

Safety Instruction

SS2100 TDLAS Gas Analyzer

Class I, Div.2 Group A, B, C, D T3 / T3C

Class I, Zone 2 IIC T3 / T3C

Type 4X, IP66



SS2100 TDLAS gas analyzer

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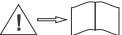
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Warnings

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>

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 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.
	The WEEE symbol indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.
	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.

U.S. export compliance

The policy of Endress+Hauser is in strict compliance with U.S. export control laws as detailed on the website of the [Bureau of Industry and Security](#) at the U.S. Department of Commerce.

1 Introduction

Endress+Hauser's SS2100 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 this manual. This manual is divided into the following sections:


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

1.1 Using this manual

Take a moment to familiarize yourself with the content in 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 operation of the SS2100 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.

1.1.1 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.

1.2 Associated documents

Enclosed in your analyzer system order is the product Safety Manual 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
BA02191C	Operating Instruction H ₂ S	A complete overview of the operations required to install, commission and maintain the SS2100 H ₂ S TDLAS Gas Analyzer.
BA02192C	Operating Instruction Trace Moisture	A complete overview of the operations required to install, commission and maintain the SS2100 Trace Moisture TDLAS Gas Analyzer.
TI01667C	Technical Information	Provides technical data on the device with an overview of associated models available.
GP01177C	Description of Device Parameters	Provides the user with an overview of the FS 5.16 firmware functionality.
GP01180C	Description of Device Parameters	Provides the user with an overview of the NS 5.14 firmware functionality.

¹Order-specific documentation is located by analyzer serial number (SN)

- For additional instruction manuals, refer to the Endress+Hauser website to download the published documentation: www.endress.com

1.3 Manufacturer address

Endress+Hauser
 11027 Arrow Route
 Rancho Cucamonga, CA 91730
 United States
www.endress.com

2 General safety information

This chapter reviews the general safety instructions for every SS2100 analyzer.

2.1 Intended equipment use

The SS2100 analyzer is intended for use as instructed in the documentation package provided with the equipment. Reading and referencing the documentation when installing, operating or having direct contact with the SS2100 analyzer is recommended. Any use of the equipment in a manner not specified by Endress+Hauser could impair the protection provided by the equipment.



The safety of the analyzer is the responsibility of the installer and the organization they represent. Incorrect transportation can cause injury and damage the device.


- Always use a lifting truck or a fork-lift 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.

2.2 Warning labels

Equipment labels are adhered to the SS2100 analyzer to alert the user of potential hazards. Instructional symbols are also used in the equipment manuals to indicate potential hazards, important information and valuable tips, and may not be labeled on the analyzer. Following are the equipment labels and instructional symbols with associated warning and caution types to observe when operating the analyzer.

2.2.1 Symbols on this device

Symbol	Description
	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: 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.). Toxins. Endress+Hauser analyzers measure a variety of gases, including high-level H ₂ S. Follow all safety protocols governing toxic gases and potential leaks. Inhalation. Inhaling toxic gases or fumes may cause physical damage or death.
	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 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.
	INVISIBLE LASER RADIATION – Avoid exposure to beam. Class 3B Radiation Product. Refer servicing to the manufacturer or qualified personnel.

Symbol	Description
	Removing label from measurement cell optical head will void analyzer warranty.

2.3 Analyzer technical specifications

2.3.1 Peripheral devices

For systems equipped with peripheral devices, e.g., probe assemblies, refer to documentation provided by the manufacturer for instruction on installation, operation, etc.

2.3.2 Equipment ratings

Equipment rating information for the SS2100 analyzer is included in the table. 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)

