

THERMAL MASS FLOW SENSORS

S401 / S421



SMARTPHONE ANDROID APP
For remote configuration



Measure consumption and flow — **optimize process efficiency**



S421 inline type

S401 insertion type

S401 / S421 FEATURES



**SMARTPHONE
ANDROID APP**
For remote
configuration



**ACCURATE
RESULTS**
Very fast
response time



**EASY PROCESS
MONITORING**
Effective and
inexpensive
measurements



TOTAL FLOW
High accuracy
and reliable
measurements

Optional color display for online values,
consumption counter and sensor settings.
10-digit counter (1 999 999 999)



S401 / S421 FEATURES AT A GLANCE

- Measures standard flow, mass flow and consumption
- Thermal mass flow, independent of pressure and temperature changes
- IP65 casing provides robust protection in rough industrial environment
- Very fast response time
- High accuracy and wide measuring range
- Isolated mA and pulse output signals or Modbus/RTU or Modbus/TCP interface
- Selectable gas type (Some gases require real gas calibration!)
- Sensor can be calibrated in 2 different gases

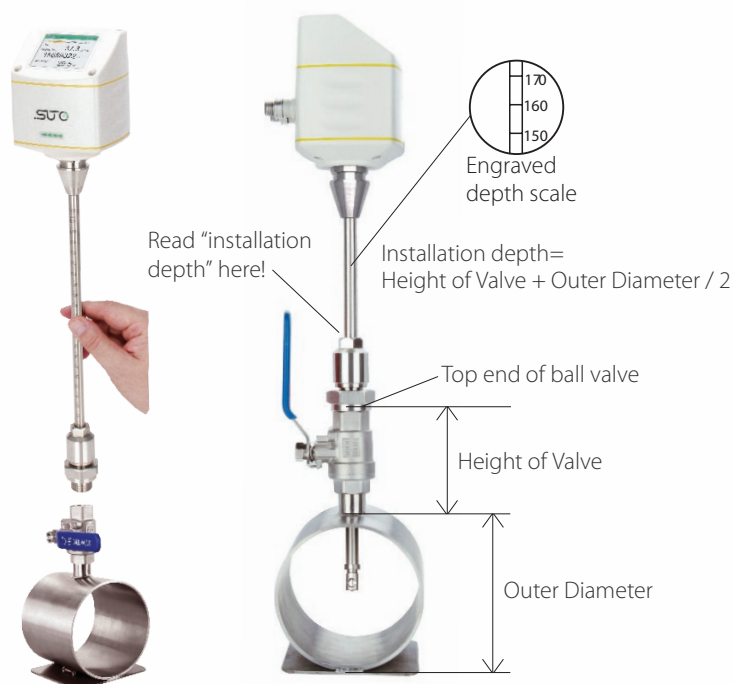
S401 BENEFITS

- Tube diameters of DN25 to DN500.
- 2 installation types: center installation and 100 mm insertion depth installation for bigger pipes (> DN250)
- Installation under pressure through 1/2" ball valve

S421 BENEFITS

- 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

S401 / S421 INSTALLATION AND SENSOR REMOVAL



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



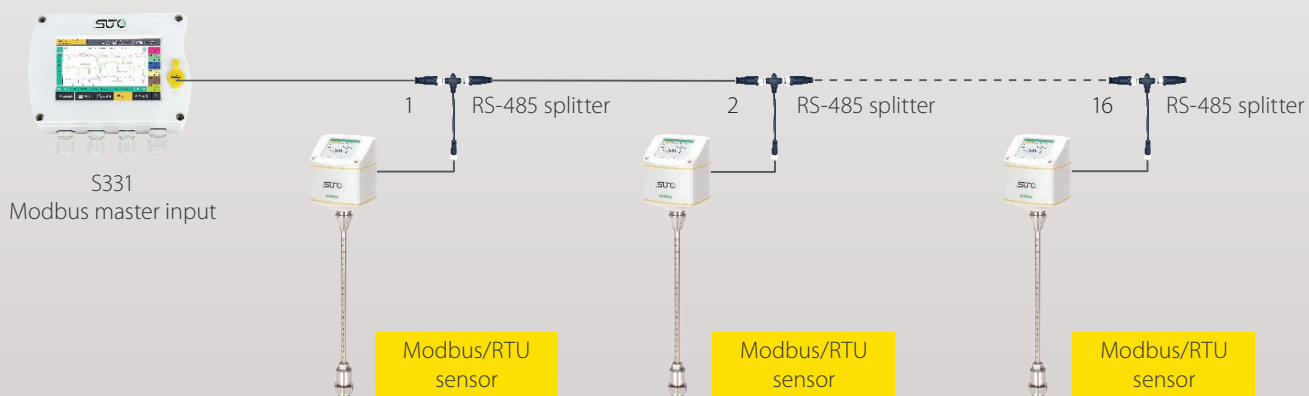
The S421 sensor unit can be easily removed for calibration. (Closing cap separately available)



