User guide EZChrom driver for Autosampler

version 1.0

document number 0060.292-10

Running the Autosampler with EZChrom *Elite* Software

The following topics will be discussed:

1. Autosampler Driver Installation page 2
2. Autosampler Configuration page 6
3. Autosampler Setup page 11
4. Autosampler Interface page 16
5. Autosampler Status page 18

1. Autosampler Driver Installation

First, EZChrom Elite must be installed. Please refer to the EZChrom Elite installation guide to install EZChrom Elite.

Insert the autosampler driver CD. The following start menu will be displayed.

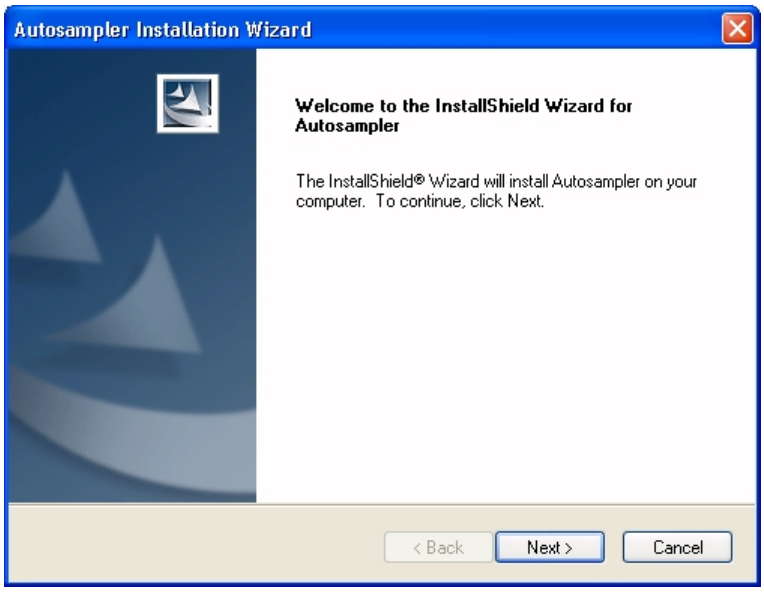

Fig. 1

Click on Next> to continue. If more than one EZChrom Elite installations exist on your PC, the target installation to which the driver shall be added must be selected (Fig. 2).

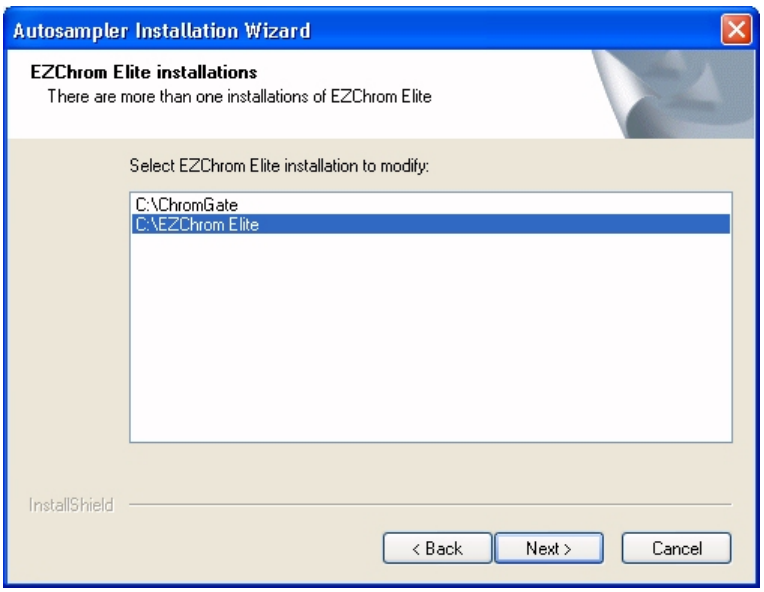

Fig. 2

Click on Next> to continue and to get the following screen.

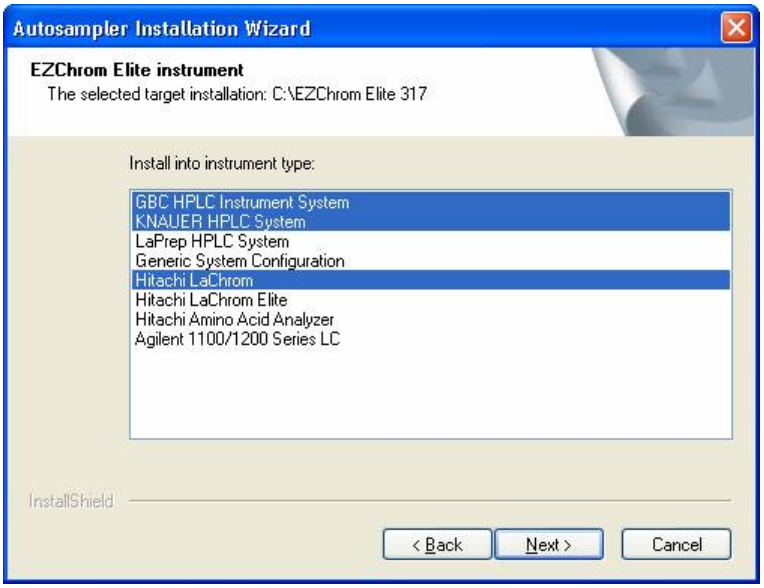

Fig. 3

Select the instrument type into which the driver shall be installed. Multiple selection is possible. Click on Next> to confirm this window. If you have not selected at least one instrument type you will get the following error message.

