HYDAC®

MODU-MAX®

DUAL pH MANUAL

Parts List
Trouble Shooting
Method of Operation
Installation Instructions
Checkout Guide and Calibration

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SYSTEM DESCRIPTION

The Modu-Max pH (Dual Set Point) controller will automatically maintain the pH level of recirculating and process flow water systems.

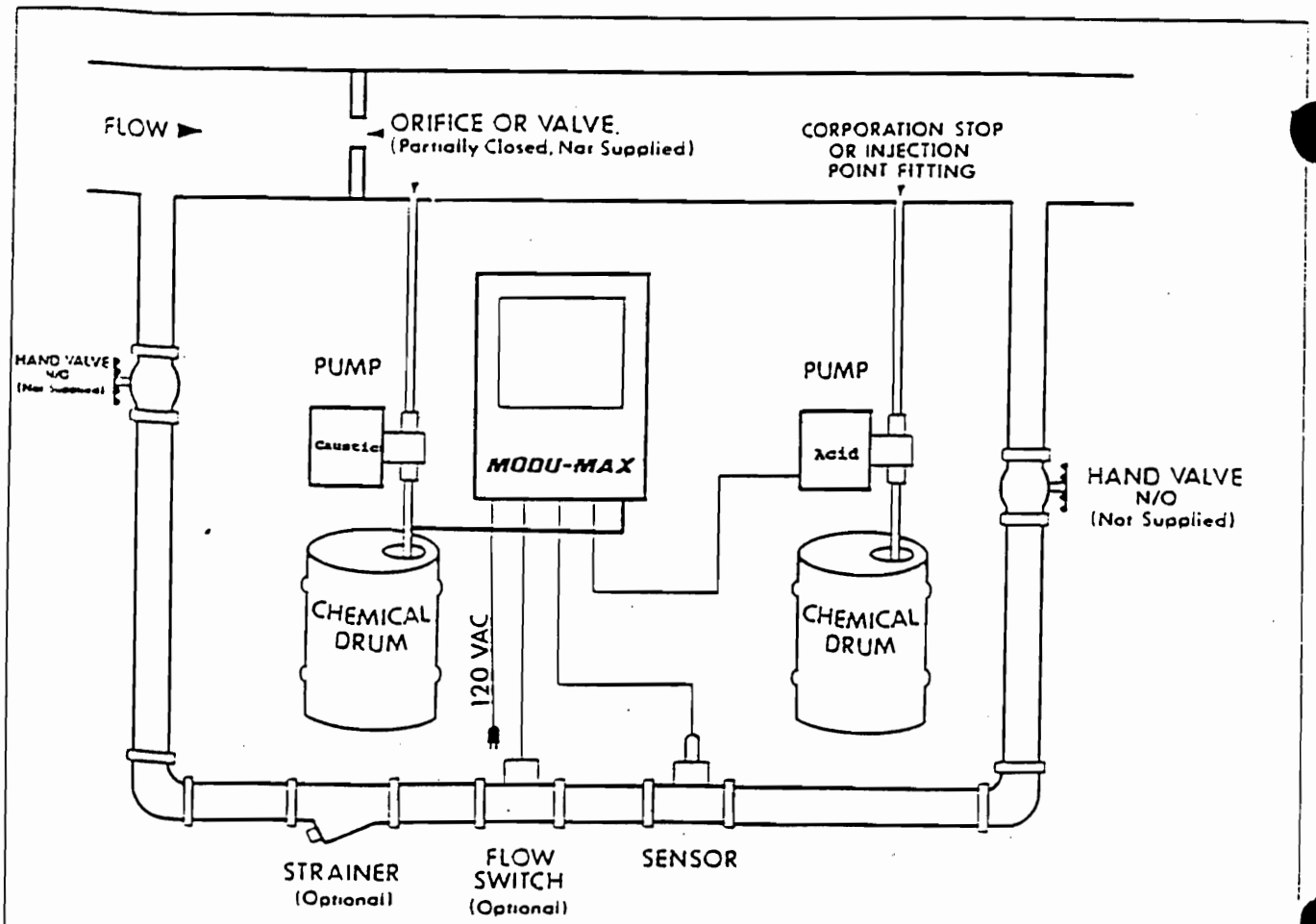
Modu-Max continuously measure the pH of the water and compares it to a preselected control point. If it is desired to lower the pH by the addition of an acid, the controller will activate an acid pump when the pH exceeds the set point. Conversely, if a caustic is being added to raise pH, the pump will activated when the pH drops below the set point.

