



Microplate Centrifuge

Quick Guide

Original Instructions



Agilent Technologies

Notices

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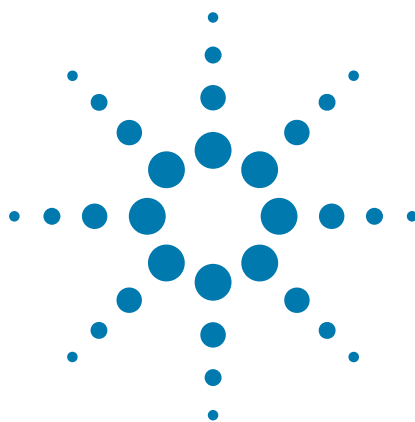
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 A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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Microplate Centrifuge Quick Guide

This guide contains the following topics:

- “About this guide” on page 2
- “Safety information” on page 2
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- “Starting up and shutting down” on page 6
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- “Loading and unloading microplates and counterweights” on page 11
- “Spinning labware” on page 13
- “Centrifuge Diagnostics – Controls tab reference” on page 16



About this guide

This guide summarizes the Microplate Centrifuge operator instructions.

This guide assumes the following:

- The Centrifuge is installed correctly and the buckets are correctly aligned. For installation instructions, see the *Microplate Centrifuge User Guide*.
- The device profile for the Centrifuge is already created and the bucket teachpoints are already set. For setup instructions, see the *Microplate Centrifuge User Guide*.
- You are familiar with the VWorks Automation Control software. See the *VWorks Automation Control User Guide*.

If you are using another lab automation system software, see the user documentation for the software.

For user information about related products, you can search the product knowledge base or download the latest version of a PDF file from the Agilent Technologies website at:

www.agilent.com/chem/askb

Safety information

Before using the Microplate Centrifuge

Before using the Centrifuge, your organization should make sure that you are properly trained in:

- General laboratory safety
- The correct and safe operation of the Centrifuge
- The correct and safe operation of lab automation systems or components used in combination with the Centrifuge

General safety precautions

For general safety precautions, intended product use statement, and the list of safety labels, see the *Automation Solutions Products General Safety Guide*. If the Centrifuge is installed in a BioCel System, see the *BioCel System Safety Guide*.

Moving-parts hazards

The Centrifuge will not spin unless:

- The door is closed and locked.
- The buckets are unlocked.
- The bucket payloads are balanced.
- The appropriate software command is sent.

The Centrifuge automatically closes and locks the door whenever you start a spin cycle. The Centrifuge door will not unlock or open if the rotor is moving.



WARNING Do not attempt to manually unlock the door while the rotor is moving. Although no longer powered, the buckets might still be rotating at a dangerous speed.

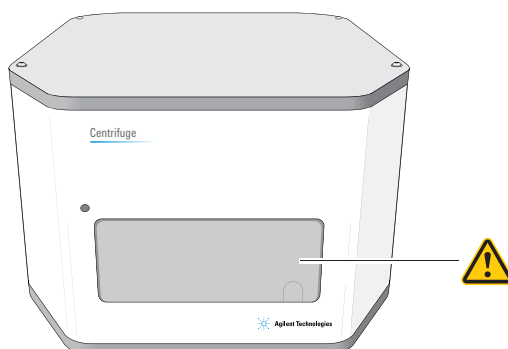


WARNING Keep away from the Centrifuge while it is in motion. Not all circumstances can be foreseen and serious injury is possible. It is the responsibility of every operator to follow warnings and safety labels.



WARNING Keep away from the Centrifuge door while it is opening or closing. The Centrifuge door can cause possible pinching, piercing, or bruising if your hand is in the opening when it closes.

Figure Centrifuge door



WARNING Do not operate the Centrifuge if any of its components or accessories are damaged or have been modified in any manner not authorized by Agilent Technologies. Do not operate the Centrifuge if objects or liquids are trapped within the chamber. Discontinue use if the Centrifuge vibrates or emits noise above normal levels.



WARNING Each Centrifuge bucket can hold a microplate or counterweight that weighs up to 250 g (8.82 oz). Placing heavier microplates or counterweights in the Centrifuge can cause the device to malfunction during operation, damaging the device and causing severe injury.

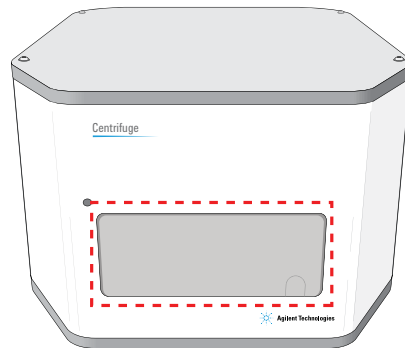


WARNING Do not operate the Centrifuge above speeds of 1500 RPM unless it is securely mounted to a structure approved by Agilent Technologies.

Hardware overview

The Centrifuge door is at the front of the device. The door opens to permit you to load and unload microplates. The door closes and locks before a spin cycle starts. For more information, see the [Microplate Centrifuge User Guide](#).

