

Title:
(BIO-RAD LOGO-B/W)
Creator:

Twister Extended Capacity



Installation Guide

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Contents	The information in this document may contain typographical errors or technical inaccuracies and is subject to change without notice. Modifications and additions may also be made to the products described in this document at any time.
Statement of Proper Use	The Twister is designed to be used in a laboratory environment. The Twister is integrated through hardware and software with an external microplate processing device, such as a reader, washer, or dispenser. The Twister automates the processing of microplates by the external device. The Twister software is designed to run under Windows 95 and Windows NT4.0.
WARNING 	Use this product only in the manner described in this manual. When used other than as specified, the safety protections may be impaired.
DANGER  	Risk of electric shock! TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER TO QUALIFIED SERVICE PERSONNEL.
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NOTE 	Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

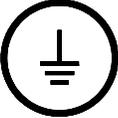
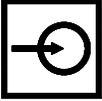
Table of Symbols

These symbols are intended to draw your attention to particularly important information and alert you to the presence of hazards as indicated. Some of these symbols may not appear in the manual or on the product:

<p>DANGER</p> 	<p>An imminently hazardous situation, which, if not avoided, will result in death or serious injury.</p>
<p>WARNING</p> 	<p>A potentially hazardous situation, which, if not avoided, could result in death or serious injury.</p>
<p>NOTE</p> 	<p>A cautionary statement; operating tip, or maintenance suggestion, which may result in instrument damage if not followed.</p>
	<p>Hazardous voltage, risk of shock injury.</p>
	<p>Risk of body parts, hair, jewelry or clothing getting caught in a moving part.</p>
	<p>Risk of puncture injury.</p>
	<p>Risk of eye injury, wear safety glasses.</p>
	<p>Risk of fire.</p>
	<p>Risk of poison.</p>
	<p>Risk of explosion.</p>

Table of Symbols

These symbols are intended to draw your attention to particularly important information and alert you to the presence of hazards as indicated. Some of these symbols may not appear in the manual or on the product:

	Hazardous fumes.
	Hot surface, risk of burns.
	Ground symbol.
	CE compliance mark.
	Output.
	Input.
	Signifies that the unit has passed safety tests for grounding, high voltage spikes and voltage leakage.
	Helpful hints, additional information.

Equipment Labels

Equipment labels are color coded as follows:

Yellow: **Caution, risk of danger**

Red: **Stop**

Blue: **Mandatory action**

Green: **Safe condition or information**

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1. Introduction

The Twister Expanded Capacity kit increases the capacity of the Twister Universal Microplate Handler from one input rack (which holds 20 microplates without lids or 15 microplates with lids) to four input racks (which hold a total of 80 microplates without lids or 60 microplates with lids). The increased capacity provides longer walk-away time for each run.

You should install the Extended Capacity Kit before connecting the Ultramark or other external device to the Twister. (See the *Twister User Guide* for detailed.)

Preinstallation Requirements

Tools Required

- Phillips head screwdriver

Additional tools for converting to portrait devices (including the Ultramark):

- Small Phillips head screwdriver
- 13/64 or 7/32 inch open end wrench

Space Required

NOTE  **The bench top must be flat and sturdy enough to support the weight of the computer, the Twister, the microplate device, and the extended capacity without sagging. An uneven surface will result in the misalignment of the device and the Twister.**

For the Extended Capacity option, provide an area on the side of the Twister opposite the device approximately:

