COMPRESSED AIR TECHNOLOGY

S 450/452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR

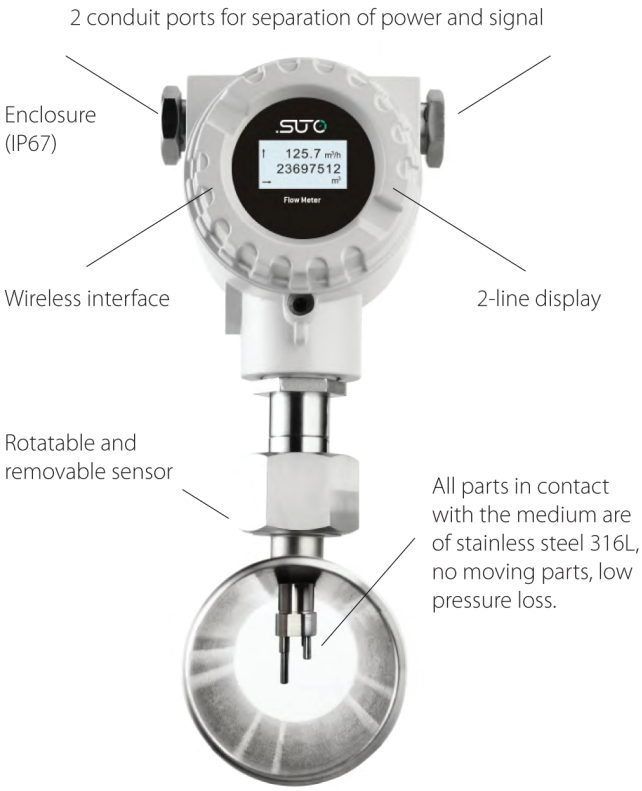
Features

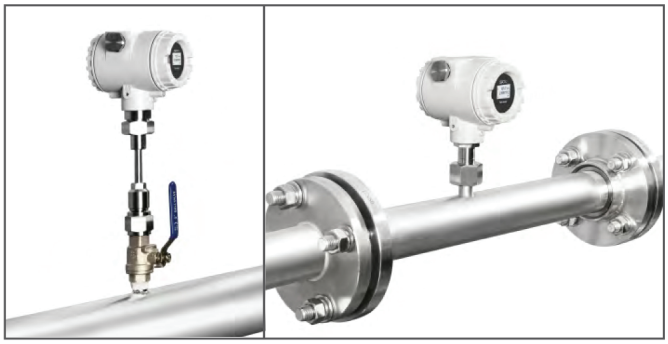
- Direct measurement of mass flow and standard flow without the need of pressure compensation
- Wide range of tube sizes are supported with insertion type for big pipe diameters and in line types for small pipe diameters
- No moving parts, non clogging
- All parts which come into contact with the measurement medium are made of stainless steel 316L
- Robust metal enclosure suitable for out-door applications in harsh environment
- Wireless interface for sensor settings on site
- Display showing flow rates, consumption, medium temperature and diagnostic results
- 2 analogue outputs (4-20 mA) and 1 pulse output
- Available options:
  - Fieldbus interface: HART, Modbus
  - Hazardous approval ATEX: II 2 G Ex d IIC T4
    IECEx approval
    GB Ex approval
  - Bi-directional measurement
  - Flow conditioning

The SUTO flow sensor S 450 is based on the thermal mass flow principle. It measures volumetric standard flow over a wide measuring range. The result is pressure and temperature independent.

The S 450 is designed specifically for harsh environments. The IP67 casing allows all-weather applications. All parts which come into contact with the measurement medium are made of stainless steel 316L. This allows applications in pharmaceutical and food industry, but also the measurement of corrosive and contaminated gas. Installations in explosive environments can be done through the optional ATEX approval. Various gases can be measured such as air, oxygen, argon, carbon dioxyde, natural gas, hydrogen, methane, etc.. Basically any gas mixture can be measured as long the mixing ratio and its components are known and constant.

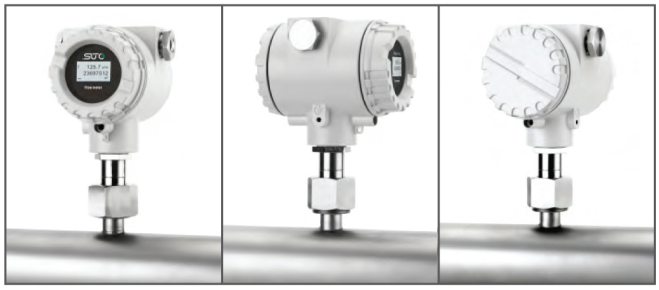
S 450/452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR



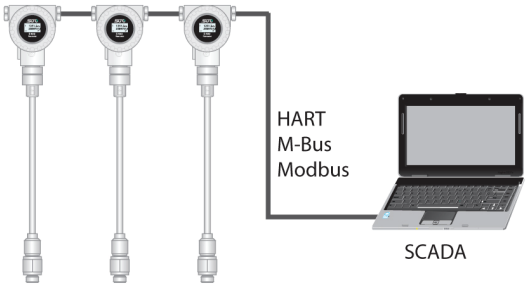


Insertion type installation through ball valve

In line type installation through flanges or R thread



Sensor head can be rotated in 90° steps through the screw nut



Industrial communication through Modbus, M-Bus, HART

Volumetric flow ranges S 450/452

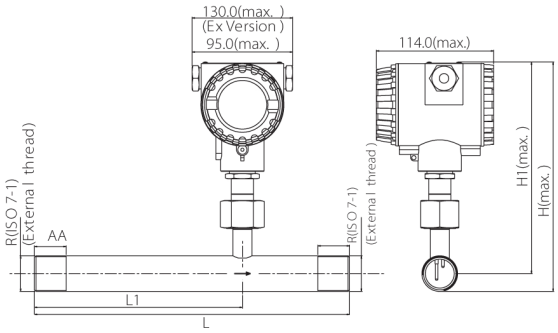
Inch	DN	S-Range (m3/h)	M-Range (m3/h)	HS-Range (m3/h)
½″	DN15	0.2 ... 45.6	0.4 ... 91.0	0.48 ... 110.16
¾″	DN20	0.4 ... 89.1	0.9 ... 177.8	1.09 ... 215.3
1″	DN25	0.6 ... 147.7	1.2 ... 294.7	1.82 ... 356.85
1½″	DN40	1.5 ... 366.7	2.9 ... 731.9	4.36 ... 886.18
2″	DN50	2.4 ... 600	4.8 ... 1198	7.26 ... 1450.04
2½″	DN65	4.1 ... 1027	8.2 ... 2049	12.1 ... 2480.44
3″	DN80	5.7 ... 1424	11.4 ... 2841	16.94 ... 3441.91
4″	DN100	8.7 ... 2183	17.4 ... 4357	24.2 ... 5275.71
5″	DN125	20 ... 3419.6	38 ... 6824.4	45.9 ... 8263.09
6″	DN150	20 ... 4930	39 ... 9839	70.18 ... 11913.10
8″	DN200	35 ... 8786	70 ... 17533	106.48 ... 21229.51
10″	DN250	55 ... 13744	110 ... 27429	165.77 ... 33210.69
12″	DN300	79 ... 19815	158 ... 39544	239.58 ... 47880.39

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

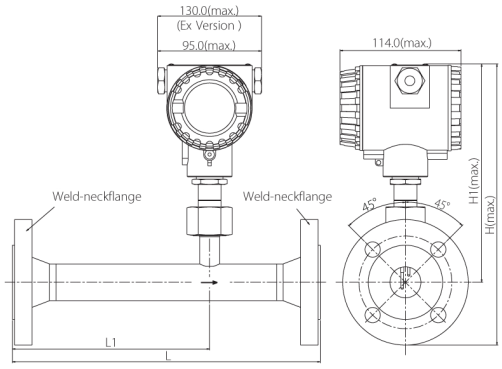
At other standard conditions and in other gases flow ranges are different and data are available on request.
In larger pipe diameters flow can also be measured.

S 450/452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR

S 452



Pipe nominal size inch / (DN)	L total length (mm)	L1 inlet length (mm)	H total height (mm)	H1 from pipe center to casing top (mm)	R External Thread	A Thread Length (mm)
1/2" (DN15)	300	210	210.8	200.15	R1/2"	20
3/4" (DN20)	475	275	213.6	200.15	R3/4"	20
1" (DN25)	475	275	217.0	200.15	R1"	25
1¼" (DN32)	475	275	221.35	200.15	R1¼"	25
1½" (DN40)	475	275	224.3	200.15	R1½"	25
2" (DN50)	475	275	230.3	200.15	R2"	30

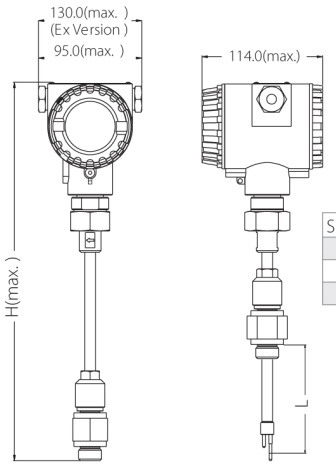


Pipe nominal size inch/(DN)	L total length (mm)	L1 inlet length (mm)	H total height (mm)	H1 from pipe center to casing top (mm)
1/2" (DN15)	300	210	247.65	200.15
3/4" (DN20)	475	275	252.65	200.15
1" (DN25)	475	275	257.65	200.15
1¼" (DN32)	475	275	270.15	200.15
1½" (DN40)	475	275	275.15	200.15
2" (DN50)	475	275	282.65	200.15
2½" (DN65)	475	275	300.55	208.05
3" (DN80)	475	275	314.45	214.45

