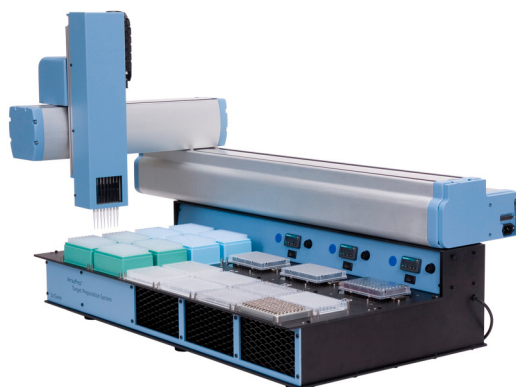


ArrayPrep[®] Target Preparation System USER MANUAL

CAT. #2000-00-1 (115V); 2000-00-2 (230V)



FOR RESEARCH USE ONLY
Not for Use in Diagnostic Procedures

Serial Number

The following serial number identifies the specific instrument you have purchased and must be referenced when requesting service. A copy is affixed to the instrument.

Technical Service: (408) 733-7337, techserv@scigene.com

Warranty

SciGene warrants that the ArrayPrep® Target Preparation System described in this manual shall be free of defects in materials and workmanship for a period of 12 months from date of delivery. This warranty does not cover removable parts or accessories. In the event of a defect during the warranty period, SciGene's limit of liability will be to provide repair service at its factory at no charge or, at its sole discretion, replace the product. The foregoing warranty is void in the event the unit was abused or modified or used in a manner inconsistent with its intended purpose. SciGene makes no other warranty, expressed or implied including warranties of merchantability and fitness for a particular purpose. In no event shall SciGene be liable for any direct, indirect, special, incidental or consequential damages or for any damages resulting from loss arising out of or in connection with the sale, use or performance of the product.

Copyright

Copyright ©2010-2012 SciGene Corporation. All rights reserved. SciGene and ArrayPrep are trademarks of SciGene Corporation, Sunnyvale, California, USA. All other trademarks used in this manual are the property of their respective owners.

Intended Use

The intended use of this instrument is for pipetting, heating and cooling small volumes of liquid containing biological samples.

This instrument should only be used according to instructions provided in this User Manual and other SciGene technical documents. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Table of Contents

I. SAFETY NOTICES	3
A. Instrument Safety	3
B. Conventions and Labels	3
II. SITE PREPARATION	5
III. UNPACKING AND SETUP	6
A. Uncrating and Verifying Items	6
B. Identifying System Components	7
C. Moving the Instrument	7
D. Removing the Shipping Bracket	8
E. Assembling the Safety Guard	8
F. Computer and Power Connections	10
G. Performing a System Check	10
IV. USING THE TEMPERATURE CONTROLLED BLOCKS	13
A. Setting Block Temperatures	13
B. Using Heated Lids	13
V. OPERATION	14
A. Understanding the Protocol Screen	14
B. Running a Test Protocol	15
C. Running a Pre-Installed Protocol	16
D. Creating and Editing Protocols	16
E. Using Single Tip Mode	20
F. Using the Move Plate Command	20
G. Importing a Protocol	21
H. Using the Emergency Stop Switch	21
I. Using the Z Release Button	21
VI. SYSTEM MAINTENANCE	22
A. Deck Spills	22
B. Tips, Labware and Reagent Disposal	22
C. Cleaning	22
D. Calibration of the Temperature Controlled Blocks	23
E. Checking Dispensing Performance	24
VII. SPECIFICATIONS	25
VIII. ORDERING INFORMATION	25
IX. TROUBLESHOOTING	26
X. SERVICE	27
A. Lockout Procedure	27
B. Fuse Replacement	27
XI. DECLARATION OF CONFORMITY	28

I. SAFETY NOTICES

A. Instrument Safety

Before operating the instrument, read the information in this section concerning hazards and potential hazards. Ensure that everyone involved with the instrument's operation is instructed in both general safety practices for laboratories and specific safety practices for the instrument.

B. Conventions and Labels

The following is a glossary of the safety conventions and symbols that are used on the ArrayPrep® Target Preparation System. Whenever such symbols appear on instruments, please observe appropriate safety measures.

1. Conventions



DANGER: This indicates an imminently hazardous situation, which, if not avoided, will result in serious injury or death. Consult the **User Guide** for further information.



WARNING: This indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or major damage to the equipment. Consult the **User Guide** for further information.



CAUTION: This indicates a situation, which, if not avoided, could result in a minor injury or damage to the equipment. Consult the **User Guide** for further information.

2. Warning Labels

Failure to comply with the following warnings that are affixed to the product can lead to possible personal injury or death.



This symbol alerts you to consult this User Guide for further information and to proceed with caution.



This symbol on top of the Heated Lid is to alert the user that the lid must be removed prior to operating the robot.



This symbol alerts you to a potential Biohazard. Precautions must be taken with potentially infectious material.



The motor power supply for the robot portion of the ArrayPrep contains unshielded high voltage pins, components and surfaces.



This instrument should be serviced by trained personnel only. Please contact SciGene or your local Distributor for all service related matters.



This symbol indicates the potential for a Hand Crush. Do not place hands or arms under the guard while a protocol is running.



This symbol indicates the potential presence of a Hot Surface. Use care when working in this area to avoid being burned.

II. SITE PREPARATION

The ArrayPrep System requires a flat, level surface of at least 48 inches wide by 23 inches deep (122 x 58 cm) with vertical clearance of 32 inches (81 cm). Locate the left side of the instrument within 6 feet (2 meters) of a single power outlet that delivers 115V/230V with at least 920 Watts of constant power. Avoid circuits with multiple pieces of equipment connected, particularly those drawing large amounts of power.

III. UNPACKING AND SETUP

A. Uncrating and Verifying Items

1. Open the shipping container by unlatching and removing the lid. The lid will be heavy due to the bracing underneath (Fig. III-A-1).
2. Remove all items from the small storage compartment behind the instrument (Fig. III-A-2).
3. Remove the laptop box and dust bag (Fig. III-A-3).
4. Unlatch and remove the sides of the crate (Fig. III-A-4).



Fig. III-A-1 Unlatch and remove crate lid.



Fig. III-A-2. Remove all small items.



Fig. Fig. III-A-3. Remove box and bag.

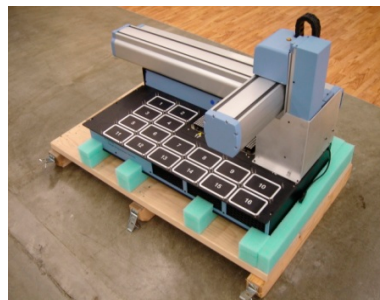


Fig. III-A-4. Remove all crate sides.

5. Verify that the following items are provided (Fig. III-A-5). If there are any discrepancies, contact SciGene Technical Service at [techserv@scigene.com] or your local distributor.

- Power Cord
- Emergency Stop Switch & cable
- Ethernet Cable
- Laptop Computer
- Laptop Power Supply
- 3x Heated Lids
- Plastic Tip Bucket
- Safety Guard:
 - 1x Front Guard
 - 1x Side Mount Bracket
 - 2x Side Guards
 - 2x Corner Brackets
 - 2x Screws, 6-32 x ¾"
 - 4x Flat Washers, M4
 - 2x Screws, M4 x 50mm
 - 10x Nuts, 6-32 + star washers



Fig. III-A-5. Items provided with the instrument.