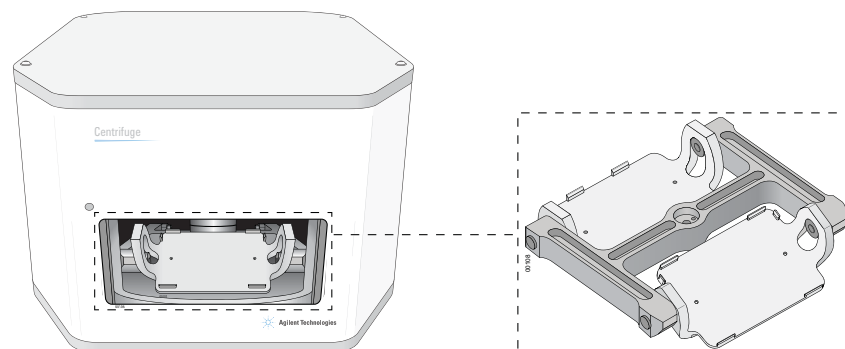
Figure Door at the front of the Centrifuge



Inside the Centrifuge are two buckets that host microplates and counterweights. The following figure shows a close-up view of the buckets.

Note: Only one bucket is visible from the doorway.

Figure Buckets inside the Centrifuge



Workflows

About the workflows

There are two ways you can use the Centrifuge to spin microplates:

- In a lab automation system, where you run a protocol containing Centrifuge tasks to spin multiple microplates in one or more spin cycles. See [“Workflow for running a protocol” on page 5](#).
- As a standalone device, where you use commands in Centrifuge Diagnostics to spin an individual microplate. See [“Workflow for using Centrifuge Diagnostics” on page 6](#).

Workflow for running a protocol

You can start one or more spin cycles when you run a protocol containing Centrifuge tasks. During the run, the lab automation system robot will load and unload sample microplates in the Centrifuge, and the Centrifuge will spin the microplates based on the parameters specified in the Centrifuge tasks.

The workflow for starting a run is as follows:

Step	For this task...	See...
1	Start up the lab automation system.	Lab automation system user guide, such as the <i>BioCel System User Guide</i>
2	Open the form or protocol that contains the Centrifuge tasks.	<i>VWorks Automation Control User Guide</i>
3	Make sure the spin parameters are set correctly.	<i>VWorks Automation Control User Guide</i>
4	Determine whether you need to load the counterweight in bucket 2 before the run.	<i>VWorks Automation Control User Guide</i>
5	Load the counterweight in the Centrifuge if required.	“Loading and unloading microplates and counterweights” on page 11
6	Start the protocol run.	<i>VWorks Automation Control User Guide</i>

Workflow for using Centrifuge Diagnostics

You use Centrifuge Diagnostics to spin individual microplates without running protocols. The workflow is as follows:

Step	For this task...	See...
1	Start up the Centrifuge.	“Starting up and shutting down” on page 6
2	Set the spin parameters.	“Setting the spin parameters” on page 10
3	Load the microplate and counterweight.	“Loading and unloading microplates and counterweights” on page 11
4	Start the spin cycle.	“Spinning labware” on page 13

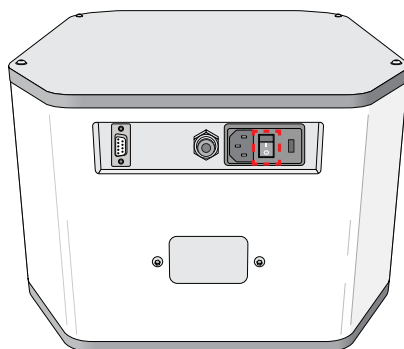
Starting up and shutting down

Starting up the Centrifuge

To start up the Centrifuge:

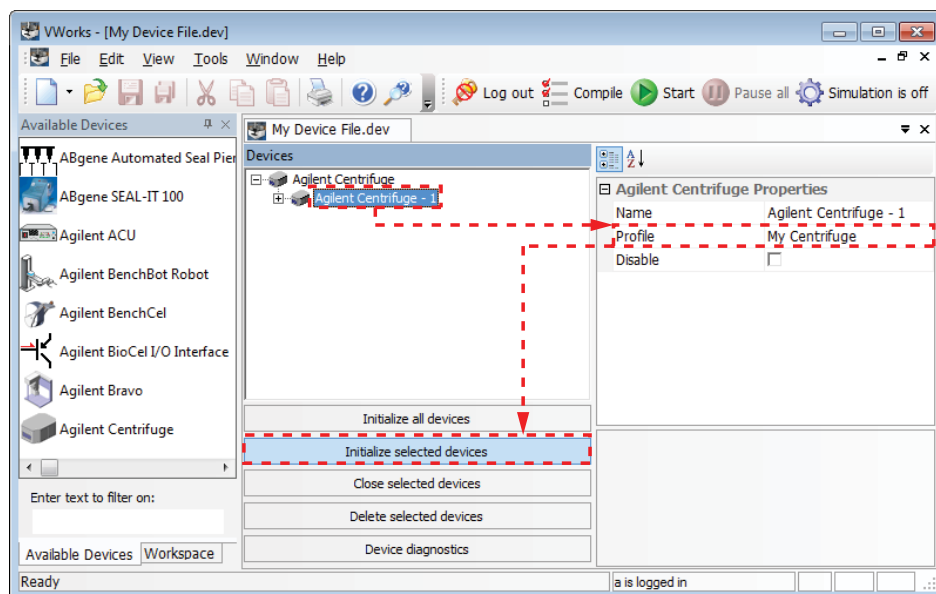
- 1 Verify that the air supply is turned on.
- 2 Turn on the computer and the monitor. The Microsoft Windows operating system starts.
- 3 On the back of the Centrifuge, press the power switch to the on position (I).

