

S-POT

Wide Range Gas Sensor Array

INSTRUCTION MANUAL

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1. General Instructions


1.1. Indications

This manual contains important information for the operation of **S-POT** Wide Range Sensor Array.

To assure operator safety and the proper use of the instrument, please read, understand, and follow the contents of this manual.


<p style="text-align: center;">Non-observance of these instructions can result in personal injury or death. Non-observance of these instructions may also lead to the loss of right to claim for damages or warranty!</p>	
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Meaning of signs used in this instruction manual:

 : Indication of particular importance

 : Warnings

Please follow the instructions given. Warnings denote a potential hazard associated with the use of **S-POT** system. Non-observance of warnings can result in personal injury or damages to the instrument.

 : Avoid actions marked with this sign

Please follow the instructions given. This symbol denotes potential hazard associated with the use of **S-POT** system. Non-observance of the instructions can result in personal injury or death.

1.2. Safety Precautions and Important Instructions

The **S-POT** System is designed for monitoring concentration levels of certain gases upon customer's request.

The **S-POT** System is not designed for use in potentially explosive environments. Never place and operate the S-POT sensors or base station in areas with a potentially explosive atmosphere!

The System should be used only for this field of application and should be installed and used only by trained and qualified personnel.

2. Fast Setup Guide (WLAN-Connection)

Pull out the S-POT sensors of transport box (trolley).

Connect the base station to power source.
(refer to chapter 3.3.)

Search and connect to the WLAN access point of the base station
(initial password same as network name).
(refer to chapter 3.4. or chapter 5.3.2. for details)


Open web browser, type address **192.168.4.1** in the address line.
(refer to chapter 5.1.)

Enter user interface (username: *user*, initial password: *user*).
(refer to chapter 5.1.)

Set basic settings, get familiar with the use of Sensor Settings and Groups.
(refer to chapter 5.3., 5.2.1, 5.4.)

Distribute the S-POTs, observe network power indication on display.
(refer to chapter 4.5.)

Connect hoses to the S-POTs inlet, depending on your requirements.

<p>Always connect at minimum a short piece (20 cm) of hose to the active gas inlet(s)!</p> <p>Otherwise the inlet(s) may draw the gas of the outlet in a “pneumatic short” which will lead to unnecessary high delay in the actual readout.</p>	
---	---

Press “*Dose In*” and inject gas.
(refer to chapter 5.5.)

Press “*Treatment*” as needed, usually after equilibrium was detected.

Press “*Stop Job*” once job is finished.

Send or download job data if needed.

Place S-POTs in transport box.

Press push-button to switch off base station computer.

Disconnect power source.

3. Description of Base Station

3.1. Layout

Storage for cables, etc. (place of GSM antenna)




3.2. Function

The S-POT is charged in the base station. However, the main task of the base station is to receive and process the data sent by the sensors.

The base station can bridge power failures of up to 20 minutes. If the lack of supply voltage lasts longer than 20 minutes, the base station will shut down in a controlled manner.

As soon as the supply voltage recovers, the base station starts up independently. Data packets generated in the meantime are stored by the S-POTs and retransmitted when the base station is back up.

3.3. Electrical Connection

<p>Before connecting unit to electric power verify the supply voltage meets the requirements of chapter 3.8 and is fuse protected. Incorrect voltage may cause the fuse of the base stations power supply to blow and/or damage the electronics and/or S-POTs.</p>	
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Push the connector on 11 o'clock position into base station.
Turn it clockwise to 12 o'clock position, the latch will snap in place.

To disconnect, pull the latch and turn the connector to 11 o'clock position.

Once connected to power the base station will start operation. The green ring light of the push button will initial glow at a low level. As soon as the base station computer is up and running the green ring light is bright on and the NFC-Field is additional indicating operation by a green light. Usually the startup takes about one minute.

If the base station is only powered for charging the S-POTs, the internal computer should be shut down by pressing the ring light button. Otherwise it may by accident kept running, also when it was disconnected to move on site.

This won't do harm to the base station as it will shut down by itself after latest 20 minutes without power. In any case, this unnecessarily drains the batteries of the base station.

The base station computer can be restarted anytime when suitable power are connected (indicated by low level glow of ring light).

3.4. WLAN - Connection

The base station offers a WLAN-Access point as soon as it has been powered up. Follow the instructions of your computer or terminal operating system to search and connect to the WLAN-network of the base station. The name of the WLAN-network is following the serial number of your base station “S****_basis”, while the login key is initial identical. The login key can be changed in the general settings (see chapter 5.3.2., WLAN).

Depending on the local conditions the WLAN-network has a typical coverage range of up to 15 meters.

3.5. GSM / UMTS / LTE – Connection (Internet Access)

To transmit alarm signals and data to a dedicated receiver the internal modem is used. Furthermore the secured access through the internet is handled by this modem. For proper function a valid SIM-card must be supplied. Depending on the area of operation, a suitable modem is used to establish a high speed LTE or UMTS connection. This gives in combination with the sometimes still also available GSM (2G) network a maximum network coverage and therefore connection safety.

Each S-POT Base Station unit comes with internet connection address and login code. Keep the connection data on a safe and secure place.

The user is responsible to keep the internet login data safe, secure and confidential! Immediately inform ppm Messtechnik GmbH or your local distributor if you recognize any abuse!



3.6. GPS - Tracking

Each station is equipped with an GPS-antenna. Depending on the situation on site the position of the base station will be determined and the generated data will be enhanced by the position/location information.

