

Safety Instructions

SS2100a TDLAS gas analyzer

ATEX:Zone 2



SS2100a TDLAS gas analyzer

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1 Introduction

Endress+Hauser’s SS2100a products are high-speed, diode laser-based extractive analyzers designed for extremely reliable monitoring of very low (trace) to standard concentrations of specific components in various background gases.


In order to operate the analyzer safely, it is important to closely review all information contained in the manuals related to system installation, operation and maintenance, as referenced in Associated Documents below. This manual is divided into the following sections:

- General Safety Instructions
- Equipment Installation
- Equipment Operation
- Equipment Maintenance and Service

1.1 Intended equipment use


The SS2100a analyzer is intended for use as instructed in the documentation package provided with the equipment. The information provided should be read and referenced by anyone installing, operating or having direct contact with the SS2100a analyzer. Any use of the equipment in a manner not specified by Endress+Hauser could impair the protection provided by the equipment.

1.2 How to use This manual

Take a moment to familiarize yourself with this manual by reading the Table of Contents → . This manual has been written to address the most common safety issues related to the installation and maintenance of the SS2100a analyzer. Additional information has been provided with the analyzer model purchased to instruct qualified users in the installation, operation and maintenance of the equipment.

Images, tables and charts have been included with instruction to provide a visual understanding of the analyzers and its functions. Special symbols are also used to provide the user with key information regarding the system configuration and/or operation. Users should pay close attention to this information.

1.2.1 Conventions used in this manual

In addition to the symbols and instructional information, this manual is created with “hot links” to enable the user to quickly navigate between different sections within the manual. These links include table, figure and section references and are identified by a pointing finger cursor  when rolling over the text. Simply click on the link to navigate to the associated reference.

1.3 Associated documents

Enclosed in your analyzer system order is the product Safety Instruction for your reference. Please review all necessary safety instructions before installing or operating your analyzer. This document is an integral part of the complete document package, which is listed in the following table.

Part Number	Document Type	Description
BA02163C	Operating Instruction	Provides a comprehensive overview of the analyzer and step-by-step installation instructions
GP01177C	Description of Device Parameters (FS 5.16)	Provides the user with an overview of the FS 5.16 firmware functionality
GP01180C	Description of Device Parameters (NS 5.14)	Provides the user with an overview of the NS 5.14 firmware functionality
EA01398C	NH3 Permeation Device Installation Instruction	Provides instructions for installing the NH3 permeation device into the Sample Conditioning System (SCS)
TI01668C	Technical Information	Provides technical data on the device with an overview of associated models available.

1.4 Manufacturer certificates

1.4.1 CE mark

The SS2100a TDLAS Gas Analyzer meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

1.4.2 Ex approval

The measuring device is certified for use in hazardous areas and the relevant safety instructions are provided in the separate "Safety Instructions" document. Reference is made to this document on the nameplate.

The Safety Instructions containing all the relevant explosion protection data is available from the Endress+Hauser website.

1.4.3 Area classifications



Model	Certifications
SS2100a TDLAS Gas Analyzer	SS2100a TDLAS Gas Analyzer Ex dc ec nA opis IIB+H2 T3, Gc, IP66 Tambient = -20 °C to +60 °C

1.5 Manufacturer address




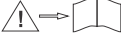
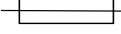


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2 General safety



2.1 Warnings






Structure of Information	Meaning
<p> WARNING</p> <p>Causes (/consequences) Consequences of noncompliance (if applicable) ▶ Corrective action</p>	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.</p>
<p> CAUTION</p> <p>Causes (/consequences) Consequences of noncompliance (if applicable) ▶ Corrective action</p>	<p>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.</p>
<p>NOTICE</p> <p>Cause/situation Consequences of noncompliance (if applicable) ▶ Action/note</p>	<p>This symbol alerts you to situations which may result in damage to property.</p>

2.2 Symbols

Symbol	Description
	The Laser Radiation symbol is used to alert the user to the danger of exposure to hazardous visible laser radiation when using the system. The laser is a class 1 radiation product.
	The High Voltage symbol that alerts people to the presence of electric potential large enough to cause injury or damage. In certain industries, high voltage refers to voltage above a certain threshold. Equipment and conductors that carry high voltage warrant special safety requirements and procedures.
	Protective Earth (PE). A terminal which is bonded to conductive parts of equipment for safety purposes and is intended to be connected to an external protective earthing system.
	This symbol refers the user to the technical documentation for more information.
	The Fuse symbol is found on the Measurement Accessory Controller (MAC) printed circuit board adjacent to the fuse holder.
	The Ex mark signals to Authorities Having Jurisdiction and end-users in Europe that the product complies with the essential ATEX Directive for explosion protection.
	The CE Marking indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA).

