



Read-i-GASS™
Model RG-1024
Sample Conditioning
System Featuring
Nafion™ Membrane
Drying Technology
User's Manual

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Caution Statement

Thank you for purchasing sample gas conditioning equipment from Perma Pure LLC. We want your new sample gas conditioning equipment to operate safely. Anyone who installs or uses this equipment should read this publication before installing or operating this equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed and to verify the equipment, installation and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

Equipment damage or serious personal injury can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your system design, installation or operation. This product should not be operated in any manner that is inconsistent with its intended use.

If you have any questions concerning the installation or operation of this equipment, or you need additional information, please call us at 1-800-337-3762.

This publication is based on information that was available at the time it was printed. At Perma Pure we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

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IMPORTANT SAFETY WARNINGS

Please be sure to review the following basic safety procedures. These procedures represent the **MINIMUM** requirements to operate the equipment safely. It is the ultimate responsibility of the operator to ensure proper safety practices are utilized at the point of operation.

- **NEVER** attempt to operate this equipment in an explosive, wet, or otherwise hazardous area.
- **NEVER** exceed any specified rating for the equipment. Voltage, temperature and pressure ratings must be closely observed and not exceeded. Voltage rating of the equipment **MUST** match the rating on the data label. Please make sure that it matches before powering up the equipment.
- **Condensate is potentially dangerous. NEVER** handle drain lines, impingers or any other item that may have come in contact with the gas stream or any hazardous material, without adequate personal protective equipment. **ALWAYS** assume that any liquid present is hazardous.
- **Sample gas is potentially dangerous.** A leak test is recommended at initial start-up and as often as necessary to maintain a safe working environment around the equipment. The gas stream exhaust must exit away from all personnel to prevent dangerous exposure.
- **NEVER operate the equipment with any part of the enclosure unsecured.** All operated doors and covers must be in place and secured prior to operation. Electrical current may be present behind covers or doors, even if tools are not necessary to access these components.
- **NEVER** attempt service on this equipment without first disconnecting all energy sources. Repair of this equipment should only be done by properly trained personnel that are familiar with the potential risks involved with servicing of the equipment.
- **NEVER** replace fuses with types other than the sample specification of type and current. Do not bypass this or any other safety device.
- **NEVER** operate this equipment if it is visibly damaged or the possibility exists that it may have been damaged.
- The use of components that have not been purchased through an authorized Perma Pure dealer or directly from Perma Pure may compromise the safety of the operator. Additionally, use of non-authorized components may change the operating characteristics of this equipment. Any changes to the equipment, that modify its operation in any way, are dangerous, and are strictly prohibited.
- Read the entire operating manual before attempting to set up or operate the equipment.
- Please heed all warning labels on the equipment. They are there to remind you of possible hazardous conditions.
- Verify the integrity of any mechanical and/or electrical connections that are made to the unit.
 - Verify that the unit is connected to the properly rated power for the system.
 - Verify that the unit is plumbed properly to operate effectively.

WARRANTY INFORMATION

Perma Pure (Seller) warrants that product supplied hereunder shall, at the time of delivery to Buyer, conform to the published specifications of Seller and be free from defects in material and workmanship under normal use and service. Seller's sole obligation and liability under this warranty is limited to the repair or replacement at its factory, at Seller's option, of any such product which proves defective within one year after the date of start-up (or within 18 months after original shipment at the discretion of Seller) and is found to be defective in material or workmanship by Seller's inspection.

Buyer agrees that (1) any technical advice, information, suggestions, or recommendations given to Buyer by Seller or any representative of Seller with respect to the product or the suitability or desirability of the product for an particular use or application are based solely on the general knowledge of Seller, are intended for information guidance only, and do not constitute any representation or warranty by Seller that the product shall in fact be suitable or desirable for any particular use or application; (2) Buyer takes sole responsibility for the use and applications to which the product is put and Buyer shall conduct all testing and analysis necessary to validate the use and application to which Buyer puts the product for which Buyer may recommend the use or application of the product by others; and (3) the characteristics, specifications, and/or properties of the product may be affected by the processing, treatment, handling, and/or manufacturing of the product by Buyer or others and Seller takes no responsibility for the nature or consequence of such operations or as to the suitability of the product for the purposes intended to be used by Buyer or others after being subjected to such operations.

SELLER MAKES NO OTHER WARRANTY, EXPLICIT OR IMPLIED, OF THE PRODUCT SUPPLIED HEREUNDER, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, AND ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY EXCLUDED. SELLER SHALL HAVE NO LIABILITY FOR LOSS OF PROFITS, OR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES UNDER ANY CIRCUMSTANCES OR LEGAL THEORY, WHETHER BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, TORT, CONTRACT, OR OTHERWISE. SELLER SHALL IN NO EVENT BE LIABLE IN RESPECT OF THIS ORDER AND OR PRODUCT DELIVERED ON ACCOUNT OF THIS ORDER FOR ANY AMOUNT GREATER THAN THAT PAID TO SELLER ON ACCOUNT OF THIS ORDER.

