User's Guide

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CDCN11
Boiler/Cooling Tower Controller

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IMPORTANT SAFETY INSTRUCTIONS

1. READ AND FOLLOW ALL INSTRUCTIONS
2. WARNING - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
3. WARNING -Risk of Electric Shock. Connect only to a grounding type receptacle protected by a ground-fault circuit interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI. (Only required for cord-connected units.)
4. Do not bury cord. Locate cord to minimize abuse from lawnmowers, hedge trimmers, and other equipment. (Only required for cord-connected units.)
5. WARNING - To reduce the risk of electric shock, replace damaged cord immediately. (Only required for cord-connected units.)
6. WARNING -To reduce the risk of electric shock, do not use extension cord to connect unit to electric supply; provide a properly located outlet. (Only required for cord-connected units.)
7. SAVE THESE INSTRUCTIONS.

TABLE OF CONTENTS

Introduction

Congratulations on your selection of a CDCN10 Series Programmable Controller for your water treatment facility.

Omega's CDCN11 uses the most advanced electronic sensing technology to monitor and control the critical parameters for water treatme i.e. conductivity, pH, Oxidation-Reduction Potential (ORP) and temperature. Also available is monitoring of flow rates for make-up and ble water and influent/effluent filter pressures.

This Instruction Manual covers the CDCN10 Model Controller. The CDCN10 offers the following features:

- Conductivity control, pH control (option), Temperature monitoring, and three additive programs.
- Data logging and remote operation (with an internal modem and software) are available on all models.

Water Maintenance

The primary purpose of water treatment is protection of the equipment from the aggressiveness of water and prevention of bacteriologic growth.

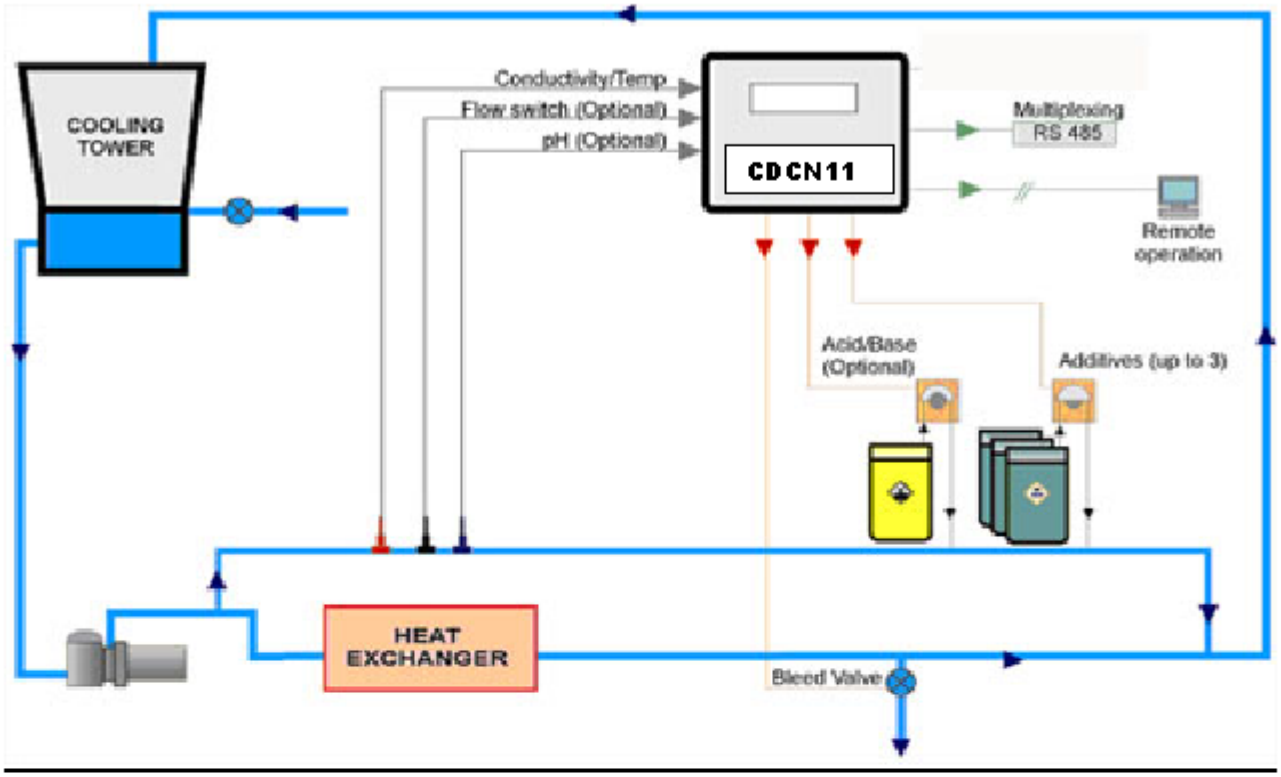
The guidelines for cooling towers include the following:

