



English

## Instruction and Operation Manual

# S551

## Portable Display and Data Logger



Dear Customer,

Thank you for choosing our product.

The operating instructions must be read in full and carefully observed before starting up the device. The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with this manual.

Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is void and the manufacturer is exempt from liability.

The device is designed exclusively for the described application.

SUTO offers no guarantee for the suitability for any other purpose. SUTO is also not liable for consequential damage resulting from the delivery, capability or use of this device.

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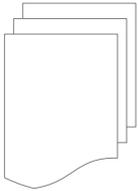
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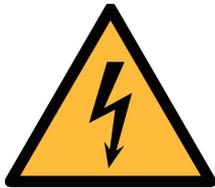
## 1 Safety instructions



**Please check if this instruction manual matches the product type.**

Please observe all notes and instructions indicated in this manual. It contains essential information which must be observed before and during installation, operation, and maintenance. Therefore this instruction manual must be read carefully by the technician as well as by the responsible user / qualified personnel.

This instruction manual must be available at the operation site of the product at any time. In case of any obscurities or questions, regarding this manual or the product, please contact the manufacturer.



### **WARNING!**

#### **Compressed air!**

**Any contact with quickly escaping air or bursting parts of the compressed air system can lead to serious injuries or even death!**

- Do not exceed the maximum permitted pressure range (stated on the sensors label).
- Only use pressure-tight installation material.
- Avoid getting hit by escaping air or bursting parts of the instrument.
- The system must be pressureless during maintenance work.



### **WARNING!**

#### **Voltage used for supply!**

**Any contact with energized parts of the product might lead to an electrical shock, which can lead to serious injuries or even death!**

- Consider all regulations for electrical installations.
- The system must be disconnected from any power supply during maintenance work.
- Any electrical work on the system is only allowed by authorized qualified personal.

**ATTENTION!****Permitted operating parameters!**

**Observe the permitted operating parameters. Any operation exceeding these parameters can lead to malfunctions and might result in damage to the instrument or the system.**

- Do not exceed the permitted operating parameters.
- Make sure the product is operated in its permitted limitations.
- Do not exceed or undercut the permitted storage and operating temperature and pressure.
- The product should be maintained and calibrated frequently, at least annually.

**General safety instructions**

- It is not allowed to use the product in explosive areas.
- Please observe the national regulations before/during installation and operation.

**Remarks**

- It is not allowed to disassemble the product.

**ATTENTION!****Measurement values can be affected by malfunction!**

**The product must be installed properly and frequently maintained, otherwise it may lead to wrong measurement values, which can lead to wrong results.**

## Storage and transportation

- Make sure that the transportation temperature of the device is between -20 ... +50°C.
- For transportation it is recommended to use the packaging which comes with the device.
- Please make sure that the storage temperature of the device is between -20 ... +50°C.
- Avoid direct UV and solar radiation during storage.
- For the storage the humidity must be <90% with no condensation.

## 2 Registered trademarks

<b>Trademark</b>	<b>Trademark owner</b>
SUTO®	SUTO iTEC
MODBUS®	Modbus Organization, Hopkinton, USA
Android™, Google Play	Google LLC

### 3 Application

The S551 is a portable data logger that displays and records various measurement data of compressed air and gases within the permissible operating parameters. (See Chapter [5 Technical data](#) on the next page.)

Incorporating with free or paid analysis software from SUTO, S551 enables you to analyze the measurement data in a flexible and efficient way.

The S551 is mainly used in compressed air systems in the industrial environment. The S551 is not developed for explosive areas. For the use in explosive areas, please contact the manufacturer.

## 4 Features

- Easy to use
  - Automatic detection of most of SUTO sensors with the Modbus/RTU or SDI interface to start reading. No configuration and programming are required.
  - High-resolution 5" color touch screen, easy to operate.
  - IP65 casing for robust protection in the industrial environment.
  - Integrated web server, enabling the remote monitoring.
  - Built-in backup battery, not affected by power failure.
- Flexible
  - Connectable to various types of sensors for all required measurement tasks including flow, consumption, power consumption, pressure, temperature and many more.
  - Up to 24 inputs through extension modules and Modbus.
  - Third-party sensors supported.
  - With the optional 4G/LTE function (P/N: A1670) and the dedicated S4A software, you can view the online measurement values, read out the logging files remotely.
  - Multiple logging files can be combined by using the CAA S/W.
- Efficient
  - Data logging on site and data analysis in the office.
  - Full software packages:
    - S4A for basic data analysis (Free of charge).
    - CAA for compressed air audit analysis (included in S551).
    - S4M for data acquisition and analysis in real-time (Paid).

## 5 Technical data

### 5.1 General

<b>CE</b>	
Data logger	4 GB, up to 100 million values
Operating temperature	0°C ... +50°C
Housing material	PC + ABS
Protection class	IP65 (only if the suitcase lid is closed and locked)
Dimensions	365 mm x 270 mm x 169 mm
Display	5" high resolution graphic display, 800 x 480 pixels with touch interface
Weight	4 kg

### 5.2 Electrical data

Main power supply (AC/DC)	Input: 100 ... 240 VAC, 50/60 Hz, 1.4 A Output: 24 VDC, 2.5 A, Max. 60 W	
Internal battery	Type	Rechargeable lithium-ion battery, 7500 mAh/83.2 Wh.
	Battery life	Up to 8 hours
	Charging time	About 3 hours

### 5.3 Signal inputs

Analog input	0 ... 1 V, 0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA
Digital input	2 x SDI Sensors 16 x RS-485 Modbus/RTU Sensors

### 5.4 Signal outputs

Communication Interface	Modbus/TCP over Ethernet, USB, 4G/LTE (optional)
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## 6 Installation

Please make sure that all components listed below are included in your package.

Qty	Description	Item No.
1	S551-P4 / S551-P6	P560 5100 / P560 5101
1	USB cable	A553 0130
1	Power cable	A553 0107
1	Instruction manual	No P/N
1	Calibration certificate	No P/N
1	Power supply adapter, 230 VAC / 24 VDC, 50/60 Hz	No P/N

### 6.1 Installation Requirements



#### ATTENTION!

**Wrong measurement is possible if the device is not installed correctly.**

- The device is for indoor use only! At an outdoor installation, the device must be protected from solar radiation and rain.
- It is strongly recommended you not install S551 permanently in wet environment such as the place right after a compressor outlet.

## 6.2 Connectors on the case



Connector	Description
1, 2	Connectors for SDI sensors, which include the following flow sensors: S401/421, S450/452, S430
3, 4	Optional. Available on the S551-P6 Connectors for process signal sensors (such as analog signal sensors and pulse sensors)
M, M	Connectors for the Modbus sensors and devices
5	Ethernet port
6	Main power supply

To connect sensors to the S551, refer to the following table for the designed connectors.

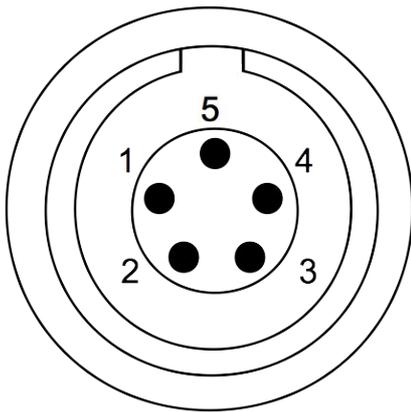
Signal	Connector 1/2	Signal	Connector M/M	Signal	Colour	Connector 3/4	Connector 3/4
	Dew point/ flow sensor		Modbus / RTU			Pulse active	Pulse passive
SDI	1 	N/A	1 	+I / Pulse	Brown		1 
-V	2 	-V	2 	20 mA	White		2 
+V	3 	+V	3 	+V	Blue		3 
N/A	4 	+D	4 	-V	Black		4 
N/A	5 	-D	5 	+S	Grey		5 

Signal	Colour	Connectors 3 and 4				
		Ampere sensor	Pressure	1V ... 10V	20 mA active	20 mA passive
Pulse	Brown	1 	1 	1 	1 	1 
+I/ 20 mA	White	2 	2 	2 	2 	2 
+V	Blue	3 	3 	3 	3 	3 
-V	Black	4 	4 	4 	4 	4 
+S	Grey	5 	5 	5 	5 	5 

**Legend to pin assignment**

- SDI Digital signal (internal use)
- V Negative supply voltage
- +V Positive supply voltage
- +I Active 4 ... 20 mA signal
- +D Modbus Data +
- D Modbus Data -
- +S Positive voltage input
- NA Not Applicable

**Pins of the ODU connector**



Connection pins  
(view onto the connector)

## 6.3 Electrical connection

With the case design, the S551 does not need a costly installation.

