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)

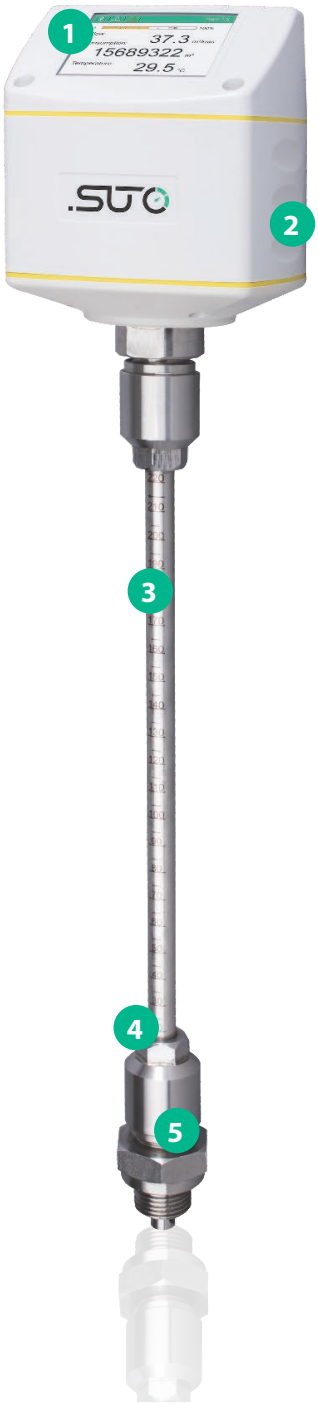
2 Various Outputs

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 easiest 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.

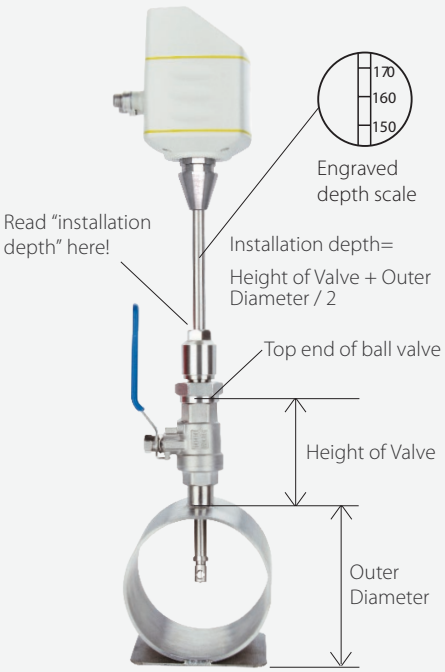
Installation and Sensor Removal

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

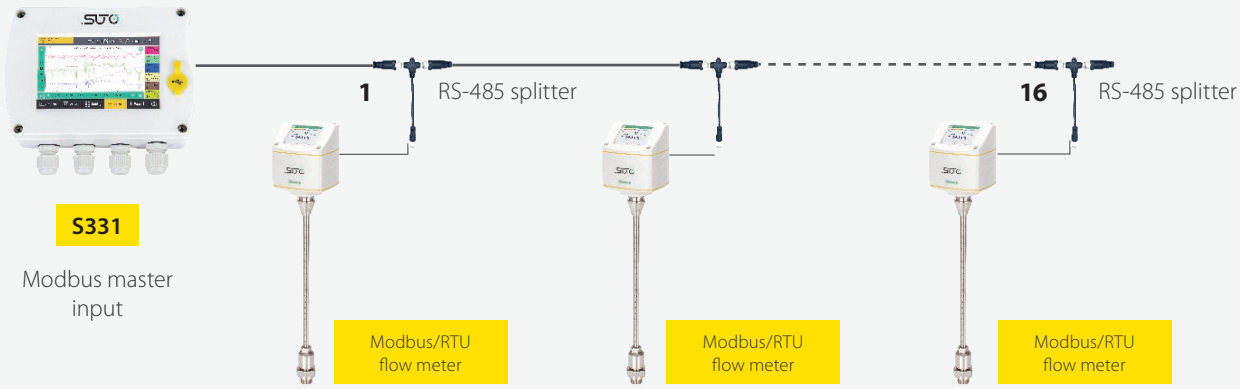
The S421 sensor unit can be easily removed for calibration. (Closing cap separately available)

