TECHNICAL MANUAL

STEMprep™ Tissue Dissociator

STEMCELL™ TECHNOLOGIES

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Safety Information and Warnings

Personnel Qualification

STEMprep™ Tissue Dissociator (Catalog #100-2112) must be installed and operated by qualified professional laboratory personnel and is intended for research use only (RUO). STEMprep™ Tissue Dissociator and its applications are intended for use in a laboratory setting; they are not intended for human or animal diagnostic or therapeutic uses.

It is essential to observe good laboratory practices when operating the instrument and associated reagents and consumables as described by your institution.

Federal Communications Commission (FCC) Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the US-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 users will be required to correct the interference at their own expense.

STEMprep™ Tissue Dissociator complies with Part 15 of the US-FCC rules. Operation is subject to the following two conditions: (1) this unit may not cause harmful interference, and (2) this unit must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not approved by STEMCELL could void the user's authority to operate the equipment.

Installation Location Requirements

The unit should be installed on a clean, flat, stable surface. There should be at least 75 mm of clearance to the rear and at least 30 mm of clearance on the sides of the unit to ensure adequate cooling and performance. The surface must therefore be at least 375 mm deep x 350 mm wide.

Choose a location that will minimize accidental spills and excessive dust or moisture. Optimal ambient conditions are 15 - 30°C and 10 - 80% relative humidity.

For unpacking and setup instructions, refer to section 3.0. For installation in a biosafety cabinet (BSC), refer to section 3.7.

General Disclaimers

STEMprep™ Tissue Dissociator is manufactured and distributed by STEMCELL Technologies Inc., 1618 Station Street, Vancouver, BC, Canada V6A 1B6. Call 1-604-877-0713 or toll-free 1-800-667-0322 within North America.

STEMCELL Technologies Inc. is not responsible for any injury or damage caused by the use of this unit for purposes other than those for which it is intended, or by modifications of the unit or software not performed by an authorized STEMCELL Technologies representative.

In case of a malfunction, contact STEMCELL Technologies Inc. for service. Servicing performed by anyone other than an authorized STEMCELL Technologies representative will void the warranty associated with STEMprep™ Tissue Dissociator. There are no user-serviceable parts inside the unit, and the outer enclosure should never be opened by unauthorized persons.

STEMCELL Technologies Inc. shall disclaim all warranties and in no event be liable for any kind of damages caused by or arising out of any operation of STEMprep™ Tissue Dissociator in a manner that contravenes the safety and handling instructions outlined in this document.

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Legal

The purchase of a STEMprep™ Tissue Dissociator, STEMprep™ Sample Tubes, and associated reagents ("STEMprep™ Products") conveys to the purchaser a limited, non-exclusive, non-transferable license to use STEMprep™ Products, in accordance with STEMCELL's Terms and Conditions of Sale (updated as needed at www.stemcell.com/terms-and-conditions-general) and all applicable laws and regulations, and solely for RUO applications (which exclude any commercial application or any therapeutic, prophylactic, diagnostic application, as well as any development and/or commercialization of products therewith or developed therefrom). STEMCELL or its licensor(s) grant no additional license rights other than those explicitly granted herein, and except for such limited license rights, all other intellectual property and proprietary rights in and to STEMprep™ Products are and shall remain the exclusive property of STEMCELL and its licensors. The purchaser of STEMprep™ Products agrees to prevent unauthorized use, access, copying, or disclosure of any intellectual property comprised in STEMprep™ Products. The purchaser shall not, and shall not permit anyone to, copy, create any derivative work, reverse engineer, disassemble, decompile, or make improvements to STEMprep™ Products. Users and purchasers of STEMprep™ Products hereby grant to STEMCELL exclusive ownership and all rights, title, and interest in and to any improvements made, by purchasers or users, to the STEMprep™ Products (including any improvements by purchasers or users to the intellectual property directly related to STEMprep™ Products), provided, however, that the user or purchaser who makes the improvement retains a limited, non-transferable license to use such improvement for its internal, non-commercial research use, in accordance with this agreement, only so long as such user or purchaser is in compliance with this agreement. All data, information, and results (to the extent they do not constitute improvements of STEMprep™ Products) entered, stored, compiled, generated, and/or analyzed by purchasers of STEMprep™ Products using the STEMprep™ Products in accordance with all of the foregoing shall be the property of such purchaser.

STEMprep™ Products, such as STEMprep™ Tissue Dissociator and STEMprep™ Sample Tubes, are protected by patents and/or patent applications in the United States and elsewhere. For additional information, refer to www.stemcell.com/stemprep. The list of products and patents contained therein are subject to change as a result of routine prosecution and dependent on the patent life cycle, as determined by the laws of each jurisdiction in which a relevant patent is in effect.

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Overview of Safety Symbols and Callout Boxes

The safety symbols and callout boxes used in this manual and the safety symbols on the STEMprep™ Tissue Dissociator instrument are described below.

Safety Symbols and Callout Boxes in this Manual

The following callout boxes and safety symbols are used in this manual to highlight important safety information.

WARNING

This box, with the red top line, the yellow exclamation symbol, and the word WARNING*, indicates a hazardous situation that, if not avoided, may result in death or serious (irreversible) injury.*

NOTICE

This box, with the blue top line and the word NOTICE*, indicates a potentially hazardous situation that, if not avoided, may result in damage to the product and/or its functions, or damage to other objects nearby.*

The yellow WARNING symbol, when used in the manual, indicates where the operator must follow instructions to avoid personal injury.

The white CAUTION symbol, when used in the manual, indicates that caution is necessary when operating the device to avoid damage to the unit.

The BIOHAZARD symbol, when used in the manual, indicates that special care is required for users to remain protected from biological hazards.

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The HAZARDOUS VOLTAGE symbol, when used in the manual, indicates the presence of an electrical hazard to the user.

Safety Symbols on the Instrument

Each STEMprep™ Tissue Dissociator unit has a biohazard sticker on the front.

The BIOHAZARD symbol indicates that special care is required for users to remain protected from biological hazards.

Each unit also has a rating label with safety symbols located at the rear, adjacent to the power connector (Figure 1).

Note: These rating labels must be kept complete and legible. Contact STEMCELL Technologies Technical Support for replacements.

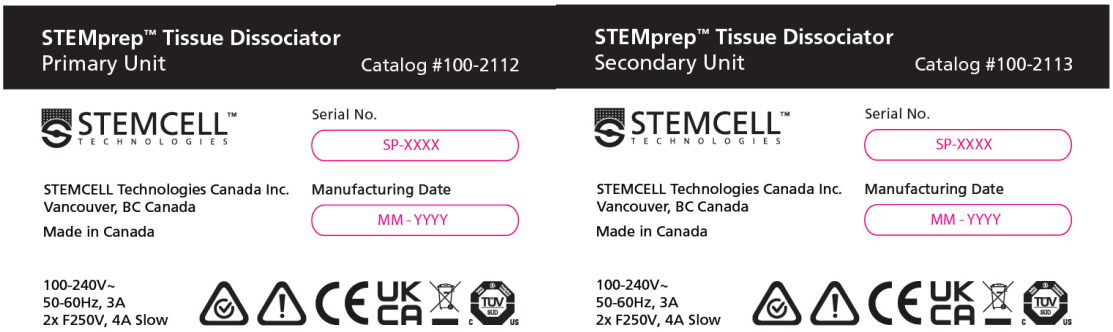

Figure 1. Rating Label with Safety Symbols on Primary and Secondary Units

The safety symbols on the rating labels are described below.

The REGULATORY COMPLIANCE MARK (RCM) is a trademarked symbol that denotes a claim that a product is safe for use in Australia and New Zealand because it satisfies applicable regulatory requirements.

The CAUTION symbol indicates that caution is necessary when operating the device or control close to where the symbol is placed to avoid damage to the unit.

The CE symbol (European conformity) indicates the manufacturer or importer affirms the goods conform with European health, safety, and environmental protection standards.

The UKCA (UK Conformity Assessed) mark indicates conformity with standards required within Great Britain.

The WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) directive symbol denotes that the device should not be disposed of in municipal waste collection centers. STEMprep™ Tissue Dissociator has been designed for easy dismantling and recycling. Contact STEMCELL Technologies regarding end-of-life care for STEMprep™ Tissue Dissociator.

The TUV symbol ensures the product has been tested for safety and that it complies with the requirements of national, regional, and international regulations.

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1.0 Introduction

STEMprep™ Tissue Dissociator is a laboratory instrument that enables automated tissue dissociation. This system is an integrated benchtop platform designed to reproducibly generate single-cell suspensions from samples (e.g. tissues) while maintaining cell viability and functionality. The resulting cell suspensions can be used in downstream applications, including flow cytometry analysis, EasySep™ immunomagnetic cell separation, and the isolation of nucleic acids for molecular characterization.

The STEMprep™ Tissue Dissociator system comprises three main components: STEMprep™ Tissue Dissociator instrument (Figure 2) for processing tissue samples, STEMprep™ Sample Tubes (Catalog #200-0800) for loading samples, and tissue-specific STEMprep™ Dissociation Kits that contain optimized dissociation reagents.

Users can select from ready-to-use pre-programmed tissue dissociation protocols or create custom protocols to adjust the speed, time, and temperature of each protocol step. Additionally, users can easily increase sample processing throughput by adding secondary units.

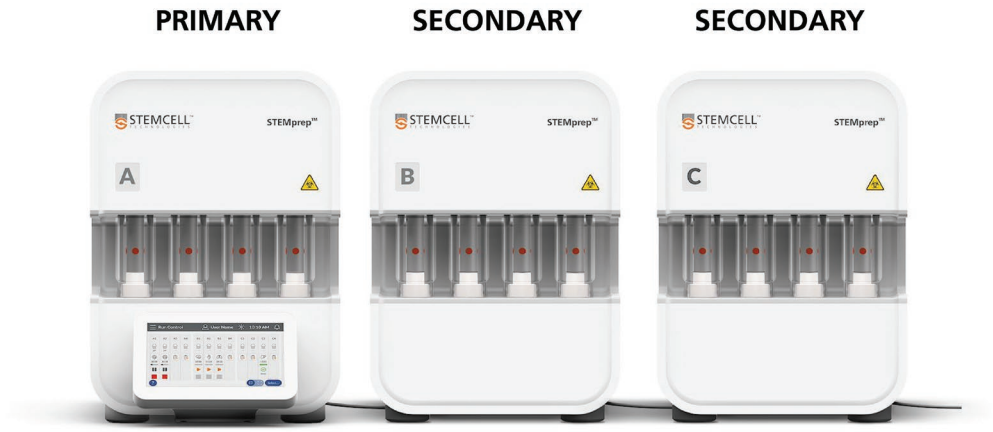

Figure 2. STEMprep™ Tissue Dissociator Primary Unit and Optional Secondary Units

STEMprep™ Tissue Dissociator is available in the modular formats described in Table 1.

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Table 1. Modular Formats of STEMprep™ Tissue Dissociator

PRODUCT NAME	CATALOG #	FORMAT	DESCRIPTION
STEMprep™ Tissue Dissociator 4-Sample System	100-2112	• 1 x STEMprep™ Tissue Dissociator Primary Unit (Catalog #100-1248) • 1 x Plastic Rack for Centrifuge Tubes, 50 mL (Catalog #200-0651)	Includes touch-screen monitor. Can process up to 4 samples.
STEMprep™ Tissue Dissociator 4-Sample Expansion Unit	100-2113	• 1 x STEMprep™ Tissue Dissociator Secondary Unit (Catalog #100-2110) • 1 x Plastic Rack for Centrifuge Tubes, 50 mL (Catalog #200-0651)	Includes a Secondary Unit only that allows for processing 4 additional samples when connected to the STEMprep™ Tissue Dissociator 4-Sample System or Primary Unit. *Cannot be operated separately.*
STEMprep™ Tissue Dissociator 8-Sample System	100-2114	• 1 x STEMprep™ Tissue Dissociator Primary Unit (Catalog #100-1248) • 1 x STEMprep™ Tissue Dissociator Secondary Unit (Catalog #100-2110) • 1 x Plastic Rack for Centrifuge Tubes, 50 mL (Catalog #200-0651)	Includes a Primary Unit and a Secondary Unit for processing up to 8 samples when connected.
STEMprep™ Tissue Dissociator 12-Sample System	100-2115	• 1 x STEMprep™ Tissue Dissociator Primary Unit (Catalog #100-1248) • 2 x STEMprep™ Tissue Dissociator Secondary Unit (Catalog #100-2110) • 1 x Plastic Rack for Centrifuge Tubes, 50 mL (Catalog #200-0651)	Includes a Primary Unit and 2 Secondary Units for processing up to 12 samples when connected.
STEMprep™ Tissue Dissociator 16-Sample System	100-2410	• 1 x STEMprep™ Tissue Dissociator Primary Unit (Catalog #100-1248) • 3 x STEMprep™ Tissue Dissociator Secondary Unit (Catalog #100-2110) • 1 x Plastic Rack for Centrifuge Tubes, 50 mL (Catalog #200-0651)	Includes a Primary Unit and 3 Secondary Units for processing up to 16 samples when connected.

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2.0 STEMprep™ Tissue Dissociator System

This section provides an overview of the STEMprep™ Tissue Dissociator instrument as well as the STEMprep™ Tissue Dissociation Kits.

2.1 Instrument Overview

STEMprep™ Tissue Dissociator performs the following actions to enable dissociation of compatible sample types:

- Handling STEMprep™ Sample Tubes
- Allowing specific rotational speed per individual slot
- Allowing a specific temperature per individual slot
- Allowing a specific run duration per individual slot
- Tracking run parameters and progress during operation

Primary and Secondary STEMprep™ Tissue Dissociator Units (Figure 3) each have four shields, spindles, and slots for processing tissue samples. Only the Primary Unit includes a touch screen monitor.

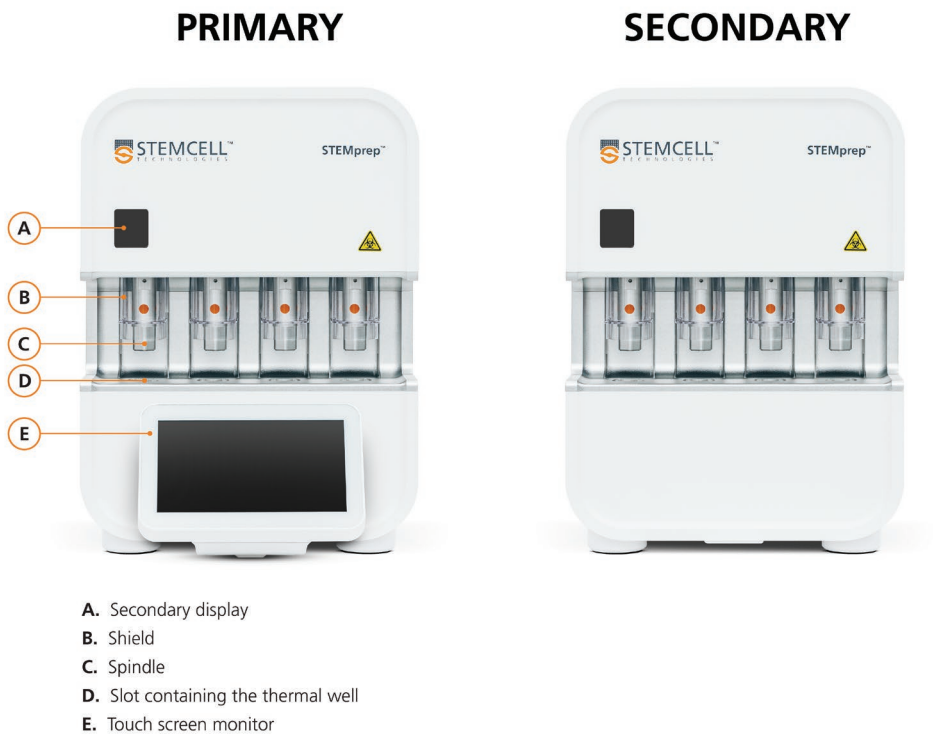

Figure 3. Front View of Primary and Secondary STEMprep™ Tissue Dissociator Units

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2.1.1 Shield, Spindle, and Slot

Each spindle has a shield to isolate the loaded STEMprep™ Sample Tube during a run in case of a spill. Below each spindle is a slot that contains a thermal well to heat or cool each sample during a run. The spindle engages with the top part of the STEMprep™ Sample Tube to rotate the rotor within the tube. The tab on the shield allows the user to easily lift the shield to insert and remove the STEMprep™ Sample Tube from the slot. Refer to Figure 4 for a close-up view of the shield, spindle, and slot containing the thermal well.

A. Shield
B. Spindle
C. Slot containing the thermal well

Figure 4. Shield, Spindle, and Slot Containing the Thermal Well

2.1.2 Power, Network, and USB Connections

The connections for power, network, and USB are found at the back of the instrument (Figure 5). Note that only Primary Units have an ethernet port and only Secondary Units have a USB-B port for connecting from a Primary or Secondary Unit.

Note: STEMprep™ Tissue Dissociator does not currently support network connectivity.

Refer to the following sections for information on power connections (section 3.3), instrument startup (section 3.4), instrument shutdown (section 3.5), and USB connections (section 3.6).

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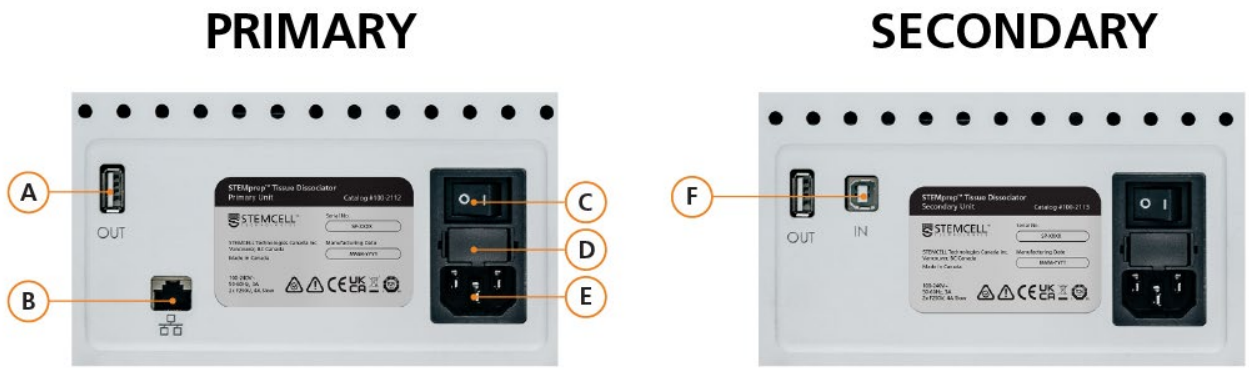

A. USB-A Port (OUT to connect to a Secondary Unit)
B. Ethernet Port (Primary Units only)
C. Power Switch
D. Fuse Box
E. Power Supply Socket
F. USB-B Port (IN to be connected from a Primary or Secondary Unit)

Figure 5. Power, Network, and USB Connections Behind Primary and Secondary Units

2.1.3 STEMprep™ Sample Tubes and Plastic Rack for Centrifuge Tubes, 50 mL

STEMprep™ Sample Tubes (Figure 6A) are designed for use with STEMprep™ Tissue Dissociator and contain blades and a rotor for efficient dissociation of various samples. For details, refer to the Product Information Sheet (PIS) for STEMprep™ Sample Tubes (Document #10000032252), available at www.stemcell.com, or contact us to request a copy.

Plastic Rack for Centrifuge Tubes, 50 mL (Figure 6B; Catalog #200-0651) is provided with each STEMprep™ Tissue Dissociator system to manage sample tubes while loading or removing tissues.

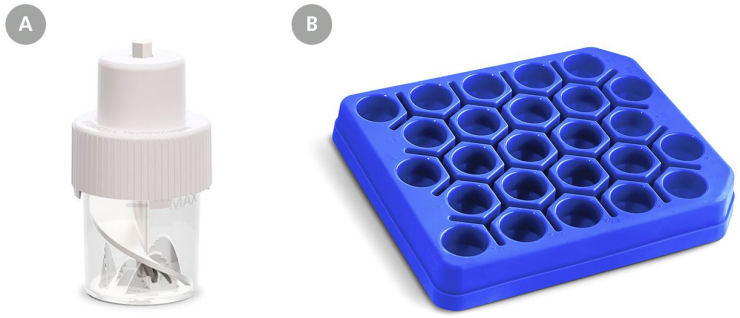

Figure 6. (A) STEMprep™ Sample Tube and (B) Plastic Rack for Centrifuge Tubes, 50 mL

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2.2 Kit Overview

STEMprep™ Tissue Dissociation Kits include optimized enzyme cocktails for the dissociation of various tissues. Together with the instrument's ready-to-use STEMCELL protocols, the STEMprep™ dissociation reagents have been thoroughly tested and optimized to generate functionally viable single-cell suspensions. For more information, refer to the applicable STEMprep™ Tissue Dissociation Kit PIS, available at www.stemcell.com, or contact us to request a copy.

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3.0 Installation

Successful operation of the STEMprep™ Tissue Dissociator requires correct installation. The steps described below will guide the user through proper installation. For help with the installation process, contact STEMCELL Technologies Technical Support.

