clear memory
"flag in software"

turn on printer first -
be sure well
connected

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Operations Manual

TwinBlock™ System

EasyCycler™ Series

ATTENTION

Before operating you must fill sample temperature probe tube with 200 microliters of mineral oil and place a small amount in the well. Review the "Cautions" section in manual for details.

ERICOMP, INC.

City of Roseville

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Section I

Introduction

Read this manual carefully before setting up and operating equipment. Read the Cautions *(Section II)* and follow the Installation Procedures *(Section III)* especially carefully before using the **TwinBlock™System** *EasyCycler™Series* .

The TwinBlock™ System

The **TwinBlock™System** *EasyCycler™Series* is a user-friendly microprocessor controlled general purpose temperature cycler that is menu driven with an easy-use keypad. It is ideally suited for research that requires the ability to conveniently heat and cool test samples automatically through repeated cycles of any of several user-defined time intervals at various user-defined temperatures ranging from approximately 25° to 110° Celsius. *(If an external supply of cold water is available, the system can cool down to 4° C.)* The **System** is composed of two, independently controlled, programmable heating/cooling blocks. The **System** provides an automated means for precisely controlling temperatures and times required for temperature cycling of materials for research and testing purposes. *(See Figure 1. for an illustration of the system.)* Temperature, time and program requirements are entered via a keypad. A standard parallel printer may be used to produce a hard copy of all data entered, history of events and chart recorder data *(generated by the system's internal Chart Recorder function)*. An analog output is also provided for two chart recorders that may be attached to the Instrument in order to graphically record sample temperature versus time characteristics for each block.

Twenty-six user-generated programs *(chained and/or iterated time/temperature profiles)* can be entered and stored. Up to 99 time/temperature cycles *(profiles)* can be stored, each of which can have up to 99 time/temperature steps *(time/temperature set)*.

This manual provides instructions for setting up and operating the **TwinBlock™System**. After reading the manual you may find it helpful to follow the sequence of operation outlined in the Overview at the beginning of the Operating Instructions *(Section IV)*. This description suggests a logical sequence of events to follow in operating the**TwinBlock™System**. Explicit step-by-step instructions A-U *(U containing a sample run)* are also found in Section IV.

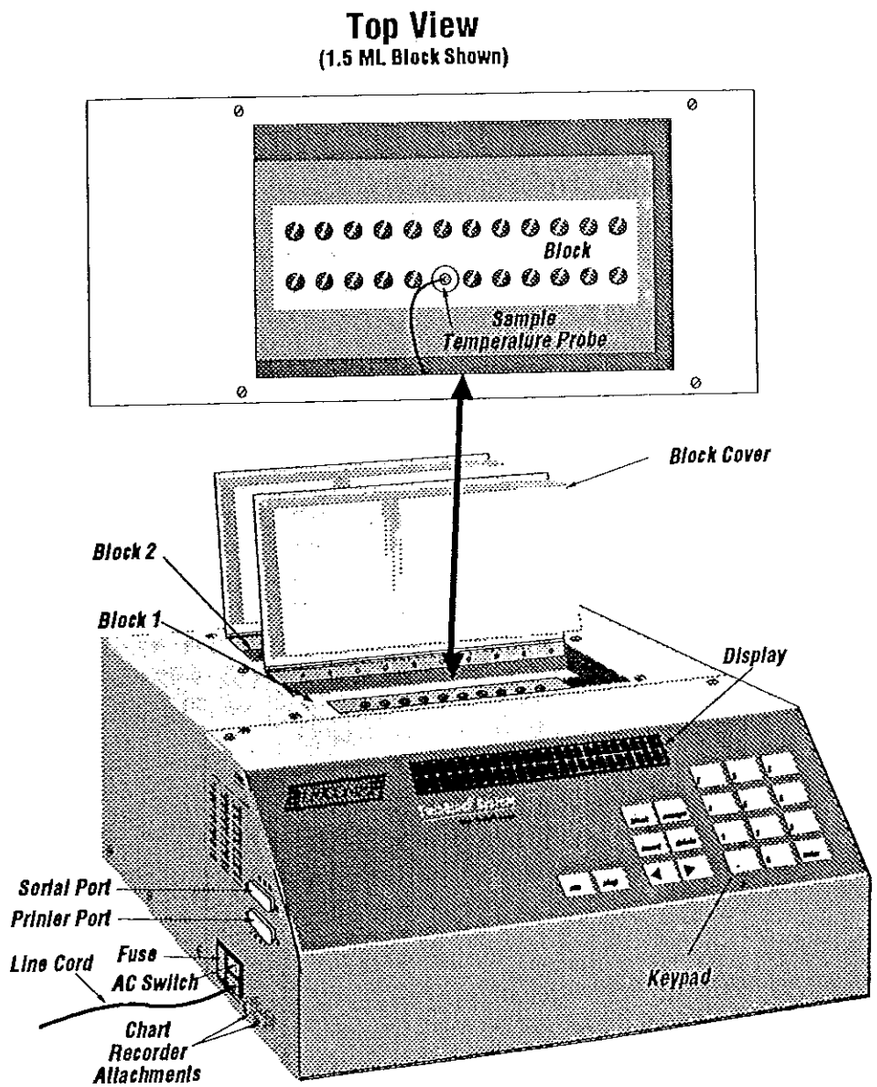

Figure 1. TwinBlock™ System

Manual Conventions

The following conventions are used in this manual:

- Key names are printed in bold face: e.g., ***run***
- Menus which are shown on the system display will appear in bold face and within rectangles in the Operating Instructions portion of this manual Section IV:

Ready to start PRG P01	**.-REV P01**
BLK 1 set 26.4 samp 23.1 blk 22.2	**0-MENU**

- In the ***Operating Instructions*** section, the screen which results from performing a step is shown to the right of that step.
- Brackets [ ] indicate that a number may be entered in this position: **[N]**

Section II

Cautions

System Initialization

Turn system on and allow system to **"warm up" approximately one hour** before operation to ensure optimum temperature control. *(This is not necessary unless highest precision is required.)*

Block Cover

Keep the block **cover closed at all times**, except when handling samples. *The block cover must remain closed in order to protect against skin burns, to protect your samples and to maintain unit temperature control. Allow the block to **cool** to near water temperature **before opening lid**. (Block temperature automatically cools down to water temperature at the end of program.)*

Grounding and Electrical Safety

Do **not remove** the unit **casing**. Do **not** use an adapter to a two-terminal outlet.
The unit must be grounded for protection against electrical shock and must be plugged into a normal 3 prong outlet.

Extension Cords

If an extension cord is used, ensure that it is **rated for 15 amps.**

Water Filter

The water filter, on line in tubing, is a screen filter which may be backflushed and checked once a year. A clogged filter results in sluggish water flow and may result in temperature overshoot and slow cooling.

Water Temperature

The water temperature reading is an approximation and should **not** be relied upon for **exact** measurement requirements. Use the Auxiliary function to establish water temperature *(see page 62). **Lowest possible temperature which** can be entered for a cycle is 4° C. If the temperature entered is less than the measured water temperature, a warning message will be displayed.*

Sample Temperature Probe Tube

Ensure that the sample temperature probe tube contains approximately 200µl of mineral oil or paraffin oil at all times. Check the oil level in the tube every 40 hours of operation and add oil if necessary. *(Do not remove the sample temperature tube when the unit is in operation.)*

Sample Well Preparation

For maximum thermal efficiency, place a small amount of mineral oil or **paraffin oil in each well** being used *(including the sample temperature probe tube).* When tube is inserted into well, the oil level will rise just to the top of the well.

***Do not apply water with a higher pressure than 120 PSI.** Pressure above 120 PSI may cause damage to the unit and void the warranty. City water pressure is normally within this limit. Under normal machine operation, water will flow through block and from output hose **only** when machine is in cool cycle. Note: Minimum necessary pressure to operate system at the maximum cooling rate is 30 PSI. Attachments to water outlet must be made using hose clamps (provided).*

Section III

Installation Procedures

Location

The **TwinBlock™System** should be placed on a **stable, level surface.** The ambient temperature and humidity should remain fairly constant and the unit should not be placed in a location exposed to direct sunlight. A **free flow of air** should be allowed around the unit.

Power

The standard unit operates on a 120 VAC, **60 Hz** input voltage and a current of **15 amperes.** *(Foreign units operate on 220 VAC and are specifically labeled for such usage.)* The unit is supplied with a three-terminal plug for an earth ground. The electrical outlet must be a properly wired three-terminal outlet conforming to National Electrical Codes.

Hook Up

The System hook up procedures are as follows:

1. Attach the Water Inlet Hose and the Water Outlet Hose to the quick disconnect fittings on the back of the instrument. *(Note: Metal tabs on female portion are pressed in first.)*

2. Place one end of the Water Outlet Hose *(attached to* **WATER OUTLET** *on backside of unit)* in a water drain. *(If anchoring hose, be careful not to pinch hose.)*

3. **Slip** the tubing of the **Water Inlet Hose** *(containing an in line screen filter)* into a barbed tapered nozzle *(attached to tap water faucet).* **Tighten** hose clamp.

4. Place a small amount *(4 drops)* of **mineral oil or paraffin oil in each** well being used to ensure heat transfer from block to tube.

5. Carefully open the sample temperature probe tube *(tube with the thermocouple wire inserted)* that is in each block. Fill the sample temperature probe tube with 200 µl. of mineral oil. Close the cap. Gently move tip of thermocouple to bottom of tube by closing the tube cap and replace in the well.

6. Plug three-terminal plug into a three-terminal electrical outlet.

7. Attach Chart Recorder to unit, if desired. Attach the Chart Recorder cable to the port on the Instrument labeled **CHART.**
   For calibration of recorder:
   Zero volts = 0 degrees C One volt = 100 degrees C

8. Attach standard parallel line printer, if desired:
   a. Connect one end of the printer cable to the port labeled **PRINTER** on the left side of the Instrument.
   b. Connect the other end of the cable to the printer connector.

Section IV

Operation

General Principles of Operation

The **Ericomp TwinBlock™ System** provides for the entry of a series of temperature settings in conjunction with the desired time for which each setpoint temperature is to be maintained. Each setting of temperature and time *(e.g., 2 minutes at 90 degrees)* is considered to comprise one step. A series of steps comprise one cycle *(e.g., 2 minutes at 90 degrees, 3 minutes at 81 degrees, 1 minute at 74 degrees, 2 minutes at 58 degrees could be described for one cycle)*. A series of cycles comprise one program. **Remember that the Ericomp cycler is controlled by monitoring the internal temperature of the sample probe tube. The internal temperature will be maintained for the exact time specified.**

Once a number of cycles have been defined, the sequence in which those cycles are to be performed can be programmed. For example: it may be desirable to perform Cycle 2, twice, followed by Cycle 4, once, followed by Cycle 1, three times, followed by Cycle 3, twice. This sequencing and specification of number of repetitions of each cycle can be conveniently programmed into the Instrument. Twenty-six separate programs *(1-26)* are available for defining cycle sequences. *(Step-by-step instructions for entering cycle and program data are contained in the Operating Instructions Section below.)*

Any program can be run for Block One or Block Two. Identical programs may be run for both blocks *(e.g., Block One and Block Two both run Program 1)* or different programs may be run *(e.g., Block One, Program 1 and Block Two, Program 2)*. Programs may be run simultaneously or independently. Either block can run while the other one is not running.

Additional features of the **TwinBlock™ System** are the functions of "Hold", "Print", and the "Auxiliary" functions. During thermal operation or cool down, the system may be put in a pause state *(with the time countdown suspended and temperature maintained)* with the "Hold" function. *("Hold" is available through the Execution Screen.)* The "Print" function, available through the **Function** Menu, is used to produce a dated, hard copy of the user's stored cycles and programs *(library)*. "Print" is also used to obtain a hard copy of the history of actual runs and to graphically record data obtained by the internal system Chart Recorder.

The four additional Auxiliary functions available through the selection of the Auxiliary function in the **Function** Menu are: setting system date and time, calibrating water temperature, and selecting the length of time for system message displays, and dumping memory.

Each menu displayed by the system presents options for system operation and indicates how you may select each of those options. A graphic structure of all menus and options which are available within each menu is presented in the flowchart in Figure 2.

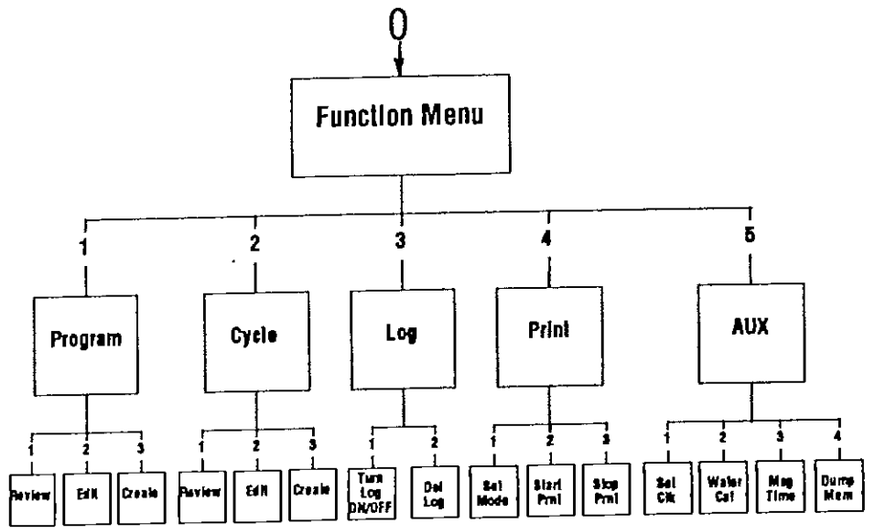

Figure 2. Software Structure

Points to keep in mind while using your **TwinBlock™ System** are: 1) The manner in which cycles are stored in memory and 2) how to ensure data is entered into memory. First, it is important to remember that cycles are stored in a library and are pulled from that library into the programs you run. A cycle, however, may be revised or edited at some point and after steps, temperature or time within that cycle are changed, they are stored in the library. Consequently, that cycle will function in its revised form in all the programs in which it occurs, *(e.g., You may have Program 6 displayed on your **Main** Screen, and add a step or change temperatures and times for cycle 4. However, when you run other programs containing cycle 4, their cycle 4 will have those same changes.)*
Secondly, the **TwinBlock™System** executes commands only from its memory. Each set of data you enter into the system is entered into memory by pressing the ***enter*** key. If ***escape*** is pressed without pressing ***enter***, no change will be entered into memory and the screen will go to the previously displayed screen.

