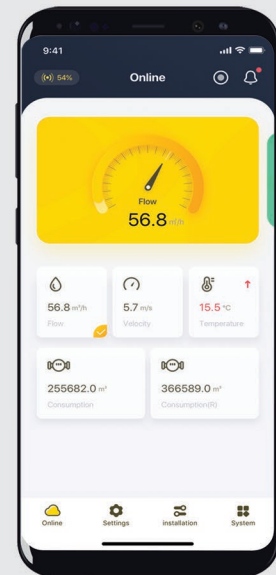


# S461

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



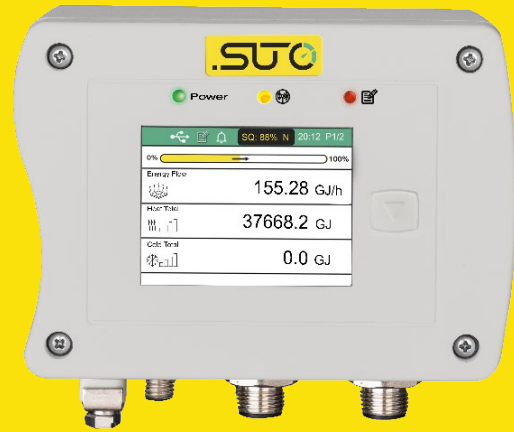
**NON-INVASIVE MEASUREMENT**  
through clamp-on sensors

**LOCAL DISPLAY**  
For instant values

**SMARTPHONE APP**  
Easy configuration

**DATA LOGGER**  
8 million samples

# Ultrasonic flow meter for liquids (Clamp-On) – Non-Invasive Flow Monitoring



## S461 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

## S461 BENEFITS

- Measures the actual flow and total consumption of various liquids
- The configuration through the dedicated smartphone app is easy and most user friendly
- The S461 offers additional temperature sensor inputs and can therefore be used as energy meter to monitor heat exchangers
- Can be connected to any monitoring system, thanks to the various signal outputs: 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
- Can be used in stationary and portable applications
- Measurement log files can be downloaded through the mobile App, via USB OTG or by using the free S4A Software
- The mobile app offers instant overviews of daily, weekly and monthly consumptions at a single click

## S461 OPERATION PRINCIPLE

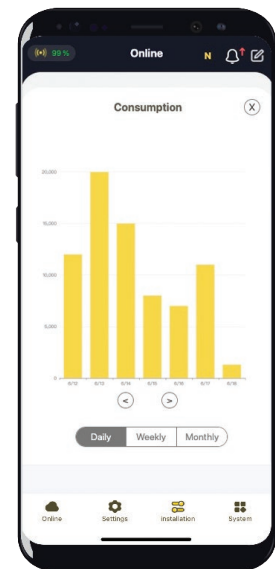
The SUTO ultrasonic clamp-on flow meter S461 has all it takes to measure reliable, easy and accurate flow and consumption of liquids. Based on the transit time technology this flow meter comes with unique features and outstanding performance.

The sensors 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.

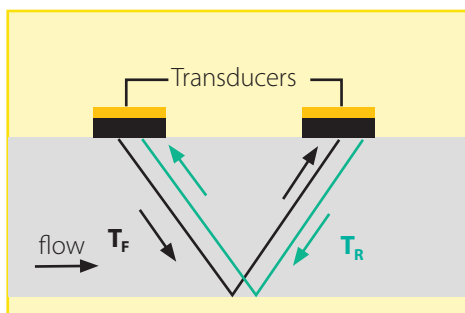
The configuration and setup is made through the wireless smartphone app S4C-US which can be downloaded for free from the SUTO website, Google Play Store and the Apple App Store. The app allows the user to set up the device as well as reading live values, logger configuration and logger data read out.

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.



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



Transit time principle:

$T_F$ : time in flow direction

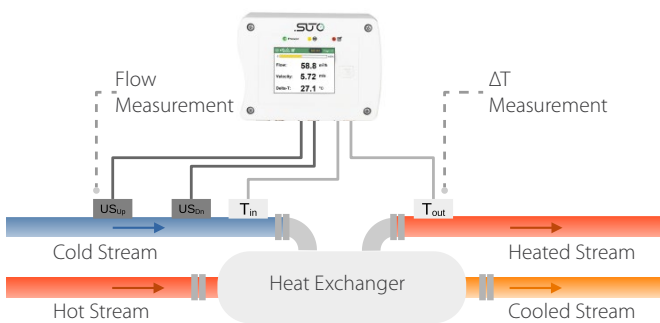
$T_R$ : time in reverse flow direction



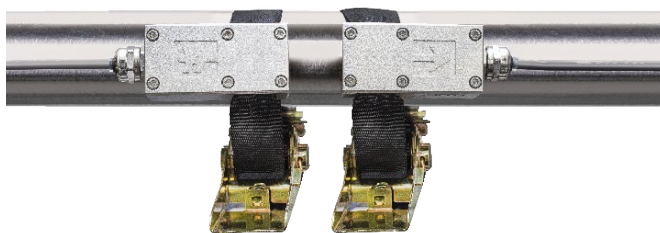
S461 and transducers mounted on pipe

# S461 TECHNICAL DATA

Measurement	
<b>Flow</b>	
Accuracy	1.0 % o. RDG $\pm$ 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/min, cfm, cfs, USG/min, IG/min, bbl/min
Measuring range	0 ... 12 m/s
Repeatability	0.2 % of reading
Sensor	Ultrasonic sensor
Sampling rate	5 samples / sec
Turndown ratio	50:1
Response time (t90)	0.1 sec
<b>Consumption</b>	
Selectable units	Metric: m <sup>3</sup> , l Imperial: cf, IG, UG, bbl
<b>Temperature</b>	
Accuracy	0.5 °K
Selectable units	Metric: °C. Imperial: °F
Measuring range	-40 ... +130 °C
Sensor	Pt1000
<b>Energy Flow</b>	
Selectable units	Metric: GJ/h, kJ/h, kcal/h Imperial: MBtu/h, Btu/h
<b>Energy</b>	
Selectable units	Metric: GJ, kJ, kcal, kWh, MWh Imperial: Mbtu, Btu
<b>Signal / Interface &amp; Supply</b>	
<b>Analog output (Option)</b>	
Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	300 msec
<b>Pulse output (Option)</b>	
Signal	Switch output, normally open, max. 30 VDC, 20 mA
Scaling	1 pulse per consumption unit (selectable)
<b>Fieldbus</b>	
Protocol	Modbus/RTU (Standard) Modbus/TCP and PoE (Option)
<b>Supply</b>	
Voltage supply	20 ... 28 VDC
Current consumption	150 mA @ 24 VDC



Principle heat recovery measurement with S461 Energy Meter



Belt stretcher for temporary installation

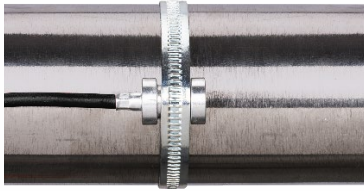
General data	
<b>Configuration</b>	
Wireless	S4C-US App for mobile phones
<b>Display</b>	
Size/Resolution	2.4" color (640 x 480) graphic display, 1 touch button
<b>Data Logger</b>	
Storage	8 Mio. values
<b>Material</b>	
Main Casing	PC + ABS
Sensor	UT-S: Industrial synthetic plastics UTH-S: Aluminum
<b>Miscellaneous</b>	
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)
Protection class	Main casing: IP65. Sensors: IP68
Approvals	CE, RoHS, FCC
Weight	1.2 kg
Dimensions	Main unit: 124 x 102 x 70 mm UT-S sensor: 64 x 30 x 27 mm UTH-S sensor: 68 x 34 x 34 mm
<b>Operating conditions</b>	
Fluids	All acoustically conductive liquids with less than 10 % gaseous
Medium temperature	-40 ... +130 °C
Ambient temperature	Main unit: 0... +50 °C UT-S sensor: 0... +80 °C UTH-S sensor: -40... +130 °C
Ambient humidity	< 99 % rH
Storage temperature	-30 ... +70 °C
Transport temperature	-30 ... +70 °C
Pipe sizes	DN40 ... DN1200

Flow Ranges:				
DN	DO	Max flow		
		l/min	m <sup>3</sup> /h	cfm
mm	mm			
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)



Temperature sensor with metal stretcher



UTH-S sensor for higher temperature applications



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



S461 powered by power bank with connection cable.

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

## S461 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
D695 4610	S461F-	S461 Ultrasonic flow meter for liquids main unit, Modbus/RTU, USB, data logger and display
D695 4611	S461E-	S461 Ultrasonic flow & energy meter for liquids main unit, Modbus/RTU, 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 hat rail mounting plate
Output options		
	A	No further output
A4606	B	4 ... 20 mA, Pulse / Alarm
A4607	C	Modbus/TCP

Example: S461 ultrasonic flow meter, pipe/wall mounting and Modbus/TCP: S461F-AC

S461 Sensors	
Order No.	Description
S695 4610	UT-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, 0 ... +80 °C, IP68 (includes coupling agent)
S695 4611	UTH-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, -40 ... +130 °C, IP68 (includes coupling agent)
S693 4610	Temperature sensor pair, 5 m cable, M8 connector -40 ... +130 °C, IP42
A553 0159	S461 transducer extension cable pair, 5 m, M12 4-pole male/female

Useful Accessories	
Order No.	Description
A695 4601	Metal stretcher for sensor installation on pipes DN40 ... DN65 (2 pieces)
A695 4602	DN80 ... DN100 (2 pieces)
A695 4603	DN125 ... DN150 (2 pieces)
A695 4604	DN200 ... DN300 (2 pieces)
A695 4605	DN350 ... DN500 (2 pieces)
A695 4608	Belt stretcher for temporary sensor installations (portable unit), DN40 ... DN500 (2 pieces)
A695 4610	Coupling agent for sensor installation, 65 g
A554 4625	Transport casing S461 dimensions: 560 x 450 x 160 mm
A554 0107	Plug-in power supply, 100 ... 240 VAC / 24 VDC, 0.5 A, 1.5 m cable M12 connector. Recommended for portable unit
A553 0154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector
A553 0104	Sensor cable, 5 m, with M12 connector, open wires, AWG24 (0.2 mm <sup>2</sup> )
A553 0105	Sensor cable, 10 m, with M12 connector, open wires, AWG24 (0.2 mm <sup>2</sup> )

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

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