

THERMAL PRODUCT SOLUTIONS

SMART 1.1™ HMI CONTROLLER OPERATION MANUAL



Simple - Precise Environmental Chamber Control
For Temperature Only and Temp. / Humidity Chambers



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Rev. 07/18/18

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TABLE OF CONTENTS

1.0	COMPANY INFORMATION AND ASSISTANCE	1
1.1	Contact Information	1
1.2	Parts List	1
2.0	SMART 1.1 CONTROLLER DESIGN.....	2
2.1	Introduction.....	2
2.2	Controller Features	2
2.3	Data Communications Overview.....	3
2.4	Updating the Controller Software Version Overview.....	3
2.5	Power Outage Effect On Smart 1.1 Controller Profile.....	3
3.0	HMI POWER-UP AND SCREEN NAVIGATION GUIDE.....	4
3.1	HMI Power-Up Screen	4
3.2	Navigation Button Functions	5
3.3	Screen Navigation Guide	6
3.4	Keyboards, Keypads, and Notification Screens.....	9
4.0	HMI SCREEN DESCRIPTIONS.....	11
4.1	Home Screen	11
4.2	About Screen.....	12
4.3	Settings Screen	13
4.3.1	Log-In and Change Password Procedures	16
4.3.2	Factory Settings Screen	18
4.3.2.1	Model Select Screen	19
4.3.2.2	Options Screen.....	20
4.3.2.3	Channel 1 Setup Screen	21
4.3.2.4	Channel 2 Setup Screen	22
4.3.2.5	Save Machine Configuration	23
4.3.3	User Settings Screen	24
4.3.4	L Values Screen	27
4.3.5	Communications Screen	28
4.4	Program Editor Screen.....	31
4.4.1	Create New Program Screen	32
4.4.2	Creating & Modifying a Program: The View - Edit Screen	33
4.4.2.1	Add Step Screen	34
4.4.2.1.1	Setpoint Screens – Direct or Ramp Setup.....	36

4.4.2.1.2	Soak Screens	40
4.4.2.1.3	Wait For Screens	45
4.4.2.1.4	Jump Loop Screens	49
4.4.2.1.5	Stop Step Screens	51
4.4.2.2	Edit Step Screens.....	53
4.4.2.3	Insert Step Screen.....	57
4.4.2.4	Delete Step Screen	58
4.4.2.5	Copy Step Screen	59
4.4.3	Load Program To Run Screen	60
4.4.4	Delete Program Screen.....	61
4.5	Program Screen	62
4.6	Logging Screen	63
4.6.1	Trending Screen.....	64
4.6.2	Data Logging Setup Screen	66
4.6.3	Profile Transfer Screen	67
4.6.4	Data File Transfer Screen	69
4.7	Alarms Screen.....	70
4.8	Maintenance Screens	73
4.8.1	Inputs / Outputs Screen	74
4.8.2	SmartWire I/O Screens	75
5.0	SMARTWIRE™ MODULE LIGHT OPERATION.....	78
6.0	DATA COMMUNICATION SETUP PROCEDURES	81
6.1	How to Connect the Smart 1.1 Controller to a Network	81
6.2	How to Connect to Smart 1.1 Controller from Laptop by Ethernet	85
6.3	Remote Client Setup Procedure	91
6.4	Using FTP (FILEZILLA) with Smart1.1 Controller.....	93
6.5	Controller Software Version Update Procedure.....	97
6.6	Smart1.1 Data Communications - Frequently Asked Questions	107
7.0	SMART 1.1 MODBUS APPLICATIONS.....	111
7.1	STEADYSTATE START / IDLE (BIT)	111
7.2	PROFILE START, STOP (BIT)	111
7.3	PROFILE PAUSE RESUME (BIT)	111
7.4	CHANNEL 2 ENABLE (BIT).....	112
7.5	CELSIUS / FAHRENHEIT (BIT).....	112

7.6	CHAMBER LIGHT ON / OFF (BIT)	112
7.7	ALARMS BUZZER / SILENCE (BIT)	113
7.8	ALARMS (BIT).....	113
7.9	EVENT 0 / AMBIENT COIL (BIT).....	115
7.10	EVENT 1 (BIT)	116
7.11	EVENT 2 (BIT)	117
7.12	EVENT 3 (BIT)	118
7.13	EVENT 4 (BIT)	119
7.14	EVENT 5 (BIT)	120
7.15	EVENT 6 (BIT)	121
7.16	BEGINNING STEP NUMBER (UINT)	122
7.17	CHANNEL 1 SETPOINT (FLOAT).....	123
7.17.1	TRIGGER - CHANNEL 1 SETPOINT	124
7.18	CHANNEL 1 PV (FLOAT)	124
7.19	CHANNEL 1 PID OUTPUT (INT).....	125
7.20	CHANNEL 2 SETPOINT (FLOAT).....	125
7.20.1	TRIGGER - CHANNEL 1 SETPOINT	126
7.21	CHANNEL 2 PV (FLOAT)	127
7.22	CHANNEL 2 PID OUTPUT (INTEGER).....	127
7.23	CURRENT STEP NUMBER (UINT).....	128
7.24	CURRENT STEP TYPE (UINT).....	128
7.25	CURRENT STEP HOURS (UINT)	129
7.26	CURRENT STEP MINUTES (UINT).....	129
7.27	CURRENT STEP SECONDS (UINT)	130
7.28	ELAPSED TIME HOURS (UINT)	130
7.29	ELAPSED TIME MINUTES (UINT).....	131
7.30	ELAPSED TIME SECONDS (UINT)	131
7.31	JUMP COUNTER (UINT).....	132
7.32	STEP TYPE (STRING)	132
8.0	PROFILES OVERVIEW	133
8.1	START / STOP PROFILE (BIT)	133
8.2	PAUSE / RESUME PROFILE (BIT)	133
8.3	LOAD PROFILE (BIT)	134
8.4	LOAD PROFILE (BIT)	134
8.5	RUNNING PROFILE NAME.....	134

8.6	REFRESH PROFILE LIST	136
8.7	LIST OF PROFILES (FOR SELECTION)	137
8.8	SELECT PROFILES	147

MANUAL REVISIONS:

Initial Release: 07 - 18 - 18

1.0 COMPANY INFORMATION AND ASSISTANCE

Congratulations on purchasing a chamber from one of the fine divisions of Thermal Product Solutions. Your chamber has been designed to operate with the reliability you expect for the demands you impose on your product and research testing. We truly hope that every aspect of chamber design and quality will measure up to your strictest standards.

Headquartered in New Columbia, Pennsylvania, Thermal Product Solutions includes the following eight divisions that manufacture environmental test chambers, industrial ovens, and furnaces. The Gruenberg, Lunaire, and Tenney divisions are located in New Columbia, Pennsylvania, which is in the North-Central part of the state. Blue M and Wisconsin Oven are located in East Troy, Wisconsin. Lindberg and MPH are located in Riverside, Michigan. Baker Furnace is located in Brea, California.

» Baker Furnace » Blue M » Gruenberg » Lindberg/MPH
 » Lunaire » Tenney » Wisconsin Oven

1.1 CONTACT INFORMATION

Address:	Thermal Product Solutions	Main Number:	570 - 538 - 7200
	2821 Old Route 15	Toll Free Number:	1 - 800 - 586 - 2473
MADE IN USA!	New Columbia, PA 17856	Website:	www.thermalproductsolutions.com
Main Fax:	570 - 538 - 7380		
TPS Service Fax:	570 - 538 - 7391		
Parts Fax:	570 - 538 - 7391	Parts E-mail:	partswd@thermalproductsolutions.com
Tenney / Lunaire Service E-Mail:			tenney.service@tenney.com
Blue M Service E-Mail:			bluem.service@tpsovens.com
Gruenberg Service E-Mail:			gruenberg.service@tpsovens.com

1.2 PARTS LIST

Your equipment has been designed and manufactured to provide years of reliable service. In the event a component should fail, it is recommended that only Original Equipment Manufacturer (OEM) approved parts be used as replacements. Please contact the TPS Parts Department for component replacement or repair.

Parts and service inquiries for equipment within each division should be directed to Thermal Product Solutions by any means listed in the Contact Information section above.

Important! Please have the **Model** and **Order Numbers** of your unit available when contacting us.

Model No. _____ **Order No.** _____

2.0 SMART 1.1 CONTROLLER DESIGN

2.1 INTRODUCTION

The Smart 1.1™ HMI Color Touchscreen Controller is designed in the tradition of the long proven line of VersaTenn Environmental Chamber Controllers. These include the VersaTenn I, II, and III Control Systems with pushbutton control, and the VersaTenn IV and V Touch Interface (HMI) Control Systems.

After the VersaTenn HMI series, Tenney developed the innovative Smart 1.0™ HMI Color Touchscreen Controller. Tenney now introduces the advanced Smart1.1™ HMI Color 7" Touchscreen Controller with a greatly improved high resolution touchscreen and more comprehensive controls.

Smart and simple! This new HMI controller features an integrated Programmable Logic Controller with a multitude of user friendly navigation and control screens. An innovative panel wiring feature from Eaton Corporation is employed, which incorporates their new SmartWire-DT™ intelligent panel control wiring system.

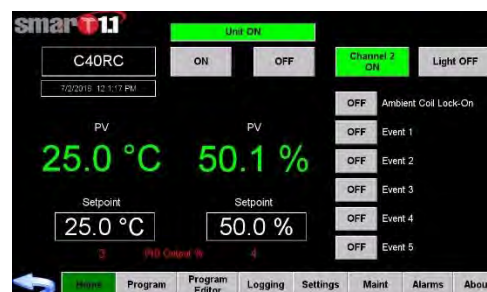
2.2 CONTROLLER FEATURES

The Smart 1.1™ Control System applies Tenney's proven environmental control technology with the ultimate in simplicity and versatility. This one / two channel controller employs a 7" color touchscreen terminal that incorporates powerful graphics capabilities using the Eaton Corporation's XV300 PLC / HMI. The control system is outfitted with Eaton's SmartWire-DT™ technology. SmartWire connects devices to the PLC DIN-rail mounted modules using eight conductor flat cable.

Programs are in the form of **CSV** files. These can be created on the controller via a program editor wizard, moved from another unit or library with a USB stick, or by a network connection. Data communications is provided in Ethernet / IP or Modbus / TCP.

The Smart 1.1 Controller is precisely designed to take complete command of the chamber's conditioning systems. PLC logic automatically selects conditioning modes as required, with total programming of temperature / humidity versus time. The main features are listed below.

- 1 / 2 Channel
- Single Setpoint – Manual Selectable Control
- Programmable Control – Selectable: Profiles are created as standalone named SMART1 (CSV) files. A list box enables the user to edit or load a CSV profile.
- Profiles – Up to 100 viewable profiles are available on HMI. If more than 100 profiles are on the controller, only the first 100 will be shown.
- Profile Steps – Up to 99 Steps are possible in each profile.
- 2 Process Inputs: Chan. 1 - 100 Ohm Platinum RTD, Chan. 2 - Dry Capacitance Humidity Sensor



HOME SCREEN



- 4 PID Loops
- Ramp / Soak Programming For All PID Loops

- Temperature Control Outputs - PID / On-Off
- Humidity Control Outputs - PID / On-Off
- 5 Event Outputs
- Alarm Output for Each Channel
- Ethernet / IP, Modbus / TCP Communication. This port can be used to manage profiles or data logging files. It can connect the controller to your network or laptop.
- USB Port: This port is used to download data logging files from the Smart 1.1 Controller. Data logging is stored as a **.CSV File** viewable in Excel.

2.3 DATA COMMUNICATIONS OVERVIEW

The following data communication protocols may be provided with the Smart 1.1 Controller HMI / PLC. Go to the Settings / **Communications Screen** in Section 4.3.5 for a complete description of the standard and optional protocols listed below.

IMPORTANT NOTE: Please refer to Section 6.0 for all Data Communication Setup Procedures.

Note: Section 6.6 comprises 'Frequently Asked Communication Questions'.

- Ethernet TCP / IP - - **Standard**
- Modbus TCP - - **Standard**
- OPC Server that is configured for Modbus - - **Customer must purchase**
- Modbus RTU - - RS-485 - - **Standard** (RS-232 is available with optional converter plug installed.)
- Modbus IEEE - 488 GPIB - - **Optional** with ICS IEEE board installed
- Remote Access - - Remote Client and VNC Software Applications using Ethernet. Remote Client and VNC provide a real time interactive display of the Smart 1.1 Controller HMI on the customer's PC (or cell phone, or tablet), with the same basic functionality using the PC mouse or track pad. - - **Must download**

2.4 UPDATING THE CONTROLLER SOFTWARE VERSION OVERVIEW

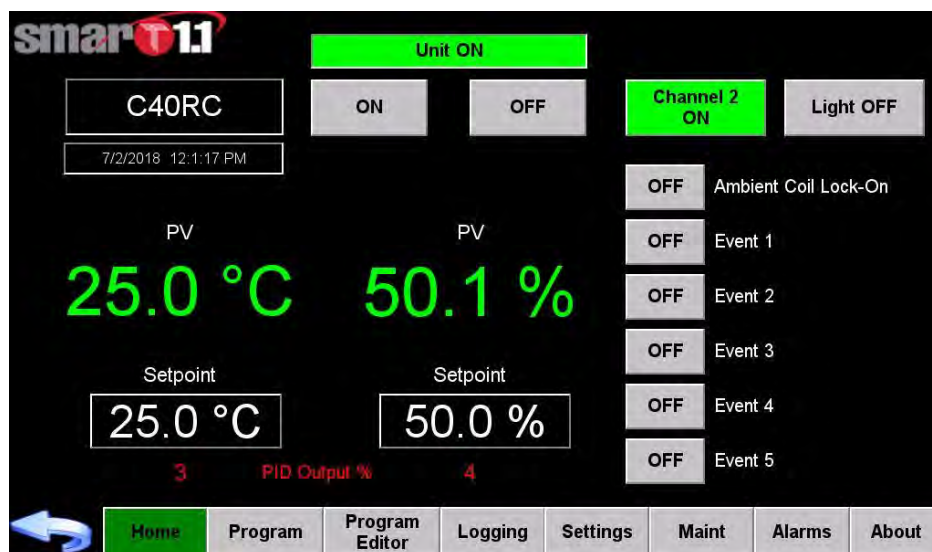
The controller software version can be updated via the USB port. Please go to Section 6.5 for the procedure.

2.5 POWER OUTAGE EFFECT ON SMART 1.1 CONTROLLER PROFILE

In an event of a power outage, once power is reapplied to the chamber the controller will automatically resume operation from where it left off. This includes both manual and profile operations.

3.0 HMI POWER-UP AND SCREEN NAVIGATION GUIDE

3.1 HMI POWER-UP SCREEN



HOME SCREEN

The **Home Screen** is the first screen that appears after a successful power-up of the chamber. This screen permits single setpoint / manual control of your chamber.

IMPORTANT NOTE: The Home Screen is fully described in **Section 4.1**.

Navigation buttons are provided along the bottom of the screen to advance you to various screens for the setup and operation of your chamber. Follow the **Navigation Button Function** chart in **Section 3.2** and the **Screen Navigation Guide** in **Section 3.3** for quick reference instructions. Full descriptions of all screens are then provided in proceeding sections.

3.2 NAVIGATION BUTTON FUNCTIONS

Button	Functions	Ctrl + Click to Follow Link	Section
Return Arrow	Return to the previous screen from any screen.		N/A
Home	Perform chamber operation in Manual Mode .		4.1
About	TPS Contact Info, Complete Controller Information, and On-board Clock		4.2
Settings	Log In & Password Change , Access to Factory Settings, User Settings, L Values, Data Communication Settings, and Update HMI / PLC Procedure		4.3
Program Editor	Create, edit, load, and delete profiles.		4.4
Program	Perform chamber profile operation in Program Mode .		4.5
Logging	Trending Screen, Data Logging Setup, Profile Transfer, Data File Transfer		4.6
Alarms	Current / Historical alarms & messages, Acknowledge alarms, Configuration		4.7
Maint	View I/O, SmartWire I/O Screens.		4.8



Return to Previous Screen Button

MAIN SCREEN NAVIGATION BUTTONS

Home

Program

Program Editor

Logging

Settings

Maint

Alarms

About

The Following Screen Functions & Sub-screens Will Appear When Pressed

↓

↓

↓

↓

↓

↓

↓

↓

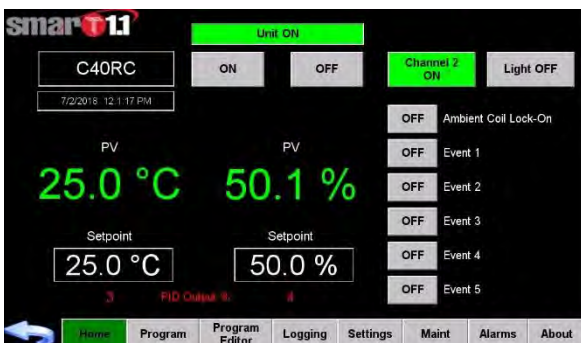
Manual Mode Operating Screen	Program Mode Operating Screen	Load Program to Run	Trending (Screen Graph)	Log In Password Change	Inputs / Outputs	Alarms	Controller Info Display
		View / Edit Program	Datalog	Factory Settings	SmartWire I/O	Alarm Configuration	
		Create New Program	Profile Transfer	User Settings		Alarm History	
		Delete Program	Data File Transfer	L Values			
				Data Comm.			
				Update HMI / PLC			

3.3 SCREEN NAVIGATION GUIDE

The following screens appear immediately upon pressing the **main navigation buttons**.

HOME Screen

Home



The Home Screen is the first screen that appears after a successful power-up of the chamber. This screen permits single setpoint / manual control of your chamber for Channel 1 and 2.

Channel 2 can be turned ON and OFF. Setpoints for both Channel 1 and 2 can be entered. Optional equipment and Event outputs can be turned ON and OFF.

ABOUT Screen

About



The About Screen displays the following software versions, addresses, memory storage, and other information pertinent to your Smart1.1 Controller.

- TPS Company Contact Information
- Controller Serial Number & IP Address
- SubNet Mask Address
- Gateway Address
- Mac Address
- TPS Software Versions for HMI & PLC
- SD Card Memory (bytes) - Free & Total

You may change the **date and clock settings** by pressing the date / time stamp display / entry box.

Program

PROGRAM Screen

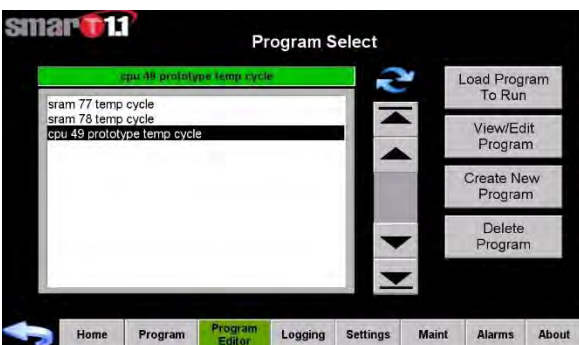


The Program Screen permits operation of your chamber in the program mode. After loading the profile to run through the Program Editor Screen, you can start, stop, pause, and resume the profile.

The entire program step listing can be viewed from the “Press to View” program window at the top. Optional equipment and Event outputs ON / OFF statuses are displayed.

Program Editor

PROGRAM EDITOR Screen

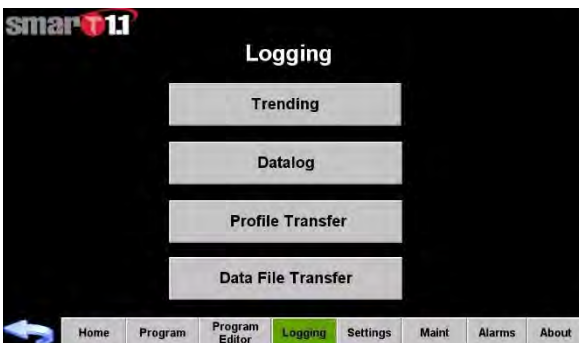


The Program Editor Screen permits you to advance to the following functions and screens.

- Load Program To Run
- View / Edit Program – Create up to 99 steps in each program
- Create New Program - Up to 100 Programs
- Delete Program

Logging

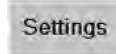
LOGGING Screen



Provides access to the following screens with various functions.

- Trending Screen – Temp. & Humidity Graphs
- Datalog Screen – Select logging interval. Start / Stop logging.
- Profile Transfer – Transfer profiles between controller SD card and USB Drive.
- Data File Transfer – Transfer all data log files from SD card to USB drive. Can delete all data files without transferring.

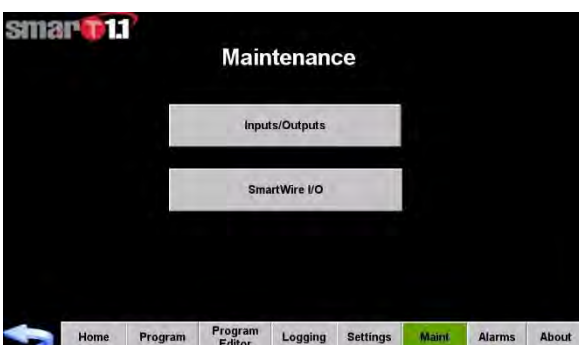
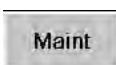
SETTINGS Screen



Provides access to the following screens and settings that can be edited.

- Log In & Password Change
- User Settings Screen – Set PIDs, ° C / ° F, and Output Retransmit Configuration, Access to Factory Settings Screen
- L Values Screen – Set parameters for the programmable logic that controls processes.
- View Data Communication Types & Settings

Maintenance Screen



Provides access to the following screens.

- Input / Output (I/O) Screen (Digital)
- SmartWire I/O Screens - Analog, Digital, and DIL Modules

ALARMS Screen



The Alarms Screen displays all active alarms with the date and time they occurred. The following functions are included.

- Alarm Silence
- Alarm History
- **Alarm Configuration** permits the setup of **low / high limit setpoints, and deviation band alarm setpoints** for Channel 1 & 2.
- Acknowledge Alarm

3.4 KEYBOARDS, KEYPADS, AND NOTIFICATION SCREENS

Various keyboards, keypads, and yellow **Notification Screens** will appear as you navigate and setup your chamber. The main keyboard types are consistent throughout the use of the HMI, employing both a lower case keyboard and an upper case keyboard. The yellow Notification Screens vary in their message according to the application encountered. Two sample Notification Screens are shown on the next page.

UPPER CASE CHARACTER KEYBOARD with SYMBOLS

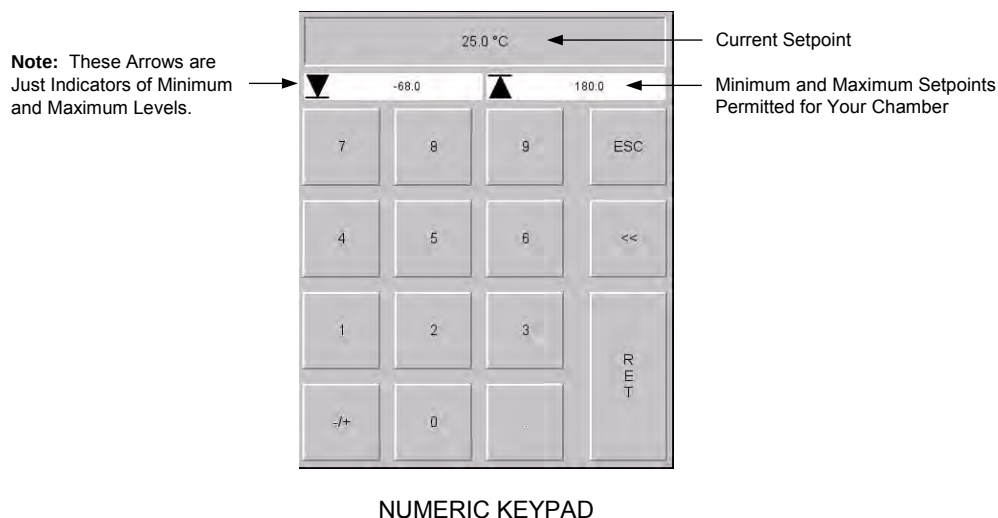


To advance to the lower case keypad with numbers, press the **Cap** key on the left side as shown.

LOWER CASE CHARACTER KEYBOARD with NUMBERS



To toggle back to the upper case keyboard with symbols, press the **Cap** key as shown.



The current setpoint is displayed in the very top display. The Minimum and Maximum allowable setpoint values that are preset at the factory for your chamber are automatically displayed in the white display windows. Enter your setpoint and press the **RET** button to enter your selection. Press the **ESC** button to escape the keypad without entry.

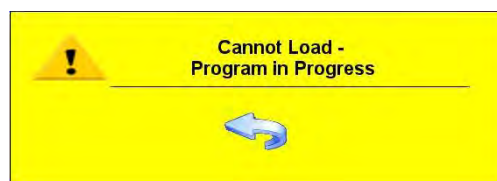
IMPORTANT NOTE!

Whenever you enter a negative value number, you must first enter the digits and then press the “-/+” key.

Notification Screens (Samples):



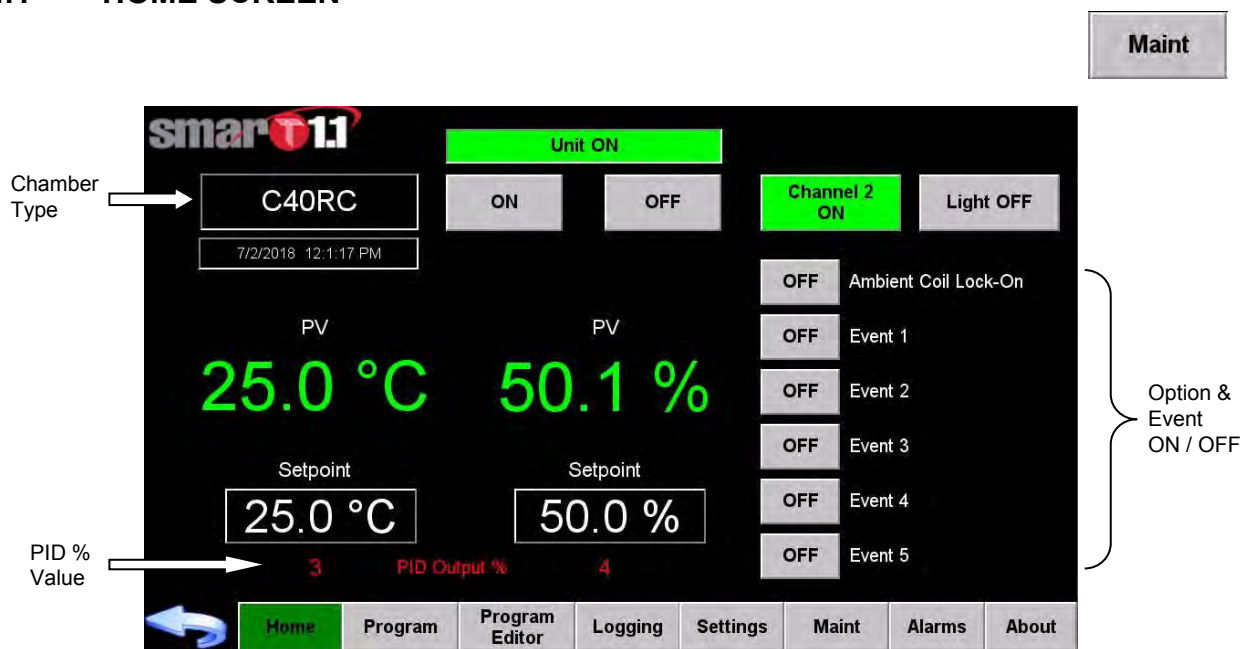
SAMPLE NOTIFICATION SCREEN



SAMPLE NOTIFICATION SCREEN

4.0 HMI SCREEN DESCRIPTIONS

4.1 HOME SCREEN



HOME SCREEN

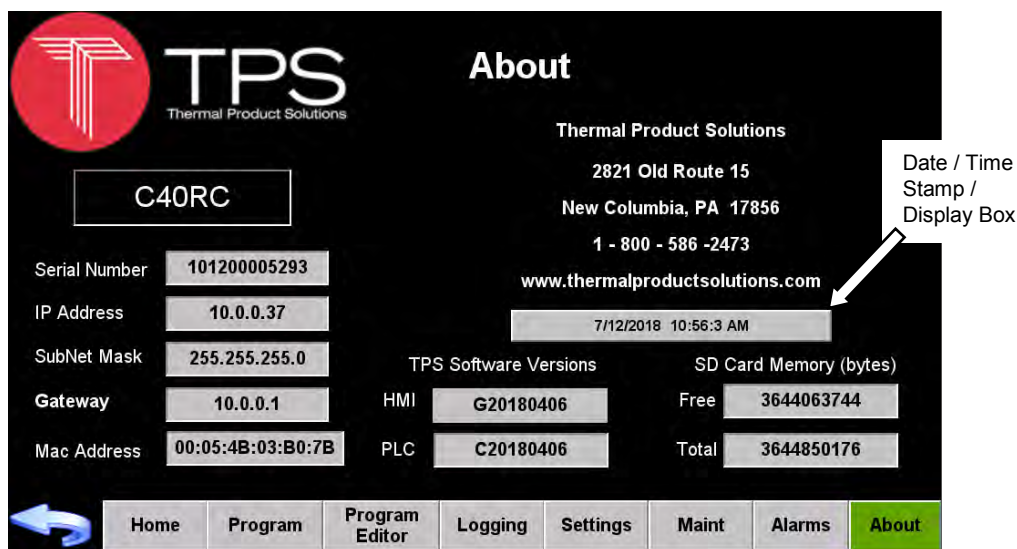
The **Home Screen** is the first screen that appears after a successful power-up of the chamber. This screen permits single setpoint / manual control of your chamber for Channel 1 and 2.

Your chamber type is displayed at the top left. Actual process values are displayed for both Channel 1 and 2. The following functions are available.

- Press the **Channel 2 ON / OFF** button to turn Channel 2 ON and OFF.
- Press the **Setpoint** entry display box to enter your temperature and / or humidity setpoint. A numeric keypad will appear.
- Press the **Option and Event ON / OFF** buttons to turn the functions ON and OFF. The button will turn green when turned ON.
- Press the **Unit ON / OFF** buttons to turn the chamber conditioning system ON and OFF. “**Unit ON**” or “**Unit OFF**” will be displayed above these buttons.
- Press the **Light ON / OFF** button to turn the chamber workspace light ON and OFF.

4.2 ABOUT SCREEN

About

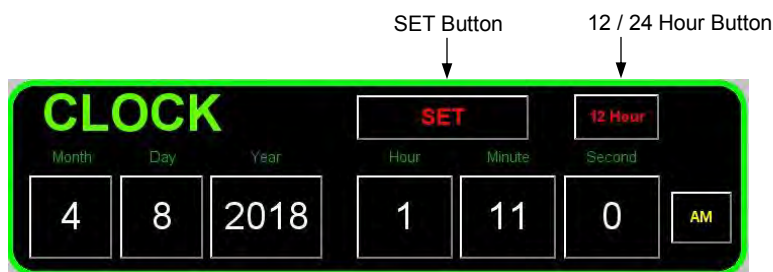


ABOUT SCREEN

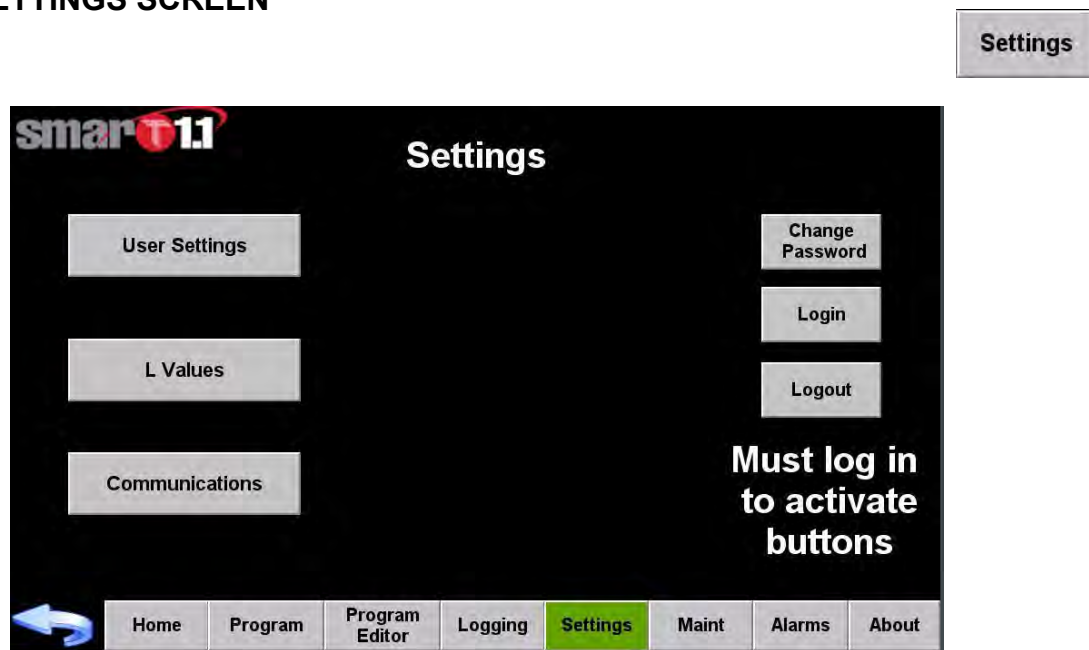
The **About Screen** displays a wealth of important technical information regarding your Smart 1.1 Controller, along with company contact information, and a date / time stamp.

Date / Time Stamp Display / Entry Box:

You may change the date and clock settings by pressing the **Date / Time Stamp** display / entry box. The **Clock Screen** will appear. You may change between a 12 hour and a 24 hour clock. Press the **Set** button on the Clock Screen when complete.



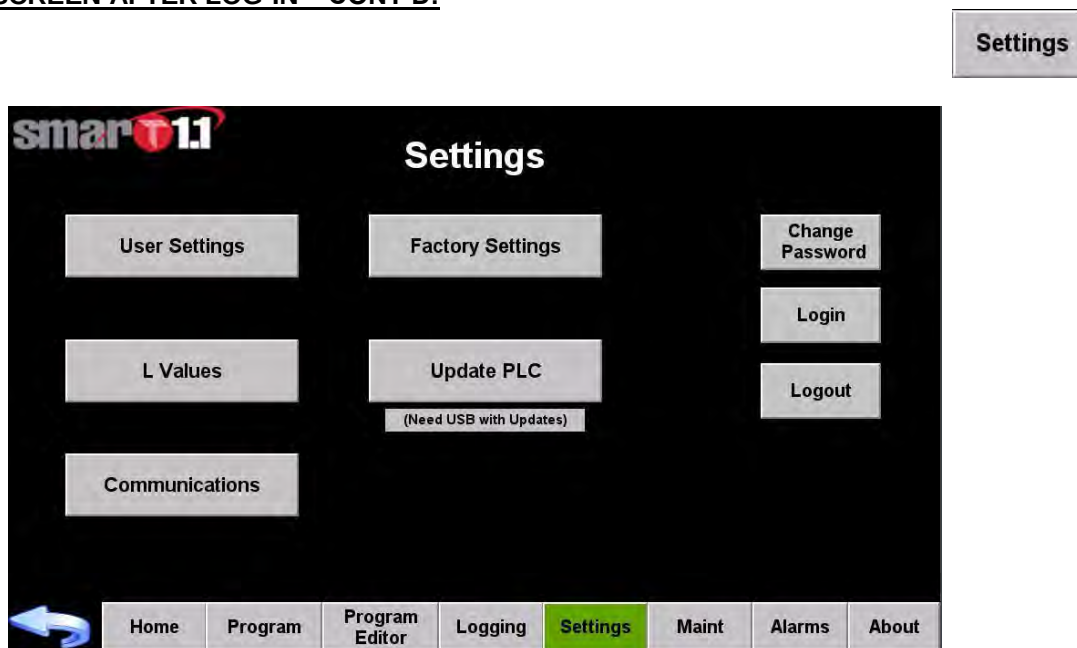
4.3 SETTINGS SCREEN



SETTINGS SCREEN – BEFORE LOG-IN

IMPORTANT NOTE! This is the Settings Screen that appears before you log in. You must log into the system to perform any functions with this screen. Go to the Log-In Screen description in Section 4.3.1, which follows.