B. Identifying System Components

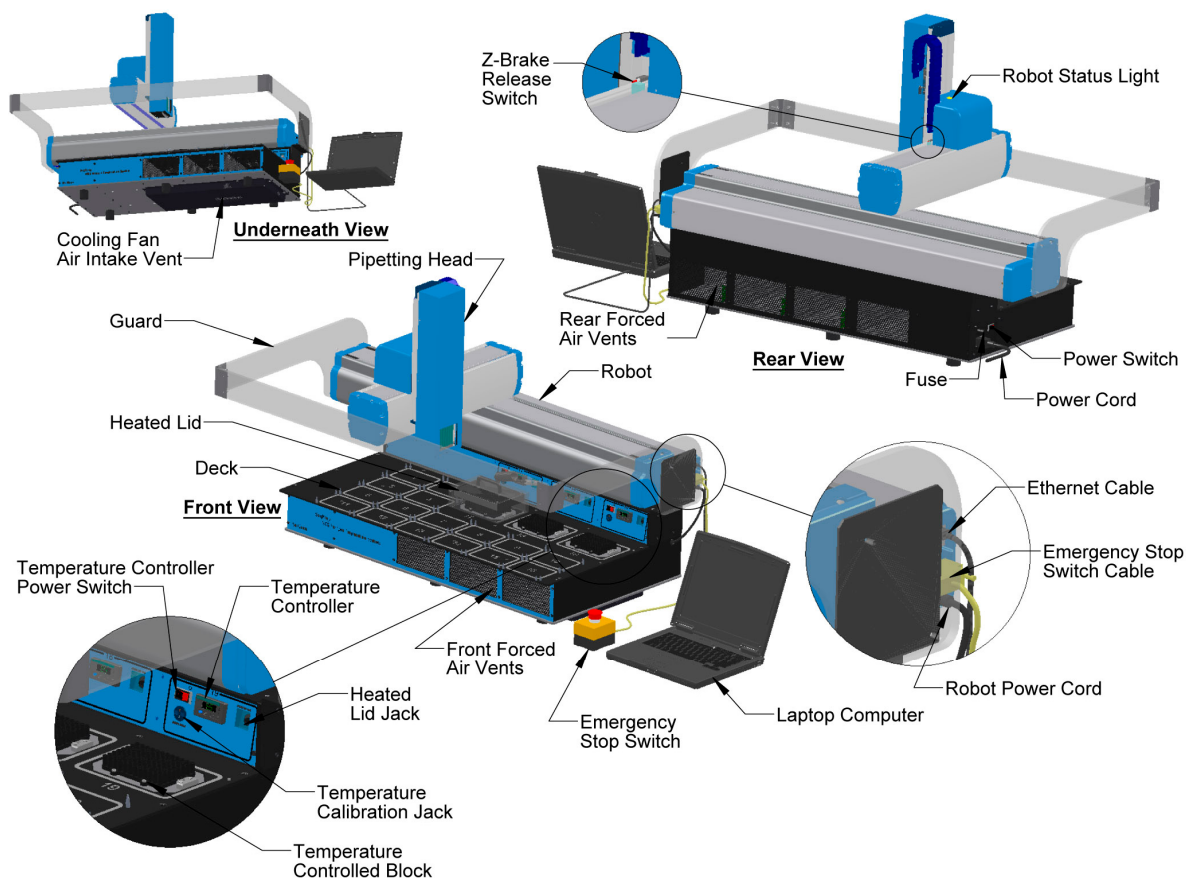


Fig. III-B-1. Identification of System Components.

C. Moving the Instrument



The ArrayPrep System weighs approximately 170 lbs (77 kg). Never attempt to lift or move the instrument alone. Use caution when lifting the unit to protect yourself and others from personal injury.

Do not lift the unit by the blue robot. Always grip the instrument from underneath the black base when lifting!!

With the assistance of another person, place your hands under the bottom of the instrument, **NOT** THE ROBOT, and carefully lift the instrument out of the crate and onto a gurney or other moveable platform. Transport to the laboratory site and place on benchtop.

D. Removing the Shipping Bracket

1. Unscrew all 14 attachment screws securing the red Shipping Bracket covering the Pipetting Head using either a 9/64" Allen wrench or Phillips screwdriver. Carefully retain all screws for immediate reuse.
2. Remove the metal bracket and place back in crate for storage.
3. Replace the screws into their original locations on the instrument as shown in Fig. III-D-1.

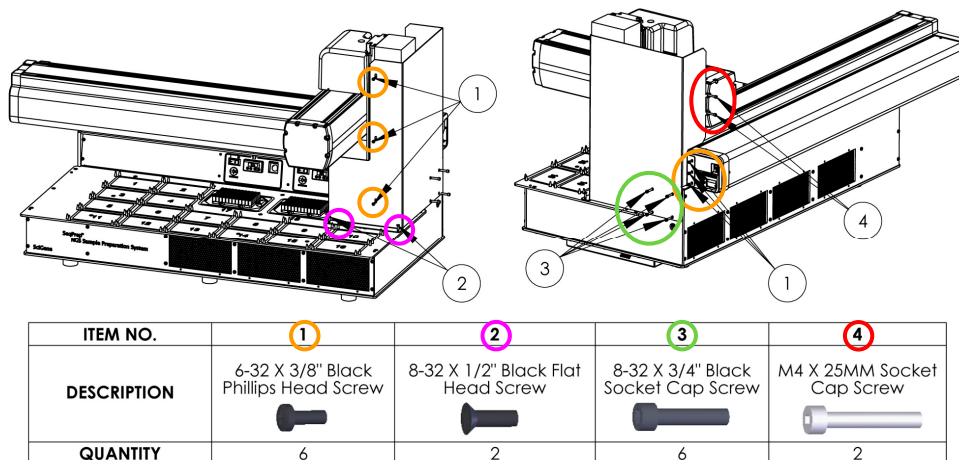


Fig. III-D-1. Locations and types of screws in Shipping Bracket

E. Assembling the Safety Guard

1. Remove the protective paper covering the Safety Guard components.
2. Using the (4x) 8-32 x 3/4" screws and washers removed from the shipping bracket, attach the Side Mount Bracket to the black base as shown in Fig. III-E-1.
3. Attach the clear Side Guard to the Side Mount Bracket using (2x) 6-32 x 3/4" screws, (2x) M4 flat washers, and (2x) 6-32 nuts with star washers. (Fig. III-E-2). The M4 flat washers should be on the outside, against the Side Guard (Fig. III-E-3).
4. Remove the screws at bottom left and top right on the left side of the robot (Fig. III-E-4). Place screws inside a bag in the crate.
5. Attach Side Guard to the left side of robot using (2x) M4 x 50mm screws and (2x) M4 flat washers (Fig. III-E-5).
6. Attach a Corner Bracket to each Side Guard using (4x) 6-32 nuts with star washers. Right side shown in Fig. III-E-6.
7. Attach Front Guard to Corner Brackets. Requires (4x) 6-32 nuts with star washers (Fig. III-E-7).

Assembling the Safety Guard

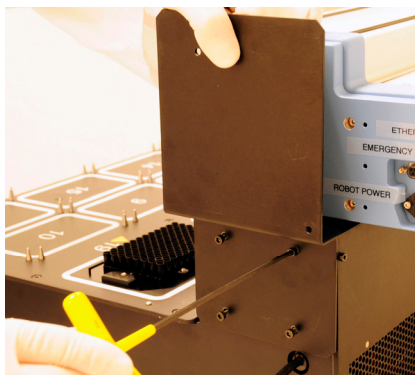


Fig. III-E-1. Attach Side Mount Bracket.

