



Electrothermal



**IA 9000 SERIES.**

**Digital Melting Point**

**INSTRUCTION BOOK.**

**Please take your time to read your IA 9000 Digital Melt Point Apparatus Instruction book in order to understand the safe and correct use of your new Electrothermal product.**

**It is recommended the Responsible Body for the use of this equipment reads this Instruction book and ensures the user(s) are suitably trained in its operation.**

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## 1. INTRODUCTION.

Your Electrothermal IA9000 series Digital Melting Point Apparatus has been designed for general purpose laboratory use in which samples submitted for analysis are enclosed in a glass capillary tube and brought to a melt point condition under strict controlled parameters of time and temperature.

All of the models within the IA9000 range are operated in a similar manner. An advanced Microcontroller and step through menu system accurately control oven temperature and ramp rate. Melt temperatures can be recorded using the new ergonomically designed keypad using a single touch keypad entry and 'One Touch' entry / storage.

The IA9200 and IA9300 models contain an internal memory which can be used for storage of run data. These units are able to output data information via the printer, USB flash drive or direct to a host PC using Hyperterminal.

In addition the IA9200 and IA9300 units contain the facility to support the following features:-

- Start of ramp temperature and ramp rate can be touch keypad selected for different test standards.
- The operating menu system permits batch serial numbers to be allocated via the touch keypad.
- All stored data enables the reproduction of hard copies which contain the date, time and batch number associated with a built in 'real time' clock.
- Ceiling temperatures may be set in order to preserve chemicals for analysis should they failed to perform as anticipated

Daylight balanced LED oven illumination assists in the clear viewing of melt points.

## 2. SYMBOLS AND USING THIS INSTRUCTION BOOK

- 2.1. Throughout this Instruction book the following symbols are shown to identify conditions which pose a hazard to the user, or to identify actions that should be observed. These symbols are also shown on the product, or its packaging. When a symbol is shown next to a paragraph or statement it is recommended the user takes particular note of that instruction in order to prevent damage to the equipment or to prevent injury to one's self or other people.

**To prevent injury or equipment damage it is the manufacturer's recommendation that all persons using this equipment are suitably trained before use.**

### 2.2. Symbols defined.



Caution, risk of danger. See note or adjacent symbol.



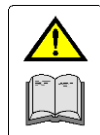
Recyclable Packing Material



Do not dispose of product in normal domestic waste.



Contains CR2032 button coin battery.  
***(To be disposed of according to regulations- not customer serviceable).***



Refer to this Instructions book.



Bio Chemical Hazard. Caution required. Will require decontamination.

### 3. SAFETY INFORMATION.

This product has been designed for safe operation when used as detailed in accordance with the Manufacturer's instructions.

**NOTE:** Failure to use this equipment in accordance with the manufactures operating instructions may compromise your basic safety protection afforded by the equipment and may invalidate the warranty / guarantee. The warranty / guarantee does not cover damaged caused by faulty installation or misuse of the equipment.

This equipment is classified as Class O (IEC519:part 2) with regard to over temperature protection and should be used accordingly.

#### 3.1. Prevention of Fire and Electric Shock.



Ensure the Mains Power Supply conforms to rating found on the data plate located on the underside of your IA melting point apparatus.



Do not attempt to gain access to the inside of the Power Supply. There are no serviceable parts inside.

#### 3.2. General Safe Operating Practice.



Always follow good laboratory practice when using this equipment. Give due recognition to your company's safety and legislative health & safety procedures and all associated legislation applicable to your areas of operation. Check laboratory procedures for substances being heated and ensure all hazards (e.g. explosion, implosion or the release of toxic or flammable gases) that might arise have been suitably addressed before proceeding. **(Consult your company practice).**



Ensure equipment is used on a clean, dry, non-combustible, solid work surface with at least 300mm suitable clearance all around from other equipment.



**Do not** position the **IA Melting Point Apparatus** so that it is difficult to connect / disconnect from the power cable assembly.



**Do not** position the **IA Melting Point Apparatus** so that it is difficult to connect / disconnect data and communication cables.



**Do not** immerse any part of this equipment in water / fluid.



It is **not** recommended to leave any heating apparatus unattended during operation.



Only use Original Equipment Manufacture's Parts and Accessories. Ref Section 11.



The equipment is not spark, flame or explosion proof and has not been designed for use in hazardous areas in terms of BSEN 60079-14:1997. Keep flammable, low flash point substances away from the apparatus.



**Do not** operate or handle any part of this product with wet hands.



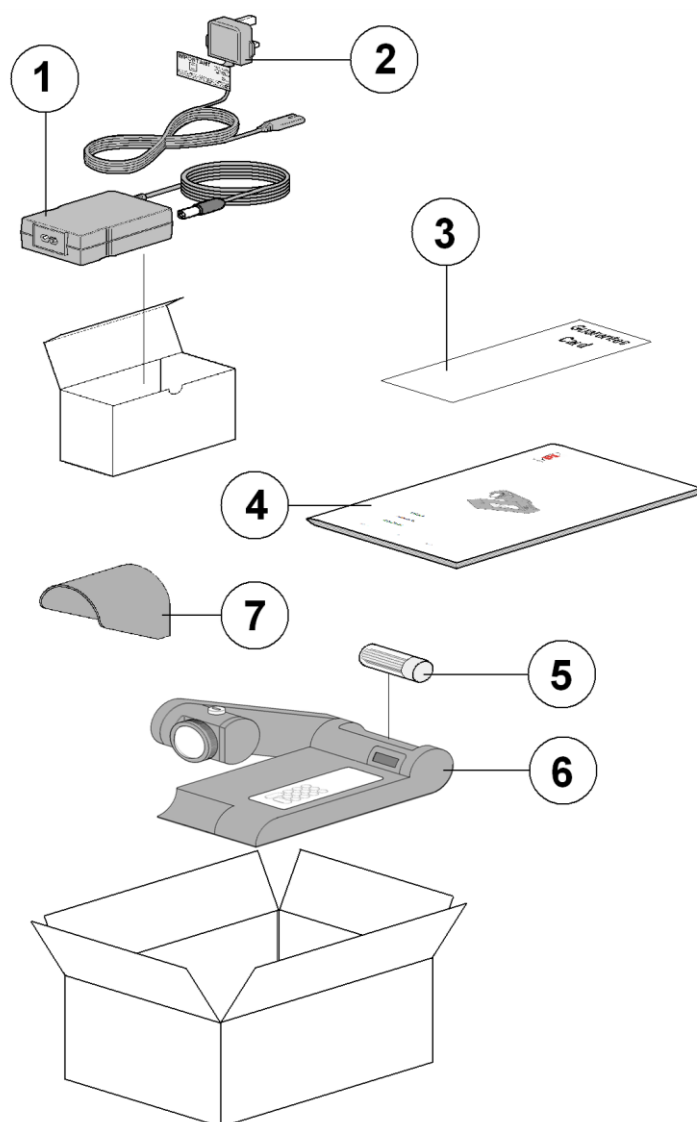
**Do not** lean or stretch over the unit when in operation.



**Do not** to look directly at the LED oven illumination light source while turned on.

## 4. UNPACK AND CONTENTS.

4.1. Please check the contents of your carton against the diagram.



Item	Description	Qty
1	Power supply	1
2	Power Supply mains lead (illustration only)	1
3	Guarantee card	1
4	Operating and safety Instructions book	1
5	Capillary tubes	1
6	IA Melting point product	1
7	Lens Hood	1

Note: Additional Packing material may be present.

<b>For your future reference please record your products Serial and Model numbers.</b>	<i>Unit Serial Number</i>	<i>Unit Model/Cat Number.</i>

## **5. INSTALLATION.**

### **5.1. Electrical Safety and Installation.**

5.1.1. This equipment is designed to safe under the following conditions:-

- Indoor use.
- Altitude up to 2000 meters.
- Temperatures between 5°C and 40°C.
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- Mains supply voltage fluctuations up to  $\pm 10\%$  of the nominal voltage.
- Transient overvoltage's typically present on the mains supply.
- Applicable rated pollution degree 2.

5.1.2. Check the voltage on the product data label on this product unit and those of any accompanying electrical accessory. Ensure the rating conforms to your local supply.



