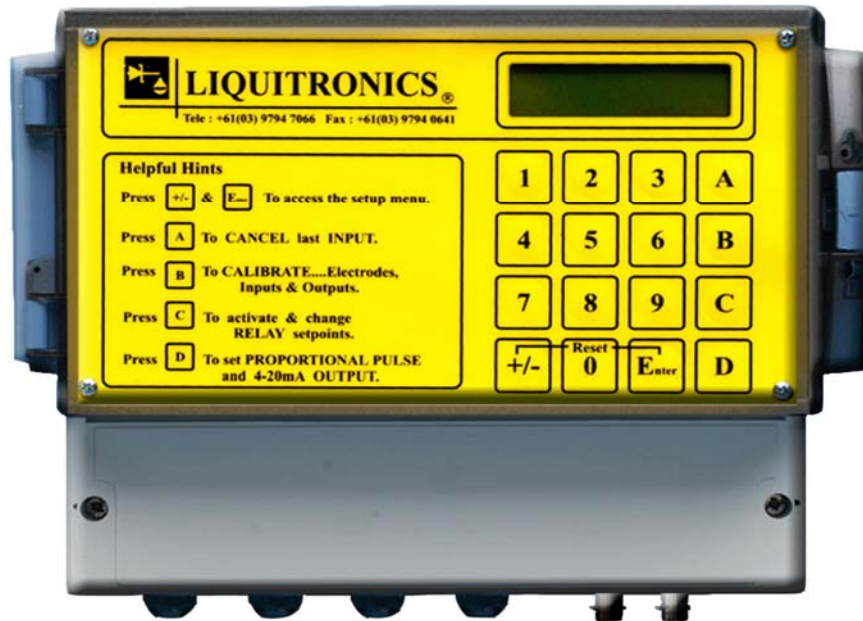


# pH/ORP Controller

# LPH-200



- |   |  |
|---|--|
| Std. External wall mount design.                    | Std. Additional internal power terminals.                          |
| Std. IP 54 Enclosure.                               | Std. Moisture proof soft touch keypad.                             |
| Std. Electronic security lock.                      | Std. Dual proportional pump pulsing outputs.                       |
| Std. Potential free relays.                         | Std. Back lit LCD. display.  |
| Std. Automatic electrode calibration.               | Std. Dual isolated 4-20mA outputs with adjustable offset and span. |
| Std. Non Volatile memory.                           | Opt. Automatic temperature compensation.                           |
| Std. Single or dual output.                         | Opt. Data logger / retriever.                                      |
| Std. 2 Line 40 Character Alpha/<br>Numeric display. |  |

[liquid@liquidcontrols.com.au](mailto:liquid@liquidcontrols.com.au)

[www.liquidcontrols.com.au](http://www.liquidcontrols.com.au)

## Liquid Controls (Aust) Pty Ltd

3/1 Quist Crt.,  
Dandenong Vic. 3175

P O Box 4174  
Dandenong Sth. Vic 3164

Tele: 03 9794 7066  
Fax: 03 9794 0641

# LIQUITRONICS

## pH/ORP Controller Series-200

<b>1. Summary</b>	<b>2</b>
<b>2. Factory Settings</b>	<b>2</b>
<b>3. Operating Instructions</b>	<b>3</b>
<b>3.1</b> Configure PIN#	4
<b>3.2</b> Configure for Single Electrode input (either pH or mV)	5
<b>3.3</b> Configure for Dual Electrode input (either pH or mV)	6
<b>3.4</b> Calibrating pH Inputs (using supplied pH Buffer solutions)	7
<b>3.5</b> Calibrating mV Inputs (using supplied calibration kit)	8
<b>3.6</b> Calibrating mV Inputs (using two other known mV solutions)	9
<b>3.7</b> Calibrating optional 4-20 mA Outputs	10
<b>3.8</b> Activating & Changing Relay Set points	11
<b>3.9</b> Setting optional 4-20 mA Outputs	12
<b>3.10</b> Setting Pulse Outputs	13
<b>4. Scenarios</b>	<b>14</b>
<b>5. Specifications</b>	<b>16</b>
<b>6. Electrical Connections</b>	<b>17</b>
<b>7. Warranty</b>	<b>18</b>

# LIQUITRONICS SERIES 200

## pH/mV (ORP) Controller/Monitor & Data Logger

### 1. Summary

The Series-200 has the ability to control with 4 X relays, 2 X proportional pulse outputs and 2 X 4-20 mA outputs. With these a multitude of treatment applications can be achieved.

With the latest advent and recognized importance of OH&S in the workplace today the optional data logging of up to 4 inputs every 10 minutes for 35 days has almost become, if not a legal imperative then certainly a very sensible addition to any work place processes. The Series-200 features two electrically independent inputs and with simple configuration can display either single or dual readings. All functions are performed through touch keypads on the front panel. A PIN number can also be activated to provide security of programmed Set Points and Calibration.

All units are factory calibrated and should not require further calibration on initial start up (refer **Section 2** for factory settings). The Series-200 is initially calibrated for two pH inputs. If the intended parameters are known, and advised then the unit can be calibrated accordingly.