### 6.3.1 Sensors powered by S551

The S551 supplies 24 VDC and totally 20 W to the connected sensors. Please make sure that the total power of all S551-powered sensors does not exceed this limit.

The following table lists the power consumption of the SUTO sensors that can be connected to the S551.

Device	Power Consumption [W]	
S401/S421	4.8 (without display)	5.8 (with display)
S415/S418/S418-V	2.9	
S430	1.8 (without display)	2.2 (with display)
S450/S452	4.5 (without display)	4.8 (with display)
S400/S420	3.0	
S230/S231	1.0	
S220/S21/S215 (2-wire)	0.5	
S220/S21/S215 (3-wire)	1.0	1.2 (with display)
S220/S21/S215 (Modbus/RTU)	1.0	1.2 (with display)
S220/S21/S215 (with pressure sensor)	1.0	1.2 (with display)
Pressure Transmitter	0.5	
Analog input extension (8-Channel)	1.3	
S110-P, S110-P-V2	2.0	
Electrical Current Transmitter	0.8	
S460-P	1.5	
S120-P	10.0	
S130/S132	5.0 (without display)	10.0(with display)

### 6.3.2 Electrical connection

Before powering on the S551, please connect all sensors with the S551.

- For SDI sensors, connect them to the S551 through connectors 1 and 2 on the case.
- For Modbus sensors, connect them to the S551 through connectors M on the case.
- For analog signal sensors such as 0 ... 20 mA, 4 ... 20 mA, 0 ... 1 V, 0 ... 10 V and pulse signal sensors, you can connect them to the S551 through connectors 3 and 4 according to the pin assignment shown in section [6.2 Connectors on the case](#) on page 12.

#### Notes:

- The S551 can automatically detect most SUTO sensors with the SDI or Modbus interface. For specific sensors that can be automatically detected, see Appendix – SUTO Devices Supported by S551 section.
- The S551 cannot automatically detect the process signal sensors. You must manually add the appropriate sensor types to the S551 by using the S551 configuration menu or on the S4C-Display software. For more information, see section [8.5.4 Analog input setting](#) on page 27.

## 7 Configuration

The S551 provides factory settings according to orders. All settings are stored in the S551. To change the factory settings on site, see section [8.5 Sensor settings](#) on page 16.

## 8 Operation

The On/Off switch on the S551 panel enables you:

- To view the remaining battery capacity and the charging status, short press the button.
- To power on or off the device, long press the button for 2 seconds.

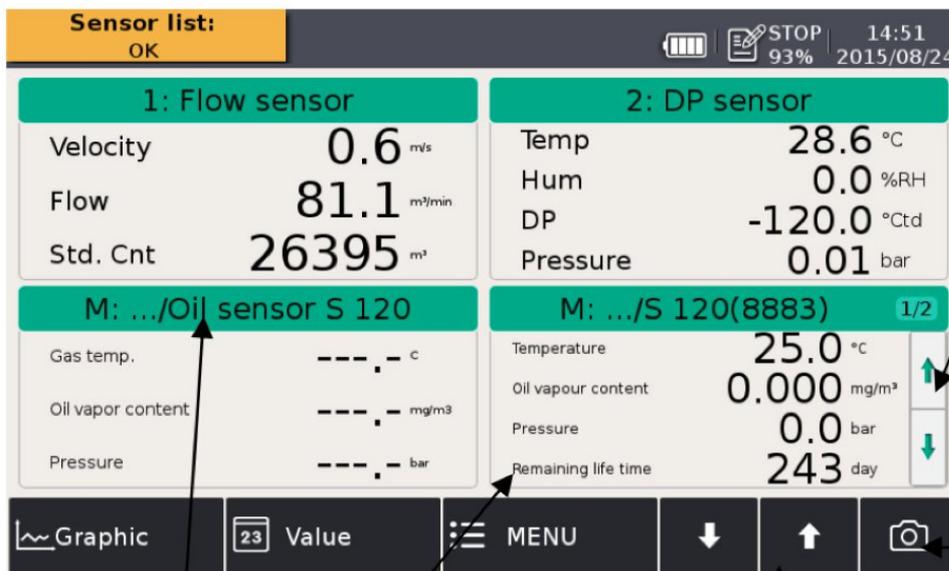


After the S551 is powered on, it starts the initialization process.

During this period, S551 detects the connected sensors and establishes the connections to sensors.

### 8.1 Value screen

After the S551 is initialized, the measurement values from the connected sensors are displayed on the screen in the real-time.



If there are more than 4 channels user can scroll through these buttons

Screen shot. Stores screen in PNG file

Sensor name and channel name

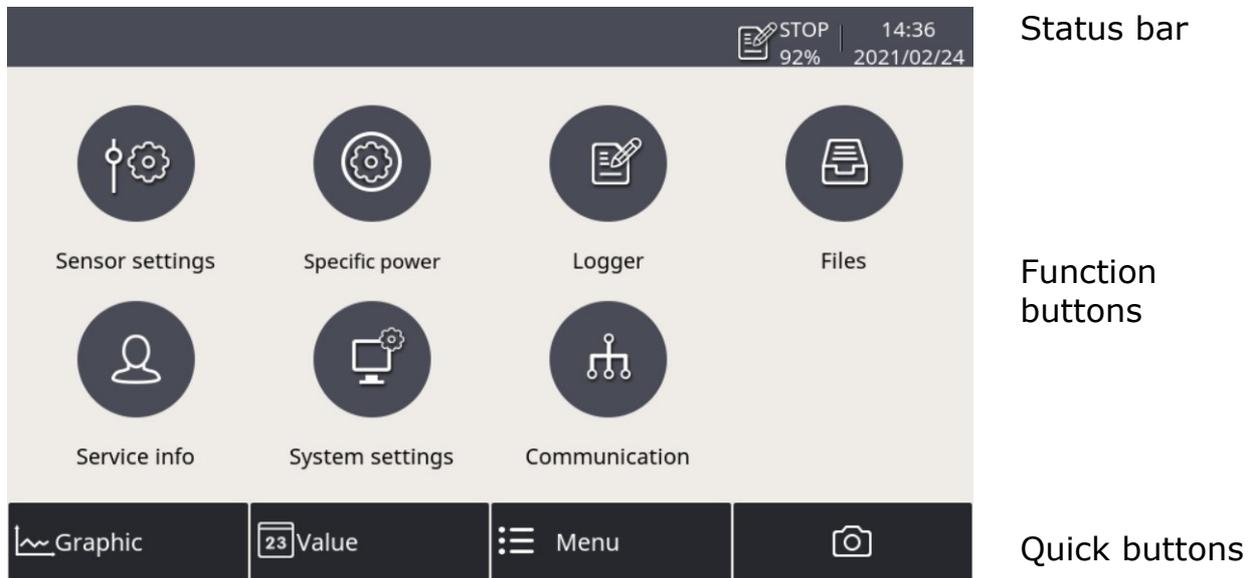
Up to 4 sensors can be shown on one page. Use page button to scroll up and down.

The quick buttons or icon on the bottom are described as follows:

- Graphic: To switch to the graphic view.
- Value: To switch to the value view.
- Menu: To enter the operation menus for detailed settings.
- Up and Down arrows: To scroll up and down pages to view measured data.
- The camera icon: To take a screenshot.

## 8.2 Menu

The Menu button enables you to view and configure settings of the S551 and the connected sensors



The following table describes the menus shown under the Menu button.

<b>Sensor settings</b>	To change settings of the connected sensors.
<b>Specific power</b>	To enable the Specific Power (SP) channels and assign a power meter for each enabled channel.
<b>Logger</b>	To view and change the S551 data logger settings.
<b>Files</b>	To view and manage all recorded log files and the screenshots. To view the memory status.
<b>Service info</b>	To view the service information in case of a service issue.

**System setting** To change system-level settings.

**Communication** To change the communication settings based on the protocol used, such as Modbus, field bus RS-485, or Ethernet.

