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ALLTECH ELSD 2000 CONTROL SOFTWARE
OPERATING MANUAL

April 2003
Manual Part. No. 600101M

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1. INTRODUCTION TO ELSD 2000 CONTROL SOFTWARE

The ELSD 2000 Control Software provides convenient control of the ELSD 2000 detector directly from a PC. The software offers the following useful features:

- **Easy-to-monitor status screens with colorful LED's to indicate run/standby modes, errors, ready (equilibration) status*, and device detection status**
- **Ability to directly monitor important detector parameters such as drift tube temperature, nebulizer zone temperature*, and gas flowrate**
- **Configuration screen for selecting audio alarm, full-scale voltage, and fault relay override settings**
- **Method editing table, including helpful calculator for determining drift tube temperatures and gas flowrates for impactor 'off' applications***
- **Methods can be saved to the PC, for increased storage capacity***
- **Operation error LED's screen and savable error log*.**

* Denotes features that are unique to the ELSD 2000 Control Software and not available through manual control of the detector.

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2. REQUIREMENTS

Installation and operation of the ELSD 2000 Control Software will require the following:

- **PC with the following specifications:**
  - **Pentium 233MHz processor or above**
  - **16MB RAM**
  - **5MB hard drive space**
  - **Windows 95/98/NT/2000/ME/XP**
  - **Monitor set to true/24-bit color or above, and 800 x 600 resolution**
  - **RS-232 serial port (9-pin)**
- **ELSD 2000 Control CD-ROM**
- **ELSD 2000 RS-232 cable**
- **ELSD 2000 detector containing compatible EPROM chip*****

*****IMPORTANT: The ELSD 2000 Control Software is only compatible with ELSD 2000 detectors that contain the proper EPROM chip version. The required EPROM version will depend on the serial number of your detector. Detectors with serial numbers up to 0009xxxA require EPROM version 0.2.10. Detectors with serial numbers from 0010xxxA to 600-0302008 require EPROM version 1.2.10. Detectors with serial numbers from 600-0302009 and above require EPROM version 2.x.x. Your detector may or may not require installation of an EPROM upgrade chip. Refer to Section 4, Setup, for more information.**

3. INSTALLATION

Use the following procedure to install the ELSD 2000 Control Software onto your PC:

1. Insert the ELSD 2000 Control CD-ROM provided into the proper drive on your PC. Select 'Run' from the start menu, and select 'Setup.exe' from the CD-ROM drive.

2. Follow the instructions as they appear on your screen.

3. Once installation is complete, the program will be saved to the 'Start/Programs' menu and an icon will be automatically created on your desktop. You will then be given a choice to either run the program immediately by checking the box, or to exit the installation screen without starting the program.

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4. SETUP

Complete the following sections to setup your system for running the ELSD 2000 Control Software:

A. Determine the current EPROM chip version in your ELSD

Before using the ELSD 2000 Control Software, first you must verify that your ELSD 2000 detector contains a compatible version of the EPROM chip. To determine this, complete the following steps:

1. Plug the power cable into your ELSD 2000 and power up the detector.
2. Manually scroll through the screens until you reach the <<Menu>> screen.
3. Press "7" and hold this key down for several seconds. This is not a listed choice in the menu, but it will bring up a "hidden" screen.
4. The current version of the EPROM chip will be listed in the upper right hand corner of this "hidden" screen. This screen also contains settings for the heaters inside the unit.

IMPORTANT: Do NOT attempt to make changes to any of the settings on this screen, as this would impair proper functioning of the detector. These settings are password protected.

5. Note the EPROM version contained in your detector and then exit the "hidden" screen to return to the main operation screen.
6. The proper EPROM chip version will be 0.2.10, 1.2.10, or 2.x.x, depending on the serial number of your detector. Detectors with serial numbers up to 0009xxxA require EPROM version 0.2.10. Detectors with serial numbers from 0010xxxA to 600-0302008 require EPROM version 1.2.10. Detectors with serial numbers from 600-0302009 and above require EPROM version 2.x.x. This chip should be included with the software package if needed. Contact Alltech if you require an upgrade chip.
7. If your detector already contains the correct EPROM chip, skip to Section C. If it does not contain the proper EPROM chip, continue on to Section B for instructions on installing the proper EPROM chip upgrade.

