

# HyDAC<sup>®</sup>

## ***MODU-MAX***<sup>®</sup>

BIOCIDE II INSTRUCTION MANUAL



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## BIOCIDE II MANUAL

### Introduction

This manual describes the Biocide II module of the HyDAC Modu-Max System of modular water treatment controllers. This module is intended for use with other control modules of the Modu-Max systems or alone with the necessary supporting modules.

The Biocide II is a programmable timer for biocide injection into cooling towers. It is capable of controlling two pumps, with the START time for each pump completely selectable. The pump DURATION, the time the pump will run, may be set to as much as 23 hours and 59 minutes for each start time. It can also provide, for each start time, a LOCK-OUT function to disable the normal bleed control for any time up to 23 hours and 50 minutes after the pump has completed its DURATION.

A biocide controller will normally accompany a conductivity controller. A typical system would have the following: "B" enclosure #015109 with bottom plate #015476 Tower conductivity controller #015294, Biocide II controller #016092, Relay Driver "Pump A" #015182 Relay-Driver "Pump B" #015183, 3 Relay modules #203072, Switch Operated module "NO FLOW" #015180, a pre-plumbed, prewired piping assembly #015439 and a solenoid valve 034676. However, the details of the conductivity control are omitted from this manual for clarity. (See Modu-Max Conductivity Control Manual for Cooling Tower Operation 010189, obtainable from Beta Technology Inc.

Details of the electrical and mechanical installation of a system are shown in the instruction manuals accompanying the complete system. Mounting dimensions for the various enclosures in the Modu-Max line are included for references. See Figure II.

### Installation Preparation

In addition to the installation planning needed for the conductivity control system, it is necessary to provide for the addition of the biocide chemical/s to be fed under the control of the Biocide II.

Survey the water system and locate convenient access point/s for the addition of chemical treatment. Figure I shows a typical installation diagram for the biocide pumps. If the main circulating pump is turned off frequently, the Biocide II controller should be programmed to account for this. If this is not possible, a flow switch and Modu-Max "add-on" module is available from BETA, which should be ordered with the complete controller package. Contact factory for details. As an alternative, an inter-lock arrangement can be used to interrupt power to the chemical pump/s when the circulating pump is off. The clock in the Biocide II will keep running even with the power off so power interruptions will not affect the programming.

