

# EpiShear™ Thermoelectric Chiller

(version B1)

**Chiller only:** Catalog Nos. 53068 (100V-240V)

**Sonicator / Chiller:** Catalog Nos. 53062 (110V) & 53063 (230V)

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<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>Overview</b> .....	1
<b>Safety Warnings</b> .....	2
<b>Included Components</b> .....	2
<b>Technical Specifications</b> .....	3
<b>Preparation for Use</b>	
A. Receipt & Inspection .....	3
B. Plumbing Connections .....	4
C. Electrical Connections .....	5
<b>Preparing the Chiller for Use with the Multi-Sample Sonicator</b> .....	6
<b>Operation of the Chiller</b>	
A. Simple Operation .....	7
B. Advanced Operation .....	7
<b>Maintenance</b> .....	8
<b>Appendix</b>	
Section A. Alarm Signal .....	9
Section B. System Alarms/Troubleshooting .....	9
Section C. RS-232 Communication .....	9
Section D. RS-232 Communication Protocol .....	10
Section E. EC Declaration of Conformity .....	13
Section F. Limited Warranty .....	14
Section G. Service / Return of Equipment .....	15
Section H. Safety Certification Form .....	15
Section I. Related Products .....	16
<b>Technical Services</b> .....	20



## Overview

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Active Motif's EpiShear™ Thermoelectric Chiller is an ultra-compact temperature control system that uses a Proportional Integral Derivative controller (PID controller) to recirculate cooled or heated fluids at a constant temperature that is precisely controlled. The unit is capable of both cooling and heating, and can recirculate 500 ml of water per minute through a range of 2-45°C range (+/- 0.1°C). The chiller does not use Freon or any other replacement gas, making the unit easy to use and ensuring a maintenance-free long life.

Active Motif uses the chiller primarily for keeping samples cool when they are being processed by its EpiShear Multi-Sample Sonicator, typically at a set point of 3-4°C. The unit can also be used for controlling the operating temperatures of lasers, medical equipment, semiconductor equipment, or any process requiring temperature control.

In addition to being able to maintain fluids at a constant temperature, the unit has a cycling feature where two different temperature set points may be entered with a soak time at each temperature and the number of cycles desired.

The Thermoelectric Chiller is backed by a one-year warranty and is supplied with a recirculating chiller unit, an AC/DC power supply, an AC power supply cord and a set of inlet, outlet and drain tubes with quick-connect fittings, which make it easy to attach the chiller to the Multi-Sample Sonicator or other units that have 1/8"-inch, quick-connect fittings.

product	format	catalog no.
EpiShear™ Thermoelectric Chiller	100V-240V	53068
EpiShear™ Multi-Sample Sonicator / Chiller	110V 230V	53062 53063

**Note:** The Thermoelectric Chiller contains a universal AC/DC power supply that accepts an input of 100-240 volts AC. Each chiller will be supplied with an appropriate AC power supply cable designed to fit the receptacles of the different wall outlets in the US, Europe or The United Kingdom.

## Safety Warnings

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### PLEASE READ THE ENTIRE MANUAL BEFORE USE OF THIS DEVICE!

The EpiShear Thermoelectric Chiller has been designed, built and tested to ensure maximum operator safety. However, no design can completely protect against improper use that may lead to bodily injury, death and/or property damage. For total safety and equipment protection, read the instruction manual carefully before attempting to operate this equipment.

Be certain to observe the following **WARNINGS**:

- **NEVER** operate the chiller within 3°C of the coolant's freezing point (*i.e.* the set point when using water should be  $\geq 3^{\circ}\text{C}$ ). The block in the chiller is colder than the fluid being circulated, so it could freeze inside the block and cause it to crack.
- **NEVER** disassemble the chiller unit, as irreparable damage may occur.
- **NEVER** operate the chiller in ambient temperatures of 40°C or greater.
- **NEVER** store the chiller over 60°C.
- Use only proper coolants, such as water. When using the chiller with Active Motif's Multi-Sample Sonicator we do not recommend use of 25% propylene glycol or 25% ethylene glycol solutions instead of water. While use of these solutions will reduce the noise produced by the chiller, their extended use will cause the acrylic water bath to become cloudy.
- When using the chiller with the Active Motif Multi-Sample Sonicator, the use of an algicide (such as VWR Clear Bath Algicide, Cat. No. 13272-031) is recommended to prevent growth of algae in the water bath. Five to ten drops per bath are sufficient.
- **DO NOT** use Methanol, Ethanol, or Isopropyl Alcohol as coolants, either by themselves or in water mixtures; use of these solutions can damage the chiller, and voids the chiller warranty.
- **NEVER** ship the chiller with water inside the liquid cold plate as freezing temperatures may be encountered, which would damage the unit. Always pump all water out of the chiller prior to shipping.

## Included Components

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The EpiShear Thermoelectric Chiller is supplied with the following components:

- Recirculating chiller unit
- AC/DC power supply with a DC power cord attached
- AC power cord for use with wall receptacles in either the United States, Europe or the United Kingdom
- Set of inlet, outlet and drain tubes with quick-connect fittings attached