In cooling tower applications, energy savings and reduced downtime maintenance costs are realized by the prevention of scale deposits. Dissolved conductivity bleed control system. Figure I shows a typical installation.

INSTALLATION PREPARATION

Survey the water system and locate convenient access pipes for obtaining a continuous sample of water.

In a recirculating system, the ideal access points are at the discharge and suction side of the main circulating pump.



NOTE In a recirculating water system, the sensor probe line should be across the main circulating pump.

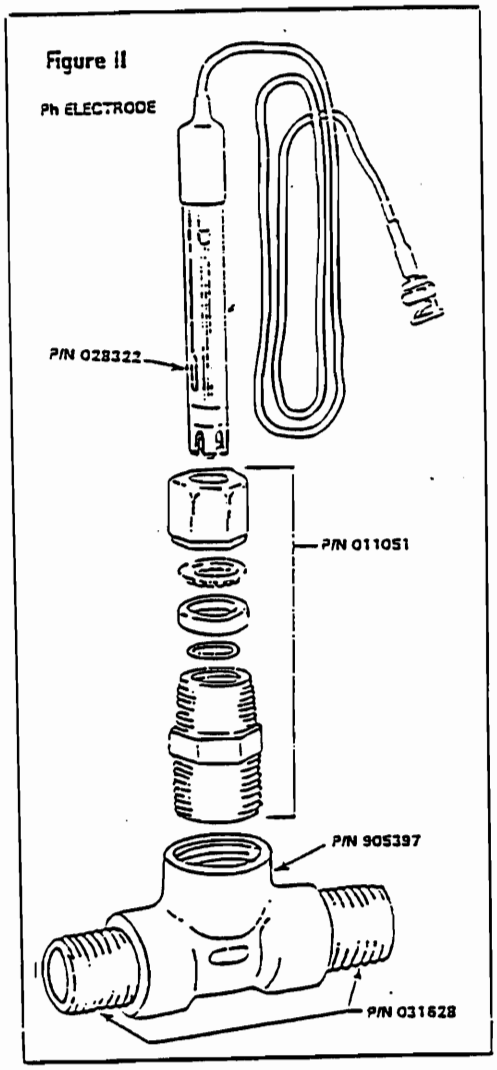
Figure I

In a process flow, a valve or orifice may be used as a pressure dropping technique to force flow through the sensor located in a by-pass line (see Figure I).

An open wire application would require a drop-in sensor P/N 028322. Mounting bracket required, not supplied by BETA. A separate chemical injection. Do not inject chemical into sensor line.

Provide a "controlled" 120 VAC outlet box for the Modu-Max. The outlet should be energized only when the main circulating pump is on. This can be accomplished by the use of either auxiliary contacts on the main circulating pump motor starting relay, a relay across the pump motor windings, a pressure switch in the circulating water line or a flow switch in the water line. Select the easiest method for your situation. A flow switch in the sample line not only "activates the controller automatically, it also "detects" a clogged sampleline and "deactivates" the controller. Such a Flow Switch is available from BETA; order P/N 031424. Also, required for the operation of this switch is an interface module, or P/N 015180.

Figure II



Note: The "Controlled" power source described earlier is desirable, but not critical. The controller line cord may be plugged into any 120 VAC receptacle; however, operating personnel should be instructed to turn the controller " on and off" as dictated by system usage. Failure to do this could result in excessive chemical usage. In other words: wasteful.

Under certain adverse conditions, a flow-through sensor is impractical. HyDAC offers an alternate "drop-in" sensor for measurement in a sump or wire. The sensor is then handy for frequent cleaning. When ordering, specify the alternate sensor P/N 028322.