Electrical & Communications	
Input Voltages (Electronics) ¹	AC 120 V or AC 240 V ±10%, 50 to 60 Hz, 60 W (2 power connections) – <i>Standard</i> DC 18 to 24 V, 1.6 A maximum – <i>Optional</i>
Input Voltages (SCS Heater, Optional)	AC 120 V or AC 240 V +/-10%, 50 to 60 Hz single phase, 200 W
Maximum Current	2 A maximum at AC 120 V 1 A maximum at AC 240 V 1.6 A maximum at AC 24 V
DO Contact Rating (Inductive Load)	AC 250 V, 3 A NO contact, 1.5 A NC contact DC 24 V, 1 A NO and NC contact
Communication	Analog: (2) 4-20 mA Isolated, 1200 ohms at 24 VDC maximum (concentration only) – <i>Optional</i> Serial: RS-232C and Ethernet Protocol: Modbus Gould RTU or Daniel RTU or ASCII
Digital Output	(5): Concentration Alarm, General Fault, Validation Fail ² , Validation 1 Active ² , Validation 2 Active ²
Application Data	
Environmental Temperature Range/Sample Cell Temperature Range	-20 °C to 50 °C (-4 °F to 122 °F) -10 °C to 60 °C (14 °F to 140 °F) - <i>Optional</i>

¹Supply voltage not to exceed ±10% of nominal.
²Application dependent.

Environmental Relative Humidity	5% to 95%, Non-condensing
Heated SCS Enclosure Temperature	50 °C (122 °F) 60 °C (140 °F) – <i>Optional</i>
Altitude	Up to 2,000 m
Sample Inlet Pressure	130 to 340 kPaG (20 to 50 psig) to panel
Sample Cell Operating Pressure Range	800 to 1200 mbara (80 to 120 kPa)(11.5 to 17.4 PSIA) 950 to 1700 mbara (95 to 170 kPa)(13.8 to 24.6 PSIA) - <i>Optional</i>
Sample Flow Rate ²	0.5 to 4 SLPM (0.02 to 0.1 SCFM)
Physical Specifications	
Size (typical) ¹	1300 to 1500 mm H × 600 to 920 mm W × 300 to 450 mm D (50 to 60 in. H × 24 to 36 in. W × 12 to 17 in. D)
Weight (typical) ¹	Approximately 59 Kg (130 lbs) with Sample System
Area Classification	
Analyzer with Sample Conditioning System (SCS)	Class I, Division 2 Group A, B, C, D T3 / T3C Class I, Zone 2 IIC T3 / T3C Type 4X, IP66

1. Supply voltage not to exceed ±10% of nominal.
2. Application dependent.

2.4 Potential risks affecting personnel

⚠ WARNING

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.

- ▶ This may include, but is not limited to, toxic and flammable gas monitoring protocols, lockout/tagout procedures, the use of personal protective equipment (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.

²Application dependent.

This section addresses the appropriate actions to undertake before or during service of the analyzer when faced with hazardous situations such as exposure to process gases, electrocution, explosion or fire. 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.

2.4.1 Personnel responsibility

NOTICE

- ▶ The safety of the analyzer is the responsibility of the installer and the organization he/she represents.

2.5 Mitigating risks

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

2.5.1 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.

2.5.2 Electrocution hazard

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

If service must be performed with power engaged:

1. Note any live electrical components and avoid all contact with them.
2. 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).

2.5.3 Explosion/fire 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 Equipment installation

The information in this chapter is related to safety during the equipment installation.

WARNING

Endress+Hauser Class I Division 2 analyzers use a non-incendive protection method, and as such all portions of the local installation codes apply.

- ▶ The maximum allowed inductance to resistance ratio (L/R ratio) for the field wiring interface must be less than 25 $\mu\text{H}/\Omega$. The maximum total loop capacitance shall be 0.27 microfarads.
- ▶ An approved switch or circuit breaker rated for 15 amps should be used and clearly marked as the disconnecting device for the analyzer.
- ▶ The power distribution panel or switch should be located in close proximity to the equipment and within easy reach of the operator. A switch or circuit breaker shall not interrupt a protective earth ground.
- ▶ All electrical work must be performed by qualified personnel.

3.1 Mounting the analyzer

The SS2100 is manufactured for wall or Unistrut® (or equivalent) metal framing installations. Refer to the detailed mounting dimensions in the drawings provided in the Operating Instruction or as-built drawings for the purchased SS2100 analyzer model.

CAUTION

Intense sun exposure in some areas may cause the analyzer temperature to exceed the maximum.

- ▶ Endress+Hauser analyzers are designed for operation within the specified ambient temperature range.