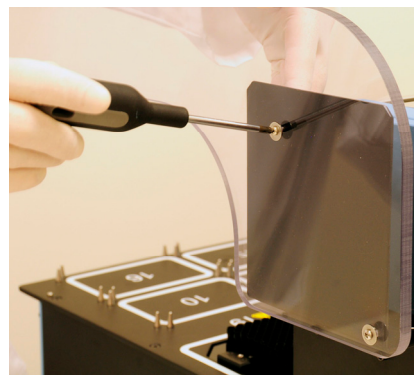


Fig. III-E-2. Attach Side Guard to Mount Bracket.

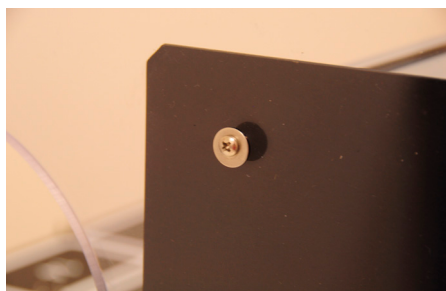


Fig. III-E-3. Place washers on the outside of the Side Guard

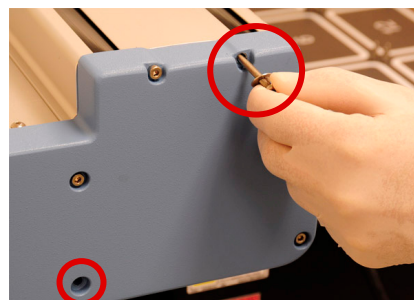


Fig. III-E-4. Remove screws from the top right and bottom left of the robot's left side.

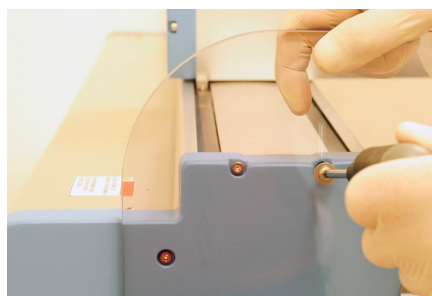


Fig. III-E-5. Attach the Side Guard to the left side of the robot.



Fig. III-E-6. Attach a Corner Bracket to each Side Guard.

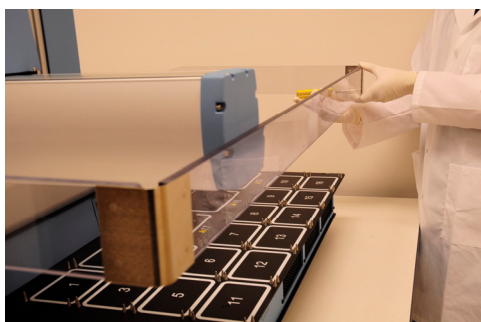


Fig. III-E-7. Attach the Front Guard to each Corner Bracket.

F. Computer and Power Connections

1. Connect the Ethernet cable and Emergency Stop Switch to the instrument as shown in Fig. III-F-1. Ensure the power connection from the instrument base to the robot is secure.



Be certain that the Emergency Stop Switch is easily accessible and that all personnel using the instrument are aware of its location and function.

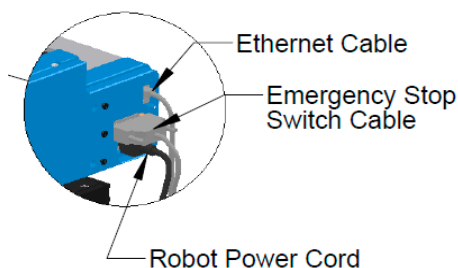


Fig. III-F-1. Connect cables to robot.

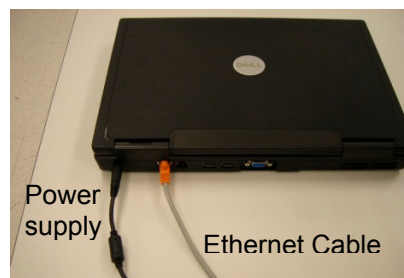


Fig. III-F-2. Connect cables to laptop.

2. Connect the other end of the Ethernet cable and the power supply to the laptop (Fig. III-F-2) and then connect the power supply to a wall outlet.
3. Connect the base unit power cord to the left side of instrument (Fig. III-F-3) and to a wall socket with appropriate voltage and power requirements (See section VII. Specifications).



Do not block access to the main power switch.



Fig. III-F-3. Connect power cord to left side of instrument

G. Performing a System Check



This symbol indicates the potential for a Hand Crush. Do NOT place hands or arms under the Safety Guard while the robot is in motion (protocol is running).

1. Turn **ON** the power switch located on the left side of the instrument. The instrument will perform a power-up routine then move the robot to its home position ('homing').
2. Turn on the laptop and allow it to boot up.
3. On the laptop screen, start the ArrayPrep software by clicking the **ArrayPrep User** icon or by selecting the program from the Start Menu [\\Program Files\\SciGene\\ArrayPrep]. The laptop is provided without password protection.



4. Select **Controls | Motion Pendant** from the ArrayPrep software menu bar. A dialog box will open. Locate the 'Robot Status' section. All three status bars should be green (Fig. III-G-1).

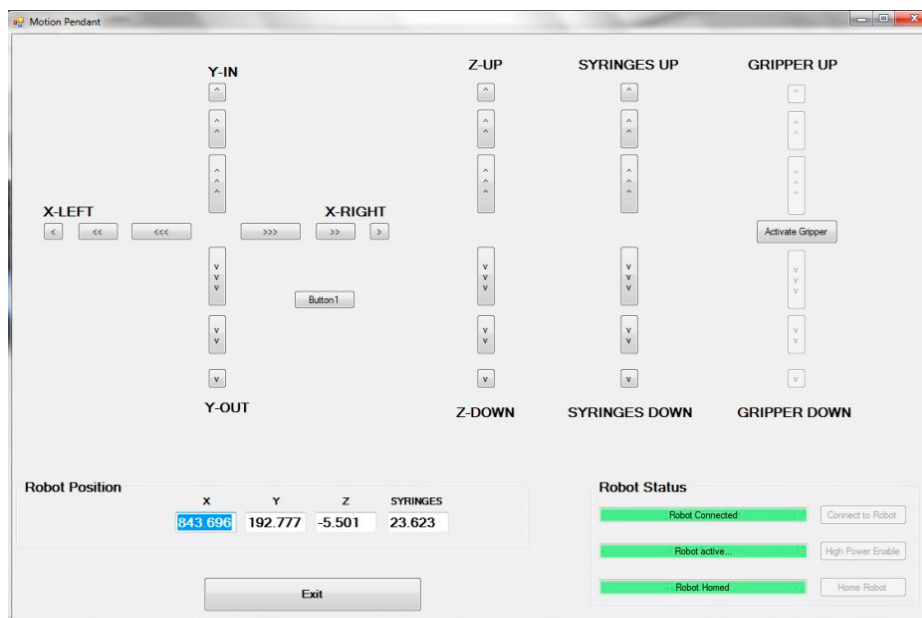


Fig. III-G-1. Motion Pendant screen.

