BA02196C/66/EN/02.23
70208738

Operating Instructions

OXY5500 Gas Analyzer
Sample Conditioning System

Endress+Hauser
People for Process Automation

Table of Contents

1 About this document

1.1 Warnings

Structure of Information	Meaning
⚠ WARNING **Causes (/consequences)** If necessary, consequences of non-compliance (if applicable) ▸ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.
⚠ CAUTION **Causes (/consequences)** If necessary, consequences of non-compliance (if applicable) ▸ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
NOTICE **Cause/situation** If necessary, consequences of non-compliance (if applicable) ▸ Action/note	This symbol alerts you to situations which may result in damage to property.

Table 1. Warnings

1.2 Symbols on the device

Symbol	Description
	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.
	The CE Marking indicates conformity with Essential Health, Safety & Environmental requirements of Directive 2014/34/EU for products sold within the European Economic Area (EEA).
	The UKCA marking indicates conformity with Essential Health, Safety & Environmental requirements of Directive UKSI 2016:1107 for products sold on the market in Great Britain (England, Wales and Scotland).

Table 2. Symbols

1.3 U.S. export compliance

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

2 Introduction

Endress+Hauser's OXY5500 Optical Oxygen Analyzer is a stand-alone device designed to detect oxygen in gases such as natural gas and air. Its design is based on fluorescence quenching technology that creates very stable, internally referenced measured values.

2.1 Associated documents

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

Part Number	Document Type	Description
BA02195C	Operating Instruction	Provides a comprehensive overview of the analyzer and step-by-step installation instructions
BA02196C	Sample Conditioning System (SCS) Operating Instruction	Commission, operation, and maintenance details for the Sample Conditioning System
SD02868C	Service Software Instruction	Instructions for operating the OXY5500 Service software to diagnose and maintain OXY5500 Optical Oxygen Analyzer systems
TI01656C	Technical Information	Provides technical data on the device with an overview of associated models available
XA02754C	Safety Instruction	Safety Instructions for the OXY5500 Optical Oxygen Analyzer

Table 3. Associated documents

For additional instruction manuals, please refer to the following:

- **For custom orders:** Refer to the Endress+Hauser website (https://endress.com/contact) for the list of local sales channels to request order-specific documentation. Order-specific documentation is located by analyzer serial number (SN).
- **For standard orders:** Refer to the Endress+Hauser website product page to download the published manuals for the analyzer: www.endress.com.

2.2 Who should read this manual

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

2.3 How to use this manual

Take a moment to familiarize yourself with this Operating Instruction by reading the **"Table of Contents"**.

There are a number of options and accessories available for the OXY5500 analyzers. This manual has been written to address the most common options and accessories. Images, tables, and charts have been included to provide a visual understanding of the analyzer and its functions. Special symbols are also used to provide the user with key information regarding the system configuration and/or operation. Pay close attention to this information.

2.3.1 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.

2.4 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 analyzer

2.4.1 Safety warning label

The warning label shown below will be affixed to the front side of all analyzer enclosures that contain sample gas.

Figure 1. Safety warning label

Hazards may vary by stream composition. One or more of the following conditions may apply.

Symbol	Description
	**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_2S. Follow all safety protocols governing toxic gases and potential leaks.
	**Inhalation**. Inhaling toxic gases or fumes may cause physical damage or death.

Table 4. Safety warning symbols

⚠ CAUTION

- 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/tag-out 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.

2.4.2 Equipment labels

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

Table 5. Equipment labels

2.4.3 Instructional symbols

Symbol	Description
	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 analyzer.
	Maximum voltage and current specifications for fuses.

Table 6. Instructional symbols

2.4.4 Special safety symbols used on the equipment

Special safety symbols and labeling are used on the equipment to alert the user to potential hazards and important information associated with the analyzer. Every symbol and label has significant meaning that should be heeded.

Symbol	Description
	**DO NOT REMOVE**—Removal of the seal and/or disassembly of pieces traversed by label voids the warranty.

Table 7. Special symbols

2.5 Manufacturer address

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

3 Safety

3.1 Potential risks affecting personnel

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

NOTICE

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

3.1.1 Mitigating risks

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

3.1.2 Electrocution hazard

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

⚠ CAUTION

- 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.

3.1.3 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).

3.1.4 Electrostatic discharge

Use a damp cloth to clean the display and keypad to avoid static electricity discharge.

Adhere to all warning labels to prevent damage to the unit. Refer to General warnings and cautions → 🖹 for more information.

4 SCS overview

Personnel should have a thorough understanding of the operation of the OXY5500 analyzer and the SCS, including procedures presented here, before operating the sample conditioning system.

⚠ CAUTION

- 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 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.

OXY5500 systems may be ordered with an optional integrated Sample Conditioning System (SCS). Each SCS has been specifically 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 analyzer and SCS should have a thorough understanding of the process application and the design of the analyzer and SCS.

Most problems experienced with sample systems tend to 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 Packing and Storage → 🖹.

⚠ CAUTION

- 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.

4.1 About the SCS

NOTICE

- Refer to the system drawings and schematics in Appendix A for your specific system configuration.

For a typical full-featured SCS, as shown in Figure 2, sample gas enters the sample conditioning unit [at the specified supply pressure set by an upstream regulator] via the sample supply port, passes through a shut-off valve, pressure regulator that maintains constant pressure in the measurement manifold, and membrane separator where any liquid in the stream is removed. Liquid removed by the membrane separator passes through the bypass loop. A continuous flow (set to the specified level by a metering valve with integrated flow meter) not only flushes the liquid from the membrane separator but also maintains flow through the sample lines, which reduces sample variation.

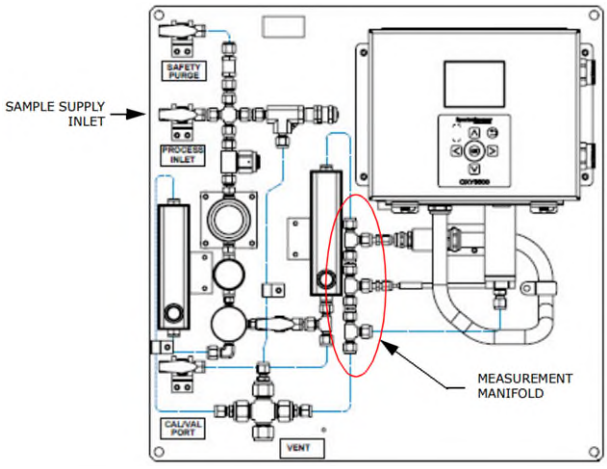

Figure 2. Typical OXY5500 with SCS on a panel

The flow exiting the bypass loop is combined with the flow exiting the measurement manifold and sent out the sample return port to be vented to a safe location.

4.2 Typical SCS component overview

Some of the typical components used in the SCS will be described in this section. The SCS for your analyzer may not use all of these components, and may also include additional special devices not discussed here.

NOTICE

- For questions regarding your SCS, refer to Service → 🖹.

4.2.1 Sample probe

A sample probe is used to provide a representative sample of any process stream. This sample can only be made if the stream is in a vapor phase. Mixed liquid/vapor streams must be avoided, so the location of the sample probe is critical in many processes.

NOTICE

- Contact Service to provide the temperature, pressure, and complete stream composition of the process stream for advise and recommendations regarding locating the sample point. Refer to Service → 🖹.

A representative sample of the process can only be taken away from the wall of the process piping. Also, dirt and liquids tend to accumulate close to the walls of the piping, especially near the bottom of horizontal runs of pipe. Therefore, Endress+Hauser recommends probes that fit well into the pipe. These may be removable to protect the probe from pipeline “pigging”.

4.2.2 Sample regulators at the probe

The pressure of the sample gas is usually reduced at or very close to the sample probe, sometimes in the probe itself, to reduce the sample transport lag time to deliver the sample to the analyzer. A guard filter is typically used to protect the regulator from larger particulates in the sample.

Refer to Figure 3 that shows the interface of the probe and the analyzer system. The analyzer system provided by Endress+Hauser is represented by the blue dashed outline. The probe and field pressure reducing station may also be supplied by Endress+Hauser, but is separate from the analyzer system.

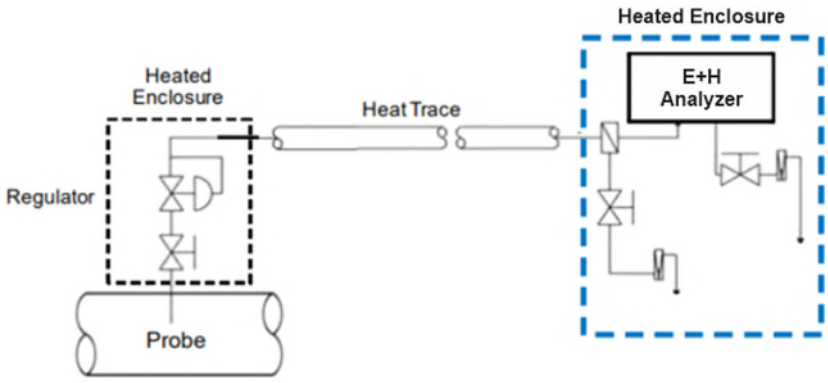

Figure 3. Analyzer and probe interface

4.2.3 Sample conditioning system filters

A guard filter is typically installed at the inlet to the SCS with a fine element to protect the flow controllers, flow meters, and pressure regulators from fine particulates.

A bypass filter with a fritted metal, glass fiber or polymeric membrane filter may also be in place to remove larger quantities of particulates or entrained liquids and mists. Some filters may fit with liquid knock-out traps to protect the system from free l/iquids.

Accumulation of liquids in these filters, or a steady flow of liquid from a liquid knock-out trap, should be investigated and corrected immediately as this is generally an abnormal condition.

4.2.4 Sample regulator heaters

In most applications, the process sample is at high pressure. When the pressure is reduced, the sample cools due to the Joule-Thompson effect[1]. The amount of cooling varies greatly depending on the application, but oftentimes must be offset using a heated sample regulator to prevent condensation of some sample components. Sample probe

regulators can be electrically or steam heated. Some probes have the pressure reducing valve parts inserted into the process piping, so that the Joule-Thompson cooling is offset by warming from the flowing sample. Note that for these probes to work correctly, the process gas must be flowing anytime the sample is flowing or liquid condensation may collect in the sample transport line, or even freeze up the sample probe regulator.

[1]*Named for James Prescott Joule and William Thomson, the Joule-Thompson effect describes the increase or decrease in temperature that accompanies the expansion of gas without production of work or transfer of heat. The cooling occurs because work must be done to overcome the long-range attraction between the gas molecules as they move farther apart. (www.britannica.com)*

4.2.5 Sample transport tubing

Sample transport tubing must be made of an appropriate material, which may be coated, and of an appropriate diameter for the application. Many times the sample transport tubing must be heat-traced to prevent sample condensation or to prevent fluctuations in measurement due to changes in ambient temperature.

