



*Installation, Operation, and
Maintenance Manual*

*Welker[®] Sample Spa[™]
Gas Conditioner*

*Model Number
HR-4SSN*

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described above. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker reserves the right to make changes to this and all products in order to improve performance and reliability.

13839 West Bellfort
Sugar Land, TX 77498-1671
(281) 491-2331 - Office
(800) 776-7267 - USA Only
(281) 491-8344 - Fax
<http://www.welkereng.com>

TABLE OF CONTENTS

<u>1.</u>	<u>GENERAL</u>	<u>3</u>
1.1	INTRODUCTION	3
1.2	DESCRIPTION OF PRODUCT	3
1.3	SPECIFICATIONS	4
1.4	SYSTEM COMPONENTS	4
1.5	SYSTEM DIAGRAM	5
<u>2.</u>	<u>INSTALLATION & OPERATIONS</u>	<u>6</u>
2.1	GENERAL	6
2.2	INSTALLATION INSTRUCTIONS	6
2.3	OPERATION INSTRUCTIONS	10
<u>3.</u>	<u>MAINTENANCE</u>	<u>11</u>
3.1	GENERAL	11
3.2	READY THE SYSTEM FOR MAINTENANCE	11
3.3	LIQUID ELIMINATOR MAINTENANCE (OPTIONAL EQUIPMENT)	11
3.4	HEATED REGULATOR MAINTENANCE	12
3.5	ALS MAINTENANCE (OPTIONAL EQUIPMENT)	13

Welker®, Welker Jet®, and WelkerScope® are Registered Trademarks owned by Welker, Inc.

SPECIFICATIONS

1. GENERAL

1.1 INTRODUCTION

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manual* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call 1-800-776-7267 in the USA or 1-281-491-2331.

Notes, Cautions, and Warnings



Notes emphasize information or set it off from the surrounding text.



Caution messages appear before procedures that, if not observed, could result in damage to equipment.



Warnings are alerts to a specific procedure or practice that, if not followed correctly, could cause personal injury.

The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.

1.2 DESCRIPTION OF PRODUCT

The Welker Sample Spa is designed to provide analytical equipment with a properly conditioned sample stream, keeping the sampled product in the gas phase. Natural gas taken from the pipeline through an insulated sample probe is directed to the Welker Sample Spa by means of a heat trace tubing bundle or by direct mount to the pipeline.

When the gas enters the Sample Spa, the patented Welker Heated Regulator (HR) reduces it to the pressure set by the operator.

Inside the Heated Regulator, the temperature loss associated with the pressure drop is offset by the heat generated from the regulator, which works to keep the gas above the hydrocarbon dew point. Welker's patented Analyzer Liquid Shut-off (ALS) is an effective option that gives final assurance that no liquids will enter the analyzer. The gas then exits the Sample Spa in a heat-trace tubing bundle and enters the analyzer.



SPECIFICATIONS

1.3 SPECIFICATIONS



The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. However, please note that **the specifications may vary depending on the customization of your product.**

Table 1

Overall System Specifications	
Products Heated:	Gases
Materials of Construction:	316 stainless steel, aluminum, Viton [®] , and PTFE; others available.
Maximum Allowable Operating Pressure:	2,160 PSIG @ -20° F to 100° F (99 Bar @ -29° C to 37° C)
Standard Temperature Range:	-20°F to 200°F (-28.9°C to 48°C)
Standard Regulator Output Range:	0 to 200 PSIG (13.79 Bar)
Thermostat Settings:	-20°F to 200°F (-28.9°C to 48°C)
Electrical Connection for Sample Spa Heater, Thermostat, Regulator, and Pipeline Heat Trace Bundle:	120 VAC standard; 240 VAC available
Electrical Connection Control Room Heat Trace Bundle:	120 VAC standard; 240 VAC available
Sample Probe Pipeline Connection with Liquid Eliminator (Optional):	$\frac{1}{2}$ " , $\frac{3}{4}$ " , or 1" NPT; others available.
Heat Trace Tubing Bundles (Optional):	$\frac{1}{8}$ " OD Tubing; Fittings available, length to order specifications
Other Options:	Analyzer Liquid Shut Off Probe Blanket Panel, pipe or pipeline mount

