

S 401/421 THERMAL MASS FLOW SENSORS



S 401 insertion type sensor where easy installation and flexibility is required



S 421 inline type where high accuracy is priority

Features S 401

- 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

Features S 421

- Pipes sizes available: DN32, DN40, DN50, DN65, DN80
- Process connections available: R thread, flange EN1092-1, ANSI/B16.5
- Exchangeable sensor unit (easy sensor swap)
- Integrated flow conditioner --> no straight inlet requirements

Common Features S 401 / 421

- Measures standard flow, mass flow, consumption and temperature
- 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 interface
- Selectable gas type (some gases require real gas calibration!)
- App for mobile phones and tablets for sensor settings via BlueTooth
- Sensor can be calibrated in 2 different gases



Optional color graphic display for online values and sensor settings, consumption can have up to 9 digits

Volumetric flow ranges S 401

Inch	DN	Di (mm)	S 401-S (m ³ /h)	S 401-M (m ³ /h)	S 401-H (m ³ /h)
1"	DN25	27.3	0.5 ... 147.7	0.6 ... 294.7	0.6 ... 356.9
1¼"	DN32	36.0	0.9 ... 266.3	1.2 ... 531.5	1.2 ... 643.5
1½"	DN40	41.9	1.2 ... 366.7	1.5 ... 731.9	1.5 ... 886.2
2"	DN50	53.1	2.0 ... 600.1	2.5 ... 1197.6	3.0 ... 1450.0
2½"	DN65	68.9	3.5 ... 1026.5	5.0 ... 2048.6	5.0 ... 2480.4
3"	DN80	80.9	5.0 ... 1424.4	7.0 ... 2842.7	7.0 ... 3441.9
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

The table shows flow ranges up to 300 mm pipe diameter at standard conditions in air. At other standard conditions and in other gases flow ranges are different and data are available on request. In larger pipe diameters flow can also be measured.

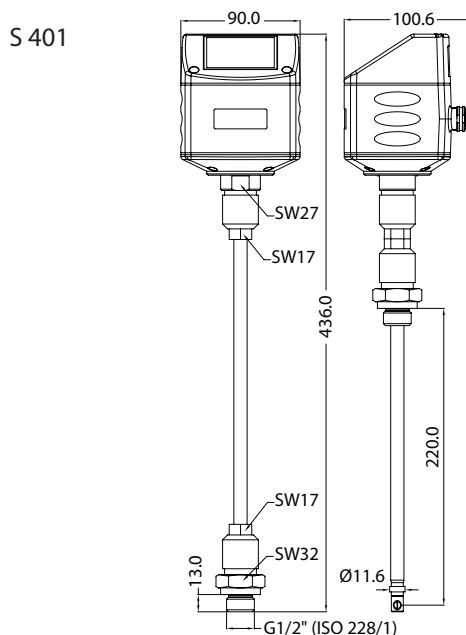
Volumetric flow ranges S 421

Connection thread	DN	Measuring range from to
* 1¼"	DN32	2 ... 500 m ³ /h
* 1½"	DN40	3 ... 700 m ³ /h
* 2"	DN50	4 ... 1000 m ³ /h
* 2½"	DN65	6 ... 1500 m ³ /h
* 3"	DN80	8 ... 2500 m ³ /h

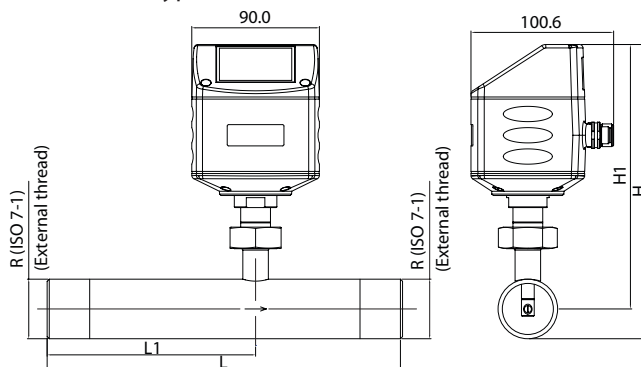
Stated flow values are at standard conditions of Ps = 0.1MPa(a) and Ts = 20 °C with medium air.

