Fuji Electric

Innovating Energy Technology

Ultrasonic Flowmeters

For Steam, Liquids, and Air
Reliable Flow Measurement

21A1-E-0006e

Innovative Solutions for Various Applications

Clamp-on Ultrasonic Flowmeter for Steam

Fuji Electric's proprietary "high-sensitivity ultrasonic sensor" and "noise reduction technology" enable clamp-on type saturated steam flow rate measurements.

Principle: transit time difference method

Applications

Flow rate measurement of saturated steam used for heating, drying, sterilization, cleaning, and distillation at factories and offices

Clamp-on Ultrasonic Flowmeter for Liquids

- Easy instration
- Integrated detector and flow transmitter
- Built-in pipe surface temperature sensor (optional) and RS-485 communication enable simultaneous flow and temperature monitoring.

Crinciple: transit time difference method with parallel three measuring paths *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

- 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

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 *1

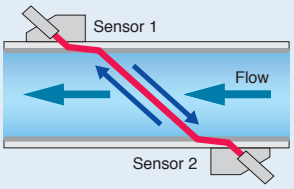
Applications

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

Principle

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 steam] Clamp-on	S-Flow	[For liquid] Clamp-on				[For air]
				TIME DELTA-C	TIME DELTA-C advanced type	M-Flow PW	Portable type	
Flow transmitter		F S J	FSZ	FSV	FSV	FLR	FSC	FWD
Detector		F S X		FSS	FSS	FSS	FSS	
								
Principle		Transit time						Transit time
Bubble resistance		Good						—
Applicable fluid	Clean, no air bubbles	×	✓✓	✓✓	✓✓	✓✓	✓✓	Air N_2
	Sewage, drainage	×	✓	✓	✓	✓	✓	
	High-viscosity	×	✓	✓	✓	✓	✓	
	Oil	×	✓	✓	✓	✓	✓	
	Corrosive	×	✓✓	✓✓	✓✓	✓✓	✓✓	
	Polishing slurry	×	Conditionally applicable					
	Fibrous slurry	×						
	Low-velocity	×	✓	✓	✓	✓	✓	
	Pulsating	×	×	Conditionally applicable				
	Saturated Steam	✓✓	×	×	×	×	×	
	High-temperature	×	✓	✓	✓	✓	✓	
	High-pressure	×	✓✓	✓✓	✓✓	✓✓	✓✓	
Pipe size (in mm)		50, 65, 80, 100	8, 10, 15, 20, 25, 32	See Table on Page 9.				25, 32, 40, 50, 65, 80, 100, 150, 200
Fluid temperature		120°C to 180°C	Standard: -15°C to 85°C					-10°C to 60°C
No. of path		1	1	1	1 or 2	1	1	1
Flow velocity range		0 … ±30 m/s 0 … ±50 m/s	Min 0 … ±0.2 m/s Max 0 … ±5 m/s	Min 0 … ±0.3 m/s Max 0 … ±32 m/s	Min 0 … ±0.3 m/s Max 0 … ±32 m/s	Min 0 … ±0.3 m/s Max 0 … ±10 m/s	Min 0…±0.3 m/s Max 0…±32 m/s	Min 0 … ±0.6 m^3/h Max 0 … ±2000 m^3/h
Accuracy (% of rate)		±3.0%, ±5.0%	±0.2%	±1.0%		±1.5% (±1.0% version available)	±1.0%	±2.0%
Response time		0.2 s	0.55 s	≤ 0.2 s			≤ 1 s	≤ 0.5 s
4–20 mA output		✓	✓	✓	✓	✓	✓	✓
Pulse output		✓	✓	✓	✓	✓	—	✓
Alarm output		✓	✓	✓	✓	✓	—	✓
Communication		RS-485	RS-485	RS-485			SD card, USB port	—
Consumed energy calculation		—	—	—	✓ *1	—	✓ *2	—
Power supply		100–240 V AC, 50/60 Hz	20–27.5 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	Lithium-ion battery or 24 V DC
Cable btwn detector and transmitter		≤ 30 m	—	≤ 150 m		≤ 60 m	≤ 150 m	—
Dimensions (in mm)		240 × 247 × 134	120 × 42 × 39	170 × 142 × 70	240 × 247 × 134	140 × 137 × 68	210 × 120 × 65	—
Weight		5.5 kg	0.4–0.6 kg	1.5 kg	5.0 kg	0.8 kg	1.0 kg	1.1 kg–24.1 kg

Notes: 1. Temperature sensor is not provided.
2. Temperature sensor and signal converter are not provided.

*Measurement may be unavailable depending on conditions.

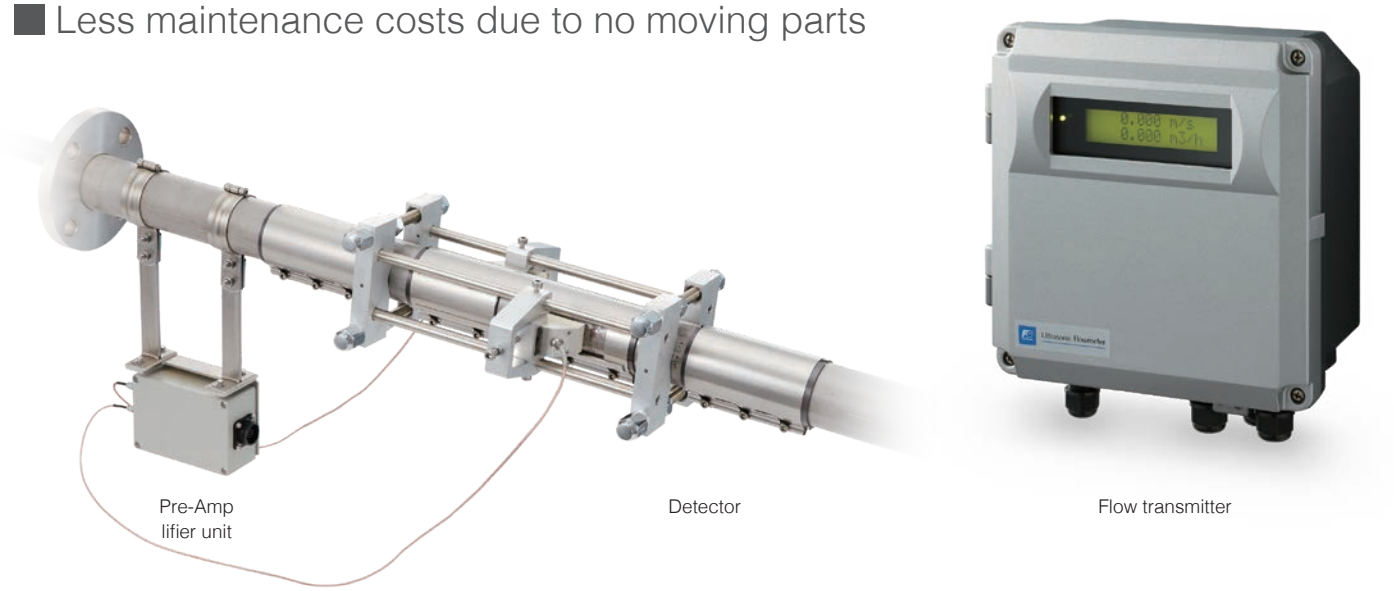
Clamp-on type that achieves saturated steam flow rate measurements

