Model SHKE8000 Series

MaxQ Orbital Shaker*

Operating and Maintenance Manual 7000443 Rev. 4

Thermo SCIENTIFIC

(from cover)

* Triple counter-balanced, single eccentric drive mechanism (U.S. Patent #5,558,437)

* Horizontal, HEPA-filtered airflow design (U.S. Patent #5,577,837)

* Test Tube Rack (U.S. Patent #5,632,388)

Models covered by this manual

Model	Number	Voltage	Width (exterior)
SHKE8000	443	120	46.5 inches
SHKE8000-1CE	444	230	46.5 inches
SHKE8000-7	493	120	56.5 inches
SHKE8000-8CE	496	230	56.5 inches

MANUAL NUMBER 7000443

REV	ECR/ECN	DATE	DESCRIPTION	By
--	25899/OS-345	10/28/09	Revised stacking info (pgs 1-3 through 1-5)	ccs
4	25596/OS-345	10/28/09	Added cord attachment info (pg 1-13)	ccs
3	25181/OS-331	3/25/09	Updated wiring drawings (-71); shock and fuse labels	ccs
2	25220/OS-337	2/18/09	Updated schematics to match amps to serial tag	ccs
1	25216/OS-336	1/26/09	Updated warranty and corrected 760201 hepa filter to 760440	ccs
0	24772/OS-323	10/31/08	Original	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. ▲

Warning Use Model SHKE8000 Series Shakers to process non-flammable materials only. ▲

Warning Grounding circuit continuity is vital for the safe operation of this shaker. Never operate this unit with the grounding conductor disconnected. ▲

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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:

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Section 1 Installation

Model SHKE8000/SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE Stackable Shakers are shipped with the following materials:

1 - T-handle 5/32” hex socket wrench
2 - Platform alignment studs 1/4-20
1 - Removeable shaker platform
6 - Grade 8, 5/32” hex socket flat head screws (with platform)
1 - 3/4” open end wrench
1 - Screwdriver for flask clip installation and removal

Location

Locate the shaker on a firm, level surface in an area free of dust and dirt. To allow for service access, the back of the shaker must be at least 4 inches from the wall. Note location of the power and light switches (Figure 1-1).

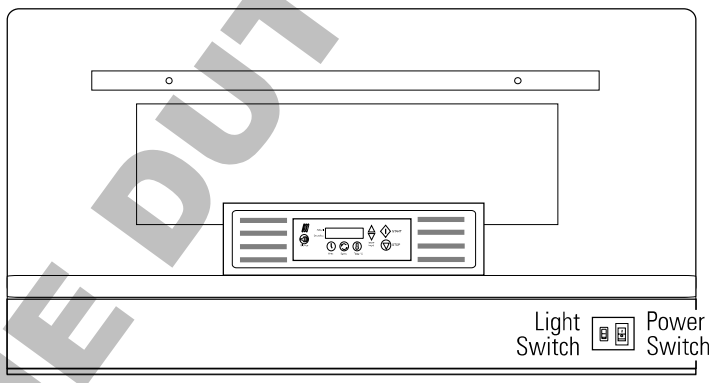


Figure 1-1. Model SHKE8000 Series Incubated Stackable Orbital Shaker

Positioning

Warning Use extreme caution when lifting and positioning the stackable shaker. Model SHKE8000/SHKE8000-ICE weighs 550 lbs. (249.5kg) and Model SHKE8000-7/SHKE8000-8CE weighs 600 lbs. (272.2kg). ▲

Warning Do not lift the unit by hand. Always use suitable equipment designed to support over 600 lbs. (272.2kg). ▲

Warning It is imperative that all specified installment hardware be used when stacking shakers. Failure to do so may result in severe injury and/or equipment damage. ▲

Caution Do not lift the unit under the sidecar! The sidecar structure is not designed to support the weight of the unit. ▲

Caution Do not lift or position the unit by the door or door handle. Damage to door mounting and gasket may occur. ▲

Caution Do not lift with forklift or other lifting device near the center of the unit base. Damage to the shaker mechanism mounting may occur. When lifting from the base, position the lifting device as close as possible to the leveling feet. Whenever possible, lift the unit by the four threaded inserts (Figure 1-3). Do not attempt to lift a stack of units by the threaded inserts. The inserts are provided to lift and position only one unit at a time. ▲

Before stacking the shakers, make sure all units are turned off and disconnected from the power source. To access the threaded inserts needed to secure the shakers to the stand or another unit, remove the front kick panel and back cover plate (Figures 1-2 and 1-3). Remove the screws where indicated. Replace after stack is secure.

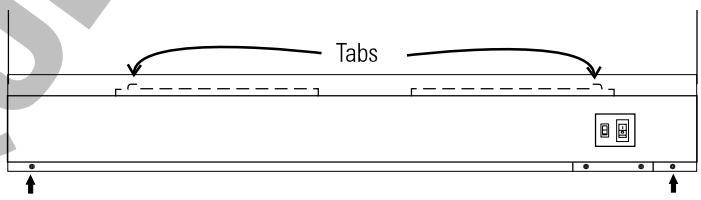


Figure 1-2. Kick Panel on Front of Unit

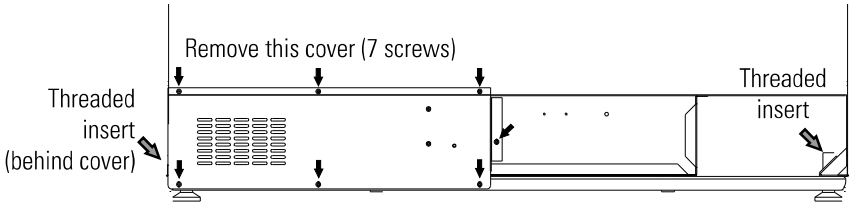


Figure 1-3. Cover Plate on Back of Unit

Positioning (continued)

For easier access to stacking hardware, the top two screws on the front of the relay box bracket may be removed (Figure 1-4). The relay box can be pushed carefully back approximately an inch. The stacking hardware may then be installed. When the stack has been secured, pull the relay box forward and reinstall the two screws.

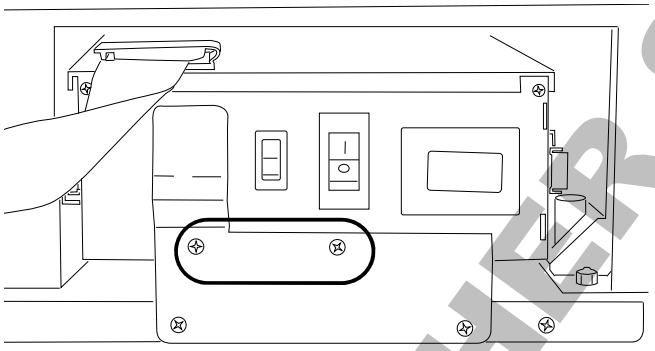


Figure 1-4. Remove Two Screws

Floor Installation

To install a single unit, or the base unit for a stack of shakers on the floor, first position the unit in its final location.

1. Install the neoprene pads onto each of the leveling feet of the single (or base) unit.

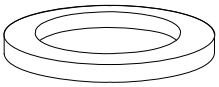


Figure 1-5. Neoprene Pad

2. Level the unit. Refer to the Leveling section.

To stack shakers onto a base unit on the floor, make sure the neoprene pads are installed onto the leveling feet of the base unit.

1. Place the 1-1/2 inch tall spacers over the holes in the top four corners of the base unit.

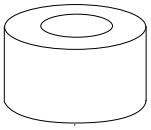


Figure 1-6. Spacer

2. Remove the leveling feet from the second shaker.
3. Carefully lift and position the shaker over the spacers on the base unit. Align the (4) mounting holes in the bottom of the shaker with the (4) spacers.
4. Thread the included 5/16”- 18 x 4” bolts through the inserts, then the spacers, and into the unit below. Tighten bolts.
5. Level the shaker/stack. Refer to the Leveling section.

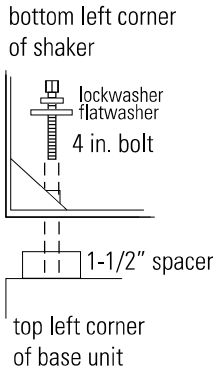


Figure 1-7. Shaker to Shaker

Single Unit on a Stand

Before installing the single unit onto the stand, place the stand in its final location.

1. Install the neoprene pads to each of the stand leveling feet.
2. Place a 1-1/2 inch tall spacer over each hole on the top four corners of the stand.
3. Remove the (4) leveling feet from the shaker.
4. Carefully lift and position the shaker over the spacers on the stand. Align the (4) mounting holes in the bottom of the shaker with the (4) spacers.
5. Assemble the lockwashers, then the D-shaped flatwashers onto the 1/2”-13 x 4” bolts. Thread the bolts through the underside of the stand top rails, through the spacers and into the holes in the bottom of the unit. Tighten these bolts to secure the shaker to the stand.
6. Level the stand. Refer to the Leveling section.

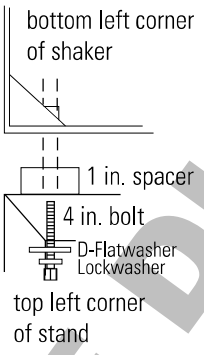


Figure 1-8. Shaker to Stand

Figure 1-9. Unit on Stand

Stacked Units on a Stand

The stand for two units is shorter than the stand for a single unit for operator convenience. Before installing the base unit onto this stand, place the stand in its final location.

1. Add the neoprene pads to each of the stand leveling feet.
2. Place a 1-1/2 inch tall spacer over each hole in the top four corners of the stand.
3. Remove the leveling feet from each shaker.
4. Carefully lift and position the shaker over the spacers. Align the (4) mounting holes in the bottom of the shaker with the (4) spacers.
5. Assemble the lockwashers, then the D-shaped flatwashers on the 1/2”-13 x 4” bolts. Thread the bolts through the underside of the stand top rails, through the spacers and into the holes in the bottom of the unit. Tighten these bolts to secure the shaker to the stand. See Figure 1-10.

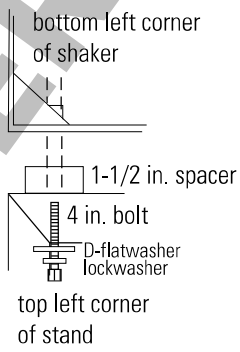


Figure 1-10. Stack on a Stand

6. Place a 1-1/2 inch spacer over each of the four holes in the top corners of the unit already on the stand.
7. Carefully lift and position the shaker over the spacers. Align the (4) mounting holes in the bottom of the shaker with the (4) spacers.
8. Thread the 5/16”-18 x 4” bolts with the required lockwashers and flatwashers through the threaded inserts, then the spacers, and into the unit below. Tighten all bolts. See Figure 1-11.

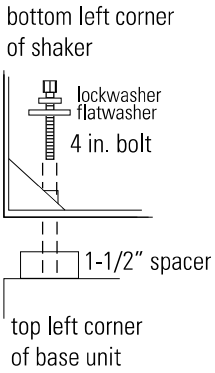


Figure 1-11. Shaker on Base Unit

Figure 1-12. Stack on Stand

Leveling the Stackable Shaker

After positioning the shaker (or stack) in its final location, it is critical that the unit(s) be as level as possible. Each of the leveling feet on a shaker or stand has an adjustment nut (the lower one, for leveling purposes) and a locknut (the upper one, for securing the adjustment). See Figure 1-13.

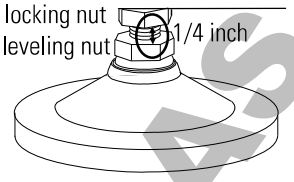


Figure 1-13. Leveling Feet

Using a 3/4" or adjustable wrench, turn the adjustment nut (extend the leveling foot) to achieve a level condition. Make sure the shaker (or stack) is leveled side-to-side and front-to-back. This can usually be accomplished by adjusting only two feet. Verify that all four feet are in full contact with the floor when leveling is complete. To "tune out" any vibrations, see the Tuning the Cabinet section. After each leveling (and/or tuning), secure the adjustment in place by tightening the locknut against the base of the cabinet/stand.

Caution The leveling feet extend only a very short distance. When the unit is leveled and tuned, with the leveling feet locked in place, the adjustment and locking nuts should be no further apart than 1/4 inch. ▲

Unit Drains

Information concerning the two drains on these shakers follows.

Chamber Drain

A drain is provided in the bottom of the chamber for convenience when cleaning or removing spills (Figure 1-14). A clear vinyl hose and plastic valve are connected to the drain and accessed by removing the lower front panel. The panel has two screws along the bottom and tabs along the top located in slots.

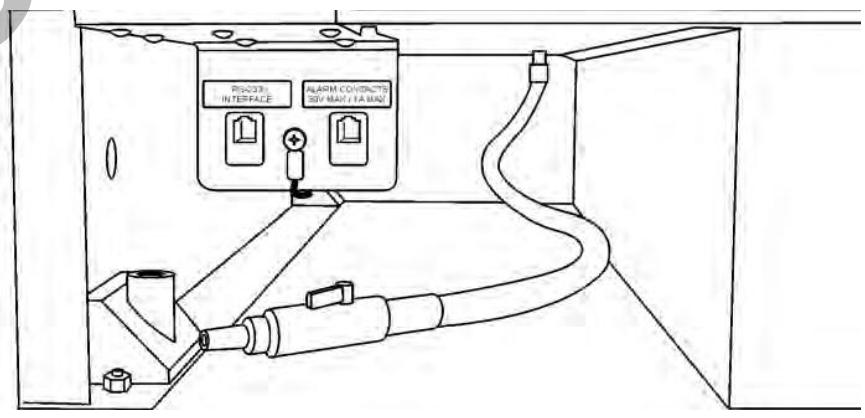


Figure 1-14. Chamber Drain

Condensate Drain

A 3/8" O.D. stainless steel condensate drain is located on the right side of the shaker in the side car (Model SHKE8000-7/SHKE8000-8CE only). This drain removes any water which may collect in the air ductwork. Water accumulates into a pan where it is evaporated by the heat from the refrigeration system. This drain does not require maintenance.

Assemble the Flask Clips

Each flask clip up to 2.8 liters in size comes with a metal spring which must be installed onto the clip. For flask clips through 500 ml, insert the end of each spring into the holes on the top of the clip leg as shown in Figure 1-15.

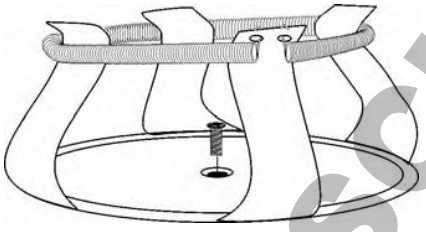


Figure 1-15. Clip Assembly

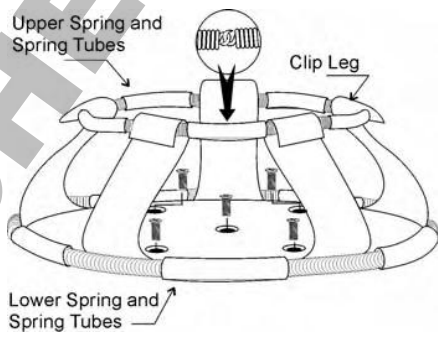


Figure 1-16. For Liter or Larger Flasks

The 2.0 and 2.8 liter Flask Clips use two metal springs and rubber spring tubes. On the larger clip, the springs are installed by hooking their ends together as illustrated in Figure 1-16. The upper spring and spring tubes should be installed prior to mounting the clip to the platform. The lower spring and spring tubes however, are placed around the bottom of the clip legs after the flask clip is fastened to the platform.

The 2 and 2.8 liter clips are supplied with two sets of springs and rubber tubes.

Note that rubber spring tubes are placed between each clip leg.

Install the Flask Clips

The Model SHKE8000/SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE accommodate glassware in numbers and sizes from ninety-one 25ml flasks to six 2.8 liter flasks. All platforms have mounting holes for flask clips and test tube racks made by other manufacturers.

Listed below are the flask clip assemblies and kits available for these shakers.

Table 1-1. Available Flask Clip Assemblies and Kits

Dedicated Platform Number	No. of Clips	Flask Size	Springs per Clip	Screws per Clip
238066	91	25 ml	1	1
238067	91	50 ml	1	1
238068	40	125 ml	1	1
238069	30	250/300 ml	1 (w/ 1 lg pad)	1
238070	40	250/300ml	1 (w/ 1 lg. pad)	1
238071	24	500 ml	1	1
238072	15	1 L	1	5
238073	12	2 L	2 (w/ 10 tubes)	5
238074	6	2800mL	2 (w/ 10 tubes)	5

Flask clips can be attached anywhere on the shaker platform. The counterbalanced design of these shakers can accommodate an unbalanced load.

The flask clips are supplied with the proper screws and are attached to the platform with a standard Phillips screwdriver or with the screwdriver provided with the unit.

Figures 1-15 and 1-16 illustrate the installation of the flask clips. Note that clips for 1, 2 and 2.8 liter flasks use five screws. The 250/300ml flask clip has an adhesive-backed flask cushion pad which is installed on the flat base of the clip body. A hole is provided in the pad for the mounting screw.

Install the Test Tube Holders

The Accessory Test Tube Racks and Test Tube Rack Holders are available in four sizes and are listed in Table 1-2. All the Test Tube Rack Holders are adjustable in seven positions, swinging and locking at 15°, 30° and 45° in either direction. Figure 1-17 illustrates the Test Tube Rack Holder with the rack in place.

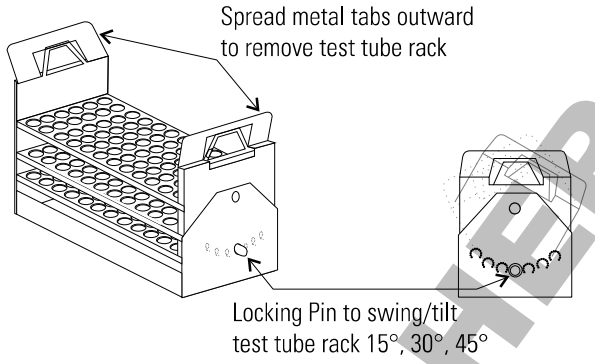


Figure 1-17. Test Tube Rack with Swing/Tilt Mechanism

To remove the rack, spread the metal tabs on either end of the holder and lift it out.

To install the Test Tube Rack Holder onto the shaker platform, remove the rack and rotate the swing-bed of the holder 90° by pulling the knobs of the locking pins on either end of the holder outward. The pins are locked in the outward position by turning the knobs 1/4-turn (Figure 1-18).

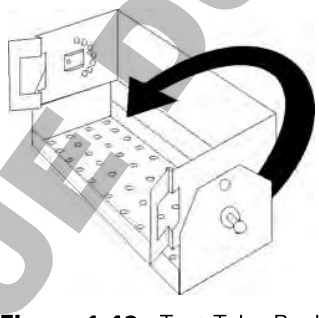


Figure 1-18. Test Tube Rack Holder with Rack Removed and Bed Rotated 90°

Test Tube Racks & Adj. Angle Rack Holder

Table 1-2. Available Test Tube Racks and Holders from Manufacturer

Part Number	Description
950040	Test Tube Rack, 10-13 mm size
950060	Test Tube Rack, 16-20 mm size
600074	Test Tube Rack, 21-25 mm size
600075	Test Tube Rack, 26-30 mm size
600076	Adjustable-Angle Test Tube Holder with Rack, 10-13 mm
600077	Adjustable-Angle Test Tube Holder with Rack, 16-20 mm
600078	Adjustable-Angle Test Tube Holder with Rack, 21-25 mm
600079	Adjustable-Angle Test Tube Holder with Rack, 26-30 mm
600088	Universal Adjustable-Angle Test Tube Holder, 10-25 mm
600089	2 Tier Micro-Plate Rack
600090	3 Tier Micro-Plate Rack
194024	#10-24 pan head Phillips screws for mounting test tube holders to Orbital Shaker platforms
185062	Pan head Phillips screws, washers and nuts for mounting test tube holders to Model 2568 and 2569 Shaker Baths

RS-232 Interface Connector

Model SHKE8000/SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE Orbital Shakers are equipped with an RS-232 Serial Communication Interface for the remote transmission of data. An RJ-11 telephone style connector is located on the lower front left corner of the cabinet, behind the kick panel (Figure 1-19). A cable with RJ-11 plugs and an RJ-11 to DB-25 adapter are required.

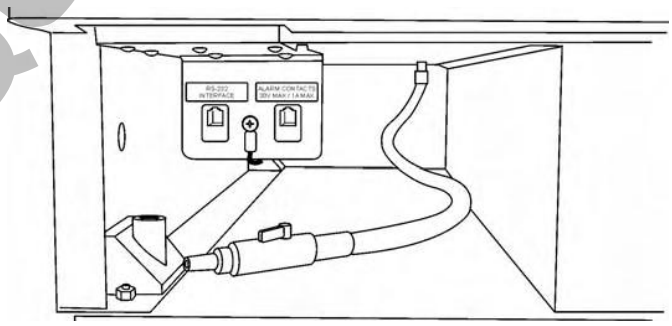


Figure 1-19. Location of RS-232 and Remote Alarm Connectors

RS-232 Interface Connector (cont.)

Figure 1-20 shows connector identifications. Figure 1-21 indicates the pin connections.

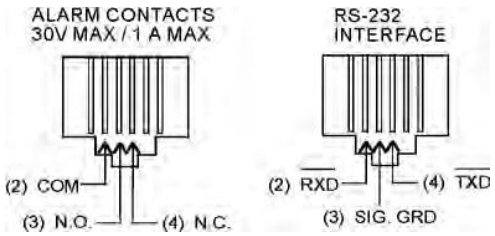


Figure 1-20. Connector Identification

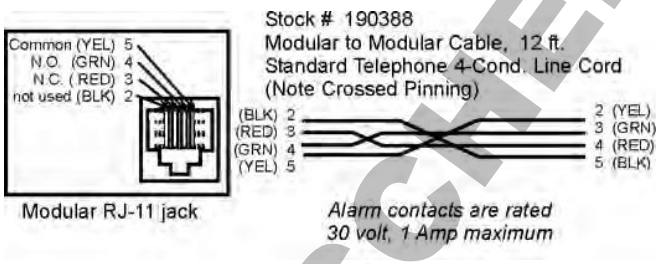


Figure 1-21. Pin Connections

The data is "dumb terminal" formatted, which permits interfacing with either a computer or a serial printer.

Three wires are used for the RS-232 interface:

1. Transmit data (/TXD) - pin 2 DB-25 connections
2. Receive data (/RXD) - pin 3DB-25 connections
3. Signal ground (GND) - pin 7DB-25 connections

The data format is:

Baud . . . . . .1200 (9600 baud with jumper at J2 on the Main Control Board)
Data bits . . . . . .8 (7 bit ASCII with leading zero)
Start bits 1
Stop bits 1
Parity . . . . . .none

RS-232 Interface Connector (cont.)

The data transfer sequence is transmitted in the following format. X refers to the numerical time, RPM and temperature.

(NUL)XX.XX(H)(SP)(SP)XXXRPM(SP)(SP)XX.XC(SP)(LF)(CR)(EOT)

NUL . . . . . .Null character (0)
SP . . . . . .Space
LF . . . . . .Line feed
CR . . . . . .Carriage return
EOT . . . . . .End of text (4)
H . . . . . .Hold Mode

The Model SHKE8000/SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE transmit time, RPM and temperature information one minute after power is first applied to the unit and then every 60 minutes.

The shaker's microprocessor responds to two ASCII commands from the remote: DC1 (XON), and DC3 (XOFF)

- DC1 (17, 11 Hexadecimal)

The shaker will transmit Time, Temperature and RPM data upon receiving "DC1" (XON) and will restart 60 minute interval transmissions unless inhibited by a "DC3" (XOFF).

- DC3 (19, 13 Hexadecimal)

Receiving a "DC3" (XOFF) from the remote inhibits the shaker from sending serial data indefinitely until a "DC1" (XON) is received.

IMPORTANT USER INFORMATION

Caution! Stored product should be protected by an activated alarm system capable of initiating a timely response 24 hours/day. Alarms provide interconnect for centralized monitoring.

Connect the Remote Alarm

An internal, remote alarm SPDT relay is provided to monitor alarms and is connected by an RJ-11 (telephone style) jack, located on the lower left front corner of the cabinet, behind the kick panel. The relay provides NO (normally open) and NC (normally closed) output and may be wired to a central remote alarm location or to an independent alarm system.

Figure 1-21 identifies the pin contacts. Figure 1-20 shows the location of the Remote Alarm Connector.

A modular to modular cable, Stock No. 190388 and an RJ-11 telephone style terminal converter, Stock No. 190392 or equivalent may be used to convert to a screw terminal connection. Refer to Figure 1-22.

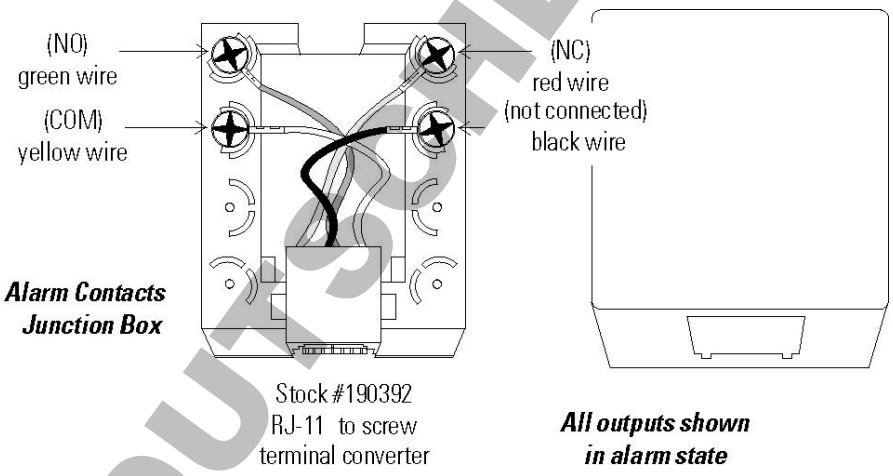


Figure 1-22. Converter

Connect to Electrical Power

Connect the line cord to the power inlet on the back of the unit. Route the cord through the factory-installed tie wrap anchor and tie wrap into place. This avoids accidental disconnection of the power cord from the unit.

See the serial tag on the side of the unit for electrical specifications or refer to the electrical schematics at the end of this manual.

Caution Connect the orbital shaker to a grounded, dedicated circuit. The power ON/OFF switch is the mains disconnect device for the orbital shaker. Position the unit so the switch is easily accessible. ▲

Quick Release Platform

The quick release platform base and (optional) platform assembly are shipped already installed in the unit.

1. To load the platform, open the chamber door.
2. Grasp the center handle, pull the inner release bar upward, then press the handle downward until it clicks into a horizontal position.

Figure 1-23. Handle

3. Pull outward on the platform. Load your samples, making sure all are securely fastened. Push the platform all the way into the chamber.
4. Pull up on the inner release bar and press the center handle upward into a vertical position. The door to the chamber may now be closed.

