HYDAC®

MODU-MAX®

pH/ORP CONTROL MANUAL

Beta

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MODU-MAX

pH/ORP System

Table of Contents

Mechanical and Mounting Dimensions (See Fig. VI)

Installation

Refer to Fig. II . For controller mounting, see Fig. VI.

pH Controller Checkout and Adjustment

1. Open the windowed door and turn the POWER switch to the "ON" (upward) position. pH display should be lit.

2. Place feed switch (On-Auto-Off) in ON. Feed light should be ON and pump should be ON. Place feed switch in AUTO. Feed pump may be on or off.

3. Open the inner (white) door by pulling on the latch (black) with an outward motion.

4. Make sure that the electrode cable is properly connected to the terminals on the top PC board; see Figs. IV, V. Also, see that the pH/millivolt switch is in the right-hand position. Close the sample line hand valves and remove the pH electrode from the PVC tee; rinse electrode in distilled water; adjust temperature compensation potentiometer to temperature of buffer solutions; insert electrode in a glass/plastic beaker filled with 7.0 buffer solution and note reading on the digital display; it should be 7.0; if not, adjust the "O" pH potentiometer on the controller printed circuit board (Fig. V). Next, rinse electrode in distilled water and insert the electrode in a buffer solution which has a value at or near the desired control point. Adjust the "slope" potentiometer so that the digital display reads the correct value. There is interaction between the "O" and "slope" adjustments, so the two steps should be repeated several times. Rinse electrode in distilled water before each immersion in buffers.

A new electrode may require a "soaking" period in water. It is good practice to store the electrode tip in water when not in service.

Insert the electrode in the PVC tee and open the sample line hand valves.

5. Close the inner door. Display should be indicating the pH value of the system water. "Operate" and "Feed" lights may or may not be on.

6. Adjust the temperature compensation potentiometer to the temperature of the system water.

7. Press down and hold the "Read-Set" switch while adjusting the "Set" potentiometer to select the desired pH operating point (shown on the display). "Operate" and "Feed" may or may not be on. Release switch.

8. The Mode Selector switch on the PC Board (Fig. V) must be in the right-hand position.

9. Deadband (Hysteresis) may be adjusted at this time. It may be desirable to accumulate operating experience with the unit at the factory set-point (+.20 to .25 pH units). When a change is required, the adjustment is located on the control PC board (Fig. V). Turn potentiometer clockwise to decrease deadband.

10. Chemical feed pump should be activated whenever the "Operate" and "Feed" lights are on. (EXCEPTION: The "Operate" light can be on but the "Feed" light can be off. This indicates that the Time-Out module has disabled the chemical feed pump).

ORP Electrode/Controller Checkout and Adjustment of Set-Point

1. See no. 1 of pH Controller Checkout and Adjustment.

2. See no. 2 of pH Controller Checkout and Adjustment.

3. See no. 3 of pH Controller Checkout and Adjustment.

ORP Electrode/Controller Checkout and Adjustment of Set-Point continued.....

4. Make sure that the electrode cable is properly connected to the terminals on the lower PC board; see Figures IV, V . Also, see that the pH/Mv switch is in the left-hand position. Remove the ORP electrode from the PVC tee and suspend it in a beaker of solution prepared as follows:

A. Fill beaker half full with pH 7.0 buffer.
B. Add a "pinch" of QUINHYDRONE (the amount which would stay on the end of a 1/4" wooden applicator). Repeat until a small amount remains undissolved.
C. Read temperature and adjust the temperature potentiometer on the controller.

When the electrode is inserted in the above solution, the reading should be between +68 & 111 Mv. Rinse electrode and pat dry on a soft tissue. Prepare another solution:

1. Fill beaker half full with 4 buffer.
2. Add a "pinch" of QUINHYDRONE. Repeat until a small amount remains undissolved.

When the electrode is inserted in the above solution, the reading should be between +238 and +296 Mv.

Note: This is not a "calibration" procedure. It is merely a guideline for determining electrode performance. If the guideline is not met:

1. Wipe the platinum surface clean with a soft cloth or tissue.
2. Soak the electrode in Muriatic acid or "Vanish" toilet bowl cleaner.
3. As a last resort, polish the platinum with 600 grade wet silicon carbide paper.

Always use fresh buffer/quinhydrone mixtures when checking the electrode. A new or freshly cleaned electrode may require a "soaking" period in water. It is good practice to store the electrode tip in water when it is not in use.

Insert the electrode in the PVC tee and open the sample line hand valves.

5. Close the white inner door. Display should be indicating the ORP value of the system water. "Operate" and "Feed" lights may or may not be on. Make sure that the Mode Selector switch (Fig. V) is to the right.

6. Adjust temperature compensation potentiometer to the temperature of the system water.

7. Press down and hold the "Read-Set" switch while adjusting the "Set" potentiometer to the desired ORP operating point (shown on the display in millivolts); typically, this will be close to 800 Mv, that is plus, not negative. The lack of a symbol (on the display) is positive or plus. The minus (-) symbol indicates a negative set-point.

8. Deadband (Hysteresis) may be adjusted at this time. It may be desirable to accumulate operating experience with the unit at the factory set-point (approximately + 3 Mv). When a change is required, the adjustment is located on the control PC board. Turn the "HYS" potentiometer clockwise to decrease deadband.

