

# Environmental Express<sup>®</sup> HotBlock<sup>®</sup> COD Reactor Operation & Instruction Manual

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 **ENVIRONMENTAL EXPRESS<sup>®</sup>**  
a Cole-Parmer company

800-343-5319 or 843-881-6560 [www.environmentalexpress.com](http://www.environmentalexpress.com)

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August 2016 1065EE21\_MAN

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## Limited Warranty

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The Environmental Express HotBlock® COD reactor 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® COD reactor, the customer may, at his or her option, receive a replacement unit or a full refund. Operating the HotBlock® COD reactor 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.

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## Repair Policies

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### Under Warranty Repair:

If the HotBlock® COD reactor 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® COD reactor 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® COD reactor 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® COD reactor system.

The manufacturer, Environmental Express, 2345A Charleston Regional Parkway, Charleston, SC 29492 declares that the following products, HotBlock™ Catalog Numbers SC196, SC154, SC150, SC151, SC100, C6002, and B3000, are in conformity with:



Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1 General Requirements, UL 61010-1, CAN/CSA-C22.2 No. 61010-1, 2nd Edition, Issued 12 July, 2004 with revisions through and including 28 October, 2008; Equipment for Measurement, Control, and Laboratory Use Part 2-010: Particular Requirements for Laboratory Equipment for the Heating of Materials, IEY 61010-2-010, 2nd Edition, Issued 1 June, 2003, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-010: Particular Requirements for Laboratory Equipment for the Heating of Materials, CSA C22.2.61010.2.01



Environmental Express, Inc. declares that all HotBlocks conform with the essential requirements of the applicable EC directives.

Signed: Nicole Truman

Nicole Truman, General Manager



Call 800-343-5319 or 843-881-6560 [www.environmentalexpress.com](http://www.environmentalexpress.com)  
2345 A Charleston Regional Pkwy • Charleston, SC 29492

**Product Information:**

Item #

Date of Purchase

HotBlock® COD Reactor Serial #

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

## HotBlock® COD Reactor Specifications:



|                    |                  |
|--------------------|------------------|
| Sample Capacity:   | 56 x 16-mm vials |
| Temperature Range: | Ambient to 150°C |
| Thermocouple:      | Type K           |
| Footprint:         | 18"W x 15"D      |
| Weight:            | 61 lb.           |

| Description                             | Catalog # |
|---|-----------|
| HotBlock COD reactor,<br>120 VAC, 9 A   | B3000     |
| HotBlock COD reactor,<br>240 VAC, 4.5 A | B3000-240 |

## About Your Environmental Express® HotBlock® COD Reactor

Environmental Express HotBlock COD reactor provides an efficient method of digesting and storing water, wastewater, soil and sludge samples for COD analysis. These innovative digestion systems allow samples to be digested 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 displays certain markings and symbols. All personnel working with the HotBlocks 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 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 COD Reactor:

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1. Remove the HotBlock COD reactor from the shipping container by lifting from the bottom of the block. The lid should not be used for lifting.
2. Your HotBlock COD reactor is shipped with metal screws securing the bottom panel. The metal screws must be removed before operating your HotBlock COD reactor. Remove the metal screws and replace them with the PVC screws and rubber feet included with your shipment. The corrosion-resistant PVC screws and rubber feet are designed to secure the bottom plate.

***Important: Do not overtighten the PVC screws!***

## Installation Requirements

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Locate the HotBlock COD reactor in an area with 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 units are rated as **Pollution Degree 2** and **Installation Category 2**.

## Electrical Requirements

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Required Voltage: 120 volts, ~60Hz, 15A  
(also available in 240V with CE mark)

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 adaptors. Make certain that power outlets are earth-grounded at the grounding pin.

See individual specifications for the HotBlock COD reactor model, page 3.

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## HotBlock COD Reactor Temperature Settings:

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The pre-set factory “set point” temperature of your HotBlock COD reactor is 150°C. Factory tests have shown that this temperature is “sea level safe.”

