



INSTALLATION MANUAL FOR
OMNI-VIEW II
CONDUCTIVITY CONTROLLER



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OMNI-VIEW II MANUAL

INTRODUCTION

This manual covers the complete installation of the basic Omni-View II conductivity controller.

First, identify your controller, either by catalog numbers listed on the serial number label, or by visually comparing the front panel on the controller with **Figure I**.

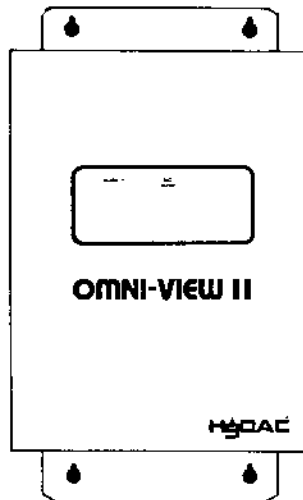
The following catalog numbers and descriptions are provided for customer convenience.

015601 or 015603	.	.	.	.	Omni-View II with timer, receptacle model
015610 or 015612	.	.	.	.	Omni-View II conductivity controller only, receptacle model
3018632 or 015612	.	.	.	.	Omni-View II with timer, conduit model
015620 or 015622	.	.	.	.	Omni-View II conductivity controller only, conduit model
015962	.	.	.	.	Omni-View II with timer, conduit model, 4X enclosure

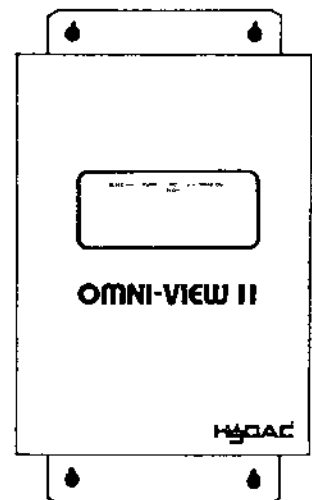
FIGURE

I

(Unit less timing circuit)



(Unit with timing circuit)



OMNI-VIEW II CONTROLLER WITH TIMING CIRCUIT

We recommend that the user carefully read **all directions and operating procedures** listed in this manual prior to the actual operation of the Omni-View II controller. If you require immediate use of this unit, a simplified installation is illustrated in **Figure II**.

SYSTEM DESCRIPTION

The Omni-View II is an electronic control system which will automatically maintain desired levels of dissolved mineral concentration in all types of recirculating water systems; e.g., cooling towers, spray ponds, fountains, evaporative condensers, etc.

The conductivity portion of the Omni-View II continuously measures the conductivity of the circulating water and compares it to a preselected control point. When the dissolved solids (mineral salts) concentration increases due to evaporation, the conductivity of the water also increases. When the conductivity control point is exceeded, the controller senses this and opens a bleed valve. The resultant call for fresh make-up water dilutes the circulating water until the controller is satisfied. The bleed valve closes until the dissolved solids build up again; when the conductivity control point is exceeded, the bleed valve opens. The automatic control of bleed responds to changes in the cooling system load, thereby eliminating wasteful overbleed or harmful underbleed.

The Omni-View II includes a unique timing circuit which allows field selection of chemical feed pump control. This timing circuit can be used as:

A limit timer:

Pump activation occurs simultaneously with bleed valve activation and timer allows pump to remain on no longer than preset "safe" maximum on time selected.

A precision reset timer:

Pump activation occurs per signal from the water meter in the make-up line. Pump "on" time is determined through timing circuit.

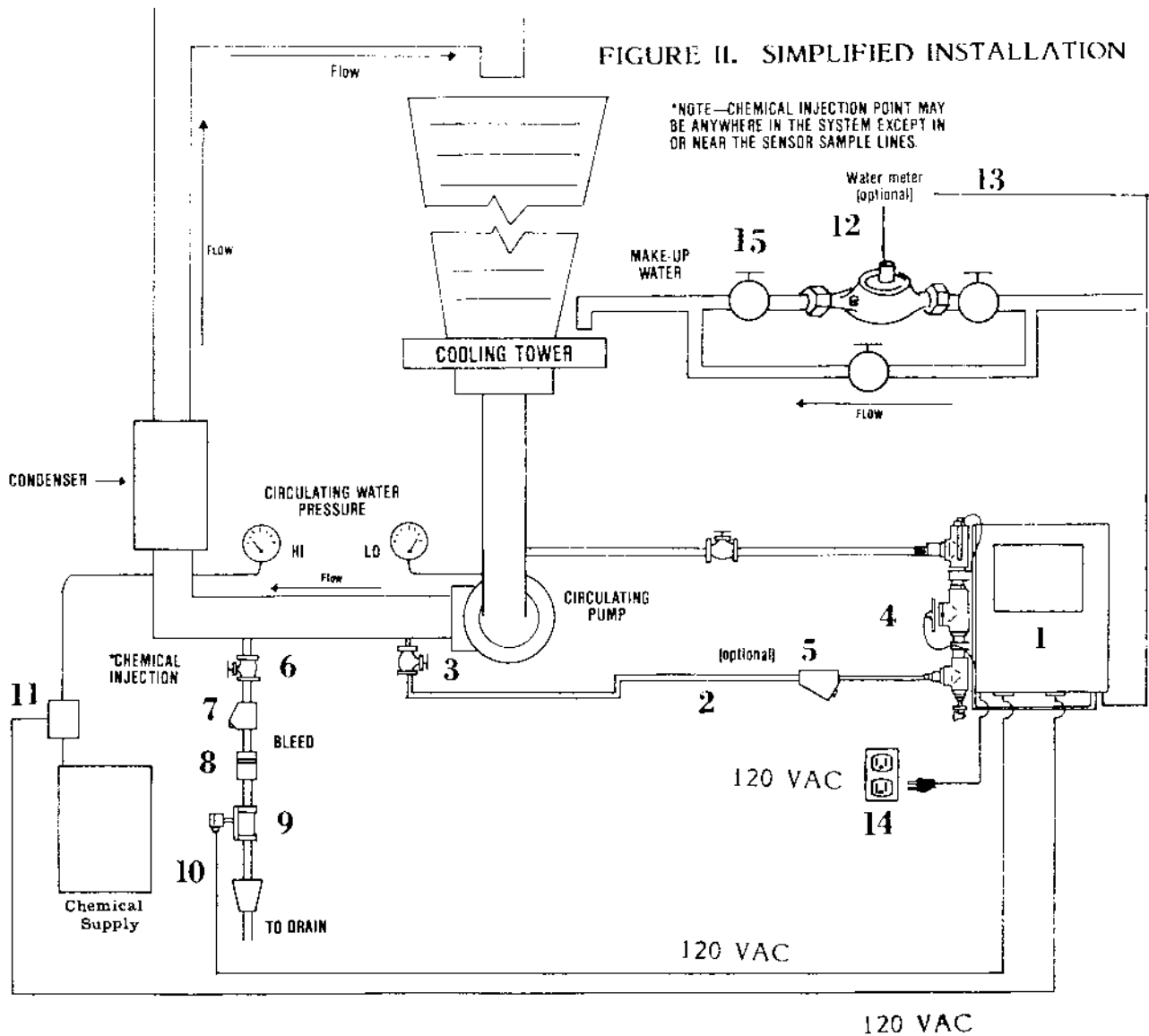
A percentage timer:

Use as a percentage timer with a total fixed cycle time and adjustable "on" times, which continuously recycles as long as power is supplied to controller.

The Omni-View II features a continuous digital readout of the system conductivity as measured by the conductivity electrode.

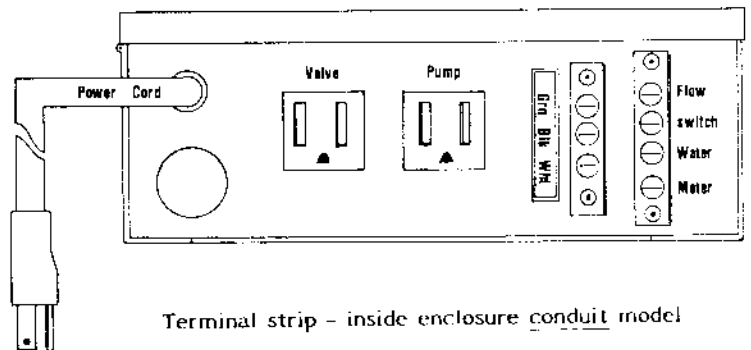
Also included is a connection for a flow switch, which may be used to disable the bleed and chemical feed if there is no flow through the conductivity sensor.

FIGURE II. SIMPLIFIED INSTALLATION

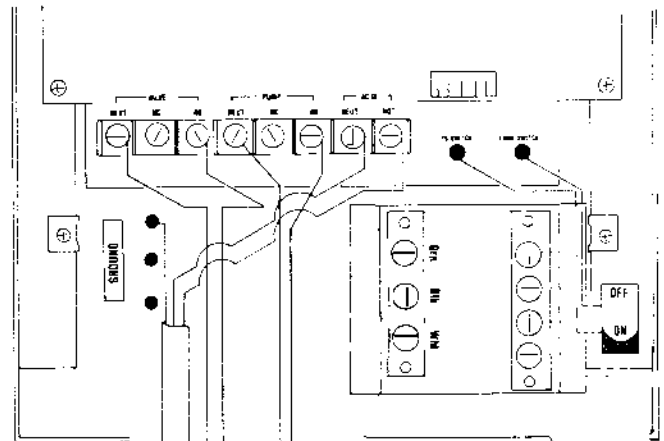


1. Omni-View II controller
2. Sensor sample lines, 3/4" for units pre-plumbed as shown; or 3/8" for use with 014200 electrode.
3. Hand valves - sized to sample line.
4. Flow switch/conductivity electrode assembly, 3/4" fittings (assembly supplied on pre-plumbed units only). If separate electrode and (optional) flow switch have been specified, plumbing arrangement for wall mounting can be used as shown. Flow switch must be mounted upright, flow in through the bottom, out through the side.
5. Strainer (optional) - sized to sample line.
6. Hand valve - sized to bleed line.
7. Strainer - sized to bleed line.
8. Dole flow regulator - sized to system (optional).
9. Solenoid valve - sized to system load.
10. Two conductor cable - bleed valve.
11. Chemical feed pump.
12. Water meter (optional) - required only when chemical feed is based on make-up.
13. Two conductor cable - when water meter option is selected.
14. Power source for controller - directly into 120 VAC wall socket when flow switch option is used, or "controlled" power source connected to auxiliary contacts of main circulating pump when flow switch option is not used.
15. Hand valves - sized to water meter line.

