



**SUPPLEMENT TO  
INSTALLATION &  
STARTUP MANUAL:  
PROCEDURE FOR  
ELEVATED  
TEMPERATURE SENSOR  
HEAD INSTALLATION**



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# 1

## INTRODUCTION

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This manual is intended to be a supplement to the *SONARtrac*<sup>®</sup> Process Monitoring System Installation & Startup Manuals. The information contained in this supplement pertains only to the Elevated Temperature Sensor Head Assembly. The Installation Manual should be read and understood prior to use of this manual.

The Elevated Temperature Sensor Head is rated for use in General Purpose (non-hazardous) locations.

All installation guidelines and safety related items listed in the VF-100 or GVF-100 Manual pertain to installation of the Elevated Temperature Sensor Head.

For additional information, contact your local sales agent or Customer Support by telephone at 1-877-243-7277 (1-877-CIDRA77) or by E-Mail at: [customersupport@cidra.com](mailto:customersupport@cidra.com)


# 2

## SENSOR HEAD INSTALLATION

### 2.1 Caution: High Temperatures

Be careful when installing or removing the high temperature system. Incidental contact with the process pipe may cause serious burns. The sensor cover and fasteners may become extremely hot.

Always use appropriate gloves and clothing.

	<b>WARNING</b> Potential burn hazard. Always wear appropriate gloves when installing or removing system from hot pipes.
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### 2.2 Tools Required For Installation

Refer to the VF-100 Installation Manual for a list of tools required for installation. Additional tools and supplies are listed below

Sensor Materials	Sensor Tools/Supplies
0.005" thick polyimide sheet	9/32" socket or slotted screwdriver adapter for use with torque wrench
Sensor alignment sheet	Torque wrench with 22 in-lb <sub>f</sub> capacity
Alignment sheet attachment springs	2 ea ¼" x 20' roll of 100% expanded Value Seal Joint Sealant
8 sensors	Cover Materials
Tefzel <sup>®</sup> cable tie	Cover Assembly
Wire number tags	Preamplifier Assembly
Sensor alignment sheet springs	Cover Fastener Kit

Table 1 Materials & Tools For Elevated Temperature Sensor Head Installation

## 2.3 Sensor Installation

### 2.3.1 Sensor Insulator Installation

Properly clean the process pipe as described in the VF-100 or GVF-100 Manual along a 36 inch length of process pipe.

Wrap the polyimide (Kapton) sheet around the pipe such that it is in the middle of the cleaned section. (The goal is to electrically insulate the alignment sheet from the pipe.) Temporarily secure the sheet with tape (if needed) outboard of where the sensors will be located.

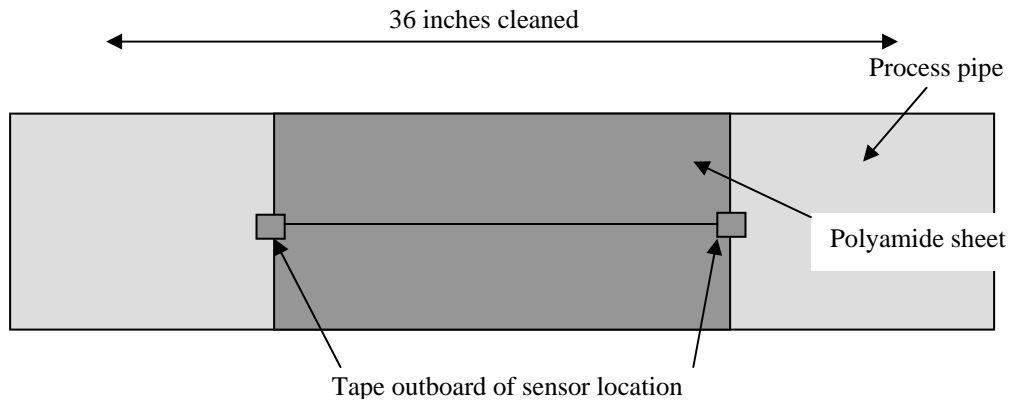


Figure 1 Sensor Polyimide Sheet Installation

### 2.3.2 Sensor Alignment Sheet Installation



#### WARNING

Use care when handling alignment sheet, sharp edges may cause cuts.