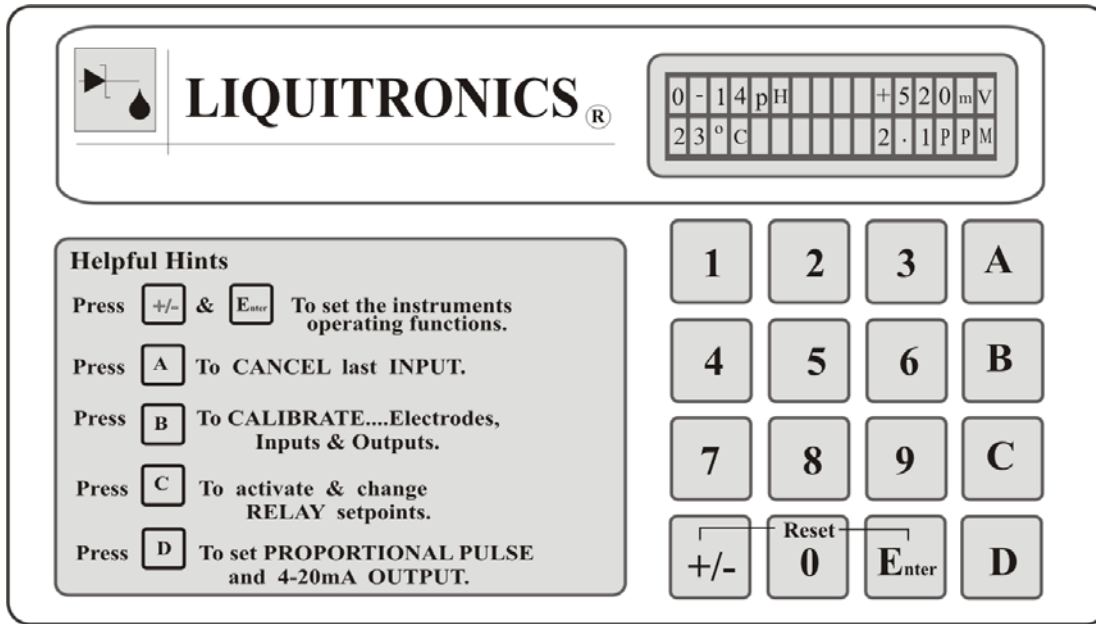
### 2. Factory Settings

*Channel 1:* pH / mV (ORP)

*Channel 2:* pH / mV (ORP)

Temperature: Set to show internal temperature of unit

### 3. Operating Instruction

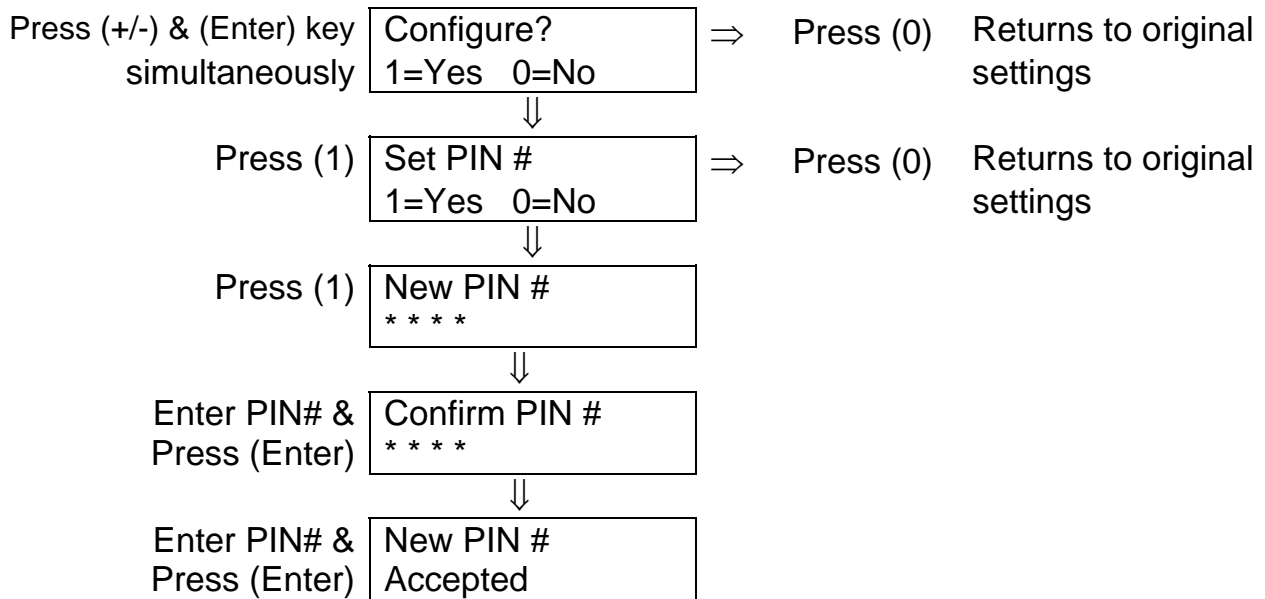


#### NOTES:

- When calibrating the instrument allow at least one minute after placing each electrode in solution, this helps to achieve a stable reading.
- Only use a PIN# if necessary, as a lost number could require complete reconfiguration or necessitate the unit being returned to Liquitronics P/L.

