

# Ultrasonic Flowmeter **DUOSONICS**



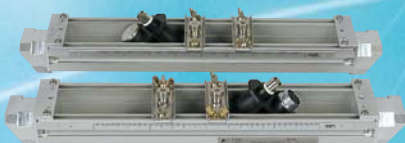
**0.5%  
ACCURACY**

## **THE FIRST HIGHLY-ACCURATE ULTRASONIC FLOW METER**

Highly accurate. Non-invasive. Until now, you had to choose between these features. Now get both with Fuji Electric's new Duosonics hybrid ultrasonic flow meter. Duosonics is the world's first ultrasonic flow meter that automatically switches between Pulse Doppler and Transit Time technologies depending on the fluid conditions in the pipe.

Duosonics excels in difficult applications where other meters fail. Do you have short straight pipe runs with undeveloped flow? Do you have an application where

different fluids run through the same pipe? From ultra-pure water to sludges and slurries...Duosonics can handle it. Call today or visit us online to learn how Duosonics can solve your flow measurement problem.

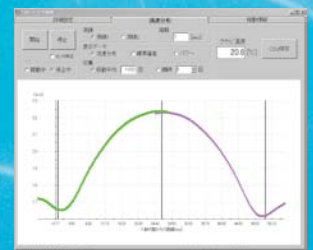


### **Applications**

- Yogurt, Dressing, Juice with Pulp
- Sugar Liquid, Milk
- Crude Oil
- Wastewater/Sewage Monitoring
- Paint
- *...and other Challenging Industrial Applications*

### **Features**

- Automatic Pulse Doppler/Transit Time Switchover
- High Accuracy (0.5%)
- Non-Invasive, Clamp-On Installation
- Pulse Doppler Velocity Profile Measurement (see inset)
- Real-Time PC Monitoring
- High-Speed Response
- Measure Different Fluids in the Same Pipe



# SPECIFICATIONS

## Operational specifications

- Application:** Uniform liquid in which ultrasonic waves can propagate.
- Air bubble quantity:**
- Pulse Doppler method: 0.02 to 15% of volume at 1 m/s
  - Transit time method: 0 to 12% of volume at 1 m/s
- Fluid temperature:** -40 to +100°C (FSWS12),  
-40 to 80°C (FSWS21, FSWS40, FSWS50)
- Type of flow:**
- Pulse Doppler method: axisymmetric flow in a filled pipe.
  - Transit time method: well-developed turbulent or laminar flow in a filled pipe.
- Applicable flow pipe:**
- Material:** Plastics (PVC, FRP, etc.) or Metals (carbon steel, SS, copper, aluminum, etc.)
- Pipe size:** 50 to 1000 mm
- Liner:** Tar epoxy, mortar, etc.
- Straight pipe length:** Typically 10D for upstream and 5D for downstream. Refer to JEMIS-032 in detail.  
(Note) JEMIS: Japan Electric Measuring Instruments Manufacturers' Associations Standard
- Velocity:** Pulse Doppler method: 0 to 0.3 ... 4 m/s (depending on pipe diameter)  
Transit time method: 0 to 0.3 ... 32 m/s
- Power supply:** 100 to 240 VAC+10%/-15%, 50/60Hz or 20 to 30 VDC
- Signal cable:** Maximum cable length: 150m  
Temperature range : 80°C
- Ambient temperature:**  
-10 to +50°C for flow transmitter,  
-20 to +80°C for detector
- Ambient humidity:**  
95%RH or less for flow transmitter, 100%RH or less for detector
- Grounding:** Class D (less than 100 ohm)
- Arrester:** Surge absorbers for outputs and power supply incorporated as standard

## Functional specifications

- Analog output:** 4 to 20 mA DC (1 point)  
Max. load resistance: 1k ohm
- Digital output:** +total, -total, alarm, acting range, flow switch or total switch  
- arbitrarily selectable
- Communication interface:**  
RS-232C equivalent / RS-485 (selectable)
- Display device:**  
Graphic LCD with back light,
- Display language:**  
Japanese, English, French, German or Spanish selectable
- Velocity/Flow rate display:**  
Display of velocity and/or flow rate with flow direction  
Data: up to 10 digits (decimal point to be counted as 1 digit)  
Unit: Metric/English system selectable



**Detector  
(Model:FSW)**



**Flow Transmitter  
(Model:FSH)**

## Performance specifications

### Accuracy :

**Pulse Doppler method :**

Pipe size (inside diameter)	Velocity *1	Accuracy
φ40mm to φ50mm (Detector FSWS12)	1.5 m/s 4 m/s	±1.0% of rate
	0 m/s to 1.5 m/s	±0.015m/s
φ50mm to φ200mm (Detector FSWS12)	1.5 m/s to about 4 m/s	±0.5% of rate
	0 m/s to 1.5 m/s	±0.0075m/s
φ100mm to φ1000mm (Detector: FSWS21, 40, 50)	1 m/s to about 4 m/s	±1.0% of rate
	0 m/s to 1 m/s	±0.01m/s

\*1 Maximum velocity is depend on pipe diameter. Indetail, see data sheet.

### Transit time method :

Pipe size (inside diameter)	Velocity	Accuracy
φ50mm to φ300mm or les	2 to 32 m/s	±1.0% of rate
	0 to 2 m/s	±0.02m/s
φ300mm to φ1000mm	1 to 32 m/s	±1.0% of rate
	0 to 1 m/s	±0.01m/s

### Response time:

Pulse Doppler method: 0.2sec (depending on pipe diameter and measuring condition)  
Transit time method: 0.5sec

### Power consumption:

20W or less

### Short-term thermal stability:

140°C, 30 min (FSWS12),  
100°C, 30 min (FSWS21, FSWS40, FSWS50)

## Physical specifications

### Enclosure protection:

Flow Transmitter: IP67,  
Detector: IP67

### Dimensions:

Flow Transmitter : H240 x W247 x D134 mm (FSH)  
Detector: H70 x W57 x L360 mm (FSWS12)  
H72 x W57 x L540 mm (FSWS21)  
H90 x W85 x L640 mm (FSWS40)  
H82 x W71 x L258 mm (FSWS50)

### Mass:

Flow Transmitter: 5 kg  
Detector: 1.7 kg (FSWS12), 1.9 kg (FSWS21),  
5 kg (FSWS40), 1.5 kg (FSWS50)

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