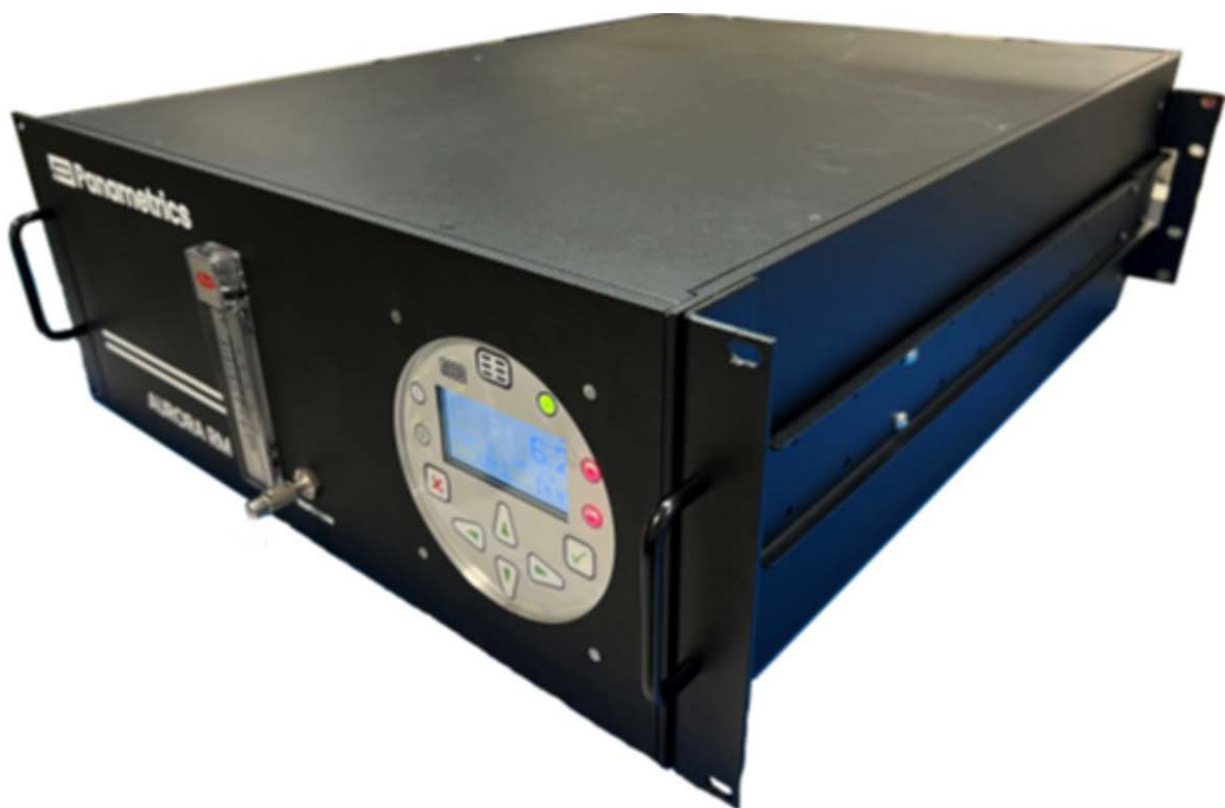


Manual Addendum

Aurora RM



This is an addendum to the Aurora H2O User manual (P/N PANA005C11 rev D) for operating the Aurora RM. Please refer to the Aurora H2O User Manual for detailed instructions on operation, general programming, maintenance and troubleshooting information.

Aurora RM

Manual Addendum

PANA005C11 Rev. D

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panametrics.com

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Services



Panametrics provides customers with an experienced staff of customer support personnel ready to respond to technical inquiries, as well as other remote and on-site support needs. To complement our broad portfolio of industry-leading solutions, we offer several types of flexible and scalable support services including: Training, Product Repairs, Service Agreements and more.

Please visit <https://panametrics.com/services> for more details.

Typographical Conventions

Note: These paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.

IMPORTANT: These paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.



CAUTION! This symbol indicates a risk of potential minor personal injury and/or severe damage to the equipment, unless these instructions are followed carefully.



WARNING! This symbol indicates a risk of potential serious personal injury, unless these instructions are followed carefully.

