watchgas detection

User Manual

SST4 Micro, SST4 Mini, SST4 Pump & SST5

Multi Gas Detectors

SST4-SST4Pump-SST5-MAN-ENG-v1.0
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Safety Information - Read First

To ensure personal safety, read **Safety Information - Read First** and the **Cautions** before using the detector.

The **SST4 Micro**, **SST4 Mini**, **SST4 Pump**, and **SST5** ("the detector") warns of hazardous gas at levels above user-defined alarm setpoints. The detector is a personal safety device. It is your responsibility to respond properly to the alarm.

Use the detector only as specified in this guide and the operator's manual, otherwise the usage and protection provided by the detector may be impaired.

Read the **Warning** and **Cautions** below before using the detector.

Warning

- This instrument contains a lithium polymer battery. Dispose of lithium cells immediately. Do not disassemble and do not dispose of in fire. Do not mix with the solid waste stream. Used batteries must be disposed of by a qualified recycler or hazardous materials handler.
- Substitution of components may impair Intrinsic Safety.

Cautions

- Before using the detector, refer to Sensor Poisons and Contaminants.
- Inspect the detector before use. Look for cracks and/or missing parts. **DO NOT USE** the device if it is damaged and/or is missing parts. In that case, contact WatchGas or an authorized WatchGas distributor immediately.
- Only use sensor(s) that are specifically designed for the SST4/SST5. Refer to Spare Parts List.
- Calibrate the detector before first-time use and then on a regular schedule, depending on use and sensor exposure to poisons and contaminants.
- WatchGas recommends to "bump test" the sensors on a regular basis depending on the usage model to confirm their ability to respond to gas by exposing the detector to a gas concentration that exceeds the alarm setpoints. Manually verify that the audible and visual alarms are activated. Calibrate if the readings are not within the specified limits.
- WatchGas recommends the catalytic combustible sensor be checked with a known concentration of calibration gas after any known exposure to catalyst contaminants/poisons (sulfur compounds, silicon vapors, halogenated compounds, etc.).
- The catalytic combustible sensor is factory calibrated to 50% LEL methane. If monitoring a different combustible gas in the % LEL range, calibrate the sensor using the appropriate gas.
- Overrange readings may indicate an explosive concentration.
- Protect the combustible sensor from exposure to lead compounds, silicones, and chlorinated hydrocarbons.
- Sensor exposure to certain organic vapors (such as leaded gasoline and halogenated hydrocarbons) may temporarily inhibit sensor performance. After exposure, a bump test or calibration is recommended.
- For use only in potentially explosive atmospheres where oxygen concentrations do not exceed 20.9% (v/v).
- Any rapid up-scaling reading followed by a declining or erratic reading may indicate a gas concentration beyond upper scale limit, which may be hazardous.
- Only calibrate the detector in a fresh air environment and in a safe area.

- Use only WatchGas approved batteries for the SST4 and SST5 detectors. Refer to **Specifications**.
- Charge the detector before first-time use. WatchGas recommends the detector to be charged a minimum of 1 hour.
- Charge the detector using the recommended charging adapter only. Do not use any other charging adapter. Failure to adhere to this caution can lead to fire and/or explosion.
- The internal battery is non-replaceable. The internals must not be accessed by the end-user by any means.
- The equipment is intended for use in hazardous atmosphere in air with normal oxygen content not exceeding 21% v/v (typical value).
- The end-user shall contact the equipment manufacturer if the antistatic film applied is damaged.
- The equipment shall only be charged wirelessly in non-explosive atmosphere.
- Um for wireless charging ≤ 5 V
- Extended exposure of the detector to certain concentrations of combustible gases and air may stress a detector element that can affect its performance. If an alarm occurs due to high concentration of combustible gases, calibrate the detector. If necessary, replace the sensor.
- Do not test the combustible sensor's response with a butane cigarette lighter; doing so will damage the sensor catalytic LEL sensor.
- Do not expose the detector to electrical shock and/or severe continuous mechanical shock.
- Do not attempt to disassemble, adjust, or service the detector unless instructions for that procedure are provided in the technical reference guide, and/or that part is listed as a replacement part. Use only WatchGas replacement parts. Refer to **Spare Parts List**.
- The detector warranty will be voided if customers, personnel, or third parties damage the detector during repair attempts.
- Non-WatchGas repair/service attempts void this warranty.

1. Introduction

1.1 SST Range Multi Gas Products Description

SST Micro

Four gas device that uses a 3 Solid Polymer Sensor (O2/CO/H2S/SO2) and an LPC (Low Powered Catalytic) for the detection for hydrocarbons. Built-in NFC and induction charging with a one working week runtime, this device offers a rugged and compact design without compromising on features like the display and alarm indicators.

SST Mini

Very similar to its slightly smaller SST Micro counterpart, the SST Mini offers an optional NDIR or traditional high-powered catalytic bead as the detection method for LEL. This is done through our WatchGas Device Link Application.

SST Pump

Pumped four gas device with our on in-house designed pump allows a draw of up to 30 meters (100 Feet). Ideal for confined space entry or sampling of tanks, ship holds, and LPG units. Coupled with our wide range of accessories, sampling is now easier than ever before.

SST5

Our five gas device, which is the same size and weight as that of the SST4. This small, compact, rugged solution offers a wide range of sensors to support your gas detection needs.

1.2 What's In the Box

The content below provides are the standard items included with the detector. If the detector is damaged or parts are missing, contact the place of purchase immediately. *The detector is shipped with the sensors and rechargeable battery installed*.

	Device	Calibration Cap	Tubing	Induction Charger	Quick Start Guide	Inspection Report	Sample Tubing	Pump Connector
SST4 Micro	✓	✓	✓	✓	✓	✓		
SST4 Mini	✓	✓	✓	✓	✓	✓		
SST4 Pump	✓	✓	✓	✓	✓	✓	✓	✓
SST5	✓	✓	✓	✓	✓	✓		

Table 1. What's in the box

1.3 Configuration Mobile Application

The detector is configured through the WatchGas Device Link Application. The app can be downloaded from Google Play and the App Store.

Download on the App Store

GET IT ON Google Play

1.4 Battery Cautions

Warning

To avoid personal injury and/or property damage, adhere to the following:

- The detector must be deactivated to charge the battery.
- Charge the battery immediately when the detector emits a low battery alarm. Refer to **Charging the Battery**.
- Charge the battery in a safe area that is free of hazardous gas in temperatures of 0°C to 45°C (32°F to 113°F).
- Charge the battery using the WatchGas Multi-Unit Cradle Charger or charger adapter only. Do not use any other charging adapters. Failure to adhere to this caution can lead to fire and/or explosion.
- The charging adapter is voltage-specific to your region. Use of a charging adapter outside your region will damage the charger and the detector.
- Do not calibrate the detector during or immediately after charging the battery.
- The battery can only be replaced by the manufacturer. Failure to adhere to this caution can lead to fire and/or explosion.
- The SST4/SST5 uses a lithium battery that may present a risk of fire or chemical burn hazard if misused.
- Do not disassemble, heat above 212° (100°C), or incinerate.
- Lithium polymer cells exposed to heat at 266°F (130°C) for 10 minutes can cause a fire and/or explosion.

NOTE: To replace the battery, contact WatchGas or authorized distributor. The battery can only be replaced by the original manufacturer part, which is SST4-MIC-MIN-BAT for the SST4 Micro and Mini, and SST4-PUMP-BAT for the SST4 Pump.

1.5 Charging w/SST Induction Cradle Charger

In addition to the Induction Disk Charger included with each detector, the SST Range of products can be charged in the **WatchGas SST Induction Cradle Charger** (sold separately). To charge the detector, refer to Figure 1., Table 2., and the steps below.

NOTE: The detector must be charged in a safe area that is free of hazardous gas, in temperatures of 32°F to 113°F (0°C to 45°C).

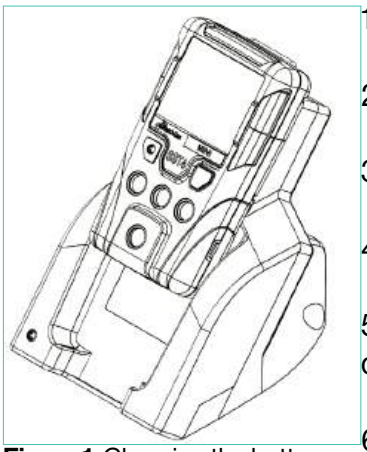


Figure 1. Charging the battery

1. Deactivate the detector.

2. Plug the charging adapter into an AC outlet.

3. The charging LED light should then turn on and be RED.

4. Place the SST Range detector into the charger.

5. If placed correctly, the LED light on the charger should blink RED and the device will indicate that it is charging on its display.

6. Allow the battery to charge per battery specifications.

7. The display will indicate the charge percentage (%).

Item	Description
1	Detector
2	Charging adapter
3	Charging cable
4	Wireless charging

Table 2. Connecting the wireless charger

Warning

The detector will not charge in temperatures above 113°F (45°C).

1.6 Charge Battery and Replace Sensors

To replace the battery, contact WatchGas or an authorized distributor. The battery can only be replaced with the original manufacturer part number. To charge the battery and replace the sensors and/or the sensor filter, refer to the following:

- **Battery Cautions**
- **Replacing a Sensor or Sensor Filter**

To order replacement parts, refer to **Spare Parts List**.

To become oriented with the features and functions of the detector, *refer to the following figures and tables*:

- Figure 4. & Table 3., Figure 5. & Table 4., and Figure 6. & Table 5 describes the detector's components.
- Figure 7. and Table 6., Figure 8. & Table 7. describes the detector's display elements.
- Chapter 2.7. describes the detector's pushbutton.

1.7 Sensor Poisons and Contaminants

Several cleaners, solvents, and lubricants can contaminate and cause permanent damage to the sensors. Before using cleaners, solvents, and lubricants in close proximity to the detector sensors, read the following cautions and refer to the lists below.

⚠ Caution

Use only the following WatchGas Technologies recommended products and procedures:

- Use water-based cleaners.
- Use non-alcohol-based cleaners.
- Clean the exterior of the detector with a soft, damp cloth.
- Do not use soaps, polishes, or solvents.