9. Chemical feed pump should be activated whenever the "Operate" and "Feed" lights are on. (EXCEPTION: The "Operate" light can be on, but the "Feed" light can be off. This indicates that the Time-Out module has disabled the chemical feed pump).

10. If a free chlorine in parts per million conversion reading is desired, refer to Fig.VII Curve Chart for proper Mv readings. NOTE: This conversion is for estimate purposes only.

Modifier Information and Check-Out

Time-Out

Function: Prevents overfeeding of chemicals by overriding the timer or conductivity controller which is activating the pump.

Features: LED light is lit after module times out. Adjustable 3 minutes to 3 hours. Resets whenever driving function pH/ORP pump is returned to normal limits, or by interrupting the power. Output will activate a Flasher/Driver.

Output Functions: For example, pH controller will activate an acid pump when pH goes above the set-point. If a malfunction occurs, pump will be disabled after the pre-set maximum pumping time has elapsed.

Module Check-Out: When used with a pH controller, activate the feed function by turning the set-point potentiometer in the proper direction (this is dependent upon the position of the "direction" switch on the PC board). Turn the time-out adjustment to minimum. After a few minutes, time-out light should come on and the chemical pump should be disabled. If the module fails to perform in accordance with the above, it can be considered defective; always check the ribbon cable/connectors before judging a module to be defective. Suspect modules should be returned to the factory for testing and repair, if necessary.

No Flow

Function: The "No-Flow" module automatically disables the controller whenever the main circulating pump is off. An external flow switch is supplied as part of the electrode assembly.

Features: Test switch, LED indicator light

Module Check-Out:
1. Press and hold the test switch.
2. LED should be lit.
3. The pH/ORP pumps should be disabled.
4. If above does not occur, either the no-flow or the control module is defective. Isolate and replace.

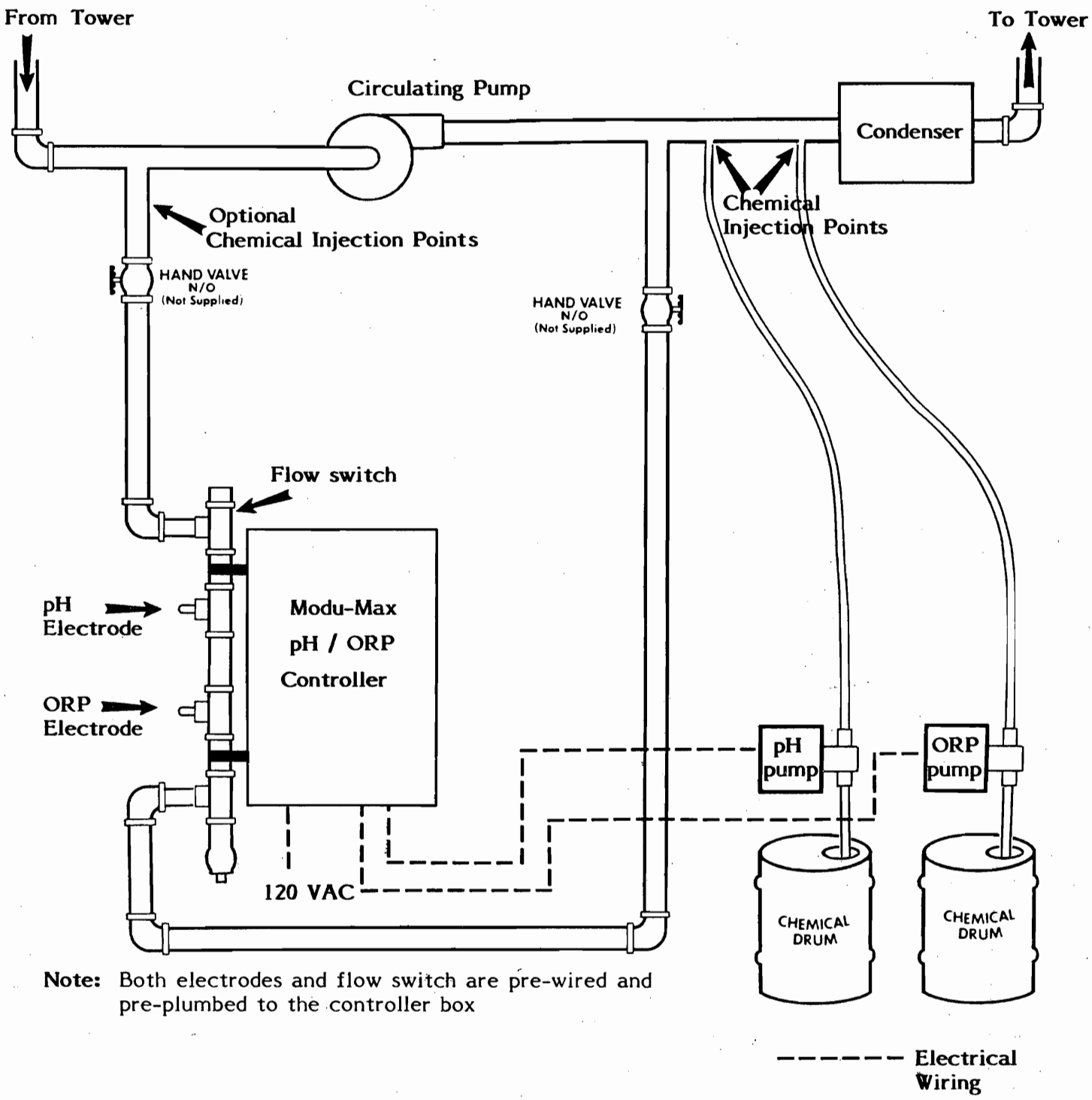
Alarm Flasher

Function: Provides a visual warning of time-out from the pH/ORP control modules.

