User Guide SPECTRONIC 200

VISIBLE SPECTROPHOTOMETER

Thermo
SCIENTIFIC

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Chapter 1 Preface

Introduction

This manual is a guide for operating and troubleshooting the SPECTRONIC 200. To get the most out of the manual, read all the chapters carefully and follow the procedures as closely as possible.

Overview

SPECTRONIC 200 has a complete on-board control set and may also be controlled from a remote computer using Thermo Scientific piQue™ software. The eight key soft touch keypad and a 320X240 pixel graphical LCD display give the user full control over all functions of the instrument. 1nm resolution over the wavelength range 340 nm to 1000 nm and optimized data integration times for each region of the spectrum give accurate, stable and highly repeatable readings.

Features

Some of the features of the SPECTRONIC 200 spectrophotometer are:

- CCD polychromator based spectrophotometer
- Large, easily accessible sample compartment
- Removable sample compartment for easy cleaning
- Adjustable display angle
- 320x240 pixel color graphical TFT LCD display
- PCL 5E and PCL 6 printer compatibility
- Instrument can be stored on a shelf in a vertical position
- No moving parts to wear out or go out of alignment
- Convenient sample holders for cuvettes and test tubes
- Built-in cuvette rack wells

Technical Specifications

- Spectral Bandwidth : ≤ 4 nm
- Light Source : Tungsten-halogen lamp
- Detector : CCD
- Scan Ordinate Modes : %T, Abs
- Wavelength range : 340-1000nm
- Monochromator : 600 lines/mm holographic grating
- Wavelength readability : 1 nm
- Wavelength Accuracy : ±2nm
- Wavelength reproducibility : ± 1 nm
- Stray light : < 0.2 %T at 400 nm.
- Photometric range
  - Absorbance : -0.1 to 2.5 Abs.
  - % Transmittance : -0.1 to 100 %T.
- Photometric Accuracy : ±0.01Abs (±1%T) at 1A@590nm SPECTRONIC standard filter
- Display : Backlit color LCD display

Informational Symbols Used In the Manual

The symbol indicates a warning pertaining to possible safety hazard or instrument damage.

This symbol indicates that some important information is given and can be noted down

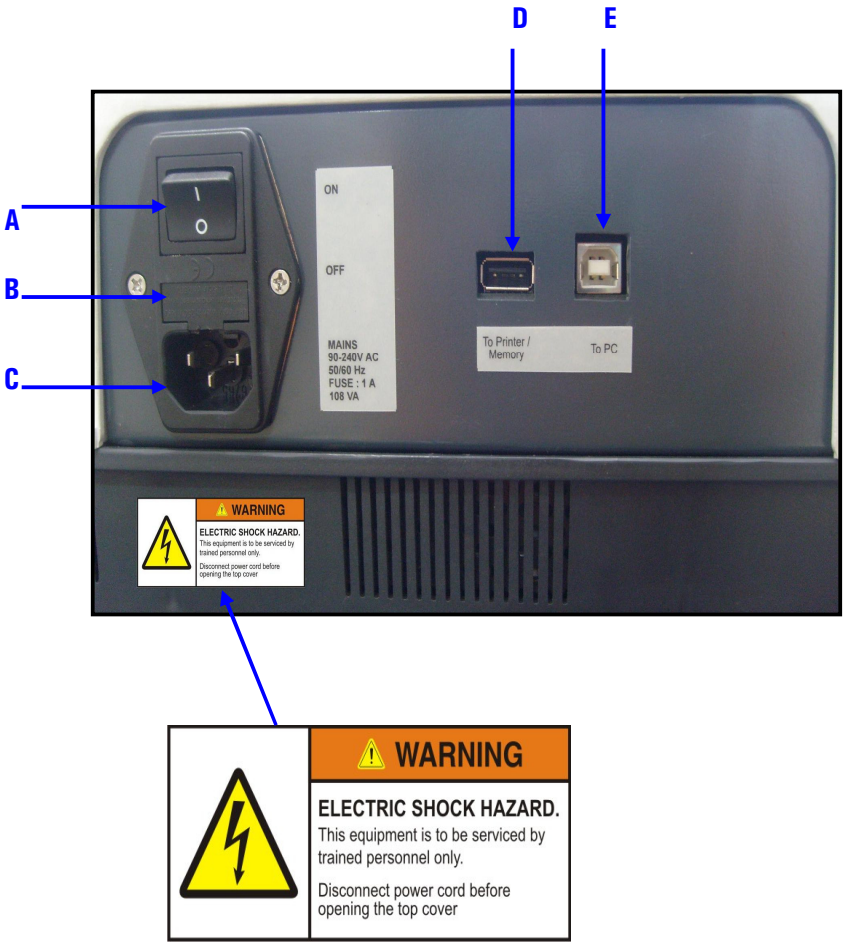


Figure 1.1

A = Power Switch
B = Fuse
C = Power cable socket
D = Printer port/Memory port
E = USB communication port

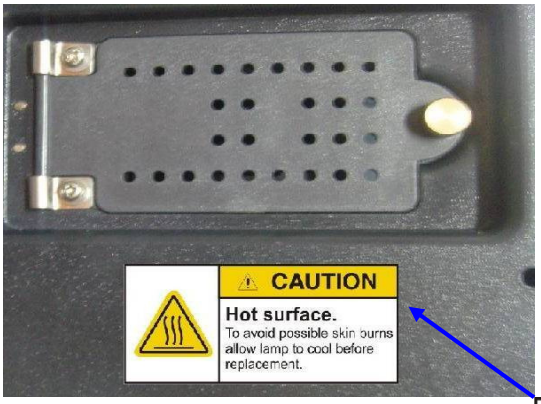
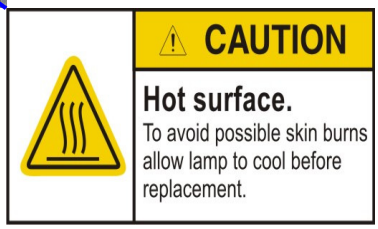


Figure 1.2



Precautions for Safe Operation

To operate the unit safely, strictly observe the following precautions.

- Do not use the unit for any purpose other than the above mentioned type of analysis.
- Follow the procedure described in this manual.
- Observe all warnings and cautions.
- Do not disassemble or modify the unit without the approval of authorized service personnel.
- Be sure to confirm that the power switch is turned OFF before plugging the power cable of the instrument into a power outlet.

Chapter 2 Site Preparation

Make sure that your laboratory meets the environmental and power requirements before installation of the spectrophotometer. The separate document **Site and Safety Information for UV-Visible Spectrophotometers** contains complete information on recommendations and requirements for locating and using your SPECTRONIC 200 safely.

Chapter 3 Before Operating

Installation

Plug the power line mains cord, provided with the instrument, into a properly earthed / grounded receptacle.

Be sure to confirm that the power switch is turned OFF before plugging the power cable of the instrument into the receptacle.

Switching On Power and Initialization

Switch ON the power to the spectrophotometer. The instrument performs a series of self tests on start-up. The sequence of initialization operations is given below:

Immediately after the instrument is switched ON a splash screen is displayed which indicates the model name and firmware version.

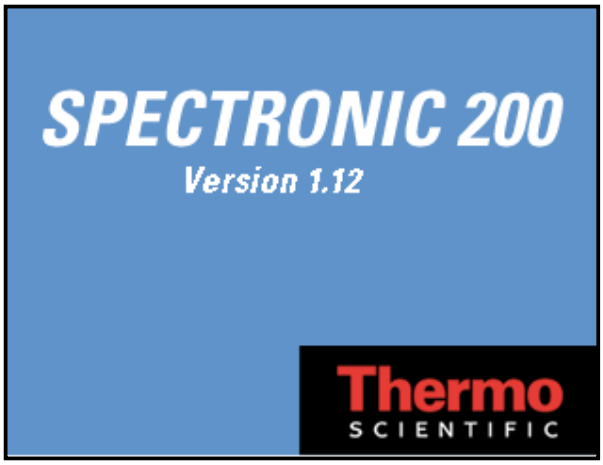


Figure 3.1

Following the splash screen the instrument will prompt the user to remove any cuvettes and close the sample compartment (fig. 3.2). Press the ENTER key to continue.

Figure 3.2

The self diagnosis steps are displayed on the screen.

Figure 3.3

If any abnormality occurs during self-diagnosis, an appropriate error message is displayed with prompts to continue or restart the instrument. For example, figure 3.4. See the section on Initialization With Error Messages at the end of this manual.

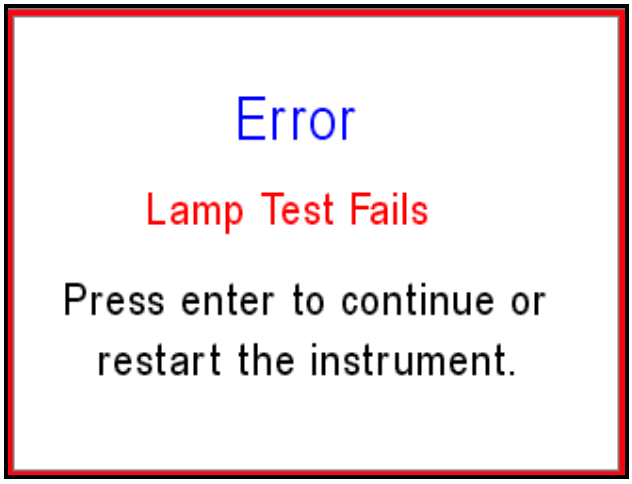


Figure 3.4

After initialization is completed, the main menu is displayed and the system is ready for operation.

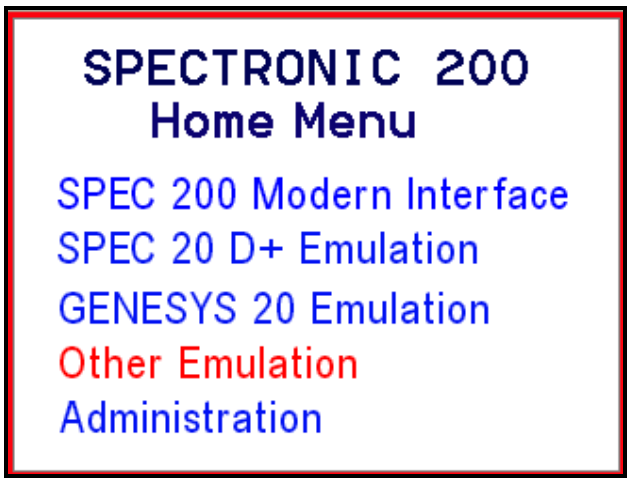


Figure 3.5

Chapter 4 Keypad Operation and Mode Selection

The Keypad

Figure 4.1

The spectrophotometer has an 8 key soft touch keypad and 320x240 pixel color graphics display.