Technical data S 401/421

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
Operating temperature	-30 °C ... +140 °C fluid temperature -30 °C ... +70 °C casing -10 °C ... +50 °C casing with display
Operating pressure	S 401: 0 ... 5.0 MPa (> 1.6 MPa need installation device) S 421: 0 ... 1.6 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/RTU	Isolated RS-485 with Modbus/RTU protocol
Power supply	12 ... 30 VDC / 200 mA
Wetted material	Stainless steel 1.4404 (SUS 316L)

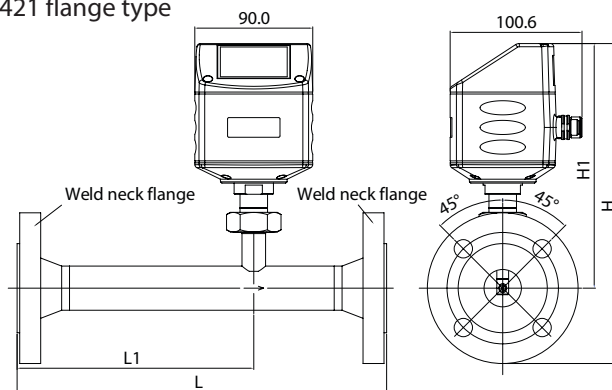


S 421 thread type



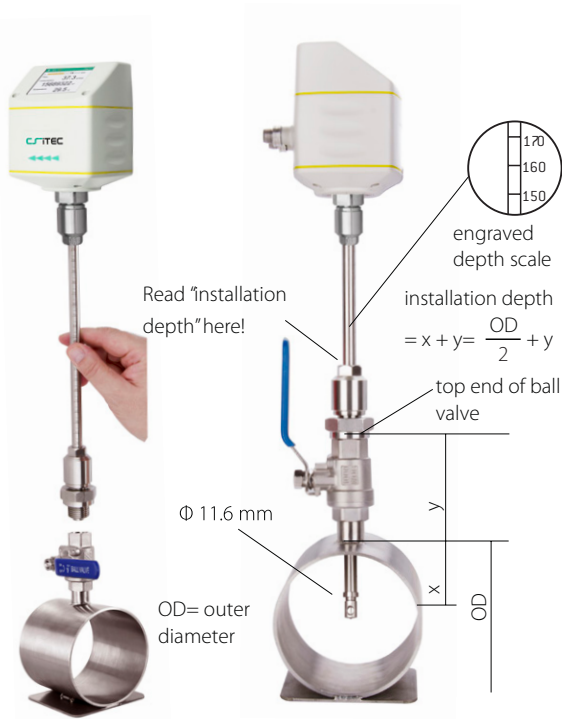
Pipe nominal size inch / (DN)	L total length (mm)	L1 total length (mm)	H total height (mm)	H1 from pipecenter to casing top (mm)	R External Thread
1¼" (DN32)	475	275	207.9	186.7	R1¼"
1½" (DN40)	475	275	210.9	186.7	R1½"
2" (DN50)	475	275	216.9	186.7	R2"

S 421 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)
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