SETTINGS SCREEN AFTER LOG-IN – CONT'D:



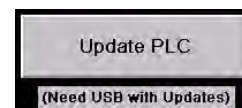
SETTINGS SCREEN – AFTER LOG-IN

IMPORTANT NOTE! This is the Settings Screen that appears after the Factory User has logged in. You must log into the system to perform any functions with this screen.

The **Settings Screen** permits you to log in to the Smart 1.1 Controller in order to perform special functions for the operation of your chamber. The following buttons will advance you to the indicated screens.

- **Factory Settings Button** – Select chamber model type, set various Min / Max values for Raw, Scaling, and PV (Process Values) parameters, and turn options ON and OFF.
- **User Settings Button** – Select Units of Measurement; ° F / ° C for Channel 1, and % (RH) for Channel 2. Set PIDs for Channel 1 and 2. Select Output Retransmit Configuration for Retransmit 1 and 2.
- **Communications Button** – View the data communication types available and their current settings.
- **Update PLC Button** – Update HMI / PLC software.

IMPORTANT NOTE: The Update PLC button feature is described in the Controller Software Version Update Procedure Section 6.5 of the Data Communications Setup Procedures (Section 6.0).

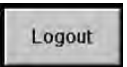


Log In / Out, Change Password, User Config. Buttons:

Press the **Login** button to log into the system. **Log In** is described in the following section.

A rectangular button with a black border and the text "Login" in the center.

After logging into the system, you can log out at any time by pressing the **Logout** button. The **About Screen** will appear when you log out.

A rectangular button with a black border and the text "Logout" in the center.

Note: Once logged into the system, you will remain logged-in until you perform the Log Out function.

Change Password:

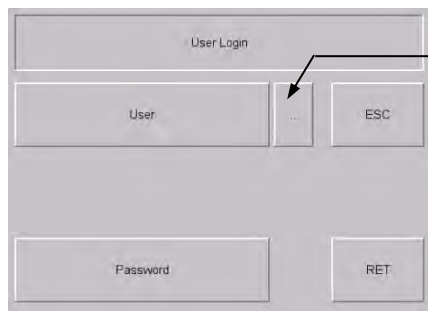
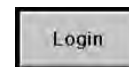
Press the **Change Password** button to change your password. This procedure is described in the following section.

A rectangular button with a black border and the text "Change Password" in the center.

4.3.1 LOG-IN AND CHANGE PASSWORD PROCEDURES

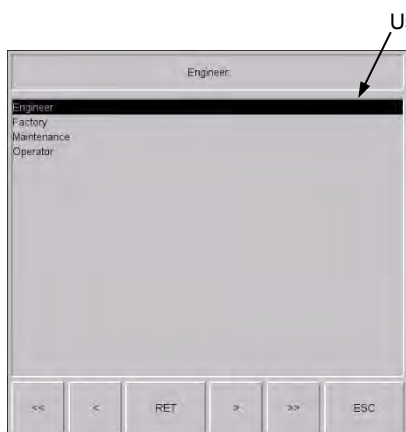
Log-In Procedure:

Press the **LogIn** button to log into the system. The following screen will appear.



LOG IN SCREEN

Press the small **User** entry button. The **User** Screen will appear.



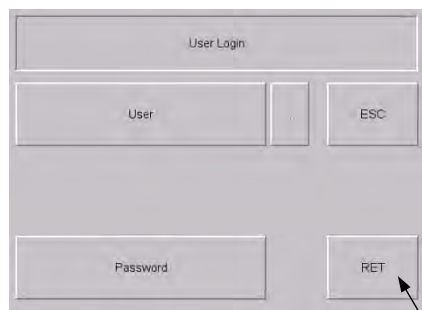
LOG IN USER SCREEN

User Name Selected

Select the proper **User Name** by either pressing on the User Name, or by pressing the scroll buttons at the bottom.

Note: You may press the **ESC** (Escape) button at any time to cancel.

Press the **RET** (Return) button. The **Login** Screen will reappear.



LOG IN SCREEN

Press the **Password** button. The keyboard screen will appear. Remember that you have to toggle the **Cap** key to go back and forth between the **Upper Case with Symbols** keyboard and the **Lower Case with Numbers** keyboard.

Enter your **Password** from the User / Password table and select the **RET** button on the keyboard.

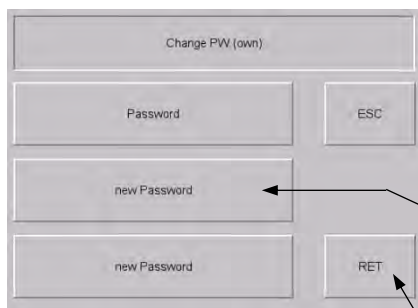
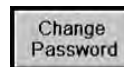
USER	PASSWORD
engineer	tesla
factory	newton
operator	galileo

After you return to the Login Screen, press the **RET** button to return to the Settings Screen.

Note: Once logged into the system, you will remain logged-in until you perform the Log Out function.

Change Password Procedure:

Press the **Change Password** button to change your password. The following screen will appear.



The screen displays a title bar 'Change PW (own)'. Below it are four input fields: 'Password', 'new Password', 'new Password', and 'new Password'. To the right of the first field is an 'ESC' button. To the right of the third field is a 'RET' button. Arrows point from the text instructions to the 'new Password' fields and the 'RET' button.

CHANGE PASSWORD SCREEN

Press the **Password** button. The keyboard screen will appear. Remember that you have to toggle the **Cap** key to go back and forth between the **Upper Case with Symbols keyboard** and the **Lower Case with Numbers keyboard**. Enter your current password.

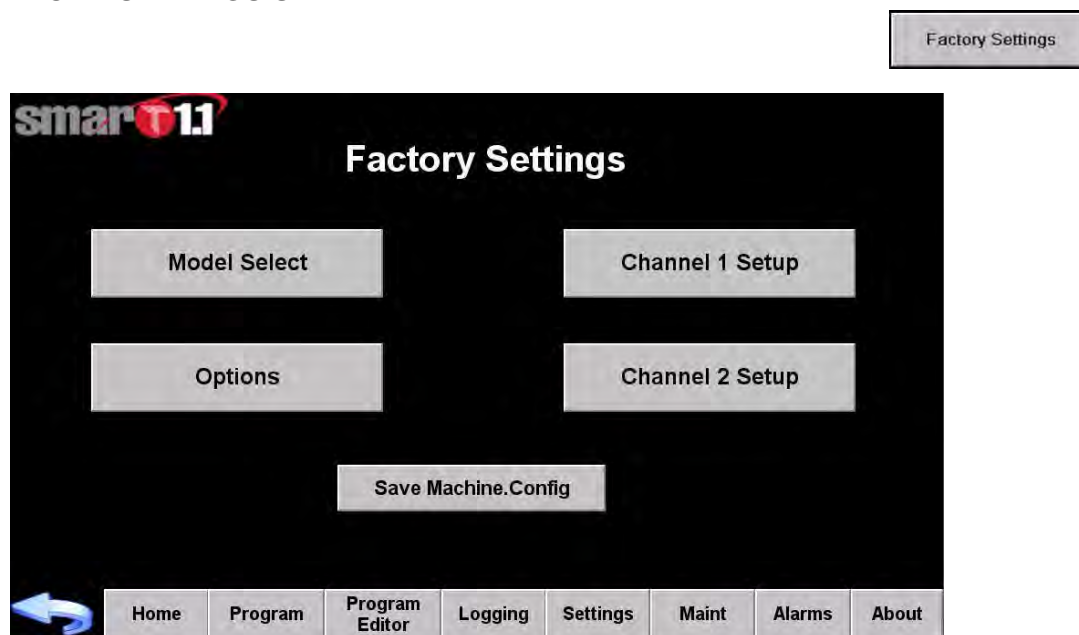
Press the top **new Password** button and enter your new password.

Press the lower **new Password** button to verify your new password.

When you are finished, press the **RET** (Return) button to return to the Settings Screen.

You may press the **ESC** (Escape) button at any time to cancel.

4.3.2 FACTORY SETTINGS SCREEN



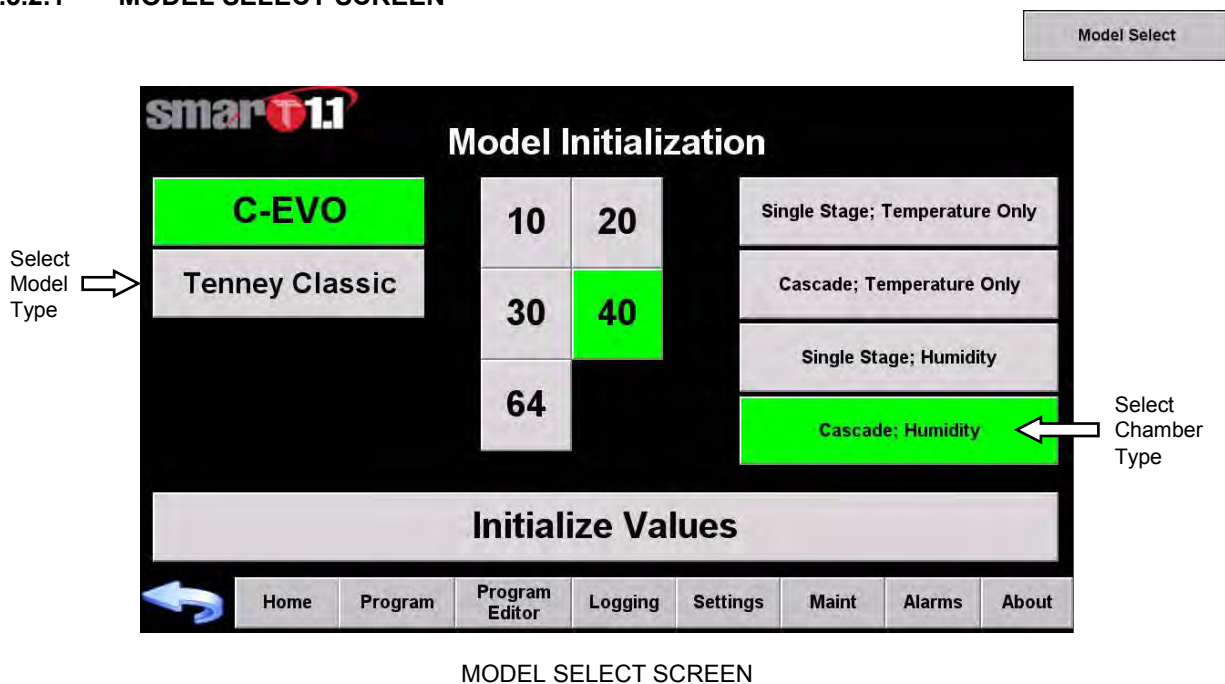
FACTORY SETTINGS SCREEN

The **Factory Settings Screen** permits you to select your chamber model type and to set various parameters for the operation of your chamber. This is normally done at the factory. The following buttons will advance you to the indicated screens.

IMPORTANT NOTE! PLEASE DO NOT CHANGE YOUR FACTORY SETTINGS!

- **Model Select** - Select your chamber model, size, and conditioning type.
- **Channel 1 & 2 Setup** - Set various Min / Max values for Raw, Scaling, and PV (Process Values).
- **Options** - Turn Options such as Boot Heat, Dry Air Dehumid, etc., ON and OFF. **Note:** You must have the proper hardware installed on your chamber. Contact TPS to purchase an option if desired.
- **Save Machine Configuration** – Saves all of the configuration parameters of your system in a comma delimited file.

4.3.2.1 MODEL SELECT SCREEN

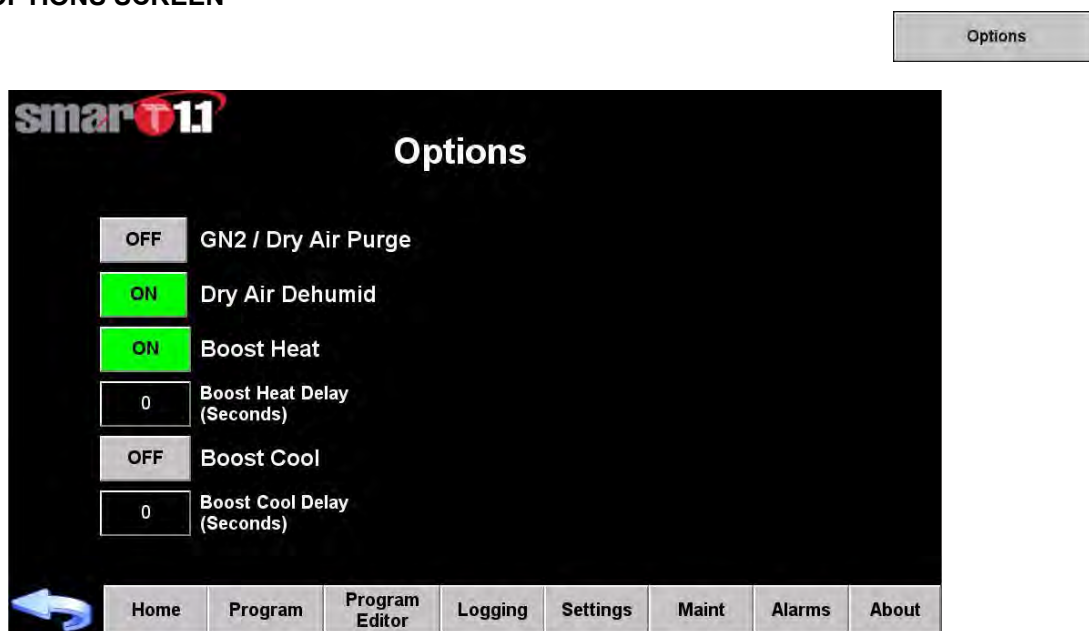


The **Model Select Screen** permits you to select your chamber build.

1. Select Model Type (left button group): C-EVO or Tenney Classic (TC).
2. Select Chamber Cubic Foot Size (middle button group).
3. Select Chamber Type (right button group).
4. Press the **Initialize Values** button to enter your selections into the PLC. This must be done in order for the selections to take effect.

Upon pressing the Initialize Values button, the Options Screen will appear. If you are just viewing this screen and have not made any changes, press the Back (Arrow) button to return to the Factory Settings Screen if desired.

4.3.2.2 OPTIONS SCREEN



OPTIONS SCREEN

The **Options Screen** permits you turn various options ON and OFF. Press the **Options ON / OFF** buttons to select the Options you wish to turn ON. The button will turn green with ON indicated.

Note: The chamber must be equipped with the proper hardware for an option to function.

Boost Heat Time Delay Function:

Press the Boost Heat Delay field entry display box to enter the time delay in seconds for the Boost Heat contactor to be energized once the Boost Heat Output is turned ON. This feature can only be activated while the controller's time proportioned Heat Control Output is still turned ON.

Boost Cool Time Delay Function:

Press the Boost Cool Delay field entry display box to enter the time delay in seconds for the Boost Cooling solenoid valve to be energized once the Boost Cool Output is turned ON. This feature can only be activated while the controller's time proportioned Cooling Control Output is still turned ON.

4.3.2.3 CHANNEL 1 SETUP SCREEN



FS - Ch1 Setup

Raw	Scaling	PV
1280 0 Raw Low Raw High	-100.0 300.0 0.0 Scaled Low Scaled High Scaled Offset	25.0 °C -68.0 180.0 Min SP Setting Max SP Setting



FS - CHANNEL 1 SETUP SCREEN

The **Channel 1 Setup Screen** permits you to set the **Raw**, **Scaling**, and **PV** (Process Variable) values for Channel 1 as indicated. Definitions for each parameter (by column) are provided below. Press the blue field entry display boxes to enter your settings. A keypad will appear.

1. **Raw:** Analog unscaled (0-4095) sensor value from the PLC analog module.
 - a. **Green PV value:** Actual sensor unscaled value from PLC analog module.
 - b. **Raw Low:** Low unscaled value possible from the PLC analog module.
 - c. **Raw High:** High unscaled value possible from the PLC analog module.

2. **Scaling:**
 - a. **Scaled Low:** Low value used for scaling signal from sensor.
 - b. **Scaled High:** High value used for scaling signal from sensor.
 - c. **Scaled Offset:** Offset applied during scaling of signal from sensor.

3. **PV:**
 - a. **Green PV value:** Actual scaled Process Variable value.
 - b. **Min SP Setting:** Lowest actual value possible from sensor.
 - c. **Max SP Setting:** Highest actual value possible from sensor.

Press the **FL - Ch2 Setup** button to advance to the Channel 2 Setup Screen.

4.3.2.4 CHANNEL 2 SETUP SCREEN

Channel 2 Setup



FS - Ch2 Setup

Raw	Scaling	PV
1025		50.1
0 Raw Low 2047 Raw High	0 Scaled Low 100 Scaled High 0 Scaled Offset	0 Min SP Setting 100 Max SP Setting

FS - Ch1 Setup

Home
Program
Program Editor
Logging
Settings
Maint
Alarms
About

FS - CHANNEL 2 SETUP SCREEN

The **Channel 2 Setup Screen** permits you to set the **Raw**, **Scaling**, and **PV** (Process Variable) values for Channel 2 as indicated. Definitions for each parameter (by column) are provided below. Press the blue field entry display boxes to enter your settings. A keypad will appear.

1. **Raw:** Analog unscaled (0-2047) sensor value from the PLC analog module.
 - a. **Green PV value:** Actual sensor unscaled value from PLC.
 - b. **Raw Low:** Low unscaled value possible from the PLC.
 - c. **Raw High:** High unscaled value possible from the PLC.
2. **Scaling:**
 - a. **Scaled Low:** Low value used for scaling signal from sensor.
 - b. **Scaled High:** High value used for scaling signal from sensor.
 - c. **Scaled Offset:** Offset applied during scaling of signal from sensor.
3. **PV:**
 - a. **Green PV value:** Actual scaled Process Variable value.
 - b. **Min SP Setting:** Lowest actual value possible from sensor.
 - c. **Max SP Setting:** Highest actual value possible from sensor.

4.3.2.5 SAVE MACHINE CONFIGURATION

Press the **Save Machine Config** button to save all of the configuration parameters of your system in a comma delimited file. **This should only be done after verifying that all of your parameters are correctly set.** The button will turn green.

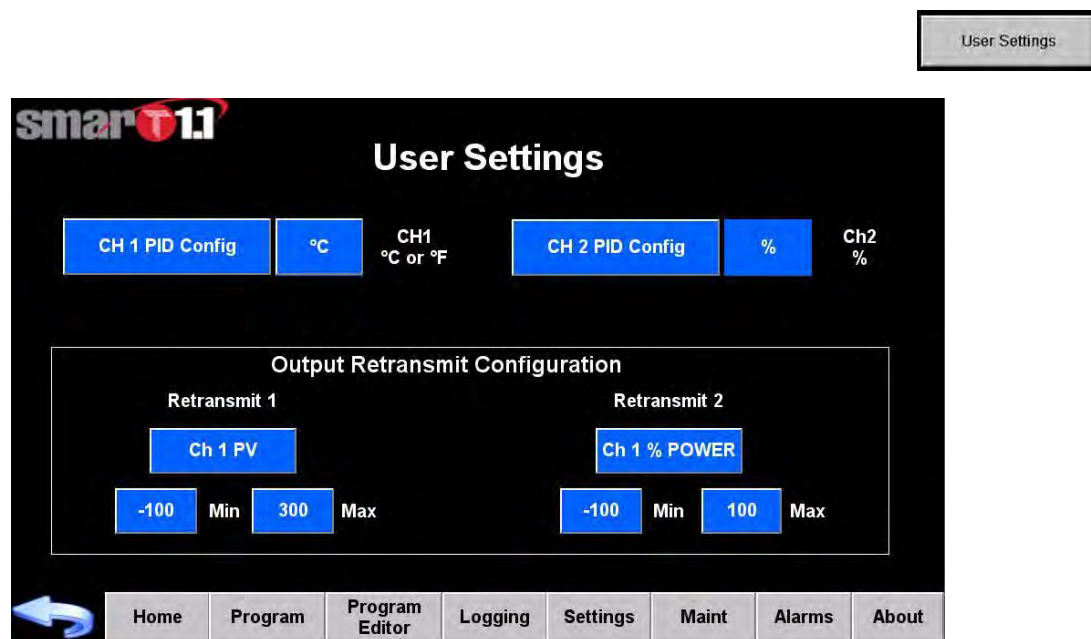


This file can be imported into EXCEL for viewing and printing.

The following screen will appear to remind you to insert a USB before continuing.



4.3.3 USER SETTINGS SCREEN

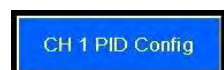


USER SETTINGS SCREEN

The **User Settings Screen** permits you to enter the Channel 1 and 2 PID configuration settings, including the units of measurement such as °C, °F, and % (RH). Press the blue entry display boxes accordingly.

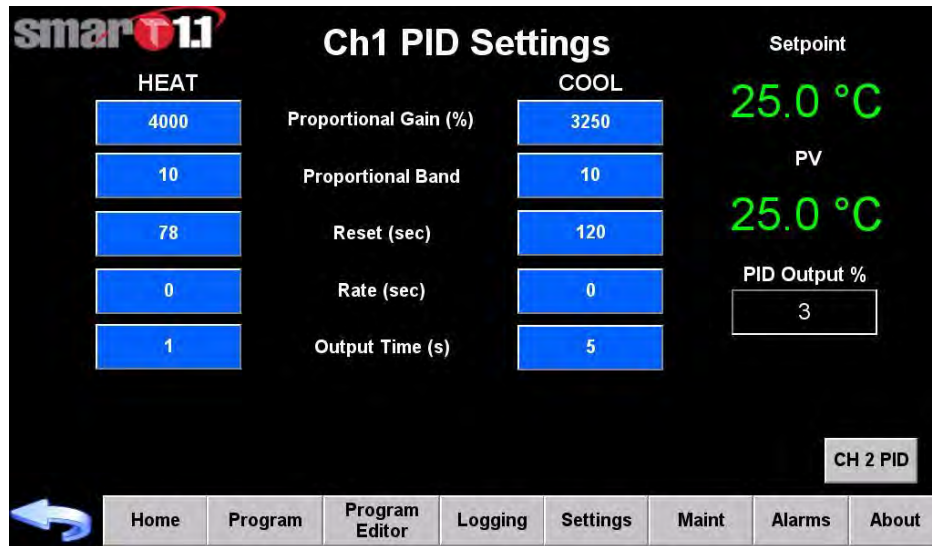
This screen also permits you to set the **Output Retransmit Configuration** Parameters for **Retransmit 1** and **Retransmit 2**.

Press the **CH 1 / 2 PID Config** buttons to advance to the Channel 1 and Channel 2 PID Settings Screens.



USER SETTINGS SCREENS - CONT'D:

CHANNEL 1 PID SETTINGS SCREEN

The screenshot shows the 'Ch1 PID Settings' screen on a Smart 1.1 HMI. The screen is divided into three main sections: HEAT, COOL, and a right-hand display area. The HEAT section has five blue buttons with values 4000, 10, 78, 0, and 1. The COOL section has five blue buttons with values 3250, 10, 120, 0, and 5. The right-hand display area shows 'Setpoint' as 25.0 °C, 'PV' as 25.0 °C, and 'PID Output %' as 3. A 'CH 2 PID' button is located at the bottom right of the settings area. At the bottom of the screen is a navigation bar with buttons for Home, Program, Program Editor, Logging, Settings, Maint, Alarms, and About. A blue arrow button is on the far left of the navigation bar.

HEAT	Proportional Gain (%)	COOL	Setpoint
4000		3250	25.0 °C
10	Proportional Band	10	PV
78		120	25.0 °C
0	Reset (sec)	0	PID Output %
1	Rate (sec)	5	3
	Output Time (s)		

CH 2 PID

Home Program Program Editor Logging Settings Maint Alarms About

The **Channel 1 PID Settings Screen** permits you to enter the PID settings for heating and cooling. Press the field entry display buttons to enter your values. A keypad will appear.

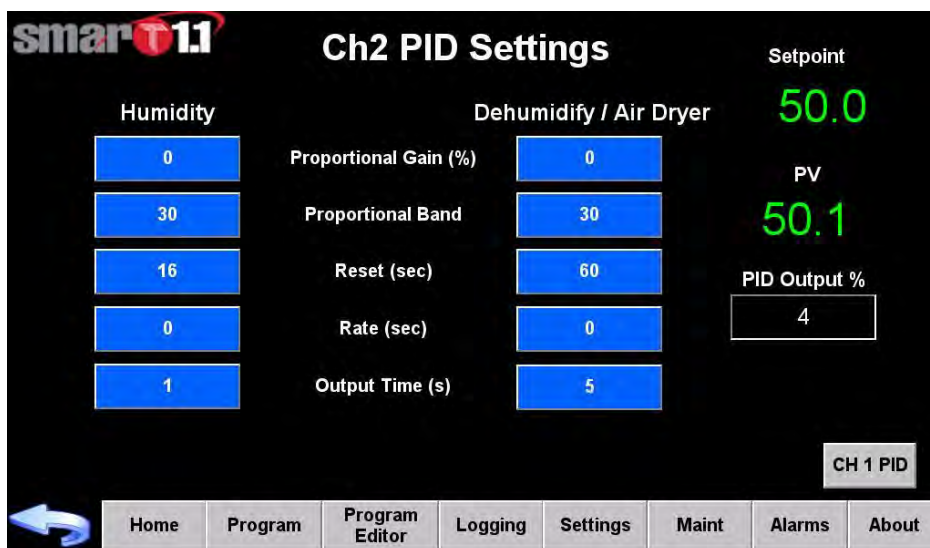
The process setpoint and process values are displayed.

Press the **CH 2 PID** button to advance to the Channel 2 PID Settings Screen.

USER SETTINGS SCREENS - CONT'D:

CHANNEL 2 PID SETTINGS SCREEN

User Settings



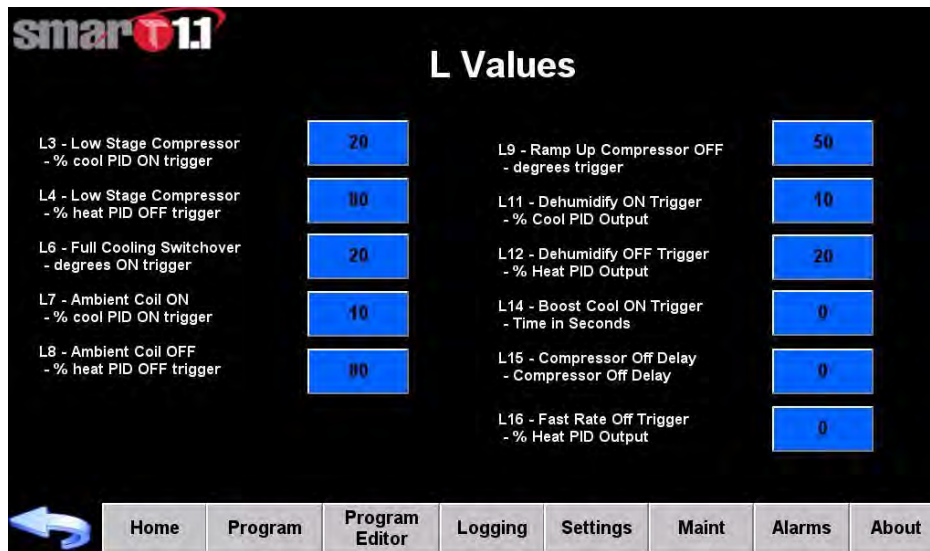
The screenshot shows the 'Ch2 PID Settings' screen on a Smart 1.1 HMI. The screen is divided into several sections. On the left, under the 'Humidity' heading, there are five blue buttons with the values 0, 30, 16, 0, and 1. In the center, there are four labels: 'Proportional Gain (%)', 'Proportional Band', 'Reset (sec)', and 'Rate (sec)', each followed by a blue button with the values 0, 30, 60, and 0 respectively. On the right, under the 'Dehumidify / Air Dryer' heading, there are three blue buttons with the values 0, 30, and 5. To the right of these buttons, the 'Setpoint' is displayed as 50.0 in green, and the 'PV' (Process Value) is displayed as 50.1 in green. Below the PV, the 'PID Output %' is shown in a box with the value 4. At the bottom right, there is a button labeled 'CH 1 PID'. At the bottom left, there is a blue arrow pointing left. At the bottom center, there is a row of buttons: Home, Program, Program Editor, Logging, Settings, Maint, Alarms, and About.

The **Channel 2 PID Settings Screen** permits you to enter the PID settings for humidify and dehumidify. Press the field entry display buttons to enter your values. A keypad will appear to enter your value.

The process setpoint and process values are displayed.

4.3.4 L VALUES SCREEN

L Values



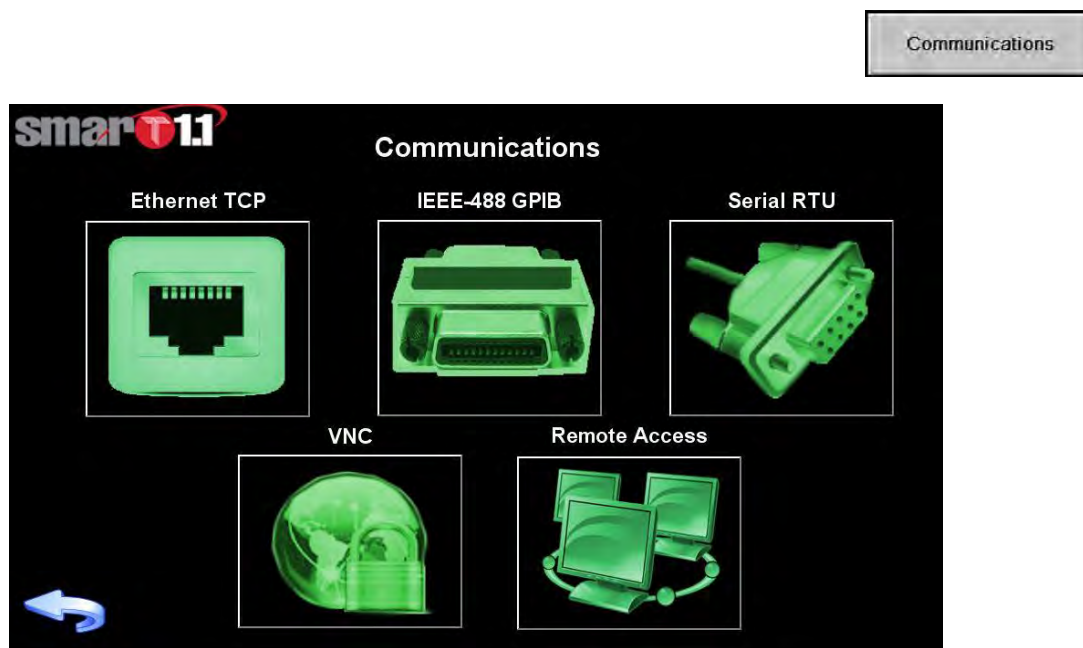
Parameter	Value
L3 - Low Stage Compressor - % cool PID ON trigger	20
L4 - Low Stage Compressor - % heat PID OFF trigger	00
L6 - Full Cooling Switchover - degrees ON trigger	20
L7 - Ambient Coil ON - % cool PID ON trigger	10
L8 - Ambient Coil OFF - % heat PID OFF trigger	00
L9 - Ramp Up Compressor OFF - degrees trigger	50
L11 - Dehumidify ON Trigger - % Cool PID Output	10
L12 - Dehumidify OFF Trigger - % Heat PID Output	20
L14 - Boost Cool ON Trigger - Time in Seconds	0
L15 - Compressor Off Delay - Compressor Off Delay	0
L16 - Fast Rate Off Trigger - % Heat PID Output	0

L VALUES SCREEN

The **L (Logic) Values Screen** permits you to set parameters for the programmable logic that controls the chamber process.

Press the blue entry display button to enter your values. A keypad will appear.

4.3.5 COMMUNICATIONS SCREEN



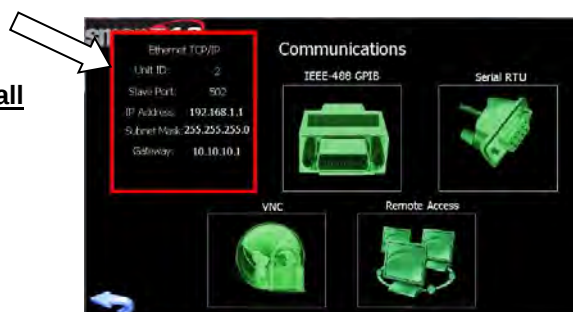
COMMUNICATIONS SCREEN

The **Communications Screen** permits you to view the HMI / PLC data communications settings. Modbus permits you to read and write into the memory registers of the PLC to control the chamber.

- Ethernet TCP / IP - - **Standard**
- Modbus TCP - - **Standard**
- OPC client that is configured for Modbus - - **Customer must purchase**
- Modbus RTU - - RS-485 - - **Standard** (RS-232 is available with optional converter plug installed.)
- Modbus IEEE - 488 GPIB - - **Optional** with ICS IEEE board installed
- Remote Access - - Remote Client provides a real time interactive display of the Smart 1.1 Controller HMI on the customer's PC using a PC mouse or track pad. - - **Available from TPS.**
- VNC Ethernet connection - Real time interactive display of the Smart 1.1 Controller HMI on the customer's cell phone, or tablet. Purchase VNC software from your mobile app store.

Press the communications type box. A red box will appear overtop with all applicable technical data.

IMPORTANT NOTE: Please refer to Section 6.0 for all Data Communication Setup Procedures.



Data Communication Types Available – Refer to Section 6.0 for all setup procedures:

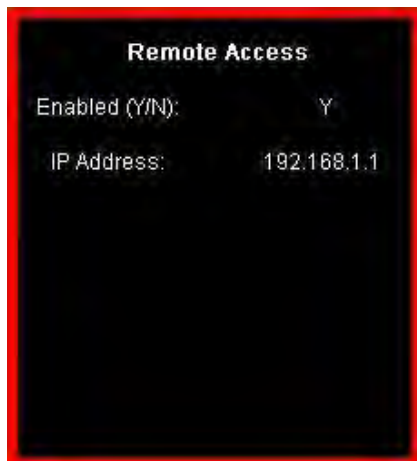


Ethernet TCP / IP:

This screen displays applicable information needed to communicate through the Ethernet port, which is located at the top or side of the power cabinet.

The following features can be performed utilizing Ethernet.

- Can communicate with the chamber using Modbus TCP.
- Can connect and manage profiles and data using FTP.

