Trinity Tft / Lx / Lx-WH Firetube Giant FTG

Model #s: Tft60-399 Lx150-800 Lx200WH-800WH FTG 600-2400 Version Date: 2018-06-11





APPENDIX A – CONTROLLER AND TOUCHSCREEN DISPLAY **INSTRUCTIONS FOR Firetube Giant, TRINITY Tft & Lx SERIES**









This appliance must be installed by a licensed and trained Heating Technician or the Warranty is Void. Failure to properly install this unit may result in property damage, serious injury to occupants, or possibly death.





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1 INTRODUCTION



Please note: within this document, references to "controller" apply to ALL of Trinity Tft/Lx/Lx-WH or Firetube Giant FTG except where explicitly identified otherwise.

The Controller and Touchscreen Display, together, form the control system of a Trinity Tft/Lx/Lx-WH or Firetube Giant FTG boiler. All control configuration parameters are stored in non-volatile memory in the controller. Access to controller status and configuration is achieved with the display. Interaction with the display is performed by physically touching icons presented on the screen. Communication between the controller and display is via EIA-485 interface using the Modbus RTU protocol.

Appliance and controller status information and configuration parameters are presented in a series of pages. On

each page, the "Home" and "Back" icons are available to assist in quickly navigating through the menu structure. These icons appear at the top left and right corners of the pages. Touching the Home icon returns to the Home page immediately from any other page in the menu. Touching the Back icon displays the previous page.



Password - Many of the configuration parameters are password protected. The required password is "**sola**" (without the " "). It is case sensitive and must be entered in lower-case letters.

1.1 Boiler vs. Water Heater Settings – Quick Reference

Controller factory settings are <u>NOT</u> configured for a particular application. Since most settings are installation dependent, parameters must be field adjusted to suit not only the application (Boiler or Water Heater), but also the system requirements. See examples below of settings to be considered or adjusted:

Boiler Example: The factory setting for CH setpoint is 180°F [82°C] which is well suited for many "low masshigh temperature" systems; however, it should be adjusted down for "high mass-low temperature" heating systems (i.e. 100-130°F for infloor heat or 130-160°F for cast iron radiator systems).

Water Heater Example (Trinity Lx200WH-800WH ONLY): The factory setting for DHW setpoint is 180°F [82°C] which is well suited for high temperature applications such as commercial dishwashing; however, it should be adjusted down for applications not requiring such high temperature water (i.e. 140°F for domestic fixtures only).

IMPORTANT

Please read the following document carefully as factory settings are not configured for a particular application and may require adjusting in order to satisfy system requirements.

It is the responsibility of the installer, a licensed qualified heating technician, to configure and commission the unit and adjust any parameters required to comply with the application and satisfy the system requirements. The Quick Reference Tables below list the minimum parameters that need to be considered and/or adjusted before putting the unit into operation. Note that each table is application-specific as setting adjustments differ depending on whether the appliance is installed as a Boiler or a Water Heater:

Boiler Settings

Configuration Group	Setting Considerations	Reference
Central Heat	Ensure the <u>sum</u> of the CH setpoint and the CH off hysteresis does not exceed 200°F [93°C] or a "Lockout" condition may occur (<i>not applicable to models Tft60-399</i>).	See Figure 4-4 and Table 4-4, pages 11 & 12
Outdoor Reset	These parameters affect the Central Heat setpoint. Settings are installation dependent and adjustments should be made accordingly.	See Figure 4-6 and Table 4-6, page on page 13
DHW	Ensure the <u>sum</u> of the DHW setpoint and the DHW off hysteresis does not exceed 200°F [93°C] or a "Lockout" condition may occur (<i>not applicable to models Tft60-399</i>).	See Figure 4-8 and Table 4-8, page 14
High Limits	If higher water temperatures are required, 190-200°F [88-93°C], adjust limit response to avoid a "Lockout" condition. Boilers only (<i>Not applicable to models Lx500-800 & FTG 600-800</i>).	See Figure 4-16 and Table 4-15, page 23

Table 1-1 Boiler Settings Quick Reference Table

Water Heater Settings (Trinity Lx200WH-800WH ONLY)

Configuration Group	nfiguration Group Setting Considerations	
Central Heat	Not used for Water Heaters. No adjustments required.	Not applicable
Outdoor Reset	Not used for Water Heaters. "Disable" parameter to avoid nuisance faults.	Not applicable
DHW	Ensure the <u>sum</u> of the DHW setpoint and the DHW off hysteresis does not exceed 200°F [93°C] or a "Lockout" condition will occur.	See Figure 4-8 and Table 4-8, page 14
High Limits	The "Lockout" limit response is a mandatory safety feature intended to require a manual reset on water heater units in the event that the appliance high limit temperature is exceeded. For this reason, the limit response must remain set to "Lockout".	See Figure 4-16 and Table 4-15, page 23

 Table 1-2
 Water Heater Settings Quick Reference Table

1.2 Second Central Heat Input vs. Multiple Unit Application Settings

All boiler and water heater models can be used as stand-alone units or in a cascaded arrangement. It is important to note that factory settings are configured for a stand-alone unit with a single heating call input; therefore, some settings will need to be adjusted depending on the application chosen, whether it is e.g. a second central heat input (boilers only) or cascading multiple units. See the quick reference tables below to identify the minimal settings which must be adjusted for each application.

For Second Central Heat Input Applications with a stand-alone boiler configuration using CH1 as the high temperature call and CH2 (LL) as the low temperature call, refer to Table 1-3.

For multiple Boilers or Water Heaters applications refer to Table 1-4.

Second Central Heat Input Application Settings (Stand Alone Boilers ONLY)

Table 1-3 Second CH Input Settings Quick Reference Table

Configuration Group	Setting Considerations	Reference
Pump Configuration < CH pump >	Leave the checkbox "Use for Lead Lag Master demand" unchecked.	See Figure 4-12 and Table 4-11, page 20
Sensor Configuration (Lx500-800 Only)	Stand-alone boilers configured to use the second CH input [CH2 (LL)] cannot use the Outdoor Temperature Sensor. Change "Outdoor temperature source" from S5 (J8-11) to UNCONFIGURED.	See Figure 4-23 and Table 4-22, page 28
Lead Lag Master Configuration	Master enable - set to "Enable". This will allow the CH2 (LL) heat input to activate the boiler on a low temperature demand.	See Figure 4-25 on page on page 30 and Table 4-24 on page 30
	Setpoint – set to the boiler temperature required for the low temperature CH2 (LL) demand.	See Figure 4-27 and Table 4-26, page 31

Multiple-Boiler/Water Heater Application Settings

Table 1-4 Lead Lag Settings Quick Reference Table

Configuration Group	Setting Considerations	Reference
System Identification & Access	MB2 Modbus Address - set to a unique value between 1 and 8 inclusive for each boiler in the cascade. TIP: Set BOTH MB1 and MB2 the same to avoid confusion.	See Figure 4-2 and Table 4-2, page 10
Sensor Configuration (Lx500-800 Only)	 Outdoor Sensor – This sensor cannot be connected to the boiler designated as a Lead-Lag Master. Change "Outdoor Temperature Source" from S5 (J8-11) to UNCONFIGURED. System Sensor – If using this sensor, connect it to the designated "Master" (enabled) boiler. "Outdoor Temperature Source" must be set to UNCONFIGURED. 	See Figure 4-23 and Table 4-22, page 28
Pump Configuration < CH pump >	Set the checkbox " Use for Lead Lag Master demand " to checked <u>only</u> on the LL slave unit that will be controlling the system pump.	See Figure 4-12 and Table 4-11, page 20
Pump Configuration < DHW pump >	Set the checkbox " Use for Lead Lag Master demand " to checked <u>only</u> on the LL slave unit that will be controlling the DHW pump.	See Figure 4-14 and Table 4-13, page 21
Lead Lag Master Configuration	Master enable - set to "Enable" on one boiler; the boiler that will become the single point of contact for cascade control wiring, i.e. Thermostat demand [CH2 (LL)], DHW demand, Outdoor and System water temperature. All other boilers in the cascade must be set to "Disable".	See Figure 4-25 and Table 4-24, page 31
	CH Setpoint – set to the desired boiler temperature for a Lead Lag Central Heat, CH2 (LL) demand. Setting only valid on the boiler with "Master enable" set to "Enable".	See Figure 4-27 and Table 4-26, page 31
Lead Lag Master Configuration – Advanced Settings < Domestic Hot	Demand switch – set to "DHW (S6) sensor shorted" if the DHW load is being serviced by the cascade; DHW demand will be received by the boiler configured as "Master", and will be serviced by all boilers in the cascade via the Lead Lag function. Set to "Disabled" to have the DHW demand serviced by individual boilers; DHW demand must be received by each responsible boiler; DHW settings must be configured at the individual boilers, under "DHW – Domestic Hot Water Configuration".	See Figure 4-27a and Table 4-26a, page 32
Water >	DHW Setpoint – set to the desired boiler temperature for a Lead Lag DHW demand. Setting only valid on the boiler with "Master enable" set to "Enable", and with "Demand switch" set to "DHW (S6) sensor shorted".	See Figure 4-27a and Table 4-26a, page 32

1.3 Indoor Combustion Air Application Settings

For applications using the Indoor Combustion Air Kit (Lx500-800 only) instead of Direct Vent piping for the air inlet, refer to Table 1-5 for a list of parameters that need to be adjusted before putting the unit into operation.

Configuration Group	Setting Considerations	Reference
Modulation Configuration	Adjust the Minimum Modulation rate according to model.	See Figure 4-11 on page 18 and Table 4- 10 on page 19.
Burner Control Ignition	Adjust the Lightoff rate according to model.	See Figure 4-21 and Table 4-19 on page 26.

 Table 1-5 Indoor Combustion Air Settings Quick Reference Table

2 HOME PAGE

When the appliance is powered there is a brief interval while the display retrieves data from the boiler control. The display then shows the Home Page, similar to the one depicted below.