### 3.1 Configure PIN#

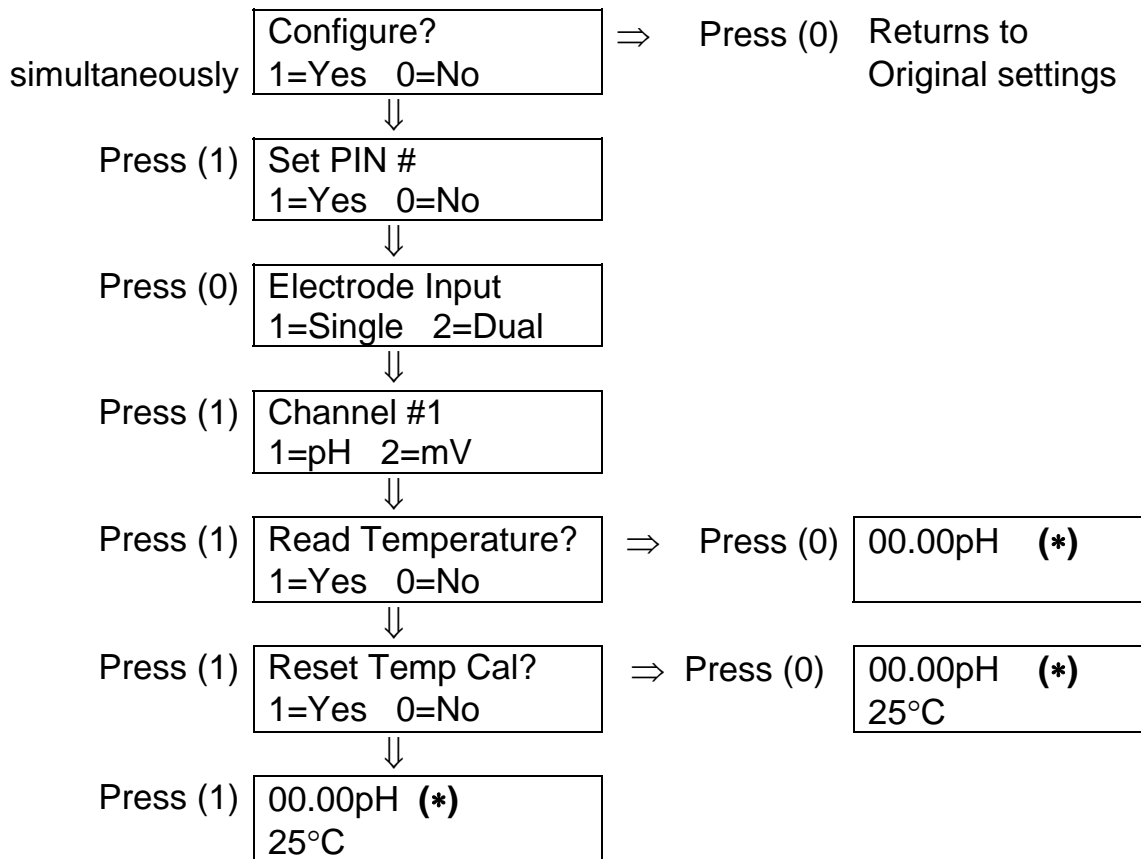
Note: Only use a PIN# if necessary, as a lost number could require complete reconfiguration or necessitate the unit being returned to Liquitronics P/L.



### 3.2 Configure for Single Electrode input (either pH or mV)

Example: Channel 1 - pH

Note: Use only the left hand BNC Input (Channel 1). This then allows both sets of relays & pump pulsers to be controlled with this single signal.

