**.SUTO**

Be smart. **Measure it.**

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

Ultrasonic Transducer
Item No.: S695 4610
Model: UT-S
Rating: IP68/0...+80 °C
Flow

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

**LOCAL DISPLAY**
For instant values

**SMARTPHONE APP**
Easy configuration

**DATA LOGGER**
8 million samples

FLOW AND CONSUMPTION SENSORS FOR LIQUIDS & STEAM

# Ultrasonic flow meter for liquids (Clamp-On) –
## Non-Invasive Flow Monitoring
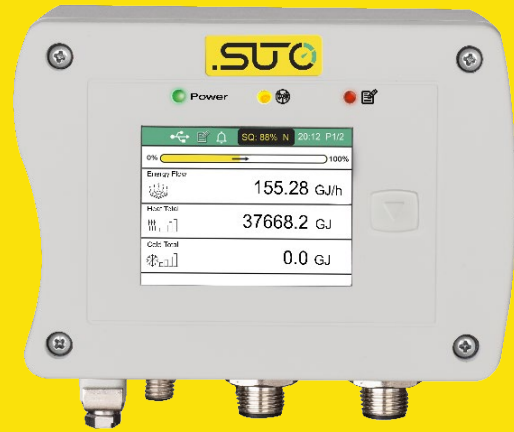
## S461 APPLICATIONS

- 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.
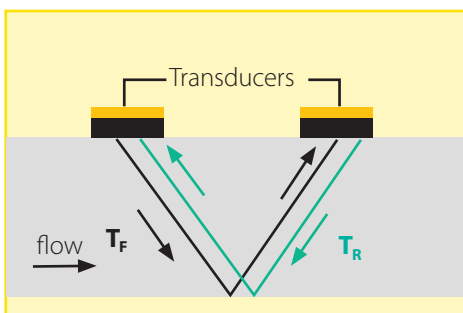
Transit time principle:
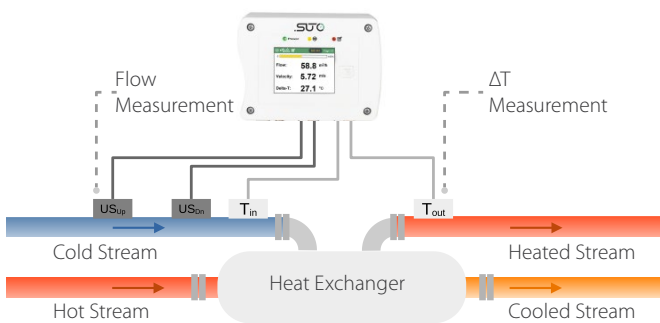$T_F$: time in flow direction
$T_R$ time in reverse flow direction

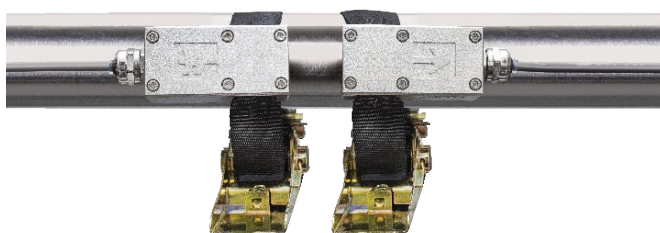S461 and transducers mounted on pipe

# S461 TECHNICAL DATA

| Measurement | |
|---|---|
| **Flow** | |
| Accuracy | 1.0 % o. RDG +-0.01 m/s |
| Selectable units | Metric: m/s, m³/h, m³/min, l/min, m³<br>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 |
| **Consumption** | |
| Selectable units | Metric: m³, l<br>Imperial: cf, IG, UG, bbl |
| **Temperature** | |
| Accuracy | 0.5 °K |
| Selectable units | Metric: °C. Imperial: °F |
| Measuring range | -40 ... +130 °C |
| Sensor | Pt1000 |
| **Energy Flow** | |
| Selectable units | Metric: GJ/h, kJ/h, kcal/h<br>Imperial: MBtu/h, Btu/h |
| **Energy** | |
| Selectable units | Metric: GJ, kJ, kcal, kWh, MWh<br>Imperial: Mbtu, Btu |

| 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 | 300 msec |
| **Pulse output (Option)** | |
| Signal | Switch output, normally open, max. 30 VDC, 20 mA |
| Scaling | 1 pulse per consumption unit (selectable) |
| **Fieldbus** | |
| Protocol | Modbus/RTU (Standard)<br>Modbus/TCP and PoE (Option) |
| **Supply** | |
| Voltage supply | 20 ... 28 VDC |
| Current consumption | 150 mA @ 24 VDC |

| General data | |
|---|---|
| **Configuration** | |
| Wireless | S4C-US App for mobile phones |
| **Display** | |
| Size/Resolution | 2.4" color (640 x 480) graphic display, 1 touch button |
| **Data Logger** | |
| Storage | 8 Mio. values |
| **Material** | |
| Main Casing | PC + ABS |
| Sensor | UT-S: Industrial synthetic plastics<br>UTH-S: Aluminum |
| **Miscellaneous** | |
| Electrical connection | 2 x M12 D code (4 pole): transducer<br>2 x M12 (5 pole): Signals/Supply. (8-pole x-coded) for TCP<br>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<br>UT-S sensor: 64 x 30 x 27 mm<br>UTH-S sensor: 68 x 34 x 34 mm |
| **Operating conditions** | |
| Fluids | All acoustically conductive liquids with less than 10 % gaseous |
| Medium temperature | -40 ... +130 °C |
| Ambient temperature | Main unit: 0... +50 °C<br>UT-S sensor: 0... +80 °C<br>UTH-S sensor: -40... +130 °C |
| Ambient humidity | < 99 % rH |
| Storage temperature | -30 ... +70 °C |
| Transport temperature | -30 ... +70 °C |
| Pipe sizes | 40 ... 1200 mm |



Principle heat recovery measurement with S461 Energy Meter



Belt stretcher for temporary installation

**Flow Ranges:**

| DN | DO | Max flow | | |
|---|---|---|---|---|
| mm | mm | l/min | m³/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 diamter
    DO:   outer diameter (depends on standard and material)
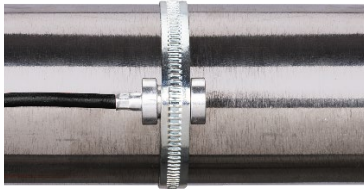
Temperature sensor with metal stretcher


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.


Visit our website or e-mail us:
**www.suto-itec.com**
**sales@suto-itec.com**

| 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 |
| **A4615** | Sensor cable length extension (please inquire) |

| Useful Accessories | |
|---|---|
| Order No. | Description |
| **A695 4601** **A695 4602** **A695 4603** **A695 4604** **A695 4605** | Metal stretcher for sensor installation on pipes DN40 ... DN65 (2 pieces) DN80 ... DN100  (2 pieces) DN125 ... DN150 (2 pieces) DN200 ... DN300 (2 pieces) 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 mm²) |
| **A553 0105** | Sensor cable, 10 m, with M12 connector, open wires, AWG24 (0.2 mm²) |

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

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