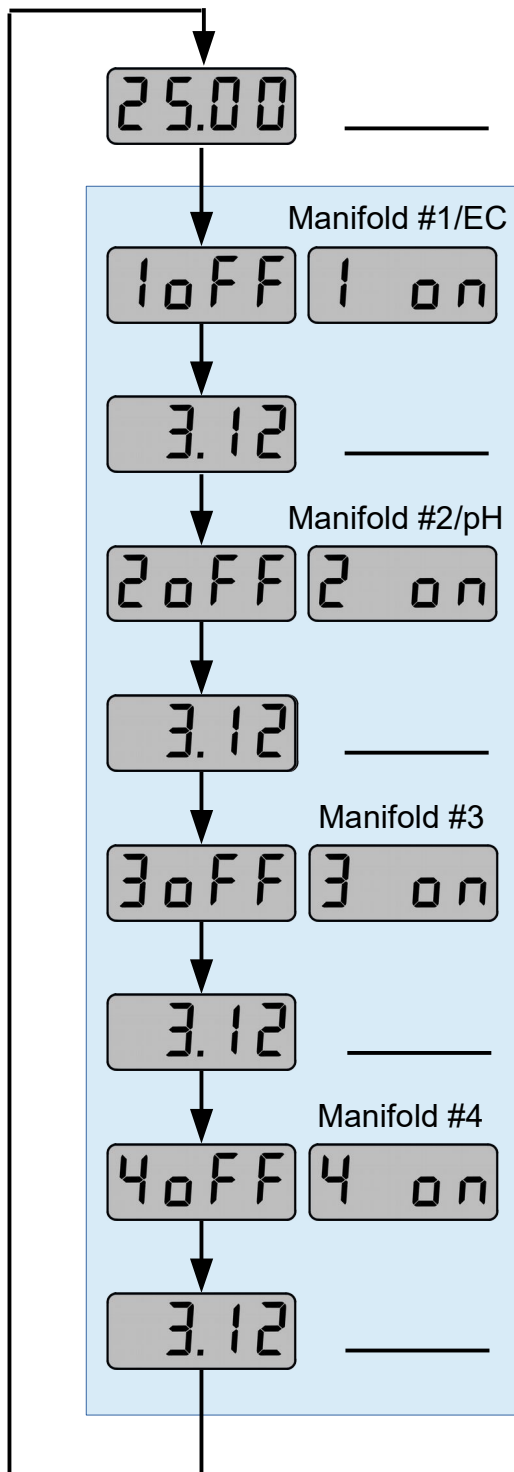


J Plus 4 Output Feedback Version Quick-Start Guide

Setting The K Factor & Basic Valve & Feed Rate Functions

This chart shows how to turn the manifold valve outputs (feed) ON and OFF. The chart shows the sequence of parameters in the order displayed. To select a parameter to change press the **SET** key and the **↑** (UP arrow) repeatedly until the parameter you wish to change is displayed. Then, without releasing the **SET** key, Press the **ENTER** key and hold both keys to enter the edit mode, indicated when the display starts blinking. See the section for each parameter to learn more details. Default values are shown.

