

# Mai Tai<sup>®</sup> M700 Hybridization System USER MANUAL

Cat. #1075-00-7 (115V); 1075-00-8 (230V)



**FOR RESEARCH USE ONLY**  
**Not for Use in Diagnostic Procedures**

**Serial Number**

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

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

**Warranty**

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

**Copyright**

Copyright ©2008-2015 SciGene Corporation. All rights reserved. SciGene and Mai Tai are trademarks of SciGene Corporation, Sunnyvale, CA. All other trademarks used in this manual are the property of their respective owners.

## Table of Contents

<b>I. SAFETY NOTICES .....</b>	<b>3</b>
A. Intended Use.....	3
B. Oven Safety.....	3
C. Symbols and Conventions.....	3
D. Warnings .....	4
E. Cautions .....	4
F. Compliance .....	5
<b>II. UNPACKING AND SET UP .....</b>	<b>6</b>
A. Unpacking, Lifting and Moving the Oven.....	6
B. Items Provided .....	6
C. Environmental Requirements.....	6
D. Installation and Location.....	6
<b>III. USING YOUR MAI TAI HYBRIDIZATION SYSTEM.....</b>	<b>7</b>
A. Oven Components, Controls and Accessories .....	7
B. Using the Temperature Controller.....	8
C. Calibrating the Temperature Controller .....	8
D. Setting the Rotator Speed.....	9
E. Using the Jog Switch .....	9
F. Loading and Removing the Mai Tai Rotator .....	9
G. Loading and Removing Mai Tai Cassettes.....	9
<b>IV. USING MAI TAI HYBRIDIZATION CASSETTES .....</b>	<b>10</b>
A. Cassette Set Up and Loading .....	10
B. Cassette Cleaning and Storage .....	12
<b>V. MAINTAINING YOUR OVEN.....</b>	<b>13</b>
A. Powering Off .....	13
B. Cleaning the Oven.....	13
C. Checking and Replacing Fuses .....	13
<b>VI. TROUBLESHOOTING.....</b>	<b>14</b>
<b>VII. SPECIFICATIONS .....</b>	<b>14</b>
<b>VIII. RELATED ACCESSORIES.....</b>	<b>14</b>
<b>IX. DECLARATION OF CONFORMITY .....</b>	<b>15</b>

## I. SAFETY NOTICES

### A. Intended Use

The **Mai Tai M700 Hybridization System** consists of a high precision oven and rotator with convection heating system for bubble mixing test samples with Agilent microarrays.

*Le système d'hybridation M700 Mai Tai est constitué d'un four à haute précision et de la coiffe avec système de chauffage par convection pour Bubble mélangeant puces Agilent.*

### B. Oven Safety

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

*Avant le fonctionnement de l'oven, lisez les renseignements dans cette section concernant les risques et les dangers potentiels. S'assurer que toute personne impliquée avec le fonctionnement de l'oven est instruit dans les pratiques générales de sécurité pour les laboratoires et les pratiques de sécurité spécifiques pour l'oven. Avant le fonctionnement de l'oven, lisez les renseignements dans cette section concernant les risques et les dangers potentiels. S'assurer que toute personne impliquée avec le fonctionnement de l'oven est instruit dans les pratiques générales de sécurité pour les laboratoires et les pratiques de sécurité spécifiques pour l'oven.*

### C. Symbols and Conventions

The following chart is an illustrated glossary of the electrical symbols that are used on the oven. Whenever such symbols appear on ovens, please observe appropriate safety measures.

*Le tableau suivant est un glossaire illustré des symboles électriques qui sont utilisées sur le système. Chaque fois que ces symboles apparaissent sur les ovens, veuillez observer les mesures de sécurité appropriées.*

#### 1. Electrical Symbols



This symbol indicates that this is a protected ground terminal that must be connected to earth ground before any other electrical connections are made to the oven.

*Ce symbole indique qu'il s'agit d'un terminal de terrain protégé qui doit être connecté à la terre avant que toutes les autres connexions électriques sont apportées à l'oven.*



**CAUTION:** This symbol warns of an electrical hazard and alerts you to consult this Operator's Manual for further information and to proceed with caution.

