invitrogen

Power Blotter System

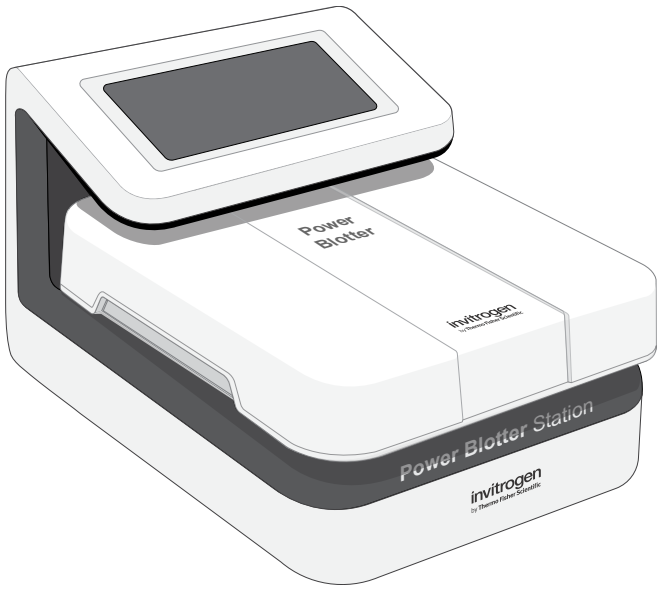
USER GUIDE

For semi-dry electroblotting of proteins from polyacrylamide gels

Catalog Number PB0012 and PB0013

Publication Number MAN0017053

Revision B.0



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Revision history: Pub. No. MAN0017053

Revision	Date	Description
B.0	March 2018	Correct dimensions in table on page 30.
A.0	October 2017	New document. Describes installation, operation, and maintenance of the Power Blotter System and consumables.

Contents

Product information

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

Contents

Table 1 Power Blotter System contents

Product No.	Product	Contents
PB0012	Power Blotter System	Power Blotter Station
		Power Blotter Cassette
		Blotting Roller
		Power Cord with C13 Connector
		Quick Reference Card

Table 2 Power Blotter XL System contents

Product No.	Product	Contents
PB0013	Power Blotter XL System	Power Blotter Station
		Power Blotter XL Cassette
		Blotting Roller
		Power Cord with C13 Connector
		Quick Reference Card

Components available for separate purchase:

- Power Blotter Station (Product No. PB0010)
- Power Blotter Cassette (Product No. PB0002)
- Power Blotter XL Cassette (Product No. PB0003)

Accessory products

Table 3 Power Blotter Select Transfer Stacks

Product	Transfer Membrane Type (Quantity)	Product No.
Power Blotter Select Transfer Stacks, Regular Size	Nitrocellulose (10 pack)	PB3310
	Nitrocellulose (40 pack)	PB3340
	PVDF (10 pack)	PB5310
	PVDF (40 pack)	PB5340
Power Blotter Select Transfer Stacks, Mini Size	Nitrocellulose (10 pack)	PB3210
	Nitrocellulose (40 pack)	PB3240
	PVDF (10 pack)	PB5210
	PVDF (40 pack)	PB5240

Table 4 Power Blotter Pre-cut Membranes and Filters and Power Blotter Transfer Buffer

Product	Transfer Membrane Type (Quantity)	Product No.
Power Blotter Pre-cut Membranes and Filters, Regular Size	Nitrocellulose (20 pack)	PB7320
	PVDF (20 pack)	PB9320
Power Blotter Pre-cut Membranes and Filters, Mini Size	Nitrocellulose (20 pack)	PB7220
	PVDF (20 pack)	PB9220
Power Blotter 1-Step Transfer Buffer (5X)	1 L	PB7300
	250 mL	PB7100

Table 5 Related products

Product	Quantity	Product No.
iBind™ Flex Western Device	1	SLF2000
iBind™ Flex Cards	10	SFL2010
iBind™ Flex Solution Kit	1 kit	SLF2020
SuperBlock™ (PBS) Blocking Buffer	1 L	37515
SuperBlock™ T20 (PBS) Blocking Buffer	1 L	37516
SuperSignal™ West Pico PLUS Chemiluminescent Substrate	200 mL	34580

Product	Quantity	Product No.
SuperSignal™ West Dura Extended Duration Substrate	200 mL	34076
SuperSignal™ West Femto Maximum Sensitivity Substrate	100 mL	34095
PageRuler™ Plus Prestained Protein Ladder	2 × 250 µL	26619
MagicMark™ XP Western Protein Standard	250 µL	LC5602
iBright™ Prestained Protein Ladder	2 × 250 µL	LC5615
Novex™ Reversible Membrane Protein Stain Kit	1 kit	IB7710
Pierce™ Reversible Membrane Protein Stain Kit for Nitrocellulose Membrane	1 kit	24580
Pierce™ Reversible Membrane Protein Stain Kit for PVDF Membrane	1 kit	24585
SYPRO™ Ruby Protein Blot Stain	200 mL	S-11791

Product description

The Invitrogen™ Power Blotter System is a self-contained blotting unit with an integrated power supply for fast, semi-dry blotting of proteins. The system consists of the Power Blotter Station, cassette, and two different choices of consumables: Power Blotter Select Transfer Stacks or Power Blotter Pre-cut Membranes and Filter with Power Blotter 1-Step Transfer Buffer.

The blotter system provides an easy solution with only a few parts to manage.

- Blotting Surface (Anode) — The blotting surface is the platinum-coated anode area where the Power Blotter Select Transfer Stacks or Power Blotter Pre-cut Membranes and Filters containing the gel are placed to perform blotting.
- Lid (Cathode) — The lid of the Power Blotter Cassette is the stainless steel cathode. The cathode plate exerts even pressure on the stack surface when the lid is closed for consistent results.
- Power Blotter Station — The base unit that houses the touchscreen controls and provides power to the cassette when joined together.
- Blotting Roller — The roller is used to remove air bubbles that can occur between the gel and the blotting membrane during assembly of the stacks and gel.

Instrument overview

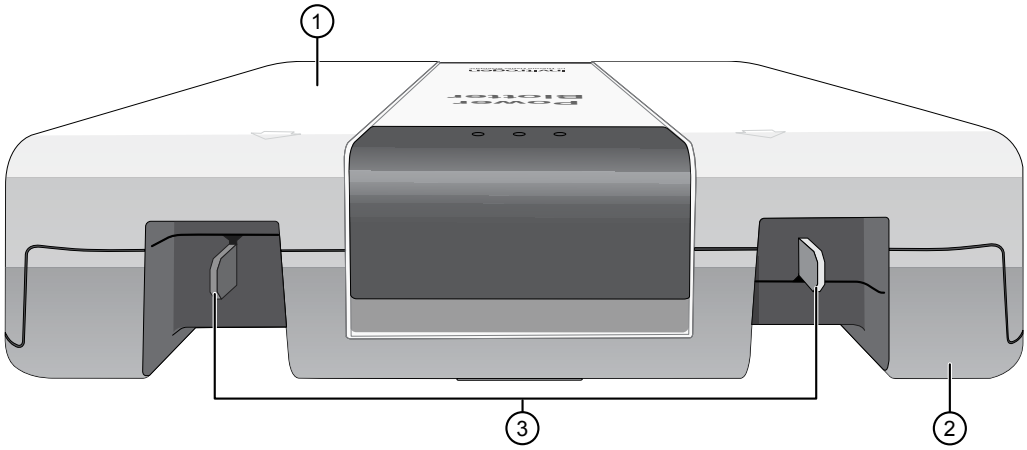


Figure 1 Cassette parts (side view)