3.1.1 Lifting/carrying the analyzer

Due to the analyzer’s size and weight (59 Kg./130 lbs.), using of a forklift, pallet jack, etc. to lift and/or move the analyzer is recommended. If the 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 analyzer by the electronics enclosure or conduit runs. Always carry the load using one of the following points/methods (refer to the drawings included with the purchased SS2100 analyzer model):

- Mounting points on Unistrut frame
- 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.

NOTICE

Bolts or screws used for wall-mounting the SS2100 must be able to support four times the weight of the instrument (approximately 59 to 154 kg [or 130 to 340 lbs] with sample system).

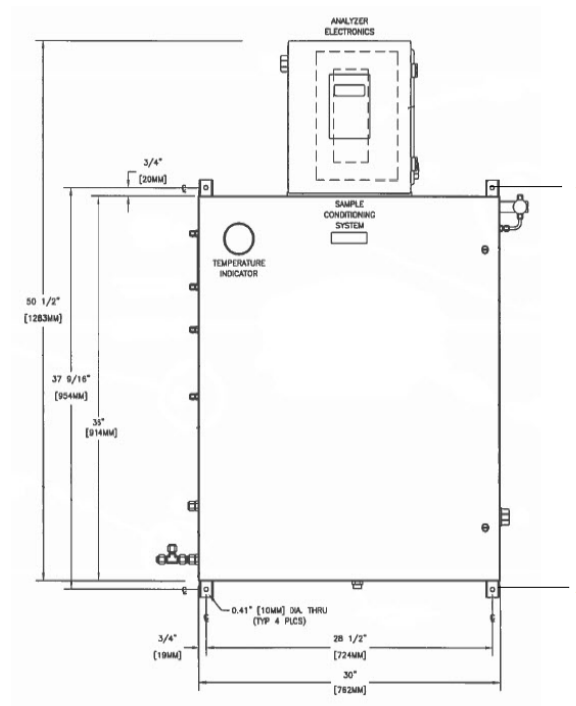


Figure 1: Lifting points for the SS2100 H₂S analyzer (1)

3.2 Electrical wiring requirements

CAUTION

Interconnection of the analyzer enclosure and sample system enclosure shall be accomplished using wiring methods approved for Class 1, Division 2 hazardous locations as per the Canadian Electrical Code (CEC) Appendix J and the National Electric Code (NEC) Article 501, or methods described in the Standard IEC/EN 60079-0 and IEC/EN 60079-14.

- ▶ The installer is responsible for complying with all local installation codes.
- ▶ Certified glands and cables should be used where appropriate in compliance with local regulations.
- ▶ Use copper conductors only.

3.2.1 External circuit breaker requirements

NOTICE

Thread lubricant must be applied on all conduit hub threaded connections. Using STL8 lubricant on all conduit screw thread and it's taped openings is recommended.

3.3 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)

3.3.1 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

3.4 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 and toxic concentrations.

- ▶ Personnel should have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before installing the SCS.
- ▶ All following work must be performed by technicians qualified in pneumatic tubing.

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.


3.4.1 To connect the sample supply line

WARNING

- ▶ Use extreme caution when operating the sample probe isolation valve and field sample reducing pressure regulator.
 - ▶ Consult sample probe manufacturer instructions for proper installation procedures.
 - ▶ All valves, regulators, switches, etc. should be operated in accordance with site lockout/tagout procedures.
 - ▶ Do not exceed 0.7 barg (10 psig) in the sample cell. Damage to cell may result.
1. First confirm that the sample probe is correctly installed at the process supply tap and that the sample probe isolation valve is closed. Also, confirm that the field pressure reducing station is installed properly at the sample probe and that the pressure regulator at the field pressure reducing station is closed (adjustment knob turned fully counterclockwise).
 2. Check that the relief valve vent line is properly installed from the field pressure reducing station to the low pressure flare or atmospheric vent connection.

3. Determine appropriate tubing route from the field pressure reducing station to the SCS.
4. Run stainless steel tubing from the field pressure reducing station set for the specified supply pressure to the sample supply port of the SCS.
5. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings.
6. Fully ream all tubing ends. Blow out the line for 10 to 15 seconds with clean, dry nitrogen or air prior to making the connection.
7. Connect the sample supply tube to the SCS using the 1/4 in. stainless steel compression-type fitting provided.
8. 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.
9. Check all connections for gas leaks. Using a liquid leak detector is recommended.

