

HNFO0-A

CLAMP ON ULTRASONIC FLOW METER



PRODUCT FEATURES

- ① High precision and high stability
- ② Non invasive measurement, not in direct contact with liquids, hygienic and safe
- ③ Can measure bidirectionally, calculate fluid volume, and also have bubble detection function
- ④ The circuit is integrated inside the sensor, without the need for external computing and processing systems, and has a compact size
- ⑤ No blockage, no steering, no dead corners, low fluid pressure loss
- ⑥ Provide standard output methods for seamless integration with customer systems
- ⑦ Customized calibration can be carried out by specifying the material, size, temperature and liquid type of the plastic rigid tube

PRODUCT INTRODUCTION

The HNF00-A clamp on ultrasonic flow meter is compact and requires no external circuitry for measurement and output.

The flow meter can be clamped directly onto rigid plastic pipes to precisely measure flow rate with an accuracy of up to $\pm 1.0\%$, and can detect bubbles and large solid particles in the liquid. Since the flow meter does not come into direct contact with the liquid in the pipe, it does not contaminate the liquid, making it ideal for applications requiring high hygiene and cleanliness, such as biopharmaceutical processes, semiconductor equipment, and medical device manufacturing.

We offer a range of standard sizes to accommodate common pipe sizes, and we can also customize them to meet specific customer requirements. The flow meter can be configured with a flow switch, bubble detection, and filling functions.

COMMON APPLICATIONS

1

Fluid monitoring during semiconductor production and processing, such as high-purity water and high-purity chemical reagent transmission pipelines

2

Medical devices such as hemodialysis machines, artificial hearts, organ transplant systems, artificial heart lung machines, blood pumps

3

Biopharmaceutical processes and equipment, such as disposable reaction vessels, fermentation tanks, cell culture equipment, vaccine production, tangential flow filtration systems, liquid chromatography, chromatography instruments

4

Food and beverage processing, such as milk, juice, and beer production processes

5

Filling equipment, spraying equipment, cooling system, lubrication system, scientific experimental system

6

Chips, PCB circuit boards, lithium batteries, boiler equipment, etc

7

Water treatment and wastewater treatment system



Coating and filling

Not in contact with liquids, can perform various measurements

Due to the clamp method used for measuring on the outside of the piping, it is most suitable for checking the application amount of lubricants and adhesives that cannot be installed with flow sensors due to concerns about solidification, as well as for checking the filling amount of food and drugs that need to avoid contact with liquids as much as possible.



Spitting, spray

No pressure loss, no change in production conditions

When using ordinary flow sensors, there is a risk of pressure loss due to the presence of structural components in the flow path, which may cause changes in production conditions. Therefore, it is sometimes difficult to install on existing equipment. If it is a clamp type, there is no such risk and no maintenance is required.



Cooling and release agent coating

Easy to install, can be quickly installed onto multiple branch pipelines

Clamp type flow sensors do not require cutting off piping and do not require piping construction during installation. Even complex branch piping can be easily installed with just a screwdriver. It can visualize the flow rate of a small amount of cooling water and the amount of mold release agent applied in the branch piping.



Lubrication

No need for construction, it can be quickly installed onto the equipment you wish to measure

We hope to carry out flow management, but due to the inability to stop production, we can only postpone the installation of corresponding equipment. When installing equipment for fluid liquids such as oil that are difficult to pipe, clamp type flow sensors can also be quickly installed.

TECHNICAL PARAMETERS

NAME	SPECIFICATION
Measurement principle	Ultrasonic transit time method
Measurable liquids	Water, chemical liquid, oil, glue, grinding fluid, etc. (excluding large solid particles and bubbles)
Calibration	Factory default calibration: 22°C±3°C (water)
Sensor housing	Plastic
Liquid temperature	0°C - 70°C
Ambient temperature	0°C - 60°C
Storage temperature	-20°C - 70°C
Operating humidity	10% - 90% RH (non-condensing)
IP rating	IP65
Installation	Threaded mounting
Top cover bolt torque	HNF00-A-025 is recommended at 35 cN.m. HNF00-A-038, HNF00-A-050, HNF00-A-075, and HNF00-A-0100 are recommended at 45 cN.m.

