	<b>SERVICE REFERENCE DOCUMENT</b>		Nbr: <b>121231DH</b>
	Product(s):	Discovery MS	Prepared By: <b>Dean Heller</b>
	Subject:	<b><i>How to Replace the Orifice on the Discovery Mass Spectrometer</i></b>	

## Purpose / Introduction

This document shows How to replace the orifice on the Discovery MS. This procedure is required if the orifice should become blocked.

## Search phrases

Installation; Discovery; MS; Thermal; Q5000; Q500; Q50; Q600; TGA; MKS; Mass Spectrometer; Capillary; Transfer Line; Orifice

## Related Documents

N/A

## Tools Needed

Adjustable Wrenches; Phillips Head Screwdriver; ¼ Ball Hex Wrench;



## Safety recommendations


N/A

## Spare parts needed/recommended

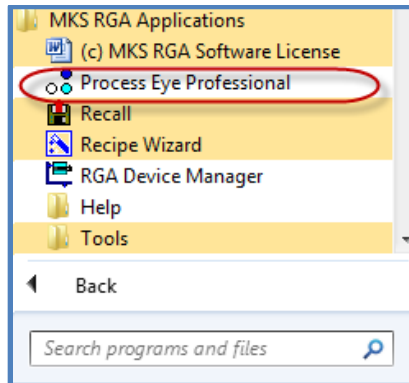
N/A

## Procedure

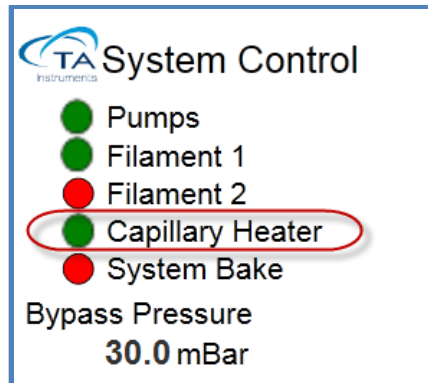
1. Click the **Start** button  on the **Windows Taskbar** and then select **All Programs /MKS RGA Applications**.

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2. Now select the application **Process Eye Professional**

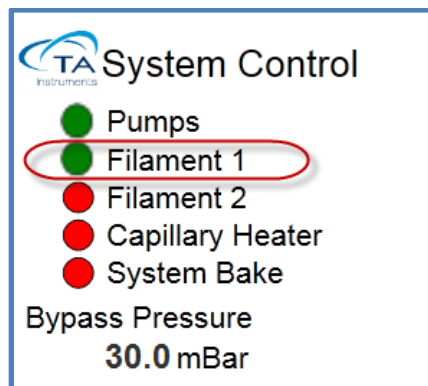



3. Go to the **TA Recipe Menu** under **System Control**, and click on the link for **Capillary Heater**, the color status indicator will change from **Green to Red** after it's been deactivated.



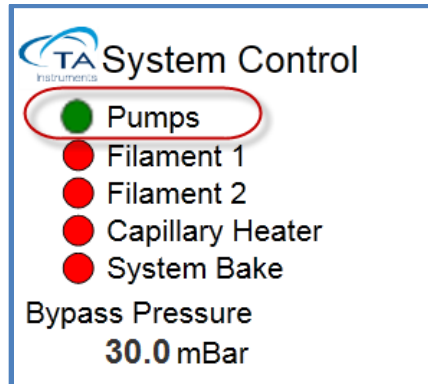
4. Allow 30 minutes for the system to cool down.

5. Under System Control, now click on the link for the current active Filament, the color status indicator will change from **Green to Red** after it's been deactivated.

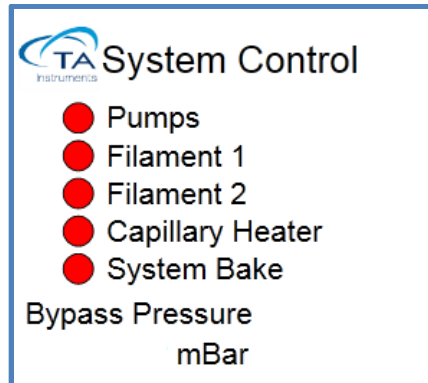


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6. Under System Control, now click on the link for Pumps, the color status indicator will change from **Green to Red** after it's been deactivated.



