Fuji Electric

Innovating Energy Technology

Ultrasonic Flowmeters

For Liquids and for Air

From Air to Oil
Reliable Flow Measurement

21A1-E-0006b

Innovative Solutions for Various Applications

Spool Piece Ultrasonic Flowmeter for Liquids

- High accuracy: ±0.2% of rate
- Easy-to-operate
- Low maintenance
- Convenient configuration and data management from PC

Principle: transit time difference method with parallel three measuring paths *1

Applications

Reduction of water use in plant utilities, flow monitoring in filtration equipment, flow measurement on two pipes, liquid level monitoring in tanks, oil flow monitoring

Introduction movie

Read the two-dimensional code with your smartphone or tablet.

Clamp-on Ultrasonic Flowmeter for Liquids

- No piping work—cost saving
- Installation available without interrupting the plant operation
- Non-contact and low-maintenance sensor
- Wide selection

Principle: transit time difference method *2

Applications

Flow measurement of ultra-pure water in semiconductor manufacturing plants, paint and coating material in painting process, water in air-conditioning systems, drainage

Ultrasonic Flowmeter for Air

- No projections inside pipe—no pressure loss
- Abundant applicable pipe diameters
- Tolerant to oil mist—no need for filter such as mist separator

Principle: transit time difference method *2

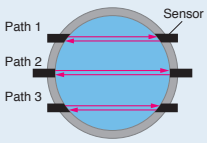
Applications

Visualization of the compressed air use, early detection of air leakage

Principle

***1: Transit time difference method with parallel three measuring paths**

Three parallel paths are arranged at selected positions to reduce the adverse effect of flow profile. By measuring the flow with the three paths simultaneously, and averaging them, the flowmeter obtains an accurate flow rate.



Flow velocity: $V = K\ (T2 - T1)$

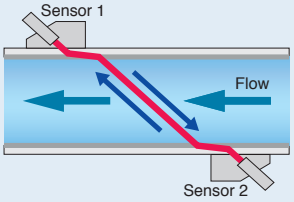
Pipe cross-sectional areas: $A = \frac{\varpi D^2}{4}$

Flow rate: $Q = A\ V$

Pipe inner diameter	: D
Transit time with flow	: T_1
Transit time against flow	: T_2
Flow coefficient	: K

***2: Transit time difference method**

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



Selection Guide

✓✓: best suitable ✓: suitable ×: not applicable

		[For liquid] Spool piece	[For liquid] Clamp-on					[For air]
			TIME DELTA-C	TIME DELTA-C advanced type	M-Flow PW	Portable type	Duosonics	
Flow transmitter		FST	FSV	FSV	FLR	FSC	FSH	FWD
Detector			FSS	FSS	FSS	FSS	FSW	
								
Principle		Transit time					Pulse doppler + Transit time	Transit time
Bubble resistance		Good					Superior	—
Applicable fluid	Clean, no air bubbles	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Air N_2
	Sewage, drainage	✓	✓	✓	✓	✓	✓✓	
	High-viscosity	✓	✓	✓	✓	✓	✓	
	Oil	✓	✓	✓	✓	✓	✓	
	Corrosive	✓	✓✓	✓✓	✓✓	✓✓	✓✓	
	Polishing slurry	Conditionally applicable					✓	
	Fibrous slurry						✓	
	Low-velocity	Conditionally applicable	✓	✓	✓	✓	✓	
	Pulsating	×	Conditionally applicable				✓	
	High-temperature	✓	✓	✓	✓	✓	×	
	High-pressure	✓	✓✓	✓✓	✓✓	✓✓	✓✓	
Pipe size (in mm)		25 (under development), 50, 80, 100	See Table on Page 7.					25, 32, 40, 50, 65, 80, 100, 150, 200
Fluid temperature		Standard: -40°C to 150°C Ex-proof: -10°C to 150°C						-10°C to 60°C
No. of path		3	1	1 or 2	1	1	1 or 2	1
Flow velocity range	Min	0 … ±0.3 m/s	0 … ±0.3 m/s	0 … ±0.3 m/s	0 … ±0.3 m/s	0…±0.3 m/s	0 … ±0.3 m/s	0 … ±0.6 m^3/h
	Max	0 … ±10 m/s	0 … ±32 m/s	0 … ±32 m/s	0 … ±10 m/s	0…±32 m/s	0 … ±32 m/s (transit time mode)*1	0 … ±2000 m^3/h
Accuracy (% of rate)		±0.2%	±1.0%		±1.5% (±1.0% version available)	±1.0%	Pulse doppler: ±0.5% Transit time: ±1.0%	±2.0%
Response time		1.2 s	≤ 0.2 s			≤ 1 s	Pulse doppler: ≤ 0.2 s Transit time: ≤ 0.5 s	≤ 0.5 s
4–20 mA output		✓	✓	✓	✓	✓	✓	✓
Pulse output		✓	✓	✓	✓	—	✓	✓
Alarm output		✓	✓	✓	✓	—	✓	✓
Communication		RS-485 or HART*4	RS-485			SD card, USB port	RS-485 / RS-232C	—
Consumed energy calculation		—	—	✓ *2	—	✓ *3	—	—
Power supply		100–240 V AC, 50/60 Hz or 20–30 V DC	100–240 V AC, 50/60 Hz or 20–30 V DC	100–240 V AC, 50/60 Hz	100–240 V AC, 50/60 Hz or 20–30 V DC	100–240 V AC, 50/60 Hz Built-in battery	100–240 V AC, 50/60 Hz or 20–30 V DC	Lithium-ion battery or 24 V DC
Cable btwn detector and transmitter		—	≤ 150 m		≤ 60 m	≤ 150 m		—
Dimensions (in mm)		—	170 × 142 × 70	240 × 247 × 134	140 × 137 × 68	210 × 120 × 65	240 × 247 × 134	—
Weight		10–39 kg	1.5 kg	5.0 kg	0.8 kg	1.0 kg	5.0 kg	1.1 kg–24.1 kg
Ex-proof approval		✓	—	—	—	—	—	—

Notes: 1. Maximum range of hybrid mode varies with pipe size.
2. Temperature sensor is not provided.
3. Temperature sensor and signal converter are not provided.
4. HART communication is an option for ex-proof version only.