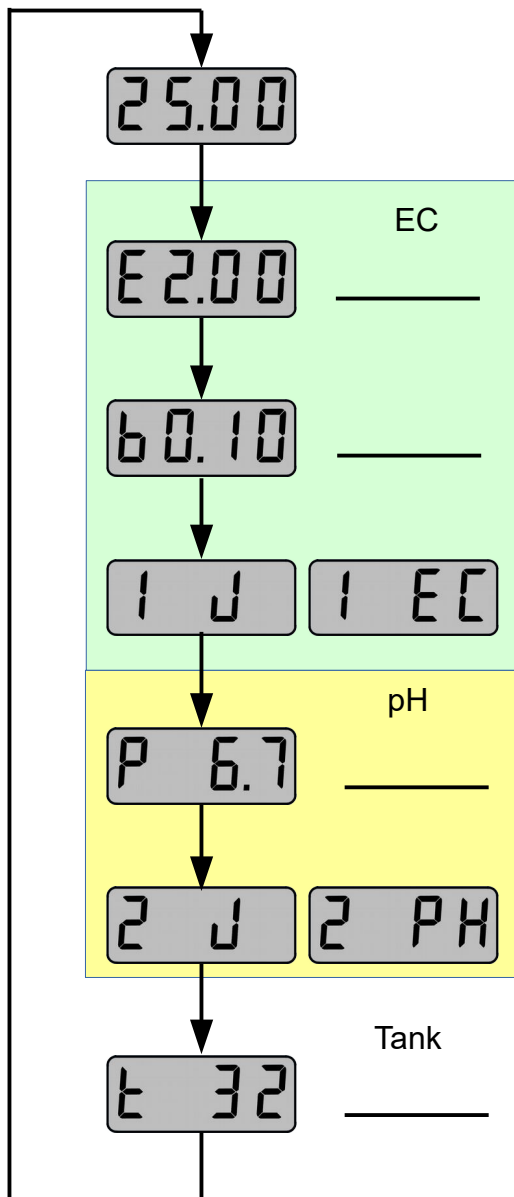


- K Factor** – Usually set at factory. *Adjustable only for custom K factors during first minute after power-up.*
- Valve #1 Feed** – Turns ON/OFF the feed for output #1. Press **↑** to turn on or **↓** to turn off. This valve can feed at a constant feed ratio or vary the feed automatically according to EC. **Must be ON for Feedback operation.**
- GPS, #1 Valve** – Sets the gallons per stroke for output #1. Press **↑** to increase (decreases feed) or **↓** to decrease (increases feed). **This is the starting point for EC operation.**
- Valve #2 Feed** – Turns ON/OFF the feed for output #2. Press **↑** to turn on, **↓** to turn off. This output can feed at a constant feed ratio or vary the feed automatically according to pH. **Must be ON for Feedback operation.**
- GPS, #2 Valve** – Sets the gallons per stroke for valve #2. Press **↑** to increase (decreases feed) or **↓** to decrease (increases feed). **This is the starting point for pH operation.**
- Valve #3 Feed** – Turns ON/OFF the feed for output #3. Press **↑** to turn on or **↓** to turn off. *This output will maintain the set feed ratio.*
- GPS, #3 Valve** – Sets the gallons per stroke for valve #2. Press **↑** to increase (decreases feed) or **↓** to decrease (increases feed).
- Valve #4 Feed** – Turns ON/OFF the feed for output #4. Press **↑** to turn on or **↓** to turn off. *This output will maintain the set feed ratio.*
- GPS, #4 Valve** – Sets the gallons per stroke for valve #3. Press **↑** to increase (decreases feed) or **↓** to decrease (increases feed).

NOTE: We recommend operating in automatic mode only until the feed stabilizes at the (EC or pH) setpoint (e.g. after changing the setpoint or the concentrate solution) and then switching to “J” mode (proportional feed) for normal operation.

Setting The Automatic Feedback Control Functions

The chart shows the sequence of parameters in the order displayed. To select a parameter to change press the **SET** key and the **↓** (**DOWN** arrow) key repeatedly until the parameter you wish to change is displayed. Then, without releasing the **SET** key, Press the **ENTER** key and hold both keys to enter the edit mode, indicated when the display starts blinking. See the section for each parameter to learn more details about what the parameter means and how to set it. Default values are shown.



- 1. K Factor** – Usually set at factory. Adjustable only for custom K factors during first minute after power-up.
- 2. EC Control Point** – Sets the EC control point (millisiemens) for automatic operation. Press **↑** to increase or **↓** to decrease. **Note: This value is the sum of the baseline EC plus the added EC.**
- 3. Baseline EC** – Sets the measured EC value with no chemical feed Press **↑** to increase or **↓** to decrease. Entering this value makes automatic adjustments more efficient.
- 4. Valve #1 Control Mode** - Press **↑** to select Automatic control by EC or **↓** to select control by GPS. Must be connected to E-1S for automatic control to be in effect. Otherwise this setting is ignored. **NOTE: The feed setting (GPS) is saved when switching to auto mode. The unit will revert o the saved setting when switching back to J mode.**
- 5. pH Control Point** – Sets the pH control point for automatic operation. Press **↑** to increase or **↓** to decrease.
- 6. Valve #2 Control Mode** - Press **↑** to select Automatic control by pH or **↓** to select control by GPS. Must be connected to P-2S for automatic control to be in effect. Otherwise this setting is ignored. **NOTE: The feed setting (GPS) is saved when switching to auto mode. The unit will revert o the saved setting when switching back to J mode.**
- 7. Blend Tank Volume** – Should be set to the **twice the volume** of the blend tank plus the volume of associated piping between the injection points and the EC and pH sensors (affects automatic operation only).



