BOEKEL ™
Boekel Scientific

Shaking Hot Tubs

290400   28 Liter 115V
290400S   28 Liter 115V
290400-2   28 Liter 230V

Operating Instructions

Table of Contents

1.   Safety

The following symbols mean:

⚠️ Caution: Read these operating instructions fully before use and pay particular attention to sections containing this symbol.

⚠️ Caution: Surfaces can become hot during use.

Always observe the following safety precautions:

➤ ⚠️ Use only as specified by the operating instructions or the intrinsic protection may be impaired.
➤ Do not place fingers or hands below the tray surface while the tray is in motion. Only use tray handles to move the tray.
➤ These baths are for water use only.
➤ Connect only to a power supply which provides a safety earth ground.
➤ Take care when topping or draining, as liquid may be very hot.

➤ ⚠️ Do not touch surfaces that become hot during high temperature use.
➤ Ensure that the mains switch and isolating device (power supply connector) are easily accessible during use.
➤ Connect only to a power supply which provides a safety earth ground terminal.
➤ Before moving, disconnect at the power supply socket.

➤ ⚠️ Do not connect to a power supply or switch on before filling the tank.
➤ If liquid is spilled inside the unit, disconnect it from the power supply and have it checked by a competent person.
➤ It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment.
➤ Clean the unit only with a damp cloth; do not use chemical cleaning agents.
➤ Place unit on a solid, level work surface or laboratory bench.
➤ Drain tank before moving the bath. Before draining allow the unit to cool below 50°C.

➤ ⚠️ Always use a lid when operating above 60°C. Take care when raising and removing the lid, it may be hot, steam and hot vapors can cause scalding.

2. Getting Started

2.1. Unpacking

Remove packing materials carefully, and retain for future shipment or storage of the unit.

2.2. The Shaking Hot Tub package includes:

➤ The Shaking Hot Tub
➤ External Power Cord
➤ Polycarbonate Lid
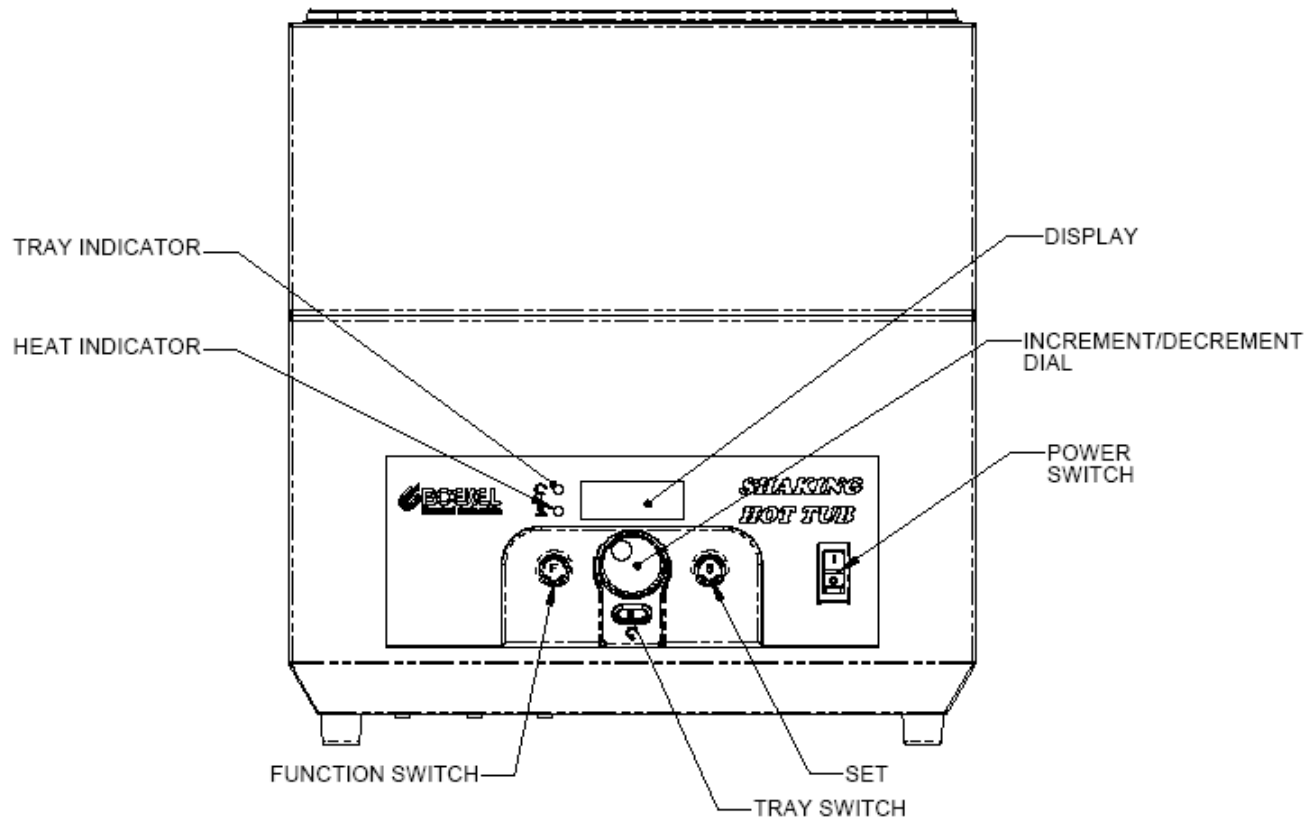➤ Drain tube
➤ Operating Instructions

