

INTRODUCTION - AIR QUALITY INSTRUMENTS



The quality of compressed air is determined by the maximum particle size and particle counts, pressure dew point, and maximum oil content allowed. The details are defined in the international standard ISO 8573-1.

Various industries such as pharmaceutical and food and beverage industries require high quality compressed air as it can directly affect product quality and safety. This requires regular measurements of compressed air quality to avoid contaminants in products and risks for health of humans.

Compressed air is not only used in industry but also in hospitals and for filling breathing air apparatus for firefighters and scuba divers. These applications also have quality standards and require the measurement of dew point and oil vapor.

SUTO offers a range of portable and stationary air quality measuring equipment including dew point measurements, particle counters and oil vapor measurement.

Quality Classes.	Particles			Humidity		Oil Vapor Content
	$0.1 \mu < d \leq 0.5 \mu$	$0.5 \mu < d \leq 1.0 \mu$	$1.0 \mu < d \leq 5.0 \mu$	Pressure Dewpoint	Residual Humidity	(Aerosols & Vapor)
	[particles / m ³]			[°C]	[g / m ³]	[mg / m ³]
0	As specified by the equipment user or supplier and more stringent than Class 1					
1	≤ 20,000	≤ 400	≤ 10	≤ -70	≤ 0.003	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40	≤ 0.11	≤ 0.1
3	N. S.	≤ 90,000	≤ 1,000	≤ -20	≤ 0.88	≤ 1
4	N. S.	N. S.	≤ 10,000	≤ +3	≤ 6	≤ 5
5	N. S.	N. S.	≤ 100,000	≤ +7	≤ 7.8	N.S.
6	Cp: 0 mg / m ³ < Cp ≤ 5 mg / m ³			≤ +10	≤ 9.4	-
7	Cp: 5 mg / m ³ < Cp ≤ 10 mg / m ³			Cw ≤ 0.5 g / m ³		-
8	-			0.5 g / m ³ < Cw ≤ 5 g / m ³		-
9	-			5 g / m ³ < Cw ≤ 10 g / m ³		-
x	Cp: Cp > 10 mg / m ³			Cw > 10 g / m ³		> 5
Maximum residual particles / m ³ of given sizes in μm in accordance with ISO 8573-4				Maximum pressure dew point in accordance with ISO 8573-3		Maximum oil vapor content in accordance with ISO 8573-2 and -5
Reference conditions: Temperature: 20°C / Pressure: 1 bar (abs.) / H2O Pressure: 0 bar in accordance with ISO 8573-1: 2010 / Clause 4 Cp = Mass concentration; Cw = Concentration of liquid water; N. S. = Not Specified						

Table shows the quality classes according to ISO 8573-1



Limits of oil vapor

- Compressed air class 1 (EN ISO 8573-1): 0.01 mg/m³
- Medical applications (EAB 407/1238): 0.1 mg/m³
- Breathing apparatus (EN 12021): 0.5 mg/m³



The S 120 oil vapor sensor monitors the oil content of compressed air and gases permanently or for spot checks when used as portable unit in conjunction with S 551. For best accuracy and long term stability, the S 120 sensor applies an automatic calibration. Sensor contaminations and sensor life time are monitored and indicated to the user. An 'over range' detection removes the sampling air from the sensor to protect it against contamination.

The simple installation and outstanding performance makes the S 120 the ideal choice when oil vapor content needs to be measured and monitored.



Features

- Measures oil vapor contents in compressed air and other gases
- Can be used for permanent or in portable applications
- Measures down to 0.003 mg/m³
- Easy connection through sampling hose and quick connect
- Output signals: - 4 ... 20 mA
- RS-485, Modbus RTU
- Relay switch (NO)
- PID sensor for highest accuracy
- Service and Alarm indication through LED
- Connectable to SUTO displays and data loggers as well as third parties displays and control units
- Integrated 5" touch screen and data logger (option)