UNPACKING

Perma Pure has made every effort to ship you a high-quality product that has been thoroughly inspected and tested. It has been carefully packed to ensure that it arrives at your facility in good condition. Even though every effort has been made to prevent damage during transportation, damage can occur by the carrier. This is out of Perma Pure's control and is the responsibility of the carrier to ensure that your equipment arrives intact and undamaged.

- ❖ Inspect outside packaging. If there is any visible damage, inform the carrier at the time of delivery. ***This inspection is important! Once the package is signed for, responsibility for any visible damage then transfers to the consignee.***
- ❖ Unpack your equipment. Visually inspect the outside of your equipment for any damage. If there is any damage, ***contact the carrier immediately.*** Generally, a carrier must be notified within 24 hours of the delivery to make a hidden damage claim. Save the packing material in the event a damage claim must be verified by the carrier.

Items in the carton include:

- (1) Readi-GASS sampling system
- (1) Inlet Air Filter
- (1) User's Manual

If any of the above parts are missing or damaged, call the helpline at (800) 337-3762 ext-149.

SPECIFICATIONS AND FEATURES

Refer to Drawing RG-1024-01-01

READI-GASS SYSTEM

Readi-GASS Assembly

Refer to drawing RG-1024-03-01

System Enclosure

The system enclosure is constructed of fiberglass. It is UL and C UL listed and certified to NEMA 4, 4X standards (UL 508). The system is designed to be wall mounted vertically with the filter section at the top. Mounting the system in this orientation is required since it allows for the gravity draining of condensate that may collect in the sample gas filter.

Utility Connections

AC Power

- 110VAC(2A) / 220VAC(1A), 60/50 Hz
- 1/2" Electrical Gland
- A customer supplied main circuit breaker switch (MCB) near to system is recommended.

Compressed Air Inlet

- Pressure, 4.0-7.0 bar g (60-100 psig).
- 3/8" OD tube inlet compression fitting
- An AFR (air filter regulator) on the compressed air inlet is recommended.

SYSTEM INSTALLATION

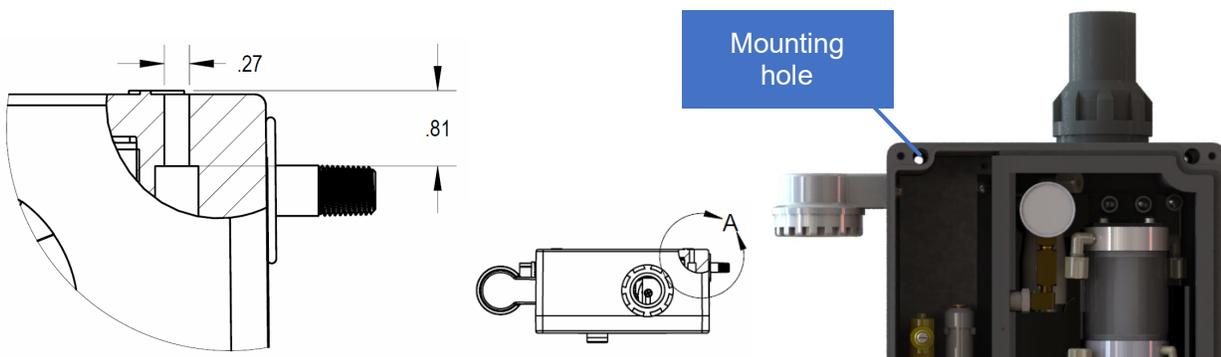
Plumbing and Electrical Connections

Refer to the Specifications and Features section for port size and utility requirement details.

Mounting

Mount the system enclosure to a wall or other rigid structure using four maximum 1/4" (6mm) screws installed through the provided holes. (The holes are concealed when the cover is in place).