## Technical Specifications

Set Point Range / Accuracy	2°C to 45°C +/- 0.1°C (When using water as the coolant, the minimum set point is 3°C; see Safety Warnings on page 2.)
Coolant Type	Water is recommended. Do not use Methanol, Ethanol, or Isopropyl Alcohol as coolants. (Use of 25% propylene glycol or 25% ethylene glycol solutions instead of water will reduce the noise produced by the chiller. Do not use these solutions, however, with Active Motif's Multi-Sample Sonicator as they will cause the acrylic water bath to become cloudy over time.)
AC/DC Power Supply	Universal Input = 100-240 volts AC Output = 200 watts, 13.5 volts DC, 14.5 amps
Operating Voltage	13.5 volts DC, 15 amps maximum
Nominal Cooling Capacity	180 watts @ 20°C in a 20°C ambient environment
Safety Certifications (with power supply)	CE/UL (TUV)
Coolant Pump	500 ml/min brushless DC magnetically driven gear
Coolant Outlet Pressure (Water)	Nominal 5 psi @ 500 ml/min Maximum 35 psig
Noise	< 65 dBA with 25% propylene glycol/water
Coolant Fluid Connections	1/8" quick disconnect with shut-off valves
Weight	8.1 lbs. (3.7 Kg)
Dimensions	7.5" D x 7" H x 5" W, plus fittings (191 mm x 178 mm x 127 mm)

## Preparation for Use

### A. Receipt & Inspection

Prior to using the EpiShear Thermoelectric Chiller, perform a visual inspection to detect any evidence of damage that may have occurred during shipment. Check the shipping box carefully to be sure you have removed all items.

The EpiShear Thermoelectric Chiller was carefully packed and thoroughly inspected before leaving the factory. The carrier, upon acceptance of the shipment, assumed responsibility for its safe delivery. Claims for loss or damage sustained in transit must be submitted to the carrier.

If damage has occurred, contact your carrier within 48 hours of the delivery date. **DO NOT OPERATE DAMAGED EQUIPMENT.** Retain all packing materials for future shipment.

The chiller should be set up with adequate space in front of and behind the unit. Restricting the airflow into or out of the chiller will impair its performance. Maintain at least 3" of clearance around the air inlet and outlet to ensure no restriction of airflow.

## B. Plumbing Connections

Connect water tubes with 1/8" quick-connect fittings to the Supply and Return fittings on the rear of the thermoelectric chiller and to the fittings on the back of the Multi-Sample Sonicator's sound enclosure, or to whatever piece of equipment you will be using the chiller with. Be sure that each tube is attached to the same type of fitting (*i.e.* Supply to Supply and Return to Return).

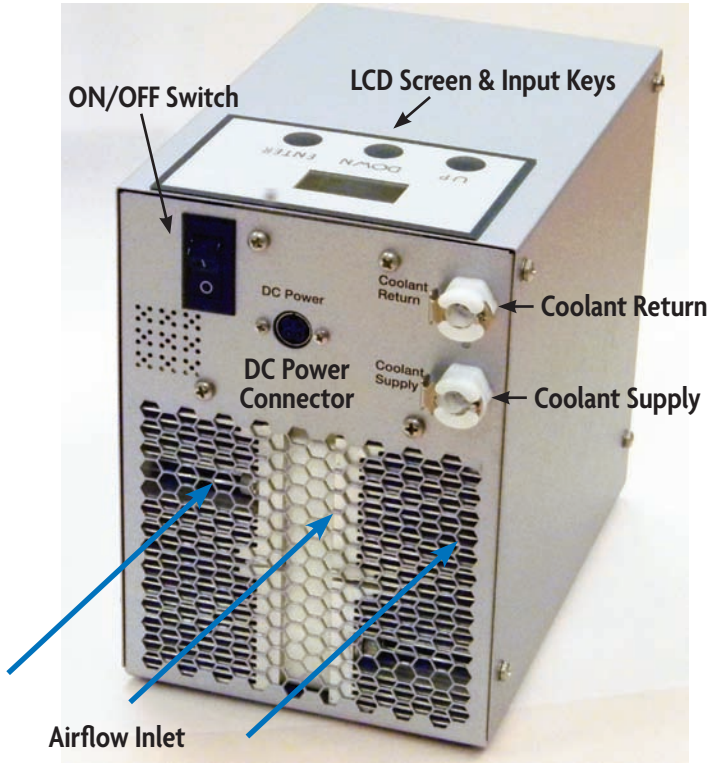


Figure 1. The rear of the Thermoelectric Chiller.

## C. Electrical Connections

**Power.** Connect the circular connector at the end of the DC power cord attached to the AC/DC power supply to the DC power connector on the rear of the chiller. Then, connect one end of the AC power cord to the AC/DC power supply and the other end into an electrical outlet.

**Alarms.** The chiller has a 250 volt AC, 1 amp dry contact relay to indicate a system alarm or temperature out of range. Connect to this dry contact on the 9 pin D-sub connector as follows:

9 pin D-sub Connector	RS-232 Signal Description
Pin No. 1	System/Temp Alarm
Pin No. 6	Alarm Signal Return

**RS-232.** The chiller comes with a RS-232 communication link. Connections are made via a 9 pin D-sub connector as follows:

9 pin D-sub Connector	RS-232 Signal Description
Pin No. 2	Transmit Data (TXD)
Pin No. 3	Receive Data (RXD)
Pin No. 5	Ground