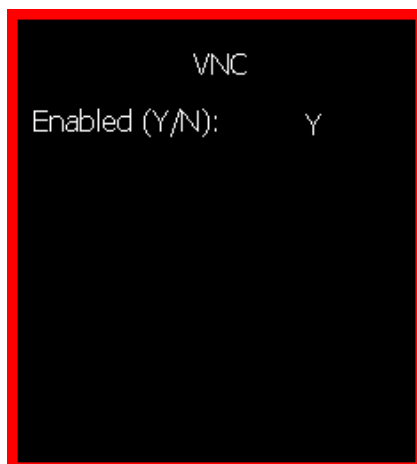


Remote Access / Client:

Remote Access / Client type communication utilizes application software installed on the customer's PC using Ethernet. Remote Client provides a real time interactive display of the Smart 1.1 Controller HMI on the customer's PC with the same basic functionality using the PC mouse or track pad.

This screen displays whether Remote Access / Client is enabled or disabled. It must be enabled (Y) in order to communicate through the Ethernet port, which is located at the top of the power cabinet.

It also displays applicable information needed to communicate through Ethernet. See Section 6.3 for the setup procedure.

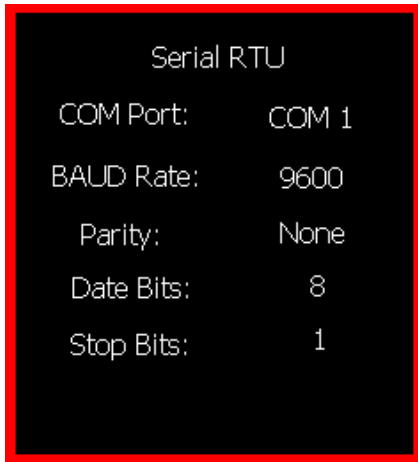


VNC:

VNC type communication utilizes application software installed on mobile devices using a wireless connection. **(Otherwise, use Remote Access / Client.)** It is similar to Remote Access / Client software. VNC provides a real time interactive display of the Smart 1.1 Controller HMI on the customer's mobile device with the same basic functionality.

VNC is always enabled (Y), allowing you to communicate through the Ethernet port.

Note: VNC application software can be downloaded from your cell phone or tablet App Store.



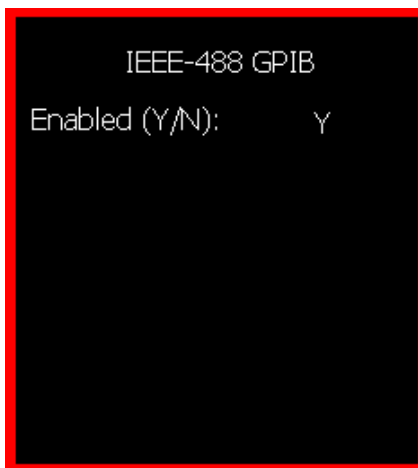
Serial RTU	
COM Port:	COM 1
BAUD Rate:	9600
Parity:	None
Data Bits:	8
Stop Bits:	1

Serial RTU - - RS-485 (RS-232 Optional):

Note: This screen will appear as a reference screen even when this option is not employed.

This screen displays applicable information needed to communicate through the RS-485 port, which is located at the top of the power cabinet. Refer to Section 7.0 for the **Smart 1.1 Modbus Applications Section** for Modbus variables and their subsequent register mapping.

RS-232 is available with optional converter installed.



IEEE-488 GPIB	
Enabled (Y/N):	Y

IEEE-488 GPIB: (Optional)

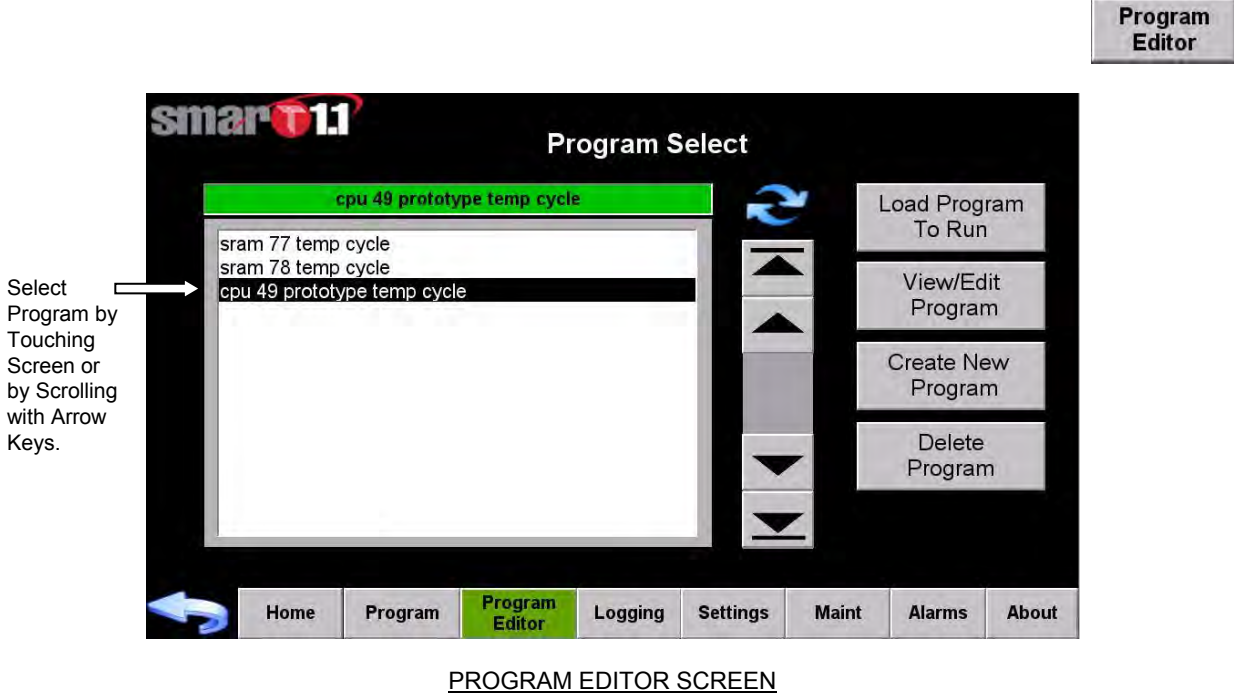
Note: This screen will appear as a reference screen even when this option is not employed.

This screen displays whether the feature is enabled or disabled. It must be enabled (Y) in order to communicate through the IEEE port, which is mounted at the top or side of the power cabinet (when employed).

Note: Communication setup parameters for IEEE-488 are identical to those shown above with Serial RTU.

IMPORTANT NOTE: Please refer to Section 6.0 for all Data Communication Setup Procedures.

4.4 PROGRAM EDITOR SCREEN



The **Program Editor Screen** is used for the following functions with the supplied buttons.

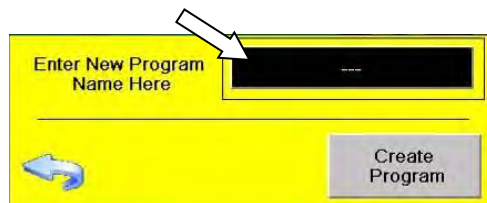
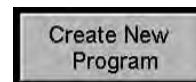
- Load Program To Run – Load selected program to run.
- View / Edit Program – Up to 99 **steps** can be created for each program.
- Create New Program – Up to 100 **programs** can be created and viewed on the Program Editor Screen.
- Delete Program – Delete selected program.

To view or edit an existing program, select the program by touching the desired program on the screen or by simply scrolling with the Up / Down Scroll buttons. Then press the **View / Edit** button.

Important Note: The View / Edit Screen functions are also utilized when creating a new program when you select the **Create New Program** button. Follow the View / Edit Screen functions descriptions in Section 4.4.2 for descriptions and procedures.

4.4.1 CREATE NEW PROGRAM SCREEN

Press the **Create New Program** button to create a new program. The following screen will appear.

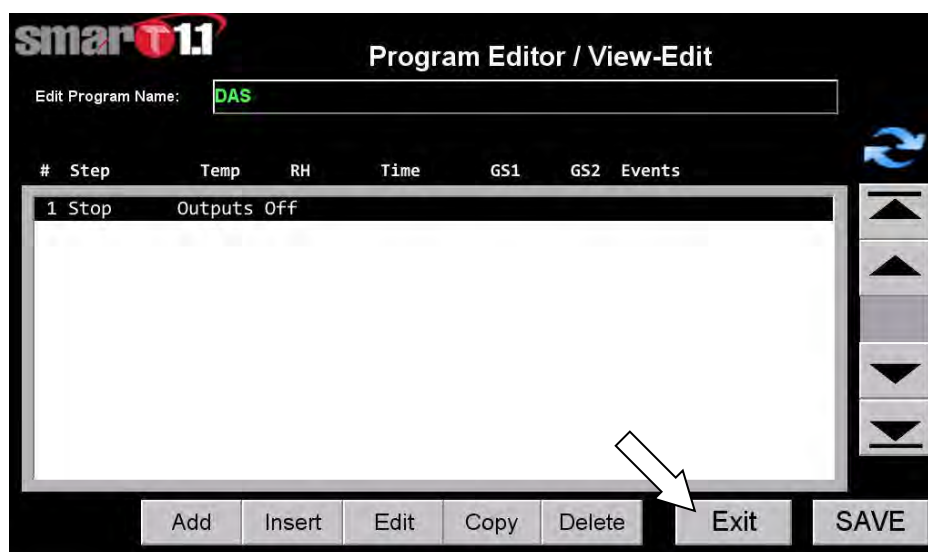


ENTER NEW PROGRAM NAME SCREEN

Press the black **Enter New Program Name Here** box to enter a new program name. The keyboard screen will appear to enter the name. After entering the new program name on the keyboard, this window will reappear with the new program name.

Press the **Create Program** button. The **Program Editor / View - Edit Screen** will appear.

Important Note! The steps required for adding, inserting, editing, copying, and deleting a step are the same whether you are editing a step or creating a step. Reference the View / Edit Section 4.4.2, which follows for instructions on how to perform these functions.



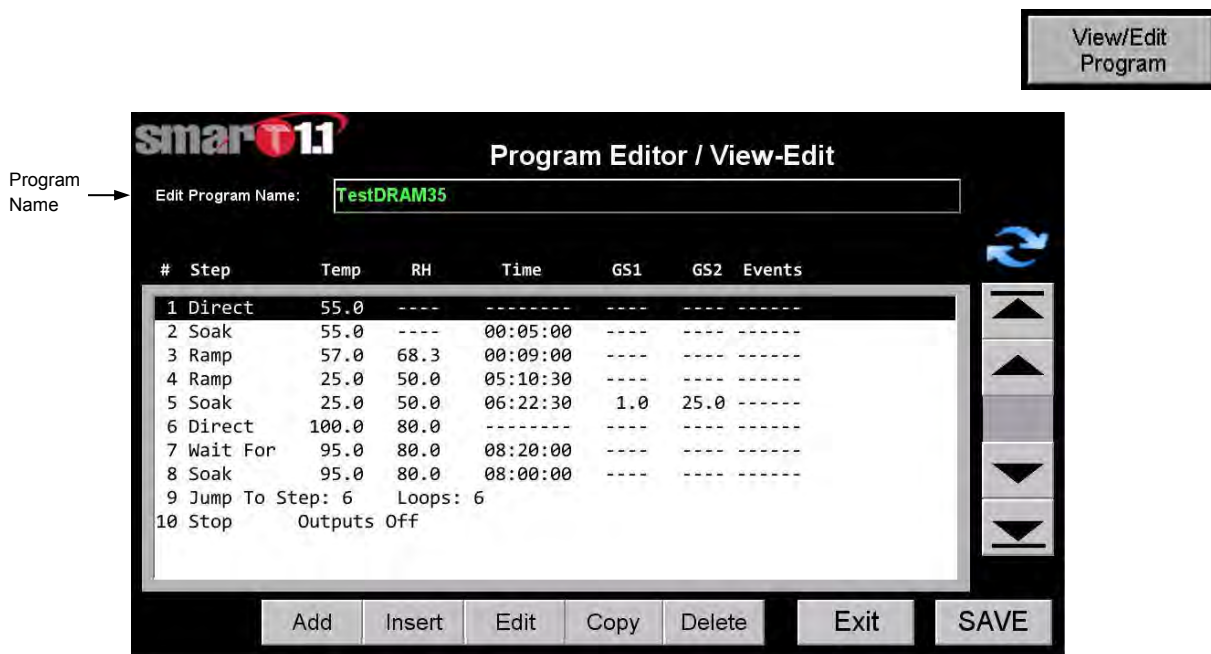
PROGRAM EDITOR – BLANK VIEW / EDIT SCREEN

Exit without Saving:

Press the **Exit** button to exit the program editor without saving. The screen shown to the right will appear. Press **Exit**.



4.4.2 CREATING & MODIFYING A PROGRAM: THE VIEW - EDIT SCREEN

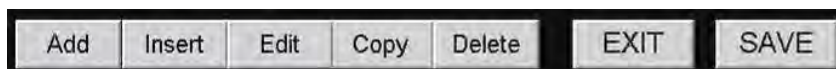


PROGRAM EDITOR – VIEW / EDIT SCREEN

After selecting a program and pressing the **View / Edit Program** button, the **Program Editor / View - Edit Screen** can be used to add, insert, edit, copy, and delete a program step. The program name appears above the listing. Up to 99 steps can be created for each program. Up to 100 programs can be created and viewed on the Program Editor Screen. If more than 100 profiles are saved in the controller, only the first 100 will be shown. **Note:** A sample program is provided above.

The Step Number, Step Type, Channel 1 / 2 Setpoint Values, Step Time, Guaranteed Soak Chan. 1 / 2, and Event numbers turned ON are displayed (as applicable).

Press the appropriate button for the desired function.



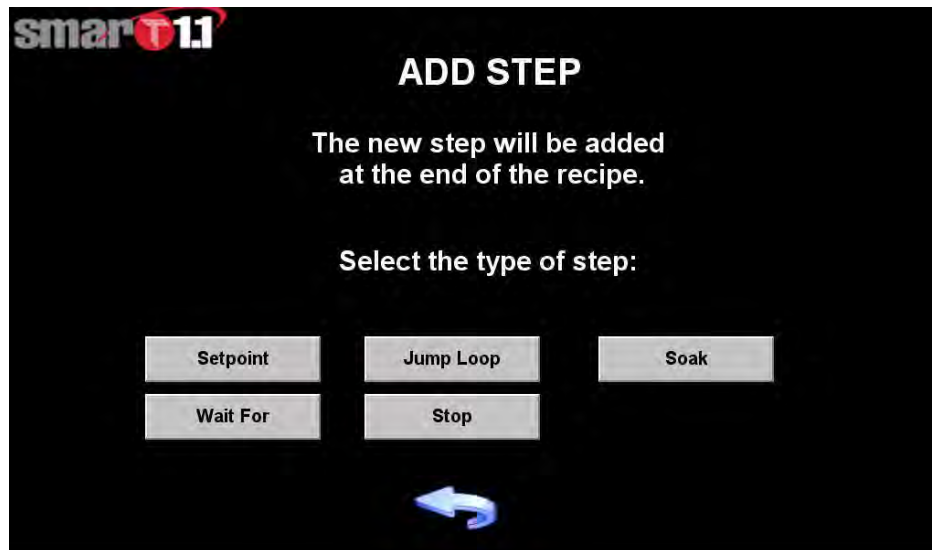
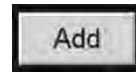
SAVE PROGRAM:

Press the **Save** button to save a program after creating a new one or after editing an existing one. The yellow Program Save Screen will appear.



4.4.2.1 ADD STEP SCREEN

To add a step, press the **Add** button at the bottom of the Program Editor Screen. The **Add Step Screen Wizard** will appear to automatically guide you through the setup procedure.



ADD STEP SCREEN

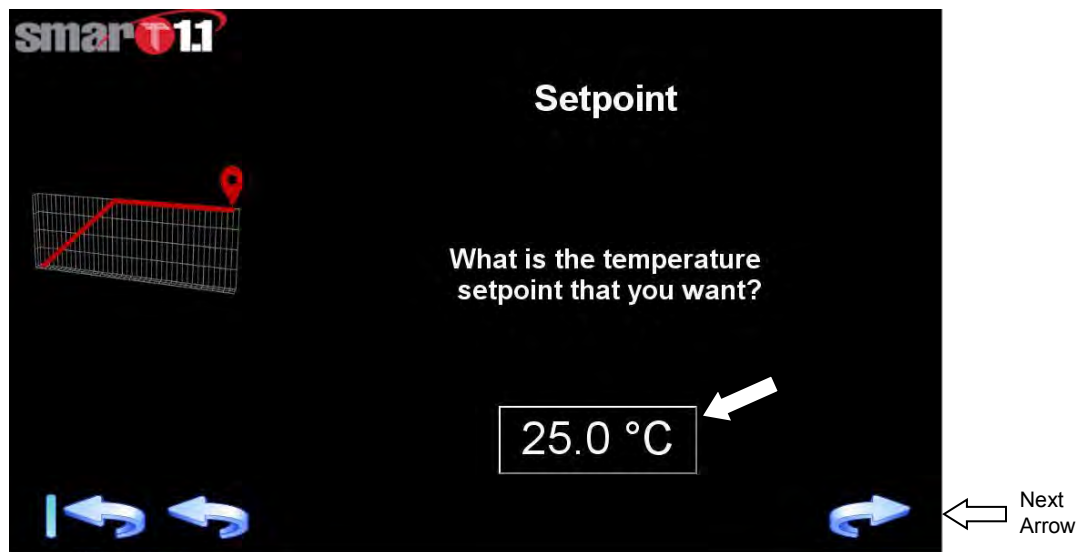
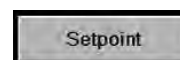
To begin creating or editing a program, you must first select the type of step to be created. This step will always be placed at the end of the program. You must always start with selecting the Setpoint button.

- **Setpoint:** This button will create either a “Direct” or a “Ramp” step.
 - ❖ **Direct Step:** Setpoint jumps to the desired temperature. The step is then immediately finished.
 - ❖ **Ramp Step:** Setpoint is ramped from the beginning temperature to the desired temperature.
- **Soak:** At the beginning of the step, the setpoint is set to the soak temperature. The setpoint is maintained at this temperature for the duration of the step.
- **Wait For:** Current outputs are maintained while the controller waits for all the trigger conditions that were set in the step. If more than one condition is set, the controller will wait for each to trigger.
 - ❖ **Temperature:** If trigger is set, the controller waits for the temperature PV to reach set temperature.
 - ❖ **Humidity:** If trigger is set, the controller waits for the humidity PV to reach set humidity.
 - ❖ **Time:** If trigger is set, the controller waits for the set time to elapse.

- **Jump Loop:** Program a step to “Jump” back to when the profile reaches the “Jump” step. Controller will loop to that programmed step number and restart the profile from that position. It will do this loop a programmed number of times.
- **Stop:** This step determines whether outputs will be maintained ON or turned OFF when the profile completes. If you do not explicitly create a “Stop” step, then one will be created **with the default setting to “Hold Setpoints”**.

4.4.2.1.1 SETPOINT SCREENS – DIRECT OR RAMP SETUP

Press the **Setpoint** button to add a **Direct** or a **Ramp Temperature Step**.



SETPOINT SCREEN – ENTER CHAN. 1 TEMPERATURE

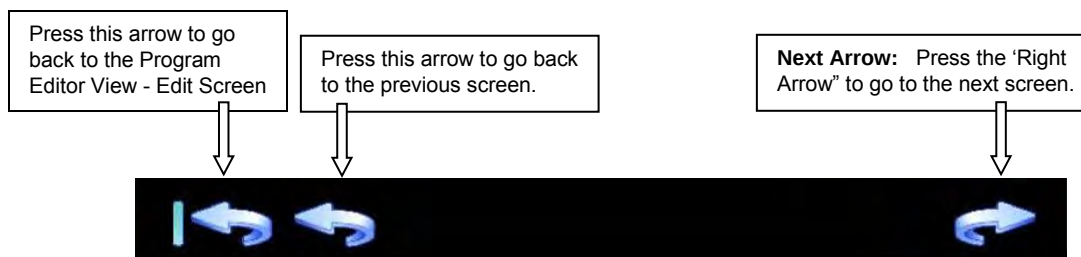
Press the temperature field entry display box to enter your temperature setpoint for Channel 1. A keypad will appear. After entering your setpoint, the value will appear in the display box. Press the Next Arrow to continue.

If creating a **Direct** step, then the setpoint will be set immediately at the beginning of the step.

If creating a **Ramp** step, then the setpoint will be ramped from the beginning temperature to the desired temperature.

Arrow Button Descriptions:

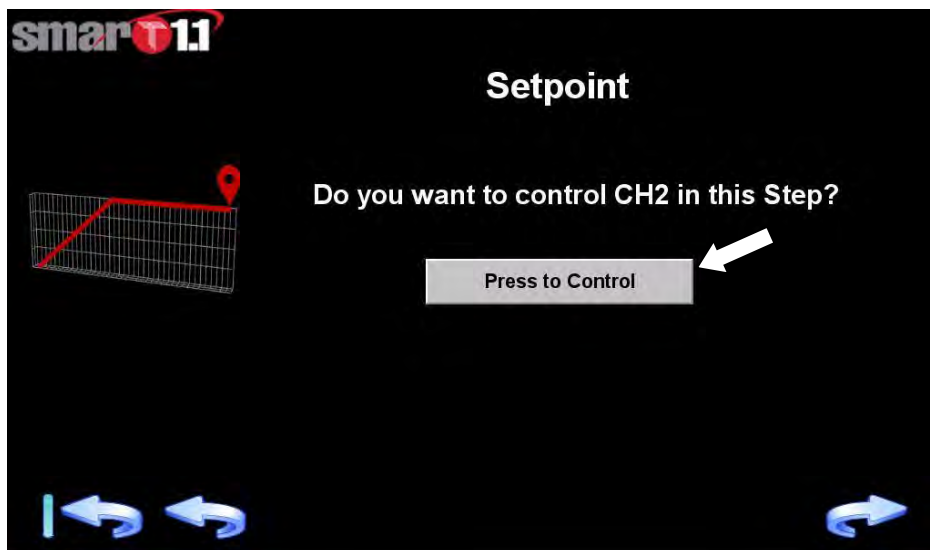
The arrows displayed at the bottom are provided for all Program Editor Screens.



SETPOINT SCREENS - CONT'D:

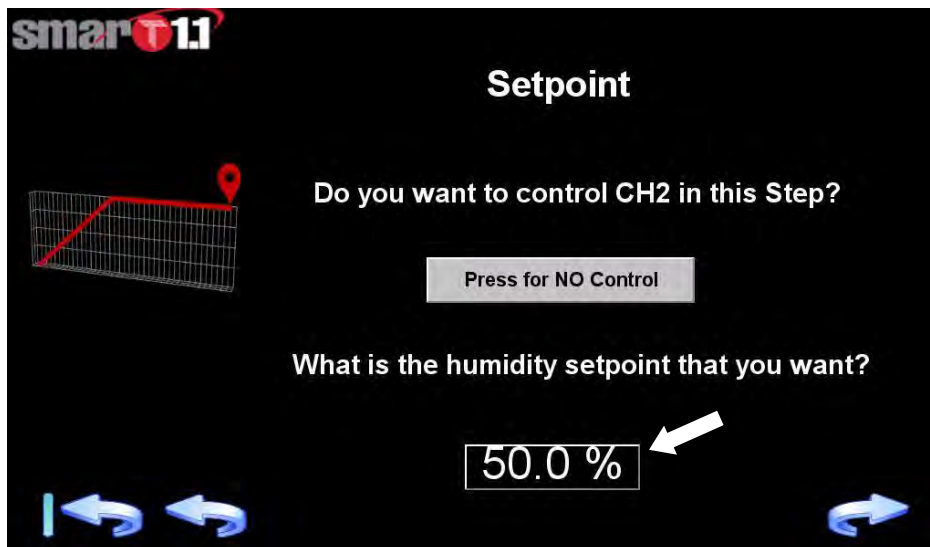
Setpoint

SETPOINT SCREEN – PRESS TO CONTROL CHAN. 2 HUMIDITY



Press the **Press to Control** button to enter a humidity setpoint for Channel 2. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control humidity.

SETPOINT SCREEN – ENTER CHAN. 2 HUMIDITY SETPOINT



Press the humidity field entry display box to enter your chamber relative humidity setpoint for Channel 2. A keypad will appear. After entering your setpoint, the value will appear in the display box. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** button if you do not want to control humidity.

SETPOINT SCREENS - CONT'D:

Setpoint

SETPOINT SCREEN – PRESS TO RAMP



Press the **Press to Ramp** button to enter a ramp time for temperature. A screen will appear to allow setting the Ramp Step parameters. Press the **Next (Right) Arrow** if you do not want to enter a ramp time.

SETPOINT SCREEN – ENTER RAMP TIME TO SETPOINT

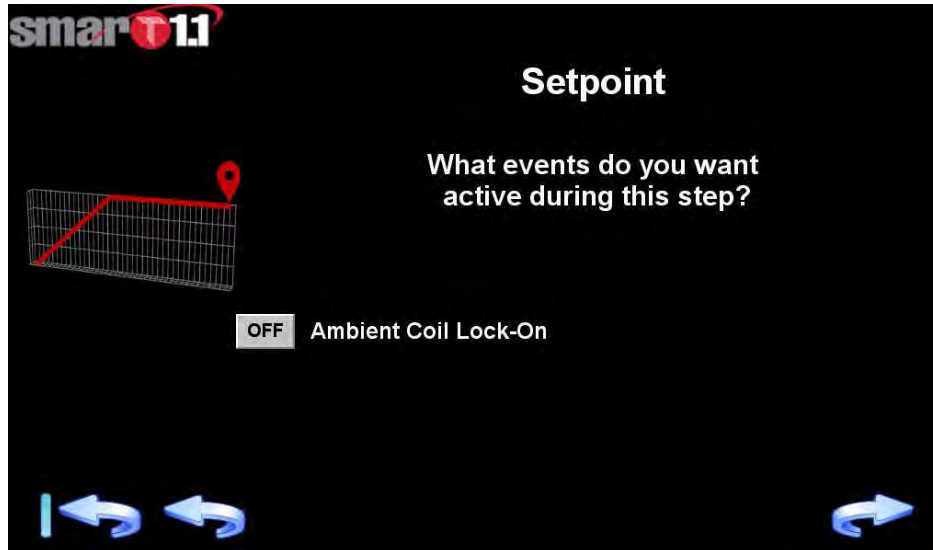


Press the **Hours**, **Minutes**, and **Seconds** entry display boxes to enter ramp time. A keypad will appear. After entering your setpoints, they will appear in the display boxes. Press the **Next (Right) Arrow** to continue.

SETPOINT SCREENS - CONT'D:

Setpoint

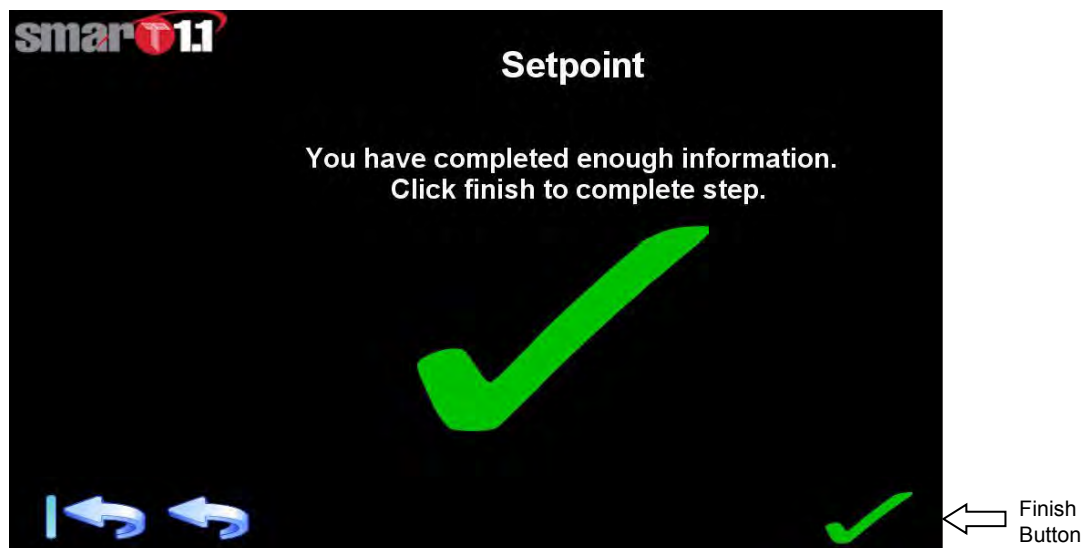
SETPOINT SCREEN – SELECT EVENT TURN - ON



Press the **Event ON / OFF** buttons to select the Events you wish to turn ON during this step. The button will turn green with ON indicated. Press the **Next (Right) Arrow** to continue.

The **Finish Screen** will appear.

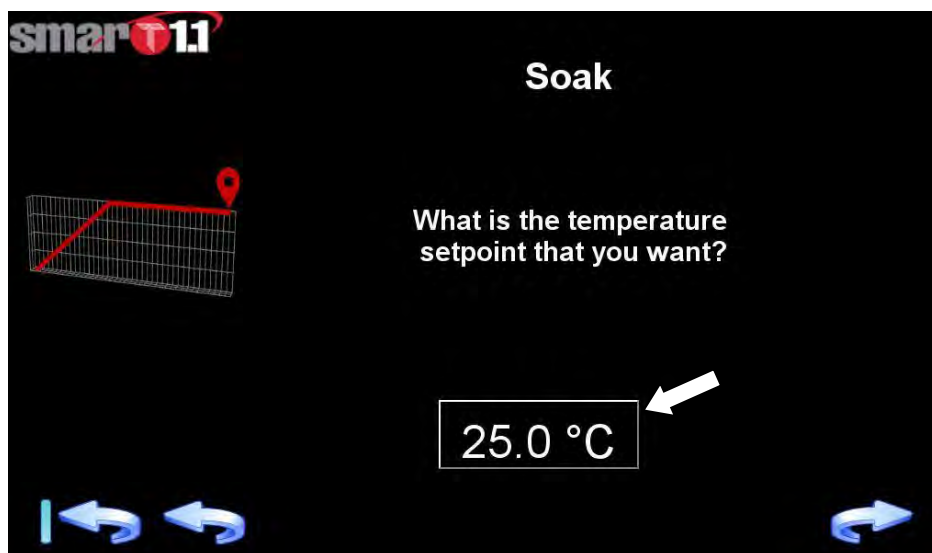
SETPOINT FINISH SCREEN



Press the **Finish (Check)** button to complete the step and to return to the **Add Step Screen**. You can abort this step by pressing the leftmost arrow.

4.4.2.1.2 SOAK SCREENS

Soak



SOAK SCREEN – ENTER CHAN. 1 SOAK TEMPERATURE

Press the temperature field entry display box to enter your soak temperature setpoint for Channel 1. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next (Right) Arrow** to continue.

SOAK SCREEN – PRESS TO CONTROL CHAN. 2 SOAK HUMIDITY



Press the **Press to Control** button to enter a humidity soak setpoint for Channel 2. The soak setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

SOAK SCREENS – CONT'D:

Soak

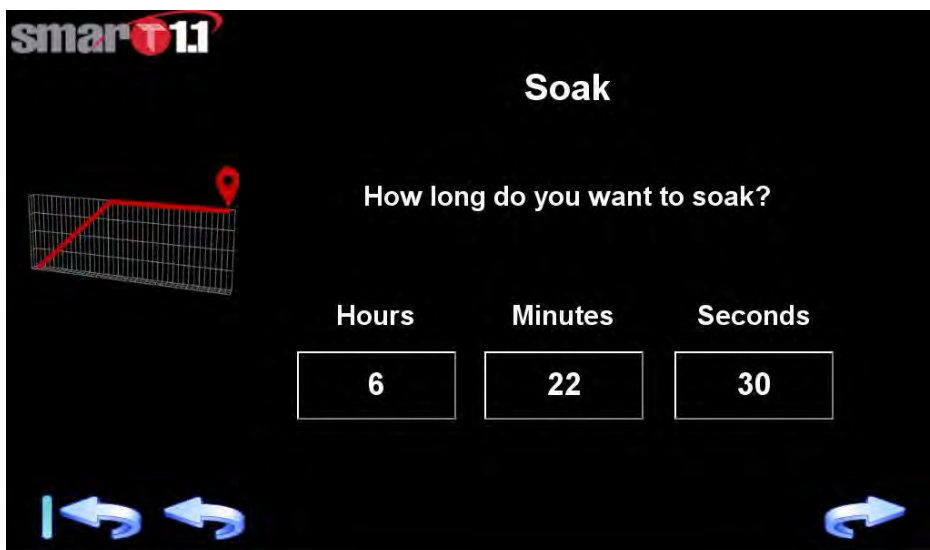
SOAK SCREEN – ENTER CHAN. 2 SOAK HUMIDITY



The screen displays the 'Smart 1.1' logo in the top left and the title 'Soak' in the top center. On the left, there is a 3D wireframe graphic of a rectangular container with a red line indicating a temperature profile. The main text asks, 'Do you want to control CH2 in this Step?'. Below this is a button labeled 'Press for NO Control'. The next question is 'What is the humidity setpoint that you want?'. Below this is a text entry box containing '50.0 %', with a white arrow pointing to it from the right. At the bottom, there are three blue arrow icons: a left arrow, a double left arrow, and a right arrow.

Press the humidity field entry display box to enter your relative humidity soak setpoint for Channel 2. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** if you do not want to control.

SOAK SCREEN – ENTER SOAK TIME



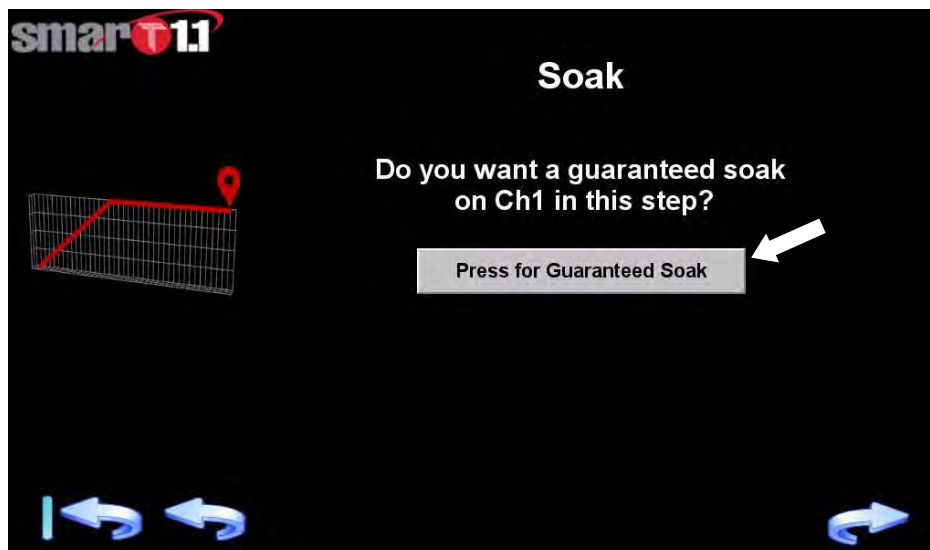
The screen displays the 'Smart 1.1' logo in the top left and the title 'Soak' in the top center. On the left, there is a 3D wireframe graphic of a rectangular container with a red line indicating a temperature profile. The main text asks, 'How long do you want to soak?'. Below this are three text entry boxes labeled 'Hours', 'Minutes', and 'Seconds'. The 'Hours' box contains '6', the 'Minutes' box contains '22', and the 'Seconds' box contains '30'. At the bottom, there are three blue arrow icons: a left arrow, a double left arrow, and a right arrow.