Table	2-1	Home	Раде	Items
rabic	4 -1	HUIIC	1 agu	Ittins

1 Boiler icon(s) (individual boiler shown) Icons shown depend on the selection of Item 3 (below). When "View Individual" is selected, the icon shows the local boiler name status and current burner firing rate. The image changes color	Item	Name	Description
depending on the current status of the burner control: • Blue: Normal operation • Red: Lockout condition • Yellow: Holding mode • Gray: Communication error (disconnected or power off) When "View Lead Lag" is selected, each slave boiler is represented by a colored square indicating status and firing rate. Touching the individual boiler icon will cause the screen to display the Summary Page for that boiler, allowing access to more pages for configuration of the locally connected controller. When icons for Lead Lag slave boilers are present, touching a boiler's icon will cause limited status information to be displayed, but does not perm any configuration to be performed.	1	Boiler icon(s) (individual boiler shown)	Icons shown depend on the selection of Item 3 (below). When "View Individual" is selected, the icon shows the local boiler name, status and current burner firing rate. The image changes color depending on the current status of the burner control: • Blue : Normal operation • Red : Lockout condition • Yellow : Holding mode • Gray : Communication error (disconnected or power off) When "View Lead Lag" is selected, each slave boiler is represented by a colored square indicating status and firing rate. Touching the individual boiler icon will cause the screen to display the Summary Page for that boiler, allowing access to more pages for configuration of the locally connected controller. When icons for Lead Lag slave boilers are present, touching a boiler's icon will cause limited status information to be displayed, but does not permit any configuration to be performed.

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Item	Name	Description
2	Camera Icon	The camera icon button may be touched to take an image (called a "screenshot") of the current screen contents. The image is stored in JPEG format in the display's non-volatile memory. Each image is assigned a name based on the date, time, and the page title e.g.: "2012-05-22_1209_PM_HomePage" Up to 16 images may be stored at once. The images may be copied to a USB mass storage device. Refer to the Display Diagnostic section for instructions to copy screenshots to a USB device.
3	Individual/Lead Lag Selection Button	The Individual/Lead Lag selection button is used to toggle the Home Page display between the locally connected boiler control and the Lead Lag cascade group. The Lead Lag selection mode is only effective when the locally connected boiler is configured to be the Master controller of the cascade.
4	Lead Lag Master (may not be present)	Used to access pages for viewing the status of the Lead Lag cascade. May be used to access the Master configuration settings if the attached control is configured as a Lead Lag Master.
5	Setup	Used only to access pages for viewing and modifying the display's configuration and setup. To access setup of the boiler controller, refer to Item 1 above.

3 SUMMARY PAGE

The Summary page is accessed from the Home Page by touching the individual boiler's icon. For information purposes, Summary Page Configuration Parameters have been numbered in Figure 3-1 and their corresponding explanation itemized in Table 3-1 on the next page.



Commercial Criteria - The FTG and Lx500-800 have a Primary Safety Control designed to maintain a Lockout condition if power is interrupted. This means if a Lockout condition occurs, the Lockout condition cannot be cleared or reset by cycling power to the unit. A manual reset is required to clear the condition. Refer to "History Page", page 44, for more details regarding Lockouts.

Clearing a Lockout - The following are methods to clear a Lockout condition and perform a manual reset to restore the control to normal operation:

- 1. <u>Switch</u> (*not applicable to models Lx500-800 or FTG*): Cycle power to the appliance OFF and ON. Tft models are equipped with a local On-Off switch; Lx150-400 must use the field-supplied service switch or circuit breaker.
- 2. <u>Controller</u> (*all models*): Clear the lockout from the controller by pressing the RESET button situated on the controller near the indicator lights (see Figure 4-37 page 38)
- 3. <u>Display</u> (*all models*): Clear the lockout from the touchscreen display menu. See Figure 6-4 on page 44 and Figure 6-5 on page 45.

Table 3-1 Summary Page Items

Item	Name	Description		
1	Boiler name	Boiler name, factory set to the model number shown on boiler (water heater) rating plate. May be set by the installer, see System Identification and Access on page 10.		
2	Demand	 Heat demand source: OFF Central Heat Lead Lag Domestic Hot Water CH frost protection DHW frost protection LL frost protection 		
3	Burner state	Current state of burner operation: Initiate Standby Delay Standby Safe Startup Prepurge - Drive to Purge Rate Prepurge - Measured Purge Time Prepurge - Drive to Lightoff Rate Direct Burner Ignition Run Postpurge Lockout		
4	Firing rate	Target blower speed in RPM		
5	Fan speed	Actual blower speed in RPM		
6	Setpoint	 Active setpoint, in °F [°C], that is the target water temperature the appliance maintains. Setpoint depends on the actual heat call: Central Heat (CH1) Lead Lag (CH2) Domestic Hot Water (DHW) 		
7	DHW	 Status of indirect DHW aquastat or DHW indirect tank sensor: SHORT – contacts closed creating heat demand OPEN – contacts open, no demand Tank sensor temperature in °F [°C] 		
8	Stack	Exhaust gas temperature measured at appliance exhaust by dual thermistor sensor (input at J9 terminals 4,5,6) consisting of a temperature control and temperature limit.		
9	Outlet	Water temperature measured at appliance outlet (hot supply to load) by dual thermistor sensor (input at J8 terminals 8,9,10) consisting of a temperature control and temperature limit. Complies with UL 353.		
10	Inlet	Water temperature at appliance inlet (cold return from load) by single thermistor sensor (input at J8 terminals 4,5).		
11	Lead Lag	Signal from system sensor. Displayed only when the controller is configured as Lead Lag Master.		
12	4-20mA	4-20mA - Signal from external controller (input at J8 terminals 6,7).		
13	Outdoor	Temperature measured by outdoor air sensor (input at J8 terminals 11,12)		
14	Flame Signal	Flame signal strength measured in microamps		
15	Modulation, Setpoints, Pumps select button	Touch button to select information group described in Item 16		

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Item	Name	Description		
16	Pumps, Modulation, Setpoints	 Pumps: present status of Boiler, Central Heat, and Domestic Hot Water circulator pumps Modulation: present Demand Rate given as blower RPM, any Limited Rate on the demand, and any Override Rate in effect Setpoints: Central Heat, Domestic Hot Water, and Lead Lag setpoint temperatures with on and off hysteresis values. 		
17	History	Details of most recent Lockouts and Alerts.		
18	Configure	Access to controller settings.		
19	Operation	Access to controller operation summary page.		
20	Diagnostics	Access to controller tests, digital and analog Input/Output (I/O) status.		
21	Details	Detailed one-page summaries of certain Configuration Groups and input/output devices.		
22	Login (Lock Icon)	Access to keyboard screen for entering the password to allow modification of certain parameters. The required password is " sola " (without the "") and must be entered in lower-case characters. Note: after 10 minutes of inactivity i.e. no interaction with the display, the password will have to be re-entered.		
23	Alarm	The Alarm "Bell" is shown when the burner is in the lockout state.		

4 CONFIGURATION PAGE

Touching the Configure button at the bottom left of the Summary page accesses the Configuration Menu page. The page contains a scrollable list of configuration groups, any of which may be selected by touching the name of the desired group, for example CH – Central Heat Configuration. To scroll quickly down the list, press and hold the scroll bar on the display screen and slide it down/up. To advance by line item, touch the directional arrows on the scroll bar.

Figure 4-1 Configuration Groups

Configuration Buttons

Login – Parameters that are password protected require an installer to enter the password before they can be changed. A message indicating this may appear when a password protected parameter is

selected. To enter the password, touch the Lock icon to access the keyboard screen.

Verify – Some configuration groups require safety parameter verification after configuration parameters are edited. This button provides access to the safety verification screens explained in more detail commencing on page 37.

Scrollable List Screen (Top)				
r 🖸 🖌	Lx800 Configuration Menu			
Select Configuration Group				
System Identification &	Access			
CH - Central Heat Conf	iguration			
Outdoor Reset Configu	ration			
DHW - Domestic Hot W	ater Configuration			
Warm Weather Shutdow	wn Configuration			
Modulation Configuration	on			
Pump Configuration				
Statistics Configuration		•		
		Verify		

Scrollable List Screen (Middle)	Scrollable List Screen (Bottom)
Configuration Menu	Configuration Menu
Select Configuration Group	Select Configuration Group
High Limits	T-rise Limit
Stack Limit	Frost Protection Configuration
Delta T Limits	Burner Control Timings & Rates
T-rise Limit	Burner Control Ignition
Frost Protection Configuration	System Configuration
Burner Control Timings & Rates	Sensor Configuration
Burner Control Ignition	Lead Lag Slave Configuration
System Configuration	Lead Lag Master Configuration
Verify	Verify

Name	Description
System Identification & Access Screen	View system identification
CH - Central Heat Configuration	Edit Central Heat settings
Outdoor Reset Configuration	Edit Outdoor Reset settings
Domestic Hot Water Configuration	Edit Domestic Hot Water settings
Warm Weather Shutdown Configuration	Edit Warm Weather Shutdown settings
Demand Priority Configuration [†]	Edit Central Heat Demand Priority settings
Modulation Configuration	Edit burner modulation settings
Pump Configuration	Edit pump settings
Statistics Configuration	View equipment operating statistics
High Limits	Edit water temperature limit settings
Stack Limit	Edit flue temperature limit settings
Delta T Limits and T-rise Limit	Edit settings of delay time for delta-t limits and T-rise limit
Frost Protection Configuration	Edit settings for frost protection
Burner Control Timings & Rates	Edit settings for burn times and fan rates
Burner Control Ignition	Not used
System Configuration	Edit temperature units, anti-short-cycle time, alarm silence time
Sensor Configuration 🔺	Edit Sensor settings
Lead Lag Slave Configuration	Edit Lead-Lag Slave settings
Lead Lag (LL) Master Configuration	Edit Lead-Lag Master settings
Verify	Confirm safety parameter changes
▲ Only Lx500-800 & FTG models	†=Only FTG

Table 4-1 Configuration Page Group Descriptions

Only Lx500-800 & FTG models

4.1 System Identification & Access

Figure 4-2 System Identification & Access Screen

The System Identification & Access page contains information about the controller. Login with the installer password is required to modify factory settings. Up to twenty (20) characters each may be entered for the Boiler name and Installation. The installer may use these areas to record installationspecific data.