7. Now allow 10 minutes for the Turbo Pump to stop spinning.



8. Loosen the two captive screws on both the left and right side panels of the capillary housing and then remove the covers.



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Product(s):

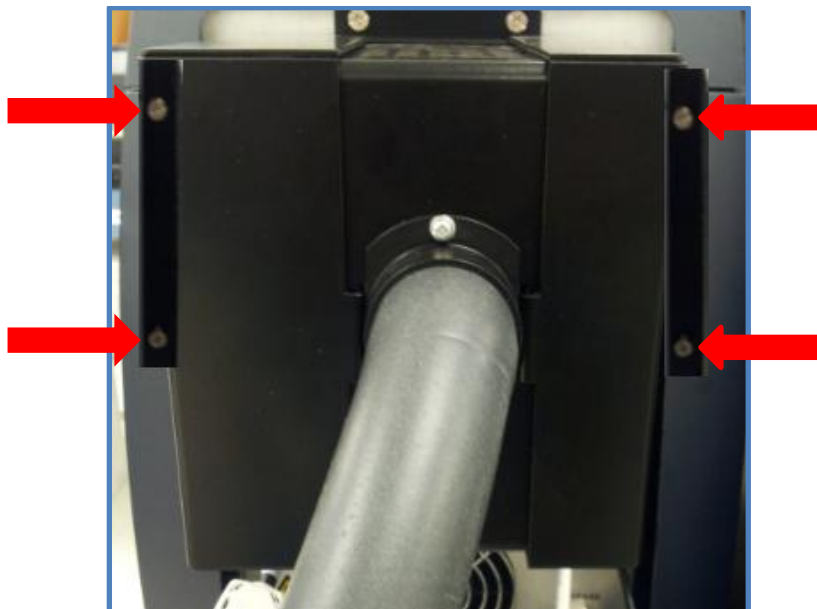
Discovery MS

Prepared By:

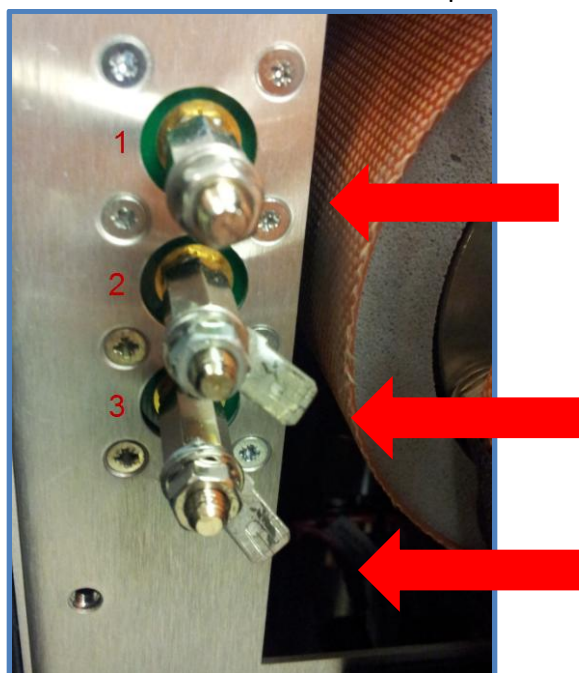
Dean Heller

Subject:


*How to Replace the Orifice on the Discovery Mass Spectrometer*



9. Locate the white heater wires and then remove the two wires with Ring Connectors from terminal post #1 and then remove the other remaining heater wires with Push-On Connectors from terminal post #2 and #3.



