

MASTER SUPPLEMENTAL INSTALLER'S GUIDE

for

**Comfort Plus Commercial and ThermElect
Models: 6100, 7100, 8100 and 9100 Series**

**Microprocessor Function Location
Descriptions & Values for Setup & Editing**

(Applicable to Software Versions 2.00-2.18)

"Manufactured in North America"

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General Information

Steffes commercial heating systems include a microprocessor which contains many program locations that determine system functions. The program locations can be adjusted to customize the heating equipment to the power company and consumer's needs.

This guide provides instructions on how to adjust location settings, location descriptions, and factory default values and ranges.

The tables are set up with the following information:

Loc. No.: Lists the programming location identifier within the "Location Edit" menu (Lxxx).

Factory Default: Lists the location value as programmed at the factory.

Default Range: Lists the range that each value can be adjusted within.

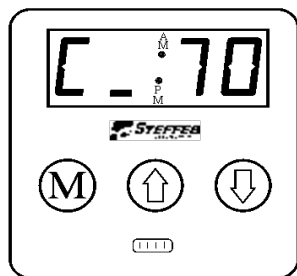
Description/Function: Description of each location and options available within that location.

Help Menu

The Help Menu may be accessed by pressing and releasing the M button until the faceplate displays "HELP". Press the up or the down arrow button to scroll through the Help Menu items listed below.

<u>Display Reading</u>	<u>Description</u>
Fxxx	Firmware Version Number - Indicates the version of software installed.
O xx	Outdoor Temperature - Indicates current outdoor temperature as recognized by the heater.
tL:xx	Target Level - Indicates the percentage of brick core charge the heater is targeting. During peak periods, the value displays as "tL _".
CL:xx	Charge Level - Indicates the percentage of heat currently stored in the brick core.
HE x	Heating Elements Active - Indicates the total number of heating elements currently energized.
PC xx	Power Line Carrier Channel - Indicates the channel on which the heater is set to receive PLC communication signal.
P xxx	Power Line Carrier Net Hit Rate Percentage - Indicates the percentage of "GOOD" communication packets received by the heater from the PLC transmitting device.
PS x	Indicates which Specialty Timer the heater is currently using. The value displayed will be zero if the Specialty Timer is not being used. The Specialty Timer is not used in most applications.
CC_x	Charge Mode Operation - Indicates the method of charge control being used during off-peak periods (L010).
CA_x	A-Peak Mode Operation - Indicates the method of charge control being used during anticipated peak periods. (L011).
C1_x	Specialty Timer #1 Charge Mode - Specialty Applications Only (L030-031).
C2_x	Specialty Timer #2 Charge Mode - Specialty Applications Only (L032-033).
HUxx	Heat Usage (L128) - Indicates the estimated amount of energy being used by the system.
Axxx	Target Discharge Air Temperature (L112) - Indicates the output air temperature the system is targeting as set in L048 and L049.
°xxx	Forecasted Outdoor Temperature – This forecasted temperature comes from a Steffes grid-interactive device.
cxxx	Compressor Output Relay Delay Time – Indicates the time remaining before the heat pump compressor can be energized. It counts down from the value in L018 on power up or any time the compressor is disabled. A display of "c 0" indicates an expired timer and "c On" indicates the compressor output is energized.

Accessing Location Information



NOTE: Upon power up of the equipment, entry into all program locations is provided for the first two minutes of operation. After this time, the security lockout prevents changes from being made in any locations above 15 (L015). To release the security lockout, refer to L099 in this manual or de-energize the system and then energize again to reset the security free function.

TO EDIT OR VIEW LOCATION SETTINGS:

1. Press and hold the **M** button. "EdIt" should be displayed on the faceplate.
2. While still holding the **M** button and with "EdIt" displayed on the faceplate, press and hold the up arrow button. Continue to hold both buttons simultaneously until "L000" appears on the faceplate.
NOTE: If the M button is released before the "L000" is displayed, start over from Step 1.
3. Release the buttons. The display will flash between "L000" and the corresponding value in this location.
The "L" indicates "location" and the last three numbers indicate the specific location number.
4. Press the up arrow button until the location to be edited is reached. (i.e., Location 8 reads "L008".)
5. After reaching the location to be edited, press and hold the **M** button. Use the up or the down arrow button to modify the value to the desired setting.
6. Once all changes have been made, release the **M** button. Press the down arrow button until "L000" is displayed. Then, press the down arrow button one more time and the normal display mode will be shown. Any changes made to the location settings will automatically be saved.

NOTE: If no buttons on the control panel are pressed, after a brief amount of time, the faceplate will automatically return to its normal operating mode and any changes made to the location settings will automatically be saved.

Determine Value of Locations with Multiple Options

To determine the value, check the options desired from the list below. Then, add the numbers from the "Value" column and enter the sum into this location.

NOTE: The check marks (✓) shown in the list below are intended only to serve as an example of a user selection.

<u>Check</u>	<u>Value</u>	<u>Option Selected</u>
	1	Display Current Time. (Not recommended without optional time clock module.)
	2	Display Day of the Week. (Not recommended without optional time clock module.)
✓	4	Display Current Operating Mode (C, P, or A) and Current Room Temperature. (Format: Cxxx, Pxxx, or Axxx)
✓	8	Display Current Room Temperature Set Point. (Format: Cxxx, Pxxx, or Axxx)
	16	Display Current Outdoor Temperature. (Format: Oxxx)

Example: To display current room temperature set point and the current operating mode: Enter 12 (4 + 8)

Short Cut Keys

M + Up	Edit Mode
M + Up + Down	Charge Control Override (8-bit in L035)
Up + Down	Off Mode (16-bit in L035)
M + Down	Set Back Option (32-bit in L035)

Standard Installation Locations (L000-L059)

Loc. No.	Factory Default	Default Range	Description / Function
L000	70 (°F) 21 (°C)	Determined by values in L007/L008.	6100/8100 SERIES Room Temperature Set Point - Not used in the 6100 or 8100 Series systems as the room temperature set point is determined by the thermostat.
	140 (°F) 60 (°C)		7100/9100 SERIES Maximum Outlet Water Temperature - Value indicates the maximum outlet water temperature to be targeted. This value cannot be set higher than the value in L007 or lower than the value in L008. The targeted outlet water temperature is also affected by the values in L012 and L013. For example, if the value in L012 = 60; L013 = 20; L000 = 180; L001 = 140, then at an outdoor temperature of 40 degrees, the targeted outlet water temperature would be 160 degrees. NOTE: If an outdoor temperature sensor is NOT installed, the system targets the outlet water temperature set in L000. NOTE: If using a serial interface the "TW" command sets target water as a percentage between L000 and L001.
L001	60 (°F) 16 (°C)	Determined by values in L007/L008.	6100/8100 SERIES Room Temperature Set Back - Specialty Applications Only!
	140 (°F) 60 (°C)		7100/9100 SERIES Minimum Outlet Water Temperature - Value indicates the minimum outlet water temperature to be targeted. This value cannot be set higher than the value in L007 or lower than the value in L008. The targeted outlet water temperature is also affected by the values in L012 and L013. For example, if the value in L012 = 60; L013 = 20; L000 = 180; L001 = 140, then at an outdoor temperature of 40 degrees, the targeted outlet water temperature would be 160 degrees. NOTE: If an outdoor temperature sensor is NOT installed, the system targets the outlet water temperature as set in L000. NOTE: If using a serial interface the "TW" command sets target water as a percentage between L000 and L001.

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function														
L002	16	0 to 255	<p>All SYSTEMS</p> <p>Faceplate Display Configuration - Specifies the end-user preferences for basic operating of the control panel and configuration of information displayed.</p> <table><tr><th><u>Value</u></th><th><u>Option Selected</u></th></tr><tr><td>1</td><td>Display temperatures in Celsius. Otherwise, temperatures are displayed in Fahrenheit.</td></tr><tr><td>2</td><td>Display 24-hour time clock. Otherwise, time is displayed on a 12-hour clock with an a.m./p.m. indicator.</td></tr><tr><td>4</td><td>Faceplate display goes blank after one minute of inactivity.</td></tr><tr><td>8</td><td>Currently not used.</td></tr><tr><td>16</td><td>Brick core charge set point can be edited at the faceplate by pressing and releasing the M button until "Edit" "CorE" appears on the display. Then use the up or down arrow button to change the value to the desired level. Only applicable if using charge subroutines 2 or 6 in L010, L011, L30 or L032.</td></tr><tr><td>32</td><td>Enables the Edit Mode Activation Delay as described in L022. To enter the Menu when the delay is activated, press and hold the M button and then release.</td></tr></table>	<u>Value</u>	<u>Option Selected</u>	1	Display temperatures in Celsius. Otherwise, temperatures are displayed in Fahrenheit.	2	Display 24-hour time clock. Otherwise, time is displayed on a 12-hour clock with an a.m./p.m. indicator.	4	Faceplate display goes blank after one minute of inactivity.	8	Currently not used.	16	Brick core charge set point can be edited at the faceplate by pressing and releasing the M button until "Edit" "CorE" appears on the display. Then use the up or down arrow button to change the value to the desired level. Only applicable if using charge subroutines 2 or 6 in L010, L011, L30 or L032.	32	Enables the Edit Mode Activation Delay as described in L022. To enter the Menu when the delay is activated, press and hold the M button and then release.
<u>Value</u>	<u>Option Selected</u>																
1	Display temperatures in Celsius. Otherwise, temperatures are displayed in Fahrenheit.																
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4	Faceplate display goes blank after one minute of inactivity.																
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32	Enables the Edit Mode Activation Delay as described in L022. To enter the Menu when the delay is activated, press and hold the M button and then release.																

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L003	244	0 to 255	<p>All SYSTEMS</p> <p>Faceplate Display Information - Selects items to display on the faceplate during normal operating mode when pressing the up or down arrow button.</p> <p><u>Value</u> <u>Option Selected</u></p> <p>1 Display Current Time. (<i>Not recommended without optional time clock module.</i>)</p> <p>2 Display Day of the Week. (<i>Not recommended without optional time clock module.</i>)</p> <p>4 6100/8100 - Display Current Operating Mode (C, P, or A). If the optional freeze protection sensor is installed, current room temperature is also displayed. (Format: Cxxx, Pxxx, or Axxx.) 7100/9100 - Display Current Operating Mode (C, P, or A) and current outlet water temperature. (Format: Cxxx, Pxxx, or Axxx.)</p> <p>8 Display System Demand when using Pulse Load Management. (Format: d xx.)</p> <p>16 Display Current Outdoor Temperature. (Format: Oxxx.)</p> <p>32 Display Heat Call Status. If interfaced with an air conditioning unit or heat pump, cooling status is also displayed. (Format: HC_x or COOL.)</p> <p>64 Display Current Core Charge Level Percentage. (Format: CL:xx.)</p> <p>128 Display Current Core Charge Level Target Percentage. (Format: tL:xx.)</p>

FACEPLATE DISPLAY CHARACTER REFERENCE:

NOTE: Each "x" represents a digit on the faceplate where a number may display.

Cxxx = Charge period (off-peak hours) and outlet water temperature or current room temperature if a freeze protection sensor is installed.

Pxxx = Peak period (on-peak hours) and outlet water temperature or current room temperature if a freeze protection sensor is installed.

Axxx = Anticipated peak period (pre-peak hours) and outlet water temperature or current room temperature if freeze protection sensor is installed.

Oxxx = Current outdoor temperature reading.

HC_x = Type of heat call: 0 = no heat call, 1 = stage 1, 2 = stage 2, 3 = emergency heat call (6100/8100) or hydronic heat call (7100/9100), COOL = cooling mode (O terminal energized), F = Fan

CLxx = Current charge level as a percentage.

tLxx = Target charge level as a percentage.

d xx = System demand. Displays the current system demand when using pulse load management. Multiply the displayed value by 10 to determine actual value.