Press the **Hours**, **Minutes**, and **Seconds** entry display boxes to enter how long you want to soak. A keypad will appear. After entering your setpoints, they will appear in the display boxes. Press the **Next (Right) Arrow** to continue.

SOAK SCREENS - CONT'D:

Soak

SOAK SCREEN – PRESS FOR CHAN. 1 GUARANTEED SOAK



Press the **Press for Guaranteed Soak** button to enter the Channel 1 Guaranteed Soak temperature setpoint. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

SOAK SCREEN – ENTER CHAN. 1 GUARANTEED SOAK DEADBAND

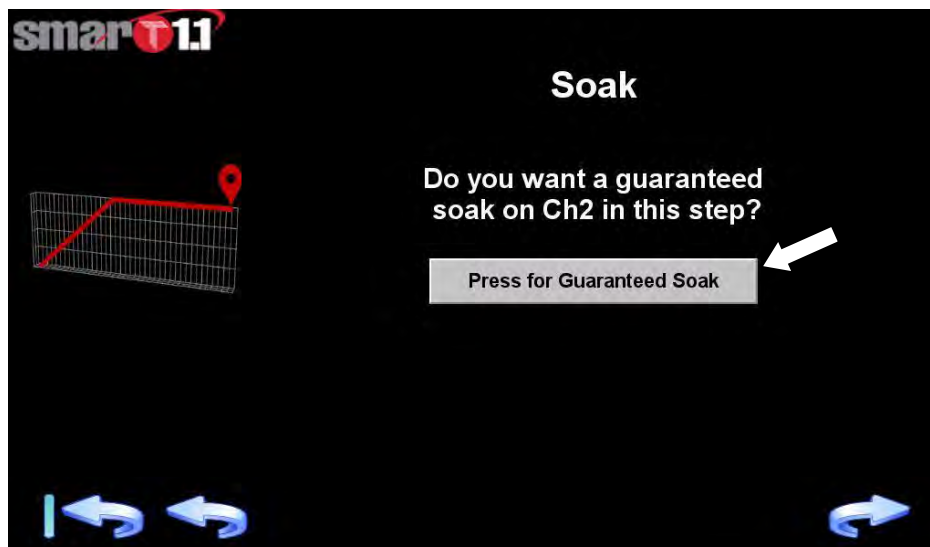


Press the temperature field entry display box to enter your Channel 1 Guaranteed Soak temperature **deadband**. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** button if you do not want to control.

SOAK SCREENS - CONT'D:

Soak

SOAK SCREEN – PRESS FOR CHAN. 2 GUARANTEED SOAK



Press the **Press for Guaranteed Soak** button to enter the Channel 2 Guaranteed Soak humidity setpoint. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

SOAK SCREEN – ENTER CHAN. 2 GUARANTEED SOAK

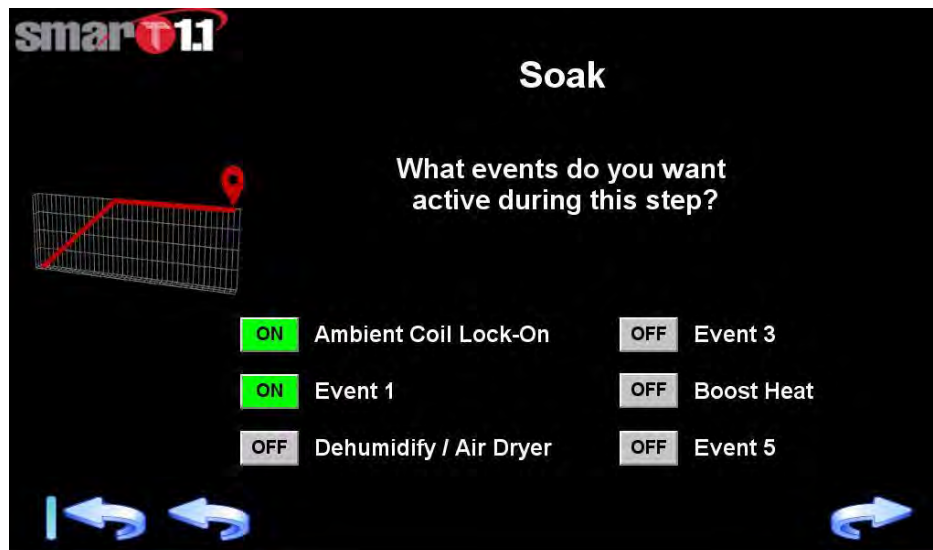


Press the humidity field entry display box to enter your Channel 2 Guaranteed Soak humidity deadband. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next Arrow** to continue.

SOAK SCREENS - CONT'D:

Soak

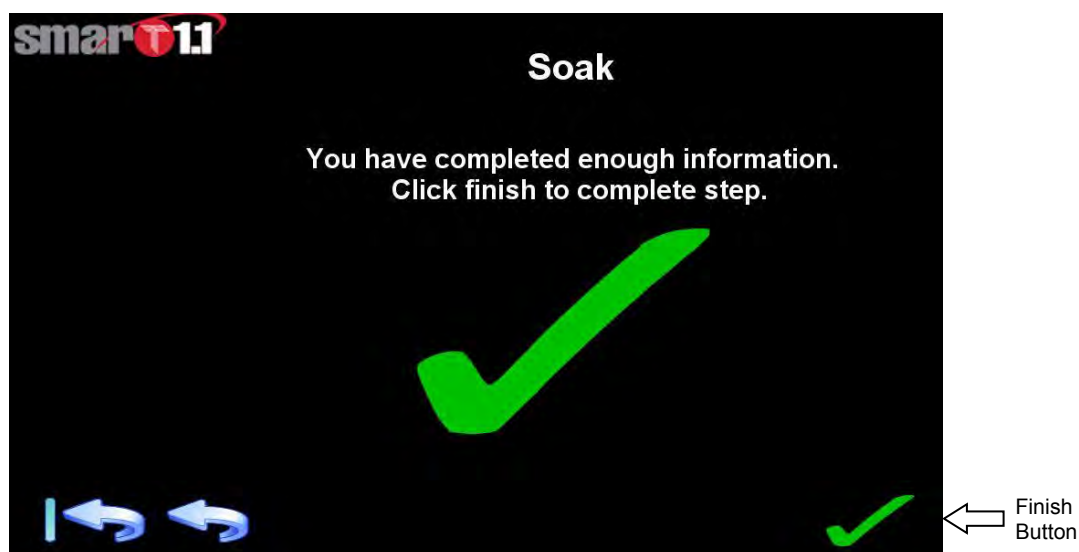
SOAK SCREEN – SELECT EVENT TURN - ON



Press the **Event ON / OFF** buttons to select the Events you wish to turn ON. The button will turn green with **ON** indicated. Press the **Next Arrow** to continue.

The **Finish Screen** will appear. Press the **Finish** button to return to the **Add Step Screen**.

SOAK FINISH SCREEN



4.4.2.1.3 WAIT FOR SCREENS

Wait For



WAIT FOR SCREEN – PRESS TO WAIT FOR CHAN. 1 TEMPERATURE

Press the **Press to Wait For Temp** button to enter a Wait For temperature setpoint. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

WAIT FOR SCREEN – ENTER CHAN. 1 WAIT FOR TEMPERATURE

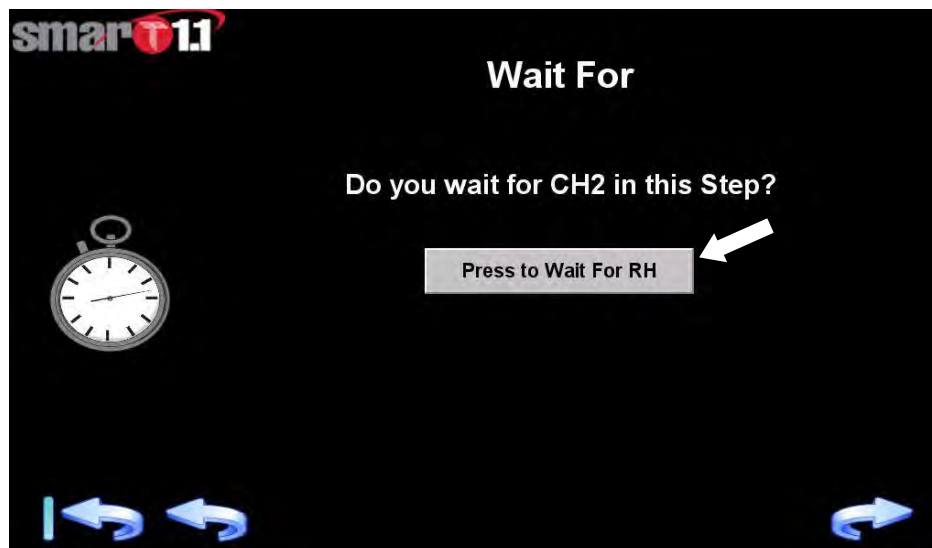


Press the temperature field entry display box to enter your temperature setpoint. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** button if you do not want to control.

WAIT FOR SCREENS - CONT'D:



WAIT FOR SCREEN – PRESS TO WAIT FOR CHAN. 2 HUMIDITY



Press the **Press to Wait For RH** button to enter a Wait For humidity setpoint. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

WAIT FOR SCREEN – ENTER CHAN. 2 WAIT FOR HUMIDITY



Press the humidity field entry display box to enter your relative humidity setpoint. A keypad will appear. After entering your setpoint it will appear in the display box. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** button if you do not want to control.

WAIT FOR SCREENS - CONT'D:

Wait For

WAIT FOR SCREEN – PRESS TO WAIT FOR TIME



Press the **Press to Wait For Time** button to enter a Wait For Time. The setpoint entry screen will appear. Press the **Next (Right) Arrow** if you do not want to control.

WAIT FOR SCREEN – ENTER WAIT FOR TIME



Press the **Hours**, **Minutes**, and **Seconds** entry display boxes to enter a Wait For Time. A keypad will appear. After entering your setpoints, they will appear in the display boxes. Press the **Next (Right) Arrow** to continue. Press the **Press for NO Control** button if you do not want to control..

WAIT FOR SCREENS - CONT'D:

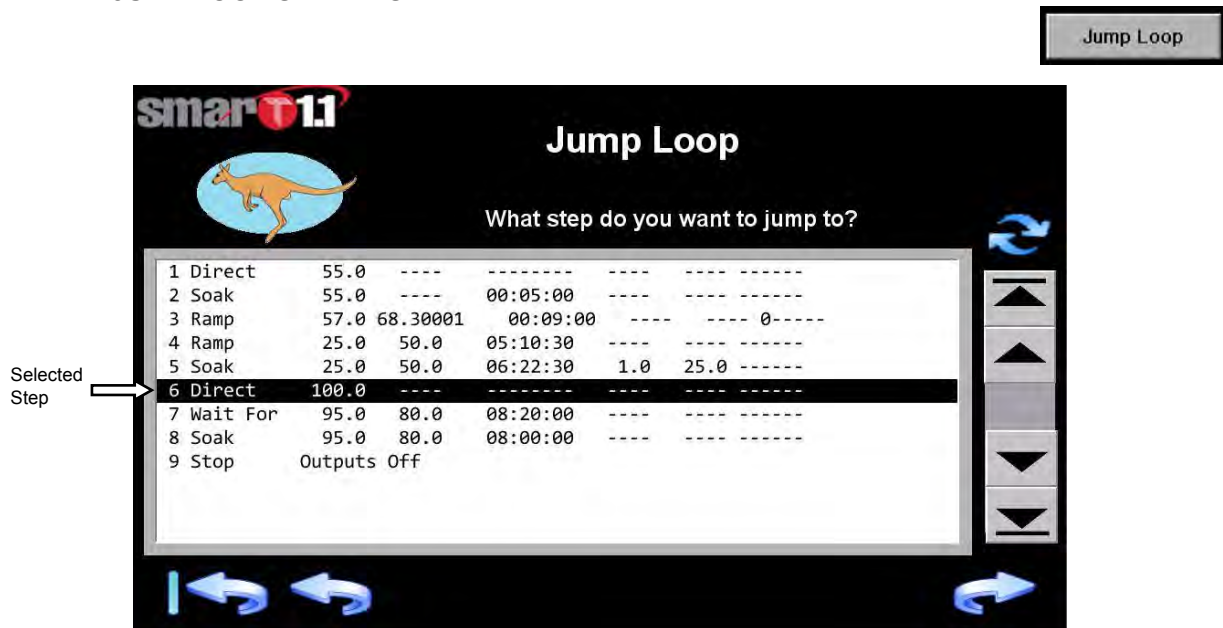


The **Finish Screen** will appear. Press the **Finish** button to return to the **Add Step Screen**.

WAIT FOR FINISH SCREEN



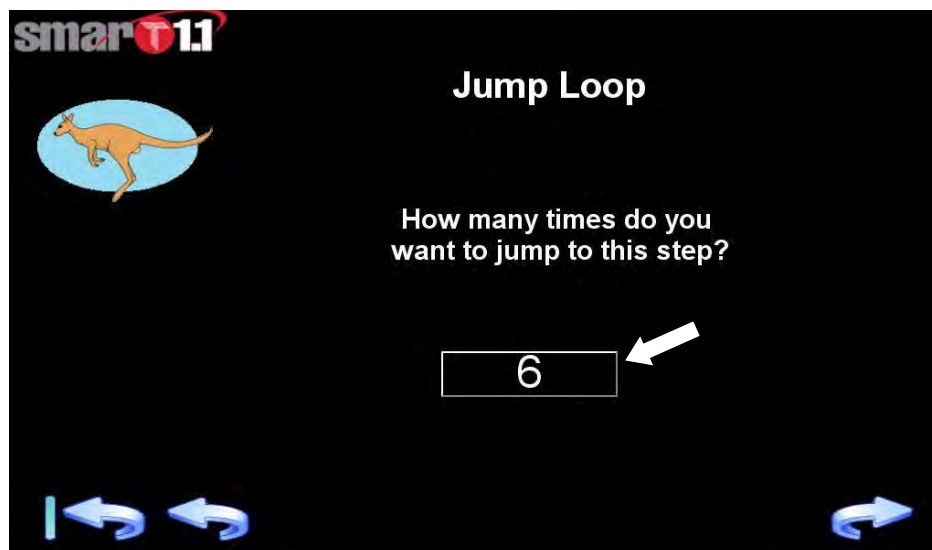
4.4.2.1.4 JUMP LOOP SCREENS



JUMP LOOP SCREEN – SELECT STEP to JUMP TO

Select the step you want to jump to by either pressing the step on the screen or by using the scroll buttons. Press the **Next (Right) Arrow** to continue.

JUMP LOOP SCREEN – ENTER NUMBER OF TIMES



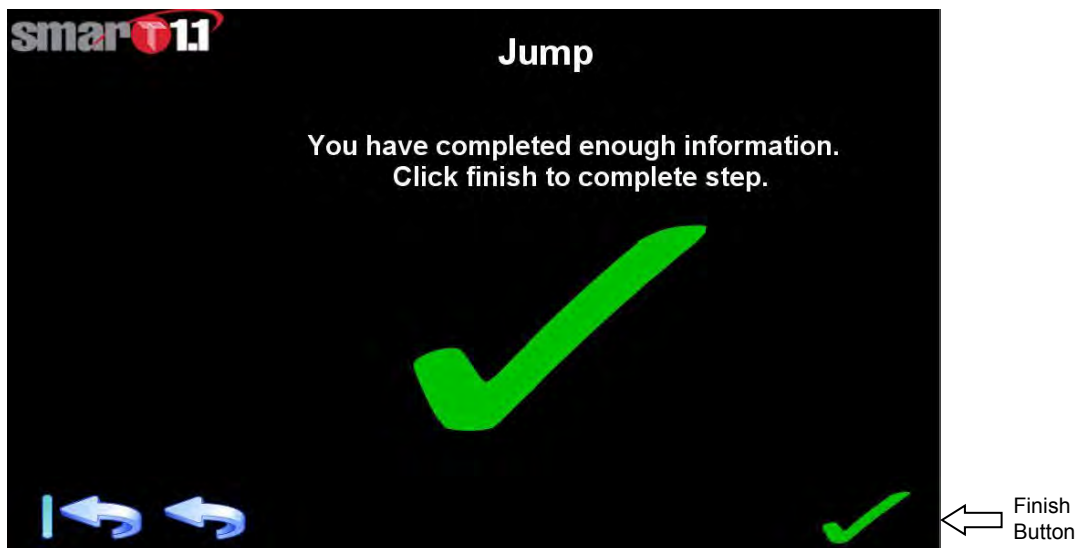
Enter the number of times you want to jump to the selected step (from previous screen) by pressing the field entry display box. A keypad will appear. Press the **Next (Right) Arrow** to continue.

JUMP LOOP SCREENS - CONT'D:

Jump Loop

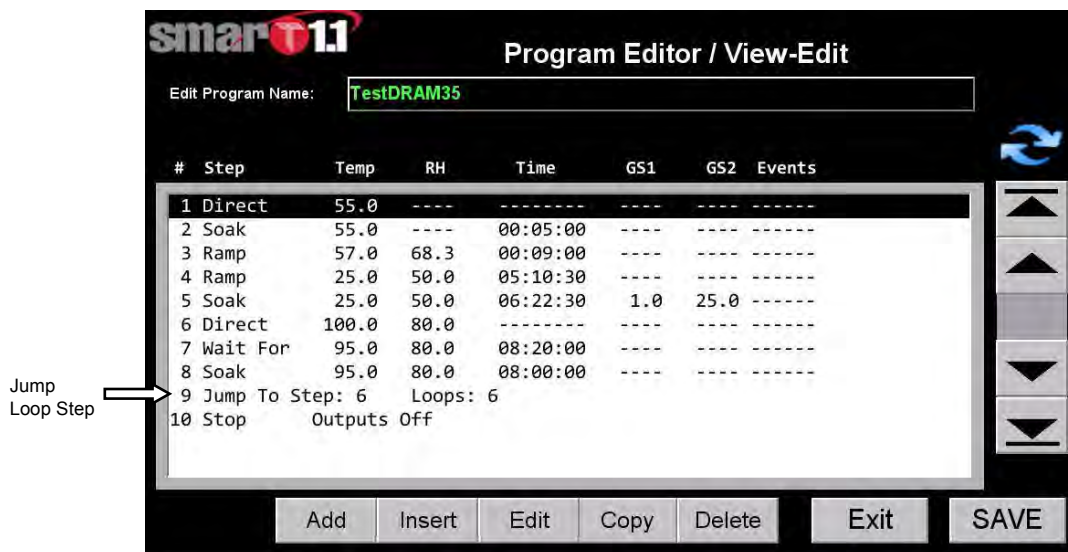
The **Finish Screen** will appear. Press the **Finish** button to return to the **Add Step Screen**.

JUMP LOOP FINISH SCREEN



A Jump Loop Step is shown below in the Program Editor Screen upon completion.

PROGRAM EDITOR SCREEN – JUMP LOOP COMPLETE



4.4.2.1.5 STOP STEP SCREENS



STOP STEP SCREEN

Decide how you want your program stopped by pressing the desired button. Function turn-on is verified when the button turns green.

- **Press for Outputs OFF:** When the profile is complete, the chamber will be turned OFF.
- **Hold Setpoints:** When the profile is complete, the profile remains at the Stop Step with the outputs at their last programmed settings. (**This is the default setting**).

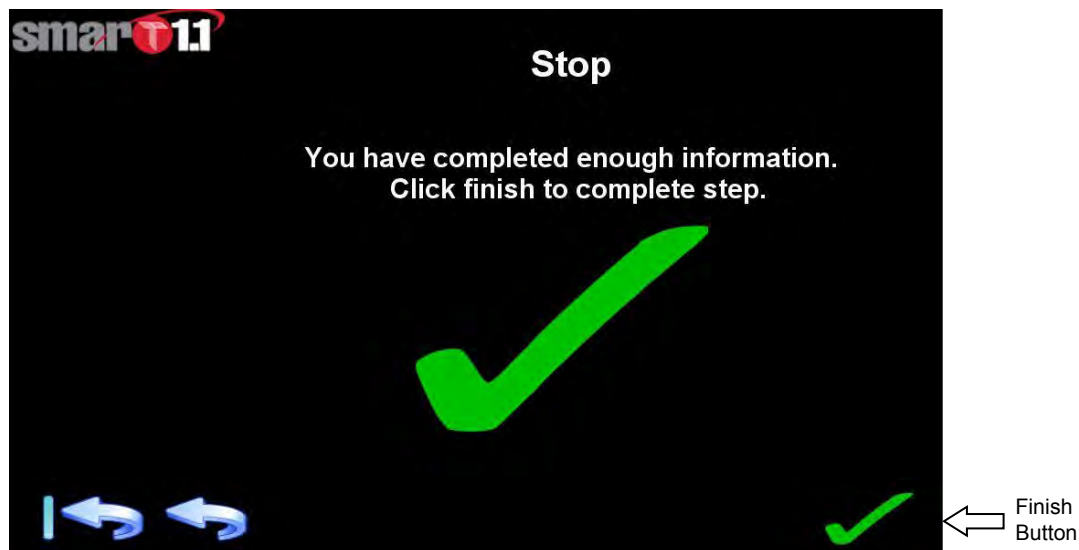
Important Note: If you do not create a Stop Step, a default Stop Step - “**Hold Setpoints**”, will be created.

Press the **Next (Right) Arrow** to continue. The following screen will appear.

STOP STEP SCREENS - CONT'D



STOP STEP FINISH SCREEN

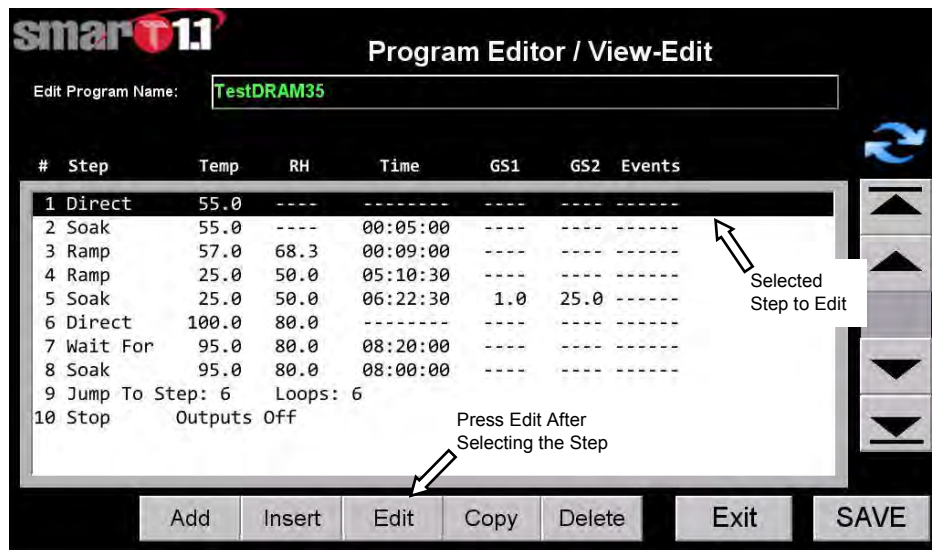


Press the **Finish** button to return to the **Add Step Screen**.

4.4.2.2 EDIT STEP SCREENS



To edit a step, select the step and then press the **Edit** button at the bottom.

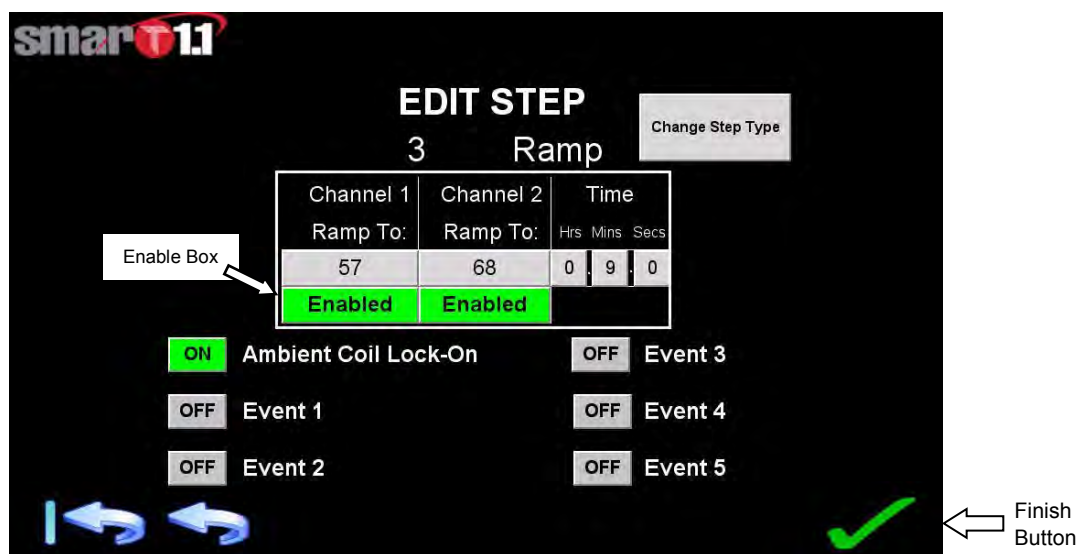


PROGRAM EDITOR – VIEW / EDIT SCREEN

The **Edit Step Screen** will appear with all of the parameters previously programmed for that step. **Sample Screens are provided below.** They are not necessarily the identical ones in the View-Edit Screen above.

Note: The screen shown below is not the one 'selected' in the View-Edit Screen above.

EDIT STEP SCREEN – STEP #3 -- RAMP STEP



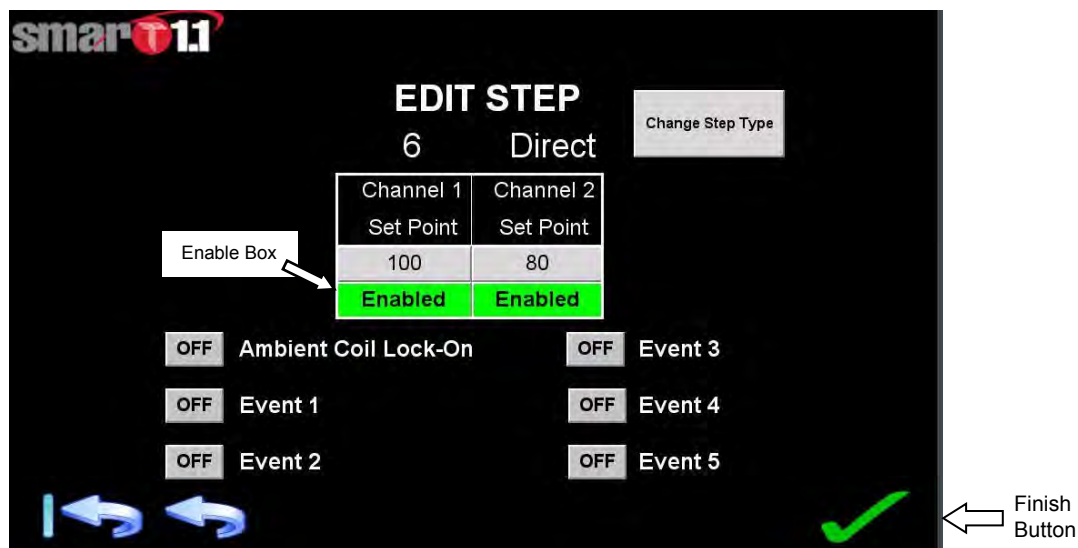
EDIT STEP SCREENS - CONT'D

Edit Step Screen Features:



- You may change any of the parameters shown by pressing on the corresponding buttons.
- Press the **Change Step Type** button to change the step type. The **Add Step Screen** will appear. Go to Section 4.4.2.1 for Add Step function details.
- You may turn each channel ON or OFF, by pressing the Enable box. Green "Enabled" = ON, grey "Enable" = OFF.
- When completed, press the **Finish** button to save the step.

EDIT STEP SCREEN – STEP #6 -- DIRECT STEP



EDIT STEP SCREENS - CONT'D

Edit

EDIT STEP SCREEN – STEP #7 -- WAIT FOR STEP



EDIT STEP

7 Wait

Change Step Type

Channel 1	Channel 2	Time		
Wait For	Wait For	Hrs	Mins	Secs
95	80	8	20	0
Enabled	Enabled			






← Finish Button

From this screen, you can adjust all the parameters of the selected Wait For step.

EDIT STEP SCREEN – STEP #9 -- JUMP LOOP STEP



EDIT STEP

9 Jump

Change Step Type

Step to Jump To: 6

Number of Jumps: 6






← Finish Button

From this screen, you can adjust all the parameters of the selected Jump step.

EDIT STEP SCREENS - CONT'D

Edit

EDIT STEP SCREEN – STEP #10 -- STOP STEP



From this screen, you can adjust all the parameters of the Stop step.

4.4.2.3 INSERT STEP SCREEN

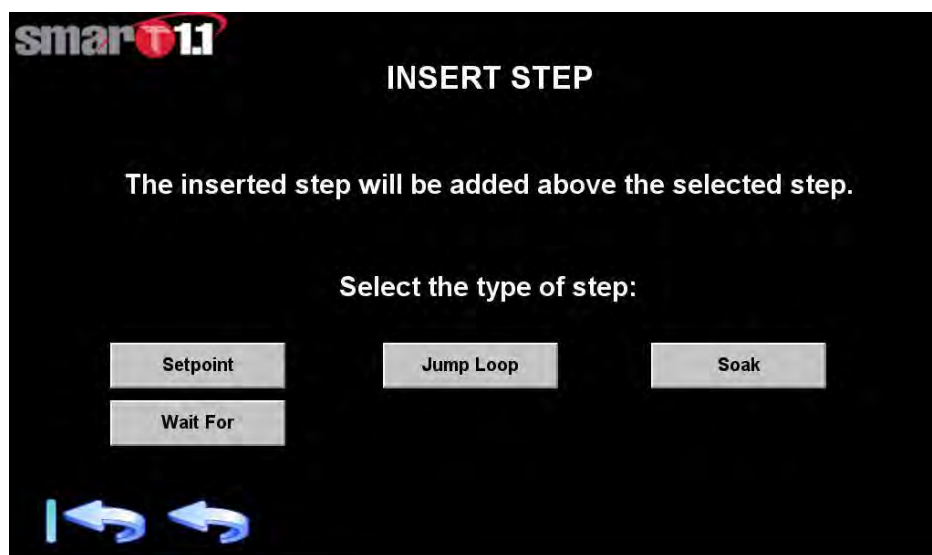


INSERT STEP SCREEN – SELECT WHERE TO INSERT

Follow the procedure below to insert a step.

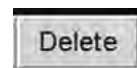
1. Press the **Insert** button on the **View-Edit Screen**. The **Insert Step Screen** shown above will appear.
2. Select the step in the program where you want to insert the new step **above / before it**. Press the **Next** button to continue. The Insert Step selection type Screen shown below will appear.

INSERT STEP SCREEN – SELECT STEP TYPE TO INSERT

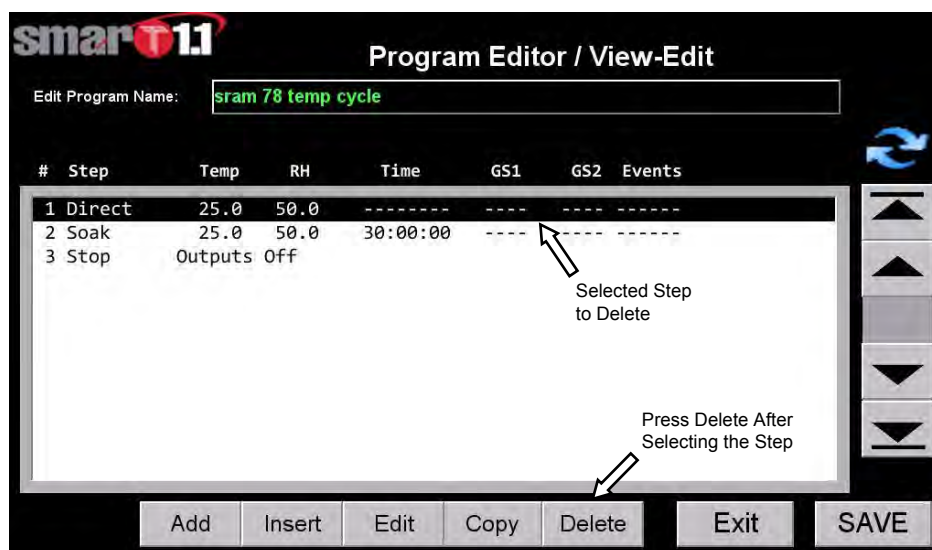


Select the type of step you wish to insert into your program. The View-Edit Screen will reappear. **Follow the instructions throughout Section 4.4.2.1** for creating any of the step types shown above.

4.4.2.4 DELETE STEP SCREEN



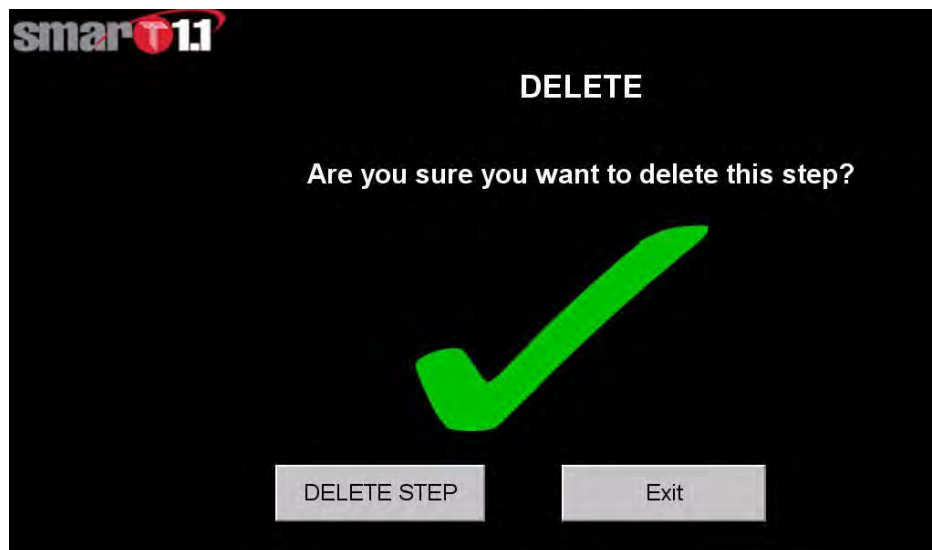
Select the step you wish to delete and then press the **Delete** button.



PROGRAM EDITOR – VIEW / EDIT SCREEN

The **Delete Step Screen** will appear.