Arrows and the central ENTER key are used to select menus and sub-menus and to edit the numerical values.

Autozero key: This key is always live. Any time you press the Autozero key, the instrument reads the current transmittance and sets the data as 100%T or 0.00A.

Home key: This key takes the user directly to the Home Menu from any point of software.

Printer key: This key prints exact copy of current screen.

Wavelength knob: In SPECTRONIC 200 Modern and SPECTRONIC 20 Emulation modes, the user can set the wavelength by rotating the wavelength knob. Turning the knob without pressing down changes the wavelength in 10nm increments. For fine wavelength control (1nm increments) press the λ knob and rotate.

Chapter 5 SPECTRONIC 200 Modern Interface

Introduction

This interface takes full advantage of all the capabilities of the SPECTRONIC 200 spectrophotometer. The modern interface gives access to experiment and display modes not found in earlier instruments.

Available experiment modes are:

- Live Display
- Multi Wavelength
- Quantitative Analysis
- Analyzer (not present in all models)
- Spectrum scan

Select the mode using left and right keys (← →).

Live Display

This application is used to measure and display absorption or transmission values in real time.

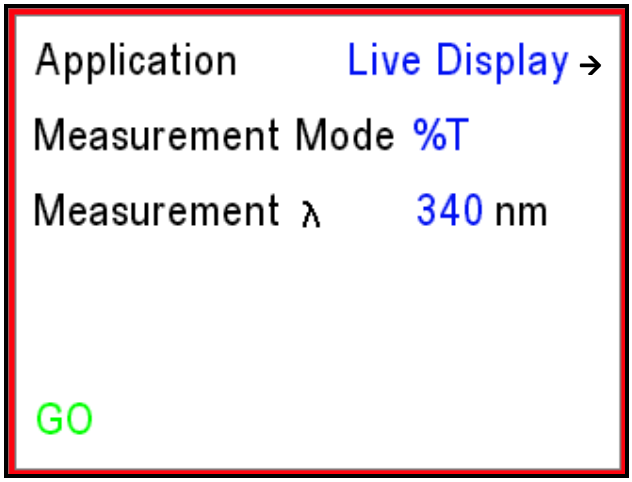


Figure 5.1

Use the up/down arrow keys to select (text turns green to show which option is selected) **Measurement Mode** and then the right/left arrow keys to toggle between %T or Abs. Select **Measurement λ** and use the left and right arrow keys or λ knob to set your desired measurement wavelength.

Use the arrow keys to select GO, then press ENTER to start the Live

- Pressing the ENTER key on the keypad when **Application** is selected has the same effect as selecting **GO** and pressing the ENTER key.
- Place a blank solution cuvette in the sample holder and press the 0.00 button (Auto zero) before measuring any sample cuvettes.

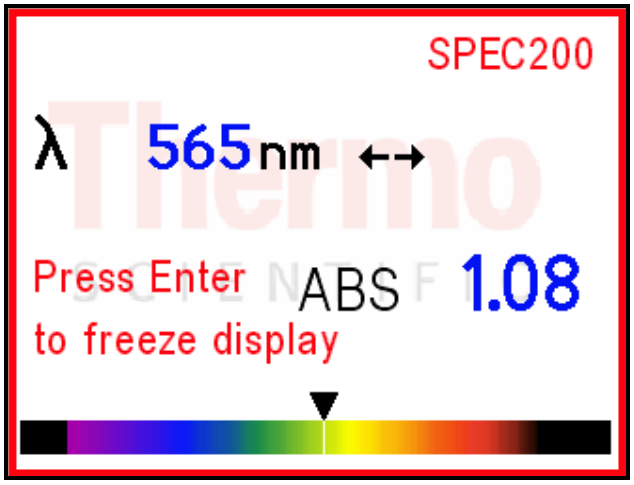


Figure 5.2

The displayed %T/Abs value updates every 2 to 5 seconds (depending on wavelength). Change the wavelength using the λ knob or the left/right keys if desired. A triangle marker and white line on the spectrum at the bottom of the screen show the color of the light presently being measured.

To freeze the display, press the ENTER key. When the display is frozen (i.e. measurement values are not being updated), the display changes to that shown in fig 5.3.

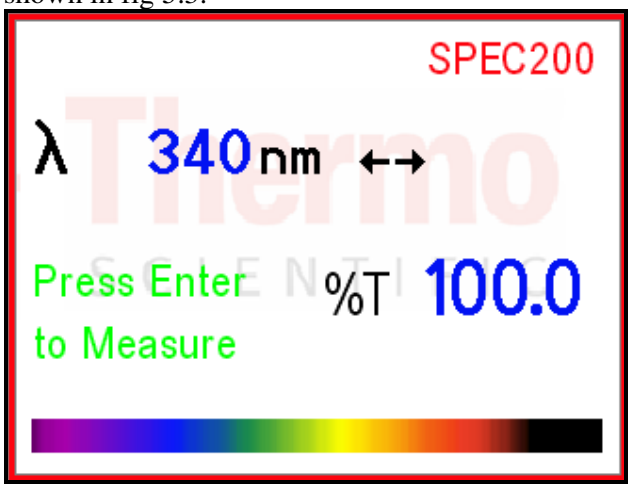


Figure 5.3

Press the Home key return to the Home Menu

- You can replace or erase the watermark logo on the Live Display screen. This option is located on the Administration menu. See chapter 9.

Multi Wavelength

Use this application to observe absorption or transmission values of the sample at up to four different wavelengths in a single measurement.

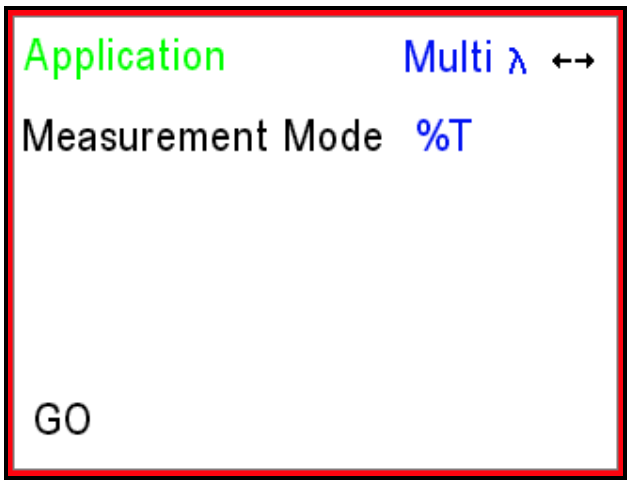


Figure 5.4

Press the down arrow key once to select **Measurement Mode**, then press the left/right arrow keys to select either ABS or %T.
Select **GO** and press the ENTER key.
The next screen is shown in figure 5.5

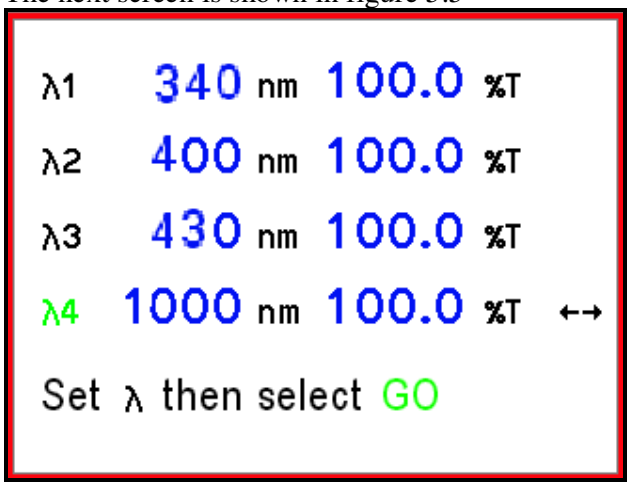


Figure 5.5

Use the up/down arrow keys to move between wavelength selections. Set the measurement wavelengths with the left/right arrow keys or the λ knob. Select the **GO** option and press the ENTER key to begin live measurements

Place a cuvette containing a blank solution in the sample stage, press the Autozero button and wait until the screen displays the message **Performing Auto Zero.** The instrument will restart live display readings as soon as the autozero measurement is complete. Remove the blank cuvette and place your sample cuvette in the sample stage. Each wavelength updates sequentially. Result values will flash when they update. (fig. 5.6).

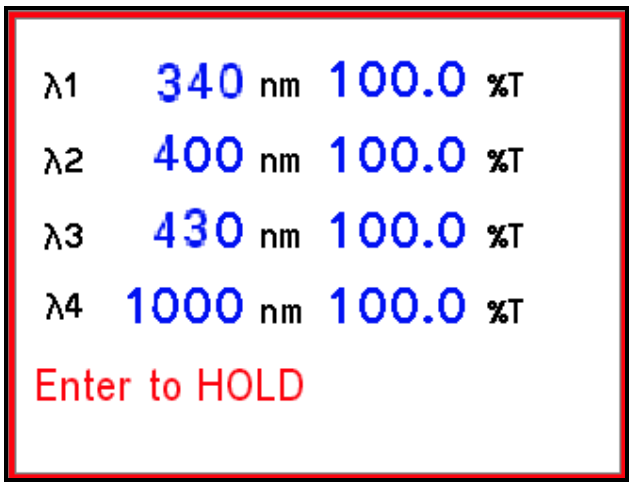


Figure 5.6

Pressing the ENTER button during measurement both freezes the displayed result values and allows you to change the measurement wavelengths using the λ knob. Use the up/down arrow keys to select the wavelength you want to change. Select GO and press ENTER to restart the measurement.

Note: If you change the measurement wavelength it may be necessary to re-zero the instrument by placing a blank solution in the sample stage and pressing the Autozero button until the screen displays the message **Performing Auto Zero.**

Quantitative Analysis

The Quantitative Analysis application supports both linear calibration curves with up to four standards and manual entry of a factor for determination of the concentration.

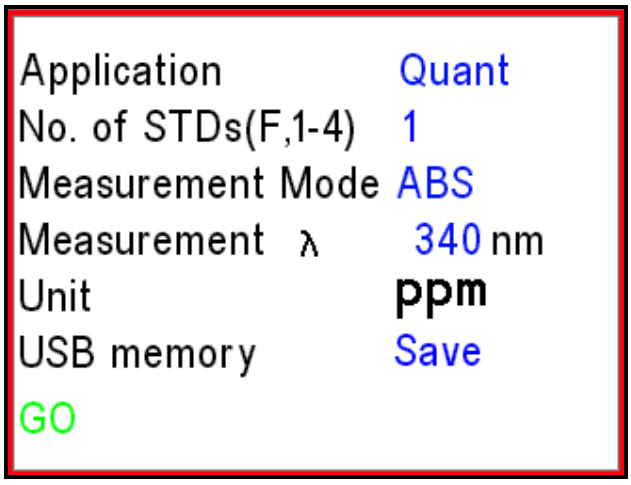


Figure 5.7

Use the arrow keys on the navigation pad to select the number of standards, **Measurement Mode** (ABS or %T) and the display unit. Set the **Measurement wavelength** using the left/right arrow keys or the λ knob. The **USB memory** option allows you to select:

- Save – to automatically enter the method save sequence
- No – to go directly to sample measurement
- Load – to automatically enter the method load sequence

Once the method parameters are complete, select GO and press the ENTER key.