Fig. 4

In the next window click on “Install” to start the installation. To cancel the installation procedure click “Cancel”.

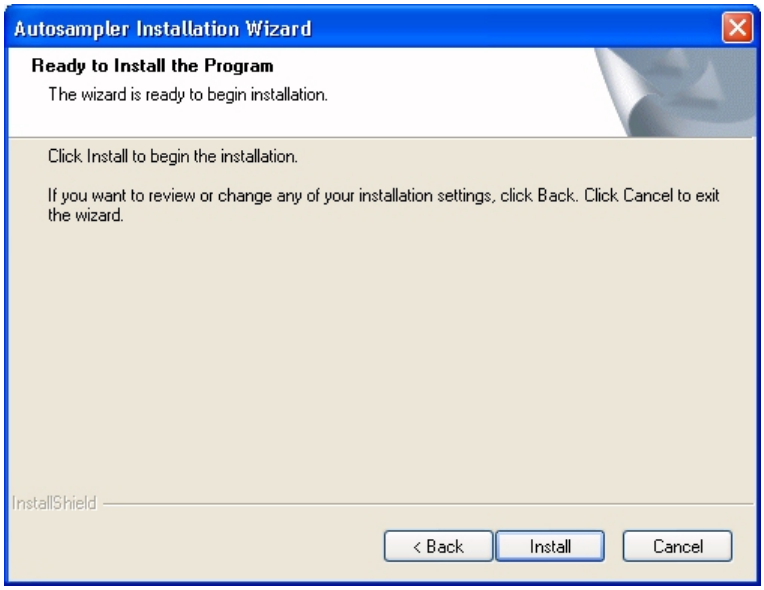

Fig. 5

During the installation its progress can be observed.

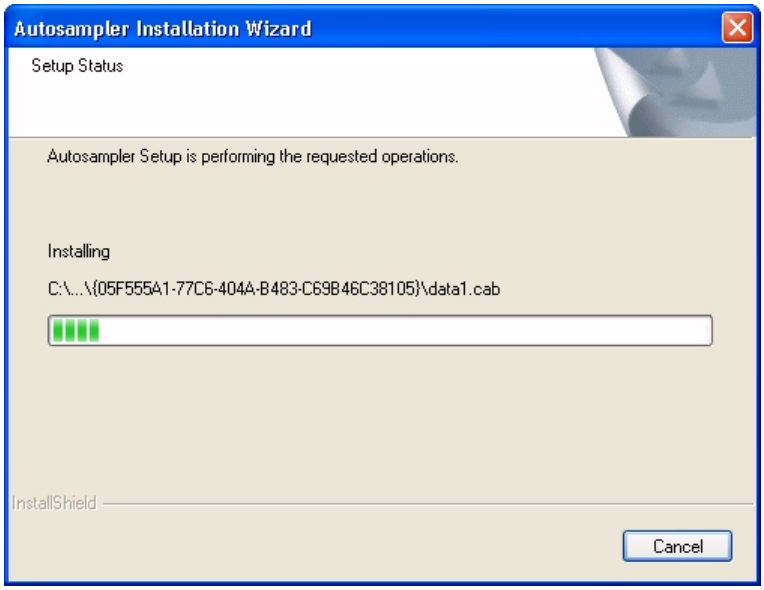

Fig. 6

The following window will be displayed when the installation has been completed.

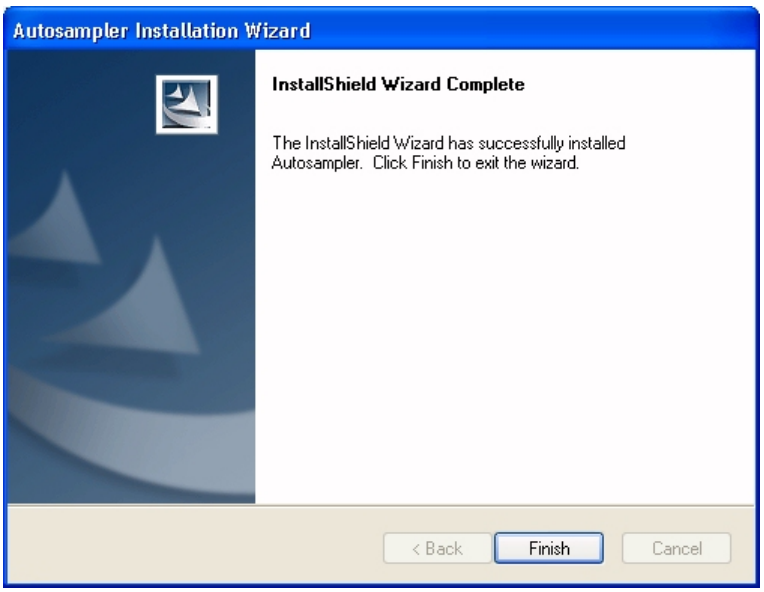

Fig. 7

Click on “Finish” to finalize the driver installation.