B. Install the proper EPROM chip into your ELSD (if necessary)

To install the new EPROM chip version, complete the following steps:

1. Turn off the power on your detector and disconnect the power cord.
2. Remove all of the screws and VERY CAREFULLY slide off the cover.
3. As you look inside the detector you will see a vertically positioned, 9" x 5" electronics board located several inches from the back of the detector. This is the mother board, and it inserts into the power board located on the floor of the detector. The EPROM chip will be visible on the left-hand side of the mother board as you face the detector with a white label stating "ELSD 2000 Vers. x.x.x". It is the only labeled chip. See **Figure 1** on the following page.
4. Gently pry the EPROM chip from its socket on the board, using a chip puller if available. Otherwise, a thin, flat screwdriver or pointed septum puller should be effective. GENTLY and UNIFORMLY loosen the chip from both the left and right sides rather than by pulling at the top of the chip. It is not necessary to save this original EPROM, but you may want to just as a backup (although it will not be compatible with the software). If so, be careful not to bend the prongs of the chip during removal.

IMPORTANT: Do NOT pull the socket piece away from the board during EPROM chip removal. The socket is soldered to the board and provides slots for the new chip to be inserted into. Remove only the chip itself.

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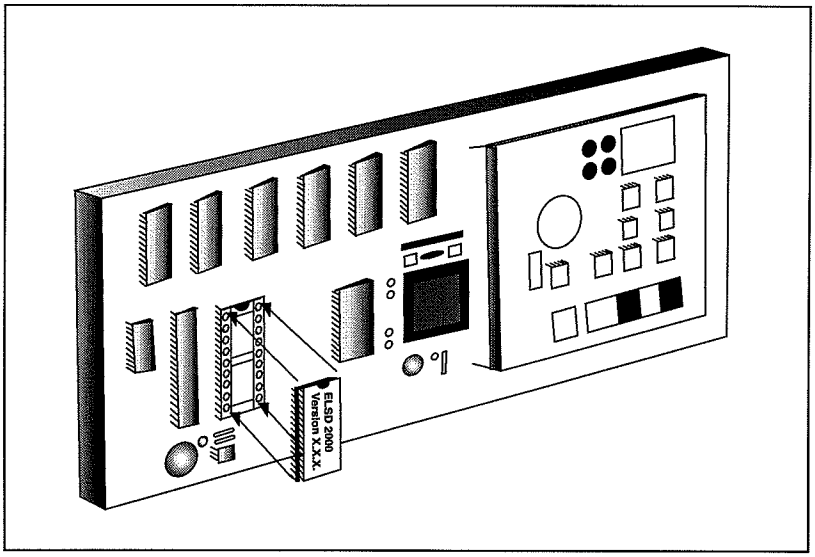


Fig. 1 EPROM Chip Insertion

5. With the **small notch positioned at the top of the chip**, GENTLY insert the updated EPROM chip with its support piece attached into the socket on the board. See **Figure 1** above.

IMPORTANT: Do NOT separate the EPROM chip from its support piece prior to insertion. The support piece provides strength and stability to the chip.

6. Carefully replace the cover and screws.

7. Reattach the power cord and power up the unit. The main operation screen should appear as usual. If the main operation screen does not appear normally, power off and contact Alltech.

C. Connect to the ELSD 2000 Control Software

To finalize your connection to the ELSD 2000 PC Control Software, complete the following steps:

1. Connect the ELSD 2000 RS-232 cable provided to the serial port on your PC and to the RS-232 port on the back of the ELSD. Note: Only the specific RS-232 cable provided may be used.

