

SCS
(Sample Conditioning System)
Remote Panel
Operator's Manual

SCS **(Sample Conditioning System)** **Remote Panel**

Operator's Manual

Products of

SpectraSensors®
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1 - INTRODUCTION

The purpose of this manual is to provide an overview of the SCS (Sample Conditioning System) Remote Panel along with instructions for installation and operation. The chapters included in this manual provide the following information:

- Getting Started
- Installing the SCS Remote Panel
- Understanding the SCS Remote Panel
- Troubleshooting the SCS Remote Panel

Who Should Read This Manual

This manual should be read and referenced by anyone installing, operating or having direct contact with the SCS.

How to Use This Manual

Take a moment to familiarize yourself with this Operator's Manual by reading the **Table of Contents**.

This manual addresses most common options and accessories for the SCS Remote Panel. Images, tables and charts are included to provide a visual understanding of the panel and its functions. Special symbols are used to provide the user with key information regarding the system configuration and/or operation. Pay close attention to this information.

General Warnings and Cautions

Instructional icons are provided in this manual 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 servicing the SCS. Some of these symbols may be marked on the panel also.



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




Failure to follow all directions may result in fire.



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

Conventions Used in this Manual

This manual contains “hot links” to enable the user to quickly navigate between different sections within the manual. “Hot links” include table, figure and section references. These are identified by a pointing finger cursor  when rolling over the text. Simply click on the link to navigate to the associated reference.

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 and remains a USA-based technology manufacturer.

Why Use a SCS Remote Panel?

The SCS Remote Panel option improves sample analysis by eliminating contaminants in the gas line, such as entrained liquids or harmful particulates that may prevent the analyzer from obtaining a high quality sample. The gas in the analyzer must be representative of the gas in the pipeline.

The basic SCS panel comes with an “on/off” control valve input port that enables the customer to connect the desired gas line to the sampling system quickly and easily. The membrane separator removes entrained liquids and particulates from gas samples, only allowing samples in gas phase to enter the analyzer. This helps protect the analyzer and other sampling components against liquid damage. Complete flow control is achieved with a low-pressure metering valve that includes an integrated flowmeter to help monitor sample flow into the analyzer. Providing a flowmeter in the system can help identify potential contaminants in the system.

The full sample conditioning panel provides the customer with the ultimate protection and control of the sampled gas. The full assembly configuration includes everything in the basic configuration plus additional protection, including an integrated pressure reducing regulator (in case the incoming pressure is greater than 10 psig). A liquid trap is located at the bypass port of the membrane separator and is an additional security measure. The liquid trap enables quick identification of entrained liquid within the gas line and filters moisture from the system. Liquid is purged from the line through the liquid trap’s integrated drain. The liquid trap option includes a metering valve with an integrated flowmeter for optimal control of the bypass flow rate. Bypass flow sweeps separated liquids from the surface of the membrane.

Getting to know the SCS Remote Panel

SpectraSensors offers a variety of different sample conditioning panels, from the basic assembly to the full configuration. The SCS Remote Panel can be configured to suit each customer's needs, with the full assemblies providing maximum control over the sampling system. Refer to Figure 1-1 to identify each component of the SCS Remote Panel (your model may not include each of the components shown or may show others not pictured).