Below are common products **to avoid** using around sensors:

1. Cleaners and Lubricants:

    - Brake cleaners
    - Lubricants
    - Rust inhibitors
    - Window and glass cleaners
    - Dishsoaps
    - Citrus-based cleaners
    - Alcohol-based cleaners
    - Hand sanitizers
    - Anionic detergents
    - Methanol (fuels and antifreezes)

2. Silicones:

    - Silicone cleaners and protectants
    - Silicone-based adhesives, sealants, and gels
    - Hand/body and medicinal creams containing silicone
    - Tissues containing silicone
    - Mold releasing agents
    - Polishes

3. Aerosols:

    - Bug repellents and sprays
    - Lubricants
    - Rust inhibitors
    - Window cleaners

2. Overview of Detector

Configuration of the SST Range is done with the WatchGas Device Link Application. The app can be downloaded from Google Play and the App Store, or by scanning the appropriate QR code in **Section 1.3**. You can read more about the app on our website.

For detailed information on the Device Link Application, refer to the **Device Link manual**.

2.1 How to Tap a Unit

Ensure that your phone has NFC capability.

The NFC is located on the back of the detector - just below the alligator clip.

Figure 2. NFC location

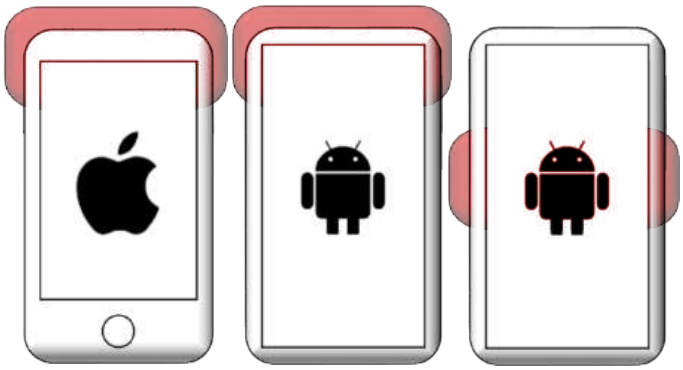


Figure 3. Tap a unit

Locate the NFC on your phone (normal locations shown). The phone gives a clear visual indication when the NFC connects.

NOTE: Make sure the battery is charged prior to use.

2.2 Overview of the SST4 Micro and Mini

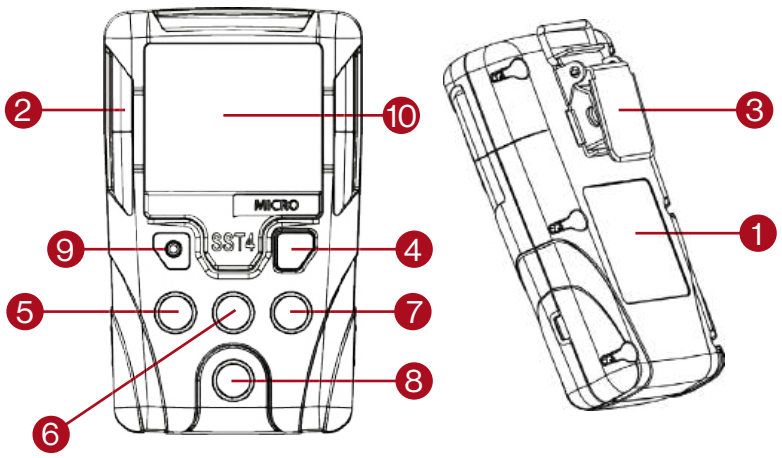
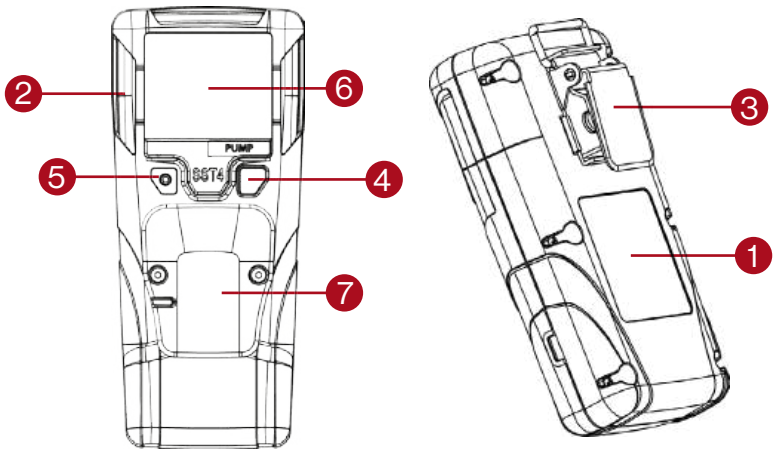


Figure 4. Overview of the SST4 Micro and Mini

Symbols	Description
1	Wireless charger and NFC
2	Visual alarm indicators (LEDs)
3	Alligator clip
4	Pushbutton
5	Oxygen (O2) Sensor
6	Carbon Monoxide (CO) Sensor
7	Hydrogen Sulfide (H2S) Sensor
8	Combustible (LEL) Sensor
9	Audible alarm
10	Liquid crystal display (LCD)

Table 3. Overview of the SST4

2.3 Overview of the SST4 Pump

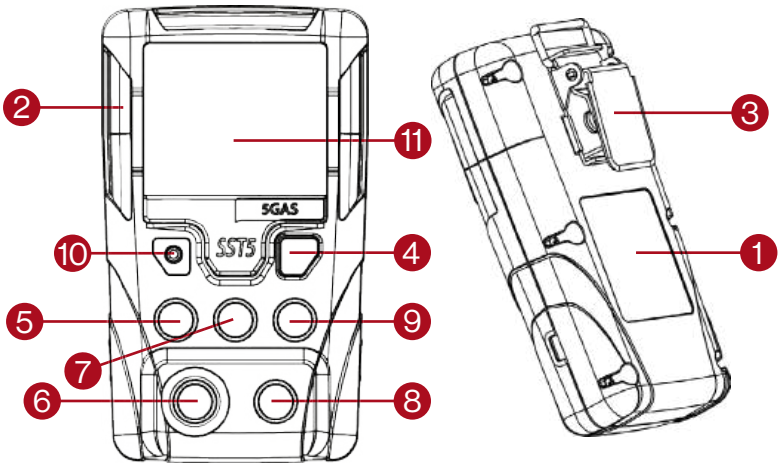


Symbols	Description
1	Wireless charger and NFC
2	Visual alarm indicators (LEDs)
3	Alligator clip
4	Pushbutton
5	Audible alarm
6	Liquid crystal display (LCD)
7	Pump plate

Table 4. Overview of the SST4 Pump

Figure 5. Overview of the SST4 Pump

2.4 Overview of the SST5



Symbols	Description
1	Wireless charger and NFC
2	Visual alarm indicators (LEDs)
3	Alligator clip
4	Pushbutton
5	Oxygen (O2) Sensor
6	5th Sensor
7	Carbon Monoxide (CO) Sensor
8	Combustible (LEL) Sensor
9	Hydrogen Sulfide (H2S) Sensor
10	Audiable alarm
11	Liquid crystal display (LCD)

Table 5. Overview of the SST5

Figure 6. Overview of the SST5

2.5 Display Elements of the SST4

Figure 7. SST4 display

Symbols	Description
ALARM	Alarm Notification
LOW	Low Alarm
HIGH	High Alarm
STEL	Short Term Exposure Alarm
TWA	Time Weighted Average Alarm
2	Indicate LOW LOW or HIGH HIGH alarm. 3rd alarm level
H_2S	Hydrogen sulfide Sensor
SO_2	Sulfur dioxide Sensor
CO	Carbon monoxide Sensor
O_2	Oxygen Sensor
IR	NDIR LEL
LPC	Low Power Catalytic
CAT	Catalytic bead LEL sensor
☺	Product Compliant
☹	Product Non-Compliant
CAL	Calibration Required
BUMP	Bump Required
)))	NFC in Communication
▬	Battery level
🔇	Mute
ppm	Parts Per Million
mg/m^3	Milligrams per Cubic Meter
LEL%	Percentage LEL
O_2%	Percent VOL
inert	Inert mode active only for SST4 Pump with NDIR sensor

Table 6. SST4 Display Elements

2.6 Display Elements of the SST5

Figure 8. SST5 display

Symbols	Description
ALARM	Alarm Notification
LOW	Low Alarm
HIGH	High Alarm
STEL	Short Term Exposure Alarm
TWA	Time Weighted Average Alarm
2	Indicate LOW LOW or HIGH HIGH alarm. 3rd alarm level
HCN	Hydrogen cyanide Sensor
H_2S	Hydrogen sulfide Sensor
SO_2	Sulfur dioxide Sensor
CO	Carbon monoxide Sensor
O_2	Oxygen Sensor
H2	Hydrogen Sensor
NO2	Nitrogen dioxide Sensor
NO	Nitrogen monoxide Sensor
ETO	Ethylene oxide Sensor
CL2	Chlorine Sensor
IR	NDIR LEL
LPC	Low Power Catalytic
CAT	Catalytic bead LEL sensor
☺	Product Compliant
☹	Product Non-Compliant
Xs	Xtox Sensor
NH_3	Ammonia Sensor
BUMP	Bump Required
	NFC in Communication
	Battery level
	Mute
ppm	Parts Per Million
mg/m^3	Milligrams per Cubic Meter
LEL%	Percentage LEL
O_2%	O2
Vol%	Percent

Table 7. SST5 Display Elements

2.7 Pushbutton

Figure 9. Pushbutton

To activate the detector, press and hold the pushbutton and a 3 second countdown will start. Keep pressing the pushbutton until the countdown ends, after which the detector will then turn on.

To deactivate the detector, press and hold the pushbutton until the OFF countdown is complete and the LCD deactivates.

To view the TWA, STEL, and peak (maximum) readings, press the pushbutton twice.

To clear the peak readings, press the pushbutton when the LCD displays CLR.

To activate NFC, press the pushbutton for 1,5 second until a single beep and the NFC Icon is active.

To activate the backlight in normal operation, press the pushbutton.

To acknowledge latched alarms, press the pushbutton.

To acknowledge a low alarm and disable the audible alarm, press the pushbutton (if the Low Alarm Acknowledge option is enabled).

3. Activating the Detector

⚠ Caution

Only activate the detector in a fresh air environment and in a safe area.

3.1. Start-Up Process

Press and hold the pushbutton for 3 seconds, the screen will show a countdown. After the countdown, the screen will show the current firmware screen for 2 seconds, followed by all user-critical information. Pay attention to the settings to make sure they are correct.

