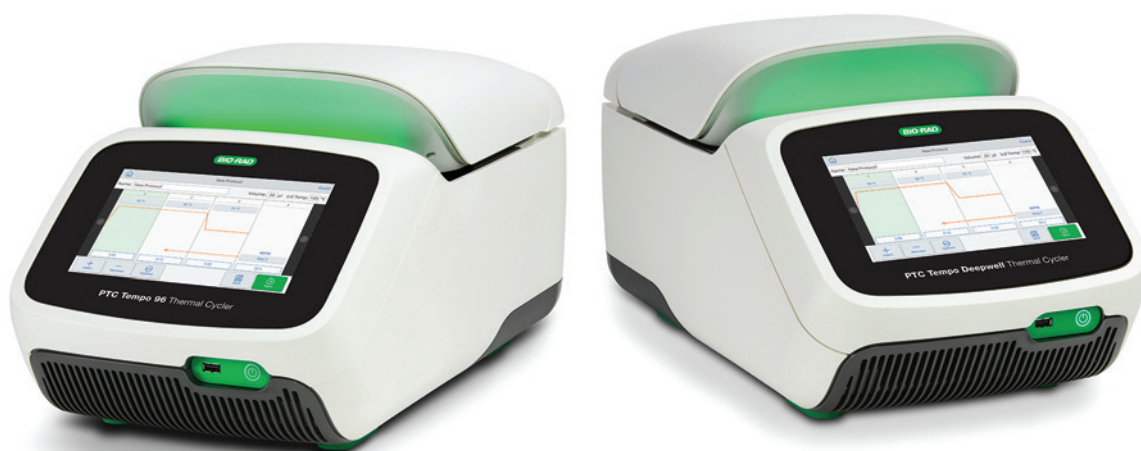


PTC Tempo Thermal Cycler

Instrument Guide

Catalog #12015382
#12015392



BIO-RAD

PTC Tempo Thermal Cycler

Instrument Guide

For Research Use Only



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<http://bio-rad.com/PTCTempo-opensource>

To view the OPEN LICENSES

1. On the Home screen, tap Tools and then tap About.
2. On the About screen, select Legal Notices in the System section.

Revision History

Document	Date	Description of Change
PTC Tempo Thermal Cycler Instrument Guide (Doc ID #10000145169)	December 2022	Initial Release

Table of Contents

Revision History	iii
Safety and Regulatory Compliance	9
Safety Warning Labels	9
Safety and Regulatory Compliance	11
Safety Compliance	11
Electromagnetic Compatibility (EMC)	12
EMC Warnings and Notes	12
Environment Requirements	14
Hazards	15
Biohazards	15
Chemical Hazards	16
Explosive or Flammability Hazards	16
Electrical Hazards	17
Transport	17
Battery	17
Disposal	17
Chapter 1 Introduction	19
Main Features	19
Performance Specifications	21
Reaction Module Performance Specifications	21
Finding Out More	22
Chapter 2 Setting Up the PTC Tempo Thermal Cyclers	23
Site Requirements	23
PTC Tempo Thermal Cyclers Dimensions	23
Power Requirements	24
Network Requirements	25
System Overview	26
Front View (96-Well and Deepwell)	26

Back View	28
Unpacking the Thermal Cycler	29
Shipping Container Specifications for Single Block PTC Tempo Thermal Cyclers	30
Unpacking the Thermal Cycler	30
Connecting the Power and Communication Cables	34
Logging In to the PTC Tempo Thermal Cycler	35
Starting the PTC Tempo Thermal Cycler	36
Creating PTC Tempo Thermal Cycler User Accounts	37
Logging In to the PTC Tempo Thermal Cycler	39
Loading the Sample Block	40
Shutting Down the PTC Tempo Thermal Cycler	42
Chapter 3 Configuring the PTC Tempo Thermal Cycler	43
Touch Screen Overview	44
Software Files	46
Tools Screen	47
User Tools Screen Options	47
Admin Tools Screen Options	49
Renaming the PTC Tempo Thermal Cycler	51
Setting the Time Zone on the PTC Tempo Thermal Cycler	52
Enabling the Diagnostic Port on the PTC Tempo Thermal Cycler	54
Setting Up a Network Connection on the PTC Tempo Thermal Cycler	56
Setting Up a Wireless Connection	58
Managing Personal User Accounts	61
Setting User Passwords	61
Setting Up a Connection to a Shared Network Drive	62
Connecting to Your Bio-Rad BR.io Account	65
Managing User Accounts	68
Setting the Admin Password	68
Changing User Settings	70
Changing a User's Role	72
Resetting User Passwords	73
Creating User Accounts	74
Deleting User Accounts	75

Chapter 4 Creating Protocols	77
Parameters and Ranges for Protocol Steps	78
Creating a Protocol	80
Modifying the Settings in a Protocol Step	85
Changing Target Temperature and Hold Time	85
Adding or Removing a Temperature Gradient	87
Adding or Removing the Ramp Rate	88
Adding or Removing a Temperature Increment	89
Adding or Removing an Extend Time Option	90
Adding or Removing a Beep Alert	90
Changing Parameters in a GOTO Step	91
Setting Sample Volume and Lid Temperature	92
Sample Volume and Temperature Control Modes	92
Lid Temperature	93
Editing a Protocol	94
Chapter 5 Running Protocols	95
Running a Protocol	96
Running a New Protocol	96
Running a Saved Protocol	96
Running a Protocol from Your BR.io Cloud Account	100
Running a Completed PTC Tempo Thermal Cycler Protocol from its Run Report	102
Monitoring a Run	104
Pausing a Run	105
Skipping Steps in a Protocol	105
Stopping a Run	106
Incubating Samples	106
Chapter 6 Managing Files	109
The Protocol Browser Screen	109
Managing Files	111
Managing Files on the PTC Tempo Thermal Cycler	112
Backing Up and Restoring Files	114
File Storage	115
Exporting Run Reports	115

Recovering Files	115
Appendix A Catalog Numbers for PTC Tempo Thermal Cyclers and Accessories	119
Instruments and Accessories	119
Appendix B Recommended Plastic Consumables	121
Recommended Plastic Consumables for PTC Tempo Thermal Cyclers	121
Plastic Consumables for PTC Tempo 96 Thermal Cyclers	121
Plastic Consumables for PTC Tempo Deepwell Thermal Cyclers	122
Plate Seals and Plate Sealer	122
Appendix C Maintenance and Troubleshooting	123
Cleaning and Maintaining the PTC Tempo Thermal Cyclers	123
Returning the PTC Tempo Thermal Cyclers to Bio-Rad	128
Maintaining Sufficient Air Flow	129
Testing for Sufficient Air Flow	129
Fixing Insufficient Air Flow	129
Replacing Fuses	130
Upgrading Software and Firmware on PTC Tempo Thermal Cyclers	134
Shutting Down the PTC Tempo Thermal Cyclers	137
Troubleshooting PTC Tempo Thermal Cyclers	138
Recovering Files	138
Viewing and Exporting Log Files	139
Manually Opening the Automated Lid	141
Troubleshooting Issues	142
Appendix D Bio-Rad Free and Open-Source Notices for PCR Products	143
Appendix E References	145

Safety and Regulatory Compliance

Bio-Rad's PTC Tempo Thermal Cyclers (known in this guide as the PTC Tempo thermal cycler) heat and cool very quickly during operation. Bio-Rad strongly recommends that you follow the safety specifications listed in this chapter and throughout this guide.

Note: Use only Bio-Rad-supplied Ethernet cables and power cords when using the PTC Tempo thermal cycler.

Safety Warning Labels

Warning labels posted on the PTC Tempo thermal cycler and in this manual inform you of sources of injury or harm. [Table 1](#) defines each safety warning label.

Table 1. General safety warnings








Icon	Meaning
	Operating the PTC Tempo thermal cycler before reading this manual can constitute a personal injury hazard. The use of this instrument in a manner not specified in this manual or by Bio-Rad may result in the protection features of the instrument becoming impaired or disabled.
 	There are no biohazards or radioactive hazards associated with the PTC Tempo thermal cycler itself. These hazards only become a concern when they are introduced into the system via the samples being tested. When handling biohazardous or radioactive samples, adhere to the recommended precautions and guidelines specific to your laboratory and location. These guidelines should include cleaning, monitoring, and disposal methods for the hazardous materials you are using.
	In addition, as identified above, there is a small risk of explosion, or of expulsion of liquids or vapors from the sample containers. When working with hazardous materials the risk of injury from expelled material is compounded with the risk that the hazardous material themselves could be dispersed in and around the instrument. Users should take appropriate precautions for such a situation.

Table 1. General safety warnings, continued

Icon	Meaning
	<p>The PTC Tempo thermal cyclers operate at temperatures high enough to cause serious burns. Always allow the sample block to return to room temperature before opening the lid and removing samples. Even after the sample block has cooled, the surrounding areas as well as the heater plate can remain hot for quite some time. In situations where there is not sufficient time to allow the instrument to cool, the use of protective equipment such as thermal gloves or “oven mitts” is recommended.</p>
	<p>The safety and performance of any system incorporating a PTC Tempo thermal cycler is solely the responsibility of the assembler of the system.</p>
	<p>The PTC Tempo thermal cycler can become hot enough during the course of normal operation to cause liquids in the samples to boil or vaporize, pressurizing the sample containers. There is the possibility that the sample containers could fail, leading to leaks, fluid spray, or explosive rupture and expelling vapors or liquids in and around the instrument.</p> <p>Users should always operate the instrument with the lid closed or wear safety goggles, thermal gloves, and other personal protection equipment during operation to avoid injury. Opening the instrument while samples are still hot, such as after aborting a run, can allow pressurized containers to leak, spray, or spurt liquid. Always allow the samples to cool before opening the lid.</p> <p>Users should never run a reaction with a lid or seal that is open, loose, punctured, or otherwise damaged because it will increase the likelihood of a dangerous rupture or explosion.</p> <p>Users should never run a reaction with volatile reagents that could increase the likelihood of a dangerous rupture or explosion.</p>

Safety and Regulatory Compliance

Safety Compliance

The PTC Tempo thermal cycler has been tested and found to be in compliance with all applicable requirements of the following safety and electromagnetic standards:

- IEC 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements
- IEC 61010-2-010:2019 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-010: Particular requirements for laboratory equipment for the heating of materials
- IEC 61010-2-081:2019 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes

- CAN/CSA-C22.2 NO. 61010-1-12:2018 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General Requirements
- CAN/CSA-C22.2 NO. 61010-2-010:19 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 2-010: Particular requirements for laboratory equipment for the heating of materials
- CAN/CSA-C22.2 NO. 61010-2-081:19 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes

- EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements
- EN 61010-2-010:2014 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-010: Particular requirements for laboratory equipment for the heating of materials
- EN 61010-2-081:2015 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes

- UL 61010-1:2012 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 1: General Requirements
- UL 61010-2-010:2019 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-010: Particular requirements for laboratory equipment for the heating of materials
- UL 61010-2-081:2019 Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes

Electromagnetic Compatibility (EMC)

The PTC Tempo thermal cycler has been tested and found to be in compliance with all applicable requirements of the following electromagnetic compatibility standards:

- IEC 61326-1:2020 Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements. Tested as a Class A device
- EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements. Tested as a Class A device
- FCC Part 15, Subpart B, Sections 15.107 and 15.109. Tested as a Class A digital device
- CAN ICES-003v6:2019 Interference-causing equipment standard, information technology equipment (including digital apparatus) — Limits and methods of measurement. Tested to Class A limits

EMC Warnings and Notes

- **Warning:** Changes or modifications to this unit, not expressly approved by Bio-Rad, could void the user's authority to operate the equipment.
- **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 their own expense.
- **Note regarding FCC compliance:** Although this instrument has been tested and found to comply with Part 15, Subpart B of the FCC Rules for a Class A digital device, please note that this

compliance is voluntary, for the instrument qualifies as an “exempted device” under 47 CFR 15.103(c), in regard to the cited FCC regulations in effect at the time of manufacture.

- **Note regarding cables:** This instrument was tested for EMC compliance with the USB cables supplied with the instrument. These cables, or Bio-Rad authorized replacements, must be used with this instrument to ensure continued compliance with the EMC emissions limits.

Environment Requirements

The PTC Tempo thermal cycler has been designed to be safely operated under the environmental conditions listed in the following table.

Table 2. PTC Tempo Thermal Cycler environment requirements

Parameter	Specification
Environment	Indoor use only
Operating altitude	Up to 2,000 meters above sea level
Ambient room temperature	15–31°C* 59–88°F
Transport and storage temperature	–20° to 60°C** –4 to 140°F
Relative humidity	20% to 80% (noncondensing)***
Operating power	100 to 240 VAC, 50/60 Hz, 850 W Max
Mains supply voltage fluctuation	±10%
Maximum power usage	<850 watts
Fuses	10 A, 250 V, 5 x 20 mm, fast blow (qty. 2)
Overvoltage category	II
Pollution degree	2

* Operating the instrument outside of this temperature range may not meet performance specifications. A room temperature between 5–40°C (41–104°F) is considered safe.

** Store and transport the instrument in its shipping container to meet these temperature conditions.

*** Operating the instrument at 4°C should be limited to 18 hours at these conditions. Holds at 4°C can be performed for up to 72 hours if humidity is 20% to 60% (noncondensing).

Hazards

The PTC Tempo thermal cycler is designed to operate safely when used in the manner prescribed by the manufacturer. If the thermal cycler or any of its associated components is used in a manner not specified by the manufacturer, the inherent protection provided by the instrument may be impaired. Bio-Rad is not liable for any injury or damage caused by the use of this equipment in any unspecified manner, or by modifications to the instrument not performed by Bio-Rad or an authorized agent. Service of the PTC Tempo thermal cycler should be performed only by trained Bio-Rad personnel.

Biohazards

The PTC Tempo thermal cycler is a laboratory product. However, if biohazardous samples are present, adhere to the following guidelines and comply with any local guidelines specific to your laboratory and location.

Note: No biohazardous substances are exhausted during normal operations of this instrument.

General Precautions

- Always wear a laboratory coat, laboratory gloves, and safety glasses with side shields or goggles.
- Keep your hands away from your mouth, nose, and eyes.
- Completely protect any cut or abrasion before working with potentially infectious materials.
- Wash your hands thoroughly with soap and water after working with any potentially infectious material before leaving the laboratory.
- Remove wristwatches and jewelry before working at the bench.
- Store all infectious or potentially infectious material in unbreakable leak-proof containers.
- Before leaving the laboratory, remove protective clothing.
- Do not use a gloved hand to write, answer the telephone, turn on a light switch, or touch anything that other people may touch without gloves.
- Change gloves frequently. Remove gloves immediately when they are visibly contaminated.
- Do not expose materials that cannot be properly decontaminated to potentially infectious material.
- Upon completion of an operation involving biohazardous material, decontaminate the work area with an appropriate disinfectant (for example, a 1:10 dilution of household bleach).

Surface Decontamination



WARNING! To prevent electrical shock, always turn off and unplug the instrument prior to performing decontamination procedures.

The following areas can be cleaned with any hospital-grade bactericide, virucide, or fungicide disinfectant:

- Outer lid and chassis
- Inner sample block surface and sample block wells
- Control panel and display

To prepare and apply the disinfectant, refer to the instructions provided by the product manufacturer. Always rinse the sample block and sample block wells several times with water after applying a disinfectant. Thoroughly dry the sample block and sample block wells after rinsing with water.

Important: Do not use abrasive or corrosive detergents or strong alkaline solutions. These agents can scratch surfaces and damage the sample block, resulting in loss of precise thermal control.

Disposal of Biohazardous Material

Dispose of the following potentially contaminated materials in accordance with laboratory local, regional, and national regulations:

- Clinical samples
- Reagents
- Used reaction vessels or other consumables that may be contaminated

Chemical Hazards

The PTC Tempo thermal cycler contains no potentially hazardous chemical materials.

Explosive or Flammability Hazards

The PTC Tempo thermal cycler poses no uncommon hazard related to flammability or explosion when used in a proper manner as specified by Bio-Rad Laboratories.

Electrical Hazards

The PTC Tempo thermal cyclers poses no uncommon electrical hazard to operators if installed and operated properly without physical modification and connected to a power source of proper specification.

Transport

Before moving or shipping the PTC Tempo thermal cycler, decontamination procedures must be performed. Always move or ship the thermal cycler in a separate container in the Bio-Rad-supplied packaging material, which protects the system from damage.

For information about transporting the thermal cycler and to request the appropriate packaging material, contact your local Bio-Rad office.

Battery

The PTC Tempo thermal cycler uses one 3 V lithium-metal coin cell battery to maintain time settings in the event of AC power loss. If the time does not remain set after the unit is turned off, it may be an indication that the batteries are getting weak.



WARNING! Do not attempt to change the batteries. They are not user serviceable. Instead, contact Bio-Rad Technical Support for assistance.

Disposal

The PTC Tempo thermal cyclers contain electrical materials; they should not be disposed of as unsorted waste and must be collected separately, according to European Union Directive 2012/19/EU on waste electrical and electronic equipment — WEEE Directive. Before disposal, contact your local Bio-Rad representative for country-specific instructions.

Chapter 1 Introduction

The PTC Tempo Thermal Cyclers (known in this guide as the PTC Tempo thermal cycler) are thermal cyclers with an integrated 96-well or 96-well large volume sample block, depending on the thermal cycler.

Thermal cyclers are essential laboratory equipment for laboratories that run polymerase chain reaction (PCR) for sequencing, cloning, mutagenesis, and many other applications. The fully adjustable heated lid supports a wide range of vessels and sealers, including low-profile and standard-height PCR plates.

This guide explains how to set up and use the PTC Tempo thermal cycler to perform PCR experiments, manage users, and connect to external data storage on the network and to BR.io, the cloud application from Bio-Rad.

Important: Cybersecurity is the protection of assets in cyberspace from cyberattacks.

Cybersecurity is Bio-Rad's ability to secure its people, information, systems, and reputation in cyberspace. Cyberspace is the always-on, technologically interconnected world; it consists of people, organizations, information, and technology.

Fast reaction is important with cybersecurity issues! If you suspect that there may be a cybersecurity issue concerning your instrument or that cybersecurity has been breached at your site, contact your Bio-Rad representative for technical support immediately.

Main Features

The main features of the PTC Tempo thermal cycler include:

- Connectivity to Bio-Rad's BR.io app to manage PCR protocol files and view run status

Using the BR.io app, you can create PCR protocols in the app, download and run them on your linked PTC Tempo thermal cycler, view the run status remotely, and then upload the run report to the BR.io app.

For more information about BR.io, go to www.BR.io. From the BR.io Home page, you can

- Create a BR.io account
- Explore the BR.io app via video
- Access helpful BR.io guides

Linking your PTC Tempo thermal cycler to your BR.io account requires an Internet connection. See your IT administrator to connect your PTC Tempo thermal cycler to the Internet.

- Wireless and WLAN Ethernet network compatibility enables connectivity to your internal network for unlimited data access and storage on shared network drives as well connectivity to your BR.io cloud account
- USB drive compatibility provides an optional medium for protocol transfer and storage
- Programmable temperature gradient to quickly and easily identify optimal annealing temperatures

Performance Specifications

PTC Tempo thermal cycler components provide precise temperature control, fast ramp rates, gradient capabilities for method optimization and multiple block options to fit your labs particular needs. [Table 3](#) lists the sample block performance specifications for the PTC Tempo thermal cycler.

Reaction Module Performance Specifications

Table 3. PTC Tempo Thermal Cycler reaction module specifications

Item	Specification	
	PTC Tempo 96	PTC Tempo Deepwell
Volume	1–50 µl (10–50 µl Recommended)	1–125 µl Optimal (10–125 µl Recommended)
Maximum ramp rate	5°C/sec	2.5°C/sec
Average ramp rate	3.3°C/sec	2.0°C/sec
The following specifications apply to all instruments		
Lid temperature	30–110°C	
Heating and cooling method	Peltier	
Temperature range	4–100°C	
Increment	-10°C to 10°C/cycle	
Gradient		
Operational range	30–100°C	
Programmable span	1–24°C	
Temperature accuracy	±0.2°C of programmed target at 90°C	
Temperature uniformity	±0.4°C well-to-well within 10 sec of arrival at 90°C	

Finding Out More

The PTC Tempo Thermal Cycler web site (bio-rad.com/PTCTempo) provides access to technical notes, manuals, product information, and technical support. This site also provides many technical resources on a wide variety of methods and applications related to conventional PCR.

Chapter 2 Setting Up the PTC Tempo Thermal Cyclers

This chapter explains how to set up the PTC Tempo thermal cyclers at your site.

Site Requirements

The tables in this section list the bench space and power requirements necessary to successfully install and use the PTC Tempo thermal cyclers. For weight and dimensions of single-block PTC Tempo thermal cyclers, see [Shipping Container Specifications for Single Block PTC Tempo Thermal Cyclers on page 30](#).

Important: Install your PTC Tempo thermal cycler on a flat, dry surface with sufficient cool airflow for it to run properly.

PTC Tempo Thermal Cycler Dimensions

Note: Ensure that there is enough clear space on the lab bench for your instrument plus additional space to maneuver it while installing cables and accessories.

The lab bench on which you plan to install the PTC Tempo thermal cycler must support its width, depth, height, and weight. [Table 4](#) lists the specifications of the PTC Tempo thermal cycler that your lab bench must support to ensure proper installation.

Tip: For information about the shipping container specifications for the PTC Tempo thermal cyclers, see [Shipping Container Specifications for Single Block PTC Tempo Thermal Cyclers on page 30](#).

Table 4. PTC Tempo Thermal Cycler dimensions

Item	Specification
Dimensions	W: 10.9 in; 27.6 cm
	D: 19.8 in; 50.2 cm
	H: 17.0 in; 43.1 cm (lid fully open)
Weight	32.63 lb; 14.8 kg

Power Requirements

Power to the PTC Tempo thermal cyclers must be stable and within specifications to ensure proper operation. The power cord connected to the power inlet port must be rated for 10 amps or more.

Table 5. PTC Tempo Thermal Cyclers power requirements

Item	Specification
Number of power sockets	■ One socket for the PTC Tempo thermal cyclers

Network Requirements

The PTC Tempo thermal cycler supports connectivity through Ethernet, wireless networking, and USB.

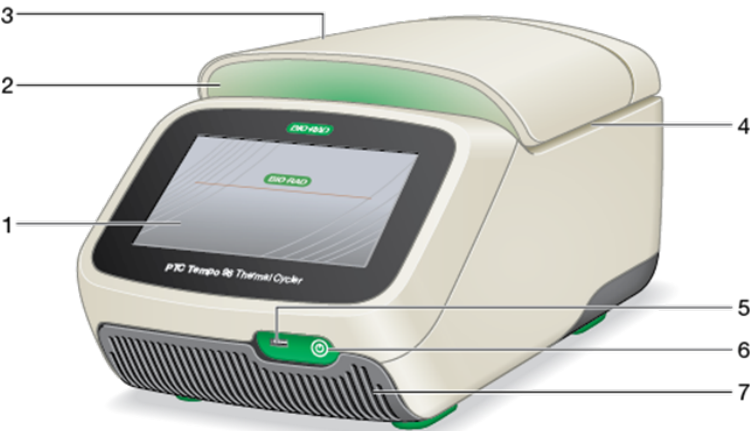
Table 6. PTC Tempo Thermal Cycler networking requirements

Item	Specification
Ethernet port	10/100 BASE-T (RJ45)*
USB ports	USB 2.0 Type A (three on rear panel, one on front panel)
Wireless connectivity	Requires the PTC Tempo thermal cycler Wi-Fi adaptor appropriate for your locale (See your Bio-Rad Sales representative for more information.) Supports IEEE 802.11b/g/n 2.4 GHz, and IEEE 802.11 a/n/ac 5 GHz standards.*
USB barcode scanner (optional)	Scanner must be attached via USB cable
* Default network support is DHCP. For information about configuring an Internet connection, see Setting Up a Network Connection on the PTC Tempo Thermal Cycler on page 56 .	

System Overview

The illustrations in this section display the main components of the PTC Tempo thermal cycler.

