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Thermo Scientific Centri-Touch User Interface

for Thermo Scientific Sorvall BP 8 / 16, Cryofuge 8 / 16, Sorvall BIOS 16, Heavy Duty and Heavy Duty Water Cooled Centrifuges

Instruction Manual

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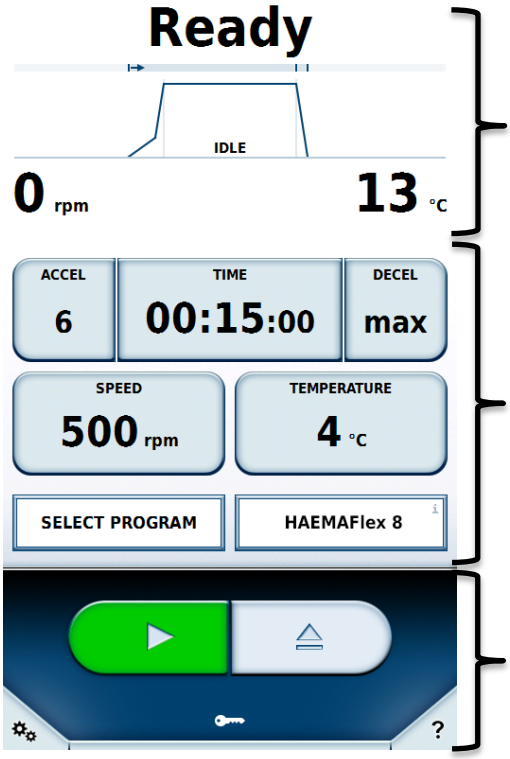
1 The Main Screen

The main screen is divided into three sections:



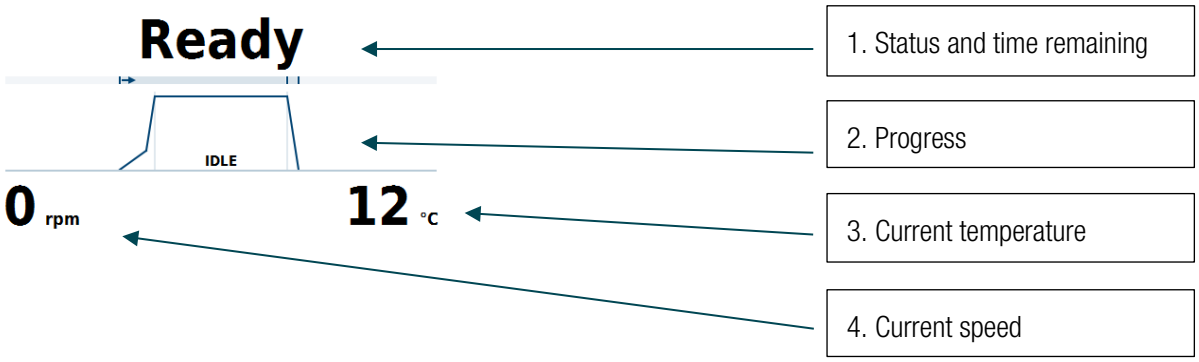
Status, current values and progress

Set value entry area

Centrifuge control, menu and help

1.1 Current Values and Progress Indicator

The top part of the main screen shows the status, current values and progress of centrifugation.



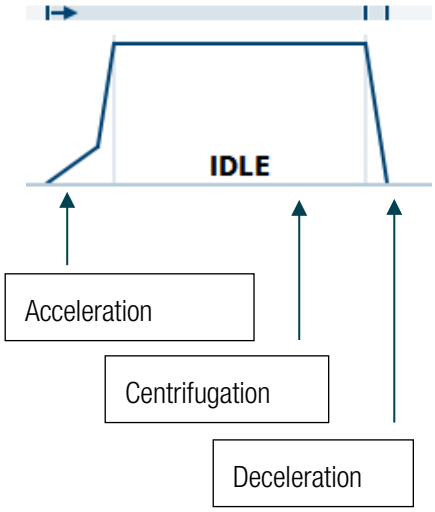
1- Status and Time Remaining

Shows the time remaining until stop during a centrifugation. In HOLD mode this displays the time elapsed. If no centrifugation is in progress, status messages are shown here.

The statuses that may occur are:

Status	Meaning
Ready	Centrifugation can be started.
Door open	Door of centrifuge is open.
Error	An error has occurred.
Interrupted	Centrifugation has been manually interrupted.
Completed	Centrifugation has been successfully completed.
Pre-tempering completed	Pre-tempering has been successfully completed.
No rotor	No rotor has been placed in the centrifuge.
Door Moving	Door is automatically closing or opening.

2- Progress
Shows the current phase of the run, divided into three sections: Acceleration, centrifugation and deceleration.

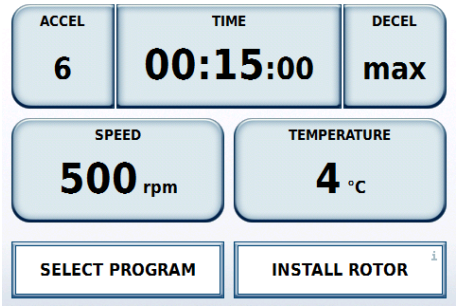


3- Current Temperature
Displays the current chamber temperature.

4- Current Speed
Displays the current rotating speed of the rotor.

1.2 Set Value Entry

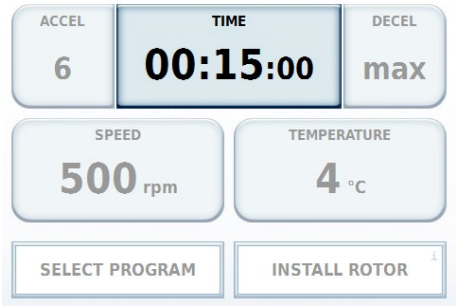
In this area of the screen set values can be changed, provided that the required user authorizations are available.



Pressing a particular key opens an input window for the relevant quantity. The value currently set is displayed on the keys. To leave an entry field, press either on the button shown or in an area outside the window. The window is closed after 20 seconds without response from the user.
If the values are changed during centrifugation, these take effect straight away.
The use and meanings of the individual buttons are described in the following sections.

1.2.1 Time

The run time can be changed via the **Time** button.

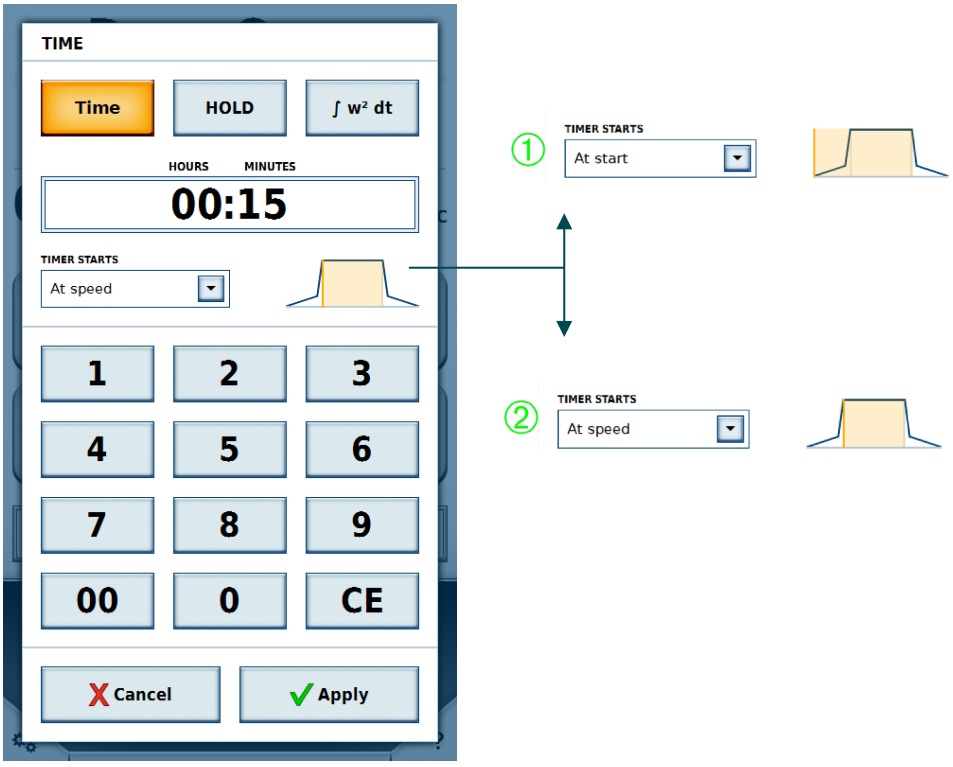


Here, you can enter a run time in hours and minutes. (You can also activate an input for seconds by making the appropriate change in the settings.)

There are three different modes for the run time.

1- **Time**

A time can be entered. When this time expires, centrifugation stops. You can specify whether the set time begins when the centrifuge is first started ① or once the acceleration phase is completed ②.



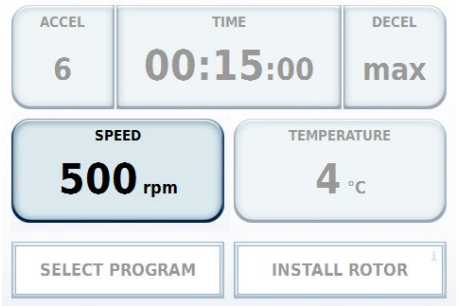
2- **HOLD Mode**

In HOLD mode, no time is entered. Instead, centrifugation continues until it is manually stopped.

3- Accumulated Centrifugal Effect (ACE)
Input as X, Y * 10^{Z}
X: Pre-decimal digits
Y: Decimal places
Z: Exponent of power of ten

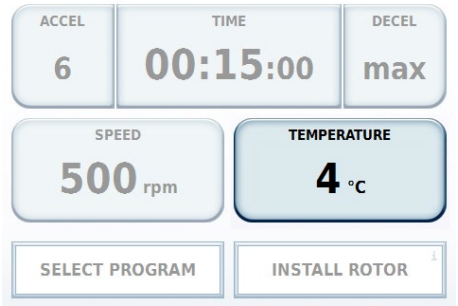
1.2.2 Speed

The rotation speed can be entered either in revolutions per minute (rpm) or as relative centrifugal force (RCF). Acceleration cannot continue beyond the maximum speed of the rotor currently in use.



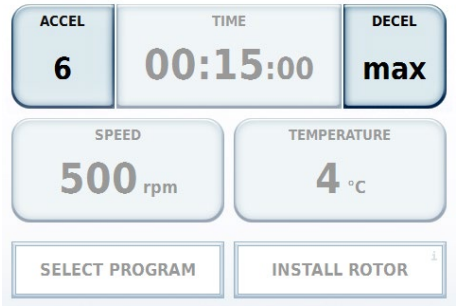
1.2.3 Temperature

The temperature is entered in degrees Celsius (°C). Positive and negative values may be entered within the range from -20 °C to +40 °C. If this value is changed, the centrifuge cools the rotor chamber to the specified temperature straight away.



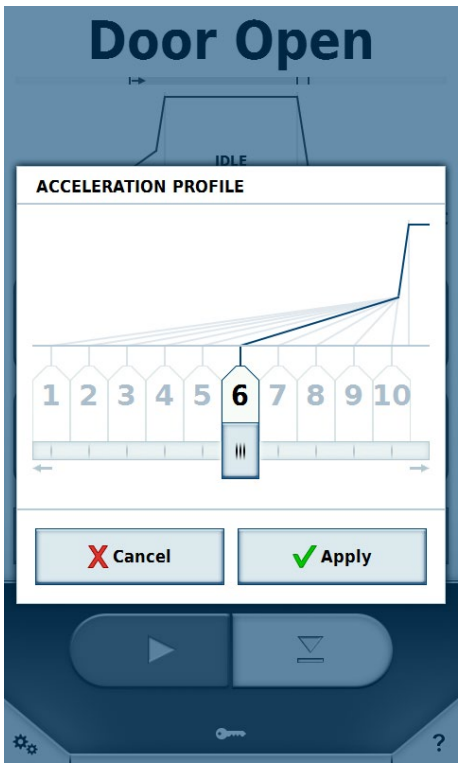
1.2.4 Acceleration and Deceleration Profile

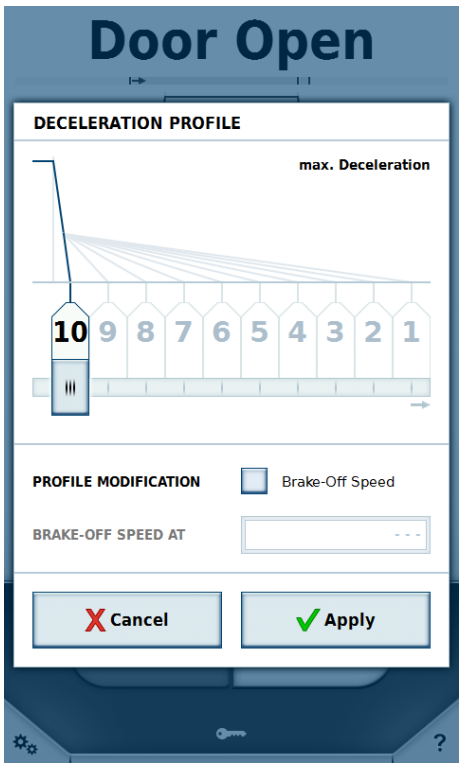
The acceleration profile specifies how fast the centrifuge reaches the set rotation speed or comes to rest.



Values are displayed as profiles from 1 to 10. If a different profile set is active in the settings, the available values may be different. The smallest value represents the minimum acceleration or deceleration; the largest value represents the maximum.

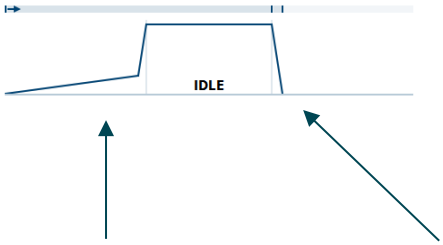
For certain profile sets, a deceleration cutout speed can be set for the deceleration profile. When this option is active, a speed must be set in rpm. Once the centrifuge reaches this speed during the deceleration phase, power to the motor is cut off. No further braking is applied, nor is the deceleration phase prolonged by the motor.





If a profile is selected, this is displayed in the progress indicator in the top part of the screen.

Example:
Minimum acceleration is selected as the acceleration profile and maximum acceleration is selected as the deceleration profile.