2.2.1 Symbols on this device

Symbol	Description
 <p>DANGER RISK OF FLAMMABLE OR TOXIC GAS MIXTURES <small>WARNING - USE DAMP CLOTH TO CLEAN LABEL TO AVOID STATIC ELECTRICITY DISCHARGE</small></p>	<p>The warning label will be affixed to the front side of all analyzer enclosures that contain sample gas. Hazards may vary by stream composition. One or more of the following conditions may apply:</p> <p>Flammable. Gases used in the processing of this analyzer may be extremely flammable. Any work in a hazardous area must be carefully controlled to avoid creating any possible ignition sources (e.g., heat, arcing, sparking, etc.).</p> <p>Toxins. Endress+Hauser analyzers measure a variety of gases, including high-level H₂S. Follow all safety protocols governing toxic gases and potential leaks.</p> <p>Inhalation. Inhaling toxic gases or fumes may cause physical damage or death.</p>
	Technicians are expected to follow all safety protocols established by the customer that are necessary for servicing or operating the analyzer. This may include, but is not limited to, lockout/tagout procedures, toxic gas monitoring protocols, personal protective equipment (PPE) requirements, hot work permits and other

Symbol	Description
	precautions that address safety concerns related to performing service or operation on process equipment located in hazardous areas.
	The High Voltage symbol alerts people to the presence of electric potential large enough to cause injury or damage. In certain industries, high voltage refers to voltage above a certain threshold. Equipment and conductors that carry high voltage warrant special safety requirements and procedures. Turn off and lock out system before servicing.
	Maximum voltage and current specifications for the fuse closest to label.
	PROTECTIVE EARTH GROUND – Symbol indicates the connection point of the ground wire from the main power source.
	FUNCTIONAL EARTH GROUND – Symbol indicates grounding points intended primarily for troubleshooting.
<p style="text-align: center;">CAUTION CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO THE BEAM</p>	INVISIBLE LASER RADIATION – Avoid exposure to beam. Class 3B Radiation Product. Refer servicing to the manufacturer or qualified personnel.
	Removing label from measurement cell optical head will void analyzer warranty.

2.3 Analyzer technical specifications

For the SS2100a analyzer, a set of technical specifications are provided that outline recommended equipment settings and ratings. This information is provided in Table 2-1 below.

2.3.1 Peripheral devices

For systems equipped with peripheral devices, e.g., probe assemblies, the documentation indicates that only devices that meet with the manufacturer's specifications may be used.

2.3.2 Equipment rating

The following equipment rating information is provided for the SS2100a below. This information includes, but is not limited to, the following:


- Supply voltage, power and current rating
- Description of all input connections
- Environmental conditions for which the equipment is designed (i.e., environmental temperature range, environmental relative humidity)
- Degree of ingress protection (IP)

SS2100a analyzer specifications

Performance	
Concentration	Refer to Calibration Certificate
Repeatability	Refer to Calibration Certificate
Response Time	Display updates vary from 4 to 16 seconds
Application Data	
Environmental Temperature Range	-20 °C to 50 °C (-4 °F to 122 °F) – <i>Standard</i> -10 °C to 60 °C – <i>Optional</i>
Heated SCS Enclosure Temperature	50 ± 5 °C - <i>Standard</i> 60 ± 5 °C - <i>Optional</i>
Analyzer Shipment and Storage Temperature	Trace H ₂ O Analyzers: >0 °C (32 °F) All other analyzers: ≥ -20 °C (-4 °F)
Environmental Relative Humidity	5% to 95%, Non-condensing
Altitude	Up to 2000 m (6,550 ft.)
Pressure to Cell ¹	70 kPaG (10 PSIG) - max to spectrometer cell
Sample Cell Pressure Range ¹	800 to 1200 mbar - <i>Standard</i> 950 to 1700 mbar - <i>Optional</i>
Sample Flow Rate ¹	0.5 to 4 SPLM (0.02 to 0.1 SCFM)
Electrical & Communications	
Input Power (Electronics) ²	120 or 240 VAC ± 10%, 50/60 Hz; 60W max. (with 2 solenoids)

¹Application dependent.