Figure Power switch on the back of the Centrifuge

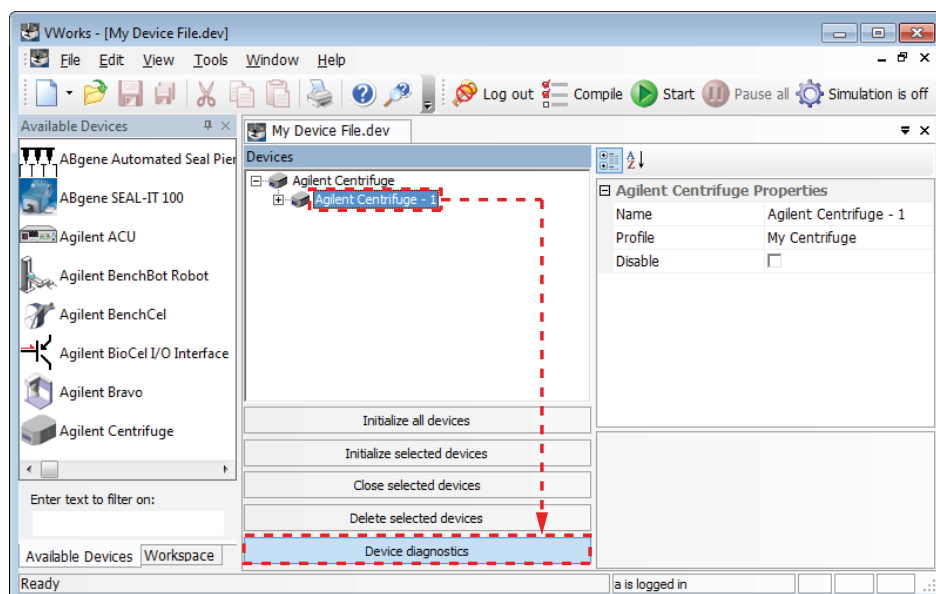


- 4 Start the VWorks software.
- 5 Open the device file.

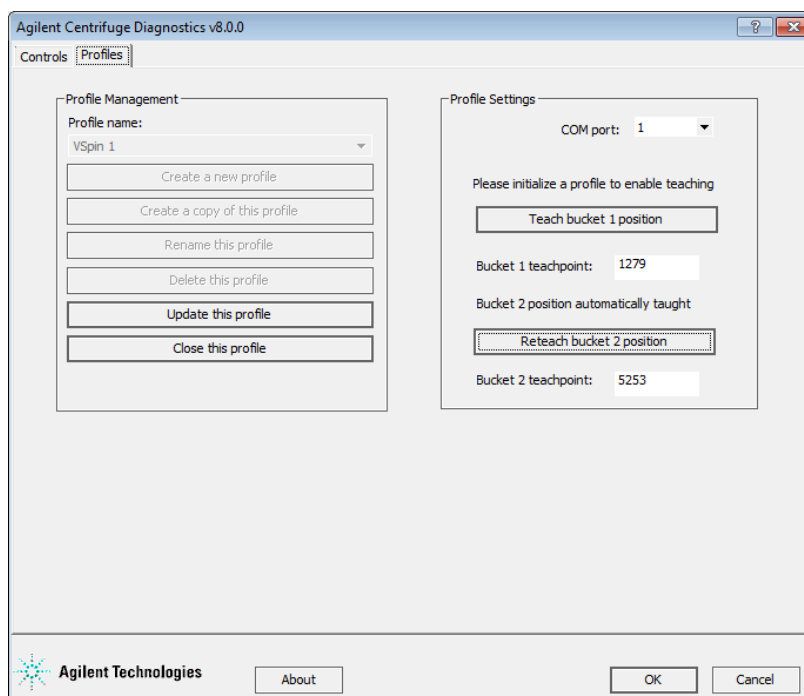
- 6 Turn off the simulation mode.
- 7 In the **Devices** area, select the **Centrifuge** device.
- 8 In the **Centrifuge Properties** area, make sure the correct profile is selected.
- 9 Click **Initialize selected devices**.



