



UNPACKING

Please open and inspect your package upon receipt. Your package was packed with great care and all the necessary packing materials to arrive to you undamaged. If you do find an item that is broken or damaged, you must contact the delivering carrier to report the claim.



ATTENTION!

Your pH electrodes must be calibrated before use.

Ratio:Guard®

Advanced EC & pH Monitor

Designed for stand alone monitoring or for automatic control of EC & pH when used with the Anderson J+ Advanced Injector controller

GETTING TECHNICAL ASSISTANCE

The H.E. Anderson Company is dedicated to assisting our customers with installation and use of our products. Our technical staff are available each weekday from 8:30am to 4:30pm central time. You may call us toll free at **1-800-331-9620** from anywhere in the U.S.A.. and Canada. If no one is available, we will promptly return your call.

Before you call, we suggest that you review this manual. You may find the answer to your question here. But even if you do not, reviewing the manual will help us to help you.

There is some information you should have available when you call. You should know the software version and serial number of your control unit. Also, you should note the number of pumpers of each type, and their model numbers. We may not need all this information, but having it available at the start can some times save a lot of time and trouble for you. You may record the information on the information page below for convenient reference.

If you need an additional owners manual for any H.E. Anderson Company product, please visit our website at <http://heanderson.com/manuals.php>

Ratio:Guard® Advanced - Information Summary

MODEL NO. _____ SERIAL NO. _____ SOFTWARE VER. _____

This unit was ordered with the following sensors & accessories:

- Anderson Digital EC Transmitter W/Cable**
- Mounting Tee for above
- Anderson Digital Temperature Transmitter W/Cable**
- Mounting Tee for above
- 4-20 ma Toroidal EC Transmitter W/Cable**
- Mounting Tee for above
- Anderson pH Electrode w/Digital signal converter & Cable** Qty. _____
- Mounting Tee for above Qty. _____

Installation

When the monitor is supplied as part of a pre-assembled system the monitor will often be totally or at least partially wired and configured as received. If this unit is added to a new or existing system this manual will guide you through the installation and wiring process.

Summary of installation steps:

1. Decide where to place all system components. Consult component specific HEA manuals for individual components (Monitor Enclosure, Sensor Tees).
2. Install and leak check all plumbing including the manifold supply, water meter, injection point fittings and blend tank.
3. Mount controller and make connections between the controller and all sensors ordered with your system. This monitor is designed to connect to the following sensors:
Anderson digital EC transmitter with associated temperature transmitter or A toroidal EC sensor with 4-20 ma current loop interface
Any combination of 1 or 2 pH transmitters consisting of any combination of Anderson pH electrodes with digital converters for digital input or other sourced pH transmitters with 4-20 ma analog interface
4. Power up the monitor
5. Refer to **Ratio:Guard® EP-2 Advanced pH & EC Monitor Set-Up** instructions to configure the monitor using the front panel keypad.

Do all wiring before connecting power. Use a surge suppressor on the incoming AC power line. Plug in the power cord and watch the LCD display. If it does not come on, unplug the power and check the wiring.

Mounting

Ensure the installation location has all the following:

- Allow easy access to front panel
- Must have access to 120 VAC power outlet.
- Close proximity to other injector components.
- Protect from direct spray

Mount the controller using the 4 metal tabs on the back of the controller enclosure.

Installing the Sensors

- The sensor tees should be installed in a bypass with isolation valves so they can be removed without shutting off the water flow. All the sensors may be installed in a single bypass loop.
- The EC electrode and temperature sensor supply high level digital signals to the monitor. This greatly reduces cable related problems and increases accuracy. Sensors come with fifteen feet of cable. Cables may be extended if necessary, with no effect on performance.
- The monitor, sensors, and signal conditioners should be mounted out of direct sunlight and protected from direct spray. The monitor enclosure and front panel are not UV resistant.
- The recommended installation is shown in *Figure 1*. It can be varied to suit your needs, but remember the following:
- The bypass for the tees should always be below the main water line, especially if a pH electrode is installed in the bypass.
- You must have some restriction in the main water line to insure water flow past the electrode.
- It is recommended that **Anderson EC sensors** be installed **horizontally** and **pH electrodes** be installed **vertically**.
- A sample valve (a hose bib will do) installed as shown in *Figure 1*. is a great convenience. It can also make electrode removal much easier by opening it to allow air to enter the line when removing the electrode.

