Fuji Electric

Innovating Energy Technology

PORTABLE TYPE
ULTRASONIC FLOWMETER

Easy Measurement Anytime Anywhere

- ☑ Compact and Lightweight—Only 1 kg
- ☑ Easy-to-Install Detector
- ☑ Consumed Energy Calculation

Clamp-on Detector & Portable Transmitter

You can start measurement anytime you wish without interrupting the plant operation

Flow transmitter (FSC)

Display

1. Date & time
2. SD memory card
3. Measurement mode
4. AI/AO status
5. Ultrasonic signal level indicator
6. Battery indicator
7. Site name
8. Quick logger start/ stop button
9. Kind of data
10. Switch to graph view
11. Unit
12. Totalizer reset
13. Totalizer ON/OFF
14. Measurement status

Operation keys

15. Power ON/OFF
16. Backlight ON/OFF
17. Print out or data-saving on SD card
18. Charging status
19. Power supply
20. ▲ Up key
21. ▼ Down key
22. ◀ Left key
23. ▶ Right key
24. ESC Escape key
25. ENT Enter key
26. MENU Menu key

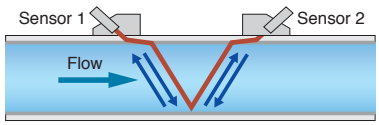
Side

27. Downstream sensor
28. Upstream sensor
29. AI/AO
30. 12 V DC power

Select the best configuration for your applicatio

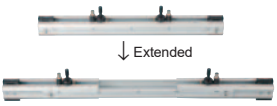
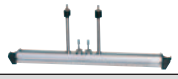
Transit time difference: V method

Principle



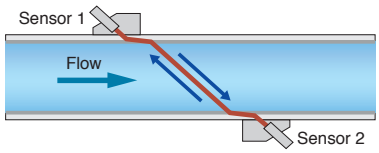
A pair of sensors aligned on the outside wall of a pipe. The sensors emit ultrasonic pulse in turn, and detect the transit time difference of the pulse, by which the flow rate is calculated

Detectors

Appearance		Model	Pipe diameter (mm)	Fluid temperature (°C)
For small diameter pipes		FSSD	13 to100	-40 to +100
Extendable rail type		FSSC	50 to 600	-40 to +120
For large pipes		FSSE	200 to 3000	-40 to +80
For high temperature		FSSH	50 to 250	-40 to +200

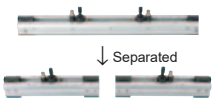
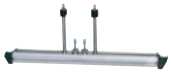
Transit time difference: Z method

Principle



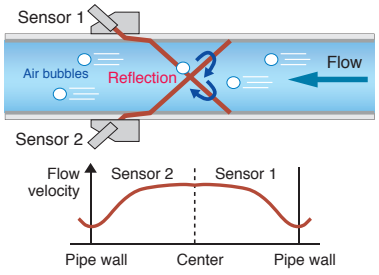
A pair of sensors installed on the outside wall of a pipe, facing each other slantingly. The sensors emit ultrasonic pulse in turn, and detect the transit time difference of the pulse. This method is used mainly when the V method is not available due to the space limitation, or when the fluid has high turbidit .

Detectors

Appearance		Model	Pipe diameter (mm)	Fluid temperature (°C)
For small diameter pipes		FSSD	150 to 300	-40 to +100
Extendable rail type		FSSC	200 to 1200	-40 to +120
For large pipes		FSSE	200 to 6000	-40 to +80
For high temperature		FSSH	150 to 400	-40 to +200

Pulse doppler method: for real-time flow profile analysis

Principle



The frequency of ultrasonic pulses reflected by air bubbles or solid particles changes according to the flow velocity. The pulse doppler flowmeter uses this frequency shift to determine the flow velocity profile