*Measurement may be unavailable depending on conditions.

Spool Piece Ultrasonic Flowmeter for Liquid Applications [FST]

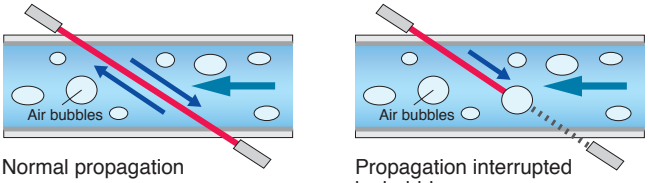
Three Pairs of Sensors Offer an Accuracy of ±0.2% of Rate

- For Precise Control and Improved Efficiency
- No Projections Inside Pipe—Low Maintenance
- Ex-Proof Version Available

Superior Bubble Resistance

Fuji Electric's advanced anti-bubble measurement technology reduces the interference to ensure accurate measurements.

Signal averaging



Normal propagation

Propagation interrupted by bubbles

Measurement failure may occur.

By averaging a set of multiple measurements, precise signals can be obtained.

Improved Sensitivity and Zero-Point Stability

Accepts Various Types of Fluid

Convenient Configuration and Data Management from PC

Low Maintenance

Flexible Output Terminal

Backlit LCD and Front Panel Operation

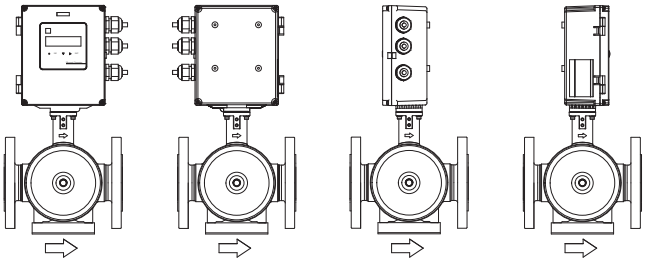
User can select which value to show on each line

Green at normal, red at error

Waterproof keypad

LED-backlit LCD

Selectable Panel Position



11th code A | 11th code B | 11th code C | 11th code D

∗ ⇨ Indicates the flow direction.

Specifications

	Standard version	Ex-proof version
Principle	Transit time difference method (parallel 3-path)	
Pipe diameter	25 mm (under development), 50 mm, 80 mm, 100 mm	
Flange rating	ANSI 150 LB, ANSI 300 LB, DIN PN16, DIN PN40, JIS 10K, JIS 20K	
Accuracy	±0.2% of rate (flow velocity: 1 m/s to 10 m/s)	
Fluid pressure	Up to flange rating	
Fluid temperature	-40°C to +150°C	-10°C to +150°C
Measuring range	Flow velocity: 0 … ±0.3 … ±10 m/s	
Materials	Flange, flow cell, sensor wetted parts: stainless steel 316L Detector housing: SCS13 Transmitter housing: Aluminum alloy	
Output signal	4–20 mA DC, total pulse, alarm output	
Display	16-digit 2-line backlit LCD 2-color LED (green: normal, red: at error)	16-digit 2-line backlit LCD 2-color LED (green: normal, red: at error) Key operation available by using the magnet bar
Functions	Zero point adjustment, damping, low-flow cutoff, alarm, output burnout, output limit, bi-directional range, automatic two ranges, flow switch, total switch, preset total, data backup at power outage	
Communication (option)	RS-485	RS-485 or HART
Data backup at power outage	On nonvolatile memory	
Power supply voltage	100–240 V AC, 50/60 Hz or 20-30 V DC	
Grounding	Class-D grounding with a maximum resistance of 100Ω	Class-A grounding with a maximum resistance of 10Ω
Varistor	Attached to the power supply terminal	
Surge arrester	Attached to the analog output terminal	
Power consumption	AC power supply: approx. 20 VA DC power supply: approx. 6 W	
Ambient temperature	-40°C to 60°C	-10°C to 60°C
Ambient humidity	90% RH or less	
Unit	Flow velocity: m/s Flow rate: L/s, L/min, L/h, L/d, kL/d, ML/d, m^3/s, m^3/min, m^3/h, m^3/d, km^3/d, Mm^3/d	
IP rating	IP66	IP67
Ex-proof certification	–	IECEx, ATEX, NEPSI, Japanese ex-proof certification

For Hazardous Areas

TRUSONIC FLOW

Oil **Chemical** **Pharmaceutical**

International and Local Certifications

- IECEx
- ATEX
- NEPSI
- Japanese ex-proof certification

Key Operation with Magnet Bar

The magnet bar allows you to operate the keys without opening the cover.

For Various Liquids from -10°C to +150°C

Non-conductive liquids such as oils, mixed liquids, and purified water can be measured.

HART or RS-485 Communication

HART COMMUNICATION PROTOCOL

You can transmit the measurement data to host devices.

Clamp-on Ultrasonic Flowmeters for Liquid Applications

No Piping Work—Cost Saving

- Easy Installation Without Interrupting the Process
- Non-Contact and Low Maintenance Sensor

Flow Transmitters


FSV (IP66)


FSV (IP67)

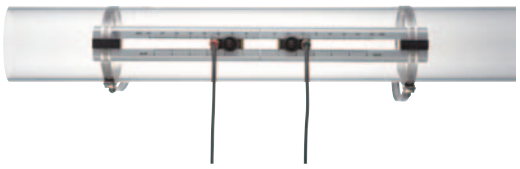
FLR


FSC


FSH

Hardly Affected by Fluid Pressure and Temperature

The sensors placed on upstream and downstream emit ultrasonic pulse in turn, and detect the transit time difference of the pulse to calculate the flow rate. Highly accurate measurement can be obtained regardless of the type of fluid.

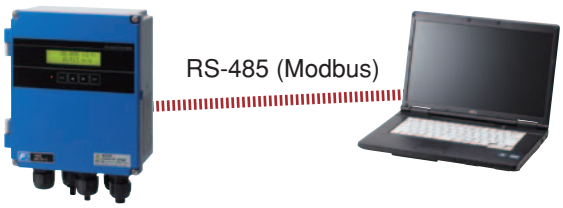


Fast Response Mode Delivers ≤ 0.2s Response Time

Allows you to take corrective actions quickly.

