ClampSonic^{TM}4 clamp-on ultrasonic flow meter
For dual-stream process liquid measurement
Model FLC-CS4

Applications

- Water and wastewater
- Process industry
- Mining, pulp and paper, primary metallurgy
- HVAC (heating, ventilation and air conditioning)

Special features

- Measurement of two independent streams
- Narrow-band high-speed (NBHS) burst measurement
- Innovative HMI (Human-Machine Interface) with touch and gesture control
- Integrated high-capacity data logger
- Embedded “WIKA WebApp” configuration (no external software needed)

Clamp-on ultrasonic flow meter, model FLC-CS4
Left: field version
Right: wireless version

Description

By exploiting the properties of acoustic wave propagation, the model FLC-CS4 clamp-on ultrasonic flow meter ensures high accuracy over a broad flow range. The FLC-CS4 provides accurate and cost-effective measurements even with corrosive and abrasive liquids.

The multi-variable capability allows additional parameters of the measured liquid such as temperature, density, concentration and calorific value to be measured. This makes the model FLC-CS4 a comprehensive solution for various applications, including retrofits and spot checks.

The clamp-on design enables non-intrusive and non-invasive bidirectional measurement without contact with the process liquid. This prevents contamination and pressure drops in the pipelines, which significantly reduces the need for maintenance and calibration.

The flow meter is available in two versions – the wireless version and the field version. Both include the electronic unit and the transducers. The field version additionally contains an power supply and communication box (P/C box), which provides isolated power connection and communication in the field.

Data sheets showing similar products and accessories:
Ultrasonic flow meter, for custody transfer of gases; FLC-UFL series; see data sheet FL 40.01

Integrated Wi-Fi allows instrument configuration both from remote or directly in the field.

The embedded “WIKA WebApp” web application offers an intuitive interface for configuring and monitoring the instrument, eliminating the need of extra software or communication tools.

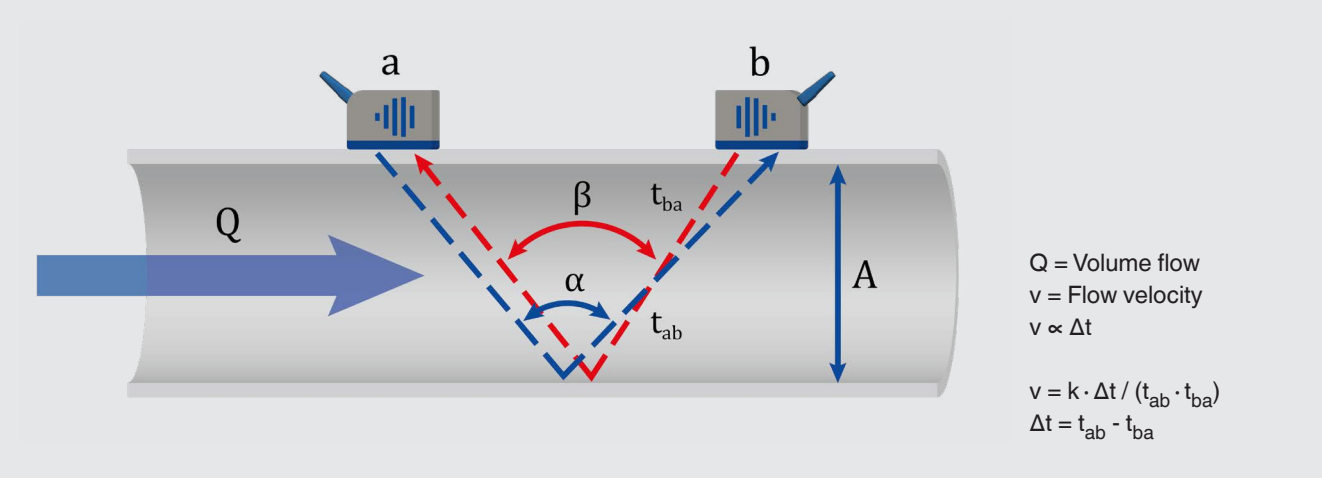
The full-colour, high-resolution IPS LC display ensures excellent readability under direct sunlight. The advanced touch and gesture Human-Machine Interface (HMI) simplifies user interaction and control, even when wearing safety gloves.

The embedded data logger and backup functions increase operational reliability by enabling fast data recovery, minimising downtime and simplifying configuration management of the instrument.