*ATTENTION: Ce symbole vous avertit à consulter ce guide de l'utilisateur pour plus d'informations et de procéder avec prudence.*



This symbol indicates the OFF position of the main POWER switch.  
*Ce symbole indique la position OFF de l'interrupteur principal.*



This symbol indicates the ON position of the main POWER switch.  
*Ce symbole indique la position ON de l'interrupteur principal.*

## 2. Non-Electrical Symbols



CAUTION: This symbol illustrates a heat hazard. Proceed with caution when working around these areas to avoid being burned by hot components.

*ATTENTION: Ce symbole illustre un danger pour la chaleur. Faire preuve de prudence lorsque vous travaillez autour de ces zones pour éviter d'être brûlé par les composants du chauds.*



CAUTION: This symbol alerts you to consult this Operator's Manual for further information and to proceed with caution.

*ATTENTION: Ce symbole vous avertit à consulter ce guide de l'utilisateur pour plus d'informations et de procéder avec prudence.*

## D. Warnings

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

*Défaut de respecter les avertissements suivants qui sont apposées sur le produit peut conduire à possibles lésions corporelles ou la mort.*



This symbol on the rear of the oven indicates the presence of the fuse box.  
**Warning: For Continued Protection Against Fire, Replace Only with Same Type Rating of Fuse.** Always disconnect the power cord before attempting to replace the fuse.

*Ce symbole sur l'arrière de l'oven indique la présence de la boîte de fusibles.*  
**Avertissement: Pour le maintien de la Protection contre l'incendie, remplacer uniquement avec la même cote de Type de fusible.** Toujours débrancher le cordon d'alimentation avant d'essayer de remplacer le fusible.

## E. Cautions

Failure to comply with the following cautionary statement affixed to the product may lead to possible personal injury.

*Omission de se conformer à la mise en garde suivante apposée sur le produit peut entraîner des blessures possibles.*



This symbol indicates the potential presence of a **Hot Surface**. Use care when working inside the oven chamber to avoid being burned.

*Ce symbole indique la présence potentielle d'une surface chaude. Faites attention lorsque vous travaillez à l'intérieur de la chambre du four pour éviter d'être brûlé.*

## F. Compliance

### 1. European Conformity (CE)



This symbol indicates the instrument is in compliance with all applicable European Union Electromagnetic Compatibility and Low Voltage Directives.

### 2. Restriction of Hazardous Substances (RoHS)



The RoHS directive was adopted in February 2003 by the European Union. It restricts (with exceptions) the use of six hazardous materials (including lead and mercury) in the manufacture of various types of electronic equipment. All SciGene instruments carrying the CE mark are also RoHS compliant.

### 3. Electrical and Electronic Equipment Waste (WEEE)



WEEE is a European Community directive that became European Law in February 2003. The crossed out wheeled bin symbol on a product or its packaging indicates that it must NOT be disposed of with standard waste at the end of its lifetime. Instead, it is your responsibility to return it to a designated collection point for electronic equipment recycling. Contact your local SciGene distributor for information on drop off locations.

### 4. Electromagnetic Compatibility (EMC)

The Model 700 Microarray Oven is a Class A digital device under FCC Title 47 Part 15B and designated as Class A electrical equipment for measurement, control, and laboratory use (EN61326).

*Note regarding Canadian EMC compliance: Le present appareil numerique n'emet pas de bruits radioelectrique depassant les limites applicables aux appareils numeriques de class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le Ministere des Communications du Canada.*

**II. UNPACKING AND SET UP**

**A. Unpacking, Lifting and Moving the Oven**

The oven weighs approximately 70 lbs (32 kg) so caution is needed when lifting the unit to protect yourself and others from personal injury. Two people are required to lift the unit, one on each side, keeping it balanced and sharing the load. Remove any packing material from around the top and sides of the oven, then carefully lift out, place on the bench and inspect for damage.

*If the oven is damaged upon arrival, please retain all shipping materials and contact SciGene or your local distributor for assistance.*

**B. Items Provided**

The following items are included in the shipping carton with the oven:

- User Manual
- Power Cord
- Drip Pan
- Mai Tai Rotator and Cassette(s) (if so equipped)

**C. Environmental Requirements**

Ensure that the area where the oven is installed meets the following conditions, for reasons of safety and performance:

Ambient temperature	+15 to +32°C (58 to 90°F)
Relative humidity	20 to 80% RH non-condensing
Air flow clearance	6 inches (15 cm) minimum above unit

**D. Installation and Location**

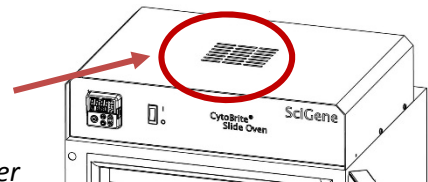
Place the oven on a stable, level surface within a few feet of the power source. Allow 6 inches of clearance at top for adequate air flow. **DO NOT** place under a shelf where solutions are stored. Any liquid entering the electrical compartment through the vent holes on the top of the unit will cause damage.

