

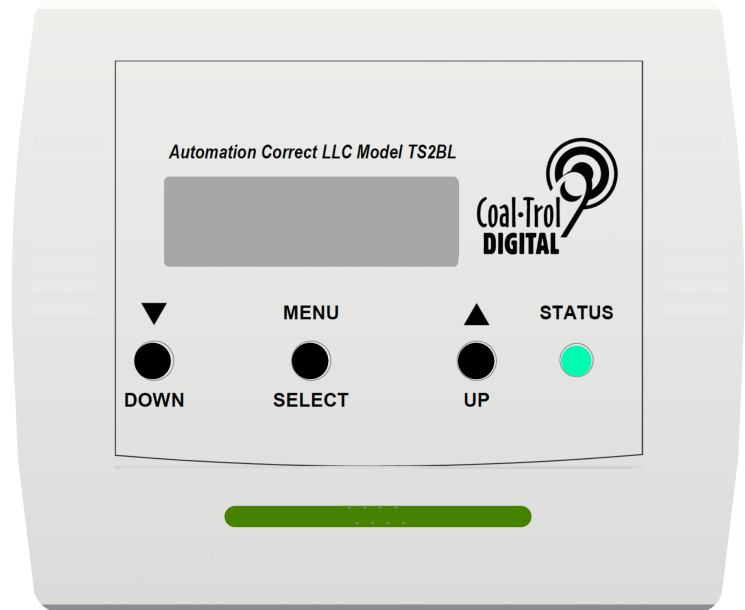
Coal-trol Digital™ TS2BL Thermostat

User Manual

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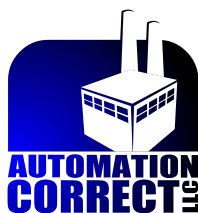
The Coal-trol Digital™ system has been specifically developed to improve the performance and convenience of your anthracite coal stove. The TS2BL thermostat and solid-state control module make this possible.

An investment of a small amount of time to review this manual will ensure the proper performance of your Coal-trol Digital™ system.



Features, compatibility and benefits of the TS2BL Thermostat:

- Fully compatible with Coal-trol TS2 Thermostat. Must be used with CM2-OEM, CM2-4, and CM2-4-XX Control Modules.
- Custom backlit display for easy use and setup.
- Single Setpoint Mode (default, super easy to use), TS2 Mode (two setbacks), TS2ES Mode (formerly Energy Star - 4 setbacks Weekdays, 4 setbacks Weekends). You choose.
- New - power loss timer recovers fire or prevents fuel feed when fire is out after power interruption.
- Variable speed convection fan speed - Automatic or manual control.
- New - two RJ45 connectors - choose behind wall or surface wiring.
- Standard on appliances by Leisure Line Stove and Hitzler Stoves.
- Use to upgrade control systems on Alaska, Keystoker, Reading, Harman (Magnum), Triburn and other anthracite stoker stoves and furnaces.



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Welcome

To a new era in solid fuel heating. You have chosen to improve your household comfort and increase the efficiency of your heating dollars.

The TS2BL is designed to be mounted to an interior wall, out of direct sunlight. Mounting hardware is provided and two thermostat control cord receptacles are available to accommodate different mounting situations. The thermostat should not be placed on a shelf or couch or placed in a location where it will be insulated from the flow of air in the space you are heating. In your thermostat's packaging you will find an insert that has thermostat wall mounting instructions and a drilling template.

This manual assumes you have already installed and connected the Control Module to your stove's motors. Please reference the Control Module manual for installation instructions, or contact a local automatic coal stove installer.

Connect the TS2BL to your Control Module using the thermostat control cord. Automation Correct can supply you cords of different lengths if the one included in your system purchase is not long enough. You can also use standard ethernet patch cords to connect the thermostat to the control module. Do not connect either the TS2BL or control module to an ethernet network. It may result in damage to the Coal-trol or your ethernet equipment.

Power will be supplied to the TS2BL thermostat once the control module is plugged into an electrical outlet and your thermostat is connected to your control module. Any switch integrated in your CM-OEM or CM2 control module only controls power to the motor outputs, not to the connected thermostat.

Safety and Warnings

ATTENTION - Please follow all manufacturer instructions that came with your stove or furnace. The Coal-trol Digital is designed to complement and enhance the safe operation of your appliance. Specifically, the Coal-trol Digital control system has been designed for use with appliances tested to ANSI Standard Designation: E1509-95, Standard Specification for Room Heaters, Pellet Fuel-Burning Type and/or UL1482, Room Heaters, Solid Fuel Type.

Use of the Coal-trol Digital™ on appliances not permanently marked with one of the above designations voids all warranties and may be unsafe. Contact us or your stove manufacturer if you are not sure that your stove/furnace is built in compliance with these safety standards.

WARNING - The Coal-trol Digital™ is capable of regulating a coal fire smaller than required to maintain a proper chimney draft. Follow all manufacturer's recommendations for minimum draft pressures and temperature. The use of mechanical means such as a draft inducer fan may be required to ensure proper draft at low fire. Installation of a carbon monoxide detector (not included) is highly recommended.

Please keep reading... Additional Safety Information:

THIS PRODUCT HAS A GROUNDING TYPE PLUG AND REQUIRES A GROUNDING TYPE OUTLET. IF THE PLUG DOES NOT FIT, CONTACT A QUALIFIED ELECTRICIAN. DO NOT MODIFY THE PLUG IN ANY WAY.

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT CONNECT TO A CIRCUIT AT MORE THAN 150 VOLTS TO GROUND.

RISK OF ELECTRICAL SHOCK: THE CONTROL MODULE AND THERMOSTAT HAVE NO SERVICEABLE PARTS INSIDE. SEE WARRANTY FOR SERVICE.

WARNING: BYPASS OF MECHANICAL VENT SPILLAGE SWITCH (FUME SWITCH) OR BONNET TEMPERATURE LIMIT, IF INSTALLED IS DANGEROUS. OPERATION MAY CAUSE SERIOUS INJURY OR DEATH, DUE TO CO POISONING OR FIRE.

FOR INDOOR USE ONLY

For Service or Repair

Contact your dealer or our company.

Phone: (315) 299-3589 (Leave a message. We get too many junk calls)

Email: coaltrol@automationcorrect.com

Web: www.automationcorrect.com

Coal-trol Digital™ Limited Warranty

THREE-YEAR WARRANTY - Automation Correct LLC (us) warrants TS2BL Thermostat and Control Module to be free from defects in material and workmanship. If a defect is found within three years from the date of original installation of the product (whether or not actual use begins on that date) Automation Correct LLC will provide a new or remanufactured part, at our sole option, to replace any defective part, without charge for the part itself.

This warranty does not include labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing, or handling either defective parts or replacement parts.