WARNING! Use of this product in fully automatic operation requires that your EC and pH electrodes be clean and accurately calibrated. Failure to observe this could damage or destroy your crop. H.E. Anderson Co. does not recommend injecting using EC feedback without a rigorous schedule of cleaning and checking calibration of the EC electrode.

Warning and Prompting Messages

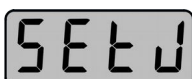
You may encounter the following displays during operation. The causes and cures are listed below. These messages are displayed periodically and will be replaced with the flowrate display when the cause has been corrected.

A digital display showing the characters 'AFLo' in a seven-segment font.

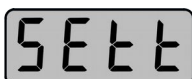
1. **High Flow Warning, Valve #1(A)** – Indicates that the current flow is too great for the injector to maintain the required feed rate. This will inhibit automatic operation and can disrupt EC control if not corrected. If you encounter this message while in EC feedback mode you should switch to proportional control (J mode) immediately and correct the problem. Let the system (EC reading) stabilize before resuming automatic control.

A digital display showing the characters 'bFLo' in a seven-segment font.

2. **High Flow Warning, Valve #2(B)** – Indicates that the current flow is too great for the injector to maintain the required acid feed. This will inhibit automatic operation and can disrupt pH control if not corrected. If you encounter this message while in pH feedback mode you should switch to proportional control (J mode) immediately and correct the problem. Let the system (pH reading) stabilize before resuming automatic control.

A digital display showing the characters 'SEtU' in a seven-segment font.

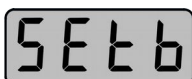
3. **K Factor and/or GPS not set or confirmed** – This warning will appear until the K factor or any GPS settings have been confirmed or changed. You can confirm a setting by putting the unit in the edit mode and pressing **ENTER**, or simply letting the unit time-out. **Note:** You can only change or confirm the K factor within one minute after applying power.

A digital display showing the characters 'SEtT' in a seven-segment font.

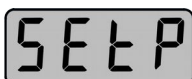
4. **Blend tank capacity not set or confirmed** – Enter a new blend tank size or confirm (See 3. above) the default setting.

A digital display showing the characters 'SEtE' in a seven-segment font.

5. **EC control point not set or confirmed** – Enter a new EC setpoint or confirm (See 3. above) the default setting.

A digital display showing the characters 'SEtB' in a seven-segment font.

6. **Baseline EC not set or confirmed** – Enter the EC value of your raw water. This will speed and tighten EC control.

A digital display showing the characters 'SEtP' in a seven-segment font.

7. **pH control point not set or confirmed** – Enter a new pH setpoint or confirm (See 3. above) the default setting.

J Plus Feedback Addendum

For Versions 4F.1x (4-Output) and F2.2x (2-Output) and later



WARNING! Use of this product in fully automatic operation requires that your EC and pH electrodes be clean and accurately calibrated. Failure to observe this could damage or destroy your crop. H.E. Anderson Co. does not recommend injecting using EC feedback without a rigorous schedule of cleaning and checking calibration of the EC electrode.

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.

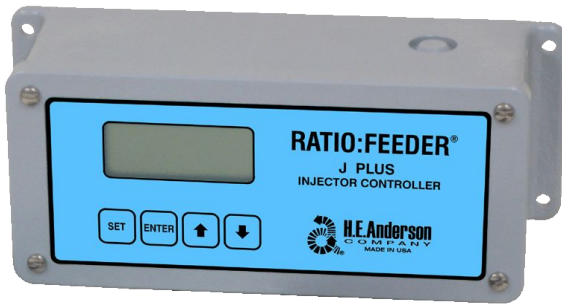
AUTO-SWITCHBACK FUNCTION INSTRUCTIONS

The feedback control software has a new Auto-Switchback feature. This feature was added to prevent a condition called Integral (reset) windup which can occur when chemical feed fails due to equipment failure or chemical depletion. Integral windup can cause overfeed and other problems when the system is restarted after a feed failure.

