2050 Genomax®

Automated Tissue and Cell Lyser for Biological Applications

Operations Manual

spex® sampleprep

Contents

PLEASE DO NOT OPERATE THE GENOMAX UNTIL YOU HAVE READ THESE INSTRUCTIONS AND ARE FAMILIAR WITH ITS CONTROLS AND CLAMP MECHANISM. THE GENOMAX IS INTENDED FOR USE ONLY BY QUALIFIED AND TRAINED PERSONNEL.

1.0 INTRODUCTION

The 2050 Genomax® is designed to effectively disrupt cellular materials using the Spex Genomic DNA Isolation Kit for plant or animal tissue by vertically oscillating up to ninety-six 2 mL vials. The unit is supplied with the *#2051* Multi-Purpose Clamp for use with vials, tubes, and jars. The *#2052* Titer Plate Clamp is sold separately and is specially designed to hold titer plates securely to prevent leakage. Genomax features include programmable operating commands through a series of touchscreen displays, an administrative lockout (passcode) which allows the lab manager to restrict user access to specific protocols, self-diagnostics, large observation window, visibility of sample loading area, and clamp orientation to easily load/unload samples.

Operation is simple. Using the removable *#2051* Multi-Purpose Clamp or *#2052* Titer Plate Clamp, vials or titer plates are prepared on the benchtop, secured, then seamlessly loaded in the Genomax. The controls are checked for the proper running time, stroke rate, number of cycles, pause time and the RUN button pushed. When the run is complete, the lid is lifted, and the vials or titer plates can be removed.

The isolation of nucleic acids from intact samples requires mechanically disrupting the samples, followed by the extraction and subsequent purification of the nucleic acid. Mechanical tissue disruption is often performed manually with a mortar and pestle, an approach that is not practical for high-throughput screening since manual grinding of tissues is slow, and re-use of mortars and pestles may lead to cross-contamination. Alternatively, nucleic acids can be isolated in a multi-well titer plate, tubes, or vials using balls or beads that mechanically disrupt the sample. Conventional isolation methodologies can then be used to extract the nucleic acids from the homogenate.

The DNAmax Isolation Kits *(#2401M, #2401MS, #2402P, #2402PT*) were optimized with the motion of the Genomax to prepare sample tissue for extraction of nucleic acid, and other constituents by agitating the tissue, steel balls or beads, and a lysis agent together in 2 mL vials.

Sample materials that can be prepared include seeds, stems, roots, leaves, and animal tissue. Because the unique vertical shaking motion of the Genomax is so strong, many seeds and other forms of plant tissue can also be pulverized dry in titer plates, jars, tubes, or vials with the help of one or two grinding balls per well, jar, tube, or vial.

2.0 SPECIFICATIONS

Type of Grinder:	Homogenizer, Bead Beater
Display:	Touchscreen
Grinding Mechanism:	Grinding balls of stainless steel, silica or zirconia ceramic beads.
Dimensions	28 in (71.1 cm) high (40 in, 102 cm with lid open) x 14 in (35.6 cm) wide x 22.5 in (57.2 cm) deep including handle.
Weight:	100 lb (45.5 kg)
Capacity:	**Clamp #2051** – sixteen 50 mL or twenty-four 15 mL centrifuge tubes, ninety-six 5 mL tubes or ninety-six 2 mL microfuge tubes. **Clamp #2052** – two, four, or six standard 96 deep-well titer plates. **Dynamic loads > 2 lb can create a rate error.**
Clamp Speed:	Adjustable range: 500 to 1750 strokes/min.
Clamp Travel:	1.25 in (3.2 cm)
Electrical Specifications:	CE approved. 115 V/230 V, 60/50 Hz
Fuse:	3AG 15-amp, 250 V slow-blow fuse for 115 V/60 Hz model. 3AG 10-amp, 250 V slow-blow fuse for 230 V/50 Hz model.
Power Cord:	**Do not plug unit into GFCI outlet (Ground Fault Circuit Interrupter)** 115 V/60 Hz model: 3-prong grounded plug supplied. 230 V/50 Hz model: 2-prong European plug supplied.
Safety Features:	Lid locks while running. Interlock prevents operation if lid is not closed. Manual lid release latch on the back of the unit.
Run Timer:	Maximum 20 minutes (1 cycle), maximum 10 minutes (2 to 5 cycles).
Motor:	1/2 HP (3-Phase). Maximum speed 3280 rpm. Maximum power 220 V.
Environment:	For indoor use only at a maximum altitude of 6600 ft (2000 m). Operate at ambient conditions between 40 °F (5 °C) and 104 °F (40 °C), with maximum relative humidity 80% below 88 °F (31 °C) decreasing linearly to 50% at 104 °F (40 °C). Main supply voltage fluctuations up to 10% of nominal voltage (115- or 230-volts AC RMS). Pollution degree 1: none or only dry, conductive pollution occurs.

3.0 UNPACKING

Carefully inspect the exterior of the packing box. Any visible damage should immediately be reported to the carrier. Remove all packing documents from the exterior of the box and file in your records. Remove the top of the shipping box, the foam packaging material, and the Genomax accessories (power cord, titer plates, etc.). Lift the sleeve of the packing box to remove from the base of the box. Remove the top foam protector with the clamp assembly inserted. Grasp the Genomax on both sides, using proper lifting techniques, and place it on a stable bench top (This is a 2-person job). Make sure that there is adequate clearance on the sides to reach the AC inlet at the rear of the unit and on top when the lid is fully open.

Follow a logical sequence of steps as you inspect the unit (see figures 1 and 2).

1. Inspect the electrical input module for any visible damage.
2. Inspect the cabinet and lid for any visible damage.
3. Ensure that the controller is intact.
4. If the lid is locked, open by pressing and holding the Manual Release Latch on the back of the unit (at the top left) while lifting the red Lid Handle at the same time.
5. Remove the wooden-plate protector around the shaft inside the unit before attaching the *#2059* Clamp Base (refer to Section 4.3) or turning the unit on.
6. Check the clamp assembly (packed separately). Ensure that it is undamaged.
7. Inspect the accessories and compare with the packing list.

If everything appears to be in proper order, store the packaging materials in case there is a need to return the unit for service or repair.

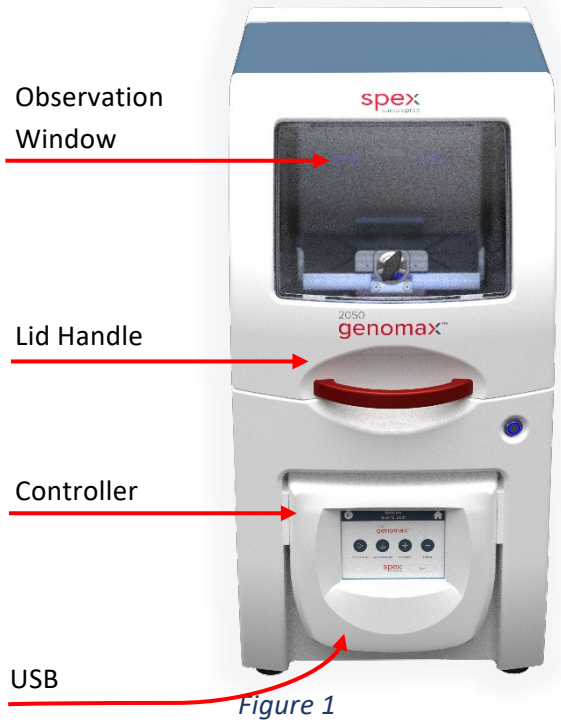


Figure 1

Figure 2

4.0 SETTING UP

The 2050 Genomax weighs 100 pounds (45.5 kg). The lid opens from the front with the handle in the center. The AC Input module, fuse tray, and power cord receptacle are located on the rear of the Genomax cabinet, toward its bottom. The power (On/Off) button is on the front right, as shown in Figure 2. The Manual Lid Release Latch is located on the rear of the unit at the top left. There are gas springs on both sides of the cabinet to control the movement of the lid. The touchscreen controller is affixed to the front of the unit. Under the front edge of the controller is an USB port to export run history or upgrade system software (Figure 1).

