

HotBlock® 450 System

Operation & Instruction Manual



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Product Information:

Item # _____ Date of Purchase _____

HotBlock® 450 Serial # _____

Please record the serial # of your HotBlock® 450 here for easy reference. Your serial # is located on the back of your HotBlock® 450.

Limited Warranty

The Environmental Express HotBlock® 450 is warranted against defects in materials and workmanship when used in accordance with applicable instructions, for a period of one year from the date of shipment. This warranty extends to parts, labor, and any approved transportation charges. This warranty applies only to damage or failure caused by normal laboratory use. The warranty is limited to product repair. If Environmental Express is unable to repair the HotBlock, the customer may, at his or her option, receive a replacement unit or a full refund. Operating the HotBlock® 450 at temperatures higher than 450°C will void the warranty.

In no event shall Environmental Express have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) abuse, neglect, misuse, fault or negligence of or by customer, (iv) use of the product in a manner for which it was not designed, (v) causes external to the product such as, but not limited to, power failure or electrical power surges, (vi) improper storage and handling of the product, (vii) use of the product in combination with equipment or software not supplied by Environmental Express, (viii) ordinary maintenance, (ix) alterations, repairs or installations that have not been performed by Environmental Express or its authorized representative or (x) failure to maintain product in accordance with Environmental Express' written instructions.

Environmental Express makes no other warranty, expressed or implied for this product with respect to merchantability, fitness for a particular use or any other matter and expressly disclaims all other warranties. Environmental Express is not liable for any consequential, special, indirect or compensatory damages arising from use of, or in conjunction with this product. The maximum liability of Environmental Express (whether by reason of breach of contract, tort, indemnification, or otherwise, but excluding liability of seller for breach of warranty (the sole remedy for which shall be as otherwise provided herein)) shall be the invoice price of this product.

Repair Policies

Under Warranty Repair:

If the HotBlock® 450 should fail to operate as warranted within the warranty period (one year from date of shipment), Environmental Express will repair it and ship it back to the customer at Environmental Express' expense. The remainder of the warranty period will be honored from the original ship date. Environmental Express will bear the cost of ground transportation both to and from the customer's location, and bear the cost of any parts, labor and cleanup required.

However, if it is determined that the damage to the HotBlock® 450 was caused by negligence or improper use or by another excluded cause as set forth above, this warranty will not apply. The warranty is also void if the system is used beyond its intended purpose or in the event of any unauthorized repair. In such cases, reasonable and customary repair charges will apply. Repair charges will be quoted prior to work being done.

Out of Warranty Repair:

If the HotBlock® 450 fails after the warranty period has lapsed, the repair procedure is as follows:

First, notify an Environmental Express Technical Service Representative of product's failure and place an order for repair. Whenever possible, our customer service technician will walk you through possible troubleshooting scenarios which may enable you to repair your block on-site.

If on-site repair is not possible, the customer may return the non-working unit to Environmental Express using appropriate shipping containers and insurance. Repair charges will be assessed and estimated prior to work being done. Repair charges will include all freight costs as well as reasonable and customary charges for parts and labor.

Note: This warranty does not apply to any consumable items associated with the HotBlock® 450 System.

 **Safety & Hazard Information**

- **The HotBlock® 450 should only be operated by properly trained personnel using standard laboratory safety practices.**
- Review Safety Data Sheets for all materials used or generated during the operation of the HotBlock® 450.
-  Use extreme caution when operating the HotBlock® 450. All surfaces of the HotBlock® 450 may be too hot to safely touch with bare hands.
- It is highly recommended that the HotBlock® 450 should be set up and operated in a chemical fume hood with a face velocity of not less than 100 fpm.
- The controller is independent from the block and should be placed outside the fume hood to reduce the likelihood of acid damage.
- The HotBlock® 450 contains electrical circuits and devices and components operating at dangerous voltages. Contact with these circuits, devices and components can cause serious injury or painful electric shock.
- Proper grounding is essential to avoid a potentially serious electric shock hazard. Ensure that there is an internal ground connection between the metal base of the system and the 3-pin, earth-grounded receptacle.
- For safety reasons, a separate power outlet receptacle should be provided for each unit in the system. Do not use extension cords or outlet adapters. Make certain each power outlet is earth-grounded at the grounding pin.
- See electrical requirements for power specifications, page 4.
- Application of the wrong supply voltage can create a fire hazard and a potentially serious shock hazard, and could seriously damage the HotBlock® 450 system.
- Wear appropriate Personal Protective Equipment (PPE) suitable for use with caustic and corrosive materials.
- Users should be aware of potential dangers from heating certain types of compounds. Such dangers may include explosion or the release of toxic or flammable gases.
- **Avoid breathing any vapors that may come off of the HotBlock® 450; they may be harmful or fatal.**
- The power should be kept plugged into its outlet until the unit has cooled down.
- If boil over does occur during operation of the HotBlock® 450, immediately wipe the system down with neutralizing solution, such as a mild solution of sodium bicarbonate.
- Unplug the HotBlock® 450 from the outlet prior to cleaning exterior surfaces. Wipe with damp sponge or towel after each use, first with mild sodium bicarbonate or similar solution followed by DI or distilled water. Avoid solutions on or near the controls.
- Always lift the HotBlock® 450 from the bottom of the unit.