(B) sy	LX200 (stem Identification & Access			
ſ	NTI LX200) v06-29-11			
	Pro	duct type Residential Hydronic Boiler			
	OS	S number R7910B1015 R7910B1015s1k			
	Softwar	e version 3100.2432 Date code 1123			
	Application	n revision 12 Safety revision 9 Model 323			
		Boiler name LX200			
		Installation			
	MB1 Modbus Address 1				
	MB2	Modbus Address 1			
	Login	Factory Data 09490546			

Table 4-2	System	Identification	& Access
	Dystem	ruchancation	C IICCOS

Parameter	Description	Factory Settings
Boiler name *	Series and model no. of boiler or water heater unit, e.g. Tft60; limit 20 characters.	Model no.
Installation *	Installation specific data, e.g. installation date; limit 20 characters	Blank
MB1 Modbus Address *	Modbus communication address used by the display to identify the attached controller. Range: $1 - 8$.	1
MB2 Modbus Address *	Unique controller I.D. needed when multiple units connected together in a Lead Lag cascade configuration; Lead-lag: each boiler needs unique address. Range: $1 - 8$.	1

* = Password protected

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4.2 CH - Central Heat Configuration

The Central Heat (CH) Configuration menu settings are only applicable to Boilers and are <u>not applicable for</u> <u>Water Heaters</u>. The CH settings establish the demand input and water temperature operating parameters for a CH demand.

Figure 4-3 Central Heat Configuration - Central Heat

IMPORTANT The sum of the CH setpoint and the CH off hysteresis should not exceed 200°F

[93°C] or a "Lockout" condition may result (*not applicable to models Tft60-399*). If higher water temperatures are required, e.g. 190-200°F [88-93°C], adjust high limit response to avoid a "Lockout" condition. See section on "High Limits", page 23.

Use the left and right arrow buttons at the top of the screen to switch between the three CH configuration sub-screens (e.g. Central Heat, Setpoint, and Modulation).



Table 4-3 Central Heat Configuration Parameters – Central Heat†

Parameter	Description	Factory Settings
Demand switch *	 Source of CH demand: Sensor only (modulation sensor) LCI (CH1 terminal) Sensor only: Demand exists if water temp. < CH setpoint – On hysteresis. 	LCI

* = Password protected

†=Not applicable to Lx-WH

Figure 4-4 Central Heat Configuration - Setpoint

Figure 4-5 Central Heat Configuration – Modulation

FTG Central Heat	i 800 Configuration	ô	FTG Central Heat	800 Configuration	
Set	point 🕨		Modu	lation	
Setpoint source	Local		Modulation sensor	Outlet sensor	
Setpoint	140°F		Modulation rate source	Local	
Time of day setpoint	120°F				
Off hysteresis	10°F				
On hysteresis	20°F				
4 mA water temperature	60°F				
20 mA water temperature	195°F				

- **Control of Central Heat operation:** The controller has the ability to control CH operation itself, or to accept a 4-20mA signal from an external control. The 4-20mA signal may be used to supply a CH setpoint OR to directly modulate the burner for CH operation (*but not both*). Refer to the Installation and Operation manual for your specific appliance for information on connecting a 4-20mA input.
- Setpoint If "Local" is selected as the CH Setpoint source, the CH Setpoint value entered on the screen, depicted in Figure 4-4, is used for control. If 4-20mA is selected as the CH Setpoint source, the controller determines its setpoint from the 4-20mA signal. The setpoint is calculated from field-set values corresponding to 4mA and 20mA. If the 4-20mA input signal is invalid, out of range, or absent, the CH Setpoint is used until the signal is valid again. Regardless of the CH Setpoint source, "Local" or "4-20mA", the controller's internal PID algorithm modulates the burner.

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NTI | Controller and Touchscreen Display

Modulation – The controller supports two methods of burner modulation for CH, selected by the "Modulation rate source" parameter, depicted on Figure 4-5 ; the factory set method is by internal PID algorithm. The installer has the option to use a 4-20mA signal from an external control to directly modulate the burner. Rates vary (see Modulation Configuration below) from minimum at 4mA to CH maximum at 20mA. <u>The 4-20mA signal does not create burner demand; a call for heat must be present at the CH1 input.</u>

Table 4-4	Central Heat	Configuration	Parameters -	Setpoint ⁺
				~~~~~

Parameter	Description	Factory Settings
Setpoint source *	<ul> <li>Select the Central Heat setpoint source:</li> <li>Local (control references CH Setpoint setting)</li> <li>S2 (J8-6) 4-20mA with sensor on/off Disable Outdoor reset to use 4-20mA Setpoint source.</li> </ul>	Local
Setpoint	Setpoint value for CH modulation. If CH outdoor reset is disabled, this is the target boiler outlet water temperature. If CH outdoor reset is enabled, this is the CH maximum water temperature (see Outdoor Reset Configuration). Range: 60-195°F (60-190°F for Tft60-399). Note: the sum of CH setpoint and Off hysteresis must not be greater than 200°F (not applicable to models Tft60-399).	180°F [82°C] <i>except</i> FTG: 140°F[60°C]
Time of day setpoint ▲	Time of day setpoint value for CH modulation when TOD input is made (night time setback). If CH outdoor reset is disabled, this is the target boiler outlet water temperature. If CH outdoor reset is enabled, this is the CH maximum water temperature. See Outdoor Reset Configuration (model Lx500-800 only). Note: the sum of Time of day setpoint and Off hysteresis must not be greater than 200°F.	160°F [71°C] <i>except</i> FTG: 120°F[49°C]
Off hysteresis	Value added to CH setpoint to determine water temperature at which the burner will shut off e.g. if CH setpoint is 150°F[65°C], and CH off hysteresis is 10°F[6°C], the burner will be shut off at 160°F[71°C]. Range 2°F to 20°F [1°C to 11°C]. <i>Note: the sum of CH setpoint and Off hysteresis must not be greater than 200°F (not applicable to models Tft60-399).</i>	10°F [6°C]
On hysteresis	Value subtracted from CH setpoint to determine water temperature at which the burner will fire e.g. if CH setpoint is $150^{\circ}F[65^{\circ}C]$ , and CH on hysteresis is $10^{\circ}F[6^{\circ}C]$ , the burner will fire at $140^{\circ}F[60^{\circ}C]$ . Range 2 °F to 40°F [1°C to 22°C].	20°F [11°C]
4mA water temperature	Target water temperature at 4mA input. Range 60°F to 125°F [15°C to 52°C].	60°F [15°C]
20mA water temperature	Target water temperature at 20mA input. Range 126°F to 195°F [52°C to 90°C].	195°F [90°C]

* = Password protected

 $\bigstar$  = Time of Day (TOD) feature is available on Lx500-800 & FTG only.

†=Not applicable to Lx-WH

#### Table 4-5 Central Heat Configuration Parameters – Modulation†

Parameter	Description	Factory Settings
Modulation sensor *	<ul> <li>Select which sensor Central Heat will modulate to:</li> <li>Outlet sensor</li> <li>Inlet sensor</li> <li>S10 (J10-7) sensor [System Manifold Temperature]</li> <li>If Demand switch (Table 4-3 above) is "Sensor only" the choice of Modulation sensor also dictates which water temp. creates CH demand.</li> </ul>	Outlet sensor
Modulation rate source *	<ul> <li>Select which source controls the modulation rate:</li> <li>Local [PID control]</li> <li>S2 (J8-6) 4-20mA with sensor on/off [remote source - allows an external control to directly modulate the burner]</li> </ul>	Local

* = Password protected

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## Tft/Lx/Lx-WH/FTG

## 4.3 Outdoor Reset Configuration

The Outdoor Reset Configuration menu settings are only applicable to Boilers and are <u>not applicable for Water</u> <u>Heaters.</u> When the "Show Line" button is touched an Outdoor Reset graph similar to Figure 4-7 is displayed, illustrating the effect of varying outdoor temperature on the CH setpoint. Outdoor reset incorporates a "Boost" capability to increase the boiler setpoint if demand is not being met. The setpoint is "boosted" by the step value at intervals set by the boost time, until the maximum off point is reached.

#### Figure 4-6 Outdoor Reset Configuration – Central Heat

Outdoor Reset is effective only if the following two conditions are met: Outdoor Reset is "enabled", and an outdoor temperature sensor is connected to the controller. The Outdoor Reset CH parameters, together with the CH Setpoint parameters, define the relationship of water temperature setpoint to outdoor temperature. Refer to Table 4-6 for a list of Outdoor Reset parameters.



Water Heaters: Outdoor Reset is not applicable.