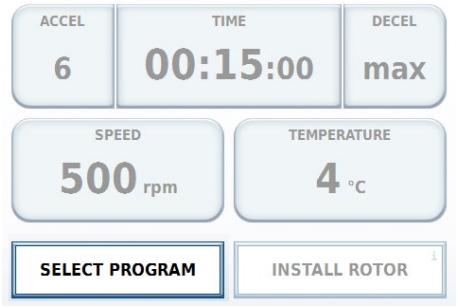
Minimum acceleration	Maximum deceleration

The centrifuge has the ability to facilitate a protocol conversion from another Thermo Scientific centrifuge model using the Centri-Cross function. The Centri-Cross function emulates the acceleration and deceleration profiles of the legacy Thermo Scientific Sorvall RC3 BP+, Thermo Scientific Sorvall RC 12 BP+, Thermo Scientific Cryofuge 6000i or Thermo Scientific Cryofuge 8500i.
These profiles can be set up in the Settings (see section Profile Set). For some legacy models, an additional option is provided beyond acceleration and deceleration profiles.

Now, the **Slow Start** option ① is available in the acceleration profile and the **Slow Stop** option is available in the deceleration profile. The profile selection area is disabled. Once one of the two options is activated, the relevant profile selection is enabled again. If the option is disabled, the fastest profile is active in each case.

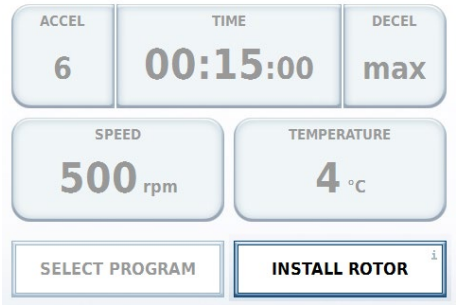
1.2.5 Program

Displays either the name of the program currently selected or the **Select Program** button. Pressing this button displays the program list (see Programs section).

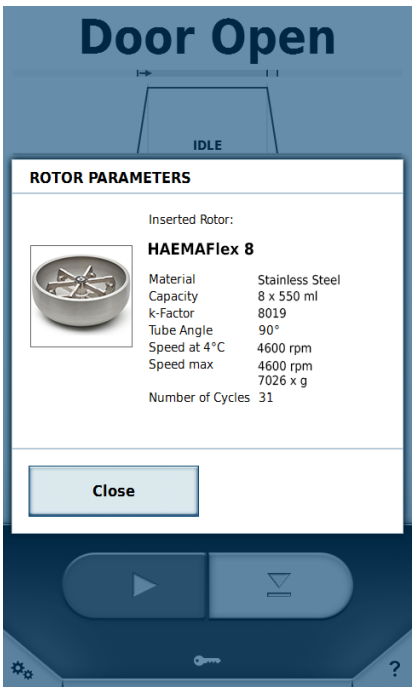


1.2.6 Rotor

Displays either the name of the rotor currently inserted or the **Install Rotor** button.



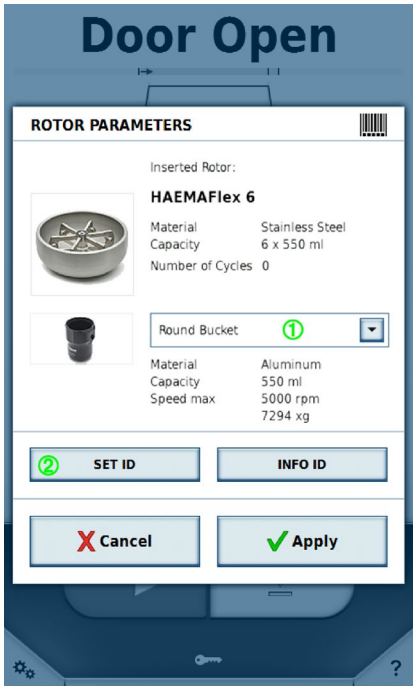
Pressing the **Install Rotor** button, or inserting a rotor, causes the information about the rotor to be displayed. If an unknown rotor is to be used, the rotor data must first be imported (see USB Import/Export section).



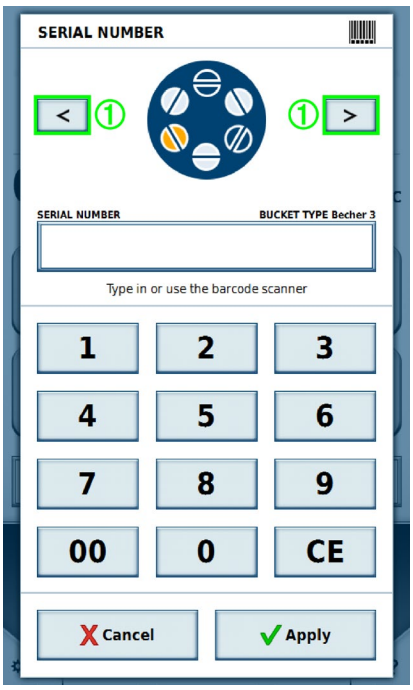
1.2.7 Serial Numbers

If the **Enter all Serial Numbers** option is enabled in the settings, the serial numbers for rotor and bucket can also be entered in the Rotor window or scanned in with a barcode reader. Assigning a serial number enables the cycles to be captured and saved for specific rotors and buckets.

First, select the bucket type ① used for which the serial numbers are to be entered.



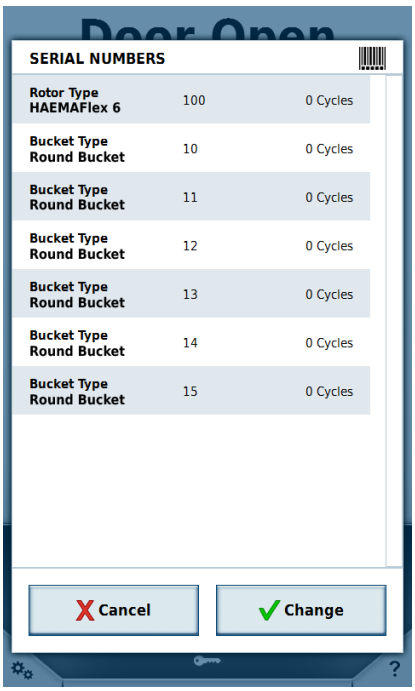
The **Set ID** button ② enables you to enter the serial numbers manually or scan them in with a barcode reader.



The arrows ① near the top of the window allow you to toggle between the rotor and the different individual buckets. Once a serial number has been read in by barcode reader, the screen jumps to the next element that can be scanned. The currently selected element is highlighted yellow. Elements to which no serial number is assigned are grayed out, while those with serial numbers are highlighted in blue.

Each serial number can only be assigned once. If an existing serial number is assigned to a different bucket of the same type, the cycles are retained. If an existing serial number is assigned to a bucket of a different type, the original allocation and cycles are deleted.

If a different bucket is selected in the **Rotor Parameters** window, all changes made since the window was opened are lost. To save the data, press the **Apply** button in the **Rotor Parameters** window. Pressing **Cancel** or on any area outside the window causes the window to be closed; any changes are not saved.



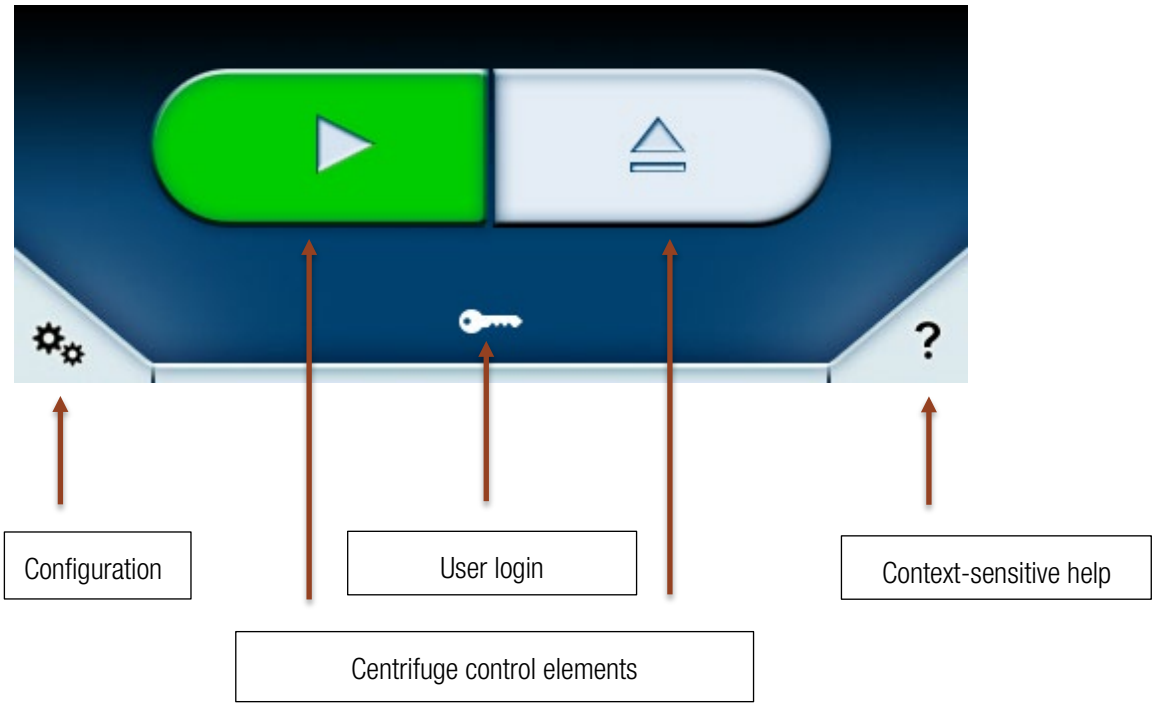
The **Info ID** button is enabled if serial numbers have been assigned for the rotor type and bucket type currently inserted. Pressing the **Info ID** button allows you to view and change the serial numbers of the rotor and bucket. The number of cycles of the individual elements is displayed. Each centrifugation run of the rotor is counted as one cycle.

If a rotor or bucket is inserted that was last used for this type, the serial numbers used are displayed again.

The serial numbers are stored in the run log.

1.3 Centrifuge Control Elements

The bottom area of the main screen can be used to control the centrifuge.



Various buttons can be displayed in the centrifuge control area:

The green Start button starts the centrifuge using the current set values, provided that the door is closed and a rotor is inserted.
If the door is open, this is automatically closed when the Start button is pressed.

If the Timed Start button was activated when the program was selected, this button replaces the green Start button (see Timed Start section).

The red Stop button halts the current centrifugation; the progress indicator moves to the deceleration phase.
If a timed start has been planned and the start time has not yet arrived, pressing the Stop button cancels the timed start.

Opens the door of the centrifuge.

Closes the door of the centrifuge.

Cannot operate door. This status occurs if the centrifuge has been switched on while the door is open. In this situation, the door must be closed manually, after which automated control becomes available again.

1.4 Menu

The symbol is used to call up the menu. The menu provides additional functions.

1.5 User Login

Different items are displayed in the bottom section, depending on the **Protected by User PIN** setting.

- Key symbol
  If the **Protected by User PIN** option is disabled in the settings, the key symbol appears. It is not necessary for a user to be logged in for centrifugation to be performed. The user can use the centrifuge to varying levels of function depending on the user level (see Users section) to which the centrifuge is set. Pressing this button opens a window in which the current user level can be changed. To do this requires the master passcode (see Settings section).

- Logging In

  If the **Protected by User PIN** option is enabled in the settings, the **Log In** button appears. For this, it is necessary that a user be logged in. If no user is logged in, no centrifugation can take place. Pressing the **Log In** button activates the entry field for the PIN code. Registered users can now log in with their chosen PIN.

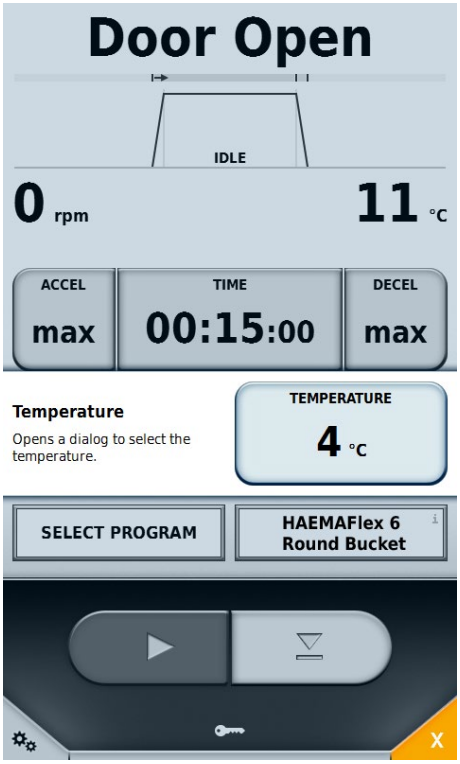
1.6 Context-Sensitive Help

The button invokes context-sensitive help. If this function is enabled, the color and symbol of this button are changed.

In this mode, you can activate any element of the user interface. A short explanatory text appears describing the function of the relevant button.

This function can be used in all areas of the user interface.

Example (the Temperature button):

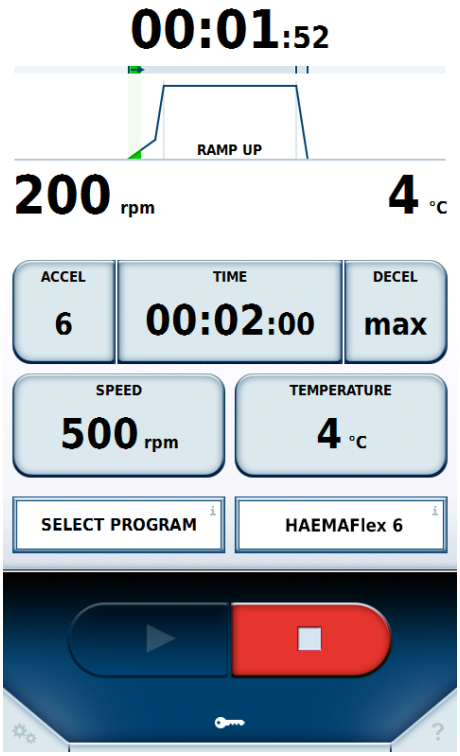


This function can be disabled via the

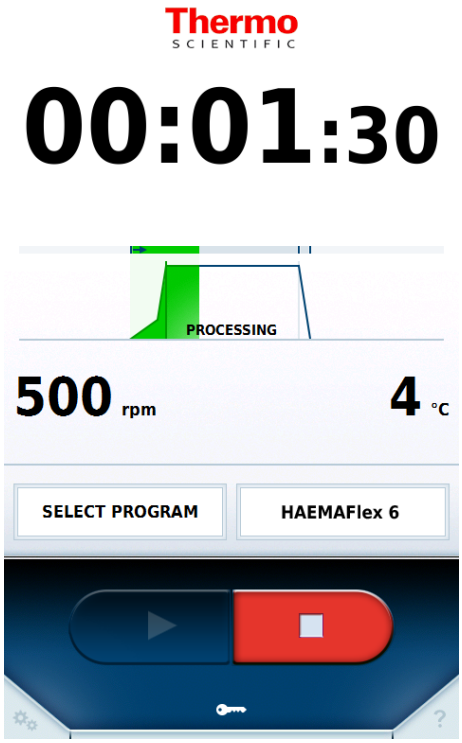
button.