Features: Large "alarm" light, incandescent type for brightness, flashes on and off. A switch enables the operator to change from the flashing mode to a steady mode. Automatic reset of the alarm module when the abnormal conduction is corrected. Allows the operator to take corrective action before costly system damage occurs.

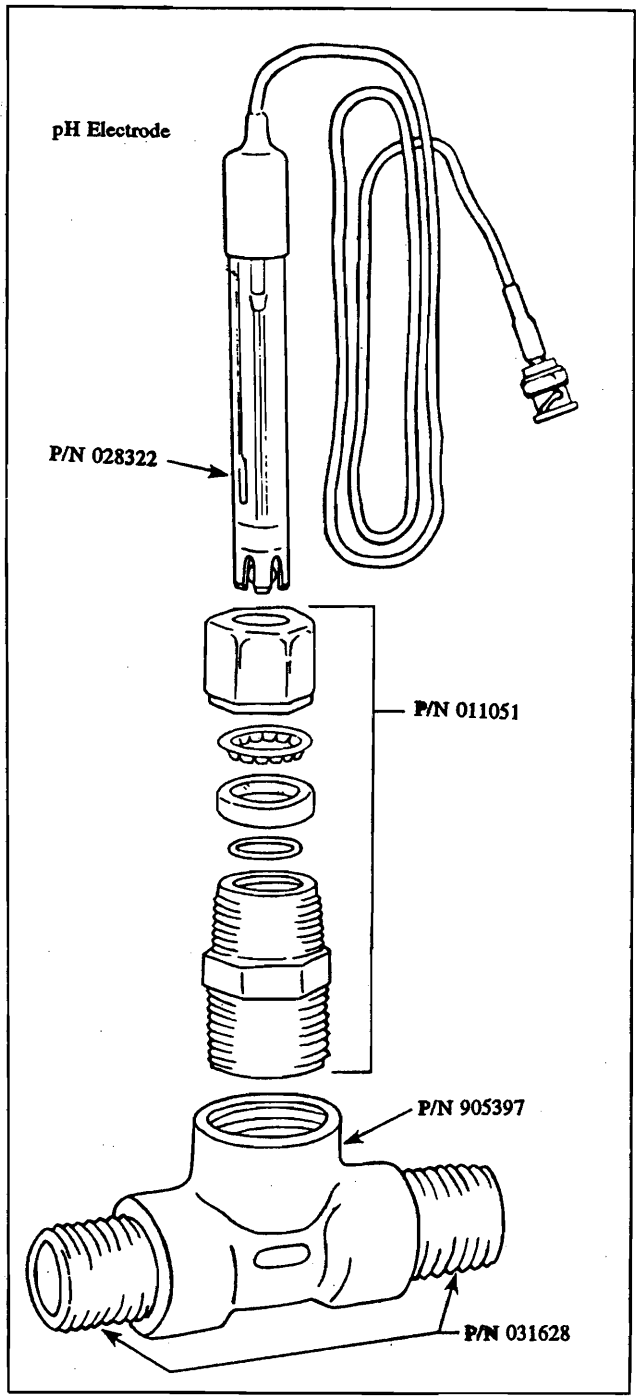
Module Check-Out: The alarm module receives its signals from the 2 Time-out modules. Check ribbon cable/connectors. Suspect modules should be returned to the factory for testing and repairs, if necessary.

