Be smart. **Measure it.**

S401 / S421

Thermal Mass Flow Meter

Insertion / Inline

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_2, CO_2, O_2 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)

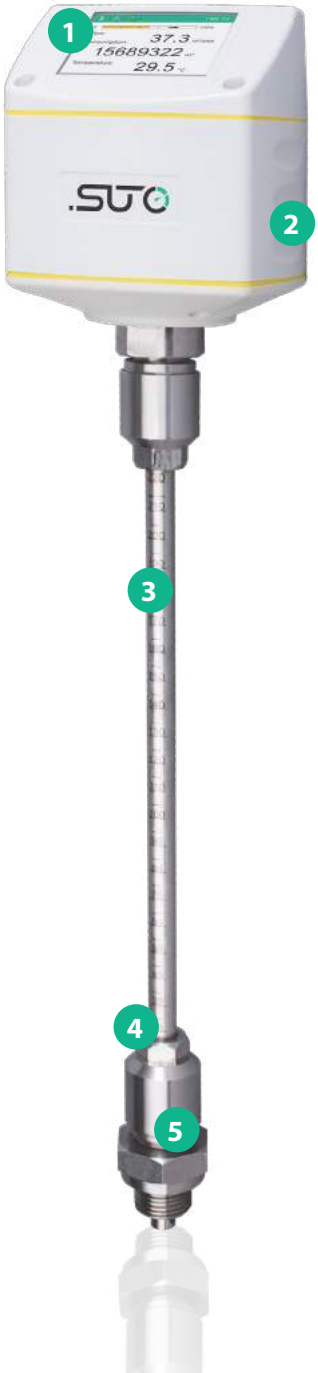
2 Various Outputs

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.



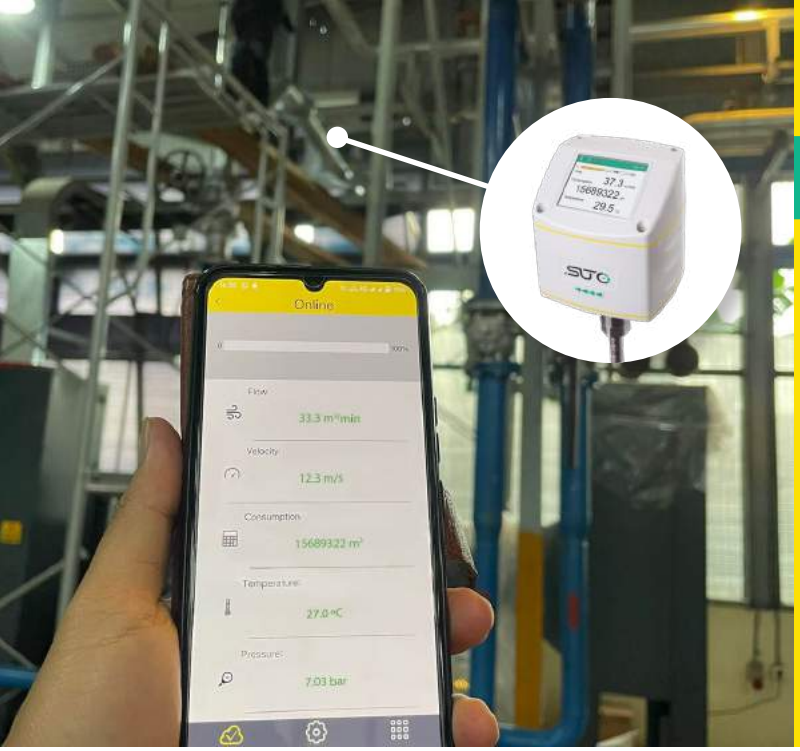
4 Flexible and Easy Installation

- 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 build 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.



Wirleless Connection

The unique wireless connection on every flow meter is unlike it's 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.

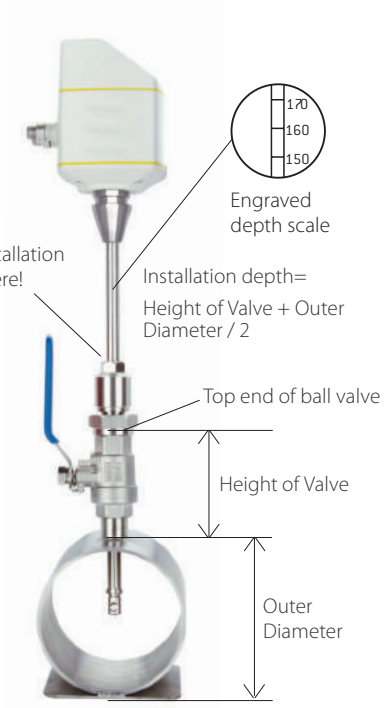
Every sensor is protected by default, to perform changes on the flow meter, first a QR code must be scanned.