Clamp-on Ultrasonic Flowmeter for Steam

Flow transmitter: FSJ Detector: FSX

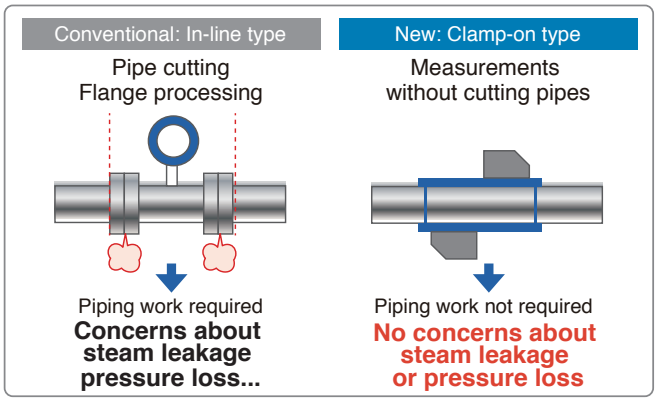
Contributes to “visualization” of steam flow and works in combination with EMS to optimize energy and achieve energy savings.

- Installable without turning off steam line No piping work required
- Effective use of steam energy without pressure loss
- Less maintenance costs due to no moving parts



No plumbing required

Installable with no pipe cutting or flange processing. Installable without stopping production lines and no steam leakage concerns since plumbing is not required.

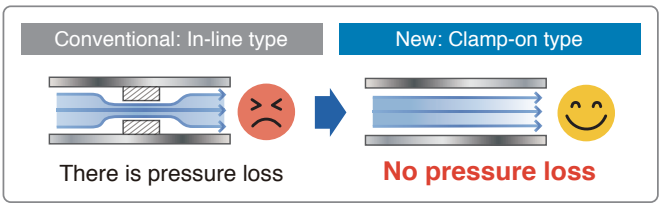


Less maintenance cost

No moving parts help to reduce regular maintenance costs such as cleaning.

No pressure loss

The ultrasonic sensors do not interfere with the steam flow.

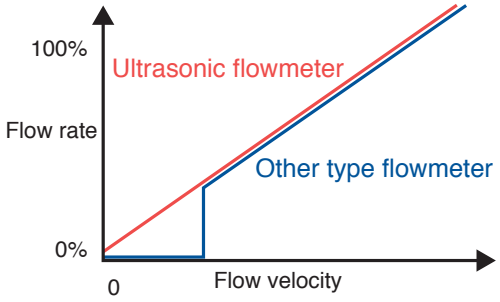


Convertible to mass flow rate

The measured volume flow measurement and density (fixed value) input can be converted to mass flow rate and output. Density correction can also be performed by measuring the pressure (4 to 20 mA DC) and temperature (with resistance bulb) of the saturated steam and inputting as external signal (AI).

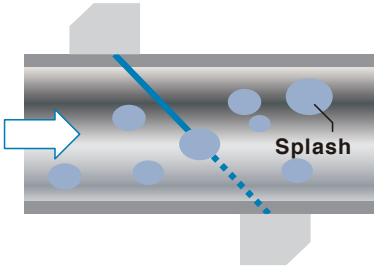
Enables measurements at low flow rates

The ultrasonic flowmeter can meusure at low flow rate, even at flow rates of 0.

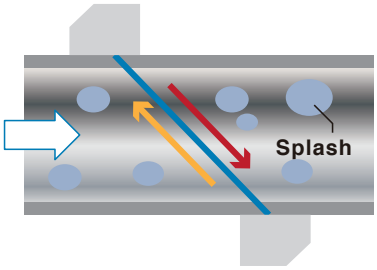


Algorithm dedicated for steam measurement

- Conventional analog processing
  Measurement failure may occur due to interruption by splash.



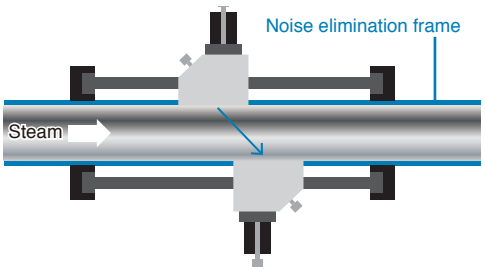
- Digital processing by Fuji own algorithm
  Normal transit of ultrasonic waves and synchronons addition processing of received signal.

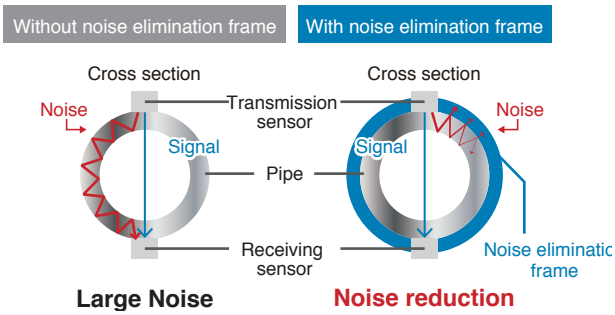


Ensured sufficient signal level by summing a rate signals

Noise elimination frame

The heat-resistant rubber frame on the piping surface can reduce noise and accurate cabtuning of the ultrasonic signals is achieuable.





Specifications

Item	Specifications
Mounting method	Clamp-on type
Measurement fluid	Saturated steam
Measuring method	Transit time difference
Flow velocity	0 to ±50 m/s
Accuracy	For required straight pipe length (upstream: 20 D or longer; downstream: 10 D or longer) Flow velocity 0 to 10 m/s: ±0.3 m/s (50 A), ±0.4 m/s (65, 80, 100 A) Flow velocity adove 10 to 30m/s: ±3% of rate (50 A), ±4% of rate (65, 80, 100 A) Flow velocity above 30 to 50 m/s: ±5% of rate
Required straight pipe length	Upstream: 20 D or longer; downstream: 10 D or longer
Piping material	Carbon steel, stainless steel
Pipe diameter	50 mm, 65 mm, 80mm, 100 mm
Pipe thickness	2.8 to 4.5 mm
Fluid temperature	120 to 180°C
Fluid pressure	0.1 to 0.9 MPa (G)
Moisture and splash	Wetness: 0%, there should be no splashing
Input (For mass flow rate conversion)	Current input (4 to 20 mA DC) ×1: Pressure measurement Temperature input (Pt100) ×1: Temperature measurement
Output	Current output (4 to 20 mA DC) ×1 Contact output ×2
Mass flow rate conversion	fixed value input (density) · temperature input · pressure input
Communication	RS-485
Power supply/ consumption	100 to 240 V AC, 20 VA
Degree of protection	IP67 (with connectors fitting)
Ambient temperature	-20 to +60°C
Ambient humidity	95% RH or less
Grounding	Class D grounding with ground resistance of 100Ω or less

Measurement may be unavailable depending on conditions.

