

S461

# Ultrasonic Flow Meter for Liquid

Clamp-on



**NON-INVASIVE MEASUREMENT**  
Through clamp-on sensors



**SMARTPHONE APP**  
Easy configuration



**ENERGY METER**  
Monitors of heat exchangers



**COMPACT DESIGN**  
Can be installed anywhere



**LOCAL DISPLAY**  
For instant values



**DATA LOGGER**  
8 million samples



**EASY INSTALLATION**  
Various installation options



## Benefits

- ✔ Measures the actual flow and total consumption of various liquids
- ✔ The configuration through the dedicated smartphone app is easy and most user friendly
- ✔ Connectable to any monitoring system, through various signal interfaces: Modbus/RTU (standard), 4 ... 20 mA / Pulse / Alarm-Relay (option), Modbus/TCP (option)
- ✔ Flow and consumption can be measured in both directions, forward and reverse (Bi-directional measurement)
- ✔ Robust industrial design with versatile installation options for the display unit: Wall installation, DIN rail and pipe installation
- ✔ Measurement log files can be downloaded through the free S4A software. Soon a wireless readout will be available through mobile App

## Accurate Liquid Measurement

The SUTO ultrasonic clamp-on flow meter S461 has all it takes to measure reliable, easy and accurate flow and consumption of liquids. Based on the transit time technology this flow meter comes with unique features and outstanding performance.

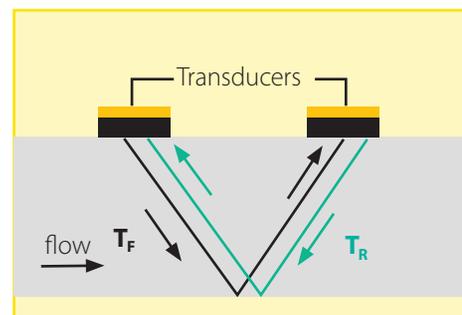
The transducers are simply clamped onto the outside of the pipe and never come in contact with the fluid. The main unit is either installed onto the pipe as well, at the wall or onto a DIN rail.

The configuration and setup is made through the wireless smartphone app S4C-US which can be downloaded for free from the SUTO website, Google Play Store and the Apple App Store. The app allows the user to set up the device as well as reading live values, logger configuration and logger data read out.

By adding 2 clamp-on temperature sensors the Energy Meter Version monitors the efficiency of heat exchangers.

The S461 comes also as portable version in a transport case.

## Transit Time Principle



$T_F$ : time in flow direction  
 $T_R$ : time in reverse flow direction

A number of pulses are transmitted from one transducer to the other and vice-versa. Sound waves travel faster with the direction of flow and slower against the direction of flow.

## Mobile App

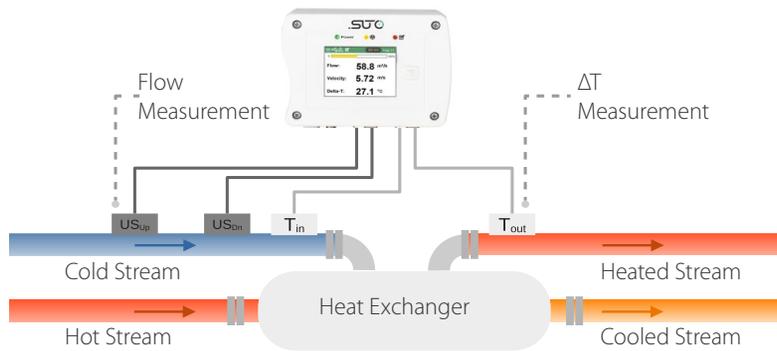
Instant view of daily, weekly and monthly consumption through mobile app.



## S461 and transducers mounted on pipe



## Heat Recovery Principle



Principle heat recovery measurement with S461 Energy Meter

Heat exchangers transfer heat (energy) from a higher temperature medium (hot stream) to a colder one (heated stream). S461 measures the flow rate and the temperature difference between cold stream and heated stream. Based on these measurements the recovered energy will be calculated.

