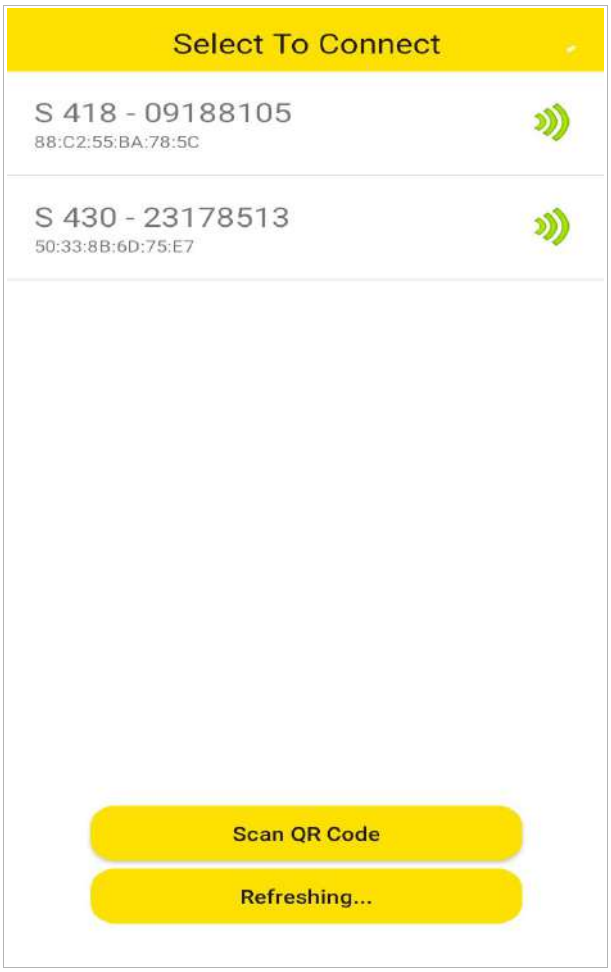
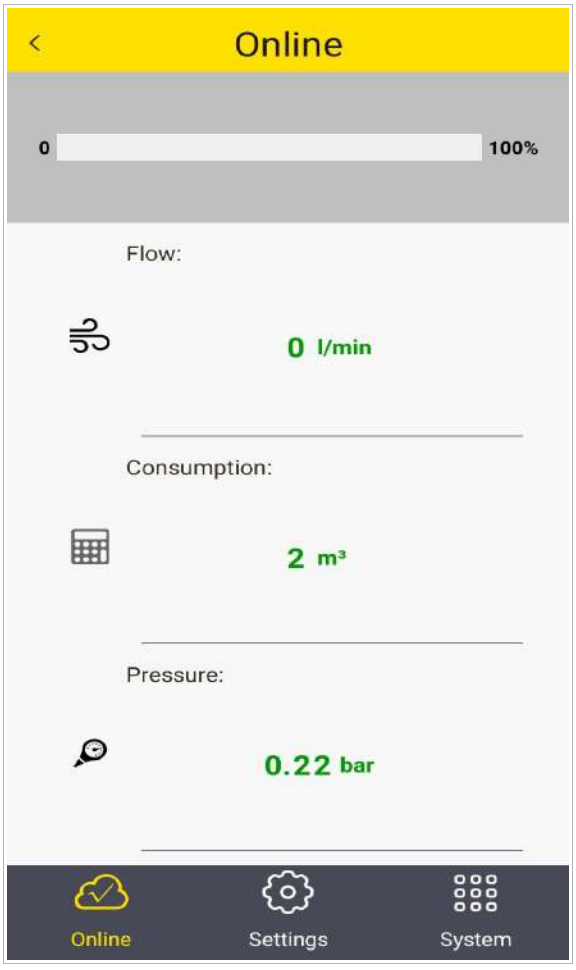
English

Instruction and Operation Manual

S4C-FS

Smartphone App for Air and Gas Flow Meter





Dear Customer,

Thank you for choosing our product.

