

SS2100i-2 Analyzer

Safety Manual

SS2100i-2 Analyzer

Safety Manual

Products of

SpectraSensors®
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1 - INTRODUCTION

SpectraSensors' SS2100i-2 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 **Documents Provided with the SS2100i-2 Analyzer** below. This manual is divided into the following sections:


- General Safety Instructions (Chapter 2)
- Equipment Installation (Chapter 3)
- Equipment Operation (Chapter 4)
- Equipment Maintenance and Service (Chapter 5)

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 SS2100i-2 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.

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.

Documents Provided with the SS2100i-2 Analyzer

Each SS2100i-2 analyzer shipped from the factory is packaged with documents specific to the model that was purchased. At a minimum, the documents included with each shipment are:

- Safety Manual
- Hardware Manual
- Firmware Manual

- System Drawings
- Calibration Certificate

SpectraSensors Overview

SpectraSensors, Inc. is a leading manufacturer of technologically advanced electro-optic gas analyzers for the industrial process, gas distribution and environmental monitoring markets. Headquartered in Houston, Texas, SpectraSensors was incorporated in 1999 as a spin-off of the NASA/Caltech Jet Propulsion Laboratory (JPL) for the purpose of commercializing space-proven measurement technologies initially developed at JPL. SpectraSensors was acquired by the Endress + Hauser Group in 2012, which has expanded our reach in the global marketplace.

2 - GENERAL SAFETY INFORMATION

Each analyzer shipped from the factory includes documentation for the purpose of relaying installing, operating and safety instructions to the responsible party and/or operator of the equipment. This chapter reviews the general safety instruction for every SS2100i-2 analyzer.

Intended Equipment Use

The SS2100i-2 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 SS2100i-2 analyzer. Any use of the equipment in a manner not specified by SpectraSensors could impair the protection provided by the equipment.

Warning Labels

Instructional icons are provided in all equipment manuals and on the SS2100i-2 analyzer to alert the user of potential hazards, important information and valuable tips. Following are the symbols and associated warning and caution types to observe when installing or servicing the analyzer. Some of these symbols are provided for instructional purposes only and are not labeled on the system.

Equipment Labels



Warning statement for **hazardous voltage**. Contact may cause electric shock or burn. Turn off and lock out system before servicing.



Failure to follow all directions may result in damage or malfunction of the analyzer.



CLASS 1 LASER PRODUCT - Invisible laser radiation when open. Avoid direct exposure to the beam.



INVISIBLE LASER RADIATION - Avoid exposure to beam. Class 3b Radiation Product. Refer servicing to the manufacturer-qualified personnel.



Maximum voltage and current specifications for fuses.



PROTECTIVE EARTH GROUND - Symbol indicates the connection point of the ground wire from the main power source.

Instructional Symbols



General notes and important information concerning the installation and operation of the analyzer.



Failure to follow all directions may result in damage or malfunction of the analyzer.



Failure to follow all directions or substitution of components may result in explosion.



Failure to follow all directions may result in fire.



INVISIBLE LASER RADIATION - Avoid exposure to beam. Class 3b Radiation Product. Refer servicing to the manufacturer-qualified personnel.

Analyzer Technical Specifications

For the SS2100i-2 analyzer, a set of technical specifications are provided that outline recommended equipment settings and ratings. This information is included in the Hardware Installation and Maintenance Manual of each document package provided with an analyzer.

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.

Equipment Rating

The following equipment rating information is provided for the SS2100i-2 in Table 4-1. 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)

Personnel Responsibility



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

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

- Understanding of the general principles of explosion protection
- 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

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.



Technicians are expected to follow all safety protocols established by the customer that are necessary for servicing the analyzer. This may include, but is not limited to, lockout/tagout procedures, toxic gas monitoring protocols, PPE requirements, hot work permits and other precautions that address safety concerns related to performing service on process equipment located in hazardous areas.

