MaxQ 6000 Stackable
Incubated and Refrigerated Shaker

Operating Manual and Parts List LT2120X1 Rev. 0

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

Models covered in this manual	
Model number	**Voltage**
SHKE6000 (4359)	120V
SHKE6000-1CE (4352)	240V
SHKE6000-7 (4353)	120V
SHKE6000-8CE (4360)	240V

MANUAL NUMBER LT2120X1 (7004352)

REV	ECR/ECN	DATE	DESCRIPTION	By
0	--	5/7/10	Transfer to Marietta (was LT12120X1 9/2/09)	ccs

Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

Material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

Important operating and/or maintenance instructions. Read the accompanying text carefully.

Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.

Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.

Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.

Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on Thermo's compliance with this directive, the recyclers in your country and information on Thermo products will be available at www.thermofisher.com.

- ✔ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✔ Always dissipate extreme cold or heat and wear protective clothing.
- ✔ Always follow good hygiene practices.
- ✔ Each individual is responsible for his or her own safety.

Do You Need Information or Assistance on Thermo Scientific Products?

If you do, please contact us 8:00 a.m. to 6:00 p.m. (Eastern Time) at:

1-740-373-4763	Direct
1-800-438-4851	Toll Free, U.S. and Canada
1-877-213-8051	FAX
http://www.thermofisher.com	Internet Worldwide Web Home Page
service.led.marietta@thermofisher.com	Service E-Mail Address

Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Thermo Scientific products.

Whatever Thermo Scientific products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific
401 Millcreek Road, Box 649
Marietta, OH 45750

International customers, please contact your local Thermo Scientific distributor.

Table of Contents

Section 1 Safety Information

Your Thermo Scientific MaxQ 6000 Shaker has been designed with function, reliability, and safety in mind. It is the user's responsibility to install it in conformance with local electrical codes. For safe operation, pay attention to Notes, Cautions, and Warnings throughout the manual.

This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment.

Warnings

To avoid electrical shock, always:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.

2. Disconnect from the power supply prior to maintenance and servicing.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components which may ignite such materials. Not rated for use in hazardous atmospheres.

2. Wear appropriate eye and hand protection when handling hazardous chemicals.

3. Refer servicing to qualified personnel.

4. Do not modify construction and/or assembly of equipment.

5. Do not remove tags, labels, decals, or other information from the unit.

6. Stand clear of equipment when it is operating.

7. If shaking action will result in the evolution of gases or fumes, carry out the operation in a well-ventilated laboratory hood.

To avoid personal injury (continued)

8. Use equipment only for its intended purpose. Use only the accessories and attachments that are shipped with the equipment or are specified for it. Substituting other attachments or accessories can produce hazards or make the unit inoperative.

9. Perform regular maintenance service as specified in this manual and keep unit in good repair. Do not operate with known defects.

10. Do not use the shaker to mix flammable materials or where the transfer of mechanical energy to glass could cause glass breakage.

Section 2 Specifications

Dimensions (L x W x H)

. . . . . .33 x 27.5 x 40.5 inches (83.8 x 69.8 x 102.8 cm)

Optional Universal Platform (30110): . . .18 x 18 inches (45.7 x 45.7 cm)

Inner Chamber: . . . 22 x 21 x 27 inches (55.9 x 53.3 x 68.6 cm)

Temperature Range and Accuracy

SHKE6000: . . . . 10°C above ambient to 80°C, ±0.1°C at 37°C in flask

SHKE6000-1CE:. 10°C above ambient to 80°C, ±0.1°C at 37°C in flask

SHKE6000-7: . . .15°C below ambient to 80°C, ±0.1°C at 37°C in flask (Minimum setpoint is 4°C on refrigerated model.)

SHKE6000-8CE:. 15°C below ambient to 80°C, ±0.1°C at 37°C in flask (Minimum setpoint is 4°C on refrigerated model.)

Over-Temp Protection: . . . . . .5°C above setpoint

Temperature Uniformity

. . . . . .±0.5°C at 37°C in flask:

Over-Temp Protection: . . . . . 0-115°C

Speed Range

. . . . . 15 to 500 ±1 rpm (unstacked); 15 to 300 ±1 rpm (stacked)

Orbit Diameter . . . . . .0.75 inches (1.9 cm)

Shipping Weight

SHKE6000-7 and SHKE6000-8CE: . . . . .430 lbs. (195 kg)

SHKE6000 and SHKE6000-1CE: . . . . . 330 lbs. (150 kg)

Electrical

SHKE6000: . . . . . .120V, 60Hz, 8.0 amps, 1100 watts
SHKE6000-1CE: . . . .240V, 50/60Hz, 5.0 amps, 1200 watts
SHKE6000-7: . . . . . 120V, 60Hz, 11 amps, 1300 watts
SHKE6000-8CE: . . . 240V, 50Hz, 6.3 amps, 1500 watts

Max Load

Shelf: . . . . . .20 lbs. (9.1 kg) each
Platform: . . . . . .35 lbs. (15.9 kg)

Environmental Operating Conditions

Pollution Degree** 2
Installation Category** II
Altitude . . . . . .2000 meters MSL (Mean Sea Level)
Relative Humidity . . . .20% to 80% maximum, non-condensing
Electrical Supply . . . . . .120 VAC or 240 VAC
Voltage Tolerance . . . . . .+10% of normal rated line
Temperature . . . . . .15°C to 32°C
Product Usage . . . . . .Indoor use only
***Refer to IEC 664-1*

Caution Operating this shaker in a CO2 enriched atmosphere is not recommended. The formation of carbonic acid could cause electrical failures. ▲

Declaration of Conformity (for CE models only)

We hereby declare under our sole responsibility that this product conforms with the technical requirements of the following standards:

EMC:

EN 61000-3-2 Limits for harmonic current emissions

EN 61000-3-3 Limits for voltage fluctuations and flicker

EN 61326-1 Electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

Safety:

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

EN 61010-2-051 Part II: Particular requirements for laboratory equipment for mixing and stirring

per the provisions of the Electromagnetic Compatibility Directive 2004/108/EC, and per the provisions of the Low Voltage Directive 2006/95/EC.

Copies of the Declaration of Conformity are available upon request.

