

Short instructions

autoMACS® NEO Separator

The short instructions provide an overview of the software menus and the most important operating functions of the autoMACS NEO Separator, for example defining an experiment and maintenance.

The autoMACS NEO Separator is a fully automated labeling and cell isolation benchtop magnetic cell separator that allows for fully automated cell isolation with various separation strategies. Reagent-specific and preset programs simplify and standardize the cell isolation process. Samples and reagents are placed in MACS® Chill Racks and the MACS Reagent Rack 8 and positioned for processing by the MACS MiniSampler S.

The autoMACS NEO Separator is for research use only. It is intended to be used in research laboratories and is to be operated by professional laboratory personnel only. The autoMACS NEO Separator shall only be used with reagents provided or recommended by Miltenyi Biotec. It is to be used only with MACS Chill Racks and the MACS Reagent Rack 8.

autoMACS® NEO Separator

Getting started (1)



Read the user manual before operating the instrument.

Start the instrument

Tap the touchscreen to start the autoMACS NEO software. After initialization, the **Home** tab is displayed by default. Automated **Wake up** and **Prime** can be scheduled via the **Task planner**.

Switch into standby

The instrument shall be filled with storage solution when it is not in use for several hours or longer. Initiate a standby either:

- via the **Task planner**
- as washing step after the last sample separation
- by tapping the shutdown button in the title bar.

① USB ports

for software updates, log file and run report exports.

- 2 × at the right side of the screen (covered by a slider)
- 2 × at the rear side of the instrument

② 2D barcode reader

to scan rack and reagent barcodes.

③ MACS® Chill Racks in three sizes

hold 5 mL, 15 mL, or 50 mL tubes.

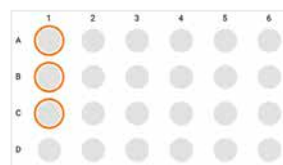
④ MACS Reagent Rack 8

holds up to eight vials of reagents.

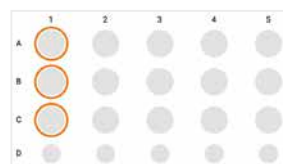
⑤ MACS MiniSampler S with cover

holds the MACS Reagent Rack 8 and MACS Chill Racks.

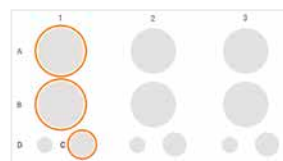
Chill 5 Rack



Chill 15 Rack



Chill 50 Rack



- A Original sample
- B Unlabeled fraction
- C Labeled fraction

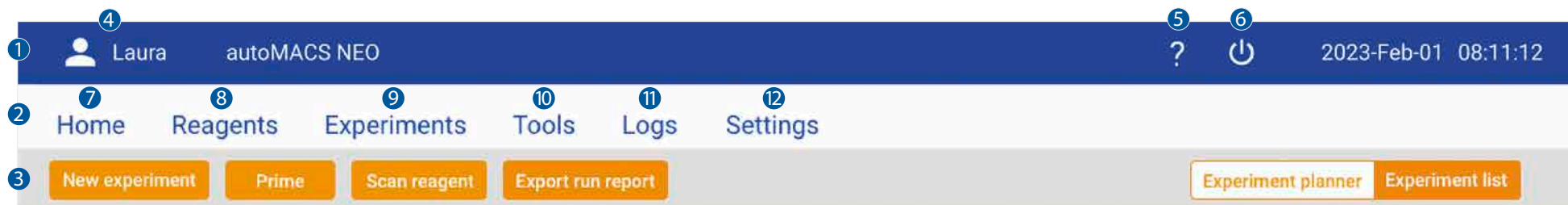


autoMACS® NEO Separator

Getting started (2)



Read the user manual before operating the instrument.



1 Title bar

with basic functions, date and time.

2 Menu bar

to switch between different tabs.

3 Toolbar

has buttons to prime the instrument, create a new experiment, and scan a reagent. The **Experiments** tab has additional buttons to export run reports and toggle between **Experiment planner** and **Experiment list**.

4 User button

to switch user and log out.

5 Help button

to access the help file.

6 Shutdown button

to initiate **Sleep** to put the instrument into standby mode/shut down.

7 Home

shows the current status of the instrument including liquid levels, column status, and scheduled tasks and enables actions such as column exchange or scheduling a new task. It is displayed by default after starting the instrument.

8 Reagents

shows a list of all reagents and kits that are available for separation on the autoMACS NEO Separator.

9 Experiments

has two views. Define and start cell separation experiments in the **Experiment planner**. View your experiment history, export run reports, and open templates for new experiments in the **Experiment list**.

10 Tools

provides access to washing, maintenance, and calibration programs as well as log file export.

11 Logs

allows to filter the log file, e.g., to look up previous error messages or device check results.

12 Settings

is only available for administrators. Provides access to general instrument settings, such as date and time, user management, and software updates.

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Getting started (3)



Read the user manual before operating the instrument.

1 Login

enables for login to your personalized user account. New accounts can be created by an administrator.

2 Overview

shows the instrument status. After starting the instrument a **Prime** must be performed.

