ENVIRO–GENIE®

OPERATING INSTRUCTIONS
Models SI–1200 through SI–1205

Scientific Industries, Inc.

U.S. PAT 5,918,979
U.S. PAT 6,962,433

ENVIRO-GENIE®

Environmentally Controlled Benchtop 5-in-1 Refrigerator / Incubator / Rotator / Rocker / Stirrer

The **Enviro-Genie** is a Refrigerator / Incubator / Rotator / Rocker / Stirrer for the study of micro-organisms and tissue cell growth under strictly controlled conditions of temperature and agitation. Designed to provide the security of precise temperature control and uniformity for demanding incubation/refrigeration applications without taking up a great deal of space. It performs membrane-based assays/washings and hybridizations more efficiently. Chamber air is gently and continuously circulating at a rate that ensures the temperature consistency and uniformity of all test samples. Shatter resistant viewing window allows for inspection of samples without affecting the chamber environment.

Microprocessor control easily achieves desired rotating, rocking, and stirring speed; temperature; and time; all of which are shown on a large, easy to read display for accurate reproducible conditions. Visible and audible alarms for both temperature and time.

FEATURES:
- 4°C to 75°C precise temperature range
- Thermo-electric (Peltier) refrigeration & heating – no compressor
- Microprocessor controls allow for accurate, reproducible conditions
- Economical, space saving, and secure

SPECIFICATIONS:
Temperature and Settings
- Heating to 75°C
- Cooling to 4°C
- Accuracy ±0.2°C
- Uniformity ±0.5°C
- Resolution 0.1°C
- Stability ±0.1°C
- Time: Programmable to 99 hours
- Alarms: Visible & audible, temp & time

2-Year Warranty

Rocking
- 2-70 cycles per minute

Rotating
- 1-35 RPM

Stirring
- Capacity: 2 containers (up to I liter each)
- Speed: 1-1000 RPM
- Stir Reversing: variable for 1-60 seconds

Size
- Overall: 495mm x 622mm x 366mm (19.5" x 24.5"x 14.5")
- Chamber: 254mm x 362mm x 260mm (10" x 14.25" x 10.25")
- Chamber Volume: 24 Liters

Electrical
- 120 Volt AC, 5 Amp (SI-1200)
- 230 Volt AC, 2.5 Amp (SI-1201, SI-1202, SI-1203, SI-1204)
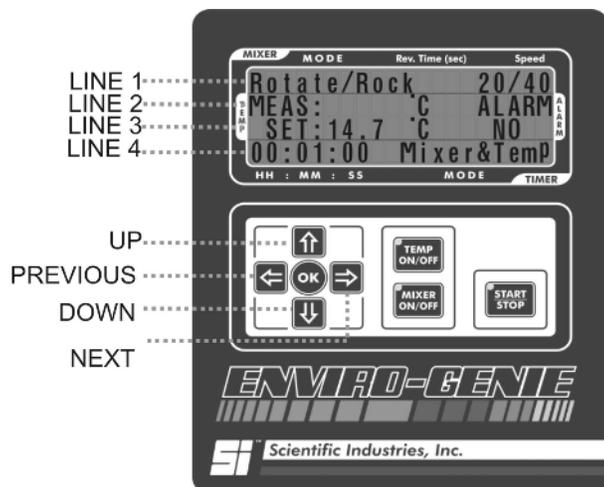- 100 Volt AC 5 Amp (SI-1205)

(Nominal voltages not to vary by more than 10%)

This symbol on ⚠ the **Enviro-Genie** means: Attention: Refer to accompanying documents.

OPERATING INSTRUCTIONS

⚠ CAUTION! Failure to follow operating instructions can compromise the user's safety.

