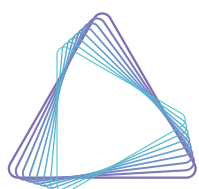
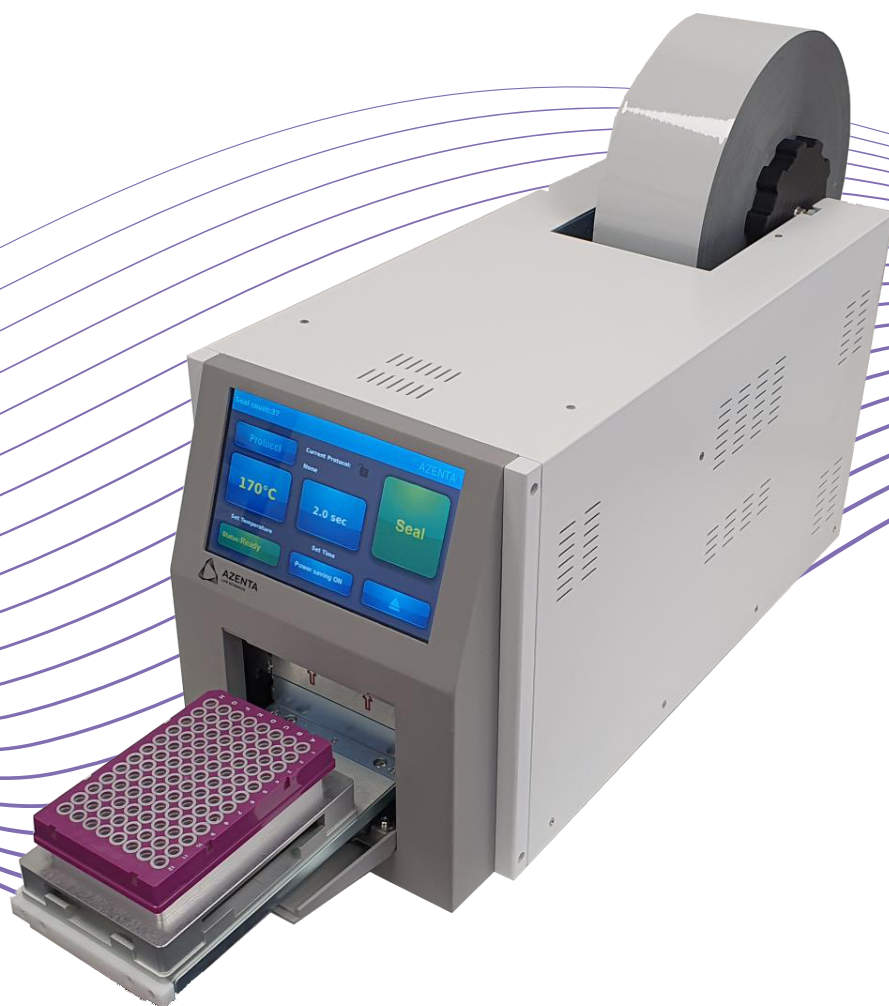


# Automated Roll Heat Sealer User Manual

For use with adapters A and B



**AZENTA**  
LIFE SCIENCES

## Azenta, Inc.

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Original manual printed in English.

These are the original instructions for the Automated Roll Heat Sealer.



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## Revision History

Part Number: 347598

Automated Roll Heat Sealer User Manual

Revision	Date
Revision A	12 JUN 2020
Revision B	18 SEP 2020
Revision C	05 AUG 2021
Revision D	17 AUG 2022
Revision E	04 JUL 2023

# Table of Contents

Cover .....	1
Revision History .....	4
<b>1. Safety .....</b>	<b>7</b>
Warnings .....	8
Personal Injury .....	8
Electric Shock .....	8
Product Damage .....	9
General Operation Safety .....	9
Regulatory Compliance and Declaration of Conformity .....	10
<b>2. Introduction .....</b>	<b>11</b>
Unpacking (Packing and Contents Listing) .....	12
Hardware Overview .....	14
Front Features .....	14
Rear Features .....	15
Touch Screen Overview .....	16
<b>3. Operation .....</b>	<b>18</b>
Basic Steps for Operation .....	18
Workflow of Main Screen .....	19
Workflow of Protocol Management .....	19
Seal Roll Loading Procedure .....	20
Installing Seal Roll on Roll Holder .....	20
Loading Procedure .....	21
Fine Adjustment of the Seal Position .....	30
X-axis Fine Adjustment .....	31
Y-axis Fine Adjustment .....	31
Seal Roll Unloading Procedure .....	32
Closing the Door .....	34
Setting the Sealing Parameters .....	34
Time Setting .....	35
Temperature Setting .....	35
Loading a Plate .....	36
Power Saving Function .....	36
Setting Power Saving Parameters .....	37
Protocol and Password Settings .....	38
Creating a Protocol .....	38
Editing a Stored Protocol .....	39
Selecting a Protocol .....	39
Deleting a Stored Protocol .....	39
Setting Protocol Security Level .....	40
Protocol Management .....	41
Protocol List .....	41
<b>4. Optimizing Seal Quality .....</b>	<b>42</b>

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Plate Requirements .....	42
Plate Adapters .....	42
Lightweight Adapters .....	44
Heat Seal Materials .....	45
Optimizing Sealing Parameters .....	46
<b>5. Integration .....</b>	<b>48</b>
Changing Rubber Feet to Screw Nuts .....	48
Remote Communication .....	49
Protocol .....	49
Serial Port Setup .....	49
Basic Commands .....	50
Status of Process .....	50
<b>6. Routine and Preventative Maintenance .....</b>	<b>51</b>
Cleaning the Heating Block .....	51
Cleaning the Touch Screen .....	52
Replacing the Vacuum Cups .....	52
Locating the Vacuum Cups .....	52
Removing the Rear Vacuum Cups .....	55
Removing the Front Vacuum Cups .....	56
<b>7. Troubleshooting .....</b>	<b>58</b>
Hardware Problem .....	58
Warning Messages .....	59
Seal Loading .....	59
Protocol Management .....	60
General .....	61
Error Messages .....	64
<b>8. Appendices .....</b>	<b>65</b>
Appendix A: Technical Specifications .....	66
Appendix B: Ordering Information and Accessories .....	67
Appendix C: Warranty .....	69
Appendix D: Shipping Instruction .....	71
Shipping Bracket and Rear Sensor Protection Screw .....	71
Packing the Device into the Shipping Box .....	72
Setting the Device on a Pallet .....	74
WEEE Statement (European Union) .....	75

# 1. Safety



## DANGER

### Read the Safety Chapter and Manual

Failure to review the Safety chapter and the manual, and follow the safety warnings can result in death or serious injury.

- All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.
- Follow all applicable safety codes of the facility as well as national and international safety codes.
- Know the facility safety procedures, safety equipment, and contact information.
- Read and understand each procedure before performing it.
- Read, follow, and understand each chapter in order to preserve product safety.





## CAUTION



### Pinch Point

Moving parts of the product may cause squeezing or compression of fingers or hands resulting in personal injury.

- Keep hands clear of the front door and the rear notch during operation.



 <b>CAUTION</b> <b>Hot Surface Hazard</b>	
The plate and other internal components may be too hot to touch.	

 <b>CAUTION</b> <b>Two-Person Lift Recommended</b>	
<p>This product weighs 27 kg (about 60 lbs). Improper lifting may result in personal injury.</p> <ul style="list-style-type: none"><li>• Do not attempt to lift this product alone. Always use 2-person lift techniques or a lift aid.</li></ul>	

<b>NOTICE</b>
It is the responsibility of each person working on this product to know the applicable regulatory safety codes as well as the facility safety procedures, safety equipment, and contact information.

This instruction manual contains important operating and maintenance instructions which must be read, understood, and followed by the product user. Failure to use this product according to this instruction manual may degrade or defeat the protection normally provided by this product. Read this instruction manual prior to product use and keep this instruction manual for future reference.

## Warnings

### Personal Injury

- Do not use this product in a manner other than as stated in the "General Operation Safety" section of this manual as the protection provided by the equipment may be impaired.
- This product is designed for use in laboratory environments by persons knowledgeable in safe laboratory practices.
- Always wear safety glasses and other appropriate protective equipment when operating this product.

### Electric Shock

- This product must be connected to a grounded power outlet for safe functioning.
- Use only the power cord supplied with the product.
- The power cord is the device available for full disconnect from mains input.



- Position the product for use so that the power cord can be easily disconnected without having to move the product.
- Disconnect the power cord before moving or cleaning the unit.

## Product Damage


- Keep the product dry and clean.
- Do not immerse the product in liquid for cleaning.
- This unit is not explosion or spark proof.
- Do not operate this product near volatile or flammable materials.

## General Operation Safety

- When using infectious, radioactive, toxic and other solutions which may pose health risks, observe the appropriate safety precautions.
- Do not use this machine in a potentially explosive environment or with potentially explosive chemicals. Install the machine in a location free of excessive dust.
- Avoid placing the machine in direct sunlight.
- Choose a flat, stable surface capable of withstanding the weight of the machine. Install the machine in the room temperature 10 – 30° C, relative humidity 0 – 85%. Do not block the air vents.
- Make sure the power source conforms to the required power supply specifications.
- To avoid electric shock, make sure the machine is plugged into a grounded electric outlet. Do not allow water or any foreign objects to enter the various openings of the machine.
- Switch off the power switch before cleaning or performing any service on the machine, such as replacing the fuses.
- To guarantee sufficient ventilation, ensure that the sealer has at least 30cm of free space on all sides, including
  - the rear.
- Repair should be carried out by authorized service personnel only. Use original spare parts and accessories only.

## Regulatory Compliance and Declaration of Conformity

The Automated Roll Heat Sealer meets the requirements of the European Union’s Low Voltage Directive 2014/35/EC, Electromagnetic Compatibility Directive 2014/30/EU, and 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment. In accordance with the directives, Azenta Life Sciences has issued a Declaration of Conformity and the Automated Roll Heat Sealer has a CE mark affixed.

DOCUMENT NUMBER: <b>347511</b>	TITLE: <b>Declaration of Conformity, Machinery Directive</b>	
REVISION: B ECO# EC132455	DOCUMENT CLASSIFICATION: 04-Form, Template or Other	

### DECLARATION OF CONFORMITY

Description: Automated Roll Heat Sealer

Function: This instrument is used for the automated heat sealing of plates, and can be used as a stand-alone system, or fully integrated within automated applications.

Product code: 4ti-0665, 4ti-0665-xx

Business name and full address of the manufacturer of the machinery:  
**Azenta Life Sciences, Northbank, Irlam, Manchester M44 5AY, United Kingdom**

Name and address of the person, established in the Community, authorized to compile the relevant technical documentation:  
**Azenta Life Sciences (Germany) GmbH, Im Leuschnerpark 1B, 64347 Griesheim, Germany**

- The manufacturer declares:
- That this machinery fulfills all the relevant provisions of Directive 2006/42/EC (Machinery Directive)
    - EN 12100:2010 Safety of machinery. General principles for design. Risk assessment and risk reduction
    - ISO/TR 14121-2:2012 ED2 Safety of machinery. Risk assessment. Practical guidance and examples of methods
    - EN 61010-1:2010+A1:2019. Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
    - EN 61010-2-010:2020 Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for laboratory equipment for the heating of materials
  - That this machinery fulfils all the relevant provisions of Directive 2014/30/EU (EMC Directive)
    - EN 61326-1:2021 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
  - That this machinery is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment and amendment 2015/863/EU.
    - BS EN IEC 63000:2018. Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Year CE Marking Affixed to Product: 2015

Signed for and on the behalf of Azenta Life Sciences:

*Rob Woodward*  
**Rob Woodward (Oct 25, 2021 05:58 GMT+1)**

Print name: Rob Woodward  
 Position: Senior Vice President, Global Quality Executive Management  
 Place: Irlam, Manchester

Confidential: The information is confidential and is to be used only in connection with matters authorized by Azenta and no part of it is to be disclosed to others without prior written permission from Azenta.		
Date Printed: Saturday, October 23, 2021	<b>This is uncontrolled when printed</b>	PAGE 1 OF 1

## 2. Introduction



The Automated Roll Heat Sealer is a device that applies a heat seal on the top of a microplate to seal the individual wells of the microplate. Sealing the wells protects the contents from evaporation and cross-contamination during experimentation, transportation, and storage.

It is a compact, bench-top heat sealer which is suitable for both research and clinical laboratories and does not require an external compressed air supply. It has a wide compatibility with different sealing films/foils and microplates.

When using the Automated Roll Heat Sealer for the first time, read this entire operating manual carefully. To guarantee problem free and safe operation, it is essential to observe the following information.