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function						
L004	0	0 to 255	All SYSTEMS Background Faceplate Display Information - Reference L003 for information and description of options available.						
L005	30	16 to 30	All SYSTEMS Faceplate Display "On" Time - Amount of time in tenths of a second that foreground information (as set in L003) is displayed on the faceplate. Error messages display for half of the time entered in this location.						
L006	0	0 to 255	All SYSTEMS Automatic Display of Faceplate Information - Used to specify the cycle (scroll) time of the Faceplate Display Information (as set in L003). Value is specified in units of 1/10th seconds.						
L007	85°F 29°C	45°F to 195°F 7°C to 91°C	6100/8100 SERIES Maximum Room Temperature Set Point - <i>Specialty Applications Only!</i>						
	185°F 91°C		7100/9100 SERIES Maximum Outlet Water Temperature Set Point - Maximum temperature to which the outlet water temperature set point can be adjusted in L000 and L001.						
L008	45°F 7°C	32°F to 80°F 0°C to 27°C	6100/8100 SERIES Minimum Room Temperature Set Point - <i>Specialty Applications Only!</i>						
			7100/9100 SERIES Minimum Outlet Water Temperature Set Point - Minimum temperature to which the outlet water temperature set point can be adjusted in L000 and L001.						
L009	0	0 to 255	All SYSTEMS Off Mode - Off mode suspends all functions of the system and is indicated on the faceplate as "OFF". If the shortcut method is enabled in L035, the system can be placed in the off mode by pressing both the up and down arrow buttons at the same time. <table><tr><td><u>Value</u></td><td><u>Function</u></td></tr><tr><td>0</td><td>Normal Operating Mode</td></tr><tr><td>1</td><td>Off Mode</td></tr></table> NOTES: <i>If the system is being used to provide a peak control signal to other devices, or if an air conditioner or heat pump is being used in conjunction with the system, the off mode should not be used.</i> <i>The system can be placed in off mode by setting the value in this location to any number greater than zero.</i>	<u>Value</u>	<u>Function</u>	0	Normal Operating Mode	1	Off Mode
<u>Value</u>	<u>Function</u>								
0	Normal Operating Mode								
1	Off Mode								

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																								
L010	5	0 to 10	<p>ALL SYSTEMS</p> <p>Off-Peak Method of Charge Control - Sets the method of brick core charging to be used during off-peak (charge) periods.</p> <p>NOTE: <i>The values listed below are termed "subroutines" and will be referenced as such from this point forward.</i></p> <table><tr><th><u>Value</u></th><th><u>Function</u></th></tr><tr><td>0</td><td>Core Charging Disabled - No core charging occurs.</td></tr><tr><td>1</td><td>Space Heating Mode - Do Not Use with 9100 Series V2.18 with integrated SSR's. System maintains minimum core temperature (L041) if there has been a heat call during the last 22 hours. Minimum core temperature set in L041 should be increased from default to effectively use this method.</td></tr><tr><td>2</td><td>Manual Charge Control - User adjusts the target level to the desired value. The desired core charge level can be set in L015 or adjusted as needed during normal operation via the faceplate buttons if the 16-bit is enabled in L002.</td></tr><tr><td>3</td><td>Automatic Charge Control - Target level adjusts based on outdoor temperature relative to L012 and L013. <i>Example:</i> If L012 (Start Brick Core Charge Set Point) is set to 50° and L013 (Full Brick core Charge Set Point) is set to 10° then a 30° outdoor temperature yields a 50% target level.</td></tr><tr><td>4</td><td>Sensorless Automatic Charge Control - Target level adjusts automatically based on heating demand from previous time period (L042) multiplied by the charge factor (L043). Minimum Core Temperature (L041) should be increased from default to effectively use this method.</td></tr><tr><td>5</td><td>Intellicharge - Target level adjusts automatically based 75% on subroutine 3 and 25% on subroutine 4. If no heat calls have occurred within the past 22 hours, L012 (Start Brick Core Charge Set Point) and L013 (Full Brick core Charge Set Point) are temporarily set back based on subroutine 7.</td></tr><tr><td>6</td><td>Intelliman Charge Control - Target level adjusts based 75% on subroutine 2 and 25% on subroutine 4.</td></tr><tr><td>7</td><td>Set Back Charge Control - Target level adjusts automatically according to outdoor temperature relative to L012 and L013. If there are no heat calls in the past 22 hours, the values in L012 and L013 will both be set back internally 20 degrees (the displayed values will remain as previously set). Once a heat call is recognized, these location values return to their original set points. On start-up, the system assumes there have been no heat calls.</td></tr><tr><td>8</td><td>Reduced Automatic Charge Control - Targets 2/3 of subroutine 3 to reserve capacity when renewable power is in excess. An "A" input signal is required for full capacity.</td></tr><tr><td>9</td><td>Reduced Intellicharge - Target level adjusts based on subroutine 5 multiplied by the percentage in L015.</td></tr><tr><td>10</td><td>Summer VAV Support - System follows subroutine 5 while maintaining a charge based on 25% of subroutine 4, so it always has a minimal amount of stored energy throughout the summer. It will use subroutine 4 even when the outdoor temperature is above Start Charge temperature set in L012.</td></tr></table>	<u>Value</u>	<u>Function</u>	0	Core Charging Disabled - No core charging occurs.	1	Space Heating Mode - Do Not Use with 9100 Series V2.18 with integrated SSR's. System maintains minimum core temperature (L041) if there has been a heat call during the last 22 hours. Minimum core temperature set in L041 should be increased from default to effectively use this method.	2	Manual Charge Control - User adjusts the target level to the desired value. The desired core charge level can be set in L015 or adjusted as needed during normal operation via the faceplate buttons if the 16-bit is enabled in L002.	3	Automatic Charge Control - Target level adjusts based on outdoor temperature relative to L012 and L013. <i>Example:</i> If L012 (Start Brick Core Charge Set Point) is set to 50° and L013 (Full Brick core Charge Set Point) is set to 10° then a 30° outdoor temperature yields a 50% target level.	4	Sensorless Automatic Charge Control - Target level adjusts automatically based on heating demand from previous time period (L042) multiplied by the charge factor (L043). Minimum Core Temperature (L041) should be increased from default to effectively use this method.	5	Intellicharge - Target level adjusts automatically based 75% on subroutine 3 and 25% on subroutine 4. If no heat calls have occurred within the past 22 hours, L012 (Start Brick Core Charge Set Point) and L013 (Full Brick core Charge Set Point) are temporarily set back based on subroutine 7.	6	Intelliman Charge Control - Target level adjusts based 75% on subroutine 2 and 25% on subroutine 4.	7	Set Back Charge Control - Target level adjusts automatically according to outdoor temperature relative to L012 and L013. If there are no heat calls in the past 22 hours, the values in L012 and L013 will both be set back internally 20 degrees (the displayed values will remain as previously set). Once a heat call is recognized, these location values return to their original set points. On start-up, the system assumes there have been no heat calls.	8	Reduced Automatic Charge Control - Targets 2/3 of subroutine 3 to reserve capacity when renewable power is in excess. An "A" input signal is required for full capacity.	9	Reduced Intellicharge - Target level adjusts based on subroutine 5 multiplied by the percentage in L015.	10	Summer VAV Support - System follows subroutine 5 while maintaining a charge based on 25% of subroutine 4, so it always has a minimal amount of stored energy throughout the summer. It will use subroutine 4 even when the outdoor temperature is above Start Charge temperature set in L012.
<u>Value</u>	<u>Function</u>																										
0	Core Charging Disabled - No core charging occurs.																										
1	Space Heating Mode - Do Not Use with 9100 Series V2.18 with integrated SSR's. System maintains minimum core temperature (L041) if there has been a heat call during the last 22 hours. Minimum core temperature set in L041 should be increased from default to effectively use this method.																										
2	Manual Charge Control - User adjusts the target level to the desired value. The desired core charge level can be set in L015 or adjusted as needed during normal operation via the faceplate buttons if the 16-bit is enabled in L002.																										
3	Automatic Charge Control - Target level adjusts based on outdoor temperature relative to L012 and L013. <i>Example:</i> If L012 (Start Brick Core Charge Set Point) is set to 50° and L013 (Full Brick core Charge Set Point) is set to 10° then a 30° outdoor temperature yields a 50% target level.																										
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Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																								
L011	5	0 to 10	<p>ALL SYSTEMS</p> <p>Anticipated Peak (Pre-Peak) Method of Charge Control - Sets the method of brick core charging to be used during anticipated peak times. For a detailed description of each subroutine, refer to L010.</p> <table><tr><th><u>Value</u></th><th><u>Function</u></th></tr><tr><td>0</td><td>Core Charging Disabled</td></tr><tr><td>1</td><td>Space Heating Mode</td></tr><tr><td>2</td><td>Manual Charge Control</td></tr><tr><td>3</td><td>Automatic Charge Control</td></tr><tr><td>4</td><td>Sensorless Automatic Charge Control</td></tr><tr><td>5</td><td>Intellicharge with Set Back</td></tr><tr><td>6</td><td>Intelliman Charge Control</td></tr><tr><td>7</td><td>Set Back Charge Control</td></tr><tr><td>8</td><td>Reduced Automatic Charge Control</td></tr><tr><td>9</td><td>Reduced Intellicharge</td></tr><tr><td>10</td><td>Summer VAV Support</td></tr></table>	<u>Value</u>	<u>Function</u>	0	Core Charging Disabled	1	Space Heating Mode	2	Manual Charge Control	3	Automatic Charge Control	4	Sensorless Automatic Charge Control	5	Intellicharge with Set Back	6	Intelliman Charge Control	7	Set Back Charge Control	8	Reduced Automatic Charge Control	9	Reduced Intellicharge	10	Summer VAV Support
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8	Reduced Automatic Charge Control																										
9	Reduced Intellicharge																										
10	Summer VAV Support																										
L012	50°F 10°C	0°F to 90°F -17°C to 32°C	<p>ALL SYSTEMS</p> <p>Start Brick Core Charge Set Point - Specifies the outdoor temperature at which core charging is targeted to begin.</p> <p>NOTE: Only applicable if using charge subroutines 3, 5, 7, 8, 9, or 10 as set in L010, L011, L030 or L032.</p>																								
L013	10°F -12°C	-20°F to 90°F -29°C to 32°C	<p>ALL SYSTEMS</p> <p>Full Brick Core Charge Set Point - Specifies the outdoor temperature at which a maximum (full) core charge level is to be targeted.</p> <p>NOTE: Only applicable if using charge subroutines 3, 5, 7, 8, 9, or 10 as set in L010, L011, L030 or L032.</p>																								
L014	0	-20 to 20	<p>6100/8100 SERIES</p> <p>Room Temperature Display Calibration - Only applicable if using freeze protection (See L024 and L035).</p>																								
	5		<p>7100/9100 SERIES</p> <p>Water Temperature Display Calibration – Used to calibrate the water temperature reading of the system. This value represents the number of degrees the outlet water temperature reading will be increased or decreased by on the display.</p> <p><i>Example: If the system is currently displaying an outlet water temperature of 120°F, increasing this value by ten (10) changes the displayed water temperature to 130°F.</i></p>																								

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L015	100	0 to 100	<p>ALL SYSTEMS Manual Charge Control Set Point - Percentage of core charge the system targets during an off-peak or anticipated peak period when using a manual charge control method (subroutine 2, 6, or 9 in L010, L011, L030 and L032). When using charge subroutines 2, 6, or 9, the 16-bit in L002 should be set to allow adjustment from the faceplate.</p> <p><u>Value</u> <u>Function</u> 0 Core Charging Disabled 50 Target 50% Core Charge Level 100 Target Maximum (Full) Core Charge Level</p> <p>NOTE: If using a charge subroutine of 2, 6, or 9, the value in L099 must <u>NOT</u> be set lower than a value of fifteen (15).</p>
L016	255	0 to 255	<p>6100/8100 SERIES Damper Control Configuration - The value in this location MUST be set to 255.</p>
			<p>7100/9100 SERIES Air Handler Pump Maximum Power - The value in this location limits the amount of power available to the air handler pump. The value should be to 255 to allow full power to the pump.</p>
L017	0	0 to 255	<p>ALL SYSTEMS Board Rise/Room Rise as Core Heats – Currently not used. NOTE: Do not change setting from the default value without factory authorization.</p>
L018	255	0 to 255	<p>ALL SYSTEMS Compressor Protection - Minimum time, in seconds, the compressor remains “OFF” after a compressor call has ended or after the system is first powered on. This delay is important even if the thermostat has a delay because outdoor temperature changes could make this fluctuate quickly. 255 seconds is 4 minutes and 15 seconds. NOTE: Only applicable to installations where the system is being used in conjunction with a heat pump or air conditioner.</p>
L019	-1	-1	<p>ALL SYSTEMS Power Line Carrier (PLC) Seconds per Bit NOTE: Do not change setting from the default value without factory authorization.</p>