Convenient Configuration and Data Management from PC

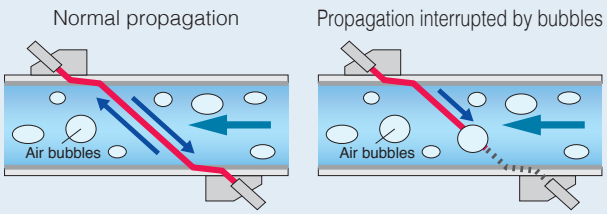
Parameter loader software, provided free of charge, allows parameter setting and measurement data acquisition on PC.



Superior Bubble Resistance

Fuji Electric's advanced anti-bubble measurement technology reduces the interference effect.

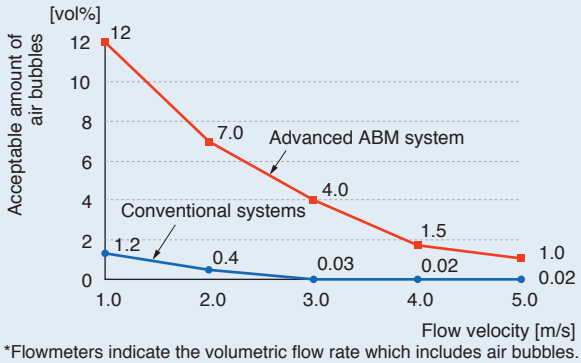
Signal averaging



Normal propagation

Measurement failure may occur.

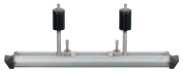
By averaging the results of 128 or 256 measurements, precise signals can be obtained.



*Flowmeters indicate the volumetric flow rate which includes air bubbles.

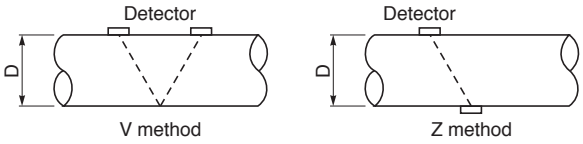
Clamp-on Detectors for Liquid Applications

For pipe diameters from 13 mm to 6000 mm

Appearance	Type	Fluid temperature [°C]	Mounting method	Pipe inner diameter (mm) and material 13 25 50 100 200 250 300 400 600 1000 3000 6000	Transmitter type
	FSSD	-40 to 100	V	13 Px, P, M 100	FSC,FSV
	FSSA	-20 to 100	V	25 P, M 225	FLR,FSV
	FSSC	-40 to 120	V	50 P, M 600 50 Px 300	FSC,FLR, FSV
			Z	200 P, M 1200 200 Px 400	
	FSSH	-40 to 200	V	50 Px, P, M 250	FSC,FSV
			Z	150 Px, P, M 400	
	FSSE	-40 to 80	V	200 Px, P, M 3000	FSC,FSV
			Z	200 Px, P, M 6000	

Pipe materials
Px : PP, PVDF
P : Plastic (PVC, etc.)
M : Metallic piping (steel, copper, aluminum, etc.)

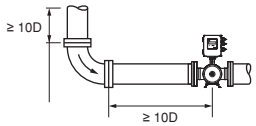
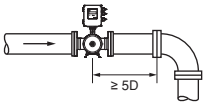
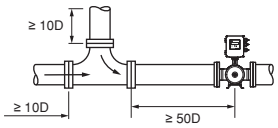
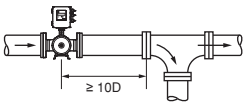
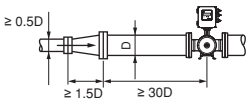
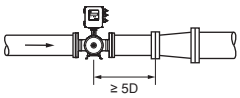
Mounting method : V method or Z method

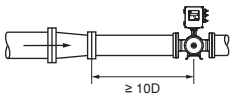
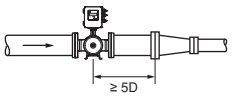
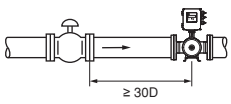
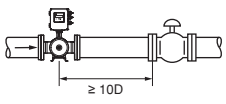
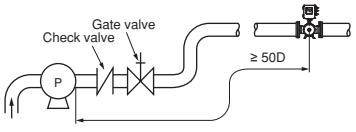


Use the Z-method when:
- You cannot use the V-method due to deficiency of space around the pipe
- The fluid has high turbidity
- Scale is build up inside the pipe

Piping Requirements

(D: inside diameter of pipe)

	Upstream	Downstream
90° bend		
T-shaped pipe		
Expanding pipe		

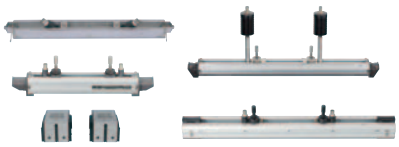
	Upstream	Downstream
Tapered pipe		
Valves	 In the case where a flow control valve exists on upstream side	 In the case where a flow control valve exists on downstream side
Pump		

Source: Japan Electric Measuring Instruments Manufacturers' Association, JAMIS 032-1987

High Accuracy and Wide Measuring Range

TIME DELTA-C

Flow transmitter: FSV Detector: FSS



Detector (FSS)

Flow transmitter (FSV)
IP66

High Accuracy: ±1.0% of Rate

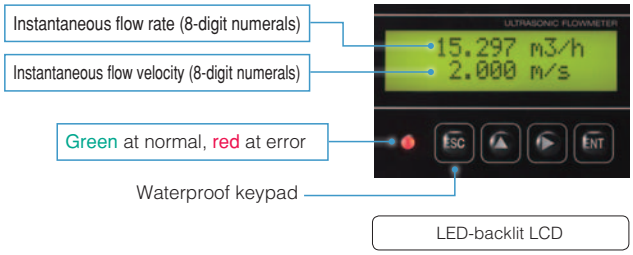
For details, refer to the data sheet.

Wide Range of Detectors for Pipes 13–6000 mm

Including the extendable detector for pipe diameters from 50 mm to 1200 mm

Backlit LCD and Front Panel Operation

Front keys allow you to configure parameters, enter piping conditions, or calculate sensor spacing, without opening the cover.



