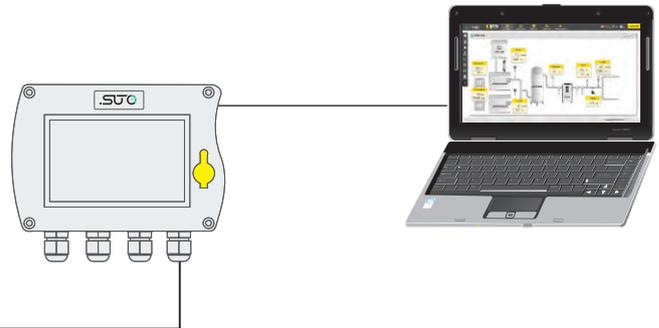
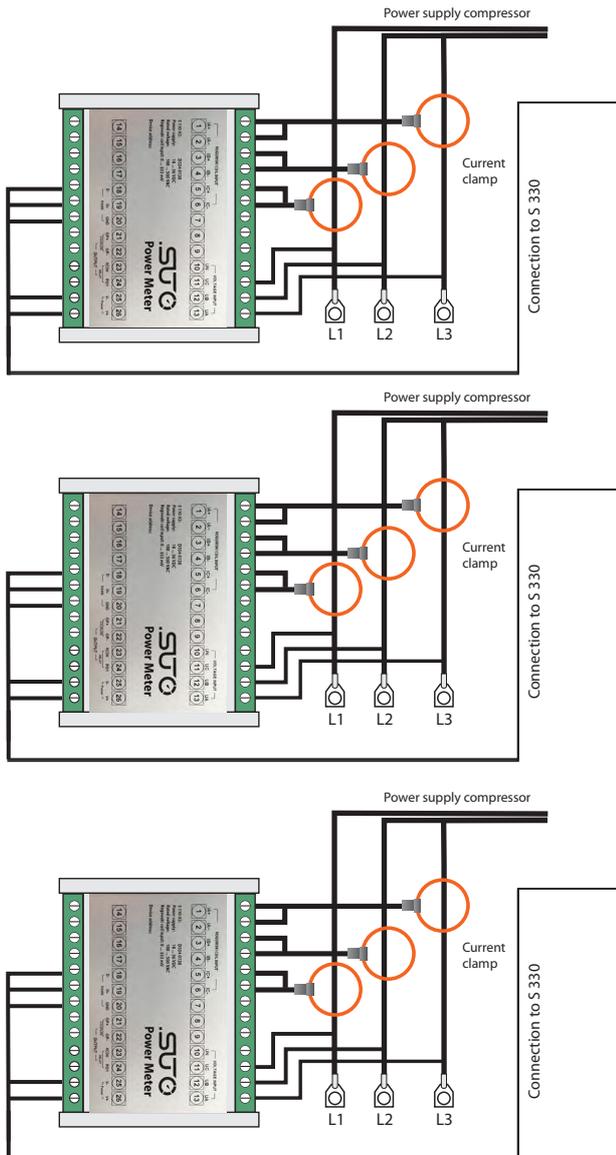


The following chapter is dedicated to a variety of additional sensors which can be used to provide more in depth analysis of compressed air or gas systems.

SUTO offers stationary as well as portable instruments to measure power and current consumption of compressors or any electrical power consumer.

Through the connection of the meters to our displays and data loggers and in combination with the S4M analysis software, energy consumption can be visualized.

Read more on page 48



Power consumption measurement with several power meters S 110, data logger S 331 and analyzes with S4M

# S 530 LEAK DETECTOR FOR PNEUMATIC SYSTEMS



Leaks in compressed air systems can significantly increase the cost of running compressors. The detection of leaks is an important maintenance requirement which can be done by soapy water or ultrasonic sound.

## Features

When gases are leaking through tubes and tanks an ultrasonic sound is produced which can be detected by the S 530 even from several meters away. The S 530 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.