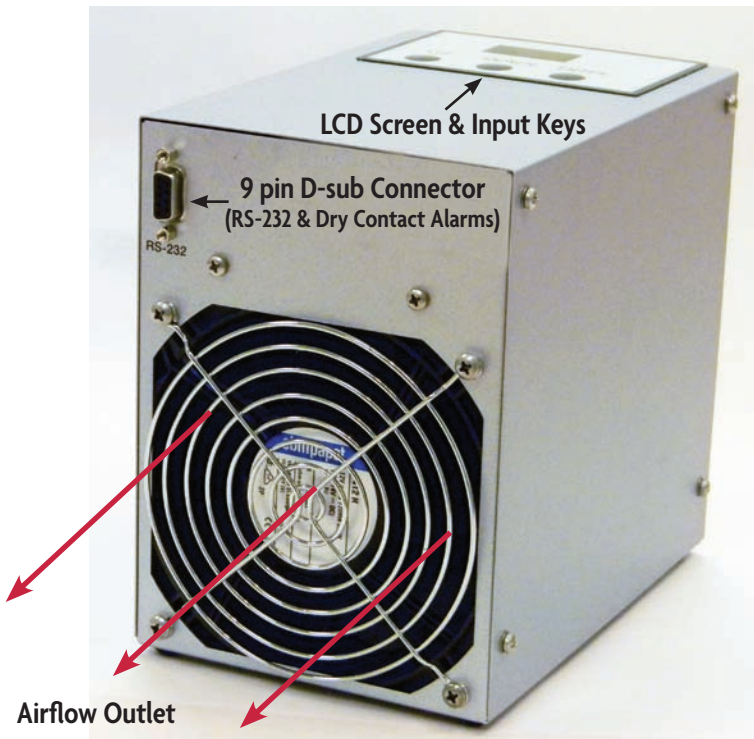


Figure 2. The front of the Thermolectric Chiller.

## Preparing the Chiller for Use with the Multi-Sample Sonicator

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You may wish to keep water cold in the refrigerator to decrease the amount of time it takes to chill the water down to 3°C before you begin sonication. We do not recommend adding ice to the water bath as this can impact sonication results, and could potentially damage the chiller. It may take 30 minutes to chill the room-temperature water completely, so begin chilling the water first.

Start-up the chiller using the following steps:

1. If the cup horn / water bath has not already been assembled and placed in the sound enclosure, do this now. See the EpiShear Multi-Sample Sonicator manual for instructions.
2. Connect the water tubing to the Supply and Return fittings on the rear of the thermoelectric chiller and to the fittings on the back of the Multi-Sample Sonicator's sound enclosure. Be sure that each tube is attached to the same type of fitting (*i.e.* Supply to Supply and Return to Return).
3. Add water to the water bath so the water level is just above the top of the upper fitting.
4. Plug the DC power cord attached to the chiller's AC/DC power supply into the rear of the chiller. Plug the AC power cord into the chiller, and then into an electrical outlet.
5. Optional: connect the alarm signal to the D-sub connector (see Electrical Connections).
6. Use the ON/OFF switch located to the rear of the chiller to turn the chiller on. The LCD screen should read the current temperature of the coolant.
7. Once the system is running the tubing will begin to fill and circulate water. This may lower the water level inside the water bath. Once water begins to flow, additional water may need to be added until the water level is just above the top of the upper fitting.
8. See the EpiShear Multi-Sample Sonicator manual for further advice with set up and operating parameters when sonicating samples with the chiller.

## Operation of the Chiller

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The chiller is operated via the control panel located on top of the unit. The control panel has a 2-line, 8-character LCD screen and 3 input keys: **UP**, **DOWN**, and **ENTER**, which work as follows:

Key	Action
<b>UP</b>	Pressing the UP key increases the value of the parameter being displayed.
<b>DOWN</b>	Pressing the DOWN key decreases the value of the parameter being displayed.
<b>ENTER</b>	Pressing the ENTER key briefly enters the parameter that has been changed.
<b>ENTER</b>	Pressing and holding the ENTER key for 3 seconds changes the Menu being displayed.

**Important:** The block in the chiller will be colder than the fluid that is circulated.

**DO NOT** set the temperature less than 3°C greater than the freezing point of the coolant being used (*i.e.* the set point for water should be  $\geq 3^{\circ}\text{C}$ ). Otherwise, the block could freeze and crack.

The chiller controller offers two menus to input parameters: the Status Menu and the Parameter Input Menu. The Status Menu is used for Simple Operation, described immediately. This is used to hold the coolant constant at a single temperature. When in this mode, the screen displays the current temperature of coolant leaving the chiller, and you can enter and change the set point temperature of the coolant, or the SETTEMP1.

## A. Simple Operation

If you wish to maintain the control at a single temperature, follow the steps below.

1. Turn on the chiller and wait for the display to read T XX.X C, which is the current temperature of the coolant.
2. Press the **UP** or **DOWN** keys to change SETTEMP1 to the desired set point. (For sonication of chromatins or DNA using water as the coolant, 3°C is recommended.)
3. Press the **ENTER** key.

The chiller will now control to the SETTEMP1 temperature. To change the set point temperature, simply press the **UP** or **DOWN** keys to change SETTEMP1 to a new set point, then press **ENTER**.

**Note:** If continuous control at one set-point temperature is desired, the # OF CYCLES parameter must be set to 0. Because the parameters that were used last are saved even after the chiller has been turned off, if another user has been using Advanced Operation, use the instructions below to ensure that # OF CYCLES = 0. Otherwise, the chiller will cycle between the SETTEMP1 and SETTEMP2 for the soak times that are set.

## B. Advanced Operation

The Parameter Input Menu enables input of 2 set point temperatures, soak times for each set point, the number of cycles between two temperatures, flow rate (not functional), an alarm temperature, a temperature offset, and a password to enter the Parameter Input Menu. (The default password is 0000 until it is changed by the user.)

**Note:** While in Parameter Input Menu, if no keys are pressed for 30 seconds the display will revert to the Status Menu. However, any parameters set will function.

1. To enter the Parameter Input, press and hold **ENTER** for 3 seconds. The screen will display:



2. If you have not changed the Password, press **ENTER** to input 0 as the first digit of the password. A second 0 will appear. Press **ENTER** a total of 4 times so the display will show 0000, then press it a final time to enter the password. (If you have changed the password, use the **UP** or **DOWN** keys to change each number to enter in your password.)

3. When in the Parameter Input Menu, a series of screens will display that enable you to set values for each parameter. Simply use the **UP** or **DOWN** keys followed by the **ENTER** key to input your choices and go to the next parameter. The table below shows the order of the parameters, describes what each parameter does, and the range of permitted values.