2 Lighthouse Mode

If no entry is made via the main screen in 30 seconds, the unit changes to lighthouse mode. In this mode, the status, current values and progress display are displayed larger.



Normal Mode



Lighthouse Mode

The set value entry fields disappear and the progress display occupies their space. The time display is enlarged, so that the centrifugation status can be seen clearly from a greater distance. It is still possible to stop the centrifuge. Pressing on any area of the screen causes it to exit from lighthouse mode.

3 USB Import/Export

Run logs, rotor logs, programs and users can be exported onto a USB stick.
Programs and users can also be imported. Only data that has been exported using the same language setting and the same profile set can be imported.

The file format for export is CSV. Data can be edited in a spreadsheet program such as Microsoft Excel™. The run log is also exported in PDF format.

The USB stick used for import and export must use the FAT32 file system.

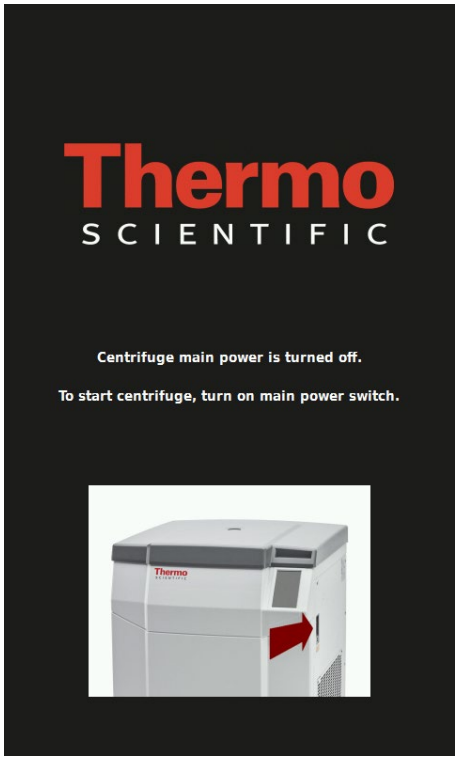
If the centrifuge is connected to a network, run logs can also be downloaded from it as PDF files via http via the centrifuge's IP address and port '801'. Thus, if for example the IP address assigned to the centrifuge is '192.168.0.1', the address for download is 'http://192.168.0.1:801'.

If an unknown rotor has been inserted into the centrifuge, the user is prompted to import the relevant rotor data. The rotor is supplied with a suitable USB stick for this purpose. Use this stick to load the rotor data into the centrifuge.

4 Power over Ethernet (PoE)

This function can be used if the centrifuge is connected to a PoE-capable device within the network.
If this is the case, the centrifuge screen is supplied with power via the network connection even if the centrifuge is switched off. No centrifugation can be performed in this state. When the centrifuge is switched on again, however, it reaches the ready state faster than would be the case without PoE.

If the centrifuge is off but connected to a PoE-capable device on the network, the screen display is as follows:



5 GMP Mode

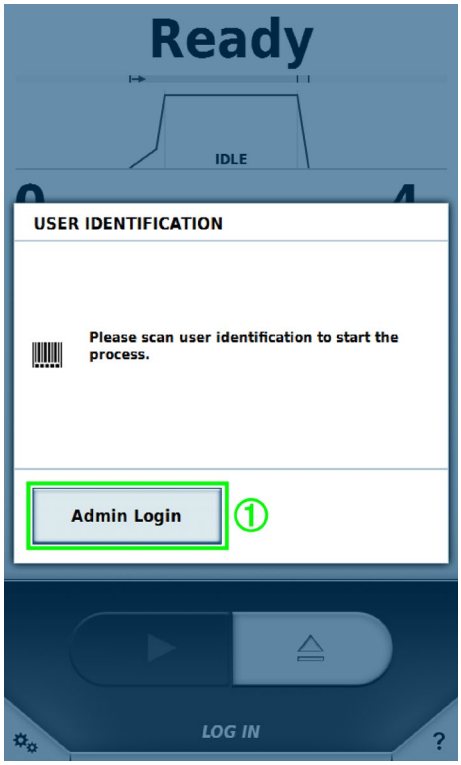
If GMP mode is enabled in the settings, the user is guided through a workflow. Here, a barcode reader can be used to select users and programs. Additionally, the serial numbers of the blood bags can be recorded either manually or using a barcode reader.

5.1 GMP Workflow

The individual steps of the GMP workflow are described below.

1. User Login

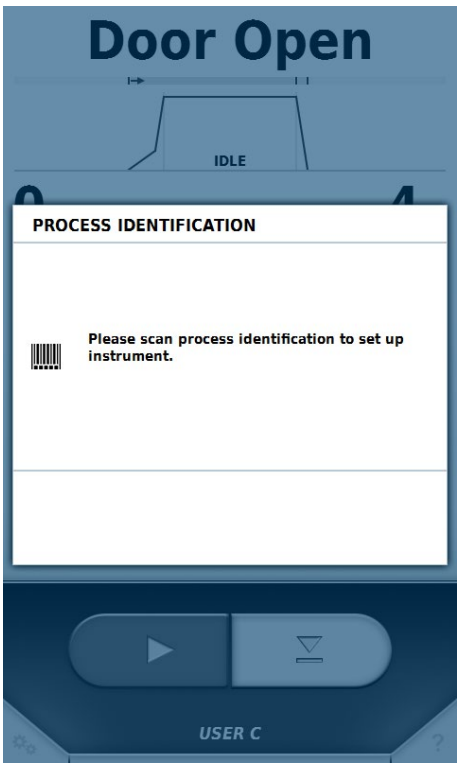
   To log in, the barcode assigned to the user must be scanned in.



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

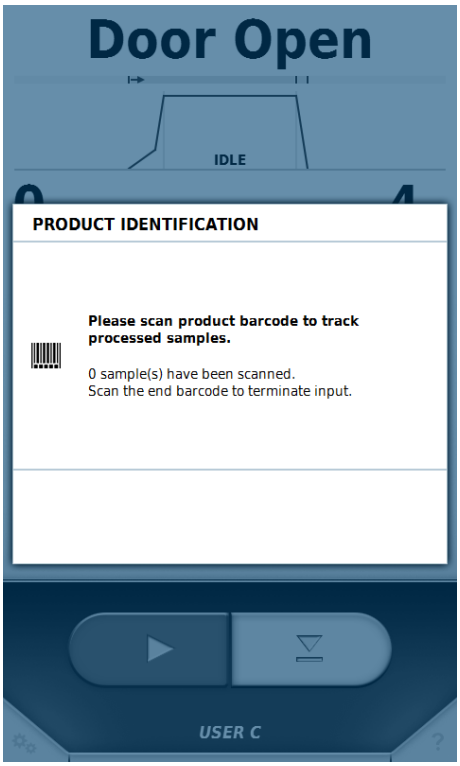
   Once the user has logged in, the barcode of the required program is scanned in.



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

3. Product Identification

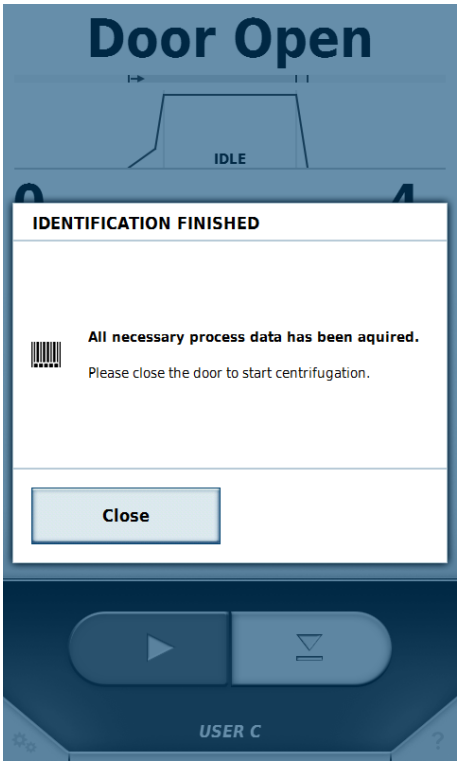
Once the program has been selected, the serial numbers of the blood bags are entered.



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

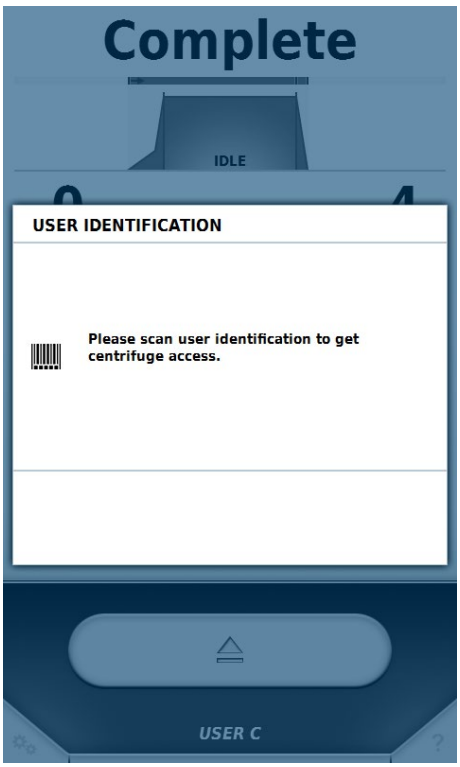
4. Closing the Door and Starting Centrifugation

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

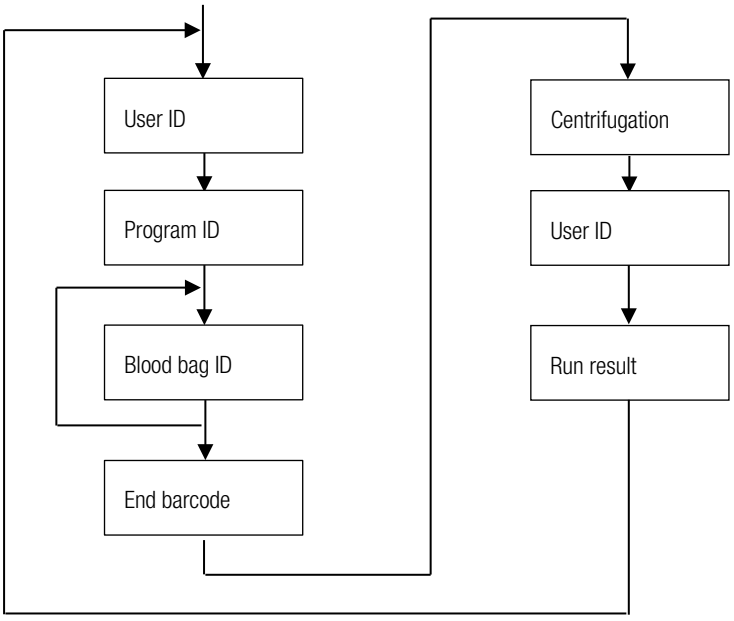


5. User Identification

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



This step is used to identify the user who removes the blood bags 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.

5.2 Predefined Barcodes

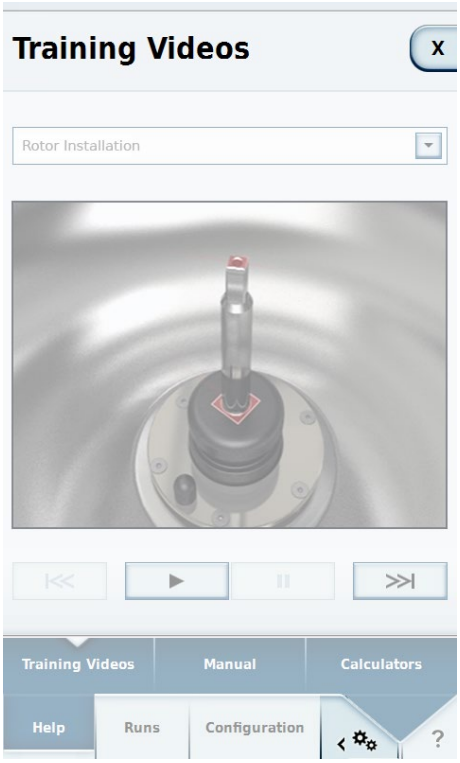
To facilitate operation with a barcode reader, two predefined barcodes are provided:

- End
  This barcode must be scanned once scanning of the blood bag serial numbers is completed.

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

6 Menu

The menu is divided into three sections: **Help**, **Runs** and **Configuration**. Each section contains another level with submenus. To quit the menu and return to the main screen, either press the Menu button again or click at the top of the screen, either on the X symbol or in the title area to the left.