Detectors

Appearance		Model	Pipe diameter (mm)	Fluid temperature (°C)
Small		FSDP2	40 to 200	-40 to +100
Middle		FSDP1	100 to 400	-40 to +80
Large		FSDP0	200 to 1000	-40 to +80

Designed for Ease-of-Use

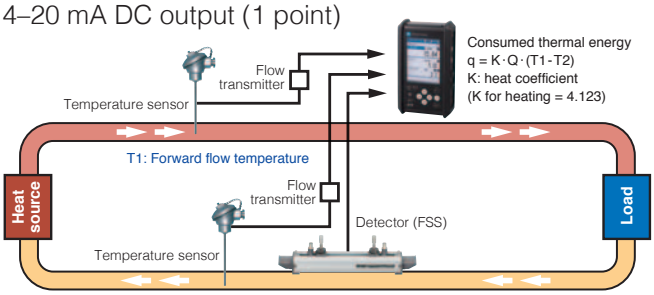
Easy Measurement Anytime Anywhere

Handy and battery-powered design allows you to take measurement when and where needed.

Consumed Energy Calculation

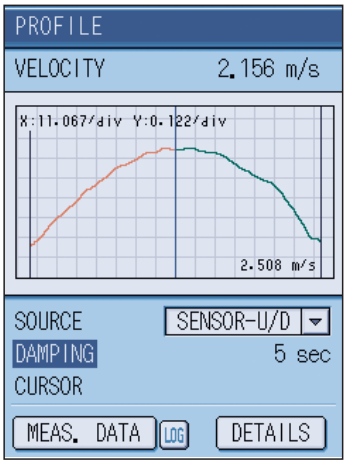
A function to obtain thermal energies exchanged via fluid used in air-conditioning systems. The transmitter calculates the consumed thermal energy based on the forward flow temperature, the return flow temperature, and the flow rate.

4–20 mA DC output (1 point)



Real-Time Monitoring of Flow Profile (option)

Using the flow transmitter FSC in combination with the optional pulse doppler detector (FSD) enables real-time monitoring of flow profile.



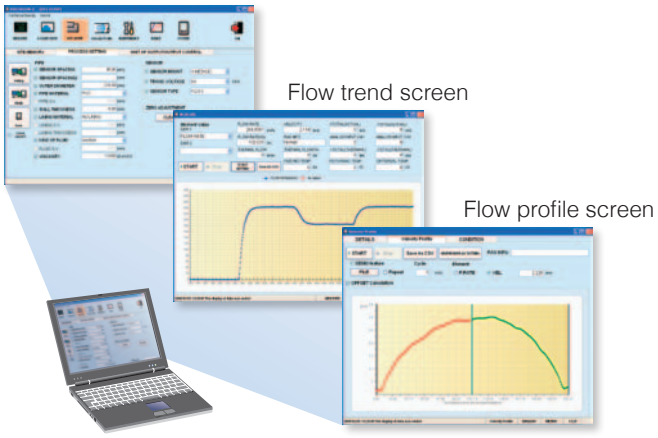
Flow profile indication

Data Management on PC

Data in SD card can be transmitted to your PC through a USB cable.

Loader software provided

Parameter setting screen



Carrying Case

The dedicated case accommodates all the necessary equipment including:

- Flow transmitter
- Detector (FSSC or FSSD)
- Acoustic coupler (silicone grease)
- Signal cable
- Analog I/O cable
- Strap
- AC power adapter
- Power cable
- Mounting belt
- USB cable
- CD-ROM (instruction manual, parameter loader software)

Carrying case

Improved Image Quality

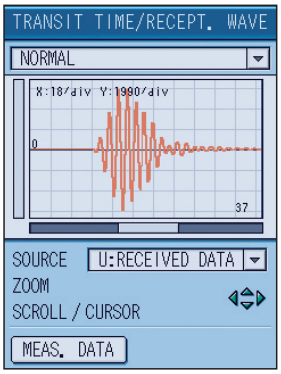
NEW

- Contrast ratio twice as high as the previous model
- Holizontal and vertical viewing angles of 80 degrees

