

**LAKWOOD INSTRUMENTS  
MODEL 2812e**

**MICROPROCESSOR-BASED  
pH AND CONDUCTIVITY CONTROLLER**

**INSTALLATION & OPERATION MANUAL**

SERIAL #: \_\_\_\_\_



**Lakewood Instruments**

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# Lakewood Instruments™ Model 2812e Controller

## Quick Installation Sheet

1. Attach the four (4) supplied mounting feet to the back of the controller enclosure either vertically or horizontally. Install the controller on a flat, non-vibrating surface. Do not mount the controller to a steel object that has a large temperature change (side of cooling tower, etc). This can cause water to condense inside the enclosure.
2. Install water meters, chemical pumps, plumbing assemblies, pH sensor, and the conductivity sensor (see drawing on back).
3. Install the provided strain reliefs with nuts, if necessary, by removing the attached black plugs and inserting strain relief through hole. Wire the flow switch, pH sensor, conductivity sensor, water meters and 4-20 mA output; if applicable (see drawing on back). Ensure wiring connections are correct or damage may occur.
4. If doing a conduit installation, remove receptacles and wire pumps and bleed valve directly to the terminals. If using a motorized ball valve, wire as per wiring instructions. Refer to the instruction manual for more details.
5. Plug in chemical pumps and valves to controller (unless hardwired as per step #4).
6. Apply power to the model 2812e controller, press "**CLR**" twice, press "**7**" System setup, press "**2**" Initialization, press "**2**" Whole controller, press "**1**" Yes. After initialization, press the "**CLR**" key several times until you get to the main menu.
7. Press "**1**" Process, Press "**ENT**". This screen allows manual control of the relay outputs to test the chemical pumps and valves. Press "**CLR**" to return to the Process screen.
8. Calibrate the pH and conductivity. Take a sample with a handheld meter, press the "**PRO**" button, select pH or Conductivity and type in the pH or conductivity value, press "**ENT**". See instruction manual for more details.
9. Program the model 2812e relays for chemical feed schemes. See instruction manual for more details.