Warranty Conditions:

1. Warranties only apply to products in their original installation location.
2. Installation, use, care, and maintenance must be normal and in accordance with the instructions contained in the Operation Manual, Installation Manual and Automation Correct LLC's Service Information.
3. Defective parts must be returned to us or an authorized dealer for credit.
4. All work is performed during normal business hours.
5. This warranty applies only to residential use.

LIMITATIONS OF WARRANTIES - All implied warranties (including implied warranties of merchantability and fitness for a particular purpose) are hereby limited in duration to the period for which the LIMITED WARRANTY is given and applies. Some states do not allow limitations on how long an implied warranty lasts, so the above may not apply to you. The expressed warranties made in this warranty are exclusive and may not be altered, enlarged, or changed by any distributor, dealer, or other person whatsoever.

Automation Correct LLC will not be responsible for:

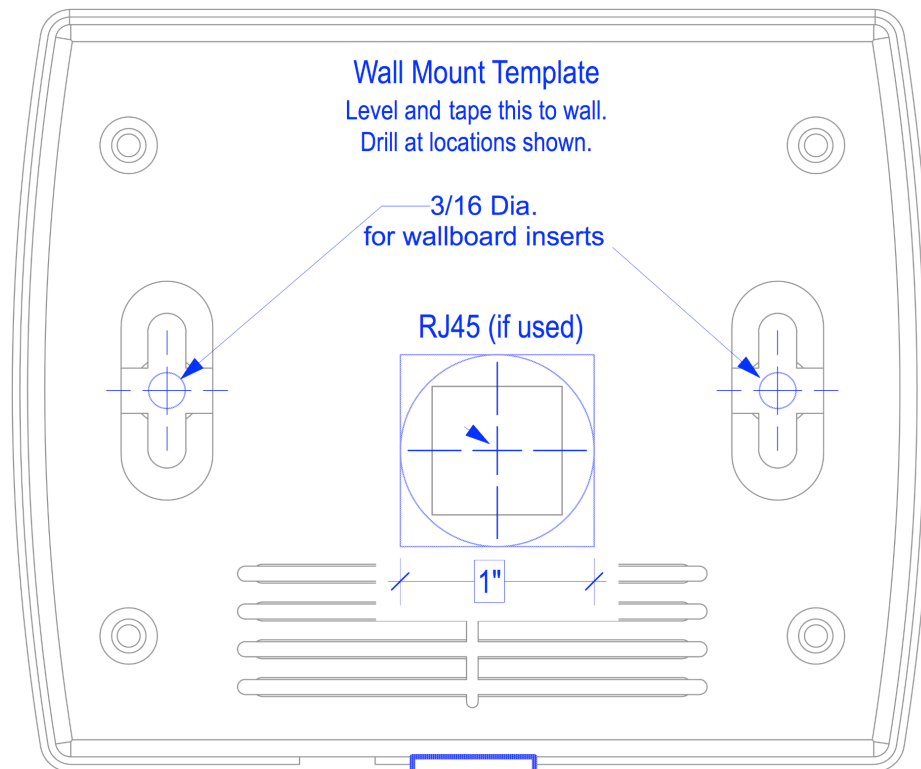
1. Damage or repairs as a consequence of faulty installation, misapplication, abuse, improper servicing, unauthorized alteration or improper operation.
2. Failure to operate due to voltage conditions, blown fuses, open circuit breakers or other conditions beyond the control of Automation Correct LLC.
3. Parts not supplied or designated by us, or damages resulting from their use.
4. Automation Correct LLC products installed outside the 50 US states or Canada.
5. Cost of heating fuel of any kind whatsoever including electricity.
6. Any special indirect or consequential property or commercial damage of any nature whatsoever. Some states do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you.

This warranty gives you specific legal rights, and you also may have other rights, which vary from state to state.

Locating and Mounting the Thermostat

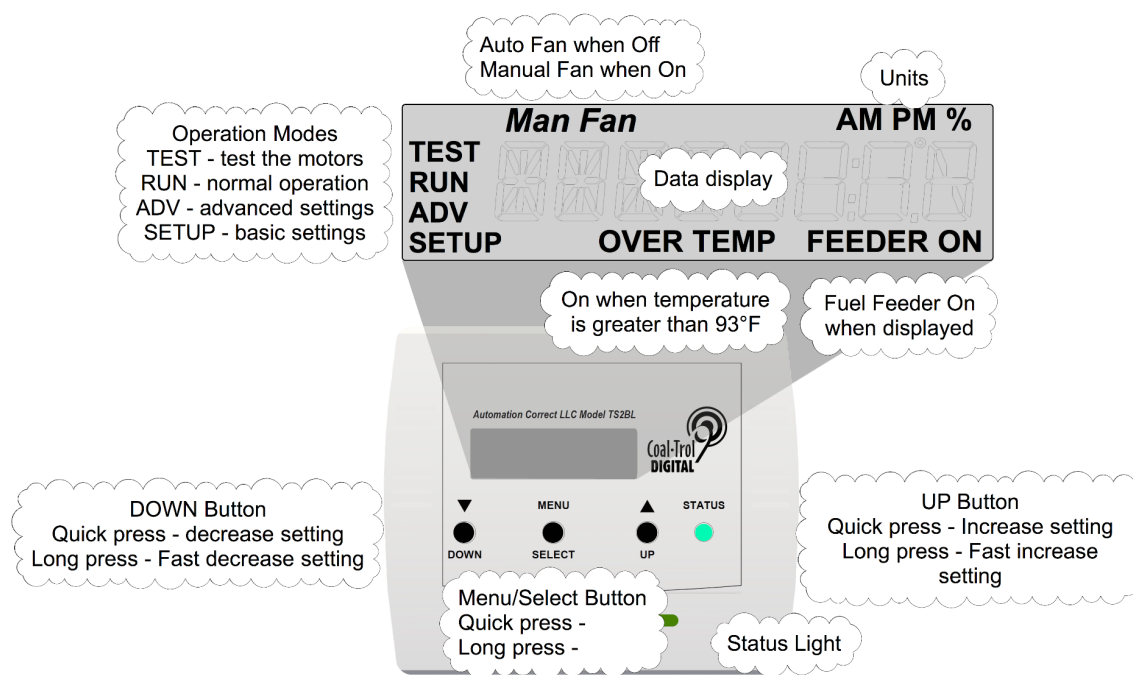
Mount the TS2BL thermostat at eye level, preferably on an interior wall. For proper operation the thermostat must either be in the same room as the stove, or must readily sense the diffuse heat from a heat discharge and return air duct system. Avoid the direct breeze of warm discharge air on the thermostat. To the side or rear, or across the room from a stove is good.

The TS2BL connects to the Control Module on the appliance with a RJ45 wire. Choose either behind the wall wiring method or wall surface wiring method. Use the template included with your thermostat to assist in mounting.