BUTTON FUNCTIONS

UP and **DOWN** buttons are used for:
- Moving through the menu
- Changing parameter value

OK button is used for:
- Selecting a menu from the display
- Confirming a chosen parameter value and leaving the current menu

NEXT button is used for going to the next parameter of the current line.
PREVIOUS button is used for returning to a previous parameter of the current line.
MIXER ON/OFF button is used for starting/stopping the mixer.
TEMP ON/OFF button is used for starting/stopping the temperature regulator.
START/STOP button is used for starting/stopping the timer.

DISPLAY CONTENTS

Power on the **Enviro-Genie** (front rocker switch below the control panel). The display will show the following:

After 5 seconds the display will show:

LINE 1 PARAMETERS

MIXER MODES
The Enviro-Genie has 4 Mixer Modes.
STIRRER
STIRRER/REV
ROTATE/ROCK
OFF (Environmental Chamber - no mixing)

REV. TIME
Displayed only when the Mixer Mode is **STIRRER/REV** and programs the reverse stirring time in seconds.

SPEED
STIRRER or **STIRRER/REV MODE:** display shows XXX revolutions per minute.
ROTATE/ROCK MODE: display shows XX/XX – the first set of values are for Rotate and the second set for Rock.
OFF: display is blank.

LINE 2 PARAMETERS

MEAS: display shows XX.X - the current temperature in the environmental chamber.

LINE 3 PARAMETERS

SET: display shows XX.X – the desired temperature in the environmental chamber.

ALARM: display shows ±1°C thru ±9°C or NO. Alarm will sound if the chamber temperature deviates from your set temperature by the tolerance selected or will not sound if the alarm is disabled (NO).

LINE 4 PARAMETERS

TIME: display shows XX.XX.XX – the desired time in hours, minutes, seconds – counts down when cycle is started pressing ON/OFF button.

TIMER MODES

The **Enviro-Genie** has 4 Timer Modes:
OFF – expiration of time does not stop the mixer function or temperature regulation.
MIXER ONLY - expiration of time stops the mixer function.
TEMP ONLY – expiration of time stops the temperature regulation.
MIXER/TEMP – expiration of time stops both the mixer function and temperature regulation.

RANGE OF PARAMETER CHANGE

TIME: 00:00 to 99:59 in 1 minute increments.
REV TIME: 1 to 60 seconds in 1 second increments.
TEMP: 4.0° to 75.0°C in 0.1°C increments.
SPEED: STIRRER and **STIRRER/REV** modes –
1 to 1000 in 1 RPM increments (1-10) and 10 RPM increments (10-1000) .
ROTATE/ROCK mode - 1/2 to 35/70 in increments of 1.

MIXER OPERATION

The mixer can be turned on by pressing the **MIXER ON/OFF** button or the **START/STOP** button (if parameters are set).
The mixer can be stopped by pressing the **MIXER ON/OFF** button or, if the time parameter expires, the unit will turn off automatically. While the mixer is not working, the **MIXER ON/OFF** button LED will not be lighted.

TEMPERATURE REGULATOR OPERATION

Temperature regulation can be turned ON/OFF by pressing the **TEMP ON/OFF** button or the **START/STOP** button. While the temperature regulation is working, the **TEMP ON/OFF** LED will be GREEN.
After the desired temperature has been reached, should the temperature deviate from the range set in the **ALARM** parameter, the **TEMP ON/OFF** LED will turn RED and the alarm will sound every 60 seconds. Once the desired temperature is achieved again, the LED will turn GREEN and the alarm will stop.

TIMER OPERATION

Timer can be switched on only by pressing the **START/STOP** button. While the timer is working, the **START/STOP** LED is GREEN. After the set time has expired, the **START/STOP** LED will blink and an alarm will sound every 15 seconds. The time parameter will start to accumulate and represent the amount of time that has expired since the set time elapsed.
Pressing the **START/STOP** button will stop the time from accumulating, the **START/STOP** LED will turn off and the time display will show the last value set in the time parameter.

CALIBRATION MODE

This section applies ONLY to units with firmware version 1.20 and under. For units with version 1.21 or higher, see the "Calibration and PC Connection Manual" for calibration instructions. This manual may be viewed or downloaded from scientificindustries.com.