4.1 Electrical Connection

The detachable power cord should be plugged firmly into its inlet, then into an electrical outlet. **Do not plug unit into a GFCI (Ground Fault Circuit Interrupter) outlet.** Make sure that the electrical outlet is easily accessible in case it becomes necessary to unplug the unit. For 115 V/60 HZ use, a 3-prong outlet fused at 20 amps is recommended. The 230 V/50 HZ power cord has a standard European 2-prong plug, but modification by the user may be necessary to meet local electrical codes.

4.2 Cabinet Set Up

To open the cabinet, grasp the red handle and raise the lid to its full upright position. The gas spring will hold the lid in its open position. To close, grasp the red handle and lower the lid until it is fully closed.

A safety interlock will engage the Genomax only when the lid is closed. If the RUN button is touched while the lid is open, the Genomax will not start. The lid stays locked when the unit is running which prevents the user from opening it during operation. If the locking mechanism fails and the lid is opened, the motor will immediately stop, and movement of the clamp assembly will cease.

4.3 Installing the #2059 Clamp Base, #2051 Clamp and #2052 Clamp

The *#2051* Multi-Purpose Clamp is used with various vials, tubes, and jars (see Genomax accessory manual). The *#2051* Clamp can also be adapted to hold anything with the same general dimensions (5 in long x 3 in wide x 2 to 4 in high). This includes racks that hold multiple individual vials and other possible configurations. The *#2052* Titer Plate Clamp can accommodate a variety of titer plates (up to six). Refer to Section 6.0 Loading the Clamp.

To prevent damage during shipping, the clamp assembly is not installed at the factory. Before operation, this must be installed by the user. Only use the *#2051* Multi-Purpose Clamp or *#2052* Titer Plate Clamp in this unit.

4.3.1 Installing the #2059 Clamp Base

To install the *#2059* Clamp Base, first locate the 3/16 in Allen wrench and the two bolts and lock washers supplied with the Genomax. Open the Genomax lid and place the clamp base on top of the shaft. Using the lock washers and bolts, secure the clamp base to the shaft with the Allen wrench (Figure 3).

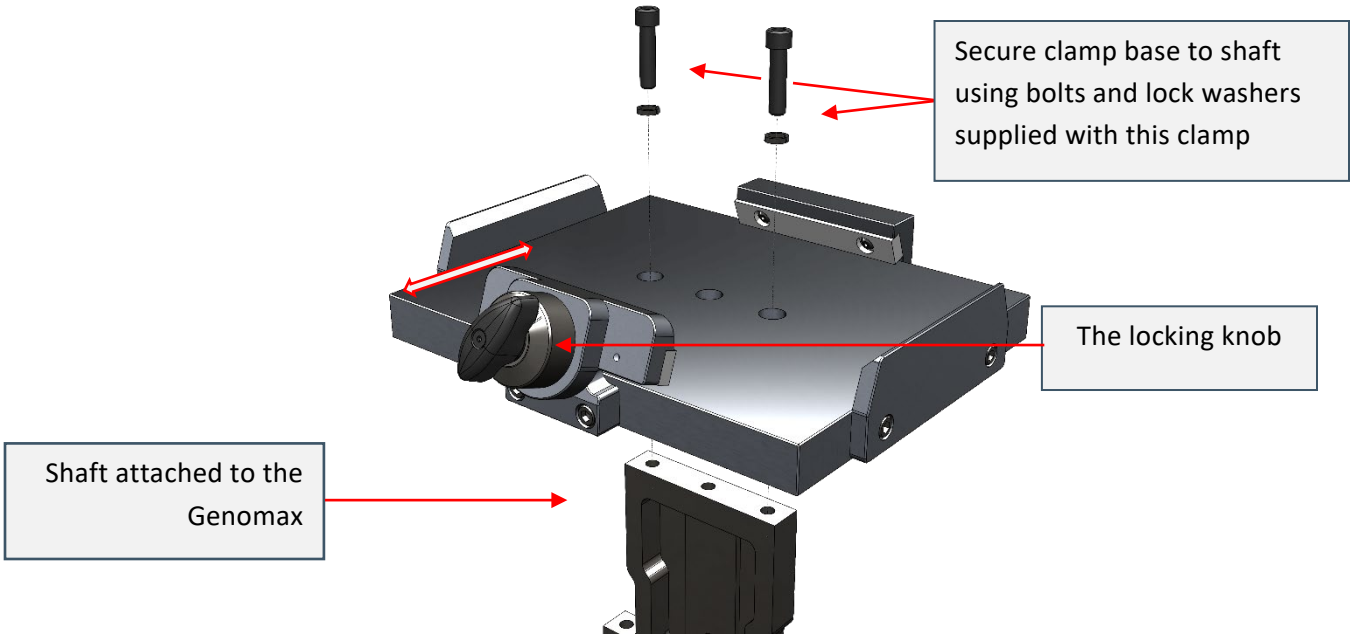


Figure 3 – Installing the #2059 Clamp Base

IMPORTANT: ONLY THE BOLTS AND LOCK WASHERS SUPPLIED WITH THIS CLAMP MUST BE USED!

5.0 TOUCHSCREEN DISPLAY

The 2050 Genomax is programmed and operated through a series of touchscreen displays. Transitioning between screens, and all programming and operating commands, is done by touching the screen with a fingertip or stylus. **Do not use a sharp point as this can damage or deface the screen.**

5.1 Logo Screen

When the power is switched ON at the front of the unit, “Please wait” appears during start-up as the software loads. The screen will switch to the **Home Screen**, as shown in Figure 4. From the Home Screen the Username, Control Panel, Saved Protocols, Run History, and Settings can be accessed by touching the buttons displayed.

The Home Screen Icon can be found on the Control Panel positioned at the upper right of the screen. Touching the Home Icon allows the user to return to the Home Screen.

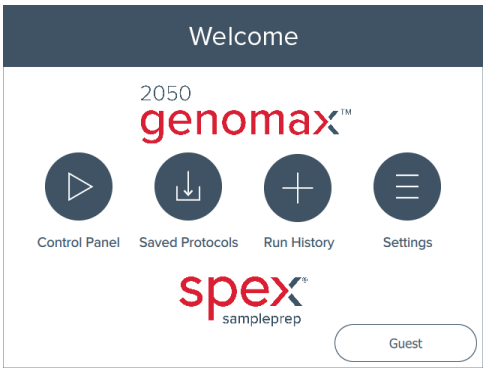


Figure 4

5.2 User List

To access the **User List** screen, touch the Username button on the Home Screen. An infinite number of users can be stored. Only 10 user slots are visible at a timeon the User List screen (Figure 5). To access or make visible additional users, or vacant spaces, swipe up or down the touchscreen. This brings up vacant slots on the User List screen. Touching the Back Arrow button (top left) allows the user to return to the previous screen.

