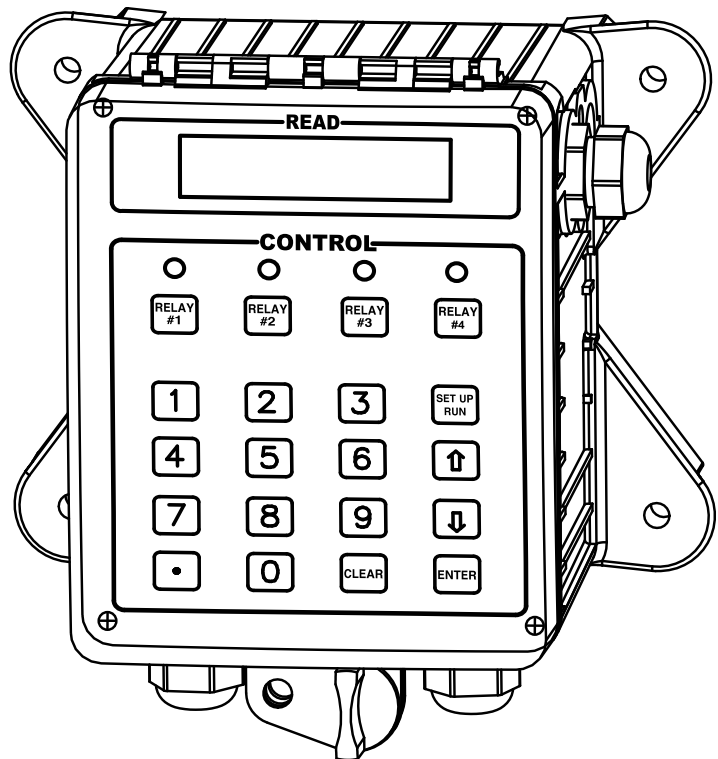


# MicroTron Tower Controller

## *Installation Maintenance Repair Manual*



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5/09

# MicroTron Tower Controller

## Instruction & Maintenance Manual

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*Instructions herein apply to all MicroTron tower controllers.  
Additional options described in this manual may or may  
not be present on your unit. Refer to Model Numbering on Page 3.*

## I. Introduction

MicroTron controllers are microprocessor based menu driven units for control of recirculating and other water applications. All settings are entered into the controller through a simple front panel keypad which includes relay test keys.

### Model Numbering

MicroTron controllers have several base functions and optional features available. Your unit may be supplied with one or more of the options that are described in this manual. To determine what features apply to your unit, check the model number label located on the controller enclosure.

#### Base Functions

All model numbers can be broken down as follows and will start with an **M** or **L**.

<b>M</b>	MicroTron with a VFD display
<b>L</b>	MicroTron with an LCD display
<b>C</b>	Conductivity Control
<b>C-0</b>	Conductivity Monitor only
<b>C-2</b>	Adds make-up conductivity function
<b>F</b>	Single programmable feed timer
<b>F-2</b>	Dual feed timers
<b>F-3</b>	Triple feed timers
<b>F-4</b>	Quadruple feed timers
<b>F-5</b>	Five feed timers
<b>B</b>	Single 28 day timer
<b>B-2</b>	Dual 28 day timers
<b>B-3</b>	Triple 28 day timers
<b>B-4</b>	Quadruple 28 day timers
<b>P</b>	pH control
<b>P-0</b>	pH monitor only
<b>P-2</b>	pH control with dual set points
<b>R</b>	ORP control

#### Optional Features

This list represents our most popular options.

<b>A</b>	Conduit connections
<b>A-6</b>	On/Off power switch
<b>A-7</b>	Lower enclosure
<b>C-1</b>	0-5V non-isolated output
<b>C-4</b>	Single 4-20mA non-isolated output
<b>C-6</b>	Single isolated 4-20mA output
<b>D</b>	220 V service (conduit only)
<b>E</b>	Mounted flow switch assembly
<b>M</b>	Alarm relay options
<b>M-1S</b>	Sonic alarm buzzer with silence switch
<b>N</b>	Non standard conductivity scales
<b>Q</b>	Alternate electrodes
<b>R</b>	Molex connector on conductivity electrode
<b>V</b>	Digital input for bleed-off water meter
<b>W</b>	Power relay 1.5 HP max, 25 amps
<b>X</b>	Tank low level alarms
<b>Y</b>	Bleed flow alarm (requires flow switch)
<b>Z-6</b>	One water meter input for each chemical feed timer
<b>Z-11</b>	Lockout chem feed with low conductivity alarm
<b>9</b>	Paddle wheel flowmeter input

**Note:** The list of functions and options represents past and current offerings. Some of these may no longer be available on new units, but are listed for reference.

## II. Description

### Control Functions

Each of the control functions is based on an analog input from a probe and will include user settable relay control settings along with a High and Low Alarm setting and Limit Timer. Each control function will include a control relay output. When the reading reaches the Set Point the control relay is activated until the reading changes by the Differential amount.

1. **Conductivity** - The conductivity function of the controller is designed to monitor and control Total Dissolved Solids (TDS) in a recirculating system like a cooling tower in terms of electrical conductivity measured in MicroSiemens/cm. This control function is also referred to as bleed. Units with conductivity and the make-up conductivity function can control the TDS of the tower system to a cycles of concentration by calculating the difference between the incoming make-up water's conductivity and the system's conductivity
2. **pH** - The pH function monitors and controls pH on a scale of 0-14 pH units.
3. **ORP** - The ORP function monitors and controls ORP on a scale of +/- 999 mV.

### Chemical Feed Timers

Selectable Chemical feed timers (base function F) are designed to automate the addition of various chemicals by activating a relay output. Multiple timers can be supplied depending upon the model number and each timer will include a relay output. All timers can be programmed to be one of the following types.

1. **Pulse Time** - This timer accepts dry contact pulses from a make-up water meter (supplied separately). It can accumulate 1-99 pulses to activate the timer to run from 0-99 minutes in minutes and seconds.
2. **Feed with Bleed** - This timer activates the relay output simultaneously with the bleed. The timer can limit the amount of time the relay output will be on during the bleed cycle, thereby preventing chemical overfeed.
3. **Feed after Bleed** - This timer activates the relay output based on a user defined percentage of the bleed off time. The relay is activated after a bleed cycle and runs for the set percentage of that bleed cycle. A limit time can also be set for the maximum amount of time the timer can run for one cycle.
4. **Percentage** - The relay is on for a percentage of a continuously repeating cycle time. The percentage timer can be set from 1 to 99% and the cycle time can be set from 1 second to 99 minutes and 59 seconds.

### 28-Day Feed Timers

28-day feed timers, typically used for biocide feed are based on a 28 day cycle with two independent programmable feed cycles allowing for feed on selectable days and weeks. The biocide timers also include prebleed and bleed lockout settings. Multiple timers can be supplied depending upon the model number and each timer will include a relay output.

### III. Installation

#### Electrical Wiring

The standard MicroTron Tower controller has an internal regulated power supply that will operate in the range of approximately 100 to 240 VAC on the incoming wiring. Output relay(s) are protected with a replaceable fuse. Each relay's output voltage will equal incoming line voltage.

Prewired units are supplied with a 16 AWG cable with 3-wire grounded USA 115 volt plug for incoming power and 18 AWG 3-wire grounded U.S.A. 120 volt receptacle cords for all control relay outputs.

Conduit units are supplied with connectors located in the lower section of the controller. Remove the screws of the lower panel for access and to view wiring diagram.

**NOTE: Liquid tight fittings and labeled signal lead cables are provided for all signal (low voltage) connections, such as water meter, low drum level, flow switch and 4-20mA outputs.**



#### **WARNINGS:**

1. The controller should be connected to its own isolated circuit breaker, and for best results, the ground should be a true earth ground, not shared. Wiring must be done according to all applicable local codes.
2. Power (line voltage) must be disconnected while making any connections. If power is supplied to the unit, line voltage will be present on the relay cards.
3. Low voltage signal wires (probes, flow switch, water meter, etc.) should never be run in conduit with high voltage wires.

**NOTE: Liquid tight fittings and some labeled signal leads are provided for all signal (low voltage) connections for both pre-wired and conduit units.**

#### Mounting Instructions

Select a mounting location that provides the operator easy access to the unit and a clear view of the controls through the cover of the controller. The location should be convenient to grounded electrical connections, the required sample line plumbing, and installed on a stable vertical surface.