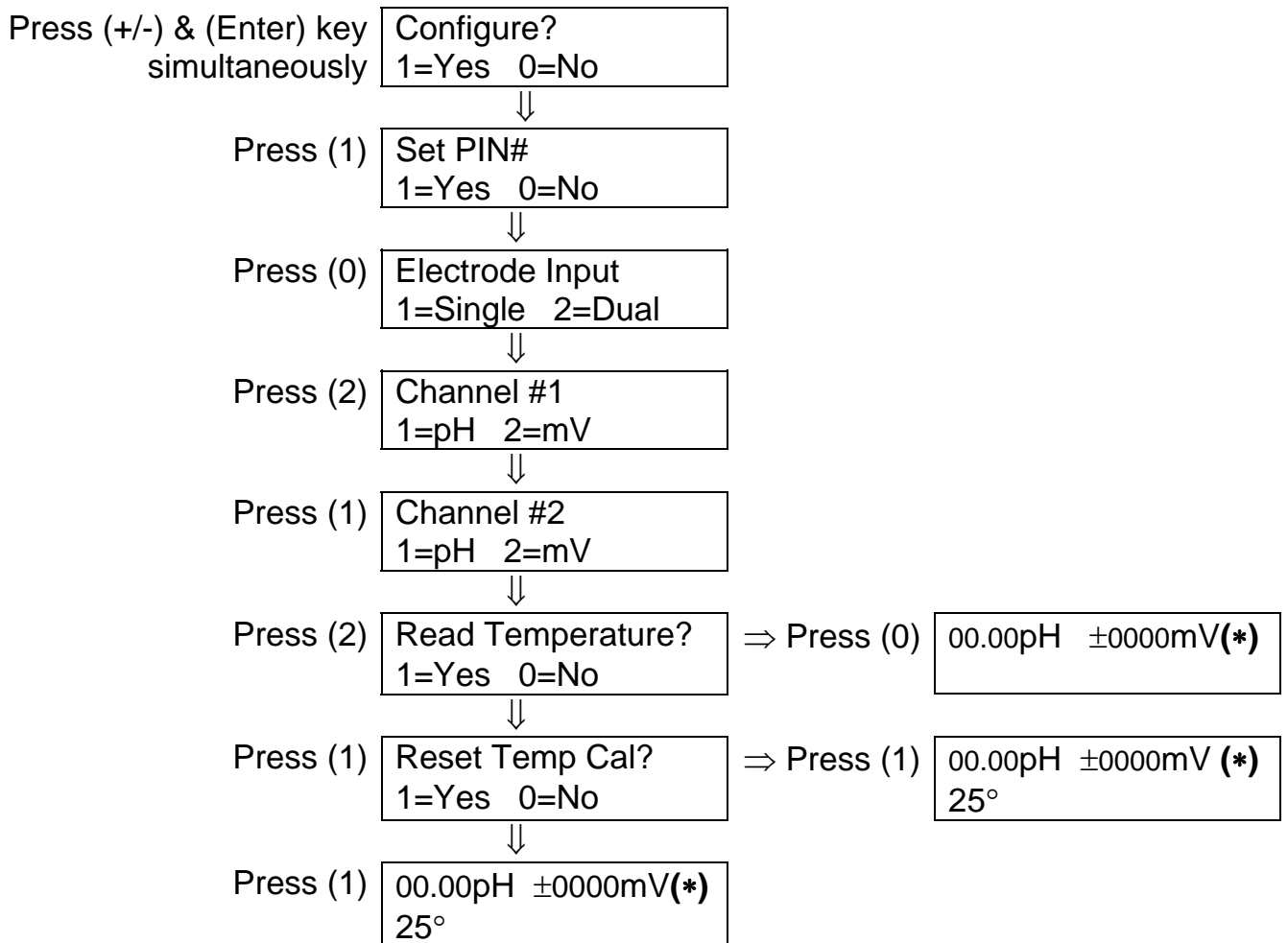


(\*) Readings will fluctuate until electrode is connected and may not be correct until calibrated.

*An optional temperature probe is required for external temperature monitoring, otherwise temperature shown is the internal temperature of the instrument.*

### 3.3 Configure for Dual Electrode input (either pH or mV)

Example:      Channel 1 - pH      Channel 2 - mV



(\*) pH values will fluctuate and may not be correct until calibrated.

*An optional temperature probe is required for external temperature monitoring, otherwise temperature shown is the internal temperature of the instrument.*

Next step Calibrate, if necessary.

### 3.4 Calibrating pH Inputs (using supplied pH Buffer solutions)

Example: Channel 1 - pH (pH 4.0 & pH 9.2)

Press (B) 

1 = Cal Inputs 2 = Cal Outputs
-----------------------------------



Press (1) 

1 = Ch 1 2 = Ch 2 3 = Temp
-------------------------------



Rinse electrode in distilled water, soak until stabilized in appropriate buffer solution (pH 4)

Press (1) 

Cal Point # 1 **.** pH
---------------------------



Input (400) 

Cal Point # 1 *4.00 pH
---------------------------



Allow at least one minute for electrode to stabilize before continuing.

Press (Enter) 

Cal Point # 2 **.** pH
---------------------------



Rinse electrode in distilled water, soak until stabilized in appropriate buffer solution (pH 9.2)

Input (920) 

Cal Point # 2 *9.20 pH
---------------------------

Allow at least one minute for electrode to stabilize before continuing.

Press (Enter)

Channel 1 is now calibrated.

*Alternately a pH/mV simulator (optional extra) can be used to set and verify the condition of electrode and/or drift of reading by firstly inputting a simulated value and then checking against a known buffer.*



### 3.5 Calibrating mV Inputs (using supplied calibration kit)

(Refer 3.6 to calibrate using other known mV solutions.)

Example: Channel 2 - mV (+000 & +245mV)

Press (B) 

1 = Cal Inputs 2 = Cal Outputs
-----------------------------------



Press (1) 

1 = Ch 1 2 = Ch 2 3 = Temp
-------------------------------



Press (2) 

Cal Point # 1 **** mV
--------------------------



Disconnect co-axial cable and connect supplied BNC 'Dummy Load'

Input (000) 

Cal Point # 1 000 mV
-------------------------



Allow at least one minute for electrode to stabilize before continuing.

Press (Enter) 

Cal Point # 2 **** mV
--------------------------



Reconnect co-axial cable then rinse electrode in distilled water, soak until stabilized in supplied buffer solution (245 mV)

Input (245) 

Cal Point # 2 245 mV
-------------------------

Allow at least one minute for electrode to stabilize before continuing.

Press (Enter)

Channel 2 is now calibrated.

Note: Buffer solutions are readily available from Liquid Controls (Aust) Pty Ltd.

### 3.6 Calibrating mV Inputs (using two other known mV solutions)

Example: Channel 2 - mV (+220 & +468 mV)

Press (B) 

1 = Cal Inputs 2 = Cal Outputs
-----------------------------------



Press (1) 

1 = Ch 1 2 = Ch 2 3 = Temp
-------------------------------



Press (2) 

Cal Point # 1 **** mV
--------------------------



Rinse electrode in distilled water, soak until stabilized in buffer solution (e.g. 220 mV)

Input (220) 

Cal Point # 1 220 mV
-------------------------



Press (Enter) 

Cal Point # 2 **** mV
--------------------------



Rinse electrode in distilled water, soak until stabilized in buffer solution (e.g. 468 mV)

Input (468) 

Cal Point # 2 468 mV
-------------------------

Press (Enter)