Sensor Bypass Loop

Showing proper sensor positions

IMPORTANT: Be certain both isolation valves are open during normal operation. Otherwise the unit will not operate properly.

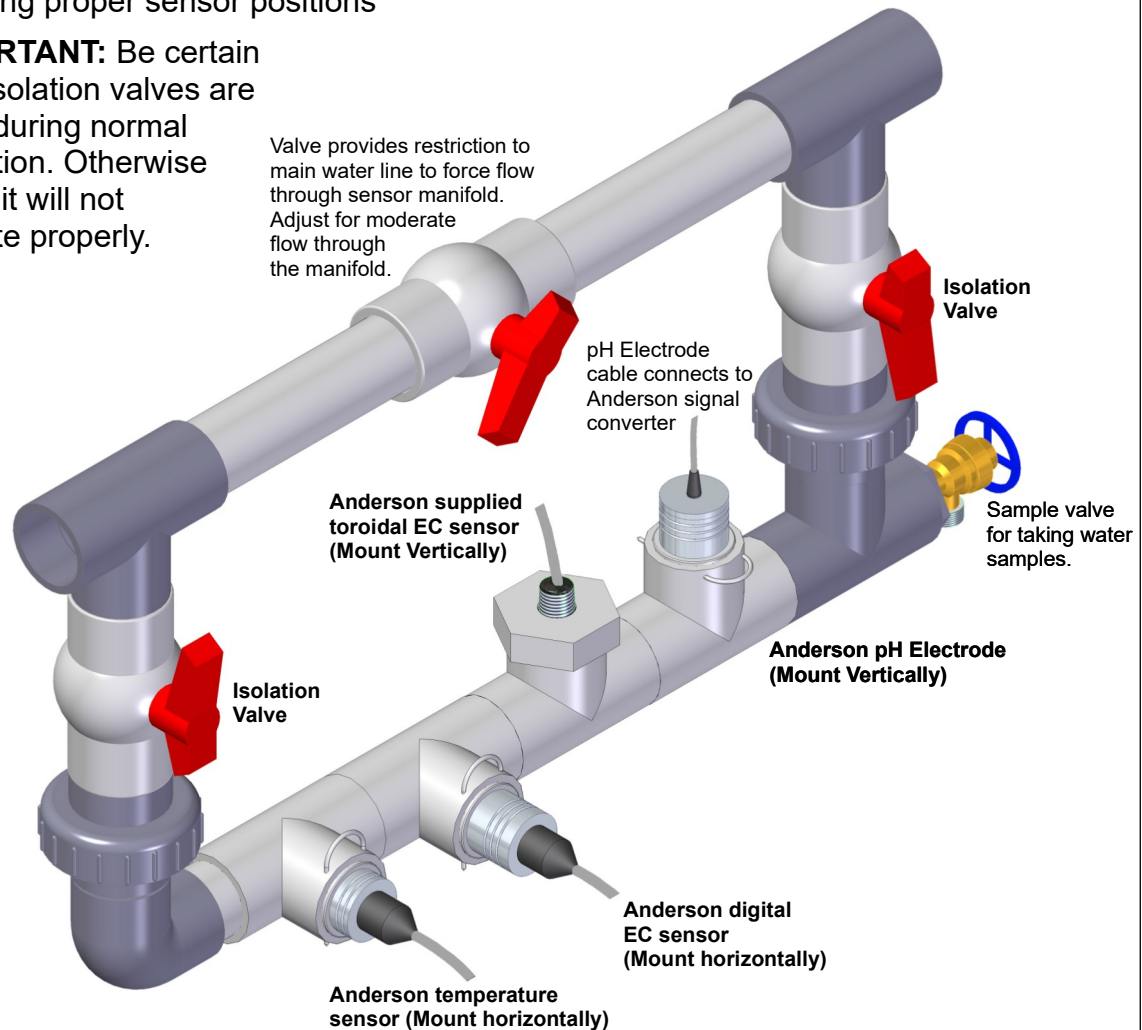


Illustration 1

Connecting the Sensors

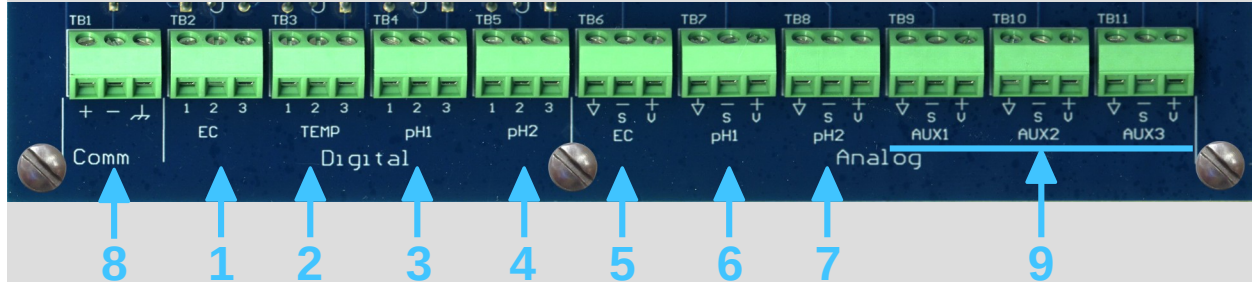
Complete the following steps to connect the control box to the required components:

- 1) Make sure the monitor is **NOT** connected to electricity.
 - 2) Open the enclosure by releasing the two latches on the right side of the enclosure.
 - 3) The sensor cables may already be connected to the terminal blocks. If they are not or more sensors are being added, feed the cables through the most convenient strain relief bushing on the bottom of the box, then connect the wires up to the proper terminal block.
- ➔ For **Anderson digital sensors** (1-4), match the '1', '2' and '3' on the sensor cable to the corresponding numbers on the terminal block.
- 1 – Signal Ground
 - 2 – Signal Input
 - 3 – + 5 VDC supply

→ For **4-20 ma current loop transmitters** there are two possibilities:

- USING AN ACTIVE TRANSMITTER WITH ITS OWN INTERNAL DC POWER SOURCE OR USING A SEPARATE DC POWER SOURCE:
 - Connect the – side of the transmitter to terminal 2 of the terminal block.
 - Connect the – (ground) side of the transmitter to terminal 1 of the terminal block.
- USING THE MONITOR'S INTERNAL 12 VDC SUPPLY AS THE POWER SOURCE:
 - Connect the + side of the transmitter to terminal 3 of the terminal block.
 - Connect the – side of the transmitter to terminal 2 of the terminal block.