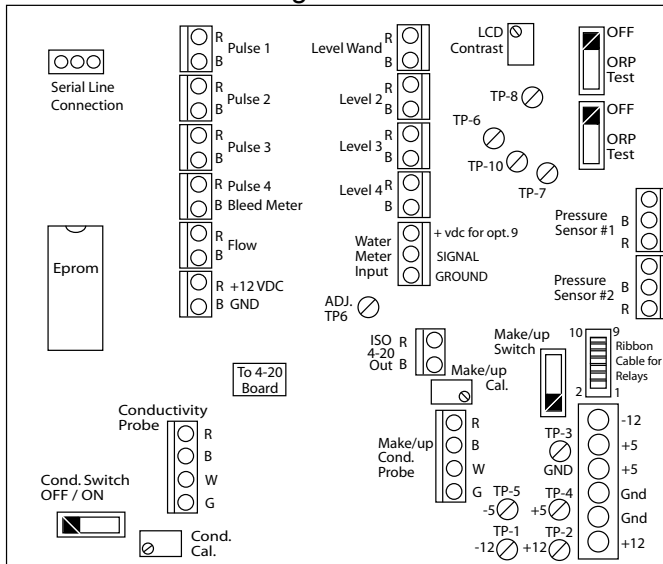


#### **WARNINGS:**

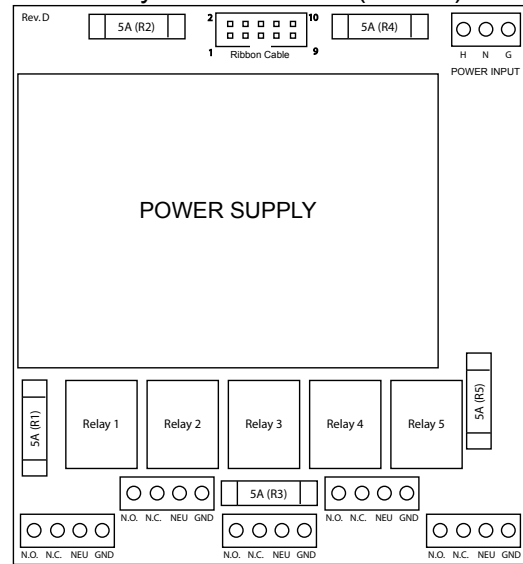
Avoid locations that expose the controller to direct sunlight, vapors, vibration, liquid spills or extreme temperatures; less than 0°F (-17.8°C) or greater than 120°F (50°C). EMI(electromagnetic interference) from radio transmissions and electric motors can also cause damage or interference and should be avoided.

## Conduit Layout for LCD Display

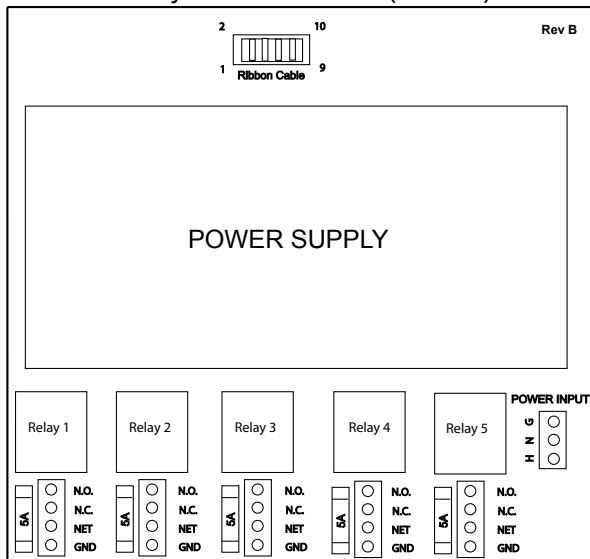
Logic Board



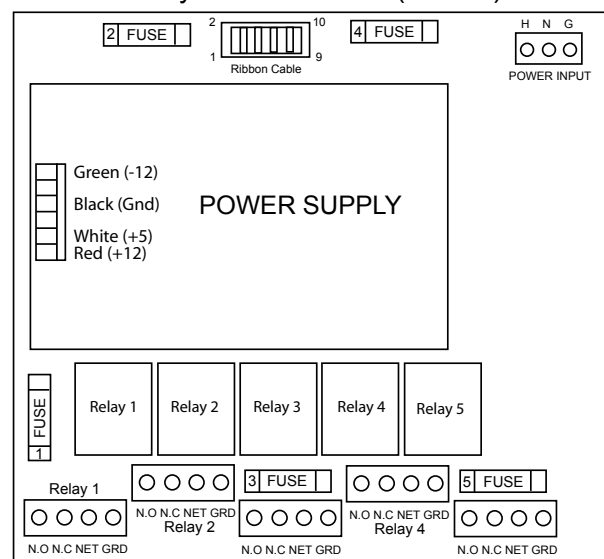
Relay / Power Board (Rev. D)



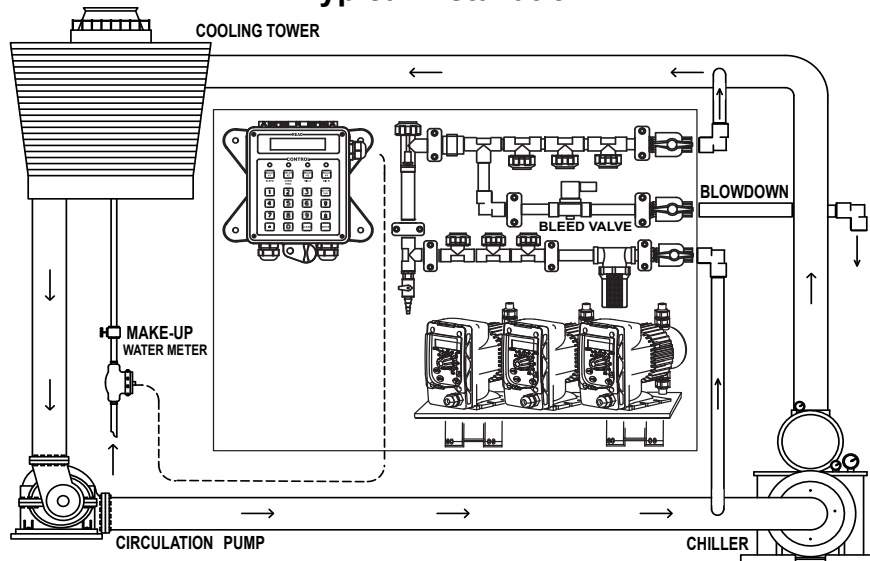
Relay / Power Board (Rev. B)



Relay / Power Board (Rev. C)



## Typical Installation



## Electrode Installation

MicroTron tower controllers may come configured for various recirculating water systems. Listed below are instructions for typical cooling tower installations. Your specific installation requirements may differ but should conform to these instructions as much as possible for proper operation.

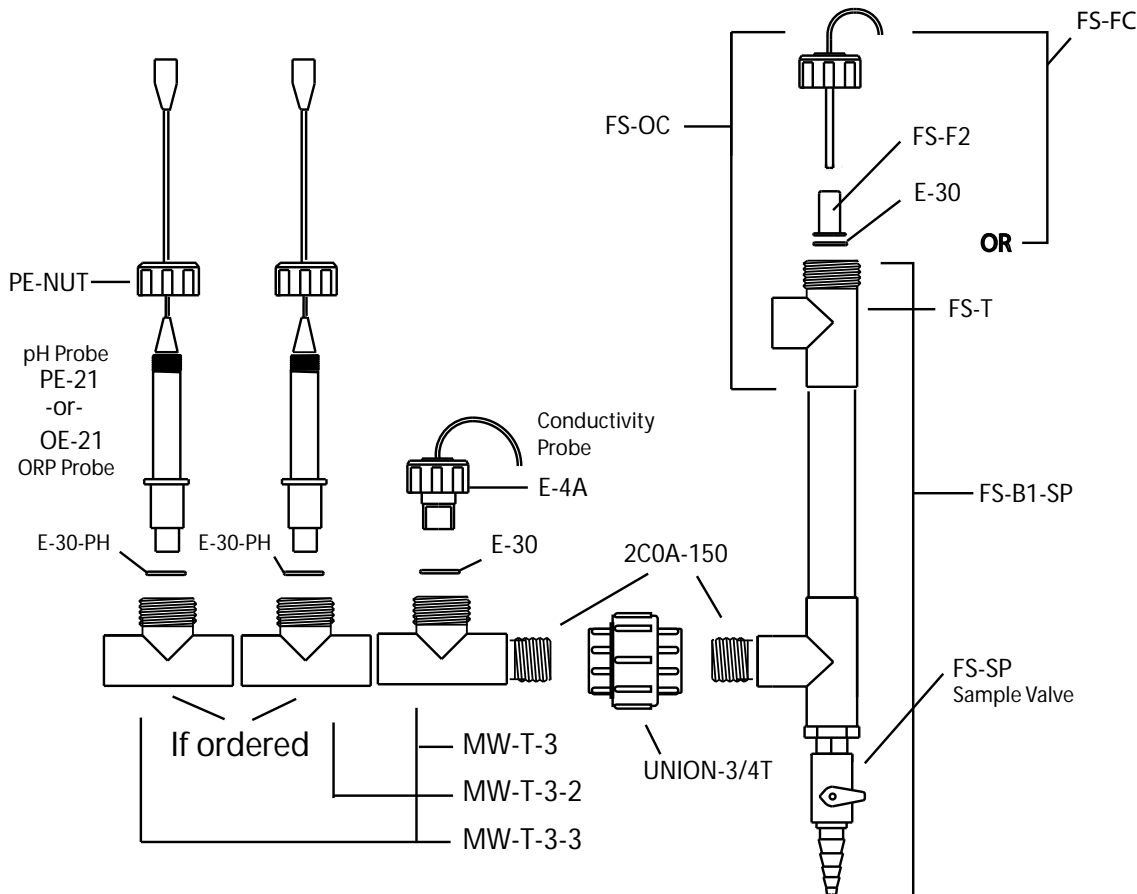
The standard probe(s) and/or flow assembly for cooling tower installations is constructed of schedule 80 PVC and supplied with  $\frac{3}{4}$ " slip fittings for installing into a sample line. To insure proper operation the sample line must have a flow rate of 3-10 gpm. Inlet pressure must be higher than outlet pressure in order for water to flow past the electrode(s) at the required rate. The probes are temperature compensated for increased accuracy.