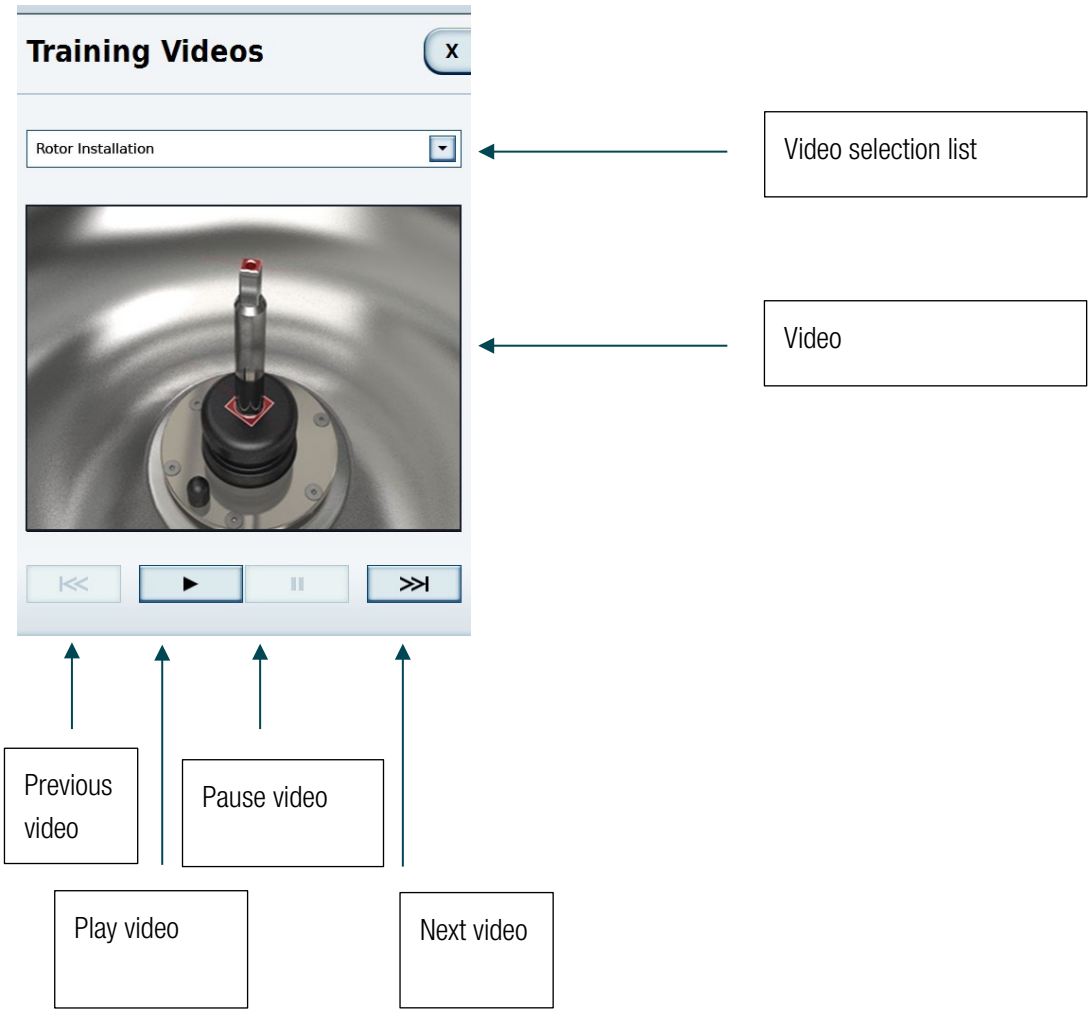


If an item from a submenu has been selected, the relevant screen is displayed.

6.1 Help

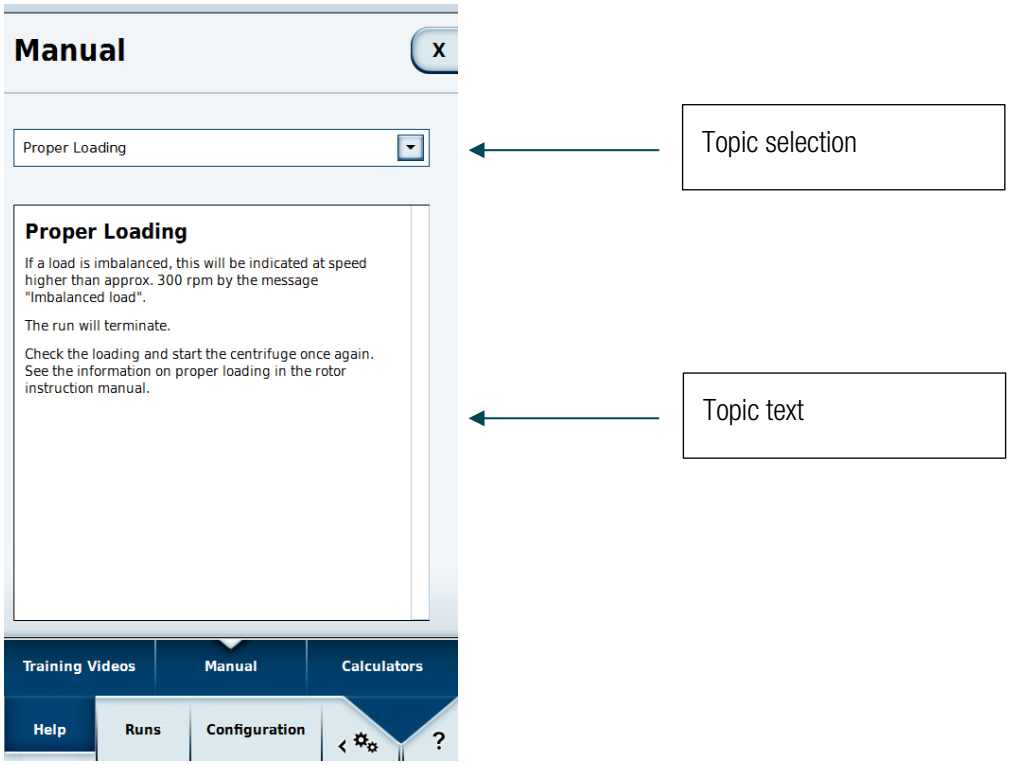
6.1.1 Training Videos

The Training Videos submenu contains instructions on various aspects of using the centrifuge.



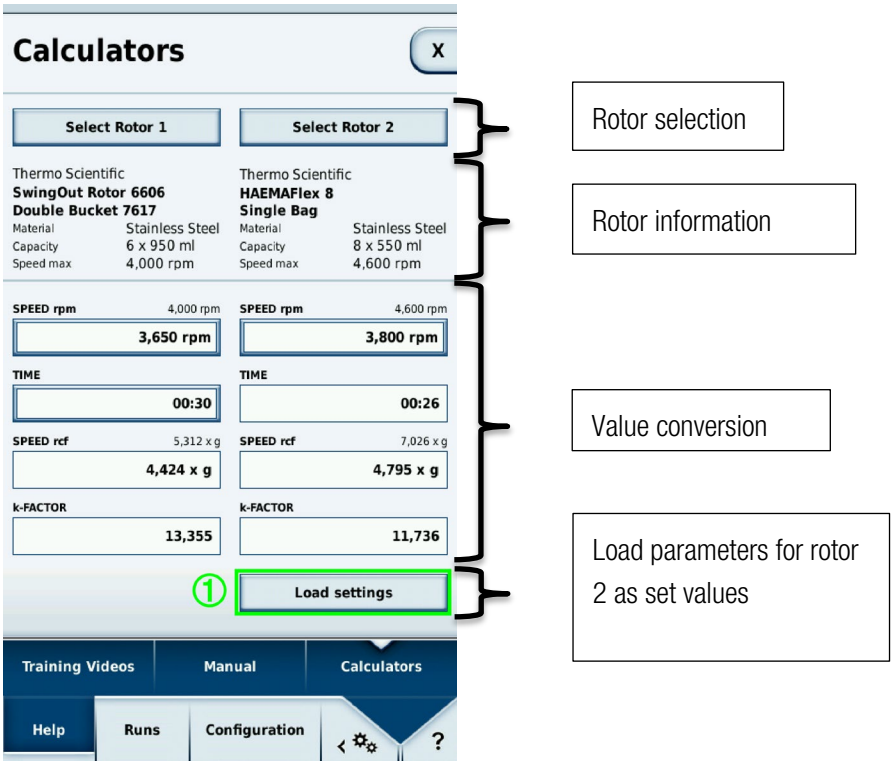
6.1.2 Instruction Manual

The instruction manual submenu contains text articles on the use of the centrifuge.



6.1.3 Calculator

The calculator helps ensure that the same results are obtained using different rotors.
The calculator can calculate a time that allows the same overall forces to be applied to the sample using the currently set speed as was applied by a compared rotor with its specified values of speed and time.



The rotor selection function allows selection of the rotors and, where available for the rotor, of the bucket types.
The rotor information area displays the values for the selected rotor.
The value conversion area contains 4 different values on each side.

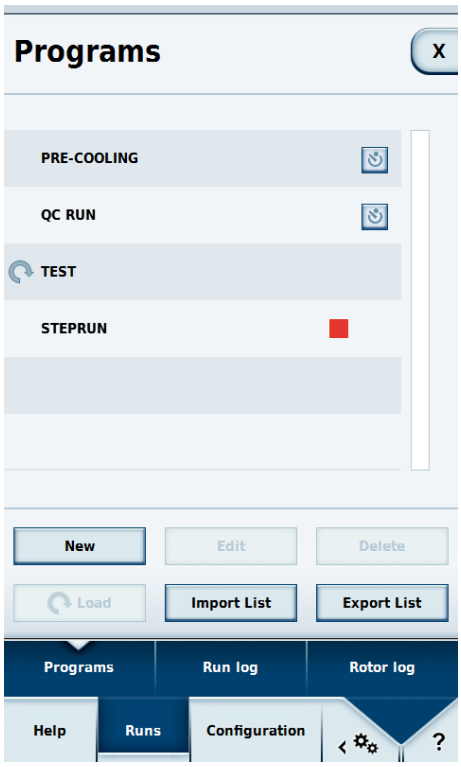
1. Rotation Speed in RPM
   This field displays the maximum speed of the currently selected rotor. The value can be changed for both rotors.
2. Time
   The run time for rotor 1 can be entered here. No time can be entered for rotor 2 since the time for this is calculated from the speeds of rotors 1 and 2 and the run time of rotor 1.
3. Centrifuge Speed in Relative Centrifugal Force (RCF)
4. The K Factor

Press Load Settings ① to set the speed and run time as the current set values. Once the settings are loaded, the main screen is displayed again.

6.2 Runs

6.2.1 Programs

In the Programs submenu, users can save combinations of set values as programs. When a program is loaded, the stored values are set as the current set values.



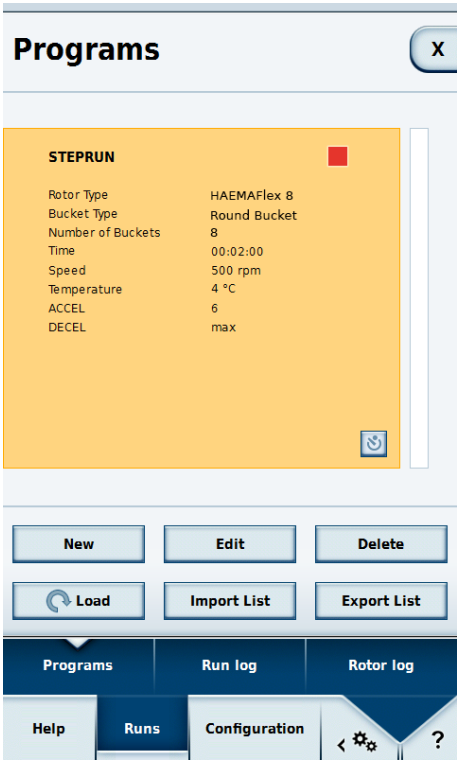
Two predefined programs are always present in this submenu:

- Pre-cooling
- QC Run

In addition, all programs created by the user are listed here. 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.



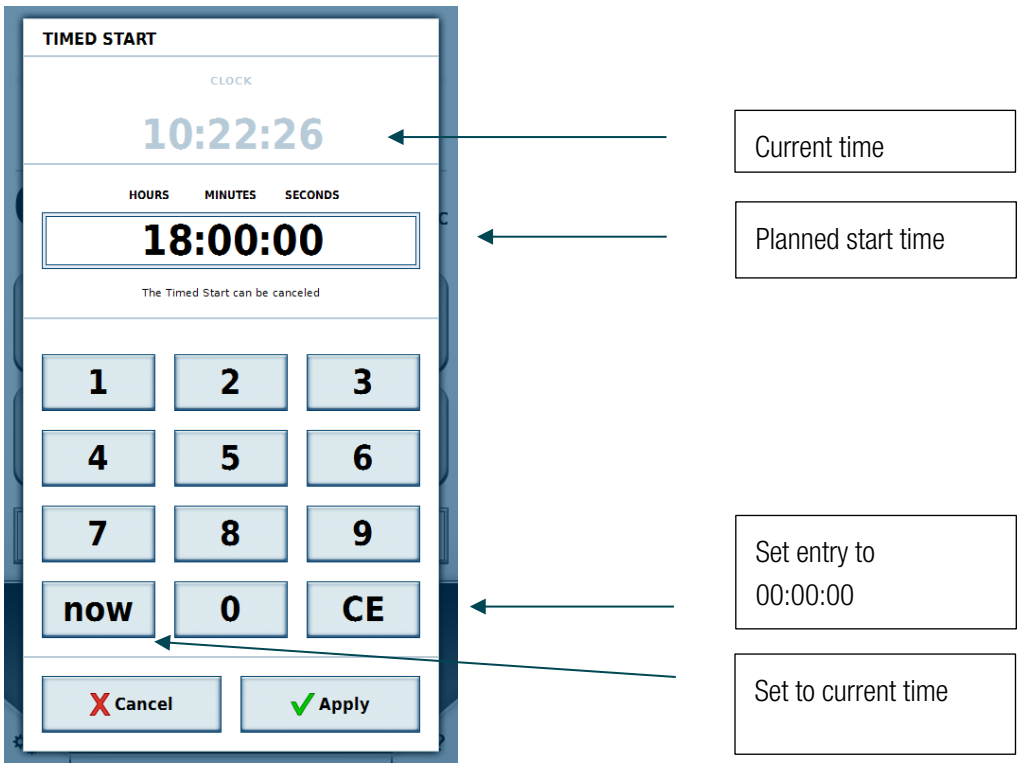
Here, all information related to the selected program can be viewed. If this program is currently active, the symbol appears beside the name. In this screen, you can activate timed starts for user-defined programs.

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.



New/Edit

Pressing one of these buttons opens the program editor. Here, you can specify the set values of a program (see Program Editor section).

The **Edit** button is available when an existing user-defined program is selected and the user currently logged in has the required authorization.

Predefined programs cannot be edited.

Loading

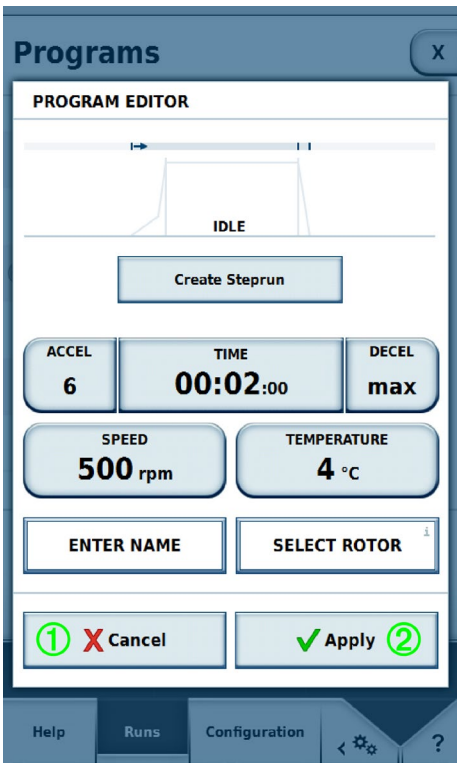
To load the selected program, press the **Load** button. Once it is loaded the main screen appears. The values contained in the program are used as the set values.