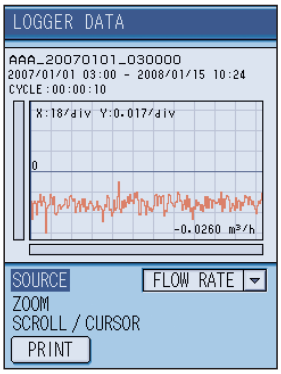
Old model

New model

- Data visualization options



Received waveform



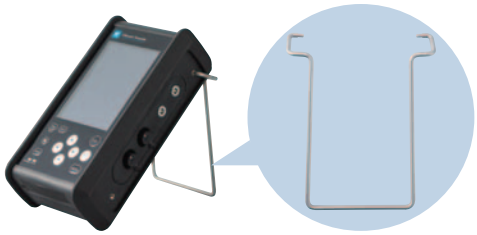
Logger data

- Multilingual display

Accessories for Comfortable Operation (option)

- Hand strap
  Helps you hold the transmitter

- Stand
  Holds the transmitter at an easy-to-see angle



* The hand strap and the stand cannot be used simultaneously.

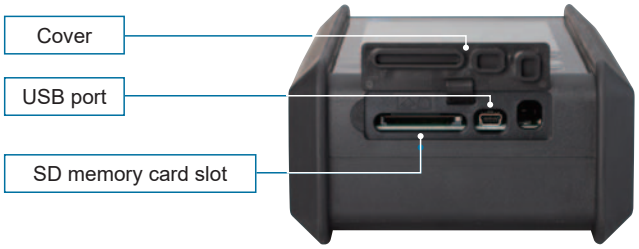
Easy-to-Mount Detector

Mounting detector requires no tools. You can start measurement anytime.

Data Storage on SD Card

The transmitter automatically saves the measured data on SD memory card at user-specified cycle. You can also send the data through USB port to your PC.

- For example, a 512 MB memory card can store the data of two years' worth (at a data save cycles of 30 s, 14 kinds of data).
- SD card up to 8 GB can be used.



12 Hours of Continuous Operation with Built-in Battery

FSC can serve long hours of outdoor measurement.

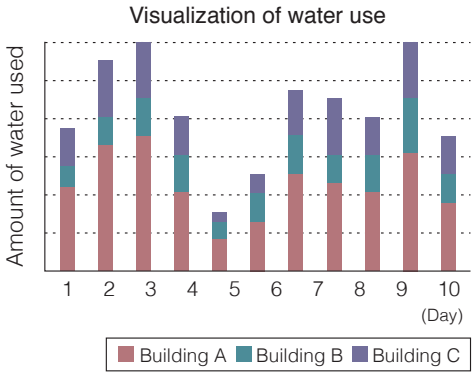
On-Site Printing (option)

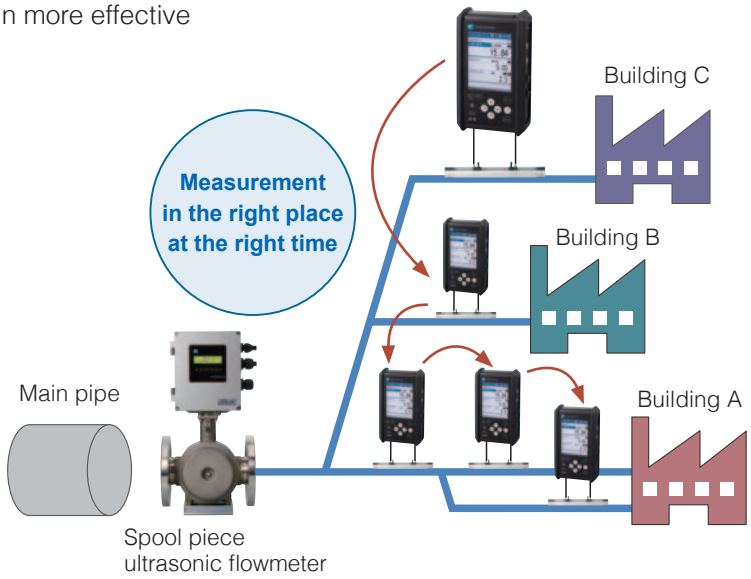
You can print out the measured data or screenshot by the dedicated printer.

