GE Healthcare

Ettan IPGphor 3 Control Software

User Manual

Ettan

Contents

1   Introduction

1.1   Introduction

Ettan™ IPGphor™ 3 Control Software is enclosed when purchasing IPGphor 3 instrument (order number 11-0036-23).

User friendly
Ettan IPGphor 3 Control Software is a user-friendly interface to the Ettan IPGphor 3 isoelectric focusing Instrument as well as it provides an enhanced functionality in the areas of data presentation, data storage, and protocol handling.

Tool tips will appear as the mouse is moved across active buttons, to guide the user in navigating and using the software. Online help for several of these functions is obtained using the menu **Help**:**IPGphor help**.

Protocol selection
Using **Fast mode** settings, recommended standard GE protocols are available to each strip length and pH interval. Using **Advanced mode** settings, new protocols are created. All protocols can be edited and saved for later use. The selected protocol is loaded to an Ettan IPGphor 3 isoelectric focusing Instrument.

Monitoring and documentation
Ettan IPGphor 3 Control Software provides excellent possibilities for monitoring and documentation:

* While isoelectric focusing of Immobiline™ DryStrip gels progresses, the software records voltage and current and graphs them as the run proceeds over time. In addition a log file is created.

* When a run is completed, graph and log file can be printed and/or exported to a Microsoft™ Excel® format.

Multiple instrument control
Ettan IPGphor 3 Control Software can be used to control up to four Ettan IPGphor 3 units at one time, each running different protocols and sets of run parameters.

1.2 Associated documentation

• Ettan IPGphor 3 Instrument User Manual (11-0034-58)

• Ettan IPGphor Cup Loading Manifold User Manual (11-0034-60)

• Ettan IPGphor 3 Safety Handbook (11-0034-61)

• Instructions Immobiline Dry Strip, attached to each package of Immobiline Dry Strip.

2   Requirements and installation

2.1   Computer requirements

Computer
Ettan IPGphor 3 Control Software is designed to work with computers that have operative systems Microsoft Windows® XP or Microsoft Windows 2000. The computer needs to have a COM port or a USB port.

To print displays, protocols, session logs etc. a printer has to be connected to the computer.

To export and save run data, graphs and log files Microsoft Excel software is required (Excel 2002 or later).

Computer instrument connection
Use the serial cable that comes with Ettan IPGphor 3 isoelectric focusing Unit to connect the serial port located at the back of the Ettan IPGphor 3 instrument to the appropriate COM port of the computer. USB port can also be used together with a USB to RS232 converter, see Ordering information in *Ettan IPGphor 3 Instrument User Manual*.

If multiple Ettan IPGphor 3 isoelectric focusing Units are to be controlled by Ettan IPGphor 3 Control Software the user must add an RS232 expansion box. Such expansion modules are available from National Instruments. Select the appropriate expansion module to fit with your computer connections (e.g. USB to RS232, PCMCIA to RS232, Ethernet to RS232).

2.2   Software installation

1   Uninstall previous versions of Ettan IPGphor Control Software if present.

2   Insert Ettan IPGphor 3 Control Software CD.

3   Run **Setup.exe**, which is found in the **Installation** folder on the CD.

4   During installation the following directories are created:

- **C\IPGphor 3\Protocols**

- **C\IPGphor 3\Run Data**

5   At the end of the installation, a dialog for adding the GE-protocols to the registry appears. Click **Yes** in this dialog before restarting the computer.

3 Software overview

3.1 Application window

The Ettan IPGphor 3 Control Software application window has a menu bar at the top with header:options selections, a series of control buttons, and two tabs, **Run settings & details** tab and **Session log** tab. In the **Run settings & details** tab there are two views, the **Info and data** view and the **Protocol** view.

Tool tips will appear as the mouse is moved across active buttons, to guide the user in navigating and using the software.

Online help for several of these functions is obtained using the menu **Help**: **IPGphor help**.

Fig 3-1. Ettan IPGphor 3 Control Software application window with Run settings & details tab and Info and data view opened.

3.2 Menus

To view the drop-down menu options, click on the selected header or use keyboard commands indicated by underlining (Alt + underlined header letter + underlined option letter), or ctrl + letter.