Bottom view - Receptacle model



Terminal strip - inside enclosure conduit model



CONTROLLER PARTS AND FUNCTIONS

First, familiarize yourself with the controller. Refer to **Figure IV** to identify the following parts:

- 1) Calibration potentiometers, high and low. Two calibrate pots are provided, one for low range (readings times 1) and one for high range (readings times 10). These are factory adjusted and normally will not need to be readjusted in the field.
- 2) Timer function selector switches. Used to select mode of operation for timer circuit. Pertains to the selection of chemical pump functions only. Used to activate pump when signal is received from water meter (W/M); or to provide fail-safe timer for pump when activated simultaneously with valve (T/O); or to activate pump for a percentage of time (W/M and P/T).
- 3) Range selection switch. Used to select range where normal operation occurs: high (times 10) or low (times 1).
- 4) Set-read switch. Used to digitally display actual conductance (read position) or desired set-point (set position).
- 5) Test-normal switch. Used in "normal" position for actual operating mode, used in test to check bleed valve activation.
- 6) Timer test button. Used to test timer activation only.
- 7) Recorder connection. Used only if external recorder (or output signal) is required. 0 - 1 milliamp signal provided.
- 8) Wire connector. Connector for electrode, flow switch and water meter from terminal strip on bottom of enclosure to main control board.
- 9) Timer setting. Used to determine portion of total cycle time to be selected.
- 10) Conductivity display. Displays either the actual conductivity measured or the set value (as determined by the set-read switch).
- 11) Conductivity set potentiometer. Used to determine "set" value - clockwise increases "set" conductivity.
- 12) Time-out light. When illuminated, indicates that "pump" has remained on longer than original maximum preset time period. Typically used when chemical addition is in proportion to bleed-off rate.
- 13) No flow light. Works in conjunction with external flow switch to indicate no flow through the sample stream assembly. Disables outputs when illuminated.
- 14) Pump light. Indicates the chemical feed pump output is activated.
- 15) Bleed light. Indicates that bleed valve output is activated.
- 16) Power board connector. Used to connect main board (low voltage) to power board (115 volts).

CONTROLLER PARTS AND FUNCTIONS continued.....

- 17) Timer chip. Integrated circuit (I.C.) used to adjust total cycle time of timer. Adjustable from 0-255 seconds (4.25 minutes). If other setting is desired, refer to Appendix.
- 18) Recorder adjustment potentiometer. Used to Adjust recorder output when external signal is required.
- 19) Power switch. Provided fused and switched to supply power to controller. To change to unfused and unswitched; contact the factory.
- 20) Guard panel warning. To alert user of presence of uninsulated "dangerous voltage" within enclosure.
- 21) Spare Chip. Alternate Timing I.C.

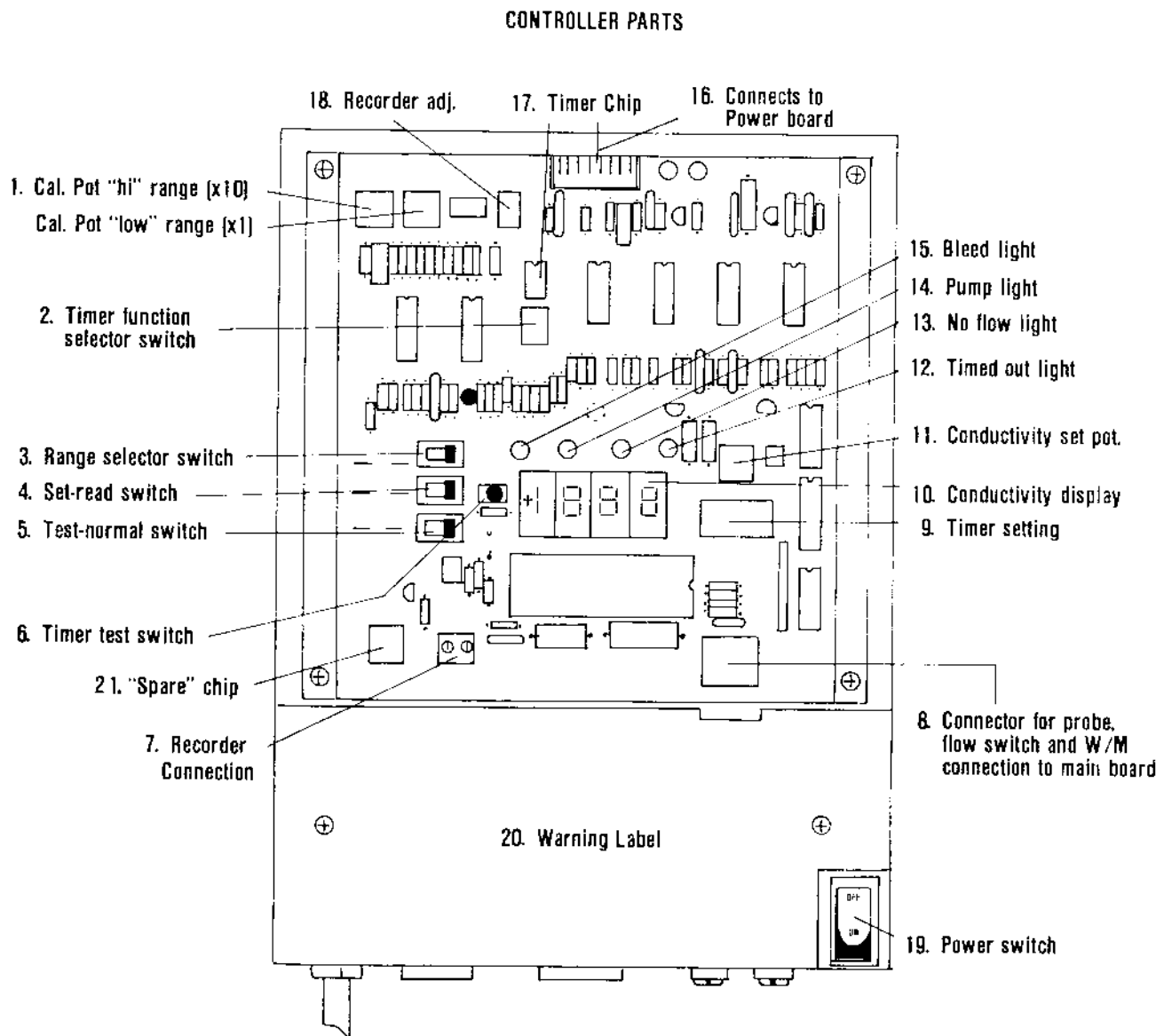


FIGURE IV. OMNI-VIEW II MAIN BOARD

SAMPLE STREAM ASSEMBLY INSTALLATION

Including Conductivity Electrode (required) and Flow Switch (optional):

This section details the installation of the sample stream assembly, ordered as individual components or as a pre-plumbed, pre-wired package.

1) Provide convenient access pipes for obtaining a continuous sample of the circulating water. Ideally, the access points are at the discharge and suction sides of the main circulating pump. Provision for a separate access point should be made if chemicals are going to be added automatically. Do not inject chemicals into the sample stream assembly.

Similarly, the bleed access point should be separate. Do not "tie in" bleed piping with the sample stream assembly. Refer to **Figure II**.

2) Under certain installation conditions, a flo-thru sensor is impractical. HyDAC offers an alternate "drop-in" sensor for measurement in the tower sump. The sensor is then handy for frequent cleaning. When ordering, specify the alternate sensor.

Note: Normally, a controller installation using a drop-in electrode will not include a sample stream assembly; therefore, flow switch installation is awkward and not recommended. A "controlled" power source is then recommended. Refer to Controller Installation section.

3) Hand valves are recommended. Install on both the inlet and outlet side of the sample stream assembly as shown in **Figure II**.

4) Electrode and flow switch (optional) installation: Mount the electrode and flow switch (optional) close to the preselected water sample access point. Place both electrode and flow switch (optional) at eye level or lower to ease maintenance.

Note: It is also recommended that a sample petcock (or similar device) be installed in the sample stream assembly close to the electrode site, especially for 3/4" electrodes that do not include clean-out plugs. Samples of water can then easily be obtained for testing purposes and comparison to display of controller.

A. For factory-mounted piping assemblies, input water at the bottom; output at the top. See **Figure V**. Sample stream piping must be installed close to controller to allow proper installation.

B. For individual 3/4" flo-thru electrode and 3/4" flow switch (optional), refer to **Figure V**. Component layout should be similar to pre-plumbed units, except sample stream components should be wall-mounted, not mounted to controller.

C. For electrode and flow switch (optional) installation with 3/8" fittings, install the 3/8" tubing sample lines. For electrode, input water at the bottom; output at the top; clean-out/drain plug facing downward with no obstructions for at least one foot. Avoid long runs of tubing. Refer to **Figure VI**. For 3/8" flow switch, input water at the bottom; output through the side; clean-out plug at the top facing skyward. See **Figure VI**.