- Conductivity typically below 5,000 µS/cm - corresponding to Total Dissolved Solids (TDS) of less than 2,500 ppm (mg/l) - to preven precipitation of dissolved salts and corrosion products,
- pH between 7.0 and 9.0, depending on chemical treatment, to prevent scaling or corrosion,
- Oxidation-Reduction Potential (ORP) above 650 mV to prevent algae growth and growth of bacteria, such as Pseudomonas, E. C etc.,
- Proper water balance with Langelier Saturation Index values between 0 and 0.3 for untreated waters, or up to 2.0 - for waters treat with phosphonates and/or polyacrylates,
- Adequate filtration with a maximum turnover rate of six hours.

Table I - TYPICAL TREATMENT VALUES

TYPICAL WATER TREATMENT FOR COOLING TOWERS			
TEST	**MIN**	**IDEAL**	**MAX**
CONDUCTIVITY, µS/cm			5,000
TDS, ppm			2,500
pH	7.0	8.5	9.0
ORP, mV	650	750	
LANGELIER SATURATION INDEX	0.0		2.0

CDCN11 Installation Drawing



INSTALLATION

Please refer to the above drawing for the recommended installation layout. Please note that we recommend that a flow switch be installed to ensure that chemicals are only added during water recirculation.

ENCLOSURE

When you open the enclosure, remove the top two screws, and back out the bottom two screws slightly. Pull the front cover out from the enclosure box, and use the bottom screws as hinges. You can also remove the bottom screws, and use the top screws as hinges, if that is more convenient. This way, you will not have to disconnect cables inside the controller to have easy access to sensor or relay connections

SENSOR CONNECTIONS

The conductivity sensor and flow switch input connections can be made on the marked power strip (TB1) at the top left corner of the power supply/relay board. You will see this board, when you open the enclosure, on the inside of the enclosure away from the display. You can also connect a water meter with standard pulse output on this strip. Refer to Figures 1 & 2 on Page 10 for connection details.