Leak detection with separated sensor



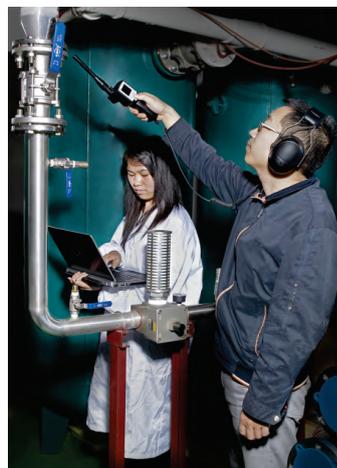
Leak detection with focus tube



## 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 with focus tip



## Ultrasonic Leak Detector S 530



## 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

## Contents of Set



Ultrasonic tone generator

Order no.	Description
P601 0103	S 530 Leak Detector set consisting of:
P560 0102	S 530 Leak Detector
S605 0001	Sensor unit
A554 0102	Noise isolated headset
A530 0101	Focus tube and focus tip
A553 0101	Cable to detach sound probe from instrument
A554 0001	Battery charger
A554 0101	Transport case S 530
<b>Additional accessories not included in set:</b>	
A554 0103	Ultrasonic Tone Generator

# S 110 POWER METER



S 110 hat rail mountable

The S 110 Power Meters are designed for easy installation and high accuracy. They measure the actual power consumption in kW and accumulate the Energy consumption in kWh of a 3-phase load. The S 110 can measure other parameters such as current, voltage, cos phi etc. Hat rail, wall mountable and portable versions are available.

### Technical Data S 110

Nominal voltage (L-N, L-L)	100 ... 500 VAC
Voltage measurement	3PH4W, 3PH3W, 1PH2W
Clamp sensor input range	external CT (333 mV only) external Rogowski coil
Available clamp sensors	Rogowski coil 1 ... 100 A 10 ... 1000 A 30 ... 3000 A

Power range	up to 2000 kW (depends on Rogowski coil)
Accuracy	Voltage: 0.2% Current: 0.5% Clamp: Class 1 Energy: Class 0.5

Output	Modbus RTU
Supply	24 V DC / 3.5 W
Operating Temperature	-25°C ... +55°C

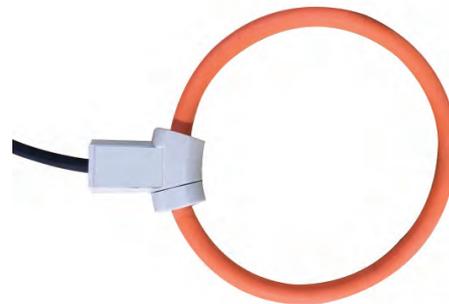
Dimensions	Hat rail version: 122 x 87 x 23 mm Wall version: 190 x 155 x 85 mm Portable: 177 x 177 x 60 mm
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S 110-P, for connection to S 551