## 6. ENVIRONMENTAL PROTECTION.

- 6.1. Electrothermal has given due consideration to environmental issues within the design and manufacturing process of this product without compromising product performance and value.



- 6.2. Packaging materials have been selected such that they may be sorted for recycling.



- 6.3. At the end of your product and accessories life, it must not be discarded as domestic waste. Ref: EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment Directive (WEEE).

Please contact your distributor / supplier for further information. For end users outside of the EU consult applicable regulations. (\*)

- 6.4. This product should only be dismantled for recycling by an authorized recycling company.



***This product and accessories must be accompanied by a completed Decontamination Certificate prior to any disposal. Copies of the Certificate are available from your distributor of Electrothermal products, alternatively you may copy and enlarge from 'Appendix A' of this instruction book.***

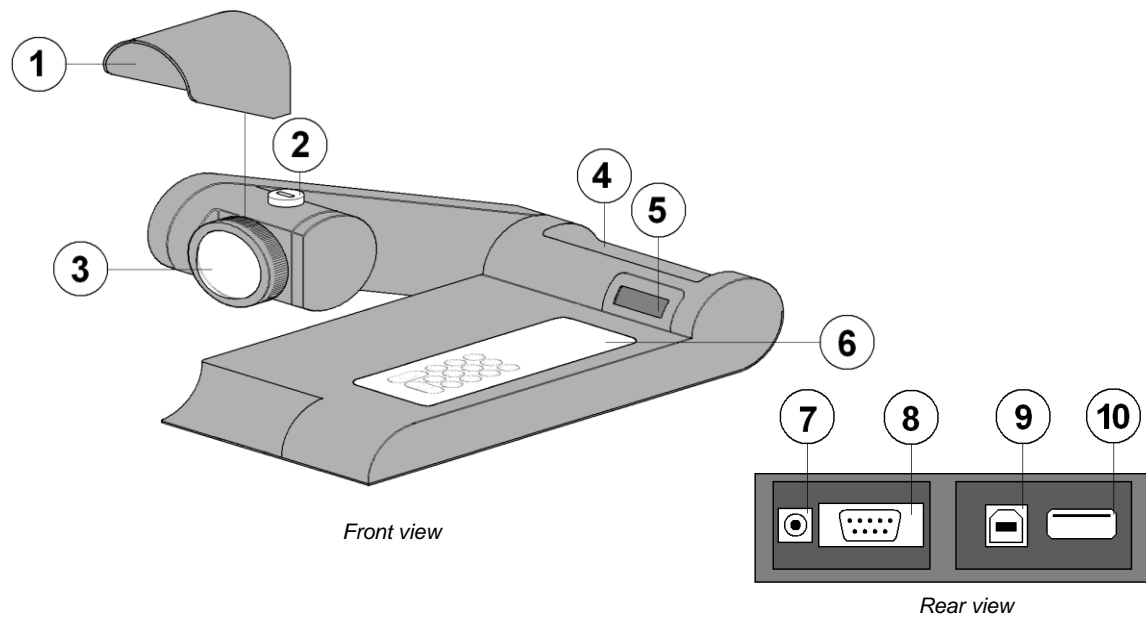
- 6.5. Battery Disposal.



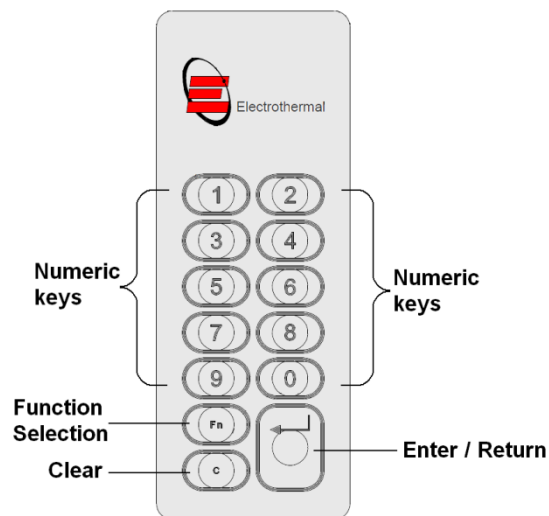
***This product contains a Lithium Cell button Battery (CR2032) on the control PCB located on the master control PCB. The battery must be disposed of in accordance with regulations. Do Not dispose of product in a fire as batteries may explode.***

## 7. PRODUCT OPERATION.

### 7.1. Overview.

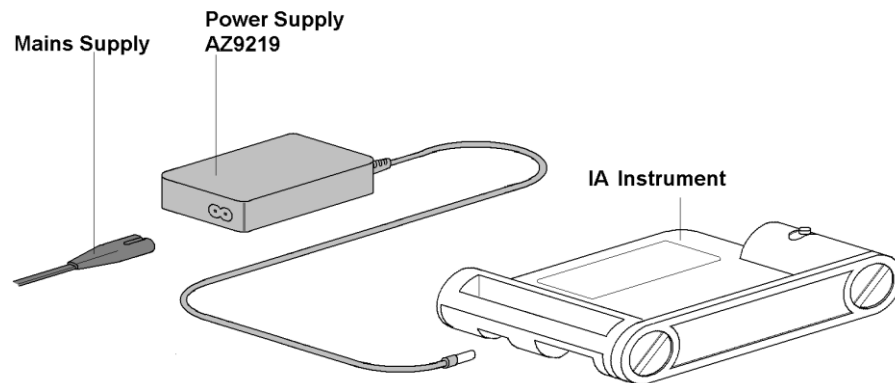


Number	Description
1	Lens hood
2	Capillary Guide
3	Lens
4	Capillary tube holder
5	2 x 12 digit display
6	Keypad
7	Power input
8	RS232 serial printer connection socket
9	USB socket type B (Slave)
10	USB socket type A (Master)

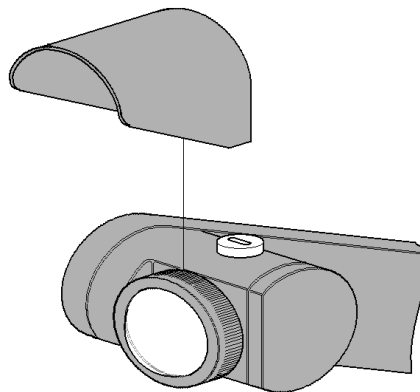


**Keypad layout**

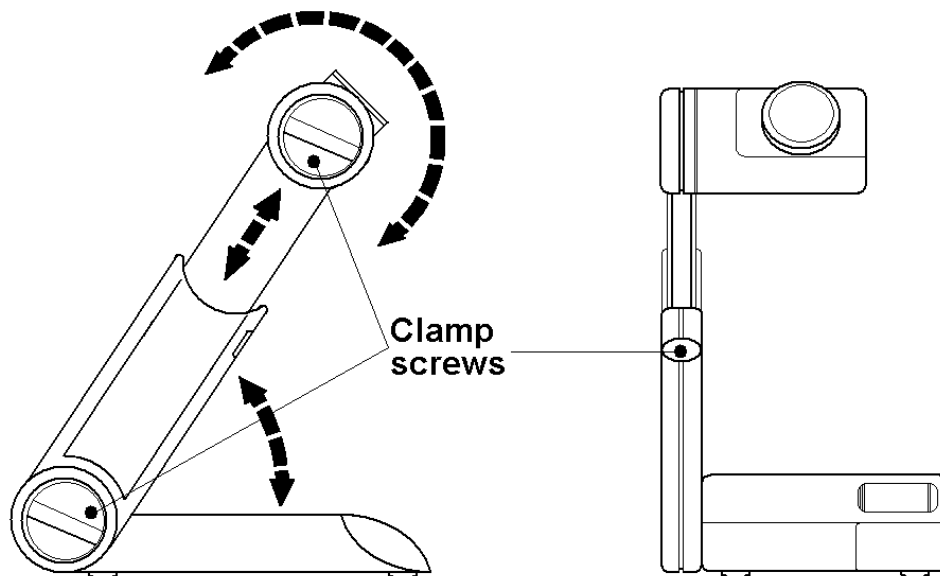
7.1.1. Connect the mains supply lead and power supply to your IA as illustrated.