Cutdoor Rese	800 t Configuration
Centr	al Heat
Enable	Enabled
Maximum outdoor temperature	70°F
Minimum outdoor temperature	0°F
Low water temperature	95°F
Outdoor boost time	30 mins
Outdoor boost step	0°F
Outdoor boost maximum off poin	180°F
	Show Line

#### Table 4-6 Outdoor Reset Configuration Parameters – Central Heat[†]

Parameter	Description	Factory Settings
Enable	Enables or disables Outdoor reset	Enabled
Maximum outdoor temperature	Outdoor temperature that corresponds to the Low water temperature setting. <i>Example:</i> If the Low water temperature setting is 95°F[35°C], and the Maximum outdoor temperature setting is 70°F[21°C], the boiler water temperature setpoint will be 95°F[35°C] when the outdoor temperature is 70°F[21°C] or higher. Range 50°F to 95°F [10°C to 35°C].	70°F [21°C]
Minimum outdoor temperature	n water temperature – Outdoor temperature that corresponds to the Maximum water temperature. <i>Example:</i> If the Maximum water temperature setting is $180^{\circ}F[82^{\circ}C]$ (defined by CH setpoint), and the Minimum outdoor temperature setting is $0^{\circ}F[-18^{\circ}C]$ , the boiler water temperature setpoint will be $180^{\circ}F[82^{\circ}C]$ when the outdoor temperature is $0^{\circ}F[-18^{\circ}C]$ or lower. Range $-40^{\circ}F/^{\circ}C$ to $40^{\circ}F$ [4°C].	
Low water temperature	Minimum water temperature setpoint; occurs when the outdoor temperature is equal to or greater than the Maximum outdoor temperature. Range $60^{\circ}$ F to $140^{\circ}$ F [15°C to $60^{\circ}$ C].	95°F [35°C]
Outdoor boost time*‡	Time interval for boost step. Range 0 – 18 hours.	30 minutes
Outdoor boost step *‡	CH setpoint boost step value. Range 0-50°F [0-28°C]. A value of 0° disables boost.	0°F/C
Outdoor boost maximum off point *‡	Maximum temperature that the CH outlet temperature may be boosted to. Range $60-200^{\circ}$ F [15-93°C]. Set Outdoor boost maximum off point = CH Setpoint + CH Off hysteresis	180°F[82°C]

* = Password protected

†=Not applicable to Lx-WH

***Outdoor boost** – during a Central Heat demand, with active Outdoor boost, the nominal CH setpoint is suspended and the "Outdoor boost maximum off point" sets the OD reset curve. For a given burner demand the starting CH setpoint is calculated accordingly and is then increased by the "Outdoor boost step", at an interval equal to the "Outdoor boost time". This continues until the effective CH setpoint reaches the "Outdoor boost maximum off point" minus CH Off hysteresis. Accordingly, to ensure outlet temperature reaches the nominal CH setpoint, set Outdoor boost maximum off point = CH Setpoint + CH Off hysteresis.

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## 4.4 DHW - Domestic Hot Water Configuration

Figure 4-8 Domestic Hot Water Configuration Screen

**CAUTION** BOILERS: The sum of the DHW setpoint and DHW off hysteresis should not exceed 200°F [93°C] or a "Lockout" condition may result (*not applicable to models Tft60-399*). If higher water temperatures are required, 190-200°F [88-93°C], adjust limit response to avoid a "Lockout" condition. See section on "High Limits", page 23. Failure to follow these instructions may result in damage to property or the unit.

## \land DANGER

## WATER HEATERS:

The "Lockout" limit response is a mandatory safety feature intended to require a manual reset on water heaters; therefore, the limit response must remain set to "Lockout". Failure to follow these instructions will result in serious injury or death.

## NOTICE

**Demand Switch -** If DHW is enabled ensure that the Lead

Lag DHW is disabled; see Lead Lag Master Configuration DHW on page 32.

Lx800 Domestic Hot Water Configuration	
DHW enable	Disabled
Demand switch	DHW (S6) switch
Modulation sensor	Outlet sensor
Setpoint	180°F
Time of day setpoint	180°F
Off hysteresis	10°F
On hysteresis	10°F
Demand On temperature	130°F
Demand Off temperature	140°F
Lx Domestic Hot Wa	800 Ater Configuration
Setpoint	180°F
Time of day setpoint	180°F

Setpoint	180°F
Time of day setpoint	180°F
Off hysteresis	10°F
On hysteresis	10°F
Demand On temperature	130°F
Demand Off temperature	140°F
DHW priority override time	2 hours
P gain	40
I gain	15

## Table 4-8 DHW-Domestic Hot Water Configuration Parameters

Parameter	Description	<b>Factory Settings</b>
DHW Enable *	Enable or disable local DHW demand. (Set to "Disable" if the DHW demand is being serviced via the Lead Lag – i.e. when Lead Lag Master DHW Demand Switch is set to "DHW (S6) sensor shorted", page 32)	Enable
Demand switch *†	<ul> <li>Select the DHW demand source (see Warning after table):</li> <li>DHW (S6) switch</li> <li>DHW sensor with On/Off temperatures</li> </ul>	DHW (S6) switch

## Tft/Lx/Lx-WH/FTG

Parameter	Description	Factory Settings
Modulation sensor *	<ul> <li>Select the DHW modulation sensor:</li> <li>Outlet sensor</li> <li>Inlet sensor</li> <li>(Reduce "Setpoint" by 20°F if "Inlet sensor" is selected)</li> </ul>	Outlet sensor
Setpoint	Operating temperature for the boiler during a DHW demand, either at the Outlet or Inlet sensor. Range: Tft 60°F to 190°F; Lx 60°F to 200°F. Note: the sum of Setpoint and Off hysteresis must not be greater than 200°F (not applicable to models Tft60-399).	180°F [82°C]
Time of day setpoint 🔺	Setpoint for DHW modulation when TOD input is made (night time setback). Range: Lx 60°F to 200°F; FTG 60°F to 195°F. Note: the sum of Time of day setpoint and Off hysteresis must not be greater than 200°F.	180°F [82°C]
Off hysteresis *	Value added to DHW setpoint to determine water temperature at which the burner will shut off e.g. if DHW setpoint is 150 °F, and DHW off hysteresis is 10 °F, the burner will be shut off at 160°F. Applies when Demand switch is set to DHW (S6) switch. Range 5 °F to 70°F [3°C to 39°C]. <i>Note: the sum of Setpoint and Off hysteresis must not be greater than 200°F (not</i> <i>applicable to models Tft60-399).</i>	10°F [6°C]
On hysteresis *	Value subtracted from DHW setpoint to determine water temperature at which the burner will fire e.g. if DHW setpoint is 150°F, and DHW on hysteresis is 10°F, burner ignition occurs at 140°F. Applies when Demand switch is set to DHW (S6) switch. Range 2°F to 40°F [1°C to 22°C].	10°F [6°C]
Demand On temperature *	DHW demand is switched On when DHW tank temperature is $\leq$ . Applies when Demand switch is set to "DHW sensor with On/Off temperatures". Range 60°F to 165°F [15°C to 74°C]	135°F [57°C]
Demand Off temperature *	DHW demand is switched Off when DHW tank temperature is $\geq$ . Applies when Demand switch is set to "DHW sensor with On/Off temperatures". Range 65°F to 170°F [18°C to 77°C]	140°F [60°C]
DHW priority override time *	Time period during which a DHW demand has priority. If override time has elapsed, the boiler and CH pumps will service a CH demand regardless of DHW demand. Value=0 inhibits DHW priority. Range 0 to 18 hours.	2 hours
P gain *	Proportional gain factor for DHW PID algorithm. Range 30 to 50. (Only available on commercial models Lx500-800)	40
I gain *	Integral gain factor for DHW PID algorithm. Range 15 to 50. (Only available on commercial models Lx500-800)	15

* = Password protected

 $\bigstar$  = Time of Day (TOD) feature is available on Lx500-800 & FTG models only.

† = If "Demand switch" is set to DHW sensor with On/Off temperatures, demand is determined by the On and Off temperature settings.



Tank sensor <u>MUST</u> be used in conjunction with a DHW temperature safety shutoff switch. NTI recommends using part number 84632. Failure to provide such a switch may result in property damage, serious injury to occupants, or possibly death.

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## 4.5 Warm Weather Shutdown Configuration

Figure 4-9 WWSD Configuration Screen

Enabling warm weather shutdown (WWSD) inhibits Central heat operation when the outdoor temperature goes above the WWSD set-point. Depending on the WWSD mode selected, CH operation will either end immediately or when an active CH demand ends.

Central heat operation is restored when the outdoor temperature drops below the WWSD set-point by a fixed value of  $4^{\circ}F[2^{\circ}C]$ .

	LX200 Warm Weather Shutdown	
	Enable	Disabled
	Setpoint	60F
Login		

## Table 4-9 Warm Weather Shutdown Configuration Parameters

Parameter	Description	Factory Settings
Enable	<ul> <li>Enable or Disable Warm Weather Shutdown and select shutdown options</li> <li>Shutdown after demand ends</li> <li>Shutdown immediately</li> <li>Disable</li> </ul>	Disabled
Setpoint	Setpoint value for WWSD. When enabled it can prevent or permit response to CH demand calls. Range 50°F to120°F [10°C to 49°C]	60°F [15°C]

## Tft/Lx/Lx-WH/FTG

## 4.6 Demand Priority Configuration

Figure 4-9a Demand Priority Configuration Screen

Demand Priority Configuration is used to designate the Central Heat demand with highest priority. The arrow points to the demand with higher priority. To change the setting, touch the arrow. Login with password is required.

NOTICE

Demand Priority Configuration is currently available only on FTG models.

ty Confi	guration Scr	een	
ሰ 🙆	Dema	FTG 800 and Priority Configuration	
		Local Loops	
	vs.	LL slave	
	Central Heat	-	
	Arrow points to la	op with higher priority. Select arro change priority.	w to

Figure 4-10 Modulation Configuration Screen

The configuration screen sets the minimum and maximum blower speeds (RPM) for burner modulation during CH or DHW demand.

Modulation rates are listed by series and model number.

Lx8	Configuration
CH maximum modulation rate	5300 RPM
DHW maximum modulation rate	5300 RPM
Minimum modulation rate	1250 RPM
Rate assigned to 0V/4mA	100%
CH slow start enable	Disabled
Slow start degrees	5ºF
Slow start ramp	200 RPM/min
Analog rate tracking	Disabled

Minimum modulation rate:

#### CH and DHW maximum modulation rate:

#### Lx/Lx-WH Tft Lx/Lx-WH Tft FTG FTG 60:4650 150: 5850 600: 5600 60: 1525 600: 1150 150: 1150 85:6300 150E: 4450 800: 7450 85: 1525 150E: 925 800: 1150 110:7000 200: 5950 110:1625 200: 925 300: 1250 154: 7980 (7500-LP) 300: 5850 154:1740 400: 1550 175:4100 400: 7250 175:900 500: 1400(2500⁴) 200: 4650 500: 6400 200: 900 201:8000 600: 4350 201: 1450 $600: 1075(2000^4)$ 250: 5900 700: 4300 250:900 700: $1250(2500^4)$ 285: 7300 $800: 1250(2500^4)$ 285:7300 800: 5300 340: 6650 340: 1100 399²: 6900(6600-LP) 399²: 1500 399³: 7800(7500-LP) 399³: 1050

#### Notes:

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¹ All modulation rate values are given in Revolutions per Minute (RPM).