3 Task planner

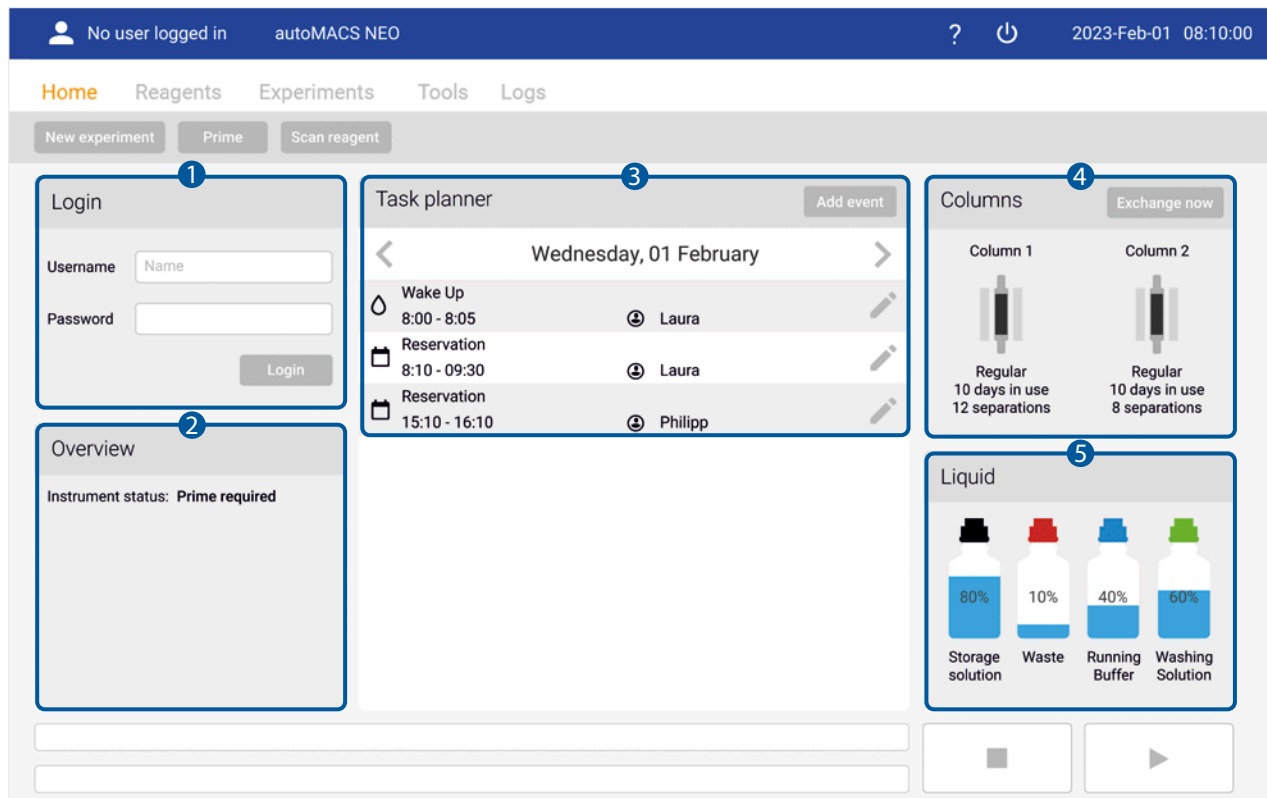
shows all planned tasks and reservations. Make a reservation or schedule an automatic **Wake up** (including a **Prime**) or **Sleep**.

4 Columns

provides a real-time overview of the column status. The autoMACS Columns can be used for 14 days. The instrument automatically records the number of days and separations since the last exchange and will inform you once an exchange is needed.

5 Liquid

shows the liquid levels of buffers and waste.



The screenshot displays the autoMACS NEO web interface. At the top, a dark blue header bar shows 'No user logged in', 'autoMACS NEO', and the date/time '2023-Feb-01 08:10:00'. Below the header, a navigation bar includes 'Home', 'Reagents', 'Experiments', 'Tools', and 'Logs'. A secondary bar contains buttons for 'New experiment', 'Prime', and 'Scan reagent'. The main content area is divided into five numbered sections: 1. Login: A form with 'Username' (placeholder 'Name') and 'Password' fields, and a 'Login' button. 2. Overview: A box showing 'Instrument status: Prime required'. 3. Task planner: A calendar view for 'Wednesday, 01 February' with a table of tasks: 'Wake Up' (8:00-8:05) by Laura, and two 'Reservation' slots (8:10-09:30 and 15:10-16:10) also by Laura and Philipp. 4. Columns: A section for 'Column 1' and 'Column 2', both showing 'Regular' status, '10 days in use', and '12' or '8' separations. 5. Liquid: A section showing four bottles: 'Storage solution' (80%), 'Waste' (10%), 'Running Buffer' (40%), and 'Washing Solution' (60%).

autoMACS® NEO Separator

Define your experiment (1)



Read the user manual before operating the instrument.

1 Select a sample rack

Select the Chill Rack size you want to use and define your samples here.

2 (De-)select multiple samples

Tap the (+)/(-) icon to (de-)select all positions on the Chill Rack at once.

3 Select sample positions

Tap to select a position for your sample. Selected sample columns (including positions for sample, unlabeled, and labeled fractions) are encircled in orange.