Specifications

Measurement principle

The principle of the transit-time difference (Δt) is based on acoustic signals transmitted between two transducers, acting alternately as sound emitters and receivers. These signals are transmitted in both directions, from a to b then back from b to a, with their propagation speed influenced by the direction of the flow: waves moving against the flow are slower than those moving with it. This creates a difference in transit time that is directly proportional to the velocity of the flow. Additionally, the system compares the instant speed of sound of the liquid with embedded tables notifying changes in liquid characteristics.



Advanced measurement capabilities

The instrument enables two streams in two separate pipes to be measured independently. For this purpose, each stream can use up to two channels to enhance measurement robustness against uneven flow profiles. The model FLC-CS4 can be equipped with up to 4 pairs of transducers. Each pair has an active 4 ... 20 mA signal input meant to read external temperature sensors.

Versions	
Communication	■ Field version (electronic unit, transducers and P/C box) ■ Wireless version (electronic unit and transducers)
Channels	1 ... 2
Size of transducers	■ Small ■ Large → For further information see „Dimensions in mm [in]“
Number of possible transducers	2 ... 8

Basic information	
Signal technology	Narrow-band high-speed (NBHS) burst
Medium	Any liquid with acoustic conductivity, maximum 10 % gaseous or solid content by volume
Measured	■ Absolute time of flight ■ Differential time of flight
Pipe diameter	DN 25 ... DN 3000 [1" ... 120"]
Pipe material	■ Metal ■ Plastic → The wetted parts of the pipeline must be matched to the medium, see operating instructions article no. 81502178.

Accuracy specifications	
Accuracy	■ ±1.5 % of reading ±0.005 m/s (factory calibration) ■ ±1 % of reading ±0.005 m/s (field calibration)
Repeatability	0.3 %
Turndown ratio	400:1 (depending on pipe diameter and application)
Reference conditions	
Ambient temperature	-10 ... +50 °C [14 ... 122 °F]
Humidity	100 % relative humidity
Condensation	Condensation permissible

Measuring ranges		
Measurands	■ Volume flow rate ■ Mass flow rate ■ Flow velocity ■ Calorific value	
Flow totaliser	■ Volume ■ Mass ■ Energy	
Calculation functions	■ Average - channels ■ Difference - between streams	
Units	■ l/m ■ l/h ■ m^3/s ■ kg/s ■ m/s	■ l ■ m^3 ■ k ■ Btu
	→ Defined by the user via the “WIKA WebApp”	
Measurement specifications		
Flow velocity	Typically v = 0.01 ... 10 m/s [0... 33 ft/s] at specified measurement accuracy	

Electronic unit	
Microcontroller unit	240 MHz 32-bit dual-core processor
User interface	Touch and gesture Human-Machine Interface (HMI)
Configuration method	Embedded “WIKA WebApp”
Ingress protection	IP66
Cable entry	■ M12, 12-pin for power/communciation ■ 4 x M12, 4-pin for ultrasonic/analogue
Voltage supply	DC 24 V, isolated
Power consumption	Max. 5 W

Electronic unit		
Case	Anodised aluminium	
Display		
Display range	Adjustable range ■ 6 digits on IPS-LC display ■ Unlimited digits over “WIKA WebApp”	
Type	TFT IPS/LC display, 480 x 320 high-brightness IPS LC display with 16M colours, transmissive	
Menu languages	■ English ■ German ■ French ■ Spanish ■ Italian	
Functions		
Data logger	Loggable values	All the measurands are selectable
	Capacity	8 GB dedicated storage memory
	Cyclic logger	Automatic recording of more than 1,000,000,000 values
	Recording rate	1 s, 10 s, 30 s, 60 s (configurable)

P/C box (field version)	
Configuration method	“WIKA WebApp”, embedded
Ingress protection	IP66
Cable inlet	Cable gland
Overvoltage category	II
Voltage supply	AC 90 ... 240 V, 560/60 Hz DC 24 V, isolated
Power rating	AC: max. 10 VA - DC: max. 10 W
Supply voltage fluctuation	±10 %

Transducers	
Electrical connection type	Circular connector M12 x 1, 4 pin
Frequency	500 kHz, 1 MHz, 2 MHz
Ingress protection	IP67
Temperature range (pipe wall)	-30 ... +80 °C [-22 ... +176 °F]
Case	■ Anodised aluminium ■ Stainless steel