Ultrasonic Flowmeter S-Flow

Easy Installation, Space Savings

- Reduces labor hours and installation costs
- No grease required
- Comes standard with RS-485 communication

Reduces labor hours and installation costs

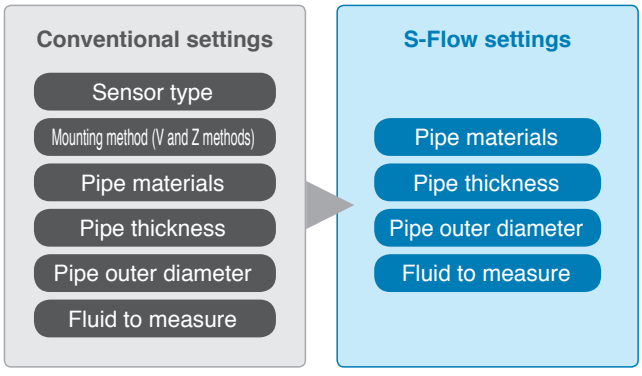
Clamp-on type requires no pipe modification. It can be installed without stopping equipment.
No need for the sensor-distance adjustment. Anyone can easily install it by simply tightening the screws.

Clamp-on type without pipe modification.

Easy installation using a single screwdriver.

Easy to set up

Configurable only with three buttons. Simply turn on, configure four settings, and start measuring immediately.



No grease required

Installation is easy and no longer requires the application of grease.
No need to store grease for maintenance purposes.

Integral, Compact design

Flow transmitter and detector functions are integrated to achieve compact dimensions.
Compared to conventional flow transmitter (type: FLR), the size is reduced by approximately 76%.

Comes standard with RS-485 communication

RS-485 communication makes it possible to simultaneously output the instantaneous flow rate, integrated flow rate, temperature, and other data. Parameters can also be set using the loader software.

The loader software allows users to:

- Set parameters
- Load data
- Display trends for the set flow rate
- View alarm information

* To connect to a PC, an RS-485/RS-232C or USB converter is required.

Specifications

Main unit type	Type	Pipe diameter
	FSZ08	8A, 10A
	FSZ15	15A, 20A
	FSZ25	25A, 32A

Configuration	Integrated flow transmitter and detector
Mounting method	Clamp-on type
Measurement method	Transit-time measuring method
Fluid to measure	Homogenous fluids where ultrasonic signals can be transmitted
Measurement range	0 to ±5 m/s (Min. 0 to ±0.2 m/s)
Accuracy	Velocity 1 m/s to 5 m/s: ±2% of rate Velocity less than 1 m/s: ±0.02 m/s
Required straight pipe length	Upstream 10D or more; Downstream 5D or more (D: Pipe inner diameter)
Pipe materials	Metals (stainless steel, steel, copper) Plastics (PVC, PP, PVDF)
Piping thickness	1.2 mm to 4.9 mm
Fluid temperature	-15 to +85°C (Can vary depending on ambient temperature)

Response time	0.5 seconds
Output signal	4 to 20 mA DC: 1 point Contact: 2 points
Communication function	RS-485
Display	LED 4-digit 2-row display
Degree of protection	IP65/IP67
Ambient temperature	-15 to +60°C
Ambient humidity	95%RH or less
Power supply and power consumption	20 to 27.5 V DC, 2.5 W or less
Mass	FSZ08: 400 g FSZ15: 500 g FSZ25: 600 g
Temperature measurement (Optional)	Pipe surface temperature measurement

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

Hardly Affected by Fluid Pressure and Temperature

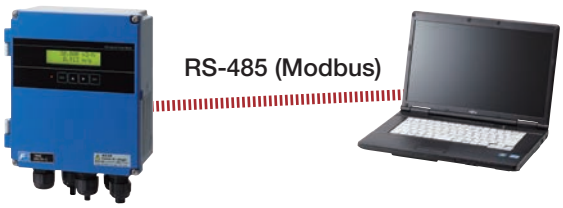
The sensors placed on upstream and downstream emit ultrasonic pulse in turn, and detect the transit time difference of the pulse to calculate the flow rate. Highly accurate measurement can be obtained regardless of the type of fluid.

Fast Response Mode Delivers ≤ 0.2s Response Time

Allows you to take corrective actions quickly.

Convenient Configuration and Data Management from PC

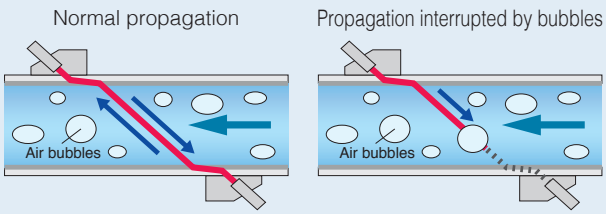
Parameter loader software, provided free of charge, allows parameter setting and measurement data acquisition on PC.



Superior Bubble Resistance

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

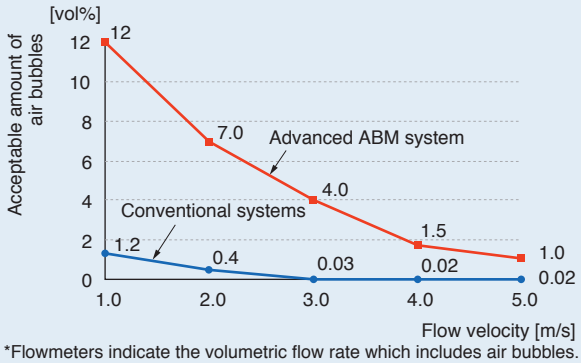
Signal averaging



Normal propagation

Measurement failure may occur.

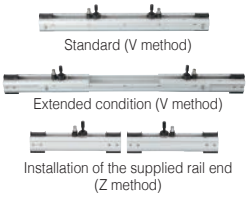
By averaging the results of 128 or 256 measurements, precise signals can be obtained.



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

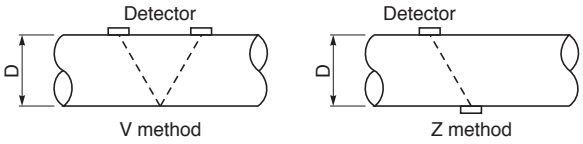
Clamp-on Detectors for Liquid Applications

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
For small diameter pipes		FSSD	-40 to 100	V	13 Px, P, M 100	FSC,FSV
Easy mounting type		FSSA	-20 to 100	V	25 P, M 225	FLR,FSV
Extendable rail type	 Standard (V method) Extended condition (V method) Installation of the supplied rail end (Z method)	FSSC	-40 to 120	V	50 P, M 600 50 Px 300	FSC,FLR, FSV
				Z	200 P, M 1200 200 Px 400	
For high temperature		FSSH	-40 to 200	V	50 Px, P, M 250	FSC,FSV
				Z	150 Px, P, M 400	
For large pipes		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.)

