Contents

Contents

1 FasTrans Software

FasTrans is the software program for operation control of the automatic pipettor of identical name.

This software allows complex pipetting programs to be edited and triggered. Selected individual program parts can be exported and recombined into new programs.

Applications cover anything from simple re-pipetting of microtiter plates to full-scale preparation of complex initial reaction solutions for PCR. In addition to fully automated sequences for pipetting of diluted samples and washing routines, reagent plate, sample plate and mother-to-daughter-plate transfers can thus be performed.

Version coverage

This description is adapted to version 1.0 of FasTrans 1.0 software in terms of contents and scope.

1.1 Notes regarding practical work with this Manual

You are advised to carefully read all instructions, advisory information and guidance provided in this Manual. This will enable you to fully utilize the capabilities which FasTrans offers.

For greater convenience, the following symbols and rules are used throughout this Manual:

- Chapters and illustrations are numbered consecutively.

- Each illustration has its own image caption.

- Specified process steps are numbered.

- Control buttons are enclosed in brackets. Example: **[OK]**.

- Menu command sequences are concatenated with a forward slash. Example: File / Save.

FasTrans is based on mouse-triggered action. In many cases, menu commands can also be selected from a context menu that will open when clicking the right mouse key. The resulting description part will apply to the context menu version in such cases. The corresponding menu commands and toolbar symbols are listed in the marginal column on the left.

1.2   Installation of FasTrans

1.2.1   System requirements

FasTrans requires your PC to meet the following minimum requirements:

Operating system:	Windows 95 or higher
Processor	Pentium II
RAM	64 MB
Free space on harddrive	For software installation, only 2.0 MB (approximate value) is required.
Interfaces	Serial interface (COM port)

1.2.2   Installation procedure

FasTrans is delivered on a CD.

1. Start your PC and Windows. If your PC is already operational and other programs currently open, close all running programs before you proceed with the **FasTrans** installation.

2. Insert the CD into the CD-drive (e.g. D).
    The installation routine should now automatically start. If it fails to do so, trigger "setup.exe" on the CD.

3. Select a software language for installation when the next dialog window appears. German and English are available as language options here. The language setting may also be changed after software installation.

4. Follow further instructions on the installation program. Installation will be completed automatically.

2 Operating FasTrans

2.1 General operating advice

FasTrans is an application of Windows. In terms of operating structure, it is similar to other Windows applications. Accordingly, this description does not cover typical Windows operator control functions such as "Save file", "Open file" or "Highlight option with the mouse". In case of questions regarding functions of this kind, you should consult your Windows documentation.

2.2 Starting & terminating FasTrans

Starting FasTrans

To launch a FasTrans session, click the **[Start]** button on the Windows desktop. Find the **Programs** folder, then look for the **FasTrans** folder. Click onto **FasTrans** in this folder.

Alternatively, you may click the FasTrans icon on the Windows desktop. FasTrans will start.

Fig. 1   Desktop symbol of FasTrans

On successful start up, the FasTrans desktop screen will appear.

☞ **Note**

If the automatic pipettor is not in power-on state at this moment, the software will start in demo mode (refer to section "Further pipettor options" on page 37).

Terminating FasTrans

FILE / QUIT   To terminate a FasTrans session, select **File / Quit** in the menu.

The latest software settings can be automatically saved for reloading as part of a restart (refer to section "Further pipettor options" on page 37).

Initial start-up of automatic pipettor

Once the FasTrans pipettor is installed, the network cable connected to the network terminal and the data cable linked up with the PC, the selected interface must be set.

OPTIONS / INTERFACE   1. Trigger an **Options / Interface** menu command to open the **RS232** dialog window.

2. Use the **Port** list field to select a COM port for communication with the FasTrans automatic pipettor.

EDIT / INITIALIZE DEVICE   3. Trigger a separate initialization routine for the pipettor head as a preliminary check.
Select **Edit / Initialize device** menu command.

> The pipettor head will move into the rear far right corner of the pipettor, which represents its initial (home) position.

☞ **Note**

If the pipettor head has already restored its initial position, you will only perceive some short motion jerks.

2.3 FasTrans desktop screen

Once the FasTrans software has started, its desktop screen will be displayed.
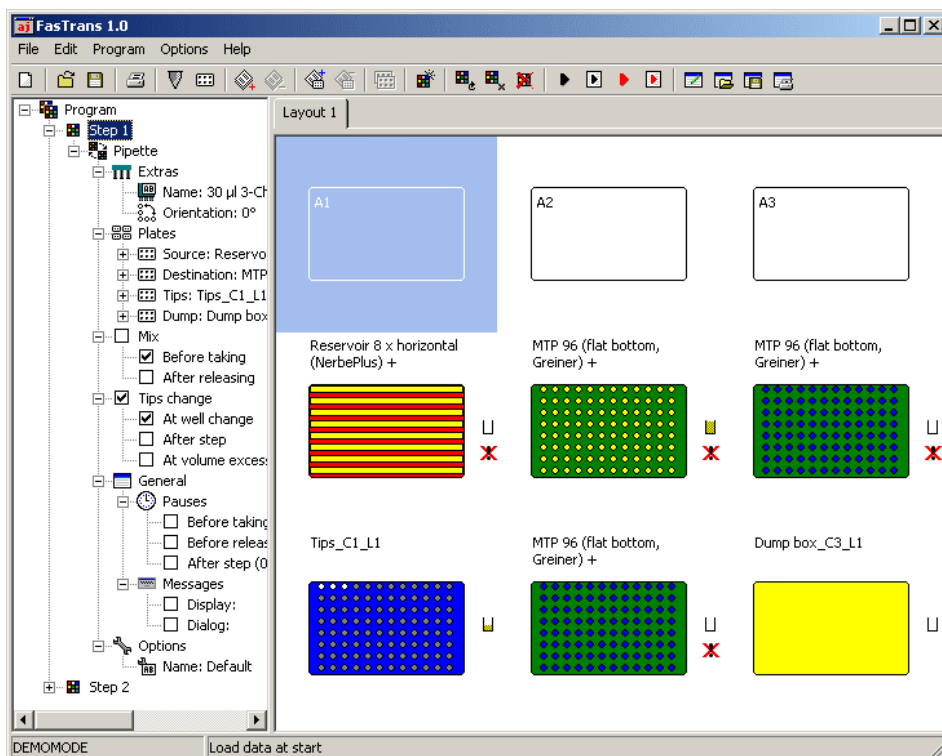
Fig. 2 FasTrans desktop screen

The desktop screen consists of two sub-areas. The left sub-area displays a tree structure of information about a previously created program with individual program steps. The right sub-area presents a layout screen (location of plates currently in the FasTrans) of plates and tubes which are currently being processed.

Each pipetting program contains information that is required to transfer volumes from a source to a destination.

The layout image reproduces the positions of plates currently seated on the work plate of the FasTrans. A plate which is actually located in the FasTrans must be placed at the equivalent position to the layout screen.

The desktop screen contains elements which are typical of Windows applications, for example:

- Header line with default areas for adaptation of window size and termination of program

- Menu bar

- Toolbar with control buttons for fast access to important program functions

2.4   Language versions

OPTIONS / LANGUAGE /ENGLISH (GERMAN)

For FasTrans software operation, German-language or English-language version can be selected. A desired language can easily be set in the software user screen.

Select the **Options / Language / English** or **Options / Language / German** on the menu command.

The language setting will change according to the most recently enabled command option.

2.5   Help

FasTrans includes a context-sensitive help tool.

HELP / CONTENT

Select the help window by clicking onto the **Help / Content** menu command.

On pressing function key **[F1]**, information will be displayed regarding the currently active window.

3 Editing layouts

A layout shows the positions and properties of plates / tubes currently located on the work plate of the automatic pipettor.

A layout provides nine positions, arranged in three columns and three lines. These positions correspond to the nine actual pocket positions in the pipettor, thus reflecting the currently selected plate arrangement.

If a program requires more than nine positions, more layouts may be defined. During execution of a multiple-layout program, messages will appear prompting the operator to insert a particular plate.

Layouting actions, for example, the addition of plates or the definition of plate content, are largely performed via context menus. These can be opened by clicking on the given layout position with the right mouse key.

3.1 Edit / delete layout

A new program will provide an empty layout on the desktop screen. Where a pipetting program requires more than nine positions, individual positions may be given multiple assignments. For more convenience, "virtual" layouts also comprising nine positions will be generated. For practical software-controlled operation, this means that execution of a program sequence will stop at a double-assigned position of the automatic pipettor, the operator will be prompted to replace the plate in this position, whereafter the program sequence will continue.

EDIT / ADD LAYOUT

1. Select **Edit / Add layout** in the command menu or

   alternatively click on ◈₊ in the toolbar.

   A new layout tab will appear in the right sub-area of the desktop. This tab is named "**Layout**" and appears with a consecutive number.

   A layout which is no longer needed can be deleted from the desktop screen, provided that the plates in this layout are not used by the currently running program step.

EDIT / DELETE LAYOUT

2. Activate the layout you want deleted, i.e. bring it to the foreground of the desktop by clicking on its tab.

3. Select **Edit / Delete layout** in the menu or alternatively click on ◈₋ in the toolbar.

The active layout will be deleted unless a plate with this layout is being used by the currently created program.

3.2   Defining plates on a layout

Add plate to layout

Position plates, trays and dump boxes as necessary on your layout.

EDIT / ADD PLATE
TO LAYOUT

1. Press the right mouse key to select a position in which you have mounted a plate in the pipettor. Then select **Add plate to layout** in the context menu.

   Alternatively, you can mark this position and select **Edit / Add plate to layout** in the menu or click on
   in the toolbar.

   The **Plate selection** dialog will open. It displays a list of calibrated plates, trays and tubes.

2. Mark the desired plate in the **Plate type** field.

3. Change the entry that designates the particular plate in your layout view, using the **Plate identification** field.
   This entry is optional.

   For tip racks and dump box:
   If several tip racks with identical tips or several dump boxes are to be involved, they may be handled in an automated succession by one pipetting program. In this case, plate identification codes must be assigned according to this pattern: "Name"+"_x" where "x" designates a consecutive number, for example, Rack_1, Rack_2, etc.

4. Confirm your entries with **[OK]**.

   The plate in question will be displayed with available cavities on the layout. Its colouring designates the plate type.

