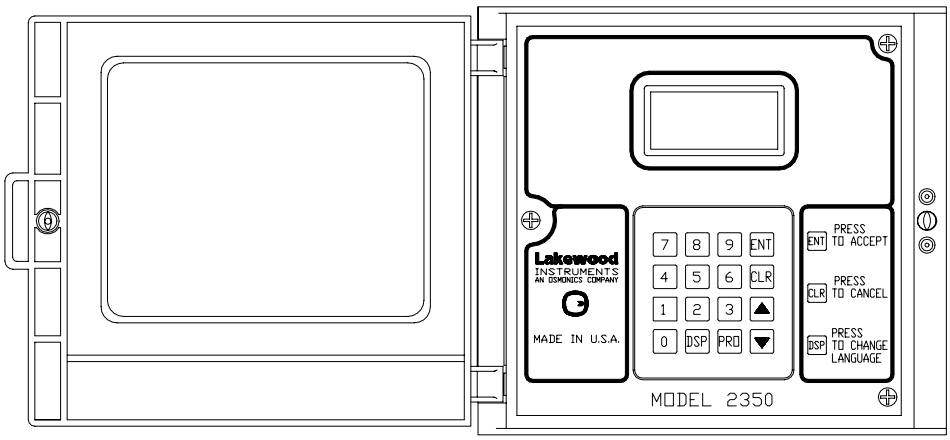
LAKEWOOD INSTRUMENTS
MODEL 2350P

MICROPROCESSOR-BASED
pH CONTROLLER

INSTALLATION & OPERATION MANUAL

SERIAL #:_____



Lakewood Instruments

7838 North Faulkner Road, Milwaukee, Wisconsin 53224 USA
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h t t p : / / w w w . l a k e w o o d i n s t r u m e n t s . c o m

IMPORTANT NOTICE

CAUTION: CHEMICAL FEED

All electromechanical devices are subject to failure from a variety of causes. These include mechanical stress, component degradation, electromagnetic fields, mishandling, improper setup, physical abuse, chemical abuse, improper installation, improper power feeds and exposure.

While every precaution is taken to insure proper functioning, extra precautions should be taken to limit the ability of over-feeding by limiting chemical quantities available, secondary shut-downs, alarms and redundancy or other available methods.

CAUTION: POWER SOURCE AND WIRING

Low voltage wiring and high voltage (110 plus) should not be run in the same conduit. Always run separately. Even shielded low voltage is not a guarantee of isolation.

Every precaution should be taken to insure proper grounding and elimination of shorting or Electromagnetic field (EMF) interference.

CAUTION: ELECTRICAL SHOCK

To reduce the risk of electrical shock, this equipment has a grounding-type plug that has a third (grounding) pin. This plug will only fit into a grounding-type outlet. If the plug does not fit into the outlet, contact a qualified electrician to install the proper outlet. ***DO NOT*** change the plug in any way.

Lakewood Instruments

We thank you for your selection and purchase of a Lakewood Instruments product.

With proper care and maintenance, this device should give you many years of trouble-free service. Please take the time to read and understand this Installation and Operation Manual, paying special attention to the sections on **OPERATION** and **MAINTENANCE**.

If, in the future, any parts or repairs are required, we strongly recommend that only original replacement parts be used. Our Customer Service Department is happy to assist you with your parts or service requests.

☎ **Lakewood Instruments Customer Service and Technical Support Departments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST.**

✉ **Mail should be sent to:**

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

MODEL 2350P

Table of Contents

LONWORKS is a registered trademark of Echelon Corporation.

INTRODUCTION

LONWORKS Technology

The Lakewood Instruments Model 2350P is a LONWORKS Technology-based pH controller with plumbing and flow switches. LONWORKS Technology gives you a high level of flexibility. The Model 2350P is user-friendly, with a large screen and keypad, access to multiple inputs and easy setup. This controller can easily be upgraded in the field. It's a combination of reliability, accuracy, security and simplicity.

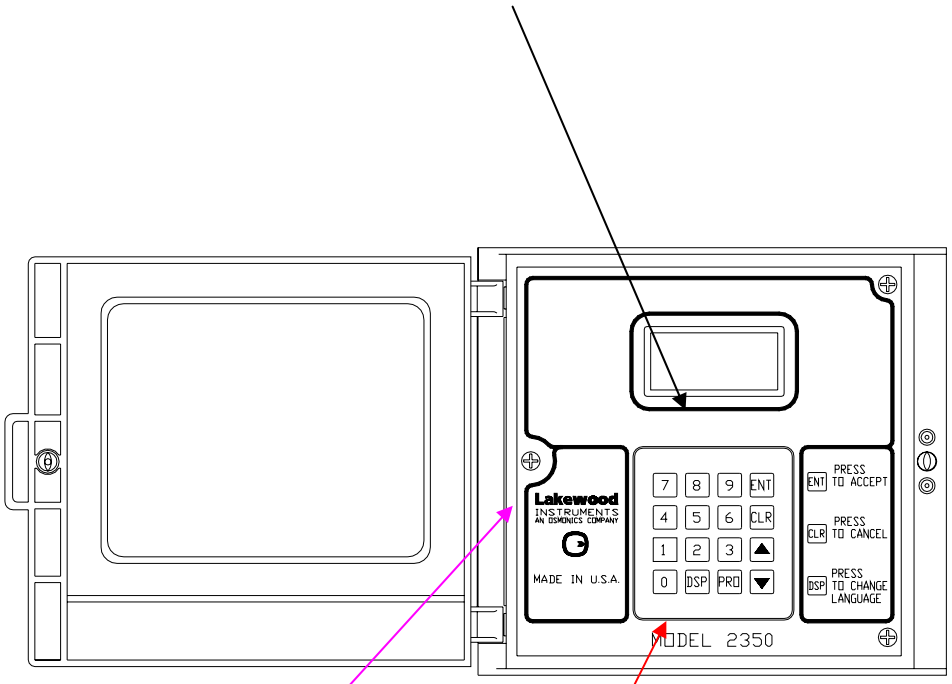
- **COMMUNICATION** — Setting and reading the controller can be done remotely with the **-RS2L** computer option. This data link can connect directly to a personal computer (PC) or through a modem and phone line to any modem-equipped PC.

- **SECURITY** — A password system can be established which requires a user password to be able to make changes or do anything more than just read the controller readout. An operator password can help ensure that the system will be operated only by authorized personnel. A third level of security, the **Technician Level Menu**, can require a different password to be able to change any of the basic controller settings.

- **LANGUAGES** — Your controller is bilingual. You can order the controller so it can operate in either English/Spanish, English/French or English/German. If no preference is indicated, the default-programmed English/Spanish model will be sent. To switch languages, all you have to do is press the **DSP** button.

Front Panel Description

ILLUMINATED LCD
A large, 128x64 pixel graphic display makes it easy to read the menu-driven program.

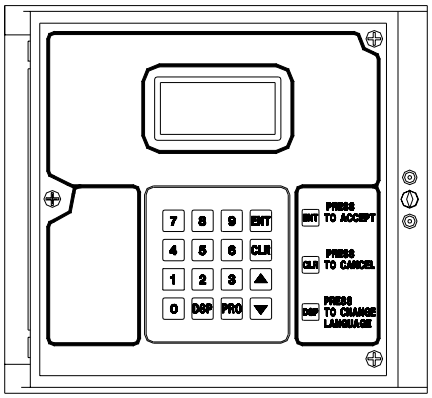


LOCK SCREW
The lock screw keeps your circuit boards secure and provides easy access for wiring and setup. Simply turn the lock screw and pull open the front panel.

16-BUTTON KEYPAD
ENT = for Menu selection and/or acceptance of selected values.
CLR = to exit a Menu selection and/or skip input options.
DSP = to change languages.
PRO = to program a Menu selection.

ENCLOSURE
A sturdy enclosure protects your controller. Make sure it is properly mounted (SEE: **INSTALLATION; Mounting**). The weatherproof enclosure provides NEMA 4X protection. The controller does not have outlets or a power cord and must be hardwired through ½" conduit knockouts.

MODEL 2350P
MICROPROCESSOR-BASED pH CONTROLLER



LONWORKS® Technology is the latest in microprocessor capability that gives the user the highest level of application flexibility. A large illuminated graphics screen, multiple inputs and very easy setup with easy field upgrade characterize this new technology. The unit does not include plumbing or a sensor. For use with process-type pH probes (order separately).

SPECIFICATIONS

pH Range	0-14 pH
Resolution	0.01 pH
Accuracy	± .05 pH
Deadband	Adjustable
Temperature compensation	Automatic
Water meter inputs (2 inputs)	Contact head, pulse, paddlewheel, electronic or turbine
Output Relays	4 selectable relays with manual override Selectable options are: • Setpoint, direct or reverse • Water meters individual or sum of both • Percent of time • Schedule by time (**-RTC** option) • Alarm
4-20 output	2 isolated 4-20 mA output (**-35L** option)
RS232 output	RS232 output for use with PC and LRWS graphical interface software to monitor, control and graph stored data (**-RS2L** option)
Power	115 VAC @ 50/60 Hz, 230 VAC @ 50 Hz
Ambient	-4 to 158°F (0 to 70°C)
Languages	English and Spanish, French or German available
Keypad	16-key tactile keypad
Display	Illuminated graphics, 128x64 pixel LCD
Enclosure	ABS Plastic, UV Stabilized NEMA 4X

2350P LONWORKS Technology-based pH controller with 4 selectable relays for HIGH/LOW setpoints or alarms. pH range is 0-14 pH. Requires pH sensor (520 Series or 521 Series) which must be ordered separately. Controller has no power cord, outlets or plumbing.

CONTROLLER OPTIONS (optional; select no more than three)

-RTC Biocide feed timer with 28-day programmable clock for selectable relays.
-35L One 4-20 mA output configurable for remote data acquisition of pH.
-RS2L Communications node with the LRWS program; requires **-RTC** Option.
-NIN Network interface node; allows 1 **NRLY** and/or up to 3 **NCON**/**NCKT**s to be added.

ENCLOSURE OPTIONS (optional)

-DU Duplex outlet for chemical pump, power cord.

REMOTE NODE OPTIONS (optional; MUST purchase -NIN option above)

NRLY Four additional relays with enclosure (1 per 2000 Series Controller).
NCON Conductivity node (node only).

MOUNTING OPTIONS

PM Panel mount 6 ¼" square cutout.
BM Bracket for pipe mounting.

ADDITIONAL OPTIONS

WMI Water Meter Interface board for Signet 515 and Data Industrial paddlewheel types.

SOFTWARE AND EXTERNAL MODEMS

LRWS *Windows*-based software for computer to communicate with 2000 Series Controllers.
MD4X High-Baud modem in NEMA 4X enclosure ready to power.
MD High-Baud modem for use with 2000 Series Controllers.

INSTALLATION

Checking

Inspect the shipping carton for obvious external damage. Note on the carrier's bill-of-lading the extent of the damage, if any, and notify the carrier. Save the shipping carton until your Model 2350P controller is started up.

☎ **If there was shipping damage, call the Lakewood Instruments Customer Service Department at (800) 228-0839 and return the controller to the factory in the original carton.**

Mounting

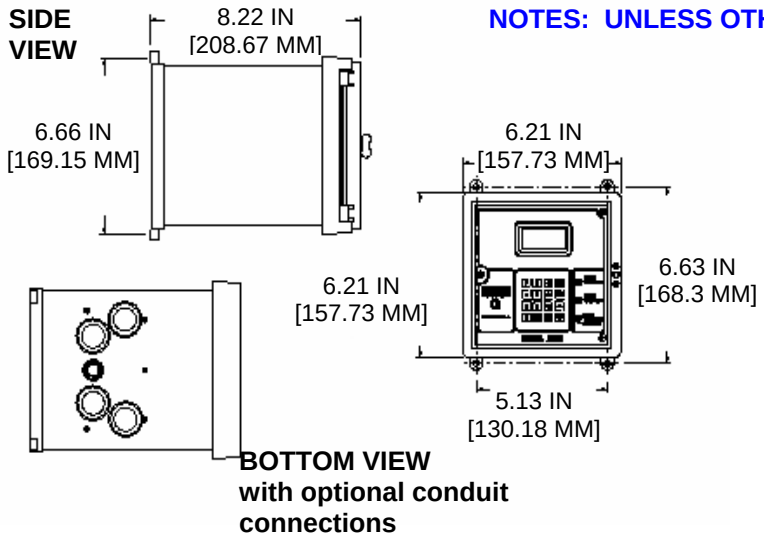
Mount the Model 2350P controller on a FLAT, NON-VIBRATING wall.

DO NOT MOUNT THE ENCLOSURE TO A METAL OBJECT SUCH AS THE COOLING TOWER.

Avoid drilling or punching additional holes in the controller enclosure, or it will no longer meet NEMA 4X protection standards. Damage incurred as a result of any alteration to the enclosure is not covered under the Lakewood Instruments product warranty.

NOTE: EXCESSIVE HEAT AND/OR DIRECT SUNLIGHT EXPOSURE WILL DARKEN THE LCD DISPLAY SCREEN, MAKING IT DIFFICULT TO READ, AND MAY SHORTEN THE LIFE OF OTHER ELECTRONIC COMPONENTS.

Outline and Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED:

- Install on smooth surface to prevent stress on mounting feet.
- Do not install on vibrating wall.
- If enclosure is installed in corrosive environments, consider purging.
- Dimensions indicated as inches (millimeters).
- Material: Body—PVC; Bevel—ABS.
- Use either #6 or #10 mounting screws (4).

Power Wiring

The 2350P is supplied with four ½ inch conduit knock outs. The controller requires a earth ground connection. The 2350P will operate at 80 to 300 VAC. The relays inside are rated at 3 Amps each. Relay 1 and 2 provide a Normally Open and Normally Closed contact. Relay 3 and 4 are Normally Open. Jumper wires are provided inside connecting the common of each relay to AC hot. These jumpers can be easily removed. Refer to the back of this manual for schematics.