If any status bars appear yellow or red, the robot is not ready. Determine the robot's state by reading the text within the bars. For example, if the robot is still homing, one of the status bars will be yellow and display the message "Robot Homing". See Table 1 for details.

Table 1. Robot Status Messages.

Status Bar	Color	Action Needed
Connection	red	Ensure main instrument power is ON. Check connections on right side of instrument. Verify robot is properly connected via the Ethernet cable to the laptop. Click the Connect Robot button on the Motion Pendant screen.
	yellow	Wait one minute to allow robot to power up.
Power	red	Check Emergency Stop switch and power connection to robot. If needed, click the High Power Enable button on the Motion Pendant screen.
	yellow	Wait one minute to allow robot to finish homing.
Homing	red	Click the Home Robot button on the Motion Pendant screen.
	yellow	Wait one minute to allow robot to finish homing.

If robot does not operate, contact SciGene Technical Service at (408) 733-7337 or techserv@scigene.com or your local distributor.

5. Test Robot X,Y,Z and Pipetting Head Motion

On the Motion Pendant screen, click the buttons one at a time to verify movement:

- X-RIGHT
- X-LEFT
- Y-IN
- Z-UP
- Z-DN
- SYRINGES UP
- SYRINGES DOWN
- Y-OUT

For example, clicking on the largest X-RIGHT button will move the robot 10 mm to the right.

6. Test Plate Gripper

On the **Motion Pendant** screen (Fig. III-G-1), click the **Activate Gripper** button. The Pipetting Head motor will activate and lower Gripper Fingers slightly.

- a) Click **Gripper Down** button a few times to verify Gripper Fingers are descending from inside the Pipetting Head.
- b) When finished, click the **De-Activate Gripper** button (same as Activate Gripper button).

IV. USING THE TEMPERATURE CONTROLLED BLOCKS



This symbol indicates the potential presence of a Hot Surface. Use care when working in this area to avoid being burned.

Deck positions 17, 18 and 19 on the ArrayPrep System provide heating and cooling of 0.2 ml PCR plates and tubes. Each block is individually controlled to provide a range of temperatures from 4 to 99°C ($\pm 0.2^\circ\text{C}$). The temperature controllers are calibrated at the factory to provide accurate plate temperatures.

Re-calibration is required only if:

- When using a calibrated digital thermometer, the block temperature differs by more than one degree (1°C) from the actual temperature shown on the controller display. See section VI. D. Calibration of the Temperature Controlled Blocks for details.

A. Setting Block Temperatures

Each block has a temperature controller with a dual LED display and four push buttons. The LED display shows the block temperature in red on the left and the set temperature in green on the right.



Fig. IV-A-1. Set temperature.

To activate the controller:

1. To use a temperature controlled block, turn ON the power switch to the left of the controller.
2. Set the desired block temperature by using the up and down arrows to change the SET temperature display. Allow sufficient time for the block temperature to stabilize before use.
3. Turn the power switch OFF when not in use.

B. Using Heated Lids



These symbols on the Heated Lid alert the user that the lid must be removed prior to operating the robot and that the inner metal surface of the lid can get hot. Always use the black handle to position or remove the Heated Lid.

To use the Heated Lid, insert the gray plug into the receptacle marked Heated Lid on the Control Panel. The arrow indicator ($\leftrightarrow$) on the plug should be facing up as it is inserted. Use the black handle to position the Heated Lid over the Temperature Controlled Block. To disconnect, remove the plug by pulling straight back and use the black handle to lift the lid.



Fig. IV-B-1 Heated Lid connection.

V. OPERATION



Before performing any of the steps below, ensure that your instrument has been calibrated by an authorized installation technician.

A. Understanding the Protocol Screen

1. Start the ArrayPrep software by clicking the desktop icon or selecting the program from the Start Menu. [\\Program Files\\SciGene\\ArrayPrep].
2. From the main screen, click **File | Run Protocol** and select the sample protocol titled “QuickTest” (‘Desktop\\ArrayPrep_Protocols’ folder) (Fig. V-A-1). See Table 2 for details on fields and descriptions in the Run Protocol screen.

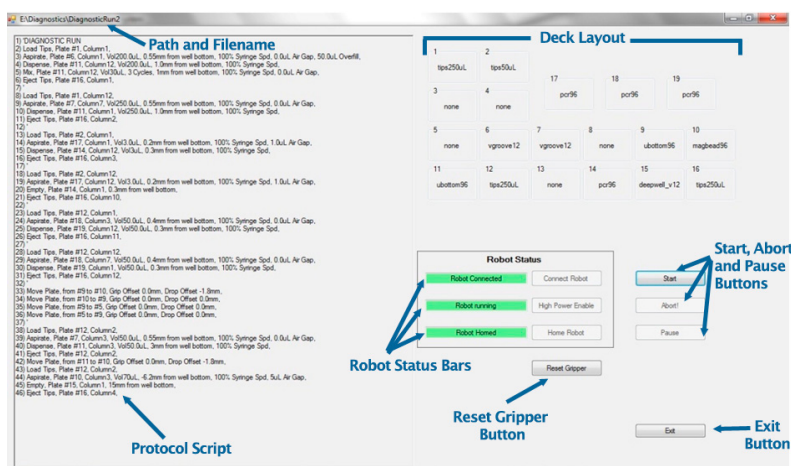


Fig. V-A-1. Run Protocol screen.

Table 2. Fields in the Run Protocol Screen.

Field	Description
Path\Filename	Displays full directory path & filename
Deck Layout	Shows layout of Deck with labware needed
Start Button	Starts moving robot to position needed at Step 1 in protocol.
Abort Button	Stops robot after current protocol step is completed. Protocol ends.
Pause Button	After current protocol step completed, moves Pipetting Head up and stops. Button text changes to “RESUME” and color changes to green. Clicking RESUME will start robot moving again at next step in protocol.
Exit Button	Closes Run Protocol screen and displays Home screen.
Reset Gripper Button	Used for raising Plate Gripper fingers up if stuck in down position after aborting or abnormally stopping protocol.
Robot Status Bars	See Table 1 for details.
Protocol Script	Sequence of commands for robot to perform.

B. Running a Test Protocol

1. From the Run Protocol screen for the QuickTest protocol (see section **V. A. Understanding the Protocol Screen**), view the three status bars and verify that all are green. If the bars are not green, see Table 1 for instructions.
2. Place labware on the deck as indicated by the Deck Layout on the Run Protocol screen.
3. Pipette 5ml of water into column 1 of the VGroove Reservoir in position 9.
4. Place the plastic tip bucket provided with the instrument on the bench adjacent to position 10. Used pipette tips will be ejected off the deck into the tip bucket.



Do not use Heated Lids while the robot is moving! It may interfere with the movement of the Pipetting Head.



Press the Emergency Stop Switch immediately to stop the instrument if a problem occurs.

5. Click the Start button to begin the protocol. The robot will move plungers up and down to reset the Plate Gripper.
6. Verify that the instrument is performing all steps, as indicated by the highlighted line in the Protocol Script area, as expected:
 - tips are loading and ejecting
 - the volume of liquid aspirated and dispensed is uniform between the tips
 - plates are being picked up and moved correctly.
7. The protocol may be paused by clicking the **Pause** button or aborted by clicking the **Abort** button or Emergency Stop Switch. If the Abort button or Emergency Stop Switch are used the protocol will not resume and must be restarted from the beginning.
8. When the protocol is finished, the robot will move up to the left and then stop. The Run Protocol screen will display a 'Protocol Finished' message box. Click OK.