Applications

Reduction of Water Used in Plant Utilities

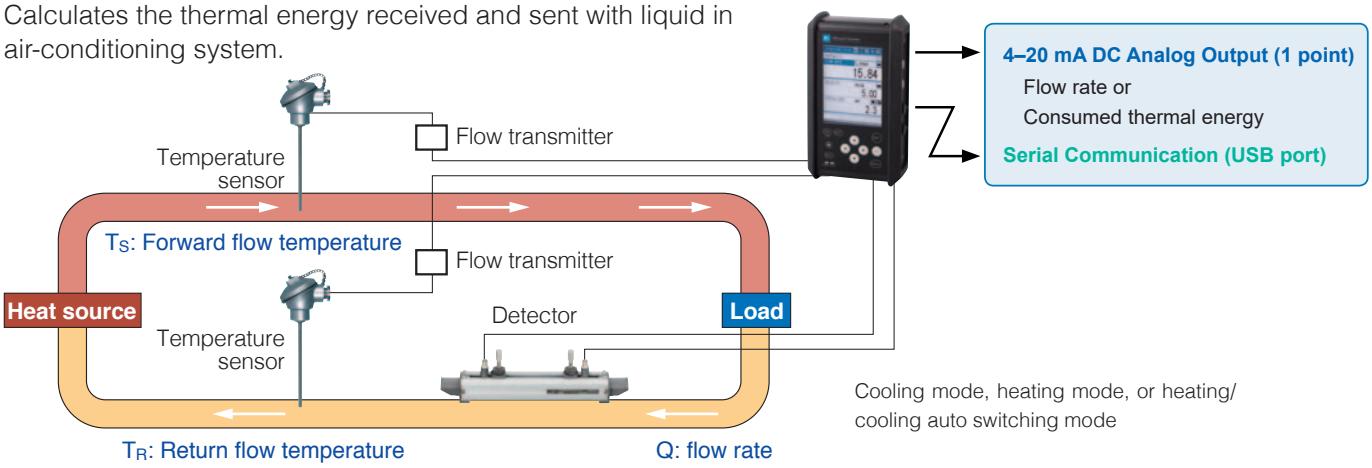
Visual depiction of a facility's water use results in more effective management of water consumption.





Energy Consumption in Air-Conditioning Systems

Calculates the thermal energy received and sent with liquid in air-conditioning system.

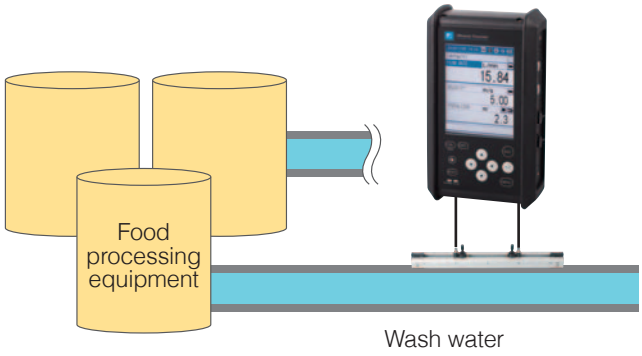


Corrosive Fluid

Ultrasonic flowmeters can take measurement on glass, metallic, and plastic pipes.

Wash Water in Food Manufacturing Plants

Easier installation and lower maintenance compared to mechanical flowmeters or Coriolis flowmeters



Ordering Code

Select a code for each digit to configure the model for your ap lication.

