

# AutoMate *Express*<sup>™</sup> Instrument

## USER GUIDE

for use with:

PrepFiler *Express*<sup>™</sup> Forensic DNA Extraction Kit

PrepFiler *Express* BTA<sup>™</sup> Forensic DNA Extraction Kit

PrepSEQ<sup>™</sup> Express Nucleic Acid Extraction Kit

GlycanAssure<sup>™</sup> AutoXpress Kit

Catalog Numbers 4441763, 4467754, and A38075

Publication Number 4441982

Revision G



Life Technologies Corporation | 200 Oyster Point Blvd | South San Francisco, CA 94080 | USA

For descriptions of symbols on product labels or product documents, go to [thermofisher.com/symbols-definition](https://www.thermofisher.com/symbols-definition).

The information in this guide is subject to change without notice.

**DISCLAIMER:** TO THE EXTENT ALLOWED BY LAW, THERMO FISHER SCIENTIFIC INC. AND/OR ITS AFFILIATE(S) WILL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, MULTIPLE, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM THIS DOCUMENT, INCLUDING YOUR USE OF IT.

**Important Licensing Information:** These products may be covered by one or more Limited Use Label Licenses. By use of these products, you accept the terms and conditions of all applicable Limited Use Label Licenses.

**Revision history:** Pub. No. 4441982

Revision	Date	Description
G	04 June 2019	Change Cat. No. 4467654 to A27904.
F	12 February 2018	Update: add automated N-glycan purification and labeling, information for the GlycanAssure™ AutoXpress Kit and the GlycanAssure™ AutoXpress Script.
E	14 March 2017	Update: add automated DNA extraction overview, information for PrepFiler <i>Express</i> ™ & PrepFiler <i>Express</i> BTA™ Protocol Card v1.1 (variable elution). Indicate that instrument tests are for HID only. Add instruction to clean piercing unit during installation. Reorganize content to move product information to the beginning of the document and installation and verification 1-time tasks to end of document.
D	August 2012	Incorporated references to the PrepSEQ™ Express Nucleic Acid Extraction Kit.

**Trademarks:** All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. Magtation is a trademark of Precision System Science Co., Ltd

©2019 Thermo Fisher Scientific Inc. All rights reserved.

# Contents

■	<b>CHAPTER 1</b>	<b>Product information</b>	<b>6</b>
		Product description	6
		Features	6
		Automated DNA extraction overview	7
		Automated N-glycan purification and labeling	7
		Instrument components	8
		Instrument exterior and interior	8
		Front panel	10
		Digital display	10
■	<b>CHAPTER 2</b>	<b>Operate the instrument</b>	<b>11</b>
		Important information about order of operations	11
		Instrument procedures for sample preparation kits	11
		Protocol card handling	12
		Remove a protocol card	12
		Insert a protocol card	12
		Load and insert the cartridge rack	14
		Load and insert the tip and tube rack	16
		Run the instrument	17
		Pause a run	18
		Cancel a run	18
■	<b>CHAPTER 3</b>	<b>Test and maintain the instrument</b>	<b>20</b>
		Maintenance schedule	20
		Maintain the instrument	20
		Clean the piercing unit	21
		Clean the instrument daily	21
		Decontaminate the instrument as needed	22

Maintain the D-rings .....	22
Replace the fuse .....	24
Perform instrument tests (forensic applications only) .....	26
When to perform instrument tests .....	26
Perform an axis test (forensic applications only) .....	27
Perform a temperature test (forensic applications only) .....	29
Perform a version test (forensic applications only) .....	30
Perform an error test (forensic applications only) .....	30
<b>■ APPENDIX A Troubleshooting .....</b>	<b>31</b>
Troubleshooting instrument operation .....	31
Troubleshooting instrument error codes .....	33
Instrument error codes .....	34
<b>■ APPENDIX B Unpack and install instrument .....</b>	<b>35</b>
Unpack the instrument .....	35
Remove the packaging .....	35
Remove the protectors .....	36
Verify the components shipped with the instrument .....	37
Install the instrument .....	38
Place the instrument .....	38
Attach the power cord .....	40
Prepare the instrument for first use .....	40
Insert a protocol card .....	40
Remove the packing peanuts .....	42
Clean and insert the instrument components .....	42
Clean the piercing unit .....	43
Set the instrument date and time .....	44
<b>■ APPENDIX C Verify operation of the instrument .....</b>	<b>46</b>
Instrument verification workflow .....	46
Insert a protocol card .....	46
Perform an axis test (forensic applications only) .....	48
Perform a temperature test (forensic applications only) .....	50
Perform an installation test (HID applications only) .....	51
Inspect cartridges .....	51
Perform an installation test .....	52

■ <b>APPENDIX D</b>	<b>Specifications</b>	<b>55</b>
	Instrument specifications	55
	Environmental requirements	56
	Barcode reader specifications	57
■ <b>APPENDIX E</b>	<b>Accessories</b>	<b>58</b>
	Accessories	58
■ <b>APPENDIX F</b>	<b>Safety</b>	<b>59</b>
	Symbols on this instrument	59
	Conformity symbols	61
	Safety alerts on this instrument	62
	Location of safety labels	62
	Instrument safety	62
	General	62
	Physical injury	63
	Electrical safety	63
	Cleaning and decontamination	63
	Instrument component and accessory disposal	63
	Barcode scanner laser	63
	Safety and electromagnetic compatibility (EMC) standards	64
	Safety	64
	EMC	64
	Environmental design	64
	Chemical safety	65
	Biological hazard safety	66
	<b>Documentation and support</b>	<b>67</b>
	Related documents	67
	Customer and technical support	67
	Limited product warranty	68



# Product information

■ Product description .....	6
■ Features .....	6
■ Automated DNA extraction overview .....	7
■ Automated N-glycan purification and labeling .....	7
■ Instrument components .....	8

---

**IMPORTANT!** Before using this product, read and understand the information in the “Safety” appendix in this document.

---

## Product description

The AutoMate *Express*<sup>™</sup> Instrument is a benchtop, automated nucleic acid and N-glycan purification/labeling instrument with an integrated magnetic and syringe unit capable of processing up to 13 samples. Each instrument consists of the magnetic and syringe unit and a platform. A pre-programmed protocol card controls the purification parameters such as buffer volumes, mixing steps, and incubation time. The instrument is designed to run for 8 to 10 hours continuously without any cooling time required between runs. The instrument uses:

- Patented Magtration<sup>™</sup> (magnetic filtration) technology, which traps magnetic particles against the sidewall of the pipetting tip. This technology improves the washing of particles and nucleic acid recovery compared to other magnetic-based purification systems.
- A simple bind-wash-elute procedure to eliminate filtration and centrifugation steps. The purified nucleic acid is suitable for use in downstream applications including quantitative PCR, STR (short-tandem repeat) analysis, SNP typing, sequence analysis, restriction enzyme digestion, and other applications. The labeled glycans are suitable for downstream applications including liquid chromatography (LC) and capillary electrophoresis (CE).

## Features

The AutoMate *Express*<sup>™</sup> Instrument:

- Performs simultaneous purification from up to 13 samples.
- Minimizes the potential for cross-contamination between samples.
- Uses pre-programmed protocol cards that contain the extraction protocol, allowing hands-free extraction.
- Provides consistent, reliable results due to the simultaneous rapid and accurate dispensing of reagents by 13 nozzles in the syringe unit.

- Minimizes the potential carry-over of magnetic particles into the purified nucleic acid.
- Includes built-in safety features.

## Automated DNA extraction overview

During automated extraction, the AutoMate *Express*<sup>™</sup> Instrument:

- Mixes the sample lysate with magnetic particles and other reagents for subsequent DNA binding to magnetic particles in tips.
- Separates the DNA-bound magnetic particles from the lysate using magnetic separation.
- Thoroughly washes the magnetic particles with wash buffers to remove PCR inhibitors.
- Dries the magnetic particles to remove ethanol.
- Elutes concentrated purified DNA in elution buffer.

## Automated N-glycan purification and labeling

During automated protein deglycosylation and glycan labeling, the AutoMate *Express*<sup>™</sup> Instrument:

- Denatures glycoproteins to promote deglycosylation
- Releases glycans from glycoproteins in an enzymatic reaction
- Purifies glycans and removes excess dye with magnetic beads
- Elutes labeled glycans in elution buffer
- At the end of run, collects all hazardous reagents in the cartridge into the sample tube for easy disposal

## Instrument components

### Instrument exterior and interior



**Figure 1** Instrument exterior

- ① Digital display
- ② Protocol card slot
- ③ Door



**Figure 2** Instrument interior

- ① Syringe unit and nozzles
- ② Magnetic unit
- ③ Heating unit

- **Syringe unit**—Contains 13 nozzles that simultaneously move in the Z-axis direction to aspirate and dispense the nucleic acid purification reagents.
- **Magnetic Unit**—Contains 13 magnets (neodymium iron boron type) that align with the instrument tips to separate simultaneously the magnetic particles from up to 13 samples during nucleic acid purification.
- **Piercing unit** (not shown)—Contains 13 piercing rods that move in Z-axis to pierce the foil on the reagent cartridges before the purification protocol starts.
- **Heating Unit**—Heats samples to up to 80°C.



**WARNING!** Do not touch the surface of the heat block. The temperature of the heat block can reach 80°C. Touching the block can cause burns.

## Front panel

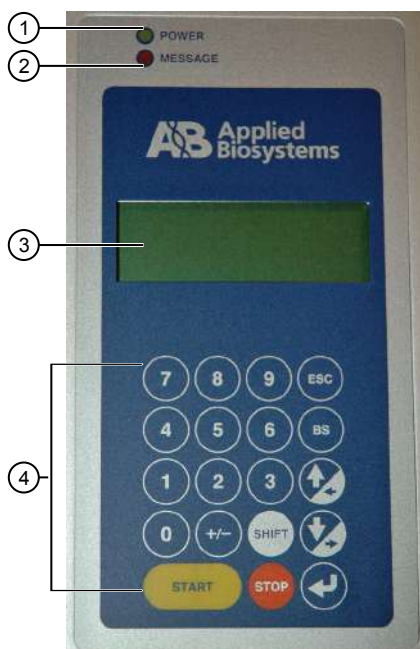



Figure 3 Front panel

- ① Power light—When lit, the power is on.
- ② Message light—When blinking, indicates an error. Look for the error code in the digital display.
- ③ Digital display—Displays protocol information, options, and error codes.
- ④ Keypad—Used to enter parameters and to operate the instrument.

Key	Description
0–9	To select menu
ESC	To previous menu
START	To run or resume protocol
STOP	To stop or pause protocol
	Enter (to confirm or enter the next menu)
BS	Backspace key to delete the last digit/character
SHIFT	Shift + Up/Down arrow keys to move the cursor right or left during time/date setup

## Digital display

The digital display consists of 4 lines of information and menu choices.

For the **Main** menu, **Tests** menu, and **Manual** menu:

- The first line shows the current menu name.
- The second and third lines show the executable commands for the current menu.
- The fourth line describes the keys to use for executing the commands.