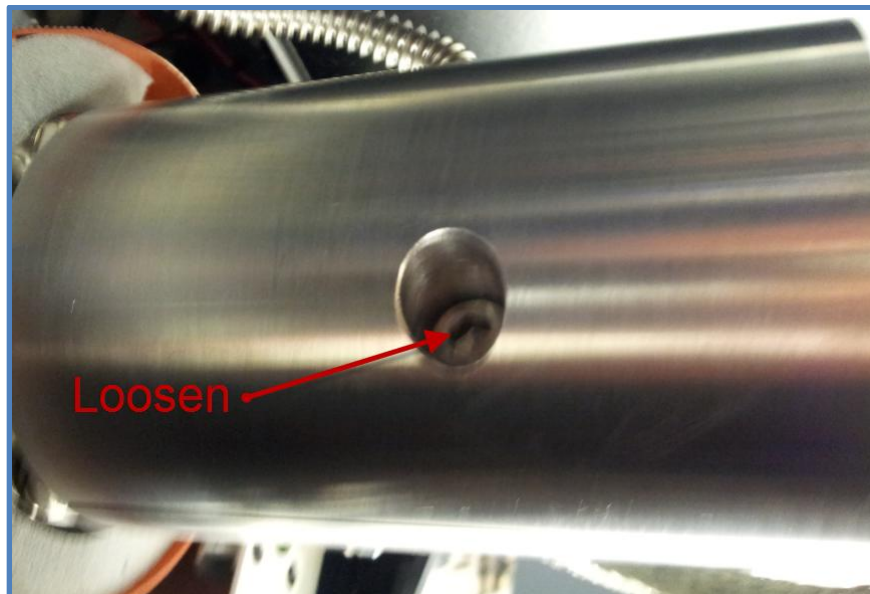
Remove the two white heater wires with the Ring Connectors to terminal post #1 and two white heater wires with Push on Connectors to terminal posts #2 and # 3


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10. Now loosen the two Velcro straps and then remove the Heater Jacket Cover from the Aluminum block.

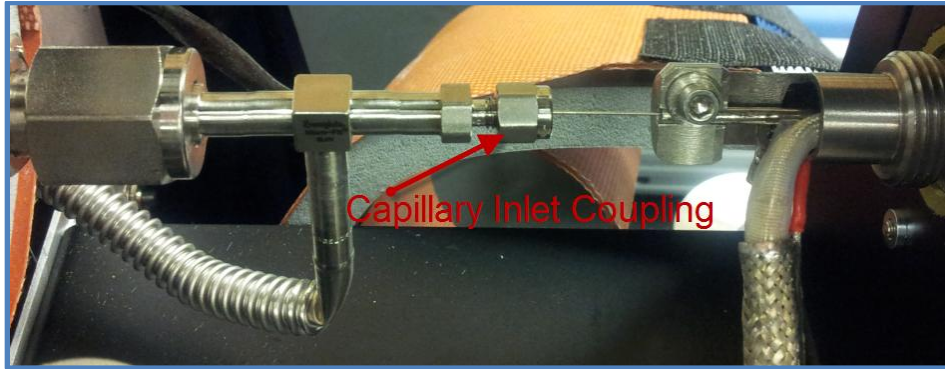


11. Now loosen the ¼" hex screw and then remove the two halves of the Aluminum block.

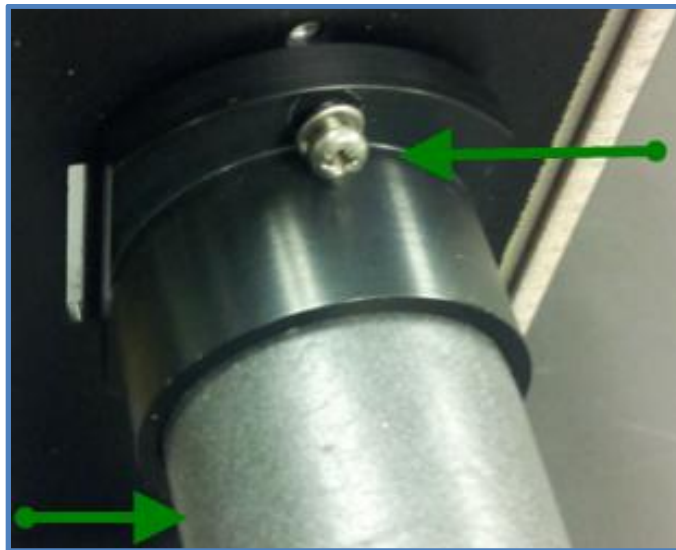



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12. Now loosen and remove the 1/8" Swagelok nut from the inlet coupling.

