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Product Guide 2023/24

Next Level of Compressed Air, Gas and Liquid Monitoring

German Quality

Be smart. **Measure it.**

Advanced Measurement Solutions

Compressed Air and Gas Monitoring - get your system under control

The use of compressed air and technical gases in modern production processes has become indispensable. Compressed air is used to drive actuators, machines and to control other automated processes. Technical gases and air are used to conserve food or are even becoming part of the product, like in the beverage production.

This leads to two crucial aspects:

1 Energy Consumption

Air compressors typically convert ~80 ... 90 % of the electrical energy into heat and only 10 ... 20 % into compressed air. This makes compressed air 5 to 10 times more expensive than electricity. Measuring and Monitoring compressors, the consumptions, pressure and flow rates becomes major part in a world with limited energy resources.

2 Purity and Quality

Having air and gases becoming a part of your product and process means, that we need to have a control system in place, insuring that filtration systems are working as they should, 24 hours a day, 7 days a week. Only by regular measurements or by using monitoring solutions this can be achieved.

Why monitor compressed air and gases?

- System Performance and Reliability
- Energy Efficiency and Cost Reduction
- Product Quality and Safety
- ISO Purity Requirements

Be smart.
Measure it.

SUTO is a leader and trusted global partner

for reliable measurement and monitoring solutions for compressed air and gas systems.

Our wide range of products play a vital role in system processes of leading companies around the world.

Since our foundation in 2005, we offer our customers outstanding service and solutions and continue to innovate dependable measurement technology.

Flow Meters
Liquids & Steam

Air Quality
& Purity

Displays
Data Logger
IoT

Energy Meter
Pressure Sensors

WHY SUTO

Years of Experience

We look back on many years of experience working in the compressed air and gas market. We are a trusted global partner by delivering value-creating solutions.

Design Driven

Many customers require unique and custom-designed solutions. We adapt to full-scale, personalized systems, ensuring the best possible solution.

Product Knowledge

We provide a wide portfolio of compressed air and gas devices and solutions which can be seamlessly integrated into your systems and processes without causing downtimes.

Powered by Innovation

We are pioneers in compressed air measurement by rethinking traditional methods and reaching new levels of time-efficient measurement, while constantly improving our portfolio.

Contents

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)

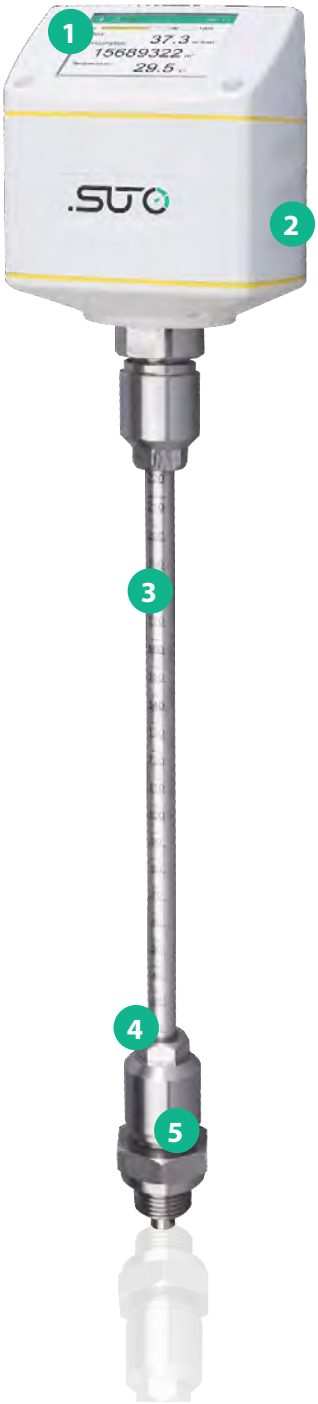
2 Various Outputs

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.



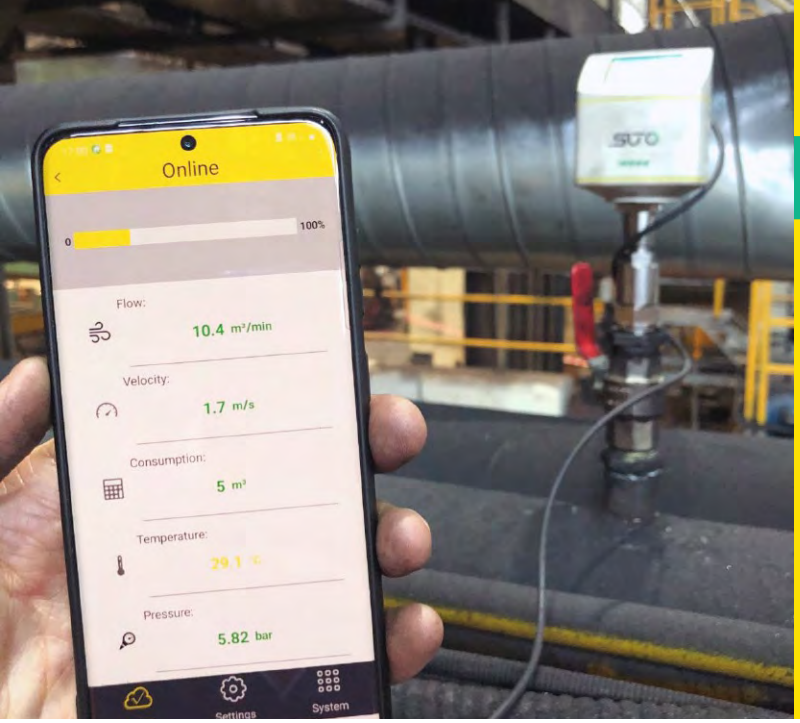
4 Flexible and Easy Installation

- 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.



Wireless 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.

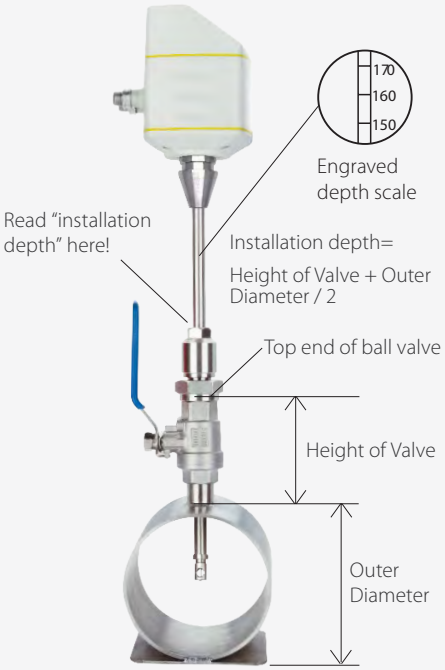
Every sensor is protected by default, to perform changes on the flow meter, first a QR code must be scanned.

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

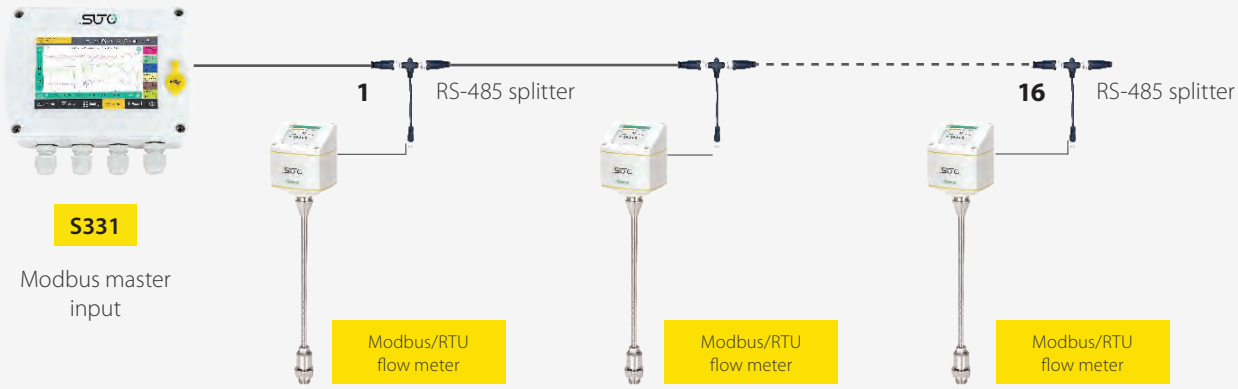


S421

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

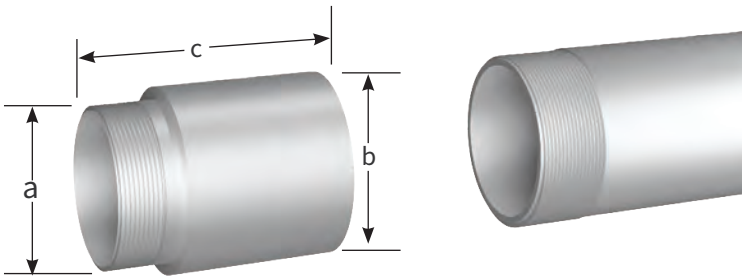
Connect several Flow Meters to Modbus Master



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

Optional Flow Conditioner

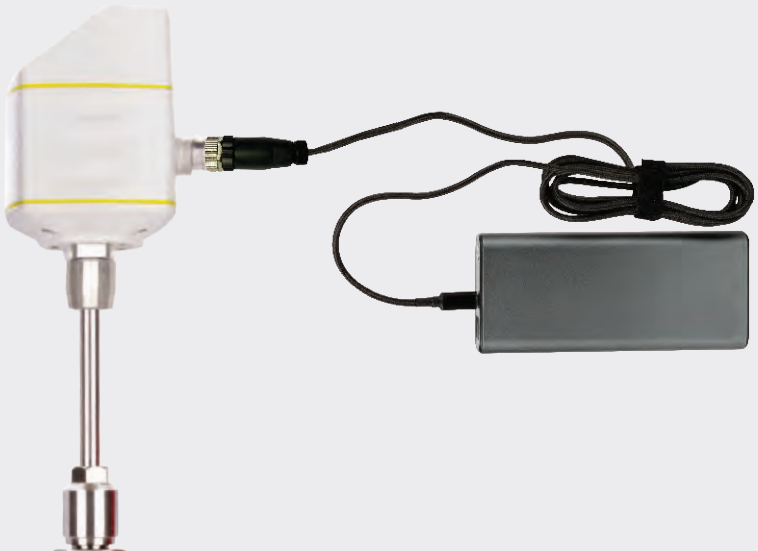
Optional flow conditioner eliminates the straight pipe inlet requirement



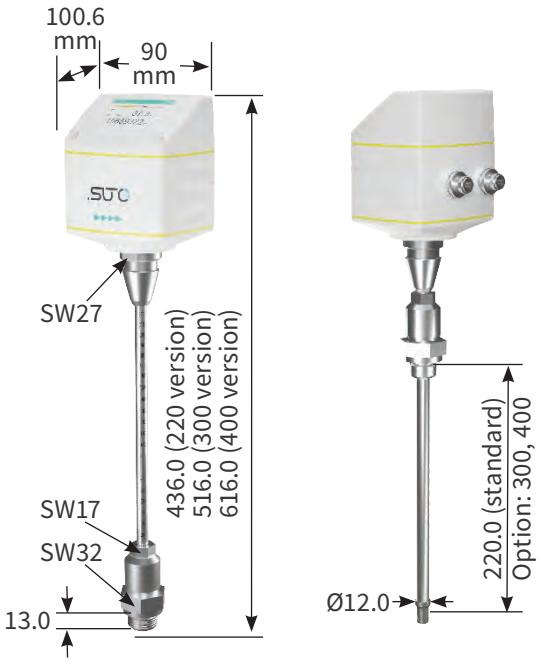
Order No.	Dimen-sions	a	b in mm	c in mm
A1071	DN15	R 1/2″	24	64
A1072	DN20	R 3/4″	32	69
A1073	DN25	R 1″	37	75
A1074	DN32	R 1.25″	45	92
A1075	DN40	R 1.5″	54	92
A1076	DN50	R 2″	68	105
A1077	DN65	R 2.5″	80	128
A1078	DN80	R 3″	95	142

Mobile Power

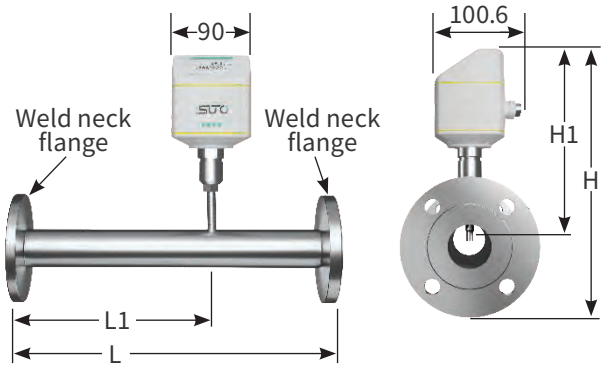
S401 / S421 powered by power bank with connection cable A553 0154.
Note: power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]



S401 Dimensions

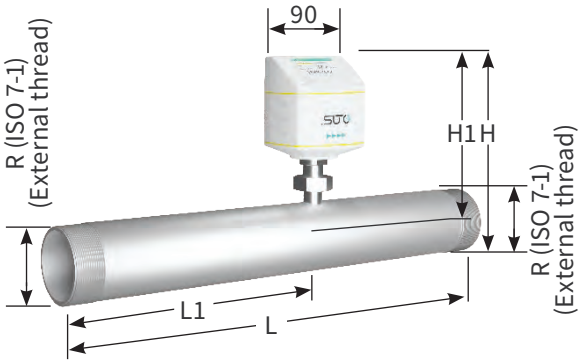


S421 Dimensions (Flange Type)



Pipe nominal size inch / (DN)	**L** total length (mm)	**L1** total length (mm)	**H** total height (mm)	**H1** from pipecenter to casing top (mm)
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 nominal size inch / (DN)	**L** total length (mm)	**L1** total length (mm)	**H** total height (mm)	**H1** from pipe center to casing top (mm)	**R** External Thread
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
Measuring range	see table below
Repeatability	0.25 % of reading
Sensor	Thermal mass flow sensor
Sampling rate	10 samples / sec
Turndown ratio	1:100
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

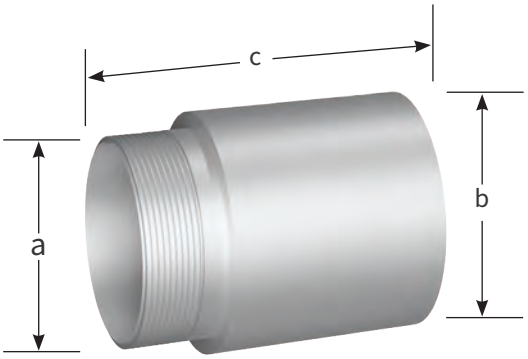
Analog output	
Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	Value updated ever 1 sec
Pulse output	
Signal	Switch output, normally open, max. 30 VDC, 20 mA
Scaling	1 pulse per consumption unit (selectable)
Fieldbus	
Protocol	Modbus/RTU, 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 2 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, N2, O2, CO2 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"

Optional Flow Conditioner

No more straight inlet requirements



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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

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)	
Range	
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	
A1405	S401: Bi-directional calibration
A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)
Output	
A1410	S401/S421: Isolated 4 ... 20 mA + pulse output
A1411	S401/S421: Modbus/RTU output
A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
A1424	S401/S421: Modbus/TCP output with PoE support
Display	
A1420	S401/S421: Colorgraphic display, 2.4" with keypad
Accessories	
A695 0008	S401: NPT½" thread adapter (former A1005)
A695 0008	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 second gas, max range, standard calibration, isolated 4 ... 20 mA and pulse output, display
Order Code:	S695 4100.A1007.A1401.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)
A130X	Flange, EN 1092-1, PN40
A130X	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)	
Range	
A1403	S401/S421: Low range version (1/3 of standard range)
A1407	S401/S421: Vacuum / Atmospheric range (1/3 of standard range)
Calibration	
A1404	S401/S421: High accuracy calibration (1 % ± 0.3 % F.S.)
Output	
A1410	S401/S421: Isolated 4 ... 20 mA + pulse output
A1411	S401/S421: Modbus/RTU output
A1413	S401/S421: 4 ... 20 mA + pulse output (pin compatible to S400 / 420)
A1424	S401/S421: Modbus/TCP output with PoE support
Display	
A1420	S401/S421: Color graphic display, 2.4" with keypad
Flow conditioner (optional)	
A107X	R-thread flow conditioner (replace X with measuring section size from table above)
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

Example:	S421, 1.6 MPa, R-thread, DN50, CO2, N2, high accuracy calibration, Modbus/RTU output, display, flow conditioner
Order Code:	S695 4120.A1305.A1008.A1010.A1404.A1411.A1420.A1075

Be smart. **Measure it.**

S415

Compact Thermal Mass Flow Meter

Eco-Inline

COMPACT DESIGN
Can be installed anywhere

SMARTPHONE ANDROID APP
For remote configuration

POINT-OF-USE MEASUREMENT
Monitor machines and air consumers

TOTAL FLOW
No bypass measurement

ACCURATE RESULTS
Integrated flow conditioner

INTEGRATED DISPLAY
For on site values

Benefits

- Compact flow meter for installation directly at the point-of use
- Various process connection sizes available: DN8, DN15, DN20, DN25 and DN32 (G-inner-thread)
- Economic flow and consumption metering at low investments
- Machine operation costs and consumption monitoring
- Integrated flow conditioner eliminates the need of straight inlet sections

Cost-efficient Eco Version – Flexible Installation

The S415 Thermal Mass Flow Meters offers compressed air flow and consumption measurement directly at the point of use with seamless integration.

These highly economical units will help you improve compressed air system efficiency, while helping reduce compressed air usage and operating costs.

The S415 come standard with wireless communication interface to help the user quickly and easily check the flow meter readings or adjust the settings via the SUTO flow meter app.

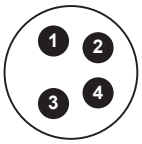
Point of Use Applications

The S415 is best suited to general process work where low cost and broad monitoring of the compressed air flow is required.

Easily monitor the compressed air flow and consumption of individual machines and processes to improve efficiency and reliability.

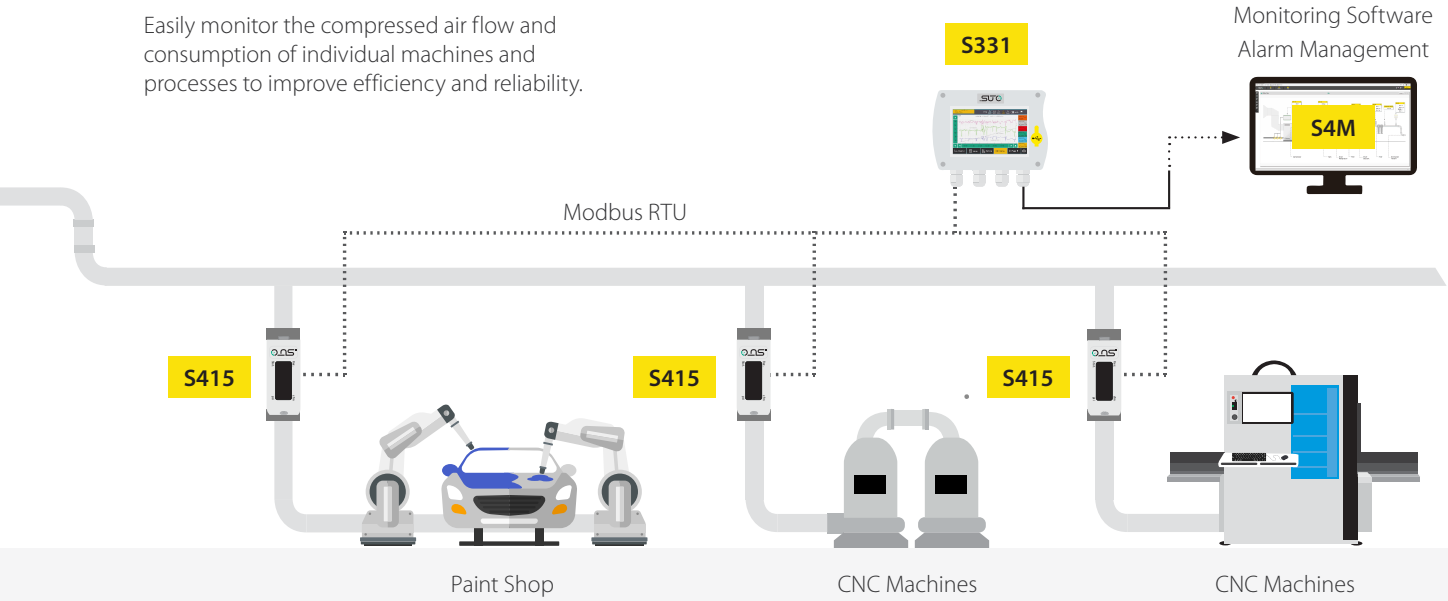
Various Output Signals

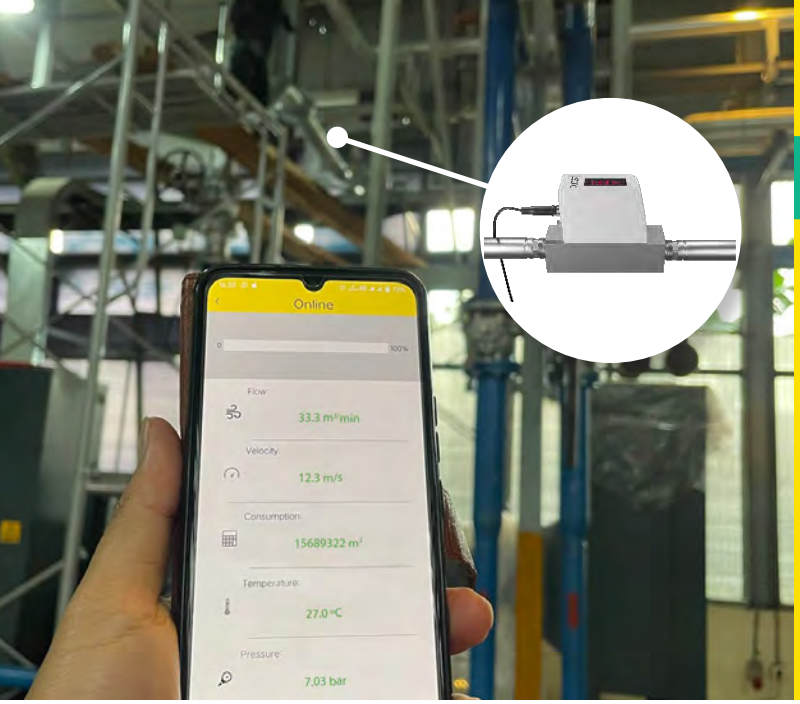
Output	Connector	Pin 1	Pin 2	Pin 3	Pin 4
Modbus/	A	D-	-VB	+VB	D+
RTU	B	D-	GND	NA	D+
Analog and Pulse	A	I-	-VB	+VB	I+
	B	I-	P	P	I+
M-Bus	A	M-bus	-VB	+VB	M-bus
	B	M-bus	NA	NA	M-bus
Wire colour		brown	white	blue	black



Pin assignment connector plug M8

- Every sensor includes 5m M8 cables with open ends
- Sensor with Modbus/RTU or M-Bus include 1 cable
- Sensors with Analog output include 2 cables





Wireless Connection

The free S4C-FS App offers a unique wireless connection to every SUTO flow meter for online readings and configuration.

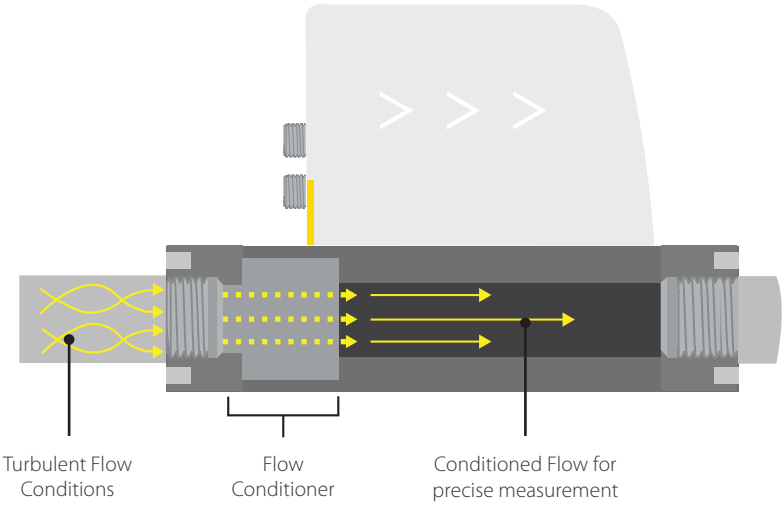
Especially during installation and setup all settings can be performed using a smartphone, there is no need to carry a PC and an interface on site. This saves a lot of time and is the easy way to get reliable sensor readings.

Every sensor is protected by default. To perform changes on the flow meter, first a QR code must be scanned.

Flow Conditioner

Asymmetric velocity profiles, swirl, and other factors caused by bends in pipes can lead quickly to inaccurate readings. But sometimes there is not enough space to have straight inlet conditions for accurate readings.

The highly engineered flow conditioner solves this problem. Unlike a standard flow conditions disk, the 3D design of the flow conditioner allows measurements with no additional straight inlet piping at all. Thanks to the innovative mechanical design, the pressure loss is negligible small (<30 hPa), offering high accurate measurements in difficult pipe conditions.



Connect several S415 to Modbus Master

The S415 with Modbus/ RTU interface can be easily daisy-chained to a Modbus Master device such as S331 by using RS-485 splitter (A554 3310) and the M8 to M12 converter cable (A553 0161). Through this method you can add up to 16 flow meters to the master device

Remark: The S331 can maximum provide 10 W power to the connected devices. If more power is required a separate power supply is needed..

Display Direction

Standard direction	Reverse direction	Standard direction
		
SI units	SI units	Imperial units

Measuring Range in Air (l/min)

Range	Standard Configuration				
Process connection	**DN8**	**DN15**	**DN20**	**DN25**	**DN32**
Standard range (S)	250	1000	2000	3500	6000
Low range (L)	50	200	400	700	1200

Stated measuring ranges for S415 under following conditions:

- Standard flow in air in l/min
- Reference pressure: 1000 mbar
- Reference Temperature: +20 °C

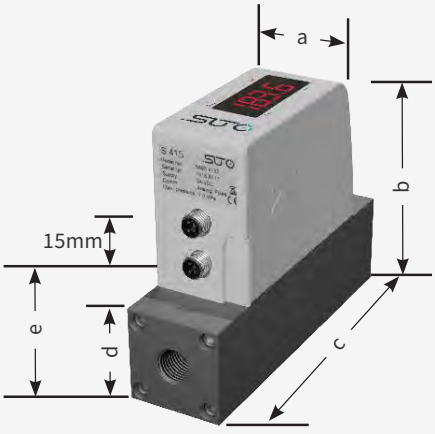
Measuring ranges in Nitrogen are different. Please contact us for details at sales@suto-itec.com

DN8,DN15

DN20,DN25,DN32

Dimensions

Dimensions in mm	a	b	c	d	e
DN8/DN15	35.0	93.0	120.4	35.0	48.0
DN20/DN25	48.0	106.0	178.0	48.0	61.0
DN32	60.0	118.0	222.0	60.0	73.0



Technical Data

Measurement

Flow	
Accuracy	3 % o.RDG ±0.3 % FS
Selectable units	l/min, cfm, kg/h, m3/h
Measuring range	see table below
Repeatability	1 % o.RDG
Sensor	Thermal mass flow sensor
Sampling rate	3/sec
Turndown ratio	50:1
Response time (t90)	2 sec
Consumption	
Selectable units	m^3, ft3, l, kg
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, isolated
Scaling	0 ... max flow
Load	250R
Update rate	3/sec
Pulse output	
Signal	Max 30 V, 200 mA
Scaling	1 pulse per consumption unit
Fieldbus	
Interface/Protocol	RS-485/Modbus/RTU M-Bus
Supply	
Voltage supply	15 ... 30 VDC
Current consumption	120 mA @ 24 VDC

General data

Configuration	
Wireless	S4C-FS App for mobile phones
Display	
Integrated	4 digit LED
Material	
Process connection	Aluminum alloy
Housing	PC + ABS
Sensor	Glass coated resistive sensor
Metal parts	Aluminum alloy
Miscellaneous	
Electrical connection	2 x M8 (4 pole)
Protection class	IP54
Approvals	CE, RoHS, FCC
Process connection	G-thread
Weight	0.45 ... 1.3 kg (depends on model)

Operating conditions

Medium	Air, N_2
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	0 ... 50 °C
Medium humidity	< 90 % rH, no condensation
Operating pressure	0 ... 10 bar(g)
Ambient temperature	0 ... 50 °C
Ambient humidity	< 95 % rH
Storage temperature	-30 ... 70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	DN8, DN15, DN20, DN25, DN32

Ordering

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

S415 Compact Thermal Mass Flow Meter (Inline)

Order No.	Description
S695 415	S415 Compact Thermal Mass Flow Meter, G inner thread, 24 VDC, 5 m cable with M8 connector and open ends included
Size	
S695 4150	DN8
S695 4151	DN15
S695 4152	DN20
S695 4153	DN25
S695 4154	DN32
Range	
A1453	Low range version
Output	
A1450	Analog 4 ... 20 mA, Pulse Output
A1451	Modbus/RTU output
A1452	M-Bus output
Gas type	
A1007	Air
A1010	N_2
Units	
A1458	With imperial units
Display direction	
A1460	Reverse display direction
Example:	S415 DN8, Modbus/RTU, Air, imperial units
Order Code:	S695 4150.A1451.A1007.A1458

S415 Accessories

Order No.	Description
A554 0109	Mains power supply 100-240 VAC / 24 VDC, 0.5 A, 2 m cable with M8 connector
A553 0137	Connection cable to S551, 5 m
A553 0161	M8 to M12 converter cable for Modbus splitter
A553 0171	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M8 connector
A554 3310	RS-485 / Modbus splitter

Mobile Power

S415 powered by power bank with connection cable A553 0171

Note: power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]

Be smart. **Measure it.**

S418

Compact Thermal Mass Flow Meter

Pro-Inline

SMARTPHONE ANDROID APP
For remote configuration

POINT-OF-USE MEASUREMENT
Monitor machines and air consumers

COMPACT DESIGN
Can be installed anywhere

TOTAL FLOW
No bypass measurement

EASY PROCESS MONITORING
Effective and inexpensive recording

ACCURATE RESULTS
Integrated flow conditioner

Benefits

- Highly versatile flow and consumption meter for compressed air and technical gases
- Integrated pressure sensor optional
- Integrated data logger for measurement recordings as standard feature
- Various process connection sizes available: DN8, DN15, DN20, DN25 and DN32 (G-inner-thread)
- Accurate monitoring of gas supplies and consumers
- Integrated flow conditioner eliminates the need of straight inlet sections

Powerful Pro Version – Flexible Installation

The S418 Thermal Mass Flow Meters offers compressed air flow and gas measurement directly at the point of use.

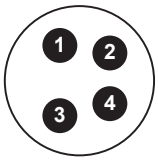
It comes standard with wireless communication interface to help the user quickly and easily check the flow meter readings or adjust the settings via the SUTO flow meter app.

Improve your compressed air system efficiency, while helping reduce compressed air and gas usage and operating costs by monitoring:

- Flow and Consumption
- Pressure
- Temperature

Connection

Pin assignment connector plug M8



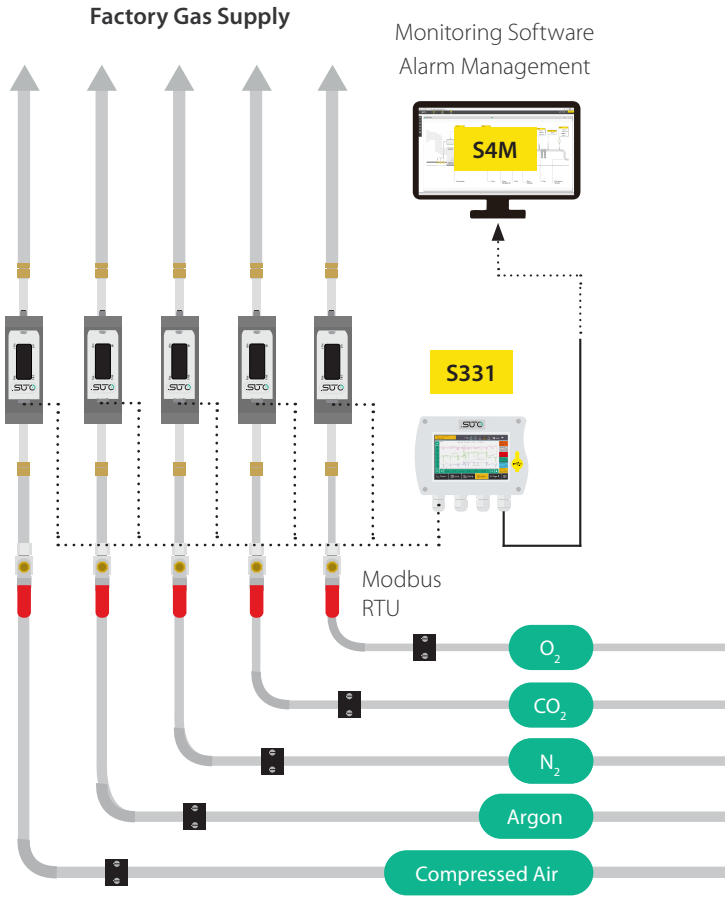
- Every sensor includes 5m M8 cables with open ends
- Sensor with Modbus/RTU or M-Bus include 1 cable
- Sensors with Analog output include 2 cables

Output	Connector	Pin 1	Pin 2	Pin 3	Pin 4
Modbus/ RTU	A	D-	-VB	+VB	D+
	B	D-	GND	NA	D+
Analog and Pulse	A	I-	-VB	+VB	I+
	B	I-	P	P	I+
M-Bus	A	M-bus	-VB	+VB	M-bus
	B	M-bus	NA	NA	M-bus
Wire colour		brown	white	blue	black

Gas Monitoring Application

The S418 is ideal for remote locations or high accuracy compressed air flow and gas measurements with its built-in data logger and optional pressure sensing.

The compact flow meters provide accurate gas flow monitoring, helping to discover weak points in the process flow, thus ensuring continuity and profitability.



Wireless Connection

The free S4C-FS App offers a unique wireless connection to every SUTO flow meter for online readings and configuration.

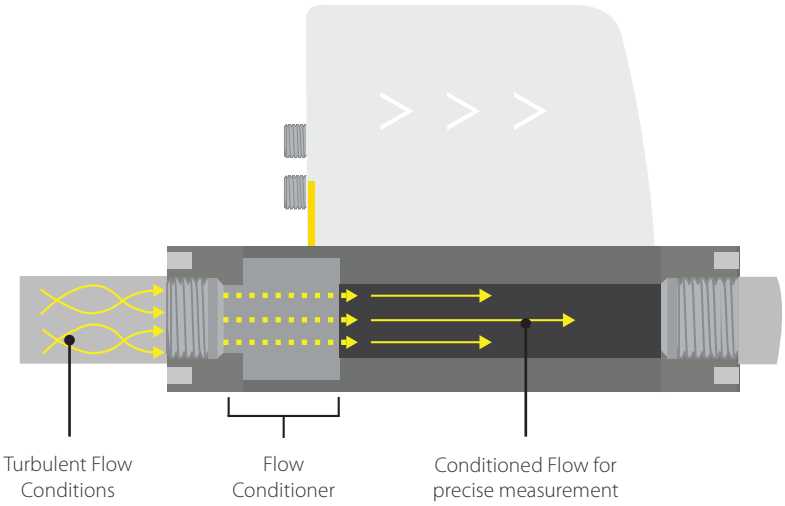
Especially during installation and setup all settings can be performed using a smartphone, there is no need to carry a PC and an interface on site. This saves a lot of time and is the easy way to get reliable sensor readings.

Every sensor is protected by default. To perform changes on the flow meter, first a QR code must be scanned.

Flow Conditioner

Asymmetric velocity profiles, swirl, and other factors caused by bends in pipes can lead quickly to inaccurate readings. But sometimes there is not enough space to have straight inlet conditions for accurate readings.

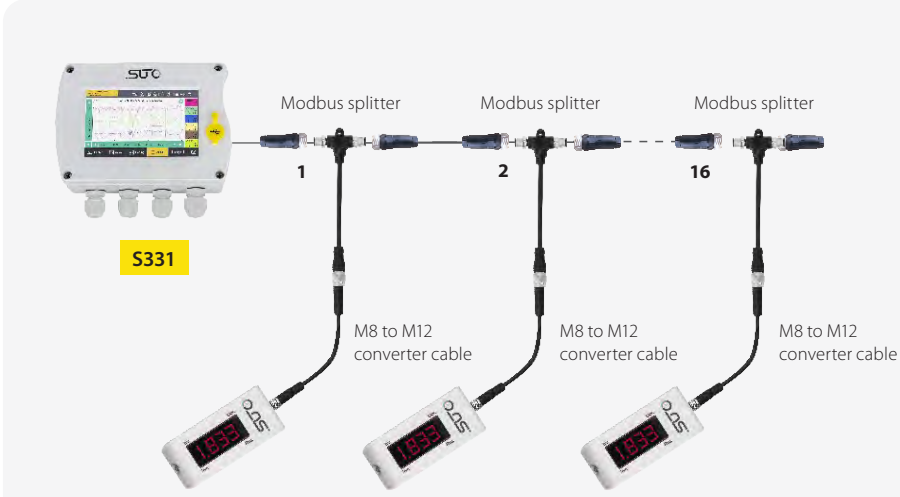
The highly engineered flow conditioner solves this problem. Unlike a standard flow conditions disk, the 3D design of the flow conditioner allows measurements with no additional straight inlet piping at all. Thanks to the innovative mechanical design, the pressure loss is negligible small (<30 hPa), offering high accurate measurements in difficult pipe conditions.



Connect several S418 to Modbus Master

The S418 with Modbus/ RTU interface can be easily daisy-chained to a Modbus Master device such as S331 by using RS-485 splitter (A554 3310) and the M8 to M12 converter cable (A553 0161). Through this method you can add up to 16 flow meters to the master.

Remark: The S331 can maximum provide 10 W power to the connected devices. If more power is required a separate power supply is needed..



Display Direction

Standard direction	Reverse direction	Standard direction
		
SI units	SI units	Imperial units

Measuring Range in Air (l/min)

Range	Standard Configuration				
Process connection	**DN8**	**DN15**	**DN20**	**DN25**	**DN32**
Standard range (S)	250	1000	2000	3500	6000
Low range (L)	50	200	400	700	1200

Stated measuring ranges for S418 under following conditions:

- Standard flow in air in l/min
- Reference pressure: 1000 mbar
- Reference Temperature: +20 °C

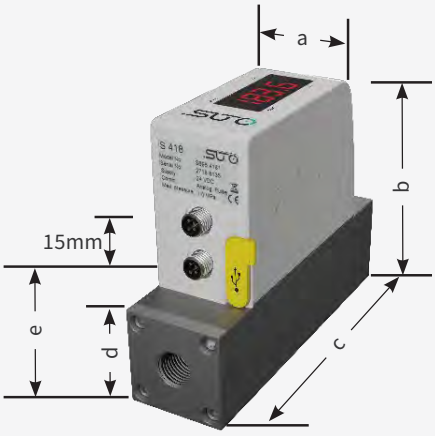
Measuring ranges in Nitrogen are different. Please contact us for details at sales@suto-itec.com

DN8,DN15

DN20,DN25,DN32

Dimensions

Dimensions in mm	a	b	c	d	e
DN8/DN15	35.0	93.0	120.4	35.0	48.0
DN20/DN25	48.0	106.0	178.0	48.0	61.0
DN32	60.0	118.0	222.0	60.0	73.0



Technical Data

Measurement

Flow	
Accuracy	1.5 % o.RDG ±0.3 % FS
Selectable units	l/min, cfm, kg/h, m3/h
Measuring range	see table on the previous page
Repeatability	0.5 % o.RDG
Sensor	Thermal mass flow sensor
Sampling rate	10/sec
Turndown ratio	100:1
Response time (t90)	0.5 sec
Consumption	
Selectable units	m^3, ft^3, l, kg
Pressure	
Accuracy	0.5 % FS
Selectable units	bar, psi
Measuring range	0 ... 10 bar(g)
Sensor	Piezo resistive sensor
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
Load	Max 250 Ω freely adjustable
Update rate	3/sec
Pulse output	
Signal	Switch output, normally open, max 30 VDC, 200 mA
Scaling	1 pulse per consumption unit
Fieldbus	
Protocol	Modbus/RTU
Supply	
Voltage supply	15 ... 30 VDC
Current consumption	120 mA @ 24 VDC
Data interface	
Connection	USB micro

General data

Configuration	
Wireless	S4C-FS App for mobile phones
PC Software	S4A PC software for download and data analyzes
Display	
Integrated	4 digit LED
Data Logger	
Storage	8 Mio. values
Material	
Process connection	Aluminum alloy
Housing	PC + ABS
Sensor	Ceramic, glass coated
Metal parts	Aluminum alloy
Miscellaneous	
Electrical connection	2 x M8 (4 pole)
Protection class	IP54
Approvals	CE, RoHS, FCC
Process connection	G-thread
Weight	0.45 ... 1.3 kg (depends on model)

Operating conditions

Medium	Air, N_2, O_2, CO_2 and other gases
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	0 ... 50 °C
Medium humidity	< 90 % rH, no condensation
Operating pressure	0 ... 10 bar(g)
Ambient temperature	0 ... 50 °C
Ambient humidity	< 95 % rH
Storage temperature	-30 ... 70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	DN8, DN15, DN20, DN25, DN32

Ordering

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

S418 Compact Thermal Mass Flow Meter (Pro-Inline)

Order No.	Description
S695 418	S418 Compact Thermal Mass Flow Meter with integrated data logger, G inner thread, 24 VDC, 5 m cable with M8 connector and open ends included
Size + Pressure sensor option	
S695 4180	DN8
S695 4181	DN15
S695 4182	DN20
S695 4183	DN25
S695 4184	DN32
S695 4185	DN8, Pressure sensor 10 bar(g)
S695 4186	DN15, Pressure sensor 10 bar(g)
S695 4187	DN20, Pressure sensor 10 bar(g)
S695 4188	DN25, Pressure sensor 10 bar(g)
S695 4189	DN32, Pressure sensor 10 bar(g)
Range	
A1453	Low range version
Output	
A1455	S418: Analog 4 ... 20 mA, Pulse output
A1456	S418: Modbus/RTU output
A1457	S418: M-Bus output
Fluid Medium 1	
A1007	Air
A1008	CO_2
A1009	O_2 (Oil- & grease-free cleaned)
A1010	N_2
A1011	N_2O
A1012	Argon
A1013	Natural Gas
A1014	H_2 (Real gas calibration)
A1015	Other Gas (Please specify)
A1016	He (Real gas calibration)
A1017	C_3H_8
Fluid Medium 2 (same selections as above)	
Units	
A1459	With imperial units
Display direction	
A1460	Reverse display direction

Example: S418 DN25, Modbus/RTU, CO_2, imperial units

Order Code: S695 4183.A1456.A1008.A1459

S418 Accessories

Order No.	Description
A554 0109	Mains power supply 100-240 VAC / 24 VDC, 0.5 A, 2 m cable with M8 connector
A553 0137	Connection cable to S551, 5 m
M599 7020	S4A data analysis software, for data logger S418
A553 0161	M8 to M12 converter cable for Modbus splitter
A553 0171	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M8 connector
A554 3310	RS-485 / Modbus splitter

Mobile Power

S418 powered by power bank with connection cable A553 0171

Note: power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]

Be smart. **Measure it.**

S418-V

Compact Thermal Mass Flow Meter for Vacuum Applications

Pro-Inline

SMARTPHONE ANDROID APP
For remote configuration

POINT-OF-USE MEASUREMENT
Monitoring of vacuum pumps

COMPACT DESIGN
Can be installed anywhere

TOTAL FLOW
No bypass measurement

EASY PROCESS MONITORING
Effective and inexpensive recording

ACCURATE RESULTS
Integrated flow conditioner

Benefits

- Highly economical point-of-use flow and consumption measurements at the low pressure side of vacuum pumps
- Integrated data logger for measurement recordings as standard feature
- Various process connection sizes available: DN8, DN15, DN20 and DN25 (G-inner-thread)
- Absolute pressure sensor integrated for actual vacuum flow measurements
- Integrated flow conditioner eliminates the need of straight inlet sections
- Optional integrated pressure sensor

Optimize Your Vacuum System Efficiency

The S418-V Compact Thermal Mass Flow Meter offers a simple but effective monitoring solution for vacuum applications at the point-of use.

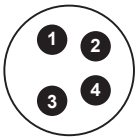
It comes standard with wireless communication interface to help the user quickly and easily check the flow meter readings or adjust the settings via the SUTO flow meter app.

Improve your vacuum system efficiency, while helping to reduce operating costs by monitoring:

- Flow and Consumption
- Pressure
- Temperature

Various Output Signals

Output	Connector	Pin 1	Pin 2	Pin 3	Pin 4
Modbus/ RTU	A	D-	-VB	+VB	D+
	B	D-	GND	NA	D+
Analog and Pulse	A	I-	-VB	+VB	I+
	B	I-	P	P	I+
M-Bus	A	M-bus	-VB	+VB	M-bus
	B	M-bus	NA	NA	M-bus
Wire colour		brown	white	blue	black

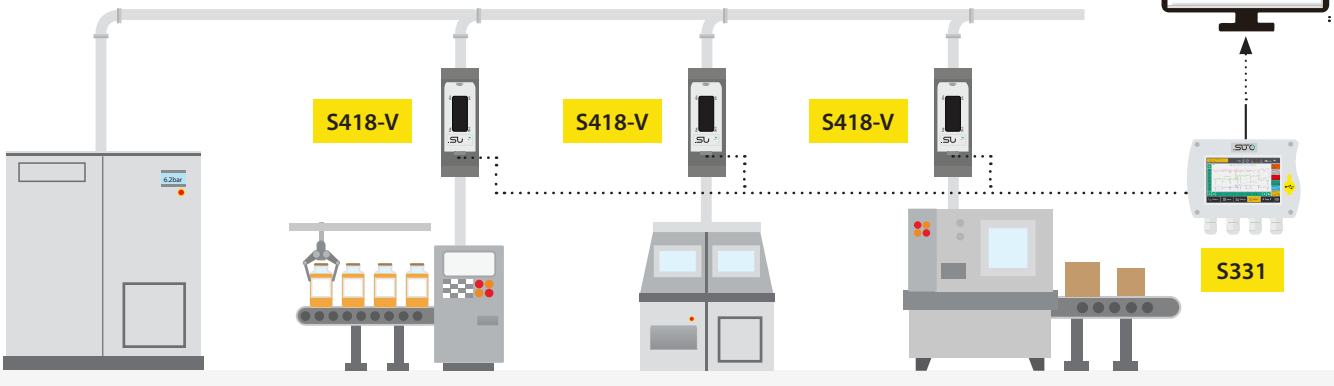


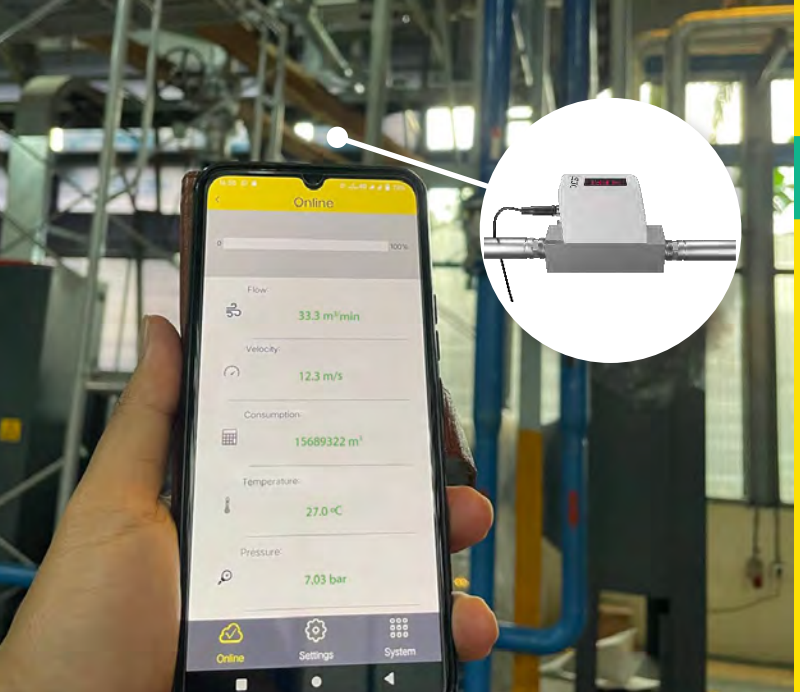
Pin assignment connector plug M8

- Every sensor includes 5m M8 cables with open ends
- Sensor with Modbus/RTU or M-Bus include 1 cable
- Sensors with Analog output include 2 cables

Vacuum Applications

S418-V is used for performance monitoring of vacuum pumps. Equipped with an absolute pressure sensor, it does not only show the vacuum pressure, but also shows the actual vacuum flow. These parameters are most the critical values in vacuum applications and help operators to ensure their process reliability.