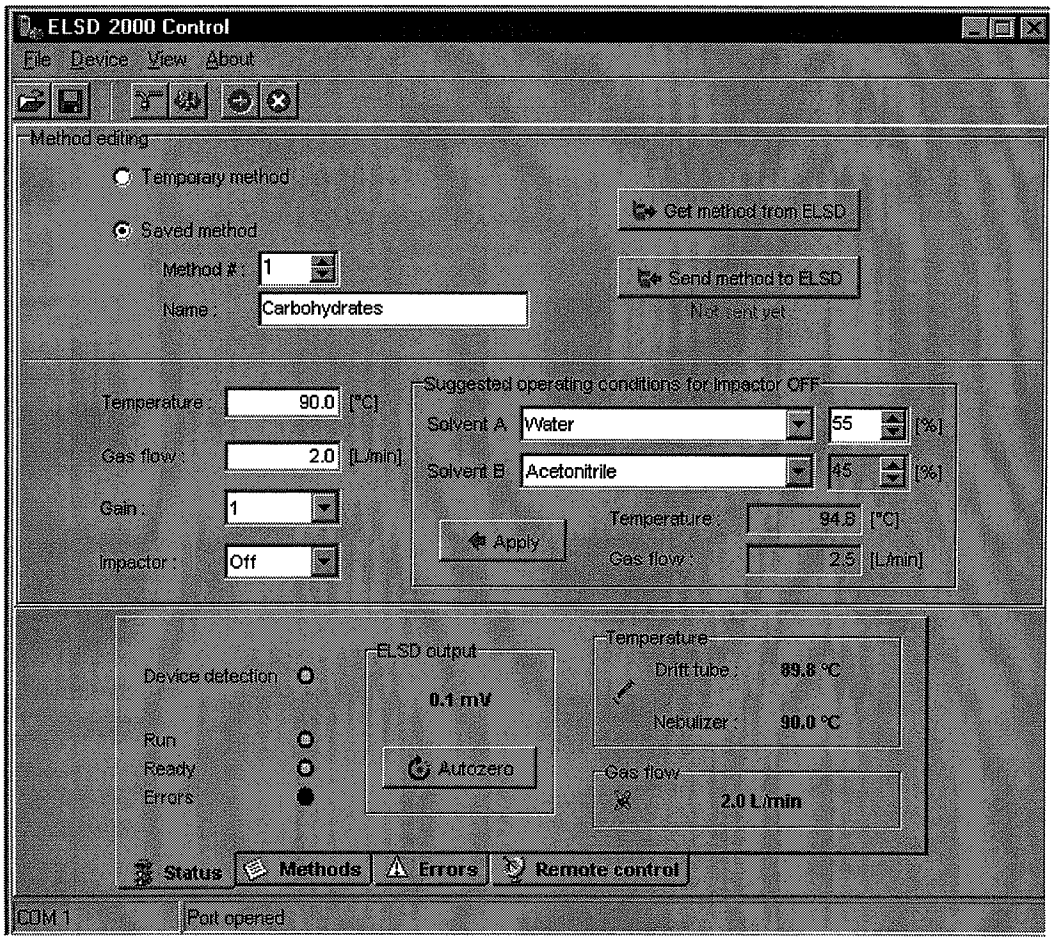
2. Make sure the ELSD 2000 detector is powered on before running the software.

3. Start the control software by double-clicking on the desktop icon or by selecting the program from the 'Start/Programs' list.

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5. OPERATION

1. Overview of the ELSD 2000 Control Software screen:



The selection bar at the top of the PC control screen provides drop-down menus with the following options:

File: **'Open method'**, **'Save method as'**, and **'Quit'**. Allows you to open a method from the PC, save a method to the PC, or quit the software program.

Device: **'Communication'**, **'Configuration'**, **'Run'**, and **'Standby'**. Allows you to choose the communication port number, select detector configuration settings, or put the detector into run or standby mode, respectively.

View: Allows you to customize the appearance of the PC control screen by selecting **'Method editing'**, **'Status screen'**, and/or **'Port status'** sections to be displayed. See below for descriptions of each section:

Method editing: Located in the top half of the control screen, this section provides a template for creating and editing methods. It also provides a calculator on the right hand side to help you select gas flowrate and drift tube temperature settings for applications using the impactor 'off' mode.

Status screen: Located towards the bottom of the screen, this section provides pages for detector **'Status'**, **'Methods'**, **'Errors'**, and **'Remote Control'** functions.

Port status: Located at the very bottom of the screen, this section consists of a bar that lists the currently selected COM port number and status.

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About: Displays the version number of the software.