3.7. Register of S-POT Sensors

To use an S-POT at another base station it must always be unsubscribed from the previous one!

Use the NFC-Field or delete the S-POT on the *Dashboard*.



Five S-POTs belong to a base station at the factory. But up to 50 S-POTs can be managed by one base station. For this purpose, additional S-POTs must be registered on the base station.

Hold the bottom of the S-POT over the NFC reader. When the ring light of the button goes off for about 2 seconds, the S-POT has been detected and it will appear on the *Dashboard* (or disappear if already registered). In the event of an incorrect enrolment, the ring light will only flash briefly. In this case repeat the process.

An already registered S-POT can also be deregistered from the base station in this way (or by deleting it on the *Dashboard*).

As the *Dashboard* is automatically refreshed every 70 seconds, it may take up to this time to show up a new registered S-POT.

3.8. Technical Data

Before connecting unit to electric power verify the supply voltage meets those requirements and is fuse protected. Incorrect voltage may cause the fuse of the base stations power supply to blow and/or damage the electronics and/or S-POTs.



Dimensions:	Trolley Case
	Height approx.: 33 cm = 13.0 inch
	Width approx.: 55 cm = 21.7 inch
	Depth approx.: 42 cm = 16.5 inch
Weight:	approx. 25 kg (with S-POTs inside) approx. 10 kg (without S-POTs inside)
Electrical power:	Wide range input ~ 110 – 260 Volts AC - 50/60 Hertz
Power consumption:	max. 150 Watts (all S-POTs charging) max. 25 Watts (during typical operation)
Temperature range:	during storage: -10°C to +60°C (+14°F to +140°F) during operation: +10°C to +40°C (+50°F to +104°F)
Air moisture range:	0 to 95%, non condensing relative humidity
Protection class:	IP54 (only if case is closed!)
Radio Base/S-POT:	Long Range Low Power Wide Area Network 433 MHz / 868 MHz / 915 MHz (depending on local regulations)
Certification:	FCC / CE / European R&TTE
Radio Terminal/Base:	Wireless LAN 2.4 GHz / 5 GHz IEEE 802.11a/b/g
Radio GSM/Internet:	4G / 3G / 2G CAT4 M2M
Location tracking:	GPS, GLONASS, BeiDou, Galileo, QZSS

4. Description of S-POT Sensor

4.1. Layout



Top view



Bottom view



Side view

(here: SO2F2 sensor, red shield)

4.2. Function

The S-POT sensor determines the gas concentration at the selected channels in periodic time intervals. Based on the assumption that the inner diameter of the hose used is 4mm (about 0.16 inch), the S-POT automatically calculates the pump time required to purge the connected gas hose(s).

Furthermore, additional measured values and parameters are transmitted to determine the ambient conditions (temperature/pressure) and the health state of the S-POT.


Measured values that could not be transmitted (e.g. due to a failure of the base station) are stored temporarily and sent again at the next opportunity as long as the dedicated job is still running. Missing data of a closed job can not be resend and lost.

4.3. Charging


The S-POT may only be charged in the base station or extension station. Place the S-POT gently on the charge dome inside the transport box. The S-POT will held in position by a magnet if placed with the display oriented so the text can be read when facing the front of the base station. Charging is only possible if the base station/extension set is connected to power. The base station computer may be off (ring light low glimmer).

Charging takes approx. 5 hours on a fully discharged S-POT.


Because of the limited space on the display the charge indication has only two digits. This means, the charge can be 0% up to 99%.

<p>The S-POT may only be charged in the base station or extension set! Never place the S-POT on other chargers, especially power supplies of kettles!</p> <p>This will immediately destroy the S-POT and can lead to injuries or even death!</p>	
--	---

The charge state indication of the S-POT is self learning. This means that initial the S-POT will only show a “---” if discharging and “+++” if charging. As soon as the first time the S-POT was completely charged up to 99% and discharged until end of operation the full charge amount is known and the S-POT will show and transmit an utmost exact value.

<p>S-POTs on charging dome with disconnected power are in deep sleep state and draw only a minimum of power.</p> <p>Those S-POTs are not reacting to any command and remain in hibernation until power is connected on base station or the S-POTs are lifted.</p> <p>Nevertheless there is a certain discharge. Recharge the S-POTs at least every 2-3 months to keep the batteries in a good health state.</p>	
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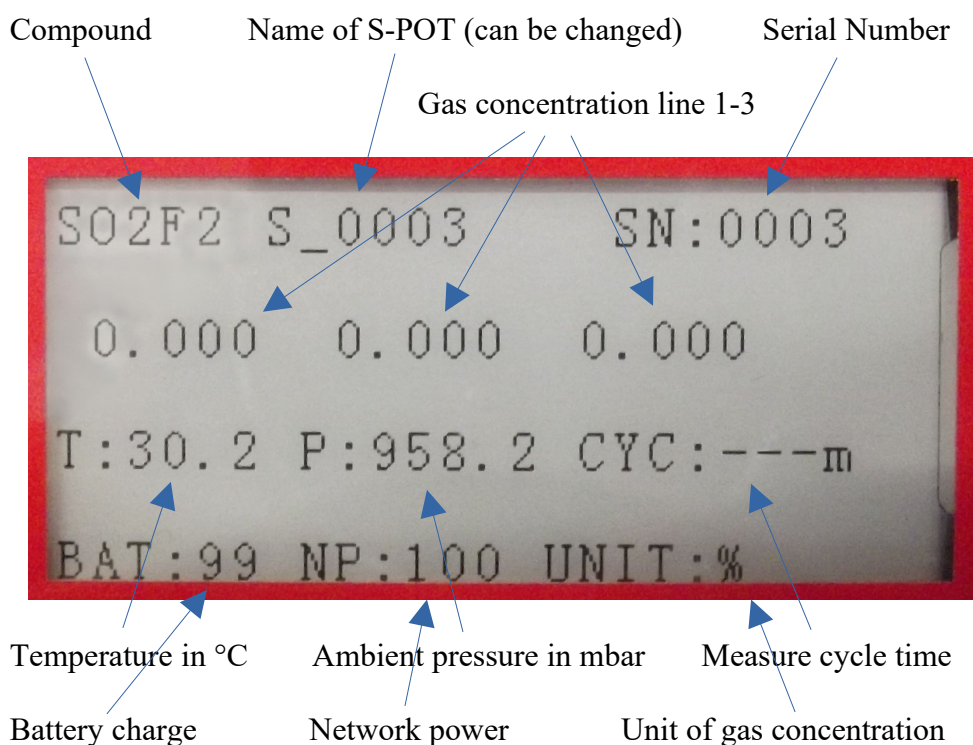
4.4. Sample Gas Connection

