

Figure 2-9: Turn the rotor knob

Before installing a rotor:

- Remove any dust, foreign objects or residue from the chamber, if necessary.
- Wipe the drive shaft and the rotor hub from the bottom side of the rotor with a clean cloth.
- Inspect the Auto-Lock and O-ring (Figure 2-11); both must be clean and undamaged.

To remove a rotor:



1. Press the Open button  on the home screen or  on the control panel to open the lid of the centrifuge.
2. Remove samples, adapters or buckets.
3. Grasp the rotor handle with both hands.
4. Press the Auto-Lock key and, at the same time, pull the rotor directly upwards and away from the drive shaft with both hands. Make sure you do not tilt the rotor while lifting it.



Figure 2-10: Pressing the Auto-Lock key

⚠ **CAUTION** Do not force the rotor onto the drive shaft. If the rotor is very light, it may be necessary to carefully press it onto the drive shaft with little force.

⚠ **WARNING** If the rotor cannot be properly locked in place after several attempts, then the Auto-Lock is defective and you are not permitted to operate the rotor. Check for any damage to the rotor: Damaged rotors must not be used. Keep the drive shaft area of the rotor clear of objects.

⚠ **CAUTION** Make sure that the rotor is properly locked on the drive shaft before each use by pulling at its handle.

Supplementary Information**CAUTION**

Unapproved or incorrectly combined rotors and accessories can cause serious damage to the centrifuge.

NOTICE

Some rotors may be too heavy to be handled by a single person. Assign a second person to assist when handling a heavy rotor. Refer to "Rotor Specifications" on page B-1 for the weight of a rotor.

The approved rotors are listed in the “Rotor Program” on page A-12. Operate the centrifuge only with rotors and accessories from this list. Make sure that all components of a rotor are safely fixed when carried.

The centrifuge is equipped with a Thermo Scientific™ Auto-Lock™ locking feature that automatically locks the rotor to the drive shaft.

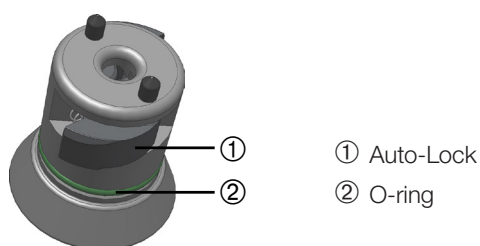


Figure 2-11: Auto-Lock on the drive shaft

2. 5. Load the Rotor

2. 5. 1. Assembling TX-400 Round Buckets and Adapters

When running a 75003655 round bucket with a 75003683 or 75003682 adapter make sure that you assemble the bucket and adapter correctly.

The adapters have a rounded key feature that fits into a matching slot in the bucket. If the key is not in the slot, the bucket cap will not close properly and the centrifuge will not start and may cause damage to bucket, adapter and the sample.

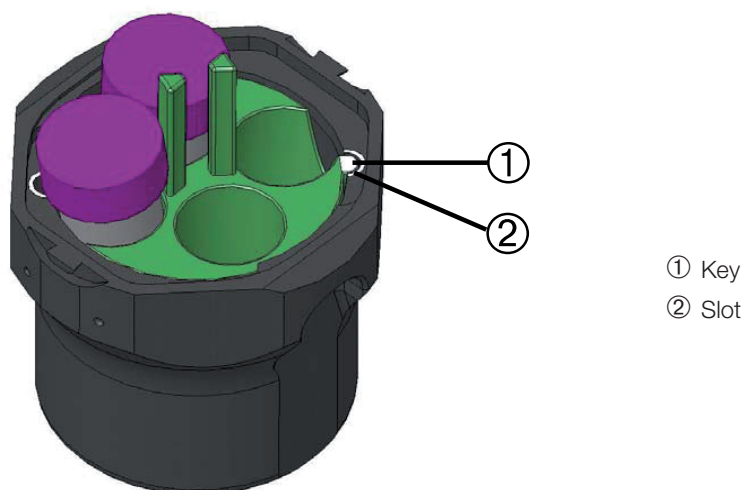


Figure 2-12: Slot and Key on Paired Buckets and Rotors

2. 5. 2. Balance Loading

Load the compartments evenly. Balance opposite loads.

When using swinging bucket rotors mind the following in addition:

- Weigh the bucket content (adapter and tube). Make sure you do not exceed the maximum compartment load nor the weight difference limit for adjacent buckets if there is one for the rotor.
- Make sure to install all buckets if using swinging bucket rotors.
Make sure you install an identical bucket type in opposite positions.
- If in doubt, contact Thermo Fisher Scientific customer service.

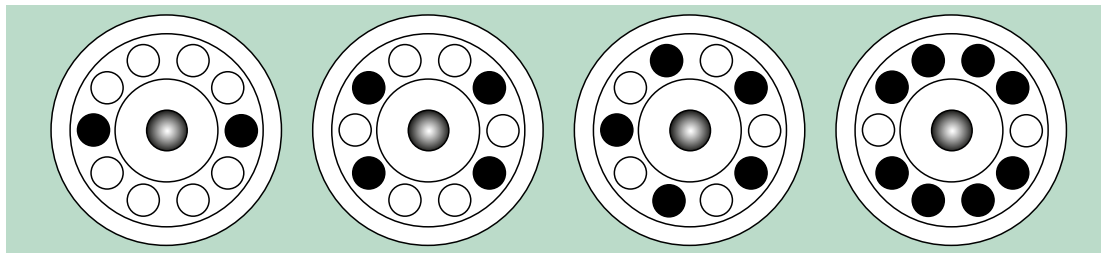
Correct Loading ✓

Figure 2-13: Correct loading examples for fixed angle rotors

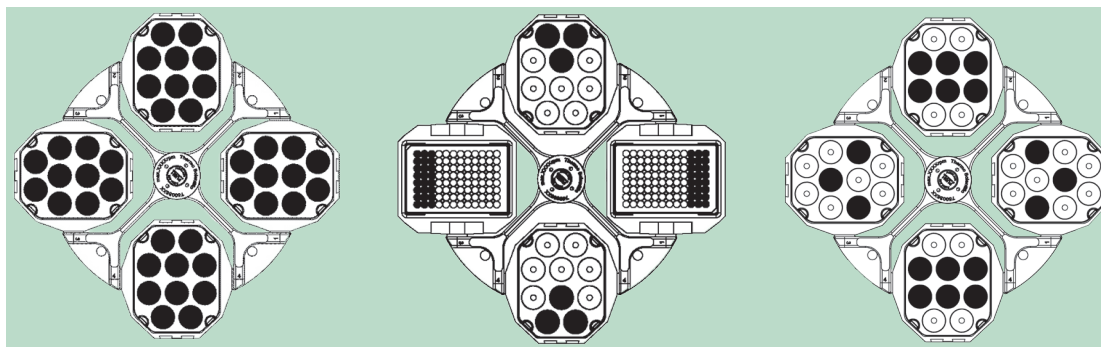


Figure 2-14: Correct loading examples for swinging bucket rotors

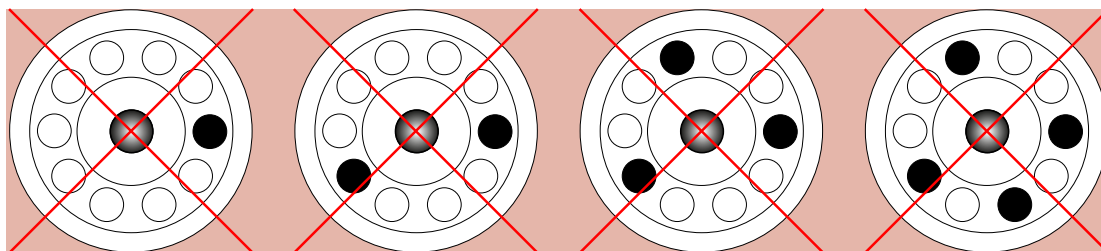
Incorrect Loading ✗

Figure 2-15: Incorrect loading examples for fixed angle rotors

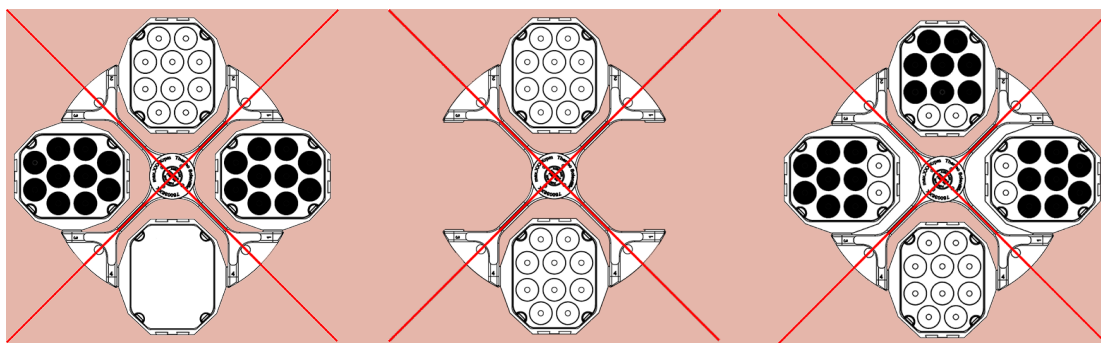


Figure 2-16: Incorrect loading examples for swinging bucket rotors

Before loading a Rotor

1. Inspect the rotor and all accessory parts for damage, such as cracks, scratches, or traces of corrosion.
2. Inspect the centrifugation chamber, drive shaft and Auto-Lock device for damage, such as cracks, scratches, or traces of corrosion.
3. Check the suitability of the rotor and other used accessories against the Chemical Compatibility Chart. Refer to "Chemical Compatibility" on page C-1.
4. Make sure that:
 - » tubes or bottles fit in the rotor.
 - » the tubes or bottles do not touch the rotor lid or bucket caps.
 - » buckets or microplate carrier can swing freely by moving them carefully with your hand.

**CAUTION**

Incorrect loading can lead to damage. Always load the rotor symmetrically to avoid imbalance, noisy spinning and possible damage. A full complement of buckets needs to be installed before operating a swinging bucket rotor.

**CAUTION**

When using an aerosol-tight rotor lid or bucket caps, verify that the sample tubes don't interfere with the rotor lid or bucket cap and don't compromise its sealing efficiency.

**CAUTION**

Always use 2 identical bucket types in opposite positions. Make sure that opposite buckets are of the same weight class, if a weight class is labeled on the buckets.

**CAUTION**

Tubes may open and break during centrifugation because they do not fit properly to the cavities.
Contamination may occur.
Make sure that the length and width of the tubes are fitting into the adapter and cavities. Do not use tubes that are too short or too thick for the adapter and the cavities.

2. 5. 3. Maximum Loading

Each rotor is designed to run with its maximum load at maximum speed. The safety system of the centrifuge requires that the rotor is not overloaded.

The rotors are designed to work with substance mixtures with a density of up to 1.2 g/ml. If the admissible maximum load is exceeded, the following steps need to be taken:

- Reduce the fill level.
- Reduce the speed.

Use the following formula or the table given for each rotor in the chapter "Rotor Specifications" on page B-1 to calculate the maximum admissible speed for a given load:

$$n_{\text{adm}} = n_{\text{max}} \sqrt{\frac{w_{\text{max}}}{w_{\text{app}}}}$$

n_{adm} = admissible maximum application speed

n_{max} = maximum rated speed

w_{max} = maximum rated load

w_{app} = applied load

RCF Value Explained

The relative centrifugal force (RCF) is given as a multiple of the force of gravity (g). It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed are used for calculation:

$$\text{RCF} = 11,18 \times \left(\frac{n}{1000} \right)^2 \times r$$

r = centrifuging radius in cm

n = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes, buckets and adapters used.

This can be accounted for in the calculation above if required.

2. 5. 4. Use of Tubes and Consumables

Make sure that the tubes and bottles used in the centrifuge are:

- rated to or above the selected RCF to be spun at,
- used at their minimum fill volume and not above their maximum fill volume,
- not used above their design life (age or number of runs),
- undamaged,
- fitting well into the cavities.

Please refer to manufacturers' data sheets for further information.

2. 6. Identify Rotor and Buckets

The centrifuge has a rotor detection that identifies an installed rotor. If a swing-out rotor is identified, the centrifuge prompts you to identify the bucket type installed in that rotor.

Rotor detection relies on a list of rotors stored in the memory of the centrifuge. If an unknown rotor is detected, please contact customer service. An update for that rotor list might be available to accommodate new rotor models.

To identify a newly installed rotor and its buckets using a centrifuge with a GUI:

After installing the rotor, close the centrifuge lid and start the centrifuge using the Start button ►. Wait for the "Rotor Detection" prompt to appear.

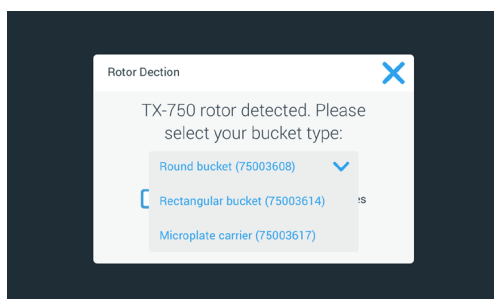


Figure 2-17: Rotor Detection: Choosing a Bucket Type for a TX-750 Rotor

- » Swinging bucket rotors with a choice of bucket types: Tap the **"buckets"** pop-up menu and choose the bucket type installed in your rotor.

If there is no need to confirm bucket type in the future—for example, because you use just one bucket type throughout, select the "Do not show this message again" checkbox.

This setting can be undone at any time using the "Bucket" setting, as explained in "Rotor Bucket" on page 3-40.

Tap the **Save** button to confirm your changes.

The rotor has been successfully detected, and the centrifuge is ready for use now.

The rotor detected by the centrifuge and the bucket type identified by the user appear.

If the rotor is unknown to the centrifuge, the "Unknown Rotor Detected" pop-up window will be shown. Tap the Cancel button to close this pop-up window, remove the unknown rotor, and replace it with a known type.

To identify buckets using a centrifuge with a LCD control panel:

Bucket selection is only possible for swing-out rotors. The bucket code corresponds to the last four digits of the bucket article number.

Proceed as follows to select the bucket type installed in the rotor:

1. Press the **+** or **-** button below the "Bucket" field of the LCD display window (see Figure 2-18) to select the correct bucket code for the buckets installed in your rotor.



Figure 2-18: Setting the Correct Bucket Code

2. Press the **Bucket** key repeatedly until the bucket code of the bucket being used is displayed.
3. Release the **+** or **-** button when the desired bucket code appears above the button.

Doing so selects the bucket code for future centrifugation runs (until the next time you choose to change this setting).

2. 7. Set Basic Centrifugation Parameters

NOTICE

For more details on settings refer to “Graphical User Interface” on page 3-1 or to “LCD Control Panel” on page 4-1.

Set Speed / RCF-Value

The centrifuge lets you set speed in rpm or as an RCF value (see “RCF Value Explained” on page 2-9). You may set speed either from within an ongoing centrifugation run (centrifuge running) or for the next centrifugation run (centrifuge at standstill).

Set Run Time

The centrifuge lets you set a run time after which the centrifugation run stops automatically.

Acceleration and Deceleration Profiles

The centrifuge offers a total of 9 acceleration profiles (numbered 1 through 9) and total of 10 deceleration profiles or braking curves (numbered 0 through 9) for centrifuging samples with a selected speed profile. An acceleration profile gradually increases the speed of the centrifuge after starting the centrifugation run. A deceleration profile gradually reduces the speed of the centrifuge towards the end of the centrifugation run.

NOTICE Avoid if possible speed ranges close to natural resonances of the system. Runs at resonance speeds may have show vibration and an adverse effect on the quality of separation.

Set Temperature

A refrigerated centrifuge allows for preselecting a temperature for the sample between -10 °C and +40 °C for the centrifugation run. This feature is not available on ventilated models.

2. 8. Pre-Temper the Centrifugation Chamber

Refrigerated centrifuges allow for pre-tempering, that is pre-warming or pre-cooling, the centrifugation chamber and the empty rotor before the centrifugation run starts. If necessary pre-temper your samples using proper equipment. The centrifuge is not intended to be used to pre-temper your samples.

NOTICE Ventilated models cannot pre-temper the centrifugation chamber.

2. 9. Centrifugation



WARNING

Damage to health from centrifuging explosive or flammable materials or substances. Do not centrifuge explosive or flammable materials or substances.







CAUTION

Due to air friction sample integrity may be affected.
The temperature of the rotor may rise significantly while the centrifuge is spinning.
Ventilated units lead to a heat up of the rotor above the ambient temperature.
Refrigerated units can have a deviation from displayed and set temperature to the sample temperature.
Make sure the centrifuge temperature control capabilities meet your application specification. If necessary make a test run.

Mind the safety zone of minimum 30 cm around the centrifuge. Refer to “Safety Zone” on page 1-2. Persons and hazardous substances must be kept out of this safety zone while centrifuging.

Once the main switch has been turned on, the rotor has been properly installed, the setpoints have been set as explained in the previous section, and the centrifuge lid has been closed, you are ready to start.





You have various options to start a centrifugation run with a GUI:

- **Continuous Mode:** This is a fully manual mode. If you have chosen Continuous Mode instead of a preset runtime (see “Set Run Time” on page 3-8), use the Start button  and Stop button  to start and stop centrifugation manually, as explained in the section “Run in Continuous or Timed Mode” on page 3-12 further below.
- **Timed Mode:** This is a semi-automatic mode that relies on a timer. If you have preset a runtime (see “Set Run Time” on page 3-8), tap the Start button , then and wait for the timer to expire and the centrifuge to stop automatically, as explained in the section “Run in Continuous or Timed Mode” on page 3-12.
- **Pulse Mode:** This is a short-run centrifugation mode with selectable behaviors. You choose a behavior, then tap the Pulse button  and wait for the centrifuge to run and stop automatically, as explained in the section “Run in Pulse Mode” on page 3-13.
- **Program Mode:** This is a fully automatic mode. You prepare and save an automated program, then run it from the touchscreen, as explained in the section “Automate Processes Using Programs” on page 3-20.

NOTICE

For more details on settings refer to “Graphical User Interface” on page 3-1.

