

# *Encore 2G*

## *Operators Guide*

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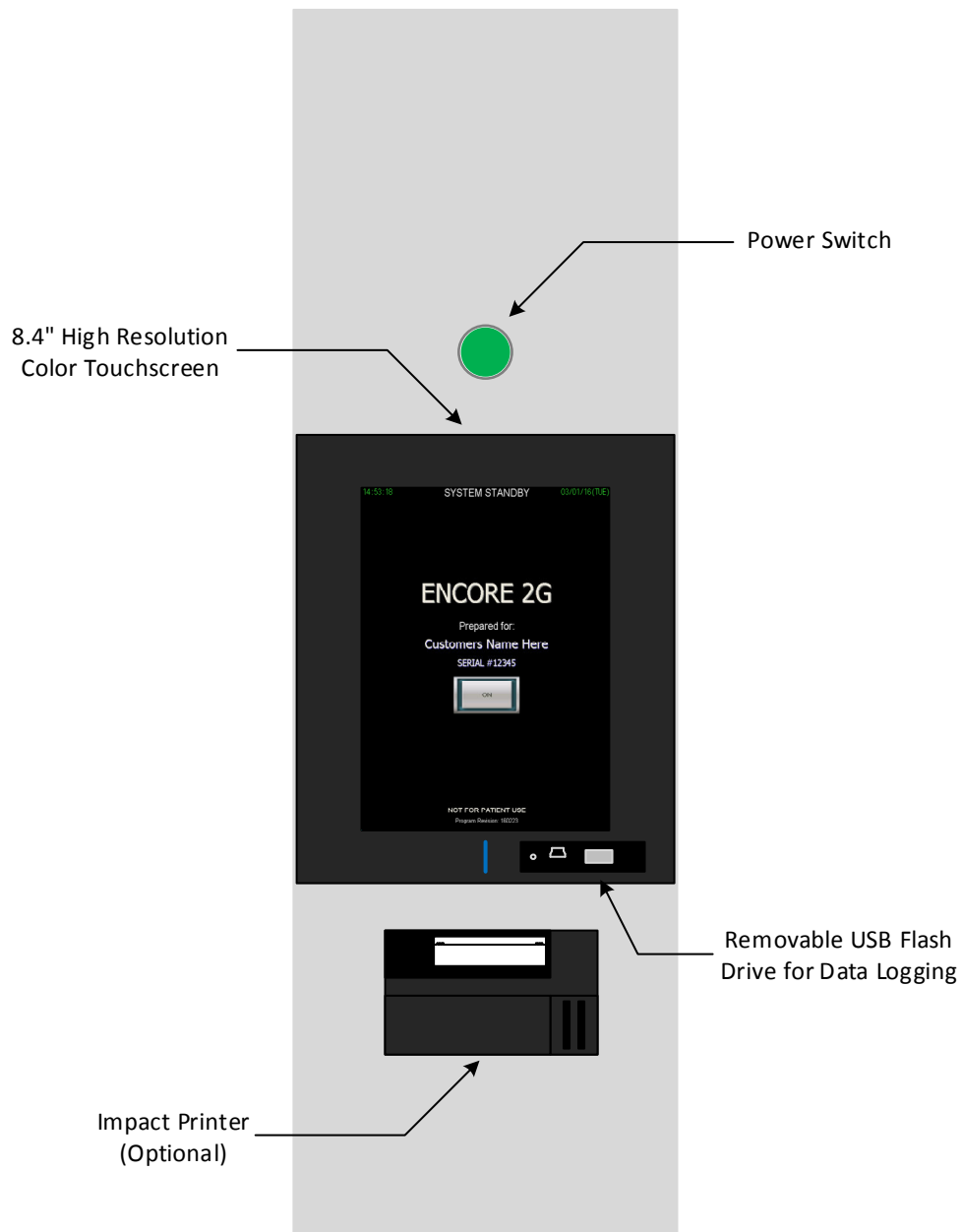
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## SECTION 1: OVERVIEW

The Encore series 2G (second generation) control is a user friendly touchscreen/PLC (Programmable Logical Controller) based sterilizer control specifically designed to meet the diversified needs of laboratory, research and scientific end users. The control features 20 user settable cycles, 2 low temp user settable cycles, and factory set Bowie Dick and Leak Test cycles. It gives the end user a clear and easy to read system status, executes selected cycles and logs cycle data to a USB flash drive and/or optional impact printer. Figure 1.1 shows a typical Encore 2G control.



**Fig. 1.1**

## SECTION 2: BASIC USER OPERATION

The Encore series 2G control features a high resolution 8.4 inch full color touchscreen. The combination of high resolution and size enables the control to give the end user the information they need without the need to move through multiple screens. This section will describe the basic functions, operation, and information for each screen the end user will use to select and run the basic cycles within the control.

### 2.1 STATUS BAR

The status bar featured on the first generation Encore control system is also featured on the Encore 2G (second generation). The status bar is displayed on most screens. Figure 2.1 shows a typical status bar. The status bar is always located in the top third of the screen and is highlighted by two green bars. In between the two green bars is system status information. The information includes system status, alarm status, door status, chamber temperature, jacket temperature and a USB flash drive indicator. Depending on system setup (Section 9) and cycle progress, additional information may show up in the status bar such as load temperature, cycle start time and approximate cycle complete time.

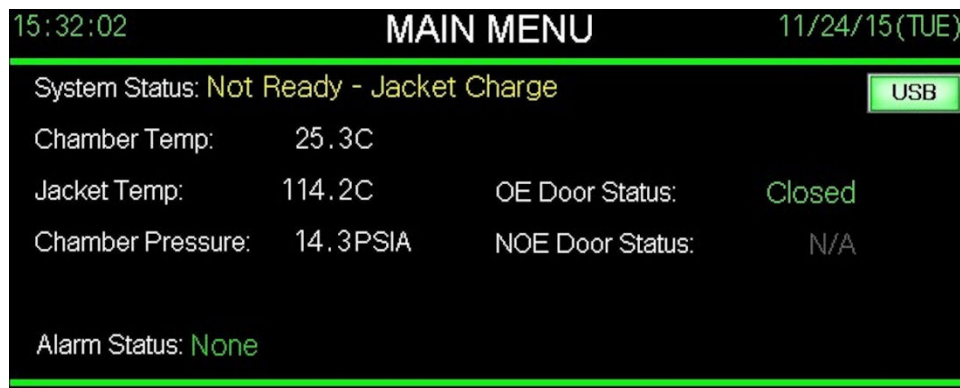


Fig. 2.1

## 2.2 STANDBY SCREEN

The standby screen is the first screen the user will encounter when the control power switch is engaged following boot up. This screen can also be accessed from the main menu and following the execution of the auto standby option (Section 9.1). The standby screen notifies the user that the system is in standby and gives the user the ability to turn the system on by touching the “ON” button. Standby means that the control is powered on but is not in operation. The standby screen also displays the time, date, serial number, and program revision of the control. Figure 2.2 shows a typical standby screen.

## 2.3 MAIN MENU

The main menu displays the status bar, buttons to enter the start screen for all 20 user configurable cycles, 2 user configurable low temp cycles, Bowie Dick and Leak Test. The main menu also gives the user access to the alarm history, historical cycle data, date and time settings, service mode, system setup, and the standby screen. Figure 2.3 shows a typical main menu screen. Some of the screens accessed from the main menu may be password protected depending on the password settings configured in the system setup (Section 9.3).

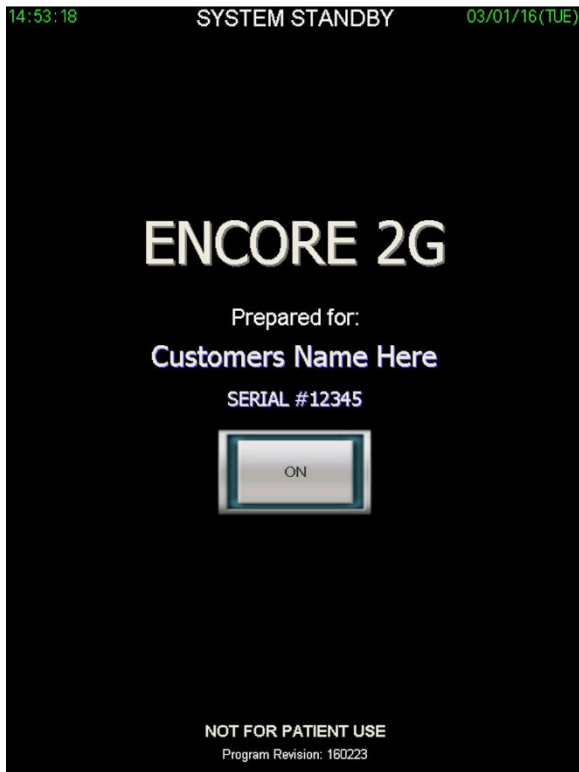


Fig. 2.2

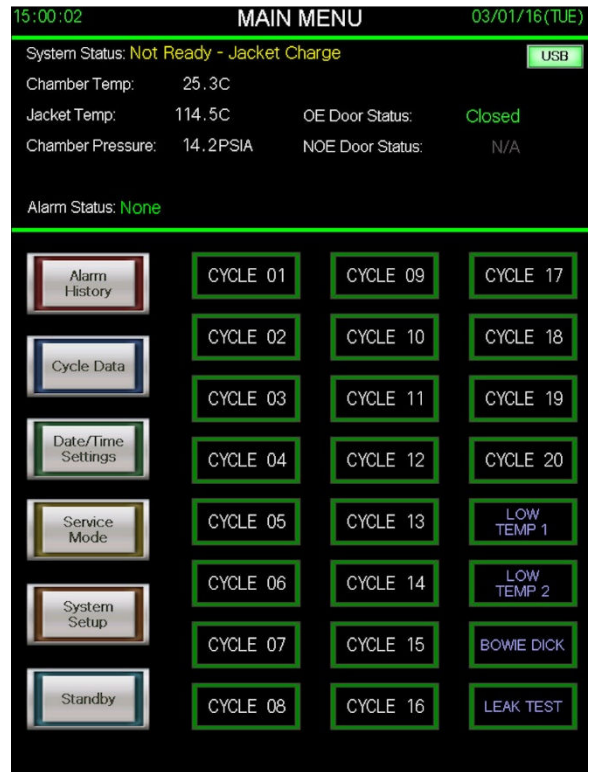


Fig. 2.3

### 2.31 PASSWORD ENTRY

Depending on the configuration of the password settings in the system setup, some screens will require a password to gain access. There are 4 levels of passwords; Operator, Supervisor, Maintenance, and Master. If a screen requires a password, the minimum level required for access will be indicated on the screen, with Operator being the lowest level required and Master being the highest. When the control indicates a password is required, touch the asterisk in the middle of the screen to bring up the numerical keypad (Figure 2.311). Enter your 4 digit password and press enter. Then press OK. If the password is accepted, the screen you are attempting to gain access to will appear. If access is denied, you will remain on your current screen.

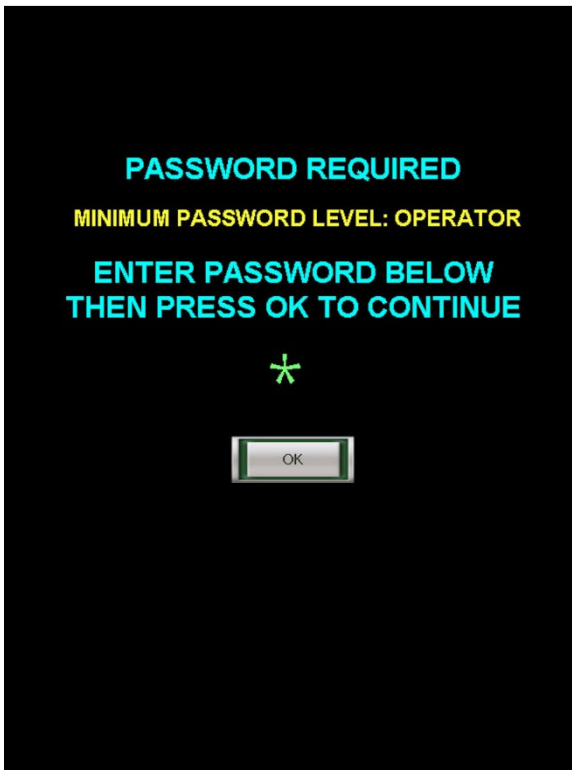


Fig. 2.31

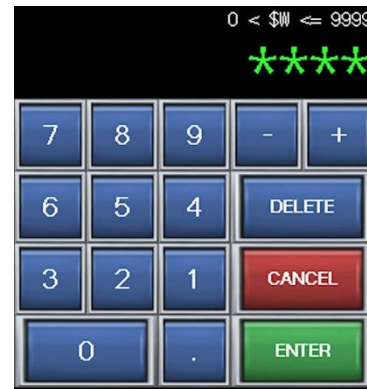


Fig. 2.311

### 2.4 CYCLE START SCREEN (*password level: operator*)

The cycle start screen can be displayed by pressing any of the 20 cycle buttons on the main menu. Figure 2.4 shows a typical cycle start screen. The screen displays a status bar, basic settings for the selected cycle, a start button, and buttons to go to the next cycle, view advanced settings, change cycle settings or return to the main menu. The status bar will also display the approximate duration of the selected cycle in the status bar. If the cycle hasn't been used before or if the cycle settings have been changed since last use, the approximate duration will display 0 hr 0 min.