Section 3 Features

- Two units can be stacked vertically with a stacking kit accessory.
- Continuous or timed operation, 0.1-999 hours or 0.1-999 minutes
- Three individual LED displays indicate temperature, time and speed simultaneously. 3 characters height 1/2 inch (1.27 cm).
- Solid state brushless DC motor.
- Soft Start Feature: Software algorithms prevent sudden start/stops.
- RS232 Interface: Monitor speed, temperature in °C and time with a computer. Interface cables not to exceed 9.8 ft. (3 m)
- 10 mv/°C output monitors temperature with external chart recorder.
- Maximum shelf load: 20 lbs. Maximum platform load 35 lbs.
- All models control temperature, time and speed by a Proportional/Integral/Derivative (PID) microprocessor-based controller that is adjustable on a keypad in 1 rpm increments. Refrigerated units feature environmentally safe CFC free insulation and coolant.
- Flashing display indicates power interruption. Pressing any key will clear display. Non-volatile memory maintains temperature, speed and time set points in the event of a power interruption. Speed and time set points are automatically reactivated after power is restored.
- Shaking action is halted while door is open.
- User settable over-temperature control monitors the chamber temperature and unit's temperature deviation if main control fails.
- 6 permanently lubricated ball bearings.
- UL, cUL and CE certification.

Alarms

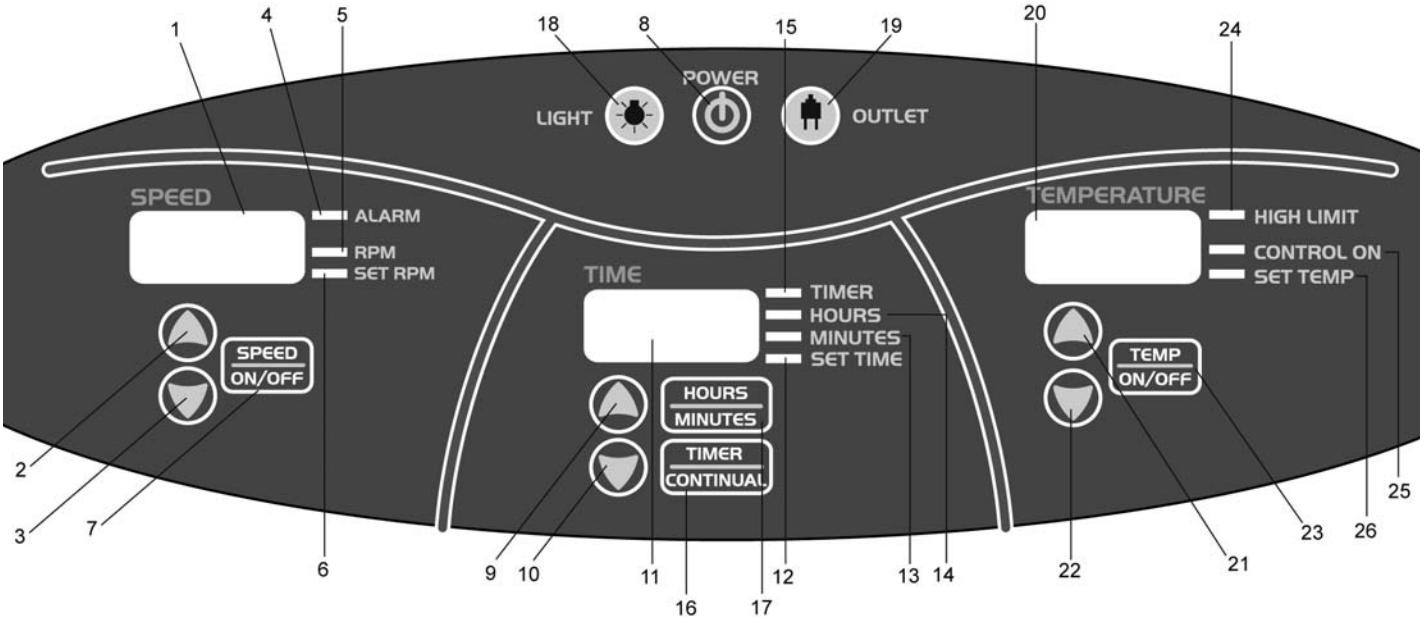
- Audible portion of the alarm can be silenced for a period of 1 hour, by depressing any key, without deactivating the actual alarm condition.
- Audible alarm with flashing LED can be set to indicate when speed deviates more than 10% of set point.
- When speed deviates 10% of set point, unit can be set to shut down immediately.
- Alarm beeps three times when time has expired. Shaking motion stops.
- If the unit is running in an unbalanced condition, an alarm will sound and the shaker will stop until the end user corrects the condition. The speed display will flash “bAL” on speed panel LED.
- When chamber temperature deviates more than 1°C from setpoint, an alarm will sound and the display will indicate an error.

Control Panel Features

1. Speed Display: 3 digit LED indicates actual or set point speed
2. Up Arrow Key: Increases platform rotation speed
3. Down Arrow Key: Decreases platform rotation speed
4. Alarm Light: Red light Illuminates when a locked platform or over-speed condition exists
5. RPM Light: Illuminates to indicate actual speed
6. Set RPM Light: Illuminates when speed is being set
7. Speed ON/OFF Switch: Starts and stops platform rotation
8. Power Switch: Turns power on and off to shaker
9. Up Arrow Key: Increases shaking time
10. Down Arrow Key: Decreases shaking time
11. Time(r) Display: 3 digit LED indicates time remaining or continual time
12. Set time: Illuminates when time is being set

Control Panel Features (cont.)

13. Minutes: Timer indicates minutes
14. Hours: Timer indicates hours
15. Timer Light: Indicates timed operation
16. Timer/Continual Allows the user to choose continual time operation, or timed operation.
17. Hours/Minutes Key: Allows user to choose timing operation in either hours or minutes
18. Lightbulb Icon: Allows user to turn on interior chamber light.
19. Plug Icon: Allows user to utilize interior electrical outlet.
20. Temperature Display: 3 digit LED indicates chamber temperature
21. Up Arrow Key: Increases temperature
22. Down Arrow Key: Decreases temperature
23. Temp ON/OFF Switch: Turns heat on and off
24. High-Limit Light: Indicates high-limit control has been activated
25. Control ON Light: Indicates heaters are energized
26. Set temp Light: Indicates temperature can be set



Section 4 Unpacking and Installation

The shipping carton should be inspected upon delivery. When received, carefully examine for any shipping damage before unpacking. If damage is discovered, the delivering carrier should specify and sign for the damage on your copy of the delivery receipt.

