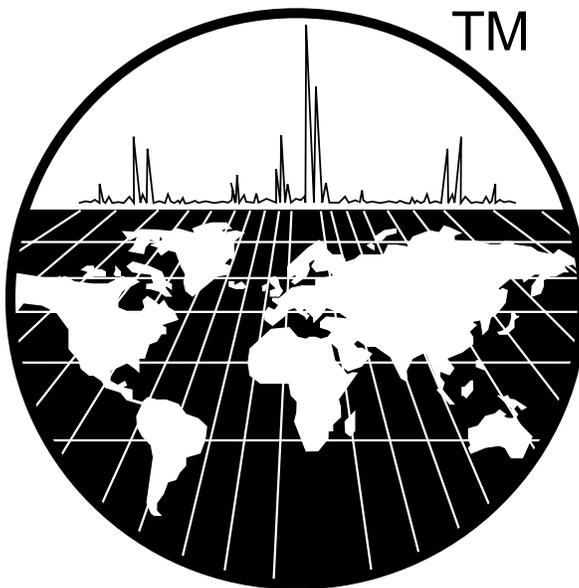


# **Manual for the Direct Exposure Probe and Temperature Controller Model PC3**



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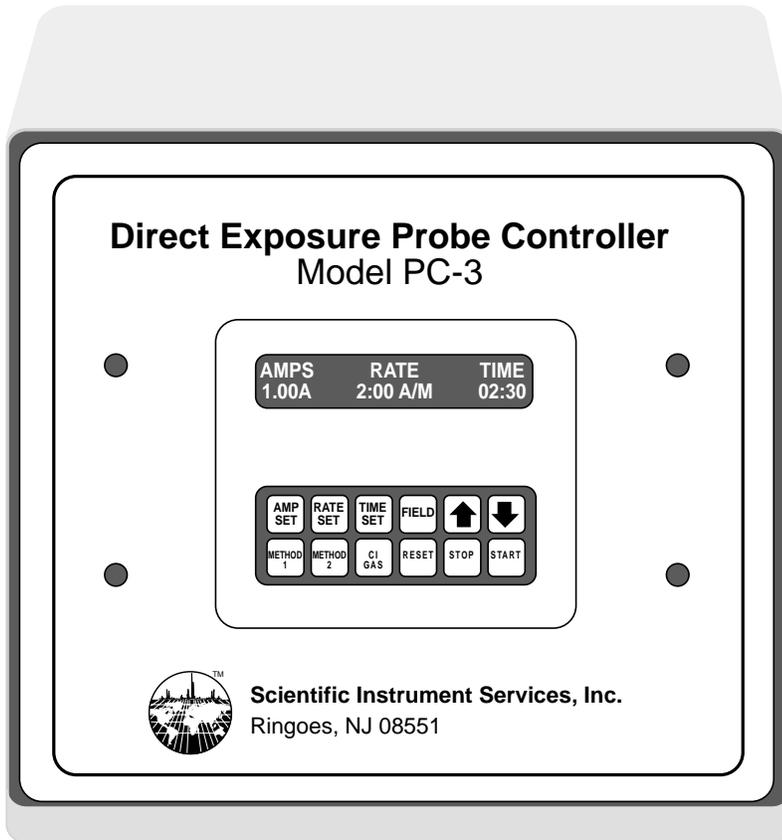
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## Description of Controller Model PC3

The Direct Exposure Probe (DEP) controller Model PC3 is designed for use with the SIS Direct Exposure Probe (DEP or DCI). The front panel of the controller (Fig. 1) has a two line LCD readout and a 12 button keypad. The rear panel of the controller (Fig.2) contains the main power switch, the hookups for the probe cable, remote start cable and the CI gas valve cable, and the fuse.



**Figure 1**

values of any of the three parameters. The up button increases the value, the down button decreases the value.

**FIELD** - The field button is located next to the UP ARROW button. This key controls the location of the cursor on the bottom line of the display. When this button is pushed the cursor will move along the bottom line of the display within its current parameter field. The position of the cursor determines which number will be changed when the ARROW buttons are pushed. The number over the cursor is the number that will be changed when the ARROW buttons are pushed.

**TIME SET** - This button is just to the left of the FIELD button. This button is used to change the overall time of the analysis. This is not the time that the probe is at its final set value, but rather the overall time of the whole analysis. The time is displayed in minutes and seconds(min:sec). The maximum time that can be set is 59 minutes and 59 seconds. When this button is pushed the cursor will move underneath the first digit in this field. Now if the ARROW buttons are pushed the value of this digit will change. If you wish to change a different digit in the time parameter field, push the FIELD button until the cursor is under the digit that you want to change and then press the UP/DOWN ARROWS.