NOTICE
STEMprep™ Tissue Dissociator should be installed in a location with an ambient temperature of 15 - 30°C and relative humidity of 10 - 80%.

The unit should be installed on a clean, flat, stable surface. There should be at least 75 mm of clearance to the rear and at least 30 mm of clearance on the sides of the unit to ensure adequate cooling and performance.

3.1 Unboxing and Moving the Unit

WARNING
Attention and care must be used while moving the packaged instrument, as it weighs up to 16 kg and can pose a lifting hazard. Grip the box at the bottom edges only and have two people lift the instrument if necessary.

The instrument is slightly front-heavy; therefore, the packaged instrument should be moved with caution to ensure it does not rotate while being moved. This is especially important with a Primary Unit.

To unbox the STEMprep™ Tissue Dissociator, open the box from the top. Remove the foam inserts.

Accessories will be packaged in a separate box. Depending on the unit purchased, the contents will differ:

- The Primary Unit is provided with an IEC C13 power cord specific to the region in which it is sold. It also comes with a Plastic Rack for Centrifuge Tubes, 50 mL (see section 2.1.3).
- The Secondary Unit is provided with both an IEC C13 power cord specific to the region in which it is sold and a USB A-B cable for connecting the units to each other. If it was purchased on its own as a 4-Sample Expansion Unit, it will come with a Plastic Rack for Centrifuge Tubes, 50 mL (see section 2.1.3).

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NOTICE

Foam inserts are made from polyethylene foam and are recyclable. Please recycle both the foam and cardboard appropriately.

While the instrument is pressed into a foam insert, the gripping locations are not easily accessed. In this scenario, the upper overhang section of the instrument can be gripped to lift the instrument out of the packaging.

Take the unit out of the box and remove the bag. Note that there are two lifting locations located underneath the instrument (Figure 7); the lifting locations should be used whenever accessible.

NOTICE

Moving the Unit

For small moves, such as moving the unit on a bench or across the lab, pick up the unit by the two lifting locations on the bottom (Figure 7). Use a cart to move it across a lab.

For larger moves, such as moving the unit between buildings, prepare the unit beforehand and use appropriate packaging. Install empty sample tubes and either remove or secure the shields with tape. Exercise caution when moving the unit and grab the lifting locations from the bottom of the unit. Failure to do so may result in damage.

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Figure 7. Lifting Locations

Remove the tape that is used to protect the unit from scratches and the shield from movement.

Finally, before use, the preloaded sample tubes need to be discarded, as they are only meant for shipping and **not** for experimental usage. These sample tubes will be labeled DO NOT USE.

3.2 Installing the Shield

The shield can be removed for cleaning. It can then be installed again easily. Each shield must be properly installed for the unit to operate.

Figure 8 shows a shield's pinch points, which are used to install and remove the shield.

Figure 8. Top View of the Shield Showing Pinch Points

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To install the shield, orient the tab of the shield to be at the bottom, pinch the back wings of the shield (Figure 8) to flex inwards, and insert into the vertical channels behind the slot. If installed correctly, the shield will move up and down smoothly.

To remove the shield, pinch the back wings of the shield (Figure 8) to flex inwards, enough to clear the vertical channels, then gently pull the shield straight out.

3.3 Power Connections

Ensure the AC power switch located at the back of the unit is in the OFF position. Connect the power cord provided with the unit to the AC inlet located on the back of the unit (Figure 5) and to the electrical outlet on a workbench or in a biosafety cabinet (BSC) if so required.

WARNING

- *To ensure continued protection against electric shock, connect to properly grounded outlets only*
- *Use only power cords of the same type and rating as supplied*
- *Replace fuses with same type and rating*
- *Disconnect power before all cleaning and maintenance operations*
- *Disconnect power cord immediately if fluids enter the unit*
- *Refer servicing to qualified STEMCELL personnel only. No user-serviceable parts inside.*
- *As with all electrical laboratory equipment, the use of multi-tap socket adaptors (power bars) is not advised*

WARNING

For your safety, do not use a power adapter or power bar to connect the unit. Ensure that the total electrical load of plugged-in equipment does not exceed the manufacturer-rated limit of the outlet.

3.4 Startup

Start the STEMprep™ Tissue Dissociator as follows:

1. Turn the power switch located on the back of each unit to ON (Figure 5C).
2. If this is the first time your STEMprep™ unit has been started, you will be required to read and accept the legal agreement.

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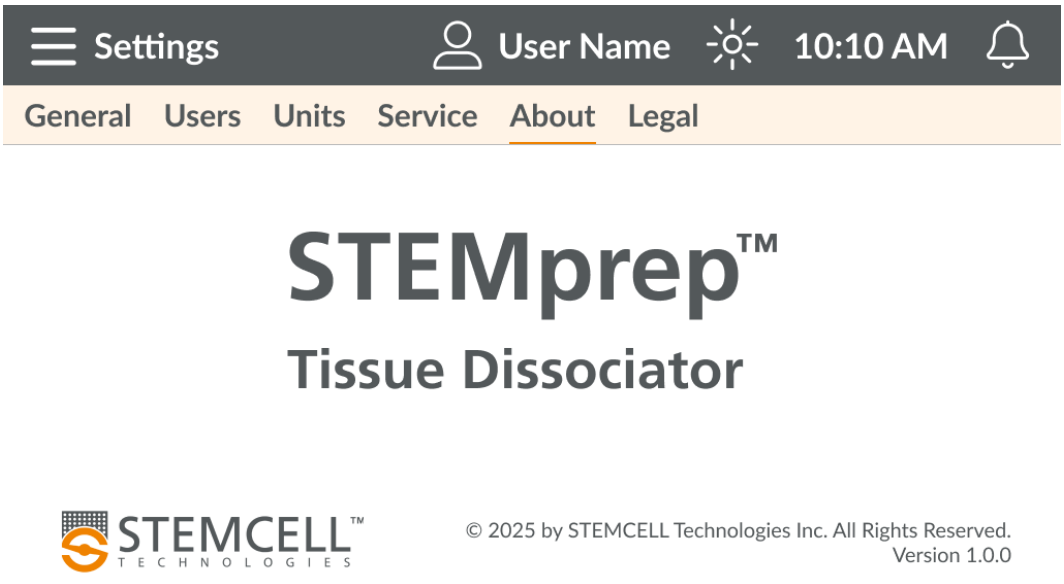

Figure 9. Screen on Startup

3.5 Shutdown

STEMprep™ Tissue Dissociator may be shut down in two ways:

- The user may flip the power switch located at the back of the unit to OFF (Figure 5C).

  OR

- If the instrument is installed within a BSC, the user may shut off power to the outlet(s) via the BSC control panel. This option enables the user to power STEMprep™ Tissue Dissociator via the BSC control panel for their convenience without reaching for the power switch at the back of the system. In this case, the power switch at the back of the system remains in the ON position.

Note: Shutdown is only complete once the touch screen has powered off completely. When attempting to reset or reboot the unit, wait until the touch screen goes completely blank before powering the unit back on. For Secondary Units, which have no touch screen, wait up to 30 seconds for a full shutdown.

3.6 USB Connections

The USB port on the rear of the instrument is for connecting multiple STEMprep™ units together. A Primary Unit has only one USB-A port on the rear labeled OUT. This OUT port can be connected to an IN port on a Secondary Unit with the USB A–to–USB B cable provided with each Secondary Unit. Each Secondary Unit has both an IN and an OUT port so that multiple Secondary Units can be daisy-chained, up to a maximum of four instruments total in one system.

There is also a USB-A port (named the primary display port) on the side of the Primary Unit touch screen monitor. This port is for connecting a USB storage device to download logs to provide to STEMCELL Technologies Technical Support, to import/export protocols, and to perform software updates over USB.

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Use caution when plugging a USB storage device into the instrument. A USB storage device infected with a software virus could affect the instrument's ability to function. Ensure any USB storage device used is trusted and virus-free.

Do not plug unsupported USB storage devices into the primary display port. Unsupported devices include a USB hub, a keyboard or mouse, or any other USB peripheral drawing more than 500 mA of current.

3.7 Biosafety Cabinet

The STEMprep™ Tissue Dissociator can be operated inside a biosafety cabinet (BSC; Figure 10). The unit must be installed with at least 75 mm of clearance behind it for adequate airflow.

The recommended positions and orientations of the unit inside a BSC are summarized in Figure 11. The positions shown with green checkmarks have been tested for NSF 49 compliance in an 18" x 46.5" BSC. The positions shown with a red X are not recommended and may not pass NSF 49 compliance testing.

IMPORTANT: Ensure that the power outlet of the BSC is a 3-prong, grounded AC outlet rated to a minimum of 3 A 100 - 240 V.

NOTICE
BSCs typically have a weight restriction and power restriction that make it inadvisable to try to use more than one STEMprep™ Tissue Dissociator inside a single BSC.

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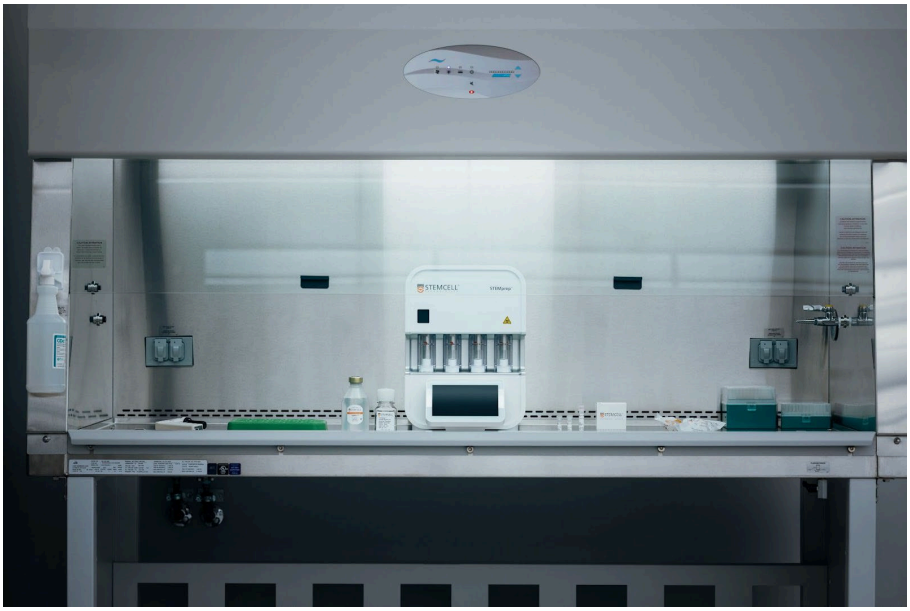

Figure 10. STEMprep™ Tissue Dissociator Setup in a BSC

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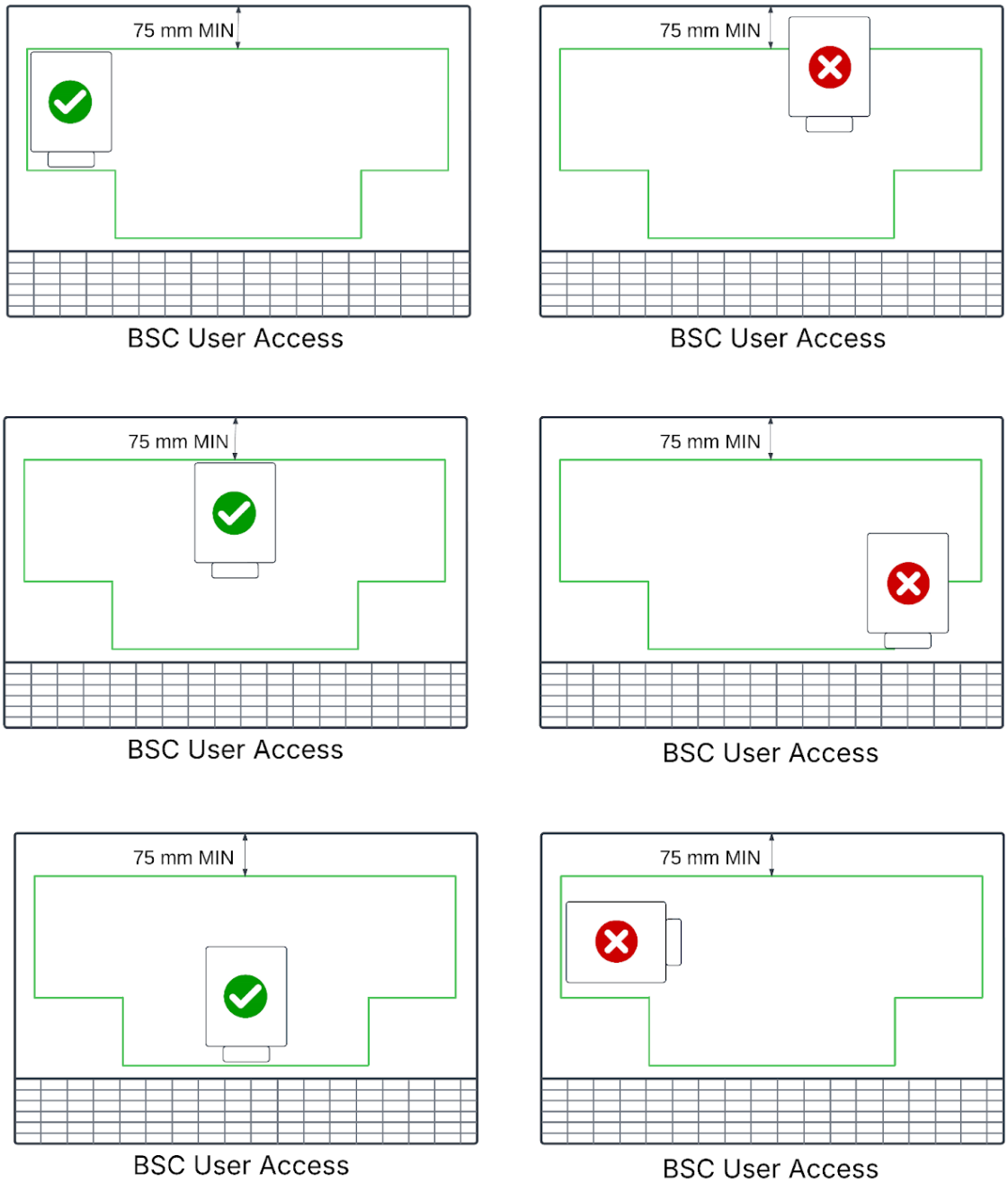

Figure 11. Recommended Positions and Orientations of STEMprep™ Tissue Dissociator for Use in a BSC

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WARNING

In larger BSCs, it may be possible to access more positions. Customers are advised to test their BSC for compliance with NSF 49 to ensure air curtains are not compromised by the presence and function of the instrument. If the BSC is not properly certified, this can threaten lab sterility or create a biohazard within the lab.

If performing this testing, the user is advised to run a protocol to create the maximum fan activity during testing. Contact STEMCELL Technologies Technical Support for support to properly conduct this testing.

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4.0 Using STEMprep™ Tissue Dissociator

This section describes how to set up and use STEMprep™ Tissue Dissociator.

In general, users will follow the workflow in Figure 12 to load samples and run a protocol.

Figure 12. General Protocol Workflow

Users can manage and run protocols through the user interface on the touch screen monitor (Figure 3), supported by the on-screen keyboard and the secondary display.

The STEMprep™ Tissue Dissociator user interface has the following five main components (Figure 13):

A. A control bar that offers multiple functions for navigating, selecting, adjusting, and controlling the system and selecting user accounts (section 4.1.1)

B. Run Control for selecting and running protocols (section 4.2)

C. A Protocol list for finding and creating protocols (section 4.3.1)

D. History for a list of protocol runs and history export capabilities (section 4.3.5)

E. Settings that allow setting the date and time; control of user accounts; unit management for multi-unit setups; service functions; and terms and conditions (section 4.4)

Many of the screens also display a Help button ? for on-screen help.

Note: Do not exert excess pressure or use sharp objects when operating the touch screen.

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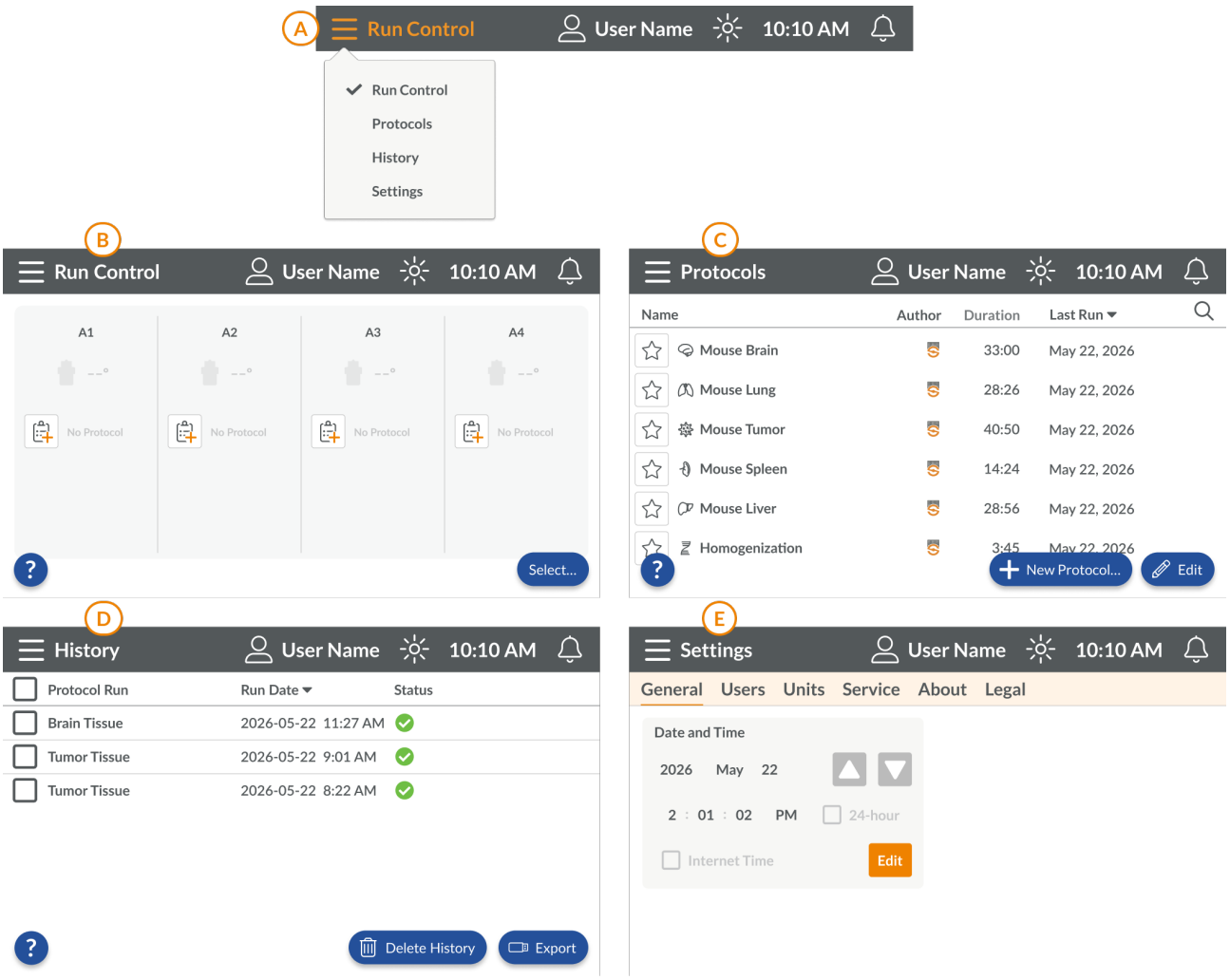

Figure 13. Main Components of the User Interface: (A) Control Bar, (B) Run Control, (C) Protocols, (D) History, and (E) Settings

4.1 Input and Displays

This section gives an overview of the control bar (located on the touch screen on the Primary Unit), the secondary display (located above the slots on all units), and the keyboard, which appears on the touch screen as required (Figure 3).

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4.1.1 Control Bar

The control bar (Figure 14) allows the user to switch between sections, view the current user account and time, set the screen brightness, and access notifications.

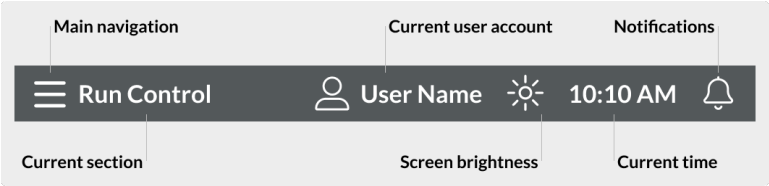

Figure 14. Control Bar

Tap ☰ [Main Navigation] to display the drop-down menu and switch between the various sections of the STEMprep™ Tissue Dissociator application (Figure 15).