²Supply voltage not to exceed ± 10% of nominal. Transient over-voltages according to Over-voltage category II.

Input Power (Sample Cabinet) ¹	120 or 240 VAC ± 10%, 50/60 Hz - <i>Standard</i> 100W or 200W max for heated systems
Analog Communication	Isolated Analog channels, 1200 ohms at 24 VDC max <i>Outputs:</i> (2) 4–20 mA (measurement value) <i>Inputs:</i> (1) 4–20 mA (pipeline pressure) ¹
Serial Communication	Ethernet & RS-485 half-duplex
Digital Signal	<i>Outputs:</i> (5) Hi/Lo Alarm, General Fault, Validation Fail ¹ , Validation 1 Active ¹ , Validation 2 Active ¹ <i>Inputs:</i> (2) Flow Alarm ¹ , Validation Request ¹
LCD Display	Concentration, cell pressure and temperature, diagnostics
Physical Specifications	
Electronics Enclosure	IP66 Copper-Free Aluminum with Weather Resistant Polyester Powder Coating, 80 to 120 micron thickness
SCS Enclosure	IP66 (min) 304 or 316L stainless steel
Sample Cell Construction	316L series polished stainless steel (standard)
Analyzer Dimensions	1628 mm H x 762 mm W x 427 mm D (64.1 in x 30.0 in. W x 16 13/16 in. D)
Analyzer Weight (typical) ³	Approximately 130 kg (286 lbs)
Area Classification	
Certification	 II 3 G Ex dc ec nA opis IIB+H2 T3, Gc, IP 66, EMC Directive 2014/30/EU, ATEX Directive 2014/34/EU

2.4 Potential risks affecting personnel

This section addresses the appropriate actions to undertake when faced with hazardous situations during or before service of the analyzer. It is not possible to list all potential hazards within this document. The user is responsible for identifying and mitigating any potential hazards present when servicing the analyzer.

NOTICE

- ▶ Technicians are expected to be trained and follow all safety protocols that have been established by the customer in accordance with the area hazard classification to service or operate the analyzer and MAC controller.
- ▶ This may include, but is not limited to, toxic and flammable gas monitoring protocols, lockout/tagout procedures, the use of PPE requirements, hot work permits and other precautions that address safety concerns related to the use and operation of process equipment located in hazardous areas.

³Application dependent.

2.4.1 Personnel responsibility

Operatives/technicians shall possess, to the extent necessary to perform their tasks, the following:

- Understanding of the general principles of explosion protection
- Understanding of those aspects of equipment design that affect the protection concept
- Understanding of the certificate contents and relevant parts of the standard associated with the product
- General understanding of inspection and maintenance requirements of IEC 60079-17
- Familiarity with the particular techniques to be employed in the selection and installation of equipment in the standard
- Understanding of the additional importance of permit to work systems and safe isolation in relation to explosion protection

2.5 Mitigating risks

Refer to the instructions for each situation listed below to mitigate associated risks.

2.5.1 Exposure to process gases

1. Shut off the process gas to the gas analyzer before any service that would require opening a part of the sample plumbing.
2. Purge the system with nitrogen.
3. Shut off the nitrogen purge before opening any part of the sample system.

2.5.2 Exposure to toxic gas (H₂S)

Follow the procedure below if there has been any suspected leak from the sample system and accumulated SCS enclosure.

1. Purge the SCS enclosure to remove any potentially toxic gas.
2. Test the H₂S levels of the SCS enclosure using the port from the safety purge kit to ensure the purge has cleared any toxic gas.
3. If no gas leak is detected, open the SCS enclosure door.

CAUTION

- ▶ Follow all safety protocols governing toxic gases and potential leaks.

2.5.3 Electrocutation hazard

1. Shut off power at the main disconnect external to the gas analyzer.

WARNING

- ▶ Complete this action before performing any service that requires working near the main input power or disconnecting any wiring or other electrical components.
 - ▶ If service must be performed with power engaged (gain adjustment, etc.), note any live electrical components and avoid all contact with them.
2. Open enclosure door.
 3. Only use tools with a safety rating for protection against accidental contact with voltage up to 1000V (IEC 900, ASTF-F1505-04, VDE 0682/201).

