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2000 Geno/Grinder™

OPERATING MANUAL

(Serial Number 03000 and Higher)

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1.0 INTRODUCTION

The Geno/Grinder™ is designed to effectively disrupt cellular materials by oscillating two deep-well Titer Plates vertically. This motion allows the unit to be used to prepare sample tissue for extractions of nucleic acid, protein, and other constituents by shaking the tissue, steel balls and a buffering agent together in each well of the titer plate.

Operation is simple: the titer plates are secured in a clamp, and the cabinet lid closed and locked. The controls are checked for the proper running time and stroke rate, and the START button pushed. When the run is complete, the lid is lifted and the titer plates unclamped. (Running times are typically less than two minutes.)

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 plate format using a ball mill that mechanically disrupts the sample. Conventional isolation methodologies can then be used to extract the nucleic acids from the homogenates.

In seed processing, the efficiency of seed disruption is dependent upon the type of ball mill used in the grinding process. Standard bead mills adapted to multi-well plates are modeled after paint shakers and move the plates in a “figure-eight” motion. This motion does not lead to uniform disruption from well to well of the Titer plate.

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

Features of the Geno/Grinder include: stroke-rate settings between 500 and 2000 strokes per minute; a timer which displays both the full timer setting and the minutes and seconds left in a run; and a secure clamp with locking tabs and adjustable clamp height.

Each Geno/Grinder is supplied with four 96-well titer plates, a set of spacers to adjust the fit of the titer plates in the clamp, and a dispenser that can deposit one 5/32” ball at a time in each well of a 96-well titer plate.

Sample Containers

While the Geno/Grinder clamp is designed to hold two standard deep-well titer plates, it can adapt to anything of the same general dimensions (5 in. long x 3 in. wide x 2 in. high). This includes titer plates with fewer and/or larger wells, racks that hold multiple individual vials, and other possible configurations. The Geno/Grinder is supplied with height adjustment spacers of different thickness to accommodate different sample holders with heights up to 2¼ inches.

2.0 SPECIFICATIONS

Type of Grinder: Reciprocating, impact grinder

Grinding Mechanism: Grinding Balls of Stainless Steel, or Silica Beads

Dimensions: 20.5 in. (52 cm) wide x 16.9 in. (43 cm) deep x 22 in. (56 cm) high

Weight: 150 lbs. (67.5 Kg) Shipping Weight, 140 lbs (63 Kg) Unit Weight

Capacity: Two standard deep-well 96-well titer plates, each 3.4 x 5 in. (8.6 x 12.7 cm)

Clamp speed: Adjustable in two ranges: 500-1000 & 1000-2000 strokes/min.

!! WARNING !! When using plastic Titer Plates with metal grinding balls, NEVER EXCEED 1700 strokes/minute.

Clamp travel: 1.25 in. (3.2 cm)

Electrical Specifications: CE Approved, available in 115V/60HZ or 230V/50HZ models

Cord: 115V 60HZ version, 3-prong grounded plug supplied.
230V 50HZ version, 2-prong European plug supplied.

NOTE: Operator is responsible for supplying alternate line cord/plug if required.

Fuse: 8 Amp, Slow-Blow Fuse for 115V/60Hz version,
5 Amp, Slow-Blow Fuse for 230V/50Hz version

Safety Features:

Lid Interlock prevents mill from running if lid is not latched shut.

Hinge Interlock prevents mill from running if lid is open.

Timer: Digital in minutes:seconds, max. 99:59

Motor: 1/2 HP

NOTE: PLEASE DO NOT OPERATE THE GENO/GRINDER UNTIL YOU HAVE READ THESE INSTRUCTIONS AND ARE FAMILIAR WITH ITS CONTROLS AND CLAMP MECHANISM.