Parameter	Possible Values	Description
SETTEMP1 (xxC)	2°C to 45°C	Set point of 1st control temperature. If # OF CYCLES is set to zero, this is the control temperature.
SETTIME1 (xxx)	0-999 seconds	Soak time at temperature 1. Not used if # OF CYCLES is set to zero, as SETTEMP1 will be held until the unit is turned off..
SETTEMP2 (xxC)	2°C to 45°C	Set point of 2nd control temperature. Not used if # OF CYCLES is set to zero.
SETTIME2 (xxx)	0-999 seconds	Soak time at temperature 2. Not used if # OF CYCLES is set to zero.
# OF CYC (xxx)	0-999 cycles	Number of cycles between SETTEMP1 and SETTEMP2. If set to zero, the chiller will maintain the temperature at SETTEMP1.
FLOW UNT (xPM)	lPM or gPM	Sets the rate of coolant flow as either liters per minute or gallons per minute. However, this parameter is not functional with this model. The flow rate is fixed, so is the same no matter which setting is chosen.
ALRM TMP (+/-x°C)	1°C to 9°C in 0.1°C increments	The Alarm temperature set point. If the current temperature is outside of the set point +/-, the dry contact alarm will open.
OFFSET (xxC)	-5°C to 5°C in 0.1°C increments	Used to adjust the current temperature displayed. Entering 5°C will increase the displayed temperature by 5 °C. Typically, this is used to synchronize the temperature displayed by the chiller with that of an external sensor. This also adjusts the RS-232 temperature reported.
CHNG PWD (Y/N)	Y or N	Entering Y enables the user to change the password that is required to enter into the Parameter Input Menu. Be certain to record your password if you change from the default of 0000 as it will then be required to utilize the Parameter Input Menu.

The various parameters that can be programmed when using the Parameter Input Menu.

## Maintenance

Proper care and cleaning is important to prevent growth in the chiller and tubing. It is recommended to treat the water used inside the chiller with VWR Clear Bath Algicide (Cat. No. 13272-031) or a similar, non-reactive product.

Please note that solvents cannot be used with the chiller when connected to a cup horn sonication device. Cup horns are made from acrylic and will be damaged by solvents.

If the chiller will not be used for an extended time period it must be drained.

Tubing should be replaced on a periodic basis to ensure cleanliness.

## Appendix

### Section A. Alarm Signal

The chiller has a dry contact alarm that is normally closed. It will provide alerts for temperature out of range or a system failure. These are located on pins 1 & 6 of the 9 pin D-sub Connector. See Electrical Connections above.

A list of system failures causing the dry contact alarm to open can be found below. In the event of a failure, the alarm type will be shown on the LCD screen.

### Section B. System Alarms/Troubleshooting

The chiller has three system alarms that, when triggered, will display on the LCD screen. When an alarm is displayed the system will not attempt to heat or chill the coolant.

Alarm	Cause	Recommendation
RTD OPEN or RTD SHORT	The temperature sensor has failed, or its connector has come loose.	Turn off the chiller and disconnect the DC power cord. Contact the Technical Services department of your nearest Active Motif office.
PUMP FAIL	The pump motor speed is not within normal limits, indicating that no coolant is flowing and/or the pump is damaged.	Either the pump has failed, or the external coolant lines are blocked. Check that there are no obstructions/closed valves or kinks in the coolant lines. Also, check that the coolant lines are fully inserted into the Supply and Return fittings on the chiller. If the coolant lines are not blocked, contact the Technical Services department of your nearest Active Motif office.

#### Other Potential Issues

Symptom	Recommendation
Cooling Capacity Insufficient	If the chiller is not providing sufficient cooling, check that the air inlet and outlet are not restricted and that the fan is running. If the airflow is not restricted, contact the Technical Services department of your nearest Active Motif office.
RS-232 Communications Not Working	If the RS-232 communications does not seem to be working, try turning the power off and back on to reset the communications. If the problem persists, contact the Technical Services department of your nearest Active Motif office.

### Section C. RS-232 Communication

The chiller comes with a modified (pin-out) RS-232 communications port. The port is a 9-pin female D-subminiature connector, and is found on the front of the chiller cover. The chiller uses this port to communicate a comprehensive set of control parameters with a Host PC. These parameters are outlined in the tables below.

**Note:** Pins 1 and 6 on this port are connected to a dry contact relay and thus the RS-232 connecting cable must be customized. This relay is “closed” when the Thermistor temperature is within the Alarm range and “open” when it is outside the range.

Host/Master 9 pin D-sub Pin No.	Chiller 9 pin Female D-sub Pin No.
2 (Receive – Rx)	2 (Transmit – Tx)
3 (Transmit – Tx)	3 (Receive – Rx)
5 (Ground)	5 (Ground)

Signal definition and wiring.

Specifications	
Speed	9600 baud
Data Flow Control	Manually set RTS (no “hardware handshaking”)
Data Format	8-bit serial
Number of Stop bits	1
Parity	None
Transmission Breakdown	One command byte followed by zero, one, or two data bytes, depending on the data type.
Master/Slave	The chiller is always the SLAVE.
Interrupts Reported	None, must be polled for status.
Transmission Length	≤ 15 meters
Minimum Time Required Between Host Command Transmissions	0.500 seconds

## Section D. RS-232 Communication Protocol

### Definitions

- SOT: start of text ‘\*’ (2A hex) h: hex
- EOT: end of text ‘^’ (5E hex) d: decimal
- LB: low byte na: not applicable
- MB: middle byte
- HB: high byte
- LS bit: least significant bit

### Data type and formatting

All commands and data passed between the Host PC and the chiller are binary (Hex) numbers (*i.e.* non ASCII) except for one; the “Get SW Version” D7(hex) command returns the sixteen character software version in ASCII. (See the Get Commands table).

