

Calibration Guide

Using the QIAgility[®] to pipet liquids into the Rotor-Disc[®] 100

This document describes using the QIAgility instrument to pipet liquids into the Rotor-Disc 100 (RD100) using the loading block, and also outlines strategies to prevent common errors and maximize pipetting performance. Please read the entire document before starting to use the RD100.

Supported software versions

The RD100 is fully supported in instrument software version 4.10 and all subsequent releases.

Note: EasyLift available since QIAgility software version 4.12.

Position calibration

Owing to the small size of the RD100 tubes, accurate position calibration of the loading block and all tip racks is critical to ensure that tips successfully enter all intended tubes of the disc.

Loading block placement

The following mechanical constraints are imposed on the Rotor-Disc 100 Loading Block to improve positional accuracy when pipetting into the RD100 tubes:

The software inhibits selection of the Rotor-Disc 100 Loading Block so that it is available only in the following positions: **A1** and **B1**.

Tip rack calibration

The exact position of the tip racks is slightly flexible due to the spring's elasticity. This results in a variable orientation of the tip when it is picked up by the pipetting head. As the RD100 tubes have a very small diameter, even these slight variations in tip position can negatively affect pipetting results. Therefore, to minimize this variation, it is very important to manually position the tip rack and tip rack holder firmly into the upper left corner. Afterwards, calibration of all tip rack positions is required, and is performed for both 50 μ l and 200 μ l tip types as described on the next page.



1. Use an empty tip rack.
2. Lower the pipetting hub onto the empty tip calibration well.
3. Locate the hub centrally over the calibration well by eye.
4. When placing the tip rack adapter on the worktable, make sure that it is pushed to the "upper left corner".

Calibration recommendations for the RD100 in the "Easy lift" loading block

The following recommendations apply when calibrating the RD100:

1. Ensure that the loading block is completely flat and firmly secured.
2. Press the RD100 plasticware flat against the loading block.
3. Ensure that all tip racks are well calibrated (as above).
4. Where possible, use 200 μ l tips for position calibration of the RD100. These are straighter and more mechanically rigid than the 50 μ l tips. Pick up a new tip (command "get new tip"). Also, the 200 μ l tips are thicker than 50 μ l tips and are easier to locate centrally by eye in the RD100 wells. Note that the software will preferentially select a 200 μ l tip for position calibration, provided at least one 200 μ l tip rack is configured on the worktable before starting position calibration of the RD100.
5. Calibrate the x- and y-coordinates of the RD100 using the cross in the center of the loading block's RD100 EasyLift holder (indicated by "cal" in the software). Position the tip precisely at the center of the cross.
6. Several positions on the loading block can be separately height calibrated in the z-axis. For the RD100, calibrate "Rotor-Disc [100] Easy Lift Block 25 μ l tube". Ensure that the calibration tip is placed centrally in the RD100 A1 calibration tube.

Calibration recommendations for the RD100 in the Rotor-Disc 100 Loading Block

The following recommendations apply when calibrating the RD100:

1. Ensure that the loading block is completely flat and firmly secured.
2. Press the RD100 plasticware flat against the loading block.
3. Ensure that all tip racks are well calibrated (as above).
4. Where possible, use 200 μ l tips for position calibration of the RD100. These are straighter and more mechanically rigid than the 50 μ l tips. Also, the 200 μ l tips are thicker than 50 μ l tips and are easier to locate centrally by eye in the RD100 wells. Note that the software will preferentially select a 200 μ l tip for position calibration, provided at least one 200 μ l tip rack is configured on the worktable before starting position calibration of the RD100.

5. **Calibrate the RD100 using the well "A1" identified by the notch in the loading block and RD100 plastic. Take care to avoid using a neighboring well.**
6. **Ensure that the calibration tip is placed centrally in the RD100 A1 calibration tube.**

Confirmation procedure

A good technique to confirm the RD100 position calibration is to perform a dry run that attempts to load a small volume of liquid into all RD100 wells using one tip for all ejections. This can be configured as follows:

1. **Create a reaction that loads 100 replicates of 10 μ l water into the RD100.**
2. **Modify the tip reuse settings to use tips 100 times.**
3. **Ensure that the tip enters all RD100 wells successfully with little or no contact between the tip and inner walls of the tubes.**

It is reasonable to expect some contact between tips and the inner walls of the RD100 tubes during normal operation. This contact should be light. The contact does not affect PCR results. If the contact is heavy or results in lifting of the disc, recalibration of the RD100 position is necessary. If excessive contact occurs, note which side of the tube the tip has collided with, open the position calibration screen and move the calibration one step in the opposite direction to the contact point, and then save. Retry the run and repeat recalibration if necessary.

Height calibration

After the plate calibration, the height calibration has to be performed as shown in the wizard. An automatic height calibration is recommended.

Level sensor operation

Owing to the material used in construction of the RD100 ring, the narrow shape of its tubes, and the likelihood of some contact between the tip and inner walls of some tubes, there is a high probability of false triggering of the level sensor when the ring is used on level sensing instruments. Such false triggering manifests as ejection of sample liquid at a position that is too high above the master mix, which has previously been aliquoted into the tubes. To avoid dispensing problems associated with false triggering, the level sensor is automatically disabled by the software when pipetting into the RD100 on level sensing instruments. This does not affect operation of the level sensor when pipetting to or from other types of wells in the run — if the level sensor is enabled in the run, it will be actively used in these other non-RD100 wells.

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