Ensure there is adequate clearance on all sides of the oven, which may be warm to the touch, including enough space to open the door completely. Using only the power cord provided, plug it into the back of the oven and then to a properly grounded outlet. Turn on power using the ON/OFF switch on the front control panel.



**To avoid a safety hazard or damage to the instrument, do not allow liquids to enter the vent holes on top of the oven.**

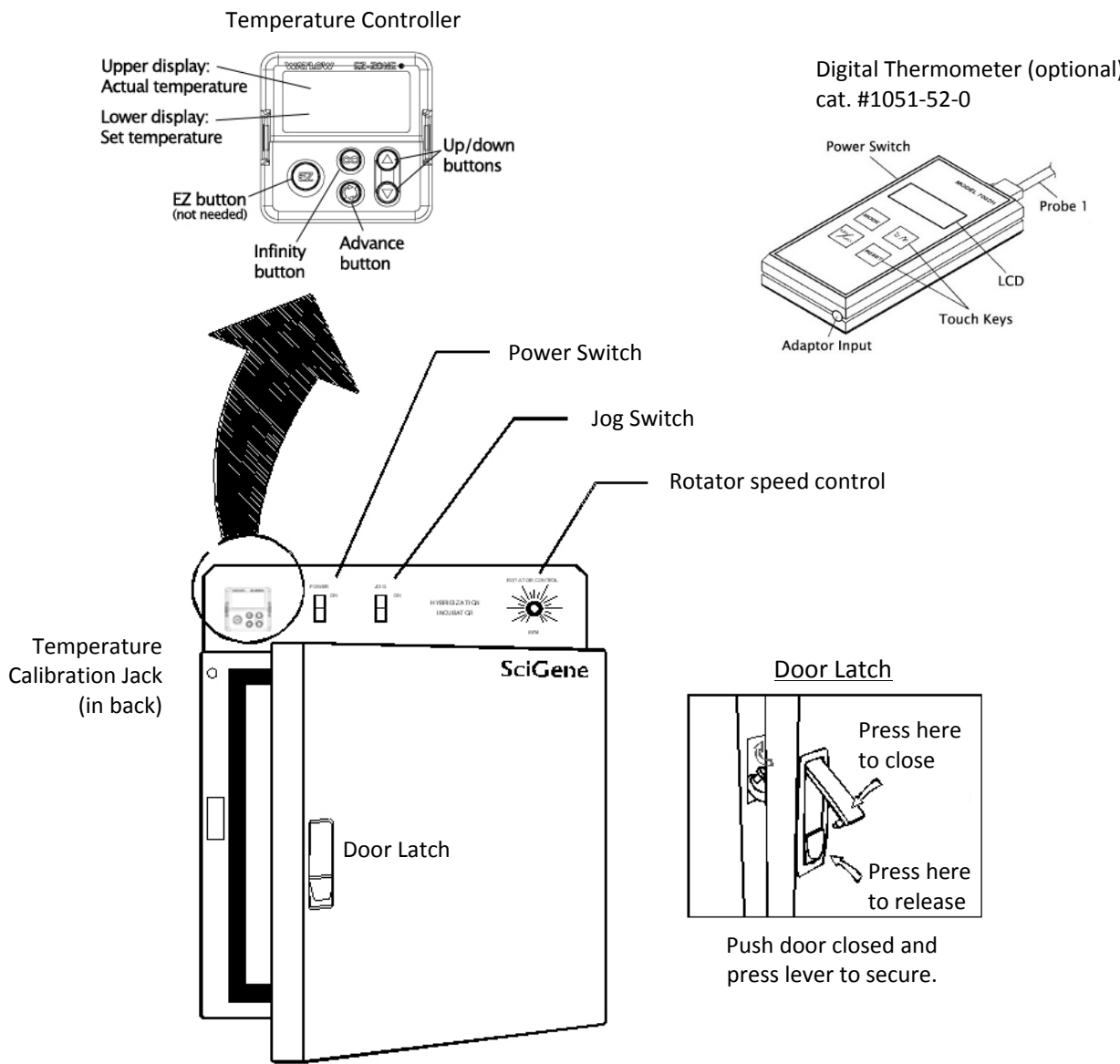
*Pour éviter tout risque de sécurité ou endommager le instrument, ne permettent pas de liquides dans le des trous d'évent sur la partie supérieure du four.*