Open the carton carefully making certain that all parts are accounted for before packaging materials are discarded. After unpacking, if damage is found, promptly report it to the carrier and request a damage inspection properly.

Important Failure to request an inspection of damage within a few days after receipt of shipment absolves the carrier from any liability for damage. Call for a damage inspection promptly.

Unpacking

Use the packing list below when unpacking to verify that the complete unit has been received. Do not discard packing materials until all is accounted for.

The following items are included in the shipment:

Inspection Tag- 528-028-00

Mounting Plate Mat- 790-316-11

Thumbscrew Knob (4) - 562-184-10

Shelves (2)

Shelf Clips (4)

Cord

Male Connector

Warranty Card

If any items are missing, contact Technical Services.

Location

Place the shaker on the floor near an electrical outlet that matches the unit nameplate requirements. Allow approximately 2" (5 cm) of clearance around the unit for free air convection, accessory attachments and user convenience.

Electrical Requirements

SHKE6000 Series shakers require a 120VAC, 60 Hz power source. They are supplied with a 3-wire line cord and should be plugged into an outlet designed for 3-prong plugs. If an extension cord is used, it also should be the 3-wire grounded type. For an outlet designed to accept 2-prong plugs (ungrounded), it is required that a qualified electrician replaces the outlet with a new, grounded type.

SHKE6000-1CE series shakers require a 220-240VAC, 50/60 Hz power source. They are supplied with a Schuko cordset. If a plug must be installed, use only the 3-prong grounded type, rated for the unit load requirements and matching the power outlet. Make sure the green ground wire is secured to the plug ground terminal.

Warning Do not operate shaker with a damaged electrical cord. ▲

To eliminate hazard of electrical shock, make sure floor around shaker is dry. In the event of accidental spilling or splashing of liquids, clean up and/or neutralize the spilled liquids before continuing.

Disconnect the shaker from the power source when not in use.

Platform Installation

1. Select the appropriate platform for the vessels to be shaken. A wide variety of platforms and accessories are available:
   - Dedicated platforms have the maximum number of flask clamps attached for safe operation.
   - Combination platforms allow the user to shake a wide variety of different sized vessels on the same platform.
2. Carefully position the platform horizontally over the shaker's mounting plate, aligning the 4 mounting holes.
3. Position one of the thumbscrews provided through each of the 4-platform mounting holes and tighten securely.

Caution Do not operate shaker with an unbalanced load. Platforms should be loaded for optimum stability and operation. Do not lift shaker by the platform. ▲

Flask Clamp Installation

Each flask clamp contains a support spring located at the narrow top of the clamp.

Depending on the size of the clamp, the clamp base may contain one or several screws necessary to secure the clamp to the platform. All screws provided with the clamp must be properly attached to the platform.

1. Carefully place the desired vessel in the clamp by first pulling the clamp spring far enough apart to enable the flask base to be positioned inside the clamp. Gently slide the flask into its proper position securing it to the wider bottom of the clamp. The spring will hold the neck of the flask securely in place and provide security during shaking.

2. Make sure all vessels are securely clamped before turning on unit.

Wherever possible, vessels should contain a stopper to prevent hazardous substances being thrown out during the mixing action.

Warning Do not operate the shaker at speeds that will cause the contents of vessels to be thrown out. ▲

Test Tube Rack Installation

1. Position the test tube rack on the platform so that the rack leg clamps are aligned with corresponding mounting holes on the platform. There are four feet on each unwire test tube rack clamp that need to be secured to the platform.

2. Secure the rack to the platform with mounting screws provided.

Section 5 Operation

Leveling the Unit

1. Place an average load onto the shaker platform. Set shaking speed to 250 rpm. Press START/STOP to activate platform rotation.
2. Set torpedo level onto top of MaxQ 6000 unit. Loosen the locking nut on the shaker feet using a 3/4" wrench.
3. Adjust the feet on both the front-to-back and right-to-left axis until the unit is level.
4. Tighten the locking nut on all feet using a 3/4" wrench and ensure the unit is still level. Press START/STOP to deactivate platform rotation.

Turning Shaker On

1. Press power switch on the front panel to turn shaker on.
2. Press power switch a second time to turn shaker off.

Setting Shaking Speed

1. Hold down appropriate arrow key in the speed module of the control panel, up or down, until desired speed is set, up to 500 rpm. SET RPM light will illuminate.
2. Press SPEED ON/OFF key to begin shaking. RPM light will illuminate.
3. Press SPEED ON/OFF key to end shaking. SET RPM light will illuminate.

Caution It is recommended that shaking action be started at a low speed in order to check that all vessels are secure and that no spilling of contents will occur. ▲

Note Speed can be changed without pressing the START/STOP key. Simply press the appropriate up or down arrow until desired rpm is reached. There will be an audible beep before the display lights. ▲

Setting Operating Temperature

1. See up and down arrows on the right side of the control panel. Press and hold up arrow key to increase temperature, release key when desired set point is obtained.

2. Press and hold down arrow key to decrease temperature, release key when desired set point is obtained.

3. Once set, temperature control is initiated by pressing the TEMP ON/OFF key; the heater will react and start increasing the temperature to reach the set point.

4. During operation, both the up and down arrow keys can be used to adjust the temperature to a new set point.

Over-Temperature Protection (OTP)

MaxQ 6000 units come equipped with an over-temperature protection (OTP) control. This control is independent of the main temperature control and serves as a safety limit for the chamber temperature.

1. The over-temperature set point can be adjusted using a small straight-blade screwdriver to rotate the OTP shaft located on the right side of the unit.

2. Allow unit to stabilize at setpoint temperature before adjusting OTP.

3. Once setpoint is stable, rotate screwdriver counterclockwise until OSP appears in the Speed Display, the Temp Display wil register your OTP termperature setting. Adjust OTP to displayed temperature setting.

During over-temperature setpoint adjustment, the unit will display the set point in 1° increments on the front display. The over-temperature setpoint is generally adjustable between 0°C and 115°C. To avoid unnecessary cycling of over-temperature control, the main control will limit itself to 5°C above the temperature setpoint. For example, with a temperature set point of 37°C, the OTP can be adjusted down to 42°C. Note that the over-temperature setpoint is designed to limit the chamber temperature; components within may exceed this setting.