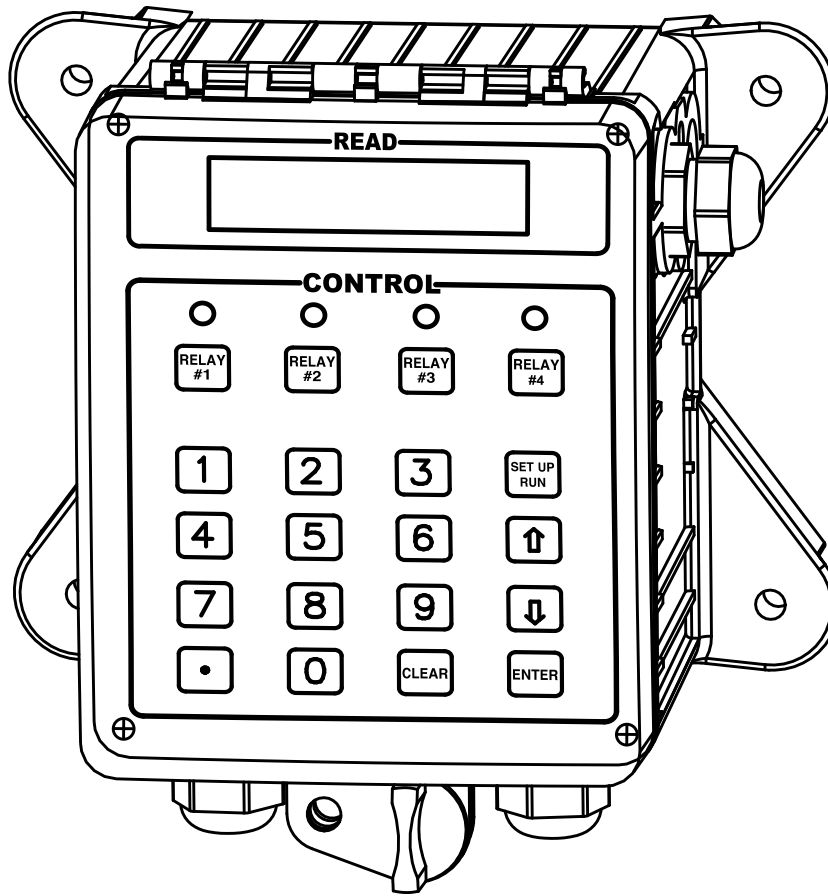
### NOTES:

1. Install an isolation valve on either side of the flow assembly so electrodes can be easily isolated for removal and cleaning.
2. A line strainer is recommended upstream from the probes to protect against fouling and damage.
3. Mount pH electrodes vertically.
4. Units with a flow switch require the needed flow rate to operate the relay outputs.
5. Tap points for sample line should not be at the top or bottom of the supply piping to reduce air or debris introduction to sample line.

### WARNINGS:

1. Electrodes are O-ring sealed, which if damaged will cause a leak.
2. Do not allow pH sensor tips to dry out, damage will occur.
3. Do not exceed a water temperature range of 32°F to 140°F.
4. Do not exceed a maximum pressure of 150 psi.





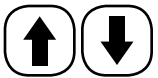
#### IV. Front Panel Description

READ: 1x16 (1/4") Alpha Numeric Display.

CONTROL: Relay 1, Relay 2, Relay 3, Relay 4 - HOA switches for control relays.



**SET UP/RUN key** - System initializes into RUN mode. Press this switch to toggle the controller from SET UP mode to RUN mode.



**UP/DOWN arrows** - Used to change the display from one line to the next. All menus are circular, so when all items in a menu have been displayed, the display will return to the originally displayed item.



**ENTER key** - Used to access a menu and to log a changed value into the program.



**CLEAR key** - Used to clear numerical values from items being changed in the SET UP mode.



**DECIMAL key** - Used at certain places to change a function or displayed items. For example, when temperature is being displayed, pressing the DECIMAL key will change the reading from Fahrenheit to Celsius or visa versa.



**NUMERICAL keys** - Used to enter new values in the SET UP mode.



## V. System Operation Overview

MicroTron controllers have two modes of operation, RUN and SET UP. Both the RUN and SET UP menus are circular. Pressing the DOWN key in either menu will display the next line of information on the display. After the last item in a menu has been displayed, pressing the DOWN key will return the display to the top line of that menu.

**RUN MODE -** This mode is for normal operation. The control relays will only be automatically activated in this mode. In the RUN mode the display will read system values. If an alarm is present the display flashes with the alarm status.

The RUN menu will display values such as conductivity, pH, day, time, date and other values depending upon the features present on the unit. The unit will automatically return to the RUN mode if no keys are pressed for three minutes.

**SET UP MODE -** This mode is used to make adjustments to settings and readings on the controller. To access the SET UP mode from the RUN screen, press the SETUP/RUN key. Use the up or down arrow to scroll through the various SET UP menus. When you want to enter a specific SET UP menu, press the ENTER key. Once you have entered a SET UP sub menu you will be able to step through that menu's options with the down arrow key.

Relays may be forced on while in the SET UP mode. Press the desired relay test key to force it on. Press it a second time to turn it off. Once the unit returns to the RUN mode, relays will activate automatically.

The relay 4 test key will activate relay 4 on the first press, then will activate relay 5 on the second and will turn both 4 and 5 off on the third.

### A. Description of SET UP Menu Screens

The SET UP menu is the main menu circle of set up sub-menus used to customize your unit to the particular parameters needed for your installation. Listed on the following pages is a description and menu map of each SET UP menu.

#### NOTES:

1. Your unit may not have all of the SET UP menus listed depending upon your model number.
2. After you press ENTER or CLEAR to change a numerical value in the SET UP menu, use the number keys to define the new value. Press ENTER again to enter the new value.
3. When entering new numeric values, all available digits (characters) must be entered. The number of available digits depends upon the scale of operation. Position of cursor indicates number of digits to be entered.

For example, when entering a run time value for a timer in the minute and seconds scale (10:30 would equal 10 minutes and thirty seconds). You would need to key in a number of 0030 to make it 0 (zero) minutes and 30 seconds.

## 1. CALIBRATION

All MicroTron controllers are factory calibrated for temperature, conductivity, pH and/or ORP (if present). These values should be verified for accuracy, and adjusted as per the instructions listed below and to the side.

**Calibrating the temperature** reading, press SET UP/ RUN button. The "CALIBRATION" screen will appear. Press ENTER and the screen will read "CALIBRATE F". Press ENTER to log in the new reading. To display the reading in degrees Celsius, press the decimal key.

**High Temp Alarm Set** - If this is exceeded the Alarm will activate, set to 0 to disable.

**Calibrating the Conductivity** with the probe in a known solution, select "CALIBRATE uS" from the "CALIBRATION" menu. Press CLEAR, then key in the corrected conductivity value. Press ENTER to log in that reading.

**Calibrating the pH** with the probe in solution on line. Select "CALIBRATE PH" from the "CALIBRATION" menu. Press CLEAR, then key in the corrected pH value. Press ENTER to log in that reading.

