

# Agilent G9542A RapidFire 400 System Temperature Control Unit

## Installation Checklist

Thank you for purchasing an Agilent G9542A RapidFire 400 System Temperature Control Unit. This checklist is used by the installing engineer to ensure that the instrument and associated systems are correctly installed, upgraded, and functioning as designed in your facility. This checklist will be completed at the end of the service and provided to you as a record of the installation.

### Introduction

#### Customer Responsibilities

- Customers should leave the instrument shipment for the engineer to unpack.
- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the installation.
- Some installation tasks will be beneficial to you if you are present – refer to sections in this checklist.

#### Important Customer Web Links

- Videos about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at <https://www.youtube.com/user/agilent>
- To access *Agilent University*, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful *Agilent Resource Center* web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>
- Need technical support, FAQs, supplies? – visit our *Support Home page* at <http://www.agilent.com/search/support>

- Get answers. Share insights. Build connections:  
Join the *Agilent Community* at <https://community.agilent.com/welcome>

## Service Engineer's Responsibilities

- Only complete/printout pages that relate to the system being installed.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- Ask the customer to sign the Service Completion section including the customer's and your signature.

## Additional Instruction Notes

- This checklist is valid for G9532A and G9532AA RapidFire 400 Systems.

## Temperature Control Unit Installation


### System Information

Check this box if an instrument configuration report is attached instead of completing the table.

<b>Instrument System Name and ID</b>	
<b>Instrument System Site and Location</b>	

List System Component Product Numbers	List the Serial Numbers of each Component
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

### Preparation

 Unpack/verify the condition and completeness of shipment.  
For discrepancies, use the following table:

Product or Part Description	Observation	Action

- Discuss any specific questions or issues with the customer before starting.
- Discuss any configuration options with the customer before starting.
- Check for required service note applicability and firmware updates if connecting to instruments.
- Upgrades only** – Ensure with the customer that instrument control settings, data, methods etc. have been properly saved or archived before starting any installation procedures.
- Obtain the sample plates the customer will be using.

## Installation Procedure

### Unpacking and inventorying the shipped contents

- Section not applicable*
- Unpack and inspect the components for the temperature control unit. You should have the following items:
  - Chiller control box
  - Chiller installation kit
  - Chiller enclosure box
  - Rear panel (to replace existing rear panel)
  - Cooling unit (TEC) control

### Required tools

- 6-point screwdrivers, T-10, T-20, T-25
- Hex wrench set
- Small, thin bladed flat-head screwdriver

**Before you start**

- Ensure the power is turned off and the elevator stacks are empty.
- Remove the rear and side panels using a 4-mm hex wrench to loosen the captive screws holding the panels to the frame.
- Remove the right-front door by compressing the hinge fingers and rotating them into the locked position.

**Removing the cables, drawer, and elevator base**

- 1 Remove the door handle M4 x 18-mm screws on the drawer with a T-20 driver and set aside to reinstall later.
- 2 Disconnect the three ribbon cables from the back of the robot control box for the front, middle, and rear elevator stacks.
- 3 Remove the ferrites on the cables with the ferrite key and set aside for reinstallation later.
- 4 Using a T-10 driver, remove the three M3 screws on the rear cover over the arm bracket and remove the M3 screw holding the cable arm bracket to the elevator mounting plate. Set the cover and fasteners aside for reinstallation later.
- 5 Feed the ribbon cables up through the access hole in the deck and tie the ribbon cables and the cable arm to the rear elevator stack, using the long cable ties included in the installation kit, such that the cable arm bracket is tucked out of the way when the drawer is opened.
- 6 Using a T-20 driver, remove the drawer handle. Set the handle and fastener aside for reinstallation later.
- 7 Clear a space to set the drawer while installing the temperature enclosure and remove the drawer:
  - a Standing in front of the instrument, open the drawer fully.
  - b Locate the slide member release tabs in the middle of the slide.
  - c With the drawer at its extended position, push the right-slide tab upwards and pull the left-slide tab downwards to release the drawer.
  - d Pull the drawer fully out, supporting the weight as it falls from the end of the slides.
- 8 Using a T-20 driver, remove the four M4 screws holding the elevator mounting plate to the base plate.
- 9 Remove the elevator mounting plate and the O-ring cups and O-rings that were under the attachment screws and set them aside to be used when reinstalling the elevator mounting plate.

## Installing the temperature control unit enclosure box, elevator mounting plate, and elevator drawer

**CAUTION** To avoid damage to the temperature control unit enclosure, do not lift it by the sliding door cover.

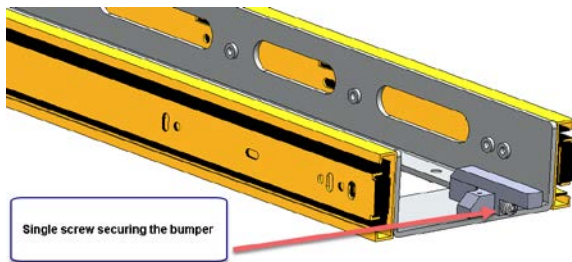
- 1 Locate the polyethylene sheet (P/N 4114-1593) from the installation kit and fold one end about 10-mm to make a lip.
- 2 Lay the sheet on the base plate so that the folded edge covers the lip of the base plate to protect the underside of the cooling enclosure.
- 3 Unpack the enclosure and holding the enclosure by the sides, lift the unit and place it on the deck, centering it left and right in the cutout on the base plate. The front edge of the enclosure should align with the front edge of the base plate.
- 4 Remove the plastic sheet.
- 5 Align all four enclosure mounting holes with the threaded holes in the base plate:
  - a Start by inserting a thin hex wrench into the holes.

Figure 1 Aligning enclosure box mounting holes



- b Once you are sure the hex wrench is inserted into the threaded hole in the base plate (for all four attachment holes), replace with a larger hex wrench.
    - c Finally, test the alignment by attaching the mounting screws, without the mounting plate. Remove the screws once you are sure the holes are aligned.
- 6 Assemble the elevator mounting plate:
  - a Using a T-20 driver, remove the hard-stop bumper from the end of the elevator mounting plate and set aside for reinstallation later.