Import/Export

Programs can be imported and exported using a USB stick.

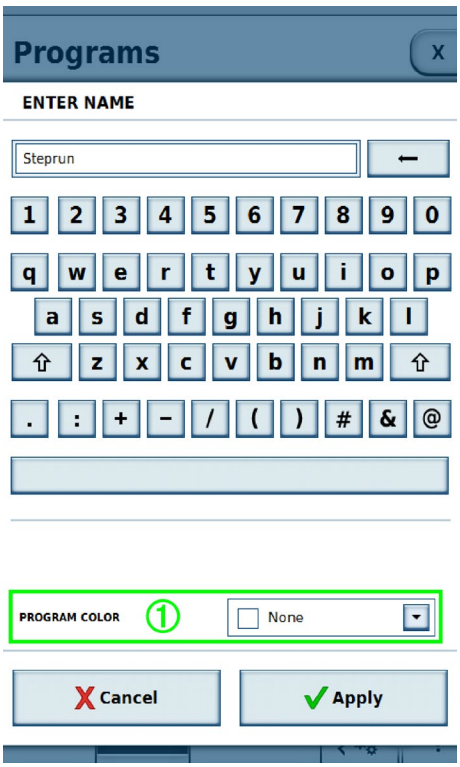
Program Editor

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 (see Entering Set Values section).



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.

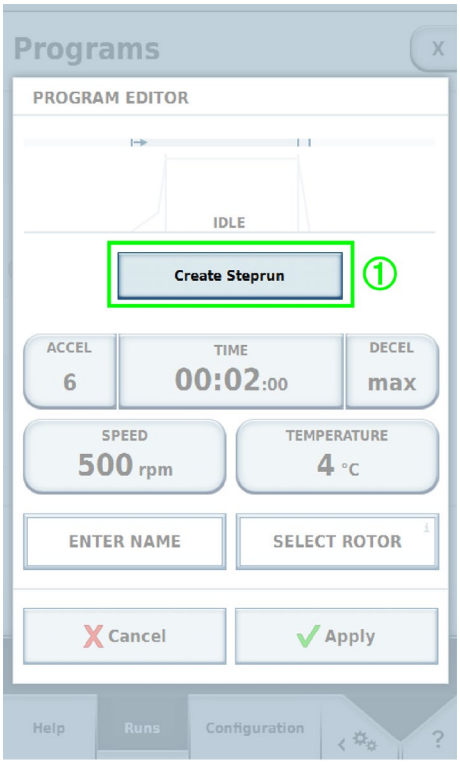


Below the keyboard, you can assign a barcode and a color to the program ①. The barcode can be used in GMP mode to select the program using a barcode scanner. The selected color appears in the program overview and in the detail view. Assigning a color is optional and serves solely to aid recognition of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

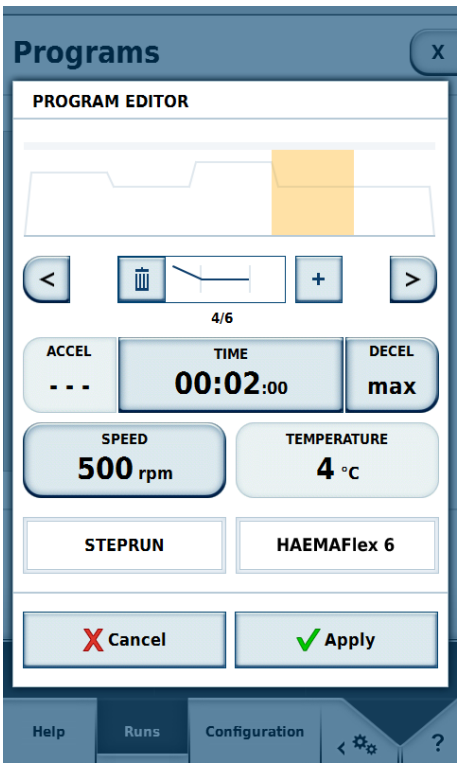
Pressing **Select Rotor** displays a list of all rotors stored in the system. Here, a rotor (and where applicable a bucket) must be chosen that is suitable for the program.

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.

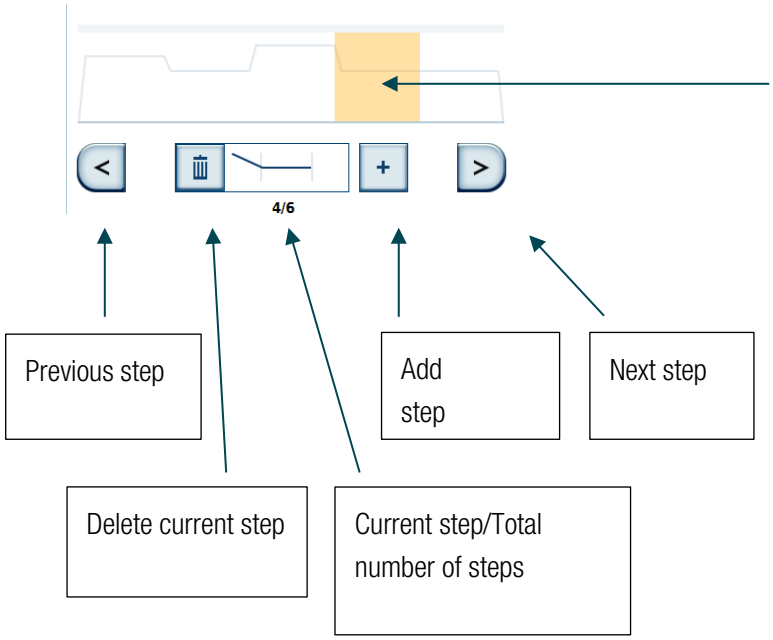


Each step has its own values for time and speed. Where one step has a lower speed than the next, an acceleration profile can be chosen. Where the previous step is at a higher speed than the next, a deceleration profile can be chosen.

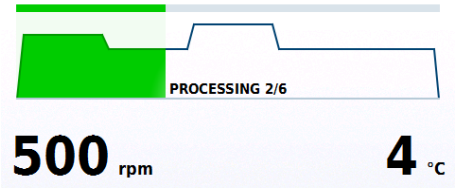
The following parameters cannot be specified for individual steps; they can only be changed while editing the first step:

- 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.

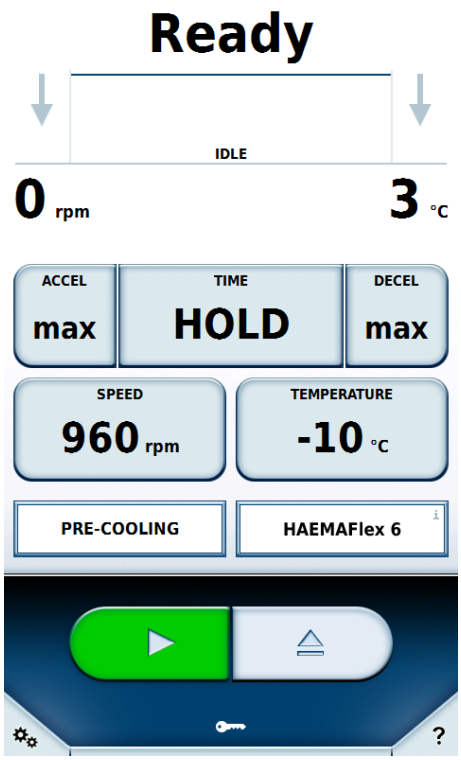


The curve displayed in the progress display is determined by the speeds specified for the individual steps. The higher the curve, the higher is the speed.



Pre-cooling

To prevent samples being damaged by temperatures that are too high or too low, a pre-tempering program is provided.

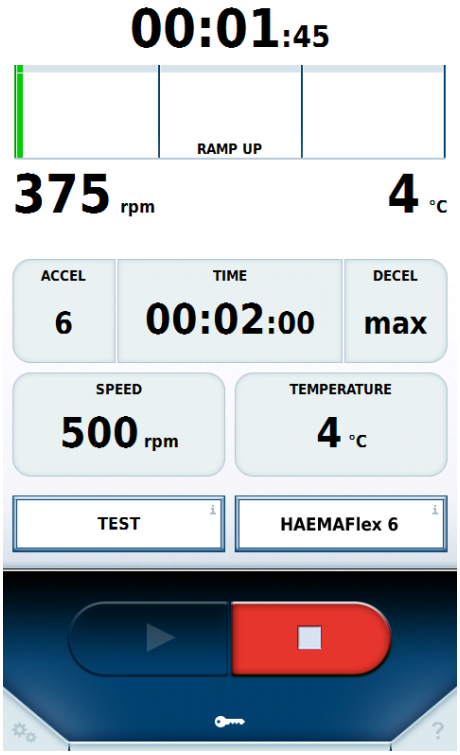


This brings the rotor chamber to the temperature specified as the set value. Only the temperature parameter can be changed in the set value entry for this. All other values are calculated automatically.

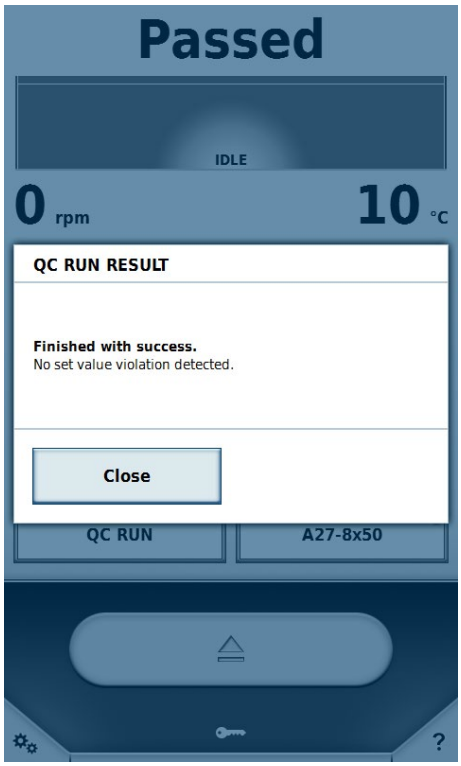
QC Run

In this predefined program, all the programs created by the user are run in sequence.
Only those programs to which the appropriate rotor is assigned are included in the run. Programs based on HOLD mode are not included. The programs are sorted in descending order by temperature and in ascending order by speed.

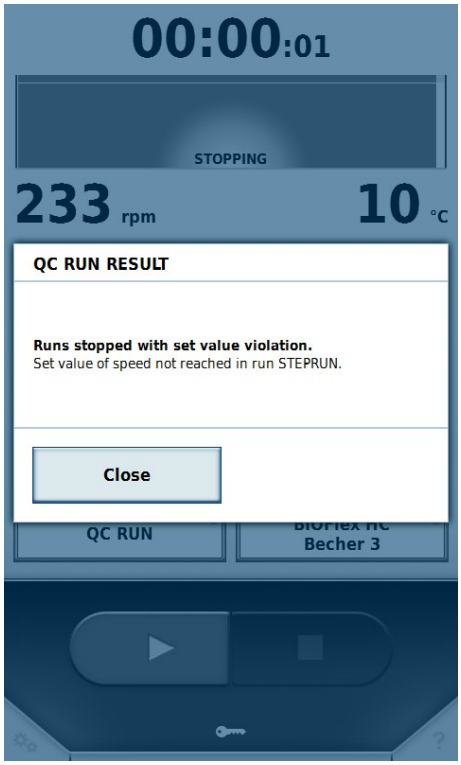
During execution of a QC run, a check is made whether the set values of the individual programs can be achieved. The functionality is tested and any potential malfunctions are detected.



If the temperature is not reached by the end of a program or a step in a steprun, the program or step is repeated. If by the end of a program or a step in a steprun the required speed is not achieved, the QC run is abandoned.



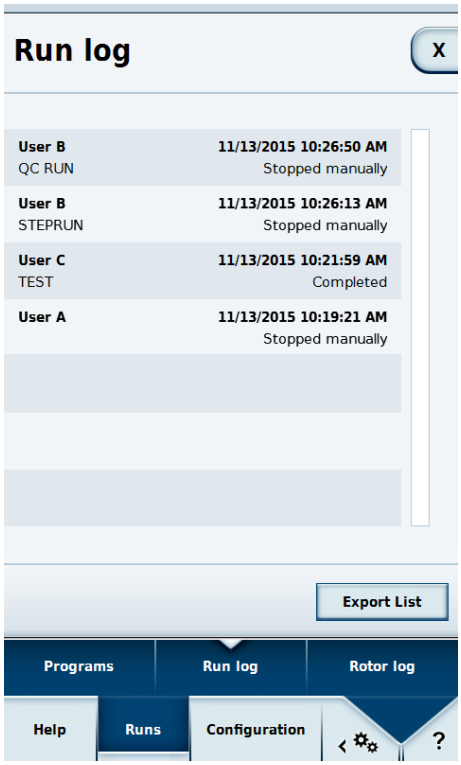
If the set values are achieved by the end of a program, the QC run moves on to the next valid program. This continues until an error occurs or until all valid programs have been executed.

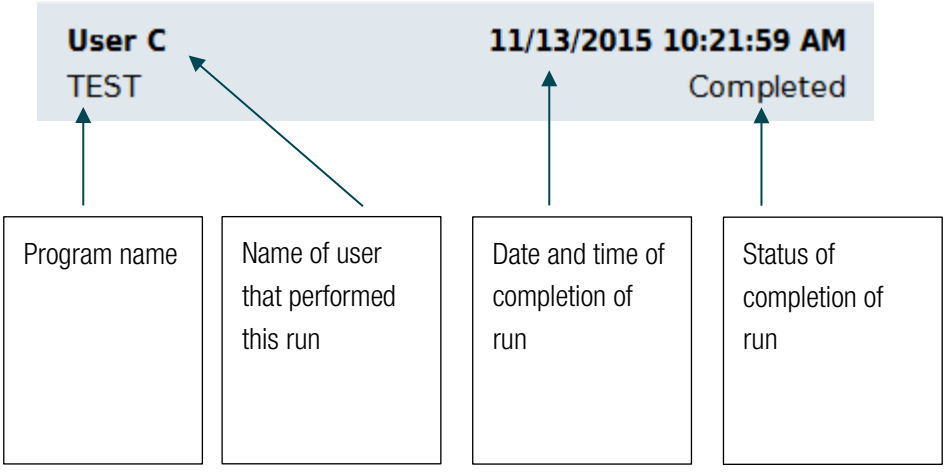


On completion of the QC run the user is informed of the result.