FIG. V

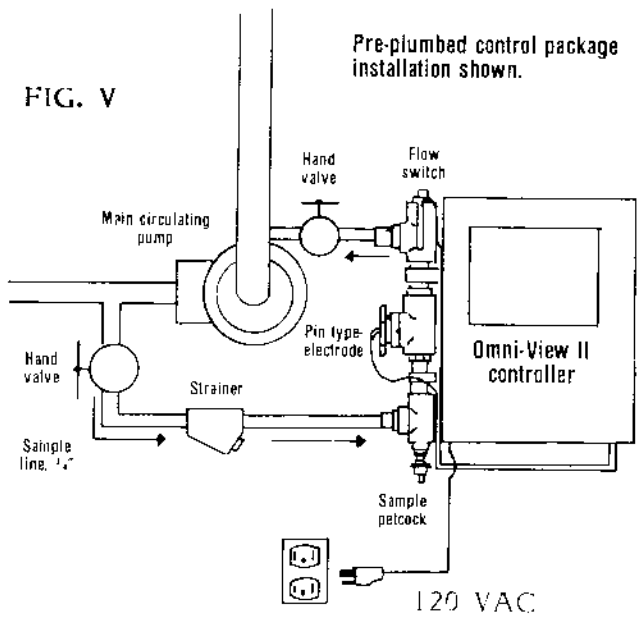
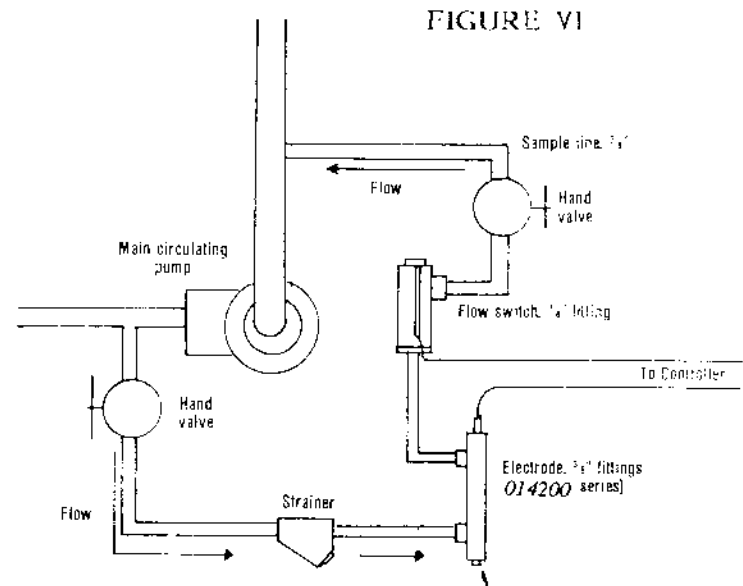


FIGURE VI



- 5) Open both hand valves and check for water leaks.
- 6) Connect sensor cable and flow switch (optional) cable to the appropriate terminal strip on enclosure. (This is completed at the factory on pre-plumbed units). Observe color code for the probe connection. An 8' cable has been provided on the electrode (or 10' cable, depending on model selected), but it can be spliced and extended; avoid long runs. If extending the cable, use 18-22 gauge 3-conductor stranded wire; for the flow switch use 18-22 gauge 2-conductor stranded wire.

A. Receptacle model - refer to Figure II.

B. Conduit model - use the most conveniently located knockout on bottom of controller

to attach cables to internal terminal strip. Refer to Figure II. Probe cable may also be run in conduit if desired; however, it must not be pulled through the same conduit with any other wires, as "hum pickup" could give false signals. Good installation practice, with or without the conduit, is to keep the probe cable away from power lines of any type.

Installation of Chemical Pump

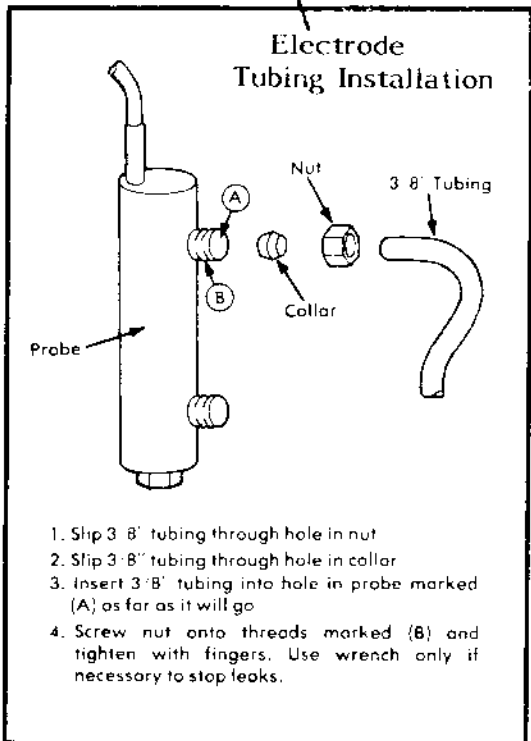
Run electric wires from the chemical pump to the controller.

Receptacle models:

Install pump power cord into outlet marked "Pump" on base of controller.

Conduit models:

Run conduit from chemical pump. Use most convenient knockout on base of controller. Connect wires to pump in accordance with pump manufacturer's instructions. Connect pump wires to "Pump" terminals on power board labelled Neut, N/C and N/O. See Figure XIII.



1. Slip 3/8" tubing through hole in nut
2. Slip 3/8" tubing through hole in collar
3. Insert 3/8" tubing into hole in probe marked (A) as far as it will go
4. Screw nut onto threads marked (B) and tighten with fingers. Use wrench only if necessary to stop leaks.

BLEED VALVE ASSEMBLY INSTALLATION: (See Figure VII)

Using the Omni-View II controller, bleed-off will normally be determined by the actual conductivity level of the circulating water compared to a conductivity set point. If another method is desired, contact the factory.

Site selection:

A. It is desirable for bleed flow to be visible from the controller; it is essential that the bleed flow be visible at the end of the bleed line wherever it may be located.

B. Bleed access point should be separate from chemical injection site and sensor sample line. Refer to **Figure II**.

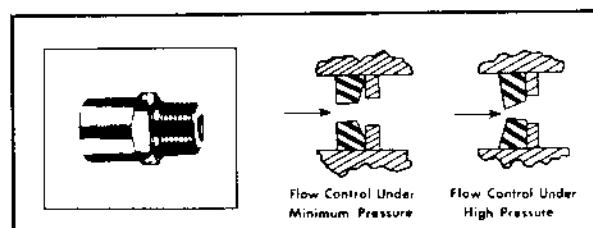
C. It is good practice to install a hand valve, sized to match valve piping size, upstream of the solenoid valve site. This allows shut-off of water through the valve when service is required.

D. Since it is imperative that bleed valves be kept clean, HyDAC recommends a strainer be installed upstream of the valve, just downstream of the hand valve previously discussed. Periodic cleaning of the strainer is mandatory to assure proper system operation.

E. Next in line should be placed a Dole flow regulator, sized to system, to maintain a constant "known" bleed-off rate. Refer to Appendix for Dole flow regulator specifications. This element is essential when chemicals are to be added in direct proportion to bleed-off rate. Flow direction must be observed.

The Dole flow regulator is a simple, self-cleaning device designed to deliver a constant volume of water from any outlet, whether the pressure is 15 psi or as high as 125 psi. The controlling mechanism consists of a flexible orifice that varies its area inversely with the pressure so that a constant flow rate is maintained. **Figure VIII** illustrates how a single orifice, for simplicity of explanation, changes shape to maintain a constant flow rate as the inlet pressure increases.

FIGURE VIII



Valve Installation

1) Install the bleed valve, Dole flow regulator, strainer and hand valve as previously described.

2) Run conduit or sheathed cable to the bleed valve. **Important note:** It is essential that the valve is connected as described below. Valve and pump outputs operate from individual relays and the timing circuit in the Omni-View II is designed to work in conjunction with the pump relay only.

3) **For receptacle model:** On the receptacle model Omni-View II, a receptacle is provided for the bleed valve hook-up to the controller. Refer to **Figure II**.

INSTALLATION OF WATER METER

Use of water meter is optional. Water meter is required when chemicals are to be added in direct proportion to make-up rate.

1) Water meter installation guidelines:

- a. Install the water meter in the water line at a point where only water to be treated passes through the meter.
- b. Consideration should be given to the winterizing of the system in cold weather areas to prevent unit from freezing.
- c. Meter is water resistant, but must be mounted in a location which will not expose it directly to falling water.
- d. Water through meter must not exceed the temperature rating specified by the manufacturer. The temperature rating on a standard meter supplied by HyDAC is 100°F. maximum. (For hot water meters, contact the factory).
- e. Direction of flow through meter must be observed.
- f. Pressure rating specified by manufacturer of meter must be observed.

Standard HyDAC meters are rated at 220 psi maximum.

g. Preferable mounting of meter is in a horizontal position with register facing toward the ceiling and near the floor, readily accessible for ease of installation and periodic viewing of the water meter register. A comparison of water usage and chemical consumption indicates correctness of dosage rate. Refer to Appendix "How to read the Water Meter Register" if assistance in this area is required.

h. Meter warranty is voided if returned with foreign particles in the measuring chamber or if broken by excessive flow.

i. Flow rates specified by the manufacturer must also be considered. Refer to **Figure IX** for specifications.

j. Make provision for a "by-pass" loop in the event that the water meter requires service, see **Figure X**.