After the installation, the autosampler will be in the list of available instruments in the selected LC systems.

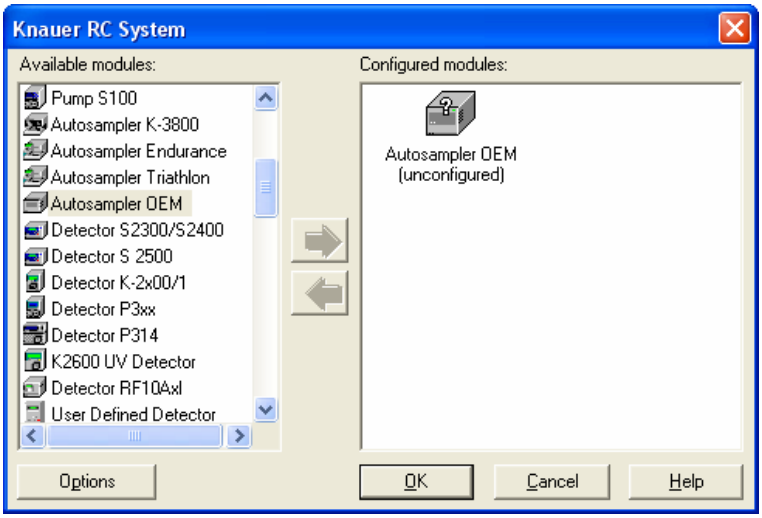

Fig. 8 Instrument selection dialog

2. Autosampler Configuration

For each system only one autosampler will be accepted. Select the autosampler in the Configured Modules window, double-click the icon and fill-in the configuration dialog.

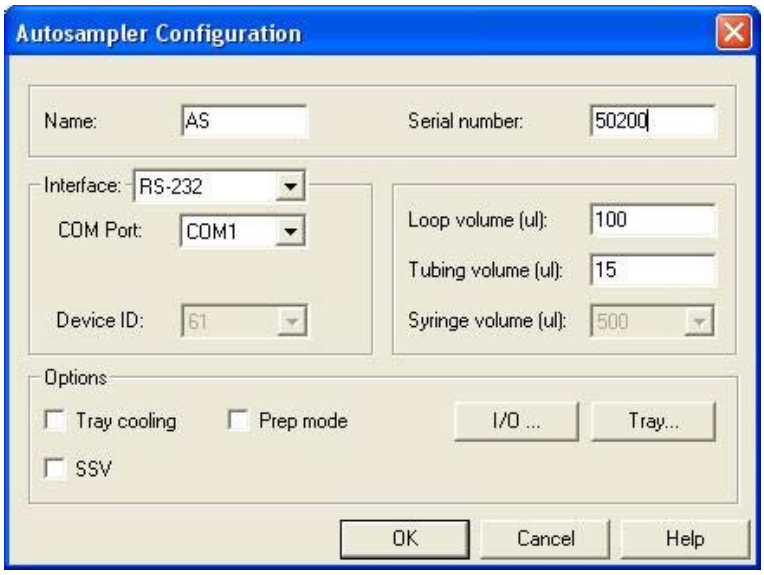

Fig. 9 Configuration window

The following parameters can be configured for the autosampler:

Name

Enter a descriptive name for the sampler. This name will appear on the autosampler tab when the instrument setup or status windows are displayed. Use a name which is unique within the instrument.

Serial Number

Enter the serial number of the autosampler used. No autosampler control will be allowed in case of a wrong serial number.

Communication Interface

COM Port

Select the number for the communication port on your PC where the autosampler is connected.

☞ **Currently, only RS-232 communication is supported.**

Device ID

The device identifier for the autosampler is fixed at **61**. It cannot be changed.

Loop Volume

Enter the volume of the installed loop in µl. The valid range is: **0000 - 5000 µl**. During **Prep Mode** the loop volume is fixed at **10000** µl.

Tubing Volume

Enter the volume of the installed needle and tubing in µl. The valid range is **0** - **999** µl.

Syringe Volume

Select the volume of the installed syringe from the drop-down list. The choice is **500 µl**; **2500 µl** syringe is used in the **Prep Mode**.

Options

Tray Cooling

Check this box if you want to control the tray cooling. The desired temperature is then to be entered later as part of the instrument setup.

