XA02754C/66/EN/03.23
70208740

Same as
XA02754C/66/EN/02.22
Updated to include internal
reference number above

Safety Instructions

OXY5500 Gas Analyzer

ATEX/IECEx/UKEX: Zone 2
cCSAus: Class I, Division 2

Safety instructions for Optical Oxygen Analyzer OXY5500 for explosion-hazardous areas classified according to the National Electrical Code (NEC), Canadian Electrical Code (CEC), International Electrotechnical Commission (IEC), UK Statutory Instrument SI 2016 No. 1107 (as amended by SI 2019 No. 696-Schedule 3A Part 1) and Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws Member States.

Endress+Hauser
People for Process Automation

OXY5500 Gas Analyzer

Table of Contents

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

Symbols

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

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.

1 Introduction

Endress+Hauser's OXY5500 products are high-speed, quenched fluorescence extractive analyzers designed for extremely reliable monitoring of very low (trace) to standard concentrations of specific components in various background gases.

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

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

1.1 How to use this manual

Take a moment to familiarize yourself with this manual by reading the Table of Contents → 🖹. This manual has been written to address the most common safety issues related to the installation and maintenance of the OXY5500 analyzer. Additional information has been provided with the analyzer model purchased to instruct qualified users in the installation, operation, and maintenance of the equipment.

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

1.1.1 Conventions used in this manual

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

1.2 Associated documents

Enclosed in your analyzer system order is the product Safety Manual for your reference. Please review all necessary safety instructions before installing or operating your analyzer.

This document is an integral part of the complete document package, which is listed in the following table.

Part Number	Document Type	Description
BA02195C	Operating Instruction	An overview of the operations required to install, commission, and maintain the device.
TI01656C	Technical Information	Provides technical data on the device with an overview of associated models available.

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 to download the operating instructions: www.endress.com.

1.3 Manufacturer certificates

ATEX/UKEX/IECEx Certificate of Conformity:

CML 21ATEX 41408X / CML 21UKEX 21409X / IECEx CML 21.0170X

ATEX	UKEX	IECEx
EN IEC 60079-0:2018 EN IEC 60079-7:2015+A1:2018	EN IEC 60079-0:2018 EN IEC 60079-7:2015+A1:2018	IEC 60079-0:2017 IEC 60079-7:2017

Table 4. Manufacturer certificates

1.4 Manufacturer address

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

2 General safety information

Each analyzer shipped from the factory includes documentation for the purpose of relaying installing, operating and safety instructions to the responsible party and/or operator of the equipment. This chapter reviews the general safety instruction for every OXY5500 analyzer.

2.1 Intended equipment use

The OXY5500 analyzer is intended for use as instructed in the documentation package provided with the equipment. This information provided should be read and referenced by anyone installing, operating, or having direct contact with the analyzer. Any use of the equipment in a manner not specified by Endress+Hauser could impair the protection provided by the equipment.

2.2 Warning labels and cautions

Instructional icons are provided in all equipment manuals and on the OXY5500 analyzer to alert the user of potential hazards, important information and valuable tips. Following are the symbols and associated warning and caution types to observe when servicing the analyzer. Some of these symbols are provided for instructional purposes only and are not labeled on the system.

2.2.1 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

2.2.2 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.