For the protocols screen, the display provides current information on the protocol step and allows you to select options.

# 2

## Operate the instrument

■ Important information about order of operations .....	11
■ Instrument procedures for sample preparation kits .....	11
■ Protocol card handling .....	12
■ Remove a protocol card .....	12
■ Insert a protocol card .....	12
■ Load and insert the cartridge rack .....	14
■ Load and insert the tip and tube rack .....	16
■ Run the instrument .....	17
■ Pause a run .....	18
■ Cancel a run .....	18

### Important information about order of operations

To avoid significant problems such as data loss or run cancellation, always perform operations in the following order:

- Before you insert or remove a protocol card, power off the instrument.
- Before you power on the instrument:
  - Insert the protocol card.
  - Close the instrument door.
- If you need to pause the instrument during an extraction run, press **Stop** before you open the instrument door.
- When you are not performing an extraction run or instrument test, you can open the instrument door with the power off or on.
- Do not move instrument components such as the platform, magnets, and syringes while the instrument is powered on.

### Instrument procedures for sample preparation kits

This document contains general procedures for operating the instrument.

For detailed instructions on operating the instrument with a specific sample preparation or nucleic acid extraction kit, see the user guide for the sample preparation or nucleic acid extraction kit.

## Protocol card handling

- Store the card in the plastic cover, in its box, protected from light.
- Do not drop or bend the card.
- Do not wipe or clean the card using volatile chemicals such as alcohol or equivalent.
- Do not expose the card to water or any solution.

## Remove a protocol card

For guidelines on handling protocol cards, see “Protocol card handling” on page 12.

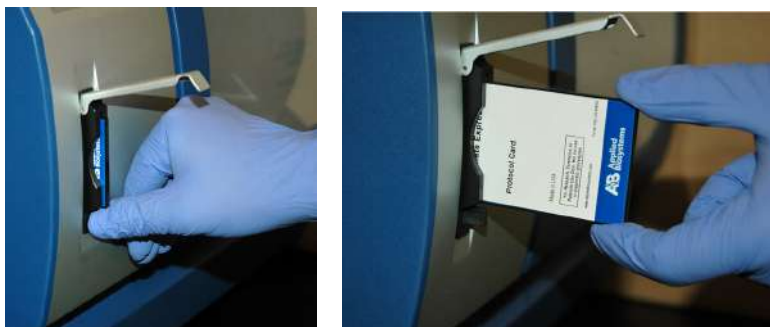
1. Ensure that the power switch is in the off position.

---

**IMPORTANT!** Do not remove the protocol card while the instrument is on.

---

2. Push the button that is located below the card slot (see the following figure), then pull the card out of the slot.



3. Place the card in the plastic cover in the box. Store the card protected from light.

## Insert a protocol card

For guidelines on handling protocol cards, see “Protocol card handling” on page 12.

1. Confirm that the power switch is in the off position.

**Note:** If you insert the card while the instrument is on, the instrument will not recognize the card.

2. Open the card slot.



3. Insert the protocol card in the slot, with the arrow pointing toward the instrument and the label facing left.



4. Push the card completely into the card slot, then close the card slot.
5. Power on the instrument.  
When the card is fully inserted in the correct orientation, the display briefly shows information including the instrument version, then shows the **Main** menu.

---

**IMPORTANT!** Do not remove or insert the protocol card while the instrument is powered on. Removing the card stops the run, and it may cause instrument data file loss. If the card is removed during a run, immediately power off the instrument to minimize the potential for data loss.

---

A photograph of the instrument's monochrome display screen. The screen shows the following text: '&lt;MENU&gt; May 20 03:02', 'START:Protocols', '1:Man 2:Setup 3:Test', and 'Key:START,1,2,3'. The text is displayed in a green, pixelated font on a dark background.

## Load and insert the cartridge rack

**Note:** To ensure the best pipetting performance, use the cartridge rack and tip and tube rack that are shipped with the instrument. These racks are calibrated with the instrument at the factory.

**Note:** Before using other racks on a specific instrument, run the installation test (see “Perform an installation test (HID applications only)” on page 51) to qualify the racks for use on that instrument.

Wear gloves when you handle samples, cartridges, tips, tubes and racks.

1. Press **Start** to display step-by-step instructions for loading on the touchscreen.
2. Open the instrument door (push up the door), then remove the tip and tube rack and the cartridge rack.



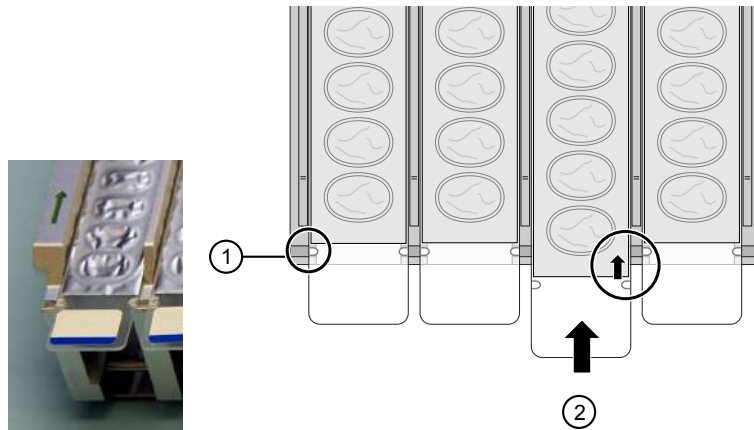
3. Prepare the reagent cartridges as described in the user guide for the kit you are using.

**Note:** Use only supported Thermo Fisher Scientific reagent cartridges.

4. Load the reagent cartridges into the cartridge rack by sliding each reagent cartridge along the groove in the direction of the arrow until the reagent cartridge clicks into place. Ensure that the notches in the cartridge align with the notches in the cartridge rack.

If you are processing fewer than 13 samples, you can leave empty slots in the cartridge rack.

**Note:** An incorrectly loaded cartridge rack can cause the instrument to stop during a run.



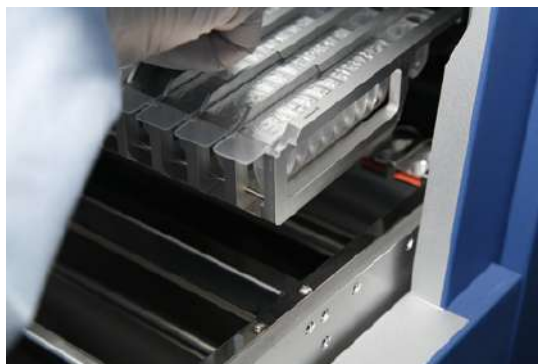
① Correct position

② Slide the cartridge until the notches align and the cartridge clicks into place

5. Insert the loaded cartridge rack into the instrument.



**WARNING!** Do not touch the surface of the heat block. The temperature of the heat block can reach 80°C. Touching the block can cause burns.





## Load and insert the tip and tube rack

---

**IMPORTANT!** Insert the cartridge rack before the tip and tube rack.

---

1. Load the tips and tubes into the tip and tube rack as described in the user guide for the kit you are using.

**Note:** If you are processing fewer than 13 samples, make sure to load the tips and tubes in the same positions as the reagent cartridges that are loaded in the cartridge rack.


2. Insert the loaded tip and tube rack into the instrument with row E in the front.

**Note:** Tip and tube placement on the rack vary between kits.





## Run the instrument

1. Set up the instrument as described in the user guide for the kit you are using.
2. Ensure that you have loaded and inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.
3. Press **Start** from the **Home** screen.
4. Verify that your kit name is displayed, then press .
5. Follow the on-screen prompts, then press **Start**.  
For some kits, the screen shows the steps and the approximate run time remaining.

---

**IMPORTANT!** Do not open the door during a protocol run. To pause or cancel the run, see “Pause a run” on page 18 or “Cancel a run” on page 18.

---

**Note:** If you lose power or the power cord is unplugged, the run stops. When the power resumes, the digital display shows the **Main** menu. You cannot resume the run. If the tips are still on the syringe unit when the power resumes, return the tips to the original positions using the **Manual** menu as described in “Cancel a run” on page 18.

6. At the end of the run, the instrument beeps briefly. Follow the instructions in the user guide for the kit you are using to:
  - Run additional scripts if needed.
  - Remove and store samples.
  - Properly dispose of used reagent cartridges, tips, and tubes.

**Note:** No cooling time is required between runs.

To perform a new run using a different protocol card, power off the instrument, then change the protocol card.

## Pause a run

1. Press **Stop** to pause the run.  
The display shows the following:

```
--Pausing by User---  
START:Continue  
STOP :Stop Protocol
```

2. To resume the run after a pause, press **Start**.  
The run continues from the last step before the pause.

## Cancel a run

Cancellation steps may vary slightly between kits. See your kit user guide for specific instructions.

1. Press **Stop** to pause the run.  
The display shows the following:

```
--Pausing by User---  
START:Continue  
STOP :Stop Protocol
```

2. Press **Stop** again.  
The instrument stops after the current step is completed. The screen returns to the **Main** menu.


```
<MENU> May 20 03:02  
START:Protocols  
1:Man 2:Setup 3:Test  
Key:START,1,2,3
```

3. Press **1** to go to the **Manual** screen.

```
Manual  
1:ORG          3:Clean  
2:Return Tip  
Key:1,2,3,ESC
```

**Note:** When the run is interrupted, the axes and tip do not automatically return to the original positions.

4. Select one of the following options:

Option	Description
To return tips to the holders	<p>Press <b>2</b> (Return Tip).</p> <p><b>Note:</b> Upon completion, the instrument returns to the <b>Main</b> menu.</p>
To move axes when tips do not need to be returned to holders	<ol style="list-style-type: none"> <li>Press <b>1</b> (ORG) to go to the <b>ORG</b> screen.</li> <li>Move each individual axis to the origin by pressing <b>1</b>, <b>2</b>, <b>3</b>, <b>4</b>, respectively, or press <b>0</b> to return all axes to the origin.</li> </ol>  <ol style="list-style-type: none"> <li>Press <b>ESC</b> to return to <b>Main</b> menu.</li> </ol>

You are now ready to start a new run.

# 3

## Test and maintain the instrument

■ Maintenance schedule .....	20
■ Maintain the instrument .....	20
■ Perform instrument tests (forensic applications only) .....	26

### Maintenance schedule

Schedule	Procedure	See
Daily	Clean the piercing unit	"Clean the piercing unit" on page 21
Daily or as needed	<ul style="list-style-type: none"> <li>Clean the platform surfaces (racks and bottom tray)</li> <li>Clean the tip and tube rack</li> <li>Clean the magnets</li> </ul>	<ul style="list-style-type: none"> <li>During verification (see Appendix C, "Verify operation of the instrument")</li> <li>"Clean the instrument daily" on page 21</li> </ul>
Every 2 weeks	Maintain the D-rings	"Maintain the D-rings" on page 22
Monthly (HID only)	Perform axis and temperature tests	"Perform an axis test (forensic applications only)" on page 27 "Perform a temperature test (forensic applications only)" on page 29
Annually	Replace the D-rings	"Replace the D-rings with D-ring tools" on page 23 "Replace the D-rings without D-ring tools" on page 24
	Planned maintenance	Contact Thermo Fisher Scientific to schedule.