#### CAUTION

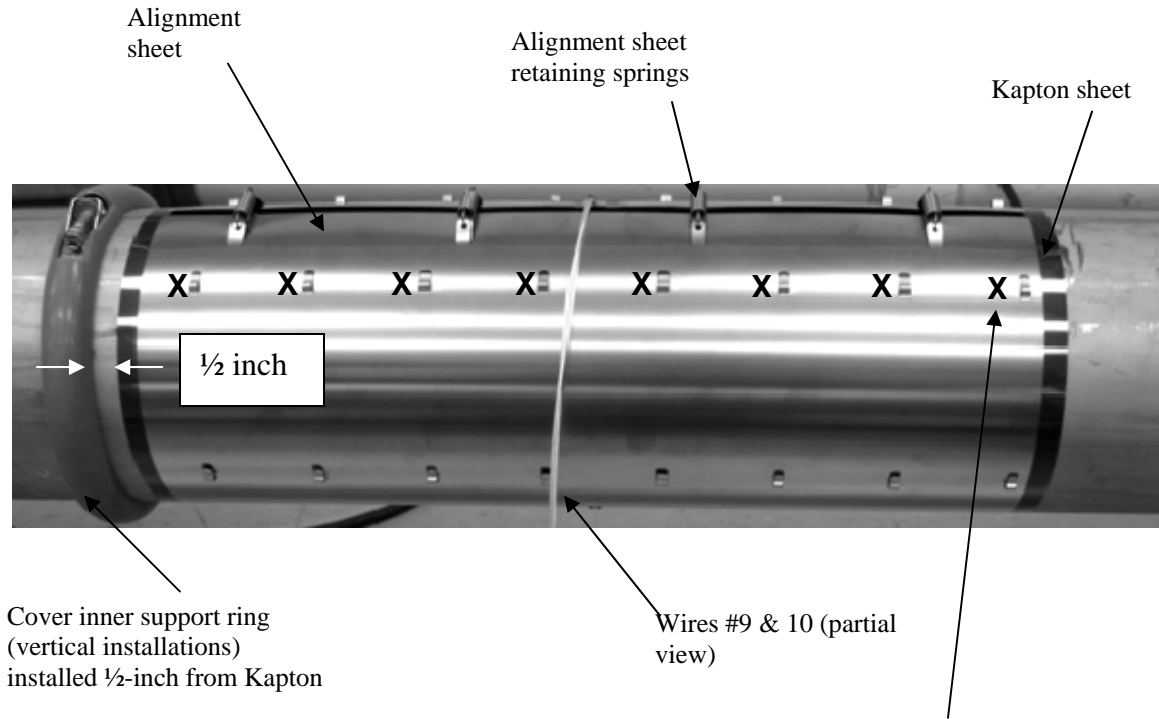
Use care when handling alignment sheet, do not damage wires attached to alignment sheet.

Attach alignment sheet to pipe using 4 springs. The seam of alignment sheet should be aligned such that it will be as close as possible to the preamplifier housing on the cover when the cover is installed. It is preferred that the preamplifier housing is oriented “up” (12 o’clock position) for horizontal pipe installations.

Remove the tape (if used) from the Kapton sheet.

**Note:** For vertical installations install the cover inner support ring  $\frac{1}{2}$ -inch from the upper edge of the Kapton sheet.

Note: Wires #9 and #10 on the alignment sheet are used for grounding and temperature.



**Important: X refers to sensor installation locations**

Figure 2 Alignment Sheet Attachment to Pipe



### 2.3.3

#### Sensor Installation

Slightly bend the alignment tabs on the sensor band alignment sheet upward. These will serve to align the sensors during installation.

Wrap the sensor bands around the alignment sheet. Align the edge of the sensor band with the alignment tabs on the alignment sheet.

**IMPORTANT: The alignment tabs on the alignment sheet are not symmetrical. Install the sensors on the side of the tab shown in Figure 2 above.**

Install the sensors so the cable exiting from under the sensor clamp does not touch the alignment tabs (this may cause the sensor element to be cut and cause a short).

Install the sensor such that their connectors are opposite the direction of wires #9 & 10 on the alignment sheet

Orient the sensor band attachment bolts with the top of the pipe (horizontal installation) so they will be directly under the cover assembly.

Tighten the screw on each of the sensor bands to 20 – 22 in-lb<sub>f</sub> using a torque wrench with a 9/32” socket or slotted screwdriver adapter.

Wait 10 minutes. Re-torque the band screws to 20-22 in-lb<sub>f</sub>.

If the sensors have not been previously numbered, label each of the leads from the sensors with wire numbers. Apply the tag near the connector end of the wire. Label the first sensor, with respect to flow direction, with #1 tag; label the second sensor with tag #2, etc..