F S C S [5][6][7][8] - [9][10][11]

F S S [4][5][6][7][8] - [9][10]

Flow transmitter

Digit	Specification	Code
5	Transmitter unit	
	Standard unit	1
	Standard unit + printer	2
6	Flow velocity profil	
	None	0
	With (A detector for flow velocity profile measurement is required)	1
7	AC power adapter + cable	
	125 V AC (Japan, North America)	A
	250 V AC (EU, Korea)	B
	250 V AC (China)	C
8	Revision code	4
9	SD memory card	
	None	0
	With (512 MB)	1
11	Instruction manual / default language setting	
	None / English	Y
	With / Japanese	J
	With / English	E
	With / Chinese	C

Detector (transit time difference method)

Digit	Specification		Code
4	Type		
	Extendable rail type	50–1200 mm	C
	For small diameter pipes	13–100 mm	D
	For large pipes	200–6000 mm	E
	For high temperature	50–400 mm	H
5	Guide rail		
	Standard		1
	Long (Selectable when the 4th code is D)		3
6	Mounting belt *1		
	None		Y
	Stainless belt (for pipe diameters ≤ 300 mm)		A
	Plastic cloth belt (for pipe diameters ≤ 300 mm)		B
	SS belt with screws (for pipe diameters ≤ 600 mm)		C
	Wire (for pipe diameters ≤ 1500 mm)		D
	Wire (for pipe diameters ≤ 6000 mm)		E
7	Acoustic coupler		
	None		Y
	Silicone-free grease		B
	Silicone grease*2		C
	Grease for high temperature (Selectable when the 4th code is H)		D
8	Revision code		1
9	Waterproof treatment		
	None		Y
	With*3 (Selectable when the 4th code is C or E)		B
10	Tag plate		
	None		Y
	Stainless steel tag plate (The tag number need to be specified.)		A

*1: Select an appropriate mounting belt in 6th code in reference to the following table.

Mounting method	≤ 300 mm	≤ 600 mm	≤ 1200 mm
V method	A, B, or C	C	D
Z method	C	D	D

Possible combination of 4th code and 6th code

6th code \ 4th code	C	D	E	H
Y	✔	✔	✔	✔
A	✔	✔		✔
B	✔	✔		
C	✔	✔		✔
D	✔		✔	
E			✔	

*2: Normally, select the silicone grease as an acoustic coupler. A silicone grease comes in a 100 gram tube.

*3: Two 10-meter signal cables are included. Waterproof treatment makes the detector submersible for five days.

Detector
(pulse doppler method, for flow velocity profile measuremen

Model	Specification
FSDP20Y1	Small (40 mm to 200 mm)
FSDP10Y1	Middle (100 mm to 400 mm)
FSDP00Y1	Large (200 mm to 1000 mm)

Scope of Delivery

Flow transmitter (FSC)	1. Transmitter unit 2. AC power adapter with AC/DC conversion cable 3. Power cable 4. Analog I/O cable (1.5 m) 5. USB cable (1 m) 6. Carrying case 7. Strap 8. Signal cable (5 m × 2) 9. CD-ROM (instruction manual, parameter loader software) Option (as specified by order) 1. SD memory card (512 MB) 2. Printer (with 1 roll of paper) 3. Instruction manual
Transmit time method flow detector (FSS)	1. Detector unit 2. Signal cable conversion cable (provided when the detector is FSSE) 3. Mounting belt or wire (as specified by order) 4. Silicone grease or silicone-free grease (as specified by order)
Pulse doppler flow detector (FSDP)	1. Detector unit 2. Mounting belt or wire 3. Silicone grease (100 g)

* Parameter loader software is available from our website at:
www.fujielectric.com/products/instruments/