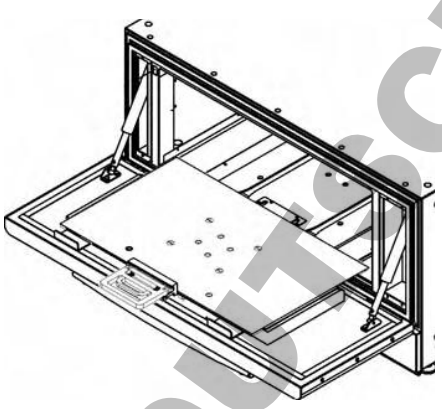


Figure 1-24. Handle When Loading

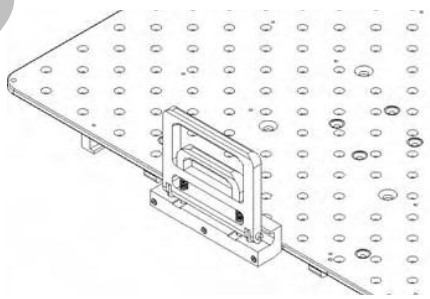


Figure 1-25. Handle Up to Close Door

Note The platform must be fully inserted into the cabinet and the center handle pressed into the 'up' position to ensure the platform is secured. ▲

Section 2 Operation

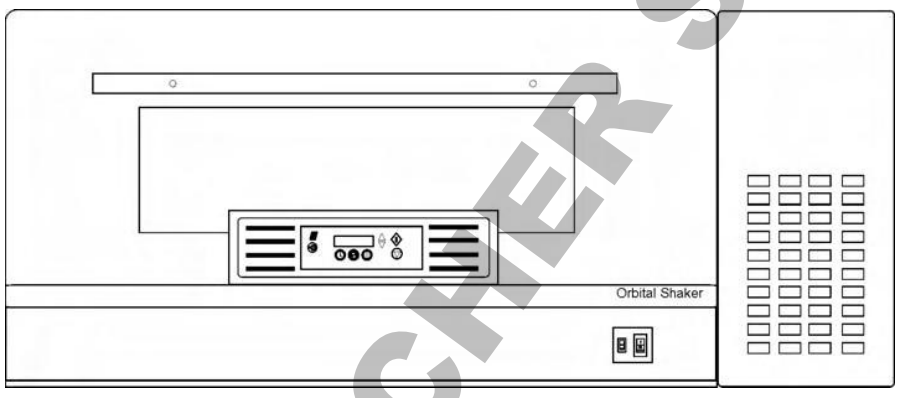


Figure 2-1. Model SHKE8000-7/SHKE8000-8CE Refrigerated Stackable Shaker

Introduction

The Stackable Shaker Models SHKE8000/SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE are microprocessor-controlled, incubated, refrigerated (SHKE8000-7/SHKE8000-8CE only) orbital units designed to accommodate a wide variety of flasks, test tubes and other glassware. The control system is easily programmed and stores the user-defined time, temperature and speed settings which remain in memory even when the shaker is turned off and unplugged.

The computer-based speed controller continuously adjusts for line voltage fluctuations and provides smooth start-ups and consistent RPM control. The circuitry is designed to slowly bring the platform up to speed and down to a stop to prevent splashing from flasks or test tubes.

The insulated door with viewing port has pneumatic dampers and spring assist for ease in opening and closing. A convenience interlock requires that the door be closed for the drive motor, circulating fans and refrigeration system (if applicable) to operate.

Caution The microprocessor speed control system may take up to one minute to bring the platform up to speed. Never leave the shaker unattended while starting. Make sure all flasks and test tube racks are firmly seated in the clips. Check the security of the flask clip and platform attachment screws monthly. The door must be closed for the air circulating fans to operate. Do not operate the shaker at maximum RPM without a load. ▲

Control Panel Operation

The control panel on these units has a liquid crystal display and eight operating keys or buttons that are identified by word and symbol. During programming, the up and down arrows increase and decrease the numerical values of time, platform speed, or temperature. Press either arrow to cause values to scroll in that direction. Press and hold for about five seconds to increase scrolling speed.

When programming the system configuration, the up arrow returns the display to the system's operating screen showing Time, RPM and Temperature, while the down arrow advances the display to the next programming screen.

The alarm indicator and alarm silence button complete the shaker control panel. When in alarm, the unit sounds an audible warning and flashes the three red indicators. Pressing the Silence button turns off the audible alarm. However, the three red indicators continue to flash until the alarm condition is corrected. The audible warning will sound again in about fifteen minutes, if the condition is not corrected.

Alarm features are discussed in detail later in this section.

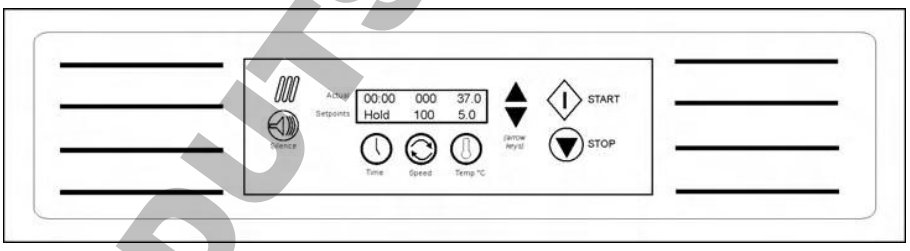


Figure 2-2. Control Panel

Quick Start-Up

The Stackable Orbital Shaker may be operated as soon as the platform is installed, the unit is plugged in, and turned on.

Note At power up, the screen at the right will appear briefly. ▲

Pressing Start and Stop will operate the shaker at the factory settings shown in Figure 2-2. When starting, the actual numbers along the top of the liquid crystal display will differ from the Setpoint values shown along the bottom. These numbers will change as the unit begins to operate.

Time - With the time set at Hold, the time display in the upper left portion of the screen will begin to count upward, showing the total operating hours and minutes. The system will reset to 00:00 whenever the unit is stopped and restarted using the Stop and Start buttons. The system will not reset if the unit is turned off and on using the power switch, or if the shaker door is repeatedly opened and closed.

Speed - The Actual speed will display zero RPM's and will gradually rise to the setpoint as the platform begins its motion.

Temperature - The temperature, shown in the upper right portion of the liquid crystal display, will indicate the actual ambient temperature inside the cabinet and will gradually move toward the 37° setpoint.

The values shown in Figure 2-2 are set at the factory and considered default values. Other factory settings are shown in the table below.

Table 2-1. Factory Settings

Function	Default	Reference Manual Section
Audible Alarm	ON	3
RPM Tracking Limit	5	3
Temp Tracking Limit	10°C	7
Over Temp Shut-down	63°C - 65°C	7
Under Temp Shut-down	-1°C to +2°C	7
All Remote Alarms	ON	3
Defrost	ON, 12°C	3

Factory Settings

The Stackable Shakers are shipped from the factory with the following default settings:

Time: When the shaker is turned on for the first time, the liquid crystal display will show 00:00H. (Hold time) This means the unit is set to record accumulated operating time. Any programming changes in the Time settings are made in increments of five minutes.

RPM: The display shows the unit ready to operate at 100 RPM. Programming changes in the RPM are made in increments of 1 RPM. However, if the up or down buttons are held for about two seconds, the display will scroll in that direction.

Temperature: The display shows the operating temperature set at 37°C. Changes to the Temperature program settings are made in increments of 0.1°C. However, if the up or down buttons are held for about two seconds, the display will scroll in that direction.

The Stackable Shaker can be easily programmed to meet the laboratory requirements using the shaker's microprocessor-based technology. The following sections outline the procedures for changing the settings and programming the control system.

Change Shaker Temp, Speed, Time Settings

When the unit is turned on or when the shaker is operating, Temperature, Time and RPM values are displayed on the LCD. A typical screen is illustrated in Figure 2-2. For convenience, this is called the Operating Screen throughout this manual. All programming or setting changes start from this screen.

The instructions to program the Stackable Shaker are written in a step-by-step format. For convenience, these instructions begin and end at the Operating Screen.

Caution If no control panel buttons are pressed for about fifteen seconds during programming or changing settings, the display automatically returns to the Operating Screen, storing any settings made. New settings are also stored immediately when either arrow key is pressed. ▲

Change Temperature

1. Press the button beneath temperature setpoint (Temp°C). The temperature value will begin to flash.
2. Press the up or down arrows to set the new temperature in 0.1°C increments. Hold either button to scroll.
3. Press the temperature button one more time (twice for Model SHKE8000-7/SHKE8000-8CE) to return to the Operating Screen.

The temperature can be set over a range of 5.0°C to 60.0°C. However, Model SHKE8000/SHKE8000-ICE may not control temperature properly if the temperature is set less than 10.0°C above ambient temperature.

Note The heating system and temperature alarms can be disabled on Model SHKE8000/SHKE8000-ICE by setting the temperature to 4.0°. ▲

Change RPM

1. Press the button beneath the Speed setpoint. The RPM value will begin to flash.
2. Press the up or down arrows to set the new speed in 1 RPM increments. Hold either button to scroll.
3. Press the Speed button again to return to the Operating Screen.

The RPM can be set over a range of 25 to 400 RPM.

Change Time

The Stackable Shaker manages operating time in two ways:

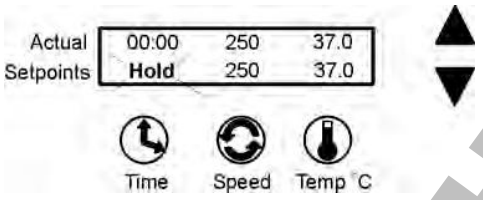
Hold - When Time is set to Hold, the value shown in the 'Actual' display represents total operating time and may be reset at the operator's convenience. The shaker will continue to count upwards even if the shaker door has been repeatedly opened and closed, or turned off and on with the power switch. The Time however, will reset to 00:00 when the Stop button is pressed, then the unit restarted by pressing the Start button.

Countdown - When the Hold setpoint is changed to Countdown, entering a time value in hours and minutes programs the shaker to operate for that period of time and automatically shut down platform motion. The display will show the programmed time in the Setpoint segment and the operating time remaining in the 'Actual' display, as the microprocessor counts down to zero. The countdown time can be set over a range of 5 minutes to 200 hours in 5 minute increments.

Change Temperature (continued)

Countdown (continued) - An additional feature on Model SHKE8000-7/SHKE8000-8CE is Hold Temperature. The refrigerated shaker can be programmed to operate at one temperature, then hold the cabinet at another temperature when the countdown reaches zero. The platform will stop, but the fans and the temperature control systems continue to operate. Further information on Hold Temperature Control follows in this section.

Change from Hold to Countdown

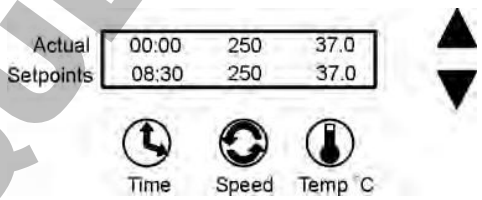


1. Press the button beneath the Time setpoint. Hold will begin to flash.

2. Press either arrow to access the Countdown Time setpoint. The preset time setpoint will begin to flash.

3. Press the up or down arrows to set the desired operating time in five minute increments. Hold either arrow to scroll in that direction.

4. When the desired elapsed time is set (8 hours, 30 minutes in this example), press the Time button to return to the Operating Screen. Pressing the Start button will start the shaker and begin the countdown sequence. As it counts down, the Actual time shown will decrease. When 00:00 is reached, the shaker platform motion will automatically shut off and the Cycle Complete alarm will sound.



Alarms

The Stackable Orbital Shaker control system monitors and provides alarms for nine operating parameters.

Parameter . . . . . .Alarm Message
Overtemp Setpoint Status . . . . .Overtemp Shutdown
Cycle Status . . . . . .Cycle Complete
Loss of Input Power . . . . . .Power Failure
RPM versus Setpoint . . . . . .RPM Tracking
Drive Belt Integrity . . . . . .Check Belt
Temp Sensor Integrity . . . . . .Sensor Fault
Temp Control Status . . . . . .Temp High/Low
Platform Movement Status . . . . . .Platform Stalled
Motor Fuse Integrity . . . . . .Check Fuse

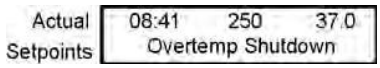
Both audible and visual alarm warnings for these nine parameters are provided by the shaker. Visual flashing of the three diagonal indicator lights on the control panel, a progression of text messages on the display, and an audible tone alerts the operator that an alarm condition has occurred, or currently exists.

For convenience, the audible tone is silenced by pressing the Silence button, but will ring back in about 15 minutes if the alarm condition is still present. However, the alarm warning indicator lights and alarm messages continue until the alarm condition is corrected by the operator. Then, pressing the Silence button clears the message from the display. (The Check Belt and Check Fuse alarm messages clear from the display when the unit is turned back on after correcting the alarm condition.)

As discussed in the Configuration section of this manual, the audible alarm feature may be turned off to suit operator or laboratory needs. Refer also to the Alarm Message/Corrective Actions chart in the Service section of this manual.

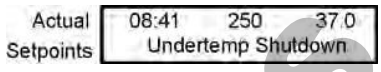
Overtemp Shutdown

Overtemp Shutdown alerts the operator that the overtemp setpoint has been exceeded by a few tenths of a degree. The Overtemp Shutdown message displays and the heaters turn off, but the platform and blowers continue to operate.



In the alarm state, the audible alarm is muted by pressing the Silence button, but will ring back in about 15 minutes if alarm condition is still present. The screen message and warning lights remain until the fault is corrected. Then, alarm message is cleared by pressing the Silence button.

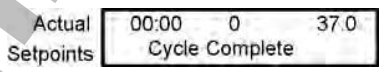
Undertemp Shutdown



Undertemp Shutdown alerts the operator that the chamber temperature has dropped below the Undertemp setpoint by a few tenths of a degree. The Undertemp Shutdown message displays and the refrigeration turns off, but the platform and blowers continue to operate.

In the alarm state, the audible alarm is silenced by pressing the Silence button, but will ring back in about 15 minutes if the alarm condition is still present. The screen message and warning lights continue until the fault is corrected. Then, the alarm message is cleared by pressing the Silence button.

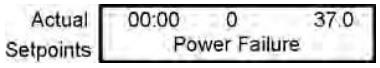
Cycle Complete



Cycle Complete alerts the operator that the end of the count-down running time has been reached. The Cycle Complete message displays and the shaker stops.

Pressing the Silence button clears the message from the display screen.

Power Failure



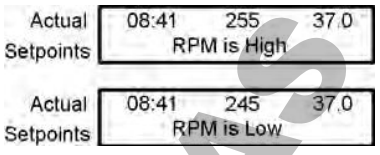
Power Failure alerts the operator that electrical power to the shaker was interrupted, then restored during shaking. While the system returns to normal operation when power is restored, the alarm message remains and the audible tone continues to sound. Both the display message and the audible tone are cleared by pressing the Silence button.

Note The alarm will not occur if the power failure is less than 15 seconds in duration. ▲

If power is interrupted for two hours or more while the Shaker is turned on but not shaking, a Power Fail alarm will occur. The purpose of the alarm in this case is to alert the user that an extended duration power failure occurred during the Hold interval after a timed shaking operation, or during a period of incubation only. This alarm will also occur any time the Shaker is turned on after an extended off period greater than 2 hours (such as when the unit is shipped from the factory, or when it is returned to use after a period of storage).

RPM Tracking

RPM Tracking alerts the operator by either alarm message shown at right that the platform speed has varied ±5 RPM.

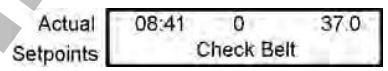


Note A two minute alarm delay is built into the software. ▲

In the alarm state, the audible alarm is silenced by pressing the Silence button, but will ring back in about 15 minutes if the alarm condition is still present. The screen message and warning lights continue until the fault is corrected. Then, the alarm message is cleared by pressing the Silence button.

Check Belt

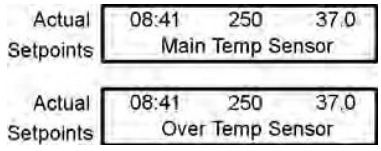
Check Belt alerts the operator that the drive belt may have broken, or an obstruction is slowing or preventing platform movement.



In the alarm state, the audible alarm is silenced by pressing the Silence button, but will ring back in about 30 minutes if the alarm condition is still present. The screen message and warning lights continue until the fault is corrected. The alarm message is cleared by cycling power to the unit OFF, then ON.

Temperature Sensor Fault

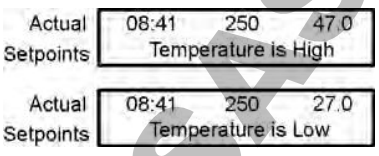
Sensor Fault alerts the operator that either of the shaker's two temperature sensors have failed. An alarm message similar to those shown at right indicates which sensor has failed.



When in the alarm state, the audible alarm is silenced by pressing the Silence button, but will ring back in about 15 minutes if the fault condition persists. The screen message and warning lights will continue until the fault is corrected. After the fault is corrected, the alarm message is cleared by pressing the Silence button.

Temperature High or Low

Temperature High or Temperature Low alerts the operator that the operating temperature of the shaker has risen above, or fallen below, the programmed temperature tracking limit control point. Therefore, either of the alarm messages shown at right could be displayed.



In the alarm state, the audible alarm is silenced by pressing the Silence button, but will ring back in about 15 minutes if the fault condition persists. The screen message and warning lights continue until the fault is corrected. After the temperature problem is corrected, the alarm message is cleared by pressing the Silence button.

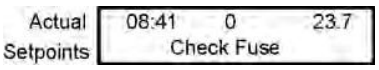
An alarm time delay of 3.5 hours is activated when the unit is first turned on or when the temperature setpoint is changed to allow adequate time for the heating or refrigeration (Model SHKE8000-7/SHKE8000-8CE) system to recover to the setpoint. The delay is reduced to 20 minutes if/when the temperature is within the temperature setpoint alarm band. See Section 3 for further information on setting the tracking alarm.

Platform Stalled

Platform Stalled alerts the operator that free platform movement is inhibited. The motor automatically shuts off and the audible alarm, screen message and warning lights are activated. The motor will attempt restart after approximately 15-20 seconds. The motor will continue to cycle on and off until the obstruction is removed, or the unit is turned off. On motor restart, the audible alarm and warning lights are automatically cleared. The display message remains until cleared by the operator.

Check Fuse

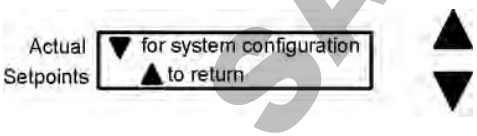
Check Fuse alerts the operator that primary drive motor fuse has blown. The audible alarm, screen message and warning lights are initiated. When the unit is turned on after fuse replacement, all alarm indicators are automatically cleared.



Change Configuration

To access the system Configuration menu, press the down arrow, the up arrow, then the Silence button, in that order. This screen will appear on the display.

Pressing the down arrow continues system configuration.



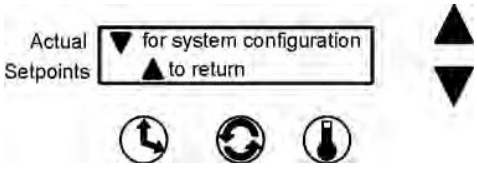
Pressing the up arrow returns to the Operating Screen.

During the following configuration procedures, menu options are given to either modify a setting as it appears in sequence, or to scroll past to the next item. If no selection is made by pressing a button or arrow, the display reverts to the Operating Screen in about fifteen seconds. The complete configuration menu is shown in the chart at the end of this section.

Note In these procedures, values and settings for time, temperature, speeds, alarms, and so forth are shown on the display screens. These numbers are for example only and may not be the values encountered when programming your shaker. ▲

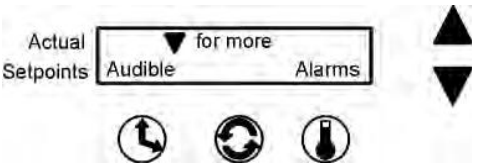
Turn the Audible Alarm On and Off

Begin by pressing the down arrow, the up arrow, and the Silence button. The following screen displays:

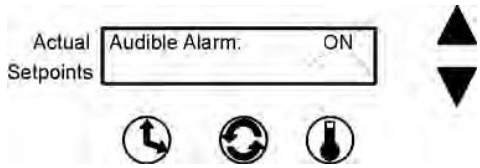


When this screen opens, press the down arrow once.

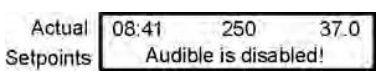
At the screen at right, press the Time button beneath Audible. The following screen appears and the current setting flashes.



Press the up or down arrow to turn the audible alarm function on or off. Pressing any of the three buttons (Time, Speed or Temp) returns the display to the previous screen. Not pressing anything for about 15 seconds returns the display to the Operating Screen.



When the audible alarm is disabled, a warning message displays in the Setpoint portion of the Operating Screen as shown at right.



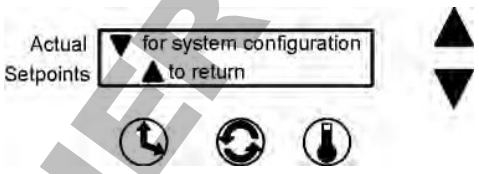
Set Alarm Limits

Three temperature alarms are programmed into the Stackable Orbital Shaker; Overtemperature, Undertemperature, and Tracking Limits.

Set the Overtemperature Alarm

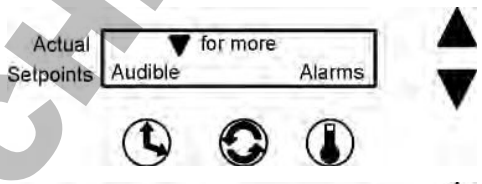
The Overtemperature alarm activates whenever the operating temperature goes above the Overtemp setpoint temperature by a few tenths of °C. This adjustable limit is set at the factory at approximately 64°C. To change this value, open the Configuration menu by pressing the down arrow, up arrow, and the Silence button in that order.

When this screen opens....

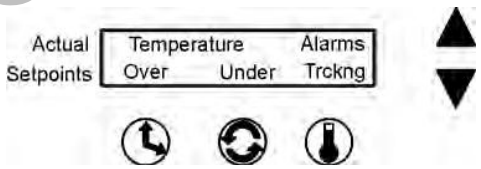


Press the down arrow once ....

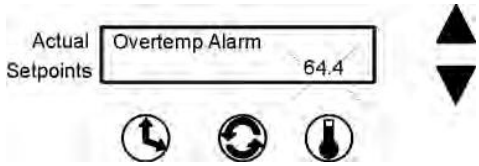
Then press the Temperature button beneath Alarms.



To change the Overtemperature alarm setting, press the Time button beneath Over.

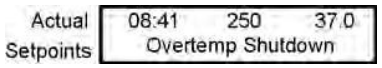


This screen appears and the current Overtemperature alarm setting flashes.



Change the Temperature setting by pressing the up or down arrow. When set, press the Temperature button to return to the previous screen or press nothing for about fifteen seconds. The display will change to the Operating Screen, saving the new settings into memory.

When the overtemperature setpoint is exceeded by a few tenths of a degree, the control system turns the heating system off. The Overtemp Shutdown warning displays, the warning lights flash and the audible warning (if not turned off) sounds.

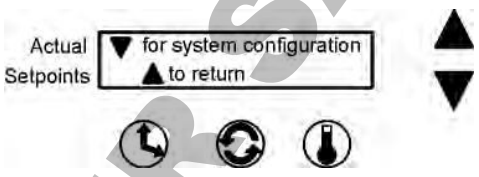


Pressing Silence turns off the audible alarm. However, warning lights continue to flash and the alarm message displays until the overtemp condition is corrected. The audible warning also sounds again in about 15 minutes if the overtemp condition persists. After the fault is corrected, press the Silence button to clear the alarm message from the display.

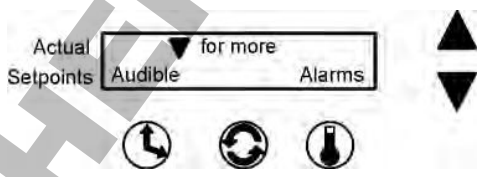
Set the Undertemperature Alarm

The Undertemperature alarm (Model SHKE8000-7/SHKE8000-8CE only) activates whenever the operating temperature drops below the undertemp setpoint temperature by a few tenths of a °C. This adjustable limit is set at the factory at approximately -1°C. To change this value, open the Configuration menu by pressing the down arrow, up arrow, and the Silence button in that order.

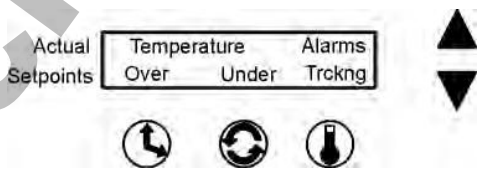
When the screen at right opens, press the down arrow once.



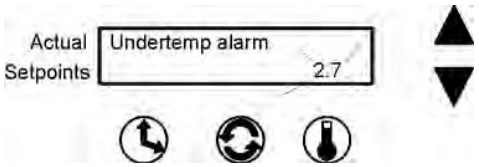
Then press the temperature button beneath Alarms.



To change the Undertemperature alarm setting, press the Speed button beneath Under.

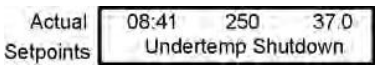


The following screen appears and the current Undertemperature alarm setting flashes.



Change the Temperature setting by pressing the up or down arrow. When set, press the Temperature button to return to the previous screen or press nothing for about fifteen seconds. The display will change to the Operating Screen, saving the new settings into memory.

When the undertemperature setpoint is exceeded by a few tenths of a degree, the control system turns off the refrigeration system. The Undertemp Shutdown warning displays, the warning lights flash and the audible warning (if not turned off) sounds.



Pressing the Silence button turns off the audible alarm. However, the warning lights continue to flash and the alarm message displays until the undertemperature condition is corrected. The audible warning will also sound again in about 15 minutes if the undertemperature condition persists. After the fault is corrected, press the Silence button to clear the alarm message from the display.

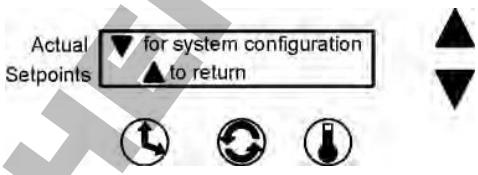
Set the Temperature Alarm Tracking Limit

The Temperature Tracking alarm activates whenever the operating temperature goes above or below the setpoint temperature by a predetermined value. This adjustable limit is set at the factory as 10° above and below the temperature setpoint.

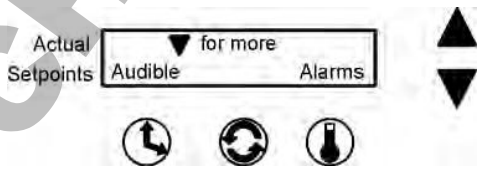
Note The above and below limits are always the same value. ▲

To change this limit, open the Configuration menu as in the previous alarm procedures, by pressing the down arrow, up arrow, and the Silence button in that order.

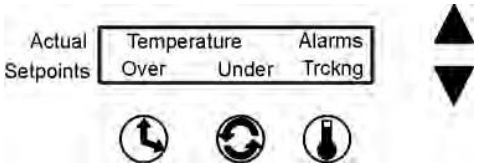
When this screen opens, press the down arrow once ....



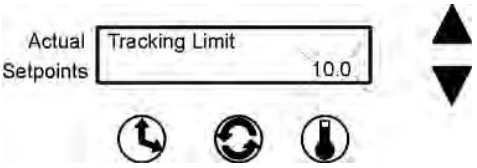
Then press the temperature button beneath Alarms.



From the screen at right, press the temperature button beneath Tracking.

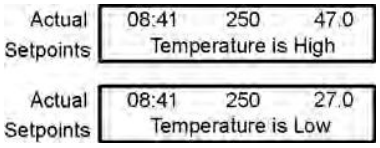


The following screen appears and the present Temperature Tracking alarm limit setting flashes.



Change the Temperature Tracking limit by pressing the up or down arrow. When set, press the Temperature button to save the setting and return to the previous screen. If no buttons are pressed for about fifteen seconds, the display returns to the Operating Screen, saving the new setting to memory.

If chamber temp rises above or falls below the temp tracking limit, the appropriate message displays, the warning lights flash and the audible warning (if not turned off) sounds.

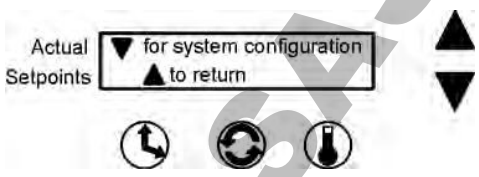


Pressing Silence turns off the audible alarm. However, the warning lights continue to flash and the alarm message displays until the high/low temp condition is corrected. The audible warning also sounds again in about 15 minutes if the over or under temp tracking condition persists. When the fault is corrected, press Silence to clear the alarm message from the display.

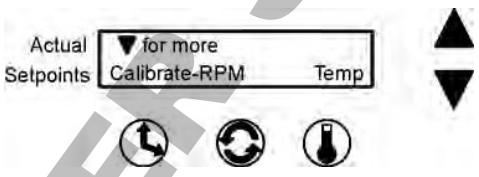
Calibrate Speed

From the Operating screen, press the down arrow, up arrow and Silence button in that order, to access the Configuration menu.

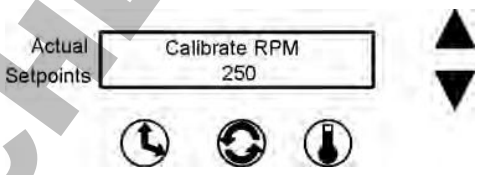
From the screen at right, press the down arrow twice.