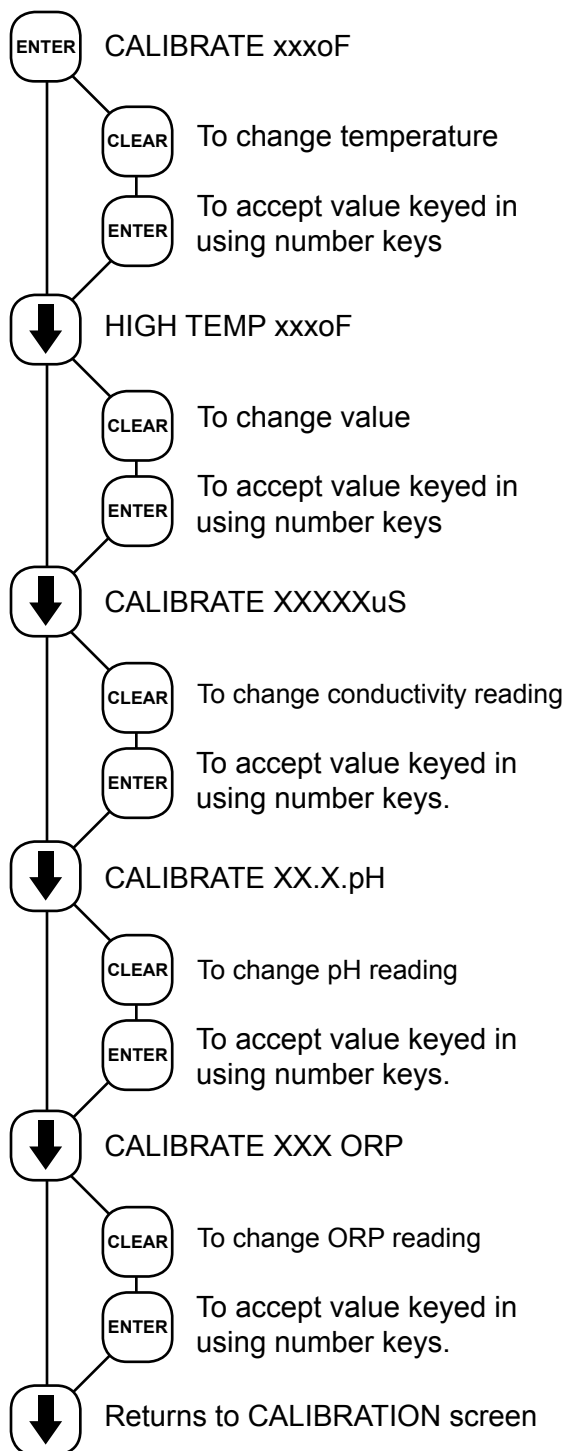
**Calibrating the ORP** with the probe in solution on line. Select "CALIBRATE ORP" from the "CALIBRATION" menu. Press CLEAR, then key in the corrected ORP value. Press ENTER to log in that reading.

The limits on this factor are from 50% to 200% and any entry which would lead to a factor outside this range will cause it to default back to the previous value.

### NOTES:

1. After entering a new numerical value hit the ENTER key to accept value and advance.
2. For severe calibration problems, see Reset Zero and Recentering pH on page 22 & 23.

## -- CALIBRATION --





### 3. PH FEED SET

This menu is used to set pH control parameters including set point, differential, high and low alarms plus a feed limit timer. (This menu choice will be present only if you have the pH control option, see model numbering on page 3.)

**pH Trip** - The pH reading value that will activate the pH relay.

**pH Diff** - Normally a rising trip point, the pH relay comes on if pH exceeds the trip point and goes off when it falls below the trip point minus the differential.

The differential may be made negative by pressing the DECIMAL key when changing differential setting. When the differential is negative, the Trip Point changes from rising to falling.

**High Alarm Setting** - Setting for a high pH alarm condition.

**Low Alarm Setting** - Setting for a low pH alarm condition.

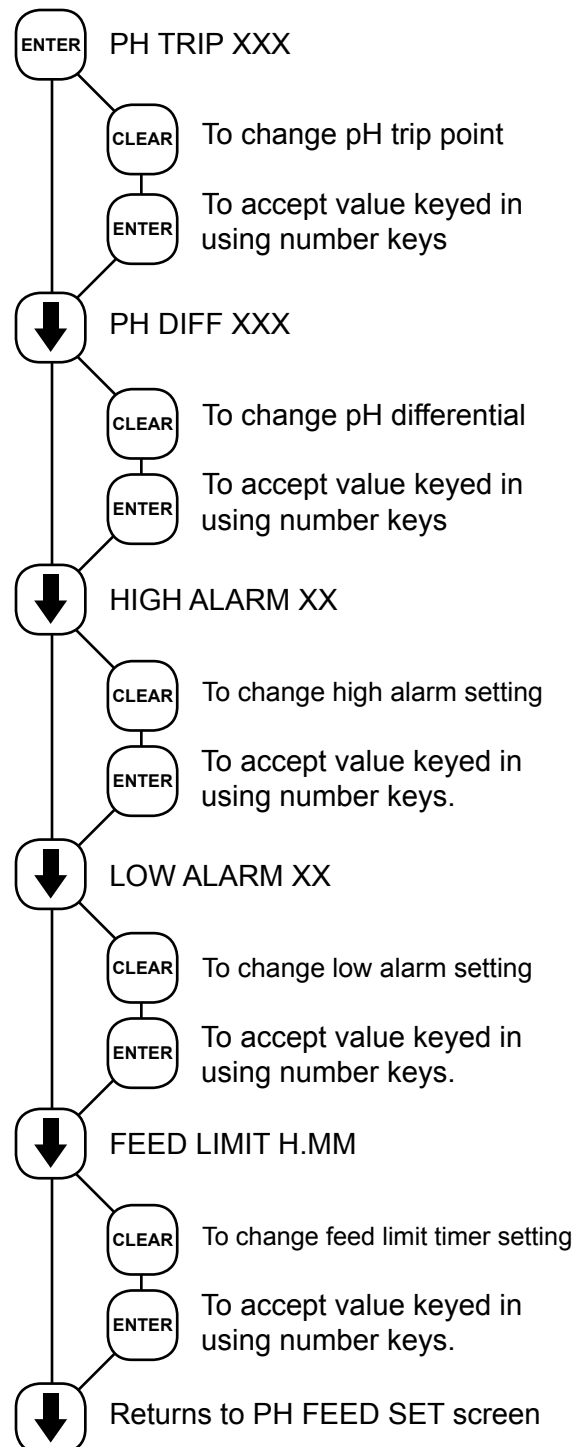
**pH Limit Timer** - The pH limit timer is set in hours and minutes. If the unit calls for feed longer than the limit timer is set for, an alarm is given and the pH feed is stopped. Maximum value is 9 hours and 59 minutes. A setting of zero disables the timer.

After entering a new numerical value hit the ENTER key to accept value and advance.

#### NOTES:

**If a unit has dual pH trip points, there will be a group of settings for "PH A" followed by the settings for "PH B".**

#### -- PH FEED SET --



#### 4. ORP FEED SET

This menu is used to set ORP control parameters including set point, differential, high and low alarms plus a feed limit timer. (This menu choice will be present only if you have the ORP control option, see model numbering on page 3.)

**ORP Trip** - The ORP reading value that will activate the ORP relay

**ORP Diff** - Normally a falling trip point, the ORP relay comes on if ORP falls below the trip point and goes off when it rises above the trip point plus the differential.

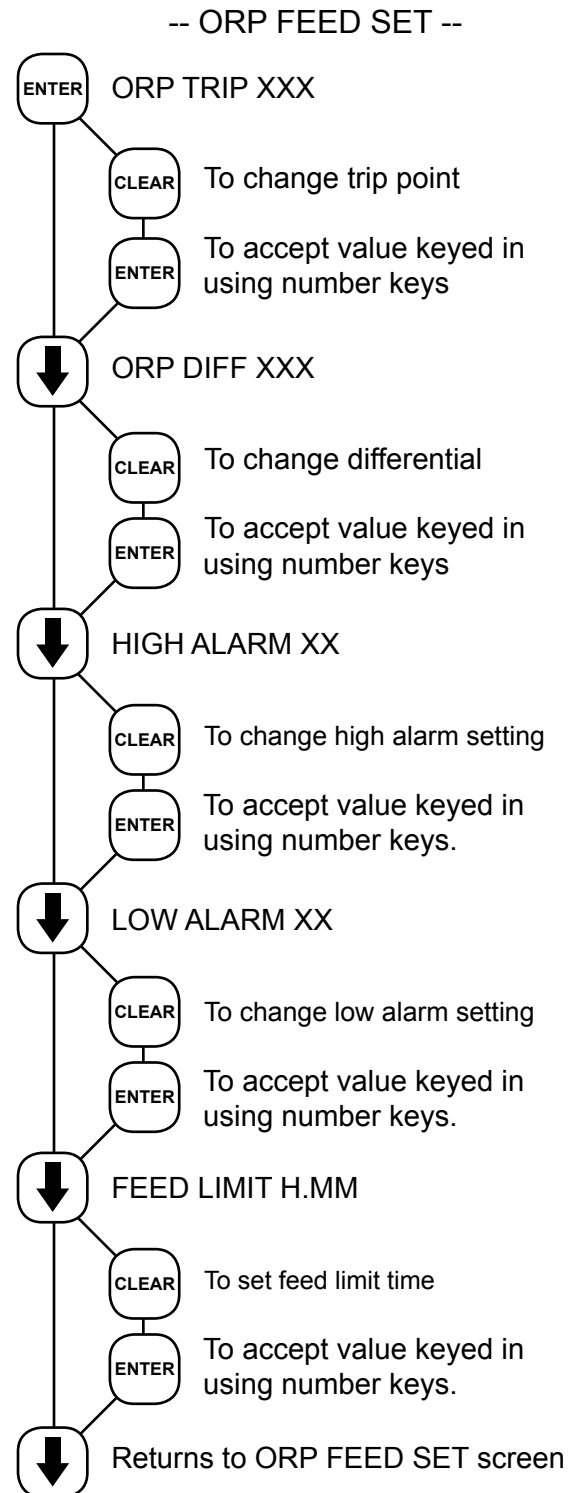
The differential may be made positive by pressing the DECIMAL key when changing differential setting. When the differential is positive, the Trip Point changes from falling to rising.