Load Option

If you selected the Load option and a USB stick is connected to instrument, all methods stored on the USB memory stick are displayed on the screen. Use the up/down arrow keys to select the method and press the ENTER key to load the method.

The instrument will confirm that the method has been loaded (fig. 5.8)

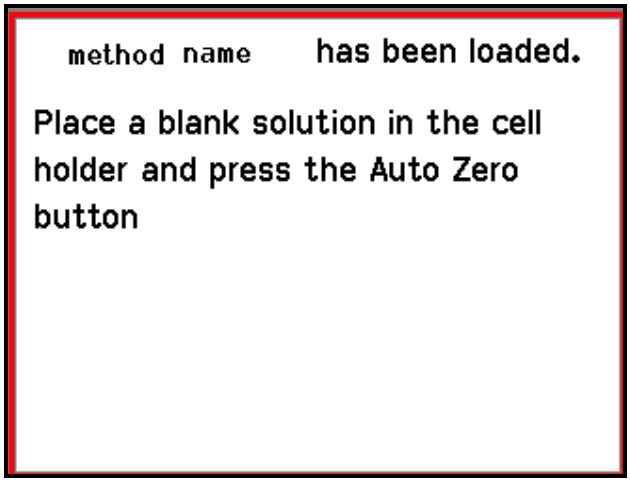


Figure 5.8

Follow the on-screen instructions to autozero the instrument. The instrument will then go to the sample measurement screen (fig. 5.17).

Save and No Options

If you selected the Save or No option, the instrument will prompt you to place a blank solution in the sample compartment and press the Autozero key to continue (fig. 5.9.)

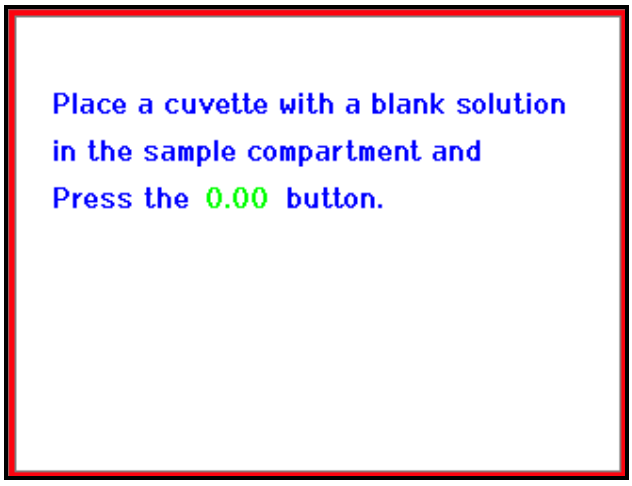


Figure 5.9

The instrument will confirm that it is recording the zero absorbance measurement, figure 5.10

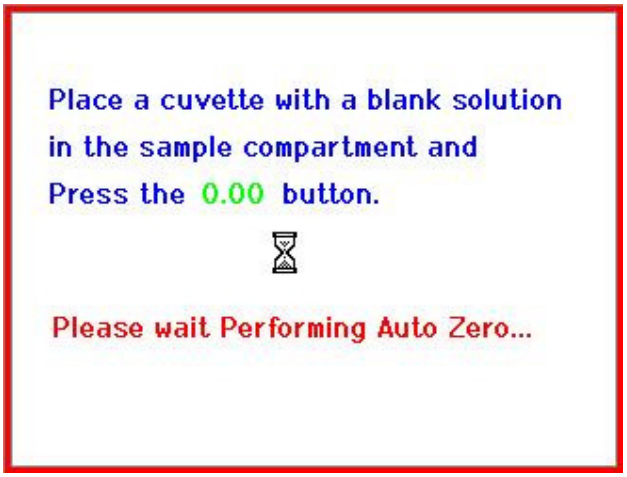


Figure 5.10

On completion of the zero measurement, the standard solution editing screen will appear, fig. 5.11

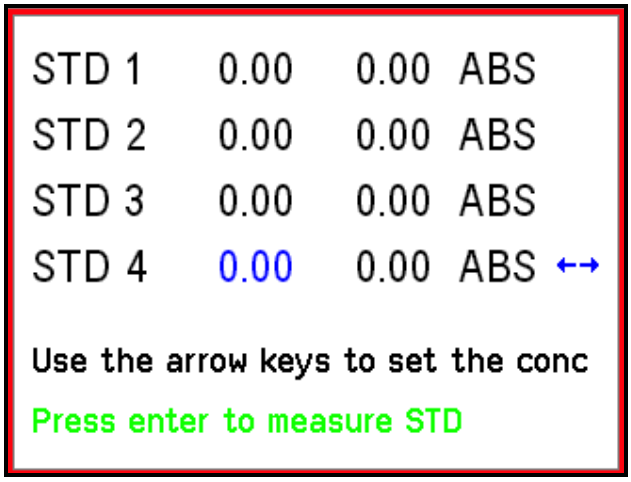


Figure 5.11

Use the left/right keys to set the concentration of each standard then press the ENTER key to measure the ABS or %T of that solution.
After all standards have been measured the instrument prompts you to press ENTER to display the calibration graph.

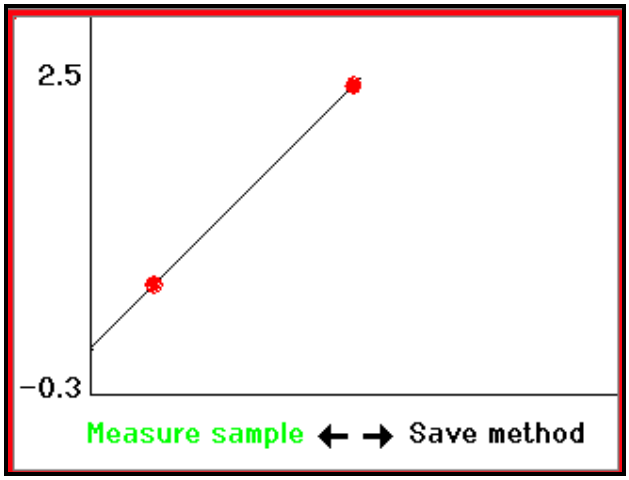


Figure 5.12

Depending on whether you selected Save or No, under the USB memory option of the setup (fig 5.7), either Save method or Measure sample will be highlighted in green. Pressing ENTER will execute the highlighted option.

If you select Save method the instrument will prompt to save the method or return to standard graph screen. If you select the Measure sample option, the instrument goes directly to the screen in figure 5.17.

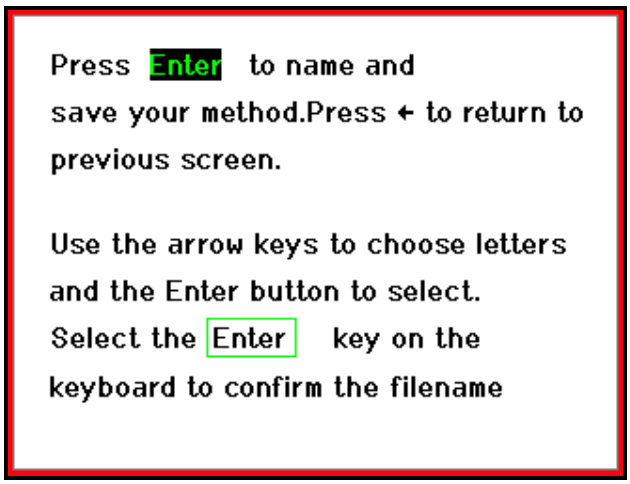


Figure 5.13

An on-screen keyboard will be displayed (fig. 5.14)

Insert a USB memory device that is formatted FAT32 into the USB-A port on the back of the instrument.

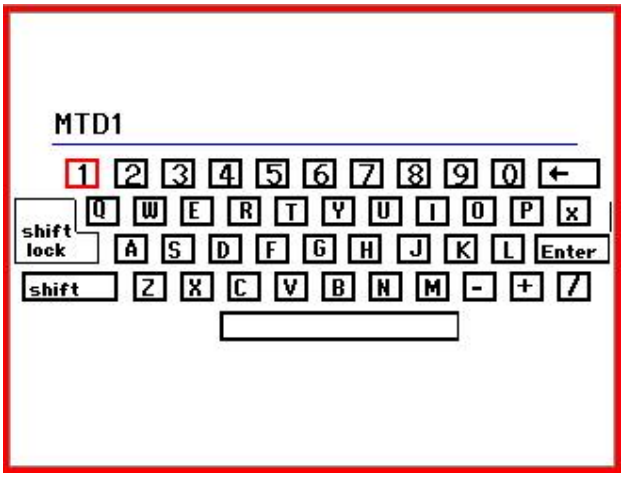


Figure 5.14

Use the arrow keys to choose letters and press the ENTER key to select the letter. Select the Enter button on the on-screen screen keyboard and press the ENTER key on the instrument to confirm the file name.

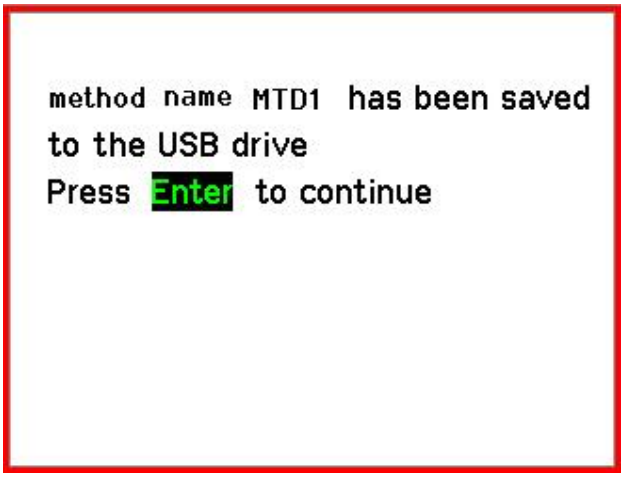


Figure 5.15

Follow the directions on the screen to continue. The standard graph will be displayed on the screen (fig 5.17).