III. USING YOUR MAI TAI HYBRIDIZATION SYSTEM

A. Oven Components, Controls and Accessories

Name	Function
Power Switch	Turns ON/OFF power to the oven
Rotator Speed Control	Selects desired speed for internal rotator
Jog Switch	Moves rotator at selected speed with door open
Temperature Controller	Used to set, control and observe temperature
Door Latch	Secures the door, with button release to open
Digital Thermometer (optional)	Used to verify and calibrate temperature
Temperature Calibration Jack	Connection for optional digital thermometer





## B. Using the Temperature Controller

The Model 700 Microarray Oven is equipped with a Watlow EZ-Zone temperature controller. It is calibrated at the factory to provide accurate chamber temperatures from ambient +5 to 99°C. The controller has two LED displays: the upper red display shows ACTUAL temperature inside the chamber and the lower green display shows the SET or programmed temperature. To program an oven temperature, simply push the up or down arrows until the desired temperature is shown in the lower display. The oven will adjust the heat of the chamber until the SET temperature is attained.

## C. Calibrating the Temperature Controller

To ensure accurate ( $\pm 0.5^\circ\text{C}$ ) oven temperatures, the performance of the EZ-Zone controller should be periodically checked by comparing the temperature displayed on the controller to an accurate, NIST-certified (National Institute of Standards and Technology) thermal measurement device. SciGene recommends the calibration method below to achieve accurate oven temperatures. No other methods are recommended.

### 1. Calibration Check

- a. Turn on the oven, set to 65°C and allow temperature to stabilize (30 min).
- b. Connect a NIST-certified digital thermometer (SciGene Cat. #1051-52-0) to the blue jack (secondary RTD) at the top back of the oven.
- c. Verify that the temperature shown on the digital thermometer matches that shown on the controller within  $\pm 0.5^\circ\text{C}$ . If it does not, follow the steps below to adjust the controller.

### 2. Calibration Procedure

- a. Turn on the oven, set to 65°C and allow temperature to stabilize (30 min).
- b. Connect a NIST-certified digital thermometer (SciGene Cat. #1051-52-0) to the blue jack at the top back of the oven.
- c. Calculate the difference in temperature shown on the controller to the digital thermometer. For example, if the controller displays 65.0°C and the thermometer displays 66.5°C, the difference (offset) is 1.5°C.
- d. On the controller, press the up and down arrows simultaneously for 3 seconds. The upper display will now read "A1" and the lower display "open".
- e. Press the green circle button 3 times until the lower display shows "i.CA". The upper display shows the offset value between the controller and thermometer when the unit was last calibrated.
- f. Use the up/down arrows to adjust the offset value to the temperature difference calculated in Step c. For example, if the controller displays a temperature 1.5°C lower than the thermometer, adjust the offset by adding 1.5 to the value shown.
- g. Press the  $\infty$  key twice to return to the operation display. Your oven is now calibrated to provide accurate temperatures between ambient + 5 to 99°C.

#### D. Setting the Rotator Speed

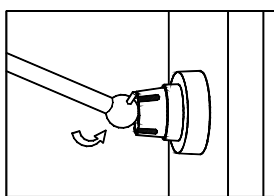
The rotator is turned on and off and its speed of rotation controlled through the rotary switch. Turn the dial clockwise from its stopping point to turn on the rotator drive system and set the speed of rotation. Rotation speed is adjustable up to 20 RPM.

#### E. Using the Jog Switch

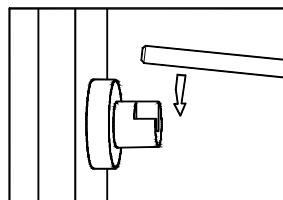
The jog switch is used to momentarily advance the rotator when the door is open. When the jog switch is pressed, the rotator will turn at the speed selected on the speed controller. It will not move if the speed controller is turned off or is set too low.