4 Assign a reagent

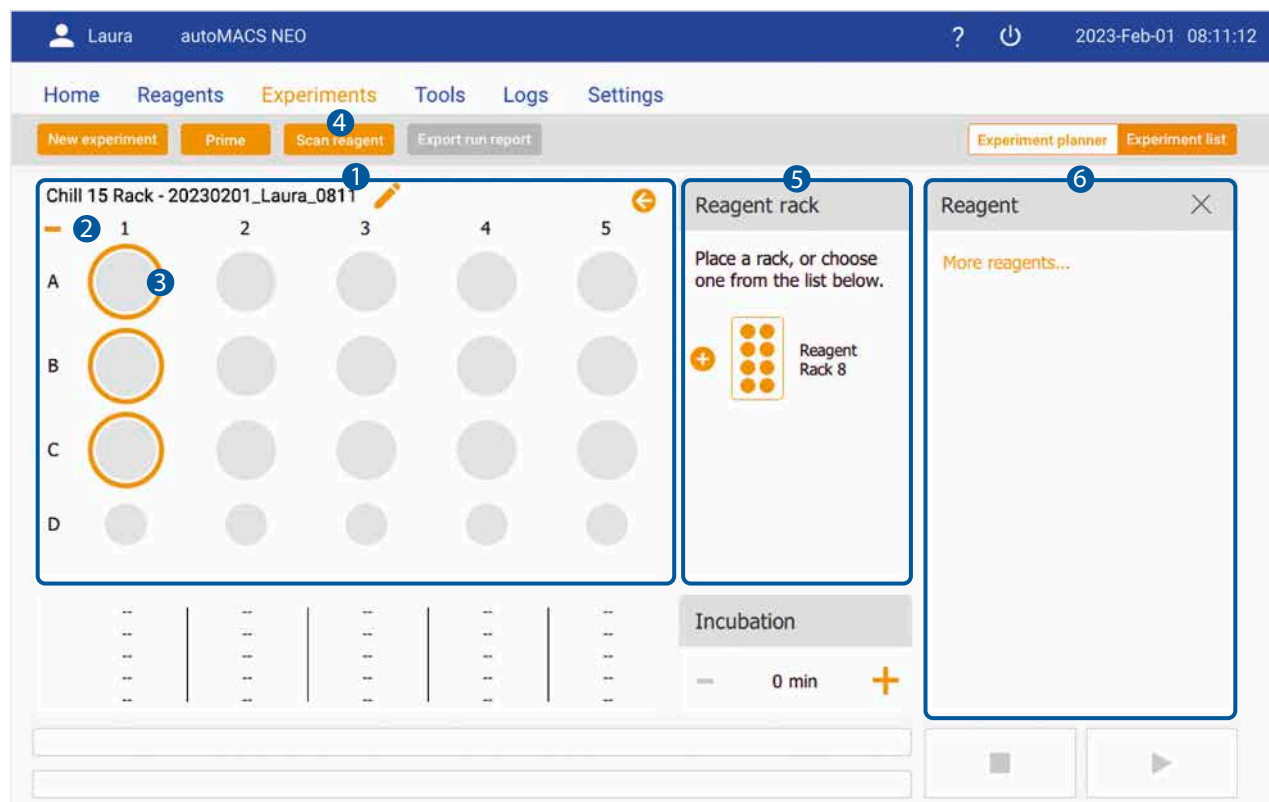
Tap **Scan reagent** for assigning a reagent or kit to the selected sample position(s). If your reagent does not have a barcode, select reagents via the **Reagent** pane on the right or via the **Reagents** tab. For details go to **page 10**.

5 Add a reagent rack

Tap to add the Reagent Rack 8 for automated labeling of your sample. For manual labeling, the reagent rack does not need to be selected.

6 Open the reagent list

Upon selection of one or several samples, the **Reagent** pane opens. Previously used reagents are listed here for selection. To select from all available reagents, tap **More reagents...** for redirection to the **Reagents** tab.



autoMACS® NEO Separator

Define your experiment (2)



Read the user manual before operating the instrument.

1 Place reagents for experiments

After scanning a reagent or upon selection of a reagent in the reagent list, a dialog box opens.

2 Record reagent data

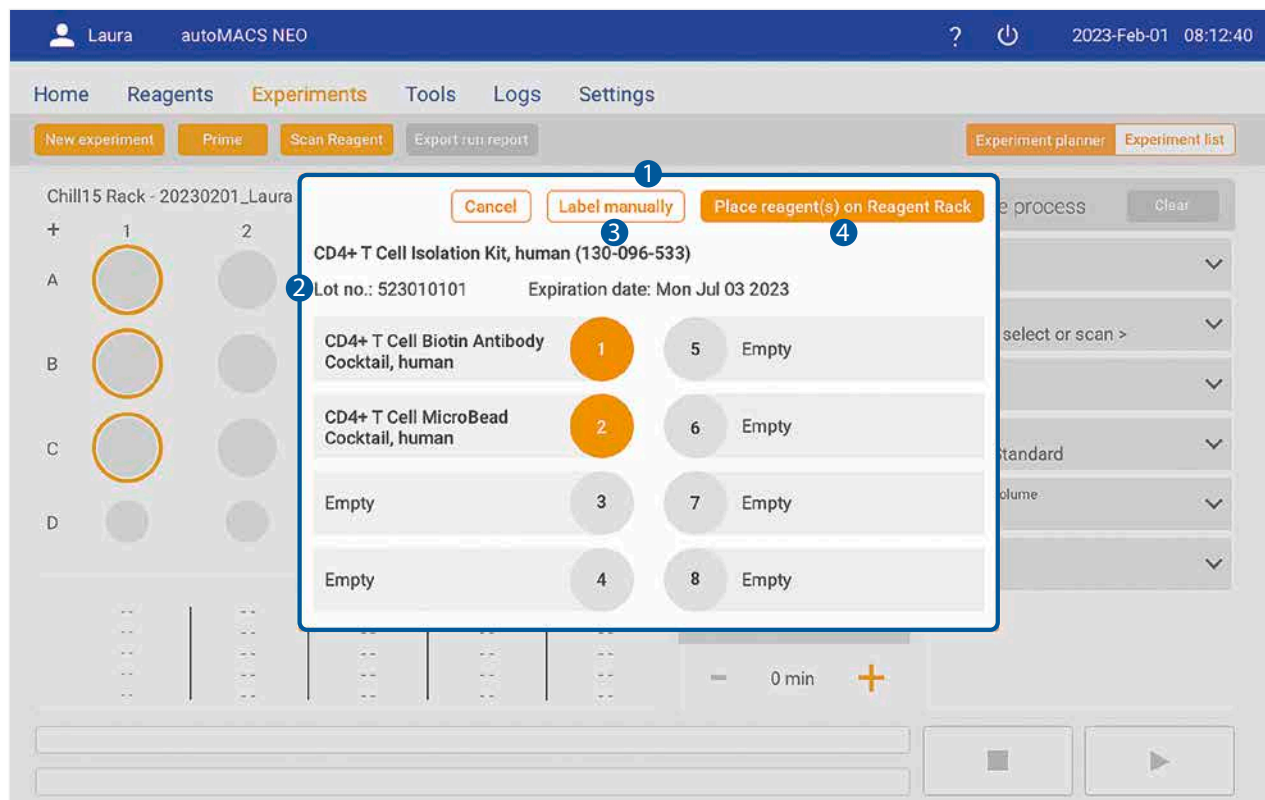
When scanning a reagent, the lot number and expiration date of the reagent are automatically monitored and documented in the run report.