You have various options to start a centrifugation run with a LCD control panel:

- **Continuous Mode:** This is a fully manual mode. In Continuous Mode you use the **Start** key  and **Stop** key  to start and stop centrifugation manually, as explained in the section “Continuous Operation” further below.
- **Timed Mode:** This is a semi-automatic mode that relies on a timer. If you have preset a runtime (see “4. 2. 2. Set Run Time” on page 4-3), you press the **Start** key , then wait for the timer to expire and the centrifuge to stop down automatically.
- **Program Mode:** This is a fully automatic mode. You prepare and save an automated program, as explained in the section “Setting Up and Saving a Program” on page 4-6, then run it by pressing the appropriate program selection key .

NOTICE

For more details on settings refer to “LCD Control Panel” on page 4-1.

2. 10. Aerosol-Tight Applications

2. 10. 1. Basic Principles

Make sure that the sample containers are well suited for the desired centrifugation process.



CAUTION

Aerosol-tight rotors and tubes may only be opened in an approved safety work-bench when centrifuging dangerous samples. Mind the maximum permissible load.



CAUTION

Be sure to check all sealings before starting any aerosol-tight applications.

2. 10. 2. Fill Level

Do not fill the tubes beyond a safe level to prevent the sample from reaching the top of the tube during centrifugation. To be on the safe side, fill the tubes only to 2/3 of the rated level.

2. 10. 3. Aerosol-Tight Rotor Lids

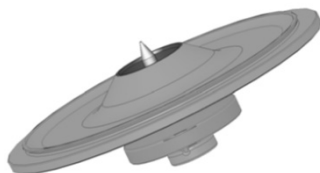


Figure 2–19: Lid of an aerosol-tight rotor with mandrel

Placing O-ring

The O-ring fulfills its purpose best, when it is neither excessively stretched nor bulged. The O-ring shall be equally placed in the groove of the lid.

Place the O-ring as follows:

1. Place the O-ring above the groove.
2. Push the O-ring on two opposite places into the groove. Make sure the rest of the O-ring is equally distributed.
3. Push the centers of the loose parts into the groove.
4. Push the remaining O-ring into place.

NOTICE If the O-ring seems to be too long or too short, take it off the lid and repeat the process.



CAUTION

When using an aerosol-tight rotor lid, verify that the sample tubes do not interfere with the rotor lid and compromise its sealing efficiency.



CAUTION

Rotors supplied with a lid for aerosol-tight applications come with a mandrel as an accessory to the Auto-Lock device. Be sure not to place the lid on this mandrel. The lid may be damaged.

2. 10. 4. Aerosol-Tight Rotor Buckets

Aerosol-tight Closure with ClickSeal

1. If necessary, grease the lid joint before closing the lid. Use grease (76003500) for this.
2. Raise the latch.
The cap can now be easily placed on the bucket.
3. Lower the latch to close the bucket aerosol-tight; be sure the latch clicks into place.
Make sure that both sides of the latch are closing the bucket cap.

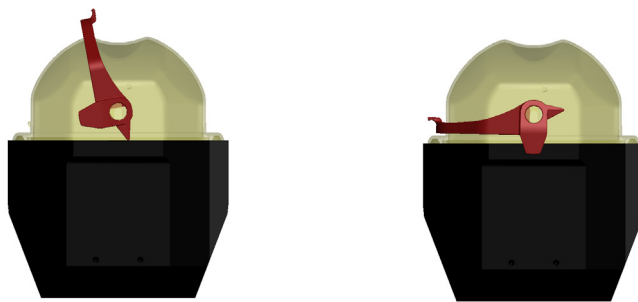


Figure 2-20: Bucket with open lid (left) and closed lid (right)



CAUTION

If the latch is not flipped down, the caps could be damaged during centrifugation. If the latch has not clicked into place, the bucket is not aerosol-tight. Never lift the bucket at its latch.



CAUTION

Make sure that the length of tubes used allow proper closing of the bucket cap. Otherwise the bucket will not be aerosol-tight.

2. 10. 5. Checking the Aerosol-Tightness

The aerosol-tightness testing of the rotors and buckets depends on the microbiological test process in accordance with the EN 61010-2-020 Appendix AA.

Whether or not a rotor is aerosol-tight depends primarily on proper handling.

Make sure that your rotor is aerosol-tight.

The careful inspection of the seals and seal surfaces for signs of wear and damage such as cracks, scratches and embrittlement is extremely important.

Aerosol-tight applications are not possible if the rotor is run without the lid.

Aerosol-tightness requires the correct operation when filling the sample vessels and closing the rotor lid.

Quick Test

As a quick test, it is possible to test the aerosol-tightness using the following process:

1. Lubricate all seals lightly.

Always use the special grease (76003500) when lubricating the seals.

2. Fill the bucket with approx. 10 ml of carbonated mineral water.
3. Close the bucket as explained in the handling instructions.
4. Shake the bucket vigorously using your hands.

This releases the carbonic acid gas which is bound in the water, resulting in excess pressure. Do not apply pressure to the lid when doing so.

Leaks can be detected by escaping water or the sound of escaping gas.

Replace the seals if you detect any leaks. Then repeat the test.

Dry the rotor, rotor lid and the cover seal.

⚠ CAUTION Prior to each use, the seals in the rotor are to be inspected in order to assure that they are correctly seated and are not worn or damaged. Damaged seals are to be replaced immediately. Replacement seals can be re-ordered as a spare part ("Rotor Specifications" on page B-1). When loading the rotor, ensure that the rotor lid closes securely. Damaged rotor covers are to be replaced immediately.



CAUTION

This quick test is not suited for validating the aerosol tightness of a rotor. Check the seals and sealing surfaces of the lid thoroughly.

3. Graphical User Interface

This chapter contains details for centrifuges with the graphical user interface described in this manual. Pictures shown are examples and may be different in details to your experience – for example the home screen for a ventilated unit does not feature an on-screen button entry for entering temperature.

3.4.2 Lietimui jautrus ekranas

3.1. Overview

The Graphical User Interface (GUI) is a color touchscreen display unit. The touchscreen is subdivided into four main screen regions. Figure 3–1 presents the arrangement of the screen areas described in the following.

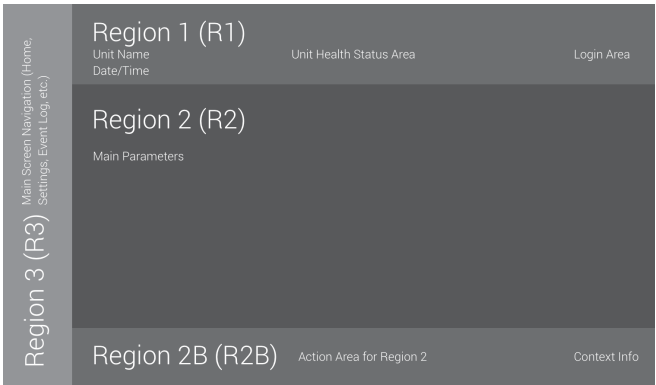


Figure 3–1: Screen Areas

The four screen areas offer the following features:

- The “Info & Health Status” area (Region 1 in Figure 3–1 above) shows the name of the centrifuge, the current date and time, the unit’s overall health status, and a login area when password protection is activated. For an overview, “Info & Health Status Area (Region 1)” on page 3-2.
- The “Main” screen (Region 2 in Figure 3–1 above) displays the main operating parameters of the unit, including current speed, speed setpoint, acceleration and deceleration profiles, temperature, and current runtime as well as runtime setpoint. When alarms or reportable events occur, this part of the display screen shows alarm or event information. For an overview, “Main Screen (Region R2)” on page 3-2.
- The “Control Panel” (Region 2B in Figure 3–1 above) has touch-sensitive buttons for controlling the major functions of the unit, such as pre-tempering (refrigerated models only), pulse, stop, open lid, and information. For an overview, “Control Panel (Region R2B)” on page 3-5.
- The navigation bar (Region R3 in Figure 3–1) holds iconic shortcuts to settings screens. Tapping any of these icons displays the settings screen in the “Main” screen area. For an overview, “Navigation Bar (Region R3)” on page 3-5.

Figure 3–2 shows the touchscreen display for a ventilated centrifuge.

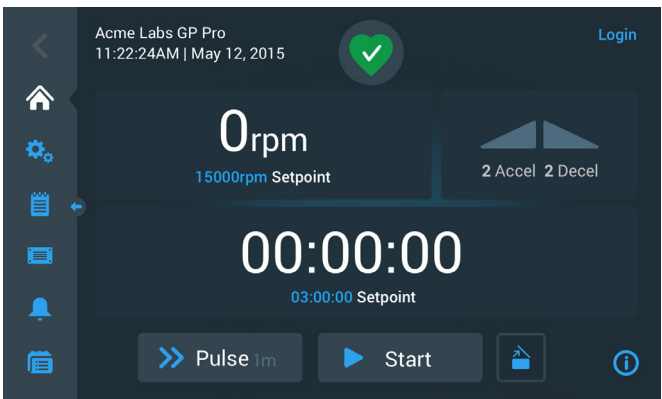


Figure 3–2: Touchscreen Display for Ventilated Centrifuge

Figure 3–3 shows the touchscreen display for a refrigerated centrifuge, which has an additional button and a temperature field.



Figure 3-3: Touchscreen Display for Refrigerated Centrifuge

Info & Health Status Area (Region 1)

The “Info & Health Status” area at the top of the display window appears in all screen displays. Figure 3-4 shows an example of the “Info & Health Status” area on a unit that is in proper working condition.



Figure 3-4: Info & Health Status Area

The “Info & Health Status” area displays the following information:

- Unit Name (top left in Figure 3-4), as entered during the initial setup (see “Initial Startup” on page 1-12) or adjusted later on (“Unit Name” on page 3-44).
- Date/Time (bottom left in Figure 3-4), as entered during the initial setup (see “Initial Startup” on page 1-12) or adjusted later on (“3. 7. 4. Date” on page 3-42 and “Time” on page 3-43).
- The Unit Health Status icon (center in Figure 3-4) is a touch-sensitive area that opens a “Health Status” pop-up window on top of the “Main” Screen. Four different icons may appear in this place, representing the overall health status of the centrifuge:

	The heart-shaped Health Status Good icon indicates that the unit is in proper operating condition. For more details, “3. 5. Status, Alarms and Alerts” on page 3-14.
	The triangle is a health status warning icon. It indicates that there is an issue that does not stop the centrifuge immediately, yet requires the operator’s attention soon. For more details, “3. 5. Status, Alarms and Alerts” on page 3-14.
	The bell Health Status Alarm icon indicates that there are one or more major alarm conditions that need to be corrected because they may constitute a hazard to the operator, the unit itself, or the samples. The white digit in the blue circle indicates how many alarms exist. The sound waves on both sides of the bell indicate that the alarm is sounding. For more details, “3. 5. Status, Alarms and Alerts” on page 3-14.
	The Health Status Alarm icon indicates that there are one or more major alarm conditions that need to be corrected because they may constitute a hazard to the operator, the unit itself, or the samples. The white digit in the blue circle indicates how many alarms exist. The diagonal line across shows that the alarm has been snoozed. For more details, “3. 5. Status, Alarms and Alerts” on page 3-14.

- The “Login” prompt (top right in Figure 3-4) appears only if the unit is set up to operate in “Secure Mode” (“3. 6. 3. Access Control” on page 3-32).

Main Screen (Region R2)

The “Main” screen takes up the main part of the touchscreen and displays the content selected by tapping an icon in the navigation bar at left. The navigation bar lets you navigate to the full set of screens you need for operating and setting up the centrifuge.

Home Screen

Figure 3–5 shows the “Home” screen and its icon in the navigation bar.

The “Home” screen is the default screen from where you run all routine centrifuge operations. It has touch-sensitive fields and buttons that let you set speed, runtime, pre-tempering target temperature (refrigerated models only), start and stop the centrifuge, as well as open the lid.

Figure 3–5 below shows an example of the “Home” screen when the centrifuge is in idle mode, with all running parameters at zero and the lid open. The setpoints for the major operational parameters are already set, so the centrifuge can be started after closing the lid.

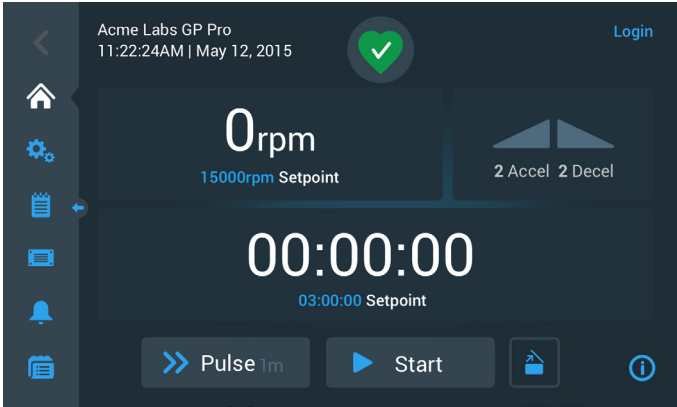


Figure 3–5: Home Screen for Idle Centrifuge

3.4 Valdymas

3.4.1 Mikroprocesorinis

3.4.2
Lietimui jautrus ekranas

Figure 3–6 and Figure 3–7 illustrate the “Home” screen when the centrifuge is running. The major operational parameters (speed, runtime and pre-tempering temperature) are at their current values.

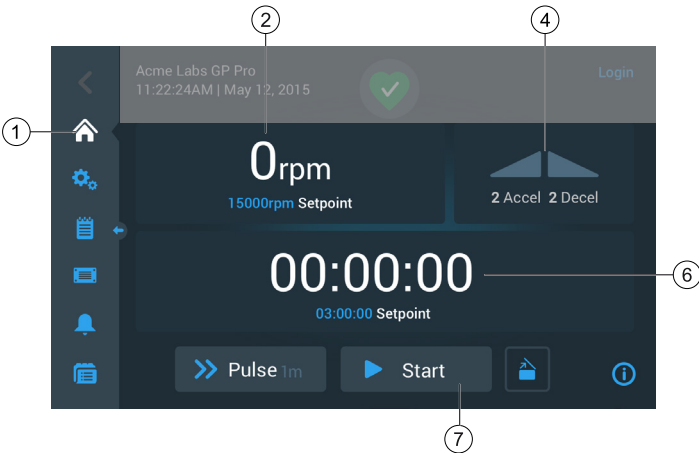


Figure 3–6: Home Screen for Running Centrifuge, Ventilated Models

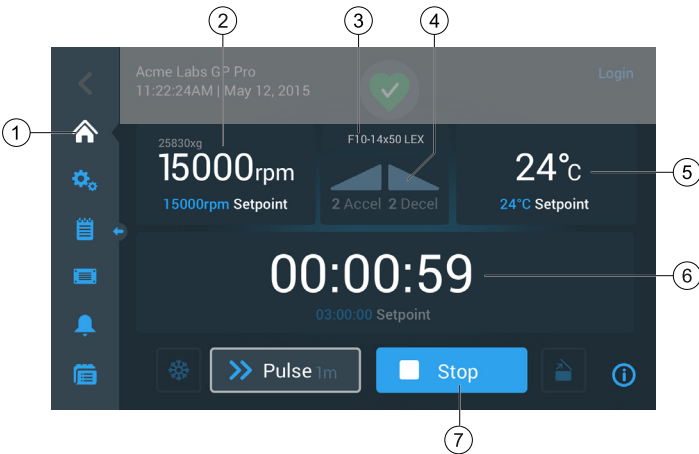


Figure 3–7: Home Screen for Running Centrifuge, Refrigerated Models

1	The Home button opens the “Home” screen shown in Figure 3–6 and Figure 3–7.
2	The speed box shows the current speed (top) and the speed setpoint (bottom) for the ongoing or upcoming centrifugation run. Tapping the speed box lets you set the speed setpoint and toggle the unit between rpm and x g. For more details, see “Overview” on page 3-1.
3	The rotor type / bucket type box shows the rotor type and bucket type installed. With certain rotor models, the rotor identification feature of the centrifuge will prompt you to confirm the bucket type before the centrifugation starts. For more details, see “Identify Rotor and Buckets” on page 2-10.
4	The acceleration / deceleration profile box shows the currently selected profile numbers for acceleration during startup or deceleration during rundown. Tapping the acceleration / deceleration profile box lets you choose an acceleration / deceleration profile. For more details, see “Acceleration and Deceleration Profiles” on page 3-9 .
5	The temperature box (refrigerated models only) shows the current temperature for the sample (top) and the pre-tempering setpoint (bottom) for the ongoing or upcoming centrifugation run. Tapping the temperature box lets you set the setpoint for pre-tempering. For more details, see “Pre-Temper the Centrifugation Chamber” on page 3-11.
6	The runtime box shows the remaining runtime (top) and the runtime setpoint (bottom) for the ongoing or upcoming centrifugation run. Tapping the runtime box lets you set the runtime in hours, minutes, and seconds. For more details, see “Set Run Time” on page 3-8.
7	The Start/Stop button starts and stops the centrifuge. The functions of the buttons are explained in the section “Control Panel (Region R2B)” on page 3-5.

Settings Screen

The “Settings” screen shown in Figure 3–8 is the point of entry for all settings you make to customize the centrifuge to your needs. You can display this screen by tapping the **Settings** icon from the navigation bar.

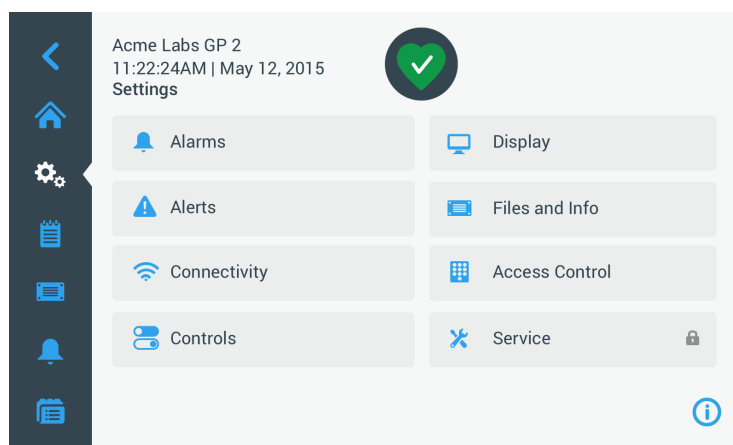


Figure 3–8: Settings Main Screen

The settings options for the centrifuge include:

- Alarms
- Alerts
- Controls
- Display
- Files and Info
- Access Control
- Service

Control Panel (Region R2B)

The “Control Panel” in Screen Region R2B contains a complete set of controls for operating the functions of the centrifuge. The inventory of buttons varies with the number of options built into the unit, as can be seen in Figure 3–9 and Figure 3–10.