SSV (Solvent Selection Valve)

Check this box if the autosampler is equipped with a Solvent Selection Valve and you want to use it. If the SSV option is present, then the position of the SSV can be programmed in the timebase method.

Prep mode

Check this box if you have the preparative instrument installed.

I/O...

Click the I/O button to configure the autosampler inputs / outputs:

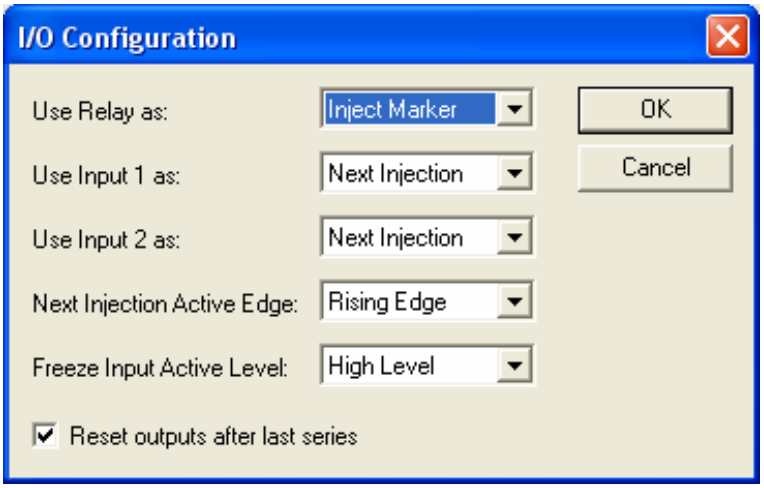

Fig. 10 I/O configuration

Use Relay as

Select the mode of the relay. The choices are **Inject Marker**, **Auxiliary**, **Alarm.** If the selection is Auxiliary, then the AUX event can be programmed in the timebase method.

The EZChrom Elite trigger paradigm (External Trigger) requires that all devices receive a wired start signal (short-closure) at the moment of injection, therefore the default choice of Inject Marker is preferable.

Use Input 1 as
Use Input 2 as

Select the mode of operation for input 1 and 2. The choices are **Next Injection**, **Freeze**, **Stop.** Under software control the Input 1 or 2 should be used rarely (may be in some specific cases).

Next Injection Active Edge

Select the active edge if you want to activate the next injection. The choices are **Falling Edge** (default) and **Rising Edge.**

Freeze Input Active Level

Select the active level if you want to freeze operation of the autosampler. The choices are **Low Level** (default) and **High Level.**

Reset Outputs after last series

Select this mode if you want to reset outputs at the end.

When complete, click **OK** to exit the dialog.

Tray...

Click the Tray… button to set up the autosampler tray:

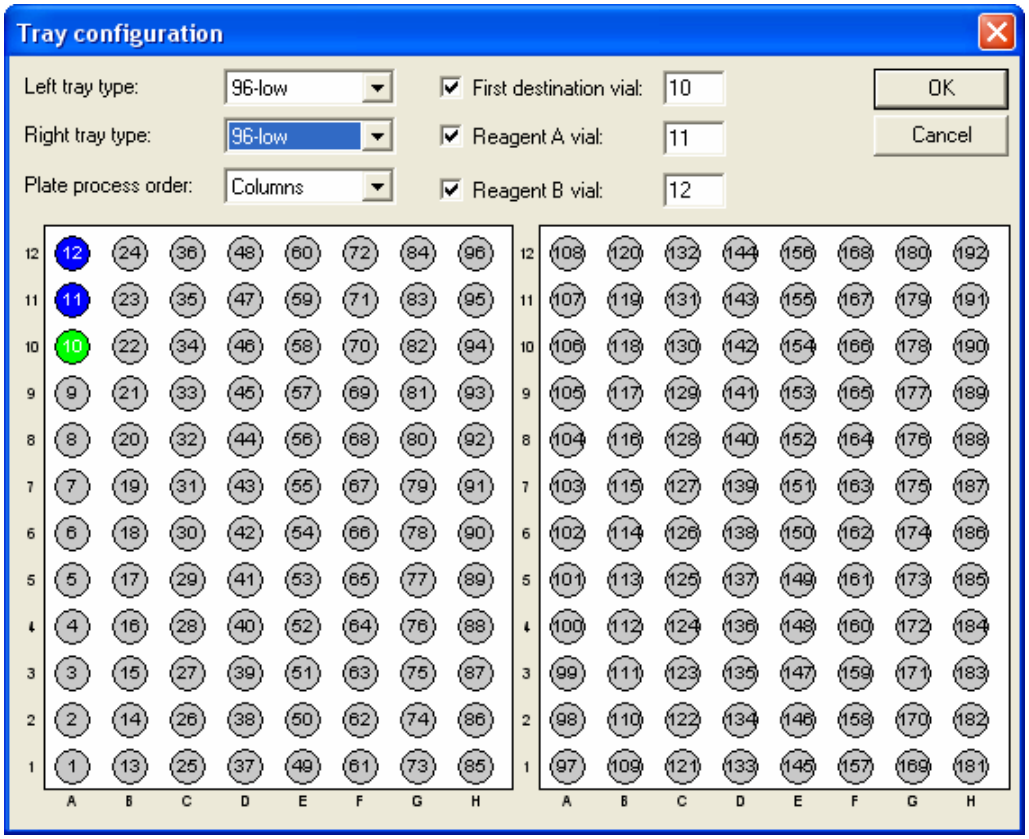

Fig. 11 Autosampler tray configuration

Left tray type

Select the type of tray installed on the left segment. The choices are **96 low**, **96 high**, **384 low**, **48 vials**, **12 vials.**