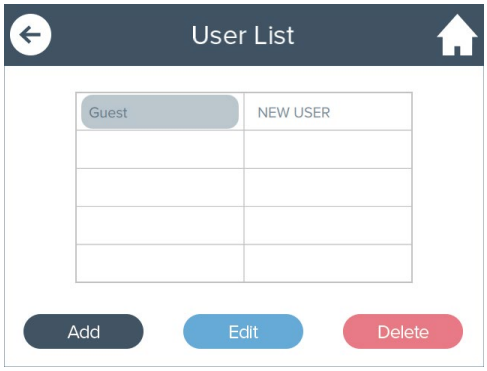


Figure 5

5.2.1 Recalling a User

In the **User List** screen, touch the Username to highlight the name. Then touch the Back Arrow button at the top left of the screen to send the username to the **Control Panel** screen. The username will appear below the Date and Time at the bottom right of the screen, as shown in Figure 6.

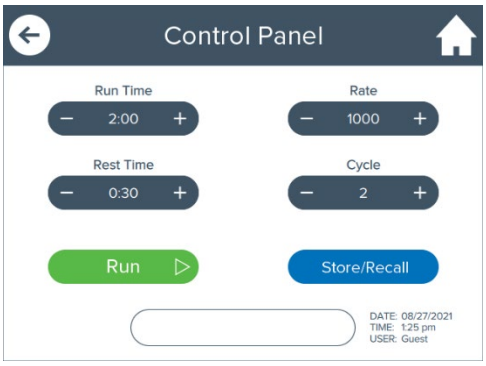


Figure 6

5.2.2 Adding a User

To add a new user, touch the Add button on the User List screen (Figure 5) which will bring up the **Edit/Add User** screen. Touch inside the box, as shown in Figure 7. Touching the Back Arrow button (top left) allows the user to return to the previous screen.

Figure 7

This will bring up the **Keyboard** screen, a simplified version of the standard keyboard for a computer. In addition to number and letter keys, this keyboard has standard symbol keys (#, %) and four function keys (SPACE, BACK, DONE, and CLEAR).

The CLEAR key deletes whatever has been entered in the box. As the letters/numbers are touched, they appear above the keyboard in the box with a centered cursor. To access the number and symbol keys touch the 12# button located bottom left on the **Keyboard** screen. To switch back to letter keys, touch the ABC button (same button) bottom left on the **Keyboard** screen.

The Up/Down yellow arrow key allows the user to shift back and forth from upper case to lower case (the default is upper case). Touch the Down arrow to switch to lower case or touch the Up arrow to revert to upper case.

Touching the SPACE key advances the cursor one space. Touching the BACK key deletes one space. Touching the DONE key enters the label shown in the box.

Touch the SAVE USER button to save the label shown in the box. The label will appear as the username in the USER LIST screen (Figure 5). The CANCEL key does not change anything on the screen, except returns the display to the USER LIST screen.

5.2.3 Editing a User

To edit a saved user, touch the Username to highlight the name on the User List screen (Figure 5). Then touch the EDIT User button. From the Edit/Add User screen change the name by touching inside the box. This will bring up the KEYBOARD screen, follow the instructions listed in the Add a User Section 5.2.2. Note: Changes cannot be made to the Guest field.

5.2.4 Deleting a User

To delete a saved user, touch the Username to highlight the name on the User List screen (Figure 5). Then touch the Delete button. A pop-up window opens confirming to delete this user. Touch YES to delete name or touch NO to retain the username.

5.3 Control Panel

The Control Panel displays the programmed run parameters; Date, Time and Username at the bottom right of the screen; and Protocol name at the bottom center of the screen, as shown in Figure 8. Changes to the run settings are made from this screen.

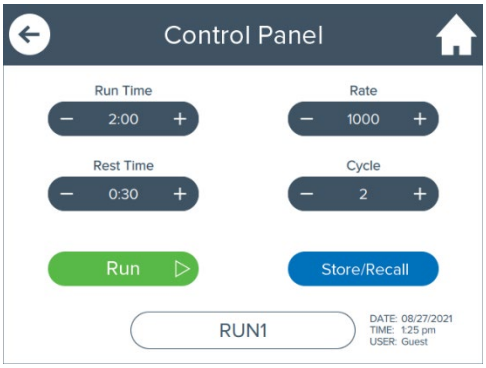


Figure 8

To recall stored run protocols, touch the Store/Recall button located at the bottom right of the screen. (See section 5.5 for more information on Saved Protocols.)

The following sequence of events will occur from the current settings in Figure 8.

1. Cycle 1 - the unit runs for 2 minutes at a rate of 1000 strokes per minute.
2. Pause - the unit is inactive for 30 seconds allowing the samples to undergo lysis.
3. Cycle 2 - the unit runs for another 2 minutes at a rate of 1000 strokes per minute.

In the CONTROL PANEL, The STATUS BAR (top of screen) counts down the time remaining for a run (Figure 9).

To change the settings of a selected field, press the arrow buttons on the CONTROL PANEL screen. The left arrow buttons decrease the number displayed and the right arrow buttons increase the number displayed.

5.3.1 Starting a Programmed Run

To run the program displayed on the CONTROL PANEL screen, touch the Run button. The Genomax can be started, stopped, or paused in the middle of a grinding program from the button selections to the right of the screen.

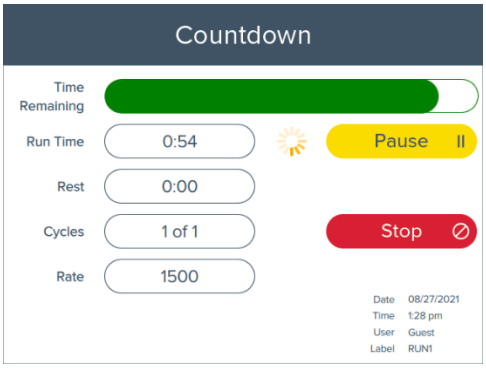


Figure 9

During the RUN TIME stage, the TIME REMAINING line counts down the time for the programmed run in 1-second increments. To pause the program, touch the Pause button. To continue the program, touch the Resume button. To abort the program, touch the Stop button.

To start a new program, touch the Run button.

The RUN TIME line will display the time remaining in that cycle of the grinding stage. If there are 2 total grinding periods, the CYCLES line will countdown to “0”. The maximum number of cycles is 5.

5.3.2 Stopping or Pausing a Run

To stop a program, touch the Stop button on the RUN SCREEN (Figure 9), the button will dim or turn a muted red and the program will end. If the Run button is touched after the program has stopped then the entire program will start over.

To pause during a grinding program, touch the Pause button. Note: The TIME REMANING line will turn yellow which indicates run time is inactive. The run will hold the settings at that moment (elapsed time, cycle, etc.). At this point the door to the sample area can be opened. To resume the program, touch the Resume button. This will restart the program at the point at which it was paused. Alternatively, pressing Stop will end the program.

5.4 Changing Settings

To change parameters (run time, pause time, cycles, and rate), touch the arrow buttons on the CONTROL PANEL screen. Touching the plus symbol increases the parameter, while touching the minus symbol decreases the parameter. Tap or hold the right or left arrow buttons until the desired number is reached. The changes will appear in the blue area between the arrows, as shown in Figure 10. The maximum run time is 20 minutes for 1 cycle. If running 2 to 5 cycles the maximum run time per cycles is 10 minutes. The minimum Rest is 15 seconds per cycle for 2 to 5 cycles. To run a program with the new settings, touch the Run button.

NOTE: If the run parameters are changed to a Protocol and not saved then (MOD) will appear to the right of the Protocol name at the bottom center of the screen.