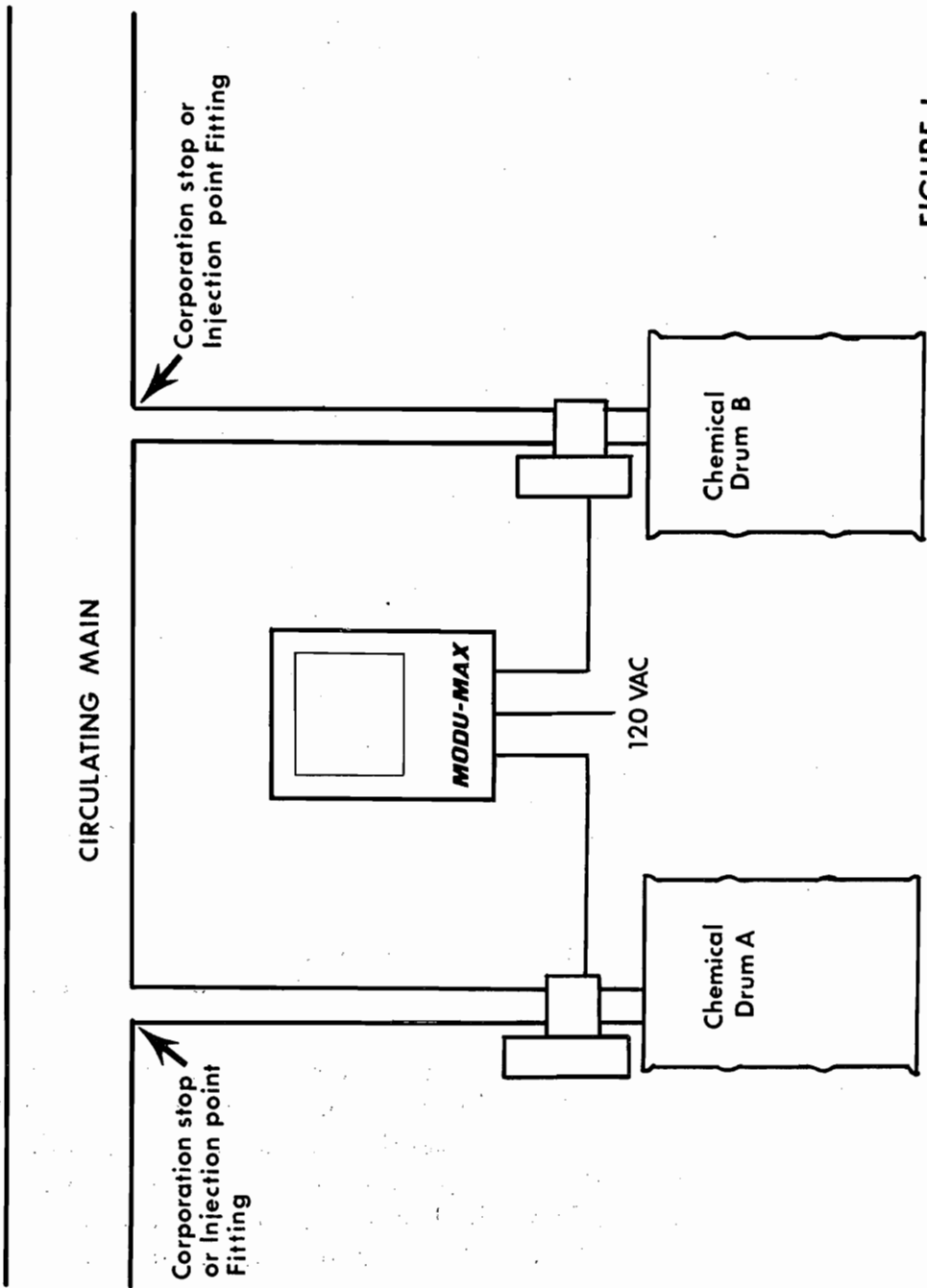


FIGURE I

Note: Both pump outputs could be combined to use (1) corporation stop; check valves are recommended.

## Controller Programming, Checkout and Operation

### 1. Start-Up

Open the windowed door and turn the Modu-Max POWER switch to the "ON" position. The Biocide II display will switch between a time display, a date display and (sometimes) "NO FEED".

### 2. Pump Check

Place Pump A and Pump B feed switches (ON-OFF-AUTO) in "ON". The Pump "A" and Pump "B" lights should be illuminated and the pumps should be ON. Place switches in "AUTO". The pumps may be either ON or OFF depending on the state of the program. The pump operation should correspond with the state of the indicators "A" and "B" on the time display. See OPERATION for more detail. If the pump light/s is illuminated, that pump should be ON.

### 3. Operation

During normal operation, the display alternates between "WK # DAY" and "HR:MNxxx". "NO FEED" may also be included as a third display sequence.

The "WK # DAY" display shows the day of the week, and the week number. The maximum week number may be set during programming to be from 1 to 4. The day is, of course, "SUN" through "SAT".

The "HR:MNxxx" display shows the time on a 24 hour basis and symbols for the operations. An "A" shows if pump A is to be running, a "B" shows if pump B is to be running and an "L" shows if the bleed lockout is engaged.

The "NO FEED" display indicates that the power was off for more than one hour.

If it is desired to show the time and operation continuously, pressing the two push buttons in the proper sequence makes this possible. Push and hold SELECT (the right hand button). Then, push ENTER (the left hand button) and release it, and then release SELECT. The display will now show the time and operation (i.e., "A", "B" and/or "L") continuously. Repeating this sequence (hold SELECT; push and release ENTER, release SELECT) will cause the display to remain in the "WK # DAY" mode continuously. Repeating the same sequence again will return the display to the alternating mode. "NO FEED" is canceled by pushing and releasing SELECT.