If no USB memory device is present, the instrument will prompt you to connect one.

If the SPECTRONIC 200 does not recognize your USB memory device, check that it is formatted FAT32. Older USB sticks and sticks of less than 2GB may be formatted FAT16 (usually labeled simply as FAT).

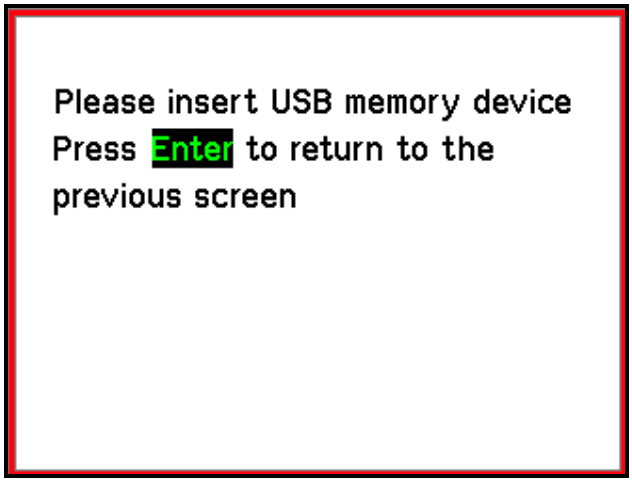


Figure 5.16

To measure a sample, select the Measure sample and press the ENTER key. The screen will display both the concentration and measured ABS or %T value as shown in figure 5.16

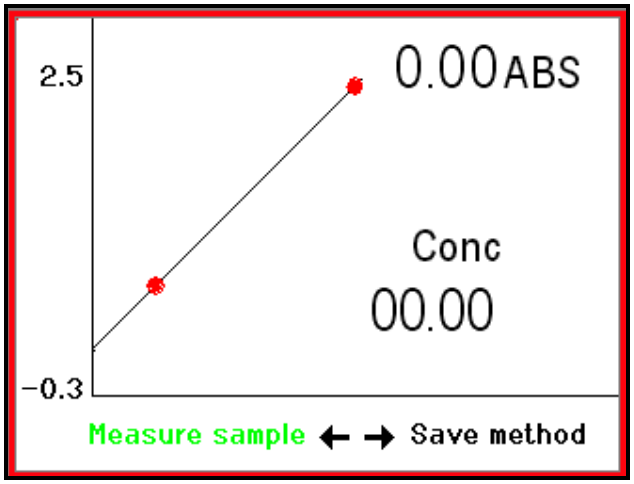


Figure 5.17

If you select FACTOR in the **No. of STDs** option, the instrument asks for entering the factor as shown in figure 5.18. Follow the on-screen directions.

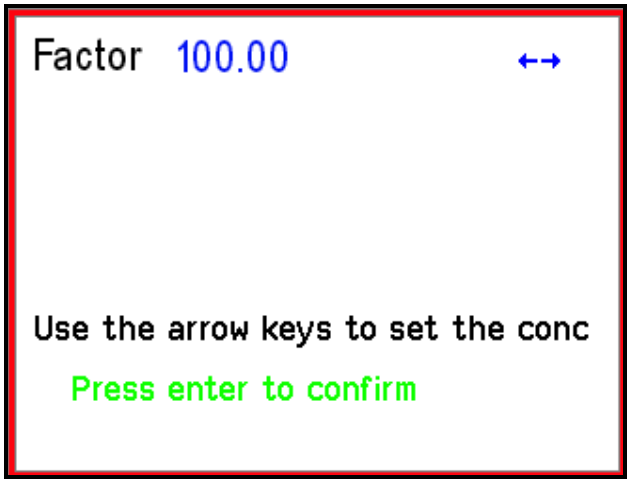


Figure 5.18

After confirmation of the factor, the instrument will ask for blank solution.

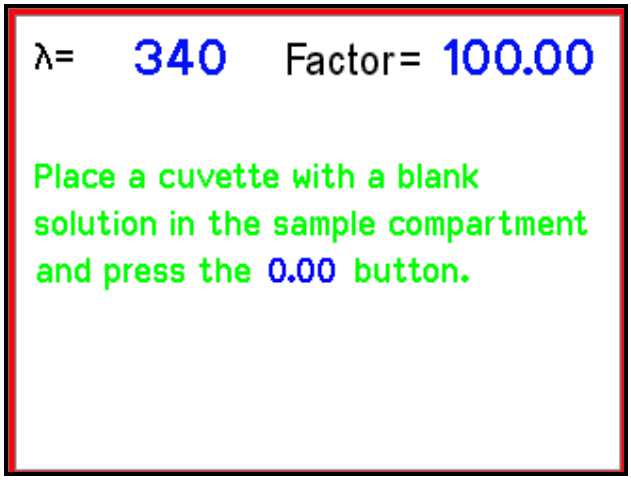


Figure 5.19

After performing and Autozero measurement, the instrument shows the measurement screen (fig. 5.20).

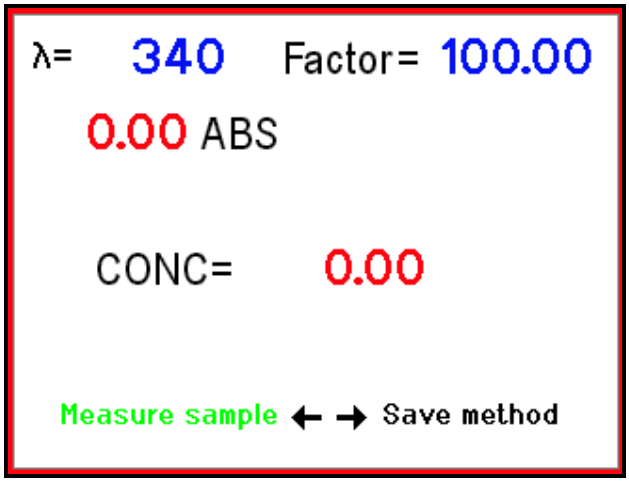


Figure 5.20

Select the Measure sample option and press the ENTER key to measure each sample.

Analyzer

The analyzer mode allows a laboratory manager to program sophisticated methods involving up to two four wavelengths, four factors, and a user entered mathematical equation. Analyzer methods, once programmed, must be saved to a USB memory device for later re-use. The working screen of an analyzer method shows only the name of the method and the result (e.g. fig. 5.21).

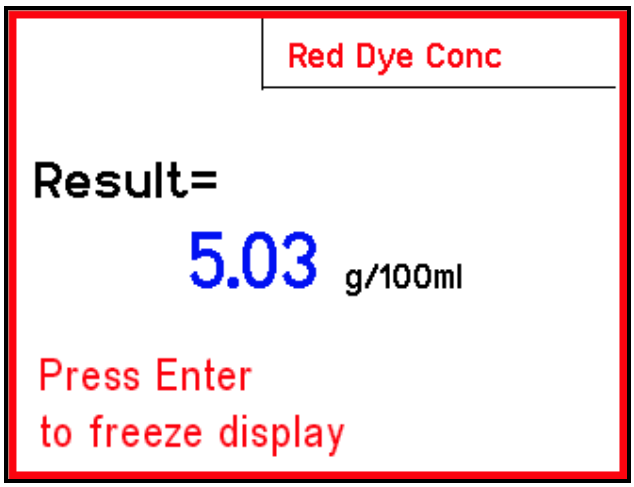


Figure 5.21

Using the Analyzer mode requires that you store methods on a USB memory device that is formatted FAT32.

Select the Analyzer mode and choose to design a new method or load a saved method.

Loading a Saved Method

If you select the LOAD METHOD option, the screen will display the names of all the methods saved on the attached USB memory device. If no memory device is present, an error is returned. Select the chosen method using the Up/Down keys and press the ENTER key to load it into the instrument.

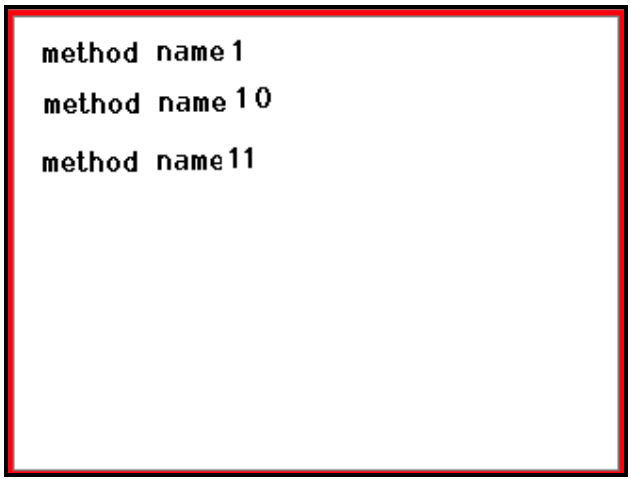


Figure 5.22

After loading the method the instrument will prompt the user place a blank solution in the sample compartment and press the Autozero key. After performing the zero measurement, the instrument prompts to place the first sample in the cell holder and press ENTER to begin live measurements (fig. 5.30)

Follow these directions and the calculated result for each sample is displayed on the screen. Pressing ENTER freezes the display to help with printing and/or data recording.

Designing a New Method

If you select the new method option (fig 5.23) the first screen in the method setup (fig 5.24) is where you specify the number of wavelengths and factors.

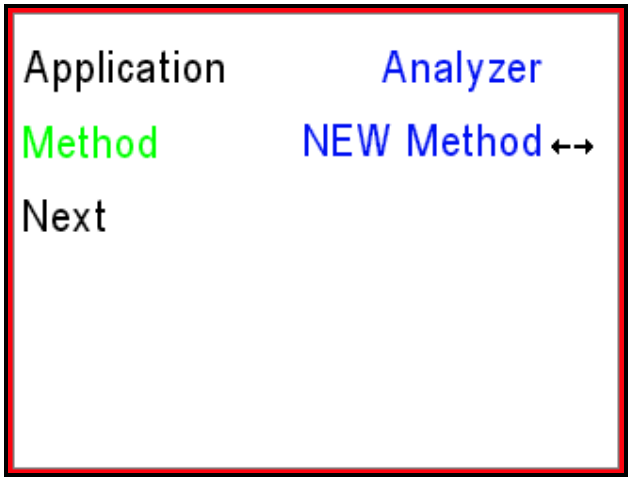


Figure 5.23

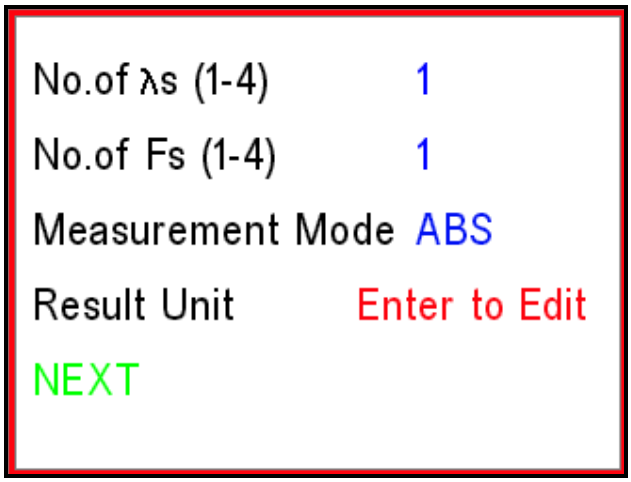


Figure 5.24

Up to four wavelengths and four factors may be specified. Select Measurement Mode and use the Left/Right keys to toggle between ABS and %T. You must specify a result unit, which may be anything you choose. The on-board software presents an on-screen keyboard (fig 5.25). Select each character by using the arrow keys on the instrument and pressing the ENTER button to add the character to the text line. Select the Enter button on the on-screen keyboard to confirm your unit selection.