Figure 2 Elevator mounting plate with bumper



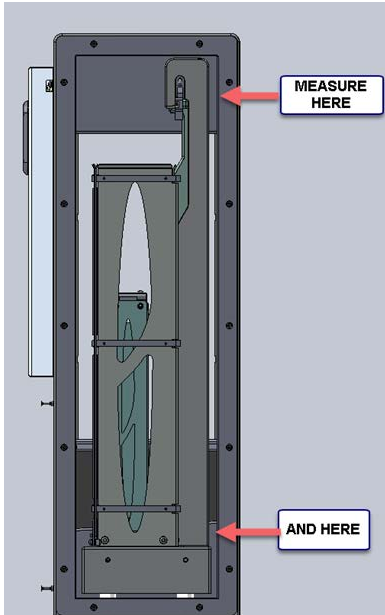
- b** Insert the four longer M4 x 18-mm mounting screws from the installation kit into the mounting holes and slide the O-ring cups followed by the O-rings onto the mounting screws.

Figure 3 Mounting plate with mounting screws and O-ring cups



- 7** Install the elevator mounting plate and drawer:
  - a** Place the elevator mounting plate into the enclosure aligning the mounting screws to the holes in the enclosure and base plate.
  - b** Using a 3-mm hex wrench, tighten the screws until you feel a hard stop.
  - c** With the slides in their closed position, pull the bearing retainers forward in the slides of the elevator mounting plate.
  - d** Lift the drawer and align the lead-ins on the drawer and the mounted slides in the enclosure and slide the drawer most of the way in.
  - e** From the opening in the back of the enclosure, cut the cable ties holding the cables to the cable arm and feed the cables and cable arm through the mounting hole of the cooling unit.
  - f** From the front of the instrument, push the drawer into the closed position with enough force to set the auto-close mechanism on the slides.
  - g** Open the drawer as needed and re-attach the bumper with the M4 screw and T-20 driver.

- 8 Verify the installed drawer and sides of the enclosure are aligned and parallel and adjust, if necessary.
- a Measure the gap between the front motor cover and the enclosure internal wall at the bottom of the cover and at the top at the upper mounting screws.



- b If the difference between the top and bottom measurements is greater than 3-mm, the tilt of the drawer will need to be adjusted using spacers. If the drawer does not need to be adjusted, go to [Routing and connecting enclosure cables](#) to continue with the installation.

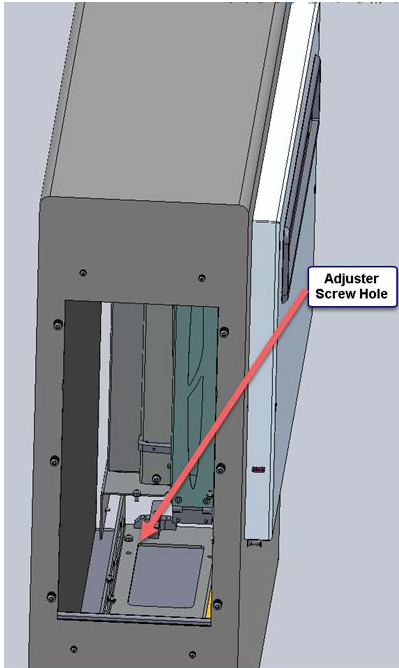
### Adjusting the tilt, if necessary

- 1 Determine which correction size spacer to use:
  - If the drawer tilt is 3-5-mm, use the 3-mm side of the correction spacers.
  - If the drawer tilt is >5-mm, use the 6-mm side of the correction spacers.
- 2 Determine which side of the enclosure to insert the spacers:
  - If the drawer leans to the left (the gap is smaller at the top on the left side) as you face the front of the enclosure, you will replace the left two white O-ring cups (underneath the elevator mounting screws) with the lean correction spacers, provided in the installation kit.
  - If the drawer leans to the right (the gap is smaller at the top on the right side) as you face the front of the enclosure, you will replace the right two O-ring cups (underneath the elevator mounting screws) with the lean correction spacers, provided in the installation kit.
- 3 Adjust the tilt:
  - a Locate the correction spacers (P/N G9532-20167, G9532-20168) and the adjuster screw (P/N 0515-0436).



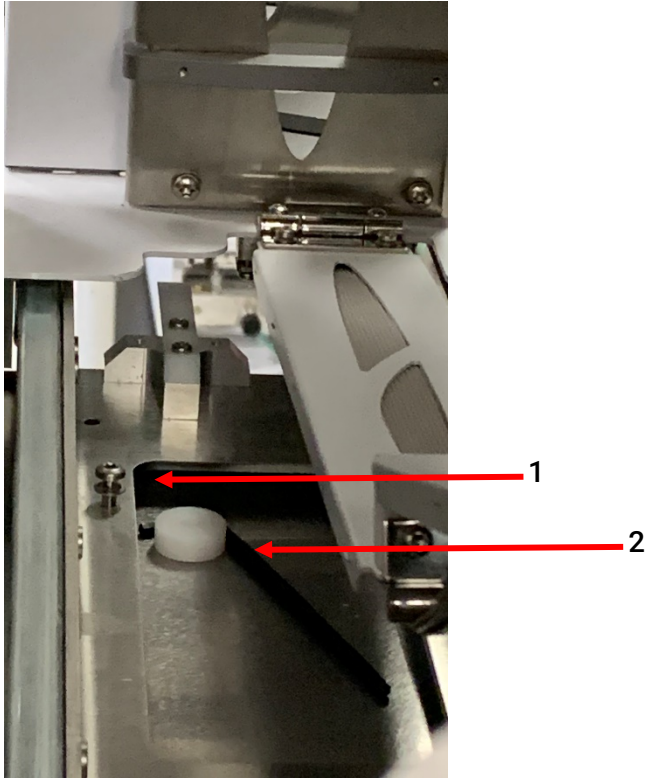
- b** Open the drawer enough to access the front mounting screws and from the opening in the rear, remove the left or right front screw, depending on which way the drawer is leaning (see previous step).
- c** Insert the adjuster screw in the adjustment hole (located near the mounting hole) and tighten the screw until it touches the plate underneath.

Figure 4 Adjustment hole for the right-front mount



- d To increase the gap by 3-mm, turn the adjuster screw (1) three turns (six turns for a 6-mm gap) and remove the existing O-ring and O-ring cup by corraling the cup with the L of a hex wrench (2).

Figure 5 Adjuster screw and O-ring cup on the front-right side, viewed from the rear



- e Slide the lean correction spacer under the mounting plate, ensuring that the 3-mm (or 6-mm, if using) correction side is under the mounting plate. When the tab on the spacer is biased against the cutout on the mounting plate, the spacer hole and the mounting plate hole will be aligned.