Please read the manual in full before you start up the device and carefully observe the instructions stated. 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 destined 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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1 Registered trademarks

Trademark	Trademark owner
SUTO®	SUTO iTEC
MODBUS®	Modbus Organization, Hopkinton, USA
HART®	HART Communication Foundation, Austin, USA
Android™, Google Play	Google LLC

2 Application

The S4C-FS is an app that enables you to view measurement readings and change settings for SUTO flow meters through Android or iOS devices.

The S4C-FS supports the following SUTO flow meters:

- S401, S402, and S421
- S415, S418, and S418-V
- S430
- S431
- S451 and S453

2.1 System requirements

Ensure that your Android or iOS devices meet the following requirements:

- Android 7.0 or above versions installed
- iOS 13 or above versions installed
- BLE4.0 and above supported (You can check the information with the device vendor.)

Ensure that you have allowed the app to access the following information:

- Location (Network-based approximate location and GPS- and Network-based precise location)
- Camera (Scan the QR code)
- Pair with Bluetooth devices

- Device ID and call information (Read phone status and identity)
- Others (View network connections, View Wi-Fi connections, Access Bluetooth settings, Change network connectivity, full network access)

2.2 Operating requirements

The S4C-FS can automatically detect a SUTO flow meter when both of the following requirements are satisfied:

- The SUTO flow meter is powered on.
- The device is no more than 10-meter away from the flow meter (within sight). Walls and metal enclosures will reduce the effective distance!

3 Features

- Smart phones and tablets applicable.
- Designed for service people to check sensor readings and change sensor settings using Android or iOS devices.
- Bluetooth integrated as the interface to communicate with the flow meter.
- Multiple languages supported: English, German, Chinese, and French.

4 Installation and connection

4.1 Installation

The Android-based S4C-FS App file (*.APK) is available for download on Google Play Store (play.google.com) and the SUTO Website. (www.suto-itec.com). The iOS-based S4C-FS App can be downloaded from Apple App Store.

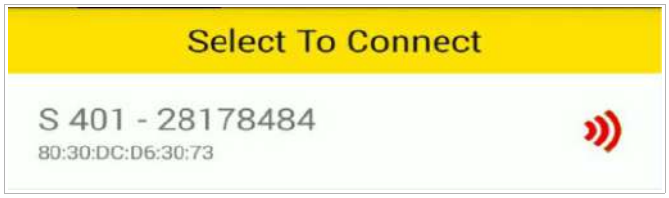
Use your mobile phone or tablet to download and install the application, same as you do for any other apps.

After the S4C-FS is launched on a device, the S4C-FS automatically detects powered-on flow meters within the valid distance of the device's bluetooth signal.

When the S4C-FS detects a flow meter for the first time, the S4C-FS has the Read-only access to the flow meter and can only view readings

and settings.

As shown in the following figure, a flow meter is detected with its name and serial number displayed. The signal icon is shown in **RED** indicating that the flow meter is Read-only. By clicking the flow meter name, you trigger the S4C-FS to connect with the flow meter. After the connection is built, you are directed to the online view of the flow meter where you can view the measurement data.



Note: The S4C-FS can detect and connect to multiple flow meters. A flow meter can connect to only one Android or iOS device at a time.

4.2 Enable the configuration

Before using the S4C-FS App to configure or calibrate flow meters, you must obtain configuration permissions.

- For S401, S402, S421, S415, S418, S418-V, and S430, you can scan the QR code of a specific flow meter to obtain its configuration permission.
- For S431, you must register to obtain the configuration permission.

4.2.1 Scan QR code

This function is applicable to flow meters supported by the S4C-FS except the S431.

To change settings of a flow meter, you must scan its QR code using the S4C-FS App.

Preparation:

- Power on the flow meter.
- Obtain the QR code of the flow meter. The QR code is attached on the side of the flow meter head or on the calibration certificate. Following is an example of the QR code.

Steps:

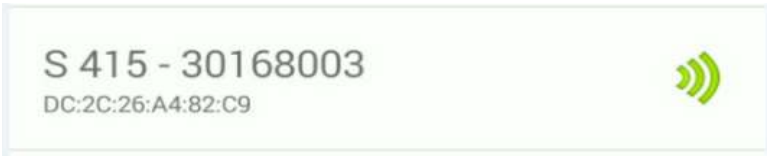
1. Launch the **S4C-FS** on your phone.

