Product Guide 2023/24

Next Level of Compressed Air, Gas
and Liquid Monitoring

German
Quality

.SUTO

Be smart. **Measure it.**

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.
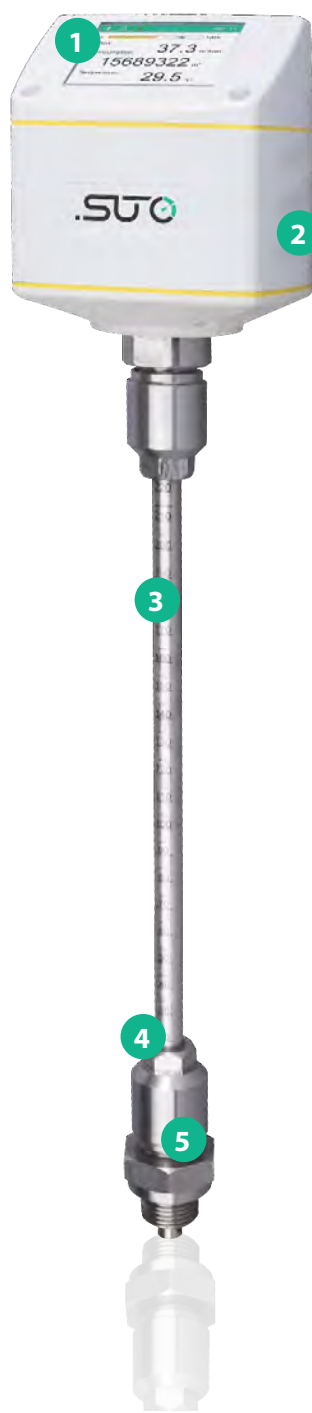
4 Flexible and Easy Installation

- 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.

S401 / S421 Flow and Consumption Meter

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.
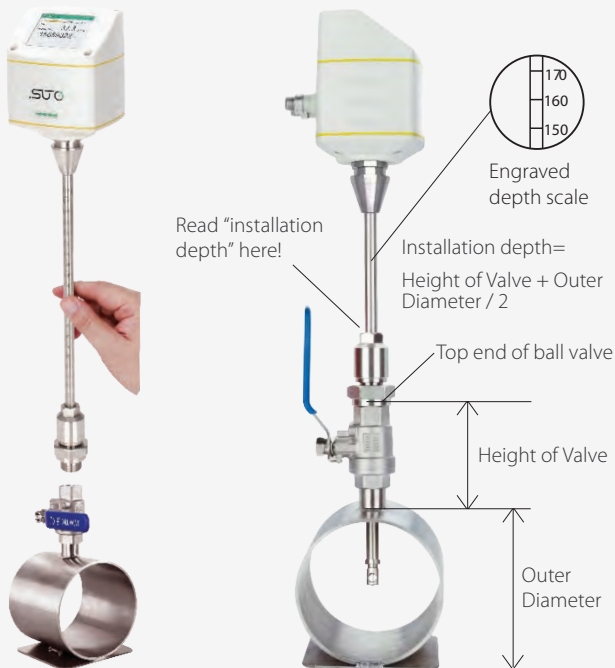
Installation and Sensor Removal

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

Read "installation depth" here!

Engraved depth scale

Installation depth=

Height of Valve + Outer Diameter / 2

Top end of ball valve

Height of Valve

Outer Diameter

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)
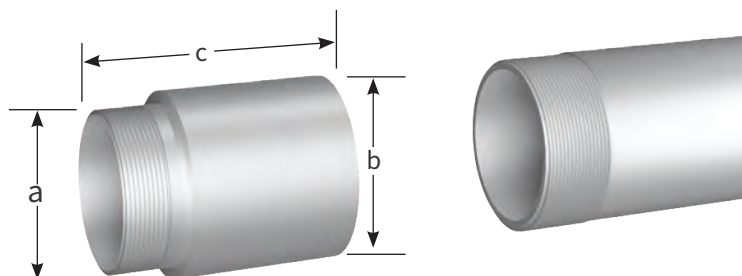- Optional flow conditioner, no need for a straight inlet anymore