Mitigating risks

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

Electrocution hazard

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



Complete this action before performing any service that requires working near the main input power or disconnecting any wiring or other electrical components.

2. Open enclosure door.

If service must be performed with power engaged:

1. Note any live electrical components and avoid any 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).

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 - EQUIPMENT INSTALLATION

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



When an "X" is included after the certificate number, it indicates that the product is subject to the Special Conditions of Use specified in the schedule to this certificate. Refer to Table 4-1 on page 4-3 for the certification listings. The entries into the analyzer enclosure can be equipped with certified accessories (e.g., blanking element, breather/drain, reducer, etc.) according to the intended use of the product.

Lifting/Carrying the Analyzer

The SS2100i-2 is bolted on a Unistrut® (or equivalent) metal frame in the factory. Due to the analyzer's size and weight (approximately 145 Kg [320 lbs], without sample conditioning system) SpectraSensors recommends the use of a forklift, pallet jack, etc. to lift and/or move the analyzer.

Before removing from the crate, move the analyzer as close as possible to the final installation location. Always carry the load using the lifting eyes (refer to Figure 3-1 and the drawings included with the purchased SS2100i-2 analyzer).



Ensure all equipment used for lifting/moving the analyzer is rated for the maximum weight load.

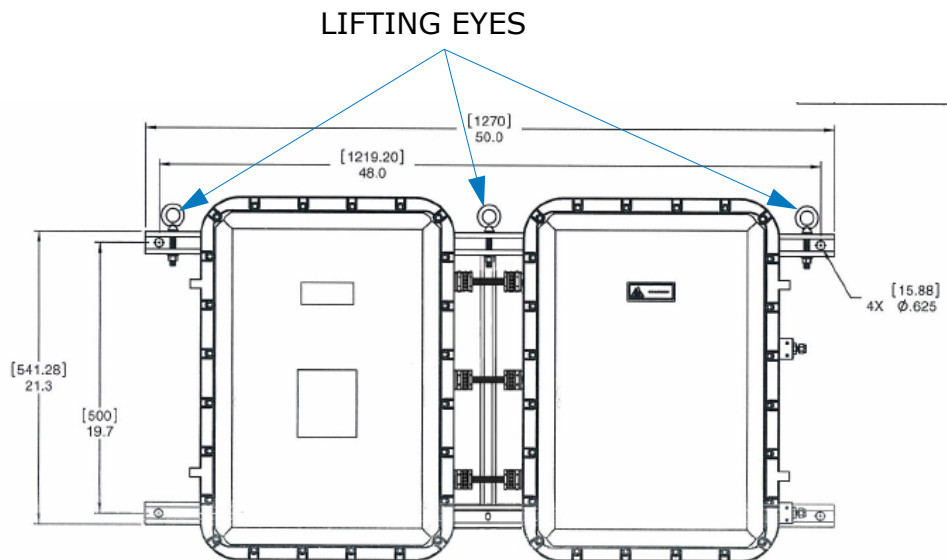


Figure 3-1 SS2100i-2 mounting and dimensions

Mounting the Analyzer

Refer to the layout diagrams provided with the purchased SS2100i-2 analyzer and Figure 3-1 for detailed mounting dimensions.



SpectraSensors analyzers are designed for operation within the specified ambient temperature range. Intense sun exposure in some areas may cause the analyzer temperature to exceed the maximum.



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



Bolts or screws used for wall-mounting the SS2100i-2 must be able to support four times the weight of the instrument (approximately 145 kg [320 lbs] without sample conditioning system).



It is critical to mount the analyzer so that the supply and return lines reach the supply and return connections on the chassis, while still maintaining flexibility, so that the sample lines are not under excessive stress.

The SS2100i-2 is intended to be mounted to a wall or secured upright frame. Secure the analyzer frame in position using bolts or screws of the size indicated in Figure 3-1.

Protective chassis ground connections

Before connecting any electrical signal or power, the chassis grounds must be connected. Safety requirements for the protective and chassis grounds are as follows:

- The 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.
- The protective and chassis grounds must remain connected until all other wiring is removed.
- If the protective and chassis ground is insulated, it must use the green/yellow color.