## Adjusting the Temperature and Timer of your HotBlock COD Reactor:

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1. Plug the HotBlock COD reactor into an approved receptacle. Turn the COD reactor on by pressing the switch on the back of the unit. Wait until the display shows the current block temperature (in red) and the set point temperature (in green).
2. Press and hold or tap the  $\Delta$  or  $\nabla$  key to change the set point temperature. The display will show the set point temperature on the right in green. The adjustment is from ambient to 150°C in increments of 0.1°C.
3. To change the timer, press the green button three times to reach the “hours” screen. Press the  $\Delta$  or  $\nabla$  key to adjust the hours. Press the green button a fourth time to reach the “minutes” screen. Press the  $\Delta$  or  $\nabla$  key to adjust the minutes.
4. Press the infinity key ( $\infty$ ) to return to the main screen.

## Safe-Sample™ Temperature Protection:

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Your HotBlock COD reactor is designed to protect from runaway temperatures by a fail-safe 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 COD reactor will stop heating, preventing the loss of samples. The HotBlock COD reactor must be turned off, then turned back on to reset the alarm.



**If the alarm sounds, see the troubleshooting section of this manual, pages 9-12.**

## Potential Hazards:

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*The HotBlock COD reactor should only be operated by properly trained personnel using standard laboratory safety practices.*

Use extreme caution when operating the HotBlock COD reactor. Plastic and graphite surfaces of the HotBlock COD reactor may be too hot to safely touch with bare hands.

The HotBlock COD reactor contains electrical circuits and devices and compounds 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 adaptors. Make certain each power outlet is earth-grounded at the grounding pin.

See individual block specifications for power requirements, page 3.

Application of the wrong supply voltage can create a fire hazard and a potentially serious shock hazard, and could seriously damage the HotBlock COD reactor system. See specifications for individual HotBlock COD reactor .

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.

Always lift the HotBlock COD reactor from the bottom of the unit.

## Maintenance:

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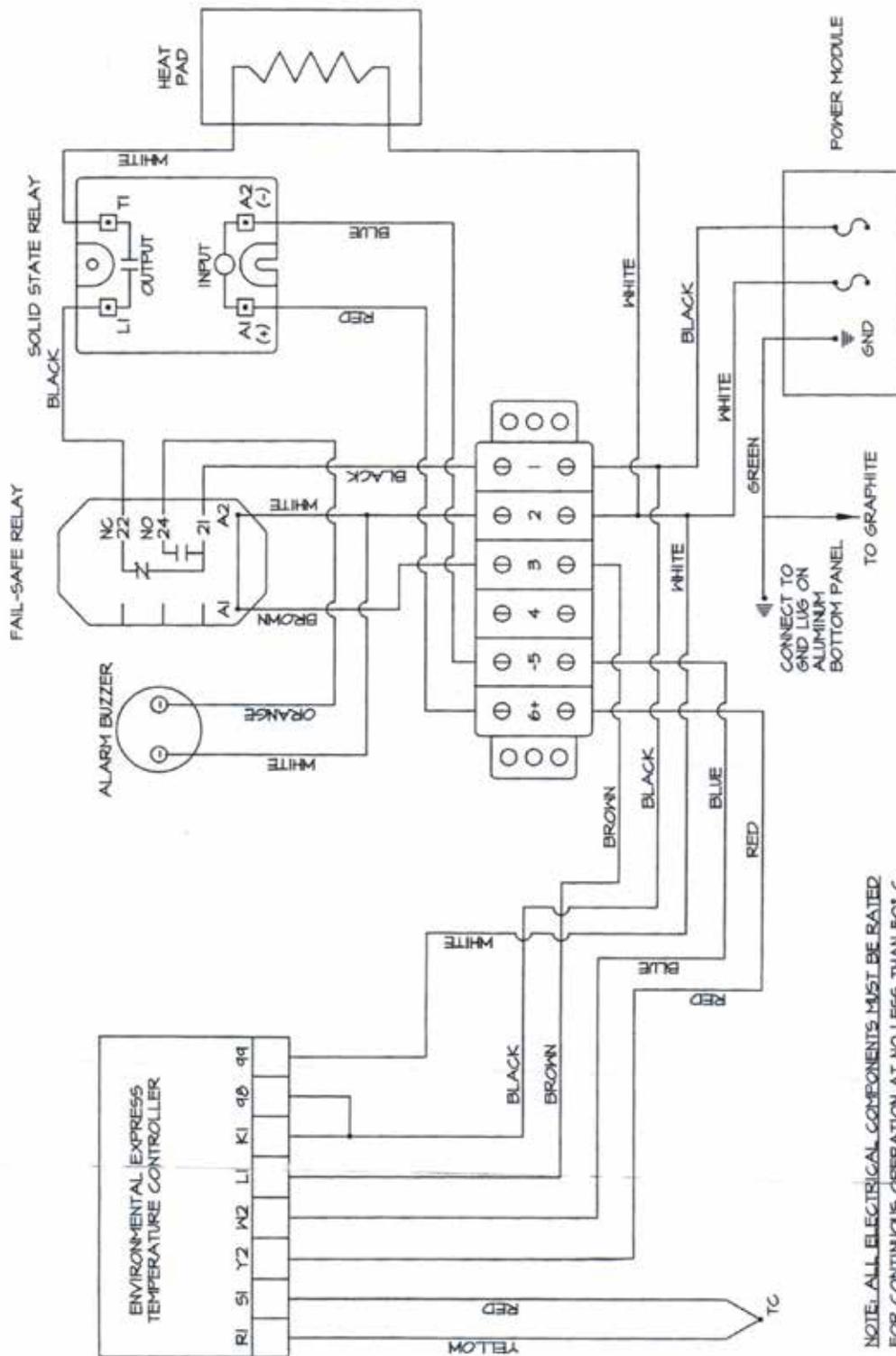
Any service inquiries should be directed to Environmental Express Technical Service Department.