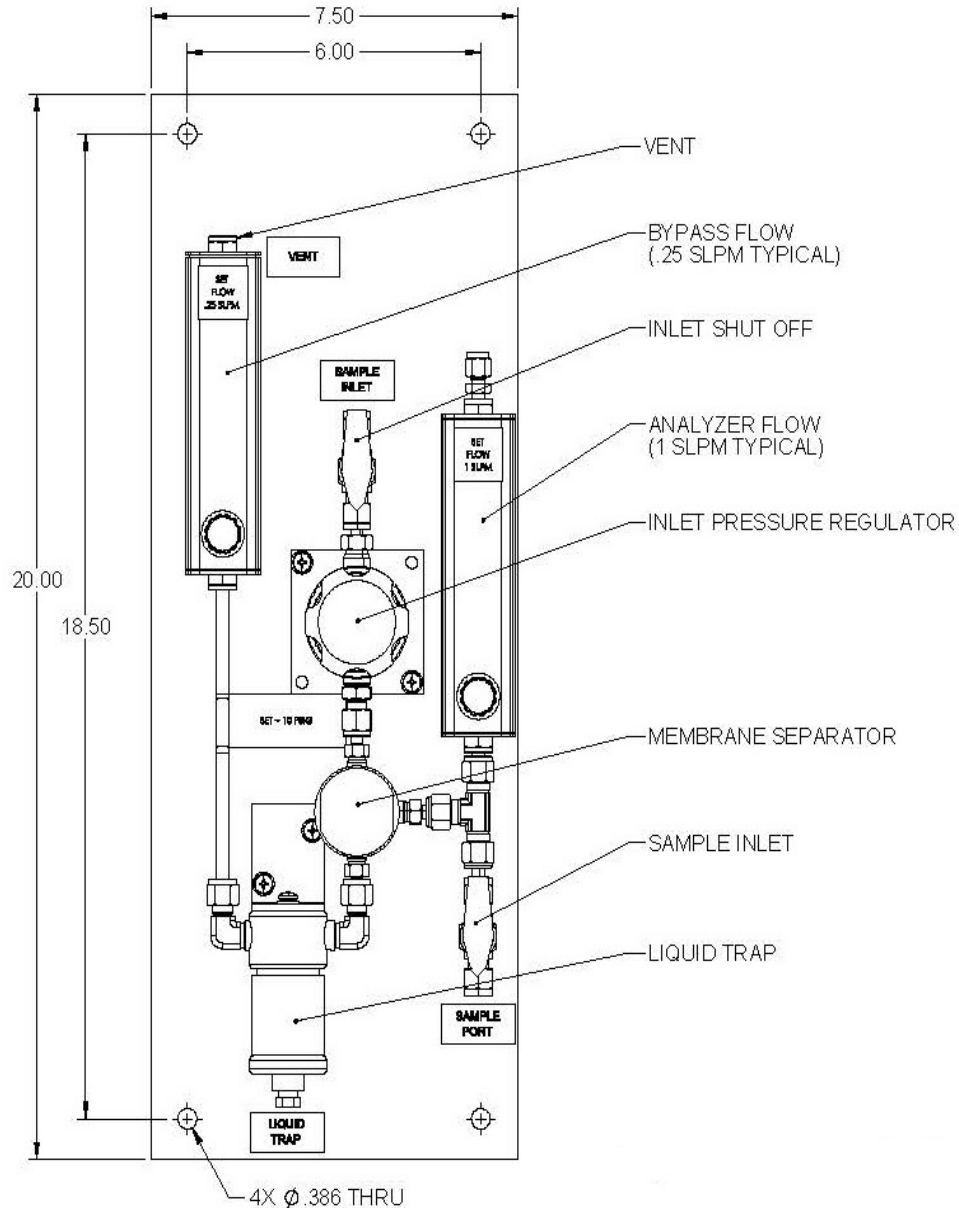


Figure 1-1 SCS Remote Panel Overview

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2 - INSTALLATION

The SCS Remote Panel requires several steps to ensure safe and accurate installation. This chapter discusses:

- Hardware and tools needed for installation
- Tubing guidelines
- Connecting and turning on the gas lines
- Conditioning the SCS tubing

After completing these steps, the SCS Remote Panel is ready for use.

Inspecting the SCS Remote Panel

Unpack and place the unit on a flat surface. Inspect all elements carefully for dents, dings, or general damage. Inspect the inlet and outlet connections for damage, such as bent tubing. Report any damage to the carrier.



Avoid jolting the panel. Do not drop it or bang it against a hard surface. SpectraSensors recommends lifting the panel by the backboard only.

Hardware and Tools for Installation

Depending on the model, you may need the following and tools to complete the installation process:

Hardware

- Stainless steel compression fittings
- 1/4" 316 stainless steel tubing

Tools

- 9/16" crescent wrench
- 5/8" crescent wrench
- Swage gauge

Mounting the Panel

The SCS remote panel is manufactured for wall or Unistrut® (or equivalent) metal framing installations. Refer to the Figure 1-1 on page 1-3 for mounting dimensions.



When mounting the remote panel, be sure not to position so that it is not difficult to operate adjacent devices.



It is critical to mount the panel so that the inlet and outlet lines reach the inlet and outlet connections on the analyzer while still maintaining flexibility so that the sample lines are not under excessive stress.

Lifting/carrying the panel

The remote panel can easily be lifted from the packaging and moved to the installation location. Take care not to lift or carry the panel by the components or the cables, or damage may occur.

Tubing Guidelines

Proper selection, handling and installation are essential for reliable tubing systems. Proper selection and handling of tubing, along with the Swagelok fittings, will give a leak-tight sample conditioning system. SpectraSensors recommends using a 1/4" O.D x 0.035" wall thickness, seamless stainless steel tubing to be fed from the probe regulator or heated pressure regulator to the SCS Remote Panel inlet.