**High Alarm Setting** - Setting for a high ORP alarm condition.

**Low Alarm Setting** - Setting for a low ORP alarm condition.

**ORP Limit Timer** - The ORP limit timer is set in hours and minutes. If the unit calls for feed longer than the limit timer is set for, an alarm is given and the ORP feed is stopped. Maximum value is 9 hours and 59 minutes. A setting of zero disables the timer.

After entering a new numerical value hit the ENTER key to accept value and advance.

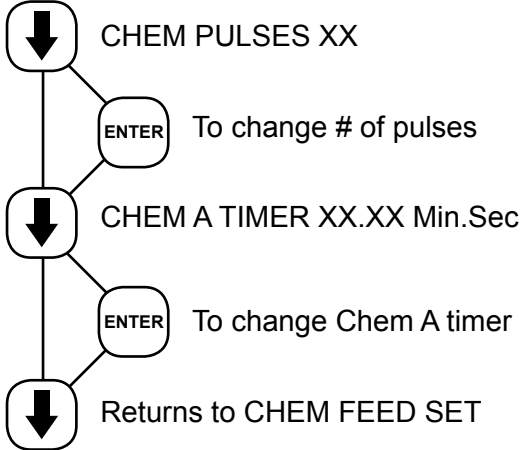


## 5. CHEM FEED SET

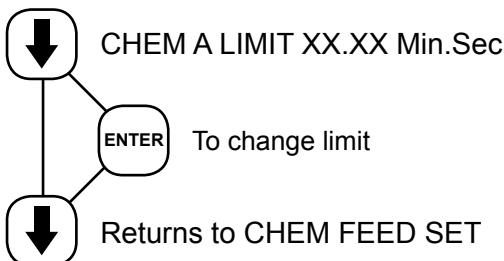
Units with selectable feed timer(s) will have this SET UP menu for selecting the chemical feed method and setting the feed time. A selectable feed timer can be programmed to be one of the following:

1. **PULSE TIME** - A timer activated by dry contacts from a contacting head water meter and includes an accumulator for counting the number of pulse (contacts) before starting the timer.
2. **WITH BLEED** - A feed limit timer that runs during a bleed cycle. The chemical feed will run for as long as the bleed occurs or until the limit time is reached.
3. **POST BLEED** - This timer counts how long a bleed cycle lasts then runs the chemical feed after the cycle is over for a user defined percentage of the bleed time. A limit timer prevents over feeding.
4. **PERCENTAGE** - A continuously repeating timer where the cycle timer can be programmed along with the percentage of ON time for the cycle.

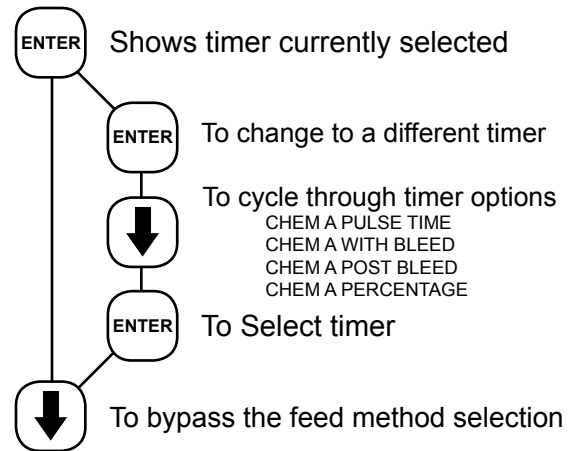
### -- CHEM A PULSE TIME --



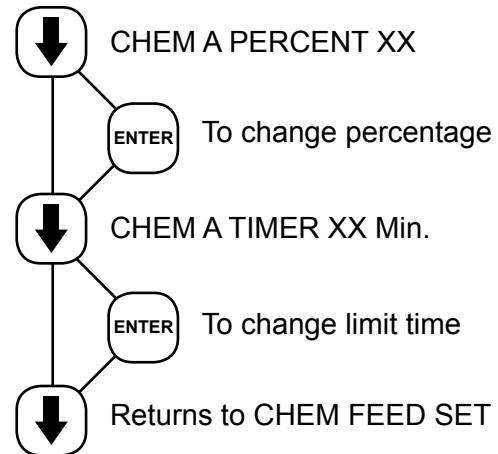
### -- CHEM A WITH BLEED --



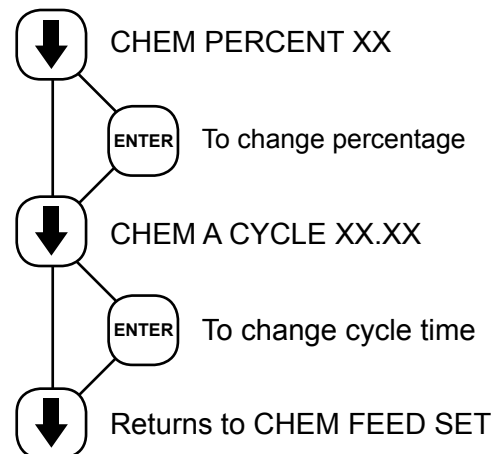
## -- CHEM FEED SET --



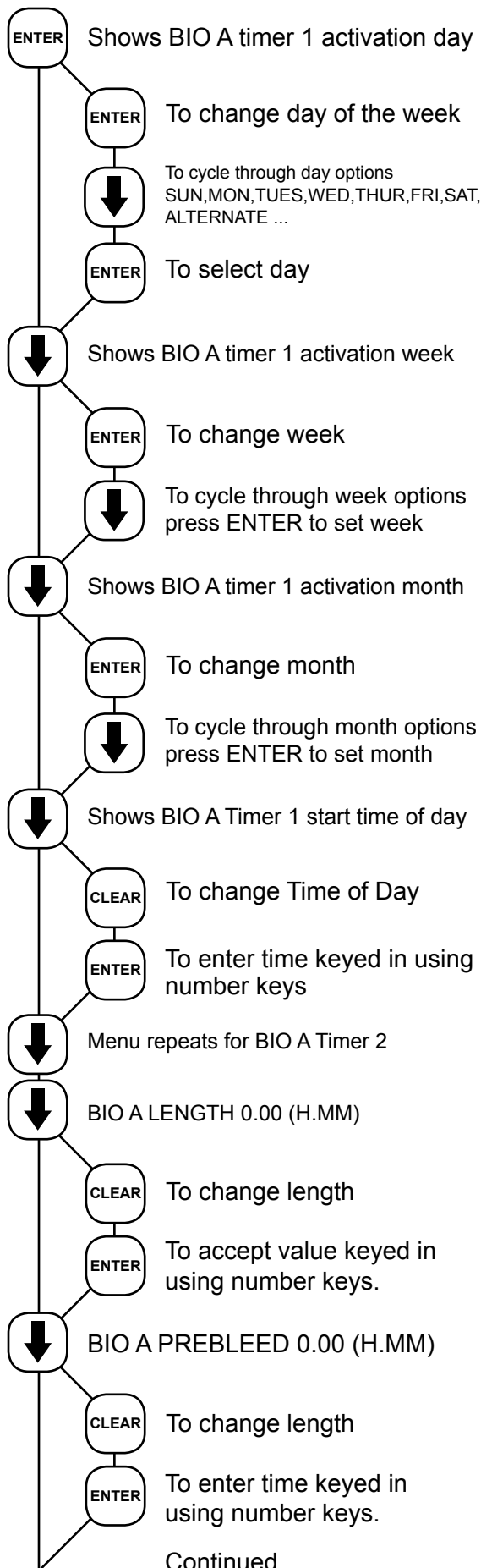
### -- CHEM A POST BLEED --



### -- CHEM A PERCENTAGE --



## -- BIOCID SET --



## 6. BIOCID SET

Units with a biocide timer will have this SET UP menu for setting biocide feed times. Biocide Set Menu consists of two weekdays, week and start times, one feed length time and an overall prebleed and lockout setting for each biocide.