WARNING! DO NOT **PLUG IN CHEMICAL PUMPS THAT ARE LARGER THAN 1/6 HORSEPOWER. THE CONTROL RELAYS ARE INTENDED FOR ELECTRONIC OR SMALL MOTOR-DRIVEN CHEMICAL PUMPS. LARGER PUMPS REQUIRE THE -HR OPTION WITH 25-AMP-RATED INTERPOSING RELAYS. CONTACT LAKEWOOD INSTRUMENTS FOR SPECIAL INSTRUCTIONS.**

Sensor Wiring

Most common pH sensors will work with the 2350P. Temperature compensation is not required for operation of the 2350P. For a pH sensor to work with the 2350P it must have a BNC connector and have and output of 59 mV per pH. 7pH is 0 mV.

An external thermo couple may be used for temperature compensation. Types of temperature inputs are:

- 500 NTC
- 4K NTC
- 10K NTC
- 100 PTC
- 1K PTC
- 3K PTC
- 10K PTC

Check the Operation

After installation is completed, follow these instructions:

- Make sure the controller has power and is operating.
- Press any key on the keypad and you will see the **Main Menu** on the screen.
- Use the ↑ and ↓ arrow keys to move through the menu.

Reinitialization

It is suggested that you reinitialize the controller before programming in your own numbers. This will wipe out any random settings which may be in the controller. To do so, follow these instructions:

- After you have practiced moving up and down in the **Main Menu**, press **7** or highlight **SYSTEM SETUP** and press **ENT**.
- Press **2** or highlight **INITIALIZATION** and press **ENT**.
- Press **2** or highlight **WHOLE CONTROLLER** and press **ENT**. A warning will appear on the screen, advising you that "**THIS OPTION REQUIRES RE-CALIBRATION AND RE-PROGRAMMING!**" Press **1** to proceed, **2** to cancel.

Testing

Continue to test the controller's accessories by following these instructions:

- Get back to the **Main Menu** by pressing **CLR** several times.
- Press **1** or highlight **PROCESS** and press **ENT**. The screen that appears will have a top portion that deals with pH and a lower portion that has four boxes labeled **RLY1**, **RLY2**, **RLY3** and **RLY4**. These are the relays that switch on the alarms and other accessories the controller operates. There may be a dark flashing line separating the two sections; this indicates which alarms are active at the moment. As shown at the bottom of the screen, press **ENT** to access the relays.
- The four relays line up vertically with boxes that are blank when the relay is not in operation. Select a relay by pressing its number. The box will change (probably it will become shaded), indicating that the relay has reversed its status from **OFF** to **ON**. Each time you press the number, the relay reverses its status. Any changes made to the relays will last five minutes before the relays go back on automatic control.
- Finally, press **CLR** twice to return to the **Main Menu**.

Calibration

There are two methods for calibrating pH sensors to the Model 2350P. The 2350P pH default values are close and calibration may not be necessary. Initializing the pH calibration will restore the pH values back to factory defaults.

Method One, Single Point Calibration

Single point calibration is the easiest to perform. It does not require chemical buffers or removing the sensors from the process stream. It does require a pH test meter.

- Take a sample near the pH sensor and read with pH test meter.
- Press Pro, select Zero and type in the value corresponding to the pH test meter.

Method Two, Two Point Calibration

Two point calibration requires removing the pH probe from the process. Two pH buffers are required for calibration.

- Place pH sensor in the lower value of the two buffers.
- Press Pro, select Zero and type in the value corresponding to the pH buffer.
- Rinse the pH sensor with distilled or tap water.
- Place pH sensor in the higher value of the two buffers.
- Press Pro, select Span and type in the value corresponding to the pH buffer.

NOTE: TWO SEPARATE pH BUFFERS MUST BE USED WHEN DOING A TWO POINT CALIBRATION. NEVER DO A ZERO AND A SPAN CALIBRATION IN THE SAME BUFFER. IF THIS HAPPENS INITIALIZE THE pH CALIBRATION AND FOLLOW ONE OF THE CALIBRATION METHODS ABOVE.

NRLY

The RELAY NODE (**NRLY**) is a LONWORKS technology based NODE. It contains its own micro controller which talks directly to other LONWORKS NODES on a twisted pair communication wire. It contains four NO/NC dry contacts.

NRLY is option that may be added to Lakewood Instruments 2000 Series products The relays can be activated by any alarm condition generated by the 2000 Controller. It will also feed chemical based on reverse or direct set point, after a predefined number of gallons from either water meter or both, percent of blowdown time, percent of time, and/or by a biocide schedule.

The NRLY is also used with the 2255 Multi Boiler Controller. It is required to operate the motorized ball valves for boilers. The relays can also be activated by any alarm condition generated by the 2000 Series controller. It will also feed chemical based on percent of blowdown time, percent on time, after a predefined number of gallons from either water meter, and/or by a biocide schedule.

Language Choices

The Model 2350P Controller is programmed in four languages and can be ordered as English/Spanish, English/French or English/German. If no preference is indicated, the default-programmed English/Spanish version will be sent. You can change languages on the screen by pressing the **DSP** key. It's just that simple.

Security Levels

The Model 2350P Controller is menu-driven for easy use. Once you become familiar with the menu options, it will be easy to perform setup and calibration procedures.

This section of the manual provides a comprehensive overview of the entire menu as it can be viewed from each security level. In order to lead off with a complete look at the menu, the levels will be shown in the following order: 3) **Technician**, 2) **Operator** and 1) **View Only**. Once you review the instructions in this section and learn the menu options, you will be able to perform your own setup and calibration using these examples to guide you through the process.

The Model 2350P offers 3 optional security levels: 1) **View Only**, 2) **Operator** and 3) **Technician**. A password is required to change from one security level to another. Each level has its own factory-preset password (1111 for Technician, 2222 for Operator), but your water treatment engineer can also designate personalized passwords from the **Technician Level Menu**.

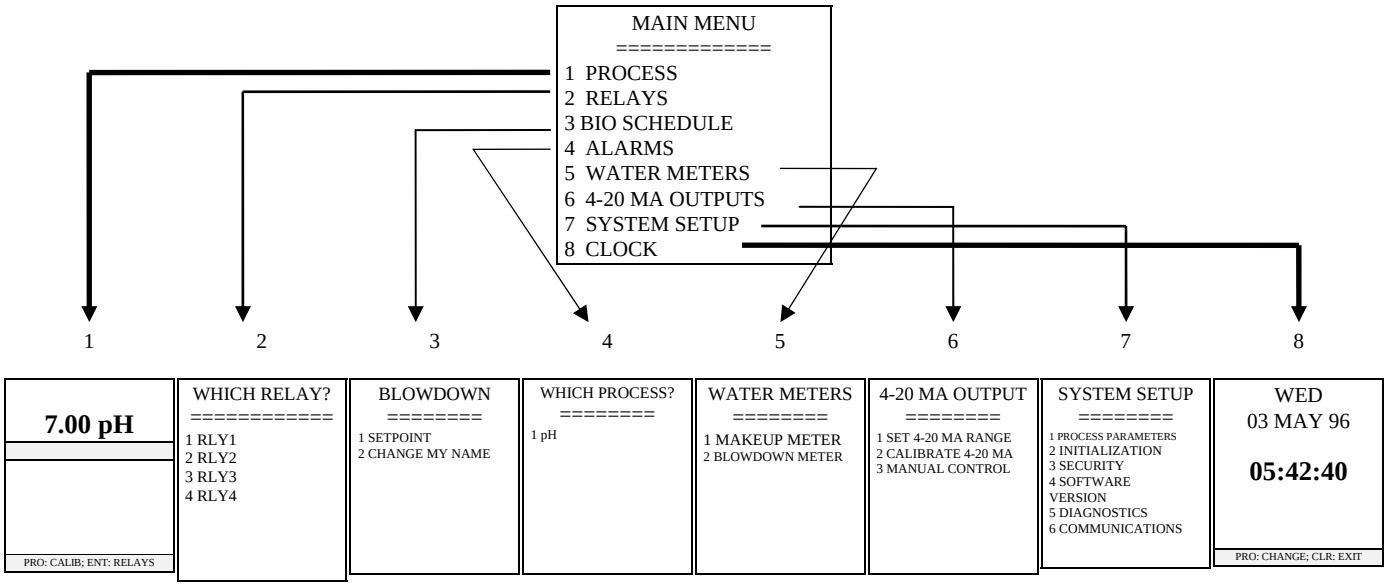
NOTE: IF YOU USE PERSONALIZED PASSWORDS, MAKE SURE THEY ARE RECORDED IN A SAFE AND SECURE PLACE.

The following pages illustrate the menu screens available in each security level:

Technician Level Menu

The complete Main Menu has eight (8) available options that can be accessed in the Technician Level. However, a list of only six (6) options can be viewed at one time. Use the ↑ and ↓ keys to scroll through the options.

The Technician Level allows you to review the entire Main Menu. As an introduction, here is a graphic overview of the first level of each option in the Main Menu to see how it operates. Complete detail of each option is provided on the following pages.



Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return all the way back to the **Main Menu** from anywhere in the program.

MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS

Press **1** or **ENT** to view **PROCESS**.

PROCESS

The **PROCESS** menu option allows you to do the following:

1) View current Process reading
2) View current status of a) Blowdown Setpoint, b) Chemical Setup Info, c) Makeup Gallons, d) Blowdown Gallons, e) Relay Status and f) Time
3) Note which alarms are active
4) Use **PRO** to calibrate the controller
5) Use **ENT** to manually control output relays

Current reading of sample water pH levels.

You can view both the sample readings and different status lines from this screen. Use the ↑ and ↓ keys to toggle through the following status screens:

a) Chemical Setup Info
b) MTR1 Gallons
c) MTR2 Gallons
d) Relay Status
e) Time (w/-**RTC** Option)

The sample reading (pH) is on the top line of the screen when a status line is selected.

9.25 pH
pH :HIGH ALARM
01 JAN '97
00:00:00
PRO=CALIB; ENT=RELAYS

Press **PRO** to calibrate your Model 2350P.

CALIBRATION
==========
1 ZERO
2 SPAN

The alarm status line, a darkened area, scrolls through all currently active alarms:

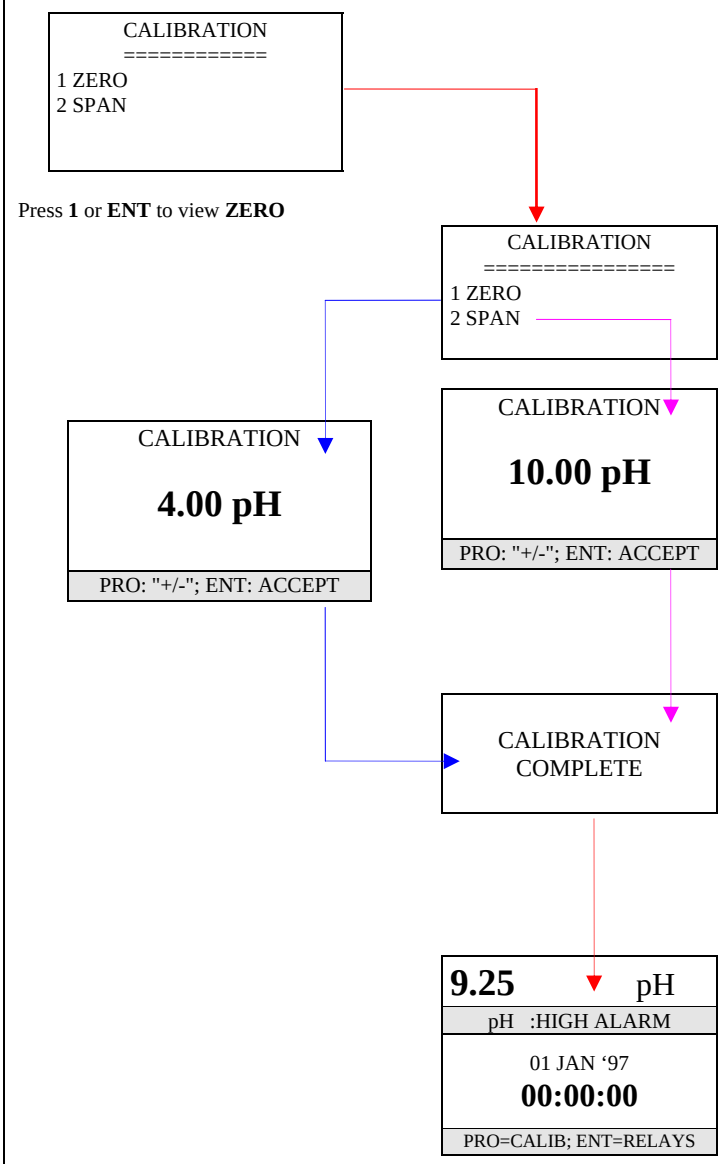
a) High pH
b) Low pH
c) Alarm No/Flow
d) Broken pH Glass
e) Open TC
f) High Reference Impedance

If no alarms are active, nothing will be displayed here.

The message "**BIOCIDE FEED SEQUENCE ACTIVE**" means a biocide program is in progress.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU | **PROCESS**



CALIBRATING pH

SINGLE POINT

A single point calibration is sufficient for most applications.

Take a sample and enter as the **ZERO** value.

TWO POINT

The Model 2350P allows you to enter a **ZERO** and a **SPAN** value. For two point, use two buffer solutions of differing pH values; one high and one low.

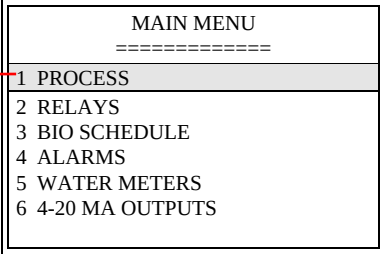
Select **ZERO** and enter the lower value and press **ENT**. The screen will verify the **ZERO** calibration is complete, then return to the selection menu. Select **SPAN** and enter the higher value. Press **ENT** and the screen will again verify calibration, then return to the process calibration menu. Press **CLR** until you return to the Main Menu.