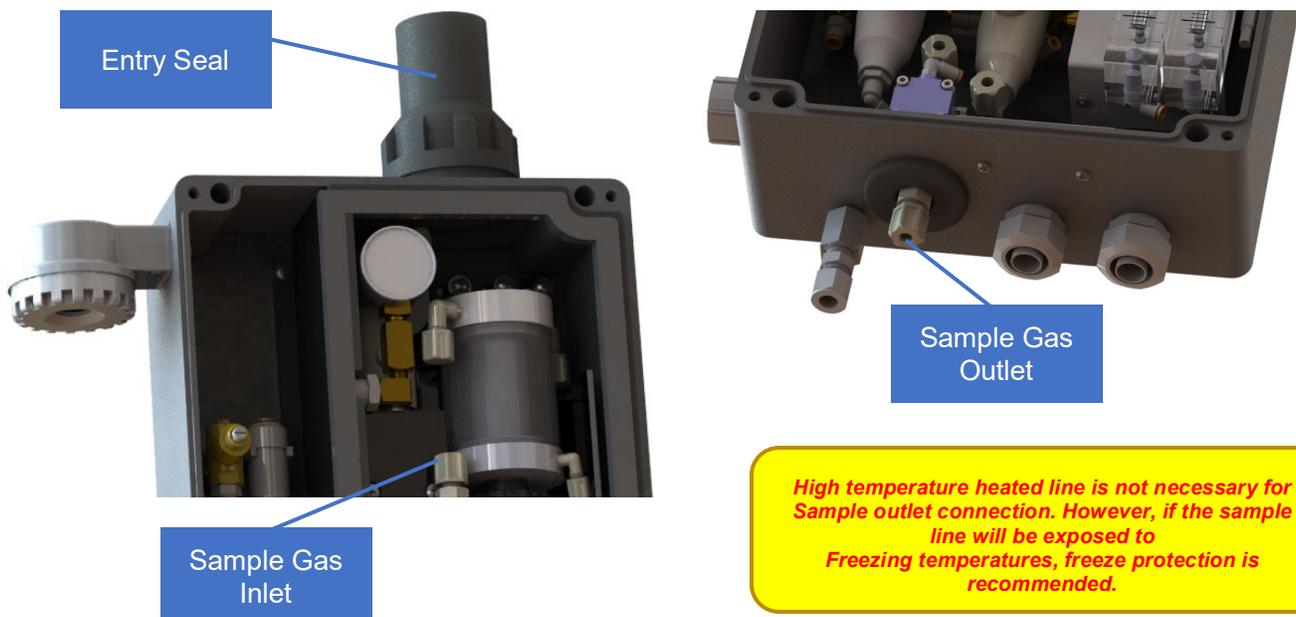
The system must be installed on a vertical surface with the heated umbilical line entry located at the top.



Heated Sample Inlet and Dry Sample Outlet

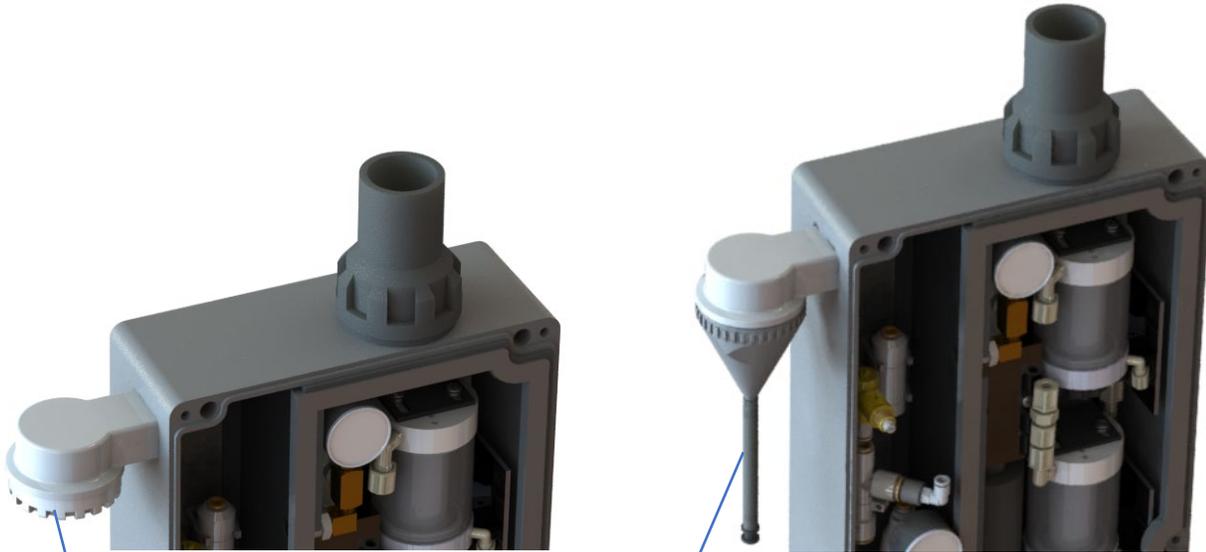
Run the heated sample inlet line through entry seal and into enclosure and connect the sample tubing to the compression fitting port labelled "Wet Sample Inlet". Shrink entry seal tubing around the heated sample line with a heat gun to provide a water tight seal.

Connect the Readi-GASS system to the sample gas analyzers or downstream sample pump via the port labelled "Sample Gas Outlet".



Atmospheric Air Inlet

Atmospheric air enters through a filter attached to outside of the system. It then passes through a smaller filter inside which allows a visual check of the condition. Both filters have replaceable elements. An optional filter cap is available for use in installations where atmospheric fog conditions may occur for extended periods of time.



Atmospheric Air Inlet

Atmospheric Air Inlet with optional cap that functions a fog eliminator. Prevents entrained liquid water aerosols from entering the system.

Filter Drain Outlet

Vent the exhaust to a remote location, connect a line to the port labelled "Drain Port". For runs under 10 ft., 1/4" pipe is acceptable. For runs 10-40 ft., 3/8" pipe is recommended and the number of elbows should be kept to a minimum. This port must be connected to an appropriate drain that can accept a minimum of 0.25 scfm (7 lpm) of air with entrained acidic mist.



Filter Drain Outlet

WARNING!

Failure to properly connect this port may result in personal injury and/or property damage! Connect the line from the filter drain outlet to designated collection/exhaust basin that is capable of accepting acid mist and the sample gas present at this location.