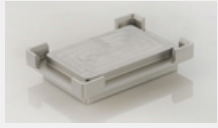
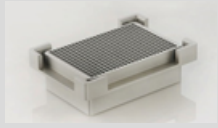
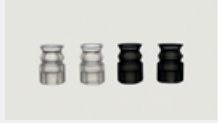


## Unpacking (Packing and Contents Listing)

The device is delivered in an external carton and an internal carton with protective PE foam cushions. Remove the pieces of the Automated Roll Heat Sealer from each carton. All packaging should be retained until it has been established that the device is working properly.

Open the Automated Roll Heat Sealer package and confirm that all items are included:


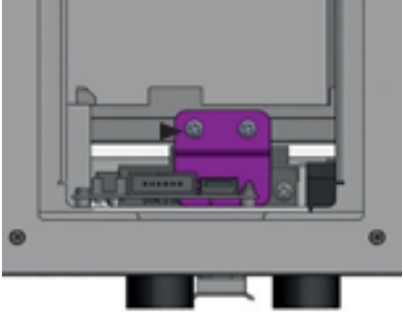

- Automated Roll Heat Sealer Device
- Power cord (four different power cords available: US, UK, EU, AU)
- User manual (including warranty statement)




**Table 2-1: Contents of Automated Roll Heat Sealer Package**

Product Title	Product Image
Roll holder	
Seal loading tool	
Plate support adapter A	
Plate support adapter B	
Vacuum cups	
Spare fuse fitted in fuse holder (either 240V or 110V, depending on territory) <b>NOTE:</b> The 8 amp fuse can be used for 240 V or 110V.	
Plastic tweezers	

If there are any items missing, damaged, or not according to your order, contact your distributor or sales representative immediately.

Refer to "[Ordering Information and Accessories](#)" on page 67 to see the ordering information of the Automated Roll Heat Sealer accessories.


 <b>CAUTION</b> <b>Shipping Bracket</b>	
<p>The Automated Roll Heat Sealer is shipped with a shipping bracket to prevent the plate carrier moving during shipping. It is essential that this bracket is removed before the unit is powered up for the first time. To remove the shipping bracket, first open the inspection door on the left side of the unit. Locate the colored bracket on the side of the carrier as shown in the following image:</p>  <p>Using a Phillips screw driver, carefully remove the screws holding the bracket in place.</p>	

 <b>CAUTION</b> <b>Sensor Protection Screw</b>	
<p>To protect the rear foil sensor during transportation, the Automated Roll Heat Sealer is shipped with a protective screw highlighted with a white washer, inserted into the rear of the instrument. Before the unit is switched on, make sure that the screw is removed from the instrument and retained with the other transportation packaging.</p> 	

**CAUTION**  
**Two-Person Lift Recommended**

This product weighs 27 kg (about 60 lbs). Improper lifting may result in personal injury.

- Do not attempt to lift this product alone. Always use 2-person lift techniques or a lift aid.



**NOTE:** Make sure you retain the shipping bracket and screws as well as the sensor protection screw in a safe place. It is essential that the shipping bracket and sensor protection screw are replaced, should the unit need to be shipped in the future. For details, refer to "[Shipping Instruction](#)" on [page 71](#).

## Hardware Overview

### Front Features

The following picture shows the front of the Automated Roll Heat Sealer. The table below describes the features shown.

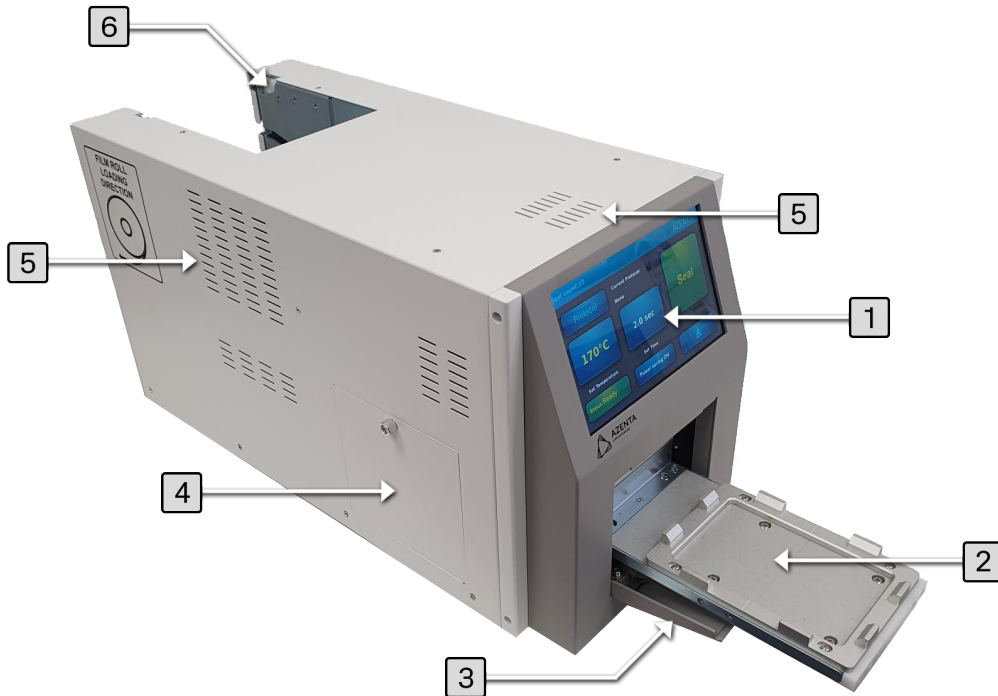


Figure 2-1: Automated Roll Heat Sealer Front Features

Table 2-2: Description of Automated Roll Heat Sealer Front Features

Number	Title of Part	Description of Part
1	Touch screen	The interface that allows you to specify the sealing parameters, and start/stop the seal cycle.
2	Plate carrier	The metal platform on which microplates and microplate adapters are loaded.
3	Door (opened)	The movable structure that opens when the plate carrier is extended and closes when the plate carrier retracts.
4	Inspection door	The removable panel that provides quick accessibility to the sealing chamber.
5	Ventilation area	The structure for heat ventilation. <b>NOTE:</b> Do <u>not</u> block the vents.
6	Roll support	The holder to support the seal roll.

## Rear Features

The following picture shows the rear side of the Automated Roll Heat Sealer. The table below describes the features shown.

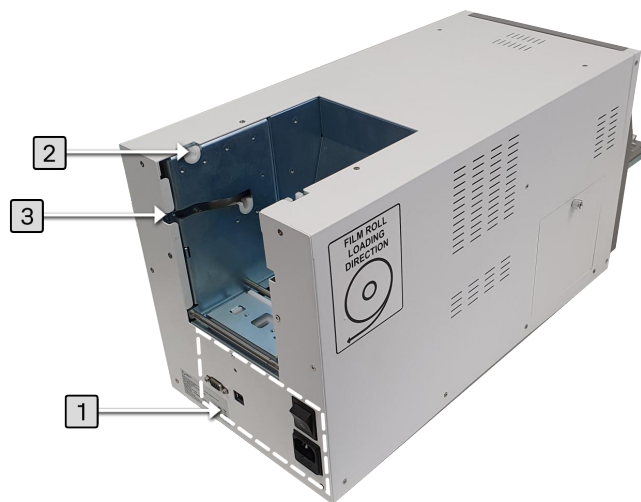
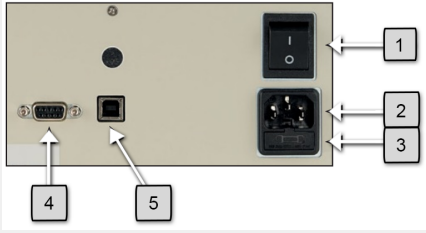


Figure 2-2: Automated Roll Heat Sealer Rear Features

**Table 2-3: Description of Automated Roll Heat Sealer Rear Features**

Number	Title of Part	Description of Part												
1	Connection panel	<p>This area includes power switch, power connector, USB port, and RS232 port, as well as the housing for the fuse and spare fuse. Refer to the picture below:</p>  <table border="1"> <thead> <tr> <th>#</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power switch</td> </tr> <tr> <td>2</td> <td>Power connector</td> </tr> <tr> <td>3</td> <td>Housing for fuse or spare fuse</td> </tr> <tr> <td>4</td> <td>RS232 port</td> </tr> <tr> <td>5</td> <td>USB port</td> </tr> </tbody> </table>	#	Description	1	Power switch	2	Power connector	3	Housing for fuse or spare fuse	4	RS232 port	5	USB port
#	Description													
1	Power switch													
2	Power connector													
3	Housing for fuse or spare fuse													
4	RS232 port													
5	USB port													
2	Seal roll support 1	The holder to support the seal roll with larger diameter (<265mm)												
3	Seal roll support 2	The holder to support the seal roll with small diameter (<140mm)												

## Touch Screen Overview

The following section provides an introductory overview of the icons on the touch screen of the Automated Roll Heat Sealer.

Eight functional icons, as well as the status display areas, are present on the touch screen of the Automated Roll Heat Sealer. The table below describes the features shown in the following diagram.



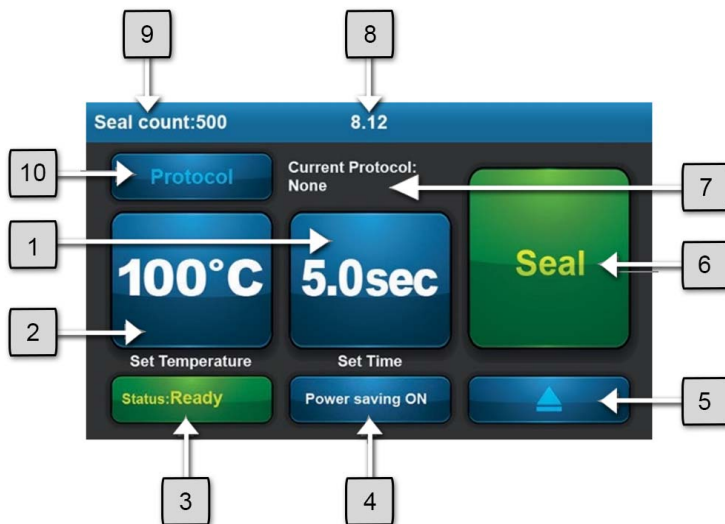


Figure 2-3: Automated Roll Heat Sealer Touch Screen Features

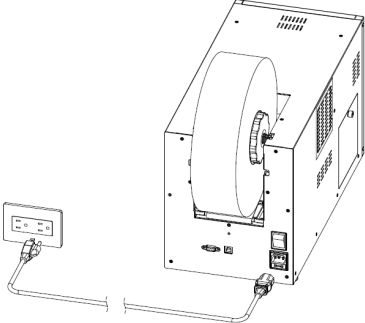
Number	Feature	Description
1	Seal time setting	Adjusts the sealing time, between 0.1 and 10 seconds, in 0.1 second increments.
2	Seal temperature setting	Adjusts range 100~195 °C.
3	Heating block Status display	Indicates the status of the heating block. <ul style="list-style-type: none"> <li>Red color: the heating block is in the heating stage</li> <li>Green color: the heating block has reached the set temperature</li> <li>Blue color: the heating block is in cooling status</li> </ul>
4	Power saving function	Helps you plan your experiment by reducing the power consumption.
5	Plate carrier movement	Retrieves the plate carrier for closing the unit or replacing a seal roll.
6	Seal function	Initiates sealing. When the temperature of the heating block reaches the set temperature, the color of this icon is green and the sealing process can be initiated. When the color of this icon is gray, it means the unit is in the heating or cooling stage and the sealing process cannot be started.
7	Current Protocol display	Displays the name of the current sealing protocol.
8	Software version	Displays the software version currently loaded onto the instrument (disappears after three seconds).
9	Seal count	Displays the total number of seals that the instrument has accomplished.
10	Protocol management	Displays the protocol management function.

# 3. Operation

## Basic Steps for Operation

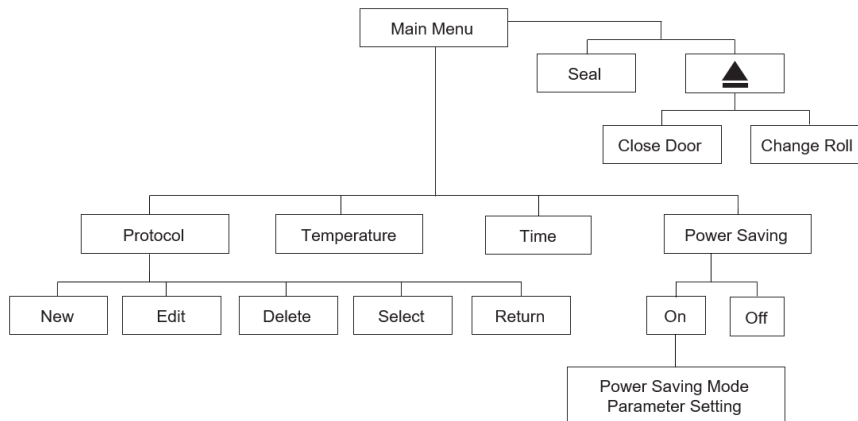
**NOTE:** Remember to first remove the shipping bracket and the sensor protection screw as described in "Unpacking (Packing and Contents Listing)" on page 12.