The auto-switch function is used to switch fertilizer and/or acid feed back to manual (J) control in the event that either fertilizer or acid feed shuts off. This function is controlled by the alarm setpoints on your EC and pH monitors. The switch point is the **low alarm point for EC** and the **high alarm point for pH**.

- You must set the low EC alarm setpoint above the baseline (untreated) EC value or the J+ controller will never switch fertilizer feed to manual.
- You must set the low EC alarm setpoint above the baseline (untreated) EC value or the J+ controller will never switch fertilizer feed to manual.
- You must set the high pH alarm setpoint or the J+ controller will not automatically control pH.
- If the pH alarm is set above the baseline (untreated) pH value J+ controller will never switch acid feed to manual.





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.

J Plus Feedback Supplement (4-Output)



WARNING! Use of this product in fully automatic operation requires that your EC and pH electrodes be clean and accurately calibrated. Failure to observe this could damage or destroy your crop. H.E. Anderson Co. does not recommend injecting using EC feedback without a rigorous schedule of cleaning and checking calibration of the EC electrode.

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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.

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



4-Output Feedback Supplement

INTRODUCTION

This software/hardware upgrade will allow your J Plus injector controller to work together with your Ratio:Guard® EC and pH monitors to automatically control fertilizer and acid feed. It also adds the following features:

- Double precision setting; allows to more accurately set the gallons per stroke (GPS) feed.
- Prevents the controller from stroking faster than the maximum rate for a full stroke.
- Can turn manifolds on/off from the front panel.
- Can turn automatic feedback operation on/off from the front panel.
- Receives information from Ratio:Guard® EC and/or pH monitors over RS-485 serial link.

Valve (manifold) #1 is assigned to feed fertilizer in automatic mode or other mild chemicals in manual mode. Valve #2 is assigned to acid feed.

PRE-INSTALL

If this controller will replace a present controller you should fill out the following. Otherwise skip to step 11.

There are some settings on your present J+ controller that you will need to transfer to the new feedback control.

Complete the following list of settings/readings from your present J+ controller:

K Factor _____
(Press SET to display)

Valve #1 Chemical _____

Valve #1 GPS _____
(Press SET + ↑ to display)

Valve #2 Chemical _____

Valve #2 GPS _____
(Press SET + ↓ to display)

Totalizer high digits _____
(Press ↑ to display)

Totalizer low digits _____
(Press ↓ to display)

Software version _____
(Press SET ↑ ↓ together to display)

Disconnect power before removing front panel.

