



Thermo Scientific Touchscreen User Interface

for Sorvall LYNX Superspeed Centrifuges

Instruction Manual

50136520-d • 03 / 2020

Table of Contents

Screen Views	5
Main Screen	5
Status	6
Parameters	8
Control & Configuration	9
Lighthouse Mode	10
Centrifugation	13
Entering Parameters	15
Temperature	15
Precooling	16
Time	17
Speed and RCF Value	19
Acceleration / Deceleration Profile	21
Configuration	23
Help	24
Runs Configuration	25
Settings	36
Tooltip Mode	49
Rotor	51
Rotor import	51
GMP Mode	53
GMP Workflow	53
Predefined Barcodes	57

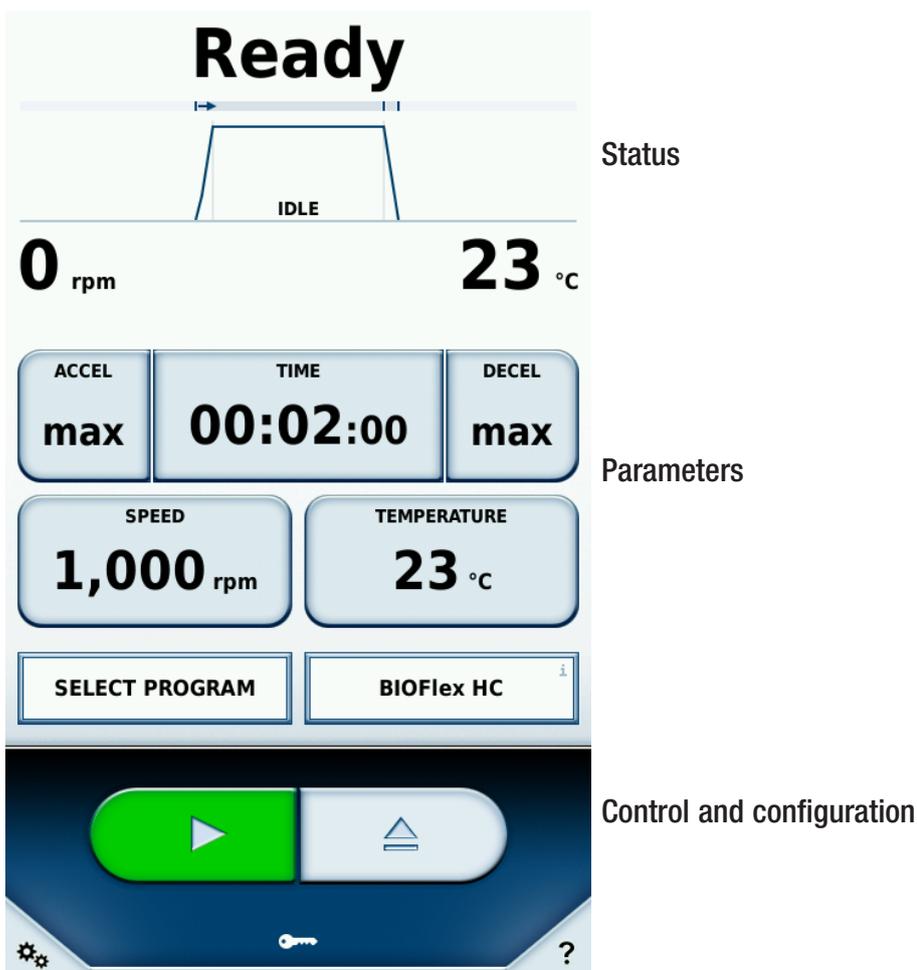
Thermo Scientific Centri-Vue Application	59
Requirements	59
Quick Guide	59
Connectivity Plug-In (Touchscreen User Interface)	63
Centri-Vue App	64
REST-Webserver	77

Screen Views

The following manual describes the touchscreen or graphical user interface (GUI) for Thermo Scientific™ Sorvall™ LYNX superspeed centrifuges.

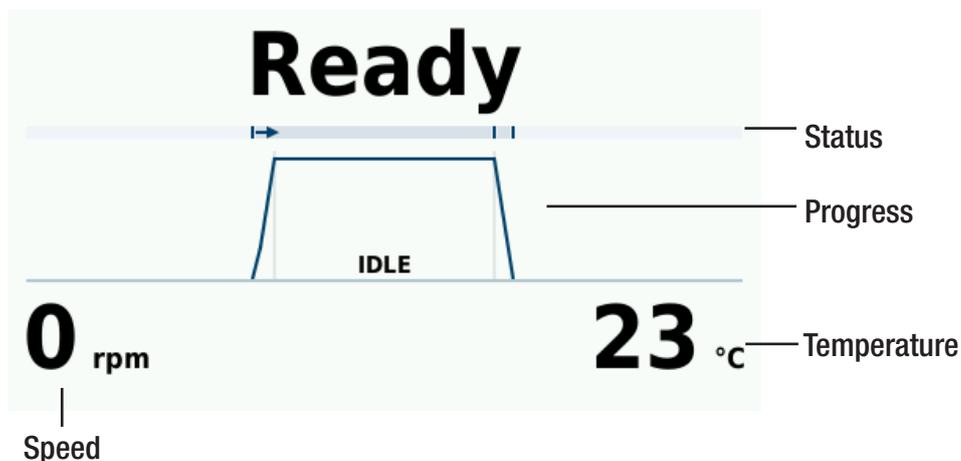
Main Screen

The main screen is subdivided into the following sections:



Status

The status of the centrifugation process is displayed at the top of the main screen.



Status:	In the Time mode, the remaining time for the centrifugation process is shown here. In the Hold mode, the elapsed time is displayed.
Progress:	The curve diagram is divided into the sections Accelerate, Centrifugation and Deceleration.
Temperature:	The current temperature in the rotor chamber is shown here.
Speed:	The current speed of the rotor is shown here.

The remaining time is shown for a centrifugation process in progress. The progress bar is used to determine in which phase the centrifugation process is currently in. The acceleration or deceleration curve corresponds to the selected profile (see [“Acceleration / Deceleration Profile”](#) on page 21).

Possible statuses:	
Ready	Centrifugation can be started.
Door open	The centrifuge door is open.
Error	An error has occurred.
Stopped	Centrifugation has been halted manually.
Completed	Centrifugation or precooling has been successfully completed.
No rotor	No rotor has been placed in the centrifuge.

Progress

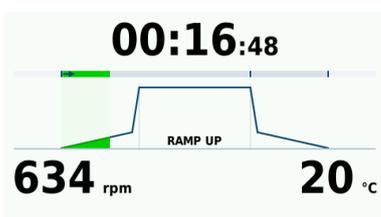
Status



The rotor has been installed and the centrifuge door is closed; precooling in progress. The remaining time for cooling is displayed (see “Precooling” on page 16).



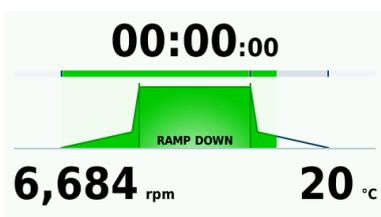
The rotor is in place and the centrifuge door is closed; press the button  to start centrifugation.



Centrifugation begins with the acceleration phase. The displayed curve corresponds to the selected profile. The time remaining for the complete centrifugation (without deceleration phase) is displayed (see “Acceleration / Deceleration Profile” on page 21).



Centrifugation is taking place at the set speed. The time remaining for centrifugation is displayed.



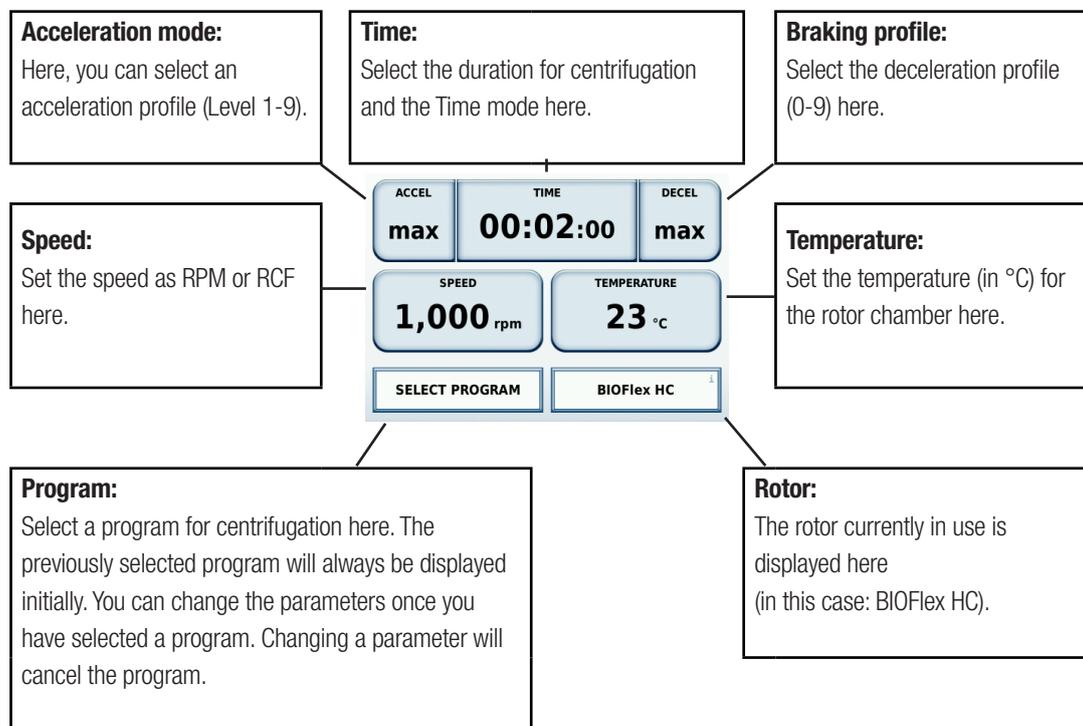
Centrifugation has been successfully completed. The centrifuge is in the deceleration phase. The displayed curve corresponds to the selected profile. The centrifuge door cannot be opened until the rotor has come to a complete stop (see “Acceleration / Deceleration Profile” on page 21).



Centrifugation has been successfully completed. The rotor has come to a complete stop and the centrifuge door can be opened.

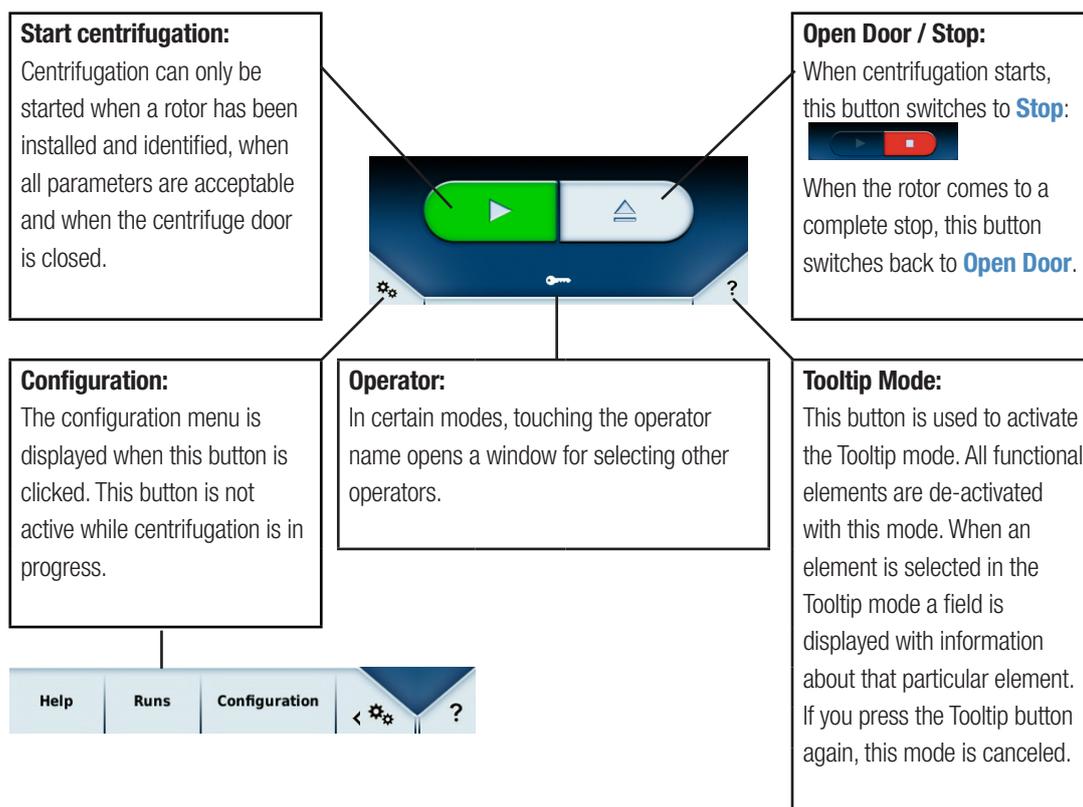
Parameters

You can set the setpoints for centrifugation in the Parameters section (for more information see [“Entering Parameters” on page 15](#)). Touch one of the buttons to open a new window to enter the corresponding value.



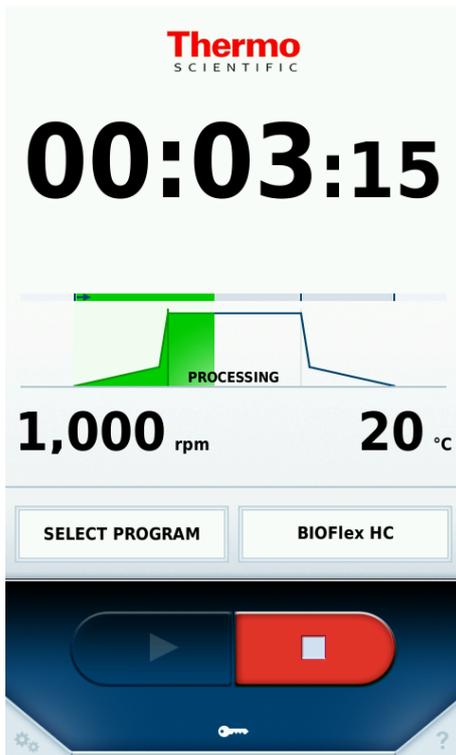
Control & Configuration

In this section you can start and halt centrifugation. You can also define other settings, such as for the centrifugation programs, in this section (for detailed information refer to the Section “Programs” on page 25). If you are not sure of the general use of a button you can use the Tooltip mode, which provides information about all of the operator control elements (see “Tooltip Mode” on page 49).



Lighthouse Mode

The Lighthouse mode is activated while centrifugation is in progress if you do not touch the screen for at least 30 seconds. The buttons for parameters are concealed when the Lighthouse mode is active. The status for centrifugation is displayed larger instead so that you can read the remaining time for centrifugation from a good distance.