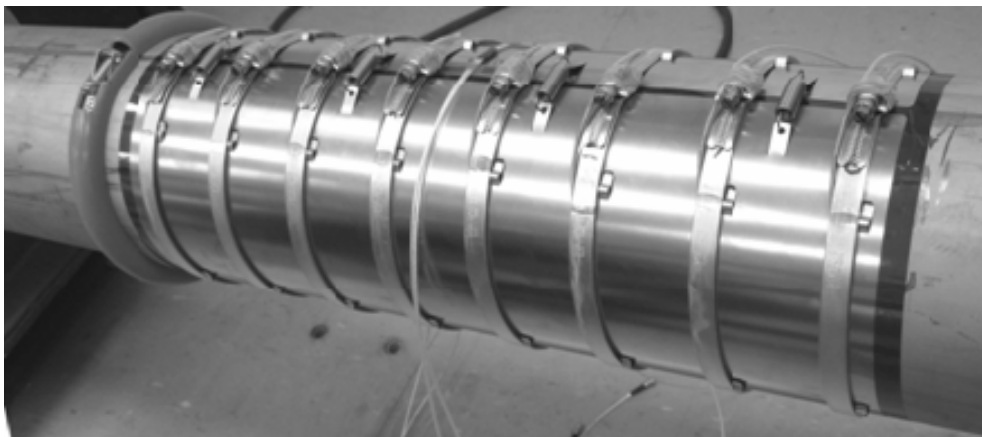
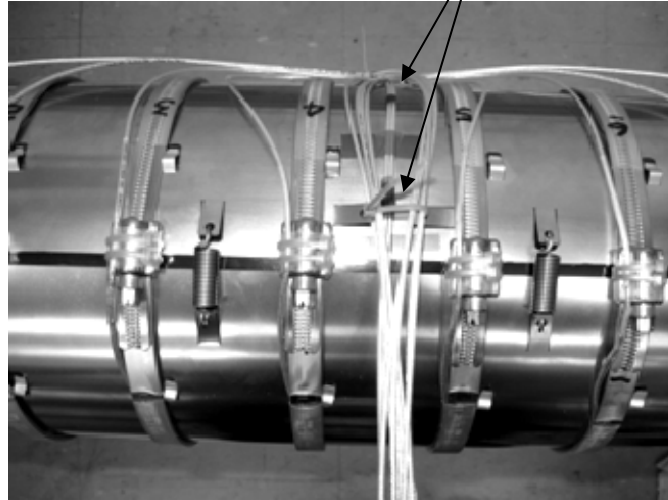


Figure 3 Installed Sensor Band

Remove the springs from the alignment sheet

Bundle the individual sensor wires and wires #9 and #10 together and attach them to the alignment sheet using the tabs provided using a blue Tefzel<sup>®</sup> wire tie (Tefzel<sup>®</sup> can withstand high temperature). Refer to the following figure

Sensor and wires #9 & 10 bundled at 2 places



*Figure 4      Sensor Assembly Wires Bundled*

## 2.4 Sensor Cover Installation

### 2.4.1 Cover Seal Installation

**Note:** The seals to be installed on each cover half must seal on each other when the cover halves are assembled. Also, the crossing seals (start and stop ends) must be on opposite sides of the cover when installed.

Remove a short length of the adhesive backing covering on the joint seal strip to expose the adhesive. Apply the joint seal strip starting at a middle of either the top or bottom cover half such that it curves partially around the inside of a bolt hole on the flange. Continue to install the seal material on the flange so that it runs just inside the inner edge of the flange bolt holes. At the last hole on the flange side (see picture) install the seal in a straight line toward the face seal. Wrap around the end of the flange face and install the seal along the outer edge of the face seal. Continue installing seal around cover flanges and end seals. Cross the starting end of the seal with the end point as shown in the figure below.