Figure 6 Positioning correction spacer under the mounting plate

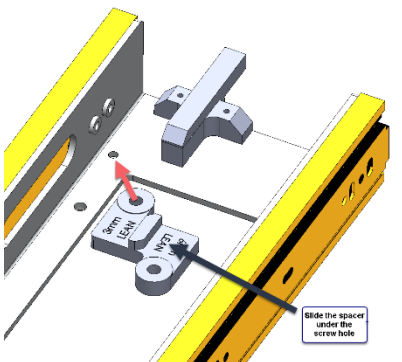
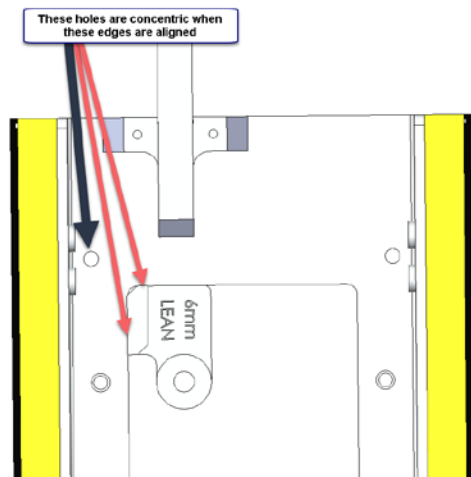


Figure 7 Spacer edges aligned with the mounting plate



- f Lower the mounting plate onto the correction spacer by loosening the adjuster screw.
- g Install the mounting screw and remove the adjustment screw.
- h Remove the corresponding rear mounting screw and replace the O-ring and O-ring cup with the second lean correction spacer.

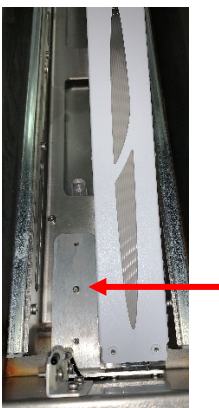
Note: The weight of the drawer should be enough to lift up the mounting plate so you don't have to use the adjuster to remove the rear O-ring and O-ring cup.

- i Replace the mounting screw.
- j Verify the change in tilt by checking the elevator to enclosure wall clearance.

## Routing and connecting the enclosure cables

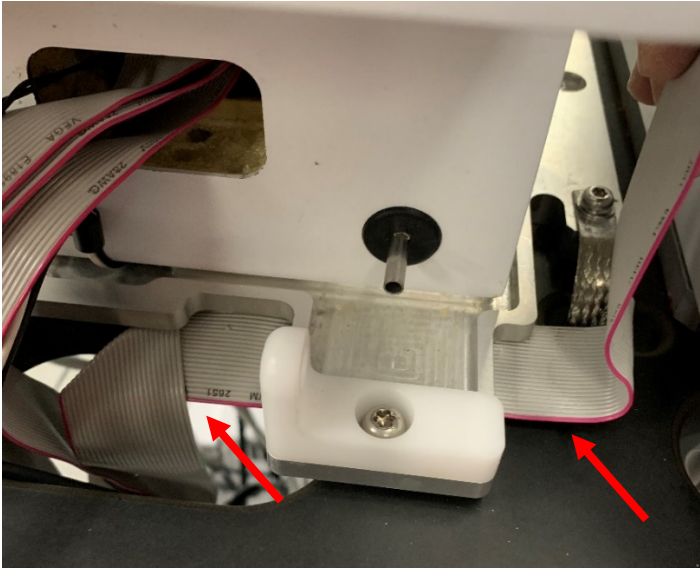
- 1 Feed the ribbon cables and temperature sensor cable through the cable port of the enclosure.
- 2 Using the M3 x 6-mm screw and T-10 driver, fasten the cable arm bracket to the elevator mounting plate. Note that a single screw is used in the center hole of the bracket.

Figure 8 Alignment of the cable arm bracket to the center mounting hole



- 3 Pass the ribbon cables through the pass-through hole in the back of the enclosure and then through the table-top pass-through.
- 4 Feed the ribbon cable coming from the enclosure box door under the base and through the table-top pass-through as shown below.

Figure 9 Path of the ribbon cable coming from enclosure door



- 5 Take the piece of foam from the installation kit, make an M with the foam and sandwich all the cables from the interior of the enclosure into the M.
- 6 Stuff the foam sandwich into the enclosure cable pass-through hole until it is flush with the edge.

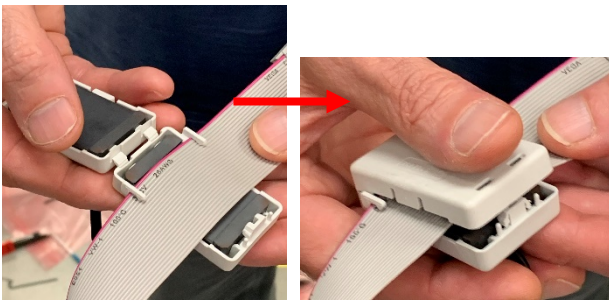
Inserting the foam causes some of the cable to be pushed back into the enclosure. Carefully pull out the excess cable through the foam sandwich so the cable doesn't interfere with the drawer motion.

Figure 10 Pulling excess cable from enclosure formed when inserting the foam sandwich



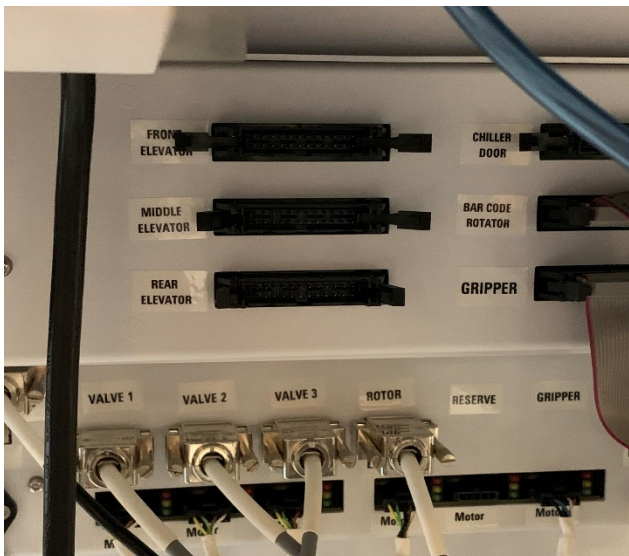
- 7 Ensure that the enclosure door ribbon cable and heater wires travel through the smaller cable pass-through.
- 8 Attach the cable housing over the cables originating from the enclosure door using a T-10 driver and M3 x 10-mm screws (P/N 0515-1103).
- 9 Attach the ferrites at the indicated location on the ribbon cables.