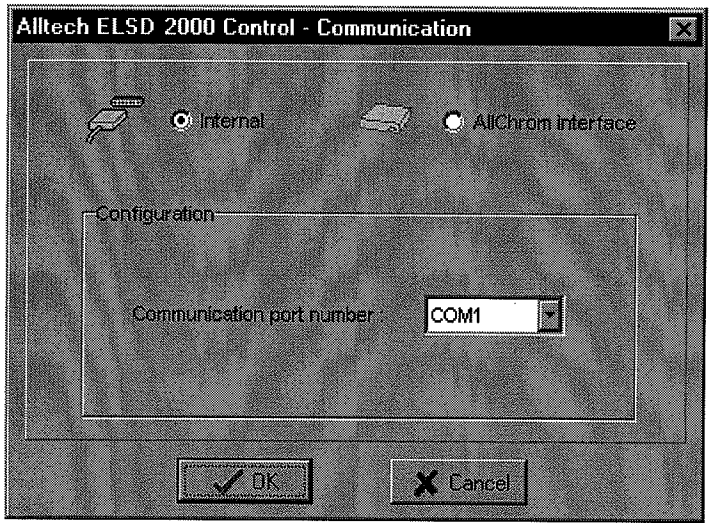
The icon bar at the top of the PC control screen also offers some of the same functions:



(from left to right): **'Open method'**, **'Save method as'**, **'Communication'**, **'Configuration'**, **'Run'**, and **'Standby'**.

2. Select Communication Settings

To use the ELSD 2000 Control Software, you must first select a communication port. Select **'Communication'** from either the Device menu or from the icon bar at the top of the screen to bring up the following screen:



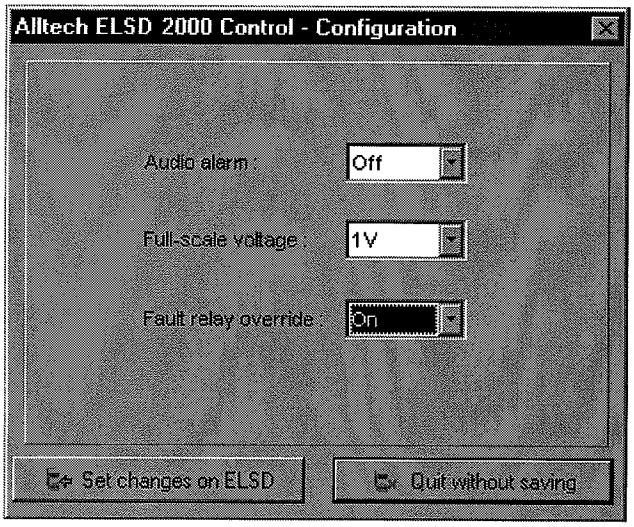
Select **'Internal'** if you are connecting directly from the ELSD 2000 detector to the serial port on your PC. Select **'AllChrom™ interface'** if you are using the control software in conjunction with AllChrom™ data acquisition software and are connecting to the ELSD 2000 through the AllChrom™ interface box. Contact Alltech for more details on AllChrom™ data acquisition software.

Use the pull-down menu to select the COM port corresponding to the RS-232 connection with your PC. Click **'OK'** to accept the setting, or **'Cancel'** to cancel the setting change.

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3. Select Configuration Settings

To select configuration settings, choose **'Configuration'** from the Device menu or from the icon bar at the top of the screen. The **'Configuration'** screen will then appear:

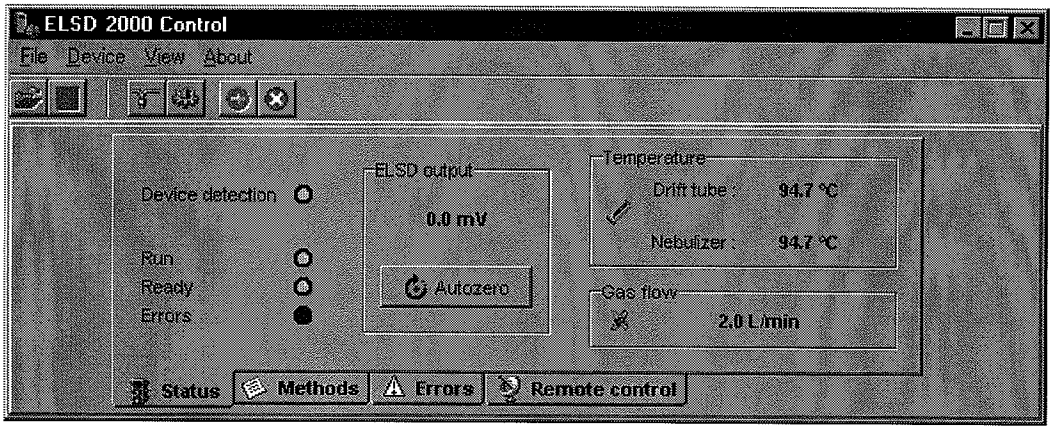


The 'Audio alarm', 'Full-scale voltage', and 'Fault relay override' settings can be selected from the drop-down menus beside each parameter. Then either accept the changed setting(s) by pressing **'Set changes on ELSD'** or cancel the changes by pressing **'Quit without saving'**.