Technical data S 120

Measuring medium	Compressed air and gases free of corrosive, aggressive, caustic and flammable constituents
Measuring range	0.003 ... 10.00 mg/m ³ (based on 1000 hPa (a), 20°C, 0% relative humidity)
Sensor type	PID (photoionization detector)
Detection limit	0.003 mg/m ³
Accuracy	5% of reading ±0.003 mg/m ³
Operating pressure	3 ... 15 barg (higher pressure on request)
Gas humidity	< 40% rel. humidity, no condensation
Sample flow rate	< 2 l/min, measuring gas is released to ambient
Gas connection	6 mm quick connect
Electrical connection	M12 connector
Sensor life time	6000 operating hours. Will be indicated. Sensor exchange by service
Gas temperature	-20°C ... +50°C (at inlet)
Ambient conditions	-20°C ... +50°C
Transport temperature	-30°C ... +70°C
Output signal	4 ... 20 mA (0 ... 10 mg/m ³) RS-485, Modbus RTU Relay: NO, 60 VDC / 1A
Power supply	24 VDC ± 5%, 10 W
Display & data logger	5" touch screen, 100 million values (option)
Application	Downstream of activated carbon filters Downstream of oil-free compressors Wherever upstream drying and filtration is applied
Casing/dimensions	PC, Al alloy, 271 X 205 X 91 mm
Classification	IP65
EMC	According to IEC 61326-1
Settings	Various sensor settings can be performed through SUTO display units or through the related service software
Weight	2400 g
Sample rate	1 s

S 120 OIL VAPOR SENSOR



Applications

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



S 120 mounted at the wall for permanent oil vapor monitoring



Portable S 120-P with accessories connectable to S 551

- **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.

Order no.	Description
S604 1201	S 120, oil vapor sensor, 0.003 ... 10 mg/m ³ , 4 ... 20 mA output, RS-485, alarm output, 24 VDC supply, incl. power supply
S604 1202	S 120-P, oil vapor sensor, 0.003 ... 10 mg/m ³ , 4 ... 20 mA output, RS-485, alarm output, connectable to S 551, transport case, incl. power supply
S604 1203	S 120, oil vapor sensor, 5" touch screen, 0.003 ... 10 mg/m ³ , 4 ... 20 mA output, RS-485, alarm output, 24 VDC supply, incl. power supply
P604 1205	S 120-P, oil vapor sensor, 5" touch screen, 0.003 ... 10 mg/m ³ , 4 ... 20 mA output, RS-485, alarm, 24 VDC supply, incl. transport case, power supply
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 S 120
A554 1203	Zero test filter for S 120, 15 barg, with quick connection at both ends.



The S 130 is a new generation laser particle counter optimized for applications in compressed air or compressed gases. With quality in mind and with the knowledge of customer needs this instrument is designed for continuous operation 24 hours, 7 days a week. Depending on the selected model there is sensitivity available from 0.1 μm up to 5.0 μm . The S 130 can fulfill the requirements stipulated in the compressed air standard ISO 8573-4. Measurement values represent the particle counts per ft^3 , l or m^3 or alternatively in $\mu\text{g}/\text{m}^3$. Settings can be done through the integrated display, an external SUTO display or through the service software.

Applications

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

Features

- Easy connection to compressed air through 6 mm quick-connector
- Can be used as portable as well as stationary instrument
- Particle sizes from 0.1 - 5.0 μm (depending on model)
- Optional display
- Measures according to ISO 8573-4
- Output signals:
 - RS-485, Modbus RTU
 - SDI (SUTO internal signal)
 - Relay switch (NO)
- Connectable to SUTO displays and data loggers as well as third parties displays and control units
- Integrated 5" touch screen and data logger (option)