NOTE: BOTH PROBES, PLUS THE SOLUTION GROUND, MUST BE USED WHEN CALIBRATING TO BUFFER SOLUTIONS IN A BEAKER OR CUP.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU

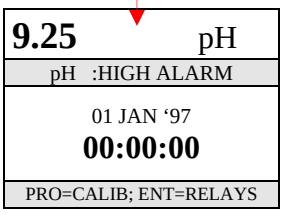
PROCESS
Relays



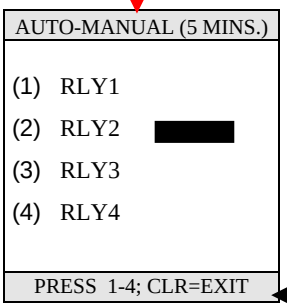
This part of the **PROCESS** menu shows the status and operation of the relays.

You can make temporary changes in their operation as described below:

Press **1** or **ENT** to view **PROCESS**.



Press **ENT** to view the relays.



This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.

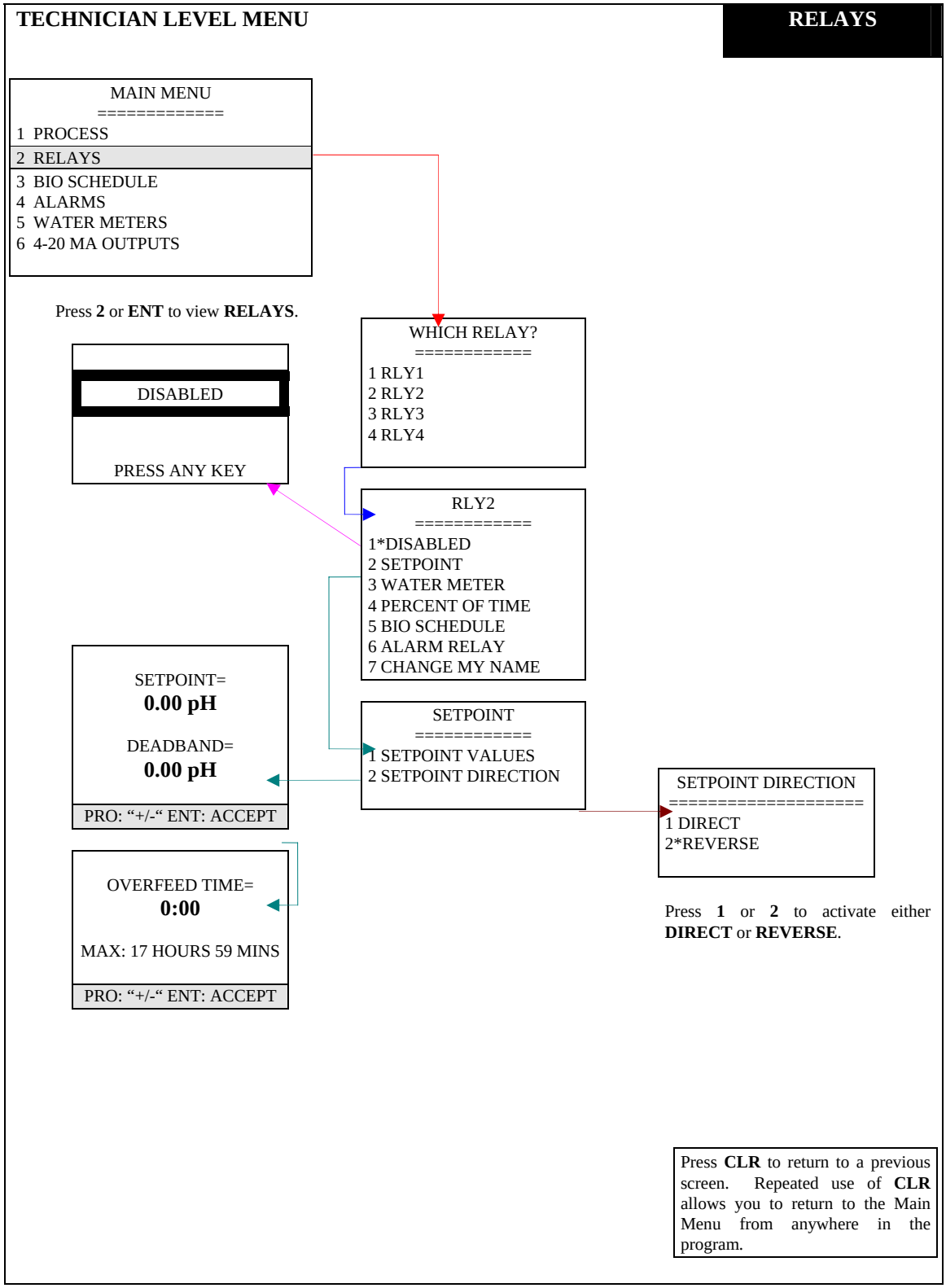
An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.

The timer will continue even if you exit the menu.

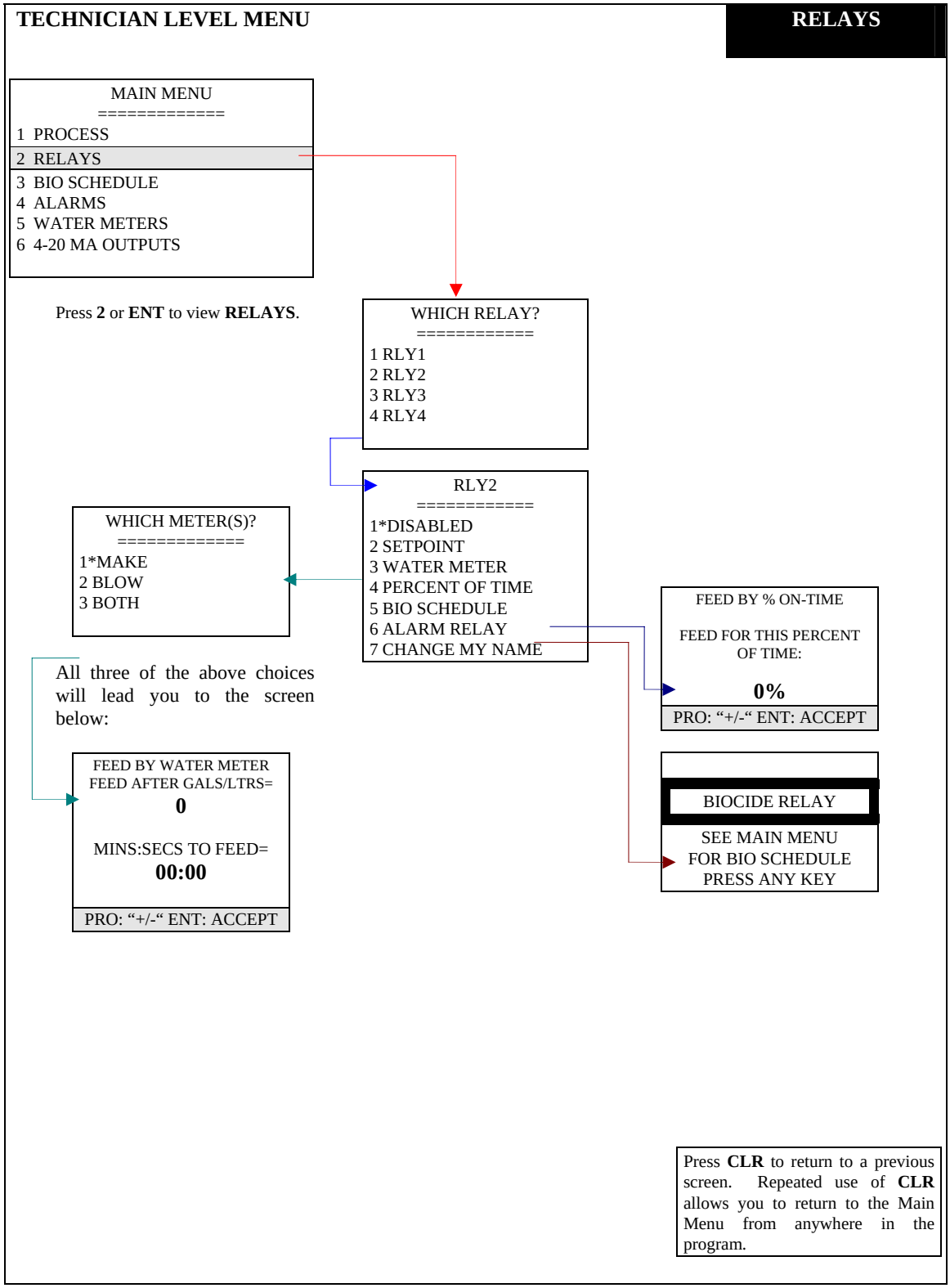
Press **CLR** to return to the **PROCESS** menu.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