Press the Speed button beneath RPM at this screen.



The value shown on this screen is the present Speed setpoint. Using the up and down arrows, increase or decrease the platform speed until the reading on an independent, accurate speed measuring device matches the shaker speed setpoint.

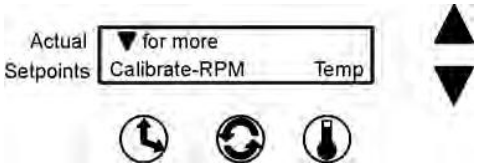


When set, press the Speed button to save the setting. The display will return to the Calibrate - RPM Temp screen. Or, if nothing is pressed for about fifteen seconds, the display will return to the Operating Screen and the setting will be automatically saved to memory.

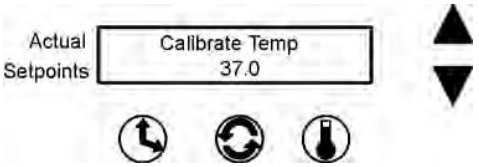
Calibrate the Temperature

Begin by pressing the down arrow, the up arrow, the Silence button. Then press the down arrow twice. The screen below will appear on the display:

Press the Temperature button beneath Temp.



Using the up and down arrows, increase or decrease the temperature value to match an independent, accurate temperature measuring device. When selected, press the Time, Speed, or Temp button to save the setting. The display will return to the Calibrate - RPM Temp screen. (Or, if nothing is pressed for about fifteen seconds, the display will return to the Operating Screen and the setting will be automatically saved to memory.)



Calibrate the Temperature (cont.)

Calibration Procedure

1. Set up a typical operating load in the shaker. Place a measuring device (of known accuracy and calibrated to a national standard) near the main control probe, clipped to the right side chamber wall just behind the baffle for the intake grille.

2. Set Temp to 37.0°C and Speed to 75 RPM.

3. Start a cycle and allow the shaker to stabilize for approximately one hour.

4. Adjust the calibration as described above so that the Actual display reads 37.0°C, ±0.3°C.

Remote Alarm System

Any of the alarm states described previously can alert a remote alarm monitoring system through an internal SPDT relay connected to an RJ-11 connector on the left front of the shaker, behind the kick panel. Refer to Section 1 of this manual for set-up. For the convenience of the laboratory, these remote alarms can be individually turned on or off. Any or all of the remote alarms that are set to On will activate the internal relay.

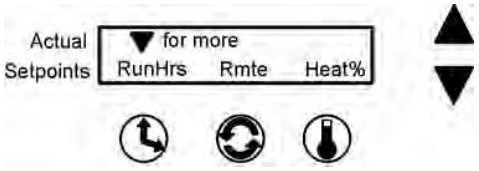
If no buttons are pressed, the display will automatically return to the Operating Screen after about fifteen seconds, saving the selection to memory.

Note The Remote Overtemp Shutdown and Check Fuse alarms cannot be deactivated. ▲

To set the remote alarms to On or Off, open the Remote Alarm Configuration menu by pressing the down arrow, up arrow, and Silence button in that order.

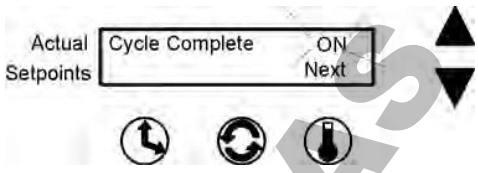
Then, press the down arrow three times until the screen below is showing.

Press Rmte (remote). The alarms will be shown in the following sequence:



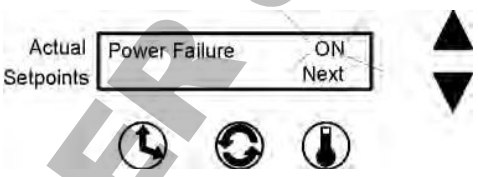
Cycle Complete

Toggle the Cycle Complete alarm with either the up (On) arrow or the down (Off) arrow. Pressing the Next (temperature) button advances the display to the next alarm, saving the Cycle Complete alarm setting to memory.



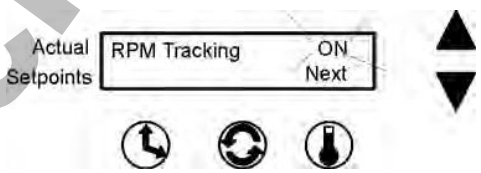
Power Failure

Toggle the Power Failure alarm with either the up (on) arrow or the down (off) arrow. Pressing the Next (temperature) button advances the display to the next alarm, saving the Power Failure setting to memory.



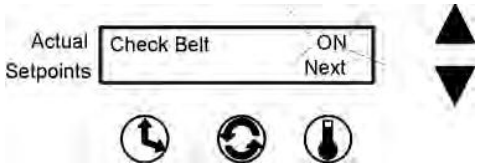
RPM Tracking

Toggle the RPM Tracking alarm with either the up (on) arrow or the down (off) arrow. Pressing the Next (temperature) button advances the display to the next alarm, saving the RPM Tracking setting to memory.



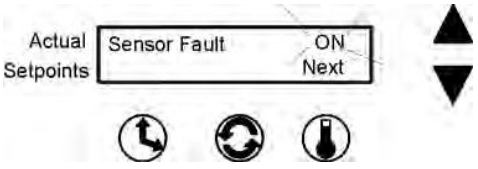
Check Belt

Toggle the Check Belt alarm with either the up (on) arrow or the down (off) arrow. Pressing the Next (temperature) button advances the display to the next alarm, saving the Check Belt setting to memory.



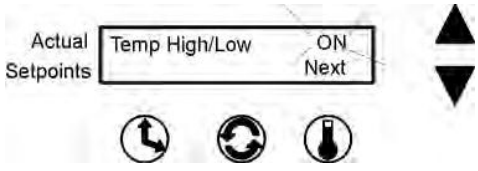
Temperature Sensor Fault

Toggle the Sensor Fault alarm with either the up (on) arrow or the down (off) arrow. Pressing the Next (temperature) button advances the display to the next alarm, saving the on/off setting to memory.



Temperature High or Low

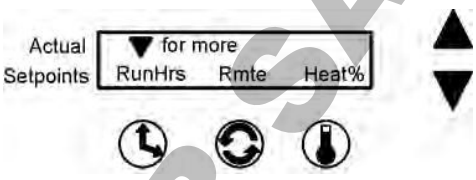
Toggle the Temp High/Low alarm with either the up (on) arrow or the down (off) arrow. Pressing the Return (temperature) button returns the display to the previous screen.



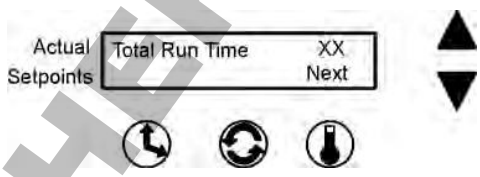
View Total Operating Hours

Even if the shaker has been operated in the Hold or Countdown modes, and/or has been turned off and unplugged many times, the microprocessor control system maintains a running total operating hours.

To view this information, access the Configuration menu by pressing the down arrow, the up arrow, and the Silence button in that order. Then press the down arrow three times.



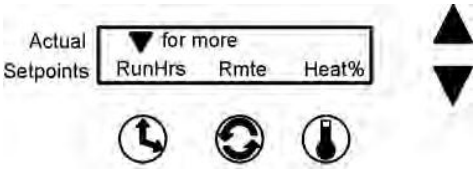
Pressing RunHrs shows the total accumulated run hours as displayed at right. In about fifteen seconds, the display will return to the Operating Screen.



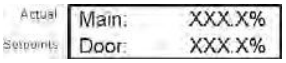
Heat %

Heat percentages are intended for factory use only, and can be helpful in troubleshooting the heat control system.

To view this information, press Heat % from the previous screen or access the Configuration menu by pressing the down arrow, the up arrow and the Silence button in that order, then press the down arrow three times.



Press Heat %.



Main Heat % is the percentage of time that the temperature control system's heaters are turned on during a five second period. Example: If the heaters are being cycled on for two seconds and off for three seconds, the Heat % value is 40 percent.

Door Heat % is the percentage of time that the door glass heater is operating during a five second period (Model SHKE8000-7/SHKE8000-8CE only).

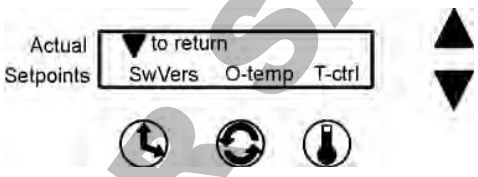
Return to the RunHrs Rmte Heat% screen by pressing any of the three buttons beneath the display. If no buttons are pressed, the display will automatically return to the Operating Screen in about fifteen seconds.

Software Version

Software Version is for factory use only and will be important if troubleshooting the microprocessor programming is ever necessary.

To access this screen, press the down arrow, the up arrow, the Silence button, then the down arrow button four more times.

The screen at right will appear on the display:



Press the Time button beneath SwVers and the next screen will appear; in this instance, showing the Model SHKE8000-7 software version in the control system memory.

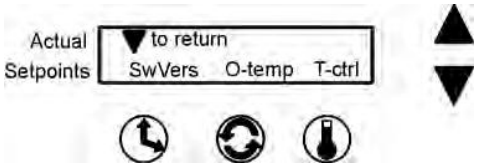
To return to the previous screen, press the Time button. To return to the Operating Screen, wait about fifteen seconds.

Temperature Sensor Readings

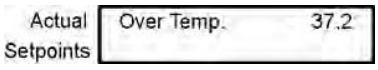
Temperature Sensor Readings is for factory use only and will be important if troubleshooting the microprocessor programming is ever necessary.

Overtemp Sensor

To access this screen, press the down arrow, the up arrow, the Silence button, then the down arrow button four more times. The screen at right will appear on the display.



Press the Speed button beneath O-temp and this screen will appear, showing the temperatures being measured or read by the Overtemperature sensor.



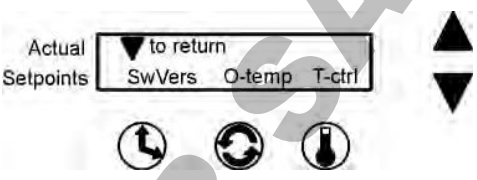
To return to the previous screen, press the Time, Speed, or Temperature button. To return to the Operating Screen, wait about fifteen seconds.

Temperature Control

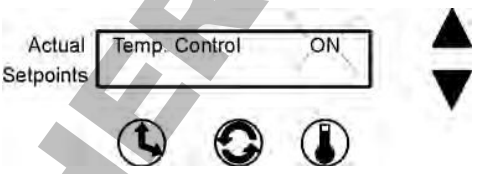
This control allows the shaker to be operated without heat or refrigeration.

To access this screen, press the down arrow, the up arrow, the Silence button, and then the down arrow button four more times.

The screen shown at right will appear on the display.



Press the Temperature button beneath T-ctrl and the screen shown next will appear.



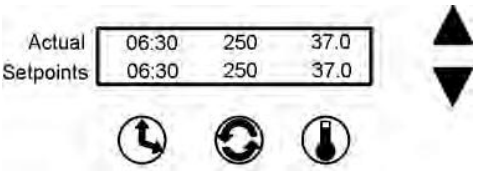
Toggle the Temperature Control with either the up (on) arrow or the down (off) arrow.

Pressing the Time, Speed, or Temp buttons returns the screen to the previous (SwVers O-temp T-ctrl) display. If no buttons are pressed, the display will automatically return to the Operating Screen after about 15 seconds, also saving the selection to memory.

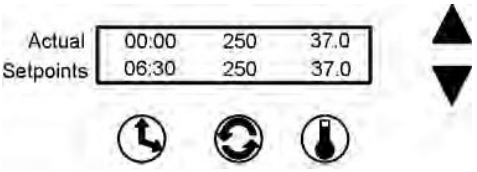
Hold Temperature Control

The Model SHKE8000-7 Series Shaker has the ability to hold the product at a specific temperature after operating for a predetermined time.

A typical example is shown at right. In this example, the shaker is operating at 250 RPM with cabinet temperature at 37°C. The 06:30 time value in the lower left corner of the display indicates that the shaker is counting down and will stop motion in six and one-half hours.

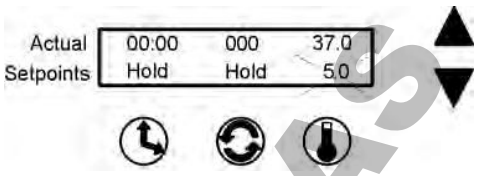


The illustration at right shows that time has counted down to zero and the shaker platform has stopped (zero RPM's). The temperature value of 5.0° in the lower right corner of the display is the temperature at which the product is being held. Hold will continue at this temperature until the Start button is pressed or a new Hold or operating temperature is entered.



Hold Temperature Control (continued)

To set a new Hold temperature, press the Temp button twice. The screen at right appears. The Hold temperature flashes.



Using the up and down arrows, program a new Hold temperature. Press the Temp button to save the new setting and return to the Operating Screen.

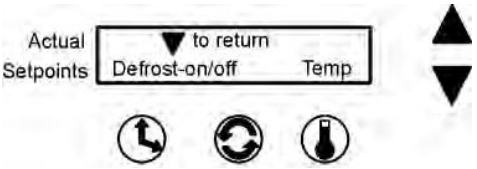
Toggle the Temperature Control with either the up (on) arrow or the down (off) arrow.

Pressing the Time, Speed, or Temp buttons returns the screen to the previous (SwVers O-temp T-ctrl) display. If no buttons are pressed, the display will automatically return to the Operating Screen after about 15 seconds, also saving the selection to memory.

Defrost Control

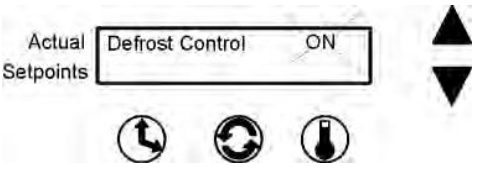
Defrosting of Model SHKE8000-7/SHKE8000-8CE Shaker takes place automatically about every eight hours, when the set temperature is 10°C or less. When turned on, the defrost system turns off the refrigeration system and increases the cabinet temperature until it reaches the 12°C or 14°C defrost setpoint. At that time, the system turns the refrigeration sysytem back on. The defrost cycle will continue for about thirty seconds. Then the cabinet circulation fan is turned back on and the Defrost message is cleared from the display.

To turn the defrost system on and off, press the down arrow, the up arrow, the Silence button, then the down arrow button five more times.



The screen shown at right appears on the display.

Press the Speed button beneath On/Off and the following screen appears.



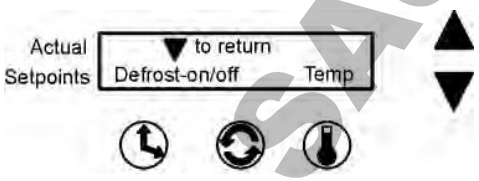
Toggle the Defrost Control with either the up (on) arrow or the down (off) arrow.

Pressing the Time, Speed or Temp buttons returns the screen to the previous (Defrost on/off, Temp) display.

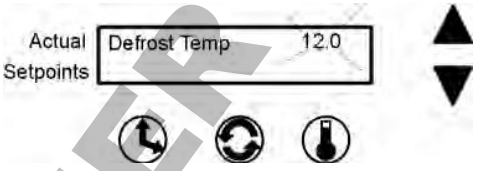
Set the Defrost Temperature

If no buttons are pressed, the display automatically returns to Operating Screen after about 15 seconds, also saving the selection to memory.

To toggle the Defrost temperature between 12°C and 14°C, press the down arrow, the up arrow, the Silence button, then the down arrow button five more times.



The screen shown at right will appear on the display.



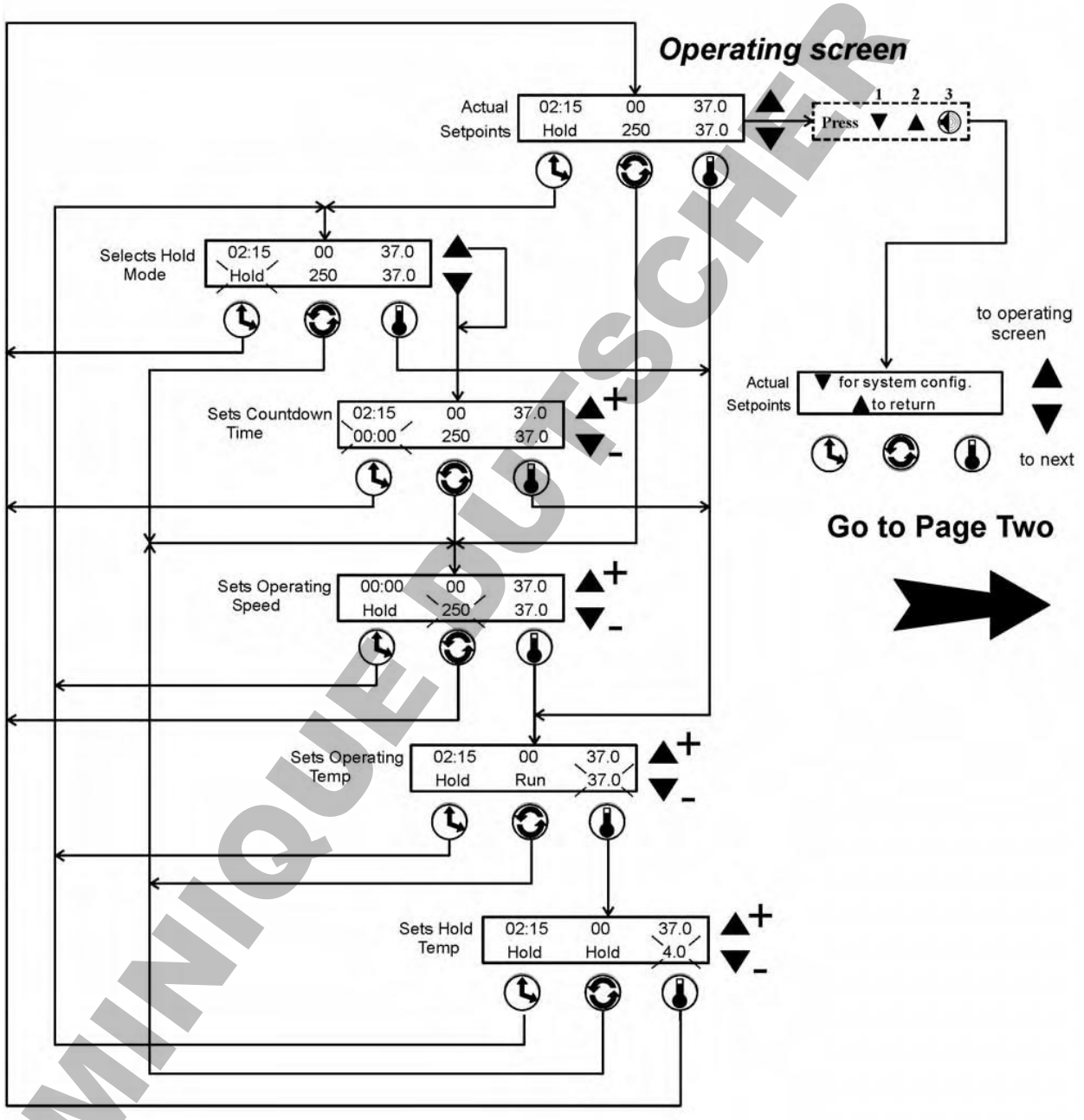
Press the Temp button and the screen at right will appear.

Toggle between the two Defrost temperatures using the up and down arrows.

Press Time, Speed, or Temp to return to the previous screen or press nothing and the display will automatically return to the Operating Screen after about 15 seconds, also saving the setpoint to memory.

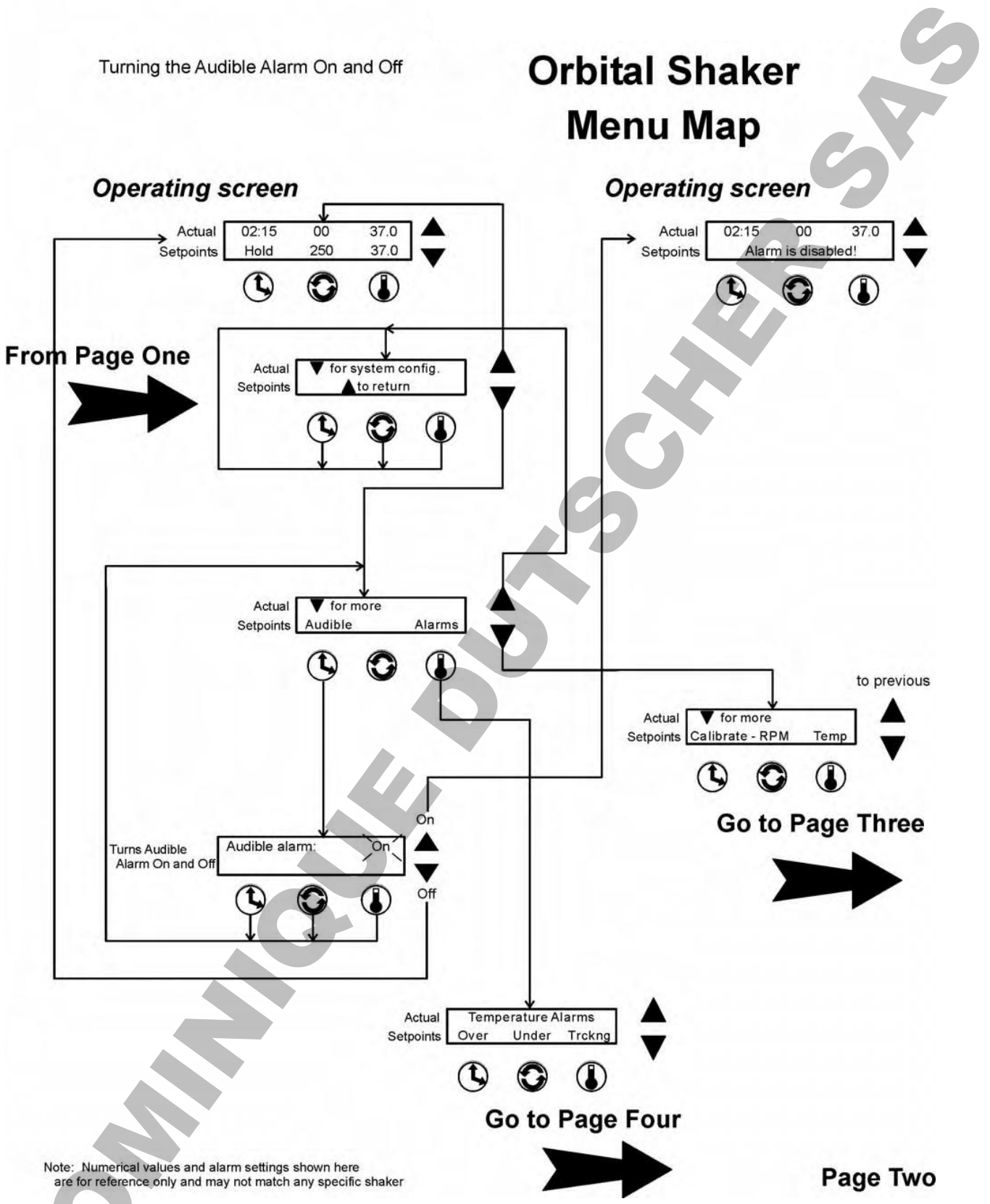
Selecting Hold or Countdown Time
Setting Operating Speed
Setting Operating Temperature
Setting Hold Temperature

Orbital Shaker Menu Map

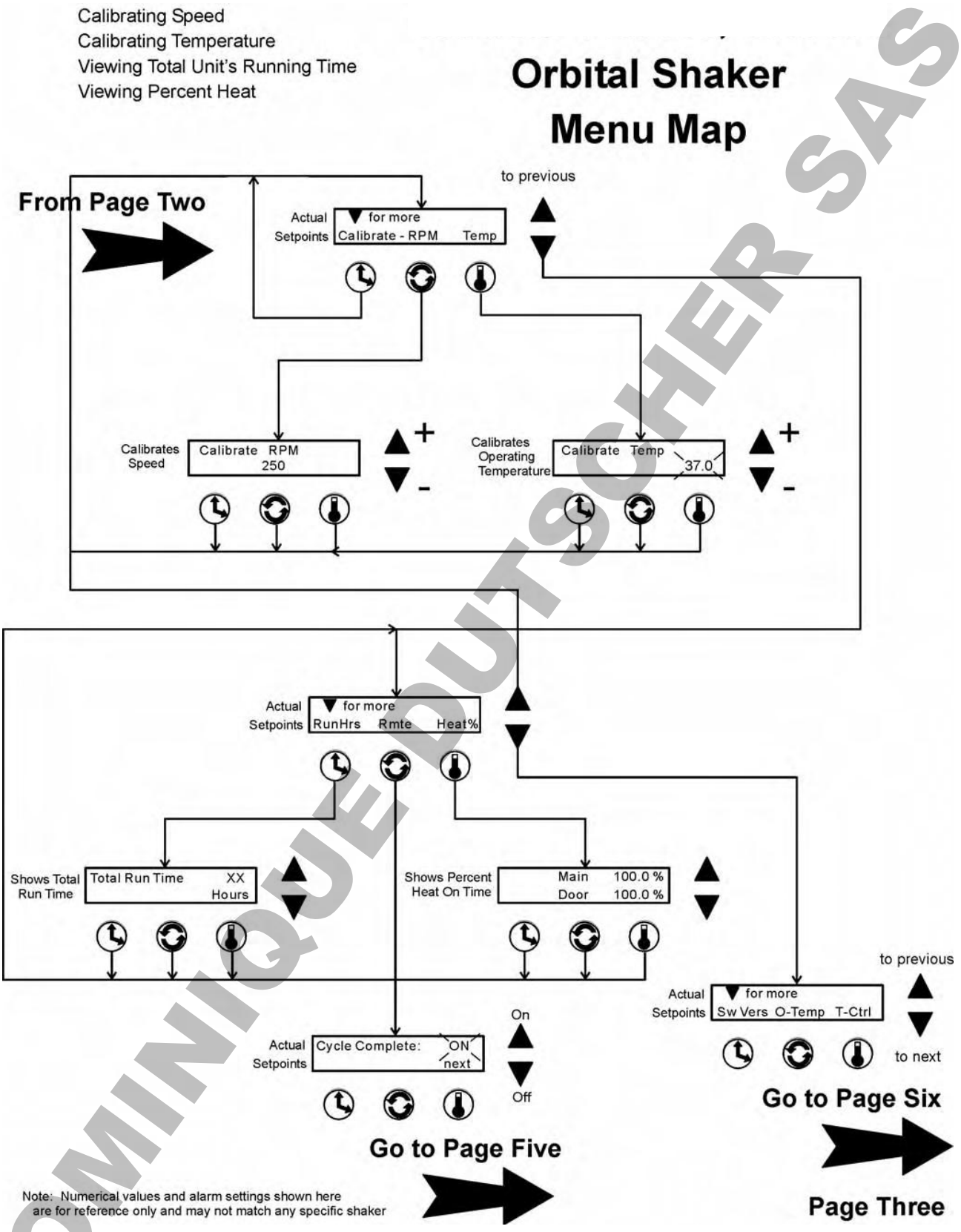


Note: Numerical values and alarm settings shown here are for reference only and may not match any specific shaker