S 130 LASER PARTICLE COUNTER



Technical data S 130

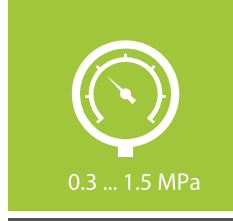
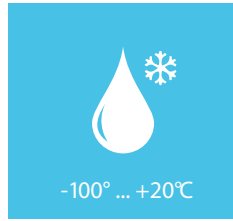
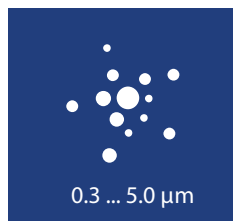
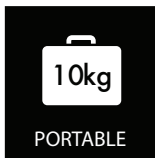
Measuring medium	Compressed air and gases free of corrosive, aggressive, caustic and flammable constituents	Ambient conditions	10°C ... +40°C
Models: S 130-A	2 channels: 0.3 - 0.5 µm, >0.5 µm	Transport temperature	-30°C ... +70°C
S 130-B	4 channels: 0.2 - 0.3 µm, 0.3 - 0.5 µm, 0.5 - 1.0 µm, >1.0 µm		
S 130-C	4 channels: 0.5 - 1.0 µm, 1.0 - 3.0 µm, 3.0 - 5.0 µm, >5.0 µm		
S 130-D	2 channels: 0.5 - 5.0 µm, >5.0 µm		
S 130-E	4 channels: 0.3 - 0.5 µm, 0.5 - 1.0 µm, 1.0 - 5.0 µm, >5.0 µm	Output signal	RS-485, Modbus RTU SDI (internal SUTO signal) 4 ... 20 mA Alarm relay: NO, 32 VDC / 500 mA
S 131	4 channels: 0.1 - 0.5 µm, 0.5 - 1.0 µm, 1.0 - 5.0 µm, >5.0 µm	Power supply	24 VDC, 10 W
Counting efficiency	50% (per JIS)	Application	Downstream of filters wherever upstream drying and filtration is applied
System pressure	0.3 ... 0.8 MPa	Casing / dimensions	PC, Al alloy, 271 X 205 X 91 mm
Flow rate	S 130: 2.83 l/min S 131: 28.3 l/min	Classification	IP65
Sampling rate	One sample per minute	EMC	According to IEC 61326-1
Calibration	NIST traceable	Settings	Various sensor settings can be performed through the related service software
Measuring unit	Particle counts per ft ³ , l or m ³ , selectable Concentration in µg/m ³	Weight	1900 g
Gas connection	6 mm quick connect	Display & data logger	5" touch screen, 100 million values (option)
Electrical connection	M12 connector		
Gas temperature	0°C ... +40°C (at inlet)		

Order No. Counter Display Description

S604 1300			S 130 particle counter base unit, 2.83 l/min, RS-485, 24 VDC/10W
A1360	A		S 130-A, particle counter, 0.3 - 0.5 µm, >0.5 µm
A1361	B		S 130-B, particle counter, 0.2 - 0.3 µm, 0.3 - 0.5 µm, 0.5 - 1.0 µm, >1.0 µm
A1362	C		S 130-C, particle counter, 0.5 - 1.0 µm, 1.0 - 3.0 µm, 3.0 - 5.0 µm, >5.0 µm
A1363	D		S 130-D, particle counter, 0.5 - 5.0 µm, >5.0 µm
A1364	E		S 130-E, particle counter, 0.3 - 0.5 µm, 0.5 - 1.0 µm, 1.0 - 5.0 µm, >5.0 µm
		A	None
A1368		B	Integrated display and data logger 5", touch screen, with USB cable and S4A software
S604 1304			S 131, particle counter, 0.1, 0.5, 1.0, 5.0 µm, 28.3 l/min, 100 ... 240 VAC, 50/60 Hz, 1.4 A
A554 0105			Transport case S 120/130, L400 x W300 x H180
A554 0312			Zero count filter for counter checking
R200 0130-A			Calibration particle counter S 130-A
R200 0130-B			Calibration particle counter S 130-B
R200 0130-C			Calibration particle counter S 130-C
R200 0130-D			Calibration particle counter S 130-D
R200 0131-E			Calibration particle counter S 130-E
R200 0131			Calibration particle counter S 131



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 S 600 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 S 600 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.



PARTICLE CONCENTRATION MEASUREMENT

- + Measurement methods according to ISO 8573 standards (together with isokinetic sampling device)
- + Latest laser detection technology
- + Smallest particle size 50% per JIS, bigger sizes 100% per JIS

DEW POINT MEASUREMENT

- + Large ranges thanks to the unique multiple sensor technology
- + Long-term stable and well-proven measurement methods
- + High precision with an accuracy of $\pm 2^\circ\text{C}$

OIL VAPOR MEASUREMENT

- + Latest photoionisation detector (PID) with self-calibration
- + Wide range of oil vapor concentrations
- + High precision with 5% of reading $\pm 0.003 \text{ mg}/\text{m}^3$ accuracy

PRESSURE MEASUREMENT

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

PLUG & PLAY MEASUREMENTS WITH A TOUCH

- + Integrated data logger records all channels in parallel for later analysis and PDF reports creation
- + 5" touchscreen interface and software guidance to easily run pre-set measurement routines

S 600 COMPRESSED AIR PURITY ANALYZER



S 600 - Technical data

Order no. P560 0600

Applications Portable multi-tool for compressed air purity measurements. Measures, records and validates quality parameters like particles, dew point, oil vapor contents, temperature and the pressure of compressed air systems.