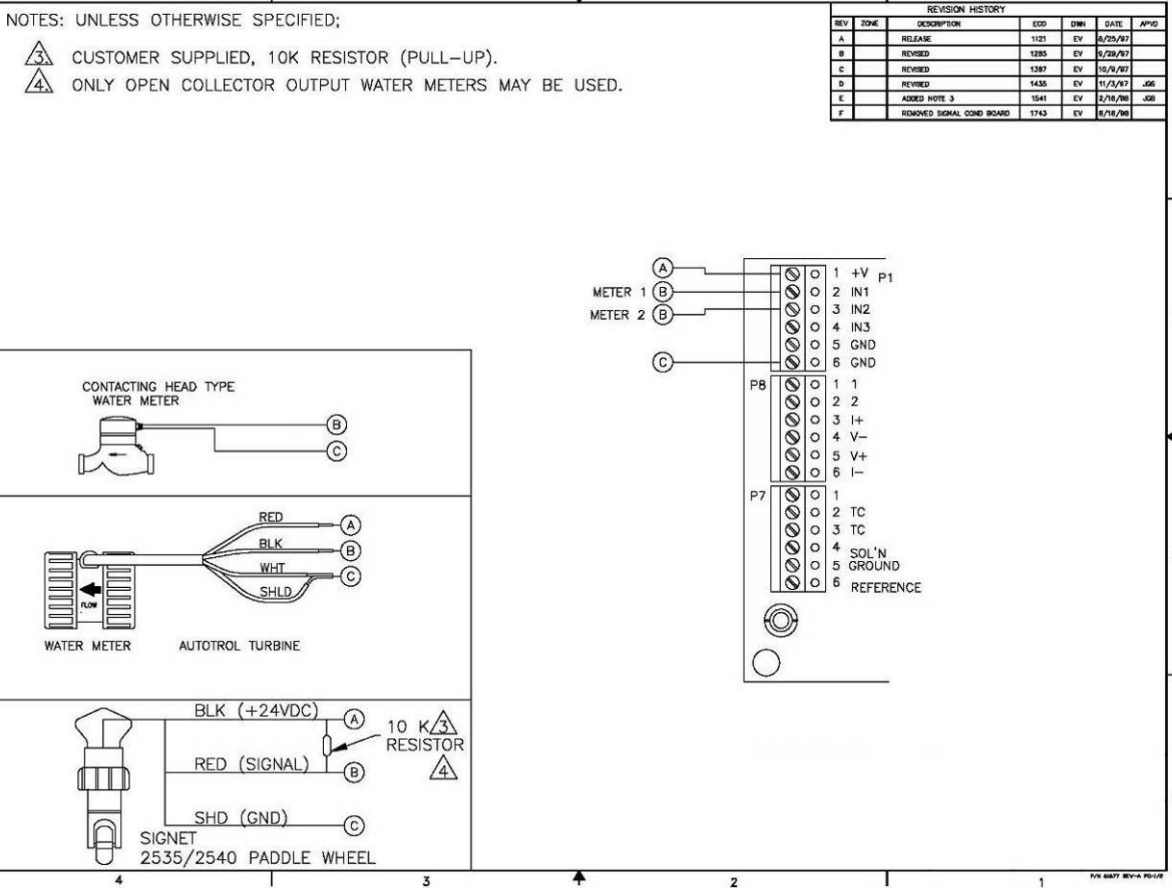
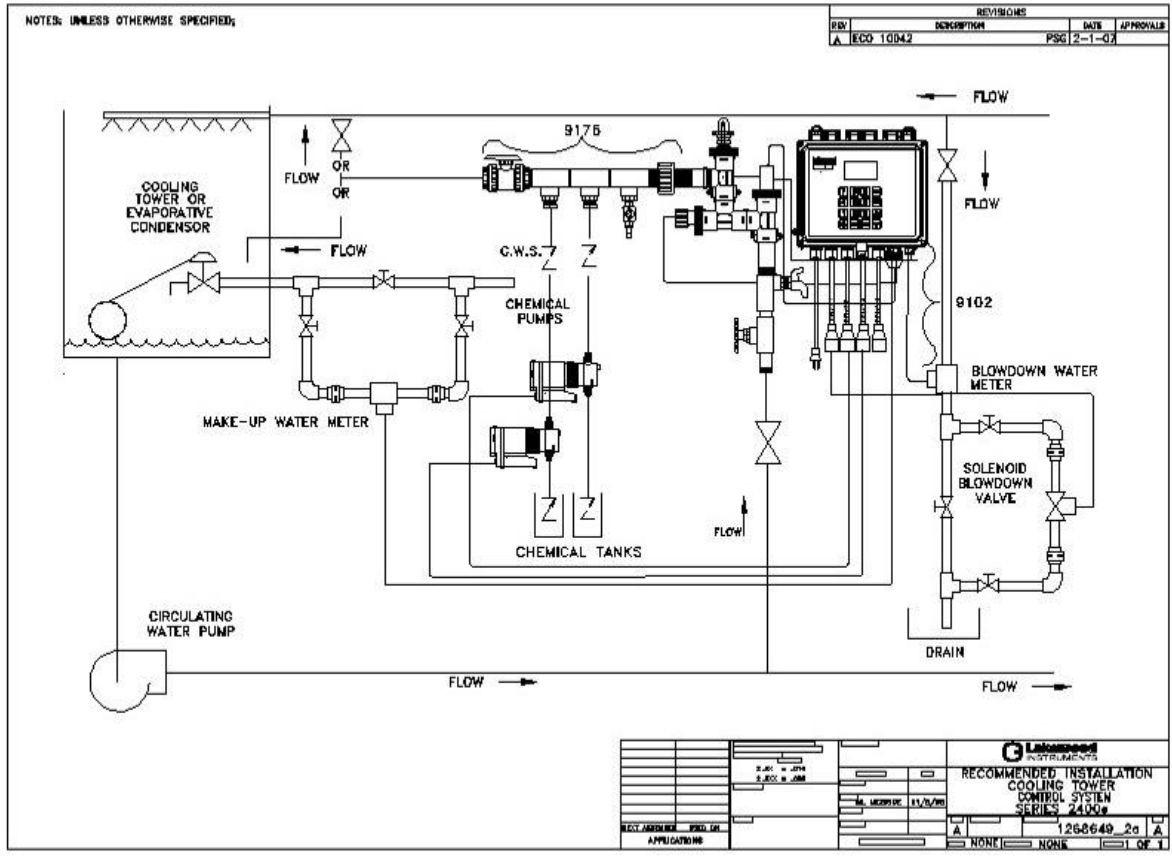


