

HotBlock™ Digestion System Operation & Instruction Manual



Ogden 3200 Controller

ENVIRONMENTAL EXPRESS

800.343.5319 or 843.881.6560 ■ Fax 843.881.3964 ■ www.environmentalexpress.com

Contents	1
Warranty Information	2
About Your HotBlock	
- Part Numbers / Model Information / Specifications	3-5
Getting Started	
- Installation Requirements / General Information	6
- Controller Settings (Pre Alarm)	7
- Controller Settings (Alarm)	8
- Adjusting the Temperature of Your HotBlock	9
Safety Information	10
Parts List	11
Circuitry Diagram	12-13
Troubleshooting Guide	14-16
EPA Approval Letter	17

HotBlock™ LIMITED WARRANTY

The Environmental Express HotBlock 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 at temperatures higher than 150°C will void the warranty.***

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. Environmental Express is not liable for any consequential or compensatory damages arising from use of, or in conjunction with this product. The maximum liability shall be the invoice price of this product.

REPAIR POLICY — Under Warranty Repair:

If the HotBlock should fail to operate within the warranty period (one year from date of shipment) Environmental Express will repair it and ship it back to the customer at our 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 was caused by negligence or improper use, 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.

REPAIR POLICY — Out of Warranty Repair:

If the HotBlock 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. (See the troubleshooting section of this manual, pages 12-14).

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.

Loaner HotBlocks MAY be available during the repair period. There are only a limited number of these units. A reasonable charge for "cleanup" will be charged if a loaner is issued. The customer will be responsible for all shipping charges associated with a loaner unit.

ENVIRONMENTAL EXPRESS

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50mL Sample 36-well HotBlock

The SC100 with its 36-sample capacity was the first model in the HotBlock line and is used daily in hundreds of laboratories around the world. All electronics are self contained and isolated in a separate compartment below the block — no need for a separate controller and clumsy cables. For use with the SC100, we recommend our disposable SC475 50mL digestion vessels shown on page 15. This energy efficient unit draws a maximum of 1080 watts and generates very little waste heat. The SC100 is supplied with two 18-place polycarbonate racks (catalog # SC200) to facilitate the loading and unloading of samples.

Catalog # SC100,
36-Sample Capacity

50mL Sample 54-well HotBlock

The large capacity SC154 HotBlock digests up to 54, 50mL samples in a 15" X 21.5" footprint. This model comes with three 18-place polycarbonate racks (catalog # SC200), allowing the operator to load or unload 18 samples at once. We recommend our disposable SC475 digestion vessels shown on page 15. The compact size of the SC154 allows it to fit comfortably inside our HEPA-filtered AirLite™ fume enclosure. All HotBlock models are equipped with the Safe-Sample™ feature to prevent runaway temperatures in event of an electronic failure.

Catalog # SC154,
54-Sample Capacity



Specifications:	SC100	SC154
Footprint:	15" x15"	15" x 21.5"
Crated Size:	23" x 23" x 17"	26" x 23" x 17"
Weight:	43 lb.	59 lb.
Shipping Weight:	58 lb.	78 lb.
Electrical:	120VAC*, 9 A	120VAC*, 14 A
Sample Capacity:	36	54
Nominal Sample Size:	50mL	50mL
Temperature Range:	to 150°C	to 150°C
Thermocouple:	Type K	Type K

All HotBlocks are also available in 240V.



HotBlocks for 100mL Samples

For larger sample size, the SC150 and SC151 HotBlocks are designed for the digestion of 100mL samples.

Both blocks use disposable, graduated 125mL screw-cap polypropylene vessels. Note that with the larger digestion vessels faster sample reduction may occur due to greater surface-to-volume ratio.

The SC150 digests up to 25 samples simultaneously and comes with two polycarbonate racks, a 15-place rack paired with a 10-place rack, to facilitate loading and unloading of samples. The SC151 accommodates up to 35 samples and comes with a 15-place rack and two 10-place racks. Digestion cups and accessories for 100mL blocks are shown on page 17.

Catalog # SC150,
25-Sample Capacity

Catalog # SC151,
35-Sample Capacity



SC150 HotBlock is a 25-well Block for 100mL Samples.