☞ **Note**
A plate identification can also be changed subsequently (refer to section "Plate properties" on page 13).

Shift plates

A plate can be shifted to another empty position in a given layout. If there are any pipetting steps previously programmed for this plate, they will automatically notice this change so no further adaptation is required.

1. Move the mouse pointer to the new position, keeping the mouse key depressed.

2. Release the mouse key.
   The plate has been shifted to the new position.

Delete plate

Plates can be removed from a layout if they are not processed in one program step.

EDIT / DELETE
PLATE FROM LAYOUT

1. Use the right mouse key to select a position for removing a plate. Then select **Delete plate of layout** in the context menu.

Alternatively, you can mark this position and select **Edit / Delete plate of layout** in the menu or click on
🖼 in the toolbar.

The plate is immediately removed from your layout.

3.3   Defining, importing and exporting plate content

For a plate in a layout, the following items of content can be defined, depending on the type of plate:

- Layout chart of trays with variable vessels (e.g. involvement of stripes, tubes, etc. and passive coolers or similar configurations)

- Tip types (for tip racks)

- Initial volumes

- Description of individual wells or tubes

Required items of content can be defined in a plate chart, using the mouse, or via direct entry in a table.

EDIT / PLATE
CONTENT

1. Use the right mouse key to select the position of a plate to be inspected for content or whose content you want to edit. Select **Plate content** in the context menu for this purpose.

   Alternatively, you may use a double-click on the particular plate or mark the particular position and select **Edit / Plate content** in the menu.

   The **Plate content – *Plate identification*** dialog window will open. It displays the tubes of a given plate in its lower sub-area. The upper sub-area provides various input options.
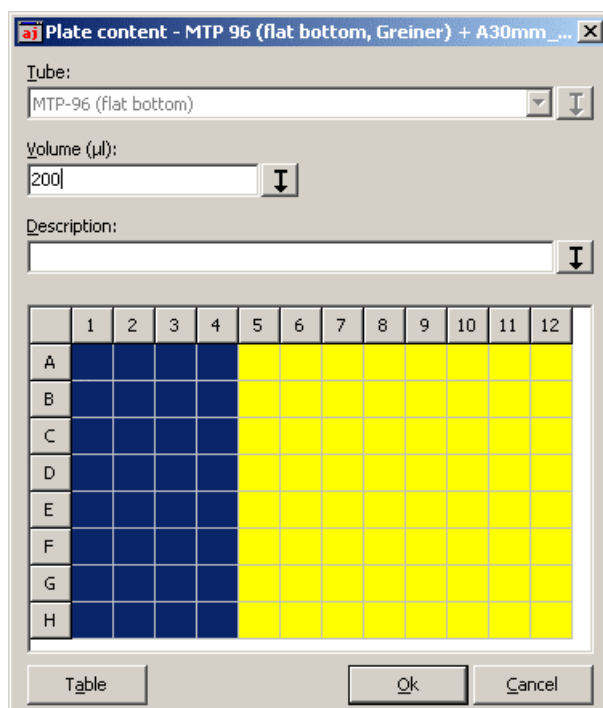
Fig. 3   Plate content dialog window

2. Use the mouse to mark those wells which are to be assigned a common property.

3. Select a desired property and use the control button beside the particular selection field to assign this property setting to all previously marked wells.

Tips type	Only for tip racks. Select tip type installed in container.
Tube	For plates with variable vessels, e.g. passive coolers for stripes, tubes, etc. Assign a tube to positions of a plate. Volumes cannot be defined, unless tubes have been assigned. A position with assigned tube is displayed with a blue background.
Volume	Enter initial volume in units of a μL. A tube, for which a volume was defined, will be represented in a yellow colour.
Description	For providing a well with a descriptive name, for example, relating to its content. This entry is optional.

Alternative inputs via table

Descriptions and volumes can also be entered in a sample table.

1. Perform a **Tube** entry at first if necessary.

2. Select **[Table]** to open the sample table.

3. Make entries as required in the various cells of the **Volume** column and **Description** column.

   Alternatively, you may assign the same value to all cells in a column.
   Use the right mouse key to click on a cell. Then select the **Fill col** context menu command to open the **Input** dialog field.
   Type a required value into the **Col content** input field and confirm your entry with **[OK]**.

Importing or exporting plate content in CSV format

Plate contents can be exported to or imported from a CSV file .

1. Click onto the plate view screen in the **Plate content** dialog window with the right mouse key.

2. Select **Import (*.csv)** or **Export (*.csv)** in the context menu.

   The respective standard Windows dialog window - **Open** or **Save** - will open.

3. Select a file to be imported or enter a new name for exportation.

4. Open or save the selected data.

3.4 Plate properties

The **Plate properties** window allows you to change the plate identification (plate description on FasTrans desktop level) and/or enter additional descriptive text for a given selected plate.

EDIT / PLATE PROPERTIES

1. Use the right mouse key to select the plate on the desktop screen which you want to inspect for currently set properties or edit in terms of properties. Select **Plate properties** in the context menu for this purpose.

   Alternatively, you can highlight this position and select **Edit / Plate properties** in the menu.

2. Enter **Plate identification** and a **Description** in the input fields of identical name.

☞ **Note**

Remember that plate identification must only be assigned once and make sure that no double-assignment is created as a result of your change in plate identification.

3.5 Plate information

This function provides you with a possibility to inspect the resulting content of a given well before you actually trigger a sequence of pipetting jobs. Depending on the complexity of work tasks, there will be comprehensive lists with individual volumes combined in one.

EDIT / PLATE INFORMATIONS

1. Use the right mouse key to select a plate on the desktop to be inspected for resulting fill level, then select the **Plate information** command of the context menu.

Alternatively, you can highlight this position and select **Edit / Plate information** in the menu.
A dialog window of identical name will open.

2. Click on **Well**. A plate chart with tube distribution table will appear.

    This plate chart can be shifted if found to cover up other significant information. To do this, click on the frame of the chart and draw the chart to a desired position, while keeping the mouse key depressed.

    For display of information, click on a tube, then draw the mouse over the chart, keeping the mouse key depressed.
    As you do this, information will be displayed for the tube on which the mouse pointer is currently located.

The following screenshot provides an example of the content of a tube of plate "MTP 96..." This sample content is composed of the volumes of two pipetting steps. 10 µL are transferred in step 1 and 15 µL in step 2.
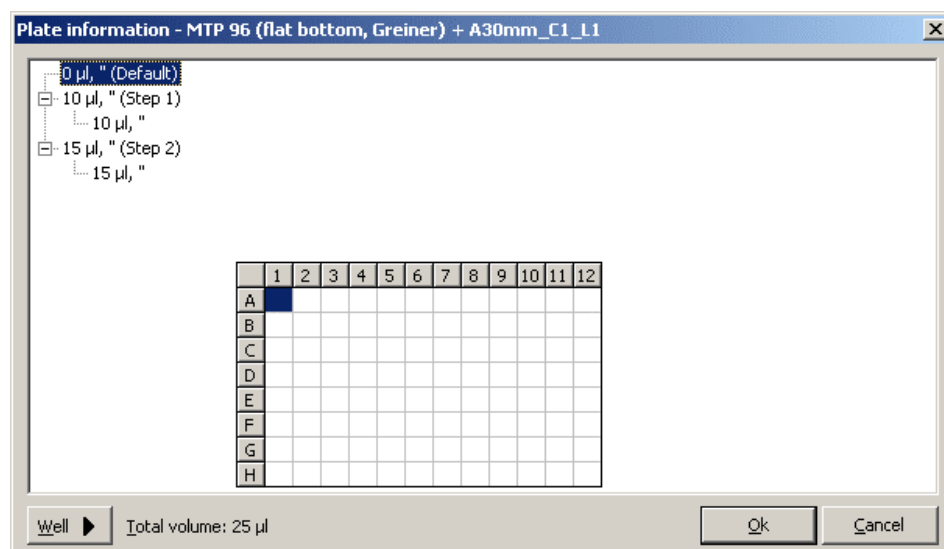

Fig. 4   Example of plate information display

3.6   Restoring plate content

The FasTrans program includes a volume administration tool. As a program sequence is being executed, it will register and save any change in the fill volume of tubes.

On completion of a program sequence, a change in volume that was caused by this sequence can be reset. This will affect only those changes which occurred during the most recently completed program sequence. It is not possible to trigger a program sequence several times in succession and restore the original state before initial program start each time.

The plate content can be restored for the entire layout or for selected plates.

Restore entire layout

EDIT / RESTORE
PLATE CONTENT

1. Select **Edit / Restore plate content**, in the menu to reset all plates of a layout to their original contents or click on ▦.

The contents of all plates in a layout will be restored.

Restore individual plates

1. Use the right mouse key to select a plate of the layout for restoring its volume.

2. Select **Restore plate content** in the context menu.

The content of this plate will be reset to its initial state, i.e. the state before starting of this program sequence.
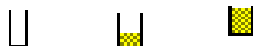
3.7 State symbols

State symbols are provided beside each plate of a layout to report its filling level and state of work progress.

Fill level

The symbol for filling level shows if there is a volume of liquid in a plate. For dump box and tips rack, the filling level is illustrated via tips.

Fill level symbols are:

empty half-filled full

These symbols will change when contents are reassigned, programs are compiled or programs are performed.

Work status

These symbols do not exist for dump boxes and tips racks.

A work status symbol shows if a plate which was loaded into the FasTrans pipettor has already been completely processed or is being processed by the currently selected pipetting program(s).

✓   ✗

Ready work status   Work in process
Program was successfully completed.

If a completely processed plate is edited via software tools so its plate content changes, the related symbol will also change to "work in process" state.

4 Working with Pipetting Steps

A pipetting step contains full information about the source, destination, volume, tip change(s) and mixing process involved in a transfer sequence. A transfer sequence between a source and a destination is recorded in a program step. A set of sequences is combined in a step list (left sub-area of desktop). It will be executed in pre-selected order when triggered.

Pipetting programs are compiled and administered via the **Program** menu.

The following program steps can be carried out with the FasTrans:

- Pipetting: Transfers a volume from a source tube to a target tube.

- Dispensing: The same volume of liquid in a source tube is distributed onto several target tubes as a dispense series.

- Mixing: Mixes liquid in a well by drawing the liquid in and releasing it again with the pipette tip.