#### F. Loading and Removing the Mai Tai Rotator

The Mai Tai rotator is loaded and removed using a two-step process. When loading, first insert the end of the shaft that ends in a ball joint with alignment pin into the slotted bearing on the right wall of the chamber. The left end of the shaft is then placed into the bearing on the left side of the chamber. Reverse the procedure to remove the rotator.



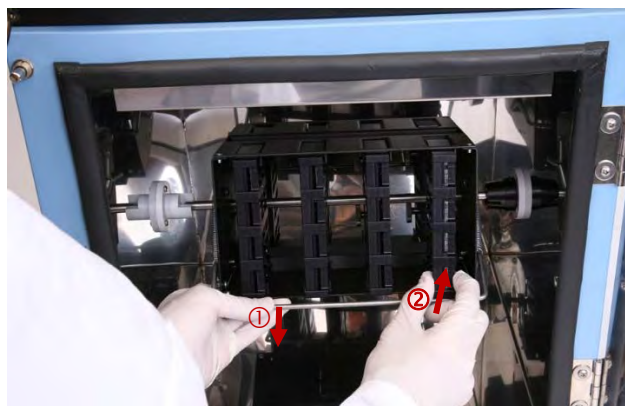
Insert ball with alignment pin into right bearing



Place shaft on left bearing

#### G. Loading and Removing Mai Tai Cassettes

Up to eight Mai Tai Cassettes may be loaded into a Mai Tai Rotator. Adjust the rotator position for easy loading by using the jog switch on the oven control panel. To insert a cassette, (1) lower and hold the spring bar open and then, (2) slide the bottom of the cassette into an empty slot. Release the spring bar to hold the cassette in place during rotation. Reverse the procedure to remove the cassette.



**Take care when working inside the oven or touching hot surfaces to avoid being burned.**

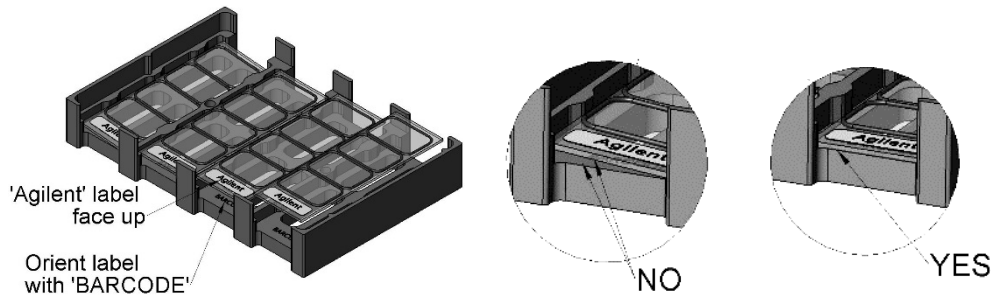
*Attention, en travaillant à l'intérieur des surfaces chaudes du four ou de toucher pour éviter d'être brûlé.*

**IV. USING MAI TAI HYBRIDIZATION CASSETTES**

**A. Cassette Set Up and Loading**

With the Mai Tai Rotator installed, pre-heat the hybridization oven to the desired incubation temperature.

1. Place the base plate on a flat surface such as a laboratory bench.
2. Place one gasket slide per chamber into the cassette with the “Agilent” label facing up and aligned with the “barcode” side of the chamber, as shown below. It is not necessary to process four slides at once. Load one to four slides as desired..



**When placing the gasket slide, ensure it does NOT rest on the edge of the base plate. Practice placing glass slides into the chamber prior to running an experiment.**

*Lorsque vous placez le curseur de joint, se assurer qu'il ne repose pas sur le bord de la plaque de base. Pratiquer placer des lames de verre dans la chambre avant d'exécuter une expérience.*

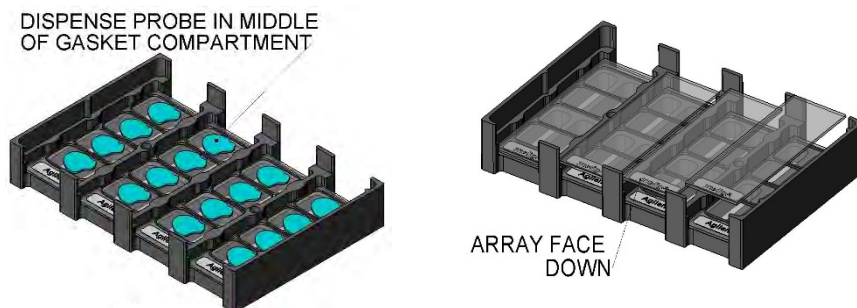
3. Pipette the labeled probe into each chamber of the gasket slide using the volumes shown in the table below for each gasket slide format.