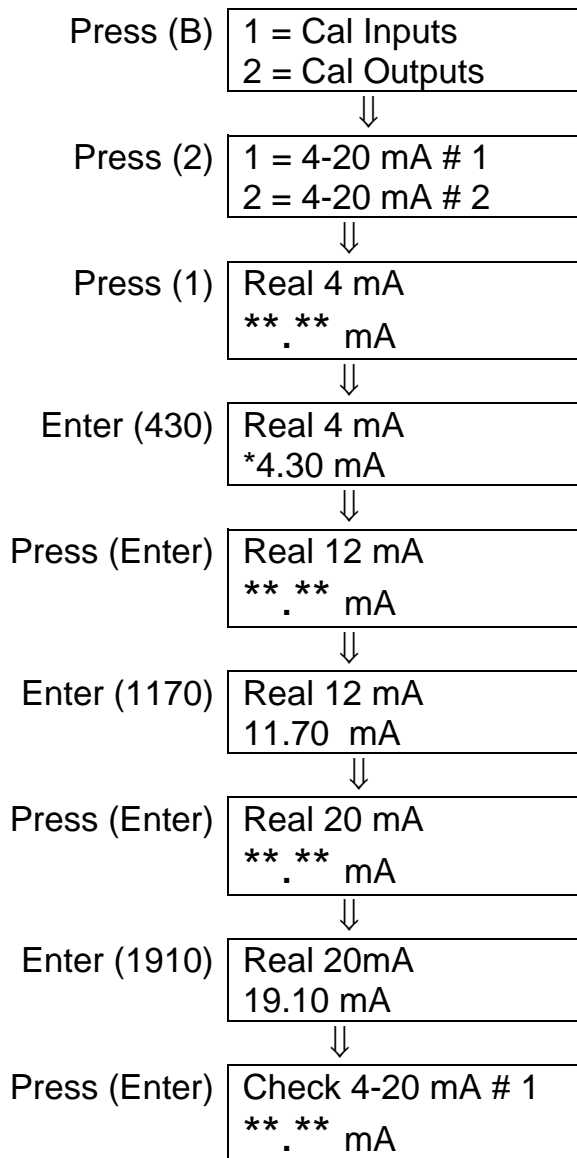
Channel 2 is now calibrated.

### 3.7 Calibrating optional 4-20 mA Outputs

Due to differences in some electronic components used in the manufacture of 4-20mA controlled pumps and instruments, calibration of the output is required using a digital multimeter.

Disconnect any 4-20mA output signal wires from terminal strip before proceeding with calibration. Connect multimeter probes in series to 4-20mA outputs noting correct polarity. When asked for REAL .....mA simply read multimeter and insert figures.

Note: The instrument is calibrated in the factory when this option is installed.



Enter sample milli-amperages (i.e. 12.40 mA) and check that external instruments (such as pumps or recorders) react accordingly.

4-20 mA Setup completed

Press (A)