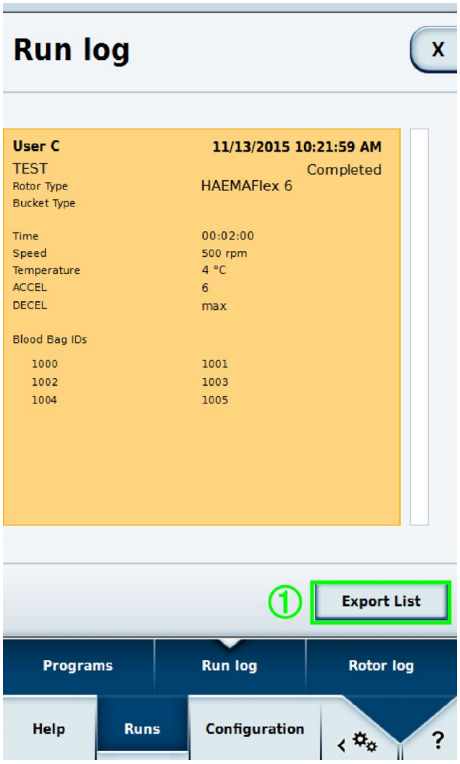
6.2.2 Run Log

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 blood bags 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 ①. Valid file formats for export are CSV and PDF.

Polaris Run Report

11/13/2015 11:01:57 AM

User	**User C**	
Device	**My Centrifuge**	
Program	**TEST**	
Rotor Type	**HAEMAFlex 6**	
Bucket Type		
Rotor ID		
Bucket IDs		
Blood Bag IDs	**1000**	**1001**
	1002	**1003**
	1004	**1005**
Run State	**Completed**	
Errors	**None**	

Run Info

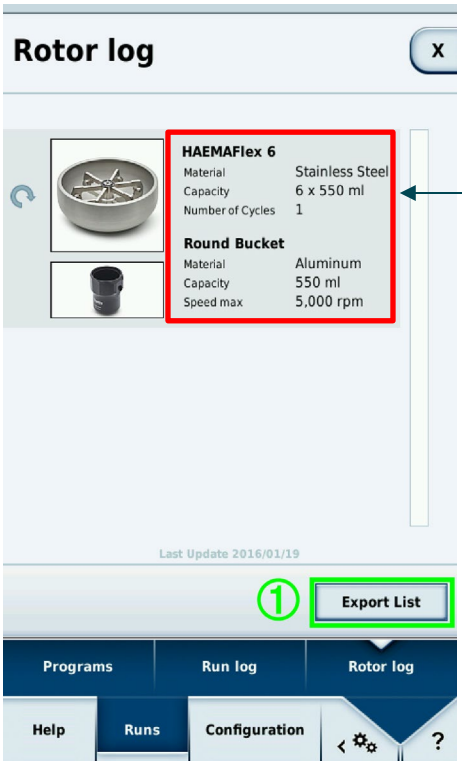
Start	**11/13/2015 10:19:53 AM**
End	**11/13/2015 10:21:59 AM**
Single Program	
Acceleration Profile	**6**
Deceleration Profile	**max**
Speed	**500 RPM**
Time	**00:02:00**
Temperature	**4 °C**

6.2.3 Rotor Log

Information regarding the rotor and buckets to be used are stored in the rotor log.

The symbol appears beside the rotor currently inserted. In addition to the rotor data, the number of runs previously performed with this rotor in this centrifuge is displayed.

Rotor protocols can be exported to a USB stick connected to the device using the **Export List** button ①. The file format for export is CSV.



Rotor information

6.3 Configuration

6.3.1 Users

To control access to the centrifuge, users can be created. If either **Protected by User PIN** is set or **User ID Logging** is set to **Mandatory User Logging** or **Optional User Logging** in the settings, such created users are necessary.

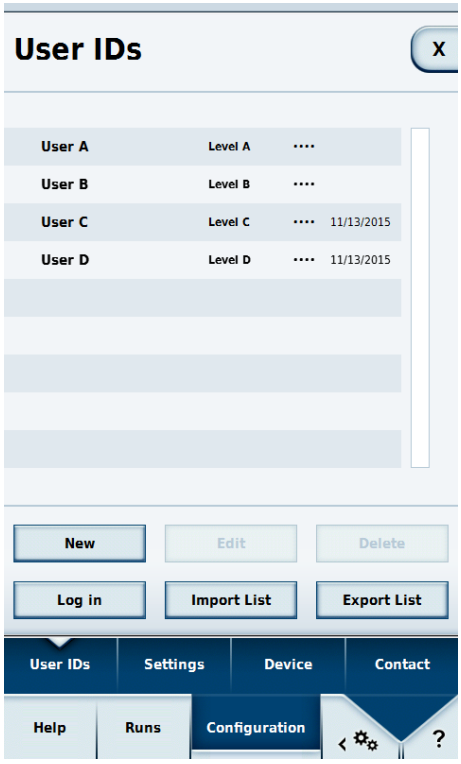
Access Level

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.

Managing Users

The options in this menu vary depending whether **Protected by User PIN** is active or not.

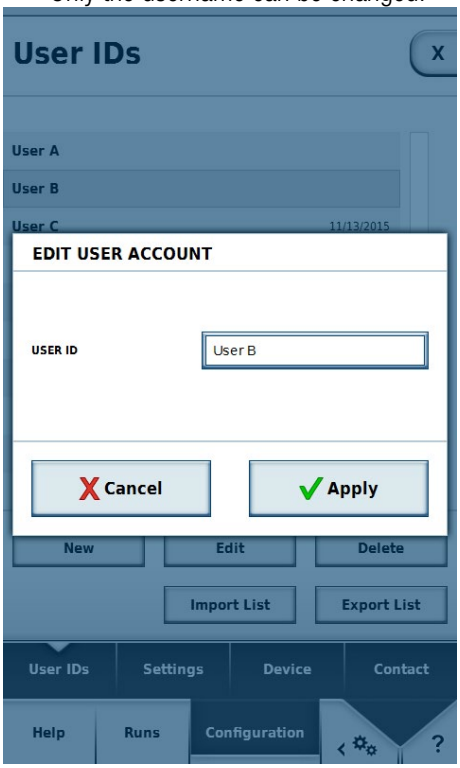


1. **New**

   Creates a new user

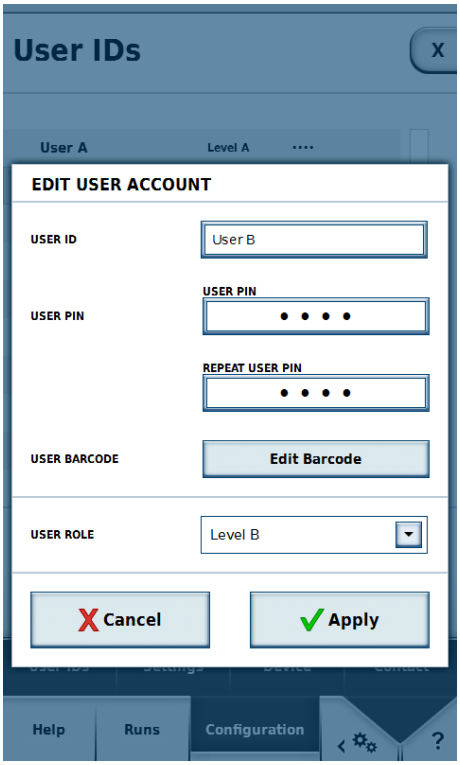
   a. **Protected by User PIN** disabled

      Only the username can be changed.



   b. **Protected by User PIN** enabled

      Username, PIN code, barcode and user level can all be modified.



2. **Delete**
   Deletes individual users
3. **Log In**
   The selected user is logged in once the PIN code is entered. This button is only available where **Protected by User PIN** is enabled.
4. **Import/Export**
   User data can be exported onto a USB stick and imported from this.

6.3.2 Settings

Here, the behavior of the centrifuge and the operating software can be modified. To change a setting, the master passcode must first be entered. The factory preset master passcode is 12345. Once this has been entered, all further changes can be performed without entering the master passcode again until the menu is closed.

Access Control

1. Protected by User PIN
   If this option is active, a user must be logged in in order to be able to start the centrifuge.
   If this option is not active, no user login is required in order to start the centrifuge.
   Only when this option is activated can 2, 3 or 4 be selected.
   Only when this option is disabled are 5 and 6 available.

2. User may change PIN
   If this option is active, users currently logged in can change their own PIN.

3. Lock after start
   Once a centrifugation run has started, the operating controls are disabled. Making a change to the set values, say, or stopping the process, are only possible by first unlocking the controls by entering the PIN of the logged-in user.

4. Logout
   For this option there are three possibilities:
   a. Never
      The user is never automatically logged out.
   b. After Run
      The user is logged out on completion of the current run.
   c. 5 Minutes After Run
      The user is logged out after 5 minutes of inactivity following a run.

5. Instrument Access Level
   Here, you can specify which access level is set for the centrifuge. All users can only work at the user level set here until it is changed.

6. User ID Logging
   In these three options you can specify how the user is reported in the run log:
   1. No User Logging
      No username is entered into the run log.
   2. Optional User Logging
      Before centrifugation begins the user is asked whether a username should be included in the log.
   3. Mandatory User Logging
      At the start of centrifugation the user must select a username that will be included in the log. No user PIN is required.

7. Master Passcode
   The master passcode for protecting the centrifuge can be changed here. It must be entered twice to prevent errors in entering the code.

Energy Options

Three options are available here.

1. Green mode
2. Balanced mode
3. Maximum availability

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.

Rotor + Buckets

If this is activated, rotors and buckets can be assigned barcodes for identification.

GMP Tracking Mode

The GMP documentation can be activated here (see GMP Documentation section).
If **Skipping enabled** is active, individual steps of the GMP procedure can be skipped.

Profile Set

The profile set can be converted to a different centrifuge type. During such conversion, all user-defined programs and the run log are deleted. This may result in changes to the selection options (see Acceleration and Deceleration Profile section).
To change a profile set, press **Load Profile Set**. Following a security prompt the profile set is converted.

Centrifugation Time

Here, you can enable the entry of seconds for the set values of run time.

Maintenance Messages

This enables the display of maintenance instructions.

Language

Here, you can select the language.
Languages available:

1. Bulgarian
2. Chinese
3. Danish
4. German

5. English
6. Estonian
7. Finnish
8. French
9. Greek
10. Italian
11. Japanese
12. Korean
13. Croatian
14. Latvian
15. Lithuanian
16. Dutch
17. Norwegian
18. Polish
19. Portuguese
20. Romanian
21. Russian
22. Swedish
23. Slovak
24. Slovenian
25. Spanish
26. Czech
27. Turkish
28. Hungarian
29. Serbian

When importing data, note that only data that has been exported with the same language setting can be imported.

Date

Changes the date. The format depends on the language selected.

Time

Changes the time. The format depends on the language selected.

Brightness Control

This control adjusts the screen brightness.

End of run alert

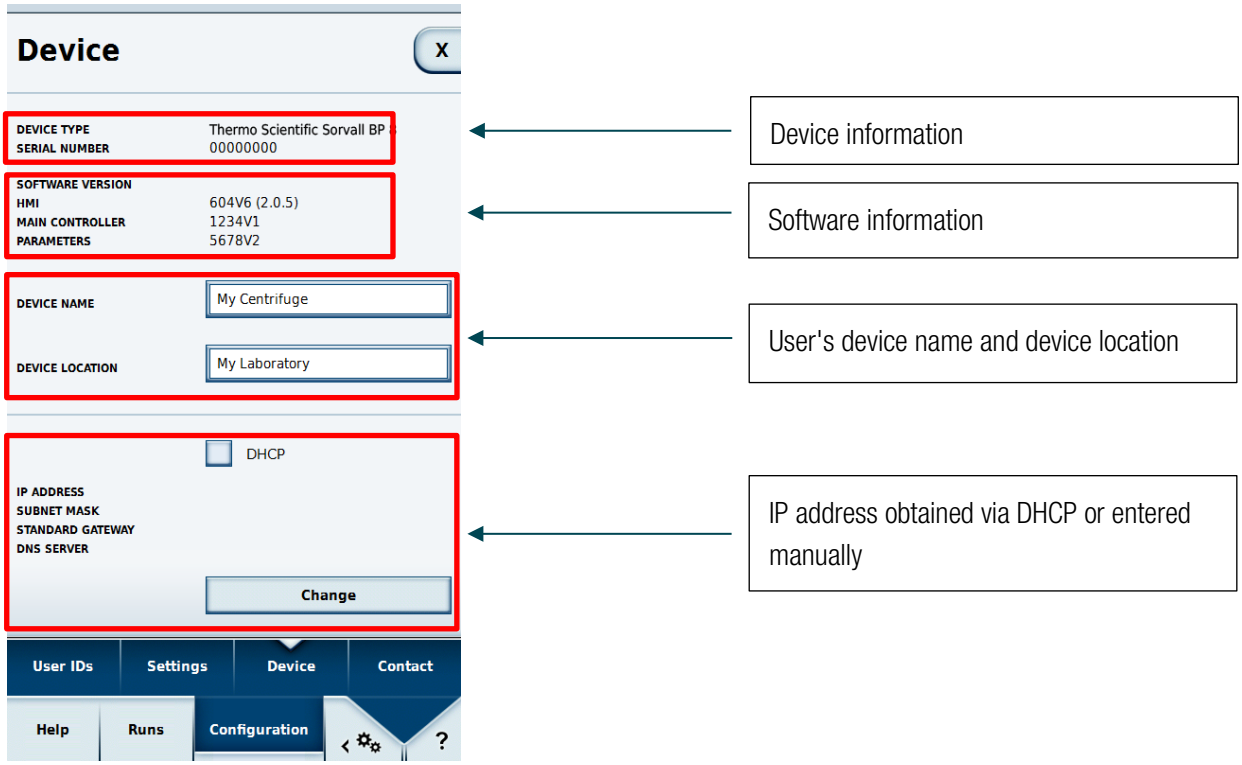
Sets the audio signal indicating the end of a run.

Remote Control

Manages access to the centrifuge via an external device such as a smartphone.