- ² Tft399's with a serial number of 20899 and lower have a modulation range of 1500-6900 RPM when operating with Natural Gas and 1500-6600 RPM when operating with Propane.
- ³ Tft399's with a serial number greater than 90974 have a modulation range of 1050-7800 RPM when operating with Natural Gas and 1050-7500 RPM when operating with Propane.
- ⁴ When using the Indoor Combustion Air Kit (models Lx500-800 only), the minimum modulation must be adjusted up as indicated.

#### Figure 4-11 Modulation Configuration Screen (Indoor Combustion Air Kit)

CAUTION Indoor Comb	ustion Air Kit	Lx8	300 Configuration
		CH maximum modulation rate	5300 RPM
The Dagger (*) in the list just abov	e indicates the	DHW maximum modulation rate	5300 RPM
minimum modulation rate required y	when using the	Minimum modulation rate	2500 RPM
Indoor Combustion Air Kit (annli	icable only to	Rate assigned to 0V/4mA	100%
commercial models I x500-800)	cubie only lo	CH slow start enable	Disabled
commercial models Ex300-000).		Slow start degrees	5°F
<b>Modify Minimum</b>		Slow start ramp	200 RPM/min
Modulation Rate		Analog rate tracking	Disabled
setting when using an			
Indoor Combustion			
Air Kit			
	J		

Parameter	Description	Factory Settings
CH max. modulation rate *	Maximum permissible blower speed during CH demand. Range is model dependent.	Model dependent
DHW max. modulation rate *	Maximum permissible blower speed during DHW demand. Range is model dependent.	Model dependent
Minimum modulation rate *	Minimum permissible blower speed. Range is model dependent. See <u>CAUTION</u> above when using Indoor Combustion Air Kit in lieu of Air-inlet Direct Vent piping (Lx500-800 only).	Model dependent
Rate assigned to 0V/4ma	Parameter not used	100%
CH slow start enable *	<ul> <li>Select CH slow start rate limiting:</li> <li>Enable</li> <li>Disable</li> <li>If CH slow start is enabled and the outlet temperature is less than setpoint minus Slow start degrees, then the control applies slow start rate limiting i.e. the burner modulates to factory-set rate of 2000RPM, then ramps the firing rate up at the rate defined by Slow start ramp.</li> </ul>	Disabled
Slow start degrees *	Differential temperature subtracted from setpoint to determine if CH slow start rate limiting is activated. Range 0°F to 40°F [0°C to 22.2°C]	5°F [2.8°C]
Slow start ramp *	Rate at which burner modulation (firing rate) increases in RPM/minute when CH slow start is enabled. Range 50RPM/minute to 2000RPM/minute	200RPM/minute
Analog rate tracking *	Select one of the functions listed below to cause analog output (4-20mA on J10-4 or 0-10Vdc on J10-5) to track either local or LL Master firing rate command: • Tracking PWM to 4-20mA • Tracking PWM to 0-10V • Tracking LL Master to 4-20mA • Tracking LL Master to 0-10V • Disabled Only available on commercial models Lx500-800 & FTG	Disabled

## **Table 4-10 Modulation Configuration Parameters**

* = Password protected

## 4.8 Pump Configuration

Figure 4-12 Pump Configuration – Central Heat pump

The pump configuration screen allows adjustment of the pump overrun time after a demand ends, or burner shutdown.

Water Heaters: use only the "Boiler pump" (PUMP B

output); therefore, CH and DHW pump overrun time are not applicable.



## **Pump control may be used** to manually override automatic

control of the pumps for testing purposes. If used in this manner, ensure that it is set back to "Auto"; otherwise the selected pump(s) will remain powered on indefinitely. TIP: Use the "Pump Test" feature under Diagnostics instead (see Figure 5-5).

> Check to permit pump to operate for overrun time when demand shifts  $CH \leftarrow \rightarrow DHW$

Uncheck to permit pump to operate for overrun time when demand shifts CH←→DHW



## Table 4-11 Pump Configuration Parameters – Central Heat pump

Parameter	Description	Factory Settings
Pump control *	Switches CH pump control from Automatic to ON.	Auto
Pump start delay *	Amount of time to delay start of CH pump when CH demand changed from off to on. No delay if burner already firing due to other demand. Range 0 to 5 seconds.	0 sec
Overrun time *	Amount of time the CH pump will continue to run after a CH demand ends. Range 0 to 1080 minutes.	0 sec
Use for local (Stand-alone) demands *	Check box used to allocate Pump C as the local pump needed for Stand-alone boilers.	Checked
Use for Lead Lag Master demands *	Check box used to allocate Pump C as the CH system pump for Lead Lag boilers.	Unchecked
Use for delayed overrun *	Check box used to permit pump to continue running for the overrun time during a transition between CH and DHW demands. Typically used in conjunction with Advanced-Force off (see next item below) and similar DHW pump settings described on page 21.	Unchecked
Advanced: Force pump off when DHW priority is active*	Check box used to permit pump to continue running for the overrun time during a transition between CH and DHW demands. Typically used in conjunction with Use for delayed overrun (see item above).	Checked

* = Password protected

## Tft/Lx/Lx-WH/FTG

Figure	4-13 Pump Configuration – Boiler pump
	LX200 Pump Configuration
	<ul> <li>▲ Boiler pump ▶</li> <li>Pump control Auto</li> <li>Overrun time 30 sec</li> </ul>
Login	

## Figure 4-14 Pump Configuration – DHW pump

LX Pump Co	400 nfiguration
Domestic Ho	t Water pump
Pump contro	Auto
Pump start delay	0 sec
Overrun time	10 secs
⊡ Use for	local demands
🗆 Use for	Lead Lag Master demands
🗆 Use for	delayed overrun
	Advanced

#### Table 4-12 Pump Configuration Parameters – Boiler pump

Parameter	Description	Factory Settings
Pump control *	Switches Boiler pump control from Automatic to ON.	Auto
Boiler pump overrun time *	Amount of time the Boiler pump will continue to run after the call for central heat or DHW ends. Range 0 to 1080 minutes.	30 sec

* = Password protected

#### Table 4-13 Pump Configuration Parameters – DHW pump

Parameter	Description	Factory Settings
Pump control *	Switches DHW pump control from Automatic to ON.	Auto
Pump start delay *	Amount of time to delay start of DHW pump when DHW demand changed from off to on. No delay if burner already firing. Range 0 to 480 minutes.	0 sec
DHW pump overrun time *	Amount of time the DHW pump will continue to run after a DHW demand ends. Range 0 to 1080 minutes.	10 sec
Use for local (Stand-alone) demands *	Check box used to allocate Pump A as the local pump needed for Stand- alone boilers.	Checked
Use for Lead Lag Master demands *	Check box used to allocate Pump A as the DHW system pump for Lead Lag boilers.	Unchecked
Use for delayed overrun *	Check box used to permit pump to continue running for the overrun time during a transition between CH and DHW demands. Typically used in conjunction with similar Central Heat pump configuration settings described in Table 4-11 on page 20.	Unchecked

* = Password protected



Setting a "Pump start delay" may cause the boiler to operate without water flow; check plumbing configuration prior to adjusting "Pump start delay". Failure to follow these instructions may cause property damage, personal injury or death.

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## 4.9 Statistics Configuration

Figure 4-15 Statistics Configuration Screen

The controller maintains counters for events related to various devices. The counters may be set to a specific value; for example if the CH pump is replaced its counter may be reset to zero.

NOTICE

Burner cycles and Burner run time counters cannot be reset.

8	LX2 Statistics Co	00 nfiguration	0
	Boiler pump cycles Burner cycles Burner run time CH pump cycles DHW pump cycles	0 0 0 hours 0 0	
Login			Clear All

#### **Table 4-14 Statistics Configuration Parameters**

Parameter	Description	Factory Settings
Boiler pump cycles *	Number of boiler pump cycles since last reset. Range 0 to 999,999.	0
Burner cycles	Number of burner cycles since last reset. Includes the blower and ignition components. Range 0 to 999,999. <i>Not adjustable by installer</i>	0
Burner run time	Total number of hours of burner operation. Range 0 to 999,999 hours. <i>Not adjustable by installer</i>	0 hour
CH pump cycles *	Number of CH pump cycles since last reset. Range 0 to 999,999.	0
DHW pump cycles *	Number of DHW pump cycles since last reset. Range 0 to 999,999.	0

* = Password protected

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## 4.10 High Limits

Figure 4-16 High Limits Screens			
<b>Boilers Only</b>	Water Heaters		
LX400 High Limits	LX400 High Limits		
*Outlet high limit response Recycle & hold	*Outlet high limit response Lockout		
Preferred Outlet high limit 210°F	Preferred Outlet high limit 210°F		
*THIS PARAMETER REQUIRES SAFETY VERIFICATION			
*THIS PARAMETER REQUIRES SAFETY VERIFICATION			

An Outlet High Limit "Lockout" will occur if the outlet temperature from the appliance exceeds the "Outlet High Limit Setpoint" (e.g. 210°F [99°C]). To avoid a lockout condition, ensure the sum of the setpoint and off hysteresis (CH and DHW) is more than 10°F less than the High Limit setpoint.

## **BOILERS ONLY:**

To completely avoid an Outlet High Limit Response "Lockout", set the limit response to "Recycle & Hold" (which is the factory setting for Tft models).

## WATER HEATERS (Trinity Lx200WH-800WH ONLY):

## A DANGER

The Outlet High Limit Response "Lockout" is a mandatory safety feature intended to require a manual reset on water heater units in the event that the appliance high limit temperature is exceeded. For this reason, the limit response must remain set to "Lockout". Failure to follow these instructions will result in serious injury or death.