Specifications:	SC150	SC151
Footprint:	15" x15"	15" x 21.5"
Crated Size:	23" x 23" x 17"	26" x 23" x 17"
Weight:	42 lb.	59 lb.
Shipping Weight:	54 lb.	65 lb.
Electrical:	120VAC, 9A	120VAC, 13A
Sample Capacity:	25	35
Nominal Sample Size:	100mL	100mL
Temperature Range:	to 150°C	to 150°C
Thermocouple:	Type K	Type K

All HotBlocks are also available in 220V.



The SC151 HotBlock is a 35-well Block for 100mL Samples.

50mL Sample 12-well HotBlock

The 12-place HotBlock was designed as a component for our SimpleDist System but doubles as a compact HotBlock for metals digestions. Digest small batches of 50mL samples in a compact footprint. Each block comes with a 12-place polycarbonate transfer rack, C6050.

Catalog # C6002,
12-Sample Capacity



C6002 Specifications—

Footprint:	8.55" x 18.5"
Crated Size:	22" x 19" x 13"
Weight:	30 lb.
Shipping Weight:	35 lb.
Electrical:	120VAC, 13A
Sample Capacity:	12
Nominal Sample Size:	50mL
Temperature Range:	to 150°C
Thermocouple:	Type K

All HotBlocks are also available in 220V.

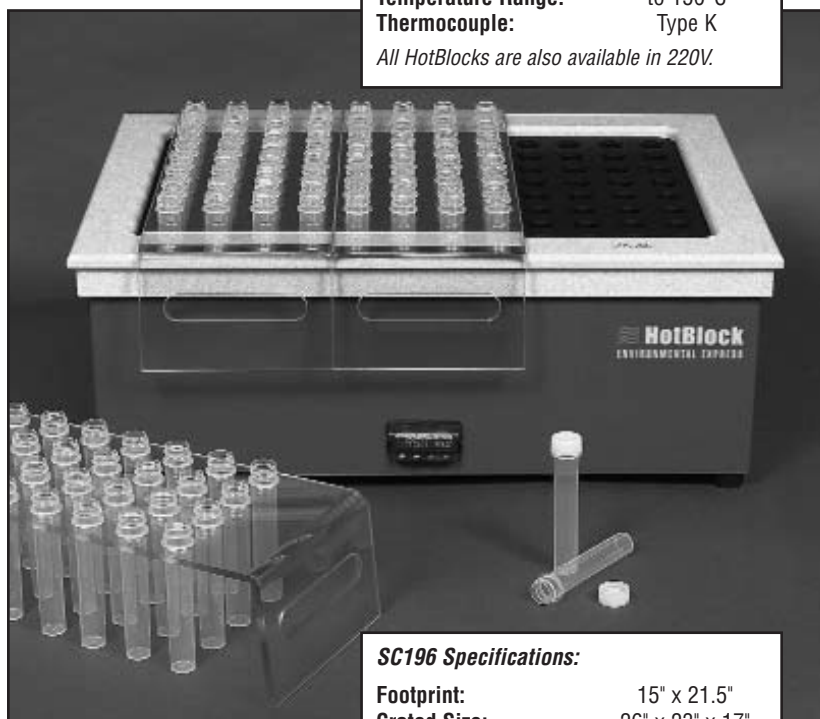
15mL Sample 96-well HotBlock

The SC196 HotBlock is for the digestion of 15mL samples and has a 96 sample capacity. The recommended digestion vessel, SC415, has a total volume of 18mL and is graduated in 5mL increments. Originally designed for the mining industry, the SC196 has proven effective for applications requiring reduced sample size, higher throughput and lower waste.

The external parts of this HotBlock are made of corrosion-resistant materials including Teflon®, Kydex® and graphite. The heating source is a solid block of Teflon-coated graphite. The SC196 has the same safety and thermal controls as other HotBlock models and has a temperature range of ambient to 150°C.

The SC196 comes with three polycarbonate racks that hold up to 32 samples each to facilitate loading and unloading samples.