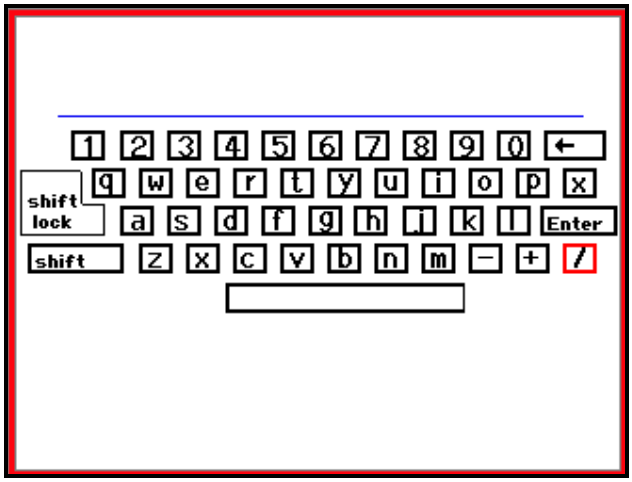


Figure 5.25

Select NEXT at the bottom of the screen shown in fig (5.25) to proceed to the wavelength editing screen (fig 5.26).

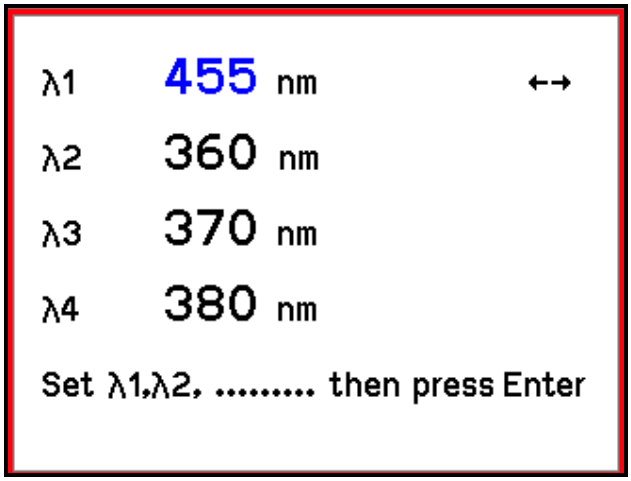


Figure 5.26

The screen displays as many wavelengths as you specified in the previous menu. Use the Up/Down keys to switch between measurement wavelengths. Use the λ knob or the Right/Left arrow keys to set each wavelength.

Select the word “Enter” at the bottom of this screen to advance to the factor entry screen.

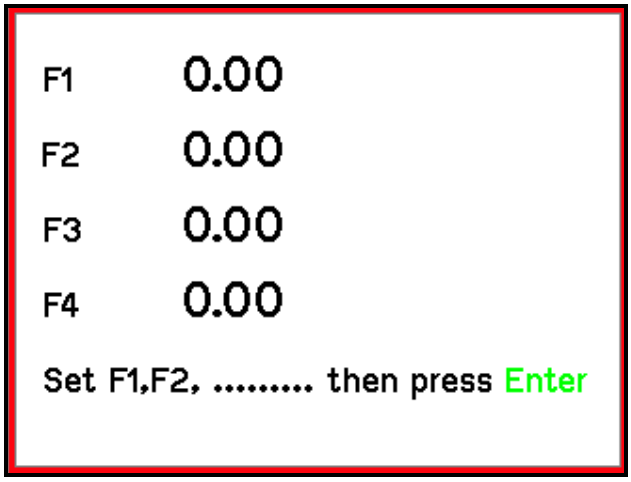


Figure 5.27

Use the arrow keys to select and set the value of each factor. Select Enter at the bottom of the screen to advance to the formula design screen.

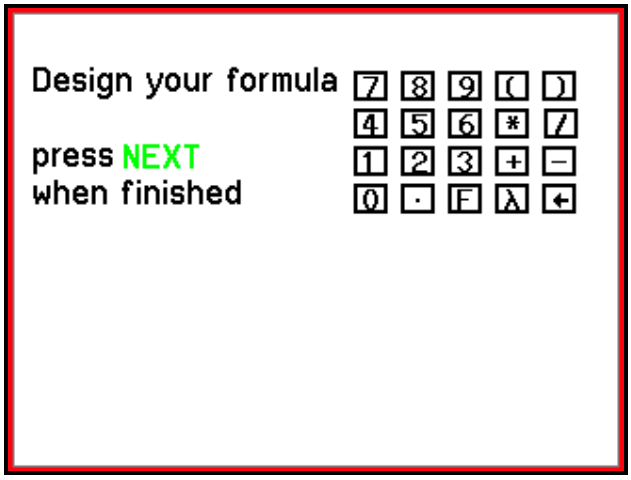


Figure 5.28

Use the arrow keys to choose characters. Press the ENTER key to select the character and enter it onto the formula line. Once the formula is complete, go to the NEXT option (navigate to the 7 and press the left arrow) then press the ENTER key. This completes the analyzer method setup and leads you into the method save sequence. An on-screen keyboard layout (fig. 5.25) is used to enter the file name for the method. After saving the method, the software prompts you as shown in figure 5.29.

If the SPECTRONIC 200 does not recognize your USB memory device, check that it is formatted FAT32. Older USB sticks and sticks of less than 2GB may be formatted FAT16 (usually labeled simply as FAT).

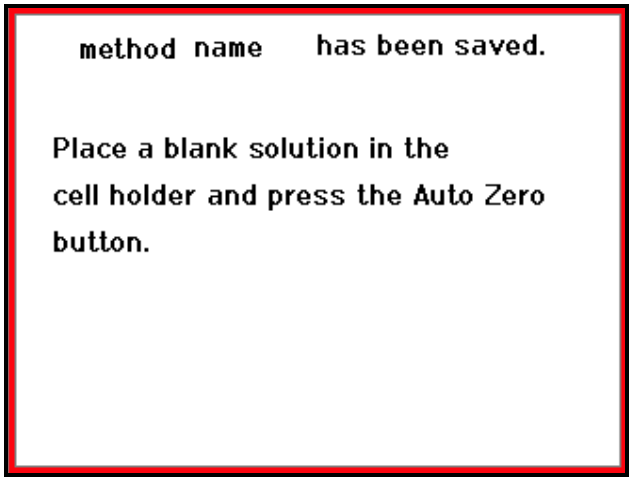


Figure 5.29

Following the zero measurement, the software prompts you to insert the sample and press the ENTER key to begin live measurements (fig. 5.30)

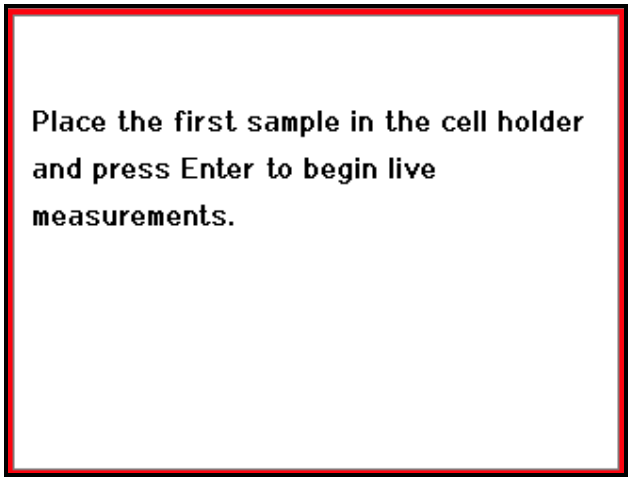


Figure 5.30

The instrument now reads continuously. The result displayed flashes each time it updates (fig 5.21)

Scan

Use this application to scans across a defined wavelength range.

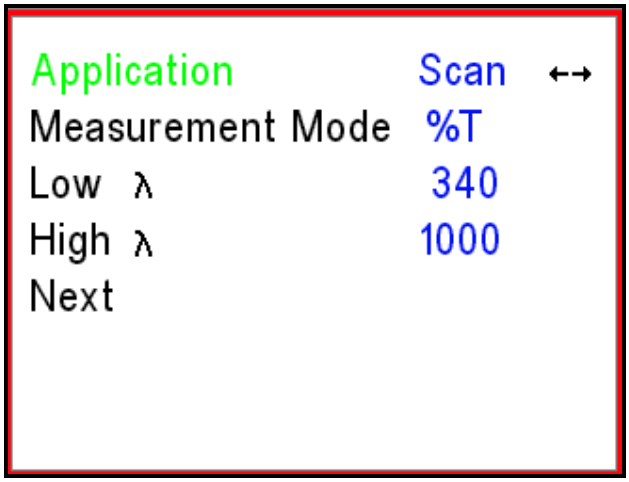


Figure 5.31

Use the up/down arrow keys to select **Measurement Mode** and then the right/left arrow keys to toggle between %T or Abs. Select **Low λ** and **High λ** and use the left and right arrow keys or λ knob to set your lower and higher wavelength limit for scan.

Use the arrow keys to select GO, then press ENTER to Scan mode as shown in fig 5.32

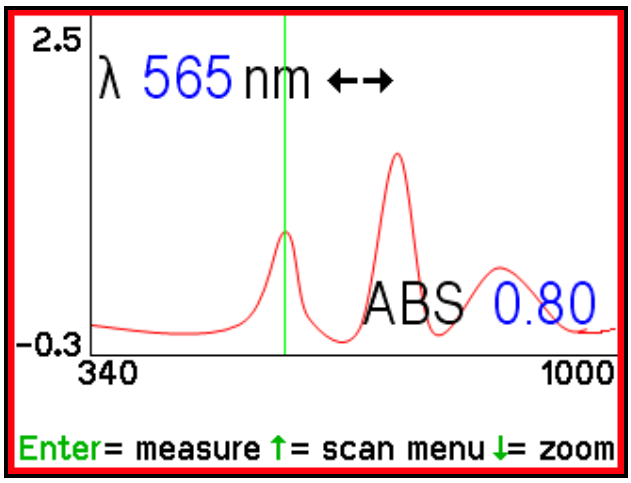


Figure 5.32

Press ENTER to scan across selected wavelength range.