Clearing a Lockout - The following are three methods to clear a "lockout" condition:

- 1. <u>Switch</u> (*not applicable to models Lx500-800 or FTG*) Cycle power to the appliance by toggling the fieldsupplied service switch or circuit breaker OFF and ON. NOTE: Tft models are equipped with a local On-Off switch which also may be used.
- 2. <u>Controller</u> Clear the lockout at the Controller by pressing the RESET button. See Figure 4-37, page 38.
- 3. <u>Display</u> Clear the lockout from the touchscreen display menu. See Figure 6-4 on 44 and Figure 6-5 on page 45.

Parameter	Description	Factory Settings
Outlet high limit response *	<ul> <li>Select controller action in the event outlet temperature exceeds High Limit setpoint (not applicable to models Lx500-800 or FTG)</li> <li>Recycle &amp; hold (Boilers)</li> <li>Lockout (Water Heaters)</li> </ul>	Lockout (Lx models) Recycle & Hold (Tft models)
Preferred Outlet high limit *	Outlet water temperature high limit. Range 100°F to 210°F	210°F [99°C] (Lx) 200°F [93°C] (Tft)

### Table 4-15 High Limit Parameters

* = Password protected

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## 4.11 Stack Limit

## Figure 4-17 Stack Limit Screen

Set-point value for appliance Stack limit. Flue gas temperature measured at appliance exhaust port.	LX400 Stack Limit       Image: Comparison of C

## **Table 4-16 Stack Limit Parameters**

Parameter	Description	Factory Settings
Preferred Stack limit setpoint *	Stack exhaust gas high limit. Range: Tft/Lx 145°F to 220°F [63°C to 104°C]; FTG 145°F to 250°F†	220°F [104°C]

* = Password protected

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†=FTG requires OEM password for access

## 4.12 Delta T Limits and T-rise Limit

Delta T is the difference in water temperature between the boiler Inlet and Outlet. If the Outlet temperature minus the Inlet temperature results in a Delta T greater than 60°F [35°C] the burner is shut off for the time specified before firing again. An initial cycle and two recycles are allowed before Lockout occurs. T-rise is the time rate of increase of the temperature difference between Inlet and Outlet. If the rate of change of Inlet to Outlet, in °F/second, exceeds a fixed value (factory set, not field accessible) the burner will recycle with a delay equal to the T-rise delay setting. An initial cycle and two recycles are allowed before Lockout occurs.

Figure 4-18 Delta T Limits Screen	Figure 4-19 T-rise Limit Screen
LX200 Delta T Limits	LX200 T-rise Limit
Delta T delay 5 min	T-rise delay 5 min

#### Table 4-17(a) Delta T Limits Parameters

Parameter	Description	Factory Settings
Delta T delay *	Delay time between burner cycles when Delta T limit is exceeded. Range 1 to 60 minutes.	5 min

*=Password Protected

#### Table 4-17(b) T-rise Limit Parameters

Parameter	Description	Factory Settings
T-rise delay *	Delay time between burner cycles when T-rise limit is exceeded. Range 1 to 60 minutes.	5 min

*=Password Protected

## 4.13 Frost Protection Configuration

#### **Figure 4-20 Frost Protection Screen**

CH Frost Protection - Operates CH and Boiler Circulators (Pump Outputs C and B) if outlet (or header) temperature drops below 45°F [7°C]. DHW Frost Protection - Operates DHW and Boiler

**DHW Frost Protection** - Operates DHW and Boiler Circulators (Pump Outputs A and B) if DHW temperature drops below 45°F [7°C].

**LL Frost Protection** - Operates System circulator (Pump Output C) if outlet (or header) temperature drops below  $45^{\circ}$ F [7°C].

Frost Protection operates the burner at the minimum modulation rate regardless of application (CH, DHW or LL) if outlet temperature drops below 38°F [3°C].

LX200 Frost Protection Co	onfiguration
CH frost protection enable	Enabled
DHW frost protection enable	Disabled
LL frost protection enable	Disabled
Login	
Login	

#### **Table 4-18 Frost Protection Configuration Parameters**

Parameter	Description	Factory Settings
CH frost protection enable *	Enable or Disable frost protection for central heat.	Enabled
DHW frost protection enable *	Enable or Disable frost protection for DHW. Enable only when used with Indirect Fired Water Heater.	Disabled
LL frost protection enable *	Enable or Disable frost protection for lead lag. Each slave detects Frost Protection individually and notifies the Master.	Disabled

* Password protected

## 4.14 Burner Control Timings & Rates

Figure 4-21 Burner Control Timings & Rates Screen

**Preferred Lightoff rate** - Can be adjusted to optimize ignition smoothness.

**A WARNING** When using the Indoor Combustion Air Kit instead of Air Inlet direct vent piping (Lx500-800 only), the Lightoff rate must be adjusted as follows:

Lx500/Lx500WH = 3500 RPM Lx600/Lx600WH = 5300 RPM Lx700/Lx700WH = 3000 RPM Lx800/Lx800WH = 3000 RPM

**Post-purge Time** - Applications with excessively long burner-on times or applications with long venting may require a longer post-purge to satisfactorily cool the flame sense circuit and remove moist flue gases remaining in the flue.

	Lx800 Burner Control Timings & Rates	
	*Prepurge time	15 secs
F	Preferred Lightoff rate	2200 RPM
	Postpurge rate	5300 RPM
	Postpurge time	15 secs

#### Table 4-19 Burner Control Timings & Rate Parameters

Parameter	Description	Factory Settings
Prepurge time * •	Amount of time the combustion blower will run prior to burner ignition. Range: Lx500-800 10 to 30 seconds; FTG 10 to 50 seconds.	Lx500-800: 15 sec FTG: 50 sec
Preferred Lightoff rate *	Blower speed for burner ignition. Range model dependent. See <u>WARNING</u> above when using Indoor Combustion Air Kit instead of Air-Inlet Direct Vent piping (Lx500-800 only).	Tft60-399/FTG 4000 RPM Lx150-500 3000 RPM Lx600-800 2000 RPM
Postpurge rate *	Blower speed for postpurge cycle after burner shutdown. Range: model dependent.	Model dependent
Postpurge time *	Amount of time the combustion blower will continue to run after burner shutdown. Range model dependent.	Model dependent

* = Password protected

 $\bigstar$  = Prepurge time only on commercial models Lx500-800 & FTG.

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## 4.15 Burner Control Ignition

Figure 4-21a Burner Control Ignition Screen

The Pilot test hold parameter is not used.	<b>(1)</b>	Lx800 Burner Control Ignition	<b>1</b>
		Pilot test hold OFF	

### Table 4-20 Burner Control Ignition Parameters

Parameter	Description	Factory Settings
Pilot test hold	Not applicable	Off

## 4.16 System Configuration

Figure 4-22 System	<b>Configuration</b>	Screen
--------------------	----------------------	--------



Anti short-cycle time - This feature does not apply to

Domestic Hot Water demand or recycle events.

The Anti short-cycle feature is designed to prevent excessive burner on/off cycling due to e.g. short or rapid thermostat cycles, low heating load, etc.

Lxt System Co	nfiguration
Temperature units	Fahrenheit
Anti short-cycle time	5 mins
Burner off inhibit time	10 secs
Alarm silence time	0 min

#### **Table 4-21 System Configuration Parameters**

Parameter	Description	Factory Settings
Temperature units	<ul><li>Select which temperature unit to display:</li><li>Fahrenheit</li><li>Celsius</li></ul>	Fahrenheit
Anti short- cycle time *	Whenever the burner is turned off due to no demand the anti-short-cycle timer is started and the burner remains in a Standby Delay condition waiting for this time to expire. Range 0 to 60 minutes (1 hour).	5 minutes
Burner off inhibit time *	If demand changes from a high-temperature setpoint to a lower setpoint (e.g. from CH to DHW), water temperature may exceed the burner off point for the new demand. This value determines how long the control will ignore the burner off hysteresis or threshold before shutting down the burner, in order to reduce burner cycling. Range 0 to 30 minutes.	10 seconds
Alarm silence time	Alarm may be silenced for this amount of time. Range 0 to 600 minutes (10 hours).	0 minutes

* Password protected

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## 4.17 Sensor Configuration

#### Models Lx500-800

The temperature sensor input designated as Outdoor/System may function as an Outdoor temperature sensor input OR as a System temperature sensor input depending on the Lead-Lag "Master" setting. If Lead-Lag "Master" is "Disabled" the controller uses the input for Outdoor temperature. If Lead-Lag "Master" is "Enabled" it uses the Outdoor/System input as Depending on the installation req configuration will have to be set as

**Outdoor Temperature source:** UNCONFIGURED on Master bo boiler application.

#### Models Lx500-800 & FTG

**S5** (**J8-11**) sensor: MUST be set to UNCONFIGURED on Master boiler if NOT using a system sensor (NTI part number 84010).

#### Models Lx150-400/Tft60-399

(**J10-7**) sensor: MUST **S10** be set to UNCONFIGURED on Master boiler if NOT using a system sensor (NTI part number 84010)

a System sensor.	
uirements, sensor	
described here.	*THIS PARAMETER REQUIRES SAFETY VERIFICATION
MUST be set to	
iler of a multiple	In a multiple heiler and
*	<b>NOTICE</b> In a multiple boner app the Outdoor Sensor M
	connected to a slave boiler

**^** 

nultiple boiler application, utdoor Sensor MUST be

Lx Comm Generic Sensor Configuration

Outdoor temperature source S5 (J8-11) sensor

Outdoor temperature correction offset 0°F

*S5 (J8-11) sensor 10K NTC single non-safety

connected to a slave boiler.