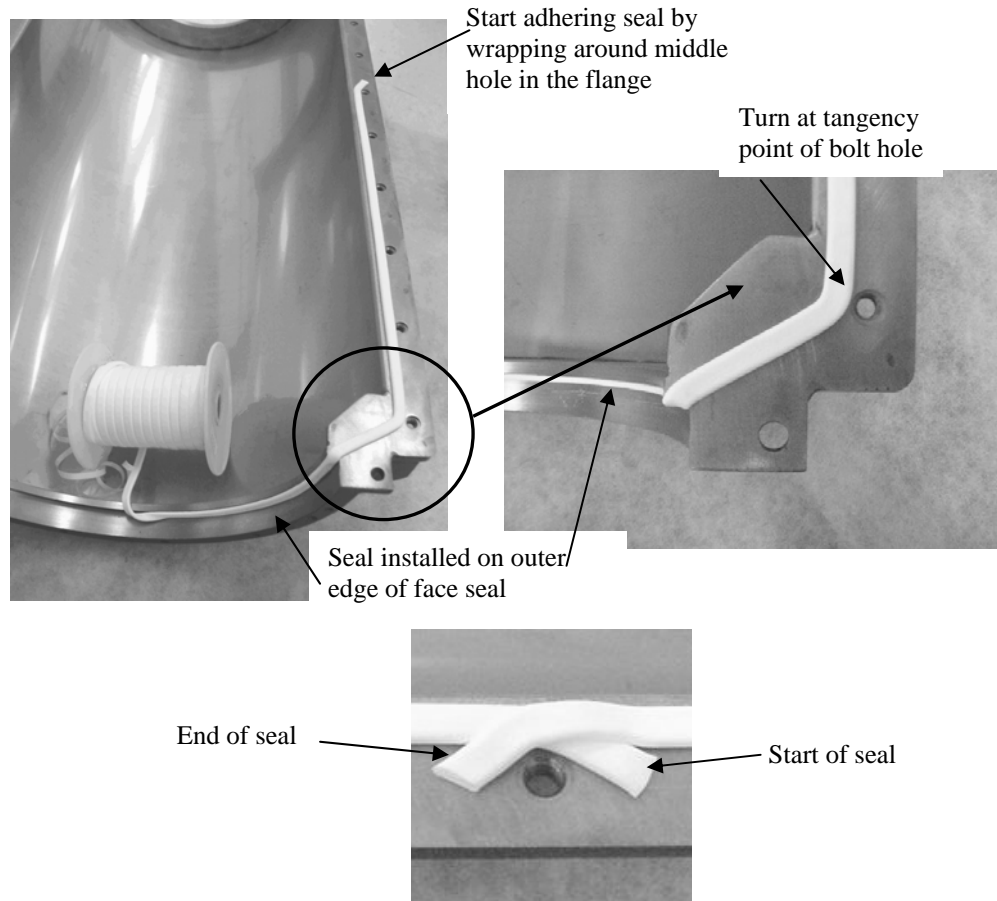
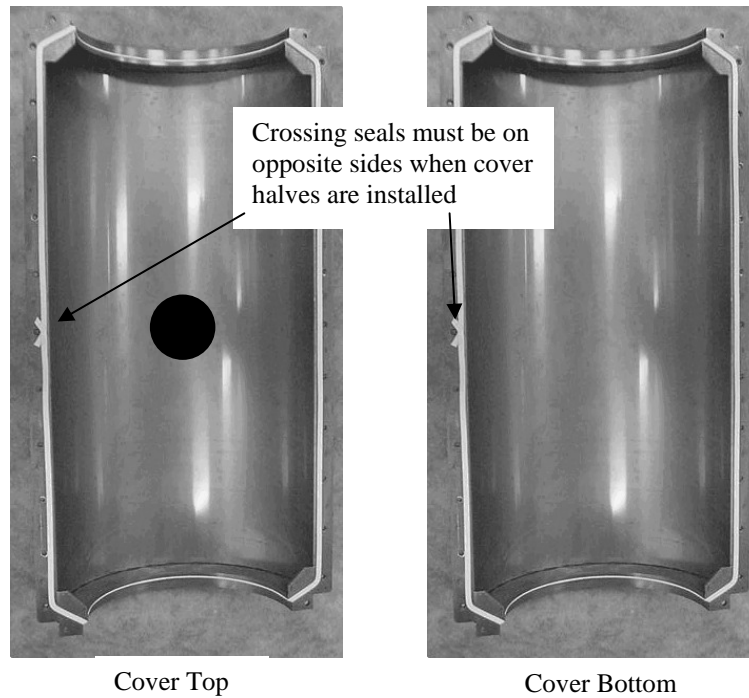


Figure 5 Cover Seal Installation

Repeat the seal installation on the opposite cover half. **Note:** Ensure the seals are installed to mirror each other as they must seal on each other during cover installation. Also, the crossing seals must be on opposite sides of the covers when they are installed. Seals must be one continuous length on each cover half.