Header / Option	Short command	Function
File		
Export		Exports all log data to MS Excel format
Page setup		Specifies printing settings
Print	Ctrl + P	Prints the display, the current protocol or the session log
Preferences...		Specifies the export and protocol directories
Quit	Ctrl + Q	Disconnects from the instrument and closes the program
Protocol		
New	Ctrl + N	Starts a new protocol
Open	Ctrl + O	Opens a protocol. The last opened folder will be set as default folder.
Save	Ctrl + S	Saves the current protocol. The last opened folder will be set as default folder.
Transfer protocol		Downloads the selected protocol to the selected instrument at desired position (1-10)
Upload all		Use at instrument service: Uploads all protocols from an instrument to a file on the computer
Download all		Use at instrument service: Downloads the previously uploaded protocols to an instrument
Communication		
Instrument 1...		Opens a communication properties dialog for communication gate specification, instrument designation and instrument connection.
Instrument 2...		See above: Function for Instrument 1
Instrument 3...		See above: Function for Instrument 1
Instrument 4...		See above: Function for Instrument 1
Help		
IPGphor help	Ctrl + H	Opens the Online Help
About IPGphor 3 software		Opens the About dialog

3.3   Control buttons

Three groups of control buttons are located in the top of the application window.
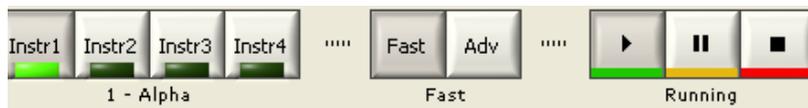
Fig 3-2. The three groups of control buttons of the Ettan IPGphor 3 Control Software application window

3.3.1   Instrument selection

With the left group of buttons one instrument is selected for downloading a protocol, starting a run, or when monitoring ongoing runs. The selected instrument ID is shown by shading the chosen button and by text below the buttons. When a green lamp on a instrument selection button is lit the corresponding instrument is connected to the software (see Fig 3-2, instrument 1).

3.3.2   Protocol mode

With the mid group of buttons **Fast** mode or **Advanced** mode for setting protocol is selected, for runs on Ettan IPGphor 3 isoelectric focusing units.

* With **Fast** mode the software selects an optimized protocol for the current experimental conditions.

* With **Advanced** mode it is possible to choose and edit any existing protocols or to make an entirely new protocol to optimize experimental performance in different aspects.

The current selected mode is shown by shading of the appropriate button and by text below the buttons.

Note: *It is possible to let the software select a protocol using the* **Fast** *mode and then edit the protocol in* **Advanced** *mode before downloading to an instrument*.

3.3.3   Instrument control

With the right group of buttons the run of the selected instrument is controlled by **Start**, **Pause** and **Stop** control buttons. The selected state of the run is indicated by shading of the appropriate button and by text below the buttons.

Note: *If the stop button is used the run can not be resumed.*

3.4   *Run settings & details tab*

This tab is used when defining experimental parameters, setting protocols, downloading protocols to the instruments and when monitoring an ongoing run.

*   At the top of the tab there are buttons and ComboBoxes used for entering experimental parameters and for protocol editing and handling.

*   At the bottom left of the tab there is a protocol details graph in which setpoint voltage, measured voltage and measured current can be displayed.

*   At the bottom right of the tab either **Info and Data** view or **Protoco**l view is shown.

3.4.1   ComboBoxes for entering experimental conditions

Fast mode
To enable automatic protocol selection in protocol **Fast** mode **Strip length**, **pH range** and **Number of strips** (**1-12**) have to be set. In the ComboBoxes allowed values are shown.
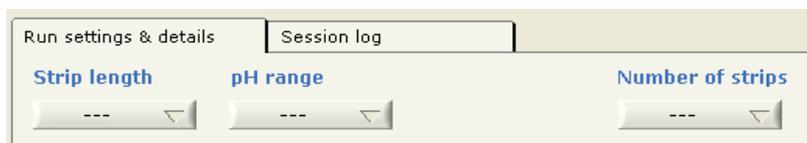
Fig 3-3. *ComboBoxes for experimental parameters in fast mode protocol selection*

Advanced mode
When using the **Advanced** mode protocol handling is performed with the **Protocol file** ComboBox and the three buttons, see 3.4.2. Number of strips is set by the **Number of strips** ComboBox.
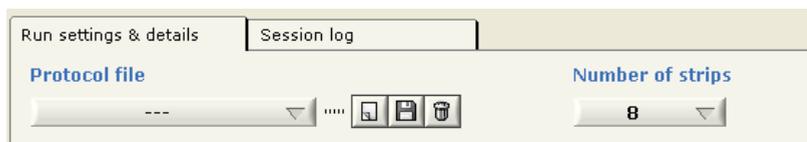
Fig 3-4. *ComboBoxes and buttons in advanced mode protocol selection*

3.4.2   Advanced mode protocol handling

Use the **Protocol file** ComboBox and the three buttons to the right of the ComboBox to create a new protocol, open an existing protocol or delete the current protocol.