7.1.2. The lense hood attachment is optional. Its purpose is to assist in viewing the sample when using the IA in direct light. Slide the lense hood over the threaded back section of the lense as illustrated.



7.1.3. Adjust the arm height and oven head angle to suit by loosening the clamp screws and adjusting as required. Retighten the clamp screws after making adjustments. Always loosen the clamp screws before making adjustments.

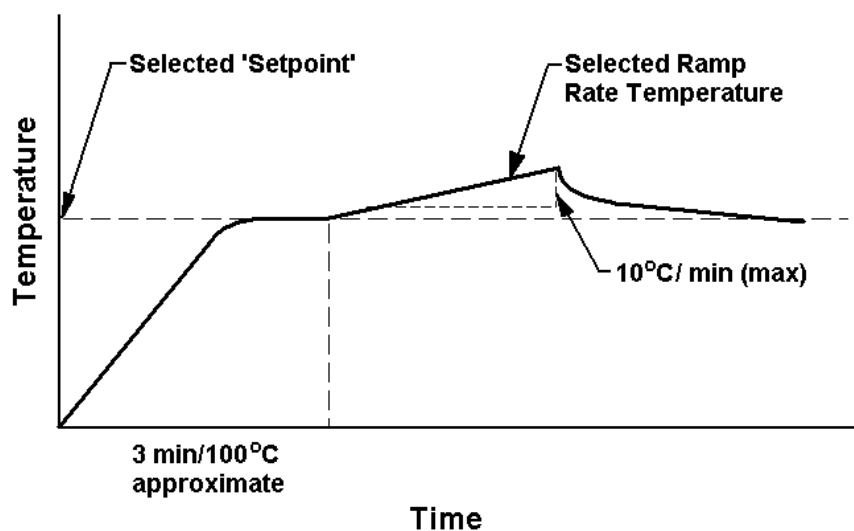


7.1.4. Turn on at the mains electrical supply and observe the IA goes through a warm up and self check routine which include a display of the Model type, the firmware issue release number. Once the clock and date have been set the 9200 and 9300 models will display the real time and date during the warm up procedure.

## 7.2. Principals of Operation.

7.2.1. During operation the various parameters of the sample analysis are shown on the liquid crystal display, and all the stages of the process are indicated by the L.E.D. illumination or audible warning. The principles of the operation are as follows:-

- Guided by knowledge of the expected melting temperatures of the sample, a 'Set Point' is established and its value keyed in.
- The oven temperature is driven to meet the 'Set Point' at maximum rate.
- After a short delay for the oven temperature to stabilize at the 'Set Point', the ramp is activated and the temperature now increases linearly at the much slower ramp rate, during which time the melt analysis takes place.
- The melting of the sample is observed and the temperatures registered via the keypad at the appropriate time.
- The temperatures (and for the IA9200 / IA9300 also the measuring parameters) are now available for review on the display (and for the IA9300 & 9200 a hard copy printed print out, output to USB flash drive or direct down load to a PC may be selected).
- The oven temperature may now be directed to a new 'Set Point' if required for the next analysis.



### 7.2.2. Preparation of Samples.

To obtain the best results, the samples under test / observation should be perfectly dry. Drying is best accomplished by storing the samples overnight in vacuum desiccators over a suitable drying agent such as phosphorus pent oxide. A drying method must be employed in the case of hygroscopic samples.

Provided the sample is dry there is usually little difficulty in introducing the small amount required into the capillary tube. Tapping the tube on the bench to compact the material at the base of the tube. It is important not to use too large a sample, a quantity occupying no more than 1-2 mm of the bottom of the tube should be used. If this is exceeded, accurate and sharp melting point may not be obtained. Care should be taken to see the sample beds down to the bottom of the tube, as large air pockets can cause difficulty.

### 7.2.3. Determination of Melting point.

In recording melting points, the operator may wish to observe four distinct phases:

- a) First signs of change (darkening, shriveling, sintering, etc). These changes may be due to loss of solvent or crystallization. Occasionally one can see the solvent condensing on the cooler portion of the tube.
- b) First signs of liquid formation.
- c) Formation of meniscus.
- d) Formation of a completely clear liquid.

Not all compounds will behave in this manner however. With many, especially where the material is in a high state of purity, no change may be seen before any liquid appears. Some materials will be seen to sublime, rather than melt above 300°C

Decomposition may often be accompanied by evolution of gas.

Pure compounds will be expected to pass through the 3 stages a) c) and d), within a range of 1°C.

### 7.2.4. Interpretation of Results.

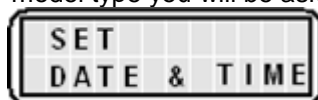
It is generally accepted the formation of a meniscus should be regarded as the figure to be recorded for a single temperature melting point. Where a range is quoted, it can generally be assumed reference is being made to stages b) to d) inclusive. The range will generally cover no more than 1°C for pure compounds, but may well extend to 3 or 4°C for others. The range will often be greater when decomposition or sublimation is experienced. When using the equipment to determine the melting point of more than one sample of the same compound at a time, the average of the meniscus temperature (onset of melt) should be taken.

### 7.3. Setting the Time and Date (9200 & 9300 models only).

Date and time settings may also be accessed via the (F3) function facility.

**Note:** The time clock has no daylight saving facility. You may wish to re-set the time when daylight saving takes place.

- 7.3.1. When either the IA9200 / IA9300 is plugged in and powered up for the first time the time and date may require setting. After the unit has displayed the firmware version and model type you will be asked to set the date and the time.



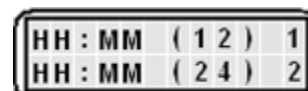
press the return key to take you to the setting functions.

- 7.3.2. You are now asked to select the date format. Select the required format by pressing either key 1 or key 2.



- 7.3.3. Enter the characters of the date for the format selected. For date selection 1 enter the following as an example. To enter 14<sup>th</sup> July 2010 press 071410. For date selection 2 enter the following using the same example. 140710.

- 7.3.4. You will now be prompted to select the date format of either 12 or 24 hour format. Press key 1 for 12 hour format or press key 2 for 24 hour format.



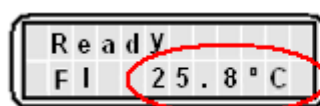
- 7.3.5. Enter the time characters for the time in your time zone as directed by the screen followed by the return key.

- 7.3.6. If you have selected the 12 hour time format you will now be asked to select whether your time is set in AM or PM mode. Select the prompt key 1 or 2 as applicable.

- 7.3.7. Your IA will return to the user screen.

### 7.4. IA9100 Operation.

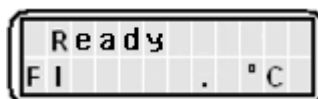
- 7.4.1. Connect the IA to the power supply. It will perform a self check while displaying the model and firmware version. The display will then turn to the Home screen which says 'Ready' and shows the IA ovens current temperature.



**Current  
Temperature**

- 7.4.2. F1 is the Home screen for setting temperatures and running the IA. Press 'Fn' key to enter the F2 screen. The F2 screen will display the details of the last performed melt sequence. To toggle between F1 home screen and F2 Melt recall screen press the 'Fn' key.

- 7.4.3. To commence melt setup and perform a melt sequence, ensure the unit is in the F1 home screen.



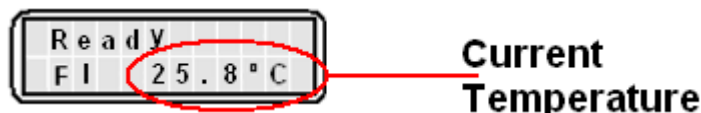
Press the return key.