When the unit is powered up, the **Main** Screen will be displayed:

Ready to start		**PRG P01**					**.-REV**	**P01**
BLK 1	**set**	**26.4**	**samp**	**23.1**	**blk**	**22.2**		**0-MENU**

0–Menu = press **0** to obtain main menu
blk = block temperature
P01 = program name
PRG = program name selected
.–REV = press "." to review program contents
samp = sample temperature
set = setpoint temperature

When the program is running the **Execution** Screen will be displayed:

n(n)	**run**	**P01**		**NN:NN**			**.-REV**	**P01**	**5-HOLD**
BLK 1	**set**	**26.4**	**samp**	**23.1**	**blk**	**22.2**			**0-MENU**

n = cycle number
(n) = repetition count
NN:NN = countdown time

Keypad Selection

Keypad numbers and the decimal point are used to select menu options. The arrow keys allow the user to move from field to field within a menu or to select program or cycle numbers within the appropriate menus. Keys with function names perform their specified functions within defined menus. An explanation of keys and their functions is below:

block - Allows you to select Block 1 or Block 2.

run - Initiates the cycling process of a block after all cycle and program data have been entered. *(Displayed time begins to count down when sample temperature is within approximately one degree of set temperature.)* The **Execution** Screen will be displayed.

stop - Halts the cycling process of the block displayed on the **Execution** Screen.

enter - Causes data entered in a menu to be saved and moves you to the next appropriate menu level. Advances you to the next step/cycle number when you are in the **Cycle Edit** or **Cycle Create** Screen.

escape - Causes you to move back up to the next higher level screen or the **Main** Screen. *Note:* If ***escape*** is selected prior to selecting ***enter***, data which has been edited on the screen will not be saved.

▶ - Selects the next program to be displayed on the **Main** Screen. Advances you to the next step/cycle when you are in the **Cycle Review** mode. Advances you to the next program number when you are in the **Program Review** mode. Advances to the next paper speed when you are in the **Chart Recorder Paper Speed Selection** mode. Moves the curser to the right of your current position when you are in **Editing** and **Create** modes for programs or cycles.

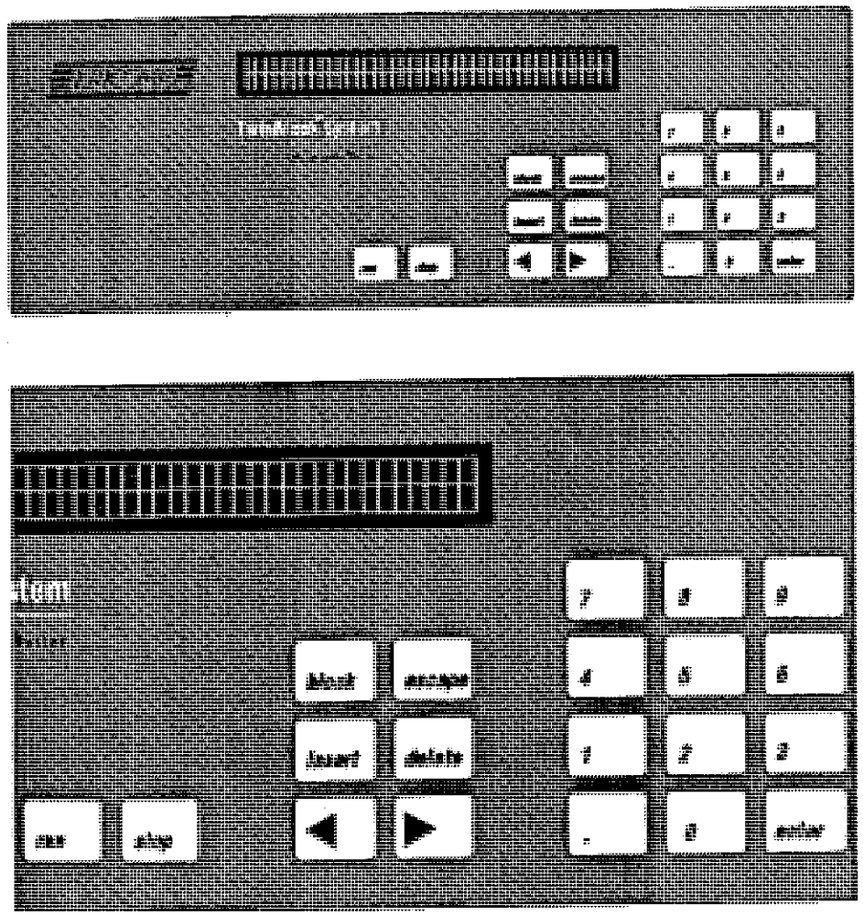

Figure 3. Keypad

◀ - Selects the previous program to be displayed on the **Main** Screen. Moves you back one step/cycle number when you are in the **Cycle Review** mode. Moves you back one program number when you are in the **Program Review** mode. Moves you back one paper speed when you are in the **Chart Recorder Paper Speed Selection** mode. Moves the curser to the left of your current position when you are in **Editing** and **Create** modes for programs or cycles.

. - Allows you to enter tenths of degrees when you are entering temperatures. Allows you to review the displayed program when you are in the **Main** Screen or in the **Execution** Screen.

insert - Allows you to insert spaces in the **Program Edit** mode so that new cycles may be added to a program. Allows you to insert a step in the **Cycle Edit** mode so that new steps may be added to a cycle.

delete - Allows you to remove cycles and repetitions from a program when you are in the **Program Edit** mode. Allows you to remove a step from a cycle when you are in the **Cycle Edit** mode. The ***delete*** key functions immediately and does not require selecting ***enter*** to implement the deletion.

Keys which are active in the **Main** Screen and the **Execution** Screen and the functions of those keys are diagrammed in Figure 4.

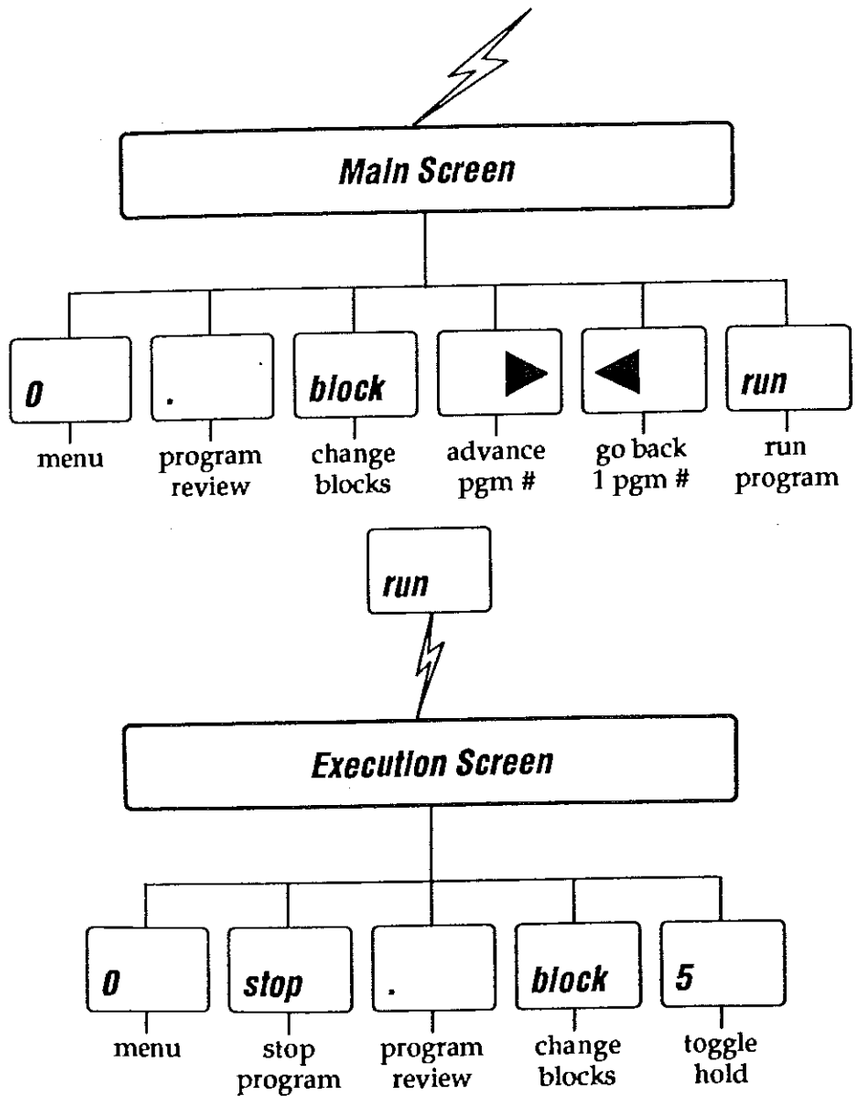

Figure 4. Overview of Key Functions

Operating Instructions

Overview

Initially, after carefully following the installation procedures and reading the Cautions, you may wish to perform the steps in A-G. These steps inform you of start-up procedures and steps for entering time, temperature and program data into the system. If you do not wish to perform any printing functions or store program data for printing, then you may proceed to H, for instructions on running a program.

If you do desire printouts, however, instructions for printing stored cycles and programs, entering time and date into the system, enabling the Chart Recorder, and/or logging events are in J-P. Before running a program, it may be desired to first print the library of cycles and programs. This is particularly helpful if you wish to edit or compose new cycles and programs. Next, you may want to enable the Event Log and then the Chart Recorder function. Once you are running a program, you may print Chart Recorder data by performing the steps in M.

After running your program, you may want to print the event log. If you print the event log before the program is completed, remember to restart your Chart Recorder function.

A To Turn On the System:

If you plan to use the printer, turn the printer **ON** first.

Place Power **ON/OFF** switch in **ON** position.
(left side of unit)

Main Screen

```
Ready to  start  PRG P01          .-REV P01
BLK1 set  26.4 samp 23.1 blk 22.2   0-MENU
```

(Note: Valve clicking is normal.)

(Note: When unit is turned off, all programs and cycle information are retained in battery backed memory.)

(Note: If it is desired to retain a history of events when the system is run, perform steps in section K prior to starting program. If it is desired to use the system Chart Recorder function, perform steps in section L prior to starting program. Both functions may be simultaneously enabled.)

B To Review Cycles and Steps:

1. With the **Main** Screen displayed,

Select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

2. Select: ***2***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

3. Select: ***1***

```
ENTER CYCLE NUMBER:  __
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

4. Select: **[N]**

```
ENTER CYCLE NUMBER:  N
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

*(Where **[N]** = cycle number desired.)*

5. Select: ***enter***

```
CYC 1  STP  1  TIME  OX:XX:XX TEMP      XX
BLK1 set  26.4 samp  23.1  blk 22.2  rev cycle
```

(Note: Use arrow keys ◀ ▶ to move backward and forward through steps and cycles.)

6. When review is complete, select: ***escape, escape***

C To Enter Time and Temperature Requirements for Cycles:

(Note: Cycles may be added when a program is running.)

1. With **Main** Screen displayed,

Select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

2. Select: ***2***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

3. Select: ***3***

```
CYC  X  STP  X   TIME   :00:00  TEMP    _
BLK1 set  26.4 samp  23.1  blk 22.2   cre cyc
```

4. Select: **[N]**

```
CYC  X  STP  X   TIME   :00:00  TEMP   NN
BLK1 set  26.4 samp  23.1  blk 22.2   cre cyc
```

*(Where **[N]** = Number desired for temperature)*

(Note: Maximum allowable temperature entry is 110°. Minimum allowable temperature entry is 4° C.)

(Note: Any one, or more time elements may be entered for required time. Hours minutes, and seconds may be entered or only seconds, and so forth.)

C. To Enter Time and Temperature Requirements for Cycles: (continued)

5. Use arrow keys ◀ ▶ to move from field to field to enter data.

6. Select: **[N]**

CYC X STP X TIME N:00:00 TEMP XX
BLK1 set 26.4 samp 23.1 blk 22.2 cre cyc

(Where [N] = Number desired for step time in hours.)

7. Select: **[N]**

CYC X STP X TIME X:NN:00 TEMP XX
BLK1 set 26.4 samp 23.1 blk 22.2 cre cyc

(Where [N] = Number desired for step time in minutes.)

8. Select: **[N]**

CYC X STP X TIME X:XX:NN TEMP XX
BLK1 set 26.4 samp 23.1 blk 22.2 cre cyc

*(Where **[N]** = Number desired for step time in seconds.)*

9. When all values are correct for the step,
   Select: ***enter***

*(Note: Before pressing **enter**, you may use the arrow keys to edit data. **enter** will yield an error message if any values are unacceptable; if this occurs, edit the time or temperature, and press **enter**.)*

10. Repeat steps **4** through **9** above for each of the steps to be defined for this cycle. *(If only one step is to be defined for the cycle, proceed to Step 11.)*

11. When all temperature and time values have been defined for all steps of one cycle, select: ***escape***

12. Repeat Steps **3** through **11** above for the second and additional cycles, if desired.

D To Edit Cycle Data:

(Note: When you modify a cycle, those changes will occur in that cycle in every program in which the cycle is used.)

(Note: Do not modify a cycle that is contained in a program which is currently being run.)

1. With the **Main** Screen displayed,

Select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

2. Select: ***2***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

3. Select: ***2***

```
ENTER CYCLE NUMBER:_
BLK1 set  26.4 samp  25.1  blk 22.2        cycle
```

4. Select: ***[N]***

```
ENTER CYCLE NUMBER:N
BLK1 set  26.4 samp  25.1  blk 22.2        cycle
```

*(Where **[N]** = desired number of cycle to be entered or modified.)*

5. Select: ***enter***

```
CYC X  STP  1  TIME OX:XX:XX TEMP        XX
BLK1 set  26.4 samp  23.1  blk 22.2  edt  cyc
```


*(Note: Use the arrow keys ◀ ▶ to move from field to field to enter data. Use **enter** to move to the next step to edit.)*

6. Use the arrow keys to move to the desired field and enter desired data for time and temperature for each step.

7. Select: ***enter***
(To save data entered and to move to the next step.)

8. If it is desired to enter a new step between existing steps, use the ***enter*** key to display the step number just prior to the step to be added and then, select: ***insert***

9. If it is desired to delete a step, use the ***enter*** key to display the step to be deleted and then, select: ***delete***

*(Note: The delete function is effective immediately and does not require selecting **enter** to implement the deletion.)*

10. Select: ***enter***

11. If it is desired to continue working with cycle data,
Select: ***escape***

12. If you are finished working with cycle data,
Select: ***escape, escape***

E To Review Programs:

1. With the **Main** Screen displayed,

   select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23 . 1  blk 22.4      menu
```

2. Select: ***1***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

3. Select: ***1***

```
ENTER PROGRAM NUMBER: __
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

4. Select: **[N]**

```
ENTER PROGRAM NUMBER: N
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

*(Where **[N]** = number of program to be reviewed.)*

5. Select: ***enter***

```
X: 1(4)
BLK1 set  26.4 samp  23 . 1  blk 22.2      rev pgm
```

6. Use arrow keys ◀ ▶ to move backward and forward from program to program.

7. Select: ***escape, escape***
   (When program review is complete.)

F To Create Programs:

1. With the **Main** Screen displayed,

   select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4      menu
```

2. Select: ***1***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

3. Select: ***3***

```
_                                Enter  Cycle #  P01
BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
```

4. Select: **[N]**

```
N                                Enter  Cycle #  P01
BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
```

*(Where **[N]** = number of the cycle to be created for this program.)*

5. Select: ***enter***

```
N ( _                            Enter  # of Reps P01
BLK1 set  26.4 samp  23.1  blk 22.2  cre  pgm
```


6. Select: **[N]**

```
X ( N                            Enter  # of Reps P01
BLK1 set  26.4 samp  23.1  blk 22.2  cre  pgm
```

*(Where **[N]** = number of repetitions of the cycle to be performed for this program.)*

*(Note: If you do not enter a number here, and just press **enter**, then a repetition of one is automatically entered for you.)*

7. Select: ***enter***

```
X( X ) _                         Enter  Cycle #  P01
BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
```

8. Repeat steps 4 - 7 until the desired number of cycles and their repetitions have been entered for this program.

9. When the desired number of cycles have been entered, select: ***escape, escape.***

If an error is detected in data input, the following message will be displayed:

```
Error Detected:  1 – Fix It  2 – Exit    w/o  sav
BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
```

If you select ***1***, you will **return to** the **Program Edit** mode and the cursor will be displayed beneath the incorrect data. You may then revise your input as necessary. When the revision is complete, select: ***escape, escape.***

G To Edit Programs:

Perform **step 1** if it is desired to **revise** currently existing cycles. If it is desired to enter an additional cycle, proceed to step 2. If it is desired to **delete** an existing cycle, proceed to **step 3.**

1. To **revise** currently existing cycles:

a. With the **Main** Screen displayed,

select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

b. Select: ***1***

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 program

c. Select: ***2***

ENTER PROGRAM NUMBER: __
BLK1 set 26.4 samp 23.1 blk 22.2 program

d. Select: **[N]**

ENTER PROGRAM NUMBER: N
BLK1 set 26.4 samp 23.1 blk 22.2 program

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

X (X) X (XX) X (X) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

f. Use the arrow keys ◀ ▶ to position the cursor below the number of the cycle to be edited.

g. Select: **[N]**

X (X) N (XX) X (X) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

*(Where **[N]** = number of the cycle to be edited. If you only want to change the number of repetitions, **[N]** must still be selected.)*

h. Select: ***enter***

X (X) X (NN) X (X) Enter # of Reps P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

i. Select: **[N]**

*(Where **[N]** = number of repetitions desired for this cycle.)*

j. Repeat steps **f - i** for as many cycles as desired.

k. When editing has been completed, select: ***enter, escape, escape***

2. To **add an additional cycle** to a program, perform steps **a - m** below.

a. With the **Main** Screen displayed,

select: **0**

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

b. Select: **1**

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

c. Select: **2**

```
ENTER PROGRAM NUMBER: __
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

d. Select: **[N]**

```
ENTER PROGRAM NUMBER: N
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

```
X (X)  X (XX)  X (X)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

f. With the **Enter Cycle #** message displayed, use the arrow keys to position the cursor to the space in which you are going to enter the new cyclenumber.