Handling

Good handling practices greatly reduces scratches on tubing and protects the good surface finish that reliable tube manufacturers supply. It is critical for the integrity of the system to follow the handling and installation guidelines provided below:

- Tubing should never be dragged out of a tubing rack or across a rough surface
- Tube cutters or hacksaws should be sharp. Do not take deep cuts with each turn of the cutter or stroke of the saw.
- Tube ends should be de-burred. This helps ensure that the tubing will go all the way through the ferrules without damaging the ferrule sealing edge.

- When installing tube fittings near tube bends, confirm that there is a sufficient straight length of tubing (at least 13/16") to allow the tube to be bottomed in the fitting.

Connecting and Turning On the Gas Lines

SpectraSensors strongly recommends using a sample probe regulator or heated regulator. Use the following steps to connect and turn on the gas lines, as necessary based on your model configuration.



The pressure on the analyzer's sample cell must not exceed 10 psig. Higher pressure will cause catastrophic damage to the analyzer. SpectraSensors recommends avoiding restrictions on the output vent line of the sample cell and using a pressure relief valve on the input line in case of regulator failure.

To connect the gas lines

1. Refer to Tubing Guidelines before continuing.
2. Purge the gas lines that lead to the SCS Remote Panel to prevent contamination. If the probe regulator or heated pressure regulator are not already permanently installed, blow gas through the attachment side openings for 10 to 15 seconds.



Purging the gas lines is essential.

After the probe regulator or heated regulator is installed, open the gas line and allow gas to flow for about 10 to 15 minutes.

3. Connect the recommended stainless steel tubing (refer to "**Tubing Guidelines**" on page 2-2) to either the probe regulator or heated pressure regulator.



Blow gas through the tubing for 10 to 15 seconds prior to connecting the tubing to the SCS Remote Panel to clean out any potential contaminants.

4. Connect the opposite end of the stainless steel tube to the inlet of the SCS Remote Panel via the 1/4" compression fitting on the ball valve labeled "sample inlet". Refer to Figure 1-1 on page 1-3).

5. Use a 9/16" wrench to tighten the tubing to the compression fitting while simultaneously using a 5/8" wrench to secure the ball valve from moving.



If the sampled gas has a high hydrocarbon dew point, it will be necessary to heat trace the sections of the line that are exposed to colder temperatures in order to prevent temperature changes and potential build-up in the sample stream.

6. Once the tubing is properly connected, blow gas through the SCS Remote Panel for 10 to 15 seconds by opening the inlet valve, the sample port valve and the bypass port valve. (If your model contains a liquid trap, press the drain valve.) Return all valves except the inlet valve to the closed position.



For models SC402-XX0XX: If there is any suspicion that there will be entrained liquids regularly flowing through your sample stream, SpectraSensors recommends that the bypass port valve be slightly cracked in order to drain out the liquids and prevent damage to the membrane separator. If this is the case, it will be necessary to install ventilation tubing from the bypass valve to a safe area. Otherwise, SpectraSensors recommends draining the bypass port valve during routine check-ups.

7. Allow flow through the analyzer by adjusting the pressure regulator. Once flow is detected through the flowmeters, adjust the analyzer flowmeter to read approximately 2 scfh and the optional bypass flow to read 0.5 scfh. Adjusting the pressure regulator and flowmeter valves is required to ensure a proper flow rate. When the unrestricted vent is properly flowing gas, the pressure regulator is designed not to exceed 10 psig.
8. If the flowmeters indicate no flow through the system, check all connections for gas leaks using less than 10 psig. SpectraSensors recommends using a liquid leak detector. Otherwise, refer to **Appendix A** for additional instruction.
9. The SCS Remote Panel is now ready to run. Refer to the analyzer operator's manual for power-up instructions.
10. After power-up, perform a leak test of the SCS Remote Panel.



Although the SCS Remote Panel is fully leak tested with helium prior to shipping, it is important to perform a leak test after the gas line has been connected since vibrations during shipping can cause leaks.

11. Plug the vent and allow no more than 10 psig into the system. Pressure can be adjusted using the optional pressure regulator on the SCS Remote Panel.

12. Use the pressure gauge from the analyzer display to measure the pressure (psia). The pressure drop should be no more than a 0.05 lb. drop over a 10 minute period.

SpectraSensors recommends using 1/4" O.D x 0.035" wall thickness, seamless stainless steel tubing.

To connect the sample supply line:

1. First, confirm that the sample probe is correctly installed at the process supply tap and that the sample probe isolation valve is closed.



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 pressure reducing regulator.



All valves, regulators, switches, etc. should be operated in accordance with site lock-out/tag-out procedures.