3 Tap for manual labeling

For separation of manually labeled samples, tap **Label manually**.

4 Tap for autolabeling

For fully automated labeling and separation, tap **Place reagent(s) on reagent rack**. The dialog box indicates, where to place which reagent.



The screenshot shows the autoMACS NEO software interface. The top bar displays the user name 'Laura', the instrument name 'autoMACS NEO', and the date/time '2023-Feb-01 08:12:40'. The main menu includes 'Home', 'Reagents', 'Experiments' (selected), 'Tools', 'Logs', and 'Settings'. Below the menu are buttons for 'New experiment', 'Prime', 'Scan Reagent', 'Export run report', 'Experiment planner', and 'Experiment list'. The background shows a 'Chill15 Rack - 20230201_Laura' with four rows (A, B, C, D) and two columns (1, 2). A dialog box is open in the center, titled 'CD4+ T Cell Isolation Kit, human (130-096-533)'. It contains the following information: Lot no.: 523010101, Expiration date: Mon Jul 03 2023. Below this is a table for placing reagents on the reagent rack:

Reagent	1	2	3	4	5	6	7	8
CD4+ T Cell Biotin Antibody Cocktail, human	1				5	Empty		
CD4+ T Cell MicroBead Cocktail, human	2				6	Empty		
Empty	3				7	Empty		
Empty	4				8	Empty		

The dialog box also has buttons for 'Cancel', 'Label manually', and 'Place reagent(s) on Reagent Rack'. The background interface also shows a 'Process' section with a 'Clear' button and a list of reagents to be scanned.

autoMACS® NEO Separator

Define your experiment (3)



Read the user manual before operating the instrument.

1 View sample status

The sample positions in the **Experiment planner** as well as the experiments in the **Experiment list** are color-coded and symbol-coded to indicate their current status.

2 Check summary

Check the information of defined sample positions including the chosen reagent, labeling strategy, separation program, sample volume, and washing program in the summary pane.

3 Enter sample process information

The **Sample process** pane contains all sample process information. Missing information for a sample are indicated by orange shape.

4 Sample

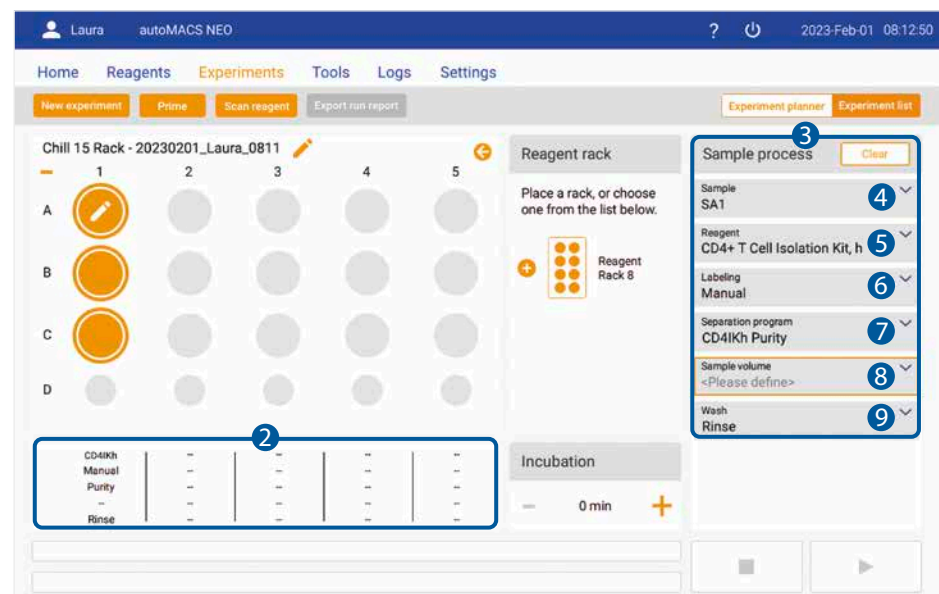
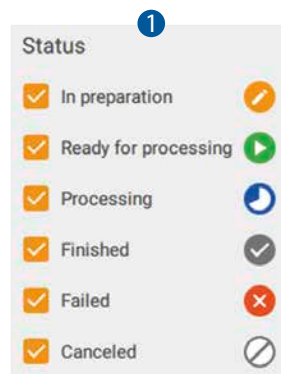
Sample name of the selected sample position.
Tap to modify the sample name.

5 Reagents

Short name of reagent/kit assigned to the selected sample position(s).

6 Labeling

Labeling method (manual or autolabeling) of selected sample position(s).



7 Separation program

A separation program for the given reagent is suggested by default. For further refining the protocol and selecting the optimal program for your sample, see **page 11**.