MEASUREMENT ACCURACY AND REPEATABILITY

PRODUCT MODEL	FLOW RANGE	MEASUREMENT ACCURACY	REPEAT ACCURACY
HNF00-A-025NB HNF00-A-006MB	Low flow: 0-0.05L/min	±10mL/min	±0.1% F.S.
	High flow: 0.5-5L/min	±2% RD	±0.1% F.S.
HNF00-A-038NB HNF00-A-010MB	Low flow: 0-1L/min	±20mL/min	±0.1% F.S.
	High flow: 1-15L/min	±2% RD	±0.1% F.S.
HNF00-A-050NB HNF00-A-012MB	Low flow: 0-1.5L/min	±30mL/min	±0.1% F.S.
	High flow: 1.5-30L/min	±2% RD	±0.1% F.S.
HNF00-A-063NB HNF00-A-016MB	Low flow: 0-2L/min	±40mL/min	±0.1% F.S.
	High flow: 2-30L/min	±2% RD	±0.1% F.S.
HNF00-A-075NB HNF00-A-020MB	Low flow: 0-2.5L/min	±50mL/min	±0.1% F.S.
	High flow: 2.5-50L/min	±2% RD	±0.1% F.S.
HNF00-A-100NB HNF00-A-026MB	Low flow: 0-4L/min	±80mL/min	±0.1% F.S.
	High flow: 4-80L/min	±2% RD	±0.1% F.S.

APPLICABLE PIPELINE CHARACTERISTICS

Pipe material: PFA, PTFE, PP, PU and other plastic rigid pipes or resin rigid pipes, with smooth inner and outer surfaces.

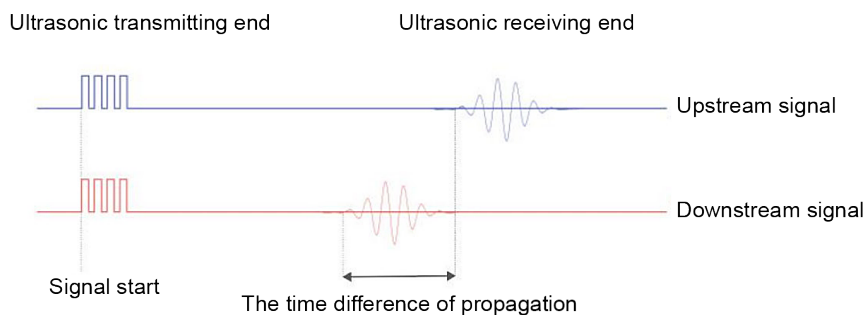
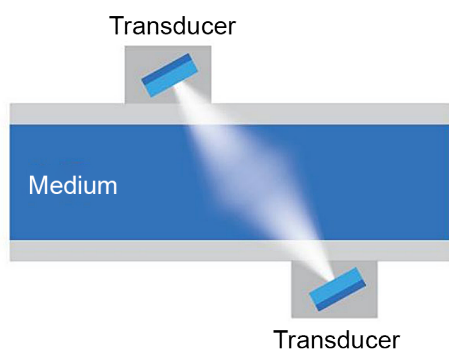
Product Model (Imperial Standard Tube)	Pipe outer diameter	Pipe inner diameter	Product Model (Imperial Standard Tube)	Pipe outer diameter	Pipe inner diameter
	inch	mm		inch	mm
HNF00-A-025NB	1/4"	3~5mm	HNF00-A-006MB	6mm	3~5mm
HNF00-A-038NB	3/8"	5~8mm	HNF00-A-010MB	10mm	5~8mm
HNF00-A-050NB	1/2"	6~11mm	HNF00-A-012MB	12mm	6~11mm
HNF00-A-063NB	5/8"	10~14mm	HNF00-A-016MB	16mm	10~14mm
HNF00-A-075NB	3/4"	10~17mm	HNF00-A-020MB	20mm	10~17mm
HNF00-A-100NB	1"	15~22mm	HNF00-A-026MB	26mm	15~22mm

Note: The piping examples listed above are for general reference only, and the outer and inner diameters shown are for reference only. When selecting a sensor, the dimensional tolerances, materials, and other relevant factors of the piping should be considered.

