UF Series
Ultrasonic Flowmeter

DESCRIPTION

The UF Series is a converter-integrated type ultrasonic flowmeter with an indicator using a straight PFA tube. It supports a wide range of applications for controlling the flow of ultrapure water, pure water, and water.



KEY FEATURES

- **Up to 150 L/min flow measurement**
  PFA tube sizes of 1/2", 3/4", and 1" are available.
- **Clean structure**
  The measuring tube is made of a commercially available PFA tube.
  It is designed to protect against liquid stagnation without welding.
- **Highly reliable flow rate detection method**
  It uses a proven ultrasonic type.
  The structure has no moving parts and so does not require regular maintenance.
- **Low pressure loss**
  The tube is completely straight and rarely causes pressure loss.
- **Wide measurement range**
  Rangeability is 100:1 (when low cutoff setting is 1%).
- **180-degree rotatable display**
- **Three types of output signal**
  An output can be selected from three types according to your application.
  - Current output and 2-point open collector
    4 to 20 mA DC output
    2-point open collector output (alarm or frequency)
  - Current output and communication
    4 to 20 mA DC output
    RS485 communication (Modbus protocol)
  - Open collector output and communication
    1-point open collector output (alarm or frequency)
    RS485 communication (Modbus protocol)
- **Conformity standard**
  EMC: EN61326-1: 2013/EN61326-2-3: 2013
  RoHS2 compliant

MEASURING PRINCIPLE

Piezoelectric elements A and B, which transmit and receive ultrasonic waves, are installed at both ends of the measuring tube, thus measuring the transit time (tA and tB) for the ultrasonic waves to travel in the liquid from A to B and B to A.
The tA and tB values are equal when the liquid is at rest. However, tA becomes shorter and tB becomes longer as the flow velocity increases, and thus the flow velocity can be obtained by subtracting tB from tA.

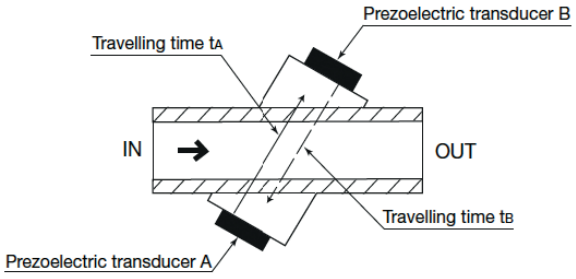


Figure 1 Operating principle

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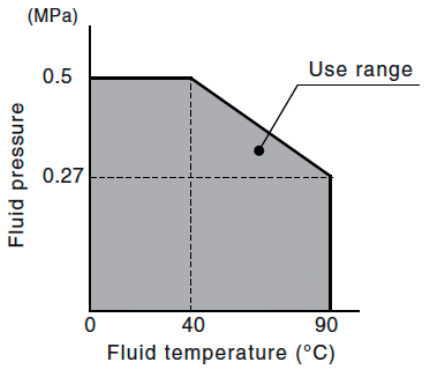
STANDARD SPECIFICATIONS