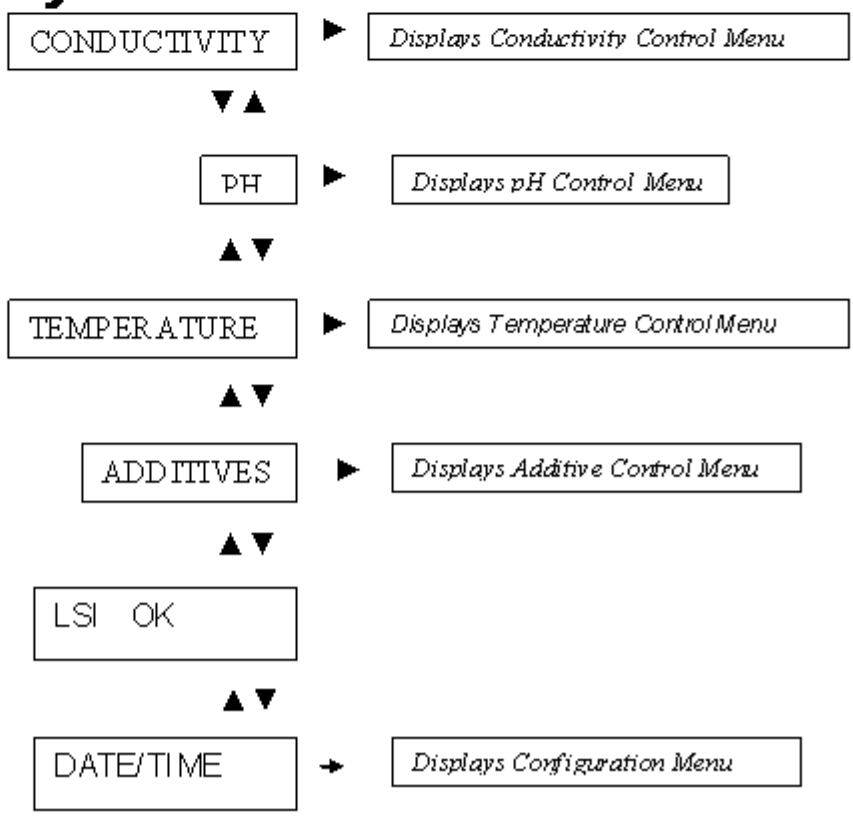
CDCN11 PROGRAMMING OVERVIEW NOTES

1. The CDCN11 is a single-line display controller. All of the control settings are accessed using the up, down, right and left arrows.
2. The right and left arrows are used to move to the next (right) or previous (left) menu screen.
3. The up and down arrows will scroll you through the current menu screen.
4. Numeric values on the display can be changed by pushing the right arrow button. When you get to a parameter that you want to change, the next time you push the right arrow, you enter the data adjustment screen. The cursor is located in the blinking space. The number in that space is adjusted using the up or down arrow. You then move to the next space using the right or left arrow.
5. All numeric values are saved by pressing the "OK" button when the number desired is displayed.
6. Parameters that are in alarm will flash. Upon entering the parameter menu, the submenu heading in alarm will also flash.
7. Parameters with an active output will have a "+" in the left column.
8. Symbol Key for menu tree:

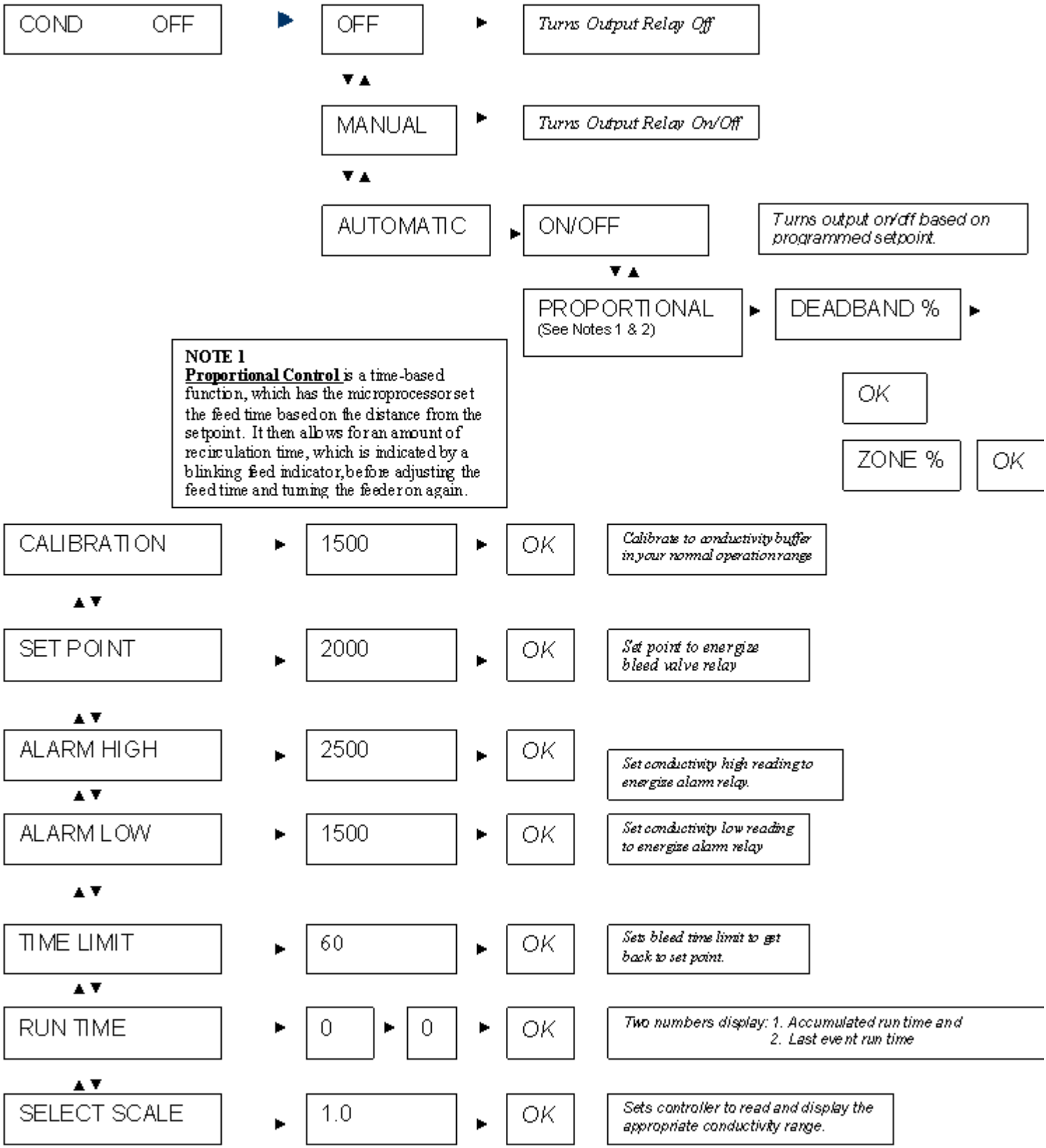
► - push the right arrow on the controller.
▲ – push the up arrow on the controller.
▼ – push the down arrow on the controller
◄ - push the left arrow on the controller.