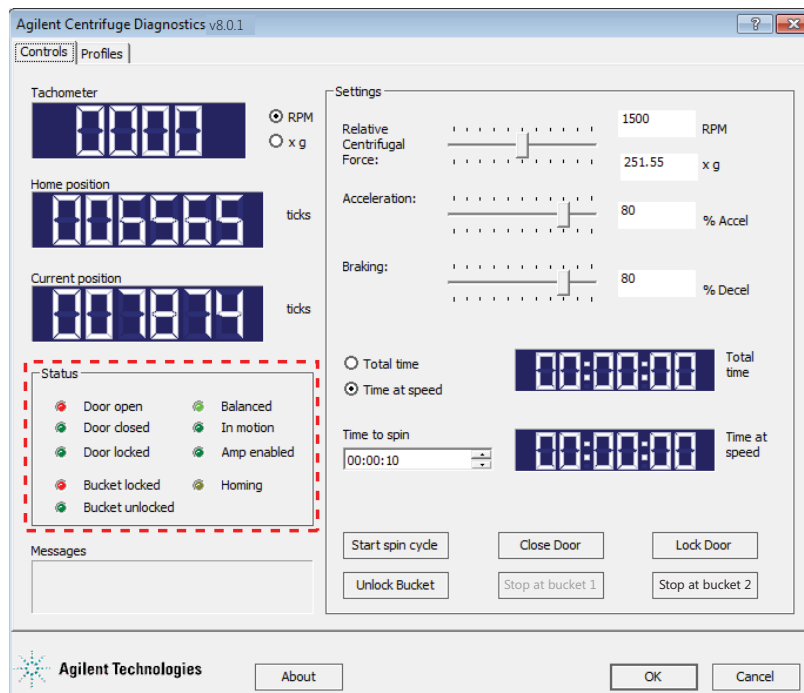
- 10 Check the status indicators in the **Centrifuge Diagnostics** dialog box to make sure that the Centrifuge is turned on:
 - a In the device file, click **Device diagnostics**.



The Centrifuge Diagnostics dialog box opens.



- b** Click the **Controls** tab. In the **Status** area, check that the appropriate indicator lights are turned on. For a description of the indicator lights, see “[Status area](#)” on page 16.

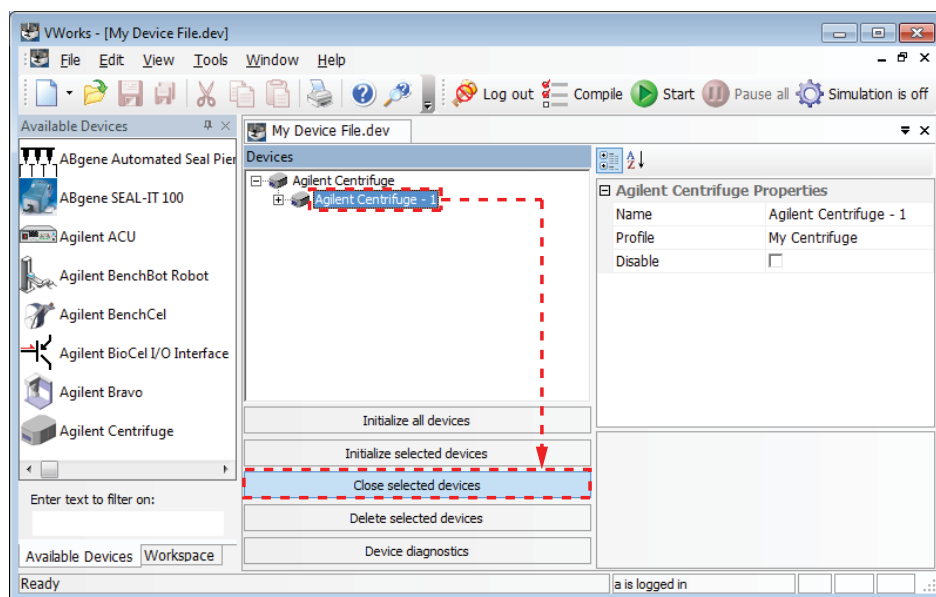


Shutting down the Centrifuge

Shut down the Centrifuge before you perform any routine maintenance or service the device.