The clock continues to run even if the power is turned off, or if the supply is interrupted. Since many installations may suffer power outages of several minutes, it is possible that a pump START operation might be missed during an outage. To minimize problems of this sort, the Biocide II incorporates power failure protection. This is entirely automatic, so the user need not program it. Should the power be interrupted for LESS than ONE HOUR, the unit will "catch up" when the power is returned. Any pump that should have started during the outage will start when the power is returned and will run for the programmed period of time. If the power is out for MORE than ONE HOUR, any event occurring during the power outage will be missed, any pump running before the interruption will be canceled and any lockout will be canceled. In that case, the display will show "NO FEED" as a third cycle during the normal display. This display is canceled by pushing and releasing SELECT.

Even when this display is showing, the operation is otherwise completely normal. Only those functions which should have occurred during the outage will have been skipped. Obviously, if nothing was programmed to occur during that time, no operation will have been missed.

If the power is interrupted during a programmed pump or lockout period, the operation will resume when the power is returned and will continue until the programmed time has elapsed. For example, suppose Pump A was to start at 22:15 and to run for 30 minutes. The power is interrupted at 22:30 and returns at 23:00. The pump will run from 22:15 until 22:30 when the power failed. The pump will start again when the power is restored at 23:00 and will run until 23:15. The total pumping time would have been the 30 minutes programmed. Similarly, the lockout time would have been extended. However, if the power had been interrupted at 22:00 and remained out until 23:01, Pump A would NOT run, the lockout would NOT be engaged and the "NO FEED" display would be shown.

#### 4. Programming

The programming is accomplished from a menu of functions. To enter the programming mode, a special sequence using the push buttons is required.

First, push and hold SELECT. In approximately three seconds, the display will show a line of "X"'s. Release SELECT, and push and hold ENTER. In approximately three seconds, the display will change to a line of "\*"s. Release ENTER, and the display shows "PROGRAM". Repeatedly pushing SELECT will display the menu items one at a time.

The menu items are:

- "SET OPER"
- "CLEAR ?"
- "REVIEW"
- "MAX WEEK"
- "SET CLCK"
- "OPERATE"

Each of these is explained below, starting from the bottom of the menu and working up.

If, at any time in the programming mode, neither push button is operated for about one minute, the display will return to the OPERATE mode. This eliminates the problem of forgetting to return to OPERATE, or being interrupted while programming.

**OPERATE** - "OPERATE" is the last item and is the one from which normal operations can be entered. Pushing ENTER will return the Biocide II to the normal display and to the running state. Pushing SELECT will return the display to "PROGRAM" where SELECT will again step through the menu.

**SET CLCK** - "SET CLCK" is selected by stepping through the menu until the display shows "SET CLCK". Pushing ENTER will select this item, and the display will show "WK # DAY", with the actual week number and day shown. The number and the day will blink, indicating what function is being set. Pushing SELECT and holding it will increment the day and the week number at about two days per second. Release the button when the desired day and week is shown. The week number will increment only to the value permitted by this setting. This will be set at 4 when the Biocide II is shipped.

Once the desired day and week have been selected, pushing ENTER will cause the display to show the time, as "HR:MN". Hours will be blinking. Pushing SELECT and holding it will increment the hours at about two hours per second. The maximum is 23 with the display showing 00 for the hour after midnight. Release the button when the desired hour has been selected.

Once the desired hour has been set, pushing ENTER will cause the display to blink the minutes. Pushing SELECT and holding it will increment the minutes through 59. Release the button when the desired minutes have been selected.

Once the desired minutes have been set, pushing ENTER will show "SAVE ?" on the display. Pushing ENTER at this time will set the clock and set the menu to "OPERATE". Pushing SELECT at this time will not set the clock, but will set the menu to "OPERATE".

If, at any time during the "SET CLCK" menu, it is desired to return to "OPERATE", push and hold ENTER, and then push SELECT. The display will show "OPERATE", from which normal operation may be resumed or more programming may be done. If this was done, the clock will not be set.

**MAX WEEK** - "MAX WEEK" establishes the number of weeks in the operating cycle. It may be set at 1, 2, 3, or 4. This is the number of weeks that will be controlled by the Biocide II. The week number will return to 1 at midnight Saturday of the maximum week; that is, at the end of week 1, or the end of week 2, or 3, or 4.