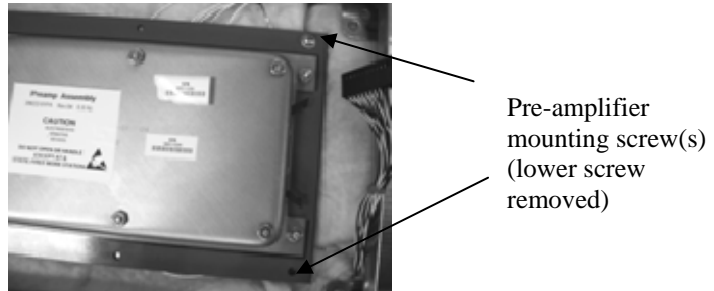


*Figure 6 Cover Seal Final Installation*

## 2.4.2

### Installing Cover on Pipe

Remove the pre-amplifier housing cover from the upper cover assembly. Disconnect external connector cable assembly from pre-amplifier assembly. Remove the four screws holding the pre-amplifier assembly in place. Remove the pre-amplifier and place it in a secure location so it will not be damaged.



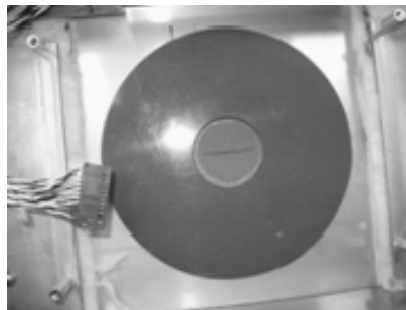
*Figure 7 Pre-amplifier Mounting Screws*

Carefully remove the fiberglass insulation from the pre-amplifier housing by grasping it along the edge and pull it upward. Place it in a secure location to keep it from being damaged.



*Figure 8 Remove Fiberglass Insulation*

Remove the sensor cable feed-through from the pre-amplifier housing



*Figure 9 Sensor Cable Feed-Through Assembly*

**For horizontal pipe installations**, install the cover half with the preamplifier box over the sensor band such that it is centered on the band and over the sensor band cables (allows for maximum sensor cable length). Ensure the cables are accessible.

Install the lower cover half and temporarily clamp the upper and lower cover halves in place using spring clamps (or equivalent). **Important:** Do not allow the cover end seals to touch any part of the sensor array including the polyamide insulation. The seals (and seal rings to be installed in the following steps) should only be in contact with the process pipe.

**For vertical pipe installations** hang the cover halves from the cover support ring. Temporarily install the cover lower support ring on the bottom of the cover assembly.

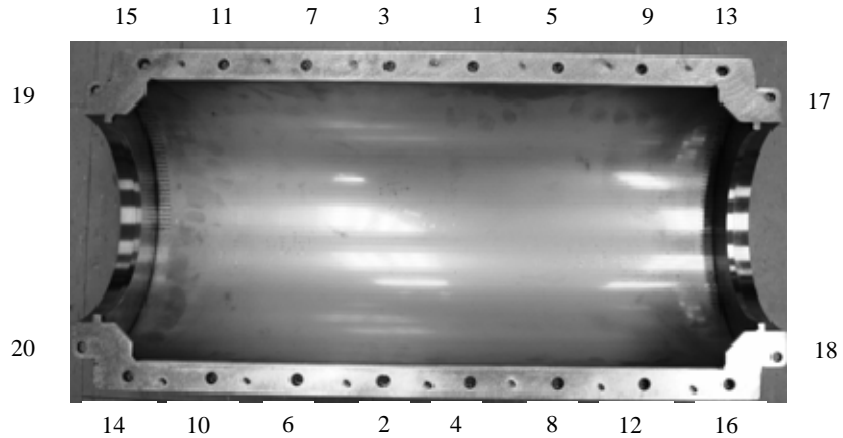


*Figure 10 Cover Lower Support Ring*

Install the lower cover half and temporarily clamp the upper and lower cover halves in place using spring clamps (or equivalent). **Important:** Do not allow the cover end seals to touch any part of the sensor array including the polyamide insulation. The seals (and seal rings to be installed in the following steps) should only be in contact with the process pipe.

Install 5/16"–18 cover bolts fitted with a washer and lock washer in each cover bolt hole numbered 1 – 16 in the following figure. Tighten the bolts gradually per the tightening sequence given in the following figure so that the flanges remain essentially parallel. Bring halves together evenly until most or the entire gap is removed. Maximum allowable gap is 0.10".

Install 1/4"-20 bolts with nuts, washers and lock washers in holes numbered 17 – 20.