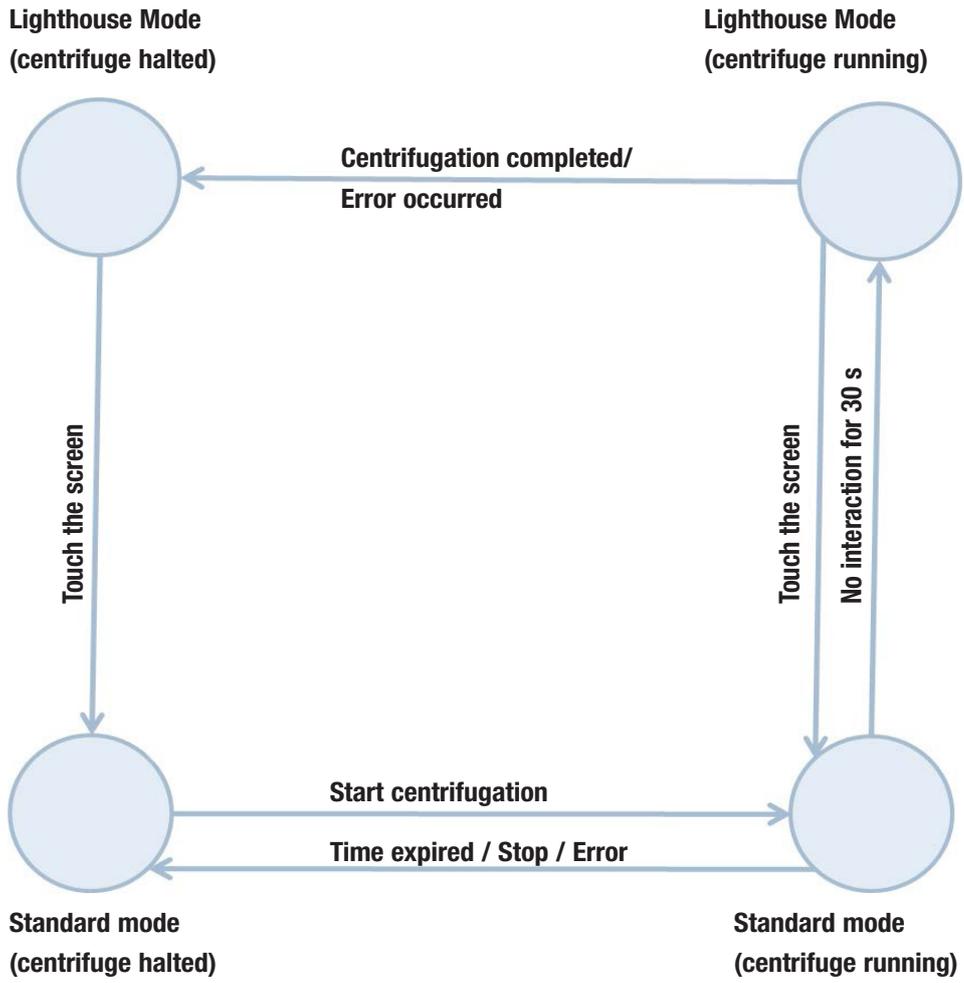


Lighthouse Mode:

Centrifugation can be halted at any time in the Lighthouse mode by touching the **Stop** button. You can exit this mode by simply touching the screen.

The **Stop** button is the only button active in the Lighthouse mode in order that you can manually halt centrifugation at any time. All other buttons are de-activated.

The diagram below illustrates graphically the statuses for the main screen, such as the switching from the Standard to the Lighthouse mode. The Standard mode is shown at the bottom, both with the centrifuge in motion and at standstill; the Lighthouse mode is shown at the top of the diagram. If the centrifuge is stopped manually it switches immediately from the Lighthouse mode back to the Standard mode. Normally you must touch the screen to switch back to the Standard mode.



2

Centrifugation

You can define the parameters for centrifugation via the main screen (see [“Entering Parameters” on page 15](#)). Touching a button opens a corresponding window in which you can enter the new value. A rotor does not have to be already in use to enter this data. The speed is adjusted automatically to the maximum when a rotor is installed.

As an alternative to manual input of parameters you can also use a program in which values have already been defined. Refer to section [“Programs” on page 25](#) for information on how to define and activate a program.

For example, you can select the predefined program **PRE-COOLING** (for details see [“Precooling” on page 16](#)).

Centrifugation can be started when all of the input parameters are acceptable, when a rotor is in use and when the door is closed.

If an error occurs, a large red X will be displayed in the main screen in the Lighthouse mode. Touch the screen to obtain information about the exact information about the error.

It is only possible to open the centrifuge door using the **Open Door** button in the main screen, if the centrifuge is at standstill.

[“Device Settings” on page 46](#) contains information about activation and de-activation of the acoustic signal on completion of centrifugation.

3

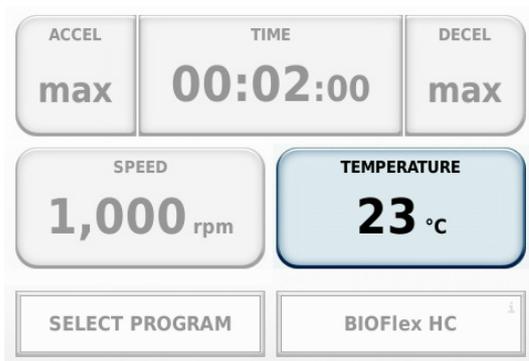
Entering Parameters

You can change any parameter prior to and during a centrifugation process.

Temperature

You can set the temperature using the **Temperature** button in the main screen.

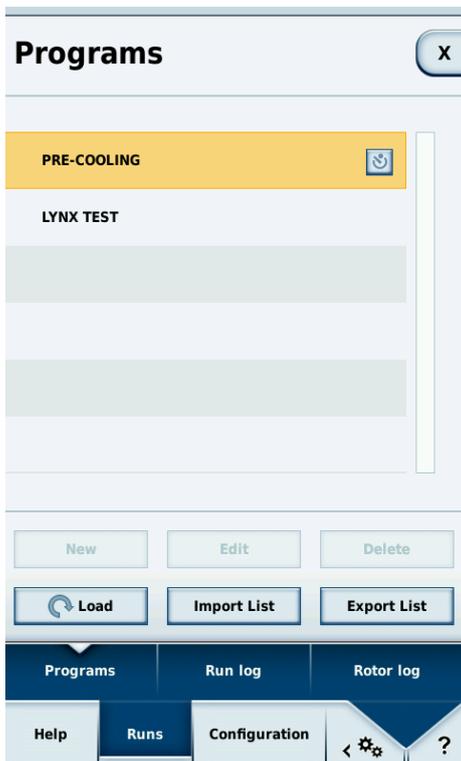
When you press this button, a window opens in which you can enter the temperature (in °C). Either positive or negative values can be entered here. The temperature limits (upper/lower) for the centrifuge may not be exceeded, however. An error message is issued to indicate any unacceptable values.



When centrifugation is in progress, the temperature will be adjusted immediately to the newly defined temperature by means of cooling. This does not affect the duration of centrifugation.

Precooling

Precooling is used to bring a rotor to a desired temperature prior to centrifugation of a sample. Precooling is defined as a set program and is called up via the configuration menu “Programs” on page 25. This program is activated using the button **Load**. In the main screen you can then set the required target temperature. The settings for acceleration and deceleration profile, time and speed are set from the centrifuge. If the values are changed, the precooling program is exited.

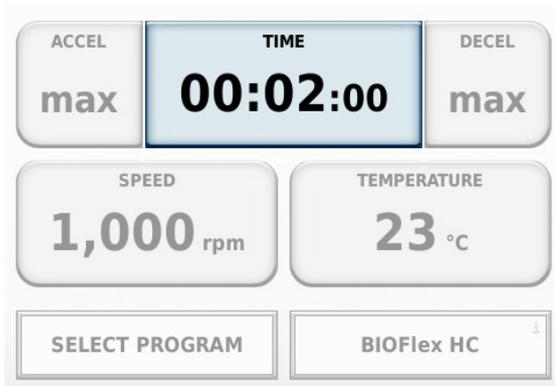


Precooling:
PRE-COOLING (marked line) is stored as a fixed program. Use the **Load** button to apply the program. You can set the target temperature after this in the main screen.

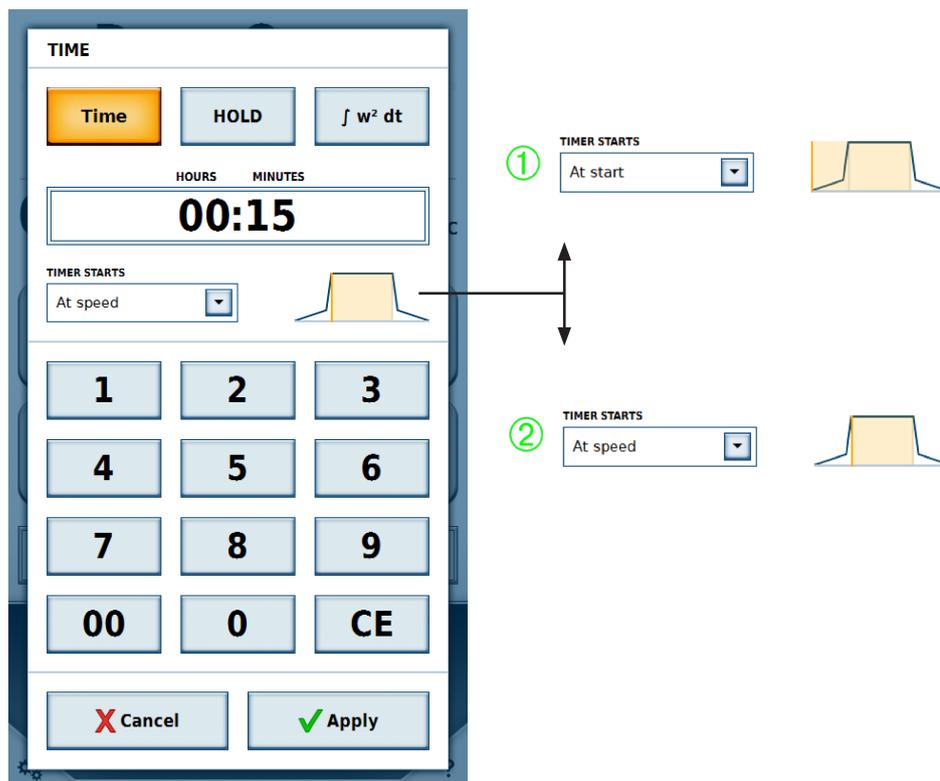


Time

You can set the time for the centrifugation process using the **Time** button in the main screen. When you click the **Time** button, a window opens in which you can enter the required time. The **Time**, **ACE** ($w^2 dt$) or **HOLD** modes can be selected. The selected mode is clearly displayed in the main screen. The selected mode is displayed on the **Time** button. As shown in the diagram below, the **Time** mode has been activated.



You can specify whether the set time begins when the centrifuge is first started ① or once the acceleration phase is completed ②.



Time	HOLD Run	ACE ($w^2 dt$)
Duration of centrifugation; input as hh:mm. The set time is counted down when centrifugation is in progress. Initial value: Defined duration hh:mm:00	Unlimited duration of centrifugation. The time elapsed so far is displayed while centrifugation is in progress. Initial value: 00:00:00	Accumulated Centrifugal Effect Input as $x.y * 10^z$ X: Whole digits Y: Decimal numbers Z: Power



If you change the time setting while centrifugation is in progress the newly defined countdown is restarted. Any time that has already elapsed is disregarded and the acceleration phase is skipped.



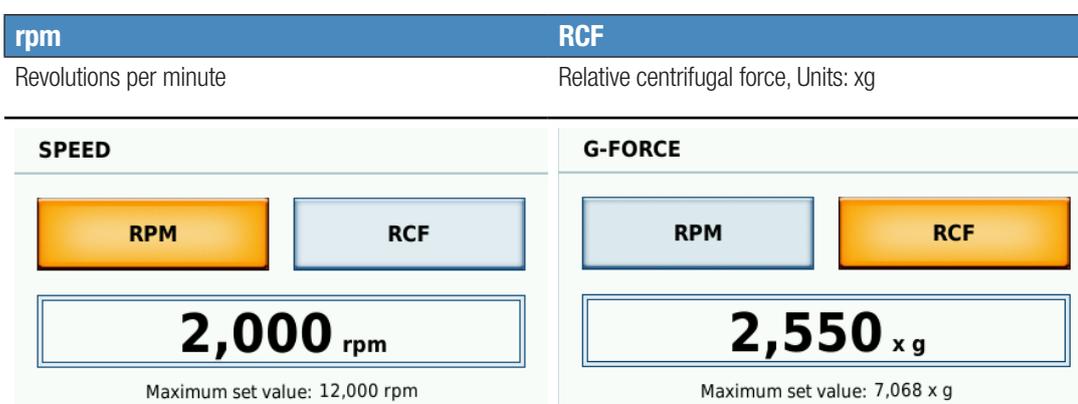
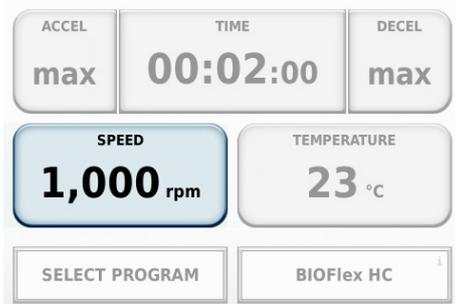
Centrifugation in progress:
The centrifugation period, including acceleration, is 20 minutes.

Time change while centrifugation in progress:
The centrifugation time is changed to 2 minutes.

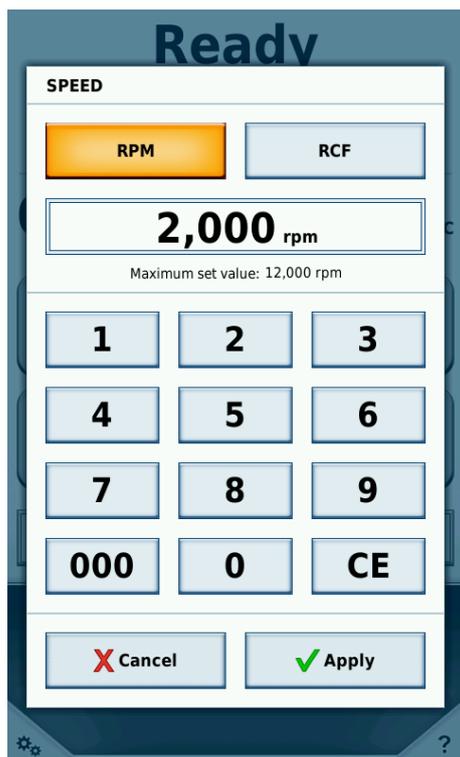
Countdown restarting:
The new centrifugation time is now 2 minutes.

Speed and RCF Value

You can set the **Speed** and the **RCF value** using the **Speed** button in the main screen. When you click this button a window opens in which you can enter the **Speed** as **rpm** or the **RCF Value**.



The defined **speed** may not exceed the maximum **speed** of the rotor being used. A notice is given below the button for the defined **speed** indicating the maximum permissible **speed** for the rotor. If the entered value for the **speed** exceeds the value entered for the rotor, a window is displayed with an error message indicating that the entered **speed** must be matched to the maximum permissible **speed** for the rotor.