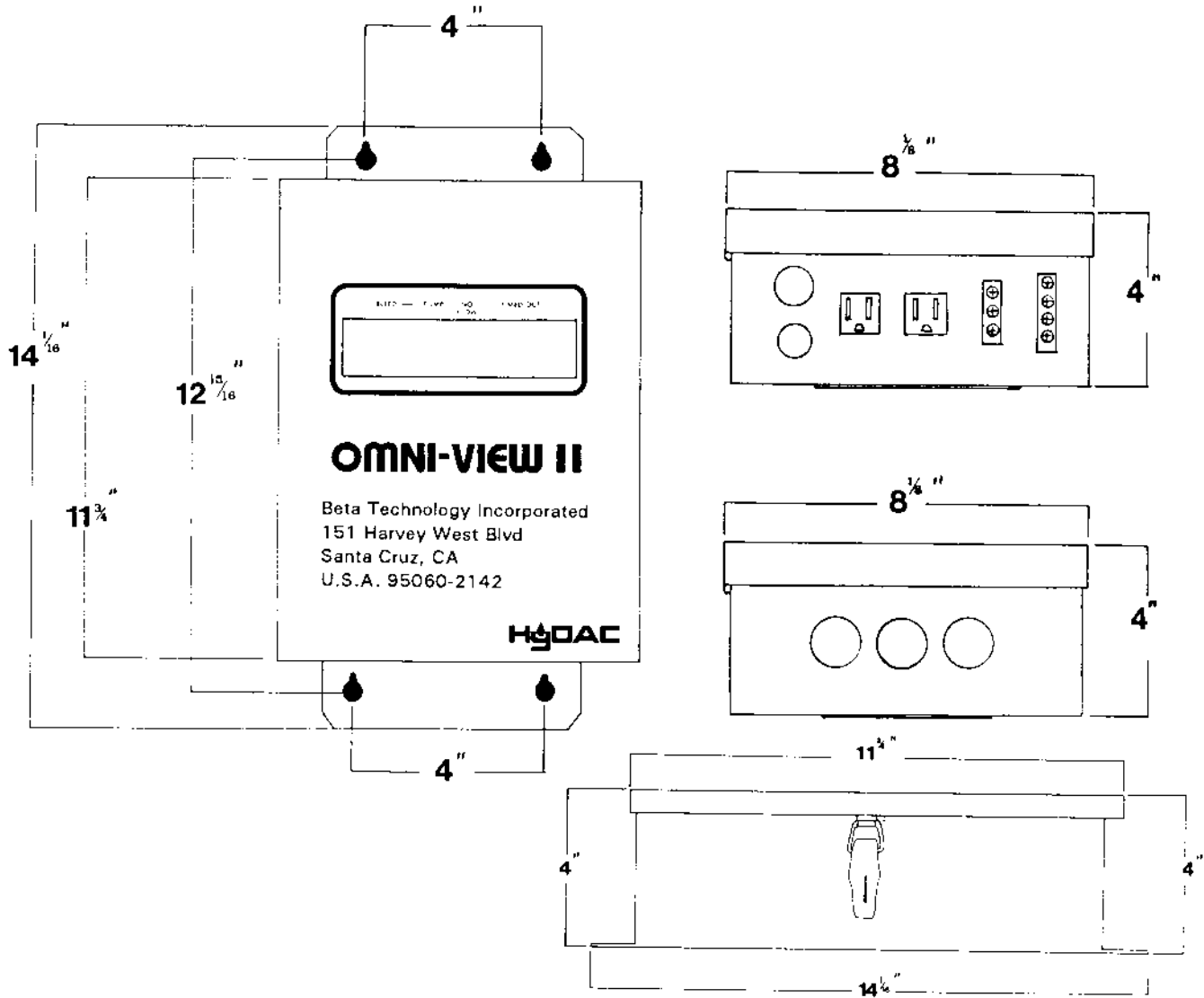
The following steps should be adhered to when installing the meter:

A. Measure the length of the meter plus pipe couplings and make the necessary plumbing arrangements to accommodate the installation.

B. Install the couplings without the meter connected.

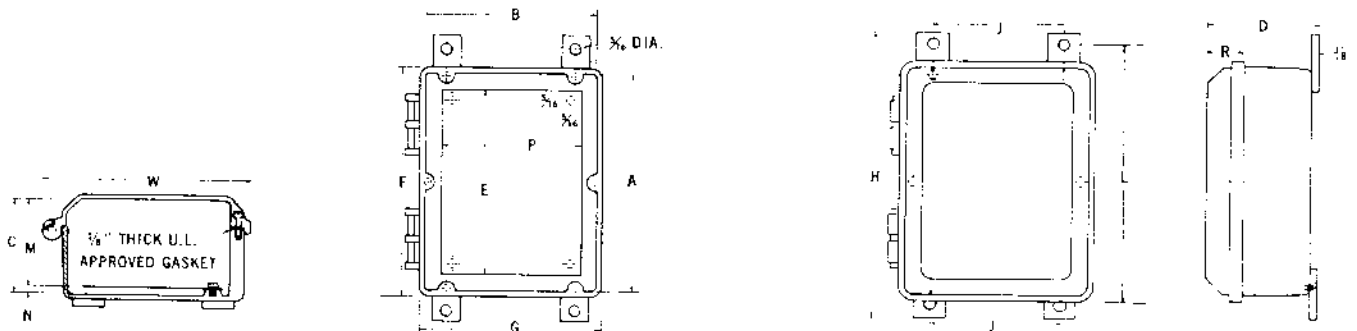
C. Important: Thoroughly flush all lines before connecting the meter in the piping. Most meter difficulties are caused by foreign matter introduced into the piping system in the form of pipe dope, threading chips, etc.

FIGURE XI - MECHANICAL & MOUNTING DIMENSIONS



Inside Box Size AxBxC	Overall Outside Including Mounting Bracket HxWxD	F	G	M	N	R
12x10x6 1/8	13 1/2 x 11 3/4 x 7 5/8	12 1/2	10 1/2	6 7/16	5/16	3 1/16

4X Enclosure Specifications



- A. Connect meter to the coupling. Observe direction of flow indicated on meter.
- B. Apply pressure to the system and check/repair leaks.
- C. Run electrical wires between the water meter electrical connections and water meter terminal on the base of the controller. Polarity is not important. For conduit models, connect to terminals indicated in Fig. XIII. This is a low voltage wiring and need adhere only to the Class II Underwriter's regulations. Maximum current is less than .05 amperes. If WATER METER WIRES ARE RUN IN CONDUIT, IT IS IMPORTANT THAT NO OTHER WIRES RUN IN THAT CONDUIT.

FIGURE X.

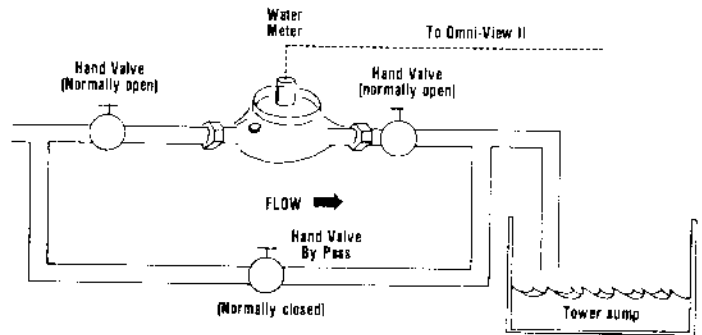
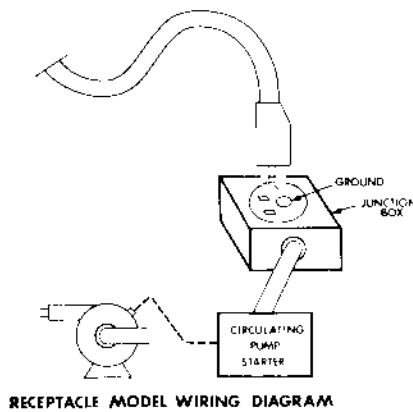
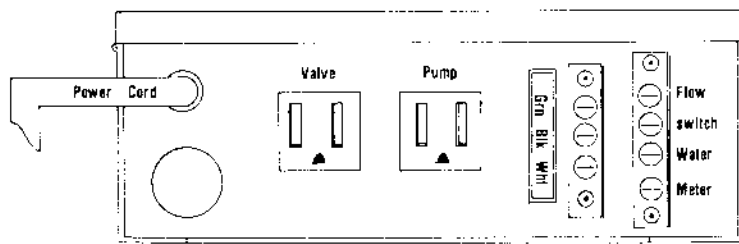
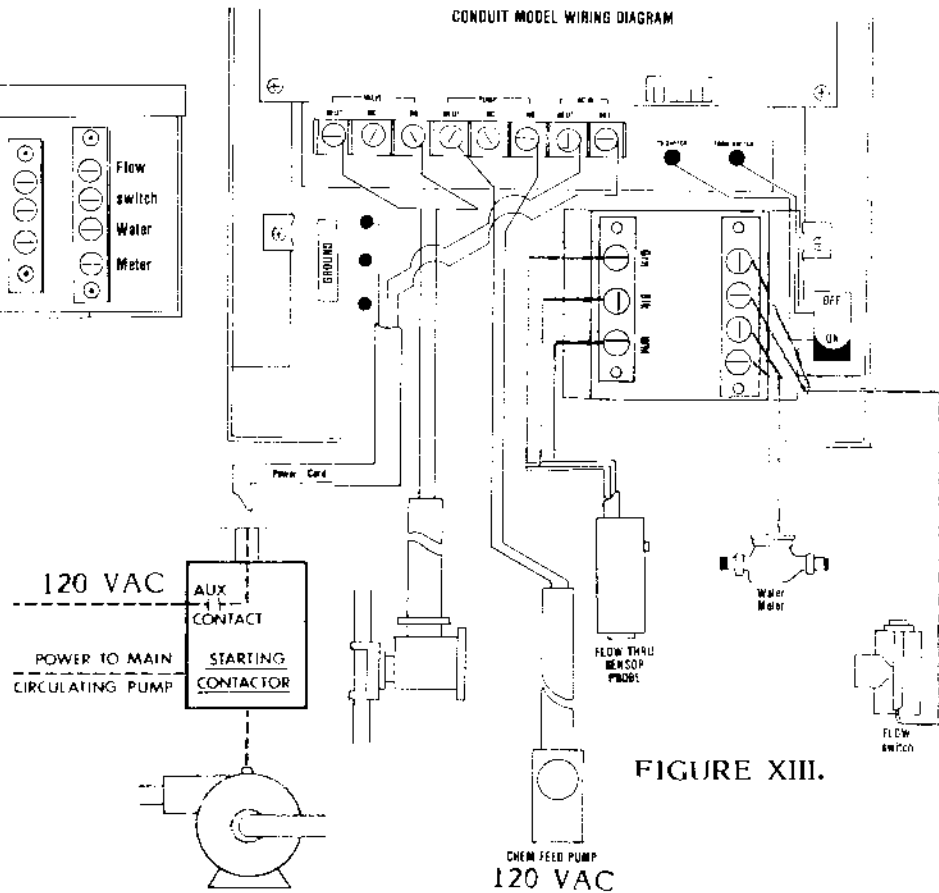


FIGURE XII.