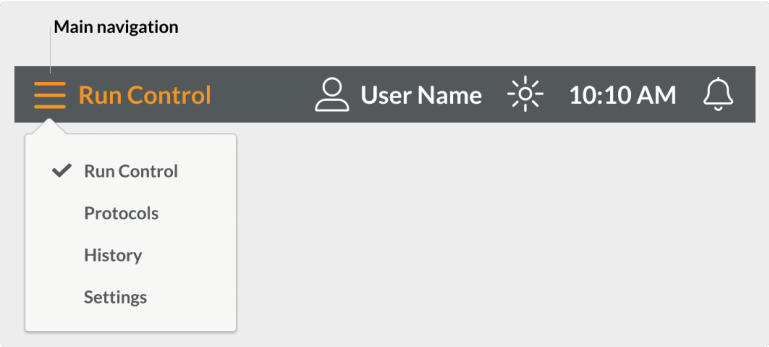

Figure 15. Main Navigation

Switch user accounts by tapping 👤 [User Name] in the control bar (Figure 16).

STEMprep™ Tissue Dissociator includes a Default user account that cannot be deleted. For more information on user accounts, see section 4.4.2.

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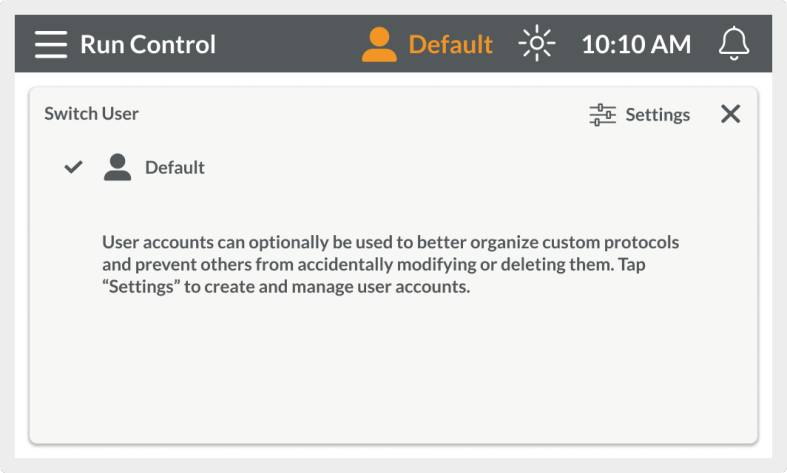

Figure 16. Switch User Account

To adjust the brightness of the screen, tap and use the **–** and **+** buttons (Figure 17). The **–** or **+** button will be grayed out when the screen is at minimum or maximum brightness.

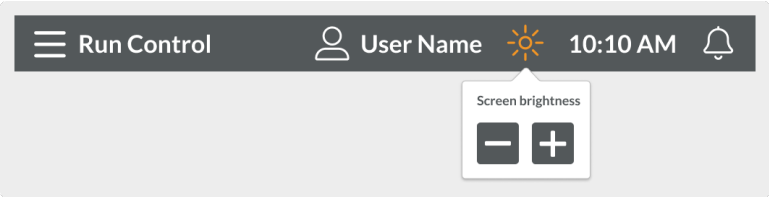

Figure 17. Screen Brightness Control

The time is displayed in the control bar and can be adjusted in Settings. See section 4.4.1.

Tap to display notifications (Figure 18). The red icon badge indicates the number of unacknowledged notifications.

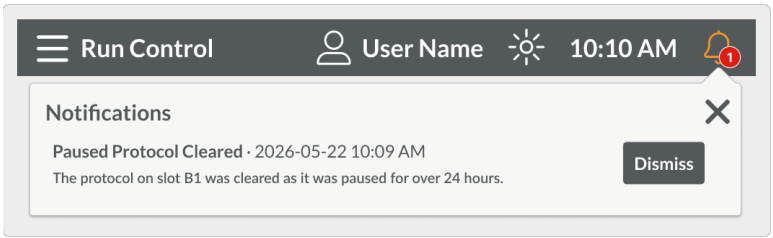

Figure 18. Notifications

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4.1.2 Secondary Display

The secondary display (Figure 3A) is the small screen located on the front panel above the slots; this display shows the label for the current unit. (For instructions on assigning labels to units, see section 4.4.3.)

Notifications and alerts are also displayed on the secondary display so that they can be more easily seen from a greater distance (Figure 19).

Figure 19. Secondary Display Notification (Left) and Alert (Right)

The secondary display on the Primary Unit will show a progress spinner when the Primary Unit starts up (Figure 20, left). When a Secondary Unit is starting up or has been unplugged from the Primary Unit, the secondary display on the Secondary Unit will show a disconnected icon (Figure 20, right).

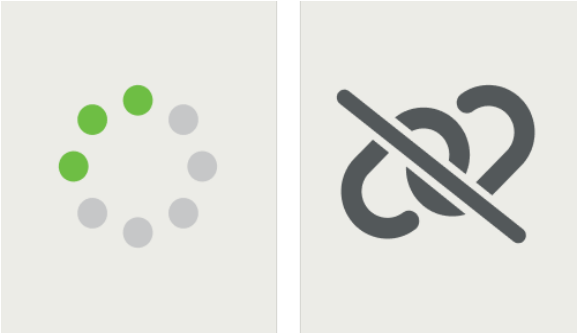

Figure 20. Secondary Display Showing a Progress Spinner (Left) and Disconnected Icon (Right)

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4.1.3 Keyboard

A full-screen keyboard (Figure 21) will be displayed when a user is required to enter text on the touch screen. For example, the keyboard will be displayed when a user is searching for protocols (section 4.3.1.1), editing protocol names (section 4.3.2), or naming user accounts (section 4.4.2).

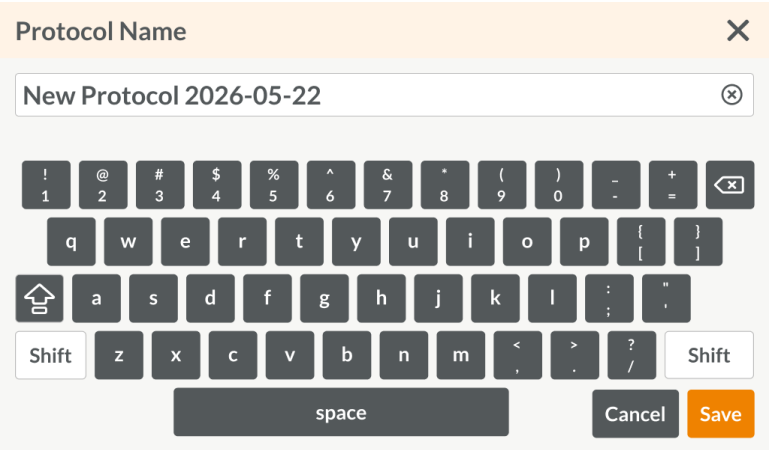

Figure 21. Full-Screen Keyboard

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4.2 Run Control

In Run Control, a user can select and run protocols, view the status of a running protocol, and pause or stop a protocol. At the end of a successful run, a user will collect dissociated tissue and dispose of the STEMprep™ Sample Tube.

Access Run Control from the Main Navigation. Tap ☰ to display the drop-down menu and select **Run Control** (Figure 22).

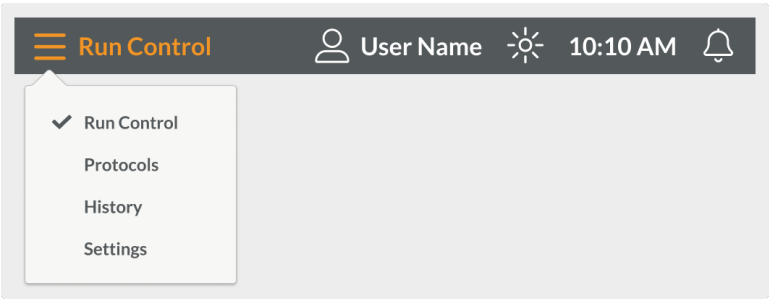

Figure 22. Navigating to Run Control from the Main Navigation

4.2.1 Selecting and Running Protocols

Protocols comprise a series of timed steps that define how the STEMprep™ Sample Tube will be heated or cooled as well as the speed and direction of the spindle. Several STEMCELL ready-to-use protocols are supplied with the unit, but custom protocols can also be created manually or from provided templates. The STEMCELL ready-to-use protocols are proprietary and cannot be viewed, edited, or duplicated. For additional information on creating custom protocols, see sections 4.3.2, 4.3.3, and 4.3.4.

Each STEMprep™ Tissue Dissociator unit has four slots (Figure 4). Each slot fits one STEMprep™ Sample Tube, where tissue samples are placed to be dissociated. Each unit is represented on the screen in the Run Control section (Figure 23); each slot displays its unit label and slot number. Units can be arranged and labeled for presentation on screen (see section 4.4.3).

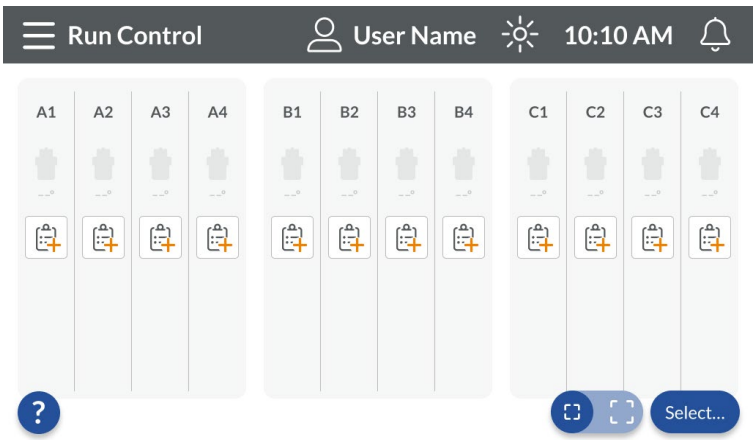

Figure 23. Run Control. Slot display in a three-unit STEMprep™ configuration (the units are labeled A, B, and C; each slot is labeled 1, 2, 3, and 4). All slots are in an idle state with no STEMprep™ Sample Tubes inserted or protocols selected.

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There are seven main states of the slot display (Figure 24): Empty, Protocol Selected, Shield Up, Sample Tube Misaligned, Sample Tube Inserted, Running, and Completed.

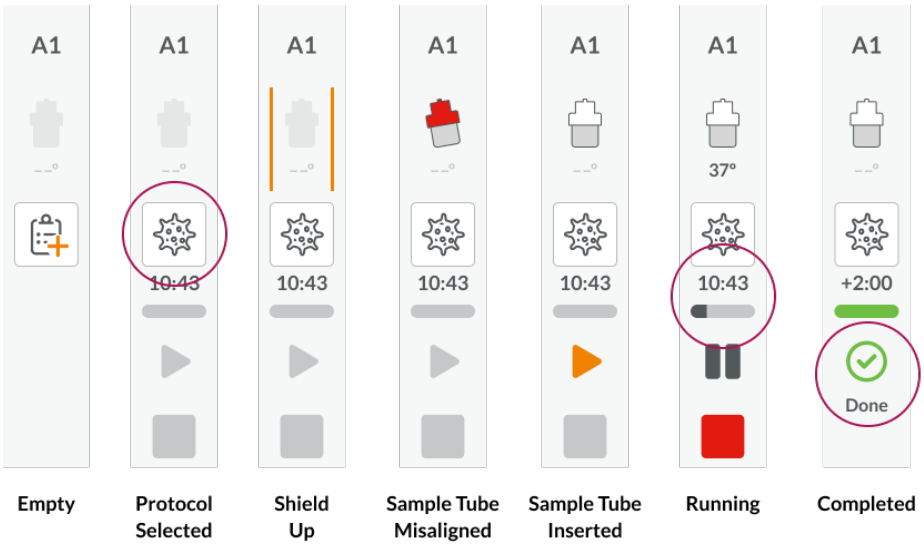

Figure 24. The Seven Main States of the Slot Display. The Protocol Selected state, Running state, and Completed state are circled to highlight a significant feature of the display in each of those states. In the Protocol Selected state, a sample-type icon is displayed. In the Running state, a progress bar is displayed. In the Completed state, a Done icon is displayed.

Note: Protocol selection and STEMprep™ Sample Tube insertion can be performed in either order.

In Run Control, protocols can be selected and run on one slot at a time (section 4.2.2.1) or on multiple slots simultaneously (section 4.2.2.2).

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4.2.2 Slot Display

The slot display will differ depending on whether a user has one, two, three, or four STEMprep™ Tissue Dissociator units installed. A single-unit configuration is shown in Figure 25.

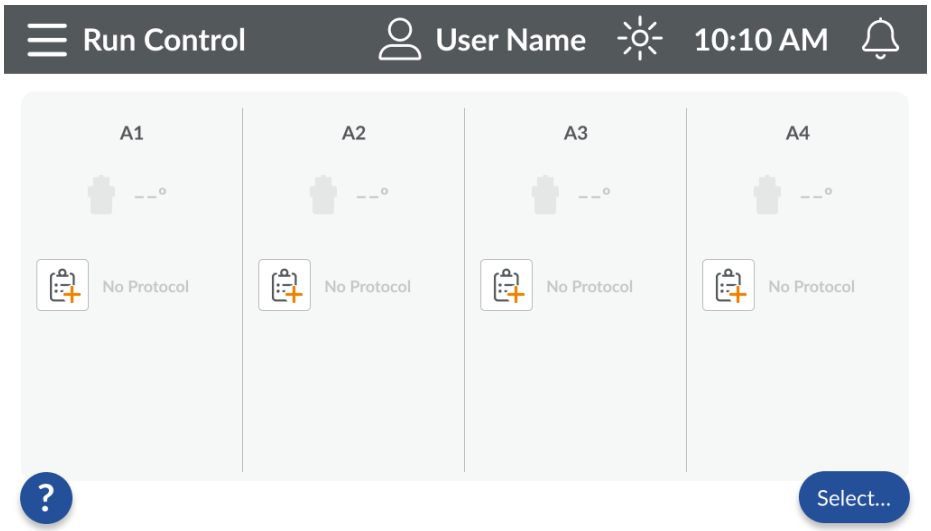

Figure 25. Slot Display in a Single-Unit Configuration

If two or more units are connected, the slot display is narrower. The same information is displayed, except for the protocol name (Figure 26).

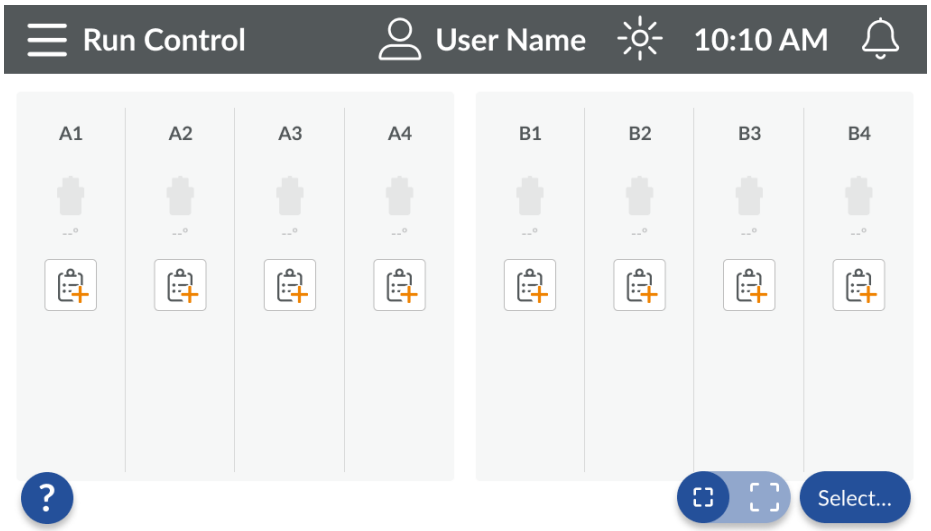

Figure 26. Slot Display in a Two-Unit Configuration

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With three units, the slots are narrower still (Figure 27).

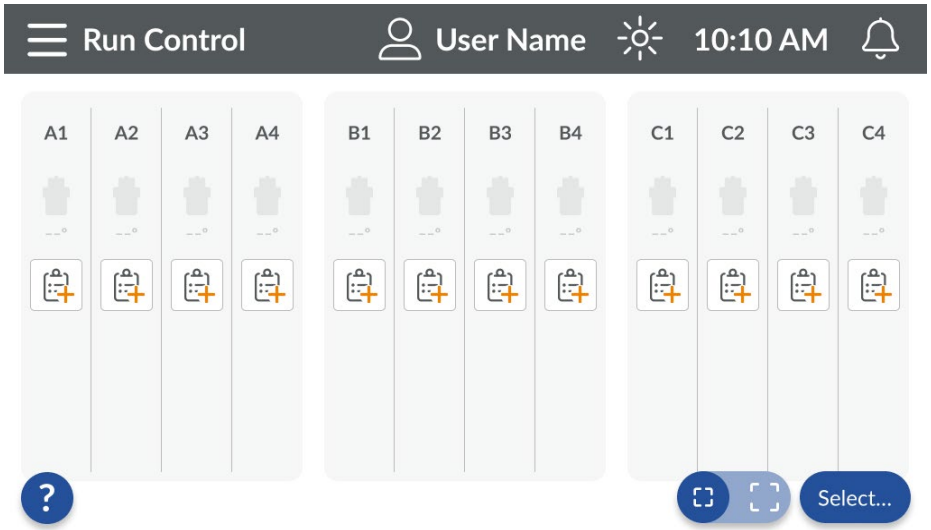

Figure 27. Slot Display in a Three-Unit Configuration

If there are four units, the display scrolls left and right. Note in Figure 28 that the slot display for the fourth unit is partially in view to the right. Scroll the display by swiping left or right.

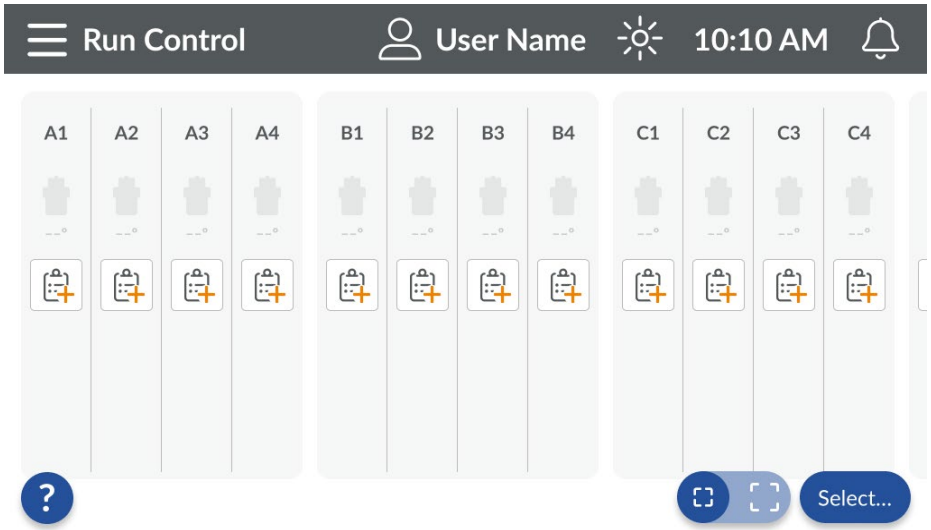

Figure 28. Slot Display in a Four-Unit Configuration

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When there is a two-, three-, or four-unit setup, the view toggle (Figure 29) can be used to view each unit in expanded mode.

Figure 29. View Toggle for Compact View (Left) and Expanded View (Right)

In Figure 29, the setting on the left displays the slots in the compact view (for configurations with one or more Secondary Units connected to the Primary Unit). The setting on the right displays the slot in the expanded view. When in expanded view, the slots for each unit will fill the screen, displaying the protocol name along with the other controls. Swipe left or right to scroll to view the slot display for each unit (Figure 30).

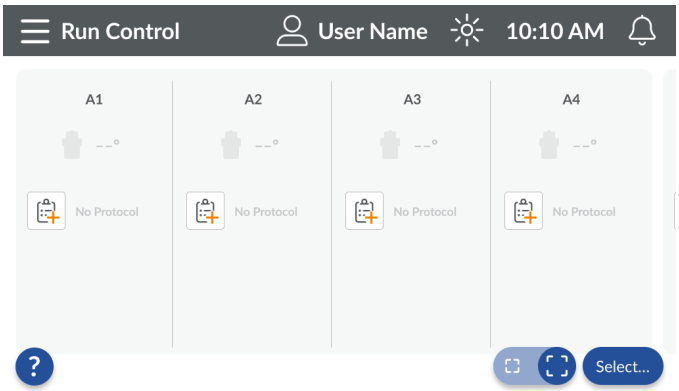

Figure 30. Expanded View with One Unit in View

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4.2.2.1 Single-Select Mode

To select a protocol for a specific slot, tap [Select Protocol]. The Select Protocol screen will be displayed (Figure 31). The Select Protocol screen lists all valid protocols on the unit, initially sorted by Last Run date. Sort the list by protocol Name, Last Run date, or Author by tapping the corresponding column header. Sort direction may be changed by tapping again on the sorted column header.