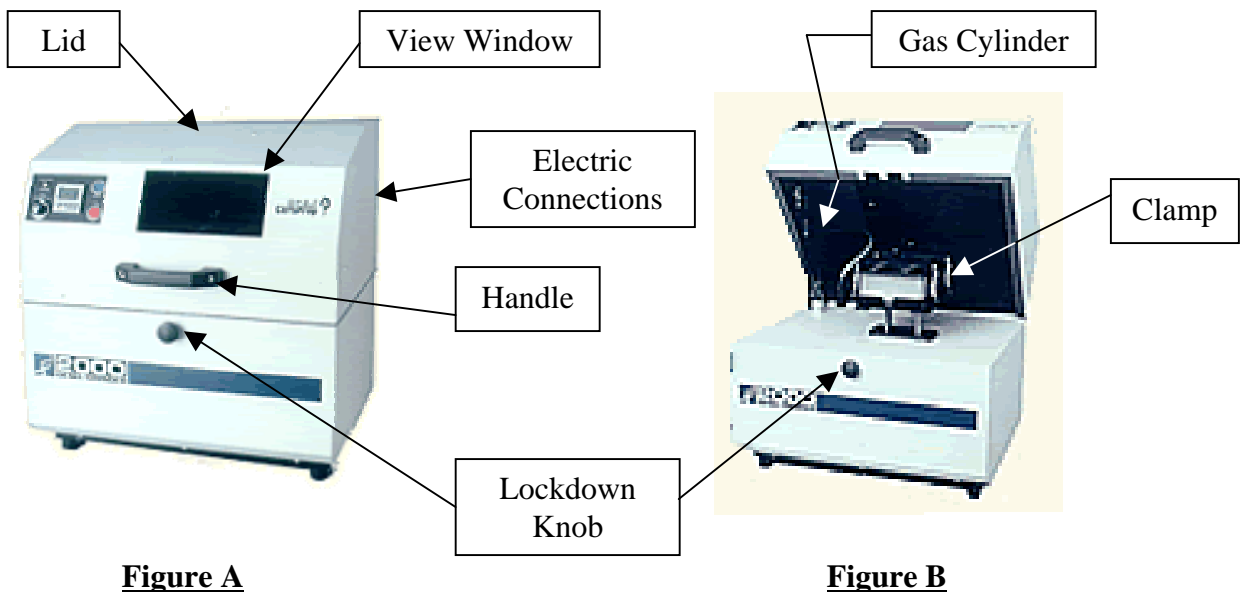
3.0 UNPACKING

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. Open the top of the shipping box. Remove the foamed-in-place packing material by lifting on the retaining plastic sheet. Remove the accessory pack and place nearby. Grasp the Geno/Grinder on both sides (you will need at least two individuals) via the attached lifting straps, using proper lifting techniques to remove the unit from the carton. Place the Geno/Grinder on the bench top. Visually check the machine for any damage that may have occurred during shipping. Inspect the accessory pack and compare with the Packing-List to ensure that there are no parts missing. Carefully remove all packaging/protective material from the clamp area. Carefully tilt the unit to remove the shipping bolts with the lifting straps. **THESE SHIPPING BOLTS MUST BE REMOVED BEFORE OPERATING THE GENO/GRINDER.**

Follow a logical sequence of steps as you inspect the unit (see Figures A & B). For example:

1. Inspect the electrical input module for any visible damage.
2. Inspect the top of the cabinet for any visible damage.
3. Are any of the switches damaged?
4. Open the lid and inspect the interior of the unit.
5. Does the clamp assembly look damaged?
6. Inspect the accessory pack. Compare with the packing list attached to the package. Did you receive what you had ordered?

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



4.0 SETTING UP

Cabinet Setup

To open the cabinet, turn the lockdown knob half a turn counterclockwise, until it clicks. Lift the lid by the handle to its full upright position, and the pneumatic cylinder will hold it there.

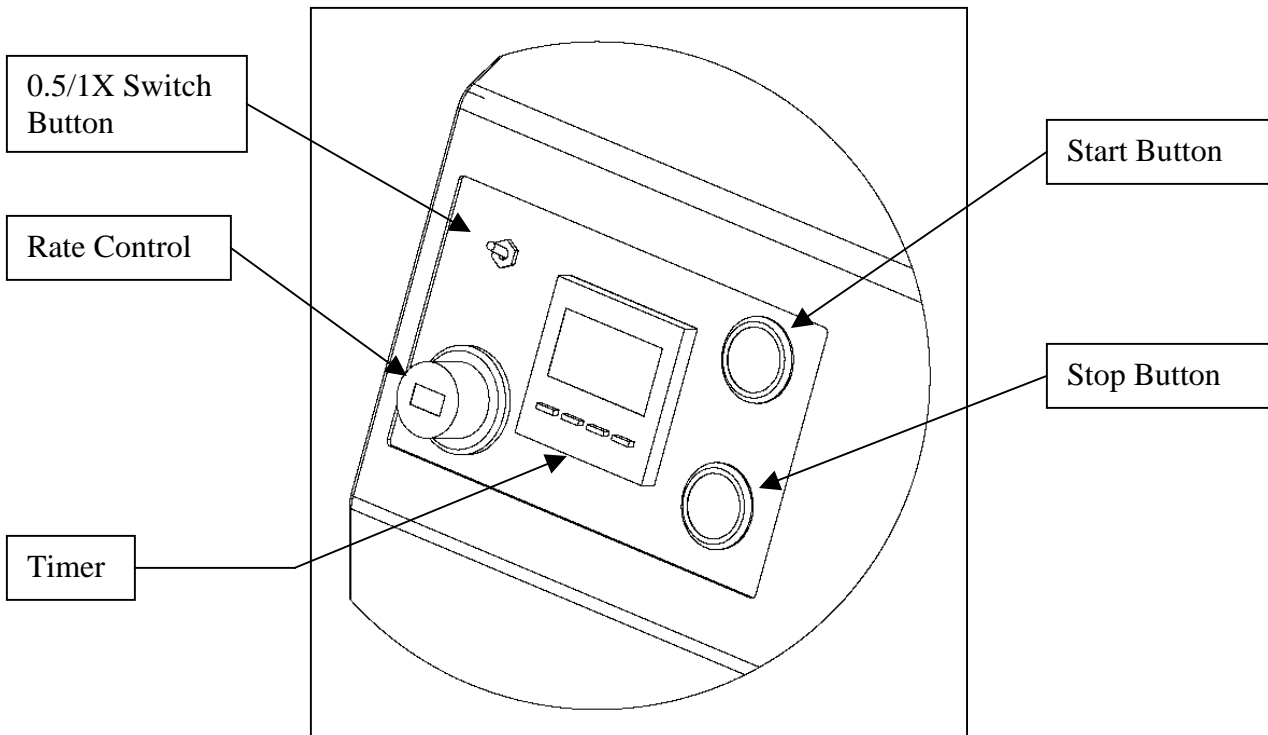
To close the cabinet, grasp the handle and pull the lid down against the resistance of the pneumatic cylinder. When the lid is partway down it moves easily, so hold on to the handle and keep fingers out of the path of the descending lid. To lock the lid down once it is closed, turn the knob clockwise half a turn, until it clicks. Only when the lid is closed and the knob locked can the Geno/Grinder be operated.