Press the Up arrow key to return the scan menu. We can zoom the spectrum using down arrow key.

Chapter 6 SPEC 20 D+ Emulation

Introduction

The SPECTRONIC 20D+ emulation mode is designed to mimic the operation of a Thermo Scientific SPECTRONIC 20D+ as closely as possible. This mode is intended for users who either:

1. have SOPs that refer to the SPEC20D+ and cannot be changed easily or
2. have several SPEC20D+ instruments and wish to integrate SPEC200 instruments into the set without adding a new instruction set for instrument use.

The application modes are exactly those found in the SPECTRONIC20D+. Change mode by pressing the Right arrow key as indicated on the screen (fig 6.1). Use the λ knob to set the wavelength. This knob has a coarse/fine feature. Turn it normally to alter the wavelength in units of 10nm. Press it down and turn to alter the wavelength in units of 1nm.

Important Differences Between SPECTRONIC 200 and SPECTRONIC 20D+

SPECTRONIC 200 performs a full spectrum 0%T measurement at startup and retains this information in internal memory. Similarly, when a user places a blank cuvette in the sample stage and presses the Autozero button (labeled 0.00) on the instrument keypad, the SPECTRONIC 200 measures the spectrum and records the 100%T value at all wavelengths. This means that it is never necessary for the user to manually set 0%T, and after measuring 100%T at one wavelength, it is not necessary to measure it again if the user changes measurement wavelength.

Experimental Modes

Transmittance and Absorbance

Simply place a blank solution in the sample stage and press the Autozero button. Once the Autozero (100%T) measurement completes, place your sample cuvette in the sample stage and the instrument displays the transmittance or absorbance, as selected (fig 6.1). Press the Right or Left arrow key on the navigation pad to toggle between Absorbance and Transmittance modes.

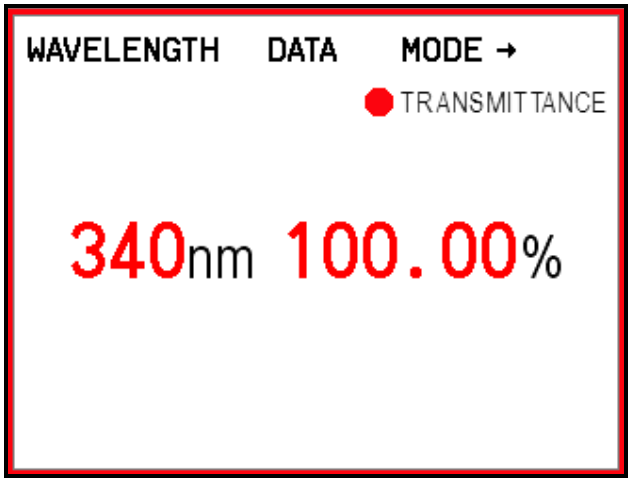


Figure 6.1

Concentration

Select Concentration mode by pressing the Right arrow key until CONCENTRATION displays on the instrument (fig 6.2).

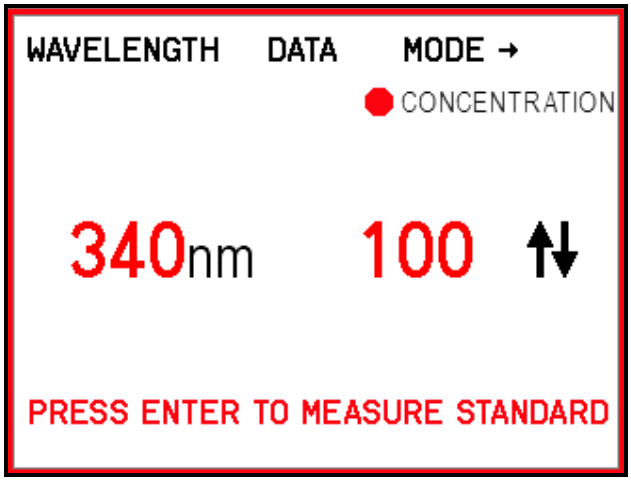


Figure 6.2

Use the Up/Down arrow keys to set the concentration of your standard. After setting the concentration value, place your standard solution cuvette in the sample stage and press the ENTER key. After the standard measurement, the instrument will calculate the factor and display it on the screen (fig 6.3). This factor can be used in the future to set up the method without need for a standard solution.

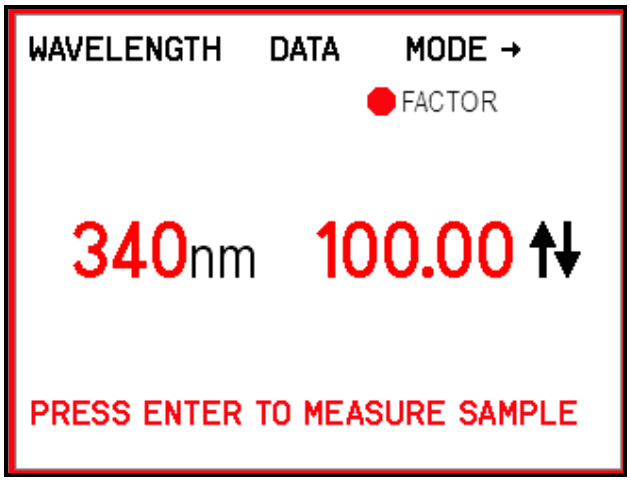


Figure 6.3

Place a sample cuvette in the sample stage and press the ENTER key to begin measuring the concentration of sample solutions.

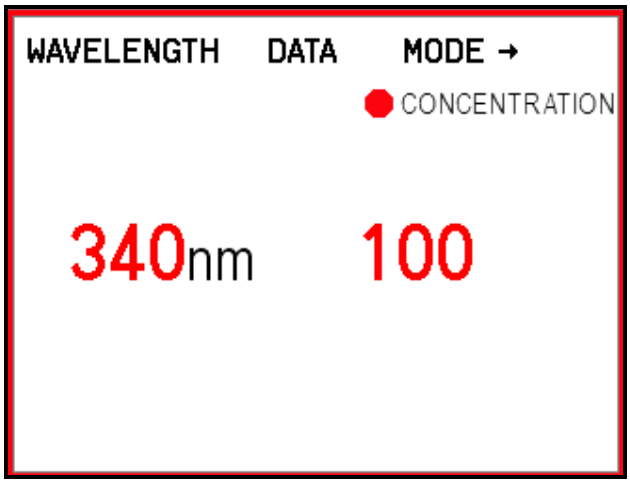


Figure 6.4

This is a live measurement mode. Readings will update as you present samples.

Factor

Select Factor Based Concentration mode by pressing the Right arrow key until FACTOR displays on the instrument (fig 6.5).

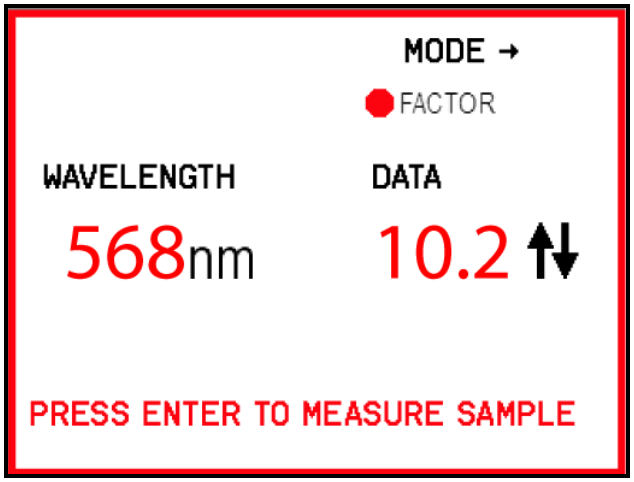


Figure 6.5

Use the Up/Down keys to set the factor. Place a cuvette with your sample solution in the sample stage and press the ENTER key as indicated on the screen. Live measurements of your sample begin. The concentration is displayed on the screen.

Chapter 7 GENESYS 20 Emulation

Introduction

The GENESYS 20 emulation mode is designed to mimic the operation of a Thermo Scientific GENESYS 20 as closely as possible. This mode is intended for users who either:

1. have SOPs that refer to the GENESYS 20 and cannot be changed easily
2. have several GENESYS 20 instruments and wish to integrate SPEC200 instruments into the set without adding new instructions for instrument use.

The application modes are exactly those found in the GENESYS 20. Since the SPECTRONIC 200 lacks the exact labeled buttons present on the GENESYS 20, the emulation shows the GENESYS 20 buttons on the screen (fig 7.1). Use the arrow keys on the navigation pad to select different buttons on the screen. A button is selected when the ring around it is green. Pressing the ENTER key on the navigation pad registers a press of the key that is selected on the screen. The key image on the screen will flash green briefly to confirm that it has been pressed.

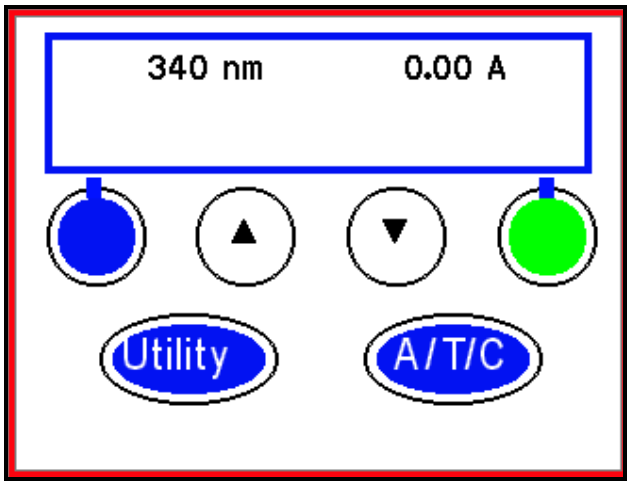


Figure 7.1

Important Differences between SPECTRONIC 200 and GENESYS 20

1. When a user places a blank cuvette in the sample stage and presses the Autozero button (labeled 0.00) on the instrument keypad, the SPECTRONIC 200 measures the spectrum and records the 100%T value

at all wavelengths. This means that it is not necessary for the user to manually reset 100%T after changing the measurement wavelength.