S401 / S421 Flow and Consumption Meter

Connect several Flow Meters to Modbus Master

S331

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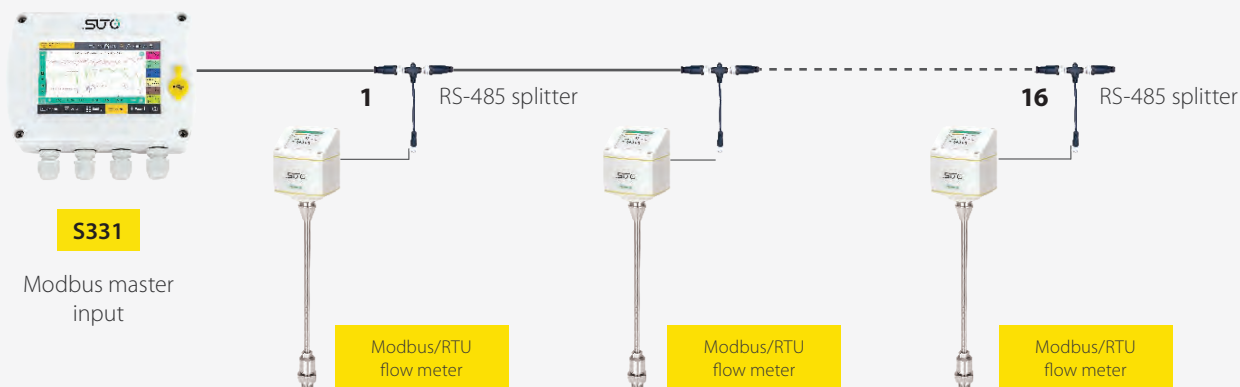
Flow meters can be easily integrated into a Modbus/RTU network (daisy chain)

Optional Flow Conditioner

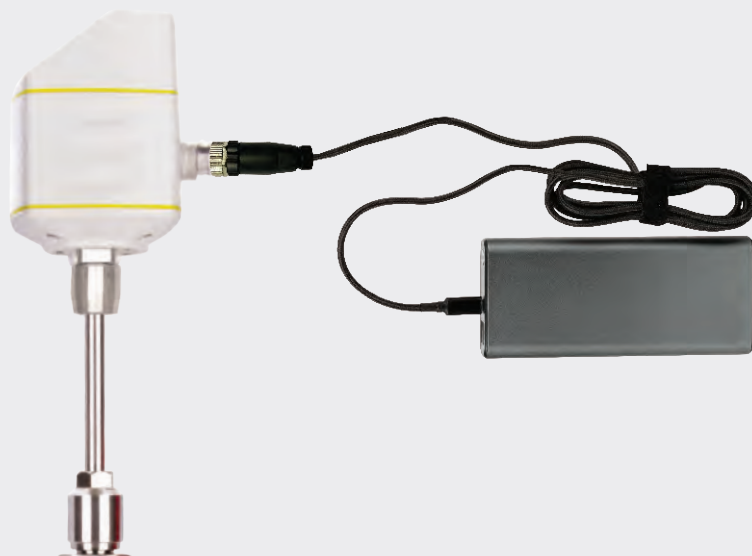Optional flow conditioner eliminates the straight pipe inlet requirement

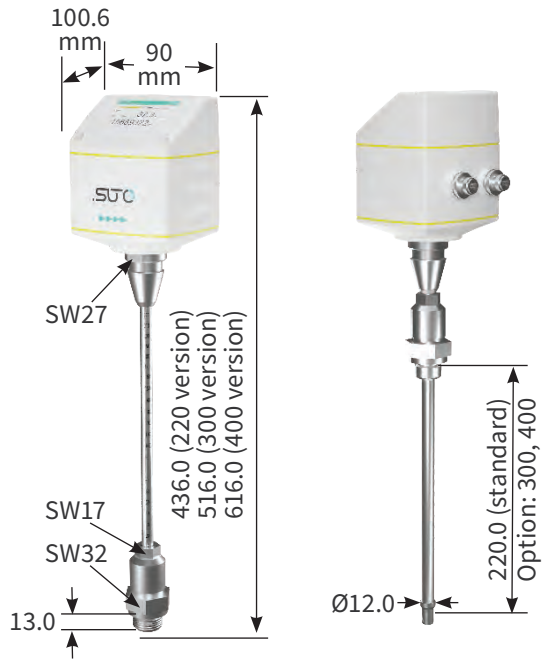| Order No.	Dimensions	a	b in mm	c in mm
A1071	DN15	R 1/2"	24	64
A1072	DN20	R 3/4"	32	69
A1073	DN25	R 1"	37	75
A1074	DN32	R 1.25"	45	92
A1075	DN40	R 1.5"	54	92
A1076	DN50	R 2"	68	105
A1077	DN65	R 2.5"	80	128
A1078	DN80	R 3"	95	142