To set the maximum week, step through the menu until the display shows "MAX WEEK". Push ENTER and the display will show "MAX WK #", where "#" is the maximum week. Push SELECT to increment the "#". It will return to "1" after it reaches "4", so that the greatest number of weeks cannot be more than "4".

Pushing ENTER will return the display to "OPERATE".

**CLEAR ?** - "CLEAR" erases all pump operating data from memory except the "MAX WEEK" value. It also stops any pumps that may have been running and clears the LOCK-OUT if it was set.

To "CLEAR", step through the menu until the display shows "CLEAR ?", push ENTER and the display will show "SURE ?". Pushing ENTER again will clear the memory and the display will show "CLEARED". Pushing ENTER or SELECT will return the menu to "OPERATE". If, for some reason clearing becomes undesirable when the display shows "SURE ?", pushing SELECT will return the display to "OPERATE", without clearing the memory.

**REVIEW** - "REVIEW" shows all the programmed events, in order of time, starting with SUN WK 1, 00:00 and ending with SAT WK (max), 23:59. The display will show each event number, with day, time and function available by pushing a button. No programming is possible from this menu. To program, use "SET OPER".

To enter, step through the menu until the display shows "REVIEW". Push ENTER and the display will show "WAIT". A short while later, the display will show EVENT (x), whichever event is first in time. Pushing SELECT will change the display to show (DAY) WK (#), whatever day corresponds with the event number. Pushing SELECT again will show "AS HR:MN". This is the starting time for Pump A, for the displayed event. (If the event were for Pump B, the display would show "BS HR:MN"). Pushing SELECT again will display "AD HR:MN". This is the duration time for pumping. (Again, "B" would show for Pump B).

Pushing SELECT again will display "AL HR:MN". This is the lockout time for the displayed event.

Note that "A" or "B" shows which pump has been selected. The "S", "D" or the "L" shows which function, START, DURATION, or LOCKOUT is being displayed.

Pushing ENTER will show "WAIT" again and a short time later, the second event (in order of time) will be displayed. Use SELECT to see the day and time, etc.

Pushing ENTER again will find the next event. After the last event has been found and after "WAIT", the display will show "ALL DONE". Pushing SELECT will re-start "REVIEW". Pushing ENTER will return the display to "OPERATE".

If "REVIEW" is entered when no pump events have been programmed, or after "CLEAR ?" has been executed, the display will show "NONE FND" instead of "ALL DONE".

At any time, except when the display shows "WAIT", pushing and holding ENTER and then SELECT will return the display to "OPERATE".

The waiting time between initiating "REVIEW" and the first result and the time between results may sometimes seem quite long. "REVIEW" must search every minute of every hour of every day of the number of weeks set as maximum. It may take as much as five minutes to find the events.

**SET OPER** - "SET OPER" is the menu item which sets and stores the pump operating data. Setting up the pump operation is accomplished in six steps. First, an event number is chosen. Up to 64 events may be chosen. Second, a WEEK # and a DAY are chosen. The WEEK may be any number allowed by MAX WEEK, while the day of course ranges from SUN through SAT. Third, the pump which is to run is selected. Fourth, the time at which the pump is to START is selected. Fifth, the DURATION of the pump run is set. Sixth, the LOCK-OUT time is selected.

To set pump operations, step through the menu until the display shows "SET OPER". Push ENTER, and the display will show "EVENT #". The number may be anything from 1 through 64. Pushing SELECT will increment the event # from 1 through 64. If this section has just been selected from the menu, it will show 1. If other events have been set, it will show the last event set.

Pushing ENTER will advance the display to "x PUMP". The "x" will be "\*", "A" or "B". The letter is the pump selected. If the "\*" shows, it means that no pump is selected for this event. This provides a convenient way to delete one event without resetting it. Pressing SELECT will change the display to the next pump, "\*", "A", "B" in rotation and a statement of "NONE" will be displayed if ENTER is pushed.

Pushing ENTER will change the display to "WEEK # DAY" with the "# DAY" blinking. Push and hold SELECT. The day will increment at about two days per second, advancing the week # when the day goes from "SAT" to "SUN". The week # will return to 1 after the value set for maximum week has been reached. Release SELECT when the desired day and week are showing.