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																								
L020	0	0 to 15	<p>ALL SYSTEMS</p> <p>Power Line Carrier (PLC) Channel Selection - Indicates the channel on which PLC communication will occur. This value MUST match the setting in the PLC transmitting device. If PLC communication is not used, a value of “0” should be entered.</p> <table><tr><th><u>Value</u></th><th><u>Function</u></th></tr><tr><td>0</td><td>PLC Communication Disabled</td></tr><tr><td>1-2</td><td>PLC Channel 1, 2 (4 minute communication time)</td></tr><tr><td>3-11</td><td>PLC Channel 3, 4, 5, . . . etc. (1 minute communication time)</td></tr><tr><td>12-15</td><td>PLC Channel 12, 13, 14, 15 (4 minute communication time)</td></tr></table> <p>NOTE 1: Channels 1 and 2 are original Steffes PLC communication channels. These two channels should not be used on the same distribution transformer or in areas with a high concentration of transmitters, as cross talk may occur.</p> <p>NOTE 2: PLC Fail message displays after 10 consecutive minutes of no communication on a fast channel and after 40 minutes on a slow channel.</p>	<u>Value</u>	<u>Function</u>	0	PLC Communication Disabled	1-2	PLC Channel 1, 2 (4 minute communication time)	3-11	PLC Channel 3, 4, 5, . . . etc. (1 minute communication time)	12-15	PLC Channel 12, 13, 14, 15 (4 minute communication time)														
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12-15	PLC Channel 12, 13, 14, 15 (4 minute communication time)																										
L021	100	0 to 100	<p>ALL SYSTEMS</p> <p>Maximum Percentage of Elements Allowed to Operate - Limits the maximum percentage of elements that will be turned on at any one time. A value of zero disables this feature. When used, this setting will allow an equal number of elements to turn on in each core relative to the value entered. The table below is an example of a system with 6 elements per core (See L091):</p> <table><tr><th><u>L021 Value</u></th><th><u>Total Percentage of Elements Allowed “ON”</u></th><th><u>Elements Allowed per Core</u></th></tr><tr><td>0</td><td>100%</td><td>6</td></tr><tr><td>1-16</td><td>16.7%</td><td>1</td></tr><tr><td>17-32</td><td>33.3%</td><td>2</td></tr><tr><td>33-49</td><td>50%</td><td>3</td></tr><tr><td>50-66</td><td>66.7%</td><td>4</td></tr><tr><td>67-82</td><td>83.3%</td><td>5</td></tr><tr><td>83-100</td><td>100%</td><td>6</td></tr></table> <p><u>NOTICE:</u></p> <p><i>Changing the value in this location will not reduce the minimum ampacity requirements of feed circuits. The system must be connected to feed circuits that comply with the Unit Identification Label. Install in accordance with all applicable local, state, and national codes and regulations.</i></p>	<u>L021 Value</u>	<u>Total Percentage of Elements Allowed “ON”</u>	<u>Elements Allowed per Core</u>	0	100%	6	1-16	16.7%	1	17-32	33.3%	2	33-49	50%	3	50-66	66.7%	4	67-82	83.3%	5	83-100	100%	6
<u>L021 Value</u>	<u>Total Percentage of Elements Allowed “ON”</u>	<u>Elements Allowed per Core</u>																									
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1-16	16.7%	1																									
17-32	33.3%	2																									
33-49	50%	3																									
50-66	66.7%	4																									
67-82	83.3%	5																									
83-100	100%	6																									
L022	40	10 to 255	<p>ALL SYSTEMS</p> <p>Location Value Access Delay Time - Amount of time it takes to access the location edit mode while pressing the M and the up arrow buttons simultaneously. If 32-bit is active in L002, accessing the Help menu by pressing the M button will also be delayed by this value.</p> <p>NOTE: A value of 40 is approximately 8 seconds.</p>																								

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L023	2	2	ALL SYSTEMS Error Message Reset Time - Minimum time, in minutes, before an error message resets. The maximum time is this value plus one minute. NOTE: Do not change setting from the default value without factory authorization.
L024	0°F -17°C	0°F to 65°F -17°C to 18°C	6100/8100 SERIES Freeze Protection Set Point - Temperature at which brick core charging is enabled, even during a peak control period, so heat can be delivered. This may protect an application from freeze up due to unforeseen circumstances such as external equipment failure. In the event of system failure this will not provide protection. NOTES: An optional room temperature sensor is required if using this feature. This option may not be available in your area. Consult with a local power company representative for authorization prior to enabling. Freeze protection will override the "MA" command for load management (version 2.06 or higher only).
			7100/9100 SERIES Currently not used.
L025	0	0 to 65	ALL SYSTEMS Currently not used.
L026	00:00	00:00 to 03:00	ALL SYSTEMS Start Charge Delay Time - Time, in 15 minute increments, the heating elements remain de-energized at the start of an off-peak (charge) period. NOTE: Space heating may be enabled during this time for all systems. Auxiliary loads can also be delayed. See L052 for more information.
L027	00:00	00:00 to 03:00	ALL SYSTEMS Start Charge Ramp Time - Time, in 15 minute increments, over which the heating elements, in each core, stage on after the Start Charge Delay Time (L026) has ended. Example: L027 set to 01:30 (90 minutes) on a 9100 series: Start of Charge (C) time: 2 elements energized in each core. 15 min into C time = 2 elements 30 min = 3 elements 45 min = 4 elements 60 min = 5 elements. 75 min = 6 elements 90 min = 6 elements

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L028	1	1 to 128	ALL SYSTEMS Minimum Core Blower Speed - Sets the minimum speed at which the core blower operates when there is a heat call. <u>Value</u> <u>Blower/Controls Configuration</u> 1 120/240V (standard heater configuration) 7 208V
L029	255	0 to 255	All SYSTEMS Maximum Blower Speed – If the core blower wheel is steel (non-aluminum), this value MUST be set to 255. If using an aluminum wheel, this value should be set to 100. NOTE: All systems built after June 1, 2020 are equipped with an aluminum wheel.
L030	0	0 to 10	ALL SYSTEMS Specialty Timer #1 Charge Mode - Specifies the core charge operating mode to be used during timed period #1. Values are interpreted the same as L010. This timer activates at the start of any peak (P) period following an off peak (C) period and runs for the duration of L031. This value is shown in the HELP menu as "C1_x". NOTE: An upper bar "¯" on the 2nd digit of the display indicates an active timer.
L031	00:00	00:00 to 16:00	ALL SYSTEMS Specialty Timer #1 Charge Mode Duration - The length of time that Specialty Timer #1 Charge Mode (L030) is active.
L032	0	0 to 10	ALL SYSTEMS Specialty Timer #2 Charge Mode - Specifies the core charge operating mode to be used during timed period #2. Values are interpreted the same as L010. This mode activates at the end of Specialty Timer #1 and lasts for the duration of L033. This value is shown in the HELP menu as "C2_x". NOTE: An upper bar "¯" on the 2nd digit of the display indicates an active timer.
L033	00:00	00:00 to 15:00	ALL SYSTEMS Specialty Timer #2 Charge Mode Duration - The length of time that Specialty Timer #2 Charge Mode (L032) is active.

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																		
L034	0	0 to 16	6100 SERIES Heat Call Relay Function - Specifies how the heat call relay will react to a heat call. The value entered determines how many elements must be active before the heat call relay opens. The number of elements active varies based on the target level of the system (L108) and Load Management inputs. <table><tr><th><u>Value</u></th><th><u>Function</u></th></tr><tr><td>0</td><td>Heat call relay closes during all heat calls.</td></tr><tr><td>1-16</td><td>Heat call relay acts as a load management device. It remains closed until the number of elements energized is greater than the value selected. Then the relay will open.</td></tr></table> Example: If a value of four (4) is used, the heat call relay remains closed until five or more elements are energized. NOTES: If the value in L034 is equal to or greater than the total number of elements the heat call relay will not open. If Maximum Percentage of Elements Allowed to Operate (L021) is enabled, this value (L034), must be lower than L021. A value in L034 that is greater than L021 may result in the heat call relay never being opened.	<u>Value</u>	<u>Function</u>	0	Heat call relay closes during all heat calls.	1-16	Heat call relay acts as a load management device. It remains closed until the number of elements energized is greater than the value selected. Then the relay will open.												
			<u>Value</u>	<u>Function</u>																	
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1-16	Heat call relay acts as a load management device. It remains closed until the number of elements energized is greater than the value selected. Then the relay will open.																				
7100/8100/9100 SERIES - Currently not used.																					
L035	9	0 to 255	ALL SYSTEMS Optional Controls Configuration - Used to interface the system with optional sensors and controls that may be used in the application. In addition, short-cut methods for some user control functions can be enabled in this location. <table><tr><th><u>Value</u></th><th><u>Option Selected</u></th></tr><tr><td>1</td><td>Enable Hard-Wired Outdoor Temperature Sensor. (Only necessary if using a charge subroutine of 3, 5, 7, 8, 9, or 10 in L010, L011, L030, and/or L032 and PLC or BACnet 'OT' command are not being used).</td></tr><tr><td>2</td><td>6100/8100 - Enable Room Temperature Sensing System. (Only applicable when installing a remote room temperature sensor for freeze protection or other specialty application.)</td></tr><tr><td>4</td><td>Enable Time Clock Module Option. This adds both "CLOC" and "DAY" to the menu on the display. (Refer to L060-L089 for setting desired function and operation of the time clock module.)</td></tr><tr><td>8</td><td>Ability to Enable/Disable Charge Control Override Option from faceplate. (This option allows user to initiate a one-time full core charge. When used, all charge control settings are temporarily overridden to force the heater to its maximum charge <u>during the off-peak period.</u>) NOTE: This is not a Peak override.</td></tr><tr><td>16</td><td>Ability to Enable/Disable "OFF" Mode from the faceplate. (Reference L009.)</td></tr><tr><td>32</td><td>Currently not used.</td></tr><tr><td>64</td><td>Currently not used.</td></tr><tr><td>128</td><td>Currently not used.</td></tr></table>	<u>Value</u>	<u>Option Selected</u>	1	Enable Hard-Wired Outdoor Temperature Sensor. (Only necessary if using a charge subroutine of 3, 5, 7, 8, 9, or 10 in L010, L011, L030, and/or L032 and PLC or BACnet 'OT' command are not being used).	2	6100/8100 - Enable Room Temperature Sensing System. (Only applicable when installing a remote room temperature sensor for freeze protection or other specialty application.)	4	Enable Time Clock Module Option. This adds both "CLOC" and "DAY" to the menu on the display. (Refer to L060-L089 for setting desired function and operation of the time clock module.)	8	Ability to Enable/Disable Charge Control Override Option from faceplate. (This option allows user to initiate a one-time full core charge. When used, all charge control settings are temporarily overridden to force the heater to its maximum charge <u>during the off-peak period.</u>) NOTE: This is not a Peak override.	16	Ability to Enable/Disable "OFF" Mode from the faceplate. (Reference L009.)	32	Currently not used.	64	Currently not used.	128	Currently not used.
<u>Value</u>	<u>Option Selected</u>																				
1	Enable Hard-Wired Outdoor Temperature Sensor. (Only necessary if using a charge subroutine of 3, 5, 7, 8, 9, or 10 in L010, L011, L030, and/or L032 and PLC or BACnet 'OT' command are not being used).																				
2	6100/8100 - Enable Room Temperature Sensing System. (Only applicable when installing a remote room temperature sensor for freeze protection or other specialty application.)																				
4	Enable Time Clock Module Option. This adds both "CLOC" and "DAY" to the menu on the display. (Refer to L060-L089 for setting desired function and operation of the time clock module.)																				
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128	Currently not used.																				