OK - Push the OK button on the controller.

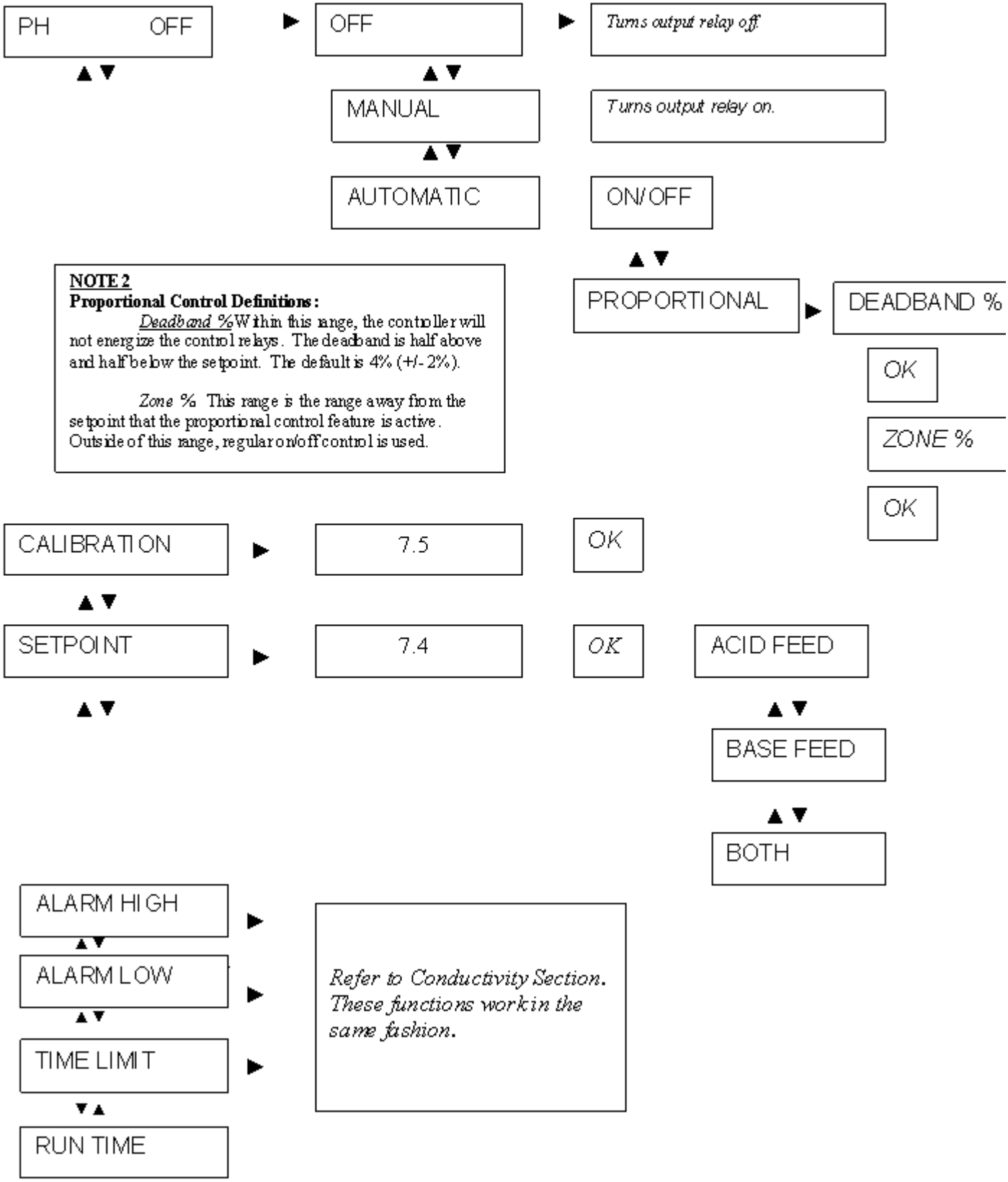
Main Menu Display



Conductivity Menu Display



pH Menu Display

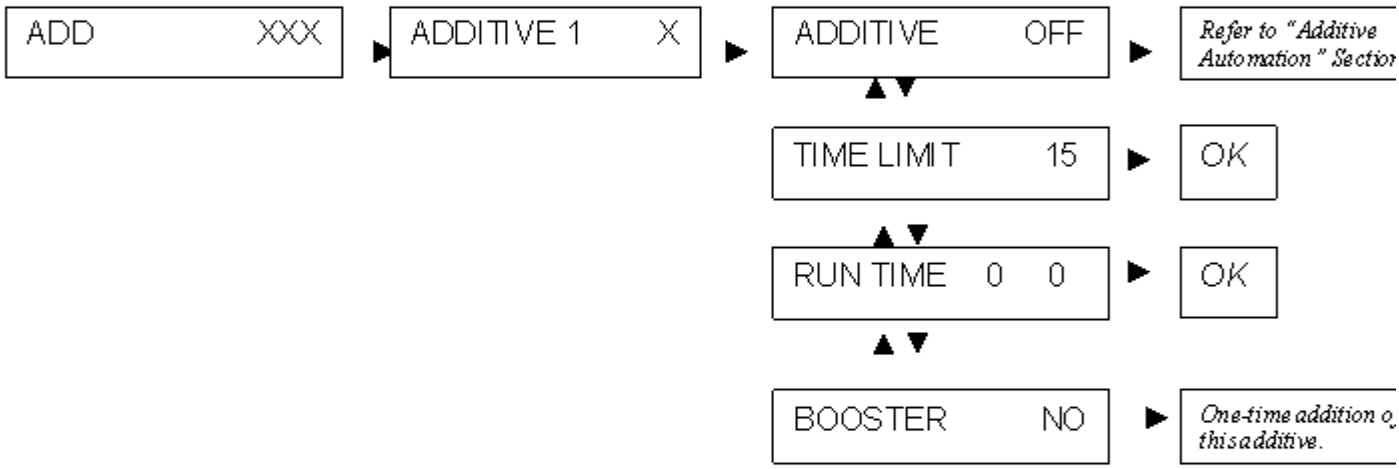


Additive Menu Display

This menu will help you to automate the addition of chemical additives, such as scale inhibitors, corrosion inhibitors, and/or different biocides. With the CDCN11, you have the following options for this chemical addition:

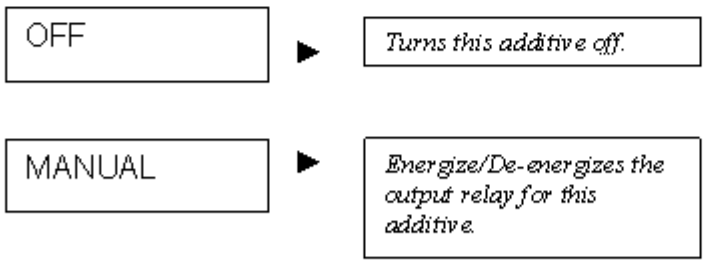
- Manual Feed Addition
- Automatic Bleed then Feed or Bleed and Feed
- Cycle Timer Addition
- Percent of Flow Addition
- Daily Schedule addition

This first section allows you to turn the automation of each additive on or off, and set your lockout timer limits for each additive:



Additive Automation

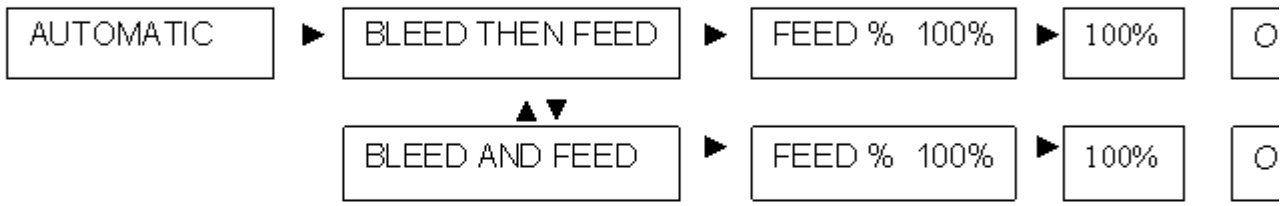
This section shows the programming tree for each option available to automate the addition of chemical.



Automatic Option

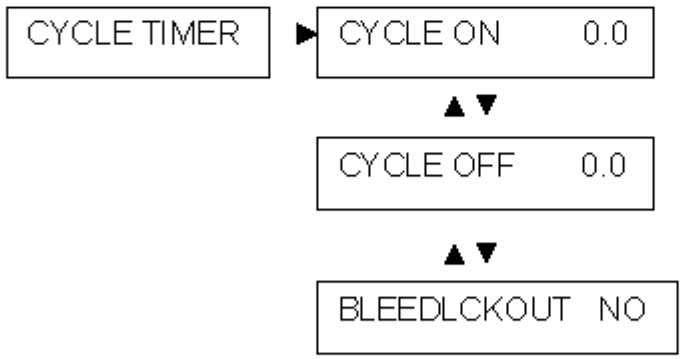
This option is the traditional "bleed then feed" or "bleed and feed" option. Traditionally, the bleed then fee option has timed the bleed function, and then activated the feed function for that amount of time. The water treatment professional would then adjust the output of the feed pump to adjust the amount of chemical to the desired proportion. Our controller adds the ability to adjust the feed time to a percent of the bleed time, to make it easier to get the desired proportion.