HOW IT WORKS

The HNF00-A series ultrasonic flow meter features a non-contact design that easily clamps onto the outside of plastic pipes to accurately measure liquid flow within them. This sensor utilizes advanced ultrasonic transit-time technology, providing exceptional accuracy and reliability.

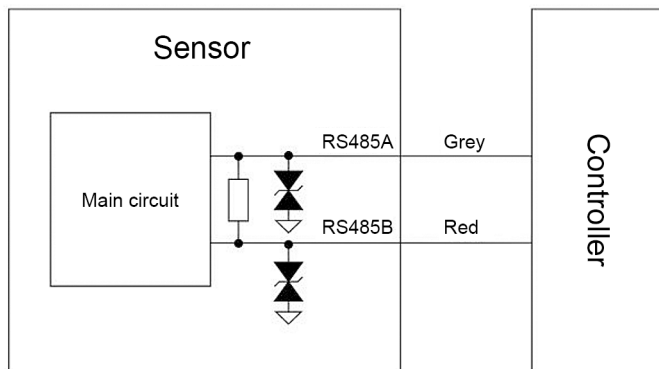
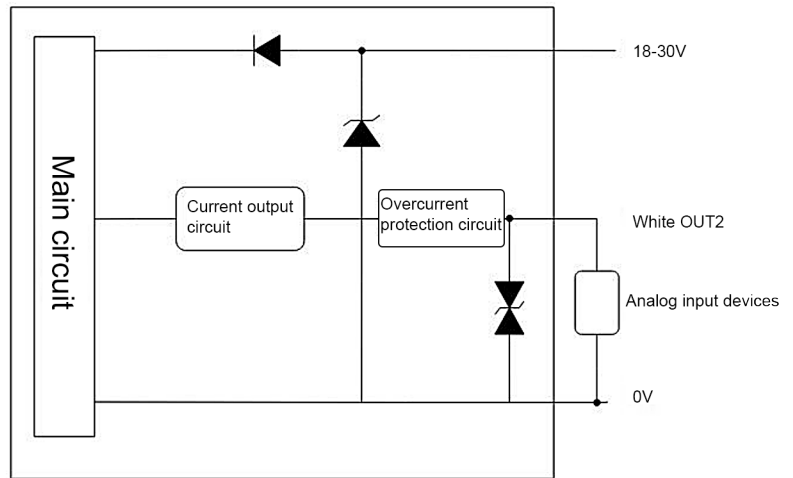
During measurement, two piezoelectric (PZT) crystals located downstream and upstream of the flow meter alternately transmit and receive ultrasonic signals. Ultrasonic waves penetrate the pipe wall at an angle and propagate into the liquid. Liquid flow affects the propagation of ultrasonic waves, causing the ultrasonic wave's transit time upstream to be longer than that downstream. By precisely analyzing the difference in transit time between these two directions and using this time difference as a function of the liquid's flow velocity, the flow meter quickly and accurately calculates the liquid's volumetric flow rate, providing users with reliable and accurate flow data.



SENSOR INTERFACE

Current output

Three current output modes are available: 4-20mA, 0-20mA, and 0-24mA. If you need to convert to voltage output, the load can be grounded, and the load resistance should not exceed 600Ω.