① Top of cassette (cathode)
② Bottom of cassette (anode)
③ Metal pins connecting cassette to station

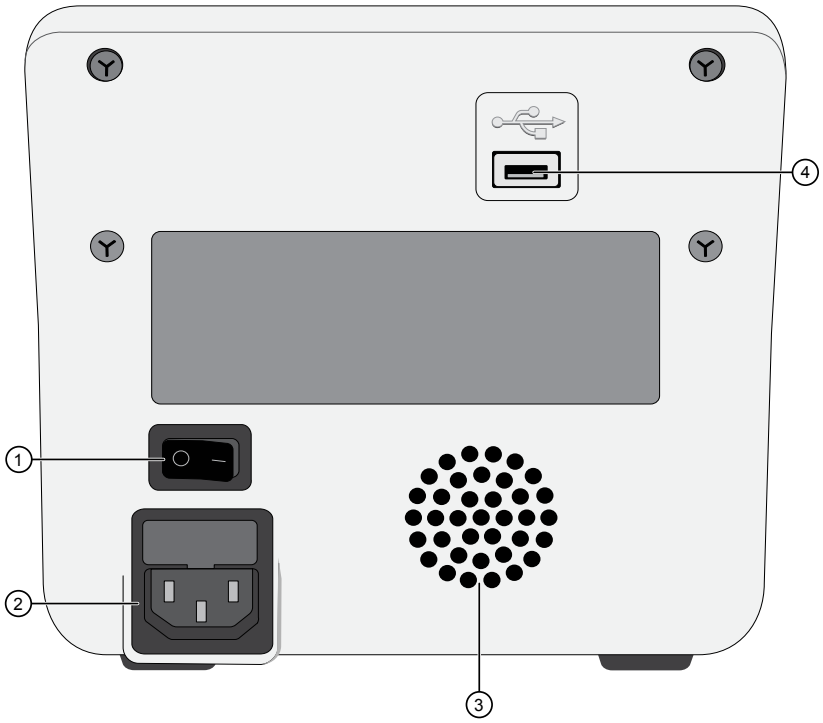


Figure 2 Rear view of Power Blotter Station

① Power switch
② Power cord connector
③ Cooling fan
④ USB port

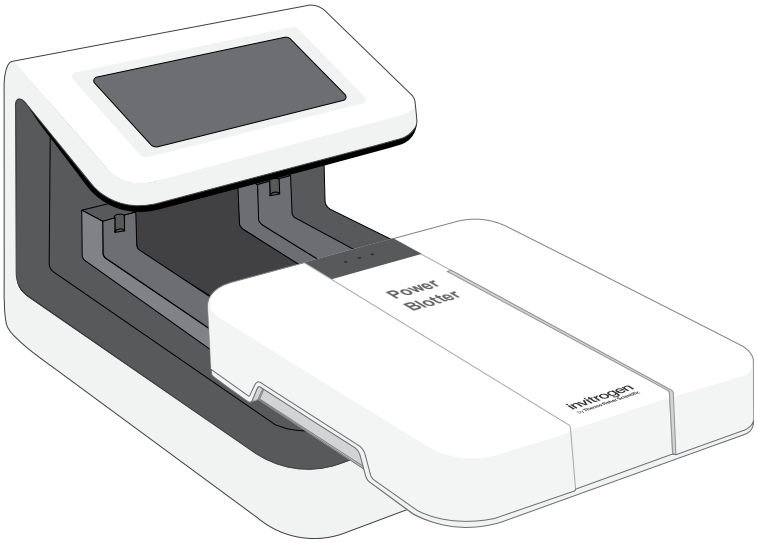


Figure 3 Cassette sliding into Power Blotter Station

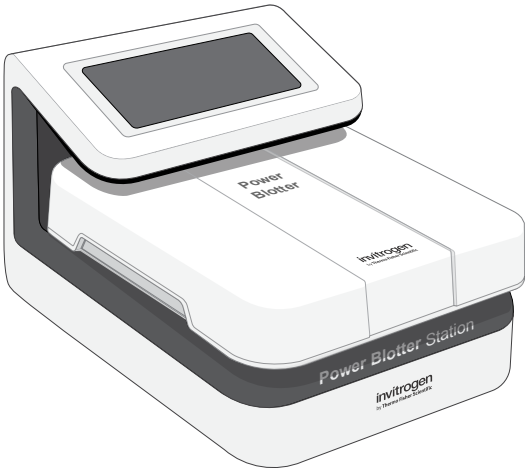
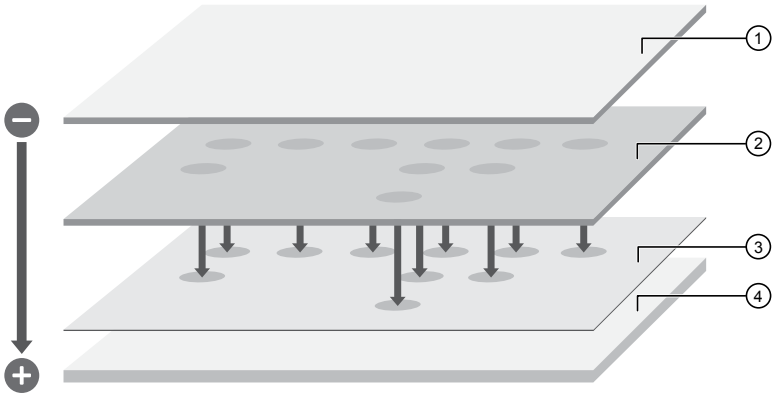


Figure 4 Complete Power Blotter Station with cassette connected

Power Blotter Select Transfer Stacks

The Power Blotter System with Power Blotter Select Transfer Stacks is based on the semi-dry blotting concept, using the unique gel matrix technology developed for the iBlot™ 2 Transfer Stacks. Power Blotter Select Transfer Stacks are disposable stacks with integrated PVDF or nitrocellulose transfer membranes. Each select transfer stack contains appropriate cathode and anode buffers in the gel matrix to allow fast, reliable transfer of proteins.

The Power Blotter Select Transfer Stack consists of a bottom stack and a top stack sandwiching a pre-run gel and a nitrocellulose (0.2 µm) or PVDF (0.2 µm) membrane. The select transfer stack is assembled with the blotting membrane on the anode side, and a pre-run gel on the cathode side.