The “Control Panel” is visible at all times below the “Home” Screen.

Figure 3–9 shows the “Control Panel” for a ventilated centrifuge.

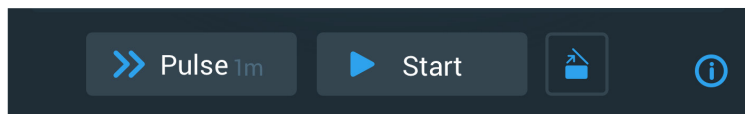


Figure 3–9: Control Panel for Ventilated Centrifuge

Figure 3–10 shows the “Control Panel” for a refrigerated centrifuge.

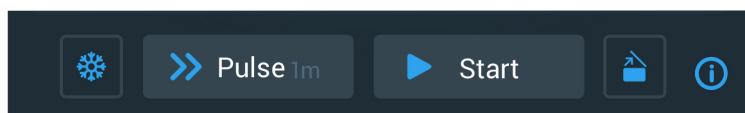


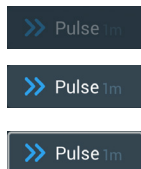
Figure 3–10: Control Panel for Refrigerated Centrifuge

The icons on the control panel are grayed out while inactive and surrounded by a light gray frame while the function is in use. A frame dimmed to dark gray, as shown for the Pulse and Start buttons in the examples above, indicates that the function is available, but currently not in use. Functions that are currently working are identified by a light gray frame around the button, as shown with the Pretemp icon shown in Figure 3–10.



Tapping the Pretemp button and then the Start button starts pre-tempering of the centrifugation chamber to the target temperature previously set in the temperature box of the home screen. Tapping the Pretemp button one more time stops pre-tempering. This button is deactivated (left) when the centrifuge is running, activated (center) when the centrifuge is at standstill, and surrounded by a gray frame (right) while pre-tempering is ongoing.

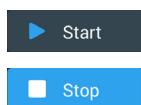
For more details, see “Pre-Temper the Centrifugation Chamber” on page 3-11.



The Pulse button launches a continuous or timed run of the centrifuge, as pre-selected in the centrifuge’s settings. Tapping the Pulse button one more time (or the Stop button) stops the centrifuge.

This button is deactivated (top) when the centrifuge is started using the Start button, activated for launching Pulse mode when the centrifuge is at standstill (center), and surrounded by a gray frame while the centrifuge is running in Pulse mode (bottom).

For more details, see “Run in Pulse Mode” on page 3-13. The behaviour of the button can be customized, see “Pulse Customization” on page 3-37.



The Start button starts the centrifuge immediately, using the settings made in the boxes of the “Home” screen. When the centrifuge is running, the button label changes to Stop. Tapping the button one more time stops the centrifuge run and reverts the button label to Start.

For more details, see “Centrifugation” on page 3-12.



The Open button unlocks and opens the centrifuge lid. This button is deactivated (left) while the centrifuge is running or pre-tempering, activated (center) for opening when the centrifuge is at standstill, and surrounded by a gray frame (right) while the lid is open.

Navigation Bar (Region R3)

Besides of the “Home” button described in the section “Main Screen (Region R2)” on page 3-2, the navigation bar holds icons for all major settings and the event logs of the centrifuge. Figure 3–11 shows the two states of the navigation bar.

By default the navigation bar (item 1 in Figure 3–11) is visible to the left of the “Home” screen. By tapping the **Show/Hide** arrow button (item 3 in Figure 3–11) in the middle, it can be hidden (item 2 in Figure 3–11) to show more of the “Home” screen. Tapping the **Show/Hide** arrow button again redisplay the navigation bar.

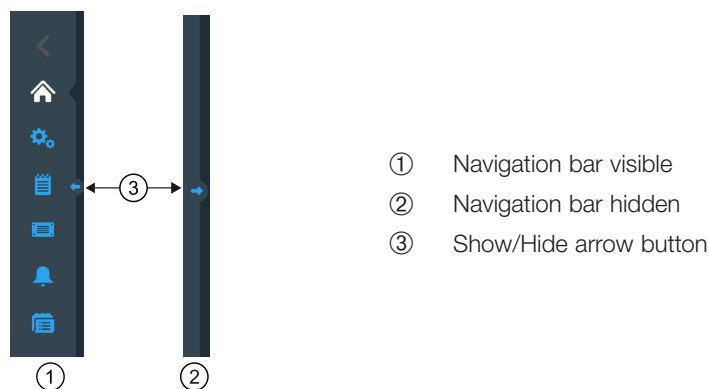


Figure 3-11: Navigation bar

The navigation bar has the following icons:

Icon	Function
	Back button: In multi-level menus, lets you run backwards through all screens previously displayed. For example, if you have tapped the Settings button, then opened another submenu, tapping this button will return you back up one level at a time. If there is no level to go back to, this icon is dark gray and not active. If there is a level to go back to, this icon is blue and can be tapped. This button is inactive and grayed out if you are on the “Home” Screen.
	Home button: Returns to the “Home Screen”, discussed in the section “Main Screen (Region R2)” on page 3-2.
	Settings button: Opens the “Settings” screen with various options for parameter settings; “Settings” on page 3-29.
	Event Log button: Opens a screen where you can view and export the event log of the centrifuge; “Logs” on page 3-44
	Files and Info button: Opens the “Files and Info” screen that provides product version information and allows administrators to perform a factory reset of the centrifuge; see “Files and Info” on page 3-50
	Alarm Settings button: Opens the “Alarm and Alerts Settings” screen where you can configure how alarms and alerts appear on screen; “3. 6. 1. Alarms” on page 3-29 and “Alerts” on page 3-31
	Programs button: Opens the “Programs” screen where you can program centrifugation runs; “Automate Processes Using Programs” on page 3-20.

Table 3-1: Navigation bar icons

3. 2. Set Basic Centrifugation Parameters

This section explains how to set up the centrifuge with speed / RCF values, acceleration and deceleration profiles, temperature (refrigerated models only) and other operating parameters.

3. 2. 1. Set Speed / RCF-Value

The centrifuge lets you set speed in rpm or as an RCF value (see “RCF Value Explained” further below). You may set speed either from within an ongoing centrifugation run (centrifuge running) or for the next centrifugation run (centrifuge at standstill).

NOTICE After the centrifuge is turned on, it shows the default selection made in the “Settings -> Setpoints” screen; see “Setpoints” on page 3-34.

RCF Value Explained

The relative centrifugal force (RCF) is given as a multiple of the force of gravity (g). It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed are used for calculation:

$$RCF = 11,18 \times \left(\frac{n}{1000} \right)^2 \times r$$

r = centrifuging radius in cm

n = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes, buckets and adapters used.

This can be accounted for in the calculation above if required.

Proceed as follows to set a speed or RCF value:

1. Tap the speed box on the “Home” screen.

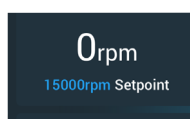


Figure 3-12: Speed Box on Home Screen

The “Setpoints: Standard” screen shown in Figure 3-13 or “Setpoints: Advanced” screen shown in Figure 3-14 appears.

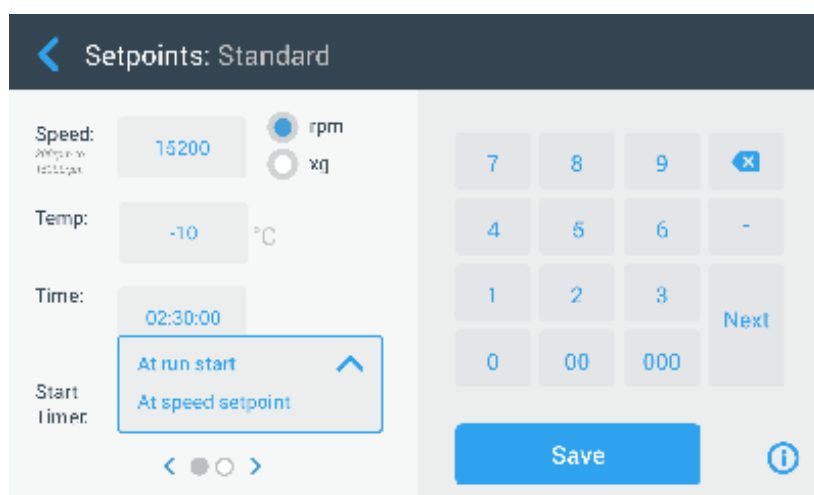


Figure 3-13: Setpoints: Standard Screen for Refrigerated Centrifuge

When the centrifuge is set up to run in “Advanced Mode” (see the section “Setpoints Mode” on page 3-36), the “Setpoints: Advanced” screen shown in Figure 3-14 appears instead.

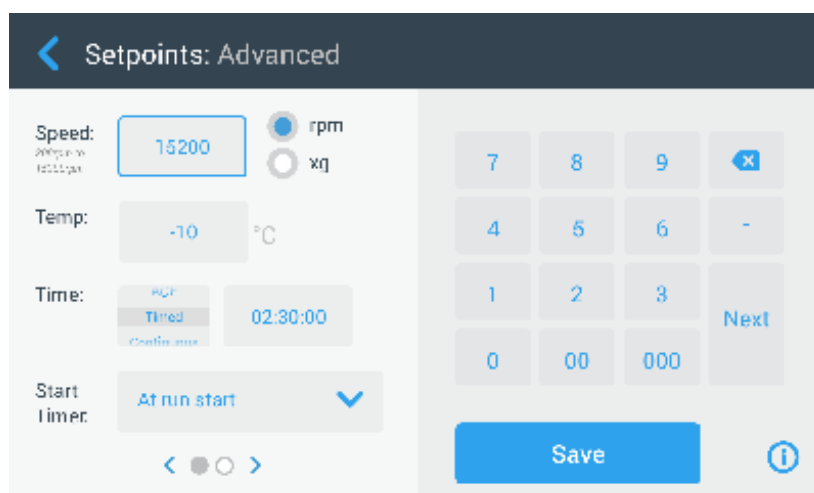


Figure 3-14: Settings -> Controls -> Setpoints: Advanced Screen for Ventilated Centrifuge

2. Tap the **rpm** or **x g** radio button to toggle between speed (in rpm, which is short for revolutions per minute) and RCF (in x g, which means multiples of the force of gravity).



Figure 3-15: Setpoints Screen Detail for Centrifuge Speed, and Range

3. Tap in the **Speed** entry field shown in Figure 3-15, then use the keypad on the right to enter the desired speed.

The admissible speed range for the current rotor appears just below the “Speed” label to assist you in setting speed correctly.

When you tap the **Speed** entry field, the previous setting will be replaced immediately as you start entering digits on the keypad.

NOTICE If you select an extremely low RCF value, it will be automatically corrected if the resulting speed is less than 300 rpm. 300 rpm is the lowest selectable speed.

4. Tap the **Save** button to save the speed setting for the ongoing or the next centrifugation run.

Invalid Rotor Speed Setpoint

If the centrifuge cannot be run with the setpoint you have just entered, an Out of range warning appears beneath the setpoint entry field. You will not be able to continue until you have supplied an acceptable setpoint value.



Figure 3-16: Settings -> Controls -> Setpoints Screen: Out of Range Value Alert

Invalid Rotor Speed Set with Centrifuge Running

If you try to change the speed from within an ongoing centrifugation run and your settings are out of range, the Invalid “Rotor Speed” pop-up window appears.

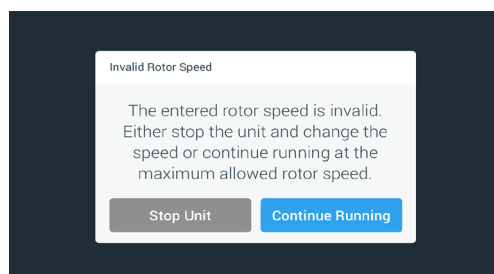


Figure 3-17: Invalid Rotor Speed Pop-up Window)

Tap the **Stop Unit** button to stop the rotor, then tap the speed box one more time to correct your speed setting. Alternatively, tap the **Continue Running** button to continue at the maximum allowed speed.

3. 2. 2. Set Run Time

The centrifuge lets you set a run time after which the centrifugation run stops automatically.

NOTICE After the centrifuge is powered on, it shows the default selection made in the “Settings -> Setpoints” screen; see “Setpoints” on page 3-34. Proceed as follows to set run time:

1. Tap the **run time** box on the “Home” Screen.

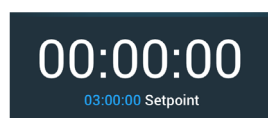


Figure 3-18: Run Time Box on Home Screen

The “Setpoints: Standard” screen or “Setpoints: Advanced” screen is appears.

Run Time in Standard Mode

Tap in the **Time** entry field above and use the keypad shown to enter the desired run time period.

Run time is shown in “hh:mm:ss”. For example, if you want to enter 2 hours and 30 min you must first tap “2” on the keypad. This will set the run time to “00:00:02”. Then tap “3” on the keypad. This will set the run time to “00:00:23”. When tapping “000” next on the keypad the set run time shows “02:30:00”, which is 2 hours and 30 min.

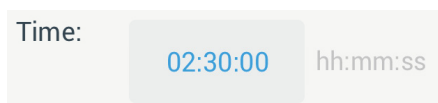


Figure 3-19: Run Time Box on Home Screen

The admissible time range for the current rotor appears just below the “Time” label to assist you in setting run time correctly.

When you tap the **Time** entry field, the previous setting will be replaced immediately as you start entering digits on the keypad.

Run Time in Advanced Mode

In “Advanced Mode” the Time entry field has an extra click-wheel and changes its appearance with the option you select. You have three options to choose from:

- » Timed: Sets the run time in hours, minutes, and seconds.
- » Continuous: Starts a no-limit run, stopped only by tapping the Stop button ■ on the “Home” screen.
- » ACE (Accumulated Centrifugal Effect): The ACE feature is an integrator function that calculates the effect of speed in relation to time and adjusts run time to account for differences in acceleration.

ACE is a mathematical model that helps you to transfer applications and their parameter settings between centrifuges. For example, when you transfer an application to a new centrifuge, ACE ensures that the application runs in exactly the same way and yields the same results as on a legacy centrifuge.

2. Tap the **Save** button to save the run time setting for the ongoing or for the next centrifugation run.

3. 2. 3. Acceleration and Deceleration Profiles

The centrifuge offers a total of 9 acceleration profiles (numbered 1 through 9) and total of 10 deceleration profiles or braking curves (numbered 0 through 9). An acceleration profile gradually increases the speed of the centrifuge after starting the centrifugation run. A deceleration profile gradually reduces the speed of the centrifuge towards the end of the centrifugation run.

NOTICE Avoid if possible speed ranges close to natural resonances of the system. Runs at resonance speeds may have show vibration and an adverse effect on the quality of separation.

Proceed as follows to select an acceleration or deceleration profile:

1. Tap the **Accel / Decel** icon on the left in the “Acceleration / Deceleration Profile” box on the “Home” screen, shown in Figure 3-20 below.

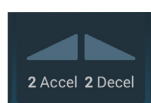


Figure 3-20: Acceleration / Deceleration Profile Box on Home Screen

The “Setpoints: Standard” screen shown in Figure 3-13 or “Setpoints: Advanced” screen shown in Figure 3-14 appears.

Acceleration: Curve number 1 provides the slowest and curve number 9 the fastest acceleration rate.

Deceleration: Curve number 0 disables active deceleration. Curve number 1 provides the slowest active and curve number 9 the fastest active deceleration rate.

2. Tap in the **Accel** or **Decel** entry field, then use the keypad on the right to enter the number for the desired profile. The admissible range of numbers appears just below the “Accel” or “Decel” label to assist you in choosing the desired profile.
When you tap the **Accel** or **Decel** entry field, the previous setting will be replaced immediately as you start entering digits on the keypad.
3. Tap the **Save** button to save the acceleration and deceleration profile setting for the ongoing or for the next centrifugation run.
4. Release the ◀ or ▶ button when the number of the desired acceleration and deceleration profile appears in the display window.
Doing so selects the acceleration and deceleration profile for the next centrifugation run.

3. 2. 4. Set Temperature

A refrigerated centrifuge allows for preselecting a temperature for the sample between -10 °C and +40 °C for the centrifugation run. This feature is not available on ventilated models. Temperatures displayed by the centrifuge are the estimated sample temperatures.

⚠ CAUTION Due to air friction sample integrity may be affected.

The temperature of the rotor may rise significantly while the centrifuge is spinning.

Refrigerated units can have a deviation from displayed and set temperature to the sample temperature.

Make sure the centrifuge temperature control capabilities meet your application specification. If necessary make a test run.

Proceed as follows to set a temperature for the next centrifugation run:

1. Tap the **temperature box** on the “Home” screen, shown in Figure 3–21 below.

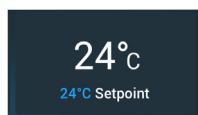


Figure 3–21: Temperature Box on Home Screen

The “Setpoints: Standard” screen or “Setpoints: Advanced” screen is displayed.

2. Tap in the **Temp** entry field, then use the keypad on the right to enter the temperature for the sample setpoint.
The admissible temperature range for the unit appears just below the “Temp” label to assist you in setting the temperature setpoint correctly.
When you tap the **Temperature** entry field, the previous setting will be replaced immediately as you start entering digits on the keypad.
3. Tap the **Save** button to save the setpoint temperature for the next centrifugation run.

3.3. Pre-Temper the Centrifugation Chamber

Refrigerated centrifuges allow for pre-tempering, that is pre-warming or pre-cooling, the centrifugation chamber and the empty rotor before the centrifugation run starts. If necessary pre-temper your samples using proper equipment. The centrifuge is not intended to be used to pre-temper your samples. Temperatures displayed by the centrifuge are the estimated sample temperatures.

NOTICE Ventilated models cannot pre-temper the centrifugation chamber.

Proceed as follows to set the pre-tempering target temperature for the centrifuge:

1. Tap the **temperature box** on the “Home” screen, shown in Figure 3–22 below.

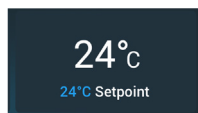




Figure 3–22: Temperature Box on Home Screen

The “Setpoints: Standard” screen shown in Figure 3–13 or “Setpoints: Advanced” screen shown in Figure 3–14 appears.