<u>Gasket Format</u>	<u>Probe Volume</u>
1 microarray	520 microliters
2 microarrays	260 microliters
4 microarrays	110 microliters
8 microarrays	40 microliters



**Dispense hybridization solution in the center of the well without touching the gasket with the pipette tip.**

*Répartir la solution d'hybridation dans le centre du puits sans toucher le joint d'étanchéité avec l'embout de pipette.*



4. Holding the slide at the ends with the array side down and ensuring that the barcode side matches with the one on the gasket slide, bring the array down slowly holding it horizontal to the gasket slide.



**Placing the array evenly onto the gasket slide is crucial to prevent spilling or leakage.**

*Placer le tableau uniformément sur la lame de joint est crucial pour éviter tout déversement ou de fuite.*

5. When all slides have been placed, make sure all assemblies are laid flat against the base . . . below for examples of proper and improper . . . .



6. Place the cover plate over the arrays with the barcode window matching the barcodes on the array. See above for correct orientation of the cover plate.
7. Tighten the thumb screws by hand until stopped. Do NOT use tools.
8. Tilt the cassette back and forth, looking in the window slots to ensure that the bubbles move freely inside each array chamber. Release any stationary bubbles by gently tapping each corner of the assembly on a firm surface as it is rotated. For optimal hybridization, it is best to have one large bubble which moves freely.
9. Place the assembly into the Mai Tai Rotator in the pre-heated oven. Raise the spring bar and load a Mai Tai Cassette by sliding the cassette into an empty slot.
10. When rotating multiple cassettes, load equal numbers of cassettes on opposing sides of the rotator to balance weight.
11. Set the rotator speed control to the RPM setting recommended by the microarray manufacturer.
12. Incubate the cassette(s) for the time and duration recommended by the microarray manufacturer, and then use hand protection (glove or mitt) to remove them from the rotator and allow to cool for a few minutes.
13. Loosen thumbscrews, lift the top plate and one-at-a-time, remove the array gasket assembly and separate them while submerged in buffer specified by the microarray manufacturer.
14. Wash and dry the microarray(s) manually or on the Little Dipper Processor [SciGene Cat. #1080-40-X] using SciGene Wash Buffers 1 and 2 for Agilent CGH Arrays [Cat. # #5188-5221 and Cat. #5188-5222].

**B. Cassette Cleaning and Storage**

Hybridization solution may occasionally spill and dry on to Mai Tai base and cover plates, making arrays or gasket slides stick to these parts during hybridization. Base plates, cover plates and thumb screws need to be cleaned periodically to prevent such sticking.

1. Disassemble each cassette into base, cover and screws.
2. Use lint-free wipes soaked in 70% ethanol to carefully wipe all surfaces and holes to remove dried hybridization solution and salts.
3. Allow the clean parts to dry completely by evaporation.
4. Re-assemble parts together using the thumb screws and store in a clean, dry place.

## V. MAINTAINING YOUR OVEN

### A. Powering Off

Turn the power switch to the OFF position and unplug the power cord before performing any cleaning or service procedure.

### B. Cleaning the Oven

Clean metal surfaces using a soft cloth and mild, detergent-based cleaner. Avoid abrasive cleaners that can scratch surfaces. Do **NOT** use caustic or strongly alkaline solutions (e.g., strong soaps, ammonia, or bleach). Under no circumstances should solutions be allowed to enter through the ventilation slots on the top of the oven.

If running radioactive or biohazardous reactions, consult your institution's radiation safety officer or biosafety office for assistance.