### 8.3 Icons in the status bar



USB stick connected



System error



Sensor connection changed, not matching with the configuration



Sensor unit is not matching with the configuration



Logger status



RTC backup battery status



Sensor calibration expired



Alarm triggered



4G/LTE signal strength



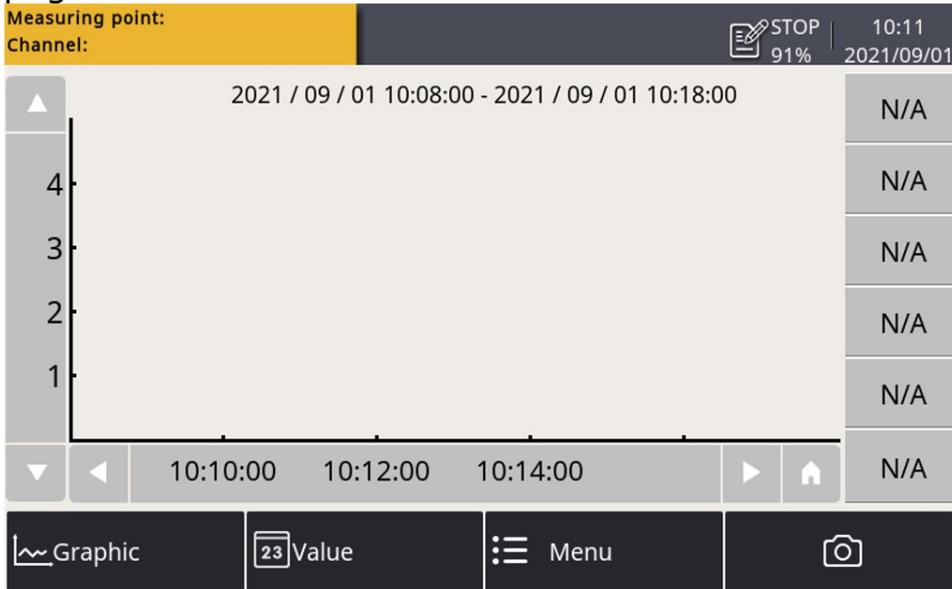
S4A remote connected

## 8.4 Graphic screen

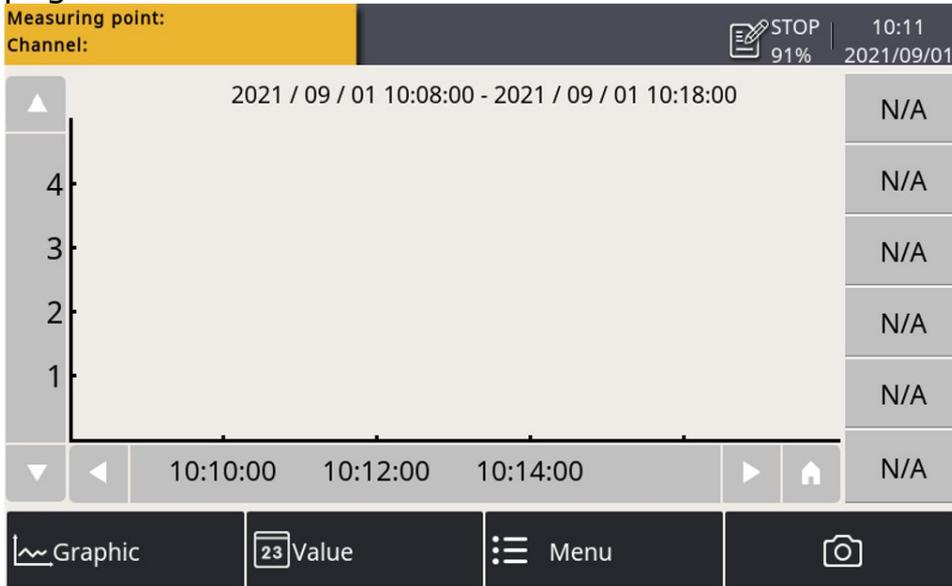
### 8.4.1 Add a data curve

Follow the steps below to add a data curve:

1. Enter into the graphic view. Long press the **N/A** icon on the page.

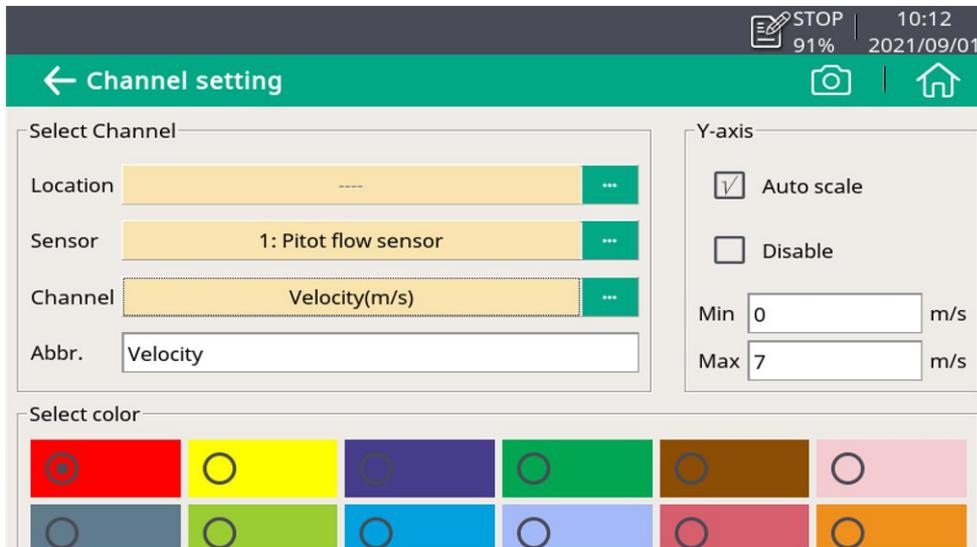


2. Enter into the graphic view. Long press the **N/A** icon on the page.



3. The channel setting window is present as below. On this page:

- Click the  icon to select the sensor and channel.
- Input a brief name in the **Abbr** item.
- Select the color for the curve.



STOP 10:12  
91% 2021/09/01

← Channel setting

Select Channel

Location ----

Sensor 1: Pitot flow sensor

Channel Velocity(m/s)