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																							
L036	1	0 to 127	<p>ALL SYSTEMS</p> <p>Control Switch Configuration - Determines how the system reacts to the control switch signaling device. In standard configuration, a “closed” control switch indicates an off-peak (charge) period, an anticipated peak period, or a cooling call (the “O” wiring position on compressor is energized). If using a BACnet controller, use the LV command instead of this location.</p> <table><thead><tr><th><u>Value</u></th><th><u>Option Selected</u></th></tr></thead><tbody><tr><td>0</td><td>A CLOSED control switch indicates a Peak (Control) time, an Anticipated Peak time, a fan call, or a reversing valve call.</td></tr><tr><td>1</td><td>An OPEN control switch indicates a Peak (Control) time.</td></tr><tr><td>2</td><td>An OPEN control switch indicates an Anticipated Peak time.</td></tr><tr><td>4</td><td>An OPEN thermostat switch enables G, Fan On.</td></tr><tr><td>8</td><td>An OPEN thermostat switch enables O, the Reversing Valve (cooling output) on a Heat Pump system.</td></tr><tr><td>16</td><td>An OPEN thermostat switch enables Y, Stage 1.</td></tr><tr><td>32</td><td>An OPEN thermostat switch enables W, Stage 2.</td></tr><tr><td>64</td><td>An OPEN thermostat switch enables E, Emergency Heat in the 6100/8100 Series or H, Hydronic Heat in the 7100/9100 Series.</td></tr></tbody></table>	<u>Value</u>	<u>Option Selected</u>	0	A CLOSED control switch indicates a Peak (Control) time, an Anticipated Peak time, a fan call, or a reversing valve call.	1	An OPEN control switch indicates a Peak (Control) time.	2	An OPEN control switch indicates an Anticipated Peak time.	4	An OPEN thermostat switch enables G, Fan On.	8	An OPEN thermostat switch enables O, the Reversing Valve (cooling output) on a Heat Pump system.	16	An OPEN thermostat switch enables Y, Stage 1.	32	An OPEN thermostat switch enables W, Stage 2.	64	An OPEN thermostat switch enables E, Emergency Heat in the 6100/8100 Series or H, Hydronic Heat in the 7100/9100 Series.					
<u>Value</u>	<u>Option Selected</u>																									
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L037	<table><tr><td><u>6100</u></td></tr><tr><td>3</td></tr><tr><td>7100/8100/</td></tr><tr><td><u>9100</u></td></tr><tr><td>2</td></tr></table>	<u>6100</u>	3	7100/8100/	<u>9100</u>	2	0 to 255	<p>ALL SYSTEMS</p> <p>Output Control Configuration - Configures the output controls of the system.</p> <table><thead><tr><th><u>Value</u></th><th><u>Option Selected</u></th></tr></thead><tbody><tr><td>1</td><td>Must be used in 6100 Series.</td></tr><tr><td>2</td><td>Deals with output temperature reactions. Must be used in all models.</td></tr><tr><td>4</td><td>Currently not used.</td></tr><tr><td>8</td><td>Enables compressor control if there is a "Cool" call (O) during a peak (control) period.</td></tr><tr><td>16</td><td>Enables Comfort Override - Do Not Use with 9100 Series V2.18 with integrated SSR's. (Comfort override allows the heating elements to be energized, even during peak control periods, provided brick core is depleted and there is a Stage 2, Stage 3, or hydronic heat call.) NOTE: Comfort Override will override the “MA” command for load management (software version 2.06 or higher only).</td></tr><tr><td>32</td><td>Enables compressor cycling. If it is a peak (control) period and the system receives a cooling call, the compressor turns off and on in 20 minute intervals. (Off first 20 minutes, on 20 minutes, off 20 minutes, etc.)</td></tr><tr><td>64</td><td>Currently not used.</td></tr><tr><td>128</td><td>Interfaces the system with a heat pump that has a reversing valve which is energized for heating (i.e., Rheem, Ruud, etc.) Most heat pumps energize the reversing valve for cooling and will not require this bit. NOTE: The system's ‘O’ terminal should always be energized in cooling mode.</td></tr></tbody></table>	<u>Value</u>	<u>Option Selected</u>	1	Must be used in 6100 Series.	2	Deals with output temperature reactions. Must be used in all models.	4	Currently not used.	8	Enables compressor control if there is a "Cool" call (O) during a peak (control) period.	16	Enables Comfort Override - Do Not Use with 9100 Series V2.18 with integrated SSR's. (Comfort override allows the heating elements to be energized, even during peak control periods, provided brick core is depleted and there is a Stage 2, Stage 3, or hydronic heat call.) NOTE: Comfort Override will override the “MA” command for load management (software version 2.06 or higher only).	32	Enables compressor cycling. If it is a peak (control) period and the system receives a cooling call, the compressor turns off and on in 20 minute intervals. (Off first 20 minutes, on 20 minutes, off 20 minutes, etc.)	64	Currently not used.	128	Interfaces the system with a heat pump that has a reversing valve which is energized for heating (i.e., Rheem, Ruud, etc.) Most heat pumps energize the reversing valve for cooling and will not require this bit. NOTE: The system's ‘O’ terminal should always be energized in cooling mode.
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Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L038	1	0 to 100	ALL SYSTEMS <u>Version 2.12 and Lower:</u> Multiple of 9600 Baud - Do not change setting from the default value of one (1) without factory authorization. <u>Version 2.14 and Higher:</u> Grid-Interactive Electric Thermal Storage (GETS) Reserve Usage Factor – Used to scale the reserve temperature in systems using a GETS control.
L039	05:00	02:00 to 23:45	ALL SYSTEMS Time to go to Full Charge - Amount of time the system is expected to go from room temperature to full charge. The shorter the amount of time, the more aggressively the system charges. NOTE: Do not change without factory authorization. This factor is important to charging subroutines 4, 5, 6, 9, and 10 as set in L010, L011, L030, and/or L032).
L040	<u>6100/7100</u> 1200°F 648°C <u>8100/9100</u> 1400°F 760°C	<u>V2.16 or Lower</u> 0°F to 1650°F 17°C to 898°C <u>V2.18 or Higher</u> 0°F to 1520°F -17°C to 826°C	ALL SYSTEMS Maximum Core Temperature - Maximum brick core charge temperature allowed. NOTE: Do not set values higher than factory default. Operating the core at maximum temperatures higher than those specified will cause heating element damage and improper operation. This value may decrement by 50°F/27.8°C when a core fail condition occurs. Reference the 1-bit in L052.
L041	200°F 93°C	0°F to 600°F -18°C to 316°C	ALL SYSTEMS Minimum Core Temperature - Minimum core charge temperature the system will target, "tL:0". This is also the core temperature the system will target during Comfort Override (16-bit in L037) or when using Space Heating Mode (subroutine 1 in L010, L011, L030, and/or L032).
L042	06:00	02:00 to 08:00	ALL SYSTEMS Sensorless Averaging Period - Represents the number of hours of history to use when averaging energy usage. NOTE: Only applicable if using a charge subroutine of 4, 5, 6, 9, or 10 in L010, L011, L030, and/or L032.
L043	30	10 to 255	ALL SYSTEMS Sensorless Auto Charge "Charge Factor" - Represents the charging factor used to determine the targeted brick core charge level based on the number of off-peak hours the electric power company offers during a 24-hour period. NOTE: Only applicable if using a charge subroutine of 4, 5, 6, 9, or 10 in L010, L011, L030, and/or L032.

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L044	10:00	00:00 to 10:00	ALL SYSTEMS Discharge Air Cycling Control for Anticipated Peak Mode - Controls the maximum number of minutes the core blower is allowed to operate within a 10-minute period during an anticipated peak time. NOTE: Not active during Specialty Timer operation (L031 and L033).
L045	1	0 to 255	ALL SYSTEMS Delay from Heat Call to Blower Activation NOTE: Do not change setting from the default value without factory authorization.
L046	5°F -15°C	-50°F to 120°F -45°C to 49°C	ALL SYSTEMS Compressor Lock-Out Set Point for Off-Peak or Anticipated Peak Modes - Indicates the outdoor temperature at which the heat pump's compressor is to be locked out (not allowed to operate) during an off-peak or anticipated peak period. NOTE: Applicable only if using system in conjunction with a heat pump.
L047	5°F -15°C	-50°F to 120°F -45°C to 49°C	ALL SYSTEMS Compressor Lock-Out Set Point for On-Peak Mode - Indicates the outdoor temperature at which the heat pump's compressor is to be locked out (not allowed to operate) during an on-peak period. NOTE: Applicable only if using system in conjunction with a heat pump.
L048	90°F 32°C	55°F to 250°F 13°C to 120°C	ALL SYSTEMS Minimum Discharge Air Temperature - Sets the minimum discharge air temperature of the system during a Stage 1 heat call.
L049	120°F 49°C	55°F to 250°F 13°C to 120°C	ALL SYSTEMS Maximum Discharge Air Temperature - Sets the maximum discharge air temperature of the system during a Stage 2 heat call or during compressor control. Also, if there is a Y call, but no G call, the system targets the value in this location.
L050	-5	-20 to 20	ALL SYSTEMS Outdoor Temperature Offset - Used to calibrate the hard-wired outdoor temperature sensor reading as sensed by the system. This offset will increase or decrease the temperature reading by the value in this location. (Reference L035 and L113). NOTE: The offset is set in Fahrenheit, so an offset of +5 degrees will increase the outdoor temperature reading by 5 degrees Fahrenheit, it will adjust the Celsius temperature by approximately 2.8 degrees.