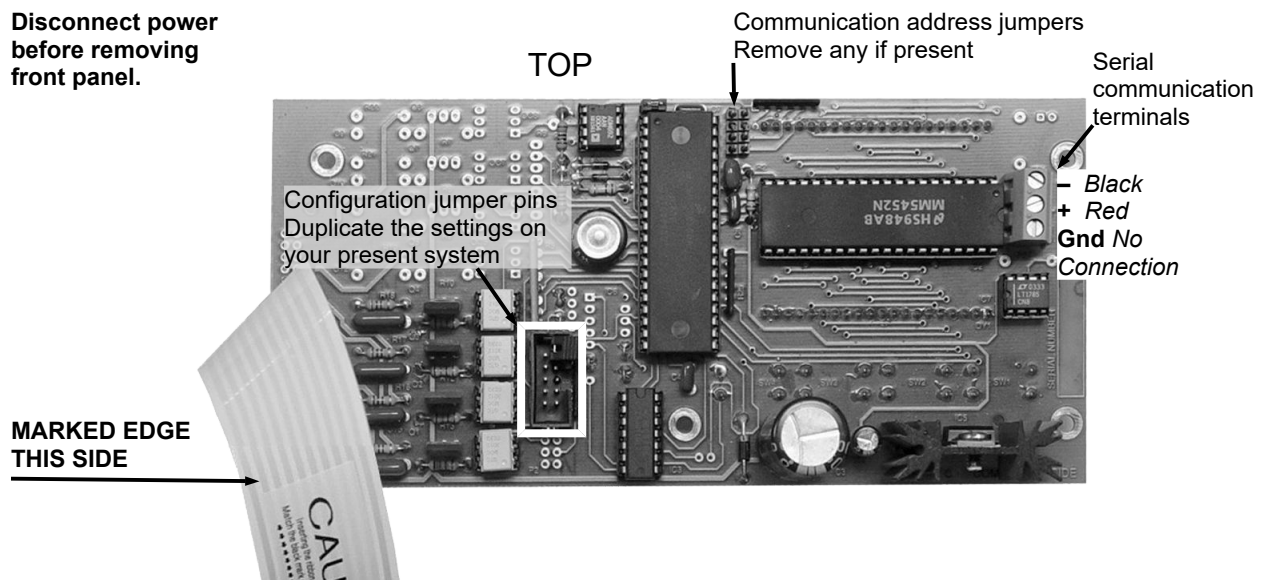


Figure 2
J Plus 2-Output front circuit (control) board.

PROCESSOR BOARD SET-UP & REPLACEMENT

NOTE: If you are replacing the processor with a processor that supports feedback, replace the processor according to the instructions supplied with the processor.



CAUTION! Disconnect power before removing front panel.

WIRING THE CONTROLLERS

1. Make any necessary plumbing changes.
2. Remove the four screws that secure the J+ front panel.
3. Carefully unplug the cable from the rear circuit board and remove the front panel.
4. Lay the old and new panels side-by-side with the circuit boards facing up.

Refer to Figure 2 for the following

5. Duplicate the configuration jumpers on the new panel the same as on the old panel.
6. Remove any address jumpers if present. Remove a hole plug from the bottom of the J+ box and install a strain bushing (supplied).
7. Run the end of the 2-conductor cable (supplied) through the bushing. Pull enough through to make it easy to work with and strip the red and black wires back about 1/4".
8. Connect the black wire to the top (-) terminal and the red wire to the middle (+) terminal. Connect no wire to the bottom terminal.
9. Replace the front panel. Carefully reconnect the ribbon cable to the socket. Be sure the marked edge

is on the left end and that the cable is properly aligned and seated.

10. In the same manner connect the monitors. If you are connecting to both EC and pH monitors, connect them in series (daisy-chain). Run the cable from the J+ box to the first box. Connect a second cable in parallel in the first box and run it to the second box. Keep the same polarity for all.

NEW INSTALLATIONS START HERE

11. Once the electronics are connected apply power to them all. *NOTE: The alarm settings and connections on the EC and pH monitors have no effect on automatic operation of the J+ controller.*
12. After a volume of water equal to the tank setting has gone through the system you should see periodic blinking of the colon on the display of each monitor, and a return blink of the colon on the J+ for each. This is a visual indication that communications are working properly
13. If the J+ controller detects the presence of EC and pH monitors the display will cycle through
flow* – **SEtJ** (feed/k factor)
flow* – **SEtt** (tank volume)
flow* – **SEtE** (EC control point)
flow* – **SEtb** (base EC)
flow* – **SEtP** (pH control point)
The "SEtX" messages will be replaced by the **flow*** display as each parameter is entered.
* The **flow** display will show either the flow rate or "**OFF**".

START-UP PROCEDURE

This procedure is written as if using both EC and pH control. You can modify it if you are using only one type of control.



WARNING! DO NOT turn on the feed outputs (Valve #1(A) & Valve #2(B) Feed) until the K factor and GPS settings have been set and verified!

This procedure will start your automated controller with both feeds turned off. Do not turn on the #1 & 2 feeds until instructed to do so.

1. Transfer the K factor and valve #1 & 2 settings from page 2 to the blanks on page 4.
2. Insert the blend tank size to the tank setting #11 at the bottom.
3. Following the instructions on the previous page cycle through the settings and **enter only the values with blanks provided**. You need or “confirm” all parameters that display a "Setx" message in order to stop the message from displaying. To confirm a parameter press **ENTER** when the parameter is flashing.
Do not change the following settings until all other settings have been made:
Valve #1(A) Feed
Valve #1(A) Control Mode
Valve #2(B) Feed
Valve #2(B) Control Mode

4. You may need to enter or confirm some default settings that do not apply to your system in order to stop the prompting displays.
5. If you know your base EC, #6, (the EC value without any fertilizer feed) enter that value on the sheet. If you do not know it, there are two ways to find it.
 - a) Take an EC reading of clear untreated water with a separate (portable) EC meter. The sample may be taken from anywhere on your system where clear water is available.
 - b) Run water through the system (with or without acid feed) until the EC reading stabilizes. The EC reading is your base EC.
6. Confirm that you have entered the desired control points for EC and pH.
7. Once you have entered the initial values you may put the injector in operation by going to settings #2 & #7 and turning the valves on.
If this is an upgrade, at this point the J+ control should be functioning exactly the same as your previous controller. You may continue to use it as is or turn on fully automatic operation.