Figure 10

5.5 Saved Protocols

The SAVED PROTOCOLS screen is shown in Figure 11. In this example, four saved protocols have been stored and named (2401M Animal, 2401MS Animal Stbl, 2402P Plant, 2402PT Plant Tough). The four saved protocols have been preprogrammed to be used with the Spex Genomic DNA isolation kits for animal and plant tissue.

DNAmax Kit Product Number	Description
#2401M	DNA Isolation Kit for Animal Tissue
#2401MS	DNA Isolation Kit with Stabilization Buffer for Animal Tissue
#2402P	DNA Isolation Kit for Soft Plant Tissue
#2402PT	DNA Isolation Kit for Tough Plant Tissue

Up to 500 Protocols can be saved for simple and fast recall, increasing productivity and reducing operator error. Only 20 protocols are visible at a time on the Saved Protocols screen. To view additional protocols or vacant protocol spaces, swipe up or down on the touchscreen. This brings up vacant protocol slots on the SAVED PROTOCOLS Screen.

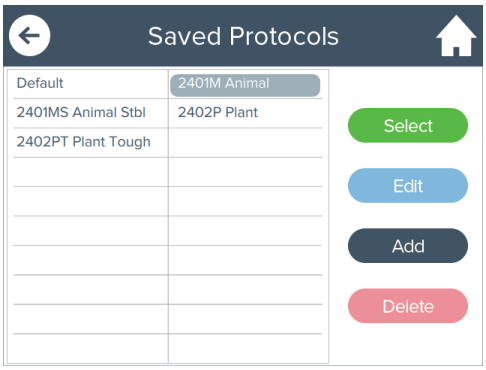


Figure 11

A saved protocol retains the settings for number of cycles, run time, pause time between cycles, and rate.

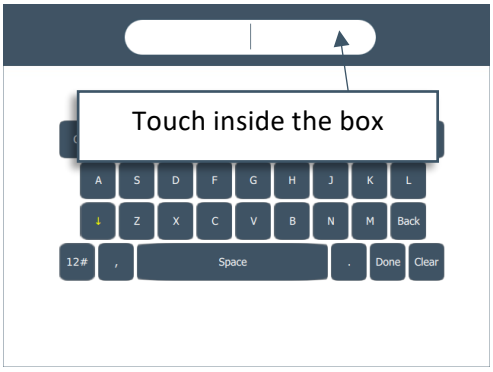
At the top left on the Saved Protocols Screen is the Back Arrow button. Touching the Back Arrow button returns the user to the previous screen.

5.5.1 Recalling a Protocol

To recall a stored program, touch the Store/Recall button on the Control Panel screen (Figure 10). In the SAVED PROTOCOLS screen, select the protocol to highlight the box. Then touch SELECT to send protocol to the CONTROL PANEL screen (Figure 11).

5.5.2 Storing a New Protocol

To store program, touch the Store/Recall button on the Control Panel screen (Figure 10). In the SAVED PROTOCOLS screen, touch the Add button, as shown in Figure 11.



This will bring up the KEYBOARD screen, a simplified version of the standard keyboard for a computer.

The CLEAR key deletes whatever has been entered in the Label Box.

Touching the DONE key enters the label shown in the box.

Touch the SAVE button to save the label shown in the Box. The label will appear as the name of the program in the SAVED PROTOCOLS Screen (Figure 11).

The CANCEL key does not change anything on the screen, except returns the display to the SAVED PROTOCOLS Screen.

To run the newly saved protocol, touch the protocol to highlight the box. Then touch Select to send the protocol to the CONTROL PANEL screen. Review the parameters and touch the Run button to initiate the protocol.

5.5.3 Editing a Protocol

To edit a saved protocol, touch the protocol name to highlight the box on the Saved Protocol screen (Figure 11). Then touch the Edit button. From the Edit Protocol screen, change the name by touching inside the box. This will bring up the KEYBOARD screen, follow the instructions listed in the Storing a Protocol Section 5.5.2.

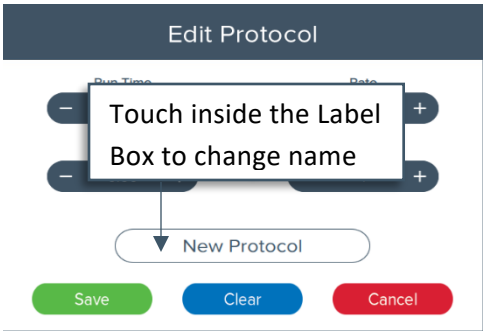


Figure 12

5.5.4 Deleting a Protocol

To delete a saved protocol, touch the protocol name to highlight the name on the Saved Protocols screen (Figure 11). Then touch the Delete button. A pop-up window opens confirming to delete this protocol. Touch YES to delete or touch NO to keep the saved protocol.

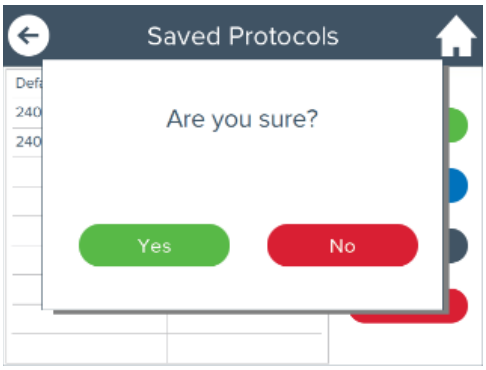


Figure 13

5.5.5 Modifying a Recalled Protocol

Once a saved protocol is recalled to the CONTROL PANEL screen, the user can modify the parameters by using the left and right arrows. If the protocol is modified, (MOD) will appear next to the protocol name, e.g. TISSUE (MOD).

6.0 LOADING THE CLAMP

This warning symbol is visible in front of the clamp assembly. It is essential that samples are securely locked into the sample holder (clamp assembly) before operation.

Lock Clamp onto #2059 Clamp Base

The clamp is the most critical component of the Genomax, as it must be screwed down tightly to hold the titer plates (or vials, centrifuge tubes, etc.) firmly in place. The up-and-down motion of the clamp is extremely vigorous. Sample holders (titer plates, vials, centrifuge tubes, etc.) must be held securely in the clamp during operation to prevent damage and leakage.

6.1 Loading the #2051 Multi-Purpose Clamp

Note: The #2059 Clamp Base must be attached to the Genomax before placing the #2051 Multi-Purpose Clamp in the unit. (Section 4.3.1)

1. Place the sample vials (in the appropriate holder or cryo-block) in the #2051 Clamp. The sample load must be evenly distributed at all sides of the clamp to avoid excess wear to the Genomax. In addition, the clamp lid must have a flat surface upon which to rest. If running less than a full holder of vials, be sure to place vials at the 4 corners to support the clamp lid.
2. Slide the #2051 Clamp lid onto the vertical threaded rod through the cutout channel and the upright at the back of the clamp.
3. Turn the locking nut clockwise until finger tight. Check to see whether the vials can be moved from side to side in the clamp. If not, the clamp is tight and samples are secure. If the vials can be moved, tighten the locking nut (with the tool) gradually until the vials are secure.
4. Insert the #2051 Clamp onto the #2059 Clamp Base and lock in place by turning locking knob clockwise to the ON position. (To remove the clamp, turn the locking knob counterclockwise to the OFF position and lift from the #2059 Clamp Base.)

   Tip: the #2051 Clamp can also be locked into the #2059 Clamp Base prior to placing sample vials in the #2051 Clamp.