Page One

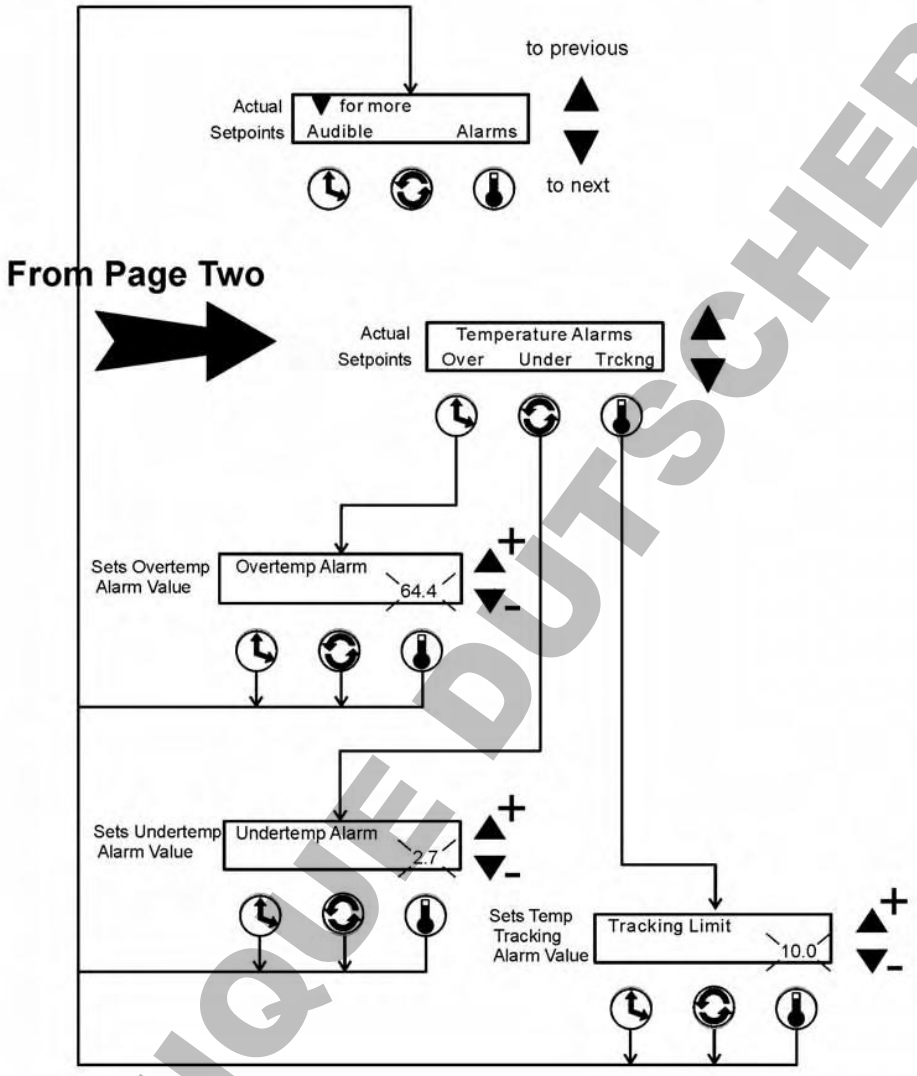


Calibrating Speed
Calibrating Temperature
Viewing Total Unit's Running Time
Viewing Percent Heat



Setting Overtemperature Alarm Value
Setting Undertemperature Alarm Value
Setting Temperature Tracking Limit Value

Orbital Shaker Menu Map

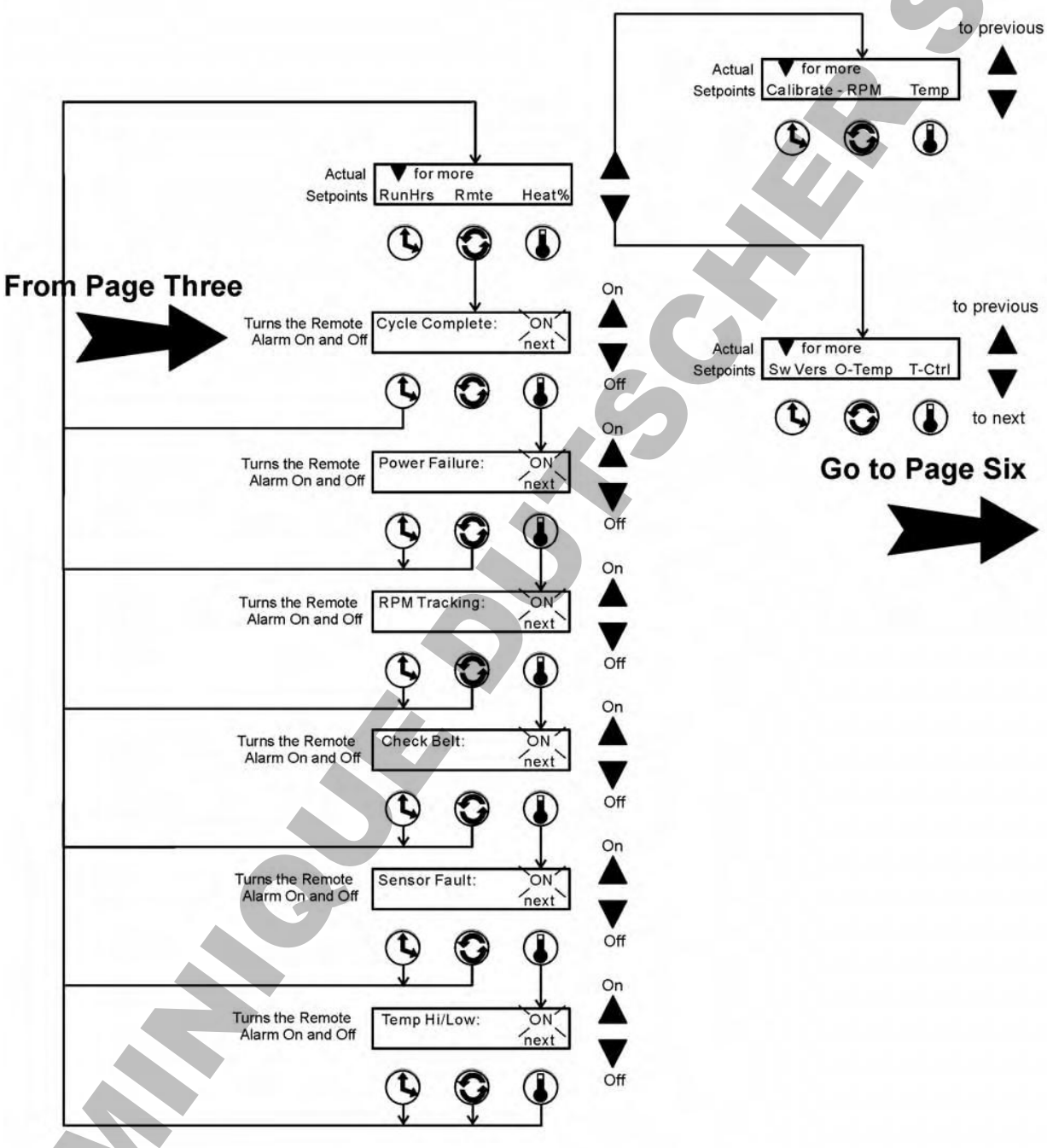


Note: Numerical values and alarm settings shown here are for reference only and may not match any specific shaker

Page Four

Turning the Individual Remote Alarms On and Off

Orbital Shaker Menu Map

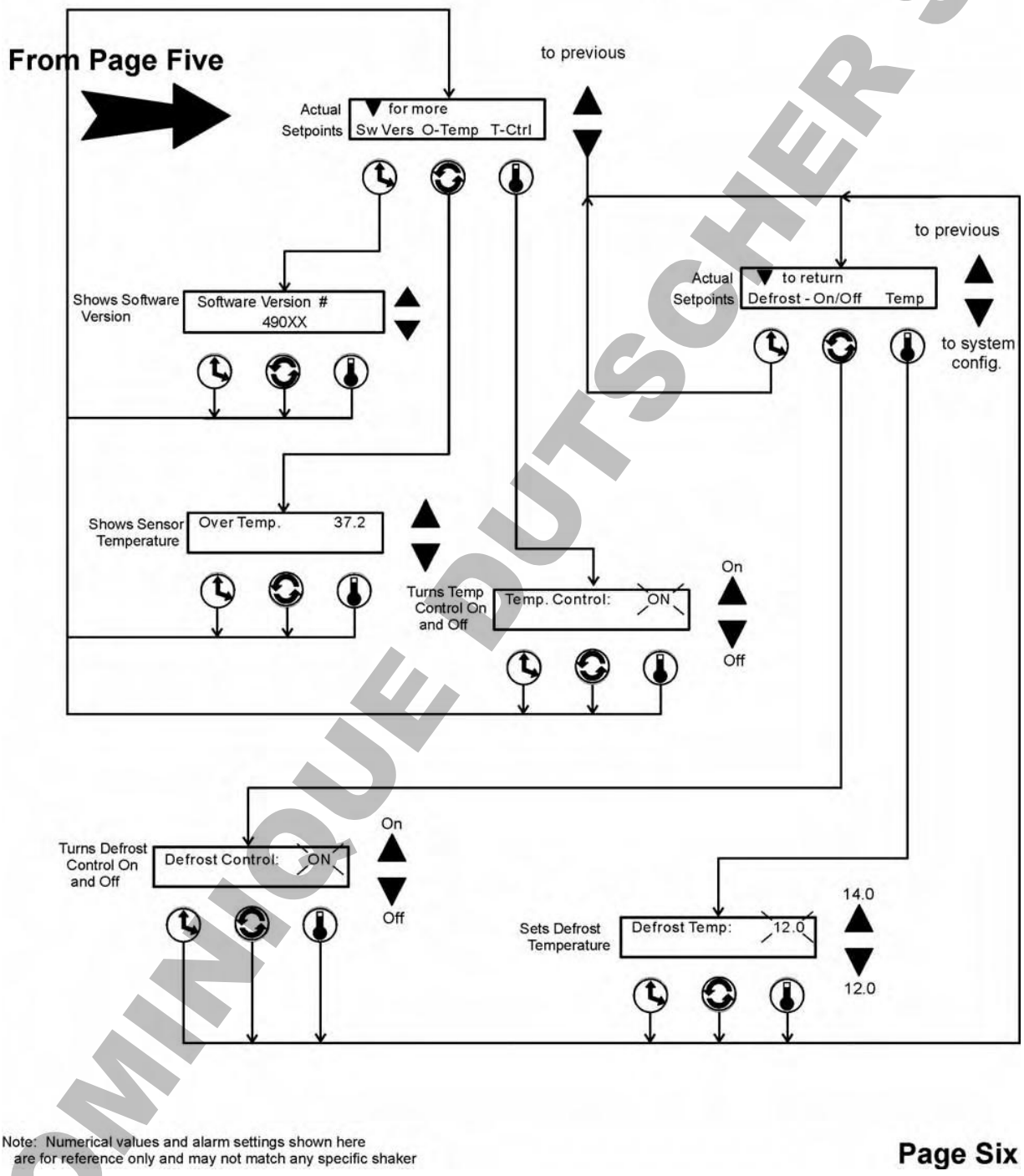


Note: Numerical values and alarm settings shown here are for reference only and may not match any specific shaker

Page Five

Viewing Software Version
Viewing Overtemperature Sensor Reading
Turning Temperature Control On and Off
Turning Defrost Control On and Off
Setting Defrost Temperature (12.0° or 14.0°)

Orbital Shaker Menu Map



Note: Numerical values and alarm settings shown here are for reference only and may not match any specific shaker

Page Six

PREVENTIVE MAINTENANCE

Shakers

Your equipment has been thoroughly tested and calibrated before shipment. Regular preventive maintenance is important to keep your unit functioning properly. The operator should perform routine cleaning and maintenance on a regular basis. For maximum performance and efficiency, it is recommended the unit be checked and calibrated periodically by a qualified service technician.

The following is a condensed list of preventive maintenance requirements. See the specified section of the operating manual for further details.

We have qualified service technicians, using NIST traceable instruments, available in many areas. For more information on Preventive Maintenance or Extended Warranties, please contact us at the number below.

Cleaning and calibration adjustment intervals are dependent upon use, environmental conditions and accuracy required.

Tips for all shakers:

- Use only our standard flat-head screws for flask clips.
- Use only our standard round-head screws for test tube racks, holders and utility trays.

Preventive Maintenance

Refer to Manual Section	Action	Daily	Monthly	Yearly
3	Inspect the air filter. Clean as needed		✓	
--	Clean the unit with mild detergent and wipe dry as needed		✓	
--	Clean the window with a glass cleaner and wipe dry		✓	
--	Check under the platform for broken glass or other debris.		✓	
--	Inspect and/or clean the condenser.		✓	
--	* Verify operation of the circulation fan motor			✓
2	* Check and document calibration of temperature, alarms, speed and time, as applicable			✓
4	Change the HEPA filter, as needed			✓

* Qualified service technicians only

Section 3 Maintenance

Model SHKE8000 and SHKE8000-7 shakers use a brushless DC motor and oversized, permanently lubricated bearings which require no maintenance.

The anodized brushed aluminum platform and powder-coated steel cabinet surfaces can be cleaned with common laboratory materials. However, liquids should not be allowed to enter the shaker cabinet from under the platform. All spills should be cleaned up immediately. If necessary, remove the platform. Refer to Section 1.

Quick Release Platform

If the platform makes undue vibration noise during operation, adjustments may be needed.

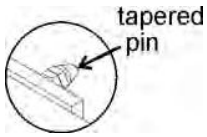


Figure 3-1. Pin

1. Pull universal platform from the cabinet. At the back of the platform are two tapered pins (Figure 3-1).
2. Loosen the nut closest to the platform. Turn the center nut slightly to extend the pin away from the platform. A quarter-turn or less is a good first test.
3. While holding the center nut, tighten the nut closest to the platform back against the pin mounting block.
4. Align the guide rails to the outer edge of the quick-release platform. Slide the platform into the cabinet.
5. Turn the unit on and set the RPM to 300. Allow the unit to run for several minutes. If the vibration is normal, return the unit to service. If not, repeat steps above.

Platform Handle Adjustment

1. Grasp the platform handle and pull up on the inner release bar to move the handle to a horizontal (down) position.
2. Remove the screws from the sides of the handle, as indicated in Figure 3-2. Remove the handle.
3. Turn the adjustment screws just one-half turn clockwise to increase the clamping force, or one-half turn counterclockwise to reduce the clamping force.

Figure 3-2. Screws

4. Reassemble the handle and install the side screws. Slide the platform into the shaker chamber. Place the handle into a vertical position.
5. Close the door and run the unit empty, at 300 RPM. If there is undue vibration noise, repeat the steps above. If not, return the unit to service.

Control Panel

The microprocessor control panel uses sealed push buttons and liquid crystal display and may be cleaned with laboratory detergents and dried with a soft cloth.

Clean/Replace Condenser Air Filter

The condenser air filter (P/N 760202) is located behind the grille on the front of the sidecar (Model SHKE8000-7/SHKE8000-8CE). The grille is secured by four press-in type retainers at the top and bottom. Remove it by grasping the edge of the cover and pulling outward.

The air filter is held in place with a flange around its perimeter (Figure 3-3) and is easily removed. It may be replaced, or washed in water with a mild detergent and dried between two lint-free towels.

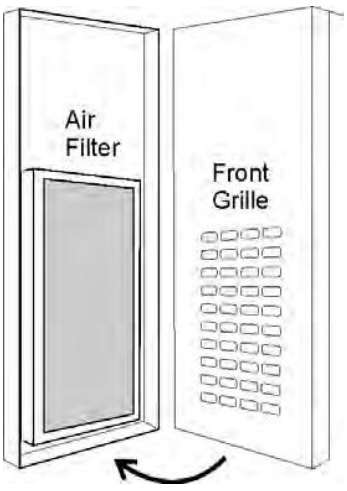


Figure 3-3. Inside Front Grille

Section 4 Service

Caution The procedures outlined in this section should be performed only by qualified service personnel or people trained and certified in electrical/mechanical repair of laboratory equipment. ▲

With the exception of the chamber air filter, Model SHKE8000/ SHKE8000-ICE and SHKE8000-7/SHKE8000-8CE Orbital Shakers contain no user-serviceable components. Table 4-1 lists display messages which may help diagnose abnormal conditions.

Alarms and Alarm Conditions

If the microprocessor control system senses a fault, malfunction or abnormal operating condition, alarm messages appear on the liquid crystal display. These messages are helpful if service or repair assistance should become necessary. Refer to the table below and to the alarm matrix on the the last three pages of this section.

Table 4-1. Alarms

Alarm Message	Fault Condition
Overtemp Shutdown	System shutdown due to over temperature condition
Undertemp Shutdown	System shut down due to under temperature condition
Main Temp Sensor	Temperature sensor failed
Over Temp Sensor	Temperature sensor failed
Temperature is High	Temperature tracking sensed higher temperature than setting
Temperature is Low	Temperature tracking sensed lower temperature than setting
Power Failure	Power failed during shaker operation
Cycle Complete	Blank screen, end of countdown cycle reached
Check Belt	Motor V-belt is broken or slipping
Audible is Disabled!	Continuously notifies operator that audible alarm is disabled
Platform Stalled	Free movement of platform is obstructed
Check Fuse	Primary drive motor fuse is blown

Change the Chamber Air FIlter

The chamber air filter is located on the left side of the chamber and is accessed by first removing the endplate. Eight screws secure the endplate and filter assembly to the chamber wall. Refer to Figure 4-1 below.

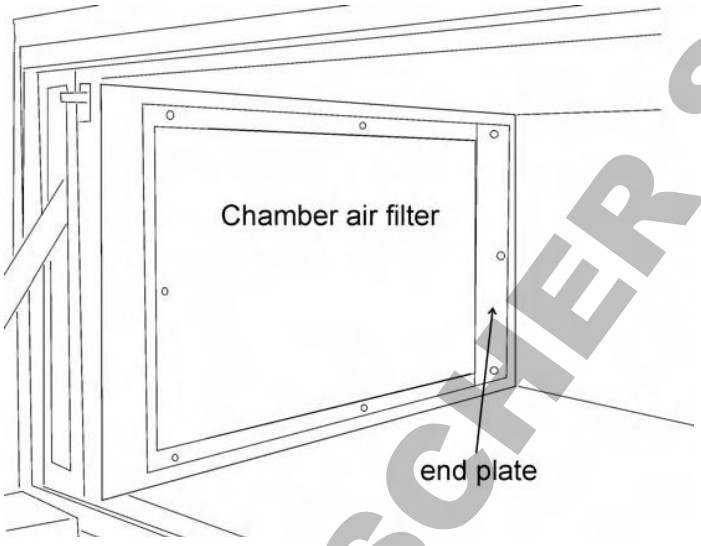


Figure 4-1. Filter Location

Remove the three screws from each end of the filter assembly first. Set the screws and endplate aside. Then remove the top and bottom screws from the filter and discard the filter.

To install the new filter, secure the filter first at the top and bottom with the two screws. Then secure the front edge of the filter with the three screws and the far end with the endplate and screws as above.

If the Shaker Will Not Operate

If the shaker platform will not operate with the unit plugged in and the power switch turned on, the following conditions may be present:

- The door may be open - Lift the door to its fully closed position.
- Time countdown reached - Reset the time, or change to continuous operation (Hold).

Replace the Door Stop

1. Turn the unit off and disconnect from the power source.
2. Pull the door of the shaker fully open.
3. At the bottom of the door stop, where it attaches to the door bracket, is a retaining clip which must be removed (Figure 4-2).

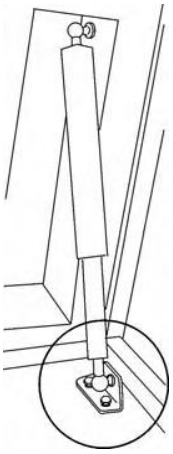


Figure 4-2. Locate Clip

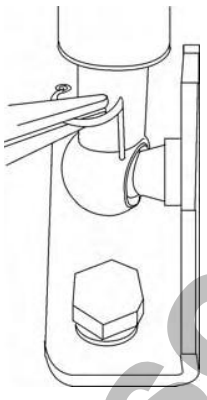


Figure 4-3. Rotate Clip

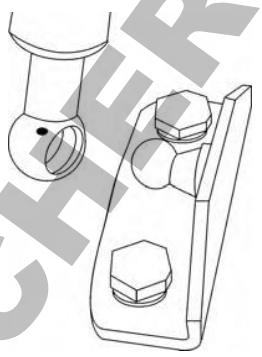


Figure 4-4. Disengage Ball

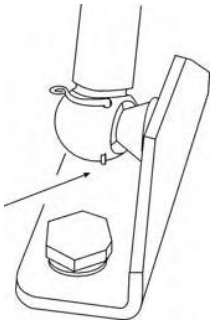


Figure 4-5. Position Clip

4. Using needlenose pliers, rotate the retaining clip outward, then pull the clip out (Figure 4-3).
5. Locate the retaining clip at the top of the door stop. Rotate the clip away from the stop and remove.
6. Remove the door stop from the balls on each mounting bracket, top and bottom (Figure 4-4). Discard the damper inside the assembly (see assembly drawing 440-200-5 toward the end of this manual).
7. Fit the new damper into the assembly, as previously.
8. Install the new door stop as it was removed. Make sure each retaining clip is installed so that the tip of the clip is showing at the bottom of the door stop (Figure 4-5).

Replace the Interior Light

1. Locate the interior light on the ceiling of the chamber.
2. To access the bulb, remove the cover from the light by turning it counterclockwise. Set this aside.
3. Pull the bulb straight out and discard.

Caution Do not touch the new bulb with bare fingers. Oil from your skin may damage bulb integrity. ▲

4. Carefully align the two pins of the new bulb with the holes in the socket (Figure 4-6). Seat the bulb securely.
5. Install the cover onto the light by turning it clockwise. Make sure the cover is finger-tight.

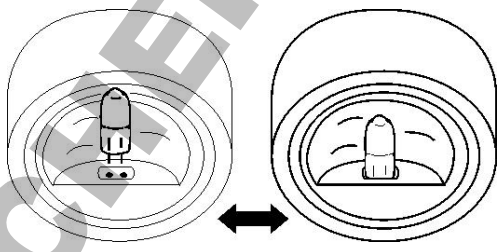


Figure 4-6. Position Bulb

Fuses

Two fuses are located on the front of the relay enclosure located in the lower right area of the stackable cabinet. Gain access to the relay enclosure by removing the kick panel on the lower front of the cabinet. It is held in place by a screw on each end of the panel and two tabs at the top. Spare fuses are taped to the inside of the kick panel. To access the fuses, remove the retainer/cover plate holding the relay enclosure in place. See Figure 4-7.

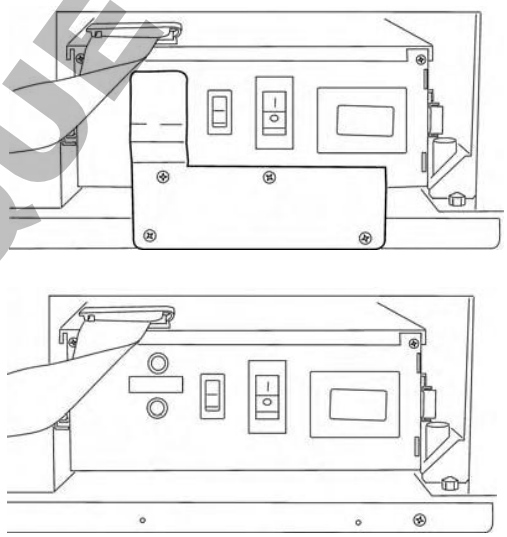


Figure 4-7. Relay Enclosure with and without Cover Plate

Fuses (continued)

Table 4-2. Fuses

Models SHKE8000 and SHKE8000-7		
Rating	**Application**	**Part Number**
0.25 amp	Main Power Relay Board	230144
1.6 amp	Drive Motor	230145
Models SHKE8000-ICE and SHKE8000-8CE		
0.15 amp	Main Power Relay Board	230142
0.8 amp	Drive Motor	230141

Caution Do not substitute! Replace these fuses only with fuses of identical electrical ratings. ▲

Circuit Boards

Five circuit boards control the Stackable Shaker. Four boards are located in the relay tray compartment, the fifth is behind the liquid crystal display. Refer to the relay tray illustrations on the following pages.

Temperature Sensors

Two temperature sensors are located on the air intake grille on the right side of the chamber (Figure 4-8). To access these sensors, remove the protective cover, then disconnect the sensors from their respective clips.

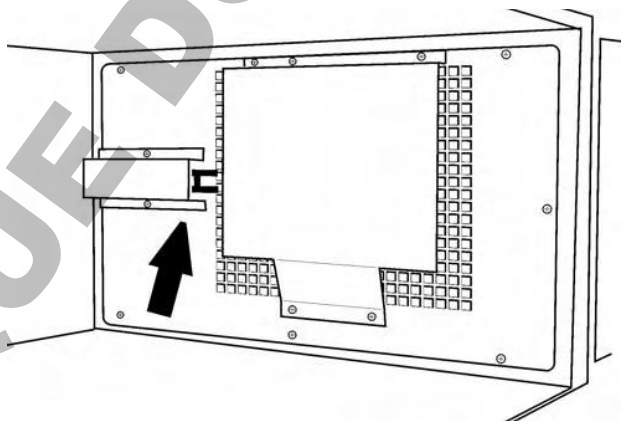


Figure 4-8. Temp Sensor Location

Heater Element Circuit Breaker

Warning Remove and lock-out electrical power when working on or near the heating element connectors. Allow sufficient time for the heating elements to cool before reaching into that area. ▲

A manual reset circuit breaker is located between the heating element electrical connectors on the top of the heater assembly (Figure 4-9). The heating element is attached to the duct wall behind the grille. To access the heating element and this circuit breaker, remove the eight Phillips screws securing the right side grille to the chamber wall (Figure 4-8).

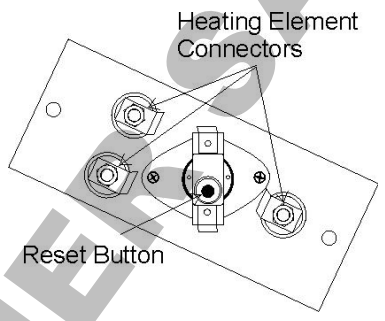


Figure 4-9. Circuit Breaker Reset

Tune the Cabinet

When the shaker is in place and level, with the platform installed, turn the unit on and set the RPM to 300. Kneeling in front of the shaker, lightly touch the lower left and right corners of the cabinet. If one side seems to vibrate more then the other, raise or lower the leveling foot using the 3/4" open end wrench supplied in the parts bag. Continue this "fine tuning" until the vibrations are lowered as far as possible. Ensure locking nuts are secured when complete.

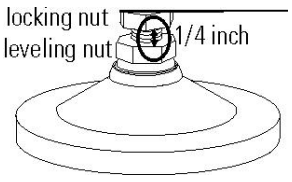


Figure 4-10. Locked Feet

Caution Do not extend leveling feet more than 1/4 inch from the bottom of the unit. When the unit is leveled and tuned, with the leveling feet locked in place, the adjustment and locking nuts should be no further apart than 1/4 inch. ▲

Platform Adjustments

Each platform is adjusted to fit the unit with which it is shipped. In the instance of replacement or additional platforms, adjustments may be required. To check for undue platform vibration noise during operation, see the steps following.

Platform Vibration Adjustment

1. Make sure the platform handle is in the vertical position and the door is closed. The unit should also be leveled and tuned.

2. Turn the unit on and set the RPM to 300. Allow the shaker to run for several minutes. If the vibration is normal, return the unit to service. If not, continue to Step 3.

3. Remove the platform from the chamber. At the back of the platform are two tapered pins (Figure 4-10).

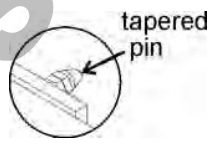


Figure 4-10. Pin

4. Loosen the nut closest to the platform. Turn the center nut slightly to extend the pin away from the platform. A quarter-turn or less is a good first test.

5. While holding the center nut, tighten the nut closest to the platform back against the pin mounting block. Install the platform into the chamber. Note pin locators (Figure 4-11) on quick-release platform.

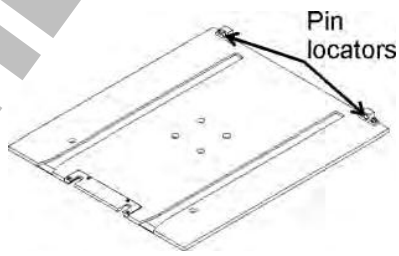


Figure 4-11. Pin Locators

6. Turn the unit on and set the RPM to 300. Allow the shaker to run for several minutes. If the vibration is normal, return the unit to service. If not, repeat Step 4.