**BIO \_\_ (A1,A2,B1,B2...) WEEKDAY** - Select from Sunday through Saturday, or TuesThrSat, MonWedFri, Every Other day, Every Day or No Day. A setting of No Day disables timer.

**BIO\_\_(A1,A2,B1,B2 ...) WEEK** - Select week (1-4), Even Weeks, Odd Weeks, or Every Week. A setting of No Week disables timer.

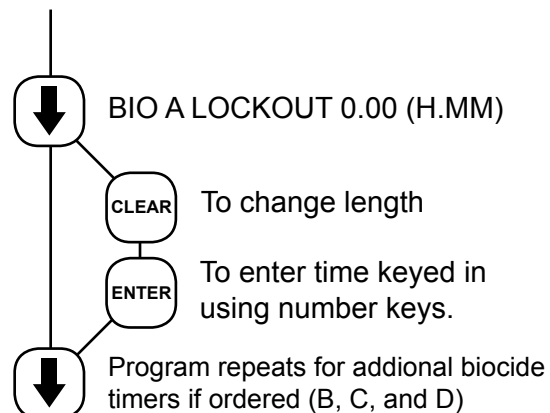
**BIO\_\_(A1,A2,B1,B2 ...) MONTH** - Select month (1-12), Even Month, Odd Month, or Every Month. A setting of No Month disables timer.

**BIO\_(A,B,C...)TIME HH.MM** - Start time based on 24 hour clock, in hours and minutes.

**BIO\_(A,B,C...) LENGTH H.MM** - Feed time in hours and minutes can be set up to 9 hours and 59 minutes, 0 (zero) disables both start times for that biocide.

**BIO\_(A,B,C...) PREBLEED H.MM** - Prebleed and lockout settings are in hours and minutes, with a maximum of 9 hours and 59 minutes, 0 (zero) disables timer. When the clock reaches a start time for any of the four timers, the Prebleed is begun.

**BIO\_(A,B,C...) LOCKOUT H.MM** - The lockout timer is a timer that starts after the biocide feed time is finished. The timer can be set for a time up to 9 hours and 59 minutes to lock out the bleed.



## 7. CLOCK SET

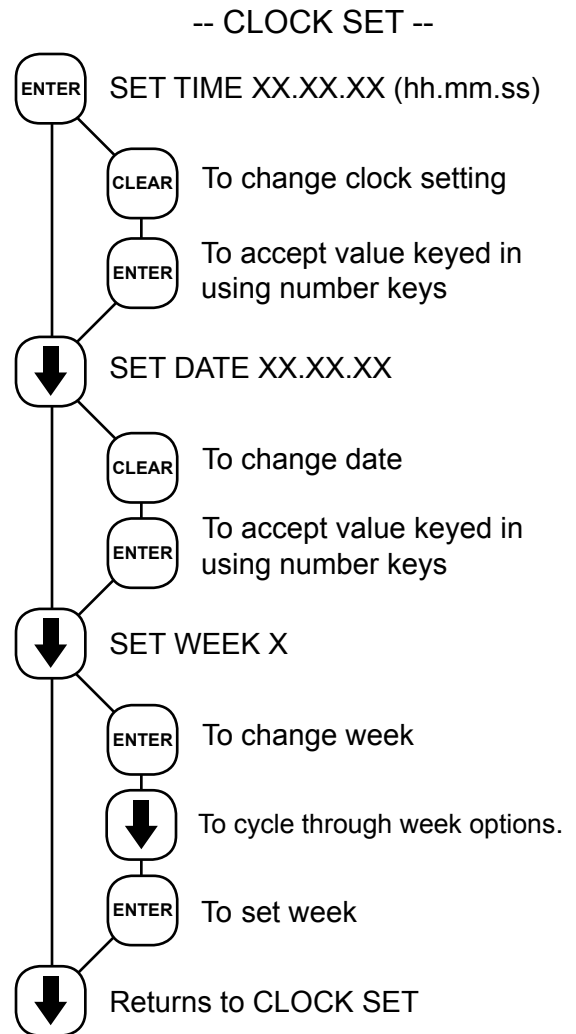
The CLOCK SET menu is for adjusting the time, date and day of the week.

After entering a new value, hit the ENTER key to accept the value and advance.

The clock time is based on a 24 hour clock. So, a time of 1 pm would be shown as 13.00.00.

### NOTES:

**If unit doesn't have a biocide timer, there will not be a SET WEEK selection.**





## 8. SYSTEM SET MENU

This menu is used to configure the controller to specific operational needs. All of the items in this menu may not apply depending on the controller model but will always be present.

**NOTE: Do not use this menu to make calibration adjustments. Use the Calibration screen.**

**PASSWORD** - If a value of 0000 is entered, a password is not required. If a password is entered, it must be used to operate the controller. If the first digit is zero, relays may be activated without a password.

**RESET WATER METER COUNT** - Does not apply unless the unit has selectable feed timer.

**DRY CONTACT HEAD** - Select a contacting head water meter or a hall effect paddle wheel meter. Anytime this setting is changed the GAL/PULSE value will need to be re-entered.

**GAL/PULSE** - If a feed timer is using a contacting head water meter this tracks make-up volume by entering the number of gallons a contact equals. Use • key to change to pulse/gal for flowmeter.

**STRAIGHT/PROPORTIONAL OUTPUTS** - A straight output setting means the optional 4-20 output span will be the same as the full scale. The proportional setting allows the span of the 4-20 mA output to be selected by the user based on the setpoint and differential.

**LOW DRUM NO PUMP/PUMP LOW DRUMS** - If unit has low level alarms, allows the associated feed timer to be forced off when drum is low.

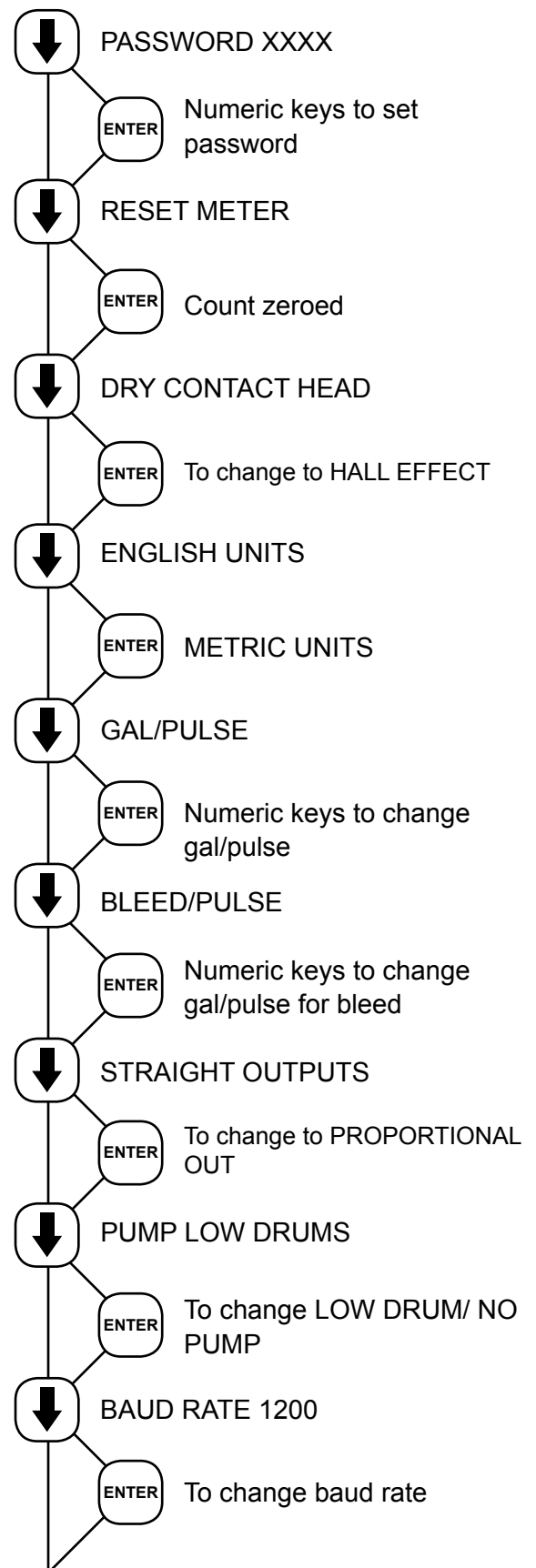
### COMM Setup:

**BAUD RATE** - For units ordered with the serial line or modem option.

**ALARM CALL** - For units with modem.

**FLOW WHEN CLOSED** - For flow switches.

## -- SYSTEM SET --



System Set continued on next page.