**2.41 START CYCLE BUTTON**

The start cycle button will start the selected cycle as long as all doors are closed, the jacket temperature is at or above setpoint, and the USB flash memory device is plugged in which is indicated in the status bar. The USB start protection may be disabled in the system setup (Section 9.2). If all of the before mentioned conditions are met and the start cycle button is pressed, the cycle will start immediately, or ask for the operator’s initials before starting. The operator’s initials may or may not be required depending on the system setup. Figure 2.41 shows a typical window to enter operator’s initials. To enter initials, press the green dashes in the center of the screen. A keypad will be displayed (Figure 2.411). Enter initials and press enter. The initials entered will be displayed. If they are correct, press OK and the cycle will start.

**2.42 NEXT CYCLE BUTTON**

Pressing the next cycle button will keep the user in the cycle start screen and advance to the next cycle parameters and settings. For example, if the user selects cycle 10 from the main menu, then presses the next cycle button, the parameters and settings for cycle 11 will be loaded and displayed.

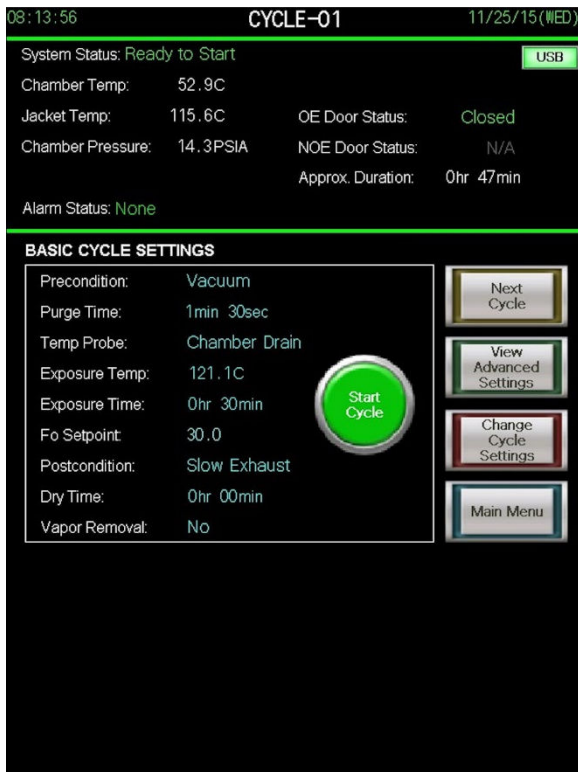


Fig. 2.4

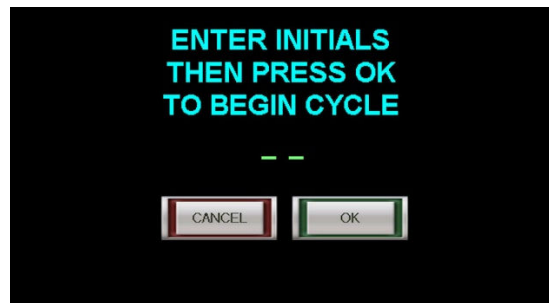


Fig. 2.41

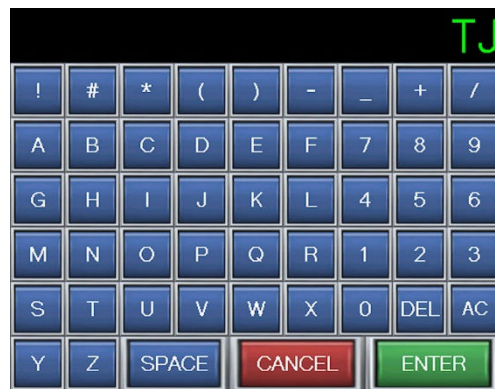


Fig. 2.411



### 2.43 VIEW ADVANCED SETTINGS

Pressing the view advanced settings button shows the user all settings for the selected cycle. Figure 2.43 shows a typical advanced settings screen. If the unit is equipped with an optional printer the user may use the print button on this screen to print the settings for the selected cycle. If the unit is not equipped with the optional printer, the print button will not be available. The OK button returns the user to the start cycle screen.

### 2.44 CHANGE CYCLE SETTINGS (password level: supervisor)

Pressing the change cycle settings button shows the user all settings for the selected cycle and gives them the ability to change those settings. Figure 2.44 shows a typical change settings screen. All changes made are temporary until the save button is pressed. The cancel button ignores any changes that were made and returns the user to the start cycle screen. More information on changing cycle settings can be found in Section 7 of this manual.

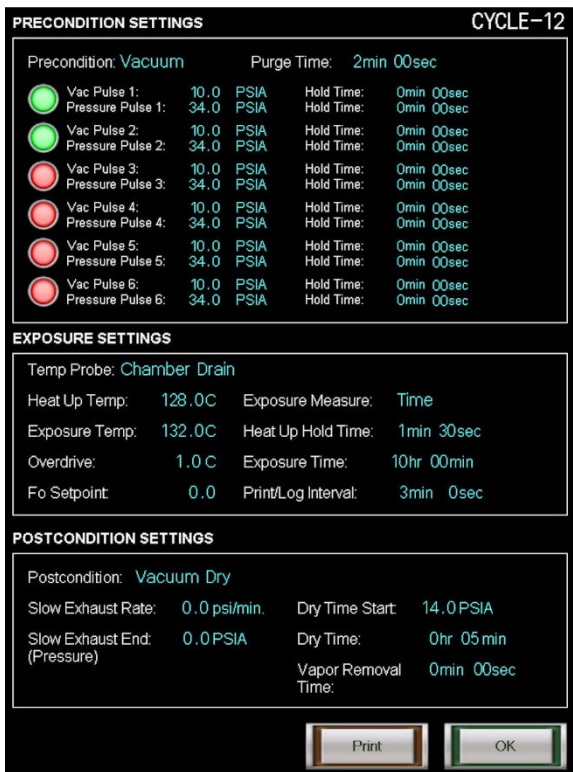


Fig. 2.43

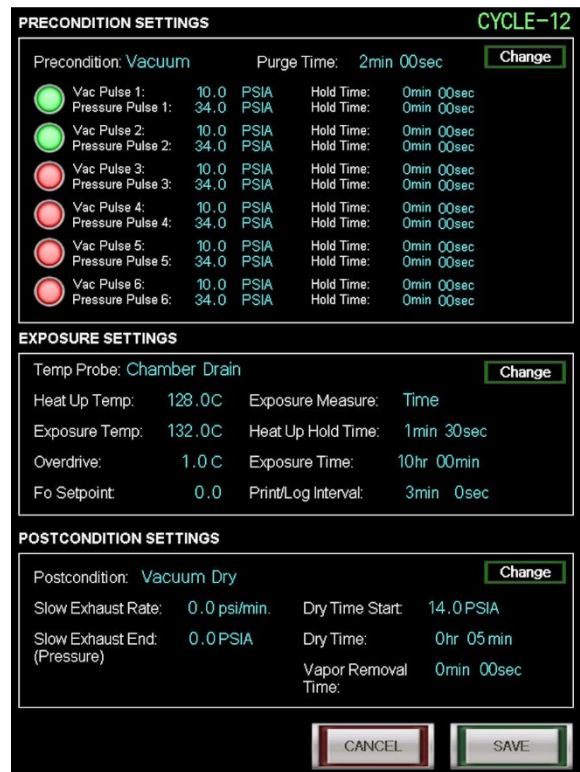


Fig. 2.44

## 2.5 CYCLE RUN SCREEN

The cycle run screen is displayed once a cycle has been started. Figure 2.5 shows a typical cycle run screen. The screen displays a status bar, current cycle status and the ability for the user to toggle between a graph display of the cycle, data log, or input/output view. The graph, data log, and input/output views are displayed at the bottom of the cycle run screen. Graph view is the default view for the start of every cycle. The status bar will display the time the cycle was started and an approximate time the cycle will be completed by. If the cycle hasn't been used before or if the cycle settings have been changed since last use, the approximate time the cycle will be completed by will be incorrect. The cycle status portion of the screen will display the current phase, phase time and the settings that pertain to that phase, as well as an abort button. Pressing the abort button will instantly abort the cycle.

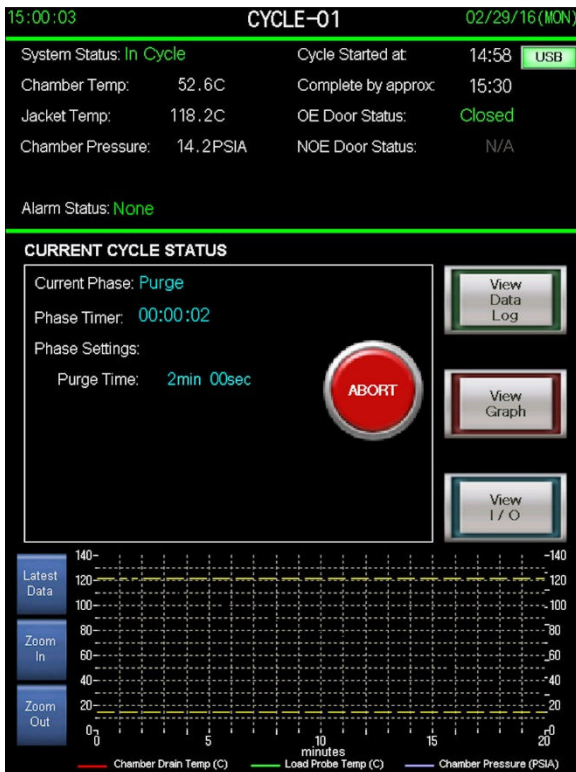


Fig. 2.5

### 2.5.1 VIEW DATA LOG

Pressing the view data log button will display the data log for the current and previous cycles. Figure 2.51 shows a typical data log view. The user may select the list up, list down, and latest data buttons to view current or past data log information. The cycle phase key gives the user the ability to interpret the phase portion of the log. For more information on data logging refer to Section 3 of this manual.



Fig. 2.51

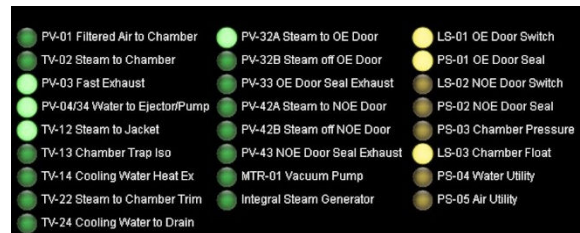


Fig. 2.53

## 2.52 VIEW GRAPH

Pressing the view graph button will display a graph representation of the last 20 minutes of the current cycle. The graph displays chamber pressure and chamber temperature. If the control is equipped with a load probe, the load probe temperature is represented on the graph as well. The user may select the zoom in, zoom out, and latest data buttons to access different views of the graph. If zoom in or zoom out is selected, the user must select latest data to return to the view of the graph with real time updating.

## 2.53 VIEW I/O (INPUTS/OUTPUTS)

Pressing the view I/O button will display the controls inputs (switches) and outputs (valves) that are actuated during the cycle. Figure 2.53 shows a typical inputs/outputs view. This view would typically be used by service technicians to verify proper operation or to diagnose a fault. *Important note: Some inputs and outputs listed in this view may not be used on your sterilizer.*

## 2.6 CYCLE COMPLETE SCREEN

The cycle complete screen is displayed following the completion of a cycle. Figure 2.6 shows a typical cycle complete screen. The screen notifies the user they cycle has completed and the load is ready to be removed. The on screen instructions notifies the user to open the door to remove the load, then press OK. The screen also gives the user a cycle summary including, the maximum/minimum exposure temperature the load was exposed to, condition time, exposure time, exhaust time, and total cycle time. If the unit is equipped with an optional load probe and a Fo cycle was executed, the summary will also include Fo setpoint and Fo achieved during the cycle. Pressing the OK button after opening the door will take the user back to the main menu.