The basic steps for the Automated Roll Heat Sealer operation as a standalone device are presented as below:

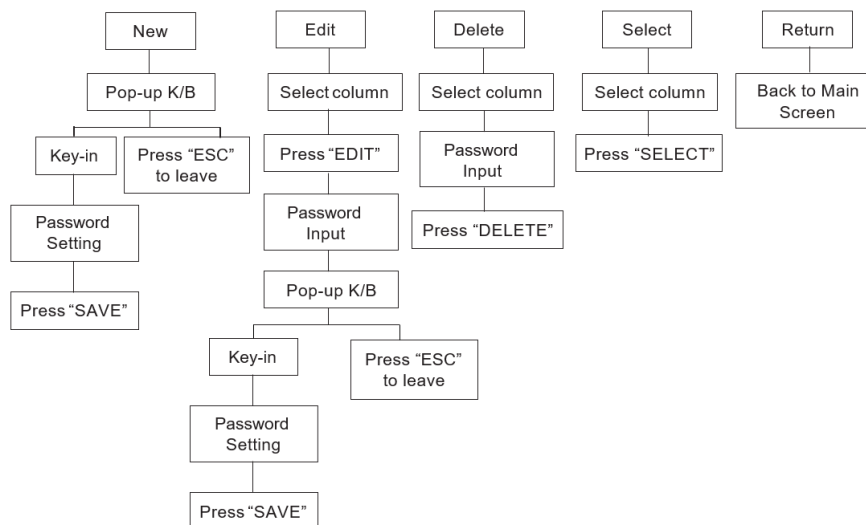
Step	Action
1.	Connect the power cord. 
2.	Turn on the device.
3.	Place the seal roll, along with its holder, on the device. Refer to "Seal Roll Loading Procedure" on page 20.
4.	Perform the seal roll loading procedure. Refer to "Seal Roll Loading Procedure" on page 20.

Step	Action
5.	Optimize sealing conditions. <ul style="list-style-type: none"> <li>Adjust the time setting. Refer to "Time Setting" on page 35.</li> <li>Adjust the temperature setting. Refer to "Temperature Setting" on page 35.</li> </ul>
6.	Carry out the sealing process. <b>NOTE:</b> Keep hands clear of the front door during operation.

## Workflow of Main Screen



## Workflow of Protocol Management



## Seal Roll Loading Procedure

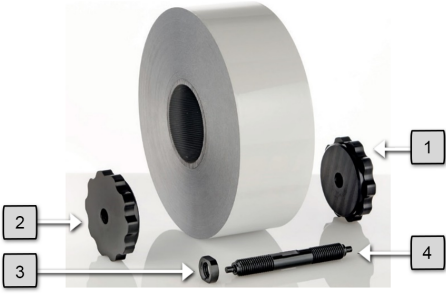
This section explains how to load a seal roll on the Automated Roll Heat Sealer. Before you start, ensure you have the roll holder component and the seal loading tool, as shown below.




Figure 3-1: Roll holder and seal loading tool

### Installing Seal Roll on Roll Holder



**NOTE:** Four parts are required for the roll holder: two clamping wheels, one spindle, and one locking nut.



Step	Action										
<p>1.</p>	<p>Rotate the locking nut, followed by the left clamping wheel onto the spindle. Do not tighten the locking nut against the clamping wheel at this point.</p>  <table border="1" data-bbox="341 1339 820 1617"> <thead> <tr> <th>Number</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Left clamping wheel</td> </tr> <tr> <td>2</td> <td>Right clamping wheel</td> </tr> <tr> <td>3</td> <td>Locking nut</td> </tr> <tr> <td>4</td> <td>Spindle</td> </tr> </tbody> </table>	Number	Part	1	Left clamping wheel	2	Right clamping wheel	3	Locking nut	4	Spindle
Number	Part										
1	Left clamping wheel										
2	Right clamping wheel										
3	Locking nut										
4	Spindle										
<p>2.</p>	<p>Place the spindle through the center of the roll (left side) and rotate the right clamping wheel onto the spindle, pinching it up against the side of the roll.  <b>NOTE:</b> Do not tighten the wheels at this point.</p>										
<p>3.</p>	<p>Adjust the spindle by rotating it backwards and forwards until the sealing material is central to ends of the spindle, or an equal amount of threads can be seen at each end of the spindle.</p>										


Step	Action
4.	Once in the correct position, clasp the end of the spindle protruding from the left clamping wheel and remove the right hand clamping wheel.
5.	Tighten the locking nut up against the left clamping wheel, fixing it place.
6.	<p>Re-insert the spindle through the center of the roll and tighten the right clamping wheel, locking the roll in position. The finished product looks like the picture below:</p> 

### Loading Procedure


Step	Action
1.	<p>Place the roll holder on the device locating the ends of the spindle in either seal roll support 1 or 2, depending on the size of the roll. The picture below shows the correct orientation of the seal roll (the orientation of the seal roll should be as indicated by the purple arrow). Incorrect orientation can cause damage to the heating block.</p> <p><b>NOTE:</b> Keep hands clear of the rear notch during operation.</p> 

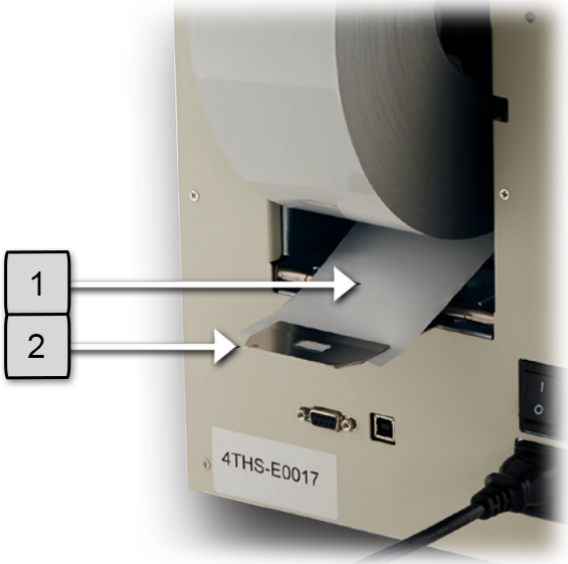
Step	Action
2.	<p>Turn on the Automated Roll Heat Sealer. On the touch screen, the warning message pictured below appears.</p>  <p>The image shows a warning dialog box with a red header containing the word "Warning" in white. The main text area is white with black text that reads: "No seal detected. Press OK to perform the Seal Loading Process." At the bottom of the dialog is a blue button with the text "OK" in white.</p>
3.	<p>Touch <b>OK</b> to perform the seal loading process. On the touch screen, the warning message pictured below appears.</p>  <p>The image shows a warning dialog box with a red header containing the word "Warning" in white. The main text area is white with black text that reads: "Remove any micro-plate and plate adaptor from the plate shuttle and press OK." At the bottom of the dialog is a blue button with the text "OK" in white.</p>


Step	Action
4.	<p>Ensure the plate carrier is free from any micro-plate and touch <b>OK</b> to start the seal loading process. The plate carrier moves to seal loading position, as shown below.</p>  <p>On the touch screen, the warning message pictured below is displayed.</p> 

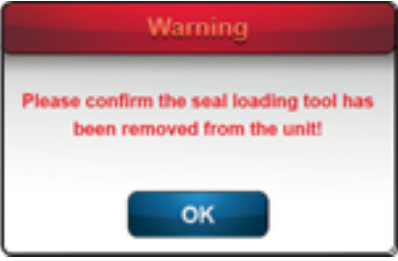


Step	Action
5.	<p>Slide the seal loading tool into the unit through the foil gripper and cutting section (using the red arrows on the cutter section for guidance) until it appears at the rear of the device.</p> <p><b>NOTE:</b> Maintaining the seal loading tool parallel with the plate carrier is essential. Use the cutout section in the door for guidance.</p>  <p>The diagram consists of two photographs of the AZENTA Automated Roll Heat Sealer. The top photograph shows the front of the unit with the door open. A white seal loading tool, labeled '1', is being inserted into the machine through the foil gripper and cutting section. Red arrows on the cutter section indicate the direction of insertion. The tool is shown passing through a cutout section in the door, labeled '2'. The bottom photograph shows the side of the unit with the door open. The seal loading tool, labeled '3', is being inserted into the cutout section of the door. The AZENTA logo is visible on the top of the unit in both images.</p>




Step	Action								
	 <table border="1" data-bbox="324 987 812 1207"> <thead> <tr> <th data-bbox="329 993 492 1056">Number</th> <th data-bbox="492 993 812 1056">Part</th> </tr> </thead> <tbody> <tr> <td data-bbox="329 1056 492 1108">1</td> <td data-bbox="492 1056 812 1108">Red arrows on cutter section</td> </tr> <tr> <td data-bbox="329 1108 492 1161">2</td> <td data-bbox="492 1108 812 1161">Cutout section in the door</td> </tr> <tr> <td data-bbox="329 1161 492 1213">3</td> <td data-bbox="492 1161 812 1213">Seal loading tool</td> </tr> </tbody> </table>	Number	Part	1	Red arrows on cutter section	2	Cutout section in the door	3	Seal loading tool
Number	Part								
1	Red arrows on cutter section								
2	Cutout section in the door								
3	Seal loading tool								

Step	Action						
6.	<p data-bbox="326 268 1328 296">Hold the end tab of the sealing material and slot it into the gripper at the end of the seal loading tool.</p>  <table border="1" data-bbox="326 898 813 1073"><thead><tr><th data-bbox="326 898 548 968">Number</th><th data-bbox="548 898 813 968">Part</th></tr></thead><tbody><tr><td data-bbox="326 968 548 1020">1</td><td data-bbox="548 968 813 1020">Sealing material</td></tr><tr><td data-bbox="326 1020 548 1073">2</td><td data-bbox="548 1020 813 1073">Seal loading tool</td></tr></tbody></table>	Number	Part	1	Sealing material	2	Seal loading tool
Number	Part						
1	Sealing material						
2	Seal loading tool						
7.	<p data-bbox="326 1108 1268 1136">Carefully withdraw the seal loading tool so it brings the seal out through the front of the device.</p> <p data-bbox="326 1140 808 1167"><b>NOTE:</b> Ensure the seal comes out with the tool.</p>						

Step	Action						
8.	<p>Once the seal loading tool is clear of the instrument, separate the seal from the loading tool.</p>  <table border="1" data-bbox="324 1480 812 1648"> <thead> <tr> <th style="background-color: #4CAF50; color: white;">Number</th> <th style="background-color: #4CAF50; color: white;">Part</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Sealing material</td> </tr> <tr> <td>2</td> <td>Seal loading tool</td> </tr> </tbody> </table> <p>On the touch screen, the following warning message is displayed.</p>	Number	Part	1	Sealing material	2	Seal loading tool
Number	Part						
1	Sealing material						
2	Seal loading tool						

Step	Action
	
9.	<p>Lightly holding the end of the seal in one hand and making sure it is central to the cutout section of the door, touch <b>OK</b> on the touch screen.</p> <p><b>NOTE:</b> Do not pull the seal material at this step.</p> <p>The plate carrier moves to the outside position.</p>  <p>As the operation is completed, the excess sealing material is cut off. On the touch screen, the warning message pictured below is displayed.</p> 

Step	Action
10.	<p>Remove the excess sealing material.</p> 
11.	<p>Touch <b>OK</b> on the touch screen to complete the seal loading process. On the touch screen, the message "Roll loading completed" appears for three seconds. You may now begin with the optimization of the sealing procedure. Please refer to "<a href="#">Fine Adjustment of the Seal Position</a>" on page 30.</p>

## Fine Adjustment of the Seal Position

The Automated Roll Heat Sealer allows sealing of a large variety of plates and sealing materials. Seal rolls with a width between 75–85mm can be loaded in either of the two roll positions, depending on roll length and available space.

Best sealing results are achieved if the seal is placed right in the center of the plate. To achieve this, it may be necessary to make fine adjustments to the X- or Y-axis of the seal position to improve sealing efficiency.