 - The sensor cables may already be connected to the terminal blocks. If they are not or more sensors are being added, feed the cables through the most convenient strain relief bushing on the bottom of the box, then connect the wires up to the proper terminal block. For Anderson digital sensors (1-4), match the '1', '2' and '3' on the sensor cable to the corresponding numbers on the terminal block.
 - 1 – Signal Ground
 - 2 – Signal Input
 - 3 – +5 VDC supply

Terminal Connections:



1. Anderson digital (contacting) EC electrode
2. Anderson digital temperature probe (used for EC temperature correction)
3. pH electrode #1 using Anderson digital signal converter
4. pH electrode #2 using Anderson digital signal converter
5. 4-20 ma analog input for a toroidal EC transmitter
6. 4-20 ma input for analog pH transmitter #1
7. 4-20 ma input for analog pH transmitter #2
8. RS-485 communications connection to J+ Advanced injector controller.
9. The auxiliary inputs AUX1, AUX2, and AUX3 are not currently implemented.

Powering Up The Unit

Plug the controller. A surge suppressor/uninterrupted power supply should be used to power the controller. When power is applied to the unit, the display will flash and then show:

Anderson Injectors
Ratio:Guard(tm)
Version Number
Version Date

for a short time as it initializes. It will then display pH, EC, and temperature readings, depending on what sensors are connected.



Configuring and Setting the Monitor

You must configure the monitor to tell it what sensors are connected to it. EC and temperature sensors come calibrated from the factory. However, ***the pH transmitters must be calibrated to the electrodes*** to display accurate readings. Refer to the **Ratio:Guard® Advanced pH & EC Monitor Set-Up** instructions for complete information on configuration and pH electrode calibration.

Repair



Before opening the enclosure and doing anything inside shut off ac power to the unit.