2. Tap in the **Temp** entry field, then use the keypad on the right to enter the desired target temperature.
The admissible temperature range for the unit appears just below the “Temp” label to assist you in setting target temperature correctly.
When you tap the **Temp** entry field, the previous setting will be replaced immediately as you start entering digits on the keypad.
3. Tap the **Save** button to save the temperature setting for the pre-tempering run.
You will be returned to the “Home” screen. The new target temperature appears as the setpoint below the current temperature.
4. Tap the **Pre-Temp** button  on the “Home” screen and then the **Start** button  to start pre-tempering.
The centrifuge starts heating or cooling the centrifugation chamber to the setpoint temperature.
The current centrifugation chamber temperature displayed on top of the setpoint temperature starts to change towards the setpoint.
5. When the centrifugation chamber temperature reaches the pre-tempering setpoint, the “Pre-Temp Complete” pop-up window shown in Figure 3–23 appears, announcing that the centrifuge is correctly pre-tempered and ready.

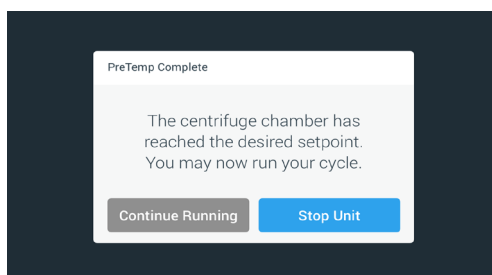


Figure 3–23: Pre-Temp Complete Pop-up Window

6. Tap the **Pre-Temp** button  to exit the Pre-Temp mode.

3. 4. Centrifugation

Mind the safety zone of minimum 30 cm around the centrifuge. Refer to “Info & Health Status Area” on page 3-2. Persons and hazardous substances must be kept out of this safety zone while centrifuging.

Once the main switch has been turned on, the rotor has been properly installed, the setpoints have been set as explained in the previous section, and the centrifuge lid has been closed, you are ready to start.

You have various options to start a centrifugation run:

- **Continuous Mode:** This is a fully manual mode. If you have chosen “Continuous Mode” instead of a preset runtime (see “Set Run Time” on page 3-8), use the Start button ► and Stop button ■ to start and stop centrifugation manually, as explained in the section “Run in Continuous or Timed Mode” further below.
- **Timed Mode:** This is a semi-automatic mode that relies on a timer. If you have preset a runtime (see “Set Run Time” on page 3-8), tap the Start button ►, then and wait for the timer to expire and the centrifuge to stop automatically, as explained in the section “Run in Continuous or Timed Mode”.
- **Pulse Mode:** This is a short-run centrifugation mode with selectable behaviors. You choose a behavior, then tap the Pulse button ►► and wait for the centrifuge to run and stop automatically, as explained in the section “Run in Pulse Mode” on page 3-13.
- **Program Mode:** This is a fully automatic mode. You prepare and save an automated program, then run it from the touchscreen, as explained in the section “Automate Processes Using Programs” on page 3-20.



WARNING

Damage to health from centrifuging explosive or flammable materials or substances. Do not centrifuge explosive or flammable materials or substances.

Run in Continuous or Timed Mode

Proceed as follows to run the centrifuge in continuous or timed mode:

1. Press the **Start** button ► on the “Home” screen.

The Start button ► turns into the Stop button ■.

The centrifuge starts running and the touchscreen shows the parameters increasing towards their setpoints.

After one minute of continuous running without any intervention by the user, the touchscreen goes to lighthouse mode. In lighthouse mode the touchscreen shows the basic settings, like current speed and speed setpoint, rotor and bucket type, run time elapsed (or remaining) and run time setpoint (timed runs only), plus a progress bar for the run, and the Stop button ■.

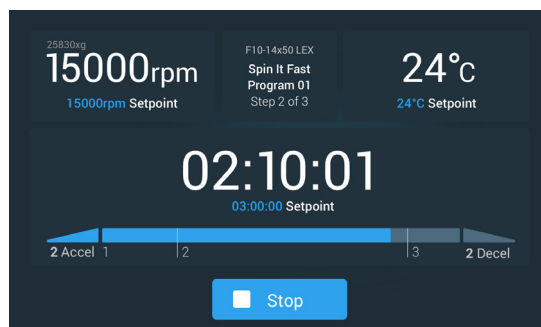


Figure 3–24: Screen in Lighthouse Mode

2. Depending on the time mode you have chosen (see “Set Run Time” on page 3-8), do one of the following to stop the centrifuge:
 - a. Continuous mode: Press the Stop button ■ on the Home screen when you have finished centrifuging.
 - b. Timed and ACE modes: Wait until the timer expires and the centrifuge stops automatically, or press the Stop button ■ on the “Home” screen to abort the centrifugation run prematurely.
3. When the centrifuge has stopped centrifugation completely, press the **Open** button ► on the control panel to open the lid.

The lid pops open, and the Open button ► is surrounded by a light gray border now to indicate that the lid is unlocked.

NOTICE You cannot open the lid as long as the centrifuge is spinning.

Run in Pulse Mode

Proceed as follows to use the unit for short-run centrifugation:

1. Check the preset Pulse Mode button behavior displayed on the Pulse button >> whether it suits your needs.
The different Pulse button behaviors are explained in the section “Pulse Customization” on page 3-37.
2. If desired, choose a “Pulse Mode” behavior in the “Settings”.
3. Press the **Pulse** button >> on the “Home” screen.

The Start button ▶ turns into the Stop button ■. The Pulse button >> appears with a gray border >> to indicate that the centrifuge is running in “Pulse Mode”.

The centrifuge starts running and the touchscreen shows the parameters increasing towards their setpoints.



Figure 3-25: Pulse Mode: Centrifuge Running for One Minute

4. Wait for the centrifugation run to end and the centrifuge to stop spinning.

NOTICE To abort the centrifugation run prematurely, you can press the Stop button ■ or the Pulse button >> on the “Home” screen.

5. When the centrifuge has stopped spinning, press the **Open** button 🚪 on the control panel to open the lid.
The lid unlocks, and the Open button 🚪 is surrounded by a light gray border now to indicate that the lid is unlocked.

NOTICE You cannot open the lid as long as the centrifuge is spinning.

3. 5. Status, Alarms and Alerts

This section explains how you can view current status information, alarms, and alerts using the buttons in the “Info & Health Status” area.

Status

When the centrifuge is in good health, the touchscreen display shows a green heart icon in the “Info & Health Status” area (see “Info & Health Status Area (Region 1)” on page 3-2). Tapping the green heart icon opens the “Status” screen. The “Status” screen consists of two successive screens that provide a full set of status information on the centrifuge. You navigate between the two screens by tapping the bullets or chevrons at the bottom of the screen.

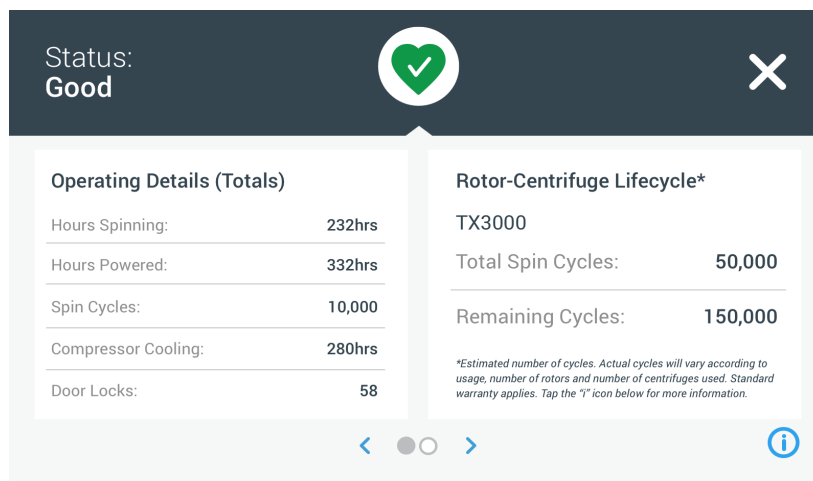


Figure 3-26: Status Screen

1. The first “Status” screen consists of two columns called “Operating Details” (Totals) and “Rotor-Centrifuge Lifecycle”.

The “Operating Details” column lists operating data for the centrifuge. This data is actively updated while the centrifuge is running. The total amounts displayed include:

- » “Hours Spinning”: The total number of hours the centrifuge has been actively spinning.
- » “Hours Powered”: The total number of hours the centrifuge has been actively powered on.
- » “Spin Cycles”: The total number of spin cycles the centrifuge has completed.
- » “Compressor Cooling”: The total number of hours the compressor has been active cooling.
- » “Door Locks”: The total number of locking operations for the centrifuge lid.

The “Rotor-Centrifuge Lifecycle” shows the name and operating data of the rotor currently installed. This data is actively updated while the centrifuge is running. If the rotor is changed, this section will reflect the new rotor installed. If a rotor with swinging buckets is installed, the bucket type is also displayed—for example: TX-750 (Round Bucket - 75003608). Refer to “Rotor Log” on page 3-47.

The total amounts displayed include:

- » “Total Spin Cycles”: The number of cycles the rotor type has been actively spinning.
- » “Remaining Cycles”: The number of spin cycles the rotor type has left.

NOTICE The number of cycles is estimated. Actual cycles will vary according to usage, number of rotors, and number of centrifuges used. Standard warranty applies.

2. The second “Status” screen displays the column called “Alarm Totals”.

The “Alarm Totals” column displays the total number of imbalance alarms the centrifuge has experienced.

Alerts

When a maintenance action becomes due or when a minor disturbance without any impact on the safe operation of the centrifuge occurs, the unit issues an alert. The centrifuge may continue to spin, but you must correct the root cause as soon as possible to avoid damage to the samples and/or the unit itself.

When an alert is issued, the touchscreen display shows a yellow bar on top of the current screen, as illustrated in the example in Figure 3–27 below. The “Info & Health Status” area (see “Info & Health Status Area (Region 1)” on page 3-2) displays a yellow warning triangle. A ticker-style message in the yellow alert bar explains the root cause of the problem and provides instructions on how to handle the alert.

Additionally, a single audible alert tone is sounded.

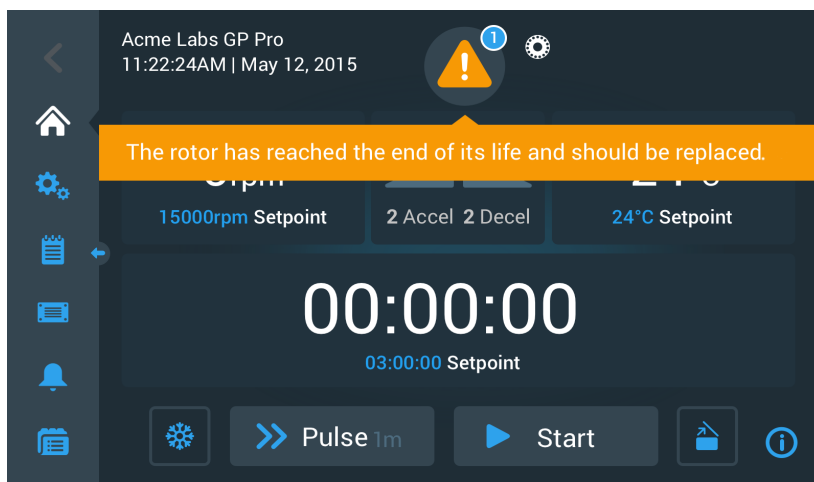


Figure 3–27: Rotor End of Life Alert Message on Top of Home Screen

After a short time, the yellow alert bar goes away. Only the yellow warning triangle in the “Info & Health Status” area indicates that alerts exist for the centrifuge, as shown in the example in Figure 3–28 below.

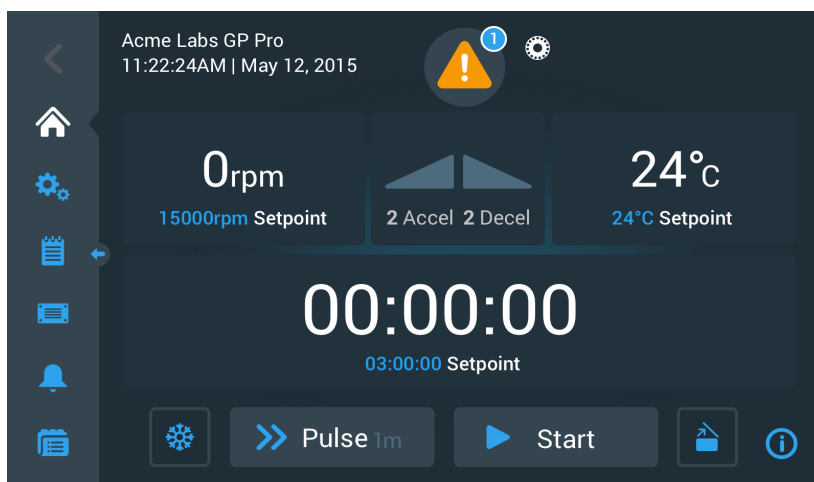


Figure 3–28: Home Screen with Alert Message

The warning triangle icon has a blue circle with a white border that shows the number of active alerts. In the example in Figure 3–27 above, there is only one alert. However, if there is more than one alert present, the alert count may be “2”, “3”, or more.

Tapping the **warning triangle** icon opens an alert list that lets you view all alerts and details about each single alert condition. This is explained in the following section.

Viewing and Handling Alerts

Tapping the warning triangle icon in the “Info & Health Status” area of the touchscreen display opens the “Status – Alert” screen shown in Figure 3–29 below. This screen lists all alerts that are currently active. The latest alert appears expanded to let you view the full details. You can scroll through the list and tap on any list item to expand it and read more.

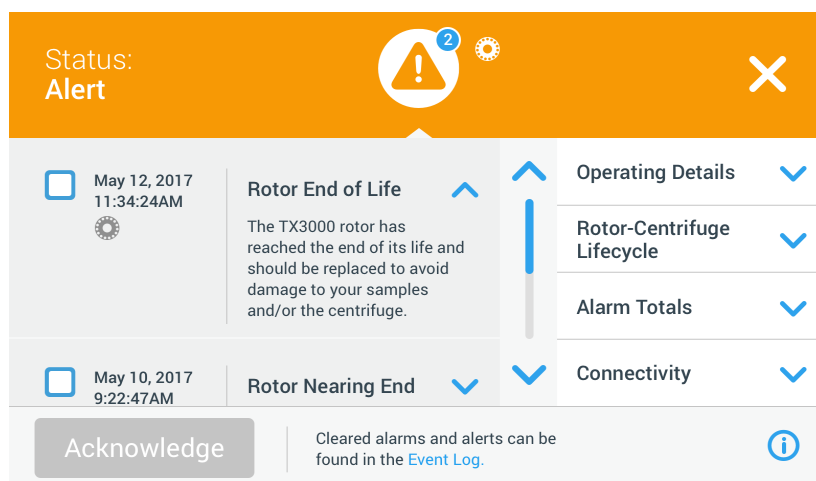


Figure 3–29: Status – Alert Screen with Alert List

On the right-hand side of the “Status – Alert” screen, there is a stack of status information fields. You can tap and expand each field to view general information on the centrifuge and the current rotor. Figure 3–30 shows the “Operating Details” section expanded, with general operating information about the unit.

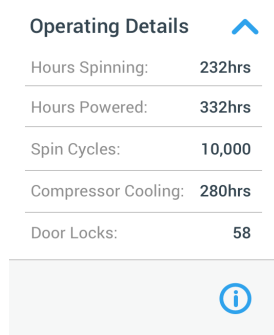




Figure 3–30: Status – Alert Screen: Operating Details Expanded

NOTICE These status information fields show the same content as the Status screen, plus the rotor log. This is described in the sections “Status” on page 3-14 and “Rotor Log” on page 3-47, respectively.

Proceed as follows to view the alert list with alert details:


1. Tap on the triangle icon  in the “Info & Health Status” area.
The “Status - Alert” screen shown in Figure 3–29 appears, with the latest alert list item already expanded.
2. To view background information about the centrifuge and rotor, tap the field header to expand the “Operating Details” (see Figure 3–30), “Rotor-Centrifuge Lifecycle”, “Rotor Log”, or “Imbalance Alerts” field.
3. Tap the field header again to hide the content of the information field.
4. Read the description and follow the instructions to correct the problem—for example:
 - a. Return to the Home screen.
 - b. Press the Lid Open button .
 - c. Remove the rotor and the buckets.
 - d. Install a new rotor with new buckets.
 - e. Restart the centrifuge.

Refer to “Troubleshooting by Guide” on page 6-2 for a full list of errors.

5. When you have corrected the problem, tap the **Acknowledge** button to acknowledge and clear the alert. The checkbox next to the alert list entry is activated.

NOTICE If you acknowledge the alert without correcting the problem, the alert will return immediately.

6. If you wish to view more alerts from the list, tap the scrollbar and drag to scroll down.

7. Tap the desired alert list item.
The alert item is expanded to reveal the details.
8. Solve the problem and acknowledge the alert, then tap the alert list item one more time to reduce it.
Once you have solved and acknowledged all alerts, the “Status – Good Screen” appears to confirm that the centrifuge is free of alerts.
9. Tap the **X** icon  in the top right corner to return to the Home screen.

Alarms

When a major error condition occurs in the centrifuge, the unit issues an alarm. The centrifuge stops or must be stopped immediately to avoid damage to the samples and/or the unit itself. You must correct the root cause before you can continue operation.

When an alarm is issued, the touchscreen display shows a red bar on top of the current screen. The “Info & Health Status” area (see “Info & Health Status Area (Region 1)” on page 3-2) displays a red alarm bell enclosed by sound waves. Additionally, an audible alarm tone is constantly sounding.

Beneath the red alarm bar, a ticker-style message explains the root cause of the problem and provides instructions on how to handle the alarm.

A Snooze button appears, allowing you to temporarily silence the alarm. When the alarm condition is not cleared within the snooze period, the alarm returns. The duration of the snooze period can be chosen in the settings, as explained in the section “Snooze Timeout” on page 3-30.