Note When adjusting OTP, E06 appears on Temp Display when you have exceeded the 5°C window. If the E06 mode continues for more than 5 seconds without adjusting OTP, the setpoint will need to be reset to original settings. ▲

AC Power Loss

The operating microprocessor possesses a non-volatile memory. Upon resumption or recovery from an AC power loss, the following will be noted:

- All readouts will flash until any key is pressed.
- If unit was shaking at the time of power failure, it will resume operation at the speed and timer settings that were entered at the time that AC power failed.

Temperature Calibration

An independent, accurate, and precise temperature measurement device is needed for temperature calibration.

To achieve published specifications, the independent measurement device must have a accuracy of at least 0.1°C. If using thermocouple-based measurement, a thermocouple of 24 gauge wire is recommended.

1. Place the independent sensor near the geometric center of the chamber.
2. Set the unit to control at the desired calibration temperature.
3. Allow the control and chamber sufficient time to settle out at the control temperature. The required time is highly dependent on control temperature and system load, it varies from minutes to hours.
4. Once the chamber temperature has settled out, record the temperature displayed by the independent sensor. To obtain the best result, an averaged temperature reading over approximately 5 minutes should be used.

Note This method calibrates to chamber air temperature and is sufficient for most situations. In some cases, it may be desirable to calibrate to a specific load and/or load location. The process is the same save for the placement of the independent sensor, which is adjusted based on user needs. ▲

5. Press the POWER key. The unit should turn off.
6. Press and hold the TEMP UP and TEMP ON/OFF keys simultaneously for approximately 5 seconds. The unit should enter Calibration Mode as indicated by ‘CAL’ being displayed on the shaker display and the calibration set point being displayed on the temperature display.
7. Using the TEMP UP and TEMP DOWN keys, adjust the temperature display to match the recorded independent sensor reading.
8. Press the POWER key. This completes temperature calibration.

Shaking Speed Calibration

An independent, accurate, and precise RPM measurement device is needed for shaking speed calibration. Note that during shaking speed calibration, opening the door will not stop the shaker. The user is advised to proceed with caution.

Warning During calibration, the door can be opened without the door switch stopping the shaking. The shaking will also not stop using the STOP key so use caution. ▲

1. Perform any necessary set up for the independent RPM measurement.
2. Ensure the shaking plate is free to rotate and that the door is closed.
3. If the unit is powered up, press the POWER key. This will power down the unit.
4. Press and hold the SPEED UP and SPEED START/STOP key simultaneously for approximately 5 seconds. The unit should enter Calibration Mode as indicated by 'CAL' being displayed on the temperature display and the calibration RPM being displayed on the 5. Wait for the shaker to reach speed.
5. Using the SPEED UP and SPEED DOWN keys, adjust the speed display to match the independent RPM sensor reading.
6. Press the POWER key. This completes shaking speed calibration.

Setting Timer for Timed Shaking

1. Press TIMER/CONTINUAL key until TIMER and SET TIME lights are illuminated. The HOURS or MINUTES light will also light up at this point depending on which option was previously chosen.
2. Press HOURS/MINUTES key for desired timing mode.
3. Hold down appropriate arrow key in the TIME module of the control panel, up or down, until desired timing cycle is set from 0.1 hour up to 999 hours, or from 0.1 minute to 999 minutes depending on which timing mode is chosen. SET TIME light will illuminate.
4. Press SPEED ON/OFF to begin timed shaking; countdown will begin from time set. TIMER and MINUTES or HOURS lights will illuminate and timer will count down from time selected. An audible alarm will sound at the end of the timing cycle and platform rotation will cease.

Setting Timer for Continuous Shaking

1. Press TIMER/CONTINUAL key until TIMER light is illuminated. The HOURS or MINUTES light will also light up at this point depending on which option was previously chosen.
2. Press HOURS/MINUTES key for desired timing mode.
3. TIME display should show 000. Press SPEED ON/OFF to begin timed shaking. Timer will begin to count up and will display accumulated time in display window. Platform rotation will continue and TIME display will flash when timer reaches 999 minutes or 999 hours.

RS232 Interface Port

The RS232 interface port (below) is located on the left side rear of the shaker cabinet and requires the use of a laptop or desk top computer running Microsoft Windows 98 or newer operating system.

Hyperterminal Configuration

1. Power up the host computer and close any running applications.
2. Open the HyperTerminal application by clicking on “Start” \ “Programs” \ “Accessories” \ “Communications” \ “HyperTerminal.”
3. In the “Connection Description” box, enter the name “Max Q Shaker” and choose an icon and click “OK.”
4. In the “Connect To” box, verify that “COM1” is selected under “Connect Using.” Click “OK.”
5. In the “COM1 Properties” box \ “Port Settings” folder select the following options:

   Bits per second: 9600

   Data bits: 8

   Parity: None

   Stop bits: 1

   Flow control None

   After verifying the above settings, click “OK.”

Hyperterminal Configuration (cont.)

6. In the main dialog box click on “File” \ “Save.”

Note RS232 Interface Port is for output only. Interface cables must not exceed 9.8’ (3m) in length. ▲

7. Exit the program by clicking on “File” \ “Exit” \ “Yes”.

8. Verify the program was saved by going to “Start” \ “Programs” \ “Accessories” \ “Communications” \ “HyperTerminal” \ “Max Q Shaker.”

9. This completes the configuration of HyperTerminal.

10. Turn shaker off and connect computer (COM 1) to shaker (COM PORT) with DB-9 serial printer cable.

11. Start HyperTerminal by clicking on “Max Q Shaker.”

12. Power up shaker. Shaker will screen print speed, time and temperature at one-minute intervals.

Setting Low Level Controls

The low limit control is located on the rear left side of the shaker cabinet. The low-limit control and low limit light are available only on units supplied with refrigeration systems.

1. Rotate low-limit control clockwise.

2. Set chamber temperature using TEMP UP and DOWN arrow keys.

3. Allow sufficient time for chamber temperature to stabilize before setting the low-limit control.

4. Rotate low-limit control slowly counterclockwise. When the set point is reached, low-limit status lamp will illuminate. Rotate the low-limit control slowly clockwise until the low-limit status lamp goes out.

5. Continue rotating the low-limit control about 5° of rotation to set it about 1°C to 3°C below the set point, the low-limit status lamp will extinguish and the temperature control status lamp stays lit.