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																		
L051	0°F -17°C	0°F to 1600°F -17°C to 871°C	6100/8100 SERIES - Currently not used.																		
			7100/9100 SERIES <u>Version 2.16 and Lower:</u> Static Heat Recovery Relay - Threshold for energizing the Static Heat Recovery relay. <table><tr><th><u>Value</u></th><th><u>Description</u></th></tr><tr><td>0</td><td>Energizes relay during any hydronic “H” heat call. Primarily used to operate secondary loop pumps with the orange and white wires.</td></tr><tr><td>10-1600</td><td>The relay will energize when the average brick core temperature is greater than this value or receives a “G”, “Y” or “W” input. Primarily used to operate the Static Heat Recovery Unit.</td></tr></table> <u>Version 2.18 and Higher:</u> Start High Temperature Input Reduction – Used to set the temperature at which the maximum power allowed to the elements will begin to be limited by the SSR’s. The maximum power input will be limited proportionally between this value and the Maximum Core Temperature (L040) while still targeting the same maximum core temperature. This greatly reduces the maximum element temperature which improves the life of the heating elements. Reference L057 for additional information.	<u>Value</u>	<u>Description</u>	0	Energizes relay during any hydronic “H” heat call. Primarily used to operate secondary loop pumps with the orange and white wires.	10-1600	The relay will energize when the average brick core temperature is greater than this value or receives a “G”, “Y” or “W” input. Primarily used to operate the Static Heat Recovery Unit.												
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L052	8	0 to 63	ALL SYSTEMS Optional Features <table><tr><th><u>Value</u></th><th><u>Description</u></th></tr><tr><td>1</td><td>The system won't decrement L040 if a core fail is detected.</td></tr><tr><td>2</td><td>“CORE FAIL” is not displayed even if a core fail is detected.</td></tr><tr><td>4</td><td>Disables proportional charging; therefore, if the core is charging, all elements are energized.</td></tr><tr><td>8</td><td>Enables Clock Editing Security, so the clock settings can only be edited for the first two (2) minutes of operation.</td></tr><tr><td>16</td><td>Enables space heating during a charge delay time (L026).</td></tr><tr><td>32</td><td>Enables Charge Delay (as set in L026) for loads controlled by the peak control relay (COM, NO, NC positions on the low voltage terminal block.)</td></tr><tr><td>64</td><td>Currently not used.</td></tr><tr><td>128</td><td>Currently not used.</td></tr></table>	<u>Value</u>	<u>Description</u>	1	The system won't decrement L040 if a core fail is detected.	2	“CORE FAIL” is not displayed even if a core fail is detected.	4	Disables proportional charging; therefore, if the core is charging, all elements are energized.	8	Enables Clock Editing Security, so the clock settings can only be edited for the first two (2) minutes of operation.	16	Enables space heating during a charge delay time (L026).	32	Enables Charge Delay (as set in L026) for loads controlled by the peak control relay (COM, NO, NC positions on the low voltage terminal block.)	64	Currently not used.	128	Currently not used.
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Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function																		
L053	0	0 to 255	<p>ALL SYSTEMS</p> <p>Load Management Features – Allows user to enable load management features on the Relay Driver Board (RDB).</p> <table><thead><tr><th><u>Value</u></th><th><u>Description</u></th></tr></thead><tbody><tr><td>1</td><td>Enable 4-20mA input on the RDB.</td></tr><tr><td>2</td><td>Enable Pulse input on the RDB.</td></tr><tr><td>4</td><td>Enable External Duct Sensor on the RDB.</td></tr><tr><td>8</td><td>Currently not used.</td></tr><tr><td>16</td><td>Enable Load Management Module 1.</td></tr><tr><td>32</td><td>Enable Load Management Module 2.</td></tr><tr><td>64</td><td>Enable SSR panel. Not required for 9100 Series with integrated SSR controls.</td></tr><tr><td>128</td><td>Enables the “MA” command to control the maximum percentage of power consumption. Command received via the communication port on the system, BACnet communication control, or PLC communications.</td></tr></tbody></table> <p>NOTE: Do NOT enable 4-20mA and pulse input at the same time.</p>	<u>Value</u>	<u>Description</u>	1	Enable 4-20mA input on the RDB.	2	Enable Pulse input on the RDB.	4	Enable External Duct Sensor on the RDB.	8	Currently not used.	16	Enable Load Management Module 1.	32	Enable Load Management Module 2.	64	Enable SSR panel. Not required for 9100 Series with integrated SSR controls.	128	Enables the “MA” command to control the maximum percentage of power consumption. Command received via the communication port on the system, BACnet communication control, or PLC communications.
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L054	0	0 to 255	<p>ALL SYSTEMS using pulse load management</p> <p>Maximum Load Capacity - Maximum kW that is allowed before loads start to shed divided by ten (10). [Maximum kW/10]</p> <p><i>Example: If maximum building load is 450kW, a value of 45 is entered.</i></p>																		
L055	0	0 to 255	<p>6100/8100 SERIES - Software Version 2.04 and Higher</p> <p>Optional Control Functions</p> <table><thead><tr><th><u>Value</u></th><th><u>Description</u></th></tr></thead><tbody><tr><td>1</td><td>Currently not used.</td></tr><tr><td>2</td><td>Currently not used.</td></tr><tr><td>4</td><td>Detect the pulse width of the A Peak input to set the maximum percent of elements allowed to operate. <i>Do Not use in conjunction with the 32-bit.</i></td></tr><tr><td>8</td><td>Currently not used.</td></tr><tr><td>16</td><td>Sets the “MA” command for PLC communication only (V2.08 or higher only).</td></tr><tr><td>32</td><td>Detect the pulse width of the A Peak input to simulate outdoor temperature. <i>Do Not use in conjunction with the 4-bit (V2.08 or higher only)</i>.</td></tr><tr><td>64</td><td>Currently not used.</td></tr><tr><td>128</td><td>6100 Series Only (V2.16 and higher only) – Enables auxiliary peak control relay and compressor relay to energize in response to the thermostat inputs. This is used to enable the variable speed blower when using BACnet control as a source of thermostat inputs. This is used when there is no low voltage thermostat connected directly to the heating system.</td></tr></tbody></table>	<u>Value</u>	<u>Description</u>	1	Currently not used.	2	Currently not used.	4	Detect the pulse width of the A Peak input to set the maximum percent of elements allowed to operate. <i>Do Not use in conjunction with the 32-bit.</i>	8	Currently not used.	16	Sets the “MA” command for PLC communication only (V2.08 or higher only) .	32	Detect the pulse width of the A Peak input to simulate outdoor temperature. <i>Do Not use in conjunction with the 4-bit (V2.08 or higher only)</i> .	64	Currently not used.	128	6100 Series Only (V2.16 and higher only) – Enables auxiliary peak control relay and compressor relay to energize in response to the thermostat inputs. This is used to enable the variable speed blower when using BACnet control as a source of thermostat inputs. This is used when there is no low voltage thermostat connected directly to the heating system.
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Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L055 cont.			7100/9100 SERIES - Software Version 2.04 and Higher Optional Control Functions <u>Value</u> <u>Description</u> 1 Pulse input will be used to set the target water temperature as a percentage between L000 and L001. 2 Enables the use of the “TW” command via the system communication port or BACnet control to set target water as a percentage between minimum outlet water temperature (L001) and maximum outlet water temperature (L000). 4 Detect the pulse width of the A Peak input to set the maximum percent of elements allowed to operate. 8 Activates relay when outlet water temperature drops 10 degrees below target for at least 10 minutes of heat call to signal secondary fuel source to turn on. 16 Sets the “MA” command for PLC communication only (software version 2.08 or higher only). 32 Detect the pulse width of the A Peak input to simulate outdoor temperature. <i>Do Not use in conjunction with 4-bit (software version 2.08 or higher only).</i> 64 Currently not used. 128 Currently not used.
L056	6100/7100 45 8100/9100 44	0 to 255	ALL SYSTEMS Heating Element Input - The kW input of a single element times ten (kW X 10). Required for use with “MA” and pulse width modulation load control inputs. <i>Example: A value of 45 equals 4.5kW elements.</i>
L057	<div style="text-align: center;">0</div> <div style="text-align: center;">30</div>	<div style="text-align: center;">0 to 55</div> <div style="text-align: center;">0 to 100</div>	<div> ALL SYSTEMS Software Version 2.04 and Lower Air Conditioner Freeze Up Protection – A temperature is set in this location. If the output temperature is less than this value and the system is in cool mode, the compressor relay opens. This feature is designed to protect the A-coil from icing up. </div> <hr/> <div> 6100/7100/8100/NON-INTEGRATED 9100 Software Version 2.08 and higher - Currently not used. </div> <hr/> <div> 9100 SERIES WITH INTEGRATED SSR CONTROL Software Version 2.08 and Higher Minimum SSR On-Percent – When limiting the input power of the system at higher core temperatures (L051), the minimum on-percent (duty cycle) of the SSR’s is limited by the value in this location. NOTE: <i>Setting this value near 100 prevents the system from reducing the heating element’s temperature. Setting this value near zero can prevent the system from achieving a full charge.</i> </div>

Standard Installation Locations (L000-L059) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L058	11	8 to 12	ALL SYSTEMS Software Version 2.10 and Higher Seasonal Menu and Schedule Month that begins the Winter (HEAt) schedule. The first day of this month is used. <i>Example: If a value of ten (10) is entered, the winter (HEAt) schedule would begin on October 1st.</i>
L059	5	1 to 7	ALL SYSTEMS Software Version 2.10 and Higher Seasonal Menu and Schedule Month that ends the Winter (EndH) schedule. The first day of this month is used. <i>Example: If a value of four (4) is entered, the winter (EndH) schedule would end on April 1st.</i>

Time Clock Module Installation Locations (L060-L089)

NOTE: Locations L060 through L089 are time clock related programs. The optional Steffes Time Clock Module must be installed in order to use the features described in these locations.

Loc. No.	Factory Default	Default Range	Description / Function
L060	1	0 to 255	<p>ALL SYSTEMS Time Clock Module Function Enable - Indicates which function(s) the optional time clock module is to be used for.</p> <p><u>Value</u> <u>Option Selected</u></p> <p>0 Time clock module not used for control purposes.</p> <p>1 Enable time clock module to be used for peak control purposes.</p> <p>2 Enable time clock module to be used for anticipated peak control purposes (Specialty Applications only).</p> <p>4 Currently not used.</p> <p>8 Enable calendar function, allows user to edit YEAR and Date.</p> <p>16 Software V2.02, V2.04, and V2.08: Enables Specialized Time Schedule (i.e. Ontario). Software V2.02, V2.04, and V2.08 have different time schedules. Refer to the appropriate configuration guide for more information. Software V2.10 and Higher: Enables the seasonal menu "SEAS" so summer and winter can operate on different schedules. With the seasonal menu, L062-L073 are used for peak and A-peak inputs.</p> <p>32 Clock schedules show "Schd" mini menu.</p> <p>64 Software V2.10 and Higher Only: If using the seasonal menu "SEAS" as set by the 16-bit in this location, the weekends will follow the same schedule as the weekdays. If this bit is not set, weekends are in charge mode all the time.</p> <p>128 Currently not used.</p>
L061	00:00	00:00 to 16:00	<p>ALL SYSTEMS Anticipated Peak Duration - Initiates an anticipated peak time prior to each scheduled peak time as programmed in the time clock module and sets the duration of the anticipated peak period. The value entered is specified in 15-minute intervals.</p>

Time Clock Module Installation Locations (L060-L089) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L062	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #1 - Specifies the time (military) at which the first time clock scheduled peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekday Peak or Anticipated Peak Time #1 - Specifies the time (military) at which the first time clock scheduled peak or anticipated-peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Winter Start Time #1 - Specifies the time (military) at which the first time clock scheduled time is to begin each weekday (Monday - Friday) during the winter. Weekends are controlled by the 64-bit in Location 60 (L060).</p>
L063	00:00	<p>00:00 to 23:45</p> <p>P0:00 to P9:45 A0:00 to A9:45</p>	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #1 Duration - Sets duration of the first weekday time clock scheduled peak time (as set in L062). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #1 Duration and Mode - Sets duration of the first time clock scheduled time as set in L062. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p> <p><i>NOTE: If the peak or anticipated-peak period is longer than 9 hours and 45 minutes in duration, a concurrent scheduled time must be set using L064 and L065.</i></p>
L064	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #2 - Specifies the time (military) at which the second time clock scheduled peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekday Peak or Anticipated Peak Time #2 - Specifies the time (military) at which the second time clock scheduled peak or anticipated-peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Winter Start Time #2 - Specifies the time (military) at which the second time clock scheduled time is to begin each weekday (Monday - Friday) during the winter. Weekends are controlled by the 64-bit in Location 60 (L060).</p>

Time Clock Module Installation Locations (L060-L089) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L065	00:00	00:00 to 23:45 P0:00 to P9:45 A0:00 to A9:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #2 Duration - Sets duration of the second weekday time clock scheduled peak time (as set in L064). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #2 Duration and Mode - Sets duration of the second time clock scheduled time as set in L064. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p> <p><i>NOTE: If the second peak or anticipated-peak period is longer than 9 hours and 45 minutes in duration, a concurrent scheduled time must be set using L066 and L067.</i></p>
L066	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #3 - Specifies the time (military) at which the third time clock scheduled peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekday Peak or Anticipated Peak Time #3 - Specifies the time (military) at which the third time clock scheduled peak or anticipated-peak time is to begin each weekday (Monday – Friday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Winter Start Time #3 - Specifies the time (military) at which the third time clock scheduled time is to begin each weekday (Monday - Friday) during the winter. Weekends are controlled by the 64-bit in Location 60 (L060).</p>
L067	00:00	00:00 to 23:45 P0:00 to P9:45 A0:00 to A9:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekday Peak Time #3 Duration - Sets duration of the third weekday time clock scheduled peak time (as set in L066). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #3 Duration and Mode - Sets duration of the third time clock scheduled time as set in L066. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p>

Time Clock Module Installation Locations (L060-L089) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L068	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #1 - Specifies the time (military) at which the first time clock scheduled peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekend Peak or Anticipated Peak Time #1 - Specifies the time (military) at which the first time clock scheduled peak or anticipated-peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Summer Start Time #1 - Specifies the time (military) at which the first time clock scheduled time is to begin each weekday (Monday - Friday) during the summer. Weekends are controlled by the 64-bit in Location 60 (L060).</p>
L069	00:00	<p>00:00 to 23:45</p> <p>P0:00 to P9:45 A0:00 to A9:45</p>	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #1 Duration - Sets duration of the first weekend time clock scheduled peak time (as set in L068). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #1 Duration and Mode - Sets duration of the first time clock scheduled time as set in L068. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p> <p><i>NOTE: If the peak or anticipated-peak period is longer than 9 hours and 45 minutes in duration, a concurrent scheduled time must be set using L070 and L071.</i></p>
L070	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #2 - Specifies the time (military) at which the second time clock scheduled peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekend Peak or Anticipated Peak Time #2 - Specifies the time (military) at which the second time clock scheduled peak or anticipated-peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Summer Start Time #2 - Specifies the time (military) at which the second time clock scheduled time is to begin each weekday (Monday - Friday) during the summer. Weekends are controlled by the 64-bit in Location 60 (L060).</p>

Time Clock Module Installation Locations (L060-L089) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L071	00:00	00:00 to 23:45 P0:00 to P9:45 A0:00 to A9:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #2 Duration - Sets duration of the second weekend time clock scheduled peak time (as set in L070). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #2 Duration and Mode - Sets duration of the second time clock scheduled time as set in L070. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p> <p><i>NOTE: If the peak or anticipated-peak period is longer than 9 hours and 45 minutes in duration, a concurrent scheduled time must be set using L072 and L073.</i></p>
L072	00:00	00:00 to 23:45	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #3 - Specifies the time (military) at which the third time clock scheduled peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit NOT Enabled in L060:</u></p> <p>Weekend Peak or Anticipated Peak Time #3 - Specifies the time (military) at which the third time clock scheduled peak or anticipated-peak time is to begin each weekend (Saturday - Sunday).</p> <p><u>Software V2.10 and Higher/16-bit Enabled in L060:</u></p> <p>Summer Start Time #3 - Specifies the time (military) at which the third time clock scheduled time is to begin each weekday (Monday - Friday) during the summer. Weekends are controlled by the 64-bit in Location 60 (L060).</p>
L073	00:00	00:00 to 16:00	<p>ALL SYSTEMS</p> <p><u>Software V2.08 and Lower:</u></p> <p>Weekend Peak Time #3 Duration - Sets duration of the third weekend time clock scheduled peak time (as set in L072). Value is specified in 15-minute intervals.</p> <p><u>Software V2.10 and Higher:</u></p> <p>Timer #3 Duration and Mode - Sets duration of the third time clock scheduled time as set in L072. It also enables the mode, peak (P) or anticipated-peak (A). This value is specified by a "P" or an "A" followed by the time in 15-minute intervals. This value may not exceed 9:45 (9 hours and 45 minutes).</p>
L074 - L089			ALL SYSTEMS - Currently not used.