To shut down the Centrifuge:

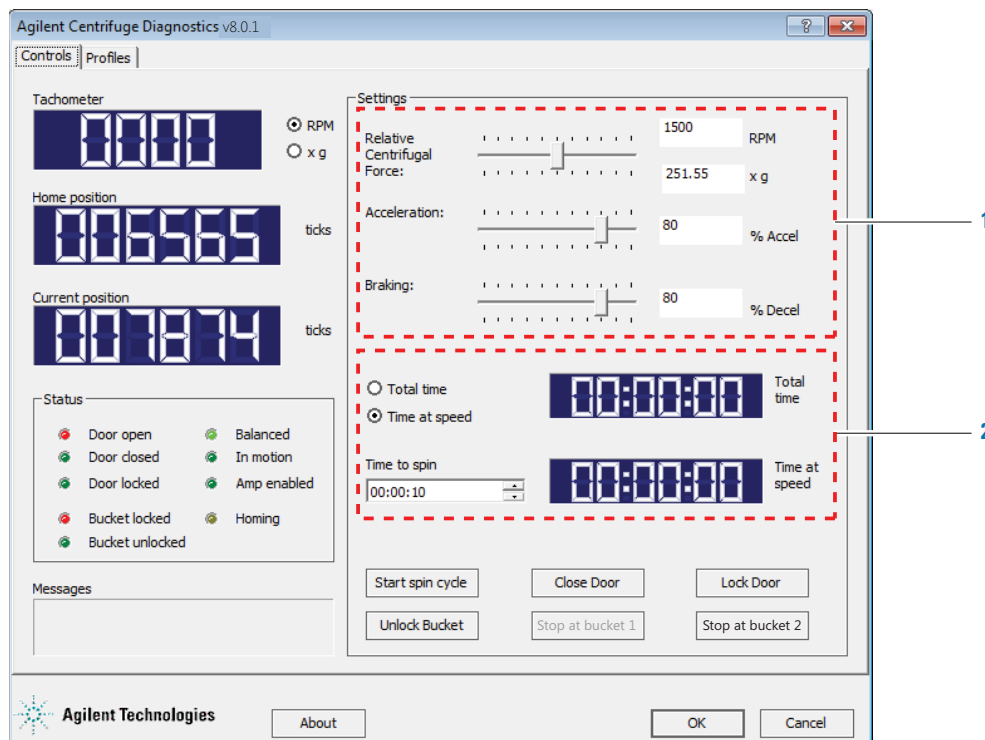
- 1 Remove any labware or counterweight that is in the Centrifuge. For unloading instructions, see [“Loading and unloading microplates and counterweights”](#) on page 11.
- 2 Close the **Centrifuge Diagnostics** dialog box.
- 3 In the device file, select the Centrifuge you want to shut down, and then click **Close selected devices**.



- 4 Exit the VWorks software.
- 5 Turn off the computer and monitor.
- 6 On the back of the Centrifuge, press the power switch to the off position (O).
- 7 Turn off the air supply to the Centrifuge.

Setting the spin parameters

You set the spin parameters in the Centrifuge Diagnostics Controls tab. When you set the spin parameters, you are specifying the motion parameters (1) and time parameters (2).



To set the spin parameters:

- 1 In the **Centrifuge Diagnostics Controls** tab, set the motion parameters:

Motion parameter	Description
Relative Centrifugal Force	The rotor speed, in revolutions per minute (RPM) or as a multiple of gravity (x g). Drag the slider left or right to set the parameter, or type the desired value in either the RPM or x g box.
Acceleration	The rate of centrifugation, as a percent of the factory-set maximum acceleration. Drag the slider left or right to set the parameter, or type the desired value in the % Accel box.
Braking	The deceleration of the centrifuge, as a percent of the factory-set maximum deceleration. Drag the slider left or right to set the parameter, or type the desired value in the % Decel box.

2 Set the time parameters:

- a** Select one of the following to specify how the software should count the spin time:

Time parameter	Description
Total time	The total spin time, including acceleration and braking.
Time at speed	The length of time during which the Centrifuge is spinning at the target speed. The time does not include acceleration and braking.

- b** In the **Time to spin** box, type the length of total time or time at speed, in hh:mm:ss. Alternatively, you can use the up and down arrows to specify the length of time.

Loading and unloading microplates and counterweights

Balancing the Centrifuge buckets



WARNING Each Centrifuge bucket can hold a microplate or counterweight that weighs up to 250 g (8.82 oz). Placing heavier microplates or counterweights in the Centrifuge can cause the device to malfunction during operation, damaging the device and causing severe injury.

The Centrifuge buckets must be the same weight or within the balance tolerance to remain balanced during the spin. Unbalanced buckets can cause a spin error.

IMPORTANT Each Centrifuge is shipped with a pair of buckets that have been balanced to within 1 g of each other. To stay within the balance tolerance of the Centrifuge, use only the buckets that shipped with your Centrifuge. Do not use buckets from another Centrifuge.

IMPORTANT Before placing microplates and counterweights in the Centrifuge, make sure that the weight of the two items are within 10 g of each other to avoid a spin error.

If you want to spin one sample microplate, be sure to use a counterweight that is within 10 g of the sample microplate. The counterweight can be a microplate containing water. If you want to spin two sample microplates together, make sure they weigh within 10 g of each other.

Note: The software does not provide indications that the buckets are unbalanced when you load the microplates and counterweights. If the buckets are unbalanced, the rotor will stop during the spin, and the Balance light in Centrifuge Diagnostics will turn on.