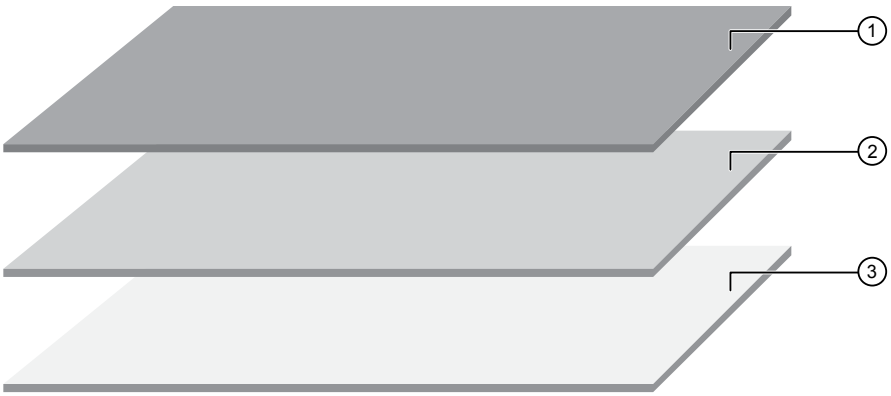
① Power Blotter Select Cathode Stack (top)
② Pre-run gel
③ Blotting membrane
④ Power Blotter Select Anode Stack (bottom)

After the stack is assembled on the Power Blotter Cassette and the cassette is closed, the appropriate method is selected and the run is initiated. Complete transfer of proteins from the gel to the blotting membrane is accomplished in ~5-10 minutes. Rapid transfer is possible because of two features:

- The gel matrices of the bottom and top stacks incorporate the appropriate anode and cathode buffers to act as ion reservoirs. This format eliminates the need for pre-made buffers or soaked filter paper, and minimizes handling that can lead to inconsistent performance.
- The gel matrix technology of Power Blotter Select Transfer Stacks allows the system to generate high field strength and increase the transfer speed.

Top cathode stack

The Top Cathode Stack is separated from the Bottom Anode Stack by a white plastic separator and contains 1 sheet of protective material on the bottom followed by the top transfer gel layer. The top transfer gel layer is composed of an optimized, proprietary gel composition and acts as an ion reservoir.



① Transfer gel layer (cathode)
② Protective material
③ Separator

Bottom anode stack

The Bottom Anode Stack contains one sheet of protective material, bottom transfer gel layer and a nitrocellulose (0.2 µm) or PVDF (0.2 µm) membrane for protein transfer. The bottom transfer gel layer acts as an ion reservoir and is composed of an optimized, proprietary gel composition. The nitrocellulose and PVDF membranes do not require any pretreatment before use. The transparent plastic tray serves as a storage vessel for the Power Blotter Select Transfer Stack.

Note: Use the Bottom Anode Stack without the tray.

① Blotting membrane
② Transfer gel layer (anode)
③ Protective material
④ Plastic package tray (discard)

Transfer membrane and protective material

The Power Blotter Select Transfer Stacks are assembled with the transfer membrane and are available with:

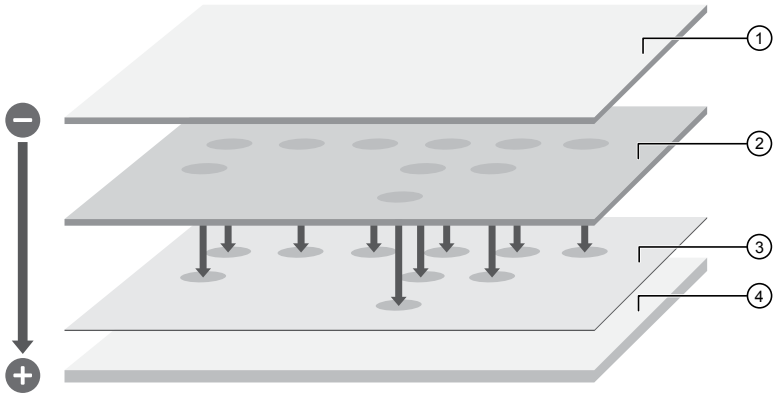
- Nitrocellulose membrane (0.2 µm)
  The nitrocellulose membrane is composed of 100% pure nitrocellulose to provide high-quality transfer. The membrane is compatible with commonly used detection methods such as staining, immunodetection, fluorescence, or radiolabeling. The proteins bind to the membrane due to hydrophobic and electrostatic interactions with a resulting protein binding capacity of 209 µg/cm^2.
- PVDF membrane (0.2 µm, low fluorescence)
  The PVDF membrane has a higher binding capacity than nitrocellulose. The PVDF membrane is preactivated and ready for use without any pretreatment with alcohol. The membrane is compatible with commonly used detection methods such as staining, immunodetection, fluorescence, or radiolabeling. The proteins bind to the membrane due to hydrophobic interactions. PVDF membrane has a higher binding capacity than nitrocellulose with a binding capacity of 240 µg/cm^2.

The protective material underneath the bottom transfer gel layer (anode) and the top transfer gel layer (cathode) should not be removed from the corresponding gel layers as it protects the surface of the platinum-coated anode, the gel, and transfer integrity during the blotting process.

Note: If the protective sheet becomes loose or shifted during shipment, align with the bottom anode gel layer and bottom cathode gel layer (on top of the pre-run gel), respectively. Failure to use the protective material during blotting of mini- or midi-gels may result in high currents and cracking of the gel matrices.

Power Blotter Pre-cut Membranes and Filters with Power Blotter 1-Step Transfer Buffer

The Power Blotter Pre-cut Membrane and Filters perform in the semi-dry blotting format when used with high-ionic Power Blotter 1-Step Transfer Buffer. Pre-soaked filter paper acts as an ion reservoir that allows for fast transfer. Complete transfer of proteins from the gel to the blotting membrane is accomplished in ~5-12 minutes for a more economical transfer option when compared to Power Blotter Select Transfer Stacks.



① Buffer-soaked filter papers
② Pre-run gel
③ Blotting membrane
④ Buffer-soaked filter papers

After the stack is assembled on the Power Blotter Cassette and the cassette is closed, the appropriate method is selected and the run is initiated. Complete transfer of proteins from the gel to the blotting membrane is accomplished in ~5-12 minutes. Rapid transfer is possible due to using optimized high-ionic transfer buffer (Power Blotter 1-Step Transfer Buffer) with high current (amps (A)/cm^2) flowing through the transfer stacks.

Note: The blotter system can also be used for standard semi-dry transfer protocols using Towbin buffer.

Operate the Power Blotter System

Set up the system

1. Unpack the instrument from the shipping materials. Remove the protective film from the cathode cassette and the touchscreen.

2. When turning on the Power Blotter Station for the first time, the **Cassette Type Activation** screen will appear. Follow the directions on the screen and insert the Power Blotter Cassette or the Power Blotter XL Cassette.
   a. Insert an additional cassette for activation or touch **Done**.

3. *(Optional)* Touch **Settings** to change the audio settings, view software and hardware versions, or activate cassettes.
   Settings provides access to these functions:
   - **Audio Settings**
   - **Info**
   - **Software Update**
   - **Cassette Type Activation**

4. Touch **Begin Blotting** to access **Pre-Programmed Methods**, **Recent Methods**, and **Custom Methods** or return to the **Main Menu**.
   - **Pre-Programmed Methods**— provides quick access to the recommended amperage, voltage, and time for the size and number of gels that you intend to simultaneously transfer. The blotter system is intended for use with the following consumables:
     – Power Blotter Select Transfer Stacks
     – Power Blotter Pre-cut Membranes and Filters, and Power Blotter 1-Step Transfer Buffer
     – Pierce™ 1-Step Transfer Buffer (Product No. 84731)
     – Power Blotter 1-Step Transfer Buffer (Product No. PB7100)
     – Bio-Rad™ Trans-Blot™ Turbo™ Transfer Stacks
     – Towbin transfer buffer (for Standard Semi-Dry transfer only)
   - **Recent Methods**
   - **Custom Methods**

Blotting methods

The Power Blotter System has four pre-programmed, constant amperage methods that allow blotting using pre-set combinations of amperage and time. Table below depicts amperage when transferring one mini-size gel.