The Modu-Max pH controller has a 0-5 VDC output for a recorder. Zero and slope adjustment potentiometers are available inside the controller.

EUIPMENT/PARTS SUPPLIED

Since Modu-Max uses a "Building Block concept, the equipment supplied will depend upon the user's selection. A typical Modu-Max system, using an "A"-size enclosure, will be covered throughout this text, although mounting dimensions and spare parts have been included for the "B"-size and "C"-size enclosures also. This manual will cover the basic "A"-size enclosure (with transformer assembly, P/N 015084 one pH control module, P/N 016502, and one relay module 20 amp,P/N 013320. "Add-on" modules such as Hi-Lo Conductivity Alarm, P/N 012907 have separate instruction sheets.

ADDITIONAL EQUIPMENT/PARTS NEEDED FOR INSTALLATION

This section covers items which can be ordered initially with the basic Modu-Max controller. As with the "add-on" modules, separate instruction sheets apply.

1. Hand valves and piping to install the sensor probe by-pass line. Not supplied; PVC recommended.

2. Flow switch, P/N 031424; and interface module, P/N 015180 (optional)

3. Strainer, P/N 034669 (optional).

4. Chemical pump and fittings not supplied, but available upon special request.

5. Wood screws or masonry fasteners to mount controller; (4) 1/4" fasteners.

6. Probe assembly; order separately. pH probe 150 psi at 150 F, P/N 015156. See Figure II. pH/conductivity probe 150 psi at 150 F, 301276.

Note pH (less PVC Tee) is available for drop-in applications, P/N 028322. User must provide brackets to secure probe against swinging, submersion and mechanical damage. The working part (tip) of the probe is glass.

ELECTRICAL INSTALLATION

Power wiring to the Controller and between the Controller and the chemical pump should be 16 gauge or larger. See Figure VI.

CAUTION: Extension of the pH probe lead wire is not recommended. The lead wire furnished by the manufacturer is long enough to permit mounting the probe adjacent to the control box, but not long enough for remote mounting of the probe. If it is absolutely impossible to mount the probe close to the control, the leads may be extended up to 12 feet maximum. The extension must be done with low-noise co-axial cable. Care must be used in the splice to leave a minimum of unshielded lead, and the splice must not be left with stray ends which might short.

All line voltage connections are made inside the connection box in the lower part of the controller. Be sure to replace cover before applying power to the controller. For personnel safety, be sure to install ground wires.

The line voltage connections inside the connection box are shown schematically on Fig. III. Fig. IV shows the connection box with the cover removed. This figure also shows the routing of the probe wiring along the left side of the connection box. Fig. V shows the probe connection to the control module.