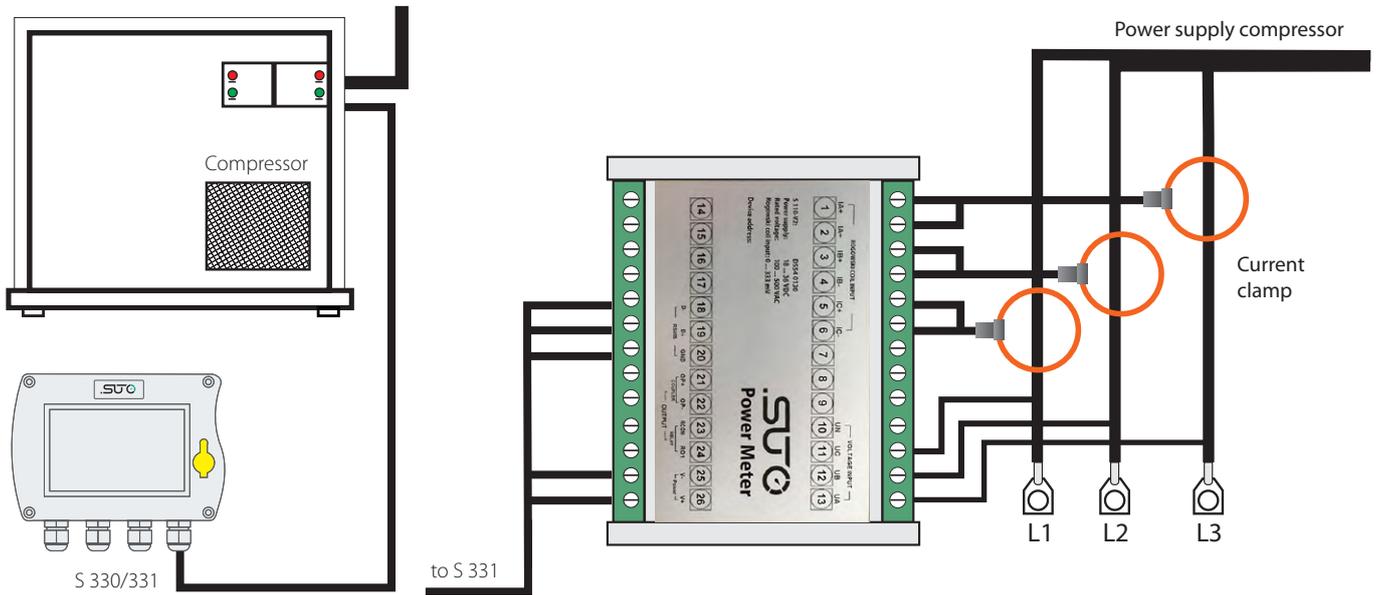


S 330/331 can be used as stationary display of up to 16 power meters



Rogowski coils with wide measuring range, high accuracy and easy installation

## Installation



In above illustration a power meter is installed directly into the connection box of the compressor. The Rogowski coils can be easily fixed. The voltage connection can be drawn from other available connection points. A separate cable connects the S 110 power meter to the S 330/331 with Modbus RTU and 24 VDC power supply. The power meter could also be installed into the connection cabinet where the power supply for the compressor is coming from. If no hat rail mounting is available, there is a wall mountable version of the S 110 power meter.

Order no.	Description
<b>Stationary</b>	
D554 0130	S 110 power meter, hat rail, Modbus RTU, 24 VDC supply
S554 0140	Rogowski coil for S 110, 1000 A, 100 mm diameter, 1.8 m cable, open ends
S554 0141	Rogowski coil for S 110, 3000 A, 150 mm diameter, 1.8 m cable, open ends
S554 0142	Rogowski coil for S 110, 100 A, 16 mm diameter, 1.8 m cable, open ends
<b>Portable</b>	
P554 0134	Portable power meter S 110-P, Modbus RTU, including 4 test leads, 4 test clips, connection cable to S 551
S554 0160	Rogowski coil for S 110-P, 1000 A, 100 mm diameter, 1.8 m cable, connector to S 110-P
S554 0161	Rogowski coil for S 110-P, 3000 A, 150 mm diameter, 1.8 m cable, connector to S 110-P
S554 0162	Rogowski coil for S 110-P, 100 A, 16 mm diameter, 1.8 m cable, connector to S 110-P
<b>Options</b>	
A554 0035	Transport case S 551 for sensors and cables

SUTO provides a calibration service for all its sensors as well as on-site testing. Please contact our service for inquiries. Dew point and flow calibration service is performed in the SUTO Test & Calibration Labs in Germany and China (Asia market). For other physical units we have contract partners in Germany. All references are traceable to national standards and are re-calibrated in regular intervals.

## Dew point calibration service

- Accuracy: 0.1°Ctd
- Calibration range: -75°Ctd ... +15°Ctd
- Reference: Dew point mirror MBW 373