```
X (X)__ X (XX)  X (X)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

(Note: This edit area is 20 characters wide. After 20 characters, data scrolls across screen.)

g. Select: ***insert***

```
X (X)__  X (XX)              Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

h. Select: ▶

```
X (XX)  __ X (XX)            Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

To Edit Programs *(continued)*

(Press ***insert*** *as many times as necessary to cause the correct number of spaces to be provided for the new cycle number and the number of repetitions for that cycle which you will add. You will need to press* ***insert*** *4 times if the inserted cycle has one digit and the number of repetitions only has one digit. Press* ***insert*** *6 times if both the cycle and repetition are* ***two*** *digit numbers.)*

i. Select: **[N]**

```
X (X)  N          X (XX)   Enter  Cycle #  P01
BLK1 set  26.4 samp  23.1  blk 22.2    edt pgm
```

(Where ***[N]*** *= the new cycle number.)*

j. Select: ***enter***

```
X (X)  X (__      X (XX)   Enter # of Reps P01
BLK1 set  26.4 samp  23.1  blk 22.2    edt pgm
```

k. Select: **[N]**

```
X (X)  X (N       X (XX)   Enter # of Reps P01
BLK1 set  26.4 samp  23.1  blk 22.2    edt pgm
```

(Where ***[N]*** *= the number of repetitions for the new cycle.)*

l. Select: ***enter***

```
X (X)  X ( X ) __ X (XX)   Enter  Cycle #  P01
BLK1 set  26.4 samp  23.1  blk 22.2    edt pgm
```


m. Repeat steps **f - l** to enter as many new cycles as desired.

n. When editing is completed, *(by pressing* ***enter*** *after last change)* select: ***escape, escape***

3. To **delete** a cycle from a program, perform steps **a - i.**

a. With the **Main** Screen displayed,

select: **0**

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

b. Select: **1**

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

c. Select: **2**

```
ENTER PROGRAM NUMBER: __
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

d. Select: **[N]**

```
ENTER PROGRAM NUMBER: N
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

```
X (X)   X (X)   X (XX)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```


f. With the **Enter Cycle #** message displayed, use the arrow keys ◀ ▶ to position the cursor to the number of the cycle which you aregoing to delete.

```
X (X)   X (X)   X (XX)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

g. Select: ***delete***

```
X (X)   X (X)   __            Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

*(Press **delete** as many times as necessary to erase the cycle number and its repetitions. Use the arrow key so that there is one space between each cycle.)*

*(Note: The delete function is effective immediately and does not require selecting **enter** to implement the deletion.)*

h. Repeat steps **a - g** to delete as many cycles as desired.

i. When editing is complete, select: ***escape, escape.***

(Note: A program can contain only one space between sets of cycle data.)

H To Run a Program for One Block:

1. With the Main Screen displayed, select: ***block***
   (To select the desired block number.)
2. Use the arrow keys ◀ ▶ to select the desired program.
3. If it is desired to review the program currently displayed,
   select: ▪
4. Press: ***run***

*(Note: To terminate a run, press **stop**. To place a **block on hold**, select: **5**.)*

(Note: Timer begins to count down when sample temperature is within approximately 1° of set temperature.)

I To Place One Block on Hold:

1. With the **Execution** Screen displayed, ensure that the desired block number is displayed,
   select: ***5***

   *(Note: **5** is pressed again to **restart** the program.)*

J To Enter the Time and Date into the System:

(Note: After time and date have been entered into the system, they will be printed out on the printout)

*(Note: Time and date only need to be **entered once**. They are stored and updated in a battery-backed system.)*

1. With the **Main** Menu displayed,

select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4      menu
```

2. Select: ***5***

```
1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

3. Select: ***1***

```
enter hour:                    —
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

4. Select: **[N]**

```
enter hour:                    N
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

*(Where **[N]** = the hour desired, 0-23)*

5. Select: ***enter***

```
enter minute:                  —
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

6. Select: **[N]**

```
enter minute:                  N N
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

*(Where **[N]** = 0-59)*

7. Select: ***enter***

```
enter month:                   —
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

8. Select: **[N]**

```
enter month:                   N
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

*(Where **[N]** = 1-12)*

9. Select: ***enter***

```
enter day:                     —
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

10. Select: **[N]**

```
enter day:                     N
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

*(Where **[N]** = 1-31)*

11. Select: ***enter***

enter year:	
BLK1 set 26.4 samp 23.1 blk 22.2	aux

12. Select: **[N]**

enter year: N	
BLK1 set 26.4 samp 23.1 blk 22.2	aux

*(Where **[N]** = 90-99)*

13. Select: ***enter***

time is 00 : 00 date is 00 / 00 / 00	
BLK1 set 26.4 samp 23.1 blk 22.2	aux

K *To Turn on the Event Logging Function:*

1. With the **Main** Screen displayed,

select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX	
BLK1 set 26.4 samp 23.1 blk 22.4	menu

2. Select: ***3***

1 – Turn Event Log ON / OFF 2 – Delete Log	
BLK1 set 26.4 samp 23.1 blk 22.2	log

3. Select: ***1***

Event Logging Block 1 – ON (1 to change)	
BLK1 set 26.4 samp 23.1 blk 22.2	log

4. Press ***1*** key
*(To select "**ON**" or "**OFF**")*

If it is desired to **log events** for Block **2**, perform Steps 5 and 6, otherwise proceed to Step **7**.

5. Select: ***enter***

6. Press: **1**
*(To select "**ON**" or "**OFF**")*

7. Select: ***escape***

L To Select the System Chart Recorder Function:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***4***

1 – Select Mode 2 – Start Prnt 3 – Stop Prnt
BLK1 set 26.4 samp 23.1 blk 22.2 print

3. Select: ***1***

1 Library 2 Event Log 3 Chart Recorder
BLK1 set 26.4 samp 23.1 blk 22.2 print

4. Select: ***3***

Plot sample 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

5. Press: ***1*** key *(To select "**YES**" or "**NO**")*

6. Select: ***enter***

Plot sample 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

7. Press: ***1*** key *(To select "**YES**" or "**NO**")*

8. Select: ***enter***

Plot block 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

9. Press: ***1*** key *(To select "**YES**" or "**NO**")*

10. Select: ***enter***

Plot block 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

11. Press: ***1*** key *(To select "**YES**" or "**NO**")*

12. Select: ***enter***

Plot target 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

13. Press: ***1*** key *(To select "**YES**" or "**NO**")*

14. Select: ***enter***

Plot target 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

15. Press: ***1*** key *(To select "**YES**" or "**NO**")*

16. Select: ***enter***

Plot water temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

17. Press: ***1*** key *(To select "**YES**" or "**NO**")*

18. Select: ***enter***

Paper speed 4 cm/min – (arrow to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

19. Use arrow keys ◀ ▶ to select desired paper speed *(1/4, 1/2, 2, 4, 8 centimeters per minute.)*

20. Select: ***enter***

M To Print Chart Recorder Data:

*(Note: The data for the **most recent** Print Mode selected will be printed when **"Start Prnt"** is selected.)*

1. With the Main Screen displayed, ensure that the standard parallel printer is on and on line, then
   select: ***0***
2. Select: ***4***
3. Select: ***1***
4. Select: ***3***
5. Select: ***escape***
6. Select: ***2***

(Chart Recorder data is printed at Line Printer,)

*(Note: To **stop printing**, select **0** with **Main** Screen displayed, then **4** and **3**. If Print Mode is changed while system is printing, printing will stop.)*

*(Note: On the Chart Recorder printout, the lines will be intermittently labeled with the letters **B, b, S, s, T** and **t.**)*

The letters indicate the following:

B = temperature for Block 1
b = temperature for Block 2
S = temperature for Sample 1
s = temperature for Sample 2
T = temperature for Target 1
t = temperature for Target 2

*(Note: If a printer is **not installed,** or is **turned off,** or is **offline,** the following message will be displayed.)*

Ready to Start PRG P01	**.–REV P01**
***** Fix Printer or hit ESC *****	**0 – MENU**

If a program is not running, to start a program
select: ***run***

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N To Print Event Logging Data:

CAUTION: Be certain that the line **printer has paper**, since event logging data is removed from memory as it is printed and therefore it can only be printed once.

*(Note: The data for the most recent Print Mode selected will be printed when **"Start Prnt"** is selected.)*

1. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected and that desired block number is displayed, then, select: ***0***
2. Select: ***4***
3. Select: ***1***
4. Select: ***2***
5. Select: ***escape***
6. Select: ***0***

(Printed History of displayed block is printed at the standard dot matrix printer.)

*(Note: If a Printed History of the other block is desired, repeat steps 1-6, after switching to desired block on **Main** Screen.)*

A sample of the Printed History printout:

HISTORY LOG BLOCK 2 Date: 01/02/89 Time: 14:23

Prog	Cycle	Rep #	Step #	Elapsed Time	Time Increment	Setpoint	Event
3:	1	1	2	00:00:53	00:00:11	55.0	HEATING
3:	1	1	2	00:01:21	00:00:28	55.0	AT TEMP
3:	1	2	1	00:01:31	00:00:10	50.0	COOLING
3:	1	2	1	00:02:03	00:00:32	50.0	AT TEMP
3:	1	2	2	00:02:13	00:00:10	55.0	HEATING
3:	1	2	2	00:02:10	00:00:57	55.0	AT TEMP
3:	0	0	0	00:03:20	00:00:10	22.8	OFF

(Note: Maximum stored printout is 150 lines per block. There is no limit to the number of lines if printed in Real Time.)

Descriptions of the printer header and event data printed are:

Prog = currently active program

Cycle = most recent cycle

Rep # = current repetition number

Step # = step number

Elapsed Time = elapsed time since event logging was initiated

Time Increment = elapsed time since last event

Setpoint = setpoint for event

Event = event which occurred, with possible events:

HEATING	= heating power on
COOLING	= running, water flowing
ON HOLD	= holding
RESUMING	= after holding
OFF	= not running
AT TEMP	= counting down
STARTUP	= startup of system
COLDSTRT	= startup of system
MEM DUMP	= memory has been cleared
LOG ON	= event logging turned on
LOG OFF	= event logging turned off
CALIB	= water calibration function running

0 To Delete the Event Log:

1. With the **Main** Screen displayed,

   select: ***0***

   ```
   1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
   BLK1 set  26.4 samp  23.1  blk 22.4        menu
   ```

(Note: Ensure desired Block number is displayed for event log to be deleted.)

2. Select: ***3***

   ```
   1 – Turn  Event  Log  ON / OFF  2 – Delete  Log
   BLK1 set  26.4 samp  23.1  blk 22.2          log
   ```

3. Select: ***2***

   ```
   1 – Del BLK1  2 – Del BLK2  3 – Del BLK1 & BLK2
   BLK1 set  26.4 samp  23.1  blk 22.2          log
   ```

4. Select: ***1, 2*** or ***3***

P To Print Library Data:

(Note: The data for the most recent Print Mode selected will be printed when "Start Prnt" is selected.)

1. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected, then, select: ***0***
2. Select: ***4*** Print
3. Select: ***1*** Select Mode
4. Select: ***1*** Library
5. Select: ***2*** Start Print.

(System Library printed at the standard dot matrix printer.)

Sample of the Library printout:

```
          Time: 17:18   Date: 01/09/89

          1: 1(2)  3 2(3)  3(5)  4
          2: 2   3   2
Program   3: 3(22)
          4 cycles
```

Cycle	Step	Step Time	Step Temperature
1	1	1:26:00	82.0
	2	0:33:10	42.0
	3	0:45:00	63.0
2	1	0:21:00	85.0
3	1	2:00:00	87.0
	2	0:14:00	66.0
4	1	0:03:00	77.0
	2	1:04:00	86.0

*(Note: If the printer is **not installed,** is turned **off,** or is **offline,** the following message will be displayed:)*

*** fix printer or hit ESC ***

*(Note: If you select **escape,** the printing of the library is aborted.)*

Q To Establish the Water Temperature:

1. With the **Main** Screen displayed,

   select: ***0***

   ```
   1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
   BLK1 set  26.4 samp  23.1  blk 22.4        menu
   ```

2. Select: ***5***

   ```
   1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
   BLK1 set  26.4 samp  23.1  blk 22.2        aux
   ```

3. Select: ***2***

   ```
   measuring water temperature,              please wait
   BLK1 set  26.4 samp  23.1  blk 22.2        aux
   ```

(It will require 30 seconds to establish the water temperature.)

R To Clear the Memory of Stored Programs and Cycles:

1. With the **Main** Screen displayed,

   select: ***0***

   ```
   1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
   BLK1 set  26.4 samp  23.1  blk 22.4        menu
   ```

2. Select: ***5***

   ```
   1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
   BLK1 set  26.4 samp  23.1  blk 22.2        aux
   ```

3. Select: ***4***

   ```
   To DESTROY all Stored data,  press 1
   BLK1 set  26.4 samp  23.1  blk 22.2        aux
   ```

4. Select: ***1***

   ```
   *** System Memory Erased ***
   BLK1 set  26.4 samp  23.1  blk 22.2        aux
   ```

S To Select Length of Time for Message Display:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***5***

1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set 26.4 samp 23.1 blk 22.2 aux

3. Select: ***3***

Message delay (1 – 10 seconds): ___
BLK1 set 26.4 samp 23.1 blk 22.2 aux

4. Select: **[N]**

Message delay (1 – 10 seconds): N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

   *(Where **[N]** = desired time (1-10) seconds)*

5. Select: ***enter***

T To Turn Off the System:

1. Ensure the blocks are at ambient temperature.
2. Place the power switch in the **"OFF"** position.
3. Turn **off** the water at the tap.

(All programs and cycles are stored in battery-backed memory.)

U Sample System Run:

The following is a quick run through the sequence of events which could be performed after you have carefully read the ***Cautions*** section of this manual and have carefully performed all installation procedures.

1. Turn printer "**ON.**"

2. Turn **TwinBlock™ System** power switch "**ON.**"

If you do **not** have a line printer or do **not need** a library printout, proceed to step **4.**

3. If you need a current version of your library *(a listing of programs and cycles that currently reside in system memory)* perform the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***4***

   c. Select: ***1***

   d. Select: ***1***

   e. Select: ***2***

(System Library printed.)

4. Next, enter the data for a cycle you need which is **not** currently **in** the system **memory** *(e.g. 60° for 1 hr. 30 min., 82° for 2 min. and 10 sec.)* by performing the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***2***

   c. Select: ***3***

   d. Select: ***60***

   e. Use arrow keys ◀ ▶ to move to hour field.

   f. Select: ***1***

   g. Use arrow keys ◀ ▶ to move to minute field.

   h. Select: ***30***

   i. Select: ***enter***

   j. Select: ***82***

   k. Use arrow keys ◀ ▶ to move to minute field.

   l. Select: ***2***

   m. Use arrow keys ◀ ▶ to move to second field.

   n. Select: ***10***

   o. Select: ***enter***

   p. Select: ***escape, escape***

5. You can now enter data for a program you need which is not currently in the system memory *(e.g. next available Program, 3 repetitions of cycle 1 and 4 repetitions of cycle 5)* by performing the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***1***

   c. Select: ***3***

   d. Select: ***1***
   *(Where **1** = number of the cycle to be created for this program.)*

   e. Select: ***enter***

   f. Select: ***3***
   (Where 3 = number of repetitions of cycle 1 to be performed for this program.)

   g. Select: ***enter***

   h. Select: ***5***
   (Where 5 = number of the cycle to be created for this program, if cycle 5 resides in the system.)

   e. Select: ***enter***

   f. Select: ***4***
   (Where 4 = number of repetitions of cycle 5 to be performed for this program.)

   g. Select: ***enter***

   h. Select: ***escape, escape***

6. If you want to perform event logging for both blocks, perform the following steps:

   a. With the **Main** Menu displayed, select: ***0***

   b. Select: ***3***

   c. Select: ***1***

   d. Select: ***1*** key to select "**ON.**"

   e. Select: ***enter***

   f. Select: ***1*** key to select "**ON.**"

   g. Select: ***enter***

Sample System Run: *(continued)*

7. If you want to use the system internal Chart Recorder function for both blocks and have a 2 cm/min. paper speed, perform the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***4***

   c. Select: ***1***

   d. Select: ***3***

   e. Select: ***1*** key
   (To select "YES or "NO.")

   f. Select: ***enter***

   g. Repeat steps d and e for all Chart Recorder questions until **Paper Speed** Screen is displayed.

   h. Use arrow keys ◀ ▶ to select desired paper speed of **2**.

   i. Select: ***enter***

   j. Select: ***2***
   (To start printing chart recorder data.)

8. To run Program **3** for Block **1** and Program **4** for Block **2**, perform the following steps *(assuming Programs 3 and 4 have been entered in the system):*

   a. With the Main Screen displayed, select: ***block***
   (To select block number 1.)

   b. Use the arrow key ▶ to select program number **3**.

   c. Select: ***run***

   d. Select: ***block***
   (To select block number 2.)

   e. Use the arrow key ▶ to select program number **4**.

   f. Press: ***run***

9. To print **Chart Recorder** Data:

   a. With the **Main** Screen displayed, ensure that the standard parallel printer is on and selected, then select: ***0***

   b. Select: ***4***

   c. Select: ***2***

10. If you want to print history logs for both blocks once you have completed your program, perform the following steps:

a. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected, then,
select: ***0***

b. Select: ***4***

c. Select: ***1***

d. Select: ***2***

e. Select: ***2***

f. Select: ***block***

g. Select: ***0***

h. Select: ***4***

i. Select: ***1***

j. Select: ***2***

k. Select: ***2***

General Notes on System Operation

- Each program can extend to **100 characters.** After **20 characters**, the screen **scrolls.** *(A program character is a space or a digit or parenthesis.)*
- There is dynamic memory allocation, so that each program only uses the memory it needs. You can **fill** memory with **26** programs of **40** characters each, or **11** programs of about **95** characters each. Shortening or deleteing a program makes more memory available.
- When the **Main** screen is displayed, the arrow keys may be used to **change** the **SELECTED** program.
- The display screen and keyboard view and talk to one block at a time. The other block is invisible and deaf, but it can continue execution of a thermal program if it is running one.
- There is **one library** of cycles and programs. **Either** block can execute any library program or **both** blocks can execute the same program.
- When using the **print** function, the data will be printed using the last print mode format selected. *(e.g., if chart recorder were the final print format selected, the Chart Recorder data will be printed.)*

- If any print function is used **while** the system is running, and internal Chart Recording is being performed, there will be a **gap** in the Chart Recording function during that time.

- When executing a program with the **Execution** screen displayed, pressing ***stop*** will terminate the program.

- The maximum allowable time for a cycle is 18 hours.

- The system **automatically returns** close to **ambient water temperature** after a program is completed.

- If an error message is received when you are entering or editing program data, the error may have been caused by one of the following:
  1. More than one space between sets of cycle data
  2. Cycle number was not defined
  3. Too many repetitions were entered
  4. Inaccurate data was entered

Section V

Troubleshooting

Symptom	*Problem*	***Correction***
Power Switch on, but **no response** (screen is blank).	*Power cable not plugged in.*	**Plug in** power cable properly.
Sample temperature does **not increase/ decrease** at expected rate.	*Thermal conductance.*	**Check** that **sample probe** is at bottom of sample tube. **Check** sample tube **oil level.** **Check oil** around sample tube. **Add oil** if necessary.
Block temperature does **not decrease** at expected rate.	*Water is not turned on.* *Outlet hose kinked.* *Filter is clogged.*	**Turn water on.** **Straighten hose.** **Replace or back-flush filter.**
Printer will not print. **"fix printer or hit escape"** displayed.	*Printer not attached, not turned on, or not "on line."*	**Check printer** status.

Hardware Specifications

Standard Unit

Dimensions:	Height 6 in. Width 14 in. Depth 20 in. Weight 20 lb.
Sample Capacity:	46 (1.5 ml) or 58 (0.6 ml) microfuge tubes
Power Requirements:	120 VAC 50-60 Hz, 15 Amps
Foreign Versions Available:	220 VAC 50 Hz, 8A 100 VAC 50/60 Hz, 15A
Temperature Accuracy:	± 1° C
Printer Interface:	Standard Parallel Interface
Chart Recorder Interface:	Analog

Limited Warranty

This limited warranty is to be interpreted according to the laws of the United States of America, State of California.

ERICOMP, Inc. warrants to the original end-user purchaser of the **TwinBlock™ System** *("product"), that all components will be free of defects in materials and workmanship for a period of twelve (12) months from the date of purchase.*

This limited warranty does not apply:

a. *To any product damaged by accident, misuse, improper line voltage, lightning, fire, water, or other acts of nature; or*
b. *If the product is altered or repaired by anyone other than ERICOMP, Inc.*

In the event of malfunction or other indication of failure of the product to function in accordance with its published specifications, you should notify ERICOMP, Inc. of such malfunction or indication of failure. Upon authorization from ERICOMP, Inc., you may then mail the product (postage paid) to the address listed below. ERICOMP, Inc. will, at its option, repair or replace the product so as to cause it to operate in accordance with its current published specifications. All such repairs or replacements will be rendered by ERICOMP, Inc. without charge.

This warranty is limited to repair or replacement of the original unit.

DISCLAIMER AND LIMITATION OF LIABILITY

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHICH NOW OR HEREAFTER MIGHT OTHERWISE ARISE WITH RESPECT TO THIS PRODUCT. ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

IN NO EVENT WILL ERICOMP, INC. BE LIABLE TO YOU FOR ANY LOST PROFITS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR INABILITY TO USE THE PRODUCT EVEN IF ERICOMP, INC. OR AN ERICOMP, INC. AUTHORIZED REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY. ERICOMP, INC.'S MAXIMUM LIABILITY SHALL IN NO EVENT EXCEED THE AMOUNT PAID BY YOU TO ERICOMP, INC. FOR THE PRODUCT. SOME STATES IN THE UNITED STATES DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

In order to obtain warranty service, you must provide evidence of purchase date. For your convenience, keep the dated bill of sale or delivery ticket as evidence of the purchase date.

For service, call the ERICOMP, Inc. toll free HELPLINE at 1-800-541-8471 or if outside the U.S. call (619) 457-1888 .

ERICOMP, Inc.
6044 Cornerstone Court West, Suite E
San Diego, CA 92121

1) Position of switch is off for all 10 characters

8 switches
sw 1

8 sw 2

(1-3) on switch 1
furthest to right
switches 6, 7, 8

second switch for (4→10)
all in off position

Manual for printer?
Dip switches

serial and/or mode of printer

DS position should be inside cover should be little blocks of on/off switches w 10-12 of them.
Use pen pt to move

1) Centronics mode normal
2) Diamond table italics
3) Cut sheet feeder off
4) page len 11"
5) [illegible] mode off
6) 1" skip perf. off
7) auto line feed off
8) input buffer capac, 1 Kbite
9) graphics print direction unidirection
10) Character spacing 10/inch
2 switches for #10

Eric Comp
Jim Whitney
for computer help

Ericomp, Inc.
6044 Cornerstone Court West, Suite F
San Diego, California 92121
Telephone: (619) 457-1888
Facsimile: (619) 457-2937

Dear Customer:

We are continuing our efforts to enhance the performance of your temperature cycler. Our engineering staff has developed a new "Turbo" software program which allows quicker cycling times for better results.

The "Turbo" software allows you to control the block temperature so the samples reach the appropriate temperatures more quickly. It also reduces the "near temperature" time so that the samples spend less overall time at high temperatures.

By controlling the block temperature, you are assured that your samples will reach the set point faster. The "in-sample" temperature probe prevents the sample itself from either overshooting or undershooting the set temperature.

The parameters which control the block temperature have been optimized for most laboratory environments. You may easily customize these parameters with a simple, menu driven operation if your conditions warrant modification. The attached sheet explains how this is accomplished.

We are confident you'll appreciate this improvement when you see it in action. If you have any questions on installation or functionality, please call our TOLL-FREE number (800) 541-8471.

Sincerely,

Jim Whitney
Customer Service Manager

Ericomp, Inc.
6044 Cornerstone Court West, Suite 1
San Diego, California 92121
Telephone: (619) 457-1888
Facsimile: (619) 457-2937

PROCEDURE FOR SETTING THE BLOCK OVERSHOOT\UNDER SHOOT

1. Turn on instrument
2. Select BLOCK
3. Press 0 for MENU
4. Press AUX
5. Press SYS OPT
6. Screen will display current settings.
7. Press any key to access values.
8. Answer question and press "ENTER".
9. If the value is being changed, enter the new number and press"ENTER".
10. Repeat #8 and 9 as desired.

HELPFUL HINTS:

1. Each block is independent and has it's own settings.
2. To eliminate the BLOCK over/under shoot change the numerical value to "0" overshoot, "0" undershoot and "10" setpoint cooling (this is the minimum number).
3. The default values of overshoot = 20, undershoot = 18 and setpoint cooling = 50 are designed for the 0.5ml size block. For the 1.5ml block overshoot =46, undershoot = 18 and setpoint cooling = 50 are used. You may need to adjust these values depending on your line voltage or water pressure.
4. On the overshoot side; if you find the block doesn't cool far enough and the sample goes too high, increase the setpoint cooling by increments of 10 or 20. If the block cools too much, decrease the setpoint cooling.
5. On the undershoot side; if you find the sample cools too much, decrease the amount of undershoot by 2 or 3 (.2-.3 degrees C).

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San Diego, California 92121
Telephone: (619) 457-1888
Facsimile: (619) 457-2937

OS/US - Overshoot/Undershoot

Creates an artificial set point for the Block temperature. When the sample temperature is within 1 degree of the true "in well" setpoint, the Block reverts to the same setpoint.

The numerical value entered is used in a formula in the software to calculate the artificial setpoint. A value of 10 = 1 degree c.

SETPOINT COOLING

Setpoint cooling works to control the block temperature overshoot. The volume of water used to bring the Block overshoot to the true setpoint is determined by the value used. The numerical value of 50 will reduce the Block temperature 1.5 degree c; the numerical value of 130 reduces the Block temperature 3 degrees c.

The normal Block heating works to control the temperature undershoot and does not require any user input.

clear memory
"flag in software"

turn on printer first –
be sure well
connected

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799802-200 0490

Operations Manual

TwinBlock™ System

EasyCycler™ Series

ATTENTION

Before operating you must fill sample temperature probe tube with 200 microliters of mineral oil and place a small amount in the well. Review the "Cautions" section in manual for details.

ERICOMP, INC.

City of Roseville

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Section I

Introduction

Read this manual **carefully** before setting up and operating equipment. Read the Cautions *(Section II)* and follow the Installation Procedures *(Section III)* especially carefully before using the **TwinBlock™System** *EasyCycler™Series* .

The TwinBlock™ System