AUTOMATIC OPERATION



WARNING! Use of this product in fully automatic operation requires that your EC and pH electrodes be clean and accurately calibrated. Failure to observe this could damage your crop.

Once you have determined that the monitors are working properly you may turn automatic operation.

1. Rotate to setting #4 and enter the edit mode. Press **↑** to change the display from **1 J** to **1 EC** to turn on EC feedback control. Press **↓** to go back to manual (ratio) control.
2. Rotate to setting #9 and enter the edit mode. Press **↑** to change the display from **2 J** to **2 PH** to turn on pH feedback control. Press **↓** to go back to manual (ratio) control.

AUTOMATIC OPERATING TIPS

- While fully automatic operation is convenient, **the safest and most reliable injection method is in standard non-feed back (feed by ratio) operation.** We recommend turning on automatic operation when making adjustments in feed or pH settings or changes in chemical solutions. Once injector has stabilized we recommend changing back to **J** (proportioning) operation (See #1 & 2 above)
- Remember to **turn off automatic control when taking electrodes out of service for calibration or cleaning.**

- When auto feed is turned off the injector will remain in its current feed setting.
- Keep a significant water flow through your sensor bypass line. This will provide quicker and smoother automatic response.
- Turning the feed down (lower dial setting) will result in quicker stroking. Turning feed up will increase the GPS. Ideally the stroke rate should be the maximum dial setting at which you can still get smooth blending.



CAUTION! Set the control to J mode before making any changes to the pumper dial settings. Make the changes and then return the unit to EC operation.

- When needing to feed additional chemicals, turn off automatic control and feed the new chemical instead of fertilizer at the calculated desired feed ratio or feed in addition to fertilizer at the current stroke rate through an additional pumper.
- Turning on auto feed will cause the injector to adjust if needed.
- Keep a log of GPS settings (settings #3 & #8 in the display rotation) for each valve. If you notice a trending change you should determine the cause. Possible causes are (1) dirty or failing electrode. (2) changes in chemical solutions, chemical mixed differently etc. (3) changes in supply water

4-Output Feedback Supplement

- If the controller overshoots the setpoint after making an adjustment, increase the blend tank setting. This will increase the time between adjustments, but can reduce the overall settling time by reducing the number of adjustments.

Changing the K factor

- If you switch to a different water for any reason you need to set the K factor to match the new meter. To do this, first cycle through the display sequence and note the value for each parameter. Changing the K factor will cause the controller to revert to the initial default values. And you will need to reenter them after the change. **NOTE: The K factor can only be changed within the first minute after power-up.**

Other Pointers

- Keep a significant water flow through your sensor bypass line. This will provide quicker and smoother automatic response.
- Turning the pumper dial setting down will result in a lower GPS and quicker stroking. Turning feed up will increase the GPS. Ideally the stroke rate should be approximately 1/5 of the blend tank volume. **Always switch to J mode (manual control) before changing the dial setting. Then switch back to feedback mode.**



CAUTION! Setting the dial too low may result in too fast a stroking rate. The

unit may work well at low flows, but not at higher flows.

Stroke Limiting

- The J controller will not allow the unit to stroke faster than 40 strokes per minute. This should allow it (in most instances) to make full strokes, but could result in lower than desired feed at high flows.

When stroke limiting takes effect the following warnings will be periodically displayed:

AFL o

for the EC manifold;

bFL o

for the pH manifold;

- Keep a log of GPS settings (settings #3 & #8 in the display rotation) for each valve. If you notice a trending change you should determine the cause. Possible causes are (1) dirty or failing electrode. (2) changes in chemical solutions, chemical mixed differently etc. (3) changes in supply water.

Monitoring Operation

- We recommend keeping a log of GPS settings (settings #3 & #8 in the display rotation) for each valve. If you notice a trending change you should determine the cause. Possible causes are (1) dirty or failing electrode. (2) changes in chemical solutions, chemical mixed differently etc. (3) changes in supply water.