RS485 interface

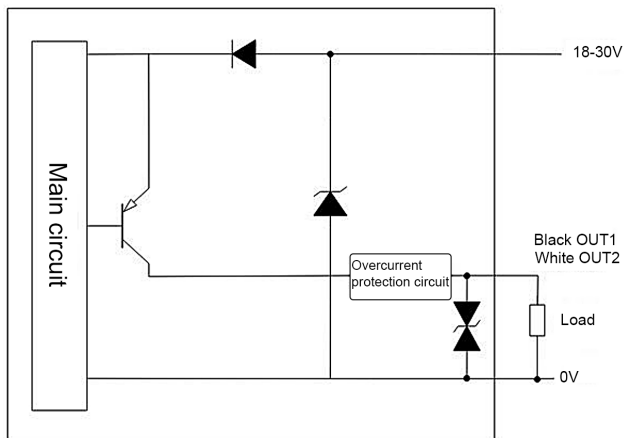
RS-485 bus operation: supports up to 12 sensors.

Pulse output

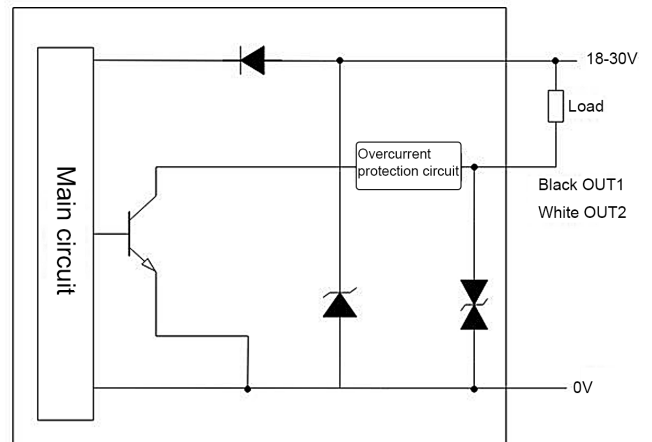
Pulse output with two modes optional: PNP (default), NPN (optional). The maximum output current is 100mA. The minimum load resistance is related to the operating voltage.

Recommendations: 12V - 250Ω 15V - 500Ω 24V - 1000Ω 30V - 1200Ω.

PNP output

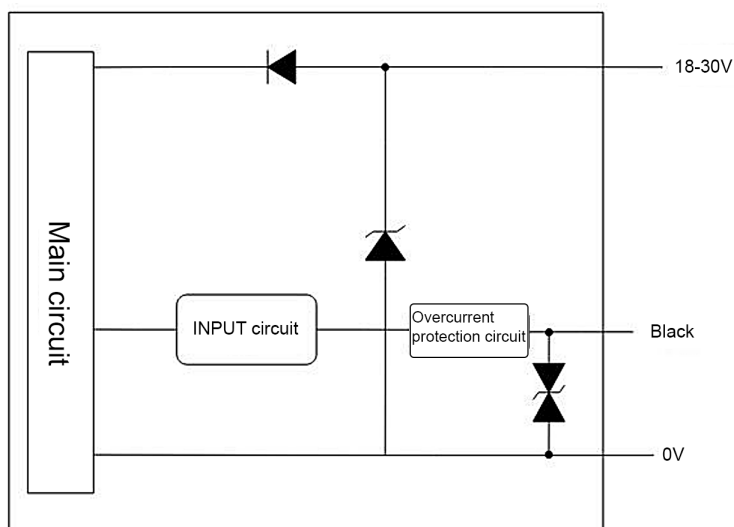


NPN output



Numeric input

It can be configured for zero-point calibration, volume zeroing, and starting filling. The grounding time must be greater than 20ms.