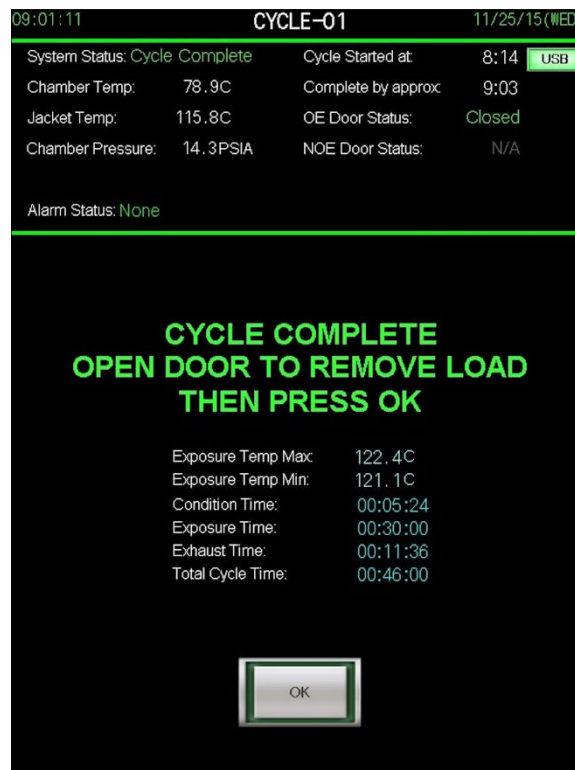


Fig. 2.6

## SECTION 3: CYCLE DATA

The Encore 2G logs all cycle data to a removable USB flash drive. The cycle data that is logged can be viewed on screen by pressing the cycle data button on the main menu screen, or in real time during cycle by pressing the view data log button on the cycle run screen. Users may store and back up the data to a PC using the USB flash drive and the sterilization report software provided. The software can also be used to view and print reports for each cycle that was logged. The same data and cycle reports can be printed to an optional impact printer. This section will describe the data logging/printing functions and the screens/settings associated with each.

### 3.1 LOGGING INFO/SETTINGS

When a cycle is started, the control logs all of the cycle parameters associated with the cycle, assigns a load number, and begins logging cycle data according to the print/log interval setting (Section 7.3) associated with the cycle. Each log contains the current time, phase, chamber pressure, chamber temperature, load probe temperature, and Fo accumulation. At the conclusion of the cycle, the cycle summary is logged including exposure temperature min/max, condition time, exposure time, exhaust time, and total cycle time.

#### 3.1.1 LOAD NUMBER

The load number is a unique number for each cycle executed. The number is assigned according to the exact date and time (military time) the cycle was started. For example, a cycle started on February 25, 2016 at 8:07:25 will be assigned: Load Number 20160225\_080725.

#### 3.1.2 PHASE NUMBER

The cycle phase is logged as a number. A phase key is located on the cycle data screen and the data log view during cycle run to help users interpret the phase. Figure 3.12 also displays the phase key.

Phase Number	Cycle Phase
0	Cycle Start
12	Seal Door(s)
13	Purge
20	Vacuum Pulse
21	Pressure Pulse
30	Low Temp Heat Up
31	Heating Up 1
32	Heating Up 2
33	Exposure
40	Fast Exhaust
50	Slow Exhaust
70	Vacuum Dry
71	Leak Test Evacuate
72	Leak Test Stabilize
73	Leak Test Hold
90	Equalization
91	Unseal Door
95	Vapor Removal
99	Cycle Complete
140	ABORT - Fast Exhaust
150	ABORT - Slow Exhaust
170	ABORT - Vacuum Dry
190	ABORT - Equalization
191	ABORT - Unseal Door
199	ABORT - Cycle Complete
9##	Alarm

Fig. 3.12

### 3.2 CYCLE DATA SCREEN

The cycle data screen can be accessed from the main menu by pressing the cycle data button. Figure 3.2 shows a typical cycle data screen. The screen displays the historical data for every cycle that the users have ever started. The cycle data is stored on an SD card in the back of the touchscreen. The SD card is to never be removed as this data can also be retrieved if there is a failure logging to the removable USB flash drive. The data is viewed in a table displaying the date/time, cycle number, phase, pressure, chamber temperature, load temperature, and Fo accumulation. The blue buttons to the left of the data assist the user in navigating and interpreting the historical data. If the unit is equipped with an optional printer, the user may reprint the previous cycle from the cycle data screen as well.

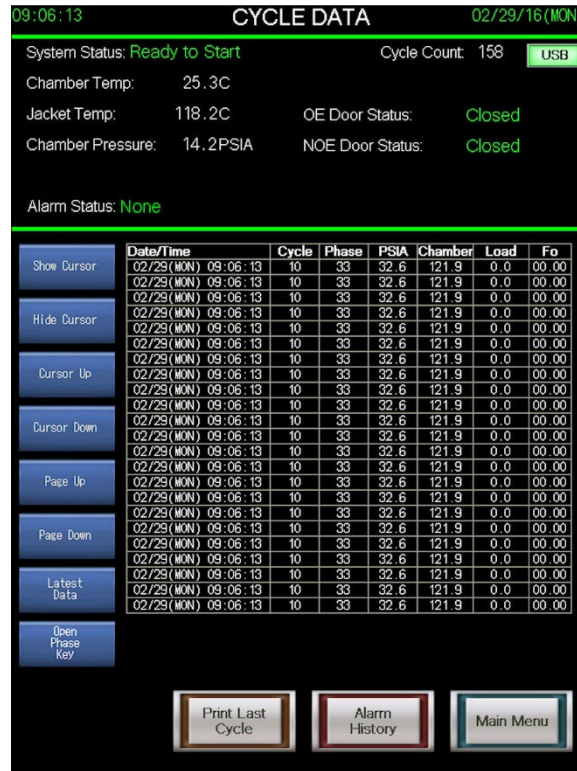


Fig. 3.2

### 3.3 REMOVABLE USB FLASH DRIVE

Each cycle log is stored to the removable USB flash drive located on the front of the touchscreen. The indicator lamp in the top right hand corner of the status bar, lets the user know if the screen recognizes the USB flash drive. If the USB flash drive is inserted, but the indicator lamp does not light up, try unplugging the flash drive and reseating it.

The removable USB flash drive is used to transfer cycle data logs from the Encore series 2G control system to a personal computer for backup storage or to view/print records using the cycle report software (Section 4). Two removable USB flash drives are provided with the control. When one is removed to transfer data to a PC, the user simply inserts the other device to insure no loss of new data while transferring. ***\*IMPORTANT: Make sure the control is out of cycle first when removing the USB flash drive.***

### 3.4 IMPACT PRINTER (OPTIONAL)

The impact printer gives the user a hard copy printout of the cycle logging information at the time the cycle is executed. Figure 3.4 shows a typical cycle printout. The top section of the printout shows the date the cycle was executed and all of the cycle parameters that are relevant to the cycle. The middle section is the cycle log information including time, phase, chamber pressure, chamber temperature, and load temperature. The final section of the printout is the cycle summary including load number, exposure temperature min/max, condition time, exposure time, exhaust time, and total cycle time.

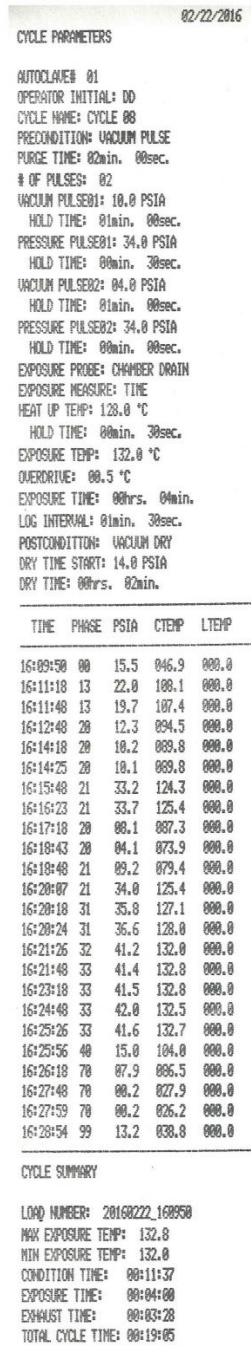


Fig. 3.4

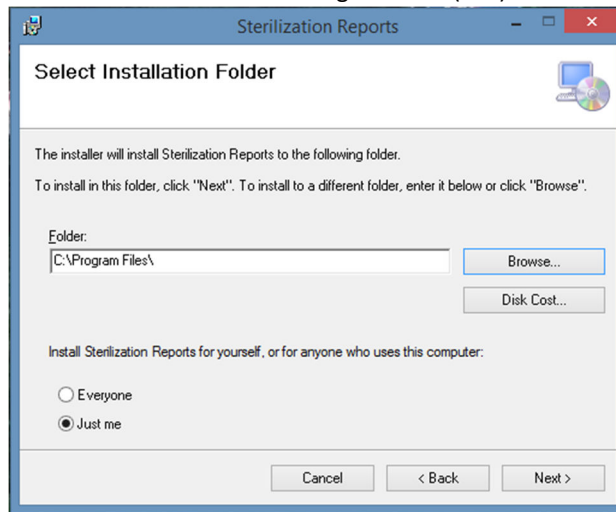
## SECTION 4: STERILIZATION REPORT SOFTWARE

The Encore 2G series control is provided with software for your personal computer to manage, store, view and print cycle reports for each cycle executed. This section describes how to install the software and use it for transferring and managing cycle data.

### 4.1 INSTALLING THE SOFTWARE

The software to install is located on the second removable USB flash drive supplied with this operators guide. If your unit is being installed by a Continental Equipment Company technician, the technician will install the software for you. Otherwise, follow these steps for installing your software to your personal computer:

1. Plug the flash drive into an available USB port on your PC.
2. Open the zipped folder titled “sterilizationreports”
3. Run the setup application.
4. ***THIS STEP IS VERY IMPORTANT.*** Choose a folder to install the software to that you have read/write access to. Do not install to Program Files (x86).



5. Once you have select a folder to install to select Next.
6. You will be asked to confirm the installation. Select Next.
7. The software will be installed. Select Close to close the installer.
8. A “Sterilization Reports” icon will be located on the desktop.
9. Double click the icon to open the program.

### 4.2 SETTINGS TAB

The settings tab of the software is where the user will designate the location and folder that cycle logs will be saved to after importing from the removable USB flash drive. It's also where the user can select categories and parameters they wish to view for their cycle reports. For instance, if the user's autoclave does not have a load probe option, they can move all categories and parameters dealing with Fo or load probe sterilization to the unselected column. Once the user has configured the settings to their liking, clicking save will apply the settings. Figure 4.2 shows a screenshot of the settings tab.

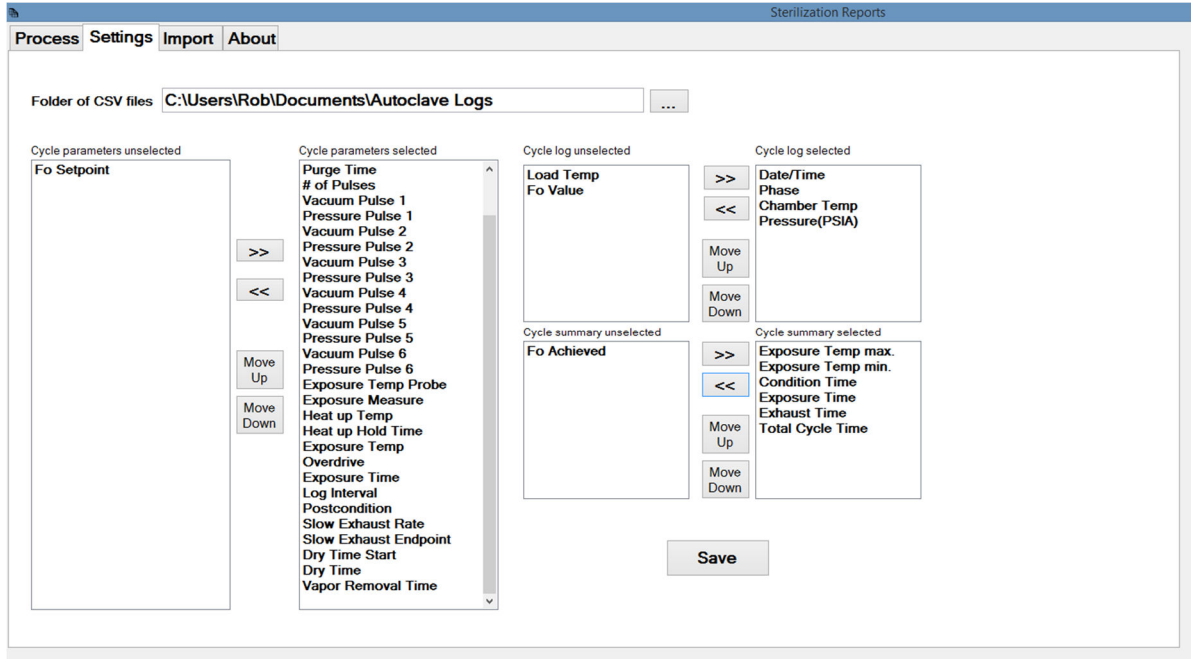


Fig. 4.2



### 4.3 IMPORT TAB

The import tab of the software is used to transfer the cycle logs from the removable USB flash drive to your personal computer. Figure 4.3 shows a screenshot of the import tab. The files will be transferred to the destination folder established in the settings tab. To transfer the files to the destination folder, plug the flash drive into an available USB port on your PC, then select the "Cycle\_Logs\_CSV" folder on the flash drive as your source folder of CSV files. Click "Copy CSV files", and the transfer is completed. The files are transferred to the destination folder. Once the files are transferred, the files on the flash device are removed. You are now ready to use the process tab to view/print your reports.