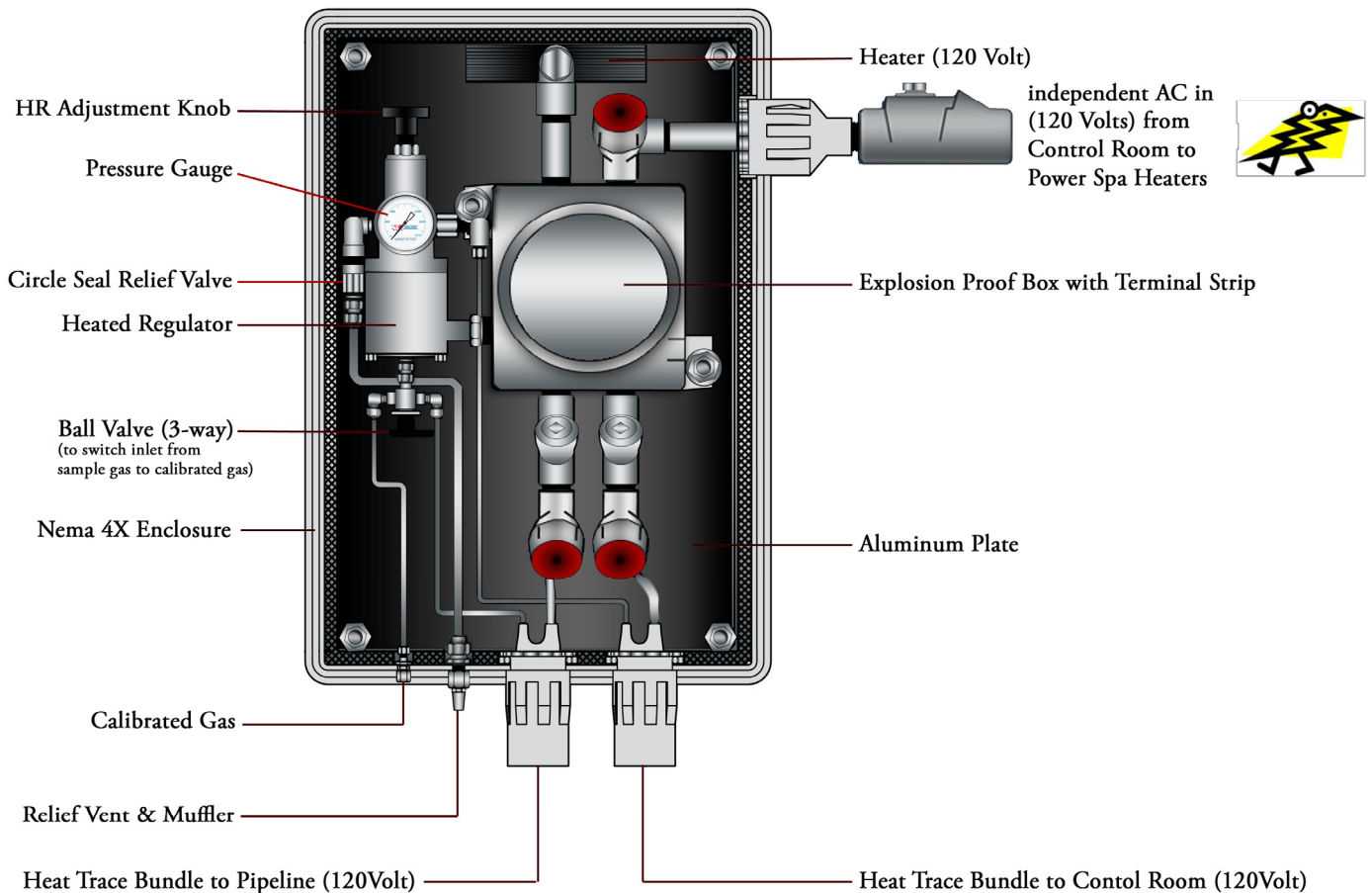
SPECIFICATIONS

1.4 SYSTEM COMPONENTS

Table 2

- | | |
|--|---|
| <ul style="list-style-type: none"> • Nema 4X Enclosure • Welker Liquid Eliminator Probe (optional) • Welker Heated Regulator • Circle Seal Relief Valve • Small Welker Valves NV-1 (2) • Large Welker Valve NV-2 • 3-way Ball Valve • 120 VAC Heater with Thermostat | <ul style="list-style-type: none"> • Aluminum Plate • Heat Trace Bundles (2) (optional) • Heat Trace Bundle Thermostat and Controller (2) (optional) • Pressure and Temperature Gauges • Explosion Proof Box with Terminal Strip • Analyzer Liquid Shut-Off (optional) • All associated fittings, tubing, electrical conduit, etc. |
|--|---|

1.5 SYSTEM DIAGRAM



Refer to above Figure throughout manual.

INSTALLATION & OPERATIONS

2. INSTALLATION INSTRUCTIONS

2.1 GENERAL

After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.

Note Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping company.

Note When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

Note The equipment will ship from the manufacturer, Welker, mounted to the enclosure, "hard tube" connected and ready for mounting.

2.2 INSTALLATION INSTRUCTIONS

Recommended Tools

It would be advisable to have the following tools available for installation of the unit; however, tools used will vary depending on probe model.