8 Sample volume

Enter the volume of your sample. The possible range for this setup is displayed.

9 Wash

Choose between different wash programs to be run after the separation.

autoMACS® NEO Separator

Define your experiment (4)



Read the user manual before operating the instrument.

1 Change the experiment name

The default name of each experiment is yyyyymmdd_user_hhmm. To change the experiment name, tap the pen.

2 Duplicate samples

The sample process can be copied to more sample positions.

1. Tap the sample position you want to copy until it starts to blink.
2. Tap the position(s) you want to copy the sample process to.
3. Tap the original sample once.

3 Add an incubation time

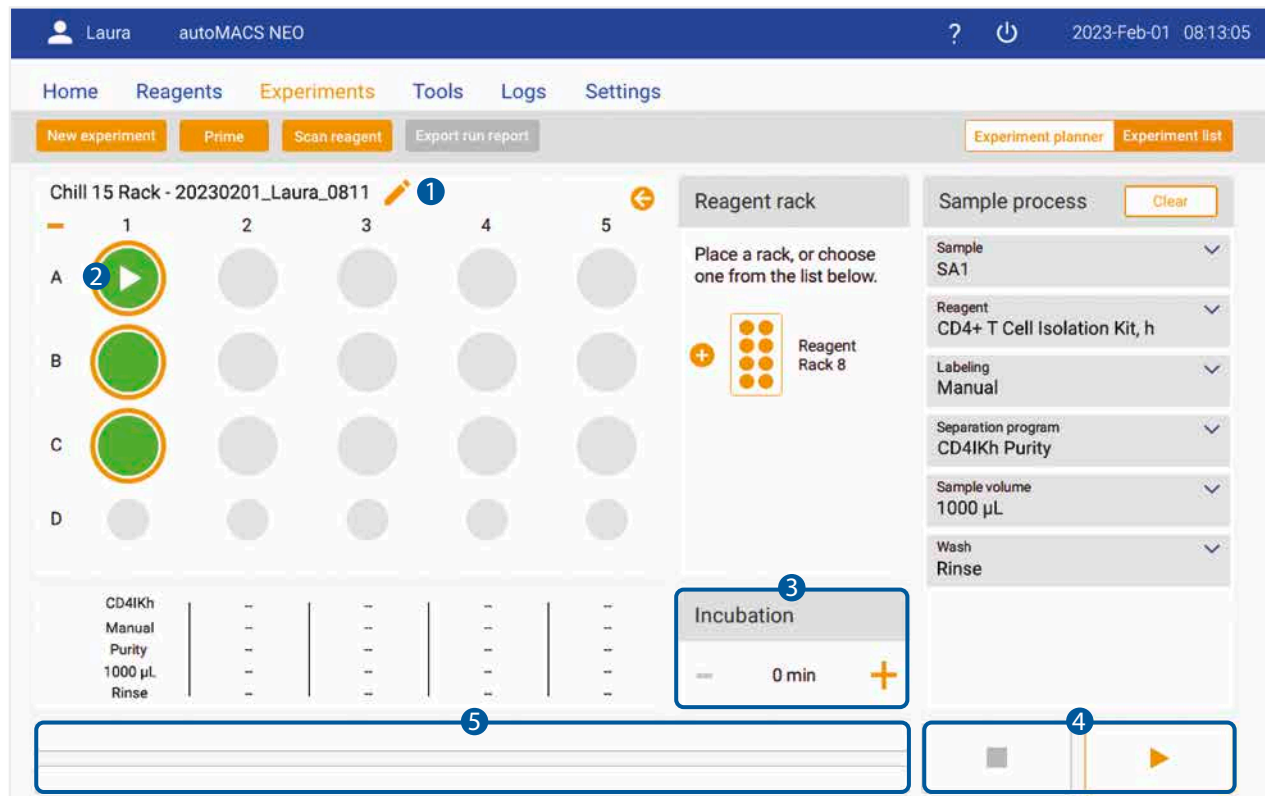
Optionally add an incubation time for manually labeled samples, before the instrument starts the separation. The incubation time for labeling can be conducted on the instrument prior to separation. If you define more than one sample, the incubation time is only performed once before the first sample but not again for following samples.

4 Start/Stop

Start or terminate a separation or a process by tapping the **Run** button or **Stop** button.

5 Observe the progress

The progress bars show the total time (left) and remaining time (right) of a running process (e.g., separation). The top bar shows the current step, the bottom bar shows the entire process.



autoMACS® NEO Separator

Review, reuse, and export your experiment



Read the user manual before operating the instrument.

1 Select filters

The experiments listed in the **Experiment list** are color-coded and symbol-coded to indicate their current status. Select filters according to the status of experiments you want to see in the **Experiment list**.