Safety Issues



WARNING! It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.



Attention European Customers! To meet CE Mark requirements for all units intended for use in the EU, all electrical cables must be installed as described in this manual.

Local Safety Standards

The user must make sure that he operates the equipment in accordance with the applicable local codes, standards, regulations, or laws.

Qualification of Personnel

Make sure that all personnel have applicable training to use the equipment.

Personal Safety Equipment

Make sure that operators and maintenance personnel have all safety equipment applicable.

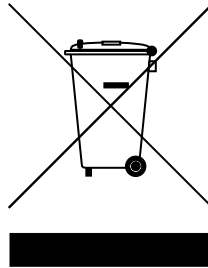
Unauthorized Operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

Environmental Compliance

Waste Electrical and Electronic Equipment (WEEE) Directive

Panametrics is an active participant in Europe's Waste Electrical and Electronic Equipment (WEEE) take-back initiative, directive 2012/19/EU.



The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end of life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Please visit <https://panametrics.com/health-safety-and-environment-hse> for take-back instructions and more information about this initiative.

1.	Aurora RM Features and Capabilities	1
1.1	Overview	1
1.2	Important Use Limitations	1
1.3	Basic Features	2
2.	Mounting the Aurora RM (Rack Mount) Analyzer	3
3.	Wiring the Aurora Rack Mount Configuration	4
4.	Making sample gas connections	6
5.	Maintenance and troubleshooting	7

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1. Aurora RM Features and Capabilities

1.1 Overview

Panametrics' Aurora RM moisture analyzer makes it possible for a variety of industrial and laboratory gas processing facilities to check moisture content in real-time with high precision and reliability. The analyzer system is designed to continuously monitor moisture content in an extracted sample of process gas using tunable diode laser absorption spectroscopy (TDLAS).

Similar to the Aurora H2O and Aurora Transport, it measures the partial pressure of water vapor (water in the gas state) in a gas sample introduced into its absorption cell. Combined with simultaneous measurement of the sample pressure and temperature, it provides readings of user-selectable moisture parameters including dew point temperature, volume ratio and absolute humidity (lbs/MMSCF or mg/m³) and both analog and digital signal transmission in addition to temperature and pressure.



Figure 1: Aurora RM outside view showing rack-mounting rails and front panel.

It's lightweight (<45 lbs) and rugged design with handles in the front and rack-mounting brackets pre-installed on the sides and the rear make it ideal for easy mounting in a standard 19" rack for quick deployment and use. The basic sample conditioning system allows for quick and easy gas connections on the rear panel, flow metering and adjustment on the front panel (see Figure 1), achieving stable readings within a few minutes of starting gas flow. Since the laser head is isolated from the sample gas, it provides non-contact drift-free moisture measurement tolerant to any contaminants such as particulates and liquid carryover in the sample.

Analysis of the extracted sample uses TDLAS to determine moisture content in the gas with high accuracy and repeatability down to PPMv levels. The fast response of the Aurora RM quickly alerts the user when moisture concentrations are out of compliance. Once upsets are corrected and the process recovers, the fast response enables gas flow to be quickly cleared for entry into the process.

1.2 Important Use Limitations

Environmental Conditions

The Aurora RM enclosure has an IP rating of 20, which implies the analyzer is designed to be used indoors and not designed to prevent dust or water ingress. The operator must be aware of weather conditions and coffee cup placement to prevent instrument damage or possible injury.



WARNING! Liquids spilled onto the analyzer may leak into the electronics enclosure causing severe damage to laser control and measurement circuitry, or possible user injury.

Orientation

During operation, Aurora RM should be positioned on a flat surface or in a 19" rack with the top surface facing upward and at an angle no greater than 15° from horizontal.



CAUTION! The Aurora rack mount configuration is intended for safe areas only and is NOT suitable for use in hazardous areas.

The wetted materials in the Aurora RM include 316 Stainless Steel, flexible Polypropylene tubing (Parker Part No. PP-43-0500), and Fluorocarbon (Viton®) seals. Please check with a Panametrics Applications Engineer on the chemical compatibility of your process gas with these materials.