Measuring unit 5" color touchscreen with data logger (100 mio. values), guided measurement and report generator function. All combined and integrated with the multiple sensor system.

Medium humidity < 40% relative humidity, no condensation

Medium temperature 0°C ... +40°C

Operating pressure 0.3 ... 1.5 MPa

Ambient & Transport conditions 0°C ... +50°C / -10°C ... +70°C

Process connection 6 mm quick connect

Power supply Adaptor: 100 ... 240 VAC, 50/60 Hz, 1.4 A

Casing & Weight PC, Al alloy, total product weight < 10 kg



S 600 - Measurement specs

Sensor type

Range

Accuracy

Particles	Laser optical detection	0.3 ... 0.5 µm	50% @ 0.3 ... 0.4 µm per JIS
		0.5 ... 1.0 µm	100% @ 0.4 ... 5.0 µm per JIS
		1.0 ... 5.0 µm	
Oil vapor	Photoionisation detector PID	0.003 ... 10.000 mg/m ³	5% of value ± 0.003 mg/m ³
Dew point	Dual-sensor technology (QCM + Polymer)	-100°C ... +20°C	±2°C

S 600 - Upgrades

Perfect accessories to enhance the capabilities

Isokinetic sampling device Combine SUTO's isokinetic sampling device to enhance the experience of simplicity and measure particles according to ISO 8573 (**Order No. A554 0600**)





Features / Benefits

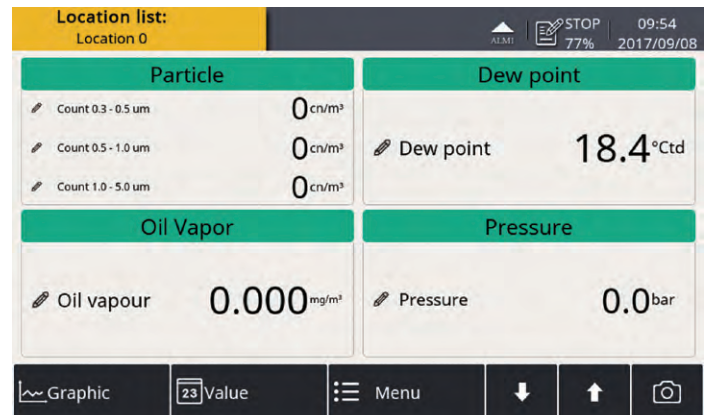
- Particle concentration measurement
 - Channel sizes: 0.3 ... 0.5, 0.5 ... 1.0, 1.0 ... 5.0 μm (A)
 - 0.1 ... 0.5, 0.5 ... 1.0, 1.0 ... 5.0 μm (B)
 - Laser particle counting technology
 - Counting efficiency: 50% for smallest size
 - 95% for all other sizes
- Oil vapor measurement
 - Latest PID sensor technology
 - Range from 0.003 ... 10.000 mg/m³
 - High precision: 5%
- Dew point measurement
 - Dual sensor technology (Polymer and QCM)
 - Wide measuring range of -100°C ... +20°C
 - High precision of $\pm 2^\circ\text{C}$
- Pressure measurement
 - Measuring range 0.3 ... 1.5 MPa
 - Accuracy of 1% FS
- Compressed air connection through 6 mm quick connect
- Ethernet (Modbus TCP), RS-485 (Modbus RTU) and USB interface
- Low purge air loss
- 100 ... 240 VAC power supply
- 5" color touchscreen with data logger



Product contamination can ruin a business and harm its customers. The typical approach of spot checks and random testing of compressed air systems does not allow businesses to quickly react to contamination events, nor does it provide continual assurance that contamination levels are being kept under control. In the ever quickening change of production, real time monitoring is crucial to protect your products integrity. The SUTO S 601 Compressed Air Purity Analyzer, measures and monitors contaminants in real time, giving businesses security that its products and customers are protected.