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

Refer to system drawings for exact locations of the chassis ground connections.

1. Connect the chassis ground to the marked bottom right corner of the right-side enclosure.
2. Connect the chassis ground to the marked top left corner of the left-side enclosure.
3. Connect the system ground to the ground bus bar as shown in Figure 5-2 during the electrical power connection. Refer to the SS2100i-2 Hardware Installation and Maintenance Manual (P/N 4900002222) for instruction.

Electrical Wiring Requirements



Interconnection of the analyzer enclosure and cell 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/EN60079-14. The installer is responsible for complying with all local installation codes.

External Circuit Breaker Requirements



An approved switch or circuit breaker rated for 15 amps should be used and clearly marked as the disconnecting device for the analyzer. The OFF switch should consider isolation of all circuit power supply conductors, including the neutral. The switch or circuit breaker shall not interrupt a protective earth conductor.



Because the breaker in the customer-provided power distribution panel or switch will be the primary means of disconnecting the power from the analyzer, the isolating device should be located in close proximity to the equipment and within easy reach of the operator.



The switch or circuit breaker employed as a disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and be suitable for the application.

Cable Installation

To avoid potential damage, cable systems and accessories should be installed, so far as is practicable, in positions that will prevent them from being exposed to mechanical damage, to corrosion or chemical influences, to the effects of

heat and to UV radiation. If cables are subject to other conditions, e.g., vibrations or continuous flexing, they shall be designed to withstand that condition without damage.

When cables are secured to equipment or cable trays, the bend radius on the cable should be in compliance with the cable manufacturer's data, or be at least eight (8) times the cable diameter to prevent damage to the cable. The bend radius of the cable should start at least 25 mm from the end of the cable gland.

The hazardous area end of each core in multi-core cables shall either be connected to earth or be adequately insulated by means of terminations suitable for the type of protection.



Insulation of multi-core cables by tape alone is not permitted.

Terminations

Connections shall be made in a manner consistent with the type of terminal, type of protection and not introduce undue stress on the connections.

If multi-stranded and, in particular, fine-stranded conductors are employed, the ends shall be protected against separation of the strands, e.g., by means of cable lugs, core-end sleeves or by the type of terminal, but not by soldering alone.



The creepage distances and clearances shall not be reduced by the method in which the conductors are connected to the terminals.

Cable Glands



Certified compound barrier seal type glands and cables shall be used where appropriate in compliance with local regulations.

The cable gland shall be selected to match the cable diameter. The use of sealing tape, heat-shrink tube or other materials are not permitted to make the cable fit to the cable gland.

If an Ex "d" gland clamping by the sealing ring (compression) is used with braided or armored cable, it shall be the type where the braid or armor is terminated in the gland and compression takes place on the inner cable sheath.



For flameproof enclosures, adapters shall not be used together with blanking elements.

Flameproof cable glands, adapters or blanking elements, having parallel threads may be fitted with a sealing washer between the entry device and the flameproof enclosure provided that the applicable thread engagement is still achieved after the washer has been fitted. Thread engagement shall be at least five (5) full threads. Suitable grease may be used as long as it is non-setting, non-metallic and non-combustible and any earthing between the device and the flameproof enclosure is maintained. SpectraSensors recommends using STL8 screw thread lubricant or equivalent on all screw thread and its taped opening. Refer to the Hardware Installation and Maintenance Manual for the lubricant application procedure.



Do not use this lubricant on exposed current-carrying parts.

Unused cable entries shall be sealed with a flameproof blanking element, which shall be fitted directly to the hole (no threaded adapter shall be used), and shall comply with thread engagement requirements detailed above and shall be secured against loosening.

Ventilation Requirements

Instruction for connecting ventilation to the SS2100i-2 analyzer is provided in the system drawings that accompany the equipment.