- Macrostep: For automated exporting and restoring of plate contents or for saving a program.

4.1 Program list view

The list of programs is located on the left-hand side of the desktop screen of the FasTrans software. It contains all pipetting steps in the order of their execution.

By expanding the tree structure, parameter/optional settings can be displayed for each step. As the mouse pointer is drawn over the various steps – with the mouse key depressed, the tubes of each step will be shown.

4.2 Creating new program steps

4.2.1 Selecting source plates and target plates

The source plates and target plates in a given program step can be defined in different ways. With **Pipette** and **Dispense**, the easiest way is using the mouse. The two programming steps **Mixing** and **Macro**, by contrast, can only be selected via menu command.

Select by drag & drop

As the term itself suggests, this method uses dragging and dropping.

1. Click onto the source plate. The mouse pointer will change into an arrow with a rectangular area. Drag the pointer over the target plate while keeping the mouse key depressed. Then release the mouse key.
   Various input fields and control buttons will appear below the layout area:

Source	Identifies source plate
Destination	Identifies target plate
Tips	Identifies selected tip rack

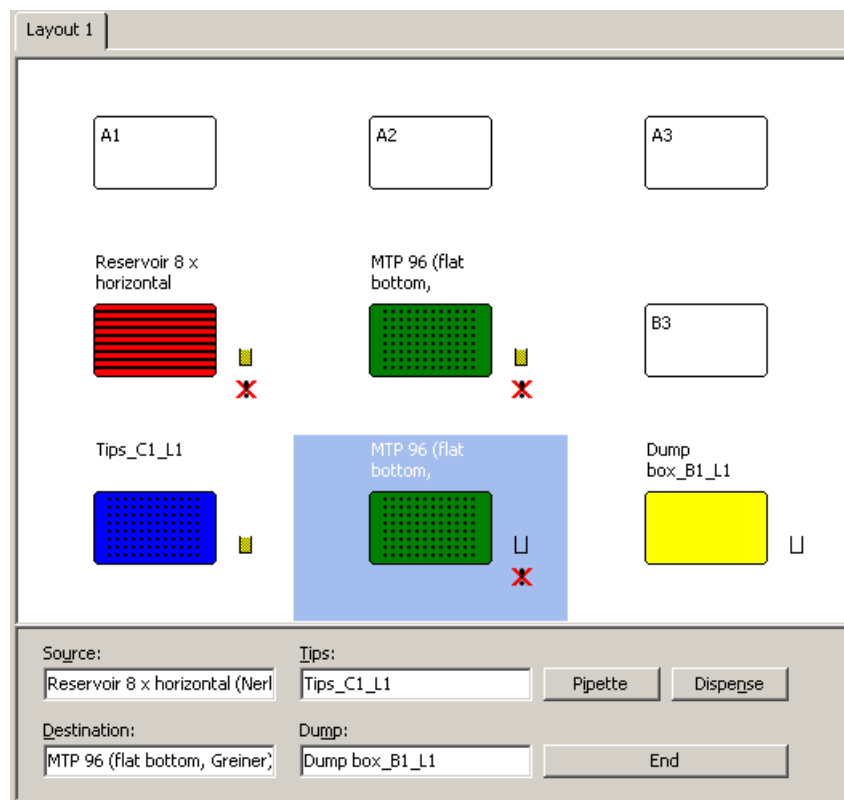|	
Dump	Identifies selected dump box
[Pipette]	Defines "Pipetting" program step
[Dispense]	Defines "Dispensing" program step
[End]	Cancels programming of program step and abandons changes

Fig. 5   Layout with input fields for program step

5. Assign required contents to the various input fields by using drag & drop.
    Click on the particular plate, then draw the mouse pointer over the
    corresponding input field while keeping the mouse key depressed.
    On releasing the mouse key, the input field will show the plate identification.

☞   **Note**
      If only one tip rack and one dump box are defined as part of a layout, related
      plate identifications are automatically added to the input fields.

6. Use the **[Pipette]** or **[Dispense]** control button to trigger the program step.

Program steps via input dialog

Target plates and source plates can also be selected from list fields in an input
dialog screen.

PROGRAM / NEW STEP

1. Select **Program / New step** via menu or click on ⊞ in the toolbar.

   The **New step** dialog window opens.

2. Select a program step from the **Type** list:

   - Pipette

   - Dispense

   - Mix

   - Macro

3. Select identifications for source plate and target plate plus involved tip rack and dump box from other list fields as necessary for the given program step.
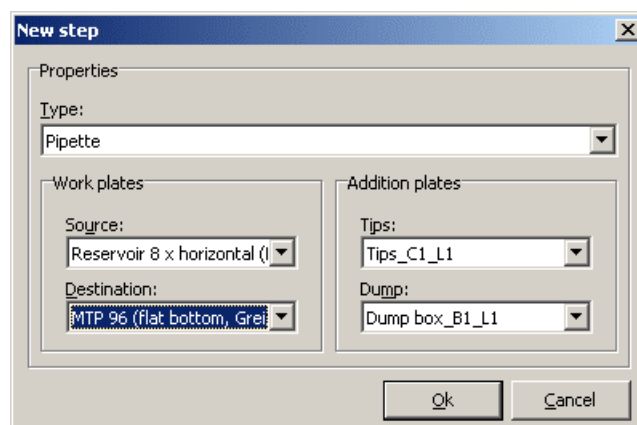
Fig. 6   New step dialog window

4. Click **[OK]** to switch to the dialog window for further specification of your program step.

4.2.2 Pipetting

After selection of source plates and target plates and **Pipette** for program step type, a dialog window of identical name appears.
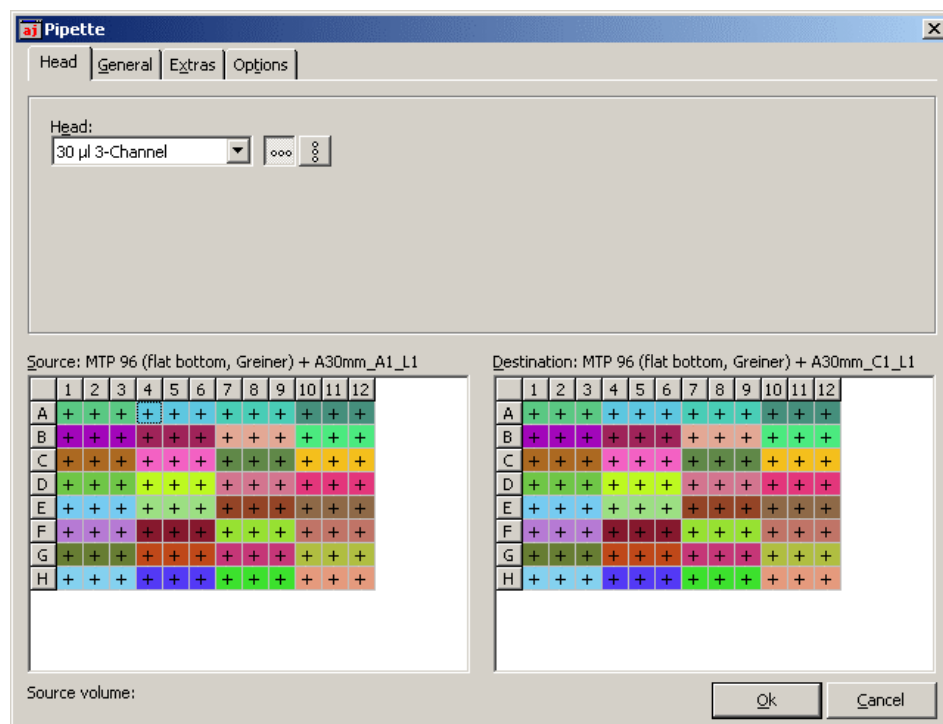

Fig. 7   Pipetting dialog window

4.2.2.1 Define parameters for pipetting step

☞ **Note**
If parameter settings are found to be beyond the pipetting range limit, they will be reset to this limit. This will be reported in a special message.

Head tab

Head	Selects pipettor head from list (also refer to "Summary table & replacement of heads " on page 38).
[icon]	Sets pipettor head orientation – 0°(horizontal) or 90°(vertical) If the plate grid is any other than 9 mm, 4.5 mm or 2.25 mm, only single-channel pipetting is available.

General tab

Pipetting Volume	Type in volume for transfer.
Prewetting tips	Wets tip prior to pipetting if active. Liquid is initially drawn in and dispensed again in the source location. This is followed by drawing in the pipetting volume.

Take from bottom	Triggers forced intake of liquid from the bottom of a tube, regardless of its fill level.
Mix sub-tab	
Yes	Mixes liquids if active. Takes liquid in with the pipette tip to return it back to the same tube.
Before taking	Mixes liquid in source tube.
After releasing	Mixes liquid in target tube.
Cycles	Defines the number of intake cycles and dispense cycles in a mixing process.
Depth (mm)	Defines the amount of depth to which the tip is to submerge below standard height level beneath the surface of a liquid.
Tip change sub-tab	
Yes	Changes tips if active.
At well change	Changes tips between each two transfers.
After step	Performs tip change on completion of a program step.
At volume excess	If a transfer can only be achieved in several sub-volume partial steps, a tips change will be performed after each partial step.

Extras tab

Pauses sub-tab	Allows different pause lengths to be set.
	A pause will occur if you have set a value greater than "0" for the option selected in the **Time** field of the **Type** list.
Type	Selects type of pause:
	Before taking
	Pause occurs before intake from source.
	Before releasing
	Pause occurs after dispensing into target tube.
	After step
	Pause occurs on completion of program step.
Time	Specifies pause length in seconds.
	A separate pause length may be selected for each pause that was set via **Type**.
Messages sub-tab	Text field entries of the messages sub-tab can be output during or on completion of a program step.
Display	Display input text during a pipetting process.
Dialog	Shows dialog on completion of step.
	The program sequence will not continue, unless this dialog is acknowledged.

Options tab

The **Options** tab provides liquid aspiration and liquid releasing parameter options that are specifically matched to the properties of liquids being pipetted.

These settings will be saved as a parameter set which is independent of the program. They are available for reloading if required at some later point in time. The **Default** parameter set contains default settings.

1. Select a required parameter set from the **Choice** list.

2. For editing, click ⬚ to open the currently selected parameter set in the **Edit options** dialog window.

3. Assign new values to available options (refer to section "Parameters for release and intake of liquids" on page 28).

4. Acknowledge these values with **[OK]**.

   A revised parameter set will initially appear as "User defined" in the selection list.

