



Zenyth 2.5 Automation Manual

Rev. A06



2021

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Revision	Purpose	Effective Date	Authorized By (Initials)
A00	Validated publication.	01/25/2018	SR
A01	Updated to include new pictures and procedures to install screen.	10/31/2018	LF
A02	Updated to include CR	6/13/2019	LF
A03	Fahrenheit/Celsius improvement + various CR Chaff-Barrel-Full-Warning + CR Alarms		
A04	Changed/added text for Setup page Oxidizer + various cleanup + added USB for 9" screen	9/15/2020	SK
A05	Cropster Replay BETA	1/27/2021	SK
A06	Removed wording "The profile can be viewed which allows the user to change profiles." on page 17. Edited image to remove coinciding graphics.	5/25/2021	EM

INTRODUCTION

The Zenyth 2.5 Automation allows the operator to roast manually and save roasting profiles for duplication in auto mode. It is designed to give the operator predictable consistency and the ability to accurately repeat roast profiles.

This manual is *NOT* intended to teach how to roast. It is intended to explain the features and the functions of the roast system buttons only.

The roast system uses a touch screen to control the roasting system. Buttons are activated with slight pressure (finger or plastic stylus) directly on the screen.

To achieve the most versatility with Zenyth 2.5 Automation, please read the entire manual before operating the equipment.

A UPS (battery backup) system is recommended.

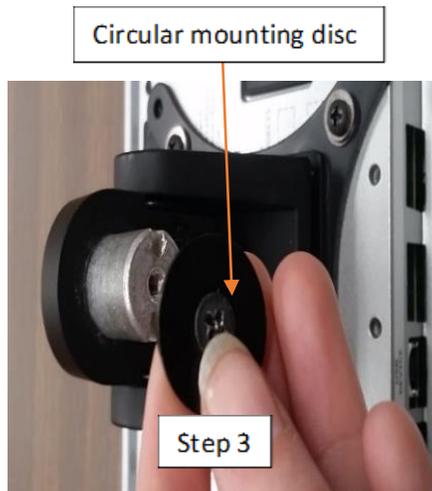
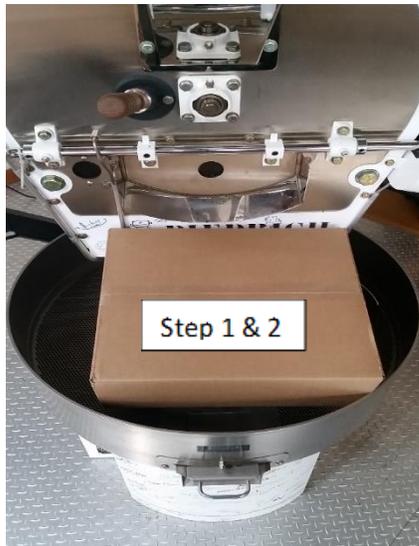
Please review all safety and installation requirements listed in the appropriate roaster operation manual.

Operators must understand how to start and stop the motors using the control system. In particular, the operator should be aware of the **emergency stop button** on the control panel. This button disconnects the outputs of the PLC which will end all functions of the roaster.

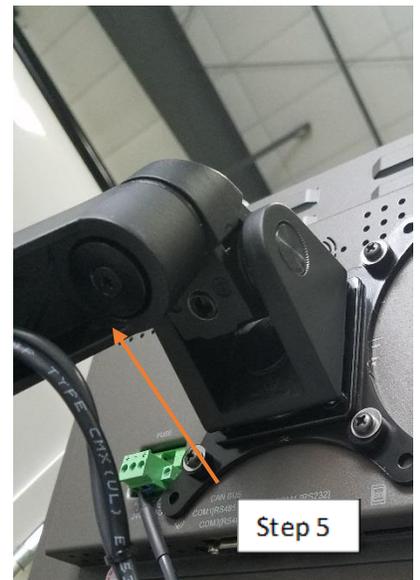
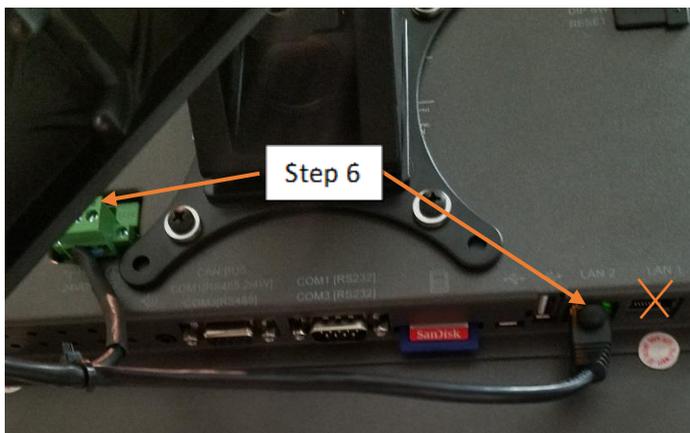
Screen calibration can be accessed upon cycling power to the screen. On powerup, a calibration screen will be displayed. After 10 seconds of inactivity, the screen will boot up to the Main Screen.

1. INSTALLING HMI (IR ONLY)

1. Remove the monitor box from the cooling bin.
2. Remove the monitor from the box.
3. Using a Phillips screwdriver, remove the black circular mounting disc from the monitor.
4. Insert the monitor into the monitor arm.

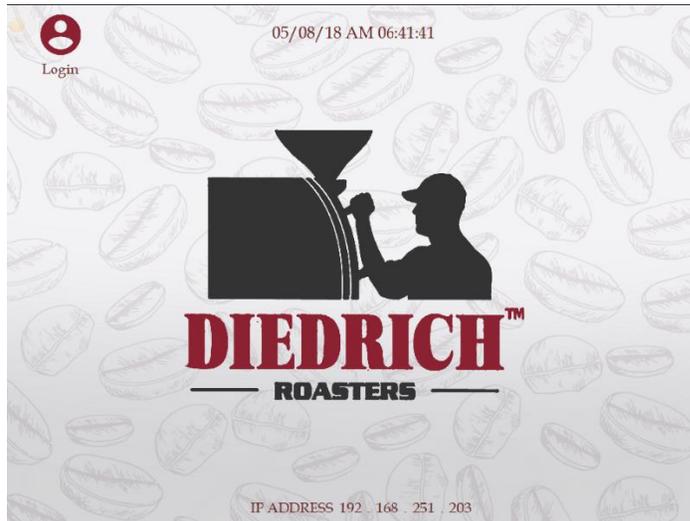


5. Using the screwdriver, re-install the mounting disc in the post of the monitor post and fasten the screw.
6. Route and plug in the ethernet (**LAN2 only**) and power cable in to the monitor – ready for use.



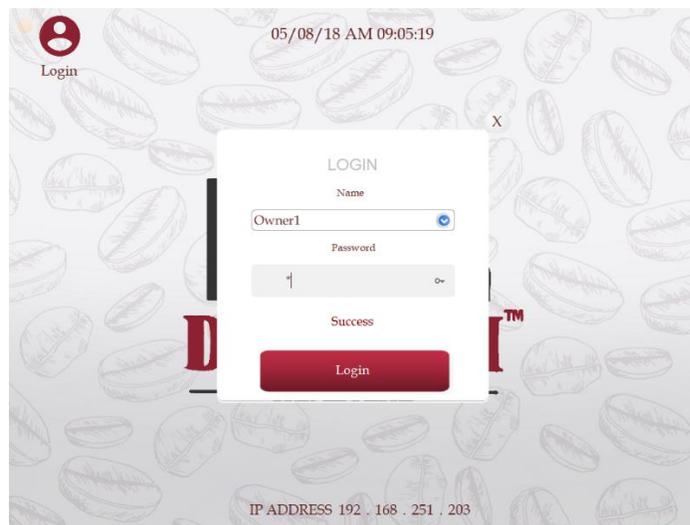
2. MAIN SCREEN

The MAIN screen is the first screen when powering on the automation.



3. LOGIN

To log on, press the “Login” button located in the top left of the “MAIN” screen.



Press the drop-down arrow and select from the default user accounts. Once the user account is selected, select the “Password” box and enter the password for that user

account. Hit enter on the keyboard and select “Login”. This will bring the user to the “SYSTEM” screen.

The “Owner” has access to all the features. The “Roaster” cannot edit, rename or delete profiles. The “User” can only load a profile and roast in auto.

Default passwords:

Login Name	Password
Owner1	1
Owner2	2
Owner3	3

Login Name	Password
Roaster1	1
Roaster2	2
Roaster3	3

Login Name	Password
User1	1
User2	2
User3	3

4. SYSTEM



IR Series Roaster System Screen



CR Series Roaster System Screen

The hour meter is located on this screen and shows the number of hours the roaster has been in operation. This timer can be used to schedule cleaning/maintenance. On the setup screen, the hour meter can be reset.