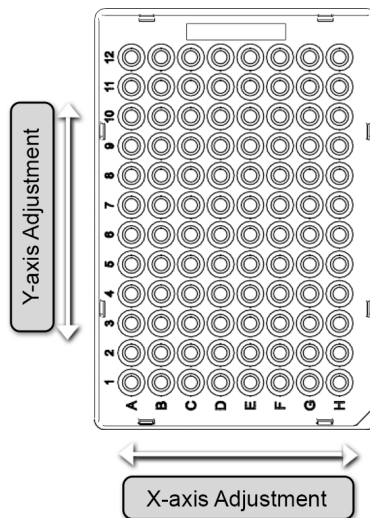


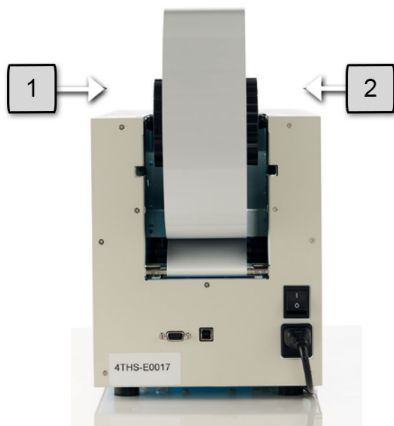
Figure 3-2: Demonstration of X-axis and Y-axis adjustment

## X-axis Fine Adjustment

The locking nut of the roll holder should not be tightened before the final seal position is correct. X-axis adjustment of the seal position can be achieved by slightly moving the seal roll on the roll holder to the left or to the right, respectively.

For this, rotate the left and right hand clamping wheels of the roll holder in opposite direction until the seal is placed at the desired position on the plate. Check the position of the seal by running three or four sample plates. If necessary, redo the procedure.

Once the seal is in the right place, carefully take off the seal roll, remove the left clamping wheel (the one farther from the locking nut), and then tighten the locking nut and reassemble.



**Figure 3-3: Right (1) and Left (2) Clamping Wheels**

## Y-axis Fine Adjustment

For Y-axis adjustment of the seal position, the frame of the plate carrier can be moved slightly. Using a Phillips screw driver, carefully loosen the four screws holding the frame in place (i.e. the outer four screws). Move the frame to the desired position and fasten the screws again. The position of the seal can be checked by sealing a sample plate. If necessary, redo the procedure.

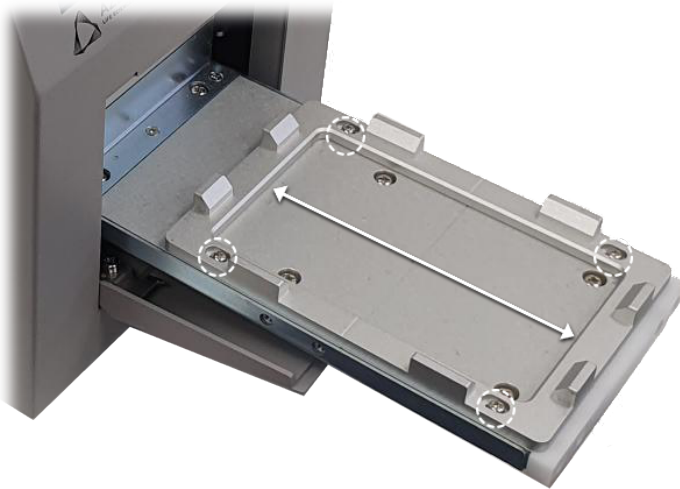

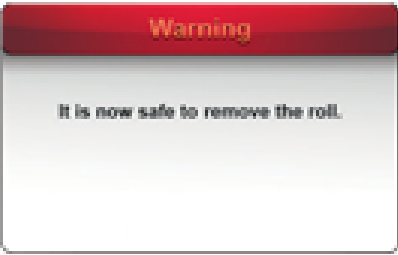



Figure 3-4: Screws in Plate Carrier

## Seal Roll Unloading Procedure

In order to remove the seal roll from the Automated Roll Heat Sealer, complete the following procedure:



Step	Action
1.	<p>Touch the <b>Plate Carrier Movement</b> icon on the touch screen. The warning message pictured below appears.</p> 
2.	<p>Touch <b>Chg roll</b> to start the seal unloading procedure. The device releases the seal and the warning message pictured below appears.</p> 




Step	Action
3.	<p>Rotate the seal roll to pull out the seal material from the device. <b>NOTE:</b> You may experience some resistance, as though the material is still gripped, but this is normal.</p>  <p>Once the material is clear of the rear of the sealer, the warning message "It is now safe to remove the roll" disappears and is replaced by the warning message pictured below.</p> 

## Closing the Door

Under certain circumstances (for example, if the instrument will not be used for a certain time), it may be advisable to close the door of the unit.

 <b>CAUTION</b> <b>Remove Cut Seal</b>	
<p>In this procedure, the plate carrier closes and the device cuts and drops a seal on to the plate carrier. Remember to remove this cut seal from the carrier when the draw is re-opened. You are prompted to do this on the screen.</p> <p>If a cut seal cannot be found on the plate carrier then it is likely to have fallen off the side. This <b>MUST</b> be removed to protect the shuttle from being blocked and causing subsequent errors.</p>	

Step	Action
1.	<p>Touch the <b>Plate Carrier Movement</b> icon on the touch screen. The warning message pictured below appears.</p> 
2.	Remove any plate adapter from the unit and touch <b>Close door</b> .
3.	To reopen, touch the <b>Plate Carrier Movement</b> icon on the touch screen.


## Setting the Sealing Parameters

Adjusting the sealing parameters is essential to create a high quality plate seal.

The following procedures detail how to adjust the time and temperature settings of the Automated Roll Heat Sealer.


## Time Setting

The time setting is a measure of the amount of dwell time (the time in which the heat seal block will remain in contact with the sealing material on the microplate). The time setting can be adjusted as follows:

Step	Action
1.	Select the icon on the touch screen showing the current sealing time. The time adjustment window appears, as shown below. 
2.	Touch the up and down arrows to adjust the time setting to your desired sealing time. <i><b>NOTE:</b> Pressing the touch screen repeatedly adjusts the time in 0.1 second intervals. Pressing and holding your finger on the screen initiates scrolling through the time settings in 0.5 second intervals.</i>
3.	Touch <b>Yes</b> to confirm the displayed setting, or touch <b>Esc</b> to revert to the original setting. The newly set time now appears on the main screen.

## Temperature Setting

The temperature setting adjusts the temperature that the internal heating block is held at prior to sealing a plate. Temperature settings can be adjusted as follows:

Step	Action
1.	<p>Select the icon on the touch screen showing the current sealing temperature. The temperature adjustment window appears, as shown below.</p> 
2.	<p>Touch the up and down arrows to adjust the temperature setting to your desired sealing temperature. <b>NOTE:</b> Pressing the touch screen repeatedly adjusts the temperature in one degree intervals. Pressing and holding your finger on the touch screen initiates scrolling through the temperature settings in 5 degree intervals.</p>
3.	<p>Touch <b>Yes</b> to confirm the displayed setting, or touch <b>Esc</b> to revert to the original setting. The newly set temperature now appears on the main screen.</p>

## Loading a Plate

Step	Action
1.	<p>Place the plate to be sealed on the plate carrier, using an appropriate adapter if necessary (see <a href="#">"Plate Adapters"</a> on page 42).</p>
2.	<p>Wait for the heating block to reach the set temperature. You can see the heating status in the bottom left-hand corner of the screen. The <b>Seal</b> icon remains gray while the unit is heating or cooling. Once the set temperature is reached, the icon turns green.</p>
3.	<p>Touch <b>Seal</b> to commence sealing.</p>

## Power Saving Function

The *Power Saving* function can help you plan your experiment, reduce the power consumption, and increase the longevity of the heating block. This function is turned on at the default setting (1 hour, 100 °C) when you receive the instrument. You can touch the **Power saving ON** button to turn off this function.

## Setting Power Saving Parameters

The two parameters of the *Power Saving* function can be adjusted to suit your needs. When you touch **Power saving ON** for over 5 seconds, the pop-up screen below appears:



**Figure 3-5: Power Saving settings**

The first parameter to set is the idle time before power saving is activated. You can then touch the up and down arrows to adjust either the time or temperature settings. The minimum time duration which can be set is 0.5 hour, the maximum duration is 12 hours. Adjustment can be made in 0.5 hour intervals.

The second parameter is the temperature at which the heating block is held once the power saving duration starts. There are three options: heater off, 50 °C, or 100 °C. You can step through the three settings using the up and down arrows and then save your setting by touching **Yes**.

## Protocol and Password Settings

It is possible to save the heat sealing settings that are created for different microplates or heat seals by using the *Protocol Management* function. It is possible to protect these protocol settings with a password. In addition to this, it is also possible to protect a selected protocol from change without the use of a password using a *Protocol Security Level*.

To access the protocol window, touch **Protocol** in the left hand corner of the touch screen. A protocol list with five functional icons (**New**, **Edit**, **Delete**, **Select**, **Return**) appears on the screen.



Figure 3-6: The Protocol Screen

### Creating a Protocol

Step	Action
1.	Touch <b>Protocol</b> in the left hand corner of the main screen.
2.	Touch <b>New</b> to create a new protocol.
3.	Touch the first column and key-in the desired name of the protocol.
4.	Touch the second column and key-in the desired sealing temperature.
5.	Touch the third column and key-in the desired sealing time.
6.	Touch the fourth column and add any additional information to your protocol.
7.	Touch <b>Save</b> to store your protocol. A protocol security level selection image then pops up. You can decide the security level for your protocol out of three possible levels.

Step	Action
8.	If your protocol does not need a password for protection, do not click the lock and touch <b>Enter</b> to leave this window. Refer to " <a href="#">Setting Protocol Security Level</a> " on page 40).
9.	Touch <b>Select</b> to go back to the main screen.

### Editing a Stored Protocol

Step	Action
1.	Touch <b>Protocol</b> in the left hand corner of the main screen.
2.	Touch the column you would like to edit.
3.	Key-in the desired temperature, time or note.
4.	Touch <b>Save</b> to store your new settings.
5.	Touch <b>Return</b> to go back to the main screen.

### Selecting a Protocol

Step	Action
1.	Touch the desired protocol in the list (you can use the scroll bar if there are more protocols than fit on the screen).
2.	Touch <b>Select</b> .
3.	Touch <b>Return</b> to return to the main screen. The protocol setting appears on the main screen.

### Deleting a Stored Protocol

Step	Action
1.	Touch the protocol you want to delete in the list.
2.	Touch <b>Delete</b> . A warning message appears for confirmation.
3.	Touch <b>Yes</b> and the protocol is deleted. Touch <b>Esc</b> if you don't want to delete the protocol.

---

**NOTE:** You may need to enter a password depending on the level of security that was set with any particular protocol. Keying-in the password is required for editing, deleting, or selecting a protected protocol.

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## Setting Protocol Security Level

Three security levels are available for the protocol protection on the Automated Roll Heat Sealer: no password protection (open black padlock), low level security (closed black padlock) and high level security (closed red padlock), as described in [Table 3-1](#).

After you create a protocol and touch **Save**, a password setting image is shown. If a password setting is not required, touch **Save** again. If protocol protection is required, select the security level by touching the box next to the padlock, as seen in [Figure 3-7](#).

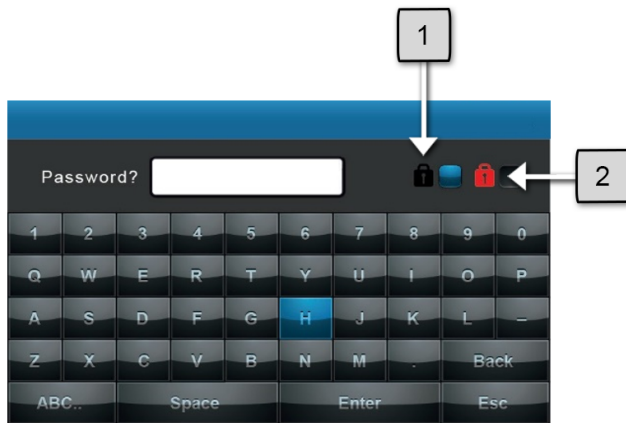


Figure 3-7: Password Settings Keyboard and Icons

Table 3-1: Description of Password Setting Icons

Number	Icon	Icon Meaning
1		Low security level
2		High security level
Not pictured		No password protection

A black lock icon represents a low security protection. When a protocol is protected under low security level, it is still possible to select different protocols from the main protocol menu but editing of any protocols saved with the black lock security requires the appropriate password to be entered.

A red lock icon represents a higher level of security protection. It has been designed to avoid unauthorized adjustment of the sealer during a production run. When a protocol is protected under high security level, you cannot change any sealing parameter or change between protocols without first entering the required password. Also, the password input is required for leaving the main screen.

---

**NOTE:** The maximum number of letters for a password is four.

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**Table 3-2: Descriptions of Protocols with Different Security Levels**

Security level	No password protection	Low level security	High level security
Select protocol	OK	OK	Password required
Change between protocols	OK	OK	Password required
Edit protocol	OK	Password required	Password required

## Protocol Management

The Automated Roll Heat Sealer has a built-in page, named “Administrator”, which can be used to manage the protocol. It is on the top of the protocol list. The default password is 8888. Change this when you receive the instrument.