Equipment Series Specific Configuration Locations (L090-L099)

NOTE: L090 through L099 are Configuration Locations. These locations are for setting up the system and access to editing them is only available in the first 4 minutes after powering up the system.

Loc. No.	Factory Default	Default Range	Description / Function																																
L090	Based on Model	10 to 59	ALL SYSTEMS Model Type – Specifies the series. <u>Value</u> <u>Heater Series</u> 48 6100/8100 Series with one storage module 49 8100 Series with two storage modules 58 7100 Series and non-integrated 9100 Series 59 9100 Series with Integrated SSR control (V2.18 and higher)																																
L091	Based on Model	1 to 6	ALL SYSTEMS Heating Elements per Core Sensor - Specifies the number of heating element relays contained in each brick core of the system. <u>Value</u> <u>Heater Series</u> 3 9100 Series with Integrated SSR control (V2.18 and higher) 4 Models 6120 and 7120 5 Models 6140 and 7140 6 Models 6130, 7130, all 8100 Series, and all non-integrated 9100 Series																																
L092	Based on Model	1 to 6	ALL SYSTEMS Brick Core Sensors per System - Specifies the number of brick core sensors (i.e. thermocouples) contained in the system. <table> <thead> <tr> <th><u>Model</u></th><th><u>Number of Sensors</u></th><th><u>Model</u></th><th><u>Number of Sensors</u></th></tr> </thead> <tbody> <tr> <td>6120</td><td>2</td><td>8150</td><td>2</td></tr> <tr> <td>6130</td><td>2</td><td>8180</td><td>3</td></tr> <tr> <td>6140</td><td>3</td><td>8155</td><td>4</td></tr> <tr> <td>7120</td><td>2</td><td>8185</td><td>5</td></tr> <tr> <td>7130</td><td>2</td><td>8188</td><td>6</td></tr> <tr> <td>7140</td><td>3</td><td>9150</td><td>2</td></tr> <tr> <td></td><td></td><td>9180</td><td>3</td></tr> </tbody> </table>	<u>Model</u>	<u>Number of Sensors</u>	<u>Model</u>	<u>Number of Sensors</u>	6120	2	8150	2	6130	2	8180	3	6140	3	8155	4	7120	2	8185	5	7130	2	8188	6	7140	3	9150	2			9180	3
<u>Model</u>	<u>Number of Sensors</u>	<u>Model</u>	<u>Number of Sensors</u>																																
6120	2	8150	2																																
6130	2	8180	3																																
6140	3	8155	4																																
7120	2	8185	5																																
7130	2	8188	6																																
7140	3	9150	2																																
		9180	3																																
L093	170°F 76°C	100°F to 200°F 38°C to 93°C	ALL SYSTEMS Maximum Temperature of Control Board - Factory Purposes Only. If the temperature sensed at the processor control board exceeds this value, the static heat recovery relay and the low speed fan relay will close, energizing the supply air blower. In systems equipped with variable speed (ECM) motors, the blower will not be energized. If the temperature control board goes 5 degrees or more above this temperature, Error 7 ("ER07") will be displayed. NOTE: Do not change setting from the default value without factory authorization.																																

Equipment Series Specific Configuration Locations (L090-L099) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L094	<u>6100</u> 178 <u>7100</u> 195 <u>8100/9100</u> 200	150 to 245	ALL SYSTEMS Portion of Range Used in Blower - Factory Purposes Only. Wave chopping factor for core blower(s). NOTE: Do not change setting from the default value without factory authorization.
L095	<u>6100/7100</u> 80 <u>8100/9100</u> 120	0 to 255	ALL SYSTEMS Jump Start - This value establishes the speed that the fan starts in when energized. For instance, if a value of 80 is selected, the fan starts in speed 80 and then adjusts to the appropriate speed.
L096	0	0 to 255	ALL SYSTEMS Power Line Carrier Channel Scan for Channels One through Seven - If the PLC Test is running (activated in L098), this location is used to indicate which channels are available of Channels 1 through 7. Also, the 1-bit is active as long as the test is in process. Reference L097 for Channels 8-15. Value Channel Available 1 Indicates the PLC Channel Test is running 2 Channel 1 is available 4 Channel 2 is available 8 Channel 3 is available 16 Channel 4 is available 32 Channel 5 is available 64 Channel 6 is available 128 Channel 7 is available
L097	0	0 to 255	ALL SYSTEMS Power Line Carrier Channel Scan for Channels Eight through Fifteen - If the PLC Test is running (activated in L098), this location is used to indicate which channels are available of Channels 8 through 15. If the PLC test is still in process, the 1-bit in L096 is active. Reference L096 for Channels 1-7. Value Channel Available 1 Channel 8 is available 2 Channel 9 is available 4 Channel 10 is available 8 Channel 11 is available 16 Channel 12 is available 32 Channel 13 is available 64 Channel 14 is available 128 Channel 15 is available

Equipment Series Specific Configuration Locations (L090-L099) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L098	0	0 to 255	<p>ALL SYSTEMS - Rev G or Lower Processor Control Board (Software V2.04 or Lower)</p> <p>Save / Restore Program Location Default Settings - Used to save preferred default values or to load previously saved or factory default values. When one of the following values is entered, the action listed is taken and the location resets to a value of zero (0).</p> <p><u>Value</u> <u>Action Triggered</u></p> <p>1 Start PLC Channel Scan Testing.</p> <p>20 Load configuration saved with value of 120.</p> <p>30 Load configuration saved with value of 130.</p> <p>40 Load configuration saved with value of 140.</p> <p>50 Load configuration saved with value of 150.</p> <p>99 Save configuration to be retrieved from 199.</p> <p>NOTE: A save with value of 99 can only be performed once without downloading new Firmware.</p> <p>120 Save configuration to be retrieved from 20.</p> <p>130 Save configuration to be retrieved from 30.</p> <p>140 Save configuration to be retrieved from 40.</p> <p>150 Save configuration to be retrieved from 50.</p> <p>199 Load configuration saved with value of 99.</p> <p>255 Load the "Factory Defaults".</p> <p>NOTE: Factory Defaults for 255-bit will be overwritten if using the 99-bit save.</p>
			<p>ALL SYSTEMS - Rev H or Higher Processor Control Board (Software V2.08 or Higher)</p> <p>Save / Restore Program Location Default Settings - Used to save preferred default values or to load previously saved or factory default values. When one of the following values is entered, the action listed is taken and the location resets to a value of zero (0).</p> <p><u>Value</u> <u>Action Triggered</u></p> <p>1 Start PLC Channel Scan Testing.</p> <p>20-91 Load configurations saved with value of 120-191 respectively.</p> <p>99 Save configuration to be retrieved from 199.</p> <p>NOTE: A save with value of 99 can only be performed once without downloading new Firmware.</p> <p>120-191 Save configuration to be retrieved from 20-91 respectively.</p> <p>199 Load configuration saved with value of 99.</p> <p>255 Load the "Factory Defaults"</p> <p>NOTE: Factory Defaults for 255-bit will be overwritten if using the 99-bit save.</p>

Equipment Series Specific Configuration Locations (L090-L099) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L099	15	0 to 89	ALL SYSTEMS Editing Locations Security Lock-Out – Specifies which program locations can be edited from the faceplate after the first minute of operation. Only locations equal to or lower than the value in this location can be edited from the faceplate. <i>NOTE: This location can always be edited, regardless of what value it is set to. During the first minute of operation, L001 through L099 can be edited. Locations above L099 are “Read Only”.</i>

Read Only Locations (L100-L163) Used to Determine Current Operating Status

Loc. No.	Factory Default	Default Range	Description / Function
L100			<p>ALL SYSTEMS Current Effective Inputs - Indicates which digital inputs are currently being used to control space heating and core charging algorithms. The value shown is based on the values in locations L101, L102, L103, and L104. When more than one digital input source is present, this location displays the most recently changed input.</p> <p><u>Value</u> <u>Input</u></p> <p>1 Peak Interval Signal</p> <p>2 Anticipated Peak Interval Signal</p> <p>4 Fan ON ("G" Thermostat Input)</p> <p>8 Cool Mode/Reversing Valve ("O" Thermostat Input)</p> <p>16 Stage One/Compressor Heat Call (if 2-stage heat pump, stage one and two compressor calls cannot be differentiated)</p> <p>32 Stage Two/Auxiliary Heat Call (if using a 2-stage heat pump energized as stage 3 three heat call)</p> <p>64 6100/8100 Series: Emergency Heat Call ("H/E" Thermostat Input) 7100/9100 Series: Hydronic Heat Call ("H/E" Thermostat Input)</p> <p>128 Active Core Fail/Open High Limit (Only applicable to L100)</p>
L101			<p>ALL SYSTEMS Low Voltage Inputs – Indicates the sum of values based on the current state of each of the input signals received from low voltage inputs. Refer to L100 for an interpretation of the value.</p> <p><u>Value</u> <u>Input</u></p> <p>128 J2 jumper installed to allow editing of locations.</p>
L102			<p>ALL SYSTEMS Power Line Carrier (PLC) Signal Inputs – Indicates a value based on the current state of each of the input signals received from a Steffes PLC. Refer to L100 for an interpretation of the value.</p>
L103			<p>ALL SYSTEMS Communication Inputs for Palm/Computer Interface - Indicates a value based on the current state of each of the input signals received from the communication port or BACnet control. Refer to L100 for an interpretation of the value.</p>
L104			<p>ALL SYSTEMS Microprocessor Based Time Clock Module Signal Inputs – Indicates a value based on the current state of each of the input signals received from the optional microprocessor based time clock module (if installed). Refer to L100 for an interpretation of the value.</p>