Method	Constant Amperage	Default Run Time	Run Time Limit
Low MW (< 25 kDa)	1.3 Amps	5 minutes	7 minutes
Mixed-Range MW (25-150 kDa)	1.3 Amps	7 minutes	9 minutes
High MW (>150 kDa)	1.3 Amps	10 minutes	11 minutes
1.5 mm thick gels	1.3 Amps	10 minutes	12 minutes

Method	Constant Voltage	Default Run Time	Run Time Limit
Std Semi Dry	25 volts (1.0 Amp)	60 minutes	60 minutes

Note: Do not use the Std Semi Dry method (Towbin method) with Power Blotter Select Transfer Stacks or Power Blotter 1-Step Transfer Buffer.

Note: Blotting parameters may have to be optimized based on initial results. E.g., increase or decrease the transfer time or perform an ethanol gel equilibration prior to transfer.

Optimize blotting

When using the Power Blotter Select Stacks, most proteins transfer efficiently using the protocol in this manual. Based on specific properties of a protein or a set of proteins, some optimization of the blotting protocol may be necessary. Optimize blotting as follows:

- In general, to improve transfer efficiency of Tris-glycine gels, perform a 2-5 minute deionized water wash at room temperature on a shaker prior to transfer.
- **Perform an ethanol equilibration step prior to transfer.**
  To improve the transfer of high-molecular weight proteins from mini- or midi-Bis-Tris or Tris-glycine gels, submerge the gel in 20% ethanol (prepared in deionized water) and equilibrate for 5-10 minutes at room temperature on a shaker prior to transfer.

  Note: Do not equilibrate for longer than 10 minutes or sensitivity may be reduced. After equilibration, perform the transfer using the Power Blotter System as described in the manual.

- **Increase or decrease transfer time.**

  Based on the initial results, you can increase or decrease the transfer time for the method used to perform the transfer.

  Note: Do not perform a transfer for more than the recommended run-time limit indicated for each method.

  Proteins >150 kDa migrate more slowly, and require more time to transfer. If your protein of interest is in this size range, it may be necessary to use a Run Time of 8-10 minutes for your transfer.

  Small proteins <25 kDa migrate more rapidly during electrophoretic separation, and consequently require less time to transfer from the gel matrix to the membrane. If your protein of interest is in this size range, you may need to reduce the run time to 4-6 minutes for your transfer.

  Near-complete transfer of prestained standard protein bands is observed with the Power Blotter Select Transfer Device. However, note that the complete transfer of prestained protein standards does not indicate complete transfer of other proteins or blow-through of other proteins.

Transfer guidelines

For optimal results:

- Wear gloves at all times during the entire blotting procedure to prevent contamination of gels and membranes.
- Do not touch the membrane or gel with bare hands. This may contaminate the gel or membrane and interfere with further analysis. If you need to adjust the membrane, always use forceps.
- Avoid using expired Power Blotter Select Transfer Stacks. Always use the transfer stacks before the specified expiration date printed on the package.
- Remove air bubbles as indicated in the protocol using the Blotting Roller supplied with the device.
- Do not trim the membrane or Power Blotter Select Transfer Stacks to fit your gel size. Maintain the membrane size identical to the transfer stacks to avoid direct contact of gel with the anode surface.
- Gently close lid after assembling transfer stacks to ensure transfer stacks do not shift out of position.
- Wipe down instrument and contacts after every use.

Recommended gel types

Table 6 Gel types compatible with the Power Blotter System and consumables.

Gel Type	Size	System for Use
Midi gels • Novex™ Tris-Glycine Plus • NuPAGE™ Bis-Tris, Tris-Acetate, or Tris-Glycine, or equivalent midi gels	8.3 cm × 13.0 cm 1.0 mm thickness	Power Blotter Select Transfer Stack, regular size
		Power Blotter Pre-cut Membranes and Filters, regular size
Mini gels • Bolt™ Bis-Tris Plus • NuPAGE™ Bis-Tris, Tris-Acetate, Tricine, Tris-Glycine, or equivalent mini gels	8.0 cm × 8.0 cm 1.0 mm or 1.5 mm thickness	Power Blotter Select Transfer Stack, mini size
		Power Blotter Pre-cut Membranes and Filters, mini size

Transfer proteins

Transfer using Power Blotter Select Transfer Stacks

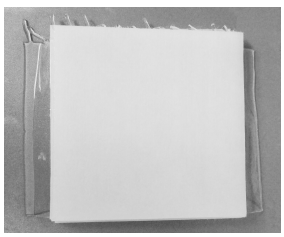
1. Press the power switch at the rear of the device to turn on the Power Blotter Station. The fan in the device will begin to run and the digital display turns on.
2. Open the lid of the Power Blotter Cassette by pressing the grey button and ensure the blotting surface is clean.
3. Unseal the Power Blotter Select Transfer Stack.
4. Separate the Top Cathode Stack and set it to one side of the bench.
5. Remove the Bottom Anode Stack from the tray using the tweezers and place the Bottom Stack in the center of the anode (bottom cassette). Discard the plastic tray.

   Note: In some instances, the membrane may adhere to the separator. Make sure that the membrane is not stuck to the separator before proceeding to the next step. If the membrane is stuck on the separator, use forceps to remove the membrane and place it on top of the Bottom Stack.

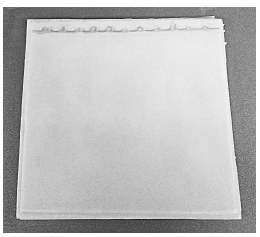
   Note: If transferring more than one gel, ensure there is a 1 cm space around all stack edges.
6. Ensure there are no bubbles between the membrane and the transfer stack. Remove any trapped air bubbles using the blotting roller.
7. Open the gel cassette and immerse the pre-run gel briefly in deionized water (5-15 seconds) to facilitate easy positioning of the gel on top of the transfer membrane.

   Note: Some gels can expand in size after electrophoresis and/or equilibration in water/transfer buffer. Ensure there is no overhang of the gel around the sides of the transfer stack as this can result in inconsistent transfer. Do not trim the sides of the stack but rather trim the gel fingers and sides of the gel.