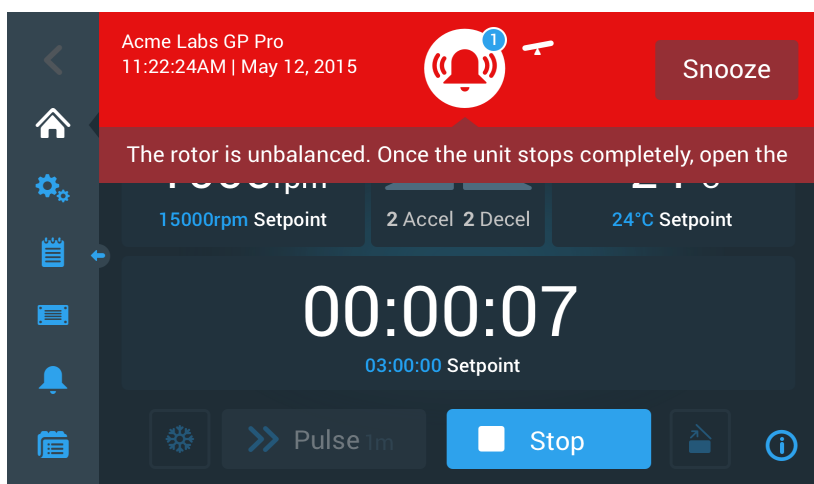


Figure 3-31: Alarm Message on Top of Home Screen

Tapping the snooze button temporarily silences the audible alarm for the duration of the snooze period. It also hides the red alarm bar, but keeps the ticker message beneath the bell icon on-screen for a short time before it disappears as well. The bell icon is displayed with a diagonal line across it and a count-down timer to its right.

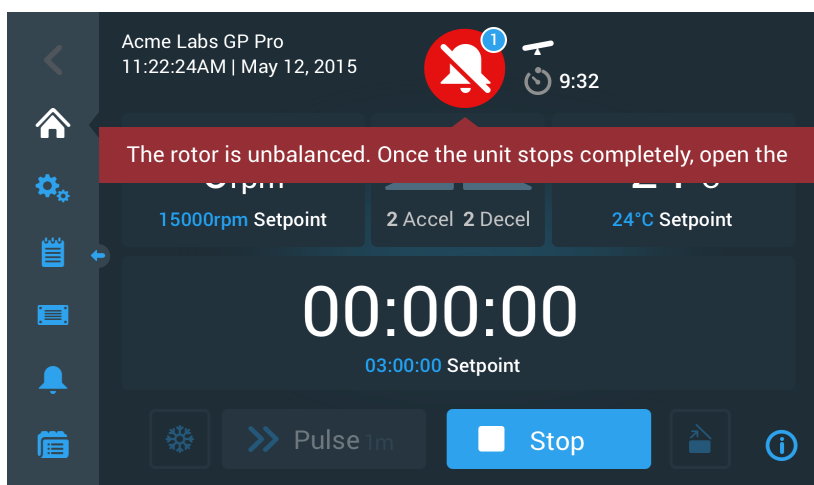


Figure 3-32: Alarm Message after Snoozing

The bell icon has a blue circle with a white border that shows the number of active alarms. In the example in Figure 3-32 above, there is only one alarm. However, if there is more than one alarm present, the alarm count may be “2”, “3”, or more.

Tapping the bell icon opens an alarm list that lets you view all alarms and details about each single alarm condition. This is explained in the section “Viewing and Handling Alarms” on page 3-18.

The visible buttons, such as Pre-Temp, Pulse, Start/Stop, and Lid Open, are still operable in this state, depending on whether centrifuge is still running or idle. For example, you can usually stop a running centrifuge and open the lid, or you can navigate to other screens using the left-hand navigation bar while alarms are present. The alarm bell and ticker message will continue to display on all screens you navigate to, unless you snooze the alarm, in which case a silenced bell is shown along with the snooze countdown timer.

There are more severe alarm conditions that cannot be solved by interacting with the touchscreen display. If such an alarm occurs, a large red overlay screen blanks out the current screen and its buttons.

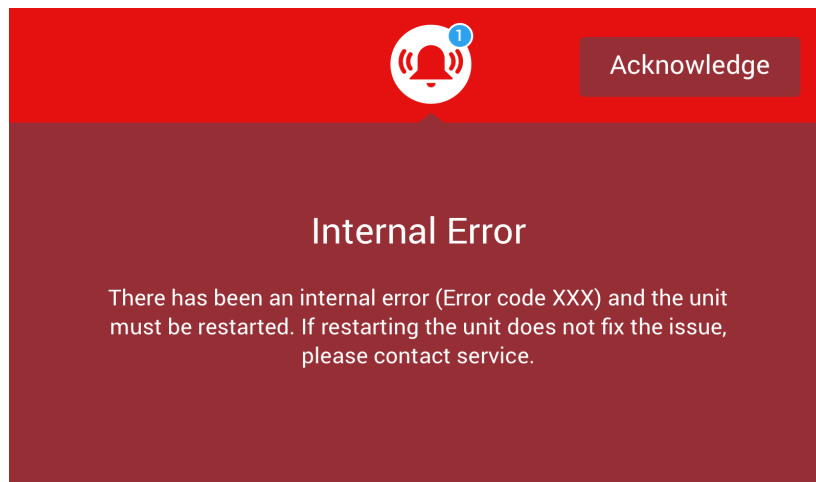


Figure 3-33: Full Screen Alarm Message

You can neither snooze this kind of alarm nor tap any buttons to solve it, but only acknowledge it. Like the less severe alarm messages discussed above, this message gives troubleshooting instructions and refers you to field service if the issue cannot be solved.

Viewing and Handling Alarms

Tapping the red bell icon in the “Info & Health Status” area of the touchscreen display opens the “Status – Alarm” screen. This screen lists all alarms that are currently active. The latest alarm appears expanded to let you view the full details. You can scroll through the list and tap on any list item to expand it and read more.

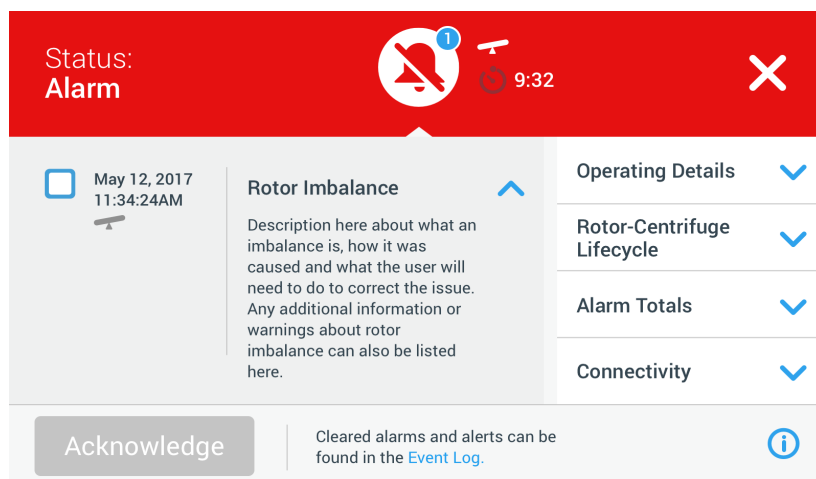



Figure 3-34: Status – Alarm Screen with Rotor Imbalance Message

On the right-hand side of the “Status – Alarm” screen, there is a stack of status information fields. You can tap and expand each field to view general information on the centrifuge and the current rotor.

Operating Details 	
Hours Spinning:	232hrs
Hours Powered:	332hrs
Spin Cycles:	10,000
Compressor Cooling:	280hrs
Door Locks:	58






Figure 3–35: Status – Alarm Screen: Operating Details Expanded

NOTICE These status information fields show the same content as the “Status” screen, plus the rotor log. This is described in the sections “Status” on page 3-14 and “Rotor Log” on page 3-47, respectively.

Proceed as follows to view the alarm list with alarm details:

1. If you wish to silence the audible alarm (and hide the alarm message) temporarily, tap the Snooze button in the “Info & Health Status” area of the touchscreen (see Figure 3–33 for an example).
2. Tap on the alarm bell icon  in the “Info & Health Status” area.
The “Status - Alarm” screen shown in Figure 3–34 appears, with the latest alarm list item already expanded.
3. To view background information about the centrifuge and rotor, tap the field header to expand the “Operating Details” (see Figure 3–35), “Rotor-Centrifuge Lifecycle”, “Rotor Log”, or “Imbalance Alarms” field.
4. Tap the field header again to hide the content of the information field.
5. Read the description and follow the instructions to correct the problem—for example:
 - a. Return to the Home screen.
 - b. Press the Lid Open button .
 - c. Remove the rotor and balance the load of the buckets.
 - d. Reinstall the rotor and restart the centrifuge.
6. When you have corrected the problem, tap the **Acknowledge** button to acknowledge and clear the alarm. The checkbox next to the alarm list entry is activated.

NOTICE If you acknowledge the alarm without correcting the problem, the alarm will return immediately.

7. If you wish to view more alarms from the list, tap the scrollbar and drag to scroll down.
8. Tap the desired alarm list item.
The alarm item is expanded to reveal the details.
9. Solve the problem and acknowledge the alarm, then tap the alarm list item one more time to reduce it.
Once you have solved and acknowledged all alarms, the “Status – Good” Screen appears to confirm that the centrifuge is free of alarms, as shown in Figure 3–36 below.

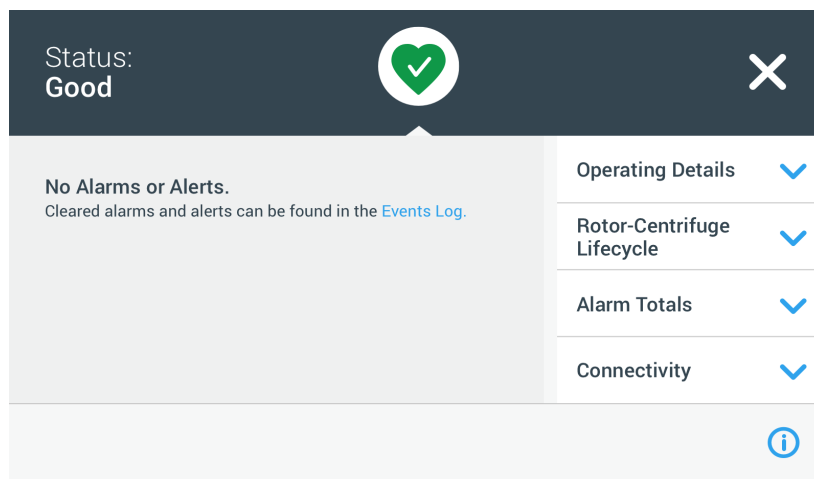


Figure 3–36: Status – Screen

10. Tap the **X** icon  in the top right corner to return to the “Home” screen.


Automate Processes Using Programs

To reduce the setup effort before a centrifugation run, the centrifuge lets you store up to 100 programs. Programs are pre-programmed centrifugation runs with a user-specified parameter set. Programs can consist of a single step that runs with just one parameter set, or of several steps with changing parameter sets.

A parameter set may consist of all or part of the operating parameters explained in previous sections of this chapter, including:

- speed in rpm or as an RCF value
- acceleration and deceleration profile
- run time
- temperature (refrigerated models only)

Setting Up and Saving a Program

Programs are created on the “Programs” screen. The “Programs” screen opens when you tap the **Programs** button  from the navigation bar on the left side of the touchscreen display.

If this is the first time you open the “Programs” screen on a newly installed centrifuge, you will see an empty programs list waiting to be filled, with basic instructions on how to get started with programs.

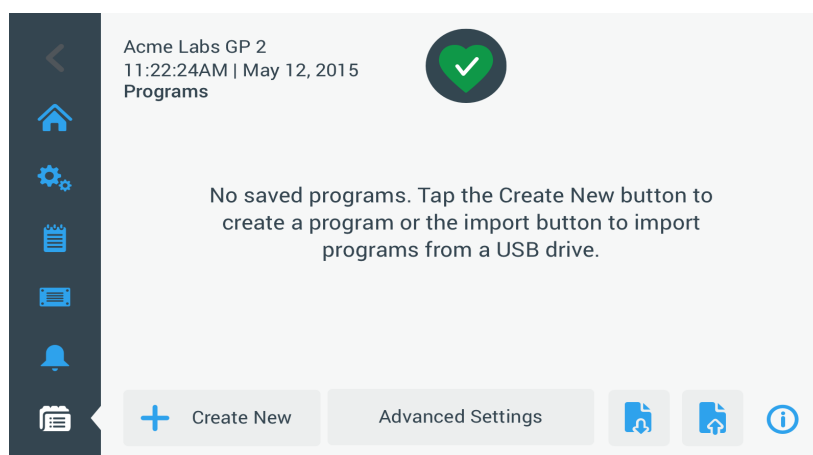


Figure 3-37: Pristine Programs Screen (Prior to Creating Programs)

Proceed as follows to create and store a program:

1. Tap the **Programs** button  on the navigation bar.

The “Programs” screen appears, either waiting to be filled with programs as shown in Figure 3-37, or listing the existing programs as in the example in Figure 3-47.

2. Tap the **Create New** button.

The “Add New Program Screen” shown in Figure 3-38 appears. The message “Tap to enter” in the “Name” field prompts you to start typing.

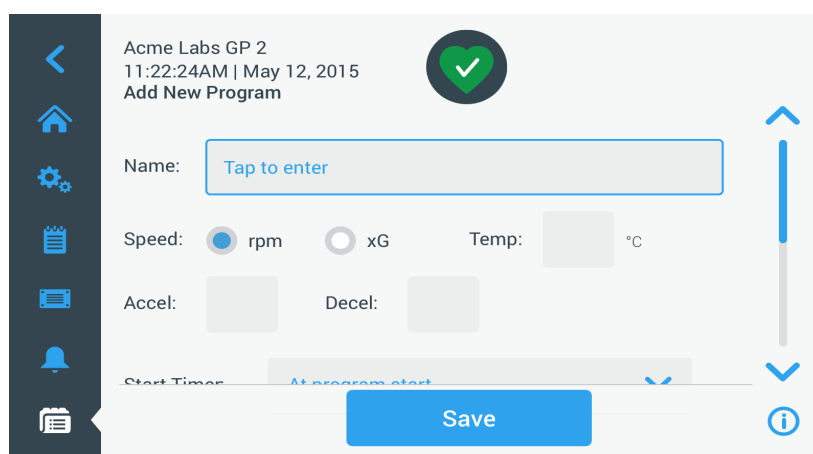


Figure 3-38: Programs -> Add New Program Screen, First Set of Options

3. Tap the **Name** field.

A keypad appears on top of the “Create New Program” screen (see Figure 3-39).

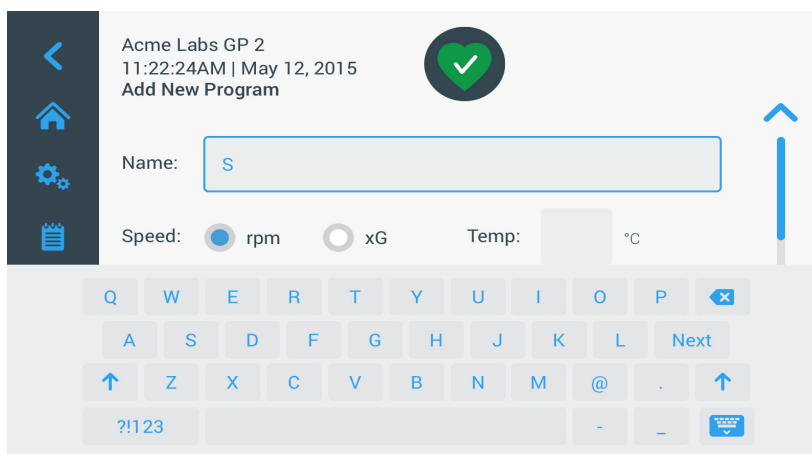


Figure 3-39: Programs with Keypad Overlay

4. Enter a program name of maximum 20 characters length.
5. Tap **rpm** or **x g** to choose the unit for centrifuge speed.
6. Tap the **Temp** field and enter a target temperature for pre-tempering (refrigerated models only).
7. Enter numbers for the acceleration and deceleration profiles, if desired (see “Settings -> Controls -> Setpoints Screen: Out of Range Value Alert” on page 3-8 and “Set Temperature” on page 3-10 for more details).
8. Tap the scroll bar on the right and drag further down to show the remaining options, as shown in Figure 3-40 below.

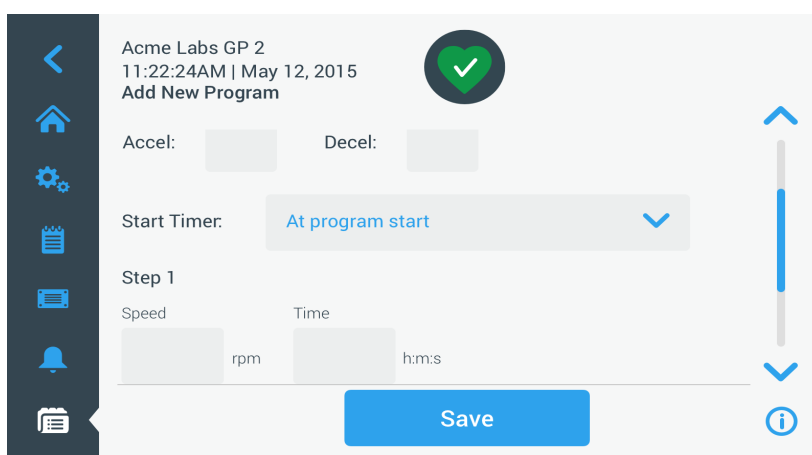


Figure 3-40: Programs -> Add New Program Screen, Second Set of Options

9. Tap the **Start Timer** field to choose whether the set time begins when the centrifuge is started or once the acceleration phase is completed.
10. Under the “Step 1” option, tap in the **Speed** field and enter the speed in rpm or x g, as chosen further up in the screen.
A keypad appears on top of the “Add New Program” screen, as shown in Figure 3-41 below.
11. Tap the **Time** field and enter a run time in hours, minutes, and seconds.

Acme Labs GP 2
11:22:24AM | May 12, 2015
Add New Program

Step 1

Speed: 15500 rpm

Time: 03:30:00 h:m:s

Next

Figure 3-41: Programs -> Add New Program Screen, Speed and Time for Step 1

12. If you wish to vary speed and run time during the centrifugation run, tap the **+ Add Step** button.
13. Tap the **Speed** field and enter a different speed for Step 2.
14. Tap the **Time** field and enter the start time for Step 2, that is, the time at which the speed should change.
15. Repeat the last three entries for as many additional steps as required.

NOTICE If you leave it at Step 1, the program will run at one speed only for the full duration.