- Preferred enclosure mounting kit
- Measuring tape
- 6" adjustable wrench
- Tubing cutters
- 316 stainless steel tubing and fittings



1. **Make sure that all valves on the unit are closed.**
2. Locate the enclosure as close to the pipeline or sample point as possible. Mount the enclosure so it is level.
3. If not installing the optional Liquid Eliminator (LE) Probe skip to step 6.
4. Depressurize the pipeline and connect LE probe to the appropriate pipeline isolation port. Be sure to face the probe in line with the pipeline flow (see Figure 1).
5. Use the 316 stainless steel tubing to connect the incoming tubing of the pipeline heat trace bundle from the sample probe outlet port (see Figure 1 for LE outlet) to the inlet port of the 3-way ball valve located at the bottom of the Heated Regulator (see Figure 2 on next page).

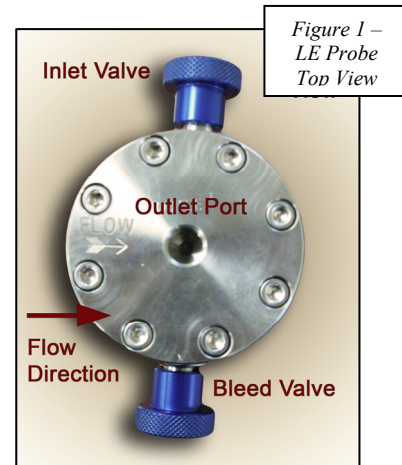
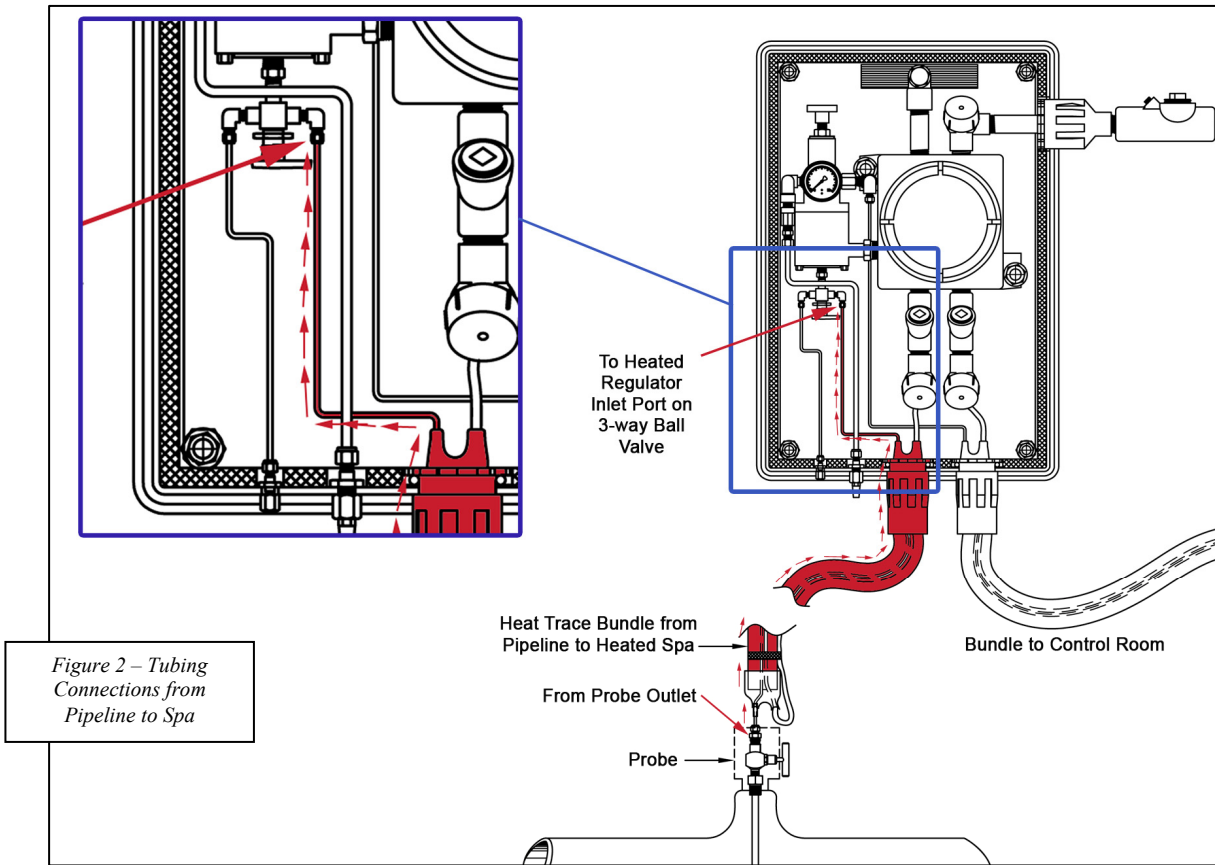
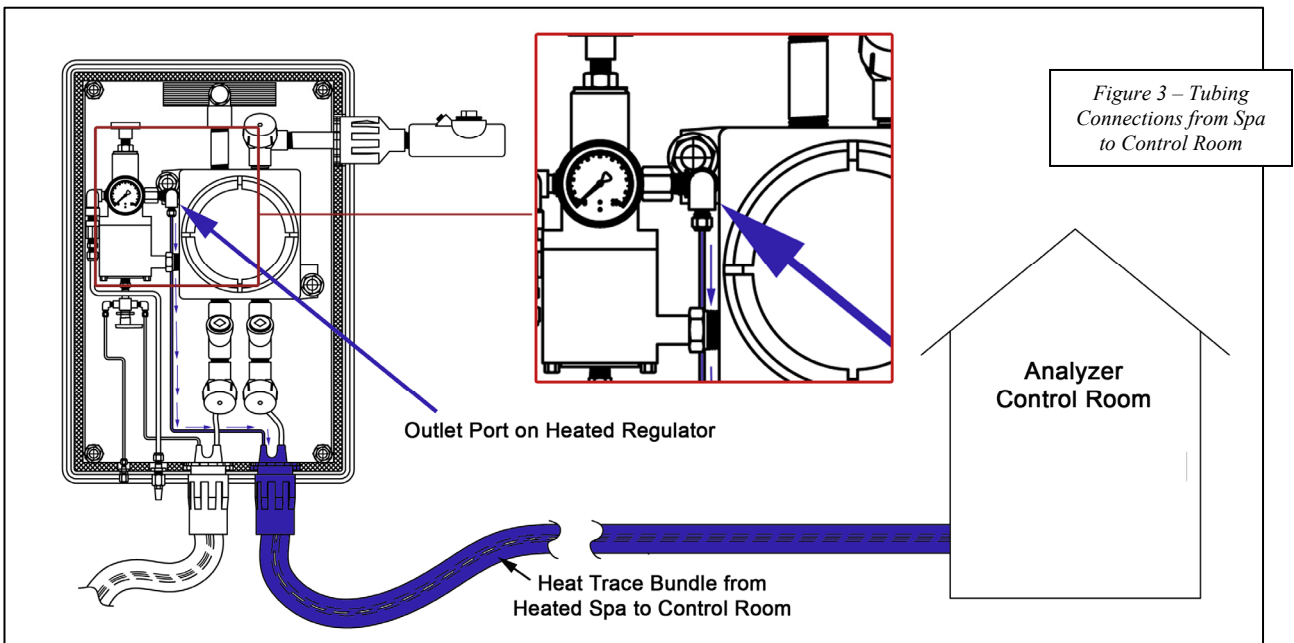