1.3 Basic Features

- Rugged, lightweight design (< 45 lbs) with front handles and rails on black anodized rack-mount enclosure for ease of mounting into a 19" rack.
- Simple intuitive user interface via LCD display and 6-key push-button keypad.
- Optical response: < 2 seconds after horizontal flow cell is purged
- Dry down from ambient (~5000 PPMv) to <10 PPMv in seconds, which enables very fast recovery from dehydration system upsets.
- Direct readout in PPMv, dew/frost point (°C, °F), density (lbs/MMSCF, mg/m³) or vapor pressure (kPa, mmHg).
- Calculation and readout of process pressure dew point with user programmable constant or remote Modbus input for the process pressure.
- Three 4 – 20 mA outputs, two RS-232/485 MODBUS RTU for connection to SCADA or plant monitoring system, and one Ethernet port with MODBUS/TCP.
- Supplied with AuroraView software for remote configuration, data logging and data retrieval capacity.
- Provided with 1 standard NIST traceable calibrations in 100% Nitrogen and 5 custom calibrations that can be user defined based on the application.
- In conformance with IEC 60825-1 Edition 2.0 Safety of Laser Products

2. Mounting the Aurora RM (Rack Mount) Analyzer

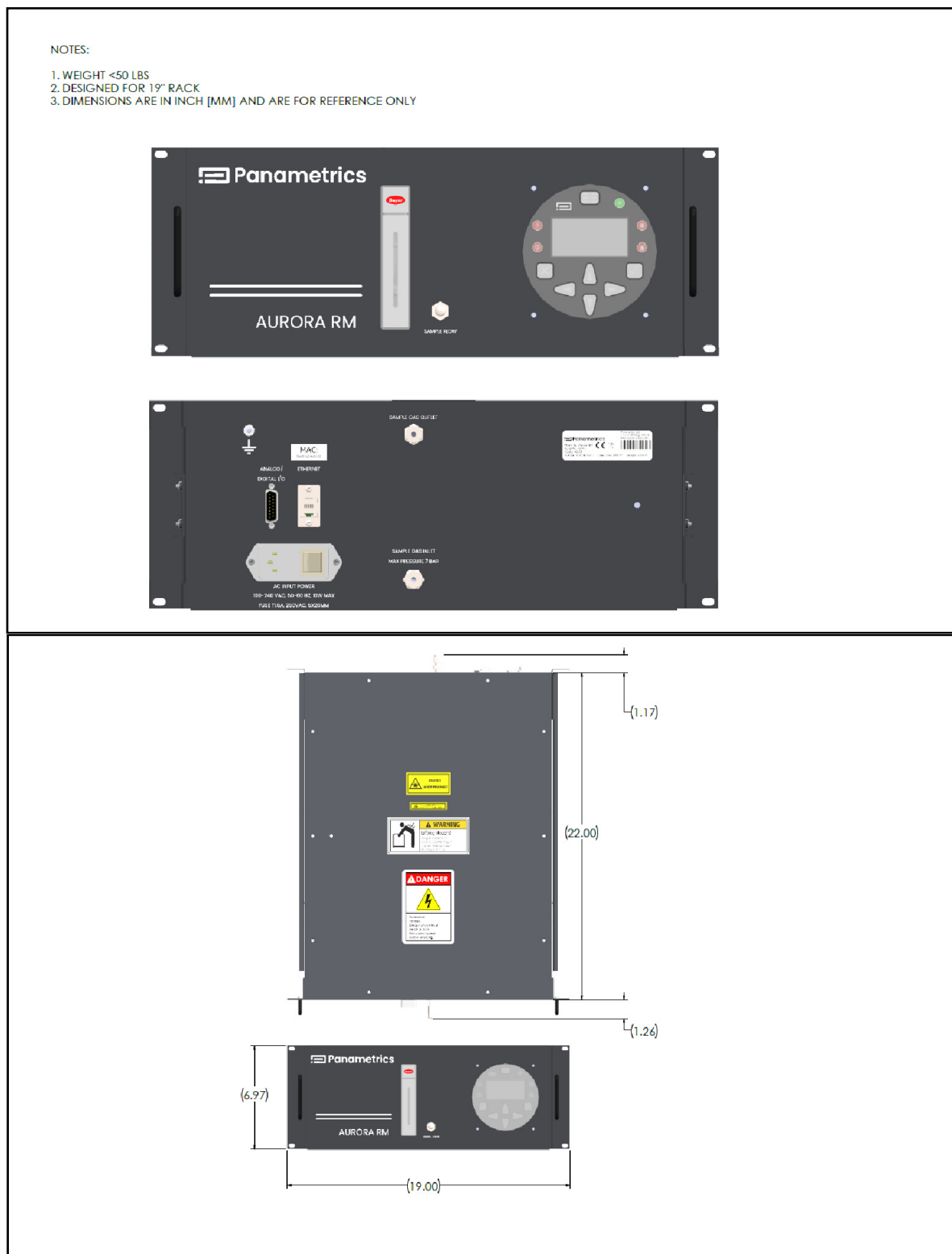


Figure 2: Aurora Drawing for Rack Mounting (P/N 165M1371 rev A)

1. Pre-wire the input and output connectors on the back panel in accordance with the wiring drawings shown below.
2. Use the approved AC input power cord provided.
3. Make sample inlet/outlet connections per instruction below and ensure they are leak free.
4. 19" rack mounting plates from Hammond Manufacturing (MPN: RM3U18BRKT) are pre-installed for customer use.
5. The 3U rack-mount enclosure should be installed in the rack with screws at both the front and the back. Consult rack manufacturer user manuals for proper installation.

3. Wiring the Aurora Rack Mount Configuration

All the electrical connections (input and output) to the Aurora RM are made via the back panel as shown in Figure 3 below. Please refer to the Aurora H2O User manual (P/N BH003C11 rev C) for detailed instructions on operating the Aurora software via the front panel HMI.

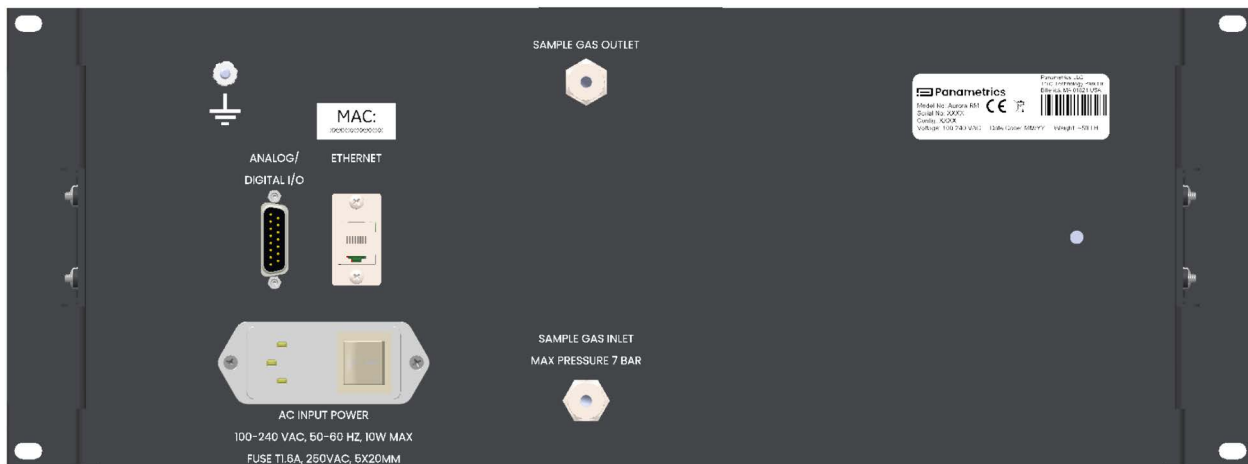
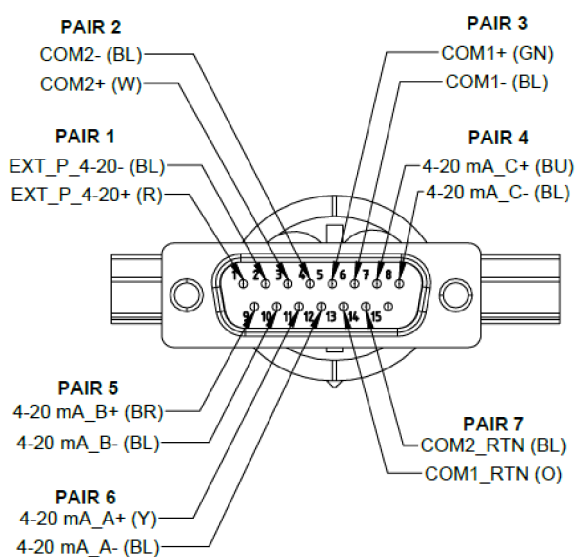