If the battery of the detector has more than 30 minutes capacity, the sensor will switch on (Figure N. Screen on) and start to warm up.

NOTE: Make sure the battery is charged before use.

If the detector's battery has less than 30 minutes capacity, the Critical Battery Warning alarm will be displayed for 3 seconds on the screen, after which the detector will automatically switch off. If this happens, charge the detector.

3.1.1. Self-Test

The following startup tests are written as startup performance as intended. If an error occurs, refer to **Startup Troubleshooting**.

When the detector is activated, it performs several startup tests and displays all alarm settings for the user. Confirm the following tests occur and that the settings are correct.

The detector then tests the sensors during warm up.

If an error message displays, refer to **Startup Troubleshooting**.
NOTE: The sensors are tested continuously while the detector is activated.

If the Calibration Interval option is set to OFF in the WatchGas Device Link Application, the calibration due date is bypassed during operation.

3.1.1.1. Self-Test Pass

When the detector has passed all startup self-tests, it enters normal operation. The LCD displays the ambient gas readings.
The detector automatically begins:

- recording the peak (maximum) gas exposure,
- calculating the short-term exposure level (STEL),
- calculating the time-weighted average (TWA) exposures.

3.1.1.2. Self-Test Fail

If the following error message displays after entering normal operation, refer to **Startup Troubleshooting**.

The bump due warning screen can be set in the WatchGas Device Link Application to either lock the unit and force the user to bump, or to simply alert the user about the overdue bump.

WARNING: device must not be used when one or more channels shows the ERR message.

3.1.2. Battery Test

The detector performs a battery test during startup. If the battery has insufficient power to operate, or a fault, the battery fail screen displays.

Charge the battery for 2 hours before restarting the detector.
Refer to the **Charging the Battery** section.

3.1.3. Audible/Visual Test

1. All of the LCD elements display simultaneously as the detector beeps, flashes, vibrates, and activates the backlight.

2. The current firmware version of the detector then displays on the LCD.

3.1.4. Alarm Setpoints

3. Next, the TWA, STEL, low, and high alarm setpoints display.

NOTE: Alarm setpoints may vary by region.
Refer to the **Factory Gas Alarm Setpoints** section.

3.2. Main Menu Functionality

Short press of the pushbutton to turn the backlight on and indicate that the unit is responsive (also required for Safe Mode).

↓

Two short pushbutton presses to move into the Main Menu.
Press the pushbutton again to move through different screens of the menu.

↓

Show the current calculated STEL value.

↓

Toggle between the STEL values screen
and the 'STEL CLR?' screen.
Press and hold the pushbutton for
1.5 seconds to clear the STEL Value.
Or press the pushbutton again to skip to the next screen.

↓

Show the current calculated TWA value.
If TWA is not enabled in the WatchGas Device Link Application, it will not be shown in the sequence.
Calculated TWA values are cleared at switch off,
or via the Main Menu.

↓

Display the current peak values. Peak values are cleared at switch off, or in the Main Menu. STEL and TWA values are cleared on power off/on cycle.

To clear peak, press and hold button

Display days remaining until calibration due - **only** if Calibration Enable Expiry is enabled via the WatchGas Device Link Application, and the 'Calibration Days To' is equal or less than the Calibration Warning setting in the app.

Display days remaining until bump due - **only** if Bump Enable Expiry enabled via the WatchGas Device Link Application, and the 'Bump Days To' is equal or less than the Bump Warning setting in the app.

If compliance interval is enabled and exceeded and Tap Due is active, the 'tap due' screen is shown.

If compliance interval is either not enabled or exceeded, this screen will not be shown.

If the LEL sensor is present, show the cross-calibration factor, selected via the WatchGas Device Link Application.

Show the language selected via the WatchGas Device Link Application.

Show the date.

Show the time.

Show the User ID as configured via the WatchGas Device Link Application.

Show the Site ID as configured via the WatchGas Device Link Application.

3.3. Gas Exposures

3.3.1 Calculated Gas Exposures

Warning

To avoid possible personal injury, do not deactivate the detector during a work shift. TWA, STEL, and MAX readings reset once the detector is deactivated.

Gas Exposures	Description
TWA (H2S, CO, and SO2 only)	Time-weighted average (TWA) based on accumulated exposure to toxic gases averaged over a workday according to US OSHA method. OSHA: 8 hour moving average
STEL (H2S and CO only)	Short-term exposure limit (STEL) to gas based on a 15 minute period.
Peak* (maximum)	Peak concentration encountered during work shift.

Table 8. Calculated Gas Exposures

* For oxygen, it is the highest, or the lowest concentration encountered.

3.3.2 Viewing Gas Exposures

To view the TWA, STEL, and peak (maximum) readings, press the pushbutton twice. The LCD first displays the TWA gas exposures. Then the LCD displays the STEL gas exposures. Finally, the LCD displays the peak (maximum) readings.

3.3.3 Clearing peak Gas Exposures

Caution

Follow all safety procedures as defined by your employer. Confirm with your supervisor before clearing TWA and STEL alarms.

To clear the peak exposure readings, press the pushbutton twice to clear. Hold the pushbutton for 5 seconds.

Gas alarms are activated when detected gas concentrations are above or below the user-defined setpoints. Gas alarms are described below.

Alarm	Condition
Low	Toxics and combustibles: Ambient gas level above low alarm setpoint. Oxygen: Ambient gas level may be set above or below 20.9% (or 20.8%).
Low Low	For Oxygen 2 alarm levels.
High	Toxics and combustibles: Ambient gas level above high alarm setpoint. Oxygen: Ambient gas level may be set above or below 20.9% (or 20.8%).
High High	Toxics and combustibles: Ambient gas level above the high high alarm setpoint.
TWA	Toxics only: Accumulated value above the TWA alarm setpoint.
STEL	Toxics only: Accumulated value above the STEL alarm setpoint.
-Over Limit (-OL)	Toxics only: If sensor reading is negative.

Multi-gas	Two or more gas alarm conditions.
Over Limit (OL)	OL displays when readings are above or below the sensor detection range. Refer to **Specifications** for detection ranges.

Table 9. Gas Alarms

3.4. Alarm Setpoints

3.4.1 Factory Alarm Setpoints

NOTE: Standard factory alarm setpoints may vary by region.

Gas	Low	High	High High	STEL	TWA
O2	19.5% Vol	23.5% Vol	N/A	N/A	N/A
LEL	10% LEL	20% LEL	N/A	N/A	N/A
CO	35 ppm	200 ppm	N/A	100 ppm	20 ppm
H2S	10 ppm	15 ppm	N/A	15 ppm	10 ppm
SO2	5 ppm	10 ppm	N/A	5 ppm	2 ppm
HCN	5 ppm	10 ppm	20 ppm	4 ppm	4 ppm
NH3	25 ppm	50 ppm	N/A	35 ppm	25 ppm
H2	100 ppm	400 ppm	N/A	N/A	N/A
H2 High Range	4000 ppm	8000 ppm	N/A	N/A	N/A
NO2	3 ppm	6 ppm	12 ppm	5 ppm	3 ppm
NO	25 ppm	50 ppm	75 ppm	25 ppm	25 ppm
Xs	50 ppm	100 ppm	150 ppm	25 ppm	10 ppm
ETO	2 ppm	5 ppm	10 ppm	2 ppm	1 ppm
CL2	0.5 ppm	1 ppm	5 ppm	1 ppm	0.5 ppm

Table 10. Factory Alarm Setpoints

NOTE: To disable an alarm, this is done in the WatchGas Device Link App.

3.4.2 Changing Alarm Setpoints

To change alarm setpoints, use the WatchGas Device Link Application. *Refer to* *Section 4*:

- High Alarm
- High High Alarm
- Low Alarm
- Low Low Alarm
- TWA Alarm
- STEL Alarm

3.4.3 Latched or Auto Alarms

The low and high alarms stop when the ambient gas concentration returns to the acceptable range.

NOTE: If alarms are set to latch, press the pushbutton to reset the alarms.

The detector calculates the TWA value based on OSHA standards and the STEL value based on a user-defined 15 minute period.

To stop a TWA or STEL alarm, deactivate and then reactivate the detector, or reset via menu.

Warning

Follow all safety procedures as defined by your employer, and/or local regulations.

Confirm with your supervisor before clearing TWA and STEL alarms.

3.5. Deactivating the Detector

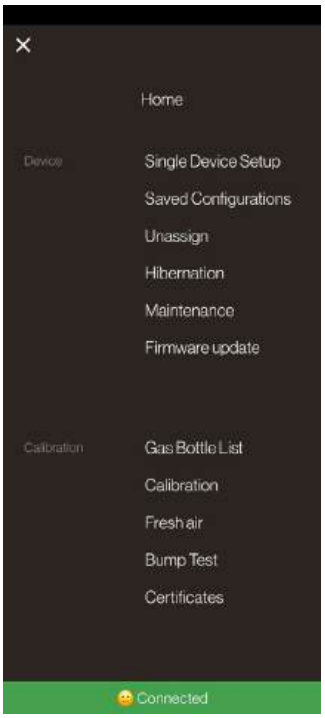
To deactivate the detector, press and hold the pushbutton. The detector performs a sequence of two sirens with alternating flashes, vibrates, lights up the full display, initiates the deactivation countdown, and finally displays OFF before deactivating.

NOTE: If the pushbutton is released before the countdown is complete, the detector will not deactivate.

NOTE: If the detector is set up via the WatchGas Device Link Application to be always on, the function must be changed via the WatchGas Device Link App to allow the unit to be switched off.

4. Configurations

4.1 App Overwiew Device Configurations



4.1.1 Installing the WatchGas App

All set up for the SST4 and SST5 devices is done using the WatchGas Device Link Application. Use the Service password to get access to the Setup options.

Either use a Saved Configuration file, or extract the settings from the device with a single Device setup.

4.1.2 Device Setup Via the WatchGas Device Link Application

The Detector Identification section provides information about the detector, current firmware revision, and hardware revision. Data can also be entered (25 characters per line) to display as a start-up message on the detector LCD each time it is activated.

4.1.3 Hardware/Firmware Revision

The Hardware/Firmware Revision cannot be altered. The field automatically populates when the data is retrieved from the detector. If a new firmware version is downloaded to the detector, the field automatically updates when the data is retrieved.

The firmware version displays on the detector LCD during the startup self-tests.