Abbr. Velocity

Y-axis

Auto scale

Disable

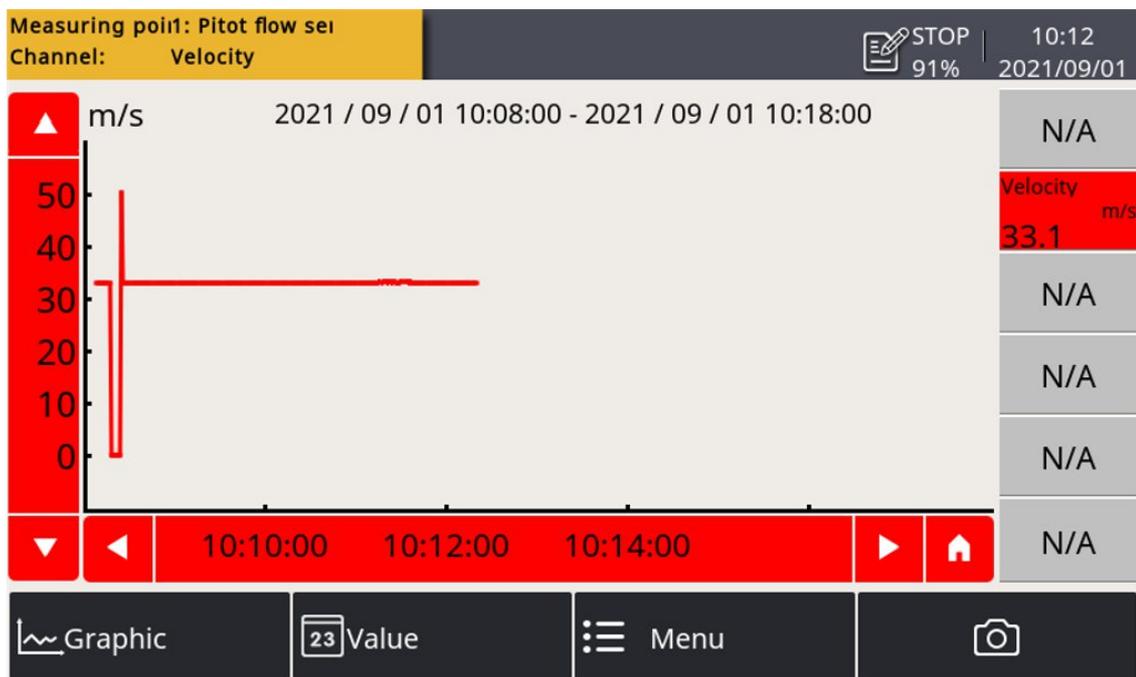
Min 0 m/s

Max 7 m/s

Select color



4. Click the  icon, and the curve is created as below.

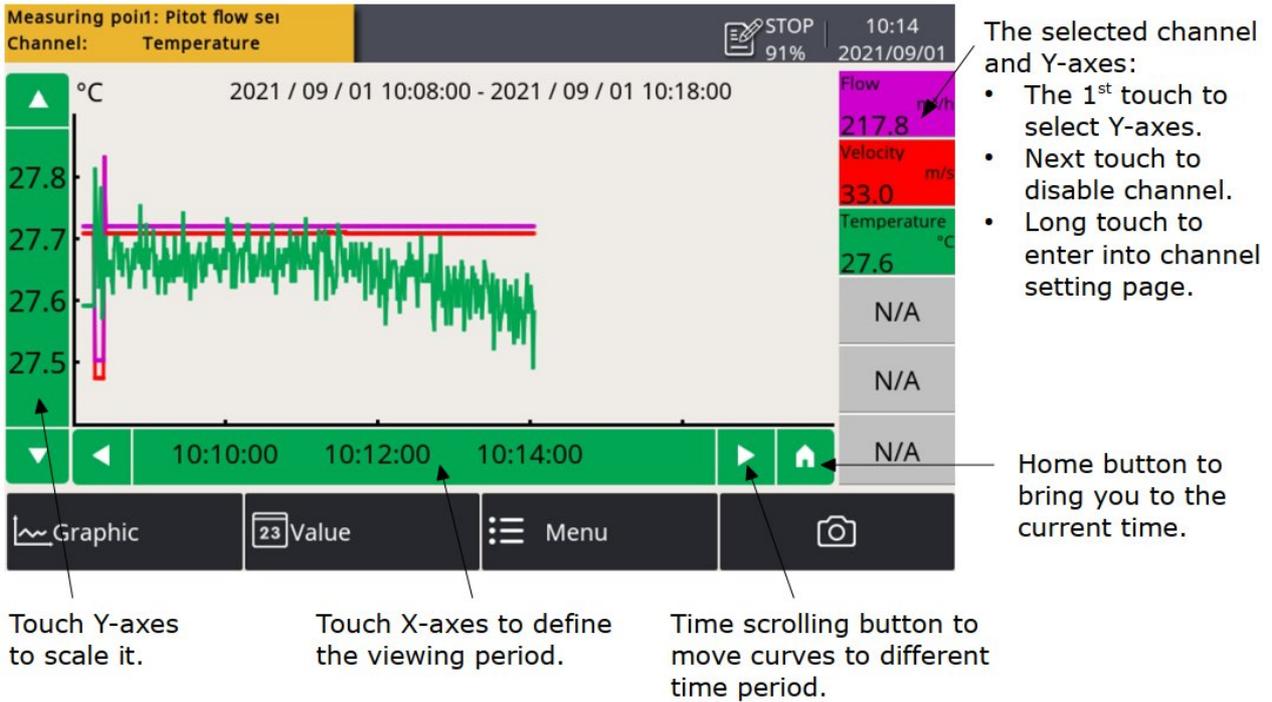


### Notes:

- Only the data curve in the last 24 hours can be seen.
- By default, the data showing the curve are not saved when the device is powered off. Thus the curve cannot be seen when the device is powered on again.

- To save the data, you must enable the logger. Use either of the following two ways to enable the logger:
  - Click **Menu > Logger > Key start**.
  - Click the  icon in the status bar, then click **Key start** .

### 8.4.2 Graphic screen



**Note:** The S110-P does not support the function described in the section 8.4.

### 8.5 Sensor settings

To configure the sensors connected to the S551.

Steps:

1. Click **Menu > Sensor settings**. The screen shows all types of sensors that the S551 can configure.
2. Select the sensor type.
3. Change sensor settings.
4. Click **Save**.

Changes are saved and downloaded to the sensors in the selected sensor type.

**Note:**

The S551 can automatically detect most SUTO sensors with the SDI or Modbus/RTU interface. The standard settings of these sensors are completed in factory.

**8.5.1 Dew point setting**

**Analog output** Select the physical moisture unit and then set the scaling of the analog output.

The options for the moisture unit include ppm (V),  $\text{g/m}^3$ ,  $\text{mg/m}^3$ , and the atmospheric dew point. After you select a moisture unit, the corresponding standard scaling values are displayed. Adjust the scaling values if needed.

Based on this setting, the dew point sensor can convert the moisture values from digit signal to 4 ... 20 mA signal, and then transfer the analog signal to a PLC or SCADA system.

**Dew point cali.** Dew point sensors can be adjusted at one point according to a reference value. We recommend you perform this calibration only below the  $-40\text{ }^\circ\text{C}$  Td dew point and by using a reliable reference.

**Pressure calibration** Applicable to the dew point sensors that have pressure sensors integrated.

Calibrate the integrated pressure sensors.

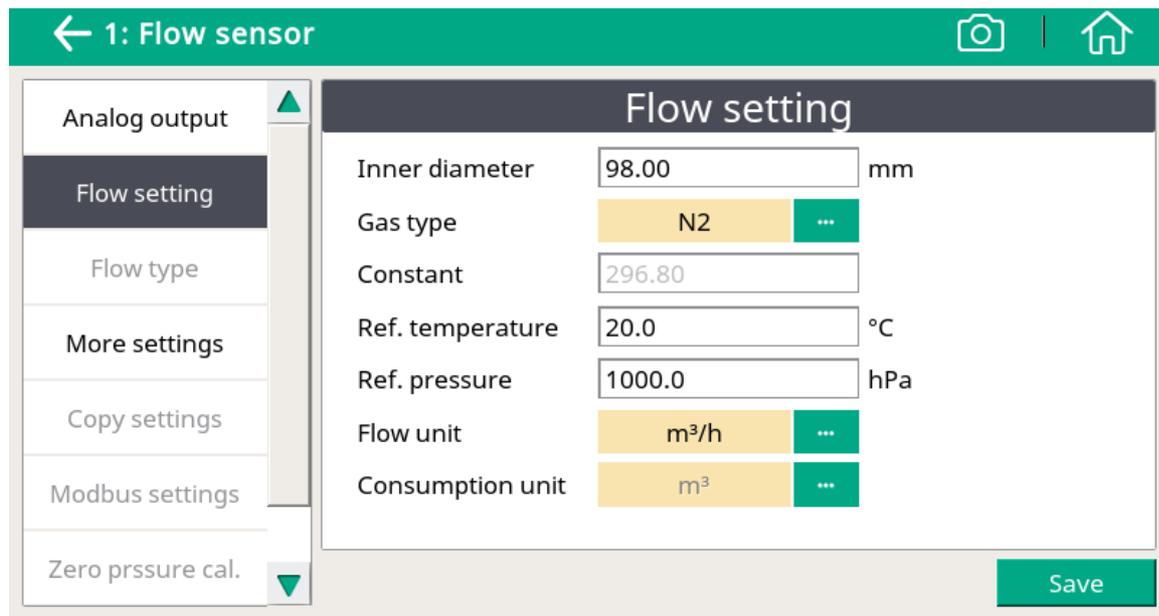
**Modbus setting** Applicable to the dew point sensors that come with the Modbus interface.  
Set the communication parameters

**More settings**

- To activate filters to dampen the output signal.
- To enable or disable the auto calibration function.
- For the unit of  $\text{g}/\text{m}^3$ ,  $\text{mg}/\text{m}^3$ ,  $\text{ppm}[\text{V}]$ , or the atmospheric dew point, enter the absolute pressure (not gauge pressure!). For the unit of  $\text{g}/\text{m}^3$  or  $\text{mg}/\text{m}^3$ , to calculate the absolute moisture under the line pressure condition, enter the reference pressure of 1013 hPa.