Bottom view - Receptacle model



CONDUIT MODEL WIRING DIAGRAM



CONTROLLER SET-UP and CHECK-OUT

Note: The main system circulating pump must be operating during these adjustments. For failure of event to occur, refer to Question and Answer Guide provided in the back of the manual. It is recommended that the following steps be followed.

Establish controller setpoint:

- 1) Disconnect the bleed valve and the chemical pump.
- 2) Apply power to the controller and place on/off switch in "on" position.

Digital display will be illuminated.

3) "No flow" must not be activated at this time. If it is illuminated, temporarily disconnect flow switch from terminals and later proceed to Question and Answer Guide in this manual to insure that "no flow circuit/flow switch" combo is working properly.

4) Place test/normal switch in the normal position.

5) Place set-read switch in the read position.

6) The display will read the conductivity of the water at sensor.* If over-range is indicated (I followed by blanks on the display) move the range switch to times 10 (high). If the display reads less than 175, move the range switch to times 1 (low).

7) Place the "set-read" switch in the set position, then rotate "set potentiometer" until display reads desired set point to be maintained. Set point has now been established.

* If sensor is not installed - complete Sample Stream Assembly Installation before proceeding further.

8) Return set-read switch to read position. This is normal operating mode for automatic conductivity control.

9) If actual conductivity (Step 6) is much higher than set point (Step 7), the "bleed" light should be illuminated until the set point is satisfied. If actual conductivity (Step 6) is much lower than set point (Step 7) bleed light should not be illuminated.

10) Do not be concerned with other settings or LED illuminations at this time, all other functions will be covered in detail.

11) Proceed to "Establishing Chemical Feed Pump Activation" section.

ESTABLISHING CHEMICAL FEED PUMP ACTIVATION

The first step in set up of the chemical pump is the determination of the method to be used to add chemicals. The following methods are possible with the Omni-View II. Select your method and proceed to the proper installation section labeled Methods A - C.

Method A: Chemical addition in proportion to bleed off rate.

This method allows fail-safe time-out of chemical pump. Use only on systems without leaks and/or overflow.

Method B: Chemical addition in proportion to make-up rate.

This method requires a water meter with an electrical contactor placed in the make-up line.

Method C: Chemical addition as a percentage of controller "on" time.

This means that as long as controller is powered, chemical will be added as a percentage of time based on total cycle time. The standard "Red 60" I.C. total time cycle is 1 minute maximum, adjustable in one second increments.

Method D: Feed and Bleed on Conductivity with extended pump time.

Method A: Chemical addition in proportion to bleed off rate.

This method allows fail-safe time-out of chemical pump. Use only on systems without leaks and/or overflow.

Important Note: This method requires changing the factory installed integrated circuit (I.C.) which controls timer cycle time. For customer convenience, the additional I.C. has been supplied with the controller. For information on accomplishing this I.C. change, refer to the section entitled "How to Change Total Timer Cycle" in the Appendix.

Where uncontrolled water leakage exists, Method B is recommended.

Method A Installation:

Chemical addition in proportion to bleed-off, with fail-safe time-out function.

1) Circulating pump must be on. "No flow" light should not be illuminated at this time. If it is, temporarily disconnect flow switch at terminal strip and later proceed to Question and Answer Guide to insure that "no flow/flow switch" combo is working properly.

2) If electrode is not installed, refer to "Sample Stream Assembly Installation" before proceeding further.

3) Controller power switch should be in the "on" position.

4) Turn "set" potentiometer to the maximum clockwise position.

5) Place "range" switch in the normal operating range. Place "set/read" switch in the "read position" and "test/normal" switch in the "Normal" position.

6) Timer function switch should be placed with the T/O switch in the "on" position; W/M and P/T switches must be in the "off" position.

7) Place timer select switch #2 in the "on" position (for 2 minutes "on" time), all others in the "off" position.

Important Note: It is assumed that the timing chip (I.C.) has been changed as described in the first section of this installation section.

8) Rotate the set potentiometer counter-clockwise until the "bleed" light becomes illuminated. "Pump" light should activate simultaneously with "bleed" light, remain "on" for two minutes as dictated by the timer switch, then "pump" light should become disabled. At time of "pump" light disablement, "timed-out" light should become activated.

9) "Timed-Out" state can then be reset by interrupting power to the controller. (When in normal operating mode, unit will reset "timed-out" state whenever the conductivity falls below the setpoint and automatically shuts off valve and pump or whenever operator interrupts power).

10) Place "set/read" switch in the "set" position to display the set value. Turn "set" potentiometer until the desired "set" value is once more displayed.

11) Establish the maximum "on" time the chemical feed pump should be allowed to pump during any one bleed cycle. Using this figure, proceed to "Establishing Timer "On" Time" section.

Method B Installation:

Chemical addition in proportion to make-up rate. Requires use of a water meter with electrical contactor installed in the make-up line. Note: Timing chip for this method is supplied installed from the factory. Maximum "on" time is 4.25 minutes, adjustable in one second increments.

- 1) Install water meter, refer to section "Water Meter Installation". Note: Do not connect water meter wires until steps 2 - 9 in this section have been completed.
 - 2) Circulating pump must be on during this step. "No flow" must not be activated at this time. If it is illuminated, temporarily disconnect flow switch from terminal and later proceed to Question and Answer Guide provided in this manual to insure that "no flow/flow switch" combination is working properly.
 - 3) Conductivity electrode must also be installed. If the electrode is not installed, refer to "Sample Stream Assembly Installation Section" before proceeding further.
 - 4) Range switch should be on normal operating range. Set/read switch should be in the read position. Test/normal switch should be in the normal position.
 - 5) Timer function switch should be placed with the W/M position in the "on" position. (T/O and P/T switches must be in the "off" position).
 - 6) Place timer select switches 2 and 4, that is, 2 seconds and 8 seconds respectively, in the "on" position; all others in the "off" position.
 - 7) Depress the timer test switch, the pump light should become illuminated for 10 seconds and then become disabled.
 - 8) The timer is now automatically reset awaiting another activation.
 - 9) Determine pump "on" time desired and proceed to section "How to Adjust On Time for Timing Circuit".
 - 10) Disconnect power to the controller. Connect water meter wires to appropriate terminal strip. Reconnect power to control box. **CAUTION: When hooking up a water meter, make sure that the water meter does not produce a voltage. The Omni-View circuit will only accept a contact closure such as a reed switch or micro-switch without an external supply.**
 - 11) With flow passing through the meter, visually check to see that one revolution of meter register (10 gallons for 5/8", 3/4" and 1" meters; 100 gallons for 1-1/2" and 2" meters) activates pump light.
- For assistance reading meter, refer to Appendix.

Chemical Pump and Timer Adjustment

Once the pump has been installed, it is necessary to properly adjust the pumping time to obtain the desired chemical dosage of water.

ADJUSTMENT OF TIMER:

The timer adjustment is made using the timer select switches. Refer to the section titled "How to Adjust "ON" Time for Timing Circuit".

Method C Installation:

Chemical addition as a percentage of controller "ON" time. Normally used when it is desired to control chemical pump based on time, where the additional cost of a water meter would be prohibitive.

1) First, determine maximum cycle time desired. The standard timing chip installed at the factory will provide a repeating cycle that occurs every 60 seconds, adjustable in one second increments. See Special Instructions on page 26.

The "spare" chip provided with each unit will provide a total cycle time of 60 minutes, adjustable in one minute increments. If this time setting is desired, refer to Appendix "How to Change Timer Chip". See Special Instructions on page 26.

2) Circulating pump must be on. No flow must not be activated at this time. If it is illuminated, temporarily disconnect flow switch from terminal and later proceed to Question and Answer Guide provided in this manual to insure that "no flow circuit/flow switch" combination is working properly.

3) If sensor is not installed, refer to Sample Stream Assembly Installation section before proceeding further.

4) Range switch should be placed in the normal operating mode. Set/read switch in the read position. Test/normal switch in the **normal position**.

5) Timer function switches: W/M and P/T should be in the ON position (upward). T/O switch should be in the OFF position (downward).

6) Place timer select switches 2 and 4 (two seconds and eight seconds for the standard chip, respectively) in the "ON" position, all others in the "OFF" position.

7) Press timer test switch, pump light should become illuminated and remain on for 10 seconds, off for 50 seconds. At this time, unit should begin to recycle ("ON" for 10 seconds, "OFF" for 50 seconds) and should continue as long as power is supplied to controller.

8) Determine total on time desired and proceed to section titled "How To Adjust "ON" Time for Timing Circuit".