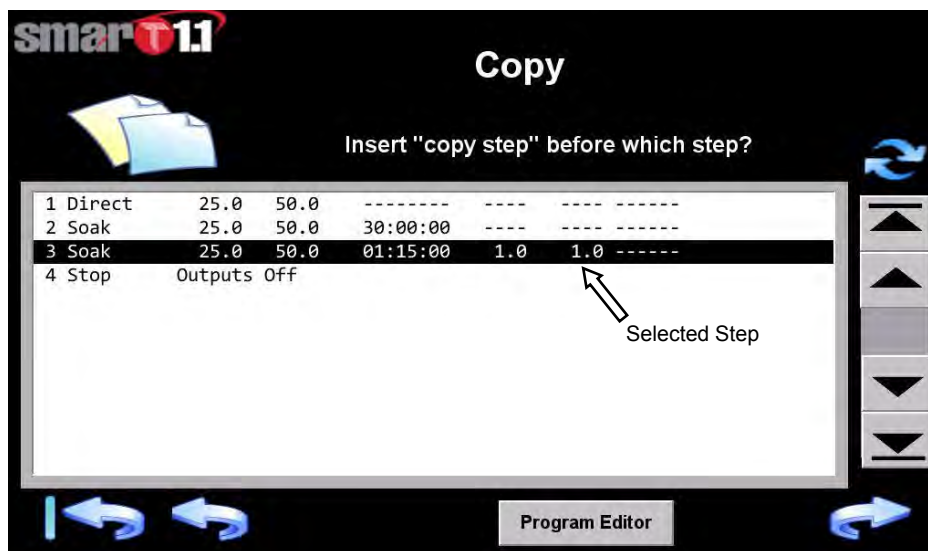
DELETE STEP SCREEN – DELETE SELECTED STEP



Confirm that you want to delete the selected step by pressing the **Delete Step** button. Press the **Exit** button if you do not want to delete the step.

4.4.2.5 COPY STEP SCREEN

Copy



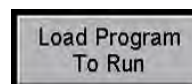
COPY STEP SCREEN – SELECT WHERE TO COPY

Follow the procedure below to copy a step.

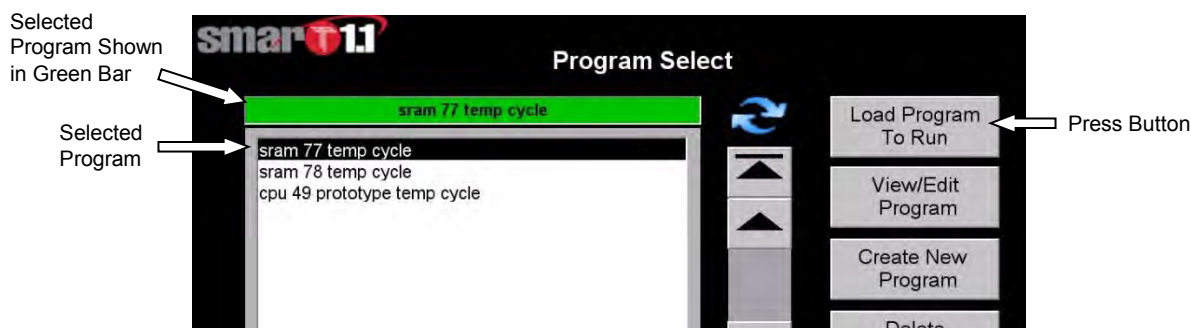
1. Select the step you wish to copy in the **Program Editor View-Edit Screen**.
2. Press the **Copy** button on the **View-Edit Screen**. The **Copy Step Screen** shown above will appear.
3. Select the step in the program where you want to place the copied step above / before it. Press the **Next (Right) Arrow** to continue. The Edit-View Screen will reappear.

4.4.3 LOAD PROGRAM TO RUN SCREEN

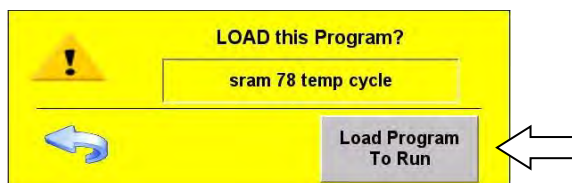
Select the program you wish to download to the PLC and run by pressing on the program name in the Program Editor Screen. You may utilize the Up / Down scroll keys if desired. The selected program name will appear in the green bar above the list of available programs.



Press the **Load Program To Run** button on the right side of the screen.

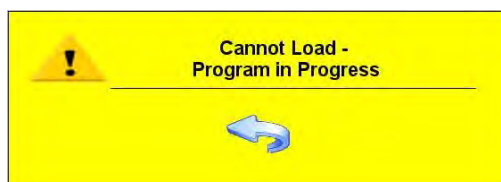


The yellow **Load this Program Screen** will appear with the selected program in the display box.



Press the **Load Program To Run** button on the yellow screen. The **Program Screen** will immediately appear for you to start your program. The Program Screen is [described in Section 4.5](#).

Note: You cannot download a program to the PLC if a program is running. The following screen will appear if this is attempted.

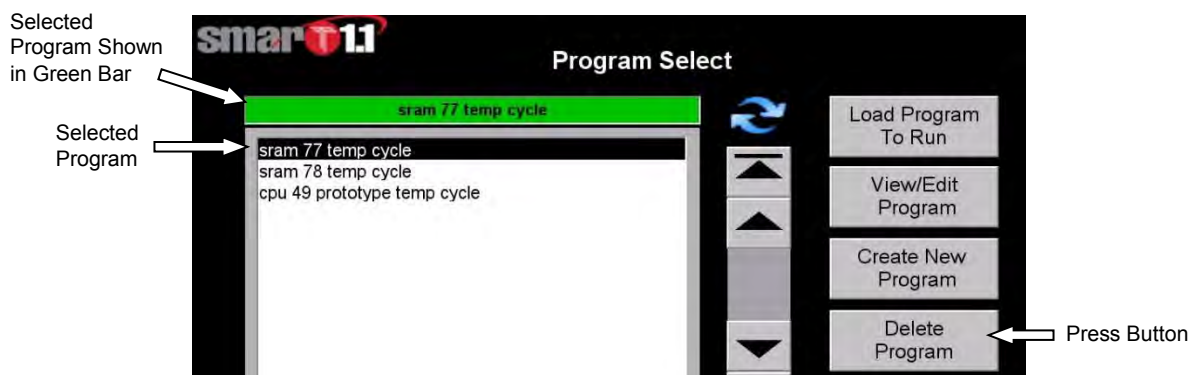


4.4.4 DELETE PROGRAM SCREEN

Select the program you wish to delete by pressing on the program name in the Program Editor Screen. You may utilize the Up / Down scroll keys if desired. The selected program name will appear in the green bar above the list of available programs.

Delete Program

Press the **Delete Program** button on the right side of the screen.

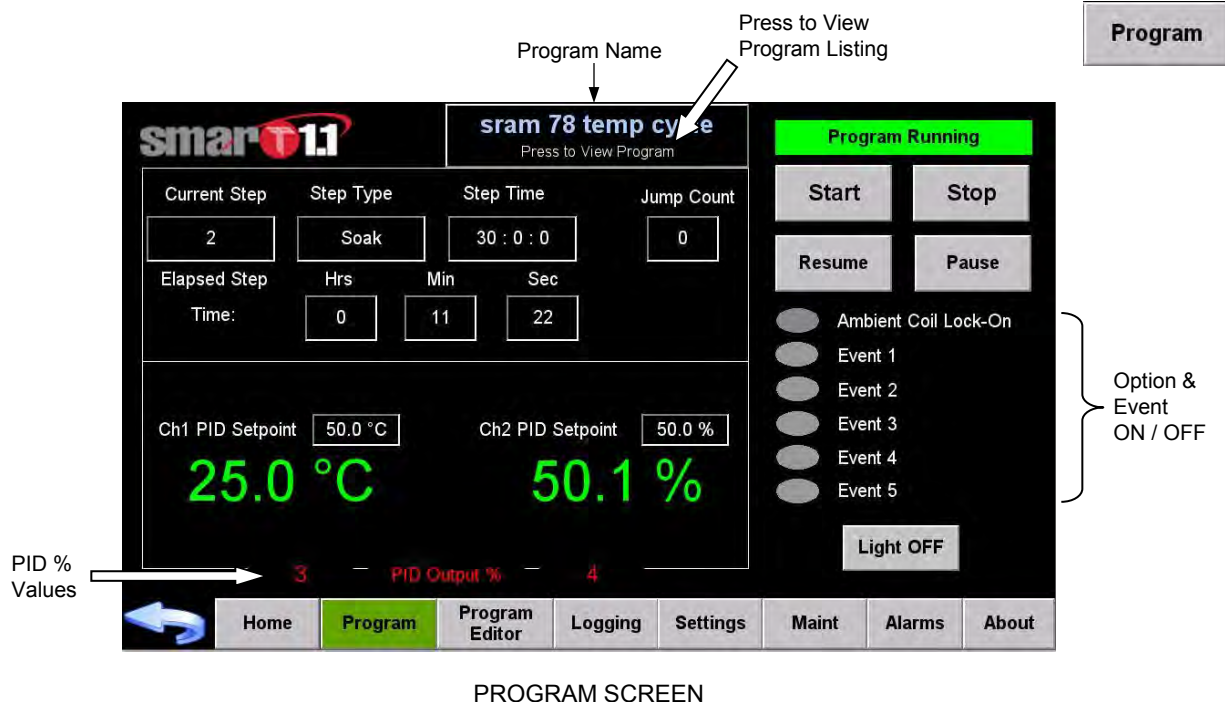


The yellow **Delete this Program File? Screen** will appear with the selected program in the display box.



Press the **Delete** button to confirm.

4.5 PROGRAM SCREEN



The **Program Screen** permits you to Start, Stop, Pause, and Resume the program after loading the program to the PLC as described in Section 4.4.3 (Program Editor). A wealth of setpoint and process information is given for Channel 1 and 2.

The current downloaded program that was downloaded from the Program Editor Screen is displayed at the top of the screen. You may press this display button to view the program listing. The Program Editor Screen will return to view the program.

Press the **Start**, **Stop**, **Pause**, and **Resume** buttons as required for the operation of your program. Option and Event status indicators are provided on the right hand side. The indicator will turn green while the function is turned ON.

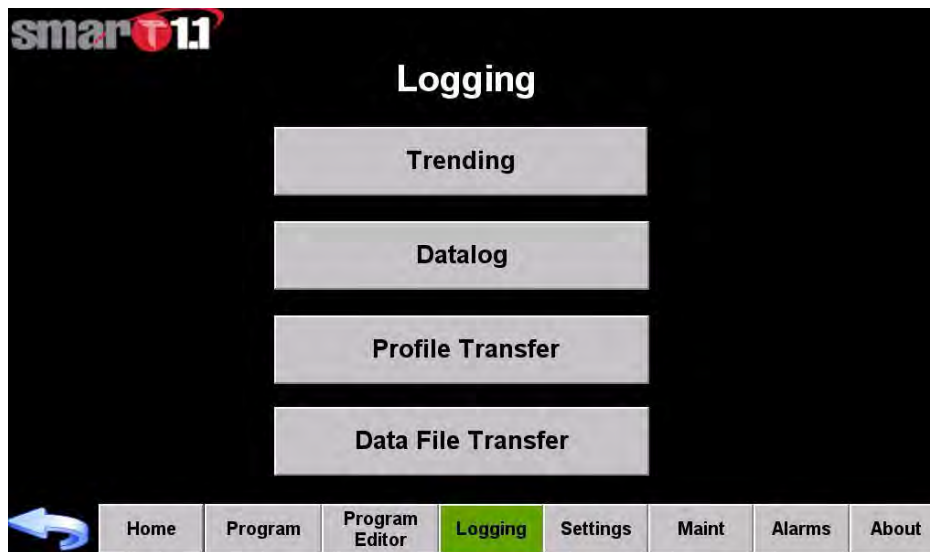
Note: If your chamber has installed options, they will appear instead of the 'numbered Event'.

Important Note: When you press the **Stop** button (after starting a program), the chamber reverts to steady state operation with the last set of conditions being maintained. This could be useful if it is desired to load and run another program.

Press the **Light ON / OFF** button to turn the chamber light ON and OFF.

4.6 LOGGING SCREEN

Logging

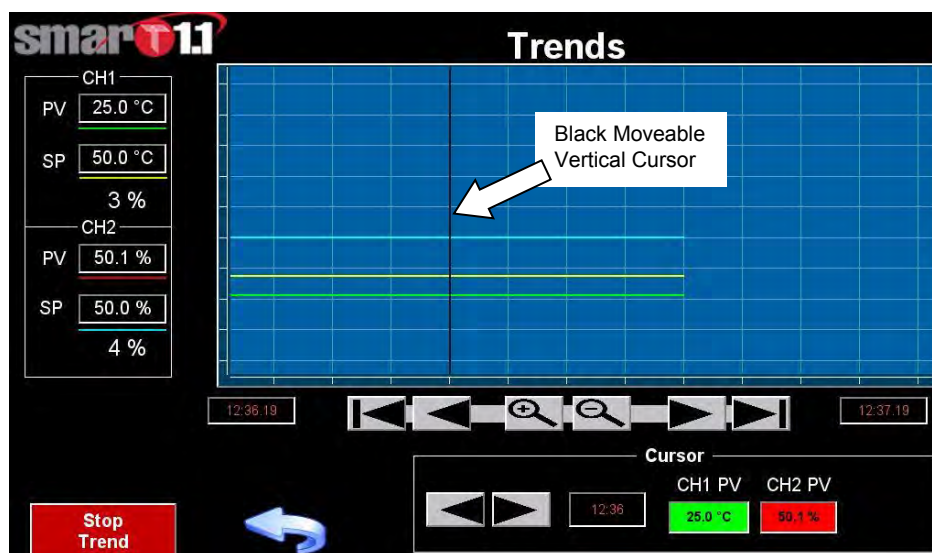


LOGGING SCREEN

The **Logging Screen** is used to access the following screens and functions.

- **Trending Screen** - Temperature and Humidity Graphs
- **Datalog Screen** - Select the logging interval. Start / Stop logging.
- **Profile Transfer Screen** - Transfer program files between controller SD card and USB Drive.
- **Data File Transfer Screen** - Transfer data logging files to a USB Drive, or clear old data logging files.

4.6.1 TRENDING SCREEN



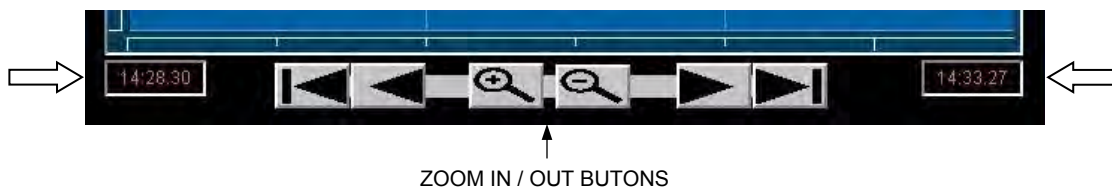
TRENDING SCREEN

The **Trending Screen** permits you to view the trending process and setpoint values for Channel 1 and 2. Process and setpoint digital displays are provided on the left side of the screen.

Each value is graphed with **color coded graph lines**. You can expand or reduce the timing view display by pressing the 'plus' and 'minus' (zoom-in and zoom-out) buttons below the screen. Left and right arrows permit you to advance along the Time Axis of the graph. You can also move the screen or control the zoom by pinching the screen as you would a smart phone.

Trending Time:

Trending timestamps are indicated in the red display boxes at both bottom corners of the screen.



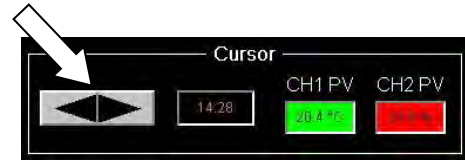
Stop / Start Trend:

Press the red **Stop Trend** button to stop trending. The button will change to "**Clear and Restart**" for you to restart trending when desired.

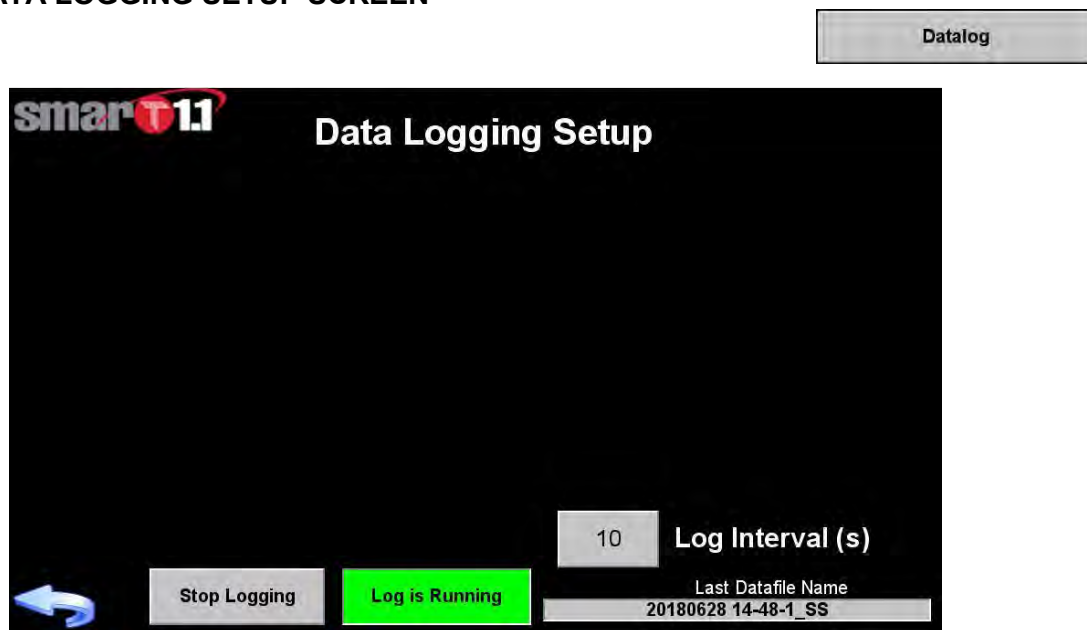


Vertical Cursor:

A black moveable **vertical cursor** is provided that can be moved to any place on the Time Axis using either your finger or the Cursor arrows in the Cursor Display box at the bottom of the screen. Channel 1 and 2 process values for the cursor location will be displayed in the Cursor Display box, along with a time stamp.



4.6.2 DATA LOGGING SETUP SCREEN



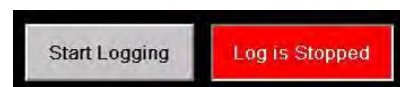
DATA LOGGING SETUP SCREEN

The **Data Logging Setup Screen** permits you to start and stop data logging. **All** data is logged. The **Last Data File Name** is displayed at the lower right corner.

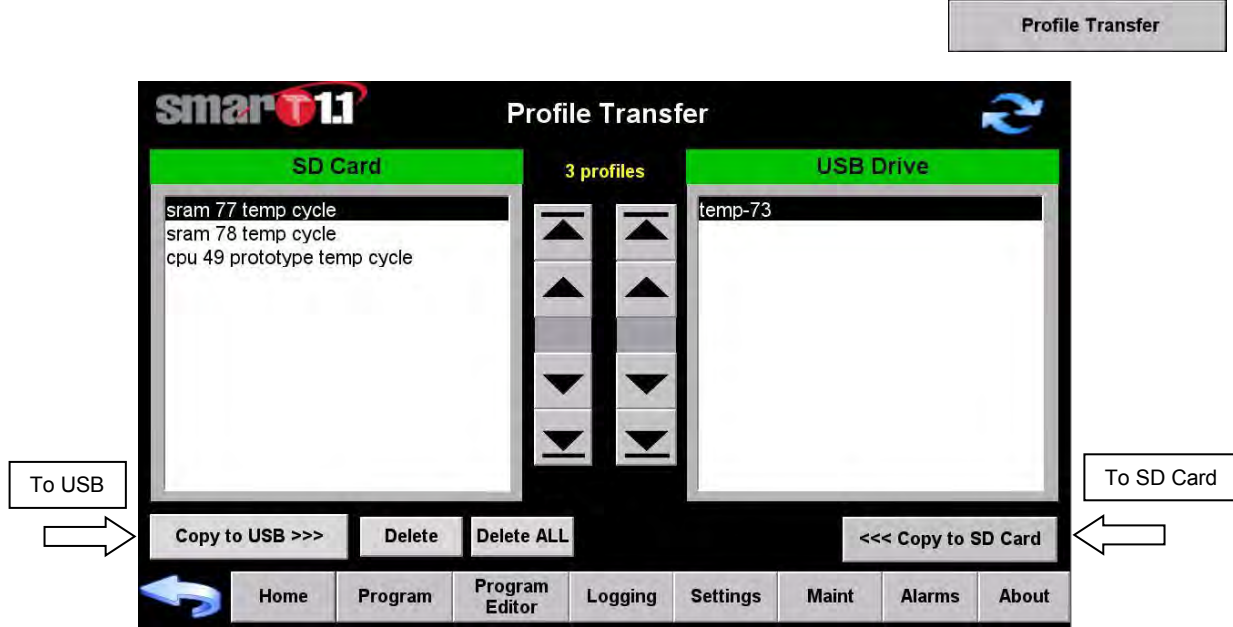
Press the **Log Interval (s)** button to enter the desired logging interval in seconds. The keypad will appear to enter your value.



Press the **Start / Stop Logging** button to start and stop logging. **The unit must be running in order for logging to take place.**



4.6.3 PROFILE TRANSFER SCREEN



PROFILE TRANSFER SCREEN

The **Profile Transfer Screen** is used to transfer program files between the controller SD Card and a USB Drive. You may also delete one or more profiles from the SD Card only. The number of profiles on the SD Card is provided at the top middle of the screen.

Select the profile(s) you wish to transfer or delete and press the appropriate button as described below.

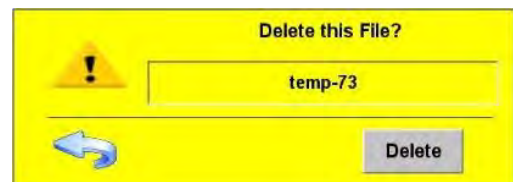
- **Delete button:** Deletes selected profile on SD Card.
- **Delete All button:** Deletes all profiles on SD Card.
- **Copy to USB button:** Press to copy selected profile(s) on SD Card to the USB Drive.
- **Copy to SD Card button:** Press to copy selected profile(s) on USB Drive to SD Card.

Delete / Delete All Buttons – Profiles from SD Card:

After selecting the desired profile(s) to delete from the SD Card section of the Profile Transfer Screen, press the Delete or Delete All button. The corresponding yellow notification screen will appear.

Press the **Delete / Delete All** button to confirm.

Note: You cannot delete profiles from the USB Drive.



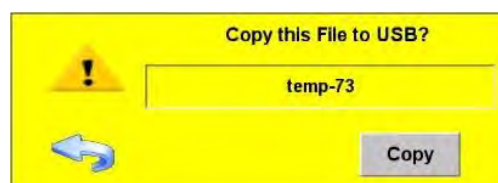
PROFILE TRANSFER SCREENS – CONT'D:

Copy to USB:

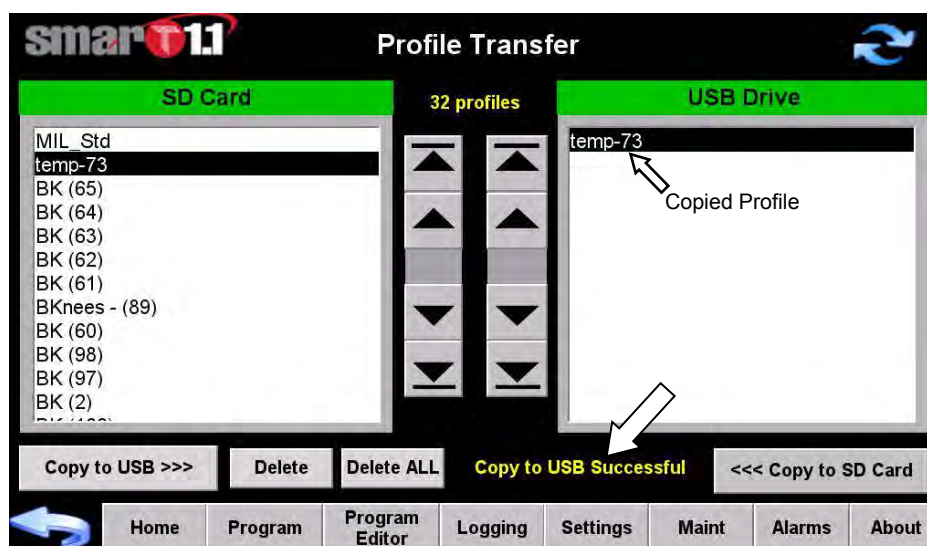
After selecting the desired profile in the SD Card listing on the left side of the screen, press the **Copy to USB** button. The yellow notification screen shown below will appear.

Copy to USB >>>

Press the **Copy** button to continue. Press the Return Arrow is you do not want to copy this profile.



When successful, the copied profile will appear in the USB Drive section and the “**Copy to USB Successful**” indication will be displayed near the bottom of the screen.



PROFILE TRANSFER SCREEN

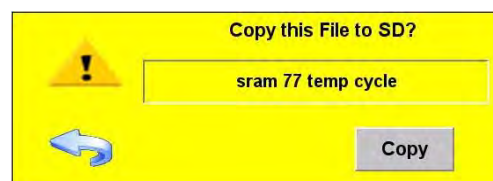
Copy to SD Card:

After selecting the desired profile in the USB Drive listing on the right side of the screen, press the **Copy to SD Card** button. The yellow notification screen shown below will appear.

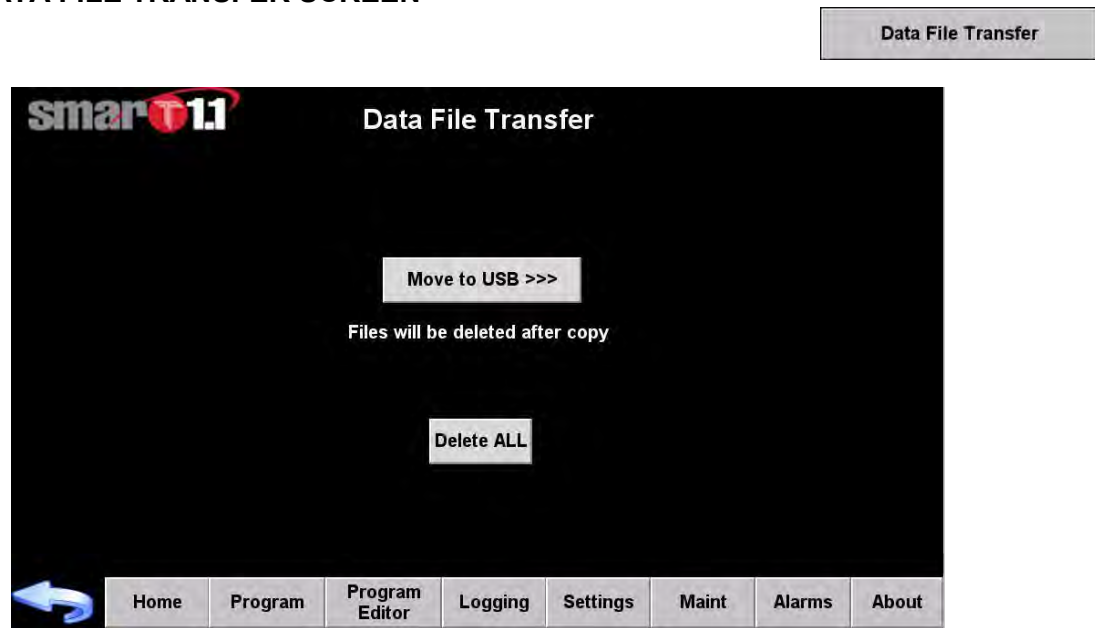
<<< Copy to SD Card

Press the **Copy** button to continue. Press the Return Arrow is you do not want to copy this profile.

When successful the copied profile will appear in the SD Card section. “Copy to SD Card Successful” **is not** displayed near the bottom of the Profile Transfer Screen.



4.6.4 DATA FILE TRANSFER SCREEN

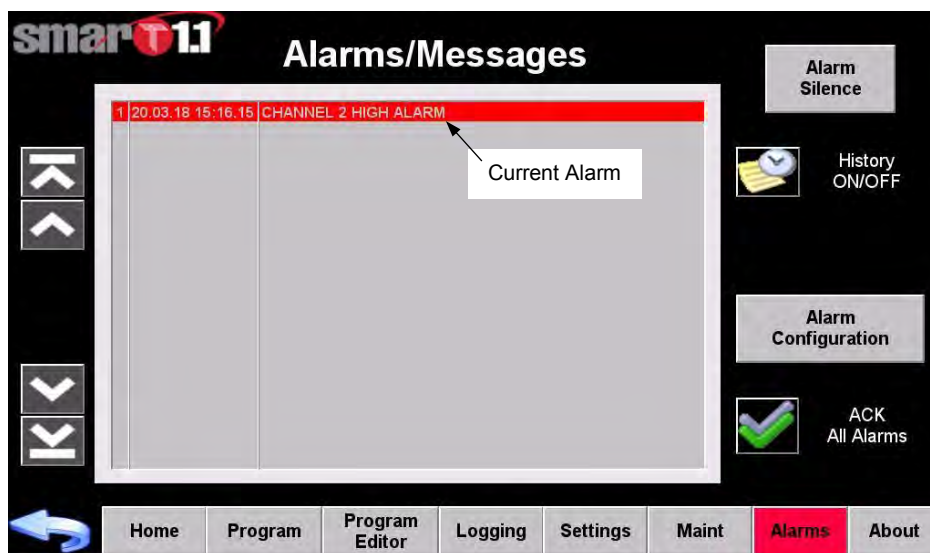


DATA FILE TRANSFER SCREEN

The **Data File Transfer Screen** is used to transfer ALL data logging files from the SD card to the USB Drive by pressing the **Move to USB** button. All data files will be deleted after the transfer is complete.

Press the **Delete ALL** button to delete all data logging files without transferring them.

4.7 ALARMS SCREEN



ALARMS SCREEN

The **Alarms Screen** displays all active alarms with a time / date stamp and alarm message. Scroll buttons are provided to scroll between alarms. Several important function buttons are provided on this screen, which are described below.

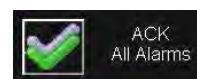
- **Alarm Configuration Button** – Press to configure high / low temperature alarm setpoints and high / low deviation alarms for Channel 1 and Channel 2.



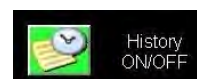
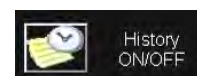
- **Alarm Silence Button** – Press to silence the alarm.



- **ACK All Alarms Button** – First select the alarm(s) you wish to acknowledge by using the Up / Down Arrow buttons or by pressing the alarm message(s). **Press and hold** the **ACK All Alarms** button **for 2 seconds** to acknowledge all alarms. If the alarm condition has been corrected, the alarm message will disappear from this screen. However, it will be retained on the Alarm History Screen.



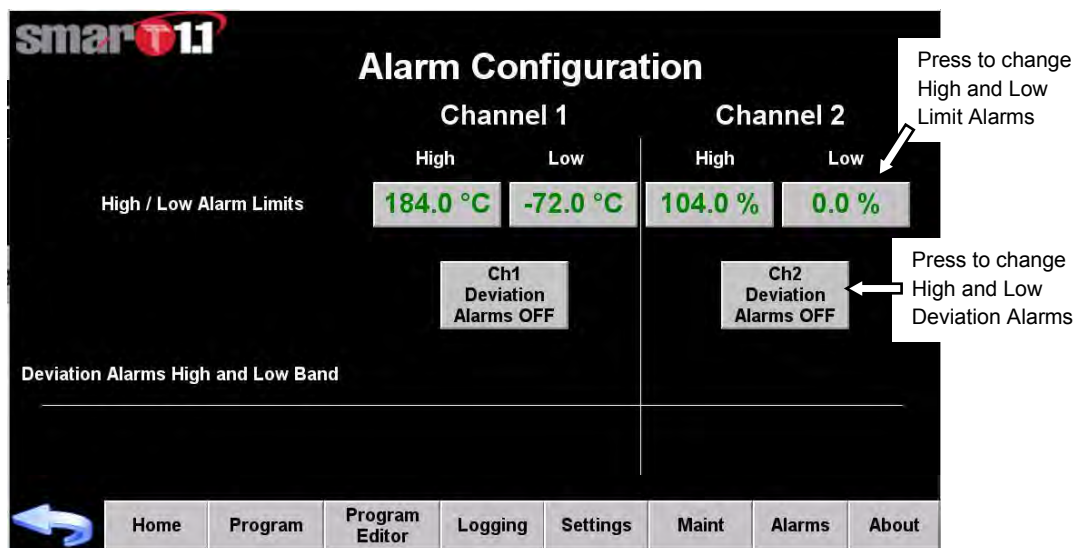
- **Alarm History Button** – Press to display a history of all alarms. The left side of the button will turn green. The **Alarms History Screen** is basically identical to the main Alarms Screen. Up to 50 alarms can be stored on this screen. You may scroll through the alarm list by pressing the **Up / Down** arrow buttons on the left side. You cannot acknowledge an alarm on this screen.



ALARMS SCREENS - CONT'D:

Alarms

ALARM CONFIGURATION SCREEN

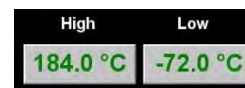


The **Alarm Configuration Screen** permits you to configure the following types of alarm setpoints for Channel 1 and Channel 2.

- High / Low Limit Alarms
- High / Low Deviation Alarms

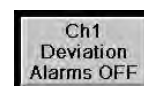
High / Low Limit Alarms Setup:

Press the **High / Low Alarm Setpoint** entry display boxes to enter your limit setpoints for Channels 1 and 2. A numeric keypad will appear.

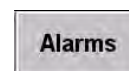


To Activate Deviation Alarms:

Press the **Ch1 / Ch2 Deviation Alarms OFF** buttons to set up your Deviation Alarms. The Deviation Alarms High and Low Band entry display boxes will appear in the lower half of the screen. This is shown on the next page.

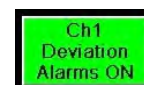


ALARMS SCREENS - CONT'D:

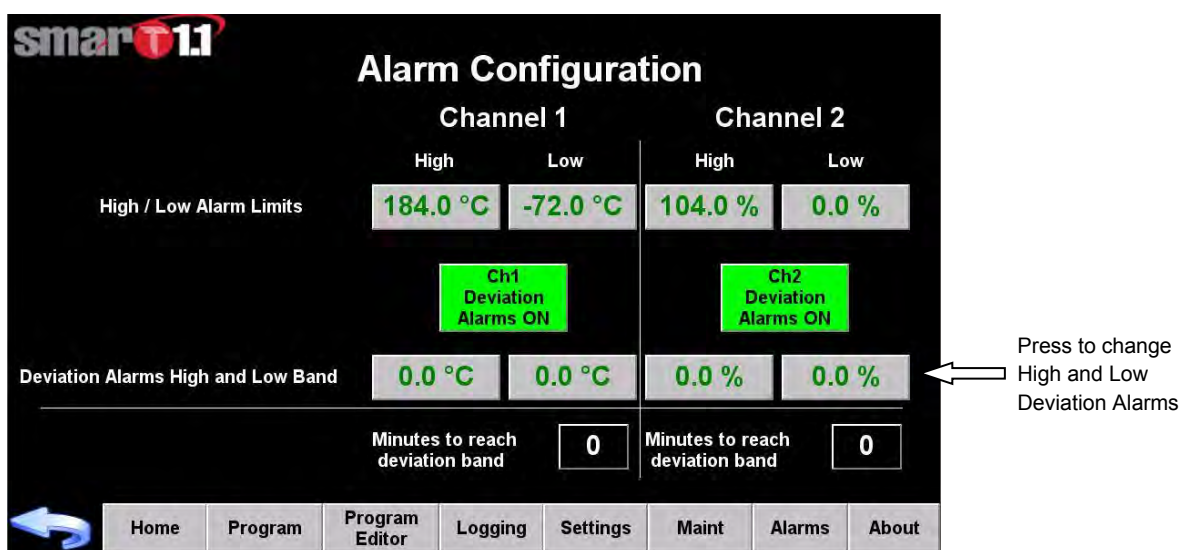


High / Low Deviation Alarms Setup:

After pressing the **Ch1 / Ch2 Deviation Alarms OFF** buttons, they will turn green with the “ON” condition. The **Deviation Alarms High and Low Band** entry display boxes will appear in the lower half of the screen.