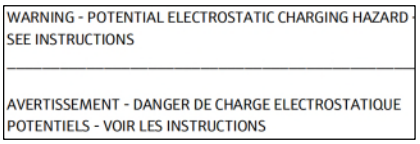	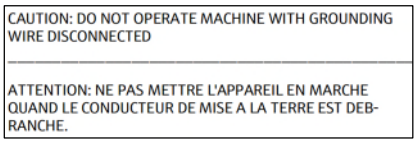	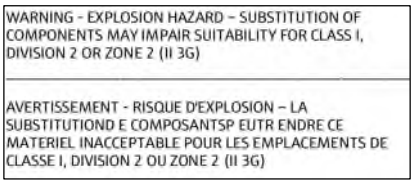
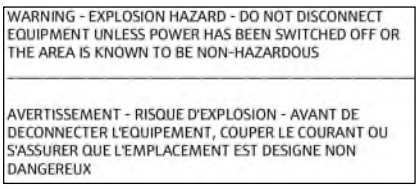	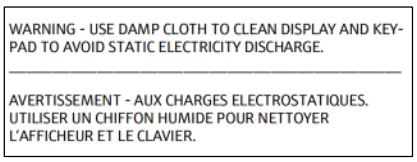	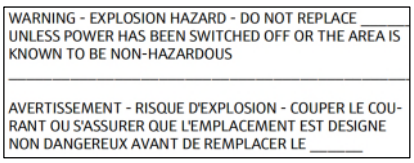

Table 6. Special safety symbols

2.2.3 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 7. Instructional symbols

2.3 Analyzer technical specifications

For the OXY5500 Gas Analyzer, a set of technical specifications are provided that outline recommended equipment settings and ratings. Standard system drawings → 🖹 illustrate the OXY5500 analyzer outline and dimensions.

2.3.1 Peripheral devices

For systems equipped with peripheral devices, e.g., probe assemblies, only devices that meet with Endress+Hauser's specifications may be used. Refer to documentation provided by the manufacturer for instruction on installation, operation, etc.

2.3.2 Equipment rating

Equipment rating information for the OXY5500 Gas Analyzer is included in OXY5500 analyzer specifications. This information includes, but is not limited to, the following:

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

Application Data			
Target Components	O_2		
Typical Measurement Ranges	**OP-9**[1]	**OP-6**[1]	**OP-3**[1]
	0 to 200 ppmv (default) 0-10 to 10-1,000 ppmv[2] User setting	0 to 5% 0-1 to 0-5% User setting	0 to 20% 0-10 to 0-20% User setting
Lower Limit of Detection	0.5 ppmv	20 ppmv	300 ppmv
Temperature Range[3] (Configurable)	1) 0 ℃ to 60 ℃ (32 ℉ to 140 ℉) 2) -20 ℃ to 50 ℃ (-4 ℉ to 122 ℉)		
Sample Inlet Pressure	140 to 275 KPaG (20 to 40 PSIG) to sample panel regulator		
Sample Pressure Range	800 to 1400 mbara		
Maximum Probe Pressure	275 KPaG (40 PSIG)		
Sample Flow Rate	Typical 1.0 SLPM (2.1 SCFH)		
Electrical & Communications			
Input Power (Voltage and Max. Power)	108 to 253 VAC, 50/60 Hz; 115mA at 120 VAC (5.3W at 120 VAC); 91mA at 240 VAC (6.6W at 240 VAC) or 9 to 30 VDC (CSA), 18 to 30 VDC (IEC/ATEX/IECEX); 195mA at 24 VDC (4.7 W at 24 VDC)		
Output Type	RS232	Input Voltage Range: +/-30 V Output Voltage: +/-15 V Output current: +/-15 mA	
	RS485	Output Voltage: -8 V to +13 V Output Current: +/- 250 mA	
	USB 2.0	Max. Voltages: 5 V Max. Currents: 64 mA	
	10/100 Ethernet	Max. Voltages: 3.3 V Max. Currents: 64 mA	
	Relays (LS-1, LS-2)	Isolation: 3750 Vrms Max. Loads: 250 mA Max. Voltages: 400 V	
	Analog Outputs 4-20 mA (Iout1, Iout2,)	Max. Voltage: 25 VDC Max. Current: 24 mA Load Range: max 800 Ω (Galvanically isolated)	