Right tray type

Select the type of tray installed on the right segment. The choices are **96 low**, **96 high**, **384 low**, **48 vials**, **12 vials.**

The selection can be different for each tray.

☞ **In case the prep mode has been activated, the selection is fixed at 12 VIALS.**

Plate process order

Select the order of processing of the plate. The choices are **Columns** and **Rows**.

First destination vial

Enable this option if you want to use destination vials.

First destination vial position

Enter the first destination vial position. The first destination vial position in the rack will be marked in green.

Reagent A vial

Enable these options if you want to use the Reagent A vial.

Reagent A vial position

Enter the corresponding vial position. The Reagent A vial position in the rack will be marked in blue.

Reagent B vial

Enable these options if you want to use the Reagent B vial.

Reagent B vial position

Enter the corresponding vial position. The Reagent B vial position in the rack will marked by blue color.

When complete, click **OK** to exit the dialog and return to the instrument configuration icon list.

☞ **Warning: No autosampler control (even for direct control operations) will be allowed if the configuration (set in the autosampler configuration dialog) mismatches the actual configuration of the autosampler (the Serial Number, the Solvent Selection Valve, and the Cooling Option).**

3. Autosampler Setup

The method parameters required for automatic operation of your autosampler are contained in the **Method/Instrument Setup/AS** tab. The control parameters for the autosampler become part of your method and sequence files.

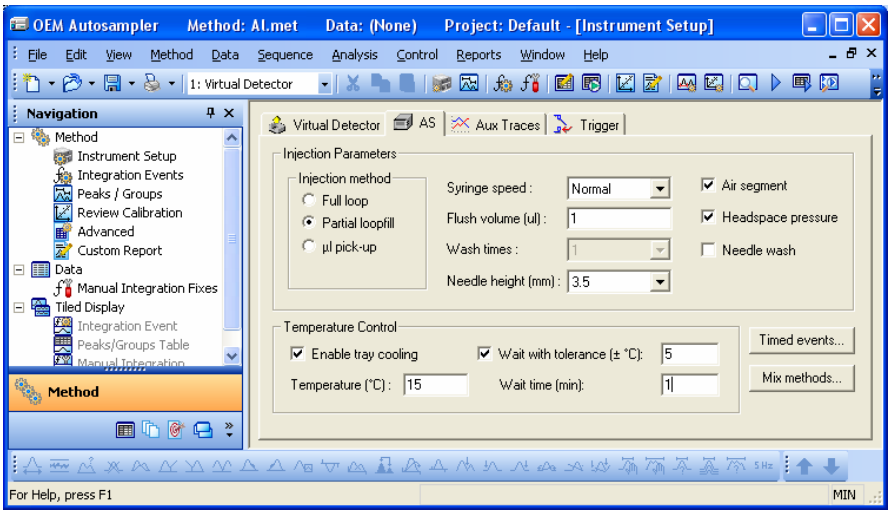

Fig. 12 Setup window

Injection Parameters

Injection Method

Select the injection method by clicking on one of the available options: **Full loop**, **Partial loop fill**, or **µl Pick-up**.

☞ **The maximum programmable injection volumes are:**

Full loop:	not programmable, is equal to the loop volume but needs more sample to fill the loop completely (3 x loop volume for loop volumes < 100 µl 2 x loop volume for loop volumes from 100 µl to 500 µl 1.5 x loop volume for loop volumes > 500 µl)
Partial loop fill:	50 % of the programmed loop volume
µl Pick-up:	Injection volume = (loop volume – 3 x needle volume) / 2

Syringe Speed

The aspirating speed of the syringe used in injection methods can be adapted depending on the viscosity of the samples (the choices are **Low**, **Normal**, **and High**). The speed of the syringe during washing or rinsing procedures is not affected by this setting.

Flush Volume

Enter the amount of sample in µl taken from a vial to preflush the needle before the loop is filled with the sample. The valid range is **0000** - **9999** µl. The default value is 30 µl for a tube volume of 15µl. In the flushed loop mode this option is deactivated.

☞ **Flush volumes lower than twice the volume of the needle and tubing will result in a decrease of performance of the autosampler.**

Wash times

Select the Wash times (in number of syringe volumes). The valid interval is between **1** and **9**.