Note: *The above list contains some basic recommendations and safety precautions. By no measure should this list be considered complete. More rigorous enhanced precautions may be necessary while operating this equipment. Please consult your Safety Manager and Safety Data Sheets (SDS) prior to operating this equipment. Contact Environmental Express, Inc. if there are any questions. User assumes all liability for damages arising from the operation of this equipment.*

Environmental Express® HotBlock® 450 System

Environmental Express HotBlock® 450 System provides an efficient method of digesting and storing water, wastewater, soil and sludge samples for Total Kjeldahl Nitrogen (TKN) analysis, total phosphorous (TP or TKP); total metals digestions, or other digestion methods requiring temperature up to 450°C. These innovative digestion systems allow samples to be digested in a corrosion-free environment. In addition, samples are handled in a small area with minimal radiant heat loss. Users should be aware of potential dangers from heating certain types of compounds. Such hazards may include explosion or the release of toxic or flammable gases.

Definitions/Markings

Each HotBlock® 450 unit displays certain markings and symbols. All personnel working with the unit should have an understanding of the following symbols and definitions:

- V = voltage
- ~ = alternating current
- Hz = frequency
- A = amperes



This symbol means **Caution Hot Surface**. The surface of the HotBlock® 450 may be too hot to safely touch with bare hands.



This symbol means **Read and become familiar with instructions before operation of instrument**.

Unpacking Your HotBlock® 450 System

1. Remove the HotBlock® 450 from the shipping container by lifting from the bottom of the block.
2. If you purchased a complete HotBlock® 450 System, you will also receive a simple manual controller (TKN100) and glass digestion tubes. If not, order items separately on page 9.
3. Connect the larger gray cable from the block to the controller using the bottom socket labeled “Block” (touch-screen controller) or the socket next to the power switch (basic controller).
4. Connect the smaller metal cable to the controller using the top socket labeled “T/C” (touch-screen controller) or the socket on the side of the controller (basic controller).
5. Insert the dummy plug into the controller in the top socket labeled “Plug” (touch-screen controller only). The unlabeled socket is not used.
6. Plug the controller into an appropriate 240 VAC outlet.
7. Save original packaging in a dry area for use if unit needs to be returned for service.

Installation Requirements

Locate the HotBlock® 450 under a fume hood with a minimum face velocity of 100 fpm, and allow a minimum of 2" of space on all sides. The following environmental conditions should be observed:

- Ambient temperature range: 5 to 30°C
- Ambient relative humidity: 0 to 90%RH
- Altitude: sea level to 2500 meters

HotBlock® 450 is rated as Pollution Degree 2 and Installation Category 2.

Electrical Requirements

Required Voltage: 240 volts, ~60Hz, 15A

Power should not vary greater than $\pm 10\%$. Use the supplied heat-resistant power cord or equivalent to connect to the power supply.

For safety reasons, a separate power receptacle should be provided for each unit in the system. Do not use extension cords or outlet adapters. Make certain that power outlets are earth-grounded at the grounding pin.

Operating Your HotBlock® 450 System

All HotBlock® 450 units come preprogrammed to run the digestion temperature and time profiles outlined in EPA method 351.2. If other profiles are needed, see the next section on how to program your controller.

Temperature Settings:

The pre-set factory “set point” temperature of your HotBlock® 450 is 160°C. This is at or near the temperature frequently used for the initial digestion phase of TKN analysis. Please note that the set point of the block is not the same as the temperature of the liquids being digested. The block temperature should be optimized for the specific digestion. The temperature of liquid contents of the digestion cup will vary according to the material being digested, the number of samples being digested, and the air movement of the digestion area.

Advanced Touch-Screen Controller:

1. Turn on the controller; wait for the opening screen to appear.
2. Touch the screen to proceed to the Main Menu Screen.
3. Select the “Global Settings” menu.
4. Touch the button for “Master” control and enter the passcode “9999”.
5. Return to the main screen and touch the button Single Control Station 1.
(**Note:** when using the HotBlock® 450, you will only be able to control one block).
6. Select the profile (1–4) that you want to run.
7. Press the Start button to initiate the profile.