Figure 11 Attaching ferrite to ribbon cable



- 10 Connect the four ribbon cables to the robot/elevator control box.

Figure 12 Elevator cable connections to the control box



- 11 Install the auxiliary drain tube (P/N G9532-60110):
  - a Locate the drainpipe exiting below the deck underneath the enclosure.
  - b Push to connect one end of the 1/4-in diameter 2.5-ft. long polygon tubing to the drainpipe and route the tubing to a waste receptacle.



Figure 13 Drainpipe attachment to the cooling unit enclosure



## Installing the temperature control unit cooler (TEC)

- 1 Unpack the TEC and insert it into the mounting hole with the cables exiting the top. Downward pressure may need to be applied to compress the seal at the base of the mounting hole.

**CAUTION** The TEC MUST be installed such that the side with the terminal block is in the top position or water will leak onto the electronics below.

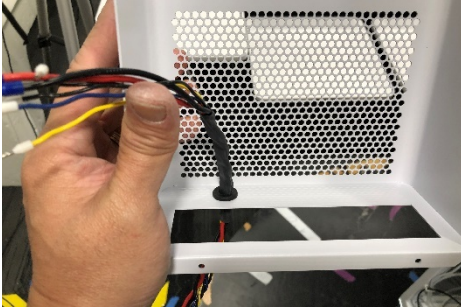
- 2 Secure the TEC to the back of the enclosure using six M 4 x 10-mm pan-head screws (P/N 0515-0433) and a T-20 driver.

Figure 14 Attachment points for TEC unit



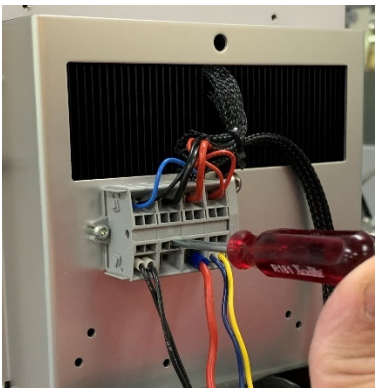
- 3 Install the grommet (P/N 0400-1065) in the cable hole of the TEC cover.
- 4 Slide the wires of the TEC cable through the hole and pull about 18 inches of wire through the hole.

Figure 15 Grommet and cables inserted in the TEC cover



- 5 Connect the TEC cable wires to the terminal block:
  - a Using a thin blade screwdriver, Insert the screwdriver into the small hole above where you want to insert the wire
  - b Depress the metal contact.
  - c Insert the wire and release the screwdriver.

Figure 16 Inserting cable wires into the terminal block on the TEC



Use the following table as a guide to map the wires.

Cable wire	Terminal block wire
Small black	Small blue
Small black	Small black
Big black	Big black
Big red	Big red
Small blue	Small red
Small yellow	Small red

Note: The small black wires on the TEC cable can pair with either small blue or small black and the blue and yellow wires on the TEC cable can pair with either small red.

- 6 Route the TEC cable around the fan and place the cover over the TEC.
- 7 Attach the cover with four screws (P/N 0515-0430) and a T-10 driver, two on the top of the cover and two on the bottom.
- 8 Route the TEC cable through the deck pass-through.

## Installing the condensation pump

- 1 Using a T-10 driver, partially install two M3 x 40-mm mounting screws into the holes for the pump located on the underside of the deck (over the solvent tray).

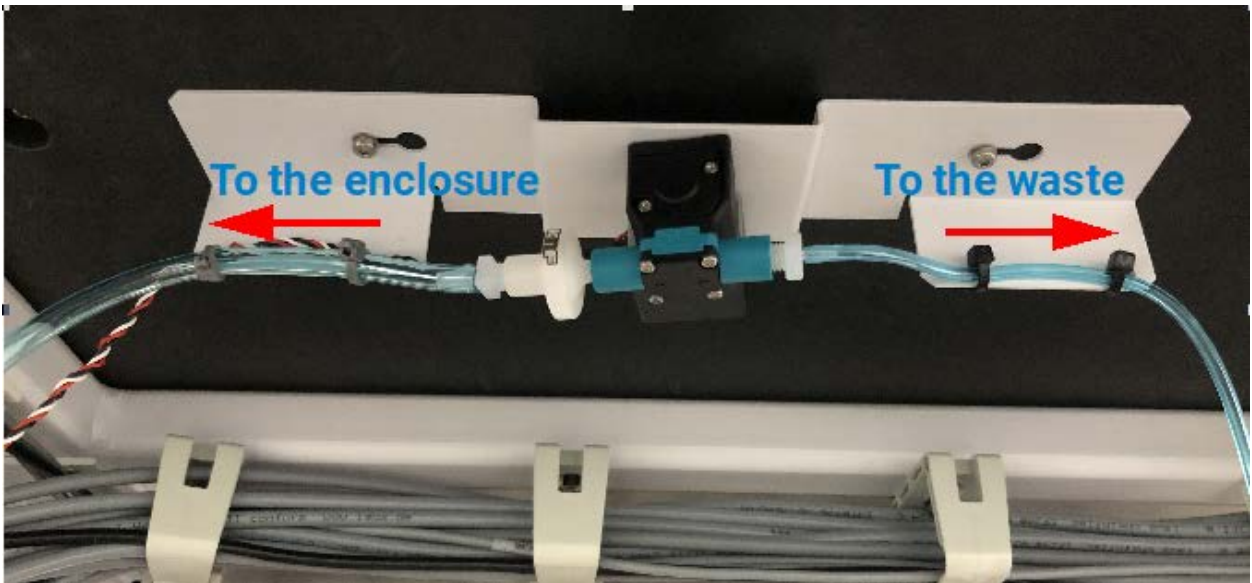
*Figure 17 Condensation pump mounting screws partially installed*





- 2 Mount the pump so that the key holes in the pump assembly slide over the partially threaded screws and tighten the screws with a T-10 driver.