Bleed and feed option will have the feed run during the entire bleed cycle. Most people would not choose this function, because it tends to waste chemical.



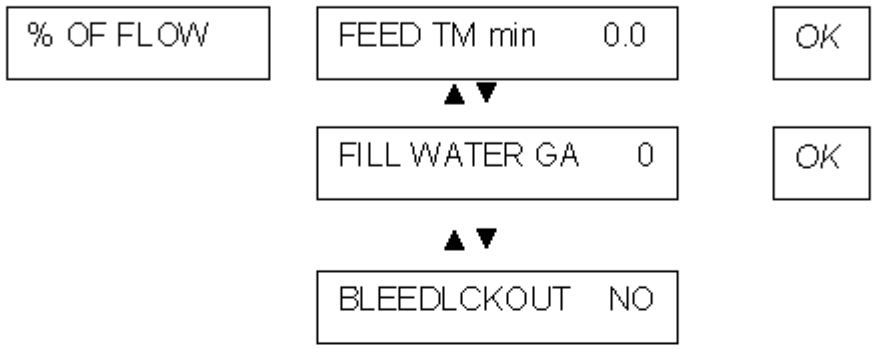
Cycle Timer Option

This option allows you to feed chemical based on time only. You can program this output to be on for a s amount of time, and off for a set amount of time. This is advantageous for volatile blends whose strength will deplete in a certain amount of time.