2.3. Trays

➢ Refer to section 4 page 8 for a complete description of the trays available.

➢ ⚠️**ATTENTION – The bottom of the Universal Flask Tray is comprised of magnets. Take care to ensure magnets do not come in contact with any metal components on your lab bench.**

2.3. Installation

➢ Using desired tray, place the tray into the bath, the tray is self positioning and only needs to be located into the approximate center of the tank.

➢ The bath is capable of providing an orbital shake or a reciprocating shake by simple reversing the tray. If an orbital shake is desired, place the tray into the bath so that the word "Orbital" (which is stamp onto the tray) is position towards the font of the bath. If a reciprocating shake is desired, align the tray with the word "Orbital" towards the rear.

➢ Be certain that the drain hose assembly is removed from the drain port prior to filling with the tank.

➢ Use water only, fill bath to a minimum of 2" above the base of the tank and the maximum of 3" from the top of the tank when the bath is fully loaded. A lid must be used with the bath at temperatures above 60°C. After bath is filled with water, connect the power line cord to the unit.

➢ The power switch is located on the front panel and is used to turn the unit on and off.

3. Operation

TRAY INDICATOR

HEAT INDICATOR

DISPLAY

INCREMENT/DECREMENT DIAL

POWER SWITCH

FUNCTION SWITCH

SET

TRAY SWITCH

3.1. Changing the Set Temperature

3.1.1 Press the "F" button once until tSEt is indicated on the display. The display will alternate between tSEt and the set temperature value.

3.1.2 Depress the "S" switch to enter the "Set Temperature" mode.

3.1.3 Adjust the Increment /Decrement Dial until the desired new Set Temperature is indicated on the display.

3.1.4 When the desired set temperature is achieved, depress the "Set" switch. This value is stored in memory and the unit will retain this value after the unit is switched off.

3.1.5 As the bath heats up the heater indicator will remain on steady, as the bath begins to reach equilibrium, the heater indicator will flash.

3.2. Setting the Motor Speed

3.2.1 Depressing the tray switch on the front panel will activate the shaking motion, and the tray indicator will illuminate.

3.2.2 Depress the "F" switch twice and the display will change to "SPd" and alternate between "SPd" and the current motor speed setting.

3.2.3 Depress the "Set" switch to enter the motor speed adjust mode.

3.2.4 Use the Increment / Decrement Dial to obtain the required motor speed. The display flashes when in the "Set Motor Speed" mode.

3.2.5 When the desired motor speed is indicated, press "S" again. This value is now stored in memory and the unit will retain this value after the unit is switched off.