16. Tap the **Save** button to store your program.

Your program is stored and ready to run now.

Advanced Program Settings

The **Advanced Settings** button on the main “Programs” screen opens the “Advanced Settings” screen that lets you make general settings for programs. The options on the “Advanced Settings” screen do the following:

- configure the run time timer on the “Home” screen to run up or down
- influence the way user-created programs are listed on the main “Programs” screen
- determine whether or not programs require the user to tap the Start button ► for confirmation before they run.

Acme Labs GP 2
11:22:24AM | May 12, 2015
Advanced Settings

View Time As: ☐ Elapsed ☒ Remaining

Organize by: ☐ Alphabetical ☒ 3 Most Used, then Alpha

Save

Figure 3-42: Programs -> Advanced Settings Screen

Proceed as follow to set advanced options for programs:

1. Under **View Time As**, choose either **Elapsed** or **Remaining** to show the timer on the “Home” screen as time elapsed (counting up) or time remaining (counting down.) The default setting is “Remaining”.
2. Under **Organize By**, choose either **Alphabetical** (default) to organize the program list in alphabetical order, or **3 Most Used**, then Alpha to have the most-used programs remain on the display and easily accessible.

NOTICE The three most used programs may change if some programs become more used than others.


3. If desired, check the **Start the centrifuge on program load** checkbox to start the program (unit spinning) immediately after tapping a program button from the main “Programs” screen (shown in Figure 3-47 further below).

NOTICE Leaving this box unchecked will load the program onto the main screen, but will require an additional tap on the Start button ► on the “Home” screen.

Previewing Program Parameters

The main “Programs” screen allows you to preview the parameters of a program listed there, so you can see what it does before you run it.

Proceed as follows to preview a program:

1. Tap the **Eye** button  next to the program you wish to preview.
The “Program Quick View” pop-up window shown in Figure 3–43 appears.

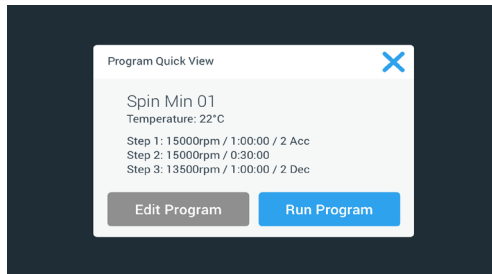


Figure 3–43: Programs -> Program Quick View Pop-up Window

2. If you are satisfied with the choice of parameters, tap the **Run Program** button to run the program immediately.


If you wish to change the program to better suit your needs, tap the **Edit Program** button and change the parameters as explained in the section “Setting Up and Saving a Program” on page 3-20.

If you do not wish to run the program yet, tap the **X** icon  to close the pop-up window and return to the main “Programs” screen.

Editing Program Parameters

The main “Programs” screen allows you to edit the parameters of a program listed there, so you can adapt it to your needs before you run it. You may change speed, run time, temperature (refrigerated models only), acceleration and deceleration profiles, add or remove steps, and rename the program.

Proceed as follows to edit a program:

1. On the main “Programs” screen, tap the **Pen** button  next to the program you wish to edit.
The “Edit Program” screen appears.

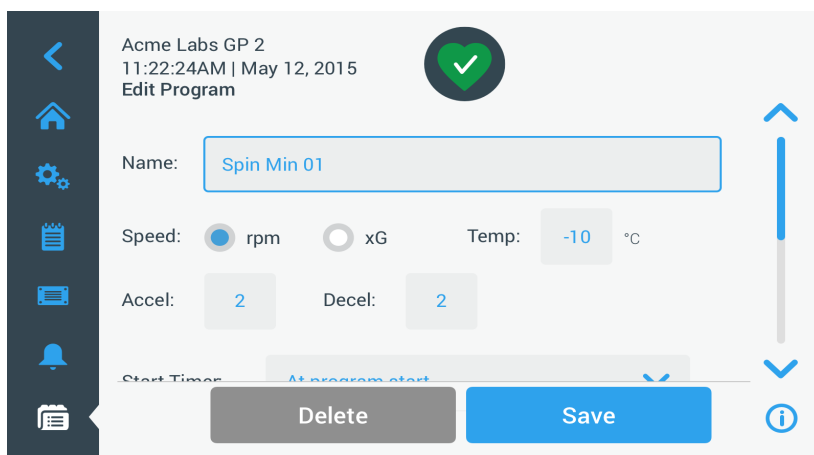



Figure 3–44: Programs -> Edit Program Screen

2. To change the program, edit the parameters as explained in the section “Setting Up and Saving a Program” on page 3-20.
3. To delete a program step, scroll down further to display the step you wish to remove.
4. Tap the **Minus** button  at the far right end of the program button.
The “Delete Confirm” window shown in Figure 3–45 appears.

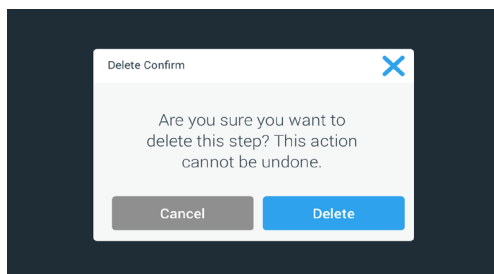



Figure 3–45: Programs -> Delete Confirm Window for Program Step)

5. Tap **Delete** one more time to delete the step.
6. When you have finished making changes, tap the **Save** button to save your changes.
You will be returned to the main “Programs” screen. The program has been changed according to your entries.

Deleting a Program

The main “Programs” screen allows you to delete any program listed there to free up storage space. Proceed as follows to delete a program:

1. On the main “Programs” screen, tap the **Pen** button  next to the program you wish to delete.
The “Edit Program” screen shown in Figure 3–44 further above appears.
2. To delete the program, tap the **Delete** button in the “Edit Program” screen.
The “Delete Confirm” window shown in Figure 3–46 below appears.

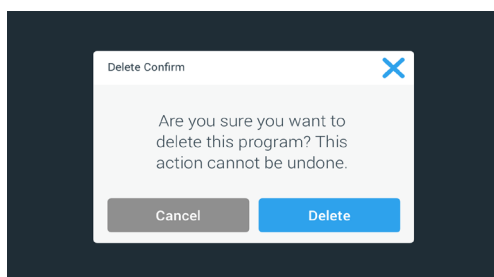


Figure 3–46: Programs -> Delete Confirm Window for Program

3. Tap **Delete** one more time to delete the program.
You will be returned to the main “Programs” screen. The program has been removed from the list.

Running a Program

Programs are run from the “Programs” screen shown in Figure 3–47. The “Programs” screen opens when you tap the “Programs” button  from the navigation bar on the left side of the touchscreen display.

You run an existing program by tapping on any of the user-named program buttons listed on the main “Programs” screen. In the example shown in Figure 3–47 below, there are three user-created programs. If you tap one of the program buttons, the screen display changes to the Home screen and indicates that the program is loaded. Depending on the advanced settings (see “Setting Up and Saving a Program” on page 3-20), the program will either start the unit spinning immediately, or it will load and wait for the user to tap the start button on the home screen.

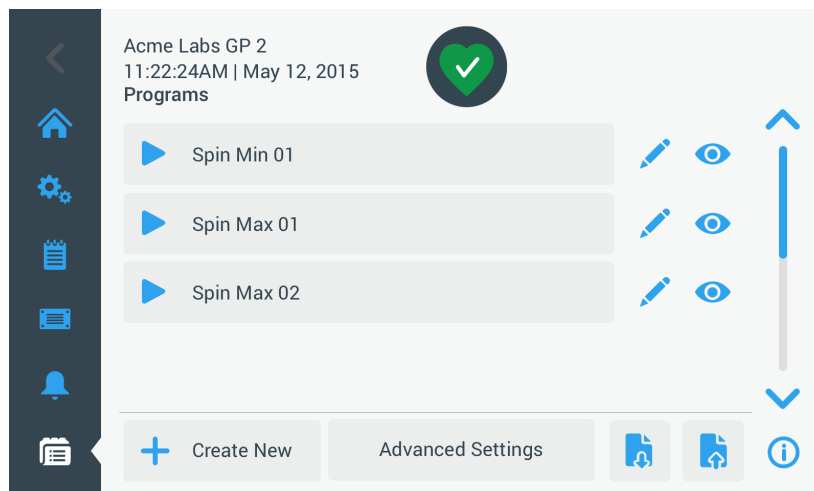




Figure 3–47: Programs Screen with Pre-Stored User Programs

Proceed as follows to start a previously stored program.

1. Load and install the rotor.
Close the lid.
2. Tap the **Programs** button  on the navigation bar.
The “Programs” screen appears, listing the existing programs as in the example in Figure 3–47.
3. Tap the **Play** icon  on the program button of your choice.

NOTICE If the centrifuge is still running, the Unit Running pop-up window appears, asking you whether you wish to cancel the current run and start the new program instead.

The centrifuge displays the “Home” screen. There are two possible scenarios, depending on the “Advanced Settings” (see the section “Setting Up and Saving a Program” on page 3-20):

- a. If your centrifuge is set up to launch programs immediately, the program will start running.
- b. If your centrifuge is set up to require a user action, you will be prompted to start the program with the **Start** button on the “Home” screen.

When the program has been executed, the “Program Complete” pop-up window appears.

Sharing Programs between Centrifuges

The main “Programs” screen has two “Import” and “Export” buttons that allow you to export programs you have created on one centrifuge and import them to a second centrifuge of the same model and series. Insert an USB drive, such as a removable memory stick, into the USB port next to the touchscreen display of the centrifuge, then export, transfer, and re-import the files to the second unit.

You can export program files using the “Export Programs” screen.

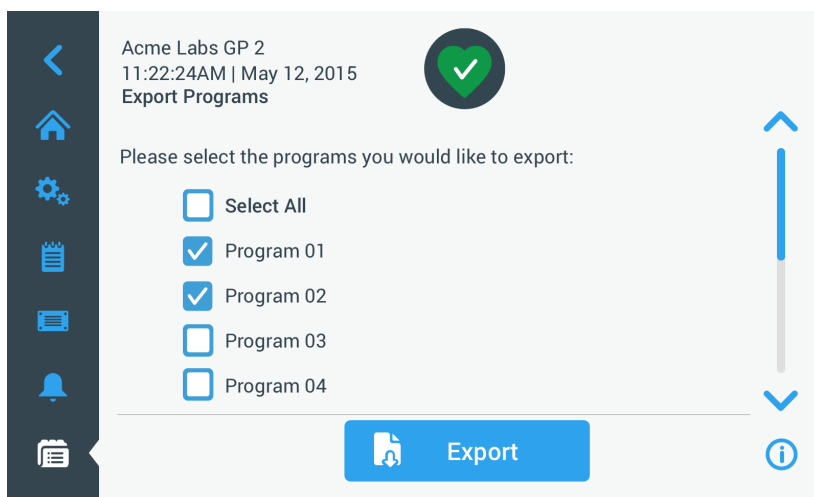


Figure 3-48: Programs -> Export Programs Screen

The matching “Import Programs” screen is used for importing the programs on the target centrifuge.

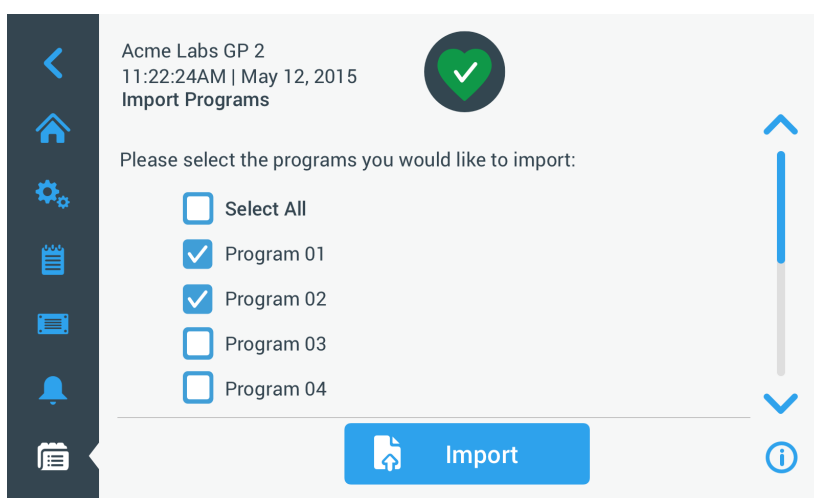




Figure 3-49: Programs -> Import Programs Screen

Exporting Programs

Proceed as follows to export one or more programs:

1. Insert a USB drive with sufficient free storage space into the USB port of the centrifuge.
2. Tap the **Programs** button  on the navigation bar.
The “Programs” screen appears, listing the existing programs.
3. Tap the **Export** icon  at the bottom edge of the “Programs” screen.
The “Export Programs” screen appears.
4. Tap the appropriate checkboxes for the programs you wish to export. Choose either **Select All** for all programs, **or** scroll and **select individual checkboxes** for the desired programs.
5. Tap the **Export** button.

NOTICE If you have not inserted a USB drive into the USB port of the centrifuge, the “Export Programs” pop-up window appears, prompting you to insert a USB drive. If necessary, insert the USB drive into the USB port of the centrifuge.

The export will start now, as indicated by the “Export Programs” pop-up window shown in Figure 3-50 below. It shows a cautioning message not to remove the USB drive and a green and gray progress bar that lets you follow the process.

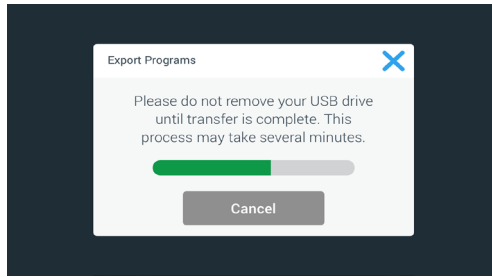


Figure 3-50: Programs -> Export Programs Pop-up Window with Progress Bar

NOTICE You may abort a running export at any time by tapping the Cancel button in the “Export Programs” pop-up window shown in Figure 3-50 above. If you do so, the export is aborted, and the “Export Error” message appears. This message lists all programs that have not been exported successfully.

NOTICE While the export is running, make sure you do not remove the USB drive from the USB port. If you remove the USB drive, the export is aborted, and the “Export Error” message appears. This message lists all programs that have not been exported successfully.

NOTICE While the export is running, the USB drive may run out of disk space. If that happens, the export is aborted, and the “Export Error” message appears.

When the export has been successfully completed, the “Export Complete” pop-up window shown in Figure 3-51 below appears.

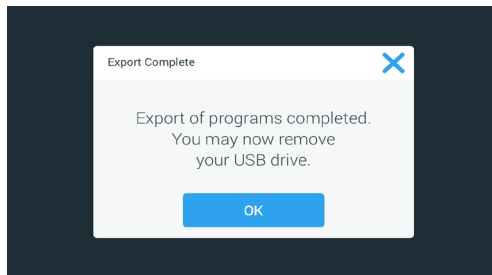




Figure 3-51: Programs -> Export Complete Pop-up Window

6. Tap the **OK** button to acknowledge the message and remove the USB drive.

Your programs are now ready for importing to another centrifuge. On your USB drive, you will find one or more new files with the general filename **UnitName_ProgramName_YYYY_MM_DD.csv** or **UnitName_ProgramName_YYYY_MM_DD_01.csv** now.

Importing Programs

Proceed as follows to import one or more programs from a USB drive:

1. Insert the USB drive with exported programs into the USB port of the centrifuge.
2. Tap the **Programs** button  on the navigation bar.
The Programs screen appears, listing the existing programs as in the example in Figure 3-47.
3. Tap the **Import** icon  at the bottom edge of the Programs screen.

NOTICE If you have not inserted a USB drive into the USB port of the centrifuge, the “Import Programs” pop-up window below appears, prompting you to insert a USB drive. If necessary, insert the USB drive into the USB port of the centrifuge.

The Import Programs screen appears.

4. Tap the appropriate checkboxes for the programs you wish to import. Choose either **Select All** for all programs, **or** scroll and **select individual checkboxes** for the desired programs.
5. Tap the **Import** button.

If necessary, insert the USB drive into the USB port of the centrifuge.

The import will start now, as indicated by the “Import Programs” pop-up window shown in Figure 3-52 below. It shows a cautioning message not to remove the USB drive and a green and gray progress bar that lets you follow the process.

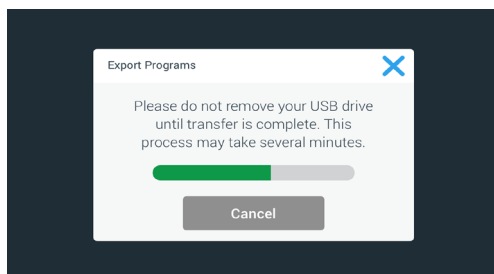


Figure 3-52: Programs -> Import Programs Pop-up Window with Progress Bar

NOTICE You may abort a running import at any time by tapping the Cancel button in the Import Programs pop-up window. If you do so, the import is aborted, and the Import Error message appears. This message lists all programs that have not been imported successfully.

NOTICE While the import is running, make sure you do not remove the USB drive from the USB port. If you remove the USB drive, the import is aborted, and the Import Error message appears. This message lists all programs that have not been imported successfully.

NOTICE While the import is running, the centrifuge may run out of memory when the maximum supported number of programs is exceeded. If that happens, the import is aborted, and the Import Error message appears. Repeat the import with fewer programs selected or delete programs from the centrifuge (see “Deleting a Program” on page 3-24) and repeat the import for the programs that were not imported.

NOTICE While the import is running, the centrifuge may encounter duplicate entries that bear the same name as existing programs. If that happens, the import is aborted, and the Import Error message appears. To resolve this conflict, tap the Overwrite button to allow the imported program to replace an existing program of the same name. Alternatively, you may tap the Skip button to retain the existing program stored on the centrifuge, rename the existing program, then repeat the import.

NOTICE While the import is running, the centrifuge verifies the programs being imported and discards any corrupted programs that will not run. If that happens, the import is aborted, and the Import Error message appears.

6. When the import has been successfully completed, the “Import Complete” pop-up window shown in Figure 3-53 below appears.

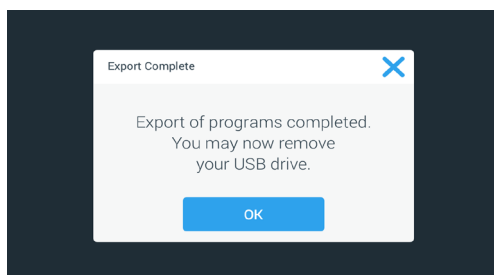



Figure 3-53: Programs -> Import Complete Pop-up Window

7. Tap the **OK** button to acknowledge the message and remove the USB drive. The imported programs are now ready for use.