Front View (96-Well and Deepwell)



LEGEND

1. Touch screen display	2. LED system status
3. Sample block lid	4. Sample block
5. USB A port	6. Soft power switch
7. Air intake vents	

Details

- **Touch screen display** — provides access to all functions necessary to create and run protocols.
- **LED system status** — indicates system status:
 - Green (constant) — run is in progress.
 - Green (flashing) — run is paused.
 - Blue (flashing) — run has completed (flashes until lid is opened).
 - Red (flashing) — system error.
 - OFF — thermal cycler is idle (not executing a run, lid not moving) or is shut down.

- **Automated lid** — provides access to the sample block.

Note: The PTC Tempo 96 and PTC Tempo Deepwell systems do not have a manual open/close button on the lid. To open or close the lid, use the button on the Home screen, Run Setup screen, or Run Status screen.

- **Sample block** — holds the 96-well or Deepwell plate, depending on the instrument.
- **USB A port** — connects the PTC Tempo thermal cycler to a USB drive, mouse, keyboard, barcode scanner, or PTC Tempo thermal cycler Wi-Fi adaptor.
- **Soft power switch** — turns on the PTC Tempo thermal cycler software.

Light on the soft power switch illuminates a different color depending on software state:

- ☐ White — instrument and software are powered on.
- ☐ Blue — software is powered off; instrument is in stand-by mode.
- ☐ Red (flashing) — system error.
- ☐ OFF — thermal cycler is shut down.

- **Air intake vents** — allow the thermal cycler to heat and cool quickly.



Important: Keep all air vents clean and clear of obstruction. Do not insert any object in the air vents at any time. Fans or other internal moving parts may collide with the object and cause personal injury or damage the thermal cycler. Conductive objects could contact internal circuitry and cause damage to the thermal cycler.

Special Considerations Regarding the PTC Tempo Thermal Cycler Touch Screen

The following are special considerations regarding the PTC Tempo thermal cycler's touch screen. If you have any questions regarding the touch screen, contact Bio-Rad Technical Support.



WARNING! If any liquid leaks out of a damaged glass cell and comes in contact with your skin, wash thoroughly with soap and water.

Notes:

- A strong incident light shining on the touch screen for extended periods of time may degrade the quality and performance of the display.
- Do not expose the touch screen to strong ultraviolet rays or direct sunlight for long periods of time.
- Do not touch or scratch the surface of the touch screen with any hard object.

Back View



LEGEND

1. Power input	2. Power switch
3. Fuses	4. Cooling vents
5. Ethernet port	6. USB Type A ports

Details

- **Power input** — connects to AC power.
- **Power switch** — powers the PTC Tempo thermal cycler up to full power and down to a 1 Watt power consumption.
- **Fuses** — provide access to the fuses.
- **Cooling vents** — cool the PTC Tempo thermal cycler.
Important: Do not block the cooling vents. For optimal operation, ensure that air can circulate behind the PTC Tempo thermal cycler.
- **USB type A ports** — transfer data to and from a USB flash drive or connect a USB mouse, keyboard, or PTC Tempo thermal cycler Wi-Fi adaptor.
- **Ethernet port** — connects the PTC Tempo thermal cycler to your network.

Unpacking the Thermal Cycler

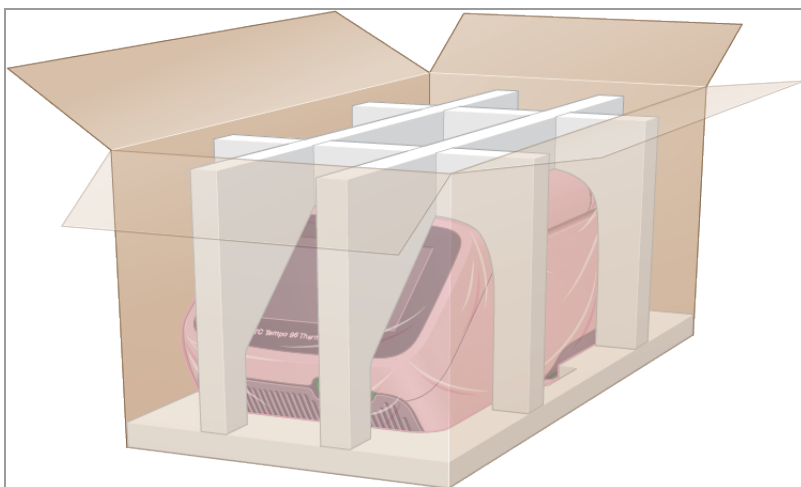
This section explains how to properly unpack the PTC Tempo thermal cycler. Read this section before you begin.

Caution: The packaged PTC Tempo thermal cycler weighs approximately 39 lb (17.7 kg). Bio-Rad strongly recommends that you use a pallet jack to move the instrument from the shipping dock to the laboratory.



Important: Use proper lifting techniques when moving and lifting the instrument to prevent damage to the instrument and personal injury. Bio-Rad recommends that two or more people lift the instrument.

The image below depicts the PTC Tempo thermal cycler inside its packaging.



Shipping Container Specifications for Single Block PTC Tempo Thermal Cyclers

Table 7 lists the specifications of the single block PTC Tempo 96 and PTC Tempo Deepwell thermal cyclers in their shipping containers.

For information about bench space specifications, see [Site Requirements on page 23](#).

Table 7. Shipping container specifications for PTC Tempo Thermal Cyclers

Parameter	Specification
Weight	39 lb; 17.7 kg
Dimensions	Depth: 25.5 in; 64.8 cm
	Width: 17 in; 43.2 cm
	Height: 16.8 in; 42.7 cm

Unpacking the Thermal Cycler

Install the PTC Tempo thermal cycler on a flat, dry surface with sufficient cool airflow to run properly. The AC power cord is approximately 5' in length. Ensure you have sufficient access to the power outlet before you begin.

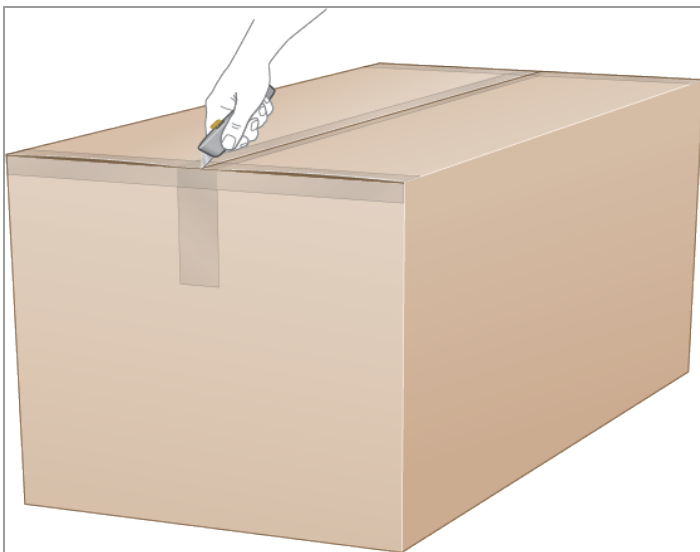
Note: Ensure that there is enough clear space on the lab bench for your instrument plus additional space to maneuver it while installing cables and accessories.

Caution: When handling the instrument, do not grip the LCD screen or lid. To lift the instrument, position your hands underneath the right and left sides of the instrument.

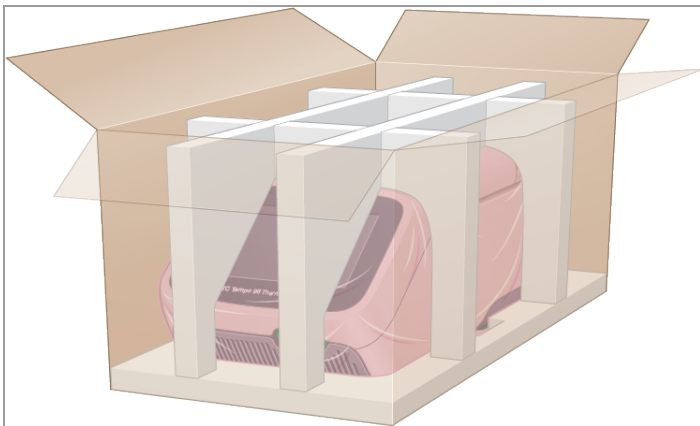


To unpack the thermal cycler

1. Ensure that the path from the shipping dock to the laboratory is clear of obstacles and can accommodate the packaged PTC Tempo thermal cycler and a pallet jack.
2. Using a pallet jack, move the instrument container from the shipping dock to the laboratory.
Important: Bio-Rad strongly recommends that you do NOT use a hand truck to move the packaged instrument.
3. Release the instrument container next to the lab bench.
4. With a box cutter, carefully slice the adhesive tape that secures the top major flaps together.

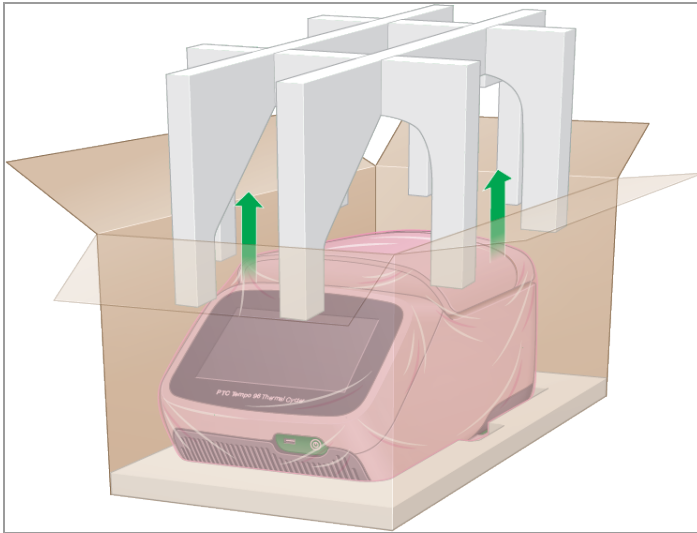


5. Spread the top major and minor flaps on the box to fully open the box.

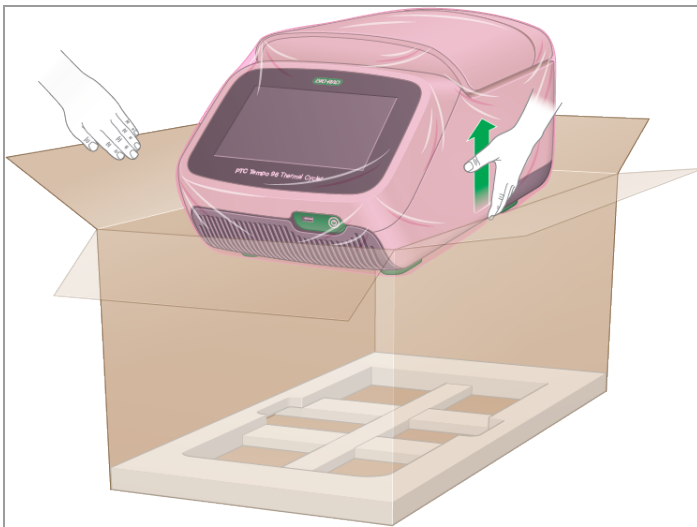


You see the PTC Tempo thermal cycler wrapped in plastic sheeting and inserted into the foam packing structure.

6. Remove the top foam insert and place it to the side.



7. While one person holds open the major flaps, using the lift points gently lift the instrument up out of the box and place it on the bench.



8. Slide the plastic cover toward the back of the instrument to remove.
9. Inspect the instrument for any damage.

10. Remove the accessories box and examine the contents. You should receive:

- 1 Tube frame
- 1 7' Bio-Rad–provided Ethernet cable
- 1 5' Bio-Rad–provided AC power cord
- 1 PTC Tempo Thermal Cycler Quick Start Guide
- 1 PTC Tempo Thermal Cycler Safety and Regulatory Guide



Important: If you observe any damage to the thermal cycler or to the cord or cable, do not continue. Instead, contact Bio-Rad Customer Support.

Connecting the Power and Communication Cables

After you unpack the PTC Tempo thermal cycler and install it on the lab bench, you will need to connect the power cord and (optionally) the communication cables. This section explains how to connect the cord and cables.

Tip: Before connecting the cables, familiarize yourself with the PTC Tempo thermal cycler, its accessory kit, and power switches.

Important: Ensure you have enough room on the lab bench to reach the power switch on the back of the thermal cycler after connecting the power cord and Ethernet cable. Use only the Bio-Rad-supplied power cord and Ethernet cable.

To connect the PTC Tempo thermal cycler power and communication cables

1. Locate the accessory kit that shipped with the PTC Tempo thermal cycler.
2. Remove the AC power cord and Ethernet cable from the accessory kit.
Tip: Store the packing material for future use. If any item is missing or damaged, contact your local Bio-Rad office.
3. Insert one end of the AC power cord into the power inlet port on back of the thermal cycler.
4. Insert the other end of the AC power cord into an available grounded, surge-protected AC outlet.
5. (Optional) If you plan to connect the PTC Tempo thermal cycler to your internal network, insert the Ethernet cable into the Ethernet port on the back of the thermal cycler.

Logging In to the PTC Tempo Thermal Cycler

The PTC Tempo thermal cycler ships with two default users: Admin and Guest. Users also have the option to create their own account when first logging in to the thermal cycler.

Tip: Creating user accounts on the PTC Tempo thermal cycler is optional though recommended.

Any user can log in as Guest and access all protocols in the Public folder and the Bio-Rad-supplied protocols in the Templates folder.

Any user, including the Guest account, can create, edit, and run protocols. When logged in as Guest, users can save their protocols into the Public folder or to an attached USB drive.

Tip: All files saved into the Public folder are available to all users of the PTC Tempo thermal cycler.

The PTC Tempo thermal cycler automatically creates a personal folder for each user who creates their own user account, as well as for the Admin user. When logged in, users can create and save protocols into their personal folder. The Admin user can create and save protocols to the Admin folder as well as to any individual user's personal folder.

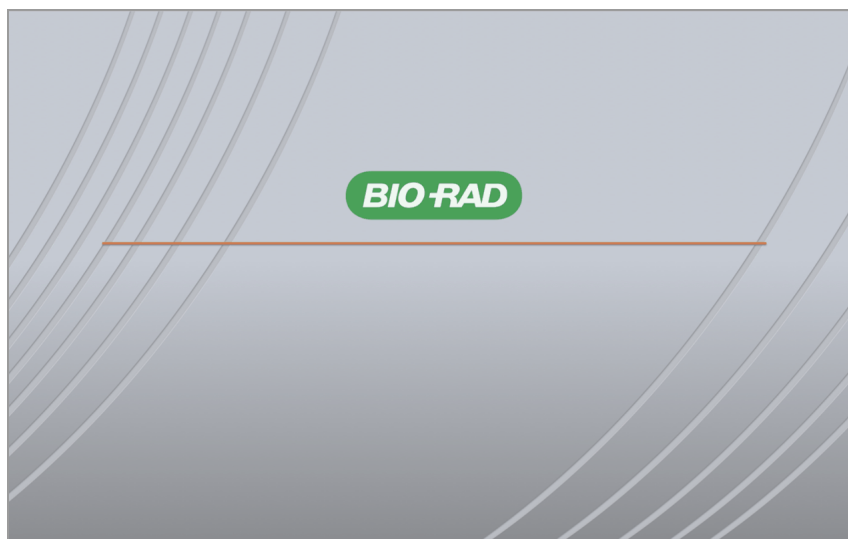
Note: Files saved to a personal folder are accessible only to the logged-in user or to the Admin user.

Starting the PTC Tempo Thermal Cycler

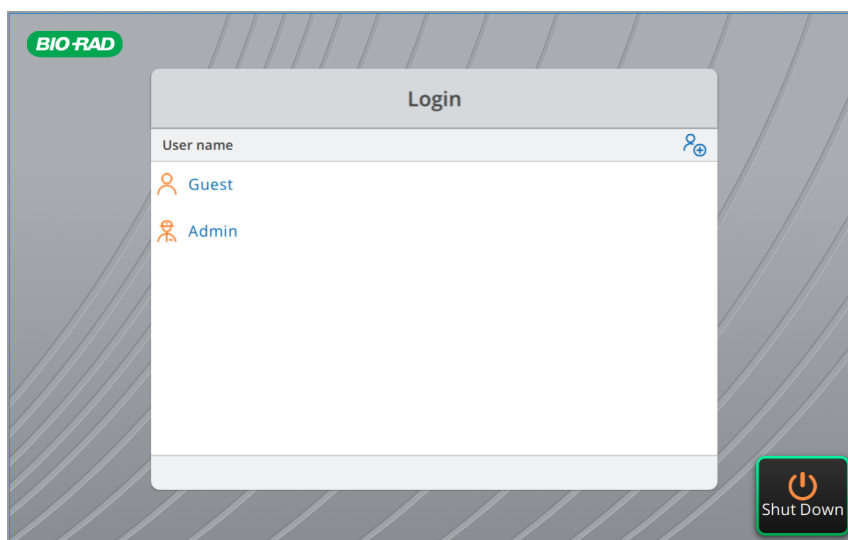
To start the PTC Tempo Thermal Cycler

- ▶ If you have not already done so, press the power switch on the back of the instrument and then press the soft power button on the front of the instrument to start the PTC Tempo thermal cycler.

You see the PTC Tempo Thermal Cycler startup screen.



The thermal cycler displays the Login screen.



Creating PTC Tempo Thermal Cycler User Accounts

Tip: Creating user accounts on the PTC Tempo thermal cycler is optional but highly recommended.

When logged in to the PTC Tempo thermal cycler, you can

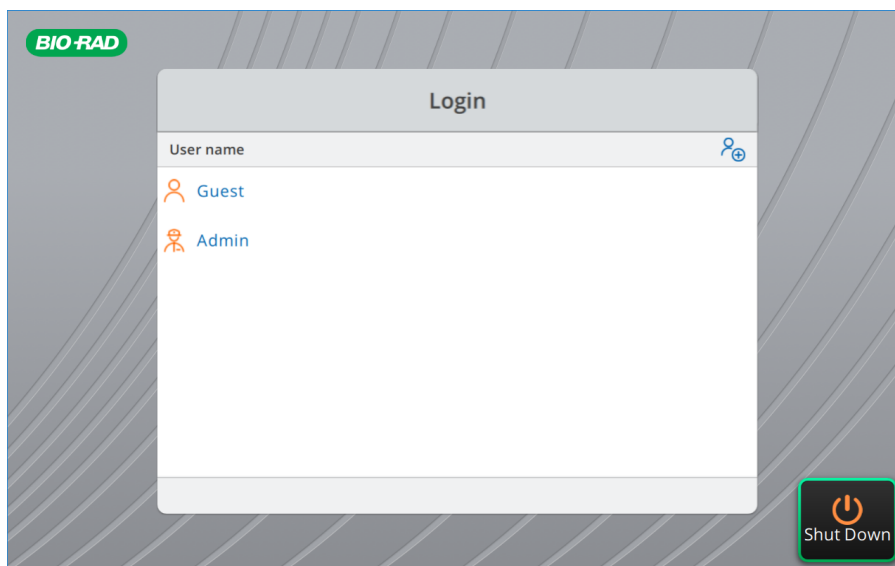
- Create and edit protocols and then save them to your personal folder.
- Rename a protocol in your personal or a public folder.
- Delete protocols in your personal folder.
- Copy a protocol to a public folder or USB drive.
- Connect to a shared folder on the network to store or access protocol files.
- Connect to your BR.io account.
- Run protocols; the run reports for which are automatically generated and saved on the instrument and to your BR.io account.
- Create and change your password.


This section explains how to create user accounts on the PTC Tempo thermal cycler.

To create a new user

1. Do one of the following:
 - Turn on the PTC Tempo thermal cycler.
 - On the Home screen, tap Logout to log out a currently logged-in user.

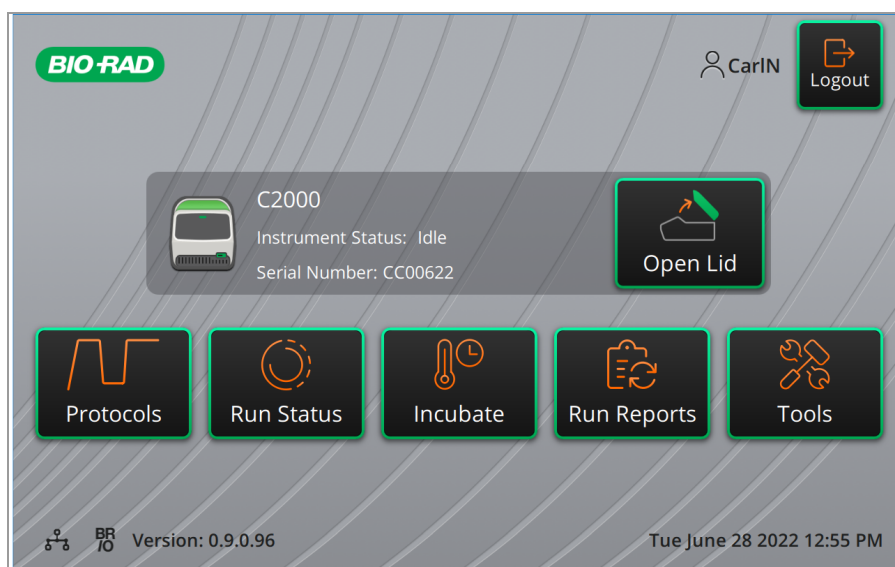
The Login list appears.



2. Tap the Create User icon ().
3. Using the alphanumeric keypad that appears, type a user name and then tap OK.

Tip: You can create a password by accessing Tools > User Profile. See [Setting User Passwords on page 61](#) for more information.

The Home screen appears and displays your user name next to the Logout button.



Logging In to the PTC Tempo Thermal Cyclers

When the PTC Tempo thermal cyclers start, the Login list appears and displays the existing users.

Important: By default, the Admin user account does not have a password. When accessed for the first time, Bio-Rad strongly recommends that you create a password for the Admin user account and record the password in a password safe.

To log in to the Admin account when the PTC Tempo thermal cyclers start

1. In the Login list, tap Admin.
2. When prompted, enter the Admin password using the alphanumeric keypad that appears and then tap OK.

To log in to a User account when the PTC Tempo thermal cyclers start

1. In the Login list, locate and tap your user name.
2. If prompted, enter your password using the alphanumeric keypad that appears and then tap OK.

Tip: After you create your user account, the keypad does not appear if you did not create a password.

To log in to the Guest account when the PTC Tempo thermal cyclers start

- In the Login list, tap Guest.

Tip: The keypad does not appear because the Guest account does not have a password.

To change users

1. On the Home screen, tap Logout to log out the currently logged-in user.
The Login list appears.
2. In the Login list, tap your user name.
3. If prompted, enter your password using the alphanumeric keypad that appears and then tap OK.

Tip: The keypad does not appear if the user account does not have a password.

To log out

- On the Home screen, tap Logout.

Loading the Sample Block

For a list of plates and tubes compatible with the PTC Tempo thermal cycler, visit us at [bio-rad.com/PTCTempo](https://www.bio-rad.com/PTCTempo) or contact your local Bio-Rad Sales representative.

To ensure uniform heating and cooling of samples, reaction vessels must be in complete contact with the sample block. To ensure adequate contact, do the following:

- Confirm that the sample block is clean before loading samples.
- Firmly press the individual tubes, tube strips, or microplates into the block wells.
- When using one or a few tubes, use the tube frame or load at least one empty tube in each corner of the block to ensure the lid exerts even pressure on individual tubes.

Loading Plates, Tubes, and Tube Strips into the Reaction Module

The inner lid of the reaction module applies heat and force to the reaction vessel lids (caps or seal) to produce consistent and successful reactions. Heating the inner lid prevents condensation while applying force seals the reaction to prevent evaporation.



Caution: Never run a sample with a lid or seal that is open, loose, punctured, or otherwise damaged. Doing so will increase the likelihood of a rupture, which could cause injury or contaminate the thermal cycler.



Warning: After a run, the heated inner lid can remain hot. Use caution when opening and closing the lid.

To load plates into the sample block

1. To open the lid on the PTC Tempo 96 or PTC Tempo Deepwell thermal cyclers, do one of the following:
 - On the Home screen, tap Open Lid.
 - On the Run Setup screen, tap Open Lid.
2. Place the microplate, individual tubes, or tube strips with sealed lids in the block.

Important: Verify that the tubes are completely sealed to prevent leakage.

Tip: For optimal results, load sample volumes of 10–50 μ l for the PTC Tempo 96 and 10–125 μ l for the PTC Tempo Deepwell thermal cycler.


