substances, they must be removed and the piping must be purged before entering the flow purge device to prevent impurities from contaminating the system.

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## Ordering Instructions

- Before ordering, please carefully read the product selection manual. If you have any doubts regarding the model code, please contact the manufacturer for clarification.
- When placing an order, the user should provide the manufacturer with detailed on-site working conditions, including parameters such as the medium name, temperature, pressure, density, maximum flow rate, minimum flow rate, rated flow rate, and other relevant information.
- Due to the variety of connection and installation types for flowmeters and flow purging devices, the product selection manual lists only some of the common connection types. For other special connection types and installation heights, please consult the manufacturer.




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