- 7.4.4. You are now asked to 'Set the Temperature'. Use the key pad to enter the required set point temperature. Refer to paragraph 7.2.1 Principals of Operation. Once the desired set point temperature has been entered press the return key.
- 7.4.5. You are now asked to select your preferred ramp rate. Press 1 for 1.0°C/min or 2 for 10.0°C/min. Note:- The default ramp rate is set at 1.0°C/min.
- 7.4.6. You are now given the option to set the ceiling temperature. The ceiling temperature should only be set if it is critical to your sample so that it must not be heated above a certain temperature. The default is 400°C. If there is no requirement for setting a ceiling temperature press the return key. The IA oven will commence heating to the set point temperature.
- Note:** The last used ceiling setting will be remembered and recalled for subsequent melts. If the IA is powered down and then powered up again the default value of 400°C will be reinstated.
- Note:** The ceiling temperature cannot be set to less than 5°C of the set point temperature. If you attempt to make an illegal setting the IA will automatically default to 5°C above the set point temperature.
- 7.4.7. As the IA heats up to the set point temperature you will see asterisk appear across the low half of the display screen indicating the closeness of the oven temperature to the set point temperature. When the set point temperature has been reached the IA will beep three times. It is recommended the user allows a short time of a couple of minutes for the oven temperature to stabilize before commencing with the ramp heating.
- 7.4.8. Insert your chemical sample and allow the IA9100 and chemicals to stabilize once more. Press the return key to commence ramping.
- 7.4.9. When the first melt is observed press the return key. Up to four melts may be performed as described in Paragraph 7.2.3 'Determining melt'. Press the return key every time a melt is observed. If less than four melts are required press the 'Fn' to move out of melt record mode.
- 7.4.10. You are now asked if you wish to turn off the oven. Press key 1 for yes or key 2 for no. If you are going to perform subsequent melts then leave the oven on. It will reset back to the previous set point temperature.
- 7.4.11. **Reading the recorded melt data.** From the home screen press the 'Fn' key to enter F2 Melt recall screen. Press the return key to display the melt point data of the first date. Press the return key to display the temperature the second melt recorded and so on for the third and fourth melts. To exit the screen press 'Fn' to return to the Home screen.

**Note:** Only the last recorded batch may be viewed. Previous melt data will be overwritten.

## 7.5. IA9200 Operation.

- 7.5.1. Connect the IA to the power supply. It will perform a self check while displaying the model, date (see 7.3 for date and time setting or adjust from F3 screen if not already set) and firmware version. The display will then turn to the home screen which says 'Ready' and shows the IA ovens current temperature.



- 7.5.2. **Function key operation. (Fn).** The function key is used for scrolling through the sub menus of the 9200 model. Each time the Fn key is pressed the IA will enter the next sequential function screen. The main home screen is F1 from which settings are made and melts are performed. From F1 press the Fn key and the sub menu F2 'Stored data' appears. The F2 sub menu is used for recalling saved melt information together with selecting data output methods. From F2 press the Fn key to access F3 the sub menu the settings menu. Within the settings function the time clock can be access for making time and date setting and adjustments. If you press the Clear 'C' key from F2 or F3 will return you to F1 home screen.

### F1 Operational mode.

- 7.5.3. **Setting the IA9200 to perform a melt.** You are now asked to 'Set the Temperature'. Use the key pad to set the set point temperature. Refer to paragraph 7.2.1 Principals of Operation. Once the desired set point temperature has been entered press the return key.

- 7.5.4. You are now asked to set the ramp rate. The default is 0.2°C/min. To change the ramp rate use the keypad to enter the new ramp rate value. Press the return key to accept the default or accept the new ramp rate value.

**Note:** The last used ramp rate setting will be remembered and recalled for subsequent melts. If the IA is powered down and then powered up again the default value of 0.2°C/min will be reinstated.

- 7.5.5. You are now given the chance to enter a ceiling. The ceiling temperature should only be set if it is critical to your sample so that it must not be heated above a certain temperature. The default is 400°C. If there is no requirement for setting a ceiling temperature press the return key. The IA oven will commence heating to the set point temperature.

**Note:** The last used ceiling setting will be remembered and recalled for subsequent melts. If the IA is powered down and then powered up again the default value of 400°C will be reinstated.

**Note:** The ceiling temperature cannot be set to less than 5°C of the set point temperature. If you attempt to make an illegal setting the IA will automatically default to 5°C above the set point temperature.

- 7.5.6. As the Melt Point apparatus heats up to the set point temperature you will see asterisk appear across the low half of the display screen indicating the closeness to the set set point temperature. When the set point temperature has been reached the Melt Point apparatus will beep three times. It is recommended the user allows time for the oven temperature to stabilize before commencing with the ramp heating.



- 7.5.7. Insert your chemical sample and allow time for the oven to reheat back to the set point temperature. Press the return key to commence ramping. You will notice a moving icon indicating that the IA is in ramping condition.
- 7.5.8. When the first melt is observed press the return key. Up to four melts may be performed. See paragraph 7.2.3 'Determination of Melt point'. Press the return key every time a melt is observed. If less than four melts are required press the 'Fn' to move out of melt storage mode.
- 7.5.9. You are now asked if you wish to turn off the oven. Press key 1 for yes or key 2 for no. If you are going to perform subsequent melts then leave the oven on. It will reset back to the previously set plateau temperature.
- 7.5.10. You are now asked if you wish to store the melt data. Press 1 for yes or 2 for no. If the answer is yes you will be asked to enter a batch number. Select a batch number between 1 and 2000 and press the return key. After making store data decision you are taken to the recorded data option screen.
- 7.5.11. You are now asked if you wish to view the recorded melt data. Press 1 for yes or 2 for no. If you have selected yes. Press the return key to scroll through the data settings and recorded melt data. If you pressed no you are taken straight to the printing option screen.
- 7.5.12. You are now asked if you wish to print out the recorded data. Press 1 for yes or 2 for no. Ensure a printer is connected before selecting 1 for a print. (See printer set up paragraph 7.8).
- 7.5.13. You are now asked if you wish to output the data via a USB Pen drive. Press 1 for yes or 2 for no. If you press 1 for yes you are asked to insert a USB Pen drive. Your data will be uploaded to the Pen drive device. Data written to the Pen drive can be accessed on your PC using MS 'Notepad' or similar application. The file name is IAXxxx where xxxx is the batch number.
- 7.5.14. You are asked if you want to send the melt data direct to your PC. Press 1 for yes or 2 for no. Ensure your IA is connected to your PC using the USB slave socket. (See 7.1 over view illustration and item 9 USB socket type 'B' Slave). The IA is accessed via HyperTerminal on your PC. (See paragraph 7.9 HyperTerminal set up and access).
- 7.5.15. Finally you are asked if you wish to retain the settings. **(Only available if the oven has not been turned off)**. Press key 1 for yes or key 2 for no. This feature allows the user to return straight back to performing subsequent melt without the option of making adjustments to the melt profile. (Returned to paragraph 7.5.6). Use this facility when there are lots of melt to be performed and the previously set temperature, ramp rate and ceiling temperature are required for all. This facility cuts down on key entry and assists in speeding up the melt through put. When 1 is selected the IA will return to the plateau temperature. The 4 asterisk will appear on the display as an indication of the closeness to temperature plateau. When the IA beeps and four asterisks are displayed press the return key to commence ramping. By pressing the 2 = no key the user is taken back to the F1 home screen where upon melt profile adjustment can be made.

## **F2 Reviewing and Outputting Stored data.**

7.5.16. From the F1 home screen press the 'Fn' key to enter F2 Stored data screen. Press the return key to accept access.

7.5.17. Enter the batch number using the keypad. Press the keypad return key.

7.5.18. The IA now says Display. This allows both settings and melt data to be viewed on the display. Press 1 for yes or 2 for no. If 1 = yes is selected you will see the following information. Press the return key to view the next field.

- Date and first melt recorded time.
- The set Ramp rate.
- M1 melt temperature.
- M2 melt temperature (assuming it was recorded).
- M3 melt temperature (assuming it was recorded).
- M4 melt temperature (assuming it was recorded).

To exit view melt data without viewing all the stored data press the 'Fn' to sequence into the printing option.

To exit viewing the melt data and return to F2 screen in order to view another stored batch press the 'C' key.

7.5.19. You are now asked if you wish to print out the recorded data. Press 1 for yes or 2 for no. Ensure a printer is connected before selecting 1 for a print.

7.5.20. You are now asked if you wish to output the data via a USB Pendrive. Press 1 for yes or 2 for no. If you press 1 for yes you are asked to insert a USB flash drive. Your data will be uploaded to the flash drive. It can be read on your PC using 'Notepad'.

7.5.21. You are asked if you want to send the melt data direct to your PC. Press 1 for yes or 2 for no. Ensure your IA is connected to your PC using the slave socket.

7.5.22. You are asked if you wish to delete stored data. Press 1 for yes or 2 for no. You are now returned to the F1 home screen.