Exhaust vent

- Connect tubing or pipe of an appropriate material from port labelled Exhaust Outlet to a permanent vent designed for this type of discharge. 1/2" I.D. tubing can be used for runs up to 10 feet. Use larger I.D. tubing for longer exhaust lines. Too small of an ID and/or too long of a piping run may cause inadequate purge vacuum performance and/or collapse of the dryer membrane tubes resulting in poor drying performance and/or high sample gas flow restriction.

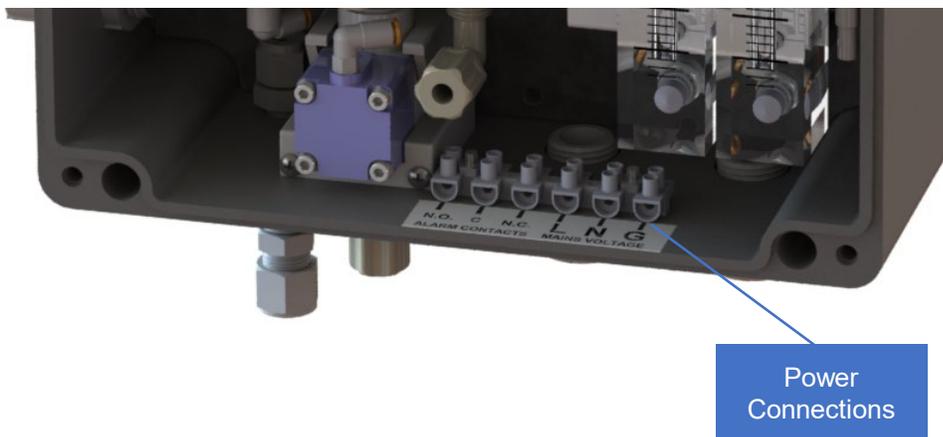


Failure to properly vent the system may result in personal injury and/or property damage!

The gas exhausted from the purge exhaust port under normal operation is humid air. However, in the event of an internal failure of the sample gas dryer installed in the system, the exhaust may contain sample gas that may be hazardous. The purge exhaust must be permanently routed to a vent system or directly outdoors. Do not allow the purge to vent into a structure or confined space.

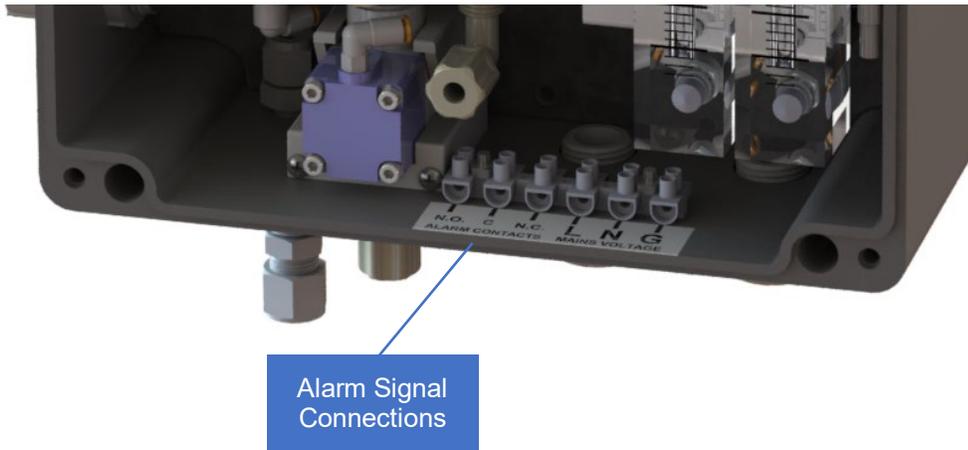
Power Connection

Readi-GASS model RG-1024 is intended to be hard wired via a customer supplied mains circuit breaker switch (MCB) and wire capable of supplying the required current. Check local/regional electrical codes. The external MCB must be installed in close proximity to the equipment, within easy reach of the operator and shall be clearly marked as the disconnecting device for the Readi-GASS. Refer to drawing RG-1024-04-01 and connect the AC power and alarm wires to the terminal block mounted on the inside bottom of the enclosure near the 1/2" conduit hub inlet. Adhere to all electrical code requirements in effect at the installation site. Cutting the conductors so that the ground wire is an inch or two longer than the others, ensures that the protective earth conductor is the last to take the strain if the wires are pulled.