Wireless Connection

The free S4C-FS App offers a unique wireless connection to every SUTO flow meter for online readings and configuration.

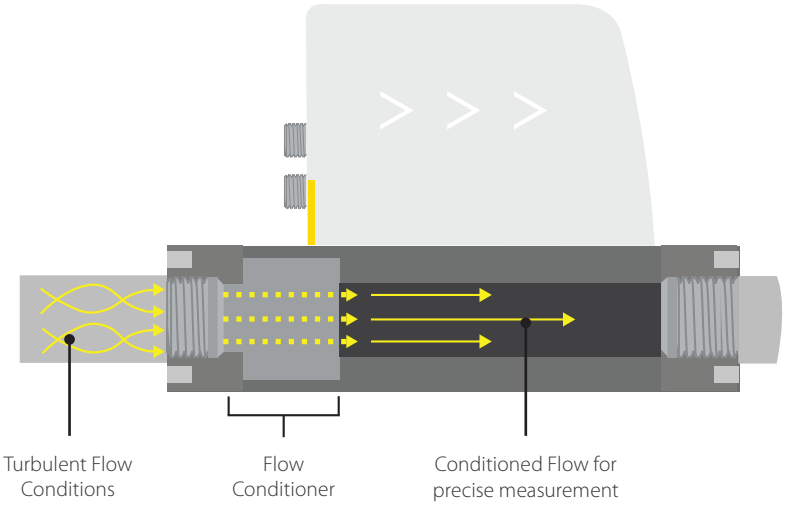
Especially during installation and setup all settings can be performed using a smartphone, there is no need to carry a PC and an interface on site. This saves a lot of time and is the easy way to get reliable sensor readings.

Every sensor is protected by default. To perform changes on the flow meter, first a QR code must be scanned.

Flow Conditioner

Asymmetric velocity profiles, swirl, and other factors caused by bends in pipes can lead quickly to inaccurate readings. But sometimes there is not enough space to have straight inlet conditions for accurate readings.

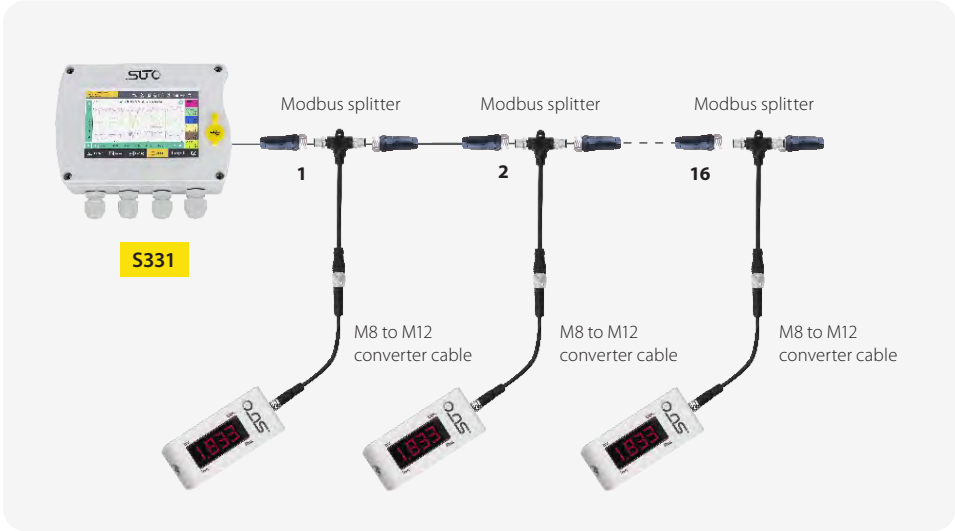
The highly engineered flow conditioner solves this problem. Unlike a standard flow conditions disk, the 3D design of the flow conditioner allows measurements with no additional straight inlet piping at all. Thanks to the innovative mechanical design, the pressure loss is negligible small (<30 hPa), offering high accurate measurements in difficult pipe conditions.



Connect several S418-V to Modbus Master

The S418-V with Modbus/ RTU interface can be easily daisy-chained to a Modbus Master device such as S331 by using RS-485 splitter (A554 3310) and the M8 to M12 converter cable (A553 0161). Through this method you can add up to 16 flow meters to the master

Remark: The S331 can maximum provide 10 W power to the connected devices. If more power is required a separate power supply is needed..



Display Direction

Standard direction	Reverse direction	Standard direction
		
SI units	SI units	Imperial units

Measuring Range in Air (l/min)

Range	Standard Configuration				
Process connection	**DN8**	**DN15**	**DN20**	**DN25**	**Absolute Pressure (mbar)**
Vacuum flow in l/min	56	222	444	778	900
	63	250	500	875	800
	71	286	571	1000	700
	83	333	667	1167	600
	100	400	800	1400	500
	125	500	1000	1750	400
	167	557	1333	2333	300
	250	1000	2000	3500	200
	500	2000	4000	7000	100

DN8,DN15

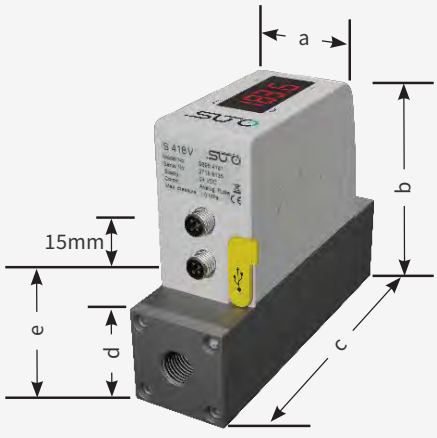
DN20,DN25

Stated measuring ranges for S418-V under following conditions:

- Standard flow in air in l/min
- Reference pressure: 1000 mbar
- Reference Temperature: +20 °C

Dimensions

Dimensions in mm	a	b	c	d	e
DN8/DN15	35.0	93.0	120.4	35.0	48.0
DN20/DN25	48.0	106.0	178.0	48.0	61.0



Technical Data

Measurement

Flow	
Accuracy	1.5 % of reading ± 0.3 % FS
Selectable units	m^3/h, l/min, cfm, kg/h
Measuring range	see table on the previous page
Repeatability	0.5 % of reading
Sensor	Thermal mass flow sensor
Sampling rate	10 samples / sec
Turndown ratio	1:100
Response time (t90)	0.5 sec
Consumption	
Selectable units	m^3, ft^3, l, kg
Pressure	
Accuracy	0.5 % FS
Selectable units	bar, psi
Measuring range	0.01 ... 1.6 bar(a)
Sensor	Piezo resistive sensor
Reference conditions	
Selectable conditions	20 °C 1000 mbar (ISO1217)

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	3/sec
Pulse output	
Signal	Switch output, normally open, max. 30 VDC, 200 mA
Scaling	1 pulse per consumption unit
Fieldbus	
Protocol	Modbus/RTU
Supply	
Voltage supply	15 ... 30 VDC
Current consumption	120 mA @ 24 VDC
Data interface	
Connection	USB micro

General data

Configuration	
Wireless	S4C-FS App for mobile phones
PC Software	S4A PC software for data analyzes
Display	
Integrated	4 digit LED
Data Logger	
Storage	8 Mio. values
Material	
Process connection	Aluminum alloy
Housing	PC + ABS
Sensor	Ceramic, glass coated
Metal parts	Aluminum alloy
Miscellaneous	
Electrical connection	2 x M8 (4 pole)
Protection class	IP54
Approvals	CE, RoHS, FCC
Process connection	G-thread
Weight	0.45 ... 1.1 kg (depends on model)

Operating conditions

Medium	Air, N_2, O_2, CO_2 and other gases
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	0 ... 50 °C
Medium humidity	< 90 % rH, no condensation
Operating pressure	Max. 10 bar(g)
Ambient temperature	0 ... 50 °C
Ambient humidity	< 95 % rH
Storage temperature	-30 ... 70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	DN8, DN15, DN20, DN25

Vacuum Scales

bar(a)	inch Hg(g)	kPa(g)	bar(g)	mbar(a)
1.00	0.00	0	0.00	1000
0.90	-2.95	-10	-0.10	900
0.80	-5.91	-20	-0.20	800
0.70	-8.86	-30	-0.30	700
0.60	-11.81	-40	-0.40	600
0.50	-14.77	-50	-0.50	500
0.40	-17.72	-60	-0.60	400
0.30	-20.67	-70	-0.70	300
0.20	-23.63	-80	-0.80	200
0.10	-26.58	-90	-0.90	100
0.01	-29.24	-99	-0.99	10

Ordering

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

S418-V Compact Thermal Mass Flow Meter for Vacuum Applications (Inline)

Order No.	Description
S695 419	S418-V, Vacuum Flow Meter, with integrated absolute pressure sensor, G inner thread, 24 VDC, 5 m cable with M8 connector and open ends included
Size	
S695 4190	DN8
S695 4191	DN15
S695 4192	DN20
S695 4193	DN25
Output	
A1455	S418: Analog 4 ... 20 mA, Pulse output
A1456	S418: Modbus/RTU output
A1457	S418: M-Bus output
Units	
A1459	With imperial units
Display direction	
A1460	Reverse display direction

Example: S418-V DN25, Modbus/RTU
Order Code: S695 4193.A1456

S418-V Accessories

Order No.	Description
A554 0109	Mains power supply 100-240 VAC / 24 VDC, 0.5 A, 2 m cable with M8 connector
A553 0137	Connection cable to S551, 5 m
M599 7020	S4A data analysis software, for data logger S418-V
A554 3310	RS-485 / Modbus splitter
A553 0161	M8 to M12 converter cable for Modbus splitter
A553 0171	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M8 connector

Mobile Power

S418-V powered by power bank with connection cable A553 0171

Note: power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 100 mA]

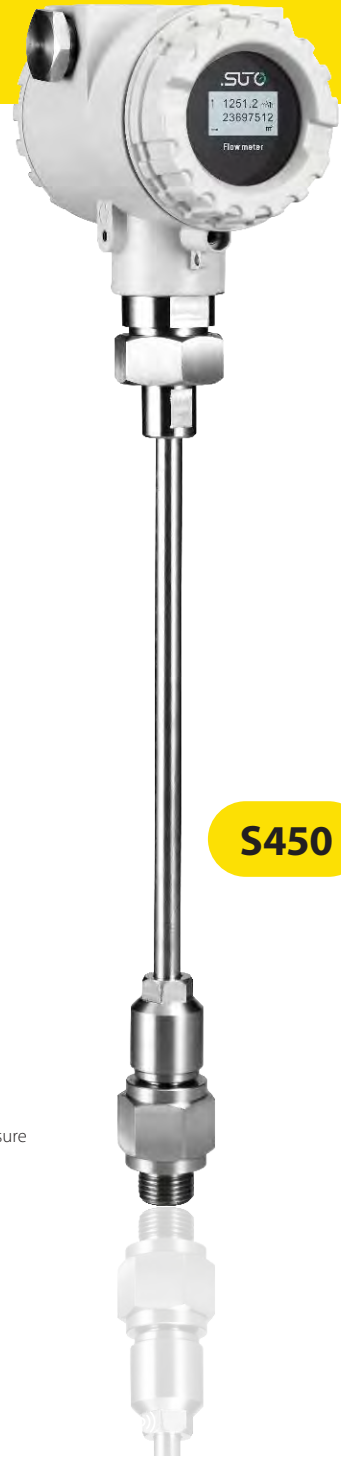
Be smart. **Measure it.**

S450 / S452

Thermal Mass Flow Meter for Heavy Duty and Ex Applications

Insertion / Inline

S452



S450

INDUSTRIAL DESIGN
For outdoor applications

WIRELESS INTERFACE
User friendly sensor settings

NO MECHANICAL WEAR PARTS
Independent of pressure and temperature

EXPLOSION PROOF
Use in Ex-area applications

EASY TO CLEAN
All wetted parts stainless steel

ACCURATE RESULTS
Very fast response time

Benefits

- Robust metal enclosure suitable for outdoor applications in harsh environment
- All parts which come into contact with the measurement medium are made of stainless steel 316L
- No moving parts, non clogging
- Direct measurement of mass flow and standard flow without the need of pressure compensation
- Low maintenance costs due to stable and reliable measurements

1 Robust Materials

- The IP67 housing allows applications in harsh industrial environ ment as well as outdoor applications.
- All parts which come into contact with the measurement medium are made of stainless steel 316L. This makes the sensors robust and guarantees a reliable measurement.

2 Display

- The display shows all relevant measured values on site. This allows the user to install the flowmeter easily and quickly.
- The pressure-tight encapsulation protects the display from external influences and ensures that it is always clearly visible.

3 Flexible and easy Installation

Wide range of tube sizes are supported with insertion type for big pipe diameters and inline types for small pipe diameters.

4 Outputs

S450 and S452 offer different signal outputs for flexible installation.

Analog 4 ... 20 mA 2/3-wire, pulse; Modbus/RTU; HART

Applications

- Flow measurement in hazardous and all wetter applications
- Explosive and harsh environments
- Pharmaceutical and food industry
- Various Gas Measurement such as oxygen, argon, carbon dioxide, natural gas, hydrogen, methane, etc..

Installation

S450

Insertion type installation
through ball valve

S452

Inline type installation
through flanges or R thread

Available Options

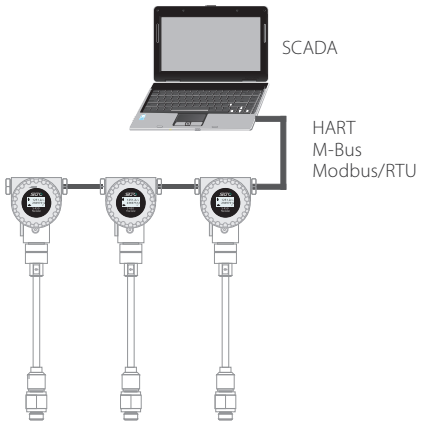
- Fieldbus interface: HART, M-Bus und Modbus/RTU
- Ex-Approvals:
  - II 2 G Ex d IIC T4
  - IECEx
  - GB Ex
- Bi-directional measurement
- Flow conditioner for R-thread measuring sections

Rotation

Sensor head can be rotated in 90° steps through the screw nut. This allows the display to be turned into the best viewing position.

Industrial Communication

Industrial communication through Modbus/RTU, M-Bus, HART



Volumetric Flow Ranges

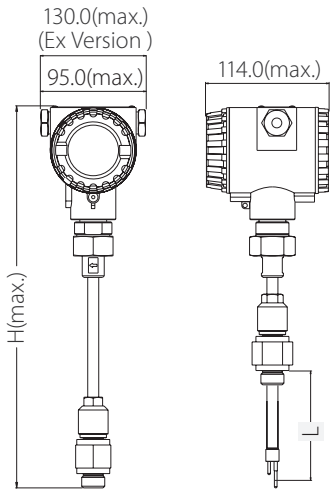
Tube		**S450** Volumetric Flow Ranges		
Inch	**DN**	**S-Range** (m³/h)	**M-Range** (m³/h)	**HS-Range** (m³/h)
½"	DN15	0.2 ... 45.6	0.4 ... 91.0	0.48 ... 110
¾"	DN20	0.4 ... 89.1	0.9 ... 178	1.09 ... 215
1"	DN25	0.6 ... 148	1.2 ... 295	1.82 ... 357
1½"	DN40	1.5 ... 367	2.9 ... 732	4.36 ... 886
2"	DN50	2.4 ... 600	4.8 ... 1,198	7.26 ... 1,450
2½"	DN65	4.1 ... 1,027	8.2 ... 2,049	12.1 ... 2,480
3"	DN80	5.7 ... 1,424	11.4 ... 2,841	16.9 ... 3,442
4"	DN100	8.7 ... 2,183	17.4 ... 4,357	24.2 ... 5,275
5"	DN125	20 ... 3,419	38 ... 6,824	45.9 ... 8,263
6"	DN150	20 ... 4,930	39 ... 9,839	70.18 ... 11,913
8"	DN200	35 ... 8,786	70 ... 17,533	106.48 ... 21,229
10"	DN250	55 ... 13,744	110 ... 27,429	165.77 ... 33,210
12"	DN300	79 ... 19,815	158 ... 39,544	239.58 ... 47,880

Tube		**S452** Volumetric Flow Ranges		
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
¾"	DN20	0.4 ... 89.1	0.9 ... 178	1.09 ... 215
1"	DN25	0.6 ... 148	1.2 ... 295	1.82 ... 357
1½"	DN40	1.5 ... 367	2.9 ... 732	4.36 ... 886
2"	DN50	2.4 ... 600	4.8 ... 1,198	7.26 ... 1,450
2½"	DN65	4.1 ... 1,027	8.2 ... 2,049	N/A
3"	DN80	5.7 ... 1,424	11.4 ... 2,841	N/A

Stated measuring ranges under following conditions:

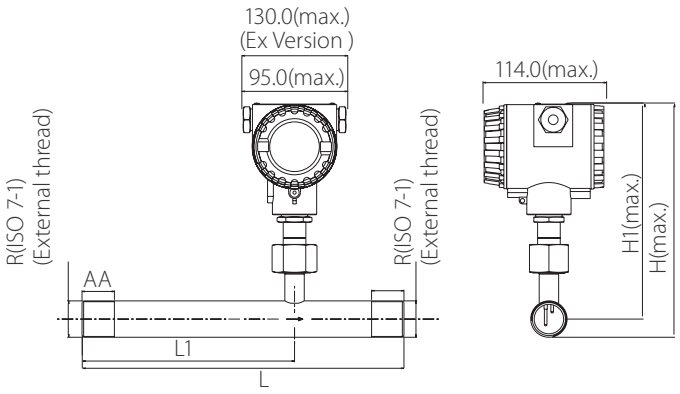
- Standard flow in air
- Reference pressure: 1000 hpa reference temperature: +20 °c
- At other standard conditions and in other gases Flow ranges are different and data are available on request.
- In larger pipe diameters flow can also be measured.

S450 Dimensions



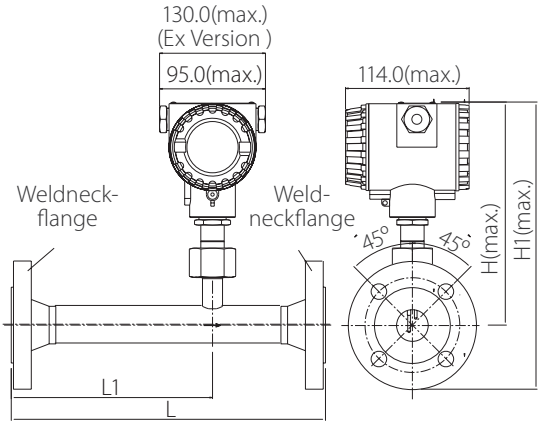
Shaft option	L (mm)	H (mm)
A	220	469
B	160	409
C	300	549

S452 Dimensions (Thread Type)



Pipe nominal size inch / (DN)	**L** total length (mm)	**L1** inlet length (mm)	**H** total height (mm)	**H1** pipe center to top (mm)	**R** External Thread
1/2" (DN15)	300	210	210.8	200.15	R 1/2"
3/4" (DN20)	475	275	213.6	200.15	R 3/4"
1" (DN25)	475	275	217.0	200.15	R 1"
1¼" (DN32)	475	275	221.35	200.15	R 1¼"
1½" (DN40)	475	275	224.3	200.15	R 1½"
2" (DN50)	475	275	230.3	200.15	R 2"
2½" (DN65)	475	275	246.15	208.15	R 2½"
3" (DN80)	475	275	259.15	214.65	R 3"

S452 Dimensions (Flange Type)



Pipe nominal size inch / (DN)	**L** total length (mm)	**L1** inlet length (mm)	**H** total height (mm)	**H1** pipe center to 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

Measurement

Flow	
Accuracy	±(1.5 % of reading + 0.3 % full scale)
Selectable units	m^3/h, m^3/min, l/min, l/s, cfm, kg/h, kg/min, kg/s
Measuring range	see table below
Repeatability	0.25 % o.RDG
Sensor	Thermal mass flow sensor
Sampling rate	3 samples / sec
Turndown ratio	1:200
Response time (t90)	0.5 sec
Consumption	
Selectable units	m^3, ft^3, l, kg
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. 400 Ohm
Update rate	Value updated ever 1 sec
Pulse output	
Signal	Switch output, normally open, max. 30 VDC, 200 mA
Scaling	1 pulse per consumption unit (selectable)
Fieldbus	
Protocol	Modbus/RTU, HART, M-Bus
Supply	
Voltage supply	16 ... 30 VDC
Current consumption	200 mA

General data

Configuration	
PC Software	USB Service Kit + Software
Display	
Integrated	LCD
Material	
Process connection	Stainless steel 1.4404 (SUS 316L)
Housing	Al alloy
Sensor	Stainless steel 1.4404 (SUS 316L)
Metal parts	Stainless steel 1.4404 (SUS 316L)
Miscellaneous	
Electrical connection	Screw terminals
Protection class	IP67
Approvals	CE, RoHS, FCC, Ex-Options
Process connection	S450: G1/2" (ISO 228/1) S452: Measuring section with R-thread or Flange
Weight	S450: 1.75 kg S452: 1.25 kg (without measuring section)
Operating conditions	
Medium	Air, N_2, O_2, CO_2 and other non corrosive gases
Medium temperature	S450: -40 ... +150 °C S452: -40 ... +100 °C
Medium humidity	< 90 %, no condensation
Operating pressure	S450: 0 ... 1.6 MPa (applicable for option A1280) 0 ... 5.0 MPa (applicable for option A1279)* S452: 0 ... 4.0 MPa *For pressure above 1.5 MPa use the installation device A530 1106 or A530 1113.
Ambient temperature	-40 ... +65 °C
Storage temperature	-30 ... +70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	S450: ½" ... 12" (bigger pipes on request) S452: ½" ... 3"

Ordering

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

S450 Thermal Mass Flow Meter (Insertion type)

Order No.	Code	Description
S695 0450	S0450	S450, Thermal Mass Flow Meter insertion type
Shaft length		
A1200	A	220 mm
A1201	B	160 mm
A1202	C	300 mm
Process connection		
A1006	B	PT 1/2" Adapter
A1005	C	NPT 1/2" Adapter
Gas type		
A1007	A	Air
A1008	B	CO_2
A1009	C	O_2 (Oil- & grease-free cleaned)
A1010	D	N_2
A1011	E	N_2O
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_3H_8
A1041	L	O_2, Ar, CO_2 (real gas calibration)
Range		
	A	Standard
A1271	B	Max range
A1272	C	Bi-directional standard range
A1273	D	Bi-directional max. range
A1274	E	High speed
Hazardous area approval		
A1279	A	None
A1280	B	IECEx / GB3836
Output		
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
Display		
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

S452 Thermal Mass Flow Meter (In-line type)

Order No.	Code	Description
S695 0452	S0452	S452, Thermal Mass Flow Meter, inline type
Process 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		
A1007	A	Air
A1008	B	CO_2
A1009	C	O_2 (Oil- & grease-free cleaned)
A1010	D	N_2
A1011	E	N_2O
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_3H_8
A1041	L	O_2, Ar, CO_2 (real gas calibration)
Range		
	A	Standard
A1271	B	Max range
A1274	E	High speed (DN15 ... DN50)
Hazardous area approval		
A1279	A	None
A1280	B	IECEx / GB3836
Output		
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
Display		
A1294	A	Without display
A1295	B	With display

Accessories

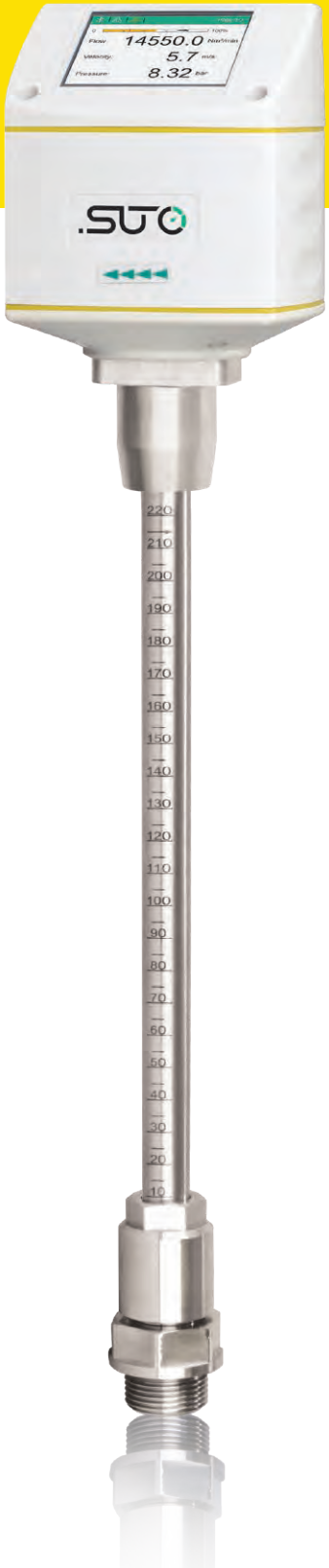
Order No.	Description
R200 0005	Oil- & grease-free cleaned option for flow sensors (for Oxygen it is already included in A 1009)
A530 1106	High pressure installation device S450, 220 mm (to be used if pressure above 1.5 MPa)
A530 1113	High pressure installation device S450, 400 mm (to be used if pressure above 1.5 MPa)

Be smart. **Measure it.**

S430

Pitot Tube Flow Meter for Wet Compressed Air

Insertion



PROCESS MONITORING
High accuracy and reliable measurements

WET AIR MEASUREMENT
Directly at the compressor outlet

COMPRESSOR EFFICIENCY
Constant monitoring of the compressor performance

MOBILE APP
For remote configuration and monitoring

EASY INSTALLATION
Under pressure trough a ball valve

NO MECHANICAL WAER PARTS
Stable results in high temperature applications

Benefits

- Accurate flow and consumption measurement in wet air or high mass flow and velocity applications based on the pitot tube principle
- Consistent and temperature stable compressed air flow monitoring at the outlet of the compressor
- Various output signals with connection to SUTO displays and/or third-party displays and PLCs
- Easy installation under pressure through ball valve
- High temperature applications up to 230 °C

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

The S430 pitot tube flow meter is perfectly suited to be integrated into process controls or high-level monitoring systems. Various output options are offered for a seamless integration:

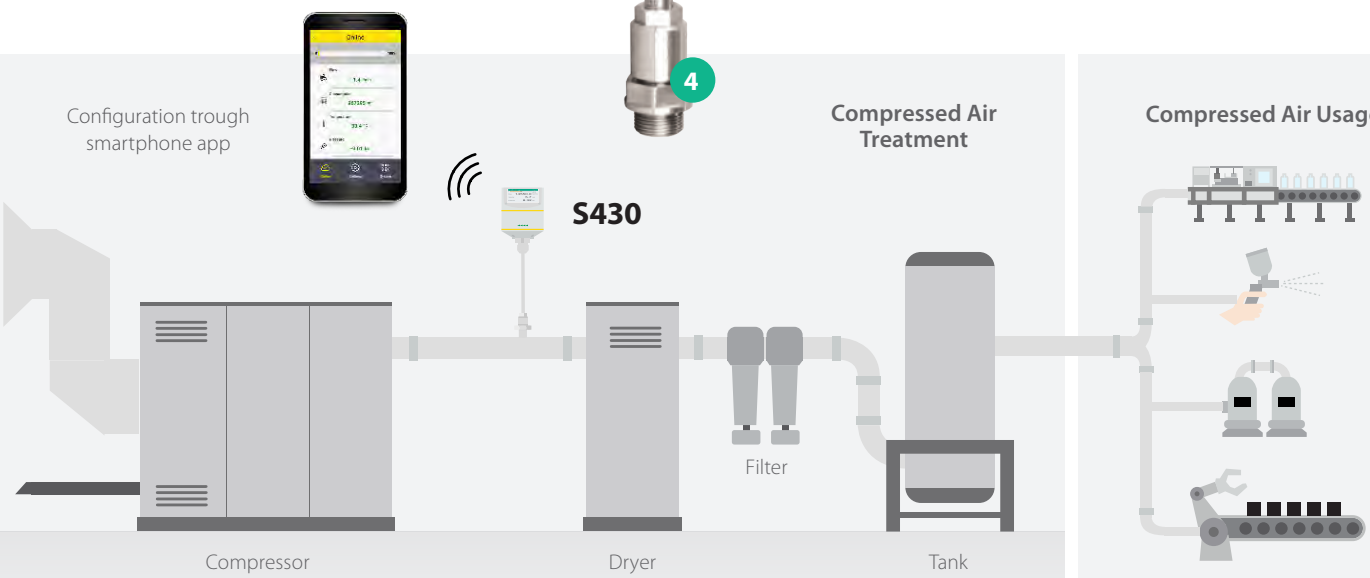
- Isolated 4 ... 20 mA output for actual flow readings
- Isolated Pulse output for totalizer
- Modbus/RTU to read all values digitally
- Modbus/TCP
- M-BUs

3 Robust Materials

- IP65 casing provides robust protection in rough industrial environment
- All parts which come into contact with the measurement medium are made of stainless steel 316L. This makes the sensors robust and guarantees a reliable measurement.

4 Flexible and Easy Installation

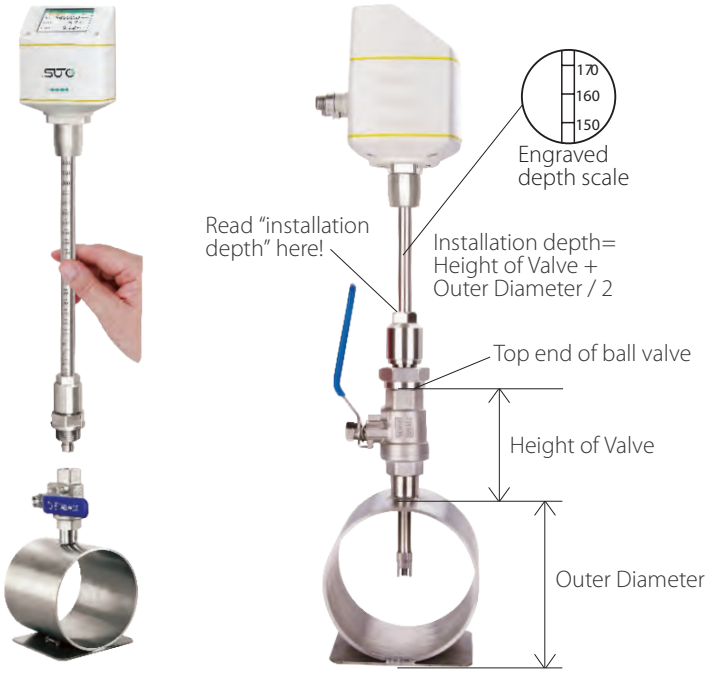
- Tube diameters of 1.25" to 10" through center installation, bigger diameters through non-center installation
- Thanks to the insertion through a 3/4" ball valve, the S430 can be installed and under pressure and is perfectly suited for installations where shutdowns are not acceptable.



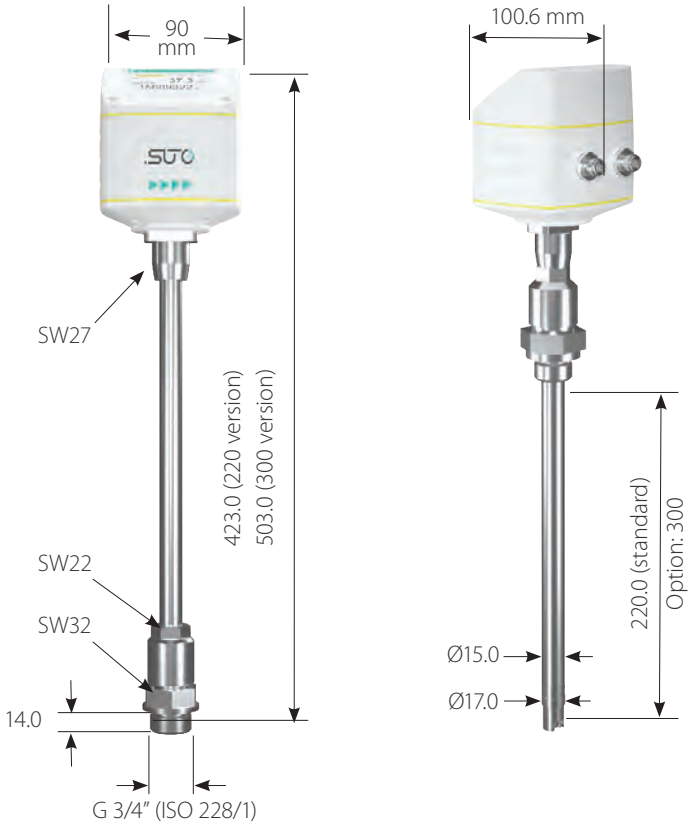
S430 Flow and Consumption Meter

S430 Installation and Sensor Removal

Installation through a ball valve



S430 Dimensions



Mobile App

Mobile Phone app for configuration and online readings. The app enable users to completely get rid of the inconvenience caused by cables, bulky PCs and hard-to-reach places.

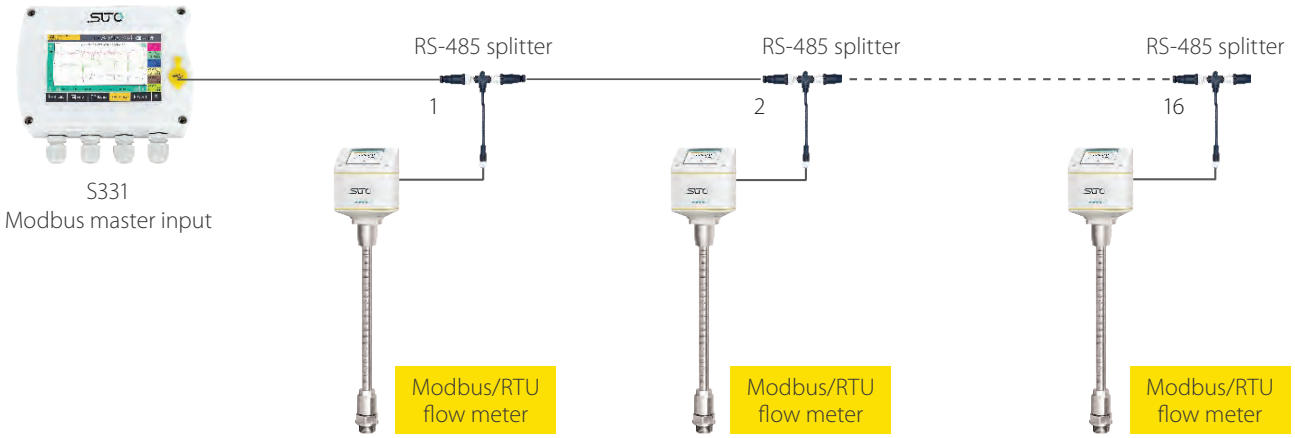
Based on the pitot tube principle

The S430 is based on the pitot tube principle to measure flow. Properly installed (refer to instruction manual for details) the sensor can measure in wet and dirty gases as occurring, for example, at the discharge of a compressor.

Optional Color Display

Colour graphic display for online values and sensor settings

Connect several Flow Meters to Modbus Master



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

Volumetric Flow Ranges

Tube		Volumetric Flow					
		m^3/h		m^3/min		cfm	
Inch	mm	Min	Max	Min	Max	Min	Max
1¼″	36	49	507	0.8	8.5	29	298
1½″	41.9	73	757	1.2	12.6	43	446
2″	53.1	124	1298	2.1	21.6	73	764
2½″	68.9	221	2311	3.7	38.5	130	1360
3″	80.9	313	3270	5.2	54.5	184	1925
4″	100	488	5094	8.1	84.9	287	2998
5″	125	767	8006	12.8	133	451	4712
6″	150	1107	11547	18.5	192	652	6796
8″	200	1983	20689	33.1	345	1167	12177
10″	250	3099	32338	51.7	539	1824	19034
12″	300	4462	46567	74.4	776	2626	27408

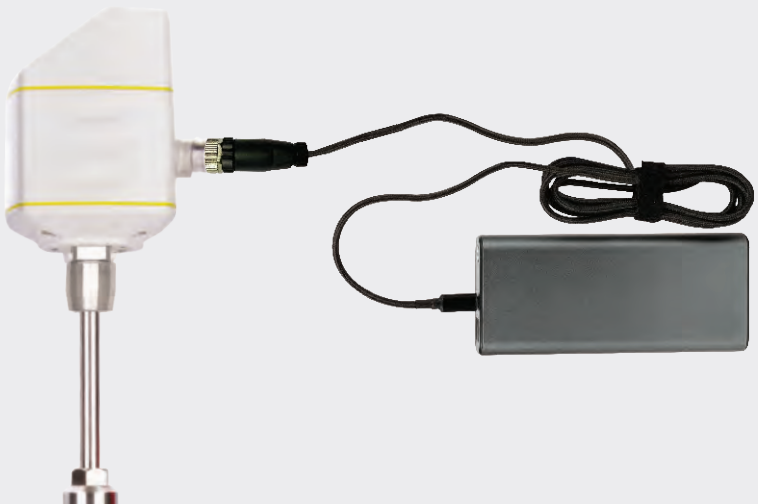
Stated measuring ranges under following conditions:

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

Flow range is calculated for Air at 6 bar(g), 50 °C and 90 % humidity.

Mobile Power

S430 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]



Technical Data

Measurement

Flow	
Accuracy	1.5 % o.r. ±0.3 % FS Volumetric Flow: m³/h, m³/min, L/min, l/s, cfm Mass Flow: kg/h, kg/min, kg/s, t/h, lb/h
Selectable units	Actual Velocity: m/s, ft/min
Measuring range	see table below
Repeatability	0.5 % o.r.
Sensor	Differential pressure sensor
Sampling rate	3/sec
Turndown ratio	10:1
Response time (t90)	2 sec
Consumption	
Selectable units	m³, ft³, t, lb, l, kg
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, isolated
Scaling	0 ... max flow
Load	250R
Update rate	1/sec
Pulse output	
Signal	Max 30 V, 200 mA
Scaling	1 pulse per consumption unit
Fieldbus	
Protocol	Modbus/RTU, Modbus/TCP
Update rate	
Supply	
Voltage supply	24 VDC 48 VDC (PoE)
Current consumption	150 mA 100 mA (PoE)

General data

Configuration	
Wireless	S4C-FS App for mobile phones
Others	Display with 3 touch buttons (Option)
Display	
Integrated	2.4" color graphic display with 3 touch buttons (option)
Material	
Process connection	Stainless steel 1.4404 (SUS 316L)
Housing	PC + ABS
Sensor	Stainless steel 1.4404 (SUS 316L)
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	G ¾" (ISO 228/1)
Weight	1.12 kg
Operating conditions	
Medium	Wet/dry air, other gases
Medium quality	non corrosive
Medium temperature	-40 ... +230 °C
Medium humidity	no requirements
Operating pressure	0 ... 1.6 MPa -30 ... +70 °C housing 0 ... +50 °C display (Optional)
Ambient temperature	-10 ... +40 °C PoE (Optional)
Ambient humidity	< 95 % rH
Storage temperature	-30 ... 70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	>=DN32

Ordering

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

S430 Pitot Tube Flow Sensor (Insertion Type)

Order No.	Description
S695 4300	S430, Pitot Tube Flow Meter, insertion type, 220 mm shaft
S695 4302	S430, Pitot Tube Flow Meter, insertion type, 300 mm shaft
Flow Medium	
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)
Range / Calibration	
A1066	S430: Bi-directional standard range
A1067	S430: High speed: Max flow increased by 30 %
Output	
A1061	S430: Modbus/RTU
A1062	S430: Analog, Pulse
A1063	S430: M-Bus
A1064	S430: Modbus/TCP + PoE support (incl. 5 m M12 cable with RJ45 plug)
Display	
A1060	S430: With Display

Accessories

A695 0010	S430: NPT ¾" thread adapter (former A1069)
A695 0011	S430: PT ¾" thread adapter (former A1068)
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: S430, 300 mm shaft, Air, bi-directional calibration, Modbus/RTU, display
Order Code: S695 4302.A1007.A1066.A1061.A1060

Be smart. **Measure it.**

S409

Thermal Mass Flow Direction Switch

Insertion

NO MECHANICAL WEAR PARTS
Robust Design

FLOW DIRECTION
Reliable indication

EASY INSTALLATION
Under pressure

RELAY OUTPUT
1 relay for each direction

Benefits

- Accurate and fast detection of the flow direction
- Detects smallest changes < 0.1 m/s referred to 20 °C and 1000 hpa
- No mechanical wear parts for long term stable measurements
- Easy installation under pressure without stopping the operation

1 Robust Materials

IP65 casing provides robust protection in rough industrial environments to ensure reliable measurement results.

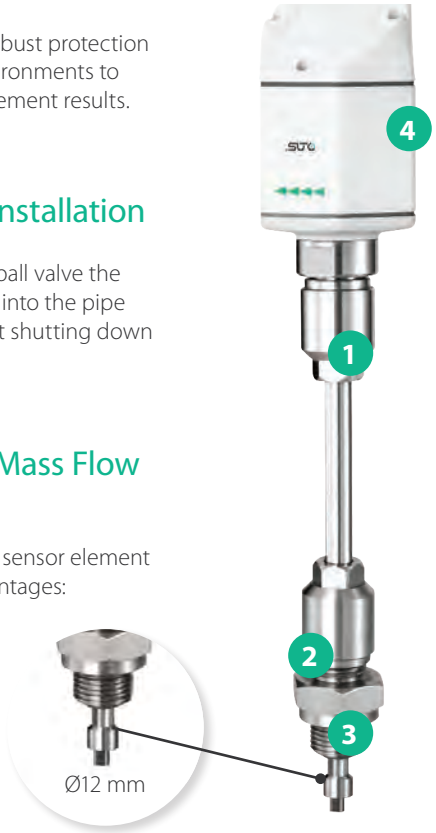
2 Flexible Installation

Through a 1/2"G-type ball valve the switch can be inserted into the pipe under pressure without shutting down the system.

3 Thermal Mass Flow Sensor

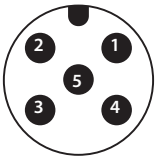
The thermal mass flow sensor element comes with main advantages:

- Very robust and completely of stainless steel
- Fast response times and wide measuring range at high accuracy
- Minimal pressure loss



4 Connection

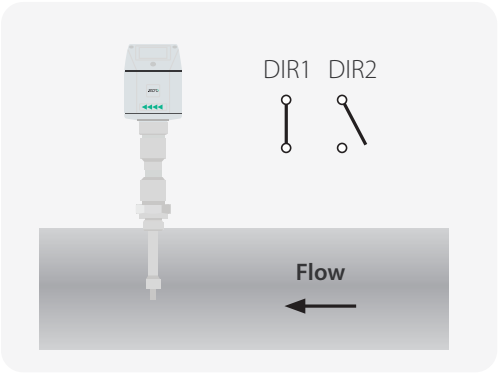
Pin assignment connector

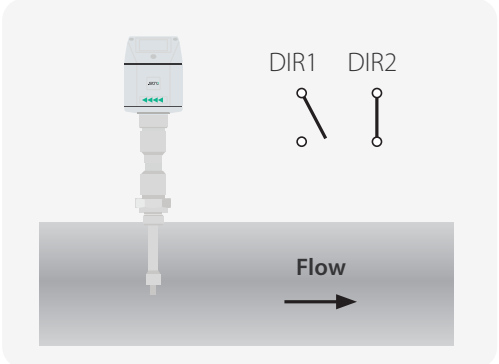


Pin arrangement of flow switch

	Pin1	Pin2	Pin3	Pin4	Pin5
A	SDI	-VB	+VB	DIR1	DIR1
B	SDI	-VB	+VB	DIR2	DIR2

Relay output at switch



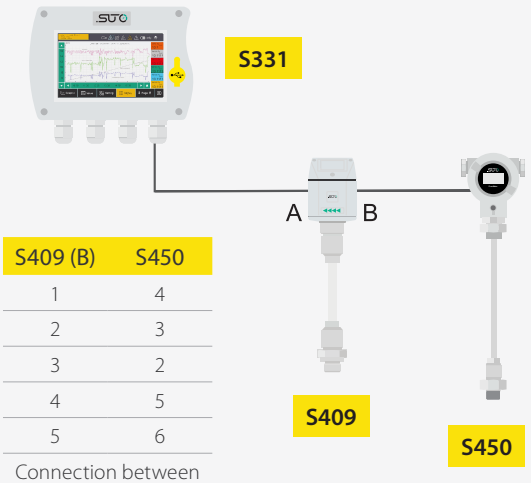


Operation Principle

The thermal mass flow direction switch S409 allows the detection of direction of the flow. It can be used in compressed air and non-corrosive gases.

The flow and direction information is output through 2 normally open relay switches. The signals can be transferred to the SUTO flow sensor to activate and deactivate the flow measurement depending on the flow direction, as well as triggering which consumption counter is used.