3. To close the motorized lid, do one of the following:
 - On the Home screen, tap Close Lid.
 - On the Run Setup screen, tap Close Lid.

Important: Ensure that nothing obstructs the lid when it closes. Although there is a safety mechanism to prevent the lid from closing if it senses an obstruction, do not place anything in the way of the lid before closing.

Shutting Down the PTC Tempo Thermal Cycler

Important: Follow these instructions to safely and completely shut down the PTC Tempo thermal cycler.

To shut down the PTC Tempo thermal cycler

1. Ensure that no protocol is running and the thermal cycler is no longer in use.
2. If you have not already done so, remove the samples from the block:
 - a. On the Home screen, tap Open Lid to access the samples.
 - b. Remove the samples from the block and then tap Close Lid.
3. On the Home screen, tap Logout to log out of the thermal cycler.
4. On the Login screen, tap Shut Down () and then tap Yes to power off the software.

Tip: The soft power button on the front of the instrument will illuminate blue. While the switch is illuminated blue, the instrument is in a stand-by state. Pressing the software power button while it is blue will start the PTC Tempo thermal cycler.

5. To completely shut down the thermal cycler, press the power switch on the back of the instrument to consume only 1W of power per the 1Watt initiative.

Chapter 3 Configuring the PTC Tempo Thermal Cyclers

After successfully installing the PTC Tempo thermal cyclers, you can configure the thermal cyclers according to the requirements at your site. Using the thermal cyclers' touch screen, users with the Admin role can perform the following tasks.

- Set the PTC Tempo thermal cyclers' time zone and local time
- Rename the thermal cyclers
- Set up network and wireless communication
- Manage user accounts

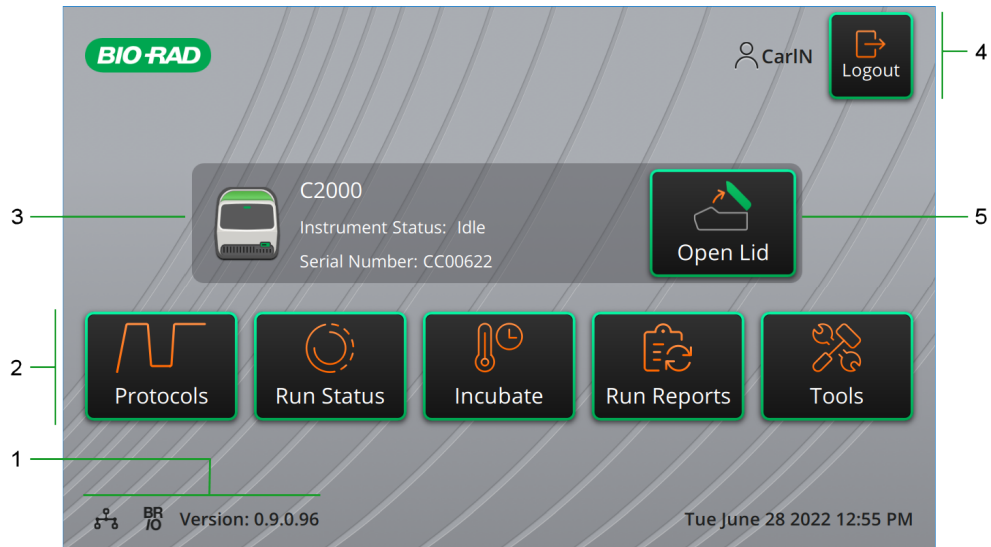
As a PTC Tempo thermal cycler user, you can

- Create your own PTC Tempo thermal cycler log-in account
- Set or change your password
- Connect to your BR.io account
- Set or change connection to a shared network folder

This chapter explains how to configure the PTC Tempo thermal cyclers.

Touch Screen Overview

This section provides an overview of the touch screen features of the PTC Tempo thermal cyclers.



LEGEND

- | | |
|--------------------------------------|---------------------------|
| 1. Connectivity and software version | 2. Primary activity menu |
| 3. Instrument details | 4. Current logged-in user |
| 5. Open/close lid | |

Details

- **Connectivity and software version** — displays the current software version and the type of operational connection:

- ☐ **Network connection** — indicates operational connection to an Ethernet or Wi-Fi network:



– Ethernet connection



- ☐ – Wi-Fi connection

Note: When the instrument has both a Wi-Fi dongle inserted and an Ethernet cable connected to the network, the default network connection is Ethernet. You will see only the Ethernet icon on the Home screen.

- **BR.io connection** — indicates operational connection to BR.io:



- — logged-in user is linked to their BR.io account.



- — logged-in user is not linked to their BR.io account.

Tip: Only logged in users with a password can link to BR.io. The Guest user cannot link to BR.io.

To manage the connection, see [Connecting to Your Bio-Rad BR.io Account on page 65](#).

- **Software version** — displays the touch screen software version. To manually install updates, see [Upgrading Software and Firmware on PTC Tempo Thermal Cyclers on page 134](#).
- **Primary activity menu** — provides quick access to the primary activities required to create and run protocols and manage the operation of the PTC Tempo thermal cycler.
 - **Protocols** — opens the Protocol Browser where you can create and manage protocols and execute runs. For details on creating protocols, see [Creating Protocols on page 77](#). For details on managing your protocols, see [Managing Files on page 109](#).
 - **Run Status** — opens the Run Status screen to view the status of the current run.
 - **Incubate** — opens the Incubate settings screen on which you can enter Incubate settings and execute an incubation run.
 - **Run Reports** — opens the Run Reports screen to view and export your run reports.
 - **Tools** — accesses menus from which users and administrators can perform system management operations.
- **Instrument status** — identifies the thermal cycler and its serial number and identifies the current instrument status.
- **Logout action/status** — identifies the currently logged-in user and enables the user to log out of the thermal cycler.
 - **Logout** — tap this button to log out. The thermal cycler then displays the Login list.



Tip: To create a new user account, see [Creating PTC Tempo Thermal Cycler User Accounts on page 37](#).
 - **Logged in user** — identifies the user currently logged in to the thermal cycler.
- **Open/Close Lid** — opens or closes the instrument lid.

Tip: If the lid is closed, the label is Open Lid. If the lid is open, the label is Close Lid.

Software Files

Table 8 lists the PTC Tempo thermal cycler file types.

Table 8. PTC Tempo thermal cycler file types

File Type	Icon	Extension	Details
Protocol		.prcl	Contains protocol setup details to perform a PCR run.
PDF		.pdf	Contains setup details of a protocol that was created on the PTC Tempo thermal cycler. It is exported and saved in a zip folder to an attached USB drive.

Tools Screen

From the Tools screen, users and administrators can access a variety of options. These options control the thermal cycler. All options available to users are also available to administrators. Only those who log in with an administrator account have access to the Admin options.

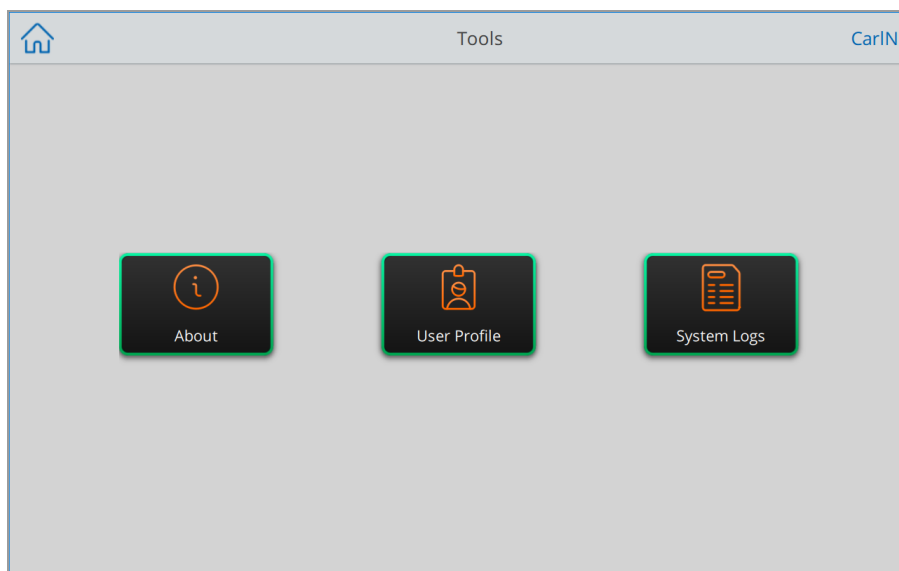
User Tools Screen Options

Tip: You do not need to log in with a user account to access the User options. The Guest account can also access options on the Tools screen.

To access the User Tools screen

1. On the Home screen, tap Logout, and then log in with your user credentials.
2. On the Home screen, tap Tools.

The User Tools screen appears.



- **About** — view the current software version, serial number, a list of all open source licenses used in PTC Tempo thermal cycler software, disk space capacity and availability, as well as total number of run hours and cycles the thermal cycler has accumulated since the last log on.

Tip: To view the list of all open source license code, tap Legal Notices. To view the agreements and terms for each item, tap its link.

- **User Profile** — view user profile options for password, shared network drive, and (when registered) the BR.io account information.
- **System Logs** — view a log of all messages and events that occur during each run.

Note: From this screen, logged-in users can export all log files to an attached USB drive. Admin users can export all logs as well as delete all logs from the thermal cycler.

Admin Tools Screen Options

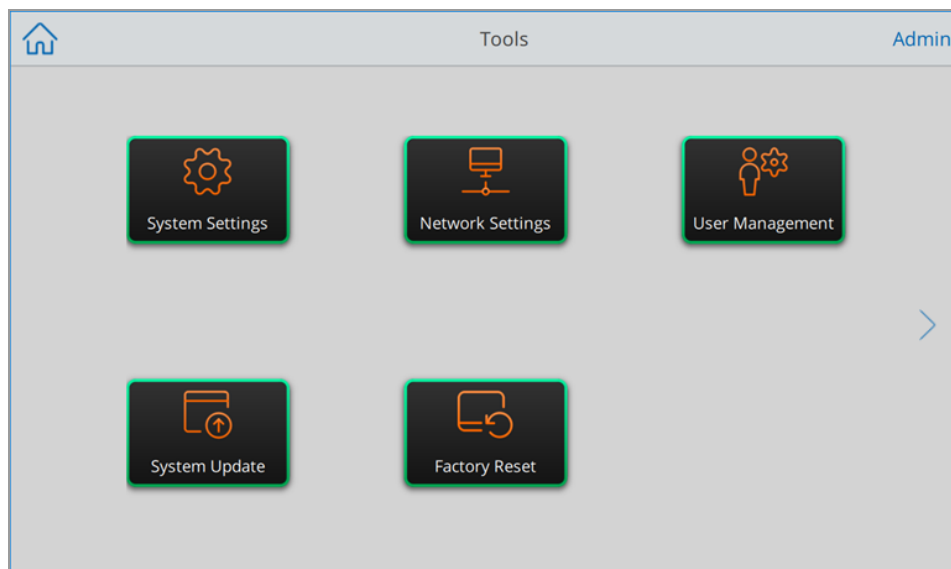
All options available to users are also available to administrators. Only those who log in with the Admin role have access to the Admin options.

Tip: The Admin Tools screen is the initial Tools screen to appear. To view the standard User options, tap the arrow button on the right side of the screen.

To access the Admin Tools screen

1. Log in as an Admin user.
2. On the Home screen, tap Tools on the Home screen.

The Tools screen appears and displays the Admin options.



- **System Settings** — from this screen, Admin users can
 - Set the time zone, date, and time on the thermal cycler
 - Rename the thermal cycler
 - Enable or disable the diagnostic port

For more information about the diagnostic port, see [Enabling the Diagnostic Port on the PTC Tempo Thermal Cycler on page 54](#).

- **Network Settings** — view details about the current network connection; use this screen to connect the thermal cycler to the internal network via wireless connection.

- **User Management** — enable secure user mode, change a user's role, reset passwords, and add and remove users.
- **System Update** — update the system software and firmware from an attached USB drive.

Note: The PTC Tempo thermal cycler installer can include both software and firmware updates. PTC Tempo thermal cycler firmware updates are not distributed in a separate package.

- **Factory Reset** — reset the PTC Tempo thermal cycler to its original state.

Caution: Performing a factory reset deletes all user accounts and user data from the thermal cycler. This process cannot be undone. Take care when performing a factory reset.

Renaming the PTC Tempo Thermal Cycler

Initially, the name of each PTC Tempo thermal cycler is its serial number. You can rename the thermal cycler for easy identification.

Tip: If you rename the PTC Tempo thermal cycler after users have linked the instrument to their BR.io account, instruct them to refresh their BR.io screen to see the new instrument name appear in the application.

To rename a PTC Tempo thermal cycler

1. Log in as an Admin user.
2. On the Home screen, tap Tools to open the Tools menu.
3. On the Admin tools screen, tap System Settings to open the System Settings screen.

The screenshot shows the 'System Settings' screen. At the top, there is a header bar with a blue '< Back' button on the left, the title 'System Settings' in the center, and an 'Admin' button on the right. Below the header, the settings are displayed: 'Instrument Name:' followed by a text field containing 'PTC Tempo 2'; 'Time Zone:' followed by a dropdown menu showing '(UTC-07:00) Pacific Daylight Time [America/Los_Angeles]'; and 'Date and Time:' followed by the text 'Mon, July 25, 2022 12:04 PM'. Below these, there are two checkboxes: 'Set Time Automatically' which is checked with a blue square, and 'Enable Diagnostic Port' which is unchecked. At the bottom right, there is a button with a blue checkmark icon and the word 'Apply' below it.

4. Tap the Instrument Name field and type a new name using the alphanumeric keypad that appears.
5. Tap Apply to confirm the change in settings.
6. Tap Back to return to the Tools menu.

Setting the Time Zone on the PTC Tempo Thermal Cycler

The date and time on the PTC Tempo thermal cycler is synchronized to the time zone configured in your thermal cycler's operating system. If your thermal cycler is connected to the Internet, you can automatically set the date and time to the time zone in which it is located.

Alternatively, you can set the time zone according to your lab's practices. You can manually set the date and time on the thermal cycler. In this manner, actual local time might differ from the detected time zone. However, run reports generated from protocols retrieved from computers running BR.io that are not in the same time zone as the PTC Tempo thermal cycler will display the intended time.

The time zone changes are applied immediately to the System Settings Date and Time fields and saved when you tap Apply. Any changes you made to the date and time prior to setting the time zone are lost.

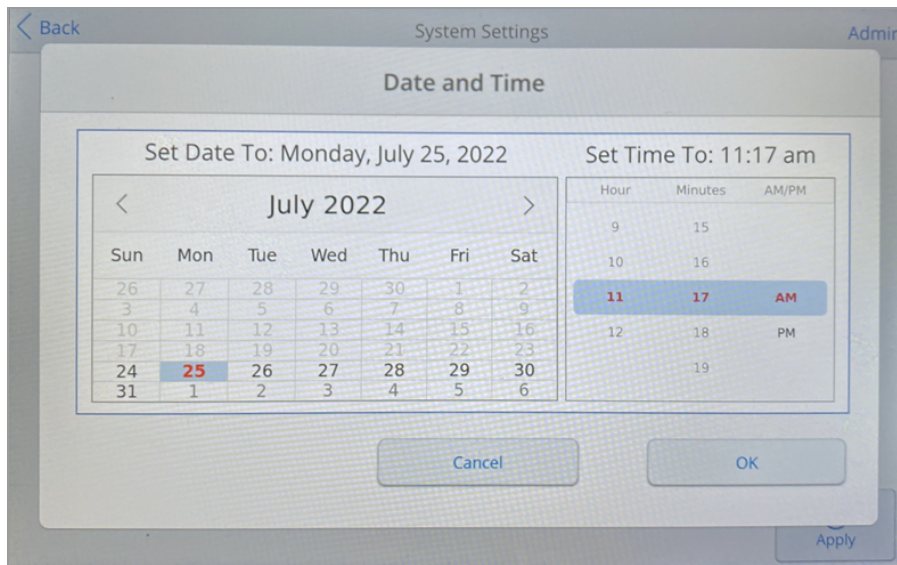
Tip: Time changes due to switching between daylight saving and standard time are applied when you set the instrument to automatically set the Time zone.

To set the time zone on the PTC Tempo thermal cycler

1. Log in as an Admin user.
2. On the Home screen, tap Tools to open the Tools menu.
3. On the Admin Tools screen, tap System Settings to open the System Settings screen.

The screenshot shows the 'System Settings' screen. At the top, there is a 'Back' button on the left and an 'Admin' label on the right. The main content area contains three input fields: 'Instrument Name' with the value 'C2000', 'Time Zone' with the value '(UTC-07:00) Pacific Daylight Time (Mexico) [America/Santa_...', and 'Date and Time' with the value 'Mon, July 25, 2022 12:04 PM'. Below these fields are two checkboxes: 'Set Time Automatically' and 'Enable Diagnostic Port', both of which are currently unchecked. At the bottom right, there is a button with a checkmark icon and the label 'Apply'.

4. Tap the Time Zone field, select the target time zone from the Time Zone screen that appears, and tap OK.
5. To set the date and time, do one of the following:
 - To set the date and time *automatically*, select the target Time Zone and then tap Set Time Zone Automatically.
 - To set the date and time *manually*, tap the Date and Time field, set date, time, and AM or PM in the Date and Time screen that appears, and tap OK.



6. Tap Apply to confirm the change in settings.
7. Tap Back to return to the Tools menu.

Enabling the Diagnostic Port on the PTC Tempo Thermal Cycler

Important: Cybersecurity is the protection of assets in cyberspace from cyberattacks.

Cybersecurity is Bio-Rad's ability to secure its people, information, systems, and reputation in cyberspace. Cyberspace is the always-on, technologically interconnected world; it consists of people, organizations, information, and technology.

Fast reaction is important with cybersecurity issues! If you suspect that there may be a cybersecurity issue concerning your instrument or that cybersecurity has been breached at your site, contact your Bio-Rad representative for technical support immediately.

To reduce cybersecurity threats, all TCP/IP ports on the PTC Tempo thermal cycler are closed by default. To enable Bio-Rad Technical Support team to connect remotely for diagnosing and troubleshooting issues, the PTC Tempo thermal cycler Admin user can temporarily open a diagnostic port on the instrument.

Note: Rebooting the instrument does not change the state of the port. Performing a Factory Reset automatically closes the open port.

Important: Bio-Rad strongly recommends that you close the open diagnostic port after Bio-Rad Technical Support completes troubleshooting the instrument to reduce any threat of cybersecurity attacks.

To enable access to the diagnostic port

1. Log in as an Admin user.
2. On the Home screen, tap Tools to open the Tools menu.
3. On the Admin tools screen, tap System Settings to open the System Settings screen.

< Back System Settings Admin

Instrument Name: C2000

Time Zone: (UTC-07:00) Pacific Daylight Time (Mexico) [America/Santa_...

Date and Time: Mon, July 25, 2022 12:04 PM

☐ Set Time Automatically

☐ Enable Diagnostic Port

Apply

4. Tap Enable Diagnostic Port and then tap Apply to confirm the change.
5. Tap Back to return to the Tools menu.

To disable the diagnostic port

1. Log in as an Admin user.
2. On the Home screen, tap Tools to open the Tools menu and then tap System Settings.
3. On the System Settings screen, clear the Enable Diagnostic Port checkbox and then tap Apply.
4. Tap Back to return to the Tools menu.

Setting Up a Network Connection on the PTC Tempo Thermal Cyclers

The PTC Tempo thermal cyclers connect to your internal network using the DHCP server. This section explains how to view the dynamic Ethernet network settings for your PTC Tempo thermal cyclers.

Viewing the Dynamic Ethernet Network Settings

Note: Before starting this procedure, ensure your PTC Tempo thermal cycler is turned off.

To view the dynamic Ethernet settings

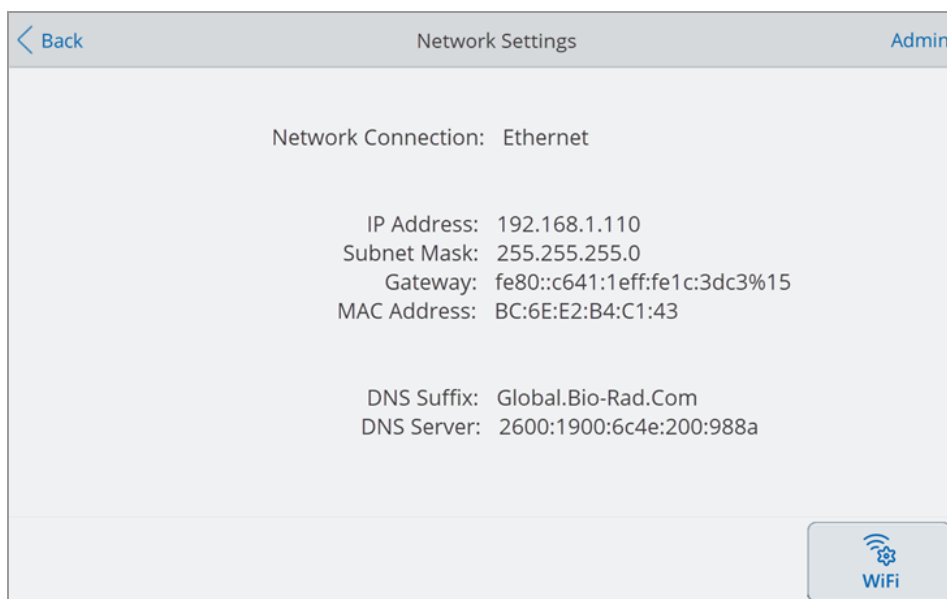
1. If you have not already done so, insert one end of the provided Ethernet cable into the Ethernet port on the back of the PTC Tempo thermal cycler.
2. Insert the loose end of the Ethernet cable into the network connection router or hub.
3. Turn on the thermal cycler.

The PTC Tempo thermal cycler automatically detects an available IP address and connects to your network. The thermal cycler displays the Ethernet icon in the lower left corner of the Home screen to indicate successful Ethernet network communication.



4. To view the Ethernet configuration, log into the PTC Tempo thermal cycler as an Admin user and tap Tools on the Home screen.
5. In the Admin Tools list, tap Network Settings.

The Network Settings screen appears and displays the current dynamic configuration details, for example:



6. On the Network Settings screen, tap Back to return to the Tools screen.
7. If necessary, implement network security measures per your organization's security and privacy policies.

Setting Up a Wireless Connection

Note: The PTC Tempo thermal cyclers Wi-Fi adaptor is specific to the country in which it is to be used. Contact your Bio-Rad Sales representative for the correct adaptor to purchase or visit bio-rad.com/PTCTempo.

You can connect the PTC Tempo thermal cyclers to internal wireless access points within your organization. When successfully connected, you can access your shared network folder and connect to your BR.io account. The PTC Tempo thermal cyclers recognize all wireless access points within your company and displays the strength and security level of each connection. The thermal cyclers maintain the most recent connection until you change it.

This section explains how to connect the PTC Tempo thermal cyclers to a wireless access point within your organization and how to change wireless connections.

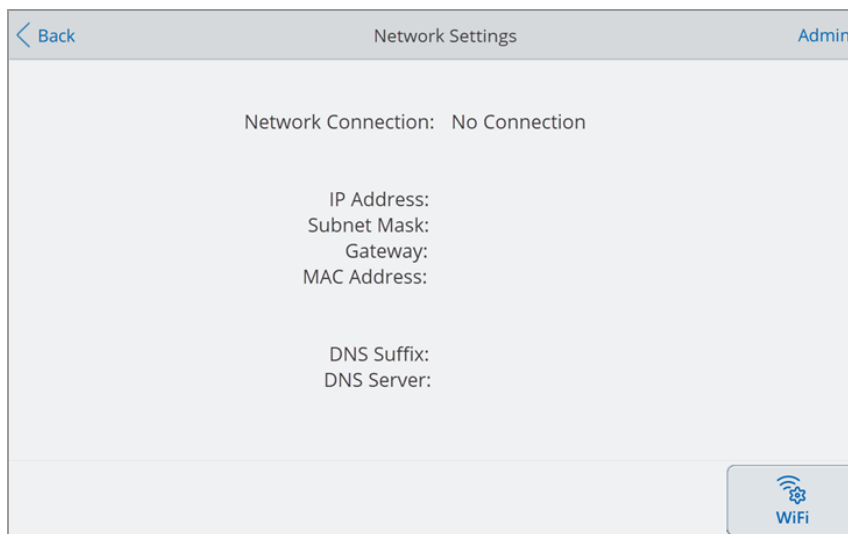
Tip: To set up a shared network folder, see [Setting Up a Connection to a Shared Network Drive on page 62](#). To set up a connection to BR.io, see [Connecting to Your Bio-Rad BR.io Account](#).