Specifications \ Output type		Type 1	Type 2	Type 3
Measuring fluid		Ultrapure water, pure water, water		
Fluid dynamic viscosity		0.3 to 40 mm^2/s		
Flow range/pipe size *1	UF10	0 to 20 L/min, 1/2"		
	UF15	0 to 50 L/min, 3/4"		
	UF20	0 to 90 L/min, 1"		
	UF21	0 to 150 L/min, 1"		
Process connection		PFA tube end (standard) or PFA coupling (option)		
Accuracy (with indicator) *1		±2% F.S. (1 digit)		
Precision		±0.5% F.S.		
Fluid pressure		Max. 0.5 MPa (Refer to the "Fluid pressure range" table.)		
Fluid temperature		10 to 90°C (Refer to the "Fluid/ambient temperature range" table.)		
Ambient temperature		0 to 50°C (Refer to the "Fluid/ambient temperature range" table.)		
Ambient humidity		5 to 90% RH		
Power voltage		10.8 to 26.4 V DC		
Current consumption		Approx. 50 mA (26.4 V) Approx. 120 mA (10.8 V)		
Inrush current at startup		Approx. 1.3 A (26.4 V) Approx. 0.7 A (10.8 V)		
Indication	Flow rate	Four-digit seven-segment LED (1 digit after the decimal point)		
	Alarm	LED with 2 lights		
Resolution		0.1 L/min		
Output *2		Current output: 4 to 20 mA DC Load resistance: 0 to 500Ω		——
		Open collector output × 2 Rated load: Max. 100 mA, 30 V DC Instantaneous flow alarm or frequency output Frequency output (to full scale) Frequency: 1000 Hz Duty: 50%	——	Open collector output × 1 Rated load: Max. 100 mA, 30 V DC Instantaneous flow alarm or frequency output Frequency output (to full scale) Frequency: 1000 Hz Duty: 50%
		——	RS485 (Modbus protocol)	
Cable		5 m 6-core (power supply: AWG26, output: AWG28, outer diameter 4.2 mm)		
Protection class		Equivalent to IP65		
Material	Measuring tube (tube)	PFA		
	Housing	PPS		
	Cable sheath	PVC		
Weight	UF10	200 g (tube end)		
	UF15	220 g (tube end)		
	UF20 / UF21	240 g (tube end)		
	Cable	140 g		

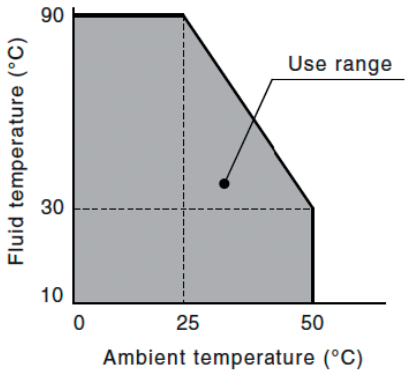
*1 Calibration conditions:
Fluid: water, fluid temperature: 20°C, ambient temperature: 23°C, power voltage: 24 V DC
*2 Select by the model code.