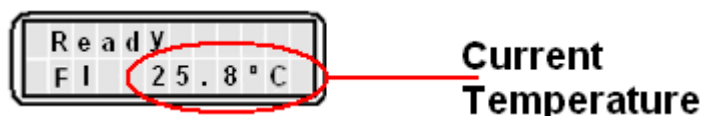
## **F3 Setup Mode.**

7.5.23. From the F1 home screen press the 'Fn' key twice to enter F3 setup mode screen. Press the return key to accept access.

7.5.24. Time and date settings and adjustments are made here. See section 7.4.

## 7.6. IA9300 Operation.

- 7.6.1. Connect the IA to the power supply. It will perform a self check while displaying the model, date and firmware version. The display will then turn to the home screen which says 'Ready' and shows the IA oven's current temperature.



- 7.6.2. **Function key operation. (Fn).** The function key is used for scrolling through the sub menus of the 9300 model. Each time the Fn key is pressed the IA will enter the next sequential function screen. The main home screen is F1 from which settings are made and melts are performed. From F1 press the Fn key and the sub menu F2 'Stored data' appears. The F2 sub menu is used for recalling saved melt information together with selecting data output methods. From F2 press the Fn key to access F3 the sub menu the settings menu. Within the settings function the time clock can be access for making time and date setting and adjustments. Pressing the Clear 'C' key from F2 or F3 will return you to F1 home screen.

### F1 Operational mode.

- 7.6.3. **Setting the IA9300 to perform a melt.** You are now asked to 'Set the Temperature'. Use the key pad to set the plateau temperature. Refer to paragraph 7.2.1 Principals of Operation. Once the desired set temperature has been entered press the return key.

- 7.6.4. You are now asked to set the ramp rate. The default is 1.0°C/min. To change the ramp rate use the keypad to enter the new ramp rate value. Press the return key to accept the default or accept the new ramp rate value.

**Note:** The last used ramp rate setting will be remembered and recalled for subsequent melts. If the IA is powered down and then powered up again the default value of 1.0°C/min will be reinstated.

- 7.6.5. You are now given the chance to enter a ceiling. The ceiling temperature should only be set if it is critical to your sample so that it must not be heated to above a certain temperature. The default is 400°C. If there is no requirement for setting a ceiling temperature press the return key. The IA oven will commence heating to the set point temperature.

**Note:** The last used ceiling setting will be remembered and recalled for subsequent melts. If the IA is powered down and then powered up again the default value of 400°C will be reinstated.

**Note:** The ceiling temperature cannot be set to less than 5°C of the set point temperature. If you attempt to make an illegal setting the IA will automatically default to 5°C above the set point temperature.

- 7.6.6. As the IA heats up to the plateau temperature you will see four asterisk appear across the low half of the display screen indicating the closeness of temperature to the set point temperature. When the set point temperature has been reached the IA will beep three times. It is recommended the user allows time for the oven temperature to stabilize before commencing with the ramp heating.

- 7.6.7. Insert your chemical sample and allow time for the oven to re-stabilize. Press the return key to commence ramping.
- 7.6.8. When the first melt is observed press the return key to register the melt. Then to identify the oven position press either 1 for left, 2 for central or 3 for the right hand oven position. Two melts may be recorded for each oven position. You will observe a figure M1 appearing next to selected oven position indicating that a melt has been saved to that oven position. A figure M12 will indicate a second melt has been saved against the selected oven position. In addition a red LED indicating the saved melt oven position can be observed through the viewing lens. See paragraph 7.2.3 'Determination of Melt point'. Press the return key every time a melt is observed. When sufficient melts have been recorded, press the 'Fn' to move out of melt storage mode.
- 7.6.9. You are now asked if you wish to turn off the oven. Press key 1 for yes or key 2 for no. If you are going to perform subsequent melts then leave the oven on. It will reset back to the previously set plateau temperature.
- 7.6.10. You are now asked if you wish to store the melt data. Press 1 for yes or 2 for no. If the answer is yes you will be asked to enter a batch number. Select a batch number between 1 and 500 and press the return key. After making a stored data decision you are taken to the recorded data option screen.
- 7.6.11. You are now asked if you wish to view the recorded melt data. Press 1 for yes or 2 for no. If you have selected yes, press the return key to scroll through the data settings and recorded melt data. If you pressed 'no' you are taken straight to the printing option screen.
- 7.6.12. You are now asked if you wish to print out the recorded data. Press 1 for yes or 2 for no. Ensure a printer is connected before selecting 1 for a print.
- 7.6.13. You are now asked if you wish to output the data via a USB Pen drive. Press 1 for yes or 2 for no. If you press 1 for yes you are asked to insert a USB Pen drive. Your data will be uploaded to the Pen drive device. Data written to the Pen drive can be accessed on your PC using MS 'Notepad'.
- 7.6.14. You are asked if you want to send the melt data direct to your PC. Press 1 for yes or 2 for no. Ensure your IA is connected to your PC using the USB slave socket.
- 7.6.15. Finally you are asked if you wish to retain the settings. **(Only available if the oven has not been turned off)**. Press key 1 for yes or key 2 for no. This feature allows the user to return straight back to performing subsequent melt without the option of making adjustments to the melt profile. (Returned to paragraph 7.6.6). Use this facility when there are lots of melt to be performed and the previously set temperature, ramp rate and ceiling temperature are required for all. This facility cuts down on key entry and assists in speeding up the melt through put. When 1 is selected the IA will return to the plateau temperature. The 4 asterisk will appear on the display as an indication of the closeness to temperature plateau. When the IA beeps and four asterisks are displayed press the return key to commence ramping. By pressing the 2 = no key the user is taken back to the F1 home screen where upon melt profile adjustment can be made.

## **F2 reviewing stored data.**

7.6.16. From the F1 home screen press the 'Fn' key to enter F2 Stored data screen. Press the return key to accept access.

7.6.17. You are now asked to enter the batch number. Use the keypad to enter the numerical location number. Press the keypad return key.

7.6.18. You will now see the following information. Press the return key to view the next field.

- Date and first melt recorded time.
- The set Ramp rate.
- Melt temp 1.1 Red LED visible through the lens in the left hand position
- Melt temp 1.2 (assuming it was recorded). Red LED visible through the lens in the left hand position
- Melt temp 2.1 (assuming it was recorded). Red LED visible through the lens in the center position
- Melt temp 2.2 (assuming it was recorded). Red LED visible through the lens in the center position.
- Melt temp 3.1 (assuming it was recorded). Red LED visible through the lens in the right hand position
- Melt temp 3.2 (assuming it was recorded). Red LED visible through the lens in the right hand position

To exit viewing melt data without viewing all the stored data press the 'Fn' to sequence into the printing option.

To exit viewing the melt data and return to F2 screen in order to view another stored batch press the 'C' key.

7.6.19. You are now asked if you wish to print out the recorded data. Press 1 for yes or 2 for no. Ensure a printer is connected before selecting 1 for a print.

7.6.20. You are now asked if you which to output the data via a USB Pendrive. Press 1 for yes or 2 for no. If you press 1 for yes you are asked to insert a USB flash drive. Your data will be uploaded to the flash drive. It can be read on your PC using 'Notepad'.

7.6.21. You are asked if you want to send the melt data direct to your PC. Press 1 for yes or 2 for no. Ensure your IA is connected to your PC using the slave socket

7.6.22. You are asked if you wish to delete stored data. Press 1 for yes or 2 for no. You are now returned to the F1 home screen.

### F3 Setup Mode.

7.6.23. From the F1 home screen press the 'Fn' key twice to enter F3 setup mode screen. Press the return key to accept access.

7.6.24. Time and date settings and adjustments are made here. See section 7.4.

## 7.7. Calibration Procedure

For equipment calibration purposes and to minimize variation between repeat measurements all calibrations should be taken using 2mm diameter capillary tubes.

**Calibration should be carried out annually, or whenever the performance of the apparatus is suspected e.g. when similar successive test produce variable differences.** The apparatus must either be returned to the dealer/manufacturer for calibration, or calibration must be carried out in the following manner, using Calibration key AZ9253 and CRM chemicals P-nitro toluene (AZ9218) and Carbazole (AZ9118).