5. Click on ⬚ to open the **Edit** dialog screen. Then enter a new name for the parameter set.

☞ **Hinweis**

On failure to define a new name for a revised parameter setting, the given parameter revision will not be saved, but will be applied in the corresponding step.

4.2.2.2 Define a pipetting step

A pipetting process implies a transfer from a source tube to a target tube. Where multi-channel heads are involved, a correspondingly higher number of tubes can be processed in one pipetting cycle.

1. Define source tubes by clicking a tube in **Source**.

   This tube, or these (grouped) tubes if served by the multi-channel head, will acquire a blue colour marking.

2. Click on the tube in **Destination** to which you want the volume transferred.

   The source and destination will receive the same identification colour.

3. Repeat the steps described above, until the pipetting job is described for the whole plate.
   Alternatively, the entire plate content or a partial area of the plate can be defined in one operation (see further below).

Rules to be observed for programming:

- Where different steps require different volumes, you must change the **Pipetting volume** (**General** tab) before you program a new step. Each step will then be performed with its own volume setting.

- Where a multi-channel head is used, a 9 mm tip-to-tip spacing at the FasTrans will result in a nested procedure of volume releases in the case of plates with a non-conforming grid size.

- If defined physical minimal or maximal volumes are reached either in the source or the destination, no transfer can be programmed.

4. Acknowledge your inputs with **[OK]**.

The **Pipette** dialog window is exited. Your programmed sequence will be added at the end of the program list on the left sub-area of the FasTrans desktop screen as a new step.

Transfer entire plate 1 to 1

Where a source plate is identical with a target plate, the plate content can be completely transferred onto itself with the preset pipetting volume.

1. Use a right click on the source.

2. Select the **Mark all** command in the context menu.

    Markers are automatically set.

Transfer parts of a plate

In the event that a **source plate has a tube number that is different from that of the target plate**, you should initially proceed as described above. You will be offered an extra dialog field for selection of a source range:

Lines	All lines are transferred to the destination, beginning with well A1.
Field	A selected range of target plate line numbers and column numbers is transferred to the destination. The two fields **Col. a**nd **Row** are for setting a range beginning.

Alternatively, you can highlight a block in the source - keeping the ALT key depressed – which, after specification of column and line number of the upper left target tube, will be transferred to the target plate.

Context menu functions in source plate and target plate

Using the right mouse key, you may open context menus both in the source grid and the target grid.

Source plate

Working in the source grid, you can define controlled transfers of whole groups of wells using context menu commands.

Context menu command	Description
Content	Opens dialog field for definition of content of related plate.
Mark all	Transfers entire plate content with preset **Pipetting volume**.

Target plate

Working in the target plate screen, you can change the pipetting volume for selected tubes or delete previously programmed positions via context menu commands.

Context menu command	Description
Content	Opens dialog field for definition of content of related plate.

Pipetting volume	Changes transfer volume for selected tube. This change will apply to tubes that are simultaneously pipetted in multi-channel-head operation mode.
Delete well	Deletes programmed transfer for a selected tube.
Delete all	Deletes transfers programmed for all tubes.
	A previously programmed block can be deleted by highlighting this block area with the ALT key depressed.

4.2.3 Dispensing

Once a source plate and a target plate have been selected, you may click the **Dispense** programming step type. A dialog window of identical name appears.

4.2.3.1 Define parameters for a dispensing step

Unlike pipetting, a dispensing cycle takes in a given quantity of liquid that is due to be dispensed plus 10% of total volume or the maximum pipette tip aspiration volume, respectively. This occurs in one single operation with subsequent distribution of the volume onto the target tubes. The remaining volume can be released back into the source or be disposed into the dump box with the help of the tip.

The dialog tabs are similar to those of the pipetting step (refer to section "Define parameters for pipetting step" on page 20), except that

an additional option is provided on the **Generals** tab.

Rest back to source	Pipette tip drains the remaining volume of liquid back into the source tube on completion of a dispensing cycle if this function is active.

In addition, there is no **Mix – After releasing** option, because mixing cannot be performed in the target tube owing to the type of liquid transfer. To achieve mixing of the target tube volume, an additional "Mix" program step must be triggered.

Multiple transfer of a volume in partial steps is not possible. Accordingly, there is no tip changing option "At volume excess".

4.2.3.2 Define dispensing step

A dispensing operation means a transfer from a given source tube to several target tubes. FasTrans allows the following types of volume to be transferred:

- Constant volume
- Dilution series
- Filling up

1. Define a source tube by clicking on a tube in the **source grid**.

   This tube – or more tubes belonging together in multi-channel head mode – will be marked in a blue colour.

2. Highlight those tubes in the target grid you want selected as targets of a transfer. Click into the upper left tube and drag the mouse pointer to the bottom right tube of your area of interest, while keeping the Strg key depressed.

   All tubes located within the resulting rectangular area will be marked in colour and the **Dispense** dialog field opens.

3. Select a desired type of transfer, then type the required values into the various input fields which will adapt to the selected type:

Transfer   Transfers a constant volume from a source tube to all highlighted sample tubes.
                   Type volume to be transferred into the **Volume (µL)** input field.

Dilution series Creates a dilution series, beginning with a certain starting volume for tube 1 and increasing or decreasing the pipetting volume by a constant amount with each next tube.
                   Define a starting volume in input field **Start. volume (µL)** and another value for the amount of incremental or decremental change in volume from tube to tube **Inc./Dec; (µL)**.
                   A negative value for **Inc./Dec; (µL)** will decrease, a positive value increase the volume of pipetting.

Filling up   Fills tubes up to a nominal volume, for example, following a dilution series.
                   An end volume must be defined in input field **Nominal volume**.

Dispense into mutually non-adjacent tubes

A volume can also be distributed onto tubes which are not adjacent to each other.

1. Define a source tube by clicking on a tube in **Source grid**.

2. Click on a tube in **Destination** which you want the first volume of a dispensing series transferred to.
   Multi-channel-head output mode will be taken into consideration.

3. Select further tubes in destination as target points for transferring a volume in subsequent dispensing steps. The source and the target will be displayed with identical colour marking.

4. Repeat this selection procedure for source tube and target tube as described before, until you have defined a dispensing job for the entire plate. A given source can be selected several times as part of a job.

5. Confirm your entries with **[OK]**.

   The **Dispense** dialog window is exited and your newly programmed sequence will be attached at the end of the program list in the left sub-area of the FasTrans desktop screen as a new step.

Context menu functions

Using the right mouse key, you may open context menus both in the source grid and the target grid.

Source grid

| Context menu command	Description
Content	Opens dialog field for definition of the content of a given plate.

Target grid

Context menu command	Description
Content	Opens dialog field for definition of content for a given plate.
Dispensing volume	Change transfer volume for a given tube. In multi-channel-head operation mode, a change will apply to all tubes that are served by one pipetting sequence.
Delete well	Deletes programmed step for a selected tube.
Delete all	Deletes all programmed steps.

4.2.4 Mixing

Mixing is achieved by drawing in liquid from and releasing it again into the same tube of a plate.
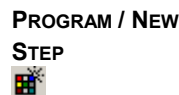
PROGRAM / NEW STEP

1. Select **Program / New step** via the menu or click on ▦ in the toolbar.

    The **New step** dialog window opens.

2. Select program step **Mixing** from the **Type** list.

3. Select plate identifications for the plate to be processed, a required tip rack and a dump box from the list fields.

    The **Mixing** dialog window opens.

4. Make parameter settings as necessary on the various tabs of the **Mixing** window. These settings are identical with those in the **Pipette** dialog window (refer to section "Define parameters for pipetting step" on page 20), except that settings in the **General** window are restricted to the mixing process and to tip change:

    Mix sub-tab

Cycles	For entering a number of draw-in and release cycles of a mixing process.
Depth (mm)	Defines the additional depth (sub-standard level) to which the tip is to submerge below the base of the standard depth of liquid directly under the surface.

Tips change sub-tab

Yes	Changes tips if active.
Before new well	Changes tips with each new tube.
After step	Performs a tip change on completion of program step.

5. Use a mouse-click onto the tubes you want processed, thus highlighting these tubes. Mutually adjacent tubes can be highlighted by pressing the Strg key and dragging the mouse pointer diagonally over these tubes while keeping the mouse key depressed.

6. Confirm your inputs with **[OK]**.

   The **Mixing** dialog window closes. Your newly programmed sequence is attached at the end of the program list in the left sub-area of the FasTrans desktop screen as a new step.

With a right mouse-click on a tube, you can open a context menu with these commands:

Context menu command	Description
Delete well	Deletes programmed step for selected tube.
Delete all	Deletes all programmed steps.

4.2.5   Macro

A macro step allows the contents of plates to be exported and restored or current plate content programs to be saved in an automated sequence. These steps are carried out in this order:

- Save plate contents

- Restore plate contents

- Save program with current plate content
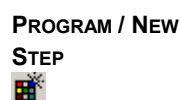
PROGRAM / NEW STEP

1. Select the **Program / New Stept** menu command or click on ![icon] in the toolbar.

   The **New step** dialog window opens.

2. Select **Macro** program step from the **Type** list.

   The **Macro** window opens.

Export plate contents

This function is similar to exportation described in section "Defining, importing and exporting plate cont" on page 11. Conventions for exporting the content of individual plates can be made on tab **Export plate content**.

Plate contents are saved in "*.csv" format that can be read by table calculation programs.

1. Highlight a desired plate.

2. Enter its file name in the input field or

   click on ![icon] to open the **Open** standard window, then define a memory path and file name there.

3. Assign this file name to your selected plate with the help of ⊞ .
   The file name will be output beside the plate name on the **Export plate content** tab.

4. Exportation can be specified for each plate of a layout via a macro step.

Add date and exact time to file name

An exportation file that was defined as described above will be overwritten with each new program run. To protect a file from overwriting, its file name can be extended by a date and a time entry. For this reason, you should additionally mark option **Insert date and time in file name**.

The name of a saved file is composed as follows:
Name_Date_Exacttime.csv, example: Name_13-03-2007_10=31=43.csv.

Restore plate contents

This function is similar to the one described in section "Restoring plate content" on page 14. Automated restoration of plate content prior to a last program start can be specified on tab **Restore plate content**.