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 COD reactor.

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



NOTE: ALL ELECTRICAL COMPONENTS MUST BE RATED FOR CONTINUOUS OPERATION AT NO LESS THAN 50°C AMBIENT CONDITIONS

BLOCK DIAGRAM FOR HOT BLOCK  
ELECTRICAL CONTROLS  
ENVIRONMENTAL EXPRESS  
REVISED 2-10-10  
DOB4601R1

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## HotBlock COD Reactor Replacement Parts

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| <i>Description</i>                                       | <i>Catalog #</i> |
|--|------------------|
| AC Inlet and Switch                                      | B3006            |
| Power Cord- heavy duty                                   | SC958            |
| Environmental Express Controller                         | B3005            |
| 12" x 15", 120V, silicone rubber, etched-foil heater mat | SC9515           |
| 12" x 15", 240V, silicone rubber, etched-foil heater mat | SC9515-240*      |
| 110/220V, 25A solid state relay                          | SC952            |
| Type K Thermocouple                                      | SC953            |
| Terminal board   | SC955            |
| Ceramic fiber insulation                                 | B3004            |
| 14" x 14" Aluminum bottom                                | B3003            |
| Fail-Safe Relay  | SC968            |
| Alarm Buzzer   | SC969            |
| PVC screw for rubber foot                                | SC964            |
| Rubber foot  | SC976            |

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## HotBlock COD Reactor Troubleshooting Guide:

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If you are experiencing issues and are unsure of your ability to fix AND/OR are not a qualified individual to work on electrical components and equipment, please contact our technical service team at 1-800-745-8218 and we'd be happy to help. If you are experiencing problems with your HotBlock COD reactor and you are a qualified individual, then please consult the following troubleshooting guide. See wiring schematic diagram (page 7) for component identification.

When the HotBlock COD reactor is initially powered on, the controller will cycle through a self-test sequence. It will then display the current temperature and begin heating until it reaches your set point temperature, where it will hold until the unit is powered off. The set point may be changed at any time. A change in the controller's factory default settings or a failed component may cause the HotBlock COD reactor to perform unsatisfactorily or render it inoperable.

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### The controller digital display will not illuminate.

There are two possible reasons that your controller will not illuminate.

