

Operations Manual

HP15

Self-Heated Oxygen Measurement and Control System

Please read, understand, and follow these instructions before operating this equipment. Super Systems, Inc. is not responsible for damages incurred due to a failure to comply with these instructions. If at any time there are questions regarding the proper use of this product, please contact us at (513) 772-0060 for assistance.



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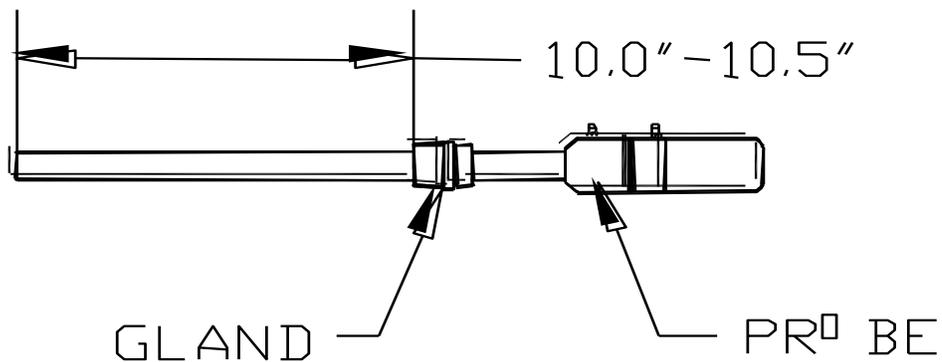
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General Information

The HP15 system includes two main enclosures. The first contains the heater and the Gold Probe and is painted with a heat resistant black paint. The second is the blue electrical control panel. Proper operation of this system requires that these two enclosures be wired to each other to allow the heater to be controlled by the electrical enclosure. For detailed information regarding the connections between the enclosures, please refer to the *Electrical Connections* section of this manual.

Electrical Connections

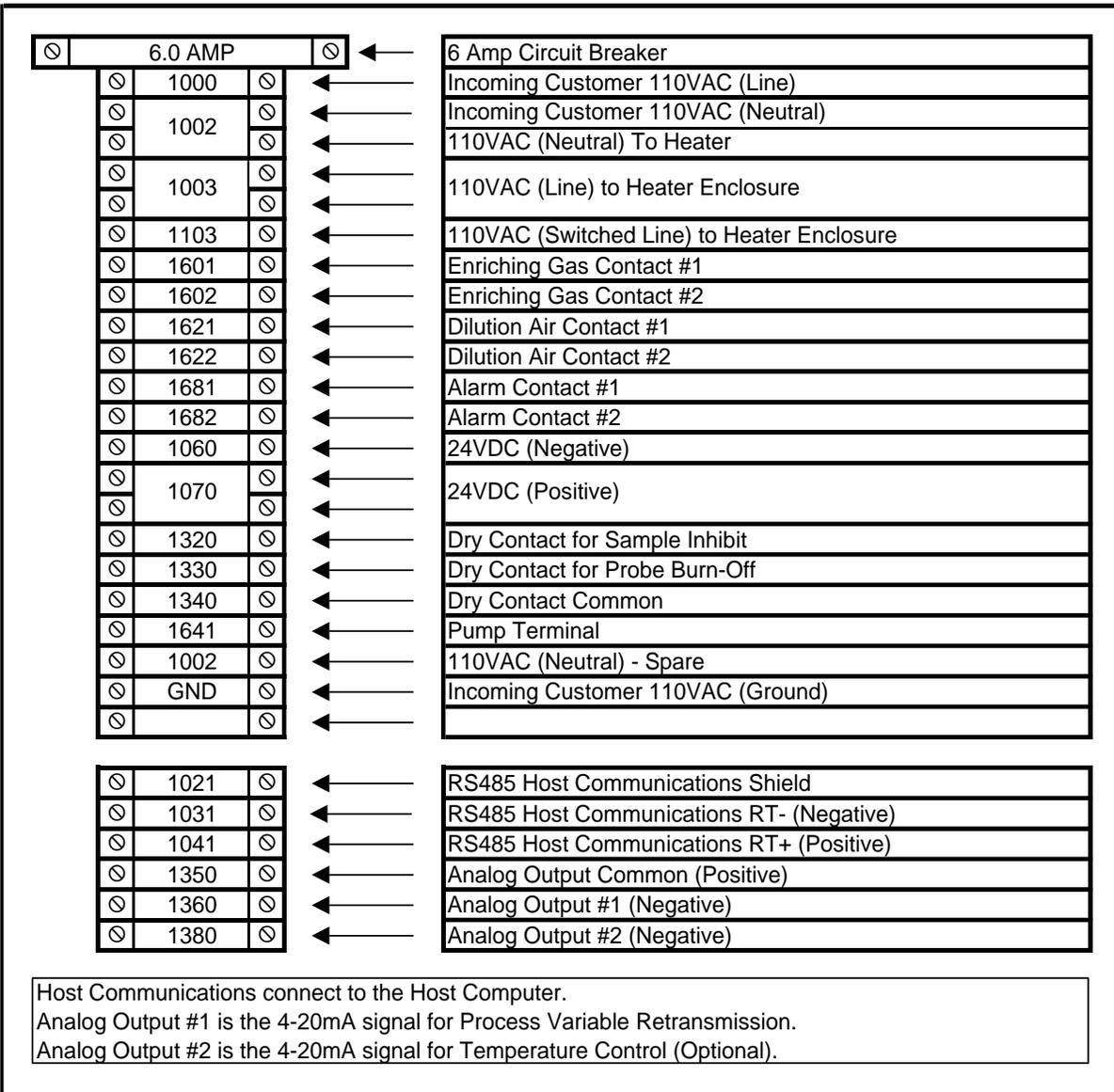
Insert the probe into the coupling at the base of the large box. **It is important that the probe is inserted at the correct depth to allow proper heating and prevent damage to the ceramic well inside the unit.** There should be between 10.0" and 10.5" between the bottom of the adjustable 1" NPT gland and the end of the probe (see sketch below).