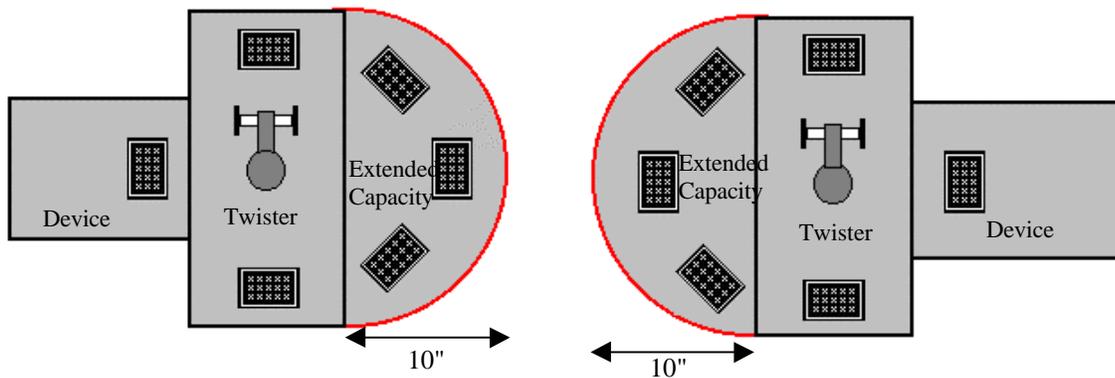
10 in. (26 cm.) wide,

28 in. (72 cm.) deep, and

19 in. (49 cm.) high.

In addition, you must provide space nearby for the PC.

Twister Extended Capacity Installation Guide



Left-Hand Orientation

Right-Hand Orientation

Assembly Overview

After the Twister has been assembled (following the instructions in the *Twister User Guide*), you are ready to connect the Extended Capacity Kit to the Twister. This guide includes the following procedures for unpacking and installing the Extended Capacity Kit and configuring the Twister software:

- Unpack the Extended Capacity Kit
- Assemble the Locating Plates
- Install the Extended Capacity Base
- Change the Rack Orientation, if necessary (shipped in the proper orientation for the Ultramark)
- Install the Racks
- Adjust the Extended Capacity Base Position
- Configure the Twister Software

2. Installation

Installation Warnings

WARNING



Use only the tools listed in this manual to perform the steps described in the instructions.

Never perform any operation on the instrument in an environment where potentially damaging liquids or gases are present.

Installation Notes

NOTE



Do not loosen/tighten any screws or touch parts other than those specifically designated in the instructions. Doing so may cause misalignment and could void the instrument warranty.

Never force any component to fit if it will not do so easily.

Unpack the Extended Capacity Kit

Step	Action
1	Carefully inspect the shipping carton for damage.
2	Remove all components from the shipping carton and verify that all parts are included. (See the Parts List below.) If any parts are missing, contact Bio-Rad. See <i>Contact Us</i> at the front of this manual for more information.
3	Retain the shipping carton and packing materials. If the contents should need to be returned for repair, use the original packing materials and shipping carton. If the shipping carton has been damaged in transit, it is particularly important to retain it for inspection by the carrier in case there has been damage to the contents.

Parts List

The Extended Capacity Kit includes the following items:

- Extended Capacity Base
- 3 Storage Racks
- Extended Capacity Locating Plate with mounting hardware
- Extended Capacity Installation Guide (this document)
- Extended Capacity Calibration Block

Assemble the Locating Plates

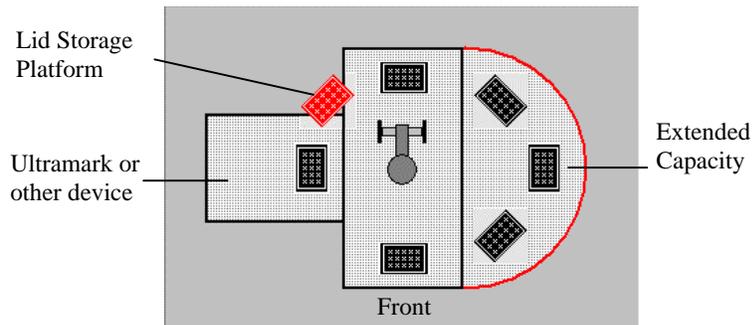
In this step, you will position the Extended Capacity Locating Platform and loosely attach it to the Twister base.

