

GENERAL

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.

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 (t_A and t_B) for the ultrasonic waves to travel in the liquid from A to B and B to A. The t_A and t_B values are equal when the liquid is at rest. However, t_A becomes shorter and t_B becomes longer as the flow velocity increases, and thus the flow velocity can be obtained by subtracting t_B from t_A .

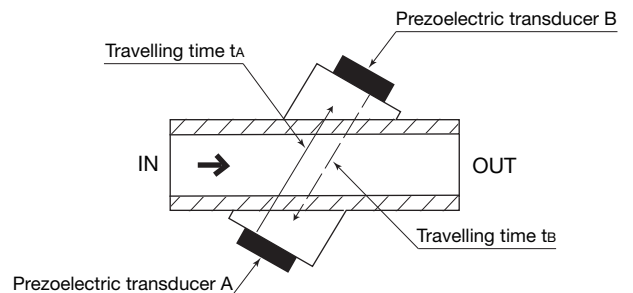


Figure 1 Operating principle

STANDARD SPECIFICATIONS

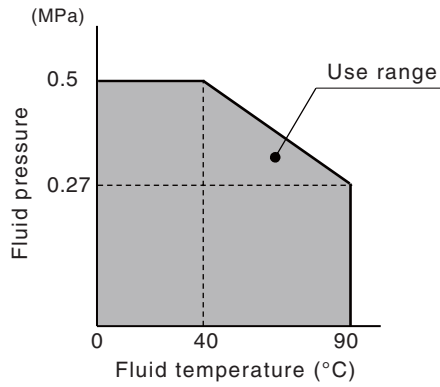
Output type		Type 1	Type 2	Type 3
Specifications				
Measuring fluid		Ultrapure water, pure water, water		
Fluid dynamic viscosity		0.3 to 40 mm ² /s		
Flow range/pipe size *1	UF10	0 to 20 L/min, 1/2"		
	UF15	0 to 50 L/min, 3/4"		
	UF20	0 to 90 L/min, 1"		
	UF21	0 to 150 L/min, 1"		
Process connection		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:

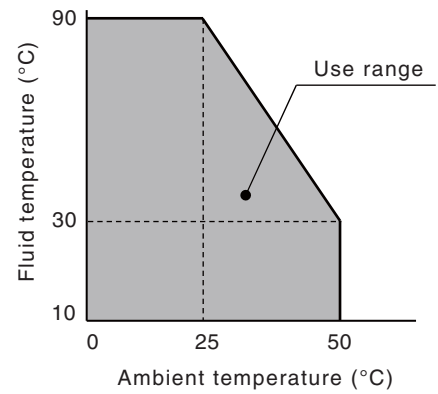
Fluid: water, fluid temperature: 20°C, ambient temperature: 23°C, power voltage: 24 V DC

*2 Select by the model code.