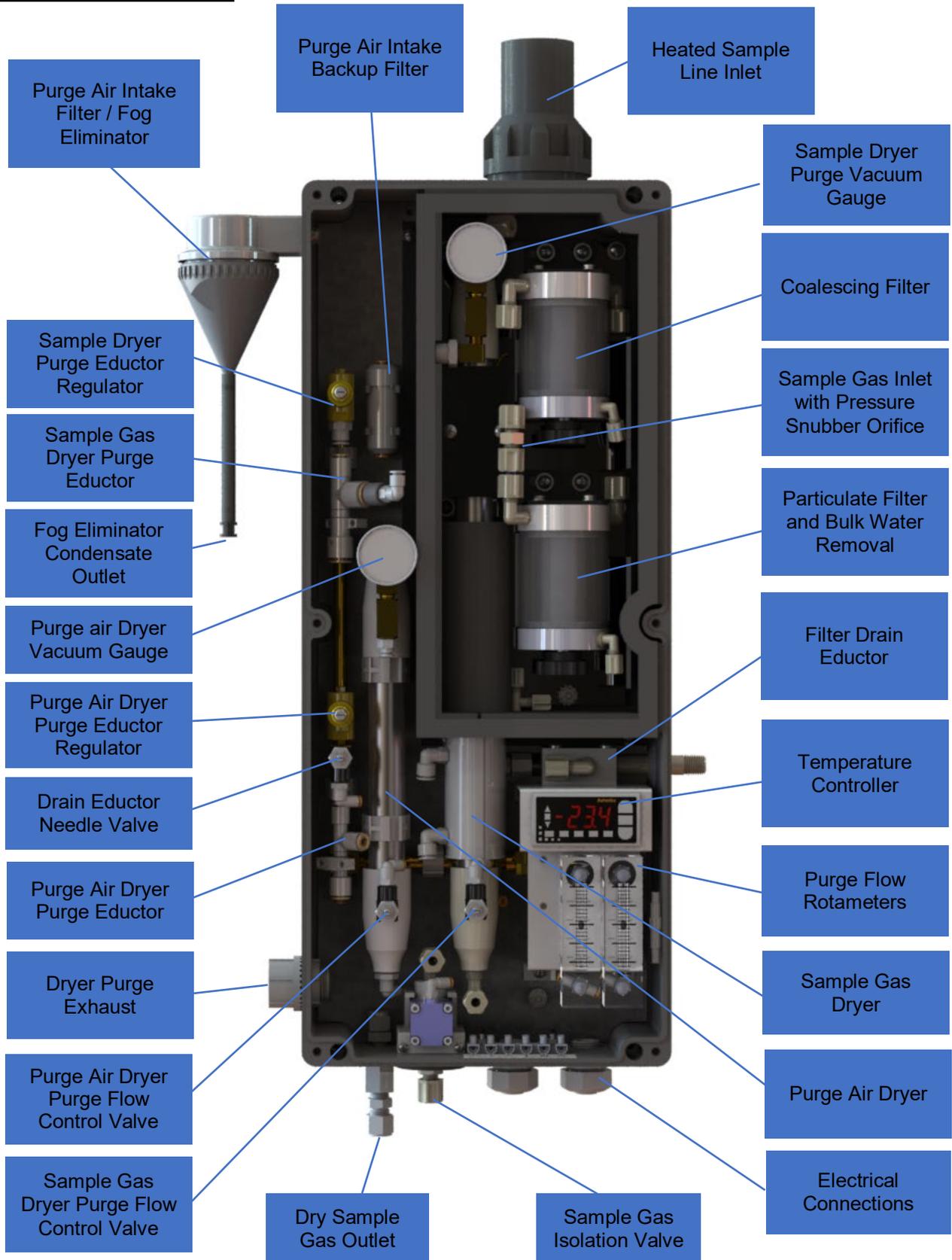


Alarm Signal Connection

The general alarm relay is de-energized in the alarm state. When both the temperature and the pressure are above the acceptable minimum level, the alarm relay will be energized. Loss of system power will also trigger an alarm. The alarm output is in the form of a SPDT (single pole double throw) set of dry contacts.



System Component Locations



SAMPLE GAS FLOW COMPONENTS

Pressure Snubber (Restriction Orifice)

The pressure snubber, located in the sample gas inlet fitting, slows the buildup of pressure from the external probe filter blowback air to prevent possible damage to system components. It is located in the sample tube between the inlet union and the elbow fitting in the inlet port of the lower filter and consists of a short section of small ID Teflon® tubing.

Sample Gas Filters/Eductor

- First, bottom filter – FF-250 with a (0.1 um, 75% efficiency) particulate element removes particles and provides a liquid collection volume that in the event of a heating failure in upstream components, will prevent the majority of liquid from reaching the second filter.
- Second, top filter – FF-250 with a 0.1 um, 95% efficiency standard coalescing element removes small particles and prevents liquid water and condensable vapors from passing through the system to the analyzer.

Consisting of parts machined from solid Kynar® (PVDF) fluoro-polymer, the two filter bodies are designed to hold different filter elements as mentioned above for the purpose of removing particulate matter and high boiling point liquids like sulfuric acid. To prevent water from condensing in the filter and causing the possible loss of water soluble analytes gases, the filter is surrounded by a heated enclosure. The temperature of heated enclosure is controlled by a temperature controller that is factory set at 70°C.

The particulate matter is removed by collection on the filter element and any liquids are removed by first coalescing on the filter element and then collecting at the bottom of the filter bowl and removed by the drain system.

Sample Gas Dryer

Removes water vapor from the gas sample stream with high selectivity that prevents loss of the analytes that are being measured.