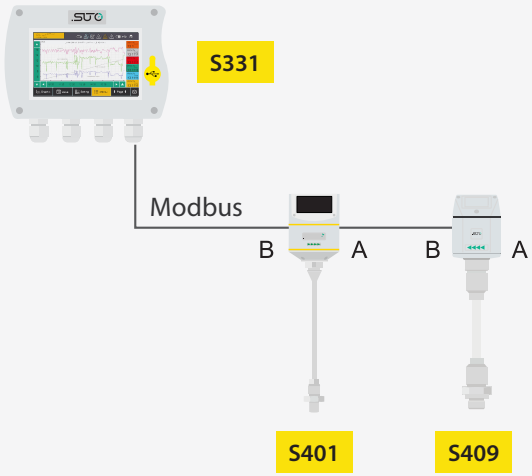
Connection of S330 to S450 via flow switch



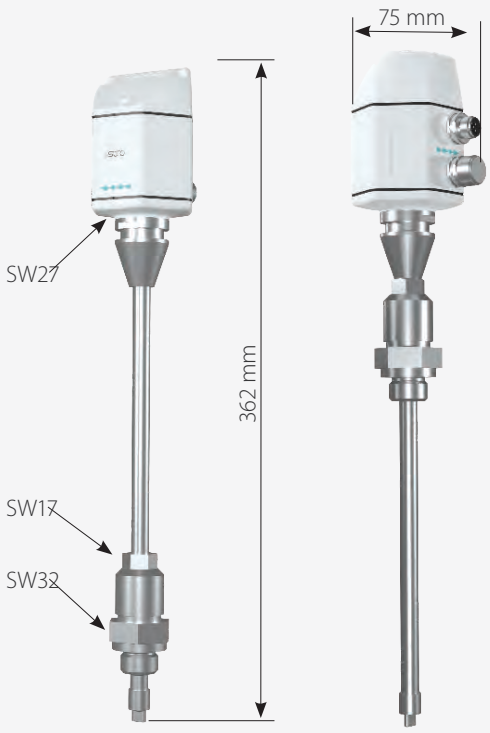
S409 (B)	S450
1	4
2	3
3	2
4	5
5	6

Connection between S409 and S450 / S452

Connection of S330 to S401 with flow switch



Attention: Flow sensors S450 / S401 need to have the bi-directional calibration option to operate in both directions



Technical Data

Measurement

Flow Direction Detection	
Accuracy	0.05 m/s
Measuring range	0.02 ... 25 m/s @ 7barg, 20 °C
Sensor	2 x Pt 1000

Signal / Interface & Supply

Switch output	
Relay	2 x isolated direction switches
Rating	60 VDC, 1 A
Supply	
Voltage supply	24 VDC
Current consumption	160 mA

General data

Material	
Process connection	G½" (ISO 228-1)
Housing	PC + ABS
Sensor	Ceramic sensor, glass coated
Metal parts	Stainless steel 1.4404 (SUS 316L)
Miscellaneous	
Electrical connection	2 x M12 5-pole
Protection class	IP65
Approvals	CE
Process connection	½" G (ISO 228-1)
Weight	500 g
Operating conditions	
Medium	air, gases
Medium quality	ISO 8573: 4.4.3 or better
Medium temperature	-20 ... +80 °C
Medium humidity	< 100 % (no condensation)
Operating pressure	0 ... 1.6 MPa
Ambient temperature	-20 ... +70 °C
Ambient humidity	< 99 % (no condensation)
Storage temperature	-40 ... +70 °C
Transport temperature	-40 ... +70 °C
Pipe sizes	½ to 12 (bigger diameters on request)

Ordering

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

S409 Thermal Mass Flow Direction Switch (Insertion)

Order No.	Description
S695 0409	S409 Thermal Mass Flow Direction Switch, insertion type
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)

Be smart. **Measure it.**

S435

Vortex Flow Meter for Steam

Inline

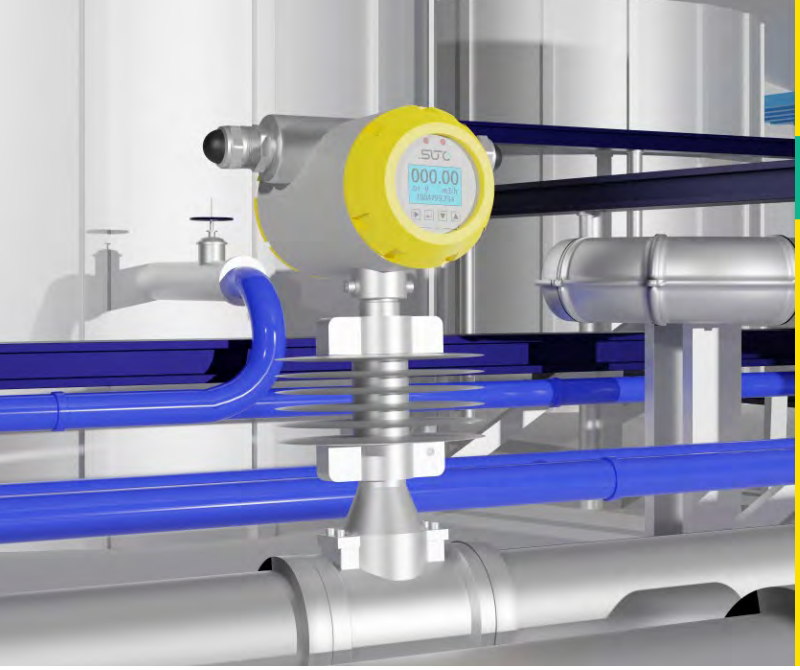
INTERGRATED TEMPERATURE SENSOR
Automatic density adjustment

EASY PROCESS MONITORING
Effective and inexpensive measurements

ACCURATE RESULTS
Very fast response time

TOTAL FLOW
High accuracy and reliable measurements

LOCAL DISPLAY
For easy configuration and live values



Benefits

- Accurate saturated steam measurement by instant flow and consumption monitoring
- Integrated temperature sensor and small pressure loss
- High protection level due to robust industrial design and no moving parts
- Analog and Modbus output for data logging and analysis
- Wafer type makes it easy for installation

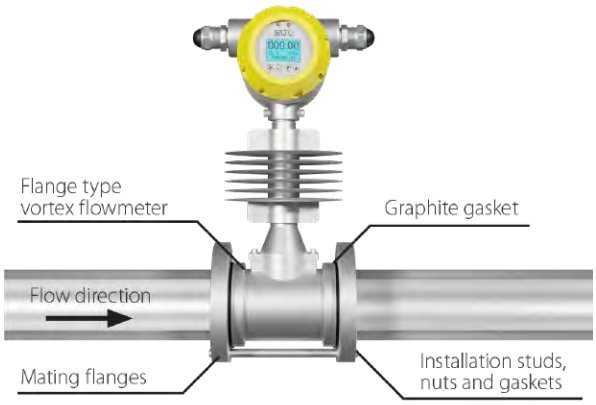
Accurate Steam Monitoring

Vortex flow meters are the ideal choice for steam measurements due to their robust design, without any moving parts and high temperature/pressure resistance.

S435 provides mass flow and consumption measurements in saturated steam with automatic density compensation. This always guarantees accurate results. Parameter settings can be done through the user interface (keys and display) at the flow meter directly. Connection to an SCADA system is through the Modbus/RTU interface or the analog output available.

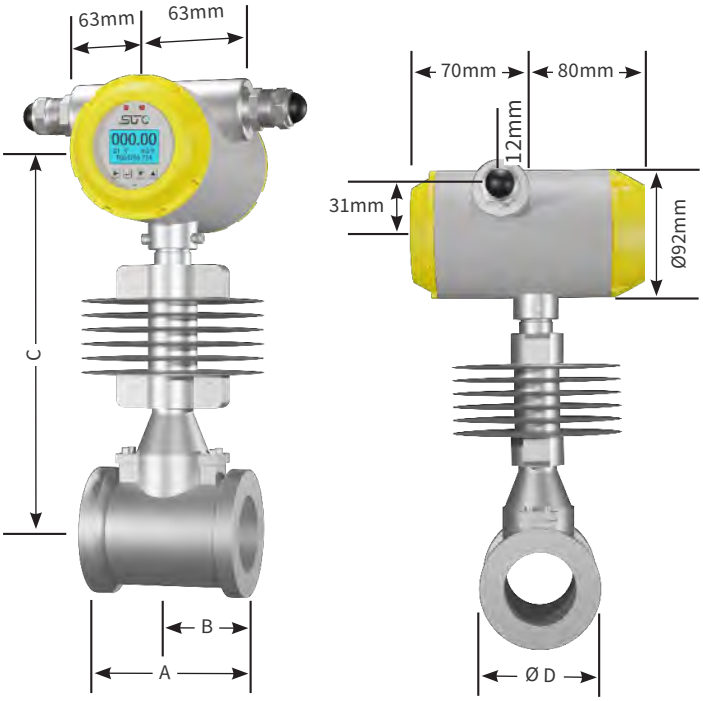
Please ensure that the steam parameters such as temperature, pressure and nominal flow are within the specification of S435.

Installation



Use double bolts and nuts. We provide gaskets and bolts.

Dimensions



Vortex Flow Meter dimension rated pressure 1.6 Mpa unit: mm

DN	A	B	C	D
40	100	50	256	75
50	110	55	256	87
65	110	55	262	109
80	110	55	267	120
100	120	60	271	149
125	133	73	291	175
150	160	90	304	203
200	185	115	331	259
250	210	140	357	312
300	240	165	383	363

Technical Data

Measurement

Flow	
Accuracy	1.5 % of reading
Selectable units	m^3/h, m^3/min, kg/h, t/h
Measuring range	see table below
Repeatability	0.5 % o.RDG
Sensor	Vortex
Turndown ratio	1:10
Consumption	
Selectable units	m^3, kg, t

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Update rate	Value updated ever 1 sec
Frequency output	
Measuring range	0~5000 Hz
Fieldbus	
Protocol	Modbus/RTU
Update rate	Value updated ever 1 sec
Supply	
Voltage supply	24VDC

General data

Display	
Integrated	LCD display
Material	
Process connection	Carbon steel /304/316/316L(Flange/Wafer)
Housing	SUS 304
Sensor	SUS 316
Metal parts	SUS 304
Miscellaneous	
Electrical connection	1/2"-14NPT
Protection class	IP65
Process connection	wafer
Weight	depends on pipe size - please enquire if needed
Operating conditions	
Medium	Saturated steam
Medium temperature	-40 ... +250 °C
Operating pressure	0 ... 1.6 MPa (applicable for option 2.5MPa or 4.0MPa)
Ambient temperature	-10 ... +60 °C
Ambient humidity	< 99 % rH
Storage temperature	-10 ... +60 °C
Transport temperature	-10 ... +60 °C
Pipe sizes	DN25 ... DN300

Measuring ranges

Saturated Steam Mass Flowrate (Unit: t/h)

DN (mm)	0.20 Mpa		0.50 Mpa		0.60 Mpa		0.70 Mpa		1.00 Mpa		1.50Mpa	
DN40	(28.8 ~ 329.8 kg/h)		(39.9 ~ 633.0 kg/h)		(42.9 ~ 732.5 kg/h)		0.05	0.83	0.05	1.13	0.06	1.61
DN50	0.04	0.52	0.06	0.99	0.07	1.14	0.07	1.29	0.08	1.76	0.1	2.52
DN65	0.08	0.87	0.11	1.67	0.11	1.93	0.12	2.18	0.14	2.97	0.17	4.26
DN80	0.12	1.32	0.16	2.53	0.17	2.93	0.18	3.3	0.21	4.5	0.25	6.45
DN100	0.18	2.06	0.25	3.96	0.27	4.58	0.28	5.16	0.33	7	0.4	10.08
DN125	0.28	3.22	0.39	6.18	0.42	7.15	0.44	8.06	0.52	11	0.62	15.76
DN150	0.4	4.64	0.56	8.9	0.6	10.3	0.64	11.61	0.75	15.83	0.9	22.69
DN200	0.72	8.25	1	15.83	1.07	18.31	1.14	20.64	1.33	28.14	1.59	40.34
DN250	1.12	12.88	1.56	24.73	1.68	28.61	1.78	32.25	2.1	44	2.49	63.03
DN300	1.62	18.55	2.24	35.61	2.41	41.2	2.56	46.45	3	63.3	3.58	90.76

Ordering

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

S435 Vortex Flow Meter for Steam (Inline)

Order No.	Description
S695 4359	S435 Vortex Flow Meter DN40, wafer type
S695 4350	S435 Vortex Flow Meter DN50, wafer type
S695 4351	S435 Vortex Flow Meter DN65, wafer type
S695 4352	S435 Vortex Flow Meter DN80, wafer type
S695 4353	S435 Vortex Flow Meter DN100, wafer type
S695 4354	S435 Vortex Flow Meter DN125, wafer type
S695 4355	S435 Vortex Flow Meter DN150, wafer type
S695 4356	S435 Vortex Flow Meter DN200, wafer type
S695 4357	S435 Vortex Flow Meter DN250, wafer type
S695 4358	S435 Vortex Flow Meter DN300, wafer type
A695 0001	Blind pipe for uninstallation - DN40&DN50
A695 0002	Blind pipe for uninstallation - DN65
A695 0003	Blind pipe for uninstallation - DN80
A695 0004	Blind pipe for uninstallation - DN100
A695 0005	Blind pipe for uninstallation - DN125
A695 0006	Blind pipe for uninstallation - DN150
A695 0007	Blind pipe for uninstallation - DN200

Notes:

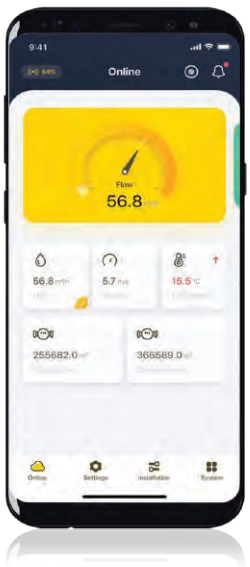
All Flow meters: Wafer connection (Companion flange, bolt and gasket included), temperature compensation, local display, medium temperature <250 °C, 4-20 mA signal output, 1/2-14 NPT electric connection, IP65, accuracy +1.5 %, 24 VCD, Modbus/RTU, Pulse, for saturated steam only

Be smart. **Measure it.**

S461

Ultrasonic Flow Meter for Liquid

Clamp-on



NON-INVASIVE MEASUREMENT
Through clamp-on sensors

SMARTPHONE APP
Easy configuration

ENERGY METER
Monitors of heat exchangers

COMPACT DESIGN
Can be installed anywhere

LOCAL DISPLAY
For instant values

DATA LOGGER
8 million samples

EASY INSTALLATION
Various installation options

Benefits

- Measures the actual flow and total consumption of various liquids
- The configuration through the dedicated smartphone app is easy and most user friendly
- Connectable to any monitoring system, through various signal interfaces:
  Modbus/RTU (standard), 4 ... 20 mA / Pulse / Alarm-Relay (option), Modbus/TCP (option)
- Flow and consumption can be measured in both directions, forward and reverse (Bi-directional measurement)
- Robust industrial design with versatile installation options for the display unit: Wall installation, DIN rail and pipe installation
- Measurement log files can be downloaded through the free S4A software. Soon a wireless readout will be available through mobile App

Accurate Liquid Measurement

The SUTO ultrasonic clamp-on flow meter S461 has all it takes to measure reliable, easy and accurate flow and consumption of liquids. Based on the transit time technology this flow meter comes with unique features and outstanding performance.

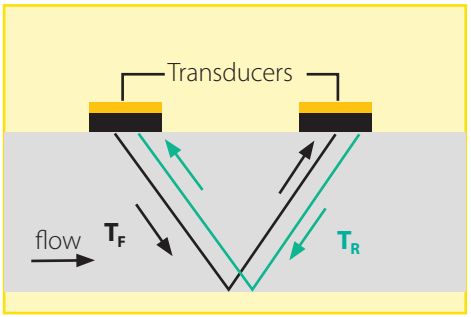
The transducers are simply clamped onto the outside of the pipe and never come in contact with the fluid. The main unit is either installed onto the pipe as well, at the wall or onto a DIN rail.

The configuration and setup is made through the wireless smartphone app S4C-US which can be downloaded for free from the SUTO website, Google Play Store and the Apple App Store. The app allows the user to set up the device as well as reading live values, logger configuration and logger data read out.

By adding 2 clamp-on temperature sensors the Energy Meter Version monitors the efficiency of heat exchangers.

The S461 comes also as portable version in a transport case.

Transit Time Principle



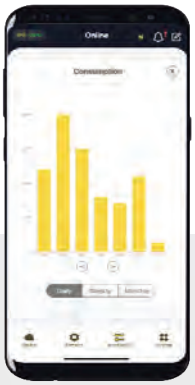
T_F: time in flow direction

T_R time in reverse flow direction

A number of pulses are transmitted from one transducer to the other and vise-versa. Sound waves travel faster with the direction of flow and slower against the direction of flow.

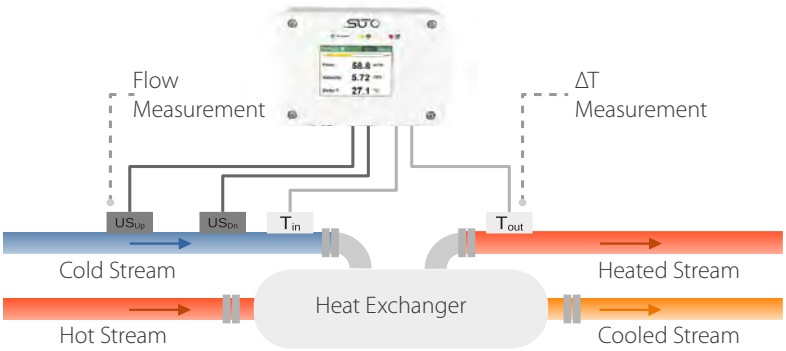
Mobile App

Instant view of daily, weekly and monthly consumption through mobile app.



S461 and transducers mounted on pipe

Heat Recovery Principle



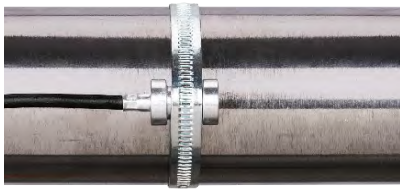
Principle heat recovery measurement with S461 Energy Meter

Heat exchangers transfer heat (energy) from a higher temperature medium (hot stream) to a colder one (heated stream). S461 measures the flow rate and the temperature difference between cold stream and heated stream. Based on these measurements the recovered energy will be calculated.

Convenient Storage

Transport casing holding up to 2 transducer pairs, T-Sensors, belt and metal stretchers, power bank, cables, charger and documentation

Accessories



Temperature sensor with metal stretcher

UTH-S transducer for higher temperature applications

Belt stretcher for temporary installation

Transducer mounting fixture simplify the flow transducer installation

Applications

- Cooling / Heating / Process Water
- Purified Water Measurement
- Fuel, Oils, Petroleum Products
- Water Treatment
- Food / Beverage
- HVAC / Energy System Audits
- Sanitary flow metering
- Hydraulic System Test
- Pharmaceutical Industry

Mobile Power

S461 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]

Technical Data

Measurement

Flow		
Accuracy		1.0 % o. RDG ±0.01 m/s
Selectable units	Metric:	m/s, m^3/h, m^3/min, l/min, m^3
	Imperial:	ft/min, cfm, cfs, USG/min, IG/min, bbl/min
Measuring range		0 ... 12 m/s
Repeatability		0.5 % o.RDG
Transducer		Ultrasonic transducer
Sampling rate		5 samples / sec
Response time (t90)		0.1 sec
Consumption		
Selectable units	Metric:	m^3, l
	Imperial:	cf, IG, UG, bbl
Temperature		
Accuracy		0.5 °C
Selectable units		Metric: °C. Imperial: °F
Measuring range		-40 ... +130 °C
Sensor		Pt1000
Energy Flow		
Selectable units	Metric:	GJ/h, kJ/h, kcal/h
	Imperial:	MBtu/h, Btu/h
Energy		
Selectable units	Metric:	GJ, kJ, kcal, kWh, MWh
	Imperial:	Mbtu, Btu

Signal / Interface & Supply

Analog output (Option)	
Signal	4 ... 20 mA (4-wire), isolated
Scaling	0 ... max flow, freely adjustable
Load	max. 250 Ohm
Update rate	100 ms
Pulse output (Option)	
Signal	Switch output, normally open, nominal value: 24 VDC/0.5 A
Scaling	1 pulse per consumption unit (selectable)
Fieldbus	
Protocol	Modbus/RTU (Standard) Modbus/TCP and PoE (Option)
Supply	
Voltage supply	20 ... 28 VDC
Current consumption	150 mA @ 24 VDC

General data

Configuration	
Wireless	S4C-US App for mobile phones
Display	
Size/Resolution	2.4" color (640 x 480) graphic display, 1 touch button
Data Logger	
Storage	8 Mio. values
Material	
Main Casing	PC + ABS
Transducer	UT-S: Industrial synthetic plastics UTH-S: Aluminum
Miscellaneous	
Electrical connection	2 x M12 D code (4 pole): transducer 2 x M12 (5 pole): Signals/Supply. (8-pole x-coded) for TCP 2 x M8 (4 pole): Pt1000 (Energy Meter Version)
Protection class	Main casing: IP65. Transducer: IP68
Approvals	CE, RoHS, FCC
Dimensions	Main unit: 124 x 102 x 70 mm UT-S Transducer: 64 x 30 x 27 mm UTH-S Transducer: 68 x 34 x 34 mm
Weight	1.2 kg
Operating conditions	
Fluids	All acoustically conductive liquids with less than 10 % gaseous
Medium temperature	-40 ... +130 °C
Ambient temperature	Main unit: 0 ... +50 °C UT-S Transducer: 0 ... +80 °C UTH-S Transducer: -40 ... +130 °C
Ambient humidity	< 99 % rH
Storage temperature	-30 ... 70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	DN40 ... DN1200

Flow Ranges

DN	DO	Max flow		
mm	mm	l/min	m³/h	cfm
40	48	905	54	32
50	60	1,414	85	50
65	76	2,389	143	84
80	88	3,619	217	128
100	114	5,655	339	200
125	139	8,835	530	312
150	165	12,723	763	449
200	219	22,618	1,357	799
250	273	35,341	2,121	1,248
300	323	50,891	3,054	1,797
500	508	141,365	8,482	4,992
1000	1016	565,458	33,929	19,970
1200	1219	814,260	48,858	28,756

Remarks: DN: nominal inner diamter
DO: outer diameter (depends on standard and material)

Ordering

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

S461 Ultrasonic Flow Meter for Liquids (Clamp-On)

Order No.	Code	Description
D695 4610	S461F-	S461 Ultrasonic Flow Meter for Liquids main unit, USB, data logger and display
D695 4611	S461E-	S461 Ultrasonic Flow & Energy Meter for Liquids main unit, USB, data logger, display and 2 additional M8 temperature inputs
Main Unit Mounting Plate		
A4603	A	Pipe/Wall mounting plate (for pipe mounting please order metal stretcher separately)
A4604	B	35 mm DIN rail mounting plate
	C	No mounting
Output Options		
	A	Modbus/RTU
A4606	B	Modbus/RTU + 4 ... 20 mA, Pulse / Alarm
A4607	C	Modbus/RTU + Modbus/TCP
S461 Ultrasonic transducers for flow meter		
S695 4610	A	UT-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, 0 ... +80 °C, IP68 (includes coupling agent)
S695 4611	B	UTH-S, Ultrasonic transducer pair, DN40 ... DN1200, 5 m cable, M12 connector, -40 ... +130 °C, IP68 (includes coupling agent)
S461 Temperature Sensors for Energy Meter		
	A	No further sensor
S693 4610	B	Temperature sensor pair, 5 m cable, M8 connector -40 ... +130 °C, IP42, for S461 energy meter only
Sensor Installation		
		Metal stretcher for transducer and main unit installation on pipes
A695 4601	A	DN40 ... DN65 (2 pieces)
A695 4602	B	DN80 ... DN100 (2 pieces)
A695 4603	C	DN125 ... DN150 (2 pieces)
A695 4604	D	DN200 ... DN300 (2 pieces)
A695 4605	E	DN350 ... DN500 (2 pieces)
A695 4608	F	Belt stretcher for temporary sensor installations (portable unit), DN40 ... DN500 (2 pieces)

Example 1: S461 ultrasonic flow & energy meter, main unit wall mounting, output Modbus/RTU and 4 ... 20mA, ultrasonic transducer -20 ... 100 °C, transducer installation DN 200: S461E-ABBBD

Example 2: S461 portable ultrasonic flow meter, ultrasonic transducer 0 ... 80 °C: S461F-CAAAF

Useful Accessories

Order No.	Description
A553 0104	Sensor cable, 5 m, M12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0105	Sensor cable, 10 m, M12 connector, open wires, AWG 24 (0.2 mm^2)
A554 0107	Mains unit 100 ... 240 VAC/24 VDC, 0.5 A for SUTO sensors, 1,5 m cable, M12 connector
A554 4625	Transport casing S461 dimensions: 560 x 450 x 160 mm (portable unit)
A553 0159	S461 flow transducer extension cable pair, 5 m, M12, 4-pole male/female
A553 0163	S461 temperature sensor extension cable pair, 5 m, M8, 4-pole male/female
A695 4610	Coupling agent for sensor installation, 65 g
A695 4617	Transducer mounting fixture for (UT-S) ultrasonic flow transducer pair
A695 4618	Transducer mounting fixture for (UTH-S) high-temperature ultrasonic flow transducer pair
A553 0154	Cable to connect power bank, 1.8 m, USB-C connector for power bank, M12 connector

Calibration & Services

Order No.	Description
R200 4610	Calibration S461 together with transducer pair
R200 4613	Calibration temperature sensor S461

Be smart. **Measure it.**

S462

Compact Ultrasonic Flow Meter for Liquids

Clamp-on

CLAMP ON
No contact to medium

TRANSIT TIME CORRELATION TECHNIQUE

PORTABLE
Connectable to S551

LOCAL DISPLAY
For easy configuration and live values

STATIONARY
Connectable to S330 / S331 series

COMPACT DESIGN
Can be installed anywhere

Benefits

- Clamp on type, very easy installation
- No moving parts
- Can be installed on stainless steel pipe, carbon steel pipe, copper pipe or plastic pipe such as (PVC, PVDF, PPR, PPH, HDPE, etc.)
- Clean fluid measurements: water, sea water, others on request
- Available pipe sizes: DN20, DN25, DN32, DN40

Time-efficient Liquid Measurement

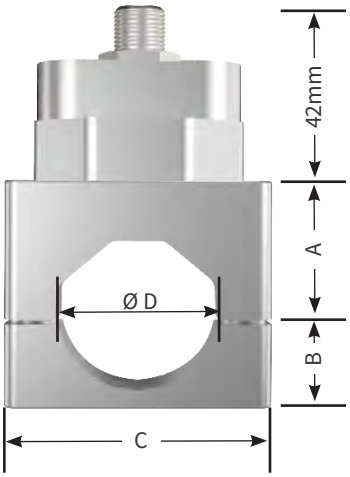
The S462 ultrasonic clamp on flow meter for liquids uses the proven transit-time correlation technique. The unit is simply clamped onto the pipe and will never come in contact with the fluid.

Available in pipe sizes from DN20 ... DN40 the S462 impresses with ease of installation and accurate flow readings. It comes with Modbus/RTU interface and 4 ... 20 mA output, which makes it easy connectable to any facility monitoring system.

Of course S462 clamp on ultrasonic flow meter also works with the SUTO displays and data loggers S330/331 and S551.

Dimensions (Main Unit)

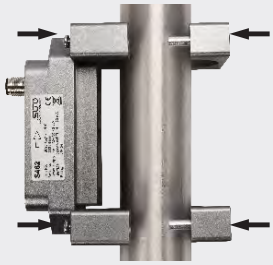
Dimensions (Mounting Bracket)



Model size	A (mm)	B (mm)	C (mm)	D (mm) min	D (mm) max
DN20	26.5	15	58	25	28
DN25	30	18	58	32	35
DN32	33	22.5	68	38	45
DN40	38	27	78	48	54

Easy Installation

Placing the couplant pads before installation to the downside part of the main unit



Easy clamp-on installation through mounting brackets

Vertical installation on a water pipe

Technical Data

Measurement

Flow	
Accuracy	1.5 % o.RDG + 0.2 % FS (0.5 ... 5.0 m/s)
Selectable units	m^3/h, l/min, GAL
Measuring range	see table below
Repeatability	0.80 % o.RDG
Sensor	Piezo ultrasonic transducer
Sampling rate	3 samples / sec
Turndown ratio	10:1
Response time (t90)	<2 sec
Consumption	
Selectable units	m^3, liter, GAL
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
Scaling	0 ... max flow / adjustable
Load	<600R
Update rate	3/sec
Fieldbus	
Protocol	Modbus/RTU
Supply	
Voltage supply	20 ... 28 VDC
Current consumption	100 mA @ 24 VDC

General data

Configuration	
Settings	via integrated keyboard
Display	
Integrated	OLED, 128 x 64 pixel (31 x 16 mm)
Data Logger	
Totalizer	Daily, monthly, yearly consumption
Material	
Housing	Aluminum alloy
Sensor	PEI
Display cover	PMMA
Key pad	F150
Miscellaneous	
Dimensions	see dimension drawing
Electrical connection	1 x M12 (5 pole)
Protection class	IP65
Approvals	CE, RoHS, FCC
Weight	0.47 ... 0.60 kg (depends on model)
Operating conditions	
Medium	Water, sea water, others on request
Medium quality	No solid particles, no air bubbles
Pipe material	Carbon steel, stainless steel, copper, PVC, PP, PU
Medium temperature	0 ... 50 °C
Ambient temperature	0 ... 50 °C
Ambient humidity	< 95 % rH
Storage temperature	-30 ... +70 °C
Transport temperature	-30 ... 70 °C
Pipe sizes	DN20, DN25, DN32, DN40

Model Depending Technical Data

	Model	DN20	DN25	DN32	DN40
Pipe size	Pipe OD (mm)	25 ... 28	32 ... 35	38 ... 45	48 ... 54
	Pipe ID (mm)	20	25	32	40
	NPS	3/4"	1"	1¼"	1½"
Flow Range	Min flow (l/min)	0.94	1.47	2.41	3.77
	Max flow (l/min)	94.2	147.2	241.2	377.0

Ordering

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

S462 Compact Ultrasonic Flow Meter for Liquids (Clamp-On)

Order No.	Description
S695 4621	S462 Clamp On Ultrasonic Flow Meter, DN20 , including 2m cable and 4 couplant pads
S695 4622	S462 Clamp On Ultrasonic Flow Meter, DN25 , including 2m cable and 4 couplant pads
S695 4623	S462 Clamp On Ultrasonic Flow Meter, DN32 , including 2m cable and 4 couplant pads
S695 4624	S462 Clamp On Ultrasonic Flow Meter, DN40 , including 2m cable and 4 couplant pads

Accessories

Order No.	Description
A695 4620	Couplant pad, 4 pieces, 0 ... +80 °C
A554 0129	Transport casing S462 , can hold 4 units, battery pack, 2 m cable, 5 m cable, cal cert, IM, dimensions: 465 x 365 x 185 mm
A554 0107	Plug-in power supply, 100 ... 240 VAC / 24 VDC, 0.5 A , 2 m cable M12 connector. Recommended for portable unit
A553 0156	Cable to connect external power bank, 1.8 m, USB-C connector for power bank, M12 connector 90 degree for S462
R200 4620	Calibration S462
A4615	Sensor cable length extension (please inquire)
A554 3310	RS-485 splitter T, with 3 x M12 connectors to connect RS-485 devices to a bus

Portable set in transport casing. Can hold up to 4 units with battery pack, cables, charger and documentation

S462 powered by external power bank with connection cable A553 0156

Note: Power bank must be sourced locally due to shipping restrictions [USB-C, 20 V, min. 80 mA]

Be smart. **Measure it.**

S211 / S215 / S220

Dew Point Transmitters

S211 -60 … +20 °C Td

FOR DESICCAN DRYERS

S215 -20 … +50 °C Td

FOR FRIGE DRYERS

S220 -100 … +20 °C Td

FOR HIGH-TECH APPLICATIONS

SIGNAL OUTPUT
4 ... 20 mA
Modbus/RTU

DISPLAY OPTION
For on-site values

COMPACT DESIGN
Makes it easy to fit into the application

PRESSURE SENSOR
integrated as option

AIR QUALITY
ISO-8573
Monitors humidity

PRECISE MEASUREMENT
± 2 °C Td Accuracy

Benefits

- Compact size makes them ideal for dryer installations
- Optional display for on-site values. Display can be rotated by 340 ° to fit your needs
- User friendly signal outputs to connect to process controls or monitoring systems
- IP65 casing provides robust protection
- Low maintenance costs due to stable and reliable measurements which increase calibration intervals
- Measured values available in several units: °C Td • g/m^3 • mg/m^3 • ppmv • g/kg (@ reference pressure) • % rH and more, please ask our support for other measurement units

1 Reliable Measurement

SUTO can rely on a 20+ years experience in developing dew point sensors used in compressed air systems and pressurized gases. During that period of time, the engineers have continued to develop new measurement methods and even developed own sensor elements for our innovative dew point meters.

2 Various Output Signal

The Dew Point Meters are perfectly suited to be integrated into process controls or high-level monitoring systems. Various output options are offered for a seamless integration:

- 4 ... 20 mA 2-wire + SDI
- 4 ... 20 mA 3-wire + SDI
- 4 ... 20 mA 3-wire + Modbus/ RTU

3 Robust Materials

The main body is made from high class aluminum alloy with a soft finish. The process connection is a 1.4301 (SUS 304) stainless steel connection, made to last forever.

Top cover made from aluminum at the same quality as the main body. The optional display cover is made from robust Polycarbonate with ABS reinforcement to withstand the rough environment.

4 Display Option

The OLED display directly mounted on the device provides on-site real time values. The display can be easily rotated by 340 ° to fit your application.

5 S220 with unique QCM Sensor

Our QCM sensor is the result of years of high-tech research and development. The sensor was especially designed for low dew point applications where other sensor types fail.

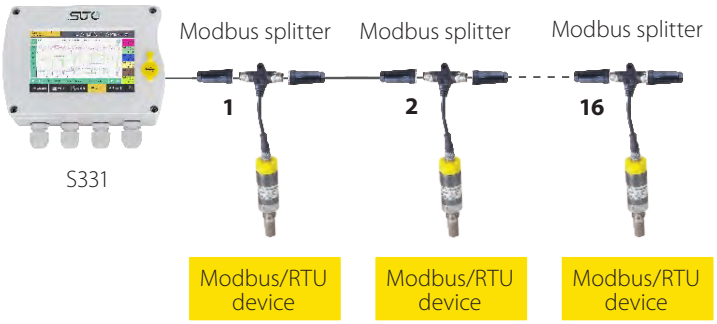
The combination of QCM and the well known Polymer sensor makes the S220 the worlds first model to measure accurate over the whole range, from -100 °C Td up to +20 °C Td by switching automatically between the two sensor elements as needed.

Measurement Ranges and Applications

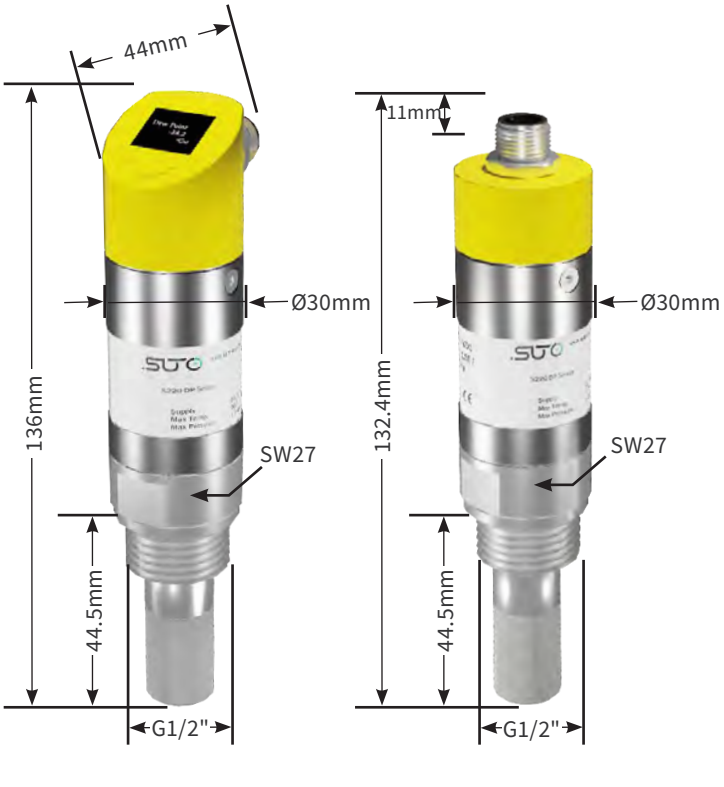
Model	S211	S215	S220
Dew point	-60 ... +20 °C Td	-20 ... +50 °C Td	-100 ... +20 °C Td
Temperature	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C
Pressure	0 ... 1.6 MPa	0 ... 1.6 MPa	0 ... 1.6 MPa
Application	In desiccant dryers	In fridge dryers	In high tech requirements and conditions

Modbus Sensor Network with S331

The Modbus/RTU bus allows to connect several devices to a single bus line via Daisy-Chain. For example up to 16 devices to a S331. The S331 is a very powerful yet cost effective new data logger and display solution.



Dimensions



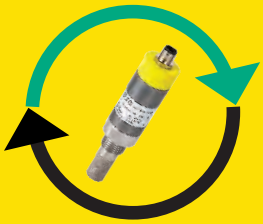
With display **Without display**

Exchange Service

No Downtime anymore!

The exchange calibration service eliminates down time and enables users to have a seamless record of their dew point measurements.

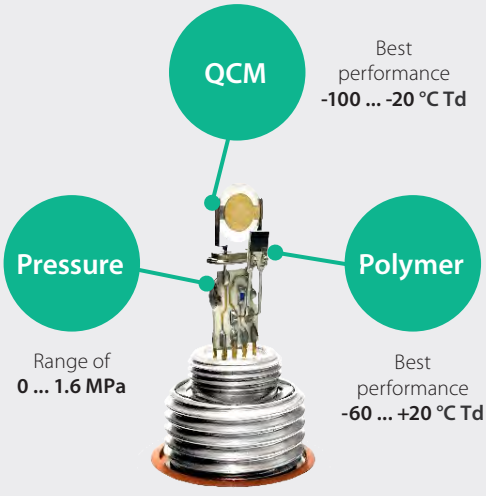
The user receives in advance a calibrated instrument with calibration certificate and the same instrument settings. The onsite instrument is then switched against the calibrated one and returned to the supplier.



SUTO | Exchange Service

S220 with unique triple sensor solution

With the S220, SUTO is combining three sensors into a single measurement unit, making it unique and the most advanced sensor available on the market, with a full range of -100 ... + 20 °C Td.



Technical Data

Specifications

Model	S211		S215		S220	
Measurement Range	Dew point Temperature Pressure	-60 ... +20 °C Td -30 ... +70 °C 0 ... 1.6 MPa	Dew point Temperature Pressure	-20 ... +50 °C Td -30 ... +70 °C 0 ... 1.6 MPa	Dew point Temperature Pressure	-100 ... +20 °C Td -30 ... +70 °C 0 ... 1.6 MPa
Dew point sensor	Polymer		Polymer		Polymer + QCM	
Operating Pressure	-0.1 ... 1.6 MPa -0.1 ... 35.0 MPa optional		-0.1 ... 1.6 MPa -0.1 ... 35.0 MPa optional		-0.1 ... 1.6 MPa	
Response time (t90)@4 l/min	0 °C Td → -60 °C Td ≤ 280 sec -60 °C Td → 0 °C Td ≤ 65 sec		0 °C Td → -20 °C Td ≤ 50 sec -20 °C Td → 0 °C Td ≤ 35 sec		0 °C Td → -80 °C Td ≤ 420 sec -80 °C Td → 0 °C Td ≤ 90 sec	
Accuracy	Dew point	+/- 1 °C Td (0 ... 20 °C Td) +/- 2 °C Td (-70 ... 0 / +20 ... +50°C Td) +/- 3 °C Td (-100 ... -70 °C Td)				
	Temperature	+/- 0.3 °C				
	Pressure	0.5 % FS				
Process connection	G 1/2" (ISO 228/1), stainless steel 1.4301 (SUS 304)					
Operating conditions	Medium Temp.: -30 ... +70 °C / Ambient Temp. : 0 ... +50 °C / Ambient Humidity: 0 ... 100 % rH					
Materials	Casing: Aluminum alloy / Process thread: Stainless steel 1.4301 (SUS 304) / Display cover: PC + ABS					
Classification / Approval	IP65 / CE					
Sensor protection	Sinter filter (stainless steel)					
Transport & Storage	Transport Temperature: -30 ... + 70 °C / Storage Temperature: -20 ... + 50 °C					
Weight	180 g					
Measured gases (Medium)	Air, Argon, O_2, N_2, CO_2*					
Output Signal	4 ... 20 mA 2-wire + SDI, 4 ... 20 mA 3-wire + SDI, 4 ... 20 mA 3-wire + Modbus/RTU					
Sensor types	Temperature sensor: Pt100 / Pressure sensor: Piezo resistive type					
Display option	0.66" OLED display, indicates the measured value and unit					
Supply Voltage	15 ... 30 VDC					

* CO_2 medium:
If the S211 is used in CO_2 the range is limited to -40 °C Td
The S211 and S220 must be set to CO_2 ex works or by using the S4C-DP Service Software + Service Kit (please state at the order if S211 and S220 will be used in CO_2)

Accessories

Measuring chamber for easy installation through quick coupling

By-pass measuring chamber with 6 mm hose connections as in- and outlet

High pressure measuring chamber for applications up to 35.0 MPa

M12 Sensor cable with open ends 5 m or 10 m

Ordering

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

	2-wire Analog & SDI output		3-wire Analog & SDI output		3-wire Analog & Modbus/RTU*3 output		3-wire Analog & Modbus/RTU*3 output With Pressure Sensor	
Transmitter Model and Range	**Order No.**	**Code**	**Order No.**	**Code**	**Order No.**	**Code**	**Order No.**	**Code**
S215 Dew Point Transmitter -20 ... +50 °C Td	S699 1215	S1215	S699 2215	S2215	S699 3215	S3215	S699 4215	S4215
S211 Dew Point Transmitter -60 ... +20 °C Td	S699 1211	S1211	S699 2211	S2211	S699 3211	S3211	S699 4211	S4211
S220 Dew Point Transmitter -100 ... +20 °C Td	S699 1220	S1220	S699 2220	S2220	S699 3220	S3220	S699 4220	S4220
Options								
Operating Pressure 0 ... 1.6 MPa (Standard)	-	A	-	A	-	A	-	A
Operating Pressure 0 ... 35.0 MPa	A1381*1	B	A1381*1	B	A1381*1	B	N/A*2	B
Without Display (Standard)	-	C	-	C	-	C	-	C
With OLED Display	N/A*2	D	A1387	D	A1388	D	A1388	D

*1 A1381: The high pressure option is only available for the models S215 and S211. The S220 can not be used in pressure applications > 1.6 MPa
*2 N/A: This option is not available for these models
*3 Standard Modbus/RTU Settings are Slave Address: last two digits of serial number / Com. Settings: 19200 baud, 8/N/1

Order Example

Code:
S3211 AD

S211 Dew point Transmitter, -60 ... +20 °C Td, 3-wire Analog & Modbus/RTU output, Operating Pressure 0 ... 1.6 MPa, with OLED Display

Output Unit

The dew point Transmitter is available with different measurement units for dew point, humidity, temperature and pressure. Standard is:
Dew point = °C Td / Temperature = °C / Pressure = bar
If you would like to have a different unit as output, please specify it at the order or use the optional Service Kit with the Service Software to change the output unit. For example pressure in PSI or humidity in ppmv.

Accessories

Order No.	Description
A699 3491	Measuring chamber with quick connector, up to 1.6 MPa, 2 l/min purge @ 0.8 MPa
A699 3493	Measuring chamber by-pass, up to 1.6 MPa, 6 mm hose connection as in- and outlet
A699 3590	High pressure measuring chamber, up to 35.0 MPa, G 1/4" inner thread process connection
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)

Calibration

Order No.	Description
R699 3396	Re-calibration dew point transmitter, incl. certificate of calibration

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Be smart. **Measure it.**

S230 / S231

Dew Point Transmitters for Ex Applications

S230	-100 ... +20 °C Td
S231	-50 ... +50 °C Td

IECE X AND GB EX APPROVAL

PRECISE MEASUREMENT
Unique QCM sensor technology

LOW DEW POINT
Measures down to -100 °C Td

DUAL SENSOR SYSTEM
High precision over the whole range

Benefits

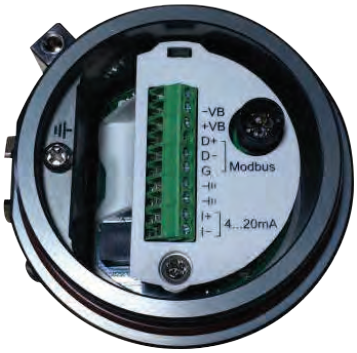
- Dew Point Transmitter made for Ex-Applications (IECEx, GB3836 Ex)
- Robust enclosure for the use rough industrial environments
- Dual sensor technology for the highest accuracy over the full range of -100 ... +20 °C Td
- G1/2" Stainless steel process connection
- 4 ... 20 mA analog and Modbus/RTU digital outputs for highest flexibility

Reliable dew point monitoring

The SUTO S230 / S231 dew point sensors provide reliable, long term stable dew point monitoring in industrial or hazardous applications. SUTO's unique dual sensor technology optimizes sensor sensitivity and accuracy by automatically selecting the ideal sensor type for the situation.

The S230 / S231 comes ready to use and simple to install with your choice of 4-20mA or Modbus/RTU (RS485) outputs. If required, parameters can quickly and easily be configured through the SUTO service software.

Cable connection

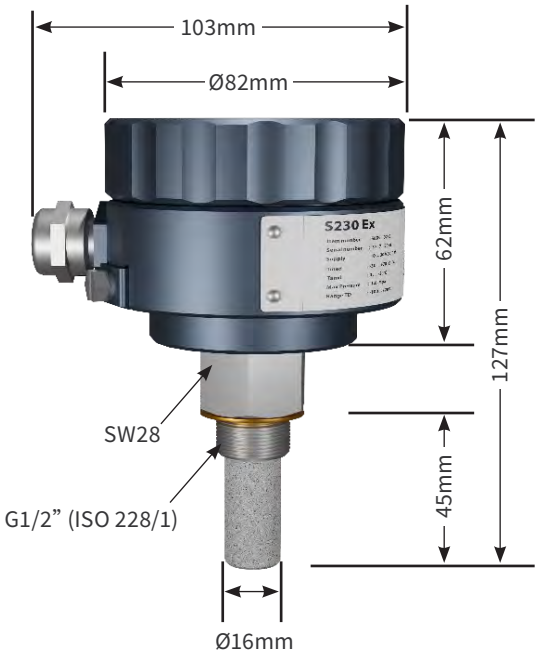


Screw terminals with signal labels inside the connection chamber

Accessories

Measuring chamber with inlet / outlet valve and compression fitting for gas supply

Dimensions



Technical Data

Measurement

Dew Point	
Accuracy	± 1 °C Td (0 ... 20 °C Td) ± 2 °C Td (-60 ... 0 °C Td) ± 3 °C (-100 ... -60 °C Td)
Selectable units	°C, °F, bar(g), MPa(g), psi(g), % rH, g/m³, mg/m³, G/m³ atm., mg/m³ atm., ppm(v), g/kg, °C Td atm.
Measuring range (model depending)	S230: -100 ... +20 °C Td S231: -50 ... +20 °C Td
Sensor	Polymer + QCM
Response time t90 (@ 4l/min)	-20 °C Td -> -60 °C Td = < 240 sec -60 °C Td -> -20 °C Td = < 30 sec
Temperature	
Accuracy	0.3 °C
Measuring range	-30 ... +70 °C
Sensor	NTC
Reference conditions	
Selectable conditions	Pressure Dew Point, Atmospheric Dew Point

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA (isolated) Modbus/RTU
Scaling	S230: 4 mA = -100 °C Td; 20 mA = +20 °C Td S231: 4 mA = -50 °C Td; 20 mA = +20 °C Td
Load	250R
Update rate	3/sec
Fieldbus	
Protocol	Modbus/RTU
Update rate	1/sec
Supply	
Voltage supply	15 ... 30 VDC
Current consumption	40 mA @ 24 VDC

General data

Configuration	
PC Software	S4C-DP Application
Material	
Process connection	Stainless steel 1.4301 (SUS 304)
Housing	Aluminium alloy
Sensor	Stainless steel 1.4301 (SUS 304)
Metal parts	Sinter Filter (stainless steel)
Miscellaneous	
Electrical connection	Screw terminals
Protection class	IP65
Approvals	Ex db[ib] IIC T4 Gb, CE
Process connection	G 1/2" thread (ISO 228/1)
Weight	728 g
Operating conditions	
Medium	Air, Argon, O_2, N_2, CO_2*
Medium quality	ISO 8573-1: 4.6.3 or better
Medium temperature	0 ... +50 °C
Medium humidity	≤ 20 °C Td
Operating pressure (model depending)	-0.1 ... 1.6 MPa (S230) -0.1 ... 35 MPa (S231)
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 100 % rH
Storage temperature	-20 ... +50 °C
Transport temperature	-30 ... +70 °C

Stated accuracy under following conditions:

- Ambient temperature 23 °C ±3 °C
- Process temperature 23 °C ±3 °C
- Ambient humidity < 95 %, no condensation
- Airflow > 2 l/min at sensor tip

Ordering

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

S230 Dew Point Transmitter (-100 ... +20 °C Td)

Order No.	Description
S699 0230	S230 Dew Point Transmitter, -100 ... +20 °C Td, G 1/2" thread, 1.6 MPa, 1 x 4 ... 20 mA, RS-485 (Modbus)
A1481	Ex option IECEx (to be ordered for hazardous environment)
A1482	Ex option GB3836 (to be ordered for hazardous environment)

S231 Dew Point Transmitter (-50 ... +20 °C Td)

Order No.	Description
S699 0231	S231 Dew Point Transmitter, -50 ... +20 °C Td, G 1/2" thread, 35 MPa, 1 x 4 ... 20 mA, RS-485 (Modbus)
A1481	Ex option IECEx (to be ordered for hazardous environment)
A1482	Ex option GB3836 (to be ordered for hazardous environment)

Accessories

Order No.	Description
A554 2301	Measuring chamber with inlet / outlet valve and compression fittings for gas supply, 1.6 MPa
A554 2302	Measuring chamber with insertion type sampling tubes (for applications where purge losses are not acceptable), 1.6 MPa
A699 3491	Measuring chamber with quick connector, up to 1.5 MPa, 2 l/min purge @ 0.8 MPa
A699 3493	Measuring chamber by-pass, up to 1.5 MPa, 6 mm hose connection as in- and outlet

Be smart. **Measure it.**

S305

Dew Point Monitor

Opt. 1	-50 ... +20 °C Td
Opt. 2	-20 ... +50 °C Td

PLUG & PLAY
Simply connect your compressed air

DEW POINT MEASUREMENT
-50 ... +50°C Td depending on the model

PRECISE MEASUREMENT
± 2°C Td accuracy

ALARM INDICATION
With internal relays or alarm units

Benefits

- Plug & Play solution, no need for complicated setup and installation
- 6 mm hose connection with quick coupling for most convenient installation
- Two ranges available:
  -20 ... +50 °C Td for fridge driers
  -50 ... +20 °C Td for desiccant driers
- Wall mountable housing with a big display and optional alarm unit
- 4 ... 20 mA output to connect it to a PLC or BMS system
- Easy alarms set up for pre- and main alarm

Refrigeration dryers are the most commonly used dryer type in compressed air system around the world. If the required drying is not achieved, the impact of wet air can be serious: Rust in the pipes, failures of machines, and a negative impact on product quality.