Tools: Phillips head screwdriver

Step	Action
------	--------

NOTE  **The Lid Storage Platform must be installed on the opposite side of the Twister from the Extended Capacity. See the *Twister User Guide* for details.**

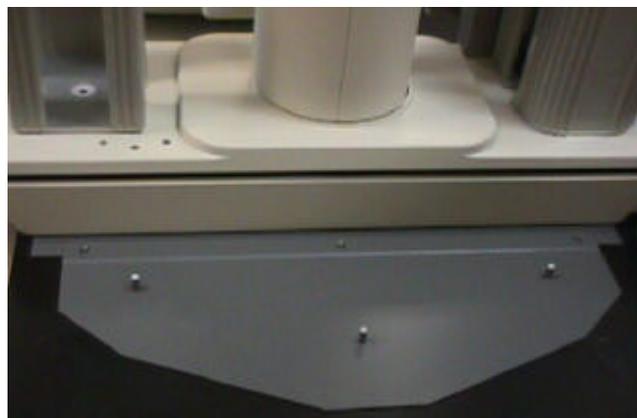
- 1 Place the Extended Capacity Locating Plate on the opposite side of the Twister from where you will locate the Ultramark or other external device. (Note the preferred configuration is with the Extended Capacity to the right of the Twister.)



Preferred Configuration

The offset edge of the Extended Capacity plate should point towards the Twister plate.

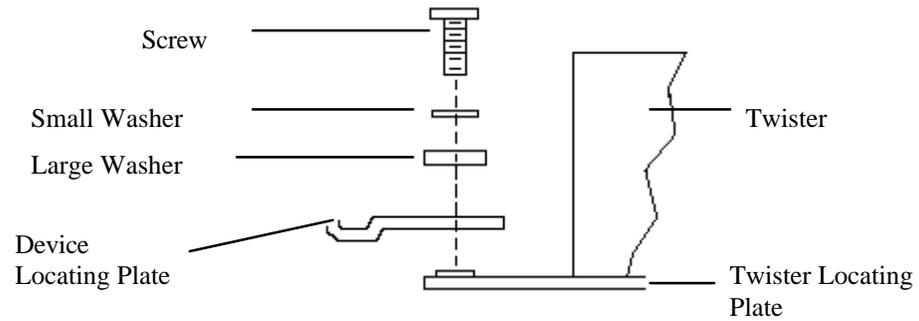
- 2 Slide the offset edge of the Extended Capacity Locating Plate over the Twister Locating Plate.



Twister Extended Capacity Installation Guide

Assemble the Locating Plates, Continued

Step	Action
3	Align the three holes in the Extended Capacity Locating Plate over the three threaded inserts on the Twister Locating Plate.
4	Locate the bag containing the mounting hardware (three screws, three small washers, and three large washers), and remove the mounting hardware from the bag.
5	Place one large washer over each of the three threaded inserts, on top of the Extended Capacity Locating Plate.
6	Place one small washer on each screw.
7	Thread a screw into each threaded insert. <u>Do not fully tighten the screws</u> until the Extended Capacity base position has been adjusted.



Assembling the Locating Plates

Install the Extended Capacity Base

Step	Action
1	Lift the Extended Capacity Base and place it onto the Extended Capacity Locating Plate so the locating pins fit into the holes in the bottom of the Extended Capacity Base. When the base is correctly seated on the pins, it will rest flat on the locating plate.



- 2 Confirm that the screws attaching the Extended Capacity Base to the Twister are loose and the base can be moved slightly forward and backward and side to side.

Install the Racks

The racks included with the Extended Capacity Kit have two rack locating holes in the bottom of each rack to accommodate portrait and landscape orientations on the Extended Capacity base. The Extended Capacity Kit ships in landscape orientation for compatibility for the Ultramark. (If using Portrait Orientation, follow the instructions in the "Changing the Rack Orientation" chapter to move the Rack Locating Pins before installing the racks.)