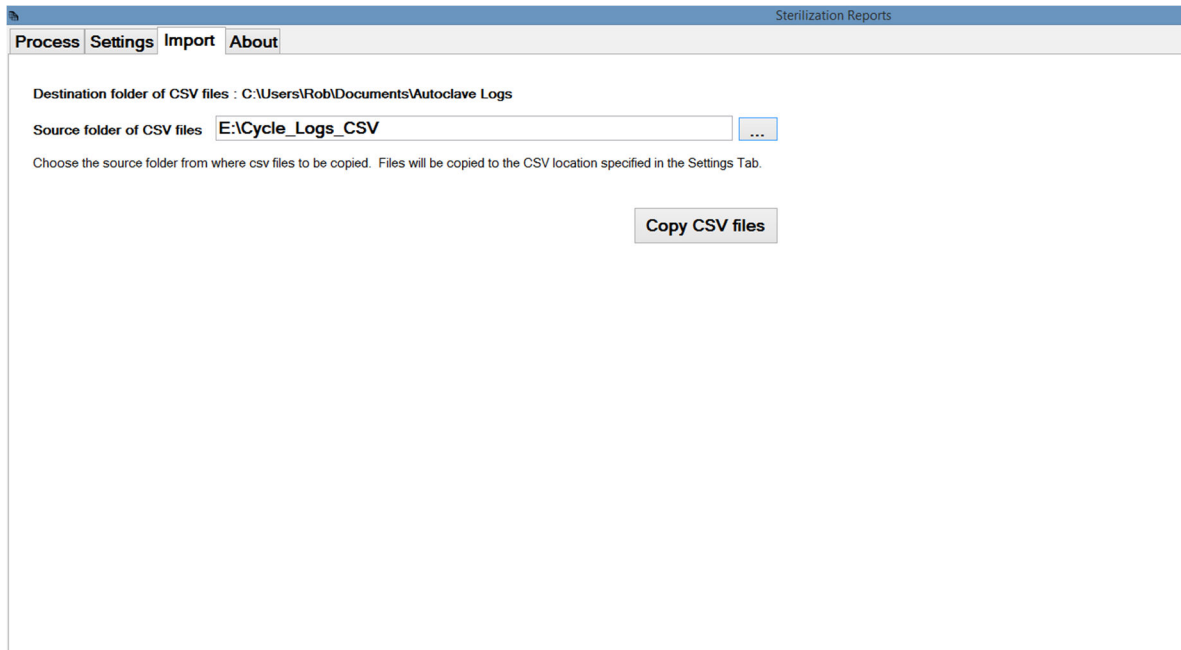


Fig. 4.3

### 4.4 PROCESS TAB

The process tab is used to view and print cycle reports. Figure 4.4 shows a screenshot of the process tab. To view a cycle report, select the load number you wish to view, then click “Generate Report”. The reports are displayed in three categories similar to the printout on the optional impact printer. The Cycle Parameters portion list all of the parameters/settings for the cycle including the cycle name and operators initials (if used). The Cycle Log portion list all of the data points that were collected during the logging process. Unlike the printout on the impact printer, the report software translates the phase and alarm codes for the user, making it much easier to interpret the data. To print the report, click “Print Preview”, select the printer icon in the upper left corner, and print.

**CYCLE PARAMETERS**

Autoclave #	1		
Operator Initials	RB		
Cycle Name	WARM UP		
Precondition	Forced Air Removal		
Purge Time	02 min 00 sec		
# of Pulses	NA		
Vacuum Pulse 1	NA	Hold Time	NA
Pressure Pulse 1	NA	Hold Time	NA
Vacuum Pulse 2	NA	Hold Time	NA
Pressure Pulse 2	NA	Hold Time	NA
Vacuum Pulse 3	NA	Hold Time	NA
Pressure Pulse 3	NA	Hold Time	NA
Vacuum Pulse 4	NA	Hold Time	NA
Pressure Pulse 4	NA	Hold Time	NA
Vacuum Pulse 5	NA	Hold Time	NA
Pressure Pulse 5	NA	Hold Time	NA
Vacuum Pulse 6	NA	Hold Time	NA
Pressure Pulse 6	NA	Hold Time	NA
Exposure Temp Pro...	Chamber Drain		
Exposure Measure	Time		
Heat up Temp	116.5 C		
Heat up Hold Time	01 min 00 sec		
Exposure Temp	121.1 C		
Overdrive	1.0 C		
Exposure Time	00 hr 05 min		

**CYCLE LOG**

Date/Time	Phase	Chamber Temp	Pressure(PS)
16/02/24 10:22:44	Cycle Start	36.2	15.1
16/02/24 10:23:42	Purge	104.2	23.4
16/02/24 10:24:42	Heating Up 1	107.9	21.0
16/02/24 10:25:09	Heating Up 1	116.5	27.5
16/02/24 10:25:42	Heating Up 2	116.5	26.7
16/02/24 10:26:40	Heating Up 2	121.1	31.5
16/02/24 10:26:42	Exposure	121.4	31.8
16/02/24 10:27:42	Exposure	122.1	31.2
16/02/24 10:28:42	Exposure	122.3	31.8
16/02/24 10:29:42	Exposure	122.3	31.2
16/02/24 10:30:42	Exposure	122.2	31.1

**CYCLE SUMMARY**

Exposure Temp max.	122.4
Exposure Temp min.	121.1
Condition Time	00:03:57
Exposure Time	00:05:00
Exhaust Time	00:04:40
Total Cycle Time	00:13:37

Fig. 4.4

## SECTION 5: ALARMS

The Encore 2G series control monitors your sterilizer for operator safety and sterilization quality. The control will notify a user of any potential faults during cycle or out of cycle via the alarm status in the status bar. The control also stores a history of past alarms for reference. This section describes the different types of alarms and how they are cleared, lists the alarms by alarm code, and describes how to access the alarm history.

### 5.1 OUT OF CYCLE ALARMS

If an “out of cycle” alarm occurs, the control will notify the user with an audible tone. The user will also notice the green bars in the status bar turn yellow and an alarm description will be listed in the status bar in yellow text. A clear alarm button will appear in the status bar as well. If the alarm condition no longer exists, pressing the clear alarm button will clear the alarm and return the control to normal operating conditions. If the clear alarm button is pressed and the alarm conditions still exist, the alarm will clear for a few seconds and then reoccur. Figure 5.1 shows a typical out of cycle alarm status bar. If the alarm cannot be cleared or continues to reoccur, a service technician should be notified.

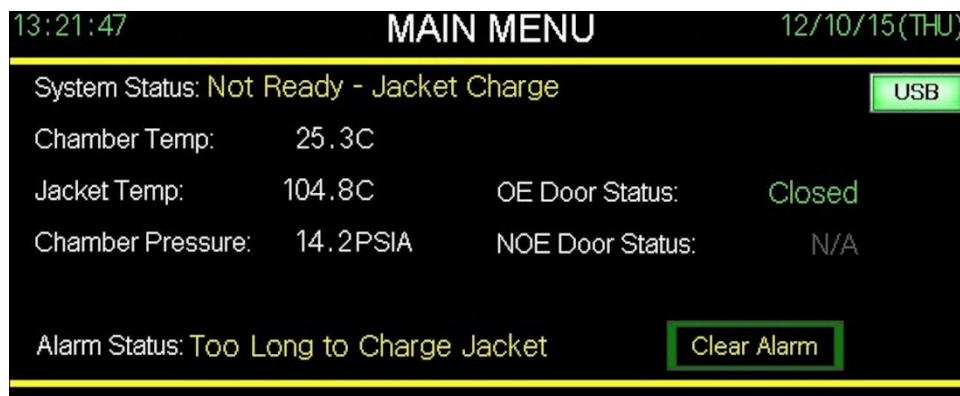


Fig. 5.1

## 5.2 IN CYCLE ALARMS

If an “in cycle alarm” occurs, the control will notify the user with an audible tone. The user will also notice the green bars in the status bar turn yellow and an alarm description will be listed in the status bar in yellow text. “In cycle alarms” can be aborting or non-aborting. All “in cycle alarms” are logged to the data log of the cycle.

### 5.2.1 NON-ABORTING ALARMS

If the alarm is a non-aborting alarm, the cycle will continue. Upon completion of the cycle, the cycle complete screen will notify the user that a non-aborting alarm occurred during the cycle. Figure 5.2 shows a typical cycle complete screen in which the cycle experienced a non-aborting alarm.

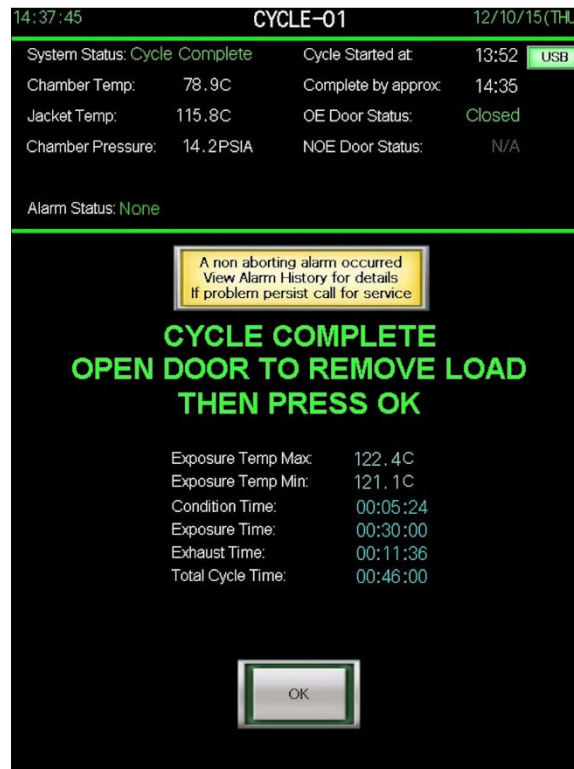


Fig. 5.2

### 5.22 ABORTING ALARMS

If the alarm is an aborting alarm, the cycle will enter an abort sequence. The screen will notify the user that the cycle has been aborted and to wait for the abort sequence to complete. Figure 5.22 shows a typical cycle run screen during an abort sequence. Once the abort sequence is complete, the control will notify the user that the cycle was aborted and instruct the user to open the door then press OK to return to normal operation. Figure 5.23 shows a typical cycle complete screen following the completion of an abort sequence.