Inspecting the Analyzer

There are three grades of inspection; visual, close and detailed. Visual and close inspections can be performed with the analyzer energized. Detailed inspections generally require the equipment to be isolated. SpectraSensors recommends, at a minimum, a visual inspection to be performed after installation to reinforce understanding that the product is installed to manufacturer specifications and to the appropriate standards.

The visual inspection should not be expected to reveal faults of a random nature, such as loose connections, but should be performed to monitor the effect of environmental conditions. Some of the key elements to consider include:

- Extremely low or high temperatures
- Pressure conditions
- Corrosive atmosphere
- Vibration, mechanical impacts, friction or abrasion
- Wind
- Painting processes
- Solar radiation

- Chemicals
- Water and moisture
- Dust and dirt
- Plants, animals, insects

The corrosion of metal, or influences of chemicals on plastic or elastomeric components, may affect the type and degree of ingress protection of the equipment. If the enclosure materials begin to exhibit signs of a corrosion, notify the responsible parties so that the enclosure can be treated with the appropriate protective coating as a corrosive protection.

If the equipment is subject to vibration, notify the responsible party so that special care can be taken to ensure that all bolts and cable entries remain tight.

Flameproof enclosure - Protection type “d”

When reassembling and/or working on the flameproof enclosure, perform a thorough visual inspection to confirm all joints are cleaned and may be lightly smeared with a suitable grease (e.g., Silicon Grease GS9) to prevent corrosion and to assist weather-proofing.



Only non-metallic scrapers and non-corrosive cleaning fluids may be used to clean flanges.

Bolts, screws and similar parts, depending on the type of protection required, shall only be replaced by similar parts in accordance with the manufacturer’s design.

Refer to Table 3–1 for the inspection schedule for Ex “d”, Ex “e”, Ex “n” equipment.

Table 3–1 *Inspection Schedule for Ex “d”, Ex “e”, Ex “n”*

Items to Check	Description	Ex “d”	Ex “e”	Ex “n”
	General (All Equipment)	Grade of Inspection		
1	Equipment is appropriate to the EPL/zone requirements of the location	X	X	X
2	Equipment group is correct	X	X	X
3	Equipment temperature class is correct (only for gas)	X	X	X
4	Degree of protection (IP grade) of equipment is appropriate for the level of protection/group/conductivity	X	X	X
5	Enclosure, glass parts and glass-to-metal sealing gaskets and/or compounds are satisfactory	X	X	X

Table 3-1 Inspection Schedule for Ex "d", Ex "e", Ex "n" (Continued)

Items to Check	Description	Ex "d"	Ex "e"	Ex "n"
	General (All Equipment)	Grade of Inspection		
6	There is no damage or unauthorized modifications	X	X	X
7	Bolts, cable entry devices (direct and indirect) and blanking elements are of the correct type and are complete and tight - physical check	X	X	X
8	Joint surfaces are clean and undamaged. Gaskets, if any, are satisfactory and positioned correctly	X		
9	Condition of enclosure gaskets are satisfactory	X	X	X
10	There is no evidence of ingress of water or dust in the enclosure in accordance with IP rating	X	X	X
11	Electrical connections are tight		X	X
12	Unused terminals are tightened		X	X
13	Enclosed-break and hermetically sealed devices are undamaged			X
14	Encapsulated components are undamaged		X	X
15	Breathing and draining devices are satisfactory	X	X	X
16	There is no obvious damage to cables	X	X	X
17	Sealing of trunking, ducts, pipes and/or conduits is satisfactory	X	X	X
18	Stopping boxes and cable boxes are correctly filled	X		
19	Earthing connections, including any supplementary earthing bonding connections, are satisfactory (for example, connections are tight and conductors are of sufficient cross-section) - physical check	X	X	X
20	Cables not in use are correctly terminated	X	X	X
21	Obstructions adjacent to flameproof flanged joints are in accordance with the standard	X		
22	Equipment is adequately protected against corrosion, weather, vibration and other adverse factors	X	X	X
23	No undue accumulation of dust and dirt	X	X	X
24	Electrical insulation is clean and dry		X	X

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4 - EQUIPMENT OPERATION

This chapter provides an overview of safety operational instructions for the SS2100i-2.