7.7.1. Switch the unit on and ensure the I.A. has settled into a constant state

7.7.2. Perform a melt (see section appropriate to your IA model) with each of the standard chemicals and note the readings.

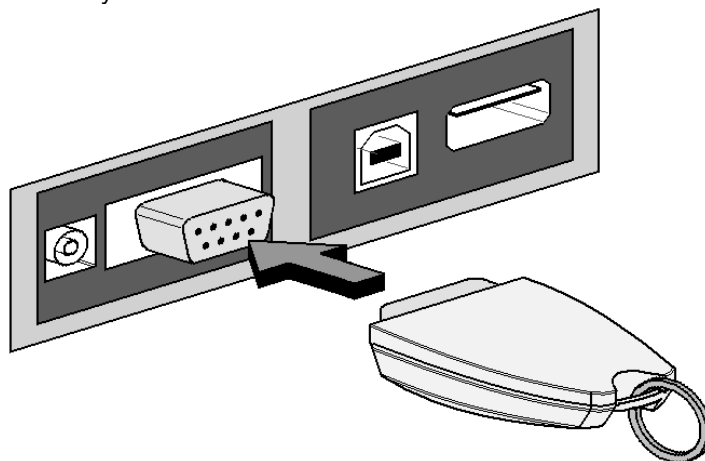
7.7.3. Compare the results obtained with the melting points shown on the certificates supplied with each chemical and ascertain whether the unit performs within acceptable limits.

**If it is decided that re-calibration is required proceed as follows:-**

7.7.4. Switch off the unit and allow it to cool sufficient for the oven temperature to be below that of the first melt chemical set point.

7.7.5. When the unit is cool switch it back on and allow it to perform the start up routine. Observe the ambient temperature for the oven is less than 50°C.

7.7.6. Insert calibration key into the RS232 socket located on the rear of the IA.



CALIBRATION  
MODE

7.7.7. Observe the display screen says . Press the return key to accept entry into the calibration mode.

LOW TEMP  
SET SAMPLE

7.7.8. The display screen will now say . If you are using P-nitro toluene (AZ9218), use the keypad to enter a value of 48°C.

7.7.9. Press the return key to accept the selected temperature. The IA will commence ramping at a rate of 1.0°C/minute.

7.7.10. Observe when the full chemical melt using P-nitro toluene occurs and press the return key to record the melt temperature.

ENTER CHEM  
CERT VALUE

7.7.11. The display will now say . The certified chemical melt value is found on the certificate supplied with the P-nitro toluene. Enter the chemical reference value using the numeric keypad. Press the return key to accept the entered value.

HIGH TEMP  
SET SAMPLE

7.7.12. You are now asked to set the High Temperature . Enter a set point value of 242.0°C for Carbazole. Press the return key.

7.7.13. The IA will start to ramp up the temperature at a rate of 1.0°C/minute.

7.7.14. Observe the onset of melt and press the return key to record the value.

7.7.15. The display will now ask for the certified chemical melt value to be entered.

ENTER CHEM  
CERT VALUE

. Enter the chemical reference value using the numeric keypad. Press the return key to accept the entered value.

7.7.16. A preprogrammed algorithm will now calculate the PID curve for all melt values.

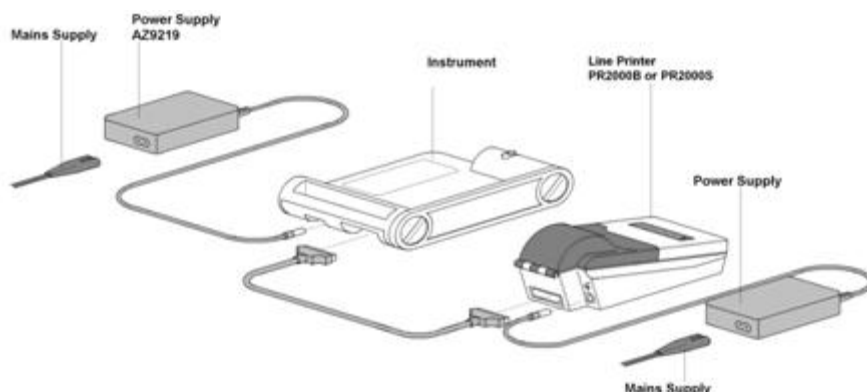
CAL COMPLETE  
REMOVE KEY

When that has been done the display will say .

7.7.17. Remove the calibration key and powerdown the IA. It may now be powered back up again ready for use. Calibration settings will now take effect.

## 7.8. Printer setu-up.

PR2000S. Model printer is set as follows:.



The PR2000S serial printer is set up for compatibility with the IA. The Baud rate on the PR2000S printer is factory set at 9600.

If using a printer that has been used from a previous model of IA the baud rate must be changed to 9600.

To make local settings on the printer the printer must be put in 'program mode'.

Press the '□' and the '1' button simultaneously. The printer will now enter 'PROGRAMMER MODE'.

The following text will be printed. "DATA/PAR'Y:- 8/NONE"

Press the 'PAPER' feed button.

The following text will be printed. "Xon/Xoff:- ON"

Press the 'PAPER' feed button.

The following text will be printed. "BAUD RATE:- 9600"

Press the '□' and 'PAPER' feed buttons simultaneously.

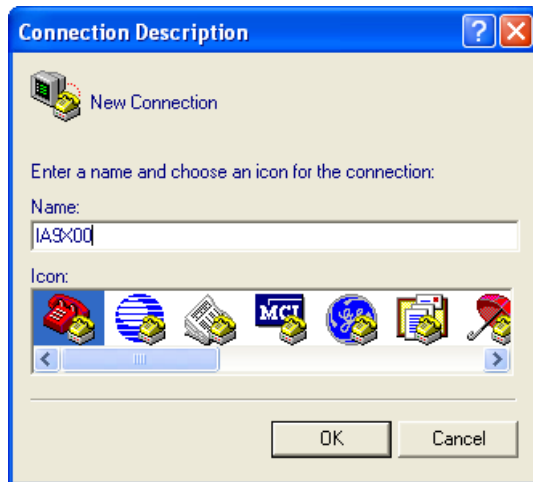
The PR2000S will produce a print of the stored settings which will be as follows:

SETUP COMPLETE	:-	
Data/Par'y	:-	8/NONE
Xon/Xoff	:-	On
Baud rate	:-	9600
Country	:-	UK
Print mode	:-	Text
Auto-off	:-	5 min
Emulation	:-	Standard
DTR	:-	Normal
Interface	:-	Serial
Mechanism	:-	M190