4. Monitoring Detector Status

The status of the detector can be monitored from the status screen located at the bottom of the software control screen. The status screen contains four pages: **'Status'**, **'Methods'**, **'Errors'**, and **'Remote control'**. Click on the corresponding tab to access a specific page.

A. Status



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The **'Status'** screen contains simulated LED's that indicate:

- **Device detection:** bright green when connection is made with the detector and unlit when no device is detected.
- **Run status:** bright green for run mode and unlit for standby mode.
- **Ready status:** bright green when detector has fully equilibrated and bright red when detector is still equilibrating.

Ready conditions are as follows:

Impactor 'Off':
Drift Tube— within 1.5°C of the temperature setpoint
Nebulizer— within 1.5°C of the temperature setpoint
Gas Flow— within 0.3L/min of the setpoint

Impactor 'On':
Drift Tube— within 1.5°C of the temperature setpoint
Nebulizer— below 30°C (since this zone is not actively heated in this mode)
Gas Flow— within 0.3L/min of the setpoint

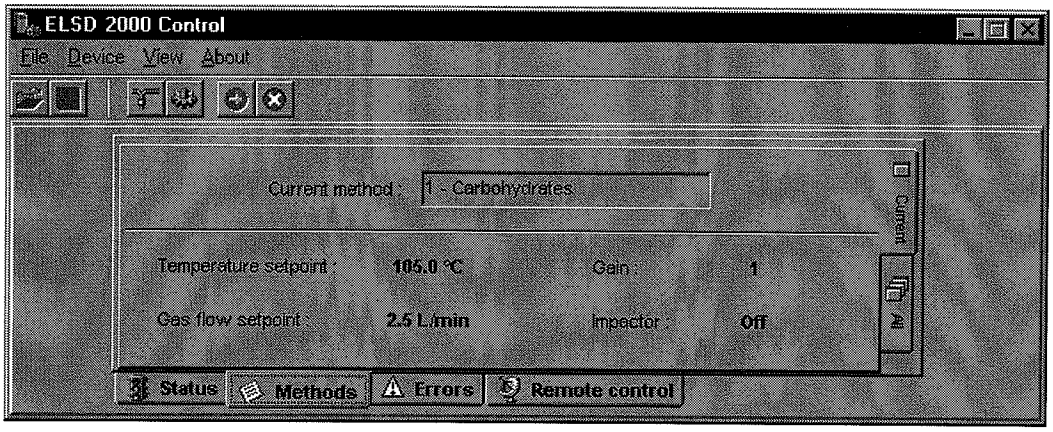
- **Errors:** bright red if any errors are present on the detector and unlit when no errors are occurring.

The **'ELSD output'** box lists the current mV reading from the detector and provides an **'Autozero'** button when the detector is in run mode. The display will read "Standby" and the Autozero button will be disabled when the detector is in standby mode.

The **'Temperature'** box displays the current drift tube and nebulizer zone temperatures. The **'Gas flow'** box displays the current gas flowrate in L/min. The temperature and gas flow values will appear in red text when they have not yet met the ready requirements for the currently loaded method. Refer to the 'Ready status' section above for equilibration requirements.