Needle height

It defines the penetration depth of the needle or the distance between the vial bottom and the needle tip. The valid settings are between 2 and 6 mm with a step width of 0.5 mm.

Air Segment

Check the Air Segment box to enable the use of an air segment between the sample and the wash solvent to reduce the amount of flush volume.

Headspace Pressure

Check the Headspace Pressure box to enable the use of headspace pressure in combination with the syringe to transport sample to the loop. The compressor will always be used during a wash procedure.

☞ **The accuracy and reproducibility of the autosampler may decrease if headspace pressure is switched off.**

Needle Wash

Check the needle wash option to perform the needle wash between injections.

Temperature control

Enable tray cooling

If your autosampler is equipped with a tray cooling facility, this option can be checked and the desired temperature (4 – 22 °C) can be entered.

Wait with tolerance (±°C)

The system becomes ready only if the current tray temperature is inside the set range.

Wait time (min)

The wait time is the equilibrating time in minutes after the tray temperature reached the temperature set range before the injection takes place.

Timed Events

This type of events enables you to control other devices with the auxiliary (relay) and / or to set the required position for the solvent selection valve. Each event can be programmed on a time base, which starts at the moment of injection.

These events are only available if the corresponding options are enabled in the configuration dialog.

Click the **Timed events**... button to set up the timebase methods. The Timebase Methods setup dialog will appear.

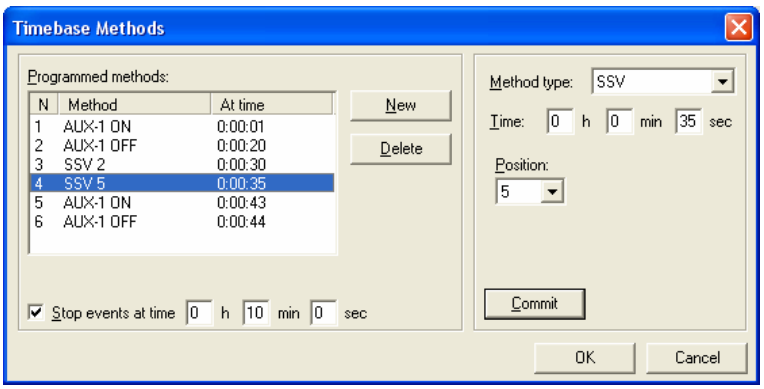

Fig. 13 Timebase methods view

Click the **New** button to add one more line to the programmed methods.

The auxiliary output **AUX-1** can be set to **ON** (contact closure) and to **OFF** at a programmed **Time**. It is not possible to program the same auxiliary to ON and OFF at the same time.

Click the **Commit** button to update your selection.

Click the **Delete** button to remove the selected line from the programmed methods.

The **SSV** can be set to positions **1, 2, 3, 4, 5, 6** at the defined time.

The **Stop events at time** allows setting the END time of the timed events. If the **Stop Events at Time** box is not checked, the END time is equal to the analysis time (the run time). The **maximum** Stop Events Time is **9 h 59 min 59 sec**.

☞ **If the END time exceeds the programmed run time, this END time overrules the analysis time for the autosampler. The next injection will be started as soon as the timed events program has finished.**

Mix Methods...

Click the Mix Methods button to create a sample preparation program. The Mix Methods setup dialog will appear.

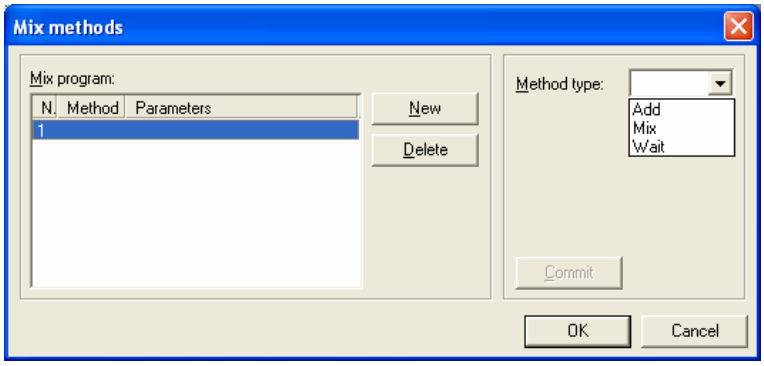

Fig. 14 Mix Methods window

Clicking the New button first the method type drop-down list becomes active. The mix method can contain a maximum of 15 programmable lines including the **END OF MIX** command.

Click the **New** button to add one more line to the programmed methods.