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

- 100.6 mm
- 90 mm
- SW27
- 436.0 (220 version)
- 516.0 (300 version)
- 616.0 (400 version)
- SW17
- SW32
- 13.0
- 220.0 (standard) Option: 300, 400
- Ø12.0

S421 Dimensions (Flange Type)
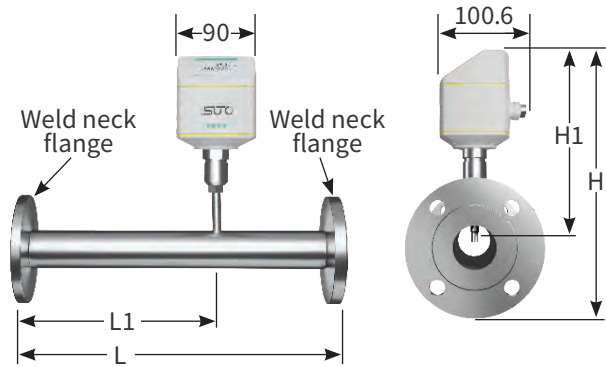
- 90
- 100.6
- Weld neck flange
- Weld neck flange
- H1
- H
- L1
- L

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)
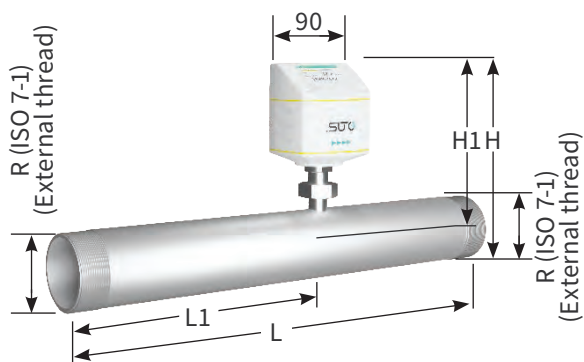
- 90
- H1 H
- R (ISO 7-1) (External thread)
- R (ISO 7-1) (External thread)
- L1
- L

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

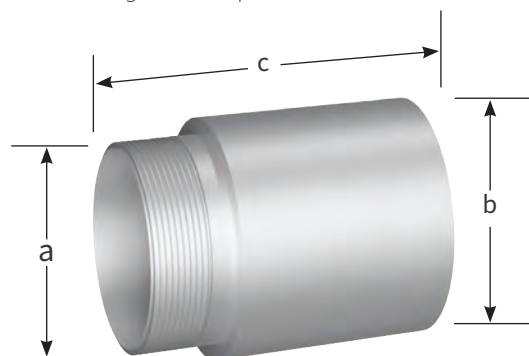|	
Electrical connection	2 x M12 (5 pole); 1 x M12 (8-pole x-coded) for TCP
Protection class	IP65
Approvals	CE, RoHS, FCC
Process connection	S401: G1/2″ (ISO 228/1)
	S421: Measuring section with R-thread or Flange
Weight	S401: 0.9 kg
	S421: 0.4 kg (without measuring section)

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

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

S401 / S421 Flow and Consumption Meter

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 mm²)
A553 0105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm²)
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 mm²)
A553 0105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm²)
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

S211 / S215 / S220

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Be smart. **Measure it.**

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
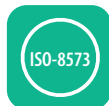
AIR QUALITY
ISO-8573
Monitors humidity

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.

S211/S215/S220 Dew Point Transmitters

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**
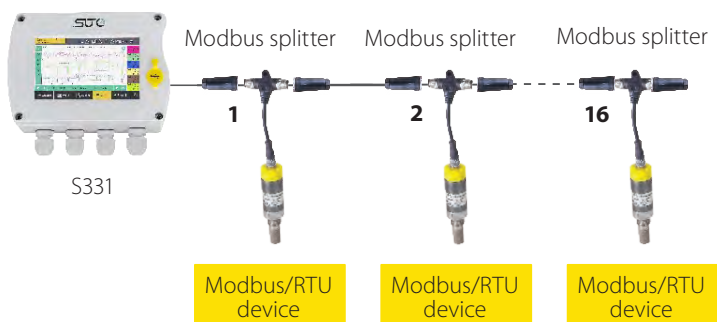
Exchange Service

No Downtime anymore!