2 Export a run report

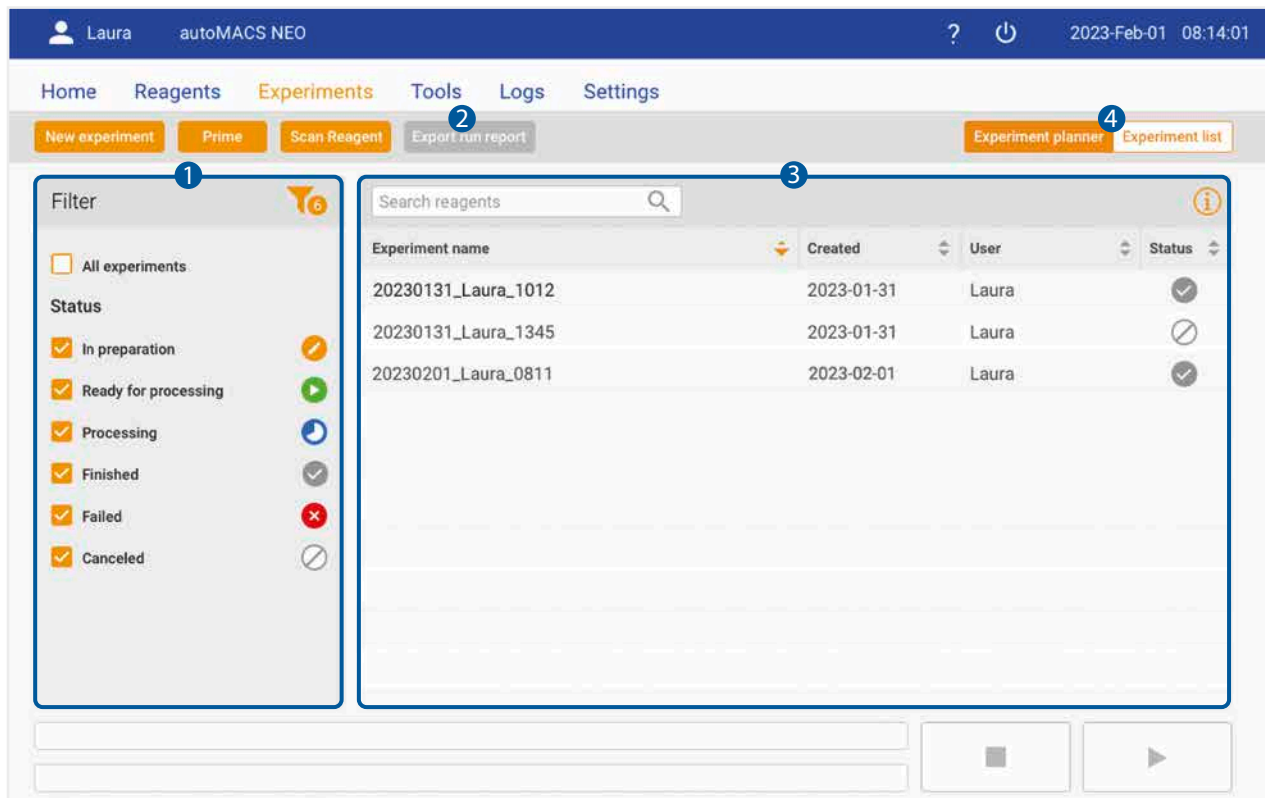
Export a report of a selected experiment.

3 Use the Experiment list

In the **Experiment list** you can view the experiment history, select templates or previously run experiments for (re-)run, and export run reports.

4 Toggle

Toggle between **Experiment list** and **Experiment planner**.



The screenshot displays the autoMACS NEO software interface. The top navigation bar includes a user profile (Laura), the software name (autoMACS NEO), and a date/time stamp (2023-Feb-01 08:14:01). Below the navigation bar, there are tabs for Home, Reagents, Experiments, Tools, Logs, and Settings. The Experiments tab is active, showing a list of experiments. On the left, a 'Filter' panel allows users to select experiment status: All experiments, In preparation, Ready for processing, Processing, Finished, Failed, and Canceled. The main area displays a table of experiments with columns for Experiment name, Created, User, and Status. The table lists three experiments: 20230131_Laura_1012, 20230131_Laura_1345, and 20230201_Laura_0811. The bottom of the interface features a search bar and buttons for 'New experiment', 'Prime', 'Scan Reagent', 'Export run report', 'Experiment planner', and 'Experiment list'.

Experiment name	Created	User	Status
20230131_Laura_1012	2023-01-31	Laura	✓
20230131_Laura_1345	2023-01-31	Laura	✗
20230201_Laura_0811	2023-02-01	Laura	✓

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Select a reagent



Read the user manual before operating the instrument.

1 Select reagents without barcode

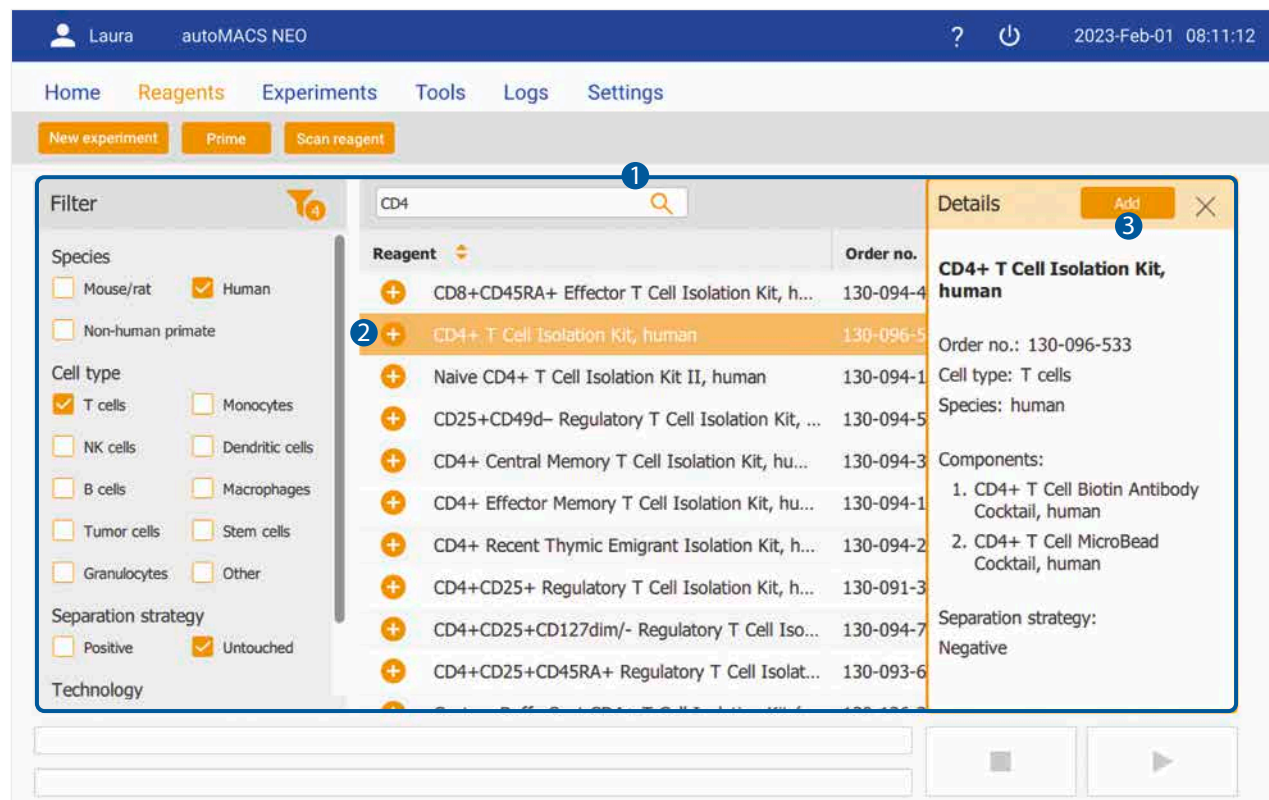
The **Reagents** tab shows a list that contains all reagents and kits that are compatible for separation on the autoMACS NEO Separator. Manually select reagents for your experiment from the **Reagents** tab if the reagent vial you want to use does not have a barcode.