4.2 File Function Single Device Setup

4.3. Function Settings

4.3.1. User Options

The user options section includes detector features that can be enabled or disabled. The green checkmark indicates that the option is enabled. Press the checkbox to disable the option.

4.3.2. Alarm Reset

If set to AUTO, the alarm will automatically go away when the alarm goes away.

If set to Latched, the user needs to confirm the Alarm before it goes away.

4.3.3. Heartbeat

When enabled, the Heartbeat indicates the device status with a green, blue or red LED as per EN'60079-29. The Hearbeat Interval can be set in the WatchGas Device Link Application and is **disabled** by default.

4.3.4. Confidence Bleep

When enabled, the Confidence Bleep indicates that the device is compliant. The tone's sound is 4300Hz and 150ms in length. The Confidence Rate can be set in the WatchGas Device Link Application.

4.3.5. Silent Mode

When enabled, the backlight, visual alarms, and audible alarms are disabled. Displays continuously on the LCD.

During an alarm, the vibrator activates and readings are displayed on the LCD. The detector is shipped with Silent Mode **disabled** by default.

This function mutes all buzzer, LED, and backlight functions. If active, the icon is displayed.

4.3.6.Alarm Mute

If this function is active, pressing the pushbutton will mute the alarms for 5 minutes. If there are any new alarms during these 5 minutes, the alarm will activate.

4.3.7. Low Alarm Acknowledge

When enabled, the audible alarm can be deactivated during a low alarm for the CO, H2S, and LEL sensors. The LED and visual alarm indicators remain active until the alarm condition changes or the detector deactivates.

Press the button to acknowledge the low alarm and deactivate the audible alarm.

NOTE: Low Alarm Acknowledge is not applicable to O2.

The detector is shipped with Low Alarm Acknowledge **disabled** by default.

4.3.8 Backlight Mode

The backlight automatically activates:

- during startup;
- when the pushbutton is pressed (then deactivates after 5 seconds);
- when an alarm occur;
- when there is an alarm condition (unless Silent Mode is enabled);
- If backlight always on is seleted in the WatchGas Device Link Application, then the backlight is always on. Note that this will result in a shorter run time of the device.

4.3.9. Datalog Interval

Enter a value (1-180 seconds). The default datalog interval is one reading every 30 seconds.

4.3.10. Scan Protect and Password

The Scan Protect function can be enabled to protect the device with a PIN code. When the Scan Protect is activated and you input the PIN code into the device, this will block any WatchGas Device Link Application from reading the detector unless it first enters the correct PIN code.

4.3.11. Enable Compliance Interval

The Compliance Interval feature enables a reminder to the user to check in the detector on a SST Kiosk, SST Dock, or a device link. This function allows the safety manager to monitor the detector's health, and to see if there is a fault on the detector and if the detector is in use.

4.3.12. Monitor Always On

This function disables the power down function and will display LOCKED if power down is attempted.

4.3.13. Auto Zero on Startup

When enabled, the sensors automatically zero during the startup self-tests. The Auto-Zero on Start-up option is applied to all sensors.

Click the checkbox of each sensor that will be auto zeroed during startup.

The detector is shipped with the Auto-Zero **disabled** by default.

4.3.14. Safe Mode

When enabled, SAFE displays continuously on the LCD unless an alarm condition occurs. The Safe Mode provides visual confirmation that no (monitored) hazardous gas is present.

The detector is shipped with Safe Mode **disabled** by default.

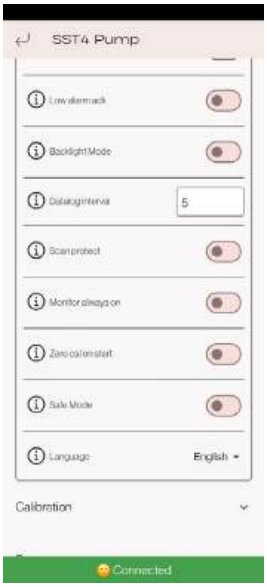
4.3.15 Inert

When the SST4 pump version is equipped with a NDIR LEL sensor, the Inert mode can be activated.

The Inert mode reverses the Oxygen alarm, so the monitor will go into alarm if the oxygen levels are above the set threshold.

4.3.16. Language Menu

The detector can display warnings and notifications in ten different languages, with more planned to come. Refer to the following illustration.



Click a language. When the settings are loaded to the detector, the LCD will then display warnings and notifications in the selected language.

The detector is shipped with English set as the default language.

4.4. Sensor setting

4.4.1. Sensor Configuration

Settings for the sensors are configured individually.
Enter values, or enable / disable options. Refer to **Factory Gas Alarm Setpoints** for setpoint values.

NOTE: Depending upon the sensor, the options may vary.

4.4.2. Combustible Sensor

Sensor 1 – allows to enable or disable the sensor, as well as to change the sensor configuration.

NOTE: this shall only be performed by a trained technical professional, as the sensor needs to match the electronics.

Measured gas - if the measured gas is different than the calibration gas, the reading and the alarms can be expressed in the form of a gas equivalent reading, but this does not make the sensor specific to this gas.

Low alarm set point - this alarm is the first level alarm.

High alarm set point - this alarm is the second level of the alarm.

High high alarm set point - this alarm is the third level of alarm.

These alarm levels are critical for different user actions.

4.4.3. Oxygen Sensor

Sensor 2 – allows to enable or disable the oxygen.

NOTE: this shall only be done by a trained technical professional, as the sensor needs to match the electronics.

Low alarm set point - this alarm is the first level alarm.

Low Low alarm set point - this alarm is the second level of alarm low oxygen levels. Note that this function can be disabled.

High alarm set point - this alarm is for increased oxygen levels.

4.4.4. Toxic Sensors

Sensors 3 and 4 – allows to enable or disable the sensors, as well as to change the sensors' configurations.

NOTE: this shall only be done by a trained technical professional, as the sensors need to match the electronics.

Low alarm set point - this alarm is the first level alarm.

High alarm set point - this alarm is the second level of alarm.

High High alarm set point - this alarm is the third level of alarm.
These alarm levels are critical for different user actions.

4.4.5. Sensor Disabled

⚠ Warning

Use extreme caution when disabling a sensor. The disabled sensor cannot detect and go into alarm against the applicable gas any more.

1. Click Sensor in the WatchGas Device Link Application.
2. Click the Sensor name checkbox for the required sensor.
3. Select not fitted and the sensor data will disappear.
4. Click the Save button located at the bottom of the window.
5. Load the setting to the device via NFC, and the LCD will automatically update. The gas type and sensor readings no longer display on the LCD for the applicable sensor.
6. Enable the sensor as soon as possible. If the sensor is damaged, replace it immediately. Refer to Replacing a Sensor or Sensor Filter.

4.5. Bump and Calibration setting

4.5.1. Enable Calibration Interval

When the Enable Calibration Interval feature is enabled, the detector will remind the user that calibration has expired.

4.5.2 Calibration Interval

⚠ Caution

WatchGas recommends that the sensors be calibrated on a regular basis, depending on the usage model.

Define how often a sensor should be calibrated in the Calibration Interval field. A different calibration interval can be defined for each sensor.

1. Enable Expire.
2. Enter the value (0-365 days) for each sensor.

3. Enter warning prior to lock.

4. Select if the unit shall lock on calibration expire.

The detector is shipped with the factory default set to 180 days.

4.5.3. Calibration Warning

When the Enable Calibration Warning feature is enabled, the detector will remind the user how many days are left before the calibration expires.

4.5.4. Lock Unit On Calibration Expired

When enabled, if a sensor(s) is past due, the sensor(s) must be calibrated immediately, otherwise the detector will be locked.

Enable the Lock Device on Expire feature to ensure calibrations are performed regularly and sensors are operating correctly. The following screen displays during the startup sequence when the option is enabled and the sensor(s) is overdue. If this feature is active, the unit will lock and not be able to be used until it is calibrated.

4.5.5. Calibration Due Warning (Optional)

The following screen displays the number of days remaining before calibration is due. The number of days that displays is when the next sensor calibration should be performed.

If the Calibration Interval option is defined as OFF in the WatchGas Device Link Application, the calibration due date is bypassed during operation.

4.5.6. Calibration Due Date (Optional)

The following screen displays shows calibration is due. The user can select whether or not to LOCK the detector until it is calibrated.

4.5.7. Enable Bump Interval

When the Enable Bump Interval feature is enabled, the detector will remind the user that bump is expired.

4.5.8. Enable Bump Warning

When the Enable Bump Warning feature is enabled, the detector will remind the user how many days are left before the bump expires.

4.5.9. Lock Unit On Bump expired

When the Lock Unit On Bump Expired feature is active, the unit will lock and not be able to be used until it has been bump tested.

4.5.10. Bump Test Speed

Fast pass at 50% of presented gas, medium pass at 70% of presented gas, and slow pass at 90% of presented gas.

NOTE: the slower the function, the more gas and time the test will take.

4.5.11. Bump Interval

Users can define how often a bump check should be performed for each sensor in the Bump Interval Field. A different bump interval can be defined for each sensor.

1. Enable Expire.
2. Enter the value (0-365 days) for each sensor.
3. Enter warning prior to LOCK.
4. Select if the unit will LOCK on calibration expire.

The detector is shipped with the factory default set to OFF.

4.5.12. Force Bump When Overdue

When enabled in the WatchGas Device Link Application, if a sensor(s) is past due for a bump test, the sensor(s) must be bump tested immediately. Otherwise, the detector is locked.

A bump test should be performed regularly to ensure the sensors are responding correctly to the gas. The following screen displays when the option is enabled and the sensor(s) is overdue.

4.5.13. Bump Test

The bump test is activated via the WatchGas Device Link Application and stored in the app automatically and as an event as well.

The bump due warning screen reminds the User to perform a bump prior to the bump overdue warning.

4.6. SST4 Pump Setting

The SST4 pump has an additional setting for the pump control.

5. Bump and Calibration

5.1. Calibration Setup

The following calibration procedures are written as calibration performance is intended. If an error or failure occurs, refer to Troubleshooting.

⚠ Caution

Only calibrate in a fresh air environment and in a safe area. Do not calibrate the detector during or immediately after charging it.

5.2. Connecting the Gas Cylinder to the Detector

Refer to the following Figure 8., Table 11., and procedures to connect the gas cylinder to the detector for calibration.

NOTE: Wind currents may cause false readings and poor calibrations.