Fuji Manual Controller:

1. Turn the controller on. It will begin to preheat to 160 deg C.
2. Press and hold the Sel button for 1 second until STBY appears.
3. Press the down button 1x. Prog will appear on the display.
4. Press the Sel button. Off will appear on the display.
5. Press the up button 1x to change Off to RUN.
6. Press and hold the Sel button for 1 second and the main temperature will appear.

Environmental Express® Manual Controller:

1. Turn the controller on. It will begin to preheat to 160°C.
2. Once the temperature has stabilized at 160°C, press the green button.
3. The display will show ‘nonE’. Use the up arrow key to show ‘ProF’.
4. Press the green button twice. The ramp indicator light will come on showing that a ramp/soak profile is active. This profile will follow the temperature and time profile outlined in EPA method 351.2.

Note: When preparing a sample for TKN digestion, it is important to mix it very well. Use a vortex mixer for best results. This will prevent layering which can lead to splashing and bumping during digestion.

Programming Your HotBlock® 450 System

Other methods or variations of the 450 method can be programmed into the HotBlock® 450 controller. The touch-screen controller can save up to 4 different profiles. Ensure that the block is turned off prior to inserting or removing cables from the controller. Follow the instructions below for help in creating your own profile on the touch-screen controller.

Touch-Screen Controller:

1. From the main menu page, touch the Single Control Station 1 button.
2. To create a new profile, select any unused profile number. Or select a previously created profile to edit. We strongly recommend that the default profile (1) not be altered. This will serve as a template for use in creating future profiles.
3. Under 'Step Type' touch the button to cycle through the choices: Time, Soak, or End.
 - a. *Time*: Use to specify the length of time the block will take to heat to the next temperature. This only works when increasing the temperature. The block does not have active cooling and cannot reliably use a time function to go down in temperature set point.
 - b. *Soak*: Use to hold the block at a temperature for a specific length of time.
 - c. *End*: Signifies the end of the program. All active heating will cease until the block cools down to the default set point.
4. Control Mode 1 should always be set to Auto.
5. Target Set Point 1 is the temperature that the block will ramp to or hold, depending on the Step Type selected.
6. Hrs, Mins, and Secs specify the length of time to hold the temperature during Soak or the length of time the block will use to reach a specific set point during Time.
7. Always select End as the final step in a profile.

Safe-Sample™ Temperature Protection

Your HotBlock® 450 unit is designed to protect from runaway temperatures by an alarm system. In the unlikely event that the heating system fails to respond to the controller, the Safe-Sample™ system will automatically shut the system off and sound an audible alarm.

This alarm sequence occurs if the actual temperature of the block reaches a temperature that is fifteen degrees higher than the set point temperature. If this should occur, the HotBlock® 450 will stop heating, preventing the loss of samples. The HotBlock® 450 must be turned off, then turned back on to reset the alarm.

Maintenance

Any service inquiries should be directed to Environmental Express Technical Service Department.

After each use, clean exterior surfaces with a damp sponge to remove acid residue.

For acid spills, sponge with a diluted solution of sodium bicarbonate followed by distilled water. Acid that is spilled directly into the digestion wells should be neutralized and removed.

Before using any cleaning or decontamination methods except those recommended, check with Environmental Express to confirm the proposed method will not damage your HotBlock® 450 unit.

Avoid excessive spills, as liquid allowed to overflow into the HotBlock® 450 casing can severely damage electronic components.

The controller is independent from the block and should be placed outside the fume hood to reduce the likelihood of acid damage.

Troubleshooting

The HotBlock® 450 contains no user serviceable parts. If you experience troubles with heating, temperature accuracy, controller display, or any other issues, you will need to send the affected portion of your system to Environmental Express for repairs. Please contact one of our technical support staff to coordinate the repair process.

To identify the defective area you will need to take the resistance of the heating mat and RTD. This is done through the cord that connects the block to the controller. Pins 1 and 2 are connected to the heating mat. For a 54-well block the resistance should be 16 Ω . For a 28-well block the resistance should be 20 Ω . Pins 6 and 7 are connected to the RTD. The resistance should be 110 Ω . If these readings are correct the problems lies within the controller.

HotBlock® 450 Replacement Parts & Supplies

<i>Description</i>	<i>Item #</i>
Advanced Touch-Screen Controller	TKN180
Simple Manual Controller	TKN100
Replacement RTD Sensor	TKN942
Replacement Heater Mat, 54-Well Block	TKN966
Replacement Heater Mat, 28-Well Block	TKN967
TKN Digestion Tube with Threads (also compatible with SimpleDist® system)	C6010
TKN Digestion Tube without Threads	TKN6011
Teardrop Stopper	TKN6012