Technical data S 450/452

Measuring range:	0.4 ... 92.7 sm/s (standard range calibration) 0.8 ... 185 sm/s (max range calibration) (refer to table for flow measurement ranges in different tube diameters) * sm/s: standard meter per second
Accuracy:	±(1.5% of reading + 0.3% full scale)
Stated accuracy at:	Ambient/process temperature 23°C ±3°C Ambient/process humidity <90%, no condensation Process pressure at 0.6 MPa
Repeatability:	0.25% of reading
Response time t95:	< 5 seconds
Sampling rate:	Display and outputs are refreshed every 200 msec
Tube diameter:	Insertion type: DN25 ... DN1500 In line type: DN15 ... DN80
Process connection:	Insertion type: ½" G type thread (ISO 228-1) In line type: R thread (ISO 7-1), Flange EN 1092-1, ANSI / B16.5, JIS B2220
Measuring medium:	Any gases where the components and the mixing ration are constant and known. See order information for a list of standard gases.
Operating temperature:	-40° ... +150°C (medium temp. insertion type) -40° ... +100°C (medium temp. in line type) -40° ... +65°C (ambient temperature)
Operating pressure:	S 450: 0 ... 4.0 MPa (>1.6 MPa need installation device) S 452: 0 ... 1.6 MPa (Optional: 4.0 MPa)
Analogue output:	2 x 4 ... 20 mA, up to 400 R load, active/ passive selectable, measurement channel selectable, scaling programmable
Pulse/Alarm output:	Either alarm or pulse output. 1 pulse per 1, 10 or 100 consumption units, Alarm programmable
Power supply:	16-30 VDC, 5 W
Enclosure:	IP67
Sensor material:	Stainless steel 1.4404 (SUS 316L)
Approvals:	CE, RoHS ATEX: II 2 G Ex d IIC T4 / GB3836 / IECEx(Optional)
Fieldbus: (Optional)	Modbus RTU HART

S 450



Shaft option	L(mm)	H(mm)
A	220	469
B	160	409
C	300	549

Order form

* R thread only up to DN 50

S 450/ S 452	Shaft/ line size	Process connection	Gas medium	Calibration	Hazardous area approval	Output	Display	Description		
S695 0450								S 450, flow sensor insertion type		
S695 0452								S 452, flow sensor, inline type		
								S695 0450	S695 0452	
	A							A1200 220mm	DN15	*Standard*
	B							A1201 160mm	DN20	
	C							A1202 300mm	DN25	
	D								DN32	
	E								DN40	
	F								DN50	
	G								DN65	
	H								DN80	
		A						G ½"	R thread (ISO 7-1)*	*Standard*
		B						PT ½" adaptor	EN-1092-1, PN40	
		C						NPT ½" adaptor	Flange ANSI 16.5	
		D							Flange JIS B2220	
A1007			A					Medium Air		*Standard*
A1008			B					Medium CO_2		
A1009			C					Medium O_2 (oil & grease free cleaned)		
A1010			D					Medium N_2		
A1011			E					Medium N_2O		
A1012			F					Medium Ar		
A1013			G					Medium Natural gas (exact gas mix required)		
A1014			H					Medium H_2 (real gas calibration)		
A1015			I					Others (please specify the gas or gas mix)		
A1016			J					Medium He (real gas calibration)		
A1017			K					Medium Propane C_3H_8		
				A				Standard range calibration		*Standard*
A1271				B				Max range calibration		
A1272				C				Bi-directional standard range calibration (S 450 only)		
A1273				D				Bi-directional max. range calibration (S 450 only)		
A1274				E				High speed calibration		
A1279					A			None		*Standard*
A1280					B			ATEX / GB3836 / IECEx		
A1284						A		2 x 4 ... 20 mA + pulse		
A1285						B		1 x 4 ... 20 mA + HART + pulse		
A1286						C		1 x 4 ... 20 mA + Modbus + pulse		
A1294							A	Without display		*Standard*
A1295							B	With display		

Order No.	Description
R200 0005	Oil & grease free cleaned option for flow sensors (for Oxygen it is already included in A 1009)
R200 0020	Real gas calibration in selected gas to ensure best accuracy
A553 0121	Sensor cable, 6 pole, AWG22, 7.5 mm outer diameter, w/shielding, black (per meter)
A553 0123	RS-485 cable, 2 pole, AWG (per meter)