

## S450 / S452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR



## Monitor your flow — optimize process efficiency



### S450/S452 FEATURES



**INDUSTRIAL DESIGN**  
For outdoor applications



**WIRELESS INTERFACE TO SENSOR SETTINGS**



**ATEX, IECEx AND GB EX APPROVAL**



**EASY TO CLEAN**  
All wetted parts stainless steel

### S450/S452 FEATURES AT A GLANCE

- 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 inline 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 outdoor 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  
GB Ex
  - Bi-directional measurement
  - Flow conditioner for R-thread measuring sections

### S450/S452 OPERATION PRINCIPLE

The SUTO flow sensor S450 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 S450 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 dioxide, natural gas, hydrogen, methane, etc.. Basically any gas mixture can be measured as long the mixing ratio and its components are known and constant.

# S450 / S452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR

## s450 /s452 TECHNICAL DATA

General Specifications	
Measuring range:	0.4 ... 92.7 sm/s (standard range calibration) 0.8 ... 185 sm/s (max range calibration) 1.0 ... 224 sm/s (high speed 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: DN15 ... DN1500 Inline type: DN15 ... DN80
Process connection:	Insertion type: ½" G type thread (ISO 228-1) Inline 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. inline type) -40 ... +65°C (ambient temperature)
Operating pressure:	S450: 0... 1.6 MPa / S452: 0... 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



Insertion type installation through ball valve



Inline type installation through flanges or R thread



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



# S450 / S452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR

## S450 / S452 VOLUMETRIC FLOW RANGES

Inch	DN	S-Range (m <sup>3</sup> /h)	M-Range (m <sup>3</sup> /h)	HS-Range (m <sup>3</sup> /h)
1/2"	DN15	0.2 ... 45.6	0.4 ... 91.0	0.48 ... 110.16
3/4"	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
1 1/2"	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
2 1/2"	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

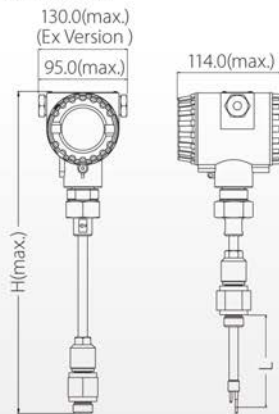
### Stated measuring ranges under following conditions:

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

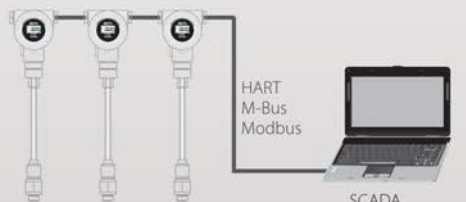
At other standard conditions and in other gases flow ranges are different and data are available on request.

In larger pipe diameters flow can also be measured.

## S450 DIMENSIONS

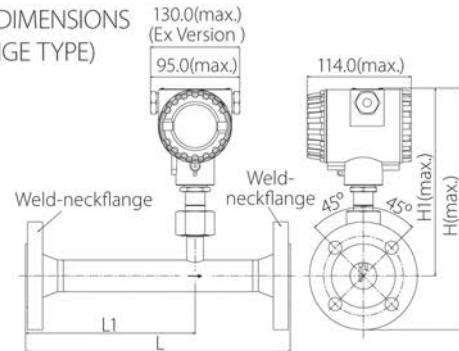


Shaft option	L (mm)	H (mm)
A	220	469
B	160	409
C	300	549



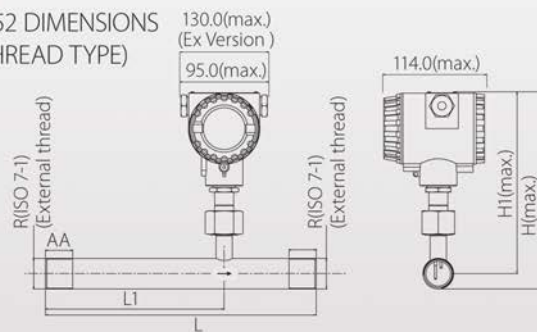
Industrial communication through Modbus, M-Bus, HART