Handle Adjustment

1. Grasp the platform handle and pull up on the inner release bar to move the handle to a horizontal (down) position.

2. Remove the screws from the sides of the handle, as indicated in Figure 4-12. Remove the handle.

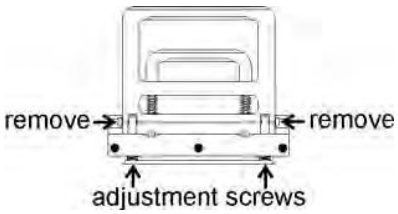
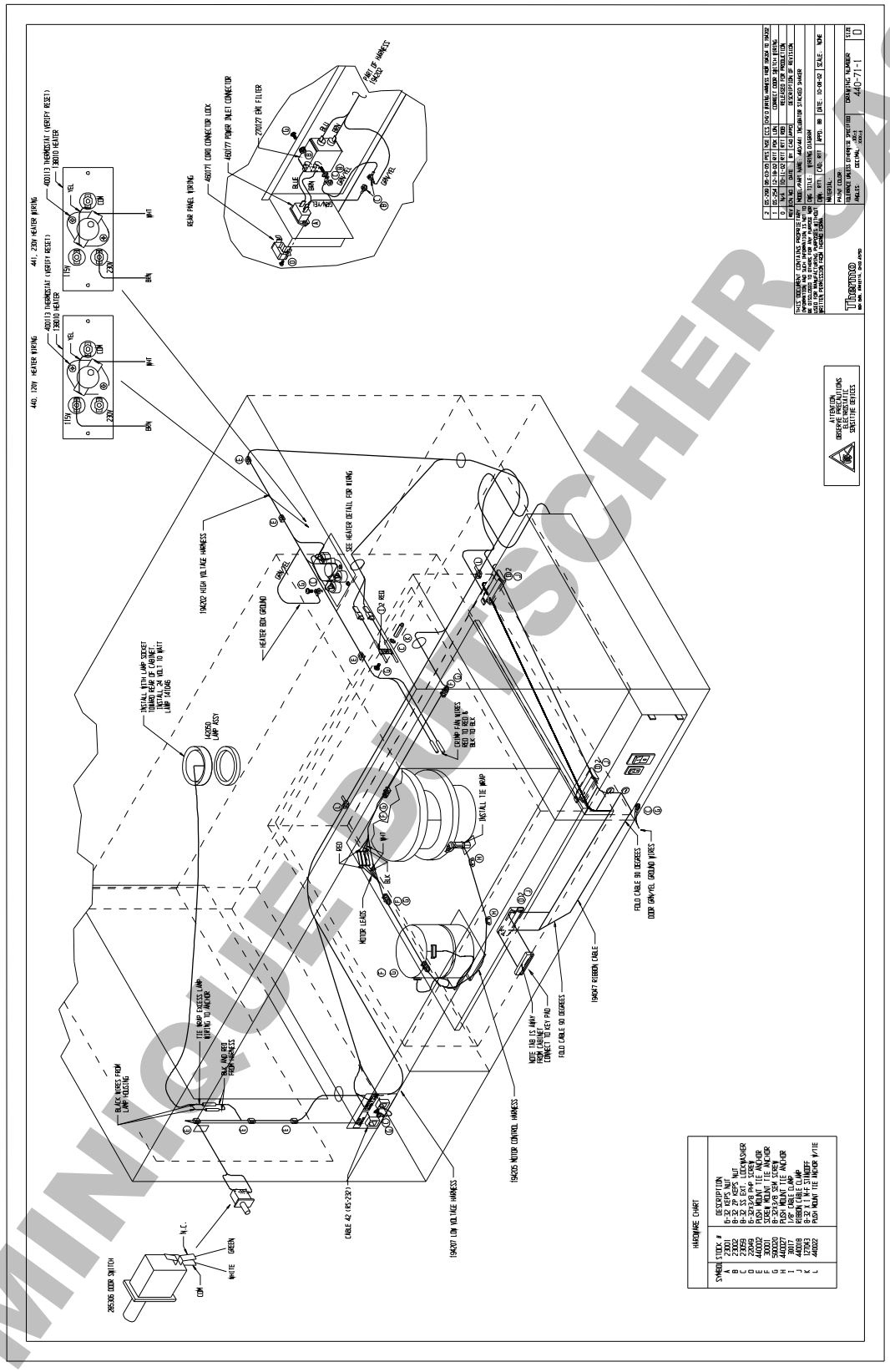


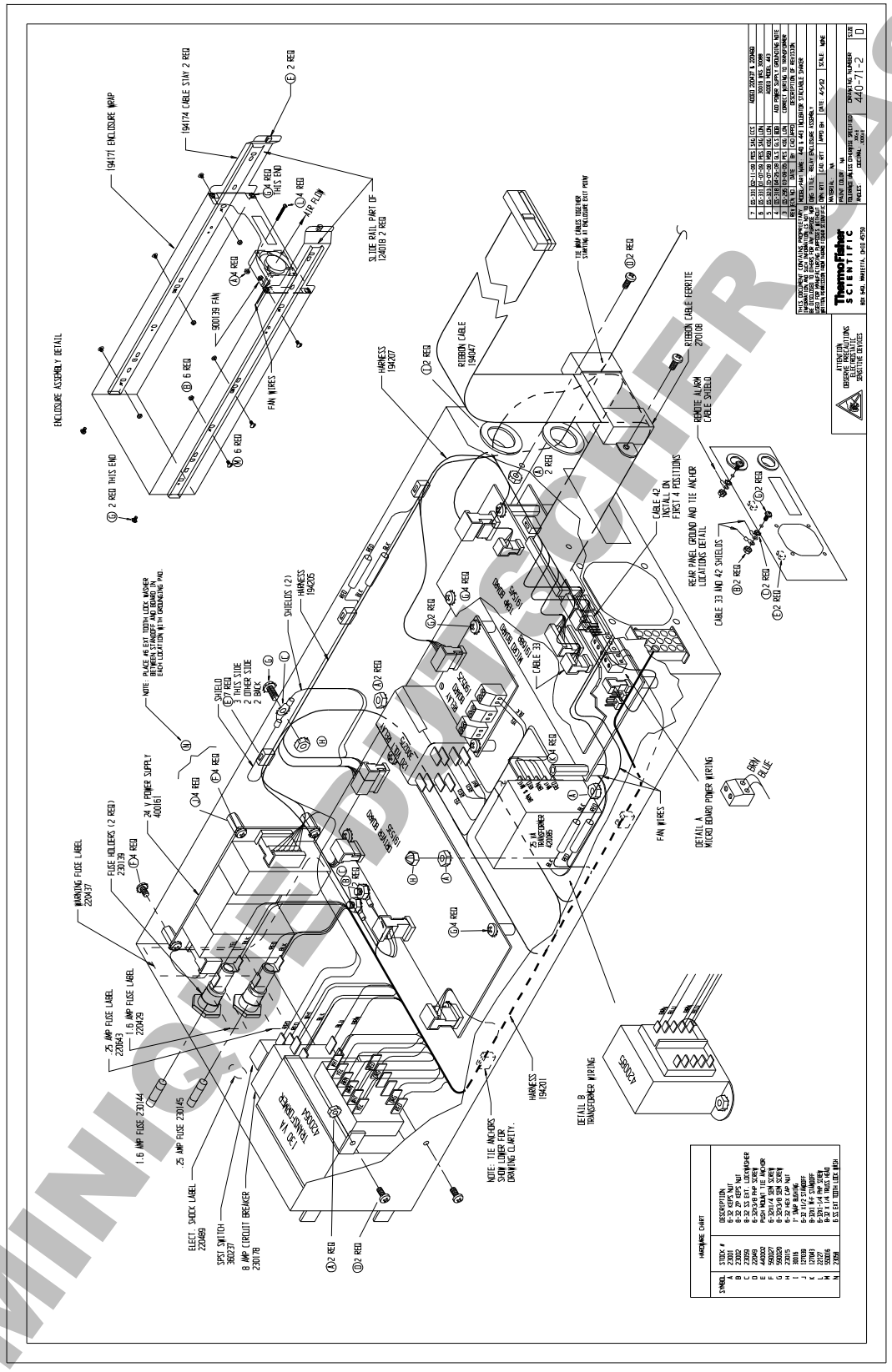
Figure 4-12. Adjustment

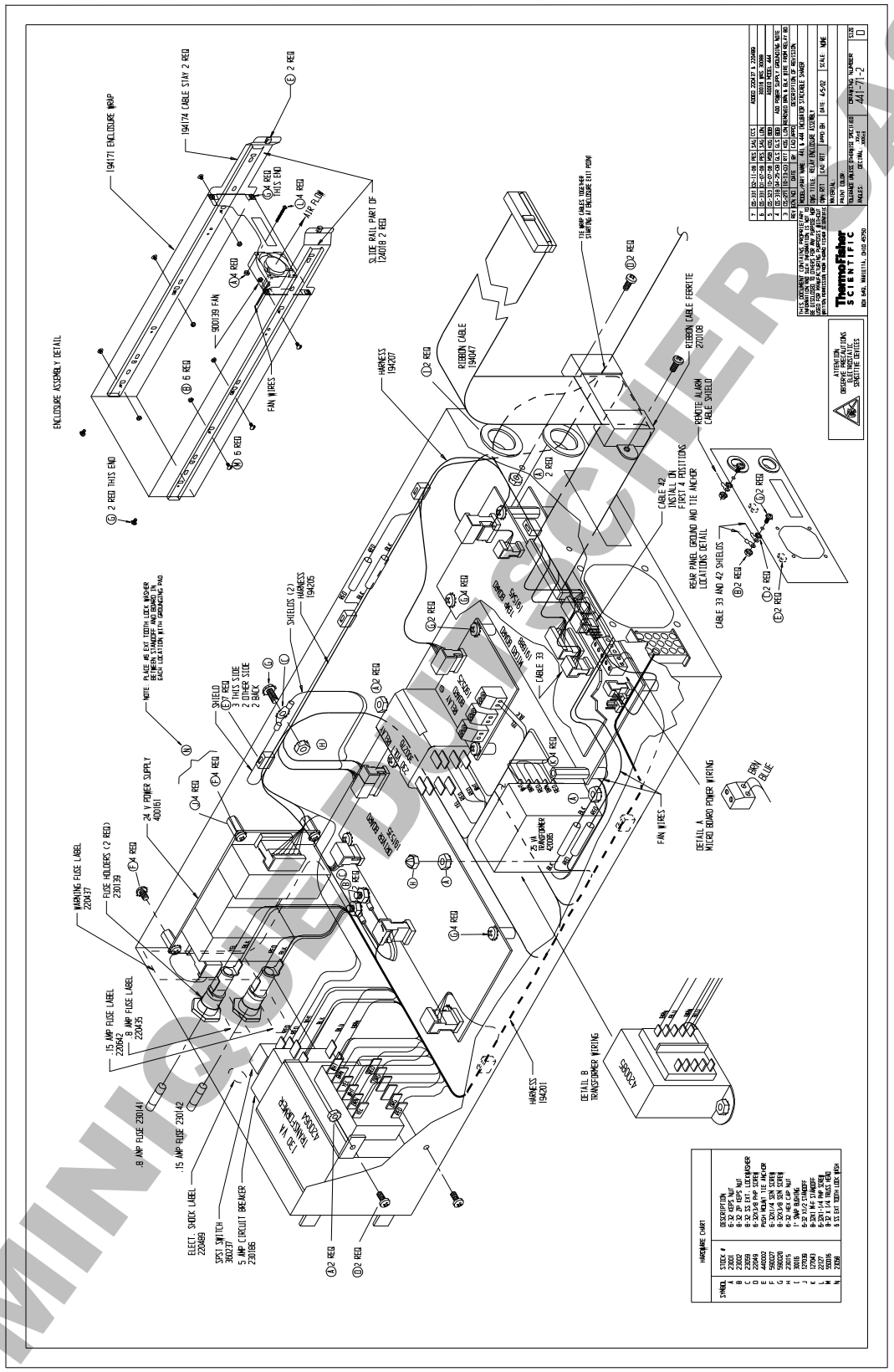
3. Turn the adjustment screws just one-half turn clockwise to increase the clamping force, or one-half turn counterclockwise to reduce the clamping force.

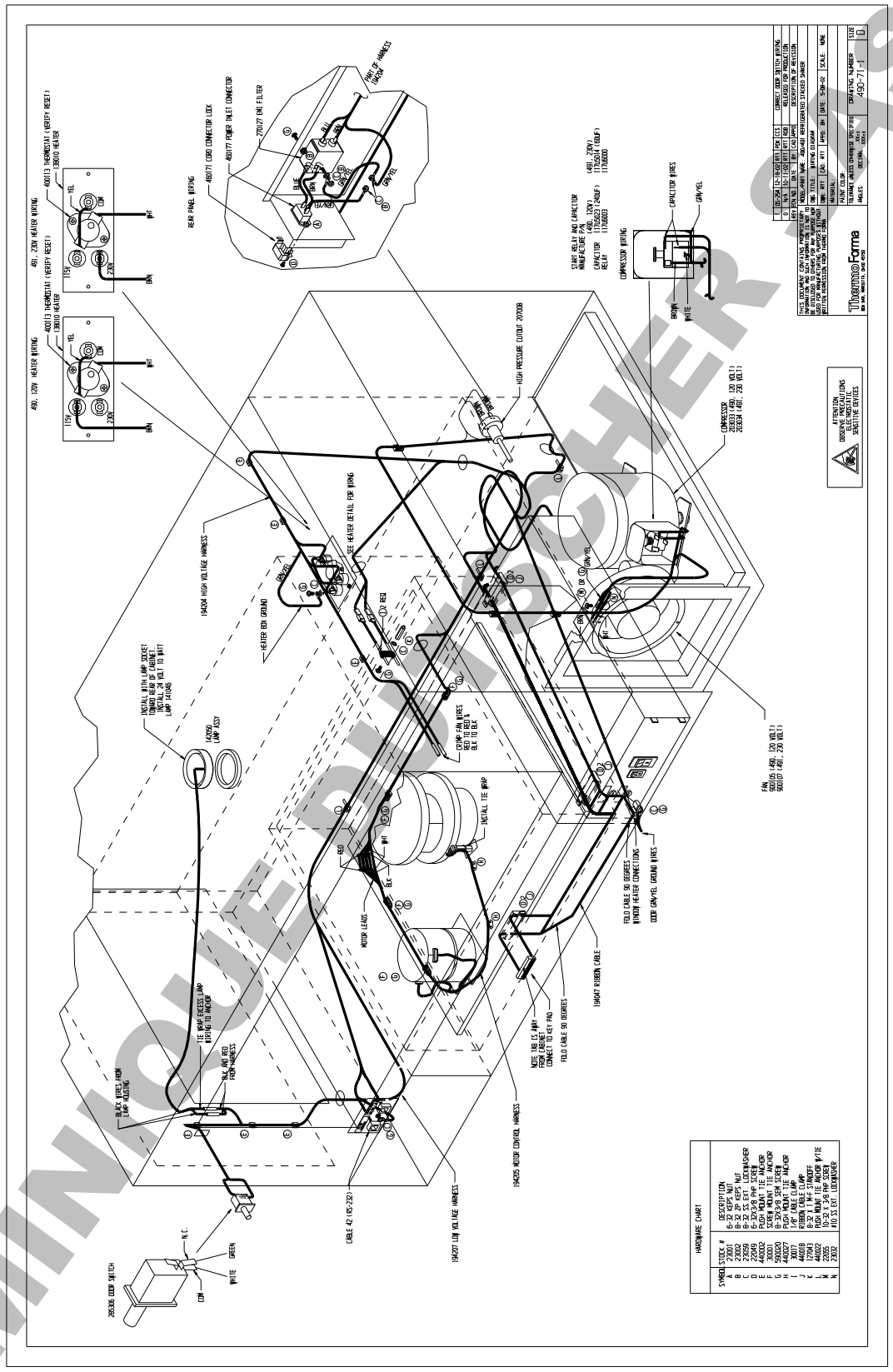
4. Reassemble the handle and install the side screws. Slide the platform into the shaker chamber. Place the handle into a vertical position.

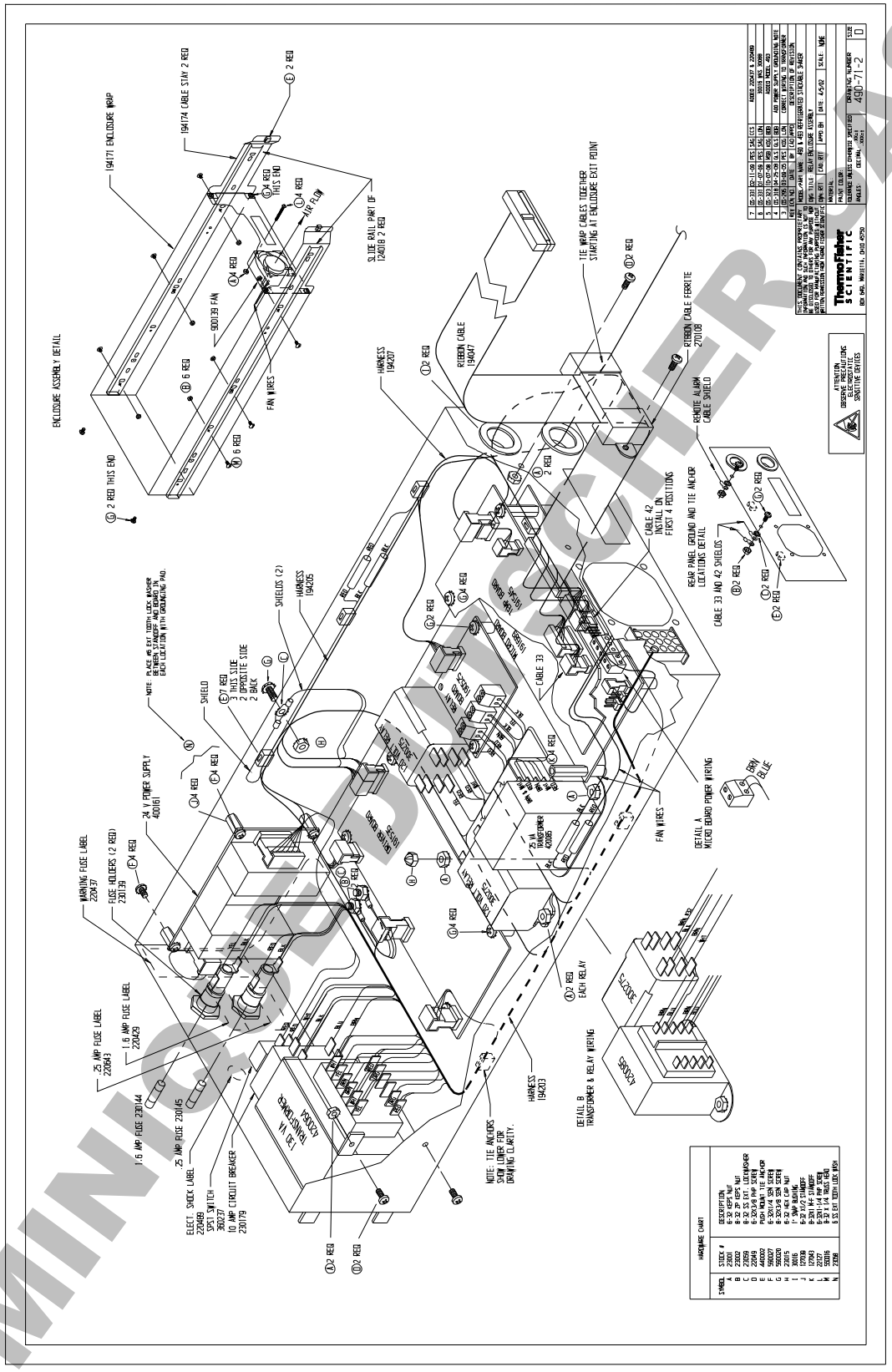
5. Close the door and run the unit empty, at 300 RPM. If there is undue vibration noise, repeat the steps above. If not, return the unit to service.

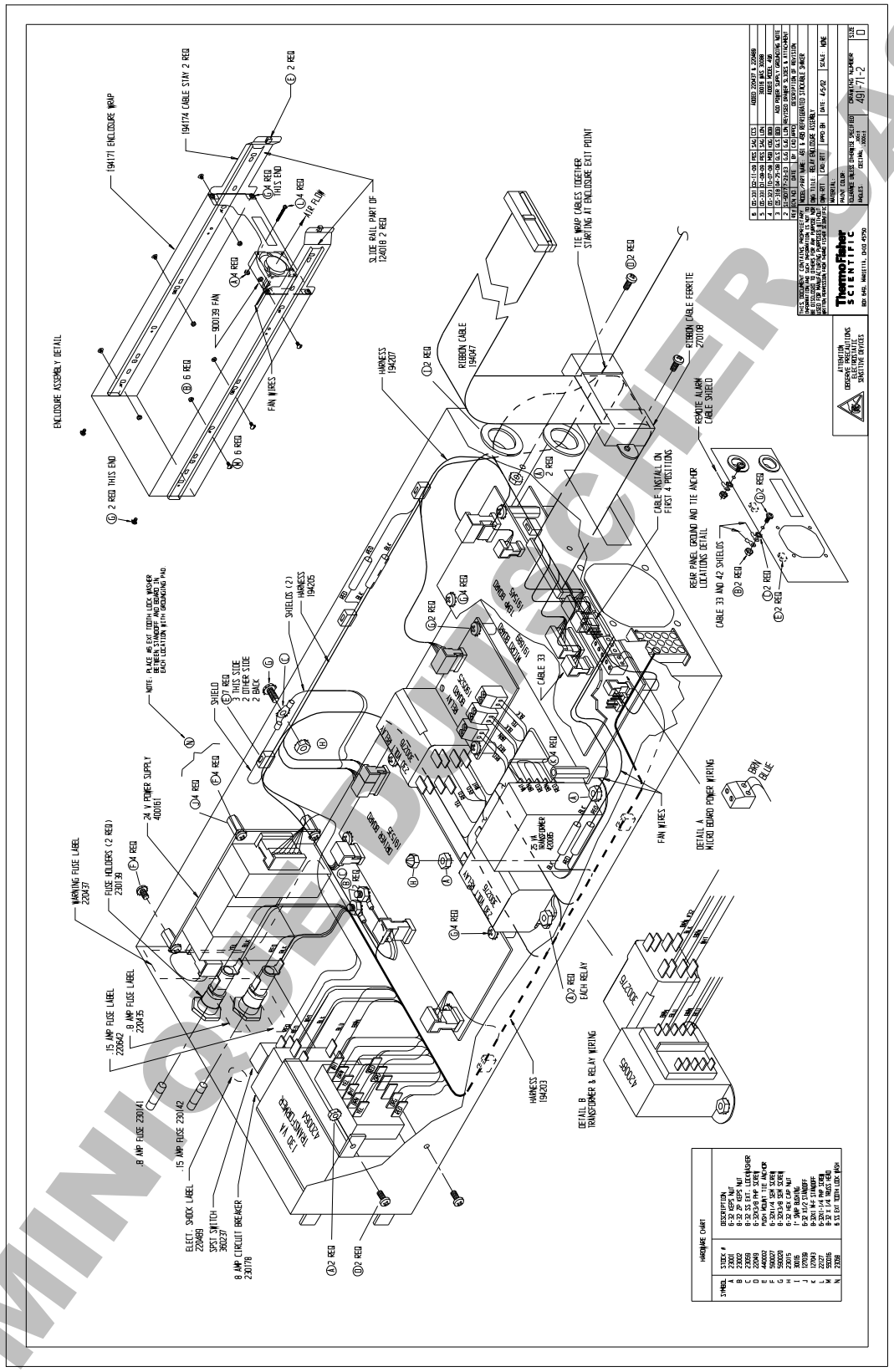












Alarm Message	Alarm Criteria	Alarm Delay*	Alarm Ringback*	System State	Corrective Action
Over Temp Shutdown	Temperature at the over temp sensor is a few tenths of a degree over the shut down set point	None	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters off	Press SILENCE to silence the audible alarm Air intake blockage Over temperature probe malfunction Sensor connector unplugged Heater circuit not cycling Main circuit board failure Call Technical Services Department
Under Temp Shutdown	Temperature at the over temp sensor is a few tenths of a degree under the shut down set point	None	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Refrig Compressor off	Press SILENCE to silence the audible alarm Over temperature probe malfunction Sensor connector unplugged Heater circuit not cycling Refrigeration system stuck on Main circuit board failure Call Technical Services Department
Main Temp Sensor	Sensor circuit is open or shorted beyond the expected resistance range in either direction	30 sec.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters off	Press SILENCE to silence the audible alarm Check board connector Check sensor circuit Replace sensor Call Technical Services Department
Over Temp Sensor	Sensor circuit is open or shorted beyond the expected resistance range in either direction.	30 sec.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters on	Press SILENCE to silence the audible alarm Check board connector Check sensor circuit Replace sensor Call Technical Services Department
Temperature is High	Temperature is above the control system's temperature tracking limit	* *	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters on	Press SILENCE to silence the audible alarm Check temperature tracking limit Check sensor circuit Replace main temperature sensor Call Technical Services Department

* Alarm Delay and Ringback times are approximate

** A 3.5 hour time delay is built into the system to allow the shaker to reach the temperature setpoint. When this point is reached, a 20 minute delay becomes effective. When the lid is opened, a 15 minute interval is added to allow the system to recover to the set temperature. (Note: all of these times are approximate)

Alarm Message	Alarm Criteria	Alarm Delay*	Alarm Ringback*	System State	Corrective Action
Temperature is Low	Temperature is above the control system's temperature tracking limit	* *	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters on	Press SILENCE to silence the audible alarm Check if lid is completely closed Check temperature tracking limit Check sensor circuit Replace main temperature sensor Call Technical Services Department
Power Failure	Electrical power has been disrupted	Upon power up	None	Not affected	Warning notice only Press SILENCE to silence the audible alarm
Cycle Complete	Count-down time has reached zero	None	None	Alarm light on Audible alarm on Blower fans on Shaker motor off Heaters on	Advisory notice only Press SILENCE to silence the alarm
RPM High	RPM is above control set point by tracking limit	2 min.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters on	Press SILENCE to silence the audible alarm Check platform loading Check RPM tracking limit setting Shut the unit off and call Technical Services Department
RPM Low	RPM is below control set point by tracking limit	2 min.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters on	Press SILENCE to silence the audible alarm Check for overloaded platform Check for obstruction to edges of platform Check for low input AC mains voltage Shut the unit off and call Technical Services Department

* Alarm Delay and Ringback times are approximate

** A 3.5 hour time delay is built into the system to allow the shaker to reach the temperature setpoint. When this point is reached, a 20 minute delay becomes effective. When the lid is opened, a 15 minute interval is added to allow the system to recover to the set temperature. (Note: All times are approximate)

Alarm Message	Alarm Criteria	Alarm Delay*	Alarm Ringback*	System State	Corrective Action
Check Belt	Rotation sensor circuit sees no mechanical rotation or receives unusual signals	None	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on Heaters off	Press SILENCE to silence the audible alarm Shut the unit off and check the belt If the alarm persists, call Technical Services Department
Audible is Disabled!	Operator has turned off the audible alarm	None	None	Normal operation	The lower half of the display will show this warning as long as the audible alarm remains turned off
Platform Stalled	Motor tries to start but platform is obstructed	15 sec.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor on/off/on Heaters on	Press SILENCE to silence the audible alarm Check for overloaded platform Check for platform edge obstructions Turn unit off and call Technical Services Department
Check Fuse	Primary drive motor fuse is blown	15 sec.	15 min.	Alarm light on Audible alarm on Blower fans on Shaker motor off Heaters on	Press SILENCE to silence the audible alarm Check/replace drive motor fuse If alarm persists, call Technical Services Department

* Alarm Delay and Ringback times are approximate

Section 5 Specifications

Shaking

Range . . . . . .25-400 RPM

Accuracy . . . . . .1 RPM

Motion . . . . . .One inch/orbital

Indicator . . . . . .LCD in 1 RPM increments

Temperature

Range:

SHKE8000/SHKE8000-ICE

. . . .10°C (50°F) above ambient to 60°C (140°F)

SHKE8000-7/SHKE8000-8CE

. . . . . .5°C (41°F) to 60°C (140°F)

Control . . . . . .±0.15°C

Uniformity . . . . . .±0.3°C (in flask)

Indicator . . . . . .LCD, in 0.1°C increments

Timer

Periods . . . Programmable from 1 minute to 199 hours 59 minutes or for continuous operation

Indicator . . . . . .LCD in 1 minute increments

Run Time . . . Display counts down for a timed run or counts up when in "hold" function

Alarms

Temperature . .Adjustable tracking high/low temps

RPM . . . . . .Adjustable tracking high/low RPM

Time . . . . . .Run complete

Power Fail . . . . .Message displayed on LCD screen

Safeties

Temperature . . .Independent over and under temp

RPM . . . . . .Independent platform motion

LCD Display

Run Time, RPM, Temperature, User Program, Alarm Conditions and Power Failure indicated by messages

Mechanical Drive System

Triple counterbalanced. Handles unbalanced platform loads regardless of flask placement

Drive Motor

1/3 HP brushless DC, permanently lubricated ball bearing

Door

Fold-down door with pneumatic dampers and spring assisted closure.