1. The controller is not getting voltage or;
2. The controller itself has failed internally.

The problem can be effectively diagnosed by determining if the controller is not getting voltage using the following steps:

1. Confirm that the power cord is plugged securely into the HotBlock COD reactor receptacle and a working outlet.
2. Confirm that the switch is in the "on" position. Press switch on the back of HotBlock COD reactor.
3. Check the fuse located in the power module:
  - a. Locate the fuse drawing indented into the power module next to the socket.
  - b. Using a small screwdriver, pry open the fuse compartment cover.
  - c. Examine the exposed fuse for a break in the filament and if necessary, check for continuity using a volt-meter.
  - d. If the fuse is determined to be blown, replace it with the spare fuse located in the slide-out compartment beneath the operating fuse.
4. Inside the HotBlock COD reactor, check voltage leading from the power module to the controller:
  - a. Remove the bottom panel of the HotBlock COD reactor by unscrewing the rubber feet.
  - b. On the back of the controller, locate the black wire at terminal 98 and white wire at terminal 99.
  - c. Set your volt-meter on AC voltage.
  - d. Touch your red lead to the exposed white wire and black lead to the exposed black wire.
  - e. If your volt-meter reads 110-122V, the controller is receiving power but has failed internally. It must be replaced (see parts list, page 8).
  - f. If your volt-meter registers less than 110-122V, using step d above check the black and white wires at the terminal board and then at the power module to determine if there is a faulty connection.



#### **CAUTION:**

These procedures are a potential electrical hazard and should only be performed by a qualified individual who is trained and experienced in the repair and maintenance of electrical components, equipment and instruments.

**The audible alarm has sounded immediately after powering on and the HotBlock COD Reactor will not heat.**

There are two possible causes for your HotBlock COD reactor to sound the alarm immediately after the controller cycles through the self test. These are:

1. Your set point has been set to a value ( $\geq$ ) 15° less than ambient or current set point temperature. Turn the set point to within 15° of the actual temperature (blue numbers)
2. The controller is faulty. Call Environmental Express at 1-800-745-8218 for more information.

**The temperature has overshoot the set point and the audible alarm has sounded.**

The function of the fail-safe system is to cease heating of the HotBlock COD reactor in the event of a set point overshoot of 15°C and to alert the technician of the incident.

The HotBlock COD reactor can be “fooled” into fail-safe mode if the set point is manually changed to a value  $\geq 15^\circ$  below your current temperature. However, the primary cause for the runaway temperature is a faulty relay that has exceeded its useful life.



**CAUTION:**

These procedures are a potential electrical hazard and should only be performed by a qualified individual who is trained and experienced in the repair and maintenance of electrical components, equipment and instruments.

You may troubleshoot the relay by following these steps:

1. Power off your HotBlock COD reactor.
2. Remove the bottom panel of the HotBlock COD reactor by unscrewing the rubber feet.
3. Power the HotBlock COD reactor on and allow it to overshoot your set point temperature.
4. Locate the solid state relay mounted to the bottom panel.
5. Set your volt-meter to measure AC voltage.
6. Touch your red lead to terminal T1 (white wire) of the solid state relay and touch your black lead to a ground source (e.g., the green/yellow wire from the power module or an empty terminal on the terminal board).
7. If your volt-meter reads 110V-122V, then the relay is stuck in the “closed” position and it must be replaced (see parts list, page 8).

The temperature controller is performing erratically or displays an error message.

-OR-

The temperature controller is flashing *Er.1 Attn- Thermocouple Fault*

First reset default settings:

1. Hold the up and down arrow buttons for six seconds until *Ai Set* appears.
2. Hold the down arrow until *gbl set* is in the window.
3. Press the green advance key to enter.
4. Continue pressing the green advance key until *none user* appears.
5. Press the down arrow key until *Set1* user appears.
6. Pressing the advance key will restore default settings.

To troubleshoot the thermocouple, follow these steps:

1. Power off your HotBlock COD reactor.
  2. Remove the bottom panel of the HotBlock COD reactor by unscrewing the rubber feet.
  3. Locate the thermocouple wires at terminals R1 (yellow) and S1 (red) of the controller and remove using a small screwdriver.
  4. Cut the exposed ends of the two wires.
  5. Strip 1/4" of insulation from each wire and reconnect them to the appropriate controller terminal and tighten.
  6. Power on your HotBlock COD reactor.
  7. If your display continues to flash *Er.1 Attn-* the thermocouple is faulty and must be replaced (see parts list, page 8).
-

**The HotBlock COD reactor will not heat beyond ambient temperature.**



**CAUTION:**

These procedures are a potential electrical hazard and should only be performed by a qualified individual who is trained and experienced in the repair and maintenance of electrical components, equipment and instruments.