The **TwinBlock™System** *EasyCycler™Series* is a user-friendly microprocessor controlled general purpose temperature cycler that is menu driven with an easy-use keypad. It is ideally suited for research that requires the ability to conveniently heat and cool test samples automatically through repeated cycles of any of several user-defined time intervals at various user-defined temperatures ranging from approximately 25° to 110° Celsius. *(If an external supply of cold water is available, the system can cool down to 4° C.)* The **System** is composed of two, independently controlled, programmable heating/cooling blocks. The **System** provides an automated means for precisely controlling temperatures and times required for temperature cycling of materials for research and testing purposes. *(See Figure 1. for an illustration of the system.)* Temperature, time and program requirements are entered via a keypad. A standard parallel printer may be used to produce a hard copy of all data entered, history of events and chart recorder data *(generated by the system's internal Chart Recorder function)*. An analog output is also provided for two chart recorders that may be attached to the Instrument in order to graphically record sample temperature versus time characteristics for each block.

Twenty-six user-generated programs *(chained and/or iterated time/temperature profiles)* can be entered and stored. Up to 99 time/temperature cycles *(profiles)* can be stored, each of which can have up to 99 time/temperature steps *(time/temperature set)*.

This manual provides instructions for setting up and operating the **TwinBlock™System**. After reading the manual you may find it helpful to follow the sequence of operation outlined in the Overview at the beginning of the Operating Instructions *(Section IV)*. This description suggests a logical sequence of events to follow in operating the **TwinBlock™System**. Explicit step-by-step instructions A-U *(U containing a sample run)* are also found in Section IV.

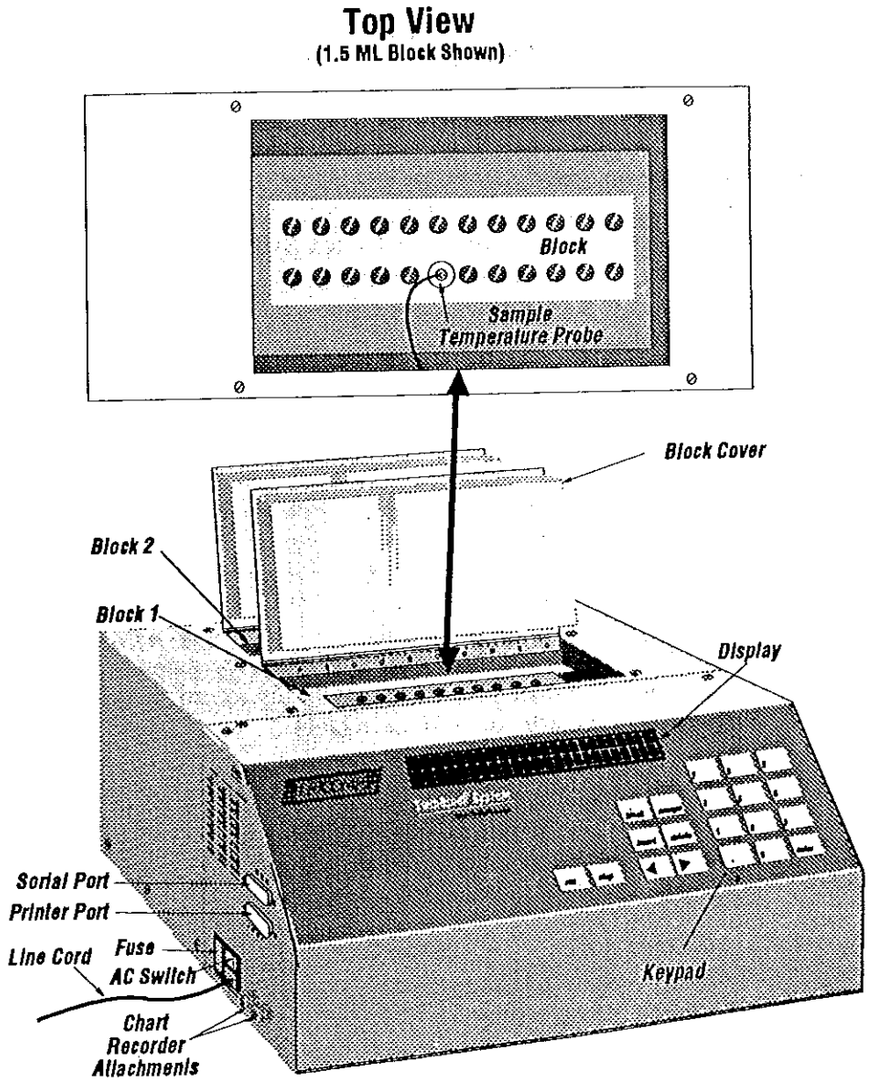


Figure 1. TwinBlock™ System

Manual Conventions

The following conventions are used in this manual:

- Key names are printed in bold face: e.g., ***run***
- Menus which are shown on the system display will appear in bold face and within rectangles in the Operating Instructions portion of this manual Section IV:

Ready to start PRG P01	**.-REV P01**
BLK 1 set 26.4 samp 23.1 blk 22.2	**0-MENU**

- In the ***Operating Instructions*** section, the screen which results from performing a step is shown to the right of that step.
- Brackets [ ] indicate that a number may be entered in this position: **[N]**

Section II

Cautions

System Initialization

Turn system on and allow system to **"warm up" approximately one hour** before operation to ensure optimum temperature control. *(This is not necessary unless highest precision is required.)*

Block Cover

Keep the block **cover closed at all times,** except when handling samples. *The block cover must remain closed in order to protect against skin burns, to protect your samples and to maintain unit temperature control. Allow the block to* ***cool*** *to near water temperature* ***before opening lid.*** *(Block temperature automatically cools down to water temperature at the end of program.)*

Grounding and Electrical Safety

Do **not remove** the unit **casing.** Do **not** use an adapter to a two-terminal outlet.
The unit must be grounded for protection against electrical shock and must be plugged into a normal 3 prong outlet.

Extension Cords

If an extension cord is used, ensure that it is **rated for 15 amps.**

Water Filter

The water filter, on line in tubing, is a screen filter which may be backflushed and checked once a year. A clogged filter results in sluggish water flow and may result in temperature overshoot and slow cooling.

Water Temperature

The water temperature reading is an approximation and should **not** be relied upon for **exact** measurement requirements. Use the Auxiliary function to establish water temperature *(see page 62).* ***Lowest possible temperature which can be entered for a cycle is 4° C. If the temperature entered is less than the measured water temperature, a warning message will be displayed.***

Sample Temperature Probe Tube

Ensure that the sample temperature probe tube contains approximately 200µl of mineral oil or paraffin oil at all times. Check the oil level in the tube every 40 hours of operation and add oil if necessary. *(Do not remove the sample temperature tube when the unit is in operation.)*

Sample Well Preparation

For maximum thermal efficiency, place a small amount of mineral oil or **paraffin oil** in **each well** being used *(including the sample temperature probe tube).* When tube is inserted into well, the oil level will rise just to the top of the well.

Do not apply water with a higher pressure than 120 PSI. *Pressure above 120 PSI may cause damage to the unit and void the warranty. City water pressure is normally within this limit. Under normal machine operation, water will flow through block and from output hose* ***only*** *when machine is in cool cycle. Note: Minimum necessary pressure to operate system at the maximum cooling rate is 30 PSI. Attachments to water outlet must be made using hose clamps (provided).*

Section III

Installation Procedures

■ Location

The **TwinBlock™System** should be placed on a **stable, level surface.** The ambient temperature and humidity should remain fairly constant and the unit should not be placed in a location exposed to direct sunlight. A **free flow of air** should be allowed around the unit.

■ Power

The standard unit operates on a 120 VAC, **60 Hz** input voltage and a current of **15 amperes.** *(Foreign units operate on 220 VAC and are specifically labeled for such usage.)* The unit is supplied with a three-terminal plug for an earth ground. The electrical outlet must be a properly wired three-terminal outlet conforming to National Electrical Codes.

■ Hook Up

The System hook up procedures are as follows:

1. Attach the Water Inlet Hose and the Water Outlet Hose to the quick disconnect fittings on the back of the instrument. *(Note: Metal tabs on female portion are pressed in first.)*

2. Place one end of the Water Outlet Hose *(attached to* **WATER OUTLET** *on backside of unit)* in a water drain. *(If anchoring hose, be careful not to pinch hose.)*

3. **Slip** the tubing of the **Water Inlet Hose** *(containing an in line screen filter)* into a barbed tapered nozzle *(attached to tap water faucet).* **Tighten** hose clamp.

4. Place a small amount *(4 drops)* of **mineral oil** or **paraffin oil in each well** being used to ensure heat transfer from block to tube.

5. Carefully open the sample temperature probe tube *(tube with the thermocouple wire inserted)* that is in each block. Fill the sample temperature probe tube with 200 µl. of mineral oil. Close the cap. Gently move tip of thermocouple to bottom of tube by closing the tube cap and replace in the well.

6. Plug three-terminal plug into a three-terminal electrical outlet.

7. Attach Chart Recorder to unit, if desired. Attach the Chart Recorder cable to the port on the Instrument labeled **CHART.**
   For calibration of recorder:
   Zero volts = 0 degrees C One volt = 100 degrees C

8. Attach standard parallel line printer, if desired:
   a. Connect one end of the printer cable to the port labeled **PRINTER** on the left side of the Instrument.
   b. Connect the other end of the cable to the printer connector.

Section IV

Operation

General Principles of Operation

The **Ericomp TwinBlock™ System** provides for the entry of a series of temperature settings in conjunction with the desired time for which each setpoint temperature is to be maintained. Each setting of temperature and time *(e.g., 2 minutes at 90 degrees)* is considered to comprise one step. A series of steps comprise one cycle *(e.g., 2 minutes at 90 degrees, 3 minutes at 81 degrees, 1 minute at 74 degrees, 2 minutes at 58 degrees could be described for one cycle)*. A series of cycles comprise one program. **Remember that the Ericomp cycler is controlled by monitoring the internal temperature of the sample probe tube. The internal temperature will be maintained for the exact time specified.**

Once a number of cycles have been defined, the sequence in which those cycles are to be performed can be programmed. For example: it may be desirable to perform Cycle 2, twice, followed by Cycle 4, once, followed by Cycle 1, three times, followed by Cycle 3, twice. This sequencing and specification of number of repetitions of each cycle can be conveniently programmed into the Instrument. Twenty-six separate programs *(1-26)* are available for defining cycle sequences. *(Step-by-step instructions for entering cycle and program data are contained in the Operating Instructions Section below.)*

Any program can be run for Block One or Block Two. Identical programs may be run for both blocks *(e.g., Block One and Block Two both run Program 1)* or different programs may be run *(e.g., Block One, Program 1 and Block Two, Program 2)*. Programs may be run simultaneously or independently. Either block can run while the other one is not running.

Additional features of the **TwinBlock™ System** are the functions of "Hold", "Print", and the "Auxiliary" functions. During thermal operation or cool down, the system may be put in a pause state *(with the time countdown suspended and temperature maintained)* with the "Hold" function. *("Hold" is available through the Execution Screen.)* The "Print" function, available through the **Function** Menu, is used to produce a dated, hard copy of the user's stored cycles and programs *(library)*. "Print" is also used to obtain a hard copy of the history of actual runs and to graphically record data obtained by the internal system Chart Recorder.

The four additional Auxiliary functions available through the selection of the Auxiliary function in the **Function** Menu are: setting system date and time, calibrating water temperature, and selecting the length of time for system message displays, and dumping memory.

Each menu displayed by the system presents options for system operation and indicates how you may select each of those options. A graphic structure of all menus and options which are available within each menu is presented in the flowchart in Figure 2.

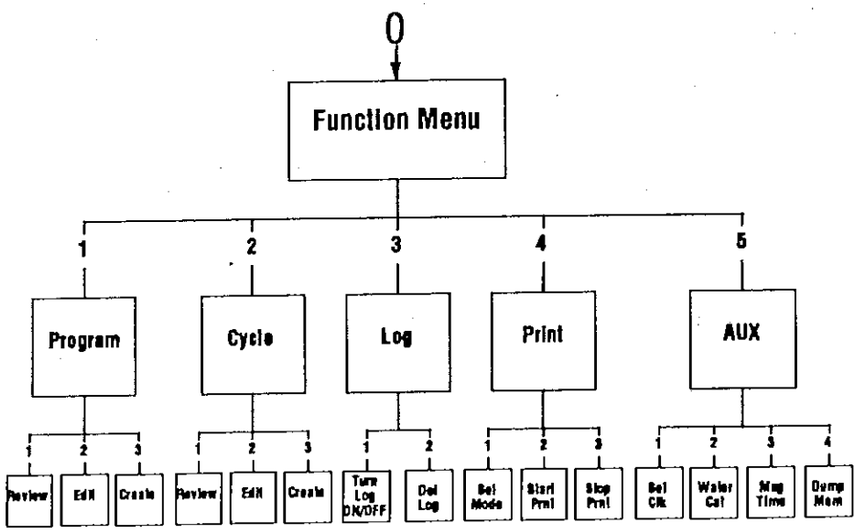


Figure 2. Software Structure

Points to keep in mind while using your **TwinBlock™ System** are: 1) The manner in which cycles are stored in memory and 2) how to ensure data is entered into memory. First, it is important to remember that cycles are stored in a library and are pulled from that library into the programs you run. A cycle, however, may be revised or edited at some point and after steps, temperature or time within that cycle are changed, they are stored in the library. Consequently, that cycle will function in its revised form in all the programs in which it occurs, *(e.g., You may have Program 6 displayed on your **Main** Screen, and add a step or change temperatures and times for cycle 4. However, when you run other programs containing cycle 4, their cycle 4 will have those same changes.)*
Secondly, the **TwinBlock™System** executes commands only from its memory. Each set of data you enter into the system is entered into memory by pressing the ***enter*** key. If ***escape*** is pressed without pressing ***enter***, no change will be entered into memory and the screen will go to the previously displayed screen.

When the unit is powered up, the **Main** Screen will be displayed:

Ready to start	**PRG P01**					**.-REV**	**P01**
BLK 1	**set**	**26.4**	**samp**	**23.1**	**blk**	**22.2**	**0-MENU**

0–Menu = press **0** to obtain main menu
blk = block temperature
P01 = program name
PRG = program name selected
.–REV = press "." to review program contents
samp = sample temperature
set = setpoint temperature

When the program is running the **Execution** Screen will be displayed:

n(n)	**run**	**P01**	**NN:NN**		**.-REV**	**P01**	**5-HOLD**
BLK 1	**set**	**26.4**	**samp**	**23.1**	**blk**	**22.2**	**0-MENU**

n = cycle number
(n) = repetition count
NN:NN = countdown time

Keypad Selection

Keypad numbers and the decimal point are used to select menu options. The arrow keys allow the user to move from field to field within a menu or to select program or cycle numbers within the appropriate menus. Keys with function names perform their specified functions within defined menus. An explanation of keys and their functions is below:

block - Allows you to select Block 1 or Block 2.

run - Initiates the cycling process of a block after all cycle and program data have been entered. *(Displayed time begins to count down when sample temperature is within approximately one degree of set temperature.)* The **Execution** Screen will be displayed.

stop - Halts the cycling process of the block displayed on the **Execution** Screen.

enter - Causes data entered in a menu to be saved and moves you to the next appropriate menu level. Advances you to the next step/cycle number when you are in the **Cycle Edit** or **Cycle Create** Screen.

escape - Causes you to move back up to the next higher level screen or the **Main** Screen. *Note:* If ***escape*** is selected prior to selecting ***enter***, data which has been edited on the screen will not be saved.

▶ - Selects the next program to be displayed on the **Main** Screen. Advances you to the next step/cycle when you are in the **Cycle Review** mode. Advances you to the next program number when you are in the **Program Review** mode. Advances to the next paper speed when you are in the **Chart Recorder Paper Speed Selection** mode. Moves the curser to the right of your current position when you are in **Editing** and **Create** modes for programs or cycles.

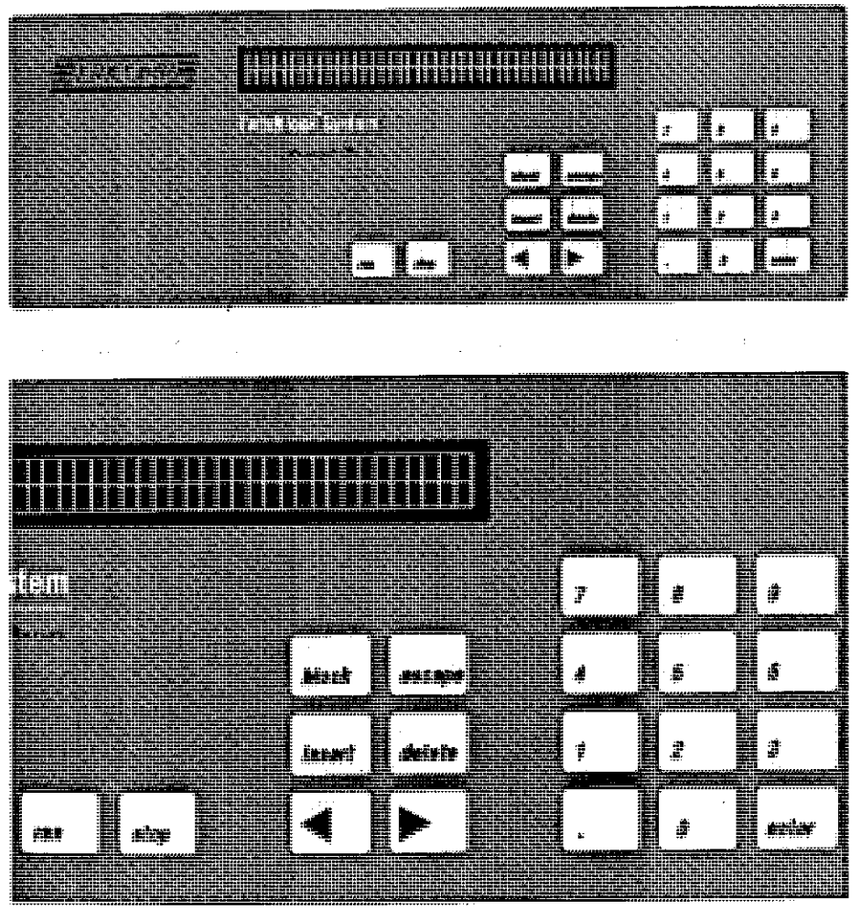


Figure 3. Keypad

◀ - Selects the previous program to be displayed on the **Main** Screen. Moves you back one step/cycle number when you are in the **Cycle Review** mode. Moves you back one program number when you are in the **Program Review** mode. Moves you back one paper speed when you are in the **Chart Recorder Paper Speed Selection** mode. Moves the curser to the left of your current position when you are in **Editing** and **Create** modes for programs or cycles.

. - Allows you to enter tenths of degrees when you are entering temperatures. Allows you to review the displayed program when you are in the **Main** Screen or in the **Execution** Screen.

insert - Allows you to insert spaces in the **Program Edit** mode so that new cycles may be added to a program. Allows you to insert a step in the **Cycle Edit** mode so that new steps may be added to a cycle.

delete - Allows you to remove cycles and repetitions from a program when you are in the **Program Edit** mode. Allows you to remove a step from a cycle when you are in the **Cycle Edit** mode. The ***delete*** key functions immediately and does not require selecting ***enter*** to implement the deletion.

Keys which are active in the **Main** Screen and the **Execution** Screen and the functions of those keys are diagrammed in Figure 4.

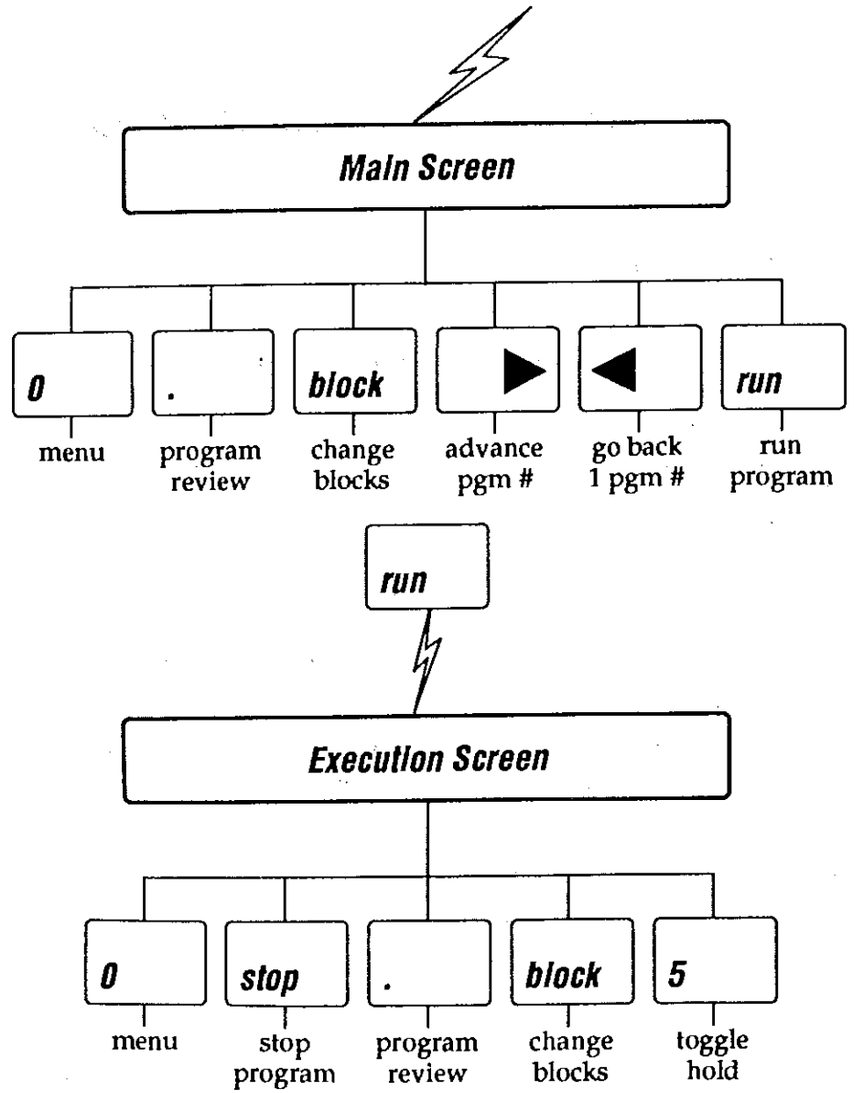


Figure 4. Overview of Key Functions

Operating Instructions

Overview

Initially, after carefully following the installation procedures and reading the Cautions, you may wish to perform the steps in A-G. These steps inform you of start-up procedures and steps for entering time, temperature and program data into the system. If you do not wish to perform any printing functions or store program data for printing, then you may proceed to H, for instructions on running a program.

If you do desire printouts, however, instructions for printing stored cycles and programs, entering time and date into the system, enabling the Chart Recorder, and/or logging events are in J-P. Before running a program, it may be desired to first print the library of cycles and programs. This is particularly helpful if you wish to edit or compose new cycles and programs. Next, you may want to enable the Event Log and then the Chart Recorder function. Once you are running a program, you may print Chart Recorder data by performing the steps in M.

After running your program, you may want to print the event log. If you print the event log before the program is completed, remember to restart your Chart Recorder function.

A To Turn On the System:

If you plan to use the printer, turn the printer **ON** first.

Place Power **ON/OFF** switch in **ON** position.
(left side of unit)

Main Screen

Ready to start PRG P01	**.–REV P01**
BLK1 set 26.4 samp 23.1 blk 22.2	**0-MENU**

(Note: Valve clicking is normal.)

(Note: When unit is turned off, all programs and cycle information are retained in battery backed memory.)

(Note: If it is desired to retain a history of events when the system is run, perform steps in section K prior to starting program. If it is desired to use the system Chart Recorder function, perform steps in section L prior to starting program. Both functions may be simultaneously enabled.)

B To Review Cycles and Steps:

1. With the **Main** Screen displayed,

Select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

2. Select: ***2***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

3. Select: ***1***