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L105			ALL SYSTEMS Current Power Line Carrier (PLC) Outdoor Temperature - Current outdoor temperature (°F or °C) as received from the PLC transmitting device. A reading of 128°F/53°C indicates no PLC packet has been received. NOTE: Heat and cold sources will affect the accuracy of the outdoor sensor. Placement of the PLC control and the sensor should be considered during installation, as well as sealing the outdoor-to-indoor wire route opening to ensure the most accurate temperature readings.
L106			ALL SYSTEMS Power Line Carrier Success Rate Percentage – This location contains the power line carrier success rate percentage based on the last 33 packets of information received by the system from the PLC transmitting device. NOTE: If power to the system is disconnected, the value in this location resets.
L107			ALL SYSTEMS Highest Consecutive "BAD" PLC Information Packets Received – Value shown indicates the most consecutive "bad" packets received by the system from the PLC transmitting device since the system was last energized. A packet is considered bad if the checksum fails or ten minutes has passed since receiving a good packet. NOTE: If power to the system is disconnected, the value in this location resets.
L108			ALL SYSTEMS Targeted Brick Core Charge Level - The amount of heat storage the system is targeting. This value represents a percentage of brick core charge between Minimum Core Temperature (L041) and Maximum Core Temperature (L040). NOTE: When in peak mode, the value in this location is -50 unless Comfort Override and/or Freeze Protection is enabled and active.
L109			ALL SYSTEMS Outdoor Temperature Reading Used by System - Indicates the current outdoor temperature reading the system is using. This value will match Current Power Line Carrier Outdoor Temperature (L105) if using PLC (L020) or Current Hard-Wired Outdoor Temperature (L113) if using a hard-wired outdoor sensor.
L110			ALL SYSTEMS Currently not used.
L111			ALL SYSTEMS Currently not used.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L112			ALL SYSTEMS Current Discharge Air Temperature – Current discharge air temperature (°F or °C) as sensed by the output thermistor. NOTE: <i>7100 and 9100 Series systems have a fixed resistor in place unless an optional discharge air sensor has been installed.</i>
L113			ALL SYSTEMS Current Hard-Wired Outdoor Temperature (if using hard-wired outdoor temperature sensor only) - Current outdoor temperature (°F or °C) as received from a hard-wired outdoor sensor. A shorted outdoor sensor will show a reading of approximately 200°F and an open sensor will show approximately -36°F. NOTE: <i>Heat and cold sources will affect the accuracy of the outdoor sensor. Placement of the sensor should be considered during installation, as well as sealing the outdoor-to-indoor wire route opening to ensure the most accurate temperature readings.</i>
L114			6100/8100 SERIES Current Room Temperature - Displays the current room temperature as sensed by the room temperature sensor, if enabled in L035, plus the value in L014. NOTE: <i>Only applicable if using freeze protection.</i>
			7100/9100 SERIES Current Outlet Water Temperature - Displays current outlet water temperature as sensed by the outlet water temperature sensor plus the value of L014.
L115			ALL SYSTEMS Microprocessor Control Board Current Operating Temperature - Indicates the current temperature (°F or °C) the microprocessor control board is operating in.
L116			ALL SYSTEMS Current Day of the Week – When using the Steffes Time Clock Module option, this location indicates current day of the week in accordance to the settings in the module.
L117			ALL SYSTEMS Current Hour of the Day – When using the Steffes Time Clock Module option, this location indicates the current hour of the day in accordance to the settings in the module. Value shown in military time.
L118			ALL SYSTEMS Current Minute of the Hour – When using the Steffes Time Clock Module option, this location indicates the current minute of the hour in accordance to the settings in the module.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L119			ALL SYSTEMS Current Second of the Minute – When using the Steffes Time Clock Module option, this location indicates the current second of the minute in accordance to the settings in the module.
L120			ALL SYSTEMS Core Blower #1 Activation Level - This location indicates the activation level of the core blower. NOTE: 6100 Series systems have two core blowers.
L121			6100 SERIES Core Blower #2 Activation Level - Indicates the activation level of the second core blower.
			7100/9100 SERIES Pump Activation Level - Amount of power (variable voltage) being applied to the air handler circulator pump circuit, if applicable.
			8100 SERIES Currently not used.
L122			6100/8100 SERIES - PSC Motors ONLY (Not applicable to ECM Motors) Current Supply Air Blower Speed – Indicates which supply air blower speed relay is currently active. This determines the speed at which the supply air blower is currently operating. <u>Value</u> <u>Speed</u> 0 Supply Air Blower is OFF. 1 Low Speed Relay is Active (RLY 1 on Base I/O). 2 High Speed Relay is Active (RLY 3 on Base I/O).
			7100/9100 SERIES Currently not used.
L123			ALL SYSTEMS Currently not used.
L124			ALL SYSTEMS Currently not used.
L125			ALL SYSTEMS Storage Module Charge Level of First Storage Module - Indicates the amount of heat storage currently in Cores C, D, and E. This value represents a percentage of core charge of the first storage module. NOTE: All ThermElect systems will have at least one storage module containing Cores C and D (53kW) or C, D, and E (80kW).

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L126			ALL SYSTEMS Storage Module Charge Level of Second Storage Module - Indicates the amount of heat storage currently in Cores F, G, and H. This value represents a percentage of core charge of the second storage module. NOTE: Dual storage module systems include the 8155, 8185, and 8188.
L127			6100/8100 SERIES Currently not used.
			7100/9100 SERIES Current Outlet Water Temperature Set Point - Indicates the outlet water temperature set point currently being targeted.
L128			ALL SYSTEMS Energy Usage - Indicates energy usage during a charge period. This is used in conjunction with L042 and L043 to set a targeted core charge level when using a charge subroutine of 4, 5, 6, 9, or 10.
L129			ALL SYSTEMS Software Version Number – Indicates the software version number.
L130			ALL SYSTEMS Core Fail Count - Indicates the number of times the system has went into core fail (core high limit switch opened) since the system was last energized. This value may take up to 15 minutes to update. NOTE: If power to the system is disconnected, the value in this location resets.
L131			ALL SYSTEMS Currently not used.
L132			ALL SYSTEMS Currently not used.
L133			ALL SYSTEMS Base I/O Relay Board Firmware Version - Indicates the firmware version of the base I/O relay board.
L134			ALL SYSTEMS First Energy Management Control Firmware Version - Indicates the firmware version of the first Energy Management Control circuit board, if applicable.
L135			ALL SYSTEMS Second Energy Management Control Firmware Version - Indicates the firmware version of the second Energy Management Control circuit board, if applicable.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L136			ALL SYSTEMS Relay Driver Board (RDB) Firmware Version – Indicates the firmware version of the RDB.
L137			ALL SYSTEMS Brick Core C Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core C.
L138			ALL SYSTEMS Brick Core D Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core D.
L139			6140/7140 and 8100/9100 SERIES Brick Core E Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core E.
L140			8100 SERIES WITH DUAL STORAGE MODULES Brick Core F Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core F.
			6100/7100/9100 SERIES Currently not used.
L141			8100 SERIES WITH DUAL STORAGE MODULES Brick Core G Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core G.
			6100/7100/9100 SERIES Currently not used.
L142			8100 SERIES WITH DUAL STORAGE MODULES Brick Core H Thermocouple Temperature – Indicates the actual brick core temperature (°F or °C) of brick Core H.
			6100/7100/9100 SERIES Currently not used.
L143			ALL SYSTEMS External Duct Sensor Temperature - Indicates the external duct temperature (°F or °C) if enabled using the 4-bit in L053.
L144			ALL SYSTEMS Currently not used.
L145		-25 to 200	ALL SYSTEMS 4-20mA Input – Indicates the mA reading that the load management system is applying to the port on the relay driver board. The 4-20mA input (1-5VDC at the input) must be enabled in L053. This value is indicated as a percentage. 0% = No heating elements allowed to operate. 50% = Half of heating elements allowed to operate as needed. 100 % = All heating elements allowed to operate as needed.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L146		0 to 255	ALL SYSTEMS Current kW Reading – Indicates the current kW reading based on the pulse input. Must be enabled in L053. Also, reference ELoc E000.
L147		0 to 63	ALL SYSTEMS EXCEPT 9100 SERIES WITH INTEGRATED SSR Brick Core C Active Heating Elements – Indicates the number of heating elements energized at any one time in Core C. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized. 9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core C “Raw” SSR On-Percent – indicates preliminary calculation of the SSR on-percent. L150 indicates final SSR on-percent.
L148		0 to 63	ALL SYSTEMS EXCEPT 9100 SERIES WITH INTEGRATED SSR Brick Core D Active Heating Elements – Indicates the number of heating elements energized at any one time in Core D. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized. 9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core D “Raw” SSR On-Percent – indicates preliminary calculation of the SSR on-percent. L151 indicates final SSR on-percent.
L149		0 to 63	6100/7100 SERIES Currently not used. 8100/9100 SERIES WITHOUT INTEGRATED SSR Brick Core E Active Heating Elements – Indicates the number of heating elements energized at any one time in Core E. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized. 9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core E “Raw” SSR On-Percent – indicates preliminary calculation of the SSR on-percent. L152 indicates final SSR on-percent.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L150		0 to 63	8100 SERIES WITH DUAL STORAGE MODULES Brick Core F Active Heating Elements – Indicates the number of heating elements energized at any one time in Core F. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized
			6100/7100/9100 SERIES WITHOUT INTEGRATED SSR Currently not used.
			9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core C SSR On-Percent – indicates final SSR on-percent for all SSR's controlling power to Core C.
L151		0 to 63	8100 SERIES WITH DUAL STORAGE MODULES Brick Core G Active Heating Elements – Indicates the number of heating elements energized at any one time in Core G. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized
			6100/7100/9100 SERIES WITHOUT INTEGRATED SSR Currently not used.
			9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core D SSR On-Percent – indicates final SSR on-percent for all SSR's controlling power to Core D.
L152		0 to 63	8100 SERIES WITH DUAL STORAGE MODULES Brick Core H Active Heating Elements – Indicates the number of heating elements energized at any one time in Core H. <u>Value</u> <u>Description</u> 1 Element 1 is energized. 2 Element 2 is energized. 4 Element 3 is energized. 8 Element 4 is energized. 16 Element 5 is energized. 32 Element 6 is energized
			6100/7100/9100 SERIES WITHOUT INTEGRATED SSR Currently not used.
			9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Core E SSR On-Percent – indicates final SSR on-percent for all SSR's controlling power to Core E.

Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L153		0 to 100	ALL SYSTEMS EXCEPT 9100 SERIES WITH INTEGRATED SSR Activation Level of SSR Panel - Indicates the percentage of "ON" time of the relays in the SSR Panel.
			9100 SERIES WITH INTEGRATED SSR (V2.18 and Higher) Currently not used.
L154			ALL SYSTEMS Core C Temperature At Last Core Fail - Indicates the Core C temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
L155			ALL SYSTEMS Core D Temperature At Last Core Fail - Indicates the Core D temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
L156			6140/7140 and 8100/9100 SERIES Core E Temperature At Last Core Fail - Indicates the Core E temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
L157			8100 SERIES WITH DUAL STORAGE MODULES Core F Temperature At Last Core Fail - Indicates the Core F temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
			6100/7100/9100 SERIES Currently not used.
L158			8100 SERIES WITH DUAL STORAGE MODULES Core G Temperature At Last Core Fail - Indicates the Core G temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
			6100/7100/9100 SERIES Currently not used.
L159			8100 SERIES WITH DUAL STORAGE MODULES Core H Temperature At Last Core Fail - Indicates the Core H temperature at the time of the last core fail. It can take up to 20 minutes to update this value once a new core fail condition occurs.
			6100/7100/9100 SERIES - Currently not used.
L160			ALL SYSTEMS Current Year - Indicates the current year, if a Time Clock Module is installed and the calendar function (8-bit) is enabled in L060.
L161			ALL SYSTEMS Current Month - Indicates the current month, if a Time Clock Module is installed and the calendar function (8-bit) is enabled in L060.

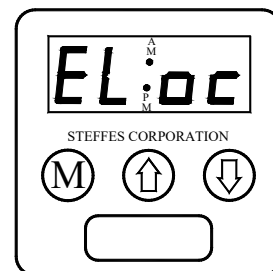
Read Only Locations (L100-L163) Continued...

Loc. No.	Factory Default	Default Range	Description / Function
L162			ALL SYSTEMS Current Day of the Month - Indicates the current day of the month, if a Time Clock Module is installed and the calendar function (8-bit) is enabled in L060.
L163			7100/9100 SERIES Active TW Command - Percentage between the water temperatures set in L000 and L001 being targeted by the "TW" command.
L164			ALL SYSTEMS Forecasted Outdoor Temperature - Indicates the forecasted outdoor temperature as provided by a Grid-Interactive ETS (GETS) control.

Accessing Relay Driver Board (RDB) ELoc Setting Information

If using the ThermElect system for pulse monitoring, the relay driver board must be set up for the application. Review the program ELoc settings to determine the proper values.

NOTE: Upon power up of the equipment, entry into all program locations is provided for the first two minutes of operation. After this time, the security lockout prevents changes from being made to the relay driver board "ELoc" settings.



TO EDIT OR VIEW "ELoc" SETTINGS:

- STEP 1** Press and release the **M** button until "ELoc" is displayed on the faceplate.
- STEP 2** Press the up arrow button once and "E000" will appear on the faceplate.
- STEP 3** Release the buttons. The display will flash between "E000" and the corresponding value.
- STEP 4** To edit "E000", press and hold the **M** button. Use the up or the down arrow button to change the value to the desired setting. Release the buttons.
- STEP 5** Use the up arrow button to go to "E001". If changes are needed, press and hold the **M** button. Use the up or the down arrow button to change the value to the desired setting. Release the buttons.
- STEP 6** Continue to repeat Step 5 until all "ELoc" values are set accordingly.
- STEP 7** Once all changes have been made, release the **M** button. Press the down arrow button until "E000" is displayed. Then, press the down arrow button one more time and the normal display mode will be shown. Any changes made will automatically be saved.

NOTE: If no buttons on the control panel are pressed, after a brief amount of time, the faceplate will automatically return to its normal operating mode and any changes made to the location settings will automatically be saved.

Relay Driver Board (RDB) Location Values and Descriptions

ELoc. No.	Factory Default	Default Range	Description / Function
E000	0	0 to 255	ALL SYSTEMS Pulses per kWh – (Number of Pulses/kW) x 10. Refer to the "Theory of Operation for Pulse Monitoring" for more detail.

ELocations E001 through E013 require the optional Steffes Time Clock Module. The 4-bit should be set in Location 35 (L035) and the 8-bit set in Location 60 (L060) to use these locations.

E001	0	0 to 28	ALL SYSTEMS Billing Day – Indicates the day of the month on which billing begins. This is the day on which the system starts monitoring kW usage for each month's load limits.
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Relay Driver Board (RDB) Location Values and Descriptions Continued...