Important: Consult your system administrator for site-specific wireless IP connections and their secure passwords before continuing. Wireless networks that require additional authentication are not supported.

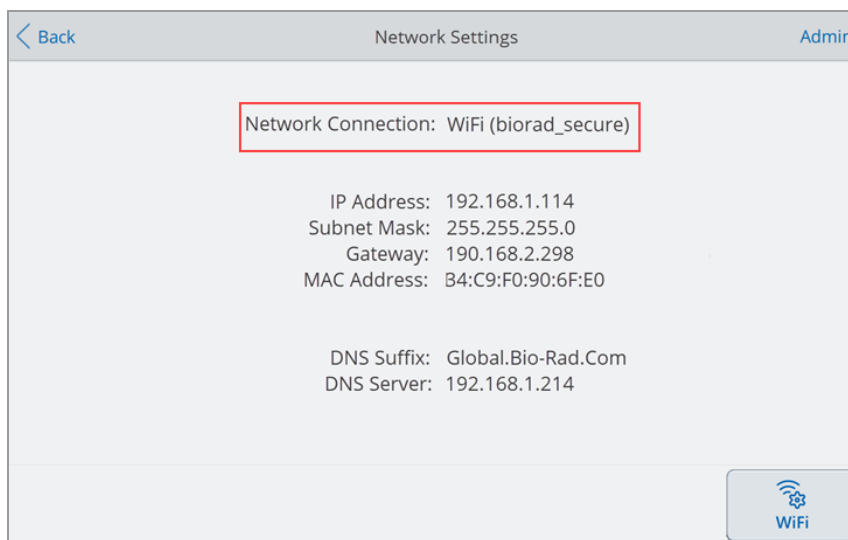
To connect the PTC Tempo thermal cyclers to a wireless access point

1. Locate your locale-specific PTC Tempo thermal cyclers Wi-Fi adaptor and insert it into a USB A port on the thermal cyclers.
2. Log in as an Admin user.
3. On the Home screen, tap Tools to open the Tools screen and then tap Network Settings to display the Network Settings screen.

The Networks Settings screen appears. The following image appears if you have not established an Ethernet connection and this is the first time you are setting up a wireless connection.



If your PTC Tempo thermal cycler is currently connected to a wireless access point, its network connection information appears on the screen:



4. Tap WiFi to display a list of available wireless connections.

The thermal cycler displays the name of each wireless access point, its security setting (Secured or Open), and its signal strength.

Tip: The list of available networks automatically refreshes when networks are located. If your preferred access point does not appear in the list, or if the list appears empty, tap Cancel to return to the Network Settings screen and then tap WiFi to return to the WiFi Settings dialog box.

5. Tap the preferred access point and then tap Connect.
6. If the preferred access point is secured, you must provide the WiFi password in order to connect.

Note: If you do not know the password, contact your system administrator.

Type the WiFi password in the alphanumeric keyboard that appears and then tap OK.

A message appears indicating that the Wi-Fi connection is successful.

7. Tap OK to close the message and return to the Network Settings dialog box.
8. On the Network Settings screen, tap Back to return to the Tools screen.
9. The thermal cycler displays the Wi-Fi icon in the lower left corner of the Home screen to indicate successful wireless access point connection.



Managing Personal User Accounts

As a logged in PTC Tempo thermal cycler user, you can

- Set or change your password
- Set or change your shared network drive
- Connect to your BR.io account from PTC Tempo thermal cycler

This section explains how to manage your personal account.

Setting User Passwords

Bio-Rad recommends that you create a password at the time you create your user profile. You can change your password at any time.

Note: If you plan to connect to a shared network drive you must have a password.


Tip: PTC Tempo thermal cycler passwords can be any combination of alphanumeric characters. Passwords must be between 4–50 characters and are case-sensitive.

To create a user password

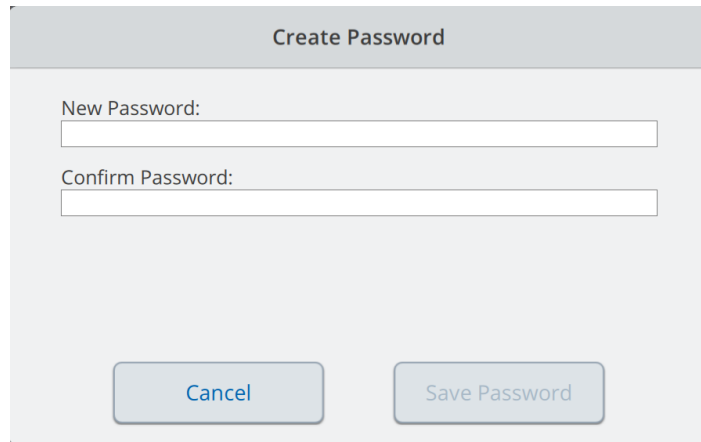
1. From the Home screen, tap Tools.
2. On The Tools screen, tap User Profile.

The User Profile screen appears.

The screenshot shows the 'User Profile' screen. At the top, there is a header bar with a blue back arrow on the left, the text 'User Profile' in the center, and the username 'CarlN' on the right. Below the header, there are three distinct sections, each with a light blue background and a rounded rectangle border. The first section is titled 'PTC Tempo Password' and displays 'User Name: CarlN' with a blue dropdown arrow on the right. The second section is titled 'Network Folder' and shows a red warning triangle icon followed by the text 'Network drive connection is not set up.', with a blue dropdown arrow on the right. The third section is titled 'BR.io Account' and shows a red warning triangle icon followed by the text 'BR.io account is not linked.', with a blue dropdown arrow on the right.

3. In the PTC Tempo thermal cycler Password section, tap  to expand the dialog box and then tap Change Password.

The Create Password dialog box appears.

A screenshot of the 'Create Password' dialog box. It has a title bar at the top that says 'Create Password'. Below the title bar, there are two text input fields. The first field is labeled 'New Password:' and the second field is labeled 'Confirm Password:'. At the bottom of the dialog box, there are two buttons: 'Cancel' on the left and 'Save Password' on the right.

4. Type and confirm your password using the alphanumeric keyboard and then tap Save Password.
5. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

To change your password

1. On the User Profile screen, expand the Password section and then tap Change Password.
2. Type your current password using the alphanumeric keyboard that appears, and then tap OK.

The Change Password dialog box appears.

3. In the Change Password dialog box, type and confirm your password using the alphanumeric keyboard that appears and then tap Save Password.
4. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

Setting Up a Connection to a Shared Network Drive

Note: You must have a password on the PTC Tempo thermal cycler to connect to a shared network drive. See [Setting User Passwords on page 61](#) for more information.

You can connect your PTC Tempo thermal cycler user account to a shared drive on your internal network. When connected, you can create protocols on your PTC Tempo thermal cycler and save protocols to your network drive. You can also copy protocol files from your network drive to a folder on the PTC Tempo thermal cycler.

Important: Before you can connect the PTC Tempo thermal cycler to your network drive, your PTC Tempo thermal cycler Admin must establish a connection to the network through either Ethernet or a wireless network connection. For more information, see [Setting Up a Network](#)

[Connection on the PTC Tempo Thermal Cycler on page 56](#) or [Setting Up a Wireless Connection on page 58](#).

Tip: The thermal cycler automatically saves your network connection details when you successfully connect to your shared network folder. Thereafter, the thermal cycler will automatically connect to your shared network folder upon login until you disconnect from that folder.

To connect to a shared network drive

1. On the Tools screen, tap User Profile.

The User Profile screen appears.

The screenshot shows the 'User Profile' screen with a header bar containing a back arrow, the title 'User Profile', and the username 'CarlN'. Below the header are three sections, each with a dropdown arrow on the right:

- PTC Tempo Password:** Shows 'User Name: CarlN'.
- Network Folder:** Shows a red error message: 'Network drive connection is not set up.'
- BR.io Account:** Shows a red error message: 'BR.io account is not linked.'

2. In the Network Folder section, tap to expand the dialog box.
3. In the Folder Path section, type the path to the shared network folder using the following format:

`\\server_name\folder_name\...\target_folder`

You must type slashes (\\) at the beginning of the path, and separate each folder with a single slash.

Note: PTC Tempo thermal cycler accepts either forward or back slashes, but you must be consistent when typing the path. That is, use either forward or backslashes, not a combination.

4. In the Connection section, type the **global domain name** and user name you use to connect to that server in this format:

`global_domain_name\user_name`

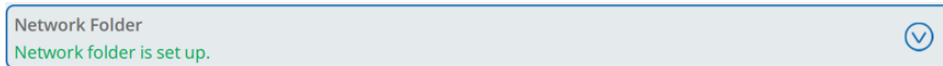
You must include the slash in the path, for example:

`Global\CarlN`

Tip: This user name might be different than your PTC Tempo thermal cycler user name.

5. Tap Connect.
6. Type the password you use to connect to that server using the alphanumeric keyboard that appears and then tap OK.


When the connection is successful, the Network Folder status changes to Connected to network folder:



7. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

Tip: The thermal cycler informs you when the folder to which you are connected is read-only.

To disconnect the PTC Tempo thermal cycler from your network drive

1. From the Home screen, tap Tools, then in the User screen tap User Profile.
The User Profile screen appears.
2. In the Network Folder section, tap the  icon to expand the dialog box.
3. Tap Disconnect.
4. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

Connecting to Your Bio-Rad BR.io Account

Note: You must have a password on the PTC Tempo thermal cycler in order to connect to your BR.io account. See [Setting User Passwords on page 61](#) for more information. You must also set up a BR.io account. For information about registering a BR.io account, see the help information in the BR.io app.

You can connect multiple PTC Tempo thermal cyclers to your Bio-Rad BR.io account. When connected, you can create PCR protocols in the BR.io app, download them to and run them on one or more PTC Tempo thermal cyclers. Upon completion, the run reports are automatically uploaded to the BR.io app. You can also run different PCR protocols from BR.io on each PTC Tempo thermal cycler.

Important: Before you can connect the PTC Tempo thermal cycler to your BR.io account, your PTC Tempo thermal cycler Admin must establish a connection to the Internet either through Ethernet or a wireless network communication. For more information, see [Setting Up a Network Connection on the PTC Tempo Thermal Cycler on page 56](#) or [Setting Up a Wireless Connection on page 58](#).

Tip: For more information about Bio-Rad's BR.io app, or to register your instrument, go to www.BR.io.

Connecting the PTC Tempo Thermal Cycler to Your BR.io Account


To connect the PTC Tempo thermal cycler to your BR.io account

1. From the Home screen, tap Tools, then in the User screen tap User Profile.

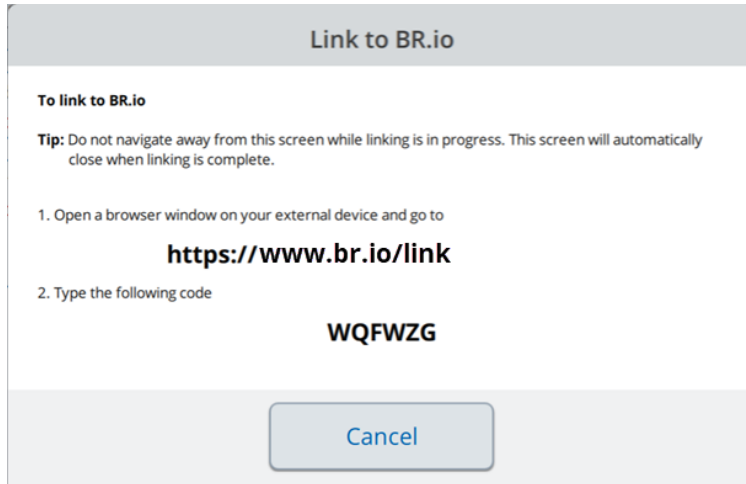
The User Profile screen appears.

The screenshot shows the 'User Profile' screen. At the top, there is a 'Back' button and the user name 'CarlN'. Below this are three sections, each with a dropdown arrow on the right:

- PTC Tempo Password**: Shows 'User Name: CarlN'.
- Network Folder**: Shows a warning icon and the text 'Network drive connection is not set up.'.
- BR.io Account**: Shows a warning icon and the text 'BR.io account is not linked.'.

2. In the BR.io Account section, tap  to expand the dialog box.
3. In the expanded dialog box click Link.

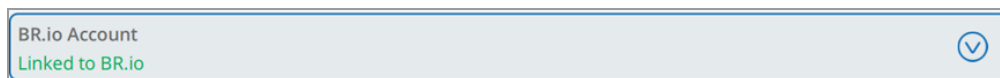
The thermal cycler displays a message while it retrieves an authentication code. When retrieved, the Link to BR.io dialog box appears.



Note: The authentication code is valid for one hour after it is retrieved. If you have not linked your instrument within that timeframe, you will need to start again.

4. Follow the on-screen procedure:
 - a. Open a web browser and navigate to www.br.io/link
 - b. At the prompt, type the code that appears on the Link to BR.io screen and click Submit.
 - c. Follow the prompts on the upcoming screens to complete the linking process to BR.io.

When the thermal cycler has linked to your BR.io account, this screen automatically closes and the BR.io Account status changes to Linked:



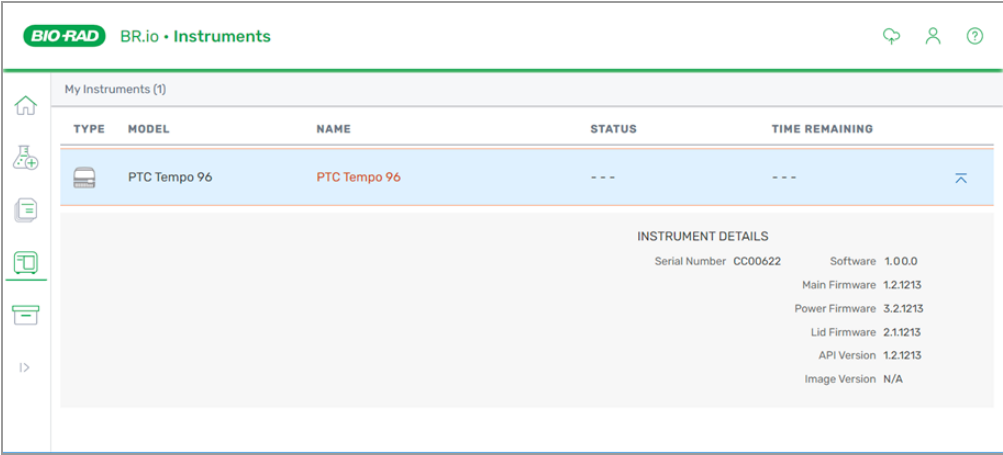
5. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

When the PTC Tempo thermal cycler successfully links to the BR.io

- The BR.io icon appears in the bottom left corner of the Home screen:



In the BR.io app, the Instrument Manager displays the connected instrument:



Note: When you log into the PTC Tempo thermal cycler after establishing the BR.io account connection, you are automatically connected to your BR.io account. When you log in to your BR.io account, your thermal cycler appears in the instrument list. When you log out of the PTC Tempo thermal cycler, your thermal cycler is removed.

Disconnecting the PTC Tempo Thermal Cycler from Your BR.io Account

If you need to remove a PTC Tempo thermal cycler from your BR.io account, you must unlink your PTC Tempo thermal cycler’s user account from the BR.io app.

To disconnect the PTC Tempo thermal cycler from your BR.io account

- 1. From the Home screen, tap Tools, then in the User screen tap User Profile.
The User Profile screen appears.
- 2. In the BR.io Account section, tap ⓘ to expand the dialog box.
- 3. Tap Unlink.
A status dialog appears to confirm your PTC Tempo thermal cycler user account is unlinked from BR.io.
- 4. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

Managing User Accounts

The PTC Tempo thermal cyclers Admin user can perform limited user management tasks. From the User Profile screen, the Admin user can create his own password. From the User Management screen, the Admin user can

- Enable secure user mode for all users
- Change a user's role
- Reset a user's password
- Create and delete user accounts

This section explains how to set the Admin password and manage user accounts.

Setting the Admin Password

Important: The default Admin user does not have a password. Bio-Rad strongly recommends that the user who assumes the Admin role immediately set a password and store that password in a password safe. Bio-Rad strongly recommends that you assign the Admin role to another user. Resetting the Admin password requires a call to Bio-Rad Technical Support.


PTC Tempo thermal cyclers passwords can be any combination of alphanumeric characters. Passwords must be between 4–50 characters and are case-sensitive.

Note: If you plan to connect to Bio-Rad's BR.io app or a shared network drive, you must have a password.

To add the Admin password

1. Log in as an Admin user.
2. On the Home screen, tap Tools to open the Admin Tools screen.
3. Tap the arrow on the right side of the screen to display the User Tools screen then tap User Profile.

The User Profile screen appears.

4. In the PTC Tempo thermal cyclers Password section, tap the  icon and then tap Change Password.
5. In the Create Password dialog box, type and confirm your password using the alphanumeric keyboard that appears, tap Save Password, and then tap OK.
6. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

To change the Admin password

1. In the PTC Tempo thermal cycler Password section on the User Profile screen, tap Change Password.
2. Type your current password using the alphanumeric keyboard that appears, and then tap OK.
The Change Password dialog box appears.
3. Type and confirm your new password, tap Save Password, and then tap OK.
4. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

Changing User Settings

To limit and control access to the PTC Tempo thermal cyclers, the admin user can enable Secure User mode. When enabled

- The Guest user is not available for use
- All logged-in users must have a password
- Only users with the Admin role can create user accounts

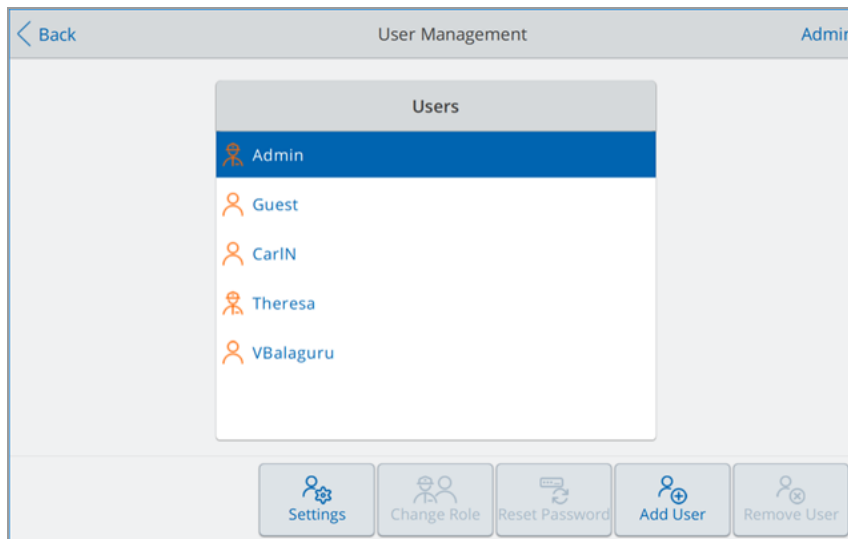
Secure User mode can be enabled or disabled at any time. If Secure User mode is enabled after users have created a personal login account, the thermal cycler confirms the user has already created a password.

Note: If a user does not have a password, the user is prompted at the next login to create a password before logging in. This applies to the Admin user as well.

To enable Secure User mode

1. Log in as an Admin user.
2. On the Home screen, tap Tools and then tap User Management.

The User Management screen appears.



3. Tap Settings.
4. On the Settings screen, select Enable Secure User mode and then tap OK.

Tip: The Guest user no longer appears in the Users list.

5. Tap Back to return to the Tools screen and then tap Home to return to the Home screen.

To disable Secure User mode

1. Log in as an Admin user.
2. On the Home screen, navigate to the Settings screen.
3. On the Settings screen, clear Enable Secure User mode and then click OK.

Tip: The Guest user reappears in the Users list.

Changing a User's Role

The PTC Tempo thermal cyclers ship with two default users: Admin and Guest. To reduce the usage of the default user Admin, PTC Tempo thermal cyclers enable you to assign the Admin role to a logged-in user. The logged-in user assigned the Admin role has the same privileges as the Admin. You can assign the role to one or more logged-in users.

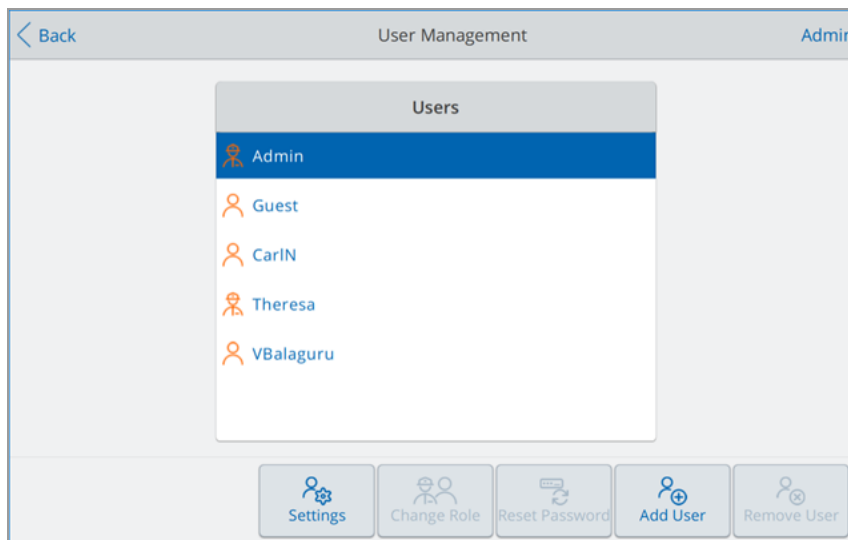
You can assign this role at any time. You can also revert this role at any time. When reverted, the user's privileges revert to those of the logged-in user.

Note: The Guest user cannot be assigned this role.

To change a user's role

1. Log in as an Admin user.
2. On the Home screen, tap Tools and then tap User Management.

The User Management screen appears.



3. Select the user's name and then tap Change Role.
4. On the Change Role screen, select the appropriate role and then tap OK.
5. Tap Back to return to the Tools screen and then tap Home to return to the Home screen.

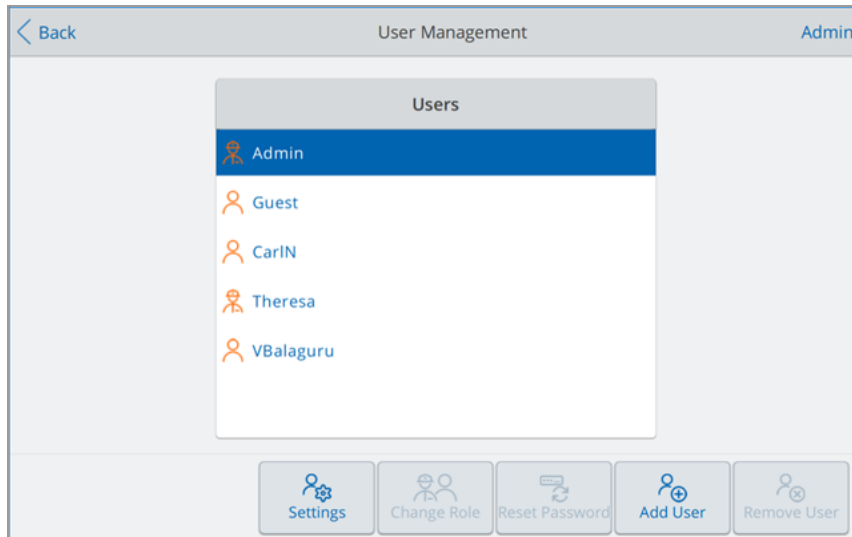
Resetting User Passwords

In the event that a user forgets his password, the Admin user can create a temporary password. When the user next logs in, the software prompts the user to reset their password. Users can change their password at any time and as often as they choose.