**Sensor info** Shows the sensor information for service inquiries.

### 8.5.2 Flow sensor setting

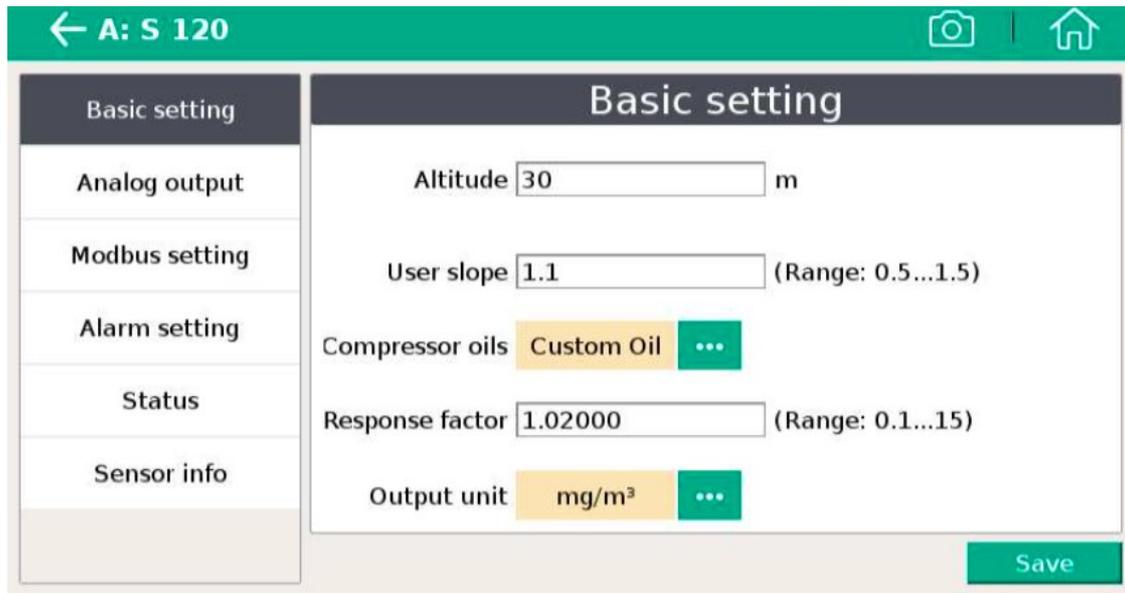


**Note:**

Reference pressure and reference temperature are not related to the actual process pressure or temperature. They are used to calculate the standard flow at standard conditions, for example: 1000 hPa, 20°C.

<b>Analog output</b>	<p>Select the physical flow unit and set the scaling of the analog output.</p> <p>After you select a moisture unit, the corresponding standard scaling values are displayed. Adjust the scaling values if needed.</p> <p>Based on this setting, the flow sensor can convert the flow values from digit signal to 4 ... 20 mA analog signal, and then transfer the analog signal to a PLC or SCADA system.</p> <p>Some sensors support active and passive analog outputs.</p>
<b>Flow setting</b>	<p><b>Inner diameter:</b> Set for the flow calculation.</p> <p><b>Gas type:</b> Select the gas type. (Some gases require real gas calibration. Please contact the manufacturer).</p> <p><b>Constant:</b> Shows the gas constant of the selected gas, or enter a constant for mixed gas or not-listed gas.</p> <p><b>Flow unit:</b> Select a desired flow unit.</p> <p><b>Consumption unit:</b> Select the desired consumption unit.</p> <p><b>References pressure:</b> Set for the standard flow calculation.</p> <p><b>Reference temperature:</b> Set for the standard flow calculation.</p>
<b>More setting</b>	<p><b>Std: consumption:</b> Set the internal consumption counter.</p> <p><b>Rev. consumption:</b> Some sensors support bi-directional flow measurement. This is the counter for the reverse direction.</p> <p><b>Altitude:</b> Enter the altitude level. Default value: 0.</p> <p><b>User slope:</b> To correct the flow by a factor, enable the user slope.</p>
<b>Copy setting</b>	Applicable to S551-P6.
<b>Modbus settings</b>	<p>Applicable to sensors with the Modbus interface.</p> <p>Set the Modbus communication parameters.</p>
<b>Sensor info</b>	Shows the sensor information for service inquiries.

### 8.5.3 Oil vapor sensor setting



- Basic setting**
  - Altitude:** Enter the altitude level. Default value is 0.
  - User slope:** To correct the oil content by a factor, enable the user slope.
  - Compressor oil:** Select the oil type.
  - Output unit:** Select the unit of the oil content.

**Analog output** Set the scaling of the analog output (4 ... 20 mA).

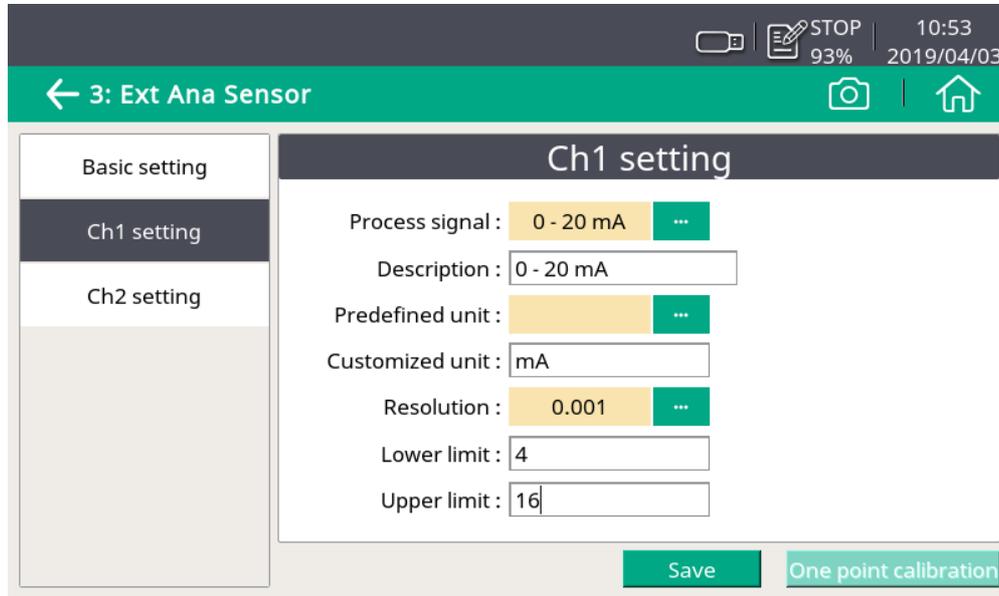
**Modbus setting** Set the Modbus communication settings such as address, baud-rate and parity.

**Alarm setting** Enable or disable the alarm function and set the alarm threshold.

**Status** Shows the PID sensor lifetime, valid calibration time, remaining filter capacity (The filter is consumable component used for auto zero calibration.), gas temperature, and pressure. An indication is given at each line about whether the value is normal or not.

### 8.5.4 Analog input setting

The S551 provides two optional analog input connectors. Each connector supports an analog channel and an pulse channel.



#### Basic setting

**Sensor description:** Enter a sensor name.

#### Ch1 setting

**Measure type:** Select mA or voltage etc.

**Description:** Enter a sensor name.

**Predefined unit:** Select a physical unit.

**Customized unit:** Enter the unit as you want.

**Resolution:** Select the precision for the channel (how many digits are required behind the decimal point).

**Lower limit / Upper limit:** Enter the lower and upper limits of the measurement range.

**One point calibration:** Enter the reference value for the one-point calibration. Based on the reference value, the S551 provides a one-point system calibration for the channel. One-point calibration can eliminate the measurement error of the connected sensor.

The calibration reference value will then be stored in the S551, and applied to the sensor that is connected to this channel. If you connect another sensor to this channel, make sure to delete the previous reference value.

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<b>Ch2 setting (counter only)</b>	<p><b>Measure type:</b> Only counter is selectable.</p> <p><b>Description:</b> Enter a channel name.</p> <p><b>Predefine unit:</b> Select a physical unit.</p> <p><b>Customer unit:</b> Enter a name for the measurement unit as you want.</p> <p><b>Count/pulse:</b> Enter how many consumption units one pulse is equal to.</p>
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### 8.5.5 Power meter S110-P setting

S110-P comes with the Modbus output. Please connect it to connector M of S551.

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<b>Sensor type</b>	Select the right CT type (100 A, 1000 A, or 3000 A).
<b>Wire type</b>	Select the wiring type (1-phase 2-wire, 3-phase 2-wire, or 3-phase 4-wire).
<b>Frequency</b>	Select the frequency (50 Hz or 60 Hz).
<b>Sensor status</b>	Shows the connection status.  If the displayed value is shown as "-- .-", it usually results from a wrong connection with the CTs or voltage measurement devices.