A HotBlock COD reactor that will not heat beyond ambient temperature typically has a failed relay, heater mat or controller.

**Relay:** To test the relay, the output voltage must be determined with a volt-meter.

To measure the relay voltage, follow these steps:

1. Remove the bottom panel of your HotBlock COD reactor by unscrewing the rubber feet.
2. Locate the solid state relay mounted to the bottom panel.
3. Set your volt-meter to measure AC voltage.
4. Touch your red lead to terminal T1 (white wire) of the solid state relay and touch your black lead to a ground source (i.e., the green/yellow wire from the power module or an empty terminal on the terminal board).
5. If your volt-meter does not read 110V-122V, then the relay has stuck in the **open** position and it must be replaced (see parts list, page 8).

**Heater Mat:** To test the heater mat, the resistance in ohms ( $\Omega$ ) must be determined with a volt-meter. It is recommended that your heater mat be replaced if it measures 25 ohms ( $\Omega$ ) or greater. It is also recommended that the thermocouple and insulation be replaced as well, both are inexpensive parts that are not easily accessible otherwise.

To measure your heater mat resistance, follow these steps:

1. Power off your HotBlock COD reactor and remove the bottom panel of your HotBlock COD reactor by unscrewing the rubber feet.
2. Locate and disconnect the white wire connected to terminal T1 of the relay and an identical wire on terminal #2 of the terminal board (note: terminal #2 of the terminal board contains 3 white wires). To ensure you have the correct wire, trace it back and ensure it originates from the graphite portion of your HotBlock COD reactor.
3. Set your volt-meter to measure ohms ( $\Omega$ )
4. Touch the red lead to one of these wires and touch the black lead to the remaining wire.
5. If your reading is "OL" (over limit) or a value greater than 25 ohms, then the heater mat has failed and it must be replaced (see parts list, page 8).



**CAUTION:**

These procedures are a potential electrical hazard and should only be performed by a qualified individual who is trained and experienced in the repair and maintenance of electrical components, equipment and instruments.

**Controller:** To test the controller, the output voltage must be determined with a volt-meter.

To measure voltage from the controller, follow these steps:

1. Remove the bottom panel of your HotBlock COD reactor by unscrewing the rubber feet.
2. Locate the solid state relay mounted to the bottom panel.
3. Set your volt-meter to measure DC voltage.
4. Touch the red lead to terminal A1 (red) and the black lead to terminal A2 (blue) of the solid state relay.
5. Your volt-meter should read 3V-16V.
6. If your volt-meter does not read 3V-16V, perform steps 3 and 4 on the red and blue (5 and 6) wires at the terminal board and controller to determine if there is a faulty or loose connection.
7. If you do not get a reading of 3V-16V at terminals Y2 (red) and W2 (blue) of the controller then the controller has failed internally and it must be replaced (see parts list, page 8).

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## Adaptation for COD Methods (including EPA 410.4, SM5220 D, Hach 8000, and others) for use with the Environmental Express HotBlock COD Reactor

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### 1.0 Scope and Application

- 1.1 This method covers the determination of chemical oxygen demand (COD) in various matrices of water.
- 1.2 The applicable range is dependent on the vials being used. Available ranges are 0 to 150 mg/L (vials B1010\* or B0010), 0 to 1500 mg/L (vials B1015\* or B0015), and 0 to 15,000 mg/L (vials B1020 or B0020).

\*EPA-approved vials.

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### 2.0 Apparatus and Materials

- 2.1 HotBlock COD reactor — Model Number B3000 or B3000-240
- 2.2 COD reagent vials in the appropriate range

**Note:** COD vials are available in all three ranges with and without mercury. Mercury is required for EPA-compliant sample reporting and for any samples containing halogens.