On entering the *Administrator* page, you can delete the protected protocol or change the password of the exiting protocol. It allows a lab manager to reorganize the protocol list in the device.

## Protocol List

The Automated Roll Heat Sealer has been set up with a number of protocols already stored in the protocol list. These are typical settings for our most popular sealing materials valid for two-component 96well and 384well PCR plates. These protocols, listed below, are not password protected and are for guidance only.

Name	Temperature (°C)	Time (sec)	Information	Protection
4ti-0520	175	3	Peel Seal	No password protection
4ti-0530	175	3	Pierce Seal	No password protection
4ti-0535	175	3	Foil Seal	No password protection
4ti-0540	175	3	Clear Seal	No password protection
4ti-0573	170	3	Clear Weld Seal Mark II	No password protection
4ti-0580	170	3	Clear Seal 3730	No password protection
4ti-0585	175	3	DMSO Resistant Peel Seal	No password protection
4ti-0590	175	3	Thermal Bond	No password protection
4ti-0598	175	3	Gas Permeable Heat Seal MK2	No password protection

Azenta Life Sciences suggests that these settings should form the basis of your sealing optimization experiment. This enables you to create the optimal seal for both the material and also the plate type that you are using.

# 4. Optimizing Seal Quality

## Plate Requirements

The Automated Roll Heat Sealer accommodates plates made from a variety of materials and plate designs. For a complete list of the acceptable sealing materials, refer to ["Optimizing Sealing Parameters" on page 46](#).

The Automated Roll Heat Sealer is designed to accommodate plates which meet the standard established by the Society of Biomolecular Sciences (SBS). These include but are not limited to deep-well plates, PCR, and standard microplates in the 96, 384, and 1536 well formats.

In assessing the suitability of a plate for heat sealing, it is important to look at its design and the quality of manufacturing. In general terms, it is important for the plate design to have raised rims around each well, giving a defined sealing ring around each well. When assessing the seal quality, it is important to study a recently removed seal looking for a regular pattern of sealing rings from one end of the plate to the other.

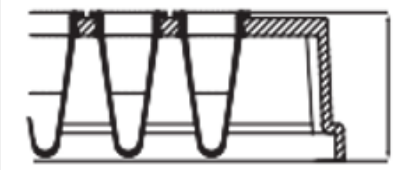
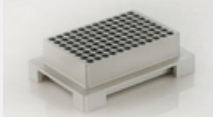

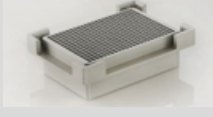
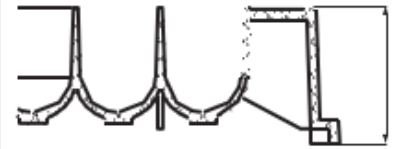
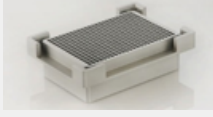
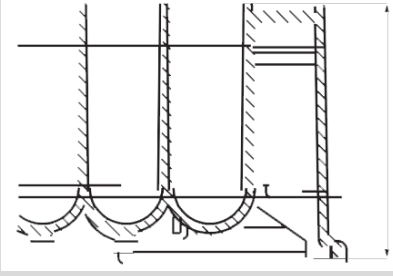

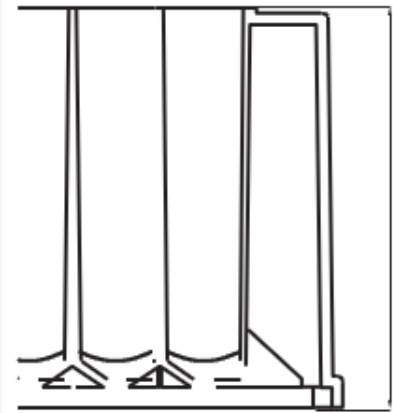
Incomplete sealing indicates that the plate is either not perfectly flat (or not flattened during the sealing process), or that the plate is not supported adequately in the plate holder.

## Plate Adapters

The Automated Roll Heat Sealer is designed to seal microplates from 4 mm to 53 mm in height. Plates less than 34mm in height must first be placed in an appropriate adapter to bring the sealing surface into the correct height range for the sealer. In addition to this, PCR plates require an adapter to support the plate precisely enough to produce an even seal. With a 96 and 384well PCR plate, it is necessary to support each well completely, whereas with standard microplates, it is only necessary to support the underside of the well but not the skirt.

See the following table to select the correct adapter for the plate you wish to seal.

Table 4-1: Plate Types and Adapters

Plate Type	Plate Height	Adapter/side of adapter to use
96well PCR plates		 <p>Adapter B Side with 96 holes</p>
384well PCR plates		 <p>Adapter B Side with 384 holes</p>
1536well plates, standard height plates	 <p>4 mm - 20 mm</p>	 <p>Adapter B Side with 384 holes</p>
Mid-height plates	 <p>18 mm - 33 mm</p>	 <p>Adapter A</p>
Deep well plates	 <p>34 mm - 53 mm</p>	<p>No adapter needed</p>

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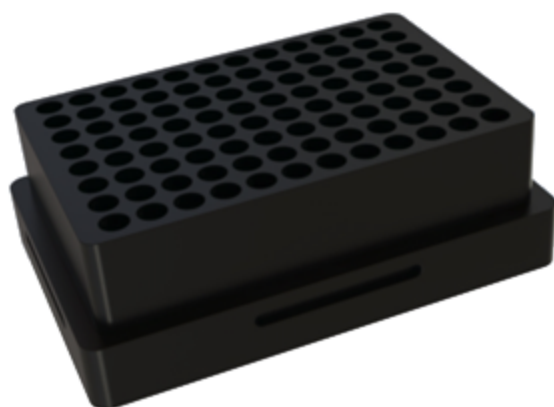
**NOTE:** Custom sealing blocks are available on request. For details, contact Azenta Life Sciences.

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## Lightweight Adapters

Automation protocols may require that different plate types require heat sealing, and subsequently, the interchange of an adapter is required.

Lightweight adapters are available for use with automation protocols and can be supplied by Azenta.



The lightweight adapter is constructed of a lighter material than the standard adapter supplied with the Automated Roll Heat Sealer, and can be more easily transported by the Robotic arm utilized in the platform.

A plate for lifting the adapter when in use with a very low skirted microplate is also available.

The following lightweight adapters are available:

**Table 4-2: Lightweight Adapters**

Part Number	Description	Weight
4TI-0665-56	Elevator Adapter for very low skirted microplates	N/A
4TI-0665-57	Lightweight Adapter for low-skirted microplates	340g
4TI-0665-58	Lightweight Adapter for high-skirted microplates	278.4g
4TI-0665-59	Lightweight Adapter for 384-well microplates	384g
4TI-0665-60	Lightweight Adapter for 96-well microplates	330g

## Heat Seal Materials

The Automated Roll Heat Sealer is compatible with the widest range of heat sealing materials available on the market. Details of available materials can be found in the following table, the Azenta Life Sciences catalog, or by visiting the Azenta Life Sciences website.

Code	Description	Dimensions	Number of Seals	Quantity
4ti-0540	Clear Heat Seal, roll	500 m x 78 mm	4,200	1
4ti-0540/80	Clear Heat Seal, roll	80 m x 78 mm	640	1
4ti-0540S	Clear Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0573	Clear Weld Heat Seal Mark 2, roll	610 m x 78 mm	5,000	1
4ti-0573/122	Clear Weld Heat Seal Mark 2, roll	122 m x 78 mm	1,000	1
4ti-0573S	Clear Weld Heat Seal Mark 2, sample roll	5 m x 78 mm	40	1
4ti-0580	Clear Heat Seal 3730, roll	610 m x 78 mm	5,000	1
4ti-0580/122	Clear Heat Seal 3730, roll	122 m x 78 mm	1,000	1
4ti-0580S	Clear Heat Seal 3730, sample roll	5 m x 78 mm	40	1
4ti-0549	Clear Heat Seal Plus, roll	250 m x 78 mm	2,100	1
4ti-0549/S	Clear Heat Seal Plus, sample roll	5 m x 78 mm	40	1
4ti-0520	Peel Heat Seal, roll	610 m x 78 mm	5,000	1
4ti-0520/122	Peel Heat Seal, roll	122 m x 78 mm	1,000	1
4ti-0520S	Peel Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0523	Universal Peel Heat Seal, roll	610 m x 78 mm	5,000	1
4ti-0523S	Universal Peel Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0585	DMSO Resistant Peel Heat Seal, roll	500 m x 78 mm	4,200	1
4ti-0585/100	DMSO Resistant Peel Heat Seal, roll	100 m x 78 mm	800	1
4ti-0585S	DMSO Resistant Peel Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0530	Pierce Heat Seal, roll	610 m x 78 mm	5,000	1
4ti-0530/122	Pierce Heat Seal, roll	122 m x 78 mm	1,000	1
4ti-0530S	Pierce Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0538	Pierce Heat Seal Strong, roll	610 m x 78 mm	5,000	1
4ti-0538S	Pierce Heat Seal Strong, sample roll	5 m x 78 mm	40	1
4ti-0535	Foil Heat Seal, roll	610 m x 78 mm	5,000	1
4ti-0535/122	Foil Heat Seal, roll	122 m x 78 mm	1,000	1
4ti-0535S	Foil Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0545	Polystyrene Foil Heat Seal, roll	610 m x 78 mm	5,000	1
4ti-0545/122	Polystyrene Foil Heat Seal, roll	122 m x 78 mm	1,000	1
4ti-0545S	Polystyrene Foil Heat Seal, sample roll	5 m x 78 mm	40	1
4ti-0590	Thermal Bond Heat Seal, roll	500 m x 78 mm	4,200	1
4ti-0590/100	Thermal Bond Heat Seal, roll	100 m x 78 mm	800	1
4ti-0590S	Thermal Bond Heat Seal, sample roll	5 m x 78 mm	40	1

Code	Description	Dimensions	Number of Seals	Quantity
4ti-0598	Gas Permeable Heat Seal Mark 2, roll	610 m x 78 mm	5,000	1
4ti-0598/122	Gas Permeable Heat Seal Mark 2, roll	122 m x 78 mm	1,000	1
4ti-0598S	Gas Permeable Heat Seal Mark 2, sample roll	5 m x 78 mm	40	1
4ti-0540/SLIT	Gas Permeable Clear Heat Seal, roll	450 m x 78 mm	3,800	1

## Optimizing Sealing Parameters

Once you have established that your plate quality is sufficient, you are using the correct plate carrier, and you have chosen your sealing material, it is necessary to optimize the sealing parameters of time and temperature. This can be achieved using empty plates.

A set of sealing protocols are already stored on the instrument. These are for guidance only but should form a good starting point for adjusting the settings for your chosen sealing material and plate type.

In general terms, it is sensible to keep one of the parameters constant and vary the other when optimizing. For example, set the sealing time to two seconds and gradually increase the temperature, monitor the results until you are satisfied with the quality of the resulting seal. You can then further fine tune the quality by adjusting the time, maintaining your desired temperature, in 0.1 second increments.

The following sealing temperatures and times are for guidance only. Sealing efficiency varies depending on the plate type used.

Code	Description	Sealing temperature (°C) / Dwell time (sec) for 96well PCR plates*	Sealing temperature (°C) / Dwell time (sec) for 384well PCR plates*
4ti-0540	Clear Heat Seal	175/3	175/3
4ti-0573	Clear Weld Heat Seal Mark 2	170/3	170/3
4ti-0580	Clear Heat Seal 3730	170/3	170/3
4ti-0549	Clear Heat Seal Plus	175/3	175/3
4ti-0520	Peel Heat Seal	175/3	175/3
4ti-0523	Universal Peel Heat Seal	175/3	175/3
4ti-0585	DMSO Resistant Peel Heat Seal	175/3	175/3
4ti-0530	Pierce Heat Seal	175/3	175/3

Code	Description	Sealing temperature (°C) / Dwell time (sec) for 96well PCR plates*	Sealing temperature (°C) / Dwell time (sec) for 384well PCR plates*
4ti-0538	Pierce Heat Seal Strong	175/3	175/3
4ti-0535	Foil Heat Seal	175/3	175/3
4ti-0545	Polystyrene Foil Heat Seal	175/3	175/3
4ti-0590	Thermal Bond Heat Seal	175/3	175/3
4ti-0598	Gas Permeable Heat Seal Mark 2	175/3	175/3
4ti-0540/SLIT	Gas Permeable Clear Heat Seal	175/3	175/3

\* These values are for two-component PCR plates. For one-piece polypropylene plates, increase dwell time by one second.

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**NOTE:** These values are for guidance only. It is advisable to conduct trials depending on the plate type being sealed.