2 Quick add

Tap the (+) icon to immediately add a reagent to your experiment.

3 Add via Details box

Upon tapping a reagent name in the reagent list, the **Details** box opens. Tap **Add** to use this reagent for your experimental setup.



autoMACS® NEO Separator

Select the optimal program for your experiment



Read the user manual before operating the instrument.

1 Default programs

The autoMACS NEO Separator provides several programs with different flow speeds through the column(s). The flow speed influences the purity and recovery of the separated fractions. For every reagent, reagent-specific optimized programs are suggested per default. These are shown as reagent short name and focus e.g., **CD4IKh Purity** or **CD4IKh Recovery**.

2 Advanced programs

For further adjustment, other programs can be selected for your sample. To do so, tap **Separation program** and select a program slower or faster than the recommended programs, depending on the desired results. A dropdown menu shows different separation programs in different categories.

3 Parameters

Single column programs require one autoMACS Column. Double column programs run through two columns for maximal purity of labeled cells and require two columns to be installed. Program names indicate the speed of sample uptake onto the column(s). Special programs pre-dilute samples or require alternative buffers.

Sample process Clear

Sample SA1

Reagent CD4+ T Cell Isolation Kit, h

Labeling Manual

1 Separation program CD4IKh Purity

Sample volume 1000 µL

Wash Rinse

Separation program X

+ CD4IKh Purity

+ CD4IKh Recovery

Single column programs ^

+ 0.25 [ml/min]

+ 0.5 [ml/min]

+ 1 [ml/min] (Purity)

+ 2 [ml/min] (Recovery)

+ 4 [ml/min]

Double column programs v

Special programs v

Target cells?	Downstream application requires ...?	Columns	Uptake speed	Separation program name
Labeled cells (=positive selection)	<div> <div>+</div> <div>Purity</div> <div>-</div> </div> <div> <div>-</div> <div>Recovery</div> <div>+</div> </div>	2	4 [mL/min] (Column 1), 4 [mL/min] (Column 2)	4/4 [mL/min]
			4 [mL/min] (Column 1), 2 [mL/min] (Column 2)	4/2 [mL/min]
			8 [mL/min]	8 [mL/min]
			6 [mL/min]	6 [mL/min]
			4 [mL/min]	4 [mL/min]
		1	3 [mL/min]	3 [mL/min]
			2 [mL/min]	2 [mL/min]
			1 [mL/min]	1 [mL/min]
			0.5 [mL/min]	0.5 [mL/min]
			0.25 [mL/min]	0.25 [mL/min]
Unlabeled cells (=negative or untouched selection)	<div> <div>+</div> <div>Purity</div> <div>-</div> </div> <div> <div>-</div> <div>Recovery</div> <div>+</div> </div>	1	0.25 [mL/min]	0.25 [mL/min]
			0.5 [mL/min]	0.5 [mL/min]
			1 [mL/min]	1 [mL/min]
			2 [mL/min]	2 [mL/min]
			4 [mL/min]	4 [mL/min]
			6 [mL/min]	6 [mL/min]
			8 [mL/min]	8 [mL/min]

Note: The slower the sample uptake, the less labeled cells are eluted in the negative fraction and the more labeled cells are collected in the positive fraction.

Example 1: labeled cells = target cells higher uptake speed = higher purity slower uptake speed = higher recovery

Example 2: unlabeled cells = target cells higher uptake speed = higher recovery slower uptake speed = higher purity

autoMACS® NEO Separator

Washing and maintenance programs



Read the user manual before operating the instrument.