The 8-hour, 40-hour, & Semi-annual lamps will light up when those maintenance intervals are due. There is a built-in maintenance schedule based on roasting time for the 8 hour and 40-hour cleanings. The Semi-annual is based on every 6 months. Refer to the “Maintenance Manual”, which covers the 8-hour, 40-hour, & Semi-annual cleanings.

The “MENU”, “SET-UP” screen, and “DATA LOGS” screen can be viewed by pressing the buttons along the bottom.

Click on the arrow at the top left of the screen for the pop-out menu to access the below system functions. Here the roaster system or individual motors/functions can be started.

If equipped, the buttons for a loader will appear on this screen if the option is enabled on the “SET-UP” screen. Other options work the same.

START STOP SYSTEM

Pull out the emergency stop button located on the side of the electrical panel. Press the START STOP SYSTEM button to start the appropriate motors and the pilot. This button starts everything needed to ignite the roaster’s pilot. While the roaster is operating the START STOP SYSTEM will be green in color.

Press the green START STOP SYSTEM button to shut the roaster off. This button turns off the gas immediately; however, the drum and roast air blower will continue to run until the roaster temperature drops below 250°F (121°C). A yellow pop-up will appear and indicate “Roaster is in Automatic Cool-down Mode” if that is the case. The temperature where the roaster will stop can be adjusted in the Setup screen with the COOLDOWN SET POINT for the CR-only. Please note that if the bean temperature probe has registered temperatures above the allowed high-limit (475°F / 252°C) then the operator is in full control and cool-down is not automatically initiated! Also, an E-Stop reset after E-Stop will always bring the roaster into a state where it is fully controllable by the operator.

HIGH LIMIT RESET

If the roaster temperature rises above 485°F (246°C) a safety mechanism will shut down the gas flow to the burners. Once the temperature drops back down to normal operating range the HI LIM RESET button must be pressed in order to reignite the gas system. (On some roasters another reset is performed with a physical manual reset button).

HOPPER LOADED RESET (CR only)

Selecting this button will override the interlock and warning that the green-bean-hopper is already loaded, allowing the operator to run the loader again. After the loader has run for 20 seconds or more (OR if the hopper has a green-bean-sensor mounted in the hopper) the hopper is considered to have green beans present and additional loading is prohibited. Any time the hopper gate is opened the warning is also reset.

CHAFF BARREL FULL RESET (CR only)

Press this button after the chaff barrel is emptied to override the interlock and the warning that the chaff-barrel-is-full in order to start a new roast.

AGITATOR

Select this button to manually turn agitator motor on or off.

DESTONER MOTOR (Optional, Coffee Roasters only)

This button will run the destoner motor for the amount of time set in the SET UP screen. Not all roasters have this option. The button will not be visible if this option is not available.

BLOWER (Roast Air Motor for CR)

Select this button to manually turn the blower motor on or off.

LOADER (Optional, CR / Coffee Roasters only)

This button will run the loader motor for the amount of time set in the SET UP screen. Not all roasters have this option. The button will not be visible if this option is not available.

HOPPER GATE (CR only)

This button will open or close the hopper slide gate.

DRUM

Select this button to manually turn the drum motor on or off.

DRUM DOOR

This button will open or close the drum door.

COOLING BIN DOOR 1 *(CR only)*

This button will open or close cooling bin door #1. This is the default cooling bin door option and is always visible. If the roaster is equipped with a second cooling bin door, it will also be shown as COOLING BIN DOOR 2.

COOLER MOTOR *(CR only)*

Select this button to manually turn the cooler motor on or off.

QUENCH *(CR only)*

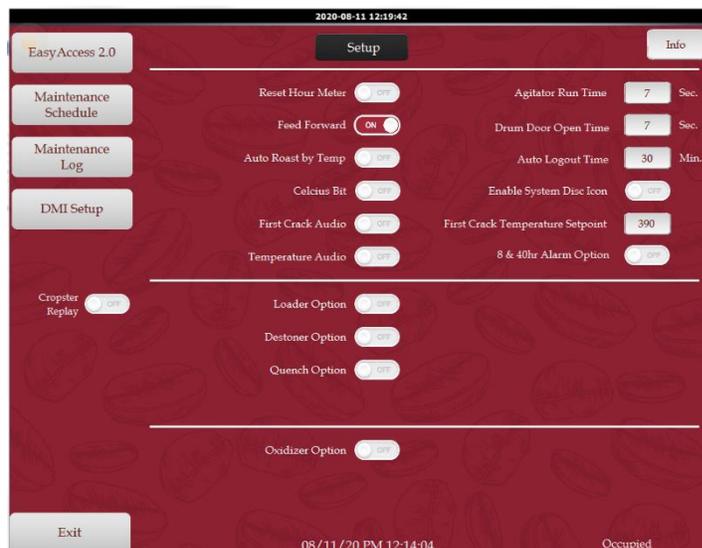
Select this button to turn on the water quench for the predetermined amount of time that was set on the owner setup screen. Not all roasters have this option. A button will not be visible if this option is turned off.

CHAFF GATE 1 & 2 *(CR only if equipped)*

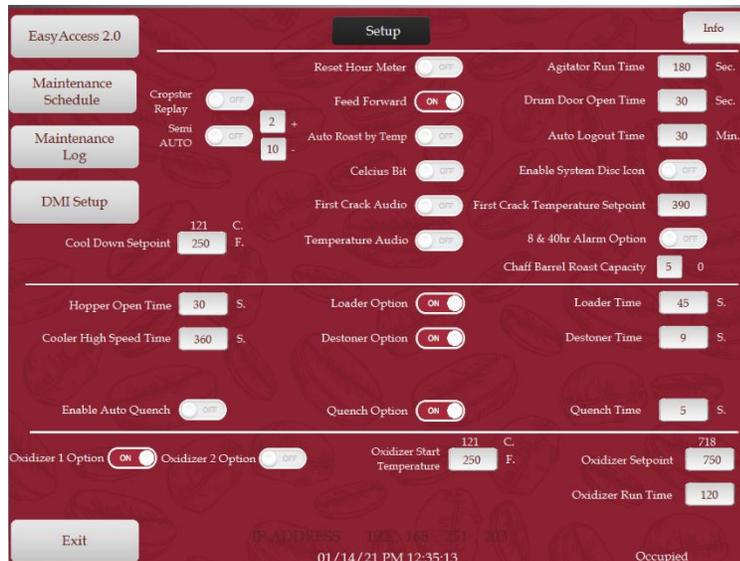
The buttons show up here if the options are selected in the Setup screen and can then be used to open or close the Chaff-Gates.

5. SET-UP

The SET-UP screen is accessed from the SYSTEM screen.



IR Series Roaster Setup Screen



CR Series Roaster Setup Screen

CROPSTER REPLAY

The values for logging within Cropster are always available, whether the option is on or off. Values are provided over Ethernet IP with direct access to the PLC. Fuel and Air values will be available. To use the feature in Cropster to Replay profiles, the option first needs to be selected. The option is on the Setup Screen and is called Cropster Replay. This option can only be turned on when the roaster is in Manual mode (Auto mode will reset the option). Once turned on, it will be indicated on the manual screen that it is turned on.

Z2.5 Automated roasters will need additional hardware, an Ethernet switch with a minimum of three (3) ports, to allow another device to access data. It is to be noted that a roast must be ended on the roaster HMI with the "End Roast" button, or by setting the end temperature and activating the use of the End Temperature. Please refer to Cropster directly on how to set up and use this option. Cropster™ is a trademarked name, visit the company's website at www.Cropster.com.

SEMIAUTO – USE PROFILE VIEW (CR-Only)

When this feature is turned on, the same fuel values that are in the loaded profile will be used in the auto roast. The automation will not change any fuel values as long as the boxes with a "-" & "+" are set to zero (0). If the values in the boxes are other than zero (0) the automation is allowed to modulate slightly around the saved fuel value to bring the bean-temperature closer to the loaded profile. A value in the boxes of 1+ and 6- will allow the automation to use 31% or 24% fuel for a 30% fuel value in the profile pending if the actual bean-temperature is behind or ahead of the profile. The fuel values will be used by time or by temperature pending the setting of the "AUTO ROAST BY TEMP" button.

COOLDOWN SET POINT (CR-Only)

This is the temperature where the roaster will shut-down when in cool-down-mode.

RESET HOUR METER

Use this feature to “zero” the hour meter displayed on the System screen.

FEED FORWARD

The feed forward feature will assist with the proper tracking of profiles while in automated mode. Although it is not recommended, this option may be turned off if a profile was originally roasted with extremely varied fuel settings, or if a profile has been edited, to provide for better profile tracking.