FIGURE A

# **IMPORTANT NOTICE**

## **WARNING: 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.

## **WARNING: 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.**

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# MODEL 2812e

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## 1.0 INTRODUCTION

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The Model 2812e is a LONWORKS Technology, microprocessor based, menu driven, pH and conductivity water treatment controller with 8 relays designed for use in cooling towers. The Model 2812e provides for pH and conductivity tracking and control, flow monitoring and chemical injection. The Model 2812e is NTL/CSA approved.

The Model 2812e uses the latest in microprocessor capability, giving the user a high level of application flexibility. A large illuminated graphics screen, multiple inputs, and an intuitive menu characterize this new technology.

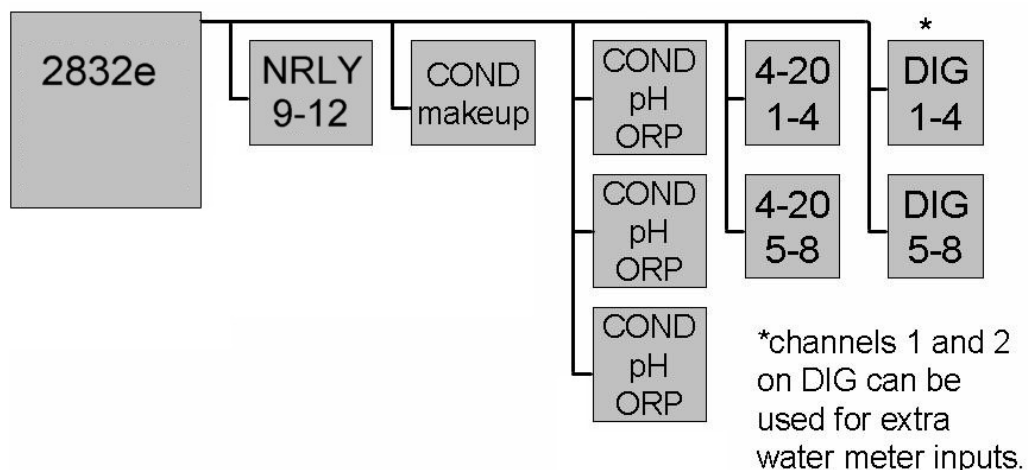
Security features allow full access to programming features or restrict access to viewing only. An operator password can help ensure that only authorized personnel will operate the system.

The Model 2812e is user-friendly with a graphical screen and 16-key numeric keypad. It accepts multiple inputs and is easily configured. This controller can easily be upgraded in the field. It's a combination of reliability, accuracy, security and simplicity.

LONWORKS Technology gives you a high level of flexibility with the capability of adding nodes, additional inputs and outputs, for monitoring and control. These nodes have functions such as extra relay outputs, drum level inputs, pH inputs, conductivity inputs, ORP inputs, 4-20 mA inputs and water meter inputs.

Nodes are added via the Network Interface Node, according to a mapped network. The mapped network shows the full node addition capability of the LonWorks based 2000 series controllers.