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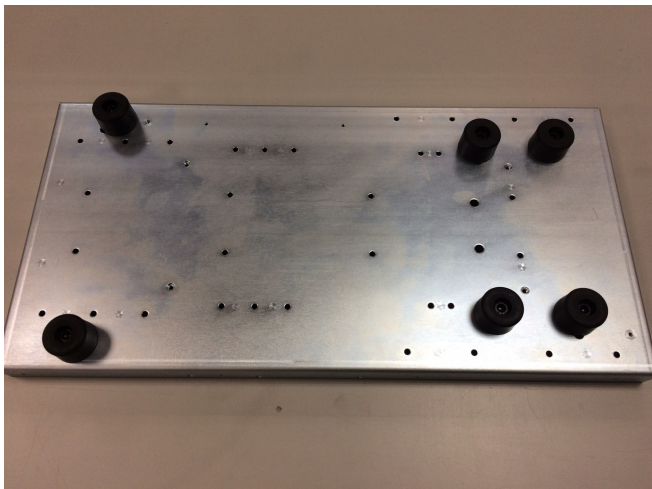
All sealing parameters were estimated using software V08.15.

# 5. Integration

Besides standalone operation, the Automated Roll Heat Sealer can be integrated into a bigger system. In integrating, the device may be fixed into a bigger system and controlled by the terminal.

## Changing Rubber Feet to Screw Nuts

The rubber feet on the base plate, as seen in the picture below, can be removed.



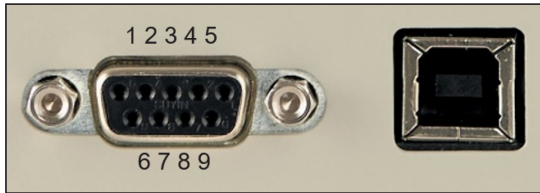
**Figure 5-1: Rubber Feet on Base Plate**

There is a hexagon socket head crew and a spring washer in the center of the rubber foot. Use an Allen screwdriver to remove the six rubber feet from the bottom side of the device. When integrating this device, six M6 hexagon socket head crews with proper length should be tightened to the mounted nuts on the top side of the base plate.



## Remote Communication

The Automated Roll Heat Sealer device can be remotely controlled via its RS232 or USB port in the rear of the instrument, as in the picture below. The SiLA driver installation is necessary to convert the USB signal to RS-232 signal for Hyper-terminal.



**Figure 5-2: RS232 and USB Ports on Automated Roll Heat Sealer**

The Automated Roll Heat Sealer remote communication is shown below (all the communication is via ASCII). Contact Azenta Life Sciences for details.

### Protocol

Step	Action
1.	Connect the Automated Roll Heat Sealer and the computer using a RS232 or USB cable.
2.	Turn on the device.
3.	Execute a terminal emulator program (for example, Tera term).
4.	Input commands.

### Serial Port Setup

Parameter	Setup
Baud rate	19200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

## Basic Commands

Function	Operation	ASCII
Seal	Conduct seal action	*00GS=zz!
Temperature Setting	Adjust seal to be 100 degree	*00DH=0100zz!
Time Setting	Adjust seal time to be 0.5 sec	*00DT=0005zz!
Shuttle open	Require Automated Roll Heat Sealer to open shuttle from the remote control computer.	*00MO=zz!
Shuttle close	Require Automated Roll Heat Sealer to close shuttle from the remote control computer.	*00MC=zz!
System reset	Clear error status when Automated Roll Heat Sealer incurs error alarm from the remote control computer.	*00SR=zz!

## Status of Process

Status	Description
0	Idle
1	Single Work
2	Repeat Work
3	Error
4	Finish

# 6. Routine and Preventative Maintenance

## Cleaning the Heating Block

During the sealing process, the heating block inside the sealing chamber descends and presses the seal onto the plate surface. Although the heating block is coated with non-stick material, seal material, residue, and dirt can accumulate on the heating block over time and this can affect the sealing quality. It is therefore necessary to regularly monitor the heating block, and if necessary clean it, to maintain optimal and reliable performance.

Material need for cleaning the heating block:

- Soft and anti-scratch cloth
- Cleaning solution (70% ethanol)

Step	Action
1.	Ensure the power to the unit is turned off and the heating block is at room temperature.
2.	Open the inspection door on the side of the unit.
3.	Dampen the anti-scratch cloth with cleaning solution.
4.	Wipe the heating block via the inspection door.
5.	Close the inspection door.

---

**NOTE:** It is important not to damage the coating on the heating block as this does affect the sealing performance.

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## Cleaning the Touch Screen


A lint-free cloth is required for touch screen cleaning. Do not use fluid cleaners on the touch screen. Any fluid that gets between the screen and the screen frame can damage the device.

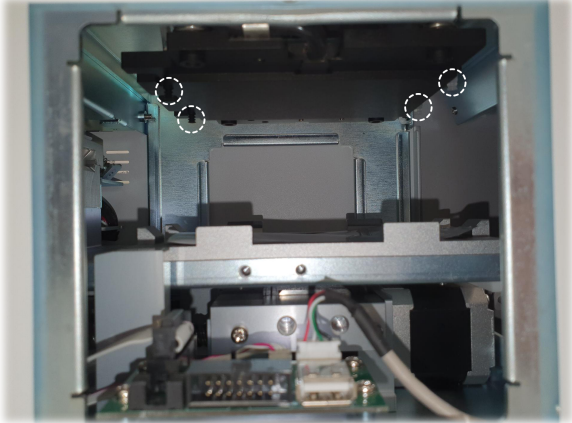
## Replacing the Vacuum Cups

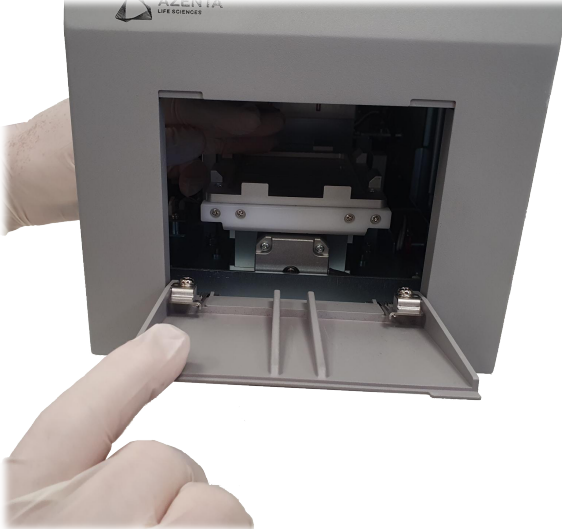
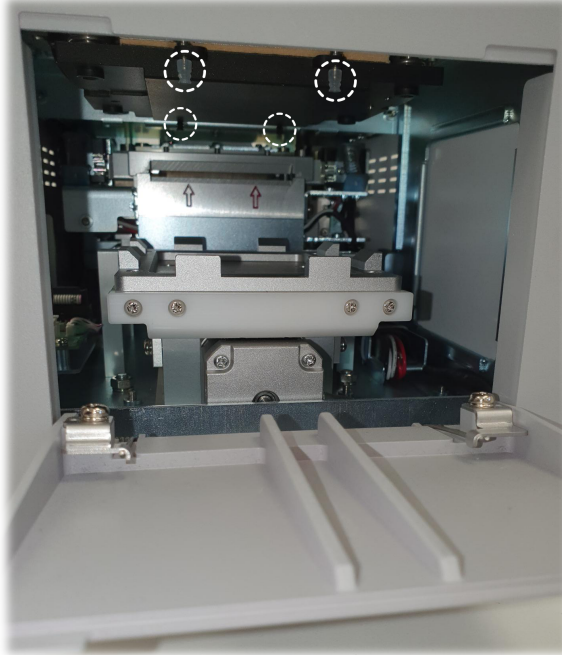
Ensure the heating block temperature is set to OFF (refer to ["Temperature Setting" on page 35](#)).

Once the heating block has cooled, switch the unit off.


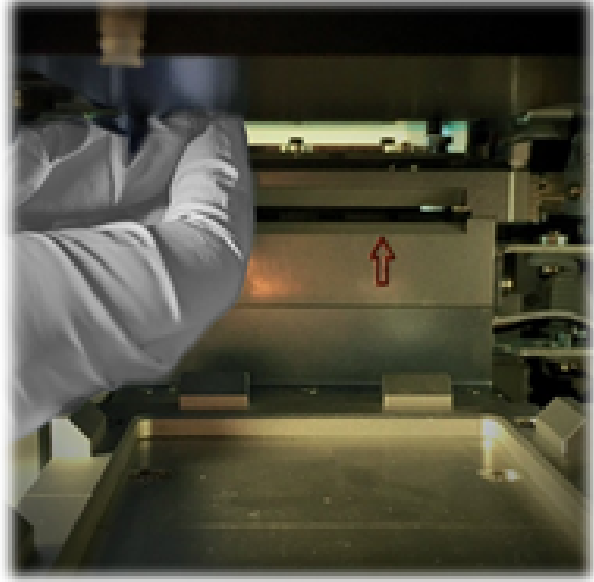
### Locating the Vacuum Cups

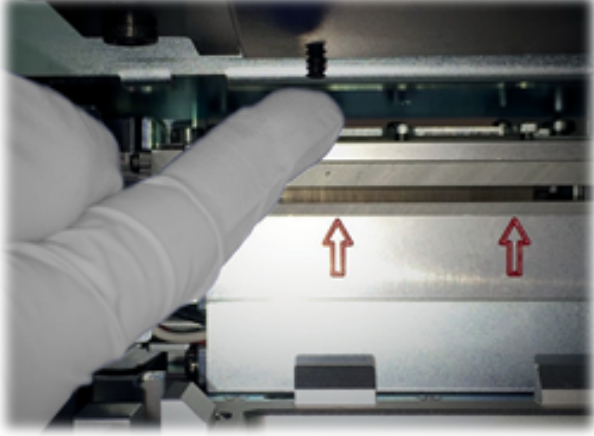
Step	Action
1.	<p>Remove the side inspection door as in the image below:</p>  <p>This enables you to locate the vacuum cups by looking inside the unit.</p>

Step	Action
2.	<p>Look inside the unit and locate four vacuum cups; two are situated towards the rear (black), and two are situated towards the front (clear). Due to the black and clear vacuum cups being different sizes, it is essential that they are fixed in these positions.</p> 

Step	Action
3.	<p data-bbox="337 268 1383 359">To locate the vacuum cups from the front, pass your left hand through the side inspection door and push the front door open. With your right hand hold the door open carefully and remove your left hand from inside the unit.</p>  

## Removing the Rear Vacuum Cups


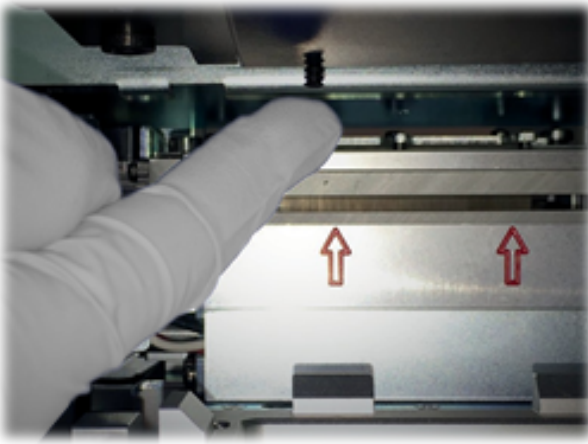
Step	Action
1.	<p>Start by removing the damaged or worn rear (black) vacuum cups. Carefully put your hand inside the side inspection door and simply pinch and pull them off the pins that hold them in place.</p>  
2.	<p>Once the damaged vacuum cups have been removed. Replace them with the spare vacuum cups provided with the unit; these are found in your accessories box.</p>

Step	Action
3.	<p>Replace the cups in the same way you removed them earlier, pushing the cups all the way onto the pins that hold them in place. You can further ensure the cups are fixed properly by applying gentle force to the cup, pushing up with the tip of your finger.</p> 

### Removing the Front Vacuum Cups

Step	Action
1.	<p>Repeat the same procedure you did to locate the front vacuum cups.</p> 



Step	Action
2.	<p>Hold the door open with your left hand and remove the vacuum cups with your right hand by pinching and pulling them off the pins that hold them in place.</p> 
3.	<p>Replace the cups in the same way you removed them earlier, pushing the cups all the way onto the pins that hold them in place. You can further ensure the cups are fixed properly by applying gentle force to the cup, pushing up with the tip of your finger.</p> 
4.	<p>Check that all vacuum cups are fixed properly and fully in place. A light helps in this instance.</p>
5.	<p>Once you are happy that all vacuum cups are fitted correctly, fix the inspection door in place, turn the unit back on, and set the temperature you require. Refer to "<a href="#">Setting the Sealing Parameters</a>" on page 34.</p>