Figure 1 –
LE Probe
Top View

INSTALLATION & OPERATIONS



6. Use the 316 stainless steel tubing to connect the incoming tubing of the control room heat trace bundle from the outlet port of the Heated Regulator to the inlet port of the customer supplied analyzer (see Figure 3). This port is located to the right of the gauge when facing the enclosure.

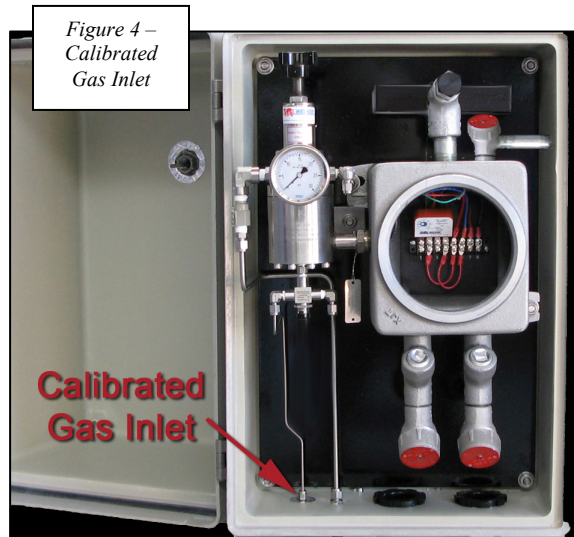


INSTALLATION & OPERATIONS

7. Use appropriate fittings and tubing (customer supplied) to tube from the calibrated gas source to the 1/8" NPT calibrated gas inlet located at the bottom of the enclosure.



