

ASR900 / Heated Acid Gas Sample Probe Heater

Essential Health and Safety Requirements

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This document contains Essential Health and Safety information for the Probe Heater Assembly used with the ASR900 Sample Probe and the Heated Acid Gas Sample Probe. Data herein has been verified and validated and is believed adequate for the intended use of this instrument. If the instrument or procedures are used for purposes over and above the capabilities specified herein, confirmation of their validity and suitability should be obtained; otherwise, AMETEK does not guarantee results and assumes no obligation or liability. This publication is not a license to operate under, or a recommendation to infringe upon, any process patents.

Contents

About This Document	4
About the Probe Heater Assembly	5
Important Safety Information.....	5
Specifications	7
Ambient Temperature Limits	7
Electrical Requirements/Power Consumption.....	7
Cable/Cable Glands	7
Probe Heater Assembly Markings.....	7
Installing the Probe Heater Assembly	8
Maintenance	10
Replacing Parts in the Sample Probe and its Heater Assembly	10
Examining and Caring for the Flamepaths	14

About This Document

This document primarily describes the essential health and safety requirements for the explosion-proof Probe Heater Assembly used with the ASR900 Sample Probe and the Heated Acid Gas Sample Probe, intended for use in explosive atmosphere locations.

The procedures and information discussed in this document include only abbreviated steps to install and perform maintenance on the Sample Probe and its Heater Assembly. The information also includes warnings and cautions to ensure the safety of personnel, the analyzer, and Sample Probe in explosive atmosphere locations.

[For complete and detailed descriptions of the procedures discussed in this guide, refer to the ASR900 Sample Probe or Heated Acid Gas (HAG) Sample Probe *Installation and Maintenance Guide* and the analyzer manual.]

About the Probe Heater Assembly

The Probe Heater Assembly is a dedicated temperature controller (explosion-proof heater) that is used to heat and maintain the temperature of the Sample Probe at a temperature level specific to each Sample Probe. To do this, the analyzer uses a control loop with a temperature sensor to control the probe temperature.

The explosion-proof (flameproof) Heater Assembly is protected from overheating by a temperature switch, which will disconnect power if the heater exceeds approximately 170° C/338° F. If the temperature of the probe falls below the analyzer *too cold* parameter (**TCold** = 125° C/257° F), the analyzer **Microcontroller** board will de-energize the flow control valve to allow zero gas to backpurge the entire sampling system.

Important Safety Information



Carefully read and understand all of the instructions before working on the Sample Probe and its Heater Assembly. The instructions are described in a sequence that will ensure the proper removal and replacement of all parts that make up the Sample Probe and its Heater Assembly.

The instructions also include special Notes, Warnings, and Cautions to follow while working on the Sample Probe and its Heater Assembly.

[Additional Notes, Warnings, and Cautions can be seen in the analyzer manual and the Sample Probe *Installation and Maintenance Guide*.]



While the Heater Assembly is removed for maintenance, take extreme care to avoid scratching or damaging the joining surfaces (flamepath) of the Heater Assembly and its cover, and the joining surfaces (heat transfer) of the Heater Assembly and the Sample Probe. Also, take care to avoid damaging the o-ring groove.

Gently clean these areas with a non-abrasive cloth.



If the Thermal Insulation Tube is removed, take extreme care to avoid damaging its threads and those in the Heater Block. Also, take care to avoid damaging the threads on the Junction Box and its cover. After removing these parts, cover the threaded ends to avoid damaging the threads. Clean, defect-free threads are essential to ensure a flame-proof connection.



Always disconnect mains AC power and/or external power sources to the analyzer and open the fuse for the Probe Heater Assembly circuitry before working on the Sample Probe and its Heater.

If it is necessary to open the analyzer's covers or doors while the circuits are live, test the area for flammable gases (and proceed only when the area is safe).

***For Purged Analyzer (Hazardous Location) Applications Only
[Special Conditions for Safe Use]***

The analyzer may only be energized by using the Purge Bypass Switch with permission of the works manager or his proxy. The permission may only be given when it is made sure that during the time the system is energized an explosive atmosphere is not present or when the necessary protective measures against explosion hazard have been taken ("hot permit").

The analyzer enclosure may not be opened when an explosive atmosphere is present.

Purged Analyzer (Hazardous Location) Applications

To work on the analyzer with it powered up and its Electronics Enclosure door open, the Purge Bypass Switch must be in the "BYPASS" position.

When the Electronics Enclosure door is open, take appropriate precautions to avoid electrical shock. Hazardous voltages are present inside.



Any adjustments or servicing of the analyzer while it is energized should be performed only by properly trained and qualified personnel.



For electrical-shock protection, the analyzer/sample probe must be operated from a grounded power source outlet that has a securely connected protective-ground contact.

Specifications

Ambient Temperature Limits

-50 °C to +70 °C (-58 °F to +158 °F)

Electrical Requirements/Power Consumption

The Heater Assembly is the only part of the Sample Probe that is electrically powered.