6. When desired temperature is achieved, load the shaker.

Warning Do not operate the unit if any of the temperature controls become inoperative. A hazardous condition will develop which can result in injury or death and property damage. ▲

Optional Refrigeration System

This section applies only to units supplied with refrigeration.

When the unit power is on, refrigeration will be initiated automatically based on the set point. The main power switch needs to be ON for the refrigeration system to work. When the refrigeration system is activated, the compressor system will run continuously and the system will go through the following routine:

Upon every automatic activation of the refrigeration system, there is an approximate 2 minute delay until the compressor becomes activated. This is a safety feature, to prevent damage to the compressor. Because the compressor does not turn on immediately after the automatic activation of the refrigeration system, please note, THIS IS NORMAL. The defrost timer will begin initiation. This may turn the fans off for several minutes until it completes a normal defrost cycle.

During operation, the defrost timer will automatically "engage" every 4 hours, switching cold gas through the evaporator (inside) coils to hot gas in order to defrost the coils. There is a dedicated sensor inside the coils which will terminate the defrost when the temperature reaches a point where it is assured that there is no ice or frost on the coil. At low set point temperatures (i.e. 5°C), this defrost time will be longer than higher set point temperatures (i.e. 25°C), which may initiate and terminate immediately because the coils will be much warmer at higher set point temperatures.

Defrost Cycle Alteration

Refrigerated MaxQ 6000 units incorporate a defrost cycle to alleviate issues associated with the build-up of condensation (ice) on the evaporator coil which is visible inside the chamber. It may be desirable to alter or disable this cycle based on user conditions. Default mode is 12 hours between cycles and 15 seconds of defrosting the evaporator coil with another 15 seconds before the chamber blower comes on. The display will flash "dEF" while in defrost mode.

1. If the unit is powered up, press the POWER key, this will power down the unit.

2. Press and hold the TIMER HOURS/MINUTES key and the TEMP DOWN arrow key simultaneously for approximately 3 seconds. The unit should enter Defrost Adjustment Mode as indicated by the speed display reading 'dEF' and temperature display reading ' On' or 'OFF'.

3. Using the TEMP UP and TEMP DOWN arrow keys, adjust the defrost feature to either ' On' or 'OFF' as desired.

Defrost Cycle Alteration (continued)

4. Press the POWER key. This will enable or disable defrost based on the previous selection. If 'OFF' was selected, defrost will be disabled and the operation is complete. If ' On' was selected, continue to set the other defrost parameters.

5. The speed display should read 'dPE', and the temperature display should read the defrost period in hours between 1 and 20. The defrost period is the time between defrost cycles.

6. Using the TEMP UP and TEMP DOWN arrow keys, adjust the defrost period to the desired time.

7. Press the POWER key. This logs the defrost period and advances to defrost duration adjustment.

8. The speed display should read 'ddU', and the temperature display should read the defrost duration in seconds between 15 and 240. The defrost duration is the time the unit spends defrosting the coil each defrost period. During this time, the unit runs high temperature gas through the evaporator coil to defrost it.

9. Using the TEMP UP and TEMP DOWN arrow keys, adjust the defrost duration to the desired time.

10. Press the POWER key. This logs the defrost duration and ends defrost cycle alteration.

Interior Chamber Light

Press the lightbulb icon on the control panel to turn On interior chamber light.

Interior 1 Amp Chamber Outlet

Press the plug icon on the control panel to turn on interior 1 amp chamber outlet. A 1 amp resettable fuse is located on the back side of the unit.

Model Alteration

MaxQ 6000 units come in two varieties (exclusive of voltage): Incubated and Refrigerated. As Incubated units do no have cooling, it is necessary to configure the unit as such to avoid defrost cycles from triggering. The default model state is Refrigerated.

1. If the unit is powered up, press the POWER key, this will power down the unit.

2. Press and hold the TIMER HOURS/MINUTES key and the TEMP ON/OFF key simultaneously for approximately 5 seconds. The unit should enter model adjustment mode as indicated by the temperature display reading either ‘rEF’ or ‘Inc’, depending upon model state.

3. Using the TEMP UP and TEMP DOWN keys, adjust the model type to either ‘rEF’ or ‘Inc’ as desired.

4. Press the POWER key. This logs the model type to memory and initializes the unit.

Note It is not necessary to change models unless the firmware has been updated or if model selection is accidentally changed in the menu. ▲

Section 6 Maintenance

Wash the exterior of the unit with a soft cloth using a solution of mild soap and water, rinse off with clean water and dry thoroughly.

Warning Disconnect plug from electrical outlet before attempting any maintenance or repair of the unit. ▲

Note The shaking mechanism is equipped with sealed ball bearings which do not require further lubrication or adjustment. ▲

Note Make no attempt to service or repair a Thermo Scientific product under warranty before consulting your Thermo Scientific dealer. After the warranty period, such consultation is still advised, especially when the repair may be technically sophisticated or difficult. If assistance is needed beyond what the distributor can provide, call Technical Services. No merchandise should be returned directly to the factory without obtaining a Return Materials Authorization (RMA) number from Technical Services. ▲

Cleaning Condenser Filter / Coil

1. Referring to refrigeration models SHKE6000-7 and SHKE6000-8CE only, first disconnect power cord.
2. Remove top 3 screws from control panel nose
3. Remove air filter and clean. Reinstall air filter.
4. Replace control panel nose onto unit. Make sure the studs located on the bottom flange go through holes located on the bottom of the nose.
5. Replace and tighten the top 3 screws for the control panel nose.
6. If needed remove condenser side cover (left side of unit) and inspect condenser coil. If needed, clean with mild soap and water, rinse off with clean water and dry thoroughly. Take special care not to bend condensor fins.
7. Replace condenser side cover.

Suggested with every 3 months of constant use

Any internal adjustments or repairs must be performed by a qualified service representative.

Remove the bearing pan by loosening 4 thumbscrews in the platform center. Remove the sheet metal panel (9 screws) under the platform to expose the belt and interior parts. Inspect the drive belt for wear. Order a replacement if necessary.