4.2.6 Sample bypass flow control

A sample bypass flow control valve and flowmeters are usually provided to maintain a flow of fresh sample to the SCS even during system shut-down. The flow control valve is typically a needle valve and should be closed very gently and carefully if used to shut off flow completely to avoid damaging the valve. If the bypass flow meter has a glass tube, perform an occasional check for evidence of liquid in the tube. If liquid is found in the bypass or sample cell flow meter tubes, investigate and correct immediately.

4.2.7 SCS pressure regulator

The OXY5500 analyzer is limited to a maximum 10 psig pressure. To ensure that this pressure is not exceeded, a pressure regulator is provided inside the sample system. Refer to Appendix A → 🖹 for the correct pressure setting for this regulator.

4.2.8 Measurement manifold controller

The measurement manifold controller is provided with the SCS. Typically a flow control needle valve and flow meter similar to the sample bypass are used, but in some cases a differential flow controller is used. As with the bypass flow control valve, if the flow control needle valve and flow meter must be used for sample shut-off, close the valve gently and carefully to avoid damage.

4.2.9 Sample return/vent

Oxygen analyzers are inherently sensitive to sample pressure variations, so the analyzers must be calibrated to a specific sample pressures. An optional pressure sensor is available to accommodate an SCS system with pressure variations. Sometimes the analyzer is designed to vent the sample to atmosphere or an atmospheric pressure return system. Return to a flare or other sample return must recognize the pressure limitations of the oxygen analyzer and the calibration.

4.2.10 SCS heaters

Some analyzer systems have heated SCS enclosures for freeze protection. Refer to System Power Up → 🖹 for instruction on heater use.

NOTICE

- Heaters are considered accessories and not part of the overall analyzer certification.

5 SCS installation

This section covers specific instructions for mounting and installing the OXY5500 sample conditioning system (SCS). Refer to Appendix A → 🖹 for system drawings.

Installing the SCS enclosure or panel is relatively easy requiring only a few steps that, when carefully followed, will ensure proper mounting and connection. This section includes information regarding:

- Hardware and Tools for Installation
- Installing the SCS Standard Enclosure or Panel
- Installing the SCS Remote Panel
- Checking the SCS Installation
- Starting up the SCS
- System Power Up

NOTICE

▶ Endress+Hauser Class I Division 2 analyzers use a non-incendive protection method and Zone 2 uses an increased safety ec protection method; as such, all portions of the local electrical installation codes apply. The maximum allowed inductance to resistance ratio (L/R ratio) for the field wiring interface must be less than 25 µH/Ω.

5.1 Inspecting the SCS

Unpack and place the SCS with analyzer on a flat surface. Carefully inspect the enclosures for dents, dings, or general damage. Inspect the supply and return connections for damage, such as bent tubing. Report any damage to the carrier.

⚠ CAUTION

▶ Avoid jolting the instrument by dropping it or banging it against a hard surface.

Each analyzer is custom configured with various accessories and options. If there is any discrepancy, please contact Service. Refer to Service → 🖹.

5.1.1 Lifting/carrying the SCS

At approximately 80 lbs (36.29 Kg) with OXY5500 analyzer and depending on the configuration, the OXY5500 SCS panel or enclosure can easily be lifted from the packaging and moved to the installation location. Lift the enclosure or panel by the mounting brackets using at least two individuals and distribute the weight among personnel to avoid injury.

5.2 Installing the SCS standard enclosure or panel

Installing the SCS enclosure or panel is relatively easy requiring only a few steps that, when carefully followed, will ensure proper mounting and connection. This section includes information regarding:

- Mounting the standard SCS panel or enclosure
- Connecting the standard SCS panel or enclosure
- Checking the SCS Installation

5.2.1 Hardware and tools for installation

Depending on the particular configuration of accessories and options ordered, you may need the following hardware and tools to complete the installation process.

5.2.1.1 Hardware

- 6 mm (1/4 in.) Unistrut® (or equivalent) bolts and spring nuts
- Stainless steel tubing (using 6.4 mm (1/4 in.) O.D. x 0.889 mm (0.035 in.) wall thickness, seamless stainless steel tubing is recommended)
- 3/4 in. conduit or appropriate M20 x Exe M20 cable gland
- 6 mm (1/4 in.) x 38.1 mm (1-1/2 in.) machine screws and nuts (for wall mounting)

5.2.1.2 Tools

- Drill and bits
- Tape measure
- Level
- Pencil
- Screw driver (Phillips)
- Screw driver, small (Flat-head)
- 9/16 in. open-end wrench or Crescent wrench
- Needle-nose pliers

5.2.2 Mounting the standard SCS panel or enclosure

The OXY5500 SCS panel or enclosure is manufactured for wall or Unistrut® (or equivalent) metal framing installations. Depending on your application and configuration, the SCS will come mounted on a plate or inside an enclosure. Refer to Appendix A → 🖹 for drawings with detailed mounting dimensions.

NOTICE

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

⚠ CAUTION

▶ 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.

NOTICE

▶ Mounting brackets for equipment intended to be mounted on a wall and/or parts that support heavy loads shall withstand four times the maximum static load.

1. Select a suitable location to mount the SCS enclosure or panel. Choose a shaded area or use an optional analyzer hood (or equivalent) to minimize sun exposure.

⚠ CAUTION

▶ Endress+Hauser analyzers are designed for operation within the specified ambient temperature range. Refer to Appendix A. Intense sun exposure in some areas may cause the analyzer temperature to exceed the maximum range.

2. Locate the mounting holes on your unit. Refer to Figure 4 (panel mount) and the system drawings in Appendix A for your configuration.
3. For wall installations, mark the centers of the top mounting holes. Mounting dimensions are shown in Appendix A.
4. Drill the appropriate size holes for the screws you are using.
5. Hold the analyzer in place and fasten with the top screws.

NOTICE

▶ Endress+Hauser recommends at least two individuals to support the analyzer SCS during the mounting process.

6. Repeat for the bottom mounting holes.

Once all four screws are tightened the SCS should be very secure and ready for the electrical connections.

5.2.3 Connecting the standard SCS panel or enclosure

After the SCS panel or enclosure is mounted, follow the steps below.

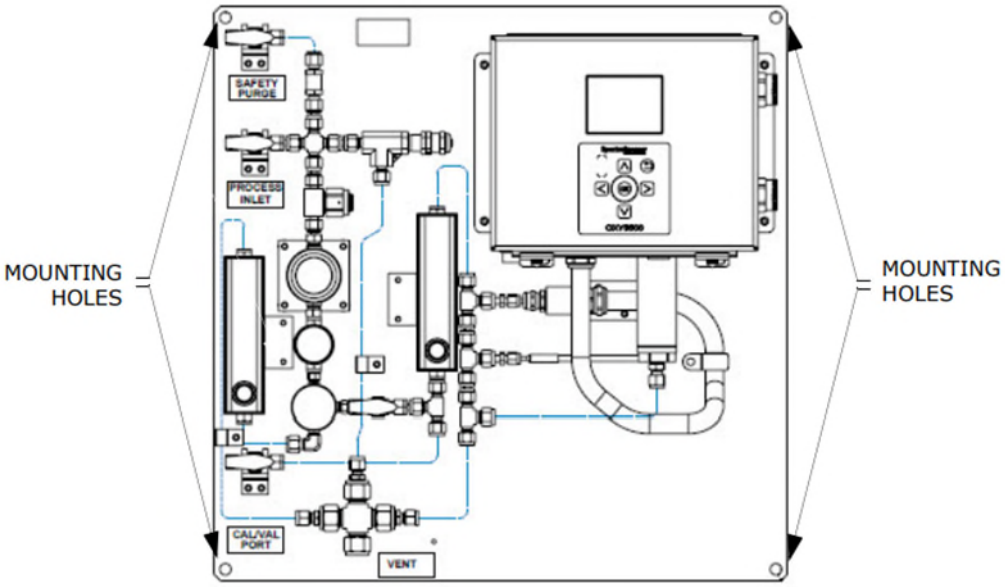

Figure 4. SCS panel mounting locations

1. Connect electrical power to the OXY5500 analyzer. Refer to the OXY5500 Optical Oxygen Analyzer Operating Instruction (BA02195C) for analyzer instructions.
2. Connect the sample supply.
3. Connect the sample return.

NOTICE

▶ Refer to system drawings for the specific analyzer model in Appendix A, Specifications and Drawings.

Refer to Checking the SCS Installation → 🖹 before starting up the SCS.

5.2.4 Connecting the SCS heater

1. Route AC power cables to the heater power junction box. Refer to Figure 19, Figure 20, and Figure 21 for heater location, depending on SCS configuration.
2. Use the wiring diagram shown in Figure 22 to connect the AC power.

5.3 Installing the SCS remote panel

Similar to the standard panel installation, the remote SCS panel includes the following steps:

- Mounting the SCS remote panel
- Connecting the SCS remote panel
- Checking the SCS Installation

5.3.1 Mounting the SCS remote panel

The OXY5500 SCS remote panel is manufactured for wall or Unistrut® (or equivalent) metal framing installations. Depending on your application and configuration, the SCS will come mounted on a plate or inside an enclosure. Refer to Appendix A → 🖹 for drawings with detailed mounting dimensions.

NOTICE

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

⚠ CAUTION

▶ 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.

NOTICE

- Mounting brackets for equipment intended to be mounted on a wall and/or parts that support heavy loads shall withstand four times the maximum static load.

1. Select a suitable location to mount the SCS remote panel. Choose a shaded area or use an optional analyzer hood (or equivalent) to minimize sun exposure.

⚠ CAUTION

- Endress+Hauser analyzers are designed for operation within the specified ambient temperature range. Refer to Appendix A → 🖹. Intense sun exposure in some areas may cause the analyzer temperature to exceed the maximum range.

2. Remove the remote panel from the crate and carry to the installation location. Refer to Lifting/carrying the SCS → 🖹.
3. Locate the mounting holes on your unit. Refer to Figure 5 and the system drawings in Appendix A.
4. For wall installations, mark the centers of the top mounting holes. Mounting dimensions are shown in Appendix A.
5. Drill the appropriate size holes for the screws you are using.