Fig 3-5. *ComboBoxes and buttons in advanced mode protocol selection*

With the **Protocol file** ComboBox an existing protocol from the default protocol folder is selected. To change default folder use the menu **File: Preferences…**.

There are three buttons to the right of the **Protocol file** ComboBox:

- **New protocol** button (left), with which a new protocol is created.

- **Save protocol** button (middle), with which the current protocol is saved in the default protocol directory folder

- **Delete protocol** button (right), with which the current protocol is deleted from the hard disc

3.4.3 Protocol view

The protocol view is used when creating a new protocol or for editing an existing protocol. Values in fields can be edited. Voltage **Step/Grad** mode and **Time/Vh** mode can be selected for each **Step**.

Fig 3-6. Protocol view.

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Item	Description
Protocol name	Shows current protocol name.
Rehydr. time	Sets strip rehydration time.
Rehydr: Temp	Sets temperature of IPGphor 3 platform during rehydration.
IEF: I/strip (µA)	Sets maximal electrical current during isoelectric focusing per strip.
IEF: Temp	Sets temperature of IPGphor 3 platform during isoelectric focusing.
Step (1-9)	Makes it possible to set conditions for up to nine different steps during isoelectric focusing. Select **Step** or **Grad** (gradient) for each step. The duration of each step is defined by selecting either Time or Volthours (Vh)
Total time	Summarizes total running time for the protocol, not taking into account effects of reduced voltage due to isoelectric focusing current limits.
Total Vh	Summarizes total volthours for the protocol, not taking into account effects of reduced voltage due to isoelectric focusing current limits.

3.4.4 Range of parameters allowed

Protocol name
The **protocol name** can contain up to 16 characters.

Note: *The naming nomenclature of the GE protocols selected by the software in the* **Fast** *protocol mode follows the principle: The name is coupled to the length of the IPG strip and the pH range that is being run.*

Rehydration time
Using the **Strip Holder** the strip is rehydrated with the sample directly in the IPGphor 3. Rehydration and separation are then performed in a single time-saving run. Using the **Manifold**, the strips are rehydrated in the reswelling tray, and no rehydration time is required. **Rehydration time** can be set from 1 minute to 99 hrs:59 minutes.

Temperature (during rehydration)
Temperature during rehydration can be set between 15°C and 30°C. This value can be set in 1°C increments.

Current
The maximal recommended current is 75 μA/strip.

Temperature (during the isoelectric focusing run)
Temperature during isoelectric focusing can be set between 15°C and 30°C. This value can be set in 1°C increments. Since strips are run in high concentrations of urea, low temperatures can lead to the formation of urea crystals that block proper focusing.

Step/Grad
The two options for the voltage change pattern are **Step**, which sets the voltage at the selected value for the new step and then holds the voltage constant for the step duration; and **Grad** (gradient), which increases the voltage linearly with respect to time from the value set in the previous step to the value set for the current step. If the first step is set in gradient mode, the voltage will increase starting from 0 V.

Voltage
The **Voltage** of any step may be set from 1–10000 V. A value of 0 in this field will cause the program to end regardless of the values set for any subsequent steps.

The maximum voltage of 10000 V should only be applied to IPG strips of 18 and 24 cm, run in Ettan IPGphor Cup Loading Manifold and the Manifold Light. Other IPG strip holders have a maximum voltage of 8000 V. Regarding IPG strips of other lengths than 18 and 24 cm, please see the attached instructions of Immobiline DryStrip package.

Depending on the μA limit of the isoelectric focusing run, the conductivity of the IPG strip, rehydration solution and the sample, Ettan IPGphor 3 isoelectric focusing Unit may not operate at the set maximum voltage.

Time/VHrs
Each step of the protocol can be programmed to run for a specified **Time** or for a specific number of **VHrs** (volthours). Volthours is the product of the voltage multiplied by the number of hours for each step.