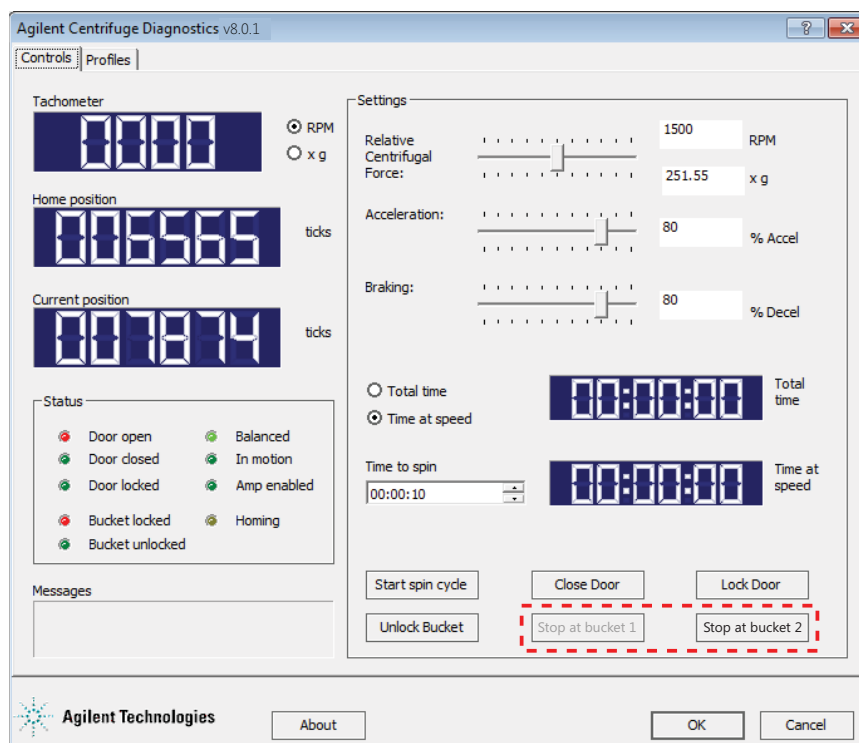
IMPORTANT If you are using a microplate counterweight, replace it regularly (weekly with heavy use), especially if the microplate is made from polystyrene.

Procedure



WARNING The Centrifuge door closes and opens automatically when you click the **Stop at bucket** commands. Keep away from the Centrifuge door while it is opening or closing. The Centrifuge door can cause possible pinching, piercing, or bruising if your hand is in the opening when it closes.

You use the **Stop at bucket** commands in the Centrifuge Diagnostics Controls tab when loading and unloading microplates and counterweights in the Centrifuge.



To load microplates or the counterweight in the Centrifuge:

- 1** In the **Centrifuge Diagnostics Controls** tab, click **Stop at bucket 2**. The Centrifuge closes and locks the door, moves bucket 2 to the door, and then opens the door. Bucket 2 should be visible from the doorway.
- 2** If you are using a counterweight, place it in bucket 2. If you are spinning two sample microplates, place one of the microplates in bucket 2.
You can place the microplate or counterweight in the bucket manually or using the lab automation system robot. For instructions on how to use the robot, see the robot user documentation.
- 3** Click **Stop at bucket 1**. The Centrifuge closes and locks the door, moves bucket 1 to the door, and then opens the door. Bucket 1 should be visible from the doorway.
- 4** Place the sample microplate in bucket 1.

To unload a microplate or counterweight:

- 1 In the **Centrifuge Diagnostics Controls** tab, click **Stop at bucket 1** or **Stop at bucket 2**. The Centrifuge closes and locks the door, moves the bucket to the door, and then opens the door. The labware should be visible from the doorway.
- 2 Remove the microplate or counterweight from the bucket.
You can pick up the microplate or counterweight from the bucket manually or using the lab automation system robot. For instructions on how to use the robot, see the robot user documentation.
- 3 Repeat steps 1 and 2 to remove the second microplate or the counterweight.

Spinning labware

Before you start

Make sure:

- The spin parameters are set correctly. See [“Setting the spin parameters” on page 10](#).
- You have loaded the counterweight and sample microplate. See [“Loading and unloading microplates and counterweights” on page 11](#).

Procedure



WARNING The Centrifuge automatically closes the door when you start a spin cycle and automatically opens the door when the spin cycle is finished. Keep away from the Centrifuge door while it is closing or opening. The Centrifuge door can cause possible pinching, piercing, or bruising if your hand is in the opening when it closes.