Automatic Restart

Microprocessor retains all programming in non-volatile memory. In the event of a power outage, the shaker restarts automatically.

Construction

Cabinet

Interior . . . . . .Stainless steel with coved corners

Exterior . . . . . .Cold rolled steel

Finish . . . Powder coated for a durable, easily maintained surface

Platform . . . . . .Anodized brushed aluminum

Door

Powder coated stainless steel

Tempered thermal pane window (Heated window, SHKE8000-7/SHKE8000-8CE only)

Dimensions

Exterior

SHKE8000/SHKE8000-ICE . .46.5”W x 25.0”H x 33.3”F-B . . . . . .(118.1cm x 63.5cm x 84.6cm)

Exterior

SHKE8000-7/SHKE8000-8CE . .56.5”W x 25.0”H x 33.3”F-B . . . . . .(143.5cm x 63.5cm x 84.6cm)

Exterior - door open . . . . . .46.6” (118.4cm) F-B

Interior . . . . . .33.4” W x 11.8” H x 23.8” F-B . . . . . .(84.8cm x 30.0cm x 60.5cm)

Electrical

SHKE8000

Nominal 120VAC, 60Hz, 1 PH, 6.4 FLA

Operating Range: 108-132VAC

SHKE8000-ICE

Nominal 230VAC, 50Hz, 1 PH, 3.0 FLA

Operating Range: 207-253VAC

Electrical (continued)

SHKE8000-7

Nominal 120VAC, 60Hz, 1 PH, 9.0 FLA

Operating Range: 108-132VAC

SHKE8000-8CE

Nominal 230VAC, 50Hz, 1 PH, 4.5 FLA

Operating Range: 207-253VAC

Data Output . . . . . .RS-232 standard

Remote Alarm Contacts . . . Time, RPM, Temperature and Loss of Power Alarms

Certifications

SHKE8000 CSA Standard C22.2 No. 1010.1

SHKE8000-7 UL Standard 61010A-1

SHKE8000-ICE CSA Standard C22.2 No. 1010.1

SHKE8000-8CE UL Standard 61010A-1

EU EN60335 (applicable sections)

CE Mark . . . Electromagnetic and Low Voltage Directives

Capacity

Flasks . . . . . .From (91) 25ml up to (6) 2.8L

Weights

Net

SHKE8000/SHKE8000-ICE . . 545 lbs. (247.2kg)

SHKE8000-7/SHKE8000-8CE . . 610 lbs. (276.7kg)

Shipping

SHKE8000/SHKE8000-ICE . . 658 lbs. (298.5kg)

SHKE8000-7/SHKE8000-8CE . . 723 lbs. (328.0kg)

Optional Platforms

Size . . . . . .29.5” x 18” (74.9cm x 45.7cm)

Clips . . .25ml, 50ml, 125ml, 250/300ml, 500ml, 1L, 2L, 2.8L

Racks . . Adjustable angle test tube holder with rack, 10-30mm

Chamber Air Filter

Rated 95% efficient at 0.3 microns

11.0” x 20.0” x 1.5” (27.9cm x 50.8cm x 3.8cm)

Ambient Operating Conditions

Indoor use only

Temperature . . . . . 5°C (41°F) to 32°C (89.6°F)

Humidity . . . . . .80% RH at or below 31°C, decreasing linearly to 50% RH at 32°C

Sound Level . . . . . .Not to exceed 64db

Safety Specifications

Altitude . . . . . .2,000 meters

Temperature . . . . . .5°C to 32°C

Humidity . . . . . .80% RH at or below 32°C, decreasing linearly to 50% RH at 32°C

Mains Supply Fluctuations . . Operating Voltage Range

Installation Category II [1]

Pollution Degree 2 [2]

Class of Equipment I

Climatic Condition - ST (EN 60335, Subtropical)

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1 Installation category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500V for a 230V supply and 1500V for a 120V supply.

2 Pollution Degree describes the amount of conductive pollution present in the operating environment. Pollution Degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.

Section 6 Parts List

Common Parts to All Models

Part No.	Description
191535	Board, Motor Drive
191545	Board, Temp Control
190525	Board, Triple Output Relay
141046	Bulb, Interior Lamp 10W, 24V
129051	Damper Pneumatic, Door
900138	Fan, 123 CFM Internal Circulation 24VDC
900139	Fan, 18 CFM Component 24VDC
270127	Filter, EMI Power
760440	Filter HEPA
990046	Gasket Door
138010	Heater, 600W, 120/230 VAC
156089	Motor, 24VDC Brushless
190816	Panel, LCD Display/Keypad
400161	Power Supply, 24VDC Output
290181	Sensor, Temperature 2252 Ohm @ 25C
194046	Spare Parts Bag (platform and clips)
285306	Switch, Door
360237	Switch, Light
400113	Thermostat, Heater
420064	Transformer, 130VA
420085	Transformer, 25VA
800040	V-Belt
443021	Wrench, 3/4” Open End
443020	Wrench, 5/32” Hex T-Handle
129052	Spring, Door
194024	Spare Parts Bag (Test Tube Holder)
194254	Platform Assembly Latch Handle

Specific Parts for Model SHKE8000 and SHKE8000-ICE

Part No.	Description
191688	Board, Microprocessor
107005	Window, Door Glass

Specific Parts for Model SHKE8000

Part No.	Description
230178	Circuit Breaker/Switch, 8A
230144	Fuse, 5 x 20mm, 0.25A
230145	Fuse, 5 x 20mm, 1.6A
300275	Relay, 20A

Specific Parts for Model SHKE8000-ICE

Part No.	Description
230186	Circuit Breaker/Switch, 5A
230142	Fuse, 5 x 20mm, 0.150A
230141	Fuse, 5 x 20mm, 0.8A
300276	Relay, 20A

Specific Parts for Model SHKE8000-7 and SHKE8000-8CE

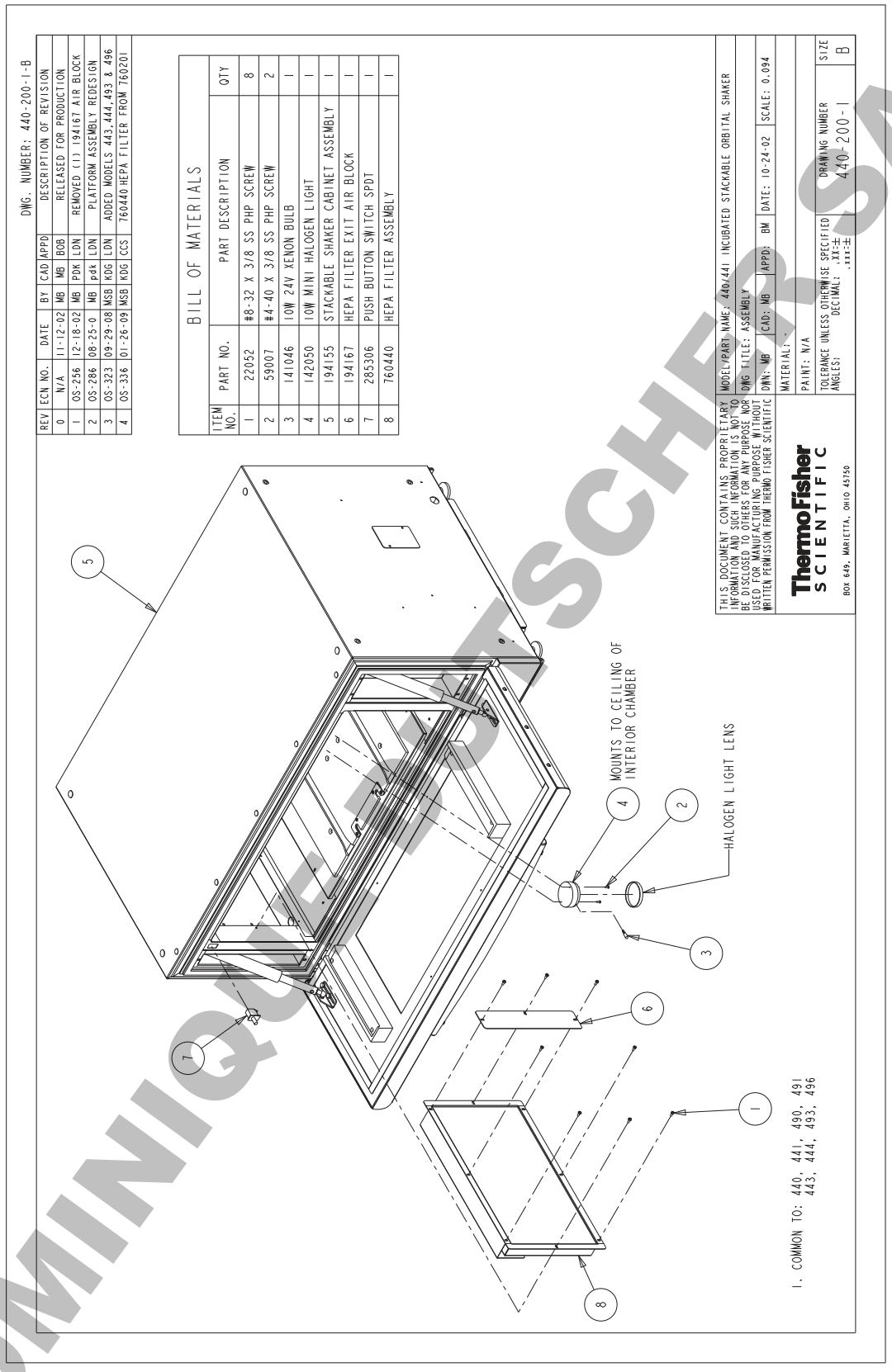
Part No.	Description
191689	Board, Microprocessor
760202	Filter, Condenser Air
204012	Condenser
220630	Constant Pressure Valve
209007	Dryer
204013	Evaporator
107006	Window, Door Glass

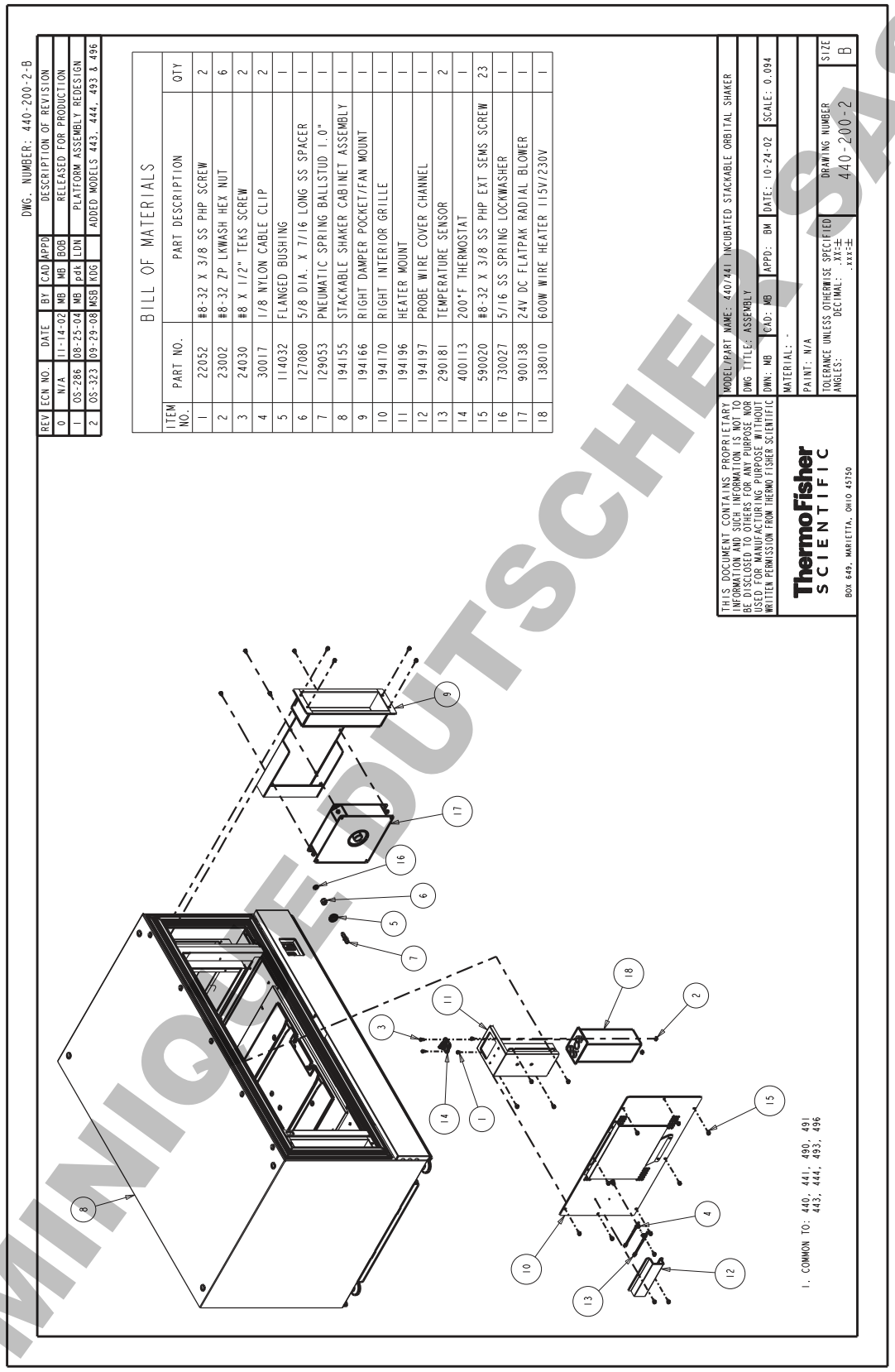
Specific Parts for Model SHKE8000-7

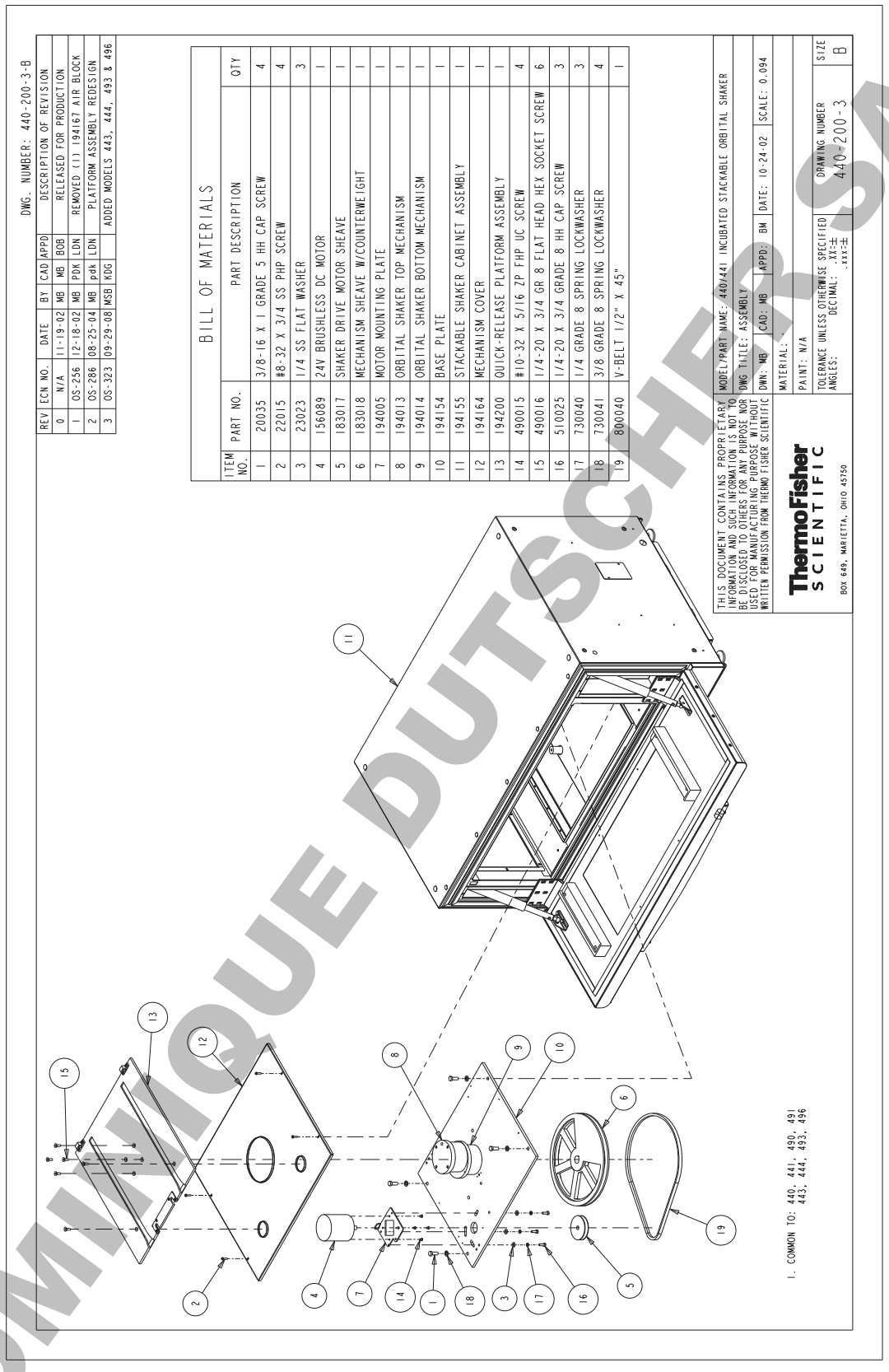
Part No.	Description
230179	Circuit Breaker/Switch, 10A
900105	Fan, 235 CFm Condenser 120VAC
230144	Fuse, 5 x 20mm, 0.25A
230145	Fuse, 5 x 20mm, 1.6A
203033	Compressor
300275	Relay, 20A

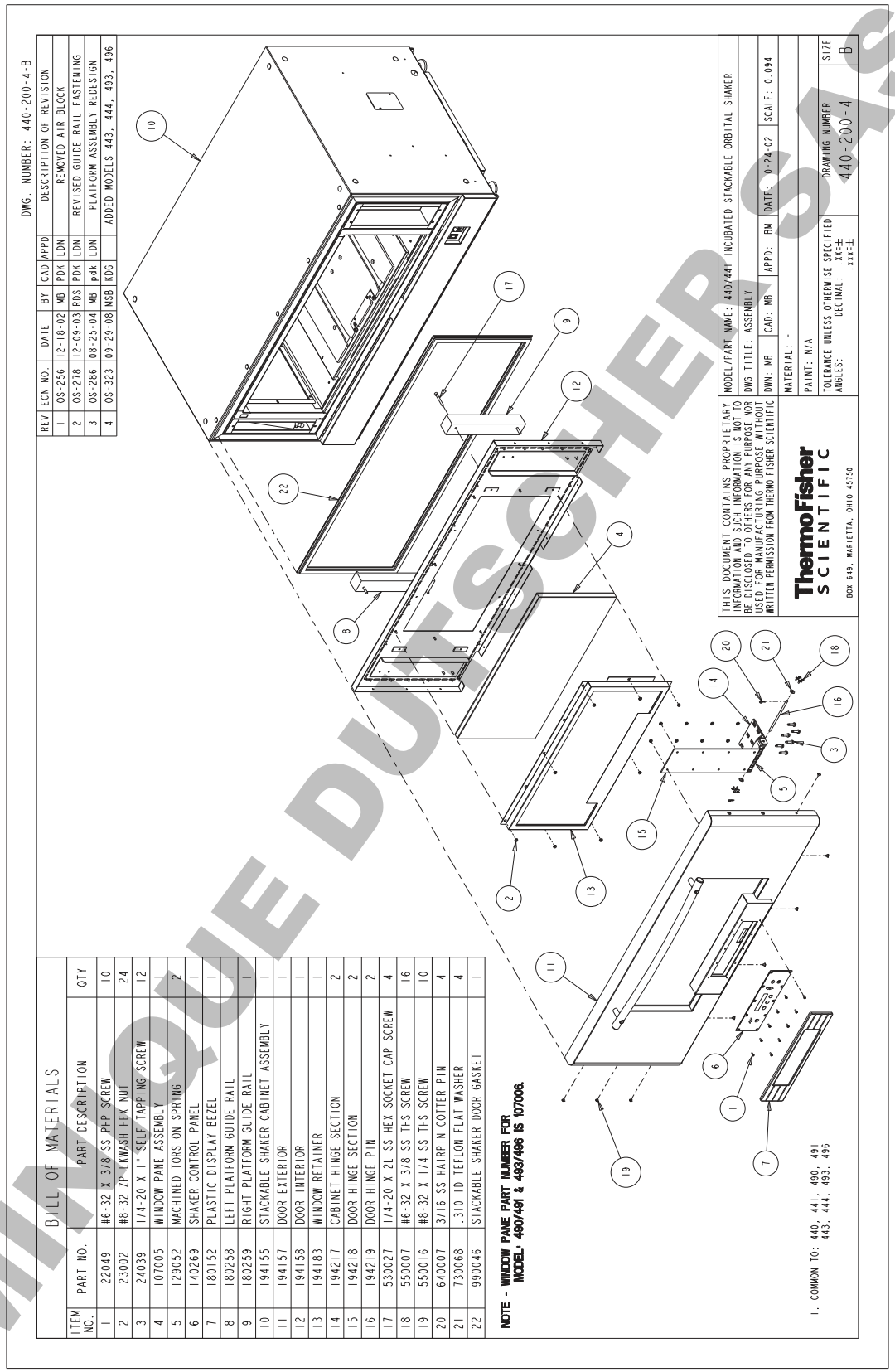
Specific Parts for Model SHKE8000-8CE

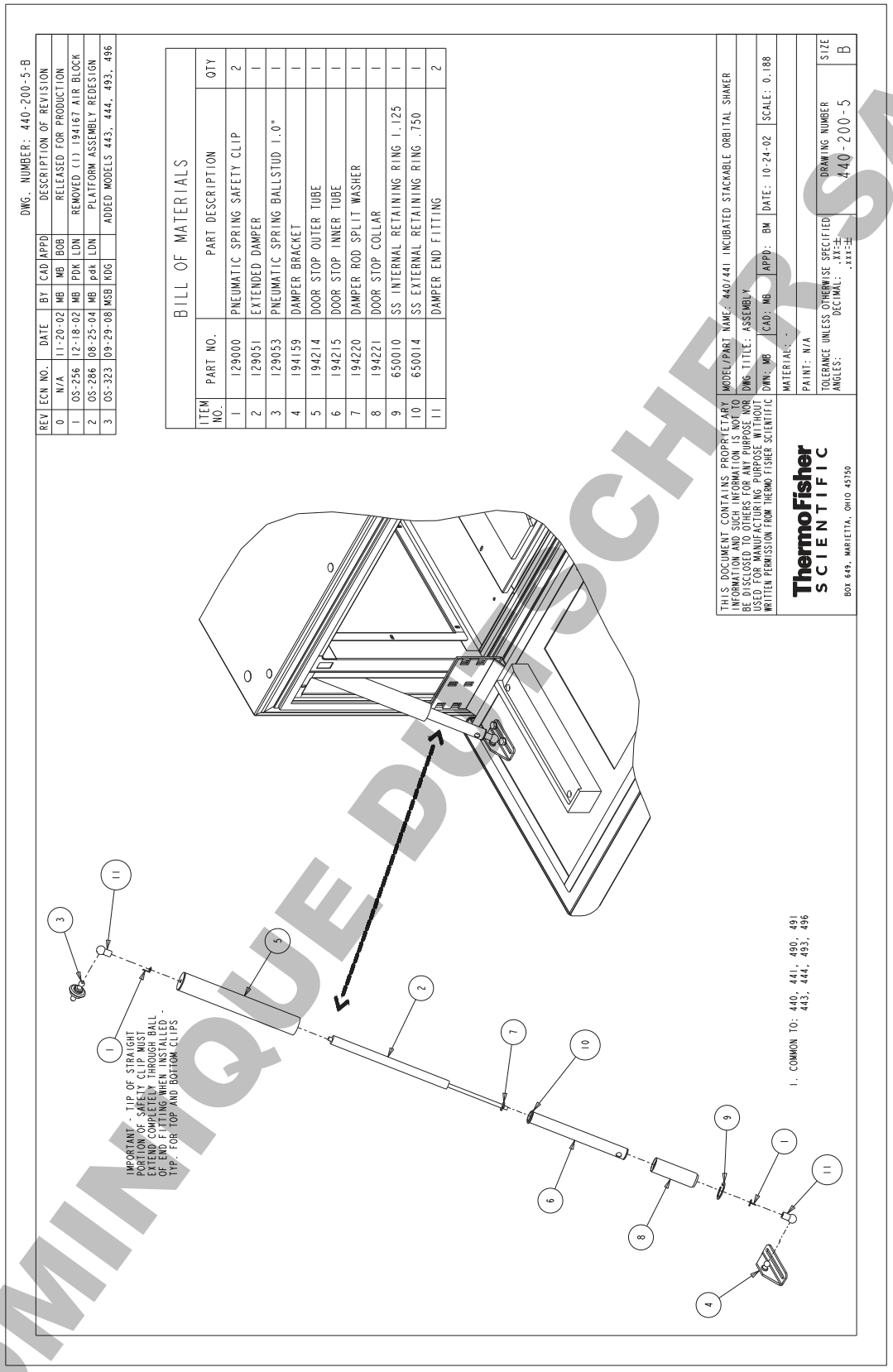
Part No.	**Description**
230178	Circuit Breaker/Switch, 8A
900107	Fan, 235 CFm Condenser 230VAC
230142	Fuse, 5 x 20mm, 0.15A
230141	Fuse, 5 x 20mm, 0.8A
203034	Compressor
300276	Relay, 20A





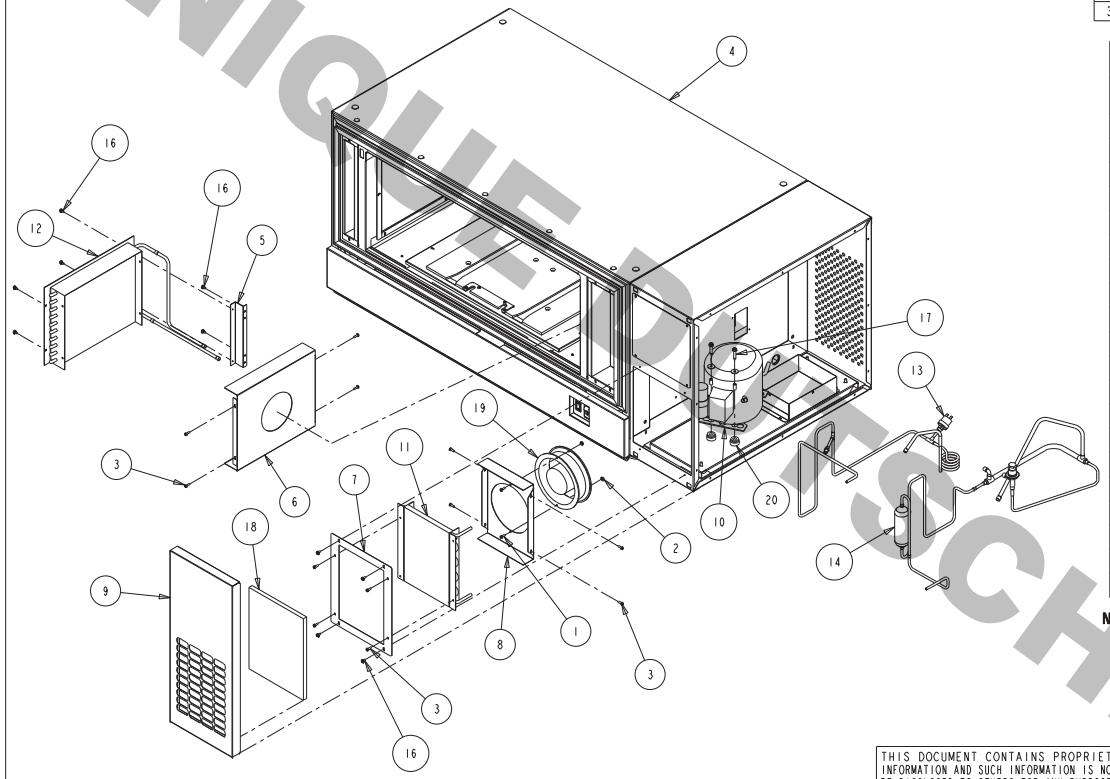






DWG. NUMBER: 490-200-1-B

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
0	N/A	11-13-02	MB	MB	BOB	RELEASED FOR PRODUCTION
1	OS-256	12-18-02	MB	PDK	LDN	REMOVED (1) 194167 AIR BLOCK
2	OS-286	08-26-04	MB	pdk	LDN	PLATFORM ASSEMBLY REDESIGN
3	OS-323	10-07-08	MSB	KDG		ADDED MODELS 493 & 496