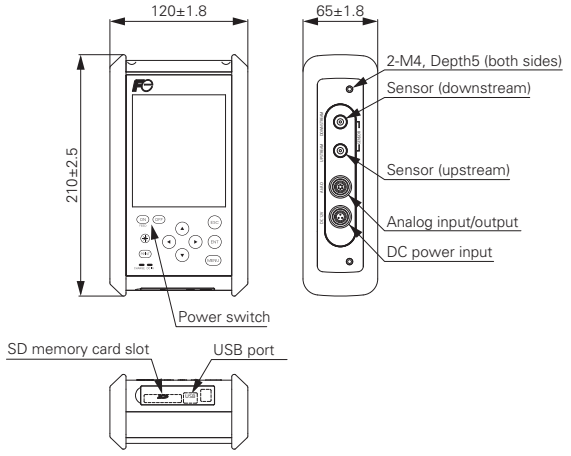
Specification

Fluid	Uniform liquid through which ultrasonic wave can propagate (water, distilled water, alcohol, etc.)
Pipe inner diameter	13 mm to 6000 mm (depending on detector)
Fluid temperature	-40°C to +200°C (depending on detector)
Velocity	0 to ±32 m/s (minimum ±0.3 m/s)
Accuracy	±1.0% of rate (depending on flow velocity)
Output cycle	1 s
Path	1 path, transit time method
Display	TFT Color LCD with back light
Analog output	1 point: 4–20 mA DC
Analog input	2 point: 4–20 mA DC (2 points) or 4–20 mA DC (1 points) and 1–5 V DC (1 points)
Power supply voltage	Built-in battery (12 hours of continuous operation)
Transmitter enclosure	IP64 (no printer version)
Transmitter dimensions	210 × 120 × 65 mm (no printer version)
Transmitter weight	Approx. 1 kg
SD card	512 MB (stores 2 years' worth data), Max. 8 GB

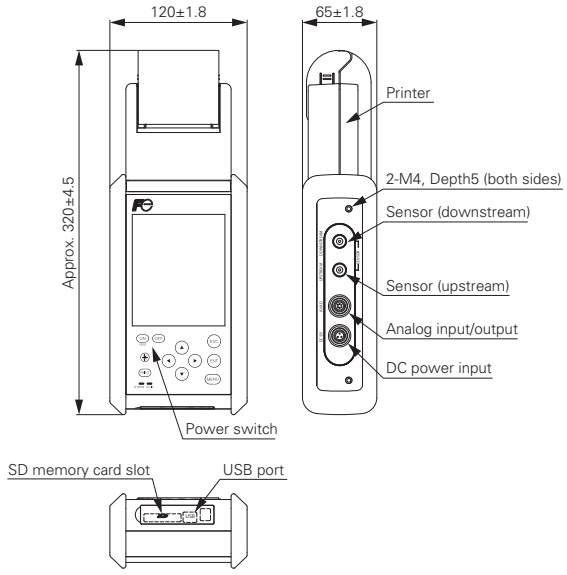
Serial communication	Transmission data: Data stored in SD card (instantaneous value, total value, etc.) Through USB port Cable length: up to 3 m
Functions	Damping time constant (0 to 100 s) Instantaneous value (10-digit) *The flow rate unit is selectable Total value (10-digit) *The flow rate unit is selectable Consumed energy calculation Self-diagnosis (battery power, received wave) Flash memory (measurement parameters for pipe, fluid, sensor, etc) Number of registration sites: 32 Zero point adjustment (by setting zero or clearing zero) Graph view, waveform view Language (Japanese, English, Germain, French, Spanish, Chinese) Bidirectional flow measurement Low flow cut-off (0–5 m/s)
Options	Printer: screen hard copy, periodic printing and logged data printing Detector for flow velocity profile measurement: displays flow velocity profile of instantaneous value and average value

Dimensions

Flow transmitter (FSCS1)



Flow transmitter with printer (FSCS2)



Information in this catalog is subject to change without notice.
Read the instruction manuals thoroughly before using the products.

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