5. Close the Genomax lid and run the unit.

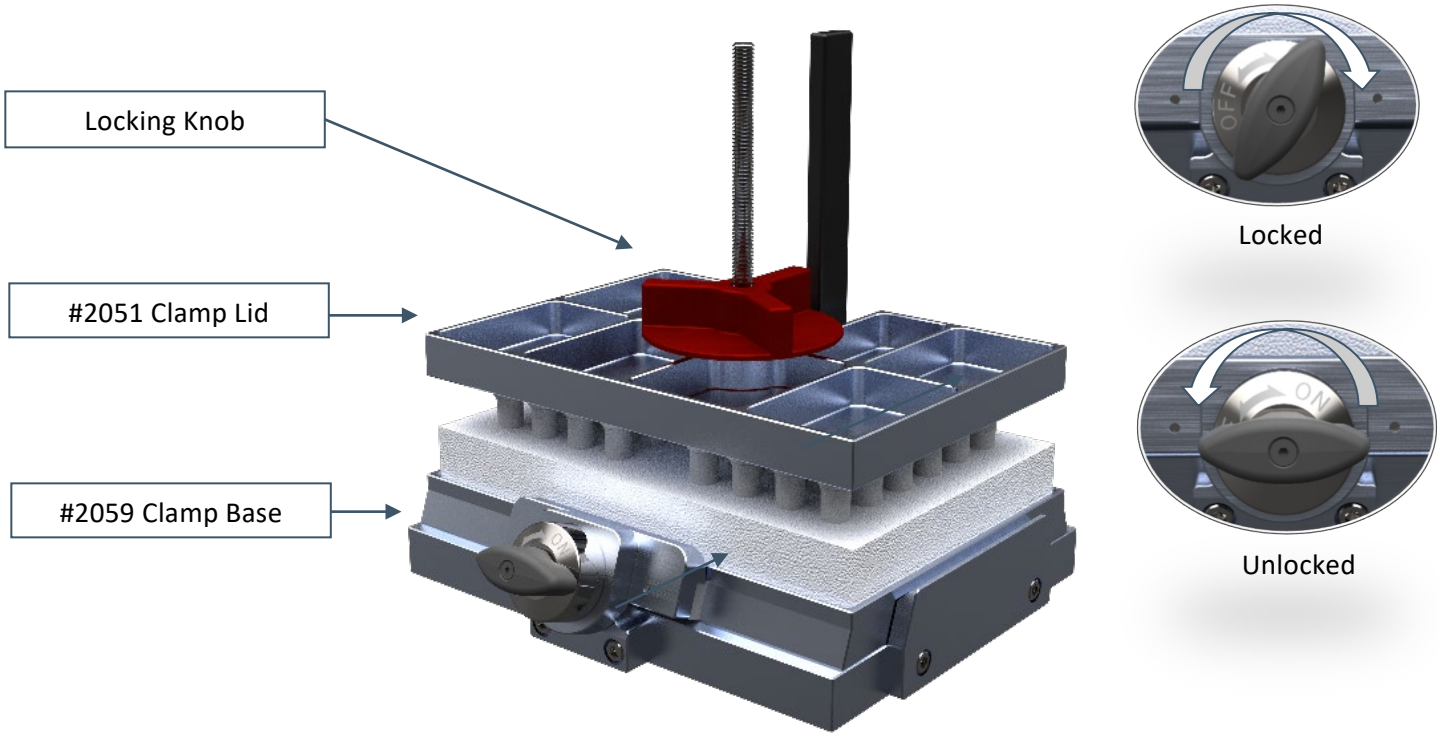
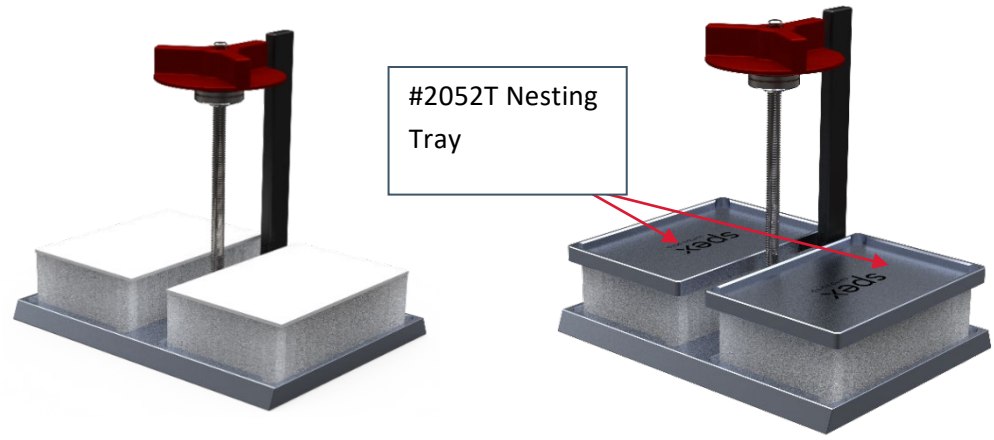


Figure 14

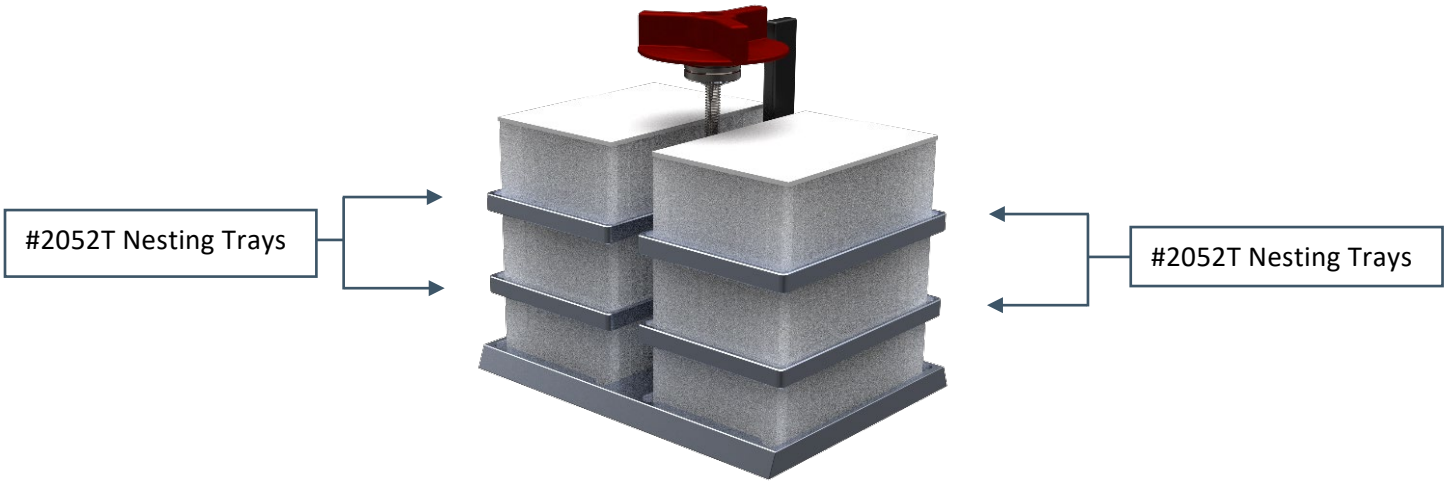
6.2 Loading the #2052 Titer Plate Clamp

Titer plates are made by many companies and are sealed in various ways. The Genomax is designed for use with titer plates. Spex #2205-50 Titer Plates and #2206-50 Caps are reinforced to withstand with rigorous bead beating and have been tested not to leak when properly sealed in the #2052 Clamp.