<p>For protection of valves and measuring chamber against pollution the gas inlet has to be provided with appropriate filter. The filter must be installed right in front of the sample inlets of the S-POT.</p>	
---	---

The S-POT can handle three gas inlets. Each inlet has a fast coupler for 6mm outer diameter hose (1/4 inch). The pump purge time is depending on the given hose length and can be defined in the settings of the S-POT (see chapter 5.2.1., Sensor Settings).

Hose length should not exceed 100 meter as this would greatly decrease, because of the long pump time, the battery charge.

4.5. Display



The S-POT has an “Electronic Paper” as display. This means, that the display can show data even when the S-POT is off. It is in the nature of things that it can only display the last data value.

Readout of gas concentration on the sampling lines are indicated on the S-POT in the unit as defined by the used sensorics (here in %). The readout on the *Dashboard* can be in the same unit, depending on the usage.

Usually the readout on the *Dashboard* is converted, depending on the given temperature, ambient pressure and compound (as example in g/m^3).

The name of the S-POT can be changed on the settings (see chapter 5.2.1., Sensor Settings). This gives maximum flexibility in job preparation, for example by defining and naming the S-POT as the point of usage (e.g. container number or floor).

4.6. Mounting

The S-POT containing a strong magnet. Therefore it can be placed on any point where the magnetic field is strong enough.

Never bring the bottom of two or more S-POT together!

The strong magnets will attract each other until they clash. This can lead to serious injuries!



Mounting point might be the wall or ceiling of a container. Or any other metallic and magnetic part. On the bottom of the S-POT an anti-slip mat is glued on. The anti-slip mat is protected by a thin cover. If needed, remove this transparent film.



Mounting in sea container



Mounting on stair railings

4.7. Technical Data

Dimensions:	Cylindrical drainpipe, polypropylene
Height approx.:	200 mm = 7.9 inch
Radius approx.:	127 mm = 5.0 inch
Weight:	approx. 2 kg
Electrical power:	= 24 Volts DC
Power consumption:	max. 30 Watts (charging)
Battery:	14.4V nominal - 77Wh - LiIon
Operation time:	Depending on set measuring time intervals, sampling lines and hose length up to 10 days
Temperature range:	during storage: -10°C to +60°C (+14°F to +140°F)
	during operation: +10°C to +40°C (+50°F to +104°F)
Air moisture range:	0 to 95%, non condensing relative humidity
Protection class:	IP42
Radio Base/S-POT:	Long Range Low Power Wide Area Network 433 MHz / 868 MHz / 915 MHz (depending on local regulations)
Certification:	FCC / CE / European R&TTE
Measuring principle:	physical, infrared spectrometry non dispersive or dispersive opto-acoustic sensor
Compound / Range:	Red S-POT: SO ₂ F ₂ 1 to 150 g/m ³ Orange S-POT: CH ₃ Br 1 to 200 g/m ³ Green S-POT: CO ₂ 1 to 100 %

5. User Interface

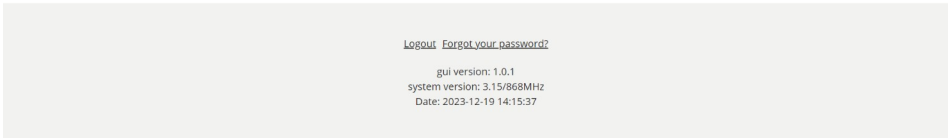
5.1. Log-In

PPM Service

Login:

Name
Password

Login




Once connected with the WLAN access point of the base station (see chapter 3.4., WLAN) a web browser of any kind can be used to enter the login screen.


Web address:
192.168.4.1

For easier access this address can be bookmarked on the web browser. Initial the password are set to “user”. It can be changed in the basic settings. The user name can not be changed and is always set to “user”.

In case the password is forgotten the link “Forgot your password?” can be used.

Take care for this data, as new login password can only be send if under “Settings” a working eMail account is available (see chapter 5.3.3., Transfer Data and 5.3.4., Change Password)!