## S452 DIMENSIONS (FLANGE TYPE)



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
1 1/4" (DN32)	475	275	270.15	200.15
1 1/2" (DN40)	475	275	275.15	200.15
2" (DN50)	475	275	282.65	200.15
2 1/2" (DN65)	475	275	300.55	208.05
3" (DN80)	475	275	314.45	214.45

## S452 DIMENSIONS (THREAD TYPE)



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
1/2" (DN15)	300	210	210.8	200.15	R1/2"
3/4" (DN20)	475	275	213.6	200.15	R3/4"
1" (DN25)	475	275	217.0	200.15	R1"
1 1/4" (DN32)	475	275	221.35	200.15	R1 1/4"
1 1/2" (DN40)	475	275	224.3	200.15	R1 1/2"
2" (DN50)	475	275	230.3	200.15	R2"

# S450 / S452 HEAVY DUTY INDUSTRY FLOW / CONSUMPTION SENSOR

## S450 / S452 ORDERING

Please use the following tables to assist in placing your order with our sales staff.

S450 Flow sensor (Insertion type)		
Order No.	Code	Description
S695 0450	S0450	S450, flow sensor insertion type
<b>Shaft length</b>		
A1200	A	220 mm <b>Standard</b>
A1201	B	160 mm
A1202	C	300 mm
<b>Process connection</b>		
	A	G1/2" <b>Standard</b>
A1006	B	PT 1/2" Adapter
A1005	C	NPT 1/2" Adapter
<b>Gas type</b>		
A1007	A	Air
A1008	B	CO <sub>2</sub>
A1009	C	O <sub>2</sub> (Oil- & grease-free cleaned)
A1010	D	N <sub>2</sub>
A1011	E	N <sub>2</sub> O
A1012	F	Argon
A1013	G	Natural Gas
A1014	H	H <sub>2</sub> (real gas calibration)
A1015	I	Other gas (please specify)
A1016	J	He (real gas calibration)
A1017	K	C <sub>3</sub> H <sub>8</sub>
A1041	L	O <sub>2</sub> , Ar, CO <sub>2</sub> (real gas calibration)
<b>Calibration</b>		
	A	Standard calibration
A1271	B	Max range calibration
A1272	C	Bi-directional standard range calibration
A1273	D	Bi-directional max. range calibration
A1274	E	High speed calibration
<b>Hazardous area approval</b>		
A1279	A	None
A1280	B	ATEX / GB3836 / IECEx
<b>Output</b>		
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
<b>Display</b>		
A1294	A	Without display
A1295	B	With display

**Attention:**

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

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

S452 Flow sensor (In-line type)		
Order No.	Code	Description
S695 0452	S0452	S452, flow sensor, inline type
<b>Measuring section size</b>		
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")
<b>Process connection</b>		
A130X	A	R-thread (IOS-7-1)
A132X	B	Flange EN 1092-1, PN40
A134X	C	Flange ANSI 16.5
<b>Gas type</b>		
A1007	A	Air
A1008	B	CO <sub>2</sub>
A1009	C	O <sub>2</sub> (Oil- & grease-free cleaned)
A1010	D	N <sub>2</sub>
A1011	E	N <sub>2</sub> O
A1012	F	Argon
A1013	G	Natural Gas
A1014	H	H <sub>2</sub> (real gas calibration)
A1015	I	Other gas (please specify)
A1016	J	He (real gas calibration)
A1017	K	C <sub>3</sub> H <sub>8</sub>
A1041	L	O <sub>2</sub> , Ar, CO <sub>2</sub> (real gas calibration)
<b>Calibration</b>		
	A	Standard calibration
A1271	B	Max range calibration
A1274	E	High speed calibration
<b>Hazardous area approval</b>		
	A	None <b>Standard</b>
A1280	B	ATEX / GB3836 / IECEx
<b>Output</b>		
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
<b>Display</b>		
	A	Without display <b>Standard</b>