The **Enviro-Genie** is electronically factory calibrated and should not need calibration, nor is it recommended. However, should the need arise, the unit may be calibrated, as follows:

In order to calibrate, you will need to make an independent measurement of the chamber temperature. Make sure the thermometer is accurate! Generally speaking, glass thermometers found around the lab will be less accurate than your **Enviro-Genie**. Good, certified glass or digital

thermometers are available from laboratory supply dealers. A thermocouple wire may be passed through the door seal and will not affect performance.

Measure the temperature in the chamber via the lab thermometer, after chamber temperature has been allowed to settle for twenty minutes. Note the difference in temperature between **Enviro-Genie** displayed temperature and your lab thermometer temperature (ex. Enviro-Genie display reads 37.5°C, lab thermometer reads 37.0°C; difference is –0.5°C). This difference is the calibration value to be entered.

To access the calibration menu, turn the unit OFF.

Press and hold the **PREVIOUS** button while simultaneously turning the unit ON.

The parameters on the display show:
MEAS: XX.X – current temperature in the chamber read by regulatory temperature sensor.
SET: XX.X – calibration temperature setting in °C.
OFFSET: X.X – offset from the temperature setting.

The cursor on the display will blink at the value of the **SET** calibration point. Use the **UP** and **DOWN** buttons to adjust your desired **SET** point. After pressing the **OK** button, the temperature regulator will turn on and the cursor on the display will blink at the value of the **OFFSET** point. Wait until the **MEAS** and **SET** values are equal (approximately 20 minutes). Compare the temperature read by the unit temperature sensor, **MEAS**, and the temperature read by the lab thermometer. If the two values are different, adjust the **OFFSET**, using the **UP** and **DOWN** buttons, to make them equal. Wait 20 minutes. Repeat this procedure until the temperature sensor reading equals the lab thermometer reading.
Press the **OK** button. The display will move to the next menu.
Use the **UP** and **DOWN** buttons to choose:

SAVE&EXIT, EXIT or **RESTORE FACTORY**.
SAVE&EXIT saves the current value of the set temperature offset.
EXIT saves the old offset .
RESTORE FACTORY resets the set offset.
After pressing the **OK** button, the device restarts and goes to a normal working mode.

If the **OFFSET** is 0 °C , the display (top right) shows **FACTORY.** If the **OFFSET** is a value other than 0 °C, the display shows **USER**.

RANGE OF OFFSET
−2 to +2 °C in 0.1 °C increments.

MIXING MODES

MAGNETIC STIRRING

Enviro-Genie comes equipped with two magnetic stirring platforms, located at the bottom of the chamber. The stirrers are centered on the raised portions of the chamber bottom. The stirrers both operate at the same settings at all times. In general, the highest speeds can only be achieved with smaller stir bars with non-viscous liquids.

If Rotating/Rocking Magnetic Platform is installed remove the platform prior to using magnetic stirrers (see rotating/rocking).

STIR REVERSE

Enabling "Stir Reverse" causes the stir bar to reverse direction at a rate set by the user. The stir bar is gently ramped down in speed to a stop, then ramped up to speed in the opposite direction. Time between reversing is adjustable from 1 to 60 seconds.
NOTE: If a very short stir reversing time is used in conjunction with a very fast stir speed, the commanded speed may not be attained. The system will not have time to ramp up to speed.

ROTATE/ROCK

Enviro-Genie comes equipped with a magnetic platform that is used for rotating and rocking. Installing/removing the magnetic platform is easy, but may take a few times to get used to. Try the following technique:

Install the magnetic platform by first unscrewing the lock shaft until the end of the lock shaft is flush with the right hand sidewall of the inside of the chamber.

Grab the magnetic platform with the label side up, so that you can read the label. Hold the platform in the chamber and insert the hex shaft on the left side of the chamber into the hex hole in the magnetic platform. You may need to rotate the platform slightly to align the shaft with the hole.