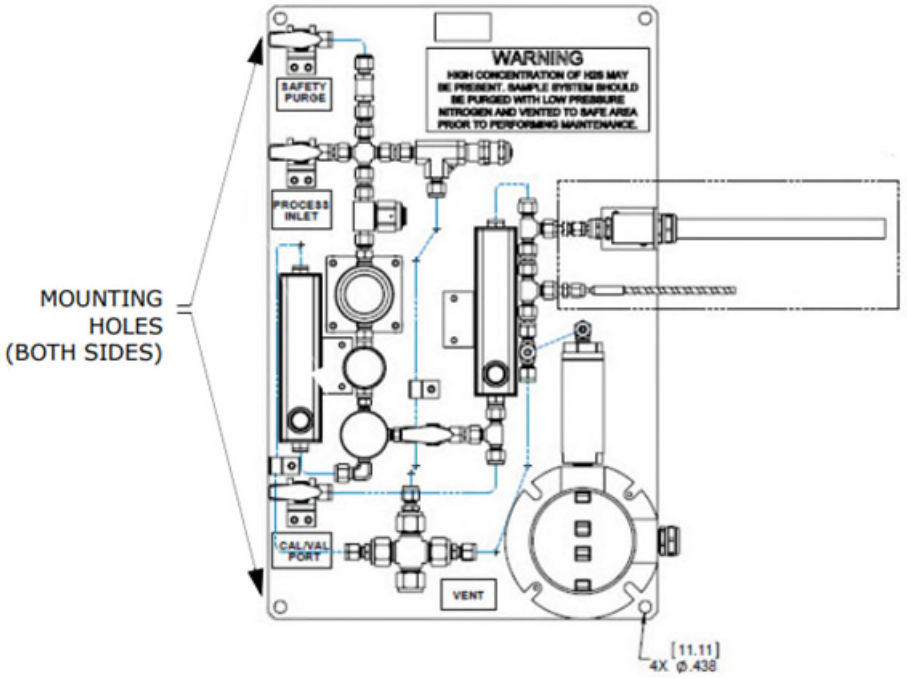

Figure 5. SCS remote panel mounting locations

6. Hold the analyzer in place and fasten with the top screws.

NOTICE

- It is recommended that at least two individuals support the analyzer SCS during the mounting process.

7. Repeat for the bottom mounting holes.

Once all four screws are tightened the SCS should be very secure and ready for the electrical connections.

5.3.2 Connecting the SCS remote panel

1. Connect the oxygen sensor from the OXY5500 to the remote panel. Refer to Connecting the oxygen sensor to the remote panel → 🖹. Refer to Figure 6 for a view of the oxygen probe.
2. Connect the temperature sensor (RTD) from the OXY5500 to the remote panel. Refer to Connecting the RTD probe to the remote panel → 🖹. Refer to Figure 6 for a view of the RTD probe.
3. Connect the pressure sensor, if included, from the OXY5500 to the remote panel.

Refer to Checking the SCS Installation → 🖹 before starting up the SCS.

5.3.3 Connecting the oxygen sensor to the remote panel

The oxygen sensor may be shipped with or without the panel mounting bracket attached. Refer to the appropriate steps below for the configuration received.

Oxygen sensor with bracket:

1. Remove the protective red cap from the probe tip. Refer to Figure 6.

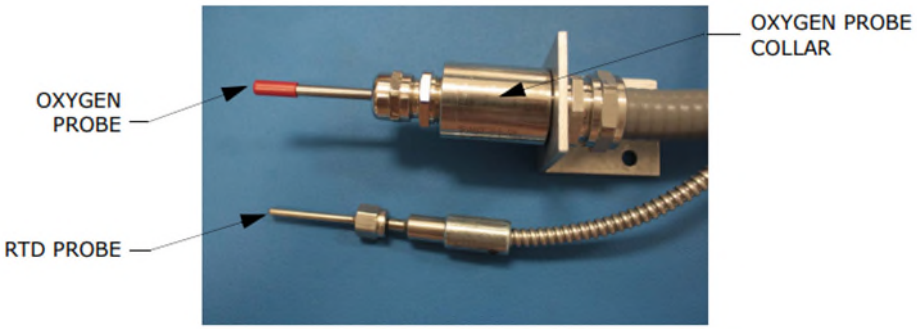

Figure 6. Oxygen and RTD probes

2. Loosen slightly the nut from the open end of the Swagelok T-fitting marked “Oxygen Probe” on the remote panel.
3. Look for the marking on the probe end. This marking indicates the depth to which the probe should be installed. Refer to Figure 7.

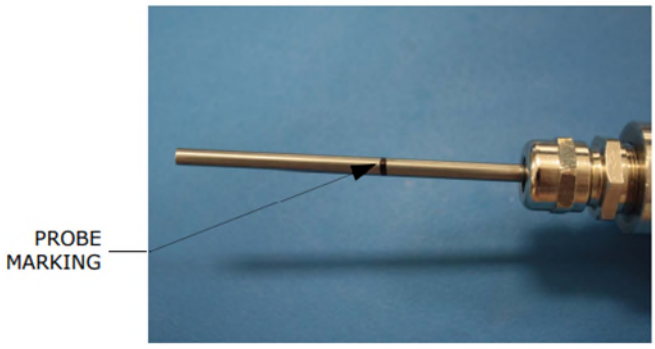

Figure 7. Oxygen probe - insertion marking

4. Insert the probe tip into the Swagelok T-fitting nut for the oxygen probe until the black marking on the probe meets the T-fitting opening. Refer to Figure 8.

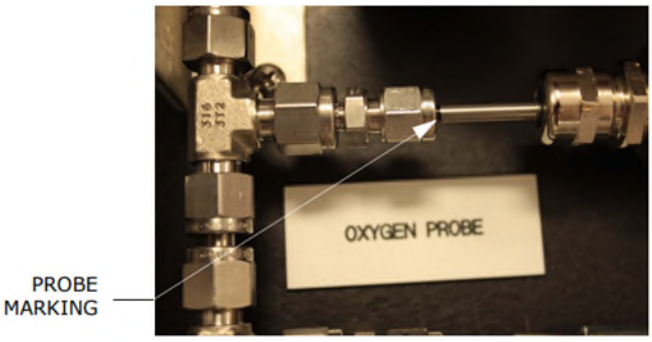

Figure 8. Oxygen probe - insertion marking

5. Tighten the Swagelok nut using a 1/2 in. open-ended wrench or adjustable wrench.
6. Secure the bracket using a Phillips screwdriver to install the screws (x 2) in the pre-drilled holes on the remote panel. Refer to Figure 9.

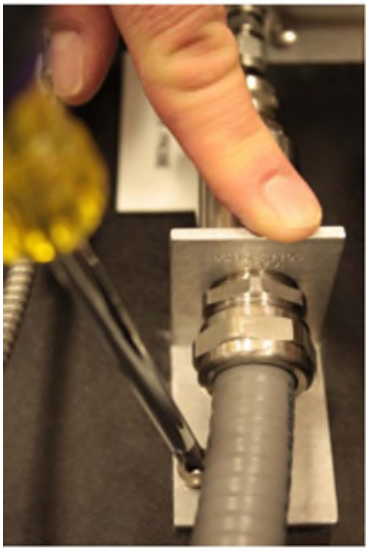

Figure 9. Oxygen probe bracket installed

5.3.4 Oxygen sensor without bracket

1. Remove the protective red cap from the probe tip.
2. Unscrew the collar from the hex nut and remove the collar. Refer to Figure 10.

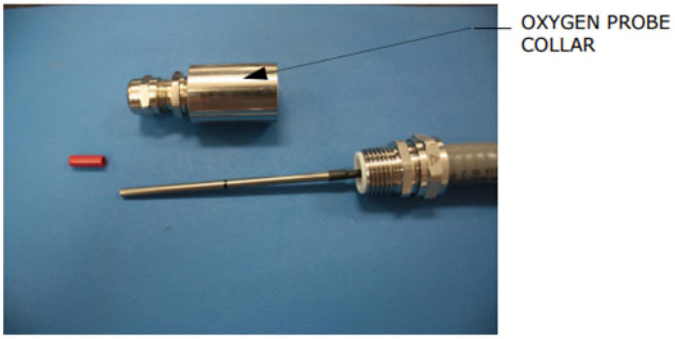

Figure 10. Remove oxygen probe collar

3. Replace the protective red cap to the probe tip.
4. Remove the bracket from the remote panel using a Phillips screwdriver (x 2 screws).
5. Feed the probe assembly through the opening in the supporting bracket.
6. Replace the collar over the probe tip and tighten against the bracket. Secure to finger tight. Refer to Figure 11.

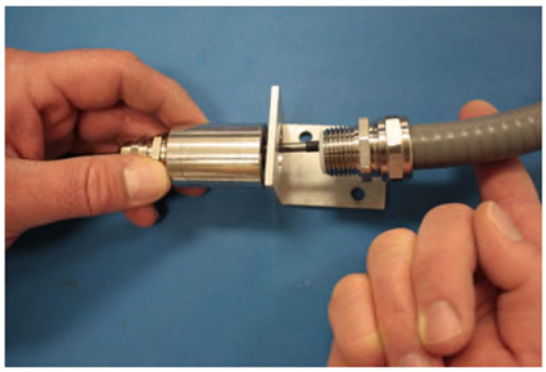

Figure 11. Feed oxygen probe through bracket opening and connect collar

7. Loosen slightly the nut from the open end of the Swagelok T-fitting marked “Oxygen Probe” on the remote panel.
8. Remove the red protective cap from the probe tip.

9. Look for the marking on the probe end. This marking indicates the depth for which the probe should be installed. Refer to Figure 7.
10. Insert the probe tip into the Swagelok T-fitting nut for the oxygen probe until the black marking on the probe meets the T-fitting opening. Refer to Figure 8.
11. Tighten the Swagelok nut using a 1/2 in. open-ended wrench or adjustable wrench.
12. Secure the bracket using a Phillips screwdriver to install the screws (x 2) in the pre-drilled holes on the remote panel. Refer to Figure 9.

5.3.5 Connecting the RTD probe to the remote panel

1. Insert the RTD probe into the Swagelok T-fitting designated for the RTD probe.
2. Tighten the Swagelok nut with a 7/16 in. open-ended wrench or adjustable wrench. Refer to Figure 12.

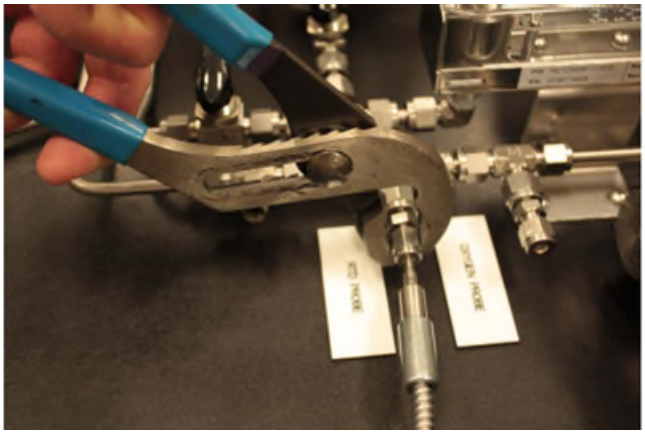

Figure 12. RTD probe installation

5.4 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.