Figure 18 Condensation pump mounted

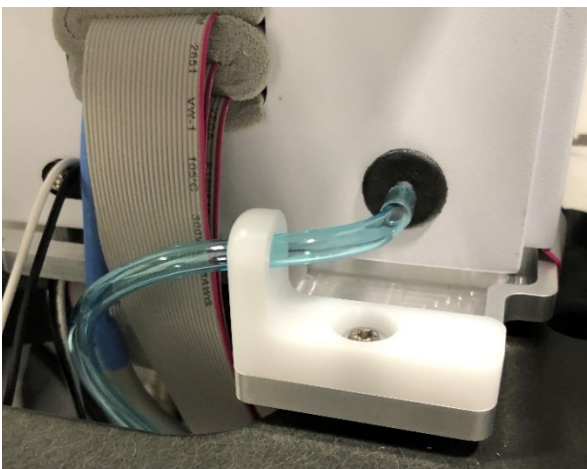


- 3 Route the cable and enclosure drain tube underneath the deck and feed the drain tube through the deck pass-through.

**CAUTION** As the drain tube passes over the plastic barrier, it must be clipped to an elevation higher than the pump connection to prevent dripping onto the electronics in the event of a pump leak.

- 4 Feed the tube through the hole in the drain tube guide (P/N G9532-20141).
- 5 Slide the end of the pump drain tube over the drainpipe exiting the enclosure and then attach the guide to the base plate with M3 x 6-mm screw and a 2.5-mm hex wrench.

Figure 19 Pump drain tube attached to the enclosure drainpipe



- 6 Route the pump outlet tube to a waste receptacle.

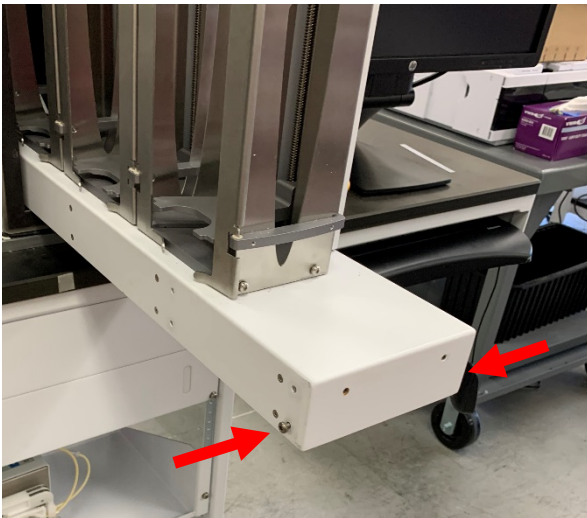
## Installing the TEC controller

- ❑ Unpack the controller and connect the following cables to the controller routed under the deck:
  - Power (P/N 8121-2253)
  - Heater
  - TEC
  - Condensation pump (labeled Pump)
  - Temperature sensor
  - Serial (on the controller) to USB (on the computer) (P/N 8121-2109)
  - Connect the power cable to the upper power strip.
  - Turn on the TEC controller power switch located above the power cord connection.
  - Secure the TEC controller to the frame with M5 screws (P/N 0515-0387) and a T-25 driver.

## Installing the front door to the enclosure

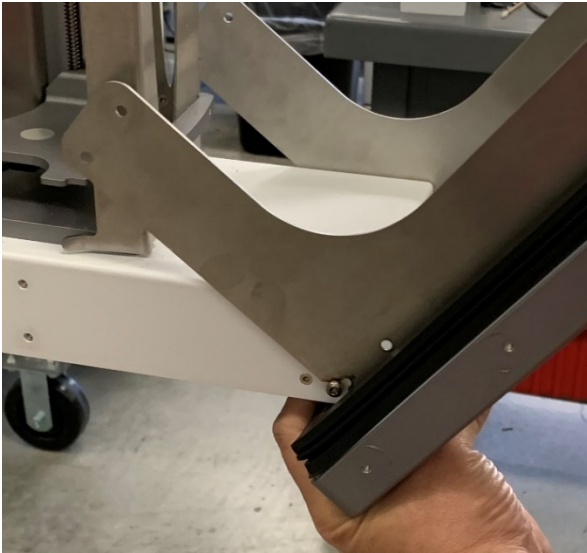
- 1 Pull out the drawer and partially install two lower M4 x 8-mm pan-head screws (P/N 0515-2113, located in the door shipping box).

Figure 20 Partially installed attachment screws for the front door



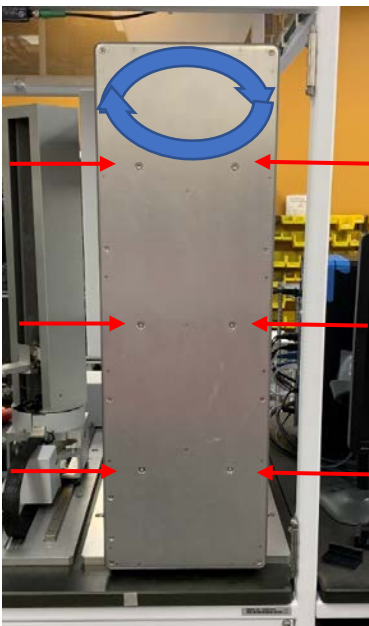
- 2 Place the door over the front of the drawer so that the partially installed screws slide onto the corresponding slots in the door.

Figure 21 Placing the cutouts on the door over the partially installed screws

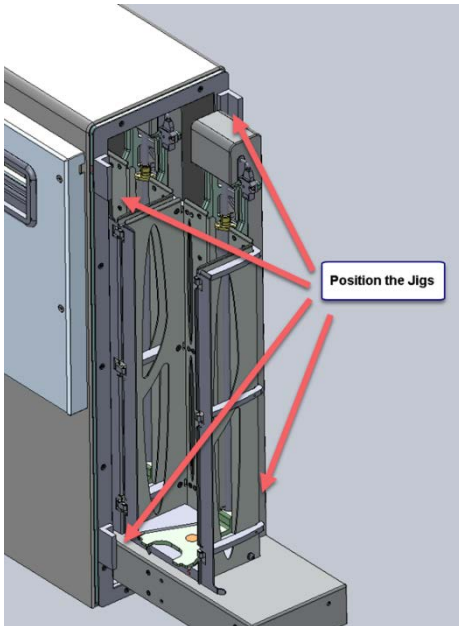


- 3 While the door is hanging on the partially threaded screws, attach the other six M4 x 8-mm screws.
- 4 Adjust the door skew:
  - a Loosen the six flat-head screws on the door face using a T-20 driver.
  - b Position/rotate the front face until it is aligned to the front of the enclosure and tighten the screws.