Now hold up the right side of the platform, while depressing the blue lock release. Screw the lock shaft into the hole in the magnetic platform making sure the blue lock release is depressed. When the lock shaft is screwed all the way in, let go of the lock release.

To remove the platform, reverse the above procedure.

To select rotating mode:
1. Press the lock release.
2. Shift the magnetic platform to the right.
3. While shifting the platform right, release the lock release and line up the hex shaft to engage the lock shaft properly.
4. The platform will lock in place when it reaches the correct position.
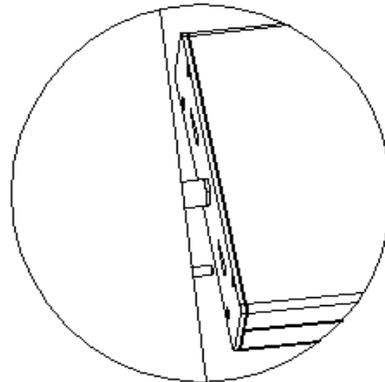
To select rocking mode:
1. Press the lock release.
2. Shift the magnetic platform to the left.
3. While shifting the platform left, release the lock release and rotate the platform to line up the pin and the pin slot in the end of the platform. Shift the platform onto the pin.
4. The platform will lock in place when it reaches the correct position.

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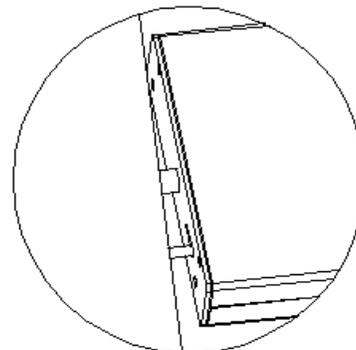
The versatile magnetic platform can be loaded a variety of ways using both sides of the platform:

To rock open trays or racks, center on the metal rocker tray.

NOTE: The metal rocker tray must be used in rocking mode only. It will not clear the housing if rotated.

To rotate or rock bags, select mode of operation (Rotate or Rock); locate the bags in the desired position using 2 or 4 (depending on application) magnetic stainless steel mounting strips to hold them in place. Four mounting strips are supplied – more can be ordered (see Accessories). The platform capacity for bags can also be expanded (see Accessories).

Various size tubes can be placed on the magnetic platform in different orientations to produce different motions within the tubes. First select the size clip plate required. The large clips hold 28-30mm dia. (50ml) tubes, the medium clips hold 15-17mm dia. (15ml) tubes and the small clips hold 10-13mm dia. (1.5-2.0ml) tubes. One clip plate of each size is supplied. The platform can hold up to eight plates (see Accessories). Push the tubes into the clips.

Positioning the plates as shown below will produce a rotating or rocking motion in the tubes.

Positioning the plates as shown below will produce a rolling or rocking motion in the tubes.

Positioning the plates as shown below will produce a combination rotating/rolling motion ("Figure 8" motion) in the tubes. Adjust the angle to achieve the desired motion.

NOTE: When rotating tubes, rotate the magnetic platform by hand before starting, to check the clearance of the tubes to the chamber walls.

PLATFORM CAPACITY

Centered on Axis: 4.5kg (10lb)
Offset: 2.3kg (5lb)

ENVIRONMENTAL CHAMBER ONLY

To use the Environmental Chamber only, within the **MIXER MODE**, choose the setting **OFF**. All mixing will become disabled and the **Enviro-Genie** becomes a temperature chamber only. A wire rack is included to increase the capacity of the chamber. An additional rack (sold separately) may be stacked on the first rack to further increase capacity (see Accessories).

RS-232 INTERFACE

Enviro-Genie comes equipped with a serial interface for connection to a PC or other serial device. This interface can be used to record machine information (including temperature) for situations that require verification. It can also be used to send commands remotely to the **Enviro-Genie**, either manually or automatically from a program in order to create profiles. Visit our website (www.scientificindustries.com) for a sample visual basic control program for the **Enviro-Genie**.