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Fluid pressure range

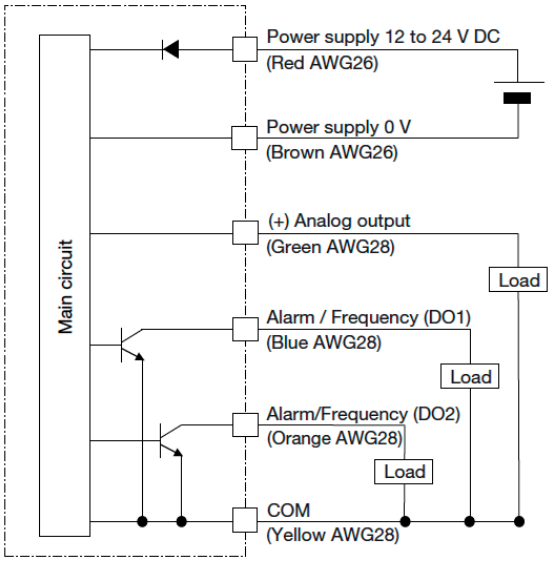


Fluid / ambient temperature range

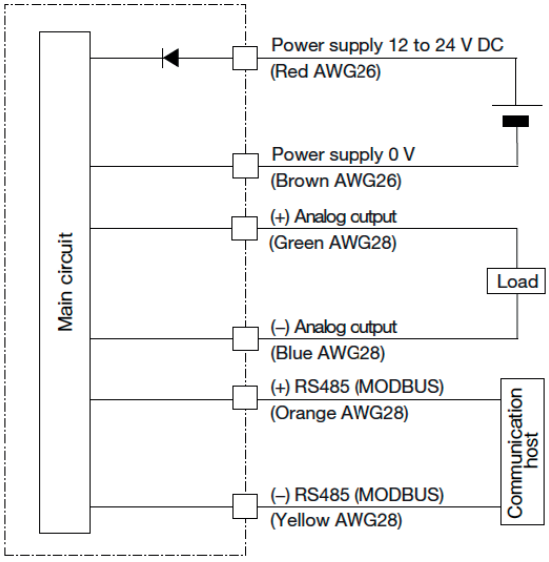


ELECTRIC CONNECTION

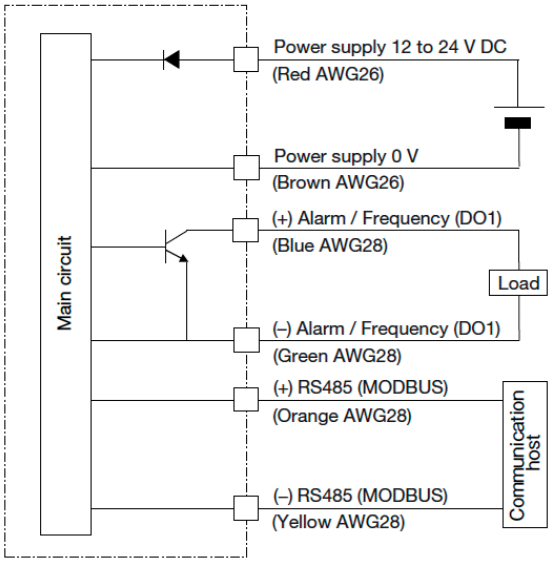
UF□□-1□ (Type 1)



UF□□-2□ (Type 2)



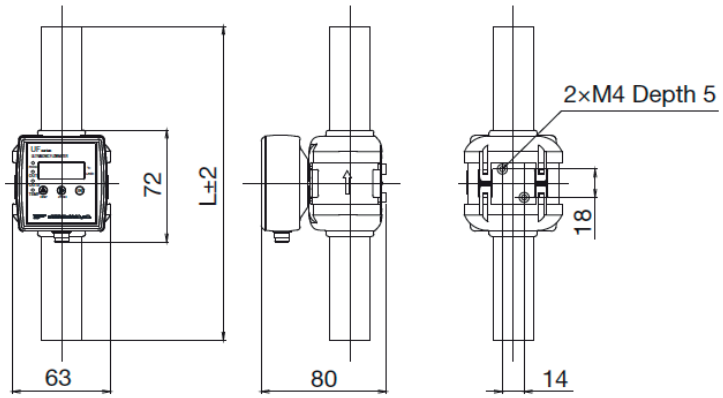
UF□□-3□ (Type 3)

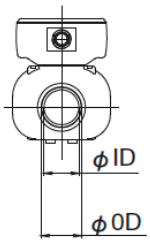


MODEL CODE

UF	□□	–□	□	Description	
Flow range/pipe size	10			0 to 20 L/min / 1/2"	
	15			0 to 50 L/min / 3/4"	
	20			0 to 90 L/min / 1"	
	21			0 to 150 L/min / 1"	
Output		–1		Type 1	Current output: 4 to 20 mA DC Open collector output: 2 points (alarm or frequency)
		–2		Type 2	Current output: 4 to 20 mA DC RS485 communication (Modbus protocol)
		–3		Type 3	Open collector output: 1 point (alarm or frequency) RS485 communication (Modbus protocol)
Process connection			0	PFA tube end (standard)	
			1	Supports coupling construction (please consult us).	

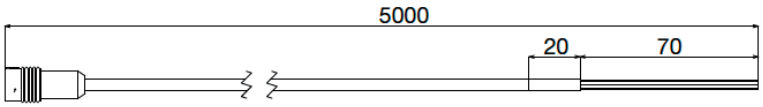
DIMENSIONS





Model	ϕ 0D	ϕ ID	L
UF10	12.7	9.52	230
UF15	19.05	15.88	280
UF20 / UF21	25.4	22.22	300

Cable dimension



*Specification is subject to change without notice.

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