6.3.3 Device

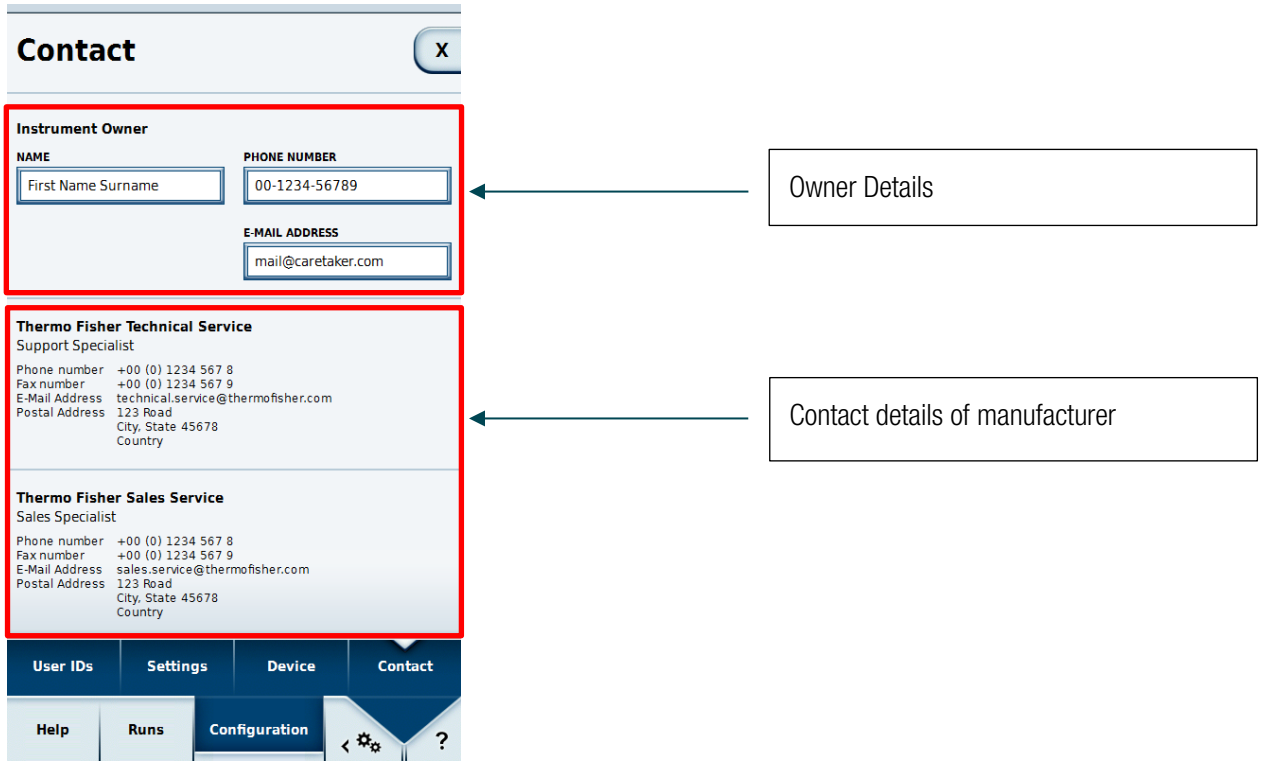
This contains information and network settings for the centrifuge unit.



To change network settings the master passcode is required (see Settings section).

6.3.4 Contact

Contact details can be viewed and entered here.



The Owner Details section includes fields for the owner's name, telephone number and e-mail address. The master passcode is required to change this information. This information is only displayed on this machine. Should a fault occur, the person named here can be informed.

7 Thermo Scientific Centri-Vue Application

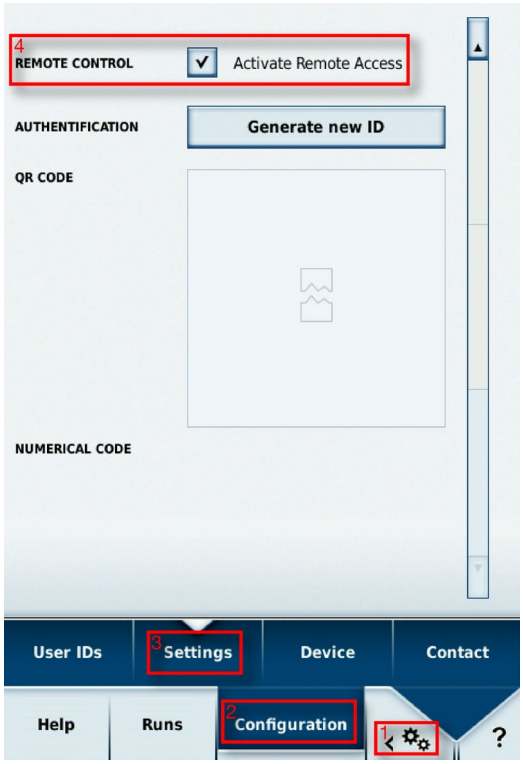
7.1 Requirements

- Thermo Scientific centrifuge with Thermo Scientific Centri-Touch User Interface software
- Thermo Scientific™ Centri-Vue™ application
- Local Area Network (LAN)

7.2 Quick Guide

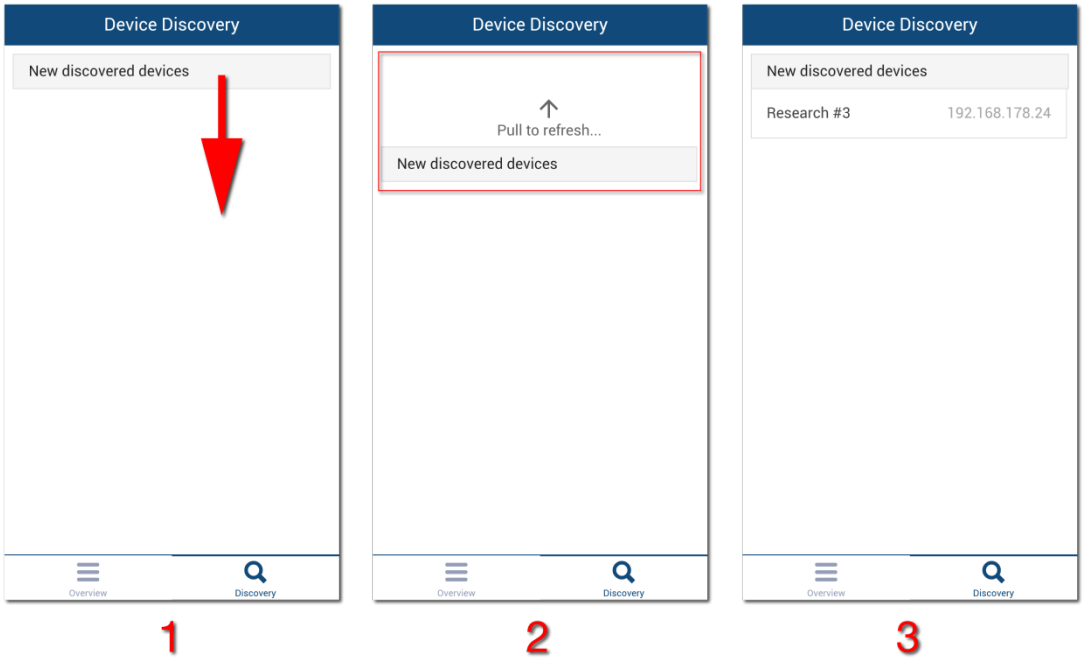
This quick guide describes the steps how to connect the centrifuge with the Centri-Vue application.

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).

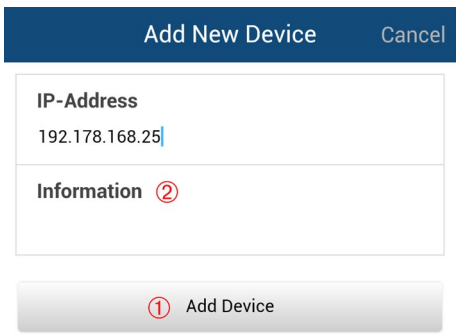


3. Download and install the Centri-Vue application on your smartphone.
4. Smartphone and centrifuge have to be in the same LAN with the same IP range.
5. Start the Centri-Vue application.
6. Select **Discovery** Screen.

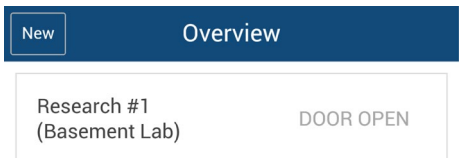
7. Open the **New Discovered Devices** list in the discovery menu to search for new centrifuges in the network (Step 1 and 2).



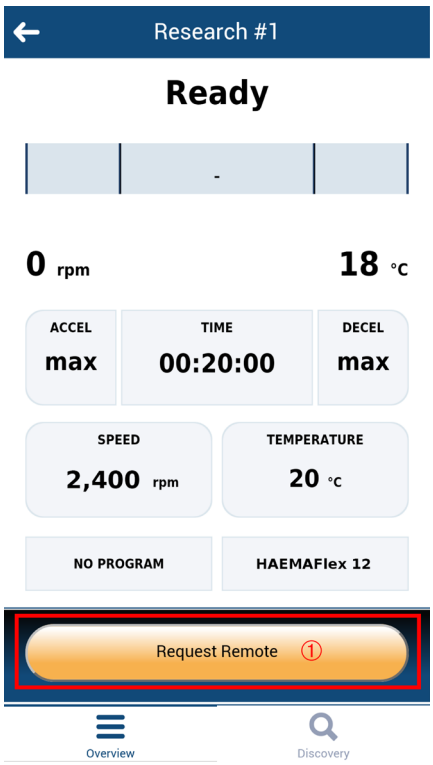
8. Centrifuges with installed Connectivity Plug-In will be identified automatically in the same LAN (Step 3).
9. Select the identified centrifuge.
10. Select **Add Device** ① to add the centrifuge to the device list in the overview menu.
    Optional: You can add some additional information about the centrifuge. Select the **Information** field ②.



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

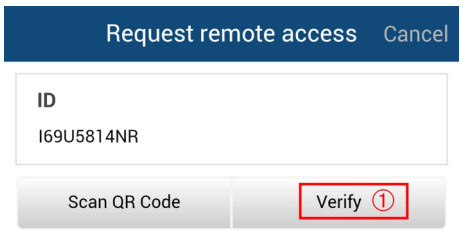


12. Select the added centrifuge entry to switch to detail view.
13. For remote control select **Request Remote** ① in detail view.

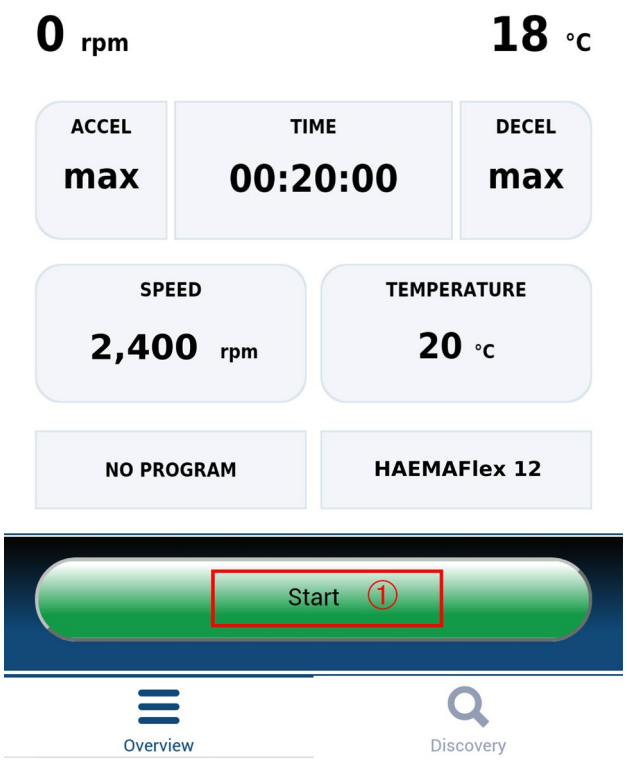


14. Generate a new Remote ID. Select **Generate new ID** ① in the settings screen.

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** ①.



17. If you have remote access to the centrifuge the start button is green ①.



7.3 Connectivity Plug-In (Touchscreen User Interface)

7.3.1 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.

7.3.2 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.

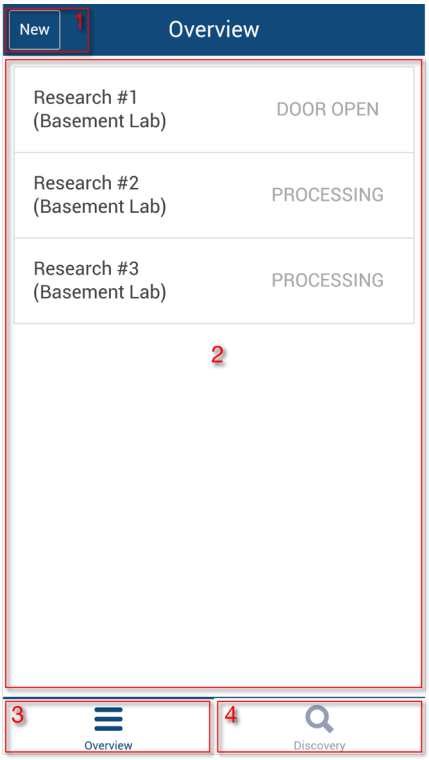
7.4 Centri-Vue App

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.

7.4.1 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)

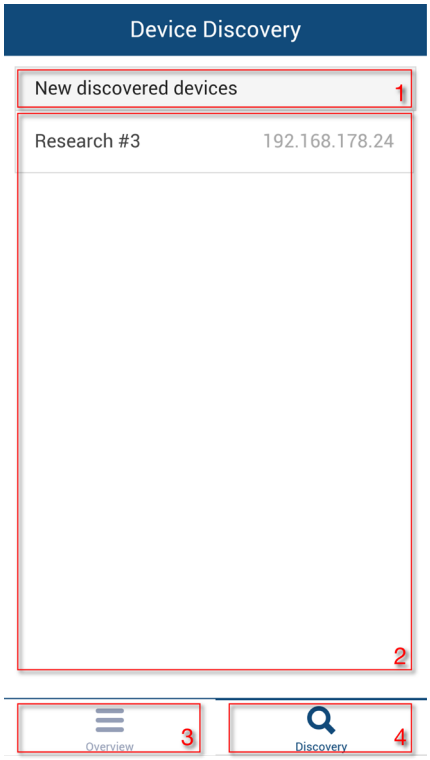
- "ACCELERATING (if the centrifuge accelerates)
- "RUNNING (if the centrifuge is running)
- "STOPPING (if the centrifuge decelerates)
- "COMPLETE (when a run has been completed successful)
- "STOPPED (If a run get canceled)
- “POWER DOWN“ (centrifuge is switched off)

  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.