1. A minimum of two titer plates must be run as the clamp lid requires a level surface upon which to rest. If running a set of 2 titer plates, simply place one plate on either side of the #2052 clamp. The titer plates fit snug in the clamp recess.



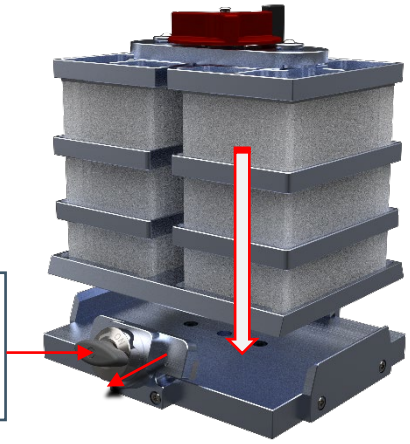
2. Titer plates can also be stacked in the clamp to increase throughput. A maximum of 6 deep-well plates can be run in the #2052 clamp, stacked three high on either side of the clamp.
3. When stacking titer plates, it is necessary to use the #2052T nesting trays. These provide a rigid surface on the top of the plate to prevent the grinding balls from perforating a film if used to seal the plate. The nesting trays must also be used if plates are sealed with cap mats as these hold the cap mats securely in place and prevent leakage from the plate wells. **Note:** When stacking 4 or 6 titer plates, do not add more than five 4 mm steel balls to a single titer plate well.



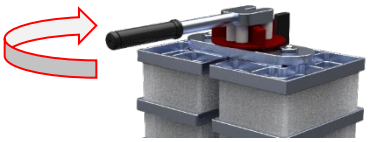
4. The #2052T nesting tray set consists of four trays that have a recess on both sides for the bottom of titer plate and the top of the titer plate (cap mat). A rubber membrane is placed on top of each titer plate to provide better sealing.

5. Slide the #2052 clamp lid onto the vertical threaded rod through the lid cutout channel and the upright at the back of the clamp.
6. Turn the locking nut clockwise until finger tight.
7. Insert the #2051 Clamp onto the #2059 Clamp Base and lock in place by pushing inwards then turning the locking knob clockwise to the ON position.

With locking knob in OFF position, pull outwards and lower clamp.



8. Then use the clamp tightening tool (#2052R) to further tighten the locking nut.
9. Close the Genomax lid and run the unit.



NOTE: Never run the Genomax without the #2051 Clamp or #2052 Clamp screw-tightened or with titer plates held loosely in the clamp. Use the clamp tool to ensure the lid is tight and secure to prevent leakage. When processing samples in only one titer plate, load an empty titer plate on the other half of the clamp assembly. Similarly, if less than a full rack of vials is used, be sure to place an equal number of vials on each side of the clamp to ensure that the load is balanced and tightly clamped. Empty vials can be used as place holders if an uneven number of samples are run.

6.3 Removing the Sample Vials, Tubes, or Titer Plates

1. When the Genomax comes to a complete stop, open the lid by grasping the red handle and lift upwards.
2. It is not necessary to remove the clamp mechanism entirely. The #2051 or #2052 Clamp can remain attached to the #2059 Clamp Base so that only the clamp lid is removed allowing sample vials and titer plates to be easily accessed.
    a. **Tip:** To remove the #2051 or #2052 Clamp, turn the locking knob counterclockwise to the OFF position and lift the clamp from the #2059 Clamp Base.
3. Turn the clamp locking knob counterclockwise until it rotates freely. (If needed, use the clamp tool to loosen.)

NOTE: To maintain proper functionality of the Genomax, the maximum recommended total sample load in the clamp assembly is 4 lb (1.8 kg). The total sample load includes sample, vials (or titer plates), grinding media, holders (or cryo-blocks), and nesting trays. For sample loads exceeding 2 lb (0.9 kg), the maximum recommended operating rate is 1500 rpm. Sample loads less than 2 lb can be run at rates up to the maximum of 1750 rpm. Dynamic loads greater than 2 lb can create a rate error. When stacking 4 or 6 titer plates, do not add more than five 4 mm steel balls to a single titer plate well.

Operating with loads that exceed the recommended maximum rate and weight limits can result in damage to the Genomax. Therefore, warranty restrictions or invalidation may apply.

7.0 OPERATION

Before operating the Genomax, make sure it is plugged in and turned on. The power cord inlet is located on the rear of the cabinet. The On/Off button is located on the face of the unit to the right of the red handle.

The following steps outline a standard operating cycle:

1. Load and seal the titer plates, or load and cap the sample vials.
2. Clamp the titer plates or vials in place, using nesting trays as needed, or vial holders.
3. Close and secure (lock) the lid.
4. Set the timer.
5. Set the number of cycles.
6. Set the pause time.
7. Set the clamp stroke rate.
8. Press the green RUN button to start a run.
9. When the run is complete, lift the lid.
10. Unclamp the titer plates or vials.

7.1 Preparing the Titer Plates

While the precise details are left to the individual user, each well in the titer plate can be loaded with a seed, plant tissue, or other sample, and an eluent, solvent, etc. If it is necessary to disrupt the sample, a grinding media is typically added first. The #2100 Grinding Ball Dispenser available for the Genomax will deposit one 5/32 in (4 mm) steel ball layer in each well of the titer plate. Dry grinding may require a second ball in each well, possibly sandwiching the sample between them during grinding. **When stacking 4 or 6 titer plates, do not add more than five 4 mm steel balls to a single titer plate well. Dynamic loads greater than 2 lb can create a rate error.**

To use the #2100 Grinding Ball Dispenser, fill the tray with more than enough steel balls to cover the bottom, and shake it gently until a steel ball falls into every hole. Then place the dispenser over an empty titer plate and push in the slide, releasing the balls caught in the slide. Set the dispenser aside and check that a ball is in each well of the titer plate.

Sealing the loaded titer plate is a matter of choice, which can vary with the brand of titer plate and the necessity of sealing a fluid in each well. Some manufacturers of titer plates make sealing systems; many technicians have also developed other methods for plugging the top of each well. Users must decide for themselves which method is most effective. What matters most is that the contents of one well do not contaminate the sample in an adjacent well.

NOTE: Because the action of the Genomax is so energetic and efficient, run times are short, typically 2 minutes or less. When developing a procedure, always start with a short running time and increase it only if needed.

7.2 Manual Lid Release Latch

To open the cabinet if the power to the Genomax fails, press and hold the metallic button on the back of the unit (at the top left) while lifting the red Lid Handle at the same time.

7.3 Running the Genomax

Press the green RUN button to initiate a programmed run. The screen will display a countdown of the time remaining in a run, as shown in Figure 9. The Genomax will stop automatically at the end of the run. When the grinding program has ended, the screen will display RUN COMPLETE, as shown in Figure 15. Touch the screen to return to the Control Panel.

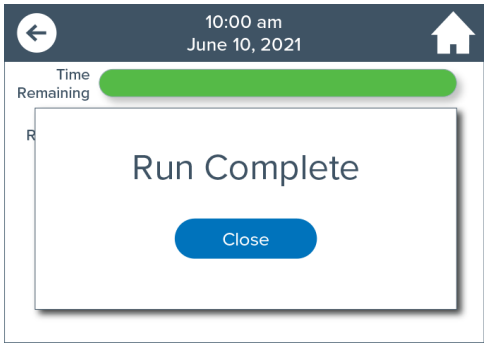


Figure 15

To stop the Genomax during a run, press the red STOP button on the screen. Operation will cease and the timer will reset.