   The flow meters that are within the reach of the device's Bluetooth are displayed on the screen, followed by a red signal icon.

2. Click the **Scan QR Code** button.

3. Scan the QR code on the flow meter's head or certificate.

   After scanning the QR code, S4C-FS saves the sensor information to the Android or iOS device, and the signal icon changes from **RED** to **GREEN**, indicating that the flow meter is configurable using the S4C-FS.



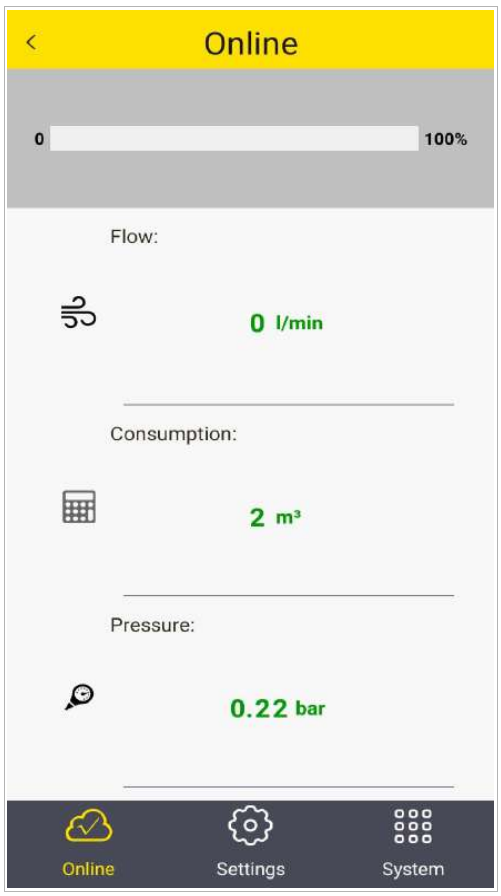
Note: A **GREEN** hollow signal icon as shown in the following figure indicates that the Bluetooth signal is weak. You can place your device closer to the flow meter.

4.2.2 Register for configuring S431

This function is only applicable to the S431.
Before using the S4C-FS App to configure or calibrate the S431, you must register. Only registered users are able to modify settings. Please get in touch with SUTO service teams and provide the required registration information.

5 Menus

On the main screen of S4C-FS, click on a flow meter record to enter the sensor screen. The screen provides three menus at the bottom for you to operate: Online, Settings, and System.



5.1 Online

The **Online** menu enables you to view the online measurement values which are updated twice per second. Different flow meters have slightly different measurement parameters as shown in the following table.

Flow meter	Measurement
S401	Flow, Consumption, Consumption[R]
S402	Flow, Consumption, Consumption[R]
S421	Flow, Consumption
S430	Flow, Consumption, Consumption[R], Temperature, Velocity, Pressure
S415	Flow, Consumption
S418	Flow, Consumption, Pressure
S418-V	Flow, Consumption, Pressure
S431	Flow, Consumption, Temperature, Velocity, Pressure
S451, S453	Flow(F), Flow(R), Consumption(F), Consumption(R), Velocity(F), Velocity(R), Temperature, Pressure

Remarks:

The S418 shows the pressure only if the optional pressure sensor is integrated.

5.2 Settings

The Settings menu enables you to change sensor settings and calibrate a sensor. The Settings menu is enabled only when the S4C-FS is completed with scanning the QR code of the flow meter.

SUTO flow meters provide various settings which influence the performance and the features of the flow meters. Be careful when you change the settings because they might affect the accuracy or the overall performance. Contact SUTO service team for information.

The following settings are available on SUTO flow meters:

- Flow Settings
- Gas Type
- Units Settings
- Reference Conditions
- Factory Settings
- Counter Settings
- Output Settings
- Calibrations
- Logger settings

For more information about the settings, see chapter 6 on page 10.

5.3 System

The **System** menu enables you to view or configure information of the flow meter and S4C-FS:

- Sensor Info
- Language
- Version

For more information, see chapter 7 on page 21.

6 Settings

This chapter describes parameters in the Settings menu.

6.1 Flow settings

To configure settings related to flow measurement.