If the **speed** is changed while centrifugation is in progress, the current **speed** is adjusted immediately to the new value (by means of acceleration/deceleration). The newly set **speed** then applies for the remaining duration of centrifugation.

Acceleration / Deceleration Profile

There are 9 profiles available for acceleration (1-9) and ten for deceleration (0-9). You can select the acceleration / deceleration profiles via the main screen.



After clicking on the appropriate button a window opens in which the required profile can be selected by moving a slide selector over it. You can also define a profile by direct point and select. Touch the **Apply** button to define the profile for the next centrifugation process, or cancel your selection using **Cancel**.

The profile with the smallest number has the most gradual slope and is indicated by **min**; the profile with the number 9 has the steepest slope and is denoted by **max**. In the main screen, the current profile is indicated by the number on the Profile button and the slope (curve) in the Status section (see “Status” on page 6). Presentation of the profiles must be taken symbolically. The exact slope is complex and is a function of the rotor being used and the set speed. The curve that is displayed represents an abstract simplification for distinguishing between the different profiles (gradual slope – steep slope). A deceleration cutout speed can be set for the deceleration profile. When this option is active, a speed must be set in rpm. Once the centrifuge reaches this speed during the deceleration phase, power to the motor is cut off. No further braking is applied, nor is the deceleration phase prolonged by the motor.

Acceleration, Brake:

Select the profile by clicking the slide on the screen. You can also move the slide on the screen on both ends using your finger.



Profile display in status section:
 The profiles selected for acceleration and deceleration are indicated by profile numbers on the buttons and by the curve in the status section.

If a profile is changed while centrifugation is in progress, the new profile is applied immediately. acceleration or deceleration of centrifugation is modified accordingly.

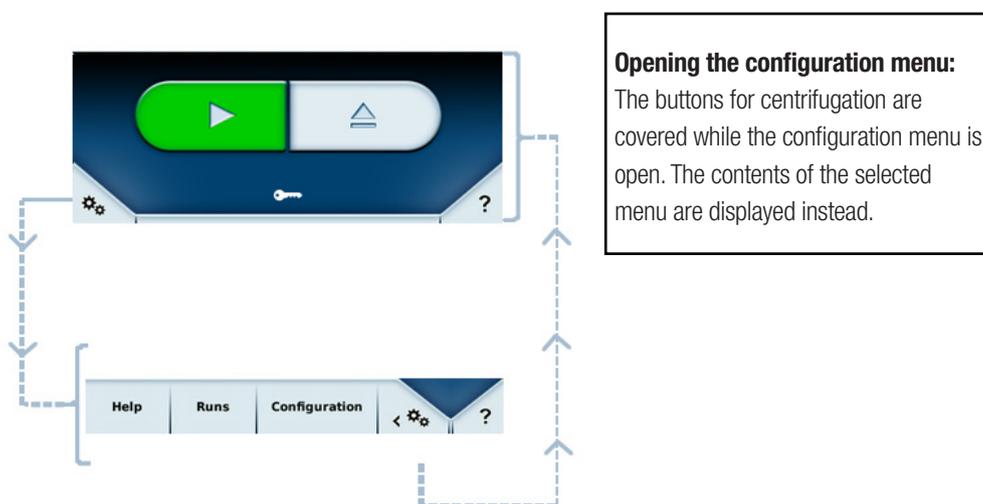
4

Configuration

You can open the configuration menu using the button at the bottom left-hand corner of the main screen. This menu is subdivided into the sections **Help**, **Runs** and **Configuration**. Touching one of these buttons will open a second level with the corresponding submenus.

All of the sections of the configuration menu can be viewed by any user. However, to make or change any settings a PIN must be entered for authentication. Details about distribution and assignment of user rights are given in “[User Management](#)” on page 36.

The **Configuration** submenu is closed automatically if there is no interaction with the user for 30 seconds. The **Manual** and **Training Videos** submenus are closed automatically if there is no interaction with the user for 60 seconds. The submenu will not be closed automatically when a training video is being played. Any input or changes which have not been saved up to then will be lost. Therefore, always be sure to save any changes at once.



Help

Help and assistance for a number of areas is provided in this menu. The first two submenus [Training Videos](#) and [Manual](#) contain helpful videos and informative texts.

Values for two different rotors can be converted in the [Calculators](#) submenu. First select a rotor on the left (a Thermo Scientific rotor or from other manufacturers) and then select a Thermo Scientific rotor for Thermo Scientific Sorvall LYNX centrifuges. All of the parameters input for the rotor on the left will then be converted automatically for the rotor on the right. Besides selecting the rotors, you can also enter speeds and times for conversion for the particular centrifugation.

The screenshot shows the 'Calculators' interface with two columns for rotor selection and conversion. The left column is for the Sorvall RC Series F8-6x1000Y rotor, and the right column is for the Thermo Scientific A27-8x50 rotor. Parameters include material, capacity, tube angle, and maximum speed. Conversion fields for speed (rpm), time, speed (rcf), and k-factor are provided for both rotors. A 'Load settings' button is at the bottom of the calculator section. The interface also shows a navigation bar with 'Training Videos', 'Manual', and 'Calculators' tabs, and a bottom bar with 'Help', 'Runs', and 'Configuration' options.

Select Rotor 1		Select Rotor 2	
Sorvall RC Series F8-6x1000Y		Thermo Scientific A27-8x50	
Material	Carbon Fiber	Material	Aluminum
Capacity	6 x 1000 ml	Capacity	8 x 50 ml
Tube Angle	20°	Tube Angle	34°
Speed max	max 8,500 rpm	Speed max	max 27,000 rpm
SPEED rpm	max 8,500 rpm	SPEED rpm	max 27,000 rpm
	8,500 rpm		27,000 rpm
TIME		TIME	
	00:30		00:03
SPEED rcf	max 15,832 x g	SPEED rcf	max 87,207 x g
	15,832 x g		87,207 x g
k-FACTOR		k-FACTOR	
	4,514		408
Load settings			

Press [Load Settings](#) to set the speed and run time as the current set values. Once the settings are loaded, the main screen is displayed again.

Runs Configuration

You can define settings for programs and for log processes in the **Runs** section of the configuration menu.

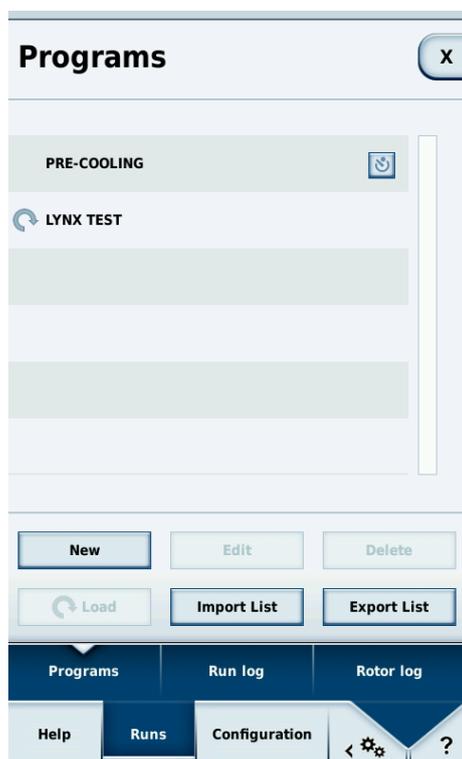
Programs

You can save set values for a centrifugation process in a centrifugation program. Avoid multiple, identical input for similar centrifugation runs by defining the values in advance in individual programs. Programs may only be administered when the rotor is at standstill.

PRE-COOLING is stored as a default program and cannot be deleted. You can only change the target temperature in this program; all other values are calculated automatically when **PRE-COOLING** is loaded. For more details refer to [see “Precooling” on page 16](#).

The list of available programs is given in the first submenu **Programs** in the **Runs** menu. If the program list should exceed the length of the screen you can use the pager to easily navigate through the individual pages of the list. A maximum of 120 programs can be contained in the list. The list can also be called up in the main screen by touching the button with the name of the program.

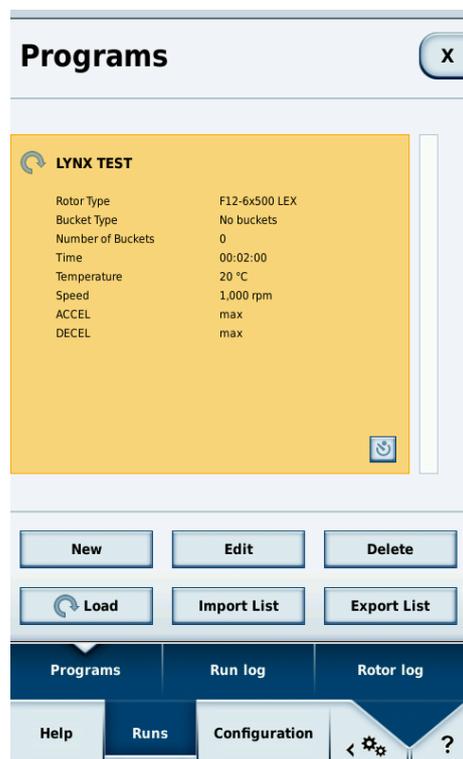
If a program has already been selected, a blue arrow is displayed in front of the program name. Before that program can be activated, you must first select a program by touching the display showing the program name and the parameters. Touch the **Load** button to activate the particular program. Now, the blue arrow is displayed in front of the selected program indicating that it is activated.



The symbol  shows the program currently loaded. The  symbol activates a timed start. With pre-defined programs, the symbol appears after the name; for user-defined programs, it appears in the detail view.

Detail View

Type on the name of a user-defined program to display the detail view.



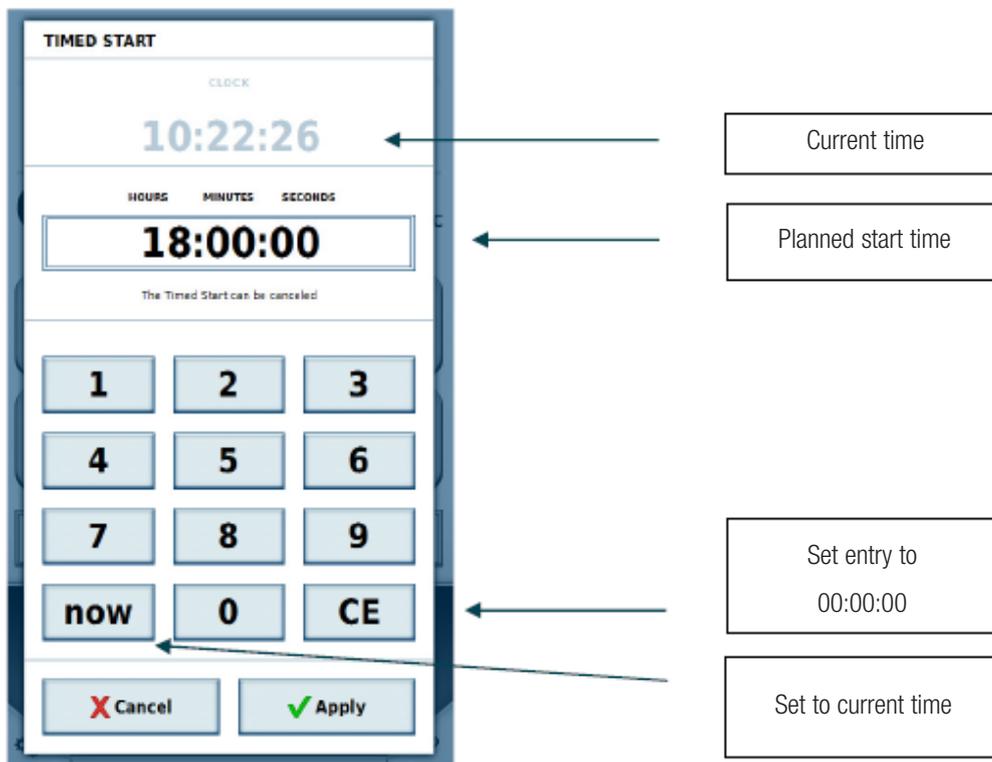
Here, all information related to the selected program can be viewed. If this program is currently active, the  symbol appears beside the name. In this screen, you can activate timed starts for user-defined programs.

Timed Start

This mode displays a time at which the centrifuge is due to start with the selected program.

When a program is activated with the  button and then loaded, instead of the normal Start button , the centrifuge control area shows the Timed Start button .

Pressing this button displays a window in which the time can be entered. Once this time is reached, centrifugation begins automatically. Pressing the Stop button cancels the timed start.



Use the button **New** to create a new program. When you touch this button the standard program editor is displayed that you can use to set all relative parameters for centrifugation.

Program Editor

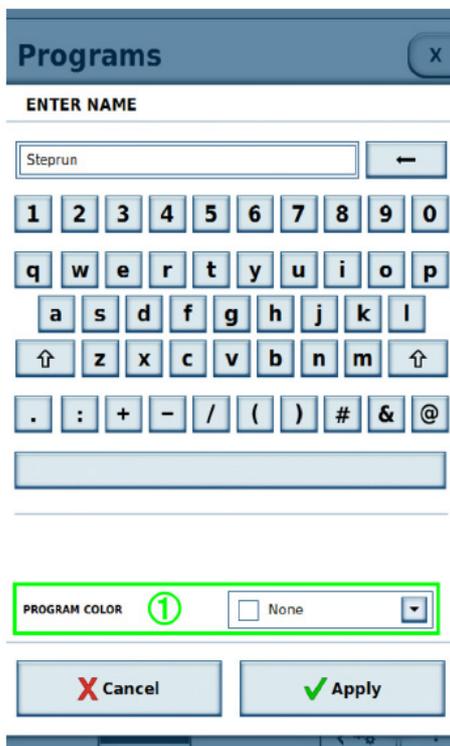
As on the main screen, here you can specify the set values to be used later. These should be set as per the functions of the main screen.



In the program editor, two buttons appear below the set value entry fields: **Enter Name** ① and **Select Rotor** ②.



Pressing **Enter Name** ① opens a window in which you can enter the program name using an on-screen keyboard.



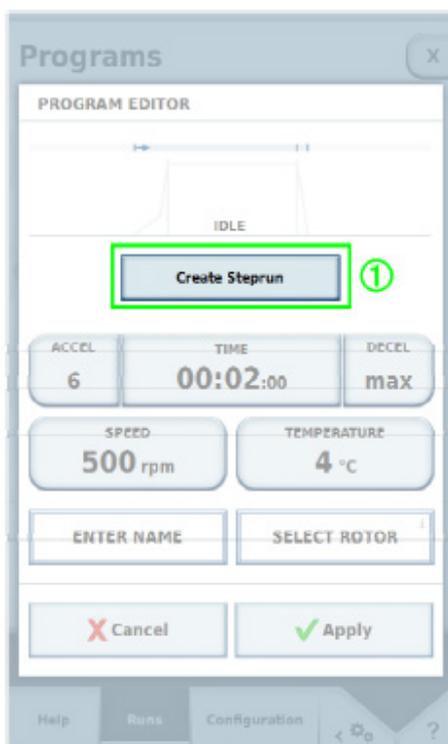
Below the keyboard, you can assign a barcode and a color to the program ①. The barcode can be used in GMP mode to select the program using a barcode scanner. The selected color appears in the program overview and in the detail view. Assigning a color is optional and serves solely to aid recognition of the program. The list of available colors is preset and cannot be changed.