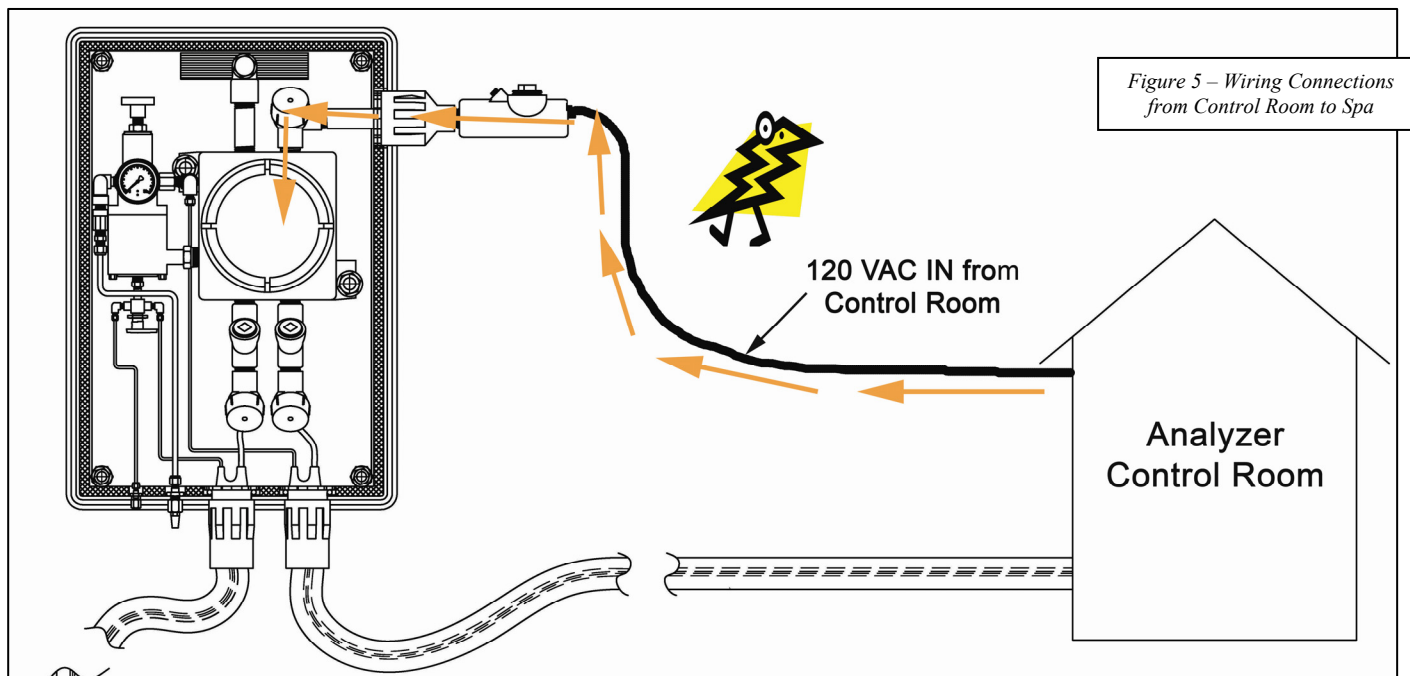
This is located to the left of the vent muffler when facing the enclosure. (See Figure 4).