Select the **Method Type** from the drop-down list. The choices are **Add**, **Mix** and **Wait.**

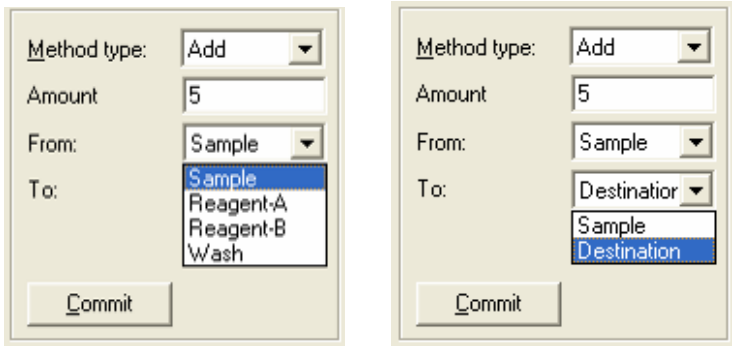

Fig. 15 Mix Methods: Step Add

Specify the **Amount** of a liquid in µl (max = the syringe volume) to be aspirated from a source (choices are **Sample**, **Reagent A**, **Reagent B** and **Wash**) and dispensed to a target (choices are **Sample** and **Destination**).

☞ **The aspirate and dispense speed depends on the selected syringe and syringe speed.**

The reagents are located at the positions on the tray specified in the configuration dialog, see Fig. 11.

Fig. 16 Mix Methods: Step Mix

According to the number of **Mix Times** (1-9 times) the programmed **Amount** (µl, max = the syringe volume) will be aspirated and dispensed. If no destination vial is used the mixing step is performed in the sample vial.

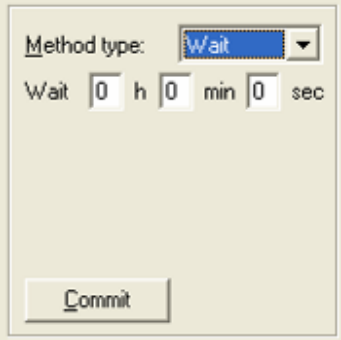

Fig. 17 Mix Methods: Step Wait

Wait a programmed period of time **x:xx:xx** (0:00:00 – 9:59:59) before continuing with the next step (reaction time).

Click the **Commit** button to add your entry to the Mix Method.

Click the **Delete** button to delete the selected step.

4. Autosampler Interface

The standard EZChrom Elite tray interfaces, which allow the user to make a graphical selection of sample positions in a run sequence or to start a single run from a graphics of the trays, are supported for the autosampler.

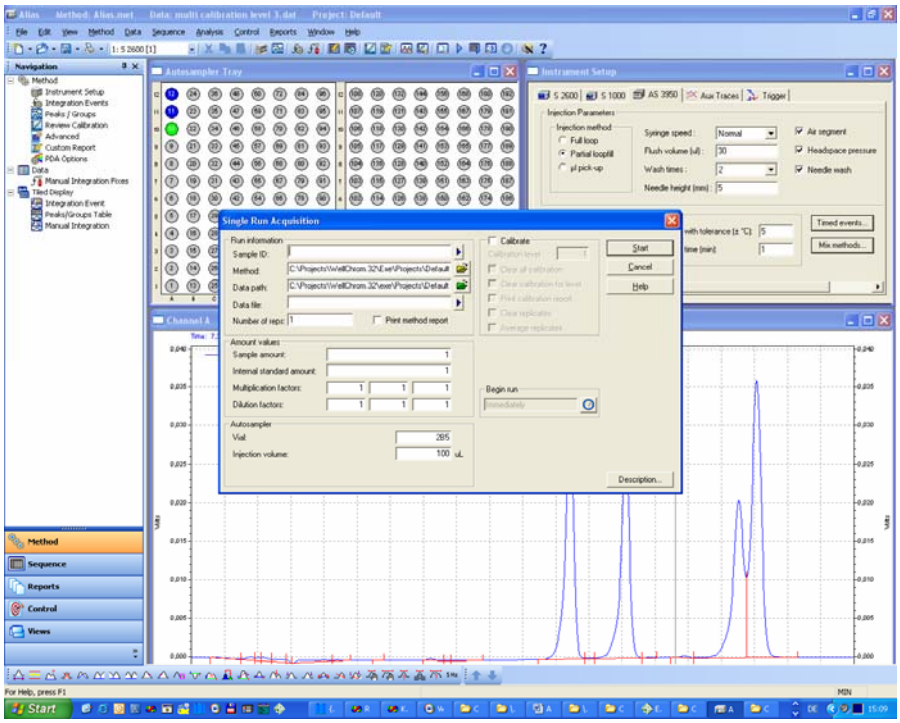

Fig. 18 Autosampler Tray Interface view / starting a single run.