### Maintain the instrument


---

**IMPORTANT!** Do not perform repairs or service on the instrument other than the procedures in this section. For any other repairs and service, contact Technical Support.

---



---

 **WARNING!** Do not clean the instrument with acids or bases (such as bleach). Acids and bases can react with the guanidine thiocyanate in the lysis buffer and generate toxic gas.

---

## Clean the piercing unit

1. From the **Main** Menu, press **1** to display the **Manual** screen.
2. Press **3** (Clean), then press **1** to lower the piercing unit.



**CAUTION!** The tips of the piercing unit are sharp.

```
Manual
1:ORG      3:Clean
2:Return Tip
Key:1,2,3,ESC
```

3. Wipe the tips with an alcohol wipe.
4. Press **ESC** to return the piercing unit to the original position.

## Clean the instrument daily

Clean the door panel, racks, bottom tray, and magnets daily or as needed as described below.

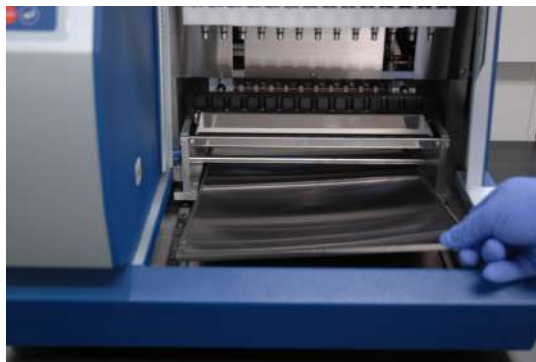
1. Clean the clear door panel with a laboratory wipe dampened with water.

**IMPORTANT!** Do not clean the clear door panel with ethanol.

2. Clean the cartridge rack, tip and tube rack, and magnets with mild detergent, then rinse with deionized water. Allow the parts to dry before use.
3. Remove and clean the bottom tray:
  - a. Power off the instrument, then push the tray platform toward the back of the instrument.

**IMPORTANT!** Make sure that the instrument is powered off before moving the tray platform to the rear of the instrument.

- b. Holding the front edge of the tray, remove the tray from the instrument.



- c. Clean the tray with mild detergent, then rinse with deionized water.
  - d. Allow the tray to dry, then place the tray back properly in the bottom of the instrument before use.

## Decontaminate the instrument as needed



**WARNING!** Do not decontaminate the instrument with acids, or bases (such as bleach). Acids and bases can react with the guanidine thiocyanate in the lysis buffer and generate toxic gas.

Decontaminate the instrument before moving, long-term storage, disposition, servicing by an engineer, or as needed:

1. Clean the clear door panel with a laboratory wipe dampened with water.

**IMPORTANT!** Do not clean the clear door panel with ethanol.

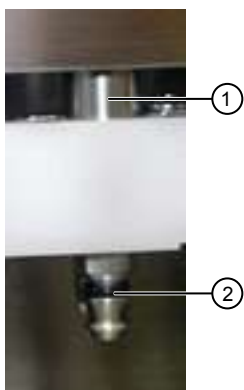
2. Clean the metal bottom tray, cartridge rack, tip and tube rack, nozzles, piercing unit, and heater block by wiping with deionized water followed by 70% ethanol.

## Maintain the D-rings

Every two weeks, apply silicon grease (supplied with the instrument) to the nozzle D-rings on the syringe unit to maintain proper attachment of the tips to the nozzles and prevent leakage:

**Note:** You can use any vacuum-type silicon grease.

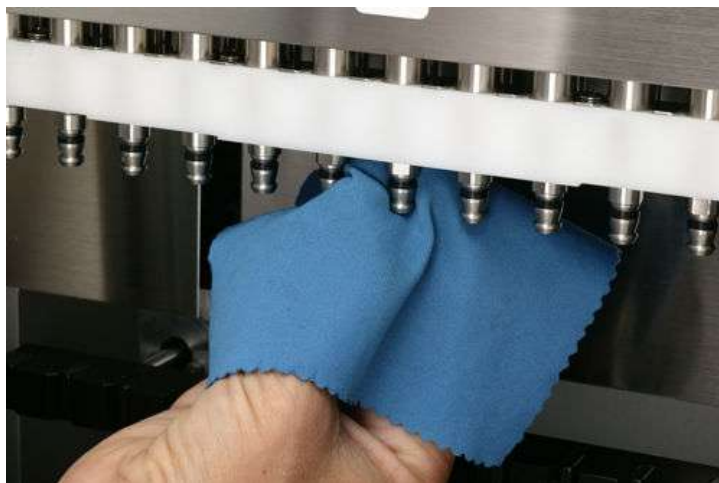
1. Place some silicon grease on a gloved finger.
2. Apply the silicon grease on the surface of the D-rings that are attached to the nozzles. Do not put grease into the nozzles. If you accidentally put grease into a nozzle, remove the grease using a laboratory wipe or a dustfree cloth.



① Nozzle

② D-ring

3. Wipe off any excess grease on the edges of the nozzles using a laboratory wipe or a dust-free cloth. Excess grease interferes with the operation of the instrument.



### Replace the D-rings with D-ring tools

Once a year, replace the nozzle D-rings to maintain proper attachment of the tips to the nozzles and prevent leakage.

One replacement set of 13 D-rings is included with the instrument. To obtain more D-rings, see Appendix E, "Accessories".

If you are using the D-ring removal and installation tools (Cat. No. 4457423), replace the D-rings as follows:

1. Using the D-ring removal tool as shown in the following figure, press the D-ring from behind to create a loop in front. Grab the loop with pliers or a pipette tip, then stretch and remove the D-ring.



2. Using the D-ring installation tool, slip a new D-ring into the nozzle groove. Keep the flat inner surface of the D-ring in contact with the installation tool so that the D-ring does not roll. Ensure that the D-ring is placed properly on the nozzle to prevent leakage.



### Replace the D-rings without D-ring tools

If the D-ring removal and installation tools are not available, replace the D-rings as follows:

1. Using a small forceps or pliers, remove each D-ring from the nozzle by pulling out the D-ring, then sliding it from the nozzle.
2. Place some silicon grease on a gloved finger.
3. Apply the silicon grease to each nozzle.
4. Slide a new D-ring on to each greased nozzle. Ensure that the D-ring is placed properly on the nozzle to prevent leakage.
5. Wipe off any excess grease on the edges of the nozzles using a laboratory wipe or a dust-free cloth. Excess grease interferes with the operation of the instrument.

### Replace the fuse

Extra 3.15-A T (time-lag type)/250-V fuses are supplied with the instrument.



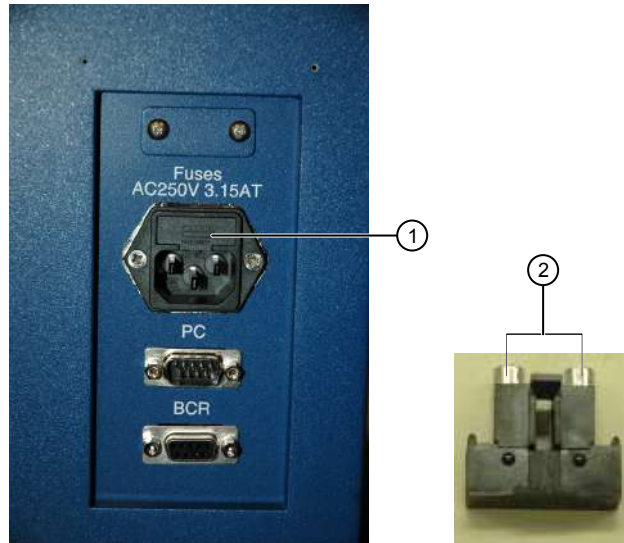
**WARNING!** The 6.3-A T (time-lag type) fuse that is included with the instrument is for internal parts (CPU, motor driver, heater) of the instrument. Do not attempt to change the 6.3-A T fuse for these internal parts. If the 6.3-A T fuse needs replacement, contact Technical Support.



**WARNING!** FIRE HAZARD. For continued protection against the risk of fire, replace fuses only with fuses of the same type and rating as the fuses currently in the instrument.

To replace a 3.15-A fuse for the main power socket:

1. Power off the instrument and remove the power cord from the rear of the instrument.
2. Open the fuse compartment that is located on the rear of the instrument using a small flat-blade screwdriver to gently pry open the fuse compartment.



- ① Fuse compartment  
② 3.15-A fuses

3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the 3.15 A fuse with the identical type fuse.
4. Place the fuse holder back into the compartment and snap the cover closed.

## Perform instrument tests (forensic applications only)

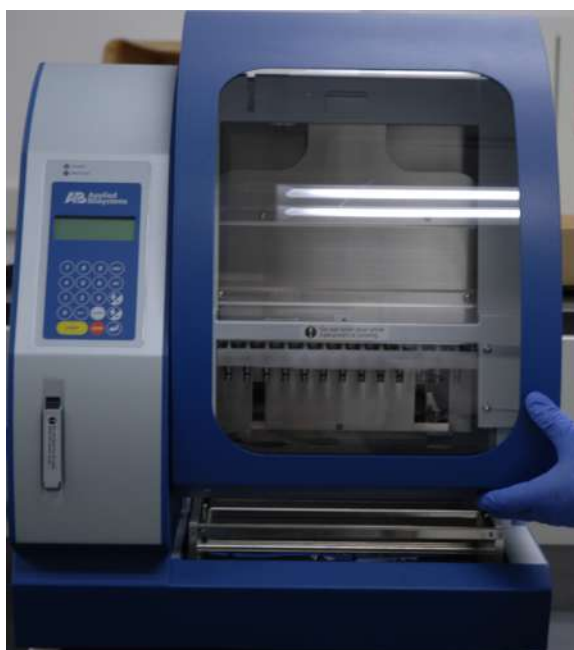
**When to perform instrument tests**      A protocol card must be installed before you perform instrument tests.

Test	Description	When to perform
Axis	Tests full range of motion in all axes.	<ul style="list-style-type: none"><li>• During verification (see Appendix C, “Verify operation of the instrument”)</li><li>• Monthly</li></ul>
Temp (Temperature)	Quick functional test of heater block.	<ul style="list-style-type: none"><li>• During verification (see Appendix C, “Verify operation of the instrument”)</li><li>• Monthly</li></ul>
Ver (Version)	Displays the firmware version	As needed
Error	Displays the error code for the last error that occurred	As needed

## Perform an axis test (forensic applications only)

The following items are needed for the axis test (items are provided with the instrument):

- Sample and Elution tubes provided with the instrument..
  - Tips and tip holders provided in the Install kit.
  - Empty reagent cartridges provided in the Install kit—Do not fill the empty reagent cartridges. When the test is complete, retain the empty cartridges for future use.
1. Ensure that the protocol card is inserted and that the instrument is powered on as described in “Insert a protocol card” on page 12.
  2. Open the instrument door (push up the door), then remove the tip and tube rack and the cartridge rack.