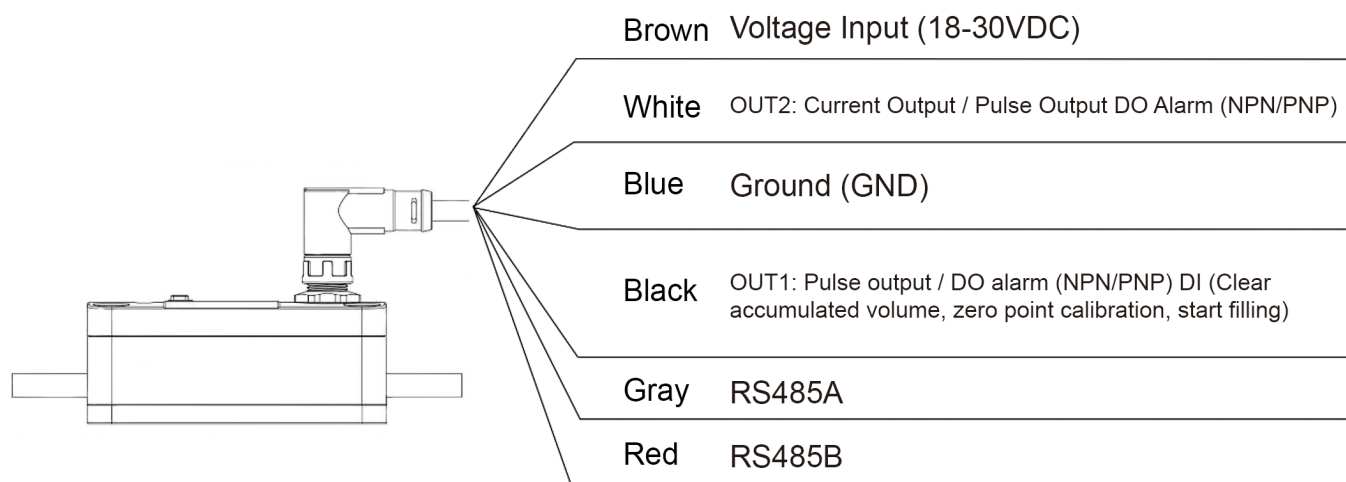


ELECTRICAL SPECIFICATIONS

NAME	SPECIFICATION
Operating voltage	18-30VDC
Current consumption	With a 24V power supply and no external load, the current consumption is <30mA; with an external load, the current consumption is >30mA, but the maximum cannot exceed 100mA.
Electrical connection	6-core cable (with extension wire at the end)