3.5 Ventilation Requirements

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

4 Equipment operation

This chapter provides an overview of safety operational instructions for the SS2100 analyzer.

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. The CSA keypad is shown in the figure below. To activate any functions on the keypad, press the mode key # followed by a number on the keypad to specify a mode.

NOTICE

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.

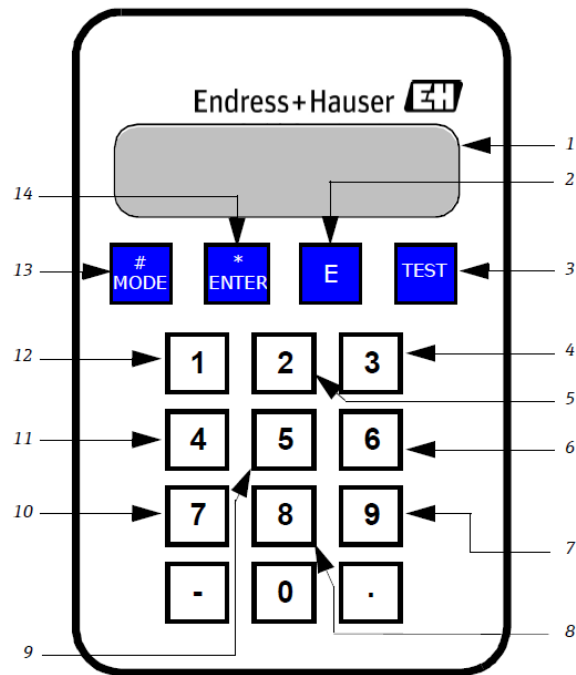


Figure 2: Keypad for CSA-certified

- | | |
|---|----------------------------|
| 1. LCD (Display) | 8. Activate Validation 2 |
| 2. Exponent value | 9. Analog output test |
| 3. Scroll direction and analog input test | 10. Activate Validation 1 |
| 4. Scrubber life data | 11. Diagnostics parameters |
| 5. Change parameters | 12. Activate process gas |
| 6. Export diagnostic data | 13. Mode menu key |
| 7. Validation Results | 14. Enter key |

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.

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.

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 and the sample system enclosure heater.

WARNING

- ▶ Never purge the analyzer with air or nitrogen while the system is powered up.
- ▶ Do not over-tighten the control valve(s) or damage could occur.

To isolate the measurement cell for short-term shutdown

1. Close the sample flow meter control valve(s) (adjustment knob turned clockwise) for each measurement channel.
2. Close the cell supply and cell return shut-off valves. Refer to your as-built drawings.
3. Allow any residual gas to flow out of the measurement cells.
4. Close the bypass supply shut off valve.
5. Close any low pressure flare or atmospheric vent header shut-off valve for the effluent from each measurement cell. Refer your as-built drawings.

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. To prevent this, isolate the sample at the probe or vent the sample to a safe location.

To isolate the SCS for short-term shutdown


1. Isolate the analyzer from the bypass following the procedure under [To isolate the measurement sample cell for short-term shutdown](#) → .
2. Close the sample supply shut-off valve to the SCS.
3. 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.
4. Close the low pressure flare or atmospheric vent header shut-off valve for the effluent from the sample return.
5. Turn off power to the analyzer.

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 and the sample system enclosure heater.

5 Maintenance and service

This chapter provides safety information for the maintenance and service of the SS2100 analyzer.

5.1 Potentially hazardous substances

SS2100 analyzers that detect H₂S can acquire leaks that lead to unsafe amounts of toxic gas. For more information, refer to [Mitigating Risks](#) → .

5.1.1 Disposal of hazardous substances



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.

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. 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

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

5.3 Replacement parts

All parts required for operation of the SS2100 analyzer must be supplied by Endress+Hauser or an authorized agent. For contact information to determine specific parts listing for the purchased model, refer to Replacement Parts → .

5.4 Fuse ratings and characteristics

If you need to replace a fuse, use only the same type and rating of fuse as the original as listed in the fuse specifications table below. Select the replacement solenoid fuse (F2) based on the number of solenoids installed on the analyzer.