### 3.8 Activating & Changing Relay Set points

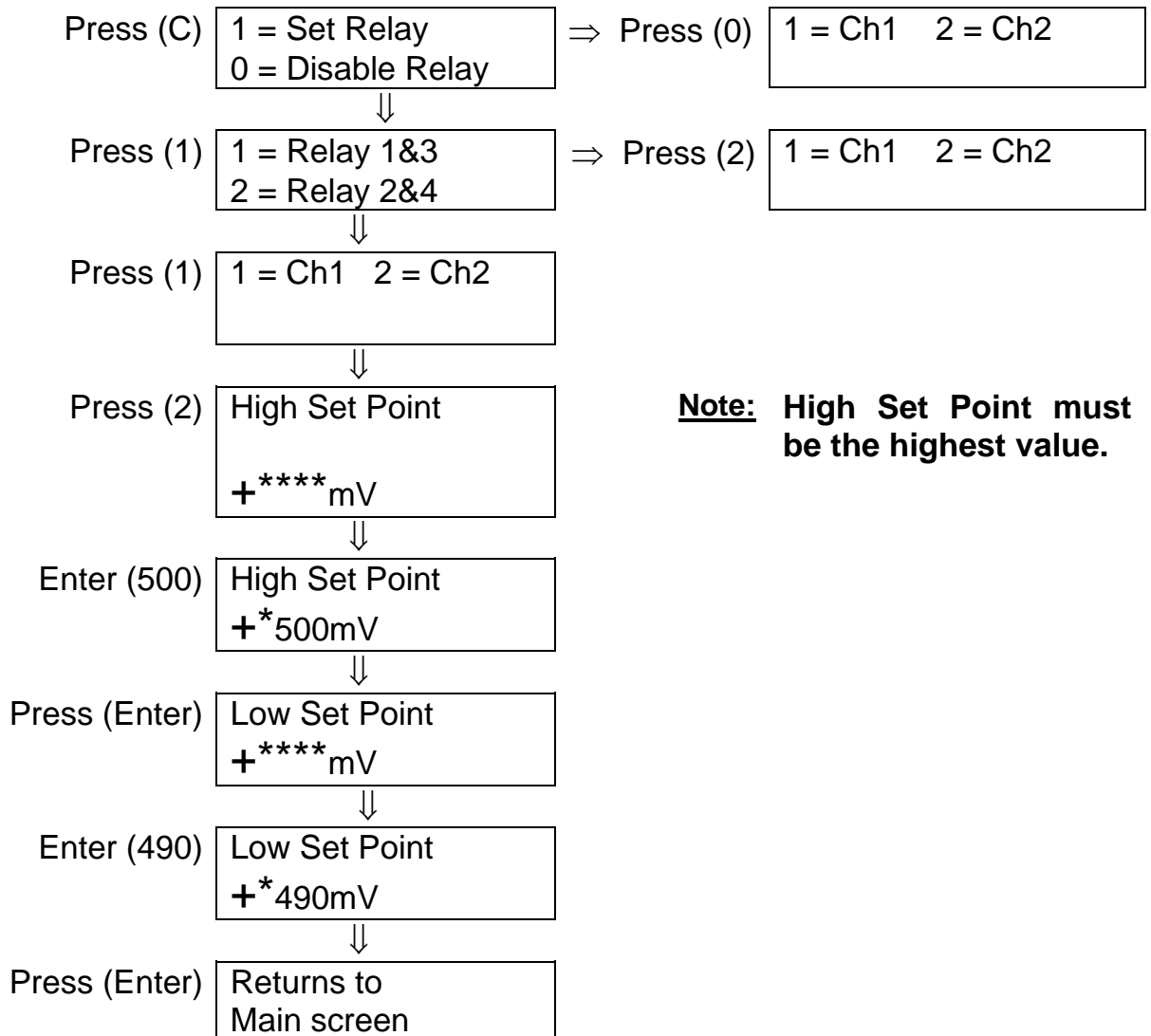
**NOTE:**

**RELAYS 1 & 3 ARE WIRED AND OPERATE IN PARALLEL AS ARE 2 & 4**  
**ie: Both 1 & 3 turn on & off together at the same time as do both 2 & 4**

**Relay 1 & 2 are INTERNALLY WIRED WITH 240 VAC**

**Relay 3 & 4 can accept up to 240 VAC & DC- 5 A resistive**

Example: Relay 1, acting through Channel 2, is to control a process between +500 mV & +490 mV



**Note:** High Set Point must be the highest value.

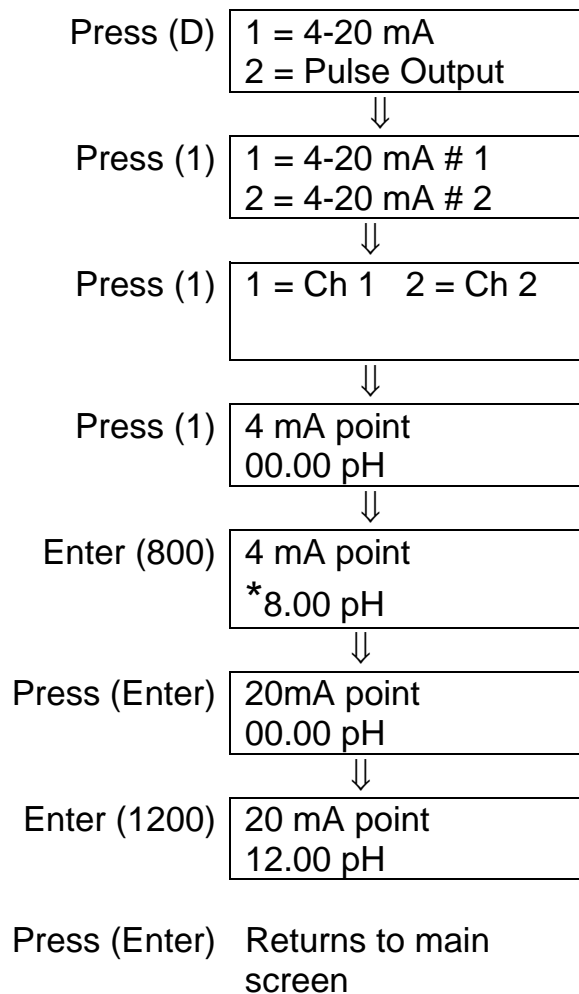
Relay 1 setup completed.

Repeat this procedure for Channel 1 if required.

Note: A Narrow dead band (i.e. 10mV) is generally recommended. Too wide a band may cause varying fluctuations in process being treated. Any setting less than 10mV may cause “Relay Chattering”.

