

# S401 / S421

## Thermal Mass Flow Meter

Insertion / Inline



S401



S421



**PROCESS MONITORING**  
High accuracy and reliable measurements



**TOTALIZER INTEGRATED**  
Total consumption stored internally



**S401 INSERTION METER**  
Installation under pressure



**MOBILE APP**  
For remote configuration



**INTEGRATED DISPLAY**  
For on site values



**S421 IN-LINE METER**  
High accuracy and easy to install



## Benefits

- ✓ S401 can be installed under pressure through a 1/2" ball valve
- ✓ S421 with measuring section for accurate and reliable readings
- ✓ No additional pressure or temperature compensation needed, thanks to thermal mass flow measurement
- ✓ Fast response time with a wide measuring range
- ✓ Thermal mass flow meter can be used in different process gases like: N<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub> and many other technical gases

### 1 Optional Color Display

On-site display for live value readings, total consumption counter and convenient sensor settings. Totalizer with 10 digits (1 999 999 999)

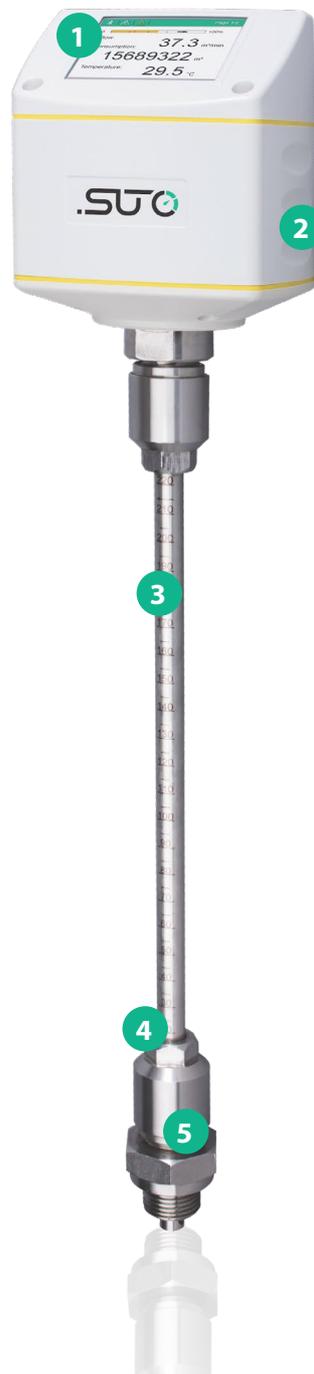
### 2 Various Outputs

S401 and S421 thermal mass flow meters are perfectly suited to be integrated into process controls or high-level monitoring systems. Various output options are offered for a seamless integration:

- Isolated 4... 20 mA output for actual flow readings
- Isolated Pulse output for totalizer
- Modbus/RTU to read all values digitally
- Modbus/TCP with PoE support to connect the meters to the local network and power them via Ethernet

### 3 Robust Materials

The industrial IP65 Polycarbonate-ABS housing offers the best protection in rough environments. The metal parts are made from high grade stainless steel, made to last forever.