2. Confirm that the field pressure reducing station is installed properly at the sample probe and the pressure regulator at the field pressure reducing station is closed (adjustment knob turned fully counter-clockwise).
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 inlet pressure) to the sample port of the SCS. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings. Fully ream all tubing ends. Blow out the lines for 10–15 seconds with clean, dry nitrogen or air prior to making the connection.
5. Connect the inlet tube to the SCS using the 1/4" stainless steel compression-type fitting provided.
6. 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.
7. Check all connections for gas leaks. SpectraSensors recommends using a liquid leak detector.



Do not exceed 10 psig (0.7 barg) in sample cell. Damage to cell may result.

To connect the sample return:

1. Confirm that the atmospheric vent header shut-off valve is closed, if applicable.



All valves, regulators, switches, etc. should be operated in accordance with site lock-out/tag-out procedures.

2. Determine appropriate tubing route from the SCS to the atmospheric vent header.
3. Run stainless steel tubing from the sample return port to the atmospheric vent header connection. Bend tubing using industrial grade benders, check tubing fit to ensure proper seating between the tubing and fittings. Fully ream all tubing ends. Blow out the lines for 10–15 seconds with clean, dry nitrogen or air prior to making the connection.
4. Connect the sample return tube to the SCS using the 1/4" stainless steel compression-type fitting provided.
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. Secure tubing to appropriate structural supports as required.
6. Check all connections for gas leaks. SpectraSensors recommends using a liquid leak detector.



Do not exceed 10 psig (0.7 barg) in sample cell. Damage to cell may result.

7. Be sure to vent the bypass return port and pressure relief vent port (if applicable) in a similar fashion when the unit is in use.

Conditioning the SCS Tubing

Newly installed systems invariably have some trace contaminants. These trace amounts of gas constituents tend to cling to system walls and may result in erroneous readings if the constituents are not in equilibrium with the system walls.

When the analyzer and SCS connection is complete, the entire system should be conditioned (from the sample source valve to the vent or return). Conditioning the system is achieved by flowing sample gas through the system for up to 12 hours or until readings stabilize. This must be done after the system is powered up but before actual readings are taken.

The progress of system conditioning can be monitored via gas concentration readings. Once the gas constituents have reached equilibrium with the system walls, readings should stabilize.

3 - SAMPLE CONDITIONING SYSTEM (SCS) OPERATION



Personnel should have a thorough understanding of the procedures presented here before operating the sample conditioning system.



The process sample at the sample tap may be at a high pressure. A field pressure reducing regulator is located at the sample tap to reduce the sample pressure and enable operation of the sample conditioning system at a low pressure. Use extreme caution when operating the sample probe isolation valve and field pressure reducing regulator.



The process sample at the sample tap may be at a high pressure. Make sure that the field pressure reducing regulator is equipped with an appropriate pressure relief valve.

Each SCS is designed to deliver a sample stream to the analyzer that is representative of the process stream at the time of sampling. To ensure the integrity of the sample stream and its analysis, care must be taken to install and operate the SCS properly. Therefore, any personnel intending to operate or service the SCS should have a thorough understanding of the process application and the design of the SCS.

Most problems experienced with sample systems result from operating the system differently than intended. In some cases, the actual process conditions may be different than originally specified (e.g., flow rates, presence of contaminants, particulates, or condensables that may only exist under upset conditions). By establishing understanding of the application and the design of the system, most issues can be avoided altogether or easily diagnosed and corrected ensuring successful normal operation.

If there are any remaining questions concerning the design, operation, or maintenance of the SCS, contact your factory service representative.



*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 and safety precautions for the sample contents before operating the SCS. Refer to "**Potential Risks Affecting Personnel**" on page A-1.*

About the SCS



The system drawings and schematics used in this manual are for illustration purposes only. Always refer to drawings for your specific system configuration and specifications.

A typical full-featured SCS is shown in Figure 3-1. Sample gas enters the sample conditioning unit at the specified supply pressure set by a customer-supplied upstream regulator. Sample gas flows in via the sample port, passes through a shut-off valve, passes through a pressure regulator that maintains constant pressure in the measurement cell, then through a membrane separator where any liquid in the stream is removed. Liquid removed by the membrane separator passes through the bypass loop and collects in a filter housing. A continuous flow, set to the specified level by a metering valve and flowmeter, not only flushes the liquid from the membrane separator but also maintains flow through the sample lines reducing sample variation. The flow exiting the bypass loop should be vented to a safe location.