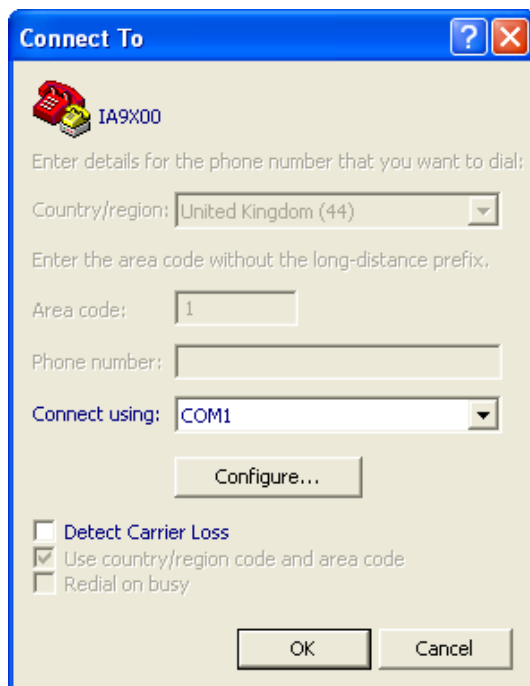


## 7.9. PC connection and Hyperterminal use.

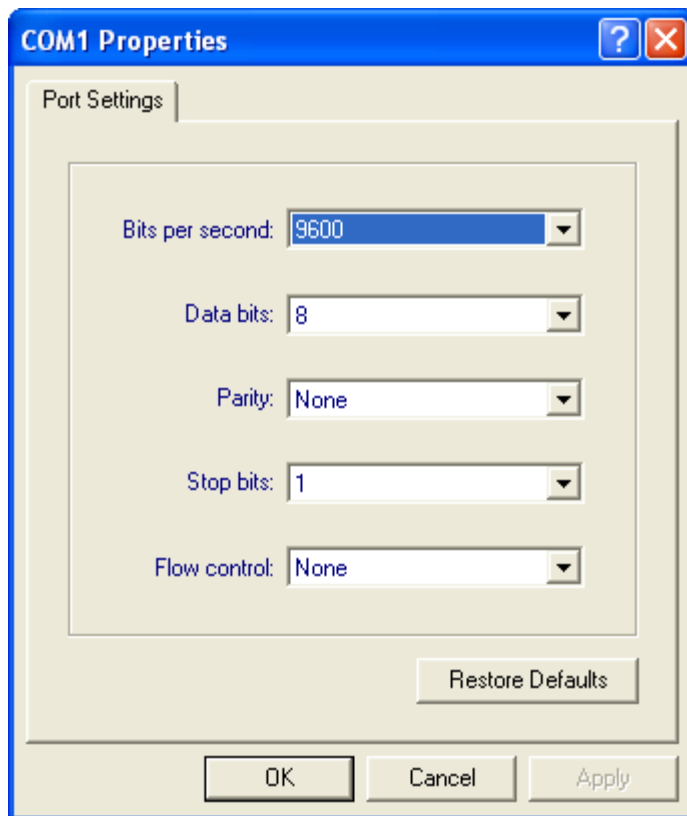
From the Window's 'Start' button, select Programs/Accessories/communications/hyperterminal.



Enter name for connection (example IA9x00). Select the phone icon and click OK



From the pull down menu select the port number applicable to your PC for the USB terminal in use.



Make sure the port settings are as detailed below.

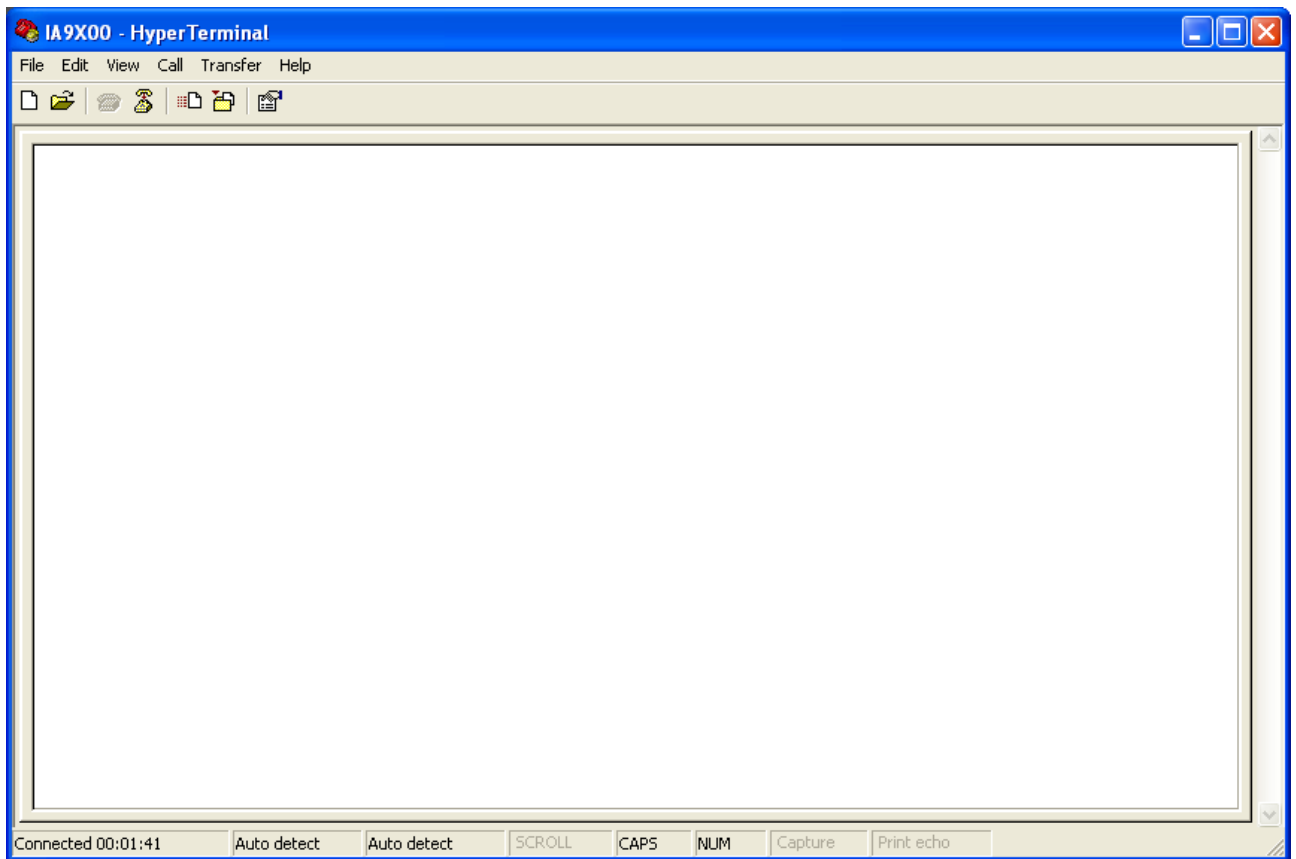
Baud rate = 9600

Data bits = 8

Parity = None

Stop bits = 1

Flow control = None



Your print data will be shown in window.

Any serial terminal emulator with USB support can be used. An example of which is given below.

If your PC doesn't have hyperterminal per installed a copy may be obtained from

<http://www.hilgraeve.com/hyperterminal/>

## 8. TECHNICAL SPECIFICATION.

### 8.1. The specified data for each instrument is shown in the table below.

	IA9100	IA9200	IA9300
32- bit processor.	•	•	•
3 capillary Tubes up 2mm OD (storage for pack 100).	•	•	•
Tube guide removal for cleaning and use of cold finger	•	•	•
40mm dia lens (magnification x 8) removable and with ajustable focus.	•	•	•
13 – key membrane keypad	•	•	•
Sample presevation ceiling temperature selection	•	•	•
White 3 x Super Flux LED's	•	•	•
Selectable ramp rate of 1.0°C/min and 10.0°C/min	•		
Ramp rate Selectable with a 1.0°C/min default setting ranging from 0.2°C/min to 10°C/min.		•	•
Date and time facility		•	•
PC output facility		•	•
Printer output facility		•	•
USB output to Pen key.		•	•
4 x 1 Melt memory capacity	•	•	
3 x 2 Melt memory capacity			•
Batch memory capacity of 500 melts			•
Batch memory capacity of 2000 melts		•	
Serial printer connection facility		•	•
Pack of 50 capillary tubes	•	•	•

### 8.2. General specification.

#### Electrical specification

Oven wattage	17W
Total power consumption	42W
Oven control	Closed loop P.I.D.
Oven illumination	3 x white Super Flux LED's
Illuminous Intensity (per LED)	3500 Lux
Oven operating temperature range.	Ambent +5°C to 400°C

#### Power supply PSU

When ordering a replacement PSU, always quote the IA9000 instrument's serial number.

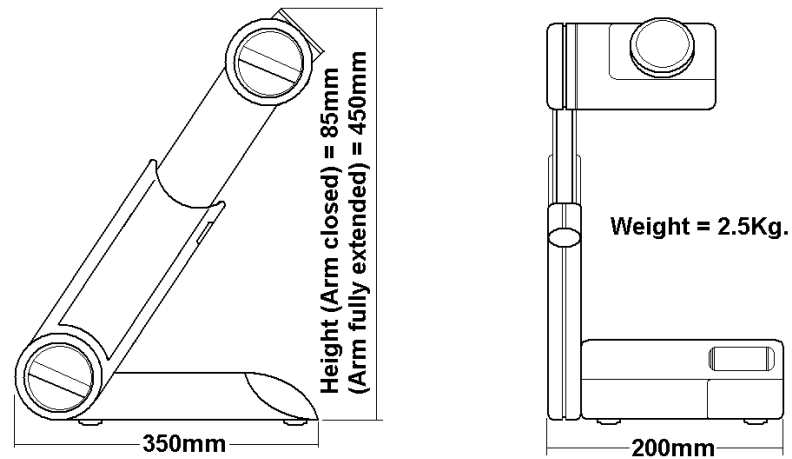
Input voltage	100 – 240V~50.60Hz.
Output voltage	15V DC with max load drawing 3.77 Amps.