The fuse is located on the DIN rail next to the power supply, inside the plastic fuse holder. Replace with the same size and type.

Fuse Replacement

Other repairs are made by replacing complete circuit board assemblies. This should be done only by an authorized repair person or under the direction of our technical staff.

Factory Service

Should you require service for your Ratio:Guard® Advanced monitor, the H.E. Anderson Co. offers several flexible factory service options. Call our number listed in the front of this manual for complete information. If you need to return any parts for service or replacement, our shipping address is:

H.E. Anderson Company
2025 Anderson Drive
Muskogee, Oklahoma 74403
USA

Please enclose a note detailing the problems and the type of service you need. Include the name of a contact person, phone number, and the billing name and address. Any return for warranty, or credit, must have an RMA number. Contact H.E. Anderson for this number before returning.

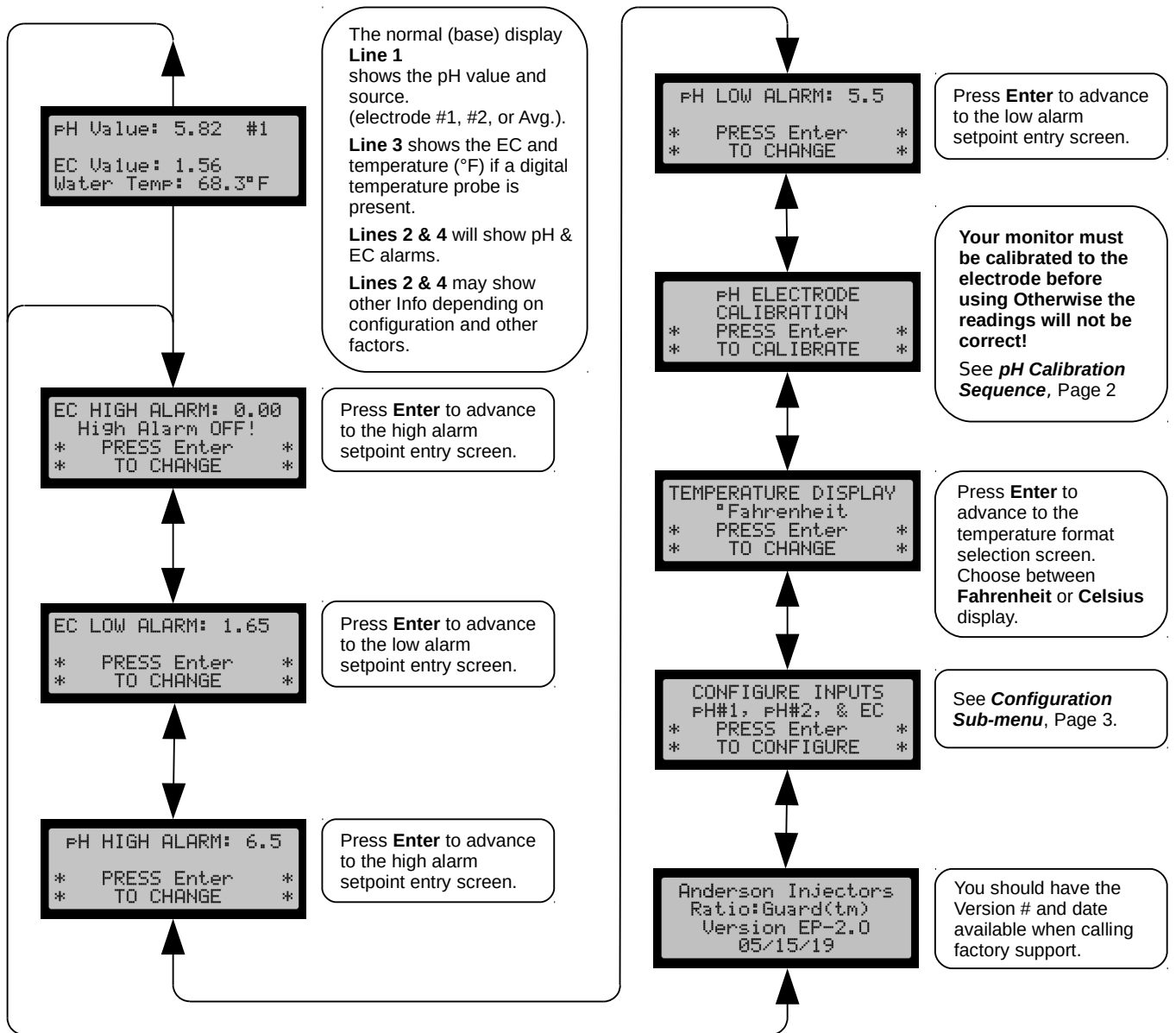
Ratio:Guard™ EP-2 Advanced pH & EC Monitor Set-Up