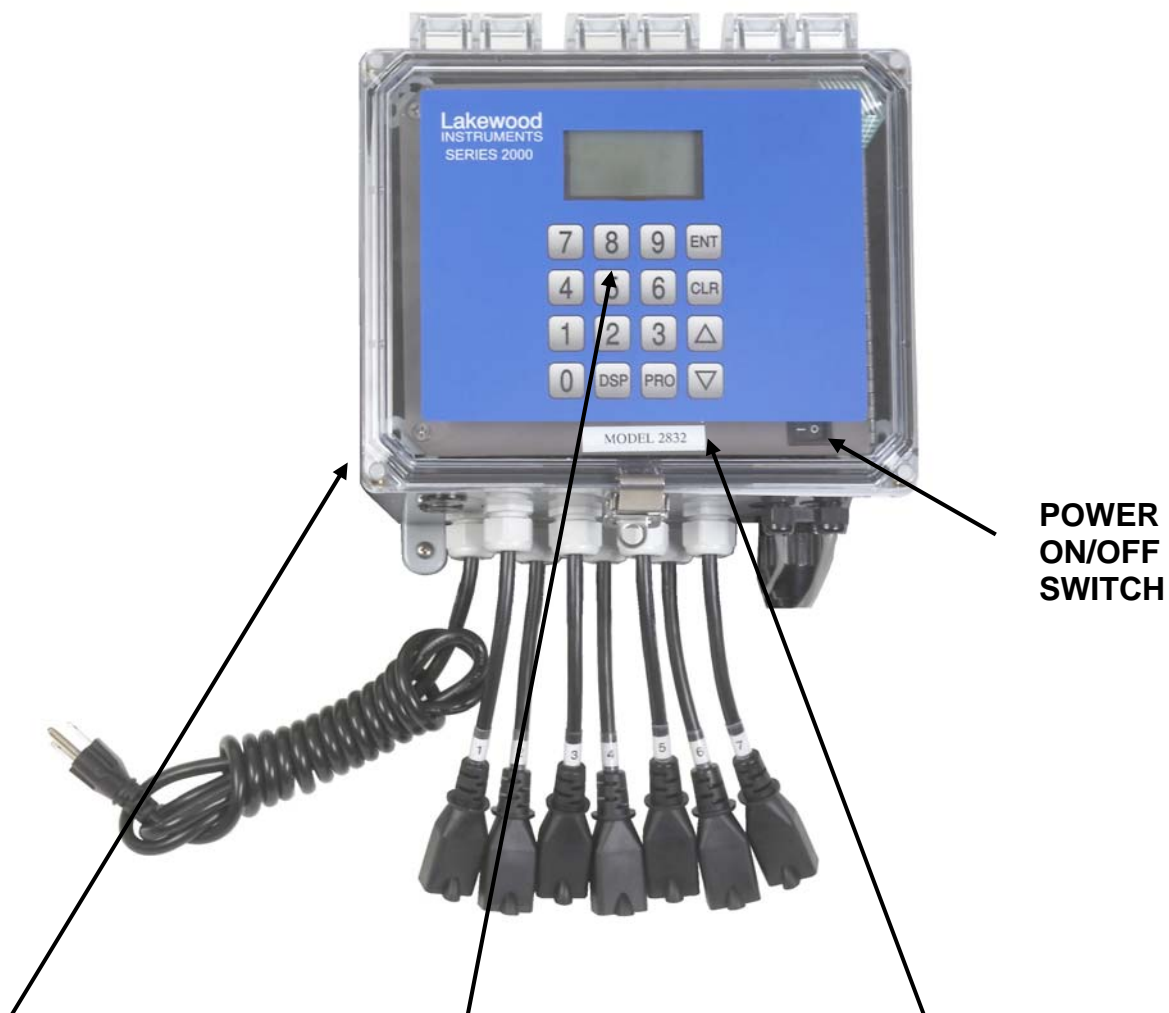
The mapped network for the model 2812e shows that any or all of the following nodes can be added; a relay node, two 4-20 mA input nodes, two digital input nodes, **four remote** sensor nodes (any combination of pH, conductivity, or ORP), and one makeup conductivity node.