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

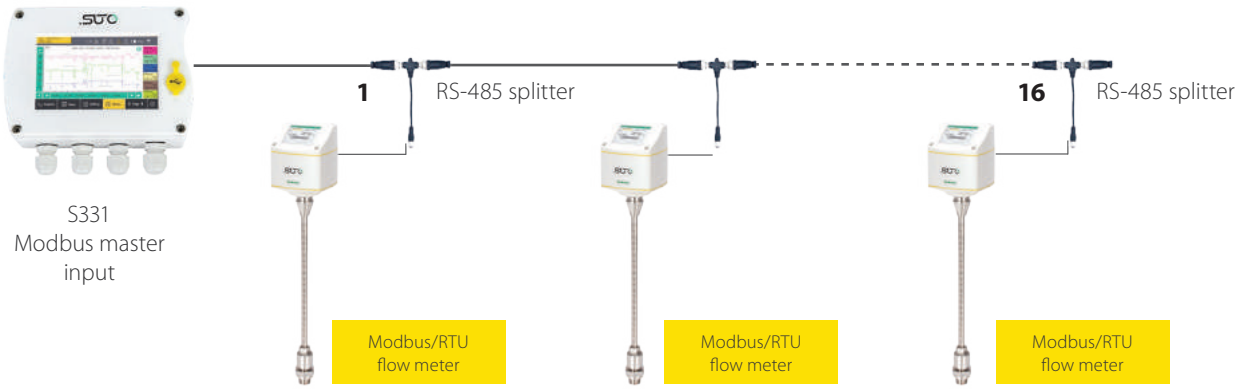


S421

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

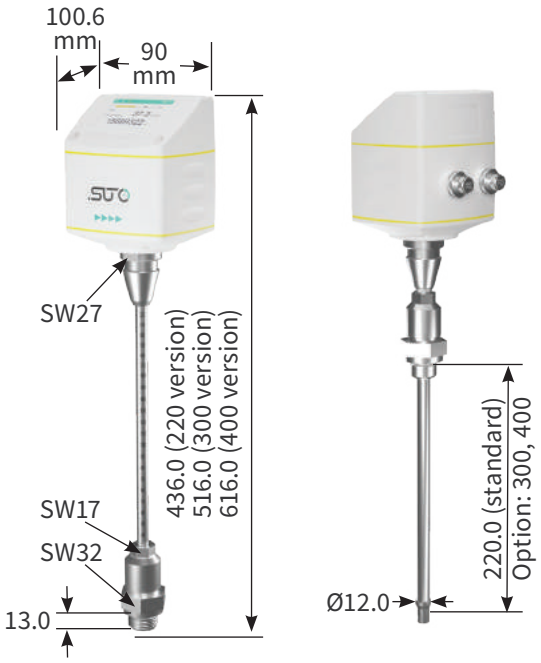
Optional flow conditioner eliminates the straight pipe inlet requirement

Accessories

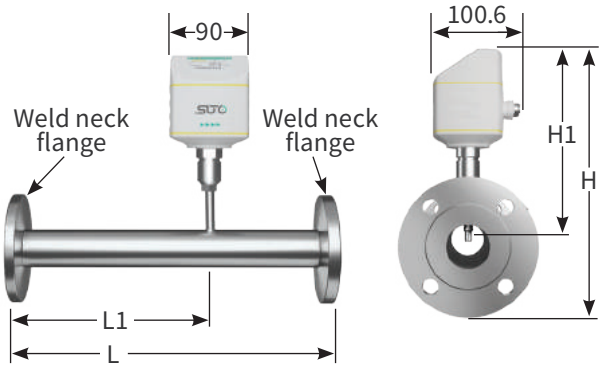
The flow meters come as standard with all needed tools. This includes:

- 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

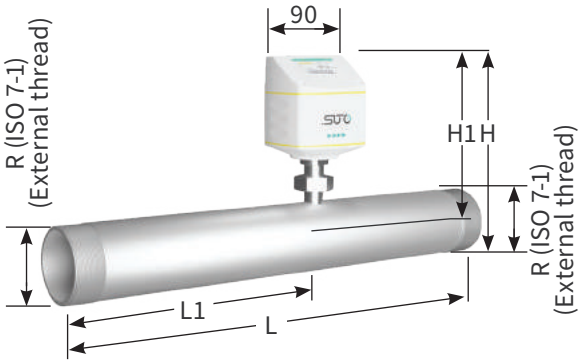


S421 Dimensions (Flange Type)



Pipe nominal size inch / (DN)	**L** total length (mm)	**L1** total length (mm)	**H** total height (mm)	**H1** from pipecenter 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 ± 0.3 % FS (optional 1 % of reading)
Selectable units	m³/h, m³/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	m³, ft³, l
Reference conditions	
Selectable conditions	20 °C 1000 mbar (ISO1217), 0 °C 1013 mbar (DIN1343) freely adjustable

Signal / Interface & Supply

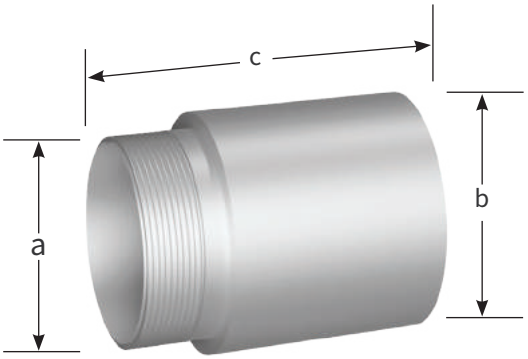
Analog output	
Signal	4 … 20 mA (4-wire), isolated
Scaling	0 … max flow, freely adjustable
Load	max. 250 Ohm
Update rate	Value updated ever 1 sec
Pulse output	
Signal	Switch output, normally open, max. 30 VDC, 20 mA
Scaling	1 pulse per consumption unit (selectable)
Fieldbus	
Protocol	Modbus/RTU, Modbus/TCP
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
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, N2, O2, CO2 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: ½" … 12" (bigger pipes on request) S421: ½" … 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	
Connection thread			
Standard	A	G 1/2"	
A1006	B	PT 1/2" Adapter	
A1005	C	NPT 1/2" Adapter	
Gas type 1			
A1007	A	Air	
A1008	B	CO_2	
A1009	C	O_2 (Oil- & grease-free cleaned)	
A1010	D	N_2	
A1011	E	N_2O	
A1012	F	Argon	
A1015	I	Other gas (Please specify)	
A1016	J	He (real gas calibration)	
A1017	K	C_3H_8	
	Z	No Second Gas	
Gas type 2 (same selections as above)			
Range			
	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)	
Calibration			
	A	Standard	
A1405	C	Bi-directional calibration, only for S401	
A1404	E	High accuracy calibration (1 % ± 0.3 %F.S.)	
Output			
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)	
Display			
	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	
Measuring section connection *			
A130X	A	R-thread (ISO 7-1)	
A132X	B	Flange, EN 1092-1, PN40	
A134X	C	Flange ANSI 16.5	
Measuring section size *			
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")	
Gas type 1			
A1007	A	Air	
A1008	B	CO_2	
A1009	C	O_2 (Oil- & grease-free cleaned)	
A1010	D	N_2	
A1011	E	N_2O	
A1012	F	Argon	
A1015	I	Other gas (Please specify)	
A1016	J	He (real gas calibration)	
A1017	K	C_3H_8	
	Z	No Second Gas	
Gas type 2 (same selections as above)			
Range			
	A	Standard range version	
A1403	D	Low range version (1/3 of standard range)	
A1407	F	Vacuum / Atmospheric range (1/3 of standard range)	
Calibration			
	A	Standard	
A1404	E	High accuracy calibration (1 % ± 0.3 %F.S.)	
Output			
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)	
Display			
	A	Without display	**Standard**
A1420	B	With display	
Flow conditioner (optional)			
A107X	A	R-thread flow conditioner	

Example: S4210AFBDAEBB
S421, R-thread, DN50, CO_2, N_2, standard range, high accuracy calibration, Modbus/RTU output, display

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