Drawing	Reference	Voltage	Description	Rating
3	F1	120 VAC	1 Solenoid, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.125 A
			2 Solenoids, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.25 A
			3 Solenoids, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.4 A
	F2		Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.8 A
	F1	240 VAC	1 Solenoid, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.63 A
			2 Solenoids, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 1.25 A
			3 Solenoids, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 2.0 A
			F2	

4	F1	24VDC	1 Solenoid, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.25 A
			2 Solenoid, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.4 A
			3 Solenoid, Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC 0.8A

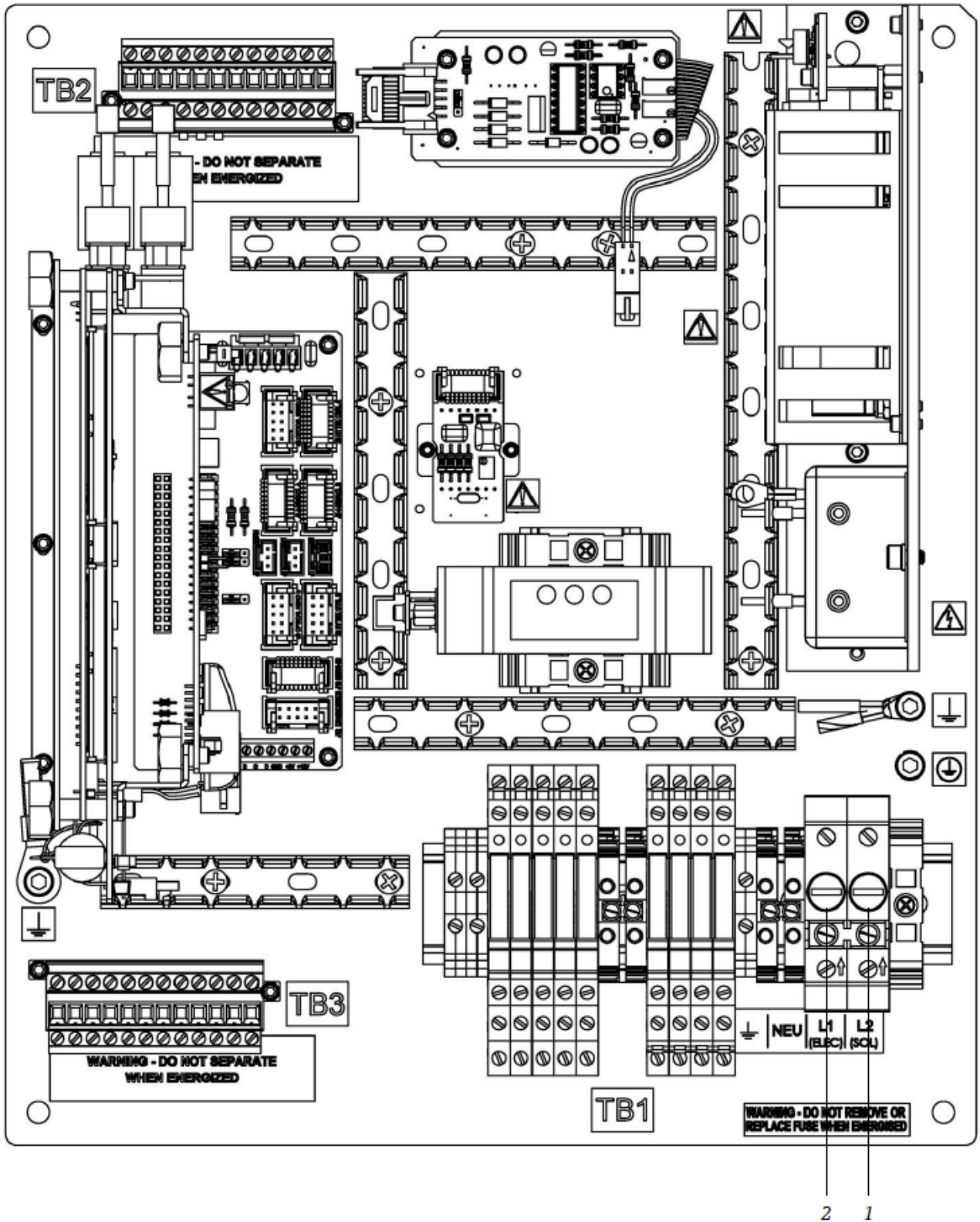


Figure 3: H_2S analyzer electronics control board (AC) showing fuses

- 1 Fuse (F1)
- 2 Fuse (F2)