Step	Action
1	Locate the holes for the Rack Locating Pin in the bottom of the rack.
2	Positioning the racks as shown in the photo below, place the racks on the white Rack Locating Disk so the Rack Locating Pin fits into the hole on the bottom of the rack.

NOTE Be careful not to insert the Rack Locating Pin into the wrong hole on the bottom of the rack, or the rack will not be properly oriented.



- 3 If the Extended Capacity is installed to the right of the Twister, the curved end of each rack should point in the direction of the front of the Twister (as shown below).

If the Extended Capacity is installed to the left of the Twister, the curved end of each rack should point in the direction of the back of the Twister.



Rack Installation—Landscape Orientation

3. Calibration

Adjust the Extended Capacity Base Position

Tools: Phillips head screwdriver

Step	Action
------	--------

NOTE  The following steps will be easier if two people perform them: one to move the Twister arm and the other to adjust the position of the Extended Capacity base.

- 1 Place the calibration block in the center Extended Capacity rack, with the cutouts in the block facing up.
- 2 With the Twister switched **OFF**, manually move the Twister arm over the middle rack and let it drop onto the calibration block.
- 3 Make sure that the screws attaching the base to the Twister are loose. Move the Extended Capacity base forward and backward and side to side until the gripper on the Twister arm drops easily and without external pressure into the cutouts in the calibration block. Try to keep the Extended Capacity base parallel to the Twister base. **This is a critical step!**

The gripper fingers on the Twister arm should be an equal distance from the sides of the microplate.

- 4 Lift the Twister arm up and to the side.
- 5 Remove the calibration block from the center Extended Capacity rack and place it in either of the two remaining racks.
- 6 Move the Twister arm over the rack containing the calibration block and let the arm drop.
- 7 If the middle rack has been properly adjusted, the Twister gripper should drop easily into the cutouts on the calibration block. If it does not, try to adjust the Extended Capacity base slightly **without** altering the adjustment made for the center rack. (After any adjustment, you will need to go back to Step 3 above to recheck the center position.)
- 8 Move the calibration block to the third Extended Capacity rack, and adjust the base in the same way.

Adjust the Extended Capacity Base Position, Continued

Step	Action
9	<p>Continue adjusting the base position until all three racks are properly aligned with the Twister.</p> <p> This adjustment is critical to the proper functioning of the Extended Capacity option. Use care in making these adjustments.</p>
10	<p>Carefully tighten the three screws attaching the Extended Capacity Locating Plate to the Twister Locating Plate. Be sure not to move the plates when tightening.</p>

Teach the Rack Positions

Step	Action
1	Switch ON the computer, if necessary, and the Twister. Start Windows, if it is not already running.
2	Click on the Windows Start button, select Programs, select Bio-Rad Twister Plate Handler, then select Twister. The Twister software will open and attempt to establish communication with the Twister. When communication is established, the Twister Main Menu will be displayed.
3	Click the Configure Layout button in the main menu to display the Configure Layout window.
4	Click the Extended Capacity checkbox to select it. The Physical Layout diagram will display the selected options. Verify that the diagram accurately represents the physical setup of the Twister and the Extended Capacity racks.
5	Click the Save button at the bottom of the window to save the configuration and display the Twister Main Menu.
6	Place one microplate in each of the three Extended Capacity racks.  The microplates must be all the same size and type.
7	Click the Positional Training button on the Twister Main Menu to display the Positional Training window.
8	In the Plate Description textbox, select the Plate Type being used. (To create a new plate type, see "New Plate Type" in the <i>Twister User Guide</i> .)
9	On the Positional Training diagram, click on the locations of the Extended Capacity rack positions being taught (either 1, 2, and 3, or 5, 6, and 7).  The checkboxes in the Rotary and Vertical columns next to each position should be checked.
10	Click the Begin Training button. The Twister arm will move to the first rack position to be taught. The rotary position textbox and the OK button for that position will be outlined in red.