Specifications

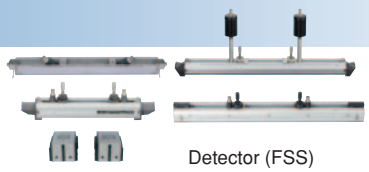
Detector	Model	Diameter (mm)	Fluid temperature (°C)
	FSSA	25 to 225	-20 to 100
	FSSC	50 to 1200	-40 to 120
	FSSE	200 to 6000	-40 to 80
	FSSD	13 to 100	-40 to 100
	FSSH	50 to 400	-40 to 200
Measurement range	0 … ±0.3 … ±32 m/s		
Response time	≤ 0.2 s		
Output signal	4–20 mA DC, pulse output, alarm output		
Communication	RS-485 (Modbus) option		
Accuracy	±1.0% of rate (depending on flow velocity and diameter)		
Power supply voltage	100–240 V AC or 20–30 V DC		
IP enclosure	IP66 or IP67		
Cable between detector and transmitter	≤ 150 m		

Configurable Among Three Different Ways to Suit Your Application

TIME DELTA-C advanced type

Flow transmitter: FSV Detector: FSS

Select one of the following functions when you order.

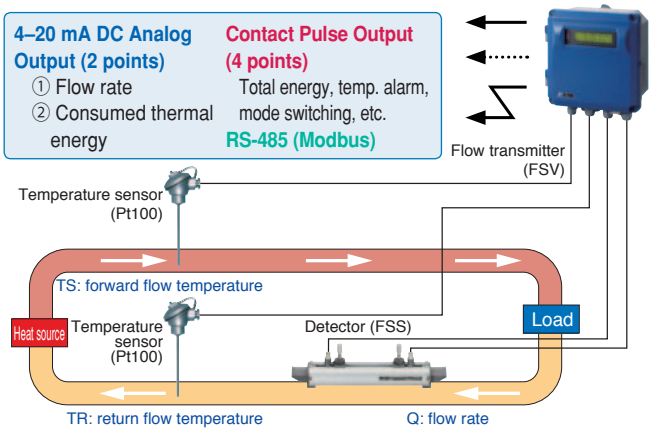


Detector (FSS)

Flow transmitter (FSV)
IP67

1. 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 reverse flow temperature, and the flow rate.



2. Simultaneous Flow Measurement of Two Pipes with One Transmitter

Allows cost reduction.

3. Two Measuring Paths for One Pipe

Highly accurate measurement can be provided even if the flow is uneven.

Specifications

Consumed energy calculation version

4–20 mA output (2 pt)	Flow rate, consumed energy
Contact output (4 pt)	Total energy, mode switching, temp, alarm, etc.

Two pipes measurement version

4–20 mA output (2 pt)	Path 1, path 2, average, total, subtraction
Contact output (4 pt)	Total flow rate, instantaneous flow rate, alarm, etc.

Two-path for one pipe version

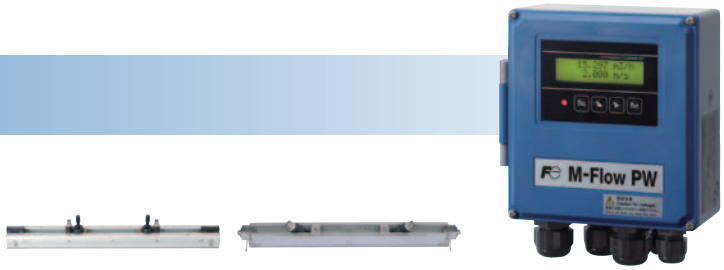
4–20 mA output (2 pt)	Path1, path 2, average
Contact output (4 pt)	Total flow rate, instantaneous flow rate, alarm, etc.

Detector	FSS	ϕ 13 mm to 6000 mm
Measurement range	0 … ±0.3 … ±32 m/s	
Accuracy	±1.0 % of rate (depending on flow velocity and diameter)	
Power supply voltage	100–240 V AC, 50/60 Hz	

Compact and Lightweight

M-Flow PW

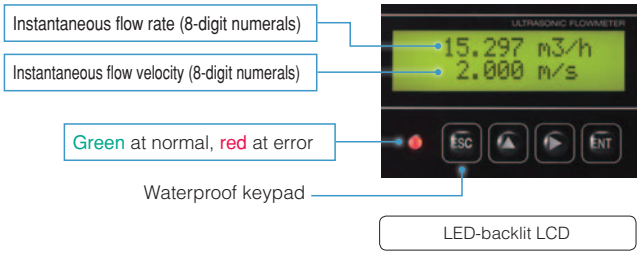
Flow transmitter: FLR Detector: FSS



Detector (FSSC) Detector (FSSA) Flow transmitter (FLR)

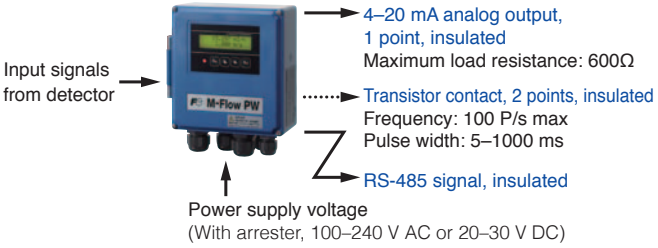
Backlit LCD and Front Panel Operation

Front keys allow you to configure parameters, enter piping conditions, or calculate sensor spacing, without opening the cover.



Analog and Digital Communication

Equipped with an analog output terminal, two transistor contacts, and an RS-485 communication interface (option).