8. Run a power cable from the control room to the Sample Spa, through the top of the explosion proof box (see Figure 5).

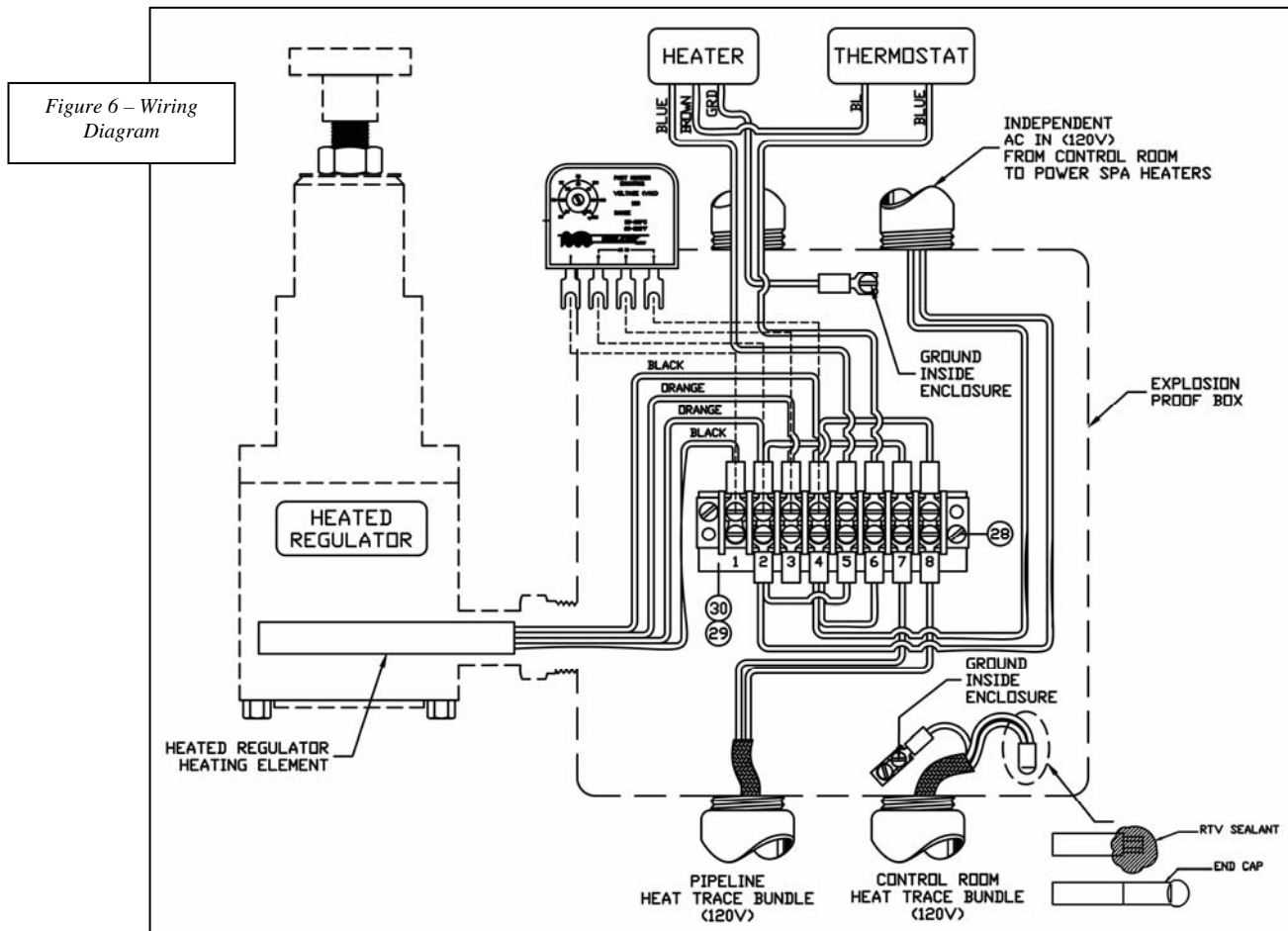


Make sure all power to be connected is turned off. **Do not make electrical connections with a live source of electricity!**



9. Open the terminal box and make the following electrical connections using the wiring diagram (see Figure 6 on next page).

INSTALLATION & OPERATIONS



10. Place the control room heat trace bundle wire ends (Sample Spa end) and ground inside the explosion proof box (see Figure 6).
11. Secure the ground of the control room heat trace bundle (Sample Spa end) to the inside of the explosion proof box (see Figure 6).
12. Use RTV sealant to seal off control room heat trace bundle power cables (Sample Spa end) and then cap (see Figure 6).
13. Connect the two control room heat trace bundle wires (control room end) to a 120 VAC power source.
14. Connect the power cable to the terminal strip at terminals “2” and “4” to power the Sample Spa and pipeline heat trace bundle (see Figures 5 & 6).
- Note** Do not power the Sample Spa heaters using heat trace from the control room.
15. Connect the two pipeline heat trace bundle wires to the terminal strip at terminals “7” and “8” (see Figure 6).
- Note** The remaining Sample Spa wiring is connected to the terminal strip at the factory.
16. Seal the conduits with supplied sealing compound kits.

INSTALLATION & OPERATIONS

2.3 OPERATION INSTRUCTIONS



At this point all valves should still be closed and no electrical power should be open to the unit.

1. Open the inlet and bleed valves on the front and back of the Liquid Eliminator Probe.
2. Open the 3-way ball valve located at the bottom of the Heated Regulator to prepare for incoming pressure to enter through the inlet port.
3. Pressurize the pipeline and allow product to flow through the inlet and into the system.
4. Tighten the adjustment knob on the Heated Regulator until the gauge reads the desired output pressure (see Figure 7).
5. Tighten the nut on the Heated Regulator's knob to secure it in place.
6. With no power to the system, open the terminal box and set the thermostat to the desired temperature.
7. Close the terminal box & enclosure, power up the system, and allow the unit to heat about 30 to 60 minutes.

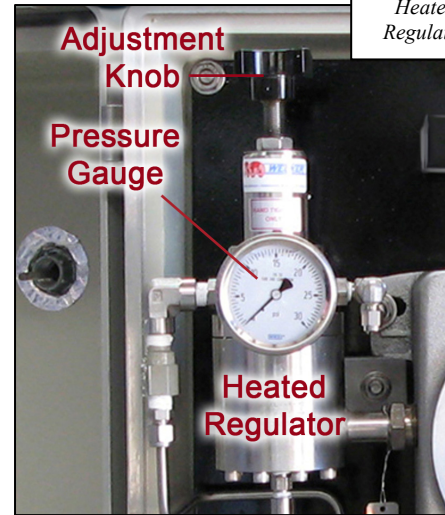


Figure 7 –
Heated
Regulator



Upon completion of this step, the heater will become **HOT! DO NOT TOUCH THE HEATER!**

8. When it is necessary to use calibration gas, open the enclosure and switch the 3-way ball valve to the calibration gas outlet on the Heated Regulator. Adjust the pressure on the Heated Regulator (see steps 4 & 5), and close the enclosure door.