Calibration certificate		SUTO					
Instrument:	<b>S 330</b>						
Serial number:	<b>5008 0326</b>						
Item number:	<b>5008 0326</b>						
<b>Test conditions:</b>							
Test medium:	Air	Ambient humidity:	30...60 % RH				
Volume flow:	2 - 4 l/min	Ambient pressure:	980...1050 hPa				
Ambient temperature:	18...20 °C	Testing method:	Calibration by comparison				
<b>Reference used:</b>							
Equipment:	Model	Uncertainty	g/g				
Dew point mirror:	MBW 373	± 0.1 °C	18/07/18				
Pressure sensor:	P-30	± 0.01 bar	6 Jul 2016				
Temperature sensor:	PT100	± 0.1 °C	20/10/2017				
<b>Calibration test results:</b>							
Description	Units	Nominal value	Permissible uncertainty	Actual value	Direction	Evaluation	
Dew point	°C	0	± 0.1	0.08	±	passed	
Dew point	°C	0	± 0.1	0.08	±	passed	
Dew point	°C	0	± 0.1	0.08	±	passed	
Temperature	°C	0	± 0.1	0.08	±	passed	
Pressure	bar	0	± 0.01	0.00	±	passed	
We hereby certify that the above-mentioned measuring system was calibrated according to CE/TEC testing standards and traceability chain. The measuring facilities used for calibration are regularly calibrated and are traceable to national standards and are re-calibrated in regular intervals. The instrument that the measuring system is used for should be re-calibrated in regular intervals.							
<b>Factory settings:</b>							
Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	
Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Parameter 4	Value
Parameter 5	Value	Parameter 6	Value	Parameter 7	Value	Parameter 8	Value
Parameter 9	Value	Parameter 10	Value	Parameter 11	Value	Parameter 12	Value
Parameter 13	Value	Parameter 14	Value	Parameter 15	Value	Parameter 16	Value
Parameter 17	Value	Parameter 18	Value	Parameter 19	Value	Parameter 20	Value
Parameter 21	Value	Parameter 22	Value	Parameter 23	Value	Parameter 24	Value
Parameter 25	Value	Parameter 26	Value	Parameter 27	Value	Parameter 28	Value
Parameter 29	Value	Parameter 30	Value	Parameter 31	Value	Parameter 32	Value
Parameter 33	Value	Parameter 34	Value	Parameter 35	Value	Parameter 36	Value
Parameter 37	Value	Parameter 38	Value	Parameter 39	Value	Parameter 40	Value
Parameter 41	Value	Parameter 42	Value	Parameter 43	Value	Parameter 44	Value
Parameter 45	Value	Parameter 46	Value	Parameter 47	Value	Parameter 48	Value
Parameter 49	Value	Parameter 50	Value	Parameter 51	Value	Parameter 52	Value
Parameter 53	Value	Parameter 54	Value	Parameter 55	Value	Parameter 56	Value
Parameter 57	Value	Parameter 58	Value	Parameter 59	Value	Parameter 60	Value
Parameter 61	Value	Parameter 62	Value	Parameter 63	Value	Parameter 64	Value
Parameter 65	Value	Parameter 66	Value	Parameter 67	Value	Parameter 68	Value
Parameter 69	Value	Parameter 70	Value	Parameter 71	Value	Parameter 72	Value
Parameter 73	Value	Parameter 74	Value	Parameter 75	Value	Parameter 76	Value
Parameter 77	Value	Parameter 78	Value	Parameter 79	Value	Parameter 80	Value
Parameter 81	Value	Parameter 82	Value	Parameter 83	Value	Parameter 84	Value
Parameter 85	Value	Parameter 86	Value	Parameter 87	Value	Parameter 88	Value
Parameter 89	Value	Parameter 90	Value	Parameter 91	Value	Parameter 92	Value
Parameter 93	Value	Parameter 94	Value	Parameter 95	Value	Parameter 96	Value
Parameter 97	Value	Parameter 98	Value	Parameter 99	Value	Parameter 100	Value
Parameter 101	Value	Parameter 102	Value	Parameter 103	Value	Parameter 104	Value
Parameter 105	Value	Parameter 106	Value	Parameter 107	Value	Parameter 108	Value
Parameter 109	Value	Parameter 110	Value	Parameter 111	Value	Parameter 112	Value
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Parameter 137	Value	Parameter 138	Value	Parameter 139	Value	Parameter 140	Value
Parameter 141	Value	Parameter 142	Value	Parameter 143	Value	Parameter 144	Value
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Parameter 405	Value	Parameter 406	Value	Parameter 407	Value	Parameter 408	Value
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Parameter 421	Value	Parameter 422	Value	Parameter 423	Value	Parameter 424	Value
Parameter 425	Value	Parameter 426	Value	Parameter 427	Value	Parameter 428	Value
Parameter 429	Value	Parameter 430	Value	Parameter 431	Value	Parameter 432	Value
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Parameter 541	Value	Parameter 542	Value	Parameter 543	Value	Parameter 544	Value
Parameter 545	Value	Parameter 546	Value	Parameter 547	Value	Parameter 548	Value
Parameter 549	Value	Parameter 550	Value	Parameter 551	Value	Parameter 552	Value
Parameter 553	Value	Parameter 554	Value	Parameter 555			