```
ENTER CYCLE NUMBER:  __
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

4. Select: **[N]**

```
ENTER CYCLE NUMBER:  N
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

*(Where **[N]** = cycle number desired.)*

5. Select: ***enter***

```
CYC 1  STP  1  TIME  OX:XX:XX TEMP      XX
BLK1 set  26.4 samp  23.1  blk 22.2  rev cycle
```

(Note: Use arrow keys ◀ ▶ to move backward and forward through steps and cycles.)

6. When review is complete, select: ***escape, escape***

C To Enter Time and Temperature Requirements for Cycles:

(Note: Cycles may be added when a program is running.)

1. With **Main** Screen displayed,

Select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4        menu
```

2. Select: ***2***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2        cycle
```

3. Select: ***3***

```
CYC  X  STP  X   TIME  :00:00 TEMP     _
BLK1 set  26.4 samp  23.1  blk 22.2   cre cyc
```

4. Select: **[N]**

```
CYC  X  STP  X   TIME  :00:00 TEMP    NN
BLK1 set  26.4 samp  23.1  blk 22.2   cre cyc
```

*(Where **[N]** = Number desired for temperature)*

(Note: Maximum allowable temperature entry is 110°. Minimum allowable temperature entry is 4° C.)

(Note: Any one, or more time elements may be entered for required time. Hours minutes, and seconds may be entered or only seconds, and so forth.)

C. To Enter Time and Temperature Requirements for Cycles: (continued)

5. Use arrow keys ◀ ▶ to move from field to field to enter data.

6. Select: **[N]**

CYC	X	STP	X	TIME	N	:00:00	TEMP	XX			
BLK1	set	26.4	samp	23.1	blk	22.2		cre	cyc		

(Where [N] = Number desired for step time in hours.)

7. Select: **[N]**

CYC	X	STP	X	TIME	X	:NN:00	TEMP	XX			
BLK1	set	26.4	samp	23.1	blk	22.2		cre	cyc		

(Where [N] = Number desired for step time in minutes.)

8. Select: **[N]**

CYC	X	STP	X	TIME	X	:XX:NN	TEMP	XX			
BLK1	set	26.4	samp	23.1	blk	22.2		cre	cyc		

*(Where **[N]** = Number desired for step time in seconds.)*

9. When all values are correct for the step,
   Select: ***enter***

*(Note: Before pressing **enter**, you may use the arrow keys to edit data. **enter** will yield an error message if any values are unacceptable; if this occurs, edit the time or temperature, and press **enter**.)*

10. Repeat steps **4** through **9** above for each of the steps to be defined for this cycle. *(If only one step is to be defined for the cycle, proceed to Step 11.)*

11. When all temperature and time values have been defined for all steps of one cycle, select: ***escape***

12. Repeat Steps **3** through **11** above for the second and additional cycles, if desired.

D To Edit Cycle Data:

(Note: When you modify a cycle, those changes will occur in that cycle in every program in which the cycle is used.)

(Note: Do not modify a cycle that is contained in a program which is currently being run.)

1. With the **Main** Screen displayed,

Select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***2***

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 cycle

3. Select: ***2***

ENTER CYCLE NUMBER:_
BLK1 set 26.4 samp 25.1 blk 22.2 cycle

4. Select: ***[N]***

ENTER CYCLE NUMBER: N
BLK1 set 26.4 samp 25.1 blk 22.2 cycle

*(Where **[N]** = desired number of cycle to be entered or modified.)*

5. Select: ***enter***

CYC X STP 1 TIME OX:XX:XX TEMP XX
BLK1 set 26.4 samp 23.1 blk 22.2 edt cyc

*(Note: Use the arrow keys ◀ ▶ to move from field to field to enter data. Use **enter** to move to the next step to edit.)*

6. Use the arrow keys to move to the desired field and enter desired data for time and temperature for each step.

7. Select: ***enter***
(To save data entered and to move to the next step.)

8. If it is desired to enter a new step between existing steps, use the ***enter*** key to display the step number just prior to the step to be added and then, select: ***insert***

9. If it is desired to delete a step, use the ***enter*** key to display the step to be deleted and then, select: ***delete***

*(Note: The delete function is effective immediately and does not require selecting **enter** to implement the deletion.)*

10. Select: ***enter***

11. If it is desired to continue working with cycle data,
Select: ***escape***

12. If you are finished working with cycle data,
Select: ***escape, escape***

E To Review Programs:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***1***

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 program

3. Select: ***1***

ENTER PROGRAM NUMBER: __
BLK1 set 26.4 samp 23.1 blk 22.2 program

4. Select: **[N]**

ENTER PROGRAM NUMBER: N
BLK1 set 26.4 samp 23.1 blk 22.2 program

   *(Where **[N]** = number of program to be reviewed.)*

5. Select: ***enter***

X: 1(4)
BLK1 set 26.4 samp 23.1 blk 22.2 rev pgm

6. Use arrow keys ◀ ▶ to move backward and forward from program to program.

7. Select: ***escape, escape***
   (When program review is complete.)

F To Create Programs:

1. With the **Main** Screen displayed,

   select: ***0***

   ```
   1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
   BLK1 set  26.4 samp  23.1  blk 22.4        menu
   ```

2. Select: ***1***

   ```
   1 – Review 2 – Edit 3 – Create
   BLK1 set  26.4 samp  23.1  blk 22.2      program
   ```

3. Select: ***3***

   ```
   _                                Enter  Cycle #  P01
   BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
   ```

4. Select: **[N]**

   ```
   N                                Enter  Cycle #  P01
   BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
   ```

   *(Where **[N]** = number of the cycle to be created for this program.)*

5. Select: ***enter***

   ```
   N ( _                            Enter  # of Reps P01
   BLK1 set  26.4 samp  23.1  blk 22.2  cre  pgm
   ```

6. Select: **[N]**

   ```
   X ( N                            Enter  # of Reps P01
   BLK1 set  26.4 samp  23.1  blk 22.2  cre  pgm
   ```

   *(Where **[N]** = number of repetitions of the cycle to be performed for this program.)*

   *(Note: If you do not enter a number here, and just press **enter**, then a repetition of one is automatically entered for you.)*

7. Select: ***enter***

   ```
   X( X )  _                        Enter Cycle # P01
   BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
   ```

8. Repeat steps 4 - 7 until the desired number of cycles and their repetitions have been entered for this program.

9. When the desired number of cycles have been entered, select: ***escape, escape.***

If an error is detected in data input, the following message will be displayed:

```
Error Detected: 1 – Fix It  2 – Exit    w/o sav
BLK1 set  26.4 samp   XX.X blk XX.X cre  pgm
```

If you select ***1***, you will **return to** the **Program Edit** mode and the cursor will be displayed beneath the incorrect data. You may then revise your input as necessary. When the revision is complete, select: ***escape, escape.***

G To Edit Programs:

Perform **step 1** if it is desired to **revise** currently existing cycles. If it is desired to enter an additional cycle, proceed to step 2. If it is desired to **delete** an existing cycle, proceed to **step 3.**

1. To **revise** currently existing cycles:

a. With the **Main** Screen displayed,

select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23 . 1  blk 22.4      menu
```

b. Select: ***1***

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

c. Select: ***2***

```
ENTER PROGRAM NUMBER: __
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

d. Select: **[N]**

```
ENTER PROGRAM NUMBER:  N
BLK1 set  26.4 samp  23 . 1  blk 22.2      program
```

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

```
X (X)   X (XX)   X (X)        Enter  Cycle #  P01
BLK1 set  26.4 samp  23 . 1  blk 22.2      edt pgm
```

f. Use the arrow keys ◀ ▶ to position the cursor below the number of the cycle to be edited.

g. Select: **[N]**

```
X (X)   N (XX)   X (X)        Enter  Cycle #  P01
BLK1 set  26.4 samp  23 . 1  blk 22.2      edt pgm
```

*(Where **[N]** = number of the cycle to be edited. If you only want to change the number of repetitions, **[N]** must still be selected.)*

h. Select: ***enter***