The lid locks automatically while the Genomax is in operation. If the lid lock fails and the lid opens, the screen will display a “LID OPEN” message, as shown in Figure 16. The timer will maintain the time remaining in the run. To restart, close the lid and press the green Resume button to finish the run. To abort the run and reset the timer, press the red STOP button. The “LID OPEN” message will disappear once the lid is closed.

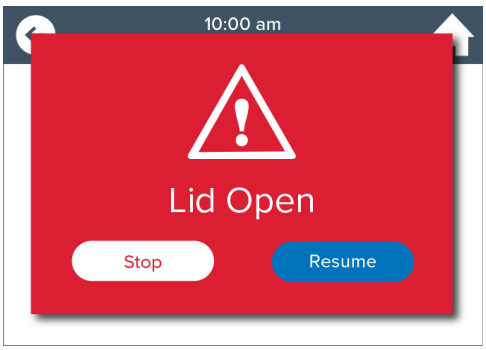


Figure 16

7.4 Safety Recommendations

The Genomax is intended for use only by qualified and trained personnel. For questions about the OPERATION, MAINTENANCE, or SERVICE of the 2050 Genomax, please call Spex SamplePrep at 1-855-GET Spex (732-623-0465).

Every effort has been made to ensure that the Genomax is safe to operate. However, the safety protection provided by the unit may be impaired if the Genomax is operated in a manner other than that described in this manual. In addition, the Genomax should only be used with accessories provided by or recommended by Spex SamplePrep and must be used in the intended manner. Use of accessories not recommended by Spex SamplePrep may negatively affect the safety protection provided by the unit. For example, do not use glass vials in the Genomax. Impact of the grinding media may cause the vials to break, resulting in broken glass and spilled samples.

Do not use the Genomax with hazardous materials for which the unit was not designed. Be aware of the hazards of the materials that are being used, particularly in the event of a spill. For instance, use of a flammable liquid could create a fire hazard if a sample is spilled.

8.0 RUN HISTORY

To recall the Run History, touch the Run History button. The Date, Time, User, Run Label, and Run Protocol data are stored on this screen, as shown in Figure 17. The Run History can be exported to computer devices via the USB located under the front of the Controller. Note: The Export History button will have a dimmed or muted green appearance which indicates it is inactive. After a flash drive or USB cable (connected to computer device) is inserted into the port the button will turn a brighter green indicating it is active. To export Run History, touch the Export History button at the bottom right of the screen. To clear Run History or delete Run History permanently from data storage, touch the Clear History button at the bottom left of the screen. To return to the Resources Screen, touch the Back Arrow button at the top left of the screen.

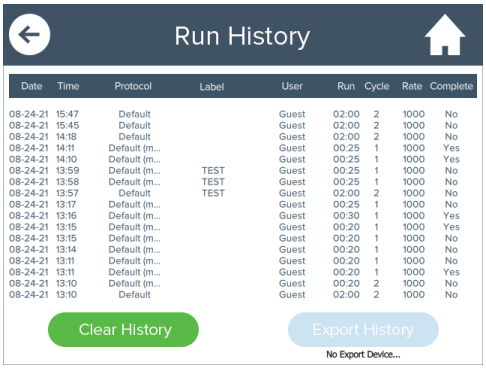


Figure 17

8.1 System Settings

To access the Settings screen, touch the Settings Icon on the Home screen (Figure 4). The system can be upgraded, diagnostics view/exported, and files exported (Run History, Saved Protocols) and saved protocols imported, as well as the time display changed from 12-hour to 24-hour, and Time and Date can be entered or changed, as shown in Figure 18. Touch inside the system date and time fields to change them. A pop-up window opens to enter Time or Date. Touch the SET button to confirm the change. Select 12 hr or 24 hr time format, which will be displayed on the Run screen. Touching the Back Arrow button returns the user to the previous screen.

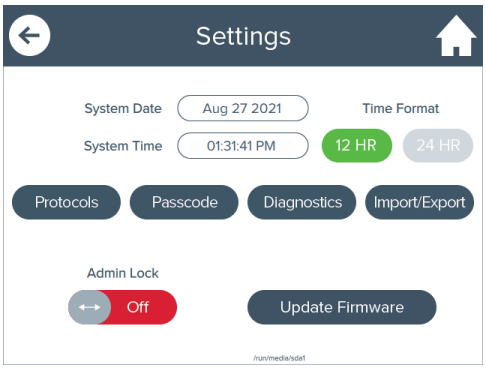
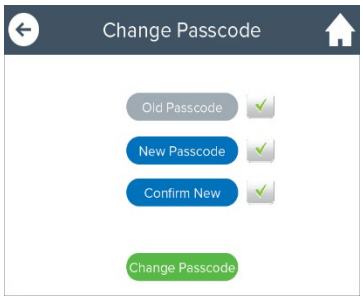


Figure 18

Admin Lock Protocols can be accessed by touching the Protocols button. A 4-digit code is entered to view, enable, or edit a locked protocol (default code is 0000). To change the passcode, touch the PASSCODE button, next enter the old passcode, then enter the new passcode, confirm the new passcode by re-entering it. After all 3 steps are complete touch the Change Passcode button to make the new 4-digit code active.



8.2 Administrative Lockout Features

The Administrative Lockout feature (passcode protected) restricts user access to specific protocols or ability to modify a protocol. From the Home Screen, touch the Settings Icon. The Admin Lock button is located on the bottom left of the screen.

When the Admin Lock mode is disabled, the button will display “OFF” highlighted with a red background, as shown in Figure 18. To enable or disable the Admin Lock feature, touch the button to toggle ON or OFF. This will bring up a Number Pad to enter a 4-digit authorization code (default code is 0000). To abort entering a code, touch the Cancel key on the Number Pad. Note: If the wrong 4-digit code is entered the Admin Lock mode will remain enabled.

8.2.1 Protocols in Admin Mode

To choose the protocols to be available to users when in Admin Lock mode, touch the PROTOCOLS button (see Figure 18) and enter the passcode. Then touch ENABLE and touch the protocols to be made available. When finished, touch SELECT. Go back to the Saved Protocols screen to verify that the correct protocols are shown.

To edit a Protocol, again touch PROTOCOLS on the Setting screen and enter the passcode. Then make sure EDIT is selected. Touch the Protocol to be edited and touch EDIT. Make the necessary changes to the Protocol and touch SAVE.

8.3 Diagnostics

The Diagnostics Screen can be accessed from the Settings Screen (Figure 18). Touching the Back Arrow button returns the user to the previous screen.

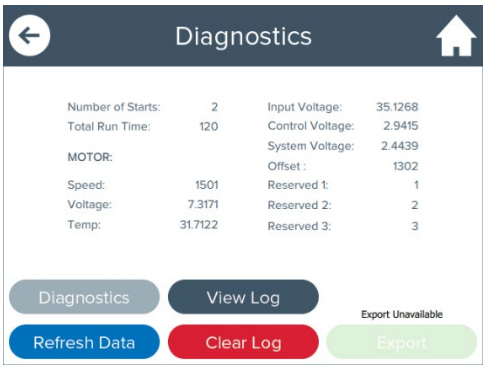


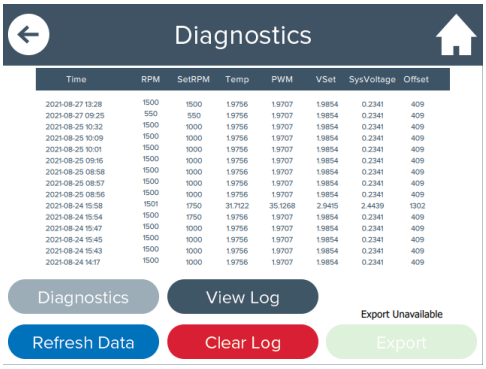
Figure 2

8.3.1 Refresh Data Button

Touching the Refresh Data button allows the user to take a reading of the data displayed in Figure 19.