Timer Method D:

Feed and bleed based on conductivity with extended pumping time.

Typical application: User is locked into a high bleed rate situation. Conductivity controller output stays energized for very short periods of time resulting in insufficient chemical treatment.

Solution: Set mode switch S4 as follows: W/M and T/O "ON" (upward). Set timer switch S5 to desired pumping time to ensure adequate chemical treatment.

How to Adjust "ON" Time for Timing Circuit

Two settings on the controller must be understood to allow proper installation and operation of the timing circuit provided. These settings, the timer function select switches and the time setting switches, must be field adjusted for each installation.

The timer function select switches are used to determine if the timing circuit will be used as a limit timer (Method A), precision reset timer working with a water meter (Method B), or as a percentage timer (Method C). These three methods were described earlier in the manual in detail.

After determining the function of the timing circuit, it must be determined which timing chip would be appropriate. The chip installed at the factory provides a total cycle time of 4.25 minutes, which would normally be used whenever the timing circuit performs as a reset timer (Method B) or as a percentage timer (Method C). Usually, when the timing circuit is used as a limit timer (Method A), the spare chip provided should be installed.

Note: There are separate instructions for setting time for Method C. See page 26.

All time setting switches are shown in **Figure XV** in the off position.

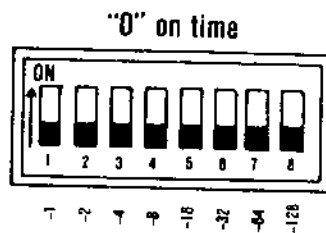


FIGURE XV.

For this example, an "on" time of 42 seconds is desired. "On" times are obtained by adding the corresponding numbers for the switches shown. Switch numbers are located on the switch block; "on" times are silkscreened on the printed circuit board.

Therefore, for 42 seconds "on" time, the following switch positions should be used (**Figure XVI**):

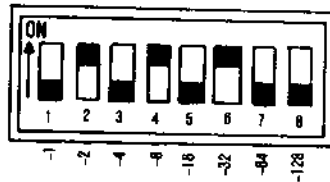


FIGURE XVI.

$$\frac{\text{Switch}}{\text{Corresponding Time}} = \frac{2}{2 \text{ (secs.)}} \quad \frac{4}{8 \text{ (secs.)}} \quad \frac{6}{32 \text{ (secs.)}} = 42 \text{ seconds total "ON" time}$$

Special Instructions for Setting the Timing in the % Timer Mode (Method C)

1. With the standard I.C. "Red 60", the cycle time is one minute in one second increments. Set the Dip timer switch S5 as per the instructions for Method A & B. Note that if the switch is set for 60 seconds or more, the pump will stay on continuously.

2. With the alternate I.C. "Red 3600", the cycle time is 60 minutes in one minute increments. Set the Dip timer switch (S5) per the instructions for Method A & B. Note that if the switch is set for 60 minutes or more, the pump will stay on continuously.

A third I.C. "Red 360" is available for a cycle time of six minutes in six second increments. Contact the factory to obtain this I.C.

TIMING SWITCH (S5) SELECTION CHART

With standard "Red 60" I.C.

Switch ON (upward)	Seconds ON (minutes ON for "Red 3600" I.C.)	Switch ON (upward)	Seconds ON (minutes ON for "Red 3600" I.C.)
1	1	2, 3, 4 & 5	30
2	2	1, 2, 3, 4 & 5	31
1 & 2	3	6	32
3	4	1 & 6	33
1 & 3	5	2 & 6	34
2 & 3	6	1, 2 & 6	35
1, 2 & 3	7	3 & 6	36
4	8	1, 3 & 6	37
1 & 4	9	2, 3 & 6	38
2 & 4	10	1, 2, 3 & 6	39
1, 2 & 4	11	4 & 6	40
3 & 4	12	1, 4 & 6	41
1, 3 & 4	13	2, 4 & 6	42
2, 3 & 4	14	1, 2, 4 & 6	43
1, 2, 3 & 4	15	3, 4 & 6	44
5	16	1, 3, 4 & 6	45
1 & 5	17	2, 3, 4 & 6	46
2 & 5	18	1, 2, 3, 4 & 6	47
1, 2 & 5	19	5 & 6	48
3 & 5	20	1, 5 & 6	49
1, 3 & 5	21	2, 5 & 6	50
2, 3 & 5	22	1, 2, 5 & 6	51
1, 2, 3 & 5	23	3, 5 & 6	52
4 & 5	24	1, 3, 5 & 6	53
1, 4 & 5	25	2, 3, 5 & 6	54
2, 4 & 5	26	1, 2, 3, 5 & 6	55
1, 2, 4 & 5	27	4, 5 & 6	56
3, 4 & 5	28	1, 4, 5 & 6	57
1, 3, 4 & 5	29	2, 4, 5 & 6	58
		1, 2, 4, 5 & 6	59
		3, 4, 5 & 6	60

(Here or above in Method C (% Timer) the pump will stay on continuously.

continuation.....TIMING SWITCH (S5) SELECTION CHART

With standard "Red 60" I.C.

Switch ON (upward)	Seconds ON (minutes ON for "Red 3600" I.C.)	Switch ON (upward)	Seconds ON (minutes ON for "Red 3600" I.C.)
1, 3, 4, 5 & 6	61	1, 2, 4, 6 & 7	107
2, 3, 4, 5 & 6	62	3, 4, 6 & 7	108
1, 2, 3, 4, 5 & 6	63	1, 3, 4, 6 & 7	109
7	64	2, 3, 4, 6 & 7	110
1 & 7	65	1, 2, 3, 4, 6 & 7	111
2 & 7	66	5, 6 & 7	112
1, 2 & 7	67	1, 5, 6 & 7	113
3 & 7	68	2, 5, 6 & 7	114
1, 3 & 7	69	1, 2, 5, 6 & 7	115
2, 3 & 7	70	3, 5, 6 & 7	116
1, 2, 3 & 7	71	1, 3, 5, 6 & 7	117
4, 3 & 7	72	2, 3, 5, 6 & 7	118
1, 4 & 7	73	1, 2, 3, 5, 6 & 7	119
2, 4 & 7	74	4, 5, 6 & 7	120
1, 2, 4 & 7	75	1, 4, 5, 6 & 7	121
3, 4 & 7	76	2, 4, 5, 6 & 7	122
1, 3, 4 & 7	77	1, 2, 4, 5, 6 & 7	123
2, 3, 4 & 7	78	3, 4, 5, 6 & 7	124
1, 2, 3, 4 & 7	79	1, 3, 4, 5, 6 & 7	125
5 & 7	80	2, 3, 4, 5, 6 & 7	126
1, 5 & 7	81	1, 2, 3, 4, 5, 6 & 7	127
2, 5 & 7	82	8	128
1, 2, 5 & 7	83	1 & 8	129
3, 5 & 7	84	2 & 8	130
1, 3, 5 & 7	85	1, 2 & 8	131
2, 3, 5 & 7	86	3 & 8	132
1, 2, 3, 5 & 7	87	1, 3 & 8	133
4, 5 & 7	88	2, 3 & 8	134
1, 4, 5 & 7	89	1, 2, 3 & 8	135
2, 4, 5 & 7	90	4 & 8	136
1, 2, 4, 5 & 7	91	1, 4 & 8	137
3, 4, 5 & 7	92	2, 4 & 8	138
1, 3, 4, 5 & 7	93	1, 2, 4 & 8	139
2, 3, 4, 5 & 7	94	3, 4 & 8	140
1, 2, 3, 4, 5 & 7	95	1, 3, 4 & 8	141
6 & 7	96	2, 3, 4 & 8	142
1, 6 & 7	97	1, 2, 3, 4 & 8	143
2, 6 & 7	98	5 & 8	144
1, 2, 6 & 7	99	1, 5 & 8	145
3, 6 & 7	100	2, 5 & 8	146
1, 3, 6 & 7	101	1, 2, 5 & 8	147
2, 3, 6 & 7	102	3, 5 & 8	148
1, 2, 3, 6 & 7	103	1, 3, 5 & 8	149
4, 6 & 7	104	2, 3, 5 & 8	150
1, 4, 6 & 7	105	1, 2, 3, 5 & 8	151
2, 4, 6 & 7	106	4, 5 & 8	152

continued TIMING SWITCH (S5) SELECTION CHART

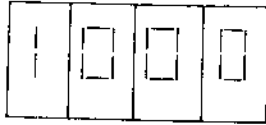
With standard "Red 60" I.C.