C. Running a Pre-Installed Protocol

The instrument comes configured with validated protocols for specific applications. Refer to the ArrayPrep Method document for specific details on how to set up the instrument for a specific application. Method sheets can be found online [www.scigene.com/support/protocols.html] or can be requested from SciGene Customer Service [custserv@scigene.com] or your local distributor.

D. Creating and Editing Protocols

1. On the ArrayPrep software menu bar, click **File | New Protocol**. The **Create Protocol** screen will appear with a **Worktable** dialog box in the center, showing all deck positions 1-19 (Fig. V-D-1).

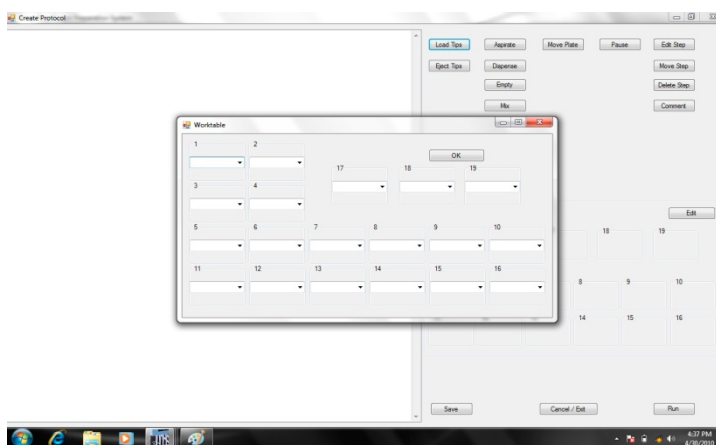


Fig. V-D-1. Worktable dialog box in the Create Protocol screen.

2. Choose specific labware for each deck position from the dropdown selections. Deck positions without labware can be left blank or select “none”. When finished, click **OK** in the **Worktable** to close the dialog box and return to the **Create Protocol** screen.

Table 3. Labware Options for Creating Custom Protocols.

Labware	Description	Vendor	Part#
deepwell_v_12	ArrayPrep Open Reagent Reservoir. (Deep well)	SciGene	2000-82-2
emptytiprack	Empty 50µL or 250µL tip rack (green or blue)	SciGene	—
magbead96	96 well Magnetic-Ring Stand (Includes height of ubottom96 plate on top).	ABI	AM10050
MaiTai_4x44K	Mai Tai base plate	SciGene	1075-10-0
pcr96	ArrayPrep PCR Incubation Plate, 96 well.	SciGene	2000-81-0
Tall_PCR_96	96 Deep Well Plate, conical bottom, 500 µl	E&K Scientific	205096
tips250uL	ArrayPrep Tip, 250 µl (blue rack)	SciGene	2000-80-0
tips50uL	ArrayPrep Tip, 50 µl (green rack)	SciGene	2000-80-1
ubottom96	ArrayPrep Round Bottom Plate, 96 well polystyrene. (U-bottom)	SciGene	2000-81-3
vgroove12	ArrayPrep 12 Channel Reagent Reservoir. (V-Groove)	SciGene	2000-82-1
none	Use to remove labware previously assigned.	—	—

3. Review the deck layout, shown on the right side of the **Create Protocol** screen, for accuracy. If the worktable is incorrect, click the **Edit** button to make changes. If correct, continue to step 4.
4. On the **Create Protocol** screen select commands for the robot to perform from the buttons at top right. Refer to Table 4 for descriptions of command functions and to Table 5 for selectable parameters of the command functions. For each command parameter created, a line of script is generated and appears on the left side of the screen.
5. To save the file, click the **Save** button at any time. A dialog box will open for creating or selecting a filename.
6. To edit steps within a protocol, use the Editing buttons on the far right of the Create Protocol screen. See Table 6 for details of the editing commands and options available.
7. To insert a step into an existing protocol, first add the step (at the end of the protocol) and then move it to the correct position within the script. Steps may be edited for changes to parameters, but commands may not be changed. To change a command, delete the step and insert a new step.
8. When finished, click **Save**.

Table 4. Robot Commands.

Command	Function
Aspirate	Raises syringe plungers for aspirating liquid from plate into pipette tips
Dispense	Lowers syringe plungers for dispensing liquid from pipette tips into plate or tubes
Eject Tips	Ejects tips from Pipetting Head nozzles
Empty	Lowers syringe plungers to bottom of syringes for dispensing all liquid inside tips.
Load Tips	Seats pipette tips onto Pipetting Head nozzles
Mix	Pipetting Head lowers pipette tips into plate then aspirates & dispenses continually for a specified number of cycles
Move Plate	Gripper fingers inside Pipetting Head lower, grip and then move plate to another deck position
Pause	Pipetting Head raises up then moves to left side & remains there for length of time specified
Single Tip Mode	Utilizes Pipetting Head 'Channel A' for single tip operation. Limited to certain deck positions. See Fig. V-E-1.

Table 5. Protocol Commands.

Command	Parameters	Description
Aspirate	Plate #	Deck position of plate for aspirating
	Column #	Column on plate for aspirating
	Aspirate Volume (µL)	Volume in microliters to be aspirated into tips per channel
	Distance from Bottom of Well (mm)	Distance from the bottom of the pipette tips to the bottom of the wells in millimeters during an aspiration
	Syringe Speed (% of Max)	Speed of Pipetting Head plungers as a % of the maximum speed
	Air Gap (µL)	Air volume in microliters to be aspirated before placing the pipette tips into the wells of a plate for aspirating liquid. Ensures all liquid dispenses from tips during an 'Empty' command
	Overfill then Dispense back (µL)	Additional liquid in microliters to be aspirated then immediately dispensed back into well. Minimizes mechanical backlash of Pipetting Head system when transferring very small volumes
	☒ Next Column	Increments 'Column #' one to the right from previous 'Aspirate' command. For example, if previous 'Aspirate' command was from Column 1, a '2' will be placed in the Column # of the current menu
	☒ 'Single Tip Mode'	Displays 'Row #' for aspirating with Pipetting Head. See Fig. V-E-1 for details.
	Row # (SingleTipMode)	Row # of plate
Dispense	Plate #	Deck position of plate for dispensing
	Column #	Column on plate for dispensing
	Dispense Volume (uL)	Volume in microliters to be dispensed into plate per well
	Distance from Bottom of Well (mm)	Distance from the end of the pipette tips to the bottom of the wells in millimeters
	Syringe Speed (% of Max)	Speed of Pipetting Head plungers as a percentage of the maximum speed
	☒ Next Column	Increments 'Column #' one to the right from previous 'Dispense' command. For example, if previous 'Dispense' command was from Column 1, a '2' will be placed in the Column # of current menu
	☒ 'Single Tip Mode'	Displays 'Row #' for dispensing with Pipetting Head. See Fig. V-E-1 for details.
	Row #	Row # of plate
Eject Tips	Eject Position	Deck position of rack to return tips
	Eject Column	Column on tip rack to return tips
	☒ Same as load position	Returns tips to their original loading position
	☒ Single Tip Mode	Adds option for row position to return tip
	Eject Row	Row # of tip rack
Empty	Plate #	Deck position of plate where emptying
	Column #	Column on plate for emptying
	Distance from Bottom of Well (mm)	The distance from the bottom of the pipette tips to the bottom of the wells in millimeters during an Empty command
	Syringe Speed (% of Max)	Speed of Pipetting Head plungers as a percentage of the maximum speed
	☒ Next Column	Increments 'Column #' one to the right from previous 'Empty' command. For example, if previous 'Empty' command was from Column 1, a '2' will be placed in the Column # of current menu
	☒ 'Single Tip Mode'	Adds 'Row#' parameter for emptying with Pipetting Head.
	Row #	Row # of plate