ALARM CONFIGURATION SCREEN



Press the **Deviation Alarms High and Low Band** entry display boxes to enter your deviation setpoints for Channels 1 and/or Channel 2. A numeric keypad will appear.

Minutes to Reach Deviation Band Entry:

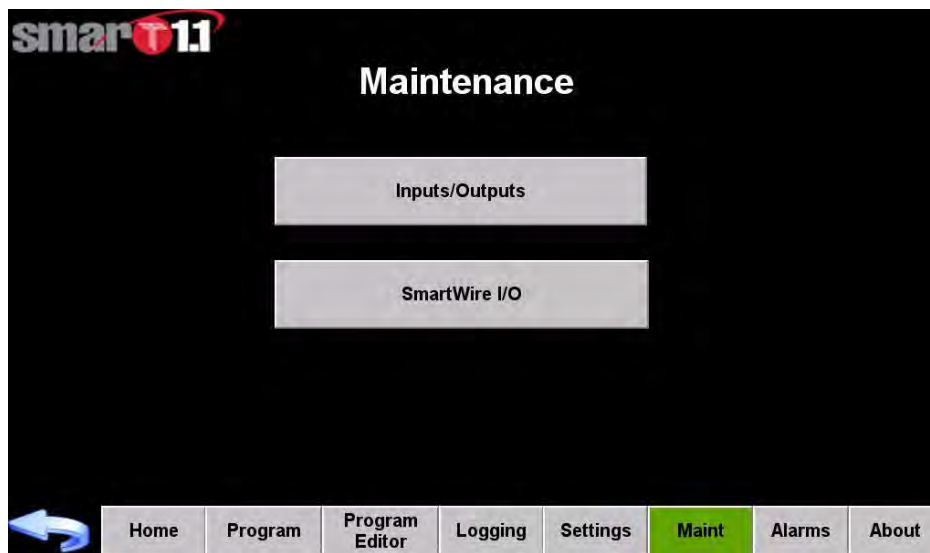
Press the Channel 1 and/or Channel 2 “**Minutes to reach deviation band**” entry display boxes to enter the time delay before reactivation of an alarm upon a setpoint change.

Important Note!

To delay the re-enabling of the deviation alarm upon a setpoint change, enter the time delay in the “**Minutes to reach deviation band**” entry display box. If zero is entered, the deviation alarm will not be re-enabled until the process variable enters the deviation band of the new setpoint.

4.8 MAINTENANCE SCREENS

Maint



MAINTENANCE SCREEN

The **Maintenance Screen** is used to access the following screens and functions.

- **Inputs / Outputs Screen** - View digital Inputs and Outputs status.
- **SmartWire I/O Screen** - View Analog and Digital Input / Output Module Screens, along with DIL Contactor Module Screen. These are all status type screens.

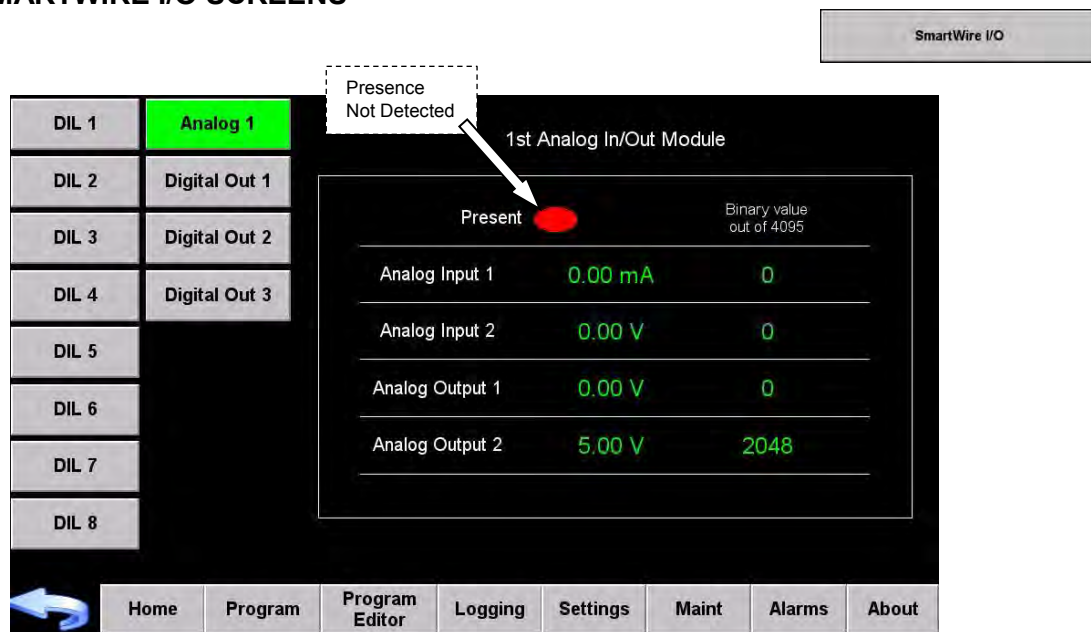
4.8.1 INPUTS / OUTPUTS SCREEN



INPUT / OUTPUTS SCREEN

The **Inputs / Outputs Screen** permits you to view the ON/ OF status of each digital input and digital output. Inputs and Output indicators that are turned ON are displayed in green. Inputs and Output indicators that are turned OFF are displayed in red.

4.8.2 SMARTWIRE I/O SCREENS



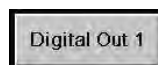
1st ANALOG INPUT / OUTPUT MODULE SCREEN

The **1st Analog Input / Output Module Screen** is the first screen that appears after pressing the SmartWire I/O button on the Inputs / Outputs Screen. This screen permits you to view the process values of the analog inputs and outputs. There is only one Analog Input / Output Module installed with the Smart 1.1 Controller. The “**Present**” indicator will be the color green when the presence of the module is detected by the PLC. It will be the color red when it is not detected.

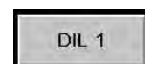
The **Binary Value (out of 4095)** is given for each with the corresponding current and voltage ranges listed below. This value is given to aid in troubleshooting by Maintenance personnel.

- Current Input = 0 to 20 mA
- Voltage Input = 0 to 10 VDC (**Note:** Only using 0 to 5 VDC - - Humidity Sensor)
- Voltage Output = 0 to 10 VDC

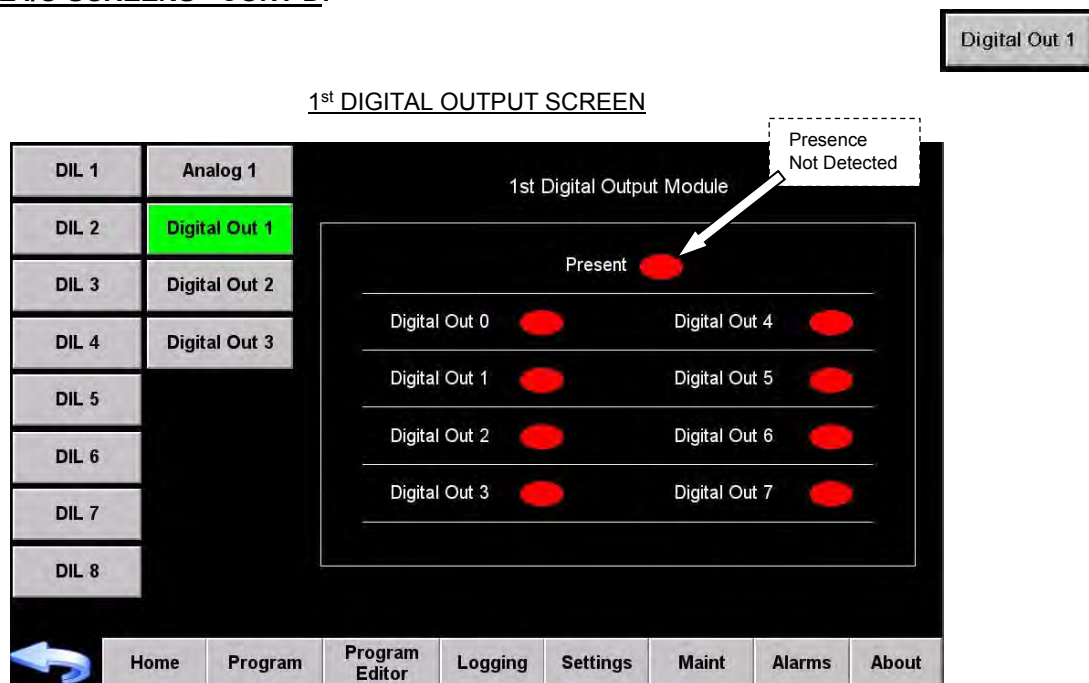
Press the **Digital Out 1, 2, and 3** buttons to advance to the three different **Digital Output Module Screens**.



Press the **DIL 1 thru DIL 8** buttons to advance to each of the **DIL Contactor Module Screens**.



SMARTWIRE I/O SCREENS - CONT'D:



The **1ST Digital Output Module Screen** displays the current ON / OFF status of Digital Outputs 0 thru 7 controlled through Digital Output #1 Module. The “**Present**” indicator will be the color green when the presence of the module is detected by the PLC. It will be the color red when it is not detected.

Inputs and Output indicators that are turned ON are displayed in green. Inputs and Output indicators that are turned OFF are displayed in red.

Refer to your electrical schematics for specific information of the actual connections on your chamber.

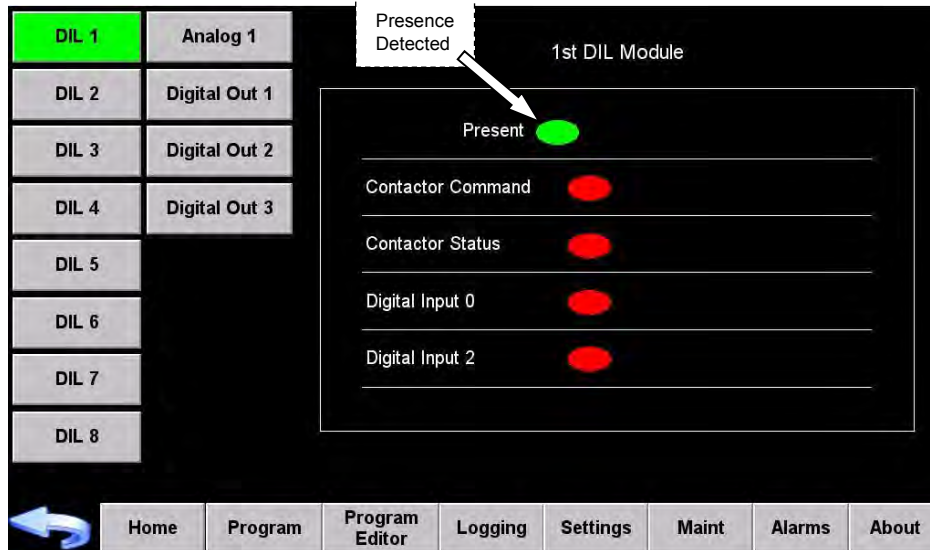
Press the **Digital Out 2 and 3** buttons to advance to the Digital Output 2 and Digital Output 3 Modules.

NOTE: Only Digital Output Module #1 is shown. Digital Output Modules 2 and 3 Screens are identical.

SMARTWIRE I/O SCREENS - CONT'D:

DIL 1

1st DIL MODULE SCREEN



The **1ST DIL Module Screen** displays the current status of various technical aspects of the DIL Contactor Module that are only used by Maintenance personnel. The “**Present**” indicator will be the color green when the presence of the module is detected by the PLC. It will be the color red when it is not detected.

The following indicators are provided.

- **Contactor Command** - - Indicates that the command to energize (green) or not to energize (red) the contactor has been sent from the PLC.
- **Contactor Status** - - Indicates that the contactor has actually been energized (green) or not been energized (red).
- **Digital Input 0** - - Indicates that the input has been received (green) or not been received (red) at the contactor module. This is an extra input not necessarily related to the contactor.
- **Digital Input 2** - - Indicates that the input has been received (green) or not been received (red) at the contactor module. This is an extra input not necessarily related to the contactor.

Refer to your electrical schematics for specific information of the actual connections on your chamber.

NOTE: Only DIL Module #1 is shown. DIL Modules 2 thru 8 Screens are identical.

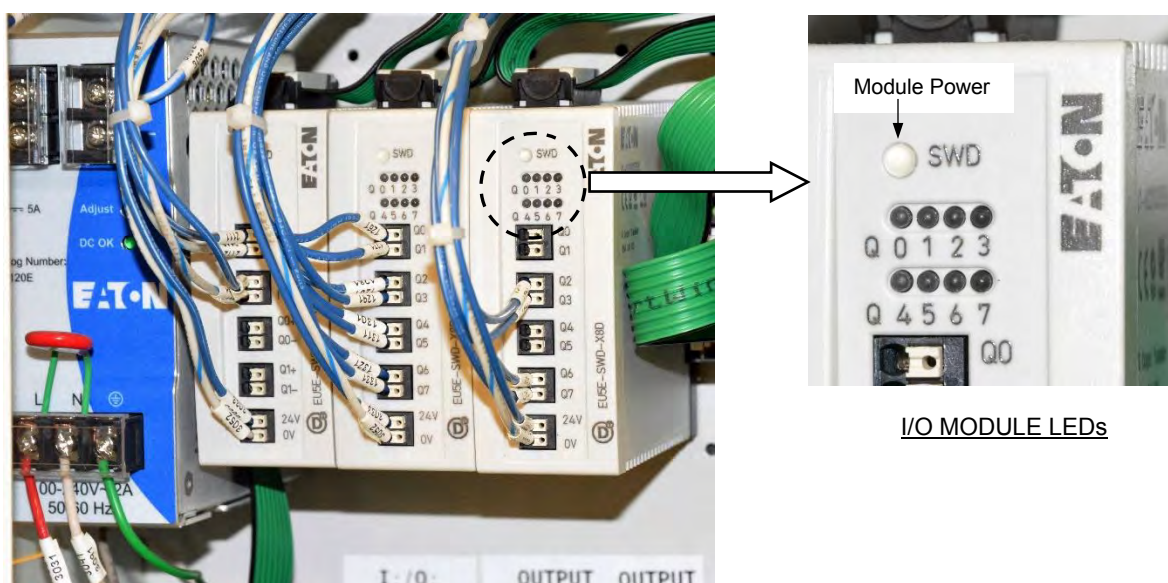
5.0 SMARTWIRE™ MODULE LIGHT OPERATION

The SmartWire-DT control and wiring system employs the following light (LED) operations for Input / Output (I / O) Modules and DIL Modules.

I / O Modules:

Module Power ON / OFF Light: Green = Energized OFF = Not Energized

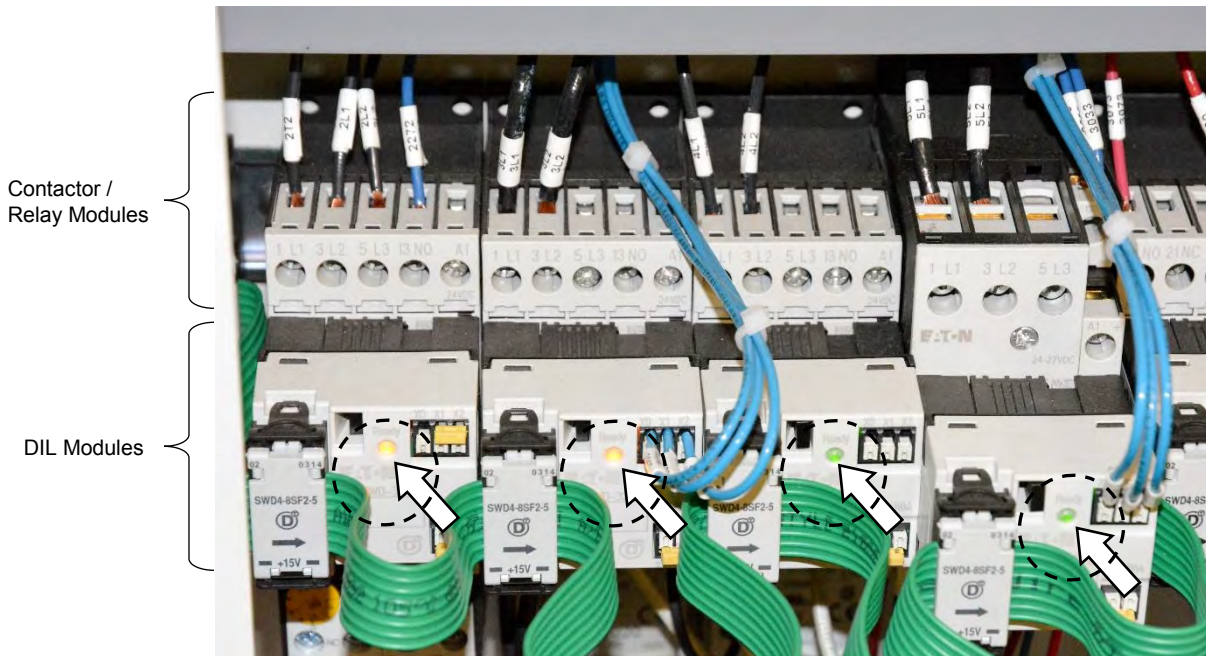
I / O Output Lights #0 to #7: Amber = Energized OFF = Not Energized



SMARTWIRE™ POWER SUPPLY and I/O MODULES

DIL Module - Ready Light:

- Solid Green Light - - PLC recognizes address of module – On Standby
- Flashing Green Light - - PLC does not recognize address of module.
Note: During boot-up of Smart1.1 Controller, these lights will flash.
- Solid Amber - - Contactor or relay is enabled / energized.

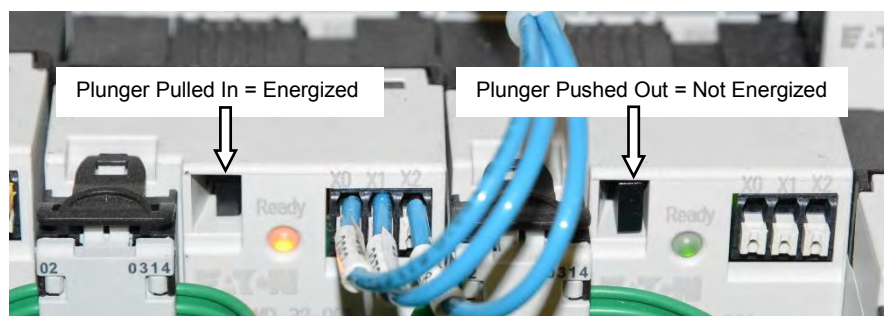


DIL MODULES with CONTACTOR and RELAY MODULES

Important Note: Along with the LED status of the DIL Module as being **Energized** or **On Standby**, there is a small black plunger immediately to the left of the LED, which indicates whether the contactor / relay module was successfully energized by the DIL output.

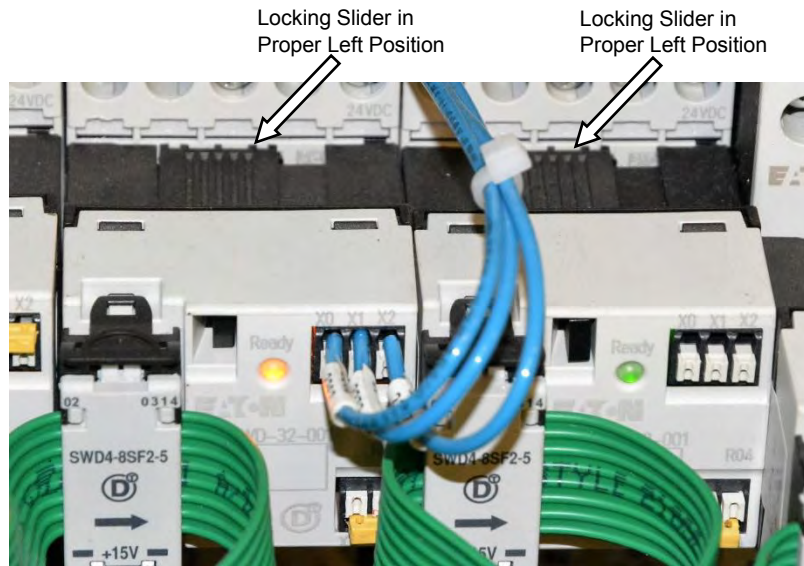
Plunger Pulled In = Contactor / Relay Module Successfully Energized

Plunger Pushed Out = Contactor / Relay Module NOT Energized



If the **Ready Light** is a solid **Amber** color and the plunger is not pulled in, this indicates that either the contactor or relay module is not working properly, or that the DIL Module was changed and not re-inserted properly.

Important Note: When replacing any DIL Module, after inserting the module into the contactor or relay base, you **MUST** move the locking slider to the **left** position as shown.



DIL MODULES SHOWING PROPER POSITION OF LOCKING SLIDER

6.0 DATA COMMUNICATION SETUP PROCEDURES

6.1 HOW TO CONNECT THE SMART 1.1 CONTROLLER TO A NETWORK

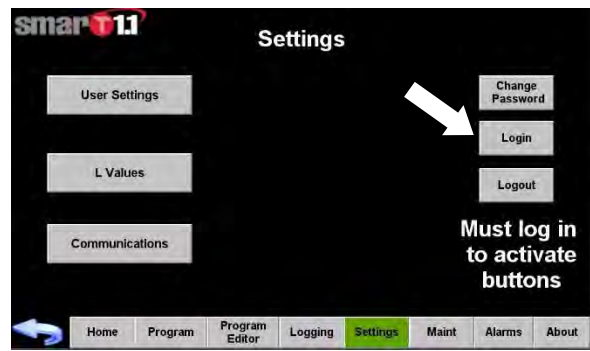
Important Note: This procedure can only be completed by an IT Administrator.

The Smart 1.1 Controller can be connected to a network by your IT department. For security reasons the network should be isolated from your company network.

The Smart 1.1 will work with either static IP Addresses or with DHCP. When completed, you can connect to a Smart 1.1 Controller via your network through **Remote Client**, **FTP**, or **Modbus**.

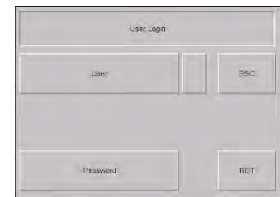
- 1.0 Log into the **Settings Screen** by pressing the **Login** button.

The **Login Screen** will appear.



- 2.0 Log in as “**factory / newton**” for the “User Name / Password”. Follow the Log in procedure in Section 4.3.1.

The **Settings Screen** will reappear.



- 3.0 Press the **Update PLC** button on the **Settings Screen**. The screen in Step 4.0 will appear.



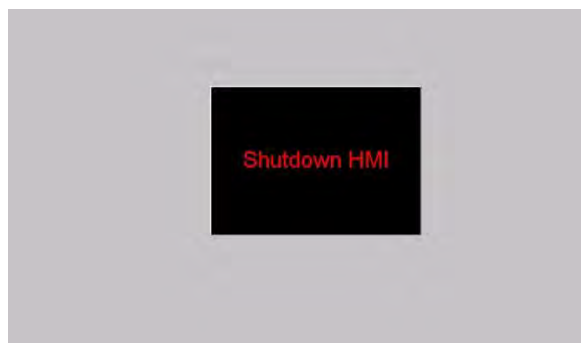
- 4.0 Press the **Go To Windows** button.

The screen in Step 5.0 will appear.



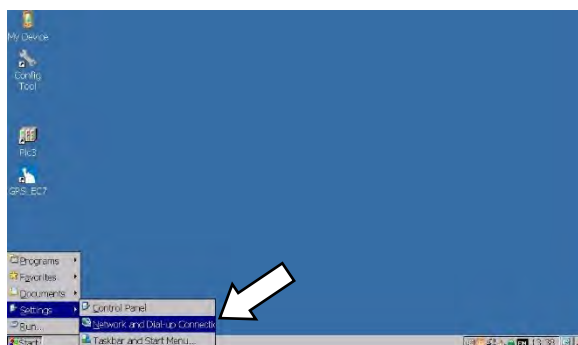
- 5.0 Press the **Shutdown HMI** button.

The **Window Screen** in Step 6.0 will appear.



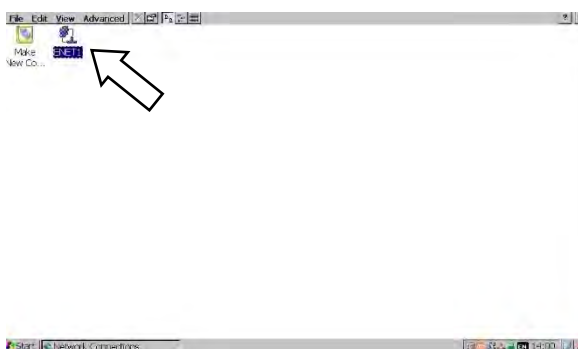
- 6.0 From the Windows **Start** menu, select **“Settings”**, and then **“Network and Dial-up Connections”** as shown.

The **Windows Screen** in Step 7.0 will appear.



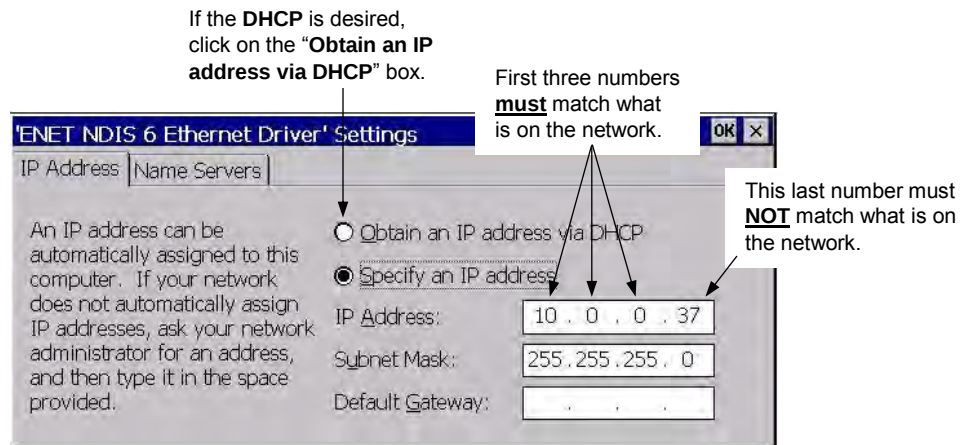
- 7.0 Select the **“ENET 1”** Icon.

The **“FEC Ethernet Driver”** Screen in Step 8.0 will appear.



8.0 Edit the **IP Address** and **Subnet Mask Address** if desired.

Make sure that the **IP Address** and the **Subnet mask** shown here match your network. If they match, then a connection is possible. If not, then change the IP Address on the Smart 1.1 Controller to match. Follow the example below.



Press the **OK** button at the top right corner when done.

You are now connected to the network.

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6.2 HOW TO CONNECT TO SMART 1.1 CONTROLLER FROM LAPTOP BY ETHERNET

This procedure is only meant to be used if the Smart 1.1 Controller is not on a network. If the laptop and Smart 1.1 Controller are both on a network, then refer to an alternate procedure.

Important! Make sure that you have permission from your IT Administrator to change the IP Address on your laptop. In order to communicate, the IP Address must be a “Static” IP Address. This means that the IP Address must be appear in the IP Address box as shown in the screen of Step No. 7.0.

Note: If your laptop or computer is NOT a Windows laptop, then you need to use a “crossover” Ethernet cable. Windows will detect the type of connection allowing the use of a standard Ethernet cable

Note: Depending on which type of Windows Operating System is installed on your laptop, your screens may differ from what is shown.

Changing The IP Address On Your Laptop:

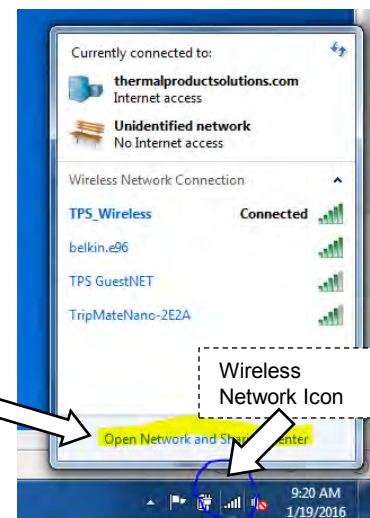
- 1.0 Determine the IP Address of the Smart 1.1 Controller by navigating to the **About Screen** on the controller.



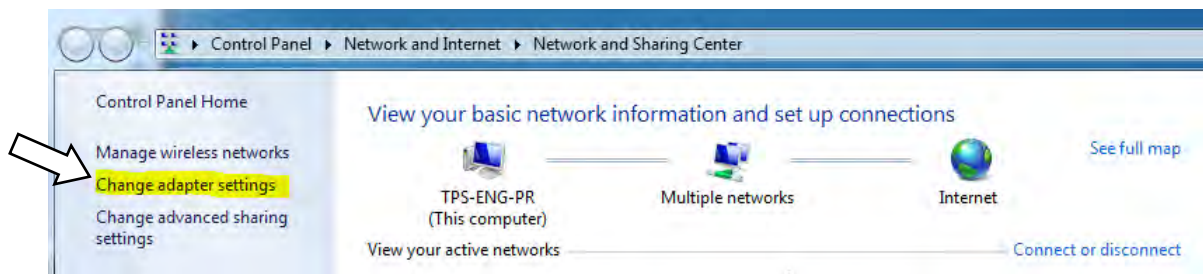
- 2.0 Go to your laptop computer. First select the “Wireless Network” Icon on the laptop system tray (shown with blue circle around it).

Then select the highlighted link “Open Network and Sharing Center”.

The “Network and Sharing Center” Screen will appear.

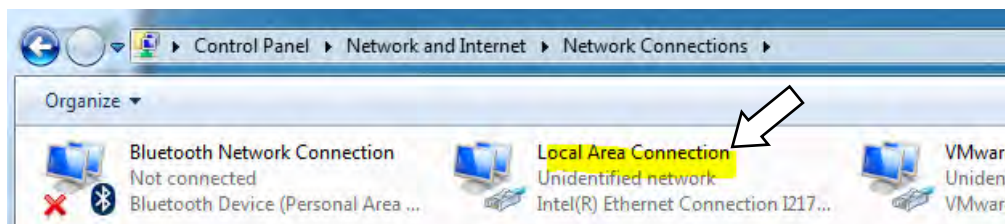


- 3.0 Select the “**Change adapter settings**” link in the “**Network and Sharing Center**” Screen below.



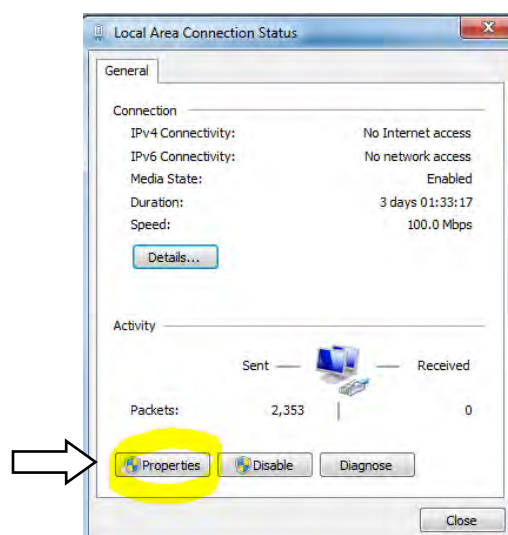
The “**Network Connections**” Screen will appear.

- 4.0 Select the “**Local Area Connection**” Icon in the “**Network Connections**” Screen below. If you do not see this Icon, contact your IT department. You may not have permissions to change the IP Address.



The “**Local Area Connection Status**” Dialog Screen will appear.

- 5.0 Select the “**Properties**” button.

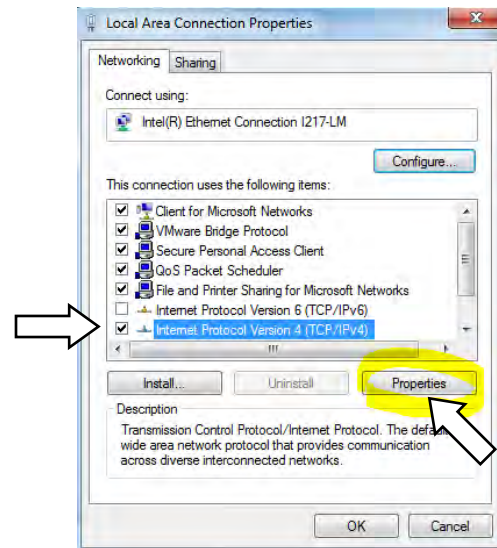


The “**Local Area Connection Properties**” Dialog Screen will appear.

- 6.0 First select / highlight the “**Internet Protocol Version 4 (TCP/IPv4)**” entry in the “Configure” window.

Then select the “**Properties**” button.

The “**Internet Protocol Version 4 Properties**” Dialog Screen will appear.

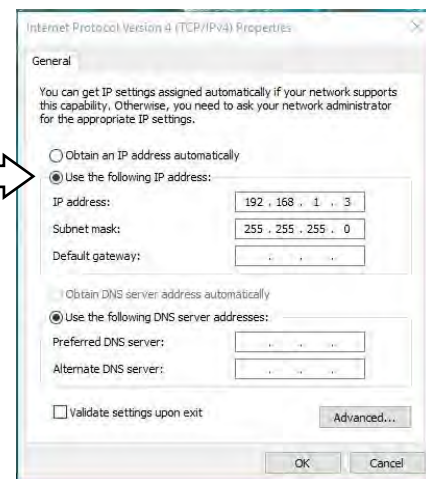


- 7.0 Select “**Use the following IP address**” as shown.

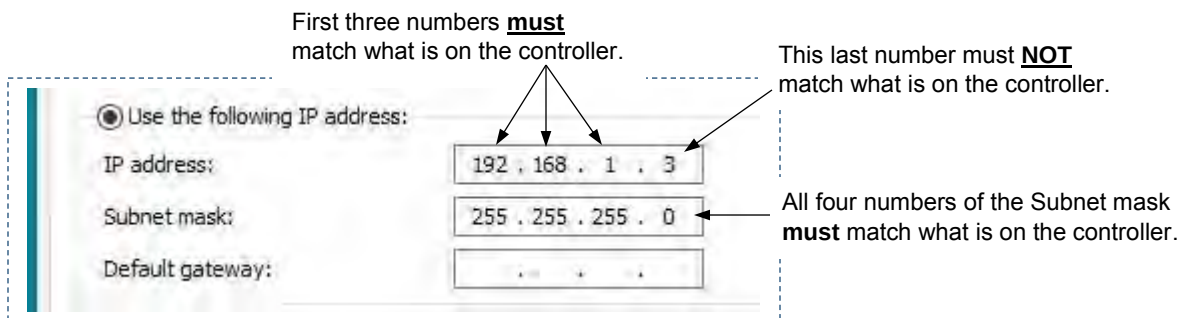
Note: Do not select “Obtain an IP address automatically”. This procedure will not work.

Make sure that the **IP Address** and the **Subnet mask** shown here match what is shown on the **About Screen** of Smart 1.1 Controller.

If they match, then a connection is possible. If not, then change the IP Address on the laptop or Controller to match. Follow the example below.



Note: The IP Address shown below is just an example. The first three number of the IP Address must match between the laptop and controller. The last number must be different. The Subnet mask must match exactly between the laptop and controller.