5.4.1 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 50 PSI.
4. Confirm that all valves are closed.
5. Confirm that the power is available to the analyzer, and if applicable, that the local switch is off.
6. Confirm that the field analog/digital and alarm signal wiring is connected properly (refer to the OXY5500 Optical Oxygen Analyzer Operating Instructions [BA02195C] for more information).
7. Confirm that the atmospheric vent is properly connected.
8. Confirm that the analyzer house atmospheric vent is properly installed, if applicable. If it is not, contact plant operator or authorizing personnel.
9. Confirm that all sample system tubing has been thoroughly leak checked.

5.5 Starting up the SCS

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

5.5.1 To prepare for SCS startup

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

NOTICE

▶ 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 flow meter control valves are gently closed (adjustment knob turned clockwise).

⚠ CAUTION

▶ Do not overtighten the control valves or damage could occur.

6. Confirm proper installation and start-up of the field pressure reducing station.

5.5.2 To start up the sample bypass stream on process sample

1. Open the atmospheric vent header shut-off valve for the combined sample bypass and measurement manifold effluent from the SCS, if applicable.
2. Open the sample supply 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 flow meter settings and provide good control using the analyzer and bypass flow control valves.
4. Open the bypass flow meter control valve to establish sample flow from the sample probe and set the flow meter to the specified value.

NOTICE

▶ Refer to Appendix A → 🖹 for SCS specifications.

5.5.3 To start up the analyzer on process sample

1. Open the sample flow meter control valve to approximately 1.0 LPM.
2. If required, adjust the pressure regulator at the field pressure reducing station to the specified setpoint.
3. Adjust the sample flow meter control valve to the specified flow.

NOTICE

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

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 OXY5500 Optical Oxygen Analyzer Operating Instructions (BA02195C).

5.6 System power up

When all the start-up procedures have been completed, follow the steps below to start up the OXY5500 system.

NOTICE

- The electrical installation to which the apparatus is connected must be protected against transients. The protective device has to be set at a level not exceeding 140% of the peak rated voltage values at the power supply terminals (according to clause 13.c) of standard EN 60079-15).

⚠ CAUTION

- Potential static electrostatic hazard. Refer to Electrostatic discharge → 🖹.

1. Energize power to the SCS and allow it to warm up to a level close to the SCS sample temperature setpoint. Refer to the Specifications in Appendix A → 🖹.
2. Start the sample flow and set to the specified flow rates.
3. Allow the SCS temperature to stabilize.
4. Energize power to the analyzer controller and allow the OXY5500 device a warm-up period of approximately 30 minutes.

6 Appendix A: Specifications and drawings

Settings				
Component	**Panel Mount**	**Remote Mount**	**Enclosure Mount**	**Enclosure Mount (Heated)**
Sample Inlet Connection	1/4 in. Swagelok Tube Fitting (6 mm optional)			
Sample Outlet Connection	1/2 in. Swagelok Tube Fitting (12 mm optional)			
Sample Inlet Pressure	1.4 to 2.8 barg (20 to 40 psig)			
Sample Return Pressure (measurement pressure)	800 to 1400 mbar			
Relief Valve Setpoint	3.5 barg (50 psig)			
Pressure Regulator Setpoint	0.7 barg (10 psig)[1]			
Sample Inlet Temperature	-20 to 60 °C (-4 to 140 °F)			
Sample Flow Rate	1 SLPM (2 SCFH)[1]			
Bypass Flow Rate	1 SLPM (1 SCFH)[1]			
Ambient Temperature Range	-20 to 60 °C (-4 to 140 °F)			-20 to 60 °C (-4 to 140 °F)
Heater Setpoint	N/A			20 °C (68 °F)
Power/Electrical				
Heater Power CSA Version	N/A			120 VAC, 120 W
Heater Power IECEx Version	N/A			120 VAC, 125 W
Electrical Connections CSA Version	N/A			3/4 NPT
Physical Specifications (SCS only)				
System Dimensions (H x W x D)	50.8 x 50.8 x 12.7 cm (20 in. x 20 in. x 5 in.)	55.9 x 35.6 x 12.7 cm (22 in. x 14 in. x 5 in.)	61.0 x 61.0 x 23.4 cm (24 in. x 24 in. x 9.2 in.)	
Mounting Dimensions (H x W)	53.7 x 53.7 cm (21.125 in. x 21.1.25 in.)	53.7 x 33.3 cm (21.125 in. x 13.1.25 in.)	57.2 x 65.0 cm (22.5 in. x 25.6 in.)	
Approximate Weight	8 kg (18 lbs.)	8 kg (18 lbs.)	36.29 kg (80 lbs.)	40.82 kg (90 lbs.)
Enclosure Type	N/A		SS304, SS316 optional	

Table 8. OXY5500 SCS specifications

[1] *User adjustable.*

NOTICE

▶ Refer to the OXY5500 Optical Oxygen Analyzer Operating Instructions (BA02195C) for analyzer specifications.