Section 7 Troubleshooting

Problem	Possible Causes	Solutions
Shaker doesn't operate	Check if power cord is plugged in.	Plug in.
	Check if power supply matches requirements on data label.	Locate power supply that matches unit requirements.
	Check circuit breaker.	Reset circuit breaker.
	Check fuse.	Replace fuse.
	Check for flashing lights on control panel.	Press any key on control panel.
	Check if continual timer is flashing.	Reset timer.
Platform doesn't rotate or has erratic speed	Check for power to motor.	Replace motor if defective.
	Check drive belt.	Replace if worn, broken or slipped off pulley.
Shaker will not heat	Make sure "TEMP ON" lamp is lit.	Push "TEMP ON" key.
"dEF" flashing on the temperature display.	Indicates the unit is in defrost mode. This is normal operation for refrigerated units.	Allow unit to complete defrost mode. This may take up to five minutes.
Chamber receptacle will not work.	Check GFI located on right side of unit.	Push "RESET" button.

Heating Error Codes

Displayed Message	Intended to Detect	Cause	Solution
E01	Chamber RTDs out of range.	Chamber RTDs not connected.	Ensure proper connection of RTD.
		RTD open.	Replace TC1415X1.
		Control board defective.	Replace PC1415X1 control board.
E02	Chamber heating ramp up timeout.	Failure in element.	Replace element.
		Element SSR defective.	Replace element SSR.
		AC board not properly connected.	Check connections on PC1415X3 AC board.
		Failure in heating circuit on AC board.	Replace PC1415X3 AC board.
E06	On-Board OTP Relay tripped (AC board). OTP detected over temperature condition, relay has opened, power to the element removed.	OTP RTD temperature is above the OTP potentiometer setting.	Increase OTP potentiometer setting.
		OTP RTD temperature is above the OTP potentiometer setting.	Reduce Chamber set point.
		OTP RTD not connected.	Ensure proper connection of OTP RTD.
		Failure in heating circuit on AC board.	Replace PC1415X3 AC board.
E08	Chamber temperature too far from set point. Occurs after stabilizing, if the chamber temperature deviates ±1 °C from set point.	Set point too close to ambient (Incubated models only).	Adjust set point to not less than 10 °C above ambient.
		Failure in cooling system.	Check cooling system for proper operation.
		AC board not properly connected.	Check connections on PC1415X3 AC board.
		Failure in cooling control circuit on AC board.	Replace PC1415X3 AC board.
		Door not sealed properly.	Check the rubber door gasket. Make sure that door seals.

Shaking Error Codes

Displayed Message	Intended to Detect	Cause	Solution
E12	Locked rotor in shaking control.	Locked rotor condition.	Free locked rotor.
		Failure in motor.	Replace motor.
		Failure in motor control circuit.	Replace PC1415X1 control board.
E13	Shaker RPM too far from set point.	Shaker pan adjusted incorrectly.	Readjust the 9 screws that secure the pan.
		Shaking RPM deviates more than ±10% of set point.	Shaking platform load too large.
		Obstruction between shaking platform and chamber wall.	Remove obstruction.
'bAL'	Shaker balance error. The speed display will show 'bAL'.	Unit vibrates and produces excessive noise and then displays 'bAL'.	Unit not leveled properly.
		Shaking platform load too large	Reduce the load placed on shaker platform.

General Error Codes

Displayed Message	Intended to Detect	Cause	Solution
E21	Corrupt Data Flash Memory	Invalid Data Flash Checksum	Call Technical Services or see Notes on E21 below.
Continuous Beep, No Display.	Corrupt Program Flash Memory	Invalid Program Flash Checksum	Replace or Reprogram PC1415X1 control board. Call Technical Services.

Notes

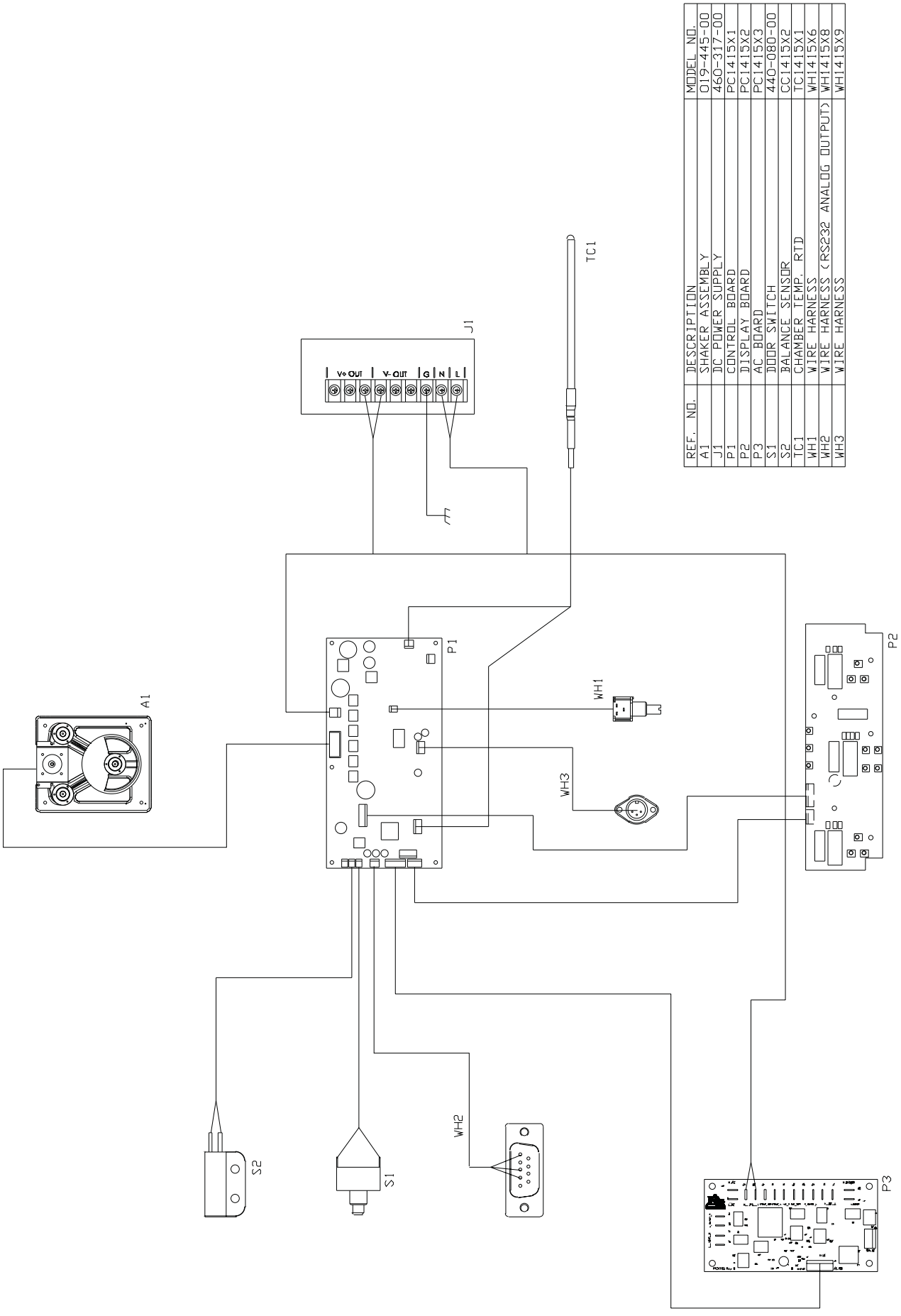
Errors E01 and E02 are critical heating errors. Error Handler will lock out heating and cooling functionality if these errors are detected. Shaking functionality is unaffected. If the condition that caused the error is no longer present, pressing the any button or unplugging the unit will clear Errors.