To change or add a password for another user

1. Log in as an Admin user.
2. On the Home screen, tap Tools then in the Admin Tools screen tap User Management.

The User Management screen appears.



3. Tap the targeted user name on the Users list.
 4. Tap Reset Password on the bottom toolbar.
- The Reset Password dialog box appears.
5. Type and confirm the temporary password using the alphanumeric keyboard that appears, and then tap Save Password.
 6. Tap Back to return to the Tools screen, and then tap Home to return to the Home screen.

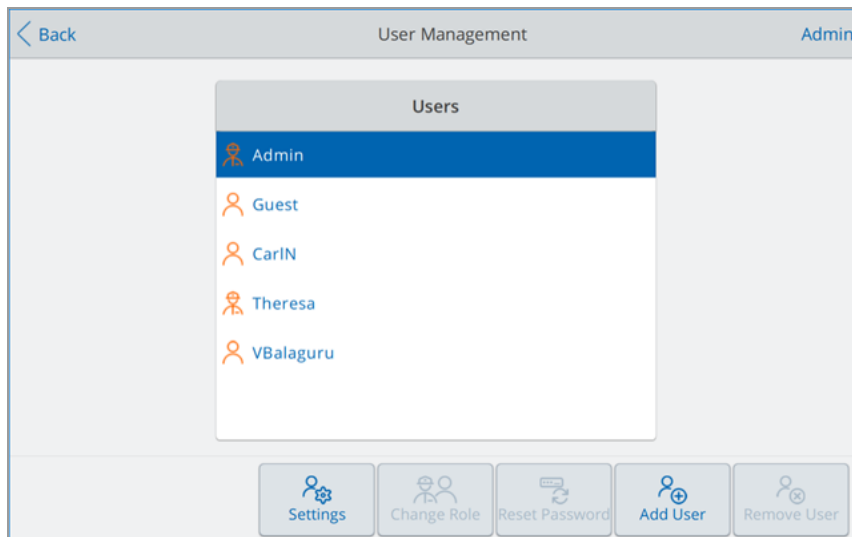
Creating User Accounts

Users with the Admin role can create user accounts on the PTC Tempo Thermal Cycler instruments at any time. When Secure User mode is enabled, only the Admin role can create user accounts. For more information about Secure User mode, [Changing User Settings on page 70](#).

To create a user account

1. Log in as an Admin user.
2. On the Home screen, tap Tools then tap User Management.

The User Management screen appears.



3. Tap Add User.
4. Using the alphanumeric keypad that appears, type a user name and then tap OK.

The name of the new user appears in the Users list.

Tip: New users do not have a password. They can create a password when they log in by following the procedure in [Setting User Passwords on page 61](#).

5. Tap Back to return to the Tools screen and then tap Home to return to the Home screen.

Deleting User Accounts



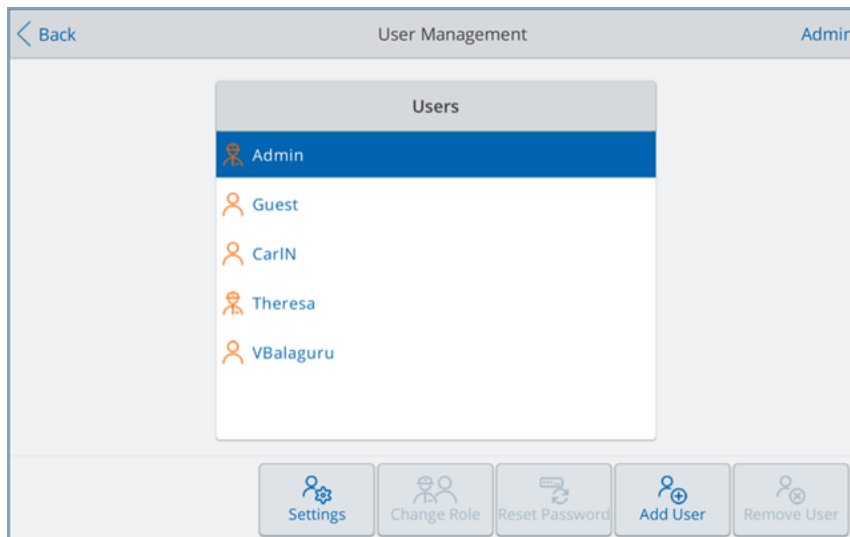
WARNING! Deleting users accounts from the PTC Tempo thermal cyclers also permanently deletes their protocols, run reports, and user data. Deleting user accounts from the PTC Tempo thermal cyclers also automatically unlinks that user from their BR.io account. Take care when deleting users from the thermal cyclers.

Note: You cannot delete the Admin or Guest user accounts.

To delete a user account

1. Log in as an Admin user.
2. On the Home screen, tap Tools then in the Admin Tools screen tap User Management.

The User Management screen appears.



3. Tap the targeted user name on the Users list.
4. Tap Remove User on the bottom toolbar.

A warning appears informing you that removing a user permanently deletes their user data.

5. Tap No to cancel the screen or Yes to remove the user account and permanently delete their data.
6. Tap Back to return to the Tools screen and then tap Home to return to the Home screen.

Chapter 4 Creating Protocols

Using the touch screen on the PTC Tempo thermal cycler, you can create and edit protocols, change step parameters, and set the sample volume and lid temperature.

For each protocol, you can add, edit, or remove any of the following parameters:

- Temperature gradients
- Temperature increments
- Ramp rate
- Extend time
- Alert beeps
- GOTO steps

A protocol can contain the following types of steps:

- Temperature — ramps to a target temperature at specified ramp rate and holds that temperature.
- Gradient — applies a temperature differential across the rows of the block.
- GOTO — creates a cycle of a specific number of repetitions between certain steps in the protocol.

The section [Parameters and Ranges for Protocol Steps on page 78](#) lists the options and ranges for protocol steps. Review the information in this section before creating your protocol.

Parameters and Ranges for Protocol Steps

Use the information in [Table 9](#) to modify the default settings for the steps in your protocol.

Temperature Steps

The target temperature is a value between 4.0 and 100.0°C, set in tenths of a degree. The thermal cycler ramps to this temperature and holds that value for a specified amount of time (the hold time).

Gradient Steps

The gradient range is the difference between the lower and upper temperatures in a gradient step. The maximum allowed range is 24°C. The lower temperature is a value between 30.0 and 99.0°C, set in tenths of a degree. The upper temperature range can be set from 31.0 to 100.0°C. The thermal cycler ramps to the target temperature gradient across the block and holds that temperature for a specified hold time.

Important: The instrument calculates the gradient value. When you enter a value in the gradient calculator's top and bottom fields, the software automatically calculates and assigns the temperatures for the remaining fields. When you enter a temperature in any field between the top and bottom field, the instrument automatically calculates the remaining fields. You cannot manually enter a temperature value in every field.

Table 9. Parameters and ranges for protocol steps

Parameter	Range	Description
Ramp rate	<ul style="list-style-type: none"> ■ For PTC Tempo 96 systems: 0.1–5°C per sec ■ For PTC Tempo Deepwell systems: 0.1–2.5°C per sec 	<p>Instructs the thermal cycler to ramp to the target temperature at the specified rate in that step.</p> <p>Available only to temperature steps.</p>
Increment	A number from –10.0 to 10.0°C per cycle in tenths of a degree	<p>Instructs the thermal cycler to change the target temperature of a step with each cycle, where a positive number increases the temperature and a negative number decreases the temperature.</p> <p>Available only to temperature steps in a GOTO cycle.</p>

Table 9. Parameters and ranges for protocol steps, continued

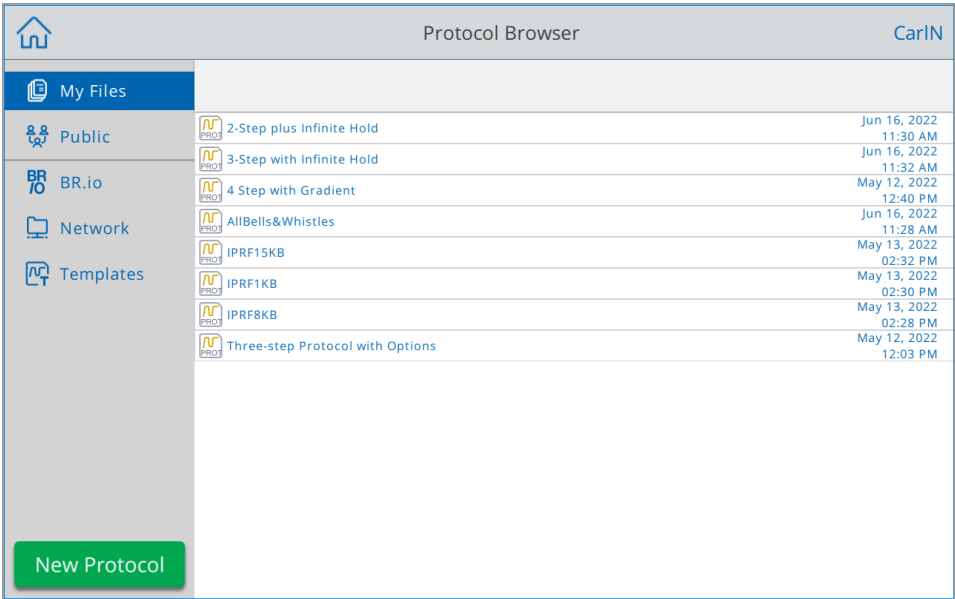
Parameter	Range	Description
Extend	A time from –60 to 60 sec per cycle	<p>Instructs the thermal cycler to extend the hold time with each cycle. A positive number increases the hold time and a negative number decreases the hold time.</p> <p>Available to both temperature and gradient steps.</p>
Beep	(No parameters)	<p>Instructs the thermal cycler to beep to signal that the thermal cycler has reached the target temperature for that step.</p> <p>Available to both temperature and gradient steps.</p>

Creating a Protocol

Important: While creating your protocol, take care when setting the sample volume and lid temperature. If the lid temperature is too high, the sample temperature might rise above the target temperature. For more information about these settings, see [Setting Sample Volume and Lid Temperature on page 92](#).

To create a protocol

- 1. On the Home screen, tap Protocols to open the Protocol Browser screen.



- 2. On the Protocol Browser screen, tap New Protocol to display the Protocol screen.

The screenshot shows the 'New Protocol' interface. At the top, there's a 'Back' button and the title 'New Protocol'. Below the title, there are input fields for 'Name: New Protocol', 'Volume: 20 µl', and 'Lid Temp: 105 °C'. The main area is divided into four columns representing steps. Step 1 is highlighted in green and contains '95 °C' and '3:00'. Step 2 contains '95 °C' and '0:10'. Step 3 contains '55 °C' and '0:30'. Step 4 is empty and contains '39 X'. An orange line connects the top of Step 1 to the top of Step 2, and another orange line connects the bottom of Step 1 to the bottom of Step 2. A 'GOTO Step 2' button is located at the bottom of Step 4. The bottom of the screen has buttons for 'Insert', 'Remove', 'Options', 'Save', and 'Next'.

- To set or change any of the following, tap its respective button or field and enter a value using the alphanumeric keypad that appears:

- **Name** — the name of the protocol. The name can consist of up to 32 alphanumeric characters.
- **Volume** — the sample/reaction volume in µl.

Note: The volume setting affects the control mode used to determine when the sample reaches the target temperature. For details, see [Sample Volume and Temperature Control Modes on page 92](#).

- **Temperature** — the target temperature of the step. For example:

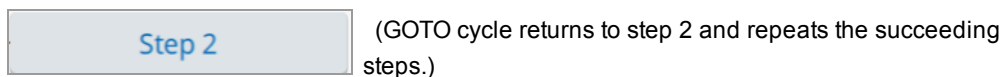
(target temperature set to 95°C)

- **Time** — the hold time of the step (between 1 sec and 17:59:59) in the format of HH:MM:SS. For example:

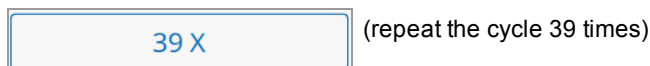
(hold time set to 10 sec)

Tip: To set an infinite hold on a step, tap the key.

- **GOTO step number** — (for GOTO steps only) the step number to which the GOTO cycle returns. For example:

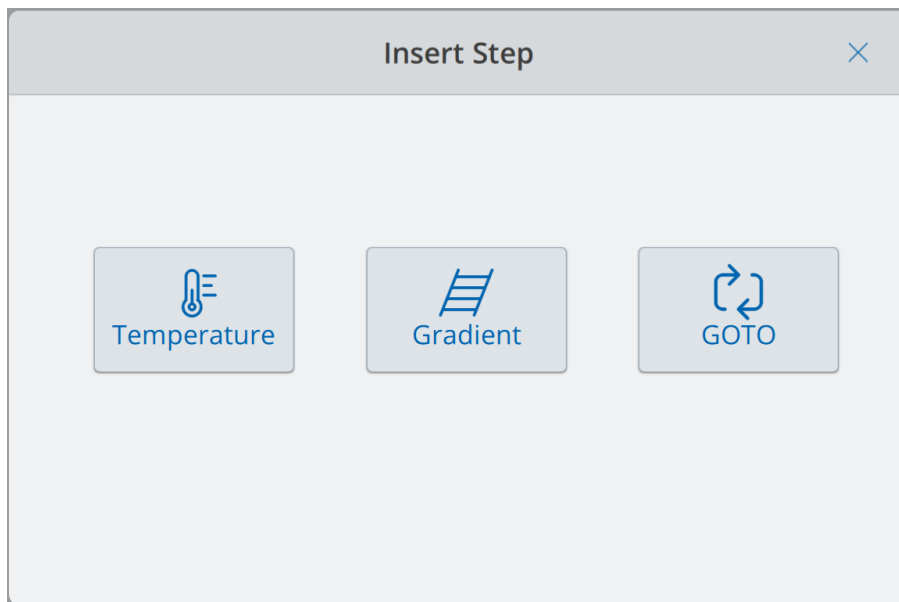


- **GOTO cycles** — (for GOTO steps only) the number of times to repeat the cycle. The default is 39 times. For example:



4. (Optional) If your protocol requires a new temperature, gradient, or GOTO step:
 - a. Select the step in the protocol that will precede the new step and tap Insert at the bottom of the screen.

The Insert Step dialog appears.



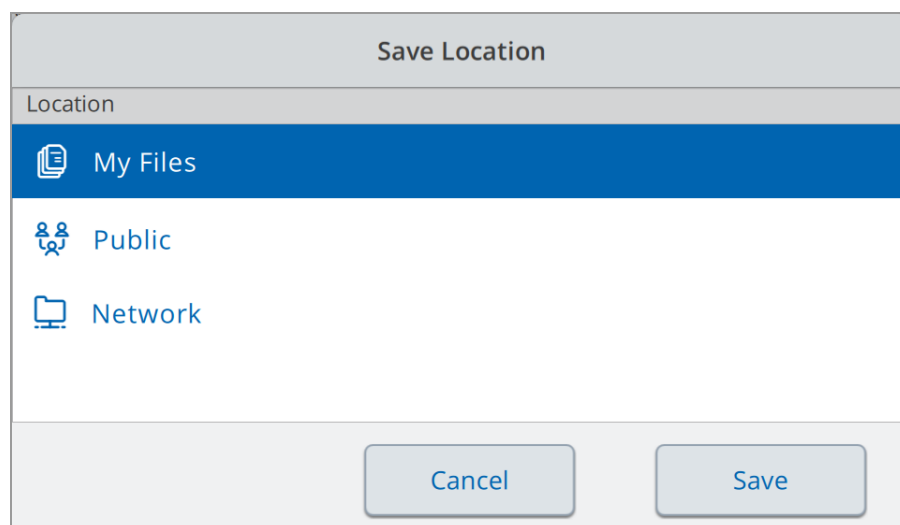
- b. Tap the type of step to insert.

The new step appears in the protocol, highlighted and to right of the selected step. The default temperature of the new step is 50°C and the default time is 30 sec (0:30). Tap time or temperature to edit the parameters in the new step.

5. (Optional) To delete a step, select the step and tap Remove at the bottom of the screen.

6. Tap Save to save the protocol.

The Save Location dialog box appears:



If you have a local user account, the default save location is your personal folder, which appears as My Files in the Save Location dialog box. Protocols that are saved in that folder are visible only to you. Files within your My Files folder are not available to or shareable with other users.

Alternatively, you can choose to save protocols to an attached USB drive or to a shared network folder if you have enabled this setting.

Finally, you can save protocols to the Public folder. Files that are saved in that folder are visible to and shareable with every PTC Tempo thermal cycler user who uses the instrument.

Important: Files saved to an alternate location are not concurrently saved on the PTC Tempo thermal cycler. Consider this before selecting the location.

For Guest users, the default save location is the Public folder. Guest users can save protocols only in the Public folder or to an attached USB drive.

Tip: For more information about managing files and folders, see [Chapter 6, Managing Files](#).

7. In the Save Location dialog box, select a location in which to save your protocol and tap Save.

Note: USB drives with Properties > Attributes manually set to Read-only can still be written to on PTC Tempo instruments.

8. In the New Protocol screen, tap Next to display the Run Setup screen.

You see

The screenshot shows the 'Run Setup' interface. At the top, there is a navigation bar with a back arrow, the title 'Run Setup', and the user name 'CarlN'. Below this, the 'Name' field is populated with '2-Step plus Infinite Hold'. To the right, 'Volume' is set to '20 µl' and 'Lid Temp' is set to '60 °C'. The main area contains three input fields: 'Run Name', 'Plate ID', and 'Notification' (which includes a checkbox and a speaker icon). At the bottom right, there are two buttons: 'Open Lid' with a lid icon and 'Run' with a right arrow icon.

9. Adjust the run settings as needed for your protocol:

- Sample volume
- Lid temperature
- (Optional) Run name

Tip: This is the name for the run file, separate from the protocol name.

- (Optional) Plate ID
- Notification after the run is complete

10. Tap Run to start the run.

Tip: The PTC Tempo thermal cycler detects whether reaction tubes are inserted on the sample block and displays a message if no tubes are detected.

For more information, see [Chapter 5, Running Protocols](#).

Modifying the Settings in a Protocol Step

While you create your protocol, you can modify the default settings for each step. You can add or remove any of the following:

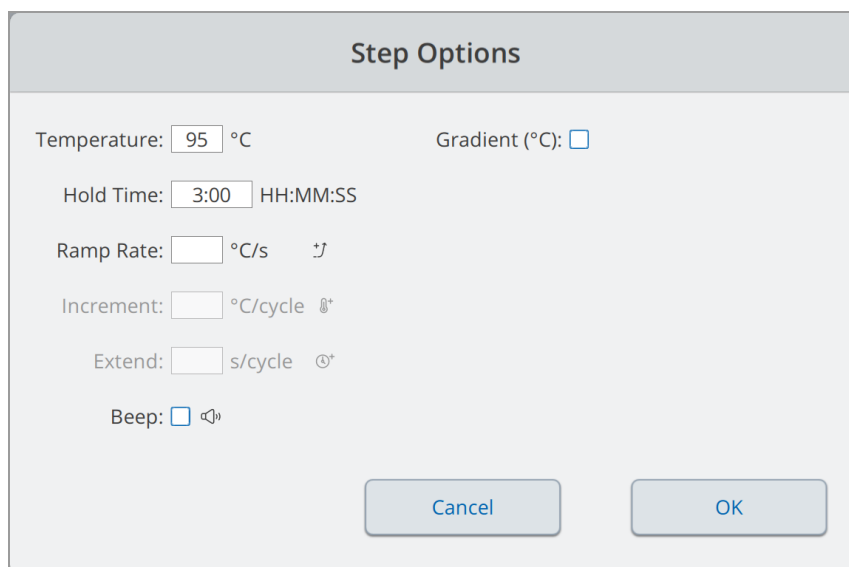
- Target temperature
- Hold time
- Temperature gradients
- Temperature increments
- Ramp rate
- Extend time
- Alert beeps

You can also modify the default settings of a GOTO step. These tasks are explained in the sections that follow.

Changing Target Temperature and Hold Time

To change the target temperature and hold time

1. Select the target step and then tap Options on the bottom toolbar to open the Step Options dialog box:



The image shows a 'Step Options' dialog box with a light gray background and a darker gray header. The header contains the text 'Step Options'. Below the header, there are several input fields and checkboxes. The first row has 'Temperature: 95 °C' and 'Gradient (°C):' followed by an unchecked checkbox. The second row has 'Hold Time: 3:00 HH:MM:SS'. The third row has 'Ramp Rate: °C/s' followed by a keypad icon. The fourth row has 'Increment: °C/cycle' followed by a keypad icon. The fifth row has 'Extend: s/cycle' followed by a keypad icon. The sixth row has 'Beep: ' followed by an unchecked checkbox and a speaker icon. At the bottom right, there are two buttons: 'Cancel' and 'OK'.

2. Tap the appropriate option and enter a new value in the keypad that appears.

3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Tip: Alternatively, tap the appropriate field in the target step and enter a new value in the keypad that appears. Tap OK to close the keypad and return to the protocol.

Adding or Removing a Temperature Gradient

To add a temperature gradient

1. On the protocol, select the target step and tap Options.

The Step Options dialog box appears.

Step Options

Temperature: 95 °C

Gradient (°C): ☐

Hold Time: 3:00 HH:MM:SS

Ramp Rate: °C/s ↕

Increment: °C/cycle ⬆

Extend: s/cycle ⌚

Beep: ☐ 🔊

Cancel

OK

2. In the Step Options dialog box, tap the Gradient checkbox. The gradient range appears to the right in the Step Options dialog box.

Step Options

Temperature:

Gradient (°C): ☒

A 100

B 99.8

C 99.2

D 98.2

E 97.1

F 96.2

G 95.5

H 95

Time: 3:00 HH:MM:SS

Ramp Rate: °C/s ↕

Increment: °C/cycle ⬆

Extend: s/cycle ⌚

Beep: ☐ 🔊

Plate Read: ☐ 📷

OK

3. To change the gradient range tap either the higher or lower value and enter a new value in the keypad that appears.

Important: The upper value of the gradient range must be within 24°C of the lower value.

4. Tap OK to confirm and close the keypad.
5. Tap OK to close the Step Options dialog box.
6. Tap Save to save the changes.

To remove the temperature gradient

1. On the protocol, select the gradient step and then tap Options.

The Step Options dialog box appears.

2. Clear the Gradient checkbox.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Adding or Removing the Ramp Rate

The ramp rate option instructs the thermal cycler to ramp to the target temperature at a specified rate in that step.

To emulate a thermal cycler that runs at a slower ramp rate than the PTC Tempo thermal cycler, change the ramp rate of the appropriate protocol step.

To add a ramp rate

1. On the protocol, select the target step and tap Options.

The Step Options dialog box appears.

2. Tap Ramp Rate and enter a value using the keypad that appears.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

To remove a ramp rate

1. On the protocol, select the ramp rate step and tap Options.
2. In the Step Options dialog box, tap Ramp Rate and then tap Off to clear the entry.

3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Adding or Removing a Temperature Increment

A temperature increment raises or lowers the target temperature of a step within each cycle.

To add a temperature increment

1. On the protocol, select the target step and tap Options.

The Step Options dialog box appears.

2. Tap Increment.
3. Enter an increment value using the keypad that appears.

Tip: A positive number increases the temperature, a negative number decreases the temperature.

4. Tap OK to confirm and close the keypad.
5. Tap OK to close the Step Options dialog box.
6. Tap Save to save the changes.

To remove a temperature increment

1. On the protocol, select the temperature increment step and tap Options.
2. In the Step Options dialog box, tap Increment and then clear the entry.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Adding or Removing an Extend Time Option

The Extend option instructs the thermal cycler to extend the hold time with each cycle.

To add or modify an Extend option

1. On the protocol, select the target step and tap Options.
The Step Options dialog box appears.
2. Tap Extend and type a value using the keypad that appears.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

To remove an Extend option

1. On the protocol, select the extend step and tap Options.
2. In the Step Options dialog box, tap Extend and then tap 0 (zero) to clear the entry.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Adding or Removing a Beep Alert

The PTC Tempo thermal cycler can emit a beep sound when it reaches the target temperature of a protocol step.

To add a beep alert

1. On the protocol, select the target step and tap Options.
The Step Options dialog box appears.
2. Tap the Beep checkbox to select it.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

To remove a beep alert

1. On the protocol, select the beep step and tap Options.
2. In the Step Options dialog box, tap Beep to clear the checkbox.
3. Tap OK to confirm and close the keypad.
4. Tap OK to close the Step Options dialog box.
5. Tap Save to save the changes.