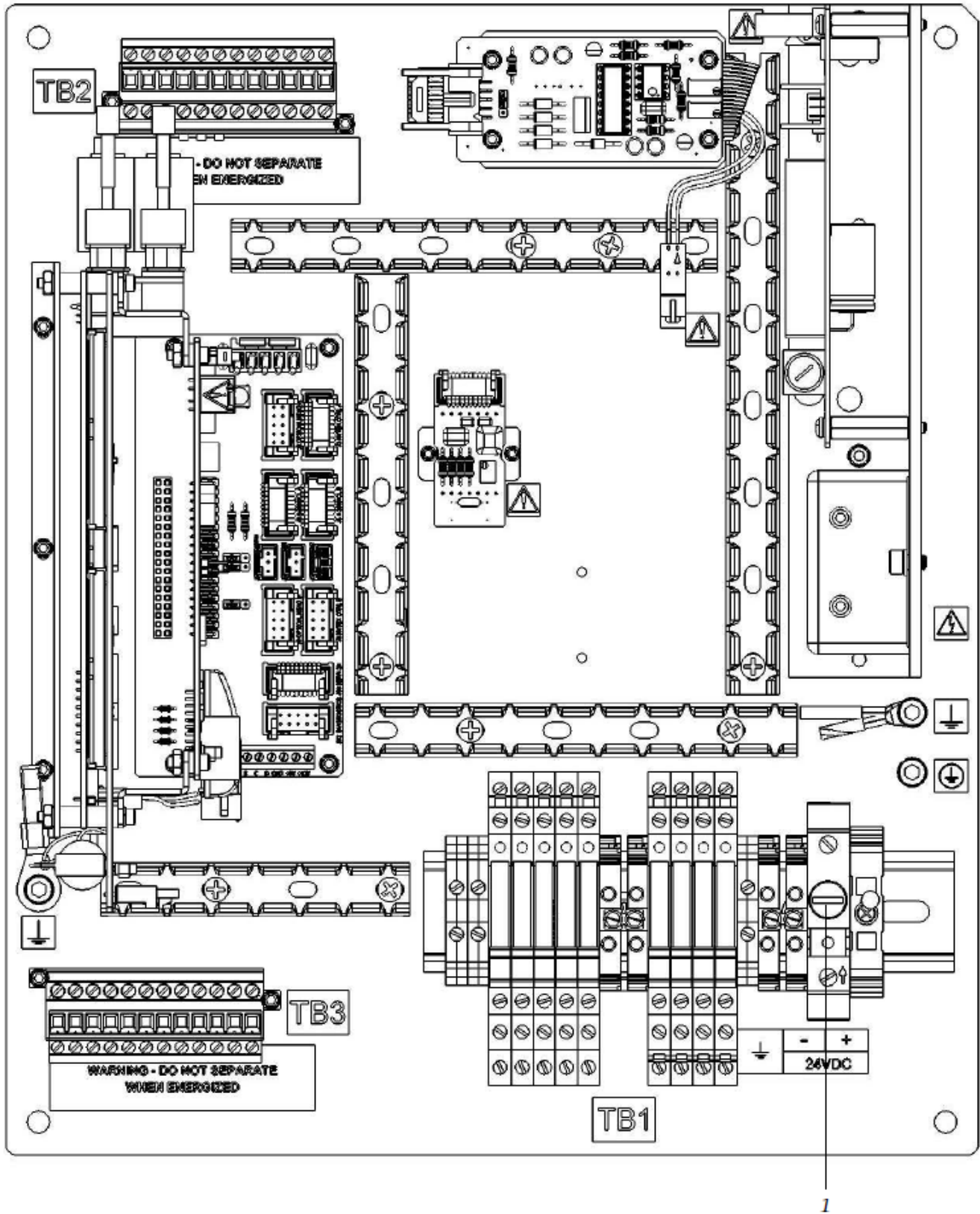


Figure 4: H_2S analyzer electronics control board (DC) showing fuses

1 Fuse (F1)

5.5 Replacing a fuse

1. Power off the system and close the sample supply valve.
2. Open the electronics enclosure. For fuse location, refer to figures above.
3. Using a flat-head screwdriver, remove the fuse screw turning counterclockwise as shown below.