Set a proper eMail account on the settings in order to benefit of the “Forgot your password” function.	
---	---

Note a new password on a secure place! If you loose your password only an authorized service is able to recover the access to the base stations <i>Dashboard</i> (if not set a working eMail account at the settings).	
---	---

5.2. Dashboard

Dashboard Groups Data

■ ■ ■ ■

⚙️

Dashboard

Actions

Zero
Gas In
Treatment
Stop
Disco

All sensors from group Level_0

Group	Serial	Name	Substance	Line 1	Line 2	Line 3	Unit	Temp	Pressure	Bat %	Radio %	Cycle	Time	Settings	Details	Delete
Level_0	0002	S_0002	SO2F2	--	--	--	g/m3	---	mbar	%	%		---	⚙️		🗑️
Level_0	0005	S_0005	SO2F2	--	--	--	g/m3	---	mbar	%	%		---	⚙️		🗑️
Level_0	0003	S_0003	SO2F2	--	--	--	g/m3	---	mbar	%	%		---	⚙️		🗑️
Level_0	0004	S_0004	SO2F2	--	--	--	g/m3	---	mbar	%	%		---	⚙️		🗑️
Level_0	0001	S_0001	SO2F2	--	--	--	g/m3	---	mbar	%	%		---	⚙️		🗑️

Groups

Level_0 ⚙️

- S_0004 (g/m3) 🗑️
- S_0005 (g/m3) 🗑️
- S_0002 (g/m3) 🗑️
- S_0001 (g/m3) 🗑️
- S_0003 (g/m3) 🗑️

+

Create new group

[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-19 16:39:53

The *Dashboard* of group “Level_0” gives the overview about all initial/new registered S-POTs and subgroups. S-POTs added to the base station are indicated here before they can be accessed or moved to subgroups. An individual *Dashboard* is generated for each subgroup.

The settings of each S-POT can be accessed from the *Dashboard*. Furthermore the details (generated and collected data) of the S-POT are found here.

Network power of the GSM-modem is indicated on the top/middle, here as an example four green squares for excellent network coverage. It is only visible if the GSM-modem is activated.

**If an S-POT shall be moved to an other base station it is strictly mandatory to delete it prior to register it to the next base station.
See chapter 3.7, Register S-POT**



The S-POTs always show the last recorded value on the *Dashboard*.
In the delivery state, initial no values will be indicated as no previous job was executed.

5.2.1. Sensor Settings

The behavior of a single S-POT sensor are adjusted by pressing the gear wheel on the right of the S-POTs row.

The settings can always be adjusted as long as it does not affect an already running job (*Gas-In* or *Treatment*). This means that the settings for S-POTs intended to be used at a job can be set ahead of time.

Dashboard Groups Data

Sensor settings for 0002 - S_0002

Serialnumber: 0002

Name:

Important! The display only shows 10 characters. Allowed characters: a-z, A-Z, 0-9, . _ - !

Concentration: g/m3

Pressure: mbar

Set to minimum of 10 meter if more than one line activated!

Line 1 active: Yes No length in m:

Line 2 active: Yes No length in m:

Line 3 active: Yes No length in m:


[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-19 16:44:10

Each S-POT can take an individual name. This eases identification.
On job preparation this name can be changed, but not if a job is already ongoing.

The three sampling lines can be activated or deactivated. Further more the hose length on each sampling line should be defined. The S-POT calculates the needed gas sampling time to flush the pneumatic system and analyze the actual gas concentration. As the pump working time has the most important power consumption, set this values wisely.

To proper flush the pneumatic path a minimum of 5 meters is preset.
If more than one line is activated hose length has to be set to 10 meter
minimum to prevent cross interference between the sampling lines.

<p>The gas pump power consumption has the most important influence on the working time! Set the hose length values wisely to not unnecessarily degrade working time and battery life.</p>	
--	---

5.2.2. Alarm Settings

Dashboard Groups Data ⚙️

Alarmsettings for 0002 - S_0002

From:

to:

Recipient Email address:

Settings for channels


<input type="text"/>	> Line 1 >	<input type="text"/>
<input type="text"/>	> Line 2 >	<input type="text"/>
<input type="text"/>	> Line 3 >	<input type="text"/>
<input type="text"/>	> Temp >	<input type="text"/>

[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-19 16:46:26

The alarm for undershooting or overshooting a certain gas concentration or exceeding a specific temperature are set for each S-POT individually. The settings are valid only inside the given time and only during “Treatment”.

The settings can also be changed while a job is running!

<p>Alarm messages are send only to the eMail address indicated in this dialog.</p>	
---	---

Examples of alarm settings:

10 > Line 1 > 120

An alarm will be send if the gas concentration on “Line 1” is lower than 10 (unit depending on *Dashboard* readout) or higher than 120 (unit depending on *Dashboard* readout). So the alarm will be send if the readout is outside of a “window”.

40 > Line 3 > 10

An alarm will be send if the gas concentration on “Line 3” is lower than 40 and higher than 10. So the alarm will be send if the readout is within a “window”.


20 > Line 3 >

An alarm will be send if the gas concentration on “Line 3” is lower than 20.

> Line 3 > 80

An alarm will be send if the gas concentration on “Line 3” is higher than 80.

5.3. Settings (General)

Dashboard Groups Data 

Export global settings

Import global settings

▲ Delete all data and settings
Reset to factory settings

Reset base station

General settings

Language:

Date format:

Temperature format:

Serialnumber base: S0001

Free space: 76 %

GPS: 4810.226506N,01155.135834E

Theme: light

Calculate equilibrium: Yes No

WLAN:

ID: S0001_basis

Password:

only 0-9, A-Z, a-z and _ are accepted

Transfer data via:

Email SFTP

SFTP:

SFTP host name:

SFTP user name:

SFTP password:

Email:

Email address: S0001@ppm-log.com

Recipient Email address:

Change password

Password*

Password again*

System date

2023-11-28 08:47:16 -60 Europe/Berlin

[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.13/868MHz
Date: 2023-11-28 08:47:16

The general settings can be accessed by pressing the gear wheel on the right/top of the *Dashboard*. Here the settings for the behavior of the base station are set. The fields are largely self-explanatory.