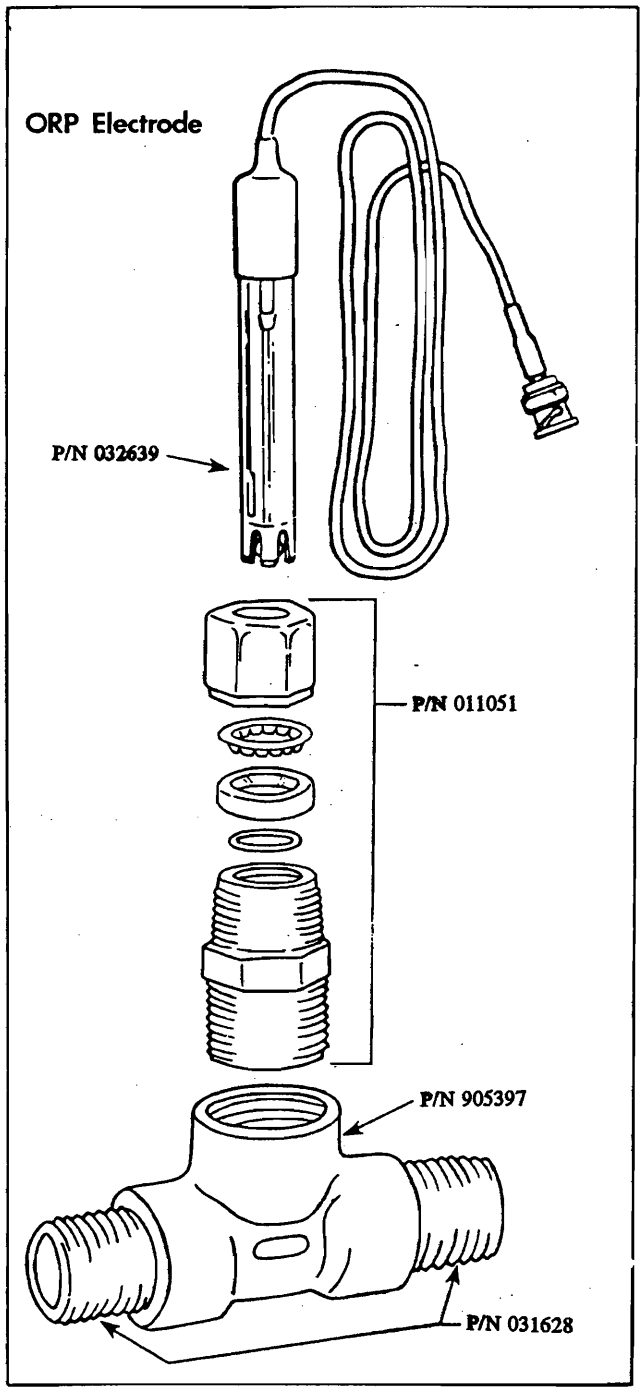
FIGURE II



Note: Both electrodes and flow switch are pre-wired and pre-plumbed to the controller box

FIGURE III


pH Electrode
P/N 028322
P/N 011051
P/N 905397
P/N 031628


ORP Electrode
P/N 032639
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P/N 905397
P/N 031628