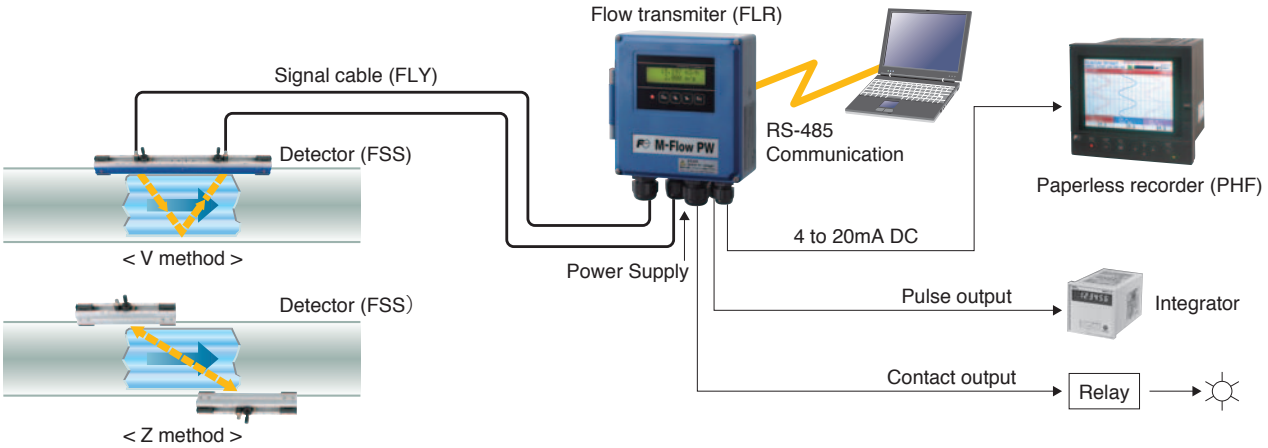
Compact Design

W13 × H14 × D6.9 cm, only a quarter in volume of conventional models. It can be easily installed in a small space.

Specifications

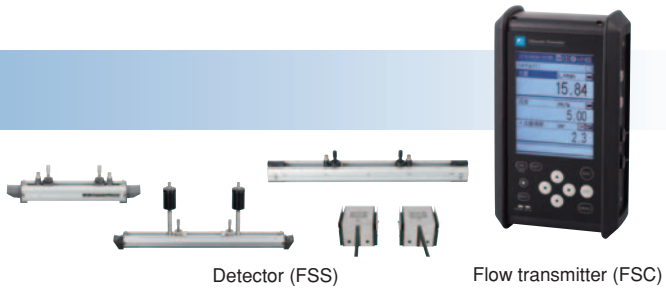
Detector	Model	Diameter (mm)	Fluid temperature (°C)
	FSSA	25 to 225	-20 to 100
	FSSC	50 to 1200	-40 to 120
Measurement range	0 … ±0.3 … ±10 m/s		
Response time	≤ 0.2 s		
Output signal	4–20 mA DC, pulse output, alarm output		
Communication	RS-485 (Modbus) option		
Accuracy	±1.5% of rate (1.0% of rate is available on request)		
Power supply voltage	100–240 V AC or 20–30 V DC		
IP enclosure	IP65		
Cable between detector and transmitter	≤ 60 m		

Example of system configuration



Portable Type

Flow transmitter: FSC Detector: FSS or FSD

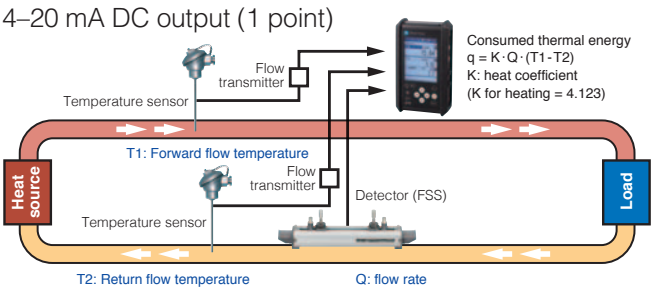


Easy Measurement Anytime and Anywhere

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

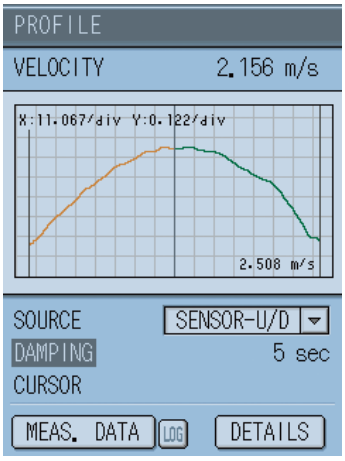
Consumed Energy Calculation

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.



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.



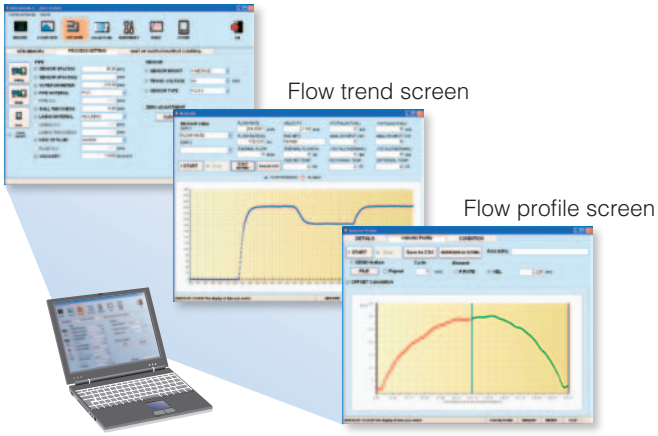
Flow profile indication

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:

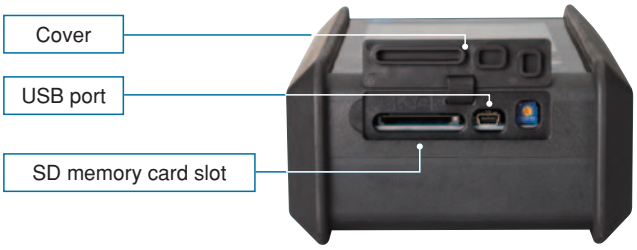
- Flow transmitter
- Detector (FSSC or FSSD)
- Acoustic coupler (silicone grease)
- Signal cable
- Analog I/O cable
- Strap
- AC power adapter
- Power cable
- Mounting belt
- USB cable
- CD-ROM (instruction manual, parameter loader software)

Carrying case

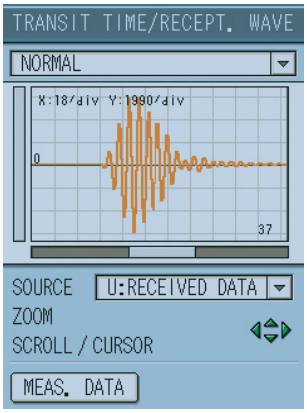
Data Storage on SD Card

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.