NOTE The following steps will be easier if two people perform them: one to observe the alignment of the Twister arm and the other to adjust the position on the computer.



Teach the Rack Positions, Continued

Step	Action
11	Using the Rotary Adjustment arrows next to the textbox, adjust the position of the arm so the gripper is centered above the rack.  The arm should be centered to within one click of the button. The tolerances are very close!
12	Click the OK button next to the rotary textbox. The Twister arm will drop and record the vertical position of the plate. The vertical offset for the position will be displayed in the Vertical textbox. The arm will then move up and over to the next position to be taught.

NOTE  **If the Twister gripper does not find the plate, contacts the side of the rack when it moves down, or is otherwise not centered, you must go back to the previous procedure (Adjust the Extended Capacity Base Position) after the rest of the training is complete.**

- 13 Teach the rotary position for the other two racks in the same manner – centering the gripper and clicking the OK button.
 The **rotary** positions of these racks will not change unless the locating plate is moved (the vertical settings may change if a different type of plate is used.)
- 14 Save the current settings to the "Defaults" plate type. This allows the use of these rotary settings for any new plate type that is defined. Click the Update Twister button to save the settings to the Twister firmware.
- 15 Click the Save Plate Data button to save the current settings under the name shown in the Plate Description textbox. Saving the settings to the "Defaults" plate type allows you to use these rotary settings for any new plate type that is defined.
- 16 Click the Main Menu button to return to the Twister Main Menu.

NOTE  **You must exit the Twister software and then restart it to download your new positional settings to the Twister.**

Perform an Exercise Run

After the positions of the Extended Capacity racks have been calibrated, performing an exercise run is recommended to verify that the offsets are correct.

Step	Action
1	<p>From the Twister Main Menu, click on the Exercise (Demo) button.</p>  <p>The Exercise window is displayed.</p>
2	Click the desired Lid Configuration option.
3	Click the desired Restacking Parameter.
4	Select Continuous Operation to start the run again after the microplates are restacked. (This option is not available if the Don't Restack option is selected.)
5	Load at least one clean, empty microplate into each Extended Capacity input rack. Be sure to leave the Output rack on the Twister empty.
6	<p>Click the Start Run button to start the run.</p> 
7	<p>Verify that the Twister grips the microplates and places them in the racks correctly.</p> <p> If the microplates rub against the sides of any rack or are not placed correctly in the racks, go back to the previous procedure (Teach the Rack Positions).</p>
<p>NOTE If the microplates touch the sides of any rack or are not placed correctly in the racks, go back to the previous procedure (Teach the Rack Positions).</p> 	
8	<p>To stop the run while Continuous Operation is selected, click the Quit Exercising button</p> 
9	Finally, clear all the plates from the Output rack.
<p>NOTE You are now ready to go back to the <i>Twister User Guide</i> and install the Ultramark or other device.</p> 	

4. Operation

The installation of the Extended Capacity Kit has few effects on the operation of the Twister and Ultramark or other external device. The following procedures change when the Extended Capacity Kit is installed:

- Loading the Microplates
- Choosing the Restacking Parameters
- Stopping the Run

Bio-Rad's Twister and Ultramark are both operated through Bio-Rad's Microplate Manager software. Microplate Manager is included with the Ultramark and should be installed when you install the Ultramark.