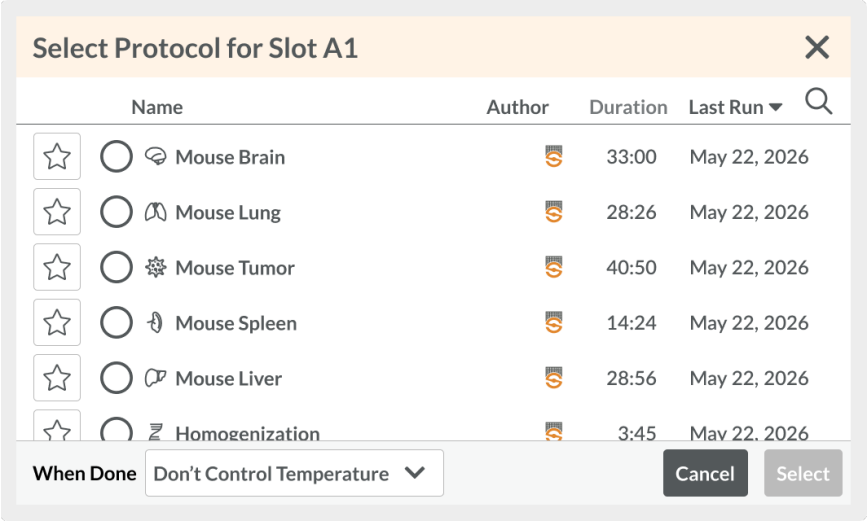

Figure 31. Select Protocol Screen

To select a protocol to run on multiple slots simultaneously, see section 4.2.2.2.

Protocols can be favorited by tapping [Favorite]. Favorited protocols are sorted to the top of the list, regardless of the current sort criteria (Figure 32). Favorited protocols are indicated with a filled-in Favorite icon: .

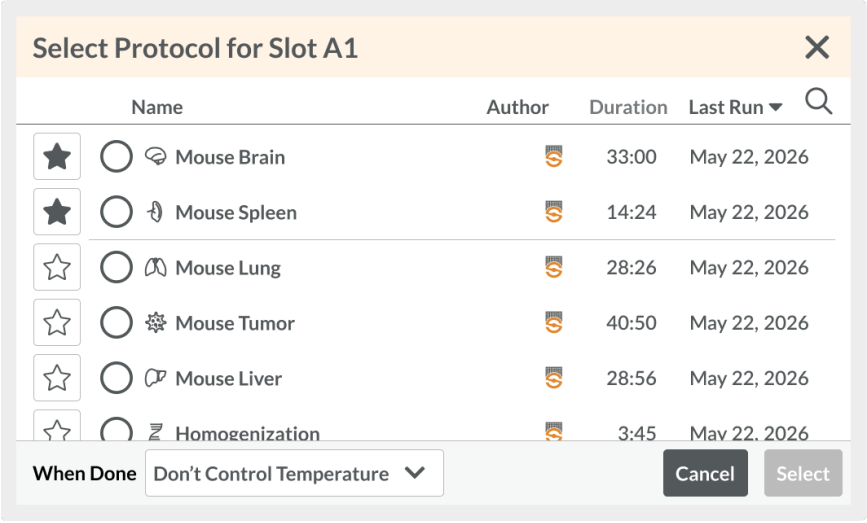

Figure 32. Favorited Protocols. The top two protocols have been favorited.

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Select a protocol to load onto the slot by tapping the round button beside the protocol name (Figure 33).

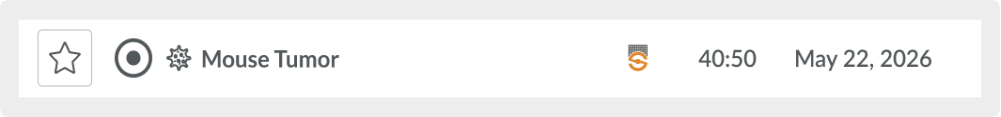

Figure 33. Selected Protocol

For details on finding protocols, see section 4.3.1.1.

After selecting a protocol, select a temperature control option to follow completion of the protocol. Tap the drop-down menu beside **When Done** (Figure 31) at the bottom of the screen and select one of the options below:

- **Don't Control Temperature** [default]: Following protocol completion, the thermal well(s) will return to ambient temperature.
- **Hold at 4°C**
- **Hold at 22°C**
- **Hold at 37°C**

The temperature control applies for up to 24 hours, after which the slot will revert to ambient temperature.

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When the protocol is loaded, the Protocol button on the corresponding slot will display a sample-type icon (e.g. a tissue) or a generic protocol icon (Figure 34). For details on editing protocols, see section 4.3.3.

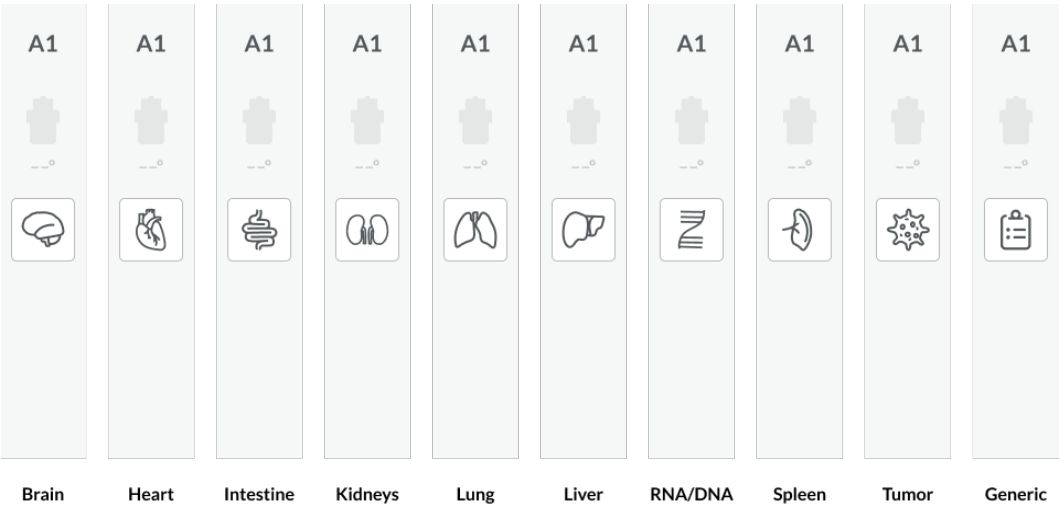

Figure 34. Protocol Icons. Sample types or a generic icon (at the far right) are displayed.

To run the protocol, a STEMprep™ Sample Tube must be inserted into the slot.

Before loading a sample into the STEMprep™ Sample Tube, check that the Sample Tube is intact. This can be done by closing the lid and spinning the top of the rotor that protrudes from the lid. If the full rotor is spinning without much resistance, the STEMprep™ Sample Tube can be used.

For sample preparation instructions, refer to the applicable STEMprep™ Tissue Dissociation Kit Product Information Sheet (PIS), available at www.stemcell.com, or contact us to request a copy.

To begin loading a STEMprep™ Sample Tube, with one hand, lift the shield using the tab and hold it at the highest position. With the other hand, load a STEMprep™ Sample Tube into the slot, and ensure that the tabs of the STEMprep™ Sample Tube fit into the grooves of the slot (Figure 35). Lower the shield to the lowest position (Figure 36).

Note: When the shield is lowered to its lowest position, the instrument checks whether the spindle is making proper contact with the STEMprep™ Sample Tube. If proper engagement is not detected, the spindle will automatically move back and forth in an attempt to align correctly. If engagement still cannot be achieved, the spindle will stop moving. In this case, manually raise the shield and gently rotate the spindle by a few degrees before trying again. If the problem persists, refer to section 7.3 for troubleshooting.

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Figure 35. Loading the STEMprep™ Sample Tube

Figure 36. Lowering the Shield

To begin the protocol, tap [Start]. A progress bar will be displayed, along with the time remaining in the protocol (see section 4.2.3).

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4.2.2.2 Multi-Select Mode

Note: The examples below show the slot display for a three-unit configuration. For the slot displays of other configurations, see section 4.2.2. The information displayed does not differ, except for how the protocol name is displayed in single-unit configurations and expanded mode.

A protocol can be selected and run on multiple slots simultaneously if desired. First, from the Run Control screen, tap Select... (Figure 37) to enter multi-select mode, where the multi-select toolbar is displayed.

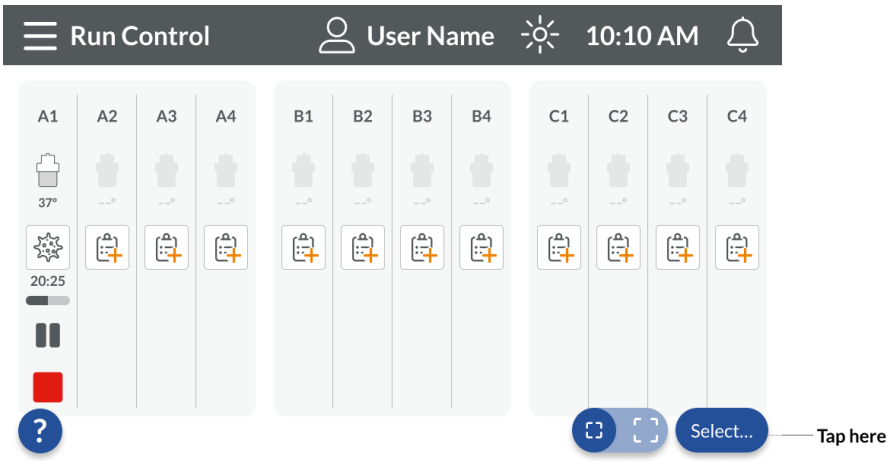

Figure 37. Multi-Select Button. Tap to display the multi-select toolbar.

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In multi-select mode, individual slots do not display Select Protocol buttons; instead, the multi-select toolbar is displayed, and each slot has a selection button (Figure 38).

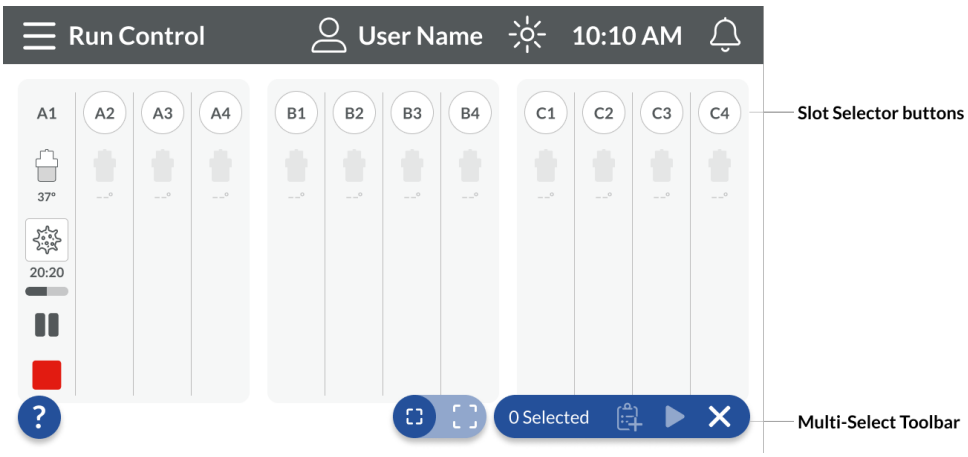

Figure 38. Multi-Select Mode. The toolbar is displayed at the bottom; slot selector buttons are at the top of each slot.

The multi-select toolbar (Figure 39) shows the number of selected slots; it also includes buttons for selecting a protocol, starting a protocol, and exiting multi-select mode.

In multi-select mode, slots that are already running are controlled as described in section 4.2.2.1.

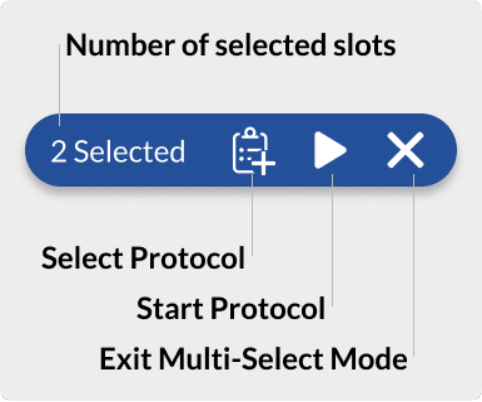

Figure 39. Multi-Select Toolbar

[Select Protocol] is enabled when at least one slot is selected. [Start Protocol] is enabled when at least one slot is selected and has both a protocol loaded and a STEMprep™ Sample Tube inserted. [Exit] returns to single-select mode.

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To operate slots in multi-select mode (Figure 40), select one or more slots by tapping the circular Slot Selector button (e.g. B1) at the top of the slots. When selected, the button is blue (e.g. B1). Figure 40 shows slot A1 running and slots B1, B2, and B3 selected.

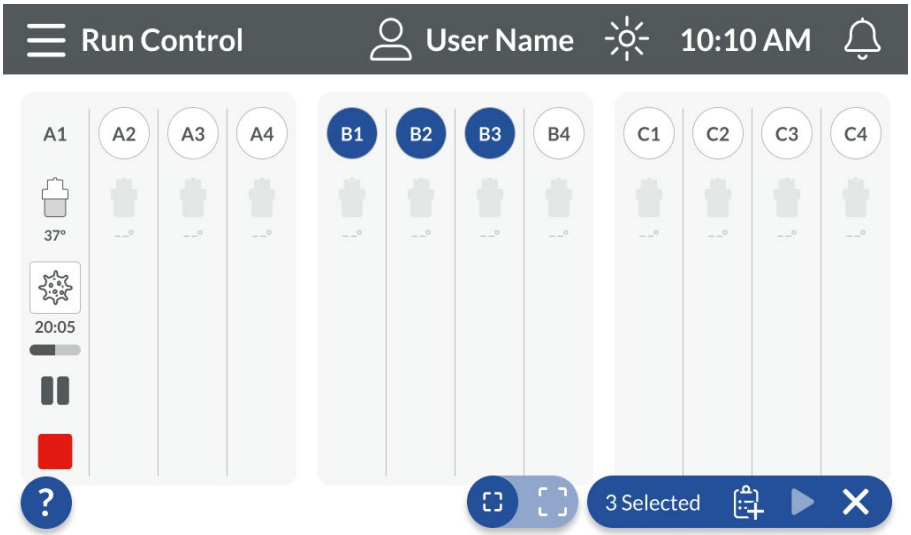

Figure 40. Selected Slots in Multi-Select Mode. Slot A1 is running; slots B1, B2, and B3 are selected.

To select a protocol for selected slot(s), tap [Select Protocol] in the toolbar (Figure 39). The Select Protocol screen will be displayed (Figure 31), and the selected protocol and temperature hold setting (section 4.2.3) will apply to all selected slots. After a protocol has been selected, it will be displayed along with the total run time for the selected slots (Figure 41, showing a brain tissue protocol).

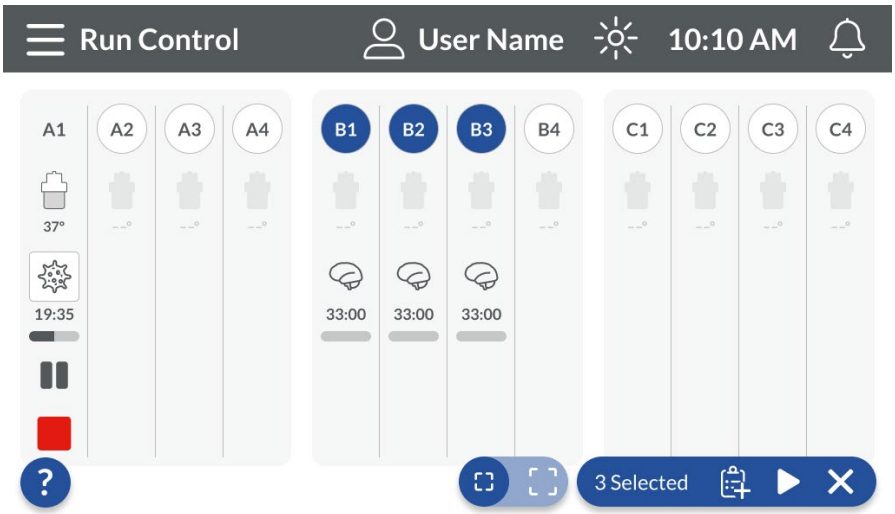

Figure 41. Multiple Selected Slots with Protocol Loaded. Displays for slots B1, B2, and B3 show the selected brain-tissue protocol and the total run time. Slot A1 is running a different protocol independently and the display is showing the remaining run time.

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Next, insert STEMprep™ Sample Tubes into the slots, as outlined in section 4.2.2.1. [Start] on the toolbar will be enabled, and the protocols for selected slots can be started simultaneously by tapping .

Once protocols are running in multi-select mode, the slots are removed from the selection and can be paused or stopped individually (Figure 42).

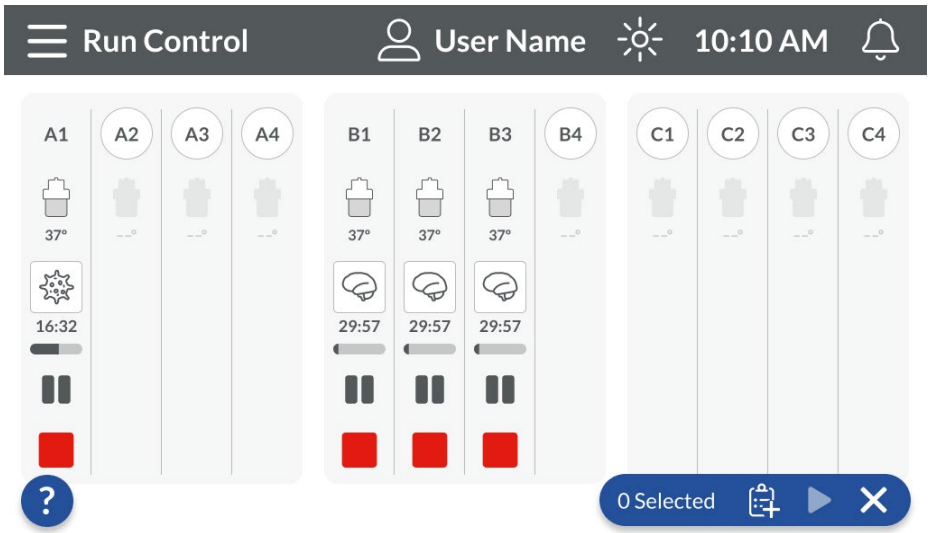

Figure 42. Slots Running in Multi-Select Mode

If desired, select a different set of the remaining unused slots to run additional protocols independently or simultaneously.

To exit multi-select mode, tap [Exit].

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4.2.3 Working with Running Protocols

When a protocol is running, the slot display shows progress information, along with controls to pause or terminate the protocol run (Figure 43).

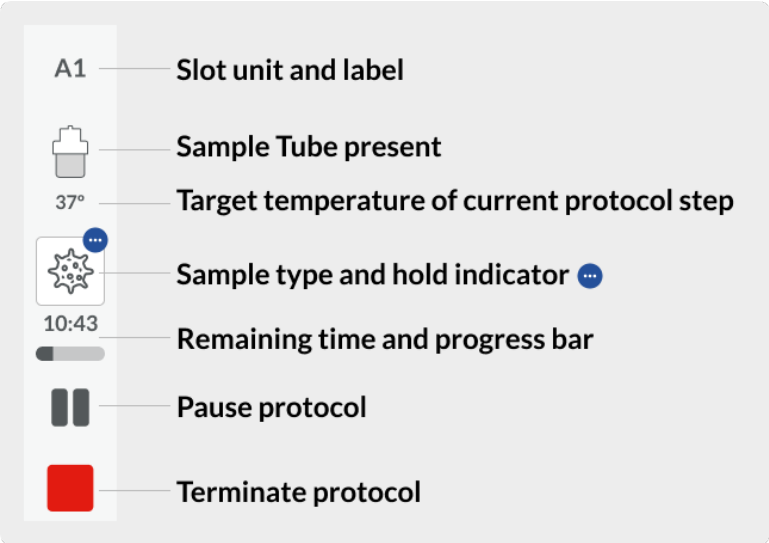

Figure 43. Slot Display for a Running Protocol

In single-unit configurations, or in multi-unit configurations in expanded mode (Figure 29 and Figure 30), the slot display is wider and displays the protocol name (Figure 44).