Changing Parameters in a GOTO Step

The GOTO step instructs the thermal cycler to return to a specific step in the protocol and repeat the series of steps a specified number of times. This creates a cycle in the PCR experiment. The GOTO step in Step 4 in the following image instructs the thermal cycler to return to Step 2 and perform 34 additional repeats, for a total of 35 cycles.



To change parameters in a GOTO step

1. To change the return-to step, tap **Step** in the GOTO step and type the new step number using the keypad that appears.
2. Tap OK to confirm and close the keypad.
3. To change the number of repeats, tap the repeat **X** on the GOTO step and type a new value.
4. Tap OK to confirm and close the keypad.
5. Tap Save to save the changes.

Setting Sample Volume and Lid Temperature

Important: If the lid temperature is too high, the sample temperature might rise above the target temperature.

Sample Volume and Temperature Control Modes

The PTC Tempo thermal cycler uses one of two control modes to determine when the sample reaches the target temperature:

- **Calculated mode** — when a sample volume setting is greater than zero, the PTC Tempo thermal cycler calculates the sample temperature based on the sample volume. Bio-Rad recommends using the calculated mode because it most accurately represents the actual sample temperature.
- **Block mode** — when a sample volume setting is zero (0) μl , the PTC Tempo thermal cycler assumes that the sample temperature is the same as the measured block temperature.

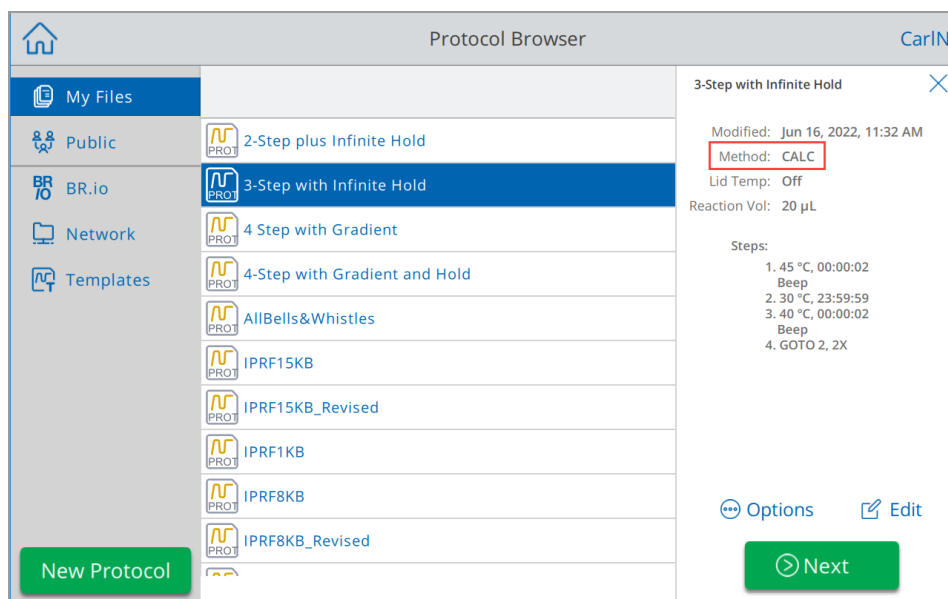
To change the sample volume

1. On the New Protocol or Edit Protocol screen, tap Volume at the top of the screen and type a new value using keypad that appears.
2. Tap OK to confirm and close the keypad.

To view the control mode setting for a saved protocol

1. From the Home screen, tap Protocols to open the Protocol Browser screen.
2. Tap the folder in which the protocol or run file resides, and then tap the file's name to view its details.

For example, the image that follows shows that the 3-Step with Infinite Hold protocol uses the CALC (calculated) control mode:



Lid Temperature

Note: For the PTC Tempo 96 and PTC Tempo Deepwell thermal cyclers, Bio-Rad recommends a lid temperature of 105°C.

The PTC Tempo thermal cycler's adjustable heated lid allows you to control the lid temperature. Heating the lid prevents condensation from forming inside the sample wells. When the PTC Tempo thermal cycler is running, the heated lid maintains the temperature specified for the protocol being run. Without a heated lid, water from the reagents can be lost to condensation, concentrating the reactants in the tube or plate.

The default lid temperature is 105°C for the PTC Tempo 96 and PTC Tempo Deepwell sample blocks.

Note: When the block is running an infinite hold at a temperature below 30.0°C for the last step in the protocol, the lid heater maintains 31.0°C.

To change the lid temperature

1. On the New Protocol or Edit Protocol screen, tap Lid Temp at the top of the screen and type a new value using keypad that appears.
2. Tap OK to confirm and close the keypad.

Editing a Protocol

You can edit any parameter within an existing protocol. You can then save it with the same name into the same or a different folder, or you can rename the protocol and save it into any folder. A renamed protocol does not overwrite the original protocol.

Tip: You edit a protocol located in your shared network folder. As well, you can edit an existing protocol located in your network folder and then save it with a new name to create a new protocol.

Caution: Saving a protocol with the same name in the same folder overwrites the original protocol. You can have multiple protocols with the same name as long as they are saved in different folders.

The PTC Tempo thermal cycler provides two options with which to edit a protocol:

- Direct interaction with buttons that appear on the protocol:
 - On temperature and gradient steps, tap the temperature and step time buttons to set these parameters. More options are available in the Options dialog.
 - On GOTO steps, tap the step number button to change the step at which the GOTO cycle begins. Tap the cycles button to change the number of cycles to repeat.
- Tap Options on the bottom toolbar to open the Step Options dialog box, which provides access to all options available for the selected step.

Chapter 5 Running Protocols

From the PTC Tempo thermal cycler you can

- Run a new protocol
- Run a saved protocol
- Run a protocol created on BR.io
- Rerun a protocol from its run report
- View the status of a run
- Pause and resume a run
- Skip steps in a run
- Stop a run

This chapter explains how to perform these tasks using the PTC Tempo thermal cycler's touch screen.

Note: Always check the sample block for condensation and clean before beginning the next run.

Running a Protocol

PTC Tempo thermal cycler offers several options for running a protocol:

- Run a new protocol.
- Run a saved protocol.
- Run a protocol from its run report.
- Run a protocol from your BR.io account.

This section explains these options in detail.

Running a New Protocol

To create and run a new protocol, see [Creating a Protocol on page 80](#).

Running a Saved Protocol

Using the PTC Tempo thermal cycler's Protocol Browser feature, logged-in users can select and run protocols that are saved locally in their My Files folder, an attached USB drive, or a shared network folder.

Guest users can run protocols saved in the Public folder or an attached USB drive.

Admin users can run saved protocols from any local folder, an attached USB drive, or a shared network folder.

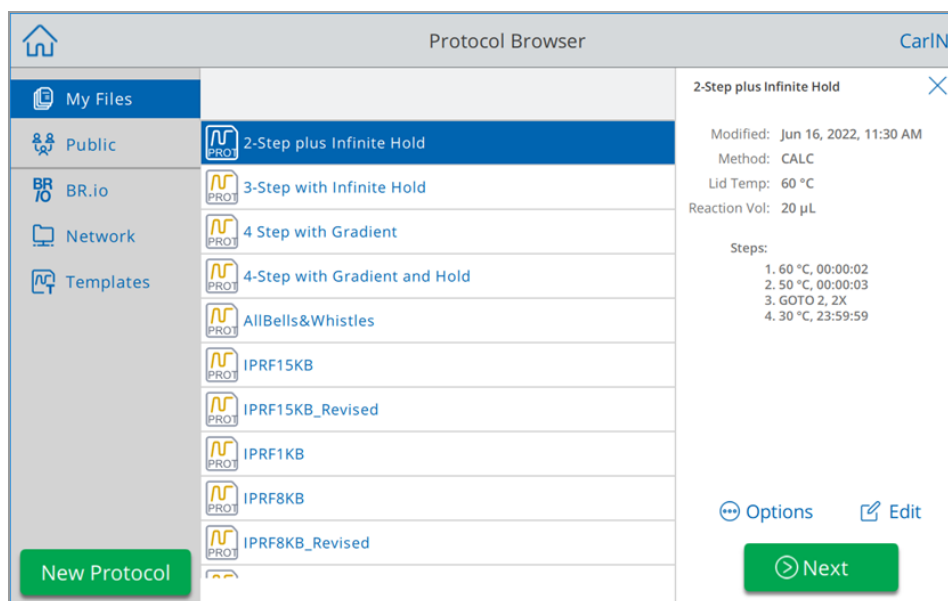
Important: The PTC Tempo thermal cycler considers single quote marks (') as invalid characters. As well, the PTC Tempo thermal cycler does not support protocols names greater than 32 characters in length. If you are running a protocol from an attached USB drive or a shared network drive that contains a single quote mark and/or more than 32 characters in its name, you must return to the location of the original protocol and rename it before starting the run.

Note: In the case of running from a USB drive:

1. Remove the USB drive from the PTC Tempo thermal cycler.
2. Insert the USB drive into the computer from which you copied the original protocol.
3. Copy the renamed protocol onto the USB drive.
4. Reinsert the USB drive into the PTC Tempo thermal cycler and start your run again.

To run a saved protocol

1. On the Home screen, tap Protocols to open the Protocol Browser screen.
2. Tap the location in which the protocol is saved and then tap the file name to select it.



3. Tap Next.

The Run Setup dialog box appears.

< Back
 Run Setup
 CarlN

Name: 2-Step plus Infinite Hold
 Volume: 20 µl
 Lid Temp: 60 °C

Run Name:

Plate ID:

Notification: ☐

Open Lid
 Run

4. Adjust the run settings as needed for your experiment:

- Sample volume
- Lid temperature
- (Optional) Run name

Note: The run name is limited to 50 characters.
- (Optional) Plate ID
 - Tap the Plate ID field and manually enter the plate ID in the alphanumeric keyboard that appears and then tap OK to accept the plate ID and close the keyboard.
 - Use a USB barcode scanner to scan the plate's barcode into this field:
 - a. Connect a barcode scanner to one of the thermal cycler's USB ports.

Note: The PTC Tempo thermal cycler only supports barcode scanners that are ready to use when connected.
 - b. Tap the Plate ID field to view the Plate ID alphanumeric keyboard.
 - c. Tap the text field in the keyboard and then scan the barcode to insert the barcode into the text field.
 - d. Tap OK to accept the barcode and close the keyboard.

- Beep notification after the run is complete:



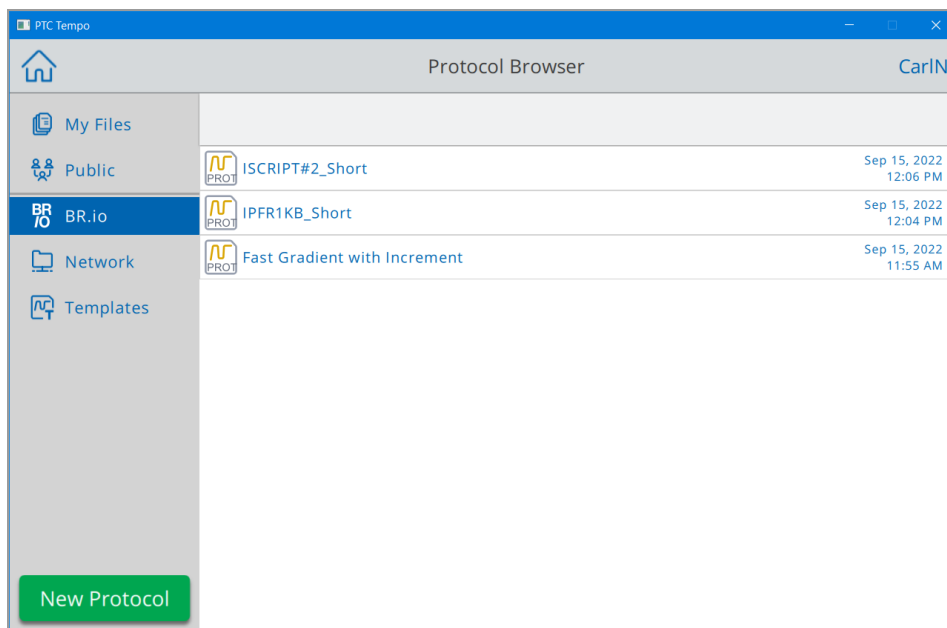
5. As needed, tap Open Lid (and Close Lid) to insert the plate in the sample block.
6. Tap Run to start the run.
7. When the run completes, the Status screen displays Protocol Complete.

Running a Protocol from Your BR.io Cloud Account

Important: The PTC Tempo thermal cycler considers single quote marks (') as invalid characters. If your protocol name contains a single quote mark, it will be substituted with an underscore (_). The PTC Tempo thermal cycler does not support protocols names greater than 32 characters in length. If your protocol name contains more than 32 characters, the PTC Tempo thermal cycler truncates all characters after the 32nd.

To run a protocol from your BR.io account

1. Make sure you have connected your PTC Tempo thermal cycler's user account to your BR.io account. For details, see [Connecting to Your Bio-Rad BR.io Account on page 65](#).
2. On the Home screen, tap Protocols to open the Protocol Browser screen.
3. In the Protocol Browser's left navigation pane, tap the BR.io icon to display the protocols, and then tap the protocol you want to run.



4. Tap Next.

The Run Setup dialog box appears.

5. Adjust the run settings as needed for your experiment.

See [Running a Saved Protocol on page 96](#) for more information.

6. If necessary, insert the plate in the sample block.

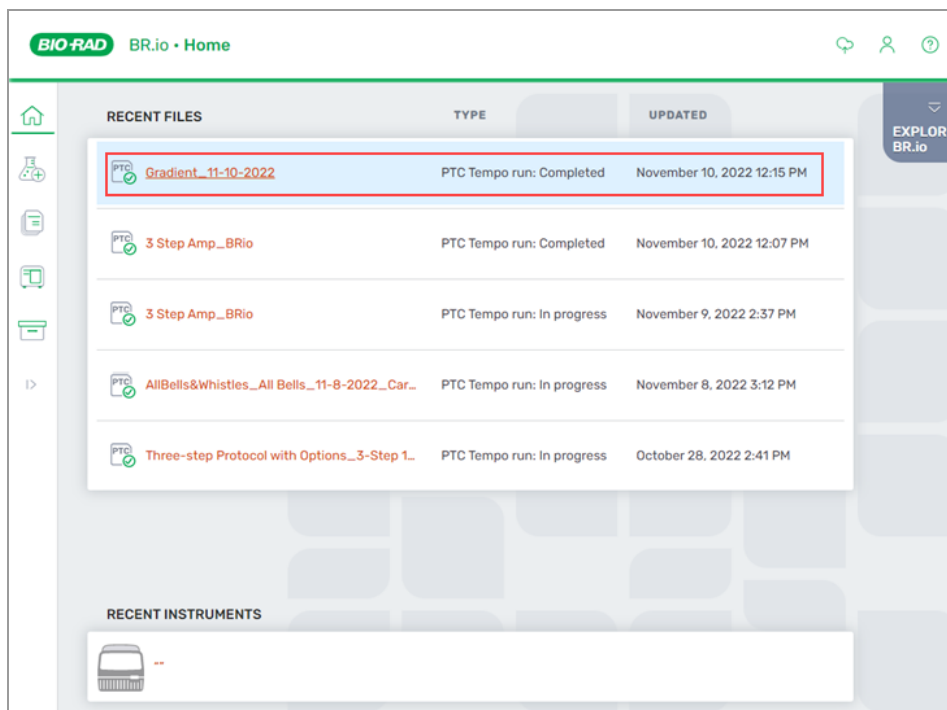
7. Tap Run to start the run.

While the run is in progress, the instrument status in your BR.io app is Running.

8. When the run completes, the run report is saved to your BR.io account as well as on the PTC Tempo thermal cycler.

Note: In the event of an interruption to the PTC Tempo thermal cycler/BR.io connection while your protocol is running and the connection is not restored before the end of the run, the run report is automatically saved to the instrument. When connection is reestablished, the run report is then automatically uploaded to your BR.io account.

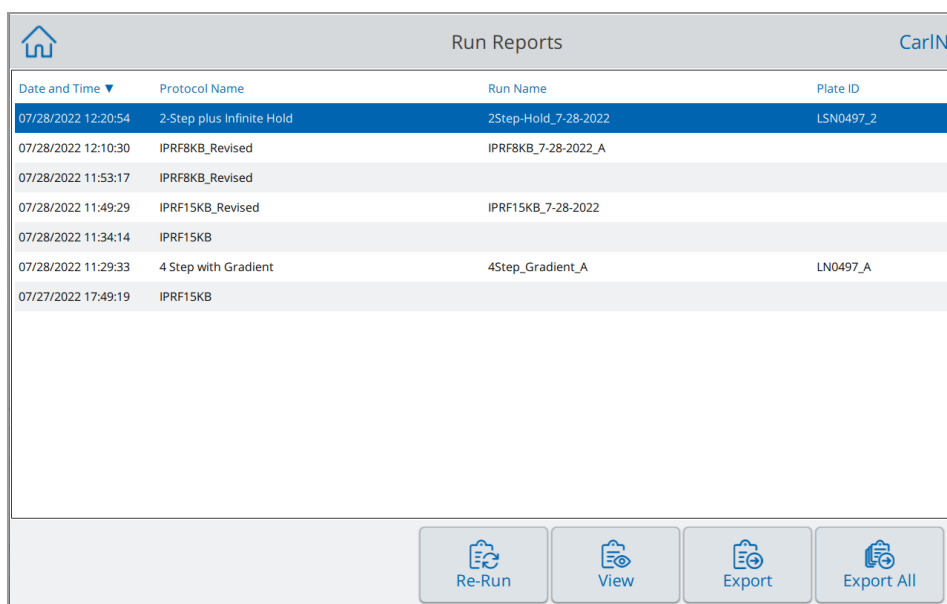
The run report is available in your BR.io Files list.



Running a Completed PTC Tempo Thermal Cycler Protocol from its Run Report

To run a completed PTC Tempo thermal cycler protocol

1. On the Home screen, tap Run Reports to open the Run Reports screen.



Date and Time ▼	Protocol Name	Run Name	Plate ID
07/28/2022 12:20:54	2-Step plus Infinite Hold	2Step-Hold_7-28-2022	LSN0497_2
07/28/2022 12:10:30	IPRF8KB_Revised	IPRF8KB_7-28-2022_A	
07/28/2022 11:53:17	IPRF8KB_Revised		
07/28/2022 11:49:29	IPRF15KB_Revised	IPRF15KB_7-28-2022	
07/28/2022 11:34:14	IPRF15KB		
07/28/2022 11:29:33	4 Step with Gradient	4Step_Gradient_A	LN0497_A
07/27/2022 17:49:19	IPRF15KB		

Re-Run View Export Export All

2. Select the protocol you want to rerun and tap Re-Run.

The Run Setup dialog box appears.

< Back
Run Setup
CarlN

Name: 2-Step plus Infinite Hold
Volume: µl
Lid Temp: °C

Run Name:

Plate ID:

Notification: ☐

Open Lid

Run

3. Adjust the volume and lid temp settings as needed for your experiment and tap Run.

Tip: To differentiate the second run report on the Run Reports screen from the original if you did not change the name, view the time stamp on the protocol name, for example:

Run Reports			
Date and Time ▼	Protocol Name	Run Name	Plate ID
07/28/2022 12:46:26	2-Step plus Infinite Hold	2Step-Hold_7-28-2022	LSN0497_2
07/28/2022 12:20:54	2-Step plus Infinite Hold	2Step-Hold_7-28-2022	LSN0497_2
07/28/2022 12:10:30	IPRF8KB_Revised	IPRF8KB_7-28-2022_A	
07/28/2022 11:53:17	IPRF8KB_Revised		
07/28/2022 11:49:29	IPRF15KB_Revised	IPRF15KB_7-28-2022	
07/28/2022 11:34:14	IPRF15KB		
07/28/2022 11:29:33	4 Step with Gradient	4Step_Gradient_A	LN0497_A
07/27/2022 17:49:19	IPRF15KB		

Re-Run

View

Export

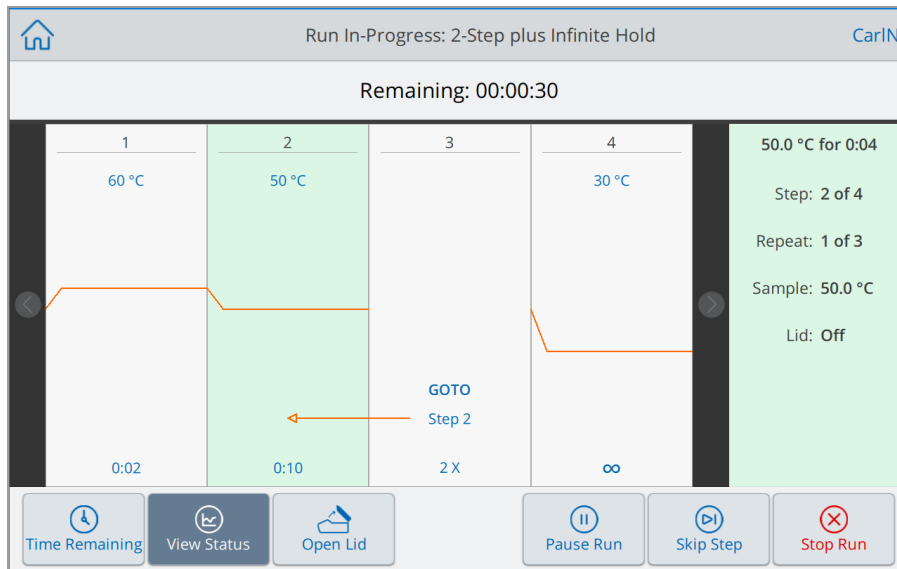
Export All

Monitoring a Run

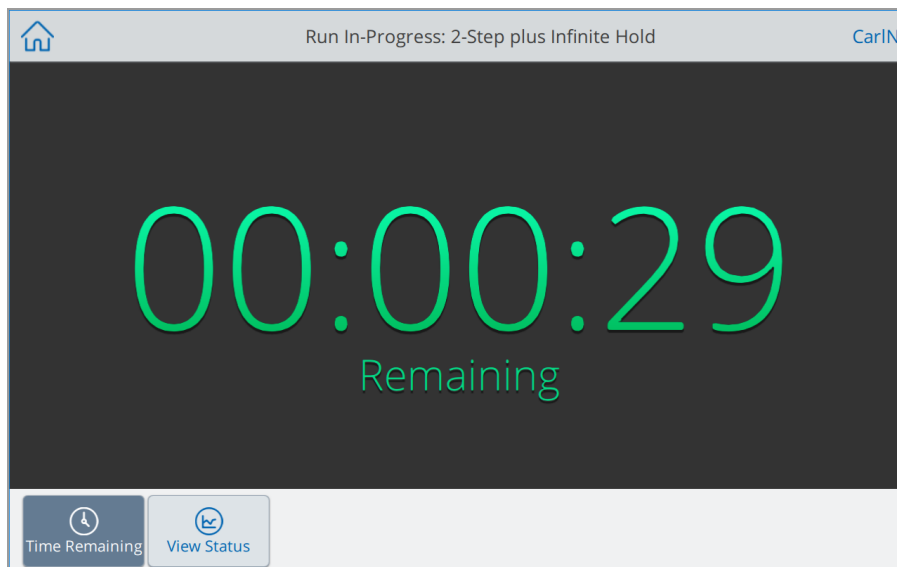
During a run, you can use the status buttons on the Home screen to monitor the run.

To monitor a running protocol

1. To see the detailed status of a run in progress, tap Run Status on the Home screen.



2. To view the remaining time for the run, tap Time Remaining.



Pausing a Run

From its status screen, you can temporarily pause a run in progress. While the run is paused, the PTC Tempo thermal cycler continues to heat or cool to the target temperature if it has not been reached, and also maintains the lid temperature.

Tip: After a power failure, the PTC Tempo thermal cycler displays a warning message. When the power resumes, the thermal cycler automatically resumes the run from the point in the protocol that was in progress at the time of the power failure.

Important: Pausing a step can adversely change the outcome of the PCR reaction. If the protocol is paused during a temperature step, the PCR reaction stays at the target temperature for a longer hold time than the protocol step requires.