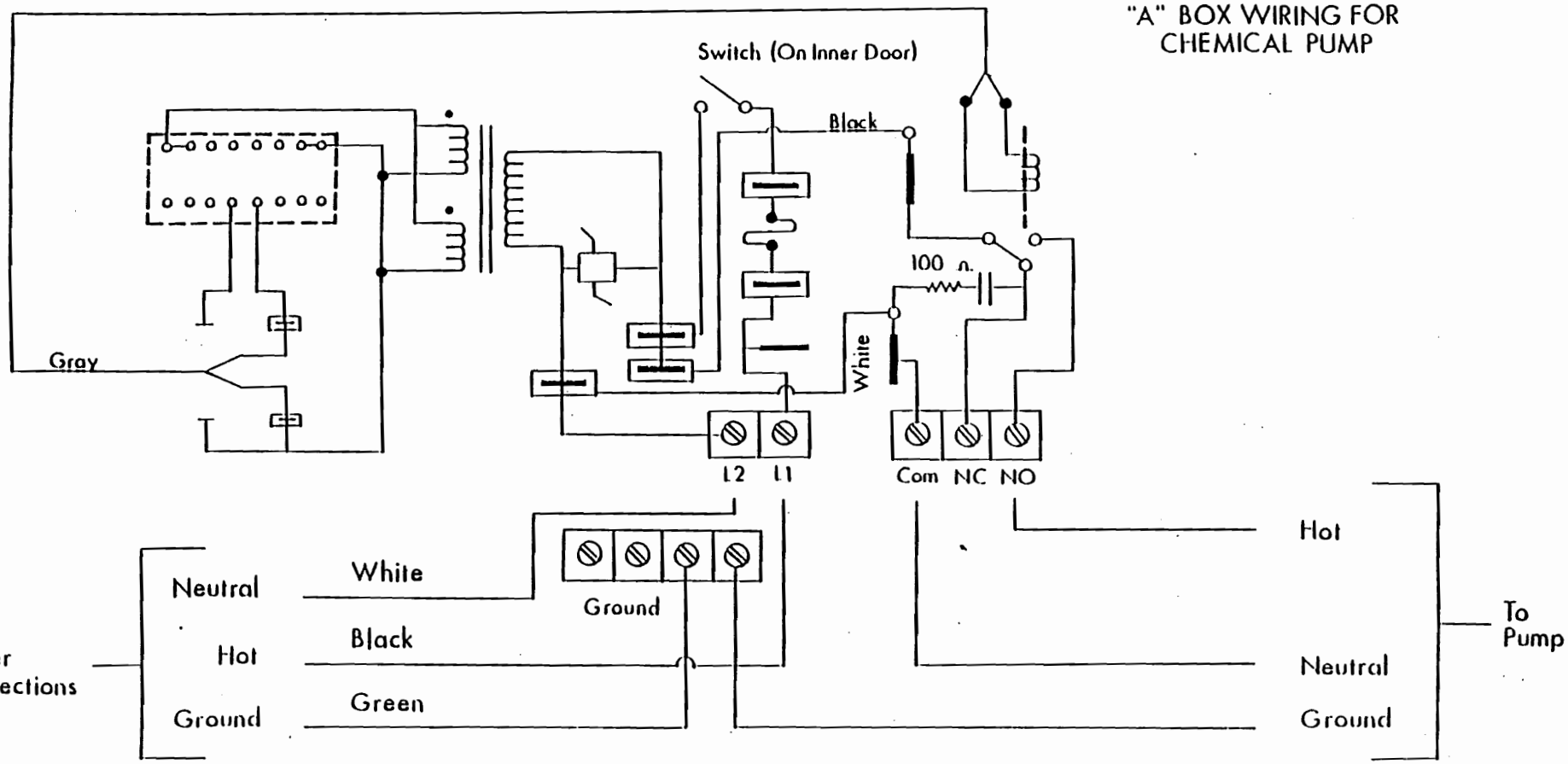

"A" BOX WIRING FOR
CHEMICAL PUMP
Switch (On Inner Door)
Black
100 n.
White
Gray
L2
L1
Com
NC
NO
Hot
Neutral
White
Ground
To
Pump
Power
Connections
Hot
Black
Neutral
Ground
Green
Ground

Figure III

MECHANICAL AND MOUNTING DIMENSIONS

See Figure VI.

INSTALLATION

Refer to Figure 1. For controller mounting, see Figure VI.