QuickStart

The TS2BL is compatible with the vast majority of forced air automatic coal stoker stoves on the market and in use. It can be used straight out of the box with no setup needed for users of Leisure Line and Hitzer brand stoker stoves. If you are using a Coal-trol Digital system on a Keystoker, Alaska, Reading, Harman, or other brand automatic stoker stove you will need to adjust your IDLE, MAX, and possibly your TRBN settings. The recommended settings for which are detailed in the [Recommended Settings by Stove Brand](#) section below. Applying those settings is detailed in the [SETUP](#) and [ADVANCED](#) menu sections below.



Button and Display Basic Description

Operation of the TS2BL thermostat is accomplished with two types of button presses. First is the “tap” which is a short duration press and release of a button lasting no more than one second. The second type of press is the “press and hold” where you press a button and hold it down for an extended period of seconds, releasing only after reaching a desired screen or result.

Upon power up from an extended loss of power, the thermostat will go through an initialization that displays the version number of the software, the manufacturer the thermostat is sold by, and then “PWR LOSS” with the LCD flashing. The Coal-trol Digital Control Module outputs will all be off in this power outage recovery mode. This is a safety that waits for the user to acknowledge the restart from complete loss of power before it will operate the stove’s feeder. This will prevent the Coal-trol system from dumping a hopper of coal into the ash pan after a power outage event that lasted long enough for the fire to have gone out.

Acknowledge the power up and get your stove running by tapping the MENU button. More information on how the TS2BL handles power outages and the four different restart modes is contained in the [Power Outages](#) section.

The thermostat comes pre-configured for Single Setpoint mode (SSP). In this mode there is only one setpoint used for all times and days of the week. Adjusting that setpoint is as simple as tapping the UP/ DOWN buttons (or pressing and holding them to make larger adjustments) while the unit is in the round-robin screens. The thermostat will adjust the stove's fire to reach and maintain the set temperature. More details on the three available setpoint modes can be found in the [Setpoint Modes and TS2 & TS2ES Compatibility](#) section.

For many people, that's all there is to it!

If you wish to use multiple setpoints, as were available with the TS2 or TS2ES; if you need to adjust settings for one of the above mentioned stove brands; if you have a dual stoker Coal-trol Digital system or other customized configuration; or if you wish to learn more about the capabilities and features of your new Coal-trol Digital TS2BL thermostat, please read on.

Recommended Settings by Stove Brand

The TS2BL comes pre-loaded with settings appropriate for most Leisure Line and Hitzer brand automatic stoker stoves. If you have another brand stove please reference this table and adjust the TS2BL's settings to the recommended defaults for your stove. These, like the pre-loaded settings, are our recommended starting points. Manufacturing differences, tolerances, and parts changes can result in the user needing to adjust from these recommendations to achieve the optimal range of operation for their stove.

Setting	Display	Leisure Line Hitzer	Keystoker 90/105/Koker	Reading (Tri-burner)	Reading (separate combustion blower)	Alaska (paddle)	Harman (Magnum)
Idle Feed Rate	IDLE	6	10	50	5	4	6
Maximum Feed Rate	MAX	40	85	99	25	30	99
Triburn	TBRN	N	N	Y	N	N	N
Mechanical		N/A	Set feeder screw to full clockwise.	Set red nut to $\frac{5}{8}$ " from acorn nut.	Set red nut to tight against acorn nut, then back off 2 turns.	N/A	Set adjustment handle to 11/16" from the acorn nut.

Follow the instructions in the sections below for accessing the IDLE and MAX settings in the [SETUP](#) menu and, if necessary, the TBRN setting in the [ADVANCED](#) menu, to apply these recommended settings.

Setpoint Modes and TS2 & TS2ES Compatibility

As mentioned in the QuickStart section above, the Coal-trol Digital TS2BL thermostat comes with the Single Setpoint, or SSP, mode of operation pre-loaded from the factory. In this mode there is only one setpoint and it is adjustable directly from the round-robin screens by using the UP/DOWN buttons.

The TS2BL offers two additional modes of operation:

The TS2 mode provides the setpoint experience of the original TS2 thermostat by providing 2 programmable set points, one for daytime and one for nighttime. These two setpoints are used on all days of the week. You get to control the time of the setpoint as well as the temperature setting. While in this mode, on the round-robin screens, you can perform a temporary override

of the currently programmed setpoint by using the UP/DOWN buttons to adjust the temperature setting. When the next programmed setpoint time comes, the programmed setpoint will take over. In this mode, you will need to set the thermostat's time setting in the SETUP menu. Setpoint programming is also available in the SETUP menu, detailed in the SETUP menu section below.

Lastly, there is the ES mode, which replicates the setpoint programming capability of the original TS2ES thermostat. In this mode, you have 8 programmable setpoints, 4 for weekdays (morning, day, evening, and night) and 4 more for weekends. Like with the TS2 mode, setpoint programming is accomplished in the SETUP menu. You will have to set a time as well as the day, also done in the SETUP menu. Temporary overrides of setpoint temperatures is accomplished by using the UP/DOWN buttons from the round-robin screens. An override will revert to the programmed setpoint temperature when the next programmed setpoint time is reached.

If you wish to make a long-term override of programmed setpoints, such as for a vacation, it is recommended you switch the thermostat back into Single Setpoint (SSP) mode and set the temperature where you want it. Any programmed setpoints you have set up while in TS2 or ES mode will be remembered and reinstated when you return the TS2BL back to the TS2 or ES mode.

Power Outages

The TS2BL has a new feature that better handles power outage situations. In the event of a power outage, one of four things will happen.

No Warning Screen	Less than 5 minutes	If power is removed for less than 5 minutes the TS2BL will restart and operate normally as if nothing has happened. Time will be kept during the outage and the clock adjusted accordingly if using TS2 or ES mode, but there will be no change in the operation of the stove from before the power outage.
"PRW IDLE"	5 to 8 minutes	If power is removed for between 5 and 8 minutes, the TS2BL will restart into an idling mode and flash "PRW IDLE" on the screen. This is to attempt to maintain a fire, but allow you time to check on the fire condition before normal operation resumes. Normal operation will not resume until you acknowledge the warning by tapping the MENU button. While in this power outage recovery mode the stove will operate at the IDLE feed rate. Normal temperature control will not happen until you acknowledge the warning. Time is kept during the outage and will be adjusted automatically when power is restored, if using TS2 or ES mode.

"PRW OUT"	8 or more minutes	If power is removed for 8 or more minutes, but not long enough for the thermostat's backup power to be depleted, the TS2BL will restart into a power out mode and flash "PRW OUT" on the screen. In this mode the stoves motors will be turned off and the control will wait for you to acknowledge the warning screen by tapping the MENU button, when it will resume normal operation. This mode assumes that the fire has gone out after 8+ minutes and will prevent coal being dumped into the ash bin. Time is kept during the outage and will be adjusted automatically when power is restored, if using TS2 or ES mode.
"PWR LOSS"	1 hour or more	If power is removed for more than an hour the TS2BL's backup power will likely be depleted. When power is restored the control will startup in the power loss mode and flash "PWR LOSS" on the screen. Tap the MENU button to start normal operation. This is the mode the thermostat will start up in when you first power it up after installation. Time will not be kept during this outage duration, so you will need to manually adjust the time setting as needed if you are using TS2 or ES mode.