Load Tips	Load Position	Deck position of tip rack for tip loading
	Load Column	Column on tip rack for tip loading
	☒ Next Column	Increments 'Column #' one to the right from previous 'Load Tips' command. For example, if previous 'Load Tips' command was from Column 1, a '2' will be placed in the Column # of current menu
	☒ 'Single Tip Mode'	Adds 'Row#' parameter for tip loading with Pipetting Head.
	Row #	Row # of tip rack
Mix	Plate #	Deck position of plate for mixing
	Column #	Column on plate for mixing
	Dispense Volume (uL)	Volume in microliters to be mixed per well
	Distance from Bottom of Well (mm)	Distance from the end of the pipette tips to the bottom of the wells in millimeters
	Syringe Speed (% of Max)	Speed of Pipetting Head plungers as a % of the maximum speed
	☒ Next Column	Increments 'Column #' one to the right from previous 'Mix' command. For example, if previous 'Mix' command was from Column 1, a '2' will be placed in the Column # of current menu
	☒ 'Single Tip Mode'	Adds 'Row#' parameter for tip loading with Pipetting Head.
Move Plate (see section V.-D.)	Row#	Row # of plate
	Move Plate From...	Deck position for picking up plate
	Move Plate To...	Destination deck position
	Dropoff Offset from deck (mm)	Distance from bottom of plate to deck when gripper releases plate in millimeters
	☒ Reverse previous move	Reverses the 'Move Plate From...' and 'Move Plate To...' values from last 'Move Plate' command (Does not update Dropoff Offset.)
Pause	Select Amount of Time for Pause (minutes)	<i>Time in minutes or USER PAUSE (Selecting USER PAUSE will cause robot to pause until user clicks 'OK'.)</i>

Table 6. Editing Commands.

Command	Parameter	Description	Action
Edit Step	Step Number	Number of step to be edited.	The drop down box will show the step numbers in the protocol. To edit a step, select the step number and click OK. Make the necessary changes in the command dialog box that appears and click OK.
Move Step	Move This Step...	Protocol step to be moved	Select the step number to be moved in the 'Move This Step' box and the destination step number in the 'To This Step' box. Click the 'OK' button to re-number the protocol.
	To This Step	Destination step number in protocol	
Delete Step	Delete Step #:	Number of the step to be deleted	Select the step number to be deleted. Click the 'OK' button to re-number the protocol.
Comment	Comment	Type in any text or a space (for a blank line).	Insert comments into a protocol or add a blank line to divide sections of a protocol.

E. Using Single Tip Mode

Single Tip Mode uses the innermost channel ('Channel A') of the 8 channel Pipetting Head for all liquid handling operations (Fig. V-E-1). Single Tip mode is limited to deck positions 1-10 and 17-19 (deck positions 11-16 are not compatible with Single Tip Mode). When operated in Single Tip Mode the operator can select both row and column for tip pick up and liquid handling.

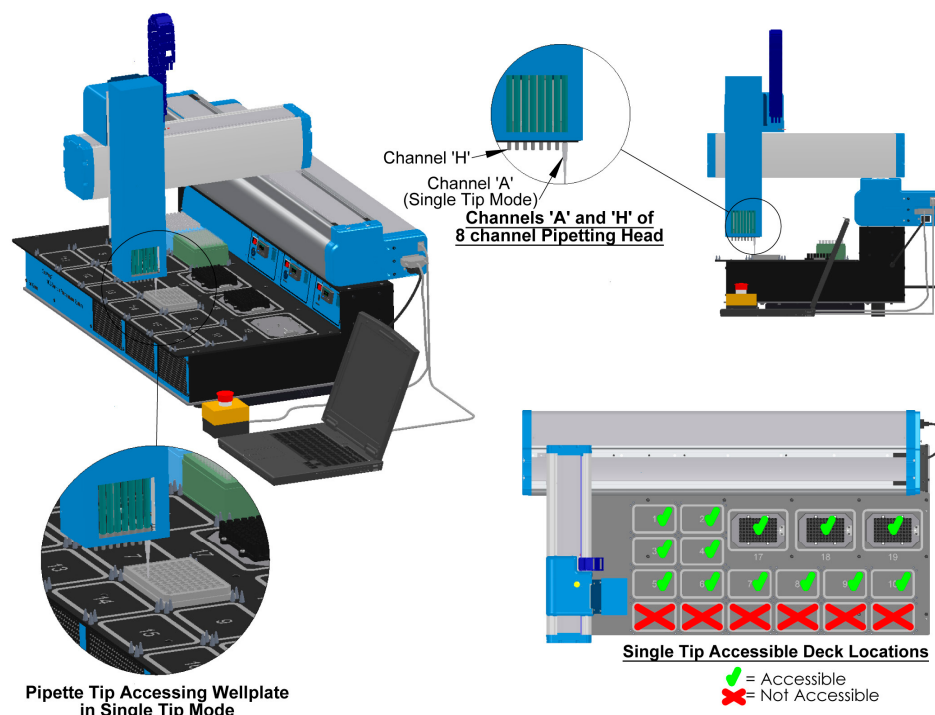


Fig. V-E-1. Single Tip Mode Operation

F. Using the Move Plate Command

The **Move Plate** command moves labware from one deck position to another using the integrated plate gripper, as defined in the Worktable. The pickup position is preset approximately ¼" (6.35 mm) from the top edge of the defined labware. The plate gripper releases the plate at a distance from the deck as specified in the 'Dropoff Offset From Deck' parameter. The default offset is "0", however, there are conditions for which the user must define a specific offset for UBottom plates (Table 7).

Table 7. Worktable Offsets for UBottom Plates.

FROM Position	TO Position	Offset
On Deck	Atop the Magnetic Ring Stand	13.7
Atop the Magnetic Ring Stand	On Deck	-13.7
On Deck	Atop Temperature Controlled Block	6.4
Atop Temperature Controlled Block	On Deck	8.0*
Atop the Magnetic Ring Stand	Atop Temperature Controlled Block	-7.3
Atop Temperature Controlled Block	Atop the Magnetic Ring Stand	21.0

*if block was previously empty ("none") in worktable

G. Importing a Protocol

To import a protocol, simply drag & drop the protocol file (__.pro) and the worktable file (__.wtb) to the desired Windows directory as you would other types of Windows files. The protocol and worktable files must have the same filename but with a '.pro' extension for the protocol file and a '.wtb' extension for the worktable file. Both files must reside in the same directory for editing or running from the ArrayPrep software.

H. Using the Emergency Stop Switch

To immediately stop the instrument, press the red Emergency Stop Switch connected by a cable to the instrument (Fig. V-H-1). When pressed, movement of the robot will stop, however, the three temperature controlled blocks will continue to receive power. To restore power to the robot, release the EMO button by rotating it a quarter turn clockwise. The protocol will not resume upon releasing the EMO switch and must be restarted from the beginning.