Pushing ENTER will advance the display to show "xS HR:MN", where the "x" is the selected pump (A or B) and the HR:MN is the time the pump will start. The "HR" digits will be blinking. Push and hold SELECT. The hours will increment at about 2 hours per second, and will return to 00 after 23. Release the button when the desired hour has been set.

Push ENTER and the "MN" digits will be blinking. Push and hold SELECT and the minutes will increment at about 2 minutes per second. Release the button when the desired minutes have been set. The minutes return to 00 after 59.

Pushing ENTER will advance the display to show "xD HR:MN" where the "x" is the selected pump (A or B) and the HR:MN is the length of time the pump will run. The "HR" digits will be blinking. Push and hold SELECT. The hours will increment at about 2 hours per second, and will return to 00 after 23. Release the button when the desired hour has been set.

Push ENTER and the "MN" digits will be blinking. Push and hold SELECT and the minutes will increment at about 2 minutes per second. Release the button when the desired minutes have been set. The minutes return to 00 after 59.

Pushing ENTER will advance the display to show "xL HR:MN" where the "x" is the selected pump (A or B) and the HR:MN is the time the LOCK-OUT will be engaged.

The "HR" digits will be blinking. Push and hold SELECT. The hours will increment at about 2 hours per second and will return to 00 after 23. Release the button when the desired hour has been set. Push ENTER and the "MN" digits will be blinking. Push and hold SELECT and the minutes will increment at about 20 minutes per second in increments of 10's of minutes. Release the button when the desired minutes have been set. The minutes return to 00 after 50.

Note that the "A" or the "B" shows which pump is being programmed, while the "S", "D", or "L" shows the function being programmed; "S" for START, "D" for DURATION and "L" for LOCKOUT.

Push ENTER and the display will return to "EVENT #". Another "EVENT" may be chosen for programming at this time.

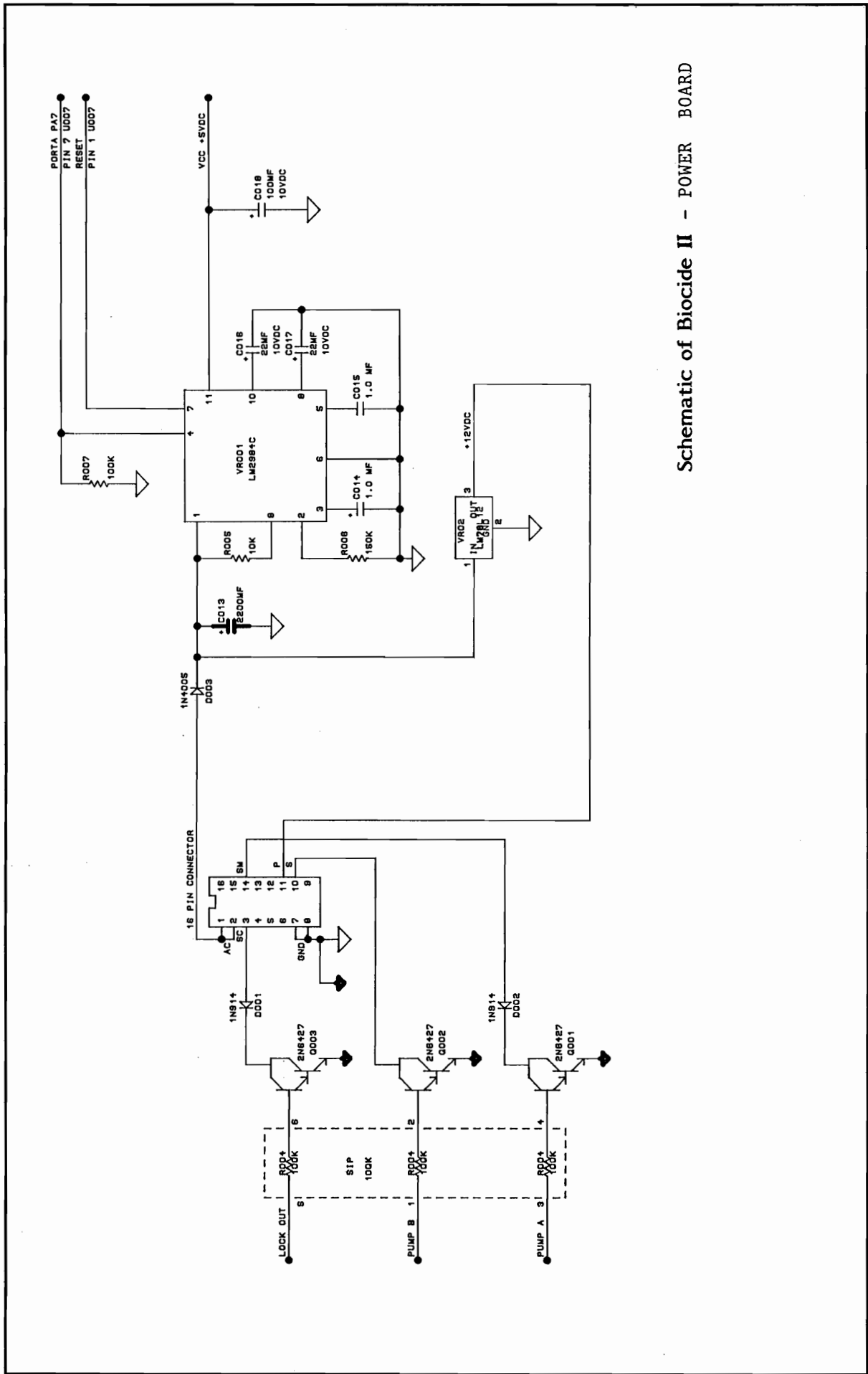
At any time in "SET OPER", pushing and holding ENTER and then pushing SELECT will return the display to "OPERATE".