The exchange calibration service eliminates down time and enables users to have a seamless record of their dew point measurements.
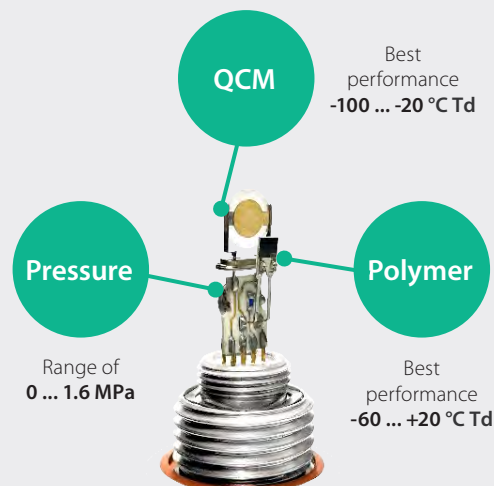
The user receives in advance a calibrated instrument with calibration certificate and the same instrument settings. The onsite instrument is then switched against the calibrated one and returned to the supplier.
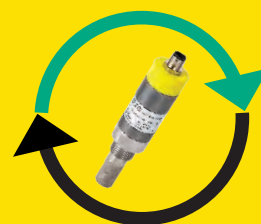
.SUTO | Exchange Service

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.

QCM — Best performance **-100 ... -20 °C Td**

Pressure — Range of **0 ... 1.6 MPa**

Polymer — Best performance **-60 ... +20 °C Td**

S211/S215/S220 Dew Point Transmitters

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.

Transmitter Model and Range	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	
	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 mm²)
A553 0105	Sensor cable, 10 m with M12 connector, open wires, AWG 24 (0.2 mm²)

Calibration

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

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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
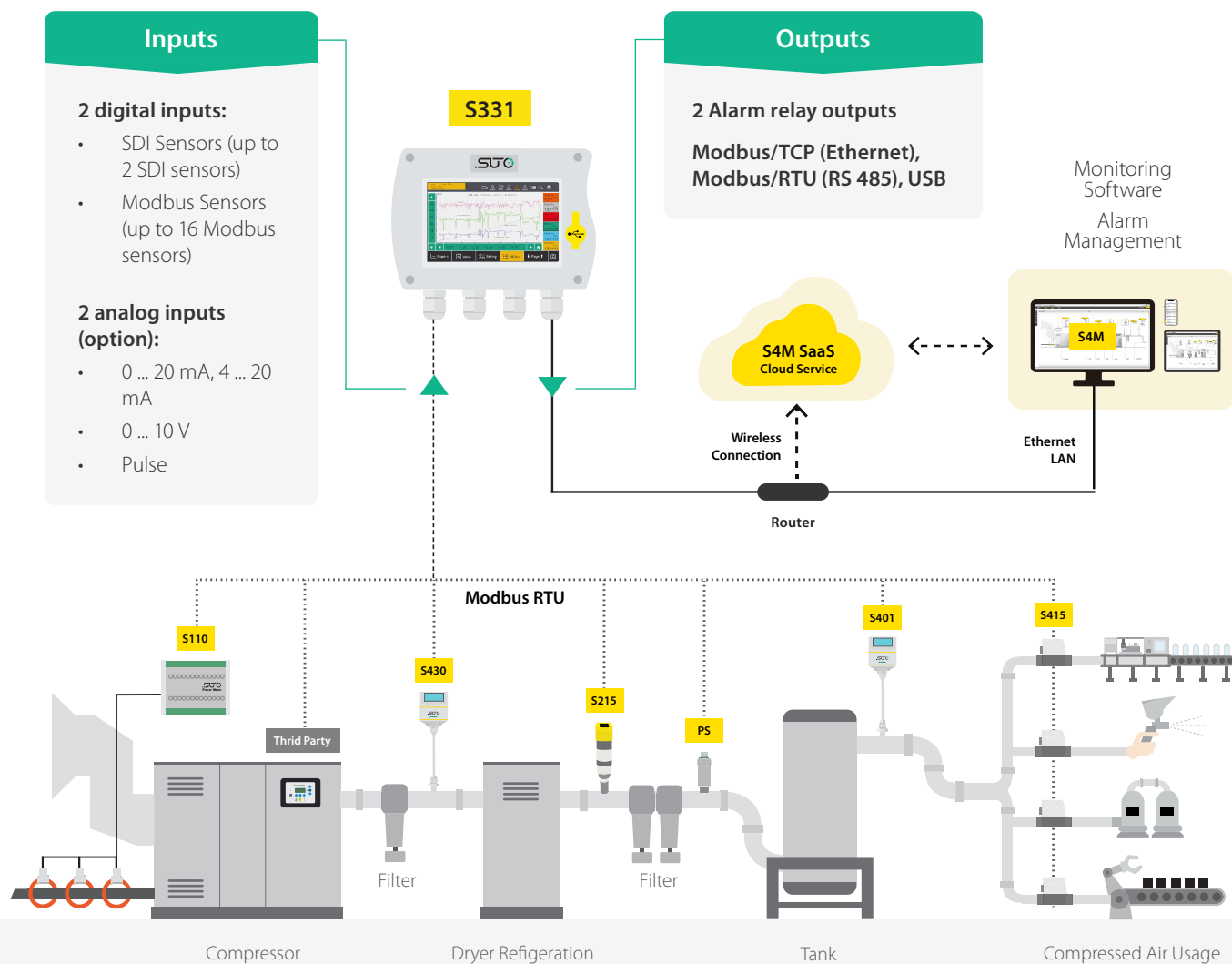IP65