### C190 0002

**Description** Closing cap for S 421/S 452 material: 1.4404.

**Application** To close the measuring sections in case the sensor unit is removed.



### C190 0060

**Description** Thread adaptor, G1/2' internal to PT1/2' external, SUS303.

**Application** Used to adapt S 401 or S 450 to a PT thread ball valve.



### C190 0065

**Description** Thread adaptor, G1/2' internal to NPT1/2' external, SUS303.

**Application** Used to adapt S 401 or S 450 to a NPT thread ball valve.



### C190 0116

**Description** Flow conditioner.

**Application** 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

**Description** High pressure installation device. To be used for pressure > 1.5 MPa.

**Application** For safety reasons we recommend using this installation device whenever the operating pressure exceeds 1.5 MPa.

- \* A530 1105 - High pressure installation device for S 400/S 401-220mm
- \* A530 1106 - High pressure installation device for S 450-220mm
- \* A530 1111 - High pressure installation device for S 400/S 401-400mm
- \* A530 1113 - High pressure installation device for S 450-400mm



### A530 1108

**Description** SUTO spot drilling device.

**Application** This drilling tool is used to drill holes into compressed air pipes under pressure through a ball valve.



### A553 0121

**Description** Sensor cable, 6 pole, AWG22, 7.5 mm outer diameter, w/ shielding, black (per meter)

**Application** Sensor cable for S 450 sensor, US flow meter and power meter



### A553 0122

**Description** Sensor cable, 5 pole, AWG24, 5.0 mm outer diameter, black (per meter)

**Application** Standard sensor cable for flow and dew point sensors



### A553 0123

**Description** RS-485 cable 3 pole with shielding, AWG 24

**Application** RS-485 connection cable



### A553 0104

**Description** Sensor cable 5 m, with M12 connector, open wires, AWG24 (0.2 mm<sup>2</sup>)

**Application** Cable can be used to connect SUTO sensors to a PLC or power supply.



### A553 0105

**Description** Sensor cable 10 m, with M12 connector, open wires, AWG24 (0.2 mm<sup>2</sup>)

**Application** Cable can be used to connect SUTO sensors to a PLC or power supply.



### A554 0009

**Description** Power supply for hat rail, input: 85 ... 264 VAC, output: 24 VDC, 60W.

**Application** This power supply can be used to supply sensors with 24 VDC/2.5A. It's mounted on a hat rail.



### A554 0007

**Description** Power supply wall mountable, input: 85 ... 264 VAC, output: 24 VDC, 15W, without cable

**Application** This power supply is used to supply 24 DC to sensors and other devices.



### A554 0008

**Description** ½" G type ball valve

**Application** This is a proper ball valve for the installations of flow sensors S 401/S 450.



### P554 0009

**Description** Wall thickness meter

**Application** 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

**Description** Mains unit 100-240 VAC/24 VDC, 0.5A for S 401/S 201 series, 2 m cable

**Application** Simple power supply for a portable S 421 or S 401 solution (Special plug on request)



### A554 2005

**Description** Service kit for sensor configuration including software

**Application** This service kit can be used for all SUTO sensors to change settings and check sensors.

For overview of sensor power consumption please refer to page 75.



**A699 3491**

**Description** Measuring chamber, 2 l/min @ 0.8 MPa, fast connector, without filter, max. pressure 1.5 MPa, suitable for all SUTO dew point sensors.

**Application** For easy connection and disconnection to compressed air system through quick-disconnector.



**A699 3493**

**Description** By-pass-type chamber with 6 mm hose in and out connection up to 1.5 MPa.

**Application** This chamber can be used in applications where the measured gas is by-passed through the chamber.



**A699 3500**

**Description** 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 S 505.

**Application** The sample gas/air is connected to the chamber through a 6 mm Teflon® hose. The chamber is mounted to the S 505 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**

**Description** By-pass-type chamber with 6 mm hose in and out connection up to 1 MPa, convenient dew point measurement of gas/air with S 505.