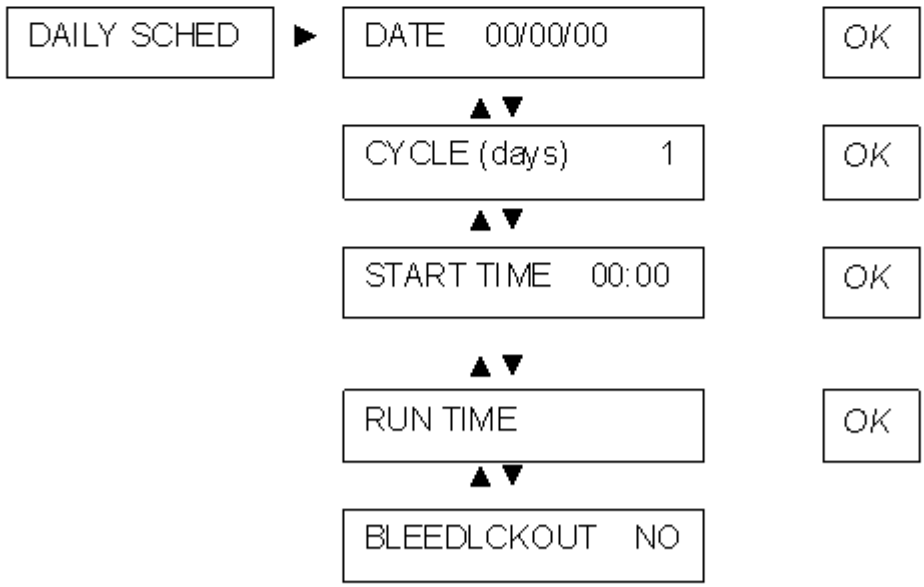
Percent of Flow Option

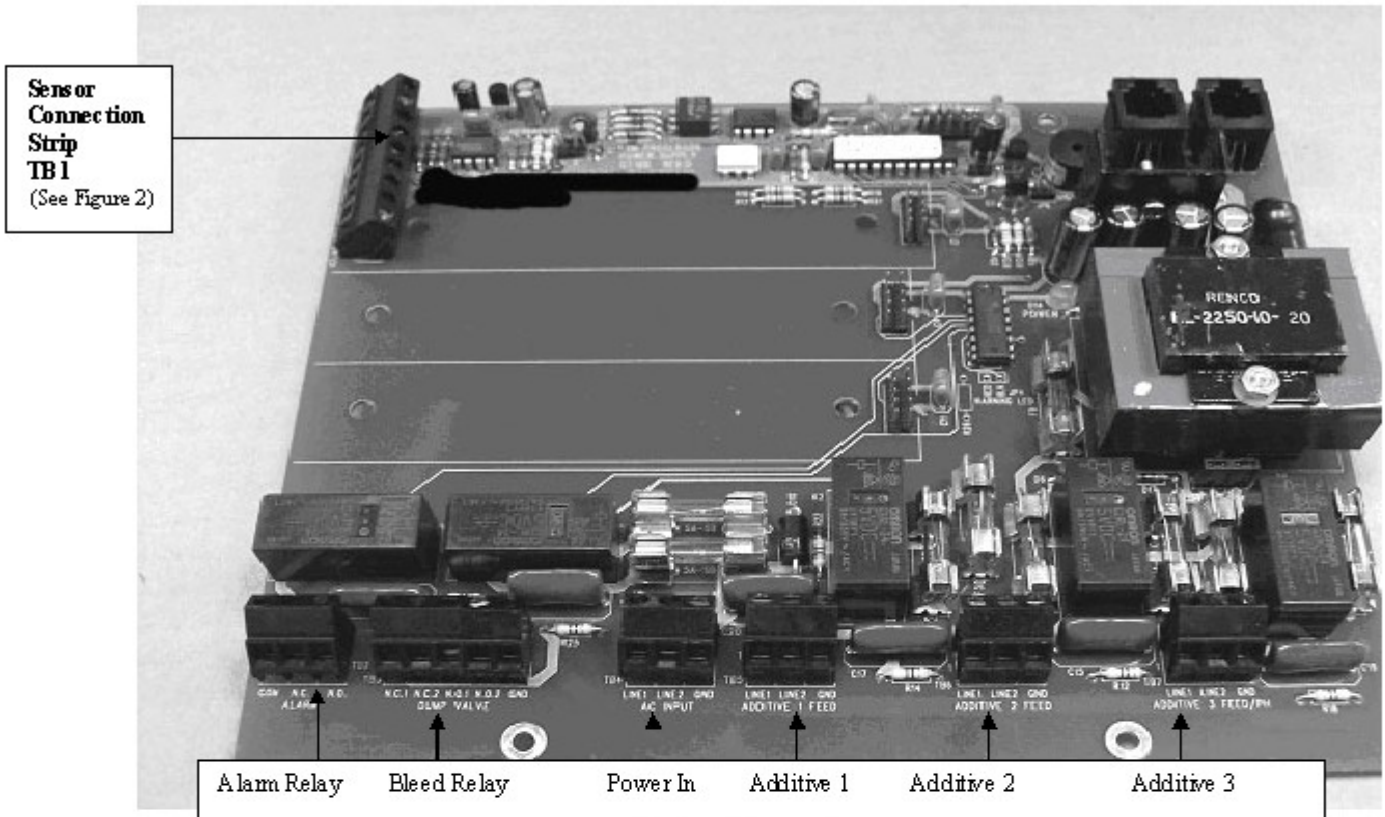
This option requires a flow sensor, with a non-powered open collector pulse output. This option will feed chemical for a programmed amount of time each time that a set amount of water is filled into the basin via the makeup valve. This is a tighter control for the bleed then feed option, because it is taking a volumetric measurement of makeup water to activate feed time. Bleed then feed is estimating the makeup based on the time the bleed valve is open. This is typically used for either scale inhibitor or corrosion inhibitor feed.