3. Load 13 empty reagent cartridges into the cartridge rack, then insert the loaded cartridge rack as described in “Load and insert the cartridge rack” on page 14.
4. Using the plastics that are shipped with the instrument and with the Install Kit, load the tip and tube rack in the following order:
  - a. **Row S** (fourth row): Load 13 sample tubes.
  - b. **Row T1** (second row): Load 13 tips inserted into tip holders.
  - c. **Row T2** (third row): Load 13 tips inserted into tip holders.

- d. **Row E** (first row): Load 13 elution tubes, with the caps open and secured as shown in the photo.



- ① S—Sample tube
- ② T2—Tip and tip holder
- ③ T1—Tip and tip holder
- ④ E—Elution

5. Insert the loaded tip and tube rack into the instrument with row E in the front.



6. Ensure that you have inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.
7. In the **Main** menu, press 3 to display the **Tests** menu.

```
<MENU> May 20 03:02
START:Protocols
1:Man 2:Setup 3:Test
Key:START,1,2,3
```

8. In the **Tests** menu, press **1** to display the **Axis** test screen.

```
Tests
1:Axis  3:Ver
2:Temp  4>Error
Key:1-4,ESC
```

9. Press **Start** to start the test. The duration of the test is ~3 minutes.

```
Axis test
Set all Disposables
ALL OK? [START] key
Return? [ESC] key
```

10. At the end of the test, note the following:
  - If the screen displays ALL OK, no problem is detected.
  - If an error screen with an error code is displayed, note the error code, then contact Technical Support.

**Note:** See “Perform an error test (forensic applications only)” on page 30 for the error screen and “Instrument error codes” on page 34 for the list of error codes.


11. Press **ESC** to return to the **Tests** menu.

**Note:** You can leave the cartridge rack and tip and tube rack in the instrument if you are performing a Temperature test next.

### Perform a temperature test (forensic applications only)

1. Ensure that the protocol card is inserted and that the instrument is powered on as described in “Insert a protocol card” on page 12.
2. In the **Tests** menu, press **2** to display the **Temp** test screen.

```
Tests
1:Axis  3:Ver
2:Temp  4>Error
Key:1-4,ESC
```

3. Use  to change the **Set Temp** to 60°C from the default of 25°C.

```
Temp test
Set Temp=60.0degC
ALL OK? [START] key
Return? [ESC] key
```

4. Use your own clock or timer and make note of the start time.
5. Press **Start** to run the test:
  - The **Now Temp** value should reach the **Set Temp** value within 5 minutes.
  - When the **Set Temp** value is reached, the **Alarm** value should change to **00**.

If one or both of these values are not reached, contact Technical Support.



```
Temp test
Set Temp=60.0degC
Now Temp=60.3degC
Alarm=00
```

6. Press **ESC** to return to the **Tests** menu, then press **ESC** again to return to the **Main** menu.

---

**IMPORTANT!** When the Temperature test is complete, the **Set Temp** resets to 25°C. The temperature of the heater unit cools down at a rate of about 1°C per minute.

---

### Perform a version test (forensic applications only)

1. From the **Main** menu, press **3**, then press **3** from the **Tests** menu. The **Ver** (version) screen shows the firmware version.



```
Ver
Version 1.0.0.0
Key:ESC
```

2. Press **ESC** to return to the **Main** menu.

### Perform an error test (forensic applications only)

1. From the **Main** menu, press **3**, then press **4** from the **Tests** menu. The Error History screen shows the error code for the last error that occurred. See “Instrument error codes” on page 34 for a list of error codes.



```
Error History
Code= 0024
Key:ESC
```

2. Press **ESC** to return to the **Main** menu.



# Troubleshooting

■ Troubleshooting instrument operation .....	31
■ Troubleshooting instrument error codes .....	33
■ Instrument error codes .....	34

## Troubleshooting instrument operation

Observation	Possible cause	Recommended action
No power (the digital display is blank and the fan does not start when you power on)	The AC power cord is not connected.	Check AC power cord connections at both ends. Use the correct cords.
	The fuse has blown.	Check the integrity of the fuse and replace it if needed.  If the problem persists after connecting the correct power cord and replacing the fuse, contact Technical Support.
The digital display is blank, but the fan starts when you power on	The protocol card is not inserted correctly.	Power off the instrument and reinsert the protocol card in the proper orientation into the card slot (see "Insert a protocol card" on page 12). Insert it completely into the slot by manually pushing the card.
	The protocol card was inserted when the instrument was powered on.	Power off the instrument, then power on the instrument.
An error code is displayed	See "Troubleshooting instrument error codes" on page 33.	See "Troubleshooting instrument error codes" on page 33.
Reagent cartridges, tips, or tubes are not inserted in the correct positions	Operator error.	Press <b>Stop</b> to pause the run. Open the door, add the missing items, then press <b>Start</b> to resume the run. Do not open the door without pausing the run.

Observation	Possible cause	Recommended action
The run stops after an initial start (you may also see an error code)	<ul style="list-style-type: none"> <li>Instrument door was opened during the run.</li> <li>Reagent cartridges, tips, or tubes are incorrectly loaded in the racks.</li> <li>Racks are incorrectly loaded on the instrument.</li> </ul>	<p><b>IMPORTANT!</b> If you open the instrument door while the instrument is running, the run stops, and it cannot be restarted. If you need to open the instrument door during a run, first press Stop to pause the run, then open the door.</p> <ol style="list-style-type: none"> <li>Follow the procedure in “Troubleshooting instrument error codes” on page 33.</li> <li>Before starting a new run, ensure that the reagent cartridges, tips, and tubes are correctly loaded: <ul style="list-style-type: none"> <li>Slide the reagent cartridges into the cartridge rack as described in “Load and insert the cartridge rack” on page 14.</li> <li>Load the cartridge rack before the tip and tube rack for proper positioning.</li> <li>Load the tip and tube rack as described in “Load and insert the tip and tube rack” on page 16.</li> <li>Do not cap the tubes.</li> </ul> </li> <li>If the instrument continues to stop during the run, contact Technical Support.</li> </ol>
Bubbles form during purification	<p>The sample volume is lower than the recommended volume.</p> <p><b>Note:</b> Some bubbles are produced during routine operation when using the recommended sample volume.</p>	<p>In future runs, use the sample volume that is recommended in the user guide for the kit you are using.</p> <p>Long-term operation with lower-than-recommended sample volumes can lead to problems with liquid handling performance.</p>
During the run: No liquid is present in the tip or liquid in the tip does not move  After the run: No elution volume.	<p>No sample was added to the tube, causing a wet filter barrier on the tip and blockage of nozzles.</p> <p>The sample volume is lower than the recommended volume, causing a wet filter barrier on the tip and blockage of nozzles.</p>	<p>Add samples to tubes, load new reagent cartridges, replace wetted tips as needed, then perform the run again.</p> <p>In future runs, use the recommended sample volume in the user guide for the kit you are using.</p> <p>Long-term operation with lower-than-recommended sample volumes can lead to problems with liquid handling performance.</p>
Buffer is present in the bottom tray	<p>Motor movements are not smooth.</p> <p>Reagent cartridges, tips, or tubes are incorrectly loaded in the rack.</p>	<p>Schedule preventive maintenance annually to ensure proper motor movements.</p> <p>If you are processing fewer than 13 samples, ensure to load the tips and tubes in the same positions as the reagent cartridges that are loaded in the cartridge rack.</p>
Leakage from tips or uneven liquid handling between nozzles	D-rings are not greased regularly or they need replacement.	You can continue the run, but maintain the D-rings as scheduled or replace the D-rings to prevent leakage. See “Maintain the D-rings” on page 22.

Observation	Possible cause	Recommended action
Tips are blocked	In HID applications: Sample is causing bead clumping.	If sample type allows, consider using a different kit for extraction (for example, the PrepFiler <i>Express</i> BTA™ kit).
	In bioprocess applications: Loose cell pellet.	Contact Technical Support.
		Before loading samples into the tip and tube rack, centrifuge the samples for 3 minutes at 1,000 × <i>g</i> . After loading the centrifuged samples into the instrument, start the run as soon as possible.

## Troubleshooting instrument error codes

If an extraction run is interrupted by an error, you cannot resume the interrupted run. Follow the procedure below to resolve the error before you start a new run.

1. Make a note of the error code, including the line number. Common error codes are listed in “Instrument error codes” on page 34.
2. Press **ESC** to return to the **Main** menu.
3. If there are tips attached to the nozzles, press **1** to select the **Manual** screen, then press **2** to return the tips to the original position (see “Cancel a run” on page 18 for details).
4. Run an axis test (see “Perform an axis test (forensic applications only)” on page 27). If the axis test is:
  - Successful, start a new extraction run. Use new samples and plastics where required.
  - Not successful, contact Technical Support.

## Instrument error codes

Code	Problem	Code	Problem
10	Failed return to origins, protocol cannot run	21	P axis time out, protocol in run
11	Limit error, protocol cannot run	22	M axis time out, protocol in run
12	Failed to return to Z Axis, protocol in run	23	Y axis time out, protocol in run
13	Failed to return to P axis, protocol in run	24	Open door in motion
14	Failed to return to M axis, protocol in run	25	Abnormal input from bottom sensor in motion
15	Failed to return to Y axis, protocol in run	26	Failed to initialize heating block
16	Z axis limit error, protocol in run	27	Failed to initialize motion control board
19	Y axis end limit, protocol in run	110	System error; (Assigned greater than 10)
20	Z axis time out, protocol in run	—	—



# Unpack and install instrument

■ Unpack the instrument .....	35
■ Verify the components shipped with the instrument .....	37
■ Install the instrument .....	38
■ Prepare the instrument for first use .....	40

## Unpack the instrument

### Remove the packaging

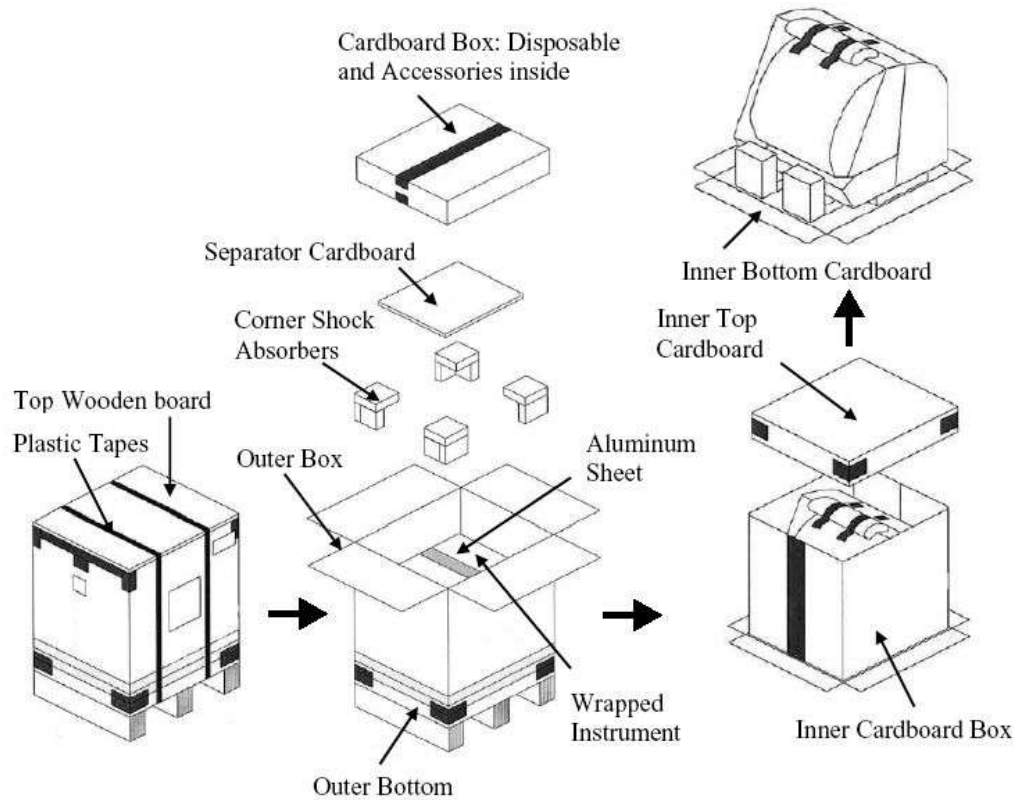
**Note:** The weight of the instrument is 55 kg (121 pounds).