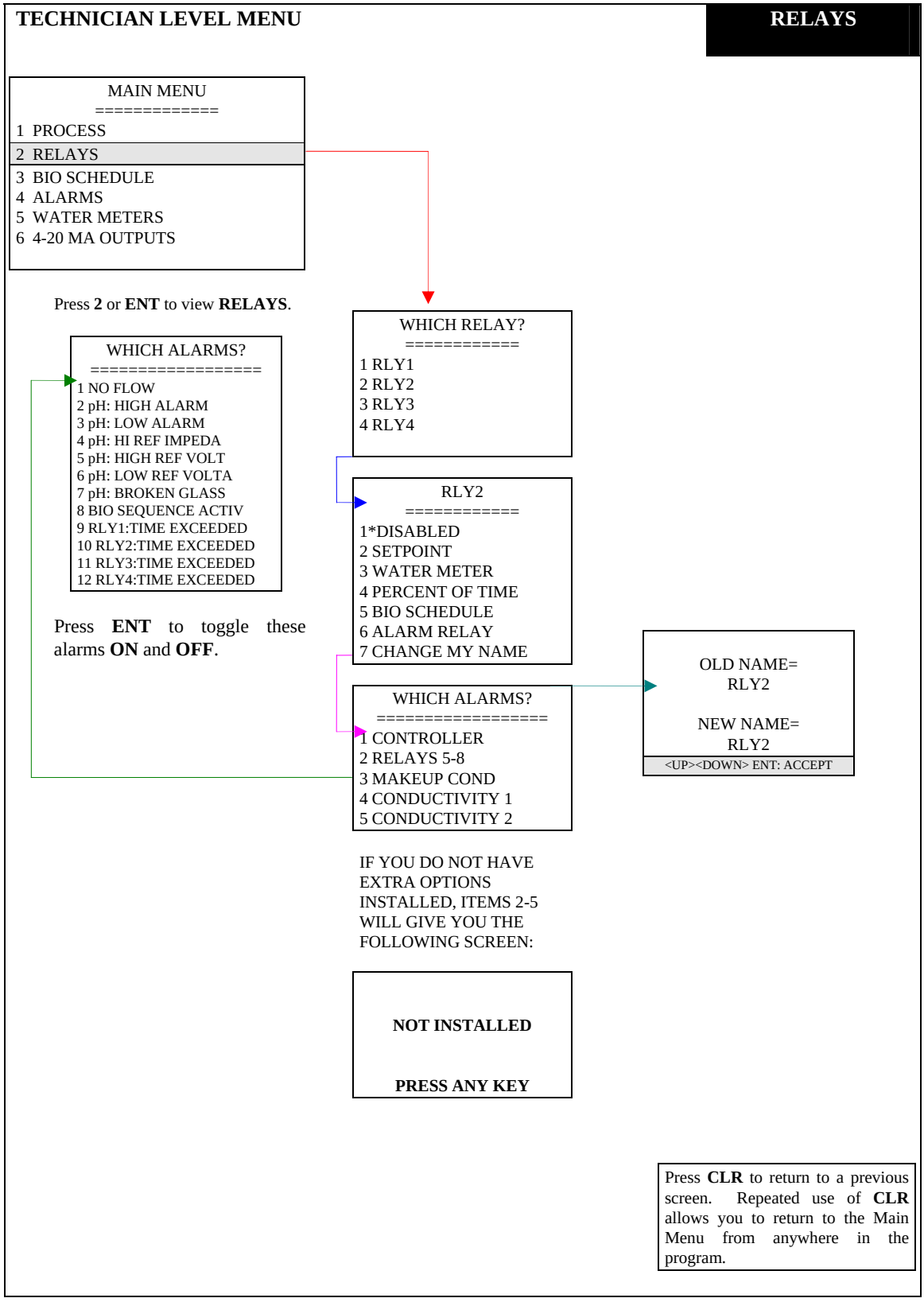
TECHNICIAN LEVEL MENU **RELAYS**



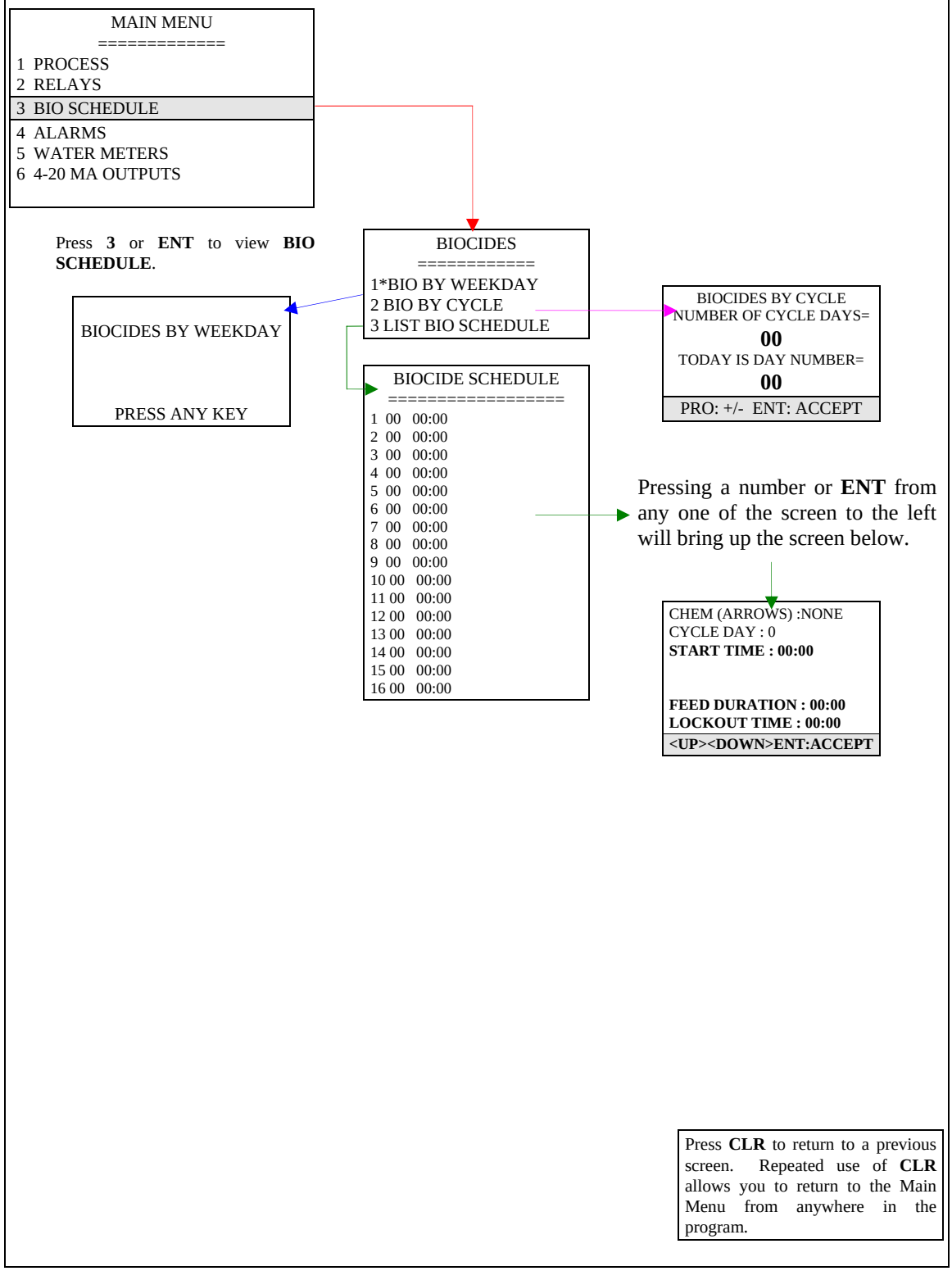
TECHNICIAN LEVEL MENU **RELAYS**



TECHNICIAN LEVEL MENU **RELAYS**



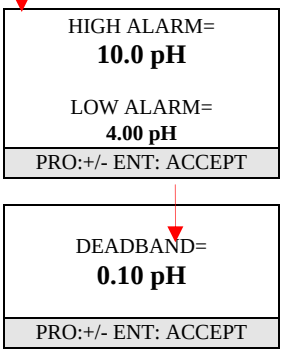
TECHNICIAN LEVEL MENU **BIO SCHEDULE**



MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS

Press **4** or **ENT** to view **ALARMS**.

The Model 2350P is equipped with both high and low alarms. This menu option allows you to program the specific values for these alarms. Consult your water treatment specialist to determine the proper High and Low Alarm values for your system.



Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU **WATER METERS**

MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS

Press **5** or **ENT** to view **WATER METERS**.

MAKEUP METER
This option allows you to monitor the volume of makeup entering your system. If you have a makeup meter, you will need to establish the parameters here.

WATER METERS
==========
1 MAKE
2 BLOW

OLD NAME=
MAKE

NEW NAME=
MAKE
<UP><DOWN> ENT: ACCEPT

TYPE OF MEASURE
==========
1 GALLONS
2 LITERS

WATER METER TYPES
==========
1 CONTACTING HEAD
2 PADDLE WHEEL
3 DATA INDUSTRIAL
4 SIGNET
5 AUTOTROL TURB 1 IN.
6 AUTOTROL TURB 2 IN.
7 CHANGE MY NAME

NOTE: GO TO THE FLOWMETER MANUFACTURING MANUAL TO GET THE SLOPE OR K-FACTOR FOR THE PIPE SIZE.

MAKE
GALLONS OR LITERS
PER CONTACT=
000.00
PRO: "+/-" ENT:ACCEPT

MAKE
PULSES PER
GAL/LITER=
000.00
PRO: "+/-" ENT:ACCEPT

MAKE
SLOPE VALUE (K)=
#.####
OFFSET=
0.0000
PRO: "+/-" ENT:ACCEPT

MAKE
K-FACTOR=
0.000
PRO: "+/-" ENT:ACCEPT

MAKE
AUTOTROL TURB 1 IN.
RESET TOTAL COUNT?
1 YES
2 NO

Enter the desired value then press ENT.

Enter the desired value then press ENT.

Enter the desired value then press ENT.

Enter the desired value then press ENT.

MAKE
GALLONS OR LITERS
PER CONTACT=
000.00
RESET TOTAL COUNT?
1 YES
2 NO

MAKE
PULSES PER
GAL/LITER=
000.00
RESET TOTAL COUNT?
1 YES
2 NO

MAKE
SLOPE VALUE (K)=
0.0000
OFFSET=
0.0000
RESET TOTAL COUNT?
1 YES
2 NO

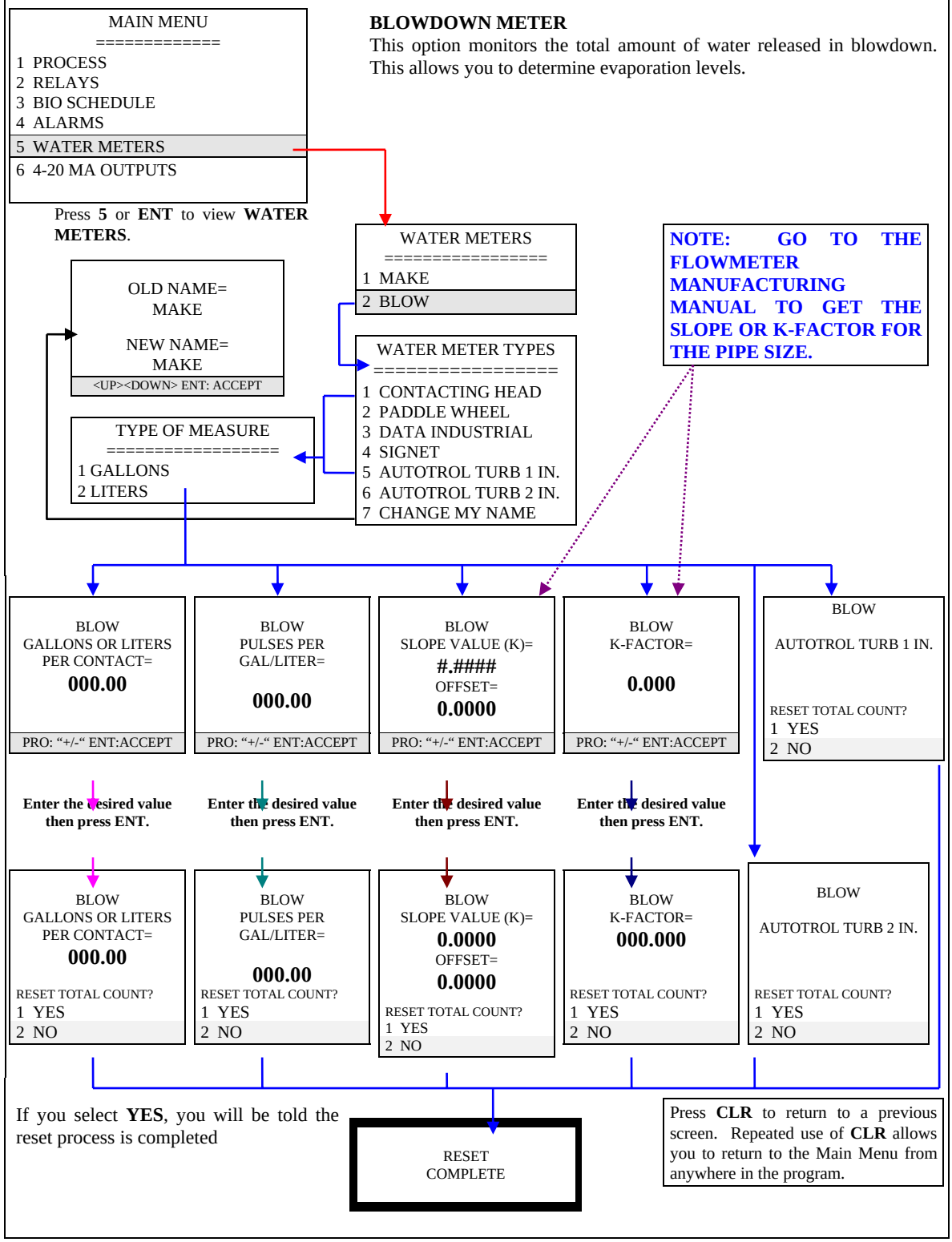
MAKE
K-FACTOR=
000.000
RESET TOTAL COUNT?
1 YES
2 NO

MAKE
AUTOTROL TURB 2 IN.
RESET TOTAL COUNT?
1 YES
2 NO

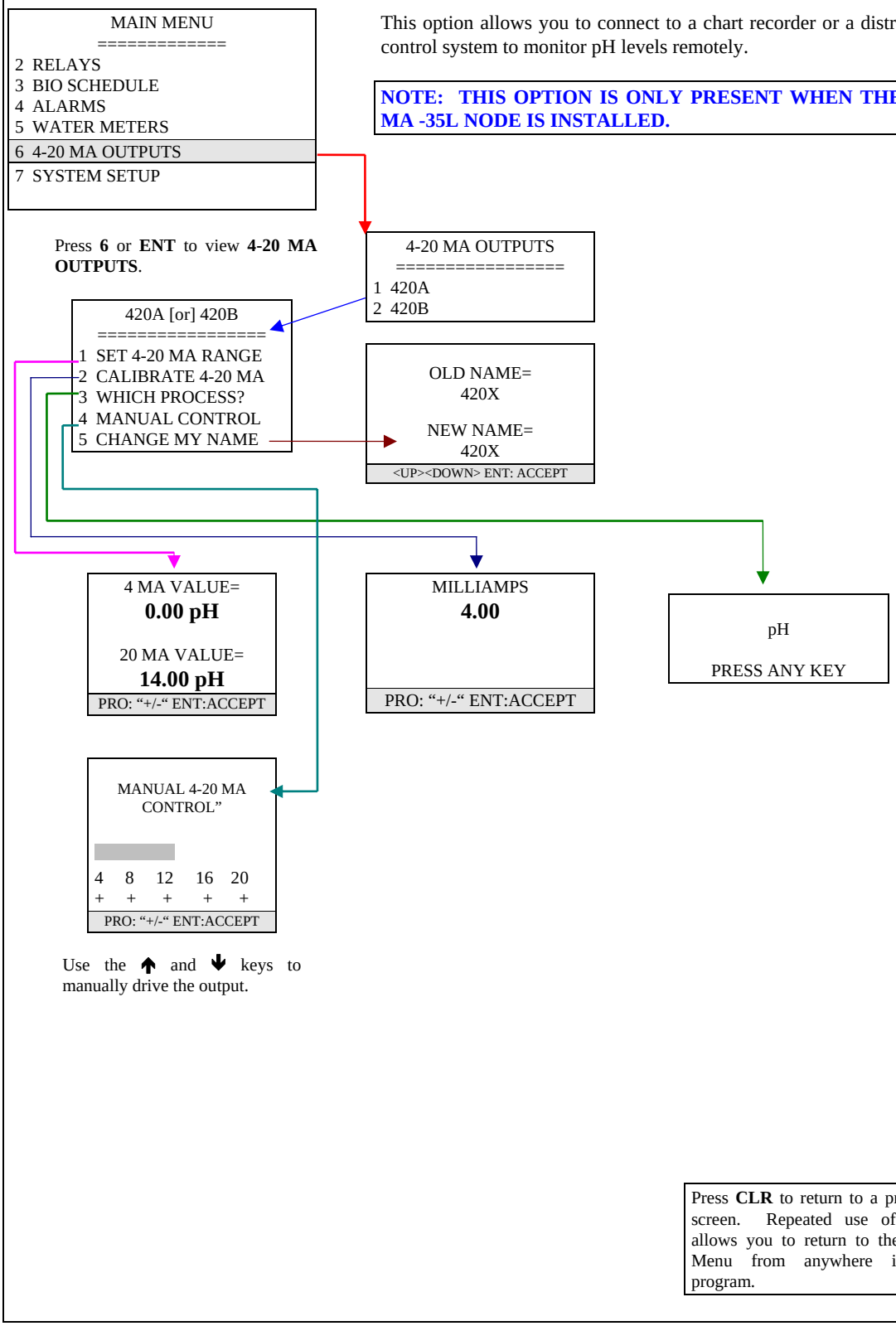
If you select **YES**, you will be told the reset process is completed

RESET
COMPLETE

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.


MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
Press 5 or ENT to view WATER METERS.
BLOWDOWN METER
This option monitors the total amount of water released in blowdown. This allows you to determine evaporation levels.
WATER METERS
==========
1 MAKE
2 BLOW
NOTE: GO TO THE FLOWMETER MANUFACTURING MANUAL TO GET THE SLOPE OR K-FACTOR FOR THE PIPE SIZE.
OLD NAME=
MAKE
NEW NAME=
MAKE
<UP><DOWN> ENT: ACCEPT
WATER METER TYPES
==========
1 CONTACTING HEAD
2 PADDLE WHEEL
3 DATA INDUSTRIAL
4 SIGNET
5 AUTOTROL TURB 1 IN.
6 AUTOTROL TURB 2 IN.
7 CHANGE MY NAME
TYPE OF MEASURE
==========
1 GALLONS
2 LITERS
BLOW
GALLONS OR LITERS
PER CONTACT=
000.00
PRO: "+/-" ENT:ACCEPT
BLOW
PULSES PER
GAL/LITER=
000.00
PRO: "+/-" ENT:ACCEPT
BLOW
SLOPE VALUE (K)=
#.####
OFFSET=
0.0000
PRO: "+/-" ENT:ACCEPT
BLOW
K-FACTOR=
0.000
PRO: "+/-" ENT:ACCEPT
BLOW
AUTOTROL TURB 1 IN.
RESET TOTAL COUNT?
1 YES
2 NO
Enter the desired value then press ENT.
Enter the desired value then press ENT.
Enter the desired value then press ENT.
Enter the desired value then press ENT.
BLOW
GALLONS OR LITERS
PER CONTACT=
000.00
RESET TOTAL COUNT?
1 YES
2 NO
BLOW
PULSES PER
GAL/LITER=
000.00
RESET TOTAL COUNT?
1 YES
2 NO
BLOW
SLOPE VALUE (K)=
0.0000
OFFSET=
0.0000
RESET TOTAL COUNT?
1 YES
2 NO
BLOW
K-FACTOR=
000.000
RESET TOTAL COUNT?
1 YES
2 NO
BLOW
AUTOTROL TURB 2 IN.
RESET TOTAL COUNT?
1 YES
2 NO
If you select YES, you will be told the reset process is completed
RESET
COMPLETE
Press CLR to return to a previous screen. Repeated use of CLR allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU **4-20 MA OUTPUTS**



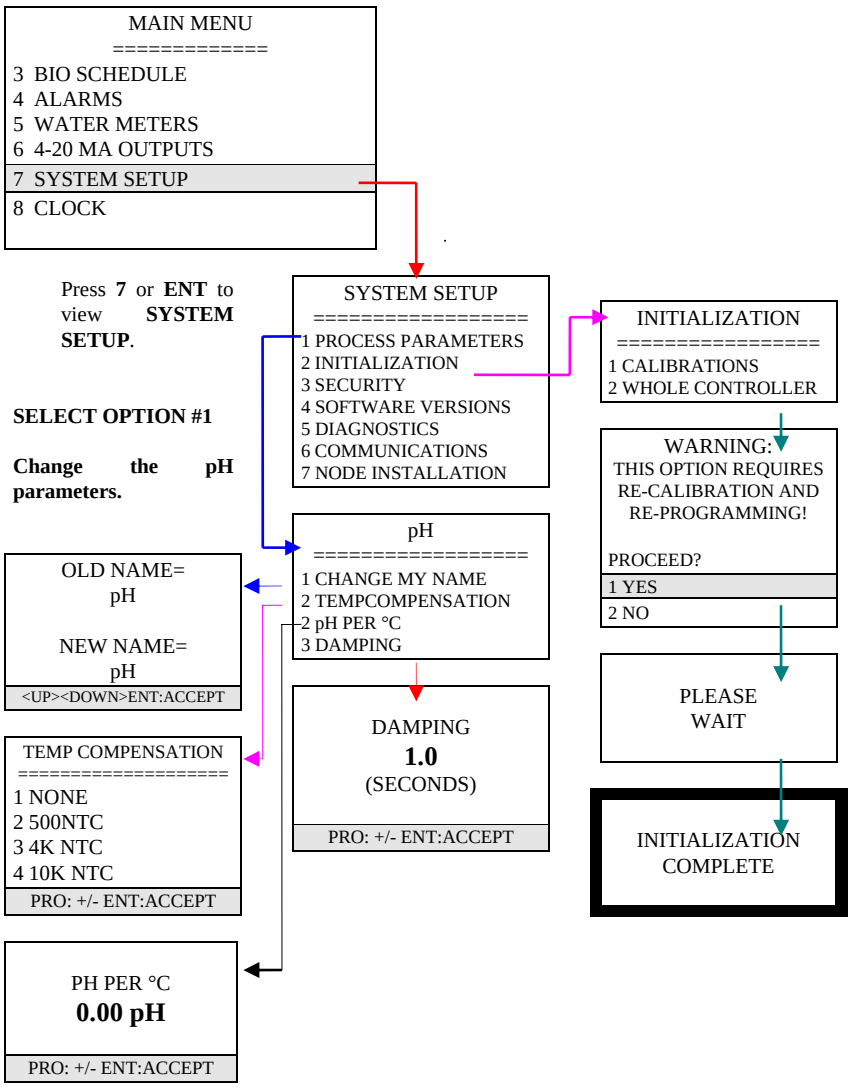
This option allows you to connect to a chart recorder or a distributed control system to monitor pH levels remotely.

NOTE: THIS OPTION IS ONLY PRESENT WHEN THE 4-20 MA -35L NODE IS INSTALLED.

Press **6** or **ENT** to view **4-20 MA OUTPUTS**.

Use the ↑ and ↓ keys to manually drive the output.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.



SELECT OPTION #2

Initialize the controller.

Initialization resets control functions back to the factory default values. The two levels of initialization are as follows:

1 Calibrations— Simply resets the pH or conductivity calibrations.

2 Whole Controller— Resets all of the control functions.

If you initialize, all previously programmed settings will be lost and you must go through the proper setup procedures for the areas installed.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

```
MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK
```

Press **7** or **ENT** to view **SYSTEM SETUP**.

```
SYSTEM SETUP
================
1 PROCESS PARAMETERS
2 INITIALIZATION
3 SECURITY
4 SOFTWARE VERSIONS
5 DIAGNOSTICS
6 COMMUNICATIONS
7 NODE INSTALLATION
```

SELECT OPTION #3

Change the security password.

A password is assigned for each security level at the factory. For security reasons, you may desire to routinely change the passwords for the **Operator** and **Technician Level Menus**.

To change a password, select the security level you want to change (i.e., **Technician**), then enter the old password. If the old password is correct, you are asked to assign a new 4-key password.

NOTE: CHANGING THE OPERATOR PASSWORD DOES NOT PUT THE CONTROLLER INTO OPERATOR MODE. YOU WILL NEED TO RETURN THE CONTROLLER BACK INTO OPERATOR MODE FOR OPERATOR USE.

```
CHANGE PASSWORD
====================
1 OPERATOR
2 TECHNICIAN
```

```
OPERATOR

PASSWORDS ARE 4 KEYS
ENTER A NEW PASSWORD

OLD PASSWORD=****
NEW PASSWORD=****
VERIFY      =****
```

SELECT OPTION #4

View the software version information.

This option is primarily for use when troubleshooting the Model 2350P. The Lakewood Instruments Technical Service Representative will need to know this information in order to properly diagnose your controller.

```
SOFTWARE VERSIONS
=====================
1 MENU  S1 REV  AX
2 IO    S1 REV  AX
3 RTC   S1 REV  AX
4 420   S1 REV  AX
5 COM   S1 REV  AX
6 NII   S1 REV AX
7 NIO   S1 REV AX
8
9
10
11
```

```
WHICH NODE?
====================
1 CONTROLLER
2 MAKEUP COND
3 CONDUCTIVITY 1
4 CONDUCTIVITY 2
```

If you do not have the optional nodes installed, selecting 2-4 will leave the menu above on the screen.

SELECT OPTION #5
View raw A/D values.

This option allows you to view the raw A/D values and may be useful when troubleshooting.

```
CONTROLLER

C0=0014     C4=-474
C1=046A     C5=0003
C2=0AAA     C6=0538
C3=0-AB9    C7=02CC
            LSB= 2.7
PRESS ANY KEY
```

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU

SYSTEM SETUP

MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK

Press **7** or **ENT** to view **SYSTEM SETUP**.

SELECT OPTION #6

Communications Port Setup and Password.

Your controller must have the **-RSL** option and the **LWREMOTE** software package installed to allow for remote communications. Please see the **LWREMOTE** manual for more information on remote communications.

To change a password, select the security level you want to change (i.e., **Technician**), then enter the old password. If the old password is correct, you are asked to assign a new 4-key password.

NOTE: CHANGING THE OPERATOR PASSWORD DOES NOT PUT THE CONTROLLER INTO OPERATOR MODE. YOU WILL NEED TO RETURN THE CONTROLLER BACK INTO OPERATOR MODE FOR OPERATOR USE.

SYSTEM SETUP
==========
1 PROCESS PARAMETERS
2 INITIALIZATION
3 SECURITY
4 SOFTWARE VERSIONS
5 DIAGNOSTICS
6 COMMUNICATIONS
7 NODE INSTALLATION

REMOTE PASSWORD

To change a password, enter the old remote password. If the old password is correct, you are asked to assign a new 8-key remote password. Type it again to verify your entry is correct. Keep a confidential log of the password for future reference.

REMOTE PASSWORD

PASSWORDS ARE 8 KEYS
ENTER A NEW PASSWORD

OLD PASSWORD=********
NEW PASSWORD=********
VERIFY= *********

REMOTE PASSWORD
COMPLETE

COM PORT SETUP

The COM PORT parameter that you need to configure is BAUD RATE. The other fields are fixed and displayed for reference only. Use the arrow keys to select the desired baud rate, then press **ENT**.

COMMUNICATIONS
==========
1 COM PORT SETUP
2 INITIALIZE MODEM
3 REMOTE PASSWORD

COM PORT PARAMETERS
==========
BAUD RATE: 19200
DATA BITS: 8
STOP BITS: 1
PARITY: NONE

INITIALIZE MODEM
==========
1 HAYES ACCURA
2 U.S. ROBOTICS
3 ZOOM
4 OTHER MODEM

COMMAND STRING=

COMMAND STRING= <

<UP><DOWN>ENT:ACCEPT

Selecting 1, 2 or 3 will result in the screens below.

PLEASE
WAIT

TIMEOUT

PRESS ANY KEY

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU

SYSTEM SETUP

SELECT OPTION #7

Node Installation.

MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK

Press **7** or **ENT** to view **SYSTEM SETUP**.

SYSTEM SETUP
==========
1 PROCESS PARAMETERS
2 INITIALIZATION
3 SECURITY
4 SOFTWARE VERSIONS
5 DIAGNOSTICS
6 COMMUNICATIONS
7 NODE INSTALLATION

NODE INSTALLATION
==========
1 INSTALL A NEW NODE
2 DE-INSTALL A NODE

INSTALL A NEW NODE
==========
1 RELAYS 5-8
2 MAKEUP COND
3 CONDUCTIVITY 1
4 CONDUCTIVITY 2

Select which node to install.

PRESS SERVICE PIN

AND THEN

PRESS ANY KEY

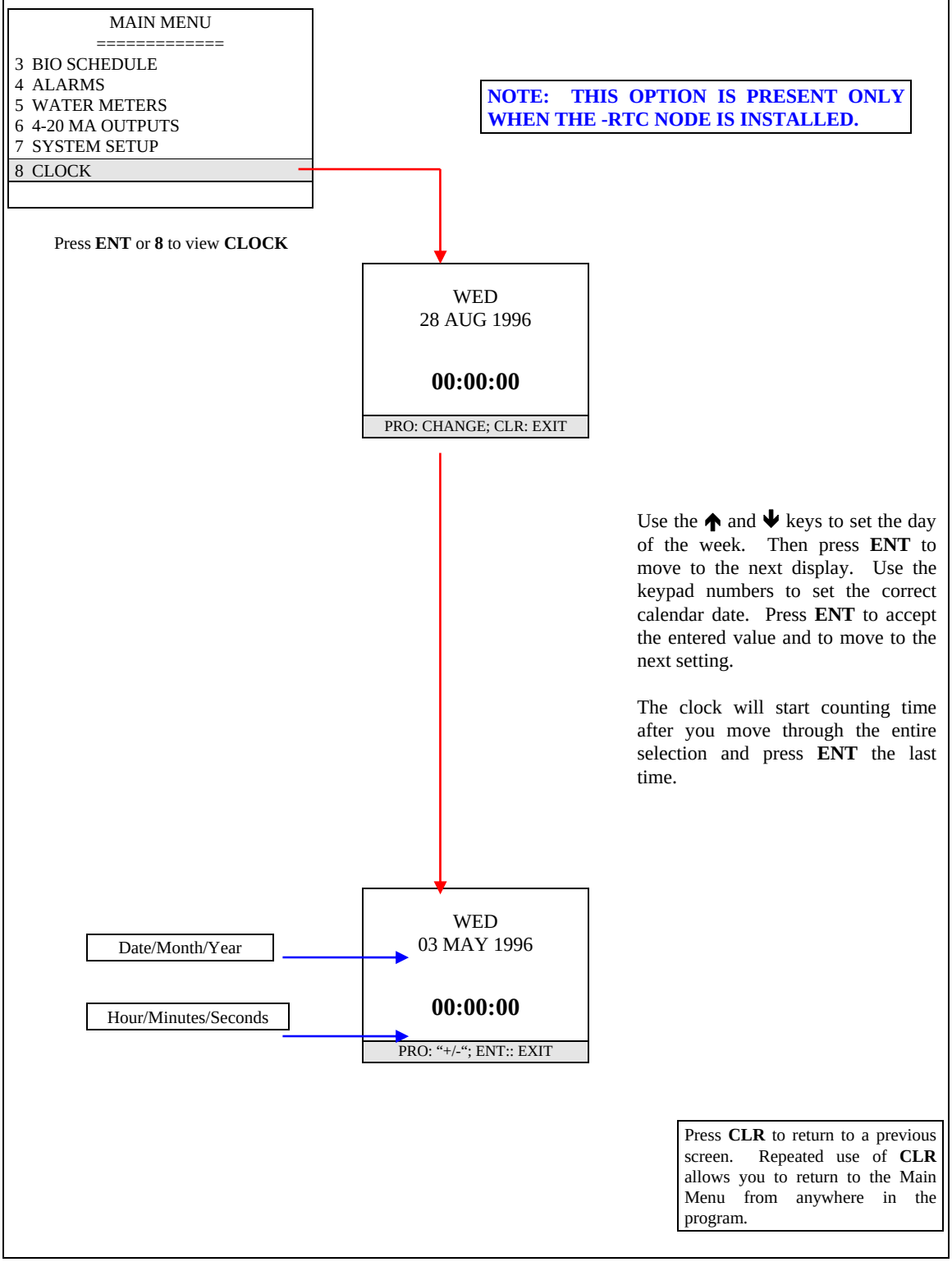
Press service pin on the node to be installed.