5.3.1. General Settings (Equilibrium)

Language: *English / Italian / French / German*

Date format: *year-month-day* or *day.month.year* or *month/day/year*


Temperature format: *Celcius* or *Fahrenheit*

Calculate Equilibrium: *Yes* or *No* (preset value for groups)

Equilibrium is calculated as stated by the Australian Department of Agriculture and Water Resources.

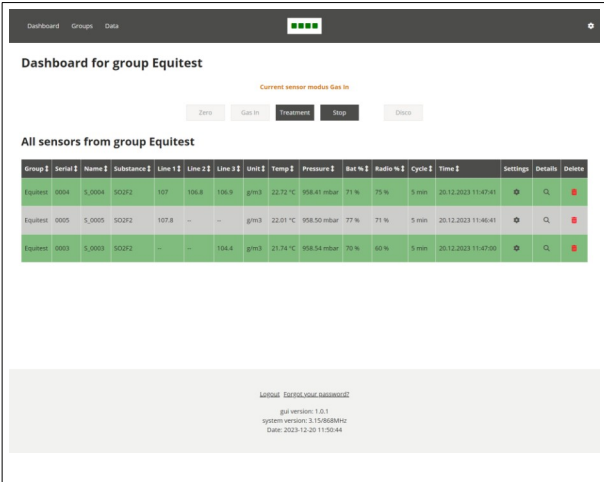
“Equilibrium is achieved when the highest concentration reading is within 15% of the lowest reading” and calculated first after 15 minutes in the *Dose-In* status.

Equilibrium calculation are made with all active lines of all S-POTs registered to the same group.



As soon as the Equilibrium is detected, the background line of the S-POT will be light green, or alternating light green with grey if more than one S-POT is within the group. It will stay green as long as the job is running. The tile belonging to the group is also set to green.

Equilibrium detection is depending on the settings of the group, see chapter 5.4.2 for reference.



Dashboard for group Equitest

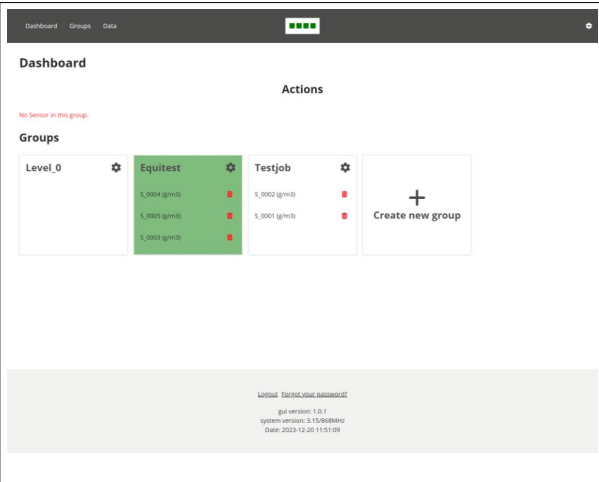
Current sensor status Gas In

Zero Gas In Treatment Stop Discs

All sensors from group Equitest

Group	Serial	Name	Substance	Line 1	Line 2	Line 3	Unit	Temp	Pressure	Bat %	Ratio %	Cycle	Time	Settings	Details	Delete
Equitest	0004	S_0004	SO2F2	107	106.8	106.9	g/m3	22.72 °C	958.41 mbar	71 %	75 %	5 min	20.12.2023 11:47:41	⊙	⊙	⊙
Equitest	0005	S_0005	SO2F2	107.8	--	--	g/m3	22.01 °C	958.50 mbar	77 %	71 %	5 min	20.12.2023 11:46:41	⊙	⊙	⊙
Equitest	0003	S_0003	SO2F2	--	--	104.4	g/m3	21.74 °C	958.54 mbar	70 %	80 %	5 min	20.12.2023 11:47:00	⊙	⊙	⊙

Logout Export your database!
git version: 1.0.1
system version: 3.153688kHz
Date: 2023-12-20 11:50:44



Dashboard

Actions

No sensor in this group.

Groups

Level_0

Equitest

1,0004 (g/m3)

1,0005 (g/m3)

1,0003 (g/m3)

Testjob

1,0002 (g/m3)

1,0001 (g/m3)

+


Create new group

Logout Export your database!
git version: 1.0.1
system version: 3.153688kHz
Date: 2023-12-20 11:51:09

5.3.2. WLAN

To get access to the base station by WLAN a proper password is needed. The WLAN SSID is set on factory to the serial number of the base station and can not be changed (S*****_basis).

Password: *only 0-9, A-Z, a-z and _ are accepted*

<p style="text-align: center;">Note a new password on a secure place!</p> <p style="text-align: center;">If you loose your password only an authorized service is able to recover the access to the base station WLAN network.</p>	
--	---

5.3.3. Transfer Data

The generated data can be send by eMail and/or SFTP. The eMail settings are mandatory for usage of the alarm settings (see chapter 5.2.2. Alarm Settings). Set the checkbox accordingly. Ask your IT-support if you do not know what these are for your network.