2.5.4 Explosion hazard

Any work in a hazardous area must be carefully controlled to avoid creating any possible ignition sources (e.g., heat, arcing, sparking, etc.). All tools must be appropriate for the area and hazards present. Electrical connections must not be made or broken with power on (to avoid arcing).

3 Installation

CAUTION

The safety of the analyzer is the responsibility of the installer and the organization they represent.

- ▶ Use appropriate protective safety equipment as recommended by local safety codes and practices, such as hard hat, steel-toe shoes, or gloves. Exercise caution, particularly when installing equipment at a height (≥ 1 m above ground).

3.1 Lifting/carrying the gas analyzer

Due to the gas analyzer’s size and weight (configurations weigh approximately 130 kg [286 lbs]), Endress+Hauser recommends the use of a forklift, pallet jack, etc. to lift and/or move the gas analyzer. If the gas analyzer is to be lifted by hand, designate multiple individuals and distribute the weight among personnel to avoid injury.

Before removing from the crate, move the analyzer as close as possible to the final installation location. Never lift the gas analyzer by the electronics enclosure. Always carry the load using one of the following points/methods. Refer to the figure below.

- Cross members on Unistrut frame
- Support beneath instrument (best used when employing a forklift)

CAUTION

- ▶ Always use a lifting truck or a forklift to transport the analyzer. Two people are needed for the installation.
- ▶ Ensure all equipment used for lifting/moving the analyzer is rated for the weight load.
- ▶ Lift the device by the recessed grips.

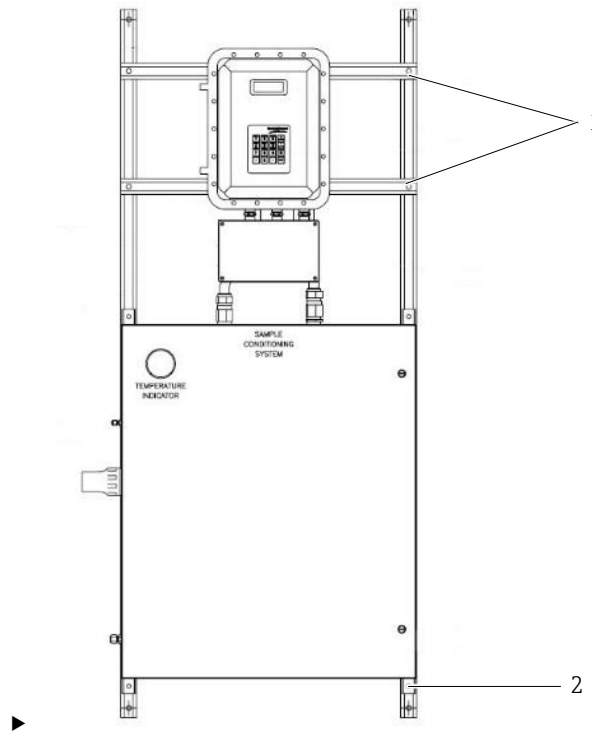


Figure 1: Lifting points for the SS2100a gas analyzer

#	Description
1	Cross members
2	Base support

3.2 Mounting the analyzer

The SS2100a gas analyzer is manufactured for wall or Unistrut® (or equivalent) metal framing installations. Typically, the SS2100a will come mounted on a Unistrut frame that can be installed on a wall. For detailed mounting dimensions, refer to the SS2100a Operating Instruction → 1.

⚠ CAUTION

- ▶ When mounting the analyzer, be sure to position the instrument so that it is not difficult to operate adjacent devices. Allow 1 meter (3 feet) of room in front of the analyzer and any switches.

3.3 Electrical wiring requirements

Check the manufacturing data label or the terminal block labels to determine the power input requirements. All work should be performed by personnel qualified in electrical installation. To consult the wiring diagrams in the system drawings, refer to the SS2100a Operating Instruction → 1.

NOTICE

The installer is responsible for complying with all local installation codes.