ELoc. No.	Factory Default	Default Range	Description / Function
E002	0	0 to 255	ALL SYSTEMS January Load Limit – Indicates the maximum demand allowed for the month of January. (kW/10)
E003	0	0 to 255	ALL SYSTEMS February Load Limit – Indicates the maximum demand allowed for the month of February. (kW/10)
E004	0	0 to 255	ALL SYSTEMS March Load Limit – Indicates the maximum demand allowed for the month of March. (kW/10)
E005	0	0 to 255	ALL SYSTEMS April Load Limit – Indicates the maximum demand allowed for the month of April. (kW/10)
E006	0	0-255	ALL SYSTEMS May Load Limit – Indicates the maximum demand allowed for the month of May. (kW/10)
E007	0	0 to 255	ALL SYSTEMS June Load Limit – Indicates the maximum demand allowed for the month of June. (kW/10)
E008	0	0 to 255	ALL SYSTEMS July Load Limit – Indicates the maximum demand allowed for the month of July. (kW/10)
E009	0	0 to 255	ALL SYSTEMS August Load Limit – Indicates the maximum demand allowed for the month of August. (kW/10)
E010	0	0 to 255	ALL SYSTEMS September Load Limit – Indicates the maximum demand allowed for the month of September. (kW/10)
E011	0	0 to 255	ALL SYSTEMS October Load Limit – Indicates the maximum demand allowed for the month of October. (kW/10)
E012	0	0 to 255	ALL SYSTEMS November Load Limit – Indicates the maximum demand allowed for the month of November. (kW/10)
E013	0	0 to 255	ALL SYSTEMS December Load Limit – Indicates the maximum demand allowed for the month of December. (kW/10)

Relay Driver Board (RDB) Location Values and Descriptions Continued...

ELocations E014 through E029 are settings for the optional Steffes Energy Management Controllers. Each ELocation corresponds to a specific relay on its respective Energy Management Controller. The value entered specifies the amount of load (kW) allowed to turn on when that relay is energized.

ELoc. No.	Energy Management Controller No.	Default Range	Relay
E014	1	0-255	1
E015			2
E016			3
E017			4
E018			5
E019			6
E020			7
E021			8
E022	2	0-255	1
E023			2
E024			3
E025			4
E026			5
E027			6
E028			7
E029			8
E030 – E035			Currently not used.

ERROR CODES

The Steffes Commercial systems have an on-board diagnostic system to monitor various operating conditions. If operating conditions move outside the normal operating range, an error code is displayed on the faceplate. If there are multiple errors simultaneously, only the highest priority error code appears. Once corrected, the next highest priority code is displayed. Error codes display as "Er--" (i.e. Er05).

Error Code	Description
01	Currently not used.
02	Currently not used.
03	<p>6100/8100 series if using freeze protection - Room temperature sensor is out of normal operating range. This may indicate an open sensor, a short in the wiring, or a circuit board which is out of calibration. Take an ohm reading across the sensor to ensure proper operation, check the wiring, and verify the value in L035. The room temperature sensor should be connected to the RS and SC low voltage terminals. Compare the sensor reading to the value in L114 to verify proper calibration of the circuit board. <i>Approximate ohm readings are 60°F (16°C) = 1552 ohms; 70°F (21°C) = 1199 ohms; 80°F (27°C) = 941 ohms.</i></p> <p>If this error is displayed on a 7100/9100 series or 6100/8100 series without freeze protection verify that the 2-bit is not set in L035.</p>



WARNING

HAZARDOUS VOLTAGE:
Risk of electric shock, injury, or death. System may be connected to more than one branch circuit. Disconnect power to all circuits before servicing. Equipment must be serviced by a qualified technician.

Error Codes Continued...

Error Code	Description
04	Discharge air sensor temperature is out of normal operating range. This can indicate an open sensor, a short in the wiring, or a circuit board which is out of calibration. Take an ohm reading across the sensor to ensure proper operation, check the wiring, and verify the value in L035. If equipped, verify that the supply air blower or air handler is properly connected to the supply blower wiring harness. Compare the sensor reading to the value in L112 to verify proper calibration of the circuit board. <i>Approximate ohm readings are 70° F = 1,199 ohms; 80° F = 941 ohms; 95° F = 646 ohms. On 7100 Series without an air handler, ensure the 1.2k ohm resistor is installed between the two brown wires connected to DS and SC low voltage terminals. On 9100 Series without an air handler, ensure that the 1.2k ohm resistor is installed between the DS and SC low voltage terminals.</i>
05	Outdoor sensor (direct wired) temperature reading is out of normal operating range. The sensor circuit may be shorted, the processor control board may be out of calibration, or there may be an incorrect value in L035. If using power line carrier control, make sure the values in L020 and L035 have been set appropriately. Otherwise, verify that the outdoor sensor is connected to OS and SC on the 12-position terminal block. Compare the sensor reading to the value in L113 to verify proper calibration of the circuit board. <i>Approximate ohm readings are 5° F = 7,646 ohms; 50° F = 2,024 ohms; 95° F = 646 ohms. If using Pulse Width Modulation for outdoor temperature this error will be presented if the signal is flat for 2 or more minutes. Reference the 32-bit in L055.</i>
06	Outdoor temperature reading from the transmitting device (PLC system) is out of normal operating range. Check the outdoor sensor attached to the transmitting device and the transmitter for proper operation.
07	Main processor control board temperature sensor is out of normal operating range. Verify value in Location 93 (L093). If the processor control board temperature is more than 5°F above the value in L093, Er07 will be displayed. Verify that none of the clearances have been violated and inspect the condition of the processor control board. Compare the value in L115 to the actual temperature at the processor control board.
08	External duct sensor temperature is out of normal operating range. This can indicate an open sensor, a short in the wiring, or the relay driver board is out of calibration. With the sensor disconnected, take an ohm reading across the sensor to ensure proper operation, check the wiring, and verify the value in L053. Compare the sensor reading to the value in L144 to verify proper calibration of the circuit board. <i>Approximate ohm readings are 60° F = 1552 ohms; 70° F = 1199 ohms; 80° F = 941 ohms. Max 190°F, Min 0°F</i>
09	Aux. Analog input is out of normal operating range. Currently not used.
10	Discharge air temperature has exceeded maximum standard operating temperatures.
11	Core C thermocouple temperature is out of normal operating range. This error is active when the sensed brick core temperature exceeds the value of L040 + 200°F (93°C) or is below -100°F (-73°C). An open or otherwise defective thermocouple, reversed polarity of thermocouple wiring coupled with a core temperature above 300°F (148°C), or a circuit board which is out of calibration can cause this. Check the thermocouple by taking a DC mV reading of the thermocouple out of circuit. Compare the thermocouple reading to the value in L137 to verify proper calibration of the circuit board. <i>Approximate DC mV readings are 200°F (93°C) = 3.8 mV; 700°F (371°C) = 15.2 mV; 1200°F (649°C) = 27.0 mV.</i>
12	Core D thermocouple temperature is out of normal operating range. Reference Error Code 11 above and L138.

Error Codes Continued...

Error Code	Description
13	Core E thermocouple temperature is out of normal operating range. Reference Error Code 11 above and L138.
14	8100 SERIES ONLY - Core F thermocouple temperature is out of normal operating range. Reference Error Code 11 above and L138.
15	8100 SERIES ONLY - Core G thermocouple temperature is out of normal operating range. Reference Error Code 11 above and L138.
16	8100 SERIES ONLY - Core H thermocouple temperature is out of normal operating range. Reference Error Code 11 above and L138.
17	Load Control Device (4-20mA) is out of normal range. This can indicate open or shorted wiring or that a relay driver board is out of calibration. Take a DC voltage reading across the input to ensure proper operation, reading should be between .5vDC and 6.25vDC. Check wiring, and verify the value in L053 is correct for the application. Compare the input reading to the value in L145 to verify proper calibration of the circuit board. 1vDC=0%, 3vDC=50%, 5vDC=100%.
19	There is no communication occurring with the relay driver board. The interface cable may be defective or the relay driver board may be unresponsive. Verify that the values in L090, L091, and L092 are correct for the application. Check connections and cleanliness of connectors for the communication system. On 9100 Series heating systems with integrated SSR controls, this error can indicate that the relay driver board is an older version which is not compatible with the integrated system and must be updated.
20	There is no communication occurring between the base I/O relay board and the processor control board. A defective circuit board or interface cable can cause this. Check connections and cleanliness of connectors for the communication system.
21	There is no communication occurring with the first Energy Management Controller. If installed, the interface cable may be defective or the Energy Management Controller may be unresponsive. Check the jumper configuration on the Energy Management Controller to ensure that J1 and J2 are both in the "OFF" position. Verify that the value in L053 is correct for the application.
22	There is no communication occurring with the second relay Energy Management Controller. If installed, the interface cable may be defective or the Energy Management Controller may be unresponsive. Check the jumper configuration on the Energy Management Controller and make sure J1 is "ON" and J2 is "OFF". Verify that the value in L053 is correct for the application.
23	There is no communication occurring with the Steffes Time Clock Module. If this module is not installed, verify the value in L035. If correct, the interface cable or the time clock module may be defective.
24	Temperature sensor offset/reference is out of range. A sensor or brick core thermocouple may be shorted to ground or the processor control board may be defective.
25	The heater is configured for power line carrier; however, is not receiving a valid power line carrier communication signal. (See also "PLC FAIL".)
26	Insufficient main control board memory (RAM) indicating the processor control board has likely failed. Contact Steffes Technical Support.
27	The processor control board is unable to communicate with the eeprom memory. Troubleshoot as Error 20 above.
28	Permanent memory change has been made. Press and release the M button twice to accept. This error message indicates a change has been made to the software program; therefore, it is important to verify that all location settings are correct for the application. If the error does not clear after programming is verified, replace the processor control board.
29	On-board communication system is not fully operable. Replace the processor control board.
30	Base I/O relay board is in test mode. Check that both jumpers are in the "OFF" position.

Error Codes Continued...

Error Code	Description
31	Energy Management Controller(s) are in test mode. Check the jumper configuration.
38	Core Fail as indicated if using BACnet. See flowchart for troubleshooting.
39	If the value in Location 13 (L013) is set to a value greater than the value in Location 12 (L012), Error 39 (Er 39) is displayed and the system space heats only until the values are corrected.
40	Indicates memory corruption has occurred. Replace the processor control board.
41	An attempt was made to write to the Flash memory a second time which is not permitted. It is only possible to write to the Flash memory one time after reprogramming. To write to the Flash memory again, reprogram the heating system with the most recent version of software or greater and then reconfigure. Reference Locations 98 (L098).
42	If the check sum fails in the Flash copy of the settings or if the initial write to the Flash fails, Er42 is displayed. Reprogram the heating system or replace the processor control board.
43	An attempt to load a saved configuration by setting Location 98 (L098) to a value of 20, 30, 40, or 50 has failed. Any changes to location values will need to be manually set. Press and release the "M" button to clear the error. <i>Er43 is only applicable to processor control boards with a revision level of G or lower.</i>
44	The check sum of the entire Flash is corrupt. Reprogram the heating system or replace the processor control board.
45	An attempt was made to load memory from an unsaved command in Location 98 (L098). <i>Applicable to processor control boards with a revision level of H or higher only.</i>
46	MA command or Pulse Width Modulation has timed out. No input has been received for 30 minutes or more. If the MA command or Pulse Width Modulation are not being used, verify that Location 53 (L053) and/or Location 55 (L055) are set correctly for the application.
47	Software Version 2.18 or Higher Only: The relay driver board is incompatible with the software version of the processor control board. Update the relay driver board.
Cold Core	The sensed temperature of the brick core is below 40°F. This may be an actual condition if the bricks are cold or it may be a defective thermocouple, loose connection to a thermocouple, a thermocouple with the wiring reversed (polarity sensitive) coupled with a core temperature between 150°F (65°C) and 300°F (148°C), or a circuit board which is out of calibration. Verify the core thermocouple wiring is connected properly and that the values in L090, L091 and L092 are correct for the application. Reference L137 to L142.
Core Fail	One of the core charging high limit switches may be open (Reference Error 38 and the 128-bit in L100).
PLC Fail	System is configured for power line carrier; however, is not receiving a valid power line carrier communication signal. Reference Error 25 above and L020.
LoAd CAP	All controllable loads have been shed and Maximum Load Capacity is still exceeded. This is not necessarily an error but merely an indication of the current condition of the application. NOTE: If 4-20mA control is being used and comfort override or freeze protection brings on elements, this error code may be displayed.