To pause or resume a running protocol

1. On the Home screen, tap Run Status.
The Run In-Progress screen appears.
2. On the Run In-Progress screen, do one of the following:
 - Tap Pause to pause the running protocol.
 - Tap Resume to resume the protocol.

Skipping Steps in a Protocol

From the status screen, you can skip steps in a protocol while it is running if it is necessary to shorten the protocol.

Notes:

- If the PTC Tempo thermal cycler is currently in an infinite hold, tap Skip Step to exit the hold.
- If you tap Skip Step while in a GOTO step, the software exits the GOTO loop and continues to the next step in the protocol.

To skip a step in a running protocol

1. If necessary, on the Home screen, tap Run Status to display the Run In-Progress screen.
2. Tap Skip Step to skip to the next step. If in a GOTO cycle, skip out of the cycle and to the next step in the protocol.

Tip: To skip more than one step, tap Skip Step multiple times.

Stopping a Run

You can stop a protocol while it is running. When the protocol is stopped, the block immediately stops changing temperature.



WARNING! Do not open the lid immediately after stopping a run. Opening the lid while samples are still hot can allow pressurized containers to leak, spray, or spurt liquid. Always allow the samples to cool before opening the lid.

To stop a run in progress

1. Tap Run Status on the Home screen.
The Run In-Progress screen appears.
2. Tap Stop Run.

Incubating Samples

PTC Tempo thermal cycler provides a default Incubate protocol that you can use to incubate samples at a constant temperature for any amount of time. The default incubation temperature is 50°C and the default length of time is infinite. You can change these default settings or modify the settings to meet your specific needs.

Changes made by the logged in user are persisted for that user. Changes made by the Guest user are not persisted. The next person logging in as Guest will always see the default settings.

Note: Incubating samples for extended periods of time at 4–10°C, particularly in areas of high humidity, can cause excessive moisture condensation around the block. Clean any condensation that might have formed before running another protocol.

To incubate samples at a single temperature

1. On the Home screen, tap Incubate.
The Incubate screen appears.

The screenshot shows the 'Incubate' screen with the following settings:

- Temperature: 50 °C
- Hold Time: ∞ HH:MM:SS
- Lid Temperature: 100 °C
- ☐ Hold at 4 °C after incubate

At the bottom right, there are two buttons: 'Open Lid' (with a lid icon) and 'Run' (with a play icon).

2. Adjust the run settings as needed to incubate your sample.

Note: When incubation occurs at temperatures below 30°C, the lid maintains a temperature of 31°C to prevent excessive condensation.

3. If you modified the Hold time for a selected temperature and want to set an Infinite hold for another temperature to start after the time ends:

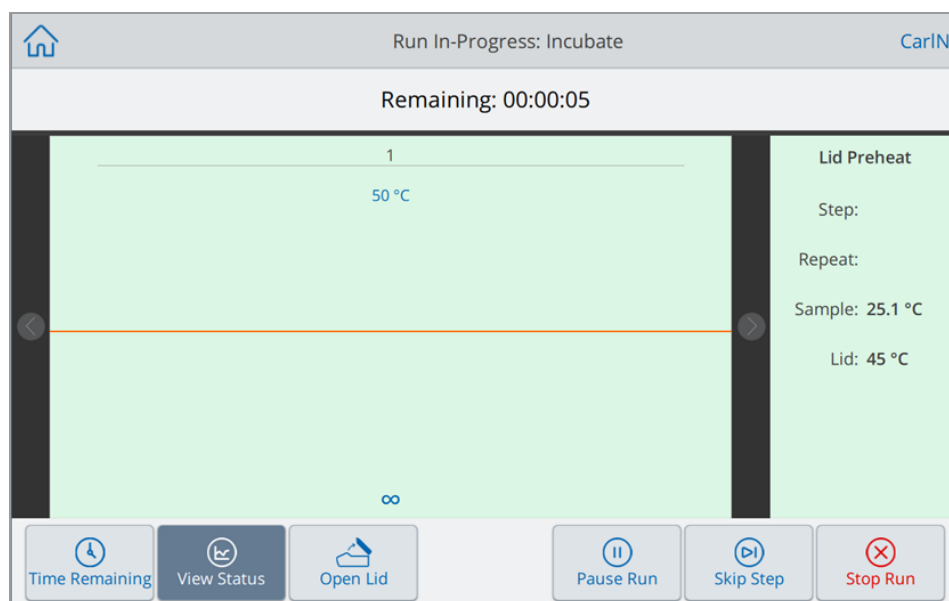
- a. Select the Hold at 4 °C after incubate checkbox.
- b. (Optional) Change the hold temperature.

This creates a two-step Incubate protocol; the first step incubates the sample for the specified temperature and time, the second step sets an infinite hold at the specified temperature.

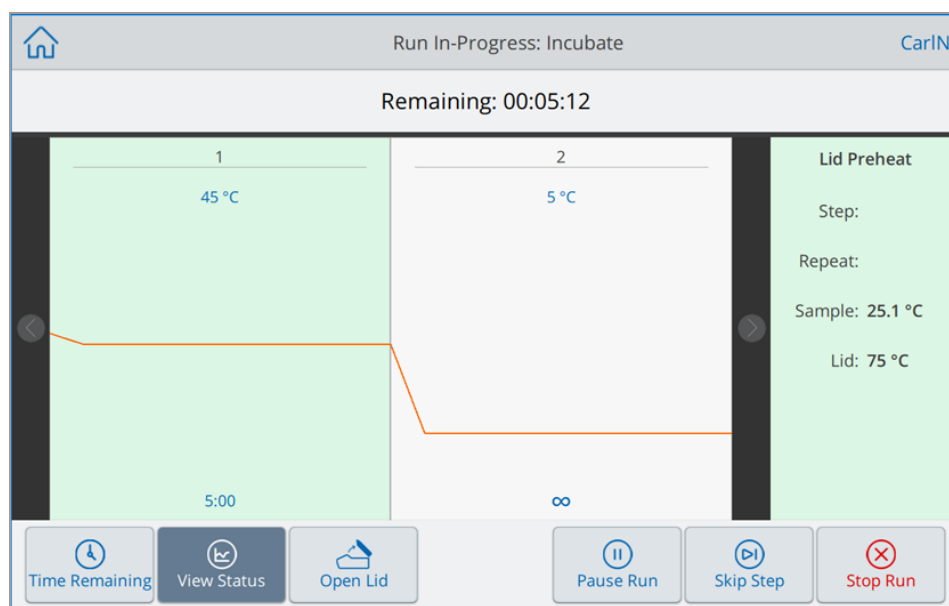
4. Tap Run to start the incubation.

The Run In-Progress: Incubate screen appears.

- If you did not select the Hold at checkbox on the Incubate screen, you see



- If you did select the Hold at checkbox on the Incubate screen, you see



5. To stop incubation, tap Stop Run.

When you stop the run, the system logs the Incubate run in the System log and creates a run report.

Note: If the final step is set to Infinite, you must manually stop the Incubate run.

Chapter 6 Managing Files

Using the PTC Tempo thermal cycler's protocol browser feature, you can

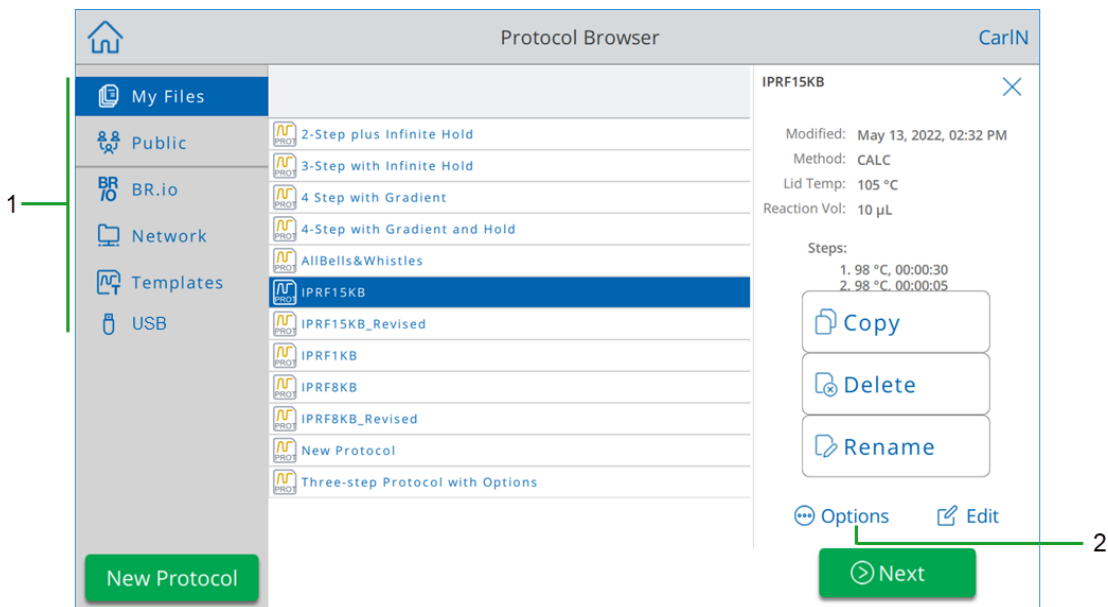
- Save protocols directly on the PTC Tempo thermal cycler or to a connected USB drive or shared network drive
- Copy protocols from a shared network drive
- Copy protocols to and from a connected USB drive
- Rename protocols on the thermal cycler
- Delete unnecessary protocols from the thermal cycler

This chapter explains how to manage protocols on the PTC Tempo thermal cycler.

The Protocol Browser Screen

On the PTC Tempo thermal cycler, you manage protocols using the Protocol Browser screen.

To view the Protocol Browser, tap Protocols on the Home screen.



The Legend table [on page 110](#) describes the Protocol Browser screen in detail.

LEGEND

- 1 **Directories** — Potential directories:
 - **My Files** — file storage available only to the person logged in to the PTC Tempo thermal cycler.
Tip: This option is not available to users who do not have a local account (that is, users logged in as Guest).
 - **Public** — file storage available to all users. Use this directory to share files across users.
Tip: This option is available to users who do not have a local account (that is, users logged in as Guest).
 - **BR.io** — contains protocols available in the BR.io account for the logged in user only; requires a BR.io account and a connection to the account (for details, see [Connecting to Your Bio-Rad BR.io Account on page 65](#)).
 - **Network** — file storage on a network drive connected to the PTC Tempo thermal cycler via Ethernet or wireless communication (for details, see [Setting Up a Connection to a Shared Network Drive on page 62](#)).
 - **Templates** — contains conventional PCR protocols that Bio-Rad supplies. This option is available to all users. The folder and the protocols within are read-only. You cannot add to or remove protocols in this folder. You cannot edit the protocols within the folder.
 - **USB** — file storage on a portable USB storage device connected to the PTC Tempo thermal cycler.

- 2 **File management options** — after selecting a file, the file details pane appears. Management options include:
 - **Copy** — copies the existing file to a specified location
 - **Delete** — deletes the file from its current location
 - **Rename** — renames the file at its current location

Managing Files

To manage files, tap Protocols on the Home screen to open the Protocol Browser screen. [Table 10](#) lists all the file management functions available on the Protocol Browser screen.

Notes:

- The file management functionality is not available for files viewed in your BR.io folder.
- File names have a 32-character limit on the PTC Tempo thermal cycler.

Table 10. List of file and folder functions in the File Browser screen

Options	Function
File options	(all file actions occur locally on the instrument)
Copy	Copies the selected file to a specified location on the thermal cycler or to an attached USB drive. Note: USB drives with Properties > Attributes manually set to Read-only can still be written to on PTC Tempo instruments.
Delete	Deletes the file from its current location.
Rename	Renames the file at its current location.

Managing Files on the PTC Tempo Thermal Cycler

Using the PTC Tempo thermal cycler's Protocol Browser, you can copy, rename, and delete protocol files located

- Locally on the thermal cycler
- On an attached USB

Note: You cannot copy files to or from your BR.io account. When your PTC Tempo thermal cycler connects to your BR.io account, it automatically syncs with your account and displays a list of all current protocols that are compatible with your thermal cycler.

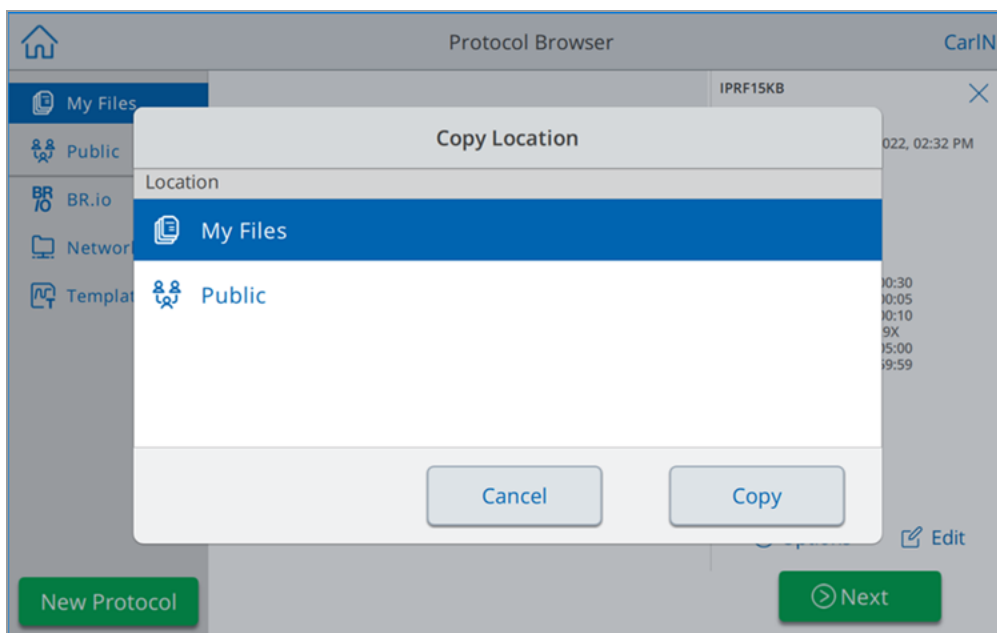
This section explains how to manage files on the PTC Tempo thermal cycler.

Copying Files

Note: You cannot copy protocols to a shared network folder or to your BR.io account. You can copy protocols from your network folder to a location on the thermal cycler.

Tip: Protocols copied to an attached USB saved as .pcri files.

1. On the PTC Tempo thermal cycler's Home screen, tap Protocols to view the Protocol Browser screen.
2. On the Protocol Browser screen, navigate to the file you want to copy, then tap the file to view the file details pane.
3. In the file details pane, tap Options and then tap Copy.



The Copy Location dialog box appears.

4. In the Copy Location dialog box, select a location in which to copy the protocol.
5. Tap Copy to copy the file to the selected location or Cancel to return to the Protocol Browser screen.

Note: If a file with the same name exists at the selected location, a message box appears. Tap Yes to overwrite the existing file or No to return to the Protocol Browser screen.

The PTC Tempo thermal cycler displays a confirmation message when the file is successfully copied.

Deleting a File

Note: You cannot delete protocols that are located in your shared network folder.

To delete a file

1. On the Home screen, tap Protocols to view the Protocol Browser screen.
2. On the Protocol Browser screen, navigate to the file you want to delete, then tap the file to view the file details pane.
3. In the file details pane, tap Options and then tap Delete.

The Delete confirmation message appears.

4. Tap Delete to confirm or Cancel to return to the File Browser screen.

The PTC Tempo thermal cycler displays a confirmation message when the file is successfully deleted.

Renaming a File

- You cannot rename protocols that are located in your shared network folder.
- The protocol files located in the Templates folder are read-only and cannot be renamed. However, you can copy a Template protocol file to another location, open the file and edit the parameters. You can then save the edited protocol with a new name.

To rename a file

1. On the Home screen, tap Protocols to view the Protocol Browser screen.
2. On the Protocol Browser screen, navigate to the file you want to rename, then tap the file to view the file details pane.
3. In the file details pane, tap Options, then tap Rename and type a new name for the file using the keypad that appears.
4. Tap OK to confirm.

Backing Up and Restoring Files

Using the PTC Tempo thermal cycler's protocol browser you can quickly back up and restore your protocol files to an attached USB drive or to a shared network folder. You can also export your run reports to an attached USB drive.

Tip: Bio-Rad recommends that you back up your files often, and to a location other than the PTC Tempo thermal cycler. Follow the recommended SOPs in place at your site.

To restore files that are lost during a power failure or system disconnection, see [Recovering Files on page 138](#).

Notes: You can back up and restore only one protocol file at a time.

To back up or restore files

1. With the target file open in the Protocol Browser screen, tap Options > Copy.
2. In the Copy Location dialog box, tap the target destination and then tap Copy.

File Storage

The PTC Tempo thermal cycler stores approximately 100,000 files including protocols and run reports on the thermal cycler. Protocols are saved locally in either your My Files folder or to the Public folder in the Protocol Browser. Up to 100 run reports per user are saved in the Run Reports viewer. For more information on how to recover protocol and run report files, see [Recovering Files on page 138](#).

Exporting Run Reports

When the run completes, the PTC Tempo thermal cycler creates and stores a run report of the protocol.

In the event of a system disconnection or interruption, the PTC Tempo thermal cycler memory can also recover up to 100 of the most recent protocol runs. These runs are logged into the run reports menu.

To export run reports

1. Insert a USB drive into a USB port on the PTC Tempo thermal cycler.
2. Log in to the PTC Tempo thermal cycler.
3. On the Home screen, tap Run Reports to open the Run Reports screen.
4. On the Run Reports screen, do one of the following:
 - To export a single run report, select the report in the Run Reports list and tap Export.
 - To export all run reports, tap Export All.

The run reports are saved as separate .pdf files to the folder PTC Tempo Run Reports on the attached USB drive.

Recovering Files

The PTC Tempo thermal cycler allows the Admin user to copy all protocol files and export all run reports to an attached USB drive. This section explains how to perform these tasks.

Note: Only an Admin user can export protocol files and run reports for all users.

Copying Protocol Files

To copy protocol files

1. Insert a USB drive into a USB port on the PTC Tempo thermal cycler.
2. Log in as an Admin user.
3. On the Home screen, tap Protocols to open the Protocol Browser screen.

4. In the left navigation pane, select the name of a user.

The protocols for that user appear in the middle pane.

5. For each protocol that you want to export:
 - a. Select the protocol in the middle pane.
 - b. In the right pane, select Options and then select Copy.
 - c. In the Copy Location dialog box, select the USB drive and click Copy.

The protocol file is saved to the attached USB drive as a .pcri file.

Note: You can only export one protocol file at a time. You must perform this procedure for each user on the thermal cycler, and for any protocol files saved to the Public folder.

After you copy the files, you can insert the USB drive into another Bio-Rad thermal cycler, open the USB drive and copy the files onto that thermal cycler.

Exporting Run Reports

To export run reports

1. Insert a USB drive into a USB port on the PTC Tempo thermal cycler.
2. Log in as an Admin user.
3. On the Home screen, tap Run Reports to open the Run Reports screen.
4. On the Run Reports screen, do one of the following:
 - To export a single run report, select the report in the Run Reports list and tap Export.
 - To export all run reports, tap Export All.

The run reports are saved as separate .pdf files to the folder PTC Tempo Run Reports on the attached USB drive.

Appendix A Catalog Numbers for PTC Tempo Thermal Cyclers and Accessories

This appendix lists the catalog numbers for the PTC Tempo thermal cyclers and accessories.

Instruments and Accessories

Table 11. Catalog numbers for PTC Tempo Thermal Cyclers and accessories

Catalog Number	Description
Instruments	
12015382	PTC Tempo 96 Thermal Cycler
12015392	PTC Tempo Deepwell Thermal Cycler
16007743	7' CAT6 Ethernet cable *
9007622	5' Power cord
	Wi-Fi Adaptor for use with PTC Tempo thermal cyclers Contact your Bio-Rad Sales representative for information about the adaptor specific to your locale or visit bio-rad.com/PTCTempo .
* For continued compliance with EMC standards only use Bio-Rad-approved Ethernet cables with this instrument.	

Appendix A Catalog Numbers for PTC Tempo Thermal Cyclers and Accessories

Appendix B Recommended Plastic Consumables

Recommended Plastic Consumables for PTC Tempo Thermal Cyclers

The PTC Tempo 96 and PTC Tempo Deepwell thermal cyclers accept low-profile 0.2 ml plates and tubes. For optimal results, Bio-Rad recommends the following consumables.

- HSP9655 — Hard-Shell™ low-profile 96-well skirted PCR plates with white shell and white well
- HSP9601 — Hard-Shell low-profile 96-well skirted PCR plates with white shell and clear wells
- TLS0801 — Low-profile 0.2 ml 8-tube PCR strips without caps, clear
- TLS0851 — Low-profile 0.2 ml 8-tube PCR strips without caps, white
- TCS0803 — Optical flat 8-cap strip, for 0.2 ml PCR tubes and plates

Plastic Consumables for PTC Tempo 96 Thermal Cyclers

These consumables are compatible with PTC Tempo 96 thermal cyclers. For optimal results Bio-Rad recommends the consumables listed in [Recommended Plastic Consumables](#).

- TBI0502 — 0.5 mL PCR Tubes, high profile, clear
- TFI0201 — 0.2 ml PCR Tubes with Flat Caps, high profile, clear
- TWI0201 — 0.2 ml PCR Tubes with Domed Caps, high profile, clear
- HSP96xx — Hard-Shell 96-Well PCR Plates, LOW profile, thin wall, skirted
- HSL96xx — Hard-Shell 96-Well PCR Plates, LOW profile, thin wall, SEMI-skirted
- HSL9605 — Hard-Shell 96-Well PCR Plates, low profile, semi-skirted, clear/white
- HSL9905 — Hard-Shell 96-Well PCR Plates, low profile, semi-skirted, clear/white Barcoded
- HSS96xx — Hard-Shell 96-Well PCR Plates, HIGH profile, thin wall, skirted
- HSS9901 — Hard-Shell 96-Well PCR Plates, HIGH profile, thin wall, skirted, Clear Barcoded
- MLP96xx — Multiplate HIGH Profile 96w unskirted plate

- MLL96xx — Multiplate LOW Profile 96w unskirted plate
- 12001925 — ddPCR™ 96-Well Plates (for PCR and QX200/QX100 Droplet Digital PCR System)

Plastic Consumables for PTC Tempo Deepwell Thermal Cyclers

These consumables are compatible with PTC Tempo Deepwell thermal cyclers. For optimal results, Bio-Rad recommends the consumables listed in [Recommended Plastic Consumables on page 121](#).

- TBI0502 — 0.5 mL PCR Tubes, high profile, clear
- TFI0201 — 0.2 ml PCR Tubes with Flat Caps, high profile, clear
- TWI0201 — 0.2 ml PCR Tubes with Domed Caps, high profile, clear
- HSP96xx — Hard-Shell 96-Well PCR Plates, LOW profile, thin wall, skirted
- HSL96xx — Hard-Shell 96-Well PCR Plates, LOW profile, thin wall, SEMI-skirted
- HSL9605 — Hard-Shell 96-Well PCR Plates, low profile, semi-skirted, clear/white
- HSL9905 — Hard-Shell 96-Well PCR Plates, low profile, semi-skirted, clear/white Barcoded
- HSS96xx — Hard-Shell 96-Well PCR Plates, HIGH profile, thin wall, skirted
- HSS9901 — Hard-Shell 96-Well PCR Plates, HIGH profile, thin wall, skirted, Clear Barcoded
- MLP96xx — Multiplate HIGH Profile 96w unskirted plate
- MLL96xx - Multiplate LOW Profile 96w unskirted plate
- 12001925 - ddPCR 96-Well Plates (for QX200/QX100 Droplet Digital PCR System)

Plate Seals and Plate Sealer

For optimal results, Bio-Rad recommends the following plate seals:

- MSB1001 — Microseal™ 'B' adhesive seals, optically clear (strong adhesive-based)
- MSC1001 — Microseal 'C' optical seals, optically clear (pressure-activated, adhesive-based)
- MSC1001 — Microseal 'F' optical seals, optically clear (pressure-activated, adhesive-based)
- 1814030 — Optically clear heat seal plate sealer
- 1814045 — Peelable Foil Heat Seal
- 1814040 — Pierceable Foil Heat Seal (for PCR and the QX200/QX100 Droplet Digital PCR System)

Appendix C Maintenance and Troubleshooting

This appendix explains how to clean and maintain the PTC Tempo Thermal Cycler and how to troubleshoot problems that you might have. If you need to return the thermal cycler to Bio-Rad, see [Returning the PTC Tempo Thermal Cycler to Bio-Rad on page 128](#).