```
X (X)   X (NN)   X (X)        Enter  # of Reps  P01
BLK1 set  26.4 samp  23 . 1  blk 22.2      edt pgm
```

i. Select: **[N]**

*(Where **[N]** = number of repetitions desired for this cycle.)*

j. Repeat steps **f - i** for as many cycles as desired.

k. When editing has been completed, select: ***enter, escape, escape***

2. To **add an additional cycle** to a program, perform steps **a - m** below.

a. With the **Main** Screen displayed,

select: **0**

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

b. Select: **1**

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 program

c. Select: **2**

ENTER PROGRAM NUMBER: __
BLK1 set 26.4 samp 23.1 blk 22.2 program

d. Select: **[N]**

ENTER PROGRAM NUMBER: N
BLK1 set 26.4 samp 23.1 blk 22.2 program

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

X (X) X (XX) X (X) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

f. With the **Enter Cycle #** message displayed, use the arrow keys to position the cursor to the space in which you are going to enter the new cyclenumber.

X (X)__ X (XX) X (X) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

(Note: This edit area is 20 characters wide. After 20 characters, data scrolls across screen.)

g. Select: ***Insert***

X (X)__ X (XX) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

h. Select: ▶

X (XX) __ X (XX) Enter Cycle # P01
BLK1 set 26.4 samp 23.1 blk 22.2 edt pgm

To Edit Programs *(continued)*

(Press ***insert*** *as many times as necessary to cause the correct number of spaces to be provided for the new cycle number and the number of repetitions for that cycle which you will add. You will need to press* ***insert*** *4 times if the inserted cycle has one digit and the number of repetitions only has one digit. Press* ***insert*** *6 times if both the cycle and repetition are two digit numbers.)*

i. Select: **[N]**

```
X (X)  N          X (XX)   Enter  Cycle #  P01
BLK1 set  26.4 samp  23.1 blk 22.2    edt pgm
```

(Where ***[N]*** *= the new cycle number.)*

j. Select: ***enter***

```
X (X)  X (__      X (XX)   Enter # of Reps P01
BLK1 set  26.4 samp  23.1 blk 22.2    edt pgm
```

k. Select: **[N]**

```
X (X)  X (N       X (XX)   Enter # of Reps P01
BLK1 set  26.4 samp  23.1 blk 22.2    edt pgm
```

(Where ***[N]*** *= the number of repetitions for the new cycle.)*

l. Select: ***enter***

```
X (X)  X ( X ) __ X (XX)   Enter  Cycle #  P01
BLK1 set  26.4 samp  23.1 blk 22.2    edt pgm
```


m. Repeat steps **f - l** to enter as many new cycles as desired.

n. When editing is completed, *(by pressing* ***enter*** *after last change)* select: ***escape, escape***

To Edit Programs (continued)

3. To **delete** a cycle from a program, perform steps **a - i.**

a. With the **Main** Screen displayed,

select: **0**

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4      menu
```

b. Select: **1**

```
1 – Review 2 – Edit 3 – Create
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

c. Select: **2**

```
ENTER PROGRAM NUMBER: __
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

d. Select: **[N]**

```
ENTER PROGRAM NUMBER: N
BLK1 set  26.4 samp  23.1  blk 22.2      program
```

*(Where **[N]** = number of the program to be edited.)*

e. Select: ***enter***

```
X (X)   X (X)   X (XX)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

f. With the **Enter Cycle #** message displayed, use the arrow keys ◀ ▶ to position the cursor to the number of the cycle which you aregoing to delete.

```
X (X)   X (X)   X (XX)        Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

g. Select: ***delete***

```
X (X)   X (X)   __            Enter Cycle # P01
BLK1 set  26.4 samp  23.1  blk 22.2      edt pgm
```

*(Press **delete** as many times as necessary to erase the cycle number and its repetitions. Use the arrow key so that there is one space between each cycle.)*

*(Note: The delete function is effective immediately and does not require selecting **enter** to implement the deletion.)*

h. Repeat steps **a - g** to delete as many cycles as desired.

i. When editing is complete, select: ***escape, escape.***

(Note: A program can contain only one space between sets of cycle data.)

H To Run a Program for One Block:

1. With the Main Screen displayed, select: ***block***
   (To select the desired block number.)
2. Use the arrow keys ◀ ▶ to select the desired program.
3. If it is desired to review the program currently displayed,
   select: ▪
4. Press: ***run***

*(Note: To terminate a run, press **stop**. To place a **block on hold**, select: **5**.)*

(Note: Timer begins to count down when sample temperature is within approximately 1° of set temperature.)

I To Place One Block on Hold:

1. With the **Execution** Screen displayed, ensure that the desired block number is displayed,
   select: ***5***

   *(Note: **5** is pressed again to **restart** the program.)*

J To Enter the Time and Date into the System:

(Note: After time and date have been entered into the system, they will be printed out on the printout)

*(Note: Time and date only need to be **entered once**. They are stored and updated in a battery-backed system.)*

1. With the **Main** Menu displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***5***

1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set 26.4 samp 23.1 blk 22.2 aux

3. Select: ***1***

enter hour: _
BLK1 set 26.4 samp 23.1 blk 22.2 aux

4. Select: **[N]**

enter hour: N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

   *(Where **[N]** = the hour desired, 0-23)*

5. Select: ***enter***

enter minute: _
BLK1 set 26.4 samp 23.1 blk 22.2 aux

6. Select: **[N]**

enter minute: N N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

   *(Where **[N]** = 0-59)*

7. Select: ***enter***

enter month: _
BLK1 set 26.4 samp 23.1 blk 22.2 aux

8. Select: **[N]**

enter month: N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

   *(Where **[N]** = 1-12)*

9. Select: ***enter***

enter day: _
BLK1 set 26.4 samp 23.1 blk 22.2 aux

10. Select: **[N]**

enter day: N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

    *(Where **[N]** = 1-31)*

To Enter the Time and Date into the System (continued)

11. Select: ***enter***

```
enter year:                    __
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

12. Select: **[N]**

```
enter year:                    N
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```

*(Where **[N]** = 90-99)*

13. Select: ***enter***

```
time is 00:00      date is 00/00/00
BLK1 set  26.4 samp  23.1  blk 22.2      aux
```


K To Turn on the Event Logging Function:

d

1. With the **Main** Screen displayed,

select: ***0***

```
1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set  26.4 samp  23.1  blk 22.4      menu
```

2. Select: ***3***

```
1 – Turn  Event  Log  ON / OFF  2 – Delete  Log
BLK1 set  26.4 samp  23.1  blk 22.2      log
```

3. Select: ***1***

```
Event Logging Block 1 – ON      (1 to change)
BLK1 set  26.4 samp  23.1  blk 22.2      log
```

4. Press ***1*** key
*(To select "**ON**" or "**OFF**")*

If it is desired to **log events** for Block **2**, perform Steps 5 and 6, otherwise proceed to Step **7**.

instead of Block 1 or in addition?

5. Select: ***enter***

6. Press: **1**
*(To select "**ON**" or "**OFF**")*

7. Select: ***escape***

L To Select the System Chart Recorder Function:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***4***

1 – Select Mode 2 – Start Prnt 3 – Stop Prnt
BLK1 set 26.4 samp 23.1 blk 22.2 print

3. Select: ***1***

1 Library 2 Event Log 3 Chart Recorder
BLK1 set 26.4 samp 23.1 blk 22.2 print

4. Select: ***3***

Plot sample 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

5. Press: ***1*** key *(To select "**YES**" or "**NO**")*

6. Select: ***enter***

Plot sample 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

7. Press: ***1*** key *(To select "**YES**" or "**NO**")*

8. Select: ***enter***

Plot block 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

9. Press: ***1*** key *(To select "**YES**" or "**NO**")*

10. Select: ***enter***

Plot block 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

11. Press: ***1*** key *(To select "**YES**" or "**NO**")*

12. Select: ***enter***

Plot target 1 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

13. Press: ***1*** key *(To select "**YES**" or "**NO**")*

14. Select: ***enter***

Plot target 2 temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

15. Press: ***1*** key *(To select "**YES**" or "**NO**")*

16. Select: ***enter***

Plot water temp ? YES (1 to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

17. Press: ***1*** key *(To select "**YES**" or "**NO**")*

18. Select: ***enter***

Paper speed 4 cm/min – (arrow to change)
BLK1 set 26.4 samp 23.1 blk 22.2 print

19. Use arrow keys ◀ ▶ to select desired paper speed *(1/4, 1/2, 2, 4, 8 centimeters per minute.)*

20. Select: ***enter***

To Print Chart Recorder Data:

*(Note: The data for the **most recent** Print Mode selected will be printed when **"Start Prnt"** is selected.)*

1. With the Main Screen displayed, ensure that the standard parallel printer is on and on line, then
   select: ***0***
2. Select: ***4***
3. Select: ***1***
4. Select: ***3***
5. Select: ***escape***
6. Select: ***2***

(Chart Recorder data is printed at Line Printer,)

*(Note: **To stop printing**, select **0** with **Main** Screen displayed, then **4** and **3**. If Print Mode is changed while system is printing, printing will stop.)*

*(Note: On the Chart Recorder printout, the lines will be intermittently labeled with the letters **B, b, S, s, T** and **t**.)*

The letters indicate the following:

B = temperature for Block 1
b = temperature for Block 2
S = temperature for Sample 1
s = temperature for Sample 2
T = temperature for Target 1
t = temperature for Target 2

*(Note: If a printer is **not installed**, or is **turned off**, or is **offline**, the following message will be displayed.)*

Ready to Start PRG P01	**.–REV P01**
***** Fix Printer or hit ESC *****	**0 – MENU**

If a program is not running, to start a program
select: ***run***

Pam Broberg

N To Print Event Logging Data:

CAUTION: Be certain that the line **printer has paper**, since event logging data is removed from memory as it is printed and therefore it can only be printed once.

*(Note: The data for the most recent Print Mode selected will be printed when **"Start Prnt"** is selected.)*

1. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected and that desired block number is displayed, then, select: ***0***
2. Select: ***4***
3. Select: ***1***
4. Select: ***2***
5. Select: ***escape***
6. Select: ***0***

(Printed History of displayed block is printed at the standard dot matrix printer.)

*(Note: If a Printed History of the other block is desired, repeat steps 1-6, after switching to desired block on **Main** Screen.)*

A sample of the Printed History printout:

HISTORY LOG BLOCK 2 Date: 01/02/89 Time: 14:23

Prog	Cycle	Rep #	Step #	Elapsed Time	Time Increment	Setpoint	Event
3:	1	1	2	00:00:53	00:00:11	55.0	HEATING
3:	1	1	2	00:01:21	00:00:28	55.0	AT TEMP
3:	1	2	1	00:01:31	00:00:10	50.0	COOLING
3:	1	2	1	00:02:03	00:00:32	50.0	AT TEMP
3:	1	2	2	00:02:13	00:00:10	55.0	HEATING
3:	1	2	2	00:02:10	00:00:57	55.0	AT TEMP
3:	0	0	0	00:03:20	00:00:10	22.8	OFF

(Note: Maximum stored printout is 150 lines per block. There is no limit to the number of lines if printed in Real Time.)

Descriptions of the printer header and event data printed are:

Prog	= currently active program
Cycle	= most recent cycle
Rep #	= current repetition number
Step #	= step number
Elapsed Time	= elapsed time since event logging was initiated
Time Increment	= elapsed time since last event
Setpoint	= setpoint for event
Event	= event which occurred, with possible events:

HEATING	= heating power on
COOLING	= running, water flowing
ON HOLD	= holding
RESUMING	= after holding
OFF	= not running
AT TEMP	= counting down
STARTUP	= startup of system
COLDSTRT	= startup of system
MEM DUMP	= memory has been cleared
LOG ON	= event logging turned on
LOG OFF	= event logging turned off
CALIB	= water calibration function running

0 To Delete the Event Log:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

(Note: Ensure desired Block number is displayed for event log to be deleted.)

2. Select: ***3***

1 – Turn Event Log ON / OFF 2 – Delete Log
BLK1 set 26.4 samp 23.1 blk 22.2 log

3. Select: ***2***

1 – Del BLK1 2 – Del BLK2 3 – Del BLK1 & BLK2
BLK1 set 26.4 samp 23.1 blk 22.2 log

4. Select: ***1, 2*** or ***3***

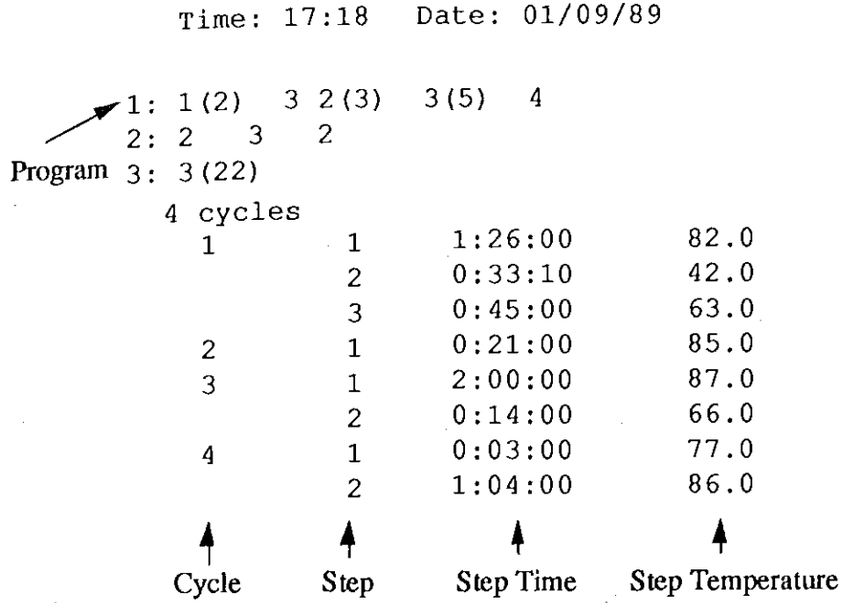
P To Print Library Data:

(Note: The data for the most recent Print Mode selected will be printed when "Start Prnt" is selected.)

1. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected, then, select: ***0***
2. Select: ***4*** Print
3. Select: ***1*** Select Mode
4. Select: ***1*** Library
5. Select: ***2*** Start Print.

(System Library printed at the standard dot matrix printer.)

Sample of the Library printout:



*(Note: If the printer is **not installed**, is turned **off**, or is **offline**, the following message will be displayed:)*

*** fix printer or hit ESC ***

*(Note: If you select **escape**, the printing of the library is aborted.)*

Q To Establish the Water Temperature:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***5***

1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set 26.4 samp 23.1 blk 22.2 aux

3. Select: ***2***

measuring water temperature, please wait
BLK1 set 26.4 samp 23.1 blk 22.2 aux

(It will require 30 seconds to establish the water temperature.)