- 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



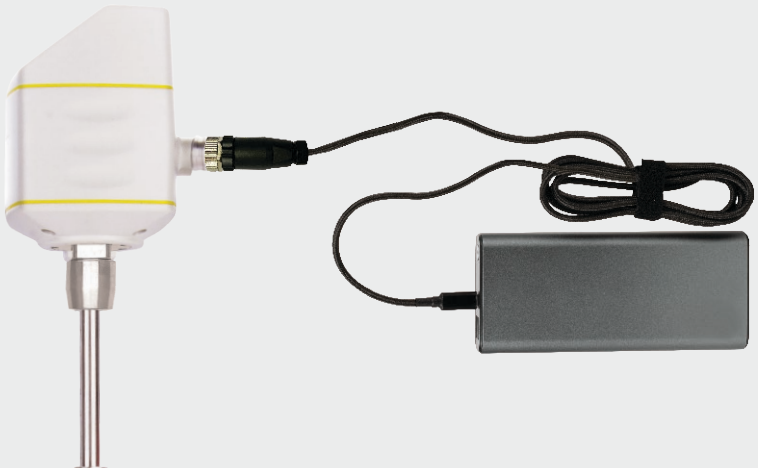
Flow meters can be easily integrated into a Modbus/RTU network (daisy chain)

Volumetric Flow Ranges

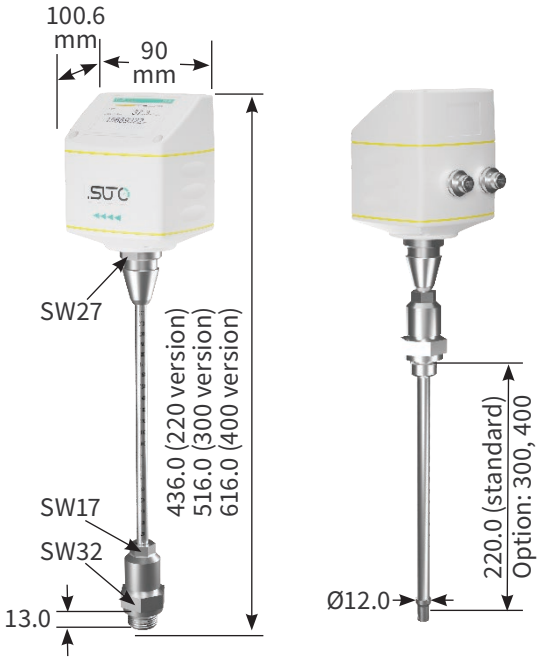
Pipe Specifications			S401			S421
Inch	DN	DI (mm)	S401-S (m³/h)	S401-M (m³/h)	S401-H (m³/h)	Measuring range from to
½″	DN15		-	-		0.5 ... 90 m3/h
¾″	DN20		-	-		0.9 ... 170 m3/h
1″	DN25	27.3	0.5 ... 147.7	0.6 ... 294.7	0.6 ... 356.9	1.5 ... 290 m3/h
1¼″	DN32	36.0	0.9 ... 266.3	1.2 ... 531.5	1.2 ... 643.5	2 ... 500 m3/h
1½″	DN40	41.9	1.2 ... 366.7	1.5 ... 731.9	1.5 ... 886.2	3 ... 700 m3/h
2″	DN50	53.1	2.0 ... 600.1	2.5 ... 1197.6	3.0 ... 1450.0	4 ... 1000 m3/h
2½″	DN65	68.9	3.5 ... 1026.5	5.0 ... 2048.6	5.0 ... 2480.4	6 ... 1500 m3/h
3″	DN80	80.9	5.0 ... 1424.4	7.0 ... 2842.7	7.0 ... 3441.9	8 ... 2500 m3/h
4″	DN100	100.0	10 ... 2183.3	12 ... 4357.2	12.0 ... 5275.7	
5″	DN125	125.0	13 ... 3419.6	18 ... 6824.4	18.0 ... 8263.1	
6″	DN150	150.0	18 ... 4930.1	25 ... 9838.9	25.0 ... 11913.1	
8″	DN200	200.0	26 ... 8785.6	33 ... 17533.3	42.0 ... 21229.5	
10″	DN250	250.0	40 ... 13743.9	52 ... 27428.5	60.0 ... 33210.7	
12″	DN300	300.0	60 ... 19814.8	80 ... 39544.1	100.0 ... 47880.4	

