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# McAllister Technical Services

*Manufacturers of surface analytical instruments and devices*

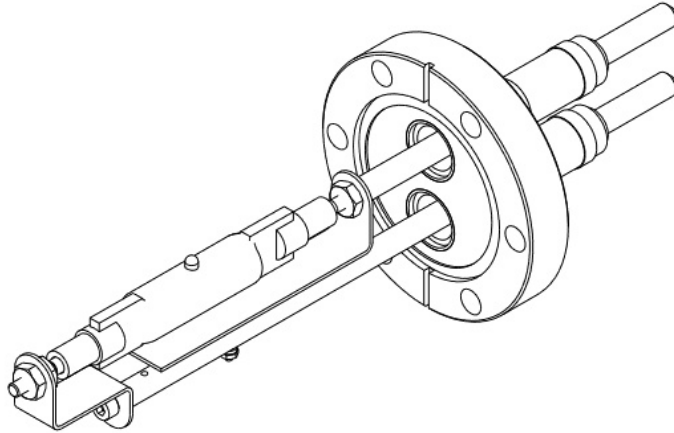
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## IR-2000 INTERNAL HEATER INSTRUCTIONS



**THANK YOU** for your purchase of MTS' IR-2000 Heater. It is the finest of its kind available. We appreciate the confidence you have placed in our company.

This vacuum system bakeout unit was developed to replace or eliminate cumbersome ovens and heater tapes used in high vacuum system bakeouts. The heaters are small, high power quartz lamps that operate on the inside of the vacuum system. These heaters utilize 100% of the radiant heat emitted by the lamps and thus are able to reach bakeout temperatures in a much shorter period of time than ovens or tapes. The internal heat sources reduce the bakeout time required to reach base pressure. The heater elements are securely mounted on standard conflat flanges. Care should be exercised not to touch, damage or coat the lamp because the high heating efficiency could be reduced.

The IR-2000 system INTERNAL HEATER employs 2 separately mounted quartz lamps designed for use inside a vacuum chamber to outgas the system. **WARNING: When in operation for a long period of time, enough heat is generated inside the vacuum chamber that the chamber or feedthrough pins can cause painful burns if touched. Care must be exercised to prevent anyone touching hot surfaces which can cause a burn and/or discomfort.**

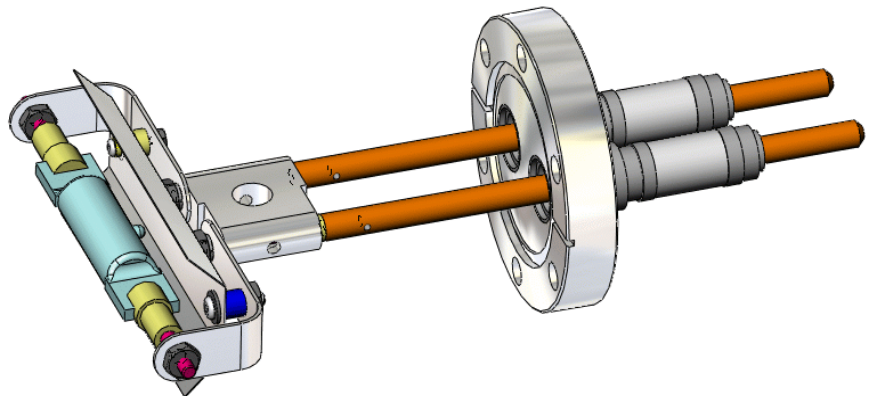
### Setup Instructions:

The IR-2000 INTERNAL HEATER is shipped ready for immediate use. However, the lamp itself is demounted and separately packaged to prevent damage in shipment.

- 1) Carefully unwrap the quartz bulb. Do **not** touch the glass portion of the bulb when installing it in the holder, as a fingerprint on the glass portion may cause early bulb failure or diminished heating, not to mention unwanted outgassing.
- 2) Carefully raise the upper bulb holder to insert the bulb and prevent the ceramic ends of the quartz bulb from chipping.
- 3) Install the bulb and holder in a 2-3/4" OD x 1-1/2" ID flange on the system. Be careful that it clears or does not interfere with any equipment inside the vacuum system. The bulb has a protrusion where it was sealed at time of manufacture. Make sure this protrusion is **not** pointed toward the sheet metal reflector.
- 4) Install the control unit in a rack panel, or place it in an unobstructed place.
- 5) Place the two power leads on the feedthroughs for the heater unit.
- 6) The IR-2000 requires 12 amperes when both bulbs are in use. The IR-2000 INTERNAL HEATER unit is now ready to operate.
- 7) With the vacuum pumping system in operation, turn the "Time" knob to the desired time for heating the system. The exact time will have to be determined for each system and depends on the outgassing required for system operation. The timer may be set for 1-12 hours depending on the system bakeout requirements. For periods of less than 2 hours, turn the timer past 2 and then back to the desired time.
- 8) First turn the power knob well past the intensity desired and then adjust the power for heating. Full power will decrease the time required to outgas the vacuum system. As the system warms up and outgasses, the base pressure of the system will increase.
- 9) After the timer shuts off, continue pumping for a period of time as the system cools down. After cooling, the vacuum system is ready for use.
- 10) Additional heating cycles may be needed to completely outgas the vacuum system and to reach the base pressure required, especially the first time a system is used. The quartz lamp is rated for 180 hours of service. McAllister Technical Services cannot guarantee the lifetime of the bulbs, as rough handling or severe system operating conditions may reduce the lamp service life.