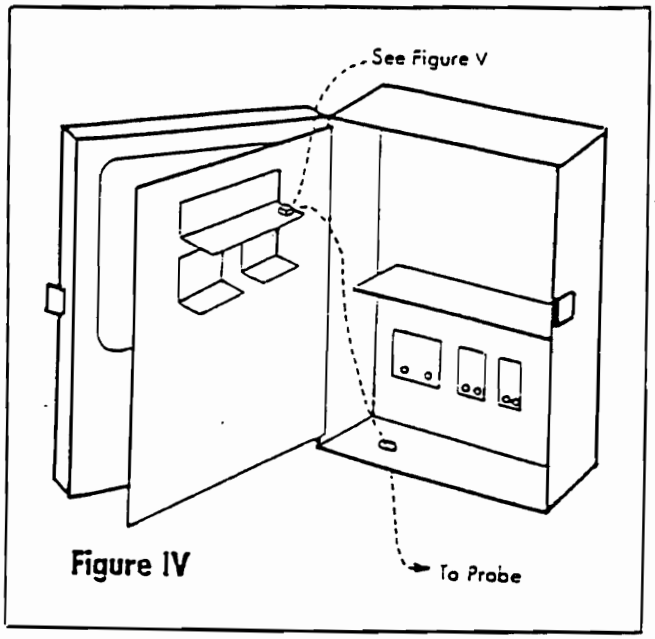
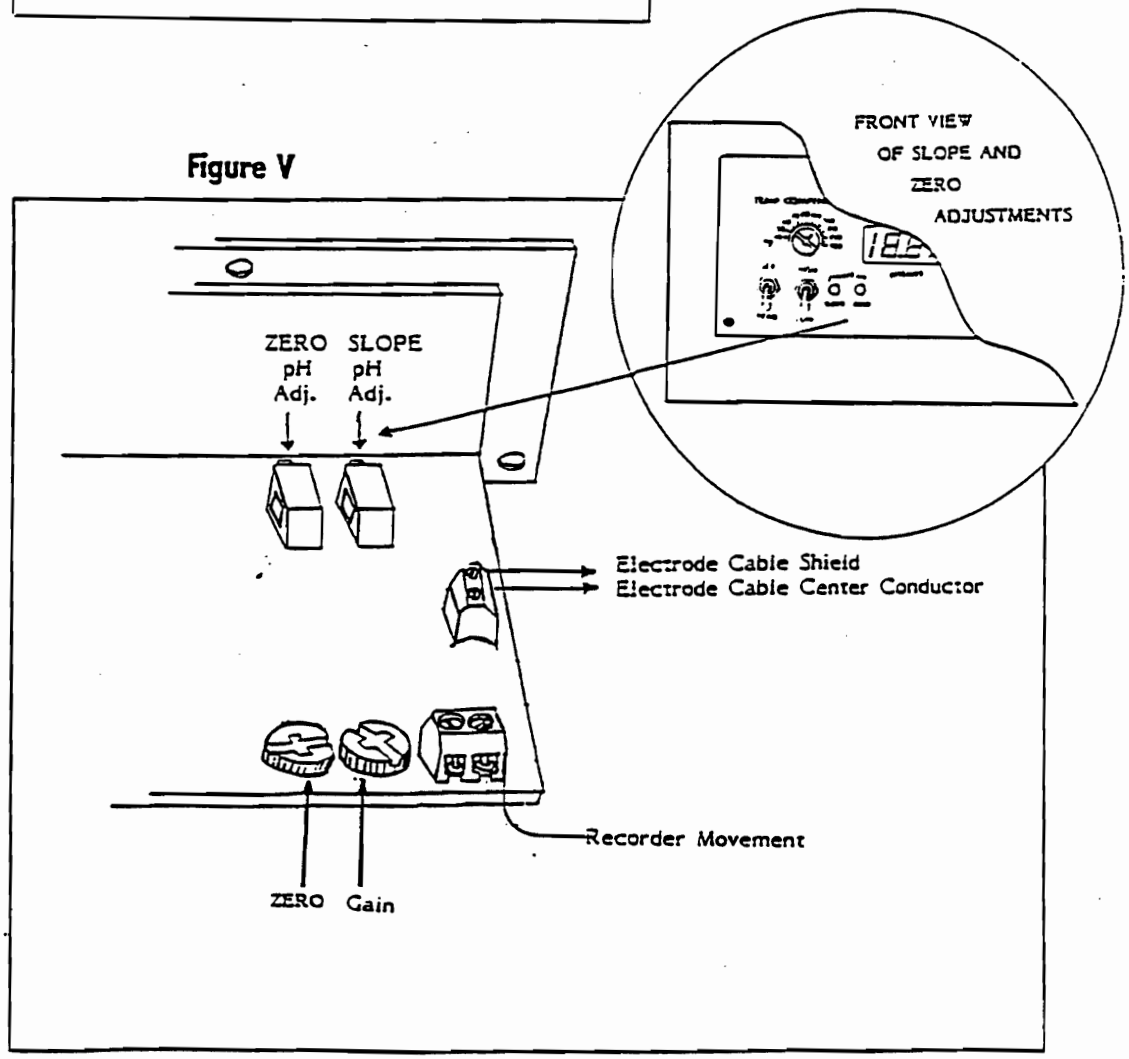


Figure IV

Figure V



CONTROLLER CHECKOUT AND ADJUSTMENT

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

2. Place the feed switches (On-Auto-Off) in ON. Feed light should be ON and pump should be on. Place feed switches in Auto. Feed pumps may be off.