1. COMMON TO: 490, 491, 493 & 496

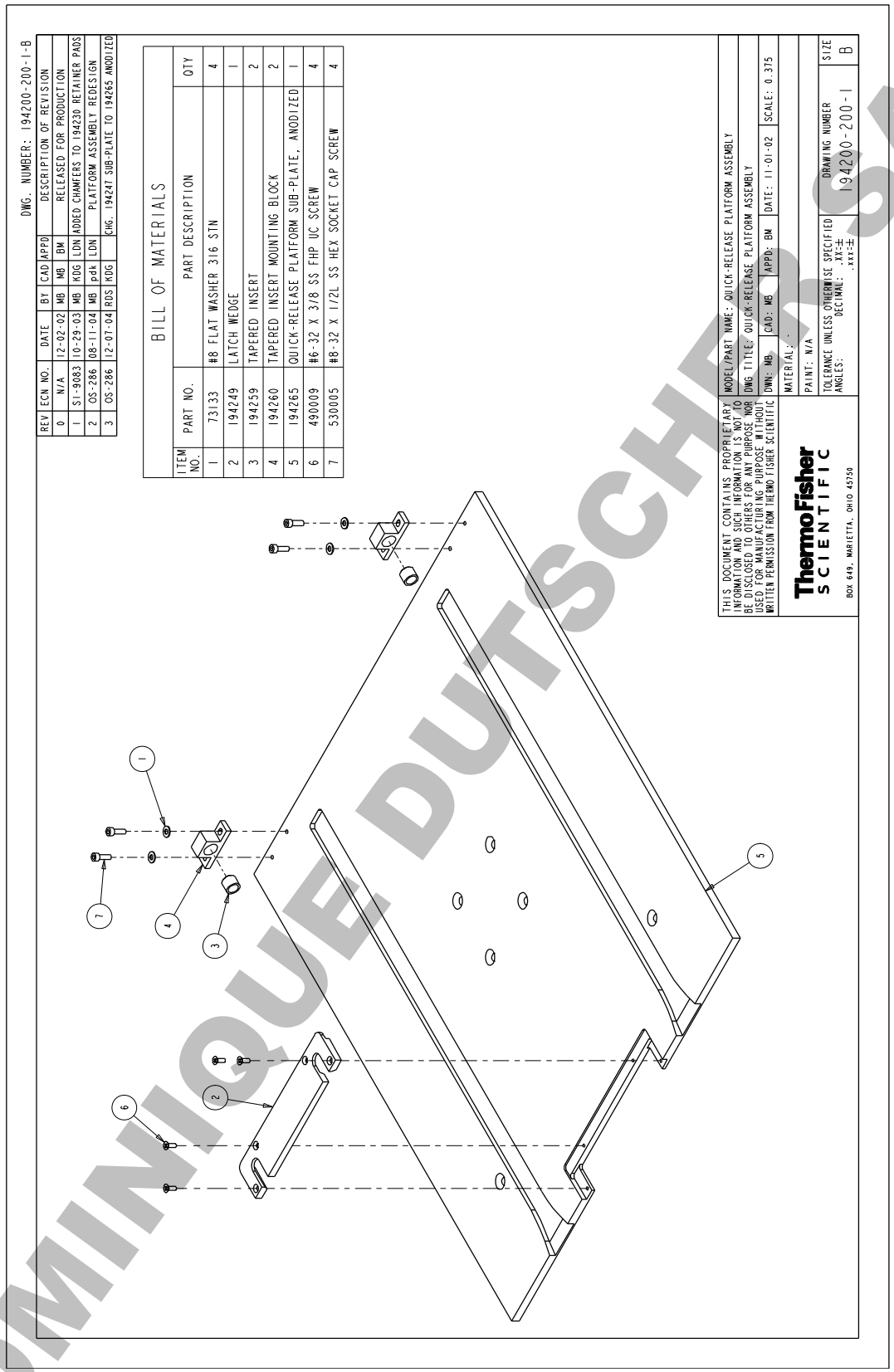
BILL OF MATERIALS

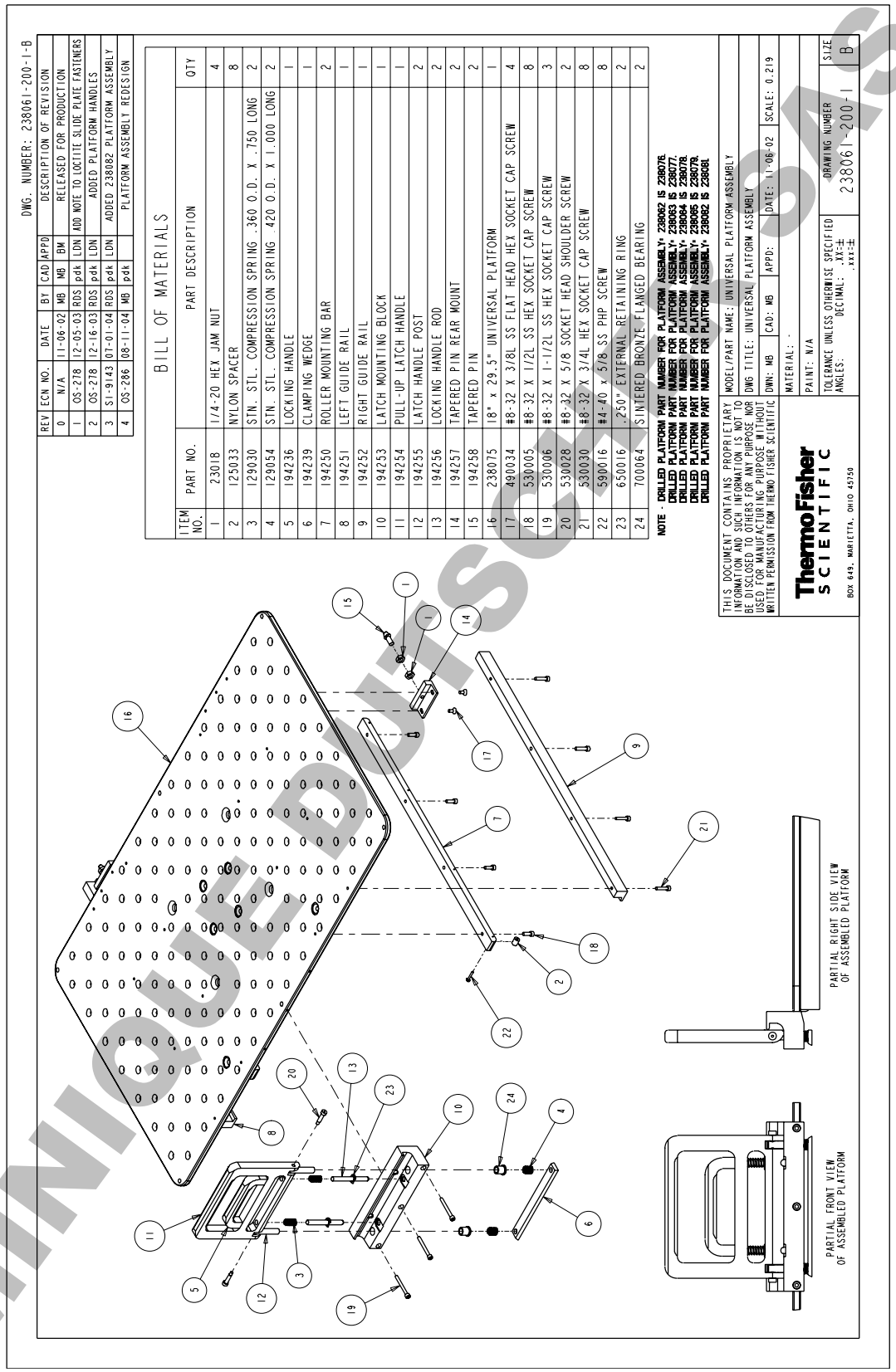
ITEM NO.	PART NO.	PART DESCRIPTION	QTY
1	22053	#8-32 X 1/2 SS PHP SCREW	2
2	23002	#8-32 ZP LKWASH HEX NUT	2
3	24042	#8-32 X 1/2 SS PHP SCREW F POINT	12
4	194155	STACKABLE SHAKER CABINET ASSEMBLY	1
5	194169	EVAPORATOR MOUNTING ANGLE	1
6	194180	EVAPORATOR ENCLOSURE	1
7	194184	CONDENSOR MOUNTING BRACKET	1
8	194185	CONDENSER FAN MOUNT	1
9	194187	SIDE CAR BEZEL	1
10	203033	HIGH TEMP COMPRESSOR 115V R134A	1
11	204012	CONDENSER COIL	1
12	204013	EVAPORATOR COIL	1
13	207008	PRESSURE SWITCH	1
14	209007	DRIER ASSEMBLY	1
15	220745	EXPANSION VALVE	1
16	590020	#8-32 X 3/8 SS PHP EXT SEMS SCREW	10
17	680017	1/4-20 X 1-1/4 SELF TAPPING SCREW	4
18	760202	FOAM AIR FILTER	1
19	900105	115V 235CFM TUBEAXIAL FAN	1
20	113019	COMPRESSOR MOUNTING KIT	4

NOTE - COMPRESSOR PART NUMBER FOR MODEL: 491 & 496 IS 203034.
TUBEAXIAL FAN PART NUMBER FOR MODEL: 491 & 496 IS 900107.

ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 490/491/493/496 INC./REFRIG. STACKABLE ORBITAL SHAKER
DWG TITLE: ASSEMBLY
DWN: MB | CAD: MB | APPD: BM | DATE: 10-24-02 | SCALE: 0.094
MATERIAL: -
PAINT: N/A
TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLES: DECIMAL: .XX=± .XXX=±
DRAWING NUMBER: 490-200-1
SIZE: B





DWG. NUMBER: 238061-200-1-B

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
0	N/A	11-06-02	WB	WB	BM	RELEASED FOR PRODUCTION
1	OS-278	12-05-03	RDS	pdk	LDN	ADD NOTE TO LOCTITE SLIDE PLATE FASTENERS
2	OS-278	12-16-03	RDS	pdk	LDN	ADDED PLATFORM HANDLES
3	SI-9143	07-01-04	RDS	pdk	LDN	ADDED 238082 PLATFORM ASSEMBLY
4	OS-286	08-11-04	WB	pdk		PLATFORM ASSEMBLY REDESIGN

BILL OF MATERIALS

ITEM NO.	PART NO.	PART DESCRIPTION	QTY
1	23018	1/4-20 HEX JAM NUT	4
2	125033	NYLON SPACER	8
3	129030	STN. STL. COMPRESSION SPRING .360 O.D. X .750 LONG	2
4	129054	STN. STL. COMPRESSION SPRING .420 O.D. X 1.000 LONG	2
5	194236	LOCKING HANDLE	1
6	194239	CLAMPING WEDGE	1
7	194250	ROLLER MOUNTING BAR	2
8	194251	LEFT GUIDE RAIL	1
9	194252	RIGHT GUIDE RAIL	1
10	194253	LATCH MOUNTING BLOCK	1
11	194254	PULL-UP LATCH HANDLE	1
12	194255	LATCH HANDLE POST	2
13	194256	LOCKING HANDLE ROD	2
14	194257	TAPERED PIN REAR MOUNT	2
15	194258	TAPERED PIN	2
16	238075	18" x 29.5" UNIVERSAL PLATFORM	1
17	490034	#8-32 X 3/8L SS FLAT HEAD HEX SOCKET CAP SCREW	4
18	530005	#8-32 X 1/2L SS HEX SOCKET CAP SCREW	8
19	530006	#8-32 X 1-1/2L SS HEX SOCKET CAP SCREW	3
20	530028	#8-32 X 5/8 SOCKET HEAD SHOULDER SCREW	2
21	530030	#8-32 X 3/4L HEX SOCKET CAP SCREW	8
22	590016	#4-40 x 5/8 SS PHP SCREW	8
23	650016	.250" EXTERNAL RETAINING RING	2
24	700064	SINTERED BRONZE FLANGED BEARING	2

NOTE - DRILLED PLATFORM PART NUMBER FOR PLATFORM ASSEMBLY= 238062 IS 238076.
DRILLED PLATFORM PART NUMBER FOR PLATFORM ASSEMBLY= 238063 IS 238077.
DRILLED PLATFORM PART NUMBER FOR PLATFORM ASSEMBLY= 238064 IS 238078.
DRILLED PLATFORM PART NUMBER FOR PLATFORM ASSEMBLY= 238065 IS 238079.
DRILLED PLATFORM PART NUMBER FOR PLATFORM ASSEMBLY= 238082 IS 238081.

PARTIAL FRONT VIEW OF ASSEMBLED PLATFORM

PARTIAL RIGHT SIDE VIEW OF ASSEMBLED PLATFORM

MODEL/PART NAME: UNIVERSAL PLATFORM ASSEMBLY
DWG TITLE: UNIVERSAL PLATFORM ASSEMBLY
DWN: WB | CAD: WB | APPD: | DATE: 11-06-02 | SCALE: 0.219
MATERIAL: -
PAINT: N/A

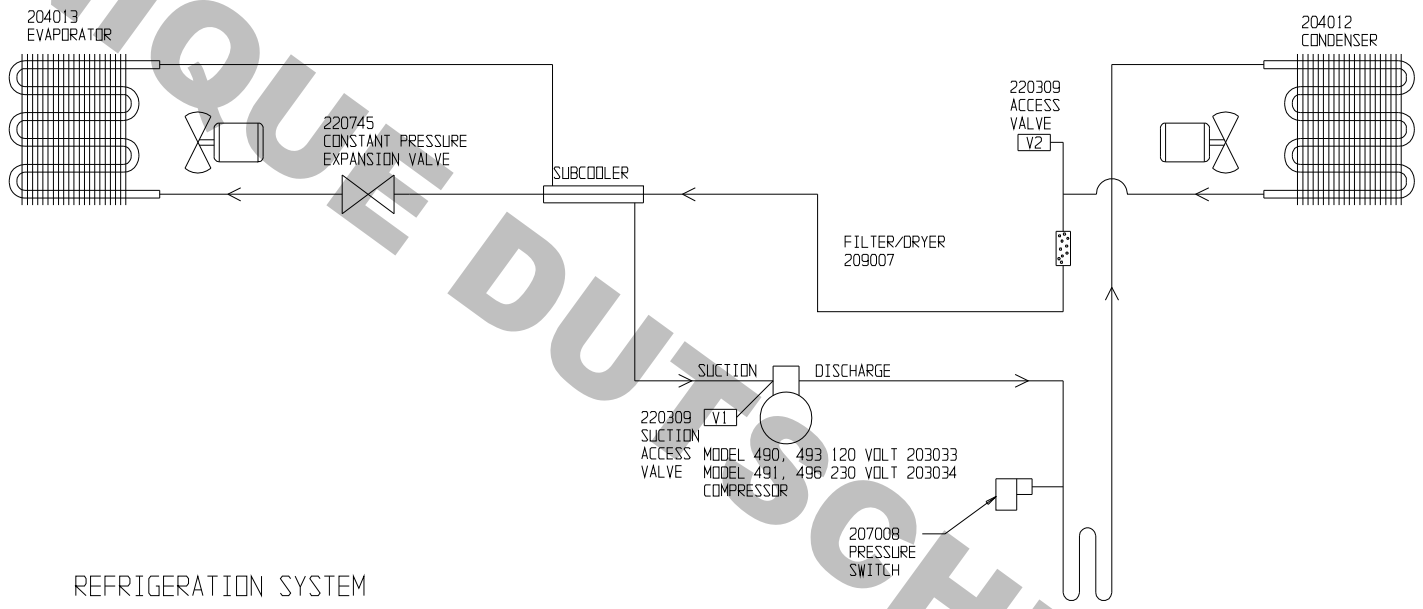
ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLES: DECIMAL: .XX=±, .XXX=±

DRAWING NUMBER 238061-200-1 | SIZE B

DRAWING NUMBER: 490-90-1-B

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
0	N/A	9-2-02	RTT	RTT	BLM	RELEASED FOR PRODUCTION
1	DS-312	6-26-07	AMB	SAG	BLM	220745 WAS 220630, 23.5 PSIG WAS 26
2	DS-323	9-30-08	MSB	KDG	CCS	ADDED MODELS 493 & 496



REFRIGERATION SYSTEM

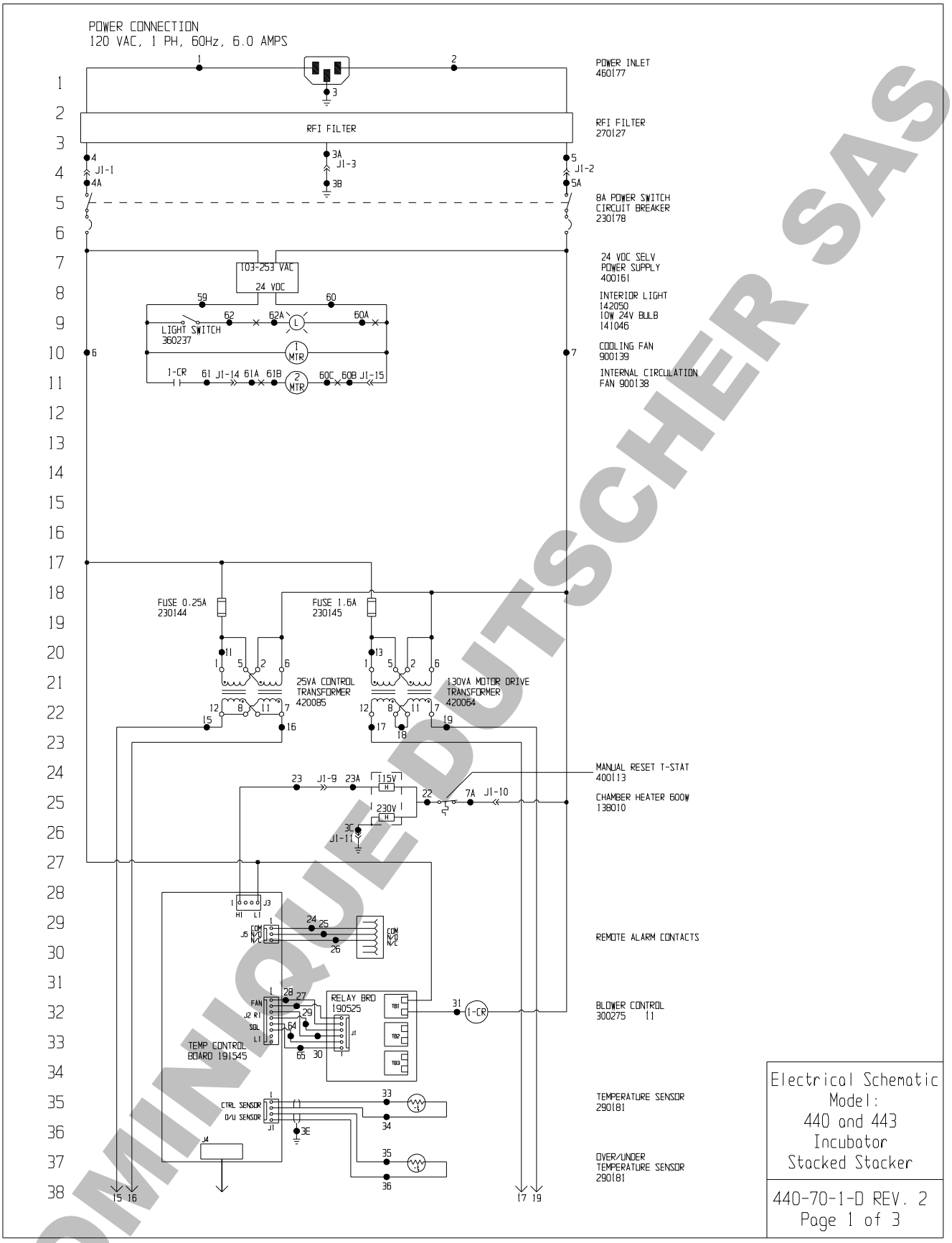
REFRIGERANT: 134A 10.5 OZ. +/-1.5 OZ.

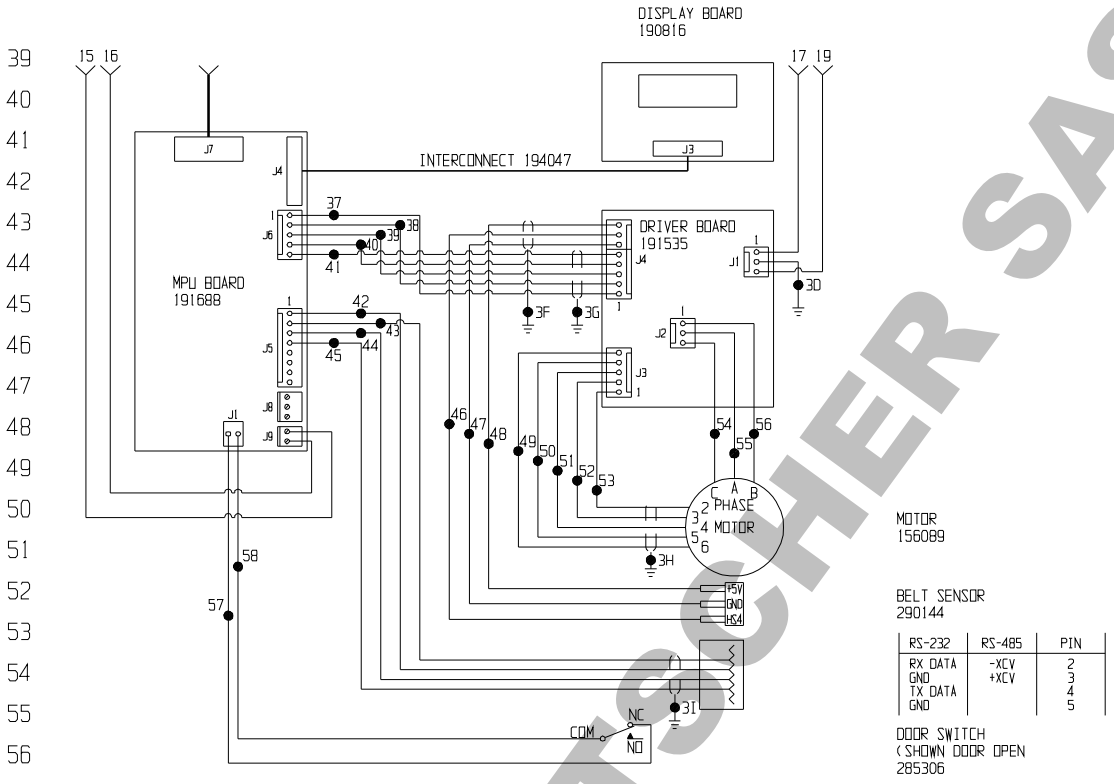
CONSTANT PRESSURE EXPANSION VALVE:
SET AT 23.5 PSIG +/-2 PSIG MEASURED AT V1.

1. COMMON TO: 490, 491, 493 & 496

ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 490,491,493,496 REFRIGERATED STACKED SHAKERS				
DWG TITLE: REFRIGERATION SCHEMATIC				
DWN: RTT	CAD: RTT	APPD: BLM	DATE: 5-3-02	SCALE: NONE
MATERIAL:				
PAINT COLOR:				
TOLERANCE UNLESS OTHERWISE SPECIFIED ANGLES: DECIMAL: .XX=± .XXX=±			DRAWING NUMBER 490-90-1	SIZE B





Electrical Schematic
Model:
440 and 443
Incubator
Stacked Stacker

440-70-1-D REV. 2
Page 2 of 3

WIRE REFERENCE CHART

WIRE #	GAUGE	COLOR	WIRE #	GAUGE	COLOR
1	18	BROWN	28	24	BLACK
2	18	BLUE	29	24	BLACK
3-3B	18	GRN/YEL	30	24	BLACK
3C-3D	18	GRN/YEL	31	18	YELLOW
3E-3I		SHIELDS			
4-4A	18	BROWN	33	24	RED
			34	24	GREEN
5-5A	18	WHITE	35	24	WHITE
			36	24	BLACK
			37	24	BLACK
6	18	BLACK	38	24	RED
7-7A	18	WHITE	39	24	GREEN
			40	24	WHITE
			41	24	BROWN
			42	24	BLACK
			43	24	RED
			44	24	GREEN
			45	24	WHITE
			46	24	GREEN
			47	24	BLACK
11	18	RED	48	24	RED
			49	24	BLACK
13	18	YELLOW	50	24	RED
15	18	BROWN	51	24	GREEN
16	18	BLUE	52	24	WHITE
17	18	RED	53	24	BROWN
18	18	ORANGE	54	18	RED
19	18	RED	55	18	WHITE
22	18	YELLOW	56	18	BLACK
23-23A	18	BROWN	57	22	GREEN
			58	22	WHITE
24	24	GREEN	59	18	RED
25	24	RED	60-60C	18/22	BLACK
26	24	BLACK	61-61B	18/22	RED
27	24	BLACK	62-62A	18/22	RED
			64	24	BLACK
			65	24	BLACK

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
2	DS-337	01-26-09	RLM	SAG	CCS	CORRECTED POWER 6.4 AMPS TO 6.0 AMPS
1	DS-323	10-07-08	MSB	KDG	LDN	ADDED MODEL 443
0	N/A	8-12-02	RTT	RTT	BDB	RELEASED FOR PRODUCTION

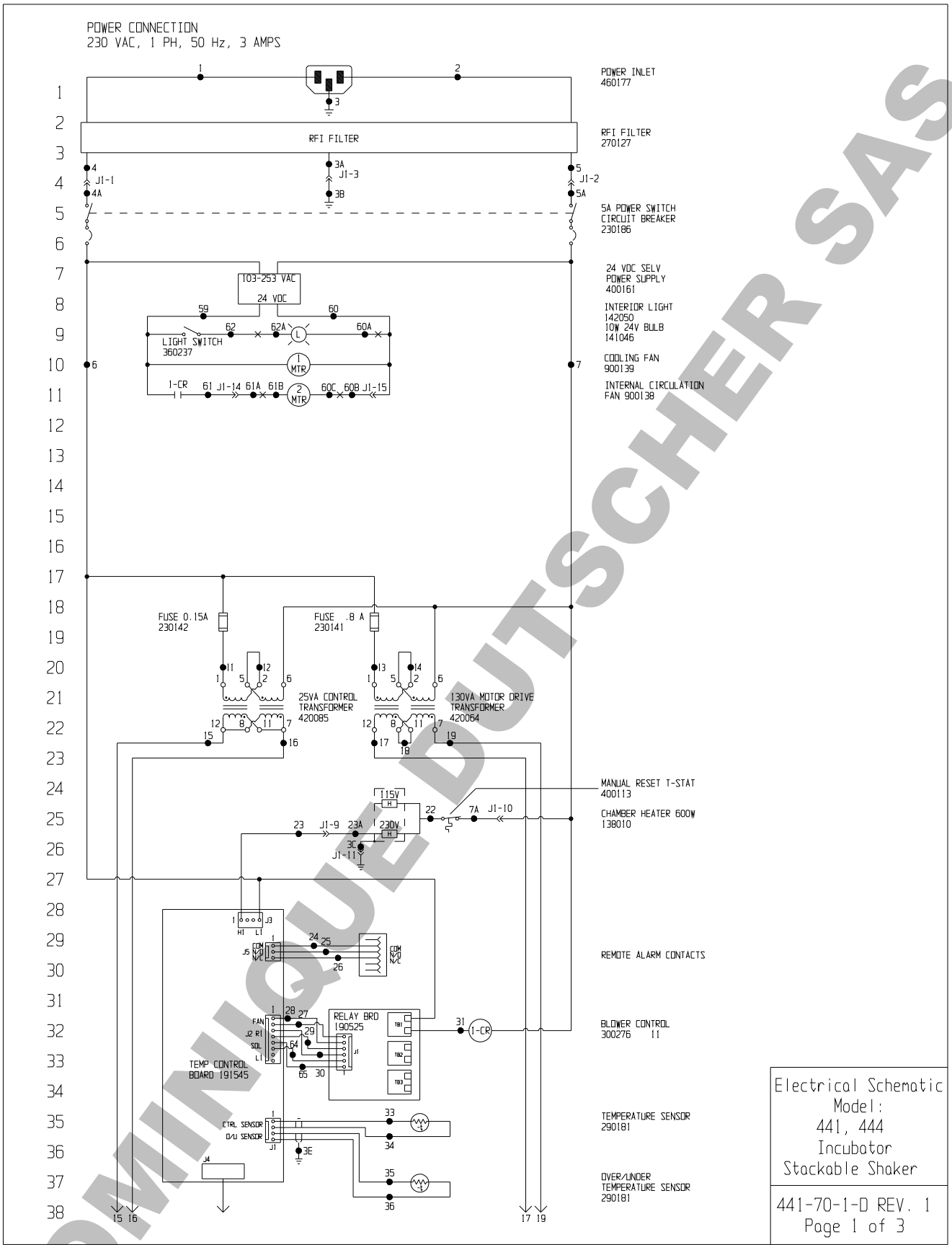
ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