Firmware Version

Each SpectraSensors 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. Detailed operation instructions are provided in the firmware manual shipped with the purchased analyzer or by model type on the SpectraSensors website (www.spectrasensors.com).

Intermittent Operation

If the analyzer is to be stored or shut down for and period of time, follow the instructions for isolating the measurement cell and sample conditioning system (SCS) in the SCS Overview Manual.

Cleaning and Decontaminating the Analyzer

If the analyzer has been installed and or operated (even for purposes of a demonstration), the system should be decontaminated (purged with an inert gas) before powering down the analyzer.



Process samples may contain hazardous material in potentially flammable and/or toxic concentrations. Personnel should have a thorough knowledge and understanding of the physical properties of the sample and prescribed safety precautions before installing, operating or maintaining the analyzer.

Cleaning and decontaminating the analyzer for shipment or storage:

1. Shut off the process gas flow.
2. Allow all residual gas to dissipate from the lines.
3. Connect a purge supply (N₂), regulated to the specified sample supply pressure, to the sample supply port.
4. Confirm that any valves controlling the sample flow effluent to the low pressure flare or atmospheric vent are open.
5. Turn on the purge supply and purge the system to clear any residual process gases. For differential systems, make sure to purge the scrubber/dryer for several dry cycles. If necessary, dry cycles can be initiated by pressing the **#** key followed by the **2** key to enter **Mode 2** and then pressing the **#** key followed by the **1** key to return to **Mode 1**.

- 6.** Turn off the purge supply.
- 7.** Allow all residual gas to dissipate from the lines.
- 8.** Close any valves controlling the sample flow effluent to the low pressure flare or atmospheric vent.
- 9.** Disconnect power to the system.
- 10.** Disconnect all tubing and signal connections.
- 11.** Cap all inlets, outlets, vents, conduit or gland openings (to prevent foreign material such as dust or water from entering the system) using the original fittings supplied as part of the packaging from the factory.

System Specifications

Table 4-1 SS2100i-2 analyzer specifications

Performance	
Concentration	See analyzer calibration report
Repeatability	See analyzer calibration report
Measurement Time ¹	Typically less than 20 seconds
Application Data	
Environmental Temperature Range	-20° C to 50° C (-4° F to 122° F) - <i>Standard</i> -10° C to 60° C (14° F to 140° F) - <i>Optional</i>
Heated Enclosure Temperature	50±5° C - <i>Standard</i> 60±5° C - <i>Optional</i>
Environmental Relative Humidity	5% to 95%, Non-condensing
Altitude	Up to 2000 m
Sample Cell Operating Pressure	Typically 800-1200 mbar - <i>Standard</i> 950-1700 mbar - <i>Optional</i>
Pressure to Cell	70 kPaG (10 PSIG) max to spectrometer cell
Sample Flow Rate	0.5-4 SLPM (0.02-0.1 SCFM) ¹
Contaminant Sensitivity	None for gas phase glycol, methanol, amines, or mercaptans
Electrical & Communications	
Input Power, Maximum ²	120 or 240 VAC ±10%, 50-60 Hz standard; ~300W ¹
Communications	<i>Analog:</i> Isolated Analog channels, 1200 ohms @ 24 VDC max <i>Outputs:</i> Qty (2) 4-20 mA (measurement value) <i>Input:</i> Qty (1) 4-20 mA (pipeline pressure) ¹ <i>Serial:</i> Ethernet and RS-485 half-duplex - <i>Standard</i> RS-232C - <i>Optional</i>
Digital Signals	<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
Protocol	Modbus Gould RTU, Daniel RTU or ASCII
Diagnostic Value Examples	Detector Power (Optics Health), Spectrum Reference Comparison and Peak Tracking (Spectrum Quality), Cell Pressure and Temperature (Overall System Health)
LCD Display	Concentration, Cell Pressure, Cell Temperature and Diagnostics