INSTALL A NEW NODE
==========
1 RELAYS 5-8
2 MAKEUP COND
3 CONDUCTIVITY 1
4 CONDUCTIVITY 2

Select which node to remove.

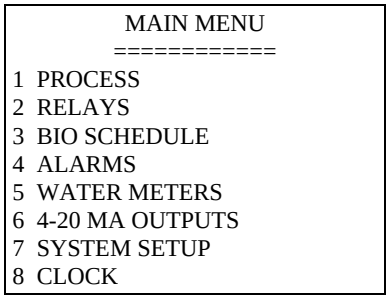
Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU **CLOCK**

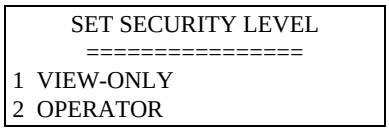


Changing Security Levels

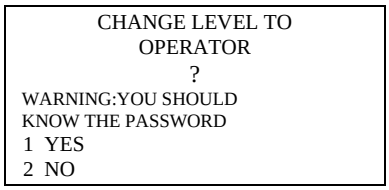
In order to change the security level (i.e., from **Technician** down to **Operator**, or from **Operator** to **View-Only**), go to the **Main Menu**.



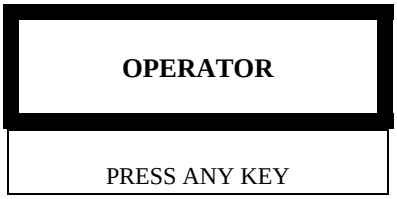
Press **0** on the keypad. Note that **0** does not appear on the menu screen, only on the keypad.



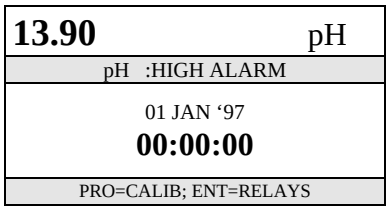
Select the new security level.



Select **YES** to change the security level.



The controller menu now functions at the new security level.
To increase the security level, go into the **PROCESS** screen:



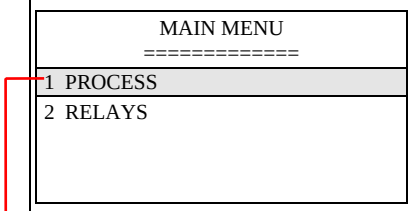
Enter the 4-digit security code that goes with the desired security level.
The **Technician** and **Operator** levels have different security codes.

Following the first power-up, the **Operator** code is **1111**.
Following the first power-up, the **Technician** code is **2222**.
You may change the passwords in the **SYSTEM SETUP** menu.

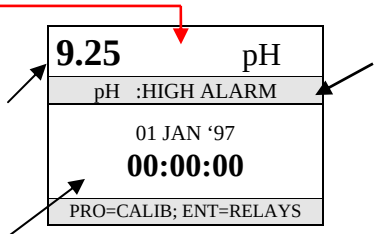
OPERATOR LEVEL MENU

PROCESS

The Operator Level Menu allows you limited access to the **PROCESS** and **RELAYS** menus. In **PROCESS**, you can view the current pH, any alarms and various status lines.



Press **1** or **ENT** to view **PROCESS**.



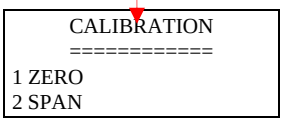
Current reading of sample water pH levels.

You can view both the sample readings and different status lines from this screen. Use the ↑ and ↓ keys to toggle through the following status screens:

a) Chemical Setup Info
b) MTR1 Gallons
c) MTR2 Gallons
e) Relay Status
f) Time (w/-**RTC** Option)

The sample reading (pH) is on the top line of the screen when a status line is selected.

Press **PRO** to calibrate your Model 2350P.



The alarm status line, a darkened area, scrolls through all currently active alarms:

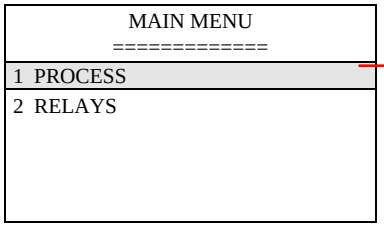
a) High pH
b) Low pH
c) Alarm No/Flow
d) Broken pH Glass
e) Open TC
f) High Reference Impedance

If no alarms are active, nothing will be displayed here.

The message "**BIOCIDE FEED SEQUENCE ACTIVE**" means a biocide program is in progress.

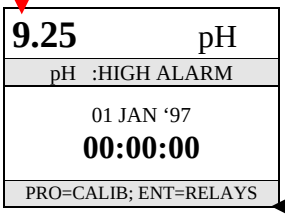
Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

OPERATOR LEVEL MENU **PROCESS**

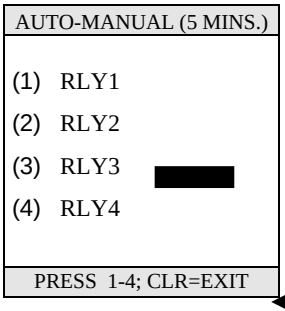


In the **Operator Level Menu**, you can also view and manually control the status of the four relays. Simply follow the procedure described below:

Press **1** or **ENT** to view **PROCESS**.



Press **ENT** to view the relays.



This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.

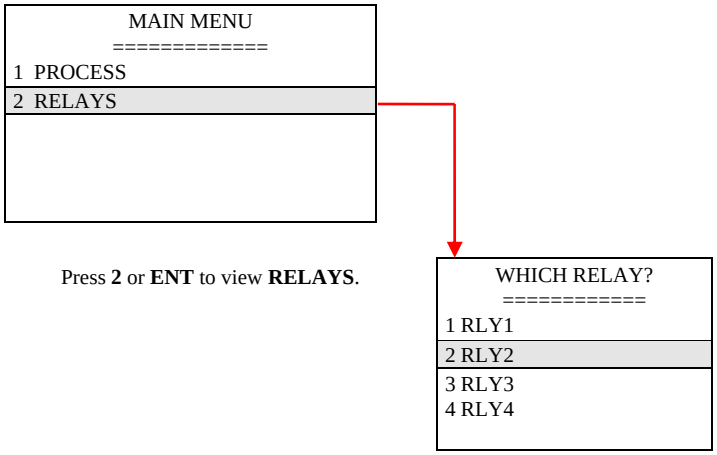
An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.

The timer will continue even if you exit the menu.

Press **CLR** to return to the **PROCESS** menu.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

OPERATOR LEVEL MENU **RELAYS**



Press **2** or **ENT** to view **RELAYS**.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

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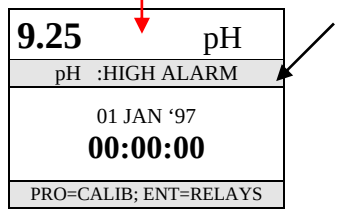
View-Only Level Menu

VIEW-ONLY LEVEL MENU **PROCESS**

THERE IS NO MENU FOR THE VIEW ONLY LEVEL

In the **View Only Level Menu**, you can view the pH level, the alarms and the status lines. You can also control the four relays. Simply follow the procedure described below:

Press **1** or **ENT** to view **PROCESS**.



Current reading of sample water pH level.

This line allows you to view one of six different status lines. To select the status to view, use the ↑ and ↓ keys to move through the list. Here's what is available:

a) Chemical Setup Info
b) MTR1 Gallons
c) MTR2 Gallons
d) Time (with **-RTC** only)
e) Relay Status

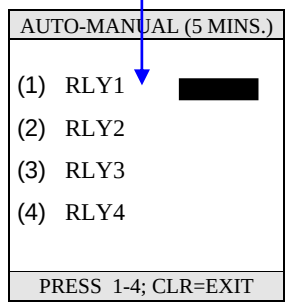
The alarm status line, a darkened area, scrolls through all currently active alarms:

If no alarms are active, nothing will be displayed here.

This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.

An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.

The timer will continue even if you exit the menu.



Technical Service

☎ **Technical Support for Lakewood Instruments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST.**

Mail and returns should be sent to:

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

When any merchandise is returned to the factory, please call and obtain a return Goods authorization (RGA) number and have the following information available:

- Customer's name, address, phone and fax numbers.
- A purchase order number (no exceptions) for cases where parts are required that are not under warranty.
- A contact person's name and phone number to call if the equipment is beyond repair or to discuss any other warranty matter.
- Equipment model and serial numbers.
- Reason for return (i.e., repair, warranty, incorrect part, etc.).

We will then fax to your attention an RGA form that must accompany the returned item.

NOTE: THE RGA NUMBER MUST BE CLEARLY WRITTEN ON THE OUTSIDE OF THE PACKAGE(S) BEING RETURNED.

Parts List and Service Guide

When calling Lakewood Instruments, please have the controller's complete model number and serial number available, together with the software version and the software revision so that the technician can better assist you.

When any parts are returned to the factory, please indicate:

- Customer's name and address
- Individual at customer location to send the repaired controller or new part to
- The person (and phone number) to call if the equipment is beyond repair or for any warranty matter

PART NUMBER	DESCRIPTION
35L	4-20 node
RTC	Real Time Clock node
RS2L	Communications node

Write your controller's complete model number, serial number, software version and software revision here so that you will have them available if you wish to contact a Lakewood Instruments technician.

Model Number:

Serial Number:

Software Version:

Software Revision:

FIRM WARE VERSIONS

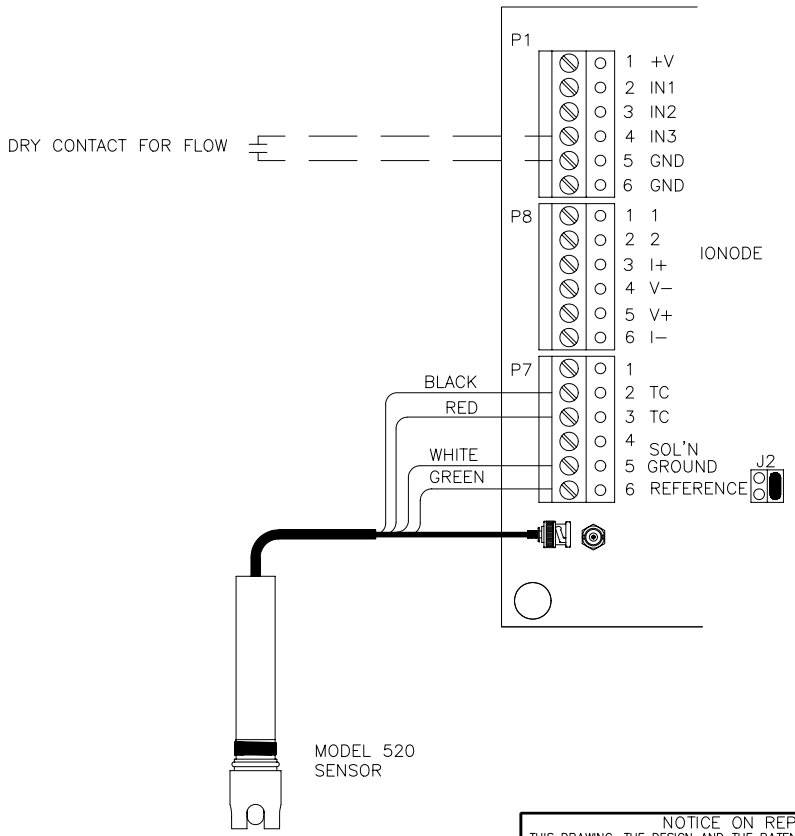
Menu	Series	Rev.
I/O		
COM		
RTC		
35L		
NII		
NIO		
RLY		
MCON		
CON1		
CON2		

Troubleshooting

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
Water meters not accumulating.	There may be a problem with the wiring or the reed switch in the meter may be bad. For water meters other than the contact type, check the manufacturer's user manual for that particular water meter.	Approximately 24 volts DC should be present at the input terminal when the water meter contact is open. That should change to zero VDC when the contact closes. Check these voltages and for correct wiring. Is the controller configured for your type of water meter?
"NODE NOT RESPONDING" error message.	This message occurs when one circuit board in the controller cannot communicate with another board.	Check that all boards are mounted correctly and that all connectors are fully mated. The controller may not have the option board that is trying to be accessed. The board that is trying to be accessed may not be working. Observe the front panel circuit boards. If a board has a green service LED constantly lit or continually flashing, the board is defective. Call the Lakewood Instruments Technical Services Department.
Display is blank.	Open the front panel. Look at the yellow LEDs on the rear power board. Are they on?	If LEDs are on, check ribbon cable. Is it properly seated? If LEDs are not on, does the unit have power? If there is power to terminals 2 and 4, replace the power supply assembly. Observe the backside of the Menu Board (board with keypad). If the board has a green service LED constantly lit or continually flashing, the board is defective. Call the Lakewood Instruments Technical Service Dept.
High Reference Z.	Reference or Sol GND is not properly working.	Replace sensor. Check earth grounding of controller. Check wiring of Sol GND and Ref pin on controller I/O board.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
Broken Electrode	pH electrode signal is incorrect.	Damaged pH cable. Bad pH sensor.
Feed Time Exceeded	Relay setpoint was not met in a specified time.	Check chemical, chemical pump. Increase feed time. Reset alarm by creating a “no flow” alarm.