Except for the “Get SW Version” command, data passed between the Host and the chiller is from one to three bytes with the first byte always the command byte. Note the decimal and integer formats in the table below. If the data format has a decimal point (XX.X) then the chiller will

interpret the resolution of the Least Significant Bit as 0.1 (a tenth) of the parameter unit specified. Otherwise if the data is XX or XXX, then it is an integer value.

**Note:** The chiller responds to every Host communiqué with at least an echo of the command sent followed by data, if applicable to the parameter.

**Command byte specifications**

Bit 7 (MSB) remote control active (1 = remote control, 0 = local control)

Bit 6 remote on/off (1 = chiller running, 0 = chiller in standby mode)

Bit 5 communication direction (1 = remote to chiller [command from master], 0 = chiller to remote [status from chiller])

Bits 4 thru 0 parameter being communicated per the Put and Get Commands tables below

**Data byte specifications**

Data consists of 1 to 3 bytes following the command byte. See the Put Commands and Get Commands tables below. If the data format in the table below is “XX.X”, then the chiller interprets the LS bit as being 0.1 (a tenth) of the unit specified.

The example below is for the Set point, Thermistor temperature, and Proportional (P) parameters:

High Byte	Low Byte	Hex
00000000	00000001 = 0.1	00 01
00000000	00001010 = 1.0	00 0A
00000000	10110100 = 18.0	00 B4
00000001	10010000 = 40.0	01 90

See the specific parameter for interpretation of other data formats: “X”, “XX”, and “XXX”.

**Put Commands table**

PUT Commands	No. Bytes Sent	Command Byte(h), Data Bytes(h)	Received(h)	Data Format	Value of LS bit	Units	Data Range
Setpoint	3	E1, LB, HB	E1 (ack)	XX.X	0.1	°C	{0, 500d} <sup>1</sup>
Fault Reset	1	FF	FF (ack)	X	na	na	na

## Get Commands table

GET Commands	No. Bytes Sent	Command Byte(h)	Received(h)	Data Format	Value of LS bit	Units	Data Range
Setpoint	1	C1	C1, LB, HB	XX.X	0.1	°C	{0, 500d} <sup>1</sup>
SW Version	1	D7	D7, SOT, <16 ASCII bytes <sup>2</sup> , EOT	19 bytes	na	na	na
Coolant Temp	1	C9	C9, LB, HB	XX.X	0.1	°C	{0, 500d} <sup>1</sup>
% Cool or Heat	1	DE	DE, sign, lsB, msB Byte Description: byte1 DE - cmd echo byte2 bit7(sign): 1 = heating, 0 = cooling byte3 = lsByte data byte4 = msByte data %pwm = sign * (61787 - (lsByte + msByte*256)) *100/1275	XXX.X	0.195	%	{61787d, 60512d}  NOTE: 61787 = 0%pwm  60512 = 100%pwm
Fault Byte	1	C8	C8, <Fault Byte> bit 0 = Tank Level Low bit 1 = Tach Fail bit 2 = Thermistor Temp > Alarm bit 3 = PCW Low bit 4 = Thermistor Fault bit 5 = Pump Fault bit 6 = (not used) bit 7 = Thermistor Temp < Alarm	XX "1" = Asserted	na	na	na

### Notes

- The chiller can store 8 bytes of transmission. It is recommended that the transmissions be limited to 1 data exchange of one, two, or three bytes (depending upon the data being communicated), until the master has received the acknowledgement from the chiller.
- An acknowledgement of the transmission will be sent back to the master when the chiller reads the data. In the case of data transmitted to the chiller controller only, the acknowledgement will be the command byte. In the case of data requested by the master, the acknowledgement will be the command byte plus the data byte(s) requested.
- For software that requires data types to be specified:  
 Format of command bytes: number, "word", unsigned, MSB first  
 Format of sent data bytes: number, "word", unsigned, LSB first  
 Format of received data bytes: variable length string
- If RS-232 communication does not seem to be functioning, cycle the main power to reset.

5. ASCII bytes = software part number and revision. For chiller 300L = 60-12663-2 revXX, where XX = software revision level.
6. % Cool or Heat command: a positive value implies heating and a negative value (2's complement) implies cooling.

## Section E. EC Declaration of Conformity

We declare under sole responsibility that the EpiShear Thermoelectric Chiller meets the intent of Directive 89/336/EEC and amendments 92/31/EEC, 93/68/EEC for Electromagnetic Compatibility and the Low Voltage Directive 2006/95/EEC. Compliance was demonstrated to the following specifications as listed in the official Journal of the European Communities:

Emissions: EN55011 Group 1 Class A

- EN 55011: 97 + A1:1999 + A2:2002 Radiated Emissions, Group 1 Class A
- EN 55011: 97 + A1:1999 + A2:2002 Conducted Emissions, Group 1 Class A
- EN 61000-3-2: 2006 Harmonics
- EN 61000-3-3: 1995 + A1:2001 Flicker Meter

Immunity: IEC 60601-1-2

- EN 61000-4-2: 1995 + A1 1998 + A2:2001 Electrostatic Discharge
- EN 61000-4-3 +A1: 2002 Radiated Susceptibility (RF)
- EN 61000-4-4: 2004 Electrical Fast Transient (EFT)
- EN 61000-4-5: 1995 + A1:2001 Surge Susceptibility
- EN 61000-4-6: 1996 + A1:2001 Conducted Disturbances Induced by RF Fields
- EN 61000-4-8: 1993 + A1:2001 Power Frequency Magnetic Field Immunity
- EN 61000-4-11: 12004 Voltage Dips and Interference (VDI)

Safety:

- EN 61010-1: 2nd Edition (2001), Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General

## Section F. Limited Warranty

Your EpiShear Thermoelectric Chiller is warranted for a period of one year from the date of shipment from Active Motif against defects in material and workmanship under normal use as described in this instruction manual. During the warranty period, Active Motif will, at its option, as the exclusive remedy, either repair or replace without charge for material and labor, the part(s) that prove to be defective, provided the unit is returned to us properly packed with all transportation charges prepaid.