There are two safety interlocks that will disable the mill when the lid is open. One is connected to the lid latch, and is only engaged when the knob is locked (turned clockwise to a full stop). The other interlock (Diagram B, item 21) is connected to the lid at its left rear corner, and engages only when the lid is shut. Each switch works independently of the other, but they work together to insure that the lid is both down *and* locked before the mill can be started.

Electrical Hookup

The off/on switch, fuse tray, and power cord receptacle are together on the rear of the Geno/Grinder cabinet base, toward its bottom. The detachable power cord should be plugged firmly into its inlet on the mill, then into an electrical outlet. For 115/60HZ use we recommend a 3-prong outlet fused at 20 amps. The 230V/50HZ Geno/Grinder power cord has a standard European 2-prong plug, but this may have to be modified by the user to meet local electrical codes.

NOTE: The panel on the rear of the cabinet base gives access to the wiring harness connecting the motor to the controls, but it should never be opened unless the Geno/Grinder is first unplugged.



5.0 Controls

The control panel is on the left side of the front of the cabinet lid. The timer is in the center, surrounded by (clockwise from top right) the blue “START” button; the red “STOP” button; the “RATE” (speed) control, and a 0.5/1X switch which selects the speed range.

TIMER: The display shows running times in minute: second format. 01:30 represents one-and-one-half minutes: The lower, smaller group of numbers is the mill’s running time, which stays the same until it is reset by the four buttons immediately underneath the display. The larger, upper group of numbers is the time left in a run: this is identical to the smaller numbers below until the mill is started, at which point the larger-number group counts *down* to zero (the end of the run), then re-sets.

The four timer-setting buttons operate one to a numeral, and each button scrolls the numeral in its control from 0 to 9. To set a running time of 12:35 from 00:00 requires all four buttons to be pushed. The three buttons in the lowest row labeled re-set, mode, and display are disabled and have no function in the Geno/Grinder’s operation.

The timer display is on whether the Geno/Grinder is plugged in and switched on or not, as it is powered by a ten-year lithium battery. The timer display is backlit when the Geno/Grinder is powered on.

***NOTE:** because the up-and-down motion of the Geno/Grinder is so energetic, typical running times range from 10 seconds to 2 minutes, and the left-hand (10-minute) timer button is unlikely ever to be used.*

5.0 Controls

Timer
(Cont'd)

START AND STOP BUTTONS: Pushing the blue START button will start the Geno/Grinder in its timed run. Pushing the red STOP button will shut off the mill when it is running, and reset the timer. Normally the STOP button is used only in an emergency, or when you are test-running the mill for a short period and don't want to re-set the timer.

RATE CONTROL KNOB AND SWITCH: The rim the knob is turned to change the setting of its three-digit readout, which sets the rate of strokes per minute. The stroke rate is raised by turning the knob clockwise, and lowered by turning the knob counterclockwise. Stroke speed can be pre-set, or adjusted during a run by the knob. One stroke is a complete up-and-down movement of the clamp.

IMPORTANT: FOR THE TRUE STROKE RATE, ADD ONE THOUSAND TO THE THREE-DIGIT READOUT OF THE SPEED CONTROL KNOB AT 1X SETTING.

A readout of 400 at the 1X Setting is in fact a stroke setting of 1400 per minute. If the knob is turned all the way counterclockwise it will read 000, a stroke setting of 1000. If the knob is turned all the way clockwise it will also read 000, but that is a stroke setting of 2000, the highest possible clamp speed for the Geno/Grinder. ***WE RECOMMEND A STROKE SPEED BETWEEN 1000 AND 1700. NEVER EXCEED 1700 strokes/minute with plastic titer plates and metal grinding balls! Beyond 1700 strokes/minute, the metal balls will crack the bottoms of the plastic titer plates.***

For stroke speeds below 1000, use the 0.5 X toggle switch position to cut the displayed stroke speed in half. This toggle switch, on the control panel immediately above the stroke readout knob, is usually left in its down position, at "1 X RATE." In this position a readout of 600 represents an actual stroke rate of 1600 per minute. When flipped up to the "0.5 X RATE" position this switch cuts the stroke speed in half, so that a readout of 600 now represents a stroke rate of 800 per minute. **NOTE:** Do not use the toggle switch during a run. The minimum clamp speed for the Geno/Grinder is a stroke rate of 500, which would be set by turning the rate control knob counterclockwise to 000 (a setting of 1000) and flipping the toggle switch up to the 0.5 X position.

5.0 CONTROLS

(Cont'd)

CLAMP: The clamp is the most critical part of the Geno/Grinder, as it must be carefully adjusted to hold the titer plates firmly in place. The up-and-down motion of the clamp is extremely vigorous.

NOTE: *Never run the Geno/Grinder with the clamp unfastened, or with titer plates held loosely in the clamp. Damage and leakage will result. If you are processing samples in only one titer plate, load an empty titer plate snugly in the other clamp.*

Diagram C (page 18) is an exploded view of the full clamp mechanism, including two titer plates and all the spacers used to hold them tightly in place. The number of spacers actually used depends on the height of the titer plates. From the top down, Diagram “C” shows: clamp lids, titer plates, assorted spacers, a divider tray, and the clamp base plate that includes four snap-down latches with security locks.

Each of the two clamp lids has a curved strike plate at either end; the strike plate engages the bar at the top of the matching snap-down latch.

Titer plates are made by many companies and are sealed in various ways. The Geno/Grinder is designed for use with the vast majority of currently available Titer Plates. Plates can be sealed using a variety of formats. For PCR, DNA/RNA work we suggest a heat sealer, so as to minimize the possibility of contamination between wells.