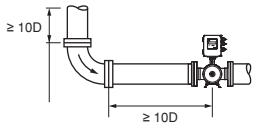
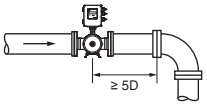
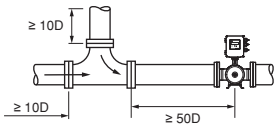
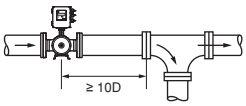
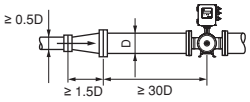
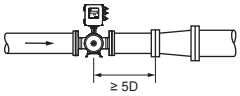
Mounting method : V method or Z method

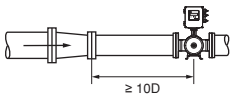
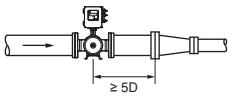
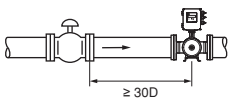
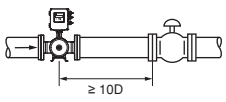
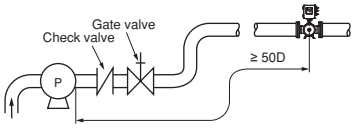


Use the Z-method when:
- You cannot use the V-method due to deficiency of space around the pipe
- The fluid has high turbidity
- Scale is build up inside the pipe

Piping Requirements

(D: inside diameter of pipe)

	Upstream	Downstream
90° bend		
T-shaped pipe		
Expanding pipe		

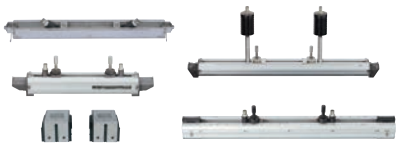
	Upstream	Downstream
Tapered pipe		
Valves	 In the case where a flow control valve exists on upstream side	 In the case where a flow control valve exists on downstream side
Pump		

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

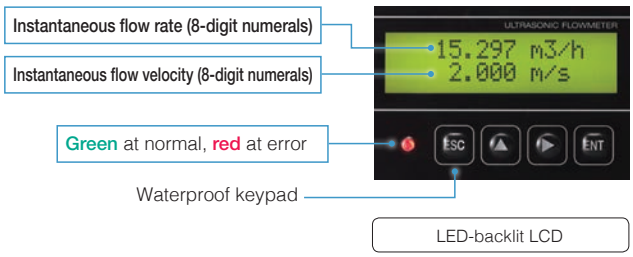
For details, refer to the data sheet.

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

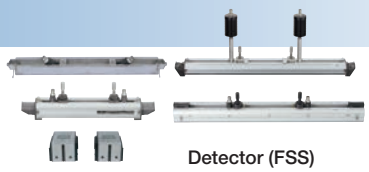
	Model	Diameter (mm)	Fluid temperature (°C)
Detector	FSSA	25 to 225	-20 to 100
	FSSC	50 to 1200	-40 to 120
	FSSE	200 to 6000	-40 to 80
	FSSD	13 to 100	-40 to 100
	FSSH	50 to 400	-40 to 200
Measurement range	0 … ±0.3 … ±32 m/s		
Response time	≤ 0.2 s		
Output signal	4–20 mA DC, pulse output, alarm output		
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.

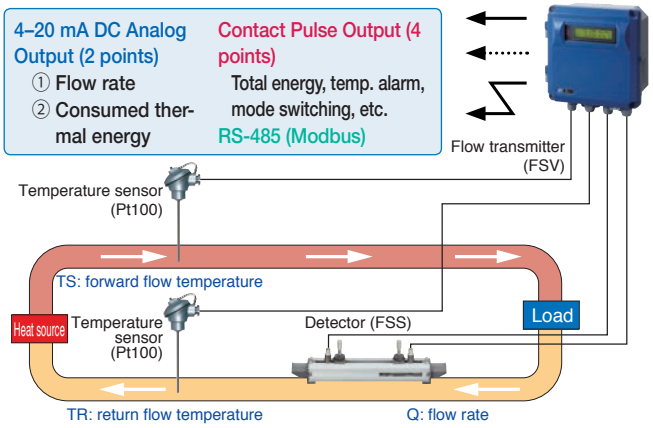


Detector (FSS)

Flow transmitter (FSV)
IP67

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.



Simultaneous Flow Measurement of Two Pipes with One Transmitter

Allows cost reduction.

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

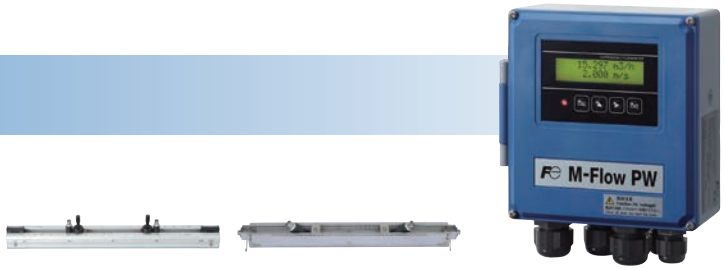
4–20 mA output (2 pt)	Path1, path 2, average
Contact output (4 pt)	Total flow rate, instantaneous flow rate, alarm, etc.

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

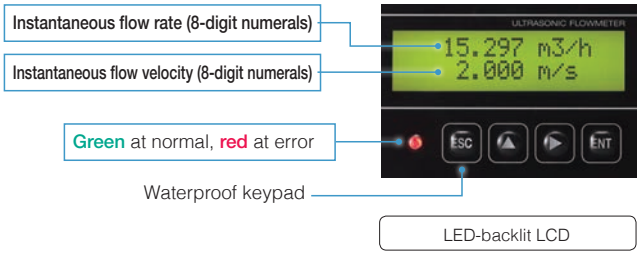
Flow transmitter: FLR Detector: FSS



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

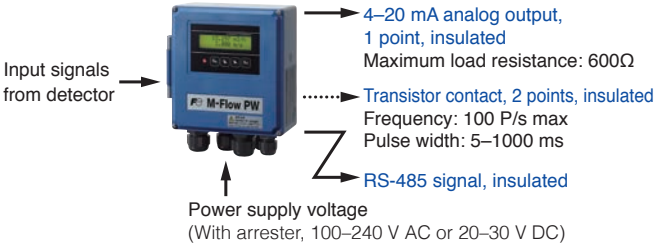
Backlit LCD and Front Panel Operation

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).