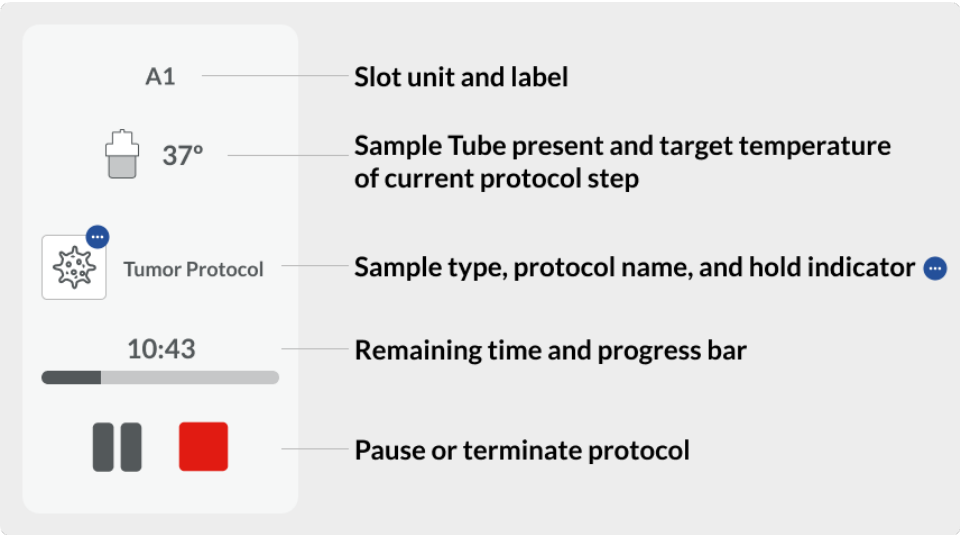

Figure 44. Slot Display for a Running Protocol (Expanded Mode)

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If a temperature hold setting is currently applied, a badge will be displayed on top of the protocol icon. To change the temperature hold setting on a protocol, tap the protocol icon. A dialog will be displayed, allowing for changes to be made to the temperature hold setting (Figure 45).

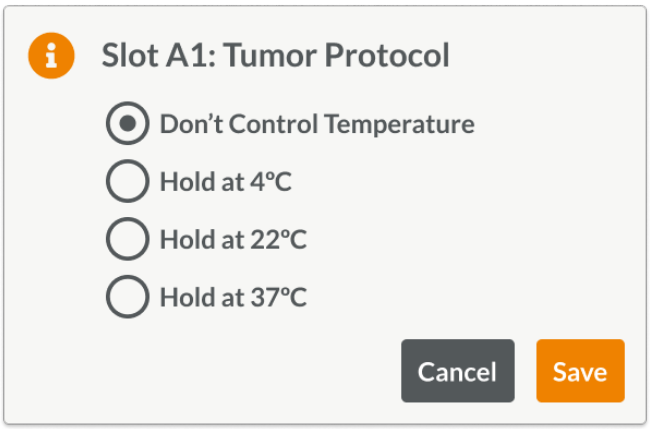

Figure 45. Temperature Hold Setting Dialog

To pause a protocol, tap [Pause]. If the STEMprep™ Sample Tube is removed during a protocol run, the slot will automatically be paused, and the temperature control will be turned off. To resume the protocol, reinsert the STEMprep™ Sample Tube and tap [Start].

To terminate a protocol, tap [Terminate]. A prompt will appear for confirmation before the protocol is terminated.

4.2.4 Collecting Dissociated Tissue

After the protocol has successfully completed and the spindle has come to a stop, retrieve the STEMprep™ Sample Tube from the slot to collect dissociated tissue. With one hand, lift the shield to the top position and retrieve the STEMprep™ Sample Tube with the other hand. Lower the shield to the closed position when done.

4.2.5 Disposing of the STEMprep™ Sample Tube

STEMprep™ Sample Tubes are single-use only and must be appropriately discarded after use. Repeated use of STEMprep™ Sample Tubes may impact subsequent performance and/or lead to non-dissociated samples, lost samples, or contamination.

After the tissue has been collected from the STEMprep™ Sample Tube, discard as per your facility policies.

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4.3 Protocols

The Protocols section contains all saved protocols, including STEMCELL-optimized protocols. Tap ☰ to navigate to Protocols (Figure 46).

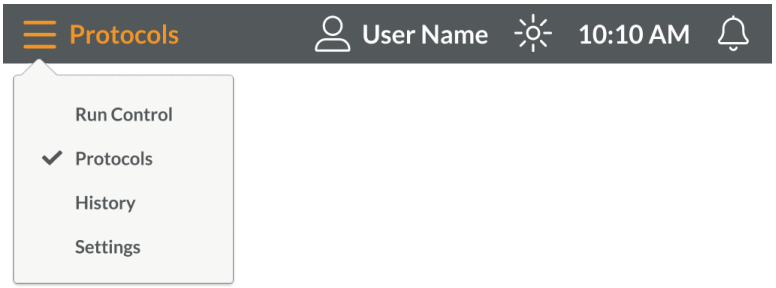

Figure 46. Navigating to the Protocols Section from the Main Navigation

4.3.1 Protocol List

The Protocol list (Figure 47) includes several ready-to-use protocols optimized by STEMCELL for processing different sample types. Ready-to-use STEMCELL protocols are identified by the STEMCELL logo in the Author column. Custom protocols will also appear in this list once they are created (see section 4.3.3).

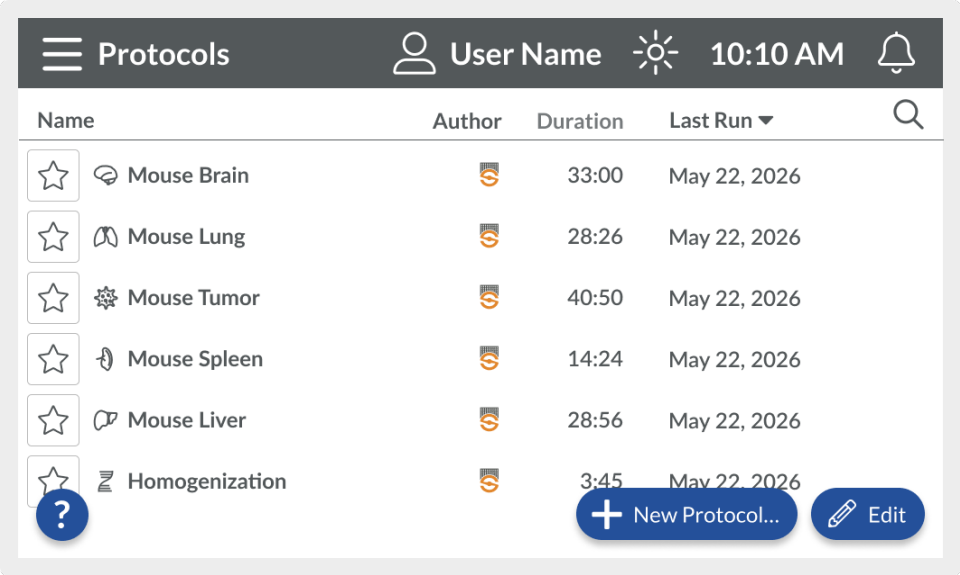

Figure 47. Protocol List Showing STEMCELL Protocols

As with the Select Protocol screen (as described in section 4.2.2.1), the Protocol list may be sorted by protocol Name, Last Run date, or Author by tapping the corresponding column header. Sort direction may be changed by tapping again on the sorted column header.

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Protocols can be favorited by tapping ☆ [Favorite]. Favorited protocols are sorted to the top of the list, regardless of the current sort criteria. Favorited protocols are indicated with a filled-in icon: ★.

Tap + New Protocol... to create a new custom protocol. A screen will be displayed that provides a choice between creating a protocol from a blank protocol or from the template protocol provided by STEMCELL (Figure 48).

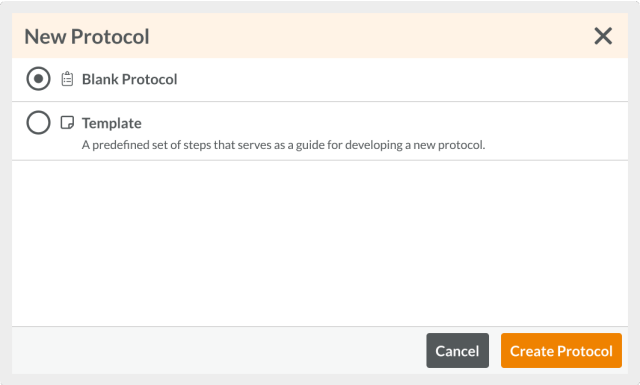

Figure 48. New Protocol Options

After selecting Blank Protocol or Template, tap Create Protocol. A new protocol will be displayed in the Protocol Editor (see section 4.3.2).

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If the Template option was selected, a new protocol will be created with a predefined set of steps (Figure 49). In the template, several steps and a loop (section 4.3.4) are provided as follows:

- **Step 1 (Prime):** A brief slow spin during heating
- **Steps 2 and 3 (Cut):** Steps 2 and 3 are looped with a repeat count of 2 (section 4.3.4). Step 2 is a forward cut step. Step 3 is a reverse spin (-40 RPM) to help ensure free movement of tissue.

  Note: Reduce the speed for soft tissues. Increase the speed or number of loops for hard tissues.
- **Step 4 (Incubate):** Slow spin to agitate tissue during incubation with enzyme cocktail
- **Step 5 (Dissociate):** High-speed spin to generate single cells

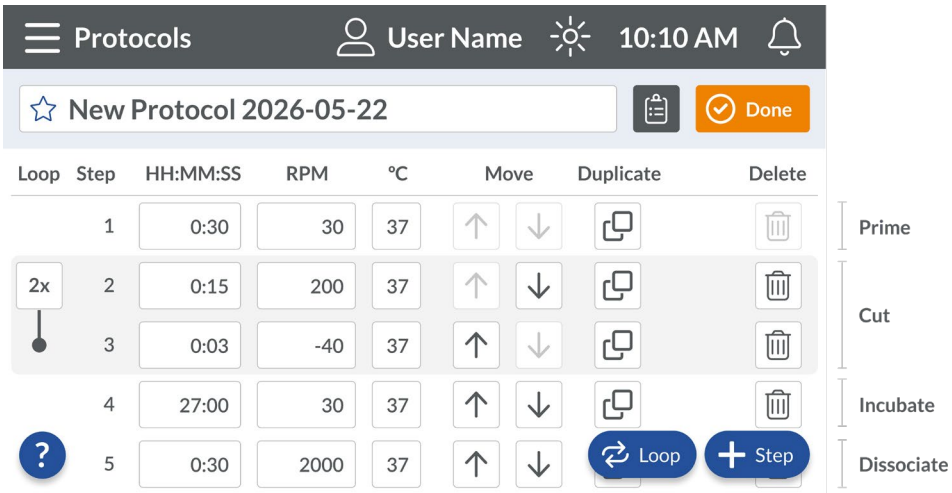

Figure 49. New Protocol from Template. Five steps and a loop (2x) are provided.

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4.3.1.1 Finding Protocols

To search for protocols, tap [Search] in the top right of the Protocol list screen. The **Find Protocols** panel will be displayed (Figure 50).

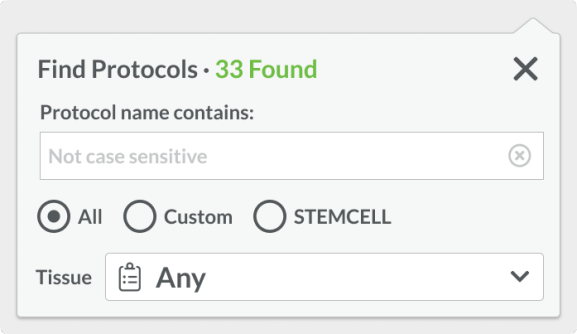

Figure 50. Find Protocols Panel

Tap the **Protocol name contains** field to search based on protocol name. The on-screen keyboard will be displayed (see section 4.1.3). Select to search all protocols, custom only, or STEMCELL-supplied protocols. Select a sample type (e.g. a tissue type). All search criteria are optional. The number of found protocols will be displayed, and the list will update based on search criteria (Figure 51).

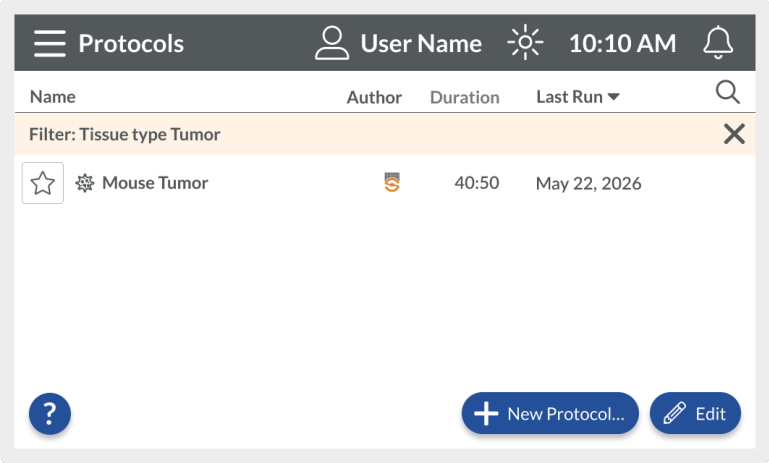

Figure 51. Results of Protocol Search Filtered by Tissue Type

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4.3.1.2 Duplicating and Deleting Protocols

Tap Edit in the Protocol list screen to duplicate or delete protocols. The list will change to Edit mode (Figure 52).

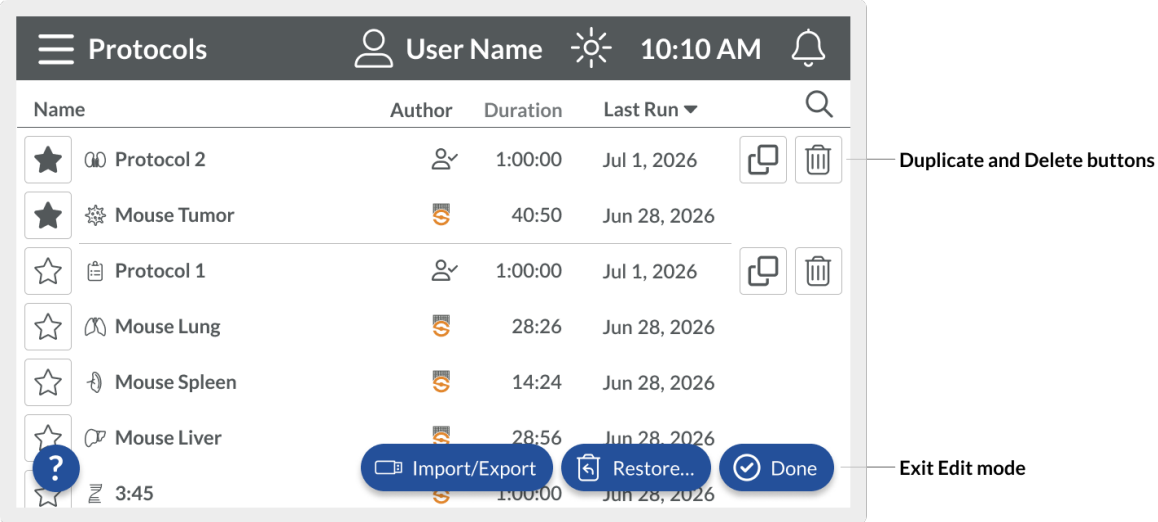

Figure 52. Protocol List in Edit Mode

Tap [Duplicate] to make a copy of a protocol. Tap [Delete] to remove the protocol from the system. Custom protocols generated from other user accounts may be duplicated; once duplicated, a protocol is owned by the user account that duplicated it. A custom protocol can be deleted by the user account that owns it.

4.3.1.3 Retrieving Deleted Protocols

In Edit mode, tap Restore... to recover recently deleted protocols. The Restore Deleted Protocols screen will be displayed (Figure 53).

Note: Protocols are automatically permanently deleted 30 days after deletion.

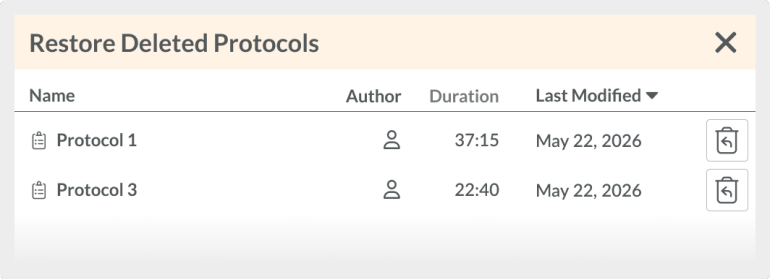

Figure 53. Restore Deleted Protocols Screen

To restore a protocol, tap next to the corresponding protocol. The restored protocol will be moved back to the main Protocol list.

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4.3.1.4 Importing and Exporting Protocols

In Edit mode, tap Import/Export to import or export protocols to or from STEMprep™ Tissue Dissociator via a USB storage device. The Import/Export Protocols screen will be displayed (Figure 54).

To import protocols, tap Import. A prompt will appear to insert a USB storage device and select which protocols to import.

To export protocols, select the desired protocols using the checkboxes to the left of the protocol icon and name. Then tap Export Selected. A prompt will appear to insert a USB storage device for export (Figure 54).

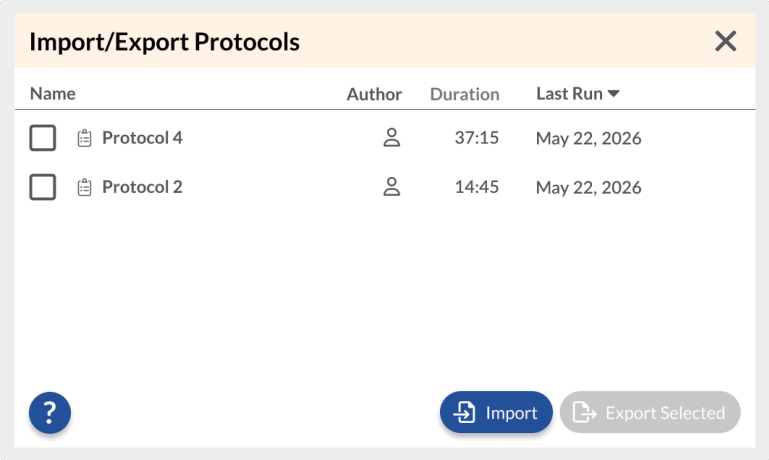

Figure 54. Import/Export Protocols Screen

When you are finished importing or exporting, tap ✕ and then tap Done to exit Edit mode and return to the Protocol list.

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4.3.2 Protocol Editor Overview

From the Protocol list (Figure 47), tap New Protocol... to create a new protocol, either empty or with template content from STEMCELL (section 4.3.3). The Protocol Editor will be displayed.

There are several components to the Protocol Editor interface (Figure 55).

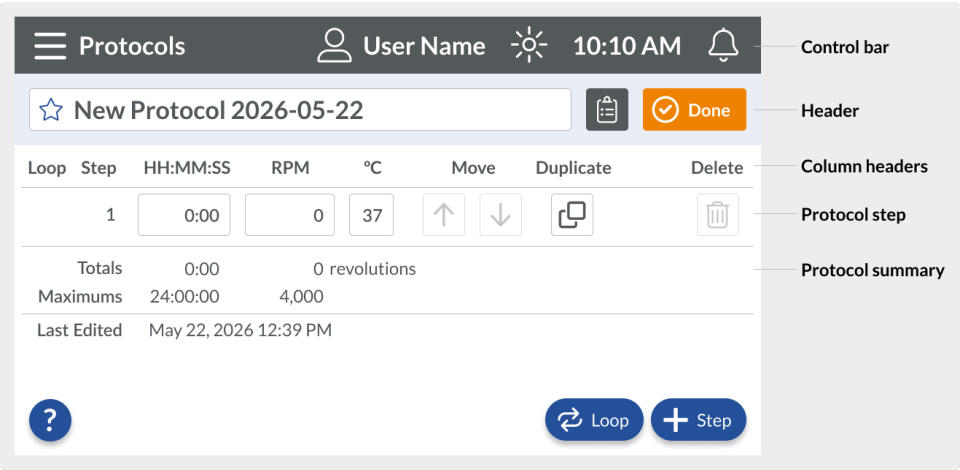

Figure 55. Protocol Editor with New Protocol

The control bar is reviewed in section 4.1.1.

Use the Header to favorite the protocol, edit the protocol name, set the sample type, and complete editing by tapping Done (Figure 56).

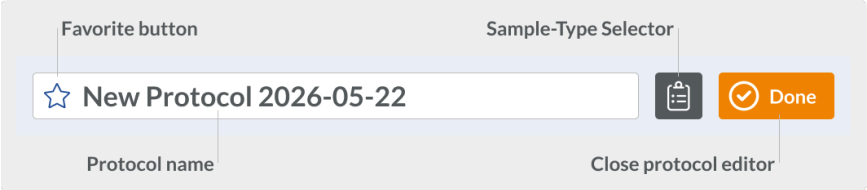

Figure 56. Protocol Editor Header

Tap the Favorite button to toggle favoriting the protocol. Favorited protocols are indicated with a filled-in icon: ★.

Tap the protocol name to change it. The full-screen keyboard will be displayed (section 4.1.3).

Note: The protocol name must be unique.

Tap [Sample-Type Selector] to specify the sample type (e.g. tissue type) for the protocol. This is optional, and it sets the icon for the protocol that will be displayed in the slot display in Run Control (section 4.2) and the Protocol list (section 4.3.1). The Sample-Type Selection menu will be displayed (Figure 57).