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

S331

Outputs

2 Alarm relay outputs

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

Monitoring Software
Alarm Management

S4M SaaS
Cloud Service

S4M

Wireless Connection

Ethernet LAN

Router

Modbus RTU

S110

S430

S215

PS

S401

S415

Thrid Party

Filter

Filter

Compressor

Dryer Refigeration

Tank

Compressed Air Usage

92 mm · 173 mm · 120 mm · 145 mm

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
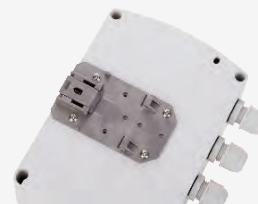
Available Installation Options

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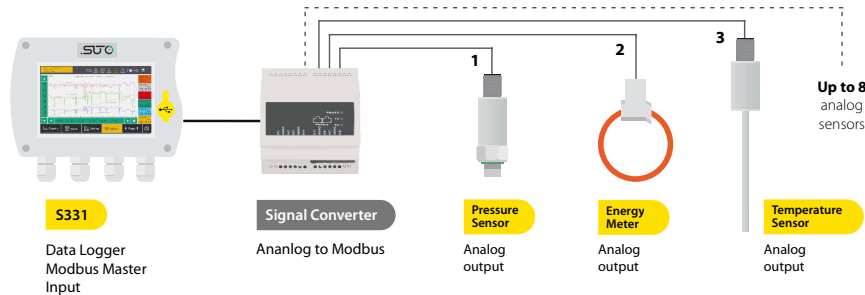
Through this method, users can add up to 16 sensors to the master input, making it most versatile and allowing to monitor whole plants with a single data logger. (Additional power supplies for field devices might be necessary)

S331
Data Logger
Modbus Master
Input

1 RS-485 Splitter

2 RS-485 Splitter

16 RS-485 Splitter

S401
Flow Meter
with Modbus/RTU

S220
Dew Point Transmitter
with Modbus/RTU

S415
Compact Flow Meter
with Modbus/RTU

S330/S331 Display and Data Logger
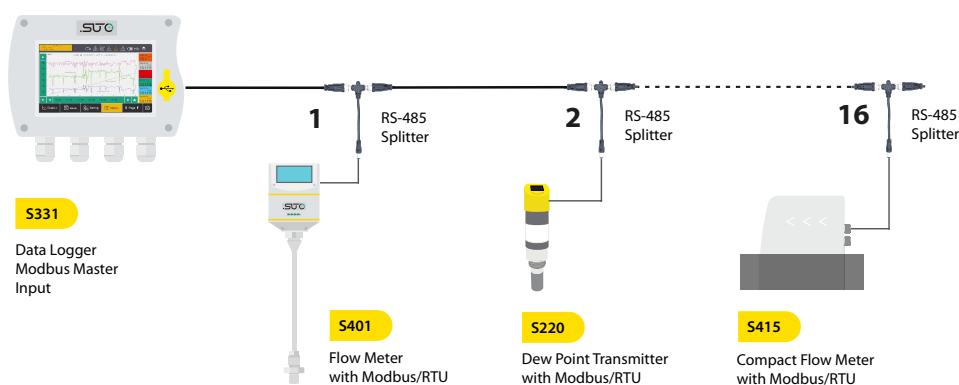
2 Analog Sensor Input