---

### 8.5.6 Analog extension module

Extension module comes with the Modbus output. Please connect it to connector M. The analog extension module offers additional 8 x 0 ... 20 mA channels. Similar to the analog input channels provided on connector 3 or 4, the sensor type can be specified through the **Sensor settings** menu.

### 8.5.7 Laser particle counter S130

S130 comes with the SDI and Modbus outputs. Please connect it to connector 1 or 2 or to connector M.

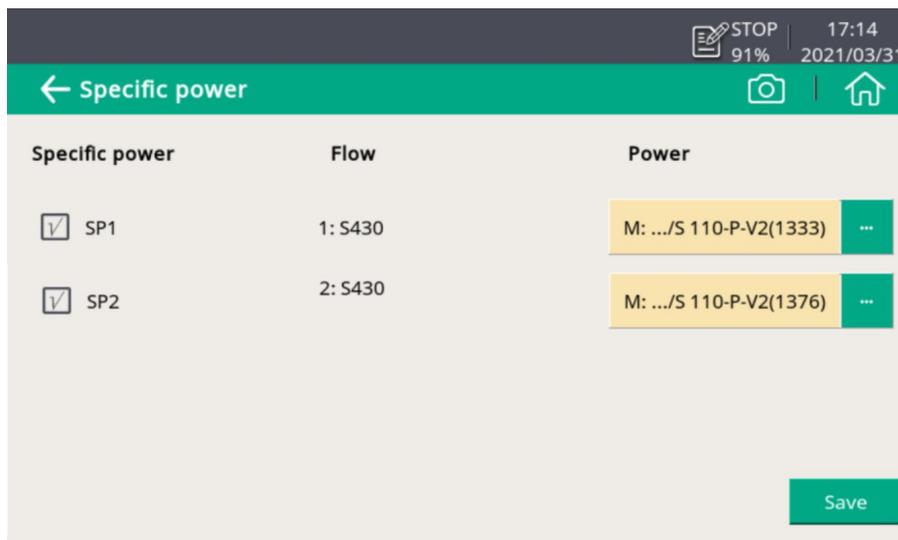
### 8.5.8 Ultrasonic liquid flow meter S460

For information about the operation and installation, see the instruction manual of the ultrasonic flow meter S460.

## 8.6 Specific power

To enable the Specific Power (SP) channels and assign a power meter for each enabled channel.

The SP measurement is made available by having the S430 flow meters and S110-P power meters connected to the S551. An S430 can be connected to an S551 only through Connector 1 or 2. An S551 can enable two SP channels at maximum for measuring SPs for two sets of compressors.



**Specific power** Select to enable the SP channels on the S551 as needed.

SP1 represents the SP channel on the S551 Connector 1. SP2 represents the SP channel on the S551 Connector 2.

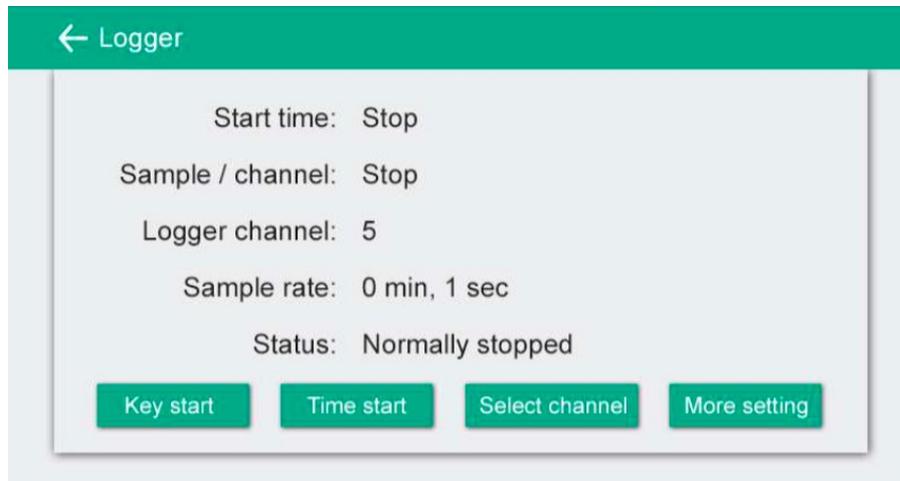
**Remark:** SP1 is displayed on the menu screen only when an S430 is connected to connector 1. Same rule applies to the SP2.

**Flow** If an S430 is connected, "S430" is displayed.

**Power** To select a power meter for a selected SP channel from the drop-down list.  
Options are the power meters that the S551 has detected.

## 8.7 Logger

To view the logger status and start the logger in different ways.

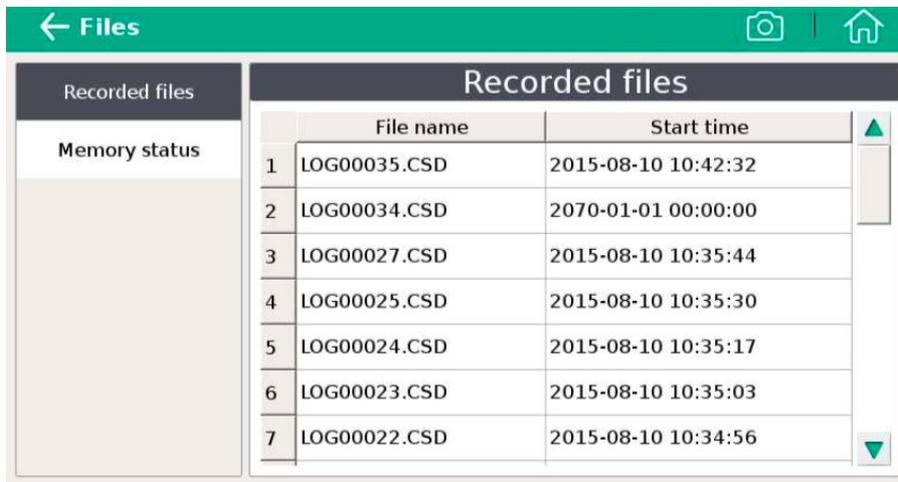


<b>Start time</b>	Shows the logger start time.
<b>Sample /Channel</b>	Shows the recorded sample number per logging channel.
<b>Logger channel</b>	Shows the total recording channel number.
<b>Sample rate</b>	Shows the recording interval.
<b>Status</b>	Logger status.
<b>Key start</b>	To start logging immediately.
<b>Time start</b>	To configure a recording schedule.
<b>Select channel</b>	To select the channel to record.
<b>More setting</b>	To configure other logger settings.

## 8.8 Files

To view and manage all recorded files and screenshots. Single files can be selected for download or deletion.

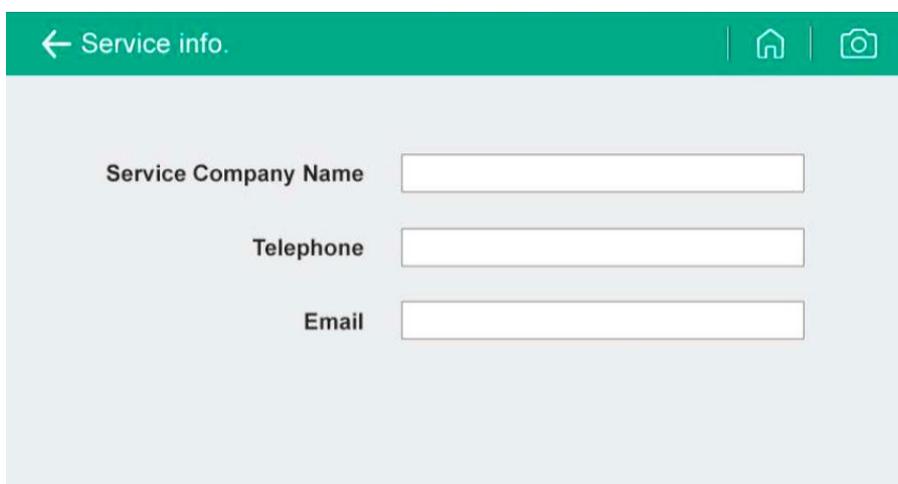
You can also check the memory status.