Mobile Power

S401 / S421 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]

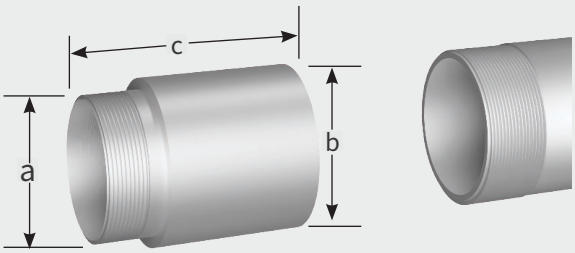


S401 Dimensions



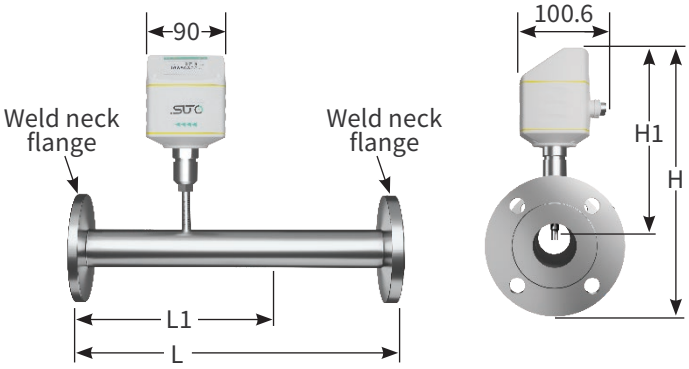
Optional Flow Conditioner

Optional flow conditioner eliminates the straight pipe inlet requirement



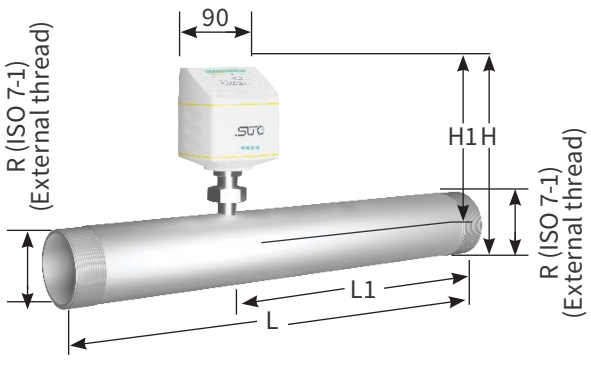
Order No.	DN	a	b in mm	c in mm
A1071	DN15	R 1/2"	24	64
A1072	DN20	R 3/4"	32	69
A1073	DN25	R 1"	37	75
A1074	DN32	R 1.25"	45	92
A1075	DN40	R 1.5"	54	92
A1076	DN50	R 2"	68	105
A1077	DN65	R 2.5"	80	128
A1078	DN80	R 3"	95	142

S421 Dimensions (Flange Type)



Pipe size inch / (DN)	L (mm)	L1 (mm)	H (mm)	H1 (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 size inch / (DN)	L (mm)	L1 (mm)	H (mm)	H1 (mm)	R
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
Repeatability	0.25 % of reading
Sensor	Thermal mass flow sensor
Sampling rate	10 samples / sec
Turndown ratio	200:1
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 3 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, N_2, O_2, CO_2 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"