MAINTENANCE

3. MAINTENANCE

3.1 GENERAL

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of encountering wear or faulty seals. All maintenance and cleaning of the unit should be done on a smooth, clean surface.



We recommend that the unit have biannual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique application that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.



When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

3.2 READY THE SYSTEM FOR MAINTENANCE



While performing maintenance on any of the unit's components, ensure that there is no power source being supplied at the terminal strip in the explosion proof box.

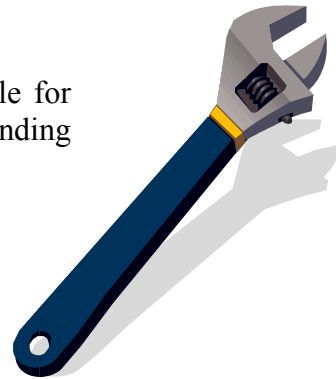


Depressurize the pipeline and system, and close all valves.

Recommended Tools

It would be advisable to have the following tools available for maintenance of the unit; however, tools used will vary depending on probe model.

- 6" adjustable wrench
- Tubing cutters
- Hex key set
- 1/4" Allen Wrench



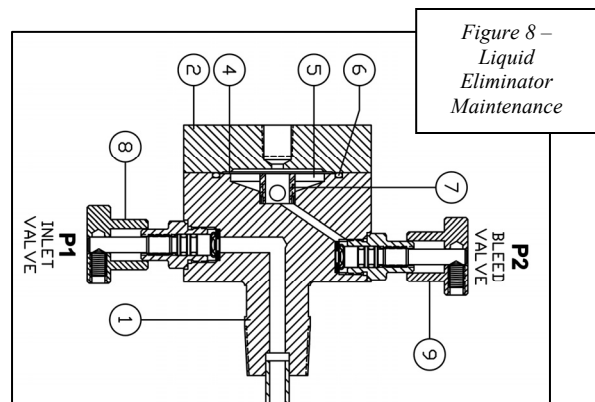
3.3 LIQUID ELIMINATOR MAINTENANCE (OPTIONAL EQUIPMENT)

(See Figure 8 on next page)

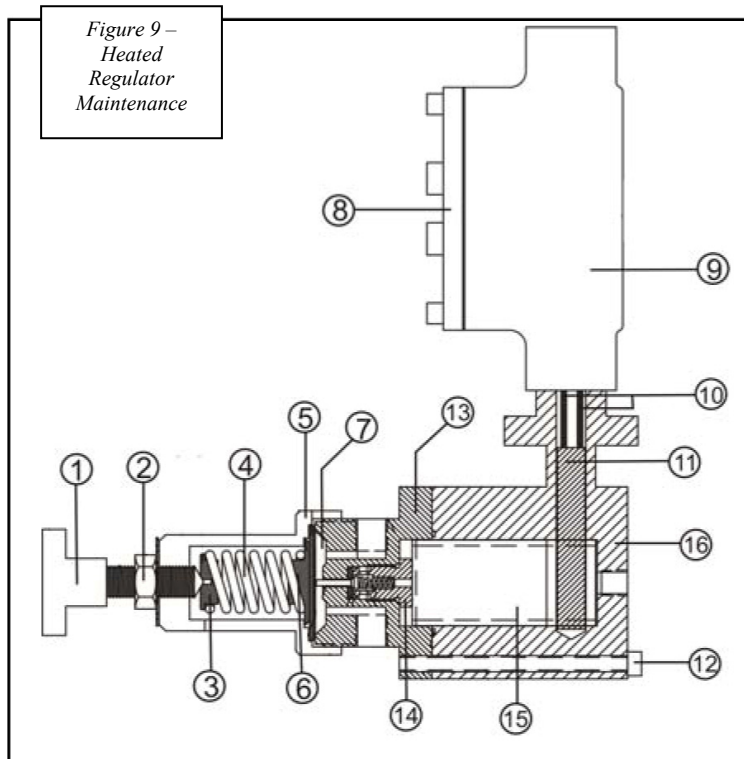
1. Close the inlet valve and the bleed valve on the device.
2. Remove all tubing and fittings connected to the Liquid Eliminator.
3. Loosen the eight screws from the cap of the Liquid Eliminator.
4. Remove the cap (Part 2) and the screen (Part 4).
5. Use a brass pick or knife to remove the O-ring (Part 6).