Parameter	Description	
Pipe diameter	For all insertion type flow sensors, enter the correct inner diameter of the pipe at the installation point. For in-line flow meters, the diameter can not be changed.	
Gas type	Select a gas from the list of available gas types. Some sensors have up to two real gas calibrations stored (for example, CO2, CH4) which is indicated by the word **CAL** behind the gas type.	
Gas constant	It is set through the selected gas type. Each gas type has its own specific gas constants. When the gas type is "other", you have to input a gas constant.	
Gas factor Max flow, Min flow	These parameters are for information only and can not be changed.	
Flow type (for S430 and S431 only)	S430 and S431 support various flow types:	
	Flow	Standard flow based on the reference conditions that you set. This is the most commonly used flow type, which corresponds to the standard flow measured with thermal mass flow meters.
	Dry air flow	Flow rate of dry air that is calculated based on the relative inside-pipe humidity that you set. 90% is the default. S430 is mainly used in wet air flow behind compressors. This selection enables you to view the dry flow after the compressed air goes through a dryer.
	FAD	Free Air Delivered referred back to the intake air conditions that you set (temperature, humidity, absolute pressure, and altitude).
	Actual flow	Actual volumetric flow rate at the system pressure.
Installation (for S401, S430, S431, and S451 only)	Select an installation type: • Center installation--The sensor tip is inserted to the center of the pipe. • 100 mm insert depth--The sensor is only inserted 100 mm into the pipe. This installation type is used in big pipe diameters where a center installation is not feasible.	

Parameter	Description
Cutoff Flow Threshold (for S401, S402, S421, S431, S451, and S453 only)	The cutoff flow threshold is a lower limit of the flow. All measured flow that is lower than the threshold are set to zero. Select between 20 or 10 m/s (standard velocity) for S431.

6.2 Gas type

To select the gas type to be measured.

Flow meter	Gas types
S401, S402, S421, S430	Air, CO_2, O_2, N_2, N_2O, Ar, Natural gas, CH_4, Propane, Butane, Others
S415	Air, N_2
S418	Air, CO_2, O_2, N_2, N_2O, Ar, Natural gas, CH_4, Propane, Butane, Others
S418-V	Air
S431	Wet/dry air, Others
S451, S453	Air, CO_2, O_2, N_2, N_2O, Ar, Natural gas, CH_4, Propane, Butane, Others

6.3 Units settings

To set units for flow, pressure, temperature, and consumption.

Available units are listed as follows based on the flow meter types.

6.3.1 Flow units

Flow meter	Flow units
S401, S421	m^3/h, m^3/min, cfm, l/min, l/s, kg/h, kg/min, kg/s, Nm^3/min, Nl/min, Nm^3/h, Nl/s, Ncfm
S402	m^3/h, m^3/min, l/min, l/s, cfm, kg/h, kg/min, kg/s
S430	m^3/h, m^3/min, cfm, l/min, l/s, kg/h, kg/min, kg/s, t/h, lb/h, Nm^3/h, Nm^3/min, Ncfm, Nl/min, Nl/s
S415, S418, S418-V	l/min, cfm, kg/h, m^3/h, Nm^3/h,Nl/min, Ncfm
S431	Volumetric flow: m^3/h, m^3/min, l/min, l/s, cfm Mass flow: kg/h, kg/min, kg/s, t/h, lb/h
S451, S453	m^3/h, m^3/min, cfm, l/min, l/s, kg/h, kg/min, kg/s, Nm^3/min, Nl/min, Nm^3/h, Nl/s, Ncfm

6.3.2 Pressure units

Flow meter	Pressure units
S401, S402, S421	N/A

S430	bar, psi, MPa
S415	N/A
S418, S418-V	bar, psi
S431	bar, psi, kPa, MPa
S451, S453	bar, psi

6.3.3 Temperature units

Flow meter	Temperature units
S401, S402, S421	N/A
S430	°C, °F
S415, S418, S418-V	N/A
S431	°C, °F
S451, S453	°C, °F

6.3.4 Consumption units

Flow meter	Consumption units
S401, S421	m^3, l, kg, cf, Nm^3, Nl, Ncf
S402	m^3, ft^3 , kg
S430	m^3, l, kg, cf, t, lb, Nm^3, Nl, Ncf
S415, S418, S418-V	m^3, l, cf, kg, Nm^3, Nl, Ncf
S431	m^3, l, kg, ft^3, t, lb
S451, S453	m^3, l, kg, cf, Nm^3, Nl, Ncf

6.4 Reference conditions

To configure “Standard” or “Norm” conditions.