The serial port is on the side of the unit and is a standard subminiature 9-pin male connector. Connection to a PC is via a straight through 9-pin female-female serial cable (P/N SI-1132).

- Baud Rate: 19,200
- Data Bits: 8
- Stop Bits: 1
- Parity: None

All communication is accomplished with ASCII Uppercase characters with a carriage return as the terminating character.

CONTROL COMMANDS

TIME: Mixing and temperature control time. Enter commanded time as follows: To enter 7 Hrs. 23 Min. type "Time 723" followed by the enter key.

TON: Turn on data output. Data is output once per second. To turn on data output, type the following: "TON" followed by the enter key. The format of the data out is as follows: Commanded Temperature, Time and Actual Temperature.

TOFF: Turn off data output. To turn off data output, type the following: "TOFF" followed by the enter key.

TEMP: Temperature command in degrees Celsius. Will accommodate tenths of degrees. To enter commanded temperature, type the following: "TEMP 250" followed by the enter key. This will return 25.0 degrees Celsius on the front panel. "TEMP 251" followed by the enter key will return 25.1 degrees Celsius. The numerical value is the temperature value in degrees Celsius in the range from 4° - 75°.

SPEED: Speed command in RPM. To enter the commanded speed, type the following: "SPEED 500" followed by the enter key. The same ranges for Rock/Rotate (0-35 RPM) and Stirring (0-1000 RPM) entered on the keypad hold for RS-232 speed command.

MMODE: Mixing mode. To enter mixing mode type the following: "MMODE 1-3" followed by the enter key.
1. No Mix mode.
2. Rock/Rotate mode.
3. Stir mode.

TMODE: Timer mode. To enter timer mode type the following: "TMODE 1-4" followed by the enter key.
1. Nothing off.
2. Mixing off.
3. Temperature off.
4. Mixing and temperature off.

ALARM: Alarm mode. To enter alarm mode
           type the following: "ALARM 1-3"
           followed by the enter key.
1. No temperature alarm.
2. $\pm$ 3 Degree Centigrade alarm
3. $\pm$ 1 Degree Centigrade alarm

START: Start mixing/stirring. To start mixing or stirring, type the following: "START" followed by the enter key.

STOP: Stop mixing/stirring. To stop mixing or stirring, type the following: "STOP" followed by the enter key.

PELTON: To turn on heating/cooling control, type the following: "PELTON" followed by the enter key.

PELTOFF: To turn off heating/cooling control, type the following: "PELTOFF" followed by the enter key.

RESTOREE: Restore all factory-preset values.

WINDOWS QUICK START:
- Connect cable to **Enviro-Genie** and PC.

- Start Windows Hyperterminal (Start, Programs, Accessories, Communication, Hyperterminal).
- Double Click on Hyperterminal.
- Give the connection a name (i.e. "Enviro-Genie").
- Select the serial port you are connected to (usually COM1 or COM2).
- Select 19,200, 8, None, 1.
- You are now connected.

In order to have Windows scroll down after each line, check the box "append line feeds to incoming line ends."
Type commands to the unit in capital letters followed by the enter key.

In order to capture data in Windows hyperterminal select "Transfer", "Capture Text" (Don't forget to issue the command "TON" to start data flowing from **Enviro-Genie**).