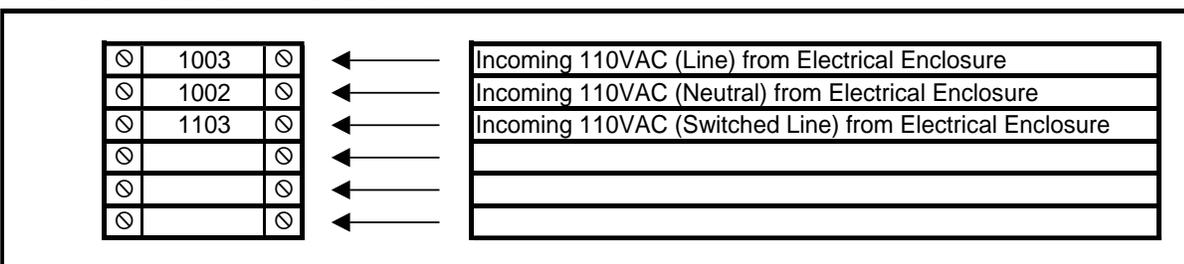
Once the probe has been inserted into the heater, make the necessary electrical connections at the head of the probe. The green thermocouple wire from the electrical enclosure box should be attached to the thermocouple connection at the head of the probe (Positive (+) = Black and Negative (-) = Red). The sensor wire should also be attached to the probe (Positive (+) = Black and Negative (-) = White).

This unit has been pre-configured and tested prior to shipment. To maximize the accuracy and longevity of the Heated Probe, it is recommended that the unit be operated at 1500°F. It is also possible to configure the HP to match the temperature of your furnace.

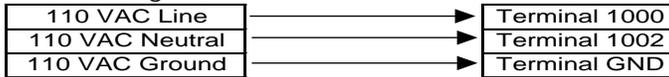
Inside Electrical Enclosure



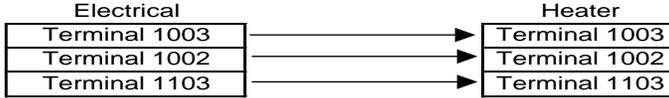
Inside Heater Enclosure



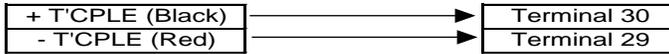
1. Connect incoming 120VAC to the Electrical Enclosure:



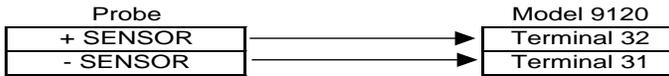
2. Connect Electrical Enclosure to Heater Enclosure:



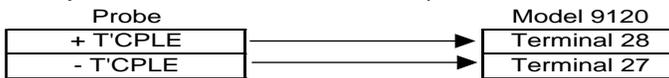
3. Connect "S" Type Thermocouple wire from Probe to Model 9120 Controller in Electrical Enclosure



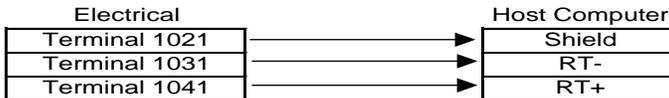
4. Connect Millivolt wire from Probe to Model 9120 Controller in Electrical Enclosure



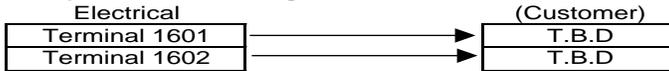
5. **(Optional)** Connect Furnace Thermocouple to Model 9120 Controller in Electrical Enclosure



6. **(Optional)** Connect RS485 Communications to Host Computer



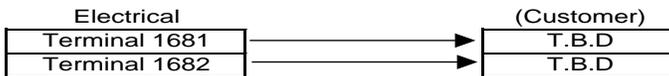
7. **(Optional)** Connect Enriching Gas Contact



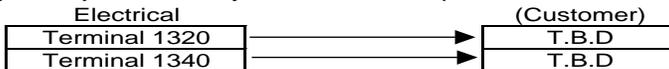
8. **(Optional)** Connect Dilution Air Contact



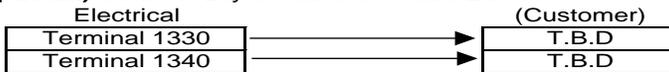
9. **(Optional)** Connect Dilution Air Contact



10. **(Optional)** Connect Dry Contact for Sample Inhibit



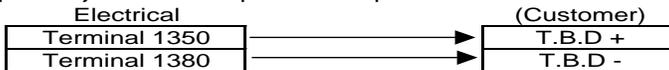
11. **(Optional)** Connect Dry Contact for Probe Burnoff



12. **(Optional)** 4-20mA Output for Process Variable Retransmission



13. **(Optional)** 4-20mA Output for Temperature Control



Plumbing Connections

The sample gas can be transported from the sample port on the furnace to the bottom of the external filter on the side of the electrical enclosure using silicone tubing. The sample flow should be between 4.0 and 5.0 SCFH. Silicone tubing should also connect the ports on the side of the electrical enclosure to the probe in the heater enclosure. Connect tubing from the fitting on the electrical enclosure marked "To Probe Reference" to the "Ref. Air" port on the probe. A connection should also be made between the "To Burnoff Port" fitting and the "B.O." fitting on the probe. There is a barb fitting on the stainless steel well on the heated probe. This is the vent, which needs to be routed to an appropriately safe location.

HP 15 Screens

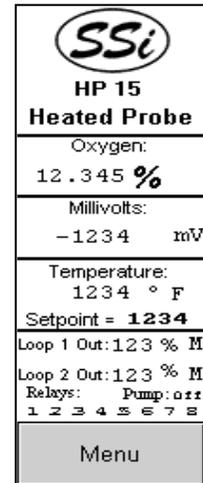
Initial Screen

The first screen to be displayed when the HP is powered up is the initial screen, which will display a combination of: Oxygen, Carbon, millivolts, dew point, temperature, setpoint, percent output, relay status, and pump status depending on the selected process variable type.

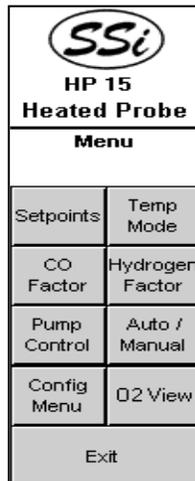
The first section below the Super Systems Inc logo will display the process variable type (PVT). The PVT can be: Oxygen, Carbon, Dewpoint, or millivolts. See the section *Configuration Menu → PVT Type* for more information on how to change the PVT type.

The second section (Millivolts:) will display the probe's current millivolt value. The third section will display the probe's current temperature, as well as the current setpoint. See the section *Set Points* for more information on how to change the setpoints.

The last section will display the Loop 1 and Loop 2 output percentages. An **A** or an **M** will be displayed next to the output percentage to let the user know if Loop 1 or Loop 2 is in automatic (**A**) or manual (**M**) mode. The "Pump" area will let the user know if the pump status is **on** or **off**. The "Relays" area, which is directly above the **Menu** button, will display the energized relays. The number corresponds to the relay in the panel. If a number is displayed, then that specific relay in the panel is energized. If a number is not displayed, then that specific relay in the panel is not energized. The **Menu** button will display the main menu.



Main Menu

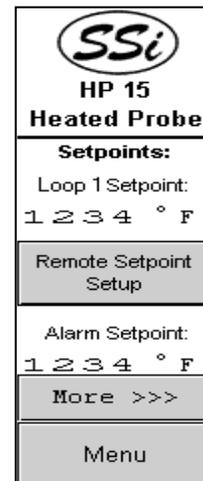


The main menu displays eight buttons, from which the user will be able to set up the HP 15 instrument. The **Exit** button will return the user to the initial screen.

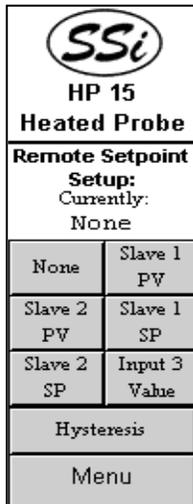
Set Points

Two setpoints are initially displayed on the screen: Loop 1 and Alarm. To change the temperature setpoint or the alarm setpoint, touch the setpoint value, which will display the numeric keypad.

Enter the new setpoint value and press the **ENT** button to set the setpoint. Press the **ESC** button to cancel the change.



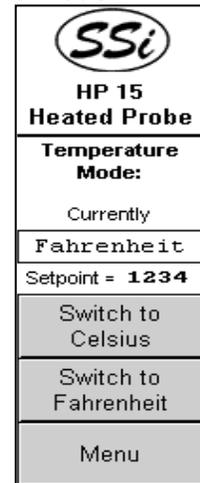
The **Remote Setpoint Setup** button will display the Remote Setpoint screen, which will allow the user to set up a remote setpoint for Loop 2, which is generally the temperature loop. There are six buttons to choose from for a remote setpoint: **None**, **Slave 1 PV**, **Slave 2 PV**, **Slave 1 SP**, **Slave 2 SP**, or **Input 3 Value**. Pressing the desired button will set the setpoint to the specified source. When **None** is pressed, the setpoint that was set from the previous screen



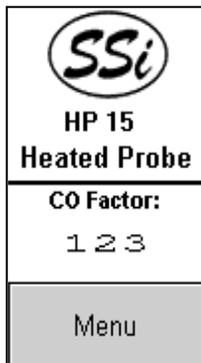
will be used. To change the hysteresis, click on the **Hysteresis** button and enter the new hysteresis value from the numeric keypad. The **More >>>** button will allow the user to set the setpoint for the selected PVT (Dew point, Carbon, Oxygen, or millivolts). The **<<< More** button will return the user to the previous screen. The **Menu** button will return the user to the main menu.

Temp Mode

The temperature mode screen displays the current temperature mode (Fahrenheit or Celsius) as well as the current setpoint. To change the mode to Celsius, press the **Switch to Celsius** button. To change the mode to Fahrenheit, press the **Switch to Fahrenheit** button. When the temperature mode is changed, the setpoint will be converted automatically. This is a safety precaution to prevent setting extremely high setpoints when switching to the Celsius scale. The setpoint can always be changed from the *Set Points* menu.



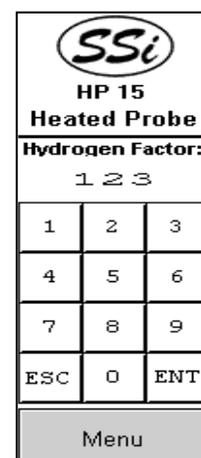
CO Factor



The COF factor allows you to make adjustments that will allow the controller to match the results obtained when measuring shim stock. If the controller set point and the process variable are the same, but you are not attaining the desired surface Carbon, you can make the adjustment with the CO Factor to increase the amount of surface Carbon available to the parts. If you lower the CO factor, it immediately lowers the % Carbon process variable. This will cause the controller to add more enriching gas--- raising the process variable until once again the process variable and the set point match. Conversely, raising the CO Factor will cause the process variable to read higher, shutting down the enriching gas solenoid (possibly turning on the air dilution solenoid) causing the % Carbon process variable to begin to lower (NOT ADDING ENRICHING GAS) until the set point and process variable match. To change the CO Factor, enter the new factor and press the **ENT** button. Pressing the **ESC** button will not set the new CO Factor. *Note: when the ESC button is pressed, the display will show a 0; however, this is just for display purposes. The CO Factor will not be set to 0.*

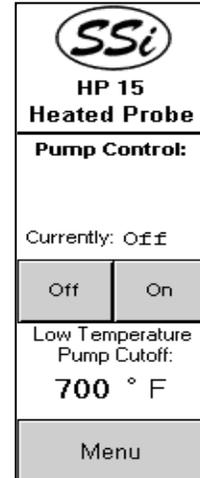
Hydrogen Factor

The Hydrogen factor is very similar to the CO factor, as explained above. The instrument will perform its calculations based on a theoretical amount of carbon or hydrogen. However, the actual amounts of carbon or hydrogen will probably be different from the theoretical amounts that the instrument is using to perform the calculations. Changing the CO factor or the Hydrogen factor will allow the instrument to make its calculations based on the actual amount of carbon or hydrogen, which will make the calculations more accurate. This screen has the same functionality as the CO Factor screen.

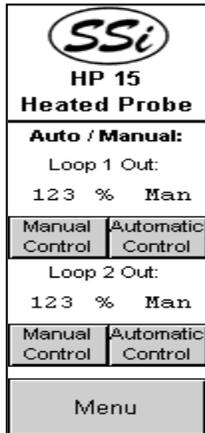


Pump Control

This screen will allow the user to manually turn the pump on or off. Press the **On** button to turn the pump on. Press the **Off** button to turn the pump off. The "Low Temperature Pump Cutoff" section will allow the user to set a low temperature that will shut the pump off if the specified temperature is reached. Press the value and enter the desired pump cutoff setpoint.



Auto / Manual



The "Loop 1 Out:" section displays the output percentage of Loop 1, along with the current mode of the loop – **Auto** for automatic, **Man** for manual. To switch the mode of the loop to automatic, press the **Automatic Control** button. To switch the mode of the loop to manual, press the **Manual Control** button. When the loop is in manual mode, the output percentage can be changed by pressing the output percentage value and entering the new value from the numeric keypad that is displayed.

The "Loop 2 Out:" section displays the output percentage of Loop 2, along with the current mode of the loop – **Auto** for automatic, **Man** for manual. To switch the mode of the loop to automatic, press the **Automatic Control** button. To switch the mode of the loop to manual, press the **Manual Control** button. When the loop is in manual mode, the output percentage can be changed by pressing the output percentage value and entering the new value from the numeric keypad that is displayed.

O2 View

This feature is not yet implemented.

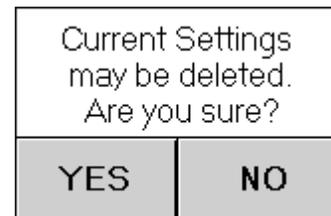
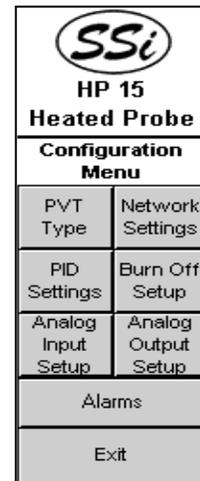
Configuration Menu

The **Config Menu** button will display the configuration menu. The Configuration menu displays six buttons that will allow the user to configure the HP15. The **Exit** button will return the user to the main menu.



PVT Type

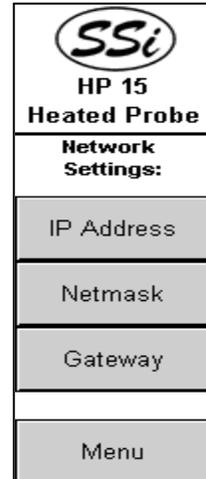
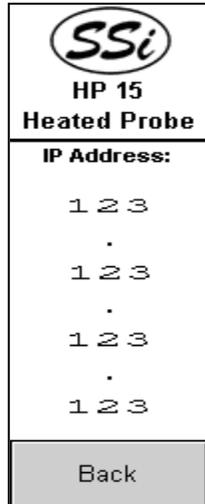
This screen will allow the user to set the PVT type. The currently selected PVT type will be listed at the top of the screen. Press the **Carbon** button to set the PVT type to Carbon. Press the **Dew Point** button to set the PVT type to Dew Point. Press the **Oxygen** button to set the PVT type to Oxygen. Press the **Millivolts** button to set the PVT type to Millivolts. Press the **Simple Nitrider** button to set the PVT type to Simple Nitriding. Press the **Dual Loop** button to set the PVT type to Dual Loop. Since changing the PVT type will set



default values for that type, certain settings may be lost. When the PVT type is changed, the user will have to confirm the changes. Pressing the **Yes** button will change the PVT type, and pressing the **No** button will not change the PVT type. The **Menu** button will return the user to the configuration menu.

Network Settings

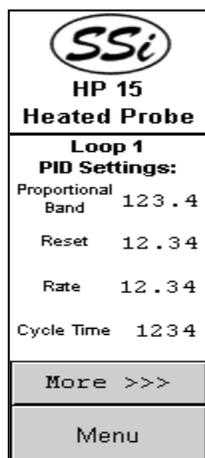
The Network Settings screen will allow the user to set up the network addresses for the HP15. Each screen – IP Address, Netmask, and Gateway – will function identically. The **IP Address** button will allow the user to change the IP address of the device. The **Netmask** button will allow the user to change the Netmask of the device. The **Gateway** button will allow the user to change the gateway of the device. To change a specific section of an address, press the value and enter the new value on the numeric keypad.



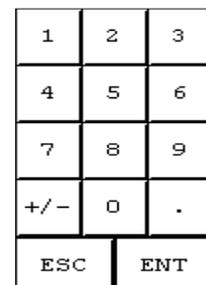
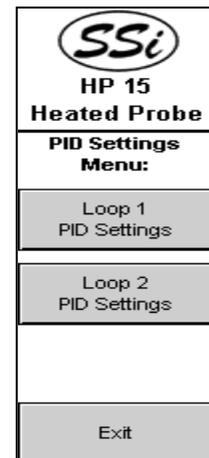
PID Settings

This menu screen will allow the user to select which loop to change the PID settings for. Press the **Loop 1 PID Settings** button to change the PID settings for Loop1, or press the **Loop 2 PID Settings** button to change the PID settings for Loop 2. The **Exit** button will return the user to the configuration menu screen. The screens for the Loop 1 PID settings and Loop 2 PID settings function identically.

Loop PID Settings – Page 1



From this screen, the user can modify the proportional band, reset, rate, and cycle time. To edit any of these values, press the value and enter the new value from the numeric keypad that is displayed. The **More >>>** button will display Page 2 of the PID Settings menu. The **Menu** button will display the *PID Settings* menu.



Loop PID Settings – Page 2

From this screen, the user can modify the control loop output, integral preset, control low limit, control high limit, and the loop mode. To edit the control loop output, integral preset, control low limit, or the control high limit, press the value and enter the new value from the numeric keypad that is displayed. The currently selected loop mode will be displayed in the box. To change the loop mode, press the up arrow next to the displayed mode. This will display the available modes in the form of buttons:

Dual Reverse (Gas/Air, Heat/Cool)
Single Reverse (Heat)
Dual Direct (Dew Point)
Dual Reverse (Cool)

Dual Reverse (Gas/Air, Heat/Cool)
Single Reverse (Heat)
Dual Direct (Dew Point)
Dual Reverse (Cool)

Press the button for the desired mode. The **<More** button will display Page 1 of the PID Settings menu. The **More>** button will display Page 3 of the PID Settings menu. The **Menu** button will display the *PID Settings* menu.

Loop PID Settings – Page 3

From this screen, the user can modify the auto PID setting, as well as whether or not the high limit shuts down the control for each input. To turn the auto PID on, press the **On** button. To turn the auto PID off, press the **Off** button. The current status of the auto PID will be displayed. To modify whether the high limit shuts down the control for Input 1, 2, or 3, press the **Toggle** button for the desired input. For example, to have the high limit shut down control for Input 1, press the top **Toggle** button; to have the high limit shut down control for Input 3, press the bottom **Toggle** button. The **<More** button will display Page 2 of the PID Settings menu. The **More>** button will display Page 4 of the PID Settings menu. The **Menu** button will display the *PID Settings* menu.

Loop PID Settings – Page 4

From this screen, the user can modify the zero setpoint shuts down control value, as well as the set point change limit value. Whether or not a zero setpoint shuts down control will be displayed above the **Yes/No** buttons.

Off	80%
70%	60%
50%	40%
30%	20%

To allow a zero setpoint to shut down control, press the **Yes** button. To not allow a zero setpoint to shut down control, press the **No** button. The current setpoint change limit is displayed in the box. To change the setpoint change limit, press the up arrow next to the displayed value. This will display eight buttons that will allow the user to change the setpoint change limit:

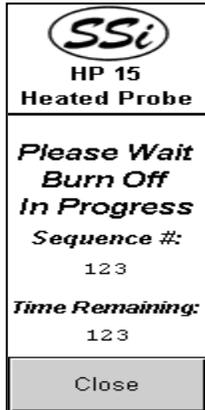
Off
80 %
70 %

- 60 %
- 50 %
- 40 %
- 30 %
- 20 %

Press the button for the desired setpoint change limit. The <<< **More** button will display Page 3 of the PID Settings menu. The **Menu** button will display the *PID Settings* menu.

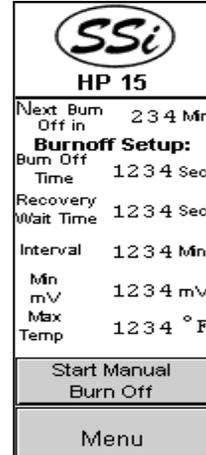
Burn Off Setup

From this screen, the user can modify the burn off time in seconds, recovery wait time in seconds, interval in minutes, minimum millivolts, and the maximum temperature values. The user can also start a manual



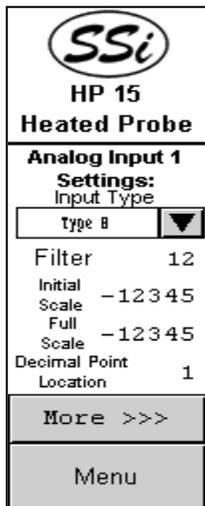
burnoff from this screen. To modify the burn off time, recovery wait time, interval, minimum millivolts, or the maximum temperature value, press the value and enter the new value from the numeric keypad that is displayed. To start a manual burnoff, press the **Start Manual Burn Off** button. While a burnoff is in progress, the burnoff in progress screen will be displayed. The current sequence number and the time remaining in seconds will be displayed. The **Close** button will close down the screen.

Note: While the burnoff in progress screen may be closed, the burnoff will still be in progress, and another manual burnoff may not be started until the current burnoff is finished.



Analog Input Setup

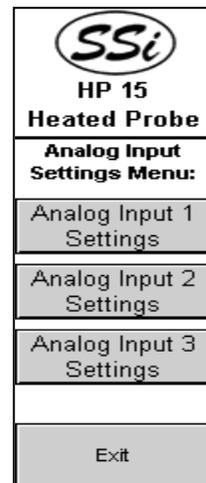
This menu screen will allow the user to set up the analog input settings for Input 1, 2, or 3. To change the analog inputs settings for Input 1, press the **Analog Input 1 Settings** button. To change the analog inputs settings for Input 2, press the **Analog Input 2 Settings** button. To change the analog inputs settings for Input 3, press the **Analog Input 3 Settings** button. The screens for the analog input settings 1, 2, and 3 function identically. The **Exit** button will return the user to the configuration menu.



Analog Input Settings – Page 1

From this screen, the user can modify the input type, filter, initial scale, full scale, and decimal point location. The current input type is displayed in the box. To change the input type, press the down arrow next to the displayed value. This action will display twenty buttons that will allow the user to change the input type:

- Type B**
- Type C**
- Type E**
- Type J**
- Type K**
- Type N**

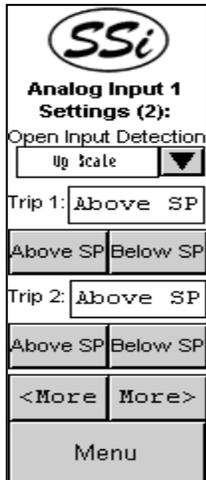


Type NNM
Type R
Type S
Type T
2.5 Volts
1.25 Volts
78.125 mV
19.53125 mV
4-20 mA
25 Volts
12.5 Volts
781.25 mV
195.3125 mV
Close Screen

Type B	Type C
Type E	Type J
Type K	Type N
Type NNM	Type R
Type S	Type T
2.5 Volts	1.25 Volts
78.125 mV	19.53125 mV
4-20 mA	25 Volts
12.5 Volts	781.25 mV
195.3125 mV	Close Screen

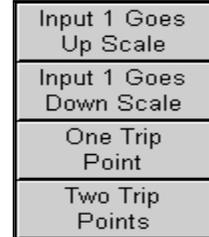
Press the button for the desired input type. To change the filter, initial scale, full scale, or decimal point location, press the value and enter the new value from the numeric keypad that is displayed. The **More >>>** button will display Page 2 of the analog input settings menu. The **Menu** button will display the *Analog Input Setup* menu.

Analog Input Settings – Page 2



From this screen, the user can modify the open input direction, trip 1 value, and the trip 2 value. The current open input direction value is displayed in the box. To modify the open input direction, press the down arrow next to the displayed value. This will display four buttons that will allow the user to change the open input direction:

Input X Goes Up Scale
Input X Goes Down Scale
One Trip Point
Two Trip Points

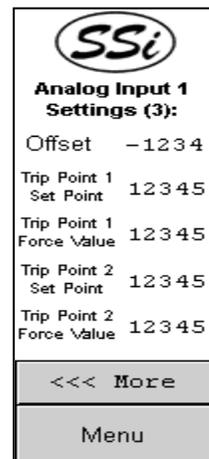


Press the button for the desired open input direction. To set the Trip 1 value to Above Setpoint, press the **Above SP** button under the Trip 1 value. To set the Trip 2 value to Above Setpoint, press the **Above SP** button under the Trip 2 value. To set the Trip 1 value to Below Setpoint, press the **Below SP** button under the Trip

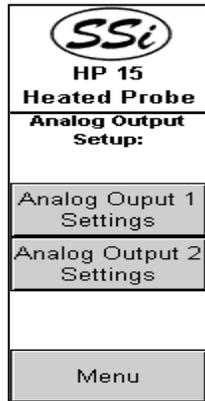
1 value. To set the Trip 2 value to Below Setpoint, press the **Below SP** button under the Trip 2 value. Pressing the **<More** button will display Page 1 of the analog inputs settings menu. Pressing the **More>** button will display Page 3 of the analog input settings menu. The **Menu** button will display the *Analog Input Setup* menu.

Analog Input Settings – Page 3

From this screen, the user can modify the offset, trip point 1 set point, trip point 1 force value, trip point 2 setpoint, and the trip point 2 force value. To edit any of these values, press the value and enter the new value from the numeric keypad that is displayed. Pressing the **<<< More** button will display Page 2 of the analog input settings menu. The **Menu** button will display the *Analog Input Setup* menu.



Analog Output Setup



This screen will allow the user to set up the analog output settings for output 1 or 2. To change the analog output settings for output 1, press the **Analog Output 1 Settings** button. To change the analog output settings for output 2, press the **Analog Output 2 Settings** button. The screens for the analog output settings function identically for outputs 1 and 2. The **Menu** button will return the user to the configuration menu.

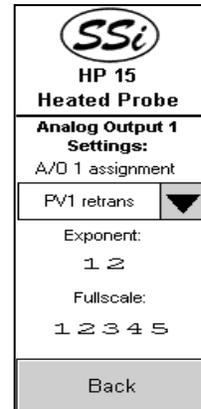
Analog Output Settings – Page 1

From this screen, the user can modify the analog output assignment, the exponent, and the full-scale values. To select a new analog output assignment, press the down arrow next to the assignment. This will display a screen with

18 buttons to choose from:

PV1 retrans	loop 1 inc
loop 1 dec	loop 1 combo
PV2 retrans	loop 2 inc
loop 2 dec	loop 2 combo
Dissoc	Nit_Pot
Hydrogen	—
Input 1 retrans	loop 2 retrans
loop 3 retrans	O2 offset log
PV1 retrans w/ expo range	

PV 1 retrans
Loop 1 inc
Loop1 dec
Loop 1 combo
PV 2 retrans
Loop 2 inc
Loop 2 dec
Loop 2 combo
Disassociation
Nit_Pot
Hydrogen
- (Invalid Option)
Input 1 retrans
Loop 2 retrans
Loop 3 retrans
O2 offset log
PV 1 retrans w/ expo range



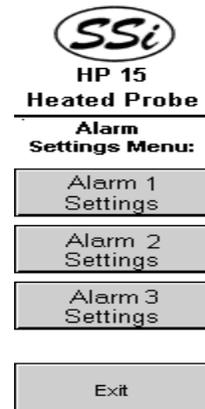
The **Close Screen** button will close the screen without selecting a new assignment. Press the new assignment button to select it. To modify either the exponent or the full scale, press the value and enter the new value from the numeric keypad that is displayed. The **Back** button will display the analog output setup menu screen.

Alarms

This screen will allow the user to set up Alarm 1, Alarm 2, or Alarm 3. To set up Alarm 1, press the **Alarm 1 Settings** button. To set up Alarm 2, press the **Alarm 2 Settings** button. To set up Alarm 3, press the **Alarm 3 Settings** button. The screens for the alarms will function identically for Alarms 1, 2, and 3. *Note: Alarm 1 is a dedicated over temperature alarm. The over temperature alarm will now read "Overtemp Alarm 1".*

Alarm Settings - Page 1

This screen will allow the user to set the alarm source, alarm action, and the alarm set point. To set the alarm source, press the up arrow next to



the source. This will display ten buttons from which the user can select the alarm source:

PV1	PV2
PV3	Input 1
Input 2	Input 3
% Output 1	% Output 2
% Output 3	Back Screen

Alarm Source:

Input 2

- PV1**
- PV2**
- PV3**
- Input 1**
- Input 2**
- Input 3**
- % Output 1**
- % Output 2**
- % Output 3**
- Back Screen**

The current alarm source will be displayed at the bottom of the screen. The **Back Screen** button will display the Alarm Settings page 1 menu screen. To set the alarm action, press the up arrow next to the action. This will display a screen with seven

buttons from which the user can select the alarm action:

- Process High**
- Process Low**
- Band Normally Open**
- Band Normally Closed**
- Deviation NO**
- Deviation NC**
- Back Screen**

The current alarm action will be displayed at the top of the screen. The **Back Screen** button will display the Alarm Settings page 1 menu screen. To set the alarm setpoint, press the value and enter the new setpoint on the keypad displayed. Pressing the **More >>>** button will display page 2 of the Alarm Settings menu. Pressing the **Menu** button will display the *Alarms* menu.

Alarm Settings – Page 2



Alarm 1 Settings
Page 2:

Smart Alarm:
Disabled

Enable	Disable
--------	---------

0 SP Blocks Alarm:
OFF

On	Off
----	-----

<Back	More>
-------	-------

Menu

This screen will allow the user to set the smart alarm and whether or not a 0 setpoint blocks the alarm. To enable the smart alarm, press the **Enable** button under the smart alarm status. To disable the smart alarm, press the **Disable** button under the smart alarm status. To ensure that a 0 setpoint will block the alarm, press the **On** button below the status. To ensure that a 0 setpoint will not block the alarm, press the **Off** button below the status. Pressing the **<Back** button will display the page 1 of the Alarm Settings menu. Pressing the **More>** button will display page 3 of the Alarm Settings menu. Pressing the **Menu** button will display the *Alarms* menu.



HP 15
Heated Probe

Alarm 1 Settings:

Alarm Source:

Input 2	▲
---------	---

Alarm Action:

Process High	▲
--------------	---

Alarm Set Point:

1800

More >>>
Menu

Process High
Process High
Process Low
Band Normally Open
Band Normally Closed
Deviation NO
Deviation NC
Back Screen

Alarm Settings – Page 3

This screen will allow the user to set the hysteresis and the on delay time for the alarm. To set the hysteresis, press the value and enter the new hysteresis value from the calculator. To set the On delay time, press the value and enter the new On delay time from the calculator. Pressing the <<<**Back** button will display page 2 of the Alarm Settings menu. Pressing the **Menu** button will display the *Alarms* menu.



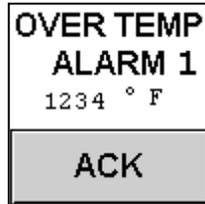
Alarm 1 Settings
Page 3:

Hysteresis: 10

On Delay Time: 15



Over Temp Alarm



If at any time the alarm setpoint is exceeded, the over temp alarm screen will be displayed on the screen. This screen will remain displayed until the acknowledge button, **ACK**, is pressed.

SSi Information Screen

On any screen where the Super Systems Inc logo is visible, the user will be able to display the information screen for the HP 15. Press the logo to



display the screen. The information screen will display the Super Systems Inc address and contact information, as well as the screen version and the firmware version of the 9120.



The user can close out the screen either by pressing the Super Systems Inc logo again, or by pressing the **Close** button.

Spare Parts List

31125 24 Volt / 1.2 Amp Power Supply
13454 Series 9120 Controller
31292 Operator Interface - Touch Screen
37177 Pump - Sample and Burnoff Air
37020 Pump - Reference Air
20059 Filter with Media
37037 Replacement Filter Media (20 grams)
32074 Heater - 110V / 425 Watt
10138 Ceragold Probe 400 zirconia sensor w/ "S" T/C

Appendix 1 – Factory Defaults

Universal Defaults

- Temperature in °F
- All Baud Rates initially 19200 and set for Modbus
- Burnoff time is 90 seconds
- Burnoff recovery wait time is 2 minutes
- Burnoff interval is 12 hours
- Burnoff maximum temperature is 2000 °F
- CO Factor is 200
- Hydrogen factor for Dewpoint calculation is 40%
- Analog to Digital Converter filter time is 8 seconds for all 3 ADCs
- For analog input 1 initial scale is 0, and full scale is 1000
- For analog input 2 initial scale is 0, and full scale is 10000
- For analog input 3 initial scale is 0, and full scale is 10000
- First Process Control Setpoint is set to 0
- First Process Proportional Band is 20%
- First Process Reset for PID control is On
- First Process Rate for PID control is 0
- First Process Output Cycle Time for Control is 16 milliseconds
- First Process Auto/Manual set to Automatic
- First Process Control Load Line or Manual Reset (integral preset) set to 0
- Second Process Control Setpoint is set to 0
- Second Process Proportional Band is 4.4%
- Second Process Reset for PID control is 12
- Second Process Rate for PID control is 216
- Second Process Output Cycle Time for Control is 60 milliseconds
- Second Process Auto/Manual set to Automatic
- Second Process Control Load Line or Manual Reset (integral preset) set to 0
- Start PV for temporary tuning set to 0
- Temporary Proportional band for tuning set to 2%
- Temporary reset for tuning set to On
- Temporary rate for tuning set to 0
- Temporary integral preset for tuning set to 0
- Relay 1 set for loop 2 heat
- Relay 2 set for alarm 1
- Relay 3 set for loop 1 increment (gas)
- Relay 4 set for loop 1 decrement (air)
- Relay 5 fixed by PV type.
- Relay 6 set for Probe Burnoff
- Relay 7 set for Alarm 3
- Relay 8 set for all alarms.
- Alarm 1 setpoint set for 1800
- Alarm 1 is set for analog input 2
- Alarm 1 hysteresis is set for 1
- Alarm 2 setpoint set for 2000
- Alarm 2 is set for analog input 1

- Alarm 2 hysteresis is set for 1
- Alarm 3 setpoint set for 2000
- Alarm 3 is set for process variable 2
- Alarm 3 hysteresis is set for 1
- Digital to Analog converter 1 assignment is PV1 retransmit
- Digital to Analog converter 2 assignment is loop 2 increment
- Default IP is 192.168.0.200

Carbon PVT Defaults

- Process variable 1 is carbon
- Process variable 2 is temperature
- Process variable 3 is temperature
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- First process control low limit is -100
- First process control high limit is 100
- First process control mode is such that setpoint of 0 shuts down and it is in dual mode
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such a high analog input 2 shuts down
- Analog input 1 full scale is 2500
- Analog input 1 type is 2.5 volts
- Analog input 2 type is S thermocouple
- Analog input 3 type is K thermocouple

Dewpoint PVT Defaults

- Process variable 1 is dewpoint
- Process variable 2 is temperature
- Process variable 3 is temperature
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- First process control low limit is -100
- First process control high limit is 100
- First process control mode is such that dual direct mode
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such a high analog input 2 shuts down
- Analog input 1 full scale is 2500
- Analog input 1 type is 2.5 volts
- Analog input 2 type is S thermocouple
- Analog input 3 type is K thermocouple

Oxygen PVT Defaults

- Process variable 1 is carbon

- Process variable 2 is temperature
- Process variable 3 is temperature
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- First process control low limit is 0
- First process control high limit is 100
- First process control mode is such that it is in single reverse
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such a high analog input 2 shuts down
- Analog input 1 full scale is 1250
- Analog input 1 type is 1.25 volts
- Analog input 2 type is S thermocouple
- Analog input 3 type is S thermocouple
- Alarm 3 setpoint is 1.0%
- Alarm 3 type PV1 process low
- Open TC input1 goes down scale
- Relay 3 assignment is loop 1 decrement (gas)
- Relay 4 assignment is loop 1 increment (air)

Probe mV PVT Defaults

- Process variable 1 is Millivolts
- Process variable 2 is temperature
- Process variable 3 is temperature
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- Analog output 1 offset is 0
- Analog output 1 range is 2000
- First process control low limit is -100
- First process control high limit is 100
- First process control mode is such that setpoint of 0 shuts down and it is in dual mode
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such a high analog input 2 shuts down
- Analog input 1 full scale is 2500
- Analog input 1 type is 2.5 volts
- Analog input 2 type is S thermocouple
- Analog input 3 type is K thermocouple

Probe Redundancy PVT Defaults

- Process variable 1 is probe 1
- Process variable 2 is probe 2
- Process variable 3 is temperature
- Analog output 1 offset is 0
- Analog output 1 range is 200
- Analog output 1 offset is 0

- Analog output 1 range is 200
- First process control low limit is -100
- First process control high limit is 100
- First process control mode is such that setpoint of 0 shuts down and it is in dual mode
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such that it is in single reverse
- Analog input 1 full scale is 2500
- Analog input 2 full scale is 2500
- Analog input 1 type is 2.5 volts
- Analog input 2 type is 2.5 volts
- Analog input 3 type is K thermocouple
- 20 minutes delay time before alarm
- Band +/-1 for alarm in millivolts is 10
- Modbus at 9600 baud

Simple Nitrider PVT Defaults

- Process variable 1 is carbon
- Process variable 2 is temperature
- Process variable 3 is temperature
- DAC 1 is set for Hydrogen
- DAC2 is set for Dissociation
- Analog output 1 offset is 0
- Analog output 1 range is 1000
- Analog output 1 offset is 0
- Analog output 1 range is 1000
- First process control low limit is -100
- First process control high limit is 100
- First process control mode is such that setpoint of 0 shuts down and it is in dual mode
- Second process control low limit is 0
- Second process control high limit is 100
- Second process control mode is such that it is in single reverse
- Analog input 1 full scale is 2500
- Analog input 1 type is 2.5 volts
- Analog input 2 type is S thermocouple
- Analog input 3 type is K thermocouple
- host RS232
- Hitech H2 cell at 9600 baud

Dual Loop PVT Defaults

- Alarm 2 setpoint is 2000
- Alarm 3 setpoint is 2000
- Alarm 2 type is input 1 process high
- Alarm 3 type is PV2 process high

Revision History

Rev.	Description	Date	MCO #
-	Initial Release	06/14/07	N/A
A	Updated logo on title page; Changed screen shots; Added "O2 View" (although this section is not implemented); Added warning when PVT type is changed; Added "Alarms" section of Configuration Menu; Updated "Revision History" section – Added "MCO #" block; Set Alarm 1 as the dedicated over temperature alarm; Added "Factory Defaults" appendix	12/21/07	2055