3.2. Changing Bath to Boil Mode

3.2.1 Depress the "Temperature" switch; the display will change to "tSEt".

3.2.2 Depress the "Set" switch to enter the set point adjust mode.

3.2.3 Depress the "up" arrow key until the display changes to "Boil". This will occur after the display reaches 100.0°C.

3.2.4 Depress the "Set" key to enter the Boil Mode. The display will now alternate between "Boil" and the actual bath temperature.

3.2.5 To exit Boil Mode, depress the "Temperature" switch, the display will change to "tSEt". Depress the down arrow key twice and hold until desired bath set temperature is achieved.

3.2.6 When the desired set temperature is achieved depress the "Set" switch.

Note: *An optional Stainless Steel lid (Part Number 290320) is required when the bath is used in the Boil Mode.*

3.3. Using the Timer

3.3.1 Depress the "F" switch three times, and the display will change to "CLOC".

3.3.2 Depress the "S" switch to enter the Timer mode.

3.3.3 Dial the Increment / Decrement Dial clockwise to change the display from "OFF" to "On".

3.3.4 Depress the "Set" switch to enter the timer adjust mode.

3.3.5 Use the Increment / Decrement Dial to select the desired timer value, a time of between 1 minute and 99 hours and 59 minutes can be selected. The timer value is displayed as HH: MM. When the desired timer value is selected, depress the "set" again, this turns on the timer and stores the timer duration in memory.

3.3.6 The display will now alternate between the bath temperature and the time remaining as the timer counts down.

3.3.7 When the timer reaches 00:00, the alarm will peep, the heater will shut off, the motor will motor will stop and the display will now alternate between "ENd" and the actual bath temperature.

3.3.8 Press the "F" and "S" simultaneously to shut the timer off and return the unit to normal operating mode.

3.4. Using the High Temperature Alarm

3.3.9 The unit is programmed with an adjustable high temperature alarm. The high temperature alarm value is factory defaulted at 5°C above the set temperature value. To change this value, follow the steps below.

3.3.10 Depress the "F" switch four times, and the display will change to "ALAr" and will alternate between "Alar" and the current high temperature alarm value.

3.3.11 Depress the "S" switch and the display will now flash the current high temperature alarm value.

3.3.12 If a different value is desired use the Increment / Decrement Dial to obtain the desired high temperature alarm value.

3.3.13 When the desired alarm value is indicated, press "S" switch. This new value is now stored.

3.3.14 If a high temperature alarm condition is encountered the display will flash "ALAr", the heater will shut off, and the unit will beep.

3.3.15 This condition will persist until the bath temperature drops below the high temperature alarm set value, or the user raises the High Temperature Alarm setting above the bath temperature. This can be accomplished by depressing the "F" key; the display will alternate between "ALAr" and the actual high temperature alarm value. Depress the "S" switch and the display will flash the actual high temperature alarm value. Use the Increment / Decrement Dial to obtain the new desired high temperature alarm value and depress the "S" key to store this new value.

Note: If a change to the temperature set point is made or the unit power is cycled on and off, the high temperature alarm value will return to a default of 5°C above the set temperature value.

3.5. Catastrophic Heater Condition

3.5.1 In the event that a chamber temperature would reach 120°C the systems heater will be disabled and remain in the disable mode until the over temperature condition is corrected.

3.6 Draining the Tank

3.6.1 Allow the liquid to cool to below 60°C.

3.6.2 Place the drain hose assemble into the drain port located on the rear of the unit. As soon as the drain hose assemble is snapped into the drain port the bath will begin to drain.

3.6.3 When the bath is drained, be sure to remove the drain hose assembly by depressing button on drain port and remove hose from drain port.

4. Accessories

4.1 Universal Tray (290410)

The Universal Tray accommodates a wide variety of different vessels. The configuration of the springs can be changed to accommodate the number of each size of Erlenmeyer flask as follows:

Quantity	Flask Size
43	25 ml flasks
26	50 ml flasks
15	100 ml flasks
11	250 ml flasks
6	500 ml flasks
3	1000 ml flasks

The Universal Tray is designed so that springs may be added, moved, or removed to accommodate different shaped vessels. The tray has a series of holes positioned along both the

long side and short sides. These holes can be used to attach the springs to fit specific sized vessels.