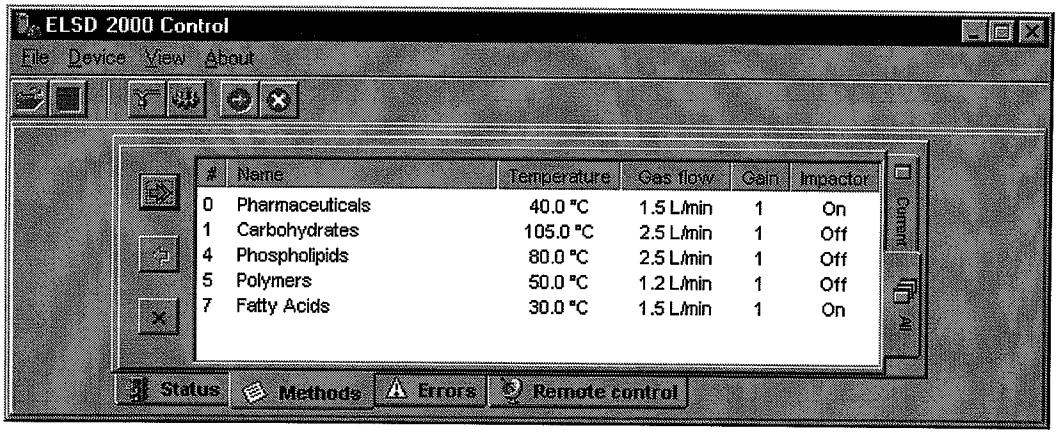
B. Methods

The **'Methods'** page of the status screen has two side tabs, **'Current'** and **'All'**. The **'Methods/Current'** tab displays the currently loaded ELSD method parameters:



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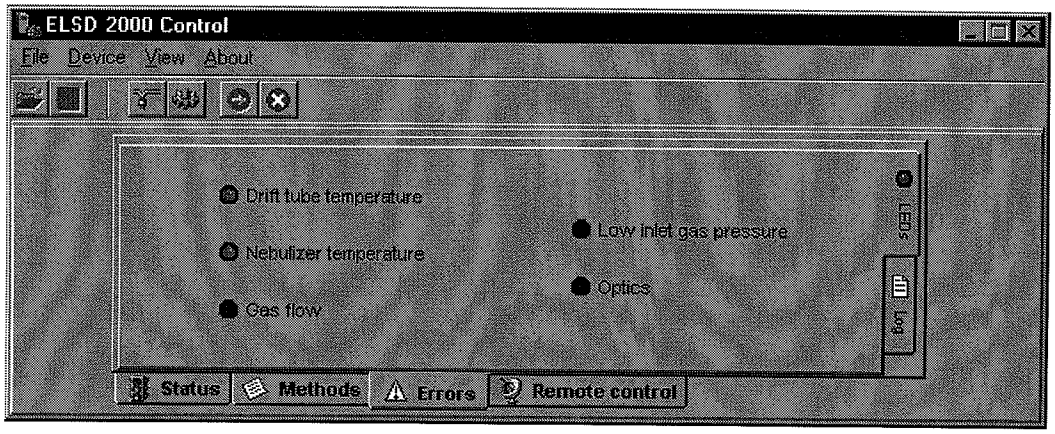
The **'Methods/All'** tab displays all of the available methods that are currently stored on the ELSD. Click on the **green double arrow icon** to get the current method list from the ELSD. To run a method, select a method from the method list and then click on the **green single arrow icon**. To delete a method, select the method from the list and then click on the **red 'X' button**.



C. Errors

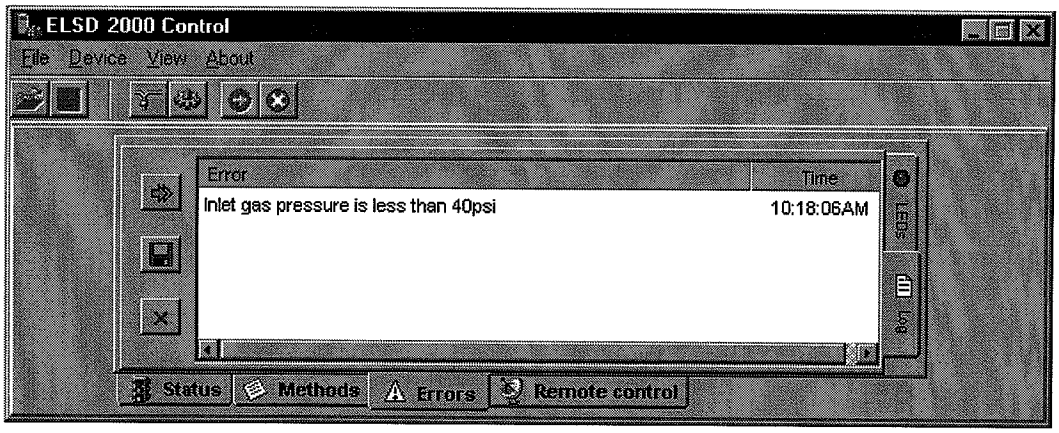
The **'Errors'** page of the status screen has two tabs on the right hand side, **'LEDs'** and **'Log'.**