AUTO ROAST BY TEMP

This feature can be selected to change the AUTO roasting to make all air and fuel changes based on the profile temperature instead of the profile time.

CELSIUS

This can be turned on to display temperatures in Celsius instead of Fahrenheit on the main screens.

APPROACHING FIRST CRACK AUDIO

This bit turns on the audible indicator that “You’re approaching first crack”. The temperature at which this audio occurs is determined by the user, based on personal preferences. This audible only happens during a roast.

TEMPERATURE AUDIO

This bit turns the audible on for the following temperatures: 200°F, 300°F, 375°F, & 425°F. If the Celsius option is selected, the following centigrade callouts are used: 93°C, 149°C, 191°C, & 218°C. They are only called out during a roast.

AGITATOR RUN TIME

The agitator will run for this amount of time after a roast completes. The agitator will shut off once the timer has expired. Press on the number to get a pop-up keypad to change the value.

DRUM DOOR OPEN TIME

The drum door will remain open after a roast for the amount of time set. The timer can be set for a longer period of time to help cool the roaster between roasts. Press on the number to get a pop-up keypad to change the value.

AUTO LOGOUT TIME

The value entered into the Auto Logout section will set the duration of inactivity before the HMI goes into screensaver mode.

APPROACHING FIRST CRACK TEMP

The value entered in this field will establish the temperature that triggers the “You’re approaching first crack” audio.

8 & 40 HOUR ALARM OPTION

Enable this button to receive a warning when 8 hours of roast time and 40 hours of runtime (roaster is turned on) has been recorded.

CHAFF BARREL ROAST CAPACITY

If a value greater than 0 is entered the system will count and display the number of roasts completed and when equal will give a warning on the screen “Chaff Barrel is FULL!”. A new roast can't be started when this warning is present. After emptying the chaff barrel, reset the warning by pressing the “Chaff Barrel Full Reset” button on the System screen.

HOPPER OPEN TIME *(CR only)*

This timer is the number of seconds the hopper gate stays open. Press on the number to get a pop-up keypad to change the value.

COOLER HIGH-SPEED TIME *(CR only)*

This timer is the number of seconds the cooling blower will remain on high after the end of a roast cycle. Press on the number to get a pop-up keypad to change the value.

COOLING BIN WITH 2ND DOOR OPTION *(CR only, Optional)*

Enable this button if the cooling bin has the optional 2nd door. This will make a second door button available for setting the destoner location to the 2nd door.

ENABLE AUTO QUENCH *(CR only)*

Although the user can quench multiple times, this feature will only repeat the last quench done in the manual roast while roasting in auto mode. The quench is recorded based on bean temperature not time of roast. Press the ‘Quench’ button to activate. Once activated, it will become bright green and turn off after the set quench time.

QUENCH OPTION *(CR only)*

Select this button to manually turn the quench feature on or off. Press the ‘Quench’ button to activate. Once activated, it will become bright green and turn off after the set quench time.

WARNING

If the EMERGENCY STOP button is pressed, all output power is removed from the roasters. The quench feature will shut off if the emergency stop button is pushed. Turn the manual bypass lever if quenching is needed. The manual bypass does not use a timer and must be turned off for water to stop flowing.

QUENCH TIME *(CR only)*

Set this number for the number of seconds the water quench will operate each time the button is pressed. Time is not accumulative. Press on the number to get a pop-up keypad to change the value.

LOADER OPTION

Enable this feature if a loader is controlled by the roaster. Press the dark green button to activate. Once activated, it will become bright green. Press again to deactivate.

LOADER TIME

Set this timer for the amount of time the loader will run in automatic mode. Press on the number to get a pop-up keypad to change the value.

DESTONER OPTION *(CR / Coffee Roasters Only)*

Enable this feature if a destoner is controlled by the roaster. Press the dark green button to activate. Once activated, it will become bright green. Press again to deactivate.

DESTONER TIME *(CR / Coffee Roasters Only)*

This is the timer for how long the destoner will run automatically. Press on the number to get a pop-up keypad to change the value.

DESTONER LOCATED AT COOLING BIN DOOR #1 *(CR / Coffee Roasters Only)*

Activate this button if the roaster has a destoner and it is located at cooling bin drop gate #1. Press the dark green button to activate. Once activated, it will become bright green. Press again to deactivate.

DESTONER LOCATED AT COOLING BIN DOOR #2 *(CR / Coffee Roasters Only)*

Activate this button if the roaster has a destoner and it is located at cooling bin drop gate #2. Press the dark green button to activate. Once activated, it will become bright green. Press again to deactivate.

OXIDIZER OPTION (OX-1 and OX-2 for retrofit needs) *(Only available on Coffee Roasters)*

Enable this feature if an oxidizer is controlled by the roaster.

OXIDIZER START TEMP *(Oxidizer Temperature on IR screen)*

This is the temperature the roaster is at when the oxidizer will go to high fire. Press on the number to get a pop-up keypad to change the value. Note: For CR's if set to 0 (zero) then go to High-Fire at the start of the roast.

OXIDIZER SET POINT *(May not be used for 3rd party Oxidizers)*

This sets the maximum temperature the afterburner will cycle to. Press on the number to get a pop-up keypad to change the value.

OXIDIZER RUN TIME

This timer is the number of seconds an oxidizer will operate after the roast ends. This feature helps to burn the smoke and smell from the cooling bin air. Press on the number to get a pop-up keypad to change the value.

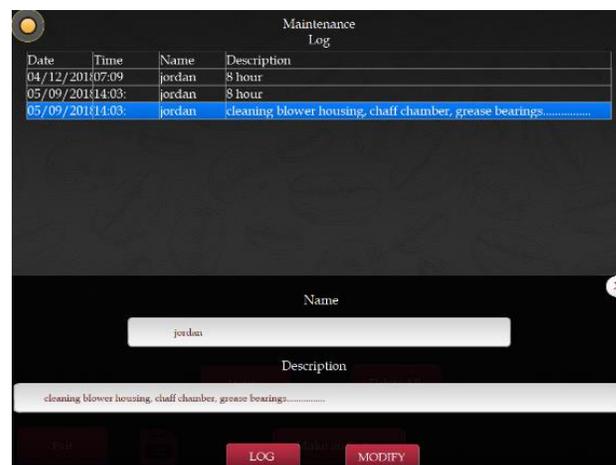
MAINTENANCE SCHEDULE

This feature gives the user a countdown until maintenance is due. Once maintenance is due, the lamps light up on the System screen.



MAINTENANCE LOG

As soon as one of the maintenance lights comes on, the user will need to go to the Maintenance Log screen and make an entry. The entry will consist of the person doing the maintenance, and a description of the maintenance being performed. Select "LOG" and then clear the maintenance lamp. This resets the maintenance for that particular scheduling.



ATTENTION

Formatting the SD card (USB-stick for 9" screen) will erase all stored data and profiles on the roaster!

DMI SETUP

This button provides access to back end features mainly used by DIEDRICH ROASTERS technicians for set up. The DIEDRICH ROASTERS password is required.

DATA LOGS

The DATA LOGS screen is accessed from the SYSTEM screen. This screen shows data for the last 30 roast days. Roast days are any day a roast cycle was started and then the roaster was shut down. It is not based on calendar dates.

Each row has the date, time, bean temperature, auto mode target temperature, air setting, fuel setting, rate of rise, roast minute and roast second. It also indicates each time a roast cycle is started. Temperature values are saved in Celsius or Fahrenheit based on if the Celsius Bit is turned on or off in the setup screen. The Data Logs should be cleared if the Celsius Bit is changed since the data will not show correct. Further data values are stored for the CR-roasters.