Reference conditions are used to calculate volumetric flow to so-called “Standard” or “Norm” conditions. This setting is important for gases because the volume of a gas varies with pressure and temperature.

Parameter	Values	Remark
Standard	1000 hPa, 20 °C	Select this option when the gas to be measured is compressed air.
Norm	1013.25 hPa, 0 °C	Select this option when the gas to be measured is nitrogen or another gas.
Customer		Select this option when it is necessary to convert the flow at the compressor outlet to the flow in the inlet suction state, that is, when the air production capacity of the compressor needs to be expressed by FAD (Free Air Delivery). Once selected, the user has to manually enter the reference temperature and reference pressure values for the operating conditions.

6.5 Factory settings

These settings are ex-factory and not changeable by users.

Parameter	Remarks
Filter grade	Enter a value between 0 … 127 as the filter grade. It's a damping of the flow value which is used to stabilize the flow rate in systems where the flow is very unstable. A high value means a very high damping (slow response).
Profile factor	The profile factor is the ration between average flow in the pipe and the centre flow.

6.6 Counter settings

To set the consumption counter to a new start value. Some flow sensors work bi-directionally and therefore have a standard counter and a reverse counter.

6.7 Output settings

There are various output options available depending on the flow meter type and the ordered options. Here is an overview of available outputs:

Flow meter	Output option					
	4 … 20 mA +pulse	**Modbus /RTU**	**Modbus/ TCP**	**MBus**	**Mbus +Analog**	**Analog compatible S400**
S401, S421	Yes	Yes	Yes	Yes	Yes	Yes
S402	Yes	Yes	No	Yes	Yes	Yes
S430	Yes	Yes	Yes	Yes	No	No
S415, S418, S418-V	Yes	Yes	No	Yes	No	No
S451 S453	Yes	Yes	Yes	No	No	No

4 … 20 mA + pulse	**Description**
Scaling: 4 mA 20 mA	 Usually set to 0 flow Usually set to maximum flow
Pulse per unit	Drop list with the following three items: - 1 pulse per consumption unit (default) - 1 pulse per 10 consumption unit - 1 pulse per 100 consumption unit

Modbus/RTU	**Description**
Device address	Each device must have a unique device address within (1 ... 247) with the ex-factory value of 1.
Baudrate	Select a baud rate from: 1200, 2400, 4800, 9600, **19200** (default), 38400, 57600, 115200
Parity	- **None** (default) - Even - Odd
Stop bit	- **1** (default) - 2

Note: All devices on the bus must have the same communication parameters: baudrate, parity, start and stop bits.

Modbus/TCP		Description
Ethernet Status	Cable Status	Shows the status of the cable connection. Read only
	Link Speed	Shows the speed of the Ethernet link. Read only
	Link Status	Shows the status of the Ethernet link. Read only
	TCP Status	Shows the status of the TCP link. This status identifies if a TCP client is in connection with this flow meter, which works as a TCP server. Read only.
Ethernet Setting	DHCP	Shows the DHCP is in use or not. - **Yes** (default) - No: Selected when you want to manually assign a fixed IP address to this flow meter.
	MAC	Shows the MAC address of this flow meter. Read only.
	IPv4	- If the DHCP setting is Yes, shows the IP address that the DHCP server assigns to this flow meter. - If the DHCP setting is No, enter the fixed IP address that is assigned to this flow meter.
	Subnet mask	- If the DHCP setting is Yes, shows the subnet mask that the DHCP server provides to the flow meter. - If the DHCP setting setting is No, enter the subnet mask corresponding to the fixed IP address.
	Gateway	- If the DHCP setting to Yes, shows the IP address of the default gateway that the DHCP server provides to the flow meter. - If the DHCP setting is No, enter the IP address of the corresponding gateway.
Ethernet Connection Setting	Mode	Shows **TCP/Server**, identifying that the flow meter works as a TCP server. Read only
	LocalPort	Shows the port number used for communication between the server and client. Default: 502 If needed, you can change the port number. Range: 0 … 65535