Catalog # SC196
96-Sample Capacity



SC196 Specifications:

Footprint:	15" x 21.5"
Crated Size:	26" x 23" x 17"
Weight:	59 lb.
Shipping Weight:	80 lb.
Electrical:	120VAC*, 14 A
Sample Capacity:	96
Nominal Sample Size:	15mL
Temperature Range:	to 150°C
Thermocouple:	Type K

All HotBlocks are also available in 240V.

Environmental Express HotBlock™

Environmental Express HotBlocks provide an efficient method of digesting and storing water, wastewater, soil and sludge samples for metals analysis. 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

Unpacking Your HotBlock

Remove the HotBlock from the shipping container by lifting from the bottom of the block. The lid should not be used for lifting. Your HotBlock is shipped with metal screws securing the bottom panel. The metal screws must be removed before operating your HotBlock. 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 OVER TIGHTEN THE PVC SCREWS!

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:

Definitions and Symbols:

- 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**”.

Installation Requirements

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

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

HotBlocks are rated as **Pollution Degree 2** and **Installation Category 2**.

Electrical Requirements

- Required Voltage: 120 volts, ~60Hz, 15A
(all HotBlocks are 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 each HotBlock model, pages 4-6.

Table 5.3 Index Code (Menu) Descriptions (OPERATOR LEVEL) NOTE: Further parameter definitions on page 15.

Security Levels	Display Code:	Description:	Adjusting Range:	Default Setting:
0		Set point Value of Control	Low scale to High scale value. (L or SC, H, SC) Press the SET or ESC key to display set point.	106
	ASPI	Alarm 1 Set Point, Value, Dwell Time (S/F = 0.00 or 1.00/F/Minutes)	Trip Point within High/Low scale or 0 - 8889 minutes (for Dwell Time)	10 C
	rAnP	Ramp Rate	0 - 99.99°F/minute (0 - 55.55°C/minute)	0.00
	oFSt	Offset Value for Manual Reset (Integral Time TI = 0)	0 - 100% Only functional if Integral is set to 0.	0.0
1	ShiF	Display Shift	-199° to 199°F (-111 - 111°C) (Refer to page 20)	0
	Pb	Proportional Band of Output 1	0 - 99.0% (0-200.0 °C) 0: for ON-OFF control (Refer to Page 16)	10 C
	t1	Integral (Reset) Time of Output 1	0 - 3600 seconds	120
	td	Derivative (Rate) Time of Output 1	0 - 1000 seconds	40
	RhY1	Hysteresis of Alarm 1	0 - 19°F (0 - 11 °C)	0
	hYSt	Hysteresis of ON-OFF control	0 - 19°F (1 - 11 °C)	0
	Addr	Interface Address	0 - 40	0
2	LoSC	Low Scale of Range. Adjust for your process	Minimum value for the selected input (INPT) to High Scale (HiSC)	0
	hiSC	High Scale of Range. Adjust for your process	Low Scale (LoSC) to maximum value for the selected input (INPT)	180
	PL1	Power Limit of Output 1	0 - 100%	100%
	PL2	Power Limit of Output 2	0 - 100%	100%
	inPt	Input Type Selection	J-kC = J Type TC K-kC = K Type TC L-kC = L Type TC E-kC = E Type TC B-kC = B Type TC H-kC = H Type TC S-kC = S Type TC N-kC = N Type TC PE ohm PT100 DIN Pt 1S = PT100 AS Y-RZ = 4-20 mA 0-20 = 0-20mA 0-1V 0-1V B-SV = 5-MV I-SV = 1-5V	H-kC
	unit	Display Units	°C = degree C °F = degree F Fu = process Unit (Engineering Units)	°C
	res0	Resolution	nodP = No decimal point used 1dP = 1 Digit decimal 2dP = 2 Digit decimal (only for Linear Voltage or Current Input)	1dP
	ConP	Control Action of Output 1	dRt = Direct (Cooling) Action rEv = Reverse (Heating) Action	rEv
	Alnd	Alarm 1 Mode	dYH = Deviation High Alarm dYL = Deviation Low Alarm dHh = Deviation Band High Alarm dLl = Deviation Band Low Alarm FSH = Full Scale High Alarm FSL = Full Scale Low Alarm	dYH
	AlSF	Alarm 1 Special Function	nonF = No Special Function LbCh = Alarm with Latch Function hOcl = Alarm with Hold Function LbHh = Alarm with Latch & Hold Function Loot = Give Temperature as time unit Lool = Give Temperature as time unit Cool = Proportional Cooling	nonE
	CYC	Proportional Cycle Time of Output 1	0 - 99 Seconds, 0 for Linear current/voltage output	0
	CCYC	Cooling Cycle Time	0 - 99 Seconds, 0 for Linear current/voltage output	20 For Relay Output
	CPb	Cooling P Band	0 - 99.0% (0 - 200°C)	10 C
d-b	Dead Band for P Band and CPB	-199 - 199°F (-111 - 111°C)	0	