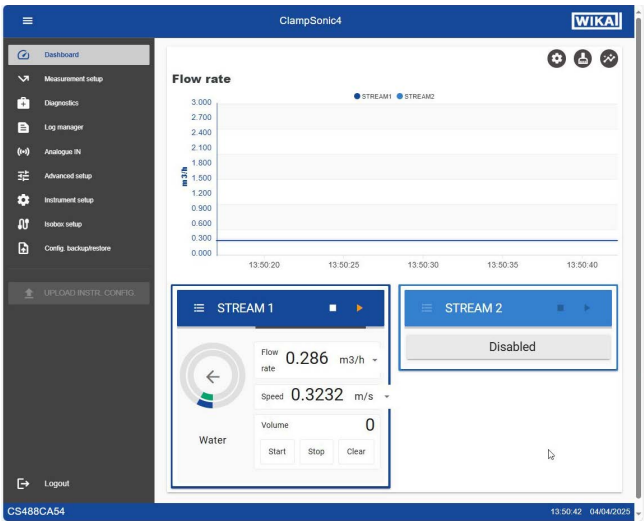
Output signal	
Field version	
Communication protocol	Modbus® (RTU + TCP)
Output	■ Isolated 2 x 4 ... 20 mA ■ Isolated 2 x 0 ... 10 V ■ Isolated 2 x pulsed output (each with direction pin)
Network protocol	■ RS-485 ■ Wi-Fi (802.11b/g/n 2.4Ghz Wi-Fi)
Current output	■ Adjustable full scale value ■ Temperature coefficient: typ. 2 µA/°C, resolution: 1.5 µA ■ Active: 4 ... 20 mA, R_L < 700 Ω

Output signal	
Pulse / status output	■ Open collector ■ DC 70 V / 50 mA ■ Passive ■ Selectable pulse / frequency output / pulse width
Isolation	Input and output circuits are both galvanically isolated from each other and from power supply
Wireless version	
Communication protocol	Modbus® (TCP)
Network protocol	Wi-Fi (802.11b/g/n 2.4Ghz Wi-Fi)
Output configuration	Via the integrated web application “WIKA WebApp”

Operating conditions	
Place of use	For indoor and outdoor use, wet location
Operating altitude	≤ 2,000 m [6,562 ft] above sea level (only for AC 90...240 V)
Ingress protection	IP66 / IP67
Pollution degree	2

Web application “WIKA WebApp”

The “WIKA WebApp” offers advanced, secure and easy-to-use functions. Access via the instrument’s physical interface is possible using a customisable password. Real-time visualisation of selected parameters for two streams is available, along with detailed measurement information and associated installation uncertainties. Instrument configuration is simplified through a wizard interface.
The web application provides real-time diagnostics, displaying waveform data and installation parameters. Users can schedule measurement logs using a calendar-based system, allowing them to be started and stopped on a specified date and time. Logs are exported in CSV format and delivered in ZIP files for easy access. Analogue input management enables users to monitor and configure four 4 ... 20 mA transducers in real-time. It also offers the option to back up user-specific instrument configurations. The user interface is intuitive and user-friendly, simplifying instrument management.
The “WIKA WebApp” ensures that instrument updates can be seamlessly performed directly from the interface.



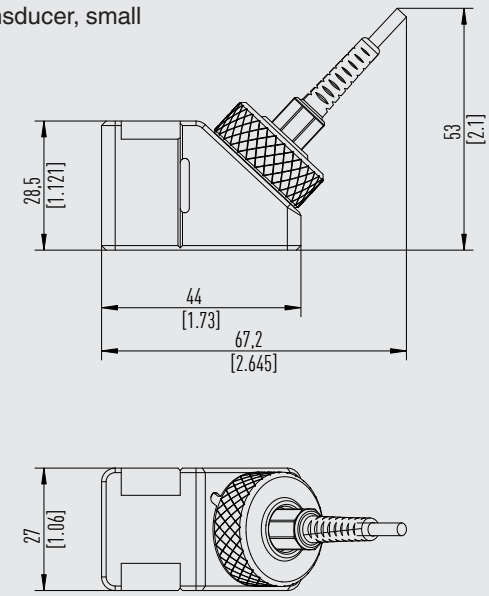
Approvals

Logo	Description	Region
CE	**EU declaration of conformity**	European Union
	EMC directive	
	Low Voltage Directive	
	RED - Radio Equipment Directive	
	RoHS directive	