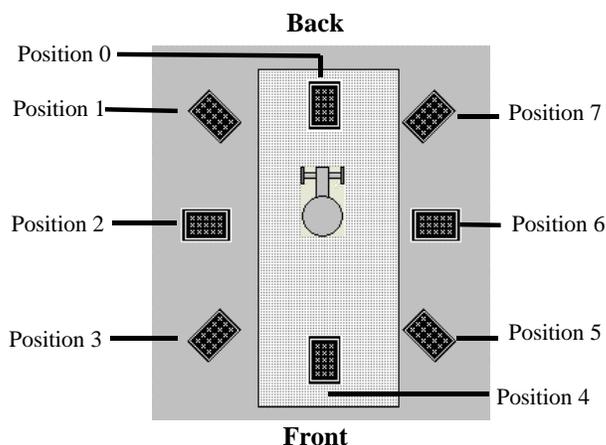
See the *Microplate Manager User Guide* for complete instructions on installing and using Microplate Manager in conjunction with the Ultramark and the Twister. See the *Twister User Guide* for further information on operating the Twister with the Ultramark or other external device.

Microplate Processing Sequence

The procedure for loading the microplates into the racks remains the same, but the order in which the microplates are processed depends on which side of the Twister the Extended Capacity base is installed.

If the Extended Capacity is to the **right** of the Twister, the racks are processed in the following order: 4, 5, 6, and 7.

If the Extended Capacity is to the **left** of the Twister, the racks are processed in the following order: 4, 3, 2, and 1. (Note: This is true if you are operating the Twister with the Ultramark using Microplate Manager software. If you are controlling the Twister through the Twister software—e.g., when doing an Exercise Run or operating a device other than the Ultramark—the racks are processed 1, 2, 3, 4.)



Choosing the Restacking Parameters

When choosing the restacking options for a run with the Extended Capacity racks installed, the following options are available:

Do Not Restack

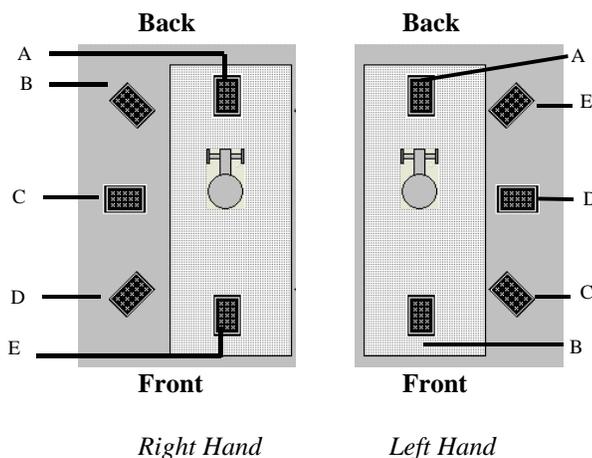
The microplates are left in the Output Rack after the run. The last microplate that was processed is located on the top of the stack in the Output Rack after the run is complete.

Restack After Each Rack

The microplates are restacked in their original order into their original Input Rack after each rack is processed. The Twister then moves to the next Input Rack and processes the plates in that rack (position 0 is always used as the output rack.)

Restack at End of Batch

The first Input Rack (B) is processed and stacked in the Output Rack (A). Then the microplates in the next Input Rack (C) are processed and stacked in the empty rack (B). The microplates continue to be processed in this manner until processing is complete. The microplates are then restacked in their original order in their original Input Racks, beginning with the last microplates that were processed (see the Position Diagram below for rack processing order.)



Stop the Run (for a Device Other than the Ultramark)

If you are running the Extended Capacity racks with a device other than the Ultramark, the following Stop options are available:

Button	Function
Now!	Stops the Twister immediately. The Twister does not release any microplate that may be in the grippers. The microplate reader is not affected by the Now! button.
At End of Current Plate	Stops the Twister after the current microplate has been processed and placed in the Output Rack.
At End of Current Rack	Stops the Twister after all of the microplates in the current rack have been processed and placed in the Output Rack.