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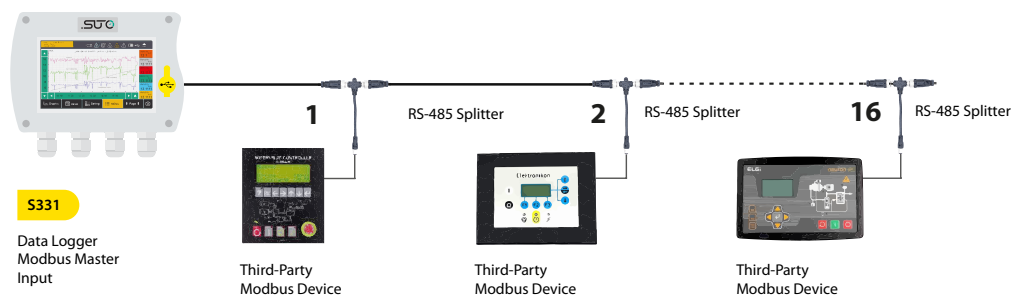
This makes the S330 / S331 most versatile and offers the possibility to connect existing field hardware and sensors seamlessly into the monitoring system.

S331
Data Logger
Modbus Master
Input

Signal Converter
Ananlog to Modbus

Pressure Sensor
Analog output

Energy Meter
Analog output

Temperature Sensor
Analog output

Up to 8 analog sensors

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.
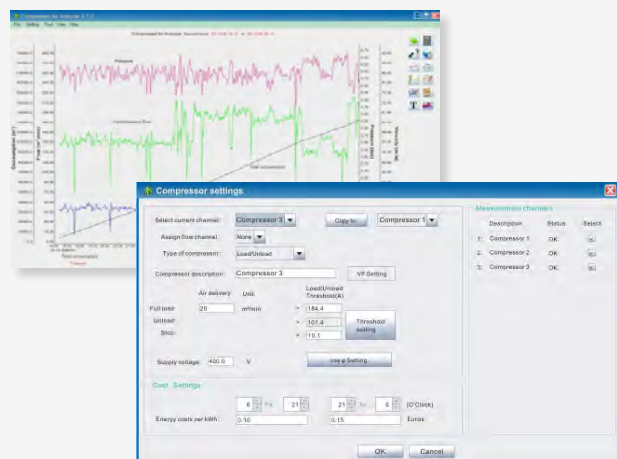

S331
Data Logger
Modbus Master
Input

1 RS-485 Splitter 2 RS-485 Splitter 16 RS-485 Splitter

Third-Party
Modbus Device

Third-Party
Modbus Device

Third-Party
Modbus Device

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 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.
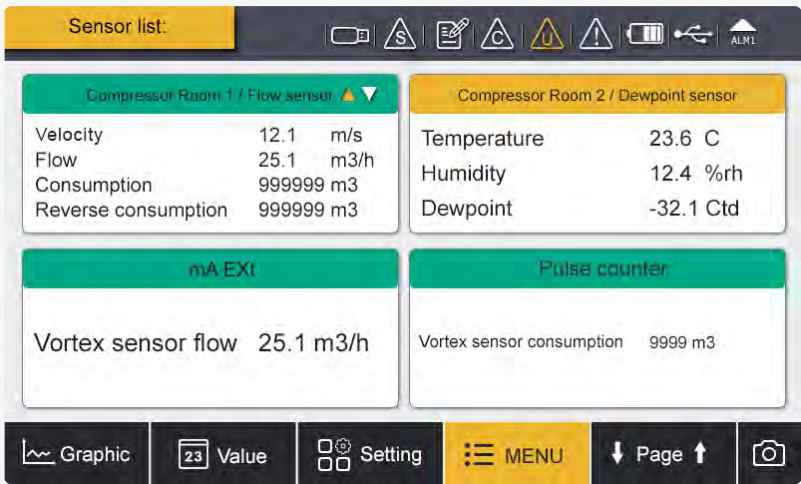
User Friendly Handling