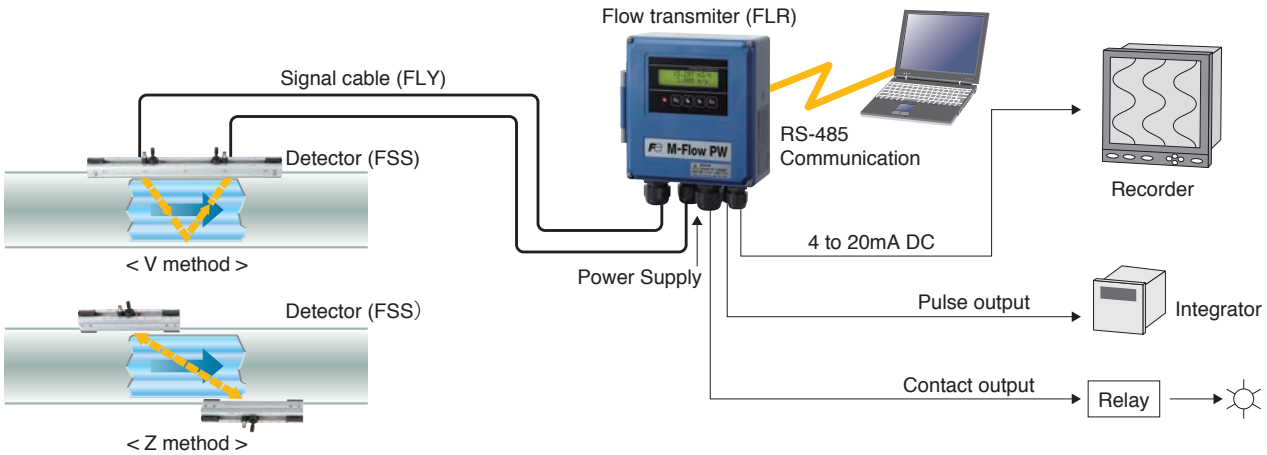
Compact Design

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

Specifications

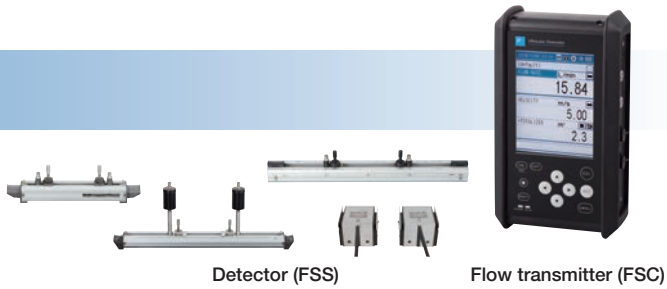
Detector	Model	Diameter (mm)	Fluid temperature (°C)
	FSSA	25 to 225	-20 to 100
	FSSC	50 to 1200	-40 to 120
Measurement range	0 … ±0.3 … ±10 m/s		
Response time	≤ 0.2 s		
Output signal	4–20 mA DC, pulse output, alarm output		
Communication	RS-485 (Modbus) option		
Accuracy	±1.5% of rate (1.0% of rate 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

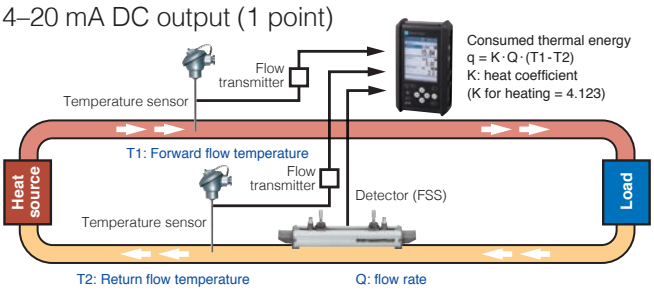


Easy Measurement Anytime and Anywhere

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

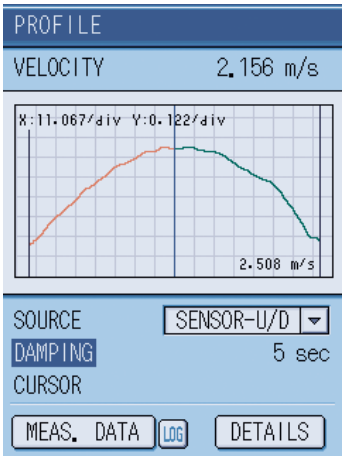
Consumed Energy Calculation

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.



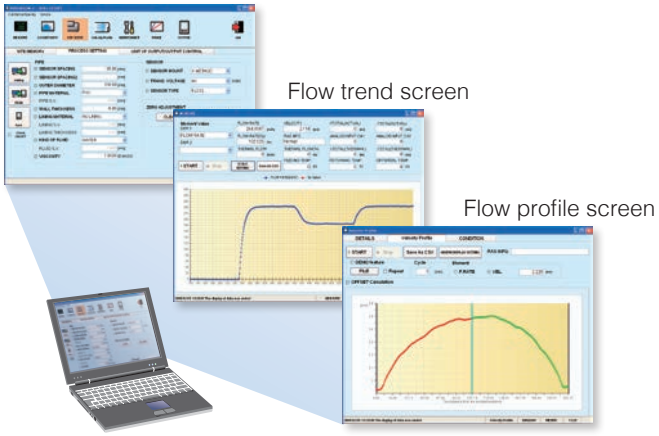
Flow profile indication

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

Improved Image Quality

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

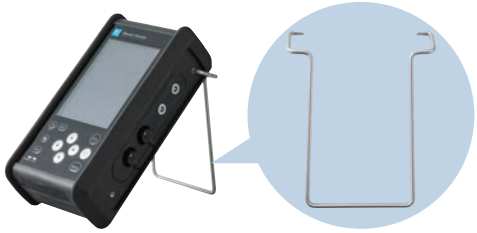
Old model　　New model

- Configurable display can show info on received waveforms, logger data, and more
- Supports various display languages, including English, Chinese, and German

Accessories for Comfortable Operation (option)

- Han d 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.

On-Site Printing (option)

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

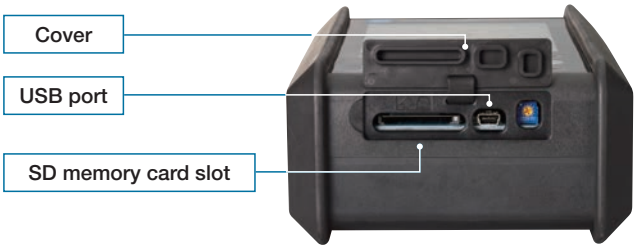
Easy-to-Mount Detector

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.

