

# Ultrasonic measurement

## Time-of-Flight

### Prosonic FDU91

Ultrasonic sensor for level and flow measurement for connection to FMU9x (measuring range up to 10m)



#### Benefits:

- Integrated temperature sensor for Time-of-Flight correction. Accurate measurements are possible, even if temperature changes are present
- Hermetically welded PVDF sensor for highest chemical resistance
- Suited for rough ambient conditions thanks to separate installation from the transmitter (up to 300m)
- Reduced build-up formation because of the self-cleaning effect
- Integrated automatic sensor detection for transmitters FMU90/ FMU95 for simple commissioning
- Weather resistant and flood-proof (IP 68)
- Integrated heating against a build-up of ice at the sensor (optional) ensures reliable measurement

More information and current pricing:

[www.endress.com/FDU91](http://www.endress.com/FDU91)

#### Specs at a glance

- **Process temperature** -40 °C ... 80 °C (-40 °F ... 176 °F)
- **Process pressure / max. overpressure limit** 0.7 bar ... 4 bar abs (10 psi ... 58 psi)
- **Max. measurement distance** Liquids: 10 m (33 ft), Solids: 5 m (16 ft)
- **Accuracy** +/- 2 mm + 0.17% of measured distance
- **Main wetted parts** PVDF (fully welded IP68 / NEMA6P)

**Field of application:** The FDU91 ultrasonic sensor for continuous, non-contact and maintenance-free level measurement of fluids, pastes, sludges and powdery to coarse bulk materials. But also for flow measurement in open channels and measuring weirs. The measurement

is unaffected by dielectric constant, density or humidity and also unaffected by build-up due to the self-cleaning effect of sensors. Suited for explosion hazardous areas. Maximum measuring range in liquids 10m (33ft), solids 5m (16ft).

## Features and specifications

### Continuous / Liquids

**Measuring principle**

Ultrasonic

**Characteristic / Application**

Separated version with field housing or top hat rail housing for control cabinet instrumentation, 300 m in-between sensor and transmitter

**Supply / Communication**

4-wire (HART, Profibus DP)

**Accuracy**

+/- 2 mm + 0.17% of measured distance

**Ambient temperature**

-40 °C ... 80 °C  
(-40 °F ... 176 °F)

**Process temperature**

-40 °C ... 80 °C  
(-40 °F ... 176 °F)

**Process pressure / max. overpressure limit**

0.7 bar ... 4 bar abs  
(10 psi ... 58 psi)

**Main wetted parts**

PVDF (fully welded IP68 / NEMA6P)

**Process connection**

G / NPT 1"

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## Continuous / Liquids

### Blocking distance

0.3 m (1 ft)

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### Max. measurement distance

Liquids: 10 m (33 ft),

Solids: 5 m (16 ft)

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### Communication

Transmitter:

4 ... 20 mA HART

Profibus DP

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### Certificates / Approvals

ATEX, FM, CSA, IEC Ex, INMETRO, NEPSI, EAC Ex

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### Options

Second 4...20 mA output

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### Components

Transmitter:

FMU90, FMU95

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### Application limits

Foam / high turbulence possible:

FDU92

Flange-flush assembly:

FDU91F

For tank farms scanner:

FMU95

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## Continuous / Solids

### Measuring principle

Ultrasonic

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### Characteristic / Application

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**Continuous / Solids****Supply / Communication**4-wire (HART , Profibus DP)

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**Accuracy**+/- 2mm + 0.17% of measured distance

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**Ambient temperature**

-40 °C ... 80 °C

(-40 °F ... 176 °F)

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**Process temperature**

-40 °C ... 80 °C

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**Process pressure / max. overpressure limit**

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(10 psi ... 58 psi)

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**Main wetted parts**PVDF (fully welded IP68 / NEMA 6P)

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**Process connection**G / NPT 1"

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**Blocking distance**0.3 m (1 ft)

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**Max. measurement distance**

Liquids: 10 m (33 ft),

Solids: 5 m (16 ft)

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**Communication**

Transmitter:

4 ... 20 mA HART

Profibus DP

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**Certificates / Approvals**ATEX, FM, CSA, IEC Ex, JPN Ex, INMETRO, NEPSI, EAC Ex

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## Continuous / Solids

### Options

Second 4...20mA output

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### Components

Transmitter:  
FMU90

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## Liquids

### Measuring principle

Ultrasonic

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### Product headline

Version with separate transmitter in field housing or top hat rail housing  
Cost effective solution for open channel flow measurement in water /  
wastewater plants

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### Max. measurement error

accuracy:  
distance measurement: +/- 2mm + 0.17%  
resolution:  
distance measurement: 1mm

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### Measuring range

max measuring distance up to 10m / 32ft

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### Max. process pressure

atm.

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### Medium temperature range

-40...80°C  
(-40...176°F)

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### Degree of protection

IP68

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### Display/Operation

Transmitter

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## Liquids

### Outputs

Transmitter:

4...20mA HART

Option: second 4...20mA output

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### Inputs

Transmitter

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### Digital communication

HART, PROFIBUS DP

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### Hazardous area approvals

ATEX, FM, CSA, IEC Ex, INMETRO, NEPSI, EAC Ex

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More information [www.endress.com/FDU91](http://www.endress.com/FDU91)