Press the **OK** button. The previous screen, “**Internet Protocol Version 4 (TCP/IPv4)**”, will appear. Then press the OK button on this previous screen. Your laptop is now set.

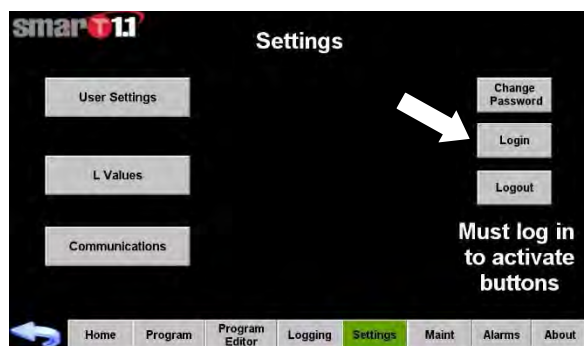
NOTE: Proceed to the section below if you need to change the IP Address on your Smart 1.1 Controller.

Changing the IP Address On Your Smart 1.1 Controller:

The Smart 1.1 will work with a static IP Address. When completed, you can connect to a Smart 1.1 Controller via your network through **Remote Client**, **FTP**, or **Modbus**.

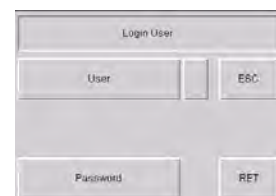
- 1.0 Log into the **Settings Screen** by pressing the **Login** button.

The **Login Screen** will appear.



- 2.0 Log in as “**factory / newton**” for the “User Name / Password”. Follow the Log in procedure in Section 4.3.1

The **Settings Screen** will reappear.



- 3.0 Press the **Update PLC** button on the **Settings Screen**. The following screen will appear.



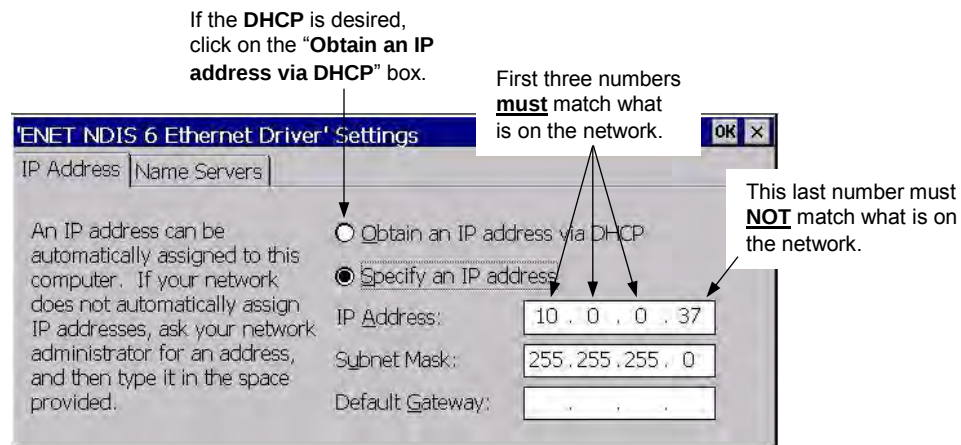
- 4.0 Press the **Go To Windows** button.

The screen in Step 5.0 will appear.



8.0 Edit the **IP Address** and **Subnet Mask Address** if desired.

Make sure that the **IP Address** and the **Subnet mask** shown here match your network. If they match, then a connection is possible. If not, then change the IP Address on the Smart 1.1 Controller to match. Follow the example below.



Press the **OK** button at the top right corner when done.

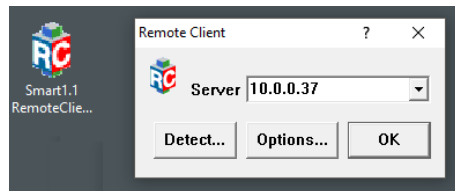
You are now connected to the network.

6.3 REMOTE CLIENT SETUP PROCEDURE

Remote Client Application Software **can only be used with a PC**. It can **only be obtained through** TPS Technical Support by contacting TPS through one of the methods listed in the [Company Information and Assistance Section 1.0](#) of this manual. In order to utilize Remote Client, you must first complete the Ethernet Communications Setup Procedure in Step 6.2 of this manual.

Note: The Remote Client is now being shipped with the Smart1.1 manual to all customers.

- 1.0 Once the Internet site provided by TPS Technical Support is accessed, click on the “**Remote Client.exe**” Icon that appears on your PC.
- 2.0 Select the “**Download**” button.
- 3.0 Select the “**Show in Folder**” button and copy the application from your “**Downloads**” folder to another secure location.
- 4.0 Open the Remote Client application from your secure location. The following screen will appear.



- 5.0 Enter the IP Address for the Smart 1.1 Controller and then press the OK button.

The active **Smart 1.1 Controller Screen** will appear on your PC. You may now operate the controller normally.

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6.4 USING FTP (FILEZILLA) WITH SMART1.1 CONTROLLER

This procedure describes how to manage programs (profiles) and data files.

Filezilla has a free open source FTP Client. It can connect to the Smart 1.1 Controller to transfer programs (profiles) back and forth. Be sure to download it from the link below to avoid phishing.

<https://filezilla-project.org/>

The following screen will appear.

Select the **"Download FileZilla Client"** button.



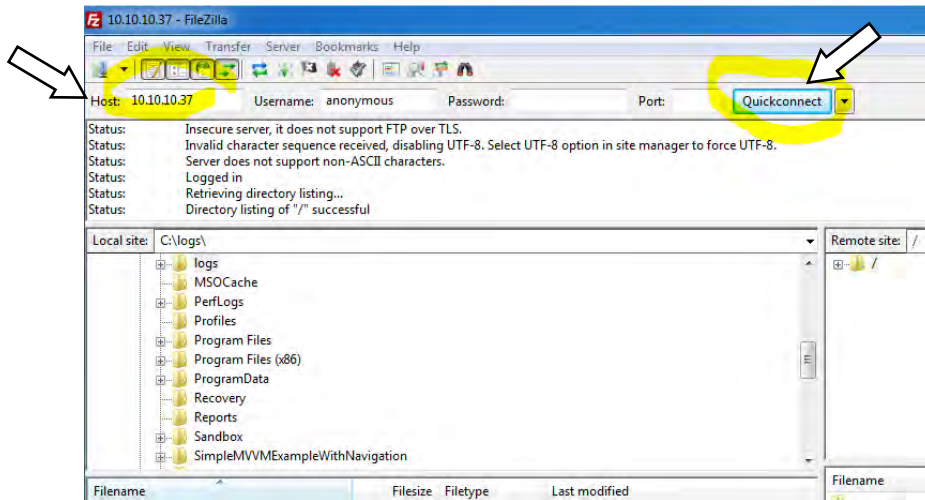
The following screen will appear.

Select the **"Download Now"** button to download the program. Follow all prompts.



1.0 Enter Controller IP Address

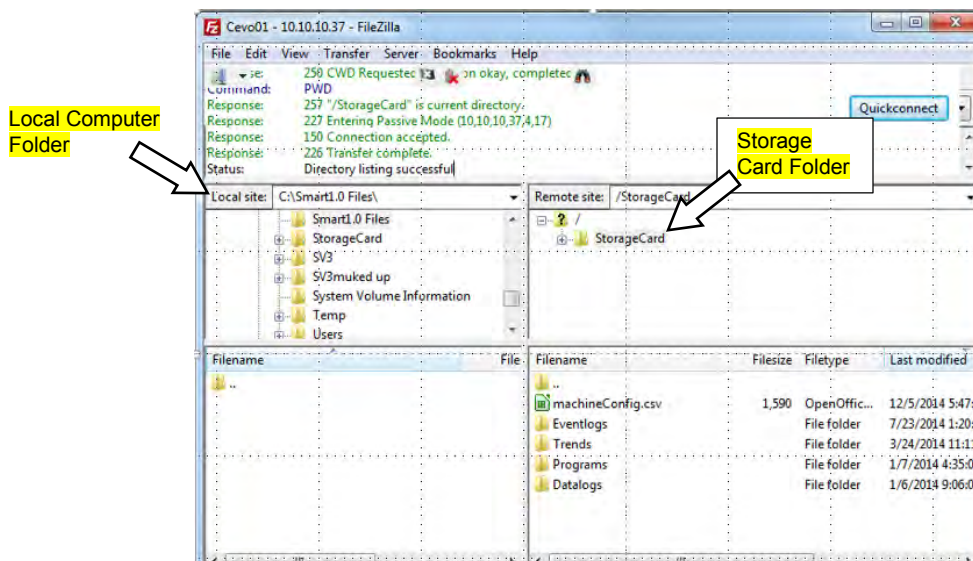
The following screen will appear after a successful download of Filezilla. Enter the IP address of the Smart1.1™ Controller into the “Host” window as shown below on the left side. Click the “Quickconnect” Button.



2.0 Now Connected To Controller

Once connected, the **Local Computer** folder will be on the left. The **Controller StorageCard** is on right.

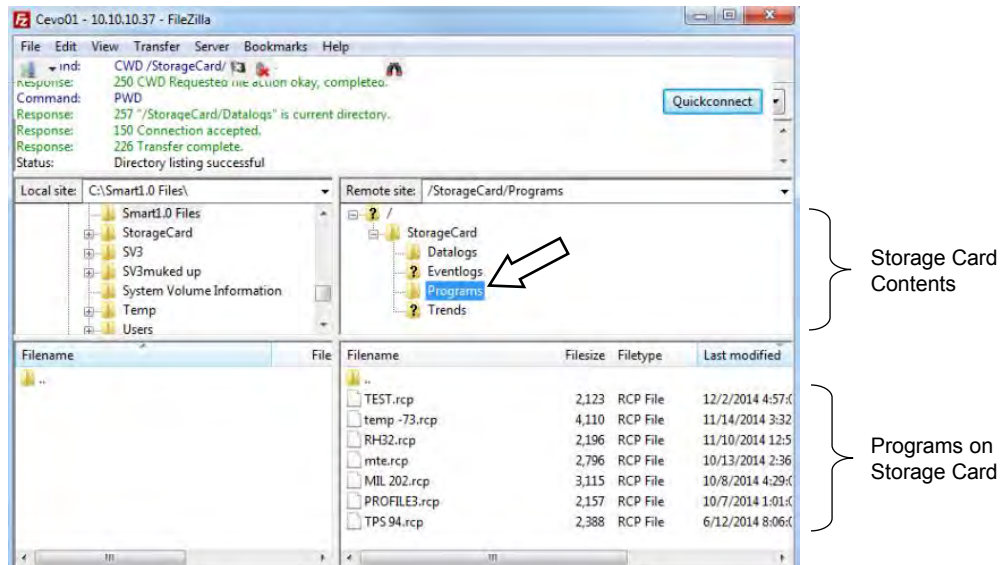
Select the “StorageCard” folder on the **right side**.



3.0 View Programs (Profiles) On Storage Card

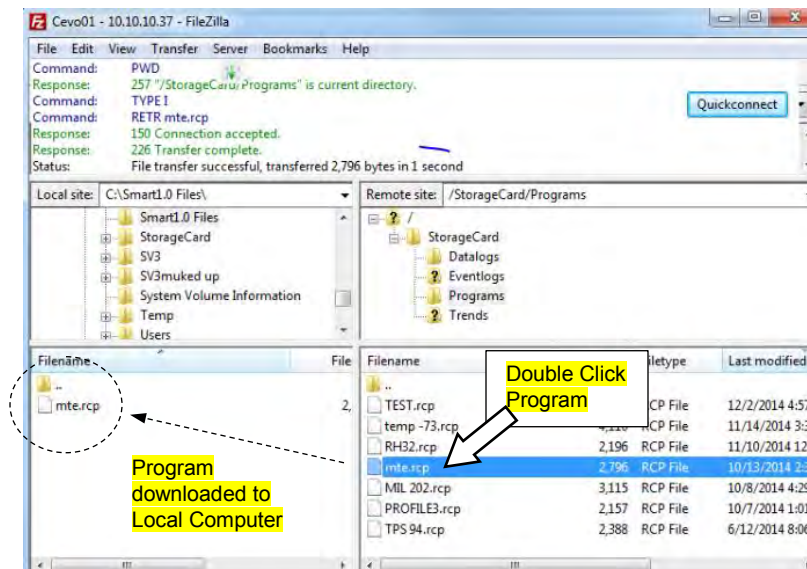
You can now view the contents of the Storage Card.

Select the **"Programs"** folder to view all of the programs on the storage card. These will be listed at the bottom right side of the screen.



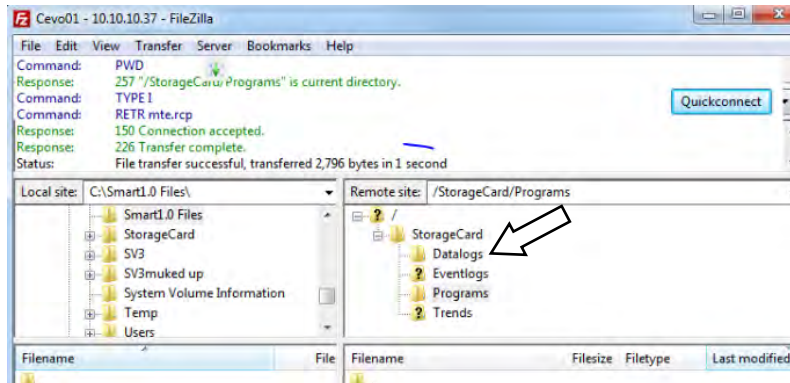
4.0 Transfer Programs (Profiles)

Double click on either side to transfer a file. Right click for other options.



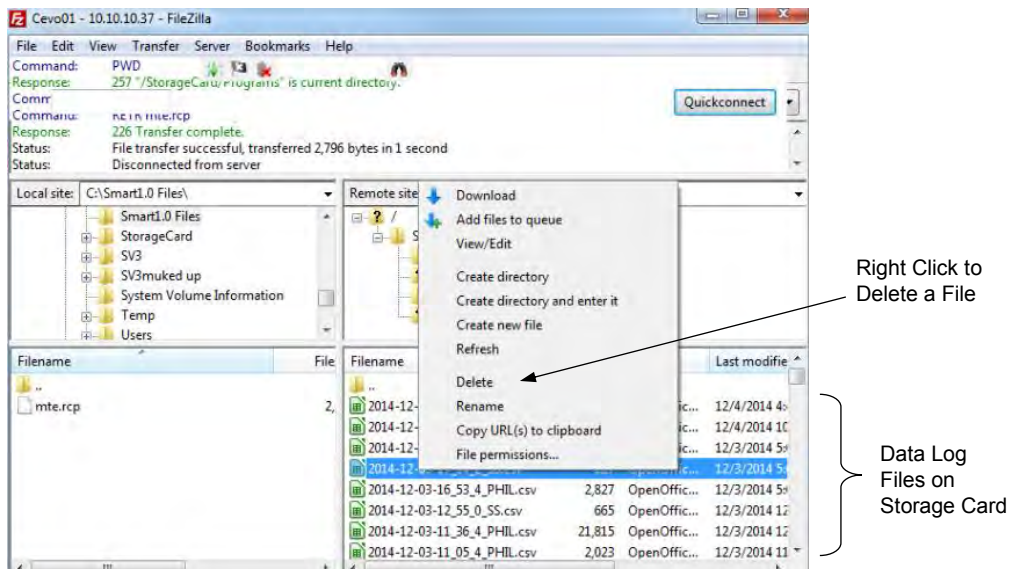
5.0 Transfer / Delete Data Log Files

Select the **Datalogs** folder on the Storage Card to view the data log files.



The **Data Log Files** will appear below the Storage Card folder on the right side.

Double click to transfer a file. Right click to delete a file.

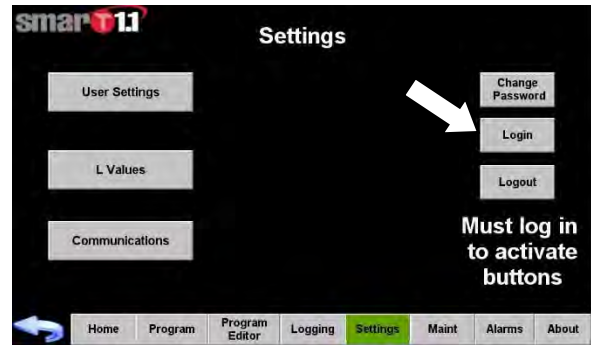


6.5 CONTROLLER SOFTWARE VERSION UPDATE PROCEDURE

Note: This procedure describes how to upgrade the Smart1.1 Controller firmware on an XV300 - from a remote computer.

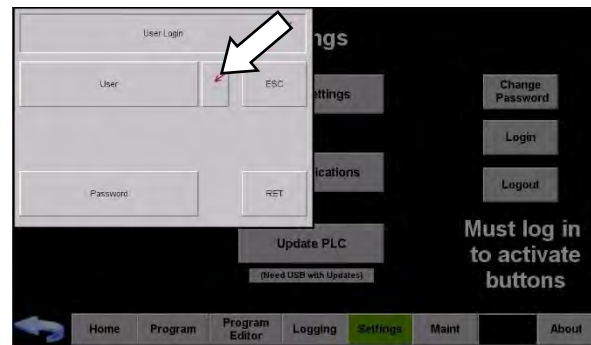
- 1.0 Go to the Setting Screen and press the **Login** button.

The Log In Screen will appear.



- 2.0 Press the small User entry button as shown.

The User Screen will appear.



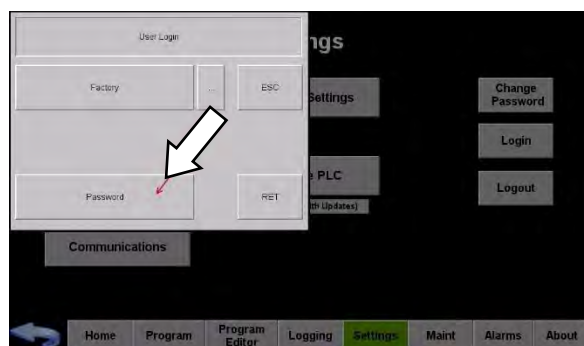
- 3.0 Select "Factory" and then press the **RET** (Return) button.

The Log In Screen will appear.



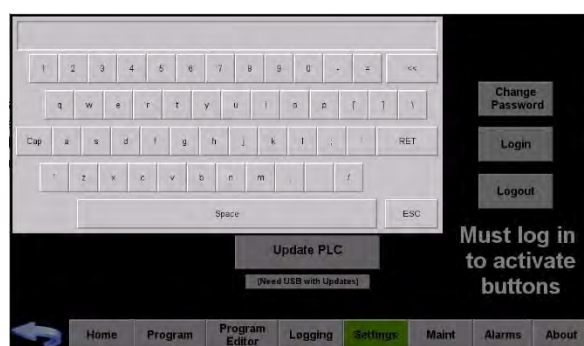
4.0 Press the **Password** button.

The keyboard will appear.



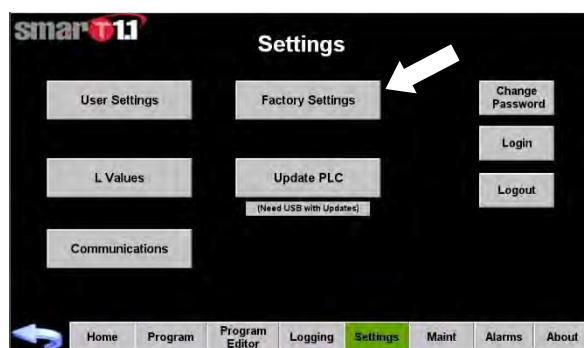
5.0 Enter the password “newton” and press the **RET** (Return) button.

The Settings Screen will appear.



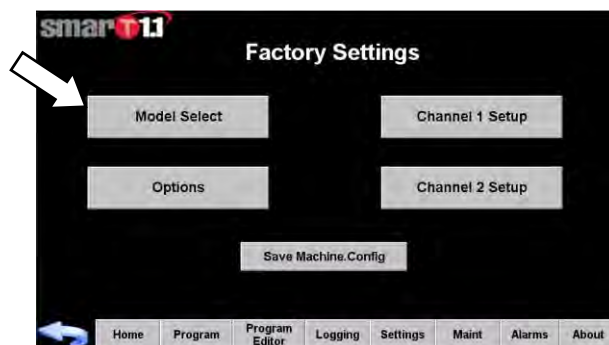
6.0 Press the **Factory Settings** button.

The Factory Settings Screen will appear.



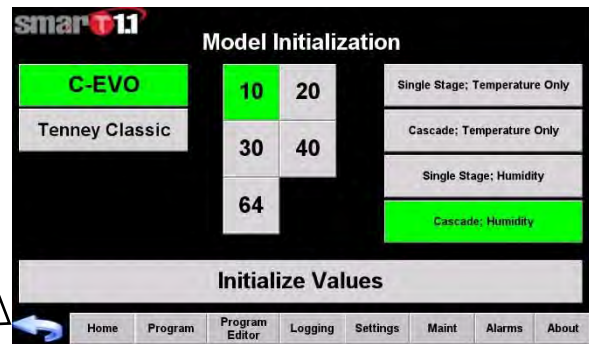
7.0 Press the **Model Select** button.

The Model Select Screen will appear.



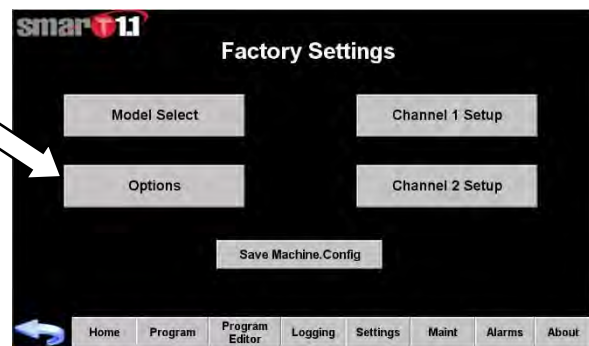
- 8.0 **VERY IMPORTANT:** Write down your model number information as it appears on this screen. You will need this later after downloading the software update.

Press the **'Back'** button.



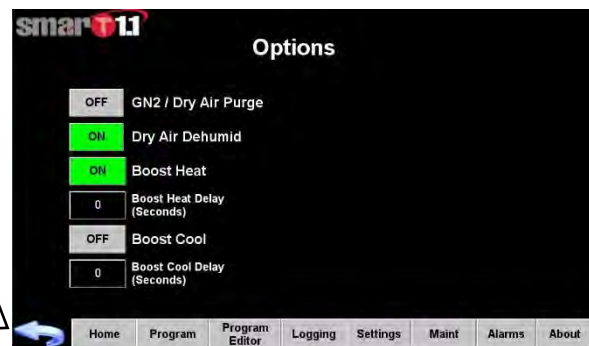
- 9.0 Press the **Options** button.

The Options Screen will appear.



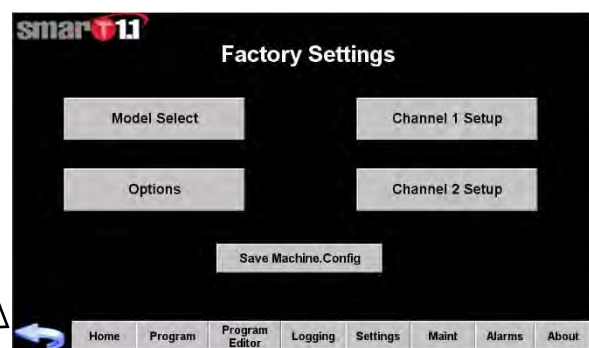
- 10.0 **VERY IMPORTANT:** Write down any selected Options (if any) to reset after the software update.

Press the **Back** button. The Factory Settings Screen will appear.



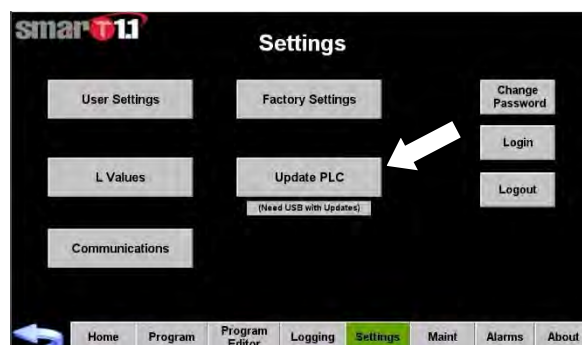
- 11.0 Press the **Back** button

The Settings Screen will appear.



12.0 Press the **Update PLC** button.

The PLC / HMI Update Screen will appear.



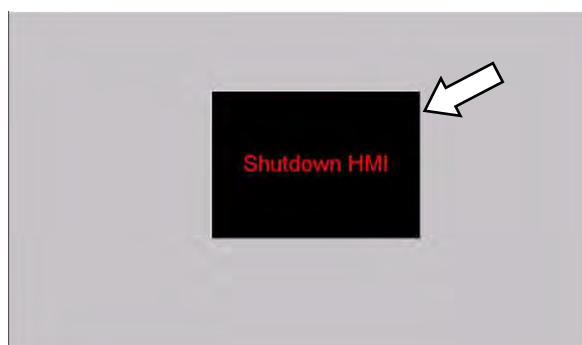
13.0 **VERY IMPORTANT:** Write down the License Code for your unit. You will need to enter it after the software update. This unit has #184. It will be different for your unit.

Press the **Go To Windows** button.

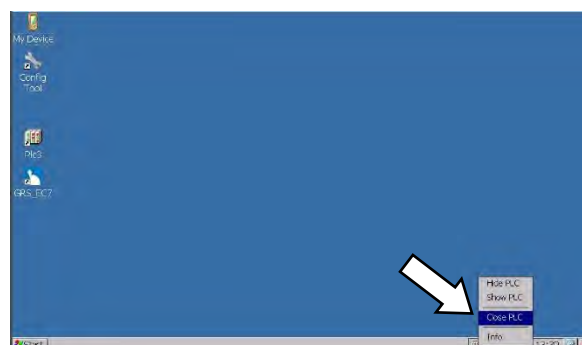


14.0 Press the **Shutdown HMI** button.

Your Windows™ Screen will appear.



15.0 Click the PLC icon in the System Tray at the bottom of the HMI controller screen. Select **Close PLC**.



16.0 PREPARE YOUR CONNECTION

There must be an Ethernet connection between the controller and your computer. The connection can be through a network, or you can connect a laptop directly to the controller.

If you are not sure how to make that connection, contact your IT department.

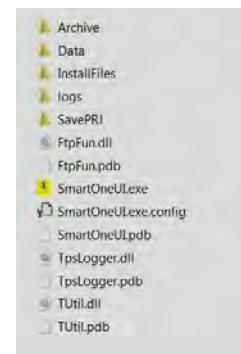
OR

There are documents available from TPS that detail how to make that connection. You can obtain the documents from TPS Technical Support. These are provided in this manual in the sections indicated.

- How to Connect Smart 1.1 to a Network - - Section 6.1
- How to Connect to Smart1.1 from a Laptop by Ethernet Cable - - Section 6.2

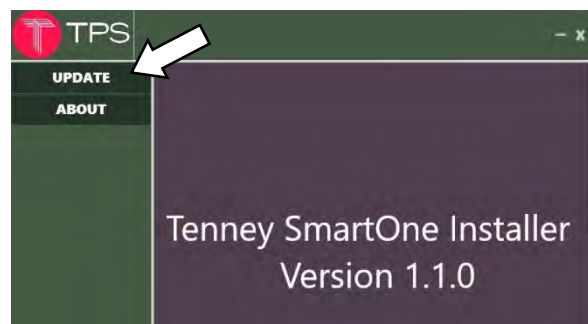
17.0 RUN UPGRADE TOOL

Before starting you must obtain the upgrade files from TPS. Unzip the files onto your computer. The unzipped files should look like those in the image shown to the right. The file with the “1” icon is the executable file. Select this file. (Depending on the configuration of your computer the “.exe” may not be visible.)



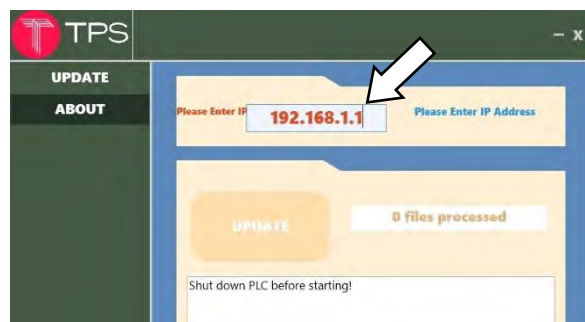
The Controller Firmware Version Upgrade Screen will appear.

- 18.0 Click the **Update** button on your PC to begin the install process.



19.0 Enter the IP Address of the controller.

Press the <Enter> key on your keyboard.

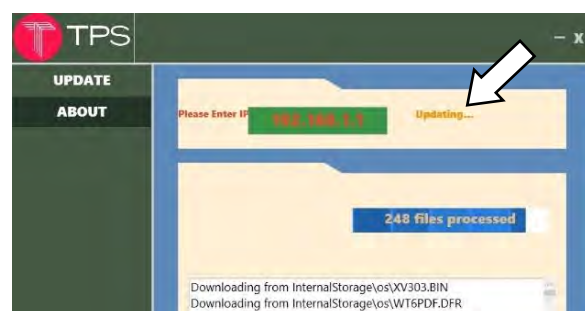


20.0 If the IP Address is highlighted in Green, then the connection to the controller is good. **“Controller is Ready”** will appear. If it is red, fix the connection.

Click the **“UPDATE”** button to proceed.

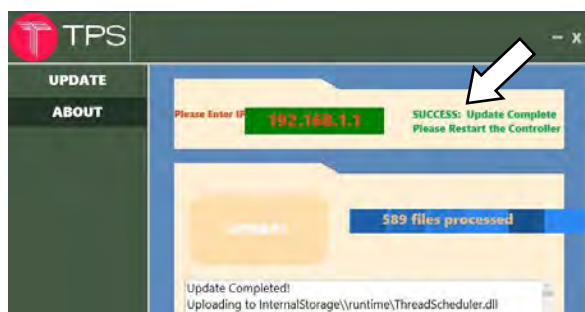


21.0 Let the process run. “Updating” will appear on the right side of the screen.

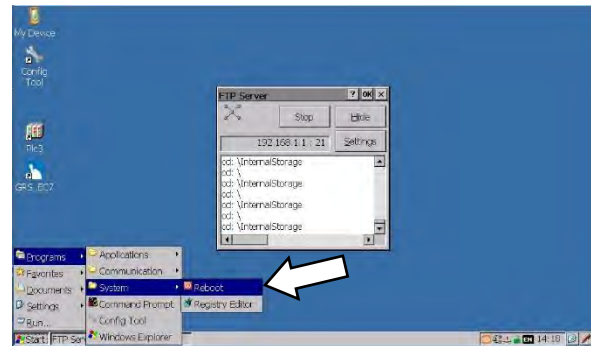


22.0 Update Complete: Upon a successful completion of the software update, a “Success” message will appear on the right side of the screen.

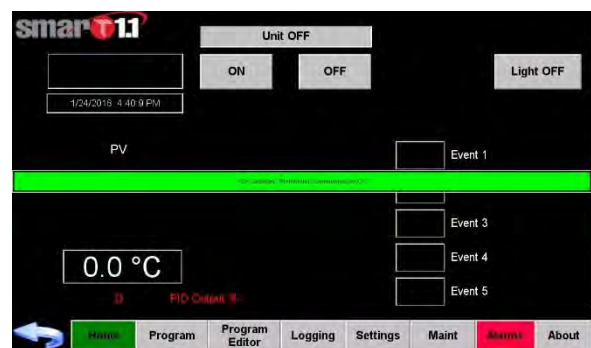
You must reboot or cycle power to the controller to finish.



- 23.0 From the Windows Start button on the HMI controller screen, select **Reboot** to reboot the controller.

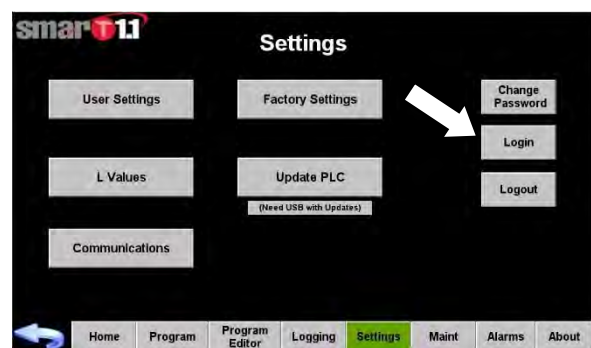


- 24.0 After rebooting the controller, the **Home Screen** will appear. If the installation was successful, a green banner will briefly appear across the middle of the screen.



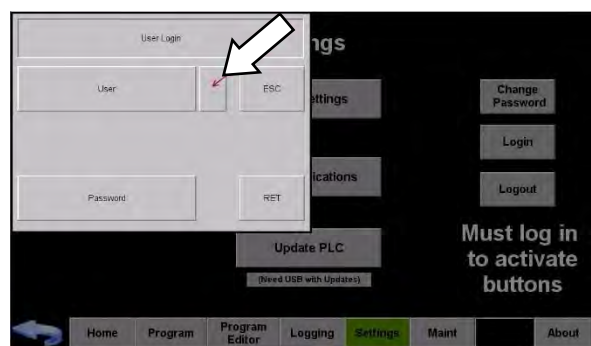
Press the Settings Screen navigation button.
You now need to set up your controller.

- 25.0 Press the **Login** button.



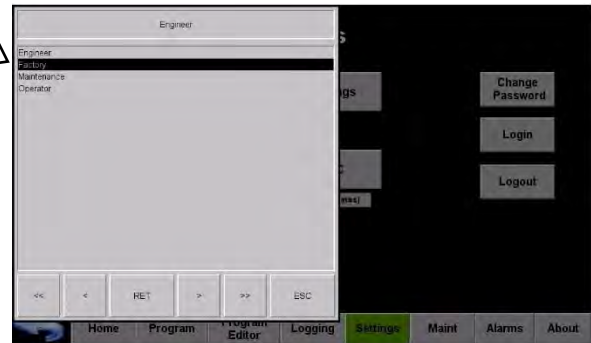
The Log In Screen will appear.

- 26.0 Press the small User entry button as shown.



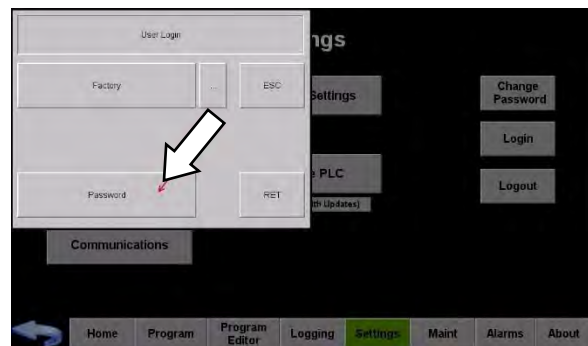
The User Screen will appear.

- 27.0 Select “Factory” and then press the **RET** (Return) button.



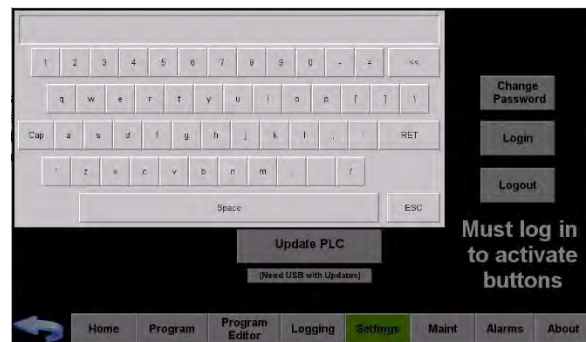
The Log In Screen will appear.