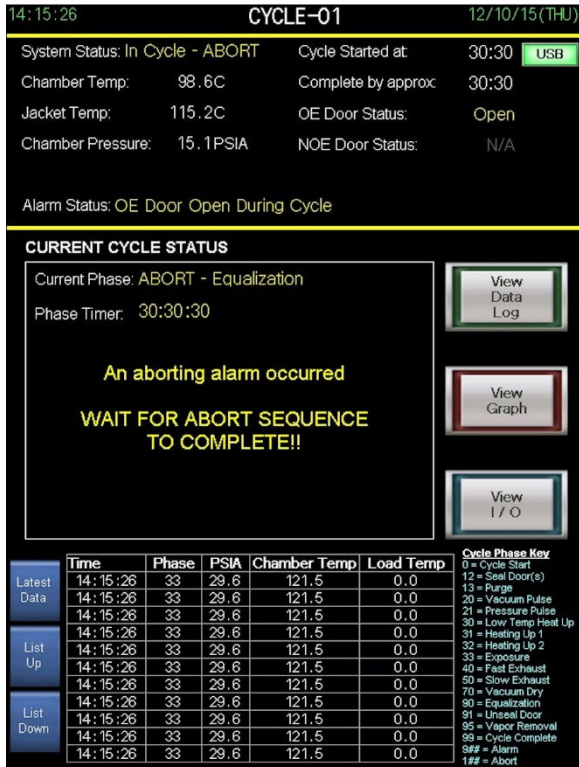


Fig. 5.22

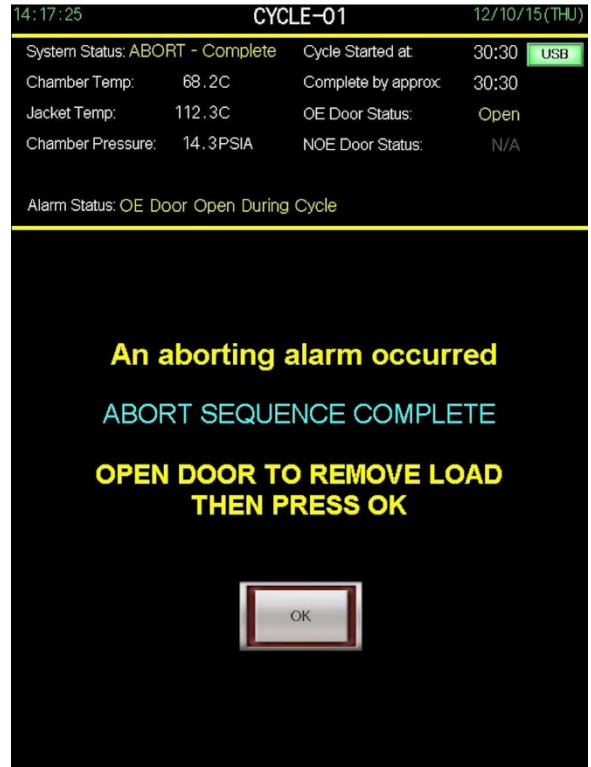


Fig. 5.23

### 5.3 ALARM HISTORY

The alarm history lists descriptions of the last 20 alarms that have occurred along with the date and time that they occurred. The alarm history screen can be accessed from the main menu. Figure 5.3 shows a typical alarm history screen. The alarm history screen also gives the user access to the cycle data history so the user may reference which cycle the alarm occurred during.



Fig. 5.3

## 5.4 ALARM LOGGING CODES

All “in cycle alarms” are logged to the data log of the cycle. The alarm code is found in the phase column of the data log. The code is a three digit number that always starts with a 9. Figure 5.4 is a listing of all of the alarm codes, their description, whether the alarm occurs in or out of cycle and the action taken following the alarms occurrence.

Code	Alarm	In Cycle or Out	Action
901	Operator abort	In Cycle	Abort
902	Pressure reading failure	Out of Cycle	Notify
903	Jacket overtemp	Both	Notify/Abort
904	Chamber overtemp	In Cycle	Abort
906	Drain overtemp	Both	Notify/Nonabort
910	Chamber undertemp	In Cycle	Notify
918	Chamber flooded	In Cycle	Abort
919	OE door open during cycle	In Cycle	Abort
920	NOE door open during cycle	In Cycle	Abort
921	OE door unsealed during cycle	In Cycle	Abort
922	NOE door unsealed during cycle	In Cycle	Abort
923	Too long to charge jacket	Out of Cycle	Notify
924	Too long to seal door	In Cycle	Abort
925	Slow exhaust too fast	In Cycle	Notify
926	Slow exhaust too slow	In Cycle	Notify
927	Too long in vacuum pulse	In Cycle	Abort
928	Too long in pressure pulse	In Cycle	Abort
929	Too long in heat up	In Cycle	Abort
930	Too long to reach exposure	In Cycle	Abort
931	Too long in temp make up	In Cycle	Abort
932	Too long in fast exhaust	In Cycle	Notify
933	Too long in equalization	In Cycle	Notify
934	Pressure/temperature out of range	In Cycle	Abort
935	Analog module error	Out of Cycle	Notify
940	Air utility pressure low	Both	Notify/Abort
950	Power failure during cycle	In Cycle	Abort

**Fig. 5.4**

5.5 ALARM DETAILS

Figure 5.5 list each alarm by code and details how the alarm occurs. Figure 5.52 list each alarm by code and details how the alarm is cleared.

Code	Alarm	Occurs:
901	Operator abort	when the abort keypad is pressed during any point of a cycle.
902	Pressure reading failure	when the chamber pressure reads >16.2 psia or <12.2 psia for longer than 1 minute. *Alarm is not active during service mode
903	Jacket overtemp	when the jacket temperature is greater than the jacket overtemp setting in the system setup.
904	Chamber overtemp	at any point during a cycle when the chamber temperature is greater than the exposure setpoint plus the chamber overtemp setting in the system setup.
906	Drain overtemp	when the drain temperature is >64.0 degrees celsius for longer than 15 seconds.
910	Chamber undertemp	during exposure when the chamber temperature is less than the exposure setpoint for more than 1 second.
918	Chamber flooded	at any point during a cycle when the chamber float switch (LS-03) is not made for more than 10 seconds.
919	OE door open during cycle	at any point during a cycle when the oe door switch (LS-01) is not made for more than 2 seconds.
920	NOE door open during cycle	at any point during a cycle when the noe door switch (LS-02) is not made for more than 2 seconds.
921	OE door unsealed during cycle	at any point during a cycle after the door seal phase when the oe door pressure switch (PS-01) is not made for more than 2 seconds.
922	NOE door unsealed during cycle	at any point during a cycle after the door seal phase when the noe door pressure switch (PS-02) is not made for more than 2 seconds.
923	Too long to charge jacket	during jacket charge when the jacket temperature fails to reach the jacket ready setpoint before the too long to charge jacket alarm timer expires.
924	Too long to seal door	during seal door(s) phase of a cycle when the door(s) fail to seal before the too long to seal door(s) alarm timer expires.
925	Slow exhaust too fast	during slow exhaust phase of a cycle when the slow exhaust phase completes before the slow exhaust too fast alarm timer expires.
926	Slow exhaust too slow	during slow exhaust phase of a cycle when the slow exhaust too slow alarm timer expires before slow exhaust is complete.
927	Too long in vacuum pulse	during vacuum pulse phase of a cycle when the too long in vac pulse alarm timer expires before vacuum pulse is complete.
928	Too long in pressure pulse	during pressure pulse phase of a cycle when the too long in pressure pulse alarm timer expires before pressure pulse is complete.
929	Too long in heat up	during heating up 1 phase of a cycle when the too long in heat up alarm timer expires before heating up 1 is complete.
930	Too long to reach exposure	during heating up 2 phase of a cycle when the too long to reach exposure alarm timer expires before heating up 2 is complete.
931	Too long in temp make up	during exposure phase of a cycle when a chamber undertemp has occurred and the too long in temp make up alarm timer expires before reaching exposure setpoint.
932	Too long in fast exhaust	during fast exhaust phase of a cycle when the too long in fast exhaust alarm timer expires before fast exhaust is complete.
933	Too long in equalization	during equalization phase of a cycle when the too long in equalization alarm timer expires before equalization is complete.
934	Pressure/temperature out of range	during exposure phase of a cycle when the chamber pressure and chamber temperature do not correlate.
935	Analog module error	when the analog rtd or a/d module is not functioning properly.
940	Air utility pressure low	when the air utility pressure switch (PS-05) is made for more than 10 seconds.
950	Power failure during cycle	when the control regains power following a power failure during a cycle.

Fig. 5.5



Code	Alarm	Clears when:
901	Operator abort	the OK keypad is pressed following abort sequence completion.
902	Pressure reading failure	the clear alarm keypad in the status bar is pressed *if the alarm condition still exists, the alarm will reoccur.
903	Jacket overtemp	the clear alarm keypad in the status bar is pressed or the OK keypad is pressed following abort sequence completion.
904	Chamber overtemp	the OK keypad is pressed following abort sequence completion.
906	Drain overtemp	the clear alarm keypad in the status bar is pressed or the drain temperature is less than 64.0 degrees celsius.
910	Chamber undertemp	the chamber temperature is greater than or equal to the exposure setpoint of the cycle.
918	Chamber flooded	the OK keypad is pressed following abort sequence completion.
919	OE door open during cycle	the OK keypad is pressed following abort sequence completion.
920	NOE door open during cycle	the OK keypad is pressed following abort sequence completion.
921	OE door unsealed during cycle	the OK keypad is pressed following abort sequence completion.
922	NOE door unsealed during cycle	the OK keypad is pressed following abort sequence completion.
923	Too long to charge jacket	the clear alarm keypad in the status bar is pressed.
924	Too long to seal door	the OK keypad is pressed following abort sequence completion.
925	Slow exhaust too fast	the OK keypad is pressed following cycle completion.
926	Slow exhaust too slow	the OK keypad is pressed following cycle completion.
927	Too long in vacuum pulse	the OK keypad is pressed following abort sequence completion.
928	Too long in pressure pulse	the OK keypad is pressed following abort sequence completion.
929	Too long in heat up	the OK keypad is pressed following abort sequence completion.
930	Too long to reach exposure	the OK keypad is pressed following abort sequence completion.
931	Too long in temp make up	the OK keypad is pressed following abort sequence completion.
932	Too long in fast exhaust	the OK keypad is pressed following cycle completion.
933	Too long in equalization	the OK keypad is pressed following cycle completion.
934	Pressure/temperature out of range	the OK keypad is pressed following abort sequence completion.
935	Analog module error	the clear alarm keypad in the status bar is pressed *if the alarm condition still exists, the alarm will reoccur.
940	Air utility pressure low	the clear alarm keypad in the status bar is pressed or the OK keypad is pressed following abort sequence completion.
950	Power failure during cycle	the OK keypad is pressed following abort sequence completion.

Fig. 5.52

## SECTION 6: CHANGING DATE AND TIME

The Encore 2G series control uses the clock in the PLC to display and log date and time. The PLC broadcasts the time and date to the touchscreen(s). Every minute, the touchscreen(s) check the PLC to make sure the date and time displayed on the screen(s) are accurate and updates accordingly. This section describes how to change the date and time settings in the PLC.

### 6.1 CHANGING TIME (operator level password)

From the main menu, press the date/time settings button to access the date/time settings screen. Figure 6.1 shows a typical date/time settings screen. The PLC's clock is kept in military time, by hours, minutes and seconds. To change the time, touch the green number under the category you wish to change. A numerical keypad will appear (Figure 6.11). Enter the number you wish to change the time to, and press enter. Repeat for each category. Once you have entered the time you wish to adjust the clock to, press save. The setting changes will take up to 1 minute to be displayed on the screen.

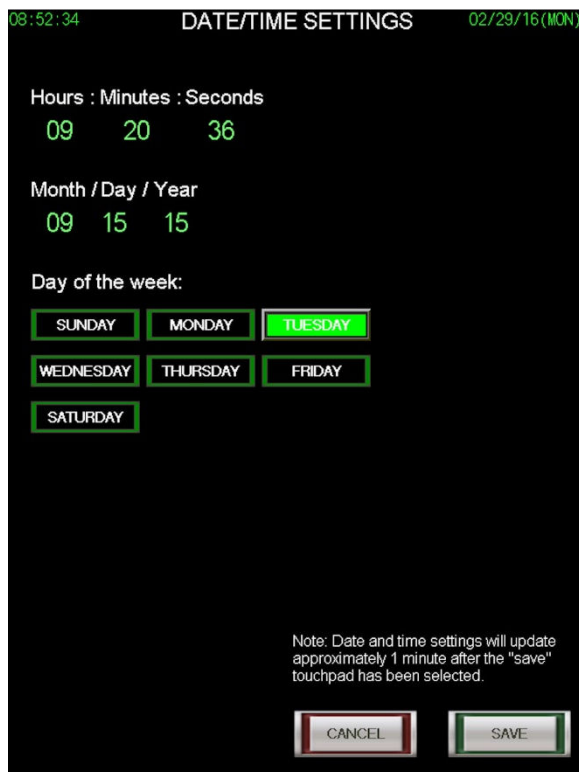


Fig. 6.1

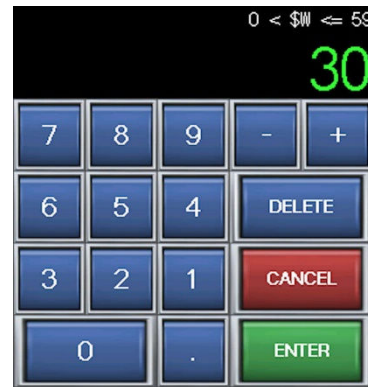


Fig. 6.11

### 6.2 CHANGING DATE (operator level password)

From the main menu, press the date/time settings button to access the date/time settings screen. The PLC's date is kept by the format of, month, day, and year. To change the date, touch the green number under the category you wish to change. A numerical keypad will appear. Enter the number you wish to change the date to, and press enter. Repeat for each category. Once you have entered the date you wish to adjust the clock to, select what day it is, and then press save. The setting changes will take up to 1 minute to be displayed on the screen.