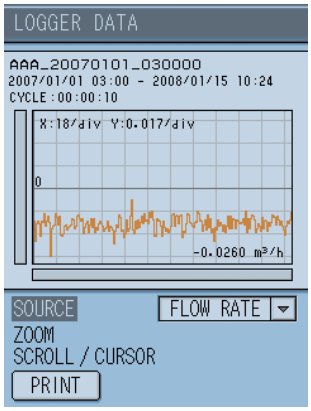
For example, a 512 MB memory card can store the data of two years' worth (at a data save cycles of 30 s, 14 kinds of data). SD card up to 8 GB can be used.



Easy-to-See LCD



Received waveform

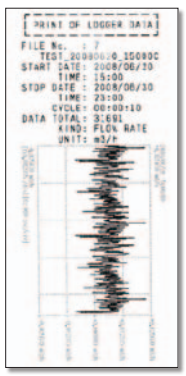


Logger data

Multilingual Display

On-Site Printing (option)

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



12 Hours of Continuous Operation with Built-in Battery

FSC can serve long hours of outdoor measurement.

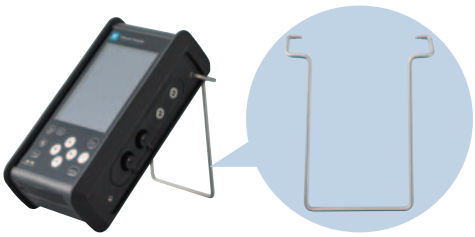
Easy-to-Mount Detector

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

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.

Specifications

	Model	Diameter (mm)	Fluid temperature (°C)
Detector	FSSD	13 to 100	-40 to 100
	FSSC	50 to 1200	-40 to 120
	FSSH	50 to 400	-40 to 200
	FSSE	200 to 6000	-40 to 80
Measurement range	0 … ±0.3 … ±32 m/s		
Response time	≤ 1 s		
Analog output	4–20 mA DC		
Analog input	4–20 mA DC (two points) or 4–20 mA DC and 1–5 V DC (one point for each)		
Accuracy	±1.0 % of rate (depending on flow velocity)		
Power supply voltage	Built-in rechargeable battery (battery life: 12 hours)		
SD card (option)	512 MB (stores 2 years' worth data)		
Others	Parameter loader software (provided as standard)		
Option	Flow velocity profile display, printer		

Hybrid type

Duosonics

Flow transmitter: FSH Detector: FSW

Detector (FSW)

Flow transmitter (FSH)

High Accuracy: ±0.5% to ±1.0% of Rate

±0.5% of rate in the pulse-Doppler method
±1.0% of rate in the transit time method

High-Speed Response

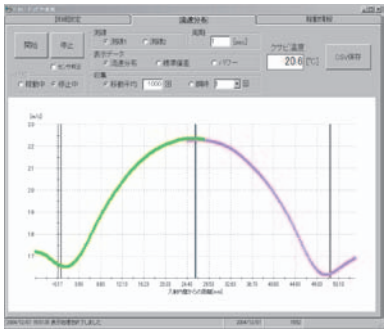
0.2s (Pulse Doppler method):
0.5s (Transit time method)

Hybrid Technology

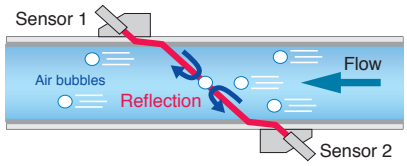
FSH switches between the pulse-Doppler method and the transit time difference method according to the fluid being measured. This enables FSH to measure a wide range of fluid, including fluid which contains air bubbles or particles.

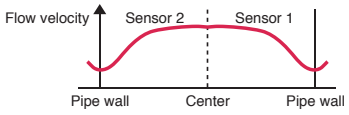
Real-Time Monitoring of Flow Profile

By connecting FSH with PC, you can monitor the flow profile in real-time (option).



[Pulse-Doppler method]

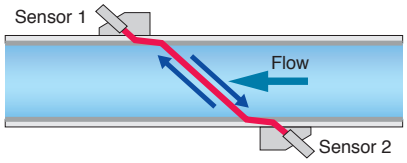


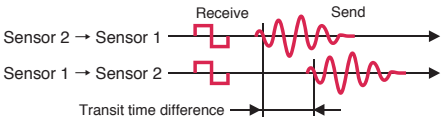


The frequency of ultrasonic pulses reflected by air bubbles or solid particles changes according to the flow velocity. The pulse-Doppler flowmeter uses this frequency shift to determine the flow profile and flow rate.

Automatic switching according to flow conditions

[Transit time method]





The sensors placed on upstream and downstream emit ultrasonic pulse in turn, and detect the transit time difference of the pulse to calculate the flow rate.

Applications

- Yoghurt, dressing, fibrous juice
- Crude oil
- Waste water, sewage
- Paint

… and other challenging industrial applications

Specifications

	Model	Diameter (mm)	Fluid temperature (°C)
Detector	FSWS12	40 to 200	-40 to 100
	FSWS21	100 to 400	-40 to 80
	FSWS40	200 to 500	-40 to 80
	FSWS50	500 to 1000	-40 to 80
Measurement range	0 … ±0.3 … ±32 m/s		
Response time	≤ 0.2 s		
Output signal	4–20 mA DC, pulse output, alarm output		
Communication	RS-485 or RS-232C		
Accuracy	Pulse-Doppler method: ±0.5% of rate Transit time method: ±1.0% of rate		
Power supply voltage	100–240 V AC or 20–30 V DC		
IP enclosure	IP67		
Cable between detector and transmitter	≤ 150 m		

Ideal for Compressor Control

Ultrasonic Flowmeter for Air

Non-Intrusive Design Free From Pressure Loss

- For Pipe Diameters from 25 mm to 200 mm
- No Need for Oil Mist Separator

No Energy Loss

Non-intrusive ultrasonic sensor causes no pressure loss

Tolerant to Oil Mist

With no moving parts, FWD is robust, and requires no filters.

Battery-Powered Version Available

The version equipped with a lithium-ion battery (10-year life) greatly lightens the installation work.

Flow rate Conversion

Measured flow rate can be converted into a flow rate under normal conditions of a temperature of 0 degree C (273.15 K) and an absolute pressure of 1 atm or user-defined conditions.

Bi-Directional Flow Measurement

FWD can measure the air transfered between facilities, and the air flow in loop piping system.