**Turn power switch to the OFF position and unplug the power cord before performing any cleaning procedure!**

*Tournez le commutateur d'alimentation sur la position OFF et débranchez le cordon d'alimentation avant d'effectuer toute opération de nettoyage!*



**Ensure oven has cooled to room temperature prior to cleaning.**

*Assurer le four est refroidi à température ambiante avant de le nettoyer!*

### C. Checking and Replacing Fuses

Two fuses are located in the removable block below the power cord receptacle on the top, back of the oven. Blown fuses will have a broken filament or appear dark. Always replace fuses with the same amperage and voltage as shown on the label below the fuse block.

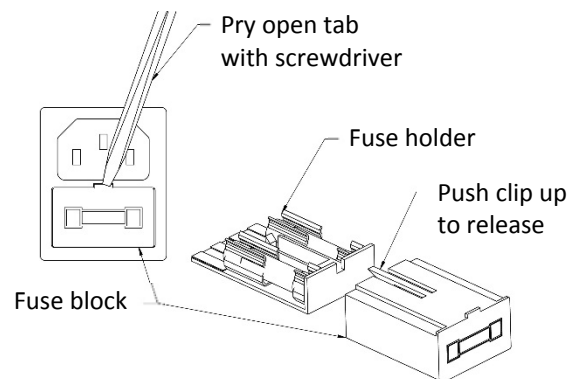


**Turn power switch to the OFF position and unplug the power cord before performing any service procedure.**

*Tournez le commutateur d'alimentation sur la position OFF et débranchez le cordon d'alimentation avant d'effectuer toute opération de service!*

To remove fuses:

1. Insert a small, flat blade screwdriver into the tab recess just below the plug receptacle.
2. Push down to release the fuse block.
3. Slide fuse holder out from the fuse block while holding the retaining tab out of the way.
4. Gently pry out the fuses.



**VI. TROUBLESHOOTING**

Symptom	Cause	Solution
Oven does not turn on.	Blown fuse(s)	Replace fuse(s) on back of unit, beneath power cord receptacle.
Door does not close properly or is difficult to open.	Latch is improperly adjusted or needs replacement.	Adjust threaded rod on inside of latch or contact SciGene or your local distributor to replace the latch if necessary.
Controller is not responding when buttons are pressed.	Controller is faulty or is program settings have been lost.	Cycle oven on and off. Contact SciGene or your local distributor to reset or replace the controller.

**VII. SPECIFICATIONS**

Electrical	
Cat. #1075-00-7	115V AC; 50/60 Hz; 6A
Cat. #1075-00-8	230V AC; 50/60 Hz; 3A
Dimensions and Weight	
Outside H x W x D	22 x 18 x 17 inches (55 x 45 x 42 cm)
Weight	70 lbs (32 kg)
Performance and Controls	
Temperature Range	Ambient +5°C to 99°C
Temperature Regulation	± 0.1°C
Rotation Speed	Up to 20 RPM
Digital Thermometer Output	T-type Thermocouple

**VIII. RELATED ACCESSORIES**

Cat. #	Description	UoM
1070-20-0	Rotator for Agilent SureHyb and Original Hyb Chambers.	EA
1075-10-0	Mai Tai Hybridization Cassette. Holds four slides.	EA
1075-20-0	Mai Tai Rotator. Holds up to 8 Mai Tai Cassettes.	EA
1040-95-0	Packaging Set for Model 700 Oven (includes box and foam inserts).	EA
1051-52-0	Digital thermometer, T-type. Includes cable and NIST certificate.	EA



**IX. DECLARATION OF CONFORMITY**

**Model 700 Microarray Oven**

SciGene  
 1287 Reamwood Avenue  
 Sunnyvale, CA 94089 USA



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

**EMC Directive 2004/108/EC**

**Standard:**

**IEC 61326-1            2005    Electrical equipment for measurement, control and laboratory use**

**LVD Directive 2006/95/EC**

**Standards:**

**IEC 61010-1            2010    Electrical Equipment for Measurement, Control and Laboratory use  
 3rd Edition Part 1: General requirements**

**IEC 60204-1            2006    Electrical equipment of machines**

**RoHS Directive 2011/65/EC**

Terry Gill Sunnyvale, California, USA  
 \_\_\_\_\_  
Name of Authorized Representative Place of Issue

Director of Product Manufacturing January 02, 2015  
 \_\_\_\_\_  
Title of Authorized Representative Date of Issue

  
 \_\_\_\_\_  
Signature of Authorized Representative