- ▶ Cables used shall comply with electrical code, standards, be suitable for the glands and meet the local regulations.
- ▶ An approved switch or circuit breaker rated for 15 amps should be used and clearly marked as the disconnecting device for the analyzer.
- ▶ Because the breaker in the power distribution panel or switch will be the primary means of disconnecting the power from the analyzer, the power distribution panel or switch should be located in close proximity to the equipment and within easy reach of the operator.

⚠ WARNING

Hazardous voltage and risk of electric shock.

- ▶ Failure to properly ground the analyzer may create a high-voltage shock hazard.

3.3.1 External circuit breaker requirements

3.4 Protective chassis and ground connections

Before connecting any electrical signal or power, the protective and chassis grounds must be connected. Requirements for the protective and chassis grounds include the following:

- Protective and chassis grounds must be of equal or greater size than any other current-carrying conductors, including the heater located in the sample conditioning system
- Protective and chassis grounds to remain connected until all other wiring is removed
- Insulated protective and chassis ground wiring must use the green/yellow color
- Protective grounding wire current carrying capacity must be at minimum the same as the main supply
- Earth bonding/chassis ground shall be at least 12 AWG (4 mm²)

3.4.1 Color coding

Green-and-yellow insulation shall only be used for:

- Protective earth conductors
- protective bonding conductors
- potential equalization conductors for safety purposes
- functional earth

3.5 Connections to the supply

Use the following procedure to connect the sample supply line.

Consult the layout and flow diagrams in the system drawings. All work must be performed by technicians qualified in pneumatic tubing.

⚠ WARNING

Process samples may contain hazardous material in potentially flammable or toxic concentrations.

- ▶ Personnel shall have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before connecting the gas supply.

Using 1/4 in. O.D x 0.035 in. wall thickness, seamless stainless steel tubing is recommended. Refer to the system layout drawings for supply and return port locations.

3.5.1 To connect the sample supply line

⚠ WARNING

Consult sample probe manufacturer instructions for proper installation procedures.

- ▶ Personnel should have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.
 - ▶ The process sample at the sample tap may be at a high pressure. Use extreme caution when operating the sample probe isolation valve and field sample reducing pressure regulator.
 - ▶ All valves, regulators, and switches should be operated in accordance with site lockout/tagout procedures.
 - ▶ Do not exceed 10 PSIG (0.7 barg) in sample cell. Damage to cell may result.
1. Connect the supply and return tubes to the analyzer using the stainless steel compression-type fittings provided.
 2. Tighten all new fittings 1-1/4 turns with a wrench from finger tight. For connections with previously swaged ferrules, thread the nut to the previously pulled up position, then tighten slightly with a wrench. Secure tubing to appropriate structural supports as required.
 3. Check all connections for gas leaks. Using a liquid leak detector is recommended.

3.6 Ventilation requirements

There are no special requirements for ventilation of the analyzer. For information related to mitigating risks associated with process gases, etc → 7.

4 Equipment operation

This chapter provides an overview of safety operational instructions for the SS2100a analyzer.

CAUTION

- ▶ The safety of the analyzer is the responsibility of the installer and the organization they represent.

4.1 Firmware version

Each Endress+Hauser analyzer operates based on its own version of firmware. The firmware version for each analyzer is listed in the system calibration report and displays upon start-up of the analyzer. Description of Device Parameters can be found on the Endress+Hauser website (www.endress.com).

4.2 Operating controls

The front panel mounted keypad enables the operator to modify measurement units, adjust operational parameters, and perform diagnostics. These instructions are found in the appropriate Description of Device Parameters.

During normal operation, the LCD continuously displays the measured component’s concentration, sample cell temperature, and sample cell pressure.

To activate any functions on the keypad, press the mode key # followed by a number on the keypad to specify a mode. You must press the # key before pressing a number or function key to trigger a response from the keypad.

When you press the # key, the words <MODE MENU> display on the LCD. If the keypad watchdog is enabled, a countdown timer will begin when <MODE MENU> displays. If the countdown expires and no buttons have been pressed, the analyzer will automatically revert to **Mode 1**.

The * key functions as the “Enter” key. When in **Mode 2**, always press * after entering a value using the keypad (unless the entry was made in error). Pressing the * key stores the displayed parameter value and cycles the LCD to the next parameter.

If you do make an error, press the * key followed by the TEST key, and then the * key to return to the parameter and enter the correct value.