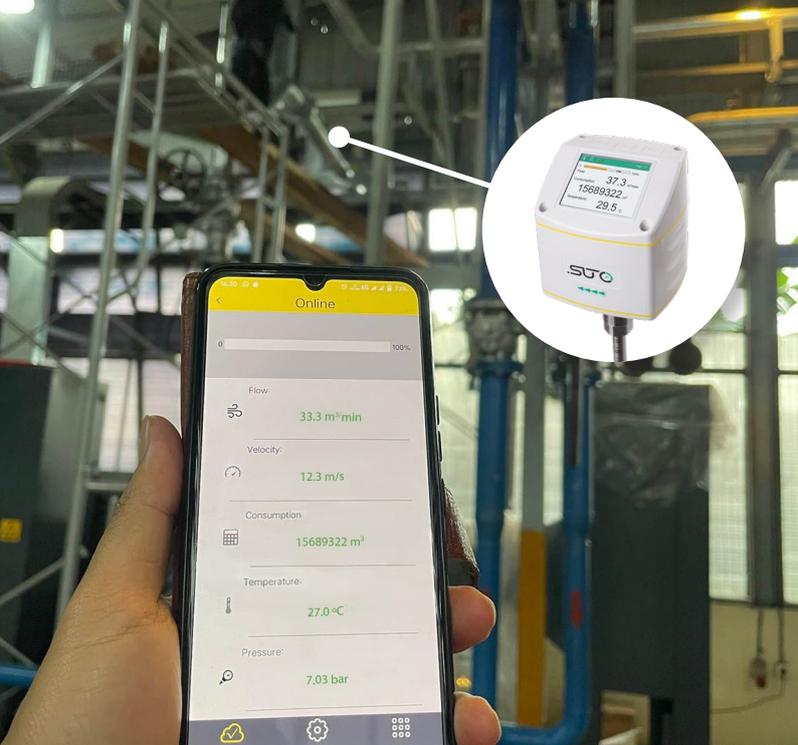
### 4 Flexible and Easy Installation

- The insertion type flow meters supports any pipe size from 1" up to 12" or even bigger pipes. Thanks to the insertion through a 1/2" ball valve, the S401 can be installed under pressure and is perfectly suited for installations where shutdowns are not acceptable.
- The in-line type are offered with measuring sections from 1/2" up to 3" and can be easily integrated into existing piping systems.

### 5 Thermal Mass Flow Sensor

The built in sensor is using the thermal mass flow principle. This comes with main advantages:

- The sensor can cover a wide measuring range at high accuracy.
- The fast response times, no moving parts and minimal pressure loss are making them most suited sensors for volumetric flow and consumption measurement of compressed air and gases.
- There is no need to compensate the line pressure and temperature additionally, making them most efficient in terms of installations and costs.



## Wireless Connection

The unique wireless connection on every flow meter is unlike its competition. Through the free S4C-FS App, live values can be read from the meters.

But not only during operation the smartphone app is useful. Especially during installation and setup all settings can be performed using a smartphone, there is no need to carry a PC and an interface on site. This saves a lot of time and is the most easy way to get reliable sensor readings.

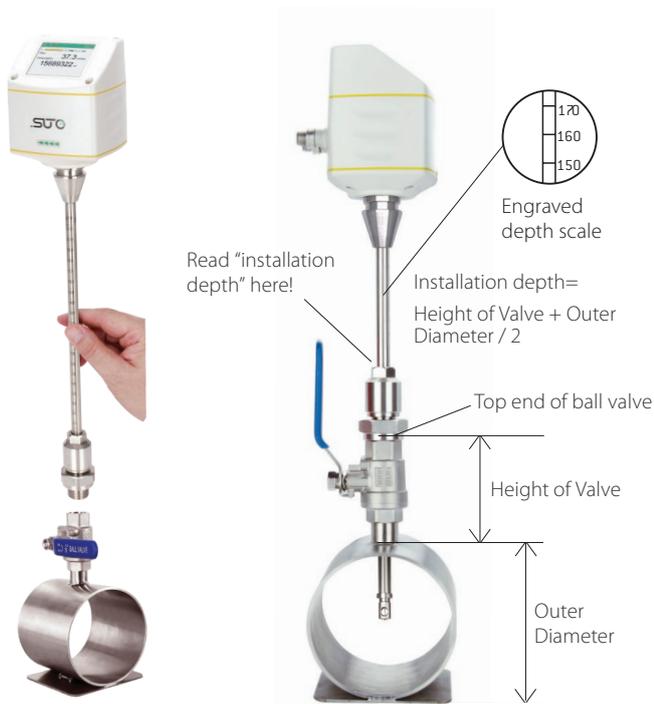
Every sensor is protected by default, to perform changes on the flow meter, first a QR code must be scanned.

## Installation and Sensor Removal

### S401

S401 can be installed under pressure through a 1/2" ball valve. The sensor tip must be in the pipes center.

- Tube diameters of DN25 and above
- 2 installation types: center installation and 100 mm insertion depth installation for bigger pipes (> DN250)
- Installation under pressure through 1/2" ball valve