NOTE: Please check our website (www.scientificindustries.com) for any updates to this document

Enviro-Genie Accessories

Figure	Cat. No.	Description
1	SI-1123	1 Clip Plate for 12 each 10-13mm tubes
2	SI-1124	1 Clip Plate for 6 each 15-17mm tubes
3	SI-1125	1 Clip Plate for 3 each 28-30mm tubes
4	SI-1120	6 Clip Plates for 12 each 10-13mm tubes
5	SI-1121	6 Clip Plates for 6 each 15-17mm tubes
6	SI-1122	6 Clip Plates for 3 each 28-30mm tubes
7	SI-1126	Bag Mounting Strips (pack of 16)
8	SI-1127	Expansion Kit - two stainless steel trays, 24 bag mounting strips
9	SI-1130	2 Clip Plates for Hybridization Tubes
10	SI-1131	1 Stackable Shelf
--	SI-1132	Serial Cable (picture not shown)
11	SI-1134	2 Universal Clip Plates
12	SI-1135	1 Magnetic Covered 100 Microtube Box
13	SI-1136	1 Clip Plate for 100ml Volumetric Flasks
14	0A-1200-001	Non-Skid Tray
15	SI-1250	3-D Orbital Shaker Attachment
16	SI-1275	Horizontal Orbital Shaker Attachment
17	SI-1137	Dual Port Mixing Tube(*)

Plasticware, glassware and other consumable products shown are not included.
*(*) Requires SI-1130*

Enviro-Genie Parts Assembly List

To order parts for the **Enviro-Genie**:
Contact your local distributor
Or visit www.scientificindustries.com
Please specify part number, quantity and voltage.

SERIAL NUMBER
PLATE LOCATION
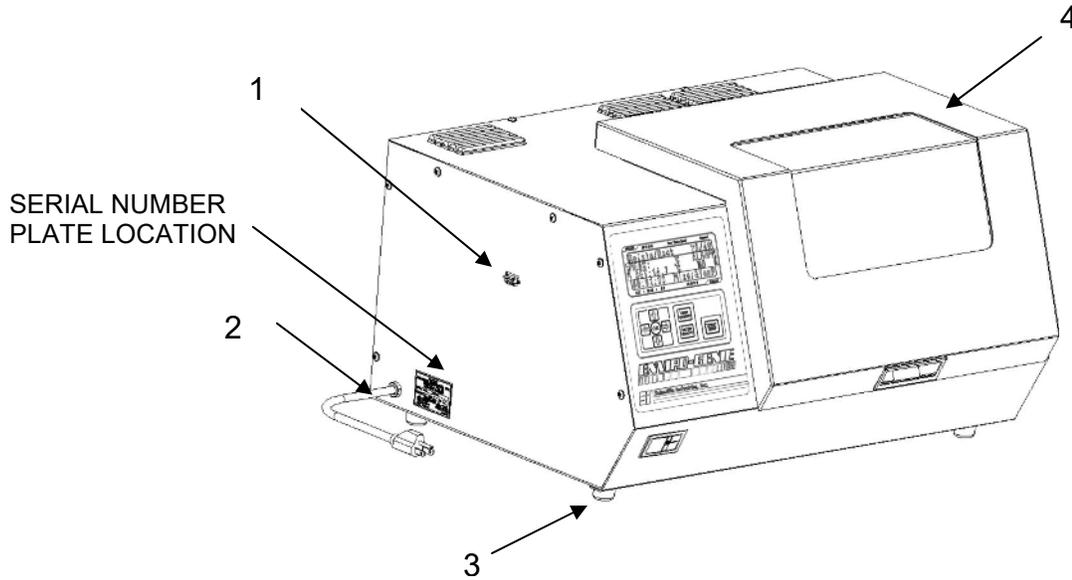
Indicator#	Part#	Description
1	0K-1200-916	KIT, RS232 CABLE, ENVIRO-GENIE
2A	318-0510-02	LINECORD 120V
2B	0A-1101-015	LINECORD, 230V W/O PLUG
2C	0A-1102-015	LINECORD, 230V EUROPEAN PLUG
2D	0A-1103-015	LINECORD, 230V BRITISH PLUG
2E	0A-1104-015	LINECORD, 230V SWISS PLUG
2F	0A-1105-015	LINECORD, 100V
3	HWP0034	BUMPER, 1"DIA X 1" LG.
4	0K-1200-915	KIT, DOOR, ENVIRO-GENIE

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Please specify part number, quantity and voltage.