## SYSTEM SET (continued)

**FLOW ALARM** - With FLOW ALARM ON when the system loses flow, an alarm signal can be sent. FLOW ALARM OFF means that no alarm signal is sent in the event of loss of system flow.

**CONCURRENT** - Only applies if there are two or more feed timers. This allows all feed timers to become active simultaneously together.

**SEQUENTIAL** - Allows the feed timer to become active in a chronological order based on settings.

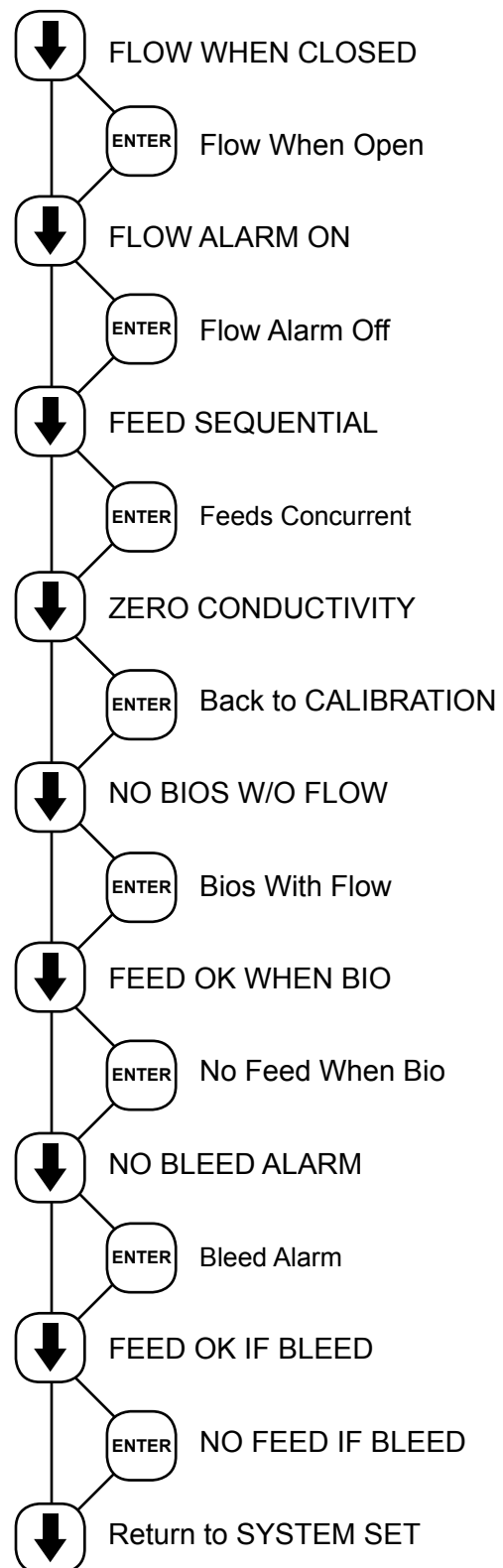
**ZERO CONDUCTIVITY** - This is normally not required, and is not recommended to use this function unless instructed to do so by the factory.

**NO BIOS WITHOUT FLOW** - Allows the biocide timer(s) to run only with a flow condition or to ignore the flow and always run even without flow.

**FEED OK WHEN BIO** - The chemical feed timer can be prevented from activating during a biocide timer run time.

**NO BLEED ALARM** - With the optional bleed flow alarm, the unit can produce an alarm if it is not sensing flow in the bleed line when bleeding.

**FEED OK IF BLEED** - Lets the unit feed chemical only when not bleeding or at anytime it is bleeding if called for.



## 9. DIAGNOSTICS MENU

This menu is used to select, enter and test the following items.

**MODEL NUMBER** - Read only screen.

**SOFTWARE VERSION NUMBER** - Read only screen. Please have this number should you need to contact customer service.

Have both available for service

**TEST DISPLAY** - Press ENTER and all pixels will flash. Make a visual check to see that all pixels are lit.

**TEST KEYPAD** - Press ENTER, then press each individual key to test its function. NOTE: Pressing the SET UP/RUN key returns display to the main menu. Pressing ENTER again returns to TEST KEYPAD.

**RESET CALIBRATE** - Resets ALL calibration data to factory default calibration.

**LEVELS INACTIVE** - Press ENTER to select between having level alarms active or inactive.

**TEMP A/D** - Shows the raw analog to digital value for the temperature reading.

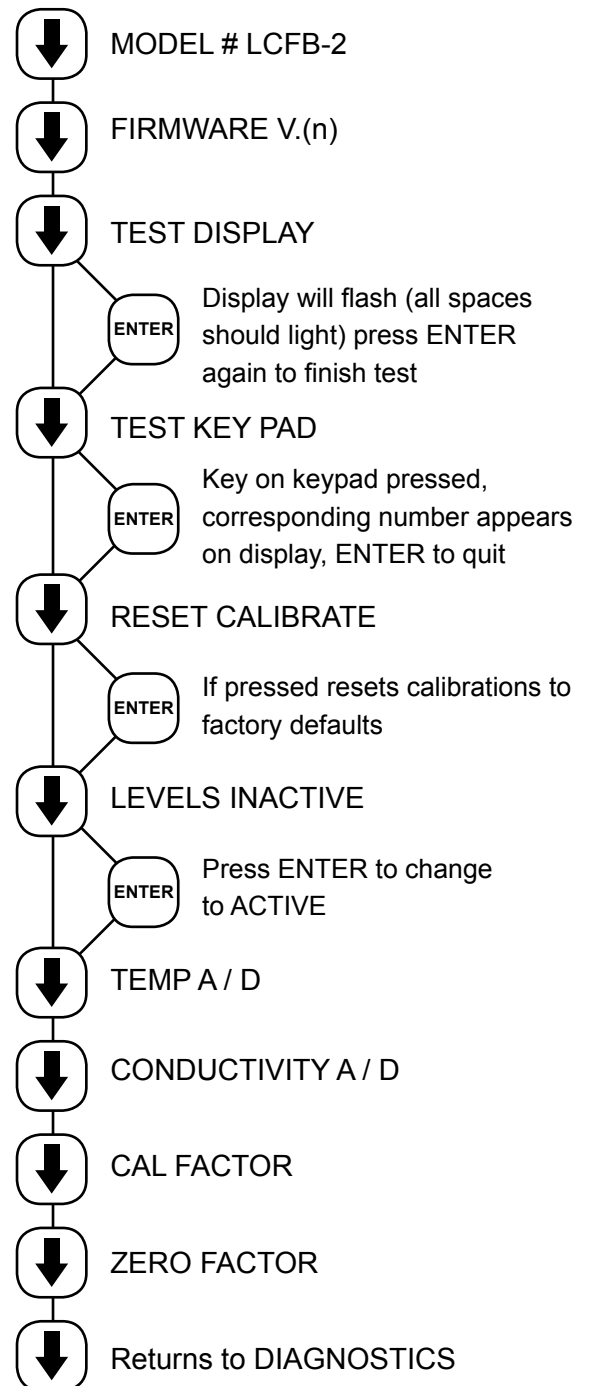
**COND A/D** - Shows the raw analog to digital value for the conductivity reading.

**CAL FACTOR** - Shows internal calibration variable. (slope of conductivity line) Default = 1000

**ZERO FACTOR** - Similar to calibration factor. (zero point of conductivity line) Default = 0

These 4 screens aid in troubleshooting, please have this information available if you require service concerning conductivity readings.

-- SYSTEM SET --



## B. Run Menu

During normal operations the controller will be in the RUN mode where current values are displayed. If left in the SET UP mode the display will revert to the RUN mode screen if no keys are touched for 3 minutes. If an alarm is present it will be flashed on the screen in the RUN mode.

While in the RUN mode if you hit the down arrow the following items may be shown:

<b>COND</b>	Current conductivity value.
<b>PH</b>	Current pH value.
<b>ORP</b>	Current ORP value.
<b>TEMP</b>	Current water temperature.
<b>DAY-TIME</b>	Current day of the week and time.
<b>DATE</b>	Current date.
<b>BLEED TIME</b>	If bleeding, how long it has been bleeding off.
<b>CHEM (A)</b>	If a chemical feed relay is on, how long it has been on.
<b>GALLONS</b>	If a water meter is being use, total number of gallons made up.
<b>WATER METER</b>	If a water meter is being used, number of contacts
<b>BLEED METER</b>	If a bleed-off water meter is being used, total number of gallon. If bleed/pulse = 0 bleed pulses is displayed otherwise bleed gallons

## **VI. Maintenance**

The only required maintenance for normal uninterrupted operation of your MicroTron controller is cleaning of the electrode(s).