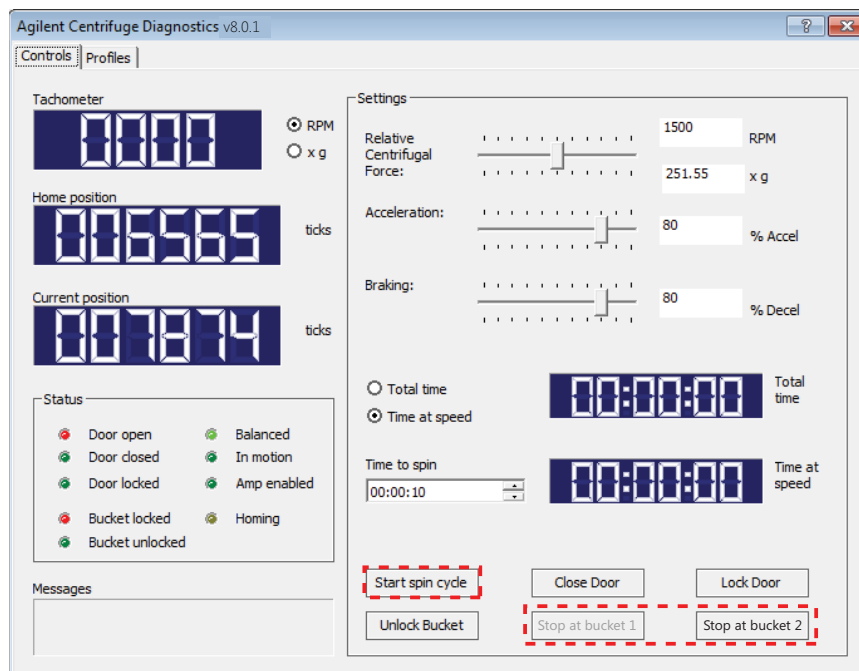


WARNING Keep away from the Centrifuge while it is in motion. Not all circumstances can be foreseen and serious injury is possible.



WARNING Do not attempt to manually unlock the door while the rotor is moving. Although no longer powered, the buckets might still be rotating at a dangerous speed.

You use the **Start spin cycle** command in the Centrifuge Diagnostics Controls tab to start spinning the microplate. You can use the **Stop at bucket** commands to stop the spin in progress.

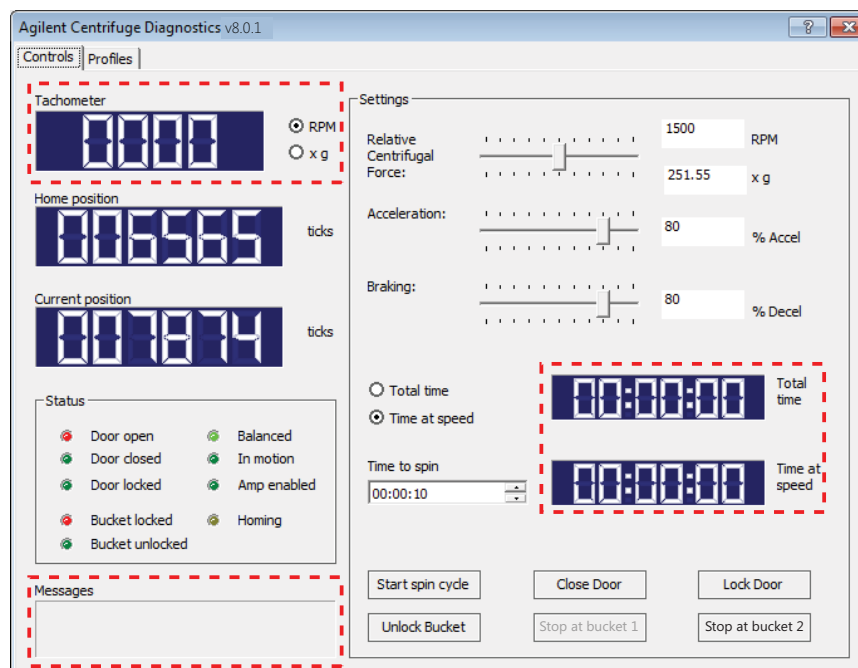


To start spinning the labware:

- 1 In the **Centrifuge Diagnostics Controls** tab, click **Start spin cycle**. The Centrifuge closes and locks the door, and then starts spinning the labware. When it is finished, the door opens. Bucket 1 (or the bucket loaded last) should be visible in the doorway.
- 2 To spin another sample microplate, replace the microplate that is in the bucket, and then start another spin cycle.

To monitor the progress of a spin cycle:

Check the information in the following areas of the **Controls** tab:



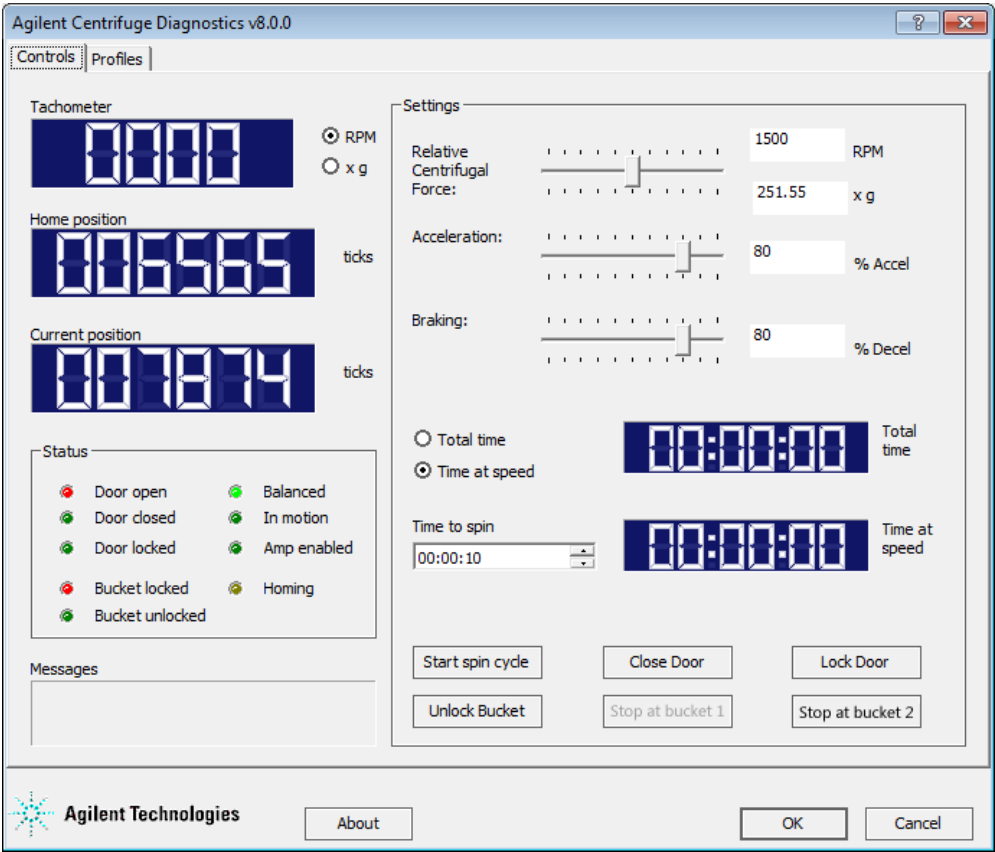
Name of area in the Controls tab	Description
Tachometer	The current spin speed. You can select the desired spin speed unit to display: RPM (revolutions per minute), or x g (a multiple of gravity).
Total time	The length of time, including acceleration and braking, of the current spin cycle.
Time at speed	The length of time during which the Centrifuge has been spinning at the target speed (not including acceleration and braking).
Messages	Error or status messages.

For information about the Status indicators, see “[Status area](#)” on page 16.

To stop a spin cycle:

In the **Centrifuge Diagnostics Controls** tab, click either **Stop at bucket 1** or **Stop at bucket 2**. The Centrifuge decelerates, moves the specified bucket to the door, and then opens the door.

Centrifuge Diagnostics — Controls tab reference



Display area

Name of the area	Description
Tachometer	The current spin speed. You can select the desired spin speed unit to display: RPM (revolutions per minute), or x g (a multiple of gravity).
Home position	The home position value. The home position is also the bucket-1 teachpoint.
Current position	The current position of bucket 1.

Status area

Name of the area	Description
Door open	Indicates that the Centrifuge door is open.
Door closed	Indicates that the Centrifuge door is closed.

Name of the area	Description
Door locked	Indicates that the door is locked.
Bucket locked	Indicates that the bucket at the door is locked in position to prevent the rotor from moving.
Bucket unlocked	Indicates that the front bucket is unlocked and the rotor can move.
Balanced	Indicates that the buckets are out of balance during spinning, because one of the buckets has more mass than the other bucket.
In motion	Indicates that the buckets are spinning.
Homing	Indicates that the Centrifuge is in the homing process.

Messages area

Displays error or status messages.

Settings area

Parameter or command	Description
Relative Centrifugal Force	The rotor speed, in RPM (revolutions per minute) and as a multiple of gravity.
Acceleration	The rate of centrifugation, as a percent of maximum acceleration.
Braking	The deceleration of the centrifuge, as a percent of maximum deceleration.
Total time	The total spin time, including acceleration and braking.
Time at speed	The length of time during which the Centrifuge is spinning at the target speed. The time does not include acceleration and braking.
Time to spin	The length of total time or time at speed, in hh:mm:ss.
Start spin cycle	The command to start the spin.
Open/Close Door	The command to open or close the Centrifuge door.
Lock/Unlock Door	The command to lock or unlock the Centrifuge door.

Parameter or command	Description
Lock/Unlock Bucket	The command to lock or unlock the front bucket. Locking the front bucket prevents the rotor from moving. Unlocking the front bucket allows the rotor to move. Unlock the bucket when you want to set a teachpoint. Lock the bucket after you finish setting the teachpoints.
Stop at Bucket 1	The command to: • Move bucket 1 to the door. • If a spin cycle is in progress, stop the spin cycle and present bucket 1.
Stop at Bucket 2	The command to: • Move bucket 2 to the door. • If a spin cycle is in progress, stop the spin cycle and present bucket 2.



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