All values are stored in memory at the time they are set, so be sure that you have set the values you desire. It is NOT necessary to complete a sequence to change one item. For example, if only the starting time of Pump B is to be changed, advance the display through the event #, the week and day, until the display shows "BS HR:MN" with HR blinking. All this may be done by successive operations of ENTER. Once the HR blinking is shown and is flashing, it may be changed by SELECT. Pushing ENTER will advance the display to MN blinking. SELECT will advance this. Pushing and holding ENTER and then pushing SELECT will store the change and return the display to "OPERATE".

MODU-MAX TROUBLE SHOOTING  
GUIDE

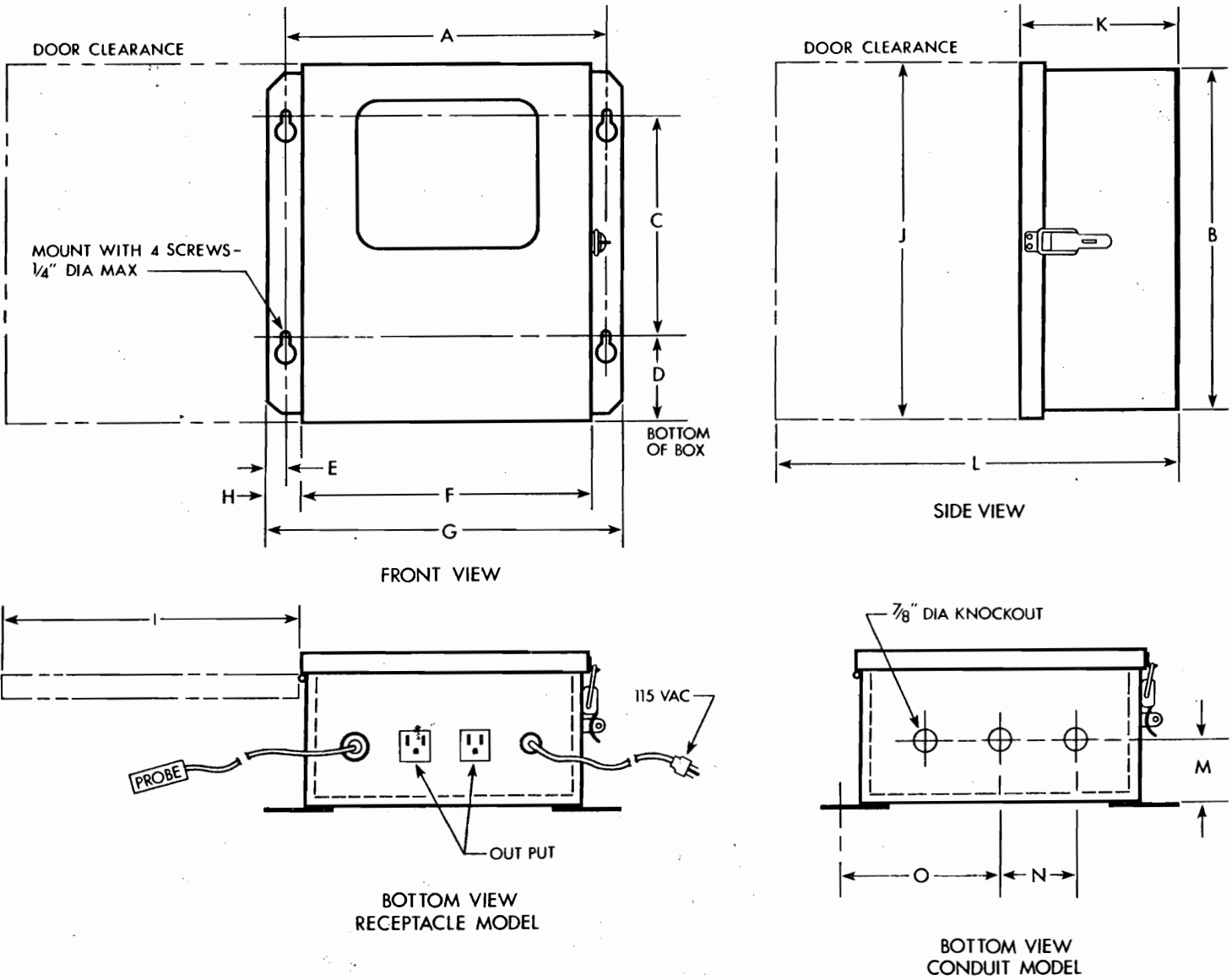
<u>Symptom</u>	<u>Possible Cause</u>	<u>Remedy</u>
Time and Day of the Week display does not light	Defective or loose wiring	Check cable connectors
	Blown fuse in the controller	Replace fuse. P/N 016666 (Bus GLH or equivalent)
	No power to the controller	Check switches; circuit breakers/fuses and wiring
	Defective display	Replace control module, P/N 016092
	Defective controller	Replace control module, P/N 016092
<hr style="border-top: 1px dashed black;"/>		