Fig. V-H-1. Emergency Stop Switch

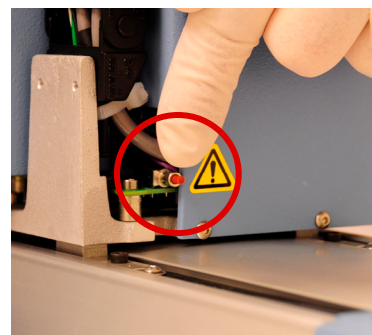


Fig. V-H-2. Z-Release Button

I. Using the Z Release Button

The Z Release is a small red button on the back of the casing atop the Y-axis that is not utilized during normal operation (Fig. V-H-2). When the instrument is plugged in and powered on this button may be used by a Service Representative to manually move the Pipetting Head up or down to verify correct alignment.



Before pressing the Z Release button, hold the Pipetting Head securely to prevent it from falling. Never allow the head to fall onto the deck as damage will result.



This symbol indicates the potential for a Hand Crush. Do not place hands or arms under the Safety Guard while a protocol is running.

VI. SYSTEM MAINTENANCE



Observe all national, regional, and local regulations for waste disposal and management.



Biological hazards can be associated with the materials used on this instrument. Potentially infectious waste must be treated in accordance with good laboratory practice guidelines.



This symbol indicates the potential presence of a Hot Surface. Use care when cleaning a spill in this area to avoid being burned.

A. Deck Spills

1. Turn off the main power switch located on the left side of the ArrayPrep instrument.
2. Wipe the spill using absorbent material, pulling the liquid to the front of the instrument, away from the control panel.
3. Clean the deck with a cloth or paper towel and an appropriate disinfectant solution (e.g. 70% ethanol) for the type of contamination that may be present.
4. Dispose of the spill in a manner that is in accordance with good laboratory practices.
5. Wipe the deck dry.

B. Tips, Labware and Reagent Disposal

Some chemicals used on this instrument can be hazardous. Please adhere to good laboratory practices when disposing of the tips, labware and reagents used on this instrument.

C. Cleaning

The following procedures are recommended after every use.

1. **Deck** — use a damp lint free paper towel or cloth to wipe down the deck. Remove any condensation which may have collected around the Temperature Controlled Blocks
2. **Syringe Nozzles** — use a lint free paper towel or cloth with 70% ethanol to wipe down the syringe nozzles
3. **Air Intake Vent** — with the instrument turned off, remove any debris (e.g. paper) underneath the instrument that may be blocking the air intake cooling fans.

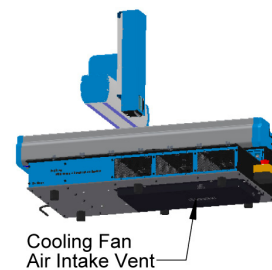


Fig. VI-C-1. Air Intake Vent.

D. Calibration of the Temperature Controlled Blocks

The frequency of calibration of the Temperature Controlled Blocks should be in accordance with calibration schedules used for other laboratory equipment. The three temperature controllers in positions 17, 18 and 19 on the ArrayPrep System are calibrated at the factory to provide accurate plate temperatures.

Re-calibration is required only if:

- When using a calibrated digital thermometer, the block temperature differs by more than one degree (1°C) from the actual temperature shown on the controller display.

Follow these steps to adjust the controller(s) to achieve accurate temperatures using a NIST-certified digital thermometer (SciGene cat. #1051-52-0):

1. Turn on the controller(s) and set the temperature to 37°C (Fig VI-D-1). Allow 15 minutes for the temperature to stabilize.



Fig. VI-D-1. Set temperature.



Fig. VI-D-2. Use thermometer.

2. Using the cable provided with the digital thermometer (SciGene cat. #1051-52-0), plug one end into the blue receptacle found next to the temperature controller and the other into the digital thermometer (Fig VI-D-2).
3. Turn on the thermometer using the **ON/OFF** button on the keypad. The temperature of the block will be displayed.
4. On the temperature controller, press the green loop button (↻) four times until “Cal” appears.
5. Calculate the difference in the temperature shown on the controller and the digital thermometer.
6. Use the up and down arrows to enter the offset value calculated in Step 5. For example, if the temperature controller is 37°C and the digital thermometer is 36.8°C use the “down” arrow button to correct offset by -0.2.
7. Press the **Infinity Key** (∞) on the controller to return to the original display. The controller is now calibrated for the set temperature you selected. Repeat the calibration process for the remaining two controllers, if necessary.

E. Checking Dispensing Performance

To determine the precision and accuracy of aspirating and dispensing small volumes of water, perform the following test. At completion, the amount transferred is checked with a calibrated handheld pipettor (10 µl) with graduated disposable tips.

1. Dispensing into Wet and Dry Plates

- Turn on the ArrayPrep instrument and temperature controllers for deck positions 17 and 18. Set both controllers to 4°C and wait 15 minutes for temperature to stabilize.
- Place a 50 µl tip rack in deck position 1. Place clean PCR Plates in deck positions 17 and 18 (Fig. VI-E-1). Put a plastic container for used tips on the bench adjacent to position 10 (Fig. VI-E-2).

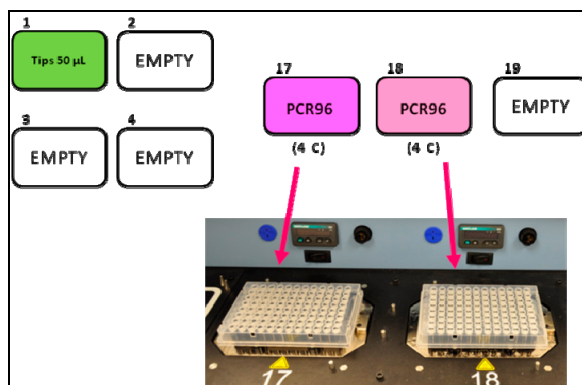


Fig. VI-E-1. Deck layout for testing small volumes.

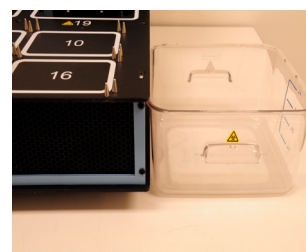


Fig. VI-E-2. Tips container.

- Manually pipette 50 µl of water into each well of column 1 in the PCR plate in position 17.
- Manually pipette 5 µl of water into each well of columns 4-6 and 10-12 in the PCR plate in position 18.
- Launch the ArrayPrep software, go to the Run menu and select the 'Desktop\ArrayPrep_Protocols\Diagnostics' folder. Choose "Small Volume Dispensing" and press **Start**. The instrument transfers 1, 2 and 3 µl of water from column 1 of position 17 into the PCR plate in position 18.
- After completion of the protocol, use a calibrated handheld pipettor (10 µl) with graduated disposable tips to check well volumes to ensure they match expected volumes (Table 8).

Table 8. Expected Well Volumes in Position 18

	Dry Dispensing			Wet Dispensing		
Columns	1 & 7	2 & 8	3 & 9	4 & 10	5 & 11	6 & 12
Volume	1µl	2µl	3µl	6µl	7µl	8µl

Accuracy should be within 0.5 µl. If the instrument does not meet this specification, contact SciGene Technical Services at [techserv@scigene.com] or your local distributor.