MBUS	Description
Primary Address	Settable from (1 ... 250)
Secondary Address	Settable and default is the product serial number.
Manufacturer Code	Read only
M-BUS Version	Read only
Baudrate	Settable from (300, 600, 1200, 2400, 4800, 9600)
Fabrication Number	Read only
Response Delay (ms)	Read only
Response Timeout (ms)	Read only

Receive Timeout (ms)	Settable from (0 … 65535)

6.8 Calibration

To perform calibration on a flow meter.

6.8.1 Calibration type

Flow meter	Zero Flow Calibration	Zero Pressure calibration
S401, S402, S421	Y	N/A
S430	Y	Y
S415, S418, S418-V	Y	N/A
S431	Y	Y
S451, S453	Y	Y

6.8.2 Calibration parameters

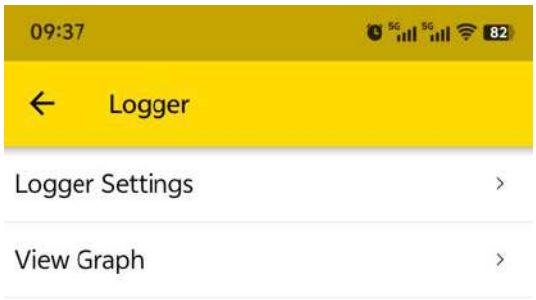
Parameter	Description
Apply User Calibration	Needs to be activated to perform the calibration.
Compressor type (for S431 only)	Select Load/Unload or VSD. For Load/Unload types, the calibration is offered at full load (1 point). For VSD compressors there are up to 5 calibration points available. It's recommended to select them over the range of 10%...100%. In general 3 points should be sufficient (10%, 50%, 90%).
Act. Flow	This is the flow without the user calibration as it is measured.
Ref. Flow	Manufacturer enters the flow measured by the calibration stand in the factory. Calibration points are sorted and user can delete any of the calibration points.

6.9 Data logger settings

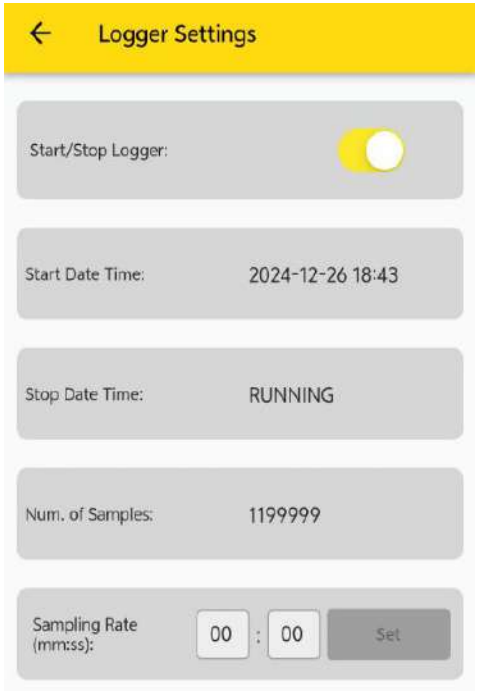
When a flow meter comes with a data logger, you can use the S4C-FS to change logger-related settings, view the graphic of measurement data, and export data in a file format.

6.9.1 Configure Logger Parameters

1. On the S4C-FS App, follow the path **Settings** > **Logger** > **Logger Settings** to enter the logger settings page.



2. Set or view data logger parameters as shown in the table below.

Parameter	Explanation	Logger setting page
Start / Stop Logger	To enable or disable the logger function.	
Start Date & Time	To view the start date and time for sampling.	
Stop Date & Time	To view the stop date and time for sampling.	
Number of Samples	To view number of the data samples that the flow meter has logged.	
Sampling Rate (mm:ss)	To configure the sampling interval.	