1. Application dependent.

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

Table 4-1 SS2100i-2 analyzer specifications (Continued)

Physical Specifications	
Electronics Enclosure	IP66 Copper-free Aluminum with weather-resistant polyurethane powder coating, 80-120 micron thickness
Size ¹	670H × 1122W × 248D mm
Weight ¹	Approximately 145 kg (320 lbs)
Sample Cell Construction	316L Series Polished Stainless Steel Standard
Number of Sample Cells	1 per analyzer
Area Classification	
Analyzer (Electronics and Laser)	CE, ATEX, IECEx and EAC: $\text{C} \text{E} \text{Ex}$ II 2 G, Ex db IIB+H2 T4 GB; LCIE 10 ATEX 3108X ² , IECEx LCI 11.0007X ¹ ; Directive 2014/34/EU

1. Dimensions are for analyzer only. Consult system drawings for analyzers with sample conditioning systems.
2. Including an "X" after the certificate number indicates that the product is subject to the Special Conditions of Use specified in the schedule to this certificate. Refer to the Special Conditions of Use under the relevant certification prior to installation or use.

Exd Accessory Conditions of Use

All accessories listed in Table 4-2 shall comply with the latest IEC/EN 60079-0 and IEC/EN 60079-1 in addition to the following conditions:

Table 4-2 Exd accessory conditions of use

Accessory Type	Rating	Notes
Stopper Plug	Exd, Zone 1	<ol style="list-style-type: none"> 1. Stopping plugs shall be assembled in such a way that their protrusion from an associated enclosure is not increased. 2. Installer must ensure the stopping plug ingress protection matches the ingress protection rating of the associated enclosure, IP66.
Reducer/Adapter	Exd, Zone 1	<ol style="list-style-type: none"> 1. Adapter/reducers shall be assembled in such a way that their protrusion from an associated enclosure is not increased. 2. Installer must ensure the stopping plug ingress matches the ingress protection of the rating of the associated enclosure, IP66. 3. For direct entry Exd applications, only one adapter/reducer shall be used per cable entry. 4. The female connection thread of a Thread Conversion Adapter shall "step" not more than two "size" up in the case of a thread gender change.

Table 4-2 Exd accessory conditions of use (Continued)

Accessory Type	Rating	Notes
Breather/Drainer	Exd, Zone 1	<ol style="list-style-type: none"> 1. The breather/drainer shall be suitable for bottom entry application only. 2. It is the user's responsibility to ensure that the ingress protection level of an associated enclosure is maintained at the interface, IP66. 3. Breather/drainer specified shall meet the following requirements: <ul style="list-style-type: none"> • Exd enclosures with an internal volume $75 \text{ L} \leq V \leq 175 \text{ L}$ • Exd enclosure reference pressure 40 bar maximum.
Cable Gland(s)	Exd, Zone 1	<ol style="list-style-type: none"> 1. Compound Barrier Cable Glands shall be specified for use with our analyzer Exd enclosure. 2. Compound Barrier Cable Glands shall carry a minimum IP66 ingress protection level.

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5 - MAINTENANCE AND SERVICE

This chapter provides safety information related to maintenance and service of the SS2100i-2 analyzer. Below is an outline of the SS2100i-2 analyzer configuration. The components for the electronics enclosure are detailed in Figure 5-2.