Physical Specifications	
Enclosure Type	Type 4X and IP66 rated, 304 and 316 (optional) Stainless Steel
Analyzer Dimensions	280 x 230 x 114 mm (11 x 9 x 4.5 in.) H x W x D (not including Sample Conditioning System)
Controller to Probe Cable Length	0.7 m (2.3 ft.) – Standard 2.5 m (8.2 ft.) and 5.0 m (16.4 ft.) – Optional
Weight	2.2 Kg (4.9 lbs.) – OXY5500 analyzer without Sample Conditioning System 14 Kg (31 lbs.) – OXY5500 analyzer on a panel
Sample Probe Construction	316 Stainless Steel
Area Classification – Certification	CSA: Class I, Div. 2, Groups A, B, C and D T3 Type 4X ATEX/IECEx/UKEX: Ex II 3 G, Ex ec IIC T3 Gc IP66 Tambient: -20°C to 60°C

Table 8. OXY5500 analyzer specifications

[1] *Analyzer ships with one sensor. Additional sensors are optional.*

[2] *Accuracy specification applies to concentrations up to 300 ppmv.*

[3] *Configurable based on OP-9, OP-6, OP-3 probe constants. Refer to the Calibration Certificate.*

2.3.3 Technical notes

- **Waterproof Enclosure:** The enclosure and fittings are designed for IP66/Type 4X ratings. In order to maintain this rating, all connections must be made with proper hardware and adhering to suggested procedures. Use of incorrect materials can compromise the integrity of the environmental seals.

NOTICE

▶ For a complete listing of new or updated certificates, please visit the product page at www.endress.com.

2.4 Potential risks affecting personnel

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

⚠ CAUTION

▶ Technicians are expected to follow all safety protocols established by the customer that are necessary for servicing the analyzer. This may include, but is not limited to, lockout/tagout procedures, toxic gas monitoring protocols, 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.

2.4.1 Personnel responsibility

NOTICE

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

2.5 Mitigating risks

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

2.5.1 Electrocution hazard

1. Shut off power at the main disconnect external to the analyzer. Complete this action before performing any service that requires working near the main input power or disconnecting any wiring or other electrical components.
2. Open enclosure door.

If service must be performed with power engaged:

1. Note any live electrical components and avoid any contact with them.
2. Only use tools with a safety rating for protection against accidental contact with voltage up to 1000V (IEC 900, ASTF-F1505-04, VDE 0682/201).

2.5.2 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).

2.5.3 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 → 🖹.

3 Equipment installation

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

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.

3.1 Mounting the analyzer

The OXY5500 Gas Analyzer is manufactured for wall installations. Depending on your application and configuration, the analyzer will come mounted on a plate. For detailed mounting dimensions, refer to the layout diagrams provided with the OXY5500 analyzer or in the OXY5500 Operating Instructions.

NOTICE

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

⚠ CAUTION

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

3.1.1 Lifting/carrying the analyzer

The OXY5500 can easily be lifted from the packaging and moved to the installation location. Refer to the Technical Specifications → 🖹 for weights by configuration. Take care to lift or carry the analyzer by the enclosure and not by any ancillary probes or cables, or damage may occur.

If the analyzer is configured with an optional integrated sample conditioning system (SCS), two individuals may be required to lift and move the analyzer system. For more information, refer to the OXY5500 SCS Operating Instructions.

3.1.2 Environmental considerations

The analyzer should be mounted indoors or, if outside, under a sun shade to prevent direct sunlight exposure.

The analyzer shall not be mounted more than 2,000 meters above sea level.

3.2 Opening/closing the analyzer enclosure

⚠ WARNING

- Hazardous voltage and risk of electric shock. Failure to properly ground the analyzer may create a high-voltage shock hazard.

⚠ CAUTION

- Conduit seals or Ex db or eb cable gland should be used where appropriate in compliance with local regulations.

NOTICE

- Apply 20 in-lbs of torque on each bolt to ensure the door is closed properly to maintain required ingress protection.

3.3 Protective chassis and ground connections

Before applying any electrical signal or power, the protective and chassis grounds must be connected.

3.3.1 Protective ground

- The protective ground (AWG and mm2), routed with the phase and neutral wire, shall be equal or greater than the phase or neutral wires.
- The protective ground shall be connected in such a way that it is unlikely to be removed during servicing that does not require disconnection of the protective conductor.
- The protective ground is the first wire to be connected to the analyzer and the last one to be removed; its color can be either solid green or green/yellow.