The maximum value for **Time** is 99 hours and 59 minutes. Each **VHrs** step may be set from 1–99,999 VHrs. If more than 100,000 VHrs is desired it will have to be split between two steps. At least 1 minute or 1 VHr must be programmed for a step or the program will end at that step regardless of what values are set for any subsequent steps.

3.4.5   Protocol details graph

To get an overview of the protocol and for monitoring the run two of three possible parameters (setpoint voltage, measured voltage and measured current) can be displayed as graphs. Ettan IPGphor 3 Control Software graphs the data (Voltage and Current) as it is retrieved from Ettan IPGphor 3 isoelectric focusing Unit.

Fig 3-7. *Protocol details graph with Measured voltage and Setpoint voltage selected*

3.4.6   Info and data view

The info and data view is used when monitoring a run. The following items are displayed:

- Selected instrument identity

- Current protocol step

- **Measured** and **Setpoint** voltage and current

- Accumulated volthours (**Vh**): An underscored value indicates that the current step has a set **Vh** (volthours) value.

- Elapsed time: An underscored value indicates that the current step has a set **Time** value.

- Estimated time left (experimental time can diverge from **Total time** due to *e.g.* disturbances in the electric current)

- **Total time** (the theoretical running time of the protocol)

- **Total Vh** (volthours) set in the protocol

- Buttons for selection of **Info and Data** view and **Protoco**l view.
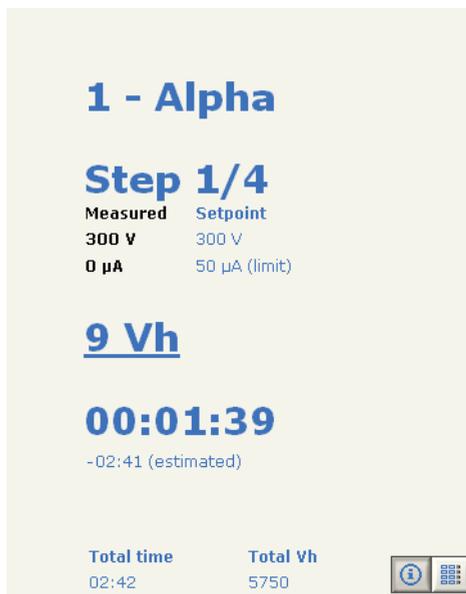
Fig 3-8. Info and data view.

3.5   Session log tab

In the **Session log** tab selected parameters and data retrieved from Ettan IPGphor 3 isoelectric focusing Unit from the run are collected. The instrument log records data once a run has started.

Examples of session log data are:

- Instrument ID

- Date

- Log on and log off times

- Run starting and ending times

- Step starting and ending times

- Run pausing time
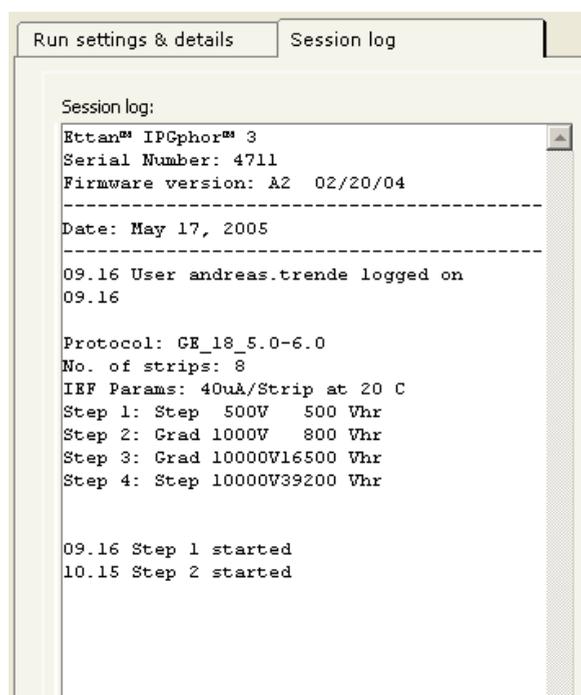
Fig 3-9. Session log tab.

4   Starting the software and connecting instruments

4.1   Opening the software

Click **Programs** in the Windows Start menu and select the Ettan IPGphor 3 **Control Software** or click on Ettan IPGphor 3 Control Software icon on desktop.