REVISION HISTORY					
REV	DESCRIPTION	ECO	DWN	DATE	APVD
A	RELEASE	1121	MLM	4/96	
B	REVISED	1121	EV	8/25/97	



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MATERIAL	TOLERANCES UNLESS NOTED FRAC DECIMALS ANGLES .X ± .1 .XX ± .03 ±1/16 .XXX ± .010 ±.5°	
FINISH		
ORDER NO.	DWN MLM	DATE 4/96
CUSTOMER	CHKD JWZ	DATE 4/96
CUSTOMER LOC.	APVD DDR	DATE 4/96
DO NOT SCALE	APVD	DATE

OSMONICS
PHOENIX OPERATIONS

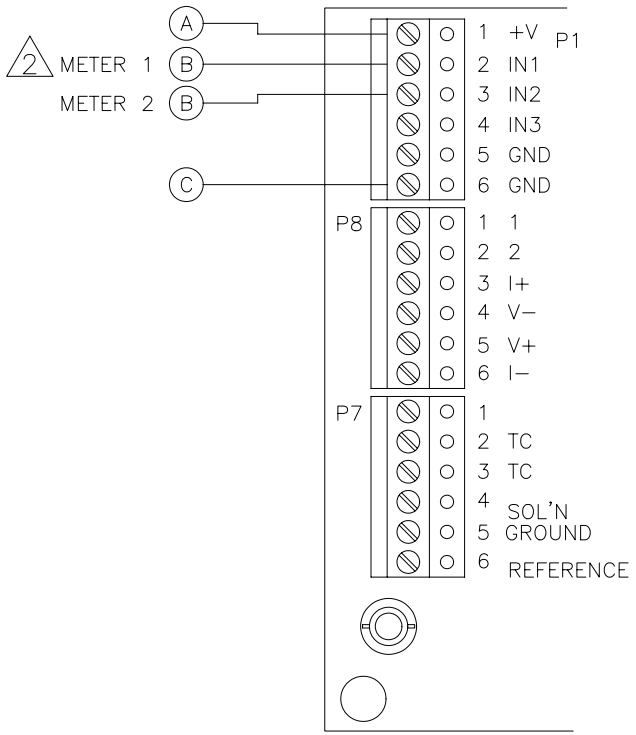
TITLE
WIRING DIAGRAM
SENSOR WIRING, INPUT WIRING M−2350P

SIZE B	THIRD ANGLE	DWG NO/PN 69624	REV B
SCALE NONE		FILE TYPE .DWG	SHEET 1 OF 1

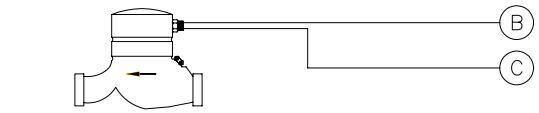
NOTES: UNLESS OTHERWISE SPECIFIED;

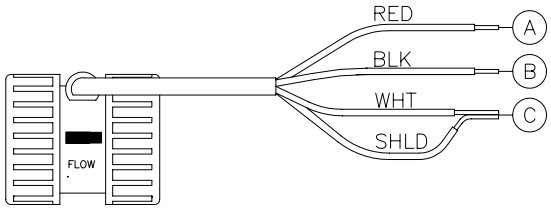
1. 2450: CANNOT BE USED WITH CONTACTING HEAD METER.
2. 2450: METER 1 IS PERMEATE, METER 2 IS CONCENTRATE.
3. CUSTOMER SUPPLIED, 10K RESISTOR ØPULL–UP).
4. ONLY OPEN COLLECTOR OUTPUT WATER METERS MAY BE USED.

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	1121	EV	8/25/97	
B		REVISED	1285	EV	9/29/97	
C		REVISED	1387	EV	10/9/97	
D		REVISED	1435	EV	11/3/97	JGS
E		ADDED NOTE 3	1541	EV	2/16/98	JGB
F		REMOVED SIGNAL COND BOARD	1743	EV	8/18/98	

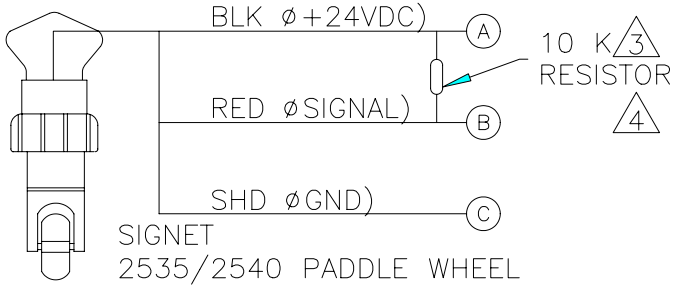


1 CONTACTING HEAD TYPE WATER METER





WATER METER AUTOTROL TURBINE



SIGNET
2535/2540 PADDLE WHEEL

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MATERIAL	TOLERANCES UNLESS NOTED FRAC ±1/16 DECIMALS .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ±.5°	
FINISH		
ORDER NO.	DWN EV	DATE 8/25/97
CUSTOMER	CHKD BZ	DATE 8/25/97
CUSTOMER LOC.	APVD JWZ	DATE 8/26/97
DO NOT SCALE	APVD JGB	DATE 8/26/97

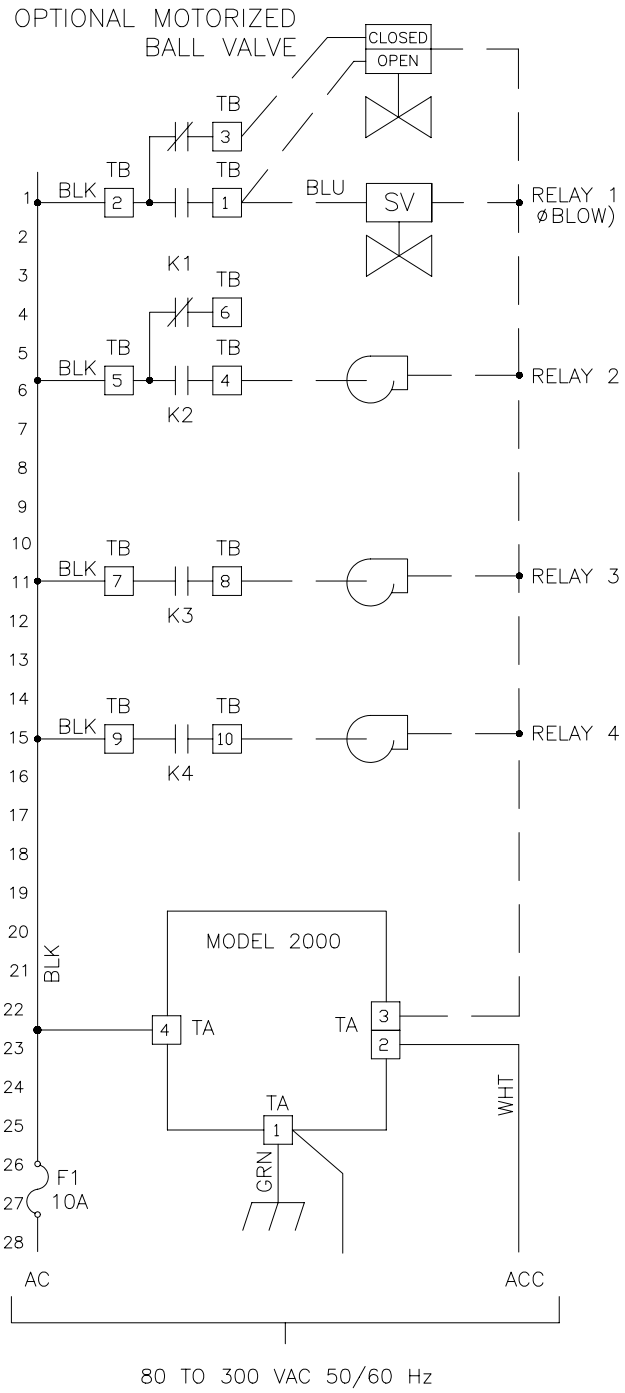
OSMONICS
PHOENIX OPERATIONS

TITLE
WIRING DIAGRAM
WATER METER INPUTS, M–2000 SERIES

SIZE C THIRD ANGLE
DWG NO/PN 1104607
REV F
SCALE NONE
FILE TYPE .DWG
SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		PRELIMINARY RELEASE	0964	EV	5/8/97	
B		REVISED	1123	EV	7/3/97	DDR
C		REVISED	1387	EV	10/8/97	



NOTES: UNLESS OTHERWISE SPECIFIED;

1. WIRING BY LAKEWOOD. _____
2. WIRING BY OTHERS. — — — —
3. RELAY CONTACTS RATED 3A/250 VAC, 1/6 HP/250 VAC.

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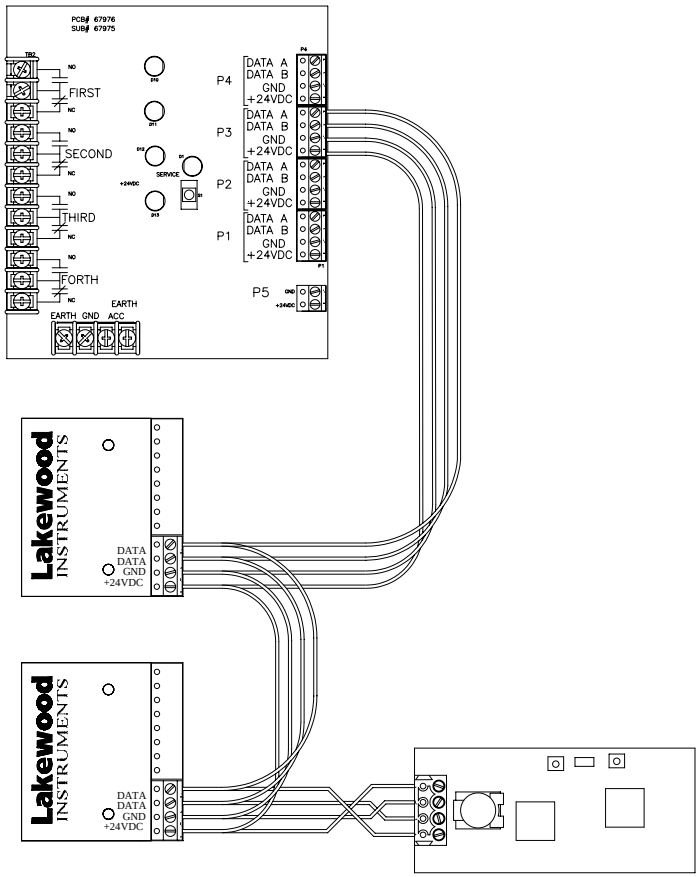
MATERIAL	TOLERANCES UNLESS NOTED FRAC ±1/16 DECIMALS .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± .5°		OSMONICS PHOENIX OPERATIONS
FINISH			TITLE: ELECTRICAL SCHEMATIC 2000 SERIES
ORDER NO.	DWN EV	DATE 5/8/97	
CUSTOMER	CHKD BZ	DATE 5/14/97	SIZE C THIRD ANGLE — DWG NO/PN 04277 — REV C
CUSTOMER LOC.	APVD DDR	DATE MAY 97	
DO NOT SCALE	APVD	DATE	SCALE NONE — FILE TYPE .DWG — SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

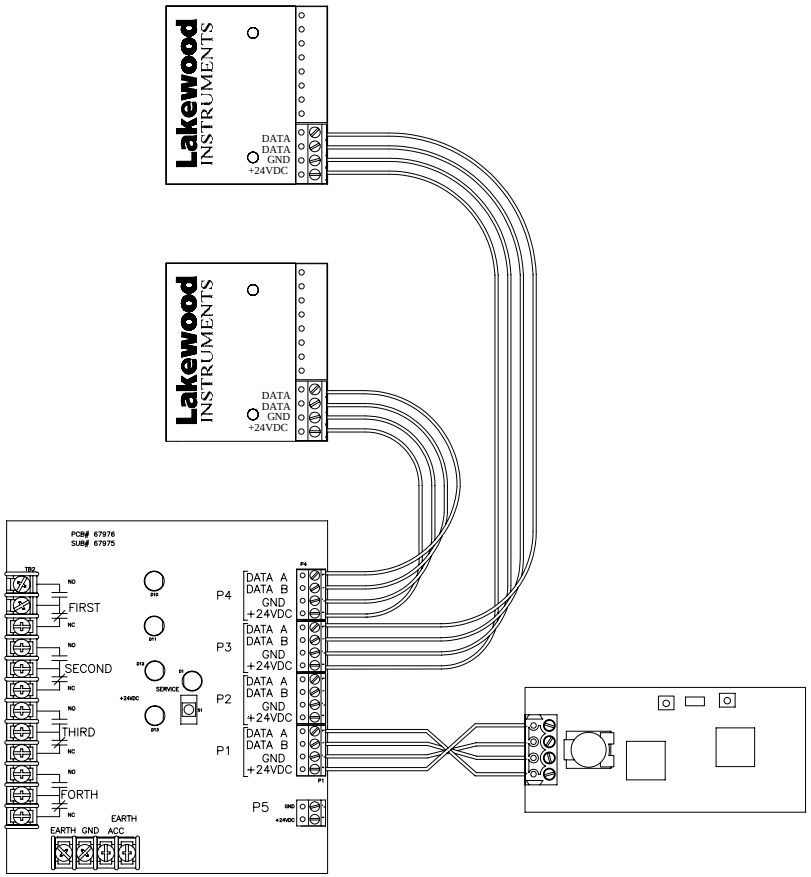
NOTES: UNLESS OTHERWISE SPECIFIED;

1. NIN OPTION PROVIDES +24 VDC TO ALL NODES. IF USING MORE THAN 3 NODES AN EXTERNAL +24 VDC POWER SUPPLY IN PARALLEL IS RECOMMENDED.