Error E06 and E08 are non-critical errors and the unit will continue to attempt to reach set point. If the condition that caused E06 or E08 is no longer present, the unit will automatically clear them.

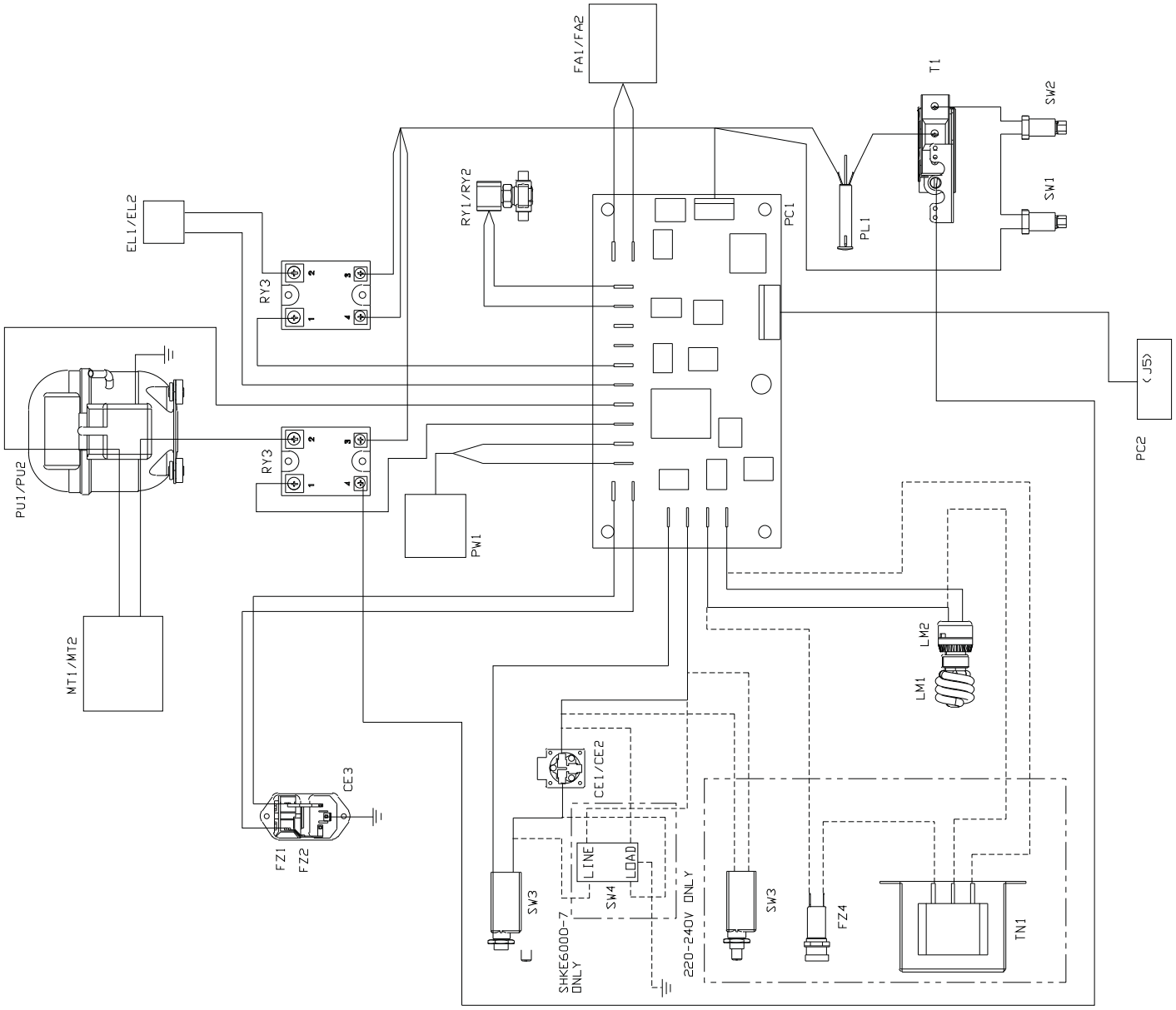
Errors E12, E13, and 'bAL' are shaking errors. Error Handler will lock out shaking functions if shaking error is detected. Pressing any button or unplugging the unit will clear the errors.

Error E21 is a data flash memory error and can be corrected by following the steps below:

- Press any key to clear the error, this re-initializes data flash memory.
- Note that it may be necessary to recalibrate the unit and/or re-enter custom settings as the unit has been reset to factory default.
- The unit can now be started normally using the POWER key.