For any titer plate seal to perform its job while the Geno/Grinder is running, the fit of the clamps must be very snug. The clamps themselves are not adjustable. The only way to adjust the fit of the titer plates in the clamping mechanism is by adding or removing spacers underneath the plates. Pairs of spacers are included with each Geno/Grinder in four thicknesses: 1/32”, 1/16”, 1/8”, and 1/4”. Extra spacers are available if needed.

The divider tray fits into the clamp base plate and locates each titer plate precisely. The spacers are placed on the divider tray, under the titer plates.

With the titer plates properly shimmed by spacers, the snap-down latches will snugly engage the curved strike plates on both ends of the clamp lids. Please note that every snap-down latch incorporates a security lock, which keeps the latch from opening while the Geno/Grinder is running. Those security locks are tabs that must be pushed in for each latch to be opened.

6.0 OPERATION

Before you operate your Geno/Grinder, we recommend going through several “dry runs” to become familiar with the mill’s clamp and controls. A full operational cycle consists of:

- 1) Loading and sealing the titer plates.
- 2) Clamping the titer plates in place.
- 3) Setting the clamp stroke rate.
- 4) Setting the timer.
- 5) Locking down the lid.
- 6) Running the Geno/Grinder.
- 7) Unlocking the lid and unclamping the titer plates.

Before operating the Geno/Mill, make sure it is plugged in and switched on. The timer display stays on whether there is power to the mill or not.

The power cord inlet is on the rear of the cabinet base, near the bottom, next to the off/on switch and the fuse tray. The off/on switch is a standard rocker switch with symbols 0 (for OFF) and I (for ON).

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 perhaps an eluent, solvent, etc. If it is necessary to disrupt the sample, a grinding element is typically added first. The 2001 Grinding Ball dispenser available for the Geno/Grinder will deposit one 5/32” (4 mm) steel ball layer in each well of the titer plate. Dry grinding may require a second ball in each well, perhaps sandwiching the sample between them.

To use the Grinding Ball Dispenser, fill the tray with more than enough steel balls to cover the bottom, and shake it gently so 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. Put the dispenser aside, and check that a ball is in each well of the titer plate.

Sealing the loaded titer plate is, again, 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 ways of plugging the top of each well. Use the method with which you are most comfortable and confident. What matters most is that the contents of one well do not contaminate the sample in an adjacent well.

2) CLAMPING THE TITER PLATES IN PLACE

Place a loaded, sealed titer plate on each side of the clamp base; if you only need to process one titer plate, place an empty plate on the other side of the clamp. Now place a clamp lid on the top of each titer plate. Flip the clamp catches up to engage the strike plates on both ends of the lid, and then push both catches down. If the titer plates are properly fitted to the clamps, the catches will snap down snugly, and the titer plates will be held firmly in place.

6.0 OPERATION (Cont'd)

If the titer plates are loose, unclamp the lids and add spacers underneath the titer plates. If the titer plates are too tight for the lids to be clamped properly, remove spacers until the fit is correct. We recommend using two ¼" spacers under each Titer Plate when using SPEX 2200 Titer Plates.

Note: Keep in mind that to unfasten a clamp, you must first push in the safety catch. Always unclamp both ends of each lid before removing it.

3) **SETTING THE CLAMP STROKE RATE**

The clamp stroke rate is set with two controls, the rate control knob (with numerical readout in the center) and the 1X/0.5X toggle switch. With the toggle switch down, in the 1X position, the reading on the rate control knob is the actual stroke rate in up-and-down cycles per minute, *plus 1000*. Hence a rate control knob setting of 300 equals a stroke rate of 1300. If with this setting you flip the toggle switch up to the 0.5X position, the stroke rate is now 650. The stroke rate can be increased by turning the rate control knob clockwise, or decreased by turning that knob counterclockwise. The readout will change as the knob is turned. The stroke speed can be changed with the knob while the Geno/Grinder is running, by turning the rate control knob. (Never flip the 1X/0.5X toggle switch during a run.)

The minimum clamp stroke rate is 500, the maximum 2000. A stroke rate of 500 is set by turning the rate control knob counterclockwise to 000 (actual setting: 1000) and setting the toggle switch at 0.5X. A stroke rate of 2000 is set by turning the rate control knob clockwise to 000 (actual setting: 2000) with the toggle switch in the 1X position.

NOTE: Please note that we do not recommend setting the stroke rate above 1500 (knob setting 500, toggle switch on 1X).

► **WARNING** ◀

NEVER EXCEED A STROKE RATE OF 1700 when using plastic titer plates with metal grinding balls!

4) **SETTING THE TIMER**

Set the running time with the four unmarked buttons underneath the timer display. Each button controls one digit of the four-digit display, which is in minutes and seconds (01:40 = one minute and forty seconds).

Once set, the timer retains its setting indefinitely, as it has a back-up battery good for ten years. The timer display is always on whether the mill is switched on or not. When the mill is not switched on, the backlight is off but the timer setting can still be changed, although the response takes several seconds.

The timer displays two groups of numbers, one large, and one small. When you set the running time, both groups of numbers are the same numbers. When the mill is running, the larger group counts down the minutes and seconds remaining in a run, and the smaller group retains the full timer setting.

6.0 OPERATION (Cont'd)

Each of the four buttons changes only one digit in the full timer display. If you keep pushing one button, it will advance one digit from 0 to 9 and then back. For example: to set a running time of one minute and thirty seconds (01:30 in the display), push the third button from the right once to set one minute (01:00). Now push the second button from the right three times to add the seconds (01:30).