The data connection for eMail transfer can be tested. To use the settings, they must first be saved.


To transfer the data via SFTP (Secure File Transfer Protocol) you need an account with a data handling service provider, preferable one that handles fumigation information.

One such company is, DEBUXX (www.debuxx.com).

The provider of the SFTP service must be able to provide a dedicated interface for processing the data.

5.3.4. Change Password

The password to access the Dashboard can be changed. Take care to note the new password on a secure place and/or have proper eMail settings to ensure functionality of the “Forgot your password” function.

<p style="text-align: center;">Set a proper eMail account on the settings in order to benefit of the “Forgot your password” function.</p>	
--	---

5.3.5. System Date

Before starting a job, it is useful to adjust the time and time zone according to your location. To do this, press the corresponding *Set time* button. This saves the settings and updates the clock. The clock should be checked occasionally.

5.3.6. Export / Import Global Settings

If a reset to factory settings is considered by any means, it may make sense to save the general settings on your computer. Later the settings can be imported.

5.3.7. Reset Base Station

In case of communication issues and/or lack of reaction on commands the base station can be reset. This will immediately reboot the base station computer. Running jobs or settings won't be disturbed and continue running if so.

5.3.8. Reset to Factory Settings

**This link will delete all settings/S-POTs/data!
The data can not be recovered!
Use only in consultation with an authorized service provider!**



5.4. Groups

5.4.1. New Group

Dashboard Groups Data

Groups

New Group

Only a-z, A-Z and 0-9 are allowed.

Group name: [Create](#)

Existing groups

Level_0

- S_0004
- S_0005
- S_0002
- S_0001
- S_0003

[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-19 16:54:09

Groups can be generated right at the *Level_0 Dashboard* or at *Groups*.

By pressing the plus symbol on a new group all in the basic group *Level_0* available S-POTs can be selected and added to the new group.

If the group is no longer needed it can be deleted by the trash can. The S-POTs belonging to the deleted group will fall back to the basic group *Level_0* and are again available for new groups.

**Only S-POTs with the same concentration unit
(e.g. ppm, %, g/m³) can be arranged in groups!**



5.4.2. Group Settings

Dashboard Groups Data

Sensors

Settings for group Level_0

Name:

Dose In cycle time (between 2 minutes and 30 minutes):

Treatment cycle time (between 2 minutes and 120 minutes):

Calculate equilibrium: Yes No

Startvalue for calculation of equilibrium:

Sensors in group Level_0

- [S_0004](#)
- [S_0005](#)
- [S_0002](#)
- [S_0001](#)
- [S_0003](#)

[Logout](#) [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-19 16:55:00

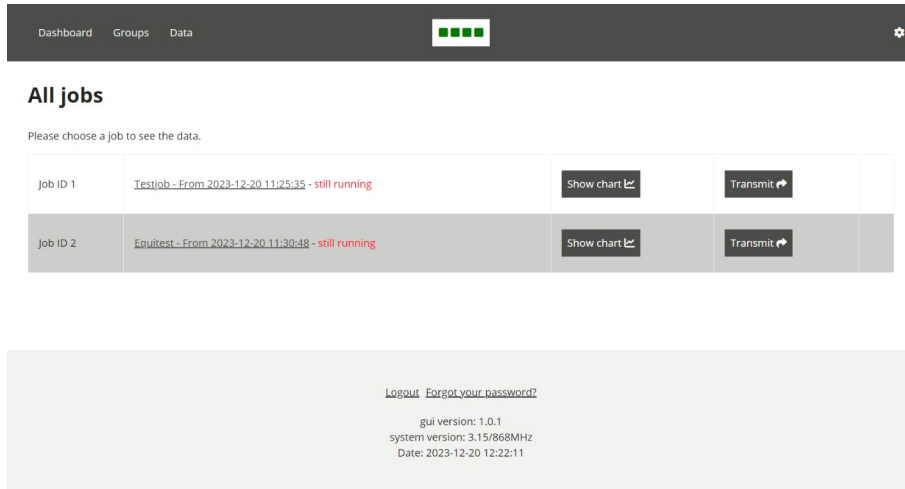
All available S-POTs can be arranged in groups. The groups are independent of each other. Each group can have individual settings.

The settings of a group can be changed by pressing the gear wheel of the groups tile on the *Dashboard*.

Changed settings must be saved before taking affect.

- | | |
|--------------------------|--|
| Name: | Name of the group (for example a container number or the floor number of a mill) |
| Dose In Cycle Time: | Measuring interval during gas injection (usually shorter than Treatment Cycle Time as the concentration change over time is much faster, preset to 5 minutes) |
| Treatment Cycle Time: | Measuring interval during Treatment (preset to 30 minutes) |
| Calculate Equilibrium: | Activated calculation only for this Group. Preset depending on the general settings. |
| Start value Equilibrium: | Minimum concentration on all active sampling lines of the S-POTs belonging to this Group before Equilibrium calculation is done. Can be set according the requirements of authorities (preset to 1, unit as indicated on the <i>Dashboard</i>). |