Maximum Power	150 W
Supply Voltage	120 VAC, 47–63 Hz
	240 VAC, 47–63 Hz

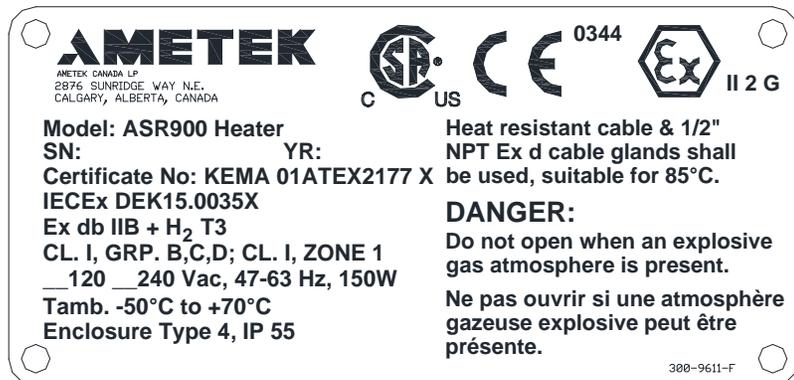
Cable/Cable Glands

Heat resistant cable and Ex d cable glands must be used, suitable for 85 °C (185 °F).

Probe Heater Assembly Markings

The Heater Assembly will be marked with a corresponding label to indicate its ATEX certification. This label (Figure 1) is used on both the ASR900 Sample Probe and Heated Acid Gas Sample Probe.

Figure 1.
ASR900/HAG Probe
Heater label.



Installing the Probe Heater Assembly

The Heater Assembly is shipped detached from the Sample Probe. This allows for easier installation of the equipment. This section discusses the safety aspects and the safe handling of parts while working on the Heater Assembly and how to install it and make the wiring connections.

To install the Heater Assembly on the Sample Probe:

1. After installing the Sample Probe on the process pipe and performing a leak check on the Sample Gas In/Out connections and Aspirator Drive Air line connection on the probe, ensure the joining surfaces (heat transfer) of the Heater Block (underside of the Heater Assembly) and the top of the Sample Probe are free of debris. Use a non-abrasive cloth to gently clean the joining surfaces, if necessary.

[For complete installation details, refer to Chapter 3 in the Sample Probe *Installation and Maintenance Guide*.]

2. The signal and power conductors must be run in cable for European/Zone 1 hazardous location installations. Terminal Box entries are 1/2" NPT.

[For complete details about the signal and power conductors and connections, refer to the Sample Probe *Installation and Maintenance Guide*.]

3. Complete the wiring from the analyzer to the Terminal Block in the Junction Box [as indicated in the wiring diagrams in the Sample Probe *Installation and Maintenance Guide* (or Final "As-Built" drawings shipped with the analyzer)].

4. Plug all unused cable entry ports with a plug certified for the hazardous area.

5. Complete the remaining installation requirements for the Sample Probe [as described in the Sample Probe *Installation and Maintenance Guide*.]



Hazardous Locations

Before proceeding, test the area around the analyzer/sample probe for hazardous gases and proceed only when the area is safe.

Do not power up the analyzer/sample probe if there is a hazardous gas atmosphere present.

6. After the complete analyzer system (analyzer, Sample Probe, and Probe Heater Assembly, plus all plumbing and electrical connections) is installed and ready to be put into service, power up the analyzer and its temperature zone circuitry (including the Sample Probe Heater Assembly circuitry). Ensure it is operating properly to be commissioned into normal operation.

[For complete power-up details, refer to “Powering Up the Probe Heater Assembly and Analyzer” in Chapter 3 of the Sample Probe *Installation and Maintenance Guide*.]

Maintenance

Follow the “Preventive Maintenance Schedule” [in Chapter 4 of the Sample Probe *Installation and Maintenance Guide*] to ensure continued and proper operation of the Sample Probe. This chapter also contains information about how to ensure the safe handling of all sample probe flamepaths. [See also the Notes, Warnings, and Cautions under “Important Safety Information” earlier in this document.]

Replacing Parts in the Sample Probe and its Heater Assembly

The maintenance procedures describe how to safely shut down the analyzer and sample probe to prepare them for replacing parts in the Sample Probe and the Probe Heater.

[For complete details about replacing these parts, refer to the Sample Probe *Installation and Maintenance Guide*.]



*This procedure assumes that all safety precautions have been met to safely power down the analyzer and its temperature zone circuitry and to prepare the analyzer for maintenance [as described under “Preparing the Analyzer and Probe for Maintenance” in the Sample Probe *Installation and Maintenance Guide*].*

*This procedure also assumes that the Insulating Jacket has been removed from the Sample Probe, the Heater Assembly has cooled down enough to ensure safe handling, and the Heater Assembly has been disconnected and pulled back from the Sample Probe. [This information is described under “Changing Out Replaceable Parts” in the Sample Probe *Installation and Maintenance Guide*.]*

Do not proceed until these conditions have been met.