VII. SPECIFICATIONS

Table 9. ArrayPrep System Specifications

Electrical		
Power supply		115V AC, 50/60 Hz; 920W; 8 Amps (cat. # 2000-00-1)
		230V AC; 50/60 Hz; 920W; 4 Amps (cat. # 2000-00-2)
Processing		
Control		Software-controlled by external laptop
Pipetting Range		1 to 250 µL
Pipetting Precision		3% CV
Temperature Control Blocks 17,18,19		Range: 4 to 99°C (41 to 194°F)
		Regulation: ± 0.2°C from set point
Environmental		
Ambient temperature		Operation: +15 to +32°C (58 to 90°F)
		Storage: -20 to +60°C (-4 to 140°F)
Relative humidity		Operation: 20 to 80% RH non-condensing
		Storage: 10 to 90% RH non-condensing
Overvoltage category		II
Physical		
Dimensions (HxWxD)		Instrument: 35 x 48 x 26.5 inches (89 x 122 x 67 cm)
		Crate: 36 x 53 x 33 inches (91 x 135 x 84cm)
Weight		Net: 77 kg (170 lbs)
		Gross: 136 kg (300 lbs) in crate
		Dimensional: 325 lbs (148 kg) domestic; 172 kg international

VIII. ORDERING INFORMATION

Table 10. SciGene Ordering Information for ArrayPrep Reagents and Labware.

SciGene Cat. #	Product Description	UOM
2000-80-0	Tip, 250 µl, 96 tips/rack.	50/Case
2000-80-1	Tip, 50 µl, 96 tips/rack.	50/Case
2000-81-0	Incubation Plate, 96 well.	50/Case
2000-81-1	PCR Plate Sealer.	50/PK
2000-81-2	Sealing Film Roller.	Each
2000-81-3	Round Bottom Plate, 96 well polystyrene. (U-bottom)	20/Case
2000-82-1	12 Channel Reagent Reservoir. (V-groove)	25/Case
2000-82-2	Open Reagent Reservoir. (Deep well)	25/Case

IX. TROUBLESHOOTING

Table 11. Troubleshooting the ArrayPrep System.

Indication	Probable Cause	Corrective Action
INSTRUMENT OPERATION		
Robot not responding	A.) Ethernet cable is disconnected	Check Ethernet cable connections
	B.) Power is turned off, or power cord is unplugged	Check the main ON/OFF switch, power switches to temperature controllers on deck position 17-19, and power cord from outlet to robot
	C.) Network settings in laptop	On the laptop, in Network Connections\Local Area Connection\Properties\Internet Protocol (TCP/IP)\Properties: enter Address=192.168.0.2 and Subnet Mask = 255.255.255.0
Robot high power is disabled	A.) Emergency Stop Switch is enabled	Twist emergency stop switch clockwise to release to the 'up' position
	B.) Robot did not boot up correctly	Reset by turning off all power for 10 seconds and then power on and wait for robot to re-home
Robot not homed	Robot axis traveled against a hard stop	Manually move robot to middle position of X,Y,Z axes. Click 'Home Robot' on Run Protocol screen.
Robot stuck in down position and will not move.	Robot is jammed in down position causing power supply to cycle on/off (a protective feature).	Activate emergency stop switch (push down). Hold up Z-Axis & Pipetting Head while simultaneously pushing Brake Release button on back of Z-Axis. Caution! Z-Axis may drop suddenly when Brake Release button is pushed if not properly supported.
PIPETTE TIPS		
Tips Not Ejecting Completely	Calibration needs to be reset	Contact SciGene Technical Service [techserv@scigene] or your local distributor for assistance.
Tip rack picked up when loading tips	XY calibration needs adjustment	Contact SciGene Technical Service [techserv@scigene] or your local distributor for assistance.
Tips not sealing to nozzles (tips leak)	Nozzles not pushing in far enough into tips - calibration problem	Contact SciGene Technical Service [techserv@scigene] or your local distributor for assistance.
PLATE MOVEMENT		
Gripper stuck in down position	Protocol interrupted during plate movement.	Click Reset Gripper button in the Run Protocol screen. If problem persists, contact SciGene Technical Service [techserv@scigene] or your local distributor for assistance.
Gripper not grabbing plate at correct height	Labware not properly defined.	Verify worktable has correct labware specified for each plate position.
Gripper not dropping plate at correct height	"Move Plate" step in protocol not defined correctly	Edit "Gripper Dropoff Offset" parameter in "Move Plate" line of protocol
Gripper taking too long to grab plate or fingers not descending	Gripper fingers open too wide before it starts slowly closing	Open file "Calibrations.txt" in C:\Program Files\ArrayPrep®\Data and reduce value for GRIPPER_CLOSED (50 to 49 for example)
LABWARE		
Labware not found in worktable file	Worktable specifying labware is not in the labware definitions file	Compare worktable labware names against labware definitions in the "Edit Labware" menu or C:\Program Files\ArrayPrep\Data\labware.txt
TEMPERATURE CONTROL		
Temperature is not stable or not reaching set temperature	Loose connection on Peltier driver board.	Connections on Peltier driver board may be loose or need replacement. Contact SciGene Technical Service for assistance
	Paper or other object blocking heatsink fans	Check underneath ArrayPrep base for objects blocking the heatsink fans

X. SERVICE

Instrument servicing is NOT to be completed by the customer. Contact SciGene Technical Services [techserv@scigene.com] or your local distributor for assistance.



The motor power supply for the robot portion of the ArrayPrep System contains unshielded high voltage pins, components and surfaces.



This instrument should be serviced by trained personnel or only.



A. Lockout Procedure

If a malfunction or need for service occurs, comply with the following lockout procedure for restricting use of the instrument. All users, upon observing that the instrument is locked out for servicing or maintenance shall not attempt to start, energize, or use the equipment.

1. Notify all affected users that servicing or maintenance is required and that the instrument must be shut down and locked out to perform the servicing or maintenance.
2. If the machine is operating, shut it down by the normal stopping procedure (turn off blocks and main power or press the EMO switch, turn off laptop).
3. Disconnect the power cords from the wall socket(s) and from the instrument and laptop so that all equipment is isolated from energy sources.
4. Twist and remove the fuse. Place in a locked safe.
5. Contact SciGene Technical Services [techserv@scigene.com] or your local distributor to arrange for service.

B. Fuse Replacement

The fuse may be replaced by turning off and unplugging the unit, then gently twisting and removing the old fuse. Replace with a new fuse (slow blow) with the same electrical rating (250V, 15A for 115V or 250V, 8A for 230V).

XI. DECLARATION OF CONFORMITY

ArrayPrep® Target Preparation System

SciGene
470F Lakeside Drive
Sunnyvale, CA 94085 USA

Declares that the above referenced product(s) meets the essential requirements of the following European Union Directives by using the relevant standards shown below to indicate compliance.

EMC Directive 2004/108/EC

EN 61326-1	2006	Electrical equipment for measurement, control and laboratory use to include:
EN 61000-4-2	1995	+A1: 1998 +A2: 2001
EN 61000-4-3	2006	
EN 61000-4-4	2004	
EN 61000-4-6	2007	

LVD Directive 2006/95/EC

EN 60204-1	2006	Electrical equipment of machines
EN 61010-1	2004	Safety requirements for measurement, control and laboratory use
	2nd Edition	Part 1: General requirements

Terry Gill
Name of Authorized Representative

Sunnyvale, California, USA
Place of Issue

Director of Product Manufacturing
Title of Authorized Representative

June 17, 2010
Date of Issue


Signature of Authorized Representative