The above warranties do not apply to equipment or parts that have been subjected to unauthorized repair, modification, misuse, abuse, negligence or accident. Excluded from this warranty is any damage caused to the product occurring during, but not limited to, such events as shipment, installation, storage, or non-normal usage. Equipment or parts that show evidence of having been used in a manner inconsistent with their ordinary purpose or the operating instructions, or which have had the serial number altered or removed, will be ineligible for this warranty.

Specific situations, which invalidate the warranty, include (but are not limited to):

- Any disassembly (partial or complete) of the chiller.
- Subjecting the chiller to temperatures over 60°C or operating it in ambient temperatures greater than 40°C.
- Subjecting a heat exchanger to unfiltered water or coolants not specified in the manual.
- Subjecting any product to temperature, voltage, current, or pressure (internal or external) greater than that specified in the product manual.
- Any actions prohibited in the “Safety Warnings” section of the product manual.
- Using voltages greater than 14 volts DC.

The aforementioned provisions do not extend the original warranty period of any product that has either been repaired or replaced by Active Motif. All warranty claims must be received by Active Motif prior to expiration of the warranty period.

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## Section G. Service / Return of Equipment

An EpiShear Thermoelectric Chiller in need of repair should be sent back to Active Motif. To do so, you must contact an Active Motif Customer Service Representative to obtain a Return Authorization Number (RA No.) before returning any instrument. Please have your Sales Order Number, date of purchase and the unit's serial number available when you call, or include it in your e-mail.

Care should be exercised to provide adequate packing to insure against possible damage in shipment. The unit should be sent to the "Service Department" of your nearest Active Motif office, with all transportation charges prepaid and return of shipment address indicated.

### Important

Any item(s) being returned must include a signed Safety Certification Form (below) to certify that the EpiShear Thermoelectric Chiller and/or the accessories being returned for repair are free of any biohazardous or radioactive material, and are safe for handling.

Do not return any equipment without an RA No. and a completed Safety Certification Form. Active Motif will send back any equipment it receives that has not been certified to be safe.

## Section H. Safety Certification Form

**Items being returned:** \_\_\_\_\_

Please check only one item below:

- The equipment was never used or exposed to any radiological, biological or chemical agents and is safe to handle, use or dispose of.
- The equipment was used, but not in conjunction with or exposed to any radiological, geological or chemical agents and is safe to handle, use or dispose of.
- The equipment was used in conjunction with or exposed to radiological, biological or chemical agents and has been decontaminated, rendering it safer for handling, use or disposal.

### Authorization

By accepting authorization to return the equipment listed above, the undersigned assumes all responsibility and liability for radiological, biological and chemical decontamination. Delivery of the equipment can be refused if necessary documentation is not provided or where it is determined that the equipment has not been properly decontaminated. If it is determined that the equipment was not properly decontaminated, the Authorized Repair Facility reserves the right to bill the customer for any and all costs associated with the decontamination and/or appropriate disposal of the equipment. In the event the equipment has been exposed to radiological contamination, the signature of the Radioactive Safety Officer is required.

**Printed Name:** \_\_\_\_\_

**RA No:** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Date:** \_\_\_\_\_

## Section I. Related Products

Sonication	Format	Catalog No.
EpiShear™ Multi-Sample Sonicator / Chiller	110V 230V	53062 53063
EpiShear™ Multi-Sample Sonicator	110V 230V	53065 53066
EpiShear™ Thermoelectric Chiller	100V-240V	53068
EpiShear™ Probe Sonicator	110V 230V	53051 53052
EpiShear™ 5/64" (2 mm) Sonicator Probe	1 probe	53056
EpiShear™ 1/8" (3.2 mm) Sonicator Probe	1 probe	53053
EpiShear™ 1/4" (6.4 mm) Sonicator Probe	1 probe	53057
EpiShear™ Cooled Sonication Platform, 1.5 ml	1 platform	53073
Support Stand / Converter Clamp	1 unit	53054
Sound Enclosure with Converter Clamp	1 enclosure	53055
Large Sound Enclosure	1 unit	53060
EpiShear™ Replacement Converter	1 unit	53058
Footswitch	1 unit	53059

ChIP-IT™ Kits	Format	Catalog No.
ChIP-IT™ Express	25 rxns	53008
ChIP-IT™ Express Enzymatic	25 rxns	53009
ChIP-IT™ Express Shearing Kit	10 rxns	53032
ChIP-IT™ Express Enzymatic Shearing Kit	10 rxns	53035
ChIP-IT™ Express HT	96 rxns	53018
Re-ChIP-IT™	25 rxns	53016
RNA ChIP-IT™	25 rxns	53024
Chromatin IP DNA Purification Kit	50 rxns	58002
ChIP-IT™ Protein G Magnetic Beads	25 rxns	53014
Siliconized Tubes, 1.7 ml	25 tubes	53036
ChIP-IT™ Control qPCR Kit – Human	5 rxns	53026
ChIP-IT™ Control qPCR Kit – Mouse	5 rxns	53027
ChIP-IT™ Control qPCR Kit – Rat	5 rxns	53028
RNA ChIP-IT™ Control Kit – Human	25 rxns	53024
Ready-to-ChIP HeLa Chromatin	10 rxns	53015
Ready-to-ChIP Hep G2 Chromatin	10 rxns	53019
Ready-to-ChIP K-562 Chromatin	10 rxns	53020
Ready-to-ChIP NIH/3T3 Chromatin	10 rxns	53021
Bridging Antibody for Mouse IgG	500 µg	53017

### ChIP-validated Antibodies

For an up-to-date list of over 140 ChIP-validated antibodies, please visit [www.activemotif.com/chipabs](http://www.activemotif.com/chipabs).

### ChIP Control qPCR Primer Sets

For an up-to-date list of over 30 qPCR Primer Sets, please visit [www.activemotif.com/chipprimers](http://www.activemotif.com/chipprimers).

Whole Genome Amplification	Format	Catalog No.
GenoMatrix™ Whole Genome Amplification Kit	1 kit	58001

<b>Modified Histones Array</b>	<b>Format</b>	<b>Catalog No.</b>
MODified™ Histone Peptide Array	1 array	13001

<b>Histone ELISAs</b>	<b>Format</b>	<b>Catalog No.</b>
Histone H3 monomethyl Lys4 ELISA	1 x 96 rxns	53101
Histone H3 dimethyl Lys4 ELISA	1 x 96 rxns	53112
Histone H3 trimethyl Lys4 ELISA	1 x 96 rxns	53113
Histone H3 acetyl Lys9 ELISA	1 x 96 rxns	53114
Histone H3 dimethyl Lys9 ELISA	1 x 96 rxns	53108
Histone H3 trimethyl Lys9 ELISA	1 x 96 rxns	53109
Histone H3 phospho Ser10 ELISA	1 x 96 rxns	53111
Histone H3 acetyl Lys14 ELISA	1 x 96 rxns	53115
Histone H3 monomethyl Lys27 ELISA	1 x 96 rxns	53104
Histone H3 trimethyl Lys27 ELISA	1 x 96 rxns	53106
Histone H3 phospho Ser28 ELISA	1 x 96 rxns	53100
Total Histone H3 ELISA	1 x 96 rxns	53110

<b>Histone Purification &amp; Chromatin Assembly</b>	<b>Format</b>	<b>Catalog No.</b>
Histone Purification Kit	10 rxns	40025
Histone Purification Mini Kit	10 rxns	40026
Chromatin Assembly Kit	10 rxns	53500
HeLa Core Histones	36 µg	53501

### **Recombinant Methylated, Acetylated and Phosphorylated Histone Proteins**

For an up-to-date list of Recombinant Histone Proteins, please visit [www.activemotif.com/recombhis](http://www.activemotif.com/recombhis).

<b>Histone Acetyltransferase and Deacetylase Activity</b>	<b>Format</b>	<b>Catalog No.</b>
HAT Assay Kit (Fluorescent)	1 x 96 rxns	56100
Recombinant p300 protein, catalytic domain	5 µg	31205
Recombinant GCN5 protein, active	5 µg	31204
HDAC Assay Kit (Fluorescent)	1 x 96 rxns	56200
HDAC Assay Kit (Colorimetric)	1 x 96 rxns	56210

<b>Histone Demethylase Activity</b>	<b>Format</b>	<b>Catalog No.</b>
Histone Demethylase Assay (Fluorescent)	48 rxns	53200

<b>DNA Methylation</b>	<b>Format</b>	<b>Catalog No.</b>
hMeDIP	10 rxns	55010
Hydroxymethyl Collector™	25 rxns	55013
MeDIP	10 rxns	55009
MethylDetector™	50 rxns	55001
MethylCollector™	25 rxns	55002
MethylCollector™ Ultra	30 rxns	55005
UnMethylCollector™	30 rxns	55004
DNMT Activity / Inhibition Assay	96 rxns	55006
Methylated DNA Standard Kit	3 x 2.5 µg	55008
Fully Methylated Jurkat DNA	10 µg	55003
Jurkat genomic DNA	10 µg	55007

Transcription Factor ELISAs	Format	Catalog No.
TransAM™ AML-1/Runx1	1 x 96-well plate	47396
TransAM™ AML-3/Runx2	1 x 96-well plate	44496
TransAM™ AP-1 Family	2 x 96-well plates	44296
TransAM™ AP-1 c-Fos	1 x 96-well plate	44096
TransAM™ AP-1 c-Jun	1 x 96-well plate	46096
TransAM™ AP-1 FosB	1 x 96-well plate	45096
TransAM™ AP-1 JunD	1 x 96-well plate	43496
TransAM™ ATF-2	1 x 96-well plate	42396
TransAM™ c-Myc	1 x 96-well plate	43396
TransAM™ C/EBP $\alpha/\beta$	1 x 96-well plate	44196
TransAM™ CREB	1 x 96-well plate	42096
TransAM™ pCREB	1 x 96-well plate	43096
TransAM™ Elk-1	1 x 96-well plate	44396
TransAM™ ER	1 x 96-well plate	41396
TransAM™ FKHR (FOXO1/4)	1 x 96-well plate	46396
TransAM™ GATA Family	2 x 96-well plates	48296
TransAM™ GATA-4	1 x 96-well plate	46496
TransAM™ GR	1 x 96-well plate	45496
TransAM™ HIF-1	1 x 96-well plate	47096
TransAM™ HNF Family	2 x 96-well plates	46296
TransAM™ HNF-1	1 x 96-well plate	46196
TransAM™ IRF-3 (Human)	1 x 96-well plate	48396
TransAM™ IRF-3 (Mouse)	1 x 96-well plate	48496
TransAM™ IRF-7	1 x 96-well plate	50196
TransAM™ MAPK Family	2 x 96-well plates	47296
TransAM™ MEF2	1 x 96-well plate	43196
TransAM™ MyoD	1 x 96-well plate	47196
TransAM™ NF-YA	1 x 96-well plate	40396
TransAM™ NFATc1	1 x 96-well plate	40296
TransAM™ NF $\kappa$ B Family	2 x 96-well plates	43296
TransAM™ Flexi NF $\kappa$ B Family	2 x 96-well plates	43298
TransAM™ NF $\kappa$ B p50	1 x 96-well plate	41096
TransAM™ NF $\kappa$ B p50 Chemi	1 x 96-well plate	41097
TransAM™ Flexi NF $\kappa$ B p50	1 x 96-well plate	41098
TransAM™ NF $\kappa$ B p52	1 x 96-well plate	48196
TransAM™ NF $\kappa$ B p52 Chemi	1 x 96-well plate	48197
TransAM™ NF $\kappa$ B p65	1 x 96-well plate	40096
TransAM™ NF $\kappa$ B p65 Chemi	1 x 96-well plate	40097
TransAM™ Flexi NF $\kappa$ B p65	1 x 96-well plate	40098
TransAM™ Nrf2	1 x 96-well plate	50296
TransAM™ Oct-4	1 x 96-well plate	42496
TransAM™ p53	1 x 96-well plate	41196
TransAM™ PPAR $\gamma$	1 x 96-well plate	40196
TransAM™ Sp1	1 x 96-well plate	41296
TransAM™ Sp1/Sp3	1 x 96-well plate	40496
TransAM™ STAT Family	2 x 96-well plates	42296
TransAM™ STAT3	1 x 96-well plate	45196
TransAM™ T-bet	1 x 96-well plate	51396