The complete mapped network is shown above.

## 2.0 Features, Benefits, Specifications

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### LOCK SCREWS

The lock screws keep your circuit boards secure and provide easy access for wiring and setup. Simply turn the lock screws 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 NEMA 4X rated enclosure protects your controller. Make sure it is properly mounted (SEE: **INSTALLATION; Mounting**). The power cord and receptacles can be removed so that the controller can be hardwired through ½" conduit knockouts.

Figure 1: **Model 2812e**

## 2.1 FEATURES

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- pH input with pH sensor diagnostics indicates fouled reference or broken glass.
- Conductivity input with fouling compensation and alarm.
- Integral flow sight & flowswitch lockout.
- Two (2) water meter inputs. Records both makeup (**MTR1**) and Blowdown (**MTR2**) water meter total gallons.
- Configure Blowdown water meter (**MTR2**) as second makeup meter.
- One relay configured for bleed off and seven user configurable relays for conductivity or pH control and chemical addition. These relays can be configured in multiple ways including scheduled feed for biocide addition
- Blowdown Relay options:
  - Bleed by volume for volume, or Bleed by volume for time
  - Bleed by setpoint
  - Bleed by cycles of concentration with **NCON/NCKT** Option
  - Bleed by multi-setpoint selected with **NCON/NCKT** Option
- User-selectable relay options:
  - Feed by setpoint, direct or reverse
  - Water meter actuated feed. **MTR1**, **MTR2** or the sum of the two
  - Percent of blowdown time
  - Percent of Time feed
  - Feed Schedule timer
  - General alarm
- Three security levels: View only, operator, technician
- 4-20 mA output available as an option.
- Remote communications available as an option.
- 16-key numeric keypad and illuminated graphical display allow for quick and easy programming.
- The Model 2812e controller stores all setpoints, calibration values, and relay configurations in an EEPROM. An EEPROM does not require a battery to retain information, so if power is lost these values will be retained for years. The 2812e includes a battery backup device to retain information such as water meter totals, and clock and calendar information. Battery life is approximately 3 months if no power is applied to the controller.

## 2.2 BENEFITS

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- Multiple control options in a single economical package.
- Very accurate control of chemical feed and cycles of concentration.
- Feeds chemical after blowdown.
- Very low maintenance.
- Tolerant to power surges and brownouts.
- Power cord, plug outlets and attached plumbing make installation easy. There is plenty of protected room inside the enclosure for electrician wiring.
- Very accurate monitoring of the evaporated water.
- Has expansion slots to add additional control, such as additional relay outputs, 4-20 mA outputs, remote sensor inputs, digital inputs, and 4-20 mA inputs.

## 2.3 Specifications

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**Conductivity range**

0-5000  $\mu$ S

**Conductivity Accuracy**

$\pm$  40  $\mu$ S

**Conductivity Resolution**

10  $\mu$ S

**pH range**

2-12 pH

**pH accuracy**

$\pm$  0.05 pH

**pH resolution**

0.01 pH

**Accuracy & Repeatability**

$\pm$  1.0% of scale

**Deadband/Setpoint**

User programmable

**Auto/Manual outputs**

Menu selectable

**Keypad**

16 - key push buttons

**Display**

Illuminated 128 x 64  
pixel LCD

**Water meter inputs (2)**

Contact head, paddle wheel or turbine

**Timer**

Relay run time exceeded.

**Output relays**

1 Bleed off  
7 selectable use

**Relay ratings**

3A each, 10A total

**Power**

120/240 VAC 50/60 Hz 6W

**Ambiant temp**

32° - 158°F (0 - 70°C)

**Storage temp**

32° - 158°F (0 - 70°C)

**Max. Water temperature**

140°F

**Max. water pressure**

140 psi @ 100°F

**Languages**

Selectable:  
English and Spanish

**Enclosure**

NEMA 4X





































































































