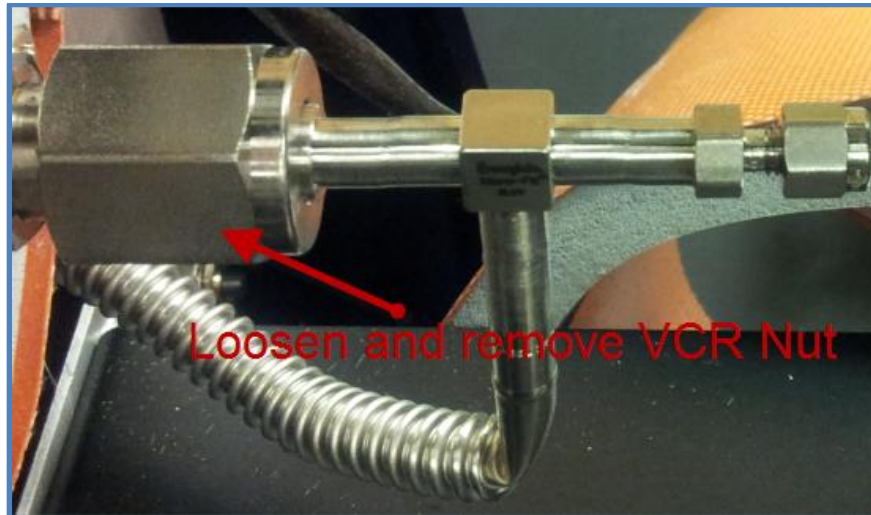


13. Now loosen the two Phillips head screws on the outer collar that secure the heated transfer line to the support bracket and then carefully slide the capillary and heated transfer hose out from the bracket.

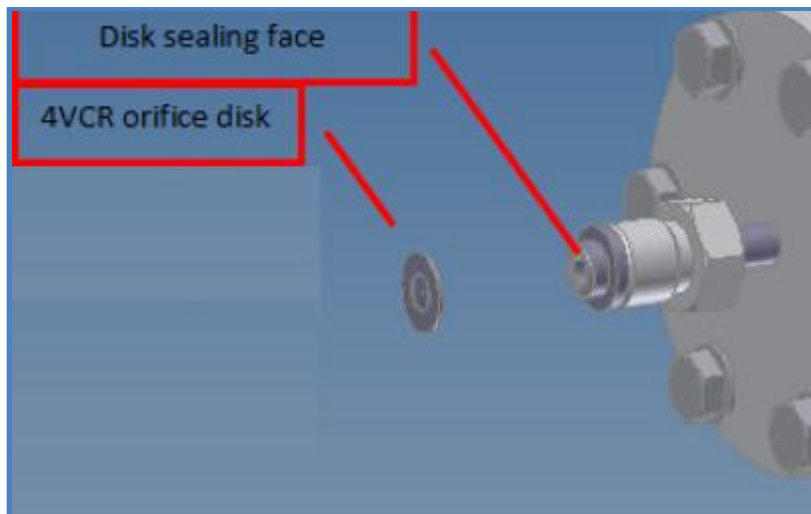


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14. Once the capillary has been removed the inlet assembly, unscrew the 4VCR nut.



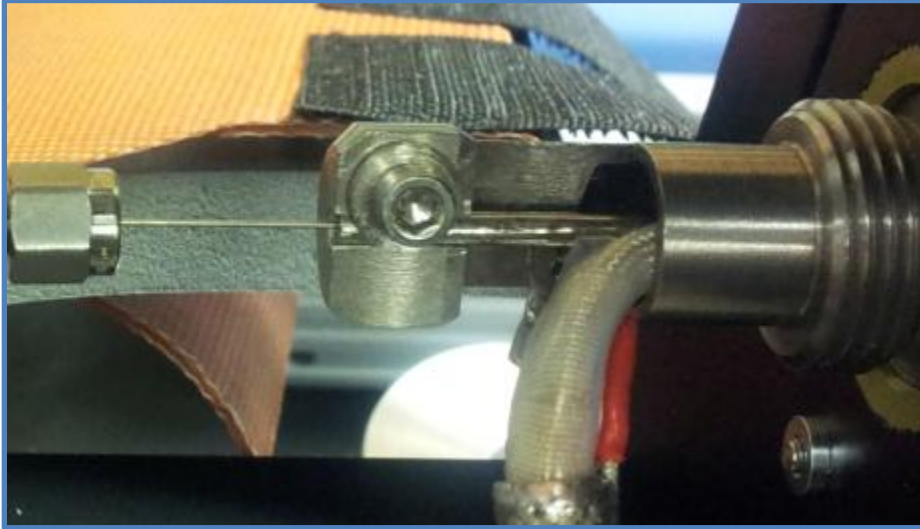
15. The VCR orifice disk is held in a sprung retainer which clips onto the sealing face of the male half of the fitting, pull the retainer from the fitting to remove.