## Convenient Storage

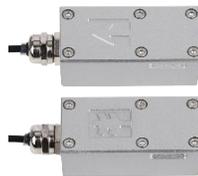
Transport casing holding up to 2 transducer pairs, T-Sensors, belt and metal stretchers, power bank, cables, charger and documentation



## Accessories



Temperature sensor with metal stretcher



UTH-S transducer for higher temperature applications



Belt stretcher for temporary installation



Transducer mounting fixture simplify the flow transducer installation

## Applications

- Cooling / Heating / Process Water
- Purified Water Measurement
- Fuel, Oils, Petroleum Products
- Water Treatment
- Food / Beverage
- HVAC / Energy System Audits
- Sanitary flow metering
- Hydraulic System Test
- Pharmaceutical Industry

## Mobile Power

S461 powered by power bank with connection cable A553 0154

**Note:** power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]



# Technical Data

## Measurement

### Flow

Accuracy	1.0 % o. RDG ±0.01 m/s
Selectable units	Metric: m/s, m <sup>3</sup> /h, m <sup>3</sup> /min, l/min, m <sup>3</sup> Imperial: ft <sup>3</sup> /min, cfm, cfs, USG/min, IG/min, bbl/min
Measuring range	0 ... 12 m/s
Repeatability	0.5 % o.RDG
Transducer	Ultrasonic transducer
Sampling rate	5 samples / sec
Response time (t90)	0.1 sec

### Consumption

Selectable units	Metric: m <sup>3</sup> , l Imperial: cf, IG, UG, bbl
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### Temperature

Accuracy	0.5 °C
Selectable units	Metric: °C. Imperial: °F
Measuring range	-40 ... +130 °C
Sensor	Pt1000

### Energy Flow

Selectable units	Metric: GJ/h, kJ/h, kcal/h Imperial: MBtu/h, Btu/h
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### Energy

Selectable units	Metric: GJ, kJ, kcal, kWh, MWh Imperial: Mbtu, Btu
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## Signal / Interface & Supply

### Analog output (Option)

Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	100 ms

### Pulse output (Option)

Signal	Switch output, normally open, nominal value: 24 VDC/0.5 A
Scaling	1 pulse per consumption unit (selectable)

### Fieldbus

Protocol	Modbus/RTU (Standard) Modbus/TCP and PoE (Option)
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### Supply

Voltage supply	20 ... 28 VDC
Current consumption	150 mA @ 24 VDC

## General data

### Configuration

Wireless	S4C-US App for mobile phones
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### Display

Size/Resolution	2.4" color (640 x 480) graphic display, 1 touch button
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### Data Logger

Storage	8 Mio. values
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### Material

Main Casing	PC + ABS
Transducer	UT-S: Industrial synthetic plastics UTH-S: Aluminum

### Miscellaneous

Electrical connection	2 x M12 D code (4 pole): transducer 2 x M12 (5 pole): Signals/Supply. (8-pole x-coded) for TCP 2 x M8 (4 pole): Pt1000 (Energy Meter Version)
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Protection class	Main casing: IP65. Transducer: IP68
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Approvals	CE, RoHS, FCC
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Dimensions	Main unit: 124 x 102 x 70 mm UT-S Transducer: 64 x 30 x 27 mm UTH-S Transducer: 68 x 34 x 34 mm
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Weight	1.2 kg
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### Operating conditions

Fluids	All acoustically conductive liquids with less than 10 % gaseous
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Medium temperature	-40 ... +130 °C
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Ambient temperature	Main unit: 0 ... +50 °C UT-S Transducer: 0 ... +80 °C UTH-S Transducer: -40 ... +130 °C
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Ambient humidity	< 99 % rH
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Storage temperature	-30 ... 70 °C
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Transport temperature	-30 ... 70 °C
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Pipe sizes	DN40 ... DN1200
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## Flow Ranges