A reminder: because the action of the Geno/Grinder is so energetic and efficient, running times are short, typically from ten seconds to two minutes. If you are developing a procedure, always start with a short milling time and increase it only if needed.

5) LOCKING DOWN THE LID

Lower the lid by slowly pulling down the handle, to overcome the push from the gas cylinder that props the lid open. In its descent the lid will move more freely. It is important to control the descent of the lid, so don't let go of the handle or put your fingers on the lip of the cabinet.

When the lid is shut, turn the lockdown knob clockwise until it clicks into place. This will engage the safety switch and allow the Geno/Grinder to be started.

6) RUNNING THE GENO/GRINDER

Push the START button. It will be obvious when the mill is running. If you are unsure that the clamp mechanism is moving freely, visually observe the mechanism through the observation window during a run. Note that the timer's larger number display counts down the time left in a run.

If the Geno/Grinder does not run when the START button is pushed, make sure the mill is plugged in, and switched on via the rocker switch on the back of the cabinet. If so, check again that the lockdown knob is turned all the way to the right and locked. See troubleshooting section on page 21.

7) UNLOCKING THE LID AND UNCLAMPING THE TITER PLATES

When the timer counts down to zero, the Geno/Grinder will stop, and the timer will re-set automatically.

Turn the lockdown knob counterclockwise until it clicks in place. Grasp the handle and lift the lid to its full upright position. The pneumatic cylinder will keep the lid up.

Unlatch the clamps one titer plate at a time. This works most easily if both clamps holding down one titer plate are unlatched and released more or less together. Remember that each clamp has a safety lock, and a tab that must be pushed in for the clamp to unlatch. When both clamps on one lid are loosened, slip the clamps off both strike plates and lift the lid. Then remove the titer plate.

If you have any questions about the OPERATION, MAINTENANCE, or SERVICE of your 2000 GENO/GRINDER, please call SPEX CertiPrep at 1-800-522-7739 or 732-549-7144 Extension 465.

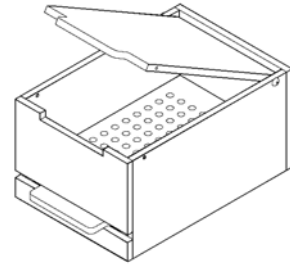
2000 Geno/Grinder

7.0 Accessories For the Model 2000 Geno/Grinder

(If not included in your Order, they are Available for Purchase at Additional Cost)

2100 Grinding Ball Dispenser

This dispenser deposits one 5/32" grinding ball into each well of the #2200, 96-well titer plate listed below.



2150 Grinding Balls 5/32" (4mm)

Sold in bags of 5,000. Made of 440C Stainless Steel.

2160 Silica Grinding Beads, 200g (800-1000um)

2161 Silica Grinding Beads, 200g

Molecular Biology Grade (800-1000um)



2165 Silica Grinding Beads, 200g (400-600um)

2166 Silica Grinding Beads, 200g

Molecular Biology Grade (400-600um)



2170 Silica Resin, 200g (100-400um)

2171 Silica Resin, 200g

Molecular Biology Grade (100-400um)



2180 Zirconium Grinding Beads, 250g

Molecular Biology Grade (200-400um)

**To Order any
of these
accessories, call
Customer
Service at 800-
522-7739 or
732-549-7144**

2200-100 (100/cs) 96-Well Titer Plate

Polypropylene Deep Well Plates have 96 2.4 ml volume wells with a 2.0 ml working volume. Round bottom wells with alphanumeric designations. This plate has proved effective in many Geno/Grinder applications.



2201-10 (10/cs) Cap-Mats

Sealing "mats" for use with #2200, 96-well titer plate listed above.
Sold in cases of 10 mats.



8.0 MAINTENANCE

The 2000 Geno/Grinder has been designed to provide trouble-free operation over a long period of time. To assure proper performance, perhaps the most important factor is cleanliness. Any spills should be wiped up immediately.

The 2000 Geno/Grinder cabinet is made of painted steel. The interior as well as the exterior surfaces of the unit is designed to be easily cleaned in case of a sample spill. To maintain the overall appearance of the unit it is a good policy to from time to time, wipe the exterior and interior of the Geno/Grinder with a mild window cleaner or similar product (use a soft non-abrasive cotton cloth).

NOTE: First disconnect the Geno/Grinder, before beginning to clean the unit.

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

The cabinet can be separated from the drive mechanism fairly easily in case of maintenance or repair.

Normally the Geno/Grinder requires no maintenance other than keeping it clean. In the rare case that you may need to service the 2000 Geno/Grinder (e.g. the drive belt breaks) please call SPEX CertiPrep Customer Service at 1-800-522-7739 Ext. 465 for assistance with any questions that you may have.