4.2   Connecting instruments

One to four instruments can be connected to one computer and Ettan IPGphor 3 Control Software.

1   Open the menu **Communication** and either of the four **Instrument (1-4)** options.

2   Set communication port below **Com port** in the dialog box.

3   Enter a name for the instrument in the **Name** box. This name will be displayed below the instrument buttons in the main software application window when this instrument is selected by the instrument buttons.

4   Tick the **Active** box to activate the instrument. The box now contains a mark and a green lamp is lit in the corresponding **Instrument** button.

Note: *Sometimes the connection between the Ettan IPGphor 3 Control Software and an instrument is lost. If that happens open the menu* **Communication/Instrument (1-4)** *as described and tick the* **Active** *box to activate the instrument. When contact to the instrument is successfully established a green light is lit.*

Note: *If there is frequent instrument computer disconnection ensure that the Ettan IPGphor 3 instrument Baude rate is set to 9600.*

4.3 Closing the software

Chose **File**: **Quit** (Ctrl+Q) to close the software. This command also disconnects any connected instruments.

Note: *If the instrument is in run mode the connection to the instruments will be lost and no run data or log files can be saved for the current runs.*

5 Setting protocols

When setting the protocol for an isoelectric focusing run in the Ettan IPGphor 3 Control Software there are two major options: **Fast** mode and **Advanced** mode.

In the **Fast** mode option the software selects an optimized protocol based on what manifold type, strip length and pH range to be used. After the software has selected a protocol it is optional to edit it.

In the **Advanced** mode option there are many possibilities for setting the protocol. It is possible to start with a new empty protocol, to use an existing protocol, or to open and edit an existing protocol.

5.1 Using the Fast mode protocol option

1 Open the software as described in section 4.1.

2 Click on an **Instrument** button (the four buttons to the top left of the main window) to select the desired instrument.

3 Select **Fast** mode by clicking the left of the two central control buttons. *Fast* should be shown below the buttons.

4 Select the **Run settings & details** tab by clicking the tab head if it is not already open

5 Set experimental conditions, that is **Strip length**, **pH range** and **Number of strips**, by using the ComboBoxes at the top of the tab window.
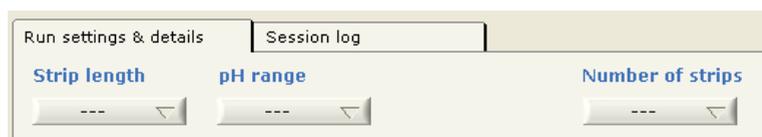
6 The software now selects an optimized GE protocol for the specified experimental parameters.

Optional
It is possible to edit the current **Fast** mode protocol. Select **Advanced** mode by clicking the right of the two central control buttons and see 5.2.3 for further instructions.

5.2 Using the Advanced mode protocol option

1 Open the software as described in section 4.1.

2 Click on an **Instrument** button (the four buttons to the top left of the main window) to select the desired instrument.

3 Select **Advanced** mode by clicking the right of the two central control buttons. *Advanced* should be shown below the buttons.

4 Select **Run settings & details** tab by clicking the tab head if it is not already open.

5 Set **Number of strips** by using the ComboBox at the top of the tab window.

Now several options is possible. It is possible to create a new protocol, to open, edit and save protocol to and from protocol folders, and to delete an existing protocol.

5.2.1 Creating new protocols

1 Open a new protocol by clicking the left of the three buttons, or by using the main menu **Protocol**: **New** (Ctrl+N).

2 Now empty fields for different parameters is shown in the **Protocol** view.

3 To enter data, click with the cursor in a field and write the desired text or values. There are switch buttons for choice of **Step**/**Grad** (gradient) for **U [V]** (voltage) and **HH:mm/Vh** (volthours) for **Time or Vh** for each protocol step. See 3.4.4, for allowed limits for each parameter.

5.2.2   Opening existing protocols

1   Select the **Protocol** view in the **Run settings & details** tab by clicking the right of the two buttons at the low right corner of the tab window.

2   Click the **Protocol file** ComboBox and select the desired protocol in the list of protocols.

3   If the desired protocol is not present in the default folder open the menu **Protocol**: **Open** (Ctrl+O) and browse for the folder containing the desired protocol. The set values of the protocol is now shown.