The **'Errors/LEDs'** tab displays the possible ELSD operation errors. If an error is present, the corresponding LED will be bright red:



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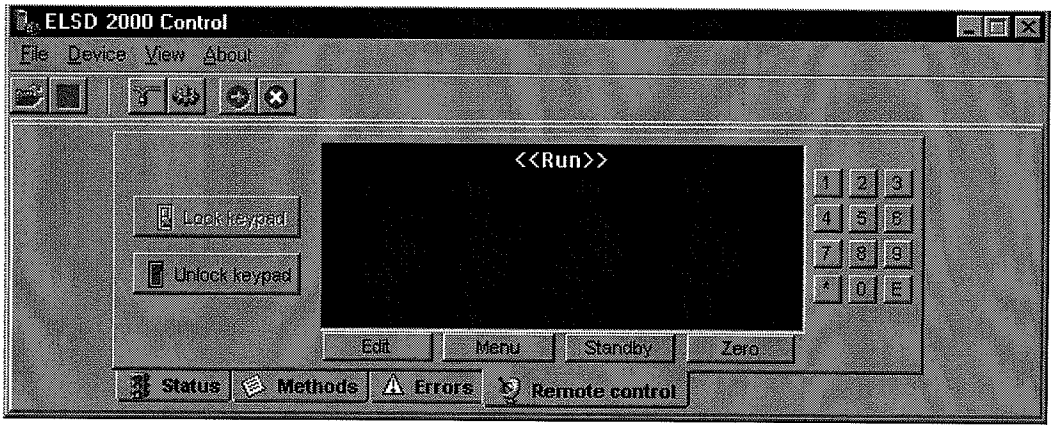
The **'Errors/Log'** tab displays the operation errors that have been logged on the ELSD. To get the logged errors, click on the **green double arrow button.** The error description and time it occurred will be displayed in the log. To save the error log, click on the **disk icon**. To delete the contents of the error log, click on the **red 'X' button**.



D. Remote Control

The **'Remote Control'** page of the status screen can be used to lock/unlock the keypad on the detector. To change the keypad setting, click on either **'Lock Keypad'** or **'Unlock Keypad'**. Locking the keypad will prevent manual use of the screen keys on the detector. The keypad can also be unlocked by re-powering up the detector or by exiting the software program.

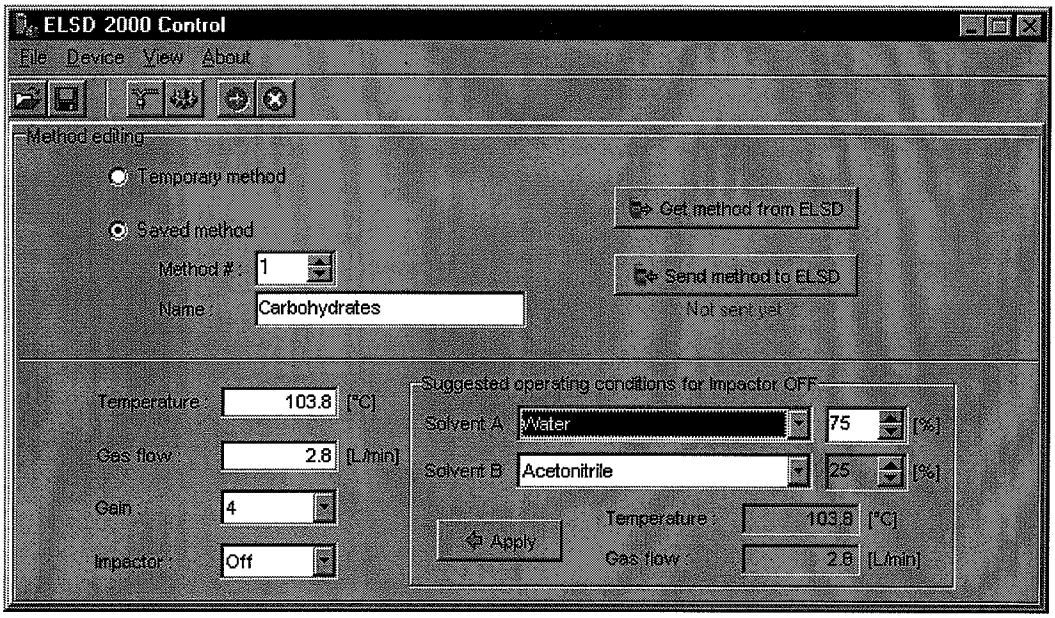
Note: Use this screen to lock/unlock keypad only, not for main PC control functions of the software.