3.3.2 Chassis ground

- The chassis wire must be at least 6 mm2.
- The chassis ground wire shall be connected to the rod or frame of the shelter as soon as the protective ground wire is connected to the instrument.

3.4 Electrical wiring requirements

⚠ CAUTION

- Interconnection of the analyzer enclosure shall be accomplished using wiring methods approved for Class I, Division 2 or Zone 2 hazardous locations as per the Canadian Electrical Code (CEC) Appendix B or J and the National Electric Code (NEC) Article 501 or 505 and IEC 60079-14. The installer is responsible for complying with all local installation codes.

3.5 External circuit breaker requirements

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

The customer-provided circuit breaker shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and must be marked as the disconnecting device for the analyzer. This switch or breaker shall not interrupt the protective earth conductor.

The electrical installation to which the analyzer is connected must be protected against transients. The protective device must be set at a level not exceeding 140% of the peak rated voltage values at the power supply terminals.

After installing all necessary conduit runs, make sure any remaining conduit hubs, if installed with the Analyzer (Module 1) enclosure, are CSA and/or UL Certified, and rated Type 4X and/or IP66.

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

4 Equipment operation

his chapter provides an overview of safety operational instructions for the OXY5500 Gas Analyzer.

4.1 Operating controls

The OXY5500 Gas Analyzer is shipped with safety manual and declaration of conformity where applicable. Additional related documents are included electronically with a USB storage device or can be downloaded from www.endress.com.

4.2 Intermittent operation

If the analyzer is to be stored or shut down for a short time period, follow the instructions for shutting down the sample conditioning system (SCS).

4.2.1 Prepare, clean, and decontaminate the analyzer for shipment/storage

⚠ CAUTION

- ▶ Use a leak detector to determine any gas leak before opening enclosure door.

1. Shut off the process gas flow.
2. Allow all residual gas to dissipate from the lines.
3. Connect a clean, dry nitrogen purge supply to the sample inlet. Set to 30 PSIG.
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 to purge the system and clear any residual process gases.
6. Open the low pressure flare or atmospheric vent header shut-off valve for the effluent from the sample bypass.
7. Allow the analyzer to purge for 20 minutes.
8. Shut off the nitrogen purge and disconnect.
9. Close the low pressure flare or atmospheric vent header shut-off valve for the effluent from the sample bypass.
10. Allow all residual gas to dissipate from the lines.

⚠ CAUTION

- ▶ Ensure the system is depressurized to ambient pressure before continuing.

11. Turn off power and disconnect power to the system.

NOTICE

- ▶ Confirm the power source is disconnected at the switch or circuit breaker. Make sure the switch or breaker is in the “OFF” position and locked with a padlock.

12. Confirm all digital/analog signals are turned off at the location from which they are being monitored.
13. Disconnect all digital/analog wires from the system.
14. Disconnect the phase and neutral wires from the analyzer.
15. Disconnect the protective ground wire from the analyzer system.
16. Disconnect all tubing and signal connections.
17. Cap all inlets and outlets to prevent foreign material such as dust or water from entering the system.
18. Ensure the analyzer is free from dust, oils, or any foreign material.
19. 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).
20. If returning the analyzer to the factory, complete the Decontamination Form provided by Service → 🖹, and attach to the outside of the shipping package as instructed before shipping.

4.3 Cleaning the instrument

The housing should be cleaned only with a moist cloth to avoid electro-static discharge.

The SMA-fiber connector of the sensor can be cleaned only with a lint-free cloth. The sensor tip may be rinsed only with distilled water or ethanol.

⚠ CAUTION

- ▶ Never use benzene, acetone, alcohol, or other organic solvents.

5 Maintenance and service

This chapter provides safety information related to maintenance and service of the OXY5500 analyzer.