- 2.3 Test tube rack
- 2.4 Pipette (with tips as needed)
- 2.5 Spectrophotometer capable of reading 420 nm and 600 nm

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### 3.0 Procedure

- 3.1 Prepare HotBlock COD reactor.
  - 3.1.1 Turn on COD reactor and verify set point temperature is 150°C.
  - 3.1.2 Press and hold the infinity key ( $\infty$ ) for 2 seconds. This will trigger the controller to go into the timer mode. The timer will not start until the temperature of the block is within 2°C of the set point temperature.
  - 3.1.3 The start of the timer will be indicated by a “ramp” symbol ( $\wedge$ ).
  - 3.1.4 If for any reason the timer needs to be stopped, simply press and hold the infinity key ( $\infty$ ) again for 2 seconds.
- 3.2 Place one COD vial for each sample, standard or QC (referred to collectively as “samples”), to be run in the test tube rack. Use a permanent marker to place an appropriate ID on the outside of each vial.
- 3.3 Remove the cap from the vial and use the pipette to add 2 mL (0.2 mL for 0 to 15,000 mg/L range vials) of sample to the correctly labeled vial. Use a new pipette tip or clean pipette for each sample.



**CAUTION:** This will start an exothermic reaction. Vials and liquid inside will become hot. Handle with appropriate caution to prevent burns.

- 3.4 Tightly recap each vial and swirl or invert tubes to mix the contents well.
- 3.5 Verify the block has reached the set temperature and place all vials in the block.
  - 3.5.1 The timer will start when the block reaches a temperature within 2°C of the set point.
  - 3.5.2 Ensure you place the tubes into the block when the timer starts.
- 3.6 After two hours the timer will go off and the vials can be removed to the rack to cool.



**CAUTION:** *The vials and their contents will still be hot. Use precaution when handling hot materials.*

- 3.6.1 The controller will automatically change the set point temperature to 25°C once the timer reaches 0:00.
- 3.6.2 An audible alarm will sound notifying the user that the block set point temperature is >15°C lower than the actual temperature. This will alert the user that the digestion is complete.
- 3.6.3 To turn off the alarm, turn off the COD reactor at the power switch.
- 3.6.4 Turning the unit back on will reset the controller to the original set point temperature (150°C).
- 3.7 Once the vials have cooled to room temperature, set your spectrophotometer to 420 nm for 0 to 150 mg/L range vials or 600 nm for all other vials.
- 3.8 Follow good lab practices to obtain a calibration curve and absorbance readings for your samples.

**Note:** The 0 to 150 mg/L vials decrease in absorbance as the COD value increases.

## Accessories and Consumables for HotBlock COD Reactor



### Environmental Express COD Reagent Vials

These COD reagent vials couldn't be easier to use—simply add your sample to the vial, digest at 150°C for two hours, and then read COD on your spectrophotometer. Substitute for your current COD vials without having to change your equipment or method. These reagents are guaranteed to provide consistent and equivalent results with your current spectrophotometer and calibration curves.

Each lot is laboratory-tested to ensure superior quality and analyzed with NIST-traceable standards and compared to reference vials of the true value for lot certification. Lot analysis is performed twice. All data points in each study must fall within an acceptance range of 95.0 to 105.0%.

In addition to reagent analysis, each lot of glass vials is checked and certified for spectral quality before use. PTFE caps and liners undergo lot-to-lot quality control to ensure cleanliness, leak free digestions, and chemical inertness.

Environmental Express offers different reagent packages for low-range, standard-range, and ultra-high-range COD measurement. Only low- and standard-range reagent vials with mercuric sulfate fully comply with EPA methodology. Mercury-free vials are available but should only be used when chlorides are not a concern and EPA reporting is not required. Ultra-high-range vials are available with or without mercury and have not received EPA approval.