Test Mode

When setting up your stove, after reconnecting it from the off-season, or when you're troubleshooting a problem it is often useful to run the TEST mode of the thermostat, to cycle through the outputs of the control module. The TEST mode is located in the [SETUP](#) menu under the TEST action item.

To enter the TEST mode:

- Press and hold the MENU button for 10 seconds, until the screen reads "SETUP", then release.
- Tap the MENU button until you see the word "TEST" on the display.
- To start the TEST mode cycle, tap the UP or DOWN button.

If you go past the TEST item, you can keep tapping MENU to loop through the SETUP menu, until you get back to it.

While in the TEST mode cycle, the display will show what stage of the test is being run. These stages will auto-advance in a continuous cycle, changing every 10 seconds.

The stages and what it's doing are:

Stage	Description
"ALL OFF"	Turn off all outputs.
"STOKER"	Turn on only the stoker output.
"COMBSTN"	Turn on only the combustion blower output.
"CONVCTN"	Turn on only the convection blower output.
"VENT"	Turn on only the power vent output. Only shown if CMT mode is set to "SV" or "SFV", see ADVANCED menu for more information.
"SUPP FAN"	Turn on only the supplemental/aux fan output. Only shown if the CMT mode is set to "SF" or "SFV".
"ALL ON"	Turn on all outputs at the same time.

The cycle will repeat until you turn off the mode by tapping any button.

If you are using a CMT setting of "D" (Dual Stoker) please see below in the [Control Module Type](#), [SETUP](#), and [ADVANCED](#) sections for more details on how to use Dual Stoker features in the TS2BL thermostat and to find out how TEST mode and its cycle stages when Dual Stoker mode is set.

Menus

In this section you'll learn all about the menus of the TS2BL. Here are some general principles to help you navigate around.

- 1) Tapping any button while the backlight is off will turn the backlight on. This tap to turn on the backlight will not modify any setting or influence the menus. The backlight will turn off after 2 minutes of no button presses.
- 2) In almost all menu screens if you wait for 60 seconds the TS2BL will return to the round-robin display. This is called round-robin auto-return. If you do not want to wait, you can exit from most menu screens back to the round-robin by pressing and holding MENU for about 3 seconds (you will see the current temperature screen show up on the display). This is called jumping to the round-robin. The few menu screens where these two behaviors do not work will be noted in the descriptions below.
- 3) Use the UP and DOWN buttons to adjust menu settings. Tap for minimum increments. Press and hold to move faster through the available setting range.
- 4) Some items in the menus are sub-menus or action locations. To enter the sub-menu or activate the action, tap the UP or DOWN button.

Round-Robin / Home

The round-robin screens auto-advance on a timed loop to show important information quickly, at a glance.

Screen Example	Name	Description
" 75°F"	Current Temperature	Displays current temperature.
"DAY 71°F" "OVR 82°F"	Setpoint Temperature	Displays current setpoint. In SSP mode this is not shown. It will only show when the thermostat is in "TS2" or "ES" mode (see ADVANCED menu section). In TS2 or ES modes this will show "MOR", "DAY", "EVE", "NIT", "OVR" for Morning, Day, Evening, Night, or Override as is appropriate for the mode and the current setpoint setting being used.
"FR 99%"	Feed Rate	Displays the current stoker feed rate.

That's the end of the round-robin screens. If you use the UP/DOWN buttons while in the round-robin screens, you will be brought to the Change Setpoint screen.

"SET 76°F" "OVR 73°F" "NIT 62°F"	Change Setpoint	<p>By using UP/DOWN buttons from any round-robin screen, you will be put into this screen where you can adjust the setpoint. You will notice that the display flashes rapidly to help indicate you are in temperature adjustment mode.</p> <p>In SSP this screen will read "SET" followed by the setpoint setting. This setting will be maintained until you change it again.</p> <p>In TS2 or ES modes this adjustment is a temporary override until the next programmed setpoint time is reached. When the setpoint temperature does not match the currently programmed setpoint, it will read "OVR" followed by the temperature setting. If the setting matches the currently programmed setpoint, it will show the currently programmed setpoint name – "MOR", "DAY", "EVE", or "NIT" – followed by the temperature setting.</p> <p>Tap the MENU button to return to the round-robin, or wait 5 seconds.</p>
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Lastly, if the thermostat detects a temperature higher than 95°F, it will go into a "HITEMP" alarm mode where the control will shut down all outputs and flash "HITEMP" on the screen. To exit this alarm state you must wait until the room temperature has fallen below 95°F and then tap the MENU button to acknowledge the condition and allow the control to start operating normally again.

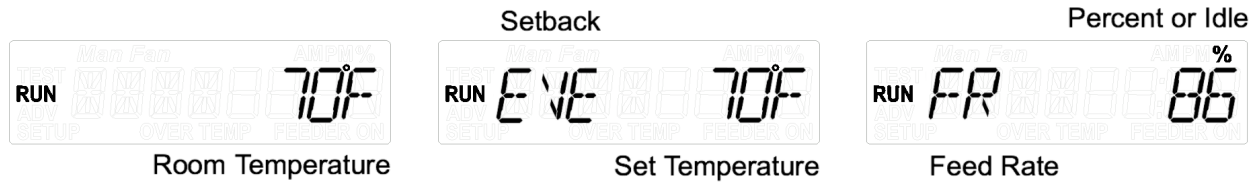
The round-robin screens will look like this when you're in "SSP" (Single Setpoint) mode (default):



These screens will look like this in "TS2" mode:



And in "ES" mode:



Quick Menu

Enter the quick menu by **tapping MENU** once while in any of the round-robin screens. **Tap MENU** to move through each screen. **Tap MENU** again on the last screen to return to the round-robin screens.

Screen Example	Name	Description
"AUTO FAN" "FS 25%"	Fan Speed	<p>Displays the fan speed setting. It will read "AUTO FAN" when the fan is being controlled by the TS2BL's logic. It will read "FS" followed by a percentage value between 1 and 99% when you have it in manual fan speed mode.</p> <p>You can adjust from auto control to manual by using the UP/DOWN buttons. Reset it to AUTO mode by trying to set a value of 0% or 100%.</p>
" 5:10AM" "THU 10:13PM"	Current Day and Time	<p>Displays the current day and time. This screen is not shown if the SPM setting (see ADVANCED section) is set to "SSP" (default). If set to "TS2" then only the time will be shown. If set to "ES" then both day and time will be shown.</p> <p>If you tap UP or DOWN while on this screen you will be able to adjust your time and day settings. The display initially show just the time and it will flash rapidly to indicate you are in adjustment mode. Press and hold UP/DOWN to make large adjustments.</p> <p>Once time is set, tap MENU. If you are in "TS2" SPM mode the control will return to the normal time display. If you are in "ES" SPM mode you will see the day setting flashing rapidly. Use the UP/DOWN buttons to adjust the setting. Tap MENU to return to the day/time display.</p>

Press and Hold MENU Sequence

To reach the menus described in the sections below you need to press and hold the MENU button. As you press and hold the menus will show up in sequence at roughly the number of

seconds listed. Press and hold until you see the menu you wish to enter, then release the MENU button and you will be placed at the first setting in that menu section.