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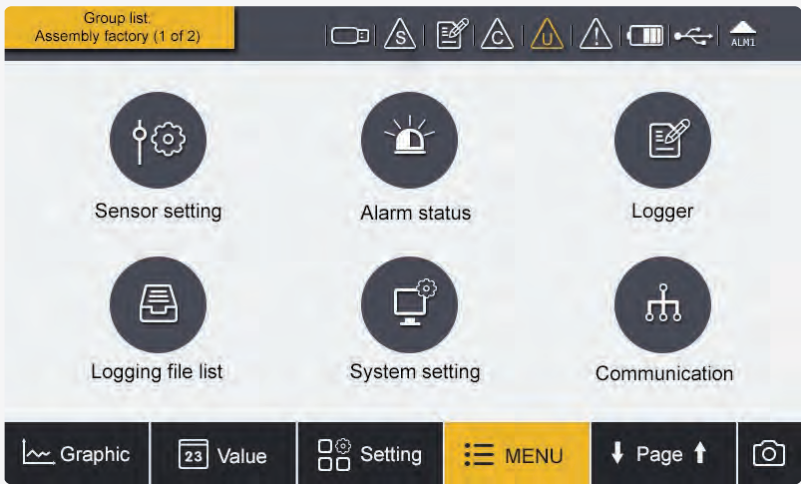
Sensor Data Overview

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.
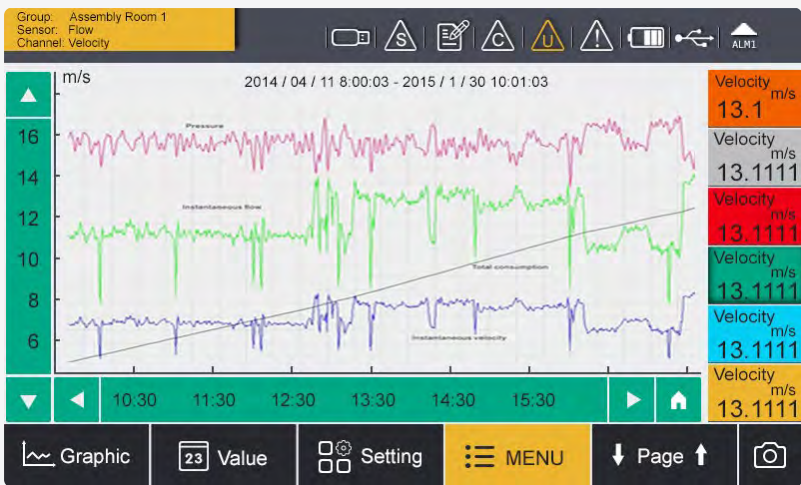
Technical Data

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 mm²; Signals: AWG16 ... AWG 28, 0.14 ... 1.5 mm²
Weight	0.52 kg

Operating conditions

Ambient temperature	0 ... +50 °C
Ambient humidity	< 90 %
Storage temperature	-20 ... +70 °C
Transport temperature	-20 ... +60 °C

S330/S331 Display and Data Logger

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 mm²)
A553 0105	Sensor cable 10 m, with M12 connector, open wires, AWG 24 (0.2 mm²)
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

S330/S331 Display and Data Logger

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

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)
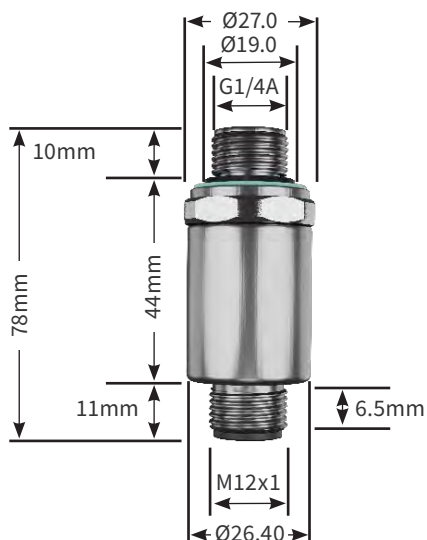
Dimensions (Modbus/RTU Type)
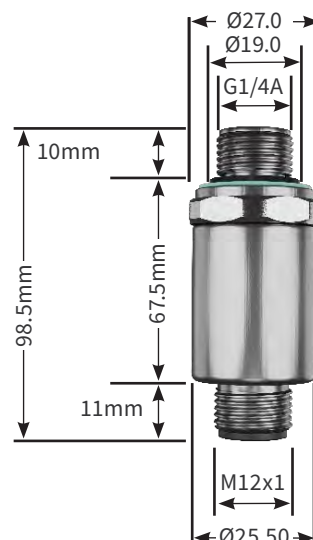
Pressure Transmitter

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

Electrical Current Transmitter

- ✓ 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.