Consisting of a PD series 20" Nafion™ membrane dryer and a mounting block assembly surrounded by a heated enclosure. Its sole purpose is to remove water vapor from the sample gas stream. Drying is accomplished by a number of small diameter "hollow fibre" tubes extruded from a unique polymer called Nafion™. While essentially a modified Teflon™ material, Nafion™ retains all of the chemical resistance and inertness of Teflon™ but has additional properties that allow it to remove water vapor without otherwise altering the gas composition. This makes Nafion™ the ideal material for drying analytical sample gases. To ensure the water present in the sample gas remains in the vapor phase, the membrane dryer is mounted in an aluminum block surrounded by a heated enclosure. The temperature of the heated enclosure is controlled by a temperature controller that is factory set at 70°C.

As the sample gas flows through the hollow fibre Nafion™ tubes, the water vapor contained in the sample gas reacts chemically with the surface of the Nafion™ material. Water vapor is thereby drawn out of the sample gas, into the walls of the hollow fibre tubes and evaporates into the dry purge air that sweeps across the outside surface of the tubes.

The sample gas dryer purge air flow rate is controlled by a needle valve located in the purge inlet port. The purge flow rate and vacuum level can be monitored with the installed rotameter and vacuum gauge.

Sample Isolation Valve

This valve prevents the flow of sample gas if the compressed air pressure is not adequate to allow the system to function properly.

To generate dry purge air for the sample gas dryer, compressed air of 60-100 Psig must be applied to the system to generate a sufficient amount of vacuum.

The sample isolation valve is a pneumatically operated on/off valve. It is a normally closed (NC) valve that once compressed air of greater than approximately 40 psig is applied to the Readi-GASS, opens and allows the sample gas to pass through the system

Filter Drain System

Since the Readi-GASS system is typically located upstream of the sample pump, the sample gas in the system is under slight vacuum. In order to remove any liquid collected in the filter, a vacuum higher than the vacuum inside the filter is required. This high vacuum is achieved by an eductor (venturi). Compressed air is supplied to this eductor via a needle valve which then generates the required vacuum. Liquids, including coalesced acid mist, collected at bottom of the filter bowl are pulled through the metering tube by the drain eductor. Extraction of the collected liquid from the filter is continuous.

PURGE AIR FLOW COMPONENTS

Purge Air Filters

Atmospheric air enters through a filter attached to outside of the system. It then passes through a smaller filter inside which allows a visual check of the condition. Both filters have replaceable elements.

Fog Eliminator – An optional cap for the air inlet filter prevents entrained water droplets from atmospheric fog from entering the system. It should be used whenever the system is installed in an area where fog may occur.

Purge Gas Dryer

Removes water vapor from the incoming atmospheric air and is used to purge both itself and the sample gas dryer.

Consisting of a PD series, 12" Nafion™ membrane dryer with reflux purge mode. Its sole purpose is to remove water vapor from the ambient air.

As the air flows through the hollow fibre Nafion™ tubes, the water vapor contained in the ambient air reacts chemically with the surface of the Nafion™ material. Water vapor is thereby drawn out of the ambient air, into the walls of the hollow fibre tubes which evaporates into the dry purge air that sweeps across the outside surface of the tubes.

The purge air dryer's purge air flow rate is controlled by a needle valve located in the purge dryer's purge inlet port. The purge air exhaust is connected to the eductor suction port. The purge flow rate and vacuum level can be monitored with the installed rotameter and vacuum gauge.

Flowmeters and Needle Valves

For maximum drying performance, monitor the flow of purge gas through the two PD dryers.

- Purge dryer purge air flowrate – 2.0 LPM
- Sample dryer purge air flowrate – 5.0 LPM

Vacuum Gauges

For optimal drying performance, monitor the vacuum levels generated to purge the PD dryers.

- Purge dryer purge air vacuum – 23.6 in-hg
- Sample dryer purge air vacuum – 20.9 in-hg

Eductors

Generate the vacuum required to purge the PD dryers.

COMPRESSED AIR FLOW COMPONENTS

Pressure Regulators

Controls the pressure to the three eductors to allow for vacuum level adjustment.

Drain Eductor Needle Valve

Further restricts the compressed air flow to the drain eductor to allow for fine tuning of the drain eductor vacuum level.

ELECTRONIC CONTROL AND INSTRUMENTATION COMPONENTS

Temperature Controller

Maintains specified temperature in the heated zone by use of PID style controller.

- Two 40w silicone pad heaters mounted on heated zone back plate, behind the filters.
- One 35w heater mounted in the dryer mounting block
- Temperature is monitored by a thermocouple in the dryer mounting block.

Alarm Relay

The general alarm relay is de-energized in the alarm state. When both the temperature and the pressure are above the acceptable minimum level, the alarm relay will be energized. The alarm relay is configured in this way to allow the loss of system power to also trigger an alarm. The alarm output is in the form of a SPDT (Single Pole Double Throw) set of dry contacts.