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		

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)

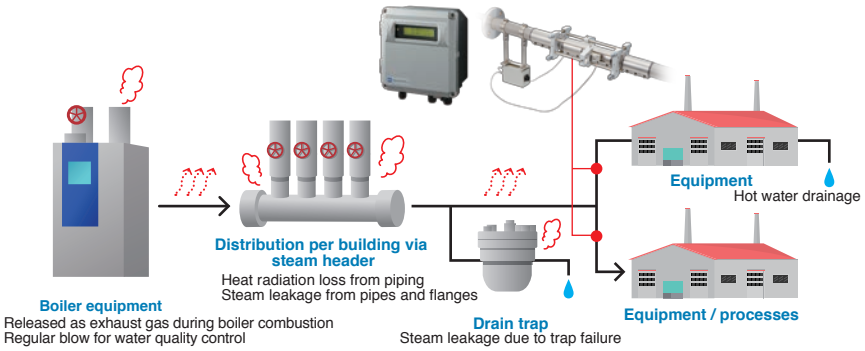
	Diameter (mm)	Range (m^3/h)	Accuracy	
			±2.0% of rate	±5.0% of rate
Range (actual flow rate) Accuracy	25	±0.6–35	±3.5–35 m^3/h	±0.6–3.5 m^3/h
	32	±1.1–65	±6.5–65 m^3/h	±1.1–6.5 m^3/h
	40	±1.3–80	±8–80 m^3/h	±1.3–8 m^3/h
	50	±2.5–150	±15–150 m^3/h	±2.5–15 m^3/h
	65	±4–240	±24–240 m^3/h	±4–24 m^3/h
	80	±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

Ultrasonic Flowmeters for Steam

Saturated steam monitoring

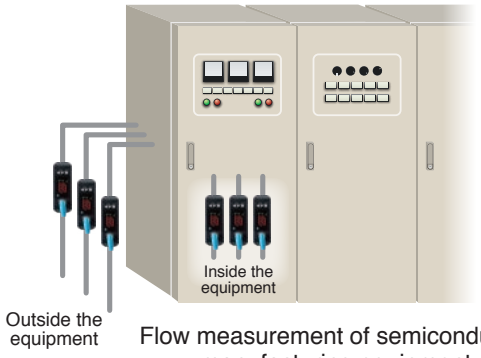
It facilitates energy savings and usage efficiency by using steam flow rate measurements to detect heat dissipation loss and steam leaks.



Recommended Model : S-Flow

Flow control of semiconductor manufacturing equipment

In addition to piping for pure water manufacturing processes, cleaning processes, and equipment cooling, it can also be mounted inside equipment where there is densely-spaced small-diameter piping. Contributes to flow control in semiconductor manufacturing lines.

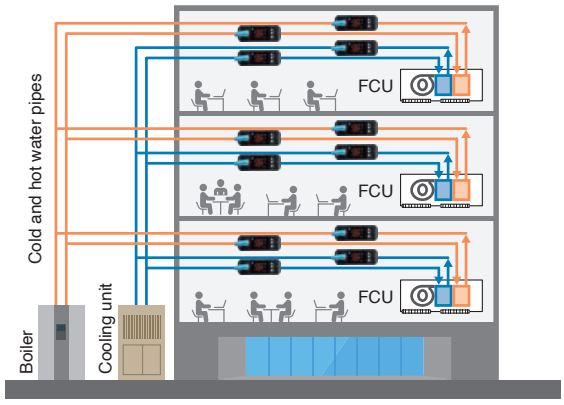


Flow measurement of semiconductor manufacturing equipment

Recommended Model : S-Flow

Flow monitoring of water for building air conditioning flow usage

It can be installed to cold and hot water piping throughout the entire building. By measuring the flow rate, it facilitates more efficient fan coil unit (FCU) operations. Similarly, it also facilitates efficient operation of air handling units (AHU) for large spaces. The monitoring of flow rates contributes to energy savings.

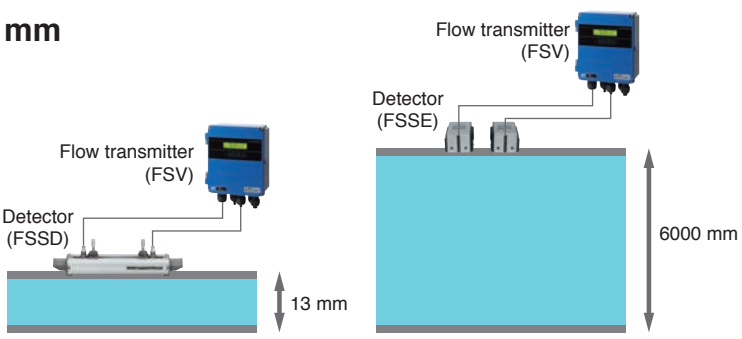


Flow measurement per fan coil unit (FCU)

Recommended Model: TIME DELTA-C

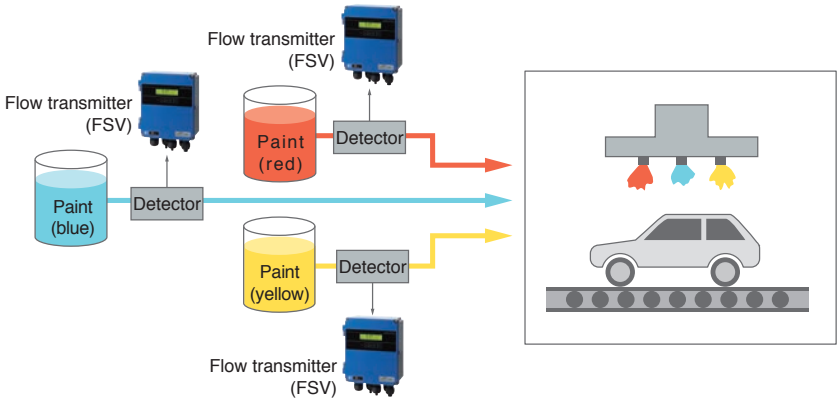
For Large Diameter Pipes up to 6000 mm

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.