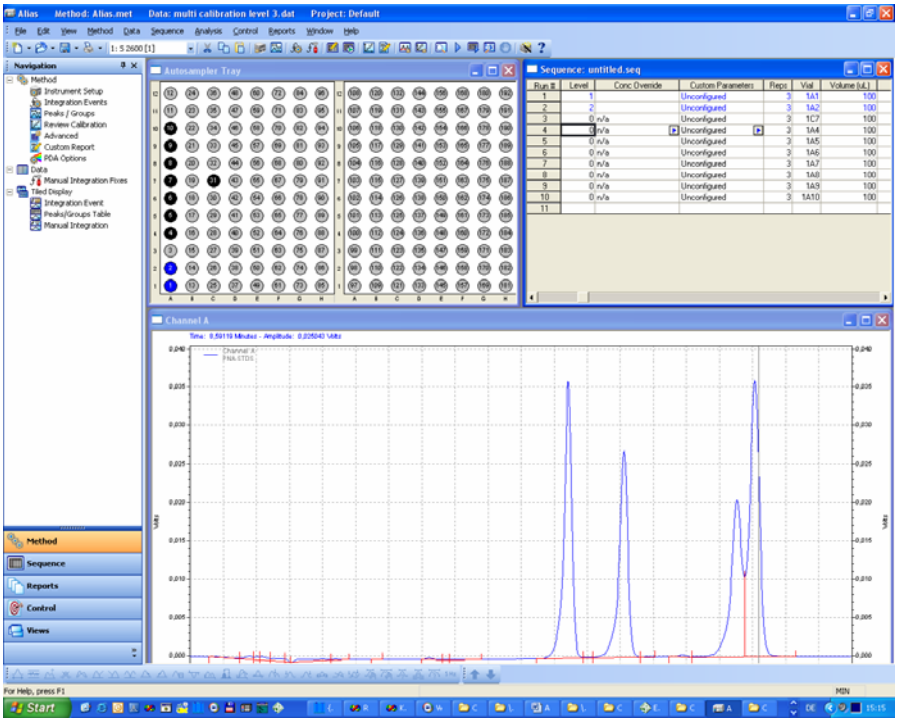

Fig. 19 Autosampler Tray Interface view / programming a run sequence.

The status of each vial is displayed using the following colors for the ring around the vial image:

Color	Run Type
Black	Normal run
Green	Run successfully completed
Red	Run unsuccessful

5. Autosampler Status

This interface is used to report current instrument conditions to the user and allow him to make real time changes to instrument parameters, if desired. The UI associated with this interface will be shown in a tab of a view created by EZChrom Elite when the user selects the Control > Instrument Status menu item. (To merge information from multiple devices onto a single tab, please see the Unified Status Interface.

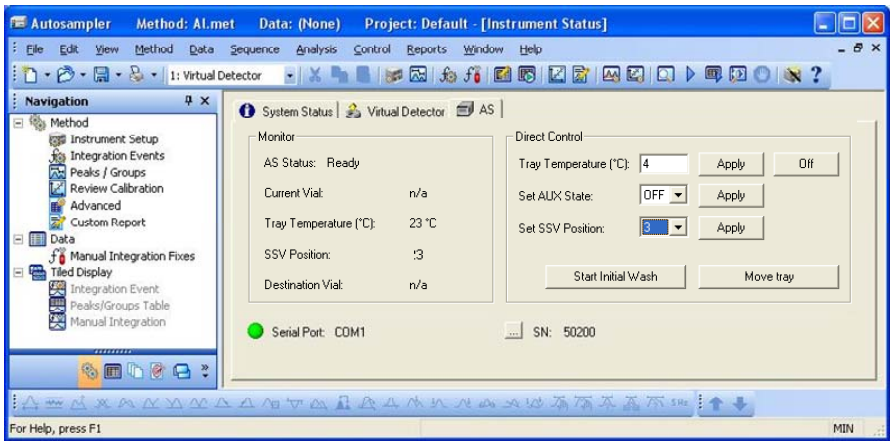

Fig. 20 Autosampler status view

Monitor

The appearence of this area may differ from the view in

Fig. 20. It depends on the settings in the configuration.

AS Status

The status **Ready** will be displayed when the autosampler is waiting to perform an injection. If an injection program is running, the current program step will be indicated. During a chromatographic run, the status is described as "Analysis timer running" or "Ready" after the injection has been made.

Current Vial

The current position of the injection needle is shown.

Tray Temperature (°C)

If the tray cooling option has been installed and configured the current tray temperature will be shown.

SSV Position

The current **SSV** position is indicated.

Destination Vial

The current destination vial (if used) will be shown.

Direct Control

The appearance of this area may differ from the view in

Fig. 20. It depends on the settings in the configuration.

Tray Temperature (°C)

If the cooling option is installed and configured the tray temperature can be set. The entered value will be transferred to the sampler by clicking the **Apply** button. The **Off** button can be used for disabling the cooling control. To switch it on again, set the required temperature and press the Apply button.

Set AUX State

If the digital output is set to Relay, the corresponding direct control button will be displayed in the status window. The selected state (**ON** or **OFF**) will be transferred to the sampler by clicking the **Apply** button.

Set SSV position

If the SSV valve is set in the configuration, then the corresponding direct control button will be displayed in the status window. The entered value (**OFF, 1, 2 … 6**) will be transferred to the sampler by clicking the **Apply** button..

Start Initial Wash

Press this button to force the autosampler to perform a needle wash.

Move Tray

Clicking briefly on this button will change the tray position:
FRONT ←→ HOME.