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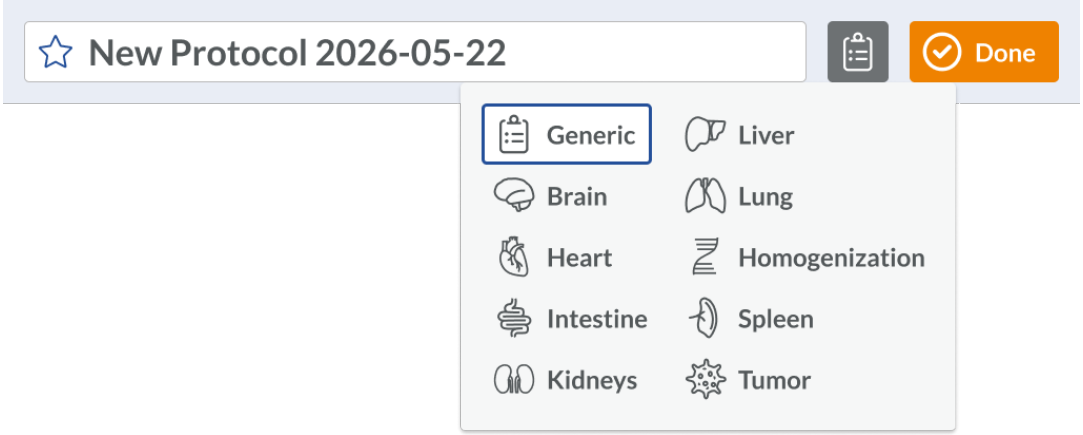

Figure 57. Sample-Type Selection Menu

Tap Done to close the Protocol Editor and return to the Protocol list.

In the Protocol Editor, the list of protocol steps shows the speed and temperature settings for each step ordered sequentially, from top to bottom (Figure 58). Looped steps are grouped visually; for information on protocol loops, refer to section 4.3.4.

The total duration and revolutions are displayed at the bottom of the list of protocol steps. The maximum protocol duration is 24 hours; the maximum number of revolutions is 4000 to protect the integrity of the STEMprep™ Sample Tube.

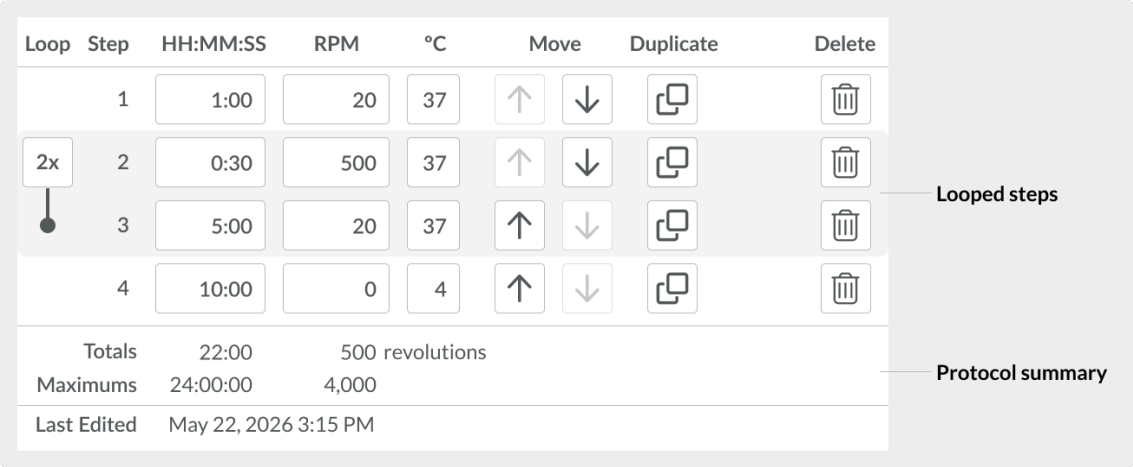

Figure 58. Protocol Steps and Protocol Summary

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4.3.3 Adding and Editing Protocol Steps

To add a protocol step, tap

in the Protocol Editor (Figure 55). A new step will be added at the end of the protocol.

Step duration, speed, and temperature can be edited. Steps can also be rearranged and deleted.

4.3.3.1 Editing Step Duration

To edit the length of a step, tap on the duration field of a step (labeled **HH:MM:SS**). The Edit Step Duration panel will be displayed (Figure 59). Using the keypad, enter a duration between one second (00:00:01) and 24 hours (24:00:00), keeping in mind that the maximum total duration of a protocol is 24 hours.

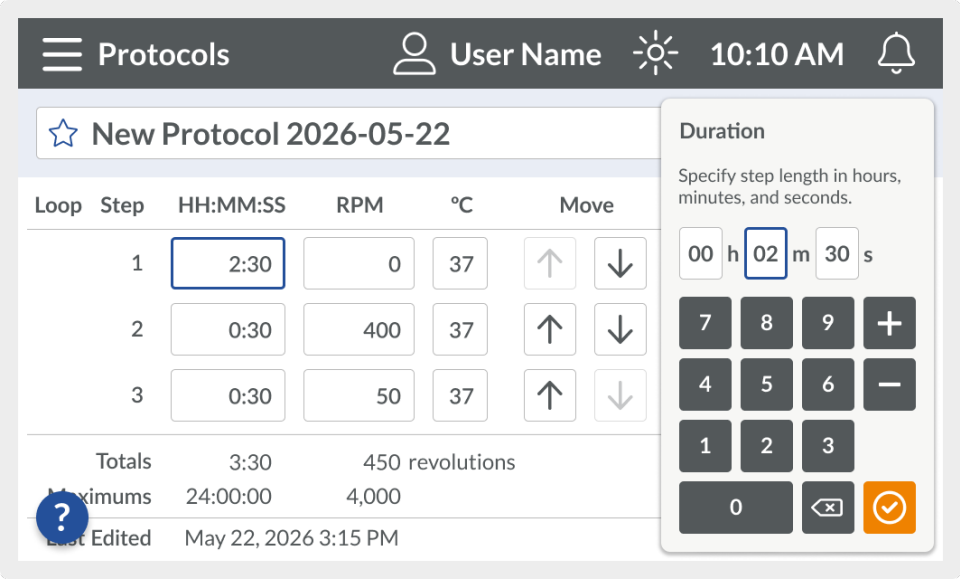

Figure 59. Edit Step Duration Panel

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4.3.3.2 Editing Step Speed

To edit the speed of a step, tap on the speed field of a step (labeled **RPM** [revolutions per minute]). The Edit Step Speed panel will be displayed (Figure 60).

Using the keypad, select Fwd Off Rev [Forward] for a clockwise rotation and enter a speed between 1 and 3000 RPM.

Select Fwd Off Rev [Reverse] for a counterclockwise rotation and enter a speed between 1 and 40 RPM.

Note: A counterclockwise spin can help ensure free movement of tissue.

Optionally, select Fwd Off Rev [Off] to create a step that does not spin the sample.

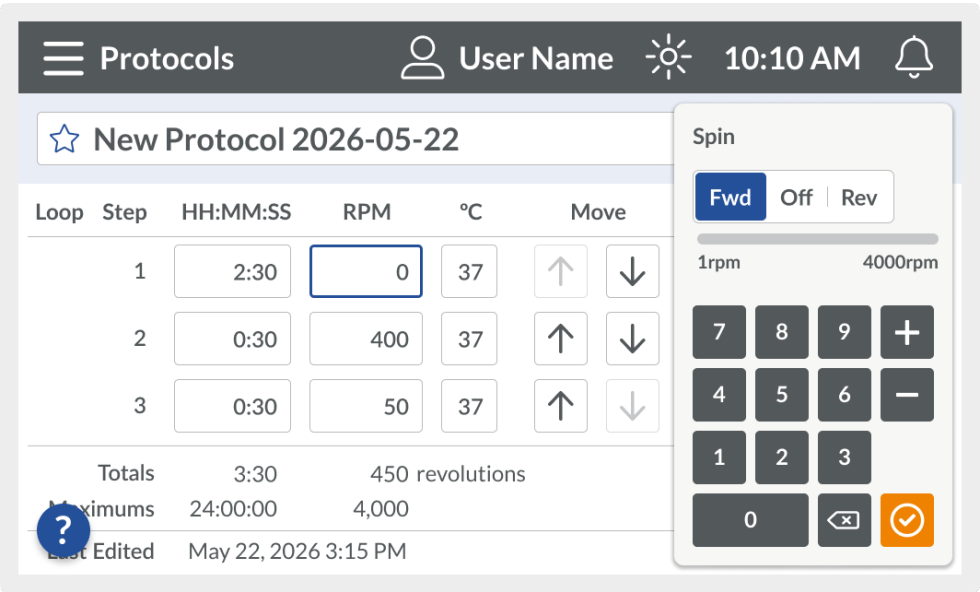

Figure 60. Edit Step Speed Panel

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Figure 61 shows all three settings for speed.

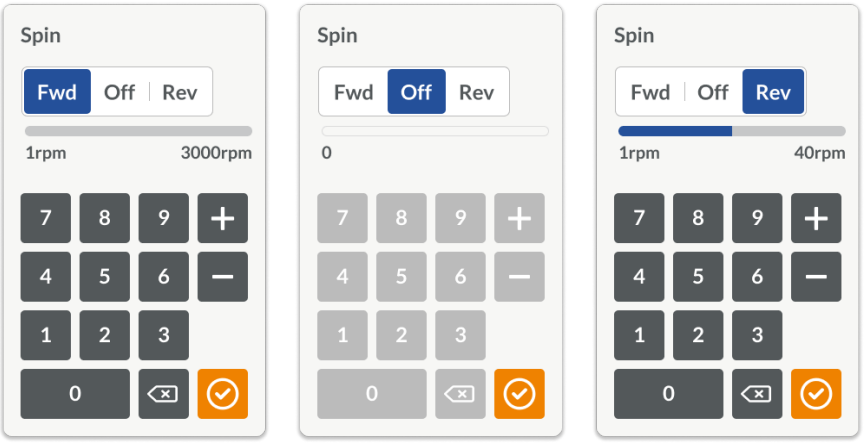

Figure 61. Edit Step Speed Panel Showing Forward, Rotation Off, and Reverse Settings

4.3.3.3 Editing Step Temperature

To edit the temperature for a step, tap on the temperature field of a step (labeled **°C**). The Edit Step Temperature panel will be displayed (Figure 62). Using the keypad, enter a temperature between 4°C and 37°C (i.e. 39°F and 99°F). Apply the temperature of the current step to all other steps by tapping [Apply to All].

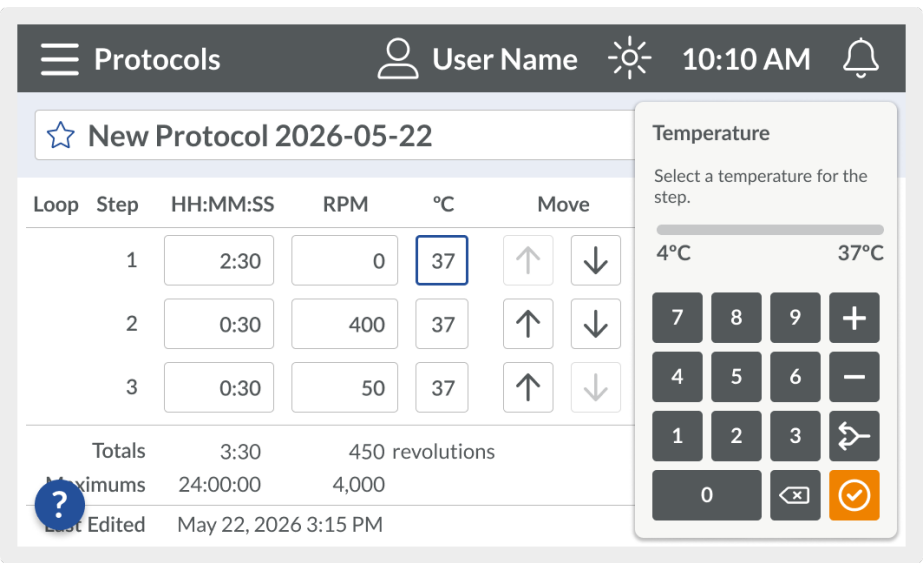

Figure 62. Edit Step Temperature Panel

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4.3.3.4 Rearranging and Deleting Steps

Steps can be rearranged and deleted from the Protocol Editor.

To rearrange a step in the list of protocol steps, tap the Move Loop button [Move Up] or [Move Down].

Note: The first step cannot be moved up, and the last step cannot be moved down.

To delete a step from the list, tap [Delete].

4.3.4 Adding and Editing Protocol Loops

To create a sequence of steps that will be repeated two or more times, tap [Loop] in the Protocol Editor (Figure 55).The Loop panel will be displayed (Figure 63).

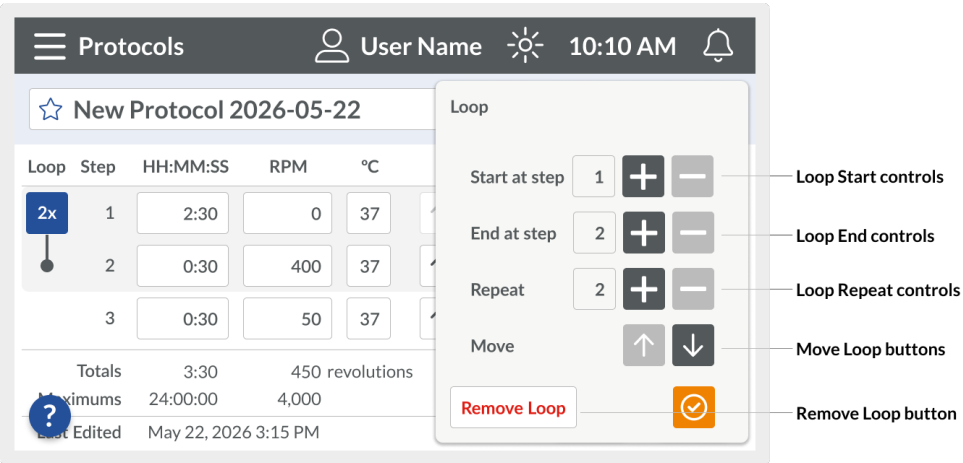

Figure 63. The Loop Panel

The loop is automatically applied to the first two steps that are not looped. In the Protocol Editor list, the looped steps are grouped visually, and a repeat count is displayed. Use the Loop panel to change the start step, end step, and repeat count. The repeat count is how many times the selected steps will be repeated before moving on to the next step (Figure 63). Tap the Move Loop buttons to move the loop up or down among the other steps in the protocol. To clear the loop, tap Remove Loop. Tap [Done] to finish editing a loop.

Each time is tapped (Figure 55), a new loop is created. To edit an existing loop, tap its Edit Loop button, which shows the repeat count (Figure 64).

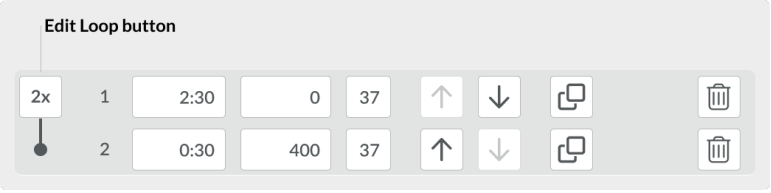

Figure 64. The Edit Loop Button, Showing a Repeat Count of 2

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4.3.5 History

History displays a list of past protocol runs and their statuses for the current user account.

Access STEMprep™ Tissue Dissociator History from the Main Navigation. Tap ☰ to display the drop-down menu and select **History** (Figure 65).

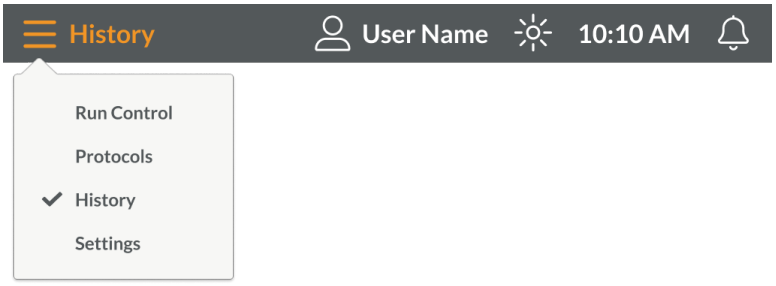

Figure 65. Navigating to History from the Main Navigation

A list of previous protocol runs will be displayed (Figure 66).

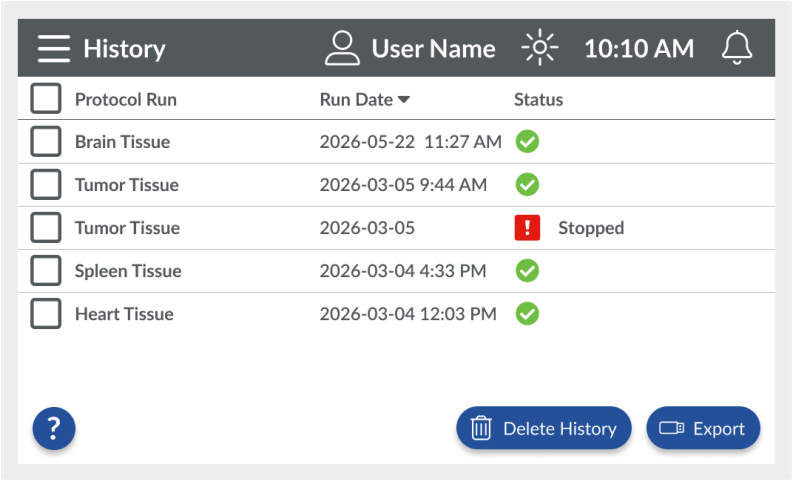

Figure 66. History

Tap Delete History to remove all history entries for the current user account. A prompt will appear for confirmation before the history is deleted.

Tap Export to save history entries to a USB storage device. An Export History dialog will be displayed (Figure 67).

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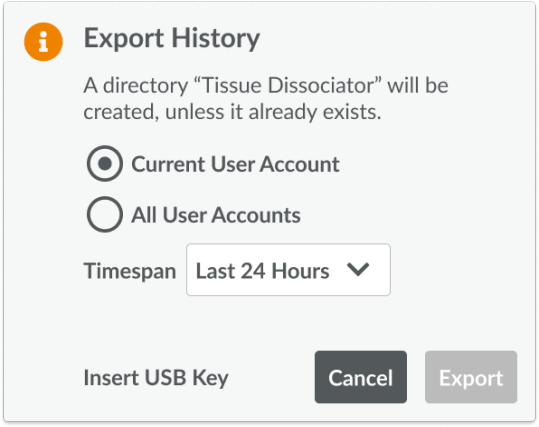

Figure 67. Export History Dialog

Select **All User Accounts** to export the protocol history for all user accounts, including the Default account, on the unit. Select a timespan for the export, insert a USB storage device, and tap Export.

4.4 Settings

The Settings section provides access to several aspects of the unit:

- Date and time settings
- User account management
- Unit management [including arrangement, labeling, and software updates]
- Service information
- Software version, legal, and end user agreement

Access STEMprep™ Tissue Dissociator Settings from the Main Navigation. Tap ☰ to display the drop-down menu and select **Settings** (Figure 68).

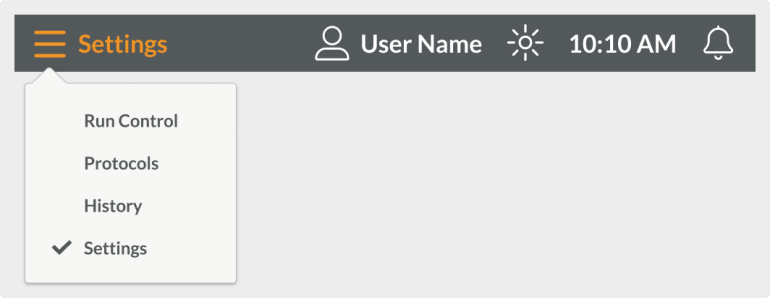

Figure 68. Navigating to Settings from the Main Navigation

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4.4.1 General

Access date and time preferences in the **General** tab of the Settings section (Figure 69).

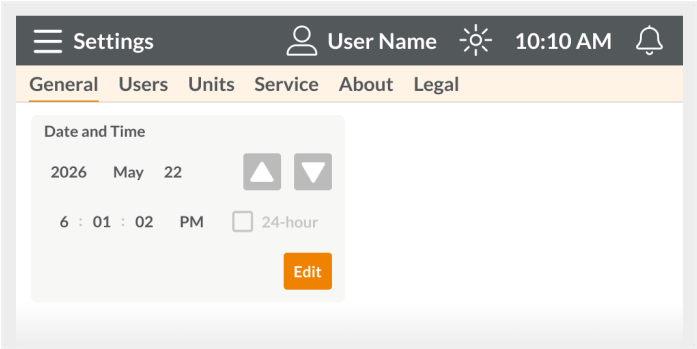

Figure 69. General Tab Screen in Settings

To edit the date and time, tap Edit. Select year, month, day, hour, and minute fields and use the increment or decrement controls to set the date and time. Optionally, select 24-hour time: for example, 2:00 PM would be displayed as 14:00. STEMprep™ Tissue Dissociator includes an internal clock that will maintain the current date and time. The time is displayed in the control bar (section 4.1.1), and protocol runs are stamped with the current date and time.

Note: The time will not automatically adjust with local changes to or from Daylight Saving Time.

4.4.2 User Accounts

Create user accounts in the **Users** tab of the Settings section. Initially, there is a single Default user account (Figure 70).