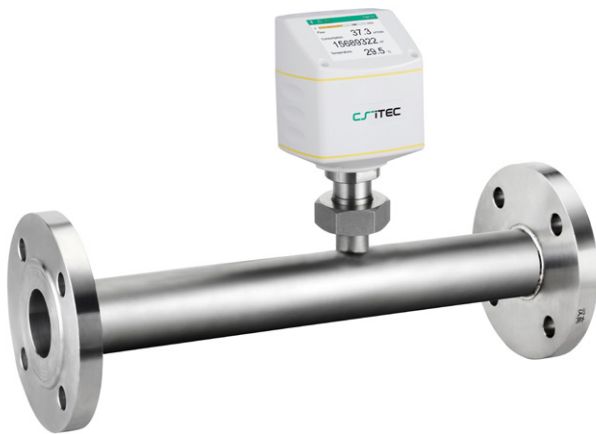
Installation



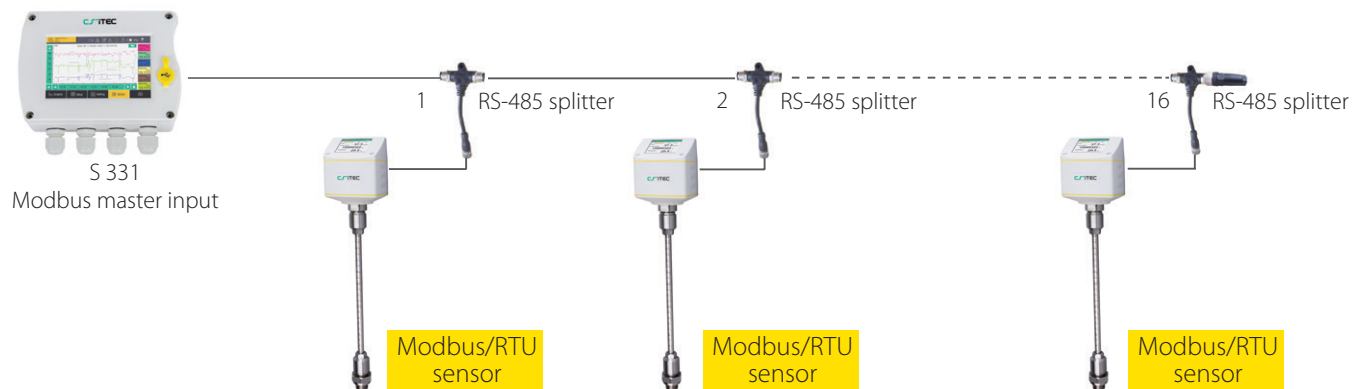
Removal of sensor unit S 421



Sensor configuration through wireless BlueTooth connection



Modbus connection of several sensors to a display unit



Order form

S 401/ S 421	Process connection	Gas 1	Gas 2	Range	Calibration	Fieldbus	Display	Description
S695 4100								S 401, flow sensor, insertion type, 220 mm shaft
S695 4101								S 401, flow sensor, insertion type, 300 mm shaft
S695 4102								S 401, flow sensor, insertion type, 400 mm shaft
S695 4120								S 421, flow sensor, in line type
	A							G ½"
A1006	B							PT ½" adaptor, S 401
A1005	C							NPT ½" adaptor, S 401
A1304	D							DN32, R thread (ISO 7-1)
A1305	E							DN40, R thread (ISO 7-1)
A1306	F							DN50, R thread (ISO 7-1)
A1324	G							DN32, Flange EN 1092-1, PN40
A1325	H							DN40, Flange EN 1092-1, PN40
A1326	I							DN50, Flange EN 1092-1, PN40
A1327	J							DN65, Flange EN 1092-1, PN40
A1328	K							DN80, Flange EN 1092-1, PN40
A1344	L							DN32, Flange ANSI 16.5
A1345	M							DN40, Flange ANSI 16.5
A1346	N							DN50, Flange ANSI 16.5
A1347	O							DN65, Flange ANSI 16.5
A1348	P							DN80, Flange ANSI 16.5
		A	Z					Medium Air / no 2nd gas
A1008		B	B					Medium CO ₂
A1009		C	C					Medium O ₂ (oil & grease free cleaned)
A1010		D	D					Medium N ₂
A1011		E	E					Medium N ₂ O
A1012		F	F					Medium Ar
A1013		G	G					Medium Natural gas (exact gas mix required)
A1014		H	H					Medium H ₂ (real gas calibration)
A1015		I	I					Others (please specify the gas or gas mix)
A1016		J	J					Medium He (real gas calibration)
A1017		K	K					Medium Propane C ₃ H ₈
				A				Standard range
A1401				B				Max range
A1402				C				High speed
A1403				D				Low range calibration (1/3 of standard range)
A1404				E				High accuracy calibration (1% ± 0.3%FS)
					A			Standard calibration
A1405					C			Bi-directional calibration
A1410						A		4 ... 20 mA + pulse
A1411						B		MODBUS
							A	Without display
A1420							B	With display

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