**RAMP SET** - This button is used to set the rate at which the current will be ramped to its final set value during the analysis. The Ramp Rate is expressed in Amps per minute (A/M).When the RAMP SET button is pushed the cursor will move to the first digit in this field. Now if the ARROW buttons are pushed this first digit will be

When the controller is first turned on the top line of the display will show the labels of the three parameters which the user can control; AMPS, RATE, and TIME. The numbers under these labels show the current set values for these parameters. After the analysis is started, the top line of the LCD will display the actual time and electrical current level which is being passed through the probe filament so that the user can easily see where the analysis is at any given time. The top line will also display any error messages if a failure should occur during the analysis. The bottom line of the LCD displays the current set values for the three parameters. On the bottom line is a small horizontal line under one of the numbers which is the cursor. This can be moved and is used when changing or setting the amps, rate or time values as described below.

The keypad consists of 12 pushbutton keys as shown in Figure 1. The functions of each of the keys is described below.

**UP/DOWN ARROW KEYS** - These two keys are used when changing the set values of any of the three parameters. The up button increases the value, the down button decreases the value.

changed. If you wish to change the numbers to the right of the decimal point push the FIELD button until the cursor is in the position you wish to change and then use the ARROW buttons to modify the value. If you wish to not have a current ramp rate but desire to go directly to the set current value through the filament, the ramp rate field should be set to its maximum value which is 5.00 amps/ min. This means that the final set filament current is immediately passed through the filament and the sample is ballistically heated.

**AMP SET** - This key is used to set the electrical current level, in amps, that will be passed through the filament on the probe. The maximum current value is 2.5 amps. When this button is pushed, the cursor will move to the first digit in the AMPS field. This means that this first digit will be changed if the ARROW keys are pushed. As before, if you wish to change a value to the right of the decimal point use the FIELD button to position the cursor. In most instances filament current levels will be set to 0.5 to 1.5 Amps for sample analysis. Higher filament currents may burn out the filament due to excessive current.

**START** - This button is used to start the ramping of the current through the filament, and start the time counter. When this button is pushed the analysis begins and the top line of the LCD will change to the changing current and time values. Pushing this button will also automatically start the data system of the mass spectrometer if the remote start cable is installed between the back of the PC3 controller and the mass spectrometer.

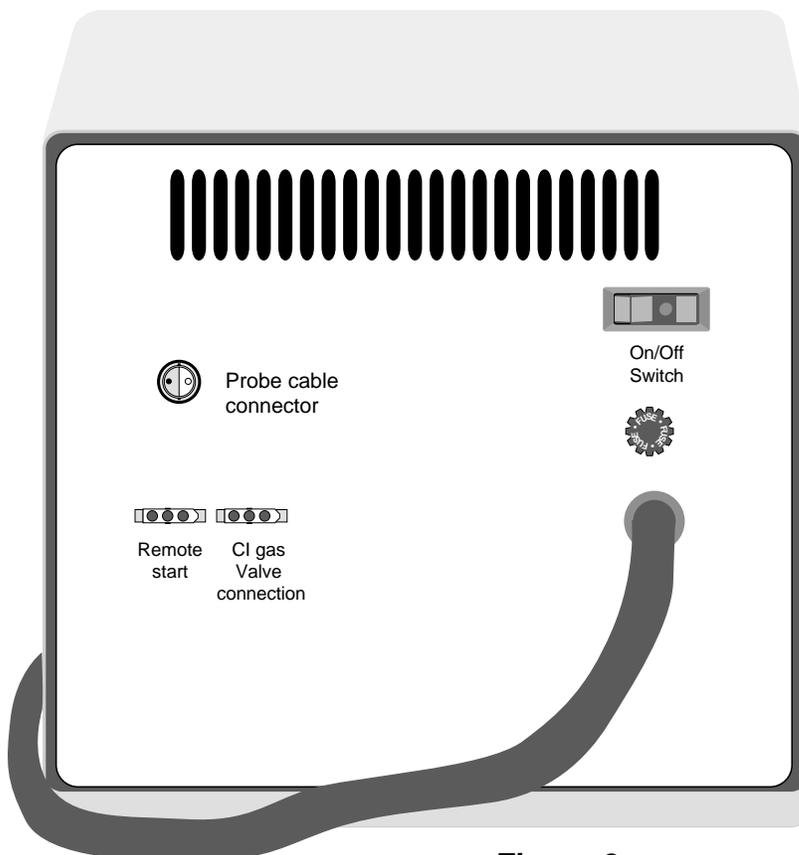
**STOP** - This button will stop the analysis as soon as it is pushed. The message "ANALYSIS INTERRUPT" will be displayed on the top line of the LCD.

**RESET** - This button is used to return the controller to the initial start values of the analysis. This button must be pushed after the STOP button is pushed during an analysis, or after an analysis is complete.

**CI GAS** - This button turns the Chemical Ionization (CI) reagent gas on and off if the optional CI gas valve is installed in the CI reagent gas line. If the valve is not installed, this button does not perform any function. When the button is pushed, "CI" will be displayed on the top line of the LCD. When this is displayed the valve for the CI reagent gas is open allowing gas flow through the probe. Pushing the CI GAS button a second time will close the valve.