LX400

Sensor Configuration

Outdoor temperature correction offset 0°F

*S10 (J10-7) sensor 10K NTC single non-safety

*THIS PARAMETER REQUIRES SAFETY VERIFICATION

### **Table 4-22 Sensor Configuration Parameters**

Parameter	Description	Factory Settings
S5 (J8-11) *	<ul> <li>Select sensor type (<i>Lx500-800, FTG Only</i>):</li> <li>10K NTC single non-safety</li> <li>UNCONFIGURED</li> </ul>	10K NTC single non-safety
S10 (J10-7) *	<ul> <li>Select system sensor input (Lx150-400, Tft60-399 Only):</li> <li>10K NTC single non-safety</li> <li>UNCONFIGURED</li> </ul>	10K NTC single non-safety
Outdoor temperature source *	<ul> <li>Select outdoor temperature input (<i>Lx500-800 Only</i>):</li> <li>S5(J8-11) sensor</li> <li>UNCONFIGURED</li> </ul>	S5(J8-11) sensor
Outdoor temperature correction offset *	Used to correct the outdoor temperature sensor readings in cases where the sensor must be installed in an unfavorable location. Range $-72^{\circ}$ F to $72^{\circ}$ F or $-40^{\circ}$ C to $40^{\circ}$ C (depends on temperature units selection).	0°F[0°C]

* = Password protected

## **Figure 4-23 Sensor Configuration Screens ^**

## 4.18 Lead Lag Slave Configuration

Figure 4-24 LL Slave Configuration Screen

**Use First** – This mode has priority over all the others. A unit with its slave mode set to "Use First", will always fire first before any other slave in the cascade and it will be the last one dropped.

**Equalize Run Time** – This mode stages the units based on run time equalization where the unit with the least burner hours fires first and the most burner hours fires last. Only "Use First" has higher priority.

**Use Last** – This mode has the lowest priority. A unit with its slave mode set to "Use Last", will always fire last after every other slave in the cascade is running. It will be the last slave to fire and the first one dropped.

	LX200 Lead Lag Slave Configuration		0
	Slave mode Modbus address	Equalize run time	
Login			

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#### Table 4-23 Lead Lag Slave Configuration Parameters

Parameter	Description	Factory Settings
Slave mode *	<ul> <li>Select from slave mode from drop down list:</li> <li>Use First</li> <li>Equalize run time</li> <li>Use Last</li> </ul>	Equalized run time
Modbus address *	DO NOT adjust Modbus address from this screen. Set MB2 address from "System Identification & Access" screen (page10). See Figure 4-2 and Table 4-2, page 10.	1

* Password protected

## 4.19 Lead Lag (LL) Master Configuration

Figure 4-25 Lead Lag Master Configuration Main Screen

**CH Setpoint** – Setpoint temperature during a CH2 (LL) demand. If LL Outdoor Reset is "Disabled", this is the target water temperature; if LL Outdoor Reset is "Enabled", then this becomes the setpoint when the outdoor temperature is at the "Minimum outdoor temperature" or lower.

The CH setpoint value selected will depend on the type of heating system and modulation source [i.e. System sensor on supply/return header or outlet sensor (backup)]. A lower setpoint is recommended when using the system sensor, especially if it is installed on the return header. See Plumbing section of Installation and Operation Manual.

Use the "Advanced Settings" button (main screen, bottom right corner) to access the other setup options described in Figures 4-26 through 4-32.

n 🖸 🔒	Lx8 ad Lag Maste	00 r Configuration	_∎ (♦
	Master enable	Enabled	
	CH setpoint	150°F	
CH time c	of day setpoint	130ºF	
	DHW setpoint	180°F	
DHW time o	of day setpoint	150°F	
			Advanced Settings>>

Table	4-24	Lead	Lag	Master	Config	uration	Parameters	– Main	Screen
Labic		Licuu	Lug	labeel	Comig	aracion	1 un uniceens	11100111	Dereen

Parameter	Description	Factory Settings
Master Enable *	Enables or Disables Lead Lag Master. Enable only one unit as LL Master.	Disable
CH Setpoint	Setpoint temperature for a Lead Lag Central Heat, CH2 (LL) demand. Setting only valid on the boiler with "Master enable" set to "Enable". Range: 60-190°F (Tft60-399); 60-195°F (Lx500-800 & FTG); 60-200°F (Lx150-400).	150°F [65°C]
CH time of day setpoint * A	Setpoint temperature for Lead Lag Central Heat, CH2 (LL) demand when TOD input is made (night time setback). Range 60-195°F.	130°F [54°C]
DHW Setpoint	Setpoint temperature for Lead Lag DHW demand. Setting only valid on the boiler with "Master enable" set to "Enable", and with "Demand switch" set to "DHW (S6) sensor shorted". Range: 60-190°F (Tft60-399); 60-195°F (Lx500-800 & FTG); 60-200°F (Lx150-400).	180°F [82°C]
DHW Time of day setpoint * <b>A</b>	Setpoint for DHW modulation when TOD input is made (night time setback). Range 60-195°F.	180°F [82°C]

* = Password protected

▲ = Time of Day (TOD) feature available only on Lx500-800 & FTG

**Control of Lead Lag Central Heat operation -** The controller has the ability to control LL CH operation with a locally configured setpoint temperature, or to accept a 4-20mA setpoint signal from an external control. Refer to the Installation and Operation manual for your specific appliance for information on connecting a 4-20mA input.

Setpoint - If "Local" is selected as the LL CH Setpoint source, the LL CH Setpoint value entered on the screen depicted in Figure 4-25 is used for control. If 4-20mA is selected as the LL CH Setpoint source, the boiler determines its setpoint from the 4-20mA signal. The setpoint is calculated from field-set values corresponding to 4mA and 20mA. In the event that the 4-20mA input signal is invalid, out of range, or absent, the LL CH Setpoint is used until the signal is valid again. Regardless of the LL CH Setpoint source, "Local" or 4-20mA, the controller's internal PID algorithm modulates the burner. The 4-20mA signal does not create burner demand; a call for heat must be present at the CH2 (LL) input.

If desired, a pump connected to the CH pump output of one boiler in a Lead Lag configuration may be configured as the system circulator pump. Refer to Figure 4-12, page 20.

Figure 4-26 LL Master C	onfiguration Modulation
FTG	800 er Configuration
Modu	lation
Off hysteresis	15°F
On hysteresis	10°F
P gain	40
I gain	15
	1

## Figure 4-27 LL Master Configuration Central Heat

<b>A</b>	FTG Lead Lag Maste	800 r Configuration
	Centra	al Heat
	Demand switch	STAT terminal
	Setpoint source	Local
	Setpoint	150°F
	Time of day setpoint	130°F
	4 mA water temperature	60°F
	20 mA water temperature	195°F

NOTICE

**Demand Switch:** If set to "Modulation sensor" demand

occurs when Water termperature < Setpoint – On hysteresis, see Table 4-26 below.

### Table 4-25 Lead Lag Master Configuration Parameters – Modulation

Parameter	Description	Factory Settings
Off Hysteresis *	Value added to LL CH Setpoint to determine water temperature at which the burner will shut off. <i>Example:</i> If LL CH Setpoint is 150°F, and Off hysteresis is 15°F, the burner will be shut off at 165°F. Range 5 °F to 70°F. <i>Note: the sum of Setpoint and Off hysteresis must not be greater than 200°F (not applicable for models Tft60-399).</i>	15°F [8°C]
On Hysteresis *	Value subtracted from LL CH setpoint to determine water temperature at which the burner will fire. <i>Example:</i> If LL CH Setpoint is 150°F[65°C], and On hysteresis is 10°F[6°C], burner ignition occurs at 140°F. Range 2°F to 40°F [1°C to 22°C].	10°F [6°C]
P Gain *	Gain applied to the proportional term of the LL PID control algorithm. Range 5 to 50 (no units). Decrease to slow rate of control response.	30
I Gain *	Gain applied to the integral term of the LL PID control algorithm. Range 5 to 50 (no units). Decrease to slow rate of control response.	15

* Password protected

#### Table 4-26 Lead Lag Master Configuration Parameters – Central Heat

Parameter	Description	Factory Settings
Demand Switch *	<ul> <li>Select the LL Central Heat demand source:</li> <li>STAT terminal</li> <li>Modulation sensor</li> <li>Disable</li> </ul>	STAT terminal
Setpoint Source *	<ul> <li>Select the LL Central Heat setpoint source:</li> <li>Local (control references LL CH Setpoint setting)</li> <li>4-20mA S2 (J8-6) (control references 4-20mA signal from an external control) Outdoor reset must be disabled when using 4-20mA signal.</li> </ul>	Local
Setpoint	Alternate location to edit LL CH setpoint. Equivalent to CH setpoint on LL Master main screen. See Table 4-24 above. Note: the sum of Setpoint and Off hysteresis must not be greater than 200°F (not applicable for models Tft60-399).	150°F [65°C]
Time of day setpoint A	Alternate location to edit LL CH TOD setpoint. See Table 4-24 above. Note: the sum of Time of day setpoint and Off hysteresis must not be greater than 200°F.	130°F [54°C]

## **NTI** | Controller and Touchscreen Display

## Tft/Lx/Lx-WH/FTG

Parameter	Description	Factory Settings
4ma water temperature	Target water temperature at 4mA input. Range 60°F to 125°F [15°C to 52°C].	60°F [15°C]
20mA water temperature	Target water temperature at 20mA input. Range 126°F to 195°F [52°C to 90°C].	195°F [90°C]

* = Password protected

 $\bigstar$  = Time of Day (TOD) feature is available on Lx500-800 & FTG models only.

## Figure 4-27a Lead Lag Master Configuration DHW

CAUTION

**BOILERS:** The sum of the

DHW setpoint and DHW off hysteresis should not exceed 200°F [93°C] or a "Lockout" condition may result (not applicable to Tft60-399). If higher water temperatures are required, 190-200°F [88-93°C], adjust limit response to "Recycle and Hold" to avoid a "Lockout" condition. See section on "High Limits", page 23. Failure to follow these instructions may result in damage to property or the unit.

## 🗥 DANGER

## WATER HEATERS:

The "Lockout" limit response is a mandatory safety feature intended to require a manual reset on water heaters; therefore, the limit response must remain set to "Lockout". Failure to follow these instructions will result in serious injury or death.

合 🙆	Lx8 Lead Lag Maste	300 er Configuration
	Domestic	Hot Water
	Demand switch	Disabled
	Setpoint	180°F
	Time of day setpoint	150°F
	DHW priority override time	2 hours

NOTICE

page 14.