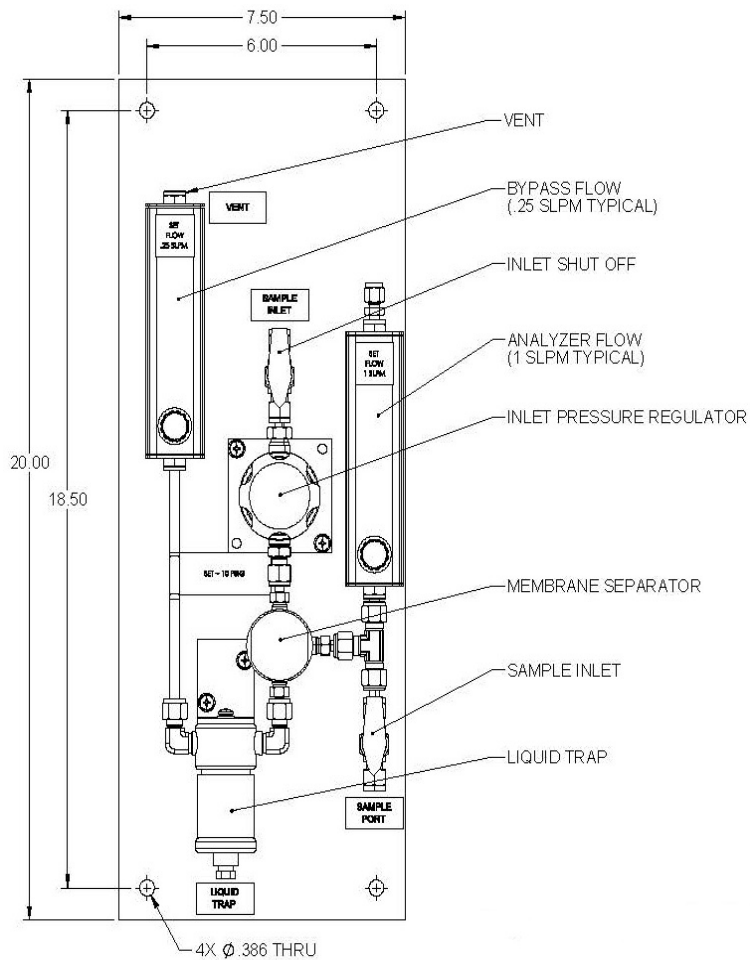


Figure 3-1 Typical full-featured, remote SCS

Checking the SCS Installation

Before operating the system for the first time, a careful check of the installation of the entire SCS from the sample probe to the vent is recommended.

To perform SCS installation checks:

1. Confirm that the sample probe is correctly installed at the process supply tap and that the sample probe isolation valve is closed.
2. Confirm that the field pressure reducing station is installed properly at the sample probe.
3. Confirm that the relief valve at the field pressure reducing station has been set to the specified setpoint.
4. Confirm that all valves are closed.
5. Confirm that the atmospheric vent is properly connected.
6. Confirm that the analyzer house atmospheric vent is properly installed, if applicable.
7. Confirm that all sample system tubing has been thoroughly leak checked.

Starting up the SCS

After the SCS installation has been thoroughly checked, you are ready to begin preparing for initial SCS startup.

To prepare for SCS startup:

1. If applicable, apply AC power to the heat-traced sample transport tubing at the tracer control system.



If applicable, personnel should have a thorough understanding of the operation of the tracer power supply and control system before operating the SCS.

2. If applicable, confirm that the sample supply line electric tracer temperature controller at the tracer control system is set to the temperature specified.
3. If applicable, confirm proper heating of the sample supply tubing.
4. Confirm that all sample system shut-off valves are closed.
5. Confirm that the sample bypass and analyzer flowmeter control valves are gently closed (adjustment knob turned clockwise).



Do not over-tighten the control valves or damage could occur.

To start up the field pressure reducing station:



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 pressure reducing regulator.

1. Confirm that the sample probe isolation valve is closed.
2. Confirm that the pressure regulator at the field pressure reducing station is closed (adjustment knob turned fully counterclockwise).
3. Slowly open the sample probe process shut-off valve at the sample supply tap.
4. Slowly open the pressure regulator at the field pressure reducing station (adjustment knob turned clockwise) and set the pressure regulator to the specified pressure.
5. Blow sample through the sample transport tubing to flare or safe vent to ensure that dirt or liquids are not in the sample tubing.
6. Reconnect the sample transport tubing and set the pressure or the regulator to the specified pressure.

To start up the sample bypass stream on process sample:

1. Open the atmospheric vent header shut-off valve for the sample bypass effluent from the SCS, if applicable.
2. Open the sample port shut-off valve and slowly open the pressure regulator (turning knob clockwise).
3. Set the inlet pressure regulator on the panel to a setting that will maintain the specified flowmeter settings and provide good control using the analyzer and bypass flow control valves.
4. Open the bypass flowmeter control valve to establish sample flow from the sample probe and set the flowmeter to the specified value.