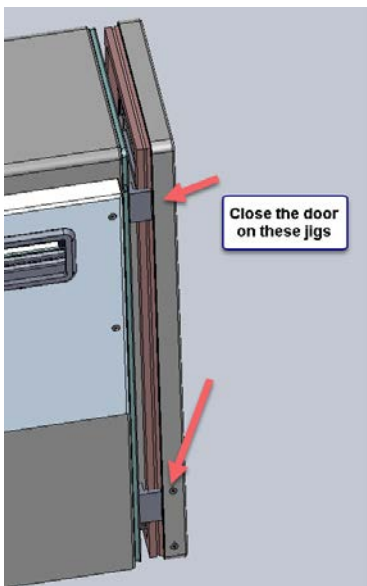
Figure 22 Adjusting the front door skew



- 5 Position the four magnetized door jigs on the edge of the enclosure face.



- 6 Close the drawer on the jigs, fitting the jigs as needed as the drawer closes.



- 7 Hold the door shut against the enclosure and tighten the two visible screws on each side.
- 8 Open the drawer and tighten the remaining screws that hold the door to the enclosure drawer.
- 9 Remove the jigs, close the door and verify the door is aligned and that the door seals are contacting the enclosure sealing face.
- 10 Attach the handle to the side of the door with two M4 x 18-mm screws and a T-20 driver.
- 11 Install the magnetic plate cover to the front of the door.

## Configuring the temperature control cooling unit

- 1 Determine the COM port the cooling unit is using:
  - a Power on the RapidFire 400 System by pressing the two main power switches in the rear. The TEC fan should start, indicating the cooling unit is working.
  - b On the computer, go to **Control Panel > Device Manager > ports (COM & LPT)**.
  - c Note the COM ports in use.
  - d Unplug the cooling unit controller USB connection from the computer and note which COM port disappears.
  - e Plug the controller USB cable back into the computer and close the control panel.
- 2 Configure the cooling unit in the RapidFire software:
  - a Open the PlateHandler.cfg file (C:\Agilent\RapidFire\Config Files for RF400) in a text editor.
  - b Change **GEMINI\_RF\_ROBOT\_HAS\_CHILLER\_DOOR=0;** to **=1;**
  - c Change **CHILLER\_COM\_PORT="NOCOM";** to **"X";** where X is the number you determined in step 1.

```

////////////////////////////////////
// Whether the system has a motorized robot access door on the side of a chiller.
// Set this parameter to 1 if the system has a chiller.
GEMINI_RF_ROBOT_HAS_CHILLER_DOOR=0;

////////////////////////////////////
// COM port to use to communicate with the chiller's temperature control.
// Enter "NOCOM" if the system has no chiller, or to disable communication.
// Enter serial port (e.g. "COM8") to communicate with the chiller.
CHILLER_COM_PORT="NOCOM";

```

- d Save and close the file.
- 3 Start the RapidFire software and verify you can open and close the robot access door, temperature controls are active, and the enclosure cools.

## Setting the robot teachpoints

Since you are installing a temperature control unit, you will need to reset the teachpoints as they will change with the addition of the cooling enclosure.

## Setting the x-axis position for the robot

- 1 Change the following parameter in the RapidFire.cfg file:

Config file	Change parameter to....	Comment
RapidFire.cfg	CONFIGURE_BENCHBOT = 2;	Allows the teaching dialog to be accessible in the software.

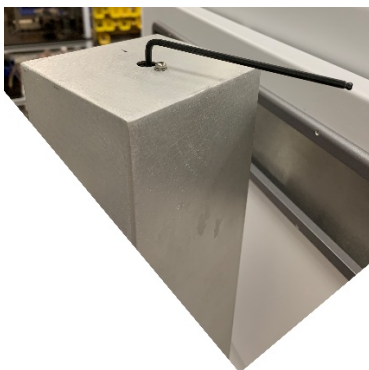
## 2 Set the x-axis position for the robot:

- a Loosen the four fasteners on the elevator stack base plate using a T-25 driver.
- b In the RapidFire main window software, click **System Tools > Lower plate elevators for loading**.
- c Click **System Tools > Robot/BCR teachpoint**.
- d Click **Yes** to home the chiller door (if applicable), BCR stage, and elevators.
- e In the teaching dialog box, select **Front Stack** and move the elevator of the front stack up to **250 mm**.
- f If there is a chiller door, in the **Chiller Door** area, click **Open** to open the enclosure door.



- g Move the robot up in the z direction using the 3.0-mm hex wrench so that when you rotate the hand, it will clear any obstacle.

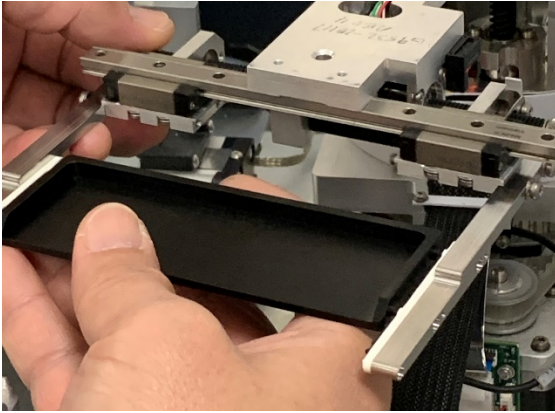
Figure 23 Manually adjusting robot z-axis



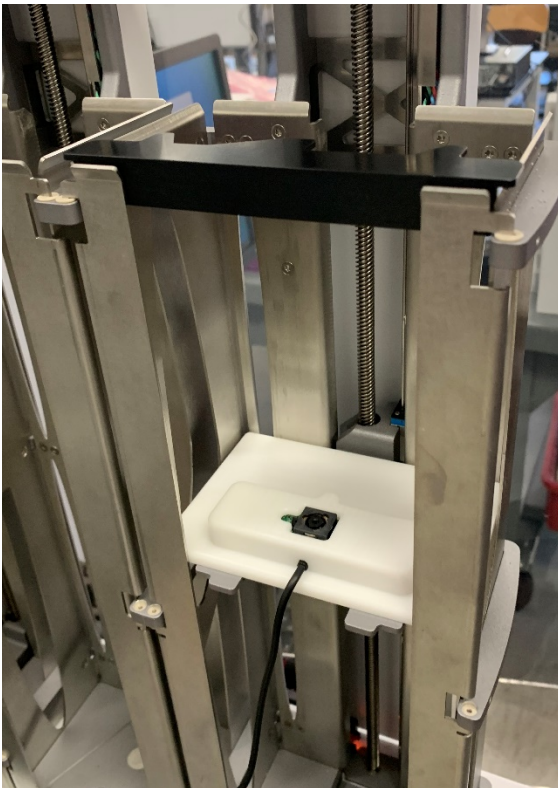
- h Install the gripper jig. Ensure it is in the correct orientation and use the adjustment knob on the gripper hand to open and close the gripper fingers.