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.	Description
S695 4100	S401 Thermal Mass Flow Meter, 220 mm shaft
S695 4101	S401 Thermal Mass Flow Meter, 300 mm shaft
S695 4102	S401 Thermal Mass Flow Meter, 400 mm shaft
S695 4103	S401 Thermal Mass Flow Meter, 160 mm shaft
Flow Medium 1	
A1007	Option, flow medium Air
A1008	Option, flow medium CO_2
A1009	Option, flow medium O_2 (cleaning for oil and grease-free)
A1010	Option, flow medium N_2
A1011	Option, flow medium N_2O
A1012	Option, flow medium Argon
A1013	Option, flow medium Natural Gas
A1014	Option, flow medium H_2 (For real gas calibration. Please consult manufacturer for this option in advance)
A1015	Other gas (specify gas or gas mix)
A1016	Option, flow medium He (real gas calibration)
A1017	Option, flow medium Propane C_3H_8
A1041	Option, flow medium O_2, Ar, CO_2 (real gas calibration)
A1042	Option, flow medium CH_4, NG, N_2O (real gas calibration, please consult with manufacturer for this option in advance)
Flow Medium 2 (same selection as above)	
A1003	No 2nd Gas
Range	
A1408	S401: Standard range version (92.7 m/s)
A1401	S401: Max range version (185 m/s)
A1402	S401: High speed range version (220 m/s)
A1403	S401/S421: Low range version (1/3 of standard range)
A1407	S401/S421: Vacuum / Atmospheric range (1/3 of standard range)
Calibration	
A1409	S401/S421: Standard calibration
A1405	S401: Bi-directional calibration
A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)
Output	
A1410	Isolated 4 ... 20 mA + pulse output
A1411	Modbus/RTU output
A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
A1424	Modbus/TCP output with PoE support
Display	
A1425	No Display
A1420	Color graphics display, 2.4" with keypad

S401 Thermal Mass Flow Meter (Insertion type)

Order No.	Description
Accessories	
A695 0008	S401: NPT½" thread adapter (former A1005)
A695 0009	S401: PT½" thread adapter (former A1006)
A553 0104	Sensor cable, 5 m with M12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

Example:

S401 220 mm shaft, Air, No 2nd Gas, Max range,
Standard calibration, Isolated 4 ... 20 mA output, Display

Order Code:

S695 4100.A1007.A1003.A1401.A1409.A1410.A1420

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.	Description
S695 4120	S421 Thermal Mass Flow Meter (Inline), 1.6 MPa
S695 4121	S421 Thermal Mass Flow Meter (Inline), 4.0 MPa
Measuring section connection *	
A130X	R-thread (ISO 7-1)
A132X	Flange, EN 1092-1, PN40
A134X	Flange ANSI 16.5
Measuring section size *	
1	DN15, ½"
2	DN20, ¾"
3	DN25, 1"
4	DN32, 1.25"
5	DN40, 1.5"
6	DN50, 2"
7	DN65, 2.5"
8	DN80, 3"
Flow Medium 1	
A1007	Option, flow medium Air
A1008	Option, flow medium CO_2
A1009	Option, flow medium O_2 (cleaning for oil and grease-free)
A1010	Option, flow medium N_2
A1011	Option, flow medium N_2O
A1012	Option, flow medium Argon
A1013	Option, flow medium Natural Gas
A1014	Option, flow medium H_2 (For real gas calibration. Please consult manufacturer for this option in advance)
A1015	Other gas (specify gas or gas mix)
A1016	Option, flow medium He (real gas calibration)
A1017	Option, flow medium Propane C_3H_8
A1041	Option, flow medium O_2, Ar, CO_2 (real gas calibration)
A1042	Option, flow medium CH_4, NG, N_2O (real gas calibration, please consult with manufacturer for this option in advance)
Flow Medium 2 (same selection as above)	
A1003	No 2nd Gas

S421 Thermal Mass Flow Meter (Inline type)

Order No.	Description
Range	
A1426	S421: Standard range version
A1403	S401/S421: Low range version (1/3 of standard range)
A1407	S401/S421: Vacuum / Atmospheric range (1/3 of standard range)
Calibration	
A1409	S401/S421: Standard calibration
A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)
Output	
A1410	Isolated 4 ... 20 mA + pulse output
A1411	Modbus/RTU output
A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
A1424	Modbus/TCP output with PoE support
Display	
A1425	No Display
A1420	Color graphics display, 2.4" with keypad
Accessories	
A553 0104	Sensor cable, 5 m with M12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

Optional Flow Conditioner

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

Example:
S421 1.6 MPa, R-thread DN50, CO_2, No 2nd Gas, Low Range Version, High Accuracy Calibration, Modbus/RTU, Display

Order Code:
S695 4120.A1306.A1008.A1003.A1403.A1404.A1411.A1420

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