You can use the ▼ and ▲ keys to navigate the top level menus in forward or reverse order. After a 10 seconds with no key pressed the display will return to the base display although that delay may be extended in some instances. Pressing the **Cancel/Exit** key will return to the base display immediately.

A top level menu item with '*' at the margins allows pressing **Enter** to enter/change a value or perform the displayed function. Pressing **Cancel/Exit** will exit the screen will return to the upper level or to the base display.

All numeric entries are right justified as they are entered. Decimal places are fixed, and when entering values with decimal positions, **trailing zeros must be entered**.

Normal (base) display and top level menu rotation



PH Calibration Sequence

The pH Calibration applies to Anderson pH electrodes or pH electrodes using the Anderson P/N 11552 pH Converter Module connected to a pH digital input. Electrodes assigned to an analog input (4-20ma) may or may not require calibration to this monitor. See instructions below right.

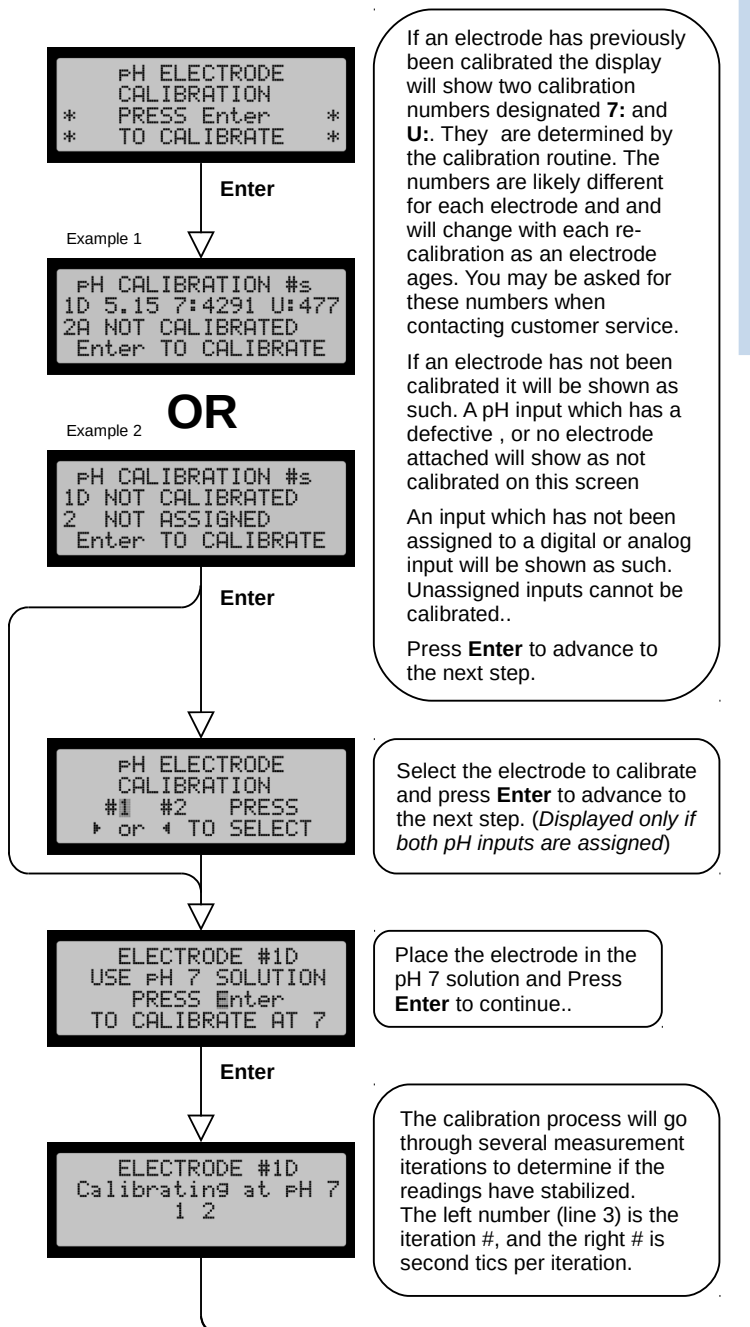
Read the separate Instructions for the P/N 06916 pH Electrode Calibration Kit. before advancing to the pH calibration sequence. You must have prepared solutions and have access to the electrode to calibrate.