To replace parts in the Sample Probe and its Heater Assembly:



Before working on the Sample Probe and its Heater Assembly, perform a manual backpurge on the analyzer to remove any residual gas in the sample system. Then, close the Double Block Valves (optional on Basic ASR900 Probe and HAG Probe) and then the Sample and Vent line valves on the Sample Probe.
[Refer to the analyzer manual for details on how to manually backpurge the analyzer.]



Follow appropriate regulatory and/or company procedures to lock out the analyzer while the Sample Probe or its Heater Assembly is being worked on.

1. Take all necessary steps to safely power down the analyzer and Sample Probe Heater to prepare it for maintenance [as described in “Preparing the Analyzer and Probe for Maintenance” in Chapter 4 of the Sample Probe *Installation and Maintenance Guide*].



The Heater Assembly can be removed from the Sample Probe without removing the Sample Probe from the process duct.

The Heater Assembly should be worked on in a suitable shop or other area equipped with proper tools, equipment, and materials that are required for repairing explosion-proof devices.

2. Disassemble, clean, replace parts in, and reassemble the Sample Probe and its Heater Assembly, and all associated sample system tubing:
 - **Sample Probe**
[For information about when and how to clean and Sample Probe parts, refer to “Replacing Sample Probe Parts” in Chapter 4 of the Sample Probe *Installation and Maintenance Guide*.]
 - **Sample Probe Heater**
[For information about when and how to replace Probe Heater parts, refer to “Replacing Probe Heater Parts – Extended Maintenance” in Chapter 4 of the Sample Probe *Installation and Maintenance Guide*.]



Take extreme care to avoid damaging the threads on the Thermal Insulation Tube and in the Heater Block. After removing the tube, cover the threaded ends to avoid damaging them. Clean, defect-free threads are essential to ensure a flame-proof connection.



*Before replacing the Thermal Insulation Tube, be sure to inspect the threads on it and in the Heater Block. If any threads have been damaged, replace the Thermal Insulation Tube only with an AMETEK-supplied Thermal Insulation Tube. **DO NOT REPLACE WITH STANDARD ELECTRICAL CONDUIT.***



*The thread lubricant (**approved for use with threaded flamepath joints**) must not contain copper.*

3. If all maintenance on the Sample Probe and Heater Assembly is complete (including a leak check), replace and secure the Heater Assembly on the Sample Probe [as described in the “Maintenance” section of the Sample Probe *Installation and Maintenance Guide*].
4. After cleaning and replacing Sample Probe and Heater Assembly parts, take all necessary safety precautions to prepare the analyzer and Sample Probe for power up (including leak checking the sample connection fittings), then restore AC power to the analyzer (and Probe Heater).
5. Prepare the analyzer and sample probe to properly commission them into operation.

Examining and Caring for the Flamepaths

The Sample Probe Heater Assembly is designed with a flamepath that will prevent flame propagation from within the Heater Assembly to the outside, should an internal explosion occur. The minimum flamepath length must be at least 9.5 mm with a maximum surface roughness of 6.3 μm . The gap between the flange surfaces with the bolts tightened must not exceed 0.04 mm. Use A2 stainless steel fasteners with yield stress ≥ 450 MPa (65,300 psi).

The flamepaths on the Heater Assembly consist of:

- The Heater Assembly joining surfaces (Heater Body and Heater Cover).

During each analyzer maintenance, use a feeler gauge to check the flamepath gap between Heater (Block) Body and the Heater Cover joining surfaces. The gap must not exceed 0.04 mm; if the gap exceeds this value, contact AMETEK for advice. See *Warning below*.

- All separable joints between the Heater Body and its Junction Box. These parts include the threads in the Heater Body and the Junction Box used to connect to the Thermal Insulation Tube, the threads on each end of the Thermal Insulation Tube, the larger diameter threads on the Junction Box and its Cover, and the o-ring groove. **See *Caution and Warning below*.**



CAUTION

If the Thermal Insulation Tube is removed, take extreme care to avoid damaging its threads and those in the Heater Block. Also, take care to avoid damaging the threads on the Junction Box and its cover. After removing these parts, cover the threaded end to avoid damaging the threads. Clean, defect-free threads are essential to ensure a flame-proof connection.



WARNING

When performing equipment maintenance in hazardous areas, all safety standards and procedures must be followed, as specified by the Owner Company, local electrical-inspection authority, and National/EU regulations.



Do not apply power to the analyzer and sample probe if there is damage (scratches, indentations, or wear) to any flamepath. Applying power to an analyzer with a damaged flamepath is dangerous and could result in serious injury or death and/or serious damage to equipment. Review this section for complete information about caring for the flamepaths.

Replace the parts immediately if damage or wear is apparent. Contact AMETEK immediately if there is any doubt about the integrity of any flamepath.

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