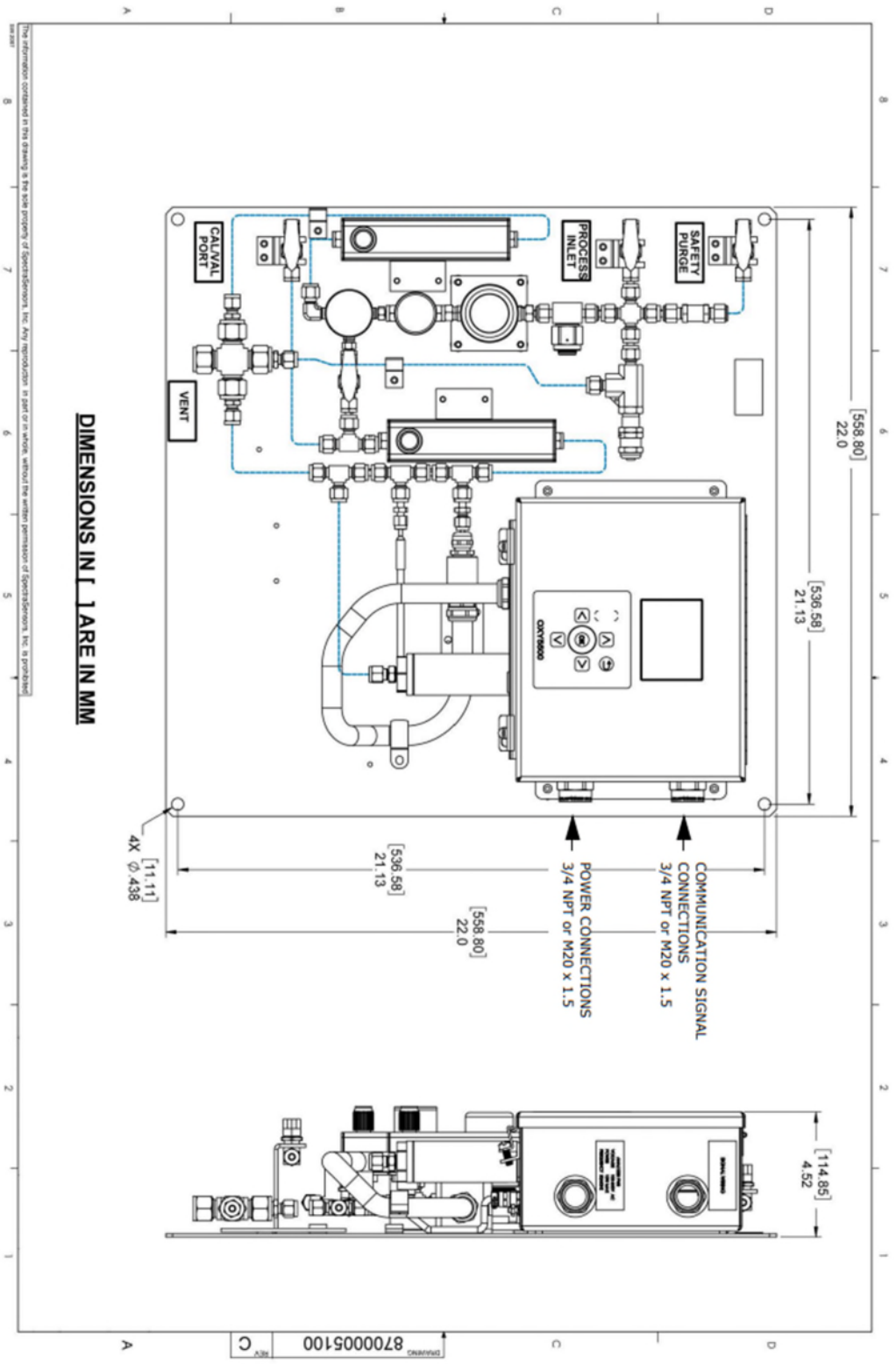

Figure 13. SCS, panel mount, standard configuration, dimensions

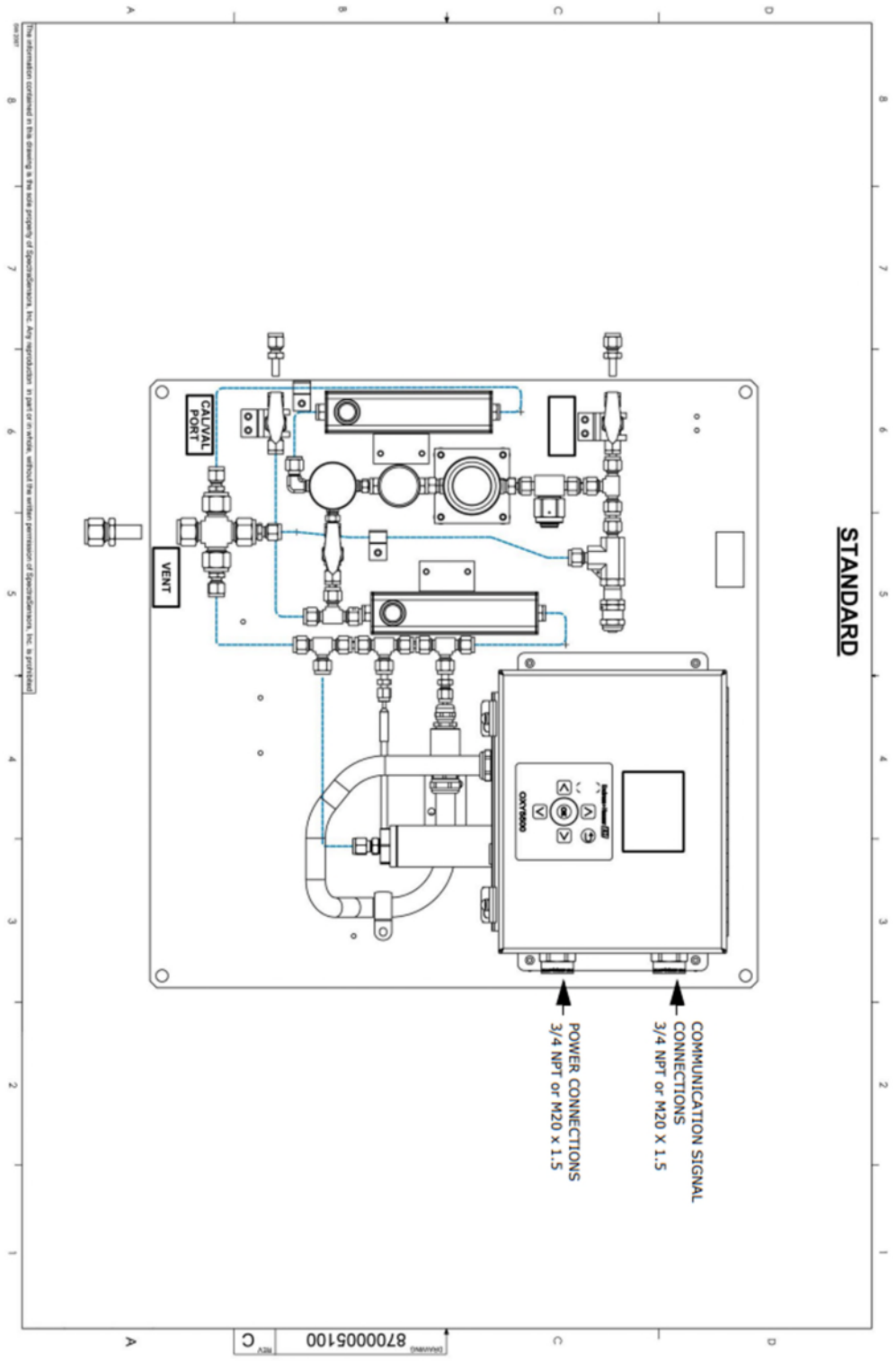

Figure 14. SCS, panel mount, standard configuration

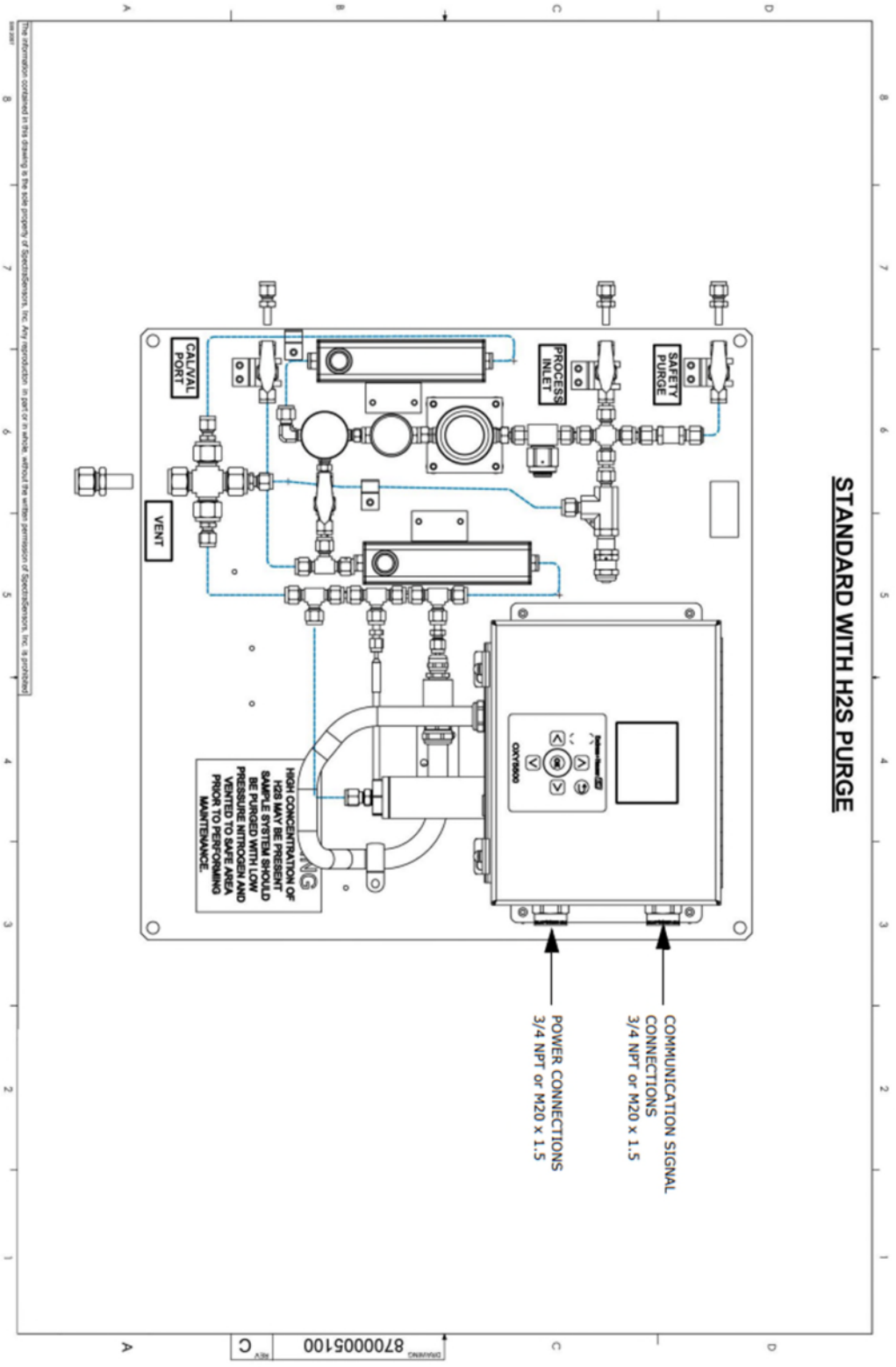

Figure 15. SCS, panel mount, standard configuration with H2S purge

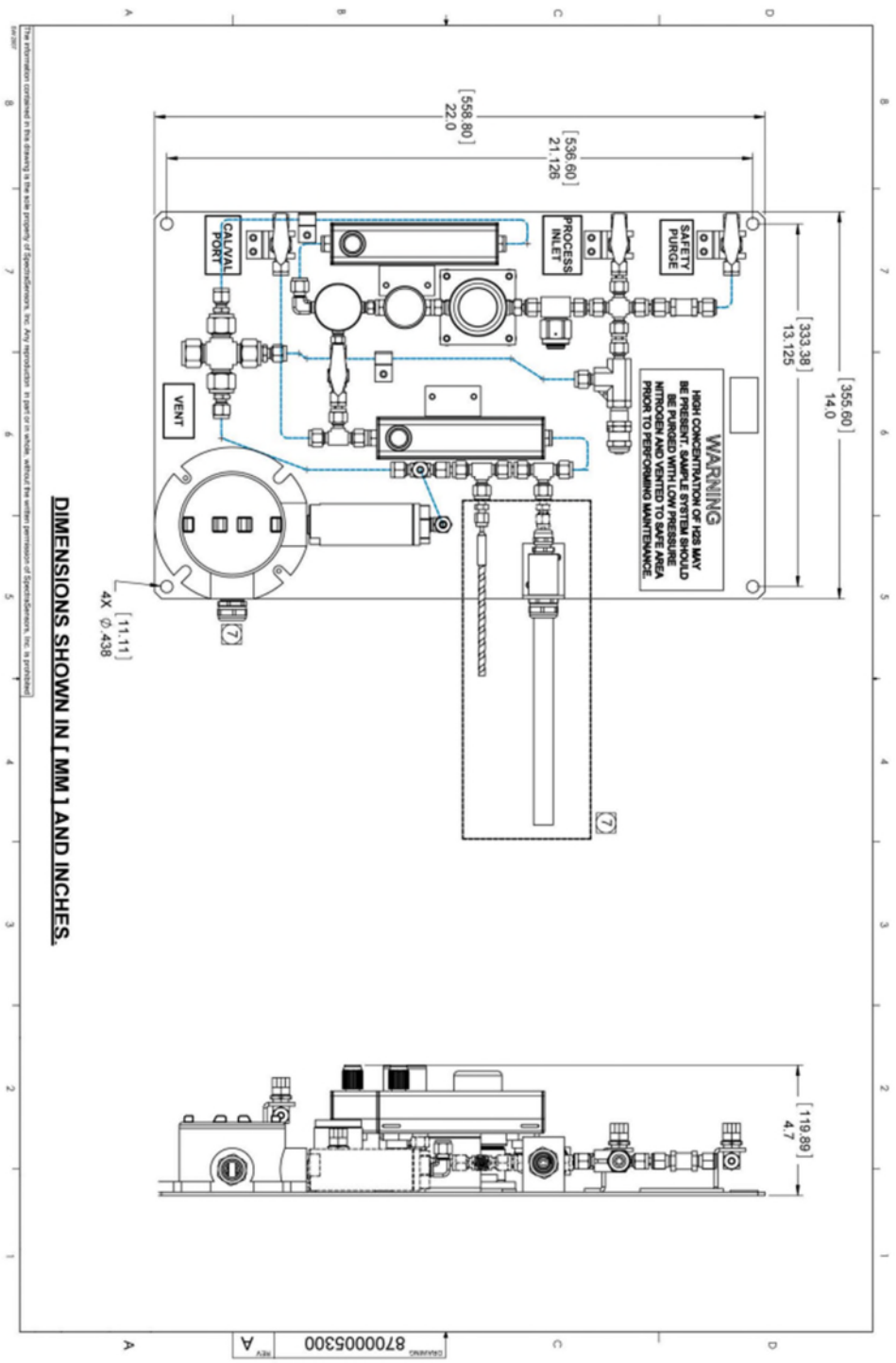

Figure 16. SCS, remote mount, standard configuration, dimensions

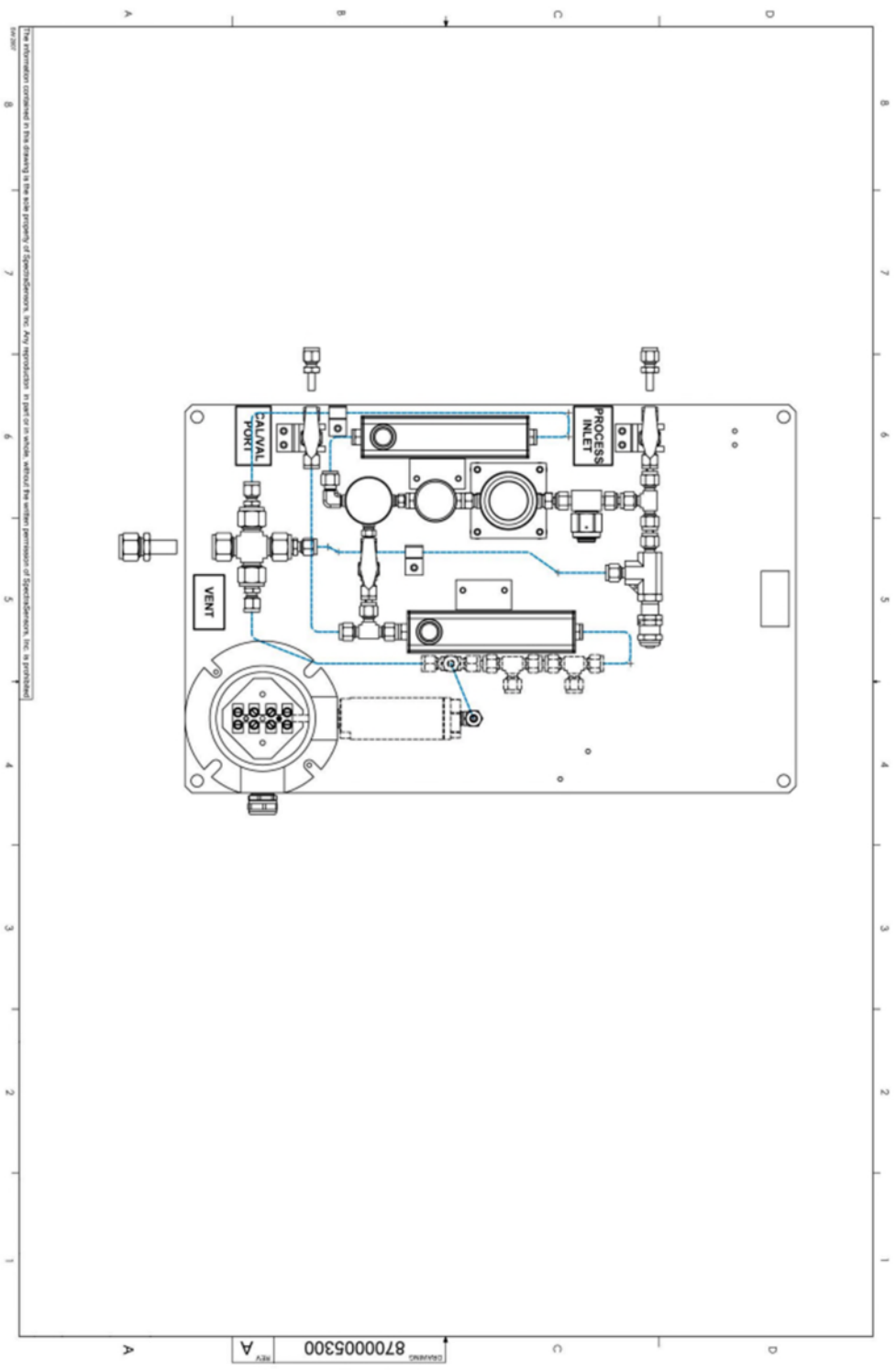

Figure 17. SCS, remote mount, standard configuration

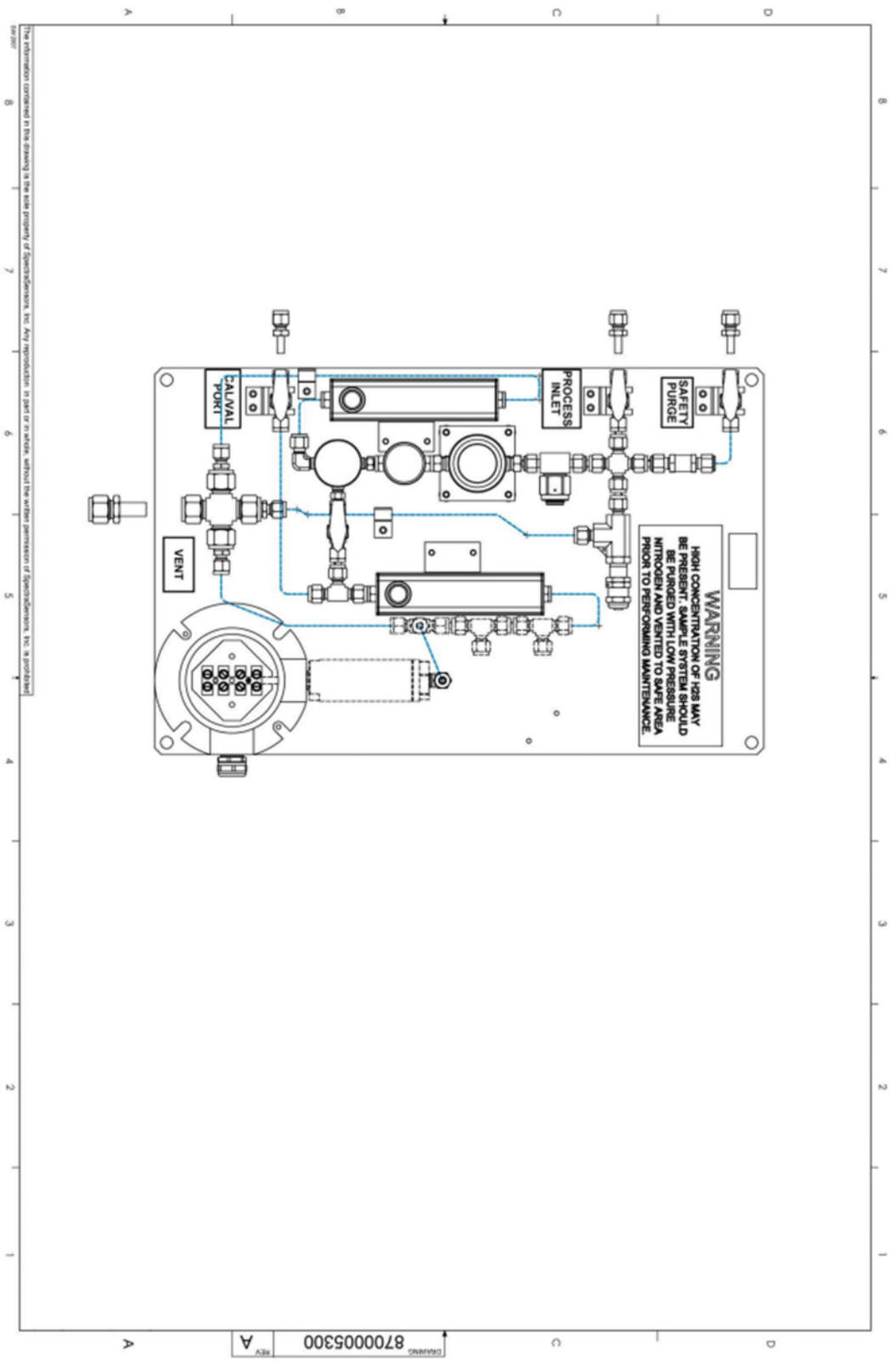

Figure 18. SCS, remote mount, standard configuration with H2S purge

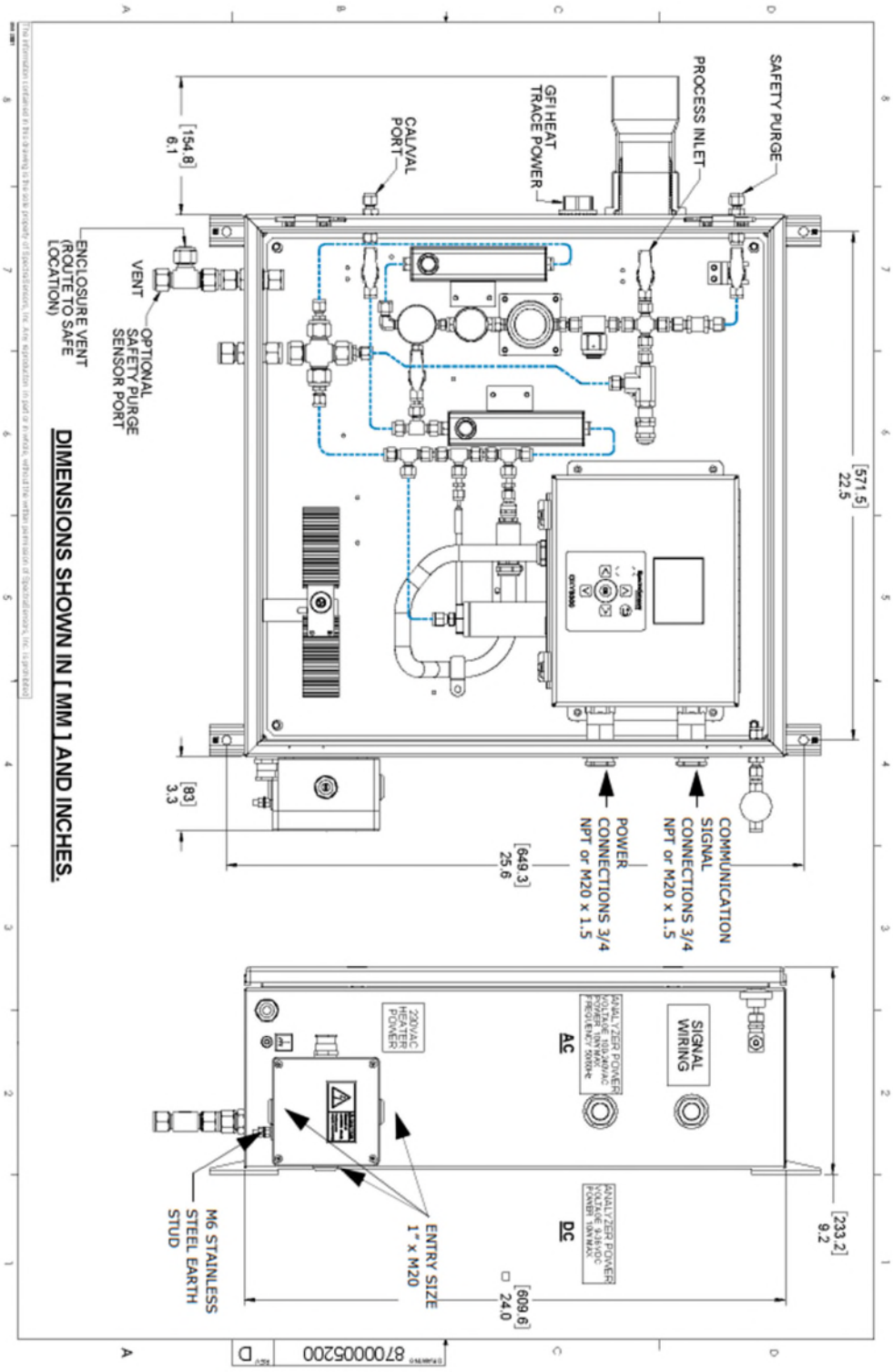

Figure 19. SCS, enclosure, standard configuration, dimensions

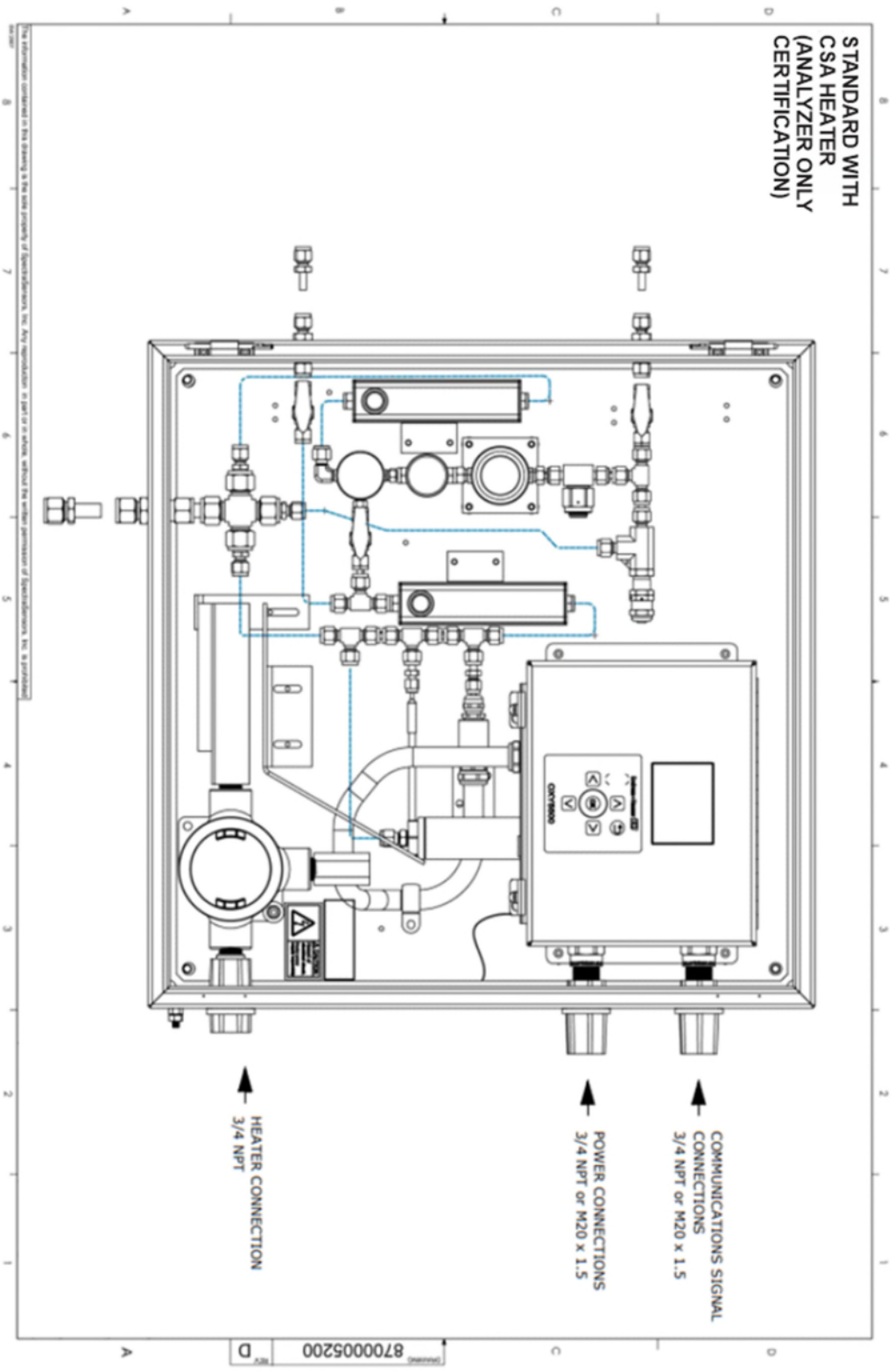

Figure 20. SCS, enclosure, standard configuration

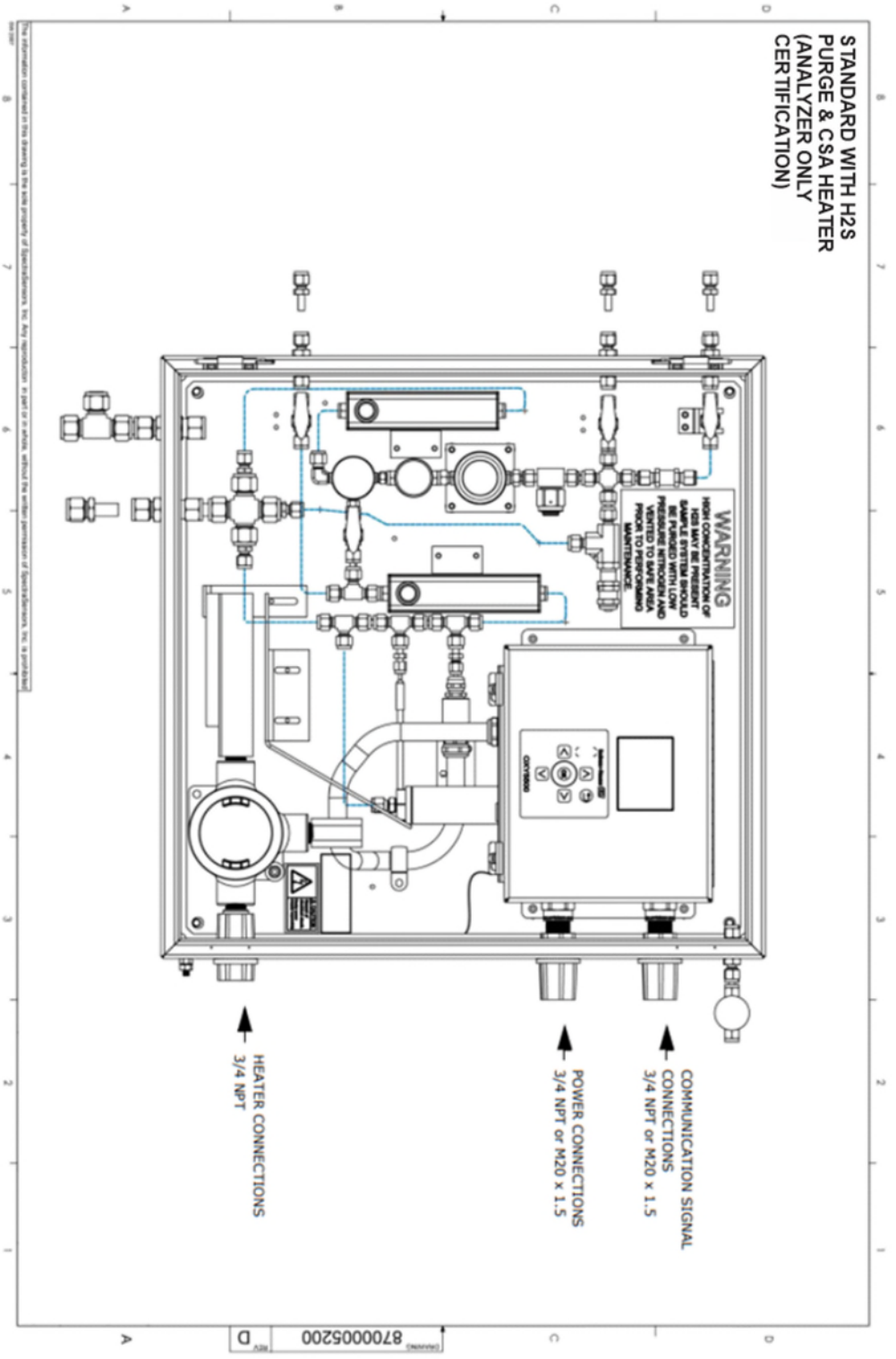

Figure 21. SCS, enclosure, standard configuration with H2S purge

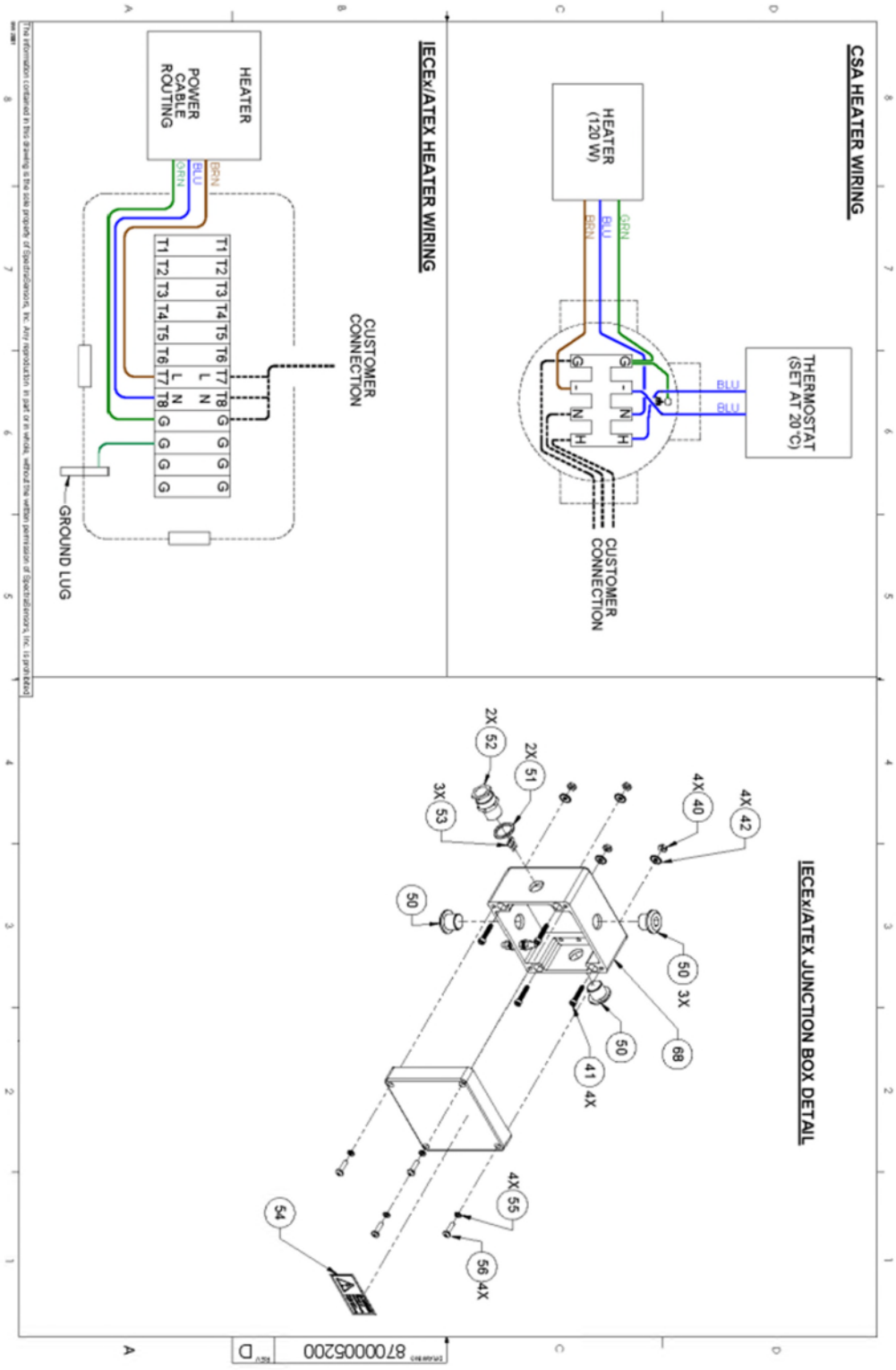

Figure 22. SCS, enclosure, heater wiring diagram

7 Appendix B: Spare parts

Below is a list of spare parts for the OXY5500 sample conditioning system (SCS) with recommended quantities for 2 years of operation. 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.

Part Number	Description	2 YR QTY
61303042S4	Ball Valve, 1/4 in. TF (SS)	-
6100002193	Membrane & O-Ring, Membrane Separator	1
2800002057	Membrane Separator Cover O-Ring, Viton	1
6101671208	Membrane Separator, 1/4 in. FNPT (SS)	-
6100002648	Relief Valve, STE at 50 psig, 1/4 in. TF (SS)	1
6101520074	Fitting, Filter, 7 µ, Tee, 1/4 SW, 316S	-
6100002186	Filter Element, 7 µ, for SS-4TF	1
6134100274	Flow Meter, 0 to 2 SLPM, Glass, Valve	-
6100002338	Flow Meter, Armored, Valve, 1/4NPT, Krohne	-
6100002767	Regulator, Pressure, 0 to 25 PSI, 0.07CV, SS	-
6100002839	Regulator, Pressure, 1 to 30 PSI, 0.06CV, 316SS	-
5300002036	Heater (Division 1), 120w, 120VAC	-
5300002003	Thermostat (Division 1), 120/240 VAC AC, 20 ˚C	-
EX5300000014	Heater (Zone 1), 120W, 230 VAC, 20C Limit	-

Table 9. Replacement parts for OXY5500 SCS

8 Appendix C: Troubleshooting and maintenance

This chapter presents recommendations and solutions to common problems, such as "Gas Leaks", "Contamination" and "Excessive Sampling Gas Temperatures and Pressures". If your analyzer does not appear to be hampered by one of these related problems, contact Packing and Storage → 🖹.

8.1 Gas leaks

Probably the most common cause of erroneous measurements is outside air leaking into the sample supply line. It is recommended the supply lines be periodically leak-tested, especially if the analyzer has been relocated or has been replaced or returned to the factory for service and the sample lines have been reconnected.

⚠ CAUTION

- Do not use plastic tubing of any kind for sample lines during regular operation (may be used for start-up calibration only). Plastic tubing is permeable to moisture and other substances which can contaminate the sample stream. Using 1/4 in. O.D x 0.035 in. wall thickness, seamless stainless steel tubing is recommended.