3. Close the sample line, hand valves and remove the pH probe from the PVC tee; rinse probe in distilled water; adjust temperature compensation potentiometer to temperature of buffer solutions; insert probe 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 zero pH potentiometer on the controller faceplate (Fig. V). Next, rinse probe in distilled water and insert probe in a buffer solution which has a valve at or near the desired control point. Adjust the "slope" potentiometer so that the digital display reads the correct valve. There is an interaction between the "O" and "slope" adjustments, so the two steps should be repeated several times. Rinse probe in distilled water before each immersion in buffers. A new probe may require a "soaking" period in water. It is good practice to store the probe tip in water when not in service.

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

5. Switch the High - Low switch to the "High" position. Push up the set read switch and hold. Adjust the set high potentiometer for desired pH operating point. Release switch.

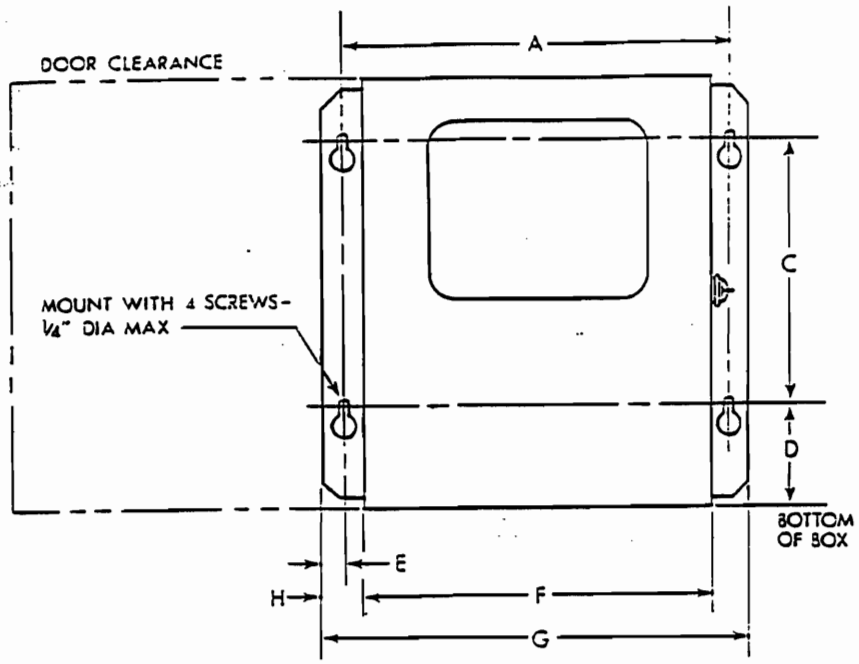
6. Switch the High - Low switch to the "Low" position. Push up the set read switch and hold. Adjust the set high potentiometer for desired low pH caustic pump operation. Release switch.