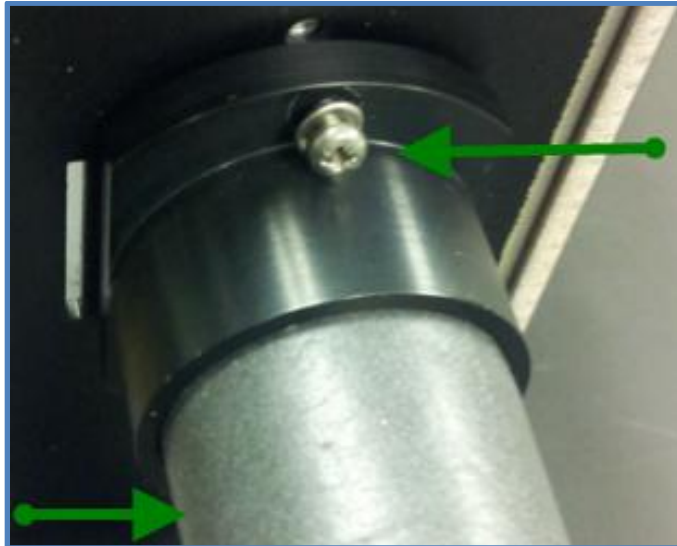
If your replacement disks are already fitted inside a retaining clip, simply push a new disk onto the sealing face. If your replacement disks are not inside a retaining clip, you will need to remove the old disk and re-use the retainer.

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16. Insert the end of the Heated Transfer Line with the heater wires through the support bracket.



17. Now tighten the two Phillips head screws on the outer collar to secure the heated transfer line to the support bracket.





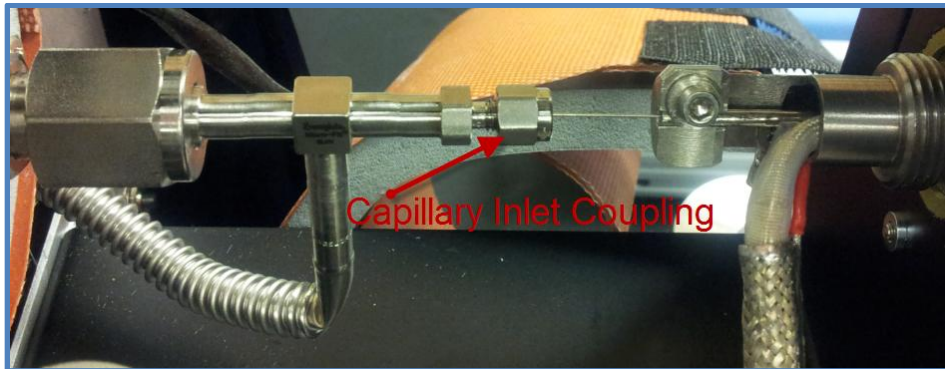
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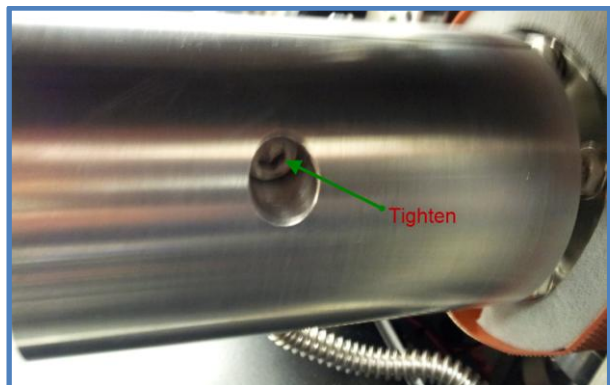
If the graphite ferrule is deformed, remove it and then replace it with a new ferrule, orienting it with the taper end toward the inlet and then feed the capillary column into the inlet until the column “dead ends” and then pull it back just slightly.




- Using two wrenches, one to hold the bulkhead fitting, the other to tighten the Swagelok nut, turn the nut  $\frac{1}{2}$  turn. Do not over tighten this nut because you could damage the capillary. If a leak is detected during the leak check test, turn the nut an additional  $\frac{1}{4}$  turn.