3 seconds	Jump back to the round-robin . This works in most locations, exceptions are noted in screen descriptions in the sections below.
5 seconds	FEED Stoker (action item)
10 seconds	SETUP Menu
20 seconds	ADVANCED Menu
30 seconds	RESET (action item)

FEED

The “FEED” display is an action item. **Press and hold MENU** for **5 seconds** until you see the word “**FEED**” on the screen, then **release**. You will enter the FEED cycle upon releasing the MENU button, shown by a countdown starting (“FEED 5” on the screen). While in this mode the stoker motor will run at full speed. The number will countdown each minute. At the end of the FEED cycle the thermostat will return to the FEED entry screen. You can exit the FEED mode countdown by tapping any button, which will return you to the FEED action item screen.

While in the FEED countdown, round-robin auto-return and jump to round-robin with a 3 second press and hold of the MENU button will not work. You must exit the FEED countdown first with a button tap.

SETUP

The SETUP menu is where the most commonly used and accessed settings options are located. To enter the SETUP menu **press and hold MENU** button for **10 seconds**, until you see the word “**SETUP**” on the screen, then **release**. Once in the menu, tap the MENU button to move through the different settings, sub-menus, and action items. Tap the UP or DOWN button to enter sub-menus or activate action items. This menu wraps to the first item when you tap MENU button on the last item.

Screen Example	Name	Description
“SETPTS”	Setpoints Sub-menu	Entry point for setpoint programming sub-menu. Tap UP or DOWN to enter this sub-menu. See below for details on the items inside this sub-menu. Only shows in SPM mode “TS2” or “ES”, not in “SSP” (see ADVANCED menu section).

"IDLE 6"	Idle Stoker Rate	Adjust the idle (or minimum) fire setting. Lower values will reduce the fire size. Higher will increase. See the "Recommended Settings by Stove Brand" for suggested values. While on this screen temperature control is disabled and the stoker is forced to run at the idle rate indicated. <i>This menu screen will not auto-return to round-robin.</i> This screen remains displayed indefinitely and the stoker is run at the speed indicated as long as you stay on this screen. Use this screen to adjust your minimum stable fire setting. Use care when you have a natural draft chimney so that you maintain a proper draft pressure.
"MAX 40"	Max Stoker Rate	Adjust the maximum fire setting. Lower values will reduce the fire size. Higher will increase. See the "Recommended Settings by Stove Brand" for suggested values. While on this screen temperature control is disabled and the stoker is forced to run at the max rate indicated. <i>This menu screen will not auto-return to the round-robin.</i> This screen remains displayed indefinitely and the stoker is run at the speed indicated as long as you stay on this screen. Use this screen to adjust your maximum fire size, without pushing burning coal off the end of the grate. Use care not to overheat your stove by running on this screen for extended periods of time. If you're having trouble adjusting, leave the screen, let the stove cool down, and return to making adjustments later.
"PVS 99%"	Power Vent Speed	Adjust the speed of the power vent. This is only available with a properly equipped control module and when the TS2BL's "CMT" setting is set to "SV" or "SFV" (see ADVANCED menu section). Use care to maintain a proper draft pressure when adjusting. Follow your stove or power vent manufacturer's recommendations on power vent installation, draft pressure, and motor speed settings.
"CFT 12"	Convection Fan Threshold	Adjusts the minimum feed rate at which the convection fan will first turn on when fan speed is in the "AUTO FAN" mode (see above in the Quick Menu section). The default setting is usually good, but some stoves benefit from a higher or lower setting to let more or less heat build-up in the stove body before the fan is turned on.
"FDR 2"	Feeder Selection	This controls whether 1 or 2 stokers are being run on a Dual Stoker stove setup. Can only be used with a properly equipped control module and is only shown when the CMT advanced menu setting is set to "D" (see ADVANCED menu section).
"TEST"	Test Mode	This is the action item to enter the control module output

		TEST mode . Press the UP or DOWN button to activate it. When in this mode the display will cycle through the outputs of the control module, turning them all off first, then each output on individually, and then finally all them on together. This cycle will repeat until you exit the TEST cycle. To exit back to the “TEST” prompt, tap any button. <i>While running the TEST cycle, the thermostat will not auto-return to the round-robin and the jump to the round-robin by pressing and holding MENU for 3 seconds will not work.</i> You must exit the TEST cycle by tapping a button first. More information on TEST mode can be found in the Test Mode section.
“INFO”	About Info Sub-menu	Tap the UP or DOWN button on this menu screen to enter the INFO sub-menu. Once in this sub-menu, you will be able to tap the MENU button to cycle through the screens that display version information and manufacturer information. The last item in this sub-menu is “EXIT”. Tap the UP or DOWN button on this item to EXIT back to the “INFO” menu screen.
“EXIT”	Exit the SETUP menu	Tap the UP or DOWN button on this menu screen to exit the SETUP menu back to the round-robin screens. Tapping MENU on this screen will cycle you back to the top of this SETUP menu screen set.

Setpoint Programming

Setpoints are programmed via the SETPTS sub-menu in the SETUP menu. To enter the sub-menu tap UP or DOWN on the SETPTS sub-menu item. This sub-menu is only displayed if the thermostat is in the “TS2” or “ES” mode (see SPM in [ADVANCED](#) menu section below and the [Setpoint Modes and TS2 & TS2ES Compatibility](#) section above for more information on this setting).

Remember, after making any adjustments, you do not need to exit via the “EXIT” menu options, you can press and hold the MENU button for 3 seconds to jump back out to the round-robin, or you can simply leave the thermostat alone and in 60 seconds it will auto-return to the round-robin.

“TS2” SPM Mode

If your control is in the “TS2” SPM mode, you will see these options:

Screen Example	Name	Description
“DAY 6:00AM”	Day Setpoint	Use to set the day setpoint time.

	Time	
"DAY 75°F"	Day Setpoint Temperature	Use to set the day setpoint temperature.
"NIT 10:00PM"	Night Setpoint Time	Use to set the night setpoint time.
"NIT 62°F"	Night Setpoint Temperature	Use to set the night setpoint temperature.
"EXIT"	Exit Setpoint Menu	Tap UP or DOWN button to exit the SETPTS sub-menu.