7.4.2 Discovery Menu

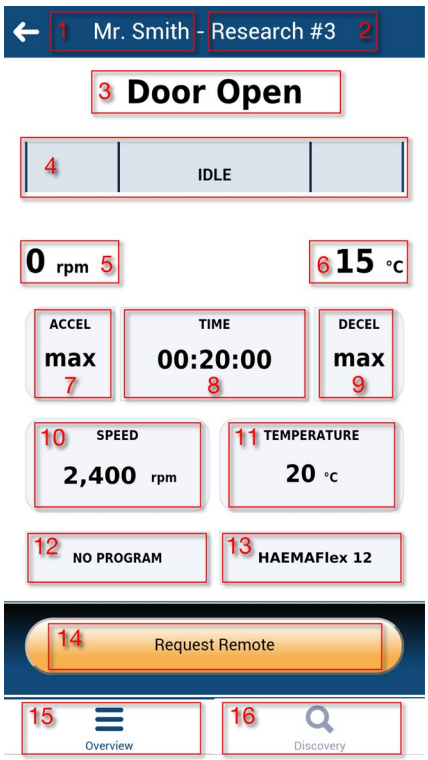
1. New discovered devices: To start a new discovery, open the item list.
2. List view: all centrifuges found in the network will be displayed. For each centrifuge following information is shown:
   a. Name of the centrifuge
   b. IP address of the centrifuge
3. Select **Overview** to switch to the overview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



7.4.3 Detail View

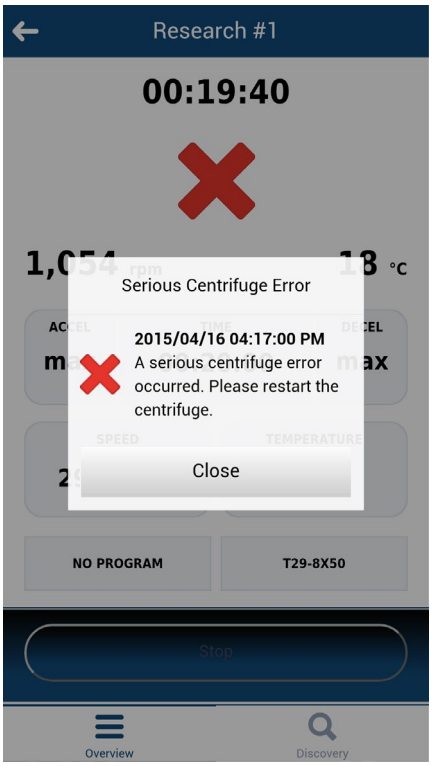
To enter the detail view of a locally stored centrifuge, select a centrifuge entry. The detail view is very similar to the main screen of the touchscreen user interface software and shows the current values of the centrifuge (at a refresh rate of one second). All parameters are read only, they can only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



7.4.4 Adding a Centrifuge

Search on Network

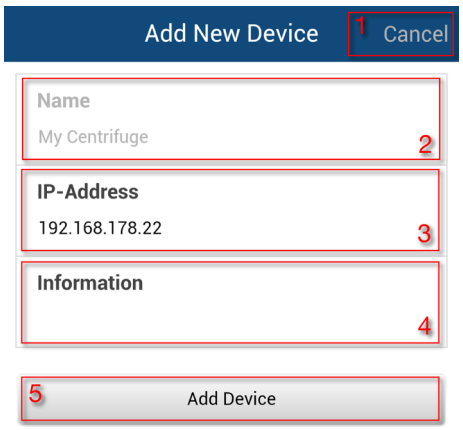
If the IP address of the centrifuge is not known, the centrifuge can be discovered with discovery functionality. Follow the provided steps:

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 succesful, the application switches to the overview menu and shows the added centrifuge.



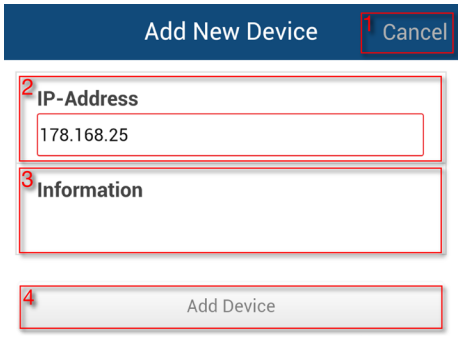
Add Manually

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:

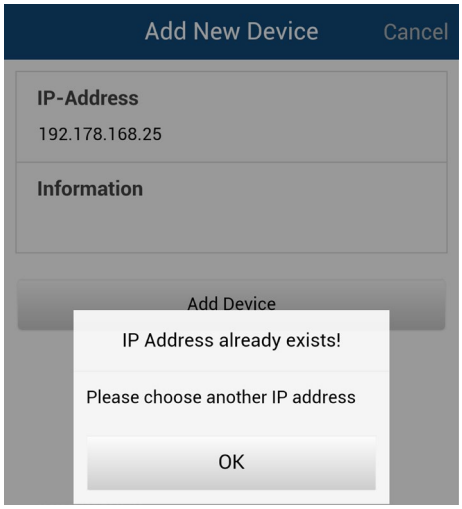
1. Cancel: closes the “Add New Device” menu without saving.
2. IP-Address: the IP address will be entered automatically if available.
3. Information: additional information can be entered in order to better identify the centrifuge later.
4. Add device: selecting this button adds the centrifuge in the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



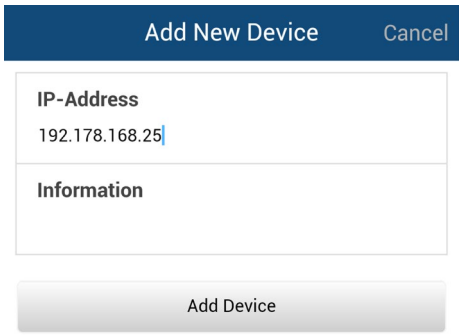
Error Adding Centrifuges

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.



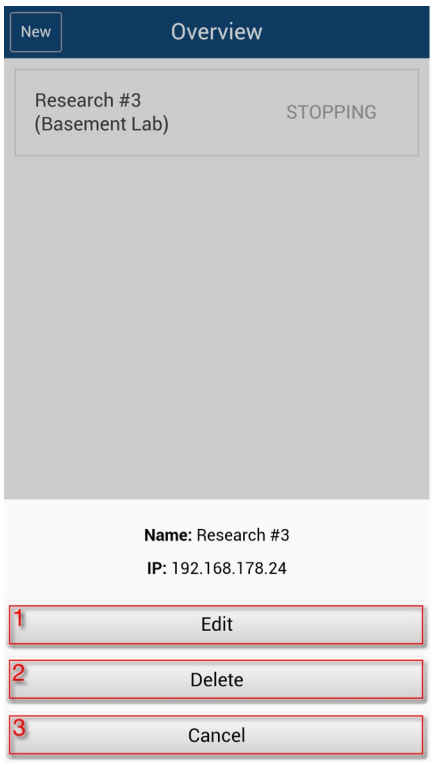
2. The IP address has no valid format. The entered IP address must have the format (x.x.x.x). In addition, only numbers may be included. If an IP address is entered in an invalid format the outline turns red and the add device button will be disabled.



7.4.5 Edit Centrifuge Entry

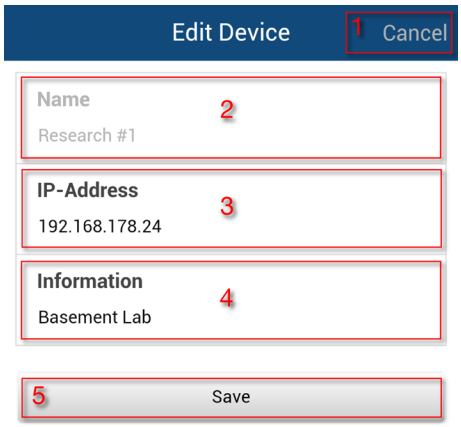
The centrifuge entries in the overview menu can be edited or deleted. To edit a centrifuge entry, select the entry and hold it (about 3 seconds). The edit menu will open with the following options:

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 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.



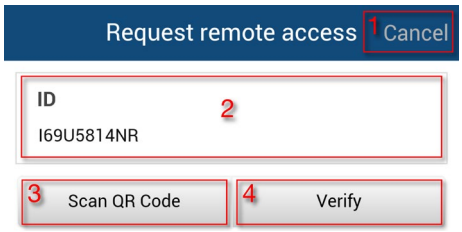
7.4.6 Remote Control

Prerequisites: The centrifuge was enabled for remote access.

Request Remote Access Menu

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

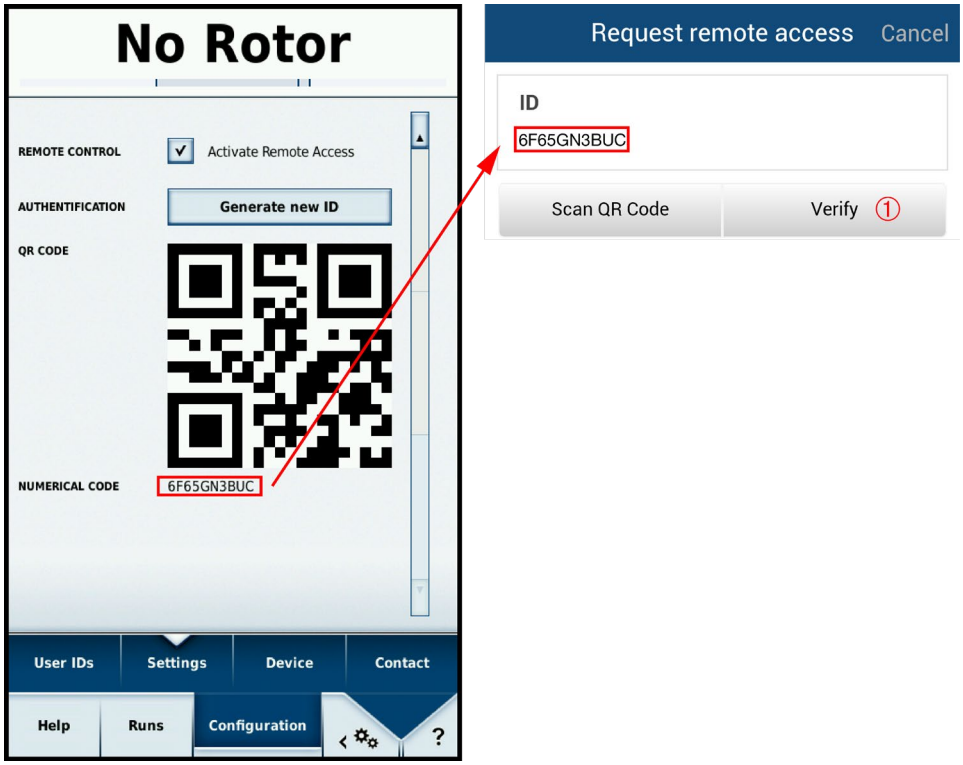
1. Select Cancel to return to the overview menu.
2. ID: the Remote ID from the centrifuge can be entered manually.
3. Scan QR-Code: opens the integrated QR-Scanner.
4. Verify: the entered or scanned code will be verified.



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** ①.



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

1. To scan the QR-code quickly and correctly, the phone must be held vertically over the QR-code.
2. The entire QR-code should be in the bright area of the scanner.
3. 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:

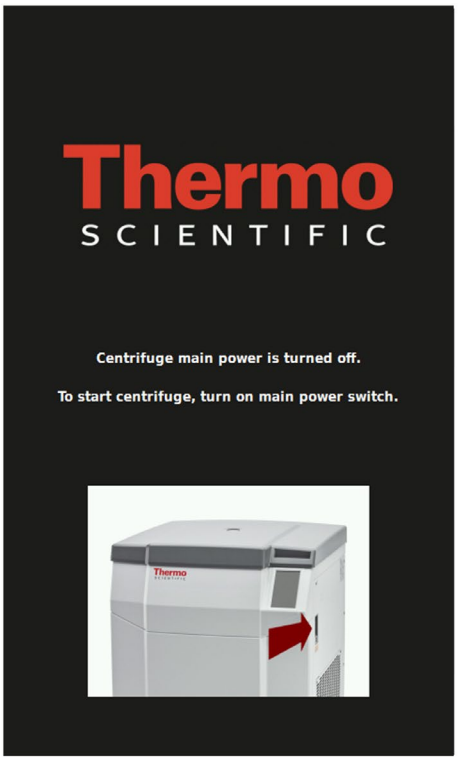
- A new remote ID is generated at the centrifuge.

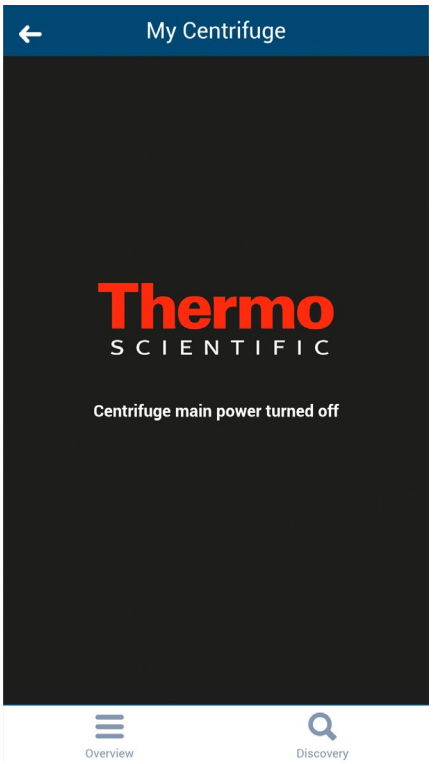
- Centrifuge without User login: If the centrifuge door has been opened, 5 minutes without interaction in the application on the smartphone or the centrifuge.
- Centrifuge with User login: If the current user is logged off (manually or automatically, depending on the selection of the combo box in the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

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

Connection to a Network with active PoE

The user interface of the centrifuge is a PoE[1] 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 port[2].

[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.

8 REST-Webserver

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

8.1 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

8.2 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:

- Centrifuge in RPM-Mode: *rpm* set, *rcf* contains the value *zero*
- Centrifuge 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": "Centrigue 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 scientific

Thermo Electron LED GmbH
Zweigniederlassung Osterode
Am Kalkberg, 37520 Osterode am Harz
Germany

thermofisher.com/centrifuge

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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.

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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

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50150733 is the original instruction manual.

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