DN	DO	Max flow		
		l/min	m <sup>3</sup> /h	cfm
40	48	905	54	32
50	60	1,414	85	50
65	76	2,389	143	84
80	88	3,619	217	128
100	114	5,655	339	200
125	139	8,835	530	312
150	165	12,723	763	449
200	219	22,618	1,357	799
250	273	35,341	2,121	1,248
300	323	50,891	3,054	1,797
500	508	141,365	8,482	4,992
1000	1016	565,458	33,929	19,970
1200	1219	814,260	48,858	28,756

Remarks: DN: nominal inner diameter

DO: outer diameter (depends on standard and material)

# Ordering

Please use the following tables to assist in placing your order with our sales staff.

## S461 Ultrasonic Flow Meter for Liquids (Clamp-On)

Order No.	Code	Description
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D695 4610	S461F-	S461 Ultrasonic Flow Meter for Liquids main unit, USB, data logger and display
D695 4611	S461E-	S461 Ultrasonic Flow & Energy Meter for Liquids main unit, USB, data logger, display and 2 additional M8 temperature inputs

### Main Unit Mounting Plate

A4603	A	Pipe/Wall mounting plate (for pipe mounting please order metal stretcher separately)
A4604	B	35 mm DIN rail mounting plate
	C	No mounting

### Output Options

	A	Modbus/RTU
A4606	B	Modbus/RTU + 4 ... 20 mA, Pulse / Alarm
A4607	C	Modbus/RTU + Modbus/TCP

### S461 Ultrasonic transducers for flow meter

S695 4610	A	UT-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, 0 ... +80 °C, IP68 (includes coupling agent)
S695 4611	B	UTH-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, -40 ... +130 °C, IP68 (includes coupling agent)

### S461 Temperature Sensors for Energy Meter

	A	No further sensor
S693 4610	B	Temperature sensor pair, 5 m cable, M8 connector -40 ... +130 °C, IP42, for S461 energy meter only

### Sensor Installation

		Metal stretcher for transducer and main unit installation on pipes
A695 4601	A	DN40 ... DN65 (2 pieces)
A695 4602	B	DN80 ... DN100 (2 pieces)
A695 4603	C	DN125 ... DN150 (2 pieces)
A695 4604	D	DN200 ... DN300 (2 pieces)
A695 4605	E	DN350 ... DN500 (2 pieces)
A695 4608	F	Belt stretcher for temporary sensor installations (portable unit), DN40 ... DN500 (2 pieces)

Example 1: S461 ultrasonic flow & energy meter, main unit wall mounting, output Modbus/RTU and 4 ... 20mA, ultrasonic transducer -20 ... 100 °C, transducer installation DN 200: S461E-ABBBB

Example 2: S461 portable ultrasonic flow meter, ultrasonic transducer 0 ... 80 °C: S461F-CAAAF

## Useful Accessories

Order No.	Description
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A553 0104	Sensor cable, 5 m, M12 connector, open wires, AWG 24 (0.2 mm <sup>2</sup> )
A553 0105	Sensor cable, 10 m, M12 connector, open wires, AWG 24 (0.2 mm <sup>2</sup> )
A554 0107	Mains unit 100 ... 240 VAC/24 VDC, 0.5 A for SUTO sensors, 1,5 m cable, M12 connector
A554 4625	Transport casing S461 dimensions: 560 x 450 x 160 mm (portable unit)
A553 0159	S461 flow transducer extension cable pair, 5 m, M12, 4-pole male/female
A553 0163	S461 temperature sensor extension cable pair, 5 m, M8, 4-pole male/female
A695 4610	Coupling agent for sensor installation, 65 g
A695 4617	Transducer mounting fixture for (UT-S) ultrasonic flow transducer pair
A695 4618	Transducer mounting fixture for (UTH-S) high-temperature ultrasonic flow transducer pair
A553 0154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

## Calibration & Services

Order No.	Description
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R200 4610	Calibration S461 together with transducer pair
R200 4613	Calibration temperature sensor S461



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