2. GENESYS 20 does not have a wavelength control knob, so the λ knob on the SPECTRONIC 200 is disabled in this mode.
3. In order to reduce clutter on the screen, the up and down triangle keys have been assigned the function of increasing or decreasing the wavelength in appropriate contexts. There are no dedicated nm▲ and nm▼ keys in the emulation mode.
4. The Utility key does not access all the functions found in the original instrument as many of them (e.g. printer choices and serial communication options) are not relevant to the SPECTRONIC 200.

Experimental Modes

Transmittance and Absorbance

To select the mode of operation select the A/T/C virtual button and press the ENTER key. The unit shown next to the data value in the top-right corner of the screen indicates which mode you are in. **A** for absorbance and **%T** for transmittance, see figure 7.1. Set the wavelength by selecting the up/down virtual button and pressing the ENTER key.

The GENESYS 20 does not prompt you to record a blank value before measuring a sample. Be sure to do this before you begin taking readings of your samples.

Concentration by Standard or Factor

The concentration mode screen is shown in figure 7.2. Use the up/down triangle virtual buttons to select the analytical wavelength. Place a cuvette with a blank solution in the sample stage and press the Autozero button.

Select Standard or Factor concentration mode by navigating to the relevant button and pressing the ENTER key. Set the concentration (fig. 7.3) or the factor (fig. 7.4) as you would for the GENESYS 20.

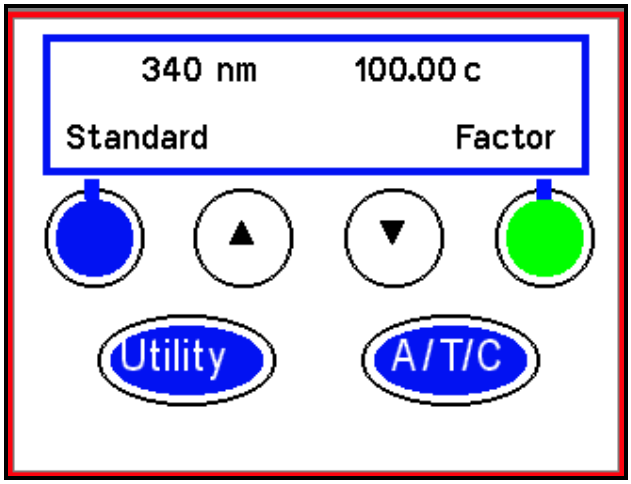


Figure 7.2

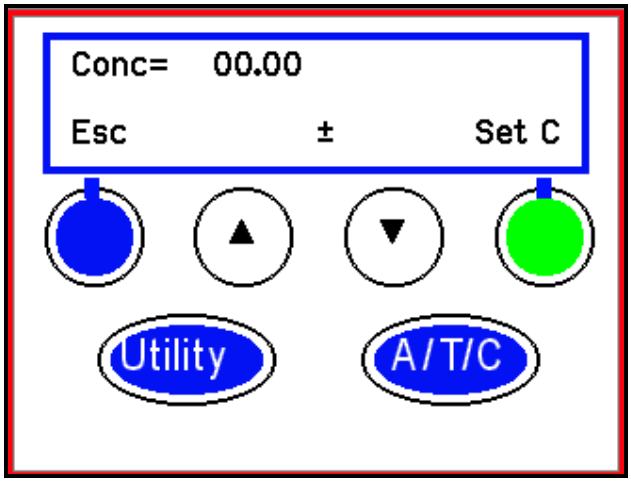


Figure 7.3

Set the concentration by selecting the up/down virtual buttons and pressing the ENTER key. Place a cuvette with your standard solution in the sample stage, select the Set C virtual button, and press the ENTER key to confirm the concentration value. The instrument measures the absorbance of the sample and calculates the factor required to reach the specified concentration value. This factor is displayed and the screen appears as shown in figure 7.2. The instrument is now in a live display mode and will show the concentration of whatever sample is in the sample stage.

If you want to change the factor, select the Factor virtual button and press the ENTER key. The factor editing screen will display as shown in figure 7.4.

Set the factor by selecting the up/down virtual buttons and pressing the ENTER key. Select the Accept virtual button and press the ENTER key to confirm the factor.

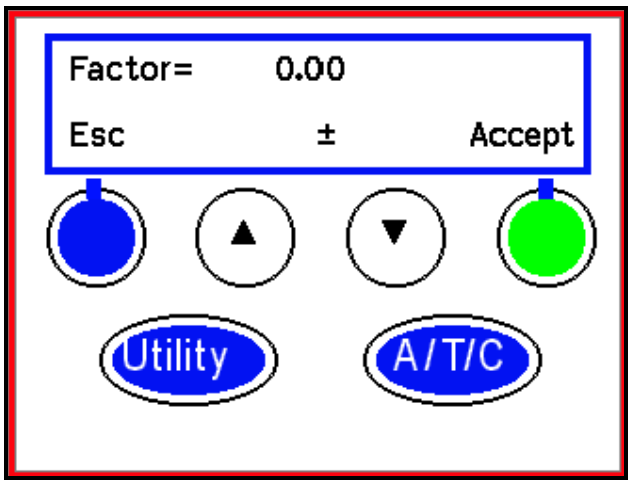


Figure 7.4

Specify the display unit by selecting the Utility virtual button.

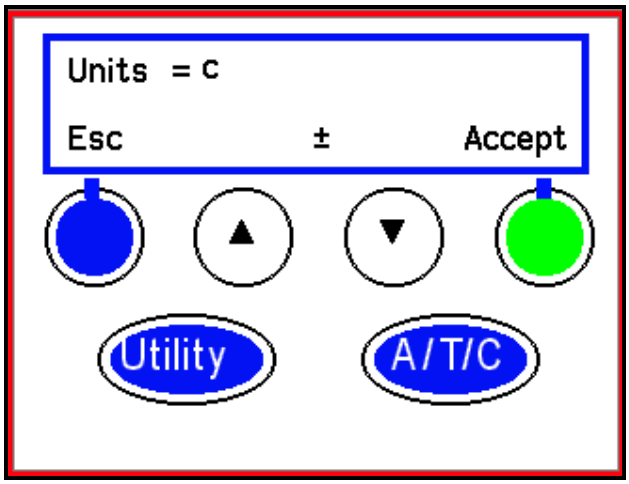


Figure 7.5

Change the unit by selecting the up/down virtual button and pressing ENTER key. Select the Accept virtual button and press the ENTER key to confirm the choice of unit.

Chapter 8 Other Emulation

Other Emulation

The Other Emulation mode mimics the interface of an instrument popular in many laboratories in Europe. The keypad buttons of the SPECTRONIC 200 are similar in function to those on this instrument, and the screen display is reproduced faithfully. Following a laboratory protocol for the emulated instrument using a SPECTRONIC 200 is very simple.

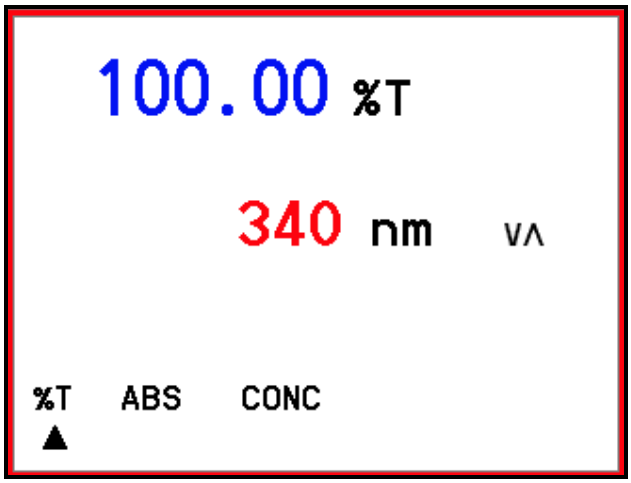


Figure 8.1

Use the up/down arrow keys for changing the wavelength. Use the left/right arrow key to change the measurement mode.

Concentration by Standard or Factor

The concentration mode screen is shown in figure 8.2. Use the up/down arrow keys to set the concentration value. After setting the concentration value, place your standard solution cuvette in the sample stage and press the ENTER key. The instrument calculates the factor and displays it on the screen (fig 8.3). Use the up/down arrow keys to edit the factor.

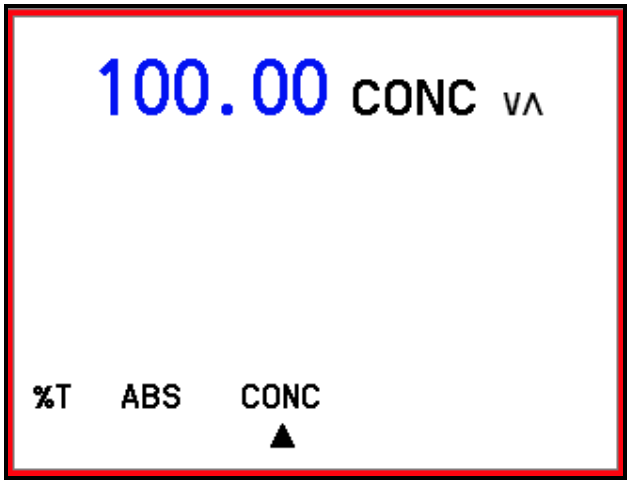


Figure 8.2

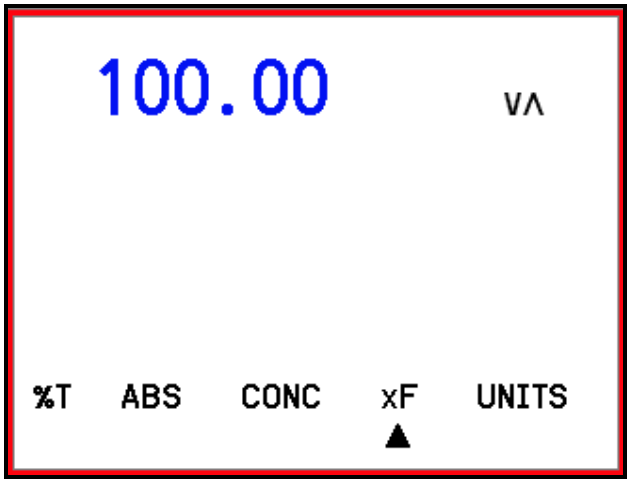


Figure 8.3

To change the display unit, move the cursor to UNITS and press the ENTER key. Figure 8.4 shows the unit editing screen.