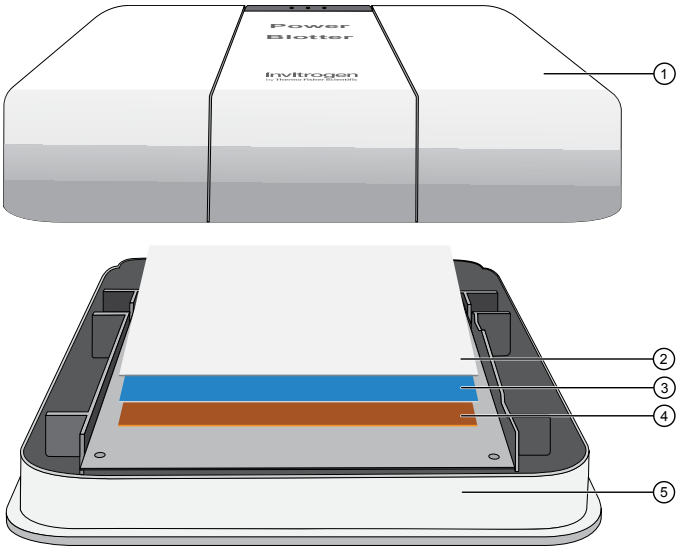
Incorrect stack



Correct stack



8. Gently shake off any excess water, then place the pre-run gel on the transfer membrane of the Bottom Anode Stack as described:
   - 1 midi gel on a Power Blotter Select Transfer Stack (regular size) OR
   - 2 mini gels (head-to-head) on a Power Blotter Select Transfer Stack (regular size) OR
   - 1 mini gel on a Power Blotter Select Transfer Stack (mini size)
9. Use the blotting roller to remove any air bubbles between the gel and the membrane.
10. Place the Top Cathode Stack (without the plastic separator) on the pre-run gel. Use the blotting roller to remove any air bubbles between the gel and Top Stack.
11. Place the cathode lid (top part of cassette) and gently press down the top of the cassette to lock into place. Perform blotting within 10-15 minutes of assembling the stacks with the gel.



① Cathode
② Transfer gel layer (cathode)
③ Gel
④ Transfer gel layer (anode) with membrane on top
⑤ Anode

12. Slide assembled cassette into the Power Blotter Station.
13. Touch **Pre-Programmed Methods** program from **Blotting Methods**.
14. Select a cassette size: Small Blot Cassette or Blot Cassette (Blotter Cassette XL).
15. Select the number of gels and the gel size to transfer.

16. Choose the appropriate method for transfer (constant parameters in **BOLD**).

Method	Constant	Default Run Time
Low MW (< 25kDa)	1.3 Amps	**5 minutes**
Mixed-Range MW (25-150 kDa)	1.3 Amps	**7 minutes**
High MW (>150 kDa)	1.3 Amps	**10 minutes**
Std Semi Dry	**25 volts**	**60 minutes**
1.5 mm thick gels or unknown gel sizes	1.3 Amps	**10 minutes**

Note: For fast-blotting programs (all programs except Std Semi Dry), Power Blotter Select Stacks transfer time may be increased to 11 minutes for extremely high-molecular weight proteins or for slow-transferring gels. **Do not use the Std Semi-Dry transfer program with Power Blotter Select Transfer Stacks.**

17. Touch **Start** to begin transfer.
The system signals the end of the transfer with repeated beeping sounds and a message on the display.

18. Upon transfer completion, pull the cassette out from the base, remove the transfer stack from the cassette(s), and thoroughly rinse the top and bottom section of the cassette.

Note: Rinse cassette(s) after every use. Build-up of buffer salts will reduce cassette function and prevent the cassette from properly opening and closing. Refer to cleaning instructions in "Disassemble the Select Transfer Stack" on page 20
.

WARNING! After running at high current, the anode and cathode plates can become hot. Use caution when separating the gels and stacks from the plates. When continuously processing multiple samples at ~5A for a maximum of 2 hours, allow the cassette to cool for 30 minutes or use multiple cassettes to avoid excessive cassette heating.

Disassemble the Select Transfer Stack

Note: To obtain good transfer and detection results, open the device and disassemble the stack within 30 minutes of ending the blotting procedure.

1. Pull out the cassette from the Power Blotter Station.

2. Press the grey button to open the cassette.

3. Carefully remove and discard the top transfer gel layer.

4. Carefully remove the gel and the transfer membrane from the stack and proceed with the blocking procedure or stain the membrane.

Note: If you are using PVDF membranes, place the membrane immediately into water, as PVDF membranes dry quickly. If the PVDF membrane has dried, re-wet the membrane with methanol and rinse with deionized water a few times before use. Transfer the membrane to the blocking or staining solution only after

ensuring that it is completely wet, as reactivating after the membrane is exposed to the blocking solution may be problematic.

5. Remove and discard the bottom transfer gel layer.

6. When performing several consecutive transfers, drain the cassette by tilting the cassette at the corner and wipe down the anode surface with a damp cloth or paper tissue to remove any excess liquid.
   The Power Blotter system is ready for another run with no cooling period required unless the system has been running continuously for 2 hours. After extended use, cool the cassette for 30 minutes.

7. When finished transferring, and before storage of the cassette(s), thoroughly wash the anode and cathode by rinsing the unassembled cassette under hot water while removing any residue with a gloved hand. Rinse with deionized water and stand parts in a rack to dry. For more thorough cleaning, immerse the unassembled cassette top (cathode) and bottom (anode) in hot water and use a gloved hand or clean sponge to remove salt residue. Rinse with deionized water and stand parts in a rack to dry.

IMPORTANT! Do not reuse the top or bottom of the Power Blotter Select Transfer Stack after blotting. Discard both after use.

Transfer using Power Blotter Pre-cut Membranes and Filter with 1-Step Transfer Buffer

1. Press the power switch at the rear of the device to turn on the Power Blotter Station. The fan in the device will begin to run and the digital display turns on.

2. After completion of electrophoresis, remove the gel from the cassette and briefly place in a tray containing deionized water or transfer buffer. This will ensure even wetting, facilitate proper gel placement, and improve gel contact with the membrane.

3. Dilute Power Blotter 1-Step Transfer Buffer (5X) to a 1X concentration using deionized water.

4. Open the lid of the Power Blotter Cassette by pressing the grey button and ensure the blotting surface is clean.

5. Open the boxes containing the membranes and filter papers and equilibrate in the pre-diluted Power Blotter 1-Step Transfer Buffer for a minimum of 5 minutes. Use a sufficient volume of buffer to cover filter papers and membrane [~50 mL per mini-size (7 cm × 8.4 cm) sandwich and ~100 mL per midi-size (8 cm × 13.5 cm) sandwich].

   Note: Four pieces of filter paper are required for each membrane. PVDF membrane must be wetted with methanol or ethanol before equilibration in 1X Power Blotter 1-Step Transfer Buffer.

6. Place 2 pre-wetted filter papers in the center of the bottom part of the cassette (anode).

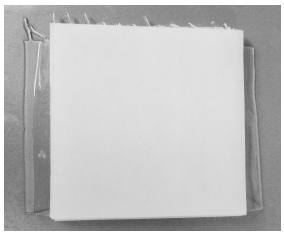
7. Place equilibrated membrane on top of the filter papers and remove any trapped air bubbles using the blotting roller. Removal of trapped air bubbles is essential for high-quality transfer. Ensure there are no bubbles between the membrane and the transfer stack.

8. Remove the gel from the cassette and immerse the pre-run gel briefly in deionized water (5-15 seconds) to facilitate easy positioning of the gel on top of the transfer membrane.

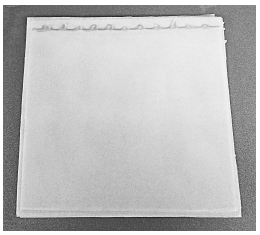
   Note: Do not leave gels in water for extended periods of time, as they can expand beyond the surface of the filter paper.