5.1 Fuse ratings and characteristics

Use only the same type and rating of fuse for replacements. Refer to fuse specifications below.

NOTICE

▶ For an illustration of the fuse enclosure → 🖹. Instructions for replacing a fuse can be found in the OXY5500 Operating Instructions.

5.2 Fuse specifications

Description	Rating
Cartridge fuse, 216 Series, 5 x 20 mm, Fast Act	800 mA, 250V

Table 9. Fuse specifications

5.3 Checking filters

The micron filter and membrane separator can be replaced in field. For full instructions on replacing these filters, refer to the SCS Operating Instructions (BA02196C).

1. Shut down the system following the procedure in “Shutting Down the SCS” in the SCS Operating Instructions.
2. Inspect, repair, or replace the filter as required.
3. Restart the system. Refer to “Starting up the SCS” in the SCS Operating Instructions.

5.4 Service

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

5.4.1 Before contacting service

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

- Contact information
- Description of the problem or questions

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

6 Appendix A: Drawings

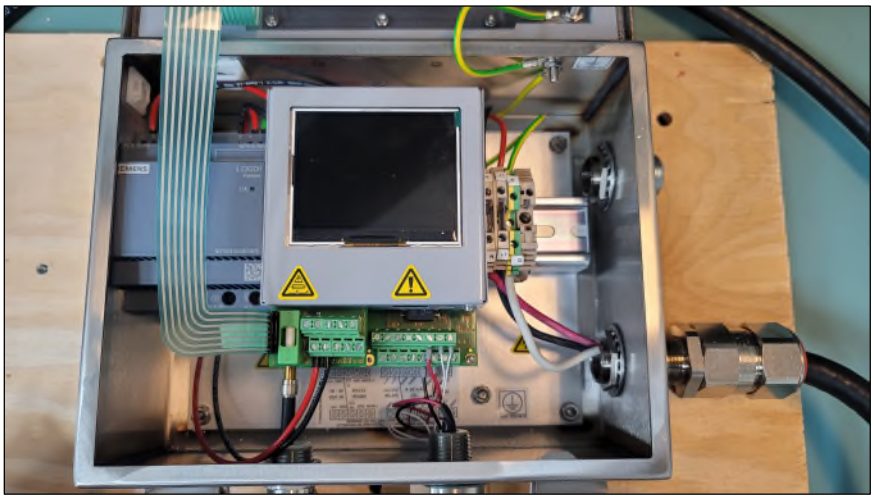

Figure 1. Inside cabinet view (AC version)

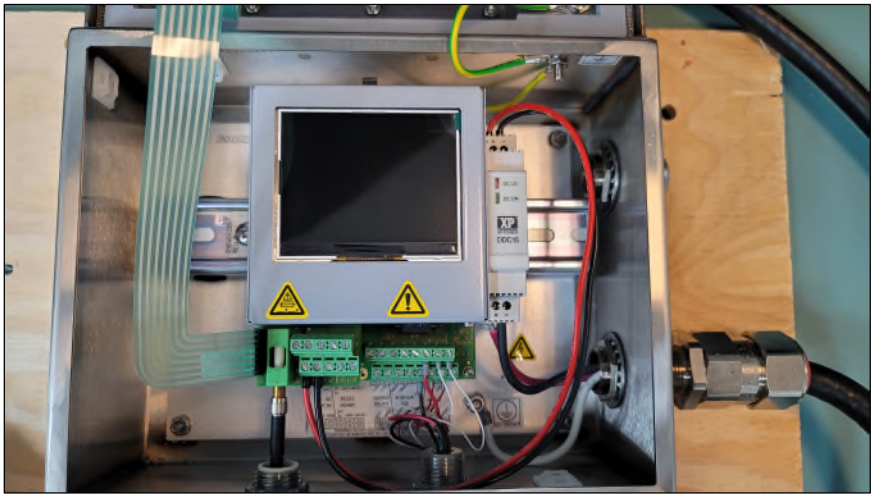

Figure 2. Inside cabinet view (DC version)