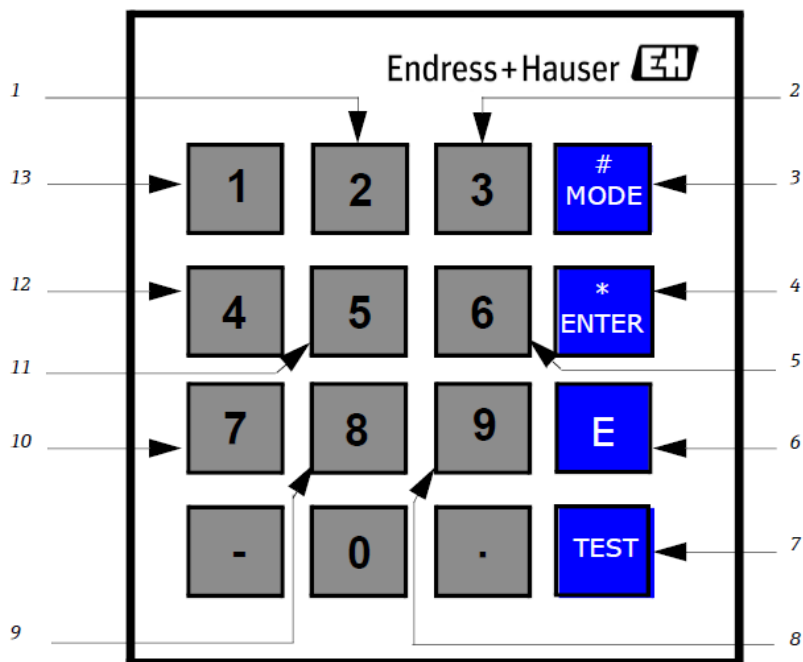


Figure 2: Keypad for ATEX-certified analyzers

1	Change parameters
2	Scrubber life data
3	Mode menu key
4	Enter key
5	Export diagnostic data
6	Exponent value
7	Scroll direction and analog input test

8	Validation results
9	Activate validation 2
10	Activate validation 1
11	Analog output test
12	Diagnostics parameters
13	Activate process gas

4.3 Intermittent operation

4.3.1 To isolate the measurement cell for short-term shutdown

The analyzer can be isolated from the primary sample bypass section for short-term shutdown or maintenance of the analyzer while allowing the sample bypass flow to continue in a steady-state mode.

CAUTION

Due to the high pressure of the process sample, it is advisable to allow the sample bypass flow to continue during short-term isolation of the analyzer.

- ▶ Continuing sample bypass flow allows the field pressure regulator to continue normal operation without possible overpressure and activation of the relief valve in the event the pressure regulator leaks when the downstream flow is discontinued.

1. Close the sample flow meter metering valve (adjustment knob turned clockwise) for each measurement channel. Do not overtighten the metering valves or damage could occur.
2. Allow any residual gas to flow out of the measurement cells.

NOTICE

- ▶ Never purge the analyzer with air or nitrogen while the system is powered up.
- ▶ If the system will not be out of service for an extended period, it is advised that power remain applied to the sample transport line electric tracer, if applicable, and the sample system enclosure heater.

3. Close the low pressure flare or atmospheric vent header shut-off valve for the effluent from each measurement cell.

4.3.2 To isolate the SCS for short-term shutdown

The SCS can be isolated from the process sample tap for short-term shutdown or maintenance of the SCS without requiring the shutdown of the field pressure reducing station.

WARNING

Process samples may contain hazardous material in potentially flammable and toxic concentrations.

- ▶ Personnel should have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.

Although the pressure reducing regulator at the process sample tap is designed for “bubble-tight” shut off, this condition may not occur after the system has been in operation for an extended period. Isolation of the SCS from the field pressure regulator will discontinue sample flow and may cause the pressure at the outlet of the field pressure regulator to slowly increase if “bubble-tight” shut off of the pressure regulator does not occur. The slow pressure increase will continue until the pressure setpoint of the relief valve is reached and the excess pressure is vented by the relief valve. Although this situation is not intended, it does not cause a significant problem if the SCS is only isolated for a short period. Only a small amount of process sample will be vented when the relief valve opens because the pressure regulator will continue to act as a flow restriction.

