

Advanced Membrane Separator and Condenser

AMS-100 and CND-225 Instruction Manual

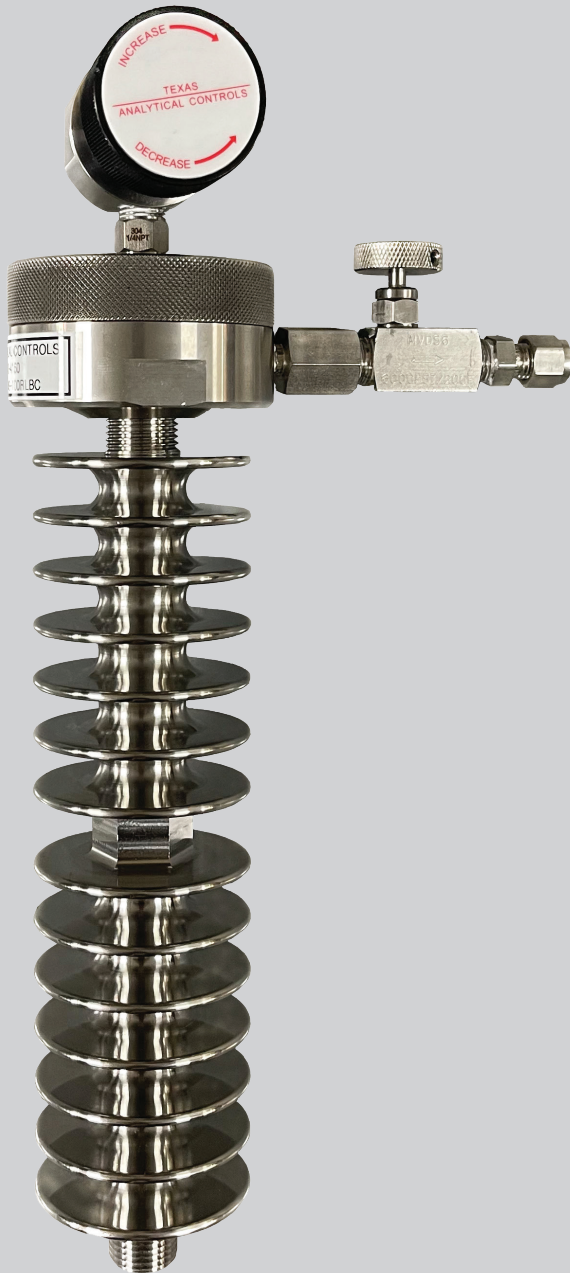


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1.1 General Introduction

Natural gas pipelines often contain oils, water, and particulates that can cause issues with Texas Analytical's line of gas analyzers. While these will not damage the sensor in itself, if the sensing surface of the sensor or sample system is blocked it will interfere with the ability to accurately measure gas (oxygen, H₂S, etc.) levels and would subsequently need to be cleaned out causing undue maintenance.

The AMS-100 membrane separator and CND-225 condenser work to cool pipeline gas, allowing moisture and vapor to condense out, and then to physically block any moisture or particulates from reaching the gas analyzer. The upright design of the CND-225 allows any liquids, oils or particulates to drain back into the pipeline.

For especially wet gas streams, an optional continuous liquid drain configuration is available to help with drainage issues. It is also available with a pressure regulator for high pressure gas streams to protect the sensor while requiring no additional 3rd party equipment.

1.2 Principle of Operation

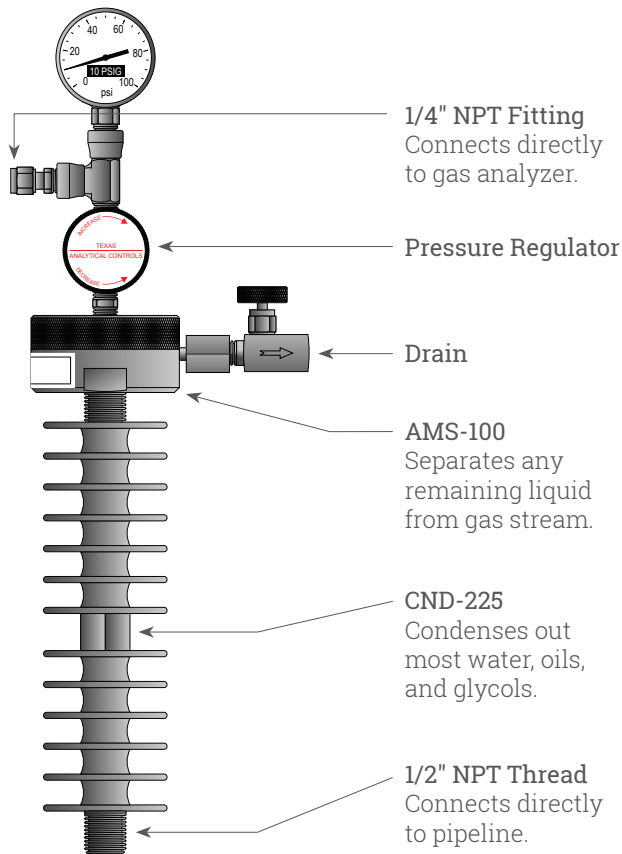
The CND-225 is outfitted with 1/2" Male NPT threads to mount directly onto the pipeline and cools the gas along the length of the inner pipe, using the fins along the length to help radiate heat. The solid, stainless steel design allows it to efficiently transfer heat and remove it from the gas while offering excellent corrosion protection.