1. Cut the plastic straps and the tape securing the outer box to the outer bottom.
2. Remove the top wooden board, then open the top of the box.
3. Remove the box containing the plastic disposables and instrument accessories.
4. Remove the cardboard separator.
5. Remove the shock absorbers from the four corners.
6. Remove the outer cardboard box by pulling up on the box.
7. Remove the wrapped instrument box from the outer bottom cardboard.
8. Remove the aluminum sheet wrapping from the instrument box.
9. Remove the instrument from the inner cardboard box.  
The instrument is now in a plastic wrap without cover.
10. Remove the plastic sheet.

---

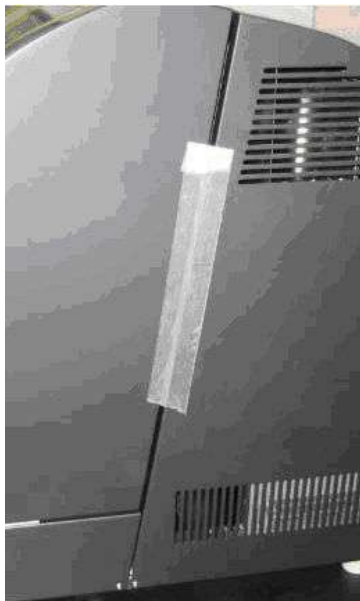
**IMPORTANT!** Handle the instrument carefully from this point to avoid any damage to the unit.

---

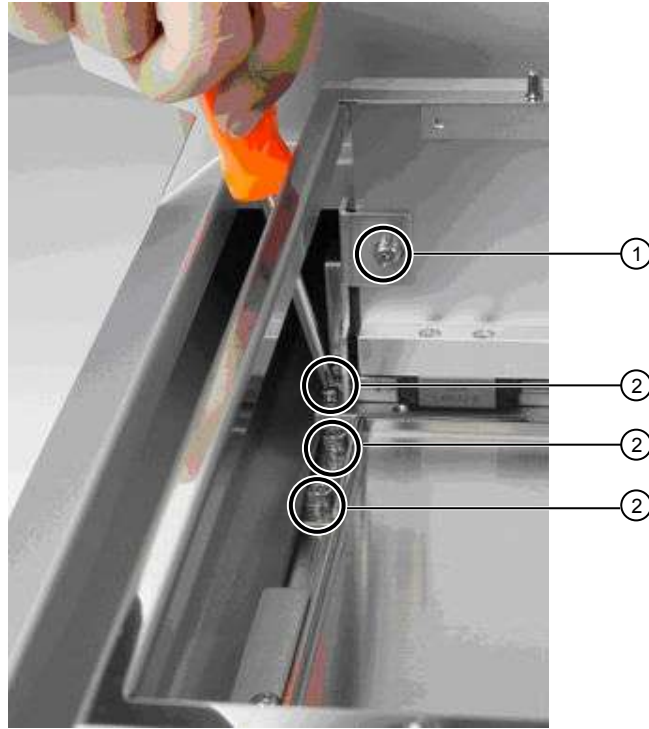


## Remove the protectors

1. Remove the adhesive tape on the door and on the card slot.



2. Push up the instrument door until the magnet holds it up.
3. Remove the y-axis shipping clamp by removing the three screws using a small Phillips head screwdriver.



- ① Y axis shipping clamp  
② Screws

## Verify the components shipped with the instrument

Verify that you received all the components that are listed below:

- **Components that are shipped with the instrument**
  - Instrument
  - Power cord (for U.S./Canada/Taiwan/Japan, Europe, or U.K.)
  - Cartridge rack
  - Tip and tube rack
  - Bottom tray
  - Tips and tip holders (52 sets, for use in “Perform an axis test (forensic applications only)” on page 27)
  - Empty reagent cartridges (13, for use in “Perform an axis test (forensic applications only)” on page 27)

**Note:** Do not fill the empty reagent cartridges. Retain the empty cartridges after performing tests for future use.

- Silicone grease
- D-rings (13)

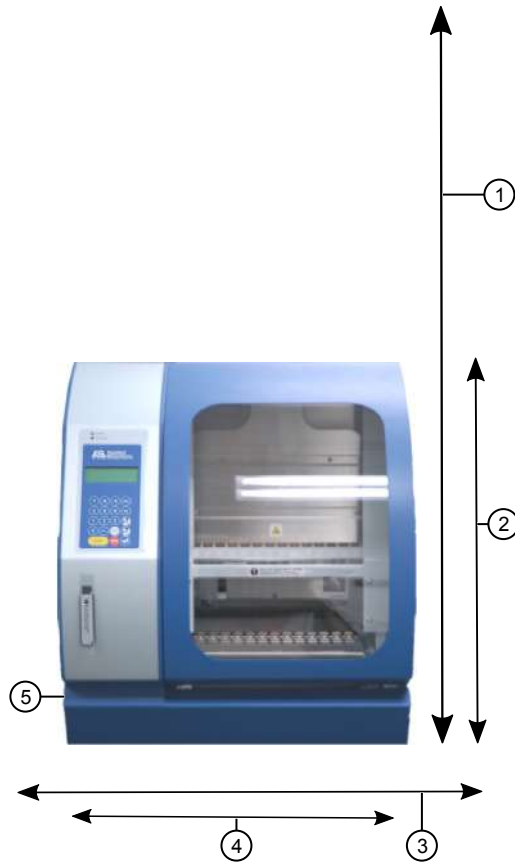
- 6.3-A T (time-lag type) fuse
- 3.15-A T (time-lag type) fuse
- Barcode reader box, containing the following:
  - Gryphon GD4130 Barcode Reader
  - USB cable (CAB-426 SH4043)
- **Components that are shipped separately**
  - Protocol card
  - Universal Power Cord Kit
  - User Guide
  - (HID applications only) Install Kit (for use in “Perform an installation test (HID applications only)” on page 51)

## Install the instrument

### Place the instrument

The surface on which you install the instrument must support 55 kg (121 pounds).

1. Place the instrument on a level laboratory bench with the power switch to the left and the AC inlet at the rear of the unit.
2. Ensure there is clearance around the instrument as follows:
  - 10 cm (4 inches) on the right and left side of the instrument to ensure proper ventilation of the unit.
  - Room at the back of the instrument to attach the power cord and access the fuses.
  - Vertical clearance of 114.5 cm (45 inches) to allow service representatives to remove the instrument cover if needed.



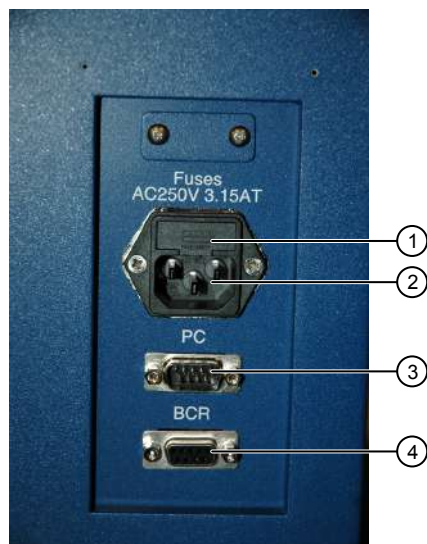
**Figure 4** Instrument front view

- ① Minimum clearance height 114.5 cm (45 in.)
- ② Instrument height 57.3 cm (22.5 in.)
- ③ Minimum width 71.1 cm (28 in.)
- ④ Instrument width 50.8 cm (20 in.)
- ⑤ Power switch on left



**Figure 5** Instrument left side view

- ① Power switch



**Figure 6** Instrument rear view

- ① Fuse
- ② Power cord
- ③ Computer (not used)
- ④ Barcode reader (not used with current system configuration)

### Attach the power cord

1. Check the power cord that is supplied with the unit to ensure that the cord is compatible with the local socket format.
2. With the AC power switch in the Off position, attach the power cord to the AC inlet and then to the electrical outlet. Use only properly grounded AC outlets and power cords.

---

**IMPORTANT!** Do not start the instrument until a protocol card is inserted into the instrument as described in “Insert a protocol card” on page 12.

---

## Prepare the instrument for first use

### Insert a protocol card

For guidelines on handling protocol cards, see “Protocol card handling” on page 12.

1. Confirm that the power switch is in the off position.

**Note:** If you insert the card while the instrument is on, the instrument will not recognize the card.

2. Open the card slot.



3. Insert the protocol card in the slot, with the arrow pointing toward the instrument and the label facing left.



4. Push the card completely into the card slot, then close the card slot.
5. Power on the instrument.  
When the card is fully inserted in the correct orientation, the display briefly shows information including the instrument version, then shows the **Main** menu.

---

**IMPORTANT!** Do not remove or insert the protocol card while the instrument is powered on. Removing the card stops the run, and it may cause instrument data file loss. If the card is removed during a run, immediately power off the instrument to minimize the potential for data loss.

---

A photograph of the instrument's monochrome display screen. The screen shows the following text: "&lt;MENU&gt; May 20 03:02", "START:Protocols", "1:Man 2:Setup 3:Test", and "Key:START,1,2,3". The text is displayed in a green, pixelated font on a dark background.