5.4.3. Data

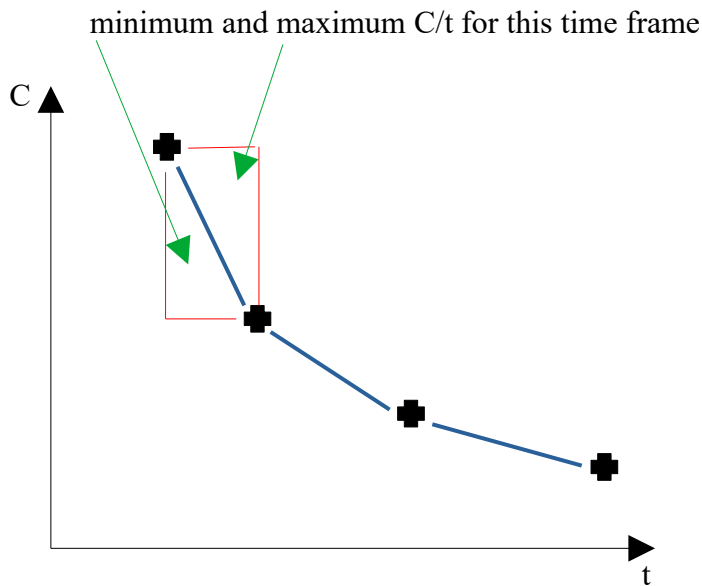


The data of all previous jobs and currently running jobs can be accessed at *Data*.

The collected data can not be changed nor modified or deleted.

Each job has an unique ID. The data can be send to the recipient set on the general settings (eMail, SFTP, see chapter 5.3.3. *Transfer Data*).

The C/t (Concentration over time) is calculated in the tendon trapezoid method. Therefore it is not an accurate calculation. To express this, the maximum theoretical deviation is indicated in %.



Blue: tendon trapezoid calculation
Red: maximum theoretical deviation

The C/t and its deviation is also indicated on the Dashboard.

Dashboard for group Equitest

Current sensor modus Treatment

Zero Gas In Treatment Stop Disco

All sensors from group Equitest

Group	Serial	Name	Substance	Line 1	Line 2	Line 3	Unit	Temp	Pressure	Bat %	Radio %	Cycle	Time	Settings	Details	Delete
Equitest	0004	S_0004	SO2F2	106.5 CT:53.29 deviation +/-0.08%	106.7 CT:53.34 deviation +/-0%	106.6 CT:53.27 deviation +/-0.09%	g/m3	23.28 °C	958.23 mbar	70 %	75 %	30 min	20.12.2023 12:03:23	⚙️	🔍	🗑️
Equitest	0005	S_0005	SO2F2	108 CT:53.98 deviation +/-0.03%	--	--	g/m3	21.95 °C	958.32 mbar	77 %	71 %	30 min	20.12.2023 12:01:43	⚙️	🔍	🗑️
Equitest	0003	S_0003	SO2F2	--	--	104.6 CT:52.27 deviation +/-0.1%	g/m3	21.81 °C	958.41 mbar	70 %	58 %	30 min	20.12.2023 12:02:02	⚙️	🔍	🗑️

Logout [Forgot your password?](#)

gui version: 1.0.1
system version: 3.15/868MHz
Date: 2023-12-20 12:10:28

5.4.4. Arrange in Groups / Define Settings


In general all S-POTs are arranged in groups. Initial or if new S-POTs are added those belong to *Level_0*. The basic group *Level_0* can not be deleted. S-POTs arranged in other groups fall back to the basic group *Level_0* as soon as their group was deleted.

Establish a new group by pressing the “Create new group” tile on the *Dashboard* or by *Groups* → *Group name* → *Create*. The group name may have up to 16 letters.

S-POTs are added by *Groups* → “+” on the new group tile. All S-POTs of the basic group *Level_0* are available. If the use of other S-POTs is intended, the specific group containing those S-POTs must first be deleted.

The settings of the new generated group can be changed at the gear wheel on the groups tile (see chapter 5.4.2., Group Settings).

5.5. On Site / Workflow

<p>To prevent heavy data traffic and therefore occasional data transmission collisions we recommend to</p> <ol style="list-style-type: none">1. pull out S-POTs of Trolley2. connect base station to power source	
---	---

The typical workflow on site is depending on the usage. If equilibrium detection is mandatory, the *Dose-In* shall be used prior to *Treatment*. Otherwise it may be sufficient by directly start with *Treatment*.

Only state *Dose-In* or *Treatment* will start the data recording of the job.

Minimum workflow without equilibrium:

Treatment → *Stop Job*

Minimum workflow with equilibrium:

Dose-In → *Treatment* → *Stop Job*


Full workflow:

Zero → *Dose-In* → *Treatment* → *Stop Job*

5.5.1. Zero

Sets the zero point of the groups S-POTs. For utmost accuracy this may be done with already distributed S-POTs on location.

In fact it is not necessary to perform a zero point adjustment prior to each job because of the good stability of the used sensors.

<p>Never zero the S-POTs with already injected gas or in polluted air!</p> <p>The readout of the S-POT will be corrupted!</p>	
---	---

The fresh air for the zero point adjustment will be drawn through channel 2.

Zero will not start a job and can only be executed when no job is ongoing.

5.5.2. Dose-In

During gas injection the gas concentration is changing in a fast way. Therefore the measuring cycles should have a short time frame, defined in the Group Settings (see chapter 5.4.2.). Further more the detection of equilibrium may be of interest.

On the other hand during *Dose-in* the *C/t*-Calculation is not necessary and so not applicable.

Dose-In starts a new job. From this point no more changes can be made in the Group Settings. Consequentially only *Treatment* and *Stop-Job* are now exclusively available.

Once pressed, an initial measurement is carried out by the groups S-POTs (with a possible delay of up to one minute).

5.5.3. Treatment

If *Treatment* is following to the previous *Dose-In*, the measuring interval is changing according to the Group Settings (see chapter 5.4.2.).