The AMS-100 utilizes a specialized membrane that allows gas to pass through while blocking any liquids, oils or particulates. A perforated steel disc acts as a backup to completely cut off the flow of gas in case of a large slug of liquid and let it flow again once the liquid has entirely cleared.

An optional pressure regulator can be mounted directly on the outlet of the AMS-100 to regulate the pressure down to acceptable levels for your Texas Analytical gas analyzer.

The optional continuous liquid drain valve allows liquid to drain directly out of the chamber in the AMS-100 instead of having to drop back down into the pipeline. For especially wet gas streams this will drain any liquids with added efficiency.

1.3 Membrane Separator and Condenser Specifications



- Mounts Directly to Pipeline
- Effectively Filters Liquids
- Easily Field-Serviceable
- Conditions Sample Gas
- Protects Sensor and Analyzer

The Advanced Membrane Separator and Condenser (CND-225) are designed specifically for the natural gas industry and is able to be mounted directly to a pipeline.

The CND-225 is designed to filter all oils, water, and glycol out of pipeline gas by rapidly cooling it so they condense out of suspension. The Advanced Membrane Separator (AMS-100) provides further protection for the sensor with a gas-permeable membrane that filters any liquids and protects the analyzer from liquid slugs.

The AMS-100 can be included with a pressure regulator, as well as a liquid drain valve for gas streams with more water vapor present.

Configurations:

AMS-100 Membrane Separator

AMS-100R: Includes Pressure Regulator

AMS-100RL: Includes Pressure Regulator and Liquid Drain Valve

AMS-100RL-G: Includes Pressure Regulator, Liquid Drain Valve and Gauge

Replacement Parts:

AMS-PK1: Membrane Replacement Kit includes O-ring and Hydrophobic Membrane

AMS-PK2: Full Rebuild Kit includes O-ring, Hydrophobic Membrane, and Perforated Metal Diaphragm

AMS-100 Specifications

Body Material:	304 Stainless Steel
Max Pressure (AMS-100):	80 PSIG
Max Pressure (AMS-100R / AMS-100RL):	1500 PSIG
Gas Connections (Inlet):	1/2" Female NPT
Gas Connections (Outlet):	1/4" Female NPT
Flow Rate:	0.5-5.0 SCFH

CND-225 Specifications

Body Material:	304 Stainless Steel
Gas Connections (Inlet):	1/2" Male NPT
Gas Connections (Outlet):	1/4" Male NPT

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1.4 General Safety & Installation

The maximum operating pressure of the membrane separator (AMS-100) and condenser (CND-225) is 80 PSIG or 1500 PSIG for the pressure regulator optioned membrane separator (AMS-100R, AMS-100RL). Pressures above that may cause damage to the equipment.

Maximum inlet pressure for the Texas Analytical gas analyzer is 10 PSIG and the outlet must be vented to the atmosphere or a flare stack. Ensure the gas pressure exiting the membrane separator is 10 PSIG or less to avoid damage to sensors.

The membrane separator and condenser assembly should be mounted at least 3 feet away from any pipeline emanating heat. Heat can reduce the effectiveness of the condenser.

1.5 Mounting the Membrane Separator and Condenser

To mount the assembly without a liquid drain valve (AMS-100 & AMS-100R):

1. A ball/shutoff valve must be mounted at the pipeline tap before the condenser and membrane separator assembly— this will be supplied by the customer.
2. Mount the CND-225 directly to the 1/2" female NPT threads on the customer supplied valve.
3. Mount the AMS-100 (80 PSIG inlet maximum pressure) or AMS-100R (pressure regulated option 1500 PSIG inlet maximum pressure) directly to the top of the CND-225 using the top 1/2" NPT fittings. Adjust the pressure outlet to a maximum of 80 psig (outlet going to gas analyzer).
4. Leak check all pipe threads and fittings to ensure you have no leaks present.
5. Adjust the flow to 0.5 - 5.0 SCFH using the flow meter on the customer supplied gas analyzer.
6. The installation is complete and is ready for use.

Troubleshooting

- If there is no flow going to the gas analyzer, make sure your inlet pressure before the condenser/membrane separator is high enough to allow the flow to pass through the device.
- For leak tight connections, consider using Swagelok Swak or similar product.