Fluid pressure range

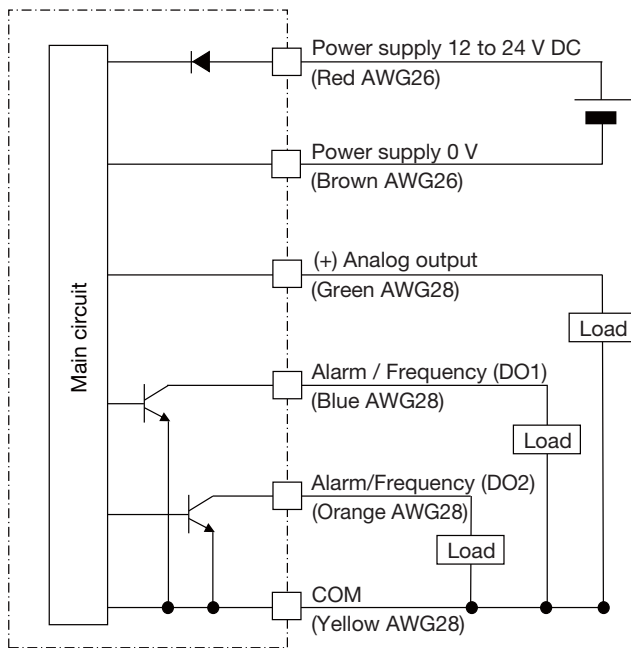


Fluid / ambient temperature range

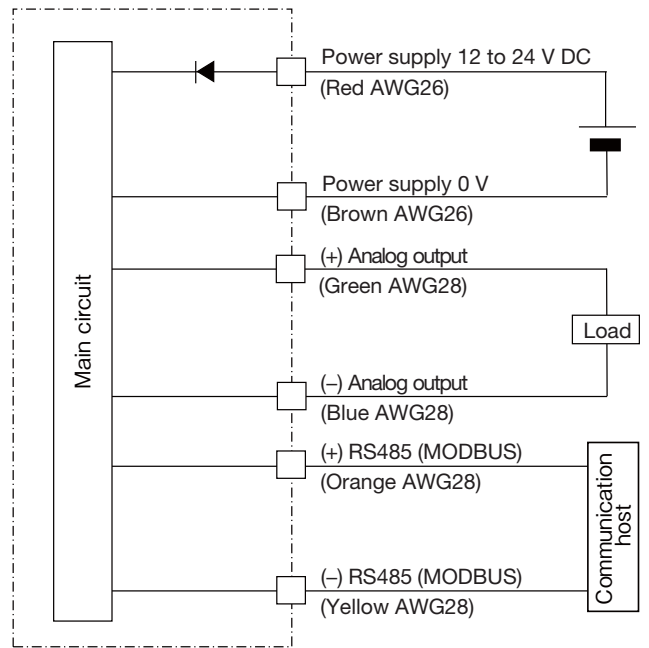


ELECTRIC CONNECTION

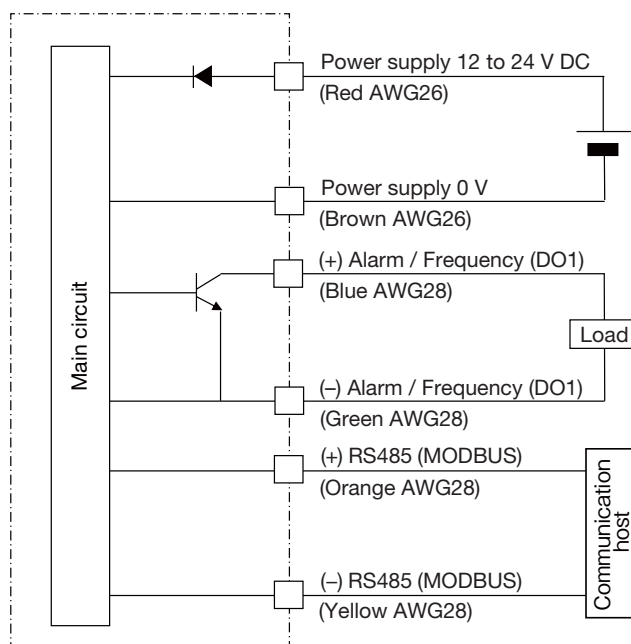
UF□□-1□ (Type 1)



UF□□-2□ (Type 2)



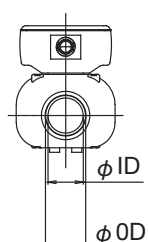
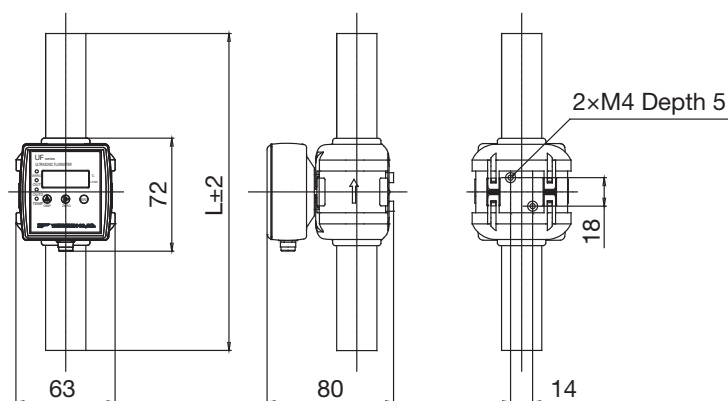
UF□□-3□ (Type 3)



MODEL CODE

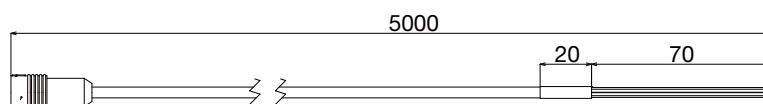
UF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Description	
Flow range/pipe size	10			0 to 20 L/min / 1/2"	
	15			0 to 50 L/min / 3/4"	
	20			0 to 90 L/min / 1"	
	21			0 to 150 L/min / 1"	
Output		-1		Type 1	Current output: 4 to 20 mA DC Open collector output: 2 points (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 OD	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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