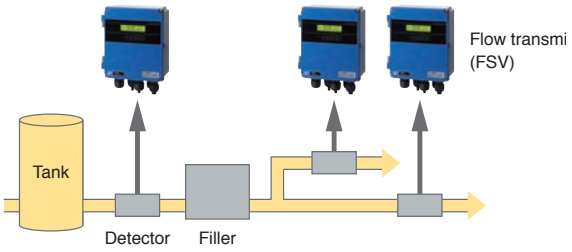
Paint Flow Measurement

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



Cooking Oil Production Line

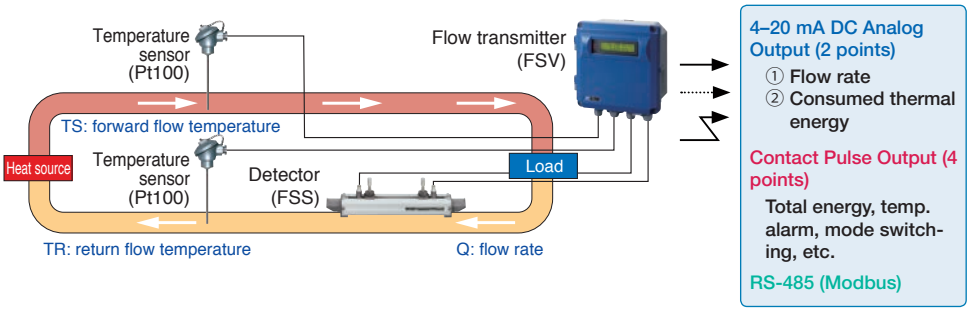
Lower maintenance compared to mechanical flowmeters or Coriolis flowmeters



TIME DELTA-C Advanced

Energy Consumption in Air-Conditioning Systems

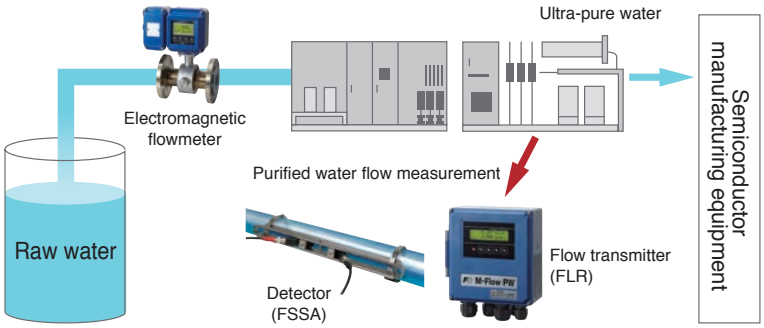
Calculates the thermal energy received and sent with liquid in air-conditioning system.



Recommended Model: M-Flow PW

Water Purifying System in Semiconductor Industry

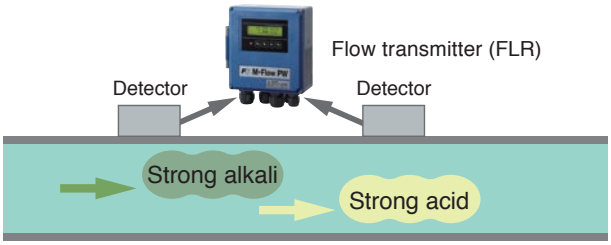
Non-contact sensor can prevent the purified water from being affected by metallic ions.



Recommended Model: M-Flow PW

Corrosive Fluid

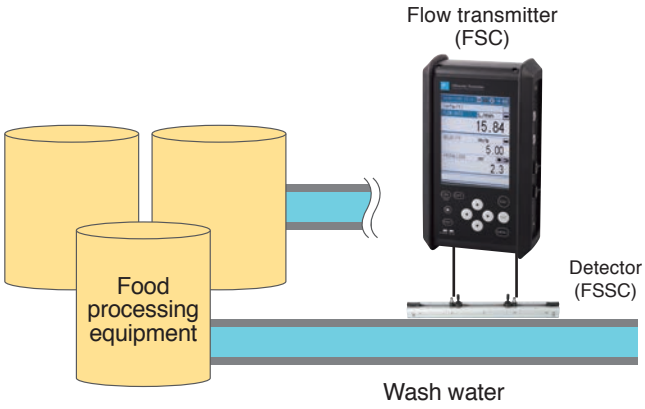
Ultrasonic flowmeters can take measurement on glass, metallic, and plastic pipes.



Recommended Model: Portable Type

Wash Water in Food Manufacturing Plants

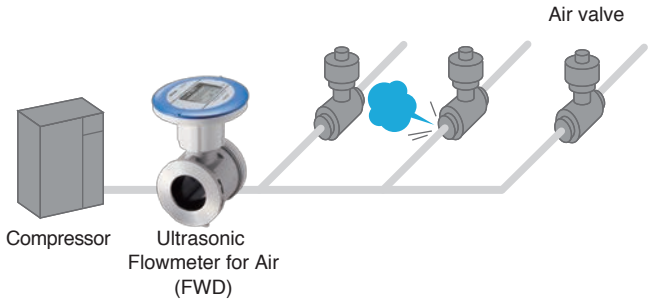
Easier installation and lower maintenance compared to mechanical flowmeters or Coriolis flowmeters



Ultrasonic Flowmeter for Air

Air Leakage Monitoring

Detects the air leakage by operating a compressor with valves closed



Fuji Electric's EMS Solution

"Visualization", "Recognition" and "Optimization".

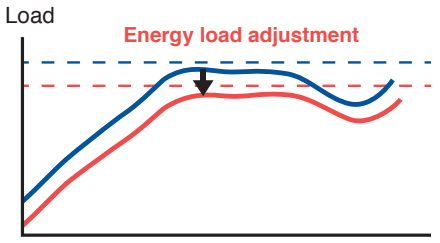
The 3-steps contrubute to your energy management sollution, based on our vision of creating daily and continuous improvement of "energy management".

STEP1 Visualization

Understanding energy usage

Understanding present situations and taking effective action immediately

1. Ascertaining the state of energy by measuring it at key points
2. Deploying known and feasible energy-saving measures



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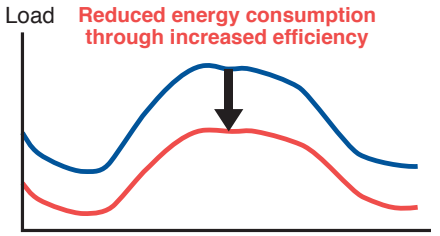
STEP2 Recognition

Energy management

Countermeasure point extraction and effect analysis

1. Achieving points of improvement while eliminating waste through energy-saving analysis support environment deployment
2. Establishing a daily improvement cycle
3. Model energy consumption trends through data collection



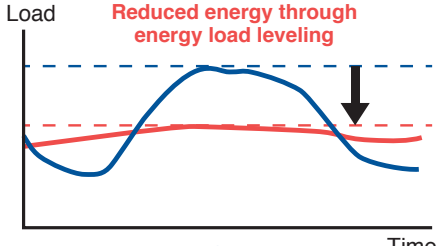
MainGATE

STEP3 Optimization

Energy usage optimization

Optimized usage, management and capital investment

1. Further reducing energy costs through use of energy-saving equipment and control technology
2. Achieving optimum supply control based on energy consumption models
3. Leveling energy loads through use of power generation and storage devices