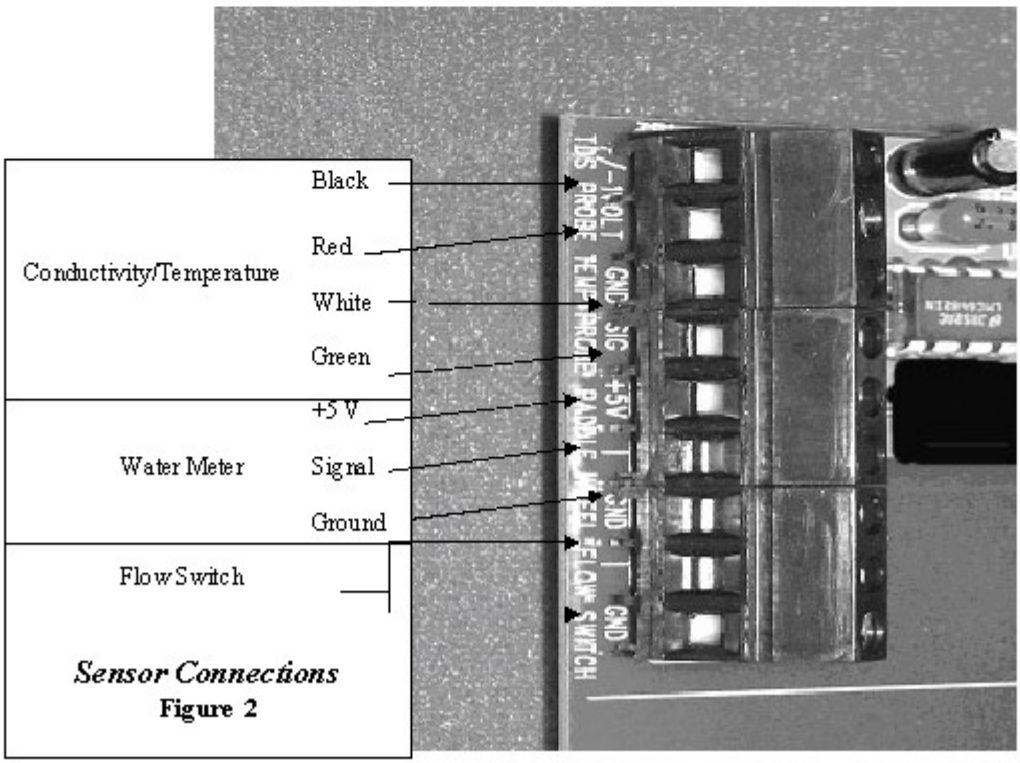
Daily Schedule Option

The daily schedule option allows you to feed the additive for a programmed amount of time, and schedule that feed for a set time on the first day of a cycle that is programmed at a set number of days. For example, if you want to feed a biocide for 30 minutes every other Sunday at 1:00 AM, you would use this function. According to the example, you would set the date for next Sunday, set the cycle for 14 days, set the start time for 01:00, and set the run time for 30 minutes.





Relay Connections
Figure 1



Sensor Connections
Figure 2

TROUBLESHOOTING

Problems	***Solutions***
1. NO DISPLAY.	1a. Check power to system. 1b. Check On/Off Switch on right side of cabinet. 1b. Check Voltage Selector Jumpers on Power Board (JP7) for Correct Setting. Verify proper input voltage 110V or 230V. 1d. Check Fuse F9 on Power Board. If blown, replace with AGC1 fast blow fuse.
2. FAINT OR DARK DISPLAY	2a. Adjust contrast with Display Potentiometer R16 on right of Mother Board.
3. ERRATIC DISPLAY.	3a. Turn Power Switch off for 10 seconds and back on. 3b. Check power cable contacts. 3c. Check power strip connecting Mother Board and Power Board.
5. NO CHEMICAL FEED NO BLEED	5a. Check flashing line in Main Display Menu. Highlight flashing line with UP or DOWN arrow. Press RIGHT arrow to enter submenu. Check flashing line in Submenu. 5b. If LOW or HIGH ALARM is flashing: Adjust water chemistry manually. Press RIGHT arrow to change alarm limits. Set Feed Lockout to Off (CAUTION !!!). 5c. If RUN TIME line is flashing: Increase chemical feeder rate. Increase Limit Timer setting. Reset Run Time with AUTO setting. 5d. If BYPASS LINE is flashing on Main Display: Check water flow in bypass line. Check Safety Flow Switch in bypass line. Set Bypass Line to Off in Operations Submenu (CAUTION !!!). 5e. Set Feed Mode to MANUAL. Feed Indicator on Main Display should turn on. 5f. Check Relay Fuses on Power Board. Bleed Valve (F5 & F6) Additive 1 (F3 & F4) Additive 2)F1 & F2) Additive 3 (F7 & F8)
6. CANNOT CALIBRATE	6a. Check water balance and adjust if needed. 6b. Clean faulty sensor as indicated. 6c. Check sensor connections. 6d. Check sensor with buffer solution. 6e. Test electronics for functionality.
7. pH OVERFEED	7a. Clean and test the faulty sensor. 7b. Check and adjust the calibration. 7c. Check and adjust the setpoint. 7d. Check the relay. 7e. Check the chemical feeder for leaks. 7f. Reduce feed rate or dilute the solution.
8. IMPROPER READINGS	8a. Clean the faulty sensor. 8b. Test the sensor with buffer solution 8c. Test the electronics for functionality.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) mont grace period to the normal **one (1) year product warranty** to cover handling and shipping time. Thi ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Servic Department will issue an Authorized Return (AR) number immediately upon phone or written reques Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at n charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchase including but not limited to mishandling, improper interfacing, operation outside of design limits improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence o having been tampered with or shows evidence of having been damaged as a result of excessive corrosion or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operatin conditions outside of OMEGA's control. Components in which wear is not warranted, include but are no limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFOR RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETUR (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOI PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the retur package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prever breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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