"ES" SPM Mode

If your control is in the "ES" SPM mode, you will see these options:

Screen Example	Name	Description
"WKDAY"	Weekday Setpoint Sub-Menu	Tap UP or DOWN button to enter the weekday setpoint sub-menu.
"WKEND"	Weekend Setpoint Sub-Menu	Tap UP or DOWN button to enter the weekend setpoint sub-menu.
"EXIT"	Exit Setpoint Sub-Menu	Tap UP or DOWN button to exit the SETPTS sub-menu.

Within the "WKDAY" and "WKEND" sub-menus you will find this set of options:

Screen Example	Name	Description
"MOR 6:00AM"	Morning Setpoint Time	Use to set the morning setpoint time.
"MOR 75°F"	Morning Setpoint Temperature	Use to set the morning setpoint temperature.
"DAY 10:00PM"	Day Setpoint Time	Use to set the day setpoint time.
"DAY 62°F"	Day Setpoint Temperature	Use to set the day setpoint temperature.
"EVE 6:00AM"	Evening Setpoint Time	Use to set the evening setpoint time.
"EVE 75°F"	Evening Setpoint	Use to set the evening setpoint temperature.

	Temperature	
"NIT 10:00PM"	Night Setpoint Time	Use to set the night setpoint time.
"NIT 62°F"	Night Setpoint Temperature	Use to set the night setpoint temperature.
"EXIT"	Exit weekday or weekend sub-menu	Tap UP or DOWN button to exit the WKDAY or WKEND sub-menu.

ADVANCED

WARNING: You can modify settings in this menu that can make your stove and the thermostat behave unexpectedly. It is highly suggested that you write down current settings before making adjustments, so you can return back to the prior setting if an adjustment does not work the way you expect. This menu is intended for infrequent use and only by those who have a specific need to do so.

To access the ADVANCED menu **press and hold** the **MENU** button for **20 seconds**, until the screen reads "**ADVNC**", then **release** the button. Tap the MENU button to move through the various settings. Use the UP and DOWN buttons to make adjustments to settings. Exit via the EXIT item at the end of the menu set, or press and hold MENU for 3 seconds, or wait for 60 seconds to auto-return to the round-robin.

Screen Example	Name	Description
"A 76.3°F"	Temperature Calibration	Use this screen to adjust the temperature reading calibration. If you notice that the TS2BL's temperature readings do not match with another thermostat. Tap or press and hold the UP and DOWN buttons to adjust to the value you believe the temperature should read. The temperature will change in the smallest increments the TS2BL is able to work in, but you will notice that it is not a consistent change of 0.1°F. There are roughly 7 UP/DOWN taps per degree Fahrenheit of resolution available.
"DEG F"	Degree Mode	Use this screen to change the thermostat between degrees Fahrenheit and Celcius.
"SPM SSP"	Setpoint Mode	Use this screen to select the Setpoint Mode the thermostat will use. By default, it is shipped in Single Setpoint Mode (SSP). In this mode, there is only one setpoint and it is used all the time. Changes to it carry

		forward until you change it again. There are also the “TS2” and “ES” settings. These modes are described in the Setpoint Modes and TS2 & TS2ES Compatibility section of this manual.
“TBRN OFF”	Tri-burn Mode	Use this screen to adjust the control to operate a “Tri-burn” equipped coal stove. These stoves operate both the stoker and convection air blower with a single motor. When set to “ON” this stoker output will operate using a hybrid speed controlled and time-proportioned scheme, in order to supply more consistent combustion air at lower feed rates. In “OFF” mode (default) the stoker output is time-proportioned only and combustion air blower is always running to provide for the most efficient burn. Please read the Tri-burner Stoves section for more information on this setting and using the Coal-trol Digital system with Tri-burner style stoves.
“CMT S ” “CMT SFV”	Control Module Type	Use this screen to set what kind of control module you have connected to the thermostat. The options include: “S” - Stoker (default and used by 95% of users) “SF” - Stoker & Aux Fan (used if you had an optional Aux-Fan “dry contact” output added to your system). “SV” - Stoker & Vent (used in some OEM configurations that include an integrated motorized exhaust vent) “SFV” - Stoker, Aux-Fan, Vent “D” - Dual Stoker (used on select OEM configurations that feature thermostat controlled dual stoker feeder selection and control) For more details on this setting please look below in the Control Module Type section.
“SFT 15”	Supplemental Fan Threshold	Use this screen to control the minimum feed rate your Aux-Fan output will engage at. Aux-Fan is most typically used to integrate the Coal-trol system with a central air furnace blower, for whole-house heated air circulation. This is an optional add-on feature available with Coal-trol control modules. This will only be shown if you are using a CMT setting of “SF” or “SFV”.
“CFMN 18”	Convection Fan Minimum	Use this screen to set the slowest speed your convection fan will turn at. In other words, the speed the motor will turn when a manual fan speed of 1% is used. This is useful if you have a “sticky” convection blower fan, that hums but doesn’t turn at minimum speed (increase the setting). Likewise, if you have a very easy-to-turn convection blower, you may find you can lower this setting to get an even slower minimum fan speed. In general you should not adjust this setting unless there

		<p>is a problem with the fan turning at low speed settings, or you are guided to adjust it during a customer service contact.</p> <p>Use with care, it is possible to set this low enough that your convection blower will not turn, but will generate heat in the motor. You should always use a CFMN setting that reliably turns the motor.</p> <p>On prior versions of the Coal-trol thermostat, this was called the CFM setting.</p> <p>When on this screen the convection fan control will be overridden and it will be run at the speed associated with the setting value.</p> <p>This number should not be thought of as a percentage. It is an electrical timing control value. The lower it is, the less power will be applied at minimum fan speed settings.</p>
"CFMX 80"	Convection Fan Maximum	<p>Use this screen to set the maximum speed your convection fan will turn at. In other words, the speed the motor will turn when a manual fan speed of 99% is used. This is useful if your fan is noisy at maximum speed and you wish to set a quieter maximum speed setting.</p> <p>This is a new setting that wasn't available on prior Coal-trol thermostats.</p> <p>Like CFMN, when on this setting screen the convection fan control will be overridden and the fan will be run at the speed associated with the setting value.</p> <p>Also like with CFMN, this number should not be thought of as a percentage. It is an electrical timing control value. The higher it is, the more power is applied to the motor at maximum fan speed settings.</p>
"PVM 15"	Power Vent Minimum	<p>Use this to control how fast the power vent motor spins at a PVS setting of 1%. This is only shown when CMT is set to "SV" or "SFV".</p> <p>It is very similar to the CFMN setting, but applied to the vent motor output, if your control module is so equipped.</p> <p>All the same warning apply about modifying the setting.</p> <p>It is used to overcome "sticky" vent motors to ensure reliable fan turning at minimum speed.</p>

		When on this setting the vent output will be overridden to run at the speed associated with the setting value. And this should not be thought of as a percentage, rather it is an electrical timing value.
"PLM ON"	Power Loss Modes	This defaults to "ON". Use this to disable the power outage recovery modes of "PWR IDLE" and "PWR OUT". Total power loss, which depletes the reserve power of the thermostat, will still start up in "PWR LOSS" mode where you have to acknowledge the screen to get into the running mode. All other power outage scenarios will restart into a running state without waiting for a user MENU button acknowledgement.
"MF 60"	Manual Fan Safe Threshold	This and the following setting, MT, are used together to control under what conditions the thermostat will take fan speed control back to AUTO FAN when the user has it set for a manual fan speed.
"MT 60"	Manual Fan Safe Time	
"EXIT"	Exit the ADVANCED menu	Tap the UP or DOWN button on this menu screen to exit the ADVANCED menu back to the round-robin screens. Tapping MENU on this screen will cycle you back to the top of the ADVANCED menu screen set.