SUTO offers with the S305 a measuring device for dew point monitoring that kicks in alarm indications when drying values are not within the desired range.

2 Models

-50 ... +20 °C Td and -20 ... +50 °C Td

1 Dew Point Sensor

Reliable polymer dew point sensor with integrated measuring chamber for accurate readings and fast response time

2 Robobust Casing

The entire measuring unit is integrated together with the display in a rugged housing (IP65)

3 Power Supply

100 ... 240 VAC or 24 VDC

4 Output

4 ... 20 mA output to PLC or SCADA system

5 Connection

The connection to the compressed air network is via a 6-mm quick connect and corresponding connecting hose.

Dimensions

Pre- and Main-Alarm programmable

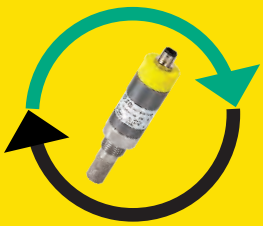
Two alarm levels can be programmed (pre and main alarm), serving an optical indications or separate relay outputs.

Exchange Service

No Downtime anymore!

The exchange calibration service eliminates down time and enables users to have a seamless record of their dew point measurements.

The user receives in advance a calibrated sensor unit with calibration certificate and the same sensor settings. The onsite sensor is then switched against the calibrated one and returned to the supplier.



.SUTO | Exchange Service

Installation

S305 is designed to be Plug & Play. There is no need for complicated setup or configuration. Simply connect your compressed air and start measuring.

Optional Alarm Unit

Wall mounted housing with a big display for dew point, temperature and humidity. The optional alarm unit can be wall mounted or mounted directly on the housing. The 360° visible LED and the alarm buzzer indicate alarms reliably.

Technical Data

Measurement

Dew Point	
Accuracy	±2 °C Td
Selectable units	°C, °F
Measuring range	-50 ... +20 °C Td
(model depending)	-20 ... +50 °C Td
Sensor	Polymer
Response time t90 (@ 4l/min)	-50 °C Td -> -20 °C Td = 20 sec
	0 °C Td -> -40 °C Td = 120 sec
Temperature	
Accuracy	0.3 °C
Measuring range	-30 ... +70 °C
Sensor	NTC
Reference conditions	
Selectable conditions	Pressure Dew Point

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA 3-Wire
Scaling	-50 ... +20 °C Td or -20 ... +50 °C Td
Load	250R
Update rate	3 / sec
Supply	
Voltage supply	100 ... 240 VAC ; 50/60 Hz
(model depending)	24 VDC
Current consumption	40 mA @ 220 VAC
(model depending)	120 mA @ 24 VDC

General data

Configuration	
PC Software	S4C-Display Software
Others	Instrument comes pre-configured Plug & Play
Display	
Integrated	LCD Display, indicates values and alarms
Material	
Process connection	Stainless steel 1.4301 (SUS 304)
Housing	ABS, Aluminium alloy
Sensor	Polymer
Metal parts	Sinter Filter (stainless steel)
Miscellaneous	
Electrical connection	Screw terminals
Protection class	IP65
Approvals	CE
Process connection	6 mm quick connector
Weight	520 g
Operating conditions	
Medium	Non-corrosive gases
Medium quality	ISO 8573-1: 4.6.3 or better
Medium temperature	-30 ... +70 °C
Medium humidity	≤ 20 °C Td or ≤ 50 °C Td (model depending)
Operating pressure	0.3 ... 1.5 MPa
Ambient temperature	-10 ... +40 °C
Ambient humidity	0 ... 100 % rH
Storage temperature	0 ... +40 °C
Transport temperature	-30 ... +70 °C

Stated accuracy under following conditions:

- Ambient temperature 23 °C ±3 °C
- Process temperature 23 °C ±3 °C
- Ambient humidity < 95 %, no condensation
- Airflow > 2 l/min at sensor tip

Ordering

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

S305 Dew Point Monitor (-50 ... +20 °C Td / -20 ... +50 °C Td)

Order No.	Description
D699 3050	S305, Dew Point Monitor, -20 ... +50 °C Td, 6 mm quick connector, 15 bar, 1 x 4 ... 20 mA, 100 ... 240 VAC, 2 relay outputs
D699 3051	S305, Dew Point Monitor, -20 ... +50 °C Td, 6 mm quick connector, 15 bar, 1 x 4 ... 20 mA, 24 VDC, 2 relay outputs
D699 3052	S305, Dew Point Monitor, -50 ... +20 °C Td, 6 mm quick connector, 15 bar, 1 x 4 ... 20 mA, 100 ... 240 VAC, 2 relay outputs
D699 3053	S305, Dew Point Monitor, -50 ... +20 °C Td, 6 mm quick connector, 15 bar, 1 x 4 ... 20 mA, 24 VDC, 2 relay outputs

Accessories

Order No.	Description
A554 0024	Alarm unit, 100 ... 240 VAC, red light and buzzer alarm, wall mountable (unit is using the relay outputs of S305 to trigger the alarm)
A554 0025	Alarm unit, 100 ... 240 VAC, red light and buzzer alarm, mounted at S305 casing (unit is using the relay outputs of S305 to trigger the alarm)
A553 0106	Power cable with mains plug, 1.8 m

Be smart. **Measure it.**

S520

Portable Dew Point Meter

Opt. A	-100 ... +20 °C Td
Opt. B	-50 ... +50 °C Td

SMART DEVICE
Dew point prediction

TOUCH SCREEN
Intuitive user interface

PRESSURE SENSOR
Enables various humidity units

DATA LOGGER
Integrated mass storage

LOW DEW POINT
Measures down to -100 °C Td

CAMERA INTEGRATED
Pictures for better reports

PORTABLE UNIT
Handheld unit within a rugged case

DEW POINT AUDITS
Indication of class on display

Benefits

- Easy to use portable meter to measure dew point, temperature and pressure on site
- Sensor selection according to your needs (-100 ... +20 °C Td with pressure sensor / -50 ... +50 °C Td version)
- ISO 8573 class measurements with powerful ISO 8573-1 PDF reporting function
- Wireless printer for on-site reporting to easily perform audits
- Unique Measuring chamber with parking function supports fast response times
- Optional smart features: End value prediction, camera and measurement snapshot

1 Dew Point Value Prediction

The S520 offers a unique dew point end value prediction algorithm as a built-in technology.

Based on the dew point measurement curve our algorithm is able to predict the end value before actually reaching the end value.

This feature enables the user to predict the dew point end value in a minimum amount of time. It helps on-site engineers to save time and to perform faster dew point audits.

Smart Features

Dew point end value prediction is a part of the smart features. With the smart features option, users also get a 5 Megapixel camera and the snapshot function for quick measurement logging.

2 Measurement Snapshot

Take a quick measurement snapshot of the current measurement, add the customer information and easily create a printed report.

All can be done on the device via touchscreen input.

3 Measurement Chamber

The unique measuring chamber with integrated parking function enables users time efficient dew point measurements.

When the instrument is not used, the measuring chamber can be set to parking position. In this state, the sensor is exposed to a desiccant, which keeps the sensor well protected and dry.

When starting the next measurement, the sensor is pre-dried and has therefore an ultra-fast response time, perfect for air audits.

4 Unique SUTO Triple-Sensor

S520 is equipped with the SUTO QCM, the Polymer and an integrated Pressure sensor.

Our QCM sensor is the result of years of high-tech research and development. The sensor was especially designed for low dew point applications where other sensor types fail.

The combination of QCM and the well known Polymer sensor makes the S520 measure accurate over the whole range, from -100 °C Td up to +20 °C Td by switching automatically between the two sensor elements as needed. At the same time the line pressure is measured.

Application: Compressed Air Quality Monitoring On Site

The S520 Portable Dew Point Meter enables more accurate and frequent quality monitoring to operators. Throughout any given day, plant personnel can check the dew point throughout their system, using the S520's detailed metrics and portability to gather useful information from even the least accessible corners of their system.

With the S520, operators can make sure that their compressed air treatment system (air dryers, filters, and drains) is functioning at its absolute peak. If the S520 reveals heightened moisture levels at any point during the routine check, personnel can quickly locate and resolve the issue, reducing instances of clogged filters and dryer problems.

Optional Printer

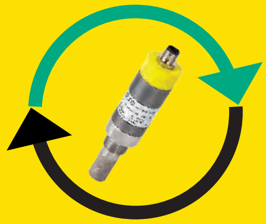
Wireless printer used to print the measurement results on site. Perfect solution for quick audits.

Exchange Service

No Downtime anymore!

The exchange calibration service eliminates down time and enables users to have a seamless record of their dew point measurements.

The user receives in advance a calibrated instrument with calibration certificate and the same instrument settings. The onsite instrument is then switched against the calibrated one and returned to the supplier.



.SUTO Exchange Service

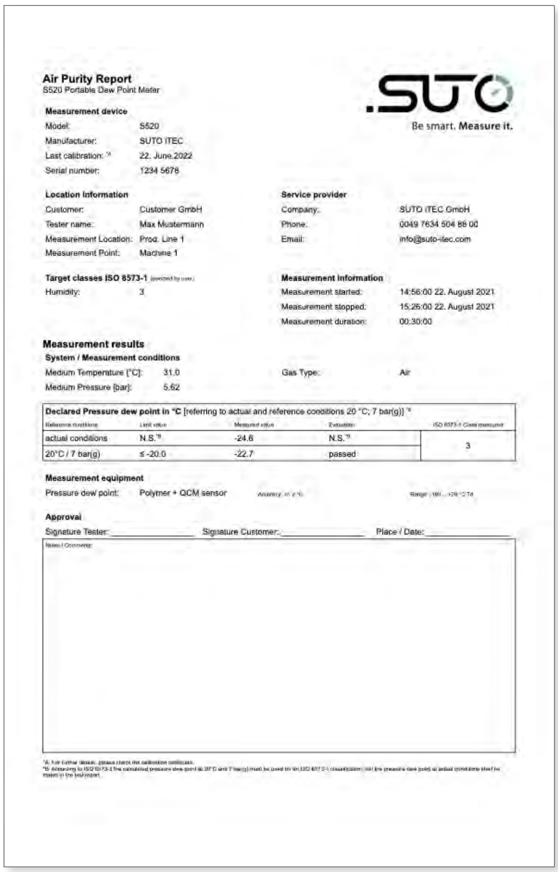
PDF Report Function according to ISO 8573-1

Create powerful PDF Reports on-site according to the ISO 8573-1 standard.

The reports are following the recommendations stated in the ISO 8573-1, additionally customer related data as well as service provider details can be entered on-screen, making it even easier to perform audits and to create meaningful reports.

PDF reports can be created from any recordings on the device and are copied on the fly to a connected USB drive.

The declared Pressure dew point in °C is stated as the measured dew point under actual conditions as well as referring to reference conditions at 20 °C/7 bar(g), as it is required by ISO 8573-1 standard. This is only possible, thanks to the integrated pressure sensor on the S520.



Air Purity Report
S520 Portable Dew Point Meter

.SUTO Be smart. Measure it.

Measurement device
Model: S520
Manufacturer: SUTO ITEC
Last calibration: *A 22. June.2022
Serial number: 1234 5678

Location information
Customer: Customer GmbH
Tester name: Max Mustermann
Measurement Location: Prod. Line 1
Measurement Point: Machine 1

Service provider
Company: SUTO ITEC GmbH
Phone: 0049 7634 504 88 00
Email: info@suto-itec.com

Target classes ISO 8573-1 (selected by user)
Humidity: 3

Measurement information
Measurement started: 14:56:00 22. August 2021
Measurement stopped: 15:26:00 22. August 2021
Measurement duration: 00:30:00

Measurement results

System / Measurement conditions
Medium Temperature [°C]: 31.0
Medium Pressure [bar]: 5.62
Gas Type: Air

Declared Pressure dew point in °C [referring to actual and reference conditions 20 °C; 7 bar(g)] *B

Reference conditions	Limit value	Measured value	Evaluation	ISO 8573-1 Class measured
actual conditions	N.S.*B	-24.6	N.S.*B	3
20°C / 7 bar(g)	≤ -20.0	-22.7	passed	

Measurement equipment
Pressure dew point: Polymer + QCM sensor

Approval
Signature Tester: ____ Signature Customer: ____ Place / Date: ____

Notes / Comments:

Technical Data

Measurement

Dew point	
Accuracy	± 1 °C Td (0 ... 20°C Td) ± 2 °C Td (-70 ... 0 / +20 ... +50 °C Td) ± 3 °C Td (-100 ... -70°C Td)
Selectable units	%rH, °C Td, g/m³, mg/m³, g/m³ atm. ,mg/m³ atm. , ppmv, g/kg, °C Td atm.
Measuring range	Sensor A: -100 ... +20 °C Td Sensor B: -50 ... +50 °C Td
Repeatability	0.5 °C
Sensor	Sensor A: QCM + Polymer Sensor B: Polymer
Pressure	
Accuracy	0.5 % FS
Measuring range	0 ... 1.5 MPa (g)
Sensor	Piezo resistive sensor
Temperature	
Accuracy	± 0.3 °C
Measuring range	-30 ... +50 °C
Sensor	PT 100

Interface & Supply

Supply	
Power supply	USB charger: 5 V, 3 A Connector: USB-C
Operating time	8h
Data interface	
Connection	USB

* At least 0.3 MPa(g) is needed for the measuring chamber supplied with the instrument. For low-pressure measurements below 0.3 MPa (g) choose the optional bypass measuring chamber A699 3501.

General data

Display	
Integrated	3.5" color LCD touch screen
Data Logger	
Storage	Integrated mass storage, 100 Million values
Material	
Housing	PC + ABS
Metal parts	Aluminium
Miscellaneous	
Protection class	IP30
Approvals	CE
Weight	2.7 kg complete set in transport case
Operating conditions	
Medium	Air, N_2, O_2, Argon, CO_2 **Note:** The CO_2 measurements with the A1371 sensor are limited to -40 °C Td.
Medium temperature	-30 ... +50 °C
Medium humidity	0 ... 90 %, no condensation
Operating pressure	-0.1 ... 1.6 MPa (g)*
Ambient temperature	0 ... +40 °C
Ambient humidity	0 ... 80 % rH
Storage temperature	-20 ... +50 °C
Transport temperature	-30 ... 70 °C

Ordering

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

S520 Portable Dew Point Meter

Order No.	Code	Description
P600 0520	**S520**	S520 Handheld Dew Point Meter with data logger Including: • Measuring chamber with parking function • 1.5 m PTFE hose 6 mm with quick coupling, USB-OTG memory stick • USB charger with USB-C cable • Certificate of calibration • Transport casing
Measuring range (Sensor unit)		
A1370	A	-100 ... +20 °C Td Standard range sensor unit, with integrated pressure sensor -0.1 ... 1.5 MPa
A1371	B	-50 ... +50 °C Td Economic range sensor unit, without integrated pressure sensor
Wireless printer		
	A	Without printer
A1372	B	With wireless printer for measurement printouts on site
Smart feature		
	A	Without smart features
A553 0106	B	With smart features (Measurement snap-shot, Dew point end value prediction, Camera)

S520 Accessories

Order No.	Description
A699 3501	By-pass measuring chamber with parking function, 0 ... 1.0 MPa, 6 mm hose quick connector as in- and outlet
A554 0021	Paper rolls for wireless printer

Example: S520ABB
S520 Handheld Dew Point Meter with data logger, measuring chamber, incl. transport casing, -100 ... +50 °C Td Standard range sensor unit with pressure measurement, wireless printer, smart features

Scope of delivery

S520

Unique measuring/parking chamber for fast sensor response

The included transport case protects the instrument. At the same time it holds all accessories.

Memory stick

PTFE hose with quick connect

USB charger with USB-C cable

Be smart. **Measure it.**

S330/S331

Display and Data Logger

S330	Display
S331	Display & Data Logger

IIOT SUPPORT
Connection to S4M software

TOUCH SCREEN
5" large color LCD

WEB SERVER
Access from world wide

VERSATILE CONNECTION
Up to 16 sensors inputs

TIGHT PROTECTION
IP65

DATA LOGGER
100 million values

Benefits

- Central unit of a compressed air monitoring system, collecting, recording and visualizing all measurement data
- High-resolution 5" color touch screen for easy operation and on-site data visualization
- Connect up to 16 Modbus/RTU sensors, 2 analog sensors and 2 SDI sensors to a single data logger
- Modbus/RTU and Modbus/TCP output alway included for a seamless integration into existing monitoring and building management systems
- Alarm monitoring for all measurement channels with on-screen indication and 2 relay outputs

Plug and Play Data Logging – Process Visualization and Analysis

The S330/S331 Display and Data Logger provides an universal solution for displaying and recording all relevant parameter of a compressed air system, which includes flow, dew point, pressure, temperature, power consumption, compressor status, and so on.

The devices offer a powerful yet cost efficient data logger and display solution for optimal and reliable management and monitoring of your compressed air system.

Inputs

2 digital inputs:

- SDI Sensors (up to 2 SDI sensors)
- Modbus Sensors (up to 16 Modbus sensors)

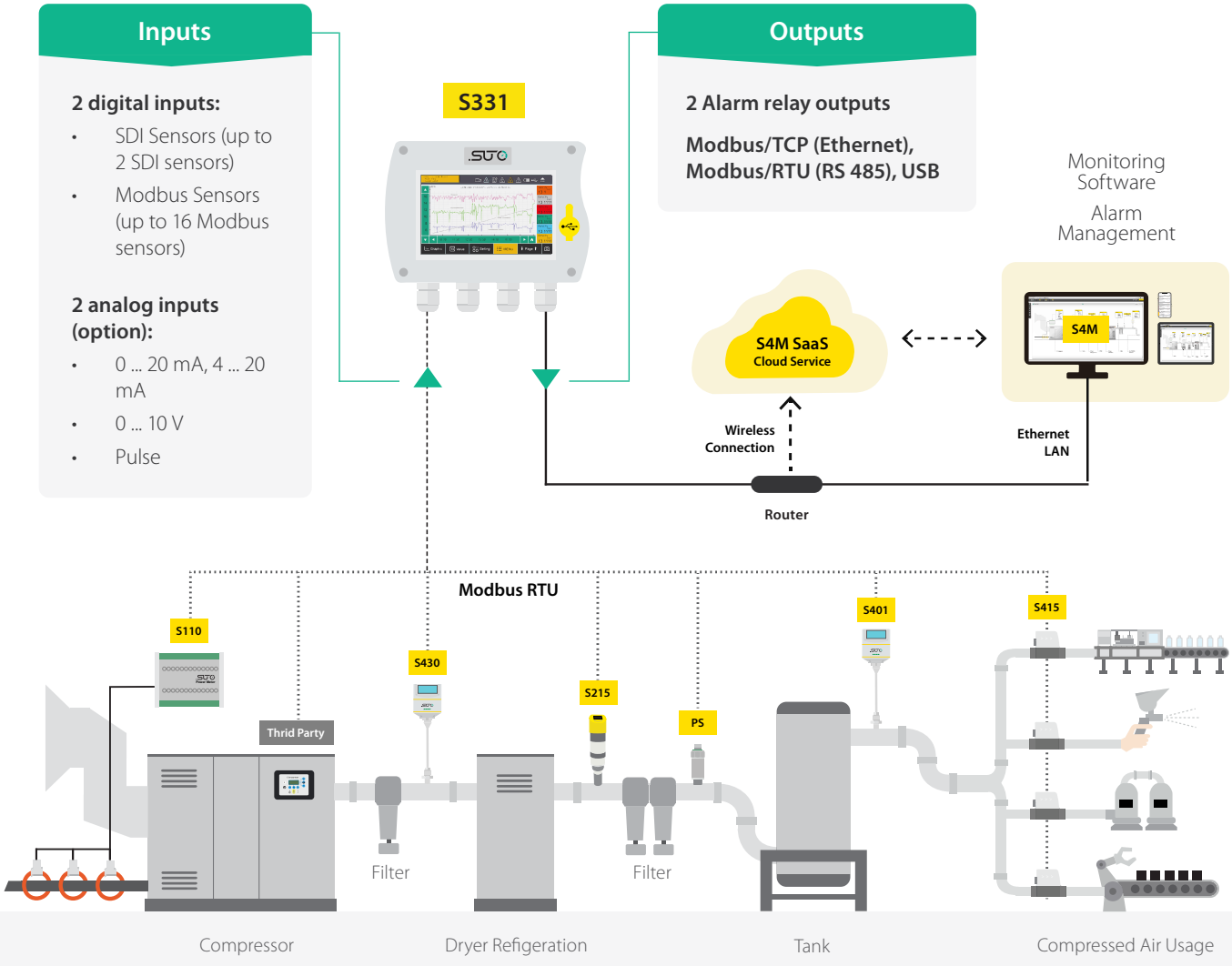
2 analog inputs (option):

- 0 ... 20 mA, 4 ... 20 mA
- 0 ... 10 V
- Pulse

Outputs

2 Alarm relay outputs

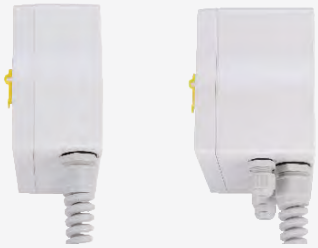
Modbus/TCP (Ethernet), Modbus/RTU (RS 485), USB



Applications

The S331 Display and Data Logger is used to gather and collect measurement data of various field devices. It acts as the central unit where all measurement data is safely stored and visualized. The digital communication outputs are not making it a display and data logger, but also a gateway to connect to IIoT services, as well as to connect it to modern software solutions

Available Installation Options



2 different wall mountable casings to fit customers needs.

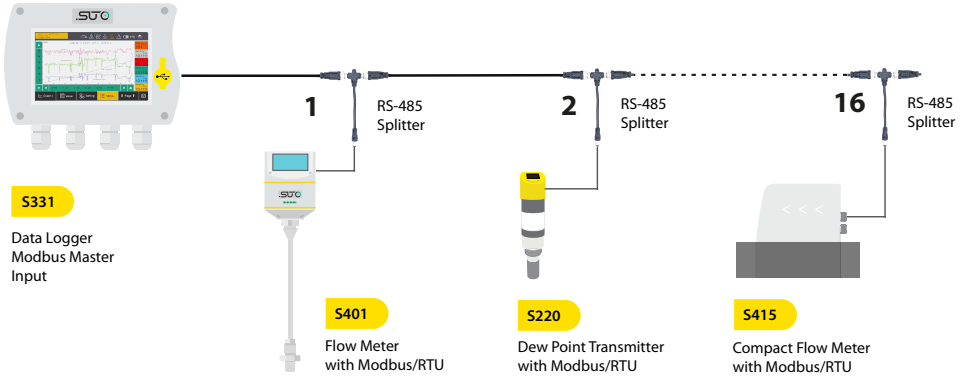
The Display can be installed in existing wall cabinets or machines via panel mounting options.

The DIN rail option is used to install the Display inside of electrical cabinets.

1 SUTO Modbus/RTU Sensor Input

The S330 / S331 includes digital inputs for SUTO SDI sensors and Modbus/RTU sensors. To connect the Modbus/RTU sensors properly on an RS 485 bus system, it's recommended to daisy-chain the sensors to one of the inputs. For this purpose, SUTO offers a RS 485 splitter to simplify the connection.

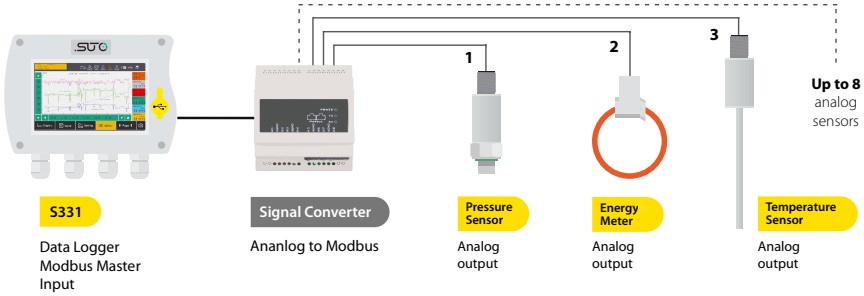
Through this method, users can add up to 16 sensors to the master input, making it most versatile and allowing to monitor whole plants with a single data logger. (Additional power supplies for field devices might be necessary)



2 Analog Sensor Input

The S330 / S331 can be equipped with an analog input option, allowing to connect 0/4... 20 mA, 0...10 V and pulse signals from field sensors. If more analog sensors need to be connected, a Analog-Modbus/RTU converter module can be easily connected, allowing to connect additionally 8 analog sensors.

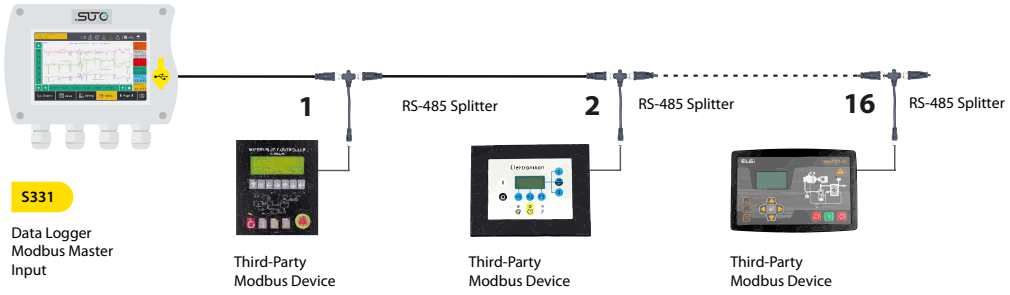
This makes the S330 / S331 most versatile and offers the possibility to connect existing field hardware and sensors seamlessly into the monitoring system.



3 Third-Party Sensor and Field Device Support

By relying on the industry standard protocol Modbus/RTU, the S330 / S331 does support third-party sensors to be easily integrated into the monitoring system. Field devices can be easily set up using the configuration software, allowing to add third-party sensor within seconds.

Of course, all connected sensor data can be logged to the internal memory, used for virtual channel calculations and real-time values are forwarded to connected software and monitoring solutions.



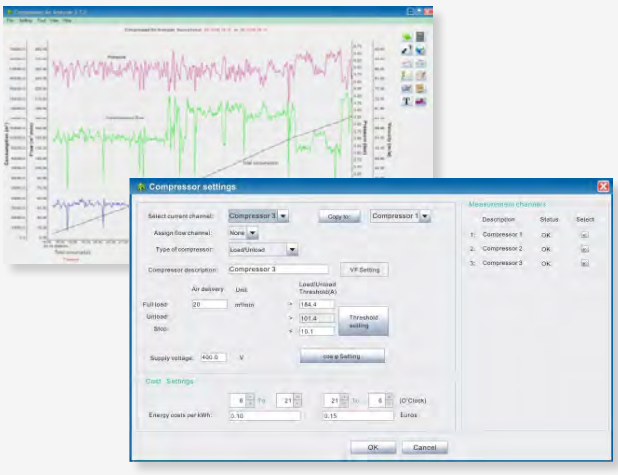
Data Analysis

Through the free SUTO S4A software recordings are downloaded to the PC via USB, LAN or wirelessly using the LTE/4G Modem. The basic analysis can be done in S4M.

For more sophisticated compressor analysis, the SUTO CAA software (incl. in S551) offers many advanced features such as:

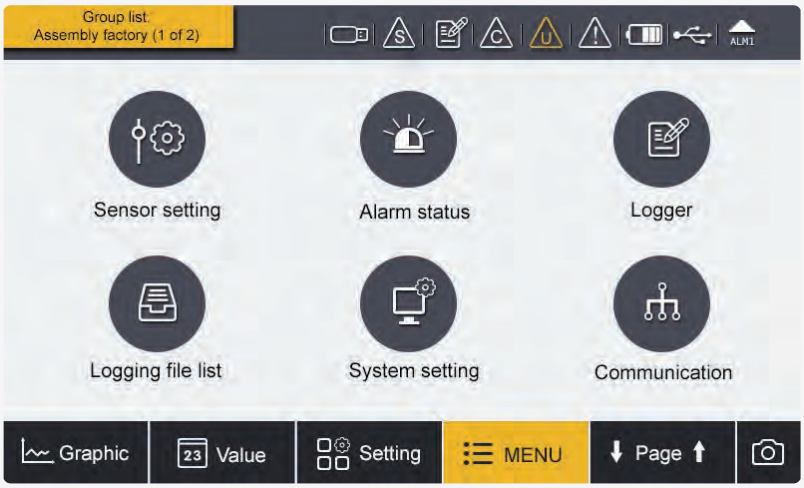
- Performance statistics of compressors (efficiency, air delivery, load/unload cycles)
- Leakage analysis
- Report generation
- and more...

Comparisons with baseline measurements from last year or last month help to identify system changes.



User Friendly Handling

The S330 / S331 comes with a high resolution 5" color touch screen interface making the operation as simple as possible.



Sensor Data Overview

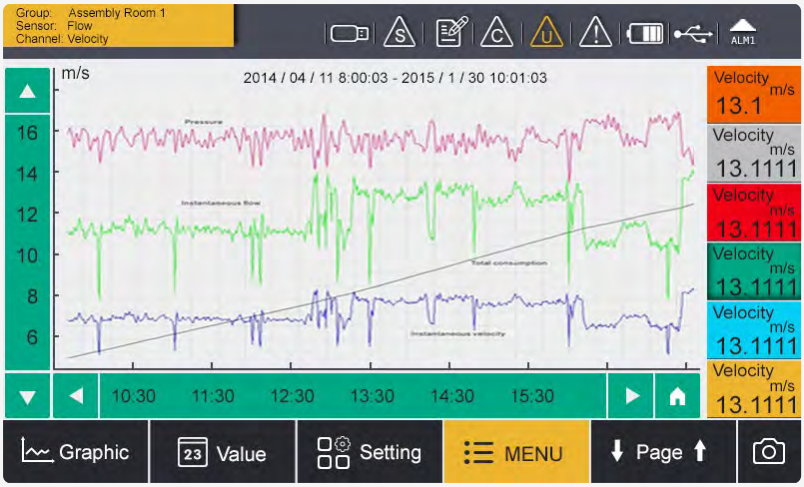
Up to 4 sensors can be viewed on one page and through page scrolling further sensors can be displayed.

This makes it easy to monitor different sensors at the same time.

Graphic Charts for Quick Analysis

Select which channels you want to view or analyze and the built in graphic analyzer will help you identify problems immediately.

For detailed analysis we recommend using SUTO S4M software.



Technical Data

Signal / Interface & Supply

Data logger	
Storage	Internal, 100 million values
Sampling rate	Optional >=1s, Max 59 mm:59 ss
Input signals	
Digital input	2 x SDI sensors 16 x RS-485 Modbus RTU Sensors 2 x 0 ... 20 mA / 4 ... 20 mA / 0 ... 10V
Analog input	2 x 0/4... 20 mA; 2 x 0... 10 V; 2 x pulse
Pulse input	100 Hz maximum; 28 V, 10 Ma
Output signals	
Analog / Pulse output	4 ... 20 mA signal and pulse signal of sensors can be looped through the display by using the connection board
Alarm output	2 relays, 230 VAC, 3 A, NC
Field bus Interface	
Protocol	Modbus/TCP (Ethernet), Modbus/ RTU (RS 485)
Electrical data	
Power supply	100 ... 240 VAC, 20 VA (option, A1663) 18 ... 30 VDC, 20 W (option, A1664)
Sensor supply	24 V, 10 W
Data interface	
Connection	Modbus/TCP (Ethernet), Modbus/ RTU (RS 485), USB

General data

Configuration	
PC Software	S4C-Display software
Display	
Integrated	Size: 5" high-resolution graphic display Resolution: 800 x 480 pixels touch screen
Material	
Housing	PC + ABS
Miscellaneous	
Electrical connection	Screw-Terminal connectors
Protection class	IP65
Approvals	CE
Weight	0.52 kg
Housing	Panel, wall mountable
Dimensions	See dimensional drawing
Cable entry diameter	4.5 ... 8 mm
Cable	Supply: AWG12 ... AWG 24, 0.2 ... 2.5 mm^2; Signals: AWG16 ... AWG 28, 0.14 ... 1.5 mm^2
Weight	0.52 kg
Operating conditions	
Ambient temperature	0 ... +50 °C
Ambient humidity	< 90 %
Storage temperature	-20 ... +70 °C
Transport temperature	-20 ... +60 °C

Ordering

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

S330 / S331 Display and Data Logger

Order No.	Option	Description
D500 0333		S330 Display, Panel Version, 2 x SDI & 16 x Modbus/RTU input, Ethernet, RS 485, USB
D500 0331		S331 Display and Data Logger, Panel Version, 2 x SDI & 16 x Modbus/RTU input, Ethernet, RS 485, USB
Analog input		
	A	None
A1662	B	2 analog inputs 0/4 ... 20 mA, 0 ... 10 V + 2 pulse inputs
Power supply (must choose one option)		
A1663	A	Power supply input 100 ... 240 VAC, 20 VA, with 2 Alarm relays
A1664	B	Power supply input 18... 30 VDC, 20 W, with 2 Alarm relays
Wall casing		
	A	None, Panel mounting
A1665	B	Wall mountable casing with 4 cable glands
A1666	C	Wall mountable casing with 7 cable glands
A1667	D	Wall mountable casing with 3 cable glands + Ethernet
A1668	E	Wall mountable casing with 6 cable glands + Ethernet
Hat rail		
	A	None
A1669	B	Hat rail holder (only in connection with wall mountable casing)

Accessories

Order No.	Description
Cables	
C219 0055	M12 connector with RS-485 termination resistor, 120 Ω , for Modbus daisy chain termination
A554 3310	M12 RS-485 (Modbus) splitter
A553 0130	USB cable for S330 / S331 (1 cable included in S330 / S331)
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 0106	Power cable with mains plug, 1.8 m
A553 0120	Ethernet cable 5 m, RJ45 plug at both ends
Converters and gateways (Please contact our customer service for further converter/gateway options)	
A554 0011	RS-485 repeater
A554 0331	RS-485 / USB converter
Software	
M599 2031	S4M, data acquisition and analyzes software
A1102	Add-on Energy Manager for S4M
Others	
D554 0031	8-channel current input module, 0 ... 20 mA, Modbus/RTU
A554 0007	Power supply wall mountable
A554 0009	Power supply for hat rail
A554 3311	Line filter for EMC protection
A554 3313	Connection board for looping 4 ... 20 mA and pulse signals to PLC, mountable in wall casing A1666 or A1668

Be smart. **Measure it.**

S320

Display

EASY TO USE
User-friendly design

POWER SUPPLY
Flexible power supply

ALARM
Optional alarm settings

USB INTERFACE
For configuration with S4C software

EASY INSTALLATION
Wall or panel mountable casing

SIGNAL INPUTS
Digital and analog input

Benefits

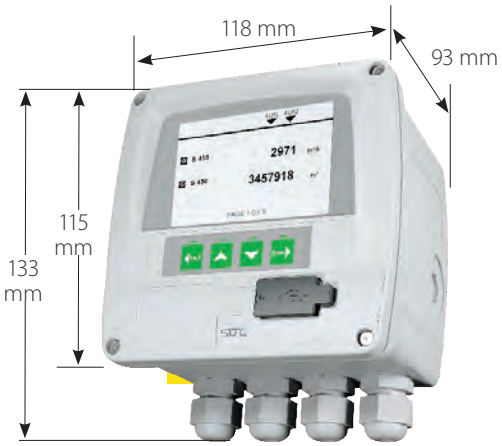
- Cost-efficient display unit for live readings on a big display
- Inputs for sensor connection:
  - 1 input for flow / dew point sensor
  - 1 input for analog sensors
- 2 relay outputs for alarm with optional alarm on display
- USB interface for configuration with S4C software
- Wall or panel mountable casing

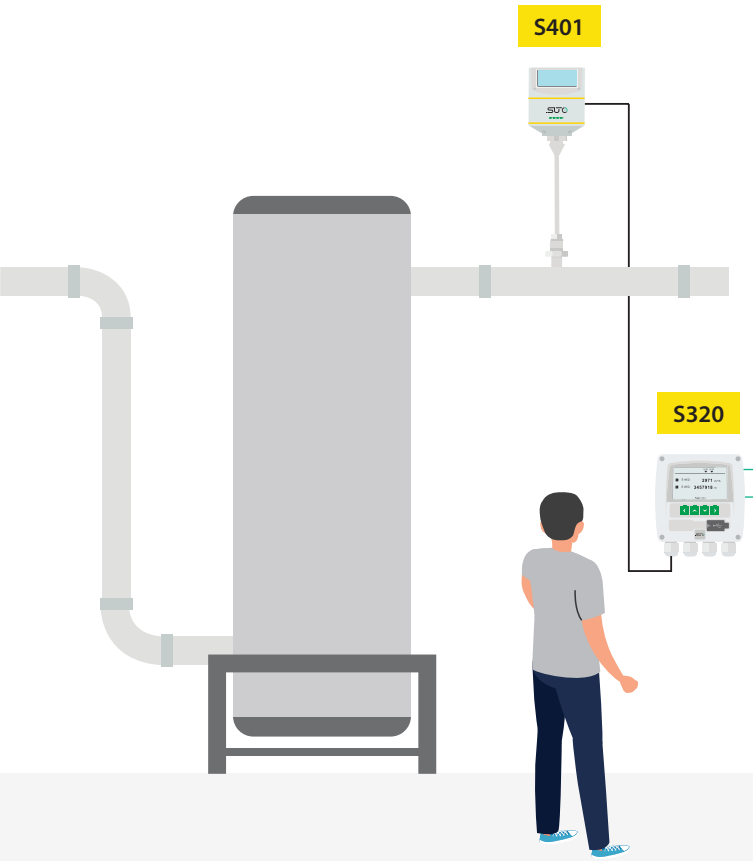
Display Solutions for Sensors

The S320 Display provides a cost efficient display solution for industrial applications where information from a single difficult-to-access sensor is required. The display has an input for SUTO flow meters and dew point sensors.

It can display all relevant parameters (flow, dew point, pressure, temperature, power consumption, compressor status etc.) in a compressed air system.

Dimensions





Inputs

1 input for SUTO flow/ dew point sensors

1 input for analog sensor
(0 ... 20 mA, 0 ... 10V)

Outputs

Communication Interfaces USB port

Other Signals / Features
2 Alarm relay outputs

Technical Data

Signal / Interface & Supply

Input signals	
Digital input	1 x SDI for dew point and flow sensors
Analog input	1 x 0 ... 20 mA or 1 x 4 ... 20 mA or
Pulse input	1 x 0 ... 10 V
Output signals	
Alarm output	2 relays, 230 VAC, 3 A
Electrical data	
	100 ... 240 VAC, 15 VA (option A1640)
Power supply	18 ... 30 VDC, 15 VA (option A1641)
Sensor supply	24 V, 10 W
Data interface	
Connection	USB to PC
Operation	Keyboard, 4 keys

General data

Configuration	
PC Software	S4C-Display software
Display	
Integrated	Graphic display, 220 x 140 pixels with back light
Material	
Housing	ABS
Miscellaneous	
Protection class	IP65
Approvals	CE
Weight	0.52 kg
Housing	Panel, wall mountable
Dimensions	See dimensional drawing
Cable entry diameter	4.5 ... 8 mm
Cable	Supply: AWG 12 ... AWG 24, 0.2 ... 2.5 mm^2; Signals: AWG 16 ... AWG 28, 0.14 ... 1.5 mm^2
Weight	0.52 kg
Operating conditions	
Ambient temperature	0 ... +50 °C
Ambient humidity	< 90 %
Storage temperature	-20 ... +70 °C
Transport temperature	-30 ... +70 °C

Ordering

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

S320 Display

Order No.	Power supply	Casing	Description
D500 0320			S320 base unit, panel version, 1 input for SUTO sensor, 1 analog input
A1640	A		Power supply 100 ... 240 VAC, 15 VA, 2 relay outputs
A1641	B		Power supply 18 ... 30 VDC, 15 VA, 2 relay outputs
		A	None
A1645		B	Wall mountable casing with 4 cable glands
Accessories			
A553 0104			Sensor cable, 5 m with M 12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0105			Sensor cable, 10 m with M 12 connector, open wires, AWG 24 (0.2 mm^2)
A553 0106			Power cable with mains plug, 1.8 m

Be smart. **Measure it.**

S551

Portable Display and Data Logger

AUTO DETECT
SDI or Modbus-based SUTO sensors

VERSATILE CONNECTION
Up to 24 sensors inputs

LTE / 4G MODEM
Access from world wide

TOUCH SCREEN
5" large color LCD

TIGHT PROTECTION
IP65

BACK-UP POWER
Battery as back-up power

Benefits

- Easy to use and cost-effective data logging solution at the point of use.
- S4A software for data analysis and remote connection via 4G / LTE Modem
- Connectable sensors for all required measurement tasks
- Up to 24 inputs through extension boxes and Modbus
- Third-party sensors can be easily connected

On site Logging

- Ultra portable and robust design to perform measurement tasks and audits on site
- High resolution 5" color touch screen interface, making the operation as simple as possible.
- Back up battery ensures continuous measurement and prevents data loss during power glitches and cuts.

Plug & Play

- With a few settings, the data logger is ready for operations with virtually unlimited memory size.
- No time consuming configuration and programming is required. Just connect the sensor and start the recording.

Optional Remote Connection

- Integrated USB port for 4G dongle connection outside the casing.
- Can be easily connected to the S4A Software and monitored remotely, no longer dependent on a Wi-Fi connection.

Compressor Efficiency Test

Knowing your Compressor Efficiency is the first step for your energy saving requirements

Applications

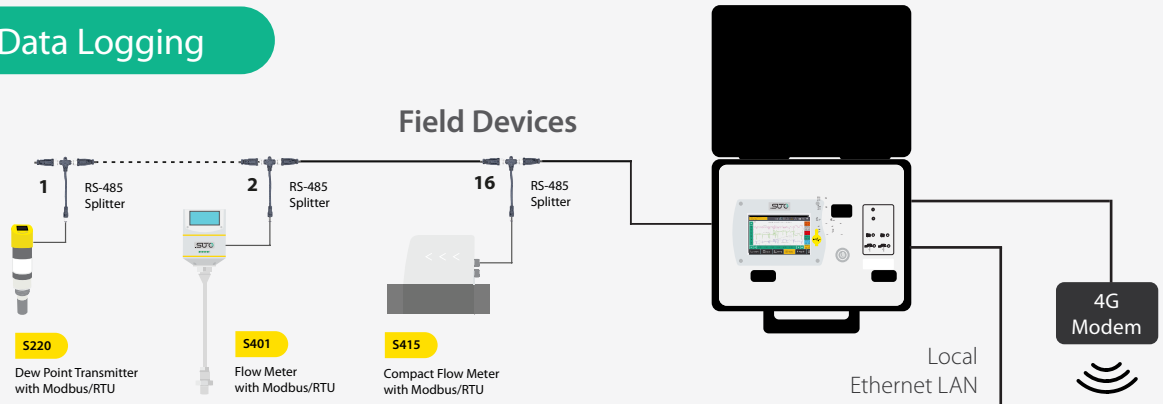
The S551 Portable Display and Data Logger is the perfect tool for compressed air service engineers as well as compressed air experts.

Due to it's compact design and the integrated battery, on-site measurements are carried out most efficient user friendly. From simple dew point spot check up to identifying insufficient compressor systems, the S551 is the tool to make these measurements.

Remote Data Analysis

The S551 is capable of sending measurement data and status information to a remote server through the Internet. This allows users to monitor the system remotely. The illustration below shows the principle setup.

Data Logging



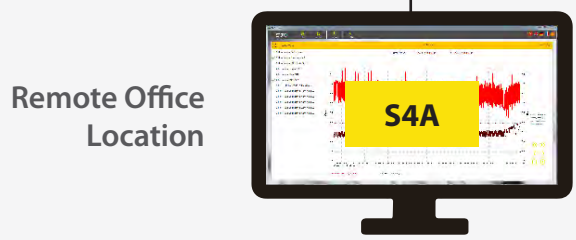
Data Analysis

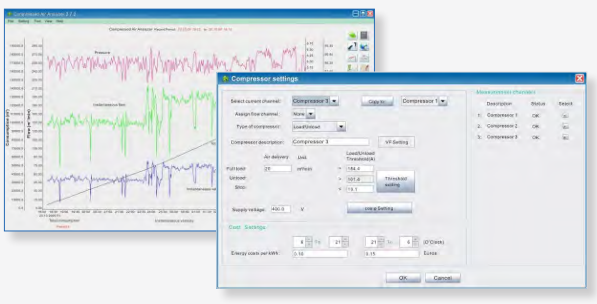
Through the free SUTO S4A software recordings are down- loaded to the PC via USB, LAN or wirelessly using the LTE/4G Modem. The basic analysis can be done in S4A.

For more sophisticated compressor analysis, the SUTO CAA software (incl. in S551) offers many advanced features such as:

- Performance statistics of compressors (efficiency, air delivery, load/unload cycles)
- Leakage analysis
- Report generation
- and more...

Comparisons with baseline measurements from last year or last month help to identify system changes.