9.0 PARTS LIST & ITEM LOCATOR

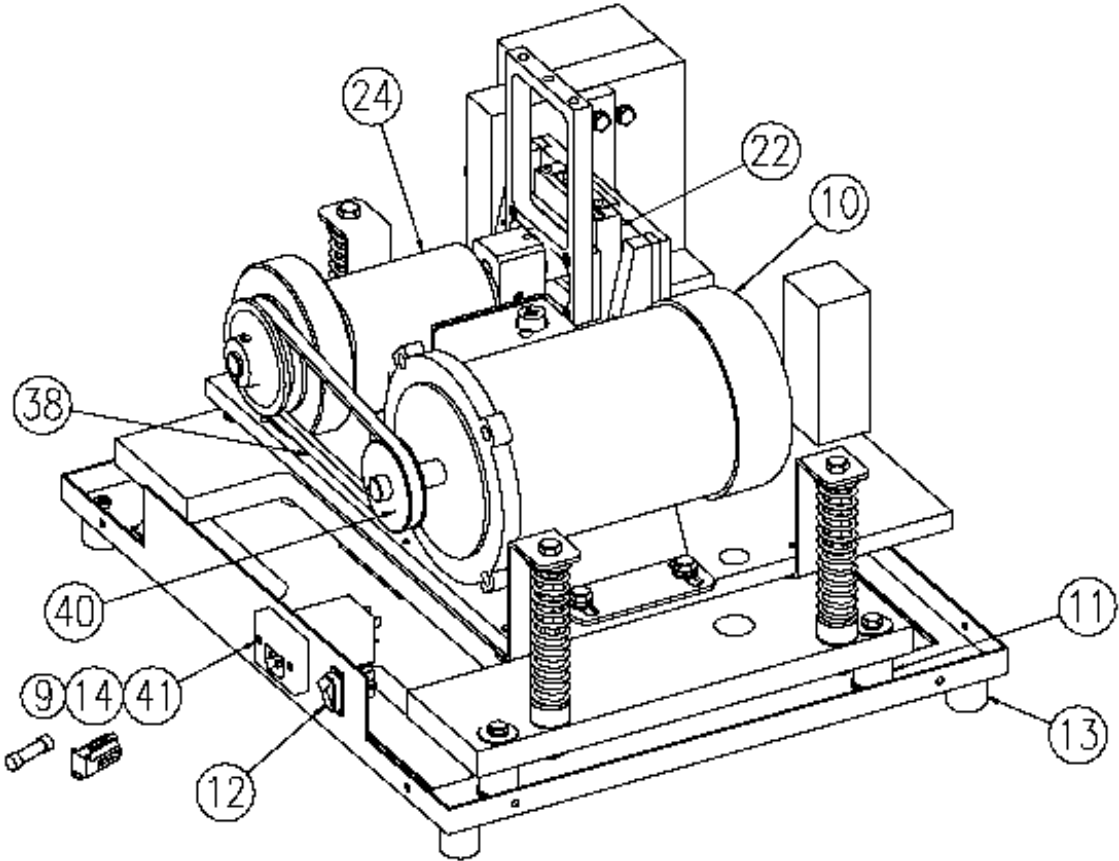
<u>Item</u>	<u>Part No.</u>	<u>Description</u>	<u>Location</u> (Diagram, Page #)
1	2100	Grinding Ball Dispenser	See page 14
2	2150	Grinding Balls, 5/32" Dia.	See page 14
3	2200	96 Well Titer Plates (two)	See page 14
4	2201	Cap-Mats	See page 14
5	38886	Spacer 1/32" Thick	C, 18
6	38887	Spacer 1/16" Thick	C, 18
7	38888	Spacer 1/8" Thick	C, 18
8	38889	Spacer 1/4" Thick	C, 18
9	93850	Fuse, 8 Amp 250 Slo, 115V	A, 16
9	93840	Fuse, 5 Amp 250 Slo, 230V	A, 16
10	96270/96271	Motor (115 Volt)/(230Volt)	A, 16
11	50153	Shock Mount	C, 18
12	92703	Power Switch	C, 18
13	93726	Foot (Four/unit), 1/4-20 x 1 OD x 1	C, 18
14	96005	Fuse Holder	A, 16
15	38981	Fan Assembly, 115/220 VAC	B, 17
16	38982	Latch (Ass'y)	B, 17
17	38910	Latch	D, 19
18	38911	Plate, Latch Mount	D, 19
19	92677	Micro Switch, SPDT Quick	D, 19
20	92820	Knurled Clamping Knob	B, 17
21	92910	Hinge Switch	B, 17
22	38843	Ball Slide	A, 16
23	38794	Plastic Window	B, 17
24	39038	Crank Assembly	A, 16
25	92654	Red Push Button Switch	B, 17
26	92655	Blue Push Button Switch	B, 17
27	51208	Handle	B, 17
28	38838	Clamp Holder	C, 18

9.0 PARTS LIST & ITEM LOCATOR (Cont'd)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>	<u>Location</u> (Diagram, Page #)
29	38839	Clamp Bracket	C, 18
30	38882	Lid Crossbar	C, 18
31	38883	Insert, Clamp Holder	C, 18
32	38884	Divider	C, 18
33	38836	Clamp Lid (two/unit)	C, 18
34	38885	Rubber Pad (each)	C, 18
35	50594	Spring Catch (Four/unit)	C, 18
36	50595	Strike (Four/unit)	C, 18
37	92791	Knob (two/clamp assembly)	C, 18
38	50123	Drive "V" Belt	A, 16
39	38567	Gas Spring	B, 17
40	51930	Sheave (Motor Pulley)	A, 16
41	96004	AC Module Plug Receptacle	A, 16
42	53166	Timer	B, 17
43	38858	Hinge (Piano Style)	B, 17
44	38881	Complete Clamp Assembly for Titer Plates	B, 17