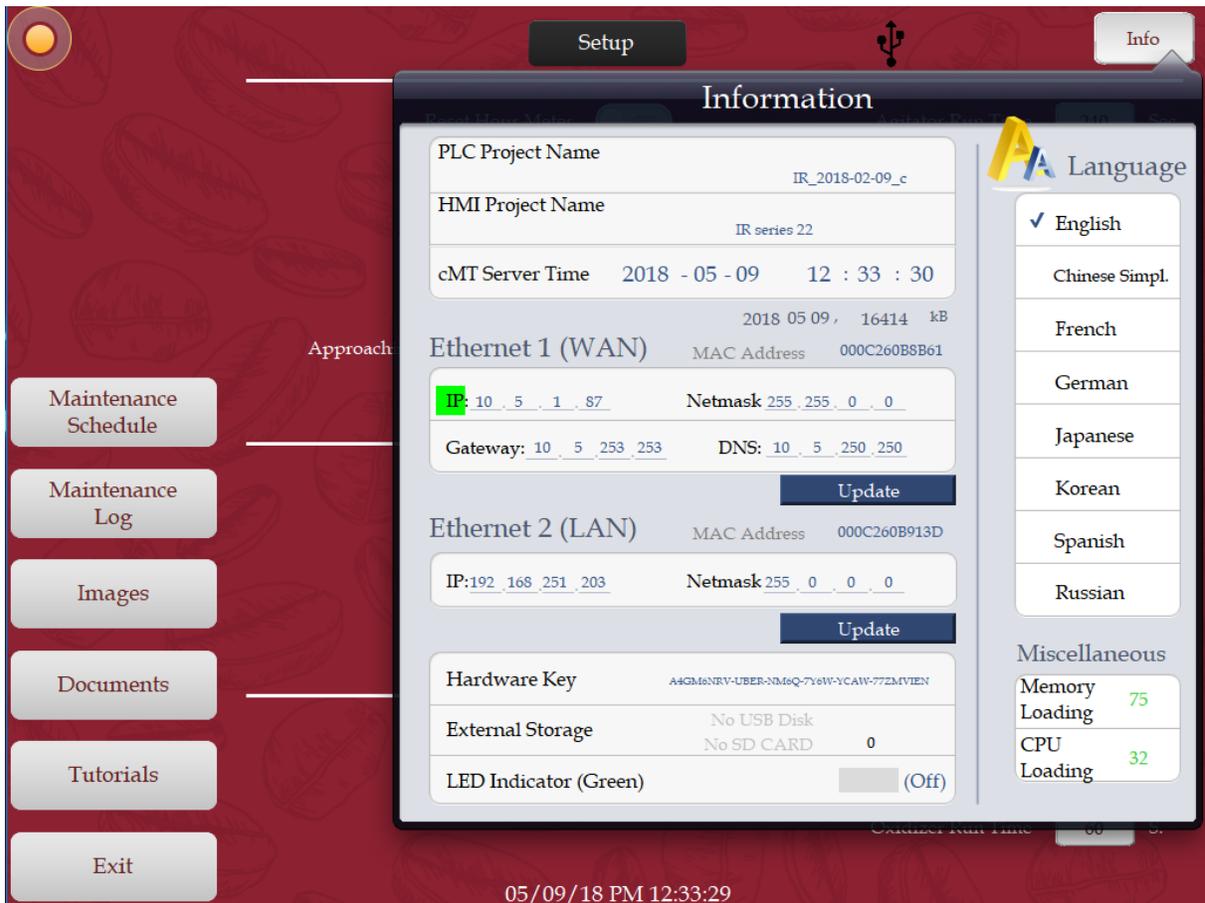
Temperature values are saved and indicated based on the Celsius option in the setup screen.

(All Temperatures Shown as selected F or C)

TIME	DATE	MIN	SEC	BEAN TEMP	BEAN TEMP SET POINT	FUEL %	ROAST AIR %
09:17	05/09/2018	0	0	32	0	0	0

Exit Clear Export

INFO BUTTON (TOP RIGHT)



HMI/PLC VERSION

Located on the info page, which is obtained by selecting the “Info” button at the top right. From the Info page, the user can select between 8 different languages.

SET DATE & TIME

To set the date and time, press on the box with the date and time to make a popup appear. The correct date and time can be achieved via keypad input.

LANGUAGE

The language is user selected from the info screen. The following languages are available: English, Chinese Simplified, French, German, Japanese, Korean, Spanish, & Russian

6. MENU

The MENU button on the SYSTEM, AUTO, and MANUAL screens will provide access to all the other screens in the system.



MAIN

This button will take the user to the MAIN screen to log out or change users. See Page 2 for more information.

SELECT ROAST

This button will display a popup window. From here, delete, rename, or load a roast profile.

ROAST DATA

This button allows the user to view the saved attributes of all saved roast profiles.

SAVE ROAST

This button allows the user to save a roast after roasting it in manual mode.

PROFILE EDIT

This button will bring up an edit screen where changes can be made to previously saved profiles.

MAINTENANCE LOGS

This button takes the user to the screen that keeps record of the maintenance alarms and the time stamp for each.

PASSWORD SETUP

This button will take the user to a screen to edit passwords and users.

EMAIL CONTACTS

Not Available

ALARMS

This button brings up the alarms screen to view and clear active alarms.

MANUAL

This button will bring up the manual roasting screen.

AUTO

This button will bring up the automated roasting screen.

EXIT

The EXIT button closes the menu.

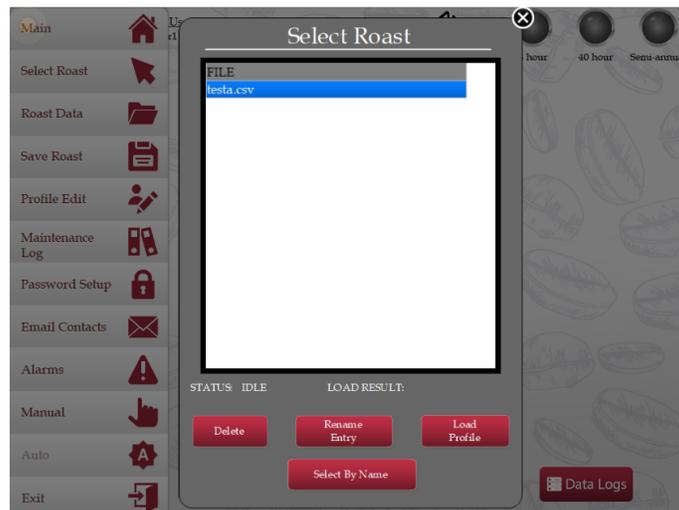
START STOP SYSTEM

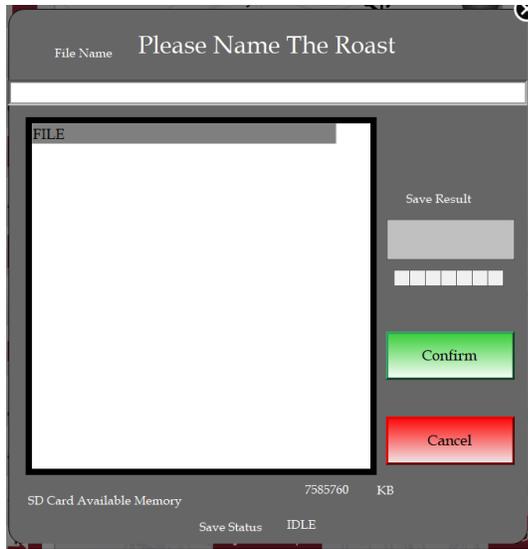
This button appears on the MENU only from the manual or auto screen. When the roaster is running and needs to be stopped, pressing this button turns off the gas immediately; however, the drum and roast air blower will continue to run until the roaster temperature drops below 250°F (121°C). A yellow pop-up will appear and indicate “Cool Down Mode”.

7. SELECT ROAST

On this screen, delete, rename, or load a roast profile. The roasts are sorted alphabetically and can be selected by name compared to the first 8 characters entered.

Move the vertical slide bar up or down with the arrow buttons to select a profile from the list. Tap a desired profile and a green bar will signify it has been selected. Press the LOAD PROFILE button to load the profile. Profiles can also be renamed or deleted.





10. PROFILE EDIT



This screen allows the user to make changes to an existing saved profile.

A loaded profile can be edited, or all data cleared, and a profile created from scratch. The user can select a profile time-slice by tapping on the horizontal line, pressing the increase/decrease arrows, or selecting a specific time-slice. The time slice location is indicated with a vertical line.

Any or all of the three values (Temp, Air & Fuel) can be changed by selecting the box and entering the desired values with the popup keypad.

The charge temp can also be changed/entered by pressing on the box and changing the values in the pop-up window. The bottom out temperature as well as the finish

temperature will be taken from the temperature graph. The graph must be used to change those two values.

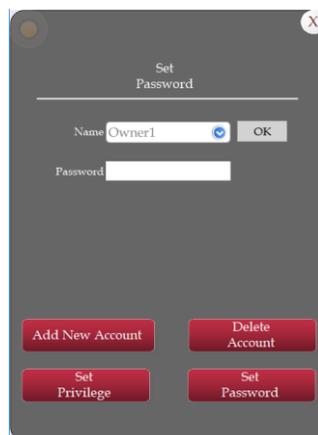
There is also a function to generate values. Each of the three values (Temp, Air & Fuel) can be generated. Any zero value will be filled in, so for the temperature, the curve will be populated and for the Air as well as the Fuel a zero value will be filled in with the prior value (in a straight line until it finds another value “a start and an end value must be present for a fill”).

Note that for a temperature fill to work, a minimum of three values need to be set. First setpoint is charge temp, second is bottom out temp, last is finish temp. From here, “Generate Temp Setpoints” can be used to generate a temperature curve.

11. MAINTENANCE LOGS

This button takes the user to the screen that keeps record of the maintenance alarms and the time stamp for each.

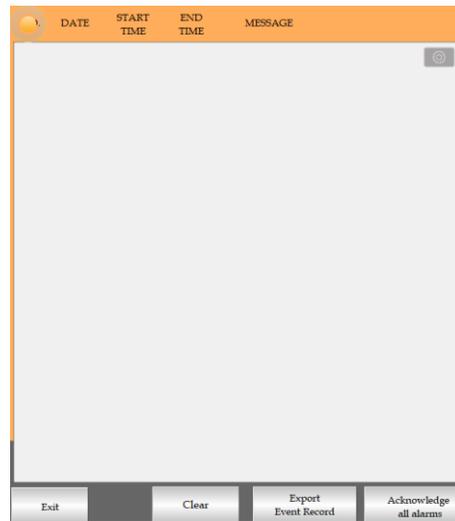
12. PASSWORD SETUP



The screenshot shows a 'Set Password' dialog box. At the top, it says 'Set Password' with a close button (X) in the top right corner. Below the title bar, there is a 'Name' dropdown menu with 'Owner1' selected and an 'OK' button next to it. Below that is a 'Password' text input field. At the bottom, there are four red buttons: 'Add New Account', 'Delete Account', 'Set Privilege', and 'Set Password'.

This screen allows the user to set passwords for each user. Select a user from the dropdown and set the password. This access is limited to owner accounts only.

13. ALARMS



When an alarm has been triggered it will show up at the top of most pages. Go to the ALARMS screen to clear the alarm. Highlight the alarm and press the Accept button. Press EXIT to leave this screen.

Note: After a predetermined time, if an alarm is present the alarm sound will change to a “ticking” similar to a clock until accepted.

14. MANUAL



IR Series Roaster Manual Screen



CR Series Roaster Manual Screen

This screen is where the user can roast manually. The user will have full control over each function of the roaster and when a roast is finished, there is the option of saving it to use in Auto mode later.

ATTENTION

A roast cannot last longer than 25 minutes for coffee and 50 minutes for cacao. The software will automatically end the roast when this time is reached. This also applies for a roast that has exceeded 485°F (246°C). When this happens, the agitator will start, the air position will be changed to cooling bin and the drum door will open to discharge the beans. Note: on CR roasters the only action is that the timer stops, and the OPERATOR IS NOW in charge to end the roast properly!

ADJ. CHARGE TEMP

Charge temp allows the user to choose a temperature which the automation will maintain between roasts. Press the green button until it illuminates then press the temperature display to the right of the button. This will open a keypad in which a temperature value can be chosen for the charge temperature. Press the button again to disable the charge temperature function.

FLAME VERIFICATION

This will illuminate when the roaster senses the gas system is ignited and a pilot flame is present.

MANUAL ROAST FINISH TEMP

This allows the user to predetermine the end temperature of a manual roast. The automation will end the roast cycle once the manual roast has reached the set

temperature. Press the green button until it illuminates then press the temperature display.

This will open a keypad in which a temperature value can be chosen for the finish temperature. Press the green button again to disable the finish temp.

TREND GRAPH

The trend graph in manual mode is a line graph only and does not offer zoom capability. There is a time scale on the bottom of the graph that indicates minutes from 0-25, and the scale is non-adjustable.

While roasting manually, the temperature rise per minute projection shows the direction the graph will take with the current settings. As changes are made to the fuel and air settings, it forecasts the rise per minute so adjustments can be made accordingly.

To the right of the graph is the next value setting from the previous roast which correlates with the temperature line, fuel, and air setting outlines on the graph.

PROFILE & R/Min LINE

Beneath the graph, there is the option to turn off the rise per minute projection and the profile lines which include the fuel/air setting prompt on the right of the graph.

RoR, ET In & ET Out (CR only)

Beneath the graph, there is the option to turn on/off various graphs and sometimes matching prompts on the right of the graph. Some buttons like the ET in/out are only available on CR machines with added options.

FUEL ADJUSTMENTS

The fuel can be adjusted by selecting on the Fuel % box and using the keypad to enter the desired fuel percentage value.

AIR ADJUSTMENTS

The air control adjustment differs between the IR and CR roasters.

IR ROASTERS

Airflow through the roaster is split between the drum and cooling bin. Press "Through Cooling Bin" to give 100% of the air through the cooling bin. Press "Through Drum" to give 100% of the air through the roasting drum. Press 50/50 to split the air between cooling bin and roasting drum.

CR Roasters

Air adjustments on the CR roasters are made in the same manner as the flame adjustments with adjustability from 0% to 100%. The air can be adjusted by selecting on

the Roaster- or Cooler Air % box and using the keypad to enter the desired air percentage value.

HI LIM RESET

If the roaster temperature rises above 485°F (251°C) a safety switch will shut off the gas flow to the burners. Once the temperature drops back down to 485°F, the HI LIM RESET button must be pressed in order to reignite the burners.

END ROAST

This button ends the roast cycle. When pressed, the agitator will start, the air setting will shift to the cooling bin position, and the drum door will open to discharge the roast. It is only active during a roast. Once the roast is complete, the button is no longer active.

END ROAST CYCLE BUTTON *(IR only)*

On the side of the electrical panel serves the same function. When a manual roast has been ended, all attributes of the roast profile are temporarily stored and can be permanently saved for further use by pressing the SAVE ROAST button.

AGIT

Select this button to manually turn the agitator on or off.

DRUM DOOR

This button will open or close the drum door.

ATTENTION

During a roast cycle, the drum door button will not be available.

LOADER *(Only available on Coffee Roasters)*

This button will run the loader motor for the amount of time set in the SET UP page. Not all roasters have this option. A button will not be visible if this option is turned off.

QUENCH *(CR only)*

This button turns on the water quench for the predetermined amount of time that was set on the owner setup screen. Not all roasters have this option. A button will not be visible if this option is turned off.

DESTONER *(Only available on Coffee Roasters)*

This button will run the destoner motor for the amount of time set in the SET UP page. Not all roasters have this option. A button will not be visible if this option is turned off.

SAVE ROAST

This button can be accessed from the Menu and gives the user the ability to save the roast from Manual Mode.



Note: End Of Roast for Cacao is based on TIME instead of Temperature

EOR By Time

Allows the user to enter a time for the roast to end. If the green button beside the roast finish time is selected (indicated by a light red color) then a roast will finish automatically when the selected time is reached. The start of the EOR process will begin 10 seconds before the indicated time and will start the agitator as well as switching the air from the drum to the cooler.

15. AUTO



IR Series Roaster Automation Screen



CR Series Roaster Automation Screen

ATTENTION

A profile must be loaded before starting an automatic roast. The automation controls fuel and air settings while in auto mode.

To control fuel or air settings during an automated roast, the user must switch to manual mode. It is possible to switch back and forth between manual and auto but the roast in manual mode must be ended to save the profile for use later in auto mode.

AUTO CHARGE/ADJ. CHARGE

The user can choose between AUTO CHARGE TEMP (the saved profile charge temperature) or ADJ. CHARGE TEMP (user chosen temperature). Press the appropriate button to use this function and the button will illuminate when active. Only one of the two choices can be used at a time. If the adjustable temp is used, a chosen value must be entered into the numeric temp display. The automation will then maintain the temperature selected.

TREND GRAPH

The roast graph works the same as in manual; however, the saved roast target temperature will also be displayed. The target temperature is also recorded in the data logs.

This is a real-time display of bean temp, fuel% and air%. The chart records these values when the roaster is on and in a roast cycle. These values are also saved and

transferred to the data logs. The graph display allows the user to zoom in, out, or view historic data for up to 24 hours.

SCATTER GRAPH

This is the smaller graph to the right of the trend graph. It provides an overview look at the loaded profile while the trend graph tracks it in real time.

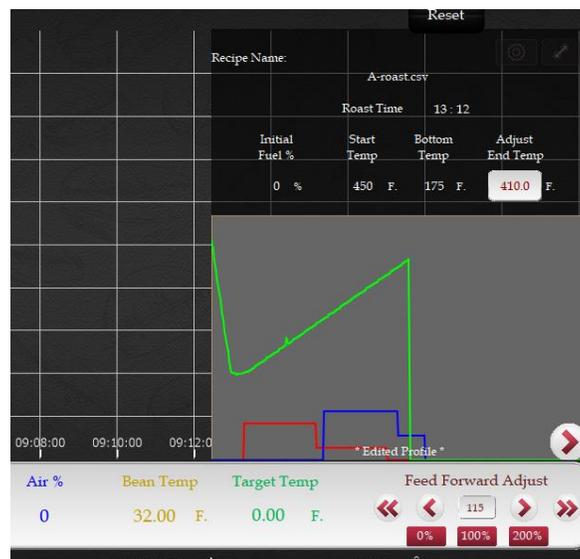
FEED FORWARD ADJUST

The Feed-Forward Adjust buttons will allow the operator to change the suggested fuel levels used during a roast, the fuel levels are taken from the profile. The change takes effect after the bean temp bottoms-out (about 2 minutes into the roast) and effects one roast only (early program version would not reset to 100% at EOR).

This can be useful to guide a roast back onto the profile if the bean temperature has separated from the desired profile OR when roasting a different batch size compared to the batch size used when creating the profile. Normally the Feed Forward Adjust is set to use 100% of the fuel levels from the profile to guide the automation (the number in the red up arrow shows the used Feed Forward value that can be from 0 - 200). The fuel level can be adjusted up or down in 5% or 10% increments by tapping the red single or double arrow respectively, or set directly to 0, 100%, or 200% by pressing the matching button.

PROFILE INFORMATION

The pop out arrow located about mid-right of the screen can be used to show the profile and associated information.



The COOLER AIR% is automated but is also user adjustable.

The INITIAL FUEL% is the fuel value that was used when the profile was created. This can be adjusted to a different value by pressing the numeric display and entering the desired value. The changed value will be used (unless changed again) until the temperature reaches the bottom out or 1:55 minutes.

The ROAST AIR% is user adjustable until the time a roast profile is started. After a profile is started the air buttons disappear.



Note: End of Roast for Cacao is based on TIME instead of Temperature

ADJUST END TEMP

This option will only be available if the option in the Setup is set to use temperature to end a roast. When the option “EOR_ByTIME” is turned on the end temperature will not be adjustable but only displayed and the roast will end at the time indicated from the loaded roast profile (Recipe).

16. REMOTE ACCESS

TP LINK ROUTER

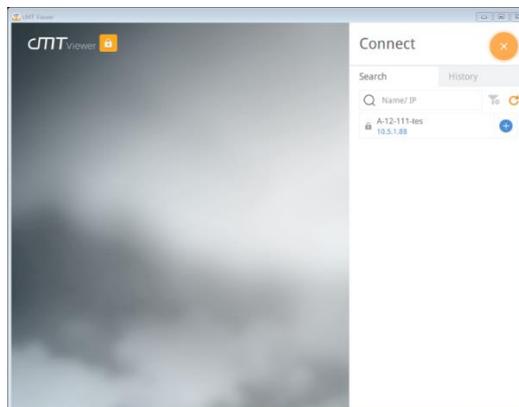
With the automated roaster comes a TP Link router. This router comes pre-configured to use as a wireless connecting point to the screen for remote access via the CMT-Viewer app. The default credentials can be found on the back of the router. Using a smart device, go to the Wi-Fi settings and select the network for the TP Link router. Use the default credentials to login to the router. There is no internet from this router, but rather a wireless access point to the HMI.

CMT VIEWER APP

The roaster HMI can be accessed with Wi-Fi enabled smart devices. Login to the provided router using the default credentials located on the back of the router. This will give access to the roaster network with or without an internet connection. Using the play store or app store, download the “CMT Viewer” app on a smart device. This is available for Apple and Android devices.



Once the app is downloaded and a device is connected to the Wi-Fi router provided with the machine, open the CMT Viewer App and select the plus button located in the top right of the app. The machine serial number should be shown with its IP Address listed below. Click the blue plus button next to the machine serial number and enter the default password (111111). Once remotely logged in to the screen, the Main screen will open to login to the user account.



CAUTION

Always be aware of the risk of a fire. We do not recommend the use of the remote access to roast coffee from a remote location.

DIEDRICH REMOTE ACCESS

CONNECTING TO A NETWORK

In order to allow Diedrich Roasters LLC to help/guide in troubleshooting of the automation, the screen will require an internet connection. This can be achieved by using the provided router as a shared hotspot to gain wireless access to an existing router, a wireless hotspot from an Android or Apple device, or using a hotspot/dongle device to the 3G/4G USB port on the side of the provided router.

Please reference Appendix A, “Configuring TP-Link Router”. If neither of those options will work, a hard-wired Ethernet connection can be made from a local network router or modem and connected directly into LAN1 of the HMI located at the bottom of the screen. Disconnect the Ethernet cable connected from the provided router going into LAN1 of the HMI, and connect Customer Provided Ethernet cable in its place. Go to the

setup screen and click on the info tab. Select “Update” for the Ethernet 1 settings. The screen will obtain a new IP address from the local network.

TP LINK ROUTER (AC 750 TRAVEL ROUTER)

In order to use the TP Link router as a wireless client to provide an internet connection to the screen, configure the router for the local network or wireless hotspot. Please follow Appendix A, “Configuring TP-Link Router”. These steps will walk through how to successfully configure the router as a wireless bridge to the existing Wi-Fi network or wireless hotspot.

CHECKING CONNECTION STATUS

Once connected to the internet, login to the HMI and go to the Setup screen. In the bottom right corner of the Setup screen, it should say “Connecting”, or “Online”. Once “Online” is shown, the screen is ready for Remote Access via Diedrich. As soon as Diedrich remotes into the HMI, the status will change to “Occupied”.

17. BACKING UP PROFILES

ATTENTION

1. Do not back up profiles while roasting coffee.
 2. The HMI screen is not compatible with Mac computers. A PC must be used.
 3. Do not modify the original spreadsheets into a different format. Only modify copies of the spreadsheets.
-

The touch screen has an SD card (USB-stick for 9” screen) installed on the side. All of the profile information is stored on this card.

The data logs and saved roast profiles can be backed up by any of the following methods.

1. Removing the SD card (USB-stick for 9" screen) from the touch screen and installing it onto a PC.
2. Copy and paste the files to a computer.

The files can then be viewed with a spreadsheet program. In the LOGS file is a file named Logs. There are thirty days of data logging spreadsheets in this file. Each spreadsheet is a different day. The spreadsheets in the folder named "Roasts" are the saved profiles.

18. TIPS FOR EFFICIENT AUTOMATED ROASTING

Once a profile is developed manually it can be saved for future replication. After loading the profile, the operator may need to adjust the charge temperature to suit the batch weight and climate conditions. The batch is charged and follows the profile to the finish. If the finish temperature option is enabled: the agitator automatically turns on and air is diverted through the cooling bin. The roast is discharged from the drum and cooled in the bin.

In auto mode, it is necessary for the actual bean temperature to be just below the target bean temperature at the bottom out point. This will allow the automated fuel percentage to best mimic the manual setting. The automation will start putting in the energy (fuel percentage) needed to follow the steep temperature ramp rate of the manual roast. If the *actual bottom out temperature* is higher than the target temperature, then the automation will reduce the fuel percentage to adjust to the target temp. By reducing the fuel, the automation will establish a slower ramp rate. Because of the slower ramp rate, the actual temperature will soon lag behind the target temperature.

Consider the *bottom out temperature* as a starting point for the automation to follow the profile. To properly reach the desired bottom out temperature, the operator must use their own judgement to set the charge temperature.

FUEL PERCENTAGE

It is important to remember that the coffee roaster cannot give more than 100% fuel. If 100% fuel is used in the manual roast the automation will have no further adjustability to increase fuel during an automated roast. For this reason, we suggest using no more than 85% fuel during any manual roast that will be saved for replication in an automated roast. This will allow the automation the flexibility to increase fuel during an automated roast.

BEAN TEMPERATURE

Coffee is ideally stored at consistent temperature. Once the operator is comfortable with the roasting system they will find it is very accommodating to green coffee temperature variations.

CHARGE TEMPERATURE

The charge temperature and batch size determine the bottom out temperature. A larger batch or colder coffee require a higher charge temperature.

BOTTOM OUT TEMPERATURE

If the batch size or green coffee temperatures vary, the charge temperature must be adjusted to accommodate the variations. The temperature at which the coffee reaches its lowest temperature starts the chain of chemistry changes.

19. ALARMS

The following table is a list of alarms and their explanation.

Alarm	Causes
ROAST TIME EXCEEDED	Maximum allowable roast time is 25 minutes
AGITATOR MOTOR FAILURE	Agitator motor is not operating
CHECK AIR PROXIMITY SENSOR	Proximity sensor for air position requires attention
BLOWER MOTOR FAILURE	Blow motor is not operating
DRUM MOTOR FAILURE	Drum motor is not operating
FIRE DANGER	Product has reached critical temperature
ROAST FLAME FAILURE	Burner flame has been lost; or Burners failed to light
ROASTER OVER TEMPERATURE	Product temperature has reached 485°F (251°C)
DRUM DOOR FUEL OFF	Drum door is open, fuel is force off
THERMOCOUPLE FAULT	Thermocouple requires attention
Emerg. Stop Button	Emergency button is activated
Drum Motor Failure (RPM PROX)	Prox sensor for drum shaft rotation fault
Drum Door Failure	Drum door proximity switch is not verified
Drum Door Open	Warning when trying to start a roast and drum door is open
Cooling Bin/Agitator Tape Switch OPEN	The tape switch around the cooling bin has been activated
Chaff Gate Roast-Air is CLOSED !	If equipped w/sensor, Chaff collection is un-available, barrel can be emptied
Chaff Gate Cooling-Air is CLOSED !	If equipped w/sensor, Chaff collection is un-available, barrel can be emptied
Chaff Gate 1 (or 2) is CLOSED !	If equipped w/power slide gate, Chaff collection is un-available, barrel can be emptied

Water Pressure Is Low !	If equipped w/sensor, the connected water for quench is low
Oxidizer Motor Failure (1 or 2)	Oxidizer motor is not operating
Oxidizer Over Temp (1 or 2)	Oxidizer temperature has reached alarm set point
Oxidizer Diff/ Pressure Failure (Check Magnehelix) (1 or 2)	If equipped w/ sensor, detected air blockage (clean catalyst)
Oxidizer Flame Failure (1 or 2)	Oxidizer flame has been lost; or Oxidizer failed to light
Hopper Gate Is Open	Warning when trying to start loader and hopper gate is open
Hopper Gate Failure	Hopper gate is very slow to open or open position is not verified
Hopper is LOADED !	Warning when trying to start the loader, a second time or if equipped w/ hopper sensor, the sensor detects green beans
Loader is Running	Warning when trying to start a roast and loader is running
Loader Motor Failure	Loader motor is not operating
Cooler Motor Failure	Cooler motor is not operating
Destoner Motor Failure	Destoner motor is not operating
Chaff Barrel is FULL !	The set chaff barrel number of roasts (capacity) is reached

Appendix A

CONFIGURING TP-LINK FOR INTERNET ACCESS TO HMI

This method is used if the end user has an existing Wi-Fi network that is accessible via existing router, or a personal hotspot from a phone that is used to access the Internet. For example, if there is an existing wireless router used for wireless access to the internet, the TP-Link router can be configured to act as a client to wirelessly bridge to the network and then provide internet access to the HMI through the hardwired ethernet port on the TP-Link router.

1. On the TP-Link router, change the Mode Switch to “Share Hotspot”. The router is powered via the USB port on the back of the Roaster HMI. Note: If the router powers up and down while connected to the HMI’s USB port, then use the supplied power adapter for the router!

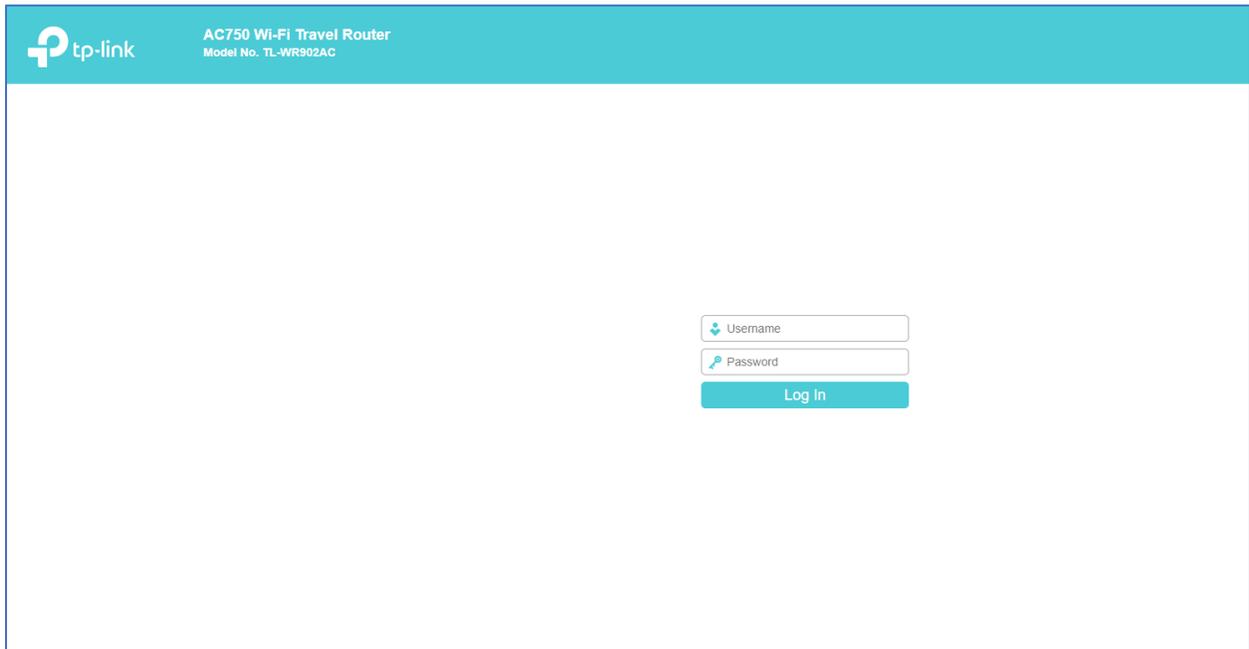


Smart Device (iPhone, iPad, Android, etc.) or Computer with Wi-Fi card

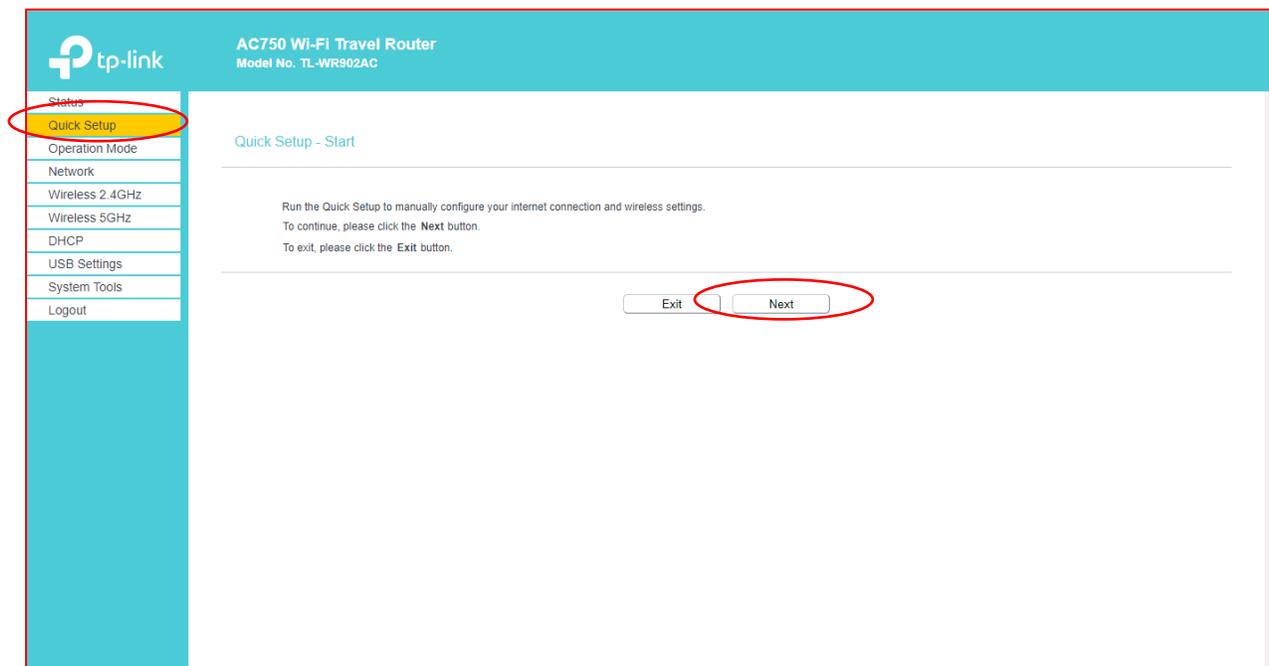
- a. From the device, login to the TP-Link router
- b. Go to network settings, select the TP-Link router, enter the default password which can be found on the bottom of the router or on the info card within the router box. NOTE: The same device CANNOT be used to configure Wi-Fi and be used as a Hotspot!