Optional flow conditioner eliminates the straight pipe inlet requirement



Wireless connection allows the user to read the measurement values and change the configuration



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

S401 / S421 TECHNICAL DATA

General Specifications						
Accuracy		1.5 % of reading + 0.3 % full scale (Optional 1 % of reading)				
Repeatability		0.25 % of reading				
Sampling rate		> 10 samples / sec				
Reference conditions		Can be set by user. Standard conditions are Ps = 0.1 MPa and Ts = 20 °C				
Medium conditions:		-30 ... +140 °C / relative humidity < 90 % no condensation				
Transport Temperature:		-30 ... +70 °C				
Material:		Metal parts 1.4404 (SUS 316L) Casing PC + ABS Sensor: Ceramic with glass coating				
Classification:		IP65				
Electrical connection:		2 x M12, 5 poles (2 x M12 plug with screw terminals included)				
Approvals:		CE, RoHS, FCC				
Operating temperature		-30 ... +140 °C fluid temperature -30 ... +70 °C casing -10 ... +50 °C casing with display				
Operating pressure		S401: 0 ... 5.0 MPa (>1.6 MPa need installation device) S421: 0 ... 1.6 MPa (Optional: 4.0 MPa)				
Analogue output		Signal: 4 ... 20 mA, isolated Scaling: 0 ... max flow Max load: 250R				
Pulse output		Signal: Isolated switch output, normally open, Max 30 VDC, 20 mA Scaling: 1 pulse per consumption unit				
Modbus output		Isolated RS-485 with Modbus/RTU protocol or Modbus/TCP output				
Power supply		15 ... 30 VDC / 200 mA				
Volumetric flow ranges		S401				S421
Inch	DN	Di (mm)	S 401-S (m³/h)	S 401-M (m³/h)	S 401-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	

Stated measuring ranges under following conditions:

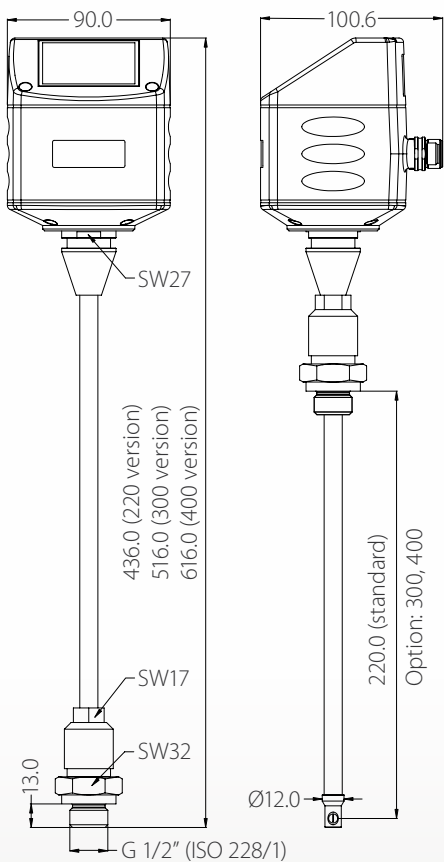
- Standard flow in air
- Reference pressure: 1000 hPa
- Reference Temperature: +20 °C

The table above shows the air flow ranges for pipe sizes up to DN300 at standard conditions. At other reference conditions and gas types the flow range may vary, please contact your local sales support.

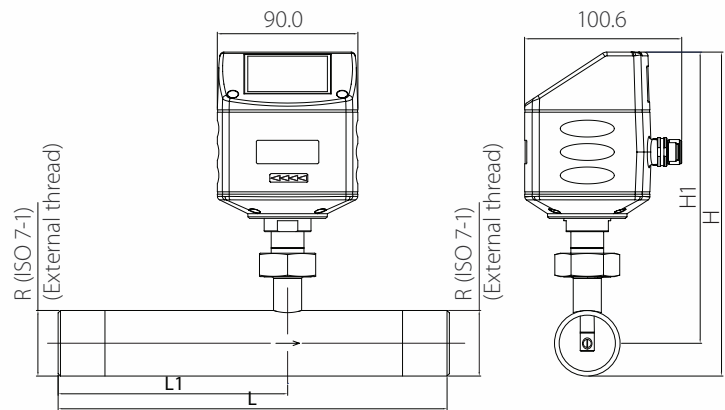
Furthermore it is possible to measure the air flow in bigger pipes (> DN300), for this please contact your local sales support.