   Note: Some gels can expand in size after electrophoresis and/or extended period of time in water/transfer buffer. Ensure there is no overhang of the gel around the sides of the transfer stack as this can result in inconsistent transfer. Trim the gel fingers and sides of the gel to fit the size of the filter paper.

   Incorrect stack

   Correct stack

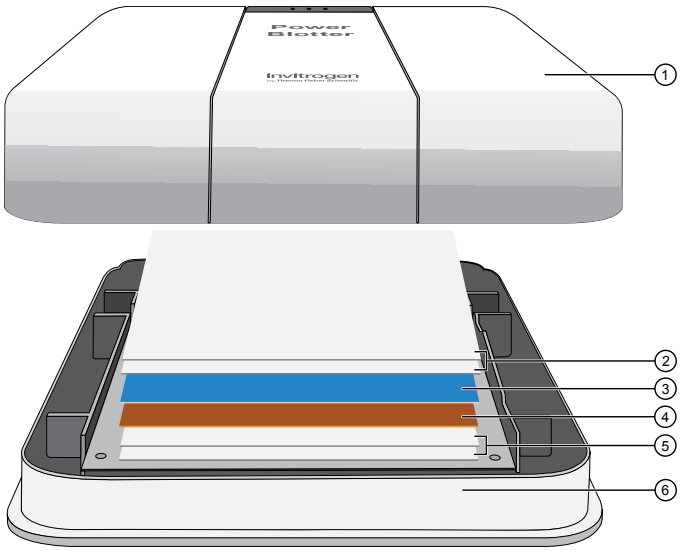
9. Shake off any excess water and place the pre-run gel on the transfer membrane.

10. Use the blotting roller to remove any air bubbles between the gel and the membrane.

11. Place 2 pre-wetted filter papers on top of the pre-run gel and use the blotting roller to remove any air bubbles between the gel and filter papers.

    Note: If transferring more than one gel, ensure there is a 1 cm space around all stack edges.

12. Place the cathode lid (top of cassette) on top of the anode (bottom portion of cassette) and gently press down on top of the cassette (cathode) to lock into place. Perform blotting within 10-15 minutes of assembling the stacks with the gel.



1. Cathode
2. 2 sheets of pre-wet filter paper (not to exceed 1.8 mm thickness)
3. Pre-run gel
4. Membrane
5. 2 sheets of pre-wet filter paper (not to exceed 1.8 mm thickness)
6. Anode

13. Slide assembled cassette into the Power Blotter Station.

14. Touch **Pre-Programmed Methods** program from **Blotting Methods**.

15. Select a cassette size: Small Blot Cassette or Blot Cassette.

16. Select the number of gels and the gel size to transfer.

17. Choose the appropriate method for transfer (constant parameters in **BOLD**).

Method	Constant	Default Run Time
Low MW (<25 kDa)	1.3 Amps	**5 minutes**
Mixed-Range MW (25-150 kDa)	1.3 Amps	**7 minutes**
High MW (>150 kDa)	1.3 Amps	**10 minutes**
Std Semi Dry	**25 volts**	**60 minutes**
1.5 mm thick gels or unknown gel sizes	1.3 Amps	**10 minutes**

Note: For fast-blotting programs (all programs except Std Semi Dry), Power Blotter transfer time may be increased to 12 minutes for extremely high-molecular weight proteins or for slow-transferring gels. **Do not use the Std Semi-Dry transfer program with Power Blotter 1-Step Transfer Buffer.**

18. Touch **Start** to begin transfer.
    The system signals the end of the transfer with repeated beeping sounds and a message on the display.

19. Upon transfer completion, remove the transfer stack from the cassette(s) and thoroughly rinse the top and bottom section of the cassette.

    Note: **Rinse cassette(s) after every use**. Build-up of buffer salts will reduce cassette function and prevent the cassette from properly opening and closing. Refer to cleaning instructions in "Disassemble the pre-cut membrane and filter stack" on page 24.

> ⚠ **WARNING!** After running at high current, the anode and cathode plates can become hot. Use caution when separating the gels and stacks from the plates. When continuously processing multiple samples at ~5A for a maximum of 2 hours, allow the cassette to cool for 30 minutes or use multiple cassettes to avoid excessive cassette heating.

Disassemble the pre-cut membrane and filter stack

Note: To obtain good transfer and detection results, open the device and disassemble the stack within 30 minutes of ending the blotting procedure.

1. Pull out the cassette from the Power Blotter Station.

2. Press the grey button to open the cassette.

3. Carefully remove and discard the 2 top filter papers.

4. Carefully remove the gel and the transfer membrane from the stack and proceed with the blocking procedure or stain the membrane.

   Note: If you are using PVDF membranes, place the membrane immediately into water, as PVDF membranes dry quickly. If the PVDF membrane has dried, re-wet the membrane with methanol and rinse with deionized water a few times before use. Transfer the membrane to the blocking or staining solution only after ensuring that it is completely wet, as reactivating after the membrane is exposed to the blocking solution may be problematic.

5. Remove and discard the 2 bottom filter papers.

6. When performing several consecutive transfers, drain the cassette by tilting the cassette at the corner and wipe down the anode surface with a damp cloth or paper tissue to remove any excess liquid.
   The Power Blotter system is ready for another run with no cooling period required unless the system has been running continuously for 2 hours. After extended use, cool the cassette for 30 minutes.

7. When finished transferring, and before storage of the cassette(s), thoroughly wash the anode and cathode by rinsing the unassembled cassette under hot water while removing any residue with a gloved hand. Rinse with deionized water and stand parts in a rack to dry. For more thorough cleaning, immerse the unassembled cassette top (cathode) and bottom (anode) in hot water and use a gloved hand or clean sponge to remove salt residue. Rinse with deionized water and stand parts in a rack to dry.

Transfer analysis

After a transfer, proceed with immunodetection, store the membrane for future use, or stain the membrane.

- For immunodetection of proteins, use chemiluminescent immunodetection kits available at thermofisher.com.
- To store nitrocellulose membranes, air-dry the membrane and store the membrane in an air-tight plastic bag at room temperature or 4°C. Low temperatures cause nitrocellulose to become brittle, so avoid storing nitrocellulose at temperatures below -20°C.
- To store PVDF membranes, air-dry the membrane and store the membrane in an air-tight plastic bag at room temperature, 4°C, or -80°C. When you are ready to use the membrane, re-wet the membrane with methanol for a few seconds, then rinse the membrane thoroughly with deionized water to remove methanol.
- To stain membranes after blotting, use any method of staining for total protein visualization, such as Coomassie Blue R-250, Ponceau S, Amido Black, Novex™ Reversible Membrane Protein Stain Kit, Pierce Reversible Protein Stain or SYPRO™ Ruby Blot Stain. The Power Blotter System blotting protocol is compatible with most of the staining methods listed above.

  Note: The sensitivity of total protein membrane staining after blotting with the Power Blotter System is slightly lower than the total membrane protein staining obtained with the wet transfer protocol.
- If you do not detect any proteins on the membrane after immunodetection or staining, refer to Troubleshooting section. Refer to the manufacturer recommendations for optimizing immunodetection.
- The immunodetection profile of proteins transferred using the Power Blotter System may differ from what is observed when using other transfer methods, such as traditional wet blotting systems. It is recommended to optimize parameters such as gel protein load, primary and secondary antibody dilution, and exposure time when using the Power Blotter System for the first time with any new combination of antigen and detection reagents.