1. Highlight a desired one in the list of plates with a mouse-click. Highlight several plates simultaneously with the shift key or control key depressed.

During execution of the given **Macro** program step, the contents of all marked plates will be restored.

Save programs

For automated saving of a current program state, the **Save programs** tab is available.

1. Enter a program name in input field **File name** or

   use ⋯ to open the **Open** standard window. You can define a memory path and file name, working in this window.

A currently active program will be saved as part of macro step execution. The file will be overwritten with each program run, unless you have modified its name by attaching a date and a time entry. You can do this by additionally highlighting option **Insert date and time in file name**. The name is organized in the same manner as discussed in function **Save program content** above.

4.2.6   Parameters for release and intake of liquids

Various parameter settings for release and intake of liquids can be matched to the properties of the liquid that needs to be pipetted, for example, in terms of viscosity. Available parameters are provided in a summary options list. They can be defined or loaded as a parameter set for each pipetting step on tab **Options** (refer to section "Define parameters for pipetting step" on page 20).

Potentially required vertical changes in pipette tip position can be defined via optional settings for the tube-opening-to-tube-bottom ratio. Motion of the pipette tip to the tube bottom is marked with a positive, motion in tube-opening direction with a negative sign.

Options

Push-out volume

Designates the volume that will be output in addition to the actual pipetting volume. This is necessary to guarantee that the pipette tip will be fully emptied.

Settings for Push-out will not be effective for dispensing.

Push-out speed

The speed at which a push-out volume is released.

Pre-motion pause

Designates a pause before up-motion of the pipette tip while liquid is being released into a target tube. Also refer to "Releasing correction" below.

Taking speed

The speed at which liquid is drawn in from a source tube.

Releasing speed

The speed at which liquid is released into a target tube.

Mix-taking or mix-releasing speed

The speed at which liquid is aspirated and released for mixing.

Post-taking pause

Describes a pause made by the tip in a source tube, once liquid has been taken in, thus allowing for after-flow of highly viscous liquids.

Taking correction
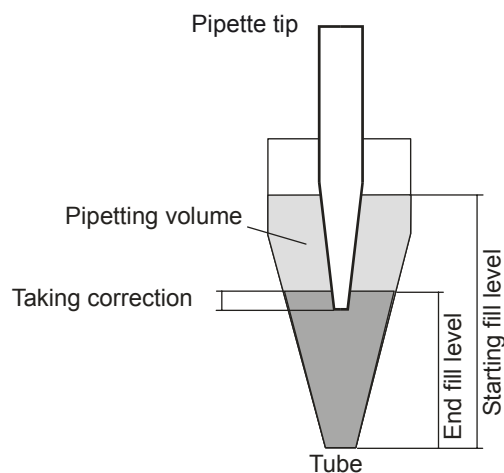
Fig. 8   Schematic view of taking correction as liquid is drawn in

For aspiration of liquid, the pipette must at least dip down to end fill level in the tube. The term "taking correction" describes the amount of additional vertical length which the pipette submerges below the end fill level for safety reasons.

The value for taking correction is always positively signed, otherwise there will be pipetting faults.

Releasing correction (lower) / (upper)

To release liquid, the pipette initially penetrates into the tube space to starting fill level. Following a **pre-motion pause** (refer to explanation above), the pipette performs up-motion concurrently with the rising fill level while releasing liquid at the same time.
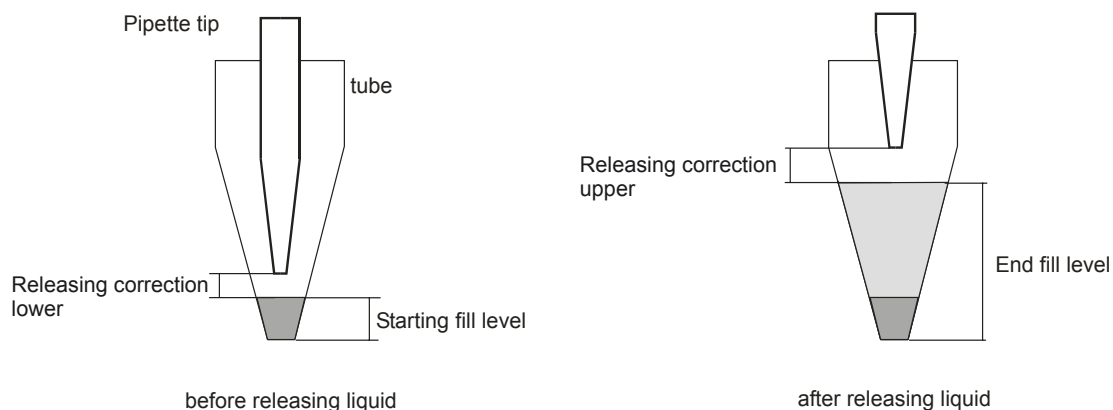

Pipette tip

tube

Releasing correction lower

Starting fill level

before releasing liquid

Releasing correction upper

End fill level

after releasing liquid

Fig. 9   Schematic view of releasing correction when liquid is output

Releasing correction lower indicates the pipette tip distance from the liquid surface before liquid is released. **Releasing correction upper** designates the pipette tip distance from the liquid surface on completion of a liquid releasing cycle. Both releasing correction settings are typically specified as negative values, because the pipette tip should normally stay above the liquid surface level.

Administration of options list

OPTIONS / OPTIONS LIST

A list of available options can be maintained and updated by selecting the **Options / Options list** menu command in the dialog window of identical name. Use a right mouse-click on a desired one of the available parameter sets to open a context menu that provides three functions: **Add**, **Edit** and **Delete**. Any change in this list must be confirmed via **[OK]**.

4.3   Starting a program

**PROGRAM / START
PROGRAM**

▶

1. Select **Program / Start program** menu command of click on ▶ in the
   toolbar.

   The FasTrans will perform a pipettor head initialization routine. While the
   routine lasts, the process flow window will show the work progress by plates
   and by steps. A click on **[Cancel]** will open another window with specific
   cancel options: **Immediately**, **After the step** or **Continue**.

2. While a program sequence is running, you should always watch for screen
   messages.

   A program run will automatically stop in any of these cases:

Cause for interruption	Action
Dump box is full.	Empty the dump box and acknowledge message with **[OK]**.
Tip rack is empty or, if several tip racks are combined via a common plate identification, all tip racks are empty.	Replace this tip rack. Make layout settings in open dialog window **Plate content**. Conform your entry with **[OK]**.
Currently running program step requires replacement of pipettor head.	Replace pipettor head and acknowledge message with **[OK]**.
In virtual layout mode, currently running program step requires a plate replacement.	Retrieve this plate from its retainer pocket in the automatic pipettor and replace it with the required plate in this pocket location. Acknowledge message with **[OK]**.

   A program will be fully aborted if the source tube volume is found to
   insufficient for one pipetting step or if the target tube could be overfilled.

☞ **Note**

Tip racks and dump boxes are not subject to any kind of checks for correct
content. This means that execution of the program list will immediately begin
even though the given tip rack may already have been processed to some
minor extent. If a layout contains several tip racks that are defined with identical
plate identification and consecutive numbering (refer to section "Defining plates
on a layout" on page 10), the automatic pipettor will automatically switch to the
next layout after the first tip rack was emptied. The same applies to dump
boxes.

Start from a particular program step

A program can also be triggered with a selected step as starting point, for
example, in order to resume pipetting operation after a program abortion
because of lack of source volume.

**PROGRAM /
PROGRAM START
FROM STEP...**

▶

1. Select **Program / Program start from step...** in the menu or click on ▶ in
   the toolbar.

   A dialog window with a list of program steps will open.

2. Highlight the desired program step and confirm this selection with **[OK]**. The program sequence will begin at the pre-selected step.

Start virtual pipetting program

Once compiled, a program can be tested in a virtual program run. A virtual program run simulates a program sequence on the PC. It does not require the automatic pipettor to be physically connected. Errors spotted during such program sequence will be displayed via messages on the screen.

**PROGRAM /
VIRTUAL PROGRAM
START**

1. Select **Program / Virtual program start** in the menu or click on ▌ in the toolbar.

   The **Run program** status window will provide a program progress display. For speed setting, a **Pause** controller is available.

As with real program starting, a virtual program start can also be told to use a particular step as the starting point.

**PROGRAM /
VIRTUAL PROGRAM
START FROM STEP…**

2. Select **Program / Virtual program start from step.** in the menu or click on ▶ in the toolbar.

4.4 Displaying and printing program tracer listings

Correct execution of a program is documented in a tracer listing. A tracer listing can be displayed, saved or printed out. Tracer (log) files are saved with extension "*.mtx".

Tracer listing functions can be selected via symbol buttons in the toolbar or via the program menu:

**PROGRAM /
SHOW TRACE FILE**
LOAD TRACE FILE
SAVE TRACE FILE
PRINT TRACE FILE

Symbol	Menu command / function
	Program / Show trace file Opens the **Tracer listing** dialog window with tracer listing display. On selecting **[Reset]**, all steps will be marked as "unprocessed".
	Program / Load trace file A trace file can be loaded via **Open** standard dialog. The trace file will be displayed in a print preview screen ready for printing out via **[Print]**.
	Program / Save trace file To save a tracer listing, use the **Save file as** standard dialog window.
	Program / Print trace file Opens the print preview of a current trace file. On clicking **[Print]**, a print process will be triggered from the preview screen.

4.5 Change program

A previously created program can be changed subsequently.

Use the right mouse key in the list of program steps to open a context menu with commands for changes in the current program step.

4.5.1 Shift step

A sequence of steps in a program can easily be changed.

1. Click onto a step in a program list then drag it to the desired location within the program, keeping the mouse key depressed.

4.5.2 Rename step

The name of step in a program list can be selectively changed.

PROGRAM / RENAME STEP

1. Select a step name you want to change with the right mouse key then select **Rename Step** in the context menu.

   Alternatively, you can highlight this name and select **Program / Rename Step** in the context menu.
   The **Input** dialog will open.

2. Define a new name in field **Step name** and confirm your entry with **[OK]**.

4.5.3 Export step

Program steps can also be individually saved on a data carrier.

PROGRAM / EXPORT STEP

1. Use the right mouse key to select a program step you want to export, then select **Export step** in the context menu.

   Alternatively, you can highlight this name and select **Program / Export step** in the context menu.
   The **Select step** dialog will open.