1. Close the sample supply shut-off valve to the SCS.
2. Allow the sample bypass to flow until all residual gas has dissipated from the lines as indicated by no flow on the sample bypass flow meter.
3. Close the low pressure flare or atmospheric vent header shut-off valve for the effluent from the sample bypass.
4. Turn off power to the analyzer.

NOTICE

- ▶ If the system will not be out of service for an extended period, it is advised that power remain applied to the sample transport line electric tracer, if applicable, and the sample system enclosure heater.

5 Equipment maintenance and service

This chapter provides safety information for the maintenance and service of the SS2100a analyzer.

5.1 Potentially hazardous substances

SS2100a analyzers that detect H₂S can acquire leaks that lead to unsafe amounts of toxic gas. For more information → 8.

5.1.1 Disposal of hazardous substances



WARNING

Process samples may contain hazardous material in potentially flammable and toxic concentrations.

- ▶ H₂S scrubbers and scrubber indicators contain Copper (II) Oxide [CAS# 1317-38-0] and basic cupric carbonate [CAS# 12069-69-1], which are harmful if swallowed and toxic to aquatic organisms. Handle with care and avoid contact with the internal substances.

For analyzers equipped with H₂S scrubbers, discard used scrubber and scrubber indicator in an appropriate leak-proof receptacle 25.

5.2 Instructions for cleaning and decontamination

5.2.1 To keep the sampling lines clean

1. Make sure that a membrane separator filter (included with most systems) is installed ahead of the analyzer and operating normally. Replace the membrane if necessary.



NOTICE

- ▶ If liquid enters the cell and accumulates on the internal optics, a Laser Power too Low fault message at the display will result.
2. Turn off the sample valve at the tap in accordance with site lock-out, tag-out rules.
 3. Disconnect the gas sampling line from the sample supply port of the analyzer.
 4. Wash the sampling line with isopropyl alcohol or acetone and blow dry with mild pressure from a dry air or nitrogen source.
 5. Once the sampling line is completely free of solvent, reconnect the gas sampling line to the sample supply port of the analyzer.
 6. Check all connections for gas leaks. Using a liquid leak detector is recommended.

5.2.2 To prevent electrostatic discharge

1. Use a damp cloth to clean the displays to avoid static electricity discharge.

5.3 Replacement parts

All parts required for operation of the SS2100a analyzer must be supplied by Endress+Hauser or an authorized agent. For contact information to determine specific parts listing for the purchased model 25.

5.4 Fuse ratings and characteristics



Hazardous voltage and risk of electric shock. Turn off and lock out system power before opening the electronics enclosure and making any connections.



If you need to replace a fuse, use only the same type and rating of fuse as the original. Refer to specifications listed in Fuse specifications for 120 VAC systems or Fuse specifications for 240 VAC systems below.

For an illustration of the fuse location in the electronics assembly, refer to the SS2100a Operating Instruction → 1.

Fuse specifications for 120 VAC systems

Drawing Reference	Description	Rating
F3	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.6 A
F4 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.5 A



F5 ⁴ , F6 ¹ , F7 ¹ , F8 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.1 A
F9 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.0A
F10 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/2.0 A

Fuse specifications for 240 VAC systems

Drawing Reference	Description	Rating
F3	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.6 A
F4 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.5 A
F5 ⁵ , F6 ¹ , F7 ¹ , F8 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.1 A
F9 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.0A
F10 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.2 A

5.5 Replacing the membrane separator

Use the following steps to replace a membrane separator.

1. Close the sample supply valve.
2. Unscrew the cap from the membrane separator.

If the membrane filter is dry:

1. Check if there are any contaminants or discoloring of the white membrane. If yes, the filter should be replaced.
2. Remove the O-Ring and replace the membrane filter.
3. Replace the O-Ring on top of the membrane filter.
4. Place the cap back onto the membrane separator and tighten.
5. Check upstream of the membrane for liquid contamination and clean and dry out before re-opening the sample supply valve.

If liquid or contaminants are detected on the filter:

1. Drain any liquids and clean with isopropyl alcohol.
2. Clean any liquids or contaminants from the base of the membrane separator.
3. Replace the filter and the O-Ring.
4. Place the cap onto the membrane separator and tighten.
5. Check upstream of the membrane for liquid contamination and clean and dry out before re-opening the sample supply valve.
6. Check connections for gas leaks. Using a liquid leak detector is recommended.