Figure 3: Aurora RM back panel showing all customer connections and labels

These include the AC power inlet, analog and digital output connections via the DB-15 connector, and Cat5/Cat6 Ethernet cable. A custom I/O cable P/N 174M2304 is available as an accessory. Figure 4 shows the detailed pin-out of the DB-15 connector used for all customer input and output connections.



DB15 PIN #	FUNCTION
PIN 11	4-20mA_A+
PIN 12	4-20mA_A-
PIN 9	4-20mA_B+
PIN 10	4-20mA_B-
PIN 7	4-20mA_C+
PIN 8	4-20mA_C-
PIN 5	COM1+
PIN 6	COM1-
PIN 13	COM1_RTN
PIN 3	COM2+
PIN 4	COM2-
PIN 14	COM2_RTN
PIN 1	EXT_P_4-20 +
PIN 2	EXT_P_4-20 -
-	-

Figure 4: Wiring Diagram for DB-15 I/O connector

Use shielded 18-22 AWG (0.82-0.33 mm²) twisted pair wire for all I/O connections. To ensure compliance to EN 61010 requirements, a shielded cable is required for these connections and the shield must be terminated to the Ground (⏏) terminal on the back panel.

For operation on RS-485, 2-wire, half-duplex bus, attach the RS-485 (+) to (+) and the RS-485 (-) to (-). If available, make a third connection to the RS-485 network common to RTN. Connect the shield wire from the cable to SHD terminal. For operation on RS-232, connect RS-232 (TXD) to (+), RS-232 (RXD) to (-), and RS-232 (GND) to RTN. Connect the cable shield wire to SHD terminal.

Table 1: RS-232/RS-485 wiring table

Aurora Serial Terminal		
Color code		(Port 1 Pin) (Port 2 Pin)
White	TX	+ (10) (14)
Red	RX	- (11) (15)
Green	Return	RTN (12) (16)
Black	Shield	SHD (13) (13)

Note: The default configuration of the two serial ports as shipped is shown below.

Table 2: Default Serial port configuration

BAUD Rate: 115,200
 Parity: Even
 ID Note: 1 for Port 1, 2 for Port 2

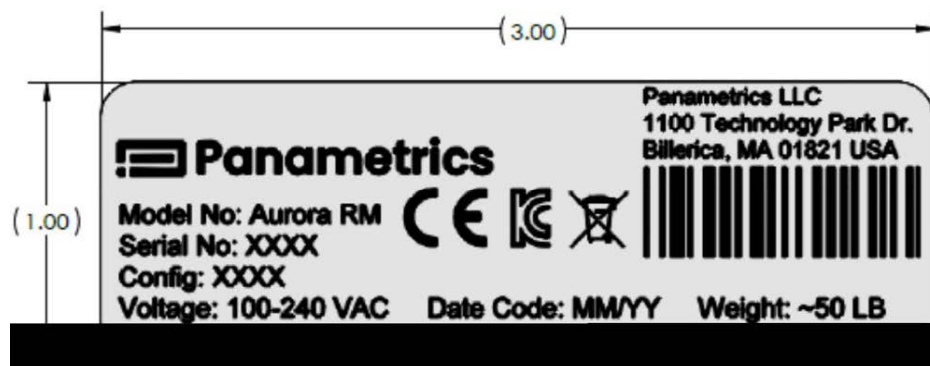


Figure 5: Location of Model and Serial Number



Figure 6: Rear panel showing Power, Certification, and Sample Inlet Labels.

Note: The Aurora RM is not equipped with alarm relays. Alarm status can be obtained via Modbus, or an Analog Output can be configured as an alarm signal (see "Selecting an Output Type" on page 45 of the Aurora H2O User Manual).