Low Temperature Alarm Relay

Relay contacts inside the temperature controller are open when the temperature is more than 10°C below the set point temperature. This causes the general alarm relay to de-energize (In the alarm state the general alarm relay is de-energized).

Low Compressed Air Pressure Alarm Switch

Switch contacts are open when the pressure is below ~55 psig (3.8 barg) and causes the general alarm relay to de-energize (In the alarm state the general alarm relay is de-energized).

System Power Fail Alarm

The alarm relay is de-energized in the alarm state which means that the loss of AC power will also put the alarm relay into the alarm state.

Thermal Insulation

Heated zone is insulated with ½" foam rubber insulation. The dryer shell inside the heated zone is insulated with ½" foam rubber insulation to prevent overheating of the dryer.

SYSTEMS OPERATION MONITORING

The temperature controller and Pressure switch monitors the system parameters like temperature of the heated enclosure (70°C) and compressed air Pressure (>55 Psig) for proper operation and can alert personnel of potential problems via an indicator light signal (alarm red LED On front panel) and external control system via digital outputs (Potential free Contact), (SPDT Relay, 3 A, 250 VAC (De-energized in Alarm state)).

A. Alarm Output Operation

The system has only one digital alarm output. It can be used to signal an external control system (PLC) that a problem has been detected. The definition of an active alarm is that the SPDT relay will be OFF (de-energized). During normal operation, (i.e. no active alarms), the alarm relay coil will be on (energized). In the event of a power failure to the system, alarms will also be in the active or de-energized state. The SPDT relay is of 3 A, 250 VAC. Customer can use same contact for their use.

General Alarm Relay and Indicator Light – This is an alarm that is initiated by either of the two alarms described below. At any time while the system power is on and either of the two alarms above, low temperature or low pressure, is active, this alarm will also be active.

This Alarm has a series connection of low temperature condition and low compressed air pressure condition

Low Temperature Alarm – This alarm is initiated when heated enclosure temperatures fall below the respective set point by 10°C as sensed by the thermocouples. At any time the system temperatures is too low, this alarm will be activated.

Low Compressed Air Pressure Condition – This occurs when the compressed air pressure that is used to generate vacuum, open the sample isolation valve, and purge the membrane dryer, is too low. The compressed air pressure is sensed by a pressure switch located in the lower enclosure. At any time while the compressed air pressure is too low (<55 Psig), the general alarm will be active. Additionally, the sample isolation valve will close.

B. System Power Indicator

The system power yellow Indicator light serves as a basic system status indicator and is located on front panel. If the system has incoming AC Power, the indicator light will be lit. If no AC power is present, the indicator will not light.

START-UP PROCEDURE

(Readi-GASS commissioning/troubleshooting kit req'd)

Read through Start-up check completely before energizing system.

Primary Sample Handling System Check Procedure

- Check that heated probe and heated line are working properly and maintaining desired temperature.
- Heated probe filter element (typically 2 micron) should be cleaned frequently and replaced if required.
- Check for cold spots (unheated tubing) in the heat traced sample line is always recommended upstream of the Readi-GASS System. Sample should enter Readi-GASS system above 100°C.
- Blowback air operated valve or SOV functioning needs to be checked.

Readi-GASS System Check Procedure

Check that the electrical, compressed air, sample gas inlet and outlet, and purge exhaust/filter drain connections have been made and that the proper voltage, pressures, etc. are present. All operating parameters are pre-set and the system is fully tested at the factory. However, shipping and handling of the unit may have affected some of the settings so an initial check is important.

With the enclosure cover off, follow below procedure:

Note: The enclosure cover must be reinstalled before operation.

- Turn on compressed air to the system (60-100 Psig). Air will begin exhausting from the vent port. If the airflow is absent check for proper compressed air pressure at the inlet to the system.

Flowmeters and Needle valves

Confirm the flow of purge gas through the two PD dryers.

- Purge dryer purge air flowrate – 2.0 LPM
- Sample dryer purge air flowrate – 5.0 LPM

Vacuum gauges

Monitor the vacuum levels generated to purge the PD dryers

- Purge dryer purge air vacuum – 23.6 in-hg
- Sample dryer purge air vacuum – 20.9 in-hg
- Turn on power to the system, and check that the display on the temperature controller turns on and the yellow indicator on the front panel/cover is on. Install the enclosure cover.
- Allow the system to heat for about 30 minutes for the system temperature to reach the factory default set point of 70°C.
- The red alarm indicator light will turn off when adequate compressed air pressure is present and system temperature has reached a minimum temperature of set point minus 10°C.
- The Readi-GASS system is now ready for service.

SHUTDOWN PROCEDURE

- Turn OFF the Sample Pump.
- Turn OFF power to Read-GASS
- Turn OFF Compressed Air supply

DOS & DON'TS

- DO NOT TURN ON SAMPLE PUMP IF compressed air supply and electrical supply to Perma Pure system is ABSENT.
- TURN ON sample pump only after temperature stabilizes (30 minutes stabilization period after system turned ON and alarm light is off).
- DO NOT TURN ON SAMPLE PUMP IF heated probe and electric heat-tracer line is not functioning. (heated probe to Perma Pure system and sample line MUST be heated for accurate analysis). This logic needs to be programmed in control system with sample pump cut-off.
- DO NOT Clean Perma Pure dryer with high pressurized compressed air or nitrogen!!!!
- DO visually inspect the condition of sample filters and air intake filters regularly.
- DO contact a Perma Pure representative with any question you may have about the operation of the system.