5.6 Replacing the filter

⁴Housed in fuse terminal blocks. Illuminated LED indicates blown fuse.

⁵Housed in fuse terminal blocks. Illuminated LED indicates blown fuse.

If necessary, use the following steps to replace the filter:

1. Close the sample supply valve.
2. Unscrew the four screws with a 5/23 in. screwdriver from the base of the filter. Remove the filter unit from the analyzer for disassembly.
3. Unscrew and remove the filter cap.
4. Remove the top O-Ring.
5. Check if there are any contaminants or solid components blocking the metal filter.
6. Drain any contaminants found
7. and clean with isopropyl alcohol.
8. Replace the top O-Ring.
9. Place the filter cap back into position and tighten.
10. Place the filter unit into the analyzer and tighten the base with the four screws.
11. Check upstream of membrane for liquid contamination and clean and dry out before opening the sample supply valve.
12. Check connections for gas leaks. Using a liquid leak detector is recommended.

5.6.1 Replacing the scrubber and scrubber efficiency indicator

WARNING

Process samples may contain hazardous material in potentially flammable and toxic concentrations.

- ▶ Personnel should have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.
 - ▶ All valves, regulators, and switches should be operated in accordance with site lockout/tagout procedures.
1. Close the sample supply shut-off valve.
 2. Allow all residual gas to dissipate as indicated by no flow on the sample bypass flow meter.
 3. Unscrew the compression nuts on the inlet end of the scrubber and scrubber efficiency indicator assembly.
 4. To install the new scrubber and indicator, insert the inlet and outlet tubes into the compression fittings of a new scrubber and scrubber efficiency indicator assembly, ensuring each are oriented correctly, according to the flow pattern shown below.

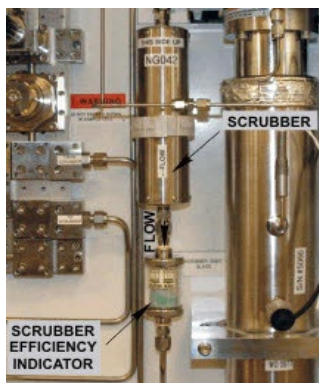


Figure 3: Scrubber and scrubber efficiency indicator

5. Tighten all new fittings 1-1/4 turns with a wrench from finger tight. For connections with previously swaged ferrules, thread the nut to the previously pulled up position, then tighten slightly with a wrench.
6. Reset the scrubber lifetime monitor with the **New Scrub Installed** parameter and the **General Fault Alarm** with the Reset option for the **General Alarm DO** parameter (see **“To change parameters in Mode 2”** in the Description of Device Parameters for your analyzer).
7. Restart the SCS.
8. Check all connections for gas leaks. Using a liquid leak detector is recommended.
9. Re-validate the system with an appropriate gas standard following the instructions under **“Validating the Analyzer”** in the Description of Device Parameters for your analyzer.
10. Purge the scrubber and scrubber efficiency indicator assembly with nitrogen to remove all flammable gas and cap the inlet and outlet.

5.7 Disposal of used scrubbers

WARNING

Process samples may contain hazardous material in potentially flammable and toxic concentrations.

- ▶ Depleted H₂S scrubbers and scrubber indicators contain predominantly Copper (II) Sulfide [CAS# 1317-40-4] with some remaining Copper (II) Oxide [CAS# 1317-38-0] and basic cupric carbonate [CAS# 12069-69-1], each of which are odorless dark powders that require few special precautions other than avoiding contact with the internal substances, keeping the scrubber tightly sealed and protecting the contents against humidity.

5.7.1 To dispose of used scrubbers

2. Discard used scrubber and scrubber indicator in an appropriate leak-proof receptacle.

5.8 Service

For Service, refer to our website for the list of local sales channels in your area (<https://www.endress.com/contact>).

5.8.1 Service repair order

If returning the unit is required, obtain a **Service Repair Order (SRO) Number** from a Sales channel representative before returning the analyzer to the factory. Your representative can determine whether the analyzer can be serviced on site or should be returned to the factory. All returns should be shipped to:

Endress+Hauser
11027 Arrow Rte.
Rancho Cucamonga, CA 91730-4866
United States of America
1-909-948-4100

www.addresses.endress.com