7. Be sure acid pumps and caustic pumps are plugged into proper receptacles.

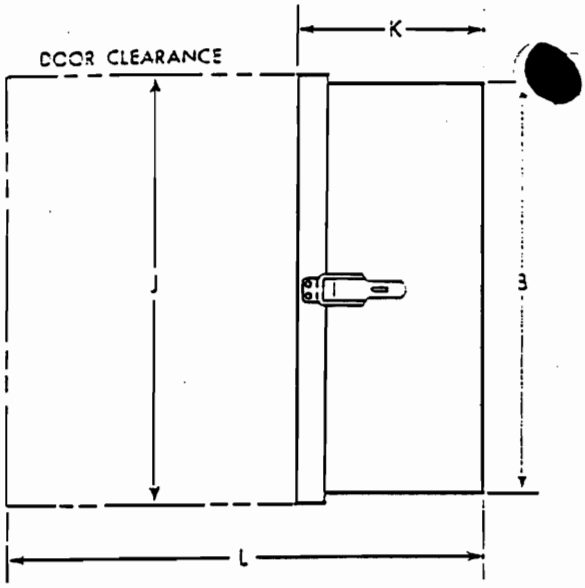
8. Chemical feed pumps should be activated whenever the "acid" or caustic lights are on . Exception when optional alarm and/or Time-out modules are incorporated the lights can come on, but no pump activation. This indicates that the alarm and/or Time-Out module has disabled the chemical feed pumps.

HIGH = Acid setpoint
LOW = Caustic "

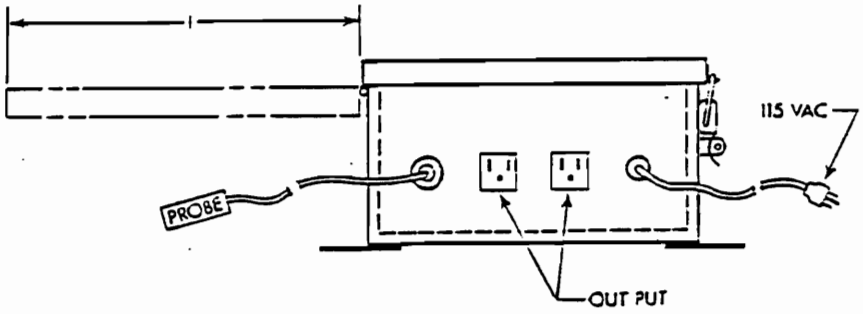
MECHANICAL AND MOUNTING DIMENSIONS



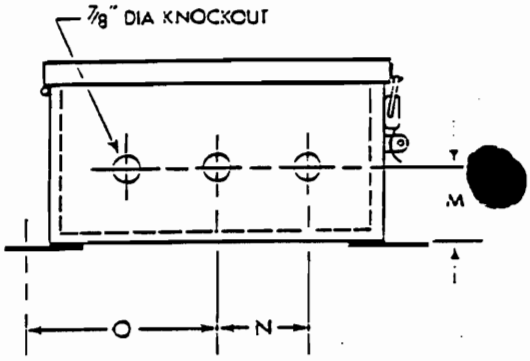
FRONT VIEW



SIDE VIEW



BOTTOM VIEW
RECEPTACLE MODEL



BOTTOM VIEW
CONDUIT MODEL

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

Figure VI

MODU-MAX TROUBLE SHOOTING GUIDE

(Refer to Controller Checkout and Adjustment Procedure)

Checkout Step	Symptom	Possible Cause	Remedy
1	pH Display does not light	Defective or loose wiring	Check cable connectors
		Blown fuse in the controller	Replace fuse. P/N 302184 (Buss GLH or equivalent)
		No power to the controller	Check switches; circuit breakers/fuses and wiring
		Defective display	Replace control module, P/N 016502
		Defective controller	Replace control module. P/N 016502
2	Feed Light does not come on	Defective light	Replace control Module
	Pump does not come on	Defective pump	Check pump in wall receptacle 120 VAC
		Defective relay	Replace relay P/N 013320
		Defective or loose wiring	Check cable connectors
4	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
		Defective probe	Replace probe P/N 028322
		Defective controller	Replace control module, P/N 016502
5	Display does not indicate the corr. 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 probe	Go back to Step 4
		Defective portable tester	Try another tester
7	Unable to "set" controller	Defective controller	Replace control module, P/N 016502
8	Pump does not activate	Defective pump	Go back to Step 2
10, 11	Does not perform as described	Varied	Repeat Steps 1 - 7
12	Pump does not activate	Defective pump	Go back to Step 2

DUAL pH CONTROL FUNCTIONAL SCHEMATIC