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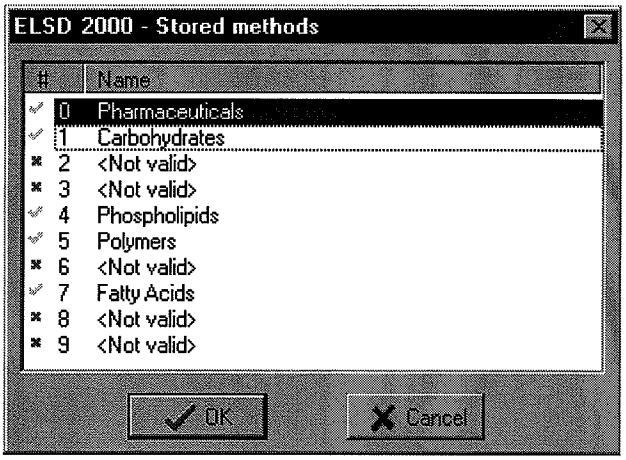
5. Creating and Editing Methods

New methods can be created and existing methods can be modified in the **'Method editing'** section of the main PC control software screen:



A. Select a Method for Editing

First select a method for editing from either the ELSD or the PC. To open a saved method from the ELSD, press **'Get method from ELSD'** to bring up the following screen:



Available methods will have a **green check** in front of them, and unused method numbers will have a **red 'X'** in front of them. Click on the desired method and then press **'OK'** to confirm selection or **'Cancel'** to cancel selection. The newly selected method settings will then appear in the 'Method editing' table.

To open a method from the PC for editing, select **'Open method'** from either the File menu or from the file icon at the top of the screen, and then choose a method. All ELSD methods will be saved to the PC with the .els extension. The settings from this method will then be listed in the 'Method editing' table.

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B. Edit the Selected Method

Make any desired changes to the selected method in the 'Method editing' table. Temperature, gas flow, gain, impactor position, method name, and method number settings can be adjusted using the text boxes, drop-down menus, and up/down arrow keys beside each parameter. Any time changes are made in the table, a **"Not sent yet"** message will appear in red text below the 'Send method to ELSD' button until the method is sent to the detector.

The **'Selected conditions for impactor 'Off' calculator** on the right hand side of the 'Method editing' table can be used to help you select temperature and gas flow settings for impactor 'off' applications. To use the calculator, first select 'Solvent A' and 'Solvent B' using the drop-down solvent menus in the table. Then select the percentage of 'Solvent A' that is present during the most aqueous part of your run using the up/down arrow keys. The percentage of 'Solvent B' and the suggested detector settings for this mobile phase will then be calculated and displayed automatically. Press **'Apply'** to enter the suggested settings into the 'Method editing' table. The recommended settings are based on a mobile phase flowrate of 1.0mL/min, so you may need to adjust your settings accordingly for higher or lower flowrates. The data and procedure used for the calculator are taken directly from Table 1 in the ELSD 2000 manual.

Note: This table should be used ONLY for impactor 'Off' applications, since the conditions required for impactor 'On' mode are much less solvent-dependent. To insure this, the calculator table is automatically disabled when the impactor 'On' setting is selected in the 'Method editing' table. Consult the ELSD 2000 manual for assistance in determining conditions for the impactor 'On' mode.

C. Save/Run the New Method Settings

Once any changes have been made, the new/edited method can either be saved to the PC or saved/sent directly to the detector. Press **'Send method to ELSD'** and the new settings from the 'Method editing' table will be sent to the ELSD and the detector will be put into the run mode. To save the method to the PC, select **'Save method as'** from the File menu or from the icon at the top of the screen and then save the new method changes with the desired name to your PC.

D. Creating Temporary Methods

To create a temporary method, click on the dot in front of **'Temporary method'** in the 'Method editing' table. The method name and number in the 'Method editing' table will then be disabled to indicate that the method is temporary. These parameters will remain disabled until the **'Saved method'** dot is selected again. Press **'Send method to ELSD'** to immediately run the temporary method conditions on the detector. Temporary method conditions will be lost from the detector upon power-off.

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