3. 6. Settings

This section explains how to set up the centrifuge using the options of the Settings main screen.

The “Settings Main” screen opens up when you tap the **Settings** icon  in the navigation Bar and features eight buttons. Seven of the buttons provide instant access to sub-menus that let you activate additional features, change the factory default settings to customize the centrifuge to your needs, and modify items entered during the initial setup process.

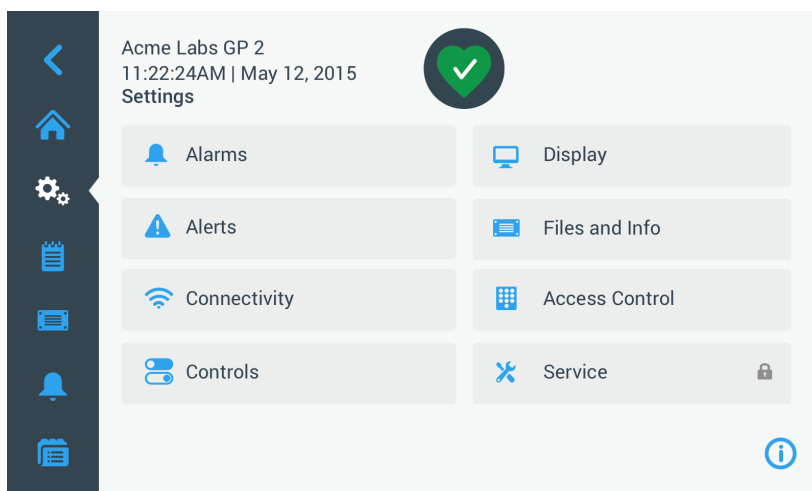



Figure 3-54: Settings Main Screen

Most of the settings are open to normal users, but some require advanced user privileges. Where this is the case, you will be prompted to enter an administrator passcode. The eighth button, labeled Service, is reserved to Thermo Fisher Scientific service technicians and requires even more advanced user privileges. This is indicated by the padlock icon on the button.

Instructions for using the screens opened by the buttons on the “Settings Main Screen” appear in the following sections.

3. 6. 1. Alarms

Tapping the **Alarms** button  on the “Settings” screen takes you to the “Alarms Settings” screen.

From the “Alarms Settings” screen, you may change the volume, tone, and timing of several audible alarms emitted by the centrifuge.

Selections are made by dragging a slider or tapping drop-down lists on the screen. You may change one, several, or all of the options before confirming your selections with the **Save** button.





Alarm Volume

You may change the volume of the alarm tone directly on the main “Alarms Settings” screen by tapping on the **speaker** icon in the slider and dragging left to decrease or right to increase.



Figure 3-55: Alarms Settings -> Alarm Volume Slider

Proceed as follows to change the Alarm Volume:



1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alarms** button  on the “Settings” screen.
Alternatively, you can also tap the **Alarm** icon on the navigation bar to open the “Alarms Settings” screen.
3. Tap the **Alarm Volume** slider and drag to the left to decrease and or to the right to increase. Alternatively, you can tap the  or  buttons on both sides of the slider to decrease or increase.
The alarm tone will play briefly with the newly chosen volume.
4. Save your changes or change any other desired option on the “Alarms Settings” screen.

Alarm Tone

You may change the alarm tone for the front window directly on the main “Alarms Settings” screen by just tapping on the drop-down list labeled Alarm Tone and selecting one of the three options.

NOTICE The naming of the options may differ in each country.



Proceed as follows to change the Alarm Tone:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alarms** button  on the “Settings” screen.
Alternatively, you can also tap the **Alarm** icon on the navigation bar to open the “Alarms Settings” screen.
3. Tap the **Alarm Tone** drop-down menu and choose an option.
The selected alarm tone will play briefly.
Save your changes or change any other desired option on the “Alarms Settings” screen.

High and Low Temperature Alarms

You may change the high and low temperature alarm thresholds (refrigerated models only) for the centrifugation chamber temperature on the main “Alarms Settings” screen by tapping on the drop-down lists labeled “High Temperature Alarm” and “Low Temperature Alarm” and selecting one of the three options. The alarm threshold is set relative to the temperature setpoint and shifts every time you change the temperature setpoint.



Proceed as follows to change the High and Low Temperature Alarms:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alarms** button  on the settings screen.
Alternatively, you can also tap the **Alarm** icon on the navigation bar to open the “Alarms Settings” screen.
3. Tap the **High and Low Temperature Alarms** drop-down menu and choose an option.
The selected “High or Low Temperature Alarm” threshold is activated now.
4. Save your changes or change any other desired option on the “Alarms Settings” screen.


Snooze Timeout

You may set the timeout period during which an alarm is temporarily silenced when you tap the **Snooze** button directly on the main “Alarms Settings” screen. This is done by tapping on the drop-down list labeled “Snooze Timeout” and selecting one of the three periods.

Proceed as follows to change the Snooze Timeout period:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alarms** button  on the “Settings” screen.
Alternatively, you can tap the **Alarm** icon on the navigation bar to open the “Alarms Settings” screen.
3. Tap the **Snooze Timeout** drop-down menu and choose the period for which an alarm is silenced by the **Snooze** button.
The time period in the “Snooze Timeout” drop-down will change to the new setting.
4. Save your changes or change any other desired option on the “Alarms Settings” screen.

3.6.2. Alerts

Tapping the **Alerts** button  on the “Settings” screen takes you to the “Alerts Settings” screen.

On the “Alerts Settings” screen, you may change the alert volume, tone, and behavior of status messages issued by the centrifuge.

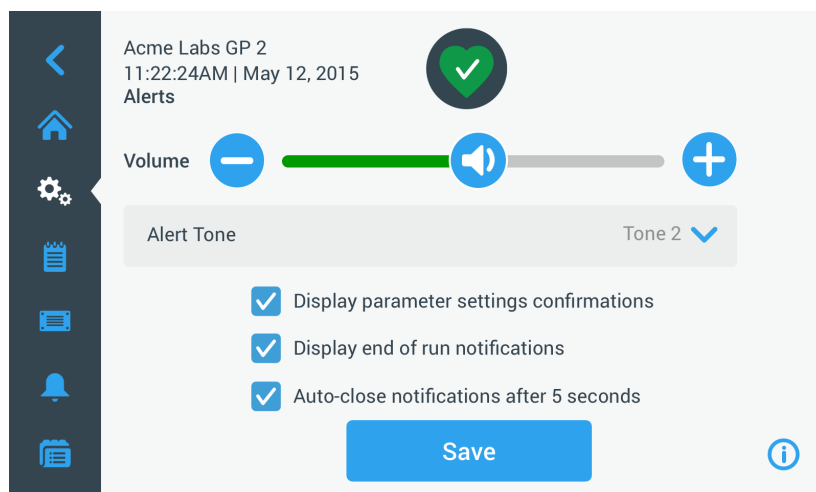


Figure 3–56: Settings -> Alerts Screen





Alert Volume

You may change the volume of the alert tone directly on the main “Alerts Settings” screen by tapping on the **speaker** icon in the slider shown in Figure 3–57 below and dragging left to decrease or right to increase.



Figure 3–57: Alerts Settings ->Alert Volume Slider

Proceed as follows to change the Alert Volume:



1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alerts** button  on the “Settings” screen.
3. Tap the **Alert Volume** slider and drag to the left to decrease and or to the right to increase. Alternatively, you can tap the  or  buttons on both sides of the slider to decrease or increase.
The alert tone will play briefly with the newly chosen volume.
4. Save your changes or change any other desired option on the “Alerts Settings” screen.

Alert Tone

You may change the alert tone for the front window directly on the main “Alerts Settings” screen by just tapping on the drop-down list labeled “Alert Tone” and selecting one of the three options.


NOTICE The naming of the options may differ in each country.

Proceed as follows to change the Alert Tone:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Alerts** button  on the “Settings” screen.
Alternatively, you can also tap the **Alert** icon on the navigation bar to open the “Alerts Settings” screen.
3. Tap the **Alert Tone** drop-down menu and choose an option.
The selected alert tone will play briefly.
4. Save your changes or change any other desired option on the “Alerts Settings” screen.

Alert Option Checkboxes

There are three checkboxes on the “Alerts Settings” screen:

1. Check or uncheck the “Display parameter settings” confirmations checkbox.
By default, this checkbox is checked and will display a “Save” confirmation pop-up window each time you change a main setpoint parameter, including run time, temperature, speed, acceleration and deceleration profile.
You may uncheck this box to disable the “Save” confirmation notifications for saving run time, temperature, speed, acceleration and deceleration parameter changes and have the Save button take effect immediately. “Save” confirmations will still be displayed for other settings—for example, changing alarm or alert settings.
2. Check or uncheck the “Display end of run” notifications checkbox.
By default, this box is checked and will display an “End of Run” notification pop-up window each time a centrifugation run has ended for both regular runs and program runs. You may uncheck this box to disable the End of Run message.
3. Check or uncheck the “Auto-close notifications after 5 seconds” checkbox.
By default, this box is checked and will auto-close all “Save” notifications, “End of run” notifications, and “Import/export” notifications after 5 seconds of no activity.
You may uncheck this box to require a manual tap of the **OK** button **or** the **X** icon  in the top right corner of the before-mentioned message screens.
4. Save your changes or change any other desired option on the “Alerts Settings” screen.

3. 6. 3. Access Control

Tapping the **Access Control** button  on the “Settings” screen takes you to the “Access Control” screen.

The “Access Control” screen allows you to toggle between “Open Mode” and “Secure Mode”.

By default, the centrifuge is in “Open Mode”, that is, you do not need to enter a passcode to access and operate the unit. “Secure Mode” requests a passcode from all users who want to operate advanced features of the centrifuge or change its settings (see Table 3–2 for a complete listing).

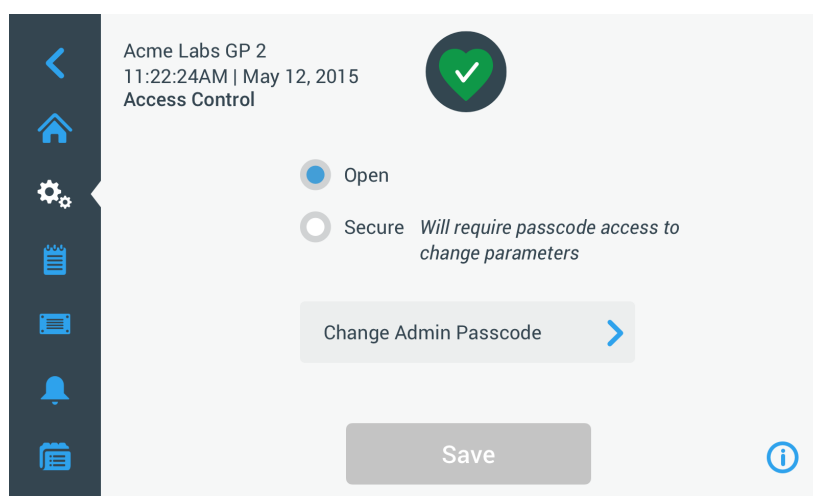


Figure 3–58: Settings -> Access Control Screen

“Secure Mode” displays a Login button in the top right corner of the touchscreen display. If you are not logged in and tap on any icon or button that invokes a passcode-protected feature, you will be prompted to enter the passcode and log in.

NOTICE Only the “Factory Settings” and “Field Certification” screens require specific passcodes, which are different from the admin passcode. These screens are reserved for Thermo Fisher Scientific service.

The following comparison of “Open Mode” versus “Secure Mode” indicates when a passcode login is required.

Action	Passcode Required in Open Mode	Passcode Required in Secure Mode
Set parameters and run the unit	No	No
Run programs	No	No
Create, edit, and delete programs	No	Yes
Change display settings	No	Yes
Change control settings	No	Yes
Change alarm settings	No	Yes
Change alert settings	No	Yes
View and export event log	No	No
Connect the unit to a wired network	No	Yes
View Files and Info screen	No	No
Snooze Alarms	No	No
Acknowledge alarms and alerts	No	No

Table 3-2: Passcode Login Requirements in Open and Secure Mode




If you switch from “Open Mode” to “Secure Mode”, you will, upon tapping the Save button, be prompted to enter the admin passcode before the change can be confirmed. All units ship with the same admin passcode pre-set at the factory and printed in the manual.

Changing the Admin Passcode

If you need to change the default passcode, you may do so from the “Access Control” screen by tapping the **Change Admin Passcode** button.

NOTICE The preset administrator passcode is “00000”.


Proceed as follows to change the admin passcode:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Access Control** button  on the “Settings” screen.
The “Access Control” screen shown in Figure 3-58 above appears.
3. Tap the **Change Admin Passcode** button in the “Access Control” screen.
A passcode prompt appears, asking you to enter the current admin passcode.
4. Enter the old admin passcode using the keypad.
Another passcode prompt appears, asking you to enter the new admin passcode.
5. Enter the new admin passcode using the keypad.
6. A third passcode prompt appears, asking you to re-enter the new admin passcode.
7. Enter the new admin passcode one more time to confirm, using the keypad.
You will be returned to the “Access Control” window. The mode has changed from open to secure, and the Save button has turned blue to indicate that you may save your changes now.
8. Tap the **Save** button to save the new passcode.
9. The “Passcode Changed” pop-up window appears, stating that your passcode has been changed.
10. To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
11. Note the new admin passcode for future reference.

Switching to Secure Mode

Changing the access mode from open to secure is done from the “Access Control” screen by tapping the **Secure** radio button.

Proceed as follows to change the admin passcode:

1. If you do not know the passcode, look up the factory pre-set admin passcode in the user manual. Refer to “Changing the Admin Passcode” on page 3-33.
2. Tap the **Settings** icon on the navigation bar.
3. Tap the **Access Control** button  on the “Settings” screen.
The “Access Control” screen appears.

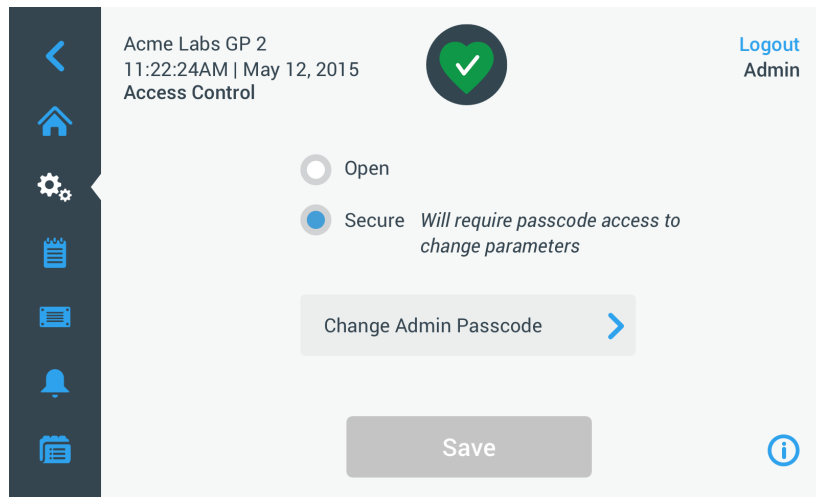




Figure 3-59: Settings -> Access Control: Access Control Screen in Secure Mode

4. Tap the **Secure** button in the “Access Control” screen.
The passcode prompt appears, asking you to enter the current admin passcode.
You will be returned to the “Access Control” window. The mode has changed from open to secure, and the Save button has turned blue to indicate that you may save your changes now.
5. Tap the **Save** button to save the new passcode.
The “Access Mode Change Success” pop-up window appears, indicating that the mode has been successfully changed to “Secure Mode” and that a passcode will be required from now on.
6. To confirm the changes, tap the **OK** button in the pop-up window. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Access Control” screen. The “Access Control” screen has a logout command and user name readout in the upper right corner now. Also new is the Create User Passcode button next to the Change Admin Passcode button.

Changing User Passcodes

Using the Create User Passcode button available in Secure Mode, you may, after logging in with the administrator passcode, create separate passcodes for other users. These users may then operate the centrifuge, but they may not change any settings.

3. 6. 4. Controls

Tapping the **Controls** button  on the “Settings” screen takes you to the “Controls” screen. The “Controls” screen offers a stack of eight buttons. These buttons allow for customizing the behavior of the controls and display items on the “Home” screen to suit your needs, altering the factory default settings. The options of the “Controls” screen include:

- “Setpoints”
- “Setpoints Mode”
- “View Time As”
- “Pulse Customization”
- “Lid Auto Open”
- “Compressor Off” (refrigerated models only)
- “Scheduling”
- “Rotor Bucket”

The “Controls” screen holds more options than would fit on one screen. Therefore, it has a scrollbar on the right side of the button stack. By tapping the scrollbar and dragging, you can display the options that are currently hidden.

Setpoints

The **Setpoints** button opens a setpoint entry screen where you can enter the default values that appear in the speed, acceleration, deceleration, and temperature boxes on the “Home” screen when you turn on the centrifuge or when the centrifuge has spun down after a run. By entering your own choice of settings, you can change the factory defaults to best suit your needs.

In “Advanced Mode”, you can choose which timed mode the centrifuge runs in by default: ACE, Timed or Continuous. “Standard Mode” only allows for a timed setpoint.

Table 3–3 lists the items on “Setpoints” screen and explains their respective functions.


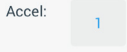

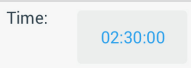
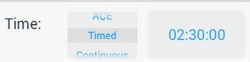
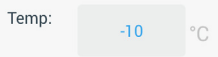
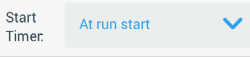
Field(s)	Function
	Speed field: Lets you set a default setpoint for the speed box on the “Home” screen. The value you enter is either rpm or x g, depending on the selection made with the radio buttons on the right.
	Accel field: Lets you choose between nine acceleration profiles from 1 to 9 (default is 1) for the accel box on the “Home” screen. “1” sets the slowest acceleration profile, while “9” chooses the fastest.
	Decel field: Lets you choose between ten deceleration profiles from 0 to 9 (default is 1) for the decel box on the “Home” screen. “1” sets the slowest braking profile, “9” chooses the fastest, and “0” lets the centrifuge slow down without active braking.
 	Time field in Standard Mode: Use this field to set a default setpoint for the time box on the “Home” screen. Time field in Advanced Mode: Use this field to set a default setpoint for the time box on the “Home” screen and a default behavior for centrifugation runs (see “Set Run Time” on page 3-8).
	Temp field (refrigerated models only): Lets you set a default setpoint for the temperature box on the “Home” screen.
	Start Timer field: Use this field to choose whether the set time begins when the centrifuge is started or once the acceleration phase is completed.