After initial start up, it is a good idea to clean the electrode(s) frequently until a schedule based on need has been developed. Since each application is unique, it is difficult to estimate the required frequency of cleaning. To determine the required cleaning frequency, record the reading on the controller before the electrode is removed for cleaning. After cleaning, record the new reading. If a change is observed in the two readings, the electrode was dirty. The more significant the change, the dirtier the electrode. If no change occurs, cleaning can be done less often.

### **Conductivity Electrode Cleaning Procedure**

1. Record the current conductivity reading.
2. Turn off water flow from tower to the electrode loop, bleed pressure from the line, and remove electrode.
3. Use a clean cloth and a mild cleaning solution to clean the flat surface of the electrode.
4. If deposits such as scale are attached to the electrode surface, use a more aggressive cleaning approach. There are several ways to do this, the preferred method is the one that is easiest for the user.
  - a. Use a mild acid solution to dissolve deposits.
  - b. Scrape probe surface perpendicular to the electrodes. Using sand paper (200 grit or finer) sand the electrode on a flat surface to remove stubborn deposits.
5. Reinstall the electrode in the system. When reading stabilizes, calibrate the unit to a reliable test reading.

### **pH & ORP Electrode Cleaning Procedure**

Prior to servicing, the electrode must be removed from the system.

1. Remove the pH/ORP electrode from the system by turning counter-clockwise until fully released.
2. Spray with water and/or detergent, using a soft brush to dislodge any particulate matter. (Cold water applied to a hot probe may cause damage.).
3. Visually inspect the electrode for signs of damage.
4. Calibrate the electrode.
5. Replace the PTFE tape and re-mount into the system, avoid twisting on the cable.

The pH glass is susceptible to coating by many substances. The speed of response, normally 95% of the reading in less than 10 seconds, is dramatically degraded when the pH glass is coated.

Slow response or non-reproducible measurements are signs that the electrode has become coated, clogged or dead. pH probes should be replaced annually under good conditions.

## VII. Troubleshooting

The Advantage Microtron controller is designed for many years of trouble free operation. Should a problem occur, refer to the following chart to help identify the problem.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
False reading	Bad or dirty electrode Out of calibration	Clean as needed Calibrate unit, see Page 10
Will not calibrate	Dirty electrode Faulty electrode Faulty wiring to electrode Out of calibration	Clean electrode Replace controller or electrode as needed. Calibrate unit see Page 10 Check diagnostics menu - Pg 19
No system power	Power source Cable from power supply board to relays or fuse	Check power source Secure cable
No output power	Check relay fuse Check ribbon cable from login board to relays	Replace as needed Secure ribbon cable & orientation
Not receiving water meter contacts	Connection between unit and water meter	Check cable between water meter and unit

If problem persists, contact our customer service department with the model number and serial number of unit for free factory technical assistance at 800-743-7431.

### Reset Zero Conductivity

It may be necessary to reset the zero value of the conductivity scale if the calibration is not responsive.

1. Remove the probe from the line and make sure it is clean and dry. Leave it out, or disconnect black and red wire at probe.
2. Make note of current blowdown settings (trip, diff, Hi/lo Alarms and Limit) as they will be reset by this procedure. Also, make note of cal factor and zero factor from diagnostics.
3. Push SET UP/RUN key and arrow to DIAGNOSTICS.
4. Push ENTER and arrow down to RESET CALIBRATE.
5. Make sure probe is clean and dry before going on.
6. Push ENTER and arrow up to SYSTEM SET.
7. Push ENTER and arrow down to ZERO CONDUCTIVITY.
8. Push the decimal key • and your current conductivity scale will appear. Continue to hit the decimal key until the conductivity scale loops through the various scale settings and comes back to your scale, then push ENTER twice.
9. Reenter you blowdown settings under the BLEED SET menu.
10. Reinstall the probe in the line and check conductivity against the actual reading.
11. Calibrate as needed using the CALIBRATION menu.

## Recentring the pH

Prior to servicing, the electrode must be removed from the system.

1. Remove the pH electrode from the line and clean the sensor tip with a clean, non-abrasive cloth.
2. Place the electrode in a buffer solution with a known and accurate pH of 7. Solution must be grounded by placing temp comp ground probe in solution also.
3. Scroll through the set up menu until you reach the "SYSTEM SET" screen.
4. Press ENTER and use the DOWN arrow to find the "CENTER PH" option. Press ENTER while the electrode is in the buffer solution.
5. Replace the pH electrode in the line and make any necessary adjustments to the pH reading using the normal pH calibration procedure.
6. Press the SET UP/RUN key to resume normal operation

## VIII. Advantage Controls' Product Warranty

Advantage Controls warrants control systems of its manufacture to be free of defects in material or workmanship. Liability under this policy extends for 24 months from date of installation. Liability is limited to repair or replacement of any failed equipment or part proven defective in material or workmanship upon manufacturer's examination. Removal and installation costs are not included under this warranty. Manufacturer's liability shall never exceed the selling price of equipment or part in question.

Advantage disclaims all liability for damage caused by its products by improper installation, maintenance, use or attempts to operate products beyond their intended functionality, intentionally or otherwise, or any unauthorized repair. Advantage is not responsible for damages, injuries or expense incurred through the use of its products.

The above warranty is in lieu of other warranties, either expressed or implied. No agent of ours is authorized to provide any warranty other than the above.

### 30 Day Billing Memo Policy

Advantage Controls maintains a unique factory exchange program to ensure uninterrupted service with minimum downtime. If your in warranty controller malfunctions, call 1-800-743-7431, and provide our technician with Model and Serial Number information. If we are unable to diagnose and solve your problem over the phone, a fully warranted replacement unit will be shipped, usually within 48 hours, on a 30 Day Billing Memo.

This service requires a purchase order and the replacement unit will be billed at current list price for that model less any applicable resale discount. Upon return of your old unit, credit will be issued to your account if the unit is in warranty. If the unit is out of warranty or the damage not covered, a partial credit will be applied based upon a prorated replacement price schedule dependent on the age of the unit. Any exchange covers only the controller or pump. **Electrodes, liquid ends and other external accessories are not included.**

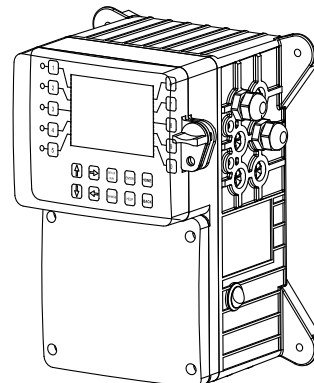
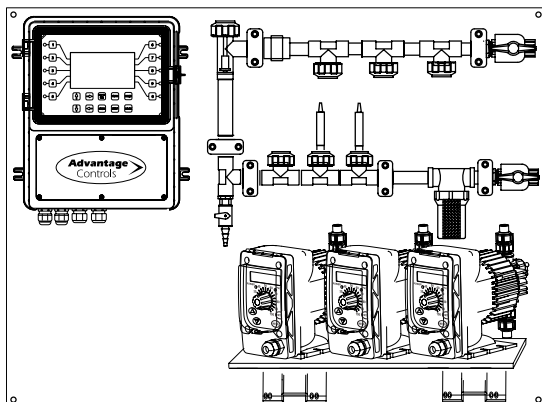
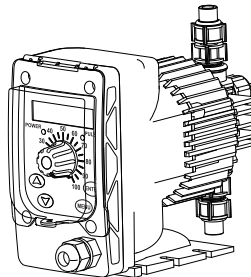
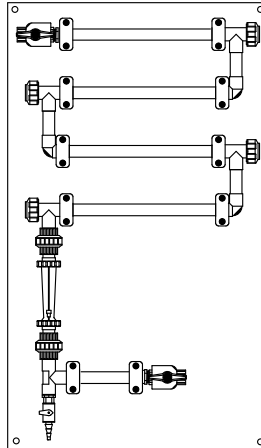
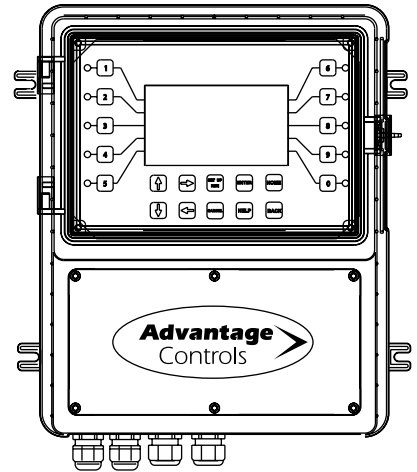
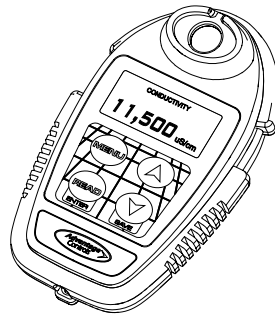
### FCC Warning

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instruction, may cause interference to radio communications. It has been type tested and found to comply with the limits for a class A computing device pursuant to subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial or industrial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures necessary to correct the interference.

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