For a complete, up-to-date list of available TransAM™ Kits, please visit [www.activemotif.com/transam](http://www.activemotif.com/transam).

## Histone Antibodies

For an up-to-date list of over 150 antibodies against histones and modified histones, please visit [www.activemotif.com/histoneabs](http://www.activemotif.com/histoneabs).

## DNA Methylation Antibodies

For an up-to-date list of over 25 DNA Methylation antibodies, visit [www.activemotif.com/dnamethabs](http://www.activemotif.com/dnamethabs).

Co-Immunoprecipitation	Format	Catalog No.
Nuclear Complex Co-IP Kit	50 rxns	54001
Universal Magnetic Co-IP Kit	25 rxns	54002

SUMOylation	Format	Catalog No.
SUMOlink™ SUMO-1 Kit	20 rxns	40120
SUMOlink™ SUMO-2/3 Kit	20 rxns	40220

In-cell Phospho-specific ELISAs	Format	Catalog No.	Catalog No.
FACE™ AKT	1 x 96 rxns	48120	48220
FACE™ ATF-2	1 x 96 rxns	48115	48215
FACE™ Bad	1 x 96 rxns	48165	48265
FACE™ c-Jun (S63)	1 x 96 rxns	48125	48225
FACE™ c-Jun (S73)	1 x 96 rxns	48135	48235
FACE™ c-Src	1 x 96 rxns	48155	48255
FACE™ EGFR (Y845)	1 x 96 rxns	48340	48440
FACE™ EGFR (Y992)	1 x 96 rxns	48150	48250
FACE™ EGFR (Y1173)	1 x 96 rxns	48190	48290
FACE™ ErbB-2 (Y877)	1 x 96 rxns	48130	48230
FACE™ ErbB-2 (Y1248)	1 x 96 rxns	48105	48205
FACE™ ERK1/2	1 x 96 rxns	48140	48240
FACE™ FAK	1 x 96 rxns	48145	48245
FACE™ FKHR (FOXO1)	1 x 96 rxns	48160	48260
FACE™ HSP27	1 x 96 rxns	48350	48450
FACE™ JAK1	1 x 96 rxns	48185	48285
FACE™ JNK	1 x 96 rxns	48110	48210
FACE™ MEK1/2	1 x 96 rxns	48180	48280
FACE™ NFκB p65 Profiler	3 x 96 rxns	48300	48400
FACE™ p38	1 x 96 rxns	48100	48200
FACE™ PI3 Kinase p85	1 x 96 rxns	48175	48275
FACE™ STAT2	1 x 96 rxns	48310	48410
FACE™ STAT4	1 x 96 rxns	48320	48420
FACE™ STAT6	1 x 96 rxns	48330	48430
FACE™ Maker	1 x 96 rxns	48000	48050
Suspension Cell FACE™	2 x 96 rxns	48305	48405

For a complete, up-to-date list of available FACE™ Kits, please visit [www.activemotif.com/face](http://www.activemotif.com/face).

## Technical Services

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If you need assistance at any time, please call Active Motif Technical Service at one of the numbers listed below.

### Active Motif North America

1914 Palomar Oaks Way, Suite 150  
Carlsbad, CA 92008  
USA

Toll Free: 877 222 9543  
Telephone: 760 431 1263  
Fax: 760 431 1351  
E-mail: [tech\\_service@activemotif.com](mailto:tech_service@activemotif.com)

### Active Motif Europe

Avenue Reine Astrid, 92  
B-1330 La Hulpe, Belgium  
UK Free Phone: 0800 169 31 47  
France Free Phone: 0800 90 99 79  
Germany Free Phone: 0800 181 99 10  
Telephone: +32 (0)2 653 0001  
Fax: +32 (0)2 653 0050  
E-mail: [eurotech@activemotif.com](mailto:eurotech@activemotif.com)

### Active Motif Japan

Azuma Bldg, 7th Floor  
2-21 Ageba-Cho, Shinjuku-Ku  
Tokyo, 162-0824, Japan  
Telephone: +81 3 5225 3638  
Fax: +81 3 5261 8733  
E-mail: [japantech@activemotif.com](mailto:japantech@activemotif.com)

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