**NOTE ON OPTIONAL CI GAS VALVE** - An optional electrically actuated valve for use on the CI reagent gas line is available from SIS. This is SIS part number PV100. This valve can be controlled from the PC3 controller when it is installed. The valve is a normally closed valve, meaning that CI gas is not allowed to flow unless it is activated from the PC3 controller by pushing the button labeled CI GAS. The valve can be installed anywhere in the CI gas line, however it is advisable to keep the valve as close to the probe as possible.

**METHOD 1 and METHOD 2** - These two buttons allow the user to store two methods in the PC3 controller. When the button is pushed the three parameters will



**Figure 2**

be changed to what ever the user has stored in that method. A common application of two methods is using Method 1 for sample analysis and Method 2 for DEP wire cleaning.

## DESCRIPTION OF DEP/DCI PROBE



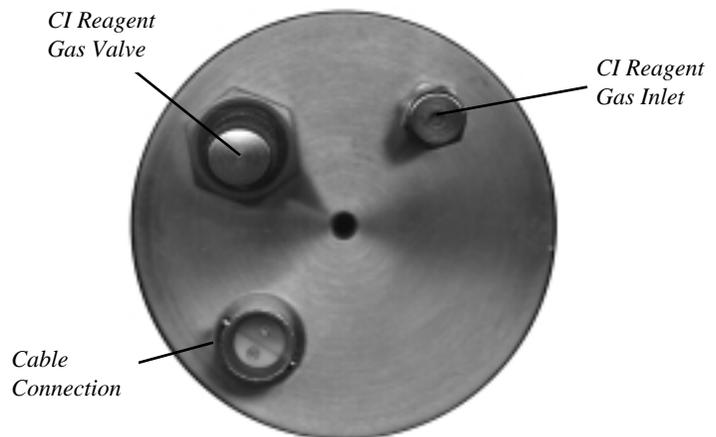
**Figure 3**

Figure 3 shows the DEP probe including an enlargement of the probe tip and filament. The filament plugs into the end of the vespel probe tip. CI reagent gas exits through the small hole in the end of the vespel probe tip. The holes in the side of the vespel tip are pump out holes.

A detailed drawing of the back of the probe handle is shown in Figure 4. The following is a description of the fittings and valve on the back of the handle.

*CI Reagent Gas Inlet* - This is a 1/16" Swagelok fitting for hookup of the CI reagent gas. If the instrument is not going to be used in the CI mode of operation than this fitting should be capped off. NOTE: The probe is shipped with a solid ferrule in this fitting which acts as a plug.

*CI Reagent Gas Valve* - This is a high precision needle valve for fine adjustment of the CI gas flow. Approximately one to three turns of the valve will open the valve sufficiently for use with most analyses. WARNING: Care must be used when closing this valve. DO NOT over tighten the valve or damage to the valve seats will occur.



**Figure 4**

*Probe Cable Connection* - This is the electrical connection for plugging in the probe cable from the controller.

## Probe Operation

1. Plug the power cord of the controller into a 110VAC outlet.
2. Turn on the PC3 power switch located on the left side of the rear panel.
3. Plug in the probe cable, and install the remote cable if so desired.
4. Plug in the CI reagent gas valve cable if the optional CI reagent gas valve is installed in the CI reagent gas line.
5. Use the keypad on the PC3 controller to set the the AMPS, RATE and TIME parameters to the desired values.
6. Wipe the probe shaft with a clean cloth using methanol and allow to dry.
7. Load the sample onto the probe filament using a syringe or other suitable applicator.
8. Allow the sample to dry.
9. Plug the filament into the end of the probe. (Alternatively the sample can be loaded onto the filament wire when the filament wire has been previously attached to the probe).
10. Insert the probe shaft into the probe inlet port until the probe reaches the first stop at the front of the inlet port. STOP, do not insert the probe further or damage to the filament wire will occur.
11. Open the pumpout valve on the probe inlet port to allow rough pumping of the inlet. Wait about three minutes for the probe inlet to be pumped out and then close the pumpout valve.
12. Continue to insert the probe by releasing the ball on the bottom of the inlet until the second stop is reached. STOP, do not insert the probe any further or damage to the filament will occur.
13. Slowly open the inlet valve until it is completely open.
14. Continue to slowly insert the probe until it seats against the outside of the ion source.
15. Push the START button on the PC3 controller to begin the analysis. This will also start the mass spec data collection if the remote start cable is installed.  
  
**NOTE** - If the message "FILAMENT OPEN" appears on the screen the filament circuit is open most likely due to a burnt out filament and in need of replacement or repair. If the filament appears to be good, be sure that the probe electrical cable is properly installed. Once the filament or cable has been replaced, push RESET.
16. The analysis will continue for the time set in the TIME parameter field.
17. At the conclusion of the analysis the message "ANALYSIS FINISHED" will appear on the LCD.
18. Carefully remove the probe until the stop point. STOP, do not pull the probe out further or venting of the mass spectrometer will occur.
19. Close the probe port inlet valve completely.
20. Remove the probe from the inlet.