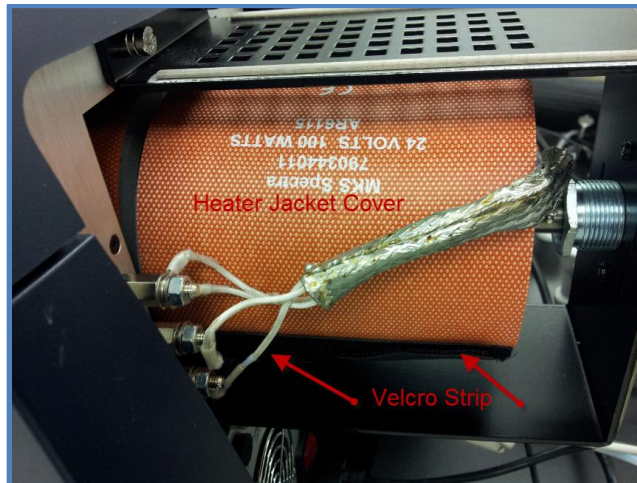


- Now attach the two halves of the Aluminum block, matching the cutout with the capillary inlet connectors and then tighten the  $\frac{1}{4}$ ” hex screw.



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20. Now slide the Heater Jacket Cover over the Aluminum block, making sure the heater wires are routed outside the cover, and then secure the cover using the two Velcro straps.

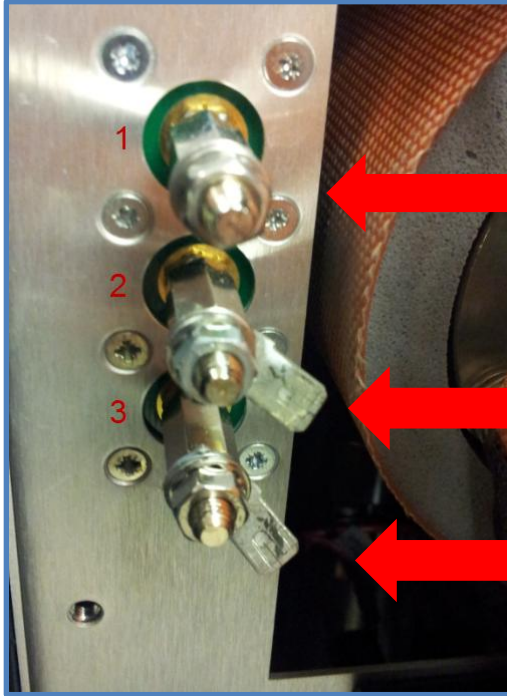


21. Now attach the four heater wires to the left rear side of the MS cabinet.

22. Locate the two wires the , and then attach the two wires with Ring Connectors to terminal post #1 and then attach the other remaining heater wires with Push On Connectors to terminal post #2 and #3.



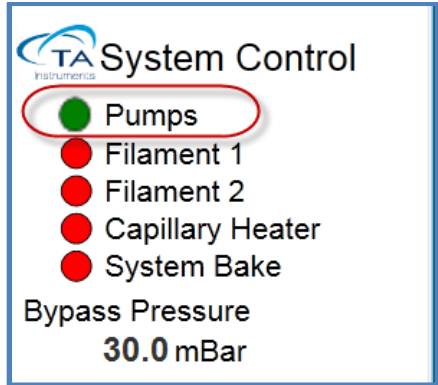
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Attach the two white heater wires with the Ring Connectors to terminal post #1

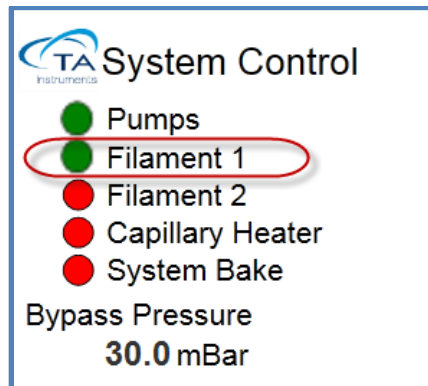
Attach the remaining two white heater wires with Push on Connectors to terminal posts #2 and # 3

23. Go to the **TA Recipe Menu** under **System Control**, and click on the link for **Pumps**, the color status indicator will change from **Red to Green** after it's been activated.



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24. When the status indicator for **Pumps** turns to **Green**, click on the link for **Filament 1**, the color status indicator will change from **Red to Green** after it's been activated.



25. When the status indicator for **Filament 1** turns to **Green**, click on the link for **Capillary Heater**, the color status indicator will change from **Red to Green** after it's been activated.