## SECTION 7: CHANGING CYCLE SETTINGS

The Encore 2G’s cycle settings are designed to meet the versatile needs of laboratory, research and scientific end users. This section will describe how to change and save cycle settings, as well as give descriptions for many of the settings. Refer to section 2.4 of this manual for information on how to access the change cycle settings screen. Cycle settings are password protected at supervisor level if made active in the system setup (Section 9.3).

### 7.1 CHANGING CYCLE NAME

The cycle name is located in the upper right hand corner of the change cycle settings screen shown in Figure 7.1. The green text color indicates that touching it will bring up the text key pad shown in Figure 7.12. Once the text key pad is displayed, the user may use a maximum of 8 characters to name the cycle. Pressing the enter button will temporarily change the cycle name. Pressing the save button at the bottom of the change cycle settings screen will record the change. The new cycle name will be displayed on the corresponding cycle selection button on the main menu as well as the heading of the corresponding cycle start screen and cycle run screen.

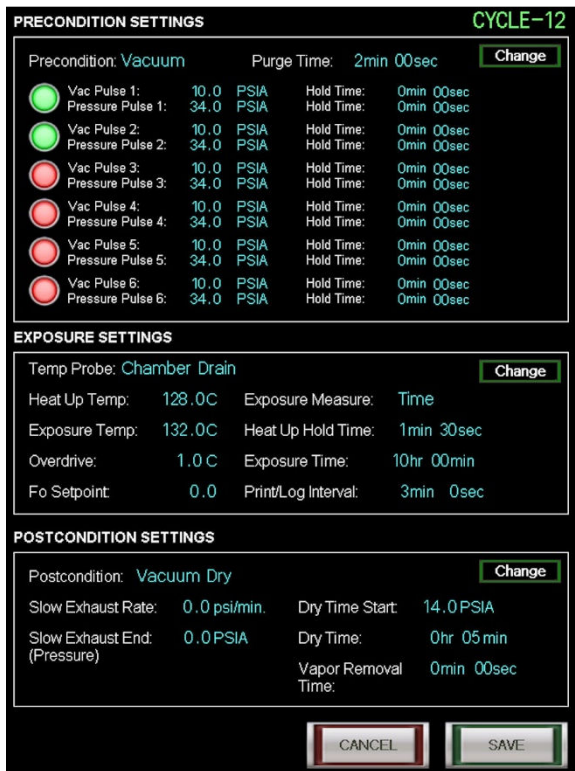


Fig. 7.1

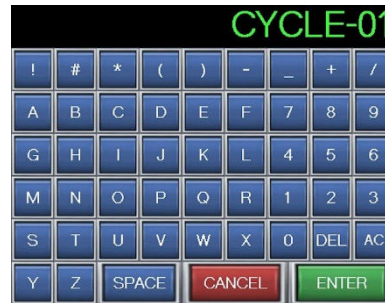


Fig. 7.12

## 7.2 CHANGING PRECONDITION SETTINGS

To make changes to a cycle's precondition settings, press the change button in the upper right hand corner of the precondition settings portion of the change cycle settings screen. Once the change button is pressed, the precondition settings screen will be displayed. Figure 7.2 shows a typical precondition settings screen. The numerical values in green text can be changed by touching the value which will bring up the numerical keypad shown in Figure 7.22. The upper portion of the keypad shows the range of acceptable values for the selected parameter. Touching a green numerical value that does not result in the numerical keypad being shown means that parameter is unavailable. For example, if "Forced Air" is selected, touching the numerical value for any of the pulses will not result in the numerical keypad being displayed.



Fig. 7.2

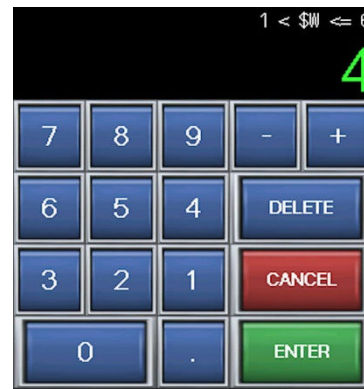


Fig. 7.22

**Forced Air:** When selected, air removal is achieved using gravity displacement. Steam fills the chamber forcing air out through a drain port.

**Vacuum Pulse:** When selected, air removal is achieved using a series of vacuum and pressure pulses.

**Purge Time:** The amount of time the sterilizer uses to allow steam to enter the chamber and displace air through the chamber drain. The purge time is used in both precondition types (forced air and vacuum pulse). The value can be set between 1 minutes 0 seconds and 9 minutes 59 seconds.

**# of Pulses:** The number of pulses used during vacuum pulse preconditioning. The value can be set between 1 and 6. This setting is not used during forced air preconditioning.

**Vac Pulse 1-6:** The level of vacuum to be achieved during vacuum pulse preconditioning. The value can be set between 2.0 and 14.0 PSIA. This setting is not used during forced air preconditioning.

**Pressure Pulse 1-6:** The level of pressure to be achieved during vacuum pulse preconditioning. The value can be set between 15.0 and 40.0 PSIA. This setting is not used during forced air preconditioning.

**Hold Time:** The amount of time the vacuum or pressure level will be held during vacuum pulse preconditioning. The value can be set between 0 minutes 0 seconds and 10 minutes 59 seconds. This setting is not used during forced air preconditioning.

### 7.3 CHANGING EXPOSURE SETTINGS

To make changes to a cycle's exposure settings, press the change button in the upper right hand corner of the exposure settings portion of the change cycle settings screen. Once the change button is pressed, the exposure settings screen will be displayed. Figure 7.3 shows a typical exposure settings screen. The numerical values in green text can be changed by touching the value which will bring up the numerical keypad shown in Figure 7.32. The upper portion of the keypad shows the range of acceptable values for the selected parameter. Touching a green numerical value that does not result in the numerical keypad being shown means that parameter is unavailable.



Fig. 7.3

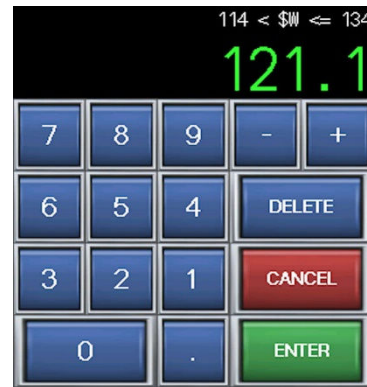


Fig. 7.32

**Chamber Drain:** When selected, the control will use the chamber drain temperature probe as the reference temperature for exposure.

**Load Probe:** When selected, the control will use the optional load probe as the reference temperature for exposure.

**Heat Up Temp:** The initial temperature the chamber will be heated to before attempting to reach exposure. The value can be set between 112.0 and 130.0 C. This setting is not used when load probe is selected.

**Exposure Temp:** The minimum temperature the load will be exposed at during the exposure phase of the cycle. The value can be set between 114.0 and 134.0.

**Overdrive:** The amount of temperature added to the exposure temperature to help maintain exposure temperature and avoid under temperature conditions. This value can be set between 0 and 3.0 C.

**Time:** When selected, the control will use time as the measurement method for exposure.

**Fo:** When selected, the control will use the Fo (F sub-oh) calculations as the measurement for exposure. Fo can only be selected when load probe has been selected as the reference temperature for exposure.

**Heat Up Hold Time:** The amount of time the heat up temperature will be held before attempting to reach exposure. This value can be set between 0 minutes 0 seconds and 10 minutes 59 seconds. This setting is not used when Fo is selected as the exposure measurement method.

**Exposure Time:** The amount of time the load will be exposed to the exposure temperature. This value can be set between 0 hours 1 minute and 6 hours 59 minutes. This setting is not used when Fo is selected as the exposure measurement method.

**Fo Setpoint:** The minimum Fo calculation during the exposure phase to achieve sterilization. The Fo is the number of equivalent minutes of steam sterilization at 121.1 C the load is exposed to. This value can be set between 1.0 and 20.0. This setting is only used when Fo is selected as the exposure measurement method.

**Print/Log Interval:** The amount of time between each print line or USB logging during all phases. This setting can be set between 0 minutes 30 seconds and 10 minutes 59 seconds.

## 7.4 CHANGING POSTCONDITION SETTINGS

To make changes to a cycle's postcondition settings, press the change button in the upper right hand corner of the postcondition settings portion of the change cycle settings screen. Once the change button is pressed, the postcondition settings screen will be displayed. Figure 7.4 shows a typical postcondition settings screen. The numerical values in green text can be changed by touching the value which will bring up the numerical keypad shown in Fig. 7.42. The upper portion of the keypad shows the range of acceptable values for the selected parameter. Touching a green numerical value that does not result in the numerical keypad being shown means that parameter is unavailable.



Fig. 7.4

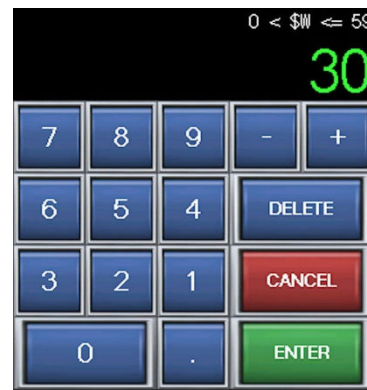


Fig. 7.43

**Slow Exhaust:** When selected, the control will use controlled slow exhaust to bring the chamber pressure down at a specified rate. This setting is typically used with sterilizing liquid loads to allow the load to cool down as the pressure is decreased, preventing boil over.

**Fast Exhaust:** When selected, the control will exhaust the chamber as quickly as possible.

**Vacuum Dry:** When selected, the control will exhaust the chamber as quickly as possible, then pull a vacuum on the chamber and load for a time specified in the dry time setting.

**Dry Time Start:** The chamber pressure at which the dry time setting will start. This setting is only used when vacuum dry is selected. The value can be set between 4.0 and 15.0 psia.

**Dry Time:** The amount of time a vacuum will be drawn on the chamber after the dry time start pressure has been reached. This setting is only used when vacuum dry is selected. The value can be set between 0 hours 0 minutes and 2 hours 59 minutes.



**Slow Exhaust Rate:** The controlled rate in psia per minute that the control attempts to exhaust the chamber pressure. This setting is only used when slow exhaust is selected. The value can be set between 0.5 and 1.5 psia/minute.

**Slow Exhaust End:** The pressure at which the slow exhaust phase will end and the control transitions to the equalization phase. This setting is only used when slow exhaust is selected. The value can be set between 14.5 and 16.5 psia.

**Vapor Removal On/Off:** When set on, the vapor removal phase will attempt to remove vapor from the chamber after the door is unsealed. This setting is not available when vacuum dry is selected.

**Vapor Removal Time:** The amount of time the control will attempt to remove vapor from the chamber. This setting is not available when vacuum dry is selected. The value can be set between 0 minutes 0 seconds and 9 minutes 59 seconds.

## 7.5 RECOMMENDED CYCLE PARAMETERS

The following table provides optimum cycle parameter guidelines for various types of items to that may be processed in your Encore sterilizer. Actual cycle performance will be determined by your specific application and may vary depending on loading, wrapping techniques, size of load, type of load, and the quality of utilities provided.