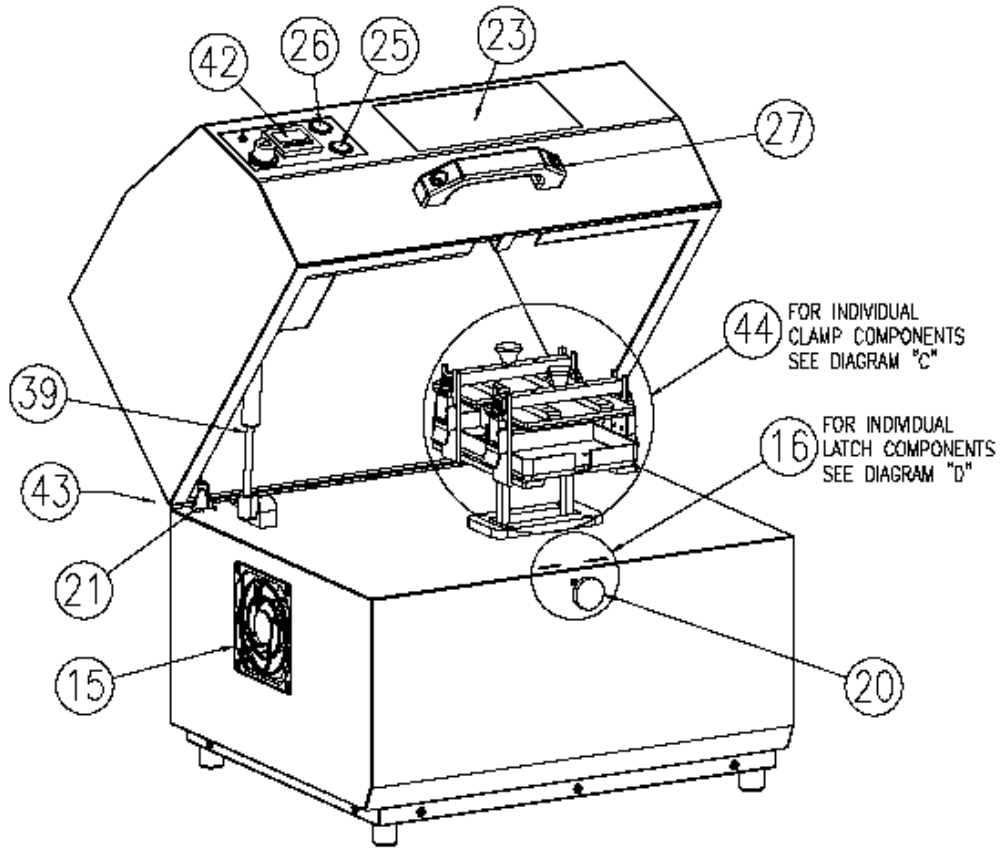
10.0 DIAGRAM A

(view of base plate, motor, and drive mechanism)



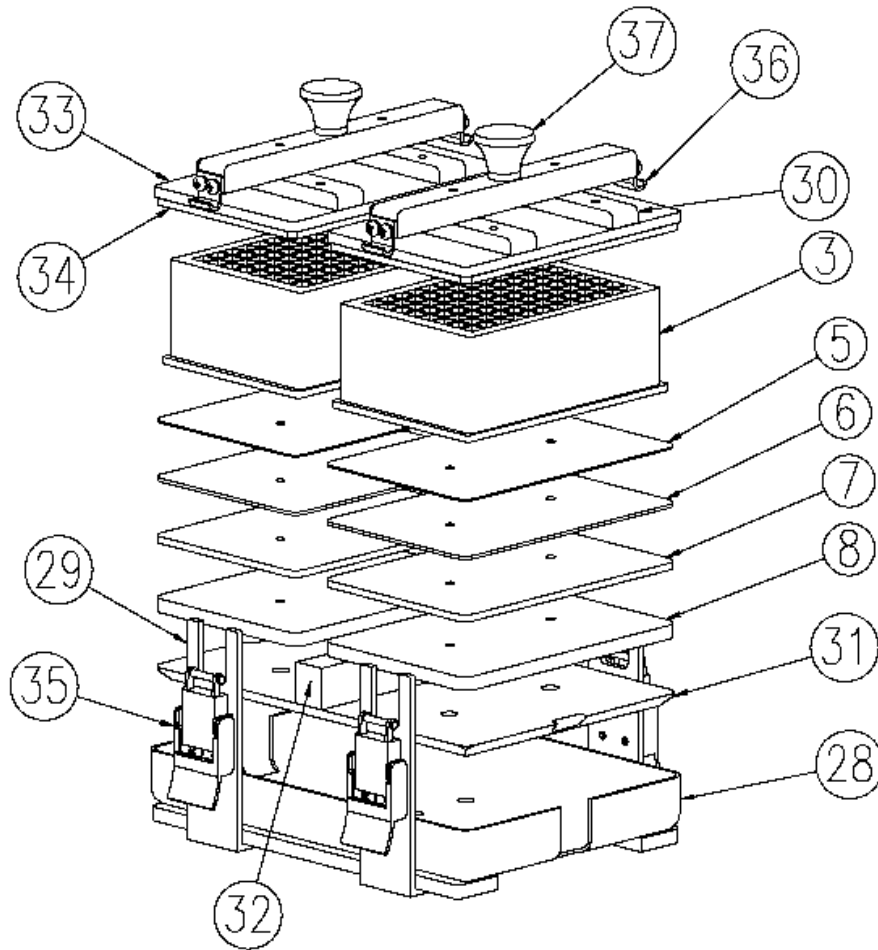
<u>Item</u>	<u>Part #</u>	<u>Description</u>
9	93850	Fuse, 8 Amp 250 Slo, for 115V units
9	93840	Fuse, 5 Amp 250 Slo, for 230V units
10	96280/96281	Motor (115 Volt)/(230Volt)
11	50153	Shock Mount
12	92703	Power Switch
13	93726	Foot (Four/unit), 1/4-20 x 1 OD x 1
14	96005	Fuse Holder
22	38843	Ball Slide
24	39038	Crank Assembly
38	50123	Drive "V" Belt
40	51930	Sheave (Motor Pulley)
41	96004	AC Module Plug Receptacle