1.6 Mounting the Membrane Separator and Condenser w/ Drain Valve

To mount the assembly with a liquid drain valve (AMS-100RL):

1. Complete steps 1 through 4 as described in section 1.5.
2. Once complete, close off the liquid continuous drain valve completely and adjust the flow to 0.5-5.0 SCFH using the flow meter on the customer supplied gas analyzer.
3. Crack open the continuous drain valve and allow the gas to flow out the valve at a very small amount (ie. if you have 2 SCFH going to the analyzer, consider having 0.5 - 1.0 SCFH out of the continuous drain valve). Suggest using a temporary flow meter attached to the outlet of the liquid drain valve if needed.
4. The installation is complete and is ready for use.

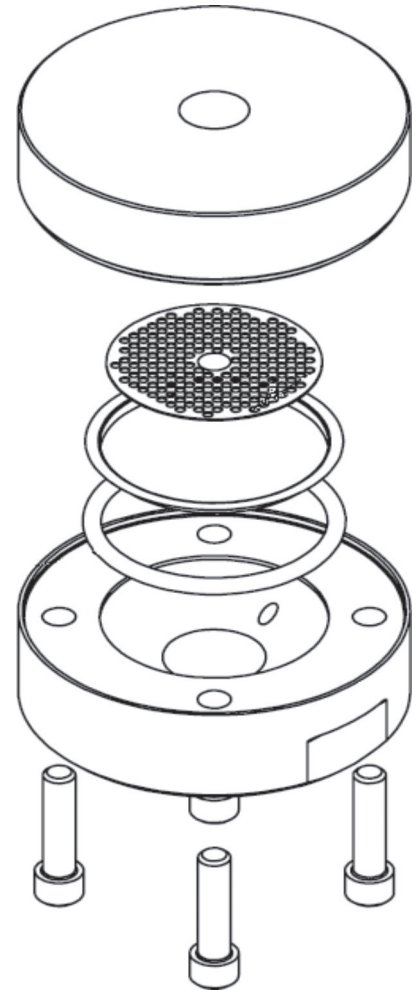
Troubleshooting

- If there is no flow going to the gas analyzer, make sure your inlet pressure before the condenser/membrane separator is high enough to allow the flow to pass through the device. Also make sure all of the gas is not going out through your liquid drain valve and not getting to the analyzer.
- For leak tight connections, consider using Swagelok Swak or similar product.

2.1 Replacing the Water Barrier, O-ring & Perforated Disk

Over time the membrane (water barrier) preventing liquid and particulates from entering the analyzer will get clogged and will need to be replaced. Replacement kits can be purchased from Texas Analytical or your local sales representative, and the procedure for replacing the membrane is as follows:

1. Shut off your flow of gas using the ball valve.
2. Disconnect the gas fitting at the outlet of the AMS-100 or the pressure regulator.
3. Unscrew the AMS-100 from the CND-225.
4. Remove the 4 screws on the bottom and separate the two portions of the membrane separator.
5. Carefully remove the o’ring holding the membrane and perforated disk in.
6. Remove the hydrophobic membrane.
7. Remove the perforated disk and clean if there is any debris present.
8. Reinstall the perforated disk ensuring it is seated and centered well.
9. Place the new membrane in position, assuring it is centered.
10. Place the O-ring on top of the membrane ensuring it lines up with the groove.
11. Either use your fingers to push the o’ring into place, applying pressure simultaneously to multiple points, or put the bottom portion of the membrane separator back into place and screw the four screws in.
12. Ensure the O-ring is completely seated in the groove before placing the membrane separator back onto the condenser.
13. Reattach the gas fitting on the outlet and it is now ready.



2.2 Replacement Kits

AMS-PK1: Membrane Replacement Kit includes large O-ring and hydrophobic membrane.

AMS-PK2: Full Rebuild Kit includes large O-ring, hydrophobic membrane, and perforated metal diaphragm.

The design and manufacture of our analyzers, precision electrochemical oxygen sensors, and sampling components conforms to established standards and incorporates state of the art materials and components for superior performance while still maintaining minimal cost of ownership. Prior to shipment, every analyzer, sensor, and sample component is thoroughly tested by the manufacturer. When operated and maintained in accordance with the Owner's Manual, the units will provide many months or years of reliable service.

Coverage

Under normal operating conditions the analyzers, sensors, and sample components are warranted to be free of defects in materials and workmanship for the period specified in accordance with the most recent published specifications, said period begins with the date of shipment by the manufacturer. The manufacturer information and serial number of this analyzer, sensor, or sample component are located visibly on the unit. Texas Analytical Controls reserves the right in its sole discretion to invalidate this warranty if the serial number does not appear.

Limitations

Texas Analytical Controls will not pay for: loss of time, inconvenience, loss of use, or property damage caused by the oxygen analyzer, sensor, or sample component or its failure to work.

Exclusions

This warranty does not cover installation, defects resulting from accidents, damage while in transit to our service location, damage resulting from alterations, misuse or abuse, lack of proper maintenance, unauthorized repair or modification of the equipment, affixing of any label or attachment not provided with the analyzer, fire or flood.