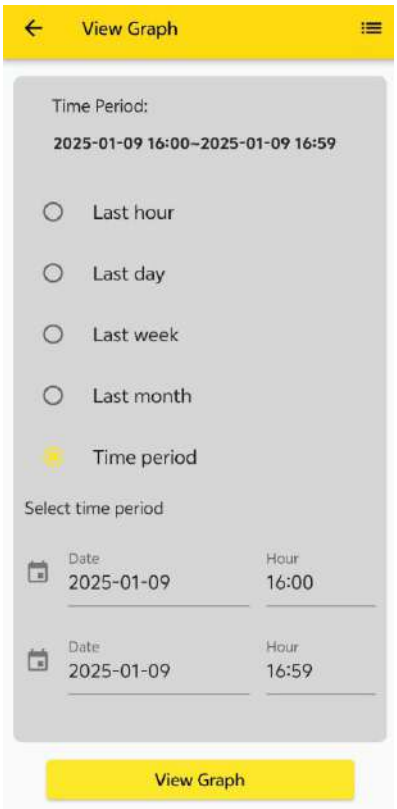
Note: When logger is started, it is not allowed to change any settings on either the device GUI or the S4C-FS app. If you try to change settings during logger running, the message "settings not allowed be change while logger is running" is displayed.

6.9.2 View Data Graph

On the S4C-FS App, follow the path **Settings** > **Logger** > **View Graph** to enter the view graph page.

1. Select the time period for which you want to view the graph. You can select the following time periods:
   - Last hour
   - Last day
   - Last week
   - Last month
   - Custom time period
     Users can select a specific start and end time.

2. Click **View Graph** to view the graph in your selected time period.



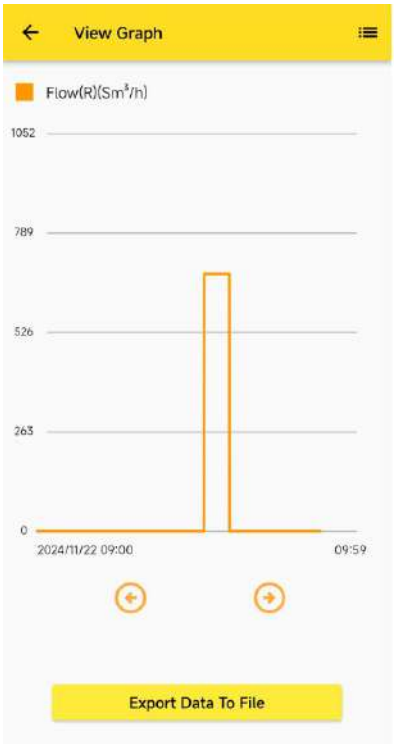
In the graph:

- Y-axis indicates recorded data.
- X-axis is the time axis.

The time period definition complies with the time standard ISO 8601 (YYYY/MM/DD hh:mm).

Click the top-right button to select a channel for displaying, and one channel is shown each time.

Click or to move the time span.



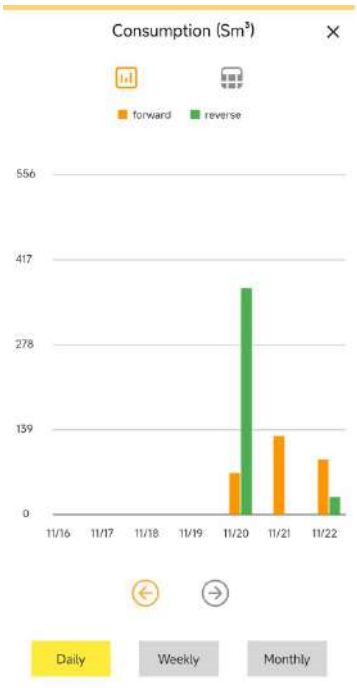
6.9.3 View Consumption Graph

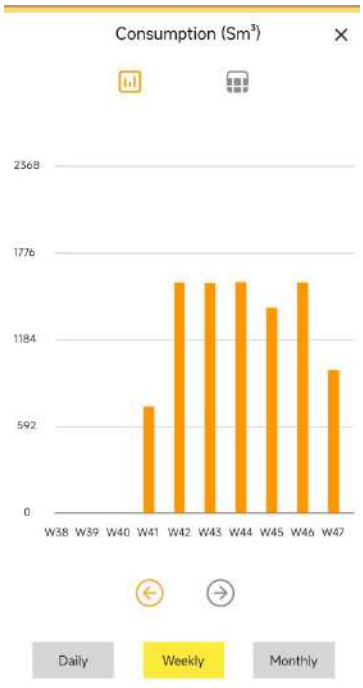
Click the bar graph icon on the S4C-FS **Online** page to enter the consumption graph page. You can view the consumption by selecting daily, weekly, monthly.