The SUTO S 601 Compressed Air Purity Analyzer brings together state of the art technology in one easy to use package, allowing businesses to continuously monitor compliance to ISO 8573. The S 601 monitors particle, dew point and oil vapor contamination across the full spectrum of ISO 8573 requirements including Class 0. Real time information can be retrieved from the S 601 by SCADA systems via MODBUS outputs. The integrated color touch screen display allows users to view all information locally. The data logging function ensures records are kept intact. Alarm points can be set to trigger in the event that contaminants hit your selected limits. An optional external light or siren can be fitted to the alarm.

The S 601 is quick and easy to install, just connect the unit to power and the compressed air supply.



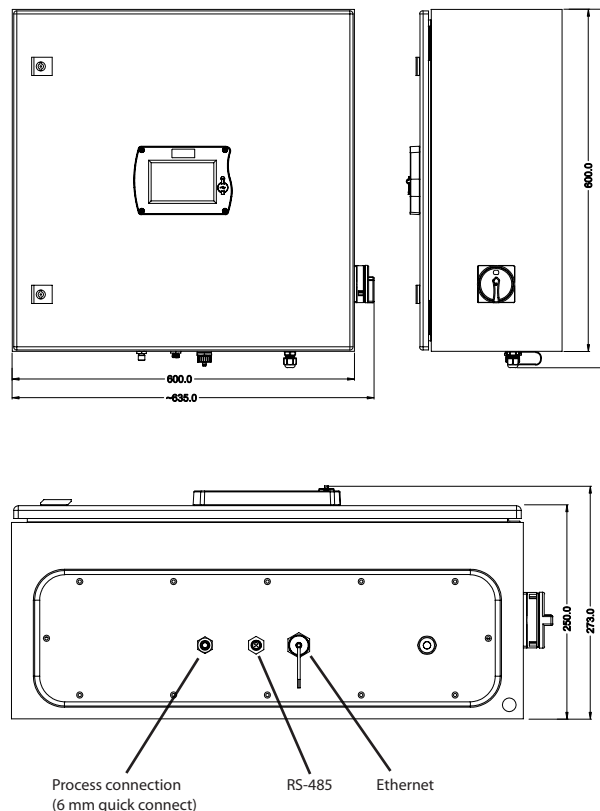
All important measurement values on screen

S 601 COMPRESSED AIR PURITY ANALYZER



Technical data	
Pressure range	0.3 ... 1.5 MPa
Power supply	100 ... 240 VAC / 50 VA
Accuracy	Dew point: $\pm 2^{\circ}\text{C}$ Oil vapor: 5 % o. RDG $\pm 0.003 \text{ mg/m}^3$ Particle: 50 % for smallest size 95 % for all other sizes Pressure: . 1 % F.S
Measured gas	Air, N ₂ (other gases on request)
Medium humidity	< 40% relative humidity
Ambient conditions	0°C ... 50°C
Transport Temp.	-10°C ... +70°C
Data logger	100 million samples 1 sec ... 1 h sampling rate
Output signal	- Ethernet (Modbus TCP) - RS-485 (Modbus RTU) - USB
Casing	Sheet steel, powder-coated on the outside Stainless steel on request
Classification	IP54
Electrical connection	1 x M12, 5 pole (RS-485) 1 x RJ45 (Ethernet) 1 x mains cable with plug
Process connection	6 mm quick connect
Approvals	CE, RoHS

Dimensions



S 601 order table

Order No.	Particle	Oil	Description
D500 0601			Base unit with dew point sensor, data logger with graphic display, metal cabinet, 100 ... 240 VAC power supply, 0 ... 1.5 MPa pressure.
A1260	A		Integrated Particle counter, 0.3, 0.5, 1.0, 5.0 μm , 0.1 cfm (2.83 l/min)
A1261	B		Integrated Particle counter, 0.1, 0.5, 1.0, 5.0 μm , 0.1 cfm (2.83 l/min)
A1267		A	Integrated oil vapor sensor unit, 0.003 ... 10.000 mg/m ³
A554 0602			Purity test kit consisting of zero filters for oil vapor, particles and a desiccant cartridge for low dew point creation.