10.1 DIAGRAM B
(cabinet, controls, and clamp)



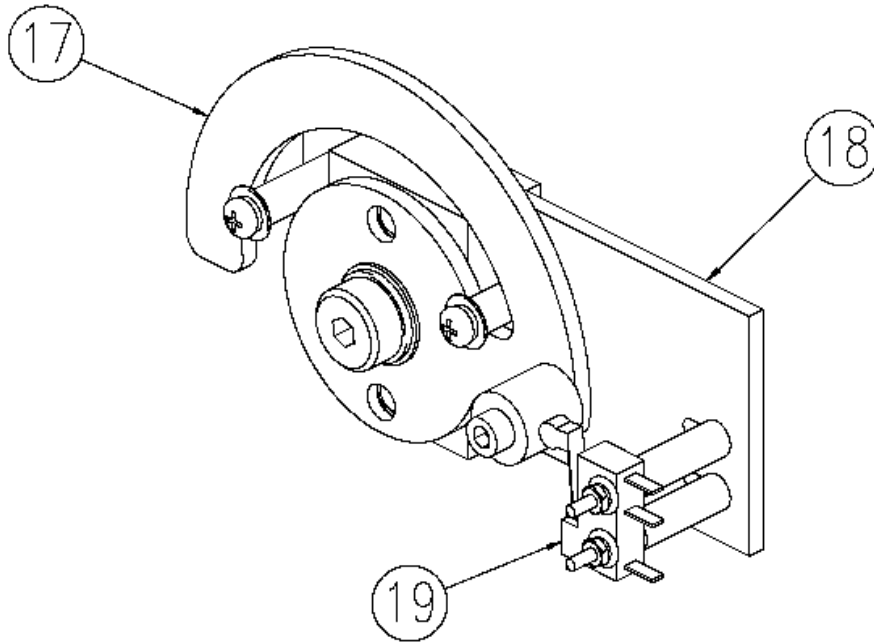
<u>Item</u>	<u>Part #</u>	<u>Description</u>
15	38981	Fan Assembly, 115/220 VAC
16	38982	Latch (Ass'y)
20	92820	Knurled Lockdown (Clamping) Knob
21	92910	Hinge Switch
23	38794	Plastic Window
25	92654	Red Push Button Switch
26	92655	Blue Push Button Switch
27	51208	Handle
39	38567	Gas Spring
42	53166	Timer
43	38858	Hinge (Piano Style)
44	38881	Complete Clamp Assembly for Titer Plates

10.2 DIAGRAM C
(clamp assembly)



<u>Item</u>	<u>Part #</u>	<u>Description</u>
3	2200	96 Well Titer Plates (two)
5	38886	Spacer 1/32" Thick
6	38887	Spacer 1/16" Thick
7	38888	Spacer 1/8" Thick
8	38889	Spacer 1/4" Thick
28	38838	Clamp Holder
29	38839	Clamp Bracket
30	38882	Lid Crossbar
31	38883	Insert, Clamp Holder
32	38884	Divider
33	38836	Clamp Lid (two/unit)
34	38885	Rubber Pad (each)
35	50594	Spring Catch (Four/unit)
36	50595	Strike (Four/unit)
37	92791	Knob (two/clamp assembly)

10.3 DIAGRAM "D"
(view of internal lid latch assembly)



<u>Item</u>	<u>Part #</u>	<u>Description</u>
17	38910	Latch
18	38911	Latch Mounting Plate
19	92677	Micro Switch, SPDT Quick

11.0 TROUBLESHOOTING GUIDE

	<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
1	The unit does not turn ON	Power cord unplugged	Plug in power cord
2	The unit does not turn ON	Outlet dead	Check outlet for power and correct as required
3	The unit does not turn ON	Blown fuse	Replace fuse
4	The unit does not turn ON	Repeatedly Blows fuse	RTF*
5	The unit does not turn ON	Power switch off	Turn power switch on
6	The unit does not RUN	Hinge Latch not engaged	Check alignment of lid with cabinet body
7	The unit does not RUN	Front Latch not engaged	Lock front latch
8	The unit does not RUN	Motor harness disconnected	Connect Motor harness
9	The unit does not RUN	Motor not powered	Replace motor controller
10	The unit does not turn OFF unless the Lid is open	Front micro switch jammed opened	Replace front latch switch
11	The unit does not turn OFF unless the Lid is open	Control board malfunction	Replace control board
12	The unit turns on but doesn't run	Disconnected Harness	Reconnect Drive Harness
13	The unit rattles and shakes	Crank Assembly loose	Tighten or replace (RTF*)
14	The unit rattles and shakes	Bearing Ass'y loose	Repair/replace – RTF*
15	The unit rattles and shakes & clamp assembly moves around	Bearing Assembly broken	Replace linear bearing assembly – RTF*
16	The unit vibrates excessively	Shipping Bolts in place	Remove Shipping Bolts
17	The motor runs but clamp doesn't move	Drive belt is broken	Replace Drive Belt
18	Clamp Assembly is broken	Shipping or fatigue damage	Replace or RTF*

***RTF**=Return to Factory for repair

12.0 WARRANTY

SPEX CertiPrep Inc. guarantees its products and new equipment against defects in materials or workmanship for two years 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 CertiPrep carry the manufacturer's warranty only.

12.1 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.

12.3 To Arrange A Return Shipment

We want you to be happy with whatever you purchase from SPEX CertiPrep. 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 up to a maximum of \$200.00.

To Contact Us

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