Use custom methods

Customize pre-programmed blotting methods

Pre-programmed methods can be modified to fit custom applications.

1. Before touching **Start**, touch **Modify**.
2. Touch **Select Constant (V or A)** to toggle the constant variable parameter from amps to volts or volts to amps.
3. Highlight the variable for change and press the up or down arrows to raise or lower the variable value.
4. Touch **Done**.
5. Select to run your modified method 1 time or save it for future use:

Option	Procedure
Run Without Saving	1. Touch Run Without Saving. 2. Touch Start.
Save	1. Touch Save. 2. Using the keypad, enter up to 15 characters to name the new method. 3. Touch Done. 4. Touch Start. **Note:** The custom method is now saved in the Custom Methods option.

Create a custom method

1. Touch **Custom Method** on the main menu.
2. Touch **Create Method ▸ Select Constant (V or A)** and toggle the constant variable from amps to volts or volts to amps.
3. Highlight the variable for change and press the up or down arrows to raise or lower the variable value.
4. Touch **Done**.

5. Select to run your modified method 1 time or save it for future use:

Option	Procedure
Run Without Saving	1. Touch **Run Without Saving**. 2. Touch **Start**.
Save	1. Touch **Save**. 2. Using the keypad, enter up to 15 characters to name the new method. 3. Touch **Done**. 4. Touch **Start**. **Note:** The custom method is now saved in the **Custom Methods** option.

Maximum watt-hour limit

To prevent damage to the cassette or control unit, custom methods are limited to **25 watt-hours** when modifying pre-programmed methods and/or creating a new method. Any voltage or amperage adjustments that result in exceeding the maximum 25 watt-hours will bring up an alert ⚠ on the up arrow key. Continuing past this value will eventually result in a **Watt-Hour Limit Reached** warning.

Watt-hours are calculated using the formula Volts (V) × Amps (A) × Time (hours).

For example, if:

V = 25

A = 5.0

T = 12.5 minutes / 60 minutes (to convert to hours) = 0.21 (12:30 converted to 12.5 for calculation)

Watt-hours = (25 V) × (5.0 A) × (0.21) = 26.25

The 26.25 watt-hours exceed the 25 watt-hours limit, so the warning window will appear.

If the **Watt-Hour Limit Reached** warning window appears, touch **Okay** to return to the previous screen and decrease the appropriate value (V, A or T) to return to a watt-hour value less than 25 watt-hours.

Power Blotter Select Transfer Stacks are intended to rapidly transfer protein from gel to membrane using a high transfer current (based on transfer area) and a short time (5-11 minutes).

- Do not exceed 12-minute transfer times with rapid transfer protocols.
- Do not exceed 22-23 mA/cm^2 (current/surface area) with rapid transfer protocols.

Conventional transfer buffers such as Towbin buffer
(25mM Tris, 192mM glycine, 20% methanol) are low-ionic strength buffers with transfer times ranging from 30-60 minutes. Current normally spikes and then quickly drops to a very low level, while voltage reaches its maximum (25 volts).

Troubleshooting

Observation	Possible cause	Recommended action
No stack detected.	Plastic separator was not removed.	Make sure the plastic separator is removed from the stack.
All pre-stained molecular weight markers were not transferred out of the gel.	Loading excess pre-stained molecular weight markers (i.e., more than recommended by manufacturer) resulted in a portion of the markers remaining in the gel after transfer.	Use an appropriate amount of pre-stained markers. It is normal for some protein not to transfer out of the gel, however sufficient proteins will be transferred for Western blotting. Even if some MW markers are left in the gel, proceed with the Western blot. Western blot sensitivity is the best indicator of transfer efficiency.
Poor detection of high molecular weight proteins.	Insufficient transfer time or inappropriate gel type was used (e.g., 4-20% Tris-glycine gradient gels are not recommended for proteins > 200 kDa.)	Increase transfer time using the High Molecular Weight Pre-Programmed Method (10-12 minutes). Use an appropriate gel type and percentage for electrophoresis of high-molecular weight proteins. Use low-percentage, non-gradient polyacrylamide gels (4%, 6%, or 8% Tris-glycine gels or 3-8% gradient or 7% non-gradient Tris-acetate gels).
High molecular weight proteins remain in the gel.	Incorrect method or transfer conditions were used. **Note:** It is normal for some proteins to remain in the gel because some high molecular weight proteins do not transfer completely using the Power Blotter System compared to a wet tank transfer apparatus.	Increase transfer time using the High Molecular Weight Pre-Programmed Method (10-12 minutes).
		Use a Tris-acetate gel to separate the high molecular weight proteins.
		Increase the transfer time in 30-second increments. Do not exceed 12 minutes if using Power Blotter Select Transfer stacks or 1-Step Transfer Buffer.
Cassette is difficult to open.	Salt deposited on moving parts inside cassette.	Rinse or immerse the unassembled cassette top and bottom in warm water while removing any sticky salt residue with a gloved hand. Rinse with deionized water and place perpendicular in a rack to dry. **Note:** Failure to keep cassette top (cathode) and bottom (anode) clean will result in the moving parts sticking, leading to poor transfer efficiency.
Inconsistent transfer.	Used an insufficient transfer time.	(Select stack) Increase transfer time from 5-7 minutes to 8-11 minutes.
		Increase transfer time from 5-10 minutes to 7-12 minutes.

Observation	Possible cause	Recommended action
Inconsistent transfer.	Membrane or filter paper was insufficiently equilibrated in 1-Step Transfer Buffer.	(Pre-cut membranes) Equilibrate membrane and filter paper in 1-Step Transfer Buffer before transfer for a minimum of 5 minutes. Use a sufficient amount of buffer for the equilibration step.
	Used an incorrect transfer buffer.	(Pre-cut membranes) Only use 1-Step Transfer Buffer for rapid transfer with pre-cut membranes.
	Filter paper and membrane were not cut to the same size as the gel.	Cut the filter paper and membrane to the same size as the gel. Ensure there is no overhang around the sides of the transfer stack.
	PVDF membrane was not pre-wetted with methanol or ethanol.	Wet PVDF membrane with methanol or ethanol and equilibrate for 10-15 minutes in 1-Step Transfer Buffer before transfer (Power Blotter Select stacks do not need to be pre-wetted with methanol or ethanol).
	Air bubbles were trapped between the gel and membrane.	When assembling transfer stack, use a roller or pipette to remove any air bubbles between the gel and the membrane.
	Filter paper used in the fast transfer exceeded 1.8 mm thickness	Use filter paper <1.8 mm thick.
Markers and proteins blow through.	Transfer time was too long.	Reduce transfer time by 30-second increments. **Note:** Pre-stained markers are charged and tend to blow through more than regular proteins.
Empty spots on the membrane.	Air bubbles were present between the gel and the membrane preventing protein transfer.	Be sure to remove all air bubbles between the gel and membrane using the blotting roller.
	Expired or creased membranes were used.	Use the Power Blotter Select Transfer Stacks before the expiration date printed on the package.
Inefficient transfer of low-molecular weight proteins to PVDF.	Some low-molecular weight proteins (<25 kDa) inefficiently bound to the PVDF membrane.	Equilibration of the gel in 20% ethanol for 5-10 minutes prior to transfer may increase overall protein transfer efficiency.
		Combine ethanol and 1-Step Transfer Buffer (1X) in a 15:85 ratio before equilibrating filter paper and membrane (e.g., 15 mL of ethanol with 85 mL of 1-Step Transfer Buffer (1X)).
Protein not binding/transferring to PVDF membrane.	PVDF membrane was dry/partially dry.	Regions where PVDF membranes are dry appear whiter than places where the membrane is wet. Remove the membrane, reactivate in 100% methanol, and rinse in water before reapplying to the transfer stack.