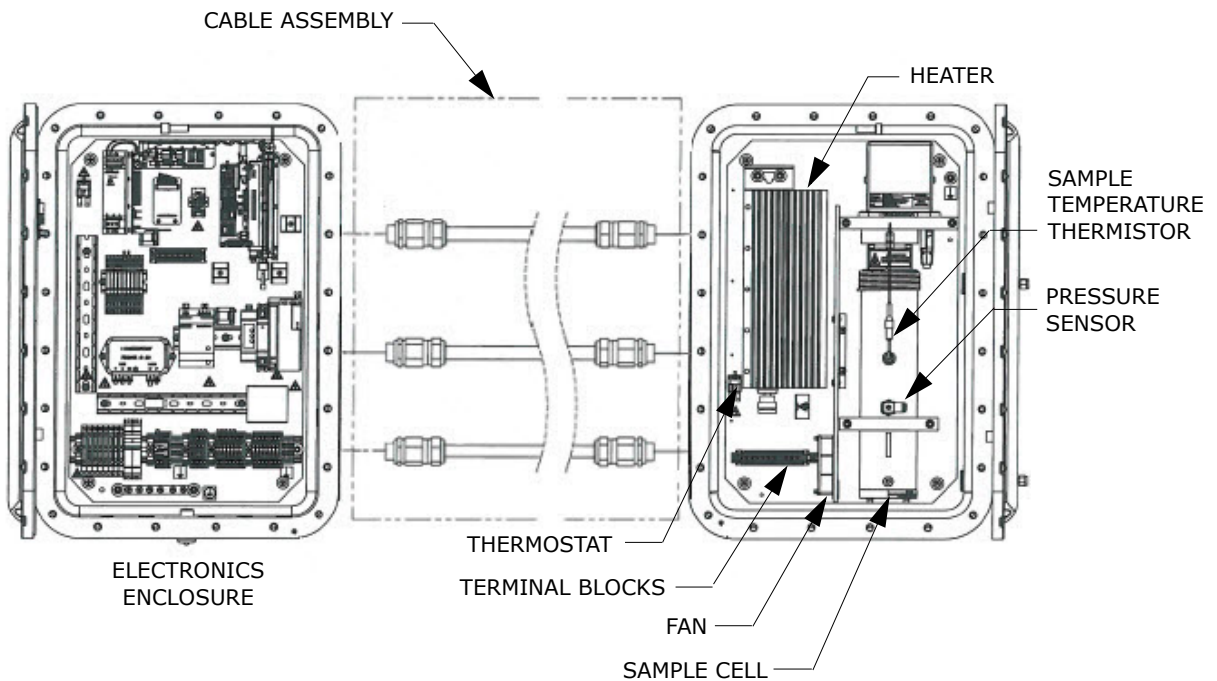


Figure 5-1 Analyzer component overview

Potentially Hazardous Substances

The SS2100i-2 analyzers may be provided with a scrubber and scrubber indicator. See below for proper disposal of these items.

Disposal of Hazardous Substances

For analyzer equipped with H₂S scrubbers, use the following instruction for safe disposal of old components.



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.

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

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 also to specifications listed in Table 5-1 or Table 5-2.

Refer to Figure 5-2 for an illustration of the fuse location in the electronics assembly.

Table 5-1 Fuse specifications for 240 VAC systems

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



1. Housed in fused terminal blocks. Illuminated LED indicates blown fuse.

Table 5-2 Fuse specifications for 120 VAC systems

DWG Ref.	Description	Rating
F3	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.6A
F4 ¹	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.5A
F5 ^a ,F6 ^a ,F7 ^a ,F8 ^a	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/0.1A
F9 ^a	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/1.0A
F10 ^a	Miniature Fuse, 5 x 20 mm, Time Delay	250 VAC/2.0A