R To Clear the Memory of Stored Programs and Cycles:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***5***

1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set 26.4 samp 23.1 blk 22.2 aux

3. Select: ***4***

To DESTROY all Stored data, press 1
BLK1 set 26.4 samp 23.1 blk 22.2 aux

4. Select: ***1***

* * * System Memory Erased * * *
BLK1 set 26.4 samp 23.1 blk 22.2 aux

S To Select Length of Time for Message Display:

1. With the **Main** Screen displayed,

   select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***5***

1 – Clock 2 - Calib Water 3 - Msg Time 4 – Dump
BLK1 set 26.4 samp 23.1 blk 22.2 aux

3. Select: ***3***

Message delay (1 – 10 seconds): __
BLK1 set 26.4 samp 23.1 blk 22.2 aux

4. Select: **[N]**

Message delay (1 – 10 seconds): N
BLK1 set 26.4 samp 23.1 blk 22.2 aux

   *(Where **[N]** = desired time (1-10) seconds)*

5. Select: ***enter***

T To Turn Off the System:

1. Ensure the blocks are at ambient temperature.
2. Place the power switch in the **"OFF"** position.
3. Turn **off** the water at the tap.

(All programs and cycles are stored in battery-backed memory.)

U Sample System Run:

The following is a quick run through the sequence of events which could be performed after you have carefully read the ***Cautions*** section of this manual and have carefully performed all installation procedures.

1. Turn printer "**ON**."

2. Turn **TwinBlock™ System** power switch "**ON**."

If you do **not** have a line printer or do **not need** a library printout, proceed to step **4**.

3. If you need a current version of your library *(a listing of programs and cycles that currently reside in system memory)* perform the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***4***

   c. Select: ***1***

   d. Select: ***1***

   e. Select: ***2***

(System Library printed.)

4. Next, enter the data for a cycle you need which is **not** currently **in** the system **memory** *(e.g. 60° for 1 hr. 30 min., 82° for 2 min. and 10 sec.)* by performing the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***2***

   c. Select: ***3***

   d. Select: ***60***

   e. Use arrow keys ◀ ▶ to move to hour field.

   f. Select: ***1***

   g. Use arrow keys ◀ ▶ to move to minute field.

   h. Select: ***30***

   i. Select: ***enter***

   j. Select: ***82***

   k. Use arrow keys ◀ ▶ to move to minute field.

   l. Select: ***2***

   m. Use arrow keys ◀ ▶ to move to second field.

   n. Select: ***10***

   o. Select: ***enter***

   p. Select: ***escape, escape***

5. You can now enter data for a program you need which is not currently in the system memory *(e.g. next available Program, 3 repetitions of cycle 1 and 4 repetitions of cycle 5)* by performing the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***1***

   c. Select: ***3***

   d. Select: ***1***
   *(Where **1** = number of the cycle to be created for this program.)*

   e. Select: ***enter***

   f. Select: ***3***
   (Where 3 = number of repetitions of cycle 1 to be performed for this program.)

   g. Select: ***enter***

   h. Select: ***5***
   (Where 5 = number of the cycle to be created for this program, if cycle 5 resides in the system.)

   e. Select: ***enter***

   f. Select: ***4***
   (Where 4 = number of repetitions of cycle 5 to be performed for this program.)

   g. Select: ***enter***

   h. Select: ***escape, escape***

6. If you want to perform event logging for both blocks, perform the following steps:

   a. With the **Main** Menu displayed, select: ***0*** for Main Menu. (Screen) ? is no choice on main menu.

   b. Select: ***3*** Log

   c. Select: ***1*** Select "Turn log on/off"

   d. Select: ***1*** key to select "**ON**." (Toggles for on/off.) } Select ON (vs. off)

   e. Select: ***enter***

   f. Select: ***1*** key to select "**ON**."

   g. Select: ***enter***

7. If you want to use the system internal Chart Recorder function for both blocks and have a 2 cm/min. paper speed, perform the following steps:

   a. With the **Main** Screen displayed, select: ***0***

   b. Select: ***4***

   c. Select: ***1***

   d. Select: ***3***

   e. Select: ***1*** key
   (To select "YES or "NO.")

   f. Select: ***enter***

   g. Repeat steps d and e for all Chart Recorder questions until **Paper Speed** Screen is displayed.

   h. Use arrow keys ◀ ▶ to select desired paper speed of **2**.

   i. Select: ***enter***

   j. Select: ***2***
   (To start printing chart recorder data.)

8. To run Program **3** for Block **1** and Program **4** for Block **2**, perform the following steps *(assuming Programs 3 and 4 have been entered in the system):*

   a. With the Main Screen displayed, select: ***block***
   (To select block number 1.)

   b. Use the arrow key ▶ to select program number **3**.

   c. Select: ***run***

   d. Select: ***block***
   (To select block number 2.)

   e. Use the arrow key ▶ to select program number **4**.

   f. Press: ***run***

9. To print **Chart Recorder** Data:

   a. With the **Main** Screen displayed, ensure that the standard parallel printer is on and selected, then select: ***0***

   b. Select: ***4***

   c. Select: ***2***

10. If you want to print history logs for both blocks once you have completed your program, perform the following steps:

a. With the **Main** Screen displayed, ensure the standard parallel printer is on and selected, then,
select: ***0***

b. Select: ***4***

c. Select: ***1***

d. Select: ***2***

e. Select: ***2***

f. Select: ***block***

g. Select: ***0***

h. Select: ***4***

i. Select: ***1***

j. Select: ***2***

k. Select: ***2***

General Notes on System Operation

- Each program can extend to **100 characters**. After **20 characters**, the screen **scrolls**. *(A program character is a space or a digit or parenthesis.)*
- There is dynamic memory allocation, so that each program only uses the memory it needs. You can **fill** memory with **26** programs of **40** characters each, or **11** programs of about **95** characters each. Shortening or deleteing a program makes more memory available.
- When the **Main** screen is displayed, the arrow keys may be used to **change** the **SELECTED** program.
- The display screen and keyboard view and talk to one block at a time. The other block is invisible and deaf, but it can continue execution of a thermal program if it is running one.
- There is **one library** of cycles and programs. **Either** block can execute any library program or **both** blocks can execute the same program.
- When using the **print** function, the data will be printed using the last print mode format selected. *(e.g., if chart recorder were the final print format selected, the Chart Recorder data will be printed.)*

- If any print function is used **while** the system is running, and internal Chart Recording is being performed, there will be a gap in the Chart Recording function during that time.

- When executing a program with the **Execution** screen displayed, pressing ***stop*** will terminate the program.

- The maximum allowable time for a cycle is 18 hours.

- The system **automatically returns** close to **ambient water temperature** after a program is completed.

- If an error message is received when you are entering or editing program data, the error may have been caused by one of the following:
  1. More than one space between sets of cycle data
  2. Cycle number was not defined
  3. Too many repetitions were entered
  4. Inaccurate data was entered

Section V

Troubleshooting

Symptom	*Problem*	***Correction***
Power Switch on, but **no response** (screen is blank).	*Power cable not plugged in.*	**Plug in** power cable properly.
Sample temperature does **not increase/ decrease** at expected rate.	*Thermal conductance.*	**Check** that **sample probe** is at bottom of sample tube. **Check** sample tube **oil level.** **Check oil** around sample tube. **Add oil** if necessary.
Block temperature does **not decrease** at expected rate.	*Water is not turned on.* *Outlet hose kinked.* *Filter is clogged.*	**Turn water on.** **Straighten hose.** **Replace or back-flush filter.**
Printer will not print. **"fix printer or hit escape"** displayed.	*Printer not attached, not turned on, or not "on line."*	**Check printer** status.

Hardware Specifications

Standard Unit

Dimensions:	Height 6 in. Width 14 in. Depth 20 in. Weight 20 lb.
Sample Capacity:	46 (1.5 ml) or 58 (0.6 ml) microfuge tubes
Power Requirements:	120 VAC 50-60 Hz, 15 Amps
Foreign Versions Available:	220 VAC 50 Hz, 8A 100 VAC 50/60 Hz, 15A
Temperature Accuracy:	± 1° C
Printer Interface:	Standard Parallel Interface
Chart Recorder Interface:	Analog

Limited Warranty

This limited warranty is to be interpreted according to the laws of the United States of America, State of California.

ERICOMP, Inc. warrants to the original end-user purchaser of the **TwinBlock™ System** *("product"), that all components will be free of defects in materials and workmanship for a period of twelve (12) months from the date of purchase.*

This limited warranty does not apply:

a. *To any product* **damaged** *by accident, misuse, improper line voltage, lightning, fire, water, or other acts of nature; or*

b. *If the product is* **altered** *or repaired by anyone other than ERICOMP, Inc.*

In the event of malfunction or other indication of failure of the product to function in accordance with its published specifications, you should notify ERICOMP, Inc. of such malfunction or indication of failure. Upon authorization from ERICOMP, Inc., you may then mail the product (postage paid) to the address listed below. ERICOMP, Inc. will, at its option, repair or replace the product so as to cause it to operate in accordance with its current published specifications. All such repairs or replacements will be rendered by ERICOMP, Inc. without charge.

This warranty is limited to repair or replacement of the original unit.

DISCLAIMER AND LIMITATION OF LIABILITY

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHICH NOW OR HEREAFTER MIGHT OTHERWISE ARISE WITH RESPECT TO THIS PRODUCT. ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

IN NO EVENT WILL ERICOMP, INC. BE LIABLE TO YOU FOR ANY LOST PROFITS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR INABILITY TO USE THE PRODUCT EVEN IF ERICOMP, INC. OR AN ERICOMP, INC. AUTHORIZED REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY. ERICOMP, INC.'S MAXIMUM LIABILITY SHALL IN NO EVENT EXCEED THE AMOUNT PAID BY YOU TO ERICOMP, INC. FOR THE PRODUCT. SOME STATES IN THE UNITED STATES DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

In order to obtain warranty service, you must provide evidence of purchase date. For your convenience, keep the dated bill of sale or delivery ticket as evidence of the purchase date.

For service, call the ERICOMP, Inc. toll free HELPLINE at 1-800-541-8471 or if outside the U.S. call (619) 457-1888 .

ERICOMP, Inc.
6044 Cornerstone Court West, Suite E
San Diego, CA 92121

3517

1) Position of switch is off for all 10 characters

8 switches
sw 1

8 sw 2

(1-3) on switch 1
furthest to right
switches 6, 7, 8
second switch for (4→10)
all in off position

Manual for printer?
Dip switch

serial and/or mode of printer

DS position should be
inside cover should
be little block of on/off
switches ~ 10-12 of them.
Use pen pt to move

1) Condensed mode normal
2) Character table italics
3) Cut sheet feeder off
4) page len 11"
5) tear " mode off
6) 1" skip over perf. off
7) auto line feed off
8) input buffer capac, 1 Kbite
9) graphics print direction unidirection
10) character spacing 10/inch
11) 2 switches for #10

EriComp
Jim Whitney
for computer help

ERICOMP INC.

Ericomp, Inc.
6044 Cornerstone Court West, Suite E
San Diego, California 92121
Telephone: (619) 457-1888
Facsimile: (619) 457-2937

Dear Customer:

We are continuing our efforts to enhance the performance of your temperature cycler. Our engineering staff has developed a new "Turbo" software program which allows quicker cycling times for better results.

The "Turbo" software allows you to control the block temperature so the samples reach the appropriate temperatures more quickly. It also reduces the "near temperature" time so that the samples spend less overall time at high temperatures.

By controlling the block temperature, you are assured that your samples will reach the set point faster. The "in-sample" temperature probe prevents the sample itself from either overshooting or undershooting the set temperature.

The parameters which control the block temperature have been optimized for most laboratory environments. You may easily customize these parameters with a simple, menu driven operation if your conditions warrant modification. The attached sheet explains how this is accomplished.

We are confident you'll appreciate this improvement when you see it in action. If you have any questions on installation or functionality, please call our TOLL-FREE number (800) 541-8471.

Sincerely,

Jim Whitney
Customer Service Manager

Ericomp, Inc.
6044 Cornerstone Court West, Suite I
San Diego, California 92121
Telephone: (619) 457-1888
Facsimile: (619) 457-2937

PROCEDURE FOR SETTING THE BLOCK OVERSHOOT\UNDER SHOOT

1. Turn on instrument
2. Select BLOCK
3. Press O for MENU
4. Press AUX
5. Press SYS OPT
6. Screen will display current settings.
7. Press any key to access values.
8. Answer question and press "ENTER".
9. If the value is being changed, enter the new number and press"ENTER".
10. Repeat #8 and 9 as desired.

HELPFUL HINTS:

1. Each block is independent and has it's own settings.
2. To eliminate the BLOCK over/under shoot change the numerical value to "O" overshoot, "O" undershoot and "10" setpoint cooling (this is the minimum number).
3. The default values of overshoot = 20, undershoot = 18 and setpoint cooling = 50 are designed for the 0.5ml size block. For the 1.5ml block overshoot =46, undershoot = 18 and setpoint cooling = 50 are used. You may need to adjust these values depending on your line voltage or water pressure.
4. On the overshoot side; if you find the block doesn't cool far enough and the sample goes too high, increase the setpoint cooling by increments of 10 or 20. If the block cools too much, decrease the setpoint cooling.
5. On the undershoot side; if you find the sample cools too much, decrease the amount of undershoot by 2 or 3 (.2-.3 degrees C).

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OS/US - Overshoot/Undershoot

Creates an artificial set point for the Block temperature. When the sample temperature is within 1 degree of the true "in well" setpoint, the Block reverts to the same setpoint.

The numerical value entered is used in a formula in the software to calculate the artificial setpoint. A value of 10 = 1 degree c.

SETPOINT COOLING

Setpoint cooling works to control the block temperature overshoot. The volume of water used to bring the Block overshoot to the true setpoint is determined by the value used. The numerical value of 50 will reduce the Block temperature 1.5 degree c; the numerical value of 130 reduces the Block temperature 3 degrees c.

The normal Block heating works to control the temperature undershoot and does not require any user input.

B To Review Cycles and Steps:

1. With the **Main** Screen displayed,

Select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***2***

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 cycle

3. Select: ***1***

ENTER CYCLE NUMBER: __
BLK1 set 26.4 samp 23.1 blk 22.2 cycle

4. Select: **[N]**

ENTER CYCLE NUMBER: N
BLK1 set 26.4 samp 23.1 blk 22.2 cycle

*(Where **[N]** = cycle number desired.)*

5. Select: ***enter***

CYC 1 STP 1 TIME OX:XX:XX TEMP XX
BLK1 set 26.4 samp 23.1 blk 22.2 rev cycle

(Note: Use arrow keys ◀ ▶ to move backward and forward through steps and cycles.)

6. When review is complete, select: ***escape, escape***

C To Enter Time and Temperature Requirements for Cycles:

(Note: Cycles may be added when a program is running.)

1. With **Main** Screen displayed,

Select: ***0***

1 – Program 2 – Cycle 3 – Log 4 – Print 5 – AUX
BLK1 set 26.4 samp 23.1 blk 22.4 menu

2. Select: ***2***

1 – Review 2 – Edit 3 – Create
BLK1 set 26.4 samp 23.1 blk 22.2 cycle

3. Select: ***3***

CYC X STP X TIME :00:00 TEMP __
BLK1 set 26.4 samp 23.1 blk 22.2 cre cyc

4. Select: **[N]**

CYC X STP X TIME :00:00 TEMP NN
BLK1 set 26.4 samp 23.1 blk 22.2 cre cyc

*(Where **[N]** = Number desired for temperature)*

(Note: Maximum allowable temperature entry is 110°. Minimum allowable temperature entry is 4° C.)

(Note: Any one, or more time elements may be entered for required time. Hours minutes, and seconds may be entered or only seconds, and so forth.)