MAINTENANCE

6. Remove the PTFE element (Part 5).
7. Use a cleaning solution that will not affect the integrity of a sample analysis to wipe and clean the inside of the Liquid Eliminator.
8. Reposition the PTFE element onto the center of the inside of the Liquid Eliminator (Part 7).
9. Replace the O-ring (Part 6). Use Dow Corning 111 (DC 111) grease or an equivalent lubricant to lightly grease the O-ring.
10. Reposition the screen (Part 4) onto the center of the PTFE element.
11. Align the cap with the Liquid Eliminator body with the eight holes in the cap.
12. Cross-bolt the eight screws into the cap itself.



3.4 HEATED REGULATOR MAINTENANCE (See Figures 9 & 10)



1. Remove all tubing and fittings connected to the Heated Regulator.
2. Loosen nut (Part 2) on adjusting knob (Part 1) and then loosen the adjusting knob to relieve tension on the spring (Part 4).
3. Loosen and remove spring housing (Part 5) from regulator body (Part 13).
4. Remove top spring guide (Part 3) and the spring.
5. Remove bottom spring guide (Part 6).
6. Remove the diaphragm (Part 7). Inspect for wear and replace if necessary.
7. Set the bottom spring guide back into place on top of the diaphragm.
8. Set the spring back into place.

9. Set the top spring guide back into place on top of the spring.
10. Reattach the spring housing (Part 5).
11. Loosen and remove eight cap screws (Part 12).
12. Remove the regulator body (Part 13) from the heating chamber (Part 16).
13. Unscrew the flow ring (Part 14) from the regulator body.

MAINTENANCE

14. Replace the seal around the flow ring (see Figure 10).

15. Remove the poppet spring and the poppet (see Figure 10).

16. Examine the poppet and poppet spring. If deep scratches are present, they will need to be replaced.

17. Use a pointed instrument to carefully pick the seat out of the regulator body (see Figure 9).

18. Examine the seat and replace if necessary.

19. Set the seat back into place. The bevel in the seat should face the poppet.



Debris or scratches on either the poppet or seat will prevent positive shut-off of the regulator.

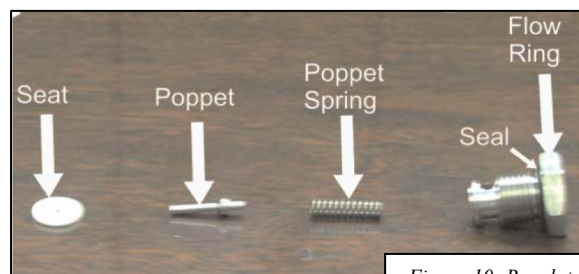


Figure 10- Regulator Spring Assembly

20. Guide the poppet into the seat.

21. Reattach the poppet spring and flow ring (Part 14) to the regulator body (Part 13).

22. Tighten the flow ring securely.

23. Remove the chamber insert (Part 15) and clean it with solvent using a cleaning solution that will not affect the sample analysis.

24. Reconnect the regulator body to the heating chamber (Part 16).

25. Reinstall the eight cap screws (Part 12) at the bottom of the regulator.

26. To perform maintenance on the relief valve, refer to the corresponding relief valve manual.

27. To replace the heating element:

- Disconnect the four heating element leads (Part 10) from the terminal.
- Pull out the heating element (Part 11) and leads from the regulator.
- Replace the heating element with a new heating element.
- Lightly lubricate the new heating element and reconnect it into the heating chamber.
- Reconnect the leads to the terminal and close the lid (Part 8).

3.5 ALS MAINTENANCE (OPTIONAL EQUIPMENT)

(See Figure 11)

- Disconnect the ALS from the Heated Regulator.
- Remove the liquid shutoff glass assembly (Parts 6, 7, and 11) from its body (Part 10).
- Replace all applicable seals (Parts 1, 2, 3, 5, and 9) in the device.
- Remove the ball (Part 8) and examine it for scratches and wear. If deep scratches or excessive wear exist, the ball will need to be replaced.
- Reinsert the ball into the guide (Part 11).
- Reinstall the glass assembly inside the cap (Part 4).
- Hand tighten the cap (Part 4) to the body (Part 10).

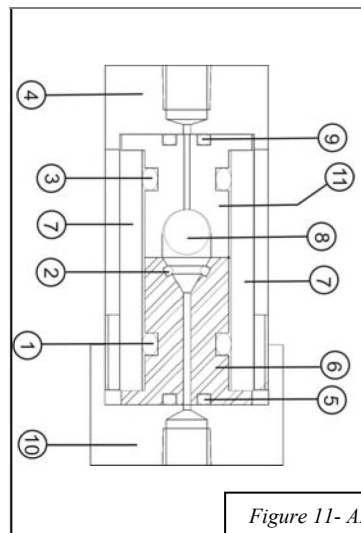


Figure 11- ALS Maintenance



13839 West Bellfort
Sugar Land, TX 77498-1671
Phone: (281) 491-2331
Fax: (281) 491-8344
Toll Free: (800) 776-7267
Web Page: www.welkereng.com