1. Housed in fused terminal blocks. Illuminated LED indicates blown fuse.

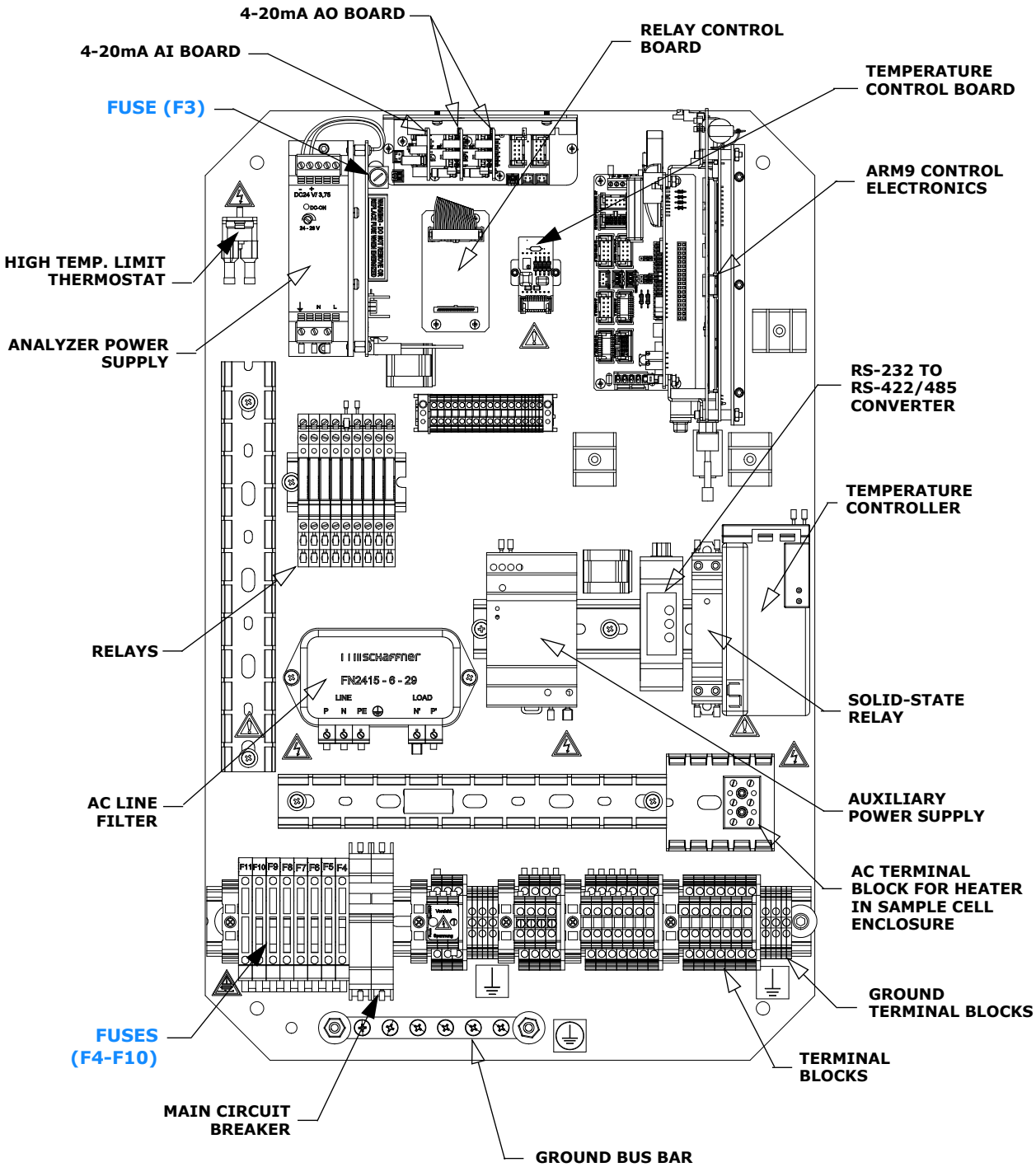


Figure 5-2 Components in electronics enclosure

Service Contact

Technical and Customer Service and can be reached as follows:

Customer Service

4333 W Sam Houston Pkwy N, Ste. 100
Houston, TX 77043-1223
United States of America
Fax: (713) 856-6623

For SpectraSensors Tech Support inside the USA:

Phone: 888-Endress

E-mail: techsupport@us.endress.com

Hours: Service engineers are on duty Monday-Friday, 8:00 a.m. to 5:00 p.m.
Central Time.

For SpectraSensors Tech Support outside the USA:

Phone: +1 (713) 466-3172

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