Instrument specifications and requirements

Instrument dimensions and specifications

The Power Blotter Station requires a stable laboratory bench or table. Provide a minimum clearance of 3 in. (7.62 cm) at the rear of the Power Blotter Station to allow for adequate ventilation for cooling and access to the power cord and switch. In addition, allow sufficient space at the front for docking and removing the cassettes from the control unit.

Table 7 Power Blotter Station dimensions.

Product	Dimensions (w × d × h)
Power Blotter Station	6.4 × 11.0 × 6.5 in. (16.4 × 28.0 × 16.5 cm)
Power Blotter Cassette	6.4 × 10 × 1.4 in. (16.4 × 25.3 × 3.5 cm)
Power Blotter XL Cassette	10.1 × 11 × 1.4 in. (25.7 × 27.8 × 3.5 cm)

Electrical requirements

WARNING! Power Blotter Station use outside of the workflows described in this manual may put the operator at risk of dangerous exposure to electrical shock. Do not use this instrument for any purposes or in any configurations not described in this manual.

WARNING! Do not overfill cassettes with liquid. Excess liquid can overflow into the control unit and possibly cause electric shock. Follow the appropriate instructions for reagent amounts and empty any remaining liquid in the cassette upon run completion.

WARNING! For safety, the power outlet used for powering the instrument must be accessible at all times. In case of emergency, you must be able to immediately disconnect the main power supply to the instrument. Allow adequate space between the wall and the equipment so the power cord can be disconnected in case of emergency.

System electrical requirements:

- Electric receptacle with grounding capability
- Maximum power dissipation: ~168 W (not including computer and monitor)
- Mains AC line voltage tolerances must be up to ±10 percent of nominal voltage

Device	Rated voltage	Circuit required	Rated frequency	Rated power
Power Blotter Station	100–240 ±10% VAC[1]	10 A	50/60 Hz	168 W

[1] If the supplied power fluctuates beyond the rated voltage, a power line regulator may be required. High or low voltages can adversely affect the electronic components of the instrument.

Environmental requirements

Table 8 Environmental requirements

Condition	Acceptable range
Installation site	Indoor use only
Electromagnetic interference	Do not use this device in close proximity to sources of strong electromagnetic radiation (for example, unshielded intentional RF sources). Strong electromagnetic radiation may interfere with the proper operation of the device.
Altitude	Between sea level and 2,000 m (6,500 ft.) above sea level
Operating conditions	• Humidity: 15–80% relative humidity (non-condensing) • Temperature: 15 to 30°C (59 to 86°F) **Note:** For optimal performance, avoid rapid or extreme fluctuations in room temperature.
Storage and transport conditions	• Humidity: 20–80% relative humidity (non-condensing) • Temperature: –40 to 50°C (–40 to 122°F)
Thermal output	During operation, the net thermal output, based on the actual current draw of the instrument, is expected to be approximately 125 W (427 Btu/h).
Vibration	Ensure that the instrument is not adjacent to strong vibration sources, such as a centrifuge, pump, or compressor. Excessive vibration will affect instrument performance.

Condition	Acceptable range
Pollution degree	The instrument has a Pollution Degree rating of II. The instrument may only be installed in an environment that has nonconductive pollutants such as dust particles or wood chips. Typical environments with a Pollution Degree II rating are laboratories and sales and commercial areas. The noise output of the instrument is ≤ 55 dB(A) when running.
Other conditions	Ensure the instrument is located away from any vents that could expel particulate material onto the instrument components. Avoid placing the instrument and computer adjacent to heaters, cooling ducts, or in direct sunlight.

A

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, etc). 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
	Caution, hot surface	Attention, surface chaude
	Potential biohazard	Danger biologique potentiel

Symbol	English	Français
	Protective conductor terminal (main ground)	Borne de conducteur de protection (mise à la terre principale)
	Do not dispose of this product in unsorted municipal waste  **CAUTION!** 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.	Ne pas éliminer ce produit avec les déchets usuels non soumis au tri sélectif.  **MISE EN GARDE!** 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.

Safety information for instruments not manufactured by Thermo Fisher Scientific

Some of the accessories provided as part of the instrument system are not designed or built by Thermo Fisher Scientific. Consult the manufacturer's documentation for the information needed for the safe use of these products.

Instrument safety

General

CAUTION! Do not remove instrument protective covers. 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 and Lifting Injury. Improper lifting can cause painful and permanent back injury.

Things to consider before lifting or moving the instrument or accessories:

- Depending on the weight, moving or lifting may require two or more persons.
- If you decide to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques.
- Ensure you have a secure, comfortable grip on the instrument or accessory.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time. Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- For smaller packages, rather than lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone else slides the contents out of the box.

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

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.

Safety and electromagnetic compatibility (EMC) standards

The instrument design and manufacture complies with the standards and requirements for safety and electromagnetic compatibility as noted in the following table:

Safety compliance

Reference	Description
EU Directive 2014/35/EU	European Union "Low Voltage Directive"
IEC 61010-1 EN 61010-1 UL 61010-1 CSA C22.2 No. 61010-1	*Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-2-010 EN 61010-2-010	*Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials*

EMC

Reference	Description
Directive 2014/30/EU	European Union "EMC Directive"
EN 61326-1	*Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements – Part 1: General Requirements*
FCC Part 18 (47 CFR)	U.S. Standard "Industrial, Scientific, and Medical Equipment"
AS/NZS 2064	*Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radiofrequency Equipment*
ICES-001, Issue 3	*Industrial, Scientific and Medical (ISM) Radio Frequency Generators*
FCC Part 15 Subpart B (47 CFR)	*U.S. Standard Radio Frequency Devices*

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Environmental design

Reference	Description
Directive 2012/19/EU	European Union "WEEE Directive"—Waste electrical and electronic equipment
Directive 2011/65/EU	European Union "RoHS Directive"—Restriction of hazardous substances in electrical and electronic equipment
MII Order #39	PRC "Management Methods for Controlling Pollution by Electronic Information Products"
Decree No. 32	China RoHS-Measures for the Administration of Restricted Use of Hazardous Substances in Electrical and Electronic Products

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.

WARNING! HAZARDOUS WASTE (from instruments). Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.

Biological hazard safety

WARNING! Potential Biohazard. Depending on the samples used on this instrument, the surface may be considered a biohazard. Use appropriate decontamination methods when working with biohazards.

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:
  www.cdc.gov/biosafety/publications/bmbl5/BMBL.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

Documentation and support

Customer and technical support

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- Product documentation, including:
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

    Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

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 found on Life Technologies' website at **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**.