- Daily: Shows the data in the latest 7 days (not include today).

  Click to move one day forward, and click to move one day backward.
- Weekly: Shows the data in the latest 10 weeks.
- Monthly: Shows the data in the latest 12 months.

Click the table icon , the data shows in a table.



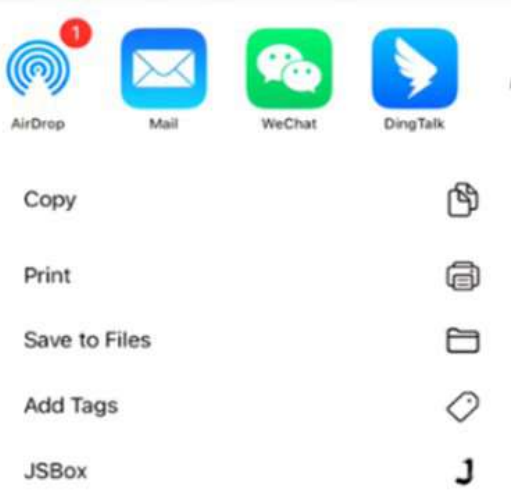


6.9.4 Export Data in a File

- You can export measurement data in the *.csd* or *.csv* file format.
- You can open the *.csd* file by using the SUTO iTEC S4A software. The *.csd* is the private file format of SUTO iTEC.
- You can open the *.csv* file by the generic software, such as Microsoft office Excel.
- The exported file has a default name, and you can rename it.

1. Click **Send by** to call related OS Apps, such as email, Wechat to send the file.

2. On your OS app, a message asks you for confirmation:
   - Click **Ok** to send the file.
   - Click **Cancel** not to send the file, and stop on the current page.



6.10 Upload settings

This function is only applicable to the S431.

The flow meter settings can be saved in the cloud server for a later access in case the S431 need to be replaced in a service case. It is recommended to use this function especially when has been tested and calibrated together with the compressor in the factory or on the site before a flow meter exchange.

6.11 Download settings

This function is only applicable to the S431.

In case the S431 has to be replaced the settings of the previous installed S431 can be downloaded into the replacement unit. This is a convenient way to ensure the same settings. User will be asked to enter the serial number of the previous S431. In case the settings can be found on the cloud server it will be downloaded into the new flow meter.

7 System

This chapter lists information that you can view in the System menu based on sensor types.

7.1 Sensor information

To view the sensor information.

	S401	S402	S421	S430	S415	S418 S418-V	S431	S451 S453
Device name	Y	Y	Y	Y	Y	Y	Y	Y
Item number	Y	Y	Y	Y	Y	Y	Y	Y
Serial number	Y	Y	Y	Y	Y	Y	Y	Y
Production date	Y	Y	Y	Y	Y	Y	Y	Y
Calibration date	Y	Y	Y	Y	Y	Y	Y	Y
Option name	Y	Y	Y	Y	Y	Y	Y	Y
Bi-directional measurement	Y	Y	N/A	Y	N/A	N/A	Y	Y
Hardware version	Y	Y	Y	Y	Y	Y	Y	Y
Firmware version	Y	Y	Y	Y	Y	Y	Y	Y

7.2 Language

To set the language for S4C-FS.

Language	语言	Sprache	Langue
English	中文	Deutsch	Francais

7.3 App version

To view the current version of the S4C-FS.

8 Maintenance

Make sure that Bluetooth always works well on your Android or iOS device.

Please check whether the latest version is installed on your device. For Android device, you can download the latest version from Google Play Store or the SUTO Website. For iOS device, download the App from Apple App Store.

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Solo

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Workshop

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