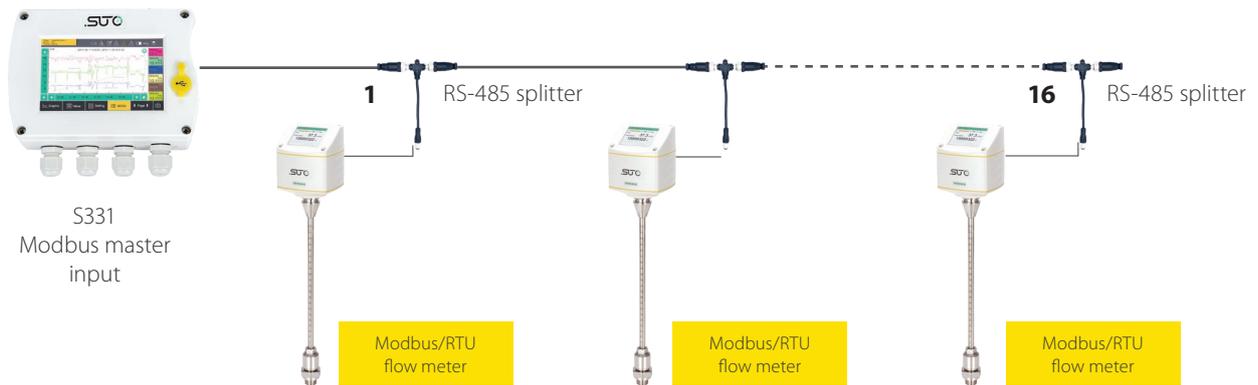
### S421

The S421 sensor unit can be easily removed for calibration. (Closing cap separately available)

- Pipes sizes available: DN15, DN20, DN32, DN40, DN50, DN65, DN80
- Fits your needs: various process connections available (R-thread, EN 1092-1 flange or ANSI flange)
- Exchangeable sensor unit (easy sensor swap)
- Optional flow conditioner, no need for a straight inlet anymore



## Connect several Flow Meters to Modbus Master



Flow meters can be easily integrated into a Modbus/RTU network (daisy chain)

## Optional Flow Conditioner

Optional flow conditioner eliminates the straight pipe inlet requirement



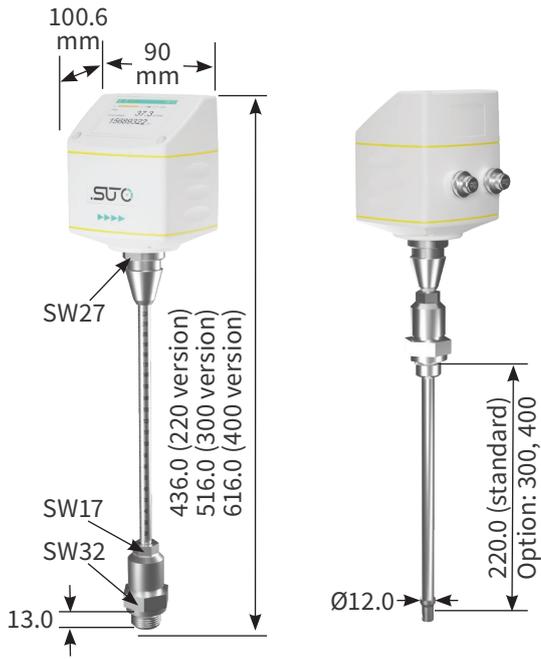
## Accessories

The flow meters come as standard with all needed tools. This includes:

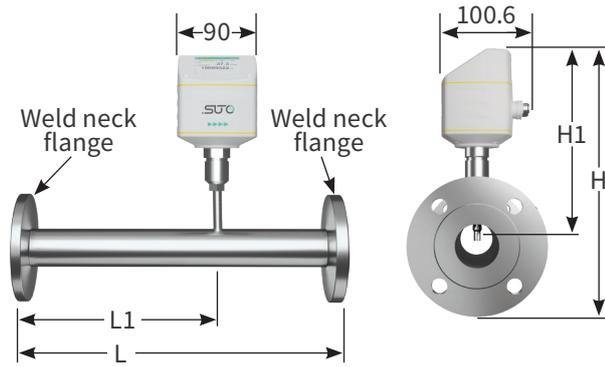
- ✓ 2 x M12 connector for signal interface and supply connections
- ✓ O-ring for pressure tight installations
- ✓ Alignment key for an accurate installation of the insertion meter



## S401 Dimensions

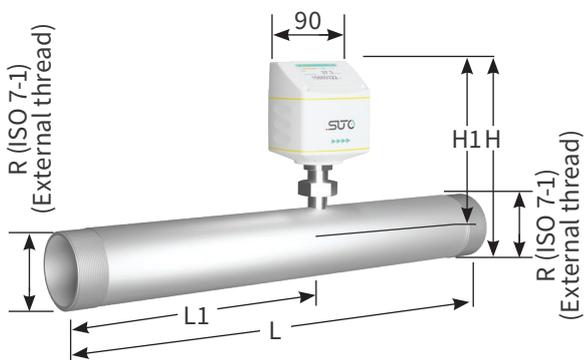


## S421 Dimensions (Flange Type)



Pipe nominal size inch / (DN)	L total length (mm)	L1 total length (mm)	H total height (mm)	H1 from pipe center to casing top (mm)
½"(DN15)	300	210	234.2	186.7
¾"(DN20)	475	275	239.2	186.7
1"(DN25)	475	275	244.2	186.7
1¼"(DN32)	475	275	256.7	186.7
1½"(DN40)	475	275	261.7	186.7
2"(DN50)	475	275	269.2	186.7
2½"(DN65)	475	275	287.1	194.6
3"(DN80)	475	275	301.0	201.0