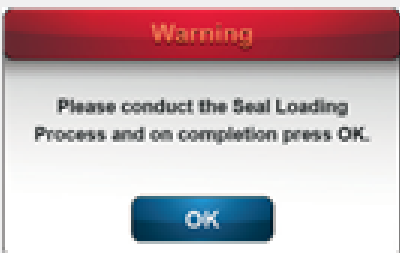
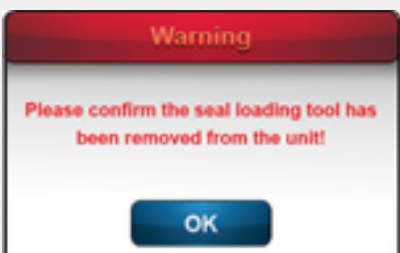

# 7. Troubleshooting

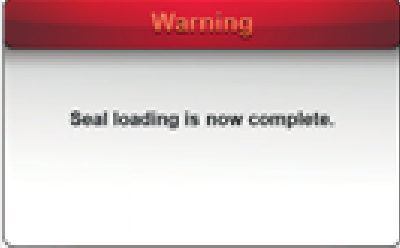
## Hardware Problem

Symptom	Possible Cause	Solution
The seal loading tool cannot pass through the rear clamp.	The loading tool is not inserted through the clamping mechanism in the correct way. OR The plate carrier is not located at the correct position for loading.	Pull the tool out. Re-insert the tool. The gap for the tool to pass through has red arrows indicating the insertion position. OR Reboot the unit by switching it off and on and the carrier returns to its home position.
Sealing material does not pull through the machine.	The sealing material is not properly inserted to the seal loading tool.	Reinsert the sealing material in the clip of the loading tool.
The sealing material doesn't cut correctly.	The sealing material has not been properly loaded. OR The cutting module may be damaged due to incorrect loading process.	Re-load the roll. OR Contact your Azenta Life Sciences service representative.
During the sealing process, the sealing material falls onto the plate carrier repeatedly.	The vacuum cup may have been damaged.	The vacuum cup is a consumable. Contact your Azenta Life Sciences service representative for replacements.
Unit doesn't seal properly or seals poorly.	Incompatible seal/plate selection OR Sealing parameters are not optimized.	Refer to Azenta Life Sciences's heat sealing film and foil comparison table. OR Refer to Azenta Life Sciences's heat sealing film and foil comparison table.
Display screen freezes.	Continuously rebooting the unit without shutting it down correctly.	Switch the Automated Roll Heat Sealer off and back on again after at least one minute.

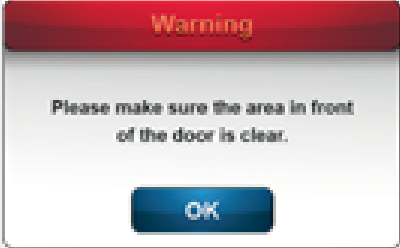
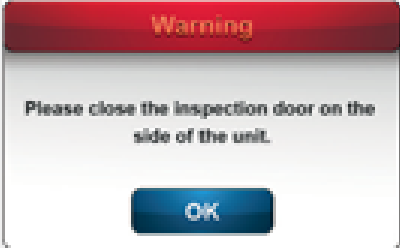

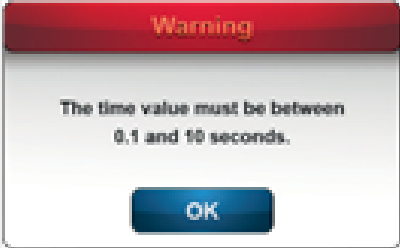
## Warning Messages

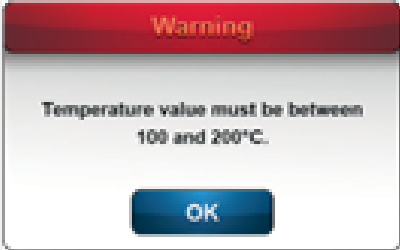
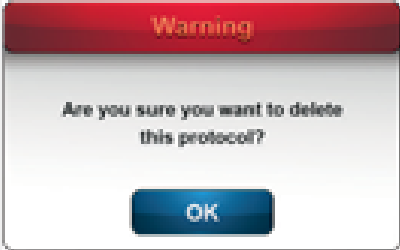
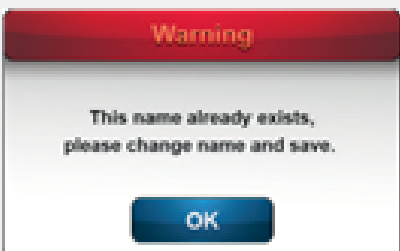
### Seal Loading

Warning	Action: User / Instrument
 <p><b>Warning</b></p> <p>No seal detected. Press OK to perform the Seal Loading Process.</p> <p>OK</p>	<p>Touch <b>OK</b> to perform the seal loading process.</p> <p><i>Before the plate carrier is moving, the seal (roll) sensor does not detect a seal.</i></p>
 <p><b>Warning</b></p> <p>Remove any micro-plate and plate adaptor from the plate shuttle and press OK.</p> <p>OK</p>	<p>Ensure the plate carrier is free from any micro-plate and touch <b>OK</b> to start the seal loading process.</p> <p><i>The plate carrier moves to the seal loading position.</i></p>
 <p><b>Warning</b></p> <p>Please conduct the Seal Loading Process and on completion press OK.</p> <p>OK</p>	<p>Conduct seal loading procedure by sliding the seal loading tool into the unit.</p>
 <p><b>Warning</b></p> <p>Please confirm the seal loading tool has been removed from the unit!</p> <p>OK</p>	<p>Ensure the seal loading tool is clear of the instrument. Lightly holding the end of the seal in one hand and making sure it is central to the cutout section of the door, touch <b>OK</b> on the touch screen.</p> <p><b>NOTE:</b> Do not pull the seal material at this step! The heating block moves down to cut off the seal.</p> <p><i>The plate carrier moves to the outside position.</i></p>
 <p><b>Warning</b></p> <p>Please remove the waste seal and press OK.</p> <p>OK</p>	<p>Remove the excess sealing material. Touch <b>OK</b> on the touch screen to complete the seal loading process.</p> <p><i>The plate carrier goes back into the machine. The front clamp closes to grip the seal film. The plate carrier goes to the outside position.</i></p>

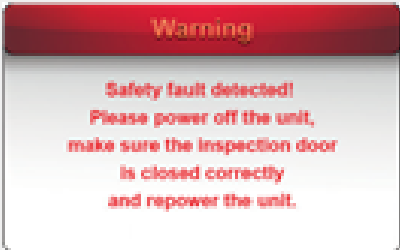
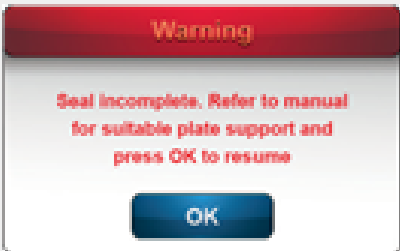
Warning	Action: User / Instrument
 <p>Warning</p> <p>Seal loading is now complete.</p>	<p>No action required. The message disappears after 3 seconds.</p>

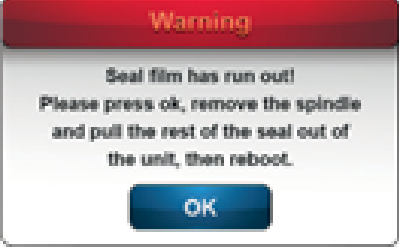
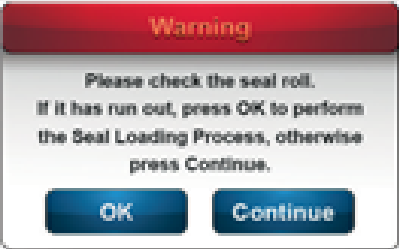

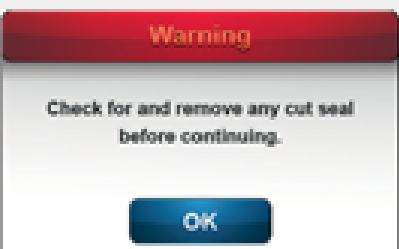
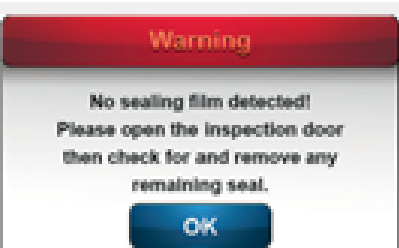
## Protocol Management




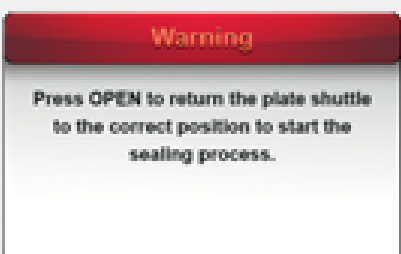
Warning	Action
 <p>Warning</p> <p>Please make sure the area in front of the door is clear.</p> <p>OK</p>	<p>Ensure the area is clear and touch <b>OK</b> to confirm. Touch the <b>Plate Carrier Movement</b> icon to open the plate carrier.</p>
 <p>Warning</p> <p>Please close the inspection door on the side of the unit.</p> <p>OK</p>	<p>Inspection door not closed. Close the inspection door and touch <b>OK</b> to proceed with sealing.</p>
 <p>Warning</p> <p>No protocol name before saving protocol.</p> <p>OK</p>	<p>Create a protocol name before saving a protocol.</p>
 <p>Warning</p> <p>The time value must be between 0.1 and 10 seconds.</p> <p>OK</p>	<p>Ensure the time value is in the correct range.</p>

Warning	Action
 <p>Warning</p> <p>Temperature value must be between 100 and 200°C.</p> <p>OK</p>	<p>Ensure the temperature value is in the correct range.</p>
 <p>Warning</p> <p>Are you sure you want to delete this protocol?</p> <p>OK</p>	<p>Press <b>Delete</b> in protocol management section.</p>
 <p>Warning</p> <p>This name already exists, please change name and save.</p> <p>OK</p>	<p>Select a new protocol name and save the protocol.</p>

## General

Warning	Action: User / Instrument
 <p>Warning</p> <p>Safety fault detected! Please power off the unit, make sure the inspection door is closed correctly and repower the unit.</p>	<p>The inspection door was opened during running. Close the inspection door and power off the unit. Repower the unit and start the seal loading procedure.</p>
 <p>Warning</p> <p>Seal incomplete. Refer to manual for suitable plate support and press OK to resume</p> <p>OK</p>	<p>No or unsuitable plate adapter on plate carrier, heating block module cannot detect the plate when pressing down. Choose suitable plate adapter and touch <b>OK</b> to resume. Refer to "<a href="#">Plate Adapters</a>" on page 42.</p>

Warning	Action: User / Instrument
 <p><b>Warning</b></p> <p>Seal film has run out! Please press ok, remove the spindle and pull the rest of the seal out of the unit, then reboot.</p> <p>OK</p>	<p>No seal can be detected by the rear sensor. Pull out the remaining seal and reboot the unit to proceed with the seal loading procedure.</p>
 <p><b>Warning</b></p> <p>Please check the seal roll. If it has run out, press OK to perform the Seal Loading Process, otherwise press Continue.</p> <p>OK Continue</p>	<p>Check if the seal roll has run out. If yes, touch <b>OK</b> to proceed with the seal loading process. If no, touch <b>Continue</b> to proceed with sealing.</p>
 <p><b>Warning</b></p> <p>To proceed, remove the plate adaptor and select one of the following options:</p> <p>Close door Chg roll Esc</p>	<p>Select one of the following options: Touch <b>Close door</b> to close the door of the instrument. Touch <b>Chg roll</b> to start the seal unloading procedure. Touch <b>Esc</b> to proceed with sealing.</p>
 <p><b>Warning</b></p> <p>Check for and remove any cut seal before continuing.</p> <p>OK</p>	<p>After you touch <b>Close door</b>, the unit closes the door and cut a seal which drops to the plate carrier. This cut seal needs to be removed before proceeding. Touch <b>OK</b> to check and remove the cut seal.</p> <p><i>The door opens and the plate carrier goes to the outside position.</i></p>
 <p><b>Warning</b></p> <p>No sealing film detected! Please open the inspection door then check for and remove any remaining seal.</p> <p>OK</p>	<p>The sealing film is not in position for the next sealing run. Possible cause:</p> <ul style="list-style-type: none"> <li>• The sealing film has run out, replace the seal roll.</li> <li>• The sealing film has been dropped. Check if the vacuum cups are intact or need replacing.</li> </ul>