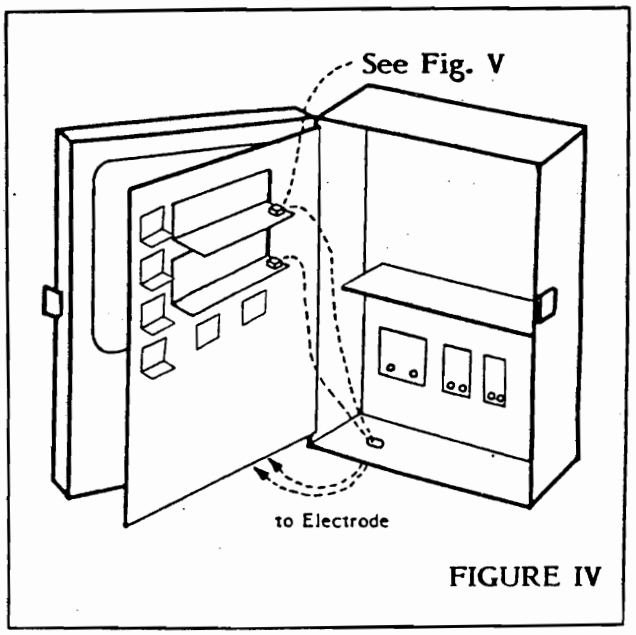


FIGURE IV

DETAIL FROM FIGURE IV

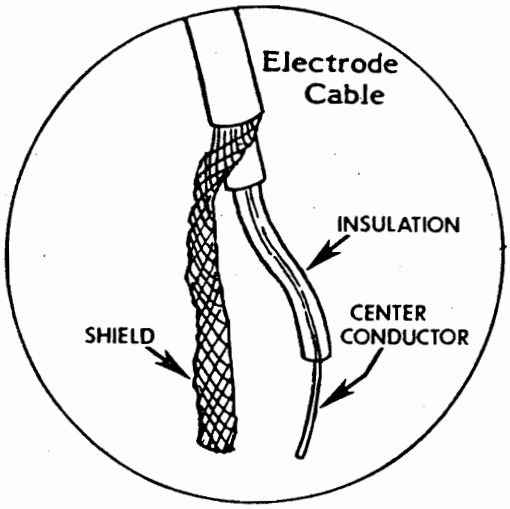
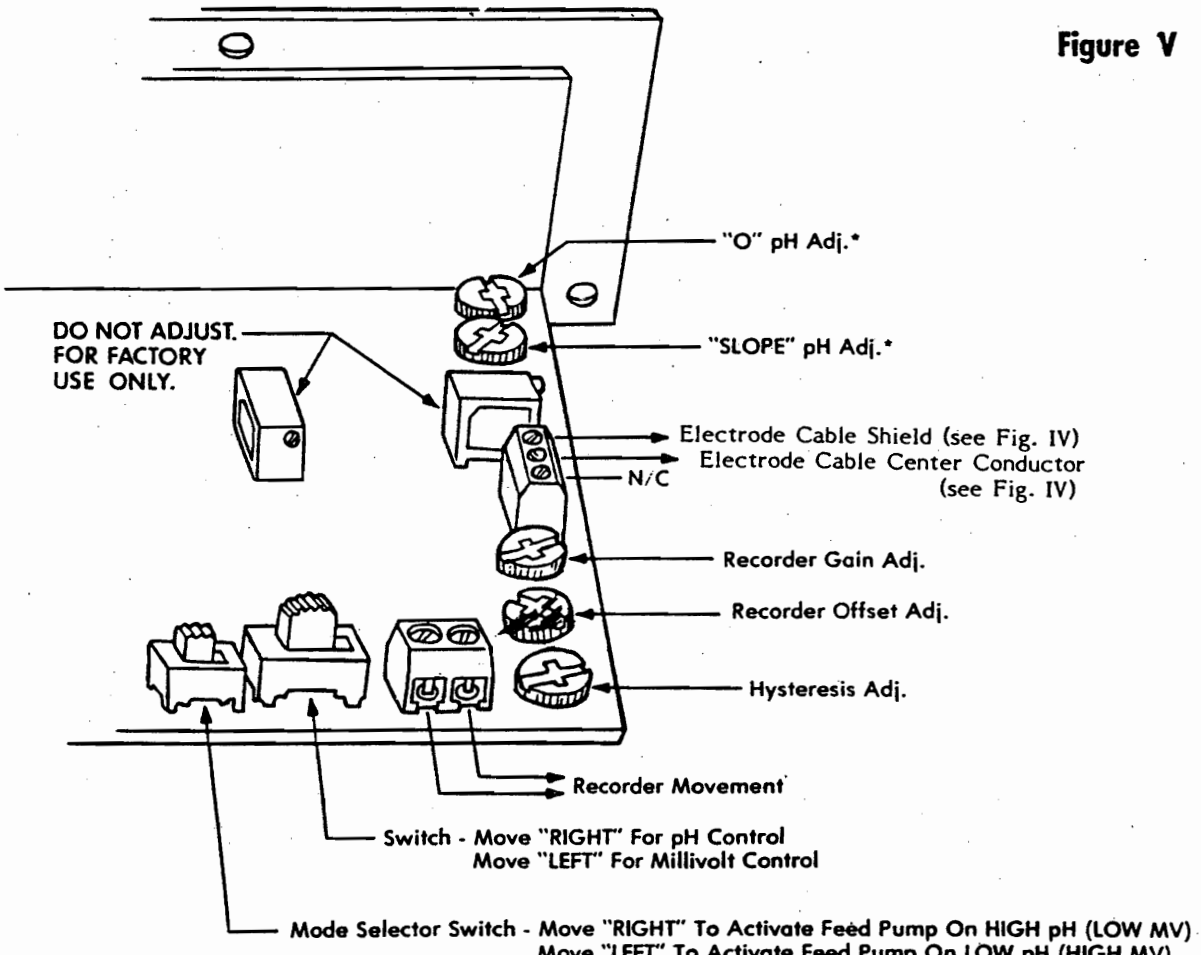
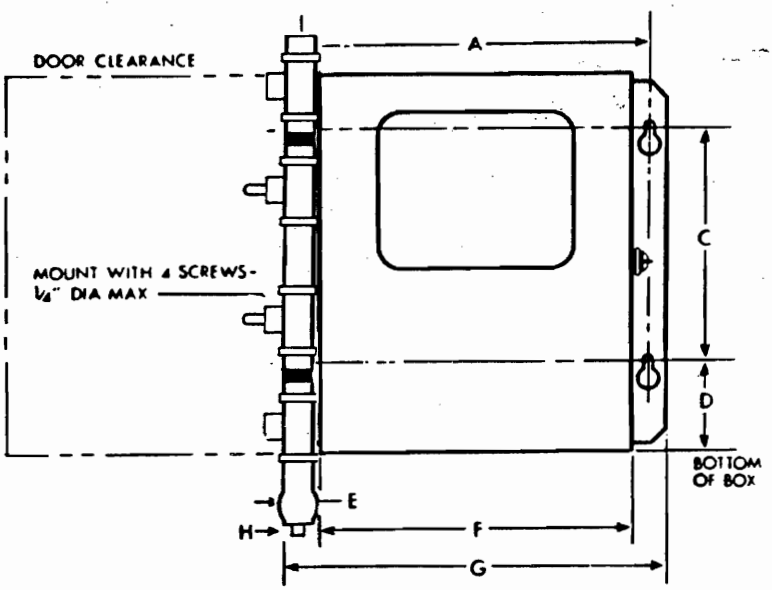


Figure V

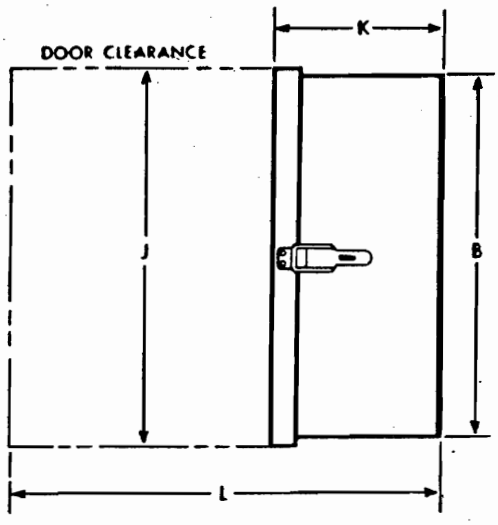


* Does not pertain to ORP

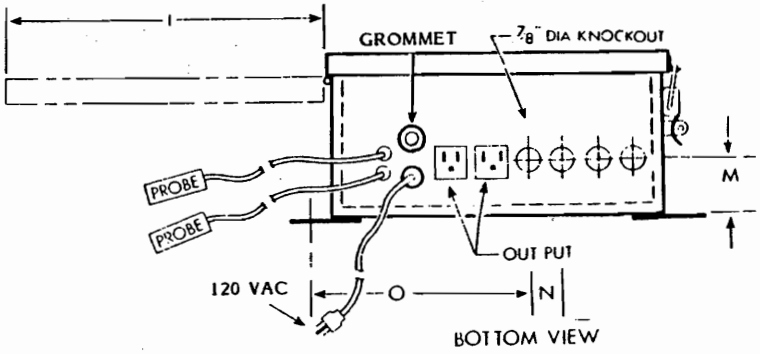
MECHANICAL AND MOUNTING DIMENSIONS



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

Figure VI

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

pH READING
8.5
8.0
7.5
7.0
6.5
1000
900
800
700
600
500
ORP READING
+mv
10.0
5.0
3.0
2.0
1.5
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
FREE CHLORINE PPM