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For convenience, parameters can be recorded on the next page.

Security Levels	Display Code:	Description:	Adjusting Ranges:	Default Setting:
0		Set point Value of Control	Low scale to High scale value (LoSC, HiSC). Press the  or  key to display set point.	106
	RSP1	Alarm 1 Set Point Value, Dwell Time R1SF = t on or t off/Minutes	Trip Point within High/Low scale or 0-9999 minutes (for Dwell Time)	10 C
	rAnP	Ramp Rate	0-99.99°F/minute (0-55.55°C/minute)	0.00
	oFSI	Offset Value for Manual Reset (Integral Time T1 = 0)	0-100% Only functional if Integral is set to 0.	0.0
1	Shif	Display Shift	-199° to 199°F (-111 - 111°C) (Refer to page 20)	0
	Pb	Proportional Band of Output 1	0-360°F (0-200.0 °C) 0: for ON OFF control (Refer to Page 16)	10 C
	t ₁	Integral (Reset) Time of Output 1	0-3650 seconds	120
	t _d	Derivative (Rate) Time of Output 1	0-1000 seconds	40
	RhY1	Hysteresis of Alarms 1	0-19°F (0-11 °C)	0
	HYSI	Hysteresis of ON-OFF control	0-19°F (1-11 °C)	0
	Addr	Interface Address	0-40	0
2	LoSC	Low Scale of Range. Adjust for your process	Minimum value for the selected Input (INPT) to High Scale (HiSC)	0
	HiSC	High Scale of Range. Adjust for your process	Low Scale (LoSC) to maximum value for the selected Input (INPT)	180
	PL1	Power Limit of Output 1	0-100%	100%
	PL2	Power Limit of Output 2	0-100%	100%
	INPT	Input Type Selection	J-tC = J Type TIC B-tC = K Type TIC z-tC = T Type TIC E-tC = E Type TIC b-tC = B Type TIC r-tC = R Type TIC S-tC = S Type TIC n-tC = N Type TIC Pt dN = PT100 DIN Pt JS = PT100 JS 4-20 = 4-20 mA 0-20 = 0-20 mA 0-1V = 0-1V 0-5V = 0-5V 1-5V = 1-5V	4-tC
	unit	Display Units	°C = degree C °F = degree F P _U = process units (Engineering Units)	°C
	rES0	Resolution	noDP = No decimal point used 1dP = 1 Digit decimal 2dP = 2 Digit decimal (only for Linear Voltage or Current Input)	1dP
	ConA	Control Action of Output 1	dir-t = Direct (Cooling) Action rEYr = Reverse (Heating) Action	rEYr
	Alnd	Alarm 1 Mode	d _u H = Deviation High Alarm d _u L = Deviation Low Alarm dB _u H = Deviation Band High Alarm dB _u L = Deviation Band Low Alarm FS _u H = Full Scale High Alarm FS _u L = Full Scale Low Alarm	d _u H
	R1SF	Alarm 1 Special Function	none = No Special Function Latch = Alarm with Latch Function hold = Alarm with Hold Function Latch & Hold = Alarm with Latch & Hold Function t on = Dwell Timer ON as Time Out t off = Dwell Timer OFF as Time Out Cool = Proportional Cooling	none
	CYC	Proportional Cycle Time of Output 1	0-99 Seconds, 0 for Linear current/voltage output	0
	CCYC	Cooling Cycle Time	0-99 Seconds, 0 for Linear current/voltage output	20 For Relay Output
CPb	Cooling P Band	0-360°F (0-200°C)	10 C	
d-b	Dead Band for pE and CPB	-199-199°F (-111-111°C)	0	

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For convenience, parameters can be recorded on the next page.

HotBlock Temperature Settings:

The pre-set factory “Control Point” temperature is 115 °C. Factory tests have shown that this temperature is “sea level safe”. Liquids in uncovered polypropylene tubes should not boil at this setting. If watch glasses are being used, this setting should be lowered to avoid boiling. The block temperature should be optimized for the specific digestion conditions. PLEASE NOTE that the block temperature is different than the temperature of the liquids being digested. The temperature of the liquid contents of the digestion cup will vary with:

- A. The material being digested.
- B. The number of samples being digested .
- C. The air movement of the digestion area.
- D. The addition of a watch glass

Note: *The maximum use temperature of the polypropylene cup is 130°C. Also please note that the temperature display is not the temperature of the sample. Sample temperature will almost always be 5-15° less than the display temperature.*

Adjusting the Temperature of Your HotBlock:

1. Turn the Hot Block on and wait until the display shows the current block temperature.
2. Press the up arrow key. The display will show the Control Point temperature. The more brightly lit digit can be changed by holding down the up or down arrow keys. The digits will scroll from 0-9. Release button when desired value is reached.
3. To change to another digit, “tap” the up arrow key. When the correct digit is highlighted, hold down the up or down arrow to change the setting.
4. When the proper Control Point is set, no further action is necessary. The display will return to the current temperature in about 10 seconds.

Tuning Your Hotblock:

Each Hot Block should be tuned at the temperature that it is to be operated. Tuning enables the Hot lock to achieve its set point temperature without any overshoot. Tuning of the Hot Block is done at the factory at 115°C. If the block is operated at a temperature significantly different from 115°C, it may be advisable to re-tune the block to prevent overshooting the set point temperature. To tune the Hot Block with the ETR-3200 controller follow these steps:

1. Tuning should be started when the block is near room temperature.
2. Turn the Hot Block off and back on.
3. When the display shows the current temperature, hold down the up and down arrow keys simultaneously for four seconds and release. The display will flash on and off indicating that the Hot Block is autotuning.
4. When the temperature reaches the set value, the Hot Block will be tuned and the parameters will automatically be stored in the controller’s memory. At this point the display will stop flashing.

Safe-Sample™ Temperature Protection:

Your Hot Block is protected from runaway temperatures by a failsafe 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 ten degrees higher than the set temperature. If this should occur, the Hot Block will stop heating, preventing the loss of samples. The Hot Block must be turned off and turned back on to reset the alarm.

Potential Hazards:

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

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

The HotBlock 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, pages 3-5.

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

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 from the bottom of the unit.

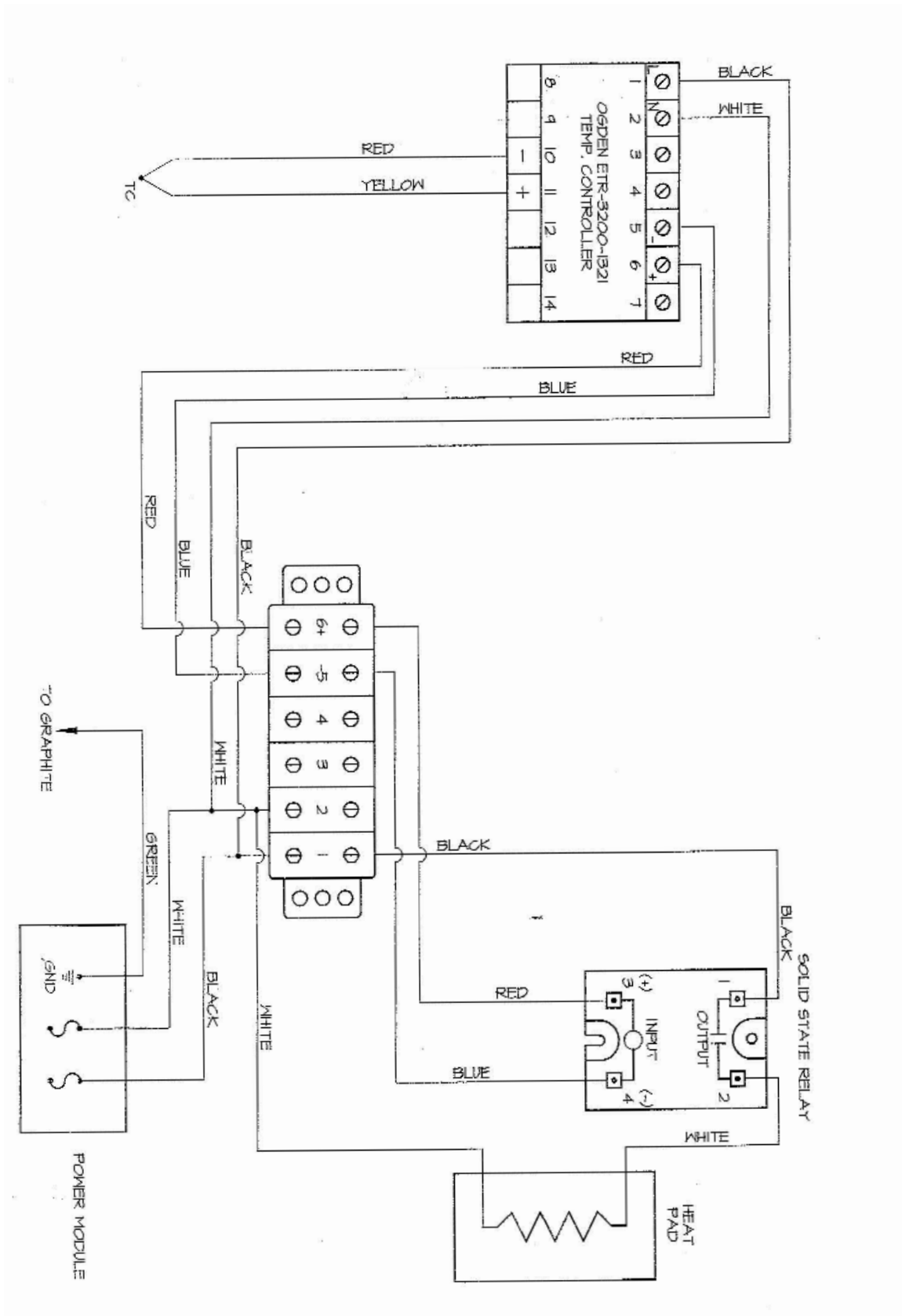
Maintenance:

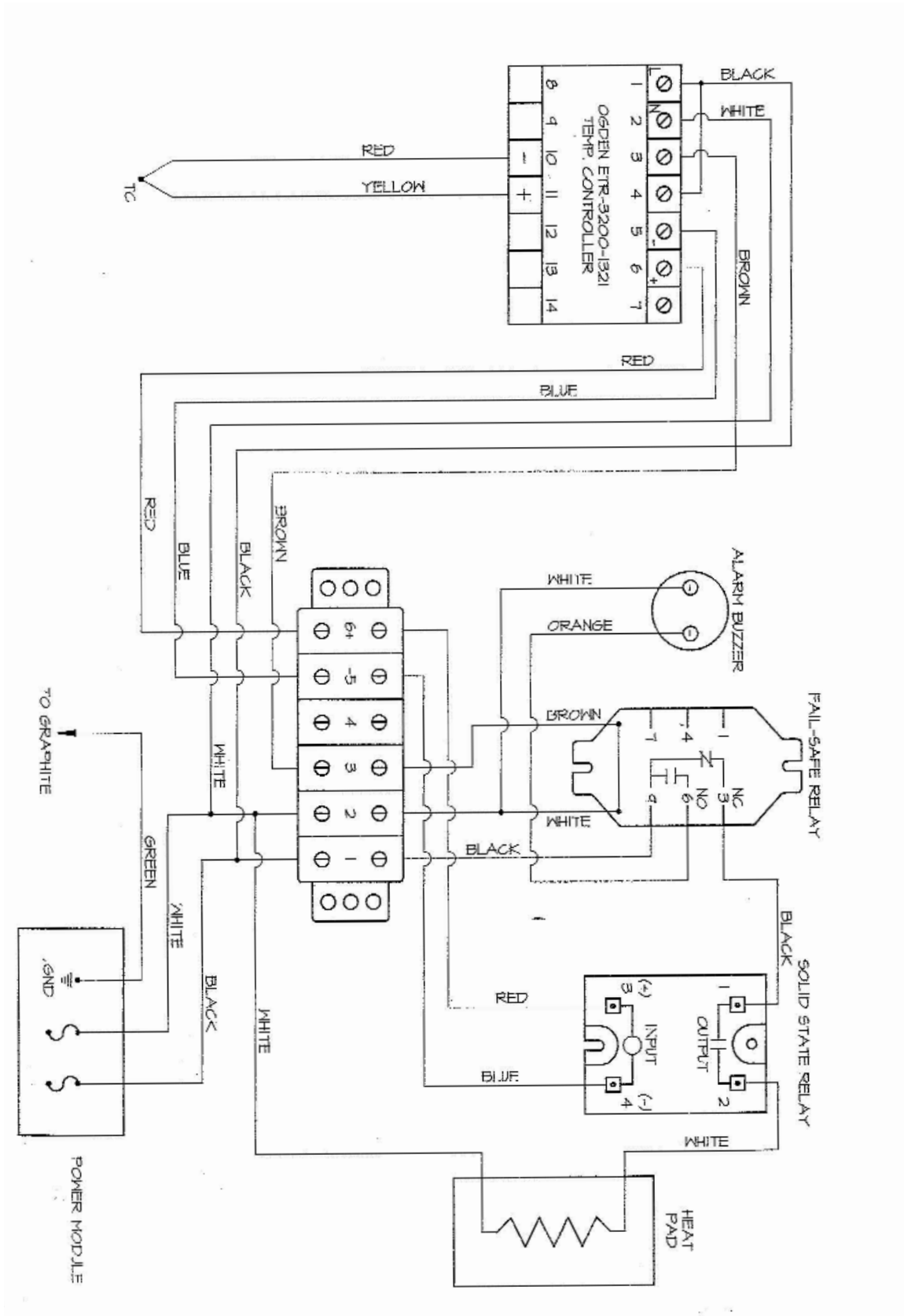
Any service inquiries should be directed to Environmental Express Technical Service Department. After each use, clean exterior surfaces with a damp sponge to remove acid residue. For acid spills, sponge with a diluted solution of sodium bicarbonate followed by distilled water. Acid that is spilled directly 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.

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

<i>Part Description</i>	<i>Part Number</i>
Power module (plug receptacle)w push button switch	SC941
Power Cord- heavy duty	SC958
Environmental Express Controller	SC945
12" X 12", 120V, silicone rubber, etched-foil heater mat for models SC100 & SC150	SC951
12" X 12", 240V, silicone rubber, etched-foil heater mat for models SC100-240 & SC150-240	SC951-240*
110/220V, 25A solid state relay	SC952
Type K Thermocouple	SC953
Terminal board	SC955
Ceramic fiber insulation for models SC100 & SC150	SC959
14" X 14" Powder-coated aluminum bottom for models SC100 & SC150	SC963
12" X 18", 120V, silicone rubber, heater mat for models SC154 and SC196 & SC151	SC966
12" X 18", 240V, silicone rubber, heater mat for models SC154-240 SC196-240 & SC151-240	SC966-240*
12" X 8" 120V silicone rubber heater mat for model C6002 (12-Place Block)	C6300
Fail-Safe Relay	SC968
Alarm Buzzer	SC969
Ceramic fiber insulation for models SC154, SC196 and SC151	SC970
14" X 19", powder-coated aluminum bottom for models SC154, SC196 and 151	SC971
PVC screw for rubber foot	SC964
Rubber foot	SC976

**for HotBlocks shipped outside the United States and Canada*





Please consult the following troubleshooting guide if you experience problems with your HotBlock. See wiring schematic (page 12-13) for component identification. If you are unable to resolve the problem or if replacement components are necessary, please contact technical service at 1-800-745-8218 as component replacement varies in degree of difficulty. We recommend that only qualified personnel attempt troubleshooting electrical components.

When the HotBlock 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 to perform unsatisfactorily or render it inoperable.

The controller digital display will not illuminate.

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

- ***The controller is not getting voltage or;***
- ***The controller itself has failed internally.***

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

1. Confirm that the power cord is plugged securely into the HotBlock receptacle and a working outlet.
2. Confirm that the switch is in the “on” position. Press button on the back of HotBlock.
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.

Caution: This procedure is a potential electrical hazard and should only be performed by qualified personnel.

4. Inside the HotBlock, check voltage leading from the power module to the controller:
 - a) Remove the bottom panel of the HotBlock by unscrewing the rubber feet.
 - b) On the back of the controller, locate the black wire at terminal 1 and white wire at terminal 2.
 - 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 11).
 - 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.

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

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

- ***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)***
- ***There the controller is faulty. Call Environmental Express at 1-800-343-5319 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 in the event of a set point overshoot of 15°C and to alert the technician of the incident. The HotBlock 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. You may troubleshoot the relay by following these steps:



Caution: *This procedure is a potential electrical hazard and should only be performed by qualified personnel.*

1. Power off your HotBlock.
2. Remove the bottom panel of the HotBlock by unscrewing the rubber feet.
3. Power the HotBlock 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 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 11).

The HotBlock will not heat beyond ambient temperature.

A HotBlock 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.*

Caution: *This procedure is a potential electrical hazard and should only be performed by qualified personnel.*

To measure the relay voltage, follow these steps:

1. Remove the bottom panel of your HotBlock 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 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 11).

- **Heater Mat**—*To test the heater mat, the resistance (ohms) must be determined with a volt-meter. It is recommended that your heater mat be replaced if it measures 25 ohms (W) 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 and remove the bottom panel of your HotBlock by unscrewing the rubber feet.
2. Locate and disconnect the white wire connected to 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.

3. Set your volt-meter to measure ohms (Ω)
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 11).

- **Controller**—*To test the controller, the output voltage must be determined with a volt-meter. To measure voltage from the controller, follow these steps:*

Caution: *This procedure is a potential electrical hazard and should only be performed by qualified personnel.*

1. Remove the bottom panel of your HotBlock 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 (RED) and the black lead to terminal (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 6 (red) and 5 (blue) of the controller then the controller has failed internally and it must be replaced (see parts list, page 11).

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

The temperature controller is flashing Er.L Attn- Thermocouple Fault

To troubleshoot the thermocouple, follow these steps:

1. Power off your HotBlock.
2. Remove the bottom panel of your HotBlock 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.
7. If your display continues to flash SbEr- the thermocouple is faulty and must be replaced (see parts list, page 11).



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 31 1998

OFFICE OF
WATER

John Stone
Vice President
Environmental Express
490 Wando Park Blvd.
Mt. Pleasant, SC 29464

Dear Mr. Stone:

This letter responds to your letter dated February 23, 1998 regarding the use of the Hot Block™ digestion system for EPA approved methods that use conventional hot plate digestion technique. EPA does not approve or endorse specific instrumentation. However, EPA does not restrict the use of instruments or equipment that employ technology which is different from the EPA approved methods as long as the user follows the procedures required in the EPA methods, as well as the manufacturer's operating instructions for proper use. Therefore, provided the above conditions are met, the Hot Block™ digestion system which is manufactured by your company is acceptable for use with EPA approved methods.

If I can be of additional assistance on this and other matters, please write or call me at (202) 260-1639 at your convenience.

Sincerely,

A handwritten signature in cursive script that reads "Maria Gomez-Taylor".

Maria Gomez-Taylor, Ph.D.
Analytical Method Staff
Engineering and Analysis Division (4303)

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