- 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.

8.2 Contamination

Contamination and long exposure to high humidity are valid reasons for periodically cleaning the gas sampling lines. Contamination in the gas sampling lines can potentially find its way to the measurement manifold and deposit on the oxygen probe or interfere with the measurement in some other way. Although the analyzer is designed to withstand some contamination, it is recommended to always keep the sampling lines as contamination free as possible.

8.2.1 To keep the sampling lines clean

1. Make sure that a membrane separator filter is installed ahead of the analyzer and operating normally. Replace the membrane if necessary. If liquid enters the measurement manifold and accumulates on the probe, a Low Power Signal or No Probe Found error will result. Refer to Troubleshooting → 🖹.
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 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 supply port of the analyzer.
6. Check all connections for gas leaks. Using a liquid leak detector is recommended.

8.3 Excessive sampling gas temperatures and pressures

The embedded software is designed to produce accurate measurements only within the allowable measurement manifold operating range. Pressures and temperatures outside these ranges may provide an inaccurate reading.

⚠ CAUTION

- If the pressure, temperature, or any other readings on the LCD appear suspect, they should be checked against the specifications. Refer to the OXY5500 Optical Oxygen Analyzer Oprating Instructions, BA02195C.

8.4 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.
   - Remove the O-Ring and insert a new membrane filter.
   - Replace the O-Ring on top of the membrane filter.
   - Place the cap back onto the membrane separator and tighten.
   - Check upstream of the membrane for liquid contamination and clean and dry out before re-opening the sample supply valve.

OR

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.

8.5 Shutting down the SCS

⚠ CAUTION

- 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.

8.5.1 To isolate the analyzer for short-term shutdown

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

⚠ WARNING

- 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.

NOTICE

- 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.
- The sample transport line must be vented to the atmospheric vent header through the bypass flow meter to avoid pressure surges. The procedure given in the following steps can be followed regardless of whether or not the SCS has been isolated from the process tap as described in the previous section.

⚠ CAUTION

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

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 flow meters.
3. Close the atmospheric vent header shut-off valve for the combined sample bypass and measurement manifold effluent from the SCS.
4. Turn off power to the analyzer.

NOTICE

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