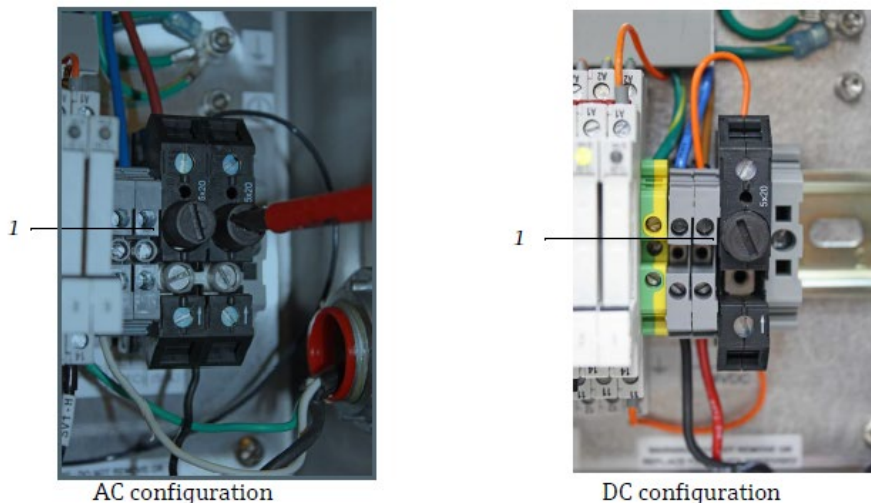


Figure 5: Unscrewing fuse cover

4. Remove the fuse cover and fuse.
5. Remove the fuse from the cover and replace with a new fuse as shown below. Refer to the table.

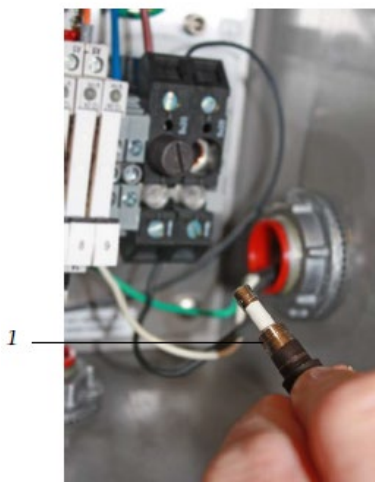


Figure 6: Replacing fuse (1)

6. Insert the new fuse into the screw cover and replace into the fuse opening.
7. Use the screwdriver to turn the fuse cover clockwise until tight. Do not overtighten.

NOTICE

- ▶ Repeat steps for each fuse to be replaced.

8. Close enclosure door and apply power to the analyzer.

5.6 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.

5.7 Replacing the filter

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.

5.7.1 Replacing the scrubber and scrubber efficiency indicator

CAUTION

- ▶ All valves, regulators, switches, etc. should be operated in accordance with site lockout/tagout procedures.

1. Close the sample supply shut-off valve. Allow all residual gas to dissipate as indicated by no flow on the sample bypass flow meter.
2. Unscrew the compression nuts on the inlet end of the scrubber and scrubber efficiency indicator assembly.
3. 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, as shown below.

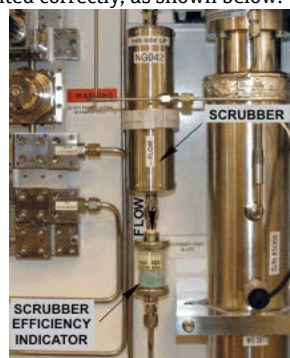


Figure 7: Scrubber and scrubber efficiency indicator

4. 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.
5. 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).
6. Restart the SCS.
7. Check all connections for gas leaks. Using a liquid leak detector is recommended.
8. 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.
9. Purge the scrubber and scrubber efficiency indicator assembly with nitrogen to remove all flammable gas and cap the inlet and outlet.

5.8 Disposal of used scrubbers

CAUTION

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].

- ▶ These substances 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.
- ▶ Discard used scrubber and scrubber indicator in an appropriate leak-proof receptacle.

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

5.9 Service

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

5.9.1 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