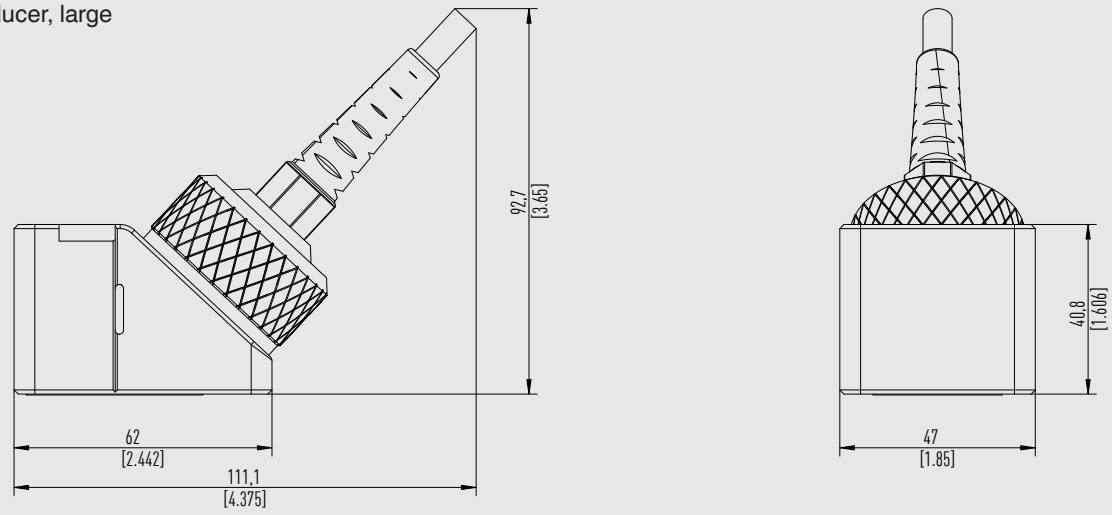
→ For approvals and certificates, see website

Dimensions in mm [in]