S551 Portable Data Logger

S430 Pitot Tube Flow Meter

Current Transmitter

Filter

Compressor
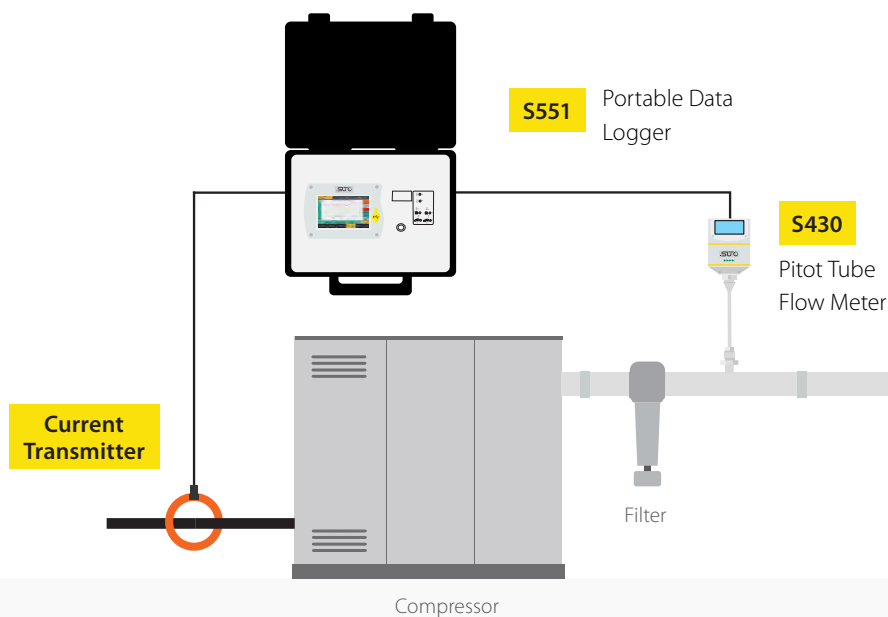
Technical Data

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
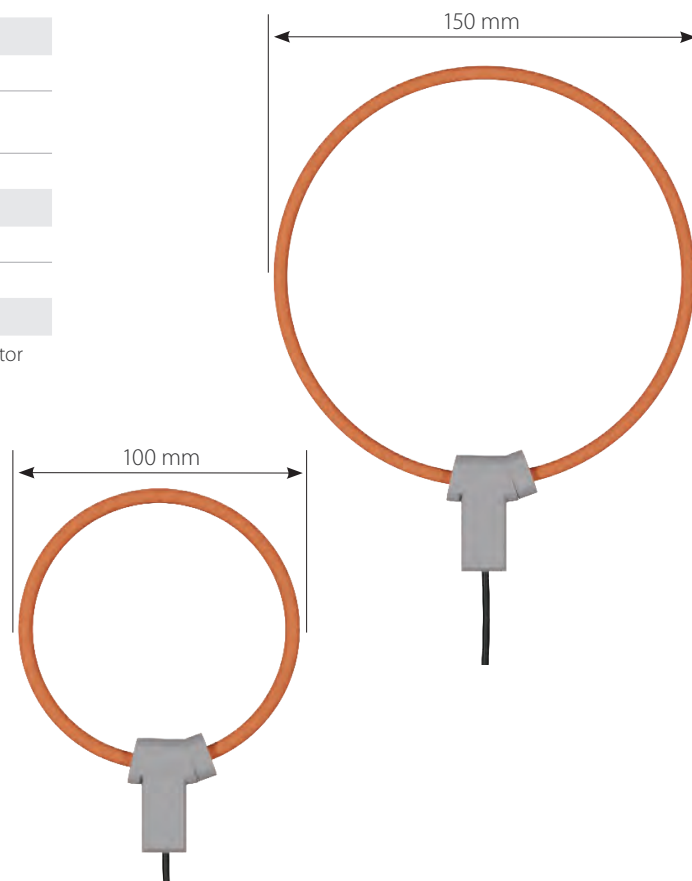
150 mm

100 mm

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