Product Variations

FWD

For small diameter pipes

Diameter:
25 mm, 32 mm
Process Connection:
ø25 mm: Rc1
ø32 mm: Rc 1 1/4

For medium diameter pipes

Diameter:
40, 50, 65, 80 mm
Process Connection:
Wafer (between JIS10K flanges)

For large pipes

Diameter:
100, 150, 200 mm
Process Connection:
JIS10K flange

Specifications

Pipe diameter (mm)	25, 32, 40, 50, 65, 80, 100, 150, 200
Power supply voltage	24 V DC ±10% or built-in lithium-ion battery (battery life: approx. 10 years under the temperature of 20°C)
Target fluid	Air (mainly factory air) or N_2 (pipe diameter 25–80 mm)
Fluid temperature	-10°C to 60°C, RH 90% or less
Operating pressure	<1 MPa (gauge pressure)
Output signal	4–20 mA DC, pulse output (2 points) *Unavailable in battery-powered version.
Straight run requirements	ø25 mm and 32 mm: ≥20D on inlet side and ≥5D on outlet side ø40–200 mm: ≥10D on inlet side and ≥5D on outlet side
Installation location	Indoor or outdoor (IP64 equivalent)

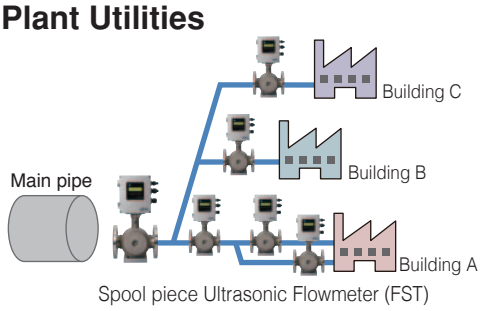
	Diameter (mm)	Range (m^3/h)	Accuracy	
			±2.0% of rate	±5.0% of rate
Range (actual flow rate) Accuracy	25	±0.6–35	±3.5–35 m^3/h	±0.6–3.5 m^3/h
	32	±1.1–65	±6.5–65 m^3/h	±1.1–6.5 m^3/h
	40	±1.3–80	±8–80 m^3/h	±1.3–8 m^3/h
	50	±2.5–150	±15–150 m^3/h	±2.5–15 m^3/h
	65	±4–240	±24–240 m^3/h	±4–24 m^3/h
	80	±5–300	±30–300 m^3/h	±5–30 m^3/h
	100	±10–500	±50–500 m^3/h	±10–50 m^3/h
	150	±24–1200	±120–1200 m^3/h	±24–120 m^3/h
	200	±40–2000	±200–2000 m^3/h	±40–200 m^3/h

Applications

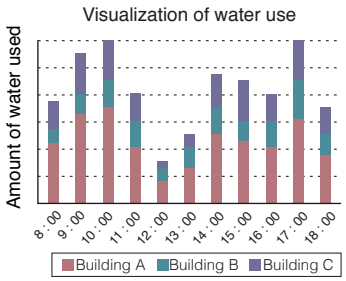
[Spool Piece Ultrasonic Flowmeter]

Reduction of Water Used in Plant Utilities

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



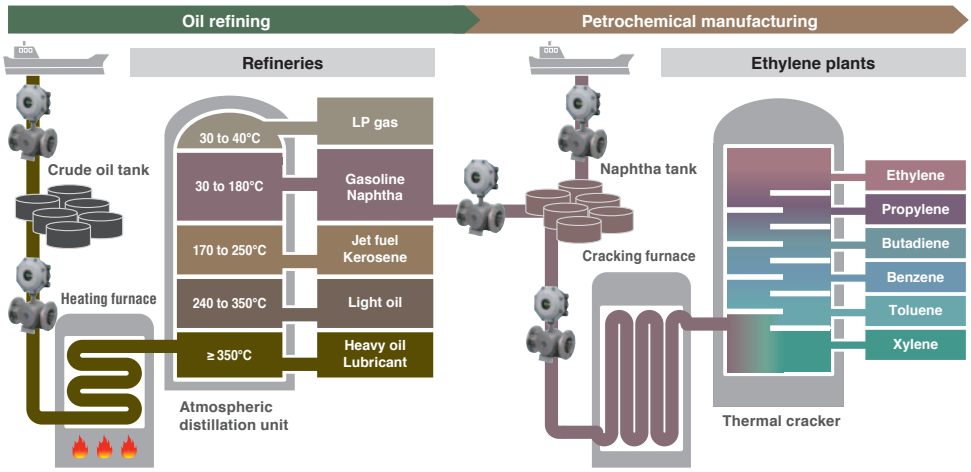
Spool piece Ultrasonic Flowmeter (FST)



[Ex-Proof Spool Piece Ultrasonic Flowmeter]

Oil Flow Monitoring

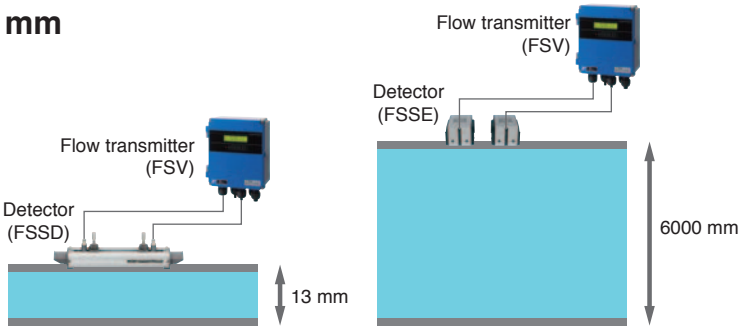
Monitoring the flow rate of each process enables optimal control of whole process and error detection.