Indicator#	Part#	Description
1	0K-1200-911	KIT, MOTOR ASSEMBLY, ENVIRO-GENIE
2	0K-1200-922	KIT, POWER DISTRIBUTION BOARD FOR LCD DISPLAY
3	0K-1200-913	KIT, LINE FILTER, ENVIRO-GENIE
4	0K-1200-914	KIT, TRANSFORMER, ENVIRO-GENIE
5	0A-1100-030	PLATFORM ASSEMBLY
6	0M-1200-214	LOCKSHAFT, PLATFORM

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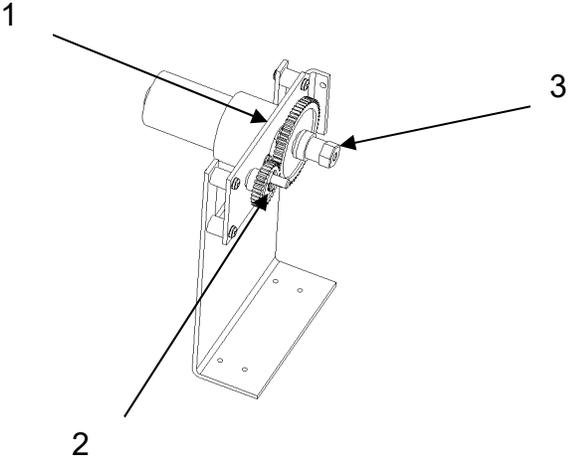
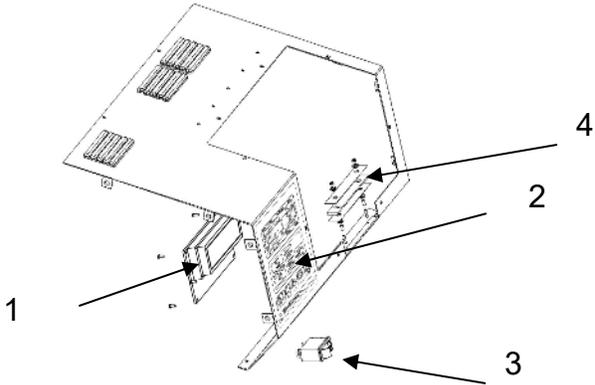| Indicator#	Part#	Description
1	0K-1200-908	KIT, MOTOR DRIVE, ENVIRO-GENIE
2	0K-1200-909	KIT, SMALL GEAR, 30T, ENVIRO-GENIE
3	0K-1200-910	KIT, HEX SHAFT, ENVIRO-GENIE
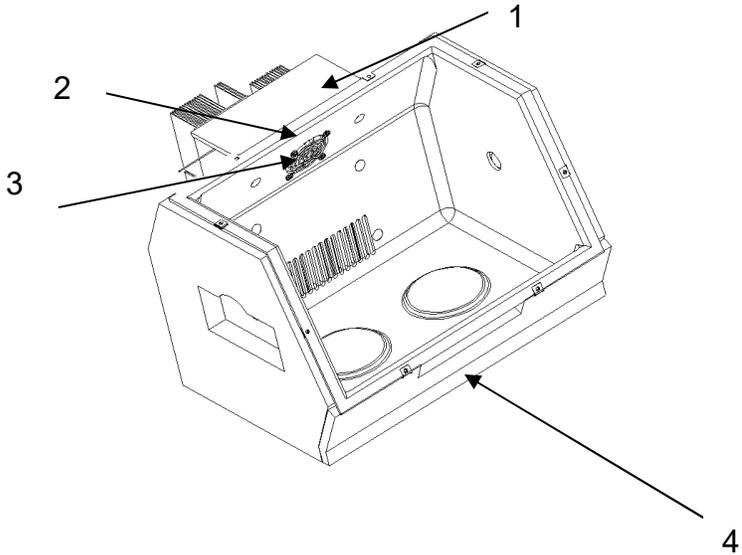
Indicator#	Part#	Description
1	0K-1200-904	KIT, TEC, ENVIRO-GENIE
2	0K-1200-905	KIT, TEMPERATURE SENSOR, ENVIRO-GENIE
3	0K-1200-906	KIT, FAN TEC ASSEMBLY, ENVIRO-GENIE
4	0K-1200-907	KIT, MAGNETIC STIRRER, ENVIRO-GENIE