#### General specification

Temperature display range	1°C to 405°C
Display resolution	0.1°C
Accuracy	± 0.5°C @ 20°C linerly to ± 1.0°C @ 350°C
Ramp rate	From 0.2°C/min to 10°C/min settable in

Ceiling temperature setting	increments of 0.1°/min (Not 9100)
Time and date	From 5°C above set temperature to 405°C in increments of 1°C
Display	Settable with date display as MMDDYY or DDMMYY. Time selectable in 12 or 24 hour format. (Not 9100)
Control Sensor	12 x 2 backlit matrix LCD
	Platinum Resistance Probe (PT100).

### 8.3. Weights and Dimensions.



## 9. Maintenance.

### 9.1. General Information.



Unplug the unit from the Power supply and allow it to cool before undertaking any maintenance tasks.



Maintenance should only be carried out under the direction of the Responsible Body, by a competent electrician. Failure to do so may result in damage to the product and in extreme cases be a danger to the end user.

Preventive maintenance for the equipment should include keeping the unit clean and protecting it from spillage, contamination or corrosive environments.

### 9.2. Spillage Procedure.

In case of solution spillage, turn off the IA. For spillage wipe off the solution using a water dampened cloth and dry thoroughly before further use.

**Ensure the unit is dry before further use. The Responsible Body shall check the electrical safety of the unit. Only if all safety requirements are met can the unit be used again. The above procedure is intended as a guide. Should spillage occur with a toxic or hazardous fluid then special precautions may be necessary.**

Observe special precautions for handling contaminated substances see Section 9.3

### 9.3. Decontamination.



**If the equipment has been exposed to toxic, radiological or biological contamination, the Responsible Body is responsible for carrying out appropriate decontamination. If hazardous material has been spilt on or inside the equipment, decontamination should only be undertaken under the control of the Responsible Body with due recognition of possible hazards. Before using any cleaning or decontamination method, the Responsible Body should check with the manufacturer the proposed method will not damage the equipment.**

#### **Decontamination Certificate.**

**Note:** In the event of any part of this unit becoming damaged, the damaged item(s) should be returned to the manufacturer for repair accompanied by a decontamination certificate. **Copies of the Certificate are available from Distributor/Manufacturer. Appendix A of this Instructions book may be copied and enlarged. At the end of life this product must be accompanied with a Decontamination Certificate.**



**This product contains fiber's consisting of the following elements. Avoid disassembly of the oven.**

Component (%)  
Alkaline Earth Silicate (HT mineral wool) 50 - 70  
Alkaline Earth Silicate (Talc) 10 - 40  
Inorganic Binder 5 - 10  
Organic Binder 2 – 5

These products are insulating fiber boards, forms and shapes having either rigid or flexible structure

### **MAY IRRITATE EYES, SKIN AND RESPIRATORY TRACT**

Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease may be aggravated by exposure. Individuals who are atopic (with history of allergies) may experience greater amounts of skin and respiratory irritation.

### **Toxicology**

The fiber used in these products has been the subject of limited testing. The fiber chemistry is within the regulatory (European Commission Directive 97/69/EC)

definition as a "man-made" vitreous (silicate) fiber with random orientation with alkaline oxide and alkaline earth oxide (Na<sub>2</sub>O, K<sub>2</sub>O, CaO, MgO, BaO) content greater than 18% by weight.

The fiber has been tested pursuant to EU protocol ECB/TM/27 Rev 7 Note Q Directive 97/69/EC. The results were below regulatory thresholds hence the products are no longer subject to EU classification and there is no EU labeling requirement regarding respiratory disease potential.

### **Epidemiology**

These products have not been the subject of epidemiological study. Epidemiological studies related to other products containing other fiber chemistries of similar solubility have not identified a statistically significant incidence of exposure related respiratory disease.

### **Classification and labeling**

Because of its high content of alkali earth oxide and because of the toxicological properties of the fiber used in these products, it is not classified as a carcinogen under Directive 97/69/CE. Further toxicological investigations are being carried out to confirm this position. It is not irritating to skin according to the test method B4 in Annex 5 of Directive 67/548/EC. Consequently VecoBoard MSF1260C, VecoForm MSF1260C and Vecoflex MSF1260C products do not require hazard warning labels.

The information presented herein is based on data considered to be accurate as of the date of preparation of this statement. However, no warranty or representation express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by the vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

For further information contact Electrothermal, (See Customer support) or your distributor.

## **10. CUSTOMER SUPPORT.**

For help and support in using this product, please contact Electrothermal at the following address.

Electrothermal.  
Electrothermal House.  
Unit12A, Purdeys Way.  
Purdeys Industrial Estate.  
Rochford,  
Essex. SS4 1ND  
Great Britain.

Tel +44(0)1702 303350  
Fax+44(0)1702 468731  
E-Mail: [info@electrothermal.com](mailto:info@electrothermal.com)



## 11. SPARES AND ACCESSORIES.

Table 3. Accessories

AZ9001	Cold Finger
AZ9002	Dust Cover
AZ9218	P-nitro toluene
AZ9118	Carbazole
AZ9253	Calibration key
AZ6731	Interface cable for alternative Serial Drive Printer.
AZ6733	Interface cable for Printer (PR2000)
AT4042	Capillary Tubes 1.5mm (10x100 packs).
AT4043	Capillary Tubes 2.0mm (10x100 packs).
PR2000	Printer (with connecting ribbon cable)
AT4044	Paper Roll (2) and ribbon for printer.
AZ9220	1A PSU Mains lead (UK)
AZ9220X1	1A PSU Mains Lead (115V – USA).
AZ9220X6	1A PSU mains Lead (European ).
AZ9219	PSU 100 -240V~ 50/60Hz.

**APPENDIX 'A'. DECONTAMINATION CERTIFICATE.**

**Electrothermal.** Electrothermal House. Unit12A, Purdeys Way. Purdeys Industrial Estate. Rochford. Essex. SS4 1ND. Great Britain

**Phone:+44(0)1702 303350 Fax:+44(0)1702 468731. E-mail: info@electrothermal.com**

**DECONTAMINATION CLEARANCE CERTIFICATE**

**For the Inspection, Repair or Return of Medical, Laboratory or Industrial Equipment.**

Prior to a Service Engineer working on equipment that has been in an environment where substances hazardous to health may have been used, you are requested to provide the following information:

**CUSTOMER DETAILS**

Company:-

Address:-

Department:-

Contact Name:-

Tel No:-

Fax No:-

Post Code:-

**Product Description**

Model No:-

Serial No:-

**Has the equipment been exposed to any of the following, Please answer all questions by deleting YES/NO as applicable and by providing details in section 2 below.**

A. Blood, body fluids, Pathological Specimens.

YES/NO

Provide details if YES

B. Biodegradable material that could become a hazard.

YES/NO

Provide details if YES

C. Other biohazard.

YES/NO

Provide details if YES

D. Chemical or substances hazardous to Health.

YES/NO

Provide details if YES

E. Radioactive substances State name(s) and quantities of isotopes and checks made for residual activity.

YES/NO

Provide details if YES

F. Other hazards.

YES/NO

Provide details if YES

2. Please provide details of any hazard present as indicated above. Include details of names and quantities of agents as appropriate:-

3. Your method of decontamination (please describe):-

4. Are there likely to be any areas of residual contamination. (Please specify).

**I declare that the above information is true and complete to the best of my knowledge and belief.**

Authorized signature:-

Name (please print):-

Title/Position:-

For and behalf of:-

Date:-

## 12. NOTES

### 13. EC DECLARATION OF CONFORMITY

CE marked products and associated accessories covered by this Instruction book conform to the essential requirements of the following directives:

EMC Directive.

Low Voltage Directive.

A full copy of the EC Declaration / Conformity document can be obtained from the manufacture at the email address [info@electrothermal.com](mailto:info@electrothermal.com)



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Toll free:800-225-9243Tel: 609-589-2560  
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Http [www.techneusa.com](http://www.techneusa.com)

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