5.2.3 Editing protocols

1 Select the **Protocol** view in the **Run settings & details** tab by clicking the right of the two buttons at the low right corner of the tab window.

2 Click the **Protocol file** ComboBox and click on the wanted protocol in the list of protocols. If the desired protocol is not present in the default folder open the menu **Protocol**: **Open** (Ctrl+O) and browse for the folder containing the desired protocol. This folder will now be the new default folder from which the **Protocol file** ComboBox is populated.

3 The set values of the protocol is now shown.

4 To edit the opened protocol, click in a field and write the desired text or values. There are switch buttons for instrument protocol position and choice of stepping/gradient of voltage and time/volthour for each protocol step. See section 3.4.4, for allowed limits for each parameter.

5.2.4   Saving protocols

1   Check that the desired protocol name is entered in the **Protocol name** box. A tip is to name the protocol according to user name_strip length_pH range (upper limit 16 characters).

2   Click the middle of the three buttons in order to save the protocol. A **Save as** dialog is opened. Change protocol file name and **Protocol directory** folder if desired.

Note: *If the name of an edited protocol is not changed the protocol used for editing will be overwritten and lost.*

5.2.5   Downloading protocols to instrument at specific positions

1   To download a protocol to the Ettan IPGphor 3 instrument at another position than position 1, select menu **Protocol: Transfer protocol...** and select desired **Instrument position** (1-10). Click **OK**.

2   The current protocol is now downloaded to the selected position in the Ettan IPGphor 3 instrument. Any existing protocol at that position is overwritten.

5.2.6   Deleting protocols

1   Click on the right button of the three buttons in the top of the **Protocol** view. The current protocol is now deleted.

5.3 Printing protocols

1   Open the menu **File**: **Print** (Ctrl+P).

2   Click the **Print option: Current protocol** tick box and **OK**.
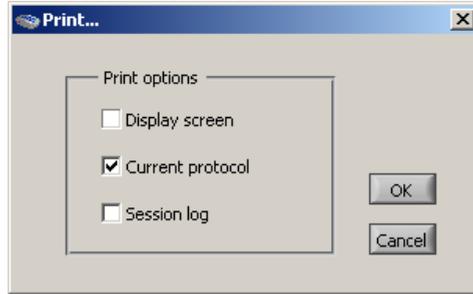
6   Starting and monitoring runs

6.1   Starting runs

1   Select instrument by clicking the desired **Instrument** button.

2   Select a protocol to run (see 5).

3   Select the number of strips to run (see 5).

4   Click the **Start** button (the left button of the three instrument control buttons). The current protocol is now downloaded to position 1 in the selected instrument.

5   The run is now started which is indicated by the word **Running** below the instrument control buttons.

6   To start a second run, select the desired instrument, protocol, and number of strips to run, and click the **Start** button. It is possible to start up to four different runs using four different protocols on four different instruments in parallel.

6.2   Pausing runs

1   Click the **Pause** button (the middle button of the three instrument control buttons). The run is now paused which is indicted by the word **Paused** below the instrument control buttons.

2   Click the **Start** button to proceed the run. The run is started from the same position in the protocol from where it was paused.

6.3   Stopping runs

1   Click the **Stop** button (the right button of the three instrument control buttons) to stop an ongoing run. The run is now stopped which is indicted by the word **Idle** below the instrument control buttons.

Note: *When using the stop button it is not possible to resume the run again. However it is possible to start from the beginning of the protocol.*

6.4 Monitoring runs

1 Click the correct **Instrument** control button to select the desired instrument. The identity of the selected instrument is shown below the control buttons.

2 Open the **Run settings & details** tab by clicking the tab heading, if not already open.

3 In the **Protocol details** graph two of three possible parameters (setpoint voltage, measured voltage and measured current) are displayed to give an overview of the protocol and the run.

4 Open any of the ComboBoxes below the graph and then click on the desired parameter to be displayed in the **Protocol details** graph.