Do not exceed 10 psig at any time in the cell.

To start up the analyzer on process sample:

1. Open the sample flowmeter control valve to approximately the specified flow.
2. If required, adjust the pressure regulator at the field pressure reducing station to the specified setpoint.
3. Adjust the sample flowmeter control valve to the specified flow.



The adjustment setpoints of the analyzer flowmeter and pressure regulator will be interactive and may require multiple adjustments until the final setpoints are obtained.



*The analyzer system has been designed for the sample flow rate specified. A lower than specified sample flow rate may adversely affect analyzer performance. If you are unable to attain the specified sample flow rate, call the "**Service Contact**" on page A-7.*

4. Confirm the sample flow and pressure setpoints and readjust the control valves and pressure regulator to the specified setpoints, if necessary.
5. Confirm the sample bypass flow and readjust the bypass control valve to the specified setpoint, if necessary. The SCS is now operating with the process sample.
6. Power up the analyzer according to the procedure given in the analyzer operator's manual.

Shutting Down the SCS



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 and safety precautions for the sample contents before operating the SCS.



The process sample at the sample tap is at a high pressure. A pressure reducing regulator is located at the sample tap to reduce the sample pressure and enable operation of the SCS at a low pressure. Use extreme caution when operating the sample probe isolation valve and field pressure reducing regulator.

1. Close the sample supply shut-off valve.
2. Allow the sample to flow until all residual gas has dissipated from the lines as indicated by no flow on the sample and sample bypass flowmeters.
3. Close the atmospheric vent header shut-off valve for the combined sample bypass and measurement cell effluent from the SCS.

To purge the sample system for shipment/relocation:



If the analyzer is configured for differential measurements, purge the system with power "on" to ensure dry and wet portions of SCS are properly purged.

1. Refer to the procedure in the analyzer operator's manual for isolating the analyzer for a long-term shut down.
2. Refer to Appendix A for instruction on acquiring a "**Service Repair Order**" number and "**Packing**" instructions.

Appendix A: Troubleshooting & Maintenance

This chapter presents recommendations and solutions to issues that may be experienced during SCS operation.

If the problem encountered is not covered in this chapter, refer to “**Service Contact**” on page A-7.

Potential Risks Affecting Personnel

This section addresses the appropriate actions to undertake when faced with hazardous situations during or before servicing the SCS. 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 SCS.



Technicians are expected to follow all safety protocols established by the customer that are necessary for servicing the SCS. 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.

Exposure to process gases

1. Shut off the process gas to the 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.

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.



Follow all safety protocols governing toxic gases and potential leaks.

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).

Gas Leaks

The most common cause of erroneous measurements is outside air leaking into the sample supply line. It is recommended that supply lines be periodically leak tested, especially if the analyzer supply lines have been disconnected and reconnected due to relocation, replacement or returned to the factory for service.



Do not use plastic tubing of any kind for sample lines. Plastic tubing is permeable to moisture and other substances which can contaminate the sample stream. SpectraSensors recommends using 1/4" O.D. x 0.035" wall thickness, seamless stainless steel tubing.



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 and safety precautions for the sample contents before operating the SCS.

Periodic SCS Maintenance



Due to the chemical properties of the process samples, care must be taken to repair or replace components with proper materials of construction. Maintenance personnel should have a thorough knowledge and understanding of the chemical characteristics of the process before performing maintenance on the SCS.

The status of the SCS should be checked regularly to confirm proper operation (pressures, flows, etc.) and detect potential problems or failures before damage occurs. If maintenance is required, isolate the part of the system to be serviced by following the appropriate procedure under "**Shutting Down the SCS**" on page 3-5.

All filter elements should be checked periodically for loading. Obstruction of a filter element can be observed by a decreasing supply pressure or bypass flow. If loading of a filter is observed, the filter should be cleaned and the filter element replaced. After observation for some time, a regular schedule can be determined for replacement of filter elements.

No other regularly scheduled maintenance should be required for the system.

Preventive and On-Demand SCS Maintenance



Due to the chemical properties of some process samples, care must be taken to repair or replace components with proper materials of construction. Maintenance personnel should have a thorough knowledge and understanding of the chemical characteristics of the process before performing maintenance on the SCS.

Preventive and on-demand maintenance will be required when components and parts deteriorate or fail as a result of continuous use. The performance of the entire SCS and individual components should be monitored regularly so that maintenance may be performed on a scheduled basis in order to prevent a failure that could take the system out of operation.