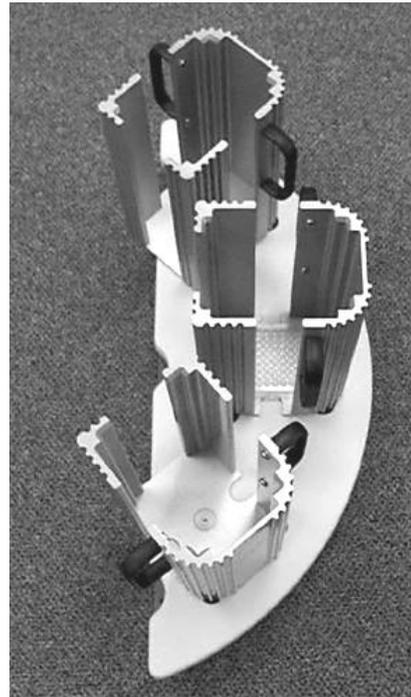
5. Change the Rack Orientation

The Extended Capacity rack locating pins are shipped in **landscape** orientation, for compatibility with the Ultramark.

Perform the procedure below to change the racks to **portrait** orientation.



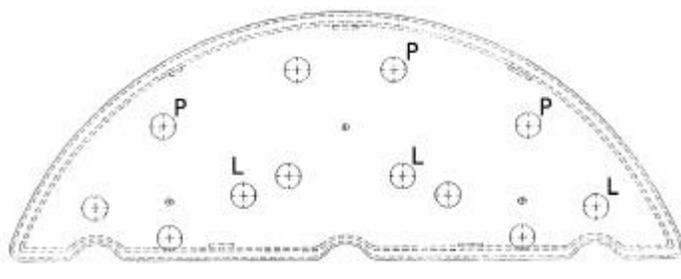
Rack Positioning—Landscape Orientation



Rack Positioning—Portrait Orientation

Tools: Small Phillips head screwdriver
13/64 or 7/32 inch open end wrench

Change the Rack Orientation, Continued



Location of the Rack Locating Pins for Portrait Orientation (P) and Landscape Orientation (L)

Change the orientation of the Extended Capacity racks by following the steps below to move the Rack Locating Pins from the positions marked L (Landscape) to the positions marked P (Portrait) in the diagram above.

Step	Action
1	Using the 13/64 or 7/32 inch open end wrench, remove the Rack Locating Pin for the Extended Capacity rack closest to the front of the Twister .
2	Remove the white disk from the the position where the pin was located, turn the disk over so the countersink is facing up, and replace the disk.
3	Using a Phillips head screwdriver, remove the screw from the center of the Support Disk marked P (for the same rack) in the diagram.
4	Remove the white disk from the position labeled P , turn the disk over so the countersink is facing down, and replace the disk.
5	Hand tighten the Rack Locating Pin into the position labeled P, then tighten it using the open end wrench.
6	Insert the screw into the hole in the disk in the position labeled L and tighten it using the Phillips head screwdriver.
7	Repeat steps 1 – 6 for the two remaining extended capacity racks.

6. Glossary

Extended Capacity	The Twister with the Extended Capacity Kit has a capacity of up to 80 microplates without lids, or up to 60 microplates with lids. Toppers can be used on the microplates without lids. This configuration uses five racks (four Input Racks and one Output Rack).
Lid	<p>A flat cover placed on top of a microplate to prevent evaporation and/or contamination of the samples in the plate. The Twister can process plates with a lid on each plate or with a lid only on the top plate in the stack.</p> <p>☞ When using a lid only on the top plate, the lower plates in the stack are protected by the plate above them.</p>
Rotary Home	The Twister arm's furthest position of travel in the clockwise direction.
Standard Capacity	The standard capacity of the Twister is up to 20 microplates without lids, or up to 15 plates with lids. A topper can be used on the stack of 20 microplates. This configuration uses two racks (one Input Rack and one Output Rack).
Storage Rack	An aluminum rack used to store microplates.
Topper	<p>A lid or an empty microplate placed on the top of a stack of microplates to prevent evaporation and/or contamination of the samples in the top plate.</p> <p>☞ When using a topper on the stack of microplates, the lower plates in the stack are protected by the plate above them.</p>
Vertical Home	The Twister arm's highest vertical position.

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