**Application** 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 S 505 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**

**Description** Measuring chamber for dryer installation, 2 l/min @ 0.8 MPa, hose fast connector, without filter, max. pressure 1.5 MPa

**Application** The sample gas/air is connected to the chamber through a 6 mm Teflon® hose. The chamber is mounted to stationary S 2XX 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 3690**

**Description** Chamber for atmospheric pressure dew point.

**Application** This chamber is used where the gas is supplied under pressure (up to 1.0 MPa) but the measurement should be under atmospheric conditions. The measurement result will be atmospheric dew point.



**A699 3590**

**Description** High pressure chamber up to 35 MPa.

**Application** 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

**Description** Compressed air quick coupling, female side R 1/2" thread

**Application** Connect this quick coupling to a 1/2" ball valve to set up a quick connector for measurement of dewpoint, oil and particle



### A554 0026

**Description** Coalescing filter, with quick connect at inlet for 6 mm hose and thread nibble for connection to measuring chamber.

**Application** Eliminates liquid water and oil from entering the measuring chamber and sensor unit.



### Dew point sensor protection caps

**Application** 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



### A554 0002

**Description** Test pot 11.3% RH.

**Application** 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

**Description** S 51 panel meter, with 4-20 mA input and 2 alarm outputs, 85 ... 240 VAC supply, 96 x 48 mm panel

**Application** Installations in dryers or similar equipment as dew point indicator



### C219 0055

**Description** M12 connector with RS-485 termination resistor, 120 Ω

**Application** Termination resistor for enhancing communication stability of RS-485 network. Connect it to the final device of RS-485 network



### A554 3310

**Description** M12 RS-485 (Modbus) splitter

**Application** Stationary Modbus splitter for easier wiring

For overview of sensor power consumption please refer to page 75.



### A554 0013

**Description** RS-485 / Ethernet gateway  
Protocol: - Modbus RTU  
- Modbus TCP

**Application** Converts RS485 physical layer to Ethernet and RTU protocol to Modbus TCP protocol.



### A554 0011

**Description** RS-485 Repeater

**Application** 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

**Description** RS-485 / USB converter

**Application** This converter brings RS-485 to the USB port of the PC.



### D554 0031

**Description** Current meter, 0-20 mA, 8 channels, Modbus RTU

**Application** For connecting up to 8 sensors with 0 ... 20 mA / 4 ... 20 mA signal via RS-485 to S 330 / 331.



### D554 0032

**Description** Pulse meter, 7 channels, Modbus RTU

**Application** For connection up to 7 sensors with pulse output signal via RS-485 to S 330 / 331.



### A554 0087

**Description** USB OTG memory stick

**Application** USB memory drive for transferring data between SUTO data loggers (S 331 / 551 / 120 with display / S 130 with display) and a PC. The USB drive has a USB-A and a Micro-USB connector.

For setting up a system in which sensor and modules need to be supplied by an external power supply please consider below consumption for selecting the correct power supply set up.

Sensor / Device	P/N	Power [W]
S 450 / 452	S695 045X	5.0
S 401 / 421	S695 4XXX	5.0
S 201	S699 041X	1.3
S 220 / 212 / 215 / 217	S699 041X	1.0
Pressure sensor	S694 XXXX	0.5
S 320 (24 VDC version)	D500 03XX	5.0
Analog input modules (8 Ch.)	D554 0031	1.3
S 110	D554 0030	3.5
Pulse input module (7 Ch.)	D554 0032	0.7
S 460	P554 007X	1.5
S 120 (without display)	S604 120X	10.0
S 130 (without display)	S604 130X	10.0
S 330 / 331	D500 033X	10.0
S 430	S695 430X	3.0
Temperature sensor	S693 000X	0.5
S 415	S695 415X	3.0
S 418	S695 418X	3.0
S 230	S699 0230 / S699 0231	1.0

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