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	1045	EV	8/5/97	



OR



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MATERIAL	TOLERANCES UNLESS NOTED: FRAC ±1/16, DECIMALS .X ± .1 / .XX ± .03 / .XXX ± .010, ANGLES ±.5°	
FINISH		
ORDER NO.	DWN EV	DATE 8/5/97
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD	DATE
DO NOT SCALE	APVD	DATE

OSMONICS
PHOENIX OPERATIONS

TITLE: INSTALLATION DRAWING
NIN OPTION

SIZE	DWG NO/PN	REV
C	04263	A

THIRD ANGLE

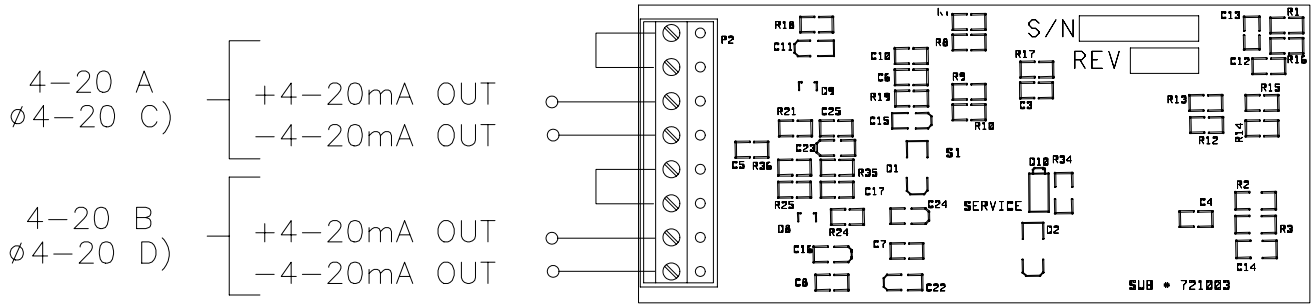
SCALE	FILE TYPE	SHEET
NONE	.DWG	1 OF 1

P/N 61677 REV-A PG-1/2

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	0767	EV	9/96	
B		REVISED	1387	EV	10/9/97	

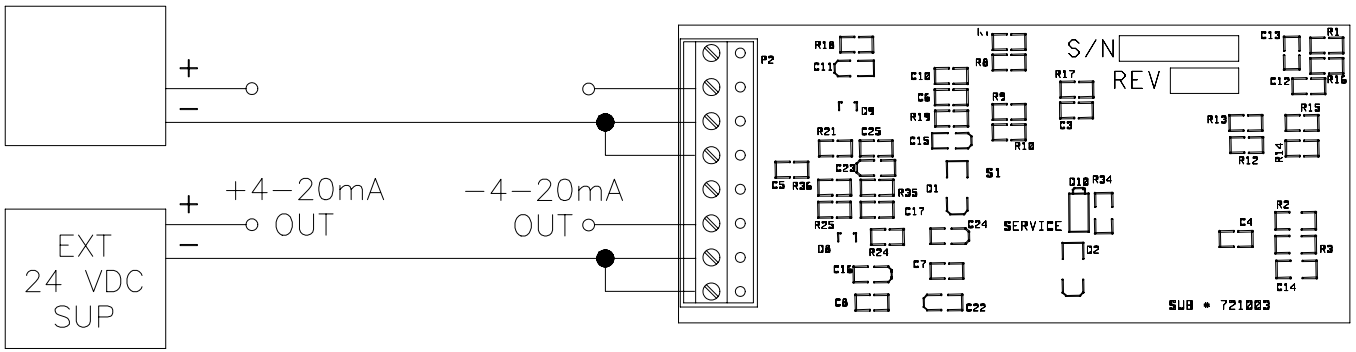
NOTES: UNLESS OTHERWISE SPECIFIED;

1. LOADS MUST BE LESS THAN 600Ω.



INTERNAL POWER

OPTIONAL EXTERNAL 24 VDC SUPPLY



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MATERIAL	TOLERANCES UNLESS NOTED: FRAC ±1/16, DECIMALS .X ± .1 / .XX ± .03 / .XXX ± .010, ANGLES ±.5°	OSMONICS, PHOENIX OPERATIONS
FINISH		TITLE: WIRING DIAGRAM, POWER SUPPLY, 24VDC, 4 TO 20 mA
ORDER NO.	DWN MLM	DATE 9/96
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD DDR	DATE 9/96
DO NOT SCALE	APVD	DATE
	SIZE C, THIRD ANGLE	DWG NO/PN 69954, REV B
	SCALE NONE	FILE TYPE .DWG, SHEET 1 OF 1

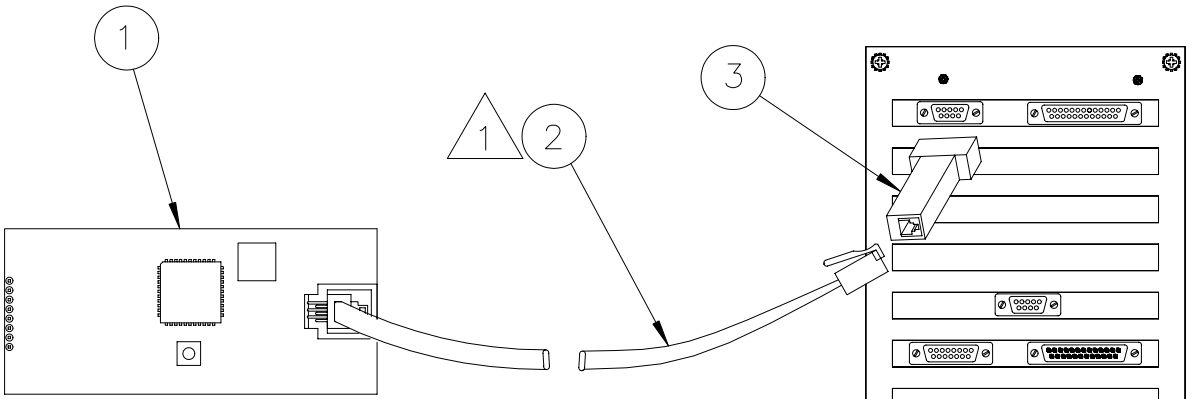
P/N 61677 REV-A PG-1/2

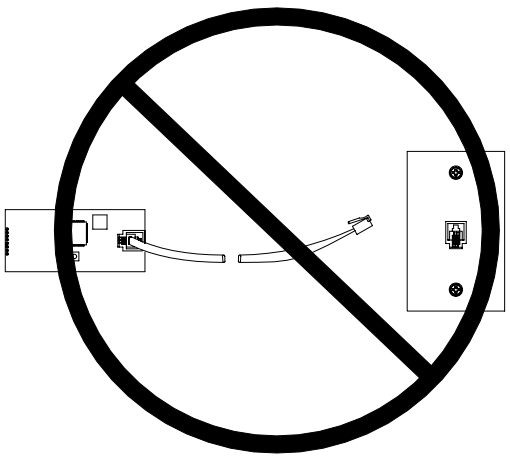
REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A	RELEASE	RELEASE	1387	EV	10/8/97	
B		REVISED	1387	EV	10/8/97	
C		REVISED	1461	EV	11/14/97	JGB

NOTES: UNLESS OTHERWISE SPECIFIED;

1. STANDARD FOUR CONDUCTOR TELEPHONE CABLE UP TO 50 FEET IN LENGTH MAY BE SUBSTITUTED.

PERSONAL COMPUTER WITH MODEM





DO NOT PLUG RS2L DIRECTLY INTO TELEPHONE LINES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL / SPECIFICATION / REMARK	ITEM NO.
1	67369	ADAPTER, 9 PIN	MALE CONN TO RJ11 DTE	3
1	66336	CABLE, RJ11	25 FT	2
1	RS2L	RS2L COM NODE	ASSEMBLED PCB, M-2000	1

PARTS LIST

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MATERIAL

FINISH

TOLERANCES UNLESS NOTED
FRAC ±1/16 DECIMALS .X ± .1 .XX ± .05 .XXX ± .010 ANGLES ±.5°

ORDER NO. | DWN EV | DATE 9/19/97

CUSTOMER | CHKD JGB | DATE 5/95

CUSTOMER LOC. | APVD DDR | DATE 5/95

DO NOT SCALE | APVD | DATE

OSMONICS
PHOENIX OPERATIONS

TITLE
INSTALLATION LAYOUT
RS232 DIRECT CONNECT TO 9 PIN,RS2L

SIZE C | THIRD ANGLE | DWG NO/PN 1169900 | REV C

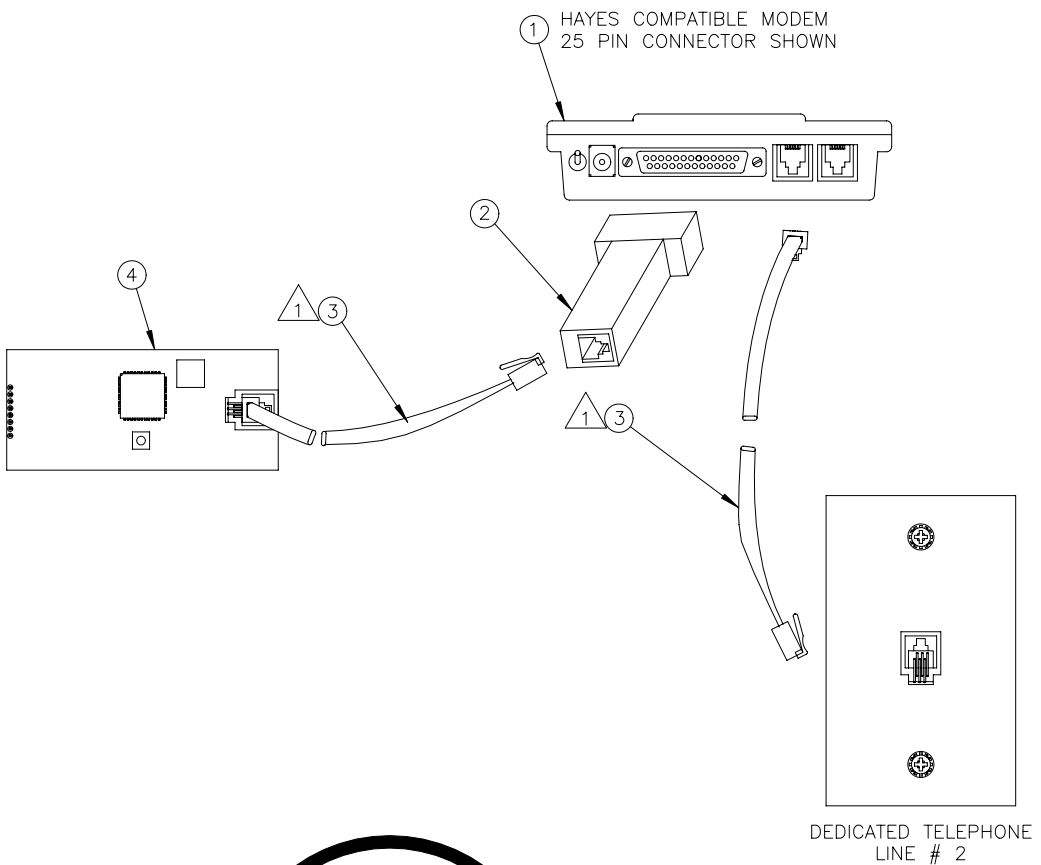
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

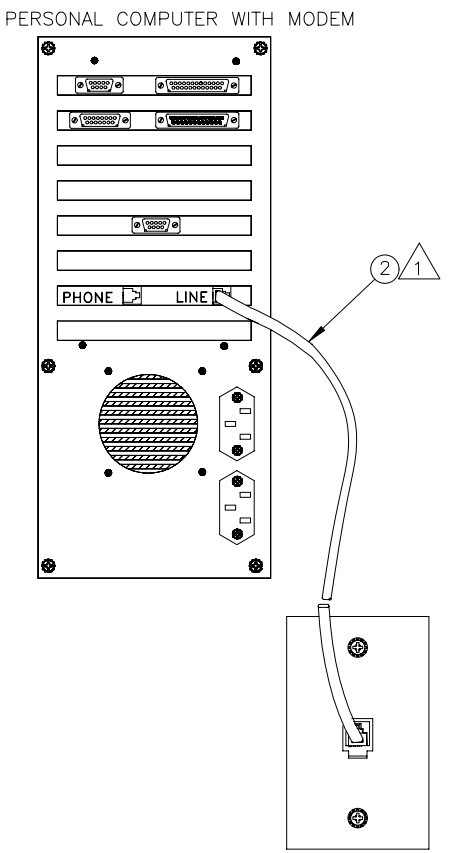
P/N 61677 REV-A PG-1/2

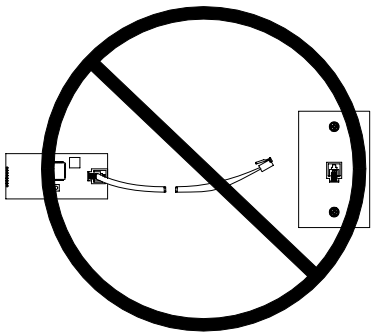
REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	0147	MLM	4/95	
B		REVISED	0767	MLM	9/95	
C		REVISED	1387	EV	10/8/97	
D		REVISED	1461	EV	11/14/97	JGB

NOTES: UNLESS OTHERWISE SPECIFIED;

1. STANDARD FOUR CONDUCTOR TELEPHONE CABLE UP TO 50 FEET IN LENGTH MAY BE SUBSTITUTED.







DO NOT PLUG RS2L DIRECTLY INTO TELEPHONE LINES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL / SPECIFICATION / REMARK	ITEM NO.
1	RS2L	RS2L COM NODE	ASSEMBLED PCB, M-2000	4
1	66336	CABLE, RJ11, 25 FT.		3
1	67765	ADAPTER	25 P MALE D CONN TO RJ11 DTE	2
1	67740	MODEM	HAYES COMPATIBLE	1

PARTS LIST

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OSMONICS
PHOENIX OPERATIONS

MATERIAL
FINISH
TOLERANCES UNLESS NOTED
FRAC ±1/16
DECIMALS .X ± .1, .XX ± .05, .XXX ± .010
ANGLES ±.5°

TITLE: INSTALLATION LAYOUT
COMNODE TO 25P DTE, SER 2000, RS2L

ORDER NO.	DWN MLM	DATE 4/18/97
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD DDR	DATE AUG 96
DO NOT SCALE	APVD	DATE

SIZE C | THIRD ANGLE | DWG NO/PN 1169899 | REV D
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

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