[Recommended Model: TIME DELTA-C]

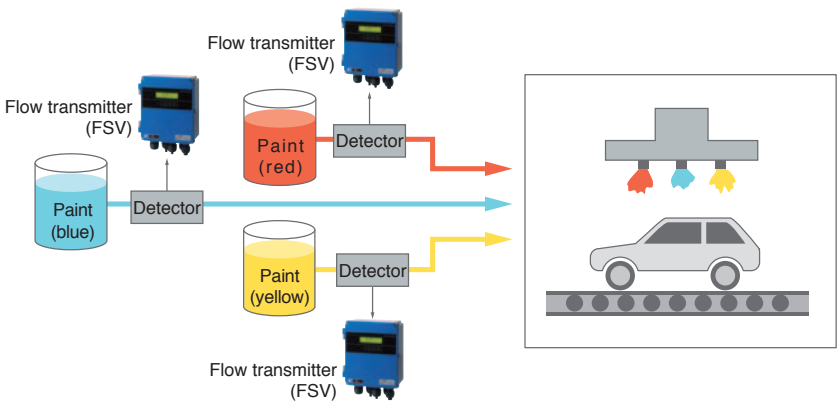
For Large Diameter Pipes up to 6000 mm

The price of clamp-on ultrasonic flowmeters is stable regardless of pipe diameters, and lower than that of electromagnetic flowmeters if the pipe diameter is 200 mm or larger.



Paint Flow Measurement

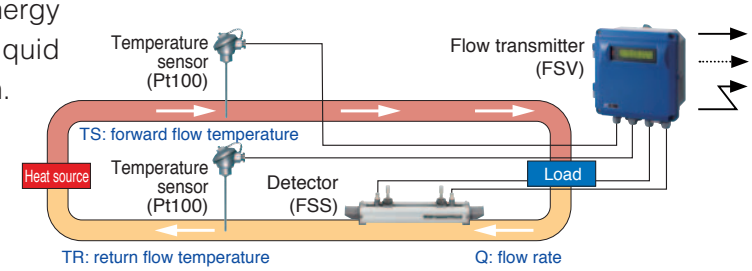
Suitable for high viscosity fluids such as paint or coating materials.



[TIME DELTA-C Advanced]

Energy Consumption in Air-Conditioning Systems

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



4–20 mA DC Analog Output (2 points)
① Flow rate
② Consumed thermal energy

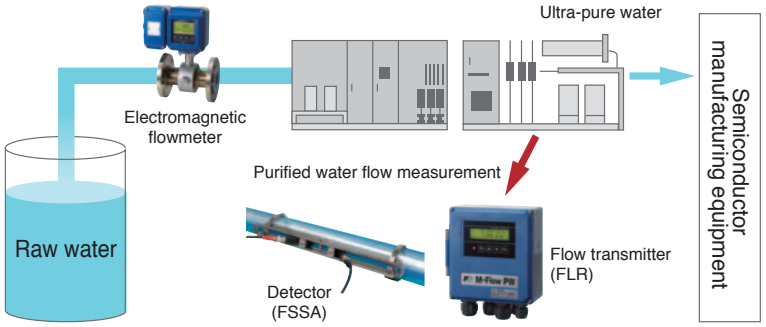
Contact Pulse Output (4 points)
Total energy, temp. alarm, mode switching, etc.

RS-485 (Modbus)

[Recommended Model: M-Flow PW]

Water Purifying System in Semiconductor Industry

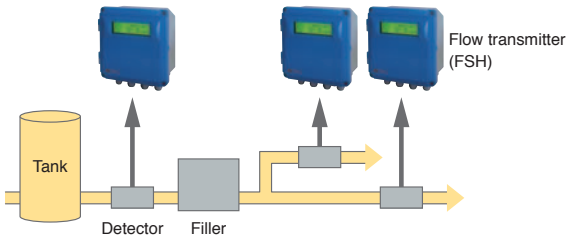
Non-contact sensor can prevent the purified water from being affected by metallic ions.



[Duosonics]

Cooking Oil Production Line

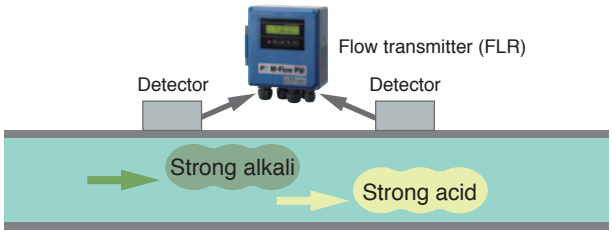
Lower maintenance compared to mechanical flowmeters or Coriolis flowmeters



[Recommended Model: M-Flow PW]

Corrosive Fluid

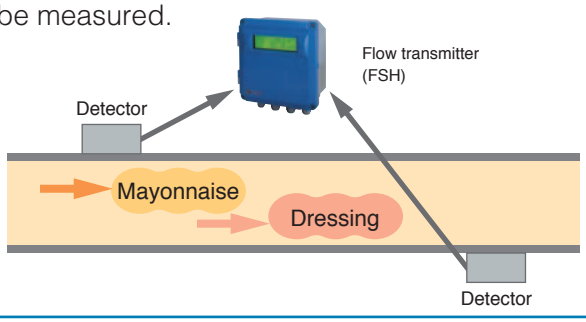
Ultrasonic flowmeters can take measurement on glass, metallic, and plastic pipes.



[Duosonics]

Mayonnaise and Dressing

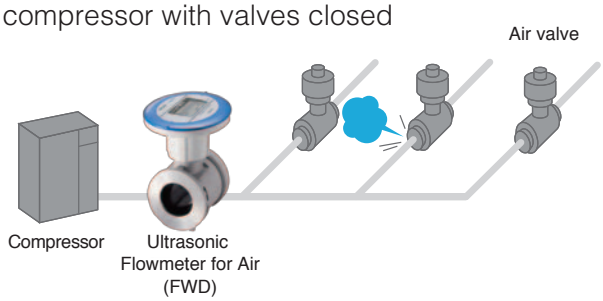
Even a high viscosity and low velocity fluid can be measured.



[Ultrasonic Flowmeter for Air]

Air Leakage Monitoring

Detects the air leakage by operating a compressor with valves closed



Find out more about our ultrasonic flowmeters.

Ultrasonic Flowmeters - Fuji Electric

www.fujielectric.com/products/instruments/products/flow_ultra/top.html

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

Fuji Electric Co., Ltd.

www.fujielectric.com

Instrumentation & Sensors Planning Dept.
Gate City Ohsaki, East Tower, 11-2, Osaki 1-chome, Shinagawa-ku, Tokyo 141-0032, Japan
Phone: +81-3-5435-7021 Fax: +81-3-5435-7475
www.fujielectric.com/products/instruments/

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