	File name	Start time
1	LOG00035.CSD	2015-08-10 10:42:32
2	LOG00034.CSD	2070-01-01 00:00:00
3	LOG00027.CSD	2015-08-10 10:35:44
4	LOG00025.CSD	2015-08-10 10:35:30
5	LOG00024.CSD	2015-08-10 10:35:17
6	LOG00023.CSD	2015-08-10 10:35:03
7	LOG00022.CSD	2015-08-10 10:34:56

## 8.9 Service info.

Shows the contact information of service company, which can be set via the S4C-Display software



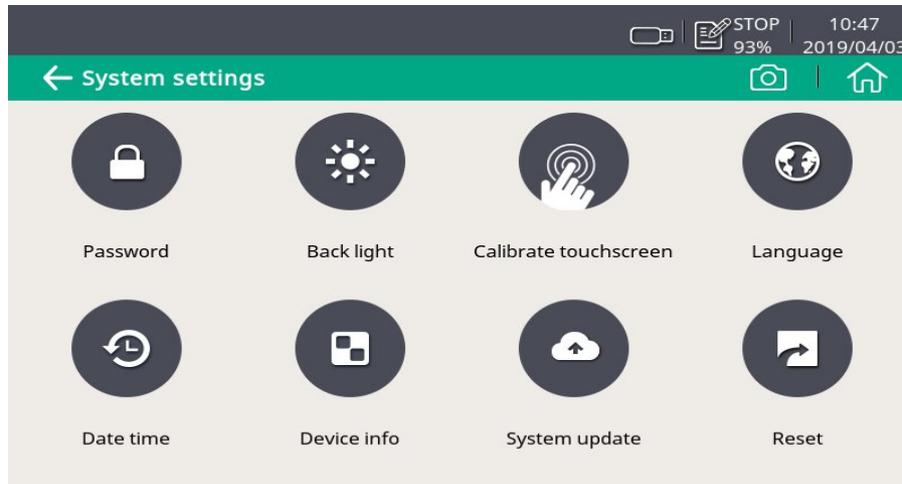
Service Company Name

Telephone

Email

## 8.10 System settings

To configure the S551 system settings.

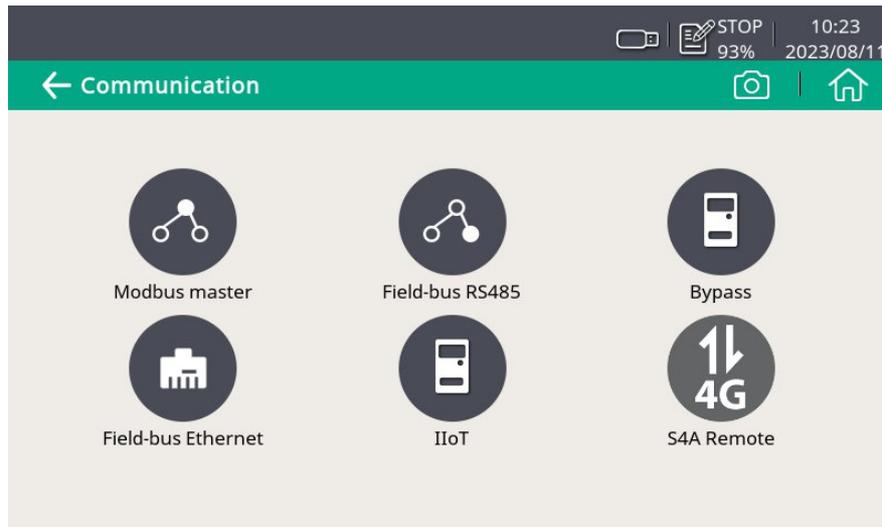


<b>Password</b>	To set a password to protect the settings menu from unauthorized access.
<b>Back light</b>	To configure the brightness and the auto dimming function of the screen.
<b>Calibrate touch screen</b>	To calibrate the touch screen if it does not respond to user inputs correctly or precisely, it can be calibrated.
<b>Language</b>	To select the interface language.
<b>Date time</b>	To configure date and time.
<b>Device info</b>	To view device information such as serial number.
<b>System update</b>	To perform a system update.
<b>Reset</b>	To restart the device (User settings will be saved).

## 8.11 Communication

An S551 is provided with an Ethernet port through which the S551 communicates with application servers such as the S4M server for remote monitoring.

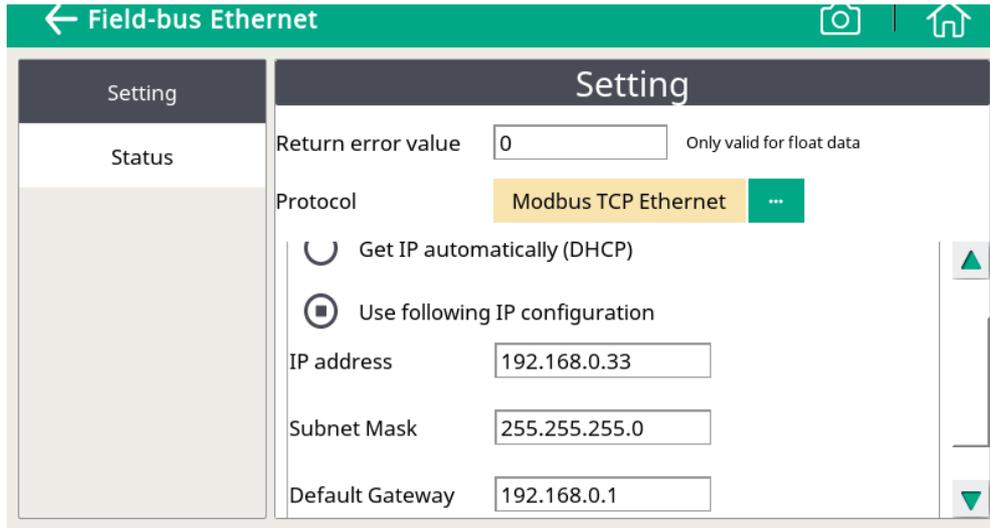
This menu enables you to configure how S551 communicates with the peer application servers such as S4M.



### 8.11.1 Field-bus Ethernet

When S551 communicates with the S4A or S4M server through the TCP protocol, do the following:

1. Click **Field-bus Ethernet**.
2. Select a protocol as needed.
3. Select how the S551 is assigned with an IP address:
  - For a quick and temporary access to the LAN where DHCP is supported, you can select **Get IP Automatically (DHCP)**.
  - For a long term and steady access to the LAN or the LAN does not support DHCP, you can select **Use following IP Configuration**, and then configure the **IP address**, **Subnet mask**, and **default gateway** of the **S551**.



### 8.11.2 Configure S4A remote connection

When the 4G/LTE function is provided, follow the steps below to set up:

1. Configure the S551 to connect it to the S4A remote server.
2. View the online measurement values, and read out the logging files remotely with S4A software.

For the detailed configuration steps, watch the instruction video which can be found online on SUTO website.

### 8.11.3 SIM card requirement for 4G option

To use the 4G/LTE function, customer needs to buy a SIM card locally.

#### Data traffic

Data traffic required depends on the number of sensors connected and total running time. Refer to the table below if the device is running 7×24 hours.

Sensor connected	Data traffic per Month (GB)
1 × S401 Thermal Mass Flow Meter	1
1 × S401 Thermal Mass Flow Meter 1 × Pressure Transmitter	2
1 × S430 Pitot Tube Flow Meter	3
1 × S110-P Power and Energy Meter 1 × S430 Pitot Tube Flow Meter 1 × S401 Thermal Mass Flow Meter	12

1 × Pressure Transmitter 1 × Temperature Transmitter	
2 × S110-P Power and Energy Meter 2 × S430 Pitot Tube Flow Meter 1 × S401 Thermal Mass Flow Meter 1 × Pressure Transmitter 1 × Temperature Transmitter	21
4 × S110-P Power and Energy Meter 4 × S430 Power and Energy Meter 1 × S401 Thermal Mass Flow Meter 1 × Pressure Transmitter 1 × Temperature Transmitter	40

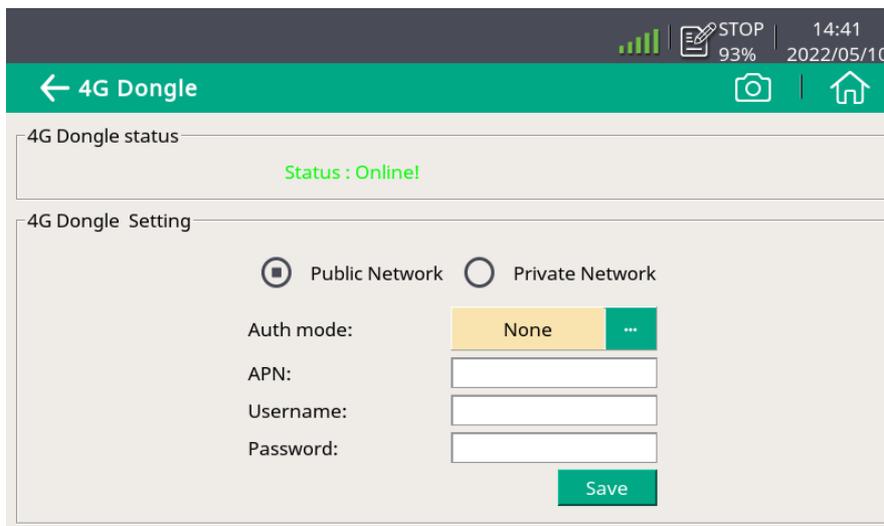
### PIN code protection

The S551 does not support modifying PIN code on the screen. If your SIM card has PIN code protection, disable it by using other devices, for instance using your mobile phone.