### 3.9 Setting optional 4-20 mA Outputs

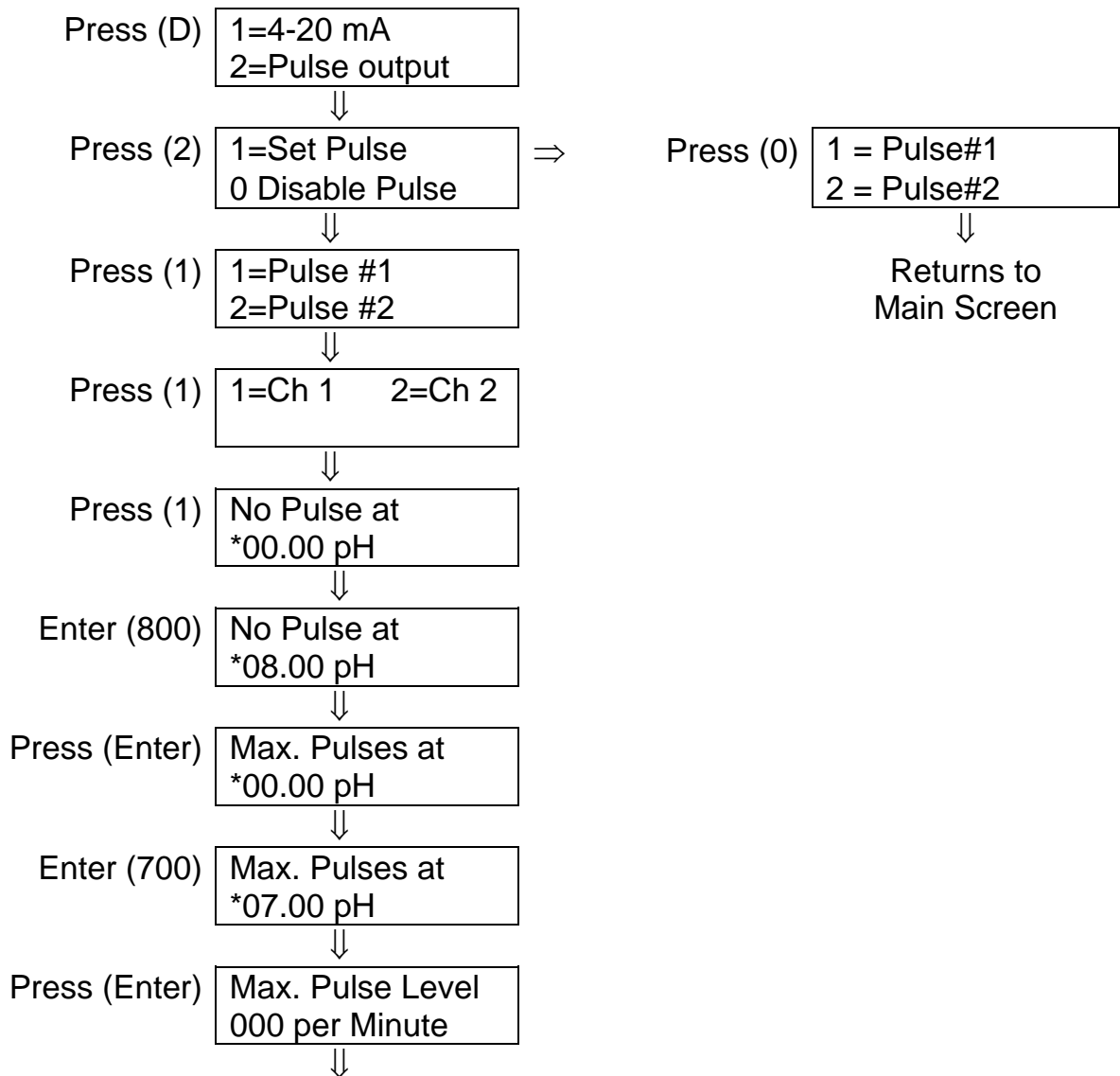
Example: Channel 1 - Where the unit to be controlled (pump etc.) is required to start at pH 8.00 and attain maximum pulse rate at pH 12.00



4-20 mA Setup completed.

### 3.10 Setting Pulse Outputs

Example: Channel 1 – Where the pump to be controlled is required to start pulsing at pH 7.00 and attain maximum pulse rate at pH 8.00.



Enter Max. Number of Strokes required, or that the pump can accept (normally 100 per minute, do not exceed 120 per minute).

Max. Pulse Level  
100 per Minute

Press (Enter) Returns to main screen

Pulse output setup is now complete.

## 4. Scenarios

*Note: All suggested Set points are for examples only. Each site application must be individually assessed.*

### **Scenario 1 - Swimming Pool**

In this application we are dosing Sodium Hypochlorite proportionally to ORP readings and pH correction, using CO<sub>2</sub> via the relay outputs to control the solenoid valve.

The equipment being used in this application could be:

- A. Proportional dosing pump (i.e. Tacmina model ARPXP-61 for dosing Sodium Hypochlorite),
- B. Liquitronics CO<sub>2</sub> Controller for pH correction using relay control.

Refer to manual for setting procedures.

Display (using 'configure' menu)

Channel 1 - Set to pH

Channel 2 - Set to mV (ORP)

No Temperature input.

pH Set points (select button 'C')

Assign Relay 1 to Channel 1

Set High point 7.50pH

Set Low point 7.40pH

mV (ORP) Set points (select button 'D')

Assign Pulse 1 to Channel 2

Set No pulse at 680mV

Set Max. pulse at 580mV

Set Max. no. of pulses at 100

How it Operates

As the mV reading drops the proportional pump starts to pulse. The lower it drops, the faster the pump pulses. The pump will slow down as the higher set point is approached.

Sodium Hypochlorite will raise the pH level, so it is important that steady pH levels are maintained. In this application when the level of 7.50 is reached the relay output is activated turning on the CO<sub>2</sub> Control Solenoid. It will remain on until the pH level of 7.40 is reached.

## Scenario 2 - Trade waste

In this application we are using Channel 1 to dose acid and alkali products proportionally to incoming pH levels and Channel 2 is used to raise an alarm if pH levels are outside the set parameters.

Channel 1 electrode is placed in the first chamber of a treatment pit and the channel 2 electrode is placed in the final chamber measuring the outgoing pH level.

Refer to manual for setting procedures.