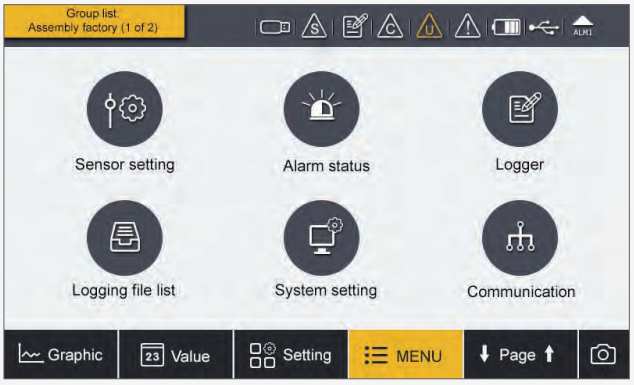


Versatile Connections and Sensor Inputs

- Connectable sensors for all required measurement tasks (air flow, air consumption, power consumption, pressure, temperature and many more)
- Up to 24 inputs through extension boxes and Modbus
- Third-party sensors can be easily connected

Industrial quick connectors allow a plug & play setup and ensure a reliable sensor connection.

Industrial Ethernet Port for LAN connections



User Friendly Interface

The S551 comes with a high resolution 5" color touch screen interface making the operation as simple as possible.

SUTO intelligent sensors are detected automatically on power-up. With a few settings the data logger is ready for operations with virtually unlimited memory size.

Sensor Data Overview

Up to 4 sensors can be viewed on one page and through page scrolling further sensors can be displayed.
This makes it easy to monitor different sensors at the same time.

Graphic Charts for Quick Analysis

Select which channels you want to view or analyze and the built in graphic analyzer will help you identify problems immediately.

For detailed analysis we recommend using SUTO software S4A, CAA or S4M.

Technical Data

Signal / Interface & Supply

Data logger	
Storage	4 GB, up to 100 million values
Sampling rate	The minimum time interval is 1 second
Digital input	
Interface	2 x SDI connectors, 2 x Modbus/RTU connectors
Update rate	Value updated every 1 sec
No. of connectable	2 x SDI sensors
Sensors	16 x Modbus/RTU sensor
Analog input	
Signal	Analog (0 ... 20 mA, 4 ... 20 mA, 0 ... 1 V, 0 ... 10 V), Pulse
Burden	max. 250 Ohm
Update rate	Value updated every 1 sec
Fieldbus output	
Protocol	Modbus/RTU, Modbus/TCP
Update rate	Value updated every 1 sec
Other outputs	
Communication Interface	4G/LTE (optional)
Purpose	View the online measurement values, read out the logging files remotely through S4A software and USB 4G dongle
Supply	
Main power supply	100 ... 240 VAC, 50/60 Hz, 1.4 A
Data interface	
Connection	USB micro, LAN (Ethernet)
Purpose	Read logger files & screenshots, show live data
Integrated web server	Remote monitoring (LAN)

General data

Configuration	
PC Software	S4C-Display (via USB or LAN)
Display	
Integrated touch screen	5" high resolution graphic display, 800 x 480 pixels with touch interface
Material	
Housing	PC + ABS
Miscellaneous	
Electrical connection	2 x M12 (5 pole) for SDI; 2 x Optional M12 (5 pole) for analog and pulse;2 x M12 (5 pole) for Modbus; 1 x RJ45 Ethernet
Protection class	IP65 (only if the suitcase lid is closed and locked)
Weight	4 kg
Operating conditions	
Operating temperature	0 ... +50 °C
Storage humidity	< 90 %
Storage temperature	-20 ... 50 °C
Transport temperature	-20 ... 50 °C

Ordering

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

Data logger	
P560 5100	S551-P4, Portable Display and Data Logger, 4 digital input channels, power cord, USB cable, S4A software, CAA software
P560 5101	S551-P6, Portable Display and Data Logger, 4 digital input channels and 2 analog, power cord, USB cable, S4A software, CAA software
A1670	USB 4G dongle for S551/S600, including S4A software

Flow sensors	
S601 0401	S401, 300 mm Shaft, insertion type thermal mass flow meter, max measuring range, DN15 ... DN300, Modbus/RTU, including 5 m cable with connector to S551
S601 0430	S430, 220 mm Shaft, insertion type Pitot tube flow meter for wet air, DN25 ... DN250, Modbus/RTU, including 5 m cable with connector to S551

Dew point sensor	
S601 0215	S215 Dew Point Transmitter, -20 ... +50 °C Td, Measuring chamber with quick coupling, 5 m cable with connector to S551
S601 0211	S211 Dew Point Transmitter, -60 ... +20 °C Td, Measuring chamber with quick coupling, 5 m cable with connector to S551
S601 0220	S220 Dew Point Transmitter, -100 ... +20 °C Td, Measuring chamber with quick coupling, 5 m cable with connector to S551

Pressure sensors	
S694 1886	Pressure Transmitter, 0 ... 1.6 MPa(g), 4 ... 20 mA including a 5 m cable with connector to S551 (works only on S551-P6)
S694 0356	Pressure Transmitter, 0 ... 4.0 MPa(g), 4 ... 20 mA including a 5 m cable with connector to S551 (works only on S551-P6)
S694 1887	Pressure Transmitter, 0 ... 1.6 MPa(g), Modbus/RTU including a 5 m cable with connector to S551 (works on S551-P4 & P6)
S694 1888	Pressure Transmitter, 0 ... 4.0 MPa(g), Modbus/RTU including a 5 m cable with connector to S551 (works on S551-P4 & P6)

Amp sensor	
S554 0156	Electrical Current Transmitter, 1000A, 100 mm diameter, including connector to S551
S554 0157	Electrical Current Transmitter, 3000A, 150 mm diameter, including connector to S551

Temperature sensor	
S693 0005	Temperature Transmitter, -50 ... +200 °C, 4 ... 20 mA loop powered, 6 x 150 mm sensor tube, 5 m cable with connector
A554 6003	Compression fitting, 6 mm, G ½" thread, 0.6 MPa
A554 6004	Compression fitting, 6 mm, G ½" thread, 1.6 MPa

Power meter (for 3 phase and single phase measurement)	
P554 0134	Portable Power and Energy Meter S110-P, Modbus/RTU, including 4 test leads, 4 test clips, 5 m cable with connector to S551
S554 0160	Electrical Current Transmitter for S110-P, 1000 A, 100 mm diameter, 1.8 m cable, connector to S110-P
S554 0161	Electrical Current Transmitter for S110-P, 3000 A, 150 mm diameter, 1.8 m cable, connector to S110-P
S554 0162	Electrical Current Transmitter for S110-P, 100 A, 160 mm diameter, 1.8 m cable, connector to S110-P

Note: For 3 phases power supply 3 Rogowski coils are needed.

Ordering

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

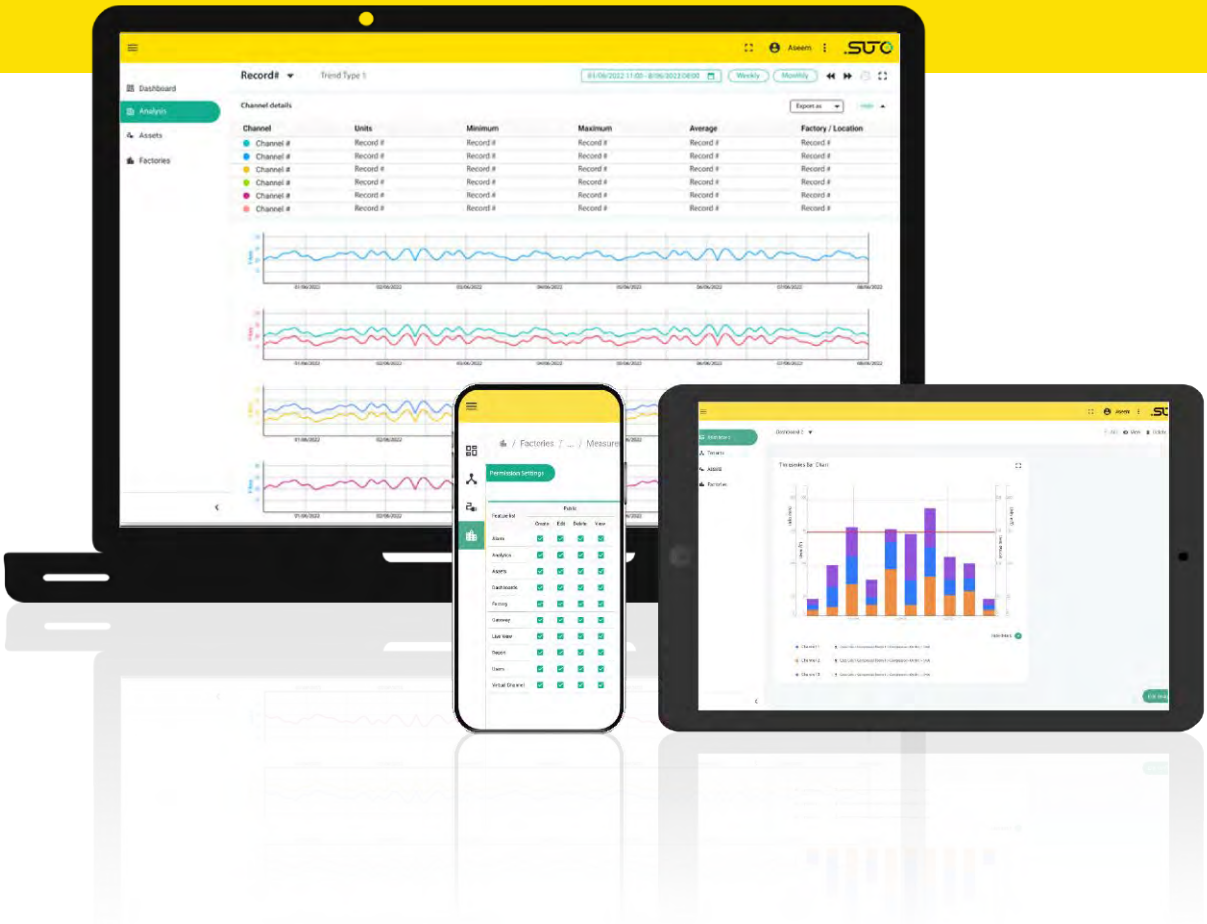
Other sensors / extensions	
P554 0080	8 channel analog input extension, connectable to S551, including 5 m cable with connector, 2-wire sensors support only Note: we offer other two models which supports 3-wire inputs and combination of 2-wire and 3-wire. Please contact the sales.
A554 3314	Portable Modbus splitter box, with M12 connector
Accessories	
A553 0103	Extension cable, 5 m, male-female connectors
A553 0110	Open wires cable, 5 m cable with connector
A553 0111	Sensor cable, M12, 5 m with connector to S551
A554 0035	Transport case S551 for sensors and cables, L560 x W450 x H160 mm (internal compartment can be arranged according to your individual sensor requirements)
A554 0036	Transport case, customized for 1 x S110-P, 3 Rogowski coils, 4 x test leads, 4 x test clips, 1 x S430

* Please contact us for further accessories and details.

Be smart. **Measure it.**

S4M SaaS

Smart Compressed Air System Monitoring Software



Next Level of Compressed Air System (CAS) Monitoring Software Service

- PROCESS VALUE VISUALIZATION
- CUSTOMER MANAGEMENT
- LIVE VIEW OF PROCESS DATA
- POWERFUL REPORTING MODULE
- EXTENSIVE DATA ANALYSIS
- MONITORING & OPTIMIZATION
- ALARMS & NOTIFICATIONS
- PERSONALIZED INTERFACE

Benefits

- Ensuring system performance and reliability with remote monitoring and alarm management
- Energy saving and CO_2 emission reduction by detecting system efficiency potentials
- Live monitoring of air production, usage and historical records for detailed system overview
- Minimization of initial CapEx by fast development and launch
- Easy to use plug & play solution for fast implementation of gateways and devices
- Auto-generate customized CAS reports for audits

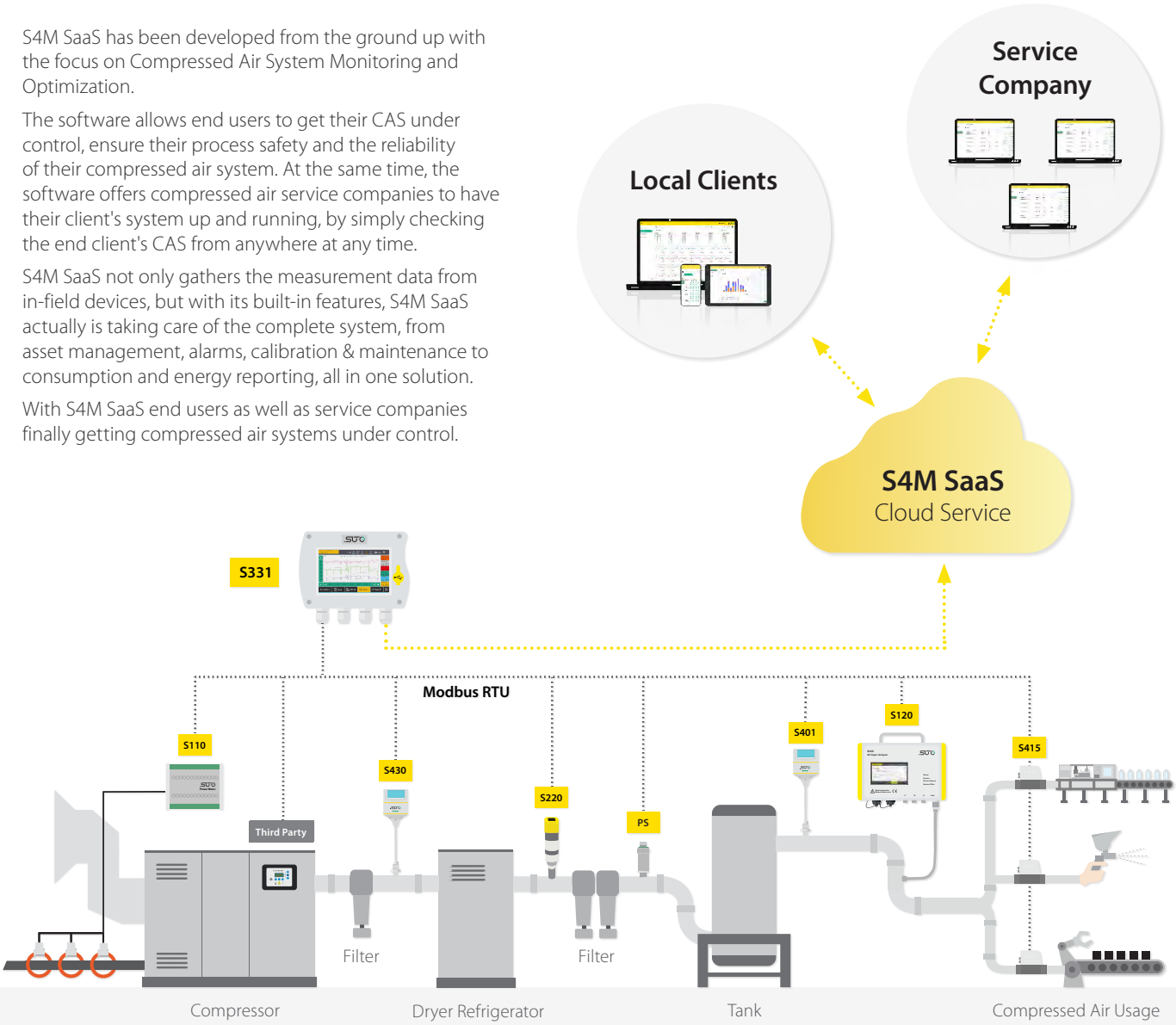
Manage and ensure your whole compressed air system — **reduce downtime and costs**

S4M SaaS has been developed from the ground up with the focus on Compressed Air System Monitoring and Optimization.

The software allows end users to get their CAS under control, ensure their process safety and the reliability of their compressed air system. At the same time, the software offers compressed air service companies to have their client's system up and running, by simply checking the end client's CAS from anywhere at any time.

S4M SaaS not only gathers the measurement data from in-field devices, but with its built-in features, S4M SaaS actually is taking care of the complete system, from asset management, alarms, calibration & maintenance to consumption and energy reporting, all in one solution.

With S4M SaaS end users as well as service companies finally getting compressed air systems under control.



Customizable Dashboard

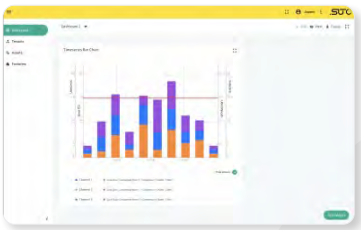
- Dashboard for system overview and monitoring
- Real-Time data and graphical analysis from the dashboard
- Dashboard fully customizable to users needs with dashboard widgets
- Quick analyzes directly from the dashboard
- Alarm and status indication

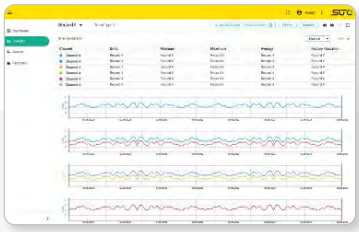
Powerful Data Analysis

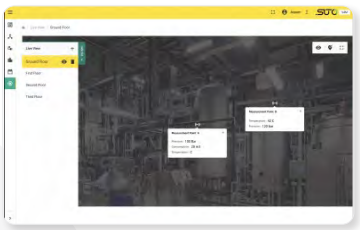
- Analyze all channels and parameters within a single module
- Compare historical data with actual data
- Benchmark your system and define KPIs
- Easily find weak spots and optimization potentials at a single glance

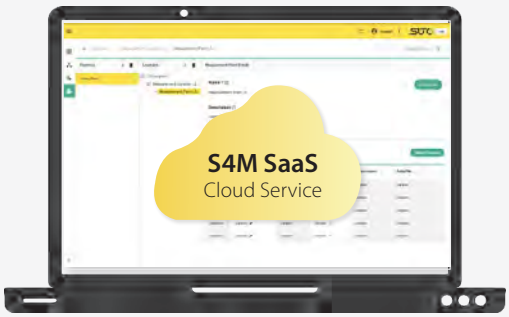
Live View of Process Data

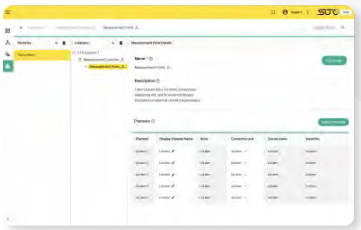
- Real-time measurement data of multiple factories and locations
- Live view of all measurement channels
- Drag & drop marker to place measurement data
- Upload system / factory plan to place your measurement device
- Alarm indications and notifications

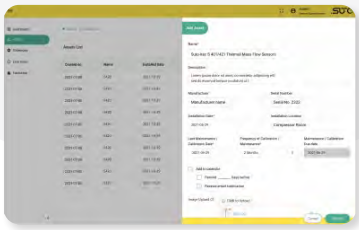


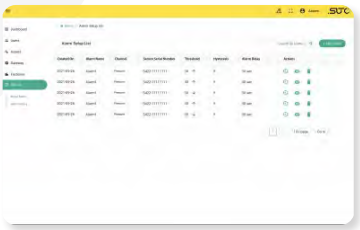












Location Management

- Logical and easy to understand complex structures of field devices
- Define factories, measurement locations and measuring Points
- Assign factories to different customers
- Convert Measurement units and set up virtual channels

Asset Management

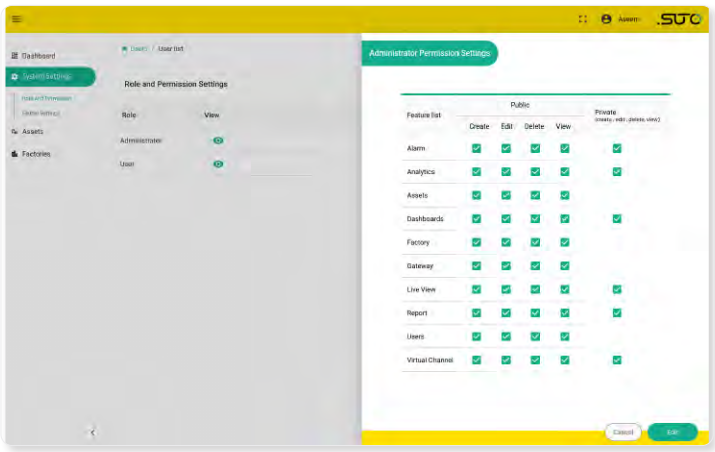
- Track all components of the CAS in a single solution
- Create maintenance and calibration schedules and get notified in time
- Set up regular tasks on your CAS
- Track sensitive equipment by serial number & get notifications

Alarm Management

- System wide alarm management with full alarm history
- Active alarms list with mute functions during maintenance or repairs
- Assign alarms to any channel within the system
- Multiple on-screen alarm notifications as well as email and push notifications on smartphones

Powerful User Access Right Management

- Easy to set up check-box based access-rights management
- Most flexibel user rights: Read-only accounts, default user accounts, multiple administrators
- Access rights management for each module
- Create private dashboards, alarms, analytics to be seen only by the specific user
- Set up multiple accounts and distribute their access rights



Create Powerful Reports

- Create powerful reports with a single Click
- Regular reporting with suggestions
- Energy cost and consumption reports
- Get reports sent automatically daily, monthly, weekly, quarterly or annually by Email
- Customize report colors and logos
- No more manual reporting needed so user can focus on more important things
- Set up management users to receive automatic financial reporting

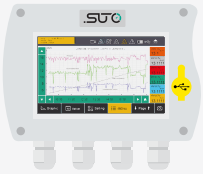
Why Data Is So Important?

Compressed air is one of the most expensive energy forms and widely used in almost any application and process. Almost 50 % of the compressed air and gases that is generated is not used efficiently.

Profound real-time system data will help to unleash optimization potentials:

- System Performance and Reliability
- Energy Efficiency and Cost Reduction
- Product Quality and Safety
- ISO Purity Requirements
- Carbon Footprint Reduction
- Less Maintenance and System Failures

Data Logging

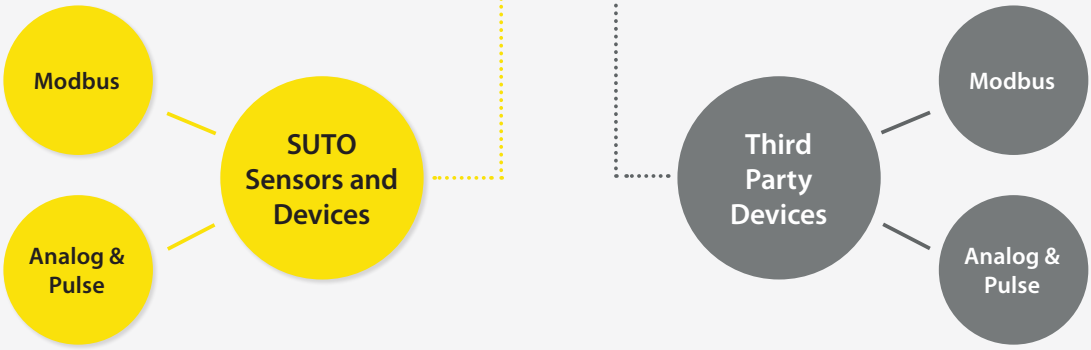


S331 Data Logger and Display

Plug & Play gateway and central interface between field devices and S4M SaaS monitoring solution.

Connect up to 16 Modbus/RTU sensors, 2 analog sensors and 2 SDI sensors to a single data logger

Field Devices



SUTO SDI and Modbus/RTU sensors as well as analog sensors can be connected to the S4M SaaS within minutes. To connect the Modbus/RTU sensors properly on an RS 485 bus system, it's recommended to daisy-chain the sensors to one of the inputs. For this purpose, SUTO offers a RS 485 splitter to simplify the connection.

Through this method, users can add up to 16 sensors to the S331 master input. This allows to monitor whole plants with the S4M SasS using a single data logger.

By relying on the industry standard protocol Modbus/RTU, third-party sensors and device can be easily integrated into the S4M SaaS through the S331 Data Logger Gateway. Field devices can be easily set up using the configuration software, allowing to add a third-party sensor within seconds.

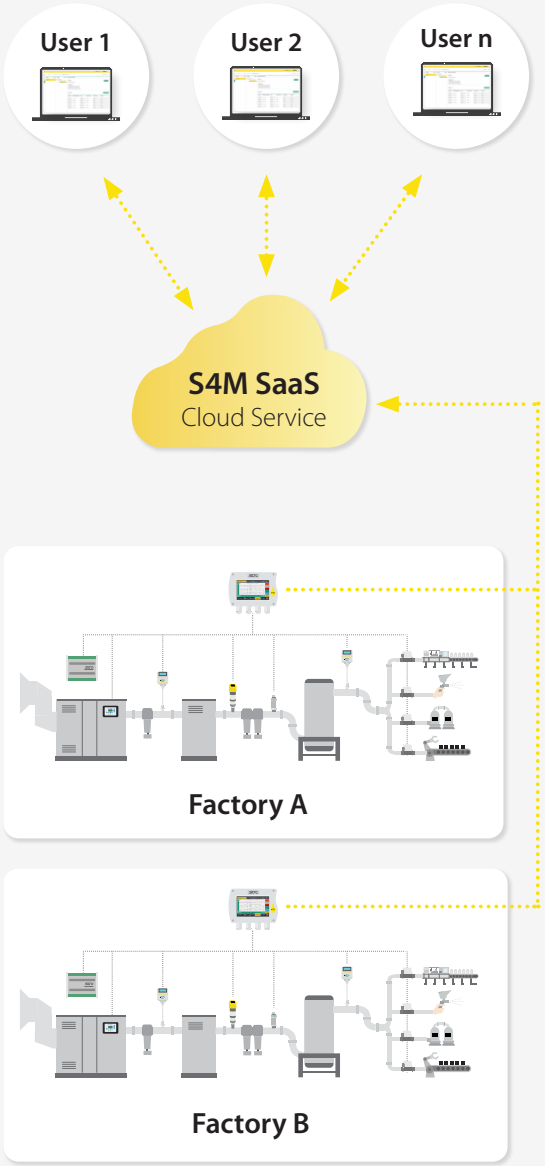
Of course, all connected sensor data can be logged to the internal memory, used for virtual channel calculations. At the same time, real-time values are sent to S4M SaaS and safely stored.

User and Access

End User License

The End User License is made for the Compressed Air System Operators and Facility Management.

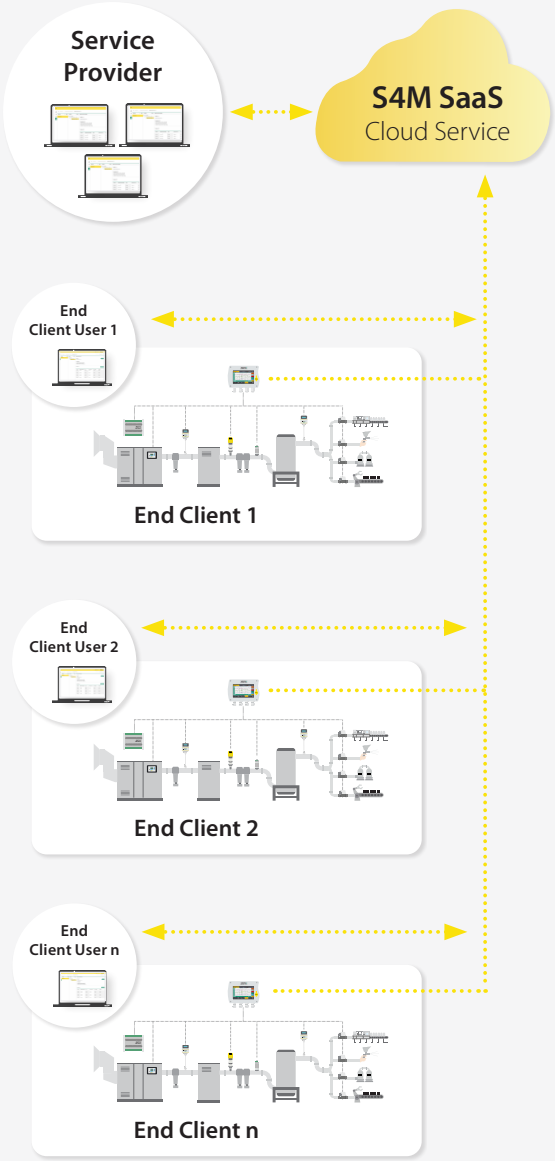
This License grants access to the own compressed air system throughout the whole factory and among multiple locations. The system can be accessed by multiple users within the same organization.



Service Provider License

The Service Provider License is made for Compressed Air Service Companies, which are offering their service for clients. Service Companies are enabled to monitor their clients compressed air systems, all over the world.

Each client is separated and the Service provider is enabled to grant the end clients access to their own system.



License Packs

	Trial	Starter	Essentials	Team	Enterprise
License Type	End User	End User	End User	Service Provider	Service Provider
User	1	1	5	10	100
Number of Channels	5	20	50	100	500
Add Additional Channels	✗	✓	✓	✓	✓
Add Additional Users	✗	✓	✓	✓	✓
License	Free (For 90 Days)	Annual Subscription	Annual Subscription	Annual Subscription	Annual Subscription

Contact Us

Please contact our sales to assist you finding the license type which suits your requirements.

EUROPE

+49 (0) 7634 50488-00

sales@suto-itec.com

CHINA

+86 (0) 755 8619 3164

sales.cn@suto-itec.com

ASIA/PACIFIC

+852 2328 9782

sales.asia@suto-itec.com

NORTH AMERICA

+1 (616) 800-7886

sales.us@suto-itec.com

Explanations

User

A user is a login who can access the system and full functionalities. User access rights can be controlled by the administrator and set individually.

One user is always the administrator with all access rights.

Channels

Each Measurement value is represented as a channel.

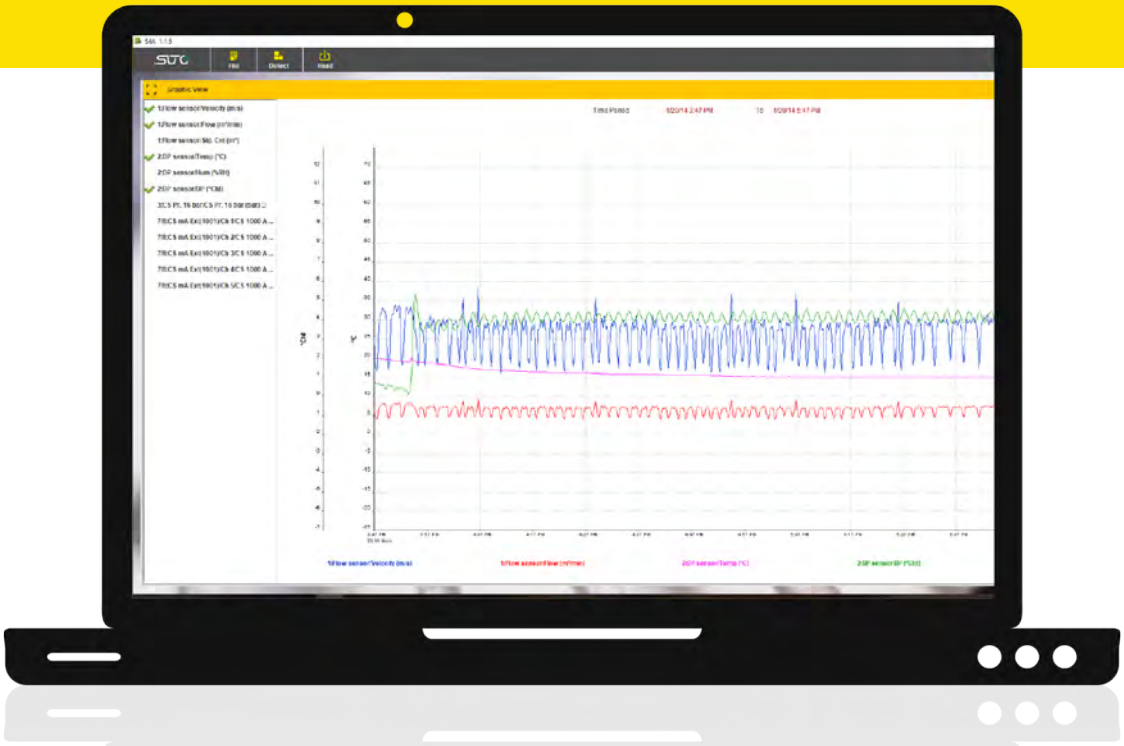
Example: 1 Flow Meter (Flow and Consumption = 2 channels) + 1 Dew Point Meter (Dew point, Temperature and Humidity = 3 channels) results in a total of 5 channels.

Created virtual channels are represented as a channel and part of the total channels available

Be smart. **Measure it.**

S4A

Data Analysis Software



GRAPHIC ANALYSIS
Powerful graphic analysis

ONLINE READING
Real time data reading with USB or Ethernet connection

FREE TO USE
No payment or subscription needed

ANALYSIS ON EXPORTED FILES
Export data to the .XLSX and .CSV file

READOUT OF SCREENSHOTS
Read screenshots from SUTO S331

REMOTE CONNECTION
Read out field devices via Internet connections

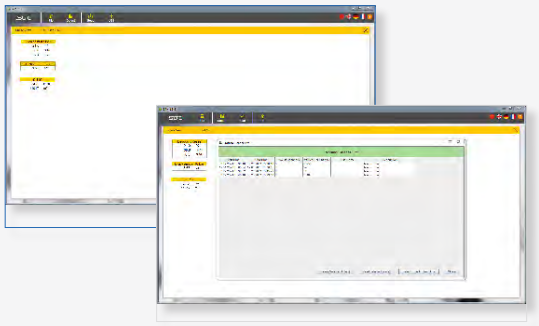
Benefits

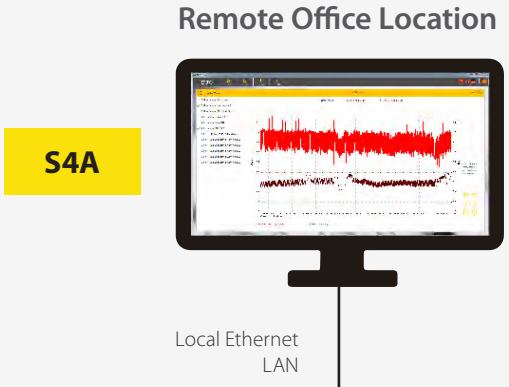
- Free software with quick analysis through powerful graphs and exported tables
- On-site real time analysis through online data reading
- Remote access of SUTO displays and Loggers that are equipped with LTE/4G modem
- Easy installation with installation wizard
- Multiple languages available

Data Analysis with S4A

S4A is a stand alone free software used to analyze measurement data recorded by SUTO data loggers. Local stored logger files from any SUTO device with logging function can be opened, analyzed and exported.

- Real-time online readings of a SUTO device via a USB , Ethernet or wireless LTE/4G connection.
- Powerful graphic tools allowing basic and in-depth analyzes of the data and prepare reports.
- Easy is to set up interface for hassle-free use. No complicated setup menus or configurations. Simply connect SUTO data loggers and read logging files with a single click.
- Integrated export function offers data exchange in .xlsx and .csv format.
- Software recordings are downloaded to the PC via USB, LAN or wirelessly using the LTE/4G Modem.
- The wireless connection offers full functionality as if the devices would be connected via USB. This makes it most flexible and versatile.





Download

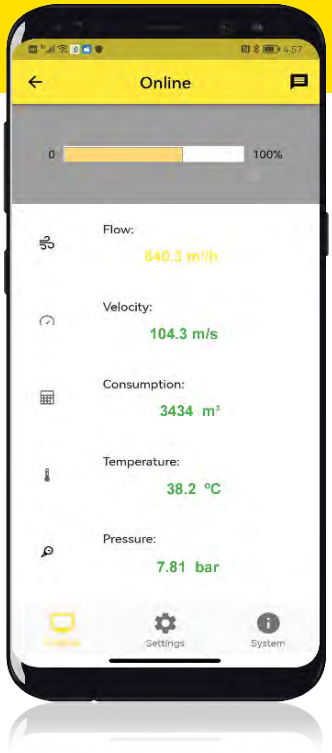
The S4A Software is offered for free and the latest version can be downloaded from the SUTO homepage, no registration or subscription needed.

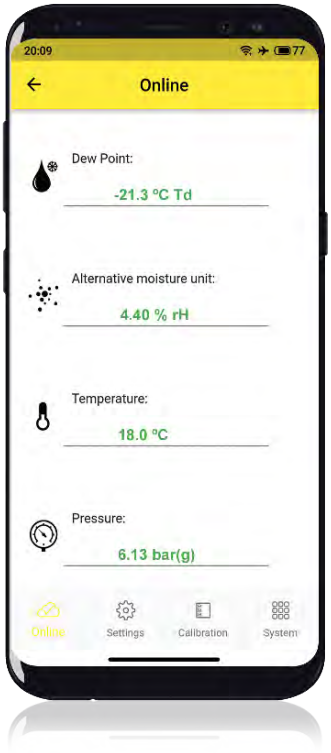
www.suto-itec.com

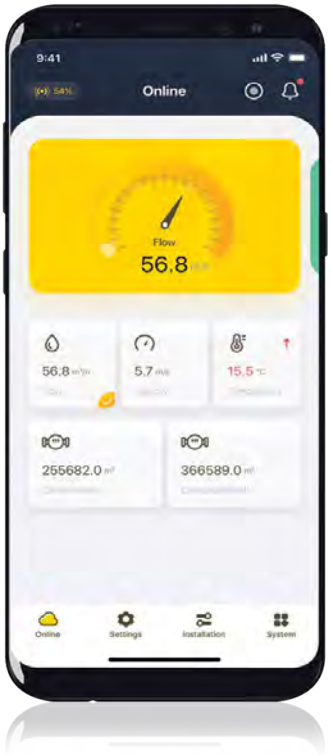
Be smart. **Measure it.**

S4C

Smartphone Apps





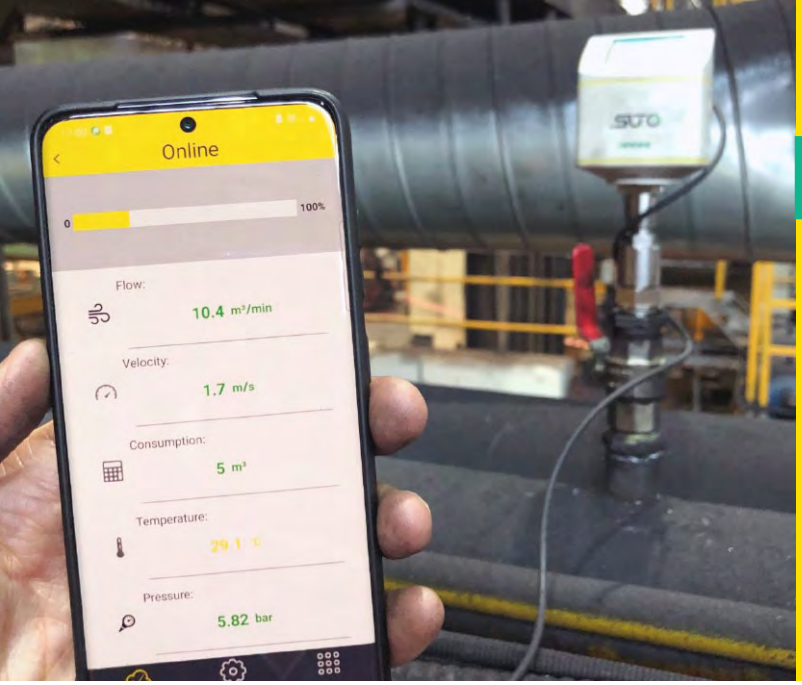


FREE SMARTPHONE APPS
For remote Configuration

ONLINE READING
Live measurement data

EASY TO USE
User-friedly design

WIRELESS CONNECTION
Connection to devices in hard-to-reach places

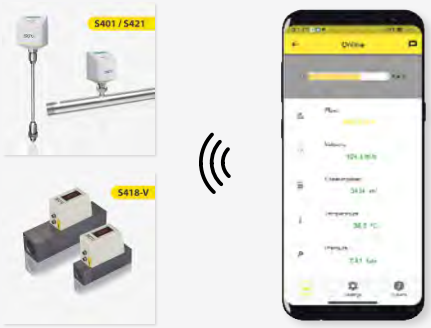


Benefits

- Wireless connection to SUTO iTEC field devices
- On-site configuration without the need of PC; everything runs from your smartphone
- Third-party access protection by QR code protected settings
- Real-time data readings and sensor settings
- User friendly design with intuitive workflows
- No registration or subscription needed
- Online Configuration and guided setup as well as customer calibration features

S4C-FS App for SUTO Flow and Consumption Meters

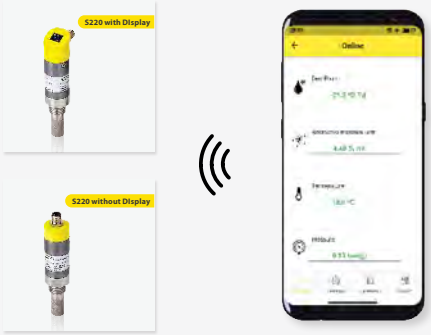
- Connect wirelessly to SUTO flow and consumption sensors
- Download for Android© and iOS© smartphones
- Live data in the palm of your hands
- On-site configuration and settings
- Fast commissioning of field devices
- User calibrations
- Data logger settings and operations



S4C-DP App for SUTO Dew Point Meters

- Connect wirelessly* to SUTO dew point sensors
- Download for Android© and iOS© smartphones
- Live sensor readings on your smartphone
- On-site configuration and settings
- Fast commissioning of field devices
- User calibrations and adjustments

*needs the optional Wireless-DP-Adapter



S4C-US App for SUTO Ultrasonic Meters for Liquids

- Connect wirelessly to SUTO ultrasonic flow meters
- Download for Android© and iOS© smartphones
- Guided setup and installation
- Adjust installation parameters and get signal quality feedback
- Actual Flow and Total consumption as well as historical data
- On-site configuration and settings
- User calibrations

Be smart. **Measure it.**

S120

Oil Vapor Monitor

Opt. 1 Without Display

Opt. 2 With Display

ACCURATE RESULTS
Latest PID senor technologyg

TOUCH SCREEN
For easy operation

EASY INSTALLATION
Plug and Play Solution

COMPACT DESIGN
Fits into your application

DATA LOGGER
Integrated as option

DEW POINT SENSOR
Option:
-100 ... +20 °C Td

Benefits

- Plug & Play setup with quick connections. Can be used in portable and stationary applications.
- Oil vapor measurement in a range of 0.001 to 5.000 mg/m³
- Various output signals to connect the unit to building management systems
- PID sensor technology for fast response time and Online monitoring
- Optional with integrated 5" touch screen display with data logger function
- Optional with integrated dew point measurement
- LED indications for status and alarms

Simple Installation – Outstanding Performance

The S120 is designed to offer users an efficient way of measuring residual oil contents in a compressed air system.

The integrated automatic calibration compensates temperature and humidity drifts in the supplied air, resulting in most accurate, reliable and long term stable measurement results.

The simple plug & play installation, as well as its outstanding performance, makes the S120 the ideal choice when oil vapor needs to be measured and monitored.

Optional Integrated Dew Point Sensor

To ensure compressed air quality and purity, dew point measurement is an essential key parameter. Therefore, we offer an optional integrated Dew Point Sensor, -100 ... +20 °C Td, to measure both parameters in one compact device with an excellent price performance ratio.

Applications

Oil free compressed air is not an easy task to be achieved. Monitoring is a must in many industries and applications to avoid contamination in products and risks for health of humans.

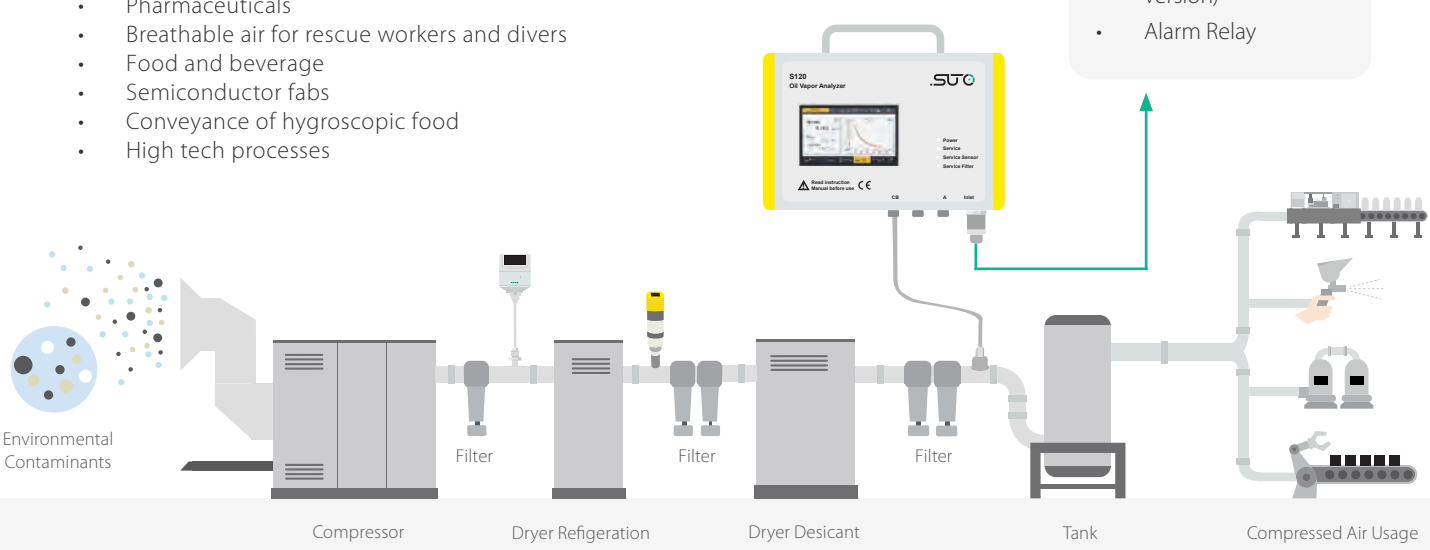
- Medical air
- Pharmaceuticals
- Breathable air for rescue workers and divers
- Food and beverage
- Semiconductor fabs
- Conveyance of hygroscopic food
- High tech processes

S120

Portable and stationary Solution

Output Signals

- 4 ... 20 mA analog output
- Modbus/RTU and Modbus/TCP (TCP only with Display version)
- Alarm Relay



Technical Data

Measurement

Oil Vapor	
Measuring range	0.001 ... 5.000 mg/m³ (Based on 1000 hPa(a), 20 °C, 0 % relative humidity)
Accuracy	5 % of reading ± 0.003 mg/m³
Resolution	0.001 mg/m³
Selectable units	mg/m³ / ppm
Sensor principle	Photo ionization detector
Pressure	
Measuring range	0 ... 16 bar(g)
Accuracy	0.5 % FS
Resolution	0.01 bar(g) / 0.001 MPa / 0.1 psi
Selectable units	bar(g) (default), MPa and psi (on request)
Sensor principle	Piezzo resistive pressure sensor
Dew Point (optional)	
Measuring range	-100 ... +20 °C Td
Accuracy	±1 °C Td (0 ... 20 °C Td) ±2 °C Td (-70 ... 0 °C Td) ±3 °C Td (-100 ... -60 °C Td)
Resolution	0.1 °C Td
Selectable units	°C Td / °F Td
Sensor principle	QCM + Polymer
Temperature	
Measuring range	0 ... 50 °C
Accuracy	0.5 °C
Resolution	0.1 °C
Selectable units	°C / °F
Sensor principle	NTC

Signal / Interface & Supply

Outputs / Interface	
Analogue output	4 ... 20 mA, isolated
Alarm output	Relay, NO, 40 VDC,0.2A
Digital interface	Modbus/RTU (RS485) Modbus/TCP (Ethernet) & USB (only available for display version)
Display (optional)	5" color touch screen with a data logger of 100 million measurement values
Supply	
Power supply	24 VDC ± 5 %, 10 W

- Power
- Alarm
- Service Sensor
- Service Filter

LEDs indicate if pre-set alarms are reached, or if filters and sensors need to be serviced. The service indications start blinking 4 weeks before expiring and turn on permanently when a service is immediately required.