2. Select a step to be exported from the list. To highlight several steps, keep the Strg or shift key depressed.

3. Confirm your selection with **[OK]**.
   The **Save file as** standard dialog screen will open.

4. Select a storage location and enter a name for the file.

5. Save the program file with **[OK]**.

4.5.4 Import step

Separately saved program steps can be imported to the program list.

PROGRAM / IMPORT STEP

1. Use the right mouse key to select a step before which you want an imported program inserted, then select **Import step** in the context menu.

Alternatively, you can highlight a name and select **Program / Import step** in the menu.
The **Open** Windows standard dialog screen will open.

2. Select the file you want opened.

If all plate identifications in an imported program are found to match the plate identifications of a current layout, the given program will at once be imported to the desired location in the program list.

If this is not the case, a list of available plates will be displayed in the **Select layout plate** dialog field.

3. Highlight a desired plate in the list and confirm your selection with **[OK]**.

Per imported step, the selection dialog can be displayed once for source, once for target, once for tips and once for dump (altogether four times).

4.5.5   Change step

This function allows the parameter settings of a previously created pipetting step to be changed subsequently. However, no changes are possible for the step type (pipetting, dispensing, mixing or macro).

PROGRAM / CHANGE STEP
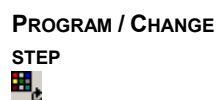
1. Use the right mouse key to select a step you want to change. Then select **Change step** in the context menu.

Alternatively, you can highlight this step and select **Program / Change step** in the menu or
click on ■ or
use a double-click on this step.

Depending on the particular type of step, the **Pipette**, **Dispense, Mix** or **Macro** dialog window will open (see above).

2. Make changes in settings as required. On exiting of the dialog window via **[OK]**, the new settings will be validated.

Change plates in step

Plates in a step may be changed, provided that they are replaced with plates of identical tube distribution and type.

1. Use a double-click on the particular plate entry in the step list.

A dialog window with a list of available plates will appear.

2. Highlight a plate and confirm your selection with **[OK]**.

The highlighted plate will be replaced in this program step.

4.5.6 Deleting program steps

4.5.6.1 Delete individual steps

PROGRAM / DELETE
STEP

1. Use the right mouse key to select a step to be deleted. Then select **Delete step** in the context menu.

   Alternatively, you can highlight this step and select **Program / Delete step** in the menu or click on .

2. Confirm the query for step deletion with **[OK]**.
   Should you decide against deleting, press **[Cancel]** for returning to the context menu.

4.5.6.2 Delete selection of steps

PROGRAM / DELETE
STEP SELECTION

1. Use the right mouse key to click on a randomly selectable step in the program list then select **Delete step selection** in the context menu.

   Alternatively, you can select **Program / Delete step selection** in the menu.

2. Highlight the steps you want deleted from the **Select steps** dialog screen. Multiple highlighting can be achieved by keeping the shift or Strg key depressed.

3. Confirm your delete selection with **[OK]**.
   Should you decide against deleting, press **[Cancel]** to return to the context menu.

4.5.6.3 Delete all steps

PROGRAM / DELETE
ALL STEPPS

1. Use the right mouse key to click on a randomly selectable step in the program list. Then select **Delete all steps** in the context menu.

   Alternatively, you can select **Program / Delete all steps** in the menu or click on in the toolbar.

2. Confirm the query for deletion of steps with **[OK]**.
   Should you decide against deleting, press **[Cancel]** to return to the context menu.

4.5.7 Convert step (on/off)

Conversion means that a dispensing step is split up into a number of individual pipetting steps. A pipetting step is created for each transfer to a tube or a group of tubes (with multi-channel heads). The dispensing step thus transformed will be marked as converted. During actual process execution, it will be carried out as a succession of individual pipetting steps.

"Convert step" facilitates expedited programming of pipetting steps. Each step created with this function performs and individual transfer of liquid from a common source tube into target tubes.

**PROGRAM /
CONVERT STEP**

1. Use the right mouse key to select a dispensing step for conversion into individual pipetting steps. Then select **Convert step (on/off)** in the context menu.

   Alternatively, you can highlight this name and select **Program / Convert step (on/off)** in the menu.

2. Makes mix parameter settings for the various pipetting steps in dialog mode.

3. Confirm your dialog entries with **[OK]**.
   The dispensing step will be marked as converted.

During actual process execution, the previous dispensing step will be replaced by the new series of pipetting steps with identical name (same as that of the original dispensing step) and with a consecutive number in the program list.

To delete a conversion, select **Convert step (on/off)** again.

5 Other Functions

5.1 Define interface

A serial interface port for communication between the automatic pipettor and the PC must be defined for FasTrans software operation.

OPTIONS /
INTERFACE

1. Use an **Options / Interface** menu command to open the **RS232** dialog screen.

2. Select the connected interface port from the **Port** list field.

3. Confirm your selection with **[OK]**.

This interface setting will stay permanently stored. It remains available for all subsequent FasTrans starts until **RS232** is called up again.

5.2 Further pipettor options

1. Trigger the **Options / Settings** menu command to open the **Options** dialog window.

2. Available setting options are:

Max. tips in dump box	Specifies a maximum fill quantity (number of tips) of the dump box .
Demo	Causes the FasTrans software to run in demo mode if active. Functions can be tested without the FasTrans itself in "On" state.
Load data at start	Loads the most recently processed program as part of a FasTrans software start if active.

Turn demo mode off and on

To establish communication between the PC and the automatic pipettor, the following order of powering-up actions must be observed:

1. Connect automatic pipettor to PC and turn power supply on.

2. Trigger FasTrans software.

If a software start fails to establish communication with the automatic pipettor (e.g. because automatic pipettor was not turned on), the FasTrans software will start in demo mode. A "Demo mode on" setting will be saved on exiting of a FasTrans software session so each subsequent software start will restore demo mode, regardless of the order in which the automatic pipettor and the software were powered on.

To turn demo mode off, proceed as follows:

1. Make sure that the automatic pipettor is physically connected and power supply is available.

2. Disable the **Demo** option in dialog window **Options** and exit the window by clicking **[OK]**.

Communication between the PC and the automatic pipettor will be established and the "Demo mode off" setting be saved. Provided that the specified order of powering-on actions is observed, each subsequent software start will establish communication between the PC and the automatic pipettor.

Conversely, you can enable the **Demo** option to interrupt communication between the PC and the automatic pipettor.

5.3 Initializing automatic pipettor

As part of a device initialization routine, the pipettor head of the FasTrans moves into a defined initial position. By triggering an initialization routine, you may check if communication between the PC and the automatic pipettor was established.

EDIT / INITIALIZE
DEVICE

1. Trigger device initialization routine with the help of the **Edit / Initialize device** menu command.

5.4 Summary table & replacement of heads

Summary table of available pipettor heads

A list of available pipettor heads is displayed in the **Head list** dialog window. The heads which are contained in this list are available for selection in the **Pipette**, the **Dispense** and the **Mix** window, as well as on the **Head** tab.

EDIT / HEAD LIST

1. Trigger an **Edit / Head list** menu command to open a dialog window of identical name.

2. Activate those pipettor heads in the head list, which are physically available for operation.

3. Confirm your entries with **[OK]**.

Change pipettor head

Mechanical replacement of a currently mounted pipettor head is fairly easy. A pipettor head can be installed in 0°- or 90°-position. The selected mounting position will be detected by the electronics. Head replacement should always be performed software-controlled.

EDIT / HEAD
CHANGE

1. Select **Edit / Head change** in the menu.
   The pipettor head moves to the front.

2. Replace installed pipettor head in accordance with instructions in the hardware manual.

3. Acknowledge the prompt for head replacement with **[OK]**.

5.5 Load tips / Dump tips

Tips can be picked up and released again in a separate work cycle. As a necessary precondition for this function to work, the given layout must contain a tip rack and a dump box.

EDIT / LOAD TIPS

1. Highlight the tip rack in your layout.

2. Select **Edit / Load tips** via the menu.

   The pipettor head will take up the tip or tips from the tip rack.

> **Caution! The pipettor head must be vacant before a "Load tips" procedure can be triggered.**
>
> Make sure that the pipettor head does not yet carry any tips before you trigger this function. Disregarding this rule might damage the pipettor head.

EDIT / DUMP TIPS

1. Highlight the dump box in your layout.

2. Select **Edit / Dump tips** in the menu.

   The pipettor head will drop the tips into the dump box.

Other Functions

Load tips / Dump tips

6   Plates & Tubes

☞   **Note**

The FasTrans software includes some typically required micro-titer plates and tubes. These have already been calibrated for use in the FasTrans. Your selected types of plates can be calibrated by Analytik Jena on special request. You can send such plates to our Service department, adding a respective explanatory note.

6.1   Calibrate tubes

To perform calibration of liquid containers, settings for dimensional details and the content of the receptacles of a plate or of single receptacles (e.g. tubes) must be entered in a dialog window. These dimensional settings are required for subsequent correct motion to the various tubes and for actual pipetting processes (e.g. maximal and minimal filling volume).

EDIT / CALIBRATE TUBES

1.   Select the **Edit / Calibrate tubes** menu command to open the dialog window for viewing or extending the list of tubes.
The dialog window provides options for input of tube-related information along with a list of previously created tubes.

Fig. 10   Dialog screen for tube calibration

2.   Make entries for the following items:

Name	Defines a name for the tube. The tube will be maintained in the list under this name.
Minimal volume	Defines the lowest allowed volume that must remain in this tube after retrieval of liquid.

Maximal volume	Defines the maximum volume this tube is allowed to have after a filling operation.
Tube dimensions	Provides setting options for dimensional details that must be made in accordance with the dimensional diagram on the right. **Note**: Note that dimensional settings are **inner dimensions**!
[Add]	Adds a modified entry as a new vessel to the list.
[Replace]	Replaces previous settings with new settings for a highlighted vessel.
[Delete]	Deletes a highlighted newly created vessel from the list. Vessels and related data which have already been software-assigned to plates cannot be deleted!
[Convert]	Mathematically converts square dimensions of tubes into equivalent diameters of round tubes.

3. Confirm your changes or new entries with **[OK]** or press **[Cancel]** to exit this dialog window without changes in calibration settings.