8.3.2 View Log Button

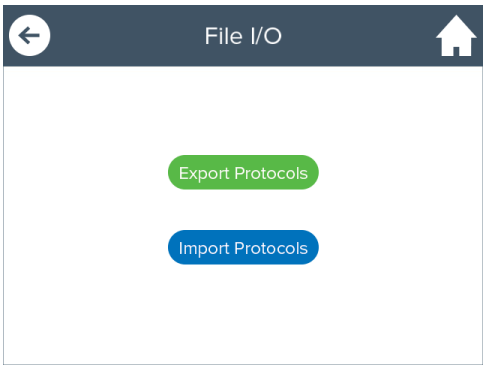
Touching the View Log button allows the user to view the diagnostic data for the unit. A pop-up window opens listing the date/time, rate, and voltage data. To close window, touch the View Log button a second time.



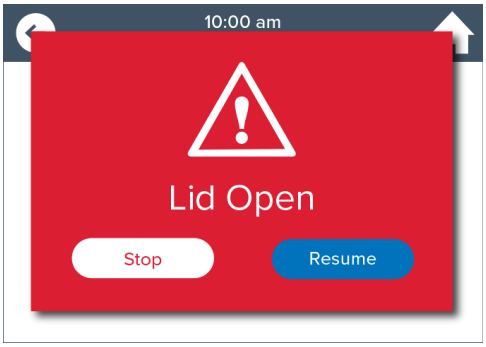
8.3.3 Export Button

Touching the Export button allows the user to transfer diagnostic data to a flash drive and send to Spex Service Department for evaluation.

Note: The Export button will have a dimmed or muted appearance which indicates it is inactive. After a flash drive or USB cable (connected to computer device) is inserted into the port the button will turn a brighter green indicating it is active.



9.0 ERROR MESSAGES



9.1 Lid Error

If the lid lock fails while the Genomax is running, the unit will stop running and the screen will display a “LID OPEN” message. The timer will maintain the time remaining in the run. To restart, close the lid and press the green RESUME button to finish the run. To end the run and reset the timer, press the red STOP button. The “LID OPEN” message will disappear once the lid is closed.

9.2 Rate Error

If a “RATE ERROR” message appears on the screen, this indicates the Genomax is not operating within an acceptable range of the set rate. Dynamic loads greater than 2 lb can create a rate error. When stacking 4 or 6 titer plates, do not add more than five 4 mm steel balls to a single titer plate well. Press the red STOP button to discontinue operation. Call our service technician at 732-623-0465 for assistance.

10.0 MAINTENANCE

This unit has been designed to provide trouble-free operation over a long period of time. To assure proper performance, the most important factor is cleanliness. Any spills should be wiped up immediately.

The cabinet is made primarily of painted aluminum. The front panel is plastic. The interior as well as the exterior surfaces of the unit are designed to be easily cleaned in case of a sample spill. To maintain the overall appearance of the unit, occasionally wipe the exterior and interior of the unit with a mild window cleaner or similar product (use a soft non-abrasive cotton cloth).

There is a raised “dam” around the clamp shaft to keep spilled liquid from dripping onto the motor or drive mechanism; however, any spills should be cleaned up immediately. It is never a good idea to leave the cabinet dirty. Sample contamination and/or equipment damage can result.

10.1 Changing the Fuses

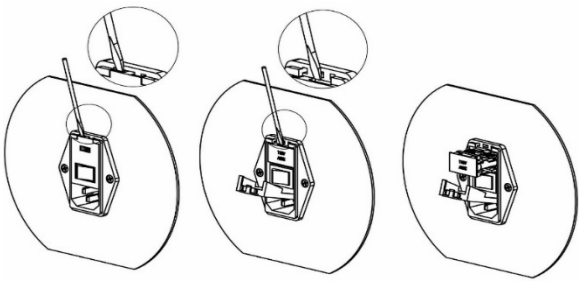


Figure 20

If the Genomax will not operate when the start button is pressed, it is possible that one or both fuses may have blown. To access the fuses, first remove the power cord from the back of the Genomax. Then open the door on the fuse compartment by gently prying it open at the top and flipping it down. Use a small screwdriver to gently pry the red fuse holder out of the compartment, as shown in Figure 20. Remove the fuses and check them using a continuity tester. If either fuse is blown or defective, replace both with proper amp (see Specifications, Sec. 2). Position the fuse holder such that the appropriate operating voltage appears on top. Return the fuse holder to the fuse compartment and close the access door. Check the window of the fuse compartment to make sure that it shows the appropriate voltage. If not, the fuse holder is upside down and must be turned around before attempting to operate the Genomax.

11.0 WARRANTY

Spex SamplePrep guarantees its products against defects in materials or workmanship for one (1) year from the date of original shipment. Repairs, replacements, or parts are guaranteed for 30 days or for the remaining original warranty period (whichever is greater) for the item that was repaired or replaced. Items not produced by Spex SamplePrep carry the manufacturer's warranty only.

The warranty excludes wear parts. These are parts that wear out through use and must be replaced periodically for proper operation. Genomax wear parts include the timing belt, gas springs, #2059 clamp base, #2051 clamp and #2052 clamp. If these or other parts require service, please contact Spex SamplePrep to arrange a return shipment.

Wear Parts	
Part Number	Description
#50174	Timing Belt
#51227	Gas Spring
#2059	Clamp Base
#2051	Multi-Purpose Clamp
#2052	Titer Plate Clamp

The customer pays return freight for warranty claims. If the warranty claim is valid, Spex SamplePrep will pay return freight to the customer. However, Spex SamplePrep reserves the right to judge whether a malfunction during the warranty period is due to defects in materials or workmanship, or to wear, negligence, or misuse.

11.1 Product Specifications

Every effort has been made to provide complete and accurate product operation and information in this manual. However, since specifications are subject to change without notice, changes may be made from time to time to improve the performance of the product. Therefore, slight changes that are not reflected in the current illustrations should be considered minor and inconsequential for the purposes of this operating manual.

11.2 To Arrange a Return Shipment

We want you to be happy with whatever you purchase from Spex SamplePrep. Please bring any problem to our attention, but please DO NOT RETURN any item before contacting us for a Return Authorization Number and instructions. Unauthorized returns will be refused. Cost for all return transportation is the responsibility of the customer. Credit for returned merchandise will be issued only after goods have been received and inspected. Returned goods are subject to a 25% restocking charge.

12.0 INSTRUMENT DISPOSAL

In accordance with the EU Directive 2012/19/EU covering Waste Electrical and Electronic Equipment, all equipment with the disposal symbol must not be disposed of with general waste. (See Figure 21)

Throughout the European Community, guidelines regarding disposal regulations may vary from territory to territory. Please contact the national legislation or local authority for more information on proper disposal of all equipment with this symbol. The disposal label is located on the back of unit.

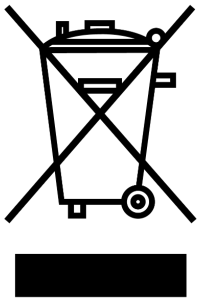


Figure 21

13.0 CONTACT US

Within the United States, contact us at 732-623-0465, fax 732-906-2492, sampleprep@antylia.com, or spexsampleprep.com.

Outside the United States, contact the Spex SamplePrep representative from whom you purchased your equipment.

Spex SamplePrep is an Antylia Scientific company.