General Data

Measuring medium	Compressed air, N_2, CO_2 (for other gases please contact us)
Sample flow rate	< 2 l/min, measuring gas is released to ambient
Sample rate	1/sec
Gas / Operating temperature	-20 ... +50 °C
Transport temperature	-30 ... +70 °C
Operating pressure	3 ... 15 bar(g) 0.5 ... 2 bar(g) (optional) 0.60 ... 1.07 bar(a) (ambient version only)
Gas humidity	< 40 % rel. humidity, no condensation
Gas connection	6 mm quick connect
UV lamp lifetime	6,000 working hours or 1 year, whichever comes first
Electrical connection	M12, USB, RJ45
Settings	Various sensor settings can be performed through SUTO display units or through the related service software
Housing material	PC, Al alloy
Protection class	IP65
Dimensions	271 x 231 x 91 mm
Weight	2.4 kg
Approval	CE

Ordering

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

S120 Oil Vapor Monitor

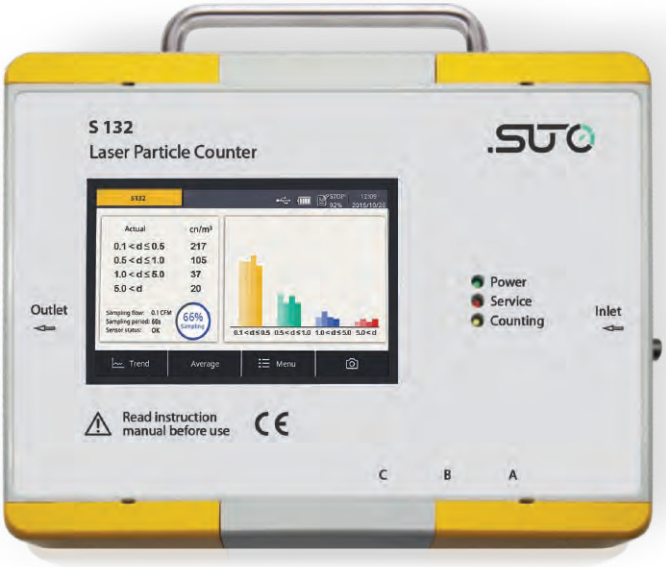
Order No.	Description
S604 1201	S120, Oil Vapor Monitor, 0.001 ... 5.000 mg/m^3, 4 ... 20 mA output, RS-485, alarm output, supply 24 VDC, incl. power supply
S604 1202	S120-P, Portable Oil Vapor Monitor, 0.001 ... 5.000 mg/m^3, 4 ... 20 mA output, RS-485, alarm output, connectable to S551, transport case, incl. power supply
S604 1203	S120, Oil Vapor Monitor, 5" touch screen, 0.001 ... 5.000 mg/m^3, 4 ... 20 mA output, RS-485, alarm output, supply 24 VDC, incl. power supply
P604 1205	S120-P, Portable Oil Vapor Monitor, 5" touch screen, 0.001 ... 5.000 mg/m^3, 4 ... 20 mA output, RS-485, alarm output, 24 VDC supply, incl. transport case, power supply
P604 1215	S120-Ambient Portable Oil Vapor Monitor for ambient air, 5" touch screen with data logger, 0.001 ... 5.000 mg/m^3, 4 ... 20 mA, RS-485 (Modbus RTU), Ethernet (Modbus TCP), alarm output, integrated pump, supply voltage 24V DC, incl. power supply and transport case.
A1250	Option: Integrated dew point sensor, -100 ... +20 °C Td (only for S604 1203 and P604 1205)
A554 1203	Oil vapor zero filter, 1.5 MPa max, with quick connectors at both ends
A554 1207	Replacement kit for zero filter oil vapor analyzer
A554 0120	Option,Transport case S120/130
R200 0120	S120 General service and re-calibration (for all models without Dew Point Sensor option A1250): - General inspection of the unit - Replacement of tubes and fittings - Cleaning of lamp and sensor - Assembly and test of unit - Calibration of oil sensor - Calibration Certificate
R200 0121	S120 General service and re-calibration with dew point sensor option (for S604 1203 and P604 1205 with Dew Point Sensor Option A1250): - General inspection of the unit - Replacement of tubes and fittings - Cleaning of lamp and sensor - Assembly and test of unit - Calibration of oil sensor - Calibration of dew point sensor - Calibration Certificate

Be smart. **Measure it.**

S130 / S132

Laser Particle Counter

ECO (0.3 < d ≤ 5.0 µm) **S130**



S132 PRO (0.1 < d ≤ 5.0 µm)

PARTICLE MEASUREMENT
According ISO-8573 Standard

EASY INSTALLATION
Plug and Play Solution

PRO VERSION S132
Smallest channel 0.1 < d ≤ 0.5 µm

ECO VERSION S130
Smallest channel 0.3 < d ≤ 0.5 µm

Benefits

- Accurate compressed air quality measurements and monitoring with particle size ranges:
  0.1 < d ≤ 0.5 µm / 0.5 < d ≤ 1.0 µm / 1.0 < d ≤ 5.0 µm / d > 5.0 µm
- Classify the compressed air systems according to ISO 8537-1 while being in compliance with the ISO 8573-4
- Easy connection to compressed air system through a 6 mm hose with quick connectors
- Integrated pressure diffuser suitable for inlet pressure ranges of 3 ... 15 bar(g)
- Optional 5" touch screen integrated for live data readings and data logging functions
- Designed to be used in stationary monitoring solutions, as well as in portable audit measurements

Reliable particulates counts in compressed air systems

The SUTO S130 / S132 Laser Particle Counters are optimized for 24/7 compressed air quality monitoring. Unlike its competition, the SUTO laser particle counters are coming with integrated pressure diffusers to reduce the line pressure inside the instrument. Users are enabled to use the laser particle counters directly at the compressed air system, without installing pressure reducers and therefore being in compliance with the ISO 8573-4 standard.

The measurement values are displayed in counts per volume (cn/m3), but can also display alternative volume units like cubic-feet or liter.

The integrated display offers live readings for all channels, signal output settings as well as an integrated data logger, to store the measurement data on the device.

Applications

Particle free compressed air is not an easy task to be achieved. Monitoring is a must in many industries and applications to avoid contamination in products and health risks for humans.

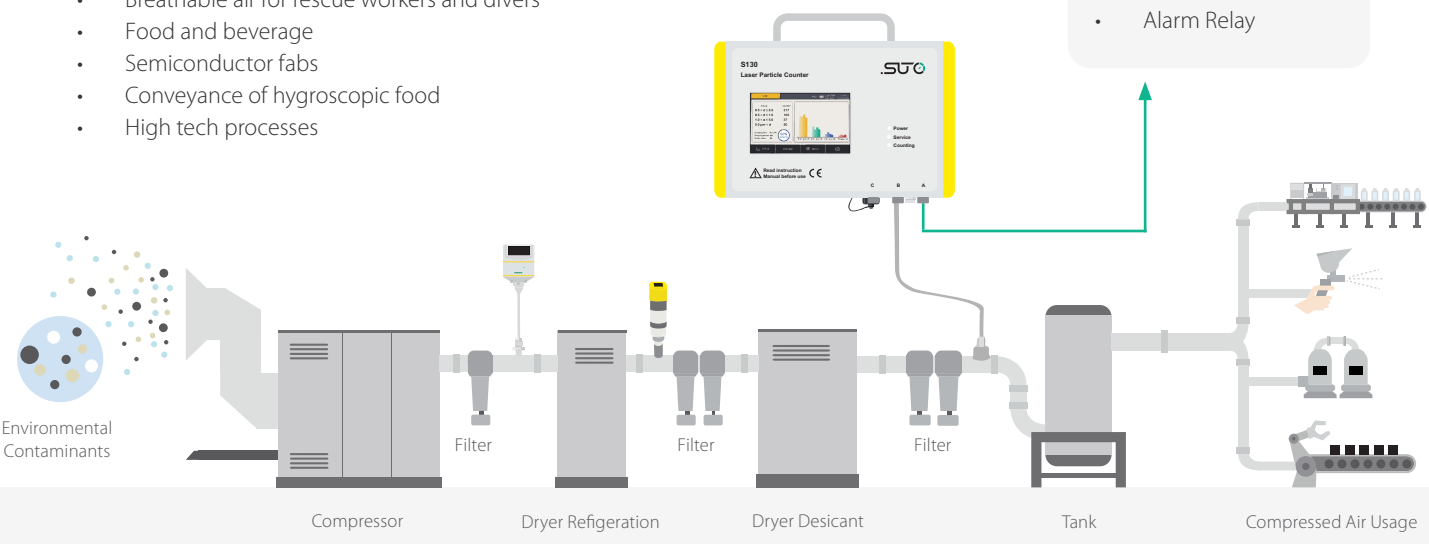
- Medical air
- Pharmaceuticals
- Breathable air for rescue workers and divers
- Food and beverage
- Semiconductor fabs
- Conveyance of hygroscopic food
- High tech processes

S130/S132

Portable and stationary Solution

Output Signals

- 4 ... 20 mA analog output
- Modbus/RTU and Modbus/TCP (TCP only with Display version)
- Alarm Relay



Particulates in Paint Shops

In a modern paint shop, the painting quality highly depends on the quality of the compressed air. Modern paint systems inject the paint into the paint gun, where compressed air is driving the paint through the nozzle. When existing the nozzle, the paint atomizes into a fine and uniformed mist. These tiny paint particles repel each other as they are leaving the nozzle and stick to the object being painted.

Excess impurities in the compressed air will cause the paint particles to "clump", resulting in uneven coverage and an inconsistent finish.

The only way to secure this high-quality painting process is by monitoring the particle concentration of the compressed air supply.

Air Quality Monitoring according to the ISO 8573-1

The ISO 8573-1 defines the compressed air purity classes for particulates in a compressed air system by providing the limit values for each channel.

The S132 Laser Particle Counter measures the channels as defined by the ISO 8573-1:

- 0.1 < d ≤ 0.5 µm
- 0.5 < d ≤ 1.0 µm
- 1.0 < d ≤ 5.0 µm

For these 3 channels, the limit values are defined and divided into classes.

But furthermore, as stated in the ISO 8573, the fourth channel must be measured as well:

- d > 5.0 µm

This channel value must be 0 for the classes 0 ... 5, as otherwise the classification falls into class 6 or worse, where a mass concentration is defined as limit values.

Certain industries like the pharmaceutical and food industry requires high-quality compressed air. By meeting the ISO 8573-1 standard requirements you can:

Ensure Process and Product Safety:
Contaminants mixing with applications effect product results and can create safety concerns.

Prevent production downtime:
Processes and machines are stopped to find and eliminate the contamination issues.

S130

S132

Technical Data

Measurement

Particle	
Measuring range	S130: 0.3 < d ≤ 5.0 µm S132: 0.1 < d ≤ 5.0 µm
Measuring channels	S130: CH1: 0.3 < d ≤ 0.5 µm CH2: 0.5 < d ≤ 1.0 µm CH3: 1.0 < d ≤ 5.0 µm CH4: 5.0 µm < d (configurable) S132: CH1: 0.1 < d ≤ 0.5 µm CH2: 0.5 < d ≤ 1.0 µm CH3: 1.0 < d ≤ 5.0 µm CH4: 5.0 µm < d (configurable)
Counting Efficiency according ISO 21501-4	30 ... 70 % of d > 0.1 µm 90 ... 110 % of d ≥ 0.3 µm
Principle of measurement	Laser detection
Sensor	LED-laser
Consumption	
Selectable units	cn/m³, cn/ft³

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA (2-wire)
Alarm	Switch output, normally open, max. 40 VDC, 200 mA
Fieldbus	
Protocol	Modbus/RTU, Modbus/TCP (with Display version)
Supply	
Voltage supply	24 VDC / 10 W (without Display) 24 VDC / 20 W (with Display)
Current consumption	420 mA (without Display) 840 mA (with Display)
Data interface	
USB	USB Micro with OTG support

General data

Configuration	
Others	Device comes pre-configured Configuration can be done via on-screen touch
Display	
Integrated	5" color touch screen
Data Logger	
Storage	100 million measurement values (optional)
Miscellaneous	
Electrical connection	3X M12
Protection class	IP65
Process connection	6 mm quick connect (pressurized version), barb connection (ambient version)
Material	PC, Al alloy
Weight	S130: 1.9 kg S132: 3.2 kg
Dimensions	S130: 271 x 205 x 91 mm S132: 300 x 240 x 120 mm
Operating conditions	
Medium	Compressed air and gases free of corrosive, aggressive, caustic and flammable constituents
Flow rate	2.83 l/min
Sample rate	One sample per minute
Medium quality	ISO 8573-4
Medium temperature	0 ... +40 °C
Medium humidity	< 90 %, no condensation
Operating pressure	0.3 ... 1.5 MPa
Ambient temperature	+10 ... +40 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... +50 °C
Storage humidity	< 90 % with no condensation
Transport temperature	-30 ... +70 °C Without display -10 ... +60 °C with display

Ordering

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

Particle Counter for Compressed Air: P = 0.3 ... 1.5 Mpa

Order No.	Description
S604 1303	S130, Particle Counter for Compressed Air, size range d: 0.3 < d ≤ 5.0 µm, 2.83 l/min
S604 1305	S130, Particle Counter for Compressed Air, size range d: 0.3 < d ≤ 5.0 µm, 2.83 l/min, display, logger
S604 1308	S132, Particle Counter for Compressed Air, size range d: 0.1 < d ≤ 5.0 µm, 2.83 l/min
S604 1309	S132, Particle Counter for Compressed Air, size range d: 0.1 < d ≤ 5.0 µm, 2.83 l/min, display, logger

Accessories

Order No.	Description
A554 0120	Transport case S120 / S130
A554 0116	Transport case S132
A554 1204	Zero count filter
R200 0130	Calibration particle counter S130
R200 0131	Calibration particle counter S132

Be smart. **Measure it.**

S600

Portable Compressed Air Purity Analyzer

ISO 8573-1 ALL IN ONE
Particle concentration, Dew Point, Oil vapor

GUIDED MEASUREMENT
Software guided air quality audits

PORTABLE MULTI-TOOL
Can be carried with one hand

HIGH PRECISION
Accurate measurements

COMPACT DESIGN
Makes it unique

PDF REPORTING
Create ISO 8573-1 reports on the device

Benefits

- All-in-one device measures Particle concentration, dew point and oil vapor
- Measures additionally the temperature and pressure
- Software guided measurement makes it easy to generate reliable results
- Report generator creates PDFs for ISO 8573-1 audits
- Ultra portable and compact design

Plug & Play Measurement — Save Precious Time

ISO 8573 compliant purity quantifications of compressed air systems are bound to time-consuming installations and long-lasting test runs ... It's time for a revolution: The S600 is unlike its competition.

It combines the latest sensor technology, software-guided measurements and a time-saving setup into a handy, touchscreen controlled multi-tool. With our S600 you will finish measurement runs in much less time than with your traditional method, after that you don't ever want to leave your new comfort zone again. Trust us.

Remote connection

By connecting a LTE/4G modem to the designated USB port, S600 can be monitored remotely through S4A software

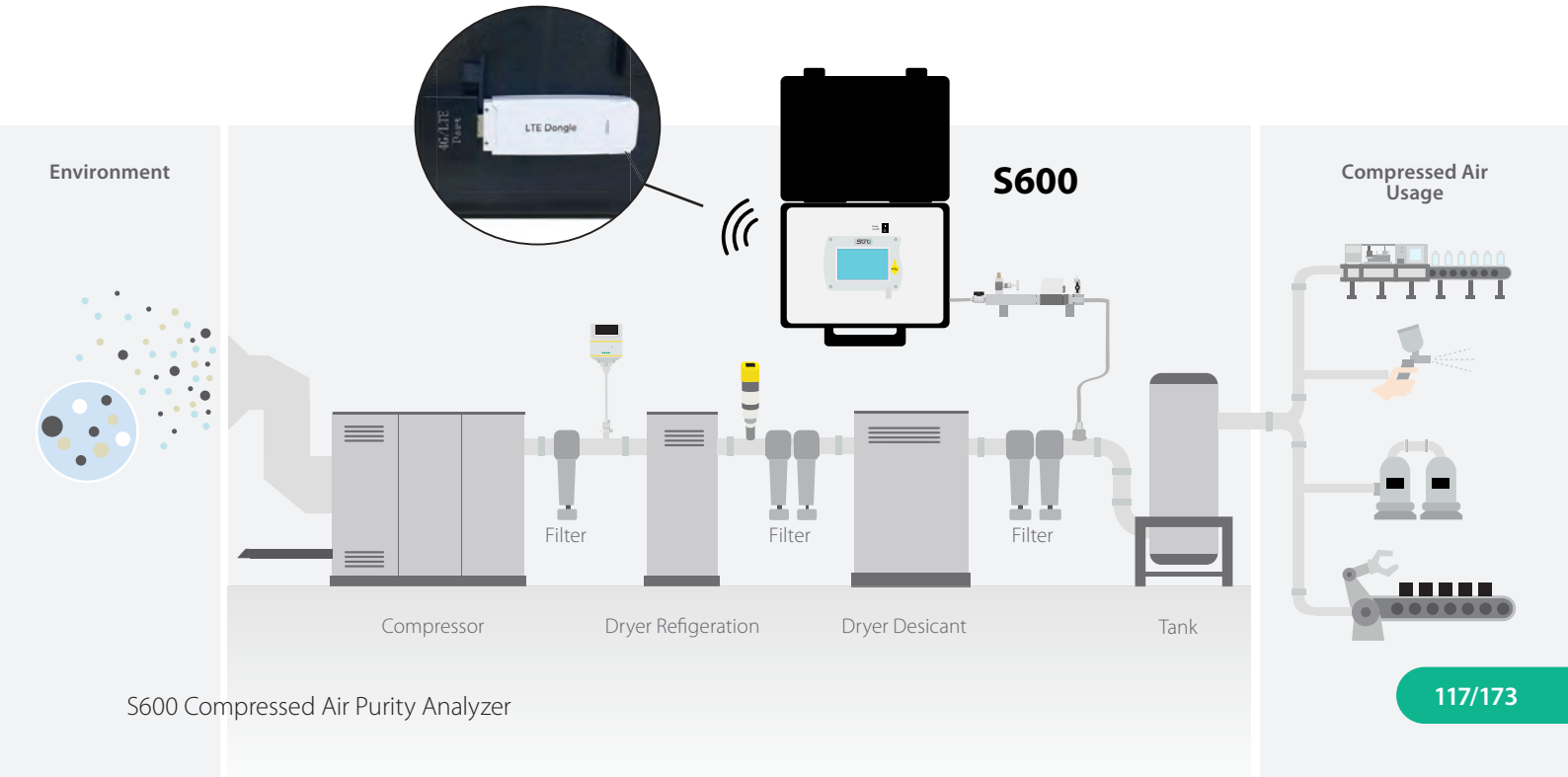
Monitoring of All Relevant Contaminants

Particle Concentration Measurement
0.1 < d ≤ 0.5 µm / 0.5 < d ≤ 1.0 µm / 1.0 < d ≤ 5.0 µm / 5.0 µm < d

Dew Point Measurement
-100 ... +20 °C Td

Oil Vapor Measurement
0.001 ... 5.000 mg/m³

ISO 8573-1 Classification



S600 Compressed Air Purity Analyzer

5 in 1 Measuring Device

The S600 is the portable multi-tool for ISO 8573-1 compressed air purity measurements. It measures, records and validates quality parameters like particle concentration, dew point, oil vapor contents, temperature and the pressure of compressed air systems.

Particle Concentration Measurement

- Measurement methods according to ISO 8573-4 standards (together with isokinetic sampling device)
- Latest laser detection technology
- Smallest particle size 30 ... 70 %, next bigger sizes 90 ... 110 % per ISO 21501-4

Dew Point Measurement

- Large ranges due to the unique multiple sensor technology
- Long-term stable and well-proven measurement methods
- High precision with an accuracy of ±2 °C Td

Oil Vapor Measurement

- Latest photoionisation detector (PID) with self-calibration
- Measuring range according to ISO 8573-1 Class 1 to Class 5
- High precision with 5 % of reading ± 0.003 mg/m^3 accuracy

Pressure Measurement

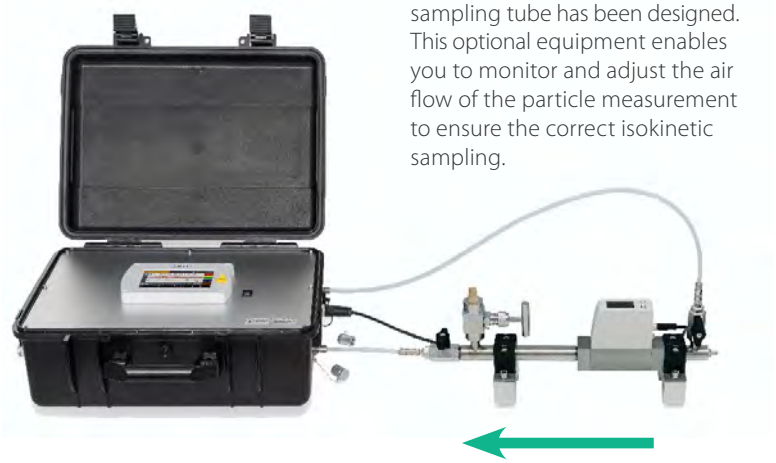
- State of the art sensor technology
- Additional quality data about the compressed air system

Integrated Data Logger

- Integrated data logger records all channels in parallel for later analysis
- 5" touchscreen allows you to interact with the device on site. There is no need for a PC to manage the device.

ISO 8573-4 Isokinetic Sampling Device

For particle measurements according to ISO 8573 an isokinetic sampling tube has been designed. This optional equipment enables you to monitor and adjust the air flow of the particle measurement to ensure the correct isokinetic sampling.



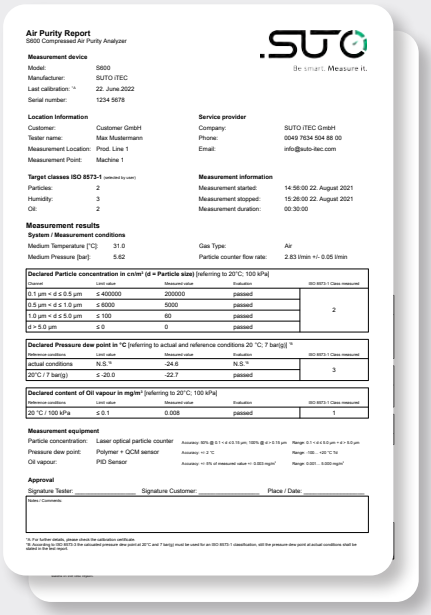
Applications

- Air quality measurements in medical, pharmaceutical, food and beverage applications
- Compressed air quality audits in regards to the ISO 8573-1
- Point-of-use measurements to ensure process safety and quality in all applications
- Monitoring of high tech applications with strict air purity requirements

Create Compressed Air Quality Reports

The S600 enables users to create powerful PDF reports directly on site. The reports are following the recommendations stated in the ISO 8573, additionally customer related data as well as service provider details can be entered on-screen, making it even easier to perform audits and to create meaningful reports.

PDF reports can be created from any recordings on the device and are copied on the fly to a connected USB drive for direct print-outs.



Air Purity Report
S600 Compressed Air Purity Analyzer

SUTO
Be smart. Measure it.

Measurement device

Model:	S600
Manufacturer:	SUTO iTEC
Last calibration: *A	22. June 2022
Serial number:	1234 5678

Location Information

Customer:	Customer GmbH
Tester name:	Max Mustermann
Measurement Location:	Prod. Line 1
Measurement Point:	Machine 1

Service provider

Company:	SUTO iTEC GmbH
Phone:	0049 7634 504 88 00
Email:	info@suto-itec.com

Target classes ISO 8573-1 (selected by user)

Particles:	2
Humidity:	3
Oil:	2

Measurement information

Measurement started:	14:56:00 22. August 2021
Measurement stopped:	15:26:00 22. August 2021
Measurement duration:	00:30:00

Measurement results

System / Measurement conditions

Medium Temperature [°C]	31.0	Gas Type:	Air
Medium Pressure [bar]:	5.62	Particle counter flow rate:	2.83 l/min +/- 0.05 l/min

Declared Particle concentration in cn/m³ (d = Particle size) [referring to 20°C; 100 kPa]

Channel	Limit value	Measured value	Evaluation	ISO 8573-1 Class measured
0.1 µm < d ≤ 0.5 µm	≤ 400000	200000	passed	2
0.5 µm < d ≤ 1.0 µm	≤ 6000	5000	passed	
1.0 µm < d ≤ 5.0 µm	≤ 100	60	passed	
d > 5.0 µm	≤ 0	0	passed	

Declared Pressure dew point in °C [referring to actual and reference conditions 20 °C; 7 bar(g)] *B

Reference conditions	Limit value	Measured value	Evaluation	ISO 8573-1 Class measured
actual conditions	N.S. *B	-24.6	N.S. *B	3
20°C / 7 bar(g)	≤ -20.0	-22.7	passed	

Declared content of Oil vapour in mg/m³ [referring to 20°C; 100 kPa]

Reference conditions	Limit value	Measured value	Evaluation	ISO 8573-1 Class measured
20 °C / 100 kPa	≤ 0.1	0.008	passed	1

Measurement equipment

Particle concentration:	Laser optical particle counter	Accuracy: 50% @ 0.1 < d ≤ 0.15 µm; 100% @ d > 0.15 µm Range: 0.1 < d ≤ 5.0 µm / d > 5.0 µm
Pressure dew point:	Polymer + QCM sensor	Accuracy: +/- 2 °C Range: -100 ... +20 °C Td
Oil vapour:	PID Sensor	Accuracy: +/- 5% of measured value +/- 0.003 mg/m³ Range: 0.001 ... 5.000 mg/m³

Approval

Signature Tester: _____ Signature Customer: _____ Place / Date: _____

Notes / Comments:

*A: For further details, please check the calibration certificate.
*B: According to ISO 8573-3 the saturated pressure dew point at 20°C and 7 bar(g) must be used for an ISO 8573-1 classification, still the pressure dew point at actual conditions shall be stated in the test report.

S600 Compressed Air Purity Analyzer

ISO 8573-1 Compressed Air Classes

ISO 8573-1:2010 is the main publication of the ISO 8573 series of standards, because it contains the permissible amount of contaminants per cubic meter of compressed air is fixed.

Class	Particle Concentration			Pressure Dew Point	Oil Concentration
	cn/m³			°C (°F)	mg/m³
	0.1 < d ≤ 0.5 µm	0.5 < d ≤ 1.0 µm	1.0 < d ≤ 5.0 µm		
0	As specified by the equipment user or supplier and more stringent than class 1				
1	≤ 20,000	≤ 400	≤ 10	≤ -70 (94.0)	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40 (-40.0)	≤ 0.1
3	not specified	≤ 90,000	≤ 1,000	≤ -20 (-4.0)	≤ 1
4	not specified	not specified	≤ 10,000	≤ +3 (+37.4)	≤ 5
5	not specified	not specified	≤ 100,000	≤ +7 (+45.6)	> 5
6	x	x	x	≤ +10 (+50.0)	x

Why should you focus on your ISO 8573-1 specifications?

Certain industries like the pharmaceutical and food industry requires high-quality compressed air. By meeting the ISO 8573-1 standard requirements you can:

- **Ensure Process and Product Safety:**

  Potential incidents, like contaminants meeting food via water and oil, can create safety concerns and unreliable processes.

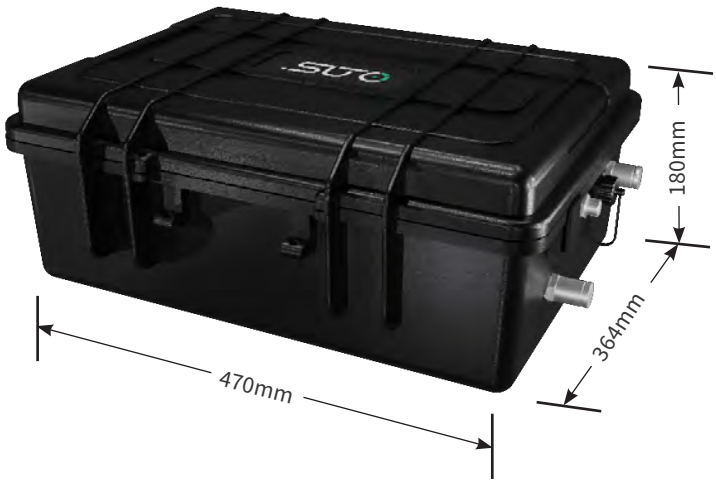
- **Avoid Production Failures and Poor Quality Finishes:**

  Contaminants mixing with applications effect product results.

- **Prevent production downtime:**

  Processes and machines are stopped to find and eliminate the contamination issues.

Dimensions



Technical Data

Measurement

Particle concentration	
Accuracy	Counting Efficiency according ISO 21501-4 30 ... 70 % of d > 0.1 µm 90 ... 110 % of d ≥ 0.3 µm
Selectable units	cn/m³, cn/ft³
Measuring range	0.1 < d ≤ 0.5 µm 0.5 < d ≤ 1.0 µm 1.0 < d ≤ 5.0 µm 5.0 µm < d
Sensor	Laser optical particle counter
Sampling rate	1 min.
Flow rate	2.83 l/min
Pressure Dew Point	
Accuracy	± 1 °C Td (0 ... 20 °C Td) ± 2 °C Td (-70 ... 0 °C Td) ± 3 °C (-100 ... -70 °C Td)
Selectable units	°C, °F
Measuring range	-100 ... +20 °C Td
Sensor	QCM + Polymer
Response time (t90)	-20 °C Td -> -60 °C Td = < 240 sec -60 °C Td -> -20°C Td = < 30 sec @ 4 l/min
Oil vapor	
Accuracy	5 % of value +/- 0.003 mg/m³
Detection limit	0.003 mg/m³
Resolution	0.001 mg/m³
Selectable units	mg/m³
Measuring range	0.001 ... 5.000 mg/m³
Sensor	PID (Photoionisation detector)
UV lamp lifetime	1 year or 6000 working hours, whichever comes first
Sampling rate	1 sec.
Pressure	
Accuracy	0.5 % FS
Measuring range	0.1 ... 1.6 MPa(g)
Sensor	Piezo resistive sensor
Temperature	
Accuracy	± 0.3 °C
Measuring range	-30 ... +70 °C
Sensor	Pt100
Reference conditions	
Selectable conditions	ISO1217 20 °C 1000 mbar

Signal / Interface & Supply

Fieldbus	
Protocol	Modbus/TCP
Update rate	1 / sec.
Power Supply	
Voltage supply	Mains supply adapter (AC/DC) Input: 100 ... 240 VAC, 50/60 Hz, 1.4 A Output: 24 VDC, 2.5 A, 60 W max.
Current consumption	1.4 A
Interface	
USB	USB Micro with OTG support
LTE/4G USB	USB Port for 4G/LTE Modem

General data

Configuration	
Others	Device comes pre-configured Configuration can be done via on-screen touch
Display	
Integrated	Touchscreen, Size: 5", Resolution: 800 x 480 px
Data Logger	
Storage	100 mio. values
Report	Integrated report generator for PDF export
Material	
Process connection	Brass nickel-plated, FKM
Housing	PC + ABS, Al alloy
Miscellaneous	
Electrical connection	2-Pin, push-pull socket
Protection class	IP54 (cover lid closed)
Approvals	IEC 61326-1
Process connection	Micro quick connector, full passthrough, male (1.5 m hose with coupling included)
Weight	9.8 kg
Operating conditions	
Medium	Compressed Air, Nitrogen N2, Carbon dioxide CO_2 (software setting)
Medium quality	ISO 8573-1: 4.4.4 or better
Medium temperature	0 ... + 40 °C
Medium humidity	Medium humidity < 40 % rH, no condensation
Operating pressure	0.3 ... 1.5 MPa(g)
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... + 70 °C
Transport temperature	-10 ... + 70 °C

Technical Data

Isokinetic Sampling Device

Measurement

Isokinetic Sampling Device	
Measuring unit	Measuring unit Sampling pipe with integrated isokinetic sampling tube, flow regulation and control by integrated flow sensor, to be used for particle measurements according to ISO 8573-4
Flow meter unit	Thermal mass flow meter (only for isokinetic flow setup, no system flow measurement)
Sensor	Thermal mass flow sensor
Accuracy	3 % o. RDG

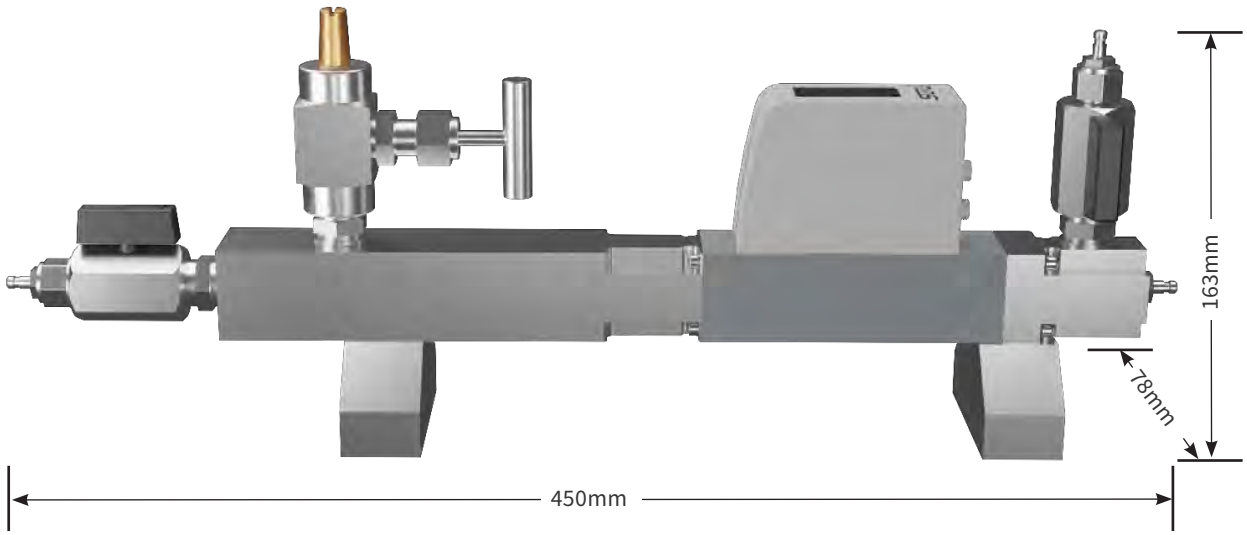
Signal Interface & Supply

Connection	Communication to S600 (cable included)
Update rate	1 / sec.

General data

Material	
Process connection	Brass nickel-plated, FKM
Housing	PC + ABS, Al alloy
Main unit	Al alloy
Isokinetic tube	Stainless steel1.4404 (SUS 316L)
Miscellaneous	
Electrical connection	M8
Protection class	IP54 IEC 61326-1
Process connection	Micro quick connector, full passthrough, male (1.5 m hose with coupling included)
Operating conditions	
Medium	Compressed Air, Nitrogen N_2, Carbon dioxide CO_2 (software setting)
Medium quality	ISO 8573-1: 4.4.4 or better
Medium temperature	0 ... + 40 °C
Medium humidity	Medium humidity < 40 % rH, no condensation
Operating pressure	0.3 ... 1.5 MPa(g)
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... + 70 °C
Transport temperature	-10 ... + 70 °C

Dimensions Isokinetic Sampling Device



Ordering

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

S600 Compressed Air Purity Analyzer (Portable Version)

Order No.	Description
P560 0600	Touch screen interface, data logger, guided measurement, PDF report generator, USB port and Ethernet port with Modbus/TCP Particle d: 0.1 < d <= 0.5, µm 0.5 < d <= 1.0 µm, 1.0 < d <= 5.0 µm, d > 5.0 µm Dew point: -100 ...+20 °C Td Oil vapor: 0.001 ... 5.000 mg/m^3 Including: • Portable compressed air analyzer in a hand carry case with handle and shoulder belt • USB OTG memory stick • Purge filter for pre-measurement (test kit) • Power supply, 230 VAC / 24 VDC 50/60 Hz • 2 x Connection hose 1.5 m, one end quick coupling, one end compressed air coupling • Certificate of calibration • Operation and instruction manual
A1670	USB 4G dongle for S551/S600, including S4A software

Isokinetic Sampling Device

Order No.	Description
A554 0600	Isokinetic sampling device for particle measurement according to ISO 8573 Including: • Isokinetic sampling pipe • Flow sensor mounted on pipe • Certificate of calibration • Connection cable to S600 • Connection hose 150 mm, both ends quick coupling • Connection hose 700 mm, both ends quick coupling • Connection hose 1.5 m, one end quick coupling, one end compressed air coupling • Transport case to carry the device, hoses and cables

Be smart. **Measure it.**

S601

Stationary Compressed Air Purity Monitor

ALL IN ONE
Dew point, particle and oil vapor

TOUCH SCREEN
5" large color LCD

INDUSTRIAL DESIGN
For outdoor applications

PRECISION
Accurate measurements

COMPACT DESIGN
Can be installed anywhere

Benefits

- All-in-one device measures particle concentration, dew point and oil vapor
- Measures additionally the temperature and pressure
- Software guided measurement makes it easy to generate reliable results
- Real time information can be retrieved from the S601 by SCADA systems via MODBUS outputs
- Compact design and easy setup, just connect the unit to power and the compressed air supply

Constant Measurement — 24/7 Monitoring

The S601 combines three major quality measurements into a single wall mountable device. Optimized to be used as Plug & Play system, the S601 helps users to identify the air quality at a glance.

The robust cabinet makes is well suited for rough industrial applications.
A stainless steel cabinet is offered on request, which is suited for pharmaceutical and medical applications.

The S601 combines the latest sensor technology and a time-saving setup into a one of its kind multi-tool. Mount it, power it, connect it and measure. Trust us, it is that easy.

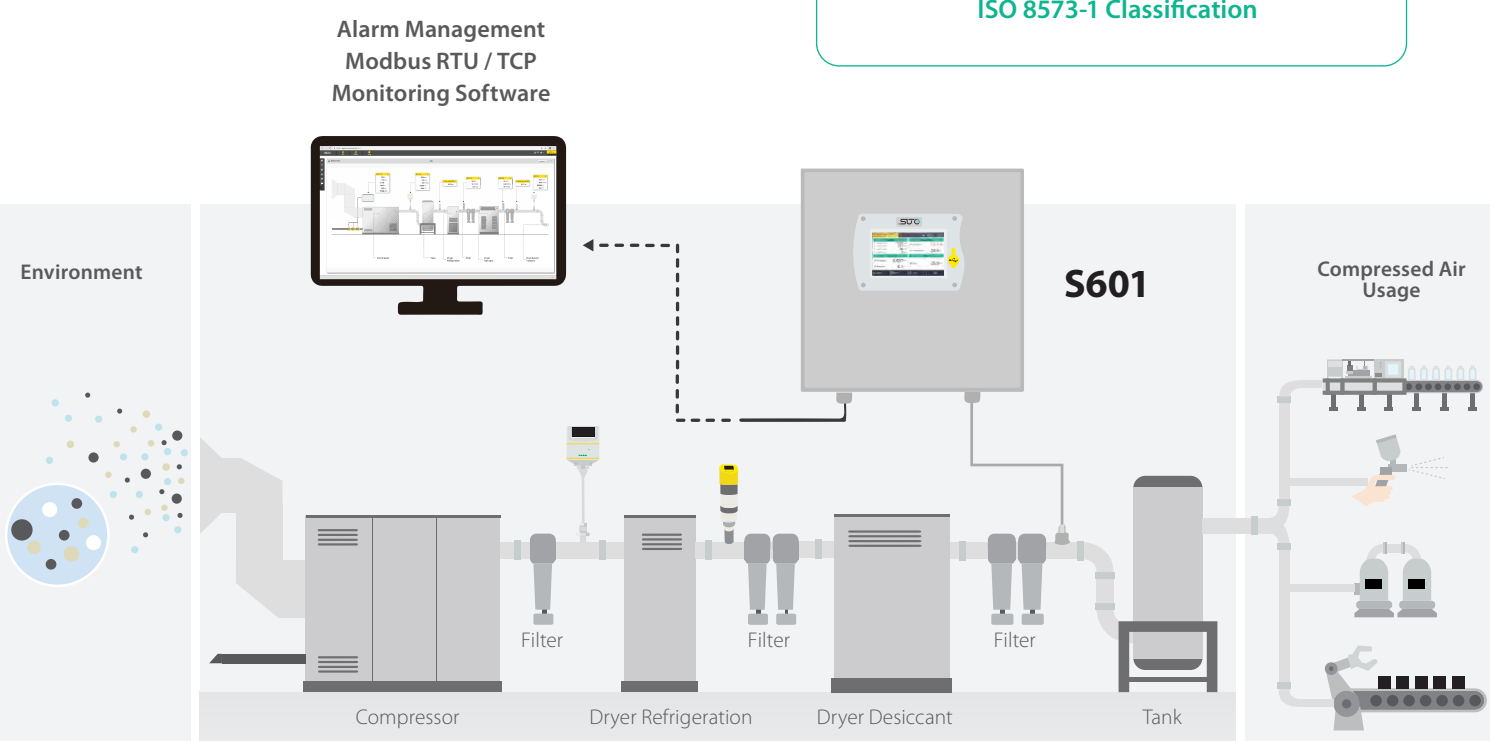
Monitoring of All Relevant Contaminants

Particle Concentration Measurement
0.1 < d ≤ 0.5 µm / 0.5 < d ≤ 1.0 µm /
1.0 < d ≤ 5.0 µm / 5.0 µm < d

Dew Point Measurement
-100 ... +20 °C Td

Oil Vapor Measurement
0.001... 5.000 mg/m³

ISO 8573-1 Classification



S601 Stationary Compressed Air Purity Monitor

Various Applications

- Air quality measurements in medical, pharmaceutical, food and beverage applications
- Compressed air quality audits in regards to the ISO 8573-1
- Point-of-use measurements to ensure process safety and quality in all applications
- Monitoring of high tech applications with strict air purity requirements

5 in 1 Measuring Device

The S601 is the stationary multi-tool for compressed air purity measurements. It measures, records and validates quality parameters like particles, dew point, oil vapor contents, temperature and the pressure of compressed air systems. It offers different signal outputs to seamlessly integrate it into your system. The integrated logger stores the recorded values safely.

Particle Concentration Measurement

- Measurement methods according to ISO 8573 standards
- Latest laser detection technology
- Smallest particle size 30 ... 70 %, next bigger sizes 90 ... 110 % per ISO 21501-4

Oil Vapor Measurement

- Latest photoionisation detector (PID) with self-calibration
- Wide range of oil vapor concentrations
- High precision with 5 % of reading ± 0.003 mg/m³ accuracy

Dew Point Measurement

- Large ranges thanks to the unique multiple sensor technology
- Long-term stable and well-proven measurement methods
- Outstanding precision with a high accuracy over the full range from -100 to +20 °C Td

Pressure Measurement

- State of the art sensor technology
- Additional quality data about the compressed air system

Integrated Data Logger

- Integrated data logger records all channels in parallel for later analysis
- 5" touchscreen allows you to interact with the device on site
- There in no need for a PC to manage the device

Modular Concept

The S601 is based on a modular concept which enables the client to decide which type of measurement needs to be performed.

This makes the S601 customizable and flexible to offer the end-user the best suited instrument to finish the desired measurement tasks.

ISO 8573-1 Compressed Air Classes

ISO 8573-1:2010 is the main publication of the ISO 8573 series of standards, because it contains the permissible amount of contaminants per cubic meter of compressed air is fixed.

Class	Particle Concentration			Pressure Dew Point	Oil Concentration
	cn/m³			°C (°F)	mg/m³
	0.1 < d ≤ 0.5 µm	0.5 < d ≤ 1.0 µm	1.0 < d ≤ 5.0 µm		
0	As specified by the equipment user or supplier and more stringent than class 1				
1	≤ 20,000	≤ 400	≤ 10	≤ -70 (94.0)	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40 (-40.0)	≤ 0.1
3	not specified	≤ 90,000	≤ 1,000	≤ -20 (-4.0)	≤ 1
4	not specified	not specified	≤ 10,000	≤ +3 (+37.4)	≤ 5
5	not specified	not specified	≤ 100,000	≤ +7 (+45.6)	> 5
6	x	x	x	≤ +10 (+50.0)	x

Why should you focus on your ISO 8573-1 specifications?

Certain industries like the pharmaceutical and food industry requires high-quality compressed air. By meeting the ISO 8573-1 standard requirements you can:

- **Ensure Process and Product Safety:**

  Potential incidents, like contaminants meeting food via water and oil, can create safety concerns and unreliable processes.

- **Avoid Production Failures and Poor Quality Finishes:**

  Contaminants mixing with applications effect product results.

- **Prevent production downtime:**

  Processes and machines are stopped to find and eliminate the contamination issues.