RESET

WARNING! Activating this action item is irreversible. Use only as a last resort.

The RESET entry is an action item. To reach it **press and hold MENU for 30 seconds**, then tap **UP** or **DOWN** to activate it. Doing so will factory reset your thermostat to default settings and then reinitialize the control as if it had been powered up for the first time.

All settings modifications that you have made since first powering it up will be lost. If your stove dealer or manufacturer modified the default settings, those settings will also be reset to Automation Correct factory settings.

This is useful if you get into a configuration that isn't working and you don't know how to fix it. This should be a last resort step. Please contact Automation Correct customer support before taking this action.

Advanced Topics

Control Module Type

Both through optional customized orders of our standard control module and the various stove OEM manufacturer configurations that we support for different styles of stove equipment, we have supported a variety of features over the years. In the prior TS2 and TS2ES thermostats, these different kinds of systems have required purpose specific firmware to be loaded that's intended for use with those system configurations. With the TS2BL, this is no longer the case. The new thermostat supports many of these configurations with a single firmware and an [ADVANCED](#) menu setting called "CMT", or Control Module Type.

By adjusting CMT to match your control module's supported features, you or your stove dealer can take advantage of all the enhanced functionality your Coal-trol Digital system and heating equipment have to offer.

The options supported by the CMT setting are:

- "S" - Single Stoker: This is the default setting and applies to the vast majority of users and stove OEM configurations. This supports the standard single stoker and combustion blower (both Tri-burn single motor setups and the more standard 2 motor setups), and a speed controlled convection blower.
- "SF" - Single Stoker & Aux-Fan: Select this if your control module has the "dry contact" option as an add-on, which is typically used to integrate with and control a central air furnace fan. Selecting this option will cause the "SFT" setting in the [ADVANCED](#) menu to become available. The "SUPP FAN" output in the [TEST](#) mode will also be enabled.
- "SV" - Single Stoker & Vent: Select this if your control module has support for a speed controlled power vent output. Control modules of this type are only available to stove OEMs and only used on specific models. When selected, both the "PVS" setting in the [SETUP](#) menu and the "PVM" setting in [ADVANCED](#) menu will become available. The "VENT" output in the [TEST](#) mode will also be enabled.
- "SFV" - Single Stoker & Aux-Fan & Vent: Select this if your control module has support for both an Aux-Fan dry contact output and a speed controlled power vent. Control modules of this type are only available to stove OEMs and only used on specific models. This setting combines the effect of "SF" and "SV" settings of CMT. When selected, the "PVS" setting in the [SETUP](#) menu and the "SFT" and "PVM" settings in the [ADVANCED](#) menu will become available. The "SUPP FAN" and "VENT" outputs in the [TEST](#) mode will be enabled.
- "D" - Dual Stoker: Select this if your control module has support for independent control of the motors on each stoker. There will be two individual stoker motor output receptacles available on your control module (not plugged into a Y-Splitter cord) and two combustion blower motor receptacles, as well. Control modules of this type are only available to stove OEMs and only on specific models of dual stoker furnaces. Selecting this will make the "FDR" setting in the [SETUP](#) menu available. It will also modify the

[TEST](#) mode sequence to: “ALL OFF”, “COMB 1”, “STOKER 1”, “COMB 2”, “STOKR 12”, “CONVCTN”, “ALL ON”. COMB 2 and STOKR 12 phases will only be included in the cycle if the FDR setting in SETUP is set to 2.

In general almost all users have a Single Stoker “S” type of control module. These have a stoker, combustion, and convection plug/receptacle on or attached to the control module. They may also include an “Igniter” output, that was for a now discontinued feature. Those that optionally purchased an Aux-Fan dry contact set should generally select the “SF” setting. If the Coal-trol Digital control module has a vent plug/receptacle on it, you should use the “SV” setting. Select “SFV” if you have both dry contact outputs and a vent output on or attached to the Coal-trol Digital control module. Lastly, if your control module has two independent outputs for two stokers, and another two for two combustion blowers, and one for a convection blower (or convection blower pair, supported by a Y-Splitter cord) select setting “D” for Dual Stoker.

If you happen to have one of our early “Advanced” system control modules that are labeled either “CM1”, “PB1”, or “CM1-4” that had five three prong power receptacles, as well as two 2 prong receptacles for safety switch support, and a aux-fan dry contact set on the side: Thank you for your early support of our products! Your control module supports the features of “SF” for the CMT setting. However, if you were using your original thermostat still, not an upgrade to the TS2 or TS2ES, you should contact Automation Correct customer support. Particularly if you hear a buzzing or chattering sound from the control module while running it with the TS2BL. Your control module may need a modification to be fully compatible with the TS2BL control.

If you are unsure of what kind of control module you have and have reason to believe your control module may support options besides those offered by the “S” setting, please consult the documents included with your stove, contact your stove dealer or manufacturer, or contact Automation Correct customer support.

Dual Stoker

In addition to the details provided in the [Control Module Type](#), [SETUP](#), and [ADVANCED](#) sections above, please consult the original documentation that came with your stove. If you have questions or are having a problem using the dual stoker features with your stove with the TS2BL, please contact your stove dealer, stove manufacturer, or Automation Correct customer support for one-on-one support.

Tri-burner Stoves

Tri-burner style stoves use a single motor to drive both the stoker mechanism and the combustion air blower, instead of the more common arrangement of a motor driving the stoker and a separate motor turning the combustion blower. The Coal-trol Digital system does run these stoves (see TBRN setting in the [ADVANCED](#) menu) and we do have a recommended mechanical setup to go along with our recommended IDLE and MAX settings in the [Recommended Settings by Stove Brand](#) section.

The nature of the single motor driving both stoker and combustion air results in a less efficient low fire system than what is capable with a 2 motor arrangement. Tri-burn stoves have limited turn down potential at IDLE. While the Coal-trol Digital can and does run Tri-burner style stoves and furnaces, we do recommend people convert to two separate motors to drive the stoker and combustion blower to get the best range of low fire and high fire performance from your stove with the Coal-trol Digital system.