The SCS is designed for convenient removal and replacement of component parts. Complete spare components should always be available. In general, if a problem or failure occurs, the complete part should be removed and replaced to limit system down time. Some components may be repaired (replacement of seats and seals, etc.) and then reused.

If the sample supply line does not appear to completely clear during normal operation, it may be necessary to clean the sample transport line to remove any liquid that may adhere to the wall of the tubing. The sample transport line should be purged dry with air or nitrogen before the system is placed back in operation.



The system must be taken out of service during any cleaning of the sample transport line.

If liquid makes it into the SCS, a filter element may become obstructed leading to a decreasing supply pressure or bypass flow. If obstruction of a filter or liquid trap is observed, the filter/liquid trap should be cleaned and/or replaced.

Regular SCS Status Check

1. Open the SCS door, if applicable.
2. Read and record the flowmeter settings while the gas is flowing.

3. Close the SCS door, if applicable.



If your SCS is contained within a cabinet, do not leave the SCS door open any longer than absolutely necessary. SpectraSensors recommends no more than 60 seconds.

Opening the door may affect the temperature reading until the temperature is stabilized.

4. Compare the current readings with the past readings to determine any variations. Reading levels should remain consistent.
5. If reading levels decrease, check the filters/liquid trap.

To check filters/liquid trap:

1. Shut down the system following the procedure in "**Shutting Down the SCS**" on page 3-5.
2. Inspect, clean or replace the filter or liquid trap as required.



For additional information, contact SpectraSensors' Technical Service Group at 800-619-2861.

3. Restart the system following the procedure in "**Starting up the SCS**" on page 3-3.

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:

3. Check if there are any contaminants or discoloring of the white membrane. If yes, the filter should be replaced.
4. Remove the O-ring and replace the membrane filter.
5. Replace the O-ring on top of the membrane filter.
6. Place the cap back onto the membrane separator and tighten.
7. 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:

3. Drain any liquids and clean with isopropyl alcohol.

4. Clean any liquids or contaminants from the base of the membrane separator.
5. Replace the filter and the O-ring.
6. Place the cap onto the membrane separator and tighten.
7. Check upstream of the membrane for liquid contamination and clean and dry out before re-opening the sample supply valve.

Instrument Issues

Refer to Table A-1 before contacting "**Customer Service**" for service.

Table A-1 Potential issues and solutions

Symptom	Response
Concentration values seem very high	Check for leak in tubing leading to the SCS Remote Panel and at the sample inlet.
	Be sure system was purged prior to start-up.
	Allow 30 minutes for dry down after a new system start-up.
	Check for liquid by opening the bypass valve or purging liquid trap filter housing.
	Refer to the "Troubleshooting" section in the analyzer operator's manual.
Concentration values are flow dependent (i.e., when flow decreases, concentration increases)	Check for a leak in the line leading up to, or at, the sample inlet.
	Confirm there is no dip in the tubing leading to the SCS Remote Panel.
	The tubing leading to the SCS Remote Panel may need to be heat traced.
Concentration values are temperature dependent (i.e., when temperature increases, concentration increases)	Check for dip in tubing leading to the SCS Remote Panel.
	There may be glycol or condensed hydrocarbons within the system.
The SCS remote panel cannot maintain a stable flow to the analyzer	Ensure pressure fittings are tight.
	Check membrane filter for cleanliness.
	Ensure there is no leak leading up to, or at, the inlet.

Table A-1 Potential issues and solutions (Continued)

Symptom	Response
The SCS remote panel cannot maintain a stable flow to the analyzer (Continued)	Be aware of pressure drops along long tube runs with a small inner diameter.
	Review the section " Periodic SCS Maintenance " on page A-2 to ensure optimal performance.
Adjusting the knob on the pressure reducing regulator does not adjust the pressure of the sampling system	Check if the regulator is freezing up. If so, be sure inlet pressure is at or below 100 psi.
	Be sure the inlet pressure is above 10 psi.
The liquid trap is filled with liquid	Purge the liquid using the manual drain.
	Ensure that the flow through the analyzer is still stable.
Condensed water found downstream of the membrane separator	Purge SCS Remote Panel with dry gas and replace membrane separator filter. Refer to the section on " Replacing the Membrane Separator " on page A-4.
	If gas is steadily wet, open up the bypass valve slightly to allow liquids to escape.
	Heat tracing tubing may be necessary.
	Review the section for the " Replacing the Membrane Separator " on page A-4 for optimal performance.
Flow through the membrane separator has become constricted	Determine if cause is related to either contamination or discoloration of the membrane separator, or if a puncture hole in the membrane separator was found. Follow the solutions in this table.
Inspection of the membrane element shows discoloration or contamination	Order replacement part and follow the instructions for replacing the membrane filter under " Replacing the Membrane Separator " on page A-4.
A puncture hole was found in the membrane separator	Order replacement part and follow the instructions for replacing the membrane filter under " Replacing the Membrane Separator " on page A-4.
The flowmeter(s) shows little or no flow through the sample panel	Ensure the regulator and valves are not closed.