6.2   Calibrate plates

6.2.1   Calibration assistant

Click onto **Edit / Calibration plates** to open the **Calibration assistant** dialog window.
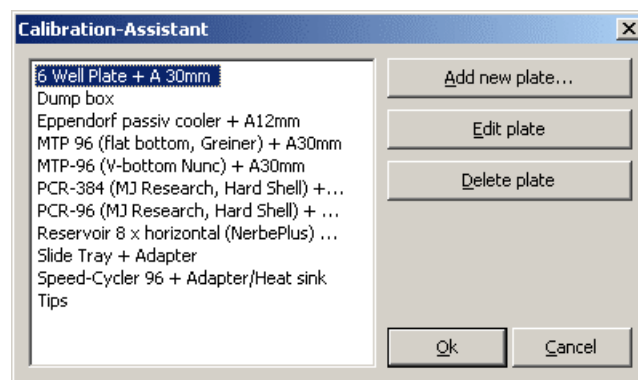
Fig. 11   Calibration assistant

For specification of further action, the following control buttons are available:

[Add new plate...]	Adds a new plate to the list of plates and opens the calibration assistant Wizard .
[Edit plate]	Changes settings in a highlighted plate and opens the calibration assistant. Plates already included on the list cannot be modified in terms of line number, column number, grid size, orientation and plate name.

[Delete plate]   Deletes entries from a highlighted plate, removes the plate name from the list of plates and closes the calibration assistant.

This option is only available if the plate in question is not used as part of the current layout.

> **Caution!**
> You are advised to proceed with utmost caution when you use **[Delete plate]**. In some cases, it may be impossible to open a previously saved program.

6.2.2   Calibrate new plate

The purpose of calibration is to determine the precise placement position of plates on the work plate of the automatic pipettor. Calibration is a software-supported process which runs under the control of the calibration assistant.

Calibration is performed with a pipettor head with tips mounted. It runs independently of the type of pipettor head (single or multi-channel pipettor head) installed.

As a necessary precondition for creating a new plate, a tube or tubes must have been defined via **Calibrate tubes** before (refer to section "Calibrate tubes" on page 41).

> **Note**
> Please note that plates with a tube grid other than those of multi-channel pipettor heads can only be calibrated with a single-head pipettor head.

1. Place the plates you want to calibrate onto the work plate of the automatic pipettor:

Plate	Position on work plate
Tip rack filled	C1
New plate	C2
Dump box	C3

2. Add the tip rack and the dump box to your layout (refer to section "Defining plates on a layout" on page 10). Then define the content of the tip rack (refer to section "Plate properties" on page 13).

3. Provide pipettor head with tips.
   To do this, mark the tip rack in your layout and select **Edit / Load tips** in the menu.
   The pipettor head will pick up the tips.

EDIT / CALIBRATE PLATES

4. Select **Edit / Calibrate plates** to open the calibration assistant.

5. Confirm **[Add new plate]**.
   The Wizard opens a dialog window with basic settings options for plate calibration. Simultaneously, the pipettor head moves into the initial position for retainer pocket C2.
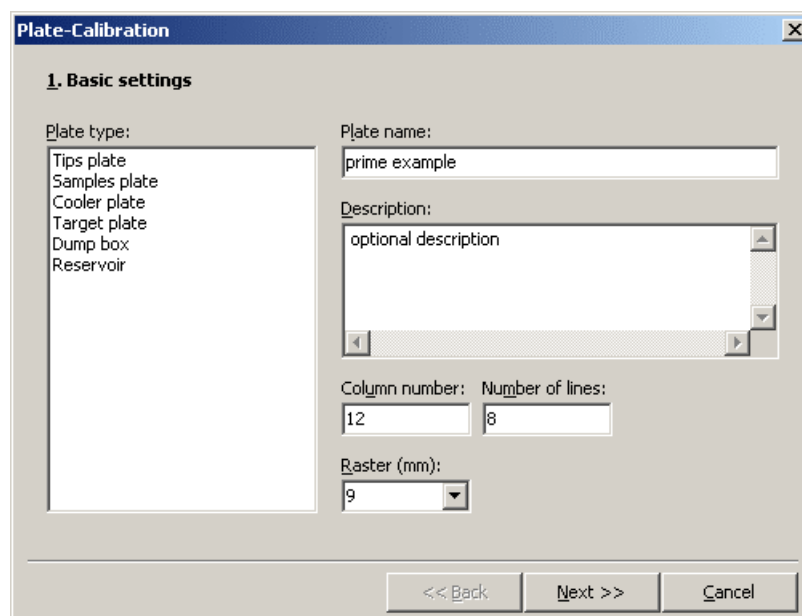
Fig. 12   Calibration assistant – dialog window with basic setting options

6. Select the type of plate to be calibrated:

Tips plate	Tip rack Tip racks used in the automatic FasTrans pipettor are already calibrated.
Samples plate	A samples plate is a plate with definitely assigned tubes, for example, a micro-titer plate. A samples plate may serve both as a source plate and a target plate.
Cooler plate	A cooler plate provides possibilities for insertion of various kinds of tubes with different dimensional configuration. A cooler plate may be specified as a source plate and as a target plate.
Target plate	A target plate may solely be used as the destination of a pipetting procedure, e.g. slides. Individual sub-areas can be masked to exclude them from a given pipetting process.
Dump box	Denotes the waste bin to collect used tips and residual pipetting matter. The dump box which is used as a part of FasTrans pipettor operation is already calibrated.
Reservoir	The reservoir is a source plate. The reservoir keeps a greater volume of liquid for a pipetting process. For reservoir, a plate with a big tube or a plate with stripe-like grooves can be defined.

7. Enter a **Plate name**. The plate will subsequently appear in the list of plates under this name.
    Optionally, you can also enter a more detailed **Description** of the plate.

8. Type in a **Column number,** a **Number of lines** and a **Grid** size, i.e. a value for tube-to-tube spacing.
For reservoir, also select an orientation for the tube grooves from the **Orientation** list.

9. Continue calibration with **[Next>>]**.
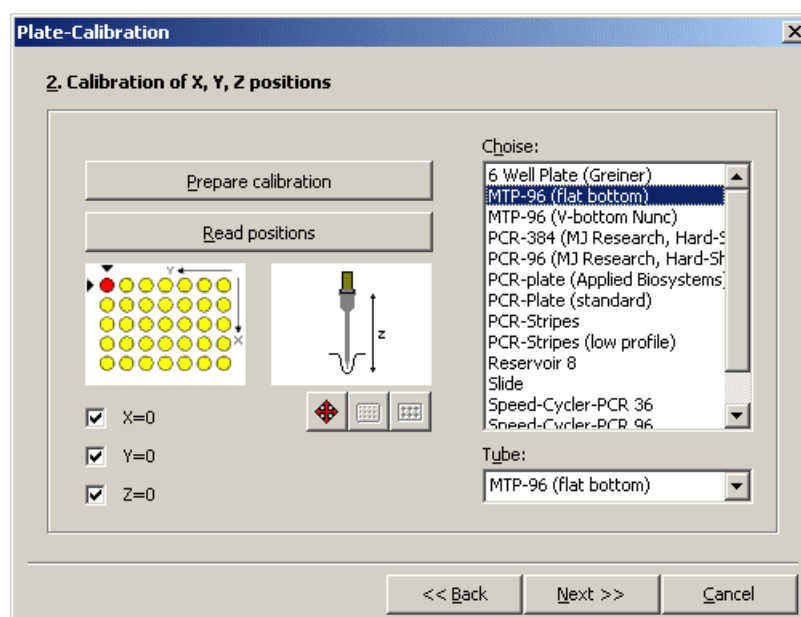The special dialog window for positional calibration will open.

Fig. 13   Calibration assistant – dialog window for calibration of positions

The purpose of "Calibration of X, Y, Z positions" is to determine the precise placement position of tubes. Typically, it proves sufficient to determine the placement position of the upper left tube (A1) in a plate. Coordinate directions are displayed on both graphic views. Three checker boxes (**X**, **Y** and **Z**) allow the corresponding coordinate direction to be turned on and off again for determination of a placement position.

10. Highlight a tube seated on the plate in the **Choice** list. In the case of a **Cooler plate**, several tubes can be highlighted with the Strg or shift key depressed.

11. To calibrate a **Cooler plate**, select a tube - in the list of identical name – which fits the rear left holder position (A1) of the plate (refer to schematic view in dialog window for calibration of positions).

12. Actuate the **[Prepare calibration]** control button.
The motor drives for pipettor head motion will turn off. The pipettor head can now be freely moved. The **[Prepare calibration]** control button turns inactive.

⚠️ **Caution!**
Refrain from manual motion of the pipettor head unless the motors are actually deenergized! Failure to comply may damage the automatic pipettor.

13. Move the pipettor head into position over the upper left tube of the plate. Then lower it carefully and slowly in tube-centered position.

The pipettor head should only make light contact with the tube bottom. Under no circumstances should the tip or the tube be deformed on making contact.

14. Actuate the **[Read positions]** control button.

    This will turn the driving motors for pipettor head motion on again and the coordinate positions will be determined. The coordinate position readings will appear beside the related checker box **X**, **Y** and **Z**. The **[Prepare calibration]** control button turns active again.

15. In the majority of cases, the coordinate positions thus established are accurate enough for working. Optionally, fine positioning of the pipettor head may be performed in a software-controlled procedure.

    - Actuate .
      The **Move** dialog window will open.

    - Use the arrow keys as necessary to move the pipettor head into a desired position. The setting for **Step width** can be varied in an input field of this name. You should, however, proceed with care when making a change in this setting. Your setting should leave a small clearance (about 0.2 mm) between the pipette tip and the tube bottom.

    - Use **[Close]** to exit the **Move** dialog window and confirm your settings.

16. Once all values are defined, you may continue calibration with **[Next>>]**. A dialog window with a summary view of all calibration data will follow.

17. Click **[OK]** to acknowledge your calibration values and exit the calibration assistant.

    The calibration data will be validated and you can use this plate in your layout.

6.2.3 Cooler plates – special features to be considered for calibration

Cooler plates imply some special features that must be taken into consideration when performing calibration. Typically, a cooler plate is able to hold a number of different types of tubes. Furthermore, some cooler plates are designed with various holder positions for mounting of differently sized tubes. For this reason, it is necessary to determine the individual Z-position for each tube of a plate and its suitability for using with this plate.