There are some coal fired heating appliances that, similarly to Tri-burn stokers, also utilize one motor to drive both stoker and combustion air, but they also employ a solenoid to disengage the stoker linkage from the motor. This allows the motor to run continuously to drive combustion air, while the stoker is switched on and off as needed. Unfortunately, the Coal-Trol Digital control system is not designed to work with this style of stoker system, at least not without modifications. If you have one of these stoker systems, please contact Automation Correct for support.

Manual Fan Safe Threshold and Time Settings

The MF (Manual Fan Safe Threshold) and MT (Manual Fan Safe Time) settings act together to provide a safety against running the stove at a consistently high feed rate for an extended period of time while the control is in manual fan mode.

Most people use Manual Fan mode to run the convection fan at a fixed, slow speed, to keep a constant light, low noise circulation in the room the stove is in. We discovered that some lower cost, lower quality stoves were experiencing damage to their convection fans, particularly units with the fans mounted relatively high on the back of the stove body. The damage was the result of overheating due to users running low manual fan speeds while the stoves were running on the higher end of the feed rate capability of their stove. The fans were not moving enough air to cool themselves nor the stove body.

To combat this problem the Manual Fan Safe system was added to the Coal-trol Digital thermostats several years ago.

These two values, MF and MT (located in the [ADVANCED](#) menu), when multiplied together cannot exceed a value of 3600. If you increase one of the two so that the value of 3600 would be exceeded, the control will automatically reduce the other setting to maintain a maximum multiplied value of 3600. Why 3600? Because the two numbers when multiplied in effect represent a BTU type of value. Through trial and error we arrived at 60 minutes running at a FR of 60 being a sweet spot for total heat generation before this fan overheating effect became a concern. This 3600 value serves as a target total heat output value we want to protect against exceeding without automatic fan control kicking in to run the fan at an appropriate speed to get rid of the heat in the stove body and convection fan motor.

The way these values are used is that if feed rate is over the MF setting, the control will start a timer. As long as the FR remains over the MF setting and manual fan speed is still in use, the timer will continue until it reaches MT minutes. At that point AUTO FAN mode will be reinstated. Any dip in feed rate below MF or the user setting fan control back to AUTO FAN will result in the timer being reset.

TIP: If you like to run a constant low fan speed, even when the stove is at IDLE feed rate, instead of using manual fan speed, try this: set a CFT setting of 0 ([SETUP](#) Menu) and then adjust the CFMN setting ([ADVANCED](#) menu) to suit your desired, always-on low fan speed. And use the new CFMX setting (also in [ADVANCED](#) menu) to set a top fan speed that you can live with and that will move enough heat off of the stove in a high feed rate condition. Then run the fan speed in AUTO FAN. This will allow the control to ramp up when needed to meet a high FR condition, but keep a constant low fan speed going when in lower feed rate, and set a fan speed range that is acceptable to you from both a noise level and safety perspective.

Where did HLF go?

HLF (Heat Loss Factor) in the TS2 and TS2ES thermostats was a good idea that was poorly implemented. We've discontinued it for now while we work on an alternative setting that will allow users to adjust the tuning of the control to better match some particular installation needs.

We've found that most people are able to address the problem HLF was intended to solve by using a combination of increasing air circulation, increasing the IDLE setting, or mounting their thermostat in a better location.

If you find you are having trouble with far too sluggish response, please contact our support through phone or email so we can help troubleshoot your situation and try to get you satisfied with your Coal-trol Digital coal stove control system.

The Temperature Keeps Overshooting Way Above Setpoint

Some Coal-trol users run into a problem where the temperature in the house or room overshoots significantly past the setpoint. This can happen due to external heating (dramatic outside temperature swing upward, swings caused by the sun and the particular construction of the house, etc.) or due to a setpoint change upward and the space being heated much more quickly than the control's tuning is set up to expect.

Like with the HLF setting discussed above, we are working on a new setting that will help address the need for faster response to externally generated temperature swings and situations where upward setpoint changes result in large overshoots past setpoint.

For now, our recommendations are to make sure your thermostat has good air circulation around it. If it is in an alcove or otherwise insulated from registering temperature changes in the dwelling, it will be slower than normal to react. You can also try adjusting your MAX setting

down. The better insulated and air sealed the house is (particularly the case in newer construction or recently updated houses) the faster the air space will heat up. Similarly, if you “oversized” your coal stove for your dwelling size or average heat loss you may encounter the same situation of overshooting target temperature setting. In both cases lowering your MAX setting, even going so far as to cut it in half, can dramatically help the problem. Sometimes this adjustment is seasonal, where in the Fall and early Spring you may need to use a lower MAX setting, but as colder days set in you can adjust it upward toward the original setting.

Generator and Off-Grid Power

Most Coal-trol Digital users operating with generator and other off-grid power supply options have success. The power supply should be a pure sine-wave, 60 hz, 120VAC type. Modified sine-wave and other power supply distortions can cause problems for both the time keeping circuit and the speed control circuits of the Coal-trol Digital system. Even with non-inverter, pure-sine wave generators, if the generator has dirty or worn brushes or other mechanical/electrical issues, the output can be quite “noisy” and result in erratic behavior by the Coal-trol Digital system. Because of the wide variability in power output type and condition of the output power from non-grid sources, we offer no guarantees as to how the Coal-trol will function with these alternative power sources. If you encounter a problem using the Coal-trol with an alternative power generation system, please contact customer support for assistance.

Boiler, Biomass, Gasifier, and Other Heating Appliance Types

The Coal-trol Digital is designed to run forced air automatic stover stoves and furnaces. We do offer controls to manufacturers for other types of heating appliances, such as corn and pellet furnaces, biomass and coal boilers, and wood gasifier appliances, but we do not currently sell these control types directly to end users. These are only sold to manufacturers for use as an OEM component.

There is too much variation in installation enclosures, motor types, feed system types, etc. to make a good, low cost, general purpose control that most users would be able to install and configure properly.

If you’re interested in such a control to retro-fit to your heating appliance, please let us know. If there’s enough interest to support making a product it may just happen.

Specifications

Automation Correct LLC is constantly working to improve our products. For this reason, all specifications are subject to change without notice. Not all versions include all control options.

TS2BL Thermostat: For Indoor Use Only

Temperature:

Displayed Precision	1°F/1°C
Accuracy	±2°F/±1.8°C @ 68°F/20°C

Electrical:

Input Power	8VAC, 2.5VA CLASS 2
Connection to Power Module	RJ45 - 8PIN, 100ft Maximum (Standard Ethernet Straight Cable)

Mechanical:

Dimensions	4" L x 4 ¾" W x 1 1/4" H
Construction	ABS Plastic, UL94V-0

Environmental:

Operating Temperature	97°F/35°C (Limited by software)
Storage Temperature	40°F to 120°F
Weight	Less than 1 lb./0.45Kg

Designed for use with the Coal-trol Digital System only.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Syracuse • NY

www.automationcorrect.com



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