ITEMS	PRECONDITION	EXPOSURE TEMPERATURE	EXPOSURE TIME	POSTCONDITION	DRY TIME
Glassware, Unwrapped Goods, Utensils, Waste	Forced Air	121 C	30-90 minutes	Fast Exhaust	0 minutes
Wrapped Goods, Packs, Animal Bedding, Cages, Porous Materials	Vacuum Pulse	121 C	20-90 minutes	Vacuum Dry	0-30 minutes
Media, LB Broth, Water	Forced Air	121 C	20-90 minutes	Slow Exhaust	0.75 psia/minute
Unwrapped Goods	Forced Air	132 C	3-10 minutes	Fast Exhaust	0 minutes

### 7.51 RECOMMENDED LIQUID CYCLE PARAMETERS

The following table provides minimum exposure times for various liquid load sizes that may be processed in your Encore sterilizer. Best practice suggests using smaller volumes when possible. Larger liquid volumes will require additional exposure time to achieve desired load temperature. If media containers are placed in drip pans during processing, additional exposure time may be required to achieve desired load temperature.

EXPOSURE TEMPERATURE	LIQUID QUANTITY	EXPOSURE TIME
121 C	75 ml	25 minutes
121 C	250 ml	30 minutes
121 C	500 ml	40 minutes
121 C	1000 ml	45 minutes
121 C	1500 ml	50 minutes
121 C	2000 ml	55 minutes

## SECTION 8: SPECIALTY CYCLES

The Encore 2G series control comes with 2 user settable Low Temp cycles, a factory set Bowie Dick cycle, and a factory set Leak Test cycle. This section of the manual describes the functions and applications of these specialty cycles.

### 8.1 LOW TEMP CYCLE

Low temp cycles are for any cycles with an exposure temperature of less than 115 degrees Celsius. To run a low temp cycle, select one of the two Low Temp buttons on the main menu. Many of the settings associated with typical cycles are used with low temp cycles with exception to precondition settings. The settings are changed using the same method as the other 20 user settable cycles which can be found in Section 7.

### 8.2 BOWIE DICK CYCLE

The Bowie Dick cycle is used in conjunction with a Bowie Dick test pack. The cycle is factory set and cannot be changed. To run the cycle, place a test pack in an empty chamber on the lowest shelf above the drain. Select the Bowie Dick cycle from the main menu and start the cycle.

### 8.3 LEAK TEST CYCLE

The Leak Test cycle is used to test the air-tight integrity of the sterilizer's chamber and piping components. The test exposes the chamber and piping to vacuum conditions and measures how much vacuum is lost over a period of time. The cycle is factory set and cannot be changed. The test consists of preconditioning pulses, a 10 minute evacuation and a 10 minute vacuum hold time. At the completion of that hold time, a leak rate is displayed on the main screen. An acceptable leak rate would be less than 0.3 PSIA/10 min.

## SECTION 9: SYSTEM SETUP

The Encore 2G’s system setup allows a service technician to set the controls system options, system settings, password setting, and alarm settings to meet the needs of the sterilizer and user. The current system settings can be viewed by pressing the system setup button on the main menu. Viewing system setup requires at least a maintenance level password. Figure 9.1 shows a typical system setup screen.

### 9.1 SYSTEM OPTIONS

The system options section of the system setup screen lists the options your sterilizer may or may not have. The settings will have an impact on the usage of the controls inputs and outputs. Once the control is installed and working properly, these settings should not be changed. Upon initial installation or if an option has been added, the system options may be updated. To make changes to the system options, press the change button next to the system options box. Pressing the change button will take you to the system options screen. Figure 9.12 shows a typical system options screen. Once the system options screen is displayed, simply select the options that the sterilizer is equipped with. Press save to set the system options selected or cancel to leave the options as they were.

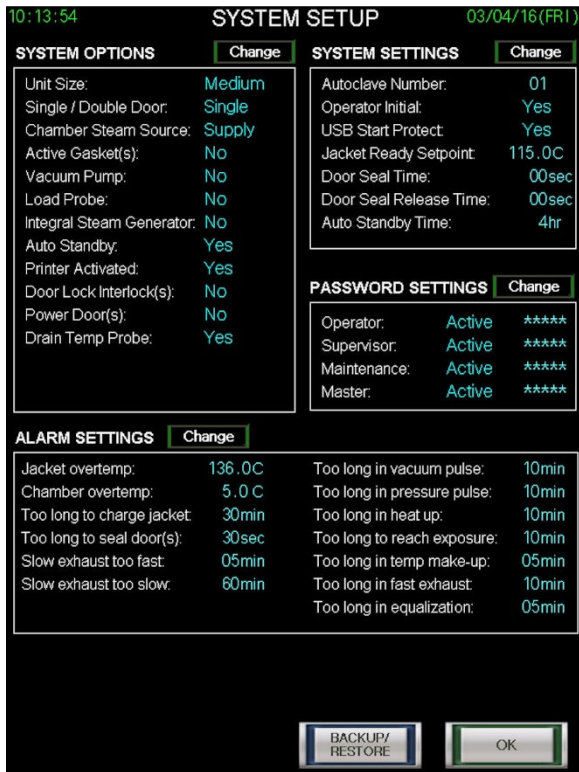


Fig. 9.1

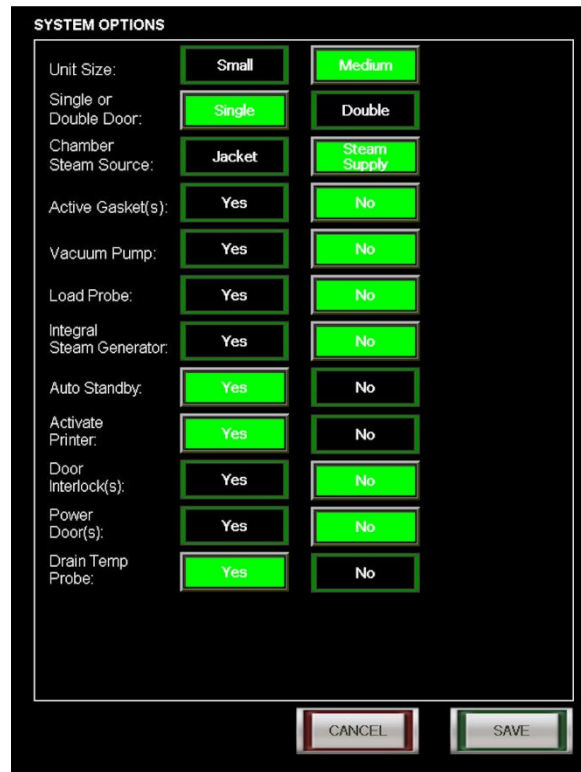


Fig. 9.12

**Unit Size:** Determine the size of the unit and select small or medium. Medium units are typically classified as units 24 x 36 or larger.

**Single/Double Door:** Determine if the unit is has one door or is a passthru and select single or double.

**Chamber Steam Source:** Determine if the unit feeds the chamber steam from the jacket and select jacket or steam supply.

**Active Gasket(s):** Determine if the unit has an active gasket and select yes or no.

**Vacuum Pump:** Determine if the unit has a vacuum pump and select yes or no.

**Load Probe:** Determine if the unit is equipped with a load probe and select yes or no.

**Integral Steam Generator:** Determine if the unit is equipped with an integral steam generator (typically only on small units) and select yes or no.

**Auto Standby:** Determine if the auto standby function is to be used and select yes or no. Auto standby automatically turns the control to the standby screen after a set amount of time of inactivity.

**Activate Printer:** Determine if the unit is equipped with a printer or if the printer is to be used and select yes or no.

**Door Interlocks:** Determine if the unit is equipped with door interlocks and select yes or no. Door interlocks are typically found on units double door units with a bioseal.

**Power Door(s):** Determine if the unit is equipped with power doors and select yes or no.

**Drain Temp Probe:** Determine if the unit is equipped with a drain temperature probe and select yes or no.

## 9.2 SYSTEM SETTINGS

The system settings section of the system setup screen lists settings for certain functions of the Encore 2G control. To make changes to the system settings, press the change button next to the system settings box. Pressing the change button will take you to the system settings screen. Figure 9.2 shows a typical system settings screen. Once the system settings screen is displayed, simply select and set the settings as you would like. Press save to set the system settings selected or cancel to leave the settings as they were.



Fig. 9.2

**Autoclave Number:** This setting is used to give the sterilizer a unique number to differentiate from other units within a facility. The autoclave number is stored in each individual cycle log and printed in the header of printouts if the optional printer is used.

**Operator Initial:** When selected (yes), the operator will be asked to enter their initials when starting a cycle. The operator initial is stored in each individual cycle log and printed in the header of printout if the optional printer is used.

**USB Start Protect:** When selected (yes), the operator will be unable to start a cycle if a removable USB flash drive is not plugged into the USB port on the front of the control.

**Jacket Ready Setpoint:** The temperature at which the jacket will need to be heated to and maintained in order for the operator to start a cycle.

**Door Seal Time:** The amount of time the control will use for the door seal phase of a cycle. This setting is not used if the system option active gasket is set to no.

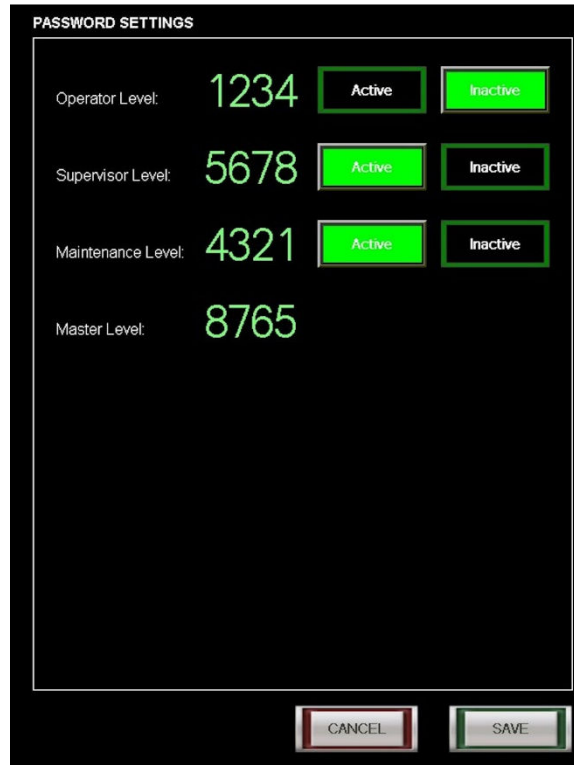
**Door Seal Release Time:** The amount of time the control will use for the door unseal phase of a cycle. This setting is not used if the system option active gasket is set to no.

**Auto Standby Time:** The amount of time the control must be inactive before automatically going to system standby. This setting is not used if the system option auto utility shutdown is set to no.

### 9.3 PASSWORD SETTINGS (password level: master)

The password settings section of the system setup screen lists settings for each password level. To make changes to the password settings, press the change button next to the password settings box. The master level password will be required to enter the password settings screen. Figure 9.3 shows a typical password settings screen. Once the password settings screen is displayed, simply select and set the settings as you would like. Press save to set the password settings selected or cancel to leave the settings as they were.

The password levels are hierarchal, with the operator level being the lowest level and the master the highest level. Making any password level inactive will automatically make the level(s) below it inactive as well.



**Fig. 9.3**

**Operator Level:** When the Operator Level is set to active, operators must have a password to access the cycle start screen for all cycles, as well as the date and time settings.

**Supervisor Level:** When the Supervisor Level is set to active, users must have at least supervisor level access to change cycle settings.

**Maintenance Level:** When Maintenance Level is set to active, users must have at least maintenance level access to enter service mode and system setup.

**Master Level:** Master Level access is required to access the password settings.



## 9.4 ALARM SETTINGS

The alarm settings section of the system setup screen lists settings for many of the alarms. To make changes to the alarm settings, press the change button next to the system settings box. Figure 9.4 shows a typical alarm settings screen. Once the alarm settings screen is displayed, simply select and set the settings as you would like. Press save to set the alarm settings selected or cancel to leave the settings as they were.



Fig. 9.4

**Jacket Overtemp:** Set the temperature at which the Jacket Overtemp alarm will occur.

**Chamber Overtemp:** Set the temperature to add to the exposure setpoint that will cause a Chamber Overtemp alarm to occur.

**Too Long to Charge Jacket:** Set the amount of time to elapse during Jacket Charge that will cause the alarm to occur if the jacket has not reached its setpoint.

**Too Long to Seal Door(s):** Set the amount of time to elapse during Seal Door(s) that will cause the alarm to occur if the door(s) is not sealed.

**Slow Exhaust Too Fast:** Set the amount of time to elapse during Slow Exhaust that will cause the alarm to occur if slow exhaust has already been completed.

**Slow Exhaust Too Slow:** Set the amount of time to elapse during Slow Exhaust that will cause the alarm to occur if slow exhaust hasn't completed.