### Network settings

Depends on the Internet Service Provider (ISP) you may need to change the network settings. Click the 4G/LTE signal strength icon  on the status bar to check and change the settings, as shown below.

You can get the APN data from your provider, or they are easy to find if you search for <APN Provider> on the Internet.



## 9 Application example

SUTO provides a complete solution for you to measure, monitor, and analyze a compressor.

Specific Power (SP) is the ratio of the compressor active power to the compressor flow, indicating the compressor efficiency. The lower the SP value, the higher efficiency of the compressor.

The S551 displays the pressure, flow, consumption, and SP on a single screen, facilitating online monitoring. In addition, the S551 records the measured data, and sends the data to SUTO's professional analysis software such as S4A, CAA, or S4M for measurement analysis.

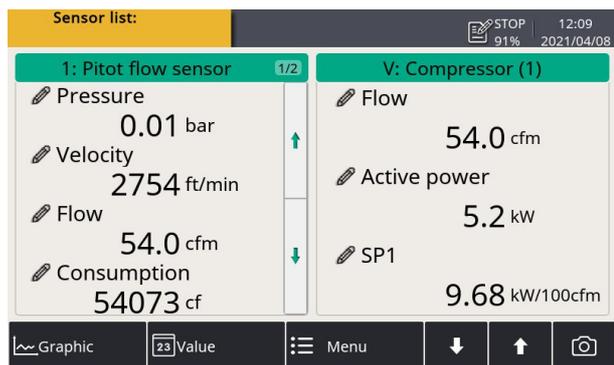
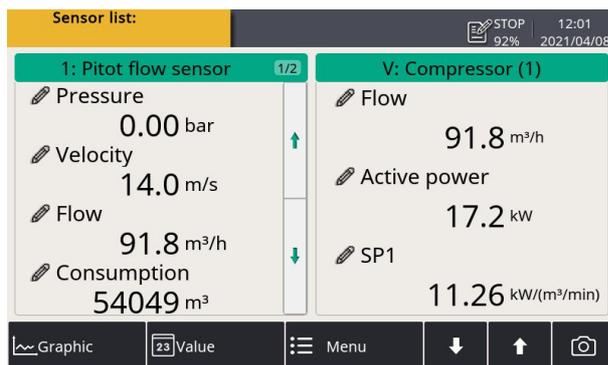
An S551 can provide two SP channels to measure SPs for two sets of compressors.

To monitor the SP for a compressor, do the following:

1. Connect the Pitot flow sensor S430 and the power meter S110-P to the S551.
2. Enable an SP channel as needed, and assign a power meter for the enabled channel through the **Menu > Specific power**.

**Remark:** To activate the SP function, the S430 must be connected to the S551 only through the SDI connector (Connector 1 or 2).

See the example in the following figures. The SP is calculated based on the measured values, and is presented in the metric or imperial unit depending on the unit setting of the S430.



## 10 Signal inputs

### 10.1 Digital inputs

The S551 provides two types of digital input connectors:

- 2 SDI connectors, supporting a total of 2 x SDI sensors, and;
- 2 Modbus connectors, supporting a total of 16 x RS-485 Modbus/RTU sensors

**Remark:** To connect a digital sensor with a digital input on the S551, please use the standard sensor cable (P/N: A553 0111). This cable is 5 m long with the M12 connector on one end (to connect a digital sensor) and the ODU connector on the other end (to connect a digital input on the S551).

The default settings of the Modbus/RTU interface are as follows:

Mode	RTU
Baud rate	19200
Device address	Last two digits of the serial number
Framing / parity / stop bit	8, N, 1
Response timeout	1 second
Response delay	0 ms
Inter-frame spacing	7 char

**Response message that the device returns to the master:**

- Function code: 03

The information of the byte order is shown in the table below:

Byte Order	Sequence				Data Type
	1st	2nd	3rd	4th	
1-0-3-2	Byte 1 (MMMMMMMM*)	Byte 0 (MMMMMMMM *)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM *)	FLOAT
1-0-3-2	Byte 1	Byte 0 LSB	Byte 3 MSB	Byte 2	UINT32 INT32
1-0	Byte 1 MSB	Byte 0 LSB	---	---	UINT16 INT16
1-0	Byte 1 XXX *	Byte 0 DATA	---	---	UINT8 INT8

\* S: Sign, E: Exponent, M: Mantissa, XXX: no value

## 10.2 Analog input

The S551 provides two optional analog/pulse input connectors. Each analog/pulse connector provides the following channels:

- 1 x analog channel (0 ... 20 mA, 4 ... 20 mA, 0 ... 1 V, 0 ... 10 V)
- 1 x pulse channel

**Remark:** To connect a SUTO analog/pulse sensor with an analog input on the S551, please use the sensor cable that is shipped with the analog/pulse sensor. This cable has a yellow label attached at both connections of the connectors and the cable to make it differentiated from the standard cable.

## 11 Signal outputs

The data can be transmitted via Modbus/TCP over Ethernet to a data collection system or software. Alternatively the data can also be transferred via a USB stick or a USB cable.

The default settings of the ModbusTCP interface are as follows:

Mode	TCP
DHCP	Yes
MAC	Set ex-factory
IP address	Dynamic or Static
Subnet	Dynamic or Static
Gateway	Dynamic or Static
Timeout	≥ 200 ms

The response message and the byte order are the same as the ones in the Modbus/RTU.

## 12 Optional accessories

The following optional accessories are available for your choice:

- 8-channel analog input extension, connectable to S551, including 5 m cable with the connector
- Portable Modbus splitter box
- Extension cable, 5 m male-female connectors
- Open-wire cable, 5 m cable with connector
- Sensor cable, M12, 5 m with the ODU connector to S551
- Transport case S551 for sensors and cables, (560 x 450 x 160 mm)
- USB 4G dongle, including S4A software (P/N: A1670)

## 13 Calibration

The sensor is calibrated ex-works. The exact calibration date is printed on the certificate supplied together with the sensor. The accuracy of the sensor is regulated by the on site conditions. Parameters such as oil, high humidity, or other impurities can affect the calibration and furthermore the accuracy.

However we recommend you calibrate the instrument at least once per year. The calibration is excluded from the instruments warranty. For more information, please contact the manufacturer.

## 14 Maintenance

To clean the device and its accessories it is recommended to use moist cloth only.



### **ATTENTION!**

**Do not use isopropyl alcohol to clean the display!**

## 15 Disposal or waste



Electronic devices are recyclable material and do not belong in the household waste.

The device, the accessories and its packing must be disposed according to your local statutory requirements. The dispose can also be carried by the manufacturer of the product, for this please contact the manufacturer.

## 16 Appendix – SUTO Devices Supported by S551

### 16.1 Automatically Detected SUTO Devices

<b>Device</b>	<b>Supported communication</b>
S401	SDI or Modbus/RTU
S421	SDI or Modbus/RTU
S415	Modbus/RTU
S418	Modbus/RTU
S430	SDI
S450	SDI
S452	SDI
S400	SDI
S420	SDI
S211/S215/S220 S699 1XXX	SDI
S211/S215/S220 S699 2XXX	SDI
Analog input extension (8-Channel)	Modbus/RTU
S110-P-V2	Modbus/RTU
S120-P (S604 1202)	SDI

## **16.2 Non-Automatically Detected SUTO Devices**

The devices that cannot be detected automatically are as follows:

- S418-V
- S211/S215/S220 S699 3XXX and S699 4XXX
- S120 (S604 1201/ S604 1203/ P604 1205/ P604 1215)
- S132
- S230/S231
- S462

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