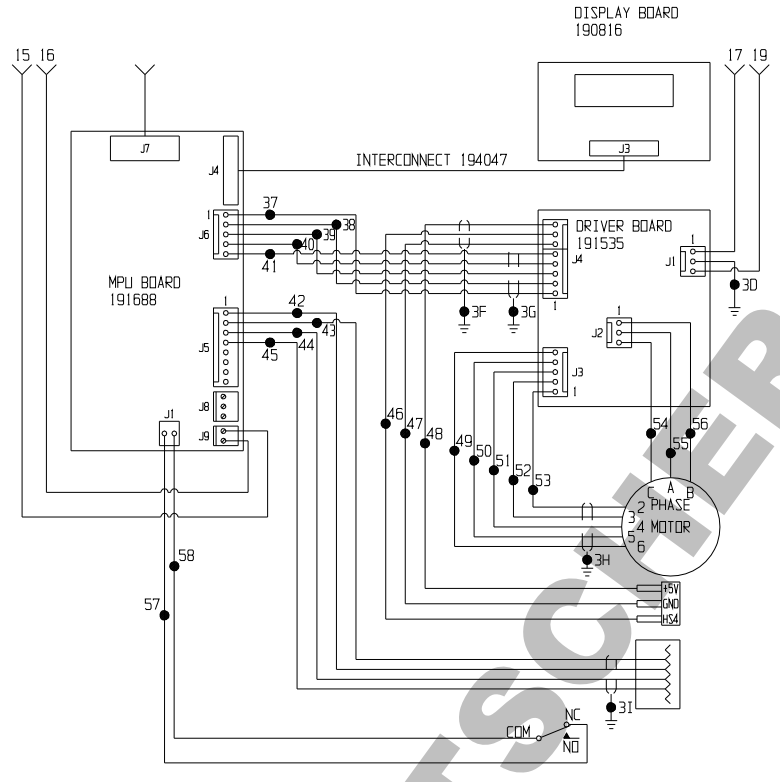
ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 440 & 443 INCUBATOR STACKED SHAKER
DWG TITLE: ELECTRICAL SCHEMATIC
DWN: RTT | CAD: RTT | APPD: BH | DATE: 3/21/02 | SCALE: NONE
MATERIAL:
PAINT COLOR:
TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLES: DECIMAL: .XX=± .XXX=±
DRAWING NUMBER 440-70-1
SIZE D

Electrical Schematic
Model:
440 and 443
Incubator
Stacked Stacker

440-70-1-D REV. 2
Page 3 of 3





Electrical Schematic Model: 441, 444 Incubator Stackable Shaker
441-70-1-D REV. 1 Page 2 of 3

WIRE REFERENCE CHART

WIRE #	GAUGE	COLOR	WIRE #	GAUGE	COLOR
1	18	BROWN	28	24	BLACK
2	18	BLUE	29	24	BLACK
3-3B	18	GRN/YEL	30	24	BLACK
3C-3D	18	GRN/YEL	31	18	YELLOW
3E-3I		SHIELDS			
4-4A	18	BROWN	33	24	RED
			34	24	GREEN
5-5A	18	WHITE	35	24	WHITE
			36	24	BLACK
			37	24	BLACK
6	18	BLACK	38	24	RED
7-7A	18	WHITE	39	24	GREEN
			40	24	WHITE
			41	24	BROWN
			42	24	BLACK
			43	24	RED
			44	24	GREEN
			45	24	WHITE
			46	24	GREEN
			47	24	BLACK
11	18	RED	48	24	RED
			49	24	BLACK
13	18	YELLOW	50	24	RED
15	18	BROWN	51	24	GREEN
16	18	BLUE	52	24	WHITE
17	18	RED	53	24	BROWN
18	18	ORANGE	54	18	RED
19	18	RED	55	18	WHITE
22	18	YELLOW	56	18	BLACK
23-23A	18	BROWN	57	22	GREEN
			58	22	WHITE
24	24	GREEN	59	18	RED
25	24	RED	60-60C	18/22	BLACK
26	24	BLACK	61-61B	18/22	RED
27	24	BLACK	62-62A	18/22	RED
			64	24	BLACK
			65	24	BLACK

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
1	DS-323	10-07-08	MSB	KDG	CCS	ADDED MODEL 444
0	N/A	8-12-02	RTT	RTT	BOB	RELEASED FOR PRODUCTION

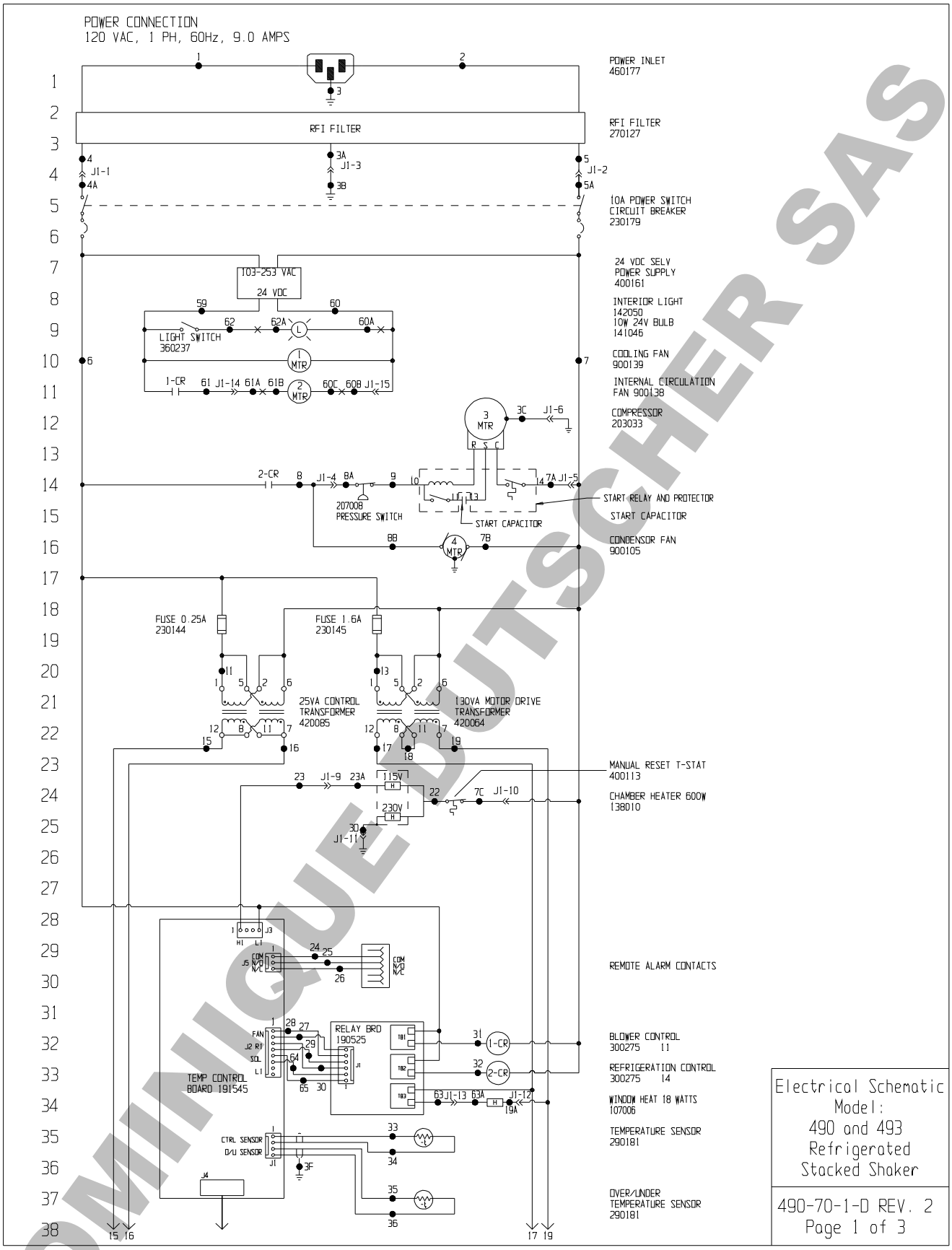
ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 441 & 444 INCUBATOR STACKED SHAKER
DWG TITLE: ELECTRICAL SCHEMATIC
DWN: RTT | CAD: RTT | APPD: BH | DATE: 3/21/02 | SCALE: NONE
MATERIAL:
PAINT COLOR:
TOLERANCE UNLESS OTHERWISE SPECIFIED ANGLES: DECIMAL: .XX=± .XXX=±
DRAWING NUMBER 441-70-1
SIZE D

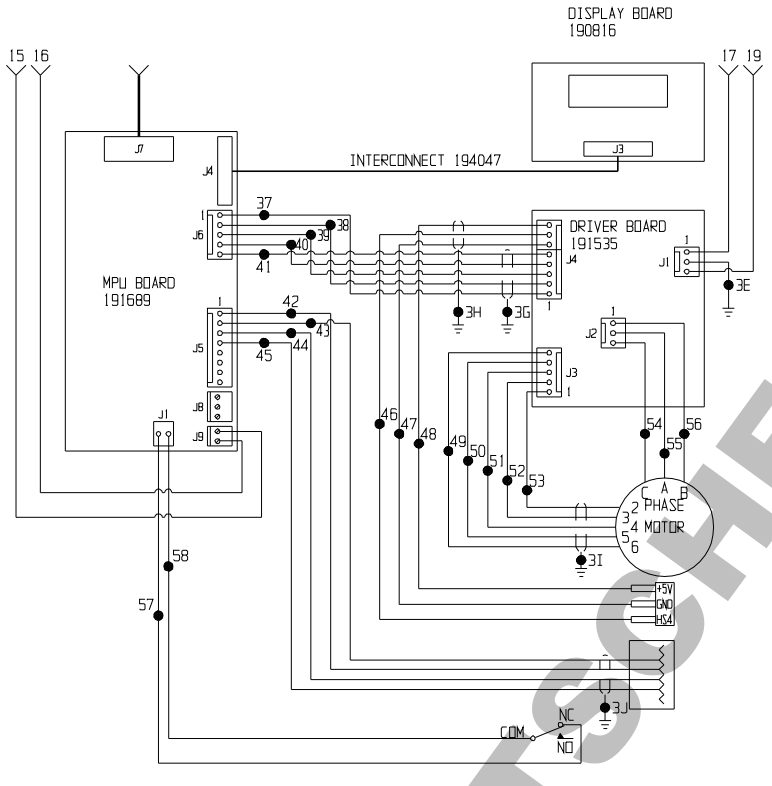
Electrical Schematic
Model:
441, 444
Incubator
Stackable Shaker

441-70-1-D REV. 1
Page 3 of 3



Electrical Schematic
Model:
490 and 493
Refrigerated
Stacked Shaker

490-70-1-D REV. 2
Page 1 of 3



Electrical Schematic
Model:
490 and 493
Refrigerated
Stacked Shaker

490-70-1-D REV. 2
Page 2 of 3

WIRE REFERENCE CHART

WIRE #	GAUGE	COLOR	WIRE #	GAUGE	COLOR
1	14	BROWN	28	24	BLACK
2	14	BLUE	29	24	BLACK
3-3B	14	GRN/YEL	30	24	BLACK
3C-3E	16/18	GRN/YEL	31	18	YELLOW
3F-3J		SHIELDS	32	18	BROWN
4-4A	14	BROWN	33	24	RED
			34	24	GREEN
5-5A	14	WHITE	35	24	WHITE
			36	24	BLACK
			37	24	BLACK
6	16/18	BLACK	38	24	RED
7-7A	16/18	WHITE	39	24	GREEN
7B	18	WHITE	40	24	WHITE
7C	18	WHITE	41	24	BROWN
			42	24	BLACK
			43	24	RED
8-8A	16	BROWN	44	24	GREEN
8B	18	BROWN	45	24	WHITE
9	16	BROWN	46	24	GREEN
			47	24	BLACK
11	18	RED	48	24	RED
			49	24	BLACK
13	18	YELLOW	50	24	RED
15	18	BROWN	51	24	GREEN
16	18	BLUE	52	24	WHITE
17	18	RED	53	24	BROWN
18	18	ORANGE	54	18	RED
19-19A	18	RED	55	18	WHITE
			56	18	BLACK
22	18	YELLOW	57	22	GREEN
23-23A	18	BROWN	58	22	WHITE
24	24	GREEN	59	18	RED
25	24	RED	60-60C	18/22	BLACK
26	24	BLACK	61-61B	18/22	RED
27	24	BLACK	62-62A	18/22	RED
			63-63A	18	RED
			64	24	BLACK
			65	24	BLACK

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
2	OS-337	01-26-09	RLM	SAG	CCS	POWER CORRECTED 8.8 AMPS TO 9.0 AMPS
1	OS-323	10-07-08	MSB	KOG	BOB	ADDED MODEL 493
0	N/A	9-27-02	RTT	RTT	BOB	RELEASED FOR PRODUCTION

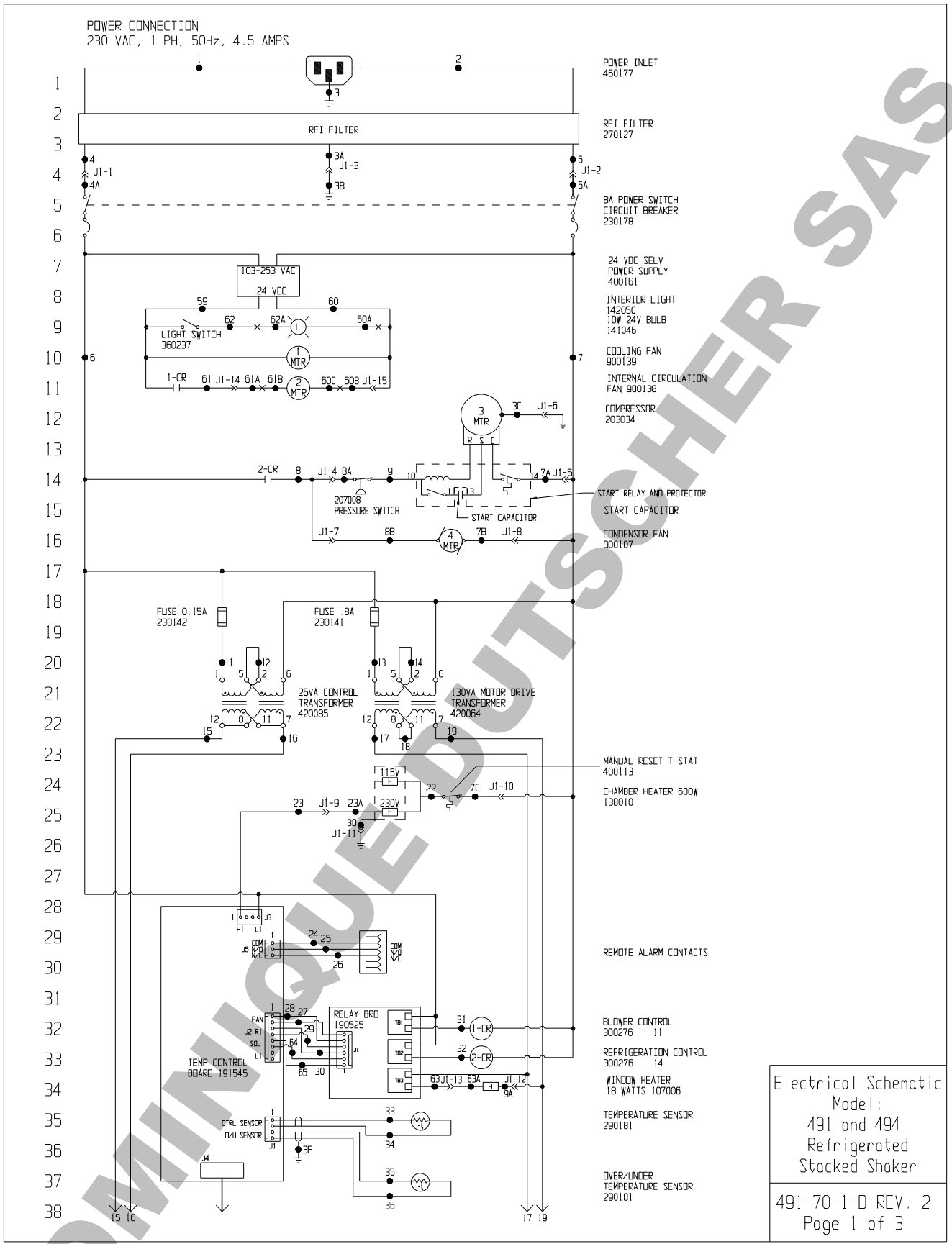
ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

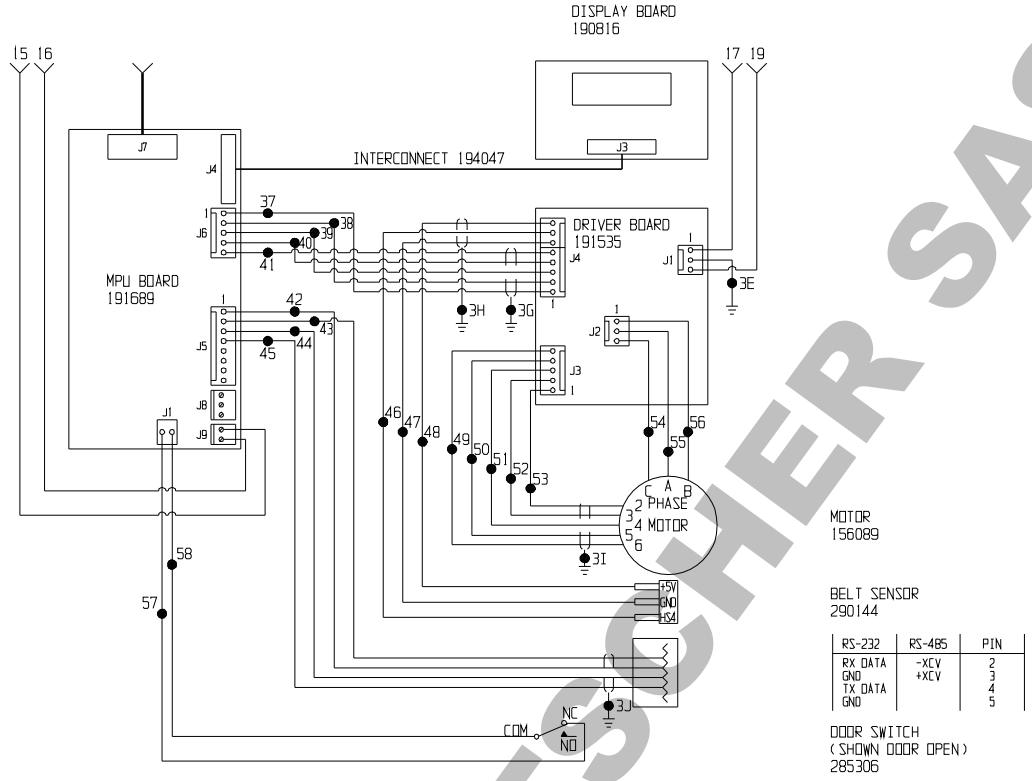
ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 490 & 493 REFRIGERATED STACKED SHAKER
DWG TITLE: ELECTRICAL SCHEMATIC
DWN: RTT | CAD: RTT | APPD: BH | DATE: 2/18/02 | SCALE: NONE
MATERIAL:
PAINT COLOR:
TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLES: DECIMAL: .XX=±, .XXX=±
DRAWING NUMBER 490-70-1
SIZE D

Electrical Schematic
Model:
490 and 493
Refrigerated
Stacked Shaker

490-70-1-D REV. 2
Page 3 of 3





Electrical Schematic
Model:
491 and 494
Refrigerated
Stacked Shaker

491-70-1-D REV. 2
Page 2 of 3

WIRE REFERENCE CHART

WIRE #	GAUGE	COLOR	WIRE #	GAUGE	COLOR
1	14	BROWN	28	24	BLACK
2	14	BLUE	29	24	BLACK
3-3B	14	GRN/YEL	30	24	BLACK
3C-3E	16/18	GRN/YEL	31	18	YELLOW
3F-3J		SHIELDS	32	18	BROWN
4-4A	14	BROWN	33	24	RED
			34	24	GREEN
5-5A	14	WHITE	35	24	WHITE
			36	24	BLACK
			37	24	BLACK
6	16/18	BLACK	38	24	RED
7-7A	16/18	WHITE	39	24	GREEN
7B	18	WHITE	40	24	WHITE
7C	18	WHITE	41	24	BROWN
			42	24	BLACK
			43	24	RED
8-8A	16	BROWN	44	24	GREEN
8B	18	BROWN	45	24	WHITE
9	16	BROWN	46	24	GREEN
11	18	RED	47	24	BLACK
12	18	BROWN	48	24	RED
13	18	YELLOW	49	24	BLACK
14	18	BROWN	50	24	RED
15	18	BROWN	51	24	GREEN
16	18	BLUE	52	24	WHITE
17	18	RED	53	24	BROWN
18	18	ORANGE	54	18	RED
19-19A	18	RED	55	18	WHITE
			56	18	BLACK
22	18	YELLOW	57	22	GREEN
23-23A	18	BROWN	58	22	WHITE
24	24	GREEN	59	18	RED
25	24	RED	60-60C	18/22	BLACK
26	24	BLACK	61-61B	18/22	RED
27	24	BLACK	62-62A	18/22	RED
			63-63A	18	RED
			64	24	BLACK
			65	24	BLACK

REV	ECN NO.	DATE	BY	CAD	APPD	DESCRIPTION OF REVISION
2	DS-337	01-26-09	RLM	SAG	CCS	POWER CORRECTED 4.1 AMPS TO 4.5 AMPS
1	DS-323	10-07-08	MSB	KDG	LDN	ADDED MODEL 496
0	N/A	9-27-02	RTT	RTT	BDB	RELEASED FOR PRODUCTION

ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

ThermoFisher SCIENTIFIC
BOX 649, MARIETTA, OHIO 45750

MODEL/PART NAME: 491 & 496 REFRIGERATED STACKED SHAKER
DWG TITLE: ELECTRICAL SCHEMATIC
DWN: RTT | CAD: RTT | APPD: BH | DATE: 3/21/02 | SCALE: NONE
MATERIAL:
PAINT COLOR:
TOLERANCE UNLESS OTHERWISE SPECIFIED ANGLES: DECIMAL: .XX±, .XXX±
DRAWING NUMBER 491-70-1
SIZE D

Electrical Schematic
Model:
491 and 496
Refrigerated
Stacked Shaker

491-70-1-D REV. 2
Page 3 of 3

THERMO FISHER SCIENTIFIC SHKE8000 SHAKER WARRANTY USA

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the warranty period.

During the first year, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. For an additional 4 years, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor excluded. In addition, the Orbital Shaker mechanism is warranted for Unit Production Life, parts only, F.O.B. factory. The mechanism is defined as the bearing assemblies. Unit Production Life is defined as 10 years. The warranty will be void if the equipment is altered without written authorization from Thermo. Installation and calibration is not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, i.e., glass, filters, light bulbs and lid gaskets are excluded from this warranty. Extended warranties are dependent on the units being maintained regularly as stated in the operation and service manuals.

Replacement or repair of components parts or equipment under this warranty shall not exceed the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY. Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation, and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer any questions on equipment warranty, operation, maintenance, service and special applications. Outside the USA, contact your local distributor for warranty information.

Rev. 0 1/09

ISO 9001 REGISTERED

THERMO FISHER SCIENTIFIC INTERNATIONAL SHKE8000 SHAKER WARRANTY

The Warranty Period starts two months from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the warranty period.

During the first year, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, including labor. For an additional 4 years, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, excluding labor. In addition, the Orbital Shaker drive mechanism is warranted for Unit Production Life, parts only, F.O.B. factory. The mechanism is defined as the bearing assemblies. Unit Production Life is defined as 10 years. The warranty will be void if the equipment is altered without the written authorization from Thermo. Installation and calibration is not covered by this warranty agreement. The local Thermo Fisher Scientific office must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, i.e., glass, filters, light bulbs and lid gaskets are excluded from this warranty. Extended warranties are dependent on the units being maintained regularly as stated in the operation and service manuals.

Replacement or repair of component parts or equipment under this warranty shall not exceed the warranty to either the equipment or to the component part beyond the original warranty period. The local Thermo Fisher Scientific office must give prior approval for return of any components or equipment.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY. Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Thermo International Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation, and preventative maintenance.

If equipment service is required, please call your local Thermo Fisher Scientific office. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special applications.

Rev. 0 1/09

ISO 9001 REGISTERED

Declaration of Conformity

Manufacturer's Name:	Thermo Fisher Scientific (Asheville) LLC
Manufacturer's Address:	401 Millcreek Road Marietta, Ohio 45750 U.S.A.
Product Description:	Max Q Stackable Shaker
Product Designations:	SHKE8000-1CE (Model 444)
Year of Initial Marking (CE):	2009
Affected Serial Numbers:	Release 2 (Release Level [REL#] shown on Serial Tag)

This product conforms to the following European Union Directive(s):

EMC: 89/336/EEC
LVD: 73/23/EEC

This product conforms to the following Harmonized, International and National Standards:

EMC:	**LVD:**
EN 61326-1:1997	EN 61010-1:1993
EN 50081-1:92	IEC 1010-1 Amendment 2
EN 50082-1:97	EN 60335-2-24 (applicable sections)
	CSA C22.2 No. 1010.1-92

Richard L. Miller, CQE
Regulatory Compliance Manager

ThermoFisher SCIENTIFIC

10 January 2009

Rev. 0

Declaration of Conformity

Manufacturer's Name:	Thermo Fisher Scientific (Asheville) LLC
Manufacturer's Address:	401 Millcreek Road Marietta, Ohio 45750 U.S.A.
Product Description:	Max Q Stackable Shaker
Product Designations:	SHKE8000-8CE (Model 496)
Year of Initial Marking (CE):	2009
Affected Serial Numbers:	Release 2 (Release Level [REL#] shown on Serial Tag)

This product conforms to the following European Union Directive(s):

EMC:	89/336/EEC
LVD:	73/23/EEC

This product conforms to the following Harmonized, International and National Standards:

EMC:	**LVD:**
EN 61326-1:1997	EN 61010-1:1993
EN 50081-1:92	IEC 1010-1 Amendment 2
EN 50082-1:97	EN 60335-2-24 (applicable sections)
	CSA C22.2 No. 1010.1-92

Richard L. Miller, CQE
Regulatory Compliance Manager

ThermoFisher SCIENTIFIC

10 January 2009

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Controlled Environment Equipment
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Marietta, Ohio 45750
United States

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