> *Note:* *If measured voltage and measured current are selected, the time scale changes and only the elapsed time is shown.*

5   Click the left of the two buttons at the lower right corner of the tab window to select the **Info and data** view. The main running parameters are now displayed. The underlined parameter indicates which of **Vh** and **Time** that is selected to define the length of the current step.
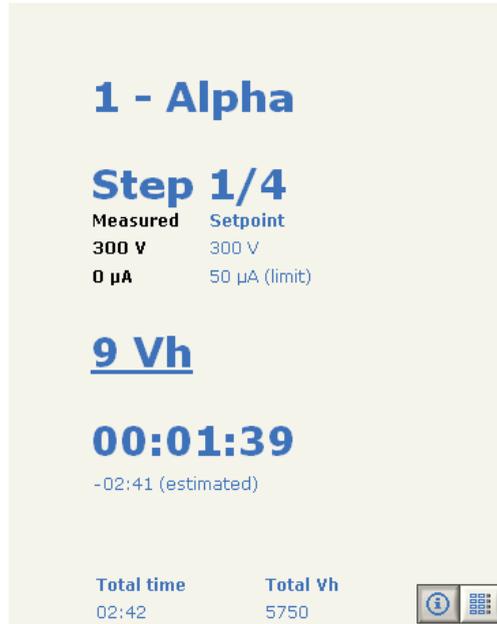
6 Open the **Session log** tab by clicking the tab heading to view the running data collected in the log file.

```
Run settings & details    Session log

Session log:
Ettan™ IPGphor™ 3
Serial Number: 4711
Firmware version: A2  02/20/04
------------------------------------------
Date: May 17, 2005
------------------------------------------
09.16 User andreas.trende logged on
09.16

Protocol: GE_18_5.0-6.0
No. of strips: 8
IEF Params: 40uA/Strip at 20 C
Step 1: Step   500V    500 Vhr
Step 2: Grad 1000V    800 Vhr
Step 3: Grad 10000V16500 Vhr
Step 4: Step 10000V39200 Vhr


09.16 Step 1 started
10.15 Step 2 started
```

7 Click another instrument control button for monitoring runs on other instruments controlled from the software. This way it is possible to monitor up to four parallel runs.

7   Handling run data and log files

After a run is finished or stopped, see section 6.3, there is an option to save recorded running data and log file for future reference.

7.1   Exporting run data and log files

1   Click on the desired instrument button, if not already done, to select the desired run.

2   Export running data and log file of the current run by using the menu **File**: **Export.**

3   Select the desired **Export options** by clicking in the tick boxes. Click **OK** to export the data. The current screen can be saved as a jpg image and the run data in a Microsoft Excel file.
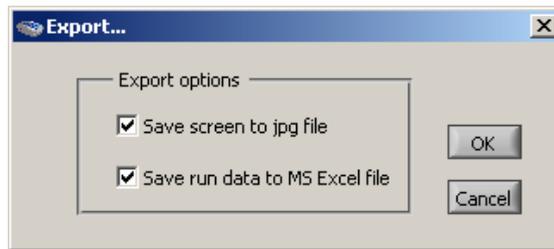
4   The selected export options are now saved in a default export directory.

Note: *To change the default folder for your export directory use the menu* **File**: **Preferences…** *and browse for the desired* **Export directory** *folder and then click OK.*
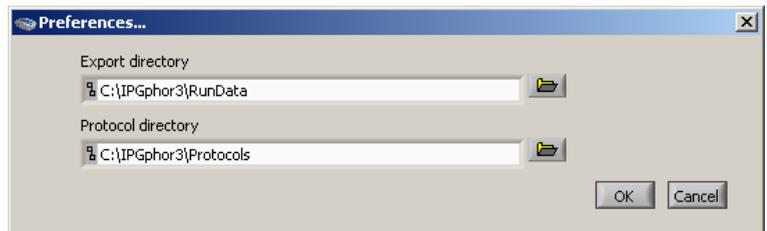
5   Edit the export file default names if desired. The default names are generated by date and time (e.g. Apr 20, 2005_14.21.20).

7.2 Printing run data and log files

1   Select the menu **File**: **Print** (Ctrl+P).

2   Select the desired **Print options** by clicking in the tick boxes and then click **OK**.
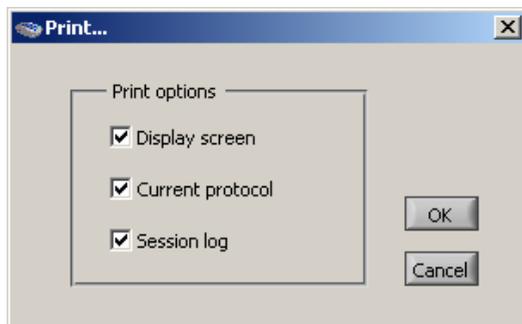
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