*Figure 11 Cover Bolt Tightening Sequence*

### 2.4.3

### Cover End Seal Installation

Un-spool a length of adhesive backed seal and wrap it around the pipe. Overlap the length of seal by about 1.5 inches and then cut it. Repeat for the opposite end of the cover.



Figure 12 Measure & Cut End Seal

Peel the backing on the seal strip to expose the adhesive strip.

Start installing the sealant about ½-inch before the center bolt hole on the top of the cover. Push the seal into the space between the cover and the pipe using an Allen wrench (or similar tool) so the adhesive on the seal will stick to the seal material that was pre-installed on the cover (reference Figure 6). Continue to push the seal in until it is fully seated. The end of the seal should overlap the start point of the seal by about 1 inch (or extend beyond the center bolt hole by about ½ inch).

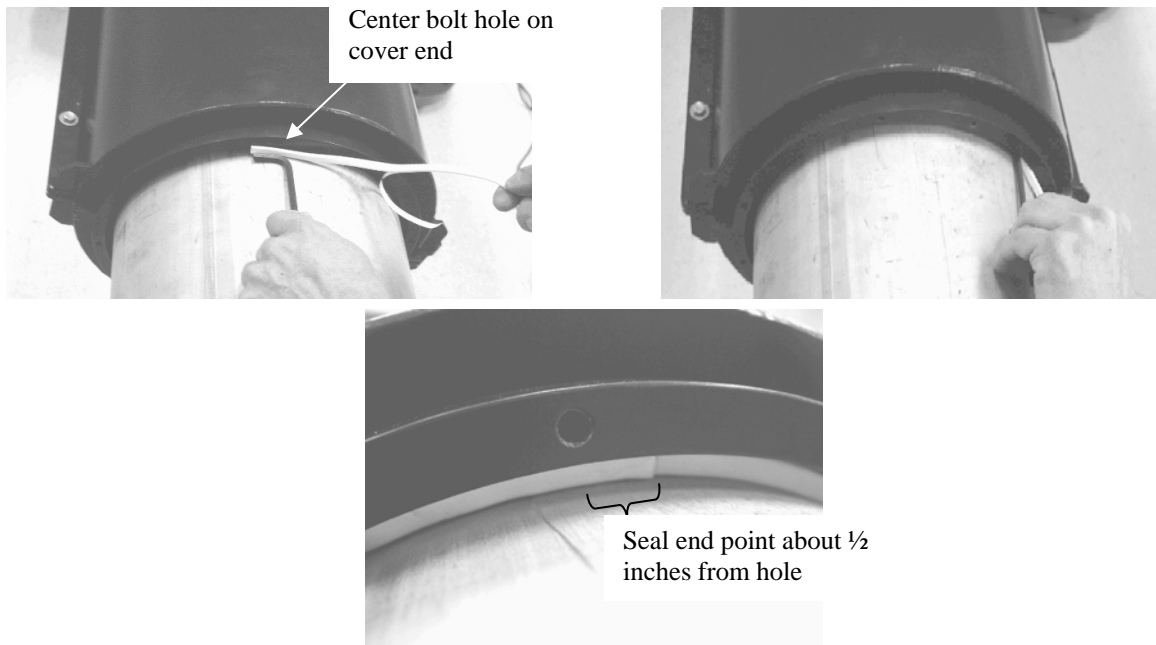


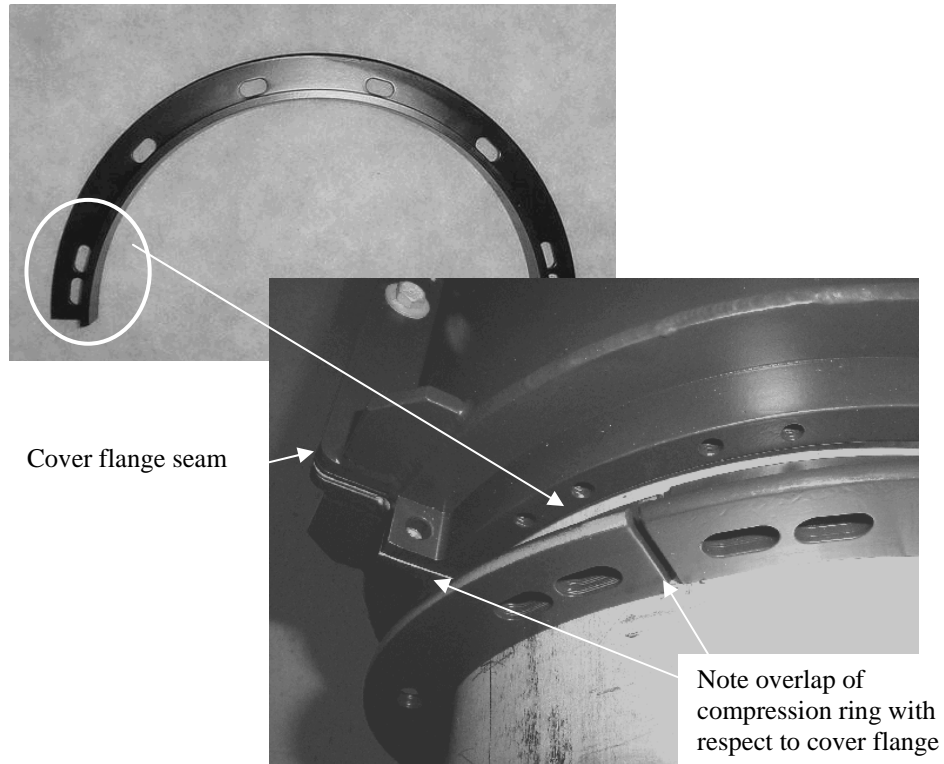
Figure 13 End Seal Installation



Repeat this installation procedure on the opposite end of the cover.

Install the cover end seal compression rings so that they overlap the cover flange seam. The double pair of bolt holes in the end seal compression rings will align with the corresponding double threaded holes in the cover halves.