Important: Cybersecurity is the protection of assets in cyberspace from cyberattacks.

Cybersecurity is Bio-Rad's ability to secure its people, information, systems, and reputation in cyberspace. Cyberspace is the always-on, technologically interconnected world; it consists of people, organizations, information, and technology.

Fast reaction is important with cybersecurity issues! If you suspect that there may be a cybersecurity issue concerning your instrument or that cybersecurity has been breached at your site, contact your Bio-Rad representative for technical support immediately.

Cleaning and Maintaining the PTC Tempo Thermal Cycler

The PTC Tempo thermal cycler requires little maintenance for proper operation and precise thermal control. However, with long and constant use, the thermal cycler will require some cleaning and other maintenance.

The PTC Tempo thermal cycler includes a sample block that must heat and cool quickly. Contamination of the sample block can interfere with thermal cycling.

Avoid contaminating your PTC Tempo thermal cycler by following these guidelines:

- Always clean the outside of any containers before placing them in the block.
- Never run a reaction with a seal that is open, loose, punctured, or otherwise damaged.
- Clean the sample block and inner lid periodically to prevent the buildup of dirt, biohazardous material, or fluorescent solutions (see [Table 13 on page 126](#)).



Fig. 1: PTC Tempo 96 and Deepwell sample block and lid






- Clean the outer surface of the PTC Tempo thermal cycler on a regular schedule to remove any debris or dirt that might interfere with proper function (see [Table 13](#)). Clean the thermal cycler to prevent damage to the air intake or sample bay.

Important: For instructions on handling and cleaning radioactive or biohazardous materials, consult the guidelines for radiation safety and biosafety provided by your institution. These guidelines also include hazardous materials disposal methods.

PTC Tempo Thermal Cycler Cleaning and Maintenance Safety Warnings

When cleaning and maintaining the PTC Tempo thermal cycler, always consider and follow the warnings listed in [Table 12](#) that follows.

Table 12. Cleaning and maintenance safety warnings

Warning	
	To prevent electrical shock, always turn off and unplug the instrument from the electrical outlet before cleaning it.
	A thermal cycler operates at temperatures high enough to cause serious burns. Always allow the entire instrument to return to room temperature before cleaning.
	When handling biohazardous or radioactive samples, adhere to the recommended precautions and guidelines specific to your laboratory and location. These guidelines should include cleaning, monitoring, and disposal methods for the hazardous material (s) you are using.
	In addition, as identified above, there is a small risk of explosion, or of expulsion of liquids or vapors from the sample container(s). When working with hazardous materials the risk of injury from expelled material is compounded with the risk that the hazardous material themselves could be dispersed in and around the instrument. Users should take appropriate precautions for such a situation.
	

PTC Tempo Thermal Cycler Maintenance

Table 13 lists the components of the PTC Tempo thermal cycler that require maintenance.

Table 13. PTC Tempo thermal cycler maintenance

Component	Action
Air vents	<p>Use a soft brush, damp cloth, or vacuum cleaner to remove light dust from the air vents. Remove any heavy dust that is deep in the vents with a vacuum cleaner.</p> <p>Tip: Cleaning the vents allows sufficient airflow for precise thermal control during a run.</p>
Touch screen	<p>Use any commercially available touch screen cleaning agent and a soft cloth to clean the touch screen.</p> <p>Note: Do not spray or pour cleaning agent directly onto the touch screen.</p> <p>Note: Do not use abrasive detergents or rough material because they can scratch the touch screen.</p>
Outside case of the thermal cycler	<p>Use a damp cloth or tissue to clean spills off the outside case. If needed, use a mild soap solution and remove the residue completely.</p> <p>Tip: Cleaning the outside case prevents corrosion.</p>

Table 13. PTC Tempo thermal cycler maintenance, continued

Component	Action
Sample block	<p>Important: Clean spills immediately to prevent them from drying inside wells.</p> <p>Note: Always check the sample block for condensation and clean before beginning the next run.</p> <p>Use disposable plastic pipettes with water (recommended), 95% ethanol, or a 1:100 dilution of bleach in water. Always rinse the wells with water several times to remove all traces of ethanol, bleach, or soap.</p> <p>Note: Consider the following when cleaning the sample block:</p> <ul style="list-style-type: none"> ■ If left in the block wells, bleach, ethanol, or soap could corrode the block and/or destroy tubes and microplates during a run. Always rinse the block thoroughly after cleaning it with any solution other than water. ■ Never clean the sample block with strong alkaline solutions (strong soap, ammonia, or highly concentrated bleach). Never use corrosive or abrasive cleaning solutions. These cleaning agents can damage the block, preventing precise thermal control. ■ Never heat the block with cleaning solution on or in it. Heating the block with cleaning solution damages the block and lid. <p>If oil is used, the wells must be cleaned thoroughly and often. Use of oil in the wells is not recommended. Use a solution of 95% ethanol to clean oil on the sample block. Do not allow oil to build up in the block.</p>

Returning the PTC Tempo Thermal Cycler to Bio-Rad

Important: Should you need to return your thermal cycler to Bio-Rad, your Bio-Rad Technical Support specialist will provide instructions and packaging material to prepare it for safe return. Before you return the thermal cycler, you must reinstall the shipping plate.

Important: Before you begin, ensure that you have completely exported all protocols and run reports to a USB drive.

To reinstall the shipping plate

1. Locate the shipping plate that you saved when you installed the thermal cycler.
2. Place the shipping plate onto the sample block and ensure that it is secure.
3. Close the lid and ensure the it is completely latched.
4. Log out of the thermal cycler and then shut down the PTC Tempo thermal cycler.
5. Follow the instructions provided by Technical Support to complete the packaging.

Maintaining Sufficient Air Flow

The PTC Tempo thermal cycler requires sufficient air flow to heat and cool precisely to the correct target temperature. If the flow of air is blocked, the thermal cycler cannot ramp to the correct temperature in the specified time. This section explains how to test the air flow and how to fix low or warm air flow.

Testing for Sufficient Air Flow

The air flow is sufficient when the thermal cycler heats and cools to the correct target temperatures promptly. Bio-Rad suggests that you test the air flow when you set up the PTC Tempo thermal cycler in a new location. You can also measure the air temperature at any time to ensure sufficient air flow.

To determine the presence of sufficient air flow

1. Set up and start the thermal cycler.
2. Adjust the local environment for typical conditions:
 - Turn on any nearby equipment, such as fans or other thermal cyclers.
 - Open any window blinds to reproduce typical conditions during a run.
3. Run a typical PCR protocol for 30 min.

If more than one is in the area, run a protocol on all at the same time.

Note: Samples are not required for the test runs. However, you must include an empty microplate or tubes. The lid does not heat correctly if it touches the sample block.

4. Measure the air temperature at the air intake vents.

If the air intake temperature increases above 31°C, see [Fixing Insufficient Air Flow](#) that follows.

Fixing Insufficient Air Flow

If the air temperature near the thermal cycler is above 31°C, make one or more of the following changes to increase the flow of cooler air:

- Adjust air conditioning to lower the ambient air temperature.
- Move the thermal cycler to another location.
- Provide more space around the thermal cycler and between adjacent thermal cyclers. Arrange the thermal cyclers so that the warm exhaust air from one does not enter the air intake vents of another.

- Shield the thermal cycler from heat sources such as radiators, heat-producing instruments, and bright sunlight.

Replacing Fuses

Fuses on the PTC Tempo thermal cycler are designed to blow in case of severe power surges or other causes of electrical short. This protects both the user and the thermal cycler from excessive, potentially damaging electric currents. Fuses on the PTC Tempo thermal cycler rarely need to be replaced. However, some institutions prefer to replace fuses on a regular basis to maintain uninterrupted operation.

If the thermal cycler does not power up, first verify that the power cord is plugged in to a functioning power source. Also, verify that the power cord and power source are within the specifications for this thermal cycler.

Important: Do not attempt to replace the power cord on the PTC Tempo thermal cycler. Instead, contact Bio-Rad Technical Support.

Finally, verify that the fuses are intact. If the fuses are broken or burned, replace the fuses. This section explains how to view and replace fuses on the PTC Tempo thermal cycler.

Tip: The thermal cycler utilizes two 10 A, 250 V, 5 x 20 mm, fast blow fuses.



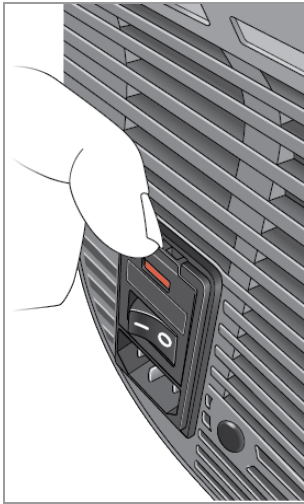
WARNING! To prevent electrical shock, always turn off and unplug the thermal cycler from the electrical outlet before checking the fuses.

To view and replace the fuses

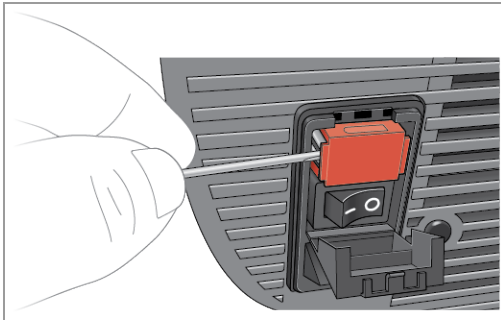
1. Verify that you have powered off the instrument and unplugged the power cord from the back of the instrument.

Important: You must unplug the power cord from the instrument to open the fuse door. Trying to open the fuse door while the cord is plugged in could damage the door.

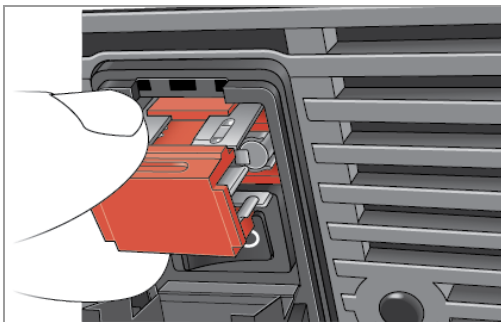
2. Using your fingertip, gently pull the black fuse door on the back of the thermal cycler out toward you.



3. Using a small flathead screw driver, gently pry out the red fuse holder until you can grasp it with your fingers.



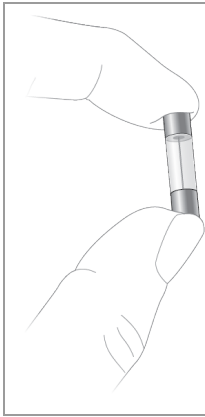
4. When you can firmly grasp the fuse holder, pull it straight out of the instrument.



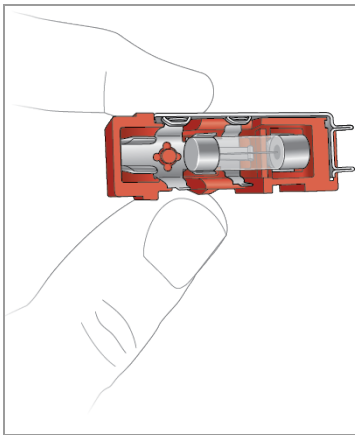
5. Using a finger tip, gently pry the fuse out of the fuse holder.
6. The fuse holder contains two fuses, one on each side. You must inspect both fuses.

A bad fuse displays a break or burned spot in the internal metal filament, or measures open with an Ohm meter. A good fuse has an internal metal filament or measures short ($< 1 \text{ Ohm}$). If a fuse is bad or damaged, replace it with a new fuse of the same type and rating.

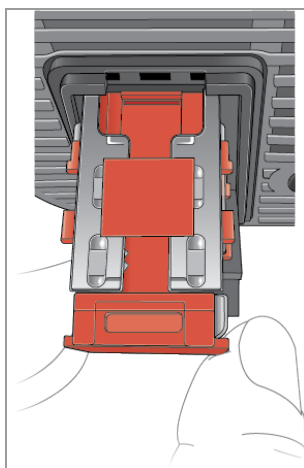
Note: Some fuses used in the PTC Tempo thermal cycler are made from ceramic and cannot be visually inspected. In this case, you must use an Ohm meter to determine whether the fuse is good. Alternatively, you can replace the fuse with a known good one without checking.



7. Assuming the prongs indicate the front of the fuse holder, insert the back end of a 10 A, 250 V, 5 x 20 mm, fast blow fuse into the middle bracket. Ensure the front end of the fuse faces the prongs. For example:



8. With the flat red square on the fuse holder facing upward, insert the fuse holder into the instrument and firmly press it into position.



9. Close the fuse door, insert the power cord, and turn on the instrument.



Caution: If the PTC Tempo thermal cycler repeatedly blows one or more fuses, there could be an internal problem with the instrument. Contact Bio-Rad Technical Support for assistance in determining whether it is safe to replace the fuses again or if the instrument should be repaired.

Upgrading Software and Firmware on PTC Tempo Thermal Cyclers

Important: Only the Admin user can upgrade software and firmware on PTC Tempo thermal cyclers.

Bio-Rad alerts you to software and firmware updates that are available for the PTC Tempo thermal cycler. You access the updates from Bio-Rad's Firmware and Software Updates web site. The installer for PTC Tempo thermal cyclers can include both software and firmware updates. Firmware updates for PTC Tempo thermal cyclers are not distributed in a separate package.

Before upgrading, Bio-Rad recommends that you verify the current version installed on the PTC Tempo thermal cycler. This section explains how to verify the installed version and how to upgrade the thermal cycler.

Note: Depending on the type of upgrade, this process can take several minutes to complete.

Verifying the Currently Installed Version

To verify the current version of the PTC Tempo thermal cycler software

1. On Home screen, tap Tools to view the Tools screen.

Tip: If you are logged in as an Admin user, tap the right arrow on the screen to view the tools available to all users.

2. Tap About and locate Version on the About screen.
3. Note the currently installed version.

Ensure the version you are upgrading to is newer than the version currently installed.

4. Tap Back and then tap Home to return to the Home screen.

Upgrading the PTC Tempo Thermal Cycler Software and Firmware

Note: Depending on the type of upgrade, this process can take several minutes to complete.

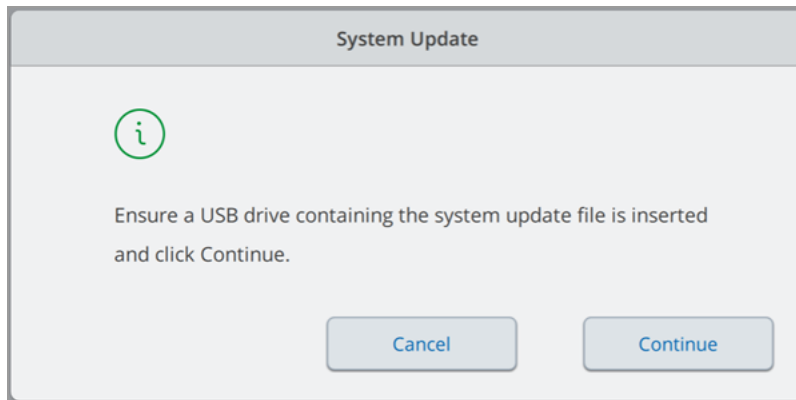
Important: While the upgrade is in progress, do not shut down the thermal cycler and do not remove the USB drive.

To upgrade the software and firmware

1. From a computer that has access to the Internet, log into bio-rad.com and go to the Firmware and Software Updates page to download the installer onto an attached USB drive.
2. Insert the USB drive into a USB port on the PTC Tempo thermal cycler.

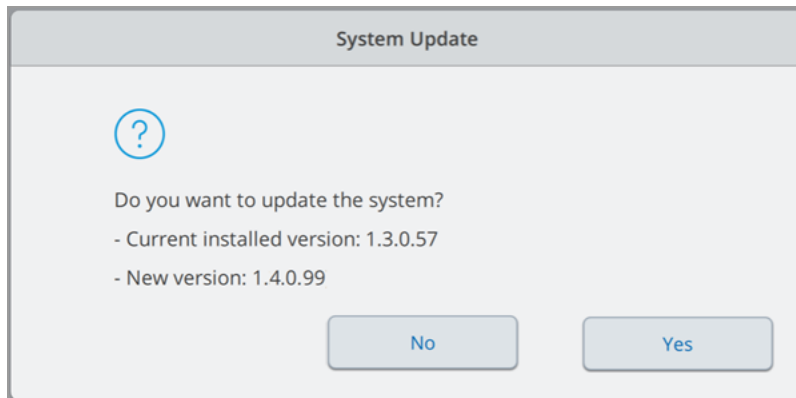
3. Log in as an Admin user.
4. On the Home screen, tap Tools to open the Admin tools screen.
5. In the Admin tools screen, tap System Update.

The System Update screen appears prompting you to confirm that a USB drive containing the upgrade file is inserted.



6. Click Continue.

The system verifies that the update file is newer than the software version currently installed. When the update file is verified, you are prompted to confirm the update.




7. Do one of the following:
 - To cancel the update, tap No.
 - To proceed, Tap Yes.

8. When the update completes, a message appears prompting you to reboot the thermal cycler. Tap OK to clear the message.

Shutting Down the PTC Tempo Thermal Cycler

Important: Follow these instructions to safely and completely shut down the PTC Tempo thermal cycler.

To shut down the PTC Tempo thermal cycler

1. Ensure that no protocol is running and the thermal cycler is no longer in use.
2. If you have not already done so, remove the samples from the block:
 - a. On the Home screen, tap Open Lid to access the samples.
 - b. Remove the samples from the block and then tap Close Lid.
3. On the Home screen, tap Logout to log out of the thermal cycler.
4. On the Login screen, tap Shut Down () and then tap Yes to power off the software.

Tip: The soft power button on the front of the instrument will illuminate blue. While the switch is illuminated blue, the instrument is in a stand-by state. Pressing the software power button while it is blue will start the PTC Tempo thermal cycler.

5. To completely shut down the thermal cycler, press the power switch on the back of the instrument to consume only 1W of power per the 1Watt initiative.

Troubleshooting PTC Tempo Thermal Cyclers

This section provides information about exporting system log information that can be used for troubleshooting purposes. It also lists potential problems and suggested solutions for the PTC Tempo thermal cycler.

Recovering Files

The PTC Tempo thermal cycler allows the Admin user to copy all protocol files and export all run reports to an attached USB drive. This section explains how to perform these tasks.

Note: Only an Admin user can export protocol files and run reports for all users.

Copying Protocol Files

To copy protocol files

1. Insert a USB drive into a USB port on the PTC Tempo thermal cycler.
2. Log in as an Admin user.
3. On the Home screen, tap Protocols to open the Protocol Browser screen.
4. In the left navigation pane, select the name of a user.

The protocols for that user appear in the middle pane.

5. For each protocol that you want to export:
 - a. Select the protocol in the middle pane.
 - b. In the right pane, select Options and then select Copy.
 - c. In the Copy Location dialog box, select the USB drive and click Copy.

The protocol file is saved to the attached USB drive as a .pcri file.

Note: You can only export one protocol file at a time. You must perform this procedure for each user on the thermal cycler, and for any protocol files saved to the Public folder.

After you copy the files, you can insert the USB drive into another Bio-Rad thermal cycler, open the USB drive and copy the files onto that thermal cycler.

Exporting Run Reports

To export run reports

1. Insert a USB drive into a USB port on the PTC Tempo thermal cycler.
2. Log in as an Admin user.
3. On the Home screen, tap Run Reports to open the Run Reports screen.
4. On the Run Reports screen, do one of the following:
 - To export a single run report, select the report in the Run Reports list and tap Export.
 - To export all run reports, tap Export All.

The run reports are saved as separate .pdf files to the folder PTC Tempo Run Reports on the attached USB drive.

Viewing and Exporting Log Files



PTC Tempo thermal cycler log files contain information that is helpful in troubleshooting problems with the thermal cycler. Bio-Rad Technical Support might ask you to provide these files so that they can better assist you in resolving problems. You can export the log files to an attached USB drive.

The PTC Tempo thermal cycler retains all log data until it is cleared. Only an Admin user can clear the log file.

To view and export log files

1. If you have not yet done so, insert a USB drive into a USB port on the instrument.
2. On the Home screen, tap Tools to open the Tools menu.
3. On the Tools screen, tap System Logs.

The System Logs screen appears.

System Logs			Theresa
< Back			
Date and Time ▼	Log Type	Description	
2022-06-07 16:39:22	Info	Logged in user: Theresa	
2022-06-07 16:39:16	Info	Logged out user: CarlN	
2022-06-07 16:39:04	Info	Logged in user: CarlN	
2022-06-07 16:39:00	Info	Logged out user: Theresa	
2022-06-07 10:23:36	Info	Logged in user: Theresa	
2022-06-07 10:23:24	Info	System has started. The Software Version: 0.9.0.942 DEV GC-e78cf589	
2022-06-07 09:09:50	Info	System has started. The Software Version: 0.9.0.942 DEV GC-e78cf589	
2022-06-06 17:14:37	Info	Role was changed for user Theresa from User to Administrator.	
2022-06-06 17:14:29	Info	Logged in user: Admin	
2022-06-06 17:14:27	Info	Logged out user: Theresa	
2022-06-06 17:02:11	Info	Logged in user: Theresa	
2022-06-06 17:02:05	Info	Logged out user: Admin	
2022-06-06 17:01:59	Info	Role was changed for user Theresa from Administrator to User.	
2022-06-06 17:01:49	Info	Logged in user: Admin	
			<div>  Delete Logs  Export Logs </div>

4. Tap Export Logs to export the system logs. The PTC Tempo thermal cyclers create a .zip file labeled <instrument- name>_<date-and-time-of-export.zip> on the attached USB drive and exports the following files as .txt files:

- CyclersFirmwareLog
- DebugLog(s)
- JournalCtlLog
- LidFirmwareLog
- SystemInformationLog
- SystemLog

5. Click Back and then the Home button to return to the Home screen.

To view the log information, remove the USB drive from the PTC Tempo thermal cyclers, insert it into a USB port on an available computer, and open the log files in a text editing or word processing program.

Manually Opening the Automated Lid

In the event of a power outage while a run is in progress, you can manually open the automated lid on the PTC Tempo 96-well and Deepwell thermal cyclers in order to retrieve the sample plate.

Note: Bio-Rad strongly recommends that whenever possible, you use the Open Lid and Close Lid buttons on the Home, Run Setup, and Run Status screens. Manually opening the lid can impact the usage of the instrument.



WARNING! Touching the lid heater can cause harm if not fully protected. Ensure that you wear protective gloves and refrain from contacting the lid heater.

To manually open the automated lid

1. Verify the thermal cycler is powered off.
If necessary, power off the instrument by pressing the power switch on the back of the instrument.
2. Locate a 3 mm hex screw driver.
3. Carefully insert the screw driver into the small hole on the right side of the automated lid, below the LED light.
4. While pressing down on the lid with medium force, turn the driver toward you until the lid unlatches.
Tip: You will feel the lid unlatch. Pressing down on the lid holds the lid from quickly opening.
5. Manually lift the lid to its fully open position.
6. Carefully remove the plate from the sample block.

Troubleshooting Issues

Error	Possible causes	Troubleshooting steps
Unable to use USB drives	Power loss	Turn the PTC Tempo thermal cycler off and then on.
Unable to connect to BR.io after a run completes, before the run report is uploaded to your BR.io account	Communication loss	Copy the run report to an attached USB drive or to a shared network folder and import into BR.io.
Unable to reconnect to a shared network folder after Wi-Fi connection disruption	Communication loss	Restart PTC Tempo thermal cycler and then reconnect to the shared network folder.

Appendix D Bio-Rad Free and Open-Source Notices for PCR Products

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The list of OPEN LICENSES used in PTC Tempo Thermal Cycler is available from the Legal Notices link in Tools > About. The corresponding open source software is available for download at bio-rad.com/PTCTempo-opensource.

Appendix E References

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Appendix E References



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