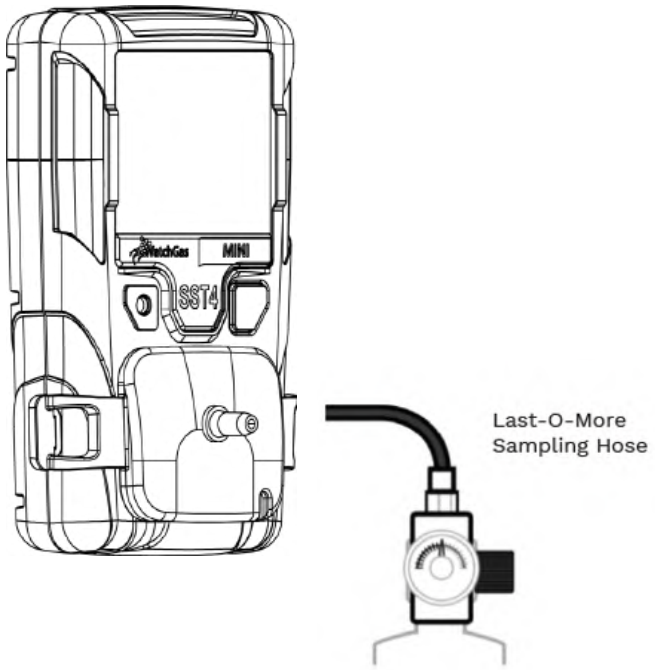


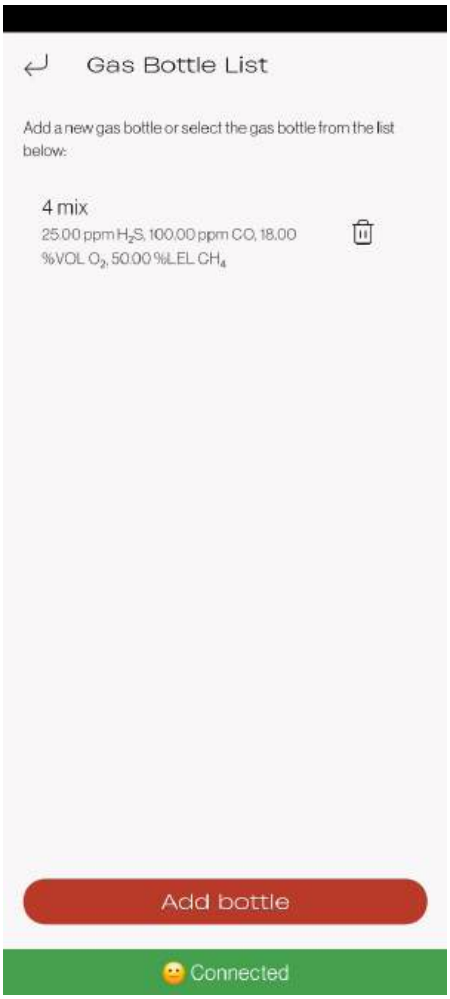
Figure 8. Connecting the Gas Cylinder to the Detector

Item	Description
1	Calibration cap
2	Calibration hose
3	Gas cylinder with 0.5 ml/min regulator
4	Mobile phone with the WatchGas Device Link Application

Table 11. Connecting the Gas Cylinder to the Detector

1. Make sure the gas bottle is loaded in the gas bottle list in the WatchGas Device Link Application.
2. Activate the calibration from the WatchGas compliance application.
3. Allow the device to finish the zero process.
4. Connect the other end of the calibration hose to the regulator on the gas cylinder.
5. Allow the span process to finish.
6. When calibration is complete turn off the gas and disconnect the hose from the calibration cap and regulator.
7. Tap the device to the WatchGas Device Link Application to upload a calibration certificate and obtain the pass/fail result.
8. Ensure that the gas cylinder is stored according to the manufacturer's specifications.

5.3. Setting Span Gas Concentration Values



When a sufficient amount of gas has been detected, the detector completes the span (approximately 2 minutes).

5.3.1. Successful Span

If the sensors have spanned successfully, the detector beeps and the calibration procedure continues.

5.3.2. Unsuccessful Span

If any sensors fail the span, the following screen displays.
Refer to Troubleshooting.

If a sensor fails calibration, the next due date for that sensor will not reset. Refer to Troubleshooting.

5.3.3. Verification

1. After calibration is complete and the detector returns to normal operation, verify the calibration using a gas cylinder other than the one used for calibration.
2. The gas concentration should not exceed the sensor's detection range. Confirm that the LCD shows the expected concentration.

3. To ensure the readings are accurate, apply the verification gas for the same amount of time as was applied to the sensor when it was calibrated.

Example: the H2S span time is 90 seconds. Therefore, apply the verification gas for 90 seconds.

5.4. Calibration

5.4.1. Calibration Guidelines

When calibrating the detector, adhere to the following guidelines:

- Recommended gas mixture:

  CO: 100 ppm balance N2.
  H2S: 25 ppm balance N2.
  LEL: 50% LEL or 2.5% for NA (2.2% for EU) by vol. methane balance air.
  O2: 18% by volume, balance N2.

- To ensure accurate calibration, use a premium-grade calibration gas. Gases approved by the National Institute of Standards and Technology (NIST) improve the accuracy of the calibration.

- Do not use a gas cylinder past its expiration date.

- Calibrate a new sensor before use. Install the sensor, activate the detector, and allow the sensor to stabilize before starting calibration (used sensor: 60 seconds / new sensor: 5 minutes, and for O2 the stabilization process takes 30 minutes).

- Calibrate the sensors at least once, depending on use and sensor exposure to poisons and contaminants.

- Calibrate the detector if the gas readings varies during startup.

- Calibrate the sensor before defining the alarm setpoints.

- Calibrate only in a safe area that is free of hazardous gas in an atmosphere of 20.9% oxygen.

- Do not calibrate the detector during or immediately after charging is complete.

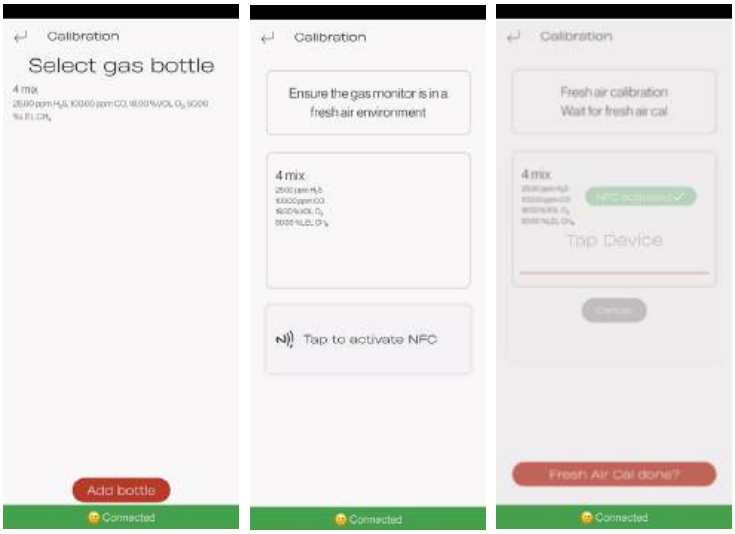
- Allow the detector to stabilize for 1 minute after activation before performing a calibration or bump test.

- If a certified calibration is required, print it from the WatchGas Device Link Application.

5.4.2. Calibration Process

Step 1. Press the Calibration option.

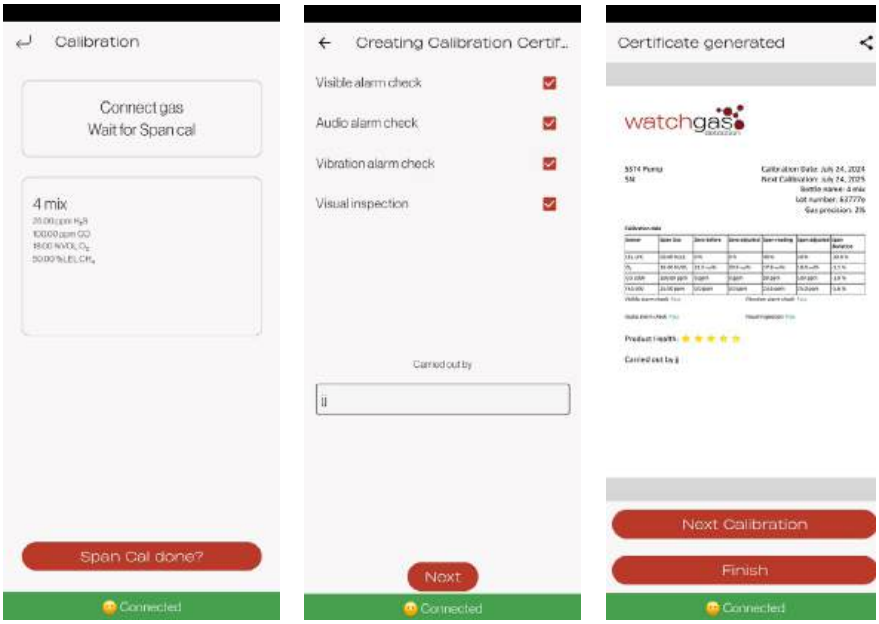
Step 2. Select the gas start zero (wait for device to pass) and connect the span. **NOTE:** If no span gas is detected in 90 seconds, the monitor will go in fail.



Step 3. Confirm span done.

Step 4. Do an inspection check, confirming the visual, audio, and vibrational alarms.

Step 5. The certificate is ready to share.



5.4.3. Fresh Air Calibration

Step 1. Ensure the unit is in fresh air.

Step 2. Activate the NFC on the monitor by pressing the pushbutton on the device.