Dimensions

Technical Data

Measurement

Particle concentration		
Accuracy	Counting Efficiency according ISO 21501-4	
	Option A1263:	Option A1260:
	30 ... 70 % of d > 0.1 µm	50 % @ 0.1 < d ≤ 0.15 µm
	90 ... 110 % of d ≥ 0.3 µm	100 @ d > 0.15 µm
Selectable units	cn/m³, cn/ft³	
Measuring range	Option A1263:	Option A1260:
	0.1 < d ≤ 0.5 µm	0.3 < d ≤ 0.5 µm
	0.5 < d ≤ 1.0 µm	0.5 < d ≤ 1.0 µm
	1.0 < d ≤ 5.0 µm	1.0 < d ≤ 5.0 µm
	5.0 µm < d	5.0 µm < d
Sensor	Laser optical particle counter	
Sampling rate	1 min.	
Flow rate	2.83 l/min	
Pressure Dew Point		
Accuracy	± 1 °C Td (0 ... 20 °C Td)	
	± 2 °C Td (-70 ... 0 °C Td)	
	± 3 °C (-100 ... -70 °C Td)	
Selectable units	°C, °F	
Measuring range	-100 ... +20 °C Td	
Sensor	QCM + Polymer	
Response time (t90)	-20 °C Td -> -60 °C Td = < 240 sec	
	-60 °C Td -> -20 °C Td = < 30 sec @ 4 l/min	
Oil vapor		
Accuracy	5 % of value +/- 0.003 mg/m³	
Detection limit	0.003 mg/m³	
Resolution	0.001 mg/m³	
Selectable units	mg/m³	
Measuring range	0.001 ... 5.000 mg/m³	
Sensor	PID (Photoionisation detector)	
UV lamp lifetime	1 year or 6000 working hours, whichever comes first	
Sampling rate	1 sec.	
Pressure		
Accuracy	0.5 % FS	
Measuring range	0.1 ... 1.6 MPa(g)	
Sensor	Piezo resistive sensor	
Temperature		
Accuracy	± 0.3 °C	
Measuring range	-30 ... +70 °C	
Sensor	Pt100	
Reference conditions		
Selectable conditions	ISO1217 20 °C 1000 mbar	

Signal / Interface & Supply

Fieldbus	
Protocol	Modbus/TCP
Update rate	1 / sec.
Alarm output	
Relay	2 x Changeover Relay (freely programmable)
Rating	230 VAC, 3A
Power Supply	
Voltage supply	100 ... 240 VAC, 50/60 Hz
Current consumption	50 VA
Interface	
USB	USB Micro with OTG support

General data

Configuration	
Others	Device comes pre-configured Configuration can be done via on-screen touch
Display	
Integrated	Touchscreen, Size: 5", Resolution: 800 x 480 px
Data Logger	
Storage	100 mio. values
Material	
Process connection	Brass nickel-plated, FKM
Housing	Sheet steel, powder coated cabinet
Miscellaneous	
Electrical connection	AC Clamp Terminals, M12, RJ45
Protection class	IP54 (cover lid closed)
Approvals	CE
Process connection	Micro quick connector, full passthrough, male (1.5 m hose with coupling included)
Weight	15 kg
Operating conditions	
Medium	Compressed Air, Nitrogen N_2, Carbon dioxide CO_2 (software setting)
Medium quality	ISO 8573-1: 4.4.4 or better
Medium temperature	0 ... + 40 °C
Medium humidity	Medium humidity < 40 % rH, no condensation
Operating pressure	0.3 ... 1.5 MPa(g)
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... +70 °C
Transport temperature	-10 ... +70 °C

Ordering

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

S601 Stationary Compressed Air Purity Monitor

Order No.	Description
D500 0601	S601 Stationary Compressed Air Purity Monitor Touch screen interface, data logger , metal cabinet for wall mounting Supply voltage 100 ... 240 V AC, Inlet pressure 0.3 ... 1.5 MPa Including: • Dew point measurement rig -100 ... +20 °C Td • 2 m PTFE hose • 1.5 m PTFE hose with quick connector • Purge unit for measuring point cleaning • USB OTG memory stick • S4A Software for logger read out and analysis • 1 x PTFE hose adapter • Certificate of calibration
Particle counter	
A1260	Integrated particle counter rig, 0.3 < d ≤ 0.5 µm, 0.5 < d ≤ 1.0 µm, 1.0 < d ≤ 5.0 µm, 2.83 l/min
A1263	Integrated particle counter rig, 0.1 < d ≤ 0.5 µm, 0.5 < d ≤ 1.0 µm, 1.0 < d ≤ 5.0 µm, 2.83 l/min
Oil vapor measurement	
A1267	Integrated oil vapor sensor rig, 0.001 ... 5.000 mg/m³

Be smart. **Measure it.**

S605

Portable Breathing Air Quality Analyzer

ALL IN ONE
O_2, CO_2, CO, H_2O, Oil, Pressure

PLUG & PLAY
Simple connection to your system

PORTABLE DEVICE
Can be carried with one hand

HIGH PRECISION
Accurate measurements

COMPACT DESIGN
Simple and efficient handling

COMMUNICATION INTERFACE
Modbus TCP/RTU, 4G-Modem

Benefits

- All-in-one Instrument measures O_2, CO_2, CO, Dew Point and Oil Vapor simultaneously in the breathing air
- Portable and lightweight measuring device in a robust carry case
- Testing quality of breathing air according to national and international standards
- Software guided measurement makes it easy to generate reliable results and reports
- Only one gas inlet for all parameters
- Integrated data logger saves data for later analysis

Real-time breathing air quality measurements

The purity of the breathing air is vital for the operators health and safety. It is essential to have regular purity checks of the supplied air.

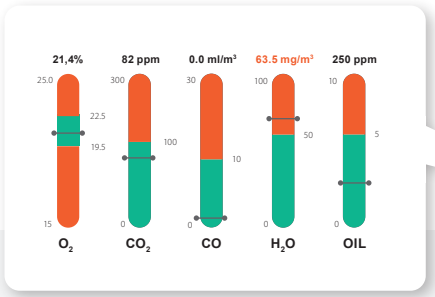
The SUTO S605 Portable Breathing Air Quality Analyzer, measures O_2, CO_2, CO, Dew Point, Oil Vapor and Pressure as defined in the breathing air purity standards and instantly shows the measured values on the touch screen display.

The robust design, quick sensor response times, and a user-friendly user interface ensures reliable and quick measurements, resulting in maximum protection for the people using air for breathing applications.

It is smarter, faster and more convenient than the traditional methods.

Monitoring of all breathing air parameters

O_2 Oxygen	CO Carbon Monoxide
CO_2 Carbon Dioxide	H_2O Humidity
According to all relevant national and international standards	OIL Oil Residues



4G Remote Connection to S4A Monitoring Software

Breathing Air

Environment

Compressor

Purification

Air Receiver Tank

Reserve Air System

7 in 1 Measurement Device

Oxygen Measurement
For safety reasons, it is recommended to measure the oxygen level in the breathing air. The optical oxygen sensor monitors the O_2 content and indicates deviations from the standard concentration.

Carbon Dioxide Measurement
The intake air may also be exposed to increased concentration of carbon dioxide. Filter material used in compressed air can adsorb, but also release CO_2. The gas is measured by the NDIR sensor to avoid extreme concentrations above 1000 ppm.

Carbon Monoxide Measurement
The compressor intake air may be contaminated with CO due to nearby combustion engines or heating systems. Carbon monoxide is a toxic and life-threatening gas which will be monitored accurately by an electrochemical sensor.

Humidity Measurement
High humidity can cause corrosion and in severe cases lead to bursting air containers. In cold environment, it can freeze and block the air supply. The integrated dew point sensor is crucial to check the proper water removal of the dryers and filters.

Oil Vapor Measurement
Atmospheric oil vapor contained in industrial air environment can get into the system through the compressor intake. Compressed into the breathing air, the oil contaminants can cause health issues. The state-of-the-art sensor technology detects the oil contaminants immediately.

Pressure Measurement
The pressure sensor provides additional pressure data about the compressed air system using state of the art sensor technology.

Integrated Data Logger
The integrated data logger records all channels in parallel for later analysis. The 5" touchscreen allows you to interact with the device on site. There is no need for a PC to manage the device.

Applications

Operators of breathing air systems are required to fill respiratory air in line with international standards such as EN 12021 or CFSR 1910.134(d). Potential hazards due to impurities in the breathing air can have consequences which endanger health or which are even life-threatening.

Regular checks with the Breathing Air Quality Analyzer S605 is an indispensable part for a safe operation.

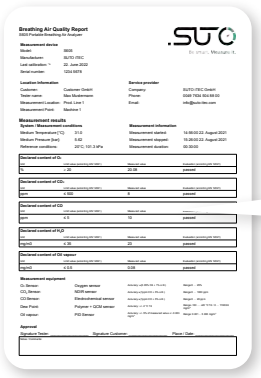
Remote Connection

By connecting a 4G/LTE modem to the designated USB port, S605 can be monitored remotely through S4A software.

Create Breathing Air Quality Reports

The S605 enables users to create powerful PDF reports directly on site. Customer related data as well as service provider details can be entered on-screen, making it even easier to perform audits and to create meaningful reports.

PDF reports can be created from any recordings on the device and are copied on the fly to a connected USB drive for direct print-outs.



Measurement results

System / Measurement conditions		Measurement information	
Medium Temperature [°C]:	31.0	Measurement started:	14:56:00 22. August 2021
Medium Pressure [bar]:	5.62	Measurement stopped:	15:26:00 22. August 2021
Reference conditions:	20°C; 101.3 kPa	Measurement duration:	00:30:00

Declared content of O_2

Unit	Limit value (according EN 12021)	Measured value	Evaluation (according EN 12021)
%	≥ 20	20.08	passed

Declared content of CO_2

Unit	Limit value (according EN 12021)	Measured value	Evaluation (according EN 12021)
ppm	≤ 500	8	passed

Declared content of CO

Unit	Limit value (according EN 12021)	Measured value	Evaluation (according EN 12021)
ppm	≤ 15	10	passed

Declared content of H_2O

Unit	Limit value (according EN 12021)	Measured value	Evaluation (according EN 12021)
mg/m3	≤ 5	23	passed

Declared content of Oil vapour

Unit	Limit value (according EN 12021)	Measured value	Evaluation (according EN 12021)
mg/m3	≤ 0.5	0.08	passed

Relevant standards for breathing air

Relevant standards including BS EN 12021, DEF STAN 68-284, OSHA, CSA and BS 8478 require adherence to specific limits of constituents in breathing air. Here some examples of the required for industrial breathing air:

Contaminant	Europe	China	USA	Canada
Standard	EN 12021	GB/T 31975-2015	CFSR	CSA
O_2	>20 %	19.5 - 23.5 %	19.5 - 23.5 %	20 – 22 %
CO_2	500 ppm	≤ 1000 mL/m³	1,000 ppm	500 ml/m³
CO	5 ppm	≤ 10 mL/m³	10 ppm	5 ml/m³
H_2O	PDP: < -11 °C 1) H_2O: <35 mg/m³ 2) H_2O: <25 mg/m³	ADP: ≤ -45.6 °C	---	---
VOC (Oil Vapor)	0.5 mg/m³	≤ 5.0 mg/m³ (Oil mist and particle)	5 mg/m³	1 mg/m³
Odor	no	no	no	no

Dimensions

Due to the small dimensions of the robust and light carry case, the S605 can be easily transported anywhere.

Why is breathing air quality testing important?

- It protects the health, safety and well-being of your employees and people who are on your premises.
- It ensures that your compressor, products and personnel are protected from airborne volatile organic compounds (VOCs) as well
- It ensures that your business complies with national and international regulatory standards for breathing air quality.
- It ensures that your compressed air and work environment have safe levels of oxygen, lubricants, oil, odor, taste, carbon dioxide, carbon monoxide and water.

Technical Data

Measurement

Oxygen O_2	
Accuracy	±(0.05 % O_2 + 1 % o.R.)
Measuring range	0 ... 25 %
Resolution	0.01 %
Sensor	Optical oxygen senor
Carbon Dioxide CO_2	
Accuracy	±(25 ppm CO_2 + 1 % o.R.)
Measuring range	0 ... 1000 ppm
Resolution	1 ppm
Sensor	NDIR sensor
Carbon Monoxide CO	
Accuracy	±(1 ppm CO + 5 % o.R.)
Measuring range	0 ... 20 ppm
Resolution	0.1 ppm
Sensor	Electrochemical sensor
Humidity H_2O	
Accuracy	±2 °C Td
Measuring range	-100 ... +20 °C Td / 0 ... 17458.6 mg/m³
Resolution	0.1 mg/m³
Sensor	QCM + Polymer
Oil Vapor	
Accuracy	5 % of reading ± 0.003 mg/m³
Measuring range	0.001 ... 5.000 mg/m³ (Based on 1000 hPa(a), 20 °C, 0 % relative humidity)
Resolution	0.001 mg/m³
Sensor	Photo ionization detector
Oil Mist and Particle	
Accuracy	15 % of reading ± 0.1 mg/m³
Measuring range	0.0 ... 5.0 mg/m³ (Based on 1000 hPa(a), 20 °C, 0 % relative humidity)
Resolution	0.1 mg/m³
Sensor	Oil mist and particle sensor
Pressure	
Accuracy	0.5 % FS
Measuring range	0 ... 16 bar(g)
Resolution	0.01 bar
Sensor	Piezo resistive pressure sensor

Signal / Interface & Supply

Fieldbus	
Protocol	Modbus/RTU (RS485) Modbus/TCP (Ethernet)
Update rate	1 / sec.
Power supply	
Voltage supply	18-32 VDC, 20 W Battery
Current consumption	1.4 A
Interface	
USB	USB Micro with OTG support
4G/LTE USB	USB Port for 4G/LTE Modem

General data

Configuration	
Others	Device comes pre-configured Configuration can be done via on-screen touch
Display	
Integrated	5" color touch screen
Data Logger	
Storage	100 million measurement values
Report	Integrated report generator for PDF export
Material	
Process connection	6 mm quick connector
Housing	PC, Al alloy
Miscellaneous	
Electrical connection	M12, USB-C, RJ45
Protection class	IP54
Water Inlet	6 mm connector
Dimensions	470 x 365 x 181 mm
Weight	11 kg
Approvals	
EMC	FCC, CE
Operating conditions	
Measuring Medium	Compressed breathing air
Sample Flow Rate	6 LPM@4 MPa(g), depends on input pressure
Sample rate	1 sample/sec
Medium temperature	0 ... +45 °C
Medium humidity	Medium humidity < 40 % rH, no condensation
Inlet Pressure	0.4 ... 1.5 MPa(g), External pressure reducer allow up to 35 MPa process pressure
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... + 50 °C
Transport temperature	-10 ... + 50 °C

Ordering

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

S605 Portable Breathing Air Quality Analyzer

Order No.	Description
P560 0605	S605 Portable Breathing Air Quality Analyzer, touch screen interface, data logger, guided measurement, PDF report generator (with oil vapor sensor refer to Europe, USA, Canada standards) *
P560 1605	S605 Portable Breathing Air Quality Analyzer, touch screen interface, data logger, guided measurement, PDF report generator (with oil mist and particle sensor refer to China standards)*
A1670	USB 4G dongle, including S4A software

* Including:
- Hand carry case with handle and shoulder belt
- USB OTG memory stick
- Purge filter for pre-measurement (test kit)
- Power adapter with USB type-C connector and cable included 60 W 20 V/3.25 A
- Connection hose 1.5 m, one end quick coupling, one end compressed air coupling
- M12 connector
- Filling bottle
- Certificate of calibration
- Operation and instruction manual

Accessories

Order No.	Description
A554 0602	Purity test kit consisting of zero filters for oil vapor, particles, and a desiccant cartridge for low dew point creation
A554 1203	Oil vapor zero filter, 1.5 MPa max, with quick connectors at both ends
A554 1204	Particle zero filter, 1.5 MPa max, with quick connectors at both ends
A554 1205	Dew point test kit for low dew point generation, with quick connectors at both sides
A604 0004	Pressure reducer, inlet pressure 0-30 MPa, outlet pressure 0.6 Mpa
A604 0005	Pressure reducer, inlet pressure 0-40 MPa, outlet pressure 0.6 Mpa

Service and Calibration

Order No.	Description
R200 0605	S605 General service and re-calibration • General inspection of the unit • Replacement of tubes and fittings • Cleaning of components • Calibration O_2, CO_2, CO, dew point sensor and oil vapor • Assembly and test of unit • Calibration Certificate
Exchange sensors	
R200 0620	CO exchange sensor unit S605/S606
R200 0621	CO_2 exchange sensor unit S605/S606
R200 0622	O_2 exchange sensor unit S605/S606
R200 0623	Oil mist and particle sensor exchange unit S605/S606
R200 0624	Oil vapor sensor exchange unit S605/S606
R200 0625	Dew Point sensor exchange unit S605/S606

Be smart. **Measure it.**

S606

Stationary Breathing Air Quality Analyzer

ALL IN ONE
O_2, CO_2, CO,
Dew Point,
Oil Vapor, Pressure

RELIABLE WARING
Alarms can be programmed

EASY HANDLING
Clear and user friendly user guidance

HIGH PRECISION
Accurate measurements

ROBUST DESIGN
Suitable for harsh industrial condition

COMMUNICATION INTERFACE
Modbus TCP/RTU, 4G-Modem

Benefits

- All-in-one Instrument measures O_2, CO_2, CO, Dew Point and Oil Vapor simultaneously in the breathing air
- 24/7 permanent breathing air monitoring with programmable alarm settings
- Testing quality of breathing air according to national and international standards
- Compressed air connection via 6 mm tube
- Only one gas inlet for all parameters
- Integrated data logger saves data for later analysis

Contant breathing air quality monitoring

When it comes to breathing air, the health and safety of humans has highest priority. Still fatal accidents have occurred in the past due to the contaminated air.

To ensure the highest safety when breathing air is supplied, an online measurement system is required. Traditional breathing air analyzes have been carried out, by taking samples and later analyze them in an external laboratories. Online systems have been rarely available and often did come with very high investments and intense process modifications.

SUTO is here to change that. The S606 Breathing Air Quality Analyzer combines latest sensor technology into a single Plug & Play measurement solution.

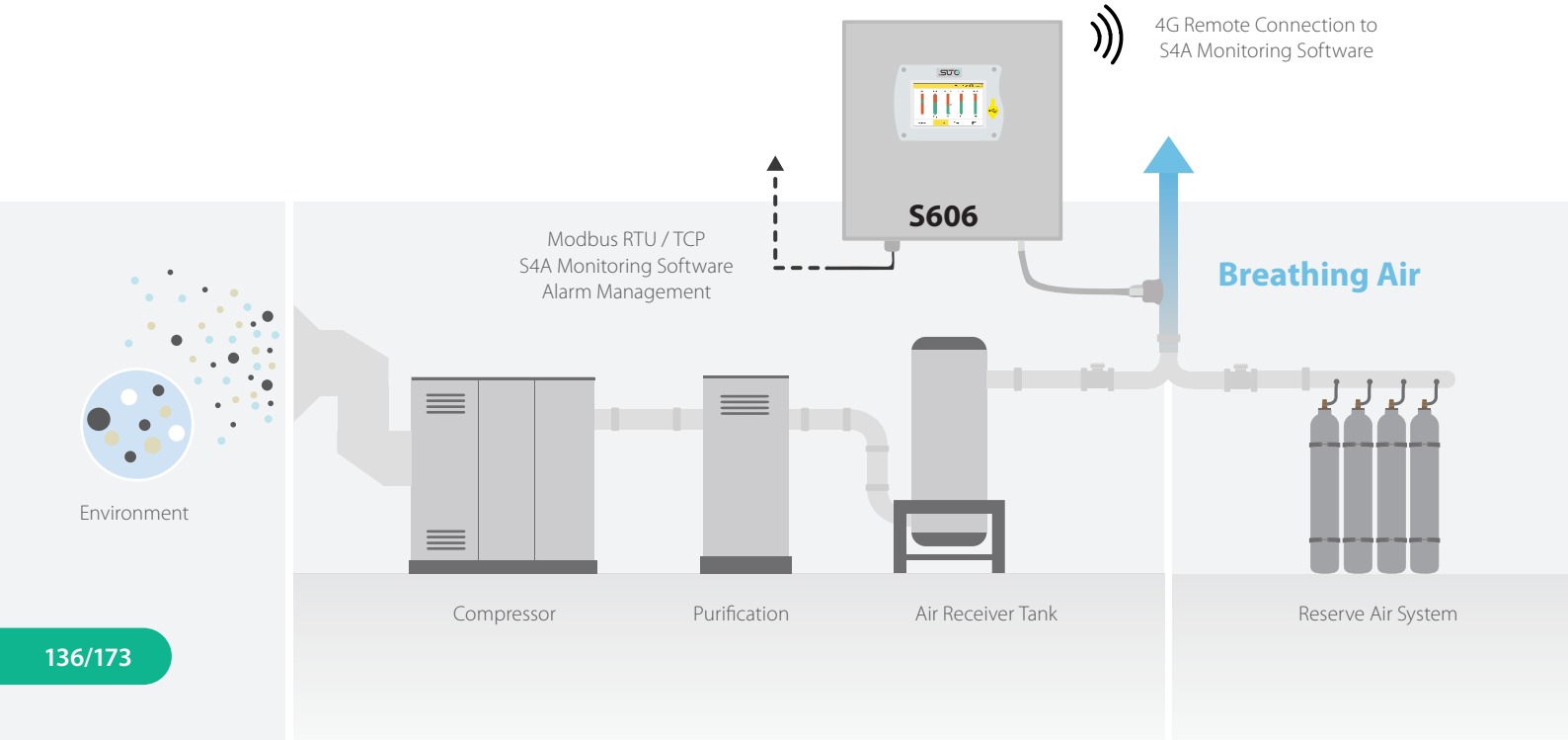
S606 constantly measures O_2, CO_2, CO, Dew Point, Oil Vapor and Pressure as defined in the breathing air purity standards and notifies users in real-time when the purity is not within the defined limits.

It is smarter, faster and more convenient than the traditional methods.

Monitoring of all breathing air parameters

O_2	Oxygen	CO	Carbon Monoxide
CO_2	Carbon Dioxide	H_2O	Humidity
		OIL	Oil Residues

According to all relevant national and international standards



Applications

The S606 is a compact wall-mounted breathing air quality analyzer which measures all crucial breathing air parameters, to ensure that the breathing air is safe for health and the process.

Crucial Industries and Sectors rely on a reliable breathing air supply, e.g. fire fighting, diving, spray painting, chemical industry, offshore and high tech applications.

7 in 1 Measurement Device

Oxygen Measurement

For safety reasons, it is recommended to measure the oxygen level in the breathing air. The optical oxygen sensor monitors the O_2 content and indicates deviations from the standard concentration.

Carbon Monoxide Measurement

The compressor intake air may be contaminated with CO due to nearby combustion engines or heating systems. Carbon monoxide is a toxic and life-threatening gas which will be monitored accurately by an electrochemical sensor.

Oil Vapor Measurement

Atmospheric oil vapor contained in industrial air environment can get into the system through the compressor intake. Compressed into the breathing air, the oil contaminants can cause health issues. The state-of-the-art sensor technology detects the oil contaminants immediately.

Pressure Measurement

The pressure sensor provides additional pressure data about the compressed air system using state of the art sensor technology.

Integrated Data Logger

The integrated data logger records all channels in parallel for later analysis. The 5" touchscreen allows you to interact with the device on site. There is no need for a PC to manage the device.

Carbon Dioxide Measurement

The intake air may also be exposed to increased concentration of carbon dioxide. Filter material used in compressed air can adsorb, but also release CO_2. The gas is measured by the NDIR sensor to avoid extreme concentrations above 1000 ppm.

Humidity Measurement

High humidity can cause corrosion and in severe cases lead to bursting air containers. In cold environment, it can freeze and block the air supply. The integrated dew point sensor is crucial to check the proper water removal of the dryers and filters.

Remote Connection

By connecting a 4G/LTE modem to the designated M12 port, S606 can be monitored remotely through S4A software.

Relevant standards for breathing air

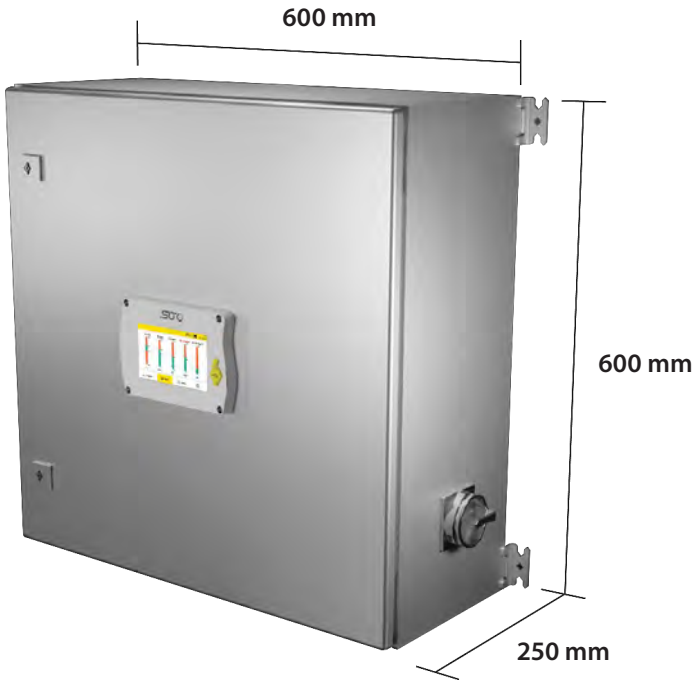
Relevant standards including BS EN 12021, DEF STAN 68-284, OSHA, CSA and BS 8478 require adherence to specific limits of constituents in breathing air. Here some examples of the required for industrial breathing air:

Contaminant	Europe	China	USA	Canada
Standard	EN 12021	GB/T 31975-2015	CFSR	CSA
O_2	>20 %	19.5 - 23.5 %	19.5 - 23.5 %	20 – 22 %
CO_2	500 ppm	≤ 1000 mL/m³	1,000 ppm	500 ml/m³
CO	5 ppm	≤ 10 mL/m³	10 ppm	5 ml/m³
H_2O	PDP: < -11 °C 1) H_2O: <35 mg/m³ 2) H_2O: <25 mg/m³	ADP: ≤ -45.6 °C	---	---
VOC (Oil Vapor)	0.5 mg/m³	≤ 5.0 mg/m³ (Oil mist and particle)	5 mg/m³	1 mg/m³
Odor	no	no	no	no

Why is breathing air quality testing and monitoring important?

- It protects the health, safety and well-being of your employees and people who are on your premises.
- It ensures that your compressor, products and personnel are protected from airborne volatile organic compounds (VOCs) as well
- It ensures that your business complies with national and international regulatory standards for breathing air quality.
- It ensures that your compressed air and work environment have safe levels of oxygen, lubricants, oil, odor, taste, carbon dioxide, carbon monoxide and water.

Dimensions



Technical Data

Measurement

Oxygen O_2	
Accuracy	±(0.05 % O_2 + 1 % o.R.)
Measuring range	0 ... 25 %
Resolution	0.01 %
Sensor	Optical oxygen sensor
Carbon Dioxide CO_2	
Accuracy	±(25 ppm CO_2 + 1 % o.R.)
Measuring range	0 ... 1000 ppm
Resolution	1 ppm
Sensor	NDIR sensor
Carbon Monoxide CO	
Accuracy	±(1 ppm CO + 5 % o.R.)
Measuring range	0 ... 20 ppm
Resolution	0.1 ppm
Sensor	Electrochemical sensor
Humidity H_2O	
Accuracy	±2 °C Td
Measuring range	-100 ... +20 °C Td / 0 ... 17458.6 mg/m³
Resolution	0.1 mg/m³
Sensor	QCM + Polymer
Oil Vapor	
Accuracy	5 % of reading ± 0.003 mg/m³
Measuring range	0.001 ... 5.000 mg/m³ (Based on 1000 hPa(a), 20 °C, 0 % relative humidity)
Resolution	0.001 mg/m³
Sensor	Photo ionization detector
Oil Mist and Particle	
Accuracy	15 % of reading ± 0.1 mg/m³
Measuring range	0.0 ... 5.0 mg/m³ (Based on 1000 hPa(a), 20 °C, 0 % relative humidity)
Resolution	0.1 mg/m³
Sensor	Oil mist and particle sensor
Pressure	
Accuracy	0.5 % FS
Measuring range	0 ... 16 bar(g)
Resolution	0.01 bar
Sensor	Piezo resistive pressure sensor

Signal / Interface & Supply

Fieldbus	
Protocol	Modbus/RTU (RS485) Modbus/TCP (Ethernet)
Power supply	
Voltage supply	100 ... 240 VAC, 50/60 Hz, 50 VA
Interface	
USB	USB Micro with OTG support
M12	4G/LTE Modem

General data

Configuration	
Others	Device comes pre-configured Configuration can be done via on-screen touch
Display	
Integrated	5" color touch screen
Data Logger	
Storage	100 million measurement values
Report	Integrated report generator for PDF export
Material	
Process connection	6 mm quick connector
Housing	Sheet steel, powder-coated on the outside (Stainless steel on request)
Miscellaneous	
Electrical connection	M12, PG plug, RJ45
Protection class	IP54
Water Inlet	G1 connector
Water Outlet	G1/8 connector
Dimensions	600 x 600 x 250 mm
Weight	34 kg
Approvals	
EMC	FCC, CE
Operating conditions	
Measuring Medium	Compressed breathing air
Sample Flow Rate	6 LPM@4 MPa(g), depends on input pressure
Sample rate	1 sample/sec
Medium temperature	0 ... +45 °C
Medium humidity	Medium humidity < 40 % rH, no condensation
Inlet Pressure	0.4 ... 1.5 MPa(g), External pressure reducer allow up to 35 MPa process pressure
Ambient temperature	0 ... +50 °C
Ambient humidity	0 ... 90 % rH
Storage temperature	-10 ... + 50 °C
Transport temperature	-10 ... + 50 °C

Ordering

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

S606 Stationary Breathing Air Quality Analyzer

Order No.	Description
D500 0606	S606 Stationary Breathing Air Quality Analyzer, touch screen interface, data logger, metal cabinet for wall mounting (with oil vapor sensor refer to Europe, USA, Canada standards)*
D500 1606	S606 Stationary Breathing Air Quality Analyzer, touch screen interface, data logger, metal cabinet for wall mounting (with oil mist and particle sensor refer to China standards)*
A1670	USB 4G dongle, including S4A software
A554 0131	4G USB Dongle protection case, with extension cable 2 m and M12 Connector
A1510	Relay module for S606, 8-ch Relay Output

* Including:
- USB OTG memory stick
- Purge filter for pre-measurement (test kit)
- Connection hose 1.5 m, one end quick coupling, one end compressed air coupling
- M12 connector
- Certificate of calibration
- Operation and instruction manual

Accessories

Order No.	Description
A554 0602	Purity test kit consisting of zero filters for oil vapor, particles, and a desiccant cartridge for low dew point creation
A554 1203	Oil vapor zero filter, 1.5 MPa max, with quick connectors at both ends
A554 1204	Particle zero filter, 1.5 MPa max, with quick connectors at both ends
A554 1205	Dew point test kit for low dew point generation, with quick connectors at both sides
A604 0004	Pressure reducer, inlet pressure 0-30 MPa, outlet pressure 0.6 Mpa
A604 0005	Pressure reducer, inlet pressure 0-40 MPa, outlet pressure 0.6 Mpa

Service and Calibration

Order No.	Description
R200 0605	S606 General service and re-calibration • General inspection of the unit • Replacement of tubes and fittings • Cleaning of components • Calibration O_2, CO_2, CO, dew point sensor and oil vapor • Assembly and test of unit • Calibration Certificate
Exchange sensors	
R200 0620	CO exchange sensor unit S605/S606
R200 0621	CO_2 exchange sensor unit S605/S606
R200 0622	O_2 exchange sensor unit S605/S606
R200 0623	Oil mist and particle sensor exchange unit S605/S606
R200 0624	Oil vapor sensor exchange unit S605/S606
R200 0625	Dew Point sensor exchange unit S605/S606

Be smart. **Measure it.**

S530

Ultrasonic Leak Detector

Eco Version

EASY TO USE
Find leaks in minutes

LASER POINTER
To spot the leak

COMPACT DESIGN
Can be used anywhere

NOISE ISOLATED HEADSET
Inaudible signals easily to be heard

LONG BATTERY LIFE

Operation Principle

When gases are leaking through tubes and tanks, an ultrasonic sound is produced which can be detected by the S530 even from several meters away. The S530 transforms these inaudible signals into a frequency which can be easily heard by using the supplied noise isolated headset.

The integrated laser pointer helps to spot the leak from distance. In unpressurized systems, an ultrasonic tone generator can be used whose sound will leak through small openings.

Save Your Time and Costs

Leaks in compressed air systems can significantly increase the cost of compressed air.

The detection of leaks is an important maintenance requirement, which can be done by soapy water or in a more convenient way with ultrasonic leak detectors like S530.

The S530 Leak Detector is providing an easy-to-use and cost-efficient solution to detect leaks in compressed air and gas systems.

Easy to use

Applications

- Leak detection in compressed air, refrigerants, simply of any gas!
- Insulation test of doors and windows
- Detection of partial electrical discharges causing damages on insulations

Leak Detection

Point with the laser at an assumed leak. The display will show the level of the leak.

Detection at medium distance for locating the leakage area.

Scan with the focus tube and focus tip the roughly location till the exact location is found.

Technical Data

Measurement

Flow	
Sensor	Ultrasonic leak detection sensor
Laser	640 ... 660 nm wavelength 0.4 ... 0.5 mW output power
Supply	
Power supply	Internal NiMH rechargeable battery
Operating time	6h
Headset	
Headset	Noise isolated head set
Headset connection	3.5 mm stereo phone jack

General data

Display	
Integrated	3 colour black-mask LCD, 10 level
Material	
Housing	PC + ABS
Miscellaneous	
Protection class	IP30
Approvals	CE
Weight	2.5 kg for the full set
Operating conditions	
Medium	Compressed Air, refrigerants and any compressed gases
Ambient temperature	0 ... +40 °C
Ambient humidity	< 90 % rH
Storage temperature	-10 ... +50 °C
Transport temperature	-20 ... +50 °C

Cost Saving

Compressed air is one of the most expensive energy forms. In Germany alone, 60,000 pneumatic systems consume 14,000,000,000 kWh electricity every year. 15 % to 20 % of this could easily be saved (Peter Radgen, Fraunhofer Institute, Karlsruhe). A large portion of these costs are caused by leaks In compressed air systems, allowing the air to "escape" unused.

Calculation example at 0.6 MPa:

1 hole of 1mm diameter = 270 EUR/year

Option

Ultrasonic tone generator to be used in pressure less systems. The generator emits ultrasonic waves which can be detected by the S530.

Ordering

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

S530 Ultrasonic Leak Detector

Order No.	Description
P601 0103	S530 Ultrasonic Leak Detector set
	Including:
P560 0102	S530 Ultrasonic Leak Detector
S605 0001	Sensor unit
A554 0114	Noise isolated headset
A530 0101	Focus tube and focus tip
A554 0001	Battery charger
A554 0101	Transport case S530

Accessories

Order No.	Description
A554 0103	Ultrasonic tone generator

Contents of Set

Be smart. **Measure it.**

S531

Smart Ultrasonic Leak Detector

MASS STORAGE
Almost unlimited memory for leak records, photos and voice recording

DETECT FROM DISTANCE
Finds leaks in compressed air system easily even from distance

WIRELESS CONNECTION
Wireless connection to headset

ANALYSIS
Export data to LMS for statistics and repair

PHOTOGRAPH LEAK PARTS
Build in camera to take photo of leak locations

LOSS CALCULATE
Calculates air loss in m3/h or in local currency

VOICE RECORDING
Voice recorder for voice memos

NOISE REDUCTION
Integrated noise reduction

LASER
Pinpoint locations with laser pointer

LONG WORKING HOURS
Battery capacity for up to 6 hours

Benefits

- Finds leaks in compressed air system easily even from distance
- Full support for Leak Surveys with the SUTO Leak Management Software (LMS)
- The perfect tool for professional leak detection
- Fast return on investment
- Easy to use, but powerful in performance

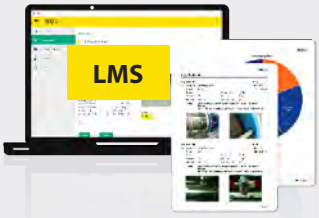
Detect and manage your compressed air leaks — save your time and costs

Finding leaks in the compressed air system is the first step into energy saving. The leaking compressed air causes immense electrical costs, as your compressors are running more than they would actually need to run.

S531 is a smart ultrasonic leak detector that helps users quickly find and record leakages in compressed air or any gas systems. The built-in touch screen assists the user easy operation in leak detecting. Photographing and voice recording make leak surveys more flexible and efficient.

S531 is designed to work with SUTO Leak Management Software (LMS) to enable companies to properly manage their leakage detection and repair activities.

Leak Management Software (LMS)



LMS included for free

When purchasing a S531 set, one free LMS license is included. Start immediately creating powerful leak reports, without paying extra for additional software licenses.

Leak Detection

Point with the laser at an assumed leak. The display will show the level of the leak.

Detection at medium distance for locating the leakage area. Record the leak losses at closer distance.

If needed, scan with the focus tube and focus tip till the exact location is found.

Seamless Connection with Leak Management Software (LMS)

1 Initiation

Enter your own company information like company name, address and contact person etc. to be later printed automatically on your reports.

2 Planing

Create a new project on the fly directly via the user interface of S531. Define project name, cost and unit settings on site via the touch screen user interface.

3 Execution

Use the S531 to perform the leakage survey on site, record the found leaks, which saves the flow, costs of leak loses, take photos of the leaks and record voice memos. All to be used later in generating powerful reports.

4 Preparation

After uploading the data to LMS software, users are enabled to easily check the leakage data, add useful information and/or correct date if needed.

5 Reporting

Generate powerful reports by a simple click of one button. The reports are with your own logo and company info, so you do not have to spend any more time to sort the data and create reports in an external tool, like ord or Excel.

Cost Saving

Compressed air is one of the most expensive energy forms. In Germany alone, 60,000 pneumatic systems consume 14,000,000,000 kWh electricity every year. 15 % to 20 % of this could easily be saved (Peter Radgen, Fraunhofer Institute, Karlsruhe). A large portion of these costs are caused by leaks In compressed air systems, allowing the air to "escape" unused.

Calculation example at 0.6 MPa:

1 hole of 1mm diameter = 270 EUR/year

Option

Ultrasonic tone generator to be used in pressure less systems. The generator emits ultrasonic waves which can be detected by the S530.

Technical Data

Measurement

Selectable units	l/min, m^3/h, cfm, bar, MPa, psi
Sensor	Ultrasonic leak detection sensor
Laser	Wave length: 640 ... 660 nm Output power: < 1.0 mW
Camera	5.0 mega pixels

Interface & Supply

Supply	
Power supply	Internal lithium-ion battery
Operating time	6 h
Data interface	
Connection	USB port for charging and data exchange
Headset	
Headset	Noise isolated headset
Headset connection	Wireless and 3.5 mm stereo phone jack for headset

General data

Display	
Integrated	3.5" color LCD touch screen
Data Logger	
Storage	Integrated mass storage, 100 Million values
Material	
Housing	PC + ABS
Miscellaneous	
Protection class	IP30
Approvals	CE
Weight	430 g for the leak detector 3.65 kg for the full set

Operating conditions

Medium	Compressed Air, refrigerants and any compressed gases
Ambient temperature	0 ... +40 °C
Ambient humidity	<90 % rH
Storage temperature	-10 ... +50 °C
Transport temperature	-20 ... +50 °C

Ordering

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

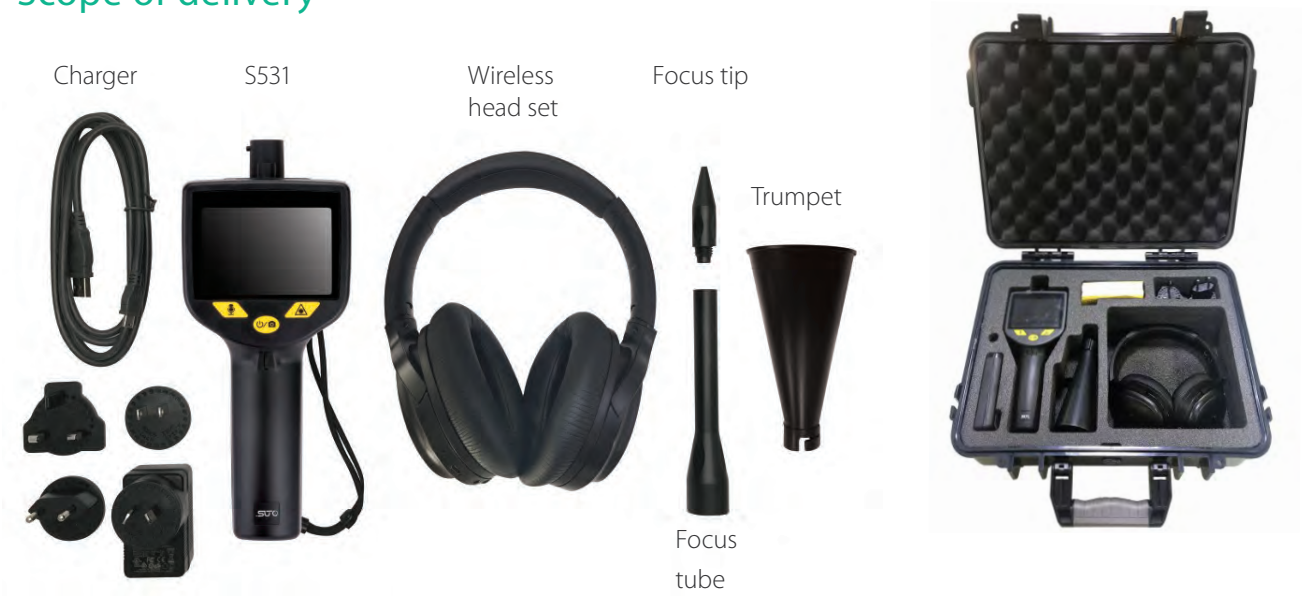
S531 Smart Ultrasonic Leak Detector

Order No.	Description
P601 0104	S531 Smart Ultrasonic Leak Detector Set
	Including:
P560 0104	S531 Smart Ultrasonic Leak Detector
A554 0119	Noise isolate/canceling headset, wireless
A530 0101	Focus tube and focus tip for accurately pinpointing
A554 0123	Trumpet for locating leaks over longer distances
A554 0117	Battery charger
A554 0118	Transport case S531
A554 0122	Leak tags to mark found leaks, 100 pieces

Accessories

Order No.	Description
A554 0103	Ultrasonic tone generator
R200 0070	Calibration S531

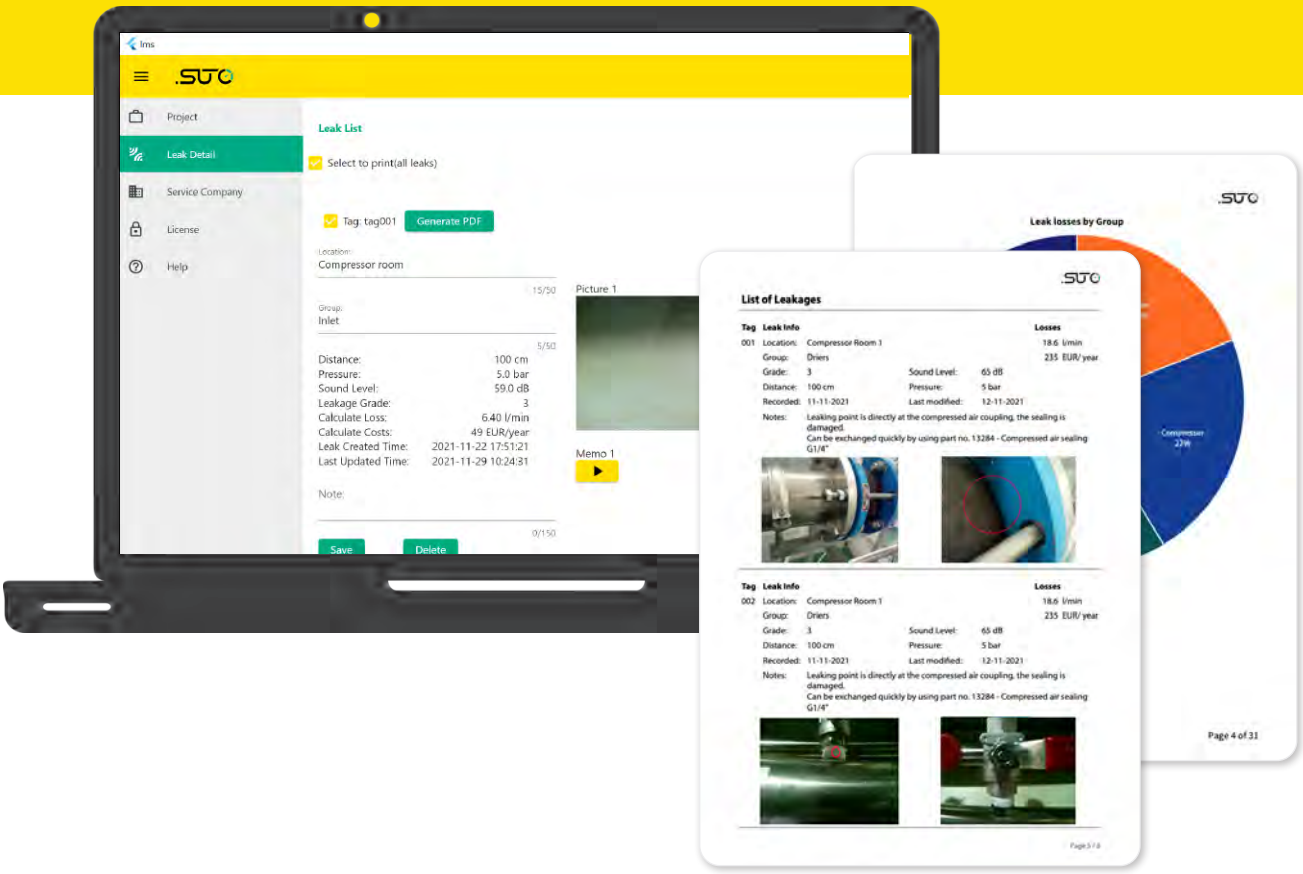
Scope of delivery



Be smart. **Measure it.**

LMS

Leak Management Software



Manage your compressed air leaks —

save your time and costs

The Leak Management Software (LMS) provides a total solution for leak detection, management and easy report creation. The software comes as a local installation on a PC and works seamlessly with our S531 ultrasonic leak detector. Recording leaks in the field using SUTO S531 leak detector and later importing them to LMS software enables users to gather quantitative leak loss data and easily create powerful reports which provide a full overview of the customers' leak situation.

Benefits

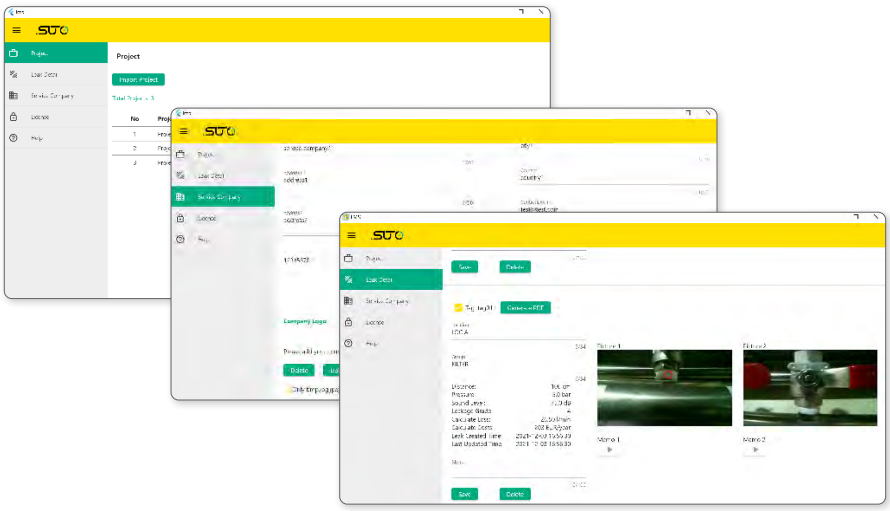
- Simple and user-friendly user interface for easy navigation and leak survey handling
- Reports can be personalized with your own company logo and contact information
- Save your valuable time in report documentation by having a one-click report
- Adjust your reports to local specifications by using the integrated unit converter

Convenient User Experience

FLAT INTERACTION DESIGN
Simplify the operation steps

LOCAL INSTALLATION
Easy to install and save your data locally

ONE-CLICK IMPORT AND UPDATE
Import and update new leak data just by a simply click

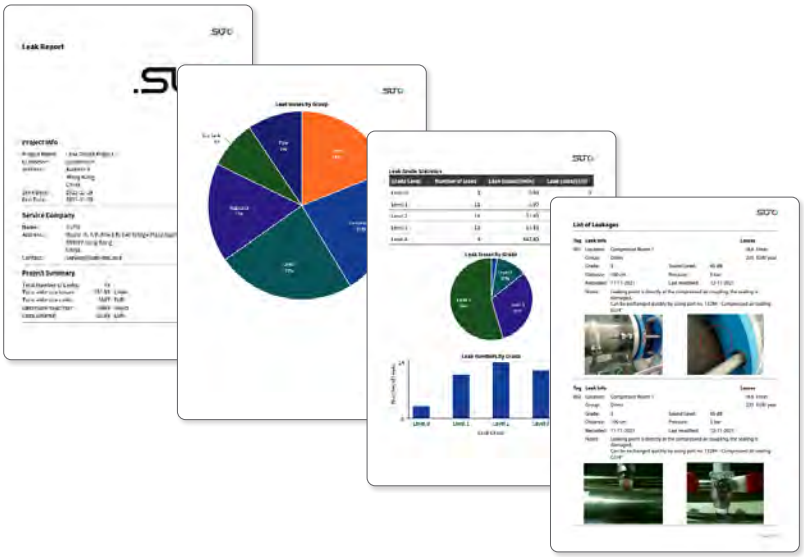


Powerful Analysis Reports

EXTENSIVE ANALYSIS REPORT
Leak report with all relevant data

PERSONALIZED CONFIGURATION
Upload your company logo, contact person etc.