8.5.2 To isolate the analyzer for long-term shutdown

If the analyzer is to be out of service for an extended period, the analyzer must be isolated at the process sample tap.

⚠ WARNING

- 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.

⚠ CAUTION

- Due to the high pressure of the process sample, it is advisable to allow the sample bypass flow to continue during long-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.

NOTICE

- The sample transport line must be vented to the atmospheric vent header through the bypass flow meter to avoid pressure surges. The procedure given in the following steps can be followed regardless of whether or not the SCS has been isolated from the process tap as described in the previous section.

⚠ CAUTION

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

1. Open (or confirm open) the or atmospheric vent header shut-off valve for the effluent from the SCS.
2. Confirm flow in the sample bypass flow meter (the actual flow is not critical).
3. Close the sample probe process shut-off valve at the sample supply process tap.
4. Allow pressure in the field pressure reducing regulator to dissipate until only a low residual pressure is indicated on the pressure gauge at the field station.
5. Close the field pressure reducing regulator (adjustment knob turned fully counterclockwise).
6. Close the sample supply shut-off valve.
7. Leave the flow meter control valves open.
8. Close the atmospheric vent header shut-off valve for the sample bypass and measurement manifold effluent from the SCS.
9. Turn off power to the analyzer.
10. Turn off the AC power to the sample tracer, if applicable, at the power distribution panel.

NOTICE

- Although power could be shut off to the sample supply electric tracer, it is advisable to allow this line to remain heated unless the SCS is to be out of service for an extended period or maintenance is required on the line.

8.6 Troubleshooting

Refer to Table 10 for frequently asked questions related to troubleshooting the OXY5500 before contacting the service department. To contact the service department, refer to Service → 🖹.

Symptom	Response
No flow	Check the process inlet.
	Check the flow path: regulator, ball valve, flow meter.
	Confirm unrestricted flow to atmosphere vent header.
No adjustment from pressure regulator	Check the field reducing station.
Reading is erratic or seems incorrect	Check for contamination in the sample system, especially if the readings are much higher than expected.
	Generate a Test Report using the Service Software and submit to Service.
Low Power Signal error	Refer to the OXY5500 Optical Oxygen Analyzer Operating Instruction (BA02195C) for instructions on cleaning the probe.
	Probe may be damaged. Replace probe.

Symptom	Response
No Probe Found error	Refer to the OXY5500 Optical Oxygen Analyzer Operating Instruction (BA02195C) for instructions on cleaning the probe.
	Probe may be damaged. Replace probe.
Slow measurement response	Clean the membrane housing.