## Remove the packing peanuts

1. Open the instrument door (push up the door).



2. Remove the packing peanuts from the instrument.

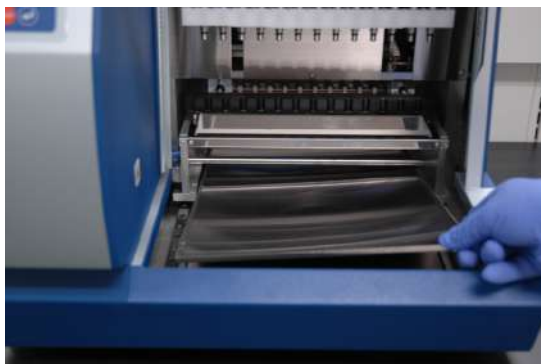
## Clean and insert the instrument components

**Note:** Do not move instrument components such as the platform, magnets, and syringes while the instrument is powered on.

1. Clean the cartridge rack, tip and tube rack, and bottom tray with a mild detergent before use (see “Clean the instrument daily” on page 21).
2. Allow the parts to dry.

**Note:** If you have more than one instrument in your lab, label the racks so that you can identify the instrument to which the racks belong.

3. Insert the bottom tray: Push the platform toward the back of the instrument. Holding the front edge of the tray, insert the tray into the instrument.



4. Insert the cartridge rack into the instrument.



**WARNING!** Do not touch the surface of the heat block. The temperature of the heat block can reach 80°C. Touching the block can cause burns.



5. Insert the tip and tube rack into the instrument with row E in the front.



### Clean the piercing unit

1. From the **Main** Menu, press **1** to display the **Manual** screen.
2. Press **3** (Clean), then press **1** to lower the piercing unit.



**CAUTION!** The tips of the piercing unit are sharp.

```
Manual
1:ORG          3:Clean
2:Return Tip
Key:1,2,3,ESC
```

3. Wipe the tips with an alcohol wipe.
4. Press **ESC** to return the piercing unit to the original position.

## Set the instrument date and time

### Set the date

1. From the **Main** menu, press **2** on the keypad (see “Digital display” on page 10) to display the **Setup** screen, press **1** to display the **Setup/System** screen, then press **1** again to display the **Setup/Sys/Date/Time** screen.

```
Setup
1: System
Key: ESC
```

```
Setup>System
1: Date/Time
Key: 1, ESC
```

2. Press **1** to display the **Date** screen.



```
Setup>Sys>Date/Time
1: Date
2: Time
Key: 1, 2, ESC
```




```
Setup>Sys>>Date
Cur: CMN CD, CYYY
Set: SMN SD, SYYY
Key: Up, Dn, RET, ESC
```

The screen displays:




- **Cur**—CMN (current month), CD (current date), CYYY (current year)
- **Set**—SMN (set month), SD (set date), SYYY (set year)

To move the cursor from the current field to the first character in a field to the:




- Left, press Shift+
- Right, press Shift+

3. Press  to display the months starting with January or press  to display the months starting with December. When the correct month is displayed, press **Shift** +  to select the month and move the cursor to the **SD** field.

```
Setup>Sys>>Date
Cur: CMN CD, CYYY
Set: SMN SD, SYYY
Key: Up, Dn, RET, ESC
```

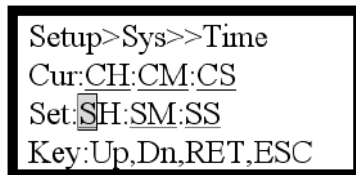
4. Press  to add 1 day to the currently displayed date. Press  to subtract 1 day from the currently displayed date until the correct date is displayed. Press **Shift** +  to select the date and move the cursor to the **SYYY** field.

```
Setup>Sys>>Date
Cur: CMN CD, CYYY
Set: SMN SD, SYYY
Key: Up, Dn, RET, ESC
```

5. Press  to add 1 to the currently displayed year or press  to subtract 1 from the currently displayed year. The system lets you set the year between 2000 and 2040.
6. Press  to save the settings and display the **Main** menu.

### Set the time

1. From the **Main** menu, press **2, 1, 1** to display the **Setup/Sys/Date/Time** screen.
2. Press **2** to display the **Time** screen.





```










Setup>Sys>>Time
Cur:CH:CM:CS
Set:SH:SM:SS
Key:Up,Dn,RET,ESC
    
```

The screen displays:

- **Cur**—CH (current hour), CM (current minute), CS (current second)
- **Set**—SH (set hour), SM (set minute), SS (set second)

To move the cursor from the current field to the first character in a field to the:

- Left, press Shift+
- Right, press Shift+

3. Press  to add 1 to the currently displayed hour or press  to subtract 1 from the currently displayed hour. When the correct date is displayed, press **Shift** +  to select the hour and move the cursor to the **SM** field.
4. Press  to add 1 to the currently displayed minute or press  to subtract 1 from the currently displayed minute. When the correct minute is displayed, press **Shift** +  to select the minute and move the cursor to the **SS** field.
5. Press  to add 1 to the currently displayed second or press  to subtract 1 from the currently displayed second.
6. Press  to save the settings and display the **Main** menu.

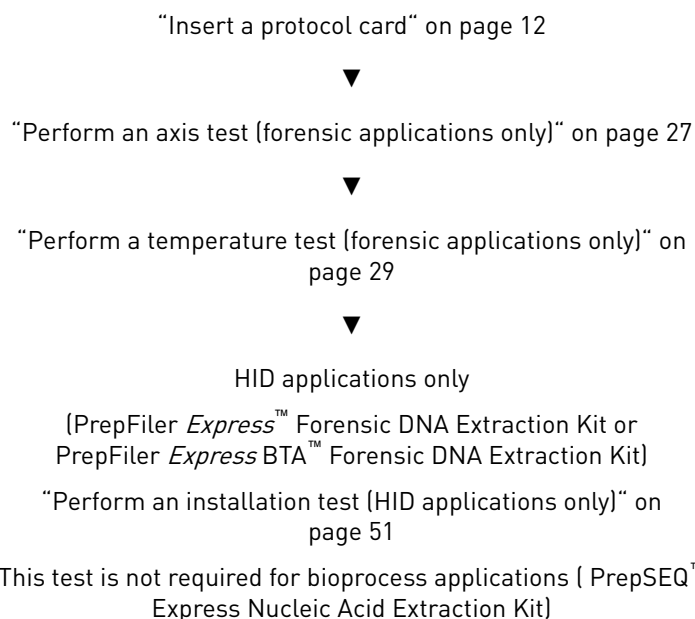


# Verify operation of the instrument

■ Instrument verification workflow .....	46
■ Insert a protocol card .....	46
■ Perform an axis test (forensic applications only) .....	48
■ Perform a temperature test (forensic applications only) .....	50
■ Perform an installation test (HID applications only) .....	51

## Instrument verification workflow

After you install and prepare the instrument as described in Appendix B, “Unpack and install instrument”, perform these actions in the following order:



If the instrument fails one or more tests, contact Technical Support.

## Insert a protocol card

For guidelines on handling protocol cards, see “Protocol card handling” on page 12.

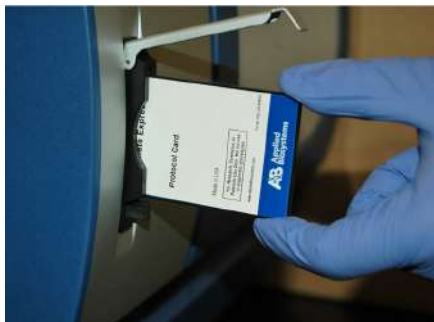
1. Confirm that the power switch is in the off position.

**Note:** If you insert the card while the instrument is on, the instrument will not recognize the card.

2. Open the card slot.



3. Insert the protocol card in the slot, with the arrow pointing toward the instrument and the label facing left.



4. Push the card completely into the card slot, then close the card slot.
5. Power on the instrument.  
When the card is fully inserted in the correct orientation, the display briefly shows information including the instrument version, then shows the **Main** menu.

---

**IMPORTANT!** Do not remove or insert the protocol card while the instrument is powered on. Removing the card stops the run, and it may cause instrument data file loss. If the card is removed during a run, immediately power off the instrument to minimize the potential for data loss.

---

A photograph of the instrument's display screen, which is a small LCD. The screen shows the following text: '&lt;MENU&gt; May 20 03:02', 'START:Protocols', '1:Man 2:Setup 3:Test', and 'Key:START,1,2,3'. The text is green on a black background.

## Perform an axis test (forensic applications only)

The following items are needed for the axis test (items are provided with the instrument):

- Sample and Elution tubes provided with the instrument..
  - Tips and tip holders provided in the Install kit.
  - Empty reagent cartridges provided in the Install kit—Do not fill the empty reagent cartridges. When the test is complete, retain the empty cartridges for future use.
1. Ensure that the protocol card is inserted and that the instrument is powered on as described in “Insert a protocol card” on page 12.
  2. Open the instrument door (push up the door), then remove the tip and tube rack and the cartridge rack.



3. Load 13 empty reagent cartridges into the cartridge rack, then insert the loaded cartridge rack as described in “Load and insert the cartridge rack” on page 14.
4. Using the plastics that are shipped with the instrument and with the Install Kit, load the tip and tube rack in the following order:
  - a. **Row S** (fourth row): Load 13 sample tubes.
  - b. **Row T1** (second row): Load 13 tips inserted into tip holders.
  - c. **Row T2** (third row): Load 13 tips inserted into tip holders.

- d. **Row E** (first row): Load 13 elution tubes, with the caps open and secured as shown in the photo.



- ① S—Sample tube
- ② T2—Tip and tip holder
- ③ T1—Tip and tip holder
- ④ E—Elution

5. Insert the loaded tip and tube rack into the instrument with row E in the front.



6. Ensure that you have inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.
7. In the **Main** menu, press 3 to display the **Tests** menu.

```
<MENU> May 20 03:02  
START:Protocols  
1:Man 2:Setup 3:Test  
Key:START,1,2,3
```

8. In the **Tests** menu, press **1** to display the **Axis** test screen.

```
Tests
1:Axis 3:Ver
2:Temp 4:Error
Key:1-4,ESC
```

9. Press **Start** to start the test. The duration of the test is ~3 minutes.

```
Axis test
Set all Disposables
ALL OK? [START] key
Return? [ESC] key
```

10. At the end of the test, note the following:
- If the screen displays ALL OK, no problem is detected.
  - If an error screen with an error code is displayed, note the error code, then contact Technical Support.

**Note:** See “Perform an error test (forensic applications only)” on page 30 for the error screen and “Instrument error codes” on page 34 for the list of error codes.


11. Press **ESC** to return to the **Tests** menu.

**Note:** You can leave the cartridge rack and tip and tube rack in the instrument if you are performing a Temperature test next.

## Perform a temperature test (forensic applications only)

1. Ensure that the protocol card is inserted and that the instrument is powered on as described in “Insert a protocol card” on page 12.
2. In the **Tests** menu, press **2** to display the **Temp** test screen.

```
Tests
1:Axis 3:Ver
2:Temp 4:Error
Key:1-4,ESC
```

3. Use  to change the **Set Temp** to 60°C from the default of 25°C.

```
Temp test
Set Temp=60.0degC
ALL OK? [START] key
Return? [ESC] key
```

4. Use your own clock or timer and make note of the start time.
5. Press **Start** to run the test:
  - The **Now Temp** value should reach the **Set Temp** value within 5 minutes.
  - When the **Set Temp** value is reached, the **Alarm** value should change to 00.