Pump "A" and Pump "B" lights do not come on	No program set	Program pump times (set oper mode),
Pump/s do not come on	Defective pump	Check pump in wall receptacle, 120 VAC
	Defective relay	Replace relay, P/N 013320
	Defective module	Replace P/N 301297 or 015183
	Defective or loose wiring	Check cable connectors
<hr style="border-top: 1px dashed black;"/>		
Controller fails to follow program	Defective controller	Replace P/N 016092
		<b>Important</b> - Recheck the program at least once before judging the controller to be defective





Schematic of Biocide II - POWER BOARD

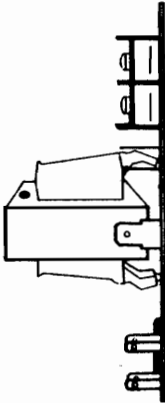
# MECHANICAL AND MOUNTING DIMENSIONS



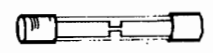
A-size box	B-size box	C-size box
A=10-5/8"	A=13-3/4"	A=16-1/4"
B=11-3/8"	B=14"	B=17"
C=7-3/8"	C=10"	C=10"
D=2-17/32"	D=2-17/32"	D=4"
E=5/8"	E=5/8"	E=5/8"
F=9-3/4"	F=12-7/8"	F=15-3/8"
G=11-15/16" (max.)	G=15-1/32" (max.)	G=17-17/32"
H=1-5/32"	H=1-5/32"	H=1-5/32"
I=10" (max.)	I=13-1/8" (max.)	I=15-5/8"
J=12" (max.)	J=14-1/2" (max.)	J=17-1/2"
K=5-3/8" (max.)	K=5-3/8" (max.)	K=5-3/8"
L=14-1/4" (max.)	L=17-3/8" (max.)	L=19-7/8"
M=2-1/16"	M=2-3/16"	M=2-3/16"
N=2-1/16" (typ.)	N=3" (typ.)	N=3" (typ.)
O=5-5/16"	O=6-7/8"	O=8-1/8"