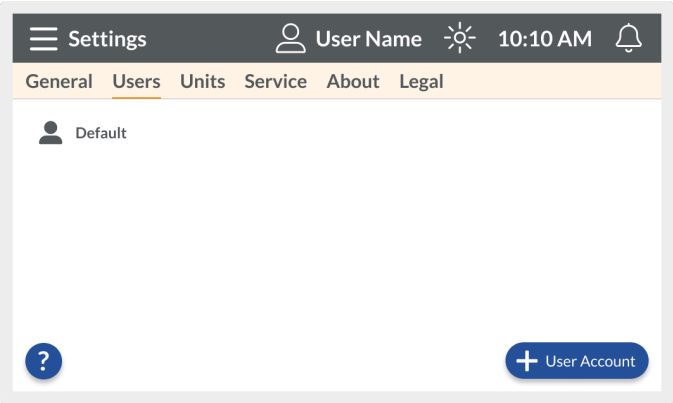

Figure 70. Users Tab Screen in Settings

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The unit is fully functional with the Default account. However, accounts can be added to allow the user to do the following:

- Organize the protocol run history (see section 4.3.5) by user. When exporting the history, there is an option to include all user accounts or just the current user history.
- Add a layer of protection to custom protocols. Protocols edited while in one user account cannot be viewed, edited, or deleted from another, without switching to the originating account.

Note: User accounts are not password-protected, and all users can switch to another account directly via the control bar.

To add an account, tap + User Account. Enter a name using the on-screen keyboard (see section 4.1.3). User account names must be unique. After the account has been created, it will be displayed in the list (Figure 71).

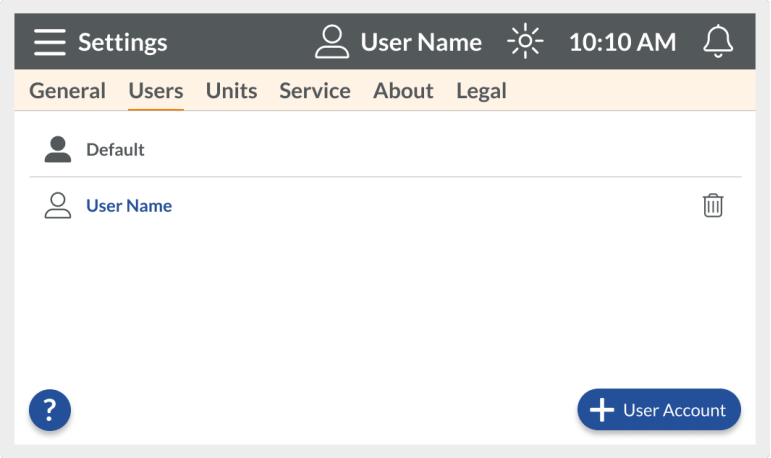

Figure 71. User Account List Showing the Default Account and a New Account ("User Name")

Tap the user name to edit it. Tap [Delete] to remove the account.

Note: When an account is deleted, any associated protocols and history will be moved to the Default account.

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4.4.3 Unit Management

A STEMprep™ Tissue Dissociator installation comprises a Primary Unit (with the touch screen); optionally, it has one, two, or three connected Secondary Units, which add between four and twelve additional slots for dissociation or homogenization protocols. All units are controlled via the Primary Unit touch screen. The Units section within Settings is used to manage and configure the unit(s) in your STEMprep™ installation (Figure 72).

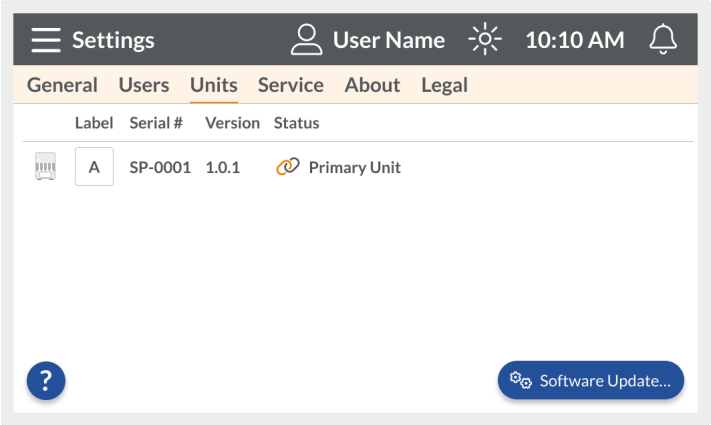

Figure 72. Unit Management. The Units tab is selected, showing a single (Primary) unit.

The Units section can be used for the following:

- Selecting an alphabetic label for the unit label screen
- Finding the serial number of each unit in the installation
- Viewing the status of each unit
- Rearranging the units so they reflect the physical arrangement of the units in the lab
- Seeing the current software version on each unit
- Updating software as necessary

Figure 73 shows a four-unit configuration. Each unit's serial number, version, and status are displayed.

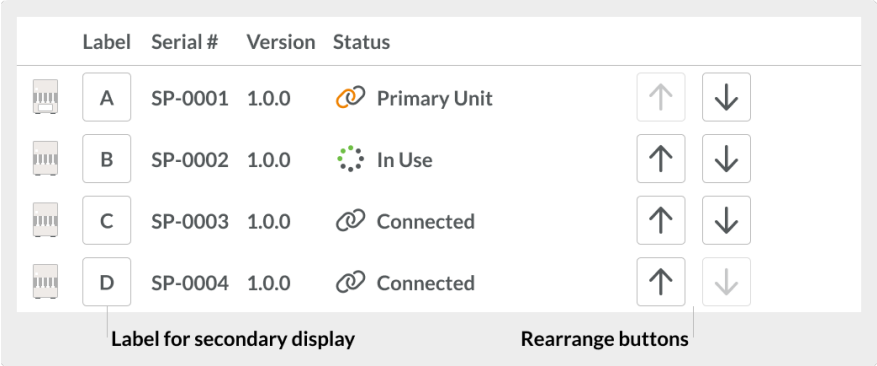

Figure 73. Unit Management Screen Showing Four Units (Labeled A, B, C, and D). The label shows up on the secondary display of each unit.

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Tap a unit label to select a different label for that unit. A small keyboard will be displayed (Figure 74).

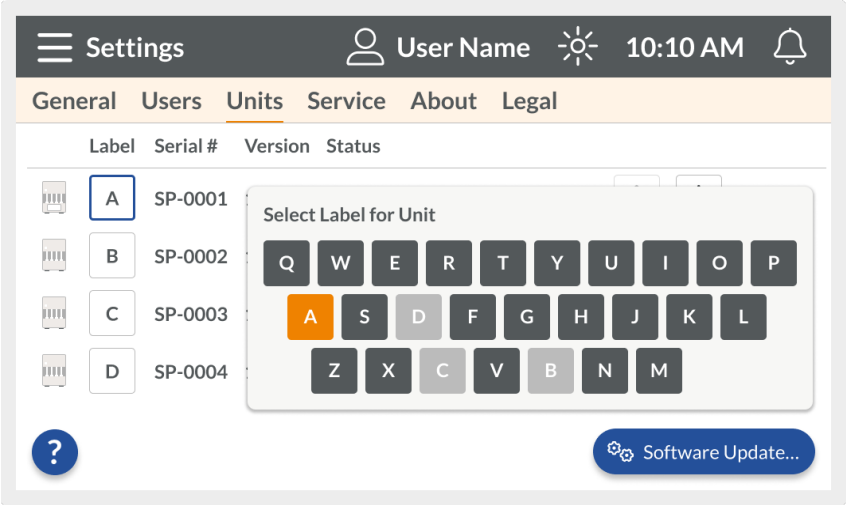

Figure 74. Re-Labeling Units. When a unit label is tapped, a small keyboard is displayed.

The small keyboard shows the current label of the selected unit in orange; the available labels in dark gray; and any labels used by other units disabled, in light gray (Figure 75).

Figure 75. Small Keyboard for Re-Labeling Units. The key of the selected unit's current label is orange; the keys for available labels are dark gray; the keys for labels that are in use are light gray and disabled.

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The unit label is shown on the secondary display of each instrument, located on the front of the unit above the slots, as shown in Figure 76.

Units can be reordered in the Unit Management screen to reflect each unit's physical arrangement in the lab. For example, it may be desirable to position the Primary Unit, with the screen, in the middle of a three-unit configuration (Figure 76).

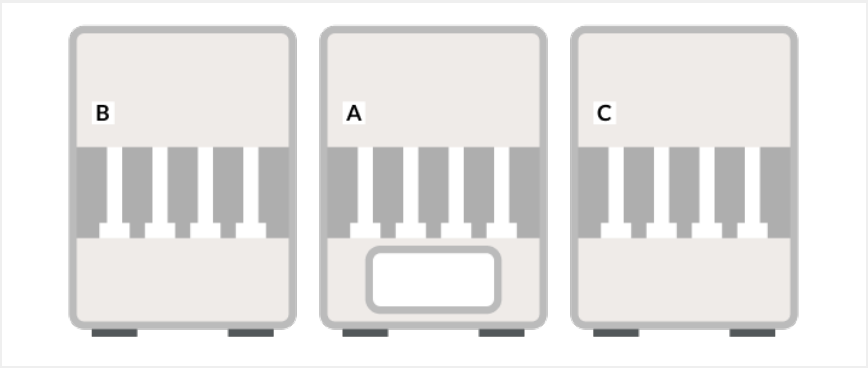

Figure 76. Example Configuration of STEMprep™ Tissue Dissociator Units with the Primary Unit in the Middle. The label of a unit is shown on the unit's secondary display, located above the slots.

To position the slot display of the Primary Unit (Unit A) in the middle, tap the Rearrange buttons (arrows) on the Unit Management screen (Figure 77). This will update the slot display of the units in Run Control (Figure 78).

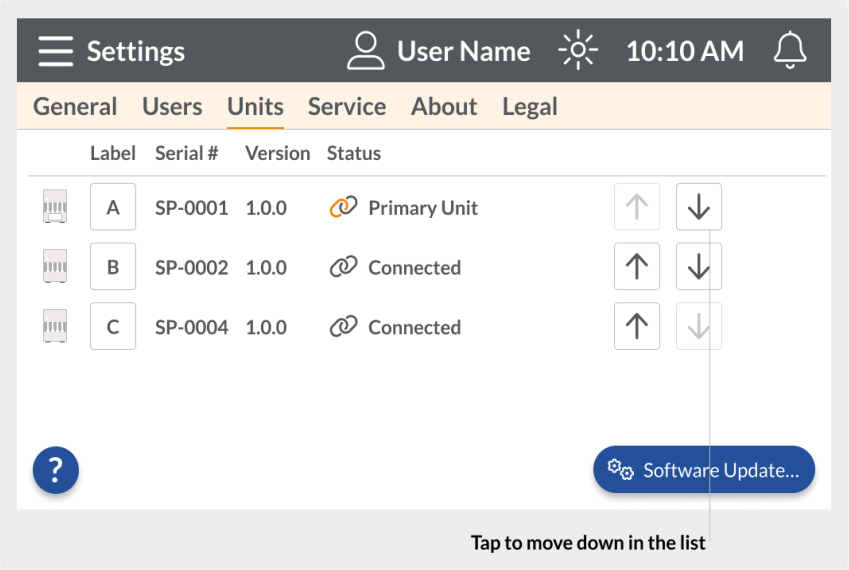

Figure 77. Unit Management Screen Showing Rearrange Buttons (Arrows) on the Right for Reordering Unit Display

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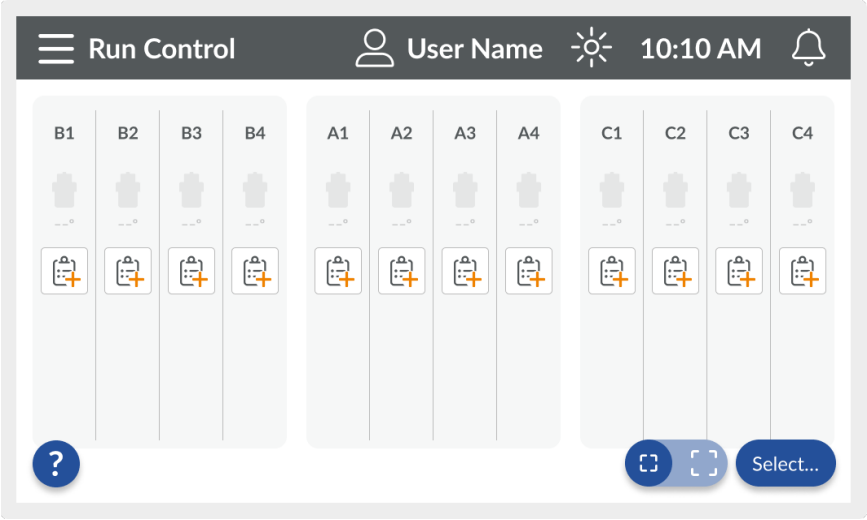

Figure 78. Example of a Three-Unit Configuration Slot Display in Run Control

The Run Control display will change to reflect the order in the Unit Management list: top-to-bottom in Unit Management corresponds to left-to-right in Run Control.

The Unit Management screen can also be used to update STEMprep™ Tissue Dissociator software. For software update information, refer to section 4.4.4.

4.4.4 Software Updates

The unit can be updated by the user through a USB storage device when a new software package is released by STEMCELL Technologies.

Note: Do not change the file name of the downloaded update package, because the unit expects the file name in a specific format. Also, ensure that the USB storage device is clear of viruses and not corrupted.

To find the current software version installed on the unit, tap **About** on the Settings screen (Figure 79). The software version is displayed on the lower right.

Software updates will be communicated through your local sales representative or can be found at www.stemcell.com/products/product-types/lab-instruments-and-software-overview.

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Figure 79. About STEMprep™ Tissue Dissociator. The software version is displayed on the lower right.

Compare the version number installed on the unit with the version in the update package file name. If the update package contains a higher version, proceed with the following instructions to install the new software version:

1. Download the update package for STEMprep™ Tissue Dissociator.
2. Save the file to a USB storage device. Do not place the file into a directory but leave it in the main folder of the drive.
3. Ensure that the Primary Unit is powered on and that all Secondary Units are powered on and connected (if applicable).
4. Plug the drive into the USB port located on the right side of the touch screen.
5. Navigate to **Settings** from the Main Navigation (Figure 68) if it is not already displayed and tap the **Units** tab (Figure 69).
6. Tap Software Update... (Figure 80). A Software Update dialog will be displayed.

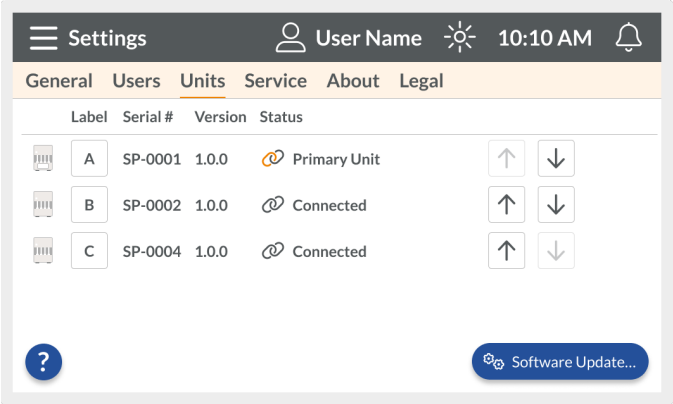


Figure 80. Software Update in the Units Tab

7. Tap **Install Now** to install the software update (Figure 81). The update will proceed, and the instrument will be unavailable until it is completely installed (Figure 82). The unit will be automatically restarted with the updated software.

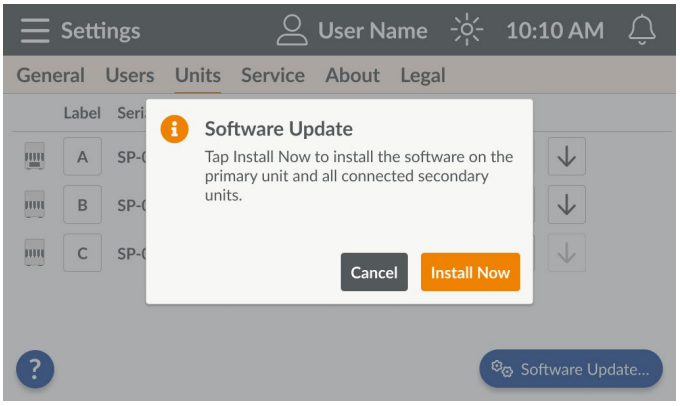


Figure 81. Software Update Dialog

Figure 82. Software Update Progress. The instrument will be unavailable until the software update is completely installed.

4.4.5 Service

The **Service** tab (Figure 83) allows the user to export diagnostic logs for STEMCELL service personnel. For details on how to export logs, refer to section 7.1.

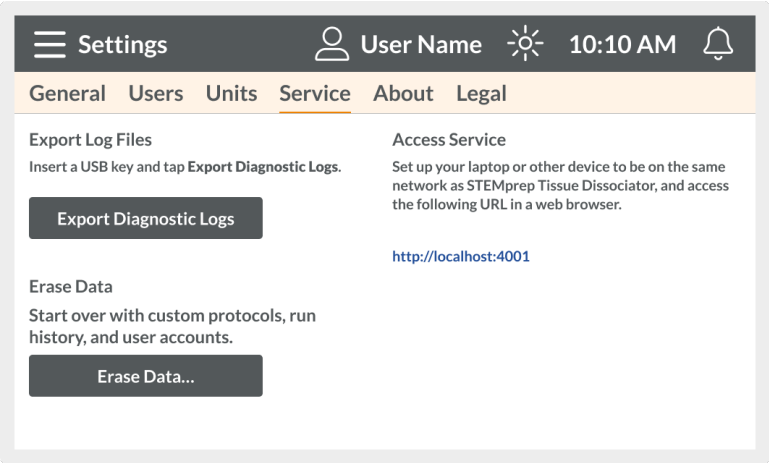


Figure 83. Service Tab

Data can be permanently deleted from the instrument. To delete data, tap Erase Data...; the Erase Data screen will be displayed (Figure 84).

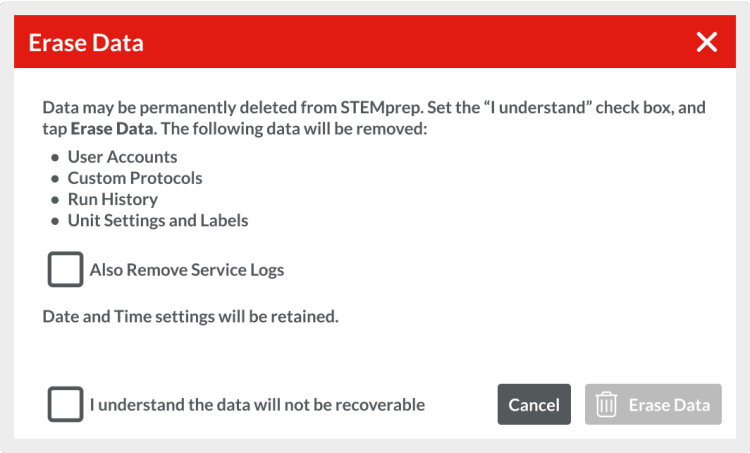
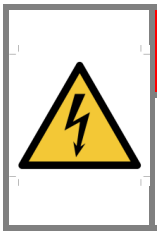


Figure 84. Erase Data Screen

Acknowledge that the user accounts, custom protocols, run history, and unit management settings will be unrecoverable by selecting the checkbox, then tap Erase Data.

5.0 Care and Maintenance



WARNING

Do not remove panels or open the unit to attempt service. Shock or hot surface hazards exist. Service procedures are to be done only by trained STEMCELL service personnel. Contact a STEMCELL Technologies representative for help troubleshooting any issues.

Preventative Maintenance

It is advisable to schedule preventative maintenance with STEMCELL Technologies annually to ensure optimal performance, longevity, and reliability of the unit. Contact STEMCELL Technologies Sales or Service for more information on Extended Warranty and Preventative Maintenance packages.

5.1 Cleaning Procedures

NOTICE

Cleaning Fluids

Recommended cleaning agents that have been shown to be compatible with the STEMprep™ Tissue Dissociator are de-ionized (DI) water; dish soap; 70% isopropyl alcohol (IPA); disinfectants using hydrogen peroxide, such as Virox Accelerated Hydrogen Peroxide (AHP); and bleaches containing Sodium Hypochlorite.

Note: If using bleach or sodium hypochlorite solution, dilute 1 in 10 with water before use.

Note: If using a hydrogen peroxide cleaner, use a maximum of 7% concentration. Dilute with water if necessary.

Hexane cleaners are not recommended and have the potential of damaging materials.

5.1.1 Regular Cleaning

The STEMprep™ Tissue Dissociator should be cleaned regularly to ensure optimal performance and longevity. A recommended cleaning schedule is as follows:

- **Daily:** Wipe down all exterior surfaces with a soft, clean paper towel and IPA. Either spray the surfaces directly or spray onto the paper towel before wiping.