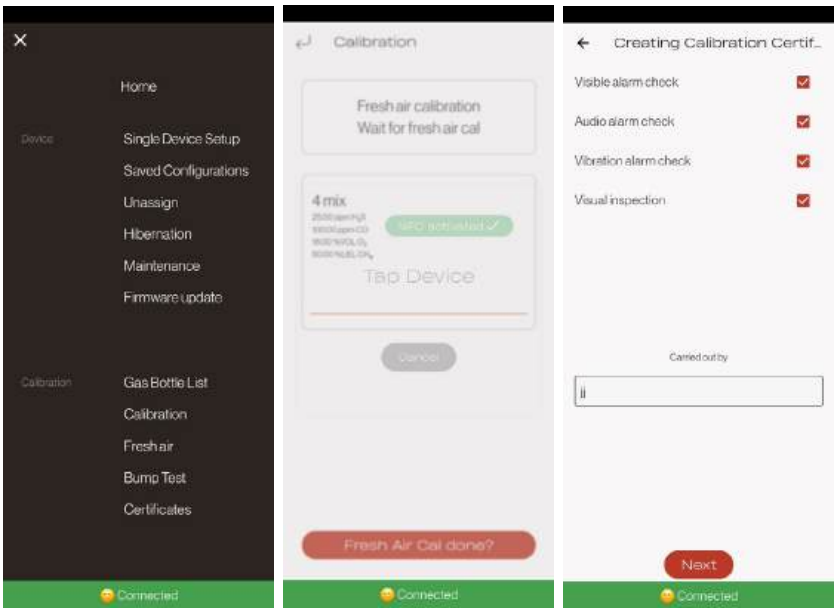
Step 3. Select the Fresh Air option.

Step 4. Wait for the Bump test to finish.

Step 5. Tap the unit again to load the result.

Step 6. Tap units.

Step 7. Tick the box and sign in.



5.5. Bump

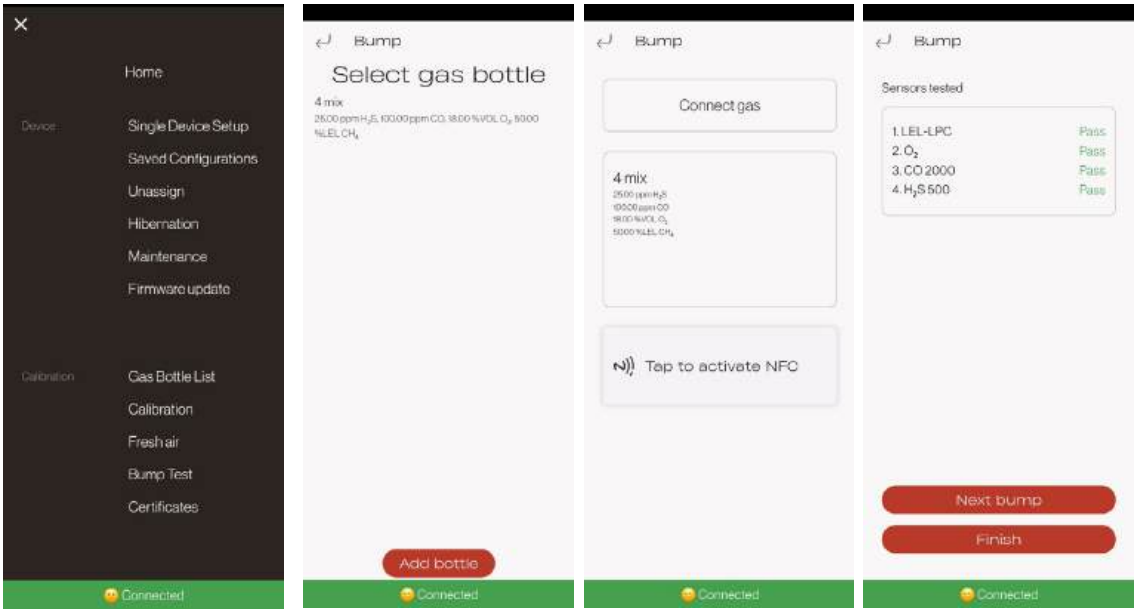
Step 1. Activate the NFC.

Step 2. Select the Bump Test option.

Step 3. Select the bottle from the list.

Step 4. When the Detector show PASS progress.

Step 5. End of Bump.



6. Alarms and Notifications

Display screen	Explanation
LOW	Low alarm
High	High alarm
High High	High high – highest alarm level
Low low	Second low level for Oxygen
STEL	15 min average
TWA	8 hours average
Sensor Err	Sensor error
Low battery	Battery needs charge
Bump due warning	Days to bump
Bump due	Bump due
Cal due warning	Days to calibration due
Cal Due	Calibration due
Vacuum Alr	Vacuum alarm
Pump Err	Pump error

Table 12. Alarms and Notifications

6.1 Low Alarm

Enter the low alarm setpoints for each sensor. Refer to **Factory Gas Alarm Setpoints** for factory defined alarm setpoints. Applicable to all sensors.

6.2 Low Low Alarm

Enter the Low Low alarm setpoints for the Oxygen sensor. Refer to **Factory Gas Alarm Setpoints** for factory defined alarm setpoints.

6.3 High Alarm

Enter the high alarm setpoints for each sensor. Refer to **Factory Gas Alarm Setpoints** for factory defined alarm setpoints. Applicable to all sensors.

6.4 High High Alarm

Enter the High High alarm setpoints for each sensor. Refer to **Factory Gas Alarm Setpoints** for factory defined alarm setpoints.
Applicable to all sensors.

6.5 TWA Alarm

The time-weighted average (TWA) is a safety measure used to determine the accumulated average exposure to gases. An average is determined using the US Occupational Safety and Health Administration (OSHA) method to ensure that the worker is warned when the maximum average is accumulated.

The US OSHA method is defined as a moving average that accumulates over an 8-hour average. If the worker is in the field longer, the oldest accumulated values (the first hour) are replaced by the newest values

(the ninth hour). This continues for the duration of the work shift until the detector is deactivated.

Refer to **Factory Gas Alarm Setpoints** for the factory alarm setpoints.

Enter the setpoint in the TWA Alarm field.

6.6 STEL Alarm

The short-term exposure limit (STEL) is the maximum permissible gas concentration a worker can safely be exposed to for short periods of time (15 min).

The STEL Alarm applies to CO, H2S, and SO2, and HCN sensors only.

NOTE: Standard factory Alarm Setpoints vary by region.

Refer to **Factory Gas Alarm Setpoints** for OSHA factory settings.

Refer to the applicable regulatory requirements in your area for defining STEL alarm setpoints.

6.6.1 STEL Interval

STEL Interval provides protection for workers from over exposure to high concentrations of gas, and is based on 15 minute intervals. When the maximum STEL is reached, the detector alarms to notify the worker.

⚠ Caution

Follow all safety procedures as defined by your employer, and/or local regulations.

7. Event and Data Log

7.1 Datalogs

The detector records various information that can be compiled to create a report. By default, the datalog interval is set to 30 seconds and there are 76936 data logging points in total. This means that the detector is capable of storing 26.7 days' worth of datalogging information if kept at the default 30 second setting.

You can change this time interval to better fit your preferences. For example, if you set the data log interval to 2 minutes, you will have 106 days of continious datalogging. And if you set it to a 5 second interval, you will have 4.5 days of datalogging, and so on.

When the memory is full, the detector replaces the oldest datalogs with the most recent datalogs.

7.2 Event Logs

The detector records the 100 most recent gas alarm events. The following information is recorded:

- Serial number of the detector.
- Start time of the alarm.
- Type, level, and duration of the alarm.
- Peak exposure level (ppm or %).
- Status of the sensors.

7.3 Downloading Datalogs and Event Logs

The datalog and event log files can only be downloaded by means of an SST Dock or the WatchGas Device Link Application.

8. Maintenance

To maintain the detector in good operating condition, perform the following basic maintenance as required:

- Calibrate, bump check, and inspect the detector at regular intervals.
- Maintain an operations log of all maintenance, bump checks, calibrations, and alarm events.
- Clean the exterior with a soft damp cloth. Do not use solvents, soaps, or polishes.
- Do not immerse the detector in liquids.

8.1 Maintenance Screen Device Link

In the WatchGas Device Link Application settings, navigate to the Maintenance section. Here you can see information regarding the device's operations and readings.

- **5 stars** mean that the sensor performance is healthy .
- **4.5 stars** mean that the sensor performance is ok.
- **3.5 stars** mean that the sensor performance is poor.
- **2 stars** or fewer mean that the sensor performance is weak.

Once a sensor's performance falls to 3.5 stars, it needs to be replaced. Refer to the **Replacing a Sensor or Sensor Filter** section on how to do this.

8.1.1 PPM/Hours

The total accumulated PPM/hours that the device sensor has been exposed to.

8.1.2 Peak Reading

The highest peak reading that the sensor has detected.

8.1.3 Factory Calibration

The factory calibration for the device sensor. Changing a sensor serial number will reset the factory calibration and the first user calibration after replacing the sensor will be the new factory calibration.

8.1.4 Last Calibration

The results of the last sensor calibration.

8.1.5 Last Calibration Date

The date and time when the device sensor's last calibration was performed.

8.1.6 Last Bump Date

The date and time when the device sensor's last bump test was performed.

8.1.7 Serial Number

The device sensor's serial number.

8.1.8 Last Run Time

How long the device has been turned on.

8.1.9 Number of Charges

How many times the device has been charged since it was turned on This is counted in increments of 10. Which means that, when you have charged the device 10 times, this number will show up as 1.

8.1.10 Minimum Temperature

The minimum temperature that the device has registered.

8.1.11 Maximum Temperature

The maximum temperature that the device has registered.

8.1.12 Alarm Minutes

The amount of time that the device has spent in alarm mode.

8.2 Update Firmware

You can update the device's firmware to the latest version through the WatchGas Device Link Application, or via the WatchGas SST-Dock.

NOTE: Always download your data logs prior to updating the firmware.

8.3 Replacing a Sensor or Sensor Filter

⚠ Warning

This is only to be performed by authorized and trained technicians. Any maintenance requires recalibration.

To avoid personal injury, only use sensors that are specifically designed for the detector. Refer to **Spare Part Lists**.

Use proper ESD handling practices.

- Each sensor has a high degree of resistance to common vapors and gases. To clear a sensor, move the detector to a non-hazardous environment and wait 10 to 30 minutes before taking it out and using it again.

- Do not expose a sensor to vapors of inorganic solvents such as fumes from paint thinners, or organic solvents such as benzoic acids and acrylic acids.

- Ensure that hands are clean or wear gloves before handling components.