Display (using 'configure' menu)

Channel 1 - Set to pH

Channel 2 - Set to pH

No temperature input.

pH dosing Set points

(select button 'D')

Assign Pulse 1 to Channel 1

Set No pulse at 7.50pH

Set Max. pulse at 6.50pH

Set Max. no. of pulses at 100

(select button 'D')

Assign Pulse 2 to Channel 1

Set No pulse at 8.50pH

Set Max. pulse at 9.50pH

Set Max. no. of pulses at 100

Alarm Setting using Relay Outputs

(select button 'C')

Assign Relay 1 to Channel 2

Set High point 6.00pH

Set Low point 5.90pH

(select button 'C')

Assign Relay 2 to Channel 2

Set High point 10.10

Set Low point 10.00

How it Operates

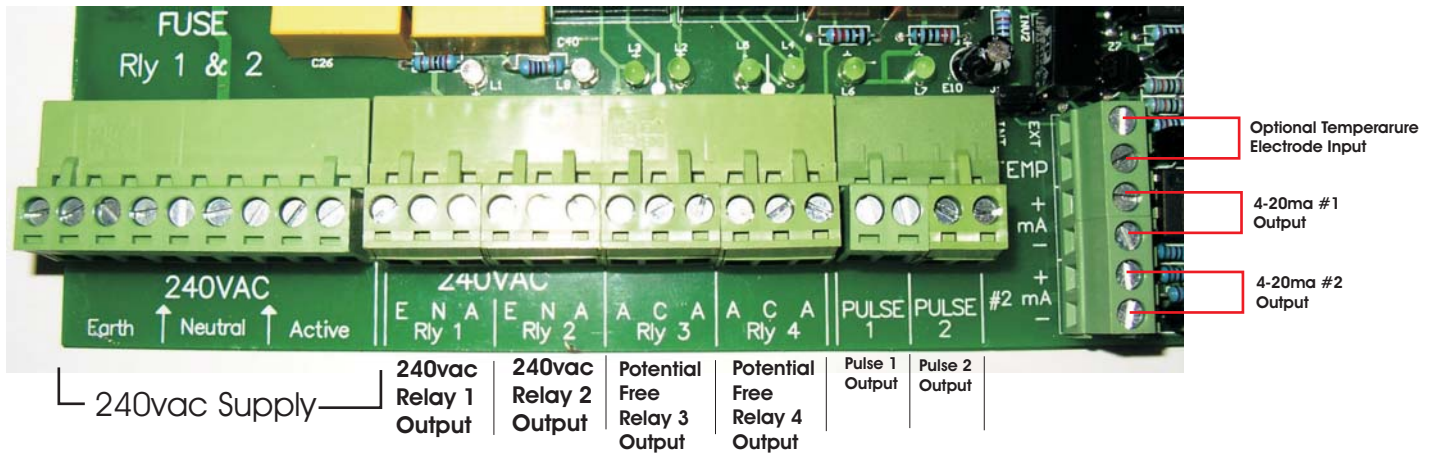
The incoming effluent is sensed via Channel 1 electrode and the required dosing pump is activated by the pulse output.



## 5. Specifications

- **Display** 2 line, 32 character, Alpha Numeric LCD with optional Back lighting.  
Displays combinations of the following:  
pH, mV, Temperature.
- **Enclosure** Fully sealed PVC / Polycarbonate with hinged front cover to IP 54 rating.  
Overall L=210mm H=180mm D=110mm.
- **Key Board** 16 plastic membrane covered micro-switches.
- **Power** 220-250 VAC, 50 Hz consumption, typically 10 VA.
- **Inputs** pH or mV via external BNC sockets.  
Temperature via external 2 pin screw socket (optional).
- **Outputs** 2 x SPDT 5 Amp (resistive) Relays with independent Power Terminals.
- **Pulse Outputs** Via OPTO coupler Non Polarized.
- **Current Outputs** Isolated, 4-20mA independent with fully adjustable offset and span.
- **Memory** Indefinitely stored in non-volatile memory.
- **Temperature** Displays and compensates from 0.0 - 99°C.
- **Relay & Pulse Setpoints** Fully and independently adjustable 0.01 - 13.99pH, and  $\pm 1999$ mV.
- **Relay & Pulse Hysterisis** Fully and independently adjustable on each channel.

# Electrical Connections



**240vac Supply:** Power supply to controller, can also be used to supply 240vac to low current draw equipment

**240vac Relay 1 & 2 Outputs:** Provides direct power to control chemical pumps, solenoids etc  
**NOTE:** max 240vac, 5 amp resistive load.

**Potential Free Relay 3 & 4:** Provides a potential free switched output for additional alarms, BMS connections, diversion valves etc. **NOTE:** relays 3 & 4 work in tandem with relays 1 & 2, max 240vac, 5 amp resistive load

**Pulse 1 & 2 Outputs:** these are used to proportionally control the speed of the chemical pumps  
**NOTE:** Opto Isolator Relay, max 15vdc, 6ma.

**Optional Temperature Electrode Input:** used if a temp display is required. **NOTE:** no 4-20ma available for temperature data logging, purely display only

**4-20ma Outputs 1 & 2:** Can be assigned to channels 1 or 2, for pump control, Data Logging, Chart recording, BMS connection etc

## 7. Warranty

We, **LIQUITRONICS**, guarantee this unit against defects due to faulty manufacture and breakdown of components for a period of two years from the date of purchase, subject to the following provisions:

- The guarantee will cover original failure of parts and natural defects due to manufacturing causes. Otherwise repair charges are to be the owner's responsibility.
- The warranty does not cover any carriage costs.

The warranty is void if:

- The instrument is damaged due to rough handling or transport after purchase.
- The article has not been used in accordance with the operating instructions.
- Any parts in the instrument have been changed or altered in any way.
- The serial number is removed or defaced.

All warranties and conditions, express or implied, are void.