Switch ON (upward)	Seconds ON (minutes ON for "Red 3600" I.C.)	Switch ON (upward)	Seconds ON (minutes for "Red 3600" I.C.)
1, 4, 5 & 8	153	3, 4, 7 & 8	204
2, 4, 5 & 8	154	1, 3, 4, 7 & 8	205
1, 2, 4, 5 & 8	155	2, 3, 4, 7 & 8	206
3, 4, 5 & 8	156	1, 2, 3, 4, 7 & 8	207
1, 3, 4, 5 & 8	157	5, 7 & 8	208
2, 3, 4, 5 & 8	158	1, 5, 7 & 8	209
1, 2, 3, 4, 5 & 8	159	2, 5, 7 & 8	210
6 & 8	160	1, 2, 5, 7 & 8	211
1, 6 & 8	161	3, 5, 7 & 8	212
2, 6 & 8	162	1, 3, 5, 7 & 8	213
1, 2, 6 & 8	163	2, 3, 5, 7 & 8	214
3, 6 & 8	164	1, 2, 3, 5, 7 & 8	215
1, 3, 6 & 8	165	4, 5, 7 & 8	216
2, 3, 6 & 8	166	1, 4, 5, 7 & 8	217
1, 2, 3, 6 & 8	167	2, 4, 5, 7 & 8	218
4, 6 & 8	168	1, 2, 4, 5, 7 & 8	219
1, 4, 6 & 8	169	3, 4, 5, 7 & 8	220
2, 4, 6 & 8	170	1, 3, 4, 5, 7 & 8	221
1, 2, 4, 6 & 8	171	2, 3, 4, 5, 7 & 8	222
3, 4, 6 & 8	172	1, 2, 3, 4, 5, 7 & 8	223
1, 3, 4, 6 & 8	173	6, 7 & 8	224
2, 3, 4, 6 & 8	174	1, 6, 7 & 8	225
1, 2, 3, 4, 6 & 8	175	2, 6, 7 & 8	226
5, 6 & 8	176	1, 2, 6, 7 & 8	227
1, 5, 6 & 8	177	3, 6, 7 & 8	228
2, 5, 6 & 8	178	1, 3, 6, 7 & 8	229
1, 2, 5, 6 & 8	179	2, 3, 6, 7 & 8	230
3, 5, 6 & 8	180	1, 2, 3, 6, 7 & 8	231
1, 3, 5, 6 & 8	181	4, 6, 7 & 8	232
2, 3, 5, 6 & 8	182	1, 4, 6, 7 & 8	233
1, 2, 3, 5, 6 & 8	183	2, 4, 6, 7 & 8	234
4, 5, 6 & 8	184	1, 2, 4, 6, 7 & 8	235
1, 4, 5, 6 & 8	185	3, 4, 6, 7 & 8	236
2, 4, 5, 6 & 8	186	1, 3, 4, 6, 7 & 8	237
1, 2, 4, 5, 6 & 8	187	2, 3, 4, 6, 7 & 8	238
3, 4, 5, 6 & 8	188	1, 2, 3, 4, 6, 7 & 8	239
1, 3, 4, 5, 6 & 8	189	5, 6, 7 & 8	240
2, 3, 4, 5, 6 & 8	190	1, 5, 6, 7 & 8	241
1, 2, 3, 4, 5, 6 & 8	191	2, 5, 6, 7 & 8	242
7 & 8	192	1, 2, 5, 6, 7 & 8	243
1, 7 & 8	193	3, 5, 6, 7 & 8	244
2, 7 & 8	194	1, 3, 5, 6, 7 & 8	245
1, 2, 7 & 8	195	2, 3, 5, 6, 7 & 8	246
3, 7 & 8	196	1, 2, 3, 5, 6, 7 & 8	247
1, 3, 7 & 8	197	4, 5, 6, 7 & 8	248
2, 3, 7 & 8	198	1, 4, 5, 6, 7 & 8	249
1, 2, 3, 7 & 8	199	2, 4, 5, 6, 7 & 8	250
4, 7 & 8	200	1, 2, 4, 5, 6, 7 & 8	251
1, 4, 7 & 8	201	3, 4, 5, 6, 7 & 8	252
2, 4, 7 & 8	202	1, 3, 4, 5, 6, 7 & 8	253
1, 2, 4, 7 & 8	203	2, 3, 4, 5, 6, 7 & 8	254
		1, 2, 3, 4, 5, 6, 7 & 8	255

Question and Answer Guide

Question (Symptom)

1) Digital display reads



Answer (Remedy or Recommendation)

- a) Unit is in "over range" - Move range selector switch to HIGH (x10) scale.
- b) Unit is in "over range" and range selector switch is on HIGH (x10) scale -
 - i) Probe wires may be shorted, check all probe wire connections, or
 - ii) Conductivity reading is higher than maximum range of controller. Check maximum range listed on controller serial number label and if water value, according to a portable test instrument, exceeds this figure, the application exceeds the range of the controller. Contact the factory.
- c) Unit is in "TEST" position - Move TEST/NORM switch to normal.

2) Digital display reads



- a) Electrode is not connected properly - Check electrode wiring for shorts/opens, especially at terminal strip or splices, check for proper color sequency. If wiring checks out, probe may be defective--refer to "Controller Checkout Using Test Module" section to isolate problem.
- b) Electrode is not sensing a proper water sample - remove electrode from line and place in beaker of "known" conductivity (for 3/4" electrode, be sure not to rest electrode on bottom of beaker). If electrode then reads properly, check sample stream assembly for proper water flow.
- c) Set-read switch is in "SET" position and set potentiometer is at minimum - Normal occurrence. Establish setpoint to be maintained. Then place SET-READ switch in READ.

3) Digital display on controller does not agree with samples verified with a portable test instrument taken at electrode site

- a) Controller readings are lower than test samples taken - indicates a fouled electrode:
 - i) For 3/4" electrode, remove from line after shut down of flow through the sample stream assembly. Clean conductivity electrode with fine grit sandpaper (400 or finer), or with mild solution of muriatic acid.
 - ii) For 3/8" electrode, clean with wire brush provided, or fill with a mild solution of muriatic acid.
Note: If cleaning electrode does not resolve problem, refer to "Controller Checkout Using Test Module" section to isolate problem.
- b) Improper flow of water through electrode creating a stagnant water sample -
 - i) Refer to appendix "How to Pinpoint a Stagnant Water Sample".
 - ii) Clean strainers. Check for 5 psi pressure drop across electrode and modify if required.
- c) Controller reads micromhos; portable test instrument reads ppm -
 - i) Use portable tester reading micromhos.
 - ii) Use a conversion factor for comparison purposes. Refer to Appendix--Conductivity vs. ppm.
- d) Defective portable instrument. Check with a sample of "known" conductivity solution.
- e) Controller has been previously field "calibrated". Obtain a "known" solution in micromhos close to the normal operating point of the system. Clean electrode thoroughly (refer to 3A i and ii above). Place electrode in solution and using appropriate "CAL POT" adjust conductivity reading. Use "HIGH CAL POT" if range selector switch is normally used in the "HIGH" mode. Clockwise increases the value displayed. If unit cannot be calibrated properly, return panel to factory for repairs.

- 4) Timer test switch does not activate timer/pump. (Be sure to allow 5 seconds between depressions to allow unit to reset.)
- a) Timer/function switches (WM/TO/PT) are all in the "off" position - determine proper function. (refer to "Establishing Chemical Feed Pump Activation" section) and change switches accordingly.
 - b. Timer setting switches (1 through 8) are all in "off" position - determine proper timer setting and change switches accordingly.
 - c) Timer function switch W/M is "on", T/O and P/T are "off", at least one timer setting switch is "on". It is possible for the W/M to stop with the contacts closed. Let some water flow thru W/M, and see if problem goes away. Disconnect water meter wires at terminal strip - if timer test switch works properly, a wiring problem or a defective meter contactor exists, if timer test switch still does not activate unit, panel is defective. Return to factory for repairs.
 - d) "No flow" state exists - normal occurrence - timer test switch will not override "no flow" circuitry - pump should not activate.
 - e) T/O switch is "on", W/M and P/T are "off, valve is not activated - normal occurrence in this mode, pump should activate only when valve is activated. To check function, place "TEST NORMAL" switch in TEST, valve and pump lights should become illuminated and pump should remain on for the period selected by the timer setting switches - then "timed-out" state should occur until unit is reset or automatically resets at the start of another bleed cycle - if sequence does not occur as stated - panel is defective.
 - f) P/T switch is in "on" position, W/M and T/O are in the "off" position, panel is defective. Return panel to factory for repairs.

6) Erratic digital display

- a) Improper water flow through sample stream assembly. Air bubbles in sample stream -
 - i) throttle sample line
 - ii) verify by removing electrode from sample stream assembly and placing it in a beaker of known solution - if problem persists - refer to "Controller Checkout Using Test Module" section to isolate problem.
- b) Faulty electrode wiring - check wiring and replace if necessary.

7) "No flow" is illuminated while main circulating pump is operational

- a) Improper flow switch mounting - refer to Sample Stream Assembly Installation Section and follow manufacturer's recommendations only.
- b) Improper wiring between flow switch and controller - remove flow switch wires from terminal, "no flow" should become disabled, if not panel is defective.

Note: To verify performance of panel, short flow switch terminals on enclosure, "no flow" should occur and then become disabled when jumper wire used for "shorting" is removed. If panel does not operate in this manner, panel is defective.

If panel operates properly, flow switch may be clogged or plunger may be stuck or installed improperly. Clean flow switch and verify position of plunger. Plunger pushes upward with flow; plunger falls toward the ground on "no flow". Remove and clean with moist cloth and replace. Secure plug fairly tight.

Recorder Instructions

The HyDAC Omni-View II has an integral recorder output which is designed to drive a 0-1 MA, 200 ohm galvanometer such as the one used in the Rustrak Model 288 recorder.

The recorder output is accessible at a dual connector block located at the bottom left-hand corner of the electric component board.

The polarity is SIG (NEGATIVE) and GRD (POSITIVE). Connect the recorder accordingly.

NOTE: The recorder output is factory set; however, if it is deemed necessary to change the adjustment, the potentiometer is located at the top left-hand corner of the electronic component board. It is the fourth potentiometer from the left edge of the board, is rectangularly shaped, and has a small adjustment screw facing the viewer.

Before changing the factory set-point, it is recommended that the controller test modules be used to check the recorder output. For example, if you have a 0-2,000/0-20,000 micromho controller, disconnect the sensor wires and connect the 10,000 micromho test module. Set the switches for HIGH, READ and NORMAL. The recorder galvanometer must be connected to the Omni-View II recorder output and the paper drive motor must be on. Check Omni-View II calibration: should be indicating 10,000 micromhos. The recorder should be indicating mid-scale; if not, turn potentiometer screw clockwise to increase or counter-clockwise to decrease.

To check the low range, replace the 10,000 micromho test module with the 1,000 micromho module. Set the switches for LOW, READ and NORMAL. The Omni-View II should be indicating 1,000 and the recorder mid-scale.