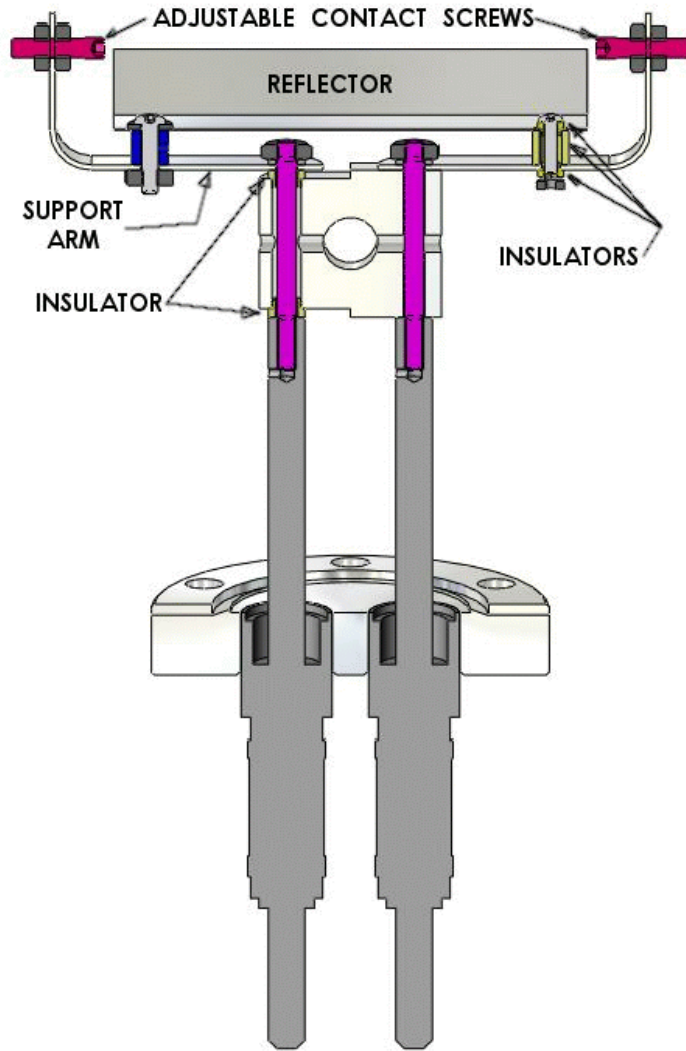
### Special orientations of the bulb

Sometimes a different orientation of the bulb is provided to satisfy a User's particular requirements. One example is the "horizontal mount" option as shown in the graphic.



Some disassembly is needed in order to install this type of holder through the conflat flange. The following procedures should be done using UHV-clean gloves and tools:

1. The bulb is shipped dismounted, as with the previous style.
2. Remove the reflector and insulators from the support arms. Note that only one side needs to be insulated.
3. Remove one or both support arms, as needed, to allow insertion through the conflat flange. Note that one of the support arms is insulated.
4. Insert the feedthrough flange, using a new gasket. It may be advisable to not tighten the flange bolts until after reassembly of the bulb supports, to allow reorientation.
5. Re-assemble the bulb supports and reflector.
6. Insert the bulb, adjusting the screws to insure tension on the contacts at the ends of the bulb.



#### Specifications:

" Power - Standard 115 VAC, 60 Hz, 1200 W (Dual bulb) Optional 220 VAC, 50-60Hz

" Dimensions - Heater unit mounting space - 1-1/2" diameter x 4-1/2" long

" Custom dimensions available - consult factory

" Rack Mount Controls - 3-1/2" high x 19" wide

" Materials - 304 Stainless steel flange, OFHC Copper rods, Quartz lamp glass (enclosed)

" Mounting Flange - Conflat 2-3/4" OD

" Temperature in  $10^{-8}$  Torr vacuum at full power:

3 minutes - 263°C @ 6 inches from bulb - 222°C @ 12 inches from bulb

6 minutes - 273°C @ 6 inches from bulb - 236°C @ 12 inches from bulb

9 minutes - 283°C @ 6 inches from bulb - 242°C @ 12 inches from bulb

The test used one bulb. The measurement point was a small piece of SS with thermocouple attached.