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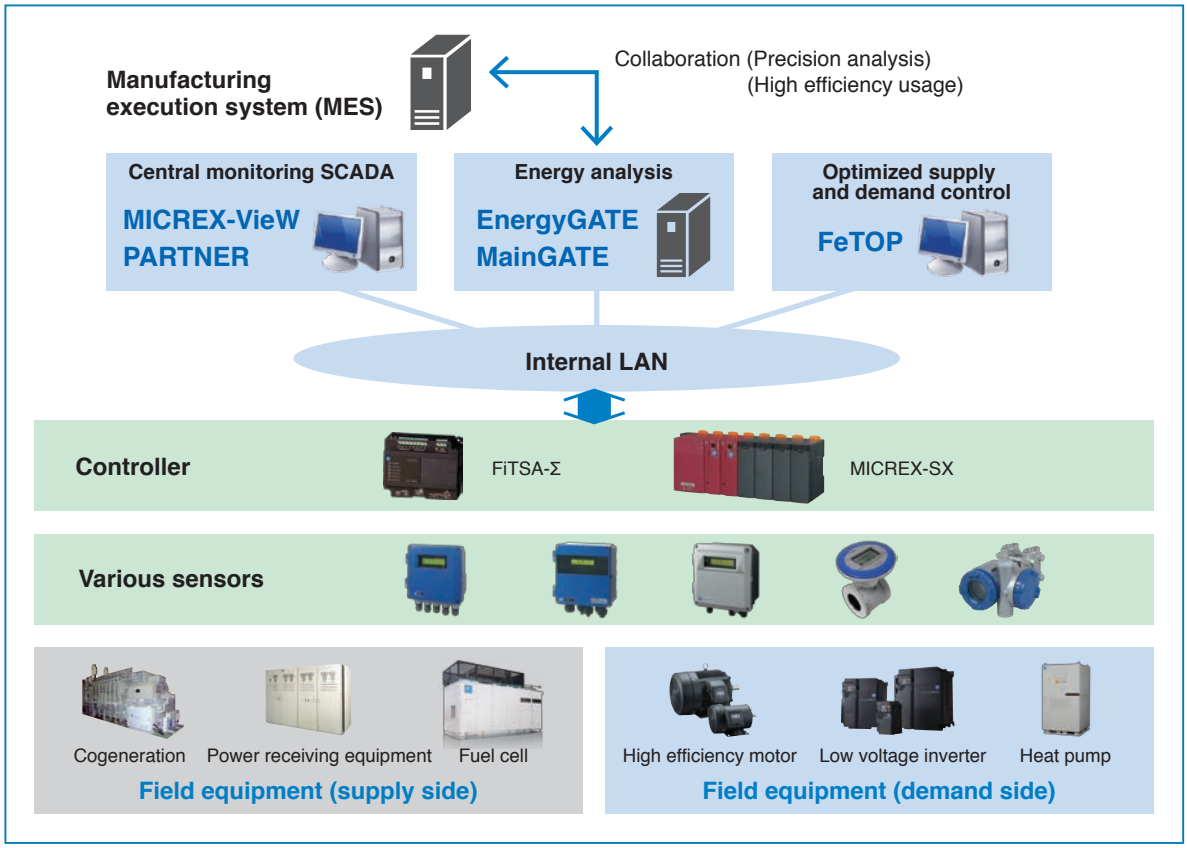
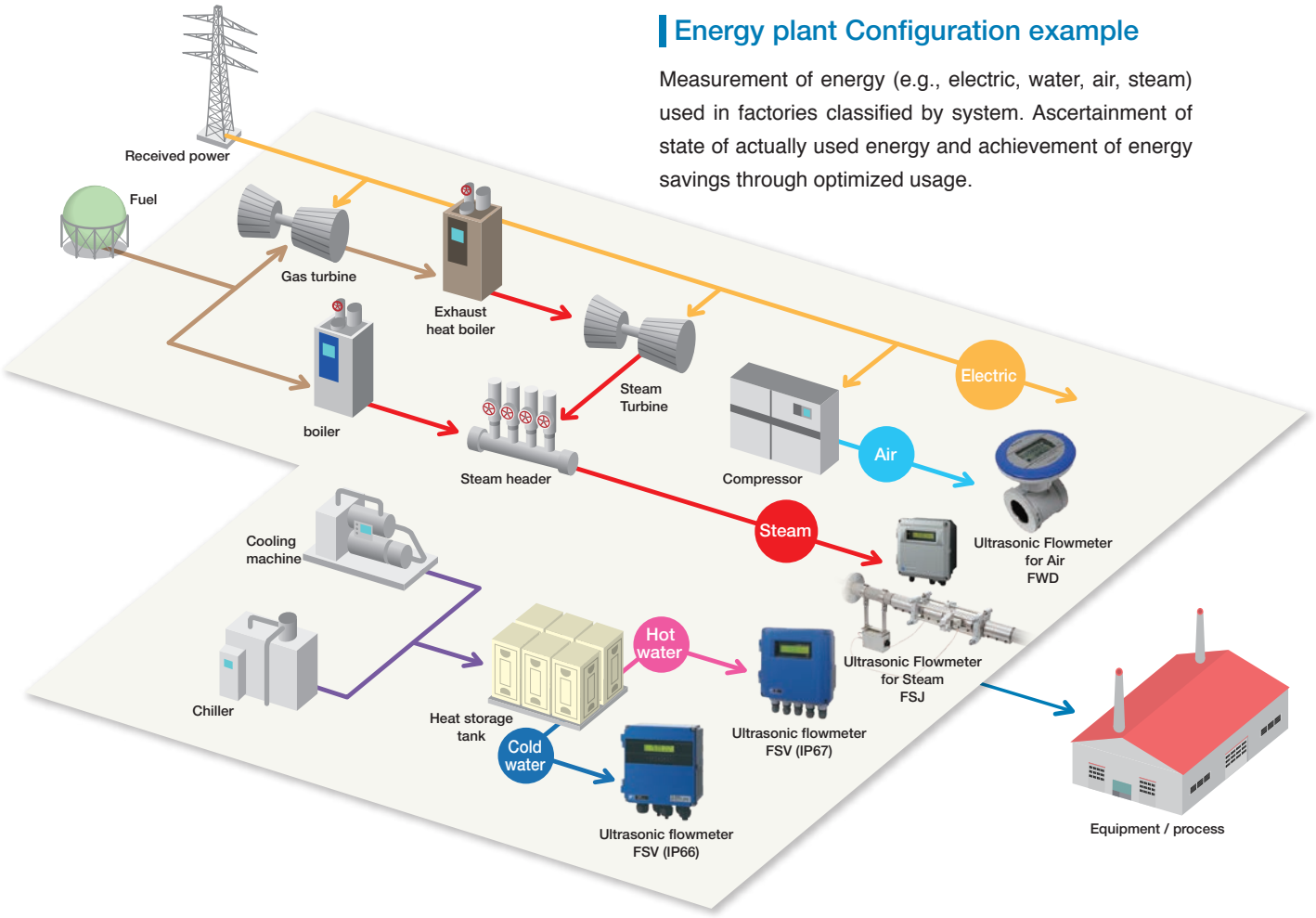


Energy plant Configuration example

Measurement of energy (e.g., electric, water, air, steam) used in factories classified by system. Ascertainment of state of actually used energy and achievement of energy savings through optimized usage.



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.

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