If one or both of these values are not reached, contact Technical Support.

```
Temp test
Set Temp=60.0degC
Now Temp=60.3degC
Alarm=00
```

- Press **ESC** to return to the **Tests** menu, then press **ESC** again to return to the **Main** menu.

**IMPORTANT!** When the Temperature test is complete, the **Set Temp** resets to 25°C. The temperature of the heater unit cools down at a rate of about 1°C per minute.

## Perform an installation test (HID applications only)

Perform this test if you use the instrument for HID applications only (PrepFiler Express™ Forensic DNA Extraction Kit or PrepFiler Express BTA™ Forensic DNA Extraction Kit). This test is not required for bioprocess applications (PrepSEQ™ Express Nucleic Acid Extraction Kit).

Perform the installation test after performing an axis test and a temperature test. Use the cartridges, tips, and tubes provided with the Install Kit (Cat. No. 4441350).

### Inspect cartridges

- Inspect the reagent cartridges to ensure that the contents are in the bottom of the wells and that no precipitate has formed in any of the wells.

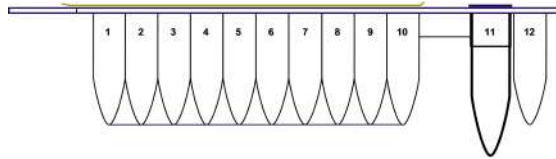



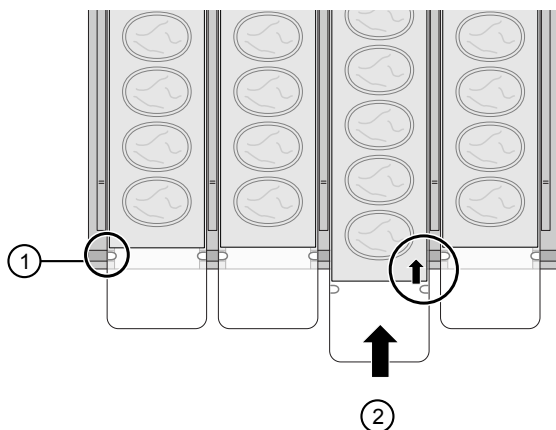
Figure 7 Cartridge compartments

Compartment	Contents
1	Lysis Buffer
2	Magnetic Particles suspension
3	Binding Solution
4 through 6	Wash Buffer
7	Elution Buffer
9	Proteinase K Solution
11	Lysis Tube (added by user)
12	Heated chamber for elution

- If precipitate forms in compartments 1 or 2 (Lysis Buffer and Magnetic Particles suspension), heat the cartridge in an incubator at 37°C for 30 minutes or until the precipitate is no longer visible. Heat only those cartridges that you plan to use that day.

## Perform an installation test

1. Ensure that the protocol card is inserted and that the instrument is powered on as described in “Insert a protocol card” on page 12.
2. In the **Main** menu, press **Start**.  
**Note:** Press  after following each on-screen prompt.
3. Open the instrument door (push up the door), then remove the tip and tube rack and the cartridge rack.
4. Mix the reagents and resuspend the magnetic particles in each cartridge:
  - a. Hold the cartridge foil-side up on a vortexer set to maximum speed, then pulse (approximately 3 seconds) 2–3 times.
  - b. Vortex again with the cartridge foil side down, then repeat with the cartridge on its side.
  - c. Ensure that the magnetic particles are resuspended. If they are not, repeat the previous vortex steps.  
**Note:** Vortexing can result in foam in compartment 1 (lysis buffer). The foam disperses within minutes and should not affect the assay performance.
5. Load 13 reagent cartridges into the cartridge rack by sliding each reagent cartridge along the groove in the direction of the arrow until the reagent cartridge clicks into place. Ensure that the notches in the cartridge align with the notches in the cartridge rack (see the following diagram).

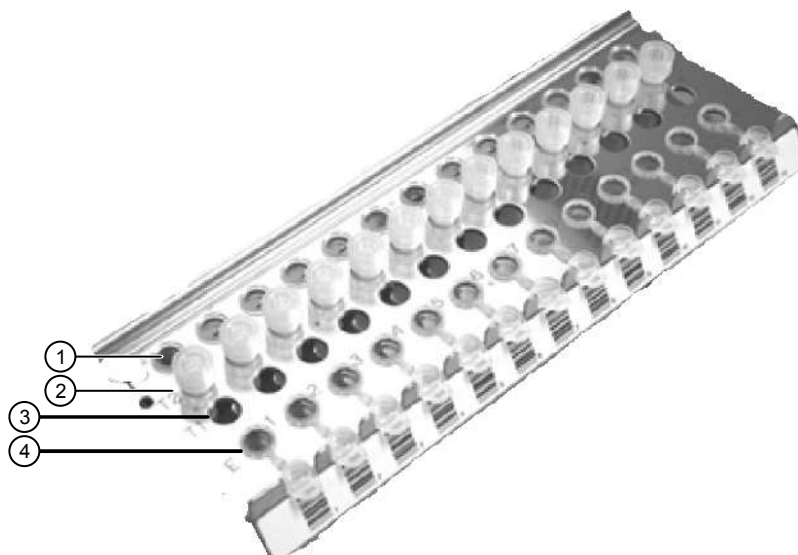


6. Insert the loaded cartridge rack into the instrument.



**WARNING!** Do not touch the surface of the heat block. The temperature of the heat block can reach 80°C. Touching the block can cause burns.

7. Using the plastics that are provided in the Install Kit, load the tip and tube rack in the following order:
  - a. **Row S** (fourth row): Load 13 sample tubes.
  - b. **Row T2** (third row): Load 13 tips inserted into tip holders.
  - c. **Row T1** (second row): Leave empty.
  - d. **Row E** (first row): Load 13 elution tubes, with the caps open and secured as shown in the photo.




- ① Row S
- ② Row T2
- ③ Row T1
- ④ Row E

8. Pipet 200  $\mu$ L of water into each sample tube (row S, positions 1–13).

---

**IMPORTANT!** If the sample tubes do not contain liquid, extensive bubble formation can occur, clogging the tips.

---

9. Insert the loaded tip and tube rack into the instrument with row E in the front.
10. Ensure that you have inserted the cartridge rack and tip and tube rack correctly, then close the instrument door.
11. Press , press 2 to select the **PF Express BTA** option, then press **Start**. The screen shows the steps and the approximate run time remaining.


---

**IMPORTANT!** Do not open the door during a run. To pause or cancel the run, see "Pause a run" on page 18 or "Cancel a run" on page 18.

---

**Note:** If you lose power or the power cord is unplugged, the run stops. When the power resumes, the screen displays the **Main** menu. You cannot resume the run. If the tips are still on the syringe unit when the power resumes, return the

tips to the original position using the **Manual** menu as described in “Cancel a run” on page 18.

12. Observe the entire test run, and contact Technical Support if you observe processing problems such as:
  - Tips not being picked up
  - On-screen error messages
  - Instrument crashes
  - Any other instrument failure
13. At the end of the run (the instrument beeps briefly and the digital display shows “**Finished Protocol**”):
  - a. Press  to return to the **Main** menu, then open the instrument door.
  - b. Remove the tip and tube rack and the cartridge rack.
14. Contact Technical Support if you observe:
  - Colored liquid in the eluate tubes (test eluate should be clear; color indicates a transfer of magnetic particles).
  - Dark coloring or observable particles in any cartridge wells (indicates a transfer of magnetic particles)  
**Note:** Some discoloration or particles may be visible in position 2 if the magnetic particles were not completely resuspended in “Perform an installation test” on page 52. If you observe particles only in position 2, it is not necessary to contact Technical Support.
  - Any liquid in the bottom tray (indicates leakage of reagents during run).
15. Close the instrument door, then power off the instrument.
16. Properly dispose of the used reagent cartridges, tips, and tubes.



# Specifications

■ Instrument specifications .....	55
■ Environmental requirements .....	56
■ Barcode reader specifications .....	57

## Instrument specifications

Component	Specification
Instrument type	Benchtop dispenser instrument with 13 nozzles
Sample processing	1–13 samples/run
Processing time	Variable (see kit user guide)
Dispensing volume	5 to 1,000 $\mu$ L
Dispensing accuracy	DN100N tips: <ul style="list-style-type: none"><li>• 25 to 50 <math>\mu</math>L: Less than 5% (CV%)</li><li>• 50 to 1,000 <math>\mu</math>L: Less than 2% (CV%)</li></ul>
Heat block temperature control <sup>[1]</sup>	30 to 80°C (at ambient ~25°C)
Instrument dimensions	50.8 cm (20 inches) (w) $\times$ 55.9 cm (22 inches) (d) $\times$ 57.2 cm (22.5 inches) (h)
Weight	55 kg (121 pounds)
Built-in features	Digital display, alarm, light LED
Protocol card	Flash, 512 KB memory card pre-programmed with the purification protocol that directs the volume of reagents used, mixing steps, and incubation time. <ul style="list-style-type: none"><li>• Store in the plastic cover, in its box, protected from light.</li><li>• Do not drop or bend the card</li><li>• Do not wipe or clean the card using volatile chemicals such as alcohol or equivalent</li><li>• Do not expose the card to water or any solution</li></ul>
Bottom tray	Stainless steel 42.672 cm (16.8 inches) (l) $\times$ 27.432 cm (10.8 inches) (w) $\times$ 0.635 cm (0.25 inches) (d).

Component	Specification
Cartridge rack	<p>Stainless steel, aluminum alloy</p> <p>27.432 cm (10.8 inches) (l) x 13.9 cm (5.5 inches) (w) x 5.9 cm (2.3 inches) (d).</p> <p><b>Note:</b> The cartridge rack is designed to hold Thermo Fisher Scientific reagent cartridges only. Do not load reagent cartridges from other manufacturers in the cartridge rack.</p>
Reagent cartridges	See the user guide for the kit you are using
Tip and tube rack	<p>Stainless steel</p> <p>28.702 cm (11.3 inches) (l) x 10.16 cm (4 inches) (w) x 7.62 cm (3 inches) (d)</p> <ul style="list-style-type: none"> <li>• Row 1—E – hinged elution tubes</li> <li>• Rows 2 and 3—T1 and T2 tips</li> <li>• Row 4 S—sample tubes</li> </ul>
Tips and holders	<ul style="list-style-type: none"> <li>• Tip—Polypropylene with filter barriers</li> <li>• Tip holder—Polypropylene, 5 to 1,000 µL, 9.906 cm (3.9 inches) (l) x 1.092 cm (0.43 inches) (d)</li> </ul>
Barcode reader	Reads most standard barcodes including UPC-A, EAN-13, Code 32, Code 39, and Code 128.

<sup>[1]</sup> The listed temperature is for the heating block and may not reflect the actual temperature of the sample/solution in a tube.