<input type="checkbox"/> None	▼
<input type="checkbox"/> None	
<input checked="" type="checkbox"/> Mint Green	
<input type="checkbox"/> Night Blue	
<input type="checkbox"/> Mocca Brown	
<input type="checkbox"/> Pale Blue	
<input type="checkbox"/> Syringa Purple	
<input type="checkbox"/> Cherry Red	
<input type="checkbox"/> Amber Orange	
<input type="checkbox"/> Salmon Pink	

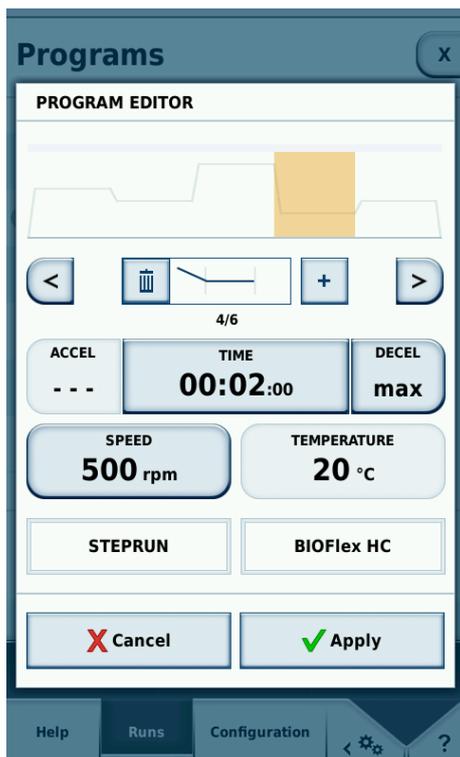
Pressing **Select Rotor** displays a list of all rotors stored in the system. Here, a rotor (and where applicable a bucket) must be chosen that is suitable for the program.

Stepruns

Stepruns are centrifugation runs that comprise multiple steps. Different set values can be given for each step; the steps are performed one after another. To create a steprun, press **Create Steprun** ① in the Program Editor.



Pressing **Create Steprun** ① also makes further options available.

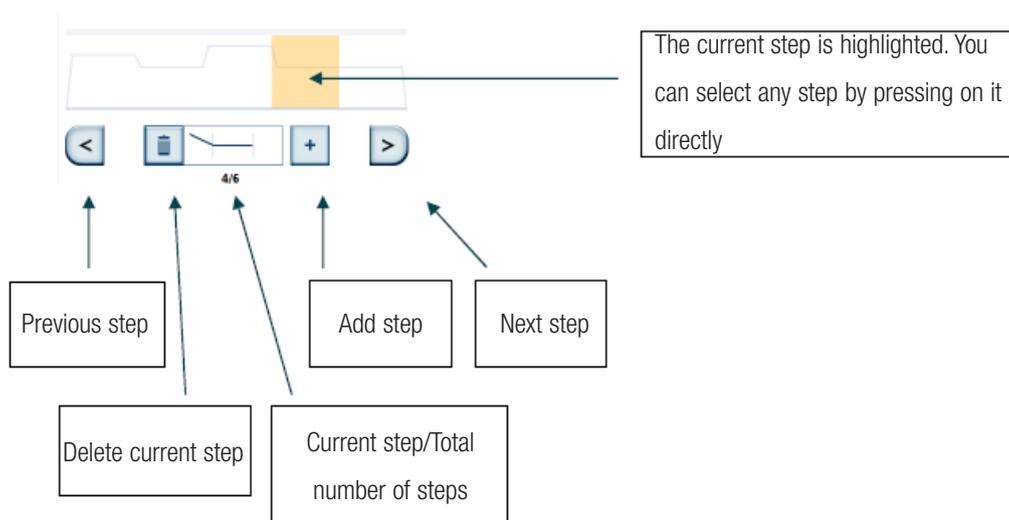


Each step has its own values for time and speed. Where one step has a lower speed than the next, an acceleration profile can be chosen. Where the previous step is at a higher speed than the next, a deceleration profile can be chosen.

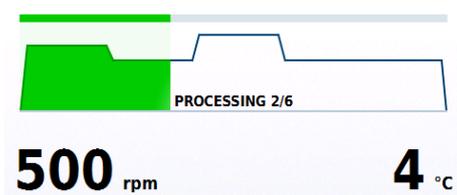
The following parameters cannot be specified for individual steps; they can only be changed while editing the first step:

- Temperature
- Unit of speed
- Unit of time
- Specifying whether the time begins from the start of acceleration or from the point at which the required speed is reached.

A steprun can contain a maximum of 30 steps.



The curve displayed in the progress display is determined by the speeds specified for the individual steps. The higher the curve, the higher is the speed.



Import

Programs can be imported via USB stick. To do this, create a folder named "Centri_Touch_Imports" and copy the programs you want to import in this folder. Then connect the USB flash drive to the centrifuge and select the option **Import List**.

All programs with new names will be added to the internal list. If programs with the same name do exist on the centrifuge, they will be replaced during the import process.

The USB stick that you use, must have FAT32 formatting in order to be readable by the centrifuge.

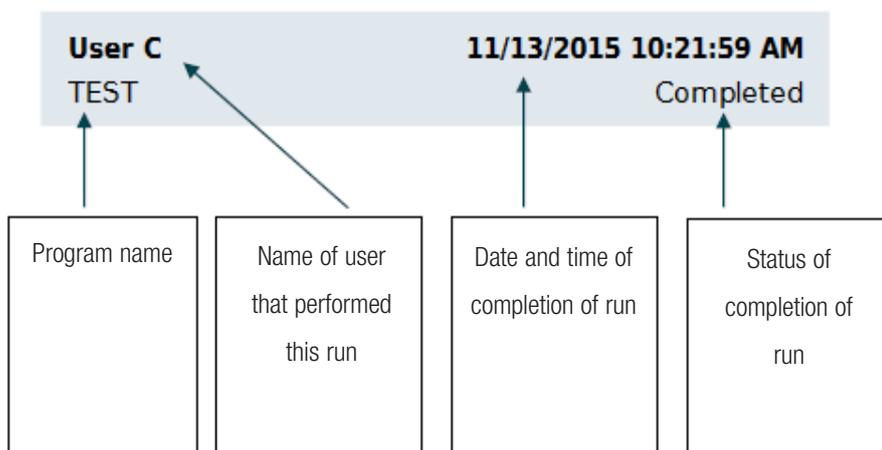
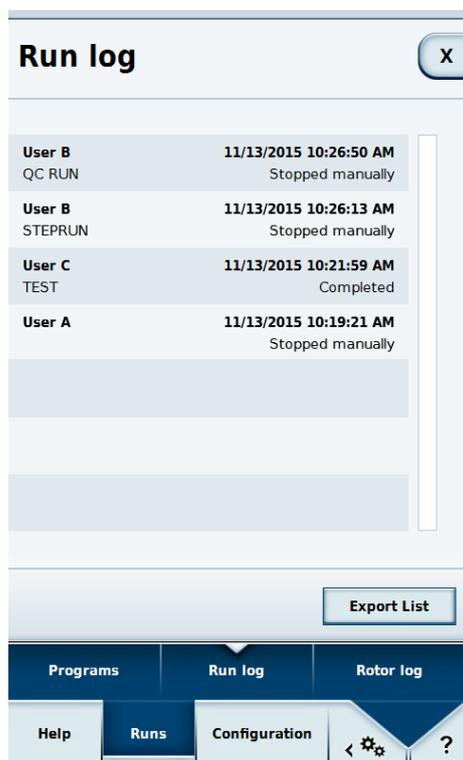
Export

Programs can be exported via USB stick for further processing. To do this, connect an USB flash drive to the centrifuge and select the option **Export List**. Existing programs will then be exported to the USB stick as CSV files. A folder will be created automatically named "Centri_Touch_Exports". Programs in this CSV format can be edited and imported using any spreadsheet program, such as Excel.

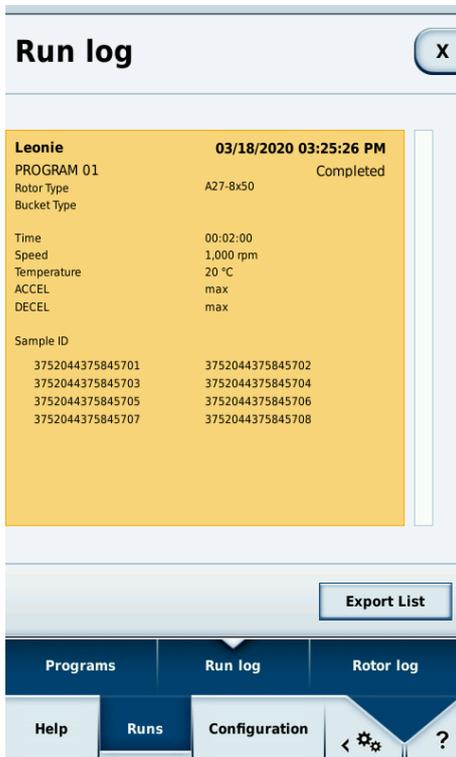
The USB stick that you use, must have FAT32 formatting in order to be readable by the centrifuge.

Run Log

The run log lists all runs in chronological sequence. A maximum of 120 runs can be stored. If this number is exceeded, the oldest entry is deleted.



Selecting an entry causes a detail view of the run to be displayed with its set values. Any serial numbers of samples recorded for the run are also shown.



If the set values were changed during the run, the  symbol appears beside the rotor name.

The run logs can be exported onto a USB stick connected to the device using the **Export List** button. Valid file formats for export are CSV and PDF.

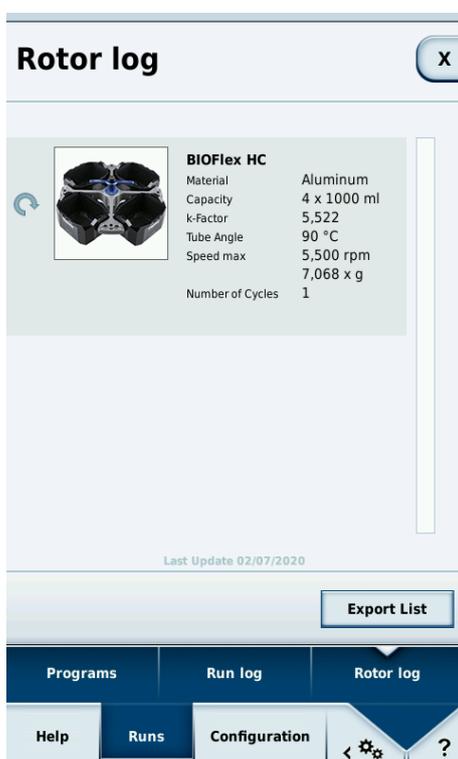
Rotor log

All of the types of rotor known by the centrifuge are listed in the **Rotor log** submenu. The maximum values and the number of centrifugation runs that have already been performed with this type of rotor are displayed for each rotor type.

The following values are saved in a **Rotor log**:

- Rotor type and rotor name
- Rotor material
- Capacity (maximum number and volume of specimen containers)
- Maximum speed
- Number of centrifugation runs performed up to this time in this centrifuge with this type of rotor.

The centrifugation runs performed with each rotor type are saved.



Rotor log:

You can view the rotor data and the number of centrifugation runs performed with this rotor here for each rotor type and rotor name ever used in the centrifuge. The type of rotor being used is indicated by the open round arrow.

Settings

You edit the settings for user management, general settings, device and contact in the setting section of the configuration menu.

User Management

A centrifugation run can be assigned to a user. That user is then saved in the centrifuge log, enabling subsequent evaluation of which user(s) conducted which centrifugation run(s). You can define in the menu **Settings** whether a log-in is required to start centrifugation (see [“Settings” on page 36](#) and [“Access Control” on page 39](#)).

Go to the submenu **User IDs** in the **configuration menu** to determine which users are listed. Here, you can create new user accounts, or edit existing ones.

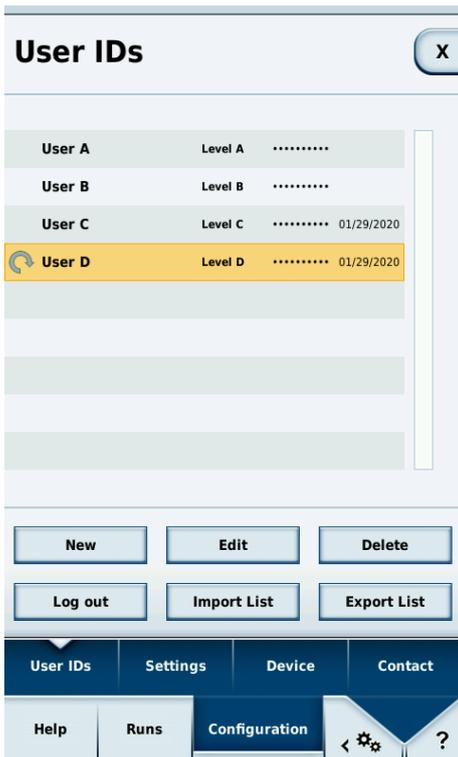
Any user that is logged in can edit his/her own user information. The user may also change his/her user name and PIN (4-digit) for the corresponding configuration. Only users with Admin rights may create new users or manage other users.

Access Level

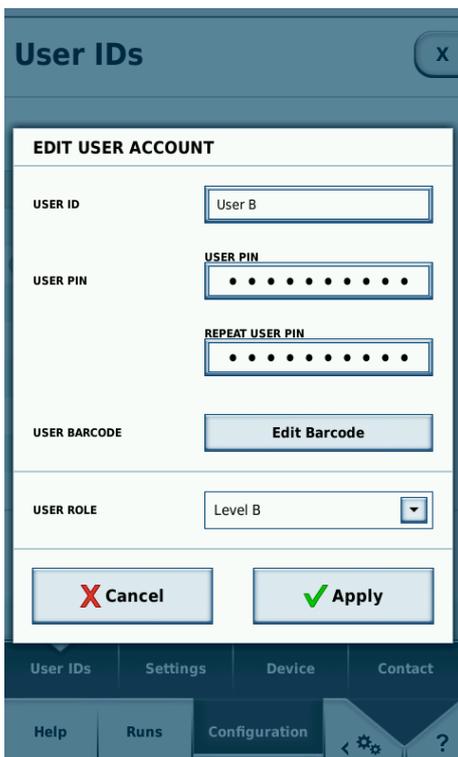
The access level determines the options available to a user in the operating software. All users are assigned an access level. If no user login is active, the owner of the centrifuge can specify an access level for it. This is then valid for all users of this centrifuge. Access level A has the most restricted rights. The higher the access level, the more rights and functions are available. A given access level always has more rights than those of the levels below it.