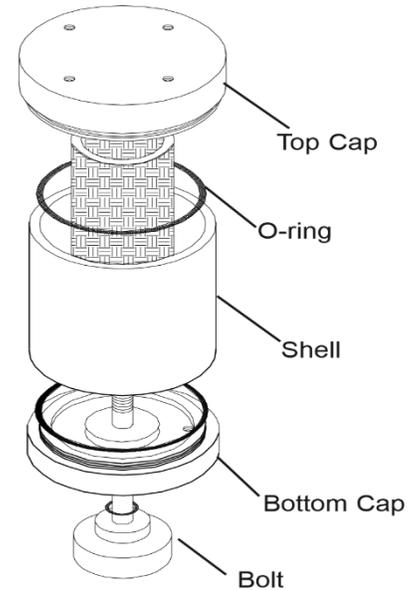
MAINTENANCE

Sample Filters

If system is fitted with a pre-filter (i.e. heated probe filter), it should be checked regularly to ensure that the element is in good condition. If element appears to be dirty or begins to cause flow restriction in the system, it should be replaced. This is a general check for any CEM system.

The Readi-GASS system has one coarse sample filter (lower) followed by one fine coalescing sample filter (upper) in the sample gas flow path which can be replaced as follows.

- 1) Loosen bolt on bottom of filter.
- 2) Gently pull apart assembly and remove old element.
- 3) Place new element into grooves in top and bottom of housing.
- 4) When re-assembling, inspect for O-rings on top and bottom caps and on center bolt.
- 5) Install glass shell onto bottom piece.
- 6) Place new element in groove in bottom piece. Be sure that element is seated correctly and parallel to glass shell.
- 7) Carefully mount bottom assembly onto top piece. Slight twisting motion may be required to allow shell to slip over o-ring seal.
- 8) Visually make sure element is seated correctly in top groove.
- 9) Replace bolt through hole in bottom piece and screw clockwise into top piece. Do not over-tighten center bolt. It should be just tight enough so it does not vibrate loose. Over-tightening will not help the filter to seal.



Purge Air Filters and fog Eliminator

Atmospheric air is drawn into the system and used to purge the membrane sample gas dryers. It is first conditioned by two components, one external filter with a pleated air paper style element and optional fog eliminator and one internal backup filter that can be visually monitored for particulate breakthrough coming from the external filter. Both filter housings are opened by rotating the end cap and pulling the cap off. The element can be easily changed if necessary. The fog eliminator cap should require no maintenance. However, in extremely dusty environments, it may be necessary to occasionally rinse the cap out with soapy water and check the two inlet holes and drain for any obstruction.

Nafion™ Membrane Dryer

Under normal conditions, Perma Pure dryers require no maintenance and can last for years. However, if the tubing becomes clogged with particulate matter or saturated with water, the dryer may require repair or replacement.

REPLACEMENT PART LIST & RECOMMENDED SPARES

Filters

ITEM NO.	QTY	Part No.	Description
1	1	103245	Coarse Filter – Sample Gas
2	1	FF-250-E-2.5G	Fine Filter, Coalescing – Sample Gas
3	1	100503	O-Ring, Viton™, Size 030
4	1	100502	O-Ring, Viton™, Size 009
5	1	103279	Coarse Filter - Atmospheric Air (external)
6	1	103242	Fine Filter - Atmospheric Air (Internal)

Nafion™ Membrane Dryer

ITEM No.	QTY	PART NO.	DESCRIPTION
1	1	PD-READI-20MKS	PD Dryer Assembly – Sample Gas
2	1	PD-READI-12MKS	PD Dryer Assembly – Purge Air
3	2	RG-1024-03-05	Heated Back plate assembly
4	2	103286	Cartridge Heater, 1-1/4" Length, 35 Watts, 120 VAC
5	1	103238	Cartridge Heater, 1-1/4" Length, 35 Watts, 240 VAC
6	1	1TTC-001	Thermocouple K Type
7	1	102662	Fuse, 2A, 5x20mm

APPENDIX A: DRAWINGS

RG-1024-01-01 System Interface

RG-1024-01-02 Piping and Instrumentation

RG-1024-03-01 Assembly

RG-1024-04-01 Electrical Diagram

APPENDIX B: READI-GASS COMMISSIONING/TROUBLESHOOTING KIT

When commissioning the system or in a situation where troubleshooting is required, it is helpful to have this kit. It is comprised of three components.

- **A compound pressure gauge** for measuring the purge vacuum and compressed air pressure.
- **A portable humidity meter** for measuring the sample dew point from the membrane dryer.
- **A temperature meter** to measure the heated enclosure temperatures.

For further assistance, please contact us at:

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