Figure 24 Installing the robot gripper jig



- i Slide the drawer out and install the camera on the elevator of the front stack.
- j Install the stacker jig on top of the front stack.



- k Slide the drawer back into the instrument (or enclosure if there is a cooling unit), plug the camera into a USB port on the computer, and open the camera application in Windows.
- l Using the 3-mm hex wrench, move the robot in the z-axis up until the grippers are above the stacker jig.
- m Manually move the robot in the y-axis to the front stack area and rotate the grippers to the front stack.

- n** Lower the gripper jig as close as possible to the stacker jig using the hex wrench until you hit a hard stop, and then reverse a half turn.
- o** Align the lines on the jigs. While viewing the jigs through the camera, adjust the theta -axis by rotating the robot hand left and right and adjust the x-axis by moving the base plate slightly to the left or right (you might use a rubber mallet).
- p** Slightly tighten the front screws on the base plate.
- q** In the teaching dialog box, select **Rear Stack** and move the rear stack elevator up 250 mm.
- r** Slide the drawer out and move the camera and stacker jig to the rear stack and reposition the robot so the grippers are over the rear stack.
- s** Repeat this procedure for the rear stack. When finished, go back and check the front stack again. When both positions are aligned, tighten the four base screws.

### Setting the y- and theta-axes teachpoints for the stacks

- 1** Ensure the elevators for all three stacks are at 250 mm.
- 2** Ensure the gripper jig is installed and stacker jig is handy.
- 3** Set the theta- and y-axes:
  - a** Place the camera on the elevator of the front stack and the stacker jig on the top of the stack.
  - b** Slide the drawer back in and observe the jigs through the camera application.
  - c** Adjust the robot theta-axis by manually rotating the robot grippers left to right and aligning the lines on the jigs.
  - d** Adjust the y-axis by moving the robot forward and back to align the vertical lines in the jigs.
  - e** When the theta- and y-axes are aligned for the front stack, set the teachpoints in the software.
    - Close the doors.
    - In the **Robot Teaching** dialog box, make sure **Front Stack** is selected from the **Robot Teachpoint** list.
    - Select the **Enabled** check boxes to ensure the motors engage as this can slightly move the grippers.
    - Verify the theta- and y-axes are aligned with the jig lines. If necessary, jog the robot in the y (back and forward) and theta (clockwise and counterCW) axes by small increments to perfect the alignment of the jig lines.
    - Click **Set Y teachpoint coord** and **Set Theta teachpoint coord**.



Robot Teaching

**Robot Teachpoint**   Include -2 mm Grip Z Offset on move to TP

**Front Stack**

Y	Z	Theta
current position: 328.53	current position: 407.65	current position: 270.77
jog by: 0.1 mm	jog by: 5.0 mm	jog by: 0.1 °
teachpoint position: 328.53	teachpoint position: 410.26	teachpoint position: 270.77
<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled
Move to position: 0	Move to position: 0	Move to position: 175
<input type="button" value="Set Y teachpoint coord"/>	<input type="button" value="Set Z teachpoint coord"/>	<input type="button" value="Set Theta teachpoint coord"/>

- Move the camera, stacker jig, and robot to the middle stack, select **Middle Stack** from the **Robot Teachpoint** list and repeat this procedure for the middle stack.
- Move the camera, stacker jig, and robot to the rear stack, select **Rear Stack** from the **Robot Teachpoint** list and repeat this procedure for the rear. stack.

## Setting the z-axis teachpoints for the stacks

- 1 Remove the gripper jig, stacker jig and camera.
- 2 Set the z-axis teachpoints:
  - a Turn on the power to the stage jig and Install the jig into the robot gripper.
  - b Using the commands in the teachpoint dialog box, move all the elevator stages to their teach height.
  - c Manually move the robot in the z-axis direction into the elevator stage area, well above the upper limit of the elevator stage. If you have a temperature control unit, move the robot into the enclosure door area at a safe height above the elevator stage.
  - d Move the robot to their y- and theta-teachpoints:
    - Select **Front Stack** from the **Robot Teachpoint** list in the teaching dialog box.
    - Ensure the axes motors are enabled.
    - In the Y area, enter the y-teachpoint position of the front stack in the **Move to position** field and click **Move to position**.
    - In the Theta area of the dialog box, enter the Theta-teachpoint position of the front stack in the **Move to position** field and click **Move to position**.

Robot Teaching

**Robot Teachpoint** Retract and move to teachpoint  Include -2 mm Grip Z Offset on move to TP

**Front Stack** Retract Teach at current Y,Z,Theta Force home robot

Y	Z	Theta
current position: 328.53	current position: 409.65	current position: 270.72
jog by: 0.5 mm	jog by: 0.03 mm	jog by: 0.2 °
teachpoint position: 328.53	teachpoint position: 410.26	teachpoint position: 270.77
<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled
Move to position: 328.53	Move to position: 0	Move to position: 270.77
<b>Set Y teachpoint coord</b>	<b>Set Z teachpoint coord</b>	<b>Set Theta teachpoint coord</b>

- Using the 3-mm hex wrench, lower the jig in the z-axis towards the elevator stage until the light on the stage jig turns on, indicating the pins on the jig are contacting the stage.
- Ensure the doors are closed, engage the z-axis motor and jog the robot up in the z-axis direction in very small increments until the light on the stage jig flickers on and off (observing from the outside with the doors still closed).
- When the jig is in the correct position, click **Set Z teachpoint coord** in the teaching dialog box.