- **Level A**
This user has the least authorizations. He may only start the centrifugation run using the preset program. No changes can be made to set value or to the program.
- **Level B**
This user can switch between different preset programs.
- **Level C**
This user can access the configuration and can edit settings. He cannot add or edit users. He can change his own PIN code.
- **Level D**
This user can manage other users in the operating software.

A user needs not be logged in the “open environment” (see [“Open Environment” on page 40](#)). New user accounts can be created by any users in this environment. These new users are not assigned a PIN, however. These user accounts can, as a result, not be used in the closed environment, for which a password must be entered. PINs must be assigned to user accounts at a later time for working in a closed environment.



User Management:
 The logged-in user is indicated by an open round arrow. All users holding a valid PIN are indicated by 4 dots to the right of his/her name.



Editing a user:
 Selection of the corresponding user role determines whether a user possesses Admin rights.

The factory default Admin PIN is 0000. First, create a new administrator profile with a new PIN. Then delete the factory default profile.

Import

Users can be imported via USB stick. To do this, create a folder named “Centri_Touch_Imports” and copy the users you want to import in this folder. Then connect the USB flash drive to the centrifuge and select the option **Import List**.

All users with new names will be added to the internal list. If users with the same name do exist on the internal list of the centrifuge, they will be replaced during the import process.

The USB stick that you use, must have FAT32 formatting in order to be readable by the centrifuge.

Export

Users can be exported via USB stick for further processing. To do this, connect an USB flash drive to the centrifuge and select the option **Export List**. Existing users will then be exported to the USB stick as CSV files. A folder will be created automatically named “Centri_Touch_Exports”. Users in this CSV format can be edited and imported using any spreadsheet program, such as Excel.

The USB stick that you use, must have FAT32 formatting in order to be readable by the centrifuge.

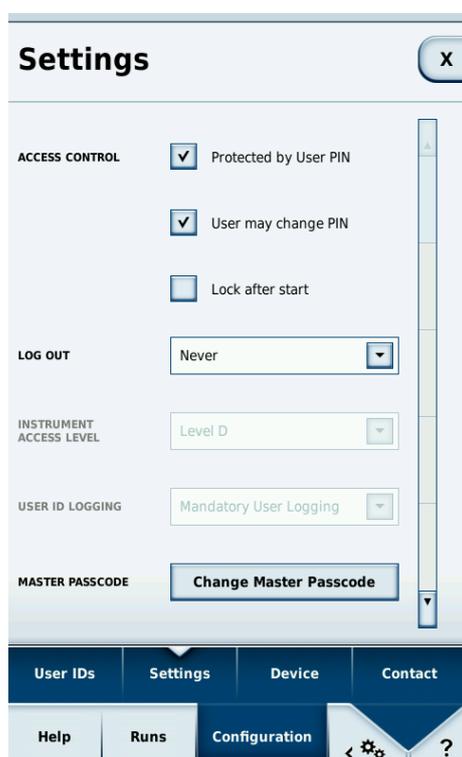
Access Control

In the **Settings** submenu of the **Configuration menu** you can define whether log-in is required to start a centrifugation run. Device policy settings can only be made after entering a master PIN (5-digit) (see “User Roles” on page 43). The factory default for the device master PIN is 12345. As the first step, change the device master PIN.

The following access control options are possible:

- Open environment
 - Log-in is not required in this mode. Centrifugation can be started by any user.
- Closed environment (PIN protected)
 - In this mode, log-in using a PIN must be entered to make any settings and to start a centrifugation run.

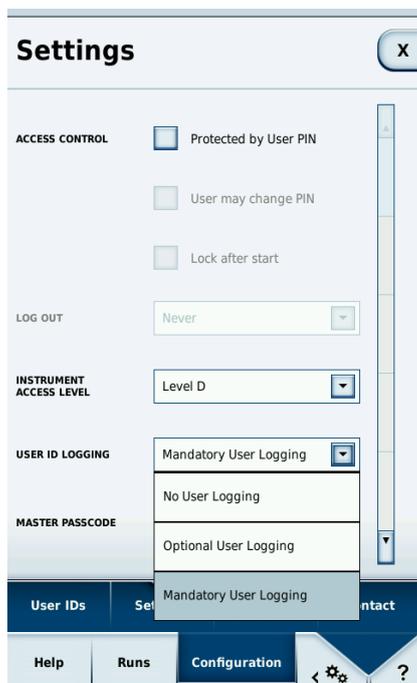
Access control	Options
Open environment	<ul style="list-style-type: none"> • No user specified • Optional user selection • Mandatory user selection
Closed environment	<ul style="list-style-type: none"> • Login with name and PIN



Closed environment:
 The closed environment is activated by checking this box. This box must remain unchecked (blank) for an open environment.

Open Environment

A PIN is not required to operate the centrifuge in an open environment. Any user can enter parameters and perform centrifugation runs. Various options are available for the open environment scenario to establish which centrifugation runs were started by which users. A distinction is drawn in these options as to whether the user is also to be documented in a centrifugation log.



Open environment

The open environment scenario is activated. You can now define whether the user is to be included in every centrifugation log (here: logging of user is activated).

- No user logging
 - No user is selected prior to starting the centrifugation run. The centrifugation log contains no information about the user who started the centrifugation run.
- Optional user logging
 - In this mode, a user may be selected when starting the centrifuge. The centrifugation run is assigned to the selected user and the user name is listed in the centrifugation log. Specifying a user is optional. If no user is selected, this log is equivalent to the first option above for the open environment: **No user**.
- Mandatory user logging
 - In this mode, a user must be selected in order to start the centrifuge. As a result, each centrifugation run is allocated uniquely to a specified user.



Mandatory user logging:
 Allocation of a user to a centrifugation run is obligatory for mandatory user selection.

Closed Environment

In a closed environment, users must log in using their PIN before they can operate the centrifuge. The login window is opened by touching the user name at the bottom of the screen.



Login:

When you press the arrow in the **USER ID** field, a list of all available users is opened.

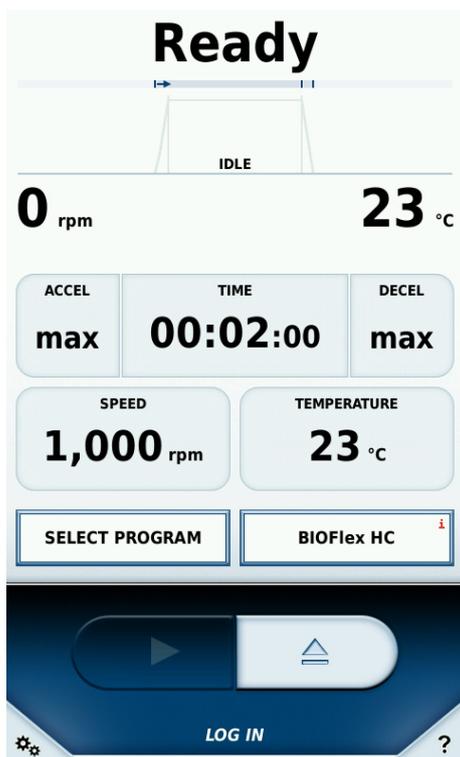
In the centrifugation log the user logged in for the specific centrifugation run is documented. If no user is logged in, the centrifuge cannot be started in a closed environment. Any user can halt an ongoing centrifugation run or open the Tooltip mode and the configuration menu without having to be logged in. All displays and screens are, however, available as read only. Only users that have logged in may define/change settings.

A user can log in/out at any time when the rotor is not spinning simply by touching the user name field at the bottom of the main screen. As an alternative, the user can also log out under **User ID** in the configuration menu using the **Log out** button.

In a closed environment it is possible to activate an automatically locking of the user interface, so that no other user is able to change the settings while a run is active. This option is called “Lock after start” and has to be enabled in the configuration menu under **Access control**. It can only be enabled, if the option “Protected by user PIN” is enabled.

When the user interface is in the “Lock after start“-mode, no changes to the centrifuge are possible except stopping it, by pressing the **Stop** button.

To unlock the user interface, touching the button for the set points or the one for the user name will bring up the log in dialog. When the correct user PIN has been entered, the user interface will be unlocked. Instead of using the user PIN it is possible to enter the device master PIN instead.

**Read only mode:**

Parameters cannot be changed until a user logs in.

Lock after start:

The user interface is locked after a centrifugation has been started.

In the closed environment you can also specify the setting for whether and when the registered user is logged out automatically. These settings can be defined under **Settings** in the configuration menu using the device master PIN (see “User Roles” on page 43). The factory default for the device master PIN is 12345.

The following settings are required for automatic logout:

- Directly after a completed centrifugation run (as soon as the cover has been opened).
- 5 minutes without any interaction after a completed centrifugation run.
- The user is not logged out automatically and remains logged in until he/she logs off, or until a different user logs in.

User Roles

A distinction is made between the following user roles: Administrator and User. The centrifuge includes the device master PIN, which can be used to define all settings for the centrifuge. The device master PIN is handed over to the owner of delivery of the unit and may be changed. Therefore, for safety and security reasons, this PIN should not be disclosed to persons besides the owner.

An administrator is authorized for user account management (see “User Management” on page 36).

The device master PIN is required to make changes in the **Settings**, **Device** and **Contact** menus. All of the settings in the open menu are enabled for editing after the master PIN has been entered. If a menu is closed completely and then re-opened, the master PIN must be entered again to make changes to any of the settings in that menu.

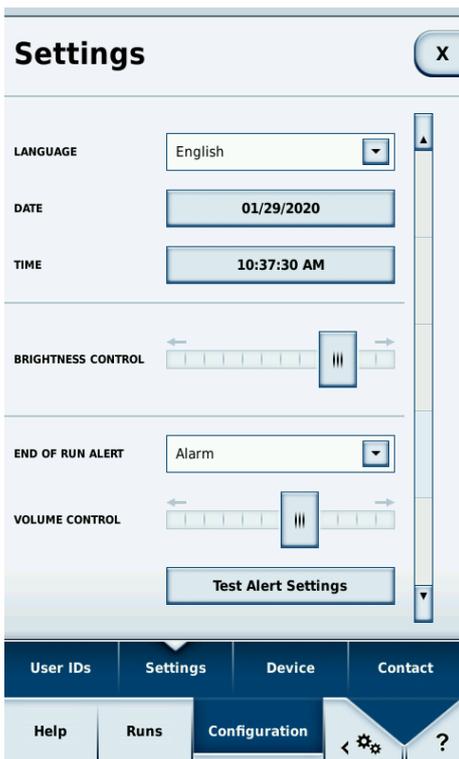
General Settings

The **Settings** submenu of the **Configuration menu** consists of five pages. On the first page you define settings for device policy and general settings, such as the energy saving option. Signal settings and languages can be defined on the second page.

The master PIN must be entered before any changes can be made in this menu (see “User Roles” on page 43). Signal settings do not require input of the device master PIN.

Overview of possible settings in this menu:

- Device Policy
 - Define whether operation of the centrifuge requires a PIN to be entered (**Closed environment** or not **Open environment**). In an open environment you can also define whether a user is to be assigned to each centrifugation run.
- Language
 - Language
- Energy Saving Options
 - Define various energy-saving modes.
Possible options: Green Mode, Balanced Mode, max. Availability
- Centrifuge Vacuum
 - Define whether a vacuum is to be employed.
Possible options: High Speed only, Smart Energy Optimized
- Brightness
 - Brightness Control.
- Sound Signal
 - You can define different acoustic signals in order to distinguish between various centrifuges.
- Volume Control
 - Use this regulator to adjust the volume of the signal.
- Cooling System
 - If the **Scheduled Cooling** option is enabled, the **Start Cooling** button can be used to specify a start time, and the **Stop Cooling** button likewise used to specify an end time. The centrifuge’s cooling system is now active in the specified time window.
If this option is disabled, the cooling system is always active.
When a centrifugation run is started, the cooling system is always active.
- GMP Tracking Mode
 - The GMP documentation can be activated here (see “GMP Mode” on page 53).
If **Skipping enabled** is active, individual steps of the GMP procedure can be skipped.
- Centrifugation Time
 - Here, you can enable the entry of seconds for the set values of run time.
- Remote Control
 - Manages access to the centrifuge via an external device such as a smartphone.



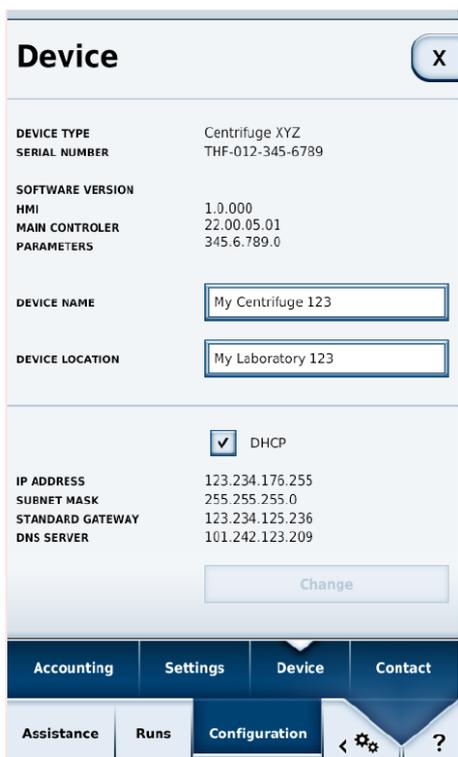
Settings Menu:
 In the **Settings** menu you can modify the volume of the signal, for example.

Device Settings

In the **Device** submenu of the configuration menu you can specify special data about the location of the device. The master PIN is required to make any changes in this menu (see “User Management” on page 36).

If the centrifuge is incorporated into a network you can specify the address of the centrifuge here. These settings are important when rotor types are to be imported or exported from a server via the network.

A device master PIN must be entered to make any changes in this menu.



Contact

Contact data for Thermo Fisher Scientific is given in the contact section in the event that you have any queries about the device or experience technical difficulties. If a caretaker is given for your centrifuge you can enter the data for this person in this section so that your employees know who to contact for any questions they may have. Also contact the person specified here if changes are to be made which required the master PIN.

Any changes to the name and contact data of the person responsible for the centrifuge require the master PIN.