1. Begin by determining the coordinate positions for the first tube in the back-end left corner as described in steps 1-15 of section "Calibrate new plate" on page 43.

2. Disable the **X** and the **Y** checker box in the dialog window for **Calibration of positions**.
   The function for X-coordinate and Y-coordinate determination is turned off.

3. Select the next tube in the **Tube** list.

4. Place this tube in a suitable holder location on the cooler plate. This location need not be position A1, because the plate's X and Y coordinate readings have already been determined.

5. Actuate the **[Prepare calibration]** control button.
The driving motors for pipettor head motion will be deenergized.

6. Transfer the pipettor head into position above the current tube by manual motion then carefully lower it in mid-tube position. Under no circumstances should the tip or tube be allowed to suffer deformation on making contact.

7. Actuate the **[Read positions]** control button.
The driving motors for pipettor head motion are powered on again and related Z-coordinate readings are taken.

8. Optionally, you may perform software-controlled fine adjustment of the pipettor head if required for higher precision.

   Actuate ⊕ for this purpose. The **Move** dialog window will appear.
Use the arrow keys are appropriate to transfer the pipettor head into the desired position. The setting for step size can be modified via **Step width**. Proceed with caution for changes in this setting. On completion of setting, there should be a small remaining clearance between the pipette tip and the tube bottom (about 0.2 mm).

9. Proceed in the same way to determine the Z-coordinate value for all other tubes.

10. Assign each tube a suitable position on the cooler plate. Actuate the ⊞ control button in the dialog window for **Calibration of positions**.

    The **Tube selection** dialog window will appear. The list on its right-hand side contains all tubes due to be processed. The left sub-screen shows the cooler plate's grid spacing.
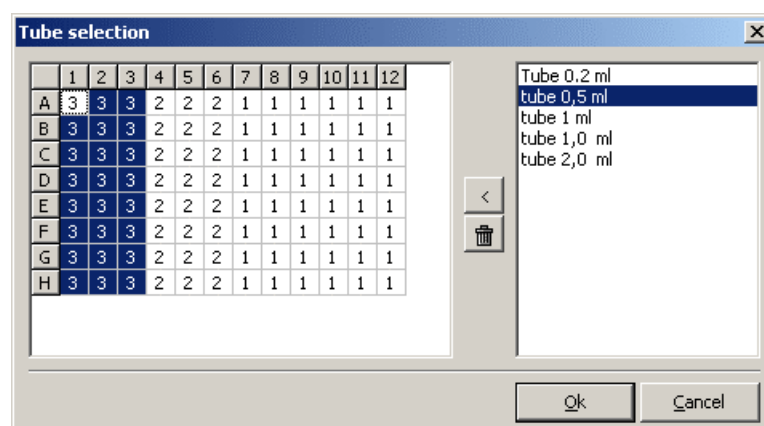

Fig. 14   Tube selection dialog window

11. Select the first tube from the list.

12. Use the mouse to highlight desired positions. Positions located within a given rectangle area can be highlighted together by clicking onto one corner of this rectangle and dragging the mouse pointer to the diagonally opposite corner while keeping the mouse key depressed.

13. Actuate [<].

    Those grid positions which were highlighted will appear with a number. This number indicates how many tubes were assigned to the related position.

    Use [🗑] to delete entries from a highlighted position.

    As you move the mouse pointer over the grid area, a list will show at the mouse pointer. It shows the tubes already assigned to a current position.

14. You can thus assign a position on the cooler plate to each tube in the list of tubes.

15. Confirm your entries with **[OK]**. You will return to the dialog window for **Calibration of positions**.

16. Once all values have been defined, you may continue calibration by clicking **[Next >>]**.
    A special dialog window with a summary view of calibration data appears.

17. Click **[OK]** to confirm these calibration values and exit the calibration assistant.

    Your calibration data will be validated and the plate can now be used for the layout.

6.2.4   Target plates – particular features to be considered for calibration

A target plate can only be defined as destination of a volume of liquid. For example, slides may serve as target plates. One or more desired sub-areas of a target plated can be masked out from pipetting steps or dispensing steps. These sub-areas will not be available for selection when a respective program step is created subsequently.

1. Begin by determining the coordinate positions for the target plate as described in steps 1-15 of section "Calibrate new plate" on page 43.

2. Actuate [⊞].

    The **Masking** dialog window will be displayed with a grid view of the target plate.
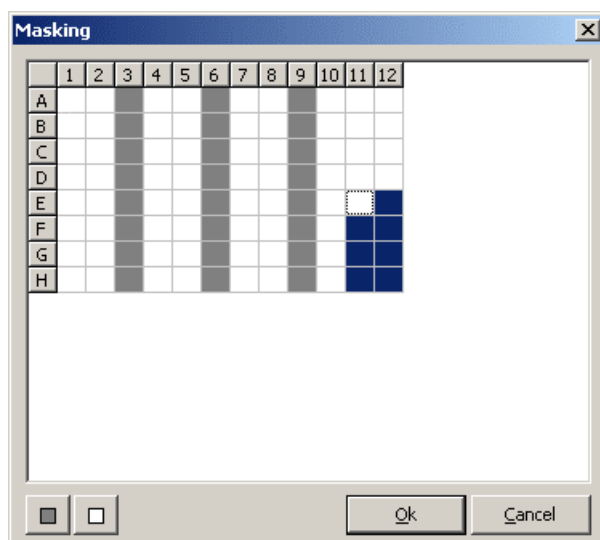
Fig. 15   Masking dialog window

3. Highlight a group of contingent positions you want masked out from this grid pattern.

4. Actuate [icon].
    Positions which were masked out will appear in grey background colour.

    Using [icon], you may remove a mask from a previously marked position.

5. Use **[OK]** to confirm your entries and return to the dialog window for **Calibration of positions**.

6. Once all required values are defined, you may proceed with calibration by clicking **[Next >>]**.
    A special dialog window with a summary view of calibration data will follow.

7. Use **[OK]** to confirm your calibration values and exit the calibration assistant.

    The calibration data will be validated and the plate can be use for the layout.

6.3   Exporting & integrating plate & tube data

Information about calibrated plates and tubes can be transferred from a program to an external file or be re-integrated into the program, respectively.

A previously created data volume can thus be protected from changes, and data regarding tubes that were calibrated in an external location can equally be used.

6.3.1 Export plate file

FILE / EXPORT /
EXPORT PLATES

1. Select **File / Export / Export plates** in the command menu.
   The standard Windows **Save** dialog will be displayed.

2. Enter a new file name in the **File name** input field, then actuate **[Save]**.
   The data of a plate will be saved under the newly specified name and with "*.mca" extension.

6.3.2 Export tube data

FILE / EXPORT /
EXPORT TUBES

1. Select **File / Export / Export tubes** in the command menu.
   The standard Windows **Save** dialog will be displayed.

2. Enter a new file name in the **File name** input field, then actuate **[Save]**.
   The data of a plate will be saved under the newly specified name and with "*.mtb" extension.

6.3.3 Integrate plate data

FILE / INTEGRATION
/ INTEGRATE PLATES

1. Select **File / Integration / Integrate plates** in the command menu.
   The **Update** dialog window will come on display.

2. Click onto **[Open]** to open the standard Windows **Open** dialog.

3. Select a plate file you want to use as source for transfer of data to and integration into the FasTrans program.

4. A list of plates which were previously saved in this file is displayed in the **Update** dialog window.

5. Highlight the required plates. Multiple highlighting can be achieved by keeping the shift key or Strg key depressed.

6. Actuate **[Paste]**.
   The screen will output a message saying that all highlighted plates were inserted.

7. This integration procedure can be repeated as many times as necessary. Having completed all integration procedures, use **[Close]** to exit the **Update** dialog window.

6.3.4 Integrate tube data

FILE / INTEGRATION
/ INTEGRATE TUBES

1. Select **File / Integration / Integrate tubes** in the command menu.
   The **Update** dialog window will appear.

2. Follow next instructions in the same order as described in section "Integrate plate data" on page 50 above.

7 Program Management

Document windows such as for saving, opening or printing, are largely managed with the help of standard Windows functions.

7.1 Open program file

Open previously saved file

FILE / OPEN

1. Select **File / Open** in the command menu or click on in the toolbar. The standard Windows **Open** dialog window will appear.

2. Highlight a file you want opened then click **[Open]**. You can also use a double-click onto the name of this file which will open immediately.

The program is displayed in the desktop screen of FasTrans.

Open empty desktop screen

FILE / NEW

An empty desktop screen will contain an empty layout and an empty program list.

1. Select **File / New** in the command menu or click on in the toolbar.

An empty desktop screen will open.

7.2 Save program file

Save file with identical name

FILE / SAVE

1. Select **File / Save** in the command menu or click on in the toolbar.

The file will be saved with changes under the same file name.

Save file with new name

FILE / SAVE AS...

1. Select **File / Save as...** in the command menu. The **Save** standard Windows window will be displayed.

2. Type in a new name and confirm your selection with **[OK]**.

The file will be saved with changes under a new name.

7.3 Print data

Optionally, a pipetting program with layout and programs or the content of a plate can be printed from the currently active layout.

FILE / PRINT

1. Select **File / Print** in the command menu or click on in the toolbar.

The dialog window of identical name will open.

2. Select your printing option and activate checker boxes as appropriate to reflect required printing contents:

Complete pipette program	Prints out pipetting program. Selectable content items are: • Layouts • Programs • Pipette table
Plate content	Prints the content of a plate selected from the list of plates.

3. Confirm your selection with **[OK]**.
   Printing will be triggered on the printer that is set as default printer in the operating system. If you want to use another printer, select the print preview screen with special setting options (see below).

Print preview

The print preview screen can be selected when working in the **Print** dialog window **[Preview]**.

The **Print preview screen** will appear. It displays the various pages via tabs. The preview screen provides the following control buttons:

[Options]	Opens standard Windows window for printer settings. In addition to the preset default printer, you may select and set other installed or connected printers in the operating system.
[Print]	Starts printing.
Pfeiltasten	Pages through print pages
List	Sets magnification.
Lens symbols	Enlarges or reduces page view if clicked. **Note**: Likewise, you may use the mouse wheel for desired changes in display screen size.
Page symbols	Displays pages in original size or in full-page view on the screen.
[Close]	Exits print preview.

8   Index