Figure VII

ORP/pH TROUBLE SHOOTING GUIDE

(Refer to Controller Checkout and Adjustment Procedure)

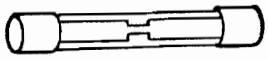
Checkout Step		Symptom	Possible Cause	Remedy
1		ORP/pH Display does not light	Defective or loose wiring	Check cable connectors
			Blown fuse in the controller	Replace Fuse. P/N 016666 (Buss GLH 10 or equivalent)
			No power to the controller	Check switches, circuit breakers/ fuses and wiring
			Defective display	Replace control mod., P/N 012957
			Defective controller	Replace control mod., P/N 012957
2		ORP or pH Feed light does not come on	Defective light	Replace light, P/N 010967
		ORP or pH Pump does not come on	Timed Out	Flip power switch off; then, back on
			Fouled Flow Switch	Clean or replace flow switch, P/N 016098
			Defective or loose wiring	Check cable connectors
			Defective relay	Replace relay, P/N 013320
			Defective pump	Check pump in wall receptacle 120V AC
4	A)	pH Display does not read 7.0 with 7.0 buffer	Out of adjustment	Adjust "O" potentiometer
		Display does not read the value of a buffer other than 7.0	Out of adjustment	Adjust "Slope" potentiometer
	B)	ORP Display does not perform according to Step 4 of the Checkout procedure	Fouled or defective electrode	Clean or replace electrode
			Defective controller	Replace module, P/N 012957

ORP/pH TROUBLE SHOOTING GUIDE

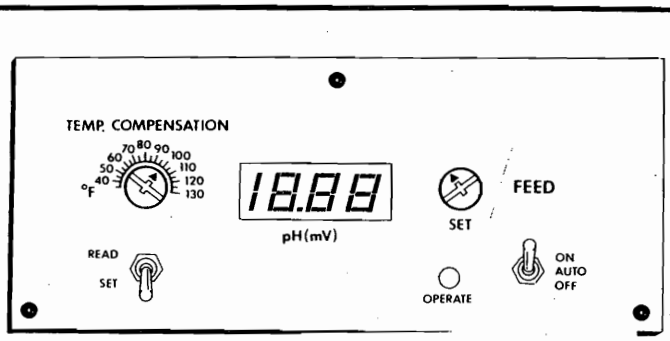
(Refer to Controller Checkout and Adjustment Procedure)

Checkout Step		Symptom	Possible Cause	Remedy
5	A)	pH Display does not indicate the correct pH value of the system water as compared to another test method (such as a portable pH tester)	Out of adjustment	Go back to Step 4
			Defective controller	Go back to Step 4
			Defective portable tester	Try another tester
	B)	ORP - Not applicable		
7		ORP or pH - unable to "set" controller	Defective controller	Replace control module, P/N 012957
10, 11		ORP or pH - does not perform as described	Varied	Repeat Steps 1 - 7
8, 12		ORP or pH - pump does not activate	Defective pump	Go back to Step 2
			Time-out may be activated	Re-start system, find cause of time-out