- 28.0 Press the **Password** button.



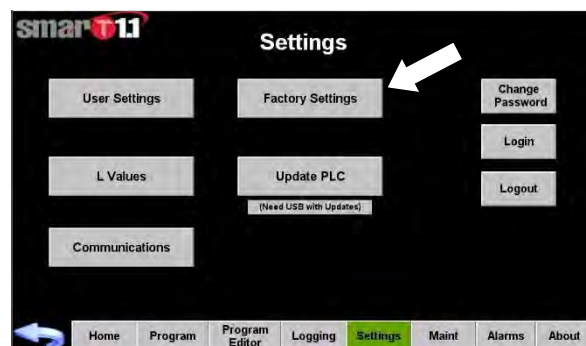
The keyboard will appear.

- 29.0 Enter the password “newton” and press the **RET** (Return) button.



The Settings Screen will appear.

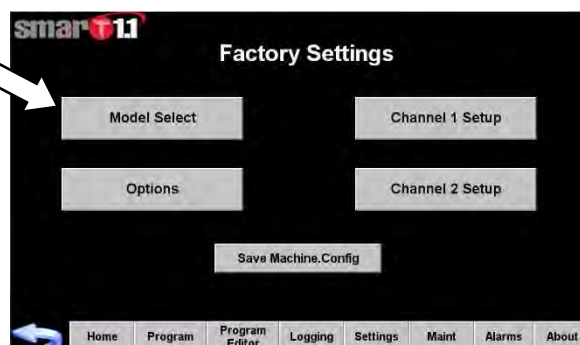
- 30.0 Press the **Factory Settings** button.



The Factory Settings Screen will appear.

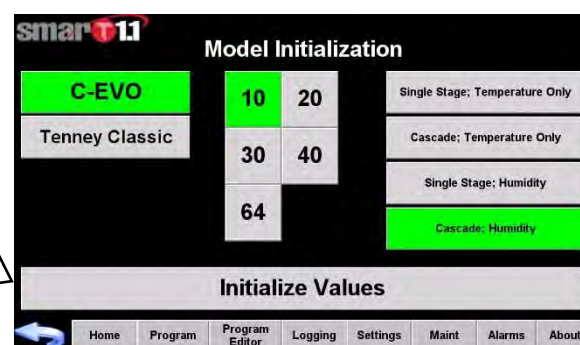
31.0 Press the **Model Select** button.

The Model Select Screen will appear.



32.0 Select the settings to match what you noted earlier in this procedure from Step 8.0.

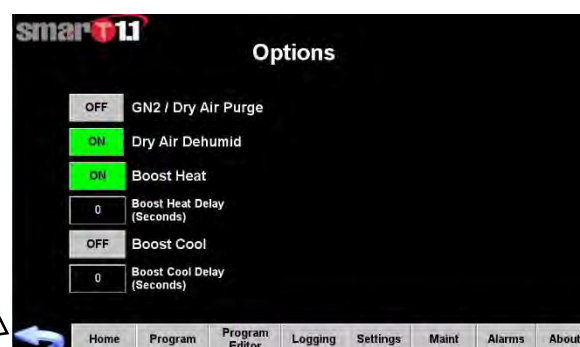
Press the **Initialize Values** button. The Options Screen will appear.



33.0 Select the Options to match what you noted earlier in this procedure from Step 10.0.

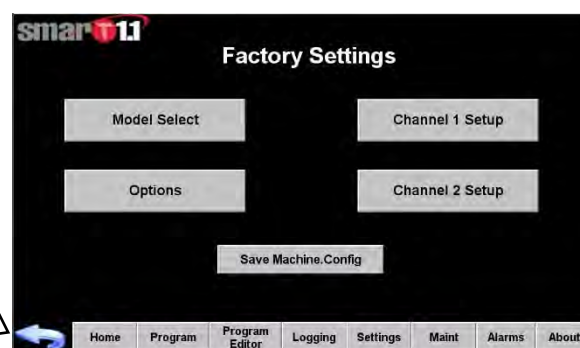
Press the **Back** button.

The Factory Settings Screen will appear.



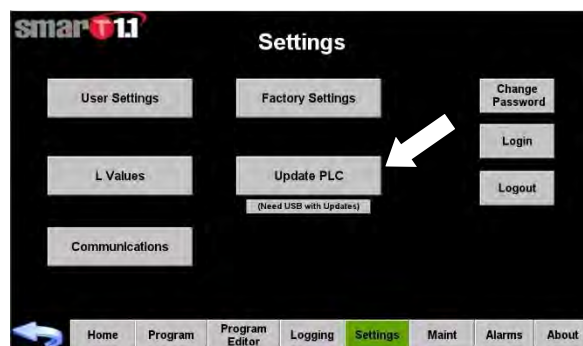
34.0 Press the **Back** button

The Settings Screen will appear.



35.0 Press the **Update PLC** button.

The PLC / HMI Update Screen will appear.



36.0 Enter your License Code noted from Step 13.0 by pressing the Enter License Code field entry display box. A keypad will appear. Press the **RET** key on the keypad when completed.

The Software Update Is Complete.

Normal operation of your Smart1.1 Controller is now enabled.



6.6 SMART1.1 DATA COMMUNICATIONS - FREQUENTLY ASKED QUESTIONS

1.0 COMMUNICATION TYPES

1.1 What type of communications is available and what functions can be done over each?

Note: Different communication type cables are used for each.

- Ethernet TCP / IP - - **Standard**
- Modbus TCP - - **Standard**
- OPC Server that is configured for Modbus - - **Customer must purchase**
- Modbus RTU - - RS-485 - - **Standard** (RS-232 is available with optional converter plug installed.)
- Modbus IEEE - 488 GPIB - - **Optional** with ICS IEEE board installed
- Remote Access - - Remote Client and VNC Software Applications using Ethernet. Remote Client and VNC provide a real time interactive display of the Smart 1.1 Controller HMI on the customer's PC (or cell phone, or tablet), with the same basic functionality using the PC mouse or track pad. - - **Customer must download**

1.2 How is connection made to a cell phone, tablet, or other wireless device?

- By VNC communications.

1.2.1 What connection resources are required from the customer, such as IP addresses, internet access, etc.?

- The Controller must be on a wireless network. Cell phones, tablets, etc., must be connected to the network.

1.3 What are common communication errors?

- **Setup:** On the customer's side, the communication cable must be connected securely and the PC port must be set up properly.
- **Proper Software:** The customer must have a Modbus Client, i.e., software that talks to Modbus registers, etc.

1.3.1 What is the proper way to troubleshoot?

- The customer needs an OPC (Industrial) software package such as "Kepware" or another Modbus Client type on their PC, which permits them to test the Modbus communication.

2.0 **DATA LOGGING**

2.1 **Can the controller datalog?**

- Yes. The controller datalogs to CSV files.

2.2 **Is it possible to datalog over the communications?**

- Yes. The customer can set up their communications using Modbus or OPC to datalog.

2.2.1 To a PC - How is it setup? What software is used?

- Yes. It can be set up using an OPC Server or a 3rd party program that communicates with Modbus, e.g., LabView, etc.

2.2.2 To a network - How is it setup? What software is used?

- Yes. It can be set up using an OPC Server or a 3rd party program that communicates with Modbus, e.g., LabView, etc.

Note: We recommend that for security reasons, you should be connected to a private network which is sheltered from the company network. Consult with your IT Department.

2.3 **Is it possible to upload collected data to a network location?**

- Yes. See below.

2.3.1 Automatically - How is it setup? What software is used?

- Yes, using an FTP Client type software, **OR**
- A simple application (program) would need to be written to copy files from the controller to a network location, using software such as Python, Visual Basic, C Sharp, or Java.

2.3.2 Manually- How is it setup? What software is used?

- Yes. You would need an FTP Client type software.

3.0 **SOFTWARE COMPATIBILITY**

3.1 **What commercially available software can be used with the controller?**

- LabView, OPC Server, or any SCADA package that uses Modbus or OPC.

3.1.1 Where can the command sets be found to write drivers for the above?

- Thermal Product Solutions provides the Modbus registers to communicate with the PLC.

4.0 **PROGRAMMING**

4.1 **Can the controller be programmed from a remote terminal such as a PC?**

- Yes, using a 3rd part program such as LabView or Remote Client.

4.1.1 Instructions in how to do.

- The Wizard program in the Smart 1.1 Program Editor is used to step you through the creation of a profile.

4.2 **Can profiles be created offline and then uploaded to the controller for use?**

- **Not at this time.** You must be connected to the controller at all times while creating a program.

4.3 **Can existing profiles be downloaded from the controller? How?**

- Yes, using the File Transfer Screen with the USB port on the 7" Smart 1.1 Controller only.

5.0 **ALARM NOTIFICATION**

5.1 **Does the controller have alarms?**

- Yes. The controller employs high and low alarm setpoints for both channels. It also has deviation alarm setpoints for both channels.

5.2 **Does it have the ability to notify a user remotely upon activation of an alarm via text, email, or other means?**

- **Not at this time.** This is being worked on for future use.

5.2.1 Instructions in how to do.

- This is being worked on for future use.

5.3 **Does the control have the ability to output a signal for alarms to a SCADA system using either a digital output, or through communications?**

- Yes, to a SCADA system using Modbus. There is no digital output.

5.3.1 Instructions in how to do.

- There are no real / absolute instructions. You must know Modbus and be able to understand how to use and interpret it.

5.4 **Does it log the alarm activation in the data collection?**

- Yes.

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7.0 SMART 1.1 MODBUS APPLICATIONS

7.1 STEADYSTATE START / IDLE (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.0	Status: Idle State Status	bit		w40001.0	Command: Idle State Start	bit
w30001.1	Status: Steady State Status	bit		w40001.1	Command: SteadyState Run	bit

7.2 PROFILE START, STOP (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.2	Status: Profile Running Status	bit		w40001.2	Command: Start Profile Run	bit
w30001.3	Reserved	bit		w40001.3	Command: Stop Running Profile	bit

7.3 PROFILE PAUSE RESUME (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.4	Status: Profile Paused Status	bit		w40001.4	Command: Pause Profile	bit
w30001.5	Reserved	bit		w40001.5	Command: Profile Resume	bit

7.4 CHANNEL 2 ENABLE (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.6	Status: Channel 2 Enabled Status	bit		w40001.6	Command: Enable Channel 2	bit
w30001.7	Reserved	bit		w40001.7	Command: Disable Channel 2	bit

7.5 CELSIUS / FAHRENHEIT (BIT)

Note: The temperature mode is read only. It must be changed from the HMI user settings.

	Read from Smart1.1				Write to Smart1.1	
w30001.8	Status: Celsius temperature active status	bit		w40001.8	Reserved	bit
w30001.9	Status: Fahrenheit temperature active status	bit		w40001.9	Reserved	bit

7.6 CHAMBER LIGHT ON / OFF (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.10	Status: Chamber Light ON Status	bit		w40001.10	Command: Chamber Light ON	bit
w30001.11	Reserved	bit		w40001.11	Command: Chamber Light OFF	bit

7.7 ALARMS BUZZER / SILENCE (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

	Read from Smart1.1				Write to Smart1.1	
w30001.12	Status: Alarm Active Status	bit		w40001.12	Command: Acknowledge Alarm	bit
w30001.13	Status: Alarm Buzzer Status	bit		w40001.13	Command: Alarm Silence	bit

7.8 ALARMS (BIT)

Note: Alarms are read only.

	Read from Smart1.1				Write to Smart1.1	
w30002.0	Status: Alarm status: High Stage Compressor - High Pressure Switch	bit		w40002.0	Reserved	bit
w30002.1	Status: Alarm status: High Stage Compressor - Low Pressure Switch	bit		w40002.1	Reserved	bit
w30002.3	Status: Alarm status: High Stage Compressor - Protection Module	bit		w40002.3	Reserved	bit
w30002.4	Status: Alarm status: Low Stage Compressor - High Pressure Switch	bit		w40002.4	Reserved	bit
w30002.5	Status: Alarm status: Low Stage Compressor - Low Pressure Switch	bit		w40002.5	Reserved	bit
w30002.7	Status: Alarm status: Low Stage Compressor - Protection Module	bit		w40002.7	Reserved	bit
w30002.8	Status: Alarm status: TempGard Alarm	bit		w40002.8	Reserved	bit
w30002.10	Status: Alarm status: Channel 1 High Alarm	bit		w40002.10	Reserved	bit
w30002.11	Status: Alarm status: Channel 1 Low Alarm	bit		w40002.11	Reserved	bit

w30002.12	Status: Alarm status: Channel 2 High Alarm	bit		w40002.12	Reserved	bit
w30002.13	Status: Alarm status: Channel 2 Low Alarm	bit		w40002.13	Reserved	bit
w30002.14	Status: Alarm status: Channel 1 Deviation High Alarm	bit		w40002.14	Reserved	bit
w30002.15	Status: Alarm status: Channel 1 Deviation Low Alarm	bit		w40002.15	Reserved	bit
w30003.0	Status: Alarm status: Channel 2 Deviation High Alarm	bit		w40003.0	Reserved	bit
w30003.1	Status: Alarm status: Channel 2 Deviation Low Alarm	bit		w40003.1	Reserved	bit
w30003.9	Status: Alarm status: Window Heat Contactor failure	bit		w40003.9	Reserved	bit
w30003.10	Status: Alarm status: Boost Heat Contactor failure	bit		w40003.10	Reserved	bit
w30003.11	Status: Alarm status: Conditioner Fan Contactor failure	bit		w40003.11	Reserved	bit
w30003.12	Status: Alarm status: Main Heat Contactor failure	bit		w40003.12	Reserved	bit
w30003.13	Status: Alarm status: Steam Generator Contactor failure	bit		w40003.13	Reserved	bit
w30003.14	Status: Alarm status: High Stage Compressor Contactor failure	bit		w40003.14	Reserved	bit
w30003.15	Status: Alarm status: Low Stage Compressor Contactor failure	bit		w40003.15	Reserved	bit
w30004.0	Status: Alarm status: Condenser Fan Contactor failure	bit		w40004.0	Reserved	bit

7.9 EVENT 0 / AMBIENT COIL (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to Modbus register

	Read from Smart1.1				Write to Smart1.1	
w30005.0	Status: Event 0 / Ambient Coil Status	bit		w40005.0	Command: Event 0 Ambient Coil ON	bit
w30005.1	Reserved	bit		w40005.1	Command: Event0 Ambient Coil OFF	bit

7.10 EVENT 1 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.2	Status: Event 1 ON / OFF	bit		w40005.2	Command: Event 1 ON	bit
w30005.3	Reserved	bit		w40005.3	Command: Event 1 OFF	bit

7.11 EVENT 2 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.4	Status: Event 2 ON / OFF	bit		w40005.4	Command: Event 2 ON	bit
w30005.5	Reserved	bit		w40005.5	Command: Event 2 OFF	bit

7.12 EVENT 3 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.6	Status: Event 3 ON / OFF	bit		w40005.6	Command: Event 3 ON	bit
w30005.7	Reserved	bit		w40005.7	Command: Event 3 OFF	bit

7.13 EVENT 4 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.8	Status: Event 4 ON / OFF	bit		w40005.8	Command: Event 4 ON	bit
w30005.9	Reserved	bit		w40005.9	Command: Event 4 OFF	bit

7.14 EVENT 5 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.10	Status: Event 5 ON / OFF	bit		w40005.10	Command: Event 5 ON	bit
w30005.11	Reserved	bit		w40005.11	Command: Event 5 OFF	bit

7.15 EVENT 6 (BIT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30005.12	Status: Event 6 ON / OFF	bit		w40005.12	Command: Event 6 ON	bit
w30005.13	Reserved	bit		w40005.13	Command: Event 6 OFF	bit

7.16 BEGINNING STEP NUMBER (UINT)

Note: Client commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

	Read from Smart1.1				Write to Smart1.1	
w30006.0	Reserved	bit		w40006.0	Trigger: Beginning Step Number	bit
w30120	Status: Beginning Step Number	UINT		w40120	Command: Beginning Step Number	UINT

7.17 CHANNEL 1 SETPOINT (FLOAT)

Note: Client Boolean commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Note: Client float commands written to the Smart1.1 are read by the controller when the Boolean trigger bit is received.

Note: First write the float setpoint. Then write the Boolean trigger bit.

Example: The way these setpoints commands work is that they have two parts.

- Load the setpoint.
 - Turn on the Boolean trigger bit (a bit is a Boolean). This indicates that the setpoint is ready to read.
- Note:** The client program must turn off the trigger so it is ready to trigger to read the next setpoint.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

Note: The user can manually change the Setpoint. In this case the Setpoint from the register 30012 and 30013 will not match the Modbus command in registers 40012 and 40013. Monitor the difference between the 30xxx series and the 40xxx series to determine if the operator has changed the setpoint.

	Read from Smart1.1				Write to Smart1.1	
w30012	Feedback: Actual Setpoint from Controller - First WORD	float (first WORD)		w40012	Command: Channel 1 Setpoint - First WORD	float (first WORD)
w30013	Feedback: Actual Setpoint from Controller - Second WORD	float (second WORD)		w40013	Command: Channel 1 Setpoint - Second WORD	float (second WORD)

7.17.1 TRIGGER - CHANNEL 1 SETPOINT

	Read from Smart1.1			Write to Smart1.1	
w30011.0	Feedback: Write Successful, if value = 1	integer		w40011.0	Trigger: Modbus Trigger Setpoint Command
w30011.1	Feedback: Write Fail - Profile Running, if value = 1	bit		w40011.1	Reserved
w30011.2	Feedback: Write Fail - Setpoint Above Maximum, if value = 1	bit		w40011.2	Reserved
w30011.3	Feedback: Write Fail - Setpoint Below Minimum, if value = 1	bit		w40011.3	Reserved

7.18 CHANNEL 1 PV (FLOAT)

Channel 1 PV is a float value. Since Float values are 32-bits, they require two Modbus registers.

To read the Process Variable from the controller:

- **Read Modbus:** Read the Modbus registers 30014 and 30015 into two WORDS.
- **Convert into float value:** Convert the two WORDS into a float value.

	Read from Smart1.1			Write to Smart1.1	
w30014	Status: Process Variable from Controller - First WORD	float (first WORD)		w40014	Reserved
w30015	Status: Process Variable from Controller - Second WORD	float (second WORD)		w40015	Reserved

7.19 CHANNEL 1 PID OUTPUT (INT)

Channel 1 PID Output is an integer value. Integer values are 16-bit. They require one Modbus register. They are read from the Modbus register as a WORD. They must be converted from a WORD to an integer.

	Read from Smart1.1			Write to Smart1.1	
w30018	Status: Channel 1 PID output	integer		w40018	Reserved
					WORD

7.20 CHANNEL 2 SETPOINT (FLOAT)

Note: Client Boolean commands written to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The client program must turn the 40xxx series command OFF to "reload" it.

Note: Client float commands written to the Smart1.1 are read by the controller when the Boolean trigger bit is received.

Note: First write the float setpoint. Then write the Boolean trigger bit.

Boolean commands and status are part of a 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Read proper bit number from WORD

To send write command:

- Read 40000 series register - entire WORD
- Toggle desired bit to set or reset command.
- Write entire word to desired Modbus 40000 series register

Note: The user can manually change the Setpoint. In this case the Setpoint from the register 30012 and 30013 will not match the Modbus command in registers 40012 and 40013. Monitor the difference between the 30xxx series and the 40xxx series to determine if the operator has changed the setpoint.

	Read from Smart1.1				Write to Smart1.1	
w30022	Feedback: Actual Setpoint from Controller - First WORD	float (first WORD)		w40022	Command: Channel 1 Setpoint Command - First WORD	float (first WORD)
w30023	Feedback: Actual Setpoint from Controller - Second WORD	float (second WORD)		w40023	Command: Channel 1 Setpoint Command - Second WORD	float (second WORD)

7.20.1 TRIGGER - CHANNEL 1 SETPOINT

	Read from Smart1.1				Write to Smart1.1	
w30021.0	Feedback: Write Successful, if value = 1	bit		w40021.0	Trigger: Modbus Trigger Setpoint Command	bit
w30021.1	Feedback: Write Fail - Profile Running, if value = 1	bit		w40021.1	Reserved	bit
w30021.2	Feedback: Write Fail - Setpoint Above Maximum, if value = 1	bit		w40021.2	Reserved	bit
w30021.3	Feedback: Write Fail - Setpoint Below Minimum, if value = 1	bit		w40021.3	Reserved	bit

7.21 CHANNEL 2 PV (FLOAT)

Channel 2 PV is a float value. Since Float values are 32-bits they require two Modbus registers.

To read the Process Variable from the controller:

- **Read Modbus:** Read the Modbus registers 30014 and 30015 into two WORDS.
- **Convert into float value:** Convert the two WORDS into a float value.

	Read from Smart1.1				Write to Smart1.1	
w30024	Process Variable from Controller - First WORD	float (first WORD)		w40024	Reserved	WORD
w30025	Process Variable from Controller - Second WORD	float (second WORD)		w40025	Reserved	WORD

7.22 CHANNEL 2 PID OUTPUT (INTEGER)

Channel 2 PID Output is an integer value. Integer values are 16-bit. They require one Modbus register. They are read from the Modbus register as a WORD. They must be converted from a WORD to an integer.

To read the Process Variable from the controller:

- **Read Modbus:** Read the Modbus registers 30014 and 30015 into two WORDS.
- **Convert into float value:** Convert the two WORDS into a float value.

	Read from Smart1.1				Write to Smart1.1	
w30028	Status: Channel 1 PID output	integer		w40028	Reserved	WORD

7.23 CURRENT STEP NUMBER (UINT)

Note: The Current Step Number is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30111	Status: Current Step Number	UINT		w40111	Reserved	WORD

7.24 CURRENT STEP TYPE (UINT)

Note: The Current Step Type is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30112	Status: Current Step Type	UINT		w40112	Reserved	WORD

7.25 CURRENT STEP HOURS (UINT)

Note: The Current Step Hours is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30113	Status: Current Step Hours	UINT		w40113	Reserved	WORD

7.26 CURENT STEP MINUTES (UINT)

Note: The Current Step Minutes is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30114	Status: Current Step Minutes	UINT		w40114	Reserved	WORD

7.27 CURRENT STEP SECONDS (UINT)

Note: The Current Step Seconds is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30115	Status: Current Step Minutes	UINT		w40115	Reserved	WORD

7.28 ELAPSED TIME HOURS (UINT)

Note: The Elapsed Time Hours is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30116	Status: Elapsed Time Hours	UINT		w40116	Reserved	integer

7.29 ELAPSED TIME MINUTES (UINT)

Note: The Elapsed Time Minutes is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30117	Status: Elapsed Time Minutes	UINT		w40117	Reserved	WORD

7.30 ELAPSED TIME SECONDS (UINT)

Note: The Elapsed Time Seconds is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30118	Status: Elapsed Time Seconds	UINT		w40118	Reserved	WORD

7.31 JUMP COUNTER (UINT)

Note: The Jump Counter is an unsigned integer. It consists of two bytes - one 16-bit WORD.

To read status 30000 series registers:

- Read entire WORD.
- Convert to unsigned integer from WORD

	Read from Smart1.1				Write to Smart1.1	
w30119	Status: Jump Counter value	UINT		w40119	Reserved	WORD

7.32 STEP TYPE (STRING)

Text is sent from the controller in Modbus registers - 16-bit WORDS. Each WORD contains two 8-bit bytes. Each byte represents one ASCII character. The low byte is first, followed by the high byte. When the WORD is decoded it will be obvious if the bytes are switched as each pair of characters will be reversed.

To read the "Running Profile Name" from the controller:

- **Read Modbus:** Read the Modbus registers 30014 and 30015 into two WORDS.
- **Convert into ASCII characters:** Convert the three WORDS into a string.

	Read from Smart1.1				Write to Smart1.1	
w30121	First two ASCII characters	2 ASCII char		w40121	Reserved	WORD
w30122	Next two ASCII characters	2 ASCII char		w40122	Reserved	WORD
w30123	Next two ASCII characters	2 ASCII char		w40123	Reserved	WORD

8.0 PROFILES OVERVIEW

There is considerable control of profiles by Modbus. There is an array of 10 Modbus profile names available. Each profile name can be 20 characters in length. When reading the profiles from the disk the program truncates each name at 20 characters.

Note: When loading a selected profile, the program looks for the desired profile on disk using a string compare. If the profile on disk is more than 20 characters, the string compare will fail.

The HMI will read the profiles on the disk into an array of 99 for display on the HMI. This is separate from the list of 10 profiles available from Modbus. It is possible to access the complete list of 99 profiles by Modbus. The register 40198 determines which group of 10 to focus on. The register 40199 determines the selected file within the focused group of 10.

8.1 START / STOP PROFILE (BIT)

Start, Stop, Pause and Resume loaded profile.

	Read from Smart1.1				Write to Smart1.1	
w30001.2	Status: Profile Running Status	bit		w40001.2	Command: Start Profile Run	bit
w30001.3	Reserved	bit		w40001.3	Command: Stop Running Profile	bit

8.2 PAUSE / RESUME PROFILE (BIT)

Start, Stop, Pause and Resume loaded profile.

	Read from Smart1.1				Write to Smart1.1	
w30001.4	Status: Profile Paused Status	bit		w40001.4	Command: Pause Profile	bit
w30001.5	Reserved	bit		w40001.5	Command: Profile Resume	bit

8.3 LOAD PROFILE (BIT)

	Read from Smart1.1				Write to Smart1.1	
w30200.0	Status: Profile Loaded and Running	bit		w30200.0	Trigger: Run Profile	bit
w30200.1	Status: Profile Load Failed	bit		w30200.1	reserved	bit

8.4 LOAD PROFILE (BIT)

	Read from Smart1.1				Write to Smart1.1	
w30200.0	Status: Profile Loaded and Running	bit		w30200.0	Trigger: Run Profile	bit
w30200.1	Status: Profile Load Failed	bit		w30200.1	reserved	bit

8.5 RUNNING PROFILE NAME

***** The name of the profile that is currently running or loaded to run.**

Text is sent from the controller in Modbus registers - 16-bit WORDS. Each WORD contains two 8-bit bytes. Each byte represents one ASCII character. The low byte is first, followed by the high byte. When the WORD is decoded it will be obvious if the bytes are switched as each pair of characters will be reversed.

To read the "Running Profile Name" from the controller:

- Read Modbus: Read each Modbus register. Convert into two ASCII characters.
- Convert into string value: Convert the WORDS into ASCII characters, concatenate to a string.

	Read from Smart1.1				Write to Smart1.1	
w30101	First two ASCII characters	2 ASCII char		w40101	Reserved	WORD
w30102	Next two ASCII characters	2 ASCII char		w40102	Reserved	WORD
w30103	Next two ASCII characters	2 ASCII char		w40103	Reserved	WORD

w30104	Next two ASCII characters	2 ASCII char		w40104	Reserved	WORD
w30105	Next two ASCII characters	2 ASCII char		w40105	Reserved	WORD
w30106	Next two ASCII characters	2 ASCII char		w40106	Reserved	WORD
w30107	Next two ASCII characters	2 ASCII char		w40107	Reserved	WORD
w30108	Next two ASCII characters	2 ASCII char		w40108	Reserved	WORD
w30109	Next two ASCII characters	2 ASCII char		w40109	Reserved	WORD
w30110	Next two ASCII characters;	2 ASCII char		w40110	Reserved	WORD

To read Running Profile Name – Example:

Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30101	Read from Smart1.1: Read 30101 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30102	Read from Smart1.1: Read 30102 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30103	Read from Smart1.1: Read 30103 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30104	Read from Smart1.1: Read 30104 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30105	Read from Smart1.1: Read 30105 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30106	Read from Smart1.1: Read 30106 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30107	Read from Smart1.1: Read 30107 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30108	Read from Smart1.1: Read 30108 (two bytes) - convert each byte to ASCII character

Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30109	Read from Smart1.1: Read 30108 (two bytes) - convert each byte to ASCII character
Get characters: Read WORD - two bytes, each byte represents one ASCII character.	WORD := 30110	Read from Smart1.1: Read 30110 (two bytes) - convert each byte to ASCII character

8.6 REFRESH PROFILE LIST

*** Command to refresh list of available profiles from the disk.

Note: Commands to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The Modbus program must turn the command OFF to "reload" it.

Refresh Profile List:

Causes the list of profile names to be refreshed by reading the disk.

	Read from Smart1.1				Write to Smart1.1	
w30200.15	Reserved	bit		w40200.15	Trigger: Refresh list of profile names in Modus Registers	bit

8.7 LIST OF PROFILES (FOR SELECTION)

***** The name of the profile that is currently running or loaded to run.**

Text is sent from the controller in Modbus registers - 16-bit WORDS. Each WORD contains two 8-bit bytes. Each byte represents one ASCII character. The low byte is first, followed by the high byte. When the WORD is decoded it will be obvious if the bytes are switched as each pair of characters will be reversed.

To read the "Running Profile Name" from the controller:

- Read Modbus: Read the Modbus registers 30014 and 30015 into two WORDS.
- Convert into string value: Convert the WORDS into ASCII characters, concatenate to a string.

First Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30201	First two ASCII characters	2 ASCII char	w40201	Reserved (Profile name is read only)	WORD
w30202	Next two ASCII characters	2 ASCII char	w40202	Reserved (Profile name is read only)	WORD
w30203	Next two ASCII characters	2 ASCII char	w40203	Reserved (Profile name is read only)	WORD
w30204	Next two ASCII characters	2 ASCII char	w40204	Reserved (Profile name is read only)	WORD
w30205	Next two ASCII characters	2 ASCII char	w40205	Reserved (Profile name is read only)	WORD
w30206	Next two ASCII characters	2 ASCII char	w40206	Reserved (Profile name is read only)	WORD
w30207	Next two ASCII characters	2 ASCII char	w40207	Reserved (Profile name is read only)	WORD
w30208	Next two ASCII characters	2 ASCII char	w40208	Reserved (Profile name is read only)	WORD
w30209	Next two ASCII characters	2 ASCII char	w40209	Reserved (Profile name is read only)	WORD
w30210	Next two ASCII characters;	2 ASCII char	w40210	Reserved (Profile name is read only)	WORD

Second Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30211	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30212	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30213	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30214	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30215	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30216	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30217	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30218	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30219	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30220	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Third Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30221	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30222	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30223	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30224	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30225	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30226	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30227	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30228	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30229	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30230	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Fourth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30231	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30232	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30233	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30234	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30235	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30236	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30237	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30238	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30239	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30240	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Fifth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30241	First two ASCII characters	2 ASCII char	w40201	Reserved (Profile name is read only)	WORD
w30242	Next two ASCII characters	2 ASCII char	w40202	Reserved (Profile name is read only)	WORD
w30243	Next two ASCII characters	2 ASCII char	w40203	Reserved (Profile name is read only)	WORD
w30244	Next two ASCII characters	2 ASCII char	w40204	Reserved (Profile name is read only)	WORD
w30245	Next two ASCII characters	2 ASCII char	w40205	Reserved (Profile name is read only)	WORD
w30246	Next two ASCII characters	2 ASCII char	w40206	Reserved (Profile name is read only)	WORD
w30247	Next two ASCII characters	2 ASCII char	w40207	Reserved (Profile name is read only)	WORD
w30248	Next two ASCII characters	2 ASCII char	w40208	Reserved (Profile name is read only)	WORD
w30249	Next two ASCII characters	2 ASCII char	w40209	Reserved (Profile name is read only)	WORD
w30250	Next two ASCII characters;	2 ASCII char	w40210	Reserved (Profile name is read only)	WORD

Sixth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30251	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30252	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30253	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30254	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30255	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30256	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30257	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30258	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30259	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30260	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Seventh Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30261	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30262	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30263	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30264	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30265	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30266	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30267	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30268	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30269	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30270	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Eighth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30271	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30272	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30273	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30274	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30275	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30276	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30277	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30278	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30279	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30280	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Ninth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30281	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30282	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30283	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30284	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30285	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30286	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30287	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30288	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30289	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30290	Next two ASCII characters;	2 ASCII char		w40210	Reserved (Profile name is read only)

Tenth Profile Name:

	Read from Smart1.1			Write to Smart1.1	
w30291	First two ASCII characters	2 ASCII char		w40201	Reserved (Profile name is read only)
w30292	Next two ASCII characters	2 ASCII char		w40202	Reserved (Profile name is read only)
w30293	Next two ASCII characters	2 ASCII char		w40203	Reserved (Profile name is read only)
w30294	Next two ASCII characters	2 ASCII char		w40204	Reserved (Profile name is read only)
w30295	Next two ASCII characters	2 ASCII char		w40205	Reserved (Profile name is read only)
w30296	Next two ASCII characters	2 ASCII char		w40206	Reserved (Profile name is read only)
w30297	Next two ASCII characters	2 ASCII char		w40207	Reserved (Profile name is read only)
w30298	Next two ASCII characters	2 ASCII char		w40208	Reserved (Profile name is read only)
w30299	Next two ASCII characters	2 ASCII char		w40209	Reserved (Profile name is read only)
w30300	Next two ASCII characters	2 ASCII char		w40210	Reserved (Profile name is read only)

8.8 SELECT PROFILES

***** View group of 10 profiles to view. Select Command to refresh list of available profiles from the disk.**

The maximum number of profiles that can be accessed by Modbus is 99. There are 10 profiles that can be accessed at one time.

- if w40198 = 1 then profiles 1 through 10 are shown.
- if w40198 = 2 then profiles 11 through 20 are shown.
- if w40198 = 3 then profiles 21 through 30 are shown.
- if w40198 = 4 then profiles 31 through 40 are shown.
- if w40198 = 5 then profiles 41 through 50 are shown.
- if w40198 = 6 then profiles 51 through 60 are shown.
- if w40198 = 7 then profiles 61 through 70 are shown.
- if w40198 = 8 then profiles 71 through 80 are shown.
- if w40198 = 9 then profiles 81 through 90 are shown.
- if w40198 = 10 then profiles 91 through 99 are shown.

To select a specific profile with a group set w30199.

- if w30199 = 1 then the 1st profile within that group is selected.
- if w30199 = 2 then the 2nd profile within that group is selected.
- if w30199 = 3 then the 3rd profile within that group is selected.
- if w30199 = 4 then the 4th profile within that group is selected.
- if w30199 = 5 then the 5th profile within that group is selected.
- if w30199 = 6 then the 6th profile within that group is selected.
- if w30199 = 7 then the 7th profile within that group is selected.
- if w30199 = 8 then the 8th profile within that group is selected.
- if w30199 = 9 then the 9th profile within that group is selected.
- if w30199 = 10 then the 10th profile within that group is selected.

Note: Commands to the Smart1.1 work on the rising edge, which means they only trigger a change when they are turned ON. The Modbus program must turn the command OFF to "reload" it.

	Read from Smart1.1			Write to Smart1.1	
w30198	Status: Group Selected			w40198 Command: Select group of profiles to view (1 to 10)	integer
w30199	Status: Selected profile within group			w30199 Command: Select profile within group of 10	integer

Select Profile:

It is possible to access the complete list of 99 profiles by Modbus. The register 40198 determines which group of 10 to focus on. The register 40199 determines the selected file within the focused group of 10.

	Read from Smart1.1			Write to Smart1.1	
w30198	Group Selected			w40198 Select group of profiles to view (1 to 10)	WORD
w30199	Selected profile within group			w30199 Select profile within group of 10	WORD

SUPPLEMENTAL INSTRUCTIONS

Included When Applicable