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Please specify part number, quantity and voltage.
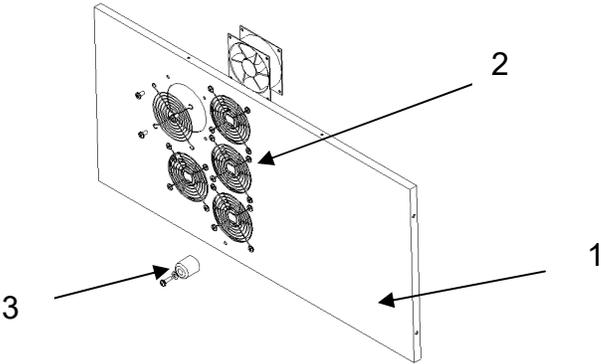
Indicator#	Part#	Description
1	0M-1200-207	BACK PANEL, ENVIRO-GENIE
2	0K-1200-903	KIT, FAN, BACK PANEL, ENVIRO-GENIE
3	HWP0034	BUMPER, 1"DIA. X 1" LG.

Indicator#	Part#	Description
1	0K-1200-923	KIT, LCD DISPLAY BOARD
2	0K-1200-924	KIT, LCD DISPLAY KEYPAD
3A	ESP0006	SWITCH, ROCKER, 120V/100V 5A
3B	ESP0007	SWITCH, ROCKER, 230V 2.5A
4	0K-1200-902	KIT, DOOR LATCH, ENVIRO-GENIE

⚠️ **CAUTION! Do not subject the Enviro-Genie to excessive shock.**
Dropping the unit, or otherwise subjecting it to unnecessary shock (ie: using excessive force to place vessels on the unit) may crack the case and lead to unsafe conditions**.**

⚠️ **CAUTION! Failure to follow operating instructions can compromise the user's safety.**

CARE & HANDLING

The **Enviro-Genie** should be given the care normally required for any electrical appliance. Avoid wetting or unnecessary exposure to fumes. The finish can be washed with a damp cloth (after unplugging) and soap or mild detergents. Keep the unit clean by immediately blotting any spills.

⚠️ **CAUTION! Unplug from power before cleaning. Do not immerse.**

⚠️ **CAUTION! Do not use Enviro-Genie in hazardous atmospheres or with hazardous materials.**

⚠️ **CAUTION! Do not use Enviro-Genie in applications such as mixing of flammable materials or where the transfer of mechanical energy to glass apparatus could lead to breakage.**

TECHNICAL SPECIFICATIONS
The **Enviro-Genie** is classified as "Installation Category 2"
Environmental: 0°C – 38°C (32°F-100°F), 95% Humidity max.

MODEL	POWER	REQUIRED	AMPS
SI-1200	120V/60Hz.	5	
SI-1201	230V/50Hz.	2.5 - No Plug	
SI-1202	230V/50Hz	2.5 - European Plug	
SI-1203	230V/50Hz	2.5 - British Plug	
SI-1204	230V/50Hz	2.5 – Swiss Plug	
SI-1205	100V/50-60Hz	5	

Weight: 36 Kg (80 lbs)
Maximum Load: Centered on Axis: 4.5kg (10lb.)
                          Offset: 2.3kg (5lb.)
Dimensions:
  • Overall: 495mm x 622mm x 366mm
     (19.5" x 24.5"x 14.5")
  • Chamber: 254mm x 362mm x 260mm
     (10" x 14.25" x 10.25")
  • Chamber Volume: 24 Liters

LTP0018 Rev. E