PRINT CONTENT OPTIONAL
Select your desired leaks to be printed



Seamless Connection with S531

1 Initiation

Enter your own company information like company name, address and contact person etc. to be later printed automatically on your reports.

2 Planing

Create a new project on the fly directly via the user interface of S531. Define project name, cost and unit settings on site via the touch screen user interface.

3 Execution

Use the S531 to perform the leakage survey on site, record the found leaks, which saves the flow, costs of leak loses, take photos of the leaks and record voice memos. All to be used later in generating powerful reports.

4 Preparation

After uploading the data to LMS software, users are enabled to easily check the leakage data, add useful information and/or correct date if needed.

5 Reporting

Generate powerful reports by a simple click of one button. The reports are with your own logo and company info, so you do not have to spend any more time to sort the data and create reports in an external tool, like ord or Excel.

Included in S531 for free

When purchasing a S531 ultrasonic leak detector set, one free LMS license is included. Start immediately creating powerful leak reports, without paying extra for additional software licenses.

Ordering

Leak Management Software (LMS)

Order No.	Description
M599 7045	Leak Management Software (LMS), Local installation, 1 license (bound to local PC)*, one-time payment

* The software license is bound to the local PC, still the same software can be used by multiple users on the same PC.

sales@suto-itec.com

Trial Period

Test it for 30 Days!

If you want to try LMS we are offering a 30 days trial period with full functionality.

When the 30 days are due to expire, in order to continue using the software you need to buy a license.

www.suto-itec.com

Be smart. **Measure it.**

S110

Power and Energy Meter

S110

S110-P

MULTIFUNCTION POWER AND ENERGY METER
3-phase, 1-phase

COMPRESSOR PERFORMANCE
Helps to identify compressor efficiency

MODBUS/ RTU INTERFACE
Connects to any Modbus-Master

ROGOWSKI COILS
Wide range, highly accurate

Benefits

- Convenient and easy to set up compressor performance and efficiency monitoring
- Real power consumption in kW and kWh by measuring each phase voltage and current
- DIN rail installation for power cabinets or portable version with rugged housing
- Power range up to 2 MW (2000 kW)
- Three current sensor models with 100 A, 1000 A or 3000 A available

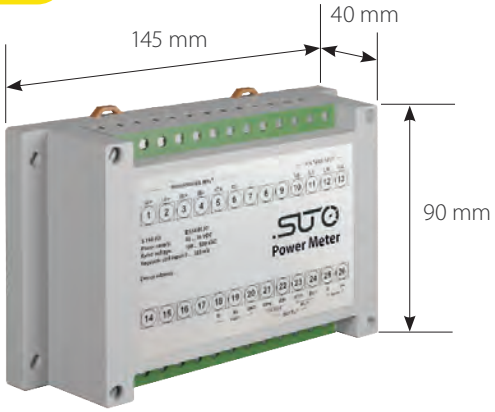
Operation Principle

The SUTO Power and Energy Meter has been designed with a focus on easy installation and reliable measurements. The main application is to measure the power consumption and the accumulated energy consumption of electrical 3-phase consumers, like compressors, driers and oxygen/nitrogen generators.

The main difference to common power measurements is that all relevant parameters are real measured values and not assumptions. Unlike the traditional method, where only one phase is measured, the voltage is assumed as stable and the phase shift is entered as a constant, the S110 measures the voltage and current of each phase.

By this, the S110 is much more accurate and delivers more reliable measurements compared to single phase current measurements.

S110



Application

In this illustration, a Power and Energy Meter is installed directly into the connection box of the compressor.

The Rogowski current coils are easy to install, by just clamping them around the power cables. The voltage connection can be drawn directly from the power cabinet of the compressor.

The Power and Energy Meter is then connected to a S330 / S331 Display and Data Logger to record the Voltage and Current of each phase, as well as recording the actual power consumption and the total energy consumption.

This is not only used to identify inefficient compressors, but also letting the compressed air operator know what the real costs of the compressed air are.

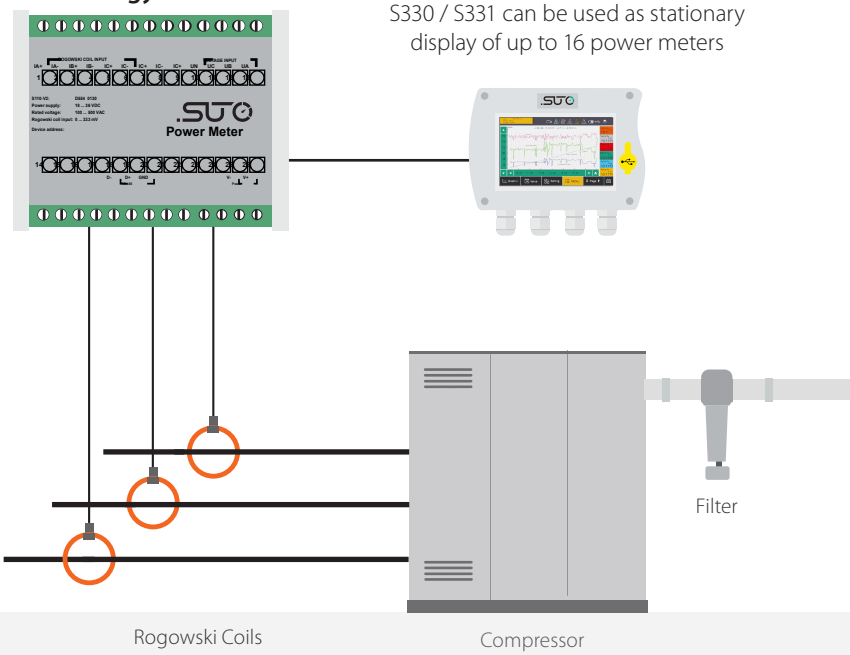
S110

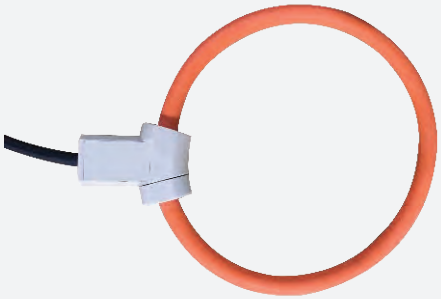
Power and Energy Meter

S331

Data Logger

S330 / S331 can be used as stationary display of up to 16 power meters



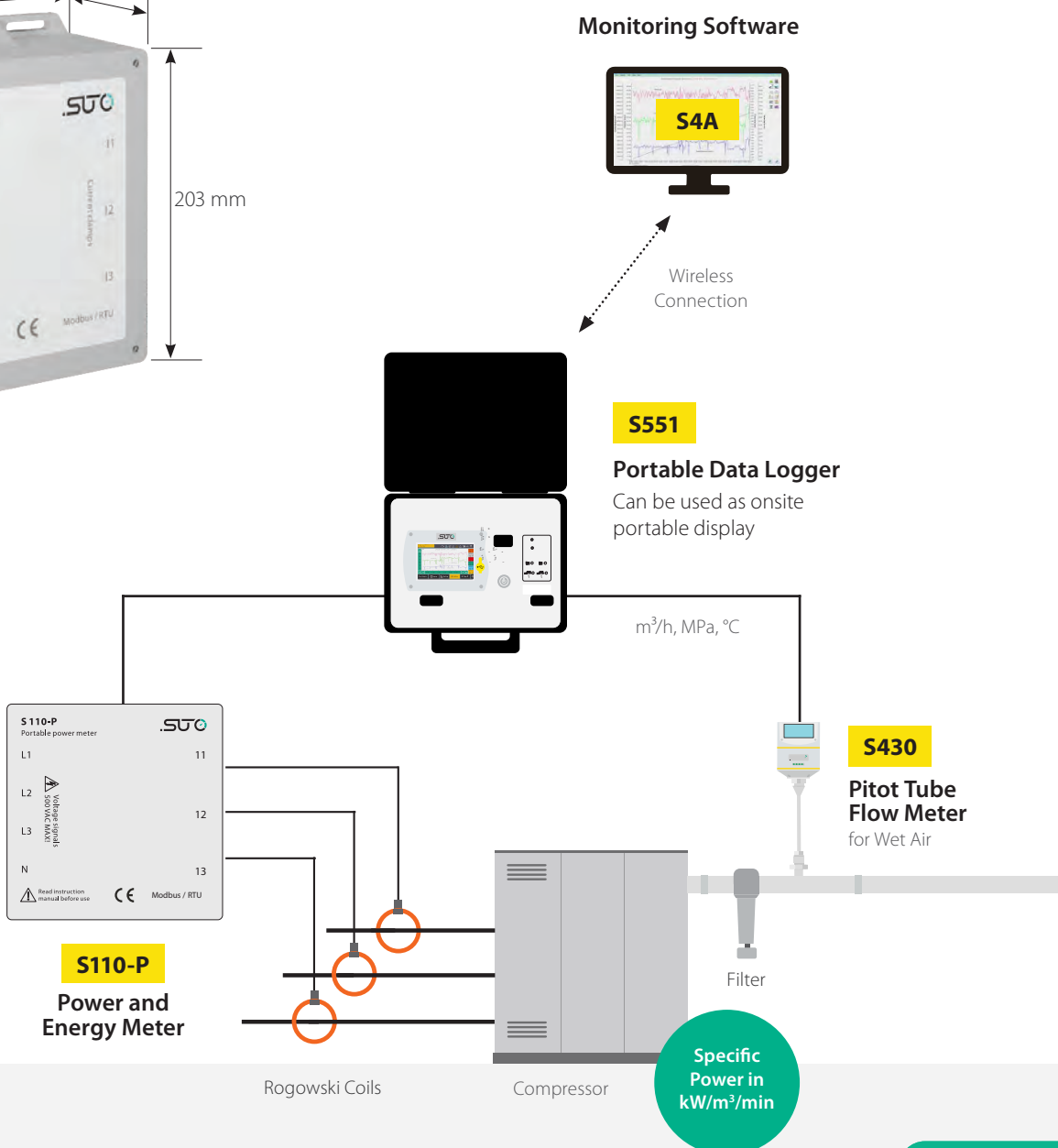


Current Measuring via Rogowski coils offers a high accuracy over a wide range and an easy installation. (Note: for each phase, one coil is needed)

S110-P

Compressor Efficiency Test

Knowing your compressor efficiency is the first step for your energy saving goals. With this solution you will know, how much electrical energy is needed to produce 1 m^3 compressed air and what are the electrical costs.



Technical Data

Measurement

Flow	
Accuracy	V = 0.2 %, A = 0.5 %
Selectable units	V, A, kW, kvar, kVA, kWh, Hz
Measuring range	100 ... 500 VAC, up to 2500 kW
Sampling rate	8 k/s

Signal / Interface & Supply

Fieldbus	
Protocol	Modbus RTU
Supply	
Voltage supply	24 VDC S110 1 W
	24 VDC S110-P 2 W
Current consumption	Max. 50 mA
Data interface	
Connection	M12 connector

General data

Material	
Housing	ABS
Miscellaneous	
Protection class	IP20
Approvals	CE
Weight	0.21 kg
Operating conditions	
Ambient temperature	-25 ... +55 °C
Storage temperature	-40 ... +85 °C

Ordering

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

S110 Power and Energy Meter

Order No.	Description
Stationary	
D554 0130	S110 Power and Energy Meter, hat rail, Modbus/RTU, 24 VDC supply
S554 0140	Electrical Current Transmitter for S110, 1000 A, 100 mm diameter, 1.8 m cable, open ends
S554 0141	Electrical Current Transmitter for S110, 3000 A, 150 mm diameter, 1.8 m cable, open ends
S554 0142	Electrical Current Transmitter for S110, 100 A, 16 mm diameter, 1.8 m cable, open ends
Portable	
P554 0134	S110-P Portable Power and Energy Meter, incl. 5 m connection cable to S551 (Modbus/RTU), 4 voltage test leads and 4 test clips
S554 0160	Electrical Current Transmitter for S110-P, 1000 A, 100 mm diameter, 1.8 m cable, connector to S110-P
S554 0161	Electrical Current Transmitter for S110-P, 3000 A, 150 mm diameter, 1.8 m cable, connector to S110-P
S554 0162	Electrical Current Transmitter for S110-P, 100 A, 16 mm diameter, 1.8 m cable, connector to S110-P

Be smart. **Measure it.**

Pressure Transmitter

Seamless Integration into your Compressed Air System

Pressure is the key point in a compressed air system. This makes it crucial to keep the pressure at a constant and reliable level. Monitoring and measuring the compressed air pressure is needed to save energy, identify degrading at an early stage and keep production machinery running.

SUTO pressure transmitters are made to seamless integrate into your compressed air monitoring system and provide reliable measurement results.

Available in Three Ranges

- 0 ... 1.6 MPa(g)
- 0 ... 4.0 MPa(g)
- 0 ... 0.16 MPa(abs.)

Signal Output

The pressure transmitter is offered as a 2-wire analog output version for easy connection.

For modern monitoring solutions, the Modbus/RTU version allows to easily connect multiple transmitters to a single data logger.

Benefits

- High accurate and affordable industrial pressure transmitter
- Excellent anti-interference capability (EMC, EMI)
- Salt-spray, temperature and humidity tested
- IP67 protection
- 4 ... 20 mA 2-wire loop powered or Modbus/RTU output

Industrial equipment for manifold applications

- Hydraulic systems
- Pneumatic systems
- Industrial engines
- HVAC/R equipment
- Spraying systems
- Cooling systems

Technical Data

Measurement

Pressure	
Accuracy	±0.5 % F.S (optional ±0.25 % F.S)
Measuring range	0 ... 4.0 MPa
Response time (t90)	≤1 ms (@ 90 % F.S)

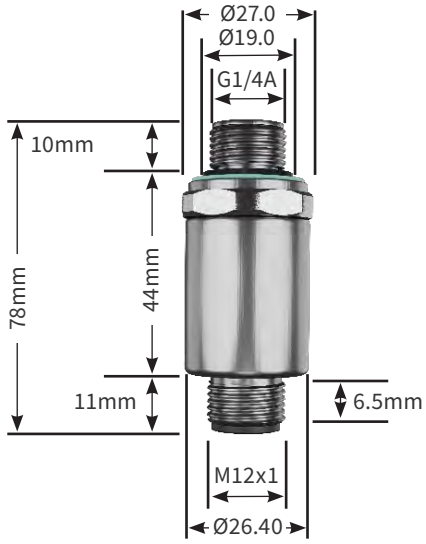
Signal / Interface & Supply

Analog output (for 4 ... 20 mA type)	
Signal	4 ... 20 mA, (2-wire loop powered)
Load	Max. 250 Ohm
Fieldbus (for Modbus/RTU type)	
Protocol	Modbus/RTU
BUS-Length	≤ 1000 m
Supply	
Voltage supply	11 ... 36 VDC
Current consumption	Max. 20 mA
Data interface	
Connection	M12 Connector

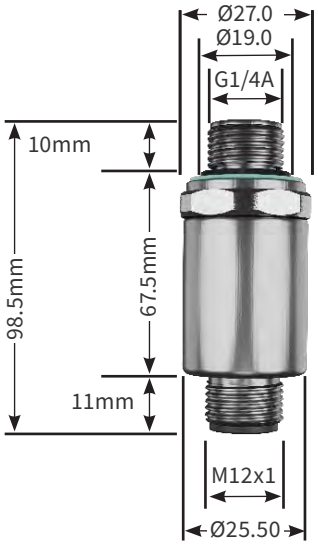
General data

Material	
Process connection	Stainless steel 1.4301
Housing	Stainless steel 1.4301
Metal parts	Stainless steel 1.4301
Miscellaneous	
Electrical connection	M12 Connector
Protection class	IP65
Approvals	CE
Process connection	G1/4" (ISO 228/1)
Operating conditions	
Medium temperature	-40 ... +85 °C
Ambient temperature	-40 ... +85 °C
Storage temperature	-40 ... +125 °C

Dimensions (4 ... 20 mA Type)



Dimensions (Modbus/RTU Type)



Ordering

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

Pressure Transmitter

Order No.	Description
S694 3557	Pressure Transmitter, 0 ... 1.6 MPa(g), 2-wire 4 ... 20 mA output, incl. M12 connector, G1/4" thread
S694 2559	Pressure Transmitter, 0 ... 1.6 MPa(g), Modbus/RTU, incl. M12 connector, G1/4" thread
S694 3558	Pressure Transmitter, 0 ... 4.0 MPa(g), 2-wire 4 ... 20 mA output, incl. M12 connector, G1/4" thread
S694 2562	Pressure Transmitter, 0 ... 4.0 MPa(g), Modbus/RTU, incl. M12 connector, G1/4" thread
S694 2564	Pressure Transmitter, 0 ... 0.16 MPa(a), 2-wire 4 ... 20 mA, incl. M12 connector, G1/4" thread
S694 2563	Pressure Transmitter, 0 ... 0.16 MPa(a), Modbus/RTU, incl. M12 connector, G1/4" thread
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)
R200 0030	Pressure Transmitter calibration at 3 points

Be smart. **Measure it.**

Temperature Transmitter

Two Versions

The compact sensor solution with 4 ... 20 mA output available in 2 sizes

Industrial Equipment for Manifold Applications

The temperature transmitter is a sensor which is designed to measure the temperature of liquid, vapour, compressed air and gases within the permissible operating parameters.

- Measure the inlet / outlet temperature of dryers
- Measure the outlet temperature of compressors

Benefits

- High accurate and affordable industrial temperature sensor
- Easy installation in compressed air systems
- 4 ... 20 mA transmitter
- Wide range of -50 ... +250 °C

Compression Fitting

There are different types of compression fittings available:

- Compression fitting 6mm, G1/2", PTFE ring, 0.6 MPa
- Compression fitting 6mm, G1/2", metal ring, 1.6 MPa

Technical Data

Measurement

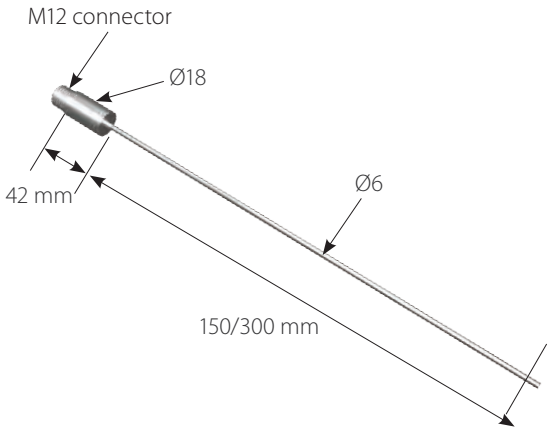
Temperature	
Accuracy	0.5 % o.RGD + 0.2 % FS
Measuring range	-50 ... +200 °C
Sensor	PT100 Class A

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA, (2 wire loop powered)
Scaling	4 mA = -50 °C, 20 mA = +200 °C
Load	Max 250 Ohm
Supply	
Voltage supply	16 ... 30 VDC
Current consumption	Max. 20 mA
Data interface	
Connection	M12 connector

General data

Material	
Process connection	Stainless steel 1.4571
Housing	Stainless steel 1.4571
Metal parts	Stainless steel 1.4571
Miscellaneous	
Electrical connection	M12 connector
Protection class	IP65
Approvals	CE
Process connection	6 mm Fitting
Weight	0.08 kg
Operating conditions	
Ambient temperature	-40 ... +90 °C



Ordering

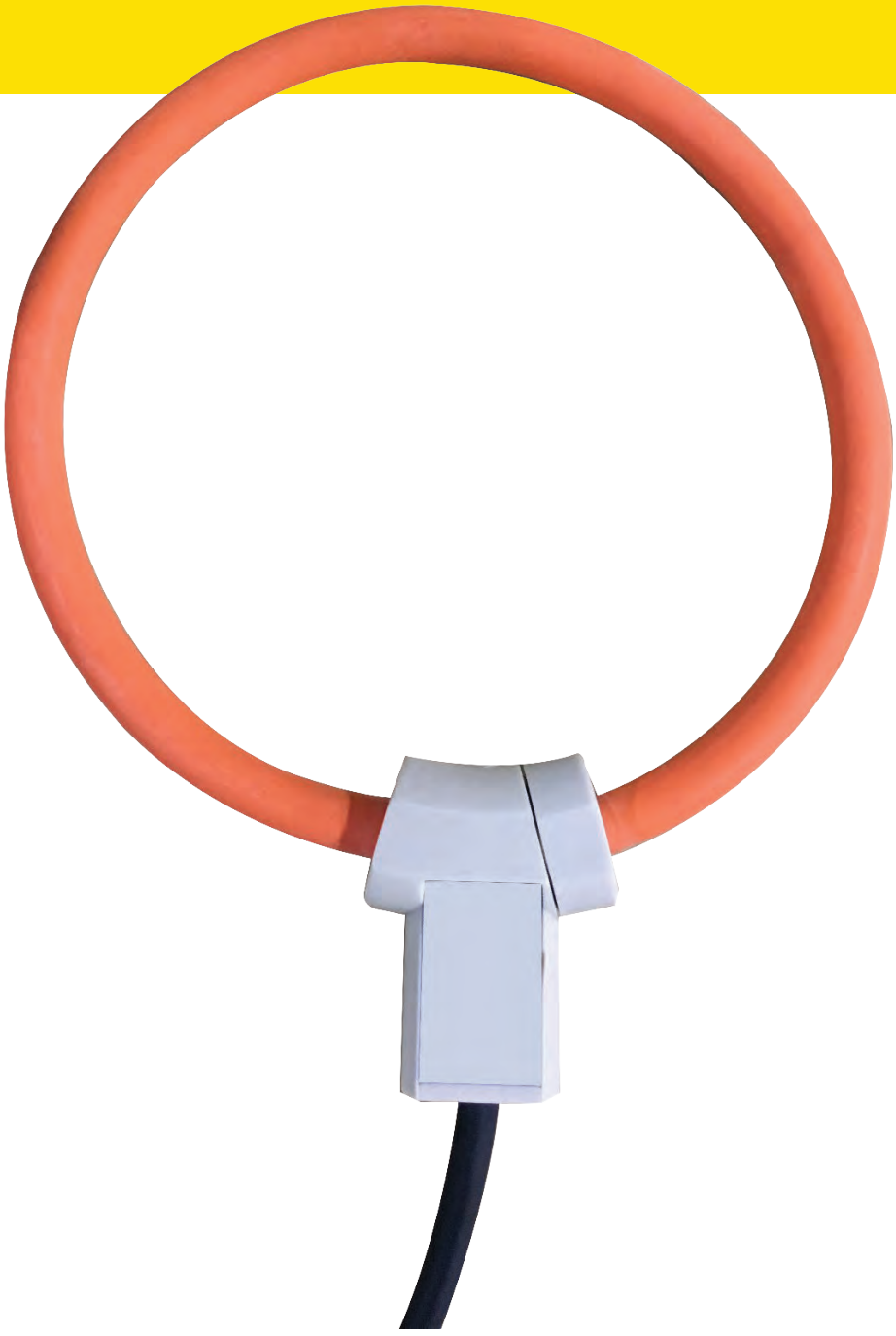
Please use the following table to assist in placing your order with our sales staff.

Temperature Transmitter

Order No.	Description
S693 0003	Temperature Transmitter, -50 ... +200 °C, 4 ... 20 mA loop powered, 6 x 150 mm sensor tube
S693 0004	Temperature Transmitter, -50 ... +200 °C, 4 ... 20 mA loop powered, 6 x 300 mm sensor tube
A554 6003	Compressor fitting 6 mm, G½", PTFE ring, 0.6 MPa
A554 6004	Compressor fitting 6 mm, G½", metal ring, 1.6 MPa
A553 0104	Sensor cable, 5 m with M 12 connector, open wires, AWG 24 (0.2 mm^2)

Be smart. **Measure it.**

Electrical Current Transmitter



Benefits

- Easy installation
- Wide measuring range
- Accurate current sensing
- 4 ... 20 mA output signal
- IP67 casing provides robust protection in the industrial environment

Accurate current measurement

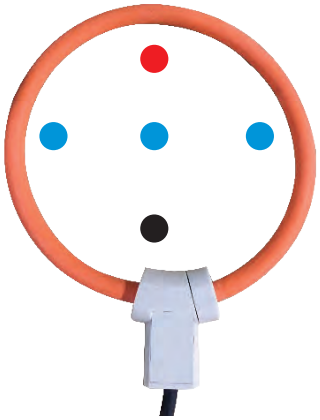
SUTO current sensor is an AC RMS current sensor composed of a flexible active part (Rogowski coil model) connected to a compact digital converter, capable of measuring the current carried on a power conductor up to a value of 3000 A AC.

The digital converter supplies an output of 4 ... 20 mA DC in linear proportion to the measured current.

Current Transmitter Application

- Current sensing at compressors for load / unload analysis
- Current sensing for power / energy measurement
- Evaluation of machine operation hours

Position Sensitivity

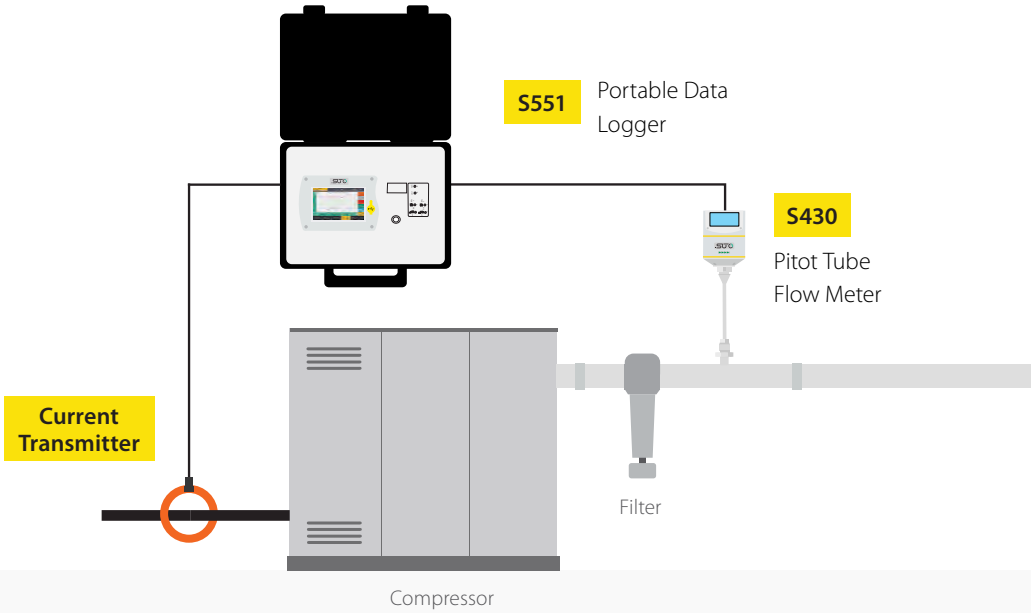


Conductor Position	Typical Error(%)
●	< 0.5 %
●	< 0.8%
●	< 1 %

Single Phase Power Measurements

By measuring the current of a symmetric power consumer on one phase, compressed air experts are able to calculate the power consumption of the compressors without the need of measuring voltage additionally.

This offers an analysis of the compressor and allows to judge the efficiency of the system.



Technical Data

Measurement

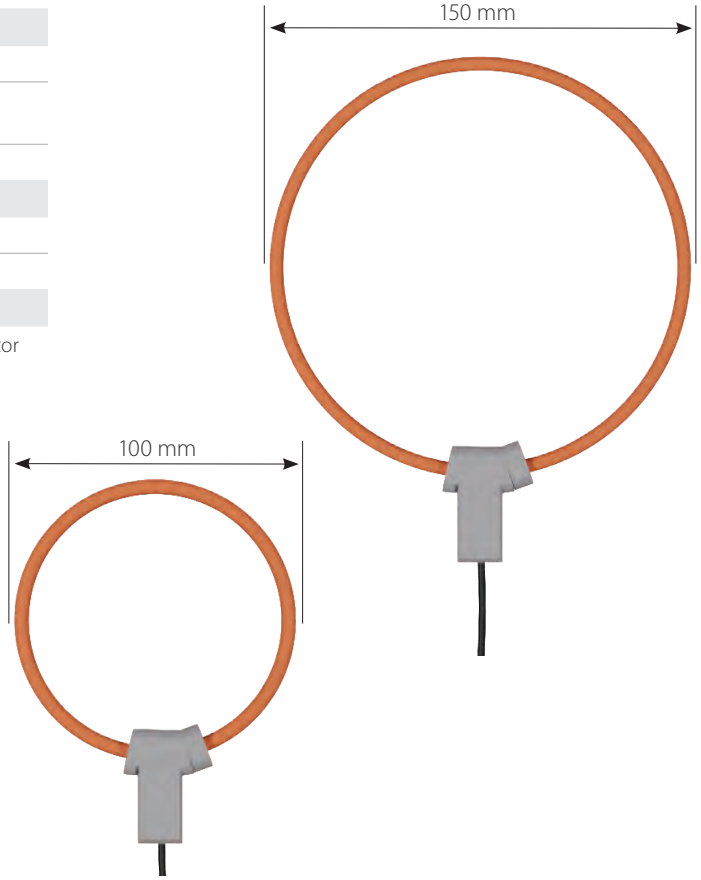
Current	
Accuracy	0,5 % of reading + 0,2 % of range

Signal / Interface & Supply

Analog output	
Signal	4 ... 20 mA 3-wire
Scaling	4 mA = 0A AC, 20 mA = 1000A / 3000 A AC
Load	Max. 300 Ohm
Supply	
Voltage supply	10 – 32 VDC
Current consumption	Max. 30 mA
Data interface	
Connection	open wire ends / ODU connector

General data

Miscellaneous	
Protection class	IP67
Approvals	CE
Operating conditions	
Ambient temperature	0 ... +80 °C



Ordering

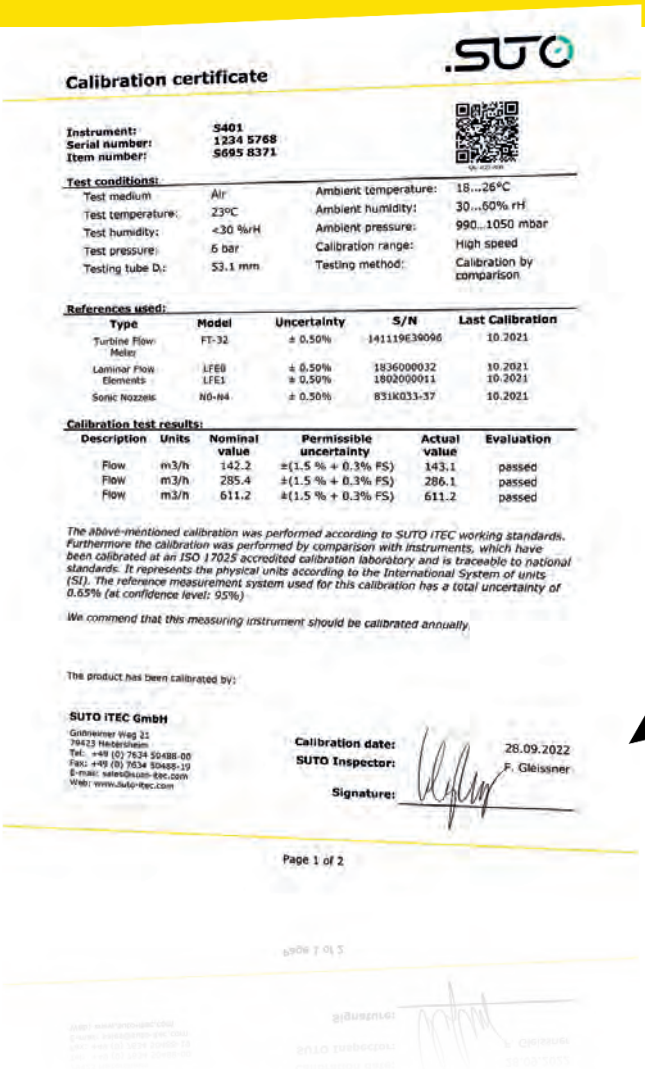
Please use the following table to assist in placing your order with our sales staff.

Electrical Current Transmitter

Order No.	Description
S554 0155	Electrical Current Transmitter, 1000 A, 100 mm diameter, open wire ends
S554 0156	Electrical Current Transmitter, 1000 A, 100 mm diameter, including connector to S551
S554 0157	Electrical Current Transmitter, 3000 A, 150 mm diameter, including connector to S551
S554 0158	Electrical Current Transmitter, 3000 A, 150 mm diameter, open wire ends

Be smart. **Measure it.**

Calibration and Certification



Calibration certificate

Instrument: S401
Serial number: 1234 5768
Item number: S695 8371

Test conditions:

Test medium:	Air	Ambient temperature:	18...26°C
Test temperature:	23°C	Ambient humidity:	30...60% rH
Test humidity:	<30 %rH	Ambient pressure:	990...1050 mbar
Test pressure:	6 bar	Calibration range:	High speed
Testing tube D.:	53.1 mm	Testing method:	Calibration by comparison

References used:

Type	Model	Uncertainty	S/N	Last Calibration
Turbine Flow Meter	FT-32	± 0.50%	141119E39096	10.2021
Laminar Flow Elements	LFE8	± 0.50%	1836000032	10.2021
	LFE1	± 0.50%	1802000011	10.2021
Sonic Nozzels	N0-N4	± 0.50%	831K033-37	10.2021

Calibration test results:

Description	Units	Nominal value	Permissible uncertainty	Actual value	Evaluation
Flow	m3/h	142.2	±(1.5 % + 0.3% FS)	143.1	passed
Flow	m3/h	285.4	±(1.5 % + 0.3% FS)	286.1	passed
Flow	m3/h	611.2	±(1.5 % + 0.3% FS)	611.2	passed

The above-mentioned calibration was performed according to SUTO iTEC working standards. Furthermore the calibration was performed by comparison with instruments, which have been calibrated at an ISO 17025 accredited calibration laboratory and is traceable to national standards. It represents the physical units according to the International System of units (SI). The reference measurement system used for this calibration has a total uncertainty of 0.65% (at confidence level: 95%)

We commend that this measuring instrument should be calibrated annually.

The product has been calibrated by:

SUTO iTEC GmbH
Gottlieb-Daimler-Weg 21
79423 Heitersheim
Tel.: +49 (0) 7634 50488-00
Fax: +49 (0) 7634 50488-19
E-mail: sales@suto-itec.com
Web: www.suto-itec.com

Calibration date: 28.09.2022
SUTO Inspector: F. Gleissner
Signature:

Page 1 of 2

FLOW CALIBRATION

PARTICLE CALIBRATION

OIL VAPOR CALIBRATION

EXCHANGE CALIBRATION

DEW POINT CALIBRATION

PRESSURE CALIBRATION

TEMPERATURE CALIBRATION

Benefits

- SUTO owned high tech calibration facilities for Dew Point, Compressed Air Flow, Oil vapor, Pressure, Temperature in Germany, Hong Kong and China
- Flow calibration under pressure and a wide range for highest accuracy
- Real gas calibration system for technical gases
- SUTO Exchange Calibration Service to minimize downtimes
- References and certificates are traceable to national standards

Flow Calibration Service

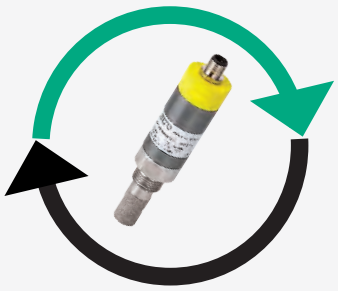
- Accuracy: < 0.5 % o. RDG
- Range: 0 ... 260 m/s (20 °C 1000 mbar)
- Pressure: 0 ... 0.7 MPa
- Pipe sizes: DN8 ... DN100
- Medium: Compressed Air and technical Gasses
- References: Sonic Nozzles, Laminar Flow Elements, Turbine Meter, Coriolis Meter

Dew Point Calibration Service

- Accuracy Frost/Dew point: ≤ ± 0.1 °C
- Accuracy Temperature: ≤ ± 0.07 °C
- Calibration Range: -85 ... +15 °C Td
- Reference: MBW 373 Dew Point Hygrometer / Dew Point Mirror

Oli Vapor Calibration Service

- Accuracy: ≤ ± 3 % o. RDG
- Gas: Isobutylene in synthetic air
- Reference: Traceable and certified gas
- Range: 0.000... 10.000 mg/m^3
- Multiple activated carbon filtration system for accurate zero-point calibration



Exchange Service

Exchange Service

No Downtime anymore!

The exchange calibration service eliminates down time and enables users to have a seamless record of their dew point measurements.

The user receives in advance a calibrated instrument with calibration certificate and the same instrument settings. The onsite instrument is then switched against the calibrated one and returned to the supplier.

Ordering

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

Calibration and Certification

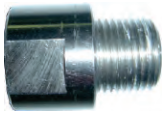
Order No.	Description
R200 0001	Flow calibration with certificate
R200 0005	Oil-& grease-free cleaning option for flow sensors (For Oxygen, it is already included in A1009.)
R200 0020	Re-calibration, real gas: O_2, Ar, CO_2, H_2 (H_2 real gas calibration needs to consult with manufacturer in advance)
R200 0021	Re-calibration, real gas: CH_4, NG, N_2O (please consult with manufacturer in advance)
R200 0022	Real gas calibration for He
R200 0030	Pressure sensor calibration 16bar(g) type, at 3 points
R200 0040	Re-calibration ultrasonic flow meter S460
R200 0050	Dew point calibration, one additional point, freely selectable in the range -75 ... +20 °C Td
R200 0070	Calibration for S531
R200 0080	Re-calibration per unit for S110 power meters or Rogowski coils
R200 0120	General service and re-calibration: - General inspection of the unit - Replacement of tubes and fittings - Cleaning of lamp and sensor - Assembly and test of unit - Calibration of oil sensor S120
R200 0130	Calibration for particle counter S130
R200 0131	Calibration for particle counter S132
R200 0600	S600 Service and calibration: - General inspection of the unit - Replacement of tubes and fittings - Cleaning of components - Calibration oil vapor, particle and dew point sensor - Assembly and test of unit - Calibration
R200 0610	Isokinetic sampler service / flow calibration
R699 3396	Dew point sensor calibration
R200 4610	Calibration for S461 ultra sonic transducer pair
R200 4613	Calibration for S461 temperature sensor
R200 4620	Calibration for S462

Be smart. **Measure it.**

Accessories

Ordering

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

Order No.	Description	Application	Picture
C190 0002	Closing cap for S421/S452 material: 1.4404	To close the measuring sections in case the sensor unit is removed	
C190 0060	Thread adaptor, G 1/2" internal to PT 1/2" external, SUS303	Used to adapt S401 or S450 to a PT thread ball valve	
C190 0065	Thread adaptor, G 1/2" internal to NPT 1/2" external, SUS303	Used to adapt S401 or S450 to a NPT thread ball valve	
C190 0116	Flow conditioner	Wafer type flow conditioners, which is flanged between two flanges 5-8 times diameter upstream of the flow meter. Please specify nominal pipe diameter and pressure	
A530 1105 / A530 1106 / A530 1111 / A530 1113	High pressure installation device. To be used for pressure > 1.5 MPa	For safety reasons we recommend using this installation device whenever the operating pressure exceeds 1.5 MPa * A530 1105 - High pressure installation device for S400/S401-220 mm * A530 1106 - High pressure installation device for S450-220 mm * A530 1111 - High pressure installation device for S400/S401-400 mm * A530 1113 - High pressure installation device for S450-400 mm	
A530 1108	SUTO spot drilling device G 1/2" for S401, S450 and S409	This drilling tool is used to drill holes into compressed air pipes under pressure through a ball valve	
A530 1205	HT20 G 3/4" hot tapping tool, for S430	Drill 3/4" holes into compressed air pipes under pressure through ball valves	
A553 0104	Sensor cable 5 m with M12 connector, open wires, AWG 24 (0.2 mm^2)	Used to connect SUTO sensors to a PLC or power supply	
A553 0105	Sensor cable 10 m with M12 connector, open wires, AWG 24 (0.2 mm^2)	Used to connect SUTO sensors to a PLC or power supply	
A553 0146	Sensor cable 5 m with M12 and RJ45 connectors, PoE supported, AWG 24 (0.2 mm^2)	Used to connect SUTO flow sensors to the Ethernet network via router, switch and etc.	
A553 0161	M8 female to M12 male converter cable	Used to connect the S415/S418 to a Modbus splitter	

Ordering

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

Order No.	Description	Application	Picture
A553 0165	Sensor cable, 5 pole, AWG 24 (0.2 mm^2), 50 m	Used to connect power supply and analogue signals to sensors	
A553 0166	Sensor cable, 5 pole, AWG 24 (0.2 mm^2), 100 m	Used to connect power supply and analogue signals to sensors	
A553 0167	RS-485 cable, 4 pole twisted pairs, AWG 24 (0.2 mm^2), 50 m	Used to connect power supply and RS-485 signal to sensors	
A553 0168	RS-485 cable, 4 pole twisted pairs, AWG 24 (0.2 mm^2), 100 m	Used to connect power supply and RS-485 signal to sensors	
A554 0009	Power supply for hat rail, input: 85 ... 264 VAC, output: 24 VDC, 60 W	This power supply can be used to supply sensors with 24 VDC/2.5 A It's mounted on a hat rail	
A554 0007	Power supply wall mountable, input: 85 ... 264 VAC, output: 24 VDC, 15 W, without cable	This power supply is used to supply 24 VDC to sensors and other devices	
A554 0008	½" G type ball valve	This is a proper ball valve for the installations of flow sensors S401/S450	
P554 0009	Wall thickness meter	The instrument is used to measure the wall thickness of pipes. Too often the inner diameter of pipes is not exactly known, but this information is required for an accurate flow measurement. By measuring the wall thickness and the pipe size the exact inner diameter can be calculated	
A554 0107	Mains unit 100-240 VAC/24 VDC, 0.5 A for S401 / S201 series, 2 m cable	Simple power supply for a portable S421 or S401 solution (Special plug on request)	
A554 2005	Service kit for sensor configuration including software	This service kit can be used for all SUTO sensors to change settings and check sensors	

Ordering

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

Order No.	Description	Application	Picture
A699 3491	Measuring chamber, 2 l/min @ 0.8 MPa, fast connector, without filter, max pressure 1.6 MPa, suitable for all SUTO dew point sensors	For easy connection and disconnection to compressed air system through quick-disconnector	
A699 3492	Measuring chamber, 2 l/min @ 0.8 MPa, 6 mm hose quick connector, without filter, max. pressure 1.6 MPa, suitable for all SUTO dew point sensors	For easy connection and disconnection to compressed air system through quick-disconnector	
A699 3493	By-pass-type chamber with 6 mm hose in and out connection up to 1.6 MPa	This chamber can be used in applications where the measured gas is by-passed through the chamber	
A699 3500	Measuring chamber, 4 l/min @ 0.8 MPa, hose fast connector, with filter, recommended pressure range 0.3 ... 1.5 MPa, convenient dew point measurement of gas/air with SUTO portable dew point meters	The sample gas/air is connected to the chamber through a 6 mm Teflon® hose The chamber is mounted to the SUTO portable dew point meters through the 1/2" G-type thread connection. Parking and measurement position is selected through the handle at the chamber, which allows quick measurement results	
A699 3501	By-pass-type chamber with 6 mm hose in and out connection up to 1 MPa, convenient dew point measurement of gas/air with SUTO portable dew point meters	This chamber can be used in applications where the measured gas is by-passed through the chamber to avoid any gas/air loss. The chamber is mounted to the SUTO portable dew point meters through the 1/2" G-type thread connection Parking and measurement position is selected through the handle at the chamber, which allows quick measurement results	
A699 3496	Measuring chamber for dryer installation, 2 l/min @ 0.8 MPa, hose fast connector, without filter, max. pressure 1.6 MPa	The sample gas/air is connected to the chamber through a 6 mm Teflon® hose The chamber is mounted to stationary S2XX dew point sensors through the 1/2" G-type thread connection. This chamber can be conveniently mounted to the frame or cabinet of a dryer	
A699 3590	High pressure chamber up to 35 MPa	In applications where the pressure is exceeding 1.5 MPa, this chamber can be used. Through the adjustable valve a small purge is set to ensure a gas flow through the sensor element (response time)	
A554 0054	Compressed air quick coupling, female side R ½" thread	Connect this quick coupling to a 1/2" ball valve to set up a quick connector for measurement of dew point, oil and particle	
Dew point sensor protection caps		Protection caps are used to protect the dew point sensor element from mechanical impacts or dust. The proper cap selection depends in application Please contact customer service	

Ordering

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

Order No.	Description	Application	Picture
A554 0002	Test pot 11.3 % rH	Is used to check dew point sensors. The pot creates a constant relative humidity of 11.3 %. The resulting dew point is depending on the ambient temperature, at 25 °C it is equal to -6.3 °C	
D500 0005	S51 panel meter, with 4 ... 20 mA input and 2 alarm outputs, 85 ... 265 VAC supply, 96 x 48 mm panel	Installations in dryers or similar equipment as dew point indicator	
C219 0055	M12 connector with RS-485 termination resistor, 120 Ω	Termination resistor for enhancing communication stability of RS-485 network Connect it to the final device of RS-485 network	
A554 3310	M12 RS-485 (Modbus) splitter	Stationary Modbus splitter for easier wiring	
A554 0011	RS-485 Repeater	A repeater is used whenever the bus length of RS-485 exceeds 500 m. After every 500 m of cable distance a repeater is recommended	
A554 0331	RS-485 / USB converter	This converter brings RS-485 to the USB port of the PC.	
D554 0031	8-channel current input module, 0 ... 20 mA, Modbus/RTU	For connecting up to 8 sensors with 0 ... 20 mA / 4 ... 20 mA signal via RS-485 to S330 / S331.	
A554 0087	USB OTG memory stick	USB memory drive for transferring data between SUTO data loggers (S331 / S551 / S120 with display / S130 with display) and a PC. The USB drive has a USB-A and a Micro-USB connector	

POWER CONSUMPTION OVERVIEW IN CATALOG

When setting up a system in which sensors and devices need to be supplied by an external power supply, please refer to the following power consumption table to select the correct power supply.

P/N	Device / Sensor	Power Consumption [W]	
S695 41XX	S401 / S421	**4.8 (w/o Display)**	**5.8 (w/Display)**
S695 415X	S415	**2.9**	
S695 418X	S418	**2.9**	
S695 419X	S418-V	**2.9**	
S695 045X	S450 / S452	**4.5 (w/o Display)**	**4.8 (w/ Display)**
S695 430X	S430	**3.8 (w/o Display)**	**4.8 (w/ Display)**
S695 430X	S430 PoE	**4.8 (w/o Display)**	**5.8 (w/ Display)**
S695 0409	S409	**3.9**	
S695 435X	S435	**3.0**	
S695 461X	S461	**3.6**	
S695 462X	S462	**2.4**	
S699 12XX	S211 / S215 / S220 (2-wire)	**0.5**	
S699 22XX	S211 / S215 / S220 (3-wire)	**1.0**	**1.2 (w/ Display)**
S699 32XX	S211 / S215 / S220 (Modbus/RTU)	**1.0**	**1.2 (w/ Display)**
S699 42XX	S211 / S215 / S220 (w/ Pr. Sensor)	**1.0**	**1.2 (w/ Display)**
S699 023X	S230 / S231	**1.0**	
D699 305X	S305	**2.88**	
D500 033X	S330 / S331	**20.0**	
D500 0320	S320	**15.0**	
S604 12XX	S120	**5.0 (w/o Display)**	**10.0 (w/ Display)**
S604 13XX	S130 / S132	**5.0 (w/o Display)**	**10.0 (w/ Display)**
D500 0601	S601	**50.0**	
D500 X606	S606	**50.0**	
D554 0130	S110	**1.0**	
P554 0134	S110-P	**2.0**	
S694 XXXX	Pressure Transmitter	**0.5**	
S693 000X	Temperature Transmitter	**0.5**	
S554 015X	Electrical Current Transmitter	**0.8**	

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