Table A-1 Potential issues and solutions (Continued)

Symptom	Response
The flowmeter(s) shows little or no flow through the sample panel (Continued)	Ensure the inlet pressure is above 10 psi.
	Check the membrane filter for obstructions.
Pressure regulator is freezing up	Verify that the inlet pressure does not exceed 100 psi.

Service Contact

If the troubleshooting solutions do not resolve the problem, contact customer service:

Customer Service

4333 W Sam Houston Pkwy N, Suite 100
Houston, TX 77043-1223
United States of America

For SpectraSensors North America Service:

Phone: 1-800-619-2861, and press 2 for Technical Service

Fax: 1-713-856-6623

E-mail: service@spectrasensors.com

For SpectraSensors International Service, please contact the SpectraSensors distributor in your area, or contact:

Phone: +1-713-466-3172, and press 2 for Technical Service

Fax: +1-713-856-6623

E-mail: techsupport@spectrasensors.com

Service Repair Order

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

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

Packing

SpectraSensors analyzer systems and auxiliary equipment are shipped from the factory in appropriate packaging. Depending on the size and weight, the packaging may consist of a cardboard-skinned container or a wooden crate. All inlets and vents are capped and protected when packaged for shipment.

If the equipment is to be shipped immediately or stored for any length of time, it should be packed in the original packaging when shipped from the factory. If the SCS Remote Panel has been installed and or operated (even for purposes of a demonstration), the system should first be decontaminated (purged with an inert gas) before powering down the analyzer and SCS.



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.

To prepare 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, 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.
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 and outlets to prevent foreign material such as dust or water from entering the system.
12. Pack the equipment in the original packaging in which it was shipped, if available. If the original packaging material is no longer available, the equipment should be adequately secured (to prevent excessive shock or vibration).
13. If returning the analyzer to the factory, complete the Decontamination Form provided by SpectraSensors "**Customer**

Service" and attach to the outside of the shipping package as instructed before shipping.

Storage

The packaged analyzer should be stored in a sheltered environment that is temperature controlled between -4°F (-20°C) and 122°F (50°C), and should not be exposed to direct sun, rain, snow, condensing humidity or corrosive environments.

Disclaimers

SpectraSensors accepts no responsibility for consequential damages arising from the use of this equipment. Liability is limited to replacement and/or repair of defective components.

This manual contains information protected by copyright. No part of this guide may be photocopied or reproduced in any form without prior written consent from SpectraSensors.

Warranty

The manufacturer warrants the items delivered shall be free from defects (latent and patent) in material and workmanship for a period of one year after delivery to the Buyer. The Buyer's sole and exclusive remedy under this warranty shall be limited to repair or replacement. Defective goods must be returned to the manufacturer and/or its distributor for valid warranty claims. This warranty shall become inapplicable in instances where the items have been misused or otherwise subjected to negligence by the Buyer.

Notwithstanding any other provision of this contract, no other warranties, whether statutory or arising by operation of law, expressed or implied, including but not limited to those of merchantability or fitness for particular purpose, shall apply to the goods or services hereunder, other than the repair and replacement warranty above. Seller shall in no event be liable to Buyer or any third party for any damage, injury or loss, including loss of use or any direct or indirect incidental or consequential damages of any kind.

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Appendix B: Spare Parts List

Below is a list of spare parts for the SCS Remote Panel with recommended quantities for 2 years of operation. Due to a policy of continuous improvement, parts and part numbers may change without notice. Not all parts listed are included on every analyzer. When ordering, please specify the system serial number to ensure that the correct parts are identified.

Table B-1 Replacement parts for the SCS Remote Panel

Part Number	Description	2 Yr. Qty.
Sample Conditioning System		
6101671208	Membrane separator, 1/4" FNPT (SS)	-
6100002193	Membrane and O-ring, membrane separator	1
6132125254	Pressure regulator, 0-25 PSI, PR-1 1/4" FNPT (SS)	-
6134100274	Flowmeter, 0-25 LPM, Glass, Valve	-
6101510004	Filter Housing, Mini SS/Glass	-
61303042S4	Ball Valve, 1/4" TF (SS)	1
Miscellaneous		
4900002202	SCS Remote Panel Operator's Manual, additional copies	-

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