| Description                              | MDL | Contains Mercury† | EPA Approved | Comparable Hach # | Quantity/pack | Catalog # |
|--|-----|-------------------|--------------|-------------------|---------------|-----------|
| Low range, 0 to 150 mg/L (ppm)           | 10  | Yes               | Yes          | 21258-15/25       | 100           | B1010     |
| Low range, 0 to 150 mg/L (ppm)           | 10  | No                | No           | 25650-15/25       | 100           | B0010     |
| Standard range, 0 to 1500 mg/L (ppm)     | 30  | Yes               | Yes          | 21259-15/25       | 100           | B1015     |
| Standard range, 0 to 1500 mg/L (ppm)     | 30  | No                | No           | 25651-15/25       | 100           | B0015     |
| Ultra-high range, 0 to 15,000 mg/L (ppm) | 300 | Yes               | No           | 24159-15/25       | 100           | B1020     |
| Ultra-high range, 0 to 15,000 mg/L (ppm) | 300 | No                | No           | —                 | 100           | B0020     |

†Some COD reagent vials contain acid, mercury, and silver and must be disposed of properly (see page 16).



### Environmental Express COD Standards

Standards are made from primary standard grade potassium hydrogen phthalate and can be used with both the EPA approved vials and the mercury-free vials. COD standards require refrigeration and have a minimum shelf life of 8 months.

| Description  | Concentration     | Volume | Catalog # |
|--------------|-------------------|--------|-----------|
| COD Standard | 1000 mg/L (ppm)   | 250 mL | B1030     |
| COD Standard | 10,000 mg/L (ppm) | 250 mL | B1031     |

**COD Waste Disposal Service**



- Eliminate the mess and hassles associated with COD waste—no risk of exposure or spillage
- Protect your lab personnel and the environment
- Comply with US EPA safe disposal guidelines

Used COD vials may contain acids, mercury, and silver and must be disposed of properly. With our convenient disposal program, you do the testing and let us worry about the removal.

Simply order a bucket volume that suits your needs. After testing, deposit the capped vials into the bucket (it isn't necessary to empty the vials). When the bucket is nearly full, order a new one so you always have one available. After you have filled the bucket, contact us to arrange the pick-up and disposal service for your region.

**Note:** The containers and disposal service are specifically for use with Environmental Express COD vials only! They cannot be used with other types of waste or other brands of COD vials.

|   |   |
|---|---|
| <b>For Hazardous<br/>Mercury-Containing<br/>COD Vials (B1010, B1015, B1020)</b> | <b>For Non-Hazardous<br/>Non-Mercury-Containing<br/>COD Vials (B0010, B0015, B0020)</b> |
|---|---|

| <i>Description</i>                                  | <i>Catalog #</i> | <i>Catalog #</i> |
|---|------------------|------------------|
| Bucket, 14 gallon, holds approximately 1100 vials   | COD1-14GAL       | COD2-14GAL       |
| Bucket, 5 gallon, holds approximately 400 vials     | COD1-5GAL        | COD2-5GAL        |
| Pick up and disposal of 14-gallon bucket, NC region | COD1NC-14        | COD2NC-14        |
| Pick up and disposal of 5-gallon bucket, NC region  | COD1NC-5         | COD2NC-5         |
| Pick up and disposal of 14-gallon bucket, NE region | COD1NE-14        | COD2NE-14        |
| Pick up and disposal of 5-gallon bucket, NE region  | COD1NE-5         | COD2NE-5         |
| Pick up and disposal of 14-gallon bucket, SE region | COD1SE-14        | COD2SE-14        |
| Pick up and disposal of 5-gallon bucket, SE region  | COD1SE-5         | COD2SE-5         |
| Pick up and disposal of 14-gallon bucket, SW region | COD1SW-14        | COD2SW-14        |
| Pick up and disposal of 5-gallon bucket, SW region  | COD1SW-5         | COD2SW-5         |
| Pick up and disposal of 14-gallon bucket, W region  | COD1W-14         | COD2W-14         |
| Pick up and disposal of 5-gallon bucket, W region   | COD1W-5          | COD2W-5          |

NC region: OH, MI, IN, KY, WV, Western PA, IL, IA, MO, NE, WI, MN, ND, SD

NE region: MA, ME, VT, NH, CT, RI, NY, NJ, MD, DE, Eastern PA

SE region: FL, GA, AL, SC, NC, TN, VA

SW region: TX, LA, AR, OK, NM, MS, KS

W region: CA, AZ, NV, CO, WY, UT, ID, WA, OR, MT