NOTE: Some sections of the kit instructions apply specifically to the P-1 pH monitor and will not apply here. Ignore those specific instructions and follow the procedure below.

Once you start through the calibration sequence for an electrode the Enter key to proceed through the sequence. You may abort the sequence at any point before completion and no new calibration numbers will be recorded.

The sequence must be repeated for each of two possible electrode hook-ups.

The monitor will perform all its functions with either one, or two electrodes. If two electrodes are attached the pH display will display "Avg." to the right of the reading. If only one calibrated electrode is attached, the display will show either "#1" or "#2".



Using a Calibrated 4-20ma Analog Input

If you are using this monitor with a separately calibrated pH transmitter with 4ma = pH 0 and 20ma = pH 14 you do not need to calibrate the analog input on the EP-2 monitor. Instead you should use the default (uncalibrated) settings for that input.

If the EP-1 input has already been calibrated, the settings must be cleared before re-calibrating See below.

Using an Uncalibrated, Blind Transmitter, or a Transmitter Calibrated to a Different pH Range.

In these cases you may also calibrate an analog input just as you would a digital input. (using pH 7 and pH 4 solutions)

Note: Any adjustment you make to the pH transmitter will affect the readings on the monitor. You should re-calibrate the monitor to the transmitter after any adjustments.

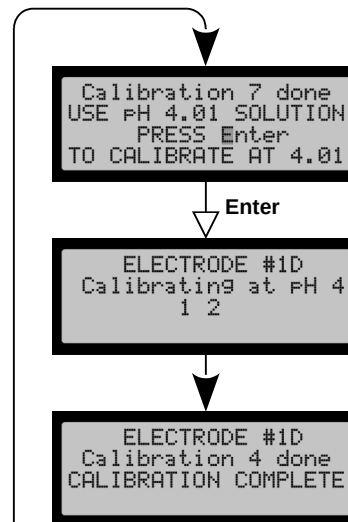
Clearing the Analog Calibration Settings:

With power ON to the unit, open up the door to the enclosure.

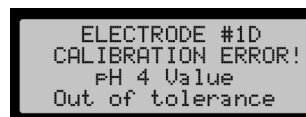
Locate the small reset push-button on the processor board.

With the door open, on the front panel press and hold the '7' Key (for Input #1) or the '9' key (for Input #2), and while holding the key, press the reset button to restart the processor. This will clear the settings and it will revert to the default settings. A message showing the values have been cleared will display for 5 seconds.

NOTE: This procedure may be easier with two people.



Error displays



Other error displays you may encounter will be self explanatory.

A calibration error at pH 7 or 4 indicates the electrode is too old or has otherwise failed and will not calibrate. The calibration will abort, but the monitor will continue operation with the previous calibration numbers.

Sensor Input Configuration

The Ratio:Guard monitor comes configured for one or two sensors and one EC sensor. Two options are offered for each input; **Digital Pulse** input (legacy Anderson) or **4-20ma Analog**. It is fully compatible with any Anderson sensors you may already have.

A digital pH input provides greater resolution and accuracy but requires our P/N 11627 Signal Converter. If you already have one this should be your setting.

The digital EC input works directly only with an Anderson digital EC electrode and provides greater resolution than a 4-20ma analog input. But for greatest reliability the best choice is a **contactless toroidal EC sensor**. It is more expensive, but provides superior reliability and much lower maintenance.

With an analog input you must also enter the EC range limit. This is the **20ma calibration point** of your EC sensor. Allowable values are 2.0-10.0 milliSeimens (mS). The lower this value is, the finer the resolution of the EC reading.