If *Treatment* is the first point, this starts a new Job. From this point no more changes can be made in the group settings. Consequentially only *Stop-Job* and *Disco* are now exclusively available.

The C/t calculation and deviation will be performed, if set (see chapter 5.4.3., Data).

Once pressed, an initial measurement is carried out by the groups S-POTs (with a possible delay of up to one minute).

5.5.4. Stop Job

The ongoing job of the group is stopped by pressing *Stop Job*. A final measurement is still being taken and the data recording will end. Afterwards the lock of the settings is released.

5.5.5. Disco

The S-POTs of the group are instructed to blink and beep. This helps to find distributed S-POTs in large structures.


Disco can only be pressed if no job is running on the dedicated group. It will not start a new job.


5.5.6. End of Operation / Restart

To stop any operation of the base station, press the “OFF/RESTART” button. The base station will shut down within a couple of seconds. The bright push-button ring light will change to low glimmering, the green indicator on the NFC-Field will go off.

The power cable can be disconnected, after about two minute the low glimmering ring light will go off, too.

With connected power, the base station can be started again by pressing “OFF/RESTART”.

<p>While it is possible within two minutes after shut down to restart, this should be prevented if power is disconnected.</p> <p>This would unnecessarily strain the base stations batteries.</p>	
---	---

<p>Shut down the base station by the push-button prior to move to the next site.</p> <p>The base station would unnecessarily kept running for 20 minutes and strain the base stations batteries.</p>	
--	---

6. Troubleshooting

6.1. Communication Base Station → WLAN Terminal

Check the following points:

- Is the base station properly powered and up (NFC-Field green light on)?
- Is WLAN on your computer activated?
- Restart scan of available WLAN networks on your terminal.
- Distance between base station and terminal not too far?
- Switch off base station and disconnect from power. Wait 3 minutes and restart.

6.2. Communication S-POT → Base Station

Check the following points:

- S-POT out of network coverage
- S-POT out of power (empty battery)
- S-POT is registered on two base stations at the same time

**Occasionally, there may be connection problems.
The base station will solve this itself,
but it may take up to 10 minutes.**



If none of the upper points applicable a full system reset may be necessary. Place the S-POT with communication issue in the charging box (base station). Power down base station computer. Wait until the ring light is off (it may still glow glimmering). Disconnect the base station from power. Wait at least 5 minutes and reconnect to power. This will issue a full system reset including the S-POT on charging point.

6.3. Power Failure Base Station

The base station can handle short power interrupts (less than 20 minutes). Longer power failures should be avoided to minimize risk of data loss. The base station will shut off in a controlled manner after 20 minutes and restart automatically if power is back.

Data that could not be sent from the S-POTs to the base station will be stored for a certain time. As soon as the base station is back on, the data will be resent.

As the storage on the S-POTs is limited to 100 data sets and the base station is off for an extended time, the S-POTs will start to prioritize the stored data and begin deleting older data (measurement points). A maximum of 16 hours without connection to the base station can occur without the loss of data points.

6.4. Display Blank S-POT

After reset condition of the S-POT (S-POT pulled out of transport box or put back to transport box) the display may keep blank. This persists as long as the status of the S-POT will not be changed. The display will show data as soon as the status changes to, for example, ZERO, GAS-IN.

6.5. Charging S-POT never reach 99%

The S-POTs batteries charged in a slow manner in order to maximize lifetime. Each charging is further protected by a timer. On heavily discharged batteries the timer may prevent to reach 99% (full) charge. If the S-POT does not indicate 99% after 6 hours of charging, the charge cycle should be restarted.

Lift the S-POT for a short moment out of charging point, this stops charging and resets the timer.

7. Maintenance

7.1. Cleaning

The instrument housing may be cleaned with a smooth cloth which has been wetted with water and a few drops of cleansing agent.

**Never use organic solvents (e.g. PERC, TRI, Acetone).
Organic solvents may be harmful to the instrument.**



7.2. Filter / Consumables

Appropriate sample gas filters are of such nature as they will neither absorb molecules of the sample gas components in the filter element nor in the filter housing. See chapter 9.1., Consumables.

**In order to avoid contamination of valves, of sample gas hoses
and the measuring cell, the filters must be installed right in front
of the sample inlet of the S-POT.**



We recommend exchanging particle filters every 3 months.



7.3. Calibration

The instrument-integrated functions concerning avoidance of zero-drift are described in chapter 5.5.1. of this instruction manual.



A factory calibration is required every 24 months. The calibration normally is done besides complete instrument maintenance.

8. Options

8.1. Extension Set


The base station is designed to handle up to 50 S-POTs. To extend the number of S-POTs on a base station extension sets are available.

Basically an extension set is of the same design as the base station (trolley with power supply). Only difference is a missing build in computer.

Additional S-POTs must be registered to a base station prior to be available on the “*Dashboard*”.

9. Appendix

9.1. Consumables

Order number	Description
G03565	<p data-bbox="558 616 1276 660">Intake filter with quick connector (hose diameter 6mm)</p>  A cylindrical intake filter with a grey, porous filter tip, a black O-ring, and a blue quick connector fitting.
F04025	<p data-bbox="558 969 1053 1014">Sensor protection/identification sleeve</p>  Four flexible, colored sleeves (red, teal, blue, yellow) used for sensor protection and identification.
XXX	<p data-bbox="558 1447 877 1491">Base station power cable</p>  A black power cable with a standard AC power plug on one end and a specialized connector on the other.