

pH Mini-Controller

Installation and Operating Instructions

Power Requirements

This controller requires a 12V AC transformer plug pack rated at a minimum of 1 Amp (12VA). An electronic power adapter must not be used.

Operation


The pH Monitor/Controller may be used as a simple monitor or may have solenoid valves/ relays added to turn it into a complete control system capable of both raising or lowering the pH.

Any of the settings listed below may be changed from the keypad. When a setting is saved, it is stored in permanent memory and will not be affected by loss of power.

Settings Available

<u>Program Mode</u>	<u>Setting</u>	<u>Explanation</u>
0	Display pH	Displays pH from 2.0 to 10.0
1	Set Point	The desired pH level
2	Dose time	The time in seconds that the solenoid valve will open in order to add acid (lower) or alkali (raise).
3	Dose interval	The time in minutes between doses to allow for mixing to occur.
4	Lower (L)/Raise (r)	This switches the controller to dose either alkali (raise) or acid (lower).
5	Alarm deviation	If the measured pH deviates from the set-point by more than this value the alarm will sound (if enabled). There is a built in time delay of 4 minutes before the alarm will sound.
6	Alarm ON/OFF	Switches the alarm ON or OFF.
7	CAL pH 7	Calibrate the controller using 7pH buffer.
8	CAL pH 4	Calibrate slope of the controller using 4.0pH buffer.

Setting the Controller

Press the SET key and hold it pressed. Then press either the UP or DOWN keys until the required program mode is displayed. This is signified by the  symbol together with the MODE number. Now release the SET key. The display blinks and shows the current setting. Press the UP or DOWN keys to obtain the required setting then press SET and hold it pressed for about 1 second to store the new value. (Note that when calibrating it is necessary to hold the set key pressed for about 5 seconds). While the display is blinking, if no key is pressed for 20 seconds, the setting is cancelled and the display returns to mode 0.

The dose time should be set to allow just enough acid or alkali to change the pH by 0.1 to 0.2 pH. Start with a setting of 2secs for a small system to about 5 seconds for a large system. The dose interval should be set to allow sufficient time for mixing of each dose, 10 minutes normally provides sufficient time in most systems.

Unless you have other information regarding your particular crop it has been found that most plants thrive in a pH of between 5 and 6. Many growers operate at a pH of 5.8

Installing the Controller

Install the controller in a dry, well-ventilated area preferably shaded from direct sunlight. The power socket should be supplied with 12V AC power. The current rating of the AC plug pack must be sufficient for the two outputs PLUS 100mA the controller. The outputs are capable of supplying up to 1A each at 12V DC. For 10W solenoid valves a 1A AC plug pack is sufficient.

The outputs may be used to control solenoid valves or a mains rated relay (with 12V DC coil) for controlling dosing pumps. If mains equipment is to be controlled an electrician should be consulted, or in Australasia, the Autogrow Relay Box may be used.

pH measurement is a delicate process and in some situations the pH readings can be a little unstable. This occurs when there are electrical fluctuations in either the sampled nutrient solution (usually introduced by the pump) or fluctuations in the mains supply. To help reduce this, the stainless steel rod supplied should be installed in the sample chamber (pH side) and the green wire connected to the terminal marked GND. This terminal should be connected to a good electrical ground (greenhouse frame or the electrical ground connection). This rod will also protect the pH electrode from damage due to severe electrical interference.

Try the system out with plain water before filling with Acid or Alkali. Ensure there are no leaks and the system is operating correctly. Prior to filling, the acid or alkali should be diluted to a concentration of 2% to 5%.

Remember acids and alkalis are dangerous. Always wear rubber gloves, apron, face mask and ALWAYS add concentrated acid to the water **NEVER** add water to the acid. After adding the acid stir gently to mix.

Re-calibration

Calibration of the unit should be checked frequently (weekly). This is done as follows:

- Place the electrode into 7pH buffer solution and stir gently for a few minutes until reading stabilises. If the reading differs from 7pH by more than 0.1pH re-calibration is required. To re-calibrate, use the keypad to select mode 7. Release the keys and wait for the display to stabilise. To save the new calibration, hold the SET button pressed for about 5 seconds until the display changes.

After completing calibration at pH 7 proceed to calibrate at pH 4.

- Rinse the electrode in water, place into pH4 buffer and gently stir until the reading stabilises. If the reading differs from 4.0 by more than 0.1 pH then re-calibration is required. To do this, use the keypad to select mode 8 release keys and wait for display to stabilise. Now hold SET pressed for 5 seconds to save the calibration. The display should now read 4.0pH

After re-calibrating, the instrument can be re-checked by rinsing the electrode in water and placing it back in 7pH buffer.

Trouble Shooting

If it is found that the unit will not re-calibrate then it is possible to return it to its factory settings. To do this remove power from the unit (i.e. switch off the power). Now hold all buttons pressed and switch on. Keep all buttons pressed until the display comes on (takes about 20 seconds).

THIS WILL CHANGE ALL SETTINGS BACK TO THEIR DEFAULT VALUES. It should now be possible to re-calibrate the unit. Remember to change all settings back to suit your requirements.

Care of pH Electrodes

pH electrodes have a limited life of between 6 months and three years. In general, the better they are treated the longer they last.

The electrodes are supplied with a rubber cap containing some liquid protecting the tip. Once removed, take care to never allow the tip to dry out. When not monitoring the nutrient solution store in a jar of tap water (NOT DISTILLED). The BNC connector must always be kept clean and dry.

If slime or algae appear on the tip of the electrode this may be removed by standing the probe in a 10% solution of acid for about 20minutes. This treatment will often rejuvenate an old probe.