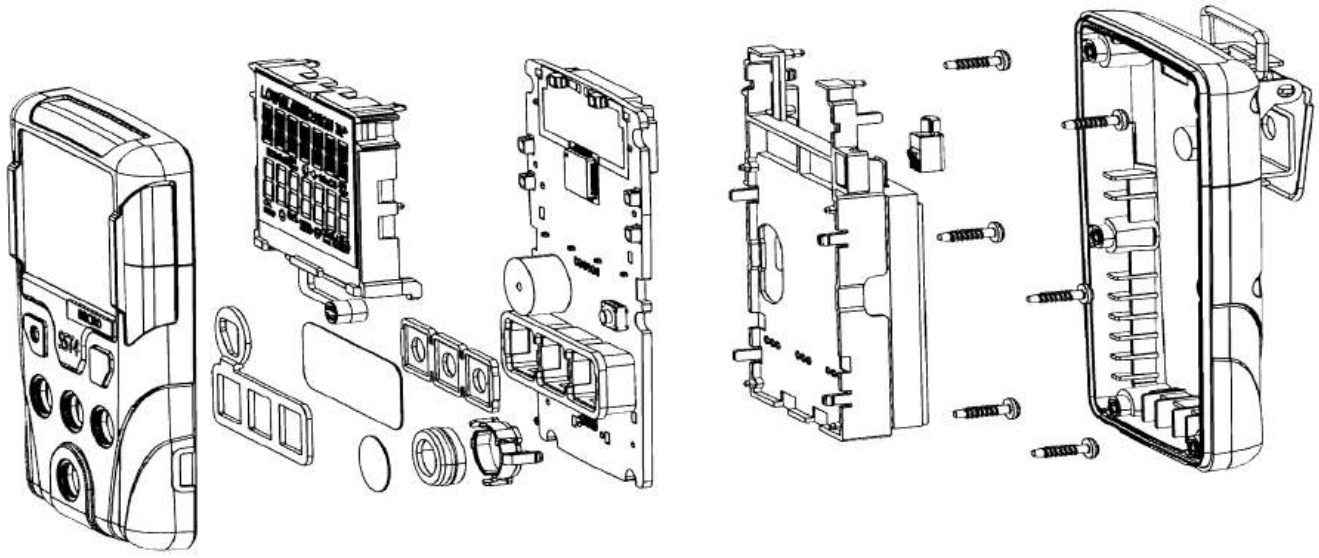


Figure 10. Replacing a Sensor or Sensor Filter for the SST4 Micro

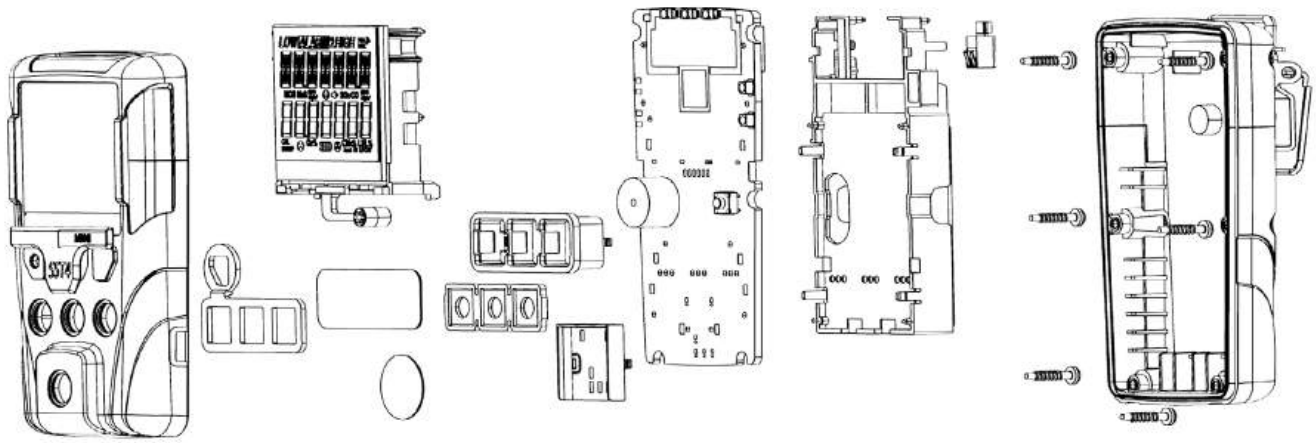


Figure 11. Replacing a Sensor or Sensor Filter for the SST4 Mini

8.4. Removing the Back Casing

1. Deactivate the detector. Place the detector face down on a clean, flat surface.
2. Remove the six machine screws on the rear casing.
3. Remove the back cover by lifting the top and the bottom simulataneously upwards.

8.5. Replacing the Sensor Filter

NOTE: when opening the detector, ensure that the PCB is correctly fitted in the housing during reassembly.

⚠ Caution

Ensure that no damage occurs to the battery.

4. Remove the old sensor filters.
5. Place the gasket as shown, and then use your fingers to apply even pressure to the entire gasket.
6. To reassemble the detector, refer to **Reassembling the detector**.

8.6. Replacing the H2S, CO, Oxygen, and LEL Sensor

1. **NOTE:** when opening the detector, ensure that the PCB is correctly fitted in the housing during reassembly.

2. Ensure that you have changed the sensor SN in the WatchGas Device Link Application, and then calibrate the sensor.

⚠ Caution

Ensure that no damage occurs to the battery. Only replace the sensor with that same sensor type. Do not replace an H2S, or a CO with an SO2 sensor, without reconfiguration by qualified technician.

3. Use a small screwdriver to remove the sensor or sensors.

NOTE: Detectors that are configured for 1, 2, or 3 gases may contain a dummy sensor in one of the four sensor locations.

4. Insert the new sensor(s). For sensor positioning, refer to **Figure 12**.

5. To complete the detector, refer to **Reassembling the detector**.

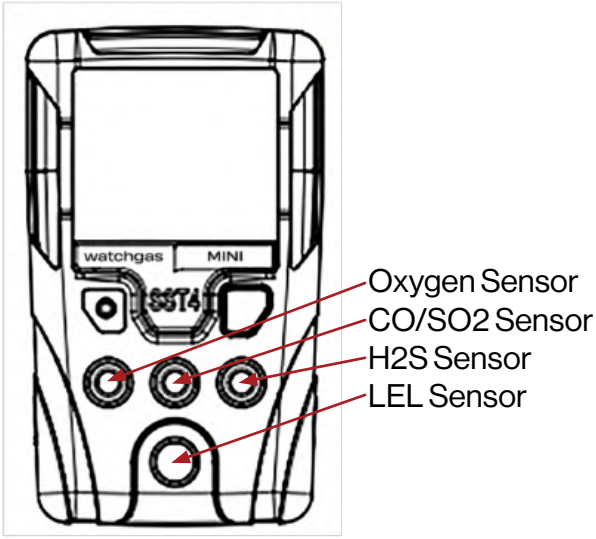
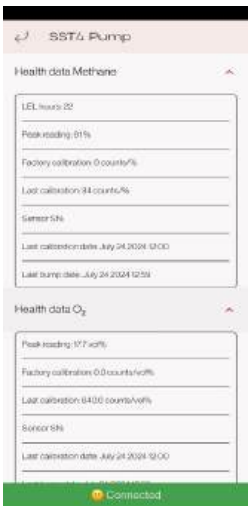


Figure 12. Replacing the H2S, CO, Oxygen, and LEL sensorr

8.7 Sensor Signal



PPM/hours - shows the total PPM/hours the sensors have been exposed to. This value is used as a indicator of the sensor usage.

Peak reading – the maximum value the sensor ever was exposed to. This indicates if a sensor should be replaced for safety reasons.

Factory calibration - the first calibration sensor signal expressed in count/ppm.

Last calibration - the last sensor signal output expressed as count/ppm, when this value is 30% of the factory value, the sensor signal is deemed too low to provide a proper signal.

- Press the front and rear shells together firmly to ensure a proper seal. Ensure that the front and rear shell have a uniform, tight 1/16 in (1 mm) seal on all sides of the detector.
- When replacing the screws, they must be seated properly to prevent cross threading. Turn the screw counter-clockwise until a click is heard and then begin tightening the screw clockwise.
- New sensors must be calibrated. Activate the detector and calibrate the sensor(s). Refer to **Calibration**.

8.8 SST4 Pump Replacement

If a pump does not pass the **Block inlet test**, the unit need to undergo maintenance.

Check **the filters marked 1 and 2 in the picture below**. These filters are the ones that are most likely to be blocked and thus the cause of the problem.

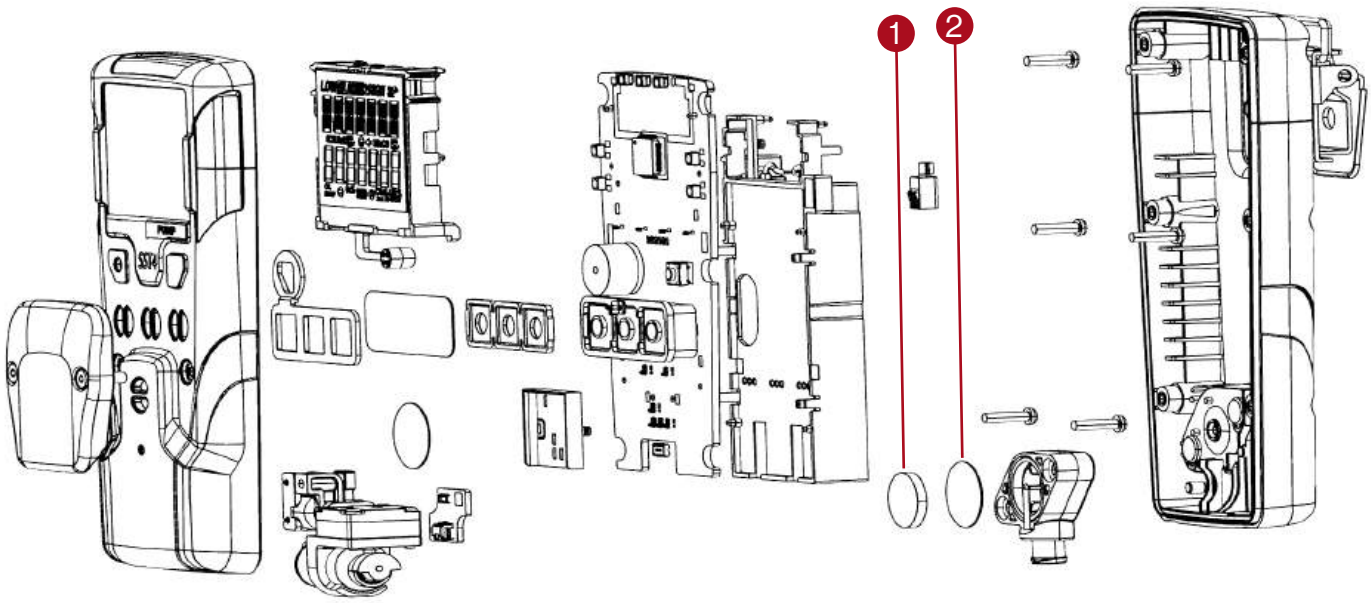


Figure 13. Replacing a Sensor or Sensor Filter for the SST4 Pump

Vacuum and Flow		
Vac (kPa)	**0m**	**30m**
20	more than 260 cc/min	more than 200 cc/min

Table 13. Vacuum and Flow

9. Troubleshooting

Troubleshooting of the SST4/SST5 is done through the **WatchGas Device Link Application maintenance** section.