## Environmental requirements

Condition	Requirement
Required input power	<p>AC 100-240 V ±10%, 50/60 Hz</p> <p>Grounding is necessary</p>
Installation site	Indoor use only
Altitude	Safety tested up to 2,000 m (6,562 ft)
Operating conditions	<ul style="list-style-type: none"> <li>• 5 to 40°C</li> <li>• 80% maximum relative humidity for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C</li> </ul>
Transient category	Installation categories II
Main supply voltage fluctuations	Up to ±10 percent of nominal voltage
Pollution degree	2
Transport conditions	<ul style="list-style-type: none"> <li>• – 20 to +50°C</li> <li>• Minimum 15% relative humidity, maximum 75% (non-condensing)</li> <li>• Environmental class 2K2 &amp; 2M2 (IEC60721-3-2)</li> </ul>

Condition	Requirement
Storage conditions	<ul style="list-style-type: none"> <li>• 5 to 40°C</li> <li>• Minimum 15% relative humidity, maximum 75% (non-condensing)</li> <li>• Environmental class 2K2 &amp; 2M2 (IEC60721-3-1)</li> </ul>

## Barcode reader specifications

Component	Specification
Maximum scan rate	325 scans/sec
Maximum resolution	0.076 mm
Reading indicators	Beep and a green spot on the code
Sensor	CCD solid state
Illuminator	LED array
Wavelength	630–670 nm
Reading angle	Skew: $\pm 65^\circ$
Operating temperature	0 to 55°C
Weight	~169 g



# Accessories

## Accessories

Unless otherwise indicated, all materials are available through [thermofisher.com](https://thermofisher.com).

Item	Cat. No.
<b>AutoMate <i>Express</i>™ accessories</b>	
AutoMate <i>Express</i> ™ Tip and Tube Rack	4456842
AutoMate <i>Express</i> ™ Cartridge Rack	4452767
D-ring Exchange Tools	4457423
D-rings, (set of 13)	4448950
AutoMate <i>Express</i> ™ Install Kit	4441350
<b>PrepFiler <i>Express</i>™ accessories</b>	
PrepFiler <i>Express</i> ™ & PrepFiler <i>Express</i> BTA™ Protocol Card Version 1.1 (variable elution)	A33682
PrepFiler <i>Express</i> ™ Forensic DNA Extraction Kit	4441352
PrepFiler <i>Express</i> BTA™ Forensic DNA Extraction Kit	4441351
<b>PrepSEQ™ <i>Express</i> accessories</b>	
PrepSEQ™ <i>Express</i> Protocol Card	A27904
PrepSEQ™ <i>Express</i> Nucleic Acid Extraction Kit	4466351
<b>GlycanAssure™ accessories</b>	
N-glycan purification and labeling: GlycanAssure™ AutoXpress Script	A36164
GlycanAssure™ AutoXpress Kit	A36063



# Safety



**WARNING! GENERAL SAFETY.** Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.











- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, see the “Documentation and Support” section in this document.




## Symbols on this instrument

Symbols may be found on the instrument to warn against potential hazards or convey important safety information. In this document, the hazard symbol is used along with one of the following user attention words:




- **CAUTION!**—Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
- **WARNING!**—Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
- **DANGER!**—Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

Symbol	English	Français
	Caution, risk of danger Consult the manual for further safety information.	Attention, risque de danger Consulter le manuel pour d'autres renseignements de sécurité.
	Caution, risk of electrical shock	Attention, risque de choc électrique
	Moving parts	Parties mobiles
	Caution, sharp edges	Attention, bords coupants

Symbol	English	Français
	Caution, hot surface	Attention, surface chaude
	Potential biohazard	Danger biologique potentiel
	On	On (marche)
	Off	Off (arrêt)
	On/Off	On/Off (marche/arrêt)
	Standby	En attente
	Earth (ground) terminal	Borne de (mise à la) terre
	Protective conductor terminal (main ground)	Borne de conducteur de protection (mise à la terre principale)
	Terminal that can receive or supply alternating current or voltage	Borne pouvant recevoir ou envoyer une tension ou un courant de type alternatif
	Terminal that can receive or supply alternating or direct current or voltage	Borne pouvant recevoir ou envoyer une tension ou un courant continu ou alternatif





Symbol	English	Français
	<p>Do not dispose of this product in unsorted municipal waste</p> <p> <b>CAUTION!</b> To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.</p>	<p>Ne pas éliminer ce produit avec les déchets usuels non soumis au tri sélectif.</p> <p> <b>MISE EN GARDE !</b> Pour minimiser les conséquences négatives sur l'environnement à la suite de l'élimination de déchets électroniques, ne pas éliminer ce déchet électronique avec les déchets usuels non soumis au tri sélectif. Se conformer aux ordonnances locales sur les déchets municipaux pour les dispositions d'élimination et communiquer avec le service à la clientèle pour des renseignements sur les options d'élimination responsable.</p>

## Conformity symbols

Conformity mark	Description
	Indicates conformity with safety requirements for Canada and U.S.A.
	Indicates conformity with European Union requirements for safety and electromagnetic compatibility.
	Indicates conformity with Australian standards for electromagnetic compatibility.

## Safety alerts on this instrument

Additional text may be used with one of the symbols described above when more specific information is needed to avoid exposure to a hazard. See the following table for safety alerts found on the instrument.


English	Français
 <b>CAUTION! Hazardous chemicals.</b> Read the Safety Data Sheets (SDSs) before handling.	 <b>MISE EN GARDE ! Produits chimiques dangereux.</b> Lire les fiches signalétiques (FS) avant de manipuler les produits.
 <b>CAUTION! Hazardous waste.</b> Refer to SDS(s) and local regulations for handling and disposal.	 <b>MISE EN GARDE ! Déchets dangereux.</b> Lire les fiches signalétiques (FS) et la réglementation locale associées à la manipulation et à l'élimination des déchets.

### Location of safety labels



## Instrument safety

### General

	<b>CAUTION! Do not remove instrument protective covers.</b> If you remove the protective instrument panels or disable interlock devices, you may be exposed to serious hazards including, but not limited to, severe electrical shock, laser exposure, crushing, or chemical exposure.
---	--

## Physical injury



**CAUTION! Moving Parts.** Moving parts can crush, pinch and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing.

## Electrical safety



**WARNING! Ensure appropriate electrical supply.** For safe operation of the instrument:

- Plug the system into a properly grounded receptacle with adequate current capacity.
- Ensure the electrical supply is of suitable voltage.
- Never operate the instrument with the ground disconnected. Grounding continuity is required for safe operation of the instrument.



**WARNING! Power Supply Line Cords.** Use properly configured and approved line cords for the power supply in your facility.



**WARNING! Disconnecting Power.** To fully disconnect power either detach or unplug the power cord, positioning the instrument such that the power cord is accessible.

## Cleaning and decontamination



**CAUTION! Cleaning and Decontamination.** Use only the cleaning and decontamination methods specified in the manufacturer's user documentation. It is the responsibility of the operator (or other responsible person) to ensure the following requirements are met:

- No decontamination or cleaning agents are used that could cause a HAZARD as a result of a reaction with parts of the equipment or with material contained in the equipment.
- The instrument is properly decontaminated a) if hazardous material is spilled onto or into the equipment, and/or b) prior to having the instrument serviced at your facility or sending the instrument for repair, maintenance, trade-in, disposal, or termination of a loan (decontamination forms may be requested from customer service).
- Before using any cleaning or decontamination methods (except those recommended by the manufacturer), users should confirm with the manufacturer that the proposed method will not damage the equipment.

## Instrument component and accessory disposal

To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.

## Barcode scanner laser

The barcode scanner that is provided with the instrument is a class 1 laser device.

## Safety and electromagnetic compatibility (EMC) standards

The instrument design and manufacture complies with the following standards and requirements for safety and electromagnetic compatibility.

### Safety

Reference	Description
EU Directive 2006/95/EC	European Union "Low Voltage Directive"
EN 61010-1 UL 61010-1 CSA C22.2 No. 61010-1	<i>Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements</i>
EN 61010-2-010	<i>Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials</i>
EN 61010-2-081	<i>Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes</i>

### EMC

Reference	Description
Directive 2004/108/EC	European Union "EMC Directive"
AS/NZS 2064	<i>Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radiofrequency Equipment</i>
ICES-001, Issue 3	<i>Industrial, Scientific and Medical (ISM) Radio Frequency Generators</i>

### Environmental design

Reference	Description
Directive 2012/19/EU	European Union "WEEE Directive"—Waste electrical and electronic equipment

## Chemical safety



**WARNING! GENERAL CHEMICAL HANDLING.** To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the “Documentation and Support” section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

## Biological hazard safety



**WARNING! BIOHAZARD.** Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/ institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, 5th Edition, HHS Publication No. (CDC) 21-1112, Revised December 2009; found at:  
<https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.pdf>
- World Health Organization, *Laboratory Biosafety Manual*, 3rd Edition, WHO/CDS/CSR/LYO/2004.11; found at:  
[www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf](http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf)

# Documentation and support

## Related documents

Document	Publication number	Description
<i>Barcode Reader for the AutoMate Express™ Instrument User Guide</i>	4453801	Provides instructions for installing and using the optional barcode reader with the AutoMate Express™ Instrument.
<i>PrepFiler Express™ and PrepFiler Express™ BTA Forensic DNA Extraction Kits User Guide</i>	4442699	Step-by-step instructions for using the PrepFiler Express™ Forensic DNA Extraction Kit and the PrepFiler Express BTA™ Forensic DNA Extraction Kit for: <ul style="list-style-type: none"><li>• Manual preparation of lysate from forensic samples</li><li>• Automated extraction and isolation of genomic DNA on the AutoMate Express™ Instrument</li></ul>
<i>PrepSEQ™ Express Nucleic Acid Extraction Kit for Mycoplasma, MMV, and Vesivirus Detection User Guide</i>	MAN0016799	Step-by-step instructions for using the PrepSEQ™ Express Nucleic Acid Extraction Kit for automated lysis, extraction, and isolation of nucleic acid from bioprocess samples on the AutoMate Express™ Instrument.
<i>GlycanAssure™ AutoXpress Kit User Guide</i>	MAN0017457	Step-by-step instructions for using the GlycanAssure™ AutoXpress Kit for automated purification and labeling of N-glycans from glycoprotein samples on the AutoMate Express™ Instrument.

## Customer and technical support

For support:

- **In North America**—Send an email to [HIDTechSupport@thermofisher.com](mailto:HIDTechSupport@thermofisher.com), or call 888-821-4443 option 1.
- **Outside North America**—Contact your local support office.

For the latest services and support information for all locations, go to [thermofisher.com/support](https://www.thermofisher.com/support) to obtain the following information.

- Worldwide contact telephone numbers
- Product support
- Order and web support
- Safety Data Sheets (SDSs; also known as MSDSs)

Additional product documentation, including user guides and Certificates of Analysis, are available by contacting Customer Support.

## Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at [www.thermofisher.com/us/en/home/global/terms-and-conditions.html](http://www.thermofisher.com/us/en/home/global/terms-and-conditions.html). If you have any questions, please contact Life Technologies at [www.thermofisher.com/support](http://www.thermofisher.com/support).