  Note: Do not spray the rear of the unit directly with IPA, as this would enter the unit and possibly cause damage.
- **Monthly:** Remove the shields. Use a Kimwipe with hydrogen peroxide disinfectant or IPA to wipe down the exposed surfaces, including the spindles, thermal wells, all transparent surfaces of the shields, and the walls behind the spindles. Do final cleaning passes with DI water and IPA as needed. Reinstall the shields as described in section 3.2.

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5.1.2 Decontamination Procedure

In the event of contamination, ensure that the proper level of personal protective equipment (PPE) is donned before continuing with the steps below.

The design of the STEMprep™ Tissue Dissociator ensures that liquid cannot enter the unit through the sample dissociation area. However, liquids can spill in this area through accidental spillage, leakage while running a protocol, or improper fastening of the STEMprep™ Sample Tube lid.

If contamination does occur, it does not threaten to contaminate other samples, as each sample is safely contained in the STEMprep™ Sample Tube during contact with the unit.

Any spilled liquids should be cleaned up immediately. For most spills, the monthly cleaning procedure outlined in section 5.1.1 will be sufficient.

If a spill or leak occurs on the unit and contamination is a concern, the following procedure can be performed to help reduce the risk of contamination:

1. Fill the thermal well with 15 mL of hydrogen peroxide disinfectant, such that the disinfectant contacts all part edges within the thermal well.
2. Leave this to soak all surfaces for 5 - 10 minutes.
3. Remove the disinfectant with a syringe.
4. Clean remaining disinfectant off surfaces using deionized water and a soft, clean paper towel.
5. Do a final scrub and wipe-down using a Kimwipe with isopropyl alcohol followed by a wipe-down with deionized water.

If any contamination or microbial growth is observed, try the above procedure. If the issue does not resolve, contact a STEMCELL Technologies representative.

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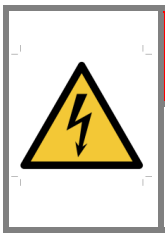
5.2 Replacement



WARNING

- *Disconnect power before all cleaning and maintenance operations*
- *Refer servicing to qualified STEMCELL personnel only. No user-serviceable parts inside.*

Fuses may need replacement if STEMprep™ Tissue Dissociator does not power on after plugging in and following the startup procedure (section 3.4). Two fuses (2 x 4 A 5 x 20 mm Time-lag) are located on the back of the unit above the power supply outlet and below the main power switch (Figure 5).

The following steps are to replace the fuses:

1. Turn OFF power switches at the back of the unit.
2. Disconnect the power cable.
3. Remove the fuse drawer using a screwdriver or by hand (Figure 5).
4. Pull out the fuses and identify the blown fuse(s) visually or using a multimeter to check the resistance across the fuse (an intact fuse's resistance is a few ohms or less).
5. Replace the blown fuse(s) by gently pressing the new fuse into the fuse drawer.
6. Reinstall the fuse drawer.
7. Connect the power cable.
8. Turn ON the STEMprep™ Tissue Dissociator and check that it starts up properly, as outlined in section 3.4.

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6.0 Specifications

Table 2 shows STEMprep™ Tissue Dissociator specifications, including dimensions, weight, power requirements, environmental operating conditions, and storage and shipping conditions.

Table 2. STEMprep™ Tissue Dissociator Specifications

Dimensions	Primary Unit: 325 mm (depth) x 284 mm (width) x 400 mm (height) Secondary Unit: 243 mm (depth) x 284 mm (width) x 400 mm (height)
Weight	Primary Unit: 14 kg (31 lb) Secondary Unit: 12.7 kg (28 lb)
Power Requirements	100 - 240 VAC ± 10% 3 A 50 - 60 Hz Power inlet: IEC C13 Overvoltage Category II Fuses: 2 x 4 A 5 x 20 mm Slow (e.g. Littelfuse 0219004.MXAP) Power cord: Rated ≥ 3 A 100 - 240 V
Environmental Operating Conditions	15 - 30°C 10 - 80% relative humidity (non-condensing) 0 - 2000 meters above sea level Not specified for use inside an incubator or cold room Pollution Degree 2
Storage and Shipping Conditions	Shipped using custom foam inserts, antistatic polyethylene bag, corrugated double-wall BC cardboard box with outer dimensions 17.125” x 14.875” x 20.375” Ship and store at room temperature (15 - 25°)

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7.0 Troubleshooting

The following troubleshooting guidelines may be helpful if the use of STEMprep™ Tissue Dissociator does not provide expected results. If additional help is required, contact STEMCELL Technologies Technical Support.

7.1 Log Files

To assist with troubleshooting and diagnostics, a STEMCELL Technologies representative may request to view the system log files. Users can access STEMprep™ log files as follows:

1. Insert a USB storage device into the primary display port (located to the right of the touch screen).
2. Tap ☰ to display the drop-down menu and select **Settings**.
3. Select the **Service** tab on this menu.
4. Tap **Export Diagnostic Logs**. An Export Logs dialog will be displayed (Figure 85).

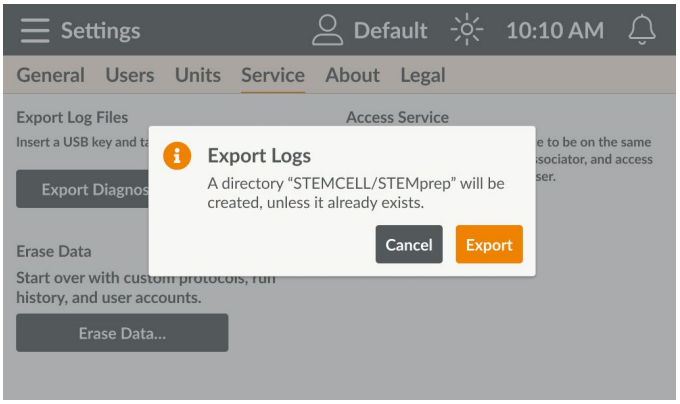

Figure 85. Export Logs Dialog

5. Tap **Export** and allow for the export to complete successfully (Figure 86).

   Note: If the USB storage device is not properly inserted, the export button will be grayed out.

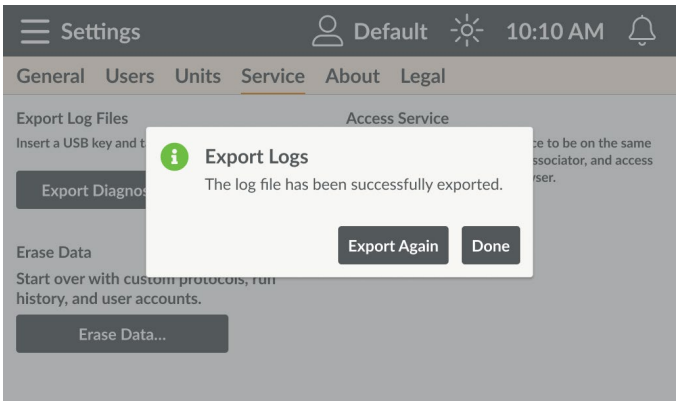

Figure 86. Successful Log Export Dialog

6. Tap **Done** and remove the USB storage device.

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7.2 Power Issues

ISSUE	POTENTIAL CAUSE	SUGGESTED ACTION
Unit does not start	No input power	Ensure that the instrument power switch is turned ON, the power cord is connected, and the outlet that the power cord is connected to is supplying power within the instrument rating. If the instrument is plugged into a biosafety cabinet (BSC), ensure that the BSC outlet is in the ON position.
	Blown fuses	Replace fuses (section 5.2). Fuses: 2 x 4 A 5 x 20 mm Time-lag
	Faulty power cable	Test by temporarily swapping the supplied cable for an equivalent one.
	Faulty power supplies	Contact STEMCELL Technologies Technical Support.

7.3 Hardware or Software Issues

ISSUE	POTENTIAL CAUSE	SUGGESTED ACTION
Operating system fails to start, and system does not initialize to startup screen	Operating system software corruption	Turn off the STEMprep™ Tissue Dissociator and wait at least 30 seconds before turning the power back on again. Make a note of any error messages displayed and contact STEMCELL Technologies Technical Support.
On power cycling, screen did not initialize to startup screen and still shows experimental screen	Rapid power cycling: STEMprep™ Tissue Dissociator was rebooted too quickly	Turn off the STEMprep™ Tissue Dissociator and wait at least 30 seconds before turning the power back on again.
Touch screen is not responsive or does not turn on	Physical damage to screen or issue with power supply	Contact STEMCELL Technologies Technical Support.
Not passing self-checks on startup	Software or hardware issue	Contact STEMCELL Technologies Technical Support.
Protocol does not begin running when Start button pressed	No shield is present, no sample tube is present, sample tube is not properly engaged with spindle, spindle is stuck	Review slot and notification icons and any error messages on user interface for details on why the error may be occurring. If the issue is recurring, contact STEMCELL Technologies Technical Support.
User interface shows an incorrectly loaded sample tube	Improper placement of the STEMprep™ Sample Tube or issue with sensors	Remove the STEMprep™ Sample Tube and clean the slot. There should be no build-up or debris in the slot. Reinstall the STEMprep™ Sample Tube and ensure that there is proper engagement with the spindle as the shield is lowered. If the problem persists, contact STEMCELL Technologies Technical Support.

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ISSUE	POTENTIAL CAUSE	SUGGESTED ACTION
Spindle is not rotating or stuck	Hardware issue with the motors	Contact STEMCELL Technologies Technical Support.
Spindle is loose and can be wiggled around laterally	Hardware issue with the spindle mounting	Contact STEMCELL Technologies Technical Support.
Excessive noise from unit during spindle high-speed rotation	Hardware issue with the spindle mounting	Contact STEMCELL Technologies Technical Support.
Spindle not engaging with STEMprep™ Sample Tube	Spindle alignment feature missed	Spindle and STEMprep™ Sample Tube should automatically engage. However, on occasion, this may not occur, and a retry will be necessary. Note that with a STEMprep™ Sample Tube inserted and the shield lowered to the lowest position, a small alignment is performed by the spindle to help with engagement. If engagement still has not occurred, lift the shield and try rotating the spindle by a small amount.
STEMprep™ Sample Tube leakage or breakage during protocol	Excessive tissue mass or volume loaded, faulty sample tube, spindle misaligned (detected by excessive noise)	Clean the unit where it is affected by following the cleaning and decontamination procedures outlined in section 5.1. Review the applicable Product Information Sheet to ensure tissue mass and sample volume are not being exceeded. If using a custom protocol, reduce the total number of revolutions by reducing the step duration (section 4.3.3.1) and/or speed (section 4.3.3.2). Try again with a different STEMprep™ Sample Tube.
Sample tube slot not reaching set temperatures	Ambient environmental conditions outside of recommended range, not enough clearance behind for cooling, or a hardware issue with the thermal wells	*Note: STEMprep™ Tissue Dissociator thermal wells have an accuracy of ± 1°C.* Ensure that the STEMprep™ Tissue Dissociator is installed in an area with sufficient clearance of 75 mm behind it and that the ambient conditions are within optimal conditions (i.e. 15 - 30°C and 10 - 80% relative humidity). If the above conditions are met and it is still not reaching set temperatures (± 1°C), contact STEMCELL Technologies Technical Support.
STEMprep™ Sample Tube's rotor not inserted properly	The rotor may have been displaced due to shipping or during handling	Ensure that the red O-ring is still present on the rotor. Reinsert the rotor in the lid by pushing the rotor directly up the opening of the lid. Take caution not to exert too much force to prevent damage. If done correctly, a click will be felt after insertion. If the rotor cannot be reinserted, discard and use another STEMprep™ Sample Tube.

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ISSUE	POTENTIAL CAUSE	SUGGESTED ACTION
Additional STEMprep™ units not recognized or controllable by the STEMprep™ Primary Unit	Software or hardware issue	Test by temporarily using another USB A–to–USB B cable between the units. Ensure that the units are running the same software version; if possible, update to the latest version (section 4.4.4). If the Primary Unit is still not recognizing any of the STEMprep™ Secondary Units and the above has been tested, contact STEMCELL Technologies Technical Support.
Primary Unit displays **Connection Lost**	Hardware or installation issue	Check that USB connections are secure and cables are intact. Test by temporarily using another USB A–to–USB B cable between the units. This error could be caused by power surges or radio frequency (RF) interference. Reduce potential sources of power surges and RF interference. If the issue persists, contact STEMCELL Technologies Technical Support.
Connecting a USB device or hub causes loss of connection to other units or an unresponsive primary touch screen	USB device has a short circuit or pulls too much current. You may be trying to connect an unsupported device like a USB hub.	Do not use that USB device: if a USB device is causing this, it is probably faulty.

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7.4 Experimental Issues

ISSUE	POTENTIAL CAUSE	SUGGESTED ACTION
Tissue remains intact after a run	Wrong sample slot was loaded	Verify the selected sample slot on the user interface is consistent with the physical sample slot.
	Protocol did not run	Check for any errors detected, including sensor warnings, and ensure the Run Protocol button is pressed.
	An error occurred during the run	Check for any errors on the screen that may have halted the protocol from starting. Contact STEMCELL Technologies Technical Support for persistent errors.
	STEMprep™ Sample Tube was not correctly inserted into unit	Check that the STEMprep™ Sample Tube is within the sample slot completely with no gaps and that the spindle fully interlocks with the tube lid. Ensure the safety shield is installed correctly.
Tissue chunks present after run	An error occurred during the run	Check for any errors on screen that may have halted the protocol during the run. Contact STEMCELL Technologies Technical Support for persistent errors.
	A reagent was not added during sample preparation, causing partial dissociation	Verify that all dissociation components were correctly added to the sample. To salvage samples and maximize cell recovery, users may press the tissue through a filter.
Clogging during filtration step of dissociated cell suspension	A reagent was not added during sample preparation	Verify that all dissociation components were correctly added to the sample. To salvage samples, add recommended medium and swirl suspension and/or press tissue manually through the filter, using multiple filters if necessary.
STEMprep™ Sample Tube will not close properly	Rotor has been dislodged	Unscrew the STEMprep™ Sample Tube lid, ensure the rotor is properly installed, and ensure the tube threads are properly aligned for proper lid closure.
Low viability in sample	A reagent was not added during sample preparation	Verify that all dissociation components were correctly added to the sample and that the components are within the stated shelf life.

7.5 Rescue of Samples

If an irrecoverable error occurs during a run, stop the protocol using the software, lift the shield, and pull out the STEMprep™ Sample Tube. The sample may be able to be salvaged by moving the tube to a different slot position and running the same protocol.

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7.6 Error Messages

MESSAGE	DESCRIPTION OF CAUSE	SUGGESTED ACTION
Low storage space	Unit is reaching low levels of disk space	Export and back up important data and remove any unwanted data. Refer to section 4.3.1.4 for exporting protocols and section 4.3.1.2 for deleting protocols. If the problem persists, contact STEMCELL Technologies Technical Support.
Out of storage space	Unit has run out of disk space	Export and back up important data and remove any unwanted data. Refer to section 4.3.1.4 for exporting protocols and section 4.3.1.2 for deleting protocols. If the problem persists, contact STEMCELL Technologies Technical Support.
Internal error	Any error returned from the control board inside the unit that does not have a more specific error callout	Restart the STEMprep™ Tissue Dissociator. If the problem persists, obtain log files (section 7.1) and contact STEMCELL Technologies Technical Support.
Motor stall	The motor controller failed to recover from a stall automatically	Restart the STEMprep™ Tissue Dissociator. If the problem persists, obtain log files (section 7.1) and contact STEMCELL Technologies Technical Support.
Motor error	Any motor controller error other than a stall	Restart the STEMprep™ Tissue Dissociator. If the problem persists, obtain log files (section 7.1) and contact STEMCELL Technologies Technical Support.
Sample tube shield raised on slot[s]	Shield is raised as reported by the sensor; protocol cannot be run	Ensure that the shield is lowered all the way down before operation. If the problem persists, it may be a hardware issue. Contact STEMCELL Technologies Technical Support.
Hardware error	Thermal module has failed, as reported by the unit controller	Obtain log files (section 7.1) and contact STEMCELL Technologies Technical Support.
	One of the self-check tests failed	
High case temperature	Case temperature has reached levels that are too high	Check the installation location and environment of the STEMprep™ Tissue Dissociator. It is recommended that it be installed in an area with sufficient clearance (75 mm behind it and at least 30 mm on each side), with ambient conditions within optimal conditions (i.e. 15 - 30°C and 10 - 80% relative humidity). Also check for any obstruction to the back panel fan. If the problem persists, contact STEMCELL Technologies Technical Support.

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MESSAGE	DESCRIPTION OF CAUSE	SUGGESTED ACTION
A visual indication of a missing or misaligned STEMprep™ Sample Tube with a red lid	STEMprep™ Sample Tube is not inserted	Ensure a STEMprep™ Sample Tube is properly inserted into the slot and that the spindle is making proper engagement with the STEMprep™ Sample Tube. Check that the tube's four tabs are sitting in the slot's four matching recesses. Remove and clean the STEMprep™ Sample Tube slot. There should be no build-up or debris in the slot. If the problem persists, it may be a calibration issue or faulty hardware. Contact STEMCELL Technologies Technical Support.
	STEMprep™ Sample Tube is not aligned	
Sample tube sensor failed	STEMprep™ Sample Tube sensor could not be read or initialized	Contact STEMCELL Technologies Technical Support.
Temperature sensor failed	Temperature of the unit could not be determined	Contact STEMCELL Technologies Technical Support.
Unit is offline	Unit cannot access online services. Security policy may be blocking the connection. STEMCELL servers are down.	Check for a faulty ethernet cable. Check that the network being connected to is functioning. Contact STEMCELL Technologies Technical Support for further assistance.
Protocol import error	Unit is not able to accept protocols from a USB storage device; protocols may be corrupted	Delete the protocol(s) in question and retry the download. Try a different USB storage device. If the problem persists, contact STEMCELL Technologies Technical Support.
Incompatible unit detected	A Secondary Unit connected has firmware that is not compatible with the Unit Controller	Update the software either on the Primary or Secondary Unit to match. If the problem persists or units cannot be updated, contact STEMCELL Technologies Technical Support.
Secondary Unit not showing on the Primary Unit	Registered Secondary Unit losing connection to the primary	Check the USB cable connecting the Primary Unit to the USB, and ensure it is not faulty. If the problem persists, contact STEMCELL Technologies Technical Support.
Maximum number of protocols	The maximum number of protocols has been reached	Delete protocols to free space for new ones (see section 4.3.1.2).
Maximum duration exceeded	The maximum allowed duration for a protocol (i.e. 24 hours) has been exceeded	Shorten the protocol to be less than or equal to 24 hours.

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MESSAGE	DESCRIPTION OF CAUSE	SUGGESTED ACTION
Maximum revolutions exceeded	The total revolutions in the protocol exceeds the maximum limits (i.e. 4000 revolutions)	Lower the total revolutions being performed in the protocol to less than or equal to 4000 revolutions. This can be achieved by lowering the protocol step duration (section 4.3.3.1) and/or speed (section 4.3.3.2).
Maximums exceeded	Both the duration and revolutions have exceeded the maximum limits	Shorten the protocol duration to be less than or equal to 24 hours. Lower the total revolutions being performed in the protocol to less than or equal to 4000 revolutions. This can be achieved by lowering the protocol step duration (section 4.3.3.1) and/or speed (section 4.3.3.2).
Failed to export	Insufficient storage to export files	Contact STEMCELL Technologies Technical Support.
	Export folder could not be created; permission denied	
	Export directory not found	
Software update interrupted	Unit could not proceed with a software update	Ensure the USB storage device is securely connected to the unit, as it may have been a communication error. Retry the update. If the problem persists, contact STEMCELL Technologies Technical Support.
Firmware update error	The firmware could not be updated on a Secondary Unit due to an internal error	Contact STEMCELL Technologies Technical Support.
Paused protocol cleared	Unit has automatically cleared a paused protocol that was paused for longer than 24 hours	No action required. Protocols that are paused are automatically cleared after 24 hours.
Slot [slot name] hold ending soon	Unit warning the user that the hold timeout is about to expire	No action required.
Slot [slot name] hold ended	Unit has automatically cleared a protocol that was on hold for longer than 24 hours	No action required. Protocols on hold are automatically cleared after 24 hours.
Unknown device	An unknown device was connected	Ensure the USB device is compatible with the unit; only compatible USB devices can be recognized by the STEMprep™ Tissue Dissociator.

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MESSAGE	DESCRIPTION OF CAUSE	SUGGESTED ACTION
Too many units connected	A fifth device is connected	Ensure that no more than four units are connected, including the Primary Unit. STEMprep™ Tissue Dissociator only supports a maximum of four connected units, including the Primary Unit.
Protocol in use	Editing or deleting a protocol that is currently in use	Protocols cannot be changed while in use. Fully stop and clear the protocol from the slot display to edit or delete the protocol in question.
Event log not writable	Event logs could not be written to, and the unit will not be able to store results of runs in logs for troubleshooting	Contact STEMCELL Technologies Technical Support.
Slots currently in use	Updating the unit when at least one slot is running a protocol	Wait for the protocol to finish or stop the protocol to update the unit.
Date Time update error	The date and time for the unit could not be updated due to an internal error	Contact STEMCELL Technologies Technical Support.

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TECHNICAL MANUAL

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