**NOTE:** If the end seal compression rings do not have a double pair of bolt holes as shown, align the end seam of the compression rings between the two closely spaced tapped holes on the end of the cover.



*Figure 14 Cover End Seal Compression Ring*

Install 5/16-18 bolts fitted with a washer and lock washer in each cover end seal compression ring bolt hole. Tighten the bolts gradually so that the rings pull in gradually and evenly with respect to the cover. The final gap between the compression ring and the cover should be less than 1/8 inch around the circumference. **Note:** It might be necessary to start the seal ring bolts without the washers due to the length of the bolts. Once the seal has compressed, remove the bolts and install the flat and lock washer.

## 2.5 Sensor Pre-Amplifier Connections

### 2.5.1 Sensor Band to Pre-Amplifier Connection

Carefully feed the eight sensor wires and wires #9 and #10 from the sensor band through the slot in the sensor band feed through. Reinstall the feed-through in the pre-amplifier housing.

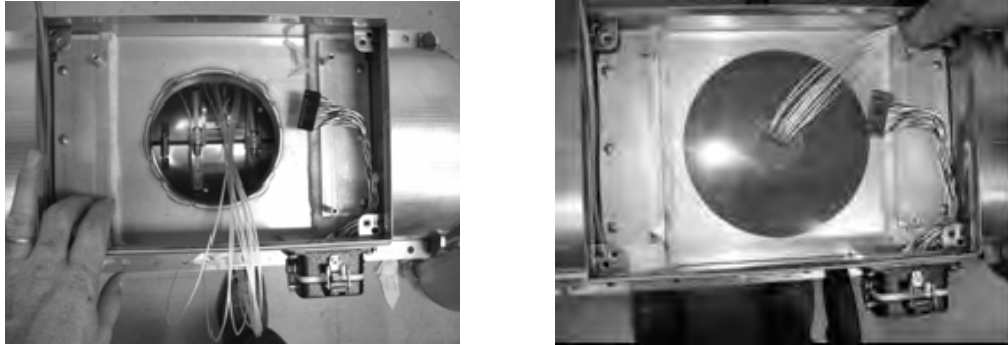


Figure 15 Pre-amplifier Housing Feed-through

Reinstall the fiberglass insulation in the pre-amplifier housing and route the sensor band wires on top of the insulation.

Lay the pre-amplifier in the pre-amplifier housing with the bottom side facing up.