Contact

X

Instrument Owner

NAME	PHONE NUMBER
<input style="width: 95%;" type="text" value="First Name Surname"/>	<input style="width: 95%;" type="text" value="00-1234-56789"/>
E-MAIL ADDRESS	
<input style="width: 95%;" type="text" value="mail@caretaker.com"/>	

Thermo Fisher Technical Service
Support Specialist

Phone number +00 (0) 1234 567 8
 Fax number +00 (0) 1234 567 9
 E-Mail Address technical.service@thermofisher.com
 Postal Address 123 Road
 City, State 45678
 Country

Thermo Fisher Sales Service
Sales Specialist

Phone number +00 (0) 1234 567 8
 Fax number +00 (0) 1234 567 9
 E-Mail Address sales.service@thermofisher.com
 Postal Address 123 Road
 City, State 45678
 Country

User IDs
Settings
Device
Contact

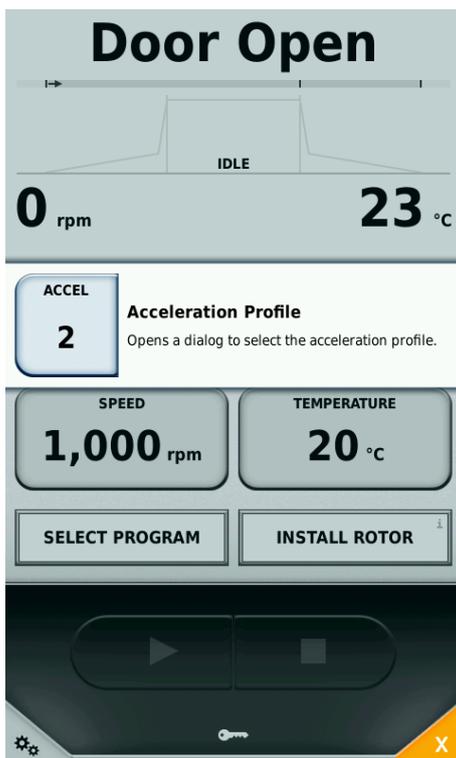
Help
Runs
Configuration
< ⚙️
?

5

Tooltip Mode

As with the configuration menu, the Tooltip mode cannot be accessed while a centrifugation run is in progress. You can activate the Tooltip mode while the rotor is at standstill to view information about the individual buttons. Use the button at the bottom right-hand corner of the main screen to activate the Tooltip mode.

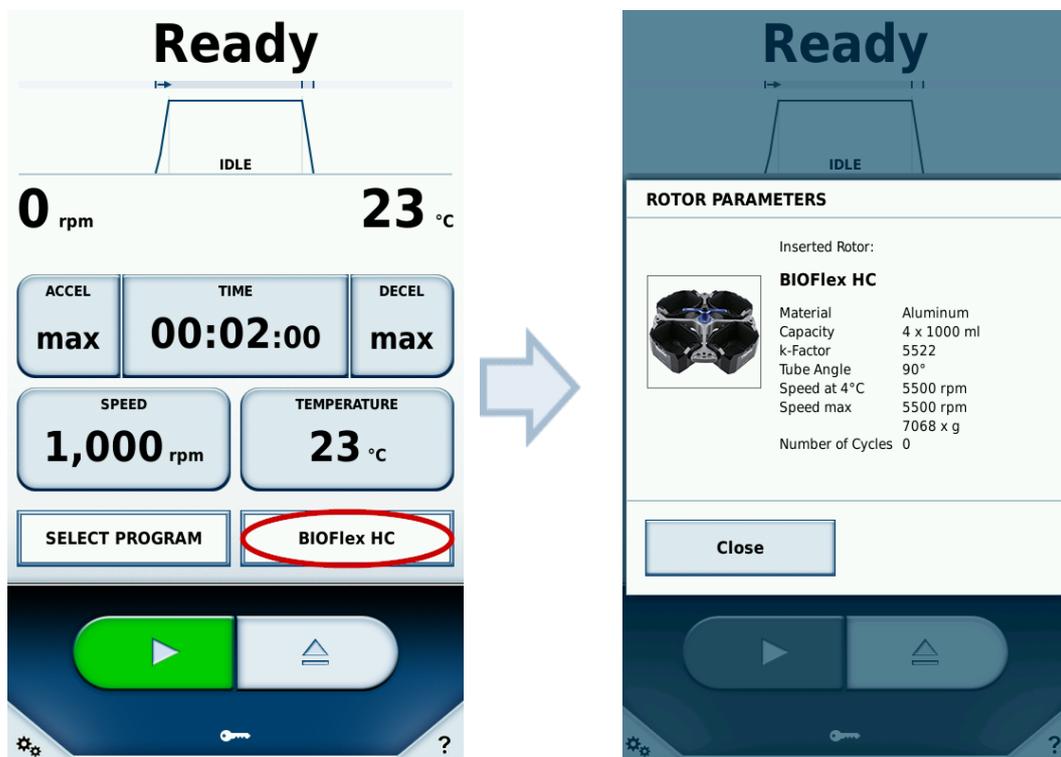
Touch any element on the screen to view detailed information about it. The actual function of the element is not activated or initiated while in the Tooltip mode. Touching the screen again de-activates the Tooltip mode. The Tooltip mode is available for every button in the main screen and most of the elements on the configuration screens.



6

Rotor

The rotor is detected automatically by the centrifuge. If the centrifuge is familiar with the rotor type the key parameters for the rotor being used will be displayed in the rotor data field.



Rotor import

When using a rotor with which the centrifuge is not familiar, the window for importing rotor data via a USB stick is displayed. This dialog guides the user through the import process.

Import of the rotor data is begun when the USB stick is connected to the centrifuge. Progress of the import is indicated by the progress bar. The remaining progress is indicated as a percentage under the progress bar, along with the remaining time in minutes and seconds (MM:SS). On successful completion of rotor data import, the rotor information field is displayed, containing all of the data for the newly added rotor. You must then restart the centrifuge by touching the **Restart** button.

7

GMP Mode

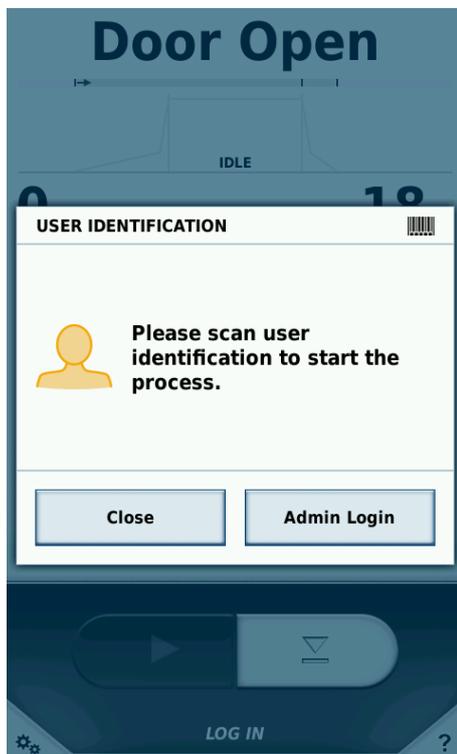
If GMP mode is enabled in the settings, the user is guided through a workflow. Here, a barcode reader can be used to select users and programs. Additionally, the serial numbers of the samples can be recorded either manually or using a barcode reader.

GMP Workflow

The individual steps of the GMP workflow are described below.

1. User Login

To log in, the barcode assigned to the user must be scanned in.

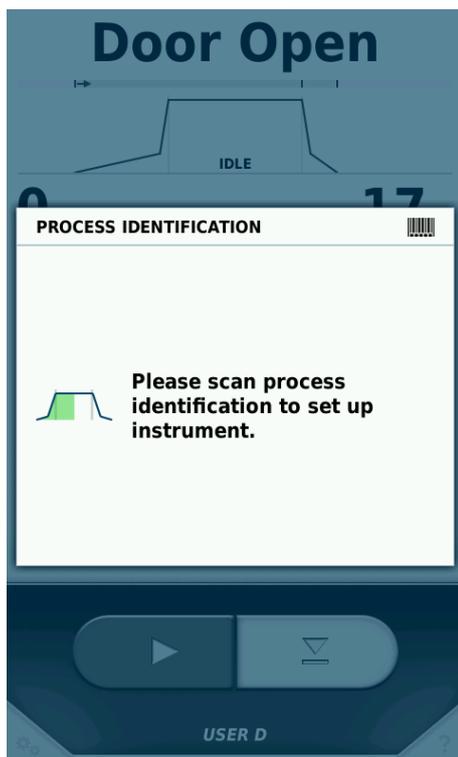


Only those users that have already been assigned a barcode in the user management area may log in by means of a barcode.

A user with higher rights may use the **Admin Login** button ① to log in in order to temporarily interrupt the GMP workflow and make settings. When the higher-rights user logs out again, the GMP workflow becomes active once more.

2. Program Selection

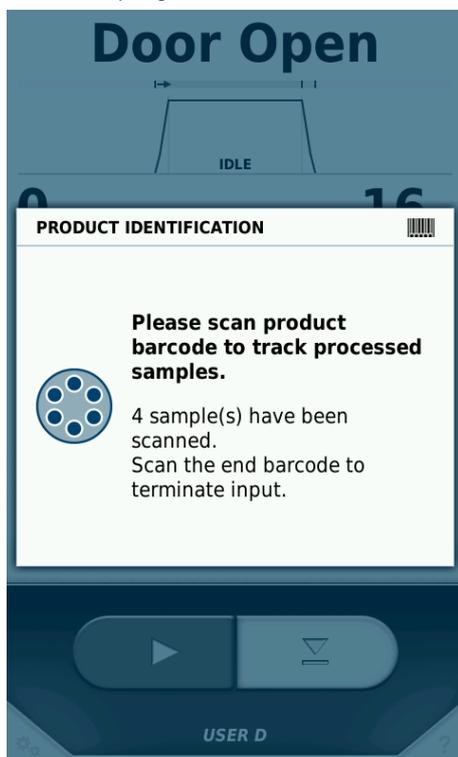
Once the user has logged in, the barcode of the required program is scanned in.



Only programs that have already been assigned a barcode in the program management area can be selected by means of a barcode (see “Programs” on page 25).

3. Product Identification

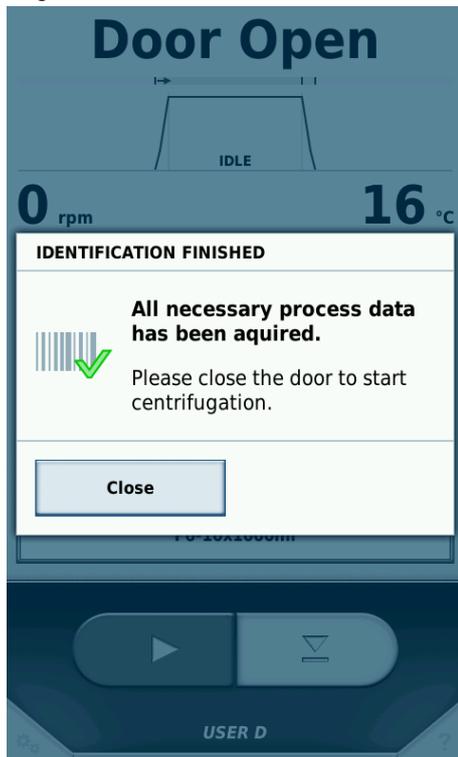
Once the program has been selected, the sample barcodes are entered.



Once all serial numbers have been captured, exit the data entry mode by scanning the predefined ‘END’ barcode.

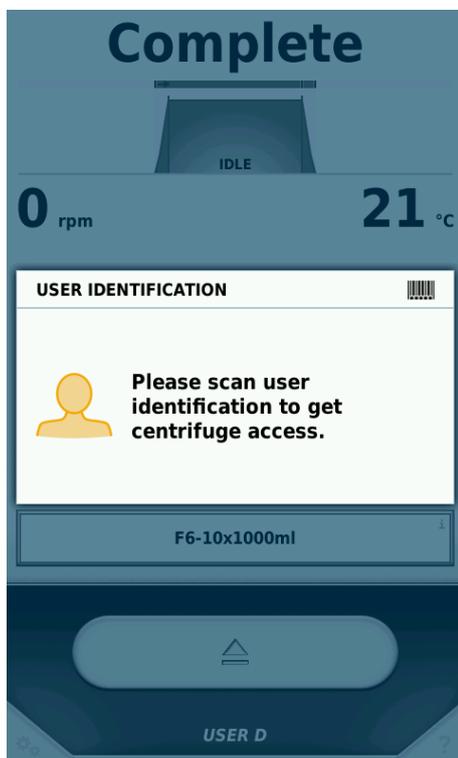
4. Closing the Door and Starting Centrifugation

Once all barcodes have been scanned in, the door can be closed and centrifugation can begin.



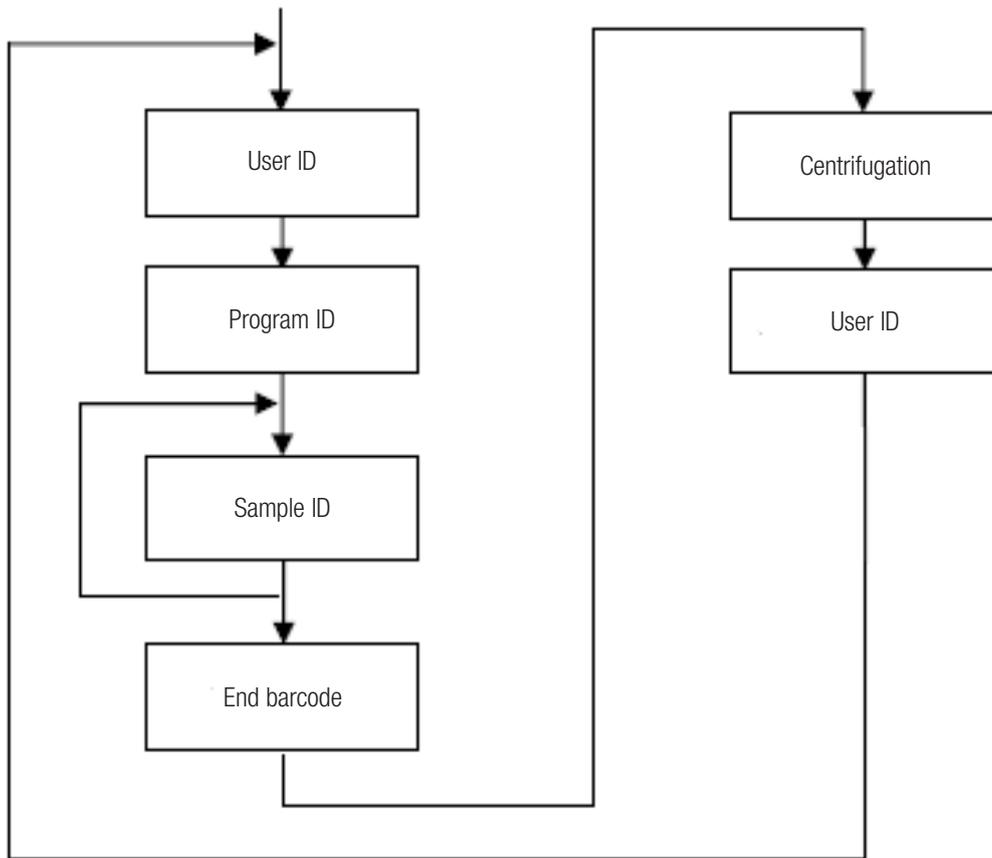
5. User Identification

Once centrifugation is complete and the centrifuge door shall be opened, a user barcode must again be scanned in with the barcode reader.



This step is used to identify the user who removes the samples from the centrifuge. Following this step, the workflow recommences from the beginning.

The workflow sequence is shown in graphical form below:



Skipping Steps

If the **Enable Skipping** option is active in the settings, all further steps can be skipped from any current step.