> **NOTE: The bottom of the Universal Flask Tray is comprised of magnets. Take care to ensure magnets do not come in contact with any metal components on your lab bench**.

4.2 Tray for Test Tube Racks (290420)

The Test Tube Tray will accommodate up to 5 Test Tube Racks. The Test Tube Racks are available in 6 different test tube sizes. The chart below describes each Test Tube Rack item number, the size and quantity of test tubes that it can hold.

Test Tube Rack Item #	Tube Capacity	Tube Size
290421	48	10mm
290422	44	13mm
290423	24	16mm
290424	21	19mm
290425	12	25mm
290426	6	30mm

4.   Accessories (cont'd)

4.3 Perforated Tray (290430)

The perforated tray is used to convert the bath to an ordinary unstirred water bath. To install, remove the tray that is presently installed in the tank. Place the Perforated Tray directly on the bottom of the tank, positioned over the roller ball bearings.

4.4 Gabled Lid, Stainless Steel (290320)
4.5 Bath Algaecide (B1906001)

5.   Maintenance and Service

The adjustable high temperature alarm cutout should be tested periodically by setting the high temperature alarm value below the set temperature value, when this condition is present the unit should go into high temperature alarm failure as indicated in step 3.4.6

The unit is equipped with circuit breaker(s) on the rear of the unit. The breakers are reset by depressing fully.

To ensure optimal performance of the shaking mechanism, the tray, and bottom of the tank including the transfer ball assembly should be cleaned periodically to remove any scale build up. The tray and the bottom of the tank can be cleaned with warm soapy water. If desired, the transfer ball assembly can be removed and cleaned with warm soapy water as well. To remove the transfer ball assembly, remove the 3 nuts holding it in place. **Be certain not to remove any of the 4**

transfer balls, the positioning of these balls is critical to the operating of the unit, and their location has been factory calibrated.

If bath is going to unused for more than a couple of days, it is recommended to drain the water from the tank. This will prevent the any possibility of corrosion which can occur with distilled or deionized water and even some tap water, even with the high grade of stainless steel used in the manufacture of this unit.

When the bath is used under certain conditions, algal growth can occur which can be mistaken for rust. This can easily be cleaned off using warm soapy water.

Boekel recommends the use of a bath algaecide, item # B1906001 to help maintain the bath water. Apply treatment at a dose of 20 drops per 1 gallon of distilled water, free of visible algae.

6. Specification

Temperature Range	Ambient +5 to 100°C
Uniformity	±0.1°C
Stability	±0.2°C
Display Resolution	0.1
Heat up to 65°C -	45 minutes
Timer	Settable from 1 min. to 99 hrs. 59 min.
Orbital Radius	10mm
Linear Stroke Length	20mm
Overall dimensions (W x L x H)	33cm x 56cm x 35.6cm (13" x 22" x 14")
Weight	15.4kg (34lb)
Power Rating 115VAC - 9.65A - 60Hz. 230VAC - 4.83A - 60Hz.	1122w 1122w
Environmental conditions	5°C to 40°C and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40° C
Indoor Use Only	
Altitude – 2000m above sea level	
Over Voltage category: II	
Pollution degree: 2	

7. Warranty and Service

7.1. Warranty

When used in laboratory conditions and according these operating instructions Boekel warrants this product to be free of defective parts, material and workmanship for a period of two years from the date of shipment. The liability of Boekel Scientific for any defective equipment during

the warranty period shall be limited to the repair of defective equipment or replacement thereof without charge for parts or labor.

7.2. Service

A Boekel Scientific Returned Material Authorization (RMA) number provided by Boekel Scientific is required before any Boekel products are returned for any reason. Contact Boekel Customer Service at 1-800-336-6929. A Decontamination Certificate must be completed, signed by the user, and returned to Boekel Scientific prior to receiving the RMA number. Please be sure to mark the outside of the returned goods package with this RMA number to ensure prompt handling.

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