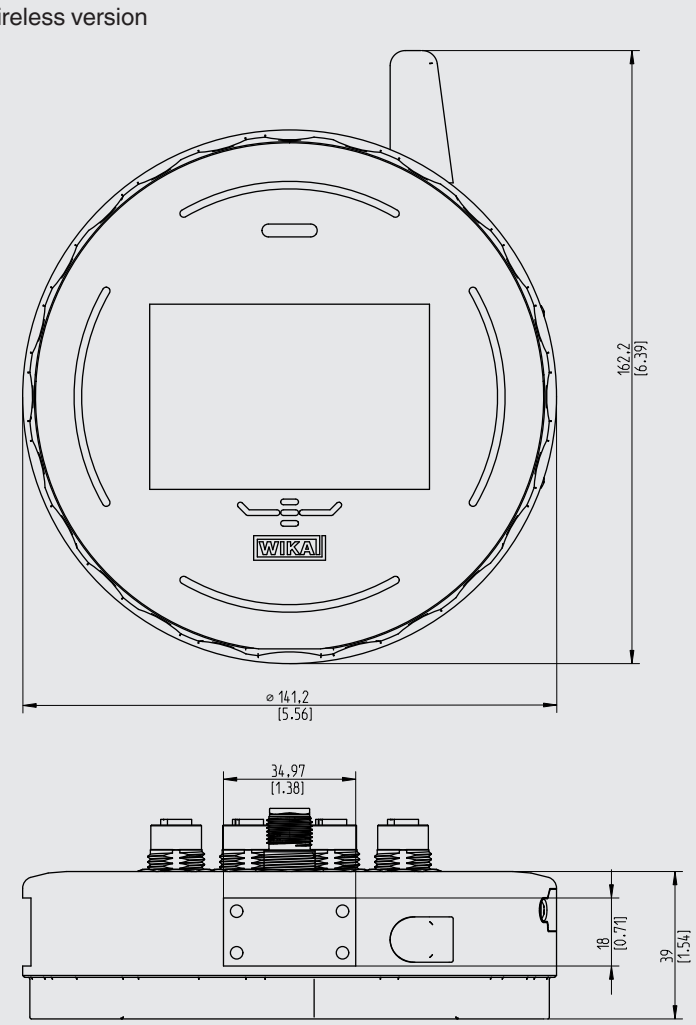
Transducer, small

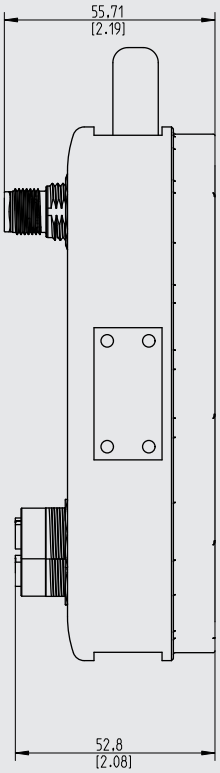


Transducer, large

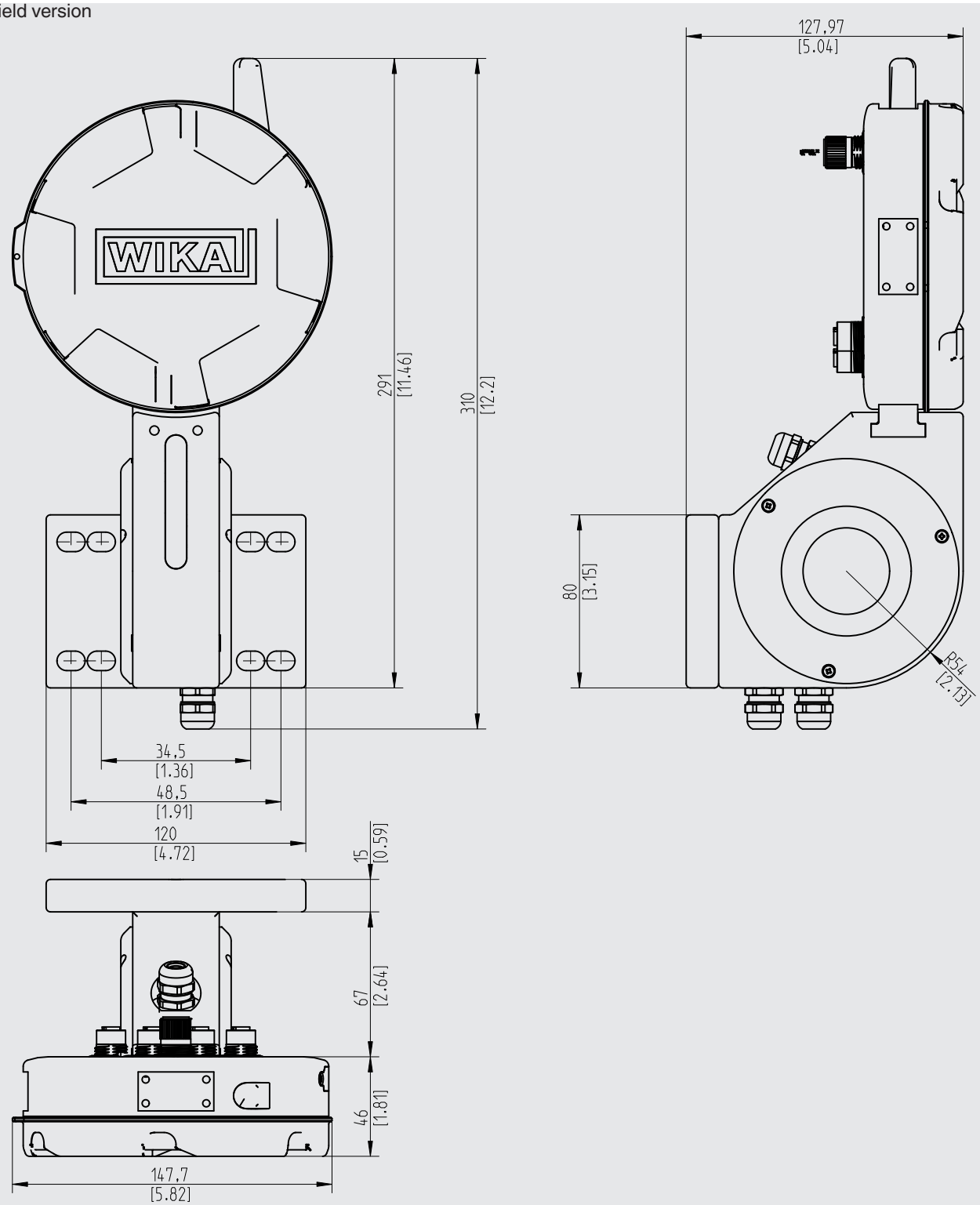


Wireless version





Field version



Accessories

Model	Description	Order number
T15.H, T15.R	Digital temperature transmitter → See data sheet TE 15.01	On request

Ordering information

Model / Version / Nominal size / Pipe material / Power supply / Accuracy specifications / Measuring ranges / Electronic case / Transducers / Output signal

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