Predefined Barcodes

To facilitate operation with a barcode reader, two predefined barcodes are provided:

- End

This barcode must be scanned once scanning of the sample serial numbers is completed.



ENDE

- Cancel

Scanning this barcode resets the current step in the GMP workflow.



ABBR

8

Thermo Scientific Centri-Vue Application



Requirements

- Thermo Scientific Sorvall LYNX centrifuge with Thermo Scientific Touchscreen User Interface software, version 1.2.2 or higher
- Thermo Scientific™ Centri-Vue™ application, version 0.1.2 or higher
- Local Area Network (LAN)

Quick Guide

This quick guide describes the steps how to connect the centrifuge with the Centri-Vue application. Detailed descriptions are given in Chapter 4.

1. Install the touchscreen user interface software on the centrifuge.
2. For remote control of the centrifuge you have to make some option changes in the touchscreen user interface. To activate the remote control access, select **Settings** (Step 1-3) and select the checkbox **Remote Control** (Step 4).



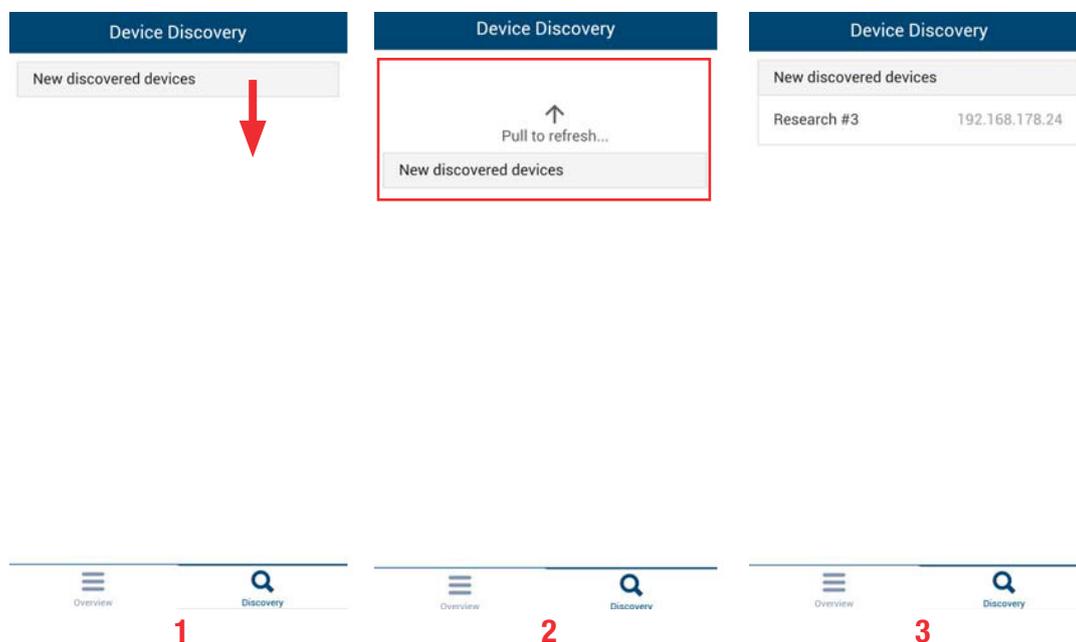
3. Download and install the Centri-Vue application on your smartphone.
4. Smartphone and centrifuge have to be in the same LAN with the same IP range.
5. Start the Centri-Vue application.



6. Select **Discovery Screen**.



7. Open the **New discovered devices** list in the discovery menu to search for new centrifuges in the network (Step 1 and 2).



8. Centrifuges with installed Connectivity Plug-In will be identified automatically in the same LAN (Step 3).
9. Select the identified centrifuge.
10. Select **Add Device** to add the centrifuge to the device list in the overview menu.

Optional: You can add some additional information about the centrifuge. Select the **Information** field.

Add New Device Cancel

IP-Address
192.178.168.25

Information

Add Device

11. The application switches to the overview menu and shows the formerly added centrifuge entry in an information block (name, information, status).

New Overview

Research #1
(Basement Lab) DOOR OPEN

12. Select the added centrifuge entry to switch to detail view.

13. For remote control select **Request Remote** in detail view.

← **Research #1**

Ready

0 rpm 18 °C

ACCEL max TIME 00:20:00 DECEL max

SPEED 29,000 rpm TEMPERATURE 20 °C

NO PROGRAM T29-8X50

Request Remote

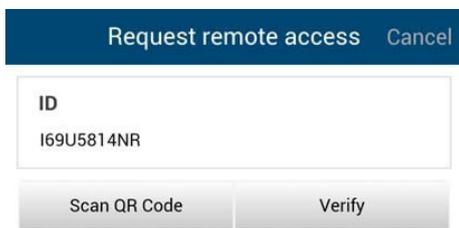
Overview Discovery

14. Generate a new Remote ID. Select **Generate new ID** in the settings screen.



15. In the request remote access screen of the Centri-Vue application you can enter the ID by hand or by scanning the QR-Code.

16. Select **Verify**.



17. If you have remote access to the centrifuge the start button is green.



Connectivity Plug-In (Touchscreen User Interface)

Remote Settings

For remote control ability (start / stop by smartphone application) you need to change the settings as described below. If you just want to check the status of the centrifuge on your smartphone (read only access) you do not need to select the checkbox “Activate Remote Access” in the touchscreen user interface.

The settings for the remote control feature are located on the last page of the touchscreen user interface settings menu.

Following options are available:



1. Remote Control: Checkbox to general allow/deny remote control. (Master passcode required)
2. Authentication: Selecting **Generate new ID** generates a new code (ID) for a remote session. Depending on the setup a user authentication may be required.
3. QR- Code: The generated ID is shown in a QR-Code.
4. Numerical Code: The generated ID is displayed in text form.

Access Control Settings

The centrifuge has 2 different user modes which influence the behavior of the remote control feature.

1. Closed centrifuge: If the option “Access Control” is selected it is not possible to start the centrifuge without login. A Remote ID can just be generated if a user is logged in.
2. Open centrifuge: The option “Access Control” is not checked. It is possible to start the centrifuge without login. There are 3 different options for user ID logging:
 - a. No user logging.
 - b. Optional user logging.
 - c. Mandatory user logging.

Depending on the selection a user login is mandatory to use the remote control feature as the user is able to start the centrifuge remotely and the centrifuge needs to know the user for logging purposes.

Centri-Vue App

The Centri-Vue application can discover available centrifuges in the LAN and create a list of local centrifuges with optional additional user information. This information can be used to add location information to the local centrifuge entry.

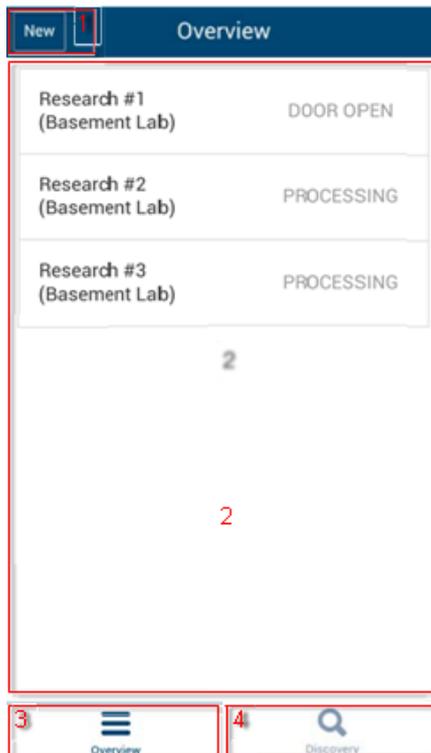
Overview Menu

1. Select **New** to manually add new centrifuges.
2. List view: shows the added centrifuges in a list showing following information:
 - a. Name of the centrifuge
(if no name is entered for the centrifuge, the IP address of the centrifuge is shown instead)
 - b. Optional information (e.g. for location information)
 - c. Centrifuge status

Select a centrifuge entry, to open the detail view for a centrifuge.

3. Select **Overview** to switch to the overview menu.
4. Select **Discovery** to switch to the discovery menu.

To edit or delete a locally saved centrifuge, select a list element and keep it touched. Detailed information to this screen is listed below.



Centrifuge States

The centrifuge can show following states:

- DOOR OPEN (if the door is open)
- READY (if the centrifuge can be started)
- ACCELERATING (if the centrifuge accelerates)
- RUNNING (if the centrifuge is running)
- STOPPING (if the centrifuge decelerates)
- COMPLETE (when a run has been completed successful)
- STOPPED (if a run get canceled)
- POWER DOWN (centrifuge is switched off)

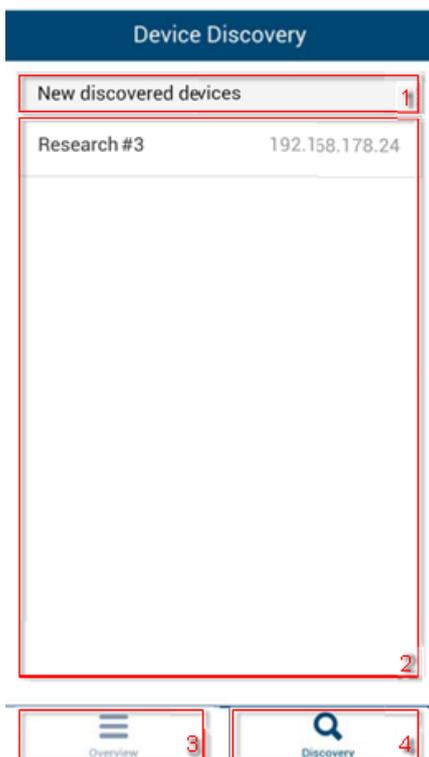
Note This message is only available when the centrifuge is connected to a network with PoE.

- DISCONNECTED (Network timeout)

If a centrifuge error occurred, a red cross is displayed.

Discovery Menu

1. New discovered devices: to start a new discovery, open the item list.
2. List view: all centrifuges found in the network will be displayed. For each centrifuge following information is shown:
 - a. Name of the centrifuge
 - b. IP address of the centrifuge
3. Select **Overview** to switch to the overview menu.
4. Select **Discovery** to switch to the discovery menu

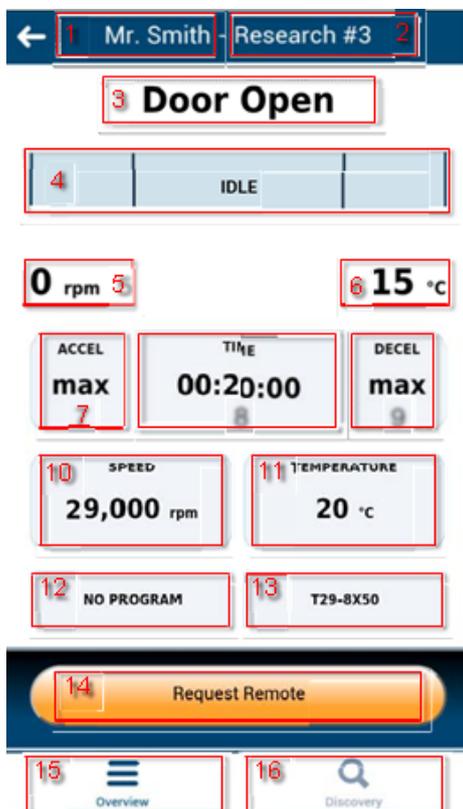


Detail View

To enter the detail view of a locally stored centrifuge, select a centrifuge entry. The detail view is very similar to the main screen of the touchscreen user interface software and shows the current values of the centrifuge (at a refresh rate of one second). All parameters are read only, they can only be changed by accessing the LYNX centrifuge directly.

1. User (Optional): if a user login is necessary to start the centrifuge, the username is shown here.
2. Name of centrifuge: shows the name of the centrifuge. If no name is set yet for the centrifuge, the IP address of the centrifuge is shown.
3. Time display: shows processing time or remaining time depending on the program selection.
4. Status display: shows the progress of the centrifuge graphically.
5. Current speed: shows the current speed of the centrifuge.

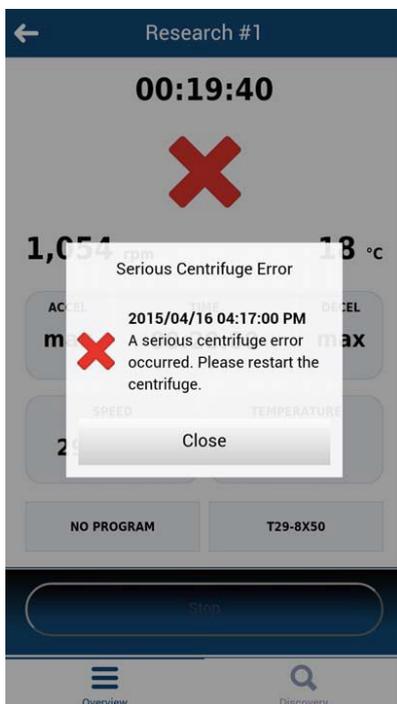
6. Current temperature: shows the current temperature of the centrifuge.
7. Acceleration: specifies the acceleration of the centrifuge.
8. Time: specifies the duration of the centrifuge.
9. Deceleration: specifies the deceleration of the centrifuge.
10. Speed: specifies the target speed of the centrifuge.
11. Temperature: specifies the target temperature of the centrifuge.
12. Program display: shows, if a preset program is used.
13. Rotor display: shows the name of the installed rotor.
14. Request remote: select button to switch to the “Request Remote Access” menu.
15. Overview: select button to switch to the “Overview” menu.
16. Discovery: select button to switch to the “Discovery” menu.



Detail View during Error

If an error occurs to the centrifuge, a message will pop up in the detail view. The message opens every time you switch to the detail view until the error is fixed.

Selecting the big red cross in the detail view opens up the message manually.



Adding a Centrifuge

Search on Network

If the IP address of the centrifuge is not known, the centrifuge can be discovered with discovery functionality. Follow the provided steps:

1. Switch to **Discovery menu**.
2. Open the list **New discovered devices**.
3. The found centrifuges are displayed in a list of names and IP addresses.

NOTE If no name is entered in the centrifuge, the name field remains empty.

4. Select the desired centrifuge.

This opens the “Add New Device” menu:

1. Cancel: closes the “Add New Device” menu without saving.
2. Name: shows the name of the centrifuge. The name is detected automatically and cannot be edited. If no name is retrievable, “Device name Example” is shown.
3. IP-Address: the IP address is entered automatically. It can be edited subsequently.
4. Information: additional information can be entered later in order to identify the centrifuge better.

5. Add device: selecting this button adds the centrifuge in the overview menu. If saved successful, the application switches to the overview menu and shows the added centrifuge.

Add Manually

If the IP address of the centrifuge is known (after selecting the found device), the centrifuge can be manually saved in the overview menu:

Select **New** in the overview menu.