**Too Long in Vacuum Pulse:** Set the amount of time to elapse during Vacuum Pulse that will cause the alarm to occur if the vacuum pulse hasn't completed.

**Too Long in Pressure Pulse:** Set the amount of time to elapse during Pressure Pulse that will cause the alarm to occur if the pressure pulse hasn't completed.

**Too Long in Heat Up:** Set the amount of time to elapse during Heating Up 1 that will cause the alarm to occur if the phase hasn't completed..

**Too Long to Reach Exposure:** Set the amount of time to elapse during Heating Up 2 that will cause the alarm to occur if the chamber temperature has failed to reach exposure setpoint.

**Too Long in Temp Make-up:** Set the amount of time to elapse during Exposure when the chamber temperature falls below the exposure setpoint that will cause the alarm to occur.

**Too Long in Fast Exhaust:** Set the amount of time to elapse during Fast Exhaust that will cause the alarm to occur if fast exhaust has not completed.

**Too Long in Equalization:** Set the amount of time to elapse during Equalization that will cause the alarm to occur if equalization has not completed.

## 9.5 BACKUP/RESTORE

The backup/restore screen can be reached from the system setup screen by pressing the backup/restore button at the bottom of the screen. These functions are primarily used by a trained service technician in conjunction with the installation of a program revision. A backup may also be used before any major settings changes are made such as a calibration, so that a restore to previous settings could be performed if the new settings are not desirable. Fig. 9.5 shows a typical backup/restore screen.

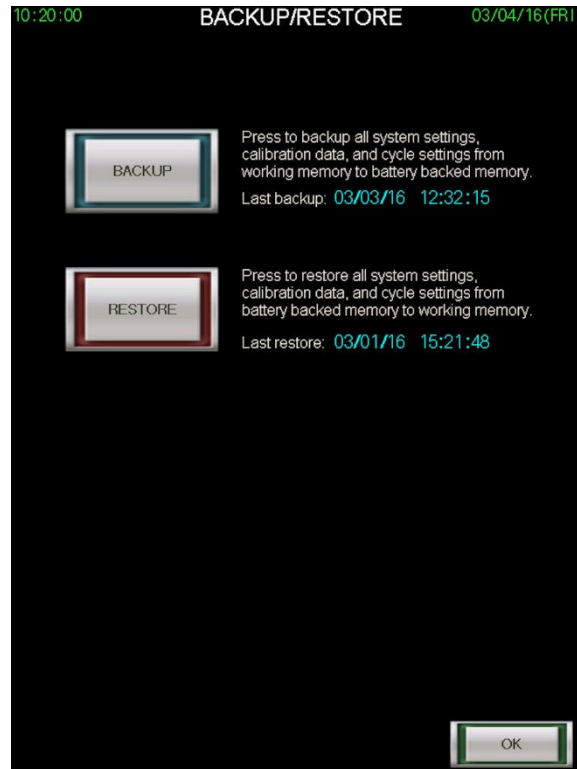


Fig. 9.5

### 9.51 BACKUP

Pressing the backup button will copy all system settings, calibration data and cycle settings from working memory in the EEPROM to the PLC's battery backed up memory. Backups can be done at any time. A backup would typically be performed before the installation of a program revision or prior to major system settings changes.

### 9.52 RESTORE

Pressing the restore button will copy all system settings, calibration data and cycle settings from the PLC's battery backed up memory to working memory in the EEPROM. Restores are typically only performed following the installation of a program revision or following major system settings changes that were not desirable.

## SECTION 10: SERVICE MODE

The Encore 2G’s service mode allows a service technician to test outputs, inputs, analog readings and perform calibration procedures. Service mode is accessed from the main menu and may require a password. This section of the manual will describe the screens and functions of the screens found in service mode.

### 10.1 INPUT/OUTPUT (I/O) TEST

Upon entering service mode, the first screen the technician will see is the outputs screen from the I/O Test, shown in Figure 10.1. The I/O Test button will be lit indicating you are currently in the I/O Test function of service mode. In the I/O Test you may toggle between outputs, inputs and analog view using the associated buttons. Many of the I/O listed on these screens or in the manual output operation are not used on your autoclave. Refer to your control schematic and/or P&ID to determine which inputs, outputs and analog devices are used.



Fig. 10.1

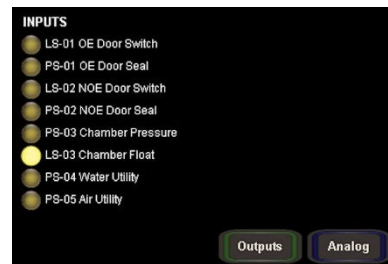


Fig. 10.13

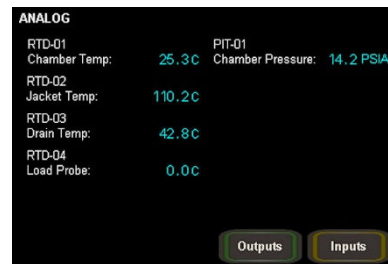


Fig. 10.14

### 10.11 MANUAL OUTPUT OPERATION

The bottom third of the service mode screen are buttons for manual output operation. These buttons can be used for testing individual outputs, manually running a test cycle, or using the sterilizer’s outputs to assist with calibration. The buttons are listed by their P&ID designation. Touching a button will cause the indicator lamp around the button to light up, indicating it has been manually activated. If the indicator lamp around the button does not light up, it indicates that the output is not used on your sterilizer.

## 10.12 OUTPUTS

The outputs listed in this view are listed by their P&ID designation. The outputs description is also listed with the designation. The indicator lamp next to the output designation indicates whether the PLC has activated that output. If an output has been manually activated and the output indicator does not light up, it indicates the PLC did not activate the output. In most cases, an output that is manually activated but does not turn on the associated output, can be attributed to a safety protection. For instance, if the steam to chamber valve is manually activated, but the door is not closed, the output indicator for the valve will not light up and the valve will not be actuated.

## 10.13 INPUTS

The inputs listed in this view are listed by their P&ID designation. The inputs description is also listed with the designation. The indicator lamp next to the output designation indicates whether the PLC recognizes the input as open (not lit) or closed (lit). Figure 10.13 shows a typical view of the inputs window.

## 10.14 ANALOG

The analog readings listed in this view are listed by their P&ID designation. The description is also listed with the designation. The readings shown next to the analog devices are their calibrated readings. An analog device reading 0.0 indicates the device is most likely not used. Figure 10.14 shows a typical view of the analog devices window.

**NOTE:** *If an analog module error alarm occurs, the analog view will display a red indicator lamp next to the device that has caused the error. In most cases, it's caused by the device being unplugged.*

## 10.2 CALIBRATION

Calibration of analog devices is an important feature in the Encore 2G series control. The calibration section of service mode is accessed using the calibration button. The red indicator light around the button indicates you are in the calibration section of service mode. Upon touching the calibration button, buttons for all of the analog devices will appear. Figure 10.2 shows a typical calibration menu. To calibrate a device, simply touch the button of the device you wish to calibrate. Figure 10.21 shows a chamber temperature calibration screen.

All analog devices are calibrated by applying a gain and offset to the raw value. The gain and offset for each device are calculated using the low capture, high capture and calibrate buttons. The following section will describe each buttons use and the values associated with them. **Note: Calibration should be done using a known calibrated device as the reference point.**

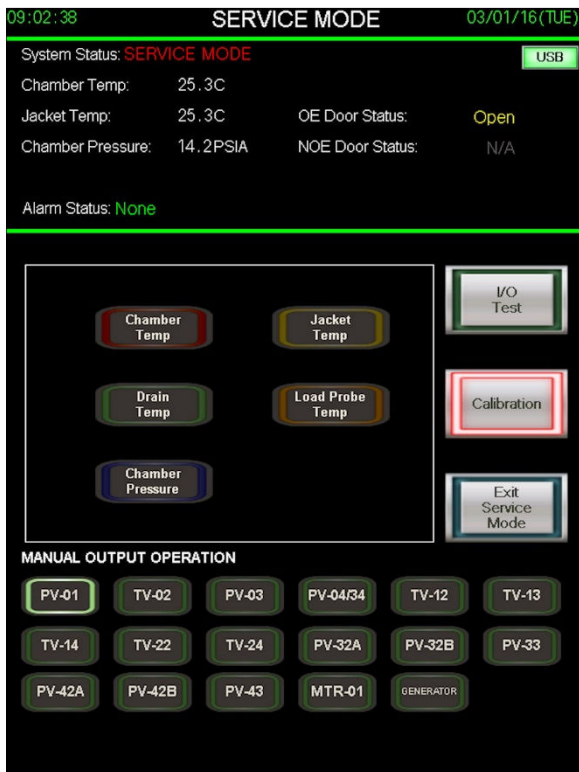


Fig. 10.2

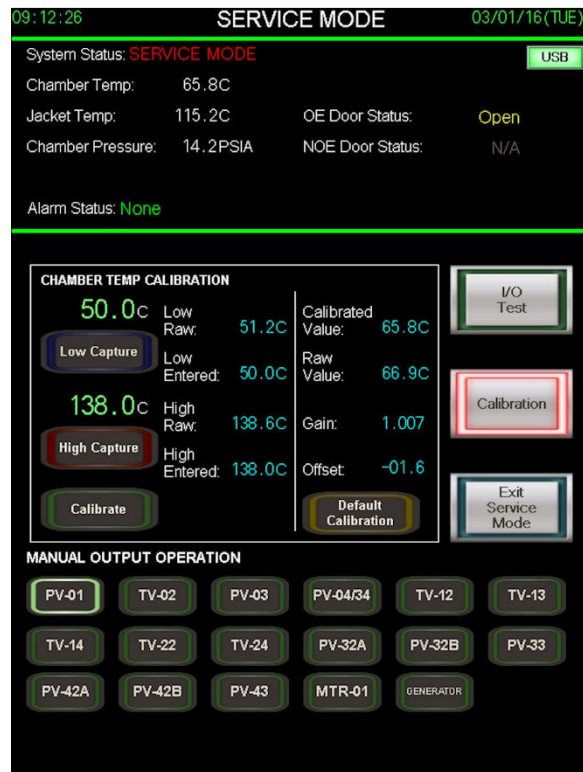


Fig. 10.21

### 10.21 LOW CAPTURE

The low capture button captures both the low raw value and low entered value at the time the button is touched. To enter a low value for calibration, touch the green number above the low capture button and use the numerical keypad to enter the low value of your calibrated reference point. Make sure your calibrated reference point is at the value entered and press the low capture button.

**Low Raw:** The analog reading at the time the low capture button was touched.

**Low Entered:** The value entered above the low capture button at the time the button was touched.

## 10.22 HIGH CAPTURE

The high capture button captures both the high raw value and high entered value at the time the button is touched. To enter a high value for calibration, touch the green number above the high capture button and use the numerical keypad to enter the high value of your calibrated reference point. Make sure your calibrated reference point is at the value entered and press the high capture button.

**High Raw:** The analog reading at the time the high capture button was touched.

**High Entered:** The value entered above the high capture button at the time the button was touched.

## 10.23 CALIBRATE

The calibrate button uses the information collected from the low capture and high capture to calculate the gain and offset to apply to the devices raw value. After touching the calibrate button, a window will pop up asking if you wish to use the low and high values you entered to calibrate the device. Touching no will cancel the calibration. Touching yes will calculate the gain and offset using the high and low values entered.

**Calibrated Value:** The analog reading with the gain and offset applied.

**Raw Value:** The raw analog reading with no gain or offset applied.

## 10.24 DEFAULT CALIBRATION

The default calibration button applies a value of 1.000 to the gain and 0.00 to the offset. Doing this, makes the calibrated value and raw value the same. After touching the default calibration buttons, a window will pop up asking if you wish to apply these default values to the gain and offset. Touching no will cancel this application. Touching yes will apply the default values to the gain and offset. Default calibration is typically used when the accuracy of the analog device is not crucial.

## 10.25 ENTERING GAIN AND OFFSET DIRECTLY

The Encore 2G gives the technician the ability to bypass the low capture, high capture and calibrate process if they choose to calculate the gain and offset on their own or wish to simply make a small change to the gain and offset. Touching the value next to the gain or offset will display a numerical keypad. Key in your value and press enter to change the current value.

**Gain** = (High entered minus Low entered) divided by (High raw minus Low raw)

**Offset** = (Low raw) minus (Gain multiplied by Low entered)

**IMPORTANT:** The gain and offset correction will only give an accurate correct reading between our two known points (low and high). Applying the gain and offset to points lower than the low value point or higher than the high value point will not produce an accurate reading.