## S421 Dimensions (Thread Type)



Pipe nominal size inch / (DN)	L total length (mm)	L1 total length (mm)	H total height (mm)	H1 from pipe center to casing top (mm)	R External Thread
½"(DN15)	300	210	197.4	186.7	R ½"
¾"(DN20)	475	275	200.2	186.7	R ¾"
1"(DN25)	475	275	203.6	186.7	R 1"
1¼"(DN32)	475	275	207.9	186.7	R 1¼"
1½"(DN40)	475	275	210.9	186.7	R 1½"
2"(DN50)	475	275	216.9	186.7	R 2"
2½"(DN65)	475	275	232.7	194.6	R 2½"
3"(DN80)	475	275	245.5	201.0	R 3"

# Technical Data

## Measurement

### Flow

Accuracy	1.5 % of reading $\pm$ 0.3 % FS (optional 1 % of reading)
Selectable units	m <sup>3</sup> /h, m <sup>3</sup> /min, l/min, l/s, cfm, kg/h, kg/min, kg/s
Measuring range	see table below
Repeatability	0.25 % of reading
Sensor	Thermal mass flow sensor
Sampling rate	10 samples / sec
Turndown ratio	1:100
Response time (t90)	0.1 sec

### Consumption

Selectable units	m <sup>3</sup> , ft <sup>3</sup> , l
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### Reference conditions

Selectable conditions	20 °C 1000 mbar (ISO1217), 0 °C 1013 mbar (DIN1343) freely adjustable
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## Signal / Interface & Supply

### Analog output

Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	Value updated ever 1 sec

### Pulse output

Signal	Switch output, normally open, max. 30 VDC, 20 mA
Scaling	1 pulse per consumption unit (selectable)

### Fieldbus

Protocol	Modbus/RTU, Modbus/TCP
Update rate	Value updated ever 1 sec

### Supply

Voltage supply	15... 30 VDC
Current consumption	max. 200 mA

## General data

### Configuration

Wireless	S4C-FS App for mobile phones
PC Software	USB Service Kit + Software
Others	Display with 2 touch buttons

### Display

Integrated	2.4" color graphic display with 2 touch buttons
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### Material

Process connection	Stainless steel 1.4404 (SUS 316L)
Housing	PC + ABS
Sensor	Ceramic, glass coated
Metal parts	Stainless steel 1.4404 (SUS 316L)

### Miscellaneous

Electrical connection	2 x M12 (5 pole); 1 x M12 (8-pole x-coded) for TCP
Protection class	IP65
Approvals	CE, RoHS, FCC
Process connection	S401: G1/2" (ISO 228/1) S421: Measuring section with R-thread or Flange

### Weight

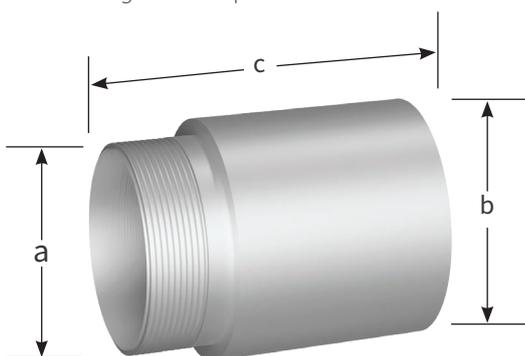
S401: 0.9 kg
S421: 0.4 kg (without measuring section)

### Operating conditions

Medium	Air, N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> and other gases
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	-30... +140 °C
Medium humidity	< 90 % rH, no condensation
Operating pressure	max. 5.0 MPa (> 1.6 MPa need installation device)
Ambient temperature	-30... +70 °C, -10... +50 °C (with display)
Ambient humidity	< 99 % rH
Storage temperature	-30... +70 °C
Transport temperature	-30... +70 °C
Pipe sizes	S401: 1/2" ... 12" (bigger pipes on request) S421: 1/2" ... 3"

## Optional Flow Conditioner

No more straight inlet requirements



Order No.	Dimensions	a	b in mm	c in mm
A1071	DN15	R 1/2"	24	64
A1072	DN20	R 3/4"	32	69
A1073	DN25	R 1"	37	75
A1074	DN32	R 1.25"	45	92
A1075	DN40	R 1.5"	54	92
A1076	DN50	R 2"	68	105
A1077	DN65	R 2.5"	80	128
A1078	DN80	R 3"	95	142