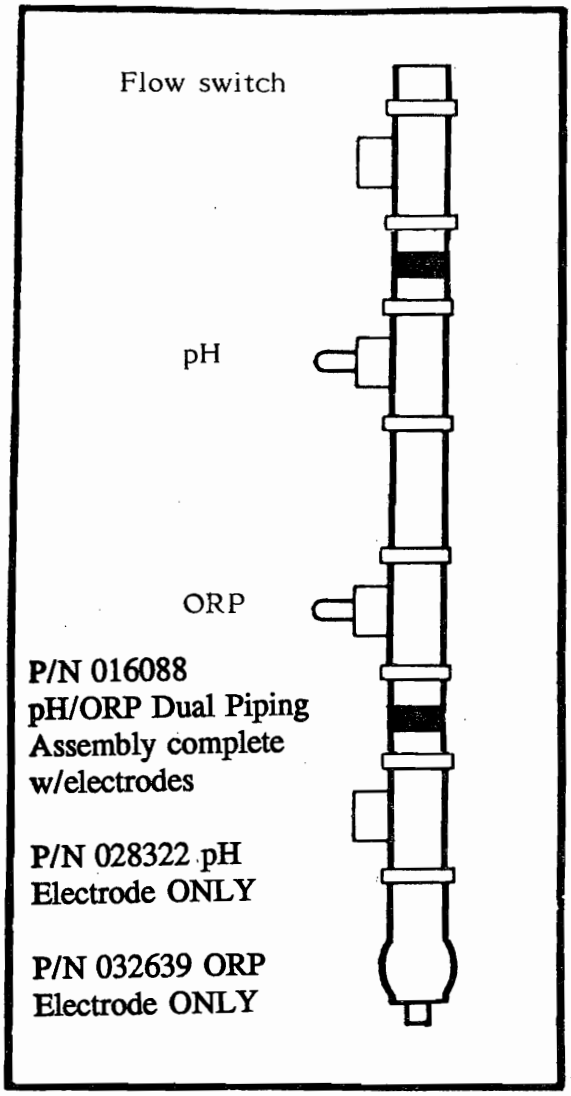
PARTS LIST



Fuse P/N 016666



pH/ORP CONTROL MODULE, P/N 016302

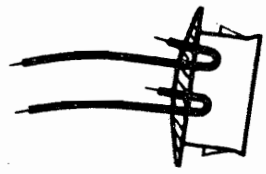


P/N 016088
pH/ORP Dual Piping
Assembly complete
w/electrodes

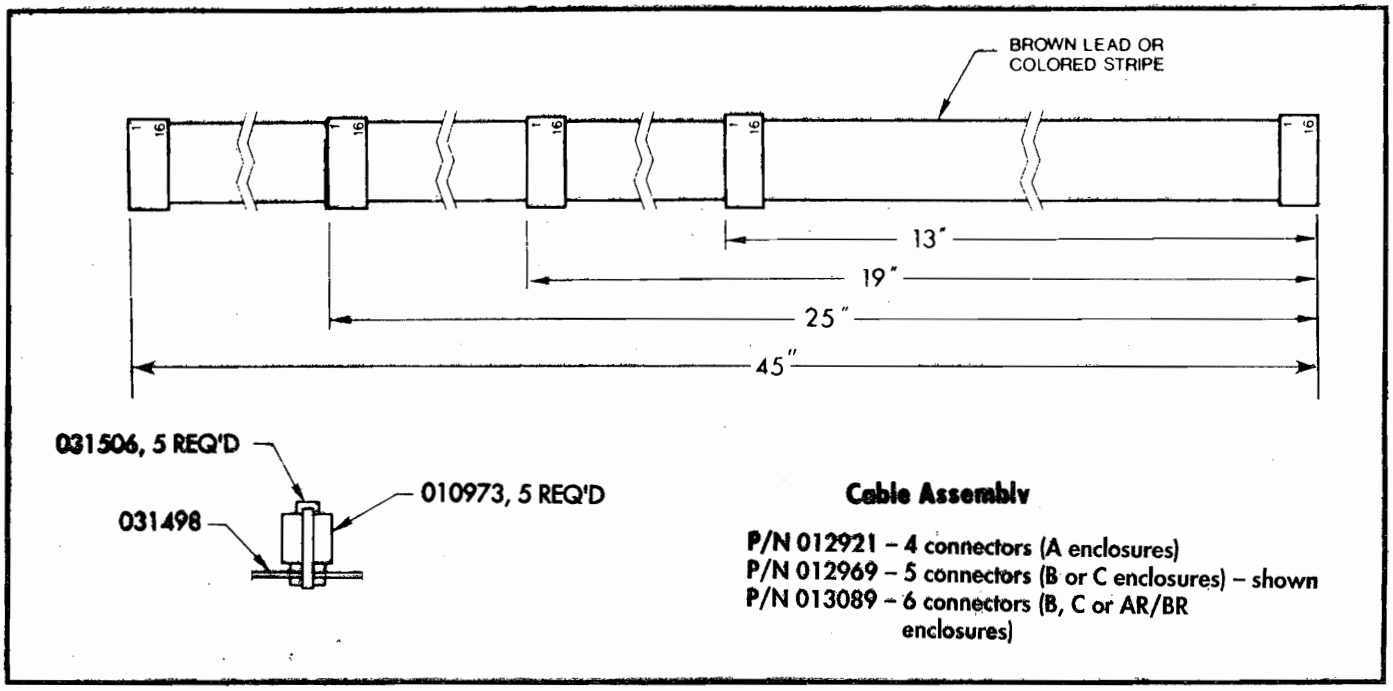
P/N 028322 pH
Electrode ONLY

P/N 032639 ORP
Electrode ONLY

Power Switch, P/N 010971

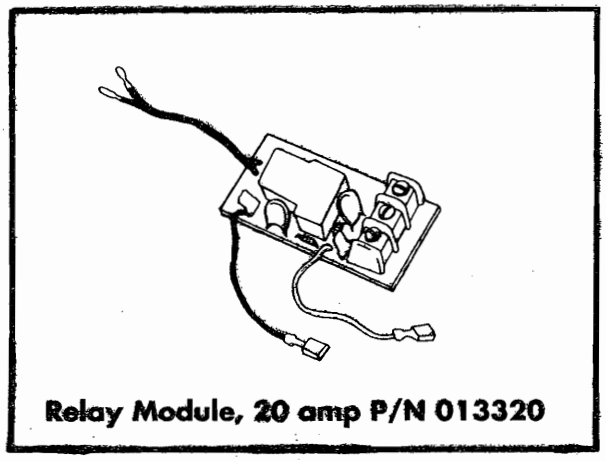


Feed Lamp Assembly P/N 010967

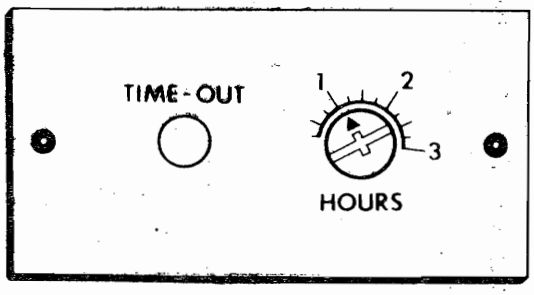


Cable Assembly

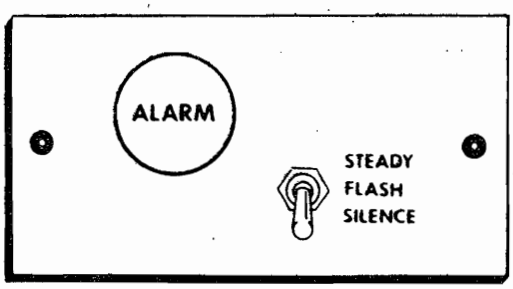
P/N 012921 – 4 connectors (A enclosures)
P/N 012969 – 5 connectors (B or C enclosures) – shown
P/N 013089 – 6 connectors (B, C or AR/BR enclosures)