Figure II

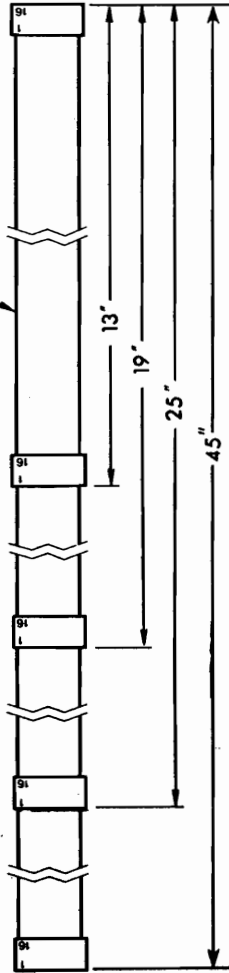
# PARTS LIST



**Transformer Assembly**  
 (Shown) P/N 013184 - A Enclosure  
 P/N 013150 - B Enclosure  
 P/N 013151 - C Enclosure



P/N 016666

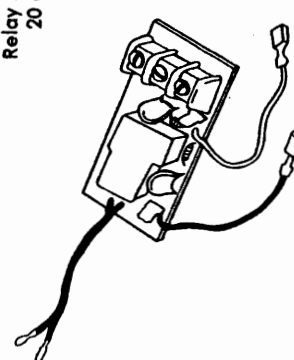


BROWN LEAD OR  
 COLORED STRIPE

031506, 5 REQ'D  
 031498


010973, 5 REQ'D

**Cable Assembly**  
 P/N 012921 - 4 connectors (A enclosures)  
 P/N 012969 - 5 connectors (B or C enclosures) - shown  
 P/N 013089 - 6 connectors (B, C or AR/BR enclosures)




Relay Module  
 20 amp

P/N 013320



ENTER SELECT

LOCKOUT  
 PUMPS



Power Switch, P/N 01097

Biocide Control Module P/N 016092

## LIMITED TWENTY-FOUR MONTH WARRANTY

Beta Technology Incorporated ("BETA") warrants each new item of HyDAC brand equipment manufactured and sold by BETA to be free from defects in materials and workmanship under normal use and operation in accordance with "BETA" instructions and use directions for a period of twenty-four (24) months from date of delivery to the original purchaser. **Exception:** pH probes are only guaranteed to be operational at the time of delivery. All claims must be submitted in writing within 30 days from the date of shipment from BETA.

BETA's obligation under this warranty are limited to the repair or replacement of any such item of equipment (or part thereof) shown to be defective or, at BETA's option, to refunding the purchase price of any such defective item of equipment less a reasonable allowance for prior use. Each item of equipment for which a warranty claim is asserted shall, at the request of BETA, be returned on a prepaid basis to BETA's factory at the expense of the purchaser. Replacement parts furnished by BETA shall be warranted as stated above for the unexpired portion of the original twenty-four (24) month warranty. This does not extend to any item or part subjected to misuse, accident, improper installation, maintenance or application, improper packing by purchaser in return shipment to BETA, or to any item or part repaired or altered outside of BETA's factory without the express prior authorization of BETA.

THE FOREGOING WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR PARTICULAR PURPOSE. IT IS EXPRESSLY UNDERSTOOD THAT PURCHASER'S SOLE AND EXCLUSIVE REMEDY IS LIMITED TO ENFORCEMENT OF BETA'S OBLIGATION AS SET FORTH ABOVE AND BETA SHALL NOT BE LIABLE TO PURCHASER OR OTHERS FOR LOSS OF USE OF THE EQUIPMENT OR FOR OTHER DIRECT, SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES.