HH
MECHANICAL INC

EB Smoke



HH1 Controller
Operations Manual

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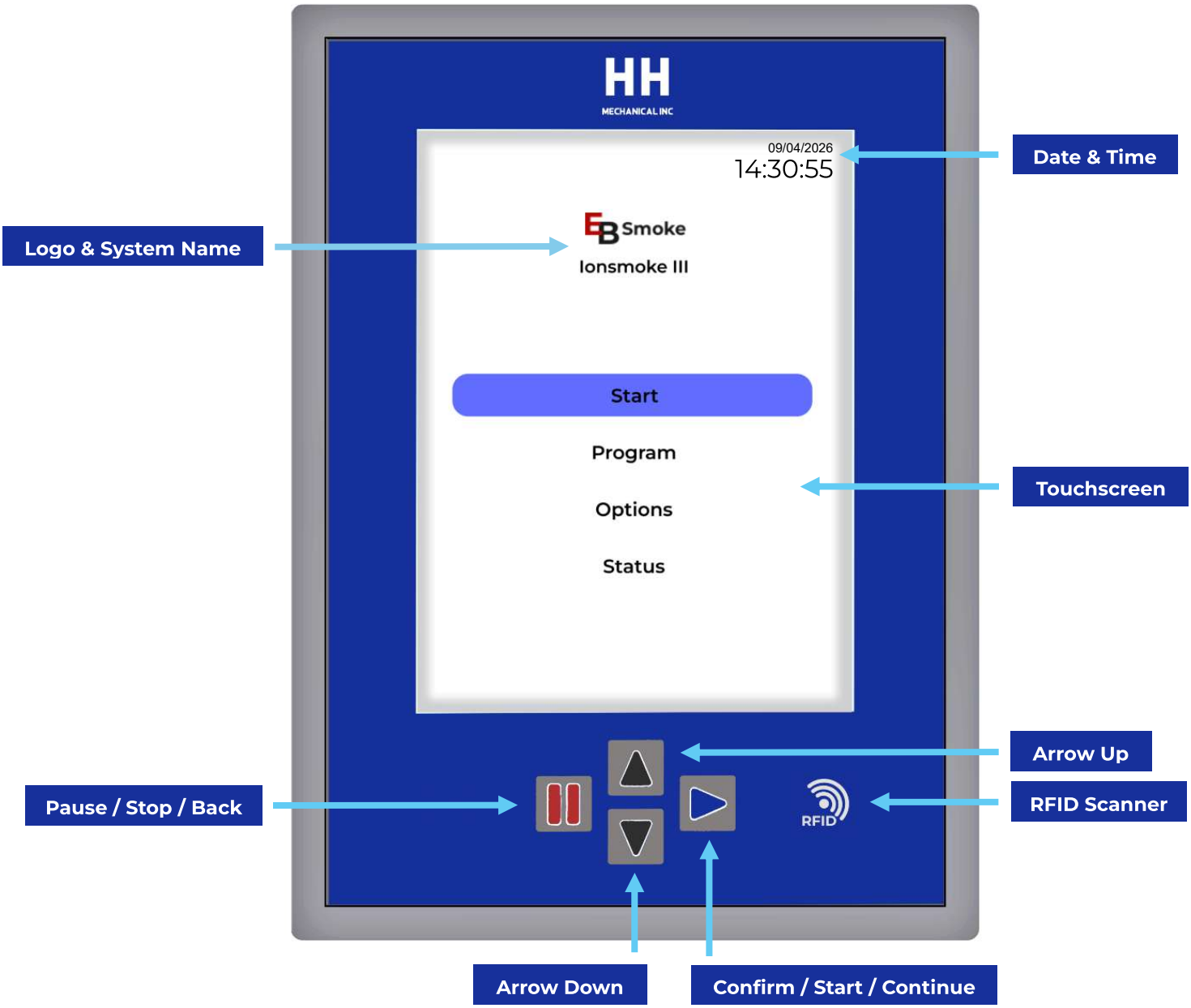
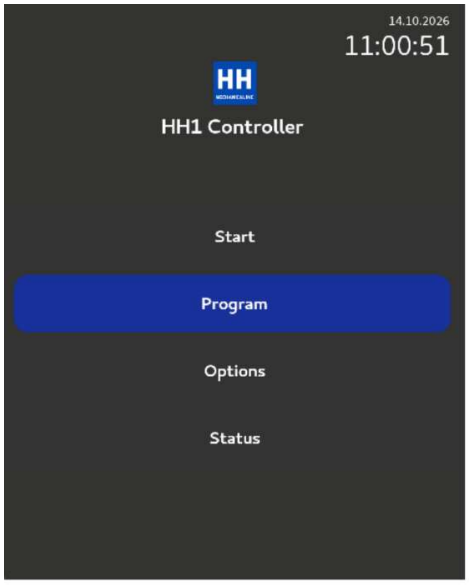
HH1 Operation & Programming

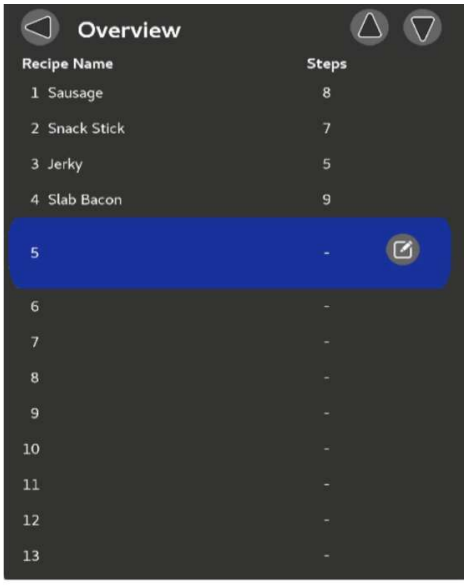
Home Screen

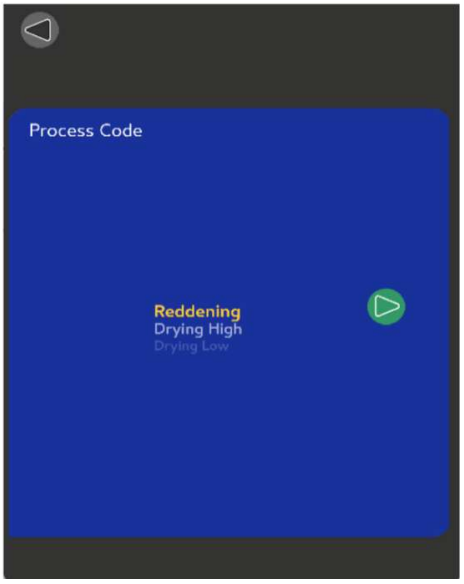


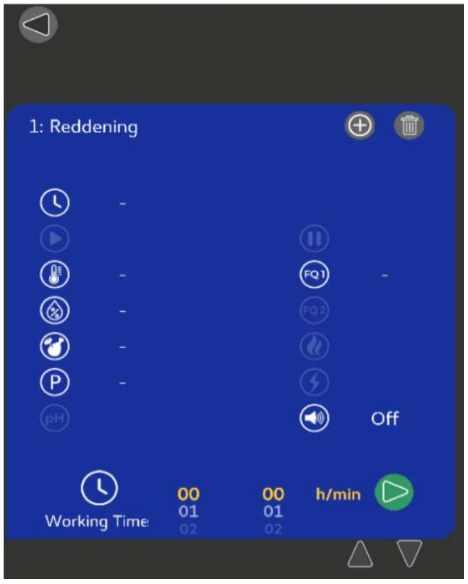
Creating a Program

1. Using the touchscreen or directional arrows, select **Program** from the Main Menu
2. Select an empty program and press the **Edit** icon
3. Select the desired **Process Code** and press the **Confirm** icon
4. Select the available symbols to define the values (greyed out symbols are not editable for that process)









Creating a Program Cont'd

The most commonly set values will be:

 Working Time

 House Temperature

 Humidity

 Core Temperature

 Fan Speed (for VFD only)

 Smoke Generator Feed Frequency

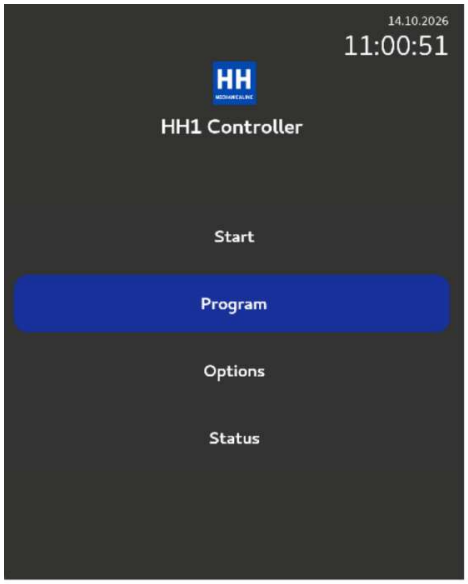
Please Note: To set a **Core Temperature** value, the **Working Time** must be set to 0h 0m.

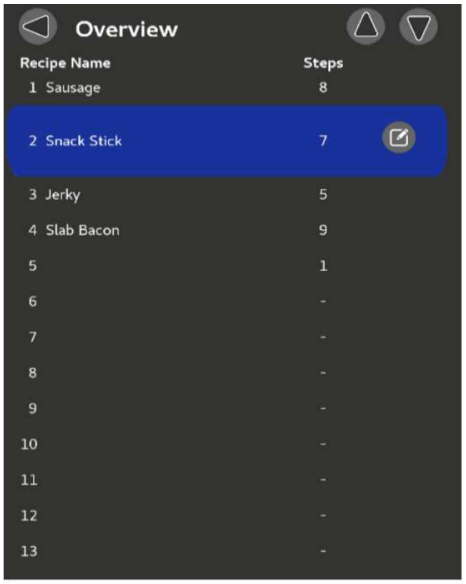
5. Once all values are set as desired, press the **Plus** icon 
6. Repeat the process for all remaining steps of the program (up to 99 steps may be included)
7. Use the touch screen directional arrows to cycle through each program step. To edit a step within the program, click on any of the available symbols within that step
8. Select the **Back** icon  or use the **Back** button to save the program and return to the previous screen

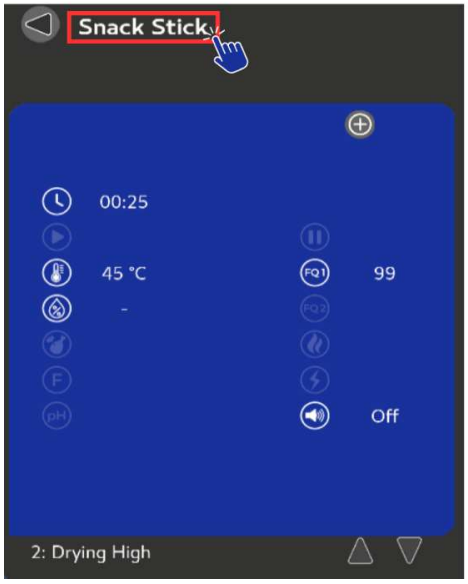
Changing a Program Name

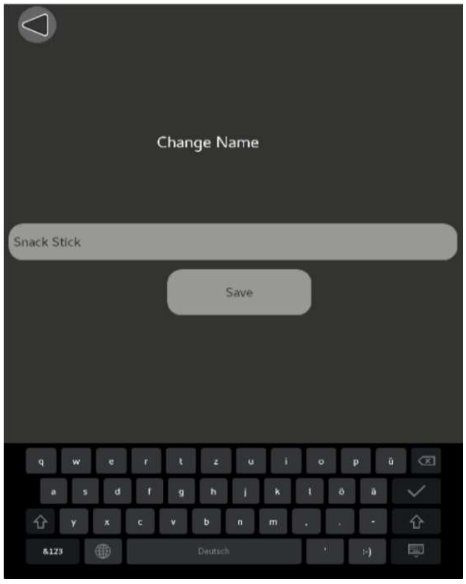
Main Menu > Program

1. Select the **Program** to be named/changed and press the **Edit** icon
2. Using the touchscreen, tap on the desired **Program**
3. Enter the desired **Name** (e.g. “Snack Stick”)
4. Select **Save** to save the name and return to the previous screen







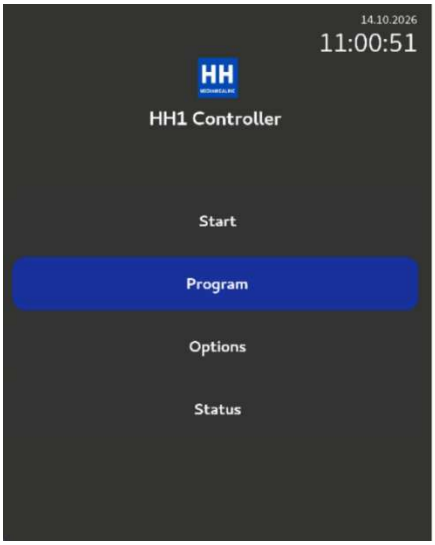


Deleting a Step/Program

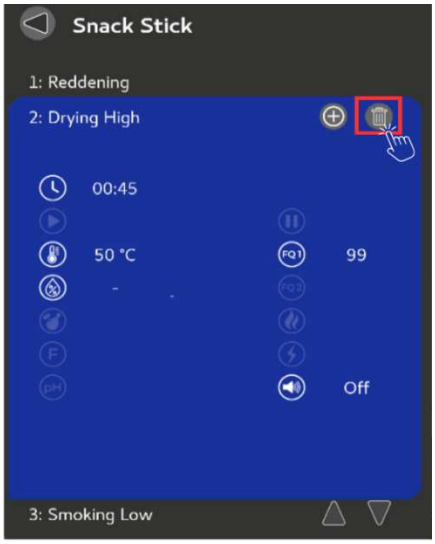
Main Menu > Program

1. Select the **Program** to be edited/deleted and press the **Edit** icon
2. Using the touchscreen directional arrows, select the step to be deleted
3. Click on the icon to delete the step
4. Repeat as necessary
5. Select the **Back** icon or use the Back button to save the program and return to the previous screen

Please Note: The first step cannot be deleted until **all** other steps are deleted. To delete the first step or the entire program, please delete all other steps first.



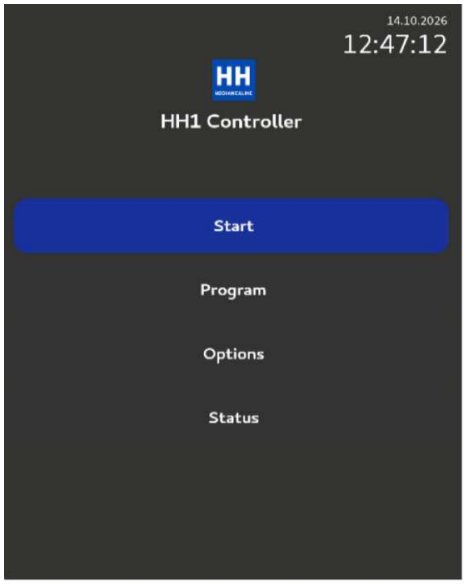


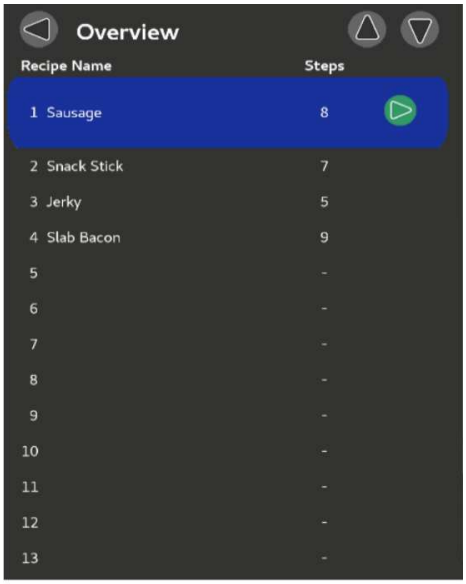


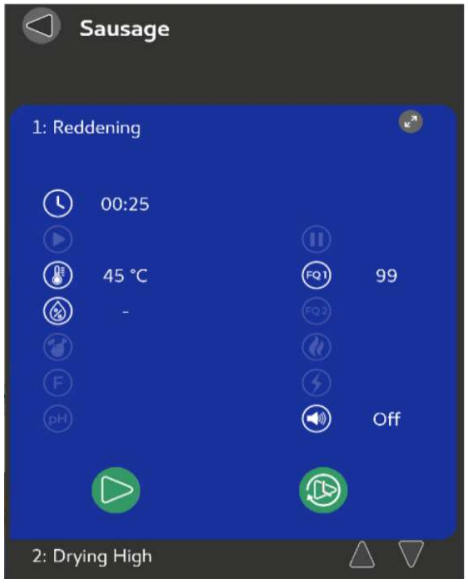
Detailed Program View

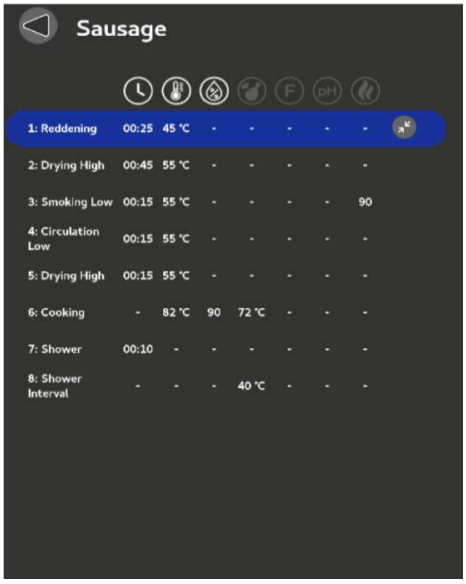
Main Menu > Start

1. Select the desire **Program Name/Number** and press the **Start** icon
2. Click the **Expand** icon
3. A detailed view of each step and value of the program will be displayed
4. Click the icon in any step for a further detailed view of values





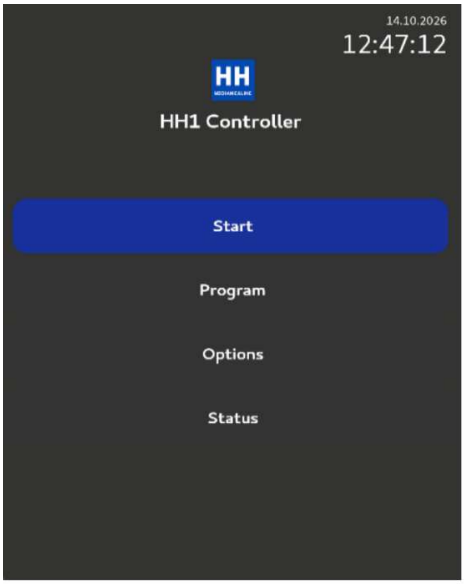


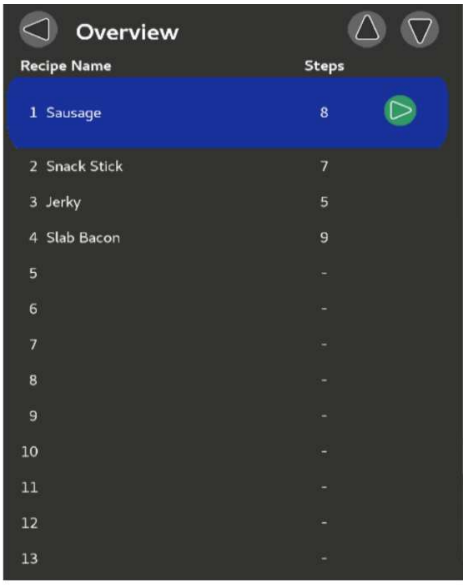


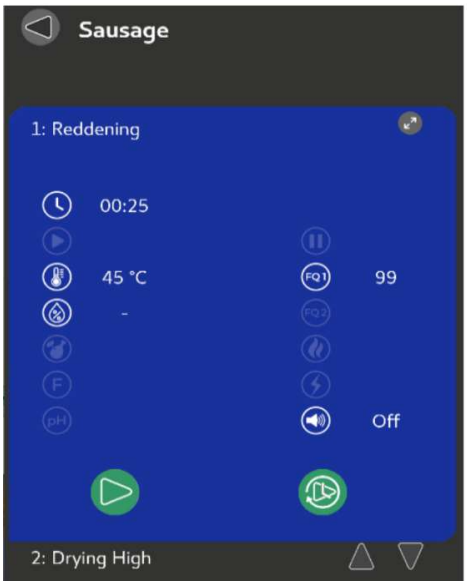
Running A Program

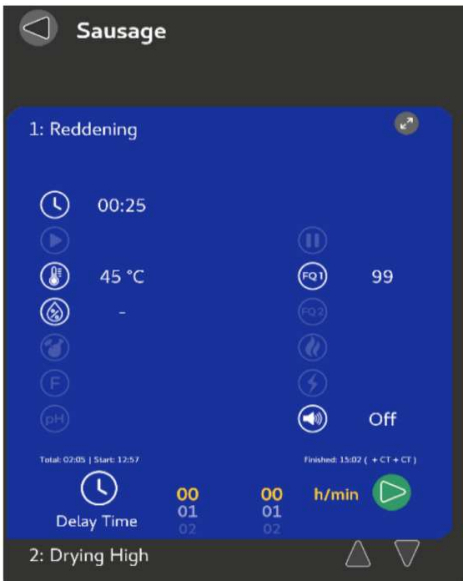
Main Menu > Start

1. Select the desired **Program Name/Number**
2. Select the **Start** icon or use the **Start** button to being the Program
3. **Optional:** The directional arrows may be used to begin a program with a specific Step
4. Optional: Use the **Start Delay** icon to set a delayed start to the Program





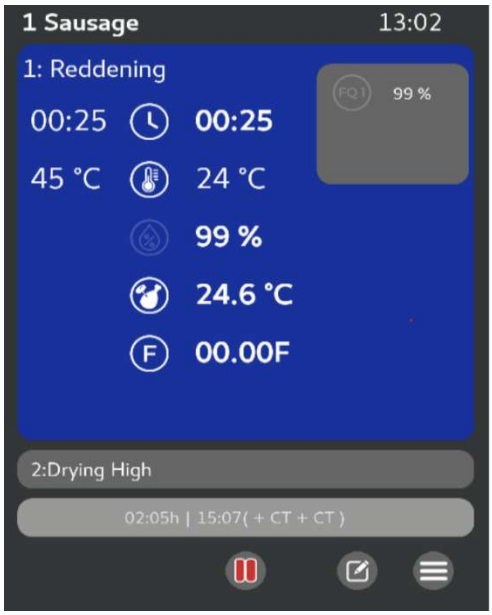


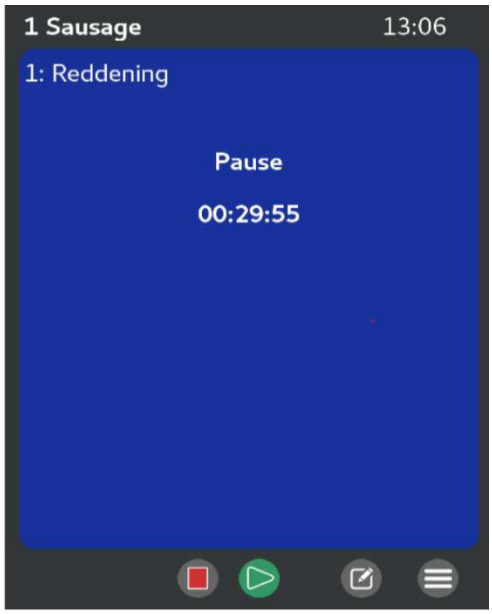


Pause/Terminate a Program

While the Program is running, press the **Pause** icon or the **Pause** button to pause the program

To terminate the Program. press the **Stop** icon or the **Pause** button again





Change Step Time, Temperature and Fan Speed

Click the **Edit** icon during a running Program to change Time, Temperature and Fan Speed values



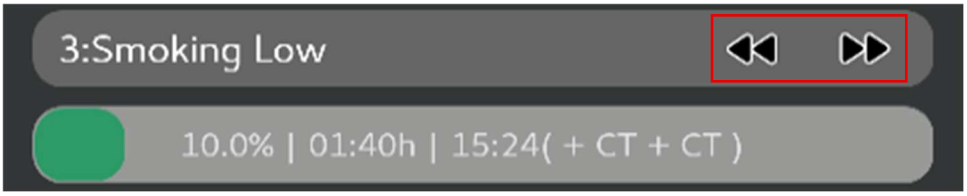
The following options may be changed:

- Working Time
- House Temperature
- Core Temperature (where applicable)
- FQ1 (for VFD only)

Tap on the flashing option and enter a new value for the current step. Press the **Start** icon or the **Start** button to resume the program.

Please Note: Changing values in a running Program are only applicable for that cycle. To permanently change the time values of a Program, please refer to **Creating a Program**

To go to the next or previous program step, select the below icons:



View Active Relays

While a Program is running, click on the **Menu** icon and select **Relays**

A detailed view of the active relays for that Step will be displayed

Please Note: Active Relays displayed will update every second







Program End/Horn Signal

A horn will sound when a program ends. To acknowledge the horn, select the **Speaker** icon or press the **Pause** button.

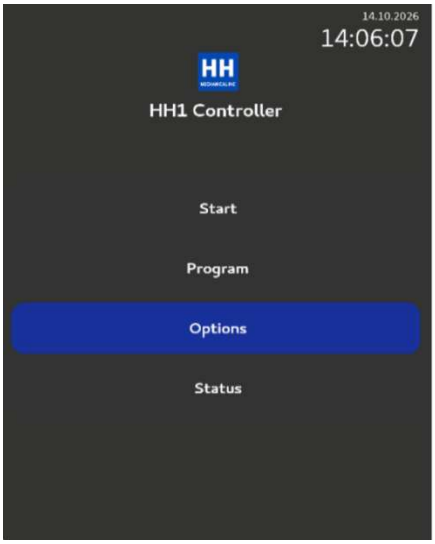
Please Note: The signal duration can be adjusted in **Service Variable 3**

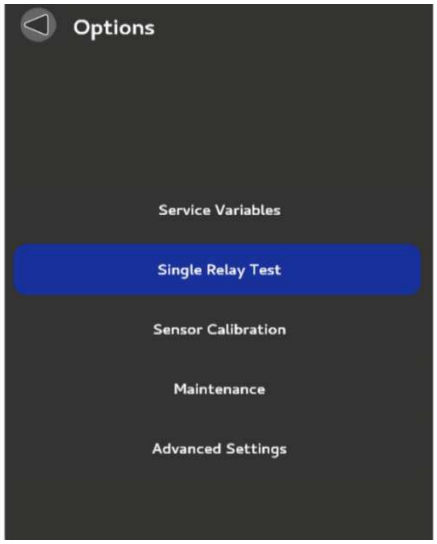
Options

Single Relay Test

Options > Single Relay Test

Used for isolating and troubleshooting potential issues. Press the desired **Relay** to activate or deactivate for testing.





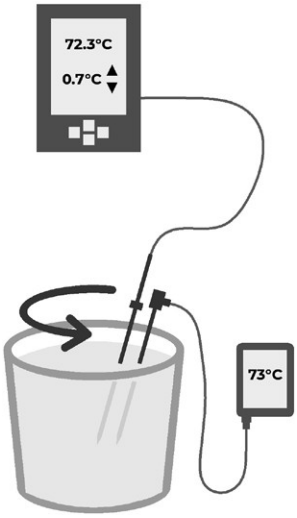


Sensor Calibration

Options > Sensor Calibration

Follow the steps below to correctly calibrate the Temperature Sensor:

Equipment



Water (minimum 3 litres)
Bucket
Sous Vide Machine
Reference Thermometer

Analysis

1. Heat and maintain water at 71° C with Sous Vide Machine
2. Place all sensors in the water
3. Maintain sensors at the same depth for 45 seconds

Calibration

Standard Allocation: 1 = Room, 2 = Humidity and 3 = Core

Options > Sensor Calibration

1. Select the desired Temperature Sensor to be calibrated from the dropdown menu
2. Current Value will display the current temperature reading
3. Record reading from the Reference Thermometer. Select **Actual Temp**, input the Reference Thermometer temperature and press **Save**. This will automatically calculate any Offset.

***Only adjust the offset if there is a difference greater than 0.25°C.**

HACCP standards dictate all sensors must be calibrated at 70°C. Temperatures shown may be within 0.25°C of the set temperature *(e.g. 70°C may show 69.75°C or 70.25°C)*

Maintenance

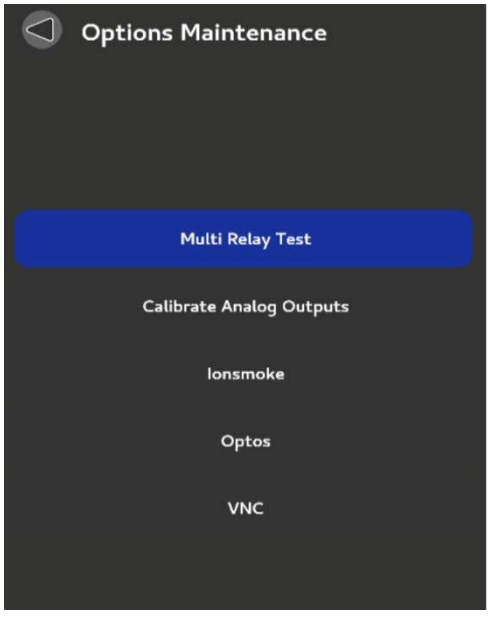
Multi Relay Test – Service Tech Only

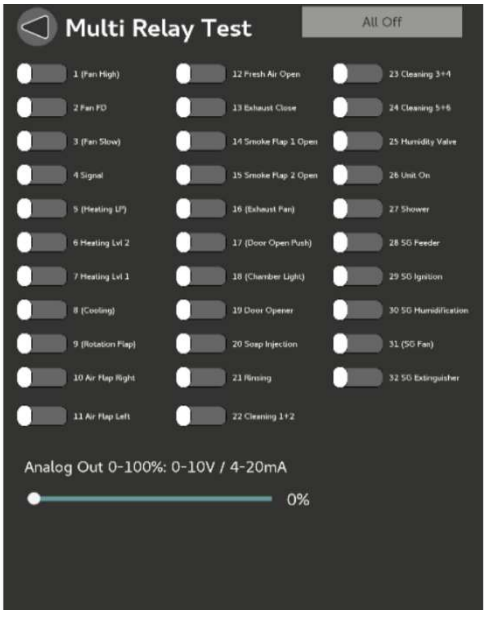
Options > Maintenance > Multi Relay Test

Used for isolating and troubleshooting potential issues. Press the desired **Relay** to activate or deactivate for testing.

Analog outputs can be selected from 0 – 100% using the slider at the bottom. A minimum of one **Relay** must be active for this.

Please Note: To be used by authorized service technicians only. Risk of short circuit to the switch cabinet may occur if performed incorrectly.





Calibrate Analog Outputs – Service Tech Only

Options > Maintenance > Calibrate Analog Outputs

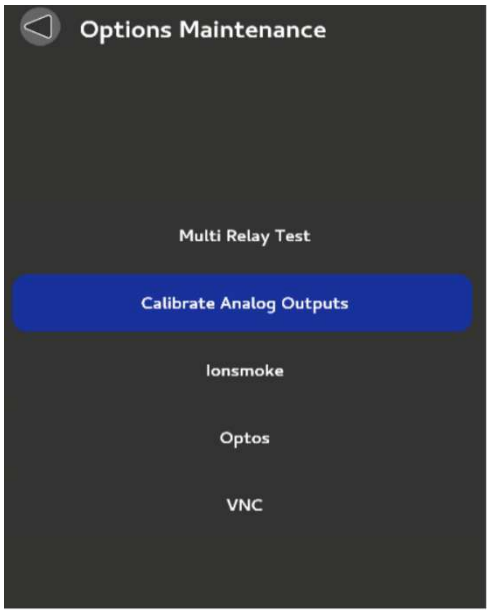
At **Offset** the momentary value appears

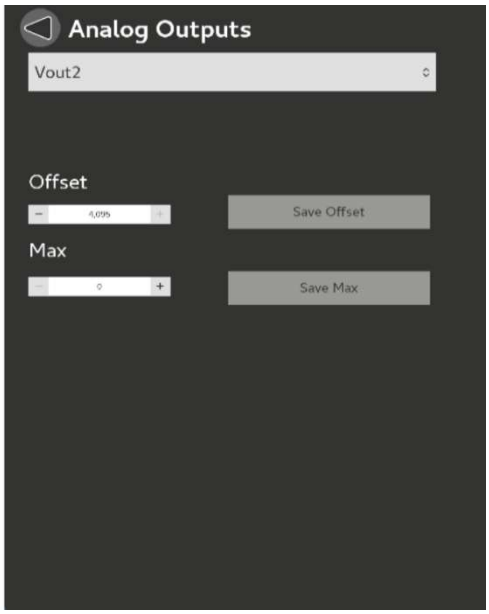
For Vout1 to Vout4 (0 – 10 V): Offset Min 0 and Max 1000

For Iout1 to Iout4 (4 – 20 mA): Offset Min 409 and Max 2048

The corresponding offset value is set with **Save Offset** and **Save Max**

Please Note: This is used to calibrate the analogue outputs of the controller. Special measuring devices are required for this purpose. To be used by authorized service technicians only.



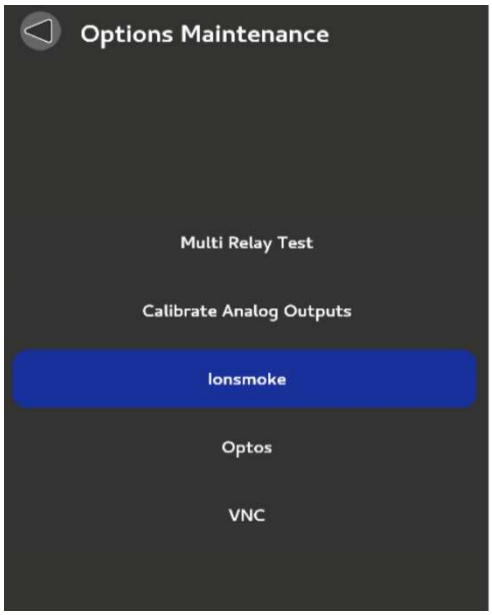


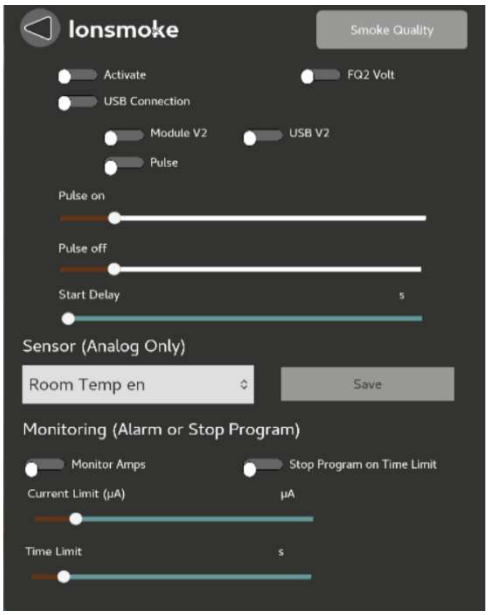
Ionsmoke®

Options > Maintenance > Ionsmoke

To activate the **Ionsmoke** function, ensure that the **Activated** and **USB-Connection** buttons are selected. Ionsmoke is controlled via USB-Connection in most systems. Restart the controller to initialize the USB connection with Ionsmoke.

Please Note: Ionsmoke is an additional product designed to reduce smoke times and fine dust pollution. For more information, please visit hhmechanical.ca/ebsmoke-ionsmoke



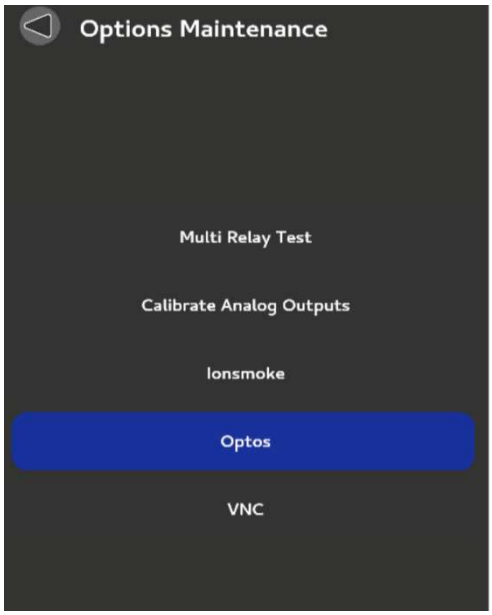


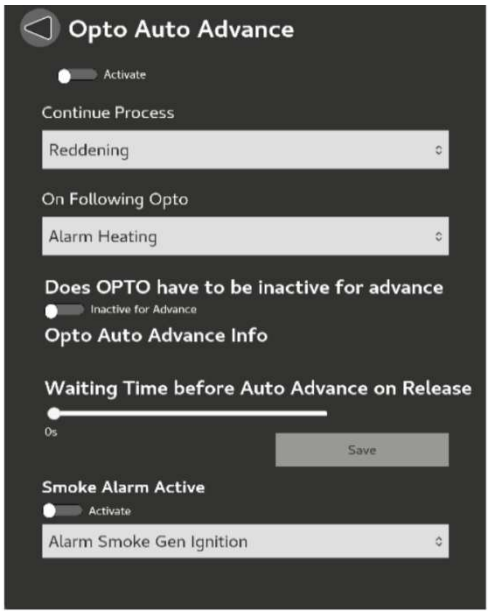
Optos – Service Tech Only

Options > Maintenance > Optos

Sets wait time variable for desired **Opto** to reach 24V

Please Note: To be used by authorized service technicians only.

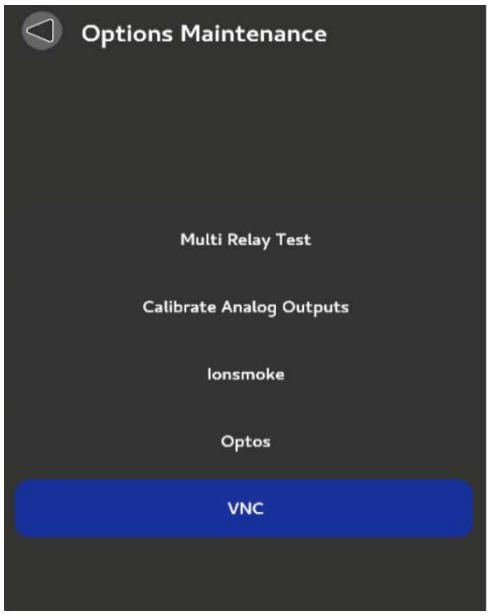


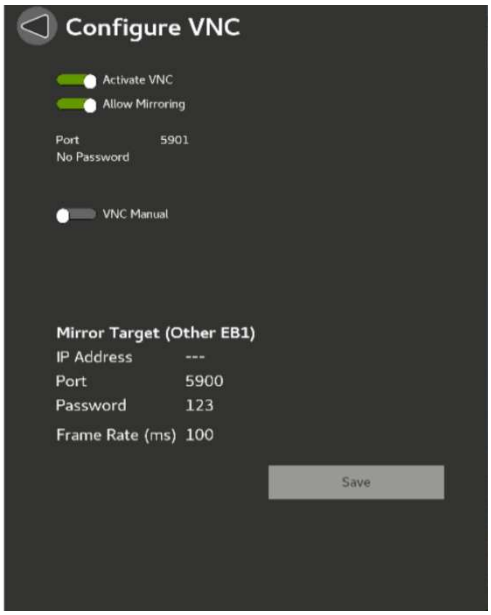


VNC

Options > Maintenance > VNC

For connecting the controller directly to a desktop within the same network. **Activate VNC** and **Allow Mirroring** must be active, and the controller must be hardwired to the network. IP Address may be found on the **Status** screen. When using a VNC viewer from the desktop, use format xxx.xxx.xxx::5901





Advanced Settings

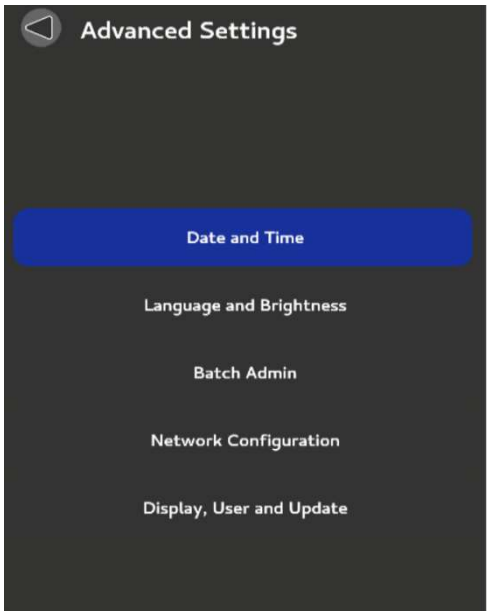
Date and Time

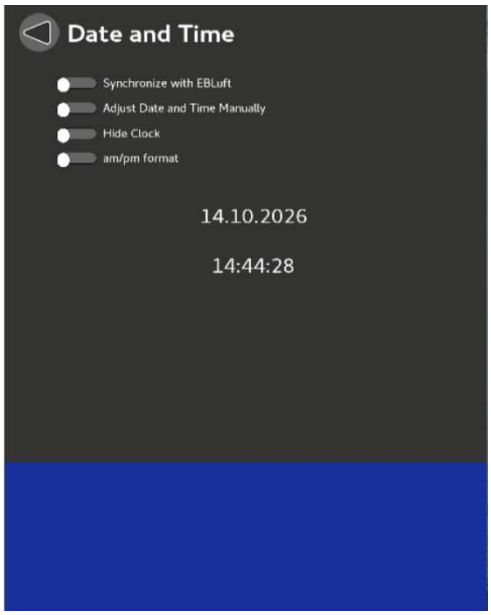
Options > Advanced Settings > Date and Time

The following options may be selected:

- Synchronize with EBLuft
- Change date and time manually
- Hide clock
- am/pm format

Please Note: Offline recording: when there is no connection the database only works if "Synchronization with EBLuft" is active. If this is active and there is a network failure, the controller stores data for up to two weeks and then transfers it automatically to the data recording as soon as the connection is re-established.

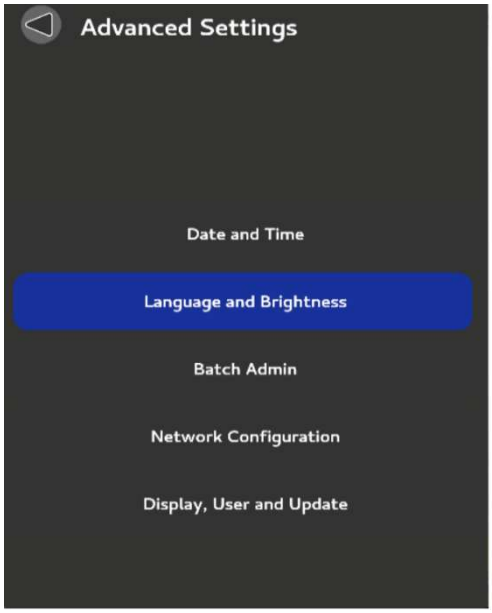




Language and Brightness

Options > Advanced Settings > Language & Brightness

Desired language may be selected and brightness adjusted





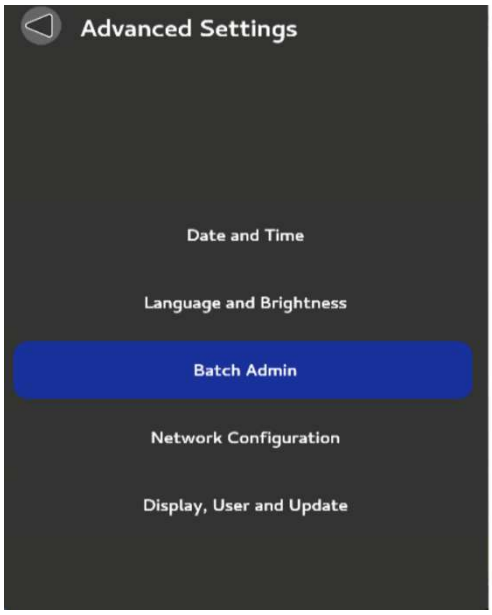
Batch Admin

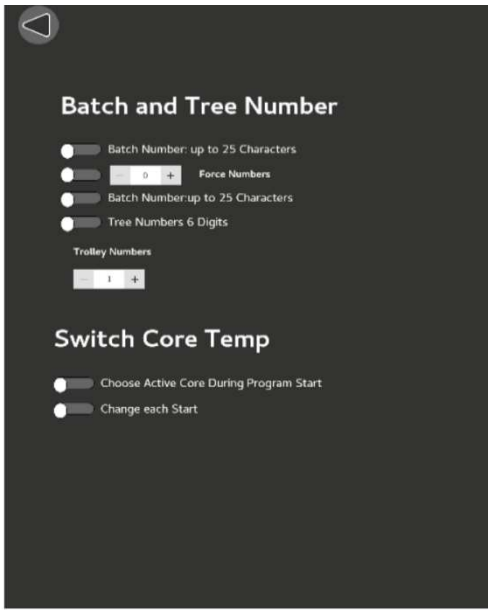
Options > Advanced Settings > Batch Admin

The following options may be selected:

- Batch Number (up to 25 digits per batch)
- Minimum Input (set number)
- Tree Numbers (up to 6 digits)
- Trolley Numbers (number of active trolleys may be set)

When active, controller will prompt for Batch and/or Trolley Number at Program start.





Network Configuration

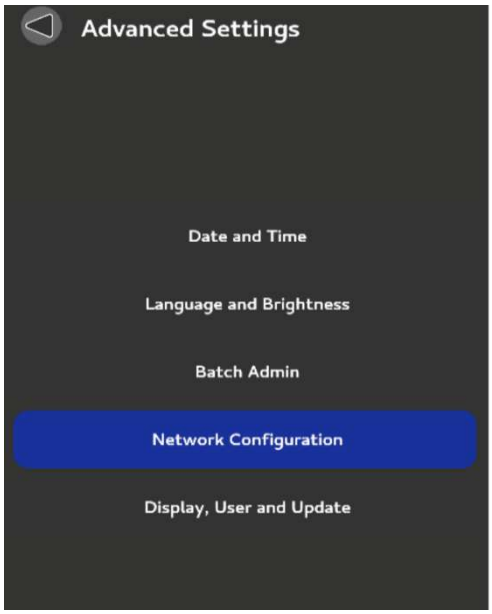
Options > Advanced Settings > Network Configuration

The following options may be selected:

IP DHCP Automatically (default)

IP Manually

Server IP (if different Subnet or no Gateway)





Display, User and Update

Display Settings

Options > Advanced Settings > Display, User and Update > Display Settings

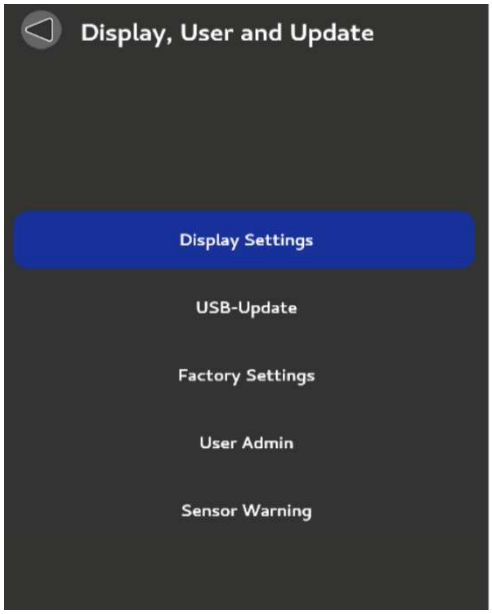
Additional Sensor information may be selected here to display during Program run

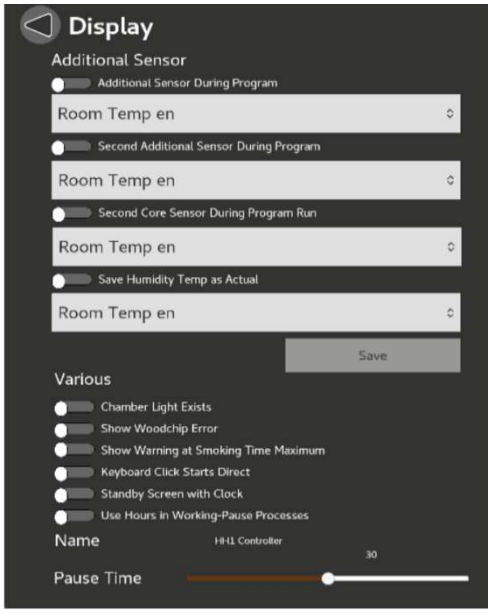
The following settings may be selected:

- Chamber light (yes/no)
- Show Woodchip Error
- Show warning at smoking time maximum
- Keyboard click starts direct
- Standby screen with clock
- Display of work/break/processes in hours

Name: The name of the controller may be changed here

Pause time: may be adjusted here





USB – Update

Options > Advanced Settings > Display, User and Update > USB – Update

The following must be completed **exactly** to update the controller

1. USB stick with FAT32 formatting
2. Create a main USB folder called **cloudUpdate** - put the file **EB1Update.zip** into it
3. Insert USB stick into **controller**
4. When the USB folder has loaded, select the **Update** folder
5. Then click **Update controller**
6. **IMPORTANT**: The update takes a total of 3 minutes to be performed
7. Turn off power and restart controller (power cycle) ⚠
8. If the update has been carried out successfully, a **Watchdog Error** or **Checksum Error** occurs during start up



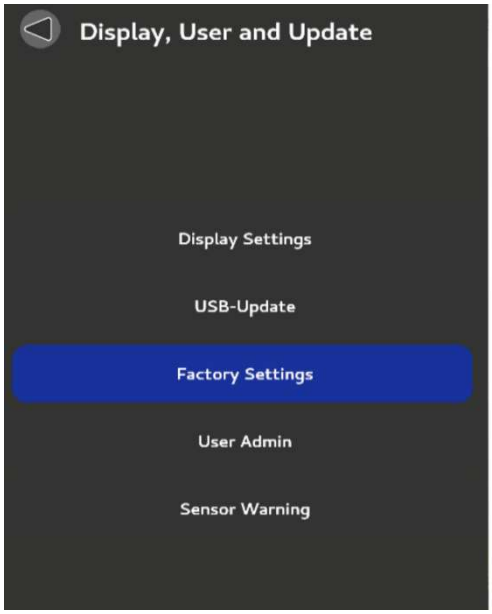
Factory Settings

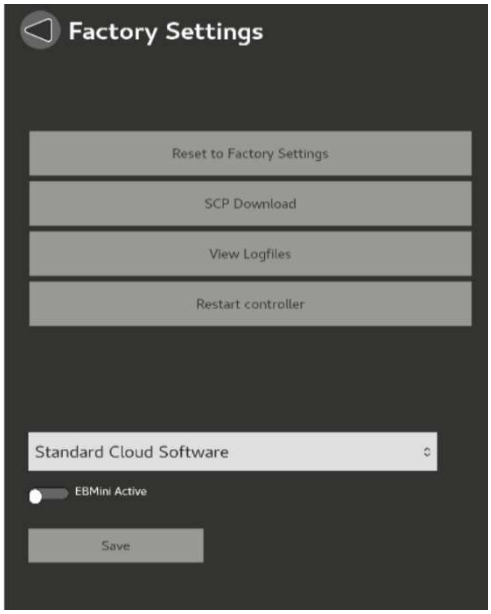
Options > Advanced Settings > Display, User and Update > Factory Settings

The desired application of the HH1 Controller may be selected here.

Select from:

- Reset to Factory Settings
- SCP Download
- View Logfiles
- Restart Controller





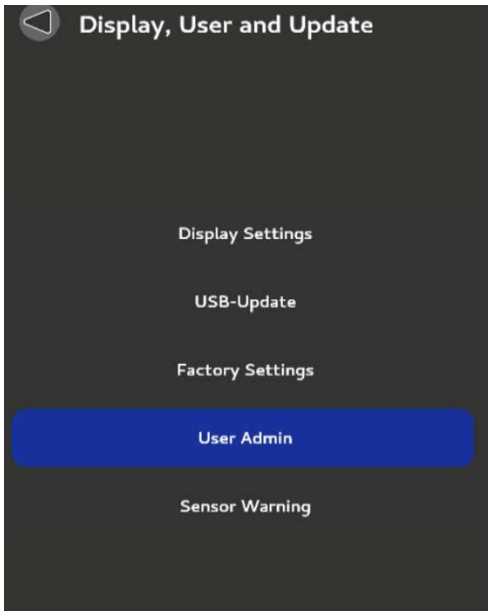
User Admin

Options > Advanced Settings > Display, User and Updated > User Admin

Activate User Administration and **RFID Active** may be selected here

Automatic Logout in Seconds may be adjusted here

Individual users may be added with the following criteria:



User ID

Name

Password

Repeat Password

RFID Number (optional)

R1: Start/Pause/Stop

R2: Change Programs

R3: Programming

R4: Sensor Calibration

R5: Service, Single Relay Test

R6: Multi Relay Test, Calibrate Analog, Ionsmoke

R7: Time, Language and Brightness

R8: Batch Number and Network Configuration

R9: Display, User and Updates



Sensor Warning

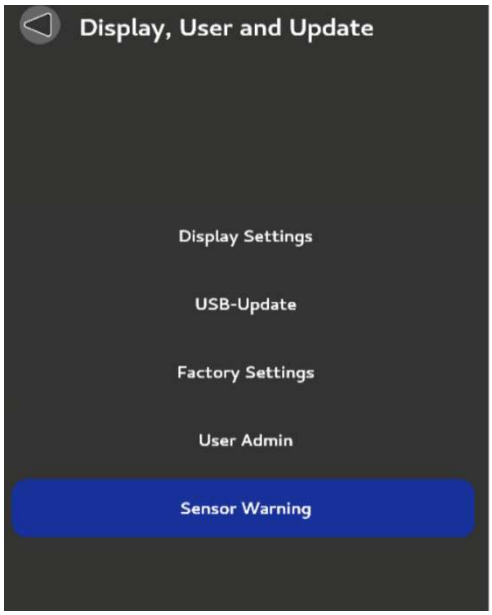
Options > Advanced Settings > Display, User and Updates > Sensor Warning

Sensor Warning may be selected on or off

Select the sensor

Select minimum and maximum temperature

Select minimum and maximum timeout





Status

Main Screen > Status

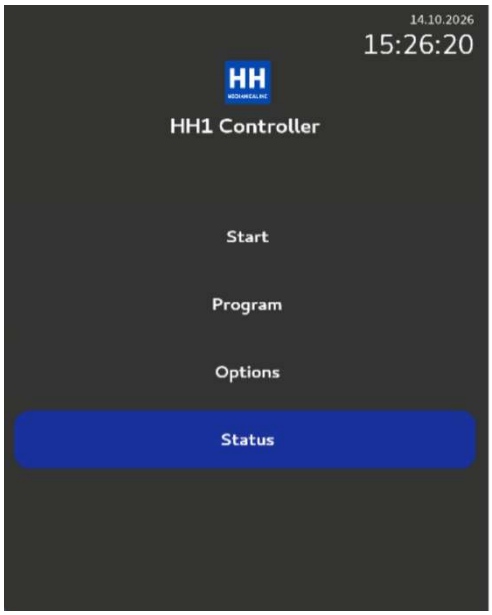
Sensor: displays the current temperature of active sensors and humidity percentage

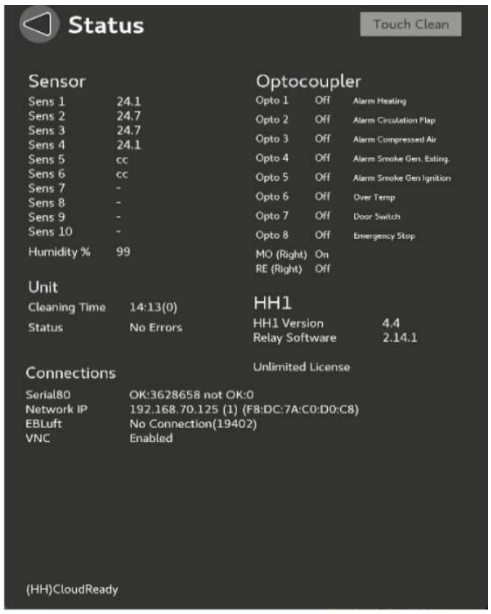
Unit: displays current cleaning time and error status

Connections: displays current file read, IP address, EBLuft connection and VNC status

Optocoupler: displays optocoupler on/off status and programmed monitoring

HH1 – displays current controller and relay software version



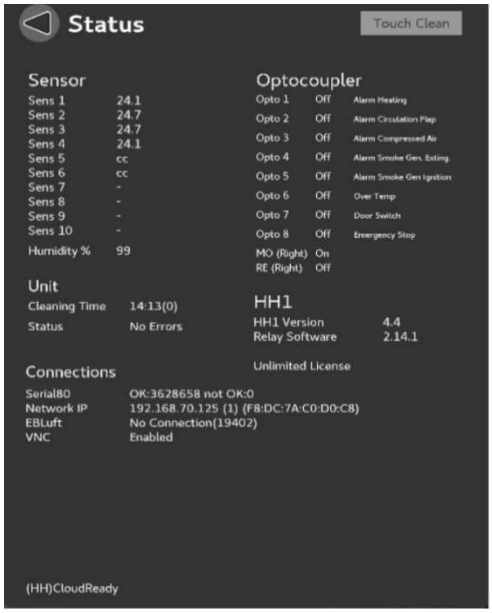


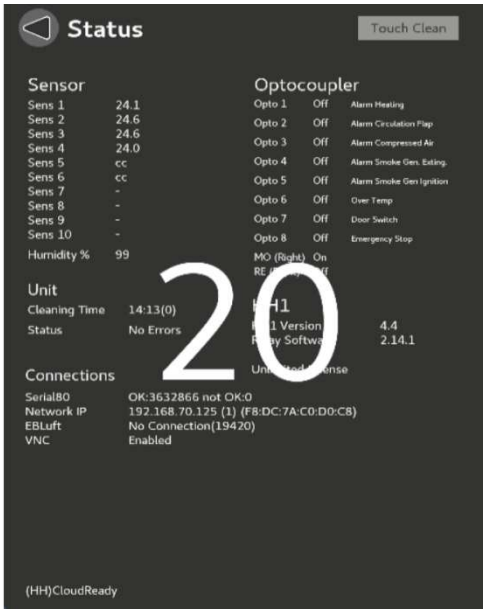
Touch Clean

Main Screen > Status

Select **Touch Clean** in the top right corner

Please Note: Controller will not respond to touch inputs for 20 seconds during the **Touch Clean** cycle. The touchscreen may now be wiped down with a damp cloth. Dirt and dust can accumulate quickly, potentially disrupting or terminating programs prematurely. It is recommended to clean the touchscreen bi-weekly.





Service Variables

There are several different service variables that can be defined within the **HH1 Controller.** Default values are assigned to all variables ranging from **1 – 66**.

Each value can be adjusted to further customize the operation of the controller.

Please Note: Not all variables are available by default. Certain variables will depend on configuration.

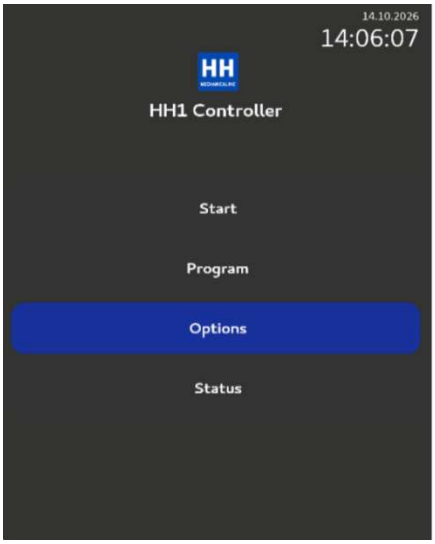
For older software models some variables may differ.

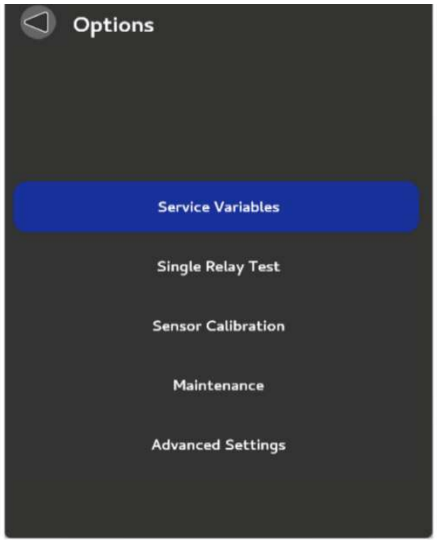
Accessing Service Variables

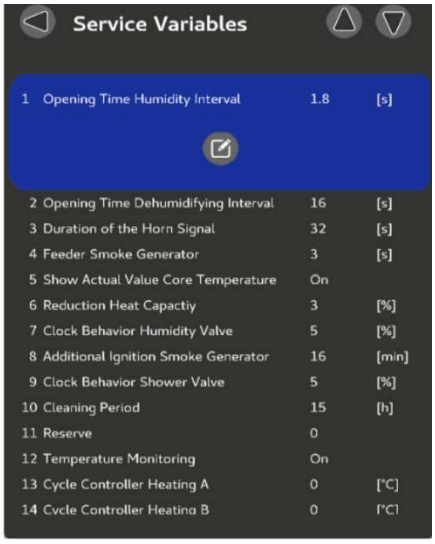
Main Menu > Options > Service Variables

Select the desired variable. The preset values will be displayed in the right columns.

To edit the existing values, select the **Edit** icon and enter the desired value.







Variable 1 – Opening Time Humidity

This defines the opening time of the humidification valve.

Value may be set between **0.1 seconds** and **9.9 seconds.**

This value corresponds to **BF Humidification Valve** in EBCloud

If **BF** is active in EBCloud, a “+” can be added to adjust the **Humidification Valve** run interval and humidity setting during recipe programming.

The **Humidification Valve** will open every *X* seconds for the entered value as defined below:

+1 = Every 450 Seconds
+2 = Every 400 Seconds
+3 = Every 350 Seconds
+4 = Every 300 Seconds
+5 = Every 250 Seconds
+6 = Every 200 Seconds
+7 = Every 150 Seconds
+8 = Every 100 Seconds
+9 = Every 50 Seconds

For example: If the value entered is **5 + 8** then the **Humidification Valve** will open for 5 seconds at an interval of every 100 seconds.

Variable 2 – Opening Time Dehumidifying

This defines the opening time of the dehumidification valve.

Value may be set between **0.1 seconds** and **9.9 seconds.**

This value corresponds to **EF Humidification Valve** in EBCloud

If **EF** is active in EBCloud, a "-" can be added to adjust the **Dehumidification Valve** run interval and humidity setting during recipe programming.

The **Dehumidification Valve** will open every *X* seconds for the entered value as defined below:

-1 = Every 450 Seconds
-2 = Every 400 Seconds
-3 = Every 350 Seconds
-4 = Every 300 Seconds
-5 = Every 250 Seconds
-6 = Every 200 Seconds
-7 = Every 150 Seconds
-8 = Every 100 Seconds
-9 = Every 50 Seconds

For example: If the value entered is **5 - 8** then the **Dehumidification Valve** will open for 5 seconds at an interval of every 100 seconds.

Variable 3 – Signal

This defines the duration of the horn signal at the end of a program.

Value may be set between **1 second** and **99 seconds.**

This value corresponds to the **Signal** relay function in EBCloud

The value can be set to seconds (default) or minutes in EBCloud

Variable 4 – Feeder Smoke Generator

This defines the feed time for the smoke generator.

Value may be set between 1 **second** and **99 seconds.**

This value corresponds to **Feeder Relay** function in EBCloud

Please Note: Electric feeders should always make one full rotation. For pneumatic feeds, a value of 4 should be selected.

Values may be set between **30** and **99** where 99 = 7 second pause

Value	Pause (s)	Value	Pause (s)	Value	Pause (s)	Value	Pause (s)	Value	Pause (s)	Value	Pause (s)	Value	Pause (s)
99	7	**89**	77	**79**	147	**69**	217	**59**	287	**49**	357	**39**	427
98	14	**88**	84	**78**	154	**68**	224	**58**	294	**48**	364	**38**	434
97	21	**87**	91	**77**	161	**67**	231	**57**	301	**47**	371	**37**	441
96	28	**86**	98	**76**	168	**66**	238	**56**	308	**46**	378	**36**	448
95	35	**85**	105	**75**	175	**65**	245	**55**	315	**45**	385	**35**	455
94	42	**84**	112	**74**	182	**64**	252	**54**	322	**44**	392	**34**	462
93	49	**83**	119	**73**	189	**63**	259	**53**	329	**43**	399	**33**	469
92	56	**82**	126	**72**	196	**62**	266	**52**	336	**42**	406	**32**	476
91	63	**81**	133	**71**	203	**61**	273	**51**	343	**41**	413	**31**	483
90	70	**80**	140	**70**	210	**60**	280	**50**	350	**40**	420	**30**	490

The feed time pause interval is set directly from the recipe programming screen:



Variable 5 – Always Show Actual Core Temperature

This activates the display for the actual value of the Core Temperature, even if no setpoint has been programmed.

Value may be set to **ON** or **OFF.**

Please Note: This is active by default in newer versions.

Variable 6 – Reduction Heat Capacity

This sets the duration of the heating cycle for **Delta Cooking Processes.**

Value may be set between **1** and **10** where the value represents percent.

For example: 10 = 100% - if 100% switch-on time corresponds to 60 seconds, then 50% = 30 seconds On and 30 seconds Off.

Please Note: This variable should only be selected for cooking processes with low-pressure steam.

Variable 7 – Clock Behavioural Humidity Valve

This determines the duration of the cycle of the humidity valve, from humidification via the humidity controller.

Value may be set between **1** and **10** where the value represents percent.

For example: 5 = 50%

This value corresponds to **FT Humidity Cycle** in EBCloud.

The default value is 20 seconds.

cont'd

Variable 7 – Clock Behavioural Humidity Valve cont'd

With the standard 20 seconds cycle, each value behaves as follows:

1 = 2 seconds on, 18 seconds off
2 = 4 seconds on, 16 seconds off
3 = 6 seconds on, 14 seconds off
4 = 8 seconds on, 12 seconds off
5 = 10 seconds on, 10 seconds off
6 = 12 seconds on, 8 seconds off
7 = 14 seconds on, 6 seconds off
8 = 16 seconds on, 4 seconds off
9 = 18 seconds on, 2 seconds off
10 = 20 seconds on, 0 seconds off

Please Note: The humidity cycle will remain active until actual humidity reaches the set value. For this process to work, a set humidity value must be entered.

Variable 08 – Additional Ignition Smoke Generator

This determines the duration of post-ignition time for the smoke generator.

Value may be set between **1 minute** and **49 minutes.**

This value corresponds to **Ignition REZ** in EBCloud.

ZZ must still be activated in the process for the ignition relay.

Please Note: Once the smoke generator is glowing, the auxiliary ignition does not have to be permanently on in the smoke step. With vapour smoke generators, the ignition can be set to static.

Variable 9 – Clock Behavioural Shower Valve

This determines the duration of the cycle of the shower valve.

Value may be set between **1** and **10** where the value represents percent.

For example: 5 = 50%

This value corresponds to the **Shower Cycle** the EBCloud.
The default value is 40 seconds.

With the standard 40 seconds cycle, each value behaves as follows:

1 = 4 seconds on, 36 seconds off
2 = 8 seconds on, 32 seconds off
3 = 12 seconds on, 28 seconds off
4 = 16 seconds on, 24 seconds off
5 = 20 seconds on, 20 seconds off
6 = 24 seconds on, 16 seconds off
7 = 28 seconds on, 12 seconds off
8 = 32 seconds on, 8 seconds off
9 = 36 seconds on, 4 seconds off
10 = 40 seconds on, 0 seconds off

Variable 10 – Cleaning Interval

This determines how many hours the system may be used for smoking until the next cleaning should take place.

Value may be set between **1** and **99** where the value represents hours.

CLN must be activated in EBCloud for cleaning to be reset.
The time counts down while **RH smoke** is activated in the process.
15 minutes is the default value which may be changed in EBCloud.

Please note: Cleaning Action must run uninterrupted for **15 minutes** for the cleaning time to be reset.

Variable 11 – Reserve

Not Used

Variable 12 – Temperature Monitoring

This determines whether **Temperature Monitoring** is Active or Inactive.

Value may be set to **On** or **Off.**

Variable 13 – Proportional Heating A

This determines the temperature setpoint at which **Heating Controller A** will begin cycling.

Value may be set between **0°C** and **50°C.**

This value corresponds to **Heating PA** in EBCloud.

For example: Value = 5°C, controller starts cycling 5°C before the selected setpoint is reached.

With Relay Heaters (ON/OFF)

For values between 1°C – 50°C, the heating is switched off before the setpoint is reached and only switched on again at proportional intervals.

With Analog Heaters (0 – 10V or 0 – 20mA)

For values between 1°C – 50°C, the heating is slowly decreased from 100% to 0% or vice versa.

Please Note: For electric, gas or oil heating with on-off relays, the recommended setting is **0**. This applies to cooking (low-pressure steam) as well.
The value can be adjusted individually for high-pressure steam dry heaters.

Variable 14 – Proportional Heating B

This determines the temperature setpoint at which **Heating Controller B** will begin its cycle.

Value may be set between **0°C** and **50°C.**

This value corresponds to **Heating PB** in EBCloud.

For example: Value = 5°C, controller starts cycling 5°C before the selected setpoint is reached.

With Relay Heaters (ON/OFF)

For values between 1°C – 50°C, the heating is switched off before the setpoint is reached and only switched on again at proportional intervals.

With Analog Heaters (0 – 10V or 0 – 20mA)

For values between 1°C – 50°C, the heating is slowly decreased from 100% to 0% or vice versa.

Please Note: For electric, gas or oil heating with on-off relays, the recommended setting is 0. This applies to cooking (low-pressure steam) as well.
The value can be adjusted individually for high-pressure steam dry heaters.

Variable 15 – Heating with Minimum ON/OFF Time

Due to legal safety regulations for oil and gas heated systems pertaining to ventilation before and after operation, it is necessary to provide a minimum time during which the system is active or inactive. The specified time is pre-defined and cannot be changed in the program.

Values may be set to **ON** or **OFF.**

The **Minimum ON/OFF** may also be adjusted in EBCloud.

Variable 16 – Feeder Clock at Ignition Time

This determines the number of feeds made during pre-ignition.

Value may be set between **1** and **9.**

A **Feeder** relay must be set in EBCloud. In addition, the **RZ** code must be activated in the process prior to smoking.

Please note: Does not apply to pneumatic feeders.

Variable 17 – Temperature Limit Relay 1

The limit of **Safety Temperature 1** may be set here.

Value may be set between **1°C** and **201°C.**

Safety Temperature 1 may be selected in any sensor position in EBCloud under **Sensor**. There it can be defined which relays must switch on or off if the temperature limit is reached.

Please note: This function is typically used to prevent an overtemperature in the smoke generator by extinguishing the smoke generator via water valve.

Variable 18 – Temperature Limit Relay 2

The limit of **Safety Temperature 2** may be set here.

Values may be set between **1°C** and **201°C.**

Safety Temperature 2 may be selected in any sensor position in EBCloud under **Sensor**. There it can be defined which relays must switch on or off if the temperature limit is reached.

Please note: This function is typically used to prevent an overtemperature in the smoke generator by extinguishing the smoke generator via water valve.

Variable 19 – Temperature Limit Relay 3

The limit of **Safety Temperature 3** may be set here.

Values may be set between **1°C** and **201°C.**

Safety Temperature 3 may be selected in any sensor position in EBCloud under **Sensor**. There it can be defined which relays must switch on or off if the temperature limit is reached.

Please note: This function is typically used to prevent an overtemperature in the smoke generator by extinguishing the smoke generator via water valve.

Variable 20 – Temperature Limit Relay 4

The limit of **Safety Temperature 4** may be set here.

Values may be set between **1°C** and **201°C.**

Safety Temperature 4 may be selected in any sensor position in EBCloud under **Sensor**. There it can be defined which relays must switch on or off if the temperature limit is reached.

Please note: This function is typically used to prevent an overtemperature in the smoke generator by extinguishing the smoke generator via water valve.

Variable 21 – Enthalpy Control

This determines the controller functionality with the de-alpha control.

Value may be set to **ON** or **OFF.**

This is a special variable that cannot be defined in EBCloud at this time.

Variable 22 – Enthalpy HT/CL Bandwidth

This determines the difference allowed between room temperature (actual value) and outside air.

Value may be set between **0°C** and **9°C** temperature band.

This is a special variable that cannot be defined in EBCloud at this time.

Variable 23 – Enthalpy HT/CL Proportion

This determines the distance from the setpoint for the room temperature versus the fresh air damper remaining fully open.

Value may be set between **0°C** and **20°C** proportional band

This is a special variable that cannot be defined in EBCloud at this time.

Variable 24 – Enthalpy H/DH Bandwidth

This determines the difference allowed in humidity (actual value) and outside air.

Value may be set between **0** and **9** where the value represents percent.

For example: 5 = 50%

This is a special variable that cannot be defined in EBCloud at this time.

Variable 25 – Enthalpy H/DH Proportion

This determines the distance from the setpoint for the humidity versus the fresh air damper remaining fully open.

Value may be set between **0** and **20** where the value represents percent.

For example: 5 = 50%

This is a special variable that cannot be defined in EBCloud at this time.

Variable 26 – Additional Core Temperature Mode

This determines whether the controller should function with additional core temperature sensors.

Value may be set between **ON** or **OFF.**

If a second **Core Temperature Sensor** has been configured under **Sensors** in EBCloud, and **Variable 26** is activated, the controller will always wait for both sensors in a core temperature-controlled process to reach the setpoint before continuing

Variable 27 – Temperature in Fahrenheit °F

This changes the temperature display to Fahrenheit °F.

Value may be set between **ON** or **OFF.**

Please Note: Celsius °C is still used in **Sensor calibration.**

Variable 28 – Reserve

Please Note: This function has moved to **Advanced Settings > Batch Admin**

Variable 29 – Time for Second Core Temperature

This determines how long the cooking process should continue after a second **Core Temperature Sensor** setpoint is reached.

Value may be set between **1 minute** and **59 minutes.**

If a second **Core Temperature Sensor** is configured under **Sensors** in EBCloud, this option is activated by default.

Variable 30 – Humidity Monitoring

This determines whether additional **Humidity Monitoring** is active. It is calculated as time during which humidity was above setpoint for more than 90% of total time elapsed.

Value may be to **ON** or **OFF.**

Please Note: This is an advanced monitoring function. Please consult HH Mechanical before using this function.

Variable 31 – Always Show Actual Humidity

This determines whether actual Humidity should be displayed.

Value may be set to **ON** or **OFF.**

This is a special variable that cannot be defined in EBCloud at this time.

Variable 32 – Outside Air for Delta-T Cooling

This defines difference allowed between fresh air temperature (core temperature minus Delta-T) and outside air.

Value may be set between **0°C** and **20°C.**

This is a special variable that cannot be defined in EBCloud at this time.

Variable 33 – Maximum Temperature for Outside Air

This defines the maximum setpoint of which outside air is used.

Value may be set between **0°C** and **20°C.**

This is a special variable that cannot be defined in EBCloud at this time.

Variable 34 – Damper Position 1

This determines the duration of **Damper Position 1.**

Value may be set between **0** and **99 seconds.**

Position: OFF/OFF

In EBCloud, **Reversing Flap 1** and **Reversing Flap 2** relays may be set to the desired position.

Variable 35 – Damper Position 2

This determines the duration of **Damper Position 2.**

Value may be set between **0** and **99 seconds.**

Position: ON/OFF

In EBCloud, **Reversing Flap 1** and **Reversing Flap 2** relays may be set to the desired position.

Variable 36 – Damper Position 3

This determines the duration of **Damper Position 3.**

Value may be set between **0** and **99 seconds.**

Position: OFF/OFF

In EBCloud, **Reversing Flap 1** and **Reversing Flap 2** relays may be set to the desired position.

Variable 37 – Analog Humidity Band (FI)

This determines when an analog damper is opened 100%.

Value may be set between **0%** and **50%** humidity band.

This also makes it possible to control a damper with two positions. The set value means 100% and a specific relay is switched when this value is exceeded. If 50% is exceeded, another relay switches.

Variable 38 – Delta-T Cooking

This determines the difference in Celsius °C between the Room temperature and the Core temperature.

Value may be set between **0°C** and **50°C.**

Delta cooking must be activated on EBCloud.

From version 2.13.1, the Delta-T can be selected individually for each program step. This variable is then cancelled.

The following applies for **0** = no temperature difference and for **50** = 50°C above the measured core temperature value.

Please Note: The control unit works with Smart Delta cooking. This requires the **time**, **core temperature** and **maximum temperature** to be programmed.

Variable 39 – Relay Switching Time RSE

This determines the timing of a relay switch before the end of a process.

Value may be set between **1 minute** and **99 minutes.**

For example: A water drain valve must be opened 2 minutes before the end of the cooking step.

The end circuit must be set under **Delays** in EBCloud.

Variable 40 – Recording Interval

This defines the interval at which data is saved in offline mode.

Value may be set between **1 second** and **99 seconds.**

Please Note: Only applicable to EBLuft data acquisition users:

https://hhmechanical.ca/ebluft-data-collection

If the control unit loses the connection to the data acquisition system, it saves up to 30,000 data records and reads them back automatically when the connection to the data acquisition system is re-established.

Variable 41 – Remote Activation

This determines whether the **Remote Switch – On** is activated.

Value may be set to **ON** or **OFF.**

This is a special variable that cannot be defined in EBCloud at this time.

Variable 42 – Tact Interval at Code Tact

Please note: This function has moved to **Variables 53 – 58**

Variable 43 – Reserve

Not Used

Variable 44 – Reserve

Not Used

Variable 45 – Reserve

Not Used

Variable 46 – Fan Minimum During Ripening

This determines the minimum fan percentage controlled via VFD/FQ1.

Value may be set between **0%** and **99%.**

The fan must have an analog connection, and the entire process must be active in EBCloud. When the correct values are reached, the system switches to the minimum speed.

Variable 47 – Display Degree Hour Value

This determines whether the **Degree/Hours** value should be displayed.

Value may be set to **ON** or **OFF.**

Please Note: The degree/hours are displayed as an additional value found on the EBLuft data acquisition reporting.

Variable 48 – Damper Position 4

This determines the duration of **Damper Position 4.**

Value may be set between **0** and **99 seconds.**

Position: OFF/ON

In EBCloud, **Reversing Flap 1** and **Reversing Flap 2** relays may be set to the desired position.

Variable 49 – Temperature Offset

This defines the maximum temperature difference before an error message occurs (in conjunction with **Variable 50**).

Value may bet set between **1°C** and **99°C.**

Variable 50 – Temperature Timeout

This delays the temperature difference before an error message occurs (in conjunction with **Variable 49**).

Value may between **0 minutes** and **99 minutes.**

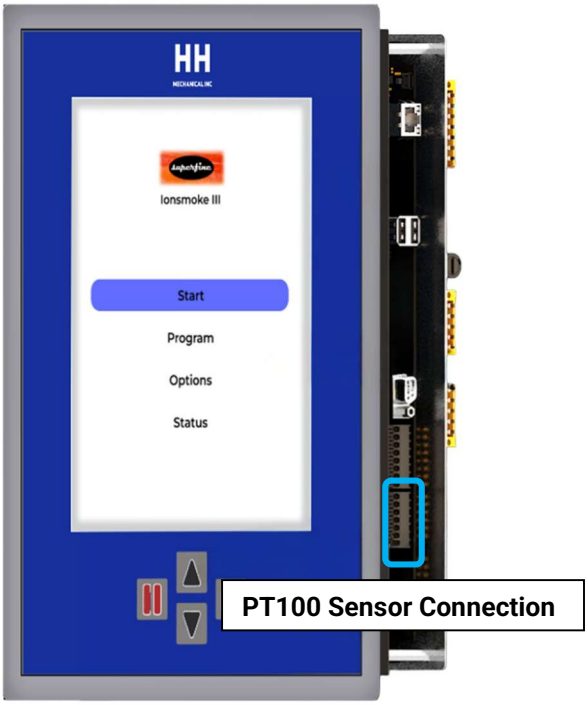
Variable 51 – Sensor Configuration

This determines which **Sensor Configuration** is active.

0 = 6 x PT100 three-wire
1 = 4 x PT100 four-wire A
2 = 4 x PT100 four-wire B
3 = 4 x PT100 four-wire C
4 = 4 x PT100 four-wire D

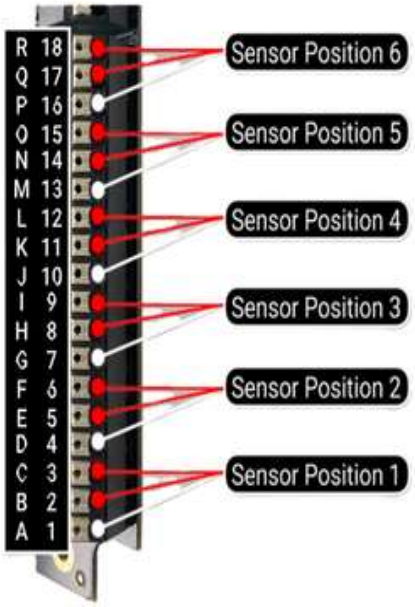
cont'd

Variable 51 – Sensor Configuration cont'd



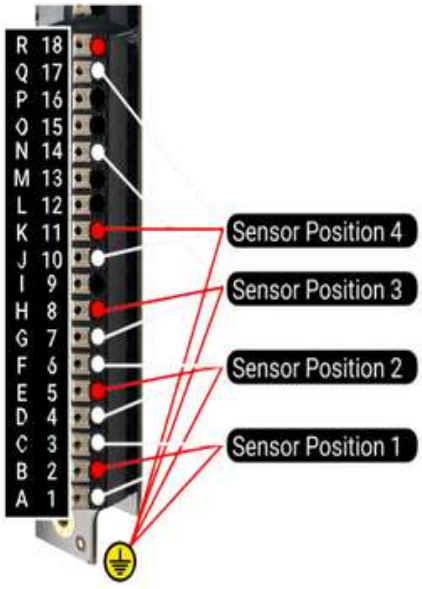
Configuration 0

6 x PT100 3-wire with share sense resistors



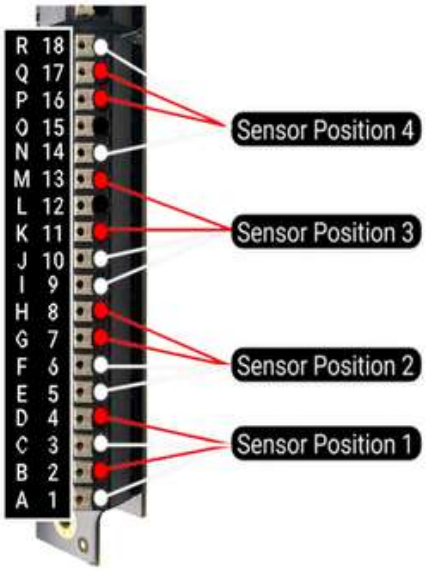
Configuration 1

4 x PT100 4-wire with dedicated sense resistors and external ground



Configuration 2

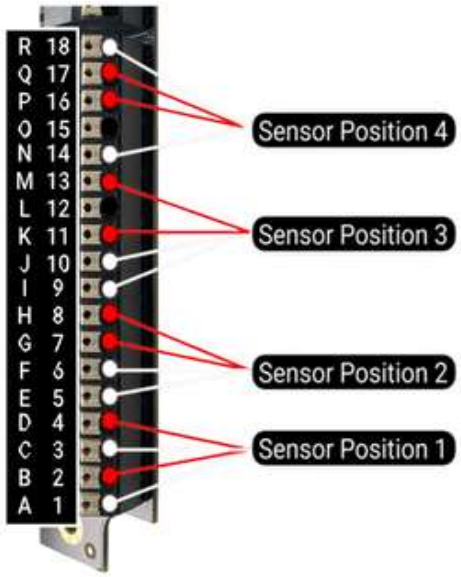
4 x PT100 4-wire with shared sense resistors and current source rotation



Variable 51 – Sensor Configuration cont'd

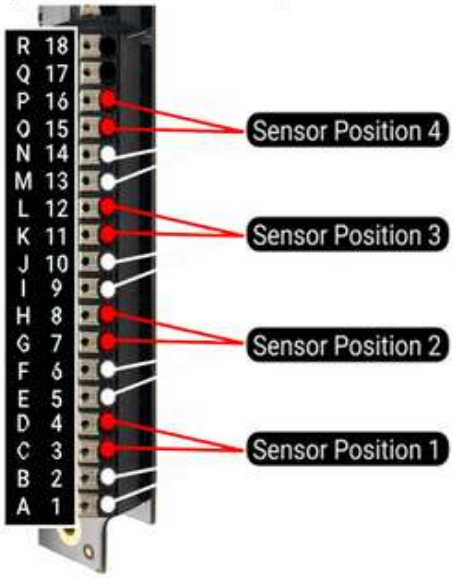
Configuration 3

4 x PT100 4-wire with shared sense resistors and without current source rotation



Configuration 4

4 x PT100 4-wire with shared sense resistors (version 2.3 and onwards)



Variable 52 – Smoke Flap Surveillance

This determines whether the interval for the Smoke Generator lower air flap should be monitored.

Value may be set between **ON** and **OFF.**

EBCloud must have a defined feed, if this is active then the power must be interrupted.

Please Note: This is input **RE** on the controller. The fault is triggered as soon as the power is interrupted.

Variable 53 – Interval 1 Phase 1 (A)

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 53** determines the active duration of **Interval 1 Clock Relay A.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 1 (Tact 1)** must be activated in the **Process Code Menu**.

Variable 54 – Interval 1 Phase 2 (B)

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 54** determines the active duration of **Interval 1 Clock Relay B.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 1 (Tact 1)** must be activated in the **Process Code Menu**.

Variable 55 – Interval 1 Pause

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 55** determines the active duration of **Interval 1 Pause.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 1 (Tact 1)** must be activated in the **Process Code Menu**.

Variable 56 – Interval 2 Phase 1 (A)

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 56** determines the active duration of **Interval 2 Clock Relay A.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 2 (Tact 2)** must be activated in the **Process Code Menu**.

Variable 57 – Interval 2 Phase 2 (B)

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 57** determines the active duration of **Interval 2 Clock Relay B.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 2 (Tact 2)** must be activated in the **Process Code Menu**.

Variable 58 – Interval 2 Pause

Two separate intervals may be set to define a pause/change in behaviour to assigned relays. **Variable 58** determines the active duration of **Interval 2 Pause.**

Each **Interval** consists of Phase 1, Phase 2 and Pause in the following sequence:

Phase 1 > Pause > Phase 2 > Pause > Phase 1

In EBCloud, the relays and **Interval Times** can be defined under **Intervals**. **Interval 2 (Tact 2)** must be activated in the **Process Code Menu**.

Variable 59 – Glycol Cooling (Analog) On/Off

This determines whether **Glycol Cooling** is active or inactive.

Value may be set to **ON** or **OFF.**

If the glycol controller is active, a special sensor is required, otherwise the system will always start with **Sensor error**.

Variable 60 – Glycol Polarity

Defines whether 0 V = 100% open or 10 V = 100% open.

Variable 61 – Glycol Minimum Lead Temperature

Minimum flow temperature.

Variable 62 – Glycol Regulator Delta-T Cooling

This determines the Delta-T to the room temperature with which the flow temperature of the glycol circuit is to be regulated.

Value may be set between **1°C** and **20°C.**

For example: With the variable set to 15, if the room temperature is greater than 15°C, the setpoint for the flow temperature is 0°C. If the room temperature is less than 15°C, the flow temperature is controlled with room temperature minus 15°C. The minimum value is set to -7°C.

Variable 63 – Glycol Temperature Surveillance On/Off

Temperature alarm for flow temperature deviation

Value may be set to **ON** or **OFF.**

Variable 64 – Glycol Temperature Monitoring

Temperature monitoring for triggering the temperature alarm.

Variable 65 – Glycol Cooling Interval Time

This determines the measurement in which the mixing valve should change.

Value may be set between **1** and **20** where the value represents **6 seconds.**

For example: 10 = 60 seconds change of state

Variable 66 – Ignition Time Smoke Generator

The determines the pre-ignition time of the Smoke Generator.

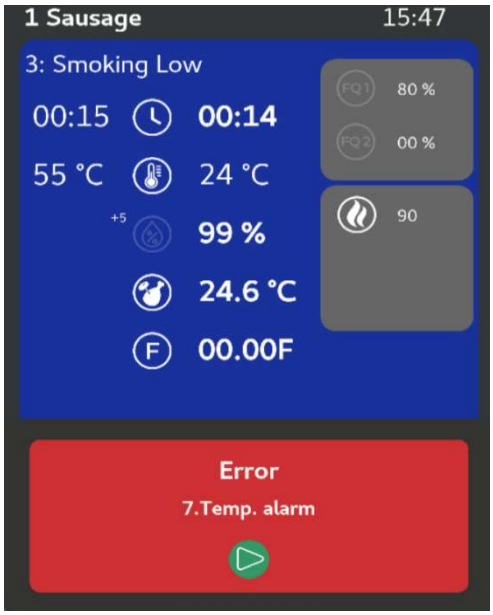
Ignition must be active in EBCloud and **RZ** must be active in the process code.

A feed also occurs during pre-ignition.

Further Service Variables are available upon request. Please contact HH Mechanical Inc. for further details.

Error Codes

In the event of an error, a message will display in red at the bottom of the controller screen. Please refer to the following pages for specific error codes.



RAM Errors

Error: The controller has detected a change in data in the RAM due to cross-sum calculation and control. The program(s) in which the error occurred has/have been deleted

Action: Acknowledge Error

Solution: Reinput and run the program. If the error persists, the RAM is defective and must be replaced

Restart Error

Error: A drop in voltage has occurred, resulting in failure to save current data on the controller. Controller could not resume program

Action: Acknowledge Error

Solution: Program must be restarted, in the process the error occurred if possible

Sensor Error

Error: The temperature sensor has experienced an interruption to power or short circuit. The controller cannot communicate with the sensor and has interrupted the program

Action: Acknowledge Error

Solution: The controller will show the program status in which the error occurred. In addition to the following:

uuu – sensor short circuit
ccc – sensor break

Replace temperature sensor

Ignition Error

Error: the controller did not measure a return signal at the start of the ignition process of the smoke generator. If the ignition element is monitored by a current monitoring relay, this means the smoke generator could not ignite. The controller interrupts the current program

Action: Acknowledge Error

Solution: Contact HH Mechanical for service.

Error 5

Error: The computer has set all functions

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

Timer Defective

Error: The installed timer device is defective. The device can no longer operate

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

Temperature Control

Error: When the operating actual temperature is 10°C lower than the setpoint and it does not reach the setpoint within 4.5 minutes

Conditions: The process must allow for heating and cooling. The process must not be assigned an interval. The process is not occupied with NTH or NTL

Action: Acknowledge Error

Solution: Inspect heating elements and replace as necessary

Cross-Sum Error

Error: The controller has been completely reconfigured

Action: Acknowledge Error

Solution: Proceed as normal

Service Variable

Error: If the **Feeder Smoke Generator** variable was not set prior to the initial startup of the controller

Action: Acknowledge Error

Solution: Check and set **Service Variable 4** and restart controller

Feeder Error

Error: Only occurs if the smokehouse is a closed unit and the safety program is activated on the controller (please refer to **Service Variable 52**). This error indicates an irregular behaviour in the feeder function

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

Glycol – Temperature Alarm

Error: When the glycol temperature setpoint is not reached within 10 minutes

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

Relay Error

Error: When an unresponsive relay occurs

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 1

Error: When 24V power is not applied to **Optocoupler 1** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 2

Error: When 24V power is not applied to **Optocoupler 2** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 3

Error: When 24V power is not applied to **Optocoupler 3** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 4

Error: When 24V power is not applied to **Optocoupler 4** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 5

Error: When 24V power is not applied to **Optocoupler 5** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 6

Error: When 24V power is not applied to **Optocoupler 6** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 7

Error: When 24V power is not applied to **Optocoupler 7** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

OPTO 8

Error: When 24V power is not applied to **Optocoupler 8** in a predetermined amount of time. Any relay may be set for monitoring in EBCloud under **Optos.** Error messages can be seen in the **Status** screen

Action: Acknowledge Error

Solution: Contact HH Mechanical for service

Controller Dimensions

- Cutout Required: 233 mm x 313 mm
- Controller Total Width: 240 mm x 338 mm
- Controller Depth: 105mm



Limited Warranty

1. What this Warranty Covers

HH Mechanical warrants that this HH1 Controller will be free from defects in materials and workmanship under normal conditions for a period of one (1) year from the date of original purchase.

2. What We Will Do

If a defect arises during the warranty period, **HH Mechanical** will, at their discretion, either:

- Repair the defect using new or refurbished parts
- Replace the HH1 controller with a new or refurbished product
- Refund the purchase price of the product/service (return required)

3. What this Warranty Does Not Cover

This Warrant does not cover problems resulting from:

- Normal wear and tear
- Misuse, abuse or neglect
- Unauthorized modifications or repairs
- Damage caused by natural disasters, accidents, or external causes
- Improper installation

4. How to Receive Service

To submit a warranty claim, please notify HH Mechanical in writing at jackson@hhmechanical.ca or via mail at PO Box 6279, 3707 57 Ave, Innisfail AB T4G 1S9 Canada within the warranty period. You must provide proof of purchase (e.g. original invoice or order number).

5. Limitation of Liability

HH Mechanical shall not be liable for any incidental or consequential damages arising from the use of this HH1 Controller.

Important Safety Instructions

This page provides important safety information to the operators of this equipment to prevent any injury to themselves or others, and/or damage to any property. Any operator must read this page prior to operating this machine to ensure that proper usage is maintained.

⚠ **Do not operate the equipment under any of the following circumstances:**

- Touchscreen or haptic buttons are cracked or missing
- Touchscreen display does not function
- Panel and/or brackets are cracked or missing
- Any error code occurs where the advised solution is to contact HH Mechanical for service (see **Error Codes**)

⚠ **Disconnect the machine from power immediately under any of the following circumstances:**

- Fire, sparks, excessive heat or smoke are emitting from the machine
- Wiring is exposed, damaged, corroded or burnt

Do not install the machine in the following environments:

- High humidity
- High heat
- Improper lighting
- Damp or dusty

Proper cleaning is necessary to ensure the longevity of the machine. It is recommended to clean the touchscreen bi-weekly (see **Status > Touch Clean**).

Improper usage and handling may result in electrical shock, burns or fire resulting in injury or death.