Computer with Hardwired Ethernet Port

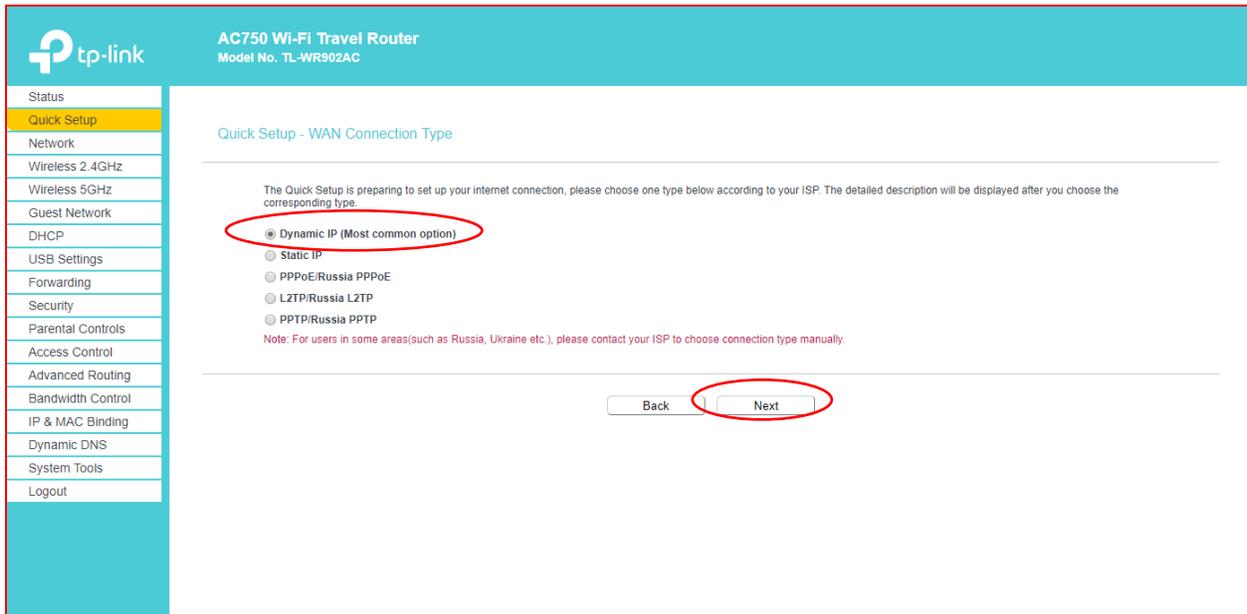
- c. Connect computer’s Ethernet port to TP-Link Ethernet port and allow the router some time to assign an IP address to the computer and reboot.
2. Open a web browser and enter <http://tplinkwifi.net>
 - a. Username: admin
 - b. Password: admin



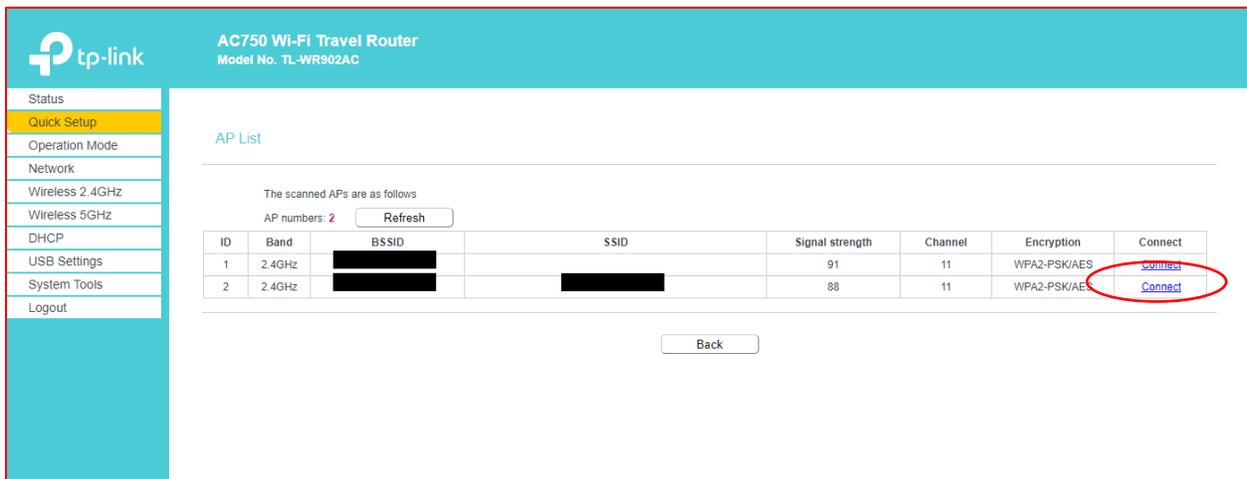
3. Once logged in, select “Quick Setup” from the menu on the left of the browser and click next.



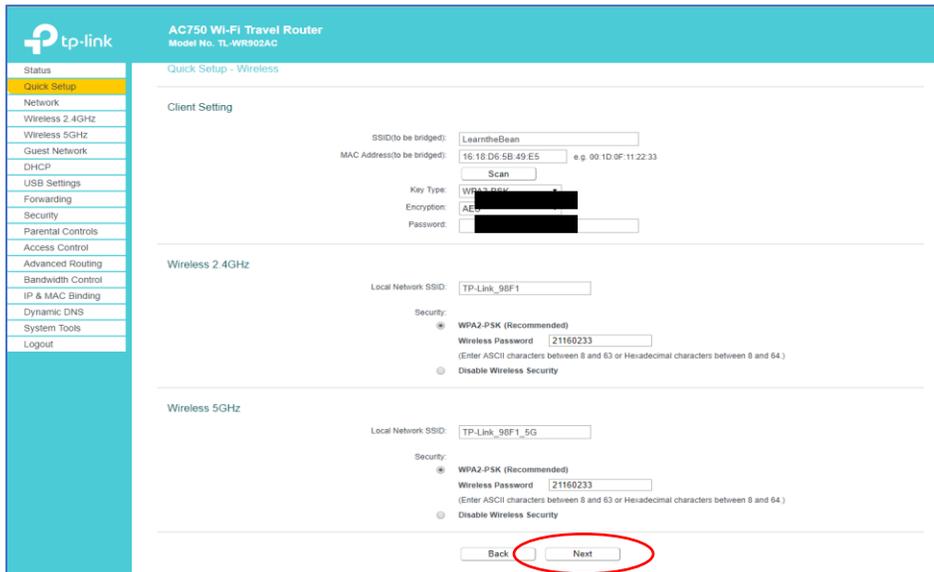
4. Choose “Dynamic IP” and click next.



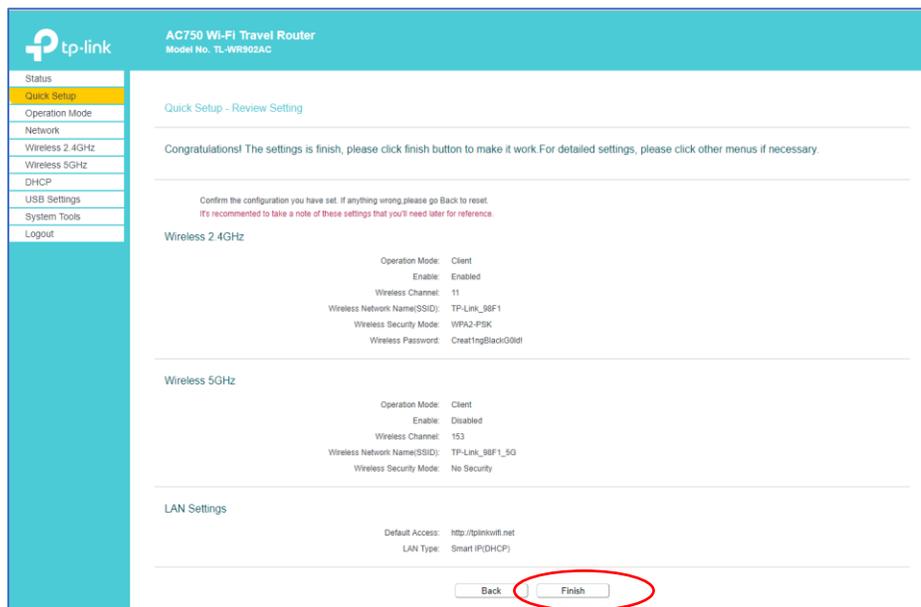
5. The next page that comes up is the list of wireless networks that are shown as available to the TP-Link router. Select the network to login to by selecting the blue “Connect” for that particular network.
- The SSID is the network name of the existing router
 - If using a wireless hotspot from a smart phone, the phone’s shared network name will show up here. The password will be the Wi-Fi Password defined in settings.



6. Next, enter the password for the selected network and click next.



7. Click finish.



- a. The router will reboot
 - i. Once rebooted, the router will have internet access.
- b. Connect the HMI Lan1 Ethernet port to the TP-Link Ethernet Port.
- c. This will allow the Weintek HMI internet access while keeping remote access to the screen via smart device with CMT Viewer app.