S401 / S421 DIMENSIONS

S401



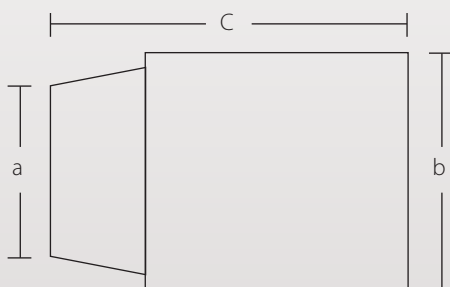
S421 thread type



Pipe nominal size inch / (DN)	L total length (mm)	L1 total length (mm)	H total height (mm)	H1 from pipecenter to casing top (mm)	R External Thread
1/2"(DN15)	300	210	197.4	186.7	R 1/2"
3/4"(DN20)	475	275	200.2	186.7	R 3/4"
1"(DN25)	475	275	203.6	186.7	R 1"
1 1/4"(DN32)	475	275	207.9	186.7	R 1 1/4"
1 1/2"(DN40)	475	275	210.9	186.7	R 1 1/2"
2"(DN50)	475	275	216.9	186.7	R 2"
2 1/2"(DN65)	475	275	232.7	194.6	R 2 1/2"
3"(DN80)	475	275	245.5	201.0	R 3"

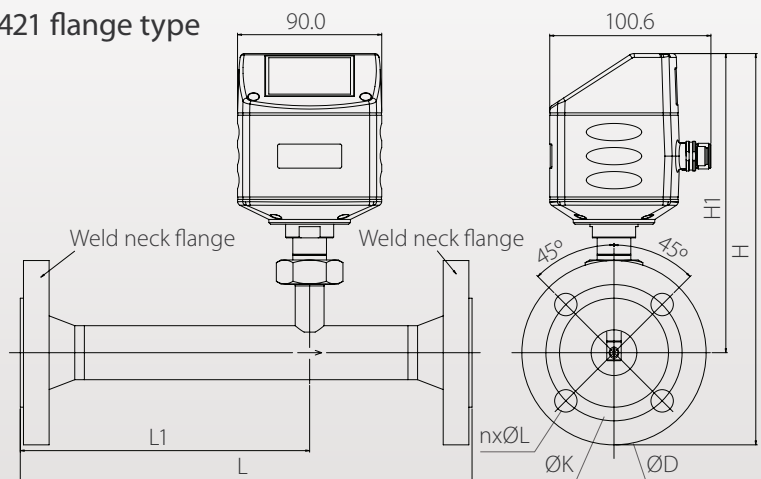
Optional flow conditioner

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

S421 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)
1/2"(DN15)	300	210	234.2	186.7
3/4"(DN20)	475	275	239.2	186.7
1"(DN25)	475	275	244.2	186.7
1 1/4"(DN32)	475	275	256.7	186.7
1 1/2"(DN40)	475	275	261.7	186.7
2"(DN50)	475	275	269.2	186.7
2 1/2"(DN65)	475	275	287.1	194.6
3"(DN80)	475	275	301.0	201.0

S401 / S421 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

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 ₂ O
A1012	F	Argon
A1013	G	Natural Gas
A1014	H	H ₂ (real gas calibration)
A1015	I	Other gas (Please specify)
A1016	J	He (real gas calibration)
A1017	K	C ₃ H 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 calibration
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)
Display		
	A	Without display Standard
A1420	B	With display

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

Attention:

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



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 ₂ O
A1012	F	Argon
A1013	G	Natural Gas
A1014	H	H ₂ (real gas calibration)
A1015	I	Other gas (Please specify)
A1016	J	He (real gas calibration)
A1017	K	C ₃ H 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 calibration
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)
Display		
	A	Without display Standard
A1420	B	With display
Flow conditioner (optional)		
A107X	A	R-thread flow conditioner

Example: S4210AFBDAEBB

S421, R-thread, DN50, CO₂, N₂, standard range, high accuracy calibration, Modbus/RTU output, display