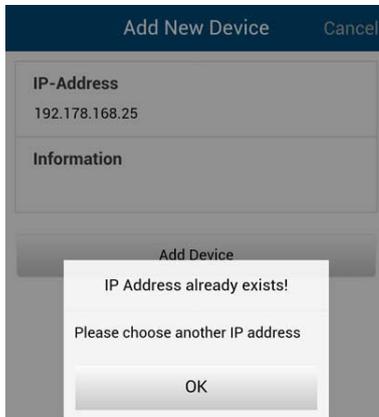
This opens the Add New Device menu:

1. Cancel: closes the “Add New Device” menu without saving.
2. IP-Address: the IP address will be entered automatically if available.
3. Information: additional information can be entered in order to better identify the centrifuge later.
4. Add device: selecting this button adds the centrifuge in the overview menu. If saved successful, the application switches to the overview menu and shows the added centrifuge.

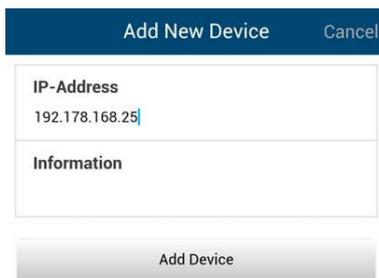
Error Adding Centrifuges

If a centrifuge cannot be added to the overview menu, there are two possible reasons:

1. A centrifuge with the same IP address is already stored in the local list. A pop-up message indicates the error.



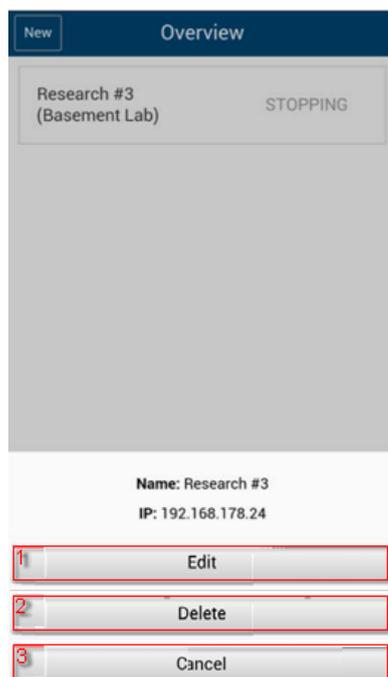
2. The IP address has no valid format. The entered IP address must have the format (x.x.x.x). In addition, only numbers may be included. If an IP address is entered in an invalid format the outline turns red and the add device button will be disabled.



Edit Centrifuge Entry

The centrifuge entries in the overview menu can be edited or deleted. To edit a centrifuge entry, select the entry and hold it (about 3 seconds). The edit menu will open with the following options:

1. Select **Edit** to open the edit menu of the centrifuge.
2. Select **Delete** to delete a centrifuge entry. Deletion is done, if the subsequent question is confirmed with **Yes**.
3. Select **Cancel** to switch back to the overview menu.



If **Edit** is selected, an “Edit Device” menu opens.

1. Select **Cancel** to return to the overview menu.
2. Name: the name of the centrifuge can only be changed directly at the LYNX centrifuge and is therefore not editable.
3. IP-Address: the stored IP address can be changed here.
4. Information: the information field can be edited here.
5. Save: changes can be saved.



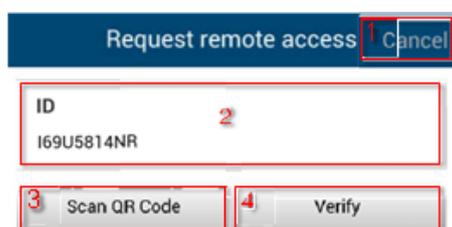
Remote Control

Prerequisites: The centrifuge was enabled for remote access (for detailed information, see chapter 3).

Request Remote Access Menu

The “Request Remote Access” menu opens when **Request Remote Access** is selected in the detail view.

1. Select **Cancel** to return to the overview menu.
2. ID: the Remote ID from the centrifuge can be entered manually.
3. Scan QR-Code: opens the integrated QR-Scanner.
4. Verify: the entered or scanned code will be verified. A new session for this smartphone will be created in case of a successful verification.



Input by Hand

1. Generate a new ID on the centrifuge
2. Press in the **ID** field of the “Request Remote Access” menu. The keyboard appears.
3. Enter the numerical ID into the input field on the smartphone. Select **Verify**.

Input by QR-Code

1. Generate a new remote ID in the centrifuge. Select **Scan QR-Code** in the “Request Remote Access” menu.
2. The integrated QR scanner opens.
3. Scan the QR-code on the centrifuge with the QR scanner.
4. If the QR-code is successfully scanned, the application returns to the “Request Remote Access” menu.
5. The remote ID is decoded from the QR-code and shown in the ID field. The ID can be checked again, by comparing it to the numerical code on the centrifuge.
6. Select **Verify**. If successfully verified, the application returns to the “Detail view” menu.



Error Establishing the Remote Connection

If a message “Request Error” pops up when selecting **Verify**, no remote connection is established to the centrifuge.

Possible error sources:

- The remote ID was not transferred correctly from the centrifuge.
- Another user has already built up a remote session with this remote ID.
- The centrifuge and/or smartphone are not on the same network

QR-Code is not Recognized by the Scanner

- To scan the QR-code quickly and correctly, the phone must be held vertically over the QR-code.
- The entire QR-code should be in the bright area of the scanner.
- If you have problems to focus the QR-code, check if the camera of the phone works and if the camera lens needs to be cleaned.

Closing the Remote Session

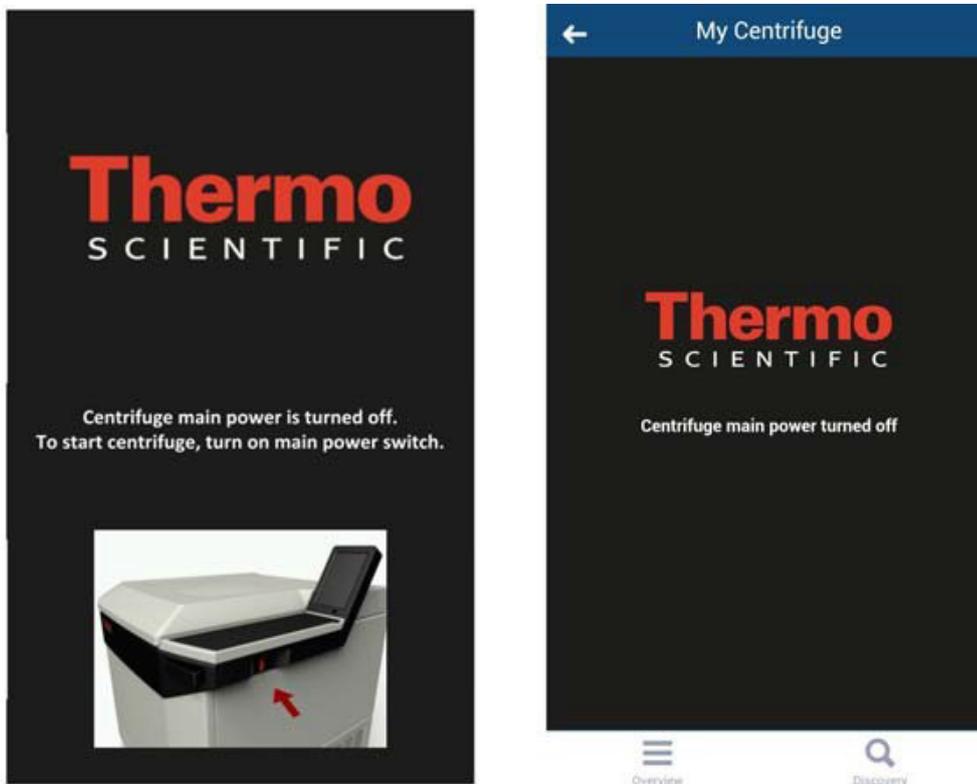
The remote session cannot be terminated manually. However, the remote session terminates automatically at the following events:

- A new remote ID is generated at the centrifuge.
- Centrifuge without User login: If the centrifuge door has been opened, 5 minutes without interaction in the application on the smartphone or the centrifuge.
- Centrifuge with User login: If the current user is logged off (manually or automatically, depending on the selection of the combo box in the configuration menu)

The session management for the smartphone is directly attached to the user management of the LYNX centrifuge. This means that the smartphone session becomes invalid in case any user logs in or out at the LYNX centrifuge.

Connection to a Network with active PoE

The user interface of the LYNX centrifuge is a PoE¹ enabled device. If it is connected to a PoE network port, it may remain active after the main power switch of the centrifuge has been turned off. While it is in this state, the following screens will be displayed at the centrifuge and in the Centri-Vue application:



After turning on the main power switch, the centrifuge will return to the normal state of operation. To avoid keeping the user interface in the active state, disable PoE on the used network port².

¹ "Power over Ethernet" or PoE describes a system which passes electrical power along with the Ethernet cabling.

² Disabling PoE is recommended to prevent premature wear of the user interface display components.

9

REST-Webserver

Port of REST-Webservers: 800 (TCP). The data is exchanged via defined JSON objects.

Resource Overview

In the table below, the REST-interface provided methods are listed.

URL	Method allowed	Description
<device ip>:<port>/getall	GET	Information and data about the current state of the centrifuge
<device ip>:<port>/getstate	GET	Brief information, only state and name of the centrifuge

Detailed description of the resources:

GET <device ip>:<port>/getall

Query the current state of the centrifuge, supplies target and actual values.

Request:

No data

Response:

```
{
  "actualValues": {
    "ace": <ace value in x.xxExx>,
    "powerDown": <true orfalse>
    "rcf": <rcf value in xg>,
    "rpm": <rotation speed in rpm>,
    "state": <state identifier>,
    "temperature": <temperature in °C>,
    "time": <time format hh::mm::ss>
  },
  "error": <error object>,
  "name": <centrifuge name>
```

```

“program”: <program name>,
“rotorName”: <rotor name>
“setValues”: {
    “accelerationProfile”: <profile number>,
    “ace”: <ace value in x.xxExx >,
    “decelerationProfile”: <profile number>,
    “rcf”: <rcf value in xg>,
    “rpm”: <rotation speed in rpm>,
    “temperature”: <temperature in °C>,
    “time”: <time in hh:mm:ss>
},
“user”: <user name>
}

```

<error object>:

```

{
    “code”: <error code>,
    “description”: <error description in gui language>
    “title”: <error title / type of error>
    “time”: <error occurrence time in year/month/day hh:mm:ss>
}

```

If a value is not available, the value is set to zero. This can be used to distinguish between the following modes of operation:

- LYNX in RPM-Mode: rpm set, rcf contains the value zero
- LYNX in RCF-Mode: rpm contains the value zero, rcf set

The distinction of operation mode time, hold and ACE is mapped as follows:

- Time-Mode: time set, ace Value is zero
- ACE-Mode: time is zero, ace is set
- Hold-Mode: As in Time-Mode, but the value for time at setValues is also zero

Examples

Centrifuge in Time-RPM-Mode and an error occurred:

```

{
    “actualValues”: {
        “ace”: null,

```

```

    "powerDown": false
    "rcf": null,
    "rpm": 0,
    "state": "EReady",
    "temperature": 0,
    "time": "00:02:00"
  },
  "error": {
    "code": 36575,
    "description": "Error Text",
    "title": "Centrifuge Error",
    "time": "2015/03/23 03:32:37 PM"
  },
  "name": "My Centrifuge",
  "program": "",
  "rotorName": "F10-4x1000 LEX",
  "setValues": {
    "accelerationProfile": 9,
    "ace": null,
    "decelerationProfile": 9,
    "rcf": null,
    "rpm": 500,
    "temperature": 0,
    "time": "00:02:00"
  },
  "user": "Centrifuge User"
}

```

Centrifuge in Hold-RCF-Mode:

```

{
  "actualValues": {
    "ace": null,
    "powerDown": false
    "rcf": 0,
    "rpm": null,

```

```

        "state": "STOPPED",
        "temperature": 0,
        "time": "00:00:38"
    },
    "error": null,
    "name": "My Centrifuge ",
    "program": "",
    "rotorName": "F10-4x1000 LEX",
    "setValues": {
        "accelerationProfile": 9,
        "ace": null,
        "decelerationProfile": 9,
        "rcf": 1000,
        "rpm": null,
        "temperature": 0,
        "time": null
    },
    "user": ""
}

```

Centrifuge in ACE-RPM-Mode:

```

{
    "actualValues": {
        "ace": "0.00E00",
        "powerDown": false
        "rcf": null,
        "rpm": 0,
        "state": "STOPPED",
        "temperature": 0,
        "time": null
    },
    "error": null,
    "name": "My Centrifuge",
    "program": "",
    "rotorName": "F10-4x1000 LEX",

```

```

    "setValues": {
        "accelerationProfile": 9,
        "ace": "2.22E02",
        "decelerationProfile": 9,
        "rcf": null,
        "rpm": 500,
        "temperature": 0,
        "time": null
    },
    "user": ""
}

```

GET <device ip>:<port>/getstate

Query status and name of the centrifuge.

Request:

No data

Response:

```

{
    "name": <centrifuge name>,
    "powerDown" : <true or false>
    "state": <state identifier>
}

```

Example

```

{
    "name": "My Centrifuge ",
    "powerDown" : false
    "state": "STOPPED"
}

```




Thermo Electron LED GmbH

Zweigniederlassung Osterode
Am Kalkberg, 37520 Osterode am Harz
Germany

thermofisher.com/centrifuge

© 2020 Thermo Fisher Scientific Inc. All rights reserved.

All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries unless otherwise indicated.

Delrin, TEFLON, and Viton are registered trademarks of DuPont. Noryl is a registered trademark of SABIC. POLYCLEAR is a registered trademark of Hongye CO., Ltd. Hypaque is a registered trademark of Amersham Health As. RULON A and Tygon are registered trademarks of Saint-Gobain Performance Plastics. Alconox is a registered trademark of Alconox. Ficoll is a registered trademark of GE Healthcare. Haemo-Sol is a registered trademark of Haemo-Sol. Triton X-100 is a registered trademark of Sigma-Aldrich Co. LLC. Valox is a registered trademark of General Electric Co.

Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.

Shown pictures within the manual are examples and may differ considering the set parameters and language. Pictures of the user interface within the manual are showing the English version as example.

Australia +61 39757 4300

Austria +43 1 801 40 0

Belgium +32 9 272 54 82

China +800 810 5118, +400 650 5118

France +33 2 2803 2180

Germany national toll free 0800 1 536 376

Germany international +49 6184 90 6000

India toll free +1800 22 8374

India +91 22 6716 2200

Italy +39 02 95059 552

Japan +81 3 5826 1616

Korea +82 2 2023 0600

Netherlands +31 76 579 55 55

New Zealand +64 9 980 6700

Nordic/Baltic/CIS countries +358 10 329 2200

Russia +7 812 703 42 15, +7 495 739 76 41

Singapore +82 2 3420 8700

Spain/Portugal +34 93 223 09 18

Switzerland +41 44 454 12 12

UK/Ireland +44 870 609 9203

USA/Canada +1 866 984 3766

Other Asian Countries +852 3107 7600

Countries not listed +49 6184 90 6000

en