Program	Duration	autoMACS Running Buffer – MACS Separation Buffer	autoMACS Washing Solution	Storage solution	Bleach solution	Description	Recommended usage
QRinse	2 min	56 mL	2 mL			Standard short wash.	Between separations of cells with normal frequency.
Rinse	6 min	70 mL	119 mL			Extensive wash.	Between separations of rare cells, e.g., stem cells.
Clean	8.5 min	76 mL	119 mL	58 mL		Very extensive wash.	After separations of whole blood, bone marrow, potentially infectious samples, and before some maintenance processes.
Sleep	7 min		119 mL	70 mL		Washing of the fluidic system followed by filling with storage solution.	Before overnight storage.
Prime	4 min	112 mL	3 mL	2 mL		Initial washing and system filling to get the instrument ready for separation.	Prior to first separation.
Store	9 min		119 mL	135 mL		Washing of the fluidic system followed by filling with Storage Solution; replacement of separation columns with substitutes.	Before storing the instrument for a period longer than two weeks.
Bleach	19 min	58 mL	114 mL	7 mL	40 mL	Disinfection of the fluidic system with bleach solution including replacement of separation columns. Corresponds to the Safe program of the autoMACS Pro Separator.	Every 3–6 months depending on the samples. For high throughput of infectious or blood material once per month.
Column exchange	3.5 min	98 mL				Replacement of separation columns.	Every 14 days or after 100 separations, whichever comes first.
Rescue	2 min	65 mL				Rescue procedure for samples.	Use to rescue samples from the tubing system, in case of an instrument error.

autoMACS® NEO Separator

Column exchange and bottle exchange



Read the user manual before operating the instrument.

1 Column exchange

Every 14 days the autoMACS Column(s) need(s) to be exchanged by a new one. For long-time storage, the columns must be replaced by column substitutes.


In the **Home** tab the instrument will inform you when a column exchange is required. Tap **Exchange now** to be redirected to the **Tools** tab. A wizard will guide you through the exchange step by step.

Depending on the separation program, one or two columns are required for separation. The instrument will request the replacement of a substitute column by a regular column before a double column program can be started.

Columns


Exchange now

Column 1



Regular
10 days in use
12 separations

Column 2



Regular
10 days in use
8 separations

Laura autoMACS NEO

2023-Feb-01 08:11:12

Home Reagents Experiments Tools Logs Settings

Programs

Calibration

1 Column exchange

Valve exchange


Diluter unit

Device check

Export log files

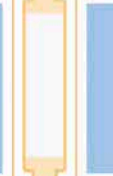
Ready for transport

Column 1



Type: Substitute
In use: 0 days
Separations: 0

Column 2



Type: Substitute
In use: 0 days
Separations: 0

Column selection

Select the columns to be exchanged by checking the appropriate check boxes. Then tap Next to start the exchange preparation.

Note: Once the exchange preparation is running, you have to complete the column exchange program.

Stop

Start

Bottle exchange

If the buffer liquid level is too low or the waste is full, a message is displayed. All bottles are illuminated in red and are blinking.

Exchange fluid bottles

1. Take out an empty bottle and the unscrew bottle closure counter-clockwise but do not remove it.
2. Place a full bottle into the holder, open it and fasten the bottle closure to the new bottle.

Exchange the waste bottle

1. Unscrew the bottle closure counter-clockwise but do not remove it.
2. Place an empty bottle next to the holder.
3. Label the empty bottle with a biohazard sticker.
4. Fasten the bottle closure to the empty bottle.
5. Close the full waste bottle with a screw can and remove it from the bottle holder.
6. Place the empty bottle in the bottle holder.

autoMACS® NEO Separator

Notification system



Read the user manual before operating the instrument.

1 Expiration signs

When scanning a reagent, the instrument will inform you in the reagent placement popup if the reagent has passed the expiration date. If you still proceed, the sign will appear in the **Sample process** pane.

In the **Home** tab the instrument will inform you when a column exchange is required. See **page 13** for column exchange.

2 Notifications

Notifications and error messages appear from the right-hand side of the screen. They can appear in three colors indicating increasing severity: blue, orange, and red.

Tap the colored flag at the left side of the notification window to minimize the notification. Tap the flag again to re-open the notification.

Sensor-controlled bottles with LED color code

Sensors measure the liquid level of all bottles. LEDs inform you about the instrument status.

Cancel

Label manually

Place reagent(s) on Reagent Rack

CD4 MicroBeads, human (130-045-101)

Lot no.: 5220431564 Expiration date: ⚠ Sat Dec 31 2022

CD4 MicroBeads, human	1	5	Empty
Empty	2	6	Empty
Empty	3	7	Empty
Empty	4	8	Empty

Sample process

Clear

Sample SA1

1 Reagent ⚠ CD4 MicroBeads, h

Labeling Manual

Separation program CD4h Purity

Sample volume <Please define>

Wash QRinse

2 2023 Feb 01 15:40h

Column exchange required
 Exchange column substitute(s) with a regular column in order to run a separation. Depending on the process to be performed only the left or both positions require a regular column.

Exchange now

OK

Note: In case you require assistance and would like to contact the Miltenyi Biotec Technical Support, provide pictures of notifications and error messages as well as log files. To export log files, go to the **Tools** tab and tap **Export log files**.

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Further information and materials

autoMACS NEO Separator instrument page



Visit us for the autoMACS NEO Separator instrument page.

► miltenyibiotec.com/products/automacs-neo-separator.html

MACS® MiniSampler S product page



Visit us for the MACS MiniSampler S product website.

► miltenyibiotec.com/products/macs-minisampler-s.html

Sample processing information



Visit us for more information about autolabeling, stage loading and volumes for each reagent.

► miltenyibiotec.com/automacs-neo-sample-processing

autoMACS NEO Separator user manual



Visit us for the autoMACS NEO Separator user manual.

► miltenyibiotec.com/automacs-neo-manual

MACS technology



Visit us for more information on MACS technology.

► miltenyibiotec.com/products/macs-cell-separation.html

MACS cell separation reagent portfolio



Discover our MACS cell separation reagent portfolio.

► miltenyibiotec.com/products/macs-cell-separation/cell-separation-reagents.html

For more detailed information please contact us.