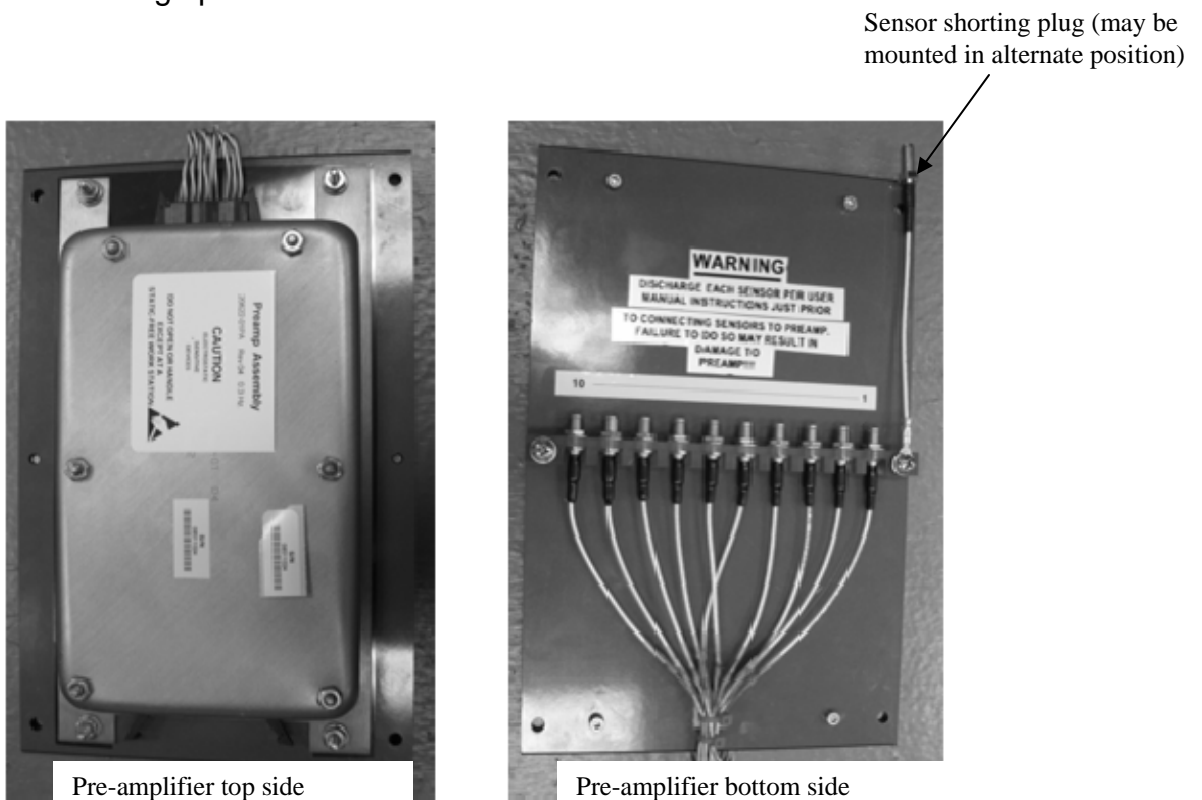


Figure 16 Pre-amplifier Top and Bottom View



## WARNING

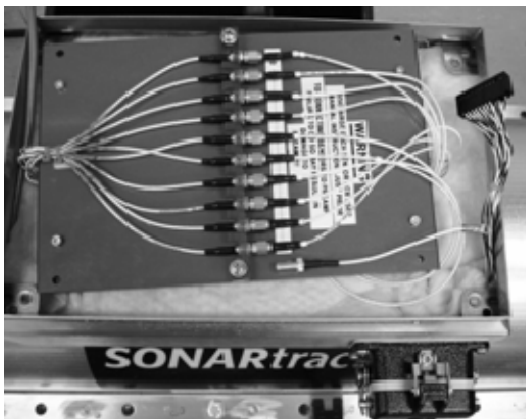
Discharge each sensor per user manual instructions just prior to connecting sensors to preamp. Failure to do so may result in damage to preamp!!

Starting with sensor #1, discharge that sensor by attaching it to the sensor shorting plug. Insert the sensor connector into the mating connector (connector #1) mounted on the bottom of the preamplifier module. Repeat for the remaining 9 wires. **Note:** It may be easier to connect the sensors by first removing the connector block and then re-installing the block after all connections have been made.

Turn the pre-amplifier over.

Re-install the four pre-amplifier mounting screws.

Connect the wire interconnect wire connector to the pre-amplifier.



Interconnect  
wire connector

Figure 17 *Wired and Mounted Pre-amplifier*

Ensure the grounding wire is attached to the pre-amplifier cover

Install the preamplifier cover and install the four cover screws.

## 2.5.2

### **Sensor to Transmitter Cable Connection**

Install the sensor cover to transmitter cable connector.

Terminate the individual sensor to transmitter cable conductors in the transmitter per the Installation Manual.

This completes installation of the high temperature sensor head. Refer to the *SONARtrac*<sup>™</sup> VF-100 user manual for transmitter installation and start-up instructions.





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