REF. NO. | DESCRIPTION | MODEL NO.
A1 | SHAKER ASSEMBLY | 019-445-00
J1 | DC POWER SUPPLY | 460-317-00
P1 | CONTROL BOARD | PC1415X1
P2 | DISPLAY BOARD | PC1415X2
P3 | AC BOARD | PC1415X3
S1 | DOOR SWITCH | 440-080-00
S2 | BALANCE SENSOR | CC1415X2
TC1 | CHAMBER TEMP. RTD | TC1415X1
WH1 | WIRE HARNESS | WH1415X6
WH2 | WIRE HARNESS (RS232 ANALOG OUTPUT) | WH1415X8
WH3 | WIRE HARNESS | WH1415X9
J1
V+ OUT
V- OUT
G
N
L
TC1
P1
P2
P3
A1
WH1
WH3
WH2
S1
S2

REF. NO.	DESCRIPTION	PART #'S
MT1	CONDENSER FOR MOTOR (120V)	MT1415X1
MT2	CONDENSER FOR MOTOR (240V)	MT1415X2
PU1	COMPRESSER (120V)	PUX36
PU2	COMPRESSER (240V)	PUX35
EL1	ELEMENT (120V)	EL1415X1
EL2	ELEMENT (240V)	EL1415X2
RY1	SOLENOID (120V)	RY1415X1
RY2	SOLENOIC (240V)	RY1415X2
RY3	RELAY	RYX34
FA1	CHAMBER BLOWER (120V)	FA1415X1
FA2	CHAMBER BLOWER (240V)	FA1415X2
T1	THERMOSTAT LOW-LIMIT (COMPRESSER)	920-098-01
PL1	PILOT LIGHT	PLX114
SW1	LOW PRESSURE SWITCH	SW1415X1
SW2	HIGH PRESSURE SWITCH	SW1415X2
SW3	CIRCUT BREAKER	330-158-00
SW4	GFCI	CEX424
LM1	CHAMBER LAMP	LMX35
LM2	CHAMBER LAMP SOCKET	LM1415X1
TN1	TRANSFORMER (240V)	TN1415X1
FZ1	FUSE (120V)	PC1415X1
FZ2	FUSE (240V)	PC1415X2
FZ3	FUSE HOLDER	CEX400
FZ4	FUSE	420-348-00
PW1	POWER SUPPLY	CEX172
		266058
		261575
		FZX50
		FZX49
		460-317-00



Section 9 Replacement Parts

Component	SHKE6000 (SERIES 1415)	SHKE6000-1CE (SERIES 1415)	SHKE6000-7 (SERIES 2120)	SHKE6000-8CE (SERIES 1415)
Belt, Drive	150-288-00	150-288-00	150-288-00	150-288-00
Circuit Breaker, 1A	330-158-00	330-158-00	330-158-00	330-158-00
Compressor			PUX36	PUX35
Element	EL1415X1	EL1415X2	EL1415X1	EL1415X2
Fuse	266058	261575	266058	261575
Fuse		FZX49		FZX49
GFCI			CEX424	
Lamp, Chamber	LMX35	LMX35	LMX35	LMX35
Linecord	CRX106	CRX104	CRX106	CRX104
Linecord, UK		CRX108		CRX108
Linecord, China		CRX115		CRX115
Motor	370-390-00	370-390-00	370-390-00	370-390-00
Motor, Chamber Blower	FA1415X1	FA1415X2	FA1415X1	FA1415X2
Motor, Condenser			MT1415X1	MT1415X2
PC Board, Control	PC1415X1	PC1415X1	PC1415X1	PC1415X1
PC Board, Display	PC1415X2	PC1415X2	PC1415X2	PC1415X2
PC Board, Power	PC1415X3	PC1415X3	PC1415X3	PC1415X3
Power Supply	460-317-00	460-317-00	460-317-00	460-317-00
Relay, Solid State	RYX34	RYX34	RYX34	RYX34
Sensor, Vibration	CC1415X2	CC1415X2	CC1415X2	CC1415X2
Shaker Mechanism	019-445-00	019-445-00	019-445-00	019-445-00
Switch, Door	440-080-00	440-080-00	440-080-00	440-080-00
Temperature Sensor	TC1415X1	TC1415X1	TC1415X1	TC1415X1
Transformer		TN1415X1		TN1415X1
Thermostat, Low Limit			920-098-01	920-098-01
Wiring Diagram	LT2120X2	LT2120X2	LT2120X2	LT2120X2

Component	SHKE6000 (SERIES 1415)	SHKE6000-1CE (SERIES 1415)	SHKE6000-7 (SERIES 2120)	SHKE6000-8CE (SERIES 1415)
Belt, Drive	150-288-00	150-288-00	150-288-00	150-288-00
Circuit Breaker, 1A	330-158-00	330-158-00	330-158-00	330-158-00
Compressor			PUX36	PUX35
Element	EL1415X1	EL1415X2	EL1415X1	EL1415X2
Fuse	266058, 261575	266058	261575	
Fuse		FZX49		FZX49
GFCI			CEX424	
Lamp, Chamber	LMX35	LMX35	LMX35	LMX35
Linecord	CRX106	CRX104	CRX106	CRX104
Linecord, UK		CRX108		CRX108
Linecord, China		CRX115		CRX115
Motor	370-390-00	370-390-00	370-390-00	370-390-00
Motor, Chamber Blower	FA1415X1	FA1415X2	FA1415X1	FA1415X2
Motor, Condenser			MT1415X1	MT1415X2
PC Board, Control	PC1415X1	PC1415X1	PC1415X1	PC1415X1
PC Board, Display	PC1415X2	PC1415X2	PC1415X2	PC1415X2
PC Board, Power	PC1415X3	PC1415X3	PC1415X3	PC1415X3
Power Supply	460-317-00	460-317-00	460-317-00	460-317-00
Relay, Solid State	RYX34	RYX34	RYX34	RYX34
Sensor, Vibration	CC1415X2	CC1415X2	CC1415X2	CC1415X2
Shaker Mechanism	019-445-00	019-445-00	019-445-00	019-445-00
Switch, Door	440-080-00	440-080-00	440-080-00	440-080-00
Temperature Sensor	TC1415X1	TC1415X1	TC1415X1	TC1415X1
Transformer		TN1415X1		TN1415X1
Thermostat, Low limit			920-098-01	920-098-01
Wiring Diagram	LT2120X2	LT2120X2	LT2120X2	LT2120X2

Refer to the Specification Plate for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the Thermo Scientific dealer from whom this unit was purchased, or can be obtained promptly from the factory. When service or replacement parts are needed, check first with your dealer. If the dealer cannot process your request, then contact our Technical Services Department.

Prior to returning any materials, contact our Technical Services Department for a “Return Materials Authorization” number (RMA). Material returned without an RMA number will be refused.

Thermo Scientific
401 Millcreek Road
Marietta, Ohio 45750
United States

www.thermofisher.com

ThermoFisher
SCIENTIFIC