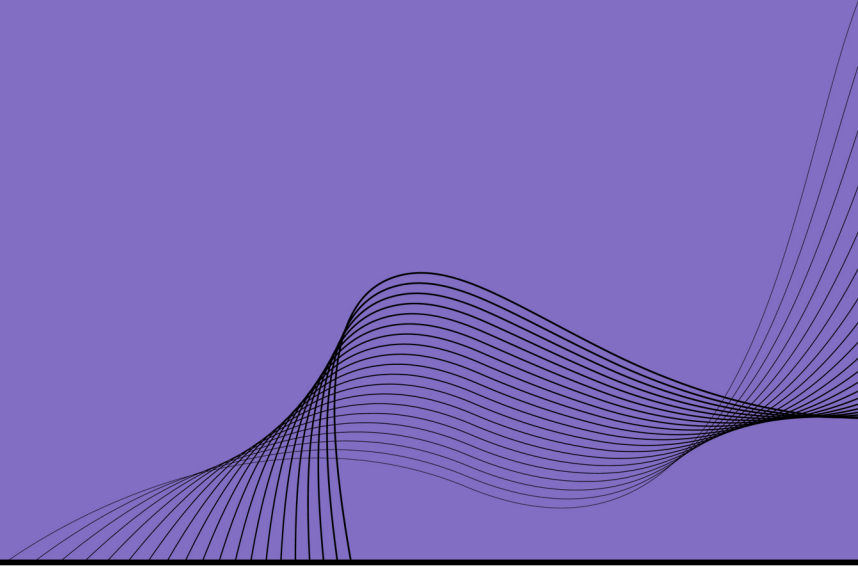
Warning	Action: User / Instrument
 <p>Warning</p> <p>Please close the inspection door on the side of the unit.</p> <p>OK</p>	<p>Reminder to close the inspection door.</p>
 <p>Warning</p> <p>Please reboot the unit.</p>	<p>Reminder to reboot the unit.</p>
 <p>Warning</p> <p>It is now safe to remove the roll.</p>	<p>Reminder that the sealing roll can be removed safely.</p>
 <p>Warning</p> <p>Press OPEN to return the plate shuttle to the correct position to start the sealing process.</p>	<p>Touch the <b>Plate Carrier Movement</b> icon to move the plate carrier to outside position for the next sealing process.</p>

## Error Messages

Error	Operation	ASCII
Error 1	Heater temperature rises over 210°C in any condition.	Contact your Azena Life Sciences service representative.
Error 2	You touch <b>Seal</b> but heater can't move up	Contact your Azena Life Sciences service representative.
Error 3	You touch <b>Seal</b> or the <b>Plate Carrier Movement</b> icon but the plate carrier does not close.	Contact your Azena Life Sciences service representative.
Error 4	You touch <b>Seal</b> or the <b>Plate Carrier Movement</b> icon but the plate carrier does not open.	Contact your Azena Life Sciences service representative.
Error 5	Temperature detect abnormal.	Contact your Azena Life Sciences service representative.
Error 6	Temperature does not reach the set value.	Contact your service representative.
Error 7	Temperature inaccuracy.	Contact your Azena Life Sciences service representative.
Error 9	Over-current occurred in the plate motor driver.	Contact your Azena Life Sciences service representative.
Error 10	Over-current occurred in the heater motor driver.	Contact your Azena Life Sciences service representative.
Error 11	No detection at heating block's home sensor.	Contact your Azena Life Sciences service representative.
Error 12	ADC value doesn't update over 10 sec.	Contact your Azena Life Sciences service representative.



# 8. Appendices



This chapter contains the appendices for the manual.

## Appendix A: Technical Specifications

Model	Technical Specification
Connection	RS-232 serial port, USB port
Dimension (W x L x H)	230 x 507 x 276 mm <b>NOTE:</b> Additional space is required if large seal rolls are used.
Location	Indoor use only
Max operating altitude	2000m
Operation humidity	0 - 85% RH
Pollution degree	2
Power consumption	700W (max)
Power supply	V in: AC100 - 240V $\pm$ 10% V out: DC 24V 320W
Sealing temperature range	100 - 195 °C
Sealing time range	0.1 - 10 sec
Storage temperature	15 - 70 °C
Weight (without roll)	27 kg
Working temperature range	10 - 30 °C

**NOTE:** Specifications are subject to change without prior notice.

## Appendix B: Ordering Information and Accessories

Code	Description	Quantity
4ti-0665	Automated Roll Heat Sealer for use with Adapters A and B	1
4ti-0665-1	Seal loading tool 	1
4ti-0665-2	Plate support adapter A 	1
4ti-0665-3	Plate support adapter B 	1
4ti-0665-4	Roll holder 	1
4ti-0665-5 4ti-0665-6	Vacuum cups, front (clear) Vacuum cups, rear (black) 	2 2
4ti-0665-7	Plastic tweezers 	1

Code	Description	Quantity
4ti-0665-8	<p data-bbox="527 273 1052 300">Clear plastic dust cover for enclosing the sealing roll</p>  <p data-bbox="527 474 1198 533"><b>NOTE:</b> Only applicable for smaller rolls (product code 4ti-xxxx/80, /100, /122). Refer to <a href="#">"Heat Seal Materials" on page 45</a>.</p>	1

## Appendix C: Warranty

Azenta Life Sciences warrants that the Automated Roll Heat Sealer (4ti-0665) should be free from defects in materials and workmanship for a period of 24 months or up to 200,000 sealing operations from the date of purchase.\* The purchase date is determined by the invoice date from Azenta Life Sciences to the customer. If the instrument is being incorporated into an automated system by a third party, the warranty period may be extended by a maximum of six months or the date the system is commissioned, whichever is the shorter. For this automation extension to be valid, Azenta Life Sciences must be notified of this requirement along with the details of the integrator at the point of purchase.

Each Automated Roll Heat Sealer is tested and documented by the manufacturer before shipping. Azenta Life Sciences's Quality Control System guarantees that the performance of the Automated Roll Heat Sealer you have purchased is within its specifications.

The warranty covers all parts (other than the vacuum cups) and labour costs associated with a repair of the unit within the first 24 months. The need for returning a unit for service must first be agreed with Azenta Life Sciences via telephone support. Once it is established a return is necessary, Azenta Life Sciences will issue a returns number, details of which must be returned with the unit.

The warranty does not cover defects caused by excessive wear and tear or damage due to shipping, accident, abuse, misuse, problems with electrical power, or usage not in accordance with product instructions, if other than original spare parts supplied by the manufacturer have been used, or if other than original Azenta Life Sciences seal rolls have been used.

The warranty does not automatically cover shipping charges. Shipping costs (both ways) will be covered by Azenta Life Sciences where a returns number is issued within 8 weeks of the original delivery date (as confirmed by the invoice date). Shipping costs after this period will need to be covered by the customer.

Once returned to an Azenta Life Sciences designated service centre, the unit will be inspected and repaired accordingly and a report provided to the customer. Azenta Life Sciences would expect to carry out this work and return the unit within 10 working days of receiving the unit.

Onsite service or a swap out service (where a loaner instrument is shipped to the customer whilst theirs is repaired) can be arranged at extra cost. Contact Azenta Life Sciences if you are interested in this service.

This standard warranty can be extended to 36 or 48 months respectively.

Extended warranty must be purchased within 4 weeks of the original invoice address.

\*The warranty period for a Refurbished Automated Roll Heat Sealer (4TI-0665R) is 12 months from date of purchase.

Code	Description
4ti-0665-10	Standard warranty (24 months)
4ti-0665-11	Warranty extension year 3
4ti-0665-12	Warranty extension year 3 and 4
4ti-0665-13	Warranty extension year 4

Contact Azenta Life Sciences or your local distributor for pricing details.

The warranty does not cover any damage to the set of four vacuum cups which can be replaced by a customer. Refer to ["Replacing the Vacuum Cups" on page 52](#). A set of four replacement vacuum cups are provided with each new unit.

The warranty does not cover damage caused to the unit in shipping due to unsuitable or insufficient packing being used. Wherever possible, the original shipping box should be retained by the customer and used for returning the unit.

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**NOTE:** Any shipment of an Automated Roll Heat Sealer must be palletized. For details, refer to ["Shipping Instruction" on page 71](#).

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## Appendix D: Shipping Instruction

In the event the instrument should be shipped from one destination to another (for example, returned to Azenta Life Sciences for servicing), you should follow these instructions to safeguard the Automated Roll Heat Sealer during its journey. Azenta Life Sciences warranty does not cover shipping costs or damage caused by shipping. Warranty for your unit will be declared void should you fail to follow these instructions fully. Please also refer to "[Warranty](#)" on page 69.

### Shipping Bracket and Rear Sensor Protection Screw

Before boxing your unit up you must ensure that the shipping bracket and rear sensor protection screw (seen in the figures below) are fixed in place fully. The shipping bracket locks the shuttle in place and restricts movement during transit, whilst the rear sensor protection screw limits movement of the rear pendulum sensor.

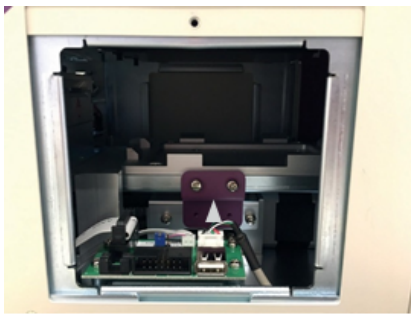


Figure 8-1: Shipping Bracket

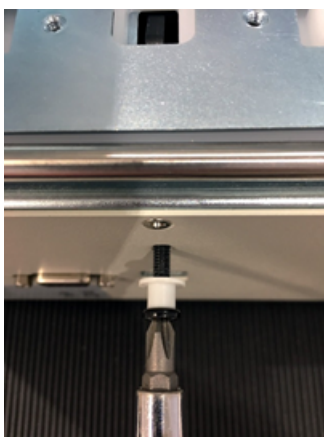




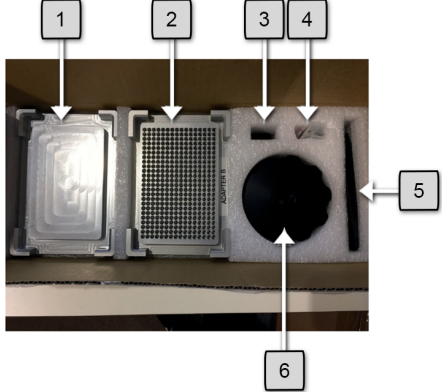

Figure 8-2: Rear Sensor Protection Screw

 <b>CAUTION</b> <b>Two-Person Lift Recommended</b>	
<p>This product weighs 27 kg (about 60 lbs). Improper lifting may result in personal injury.</p> <ul style="list-style-type: none"> <li>Do not attempt to lift this product alone. Always use 2-person lift techniques or a lift aid.</li> </ul>	

## Packing the Device into the Shipping Box

Step	Action
1.	<p>Once the shuttle and rear pendulum sensor are locked in place the unit is ready to be placed inside the shipping box. The Automated Roll Heat Sealer is very heavy (27 kg) so great care should be taken when lifting and placing the unit inside the box. Ensure the Automated Roll Heat Sealer is sitting within the cut out section of the protective foam.</p> <p><b>NOTE:</b> Ensure adapters are removed from the unit prior to boxing the Automated Roll Heat Sealer.</p> 
2.	<p>Add the top layer of protective foam packaging, securing the unit in place.</p> 



Step	Action														
<p>3.</p>	<p>Collect all adapters and accessories, packing them in the supplied accessories box.</p>  <table border="1" data-bbox="341 709 820 1087"> <thead> <tr> <th>#</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Plate support adapter A</td> </tr> <tr> <td>2</td> <td>Plate support adapter B</td> </tr> <tr> <td>3</td> <td>Locking nut</td> </tr> <tr> <td>4</td> <td>Spare vacuum cups</td> </tr> <tr> <td>5</td> <td>Spindle, tweezers</td> </tr> <tr> <td>6</td> <td>Clamping wheels</td> </tr> </tbody> </table>	#	Part	1	Plate support adapter A	2	Plate support adapter B	3	Locking nut	4	Spare vacuum cups	5	Spindle, tweezers	6	Clamping wheels
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<p>4.</p>	<p>Add the accessories box, power lead, and seal loading tool in the following manner.</p> 														

## Setting the Device on a Pallet

The Automated Roll Heat Sealer *must be* wrapped and strapped onto a pallet before being shipped from one destination to another. Ensure no boxes are stacked on top of the Automated Roll Heat Sealer box.



The standard packaging of the Automated Roll Heat Sealer is two to three layers.

## WEEE Statement (European Union)



The symbol above indicates that Waste Electrical and Electronic Equipment (WEEE) is not to be disposed of as unsorted municipal waste. Equipment marked with this symbol is to be collected separately.

The objectives of this program are to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally. Specific treatment of WEEE is indispensable in order to avoid the dispersion of pollutants into the recycled material or waste stream. Such treatment is the most effective means of protecting the customer's environment.

The waste collection, reuse, recycling, and recovery programs available to Azenta Life Sciences customers, vary by customer location. Please contact the responsible body (e.g., your laboratory manager) for information about local requirements.