Table 3–3: Settings -> Controls Settings -> Setpoints Screen Items Explained

Setpoints for Standard and Advanced Modes

When the centrifuge is set up to run in “Standard Mode” (see the next section “Setpoints Mode” on page 3-36), the “Setpoints: Standard” screen appears.

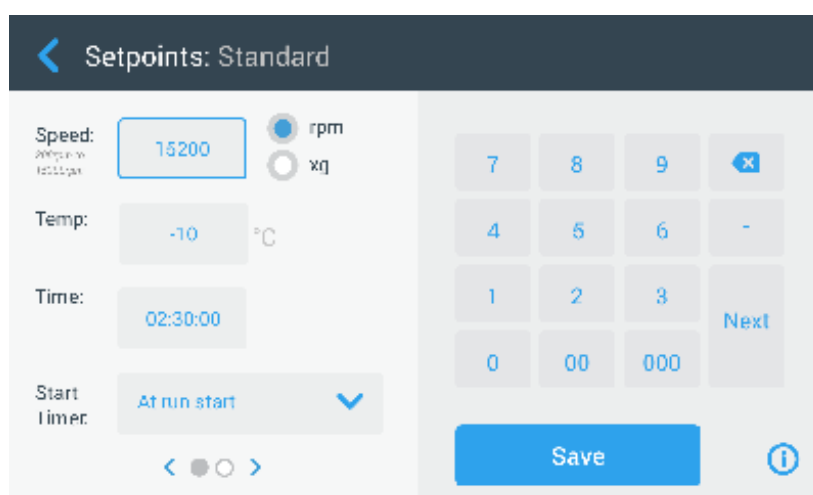


Figure 3–60: Settings -> Controls -> Setpoints: Standard Screen for Refrigerated Centrifuge

NOTICE Ventilated centrifuges do not have the “Temp” field.

When the centrifuge is set up to run in “Advanced Mode” (see the next section “Setpoints Mode” on page 3-36), the “Setpoints: Advanced” screen appears instead.

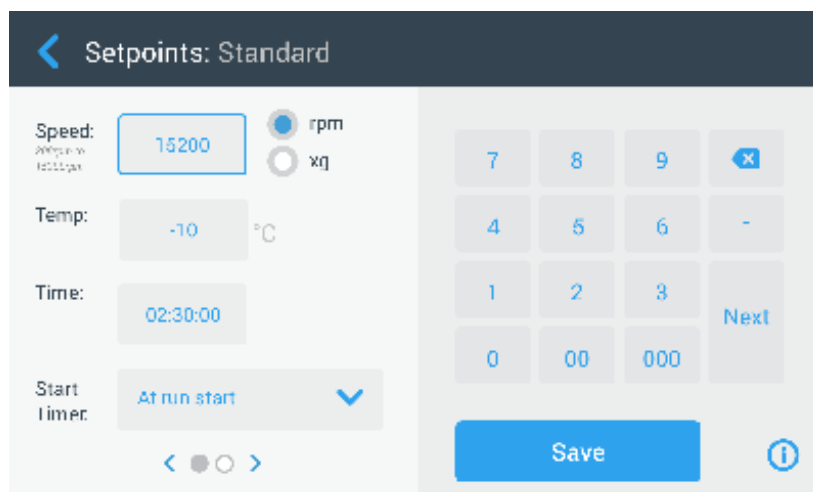


Figure 3-61: Settings -> Controls -> Setpoints: Advanced Screen for Ventilated Centrifuge

Proceed as follows to customize the setpoints for Standard Mode and Advanced Mode:

1. Tap the **Settings** icon on the navigation bar.
2. Tap the **Controls** button on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Setpoints** button.
The “Setpoints: Standard” screen or “Setpoints: Advanced” screen shown in Figure 3-61 above appears.
4. To customize the default setpoint that appears in the appropriate box of the “Home” screen, tap in the entry field, then use the keypad on the right to enter your default value.
The previous setting will be replaced immediately when you start entering digits on the keypad.
5. Tap **Next** on the keypad to continue to the next setpoint entry field.
If you have entered a correct speed value, the cursor will go to the next field.
If the centrifuge cannot be run with the setpoint you have just entered, an Out of range warning appears beneath the setpoint entry field, as shown in the example Figure 3-62 below. You will not be able to continue until you have entered an acceptable setpoint value.

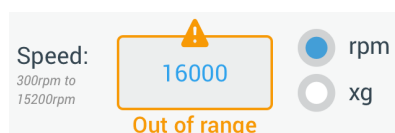


Figure 3-62: Settings -> Controls -> Setpoints Screen: Out of Range Value Alert


6. Tap the **Save** button to save the new setpoint(s).
A pop-up window appears, indicating that the setpoints have been successfully changed.
7. To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon closes this window and exits without saving.
You will be returned to the “Controls” screen.
The new setpoints will now appear in the respective boxes of the “Home” screen.

Setpoints Mode

This button lets you choose whether you wish to run the centrifuge in standard (factory default) or advanced setpoints mode. Standard mode allows you to run the centrifuge in a single timed mode only, while advanced mode lets you choose which timed mode to run before starting the centrifuge.

Proceed as follows to toggle between Standard Mode and Advanced Mode:

1. Tap the **Settings** icon on the navigation bar.
2. Tap the **Controls** button on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Setpoints Mode** menu and choose “Advanced” to customize, or “Standard” to return to the factory default.
4. Tap the **Save** button to save the new setpoints mode.
A pop-up window appears, indicating that the setpoints mode has been successfully changed.




- To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.
If you have chosen “Advanced Mode”, a click-wheel with “Timed Run” options will now be added to the screen that opens when you tap the **Time** box on the “Home” screen.
If you have reverted to “Standard Mode”, there is no click-wheel with “Timed Run” options.
- To further customize “Standard” or “Advanced Mode”, please refer to the previous section “Setpoints” on page 3-34.

View Time As


The **View Time As** button lets you choose whether you wish to have the counter in the time box of the “Home” screen run up or down while the centrifuge is spinning. The options are:



- Elapsed: Makes the timer run forward in continuous mode or up to the time setpoint in a timed run.
- Remaining: Makes the timer count down to zero from the time setpoint.

Proceed as follows to toggle between count-up and count-down timer modes:






- Tap the **Settings** icon  on the navigation bar.
- Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
- Tap the **View Time As** menu and choose **Elapsed** to have the timer run forwards (factory default), or **Remaining** to have it run backwards.
- Tap the **Save** button to save the new timer mode.
A pop-up window appears, indicating that the timer mode has been successfully changed.
- To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.

Pulse Customization

The **Pulse Customization** button opens the “Pulse Customization” screen that lets you set the default behavior for the Pulse button  on the “Home” screen. The following options are available for customizing the Pulse button:

- Continuous (factory default): This option makes the centrifuge run continuously at the default speed (for instructions on presetting the default speed, please refer to the section “Setpoints” on page 3-34) until you stop it by tapping the Pulse button  or Stop button  on the “Home” screen.
- Max speed: This option makes the centrifuge spin up to maximum speed and then stop.
- 15sec, 30sec, 1min: These options delay the start of the time counter until maximum speed has been reached.

Proceed as follows to select the default behavior for the Pulse button :




- Tap the **Settings** icon  on the navigation bar.
- Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
- Tap the **Pulse Customization** button.
The “Pulse Customization” screen appears.
- Choose an option.
- Tap the **Save** button to save the new mode for the Pulse button .
A pop-up window appears, indicating that the Pulse button  has been successfully customized.
- To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.

Lid Auto Open

This menu lets you preset the lid of the centrifuge to remain closed or unlock automatically once the run is complete. The drop-down list has two options only:

- Yes: Lid will unlock automatically once the centrifugation run is complete.
- No: Lid will remain closed after the end of the centrifugation run.

Proceed as follows to toggle between the auto-open and closed modes of the lid:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Lid Auto Open** menu and choose **Yes** to have the lid unlocked, or **No** to keep it closed (factory default).
4. Tap the **Save** button to save the open/closed default setting for the lid.
A pop-up window appears, indicating that the setting has been successfully saved.
5. To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.

Compressor Off




The **Compressor Off** button opens the “Compressor Off” screen. On refrigerated centrifuges, this screen lets you set an energy-saving timer that turns off the compressor after a selectable period of inactivity.

NOTICE This screen is not present on ventilated models.

The following options are available for the compressor inactivity timer:

- Never (factory default): This option keeps the compressor running while the centrifuge is powered up, so you can tap the Pre-temp button on the Home screen and start pre-tempering of samples instantaneously.
- 30min, 1hr, 4hrs, 8hrs: These options turn off the compressor automatically after the selected period of inactivity. When you tap the Pre-temp button on the “Home” screen, you save energy but you may have to wait for the compressor to run up before the pre-tempering of your samples is started.

Proceed as follows to activate the inactivity timer for the compressor:



1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Compressor Off** button.
The “Compressor Off” screen below appears.
4. Choose an option.
5. Tap the **Save** button to save the new inactivity timer for the compressor.
A pop-up window appears, indicating that the timer for the compressor has been successfully set.
6. To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.

Scheduling

The **Scheduling** button takes you to the “Scheduling” screen, where you can set up the centrifuge to automatically turn on and/or off at any time of the day once per day of the week.

You can set up one “Auto On” and “Auto Off” schedule and activate one or both right away, or keep one or both disabled for later use.

Auto On Scheduling

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Scheduling** button on the “Controls” screen.
The “Scheduling” screen appears.
If you have not configured any schedules yet, both the “Auto On” and “Auto Off” schedules will be disabled.
4. Tap the **Edit** button for the “Auto On” option to start setting up a schedule.
The “Edit Auto On” screen appears.
5. Tap on any day of the week—for example, M(onday).
6. Tap on **AM** or **PM** to select the period of the day

NOTICE The AM/PM division does not appear when the radio button in the “Settings -> Display -> Time” screen is set to 24hr (see “Time” on page 3-43 for details).

7. Tap the **Time On** field and enter the time of day at which you wish the centrifuge to start.
8. Tap the **Temp** field (refrigerated models only) and set the target temperature for pre-tempering, if desired.

NOTICE Observe the note about cooling and take precautions to ensure that the lid is closed at the specified start time.



9. Tap more days and repeat this procedure for as many days of the week as required.
10. Tap the **Save** button to save the new “Auto On” schedule for the centrifuge.

A pop-up window appears, alerting you to the risk of condensation pools freezing over in the centrifugation chamber.

NOTICE Observe the condensation warning and take precautions to prevent condensation from freezing in the centrifugation chamber.

11. To confirm the changes, tap the **OK** button in the pop-up window shown above.
You will be returned to the “Schedule” screen.
12. On the “Schedule” screen, tap **the slider** above the schedule field, so it changes to **Enabled**.
Your “Auto On” schedule is active now, the centrifuge will turn on automatically at the specified times.

Auto Off Scheduling

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Scheduling** button on the “Controls” screen.
The “Scheduling” screen appears.
If you have not configured any schedules yet, both the “Auto On” and “Auto Off” schedules will be disabled.
4. Tap the **Edit** button for the “Auto Off” option to start setting up a schedule.
The “Edit Auto Off” screen appears.
5. Choose the day(s) of the week and set the stop times as described further above for “Auto On”.
6. Tap the **Auto open lid** checkbox to have the lid open automatically after the centrifugation run, if desired.

NOTICE Observe the notes about how an open lid interferes with “Auto On” and about the requirement to open the lid along with “Auto Off” after cooling to prevent condensation.

7. Tap more days and repeat this procedure for as many days of the week as required.
8. Tap the **Save** button to save the new “Auto On” schedule for the centrifuge.
If you have chosen the “Auto Open Lid” option, a pop-up window appears to alert you to the risk that an open lid interferes with the next “Auto On” schedule.

NOTICE Observe the warning about the open lid and take precautions to have the lid closed before the next “Auto Off” schedule is effective.

9. To confirm the changes, tap the **OK** button in the pop-up window shown above.
You will be returned to the “Schedule” screen.
10. On the “Schedule” screen, tap **the slider** above the schedule field, so it changes to **Enabled**.
Your auto-off schedule is active now. The centrifuge will turn off automatically at the specified times.
The two sliders above the “Auto On” and “Auto Off” fields read “Enabled” (see Figure 3-63).

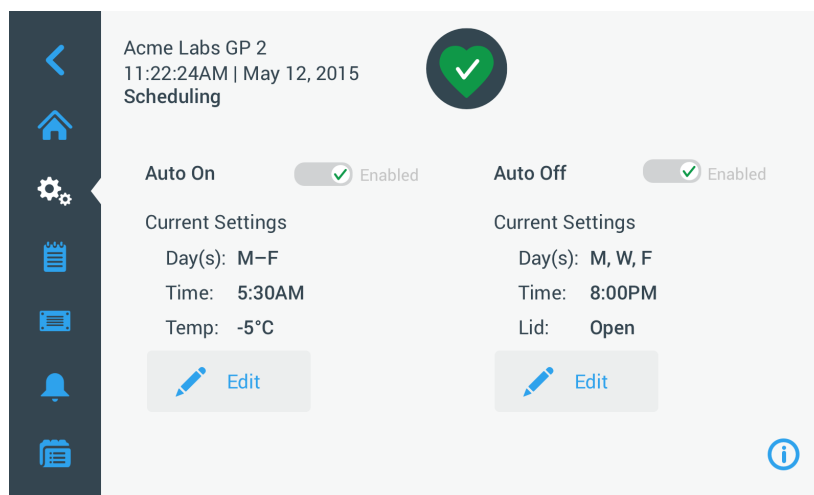





Figure 3-63: Settings -> Scheduling -Screen with All Schedules Disabled

Rotor Bucket


The **Rotor Bucket** button takes you to the “Rotor Bucket” screen. The “Rotor Bucket” screen allows you to enable and set the default bucket selection for the rotor detection prompt (see “Identify Rotor and Buckets” on page 2-10). Experience has shown that many users have a preferred bucket type for each rotor. Having this bucket identified as the default selection in the rotor detection prompt saves valuable time during the set-up process.

If there is no need to confirm bucket type in the rotor detection prompt because you do not use any other bucket type, the bucket type prompt can be disabled altogether.

Proceed as follows to set up a default rotor bucket selection:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Controls** button  on the “Settings” screen.
The “Controls” screen appears.
3. Tap the **Rotor Bucket** button.
The “Rotor Bucket” screen appears.
4. Tap on either of the drop-down lists to select a different bucket type.
If there is no need to confirm bucket type in the rotor detection prompt, disable the “Prompt for ...” rotor bucket at the start of each run checkbox.
5. Tap the **Save** button to save the default selections for the rotor detection prompt.
A pop-up window appears, indicating that the setting has been successfully saved.
6. To confirm the changes, tap the **OK** button in the pop-up window that appears. Tapping the **X** icon  closes this window and exits without saving.
You will be returned to the “Controls” screen.

3. 7. Display

Tapping the **Display** button  on the “Settings” screen takes you to the “Display” screen. The “Display” screen offers a stack of buttons. These buttons allow for customizing general display properties for all screens of the Graphical User Interface to suit your needs, altering the factory default settings. The options on the “Display” screen include:

- “Brightness”
- “Language”
- “Auto Date/Time”
- “Date”
- “Time”
- “Region”
- “Unit Name”

The “Display” screen holds more options than would fit on one screen. Therefore, it has a scrollbar on the right side of the button stack.

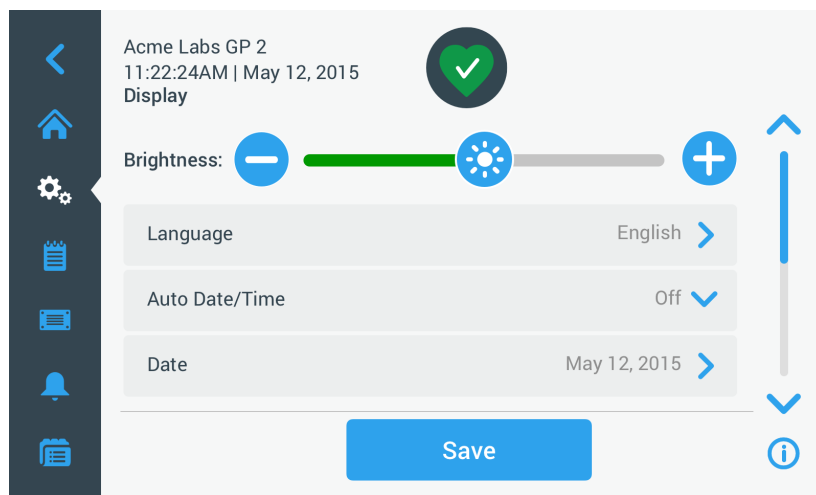


Figure 3–64: Settings -> Display Screen

By tapping the scrollbar and dragging, you can display the options that are currently hidden.

Selections are made by dragging a slider or tapping **drop-down lists** on the screen. You may change one, several, or all of the options before confirming your selections with the **Save** button.

3. 7. 1. Brightness

If the ambient lighting conditions make the centrifuge’s display unit difficult to read, you can change the brightness directly on the “Display” screen. This is achieved by tapping on the “Brightness” slider and dragging.

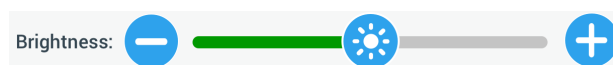






Figure 3–65: Settings -> Display Screen -> Brightness

Proceed as follows to change the brightness:

1. Tap the **Settings** icon  on the navigation bar.
2. Tap the **Display** button  on the “Settings” screen.
The “Display” screen appears.
3. Tap the **Brightness** slider and drag to the left to decrease and or to the right to increase. Alternatively, you can tap the  or  buttons on both sides of the slider to decrease or increase.
The screen dims down or brightens up as you drag the slider.
If you make any changes, the Save button at the bottom of the screen is highlighted.
4. When you have finished adjusting brightness, tap the **Save** button to save the new brightness setting for the display unit.