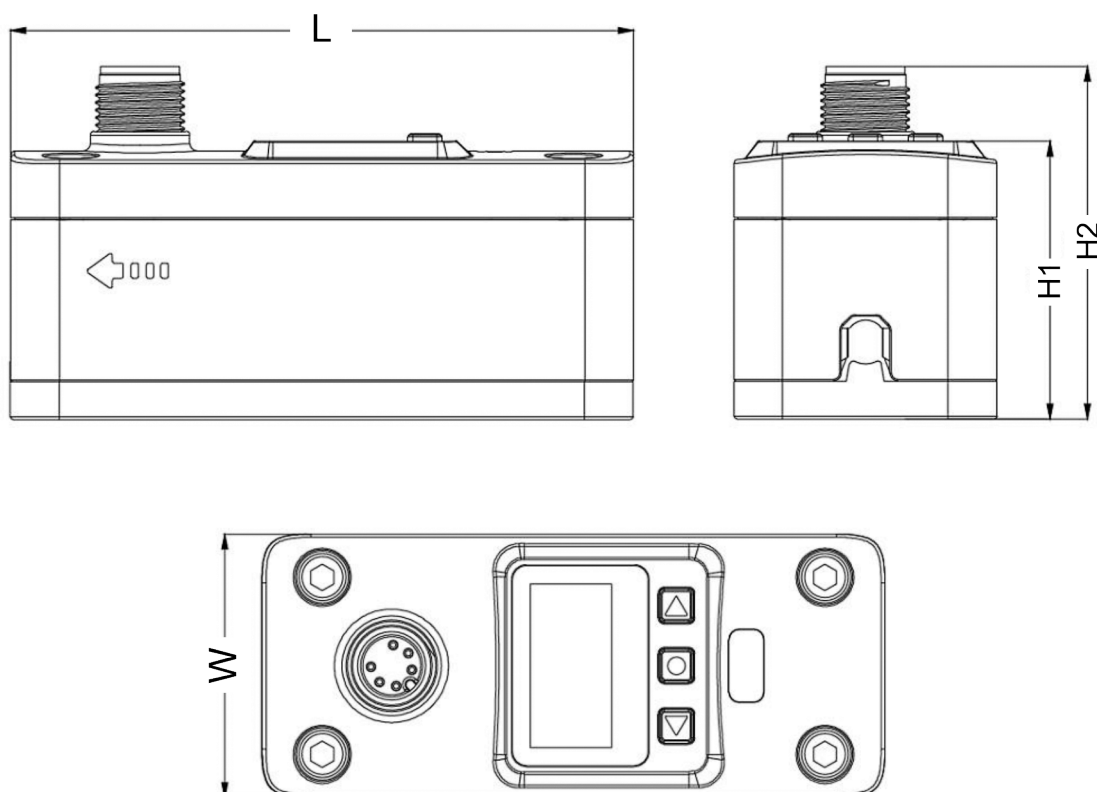
CABLE COLOR AND FUNCTION ALLOCATION

MALE CONNECTOR (CABLE)	CORE	COLOR	FUNCTION
	1	Brown	Voltage Input (18-30VDC)
	2	White	OUT2: Current Output / Pulse Output DO Alarm (NPN/PNP)
	3	Blue	Ground (GND)
	4	Black	OUT1: Pulse output / DO alarm (NPN/PNP) DI (Clear accumulated volume, zero point calibration, start filling)
	5	Gray	RS485A
	6	Red	RS485B



SENSOR SIZE

PRODUCT MODEL	PRODUCT DIMENSIONS (LxWxH1, H2)
HNF00-A-025NB/HNF00-A-006MB	83 x 35 x 37、47 mm
HNF00-A-038NB/HNF00-A-010MB	80 x 39 x 37、47 mm
HNF00-A-050NB/HNF00-A-012MB	80 x 49 x 43、53 mm
HNF00-A-075NB/HNF00-A-020MB	87 x 55 x 49.5、59.5 mm
HNF00-A-100NB/HNF00-A-026MB	87 x 65 x 57、67 mm



The following points should be noted before installation

- Ensure the piping is free from deformation, damage, or contamination;
- The piping size and material used should be compatible with the HNF00-A series flow sensor;
- Air in the piping may cause measurement errors or interrupt ultrasonic coupling;
- Ensure the piping is free of dirt or residue;
- During installation, avoid applying excessive force that could damage the sensor or piping;
- If necessary, clean the sensor before the piping comes into contact with the sensor's measurement channel.



Step 1:
Unscrew the screws and
remove the bottom cover.



Step 2:
Insert the plastic rigid tube into
the sensor's measurement channel.



Step 3:
Close the bottom cover and fix the
plastic rigid tube inside the
sensor's measurement channel.



Step 4:
Tighten the screws from the
front of the sensor, tightening
the top cover bolts to the
specified torque.

Precautions:

- Ensure the sensor base cover and sensor body are fully fitted;
- The flow sensor should be clamped onto a straight section of a rigid plastic pipe. The length of the straight pipe section before entering the sensor should be greater than 10 times the inner diameter of the pipe, and the length of the straight pipe section after exiting the sensor should be greater than 5 times the inner diameter of the pipe.

HNF00-A CLAMP ON ULTRASONIC FLOW METER SELECTION TABLE

NAME	CODE	CODE DESCRIPTION
Caliber specifications	025	1/4" (DN8)
	038	3/8" (DN10)
	050	1/2" (DN15)
	X	Customizable
Output signal	H	4-20mA
	H1	0-20mA
	H2	0-24mA
	R	RS485
	P	PNP
	N	NPN
	X	Customizable
Mounting bracket	1	Yes
	2	No