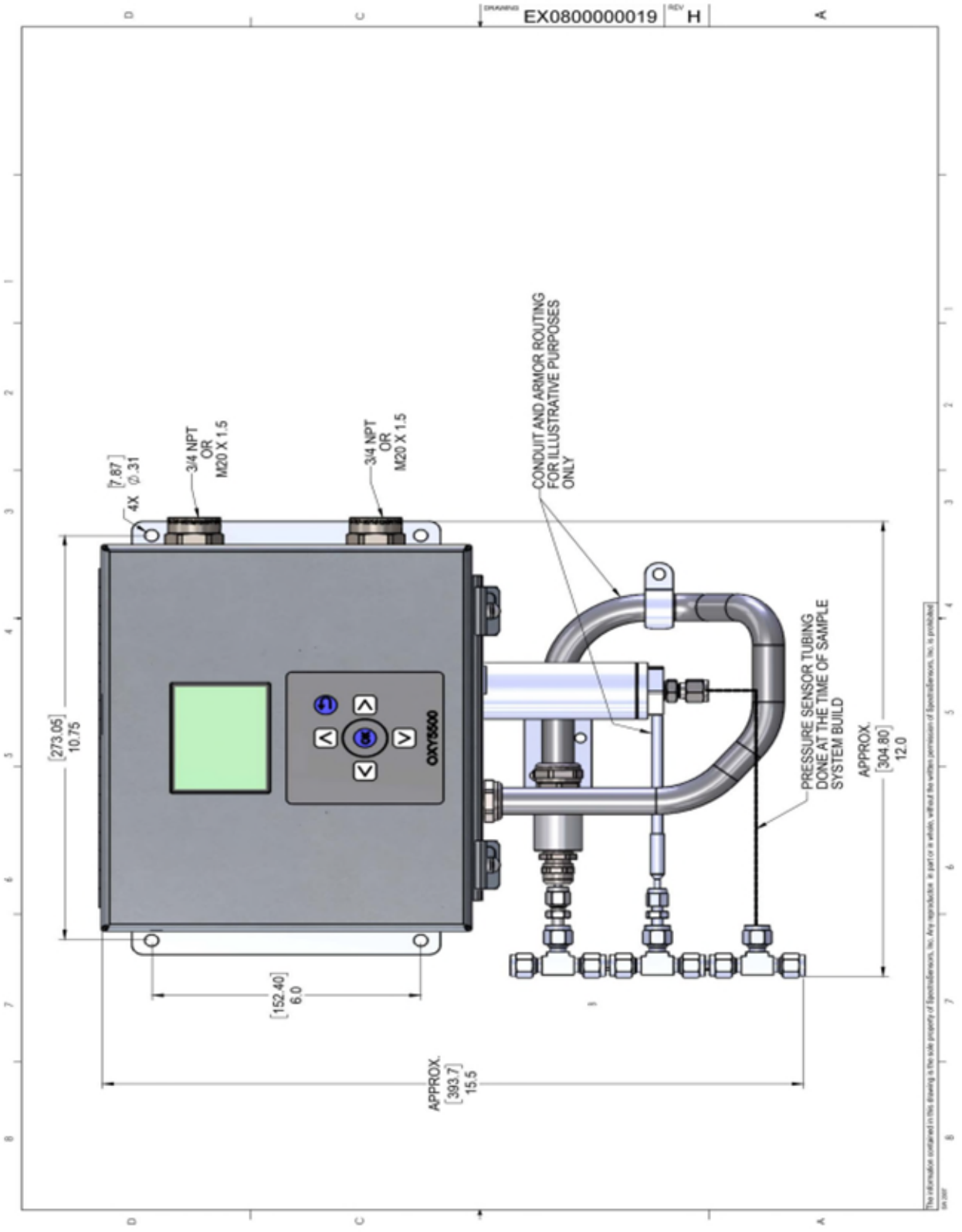

Figure 3. Outline and dimensions - panel mount

www.addresses.endress.com

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