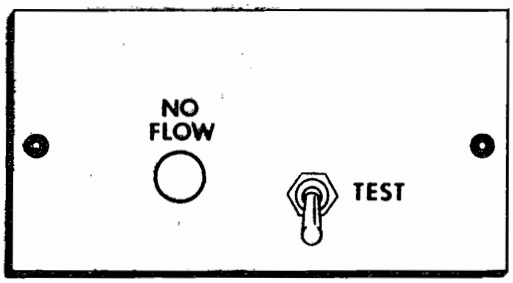
Relay Module, 20 amp P/N 013320



Time-Out Module, P/N 012947



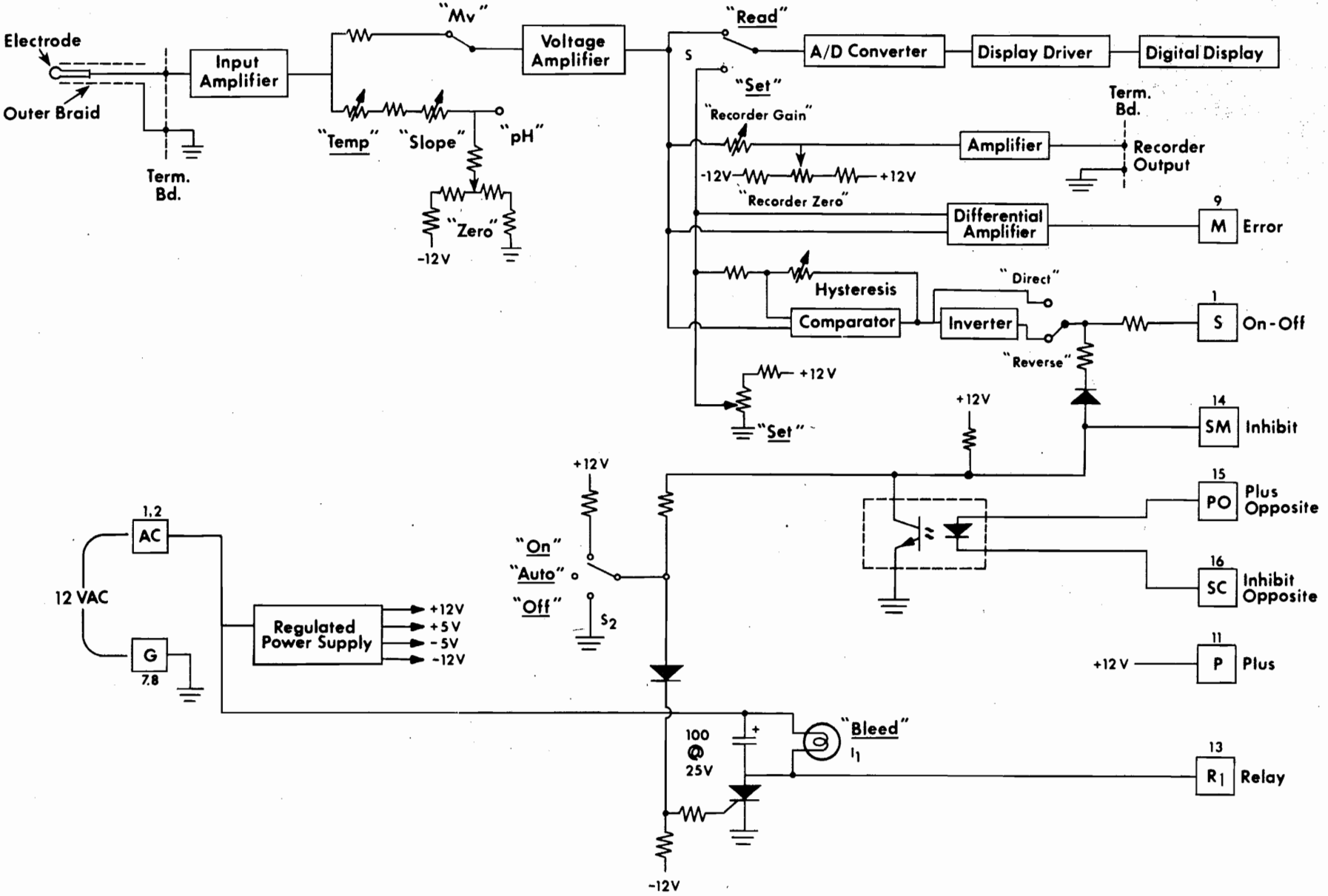
Alarm Flasher-Relay Driver Module
P/N 012919



No-Flow Module, P/N 015180

pH/ORP CONTROL FUNCTIONAL SCHEMATIC

Ref: 016302



LIMITED TWENTY-FOUR MONTH WARRANTY

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

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

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