Robot Teaching

**Robot Teachpoint** Retract and move to teachpoint

**Front Stack** Retract Teach at current Y,Z,Theta

Y	Z	Theta	Gripper
current position: 320.50	current position: 365.00	current position: 270.00	current position: 135.00
jog by: 0.5 mm	jog by: 5.0 mm	jog by: 20.0 °	jog by: 5.0 mm
teachpoint position: 320.50	teachpoint position: 0.00	teachpoint position: 270.00	Grip plate: Closed
<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	Ungrip: <input checked="" type="checkbox"/> Enabled
Move to position: 320.5	Move to position: 0	Move to position: 270	
<b>Set Y teachpoint coord</b>	<b>Set Z teachpoint coord</b>	<b>Set Theta teachpoint coord</b>	

- Select **Middle Stack** from the **Robot Teachpoint** list and repeat this procedure.
- Select **Rear Stack** from the **Robot Teachpoint** list and repeat this procedure.

## Setting the teachpoints for the barcode reader stage and barcode reader

### 3 Set the barcode reader stage and barcode reader teachpoints:

- Disable the y- and theta-axis motors and rotate the robot out of the stacker area, towards the BCR stage.

- b Manually move the robot down in the z-axis and when it is close to the stage, adjust the robot in the y-axis to fit the jig into the BCR stage.
- c Securely nest the jig into the BCR stage.
- d Close the doors and engage the axes motors.
- e Set the robot teachpoint for the barcode reader stage:
  - Select **Barcode** from the **Robot Teachpoint** list.
  - Click **Teach at current Y,Z,Theta**.

Robot Teaching

**Robot Teachpoint** Barcode Teach at current Y,Z,Theta

Retract and move to teachpoint  Include -2 mm Grip Z Offset on move to TP

Retract Teach at current Y,Z,Theta Force home robot

Y	Z	Theta
current position: 307.46	current position: 4.82	current position: 48.80
jog by: 0.5 mm	jog by: 0.05 mm	jog by: 0.2 °
teachpoint position: 307.46	teachpoint position: 4.82	teachpoint position: 48.80
<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled
Move to position: 34.21	Move to position: 0	Move to position: 270.50
<b>Set Y teachpoint coord</b>	<b>Set Z teachpoint coord</b>	<b>Set Theta teachpoint coord</b>

- f Set the barcode reader teachpoint:
  - Select **Barcode** from the **Robot Teachpoint** list.
  - In the **Barcode Reader** area, click **Teach at current position**.

Robot Teaching

**Robot Teachpoint**

Barcode   Include -2 mm Grip Z Offset on move to TP

**Y**

current position  jog by   mm

teachpoint position    Enabled

**Z**

current position  jog by   mm

teachpoint position    Enabled

**Theta**

current position  jog by   °

teachpoint position    Enabled

**Barcode Reader**

current position   jog by   °

robot access teachpoint    Enabled

## Setting the swap teachpoint

- 1 Set the swap teachpoint:
  - a In the RapidFire software, click **System Tools > Sipper Configuration**.
  - b Click **Home** to home the sipper, then click **Swap** to move the stage to the accessible position for the plate handler.
  - c Disable the robot motors and ensure the stage jig is correctly installed in the robot grippers.
  - d Move the robot so that the jig rests on the plate stage. Make sure it is flat and snug against the side that holds the matrix bottles. You might have to move the x-axis of the stage so that the jig is against the side that holds the matrix bottles. If you do move the x-axis of the stage, click **Set swap X here**.
  - e Close the doors and engage the motors.
  - f Select **Swap** from the **Robot Teachpoint** list, and click **Teach at current Y,Z,Theta**.

Robot Teaching

**Robot Teachpoint** Retract and move to teachpoint  Include -2 mm Grip Z Offset on move to TP

**Swap** Retract **Teach at current Y,Z,Theta** Force home robot

Y	Z	Theta
current position: 168.71	current position: 5.90	current position: 90.61
jog by: 5.0 mm	jog by: 5.0 mm	jog by: 5.0 °
teachpoint position: 168.70	teachpoint position: 5.90	teachpoint position: 90.61
<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled
Move to position: 0	Move to position: 0	Move to position: 175
<b>Set Y teachpoint coord</b>	<b>Set Z teachpoint coord</b>	<b>Set Theta teachpoint coord</b>

- g Close the Robot Teaching dialog box.
- 2 Remove the stage jig from the robot grippers and turn off the power on the jig.
- 3 Reset the config file so that the robot teaching dialog is not available:
  - a Click **Disconnect** in the RapidFire main software window.
  - b Click **Stop** in the RapidFire Control Panel.
  - c Close the RapidFire software.
  - d Open the **RapidFire.cfg** file in Notepad and change **CONFIGURE\_BENCHBOT=0;**
- 4 Save and close the file and restart the RapidFire software.

### Verifying the system operation

- 1 Set the temperature to 3 C and load the stacks with some plates of the type the customer is using.
- 2 Verify the enclosure has cooled.
- 3 Run a batch file that uses the stacker and barcode reader.
- 4 Ensure the robot can access all stacks, place plates on the stage at the swap position and barcode reader stage correctly.

### Restore the system

- 1 Install the new rear panel that accommodates the TEC control.
- 2 Reinstall the side door (if removed) and the right-front door.

### Installation checkout (customer present)

- Section not applicable*
- Show the customer the changes to the system hardware and software.
- Show the customer how to operate the system with the cooling unit in place.
- Repeat the system verification runs for the customer.

## Signature Page

### Service Review

- Attach available reports/printouts to this documentation.
- Record the time/date of installation or upgrade completion in the customer's records/logbook.
- Complete the following Service Engineer comments section if there are additional comments.
- Review the installation/upgrade with the customer.
- Explain Agilent warranty for instruments.
- Explain how to use manuals, guides, and online help.
- Explain how to get self-help, and FAQs online.
- Explain how to log an instrument service call and support services that are available.
- Advise customer of additional instrument training options.
- If the instrument firmware was updated, record the details of the change in the service engineer's comments box or if necessary, in the customer's IQ records.

### Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the installation or other items of interest for the customer, please write in this box.

**Service Completion**

Service request number \_\_\_\_\_

Date service completed \_\_\_\_\_

Agilent signature \_\_\_\_\_

Customer signature \_\_\_\_\_

Total number of pages in this document \_\_\_\_\_