This section will indicate what is functioning properly and what is broken.

- **5 stars** mean that the sensor performance is healthy .
- **4.5 stars** mean that the sensor performance is ok.
- **3.5 stars** mean that the sensor performance is poor.
- **2 stars** or fewer mean that the sensor performance is weak.

Once a sensor's performance falls to 3.5 stars, you should replace this sensor. Refer to the **Replacing a Sensor or Sensor Filter** section.

Problem	Possible Cause	Solution
Detector intermittently enters alarm without reason.	Ambient gas levels are near alarm setpoint, or the sensor is exposed to a puff of the target gas.	Detector is operating normally. Use caution in suspect areas. Check the peak (maximum) gas exposure reading.
	Alarm setpoints defined incorrectly.	Reset alarm setpoints. Refer to **Factory Gas Alarm Setpoints** and **Sensor Configuration**.
	Detector requires calibration.	Calibrate the sensors. Refer to **Calibration**.
	Missing or faulty sensor(s).	Replace the sensor. Refer to **Replacing a Sensor** or **Sensor Filter**.
Features and options are not operating as expected.	Changes have been made in the SST Range detector.	Verify that the settings in the SST Range detector are correct.
Charging		
The battery has been charging for 3 hours or 6 hours (SST4 pump). The charging indicator on the detector LCD shows the battery is still charging.	Battery is trickle charging.	The battery is fully charged and ready for operation.
The battery indicator does not display when charging.	Detector is depleted below normal levels.	Charge the battery for 4 hours. The device may need to be removed from the cradle a few times before it starts the deep charge.
When the detector is activated after charging, the battery indicator does not display.	Battery is defective.	Contact WatchGas.

Table 14. Troubleshooting

9.1 Failure Codes

In the table below, you can find all the failure codes and their most common causes:

ID	Library	Possible fault-cause
1	MOD_ID_HIBERNATE	EM4 devices malfunction
2	MOD_ID_TIMER	Basic ms-timer could not be started
3	MOD_ID_GPIO	One or more gpio-drivers reported an error. See also MOD_ID_EXP_ID2 and MOD_ID_EXP_SST4
4	MOD_ID_I2C0	N/A
5	MOD_ID_LCD	LCD-driver malfunction
6	MOD_ID_GAUGE	Gauge-device not found or wrong version. Might be caused by battery-pack not properly connected
7	MOD_ID_RTC	RT-device not found
8	MOD_ID_DATAFLASH	Dataflash-device not found or wrong version
9	MOD_ID_TEMP	Temperature-device not found or wrong version
10	MOD_ID_SWITCH	HALL-sensor not found or wrong version
11	MOD_ID_GENERAL	Storage-location of the general-configuration corrupt
12	MOD_ID_LOG	Storage-location of the logs corrupt
13	MOD_ID_SENSOR	Storage-location of the sensor-configuration corrupt
14	MOD_ID_TOX	Storage-location of the tox-configuration corrupt, errors during initialization of data
15	MOD_ID_LEL	Undefined lel-configuration, errors during initialization of used sensor
16	MOD_ID_ALARM	Errors during initialization of data for alarm-evaluation
17	MOD_ID_PUMP	Pressure-sensor not found or wrong version
18	MOD_ID_SESSION	Storage-location of the sessions corrupt, errors during initialization of data
19	MOD_ID_CMPL	Storage-location of the compliance-configuration corrupt
20	MOD_ID_STATISTICS	Storage-location of the statistics corrupt
21	MOD_ID_PUMPCTRL	Storage-location of the pump-control data corrupt
22	MOD_ID_USER	One or more user-devices (button, buzzer, vibrator, LCD) reported an error
23	MOD_ID_CMD	One or more communication-devices (NFC, protocol-handler) reported an error
24	MOD_ID_NFC	N/A
25	MOD_ID_EXP_ID2	Expansion-chip not found or different ID
26	MOD_ID_EXP_SST4	Expansion-chip not found or different ID

Table 15. Failure Codes

10. Spare Part Lists

10.1 SST4 Micro and Mini Spare Parts and Accessories List

Part Number	Description	Detail
SST-SPARE-H	WatchGas SST sensor H2S 0-500ppm for All (Hydrogen Sulfide)	0-500 ppm
SST-SPARE-M	WatchGas SST sensor CO 0-2000ppm for All (Carbon Monoxide)	0-2000 ppm
SST-SPARE-O	WatchGas SST sensor O2 0-25%vol. for All (Oxygen)	0-25% Vol
SST-SPARE-S	WatchGas SST sensor SO2 0-100ppm for All (Sulfur Dioxide)	0-100 ppm
SST-SPARE-X1	WatchGas SST sensor LPC LEL for SST4 Micro	0-100% LEL
SST-SPARE-X2	WatchGas SST sensor HP LEL CAT for SST4 Mini, Pump	0-100% LEL
SST-SPARE-X3	WatchGas SST sensor NDIR LEL for SST4 Mini, Pump	0-100% LEL
SST-SPARE-X4	WatchGas SST sensor LPC for SST4 Pump	0-100% LEL
SST4-POUL-10	SST4 Lanyard Bar, with screws, Pack of 10 (For Micro, Mini and Pump)	Stainless Steel
7189203-10	Layard, with breakaway feature, pack of 10	
SST4-MICRO-XFIL-10	SST4 External Filters for Micro, Pack of 10 (auxilary)	Filter for fine particulates
SST4-MINI-XFIL-10	SST4 External Filters for Mini, Pack of 10 (auxilary)	Filter for fine particulates
SST4-MICRO-CAL-CAP-10	Calibration Cap for Micro pack of 10	Pack of 10
SST4-MINI-CAL-CAP-10	Calibration Cap for Mini pack of 10	Pack of 10
SST-AG-10	WatchGas SST Replacement Alligator Clip pack of 10 for ALL with screws	
460039	Aluminium Carrying case (for SST4)	
SST4-MICRO-RB	Rubber boot with extra anker point	
SST-IND-S	WatchGas SST Induction Cradle charger with (SST-RCH) adapter	
SST-MULTI	Watchgas SST Range 6 Way USB-C Cable with 25Watt Charger with adapter	
SST-DISK-CHR	WatchGas Induction Disk Charger for SST Range with male usb-c cable	
SST-DISK-CHR-F	WatchGas Induction Disk Charger for SST Range with female usb-c port	
SST-RCH	WatchGas Charging Adapter with female usb-c connector port	
SST-STACK-CHR	WatchGas SST Range 5 Way Stackable Charging Cradle, max 4 can be coupled w/o CHR	
SST-5WSSC-CHR	WatchGas Adapter for SST-STACK-CHR can power 4 units	
SST-STACK-COU	SST Range Coupling Cable (link to couple charging stacks)	

Table 16. SST4 Micro and Mini Spare Parts and Accessories List

10.2 SST4 Pump Spare Parts and Accessories List

Part Number	Description	Detail
SST-SPARE-H	WatchGas SST sensor H2S 0-500ppm for All (Hydrogen Sulfide)	0-500 ppm
SST-SPARE-M	WatchGas SST sensor CO 0-2000ppm for All (Carbon Monoxide)	0-2000 ppm
SST-SPARE-O	WatchGas SST sensor O2 0-25%vol. for All (Oxygen)	0-25% Vol
SST-SPARE-S	WatchGas SST sensor SO2 0-100ppm for All (Sulfur Dioxide)	0-100 ppm
SST-SPARE-X2	WatchGas SST sensor HP LEL CAT for SST4 Mini, Pump	0-100% LEL
SST-SPARE-X3	WatchGas SST sensor NDIR LEL for SST4 Mini, Pump	0-100% LEL
SST-SPARE-X4	WatchGas SST sensor LPC for SST4 Pump	0-100% LEL
SST-AG-10	WatchGas SST Replacement Alligator Clip pack of 10 for ALL with screws	
SST4-POUL-10	SST4 Lanyard Bar, with screws, Pack of 10 (For Micro, Mini and Pump)	Stainless Steel
GA-PROB1-1	SST Range probe with hydrophobic and particulate filter need 5x8 Last-O-More tubing	
008-3015-200	RMT Teflon sample kit probe 26 CM with 3 Meters of tubing and built in filter	
008-3015-001	Aluminium Telescopic Probe and Carrying Pouch with PTFE tubing and luer	
GSR-07	Telescopic Probe up to 4m Extendable Body Last-O-More needed 3x5	
GSR-02	Carbon Fiber Probe, teflon insert 1 Meter 5 mm barb	
GSR-04-S-AK	Multifunctional Container Probe w/valve with 1 meter tubing/luer 5mm barb/tube holder	
RVS-G	Stainless Steel Robust Container Probe needs tubing 5mm barb	
560051	Flexible Mailbox Probe with 0.8 meter of Last-O-More tubing 3x5 and luer	
800-0000-006	Fiberglass telescopic 4m Rigid Probe w/filter/luer and Last-O-More tubing	
7182112	WatchGas Ball Float including 3x5 mm reductor needs tubing	
411-0018-038	Last-O-More Tubing 3x5 mm per Meter	
411-0018-039	Last-O-More Tubing 5x8 mm per Meter	
008-3022-010	Water-trap Filters Small pack of 10	
008-3022-100	Water-trap Filters Small -pack of 100	
45518-06	Male Luer 5/32” (5mm x 8mm) Pack of 25	
LAX26-PPO-25	Male Luer 1/8” (3mm x 5mm) Pack of 25	
7189201	Aspirator bulb/pump with flow control for diffusion models with 3 meters of tubing	
GFP-10	Motorized rechargeable ATEX pump for diffusion models (3x5mm tubing needed)	

Table 17. SST4 Pump Spare Parts and Accessories List

11. Contact details

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