Factory Repair of the Omni-View II

How to remove the electronic assembly for return to :

Beta Technology Incorporated

1. Disconnect input power to the unit.
2. Remove inner "WARNING" panel.
3. Squeeze in on the edges of the bottom white connector. See Fig. XVIII.
Do not separate the top white connector.
4. Remove the (4) screws holding the electronic assembly.
5. Slightly pull out and tilt the assembly to facilitate removing all of the single wires from the P.C. Board lugs. The connectors are "push on, pull off"; a slight wiggling motion will aid separation.
6. Remove the entire electronic assembly from the enclosure.

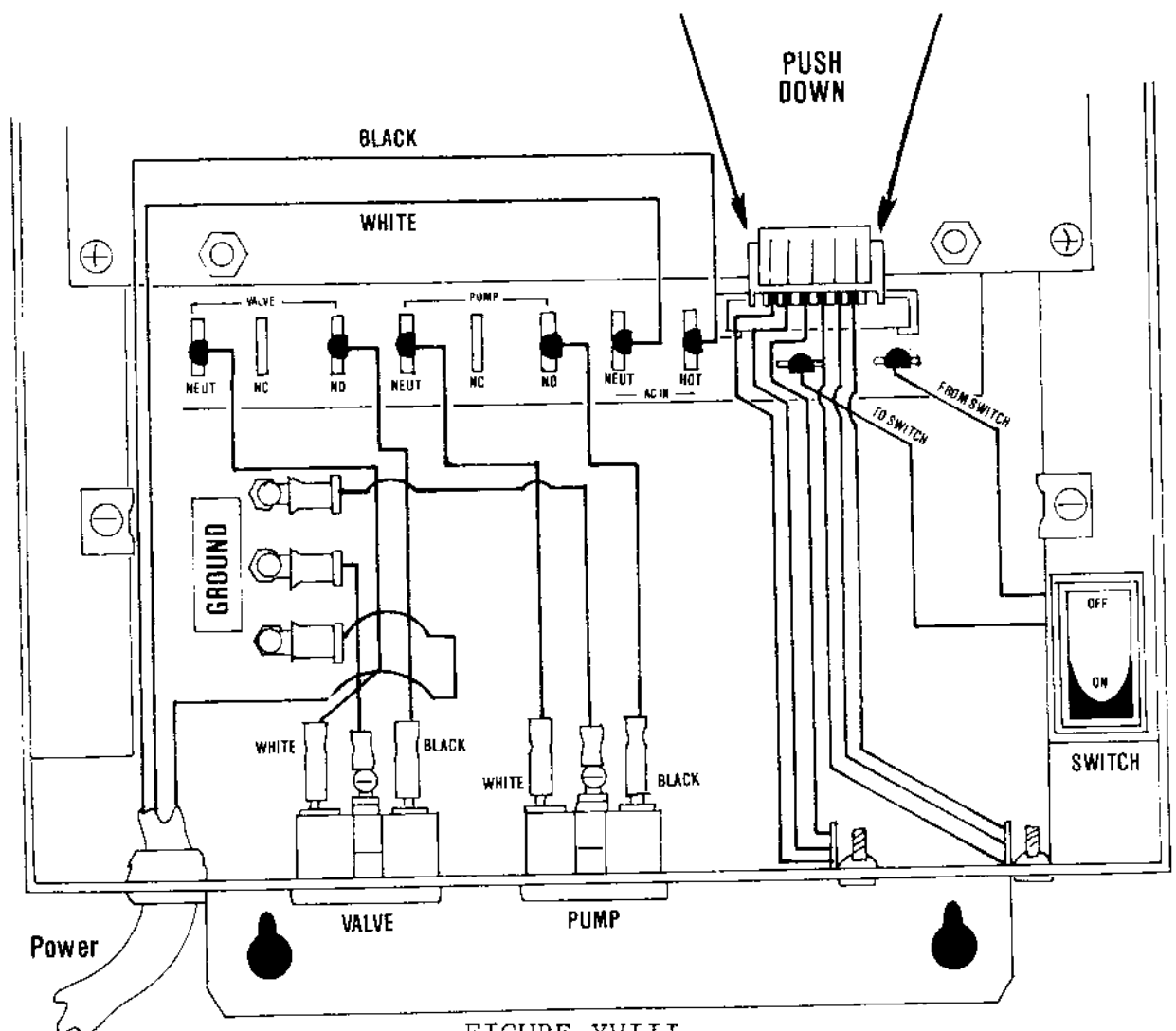


FIGURE XVIII

CHECKOUT GUIDE USING TEST MODULE KIT SUPPLIED

This procedure is recommended when unit fails to display accurate conductivity readings.

- 1) The Omni-View II controller is supplied with a test kit for this purpose. The value of the test module is 1,000 micromhos for Range -4 and 100 micromhos for Range -2.

	<u>Maximum Range</u>			<u>Test module value of 1,000 micromhos</u>
Range II (-2 on Catalog #)	0	-	20 (LO x 1)	10
	0	-	200 (HI x 10)	100
Range IV (-4 on Catalog #)	0	-	2,000 (LO x 1)	1,000
	0	-	20,000 (HI x 10)	100

- 2) With power off to the controller, disconnect the electrode (3 wires) from base of controller (on receptacle models). On conduit models, electrode connections are inside control box. Connect proper test module to electrode terminals. Be sure to observe proper color coding of wires when connecting to terminal strip.
- 3) Disconnect solenoid valve and chemical pump from controller.
- 4) Re-apply power to controller.
- 5) Check calibration of controller:
 - a) Place all timer function switches (W/M, T/O, and P/T) in the off position.
 - b) Place range switch on proper range as outlined on chart for test module selected.
 - c) Set-read switch in the read position.
 - d) Test-normal switch in the normal position.

- e) Unit should read the approximate value ($\pm 10\%$) of the test module selected. Be sure that range switch is in the correct position for module used on your controller. If unit does not perform as outlined proceed to question and answer guide provided or contact Beta Technology Incorporated for technical assistance.
- f) After checkout is complete, return all switches to the original position. Be sure to re-connect pump and valve.

PARTS LIST

Fuse	032300
Red 60 I.C.	032207
Red 360 I.C.	032208
Red 3600 I.C.	032219

A P P E N D I X

How To Change Total Timer Cycle Time by Changing Timing Chip (I.C.)

The Omni-View II, as supplied by the manufacturer, includes an integrated circuit (I.C.) to allow total "ON" time of 4.25 minutes adjustable in one second increments. See special instructions for setting time, if Method C (% timer) is being used, on page 26. An optional timer I.C. is also included with each unit. This optional I.C. allows total cycle time of 4.25 hours adjustable in one minute increments (see special instructions if Method C (% timer) is being used on page 26).

Installation of the optional I.C. is easily accomplished by completing the following steps:

- 1) **Disconnect power to the controller.**
- 2) **Remove original I.C. (identified as Red 60, BETA P/N 032207, printed on the I.C.) from the socket. Refer to Figure IV to locate this chip. This is accomplished by inserting small screwdriver between the I.C. and the socket as shown in Figure XVII.**

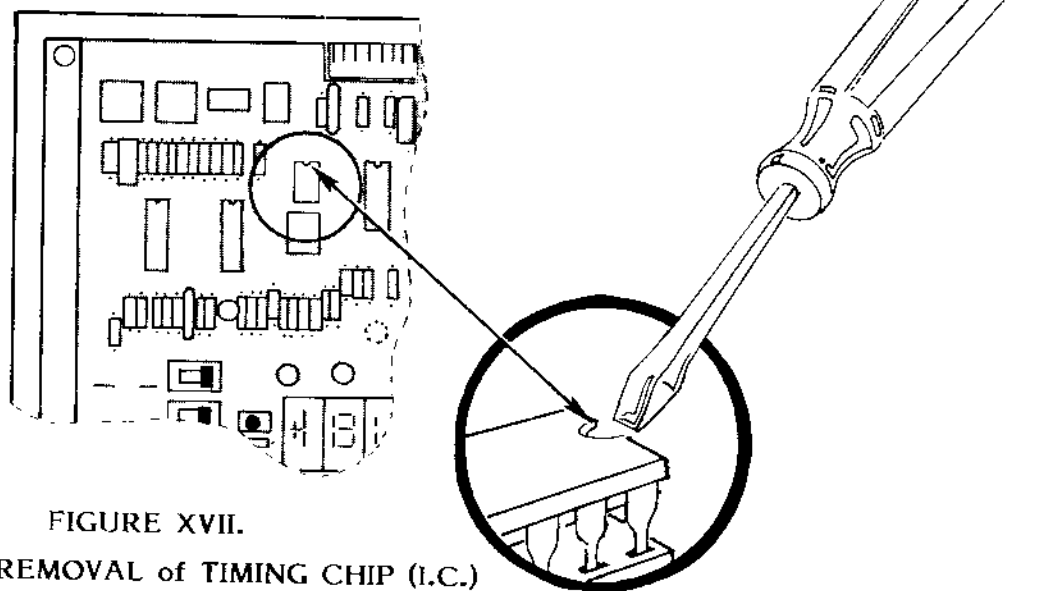


FIGURE XVII.
REMOVAL of TIMING CHIP (I.C.)

- 3) **Remove "spare " I. C. from the holding socket provided. This is identified as Red 3600, 3600, BETA P/N 032219, printed on the I.C.**
- 4) **Insert correct I.C. onto main circuit board. Observe configuration noted. The dot (or indentation) on the I.C. represents pin #1. Align pin #1 of the I.C. with the #1 silkscreen on the printed circuit board. Be sure all eight legs of the I.C. are straight and inserted properly into the socket. Put unused I.C. in holding socket.**
- 5) **Continue with System Set-up and Checkout.**