4. Making sample gas connections

The Aurora RM has a basic sample handling system with 1/4" compression bulkhead fittings provided for connecting sample inlet and outlet as shown in Figure 6. Appropriate safety precautions shall be taken to vent process gas to avoid the build-up of hazardous concentrations of flammable, toxic, or inert gases. For safe and effective operation, both the gas inlet and vent connections should be leak checked as ambient air leaks into the sample flow can lead to erroneous moisture readings.



CAUTION! Please ensure the gas sample introduced into the Aurora RM is regulated down to under 100 PSIA and is filtered (i.e., free of liquid and particulate contamination) as the sample system in the Aurora RM does not include any pressure regulation and/or membrane filters.

As shown in Figure 1 the front panel has a 0–5 l/min (air) rotameter that indicates sample flow and includes a needle valve in the bottom to control flow as required. Although the Aurora RM reading is insensitive to flow, it is recommended the sample flow be set toward the center of this scale.



CAUTION! The maximum sample inlet pressure is 7 bar (102 PSIA).

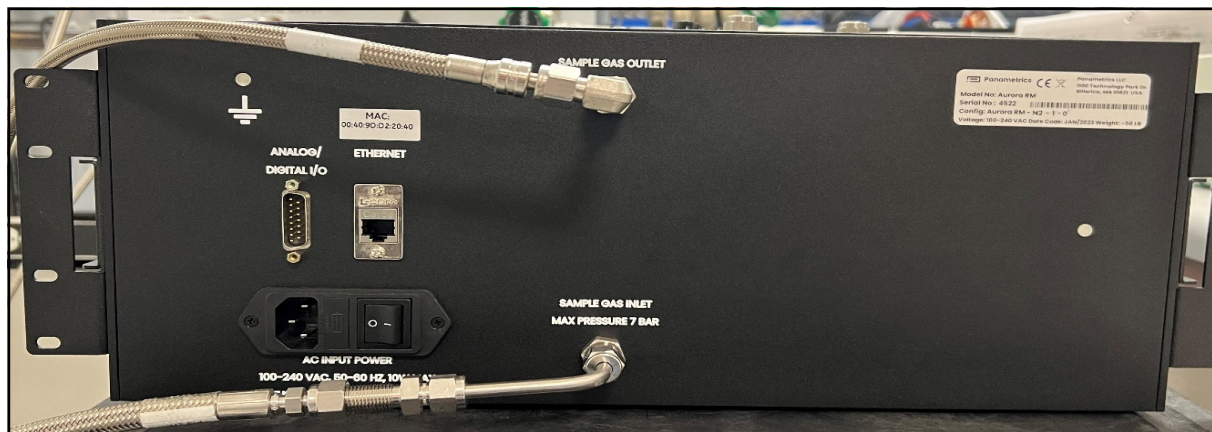


Figure 7: Sample inlet (bottom) and outlet (top) gas connections.



WARNING! Leaks of combustible and/or toxic gases could occur over the life of the analyzer. Standard industry practices to monitor and detect hazardous gas leaks and take appropriate safety actions must be followed.

5. Maintenance and troubleshooting

The Aurora RM has minimal routine or preventative maintenance requirements if used per instructions provided in this user manual addendum. Since the laser absorption cell is mounted horizontally, any accidental liquid carryover into it is likely to settle at the bottom of the cell without affecting the intensity of the laser beam or the accuracy of the moisture measurement. When the "Weak Signal" error appears on the LCD display, the laser absorption cell may need some maintenance. Please contact Panametrics Technical Support and do not attempt to access and/or clean the absorption cell.



CAUTION! Please be sure to power down the instrument before opening the top cover of the rack-mount enclosure to perform any service/maintenance.



Figure 8: Laser safety, hazard warning and lift hazard labels on top panel.



WARNING! The Aurora RM weighs ~20 kgs (45 lbs). Single person lift could cause injury. Please use assistance when moving or lifting.

The Aurora AC power inlet (P/N 223-056-LF) has a panel mount fuse holder built into it. In order to access this dual fuse holder (with two 1.6 A, 5X20 mm fuses), gently insert a flat head screwdriver and pry the fuse holder loose until your fingers can be used as shown in Figure 9. Gently pull on the fuse holder until it stops. Swivel the fuse holder carefully as shown below and replace fuses as necessary. After replacing fuses, re-insert the fuse holder and snap it into place on the back panel.



Figure 9: Replacing the fuses in the back panel AC power inlet.



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