	Replace the membrane separator. Refer to “Replacing the Membrane Separator” on page C-2.

Table 10. Potential instrument problems and solutions

8.7 Service

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

8.7.1 Service repair order

If returning the unit is required, obtain a Service Repair Order (SRO) Number from 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
www.endress.com

8.7.2 Renewity returns

Returns can also be made inside the USA through the Renewity system. From a computer, navigate to www.endress.com/return and complete the online form.

8.7.3 Before contacting Service

Before contacting Services, prepare the following information to send with your inquiry:

- Analyzer serial number (SN)
- Contact information
- Description of the problem or questions

Access to the information above will greatly expedite our response to your technical request.

8.8 Packing and storage

Endress+Hauser’s OXY5500 analyzers 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 or stored for any length of time, it should be packed in the original packaging when shipped from the factory. If the analyzer 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.

8.8.1 To prepare 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, 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 Endress+Hauser "Service" and attach to the outside of the shipping package as instructed before shipping.

8.9 Storage

The packaged analyzer should be stored in a sheltered environment that is temperature controlled between -20 ˚C (4 ˚F) and 70 ˚C (158 ˚F), and should not be exposed to direct sun, rain, snow, condensing humidity, or corrosive environments.

8.10 Disclaimers

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

8.11 Equipment warranty

For a period of 18 months from date of shipment or 12 months in operation, whichever comes first, Endress+Hauser warrants that all products sold by it shall be free from defects in material and workmanship under normal use and service when correctly installed and maintained. Endress+Hauser’s sole liability and Customer’s sole and exclusive remedy for a breach of warranty is limited to Endress+Hauser’s repair or replacement (at Endress+Hauser’s sole option) of the product or part thereof which is returned at Customer’s expense to Endress+Hauser’s plant. This warranty shall apply only if Customer notifies Endress+Hauser in writing of the defective product promptly after the discovery of the defect and within the warranty period. Products may only be returned by Customer when accompanied by a return authorization reference number (SRO) issued by Endress+Hauser. Freight expenses for products returned by Customer will be prepaid by Customer. Endress+Hauser shall pay for shipment back to Customer for products repaired under warranty. For products returned for repair that are not covered under warranty, Endress+Hauser’s standard repair charges shall be applicable in addition to all shipping expenses.

www.addresses.endress.com

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