# Ordering

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

## S401 Thermal Mass Flow Meter (Insertion type)

Order No.	Code	Description
S695 4100	S4010	S401 Flow Sensor, 220mm shaft
S695 4101	S4011	S401 Flow Sensor, 300mm shaft
S695 4102	S4012	S401 Flow Sensor, 400mm shaft
S695 4103	S4013	S401 Flow Sensor, 160mm shaft
<b>Connection thread</b>		
Standard	A	G 1/2"
A1006	B	PT 1/2" Adapter
A1005	C	NPT 1/2" Adapter
<b>Gas type 1</b>		
A1007	A	Air
A1008	B	CO <sub>2</sub>
A1009	C	O <sub>2</sub> (Oil- & grease-free cleaned)
A1010	D	N <sub>2</sub>
A1011	E	N <sub>2</sub> O
A1012	F	Argon
A1015	I	Other gas (Please specify)
A1016	J	He (real gas calibration)
A1017	K	C <sub>3</sub> H <sub>8</sub>
	Z	No Second Gas
<b>Gas type 2 (same selections as above)</b>		
<b>Range</b>		
	A	Standard range version (92,7 m/s)
A1401	B	Max range version (185 m/s), only for S401
A1402	C	High speed range version (220 m/s), only for S401
A1403	D	Low range version (1/3 or standard range)
A1407	F	Vacuum / Atmospheric range (1/3 of standard range)
<b>Calibration</b>		
	A	Standard
A1405	C	Bi-directional calibration, only for S401
A1404	E	High accuracy calibration (1 % ± 0.3 %F.S.)
<b>Output</b>		
A1410	A	Analog 4 ... 20 mA, Pulse output
A1411	B	Modbus/RTU output
A1413	C	Analog 4 ... 20 mA, Pulse output compatible to S400
A1424	D	Modbus/TCP output (including 5 m M12-cable with RJ45 Plug) (with PoE option)
<b>Display</b>		
	A	Without display

Standard

### Example: S4010AAZBAAB

S401, 220 mm shaft, G 1/2", Air, no second gas, max range, standard calibration, analog 4 ... 20 mA and Pulse output, display

# Ordering

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

## S421 Thermal Mass Flow Meter (Inline type)

Order No.	Code	Description
S695 4120	S4210	S421 Flow Sensor, in-line type, 1.6 MPa version
S695 4121	S4211	S421 Flow Sensor, in-line type, 4.0 MPa version
<b>Measuring section connection *</b>		
A130X	A	R-thread (ISO 7-1)
A132X	B	Flange, EN 1092-1, PN40
A134X	C	Flange ANSI 16.5
<b>Measuring section size *</b>		
1	A	DN15 (1/2")
2	B	DN20 (3/4")
3	C	DN25 (1")
4	D	DN32 (1.25")
5	E	DN40 (1.5")
6	F	DN50 (2")
7	G	DN65 (2.5")
8	H	DN80 (3")
<b>Gas type 1</b>		
A1007	A	Air
A1008	B	CO <sub>2</sub>
A1009	C	O <sub>2</sub> (Oil- & grease-free cleaned)
A1010	D	N <sub>2</sub>
A1011	E	N <sub>2</sub> O
A1012	F	Argon
A1015	I	Other gas (Please specify)
A1016	J	He (real gas calibration)
A1017	K	C <sub>3</sub> H <sub>8</sub>
	Z	No Second Gas
<b>Gas type 2 (same selections as above)</b>		
<b>Range</b>		
	A	Standard range version
A1403	D	Low range version (1/3 of standard range)
A1407	F	Vacuum / Atmospheric range (1/3 of standard range)
<b>Calibration</b>		
	A	Standard
A1404	E	High accuracy calibration (1 % ± 0.3 %F.S.)
<b>Output</b>		
A1410	A	Analog 4 ... 20 mA, Pulse output
A1411	B	Modbus/RTU output
A1413	C	Analog 4 ... 20 mA, Pulse output compatible to S400
A1424	D	Modbus/TCP output (including 5 m M12-cable with RJ45 Plug) (with PoE option)
<b>Display</b>		
	A	Without display <span style="float: right;"><b>Standard</b></span>
A1420	B	With display
<b>Flow conditioner (optional)</b>		
A107X	A	R-thread flow conditioner

### Example: S4210AFBDAEBB

S421, R-thread, DN50, CO<sub>2</sub>, N<sub>2</sub>, standard range, high accuracy calibration, Modbus/RTU output, display

### Attention:

- Measuring section connection and size must be combined to get the order number. Example: A1306 = R-thread DN50