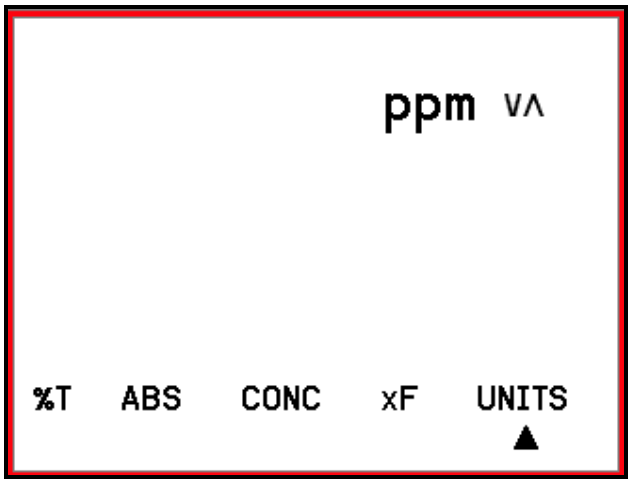


Figure 8.4

Use up/down arrow keys to edit the unit. Press the ENTER key to confirm your choice and move to sample measurement.

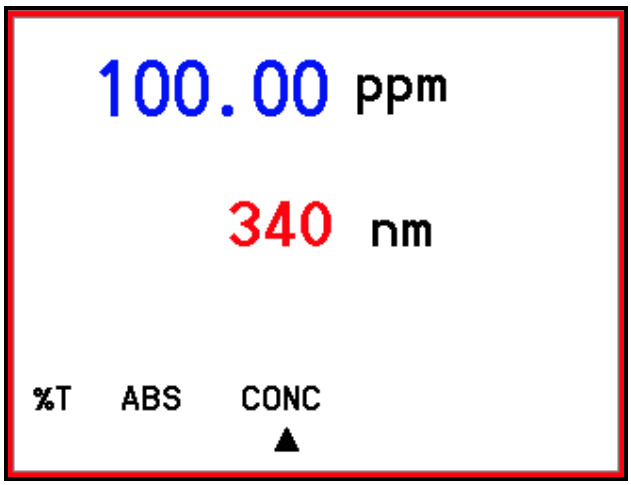


Figure 8.5

This is a live display concentration measurement mode.

Chapter 9 Administration

Introduction

This menu provides access to functions to change the display language of instrument, select the printer type, customize the logo and to connect the instrument to a computer.

Figure 9.1

Use the up/down arrow keys to select the desired option and press the ENTER key.

Language

Use the up/down arrow keys to select the desired instrument language and press the ENTER key to confirm.

Figure 9.2

Connect to a Computer

Your SPECTRONIC 200 spectrophotometer can be run remotely from a computer using Thermo Scientific piQue™ software. piQue software offers:

- More sophisticated options for scanning and manipulation of spectra
- Fixed wavelength measurements at up to ten wavelengths
- Quantitative analysis with data tables and report printing
- Instrument performance validation options
- A programmable method, information and data bank
- Tools for service engineers for instrument calibration and fault diagnosis.

The SPECTRONIC 200 connects to a computer using a standard USB cable.

To initiate remote control of the instrument by a computer, select the CONNECT TO PC option before starting piQue software on the attached computer.

Figure 9.3

Press the ENTER key again as instructed on the screen. This causes the instrument to send a signal to the computer to let the computer know that it is there and ready to connect.

Figure 9.4

When you are ready to disconnect the instrument from the computer, press the HOME key on the instrument. It will return to the Home Menu screen.

Printer Selection

The SPECTRONIC 200 supports both the Epson TM-T88IV Point of Service (POS) thermal printer and laser printers that use the PCL 5e or PCL6 communication protocols.

Before connecting a printer to your SPECTRONIC 200, read the specifications for the printer carefully to ensure that it supports one of these

protocols. Many page printers, including ink-jet and very low cost laser printers, use proprietary communication protocols and are not supported by the SPECTRONIC 200.

Only page printers that support PCL5e or PCL6 printer language will work with the SPECTRONIC 200.

When you press the printer button on the SPECTRONIC 200 an exact copy of what is on the screen (without the watermark logo if printing from the Live Display mode) is sent to the printer. On the thermal printer, the output is monochrome and approximately 4 cm wide by 3cm high. On laser printers, the output will be printed in color if the printer supports color. The screen image on a laser printer print-out is approx. 10 cm wide by 7cm high.

Certain printers offer the ability to scan, fax, read memory cards or USB memory drives, etc. These printers are referred to as ***Multifunction Printers*** and they require additional electronic commands in order for the SPECTRONIC 200 to communicate with them.

Selecting the Printer option from the Administration menu displays the screen shown in figure 9.5. Make the appropriate selection for your printer and press the ENTER button to confirm your choice. If you are not sure whether your printer is a multifunction printer or not, select the **Printer** option first and try printing the Home Menu. If this does not work, try it as a Multifunction Printer.

Figure 9.5

Customize Logo

The SPECTRONIC 200 provides the facility to customize the logo shown as a watermark in Live Display mode in the Modern Interface.

Logo images must be bitmap (.bmp extension) files that are 320 pixels wide and 195 pixels high. 8 bit color is sufficient but up to 24 bit color is supported. Images should be *at least* 80% transparent in order not to interfere with the readability of the Live Display screen. Use an image editing program to produce your image or logo in a watermark format. If your image editing software does not support degrees of transparency, greatly increasing the brightness and decreasing the contrast will give much the same effect.

The SPECTRONIC 200 only recognizes USB memory devices that are formatted FAT32. If your USB memory device is not recognized by the instrument, reformat it using a computer, resave your logo file and try again.

Insert a USB memory device containing your logo file(s). The instrument will detect the memory stick and display a list of logo files that are available to load.

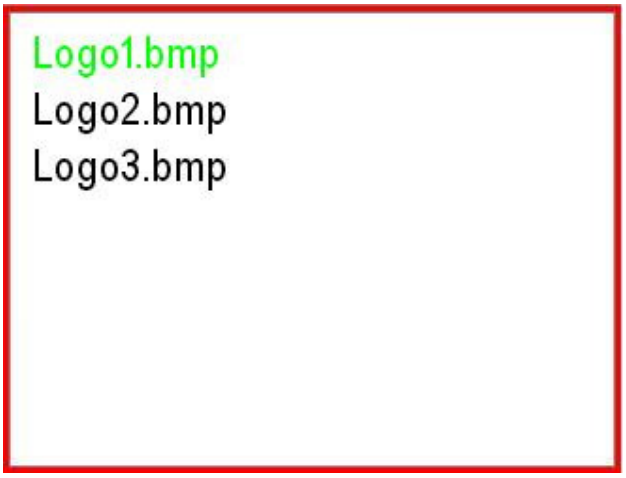


Figure 9.6

Use up/down arrow keys to select the desired logo. Press the ENTER key to confirm the selection. The instrument will prompt the user to wait while the logo is updated. Be patient. This process can take up to two minutes.

Once the software reports that the logo has been loaded, press the Home key and navigate to the Live Display screen to view your new logo. Some experimentation may be required to adapt your logo to the correct level of transparency and precise screen placement that gives the best viewing of both the logo and the data from your experiment.

Appendix A System Maintenance

Routine checks

- Check the sample compartment floor daily. Remove it and wash it with water to remove spilled chemicals. Ethanol or methanol may also be used if necessary.

DO NOT USE ACETONE as this solvent will soften the plastic of the sample compartment liner resulting in severe damage that may require replacement of the sample stage and sample compartment liner.

When using liquid samples, check the sample compartment floor for spilled liquid between measurements. Spilled chemicals may damage the sample compartment, or vapors may cloud the lenses at either side of the sample compartment, causing a measuring error. Remove the sample compartment and wash out any spilled solutions.

- Check the lenses on the left side sample compartment once per week. Ensure that they are not contaminated with fingerprints or haze from dried sample vapors. If lenses are contaminated, wipe them with a clean, lint-free cloth.

Initialization with Error Messages

The spectrophotometer performs various checks, including a lamp energy check, and sets many initialization parameter values during power up. The progress of the tests is displayed as a self-diagnosis window. If no abnormality is detected, the instrument progresses to the Home Menu. However, if an abnormality is detected at any step, the instrument stops there and displays an error message. In such a case, identify the problem source, if possible, and correct it. If the problem source is uncorrectable, contact your nearest Customer Support Center indicating the error messages.

Note that when the lamp is operating, light can be seen shining out through the ventilation grille on the back of the instrument. If a lamp error is

reported, verify that the lamp is lit before contacting Customer Support. Spare lamps are available from your Thermo dealer.

Lamp Replacement

Lamp Specifications

Halogen Lamp	
Thermo Scientific Part No.	714-039400
Mean Life	1000 Hours

Do not attempt to use any lamp other than the lamps sold specifically for this instrument. Correct voltage, wattage, and precise height of the filament are essential to proper operation of your SPECTRONIC 200 spectrophotometer.

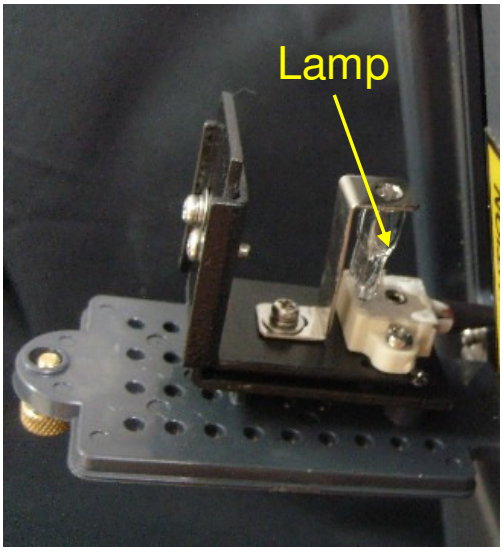
Precautions

- The light source and light source housing become hot during operation. Be sure to turn off the power switch and allow the housing and lamp to cool sufficiently before handling.

- Wear gloves when handling the lamps so as not to leave fingerprints. Leaving fingerprints on the glass of the lamp can lead to damage to the glass and/or reduce its transmittance.

- Treat the lamp with extreme care during replacement. If the lamp glass is damaged leakage in the envelope vacuum may occur. The lamp will not function if an impact causes a loss of the vacuum seal. This can occur even when the glass appears undamaged.

Replacing the halogen Lamp



- Loosen the thumb screw on the lamp door under the instrument and open the lamp assembly.
- Remove lamp protect clip.
- Pull the halogen lamp out of its socket.
- Insert a new halogen lamp into the socket. Push the lamp in until its pins are stopped by the socket holes. **Handle the lamp glass ONLY while wearing gloves.**
- There is no polarity in the lamp connector pins (it doesn't make any difference which way you plug in the halogen lamp.)
- Close the lamp door and tighten the thumb screw.