Demand Switch: If Lead Lag DHW is enabled by selecting "DHW (S6) sensor shorted", ensure that the local DHW demand is disabled; see DHW - Domestic Hot Water Configuration on

## Table 4-26a Lead Lag Master Configuration Parameters – DHW

Parameter	Description	Factory Settings
Demand switch *	<ul> <li>Select the Lead Lag DHW demand source:</li> <li>Disable</li> <li>DHW (S6) sensor shorted. Note: ensure local DHW is disabled, see page 14</li> </ul>	Disable
Setpoint	Setpoint for LL DHW modulation. Range 60°F – 190/200°F (Tft/Lx). Note: the sum of Setpoint and Off hysteresis must not be greater than 200°F (not applicable for models Tft60-399).	180°F [82°C]
Time of day setpoint ▲	Alternate location to edit LL DHW TOD setpoint. See Table 4-24 above. Note: the sum of Time of day setpoint and Off hysteresis must not be greater than 200°.	180°F [82°C]
DHW priority override time *	Time period during which a DHW demand has priority. If override time has elapsed, the boiler and CH pumps will service a CH demand regardless of DHW demand. Value=0 inhibits DHW priority. Range 0 to 18 hours.	2 hours

* = Password protected

 $\bigstar$  = Time of Day (TOD) feature available on Lx500-800 & FTG models only.

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## Tft/Lx/Lx-WH/FTG

### Figure 4-28 LL Master Configuration Frost Protection

## Figure 4-29 LL Master Configuration Outdoor Reset

LX20	00 💽		Lx8 Lead Lag Maste	00 r Configuration	₽ (
Lead Lag Master	Configuration		Outdoo	or reset	
Frost Prot	tection		Enable	Enabled	
Enable	Disabled		Maximum outdoor temperature	70°F	
	Disabled		Minimum outdoor temperature	0°F	
			Low water temperature	85°F	
			Outdoor boost time	30 mins	
			Outdoor boost step	0°F	
		0	Dutdoor boost maximum off point	150°F	
					Show Line
Login					

### Table 4-27 Lead Lag Master Configuration Parameters – Frost Protection

Parameter	Description	Factory Settings
Enable *	Enable or Disable Frost Protection for Lead Lag Master.	Disabled

* Password protected

#### Table 4-28 Lead Lag Master Configuration Parameters – Outdoor Reset

Parameter	Description	Factory Settings
Enable	Enables or disables Outdoor reset	Enabled
Maximum outdoor temperature *	Outdoor temperature that corresponds to the Low water temperature setting. <i>Example:</i> If the Low water temperature setting is 95°F, and the Maximum outdoor temperature setting is 70°F, the boiler water temperature setpoint will be 95°F when the outdoor temperature is 70°F or higher. Range 50°F to 95°F [10°C to $35^{\circ}$ C].	70°F [21°C]
Minimum outdoor temperature *	Outdoor temperature that corresponds to the Maximum water temperature. <i>Example:</i> If the Maximum water temperature setting is 150°F (defined by LL setpoint), and the Minimum outdoor temperature setting is 0°F, the boiler water temperature setpoint will be 150°F when the outdoor temperature is 0°F or lower. Range -40°F to 40°F [-40°C to 4°C].	0°F [-18°C]
Low water temperature *	Minimum water temperature setpoint; occurs when the outdoor temperature is equal to or greater than the Maximum outdoor temperature. Range $60^{\circ}$ F to $140^{\circ}$ F [15°C to $60^{\circ}$ C].	85°F [29°C]
Outdoor boost time * †	Time interval for boost step, up/down. Range $0 - 18$ hours.	30 minutes
Outdoor boost step * †	CH setpoint boost step, up/down. Range 0-50°F [0-28°C]. A value of 0° disables boost.	0°F/C
Outdoor boost maximum off point * †	Maximum temperature that the LL CH outlet temperature may be boosted to. Range 60 to 195°F [16 to 91°C].	0°F/C

* = Password protected

 $\dagger$ **Outdoor boost** – See note for <u>Table 4-6</u> for description.

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#### Figure 4-30 LL Master Configuration WWSD

Enabling warm weather shutdown (WWSD) inhibits CH operation when the outdoor temperature goes above the WWSD set-point. Depending on the WWSD mode selected, CH operation will either end immediately or when an active CH demand ends.

CH operation is restored when the outdoor temperature drops below the WWSD set-point by a fixed value of  $4^{\circ}F$  [2°C].

NOTE: Warm Weather Shutdown configuration under Lead Lag Master Configuration is a duplicate of the Warm Weather Shutdown Configuration screen that is available in the main configuration menu. Changes made from either screen affect WWSD settings equally.

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	LX200 Lead Lag Master Configuration
	<ul> <li>✓ Warm Weather Shutdown ►</li> <li>Enable Disabled</li> <li>Setpoint 60F</li> </ul>
Login	

#### Table 4-29 Lead Lag Master Configuration Parameters – Warm Weather Shutdown (WWSD)

Parameter	Description	Factory Settings
Enable	<ul> <li>Enable or Disable LL Warm Weather Shutdown and select shutdown options:</li> <li>Shutdown after demand ends</li> <li>Shutdown immediately</li> <li>Disable</li> <li>Disable for Water Heaters.</li> </ul>	Disabled
Setpoint	Setpoint value for WWSD. Use of this value depends on warm weather shutdown (WWSD) being enabled. The outdoor temperature and a 4°F [2°C] differential is compared to the WWSD setpoint to determine if it is in the active range. When enabled, the WWSD will not go active until all demand sources are off. Once active, it will inhibit CH or LL CH demand and only respond to DHW demands, until the outdoor temperature is below the WWSD set point.	60°F [15°C]

### Figure 4-31 LL Master Configuration Algorithms

**Measured Run Time** – Determines selection based on burner run time. The unit with the lowest run time is first in the queue and selection proceeds in descending order to the final unit which has the highest run time.

**Sequence Order** – Determines the order in which units will be used in a round-robin arrangement based on the default or installer assigned Modbus address.

**Rotation Time** – Rotation is based on run time in "burner hours" rather than on a 24-hour clock. Once run time has elapsed, Lead rotation will occur at the next burner off cycle. If Force lead rotation time is non-zero, during a continuous heat call or demand, the Master will force a rotation of the lead boiler immediately once the specified time has elapsed.

LX200 Lead Lag Master Configuration				
<ul> <li>Algorit</li> </ul>	hms 🕨			
Lead selection method	Measured run time			
Lag selection method	Measured run time			
Lead rotation time	1 hour			
Force lead rotation time	0 min			
Login				

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#### Table 4-30 Lead Lag Master Configuration Parameters – Algorithms

Parameter	Description	Factory Settings
Lead selection method*	<ul> <li>Select preferred selection method for Lead:</li> <li>Measured run time (only valid if Slave Mode set to "Equalize run time")</li> <li>Sequence order</li> </ul>	Measured run time
Lag selection method*	<ul> <li>Select preferred selection method for Lag:</li> <li>Measured run time (nly valid if Slave Mode set to "Equalize run time")</li> <li>Sequence order (SO)</li> </ul>	Measured run time
Lead rotation time*	Minimum amount of burner run time accumulated before Lead rotation will occur. Range 1 minute - 960 hours.	1 hour
Force lead rotation time*	Maximum amount of burner run time accumulated before Lead forced to rotate. Range 0 hours - 1030 hours (a setting of 0 disables Force lead rotation feature).	0 hours

* Password protected

#### Figure 4-32 LL Master Configuration Rate Allocation

**Base Load Common** – In a Lead Lag configuration all the boilers fire at the same rate which is determined by the Master. When there is a call for heat resulting in a burner demand, the lead boiler fires first and is allowed to modulate up to the Base load common rate. If the call for heat is not satisfied within a specified time (see Add Stage just below) successive lag boilers are fired at the Base load common rate until the water temperature is within the error threshold of the setpoint, or all the boilers are firing. When the water temperature is within the threshold of setpoint, or all boilers are firing, the system is free to modulate to meet the heating load. This parameter value is normally set below 100% to promote higher operating efficiency.

	LX200 Lead Lag Master Configuration
	◀ Rate Allocation ►
	Base load common 70%
	_
Login	

#### Table 4-31 Lead Lag Master Configuration Parameters – Rate Allocation

Parameter	Description	Factory Settings
Base load common *	Maximum modulation rate of all firing units when other units are still available and idle. Range 25 - 100%.	70%

* Password protected

#### Figure 4-33 LL Master Configuration Add Stage

Add Stage - The LL master uses error threshold and interstage delay to determine when a new stage will be added.



#### Table 4-32 Lead Lag Master Configuration Parameters – Add Stage

Parameter	Description	Factory Settings
Error threshold	Staging based on temperature error: a stage is added when the temperature error (setpoint-measured value) exceeds the specified threshold for more than 30 seconds. Range 3°F to 10°F. Note: must be set less than on/off hysteresis value.	5°F [3°C]
Interstage delay	Specifies the minimum time that the Master waits after adding one stage before adding another stage. Range 1 min - 30 min. Note: error threshold must also be exceeded before next stage is added.	5 min

* Password protected

## 4.20 Verify (Safety Parameter Verification following Lockout 2) Figure 4-34 Verifying Safety Parameters

When any safety parameter is modified the controller requires that the parameter(s) be verified before burner control operation is allowed to resume. Login with password is required to access the safety parameters. After any safety parameter is changed, the controller enters a Lockout 2 "waiting for safety data verification" state: burner operation is suspended, the Alarm LED on the controller is illuminated, Alarm contacts (J6-7,8) close.



### Figure 4-35 Verification ID

To verify the changed parameter(s), it is necessary to navigate to the Configuration page and touch the Verify button at the page bottom. If more than 10 minutes elapse following parameter change(s), a new login is required. Once login is accomplished, a page similar to the adjacent figure is displayed.

Touching the BEGIN button starts the verification.





Confirmation of the displayed parameter values is required within 30 seconds, otherwise the verification times out and the BEGIN button must be touched again. After the first group is confirmed, subsequent groups (if any) are displayed and must be confirmed. When all groups have been confirmed, the Reset button on the controller must be pressed within 30 seconds. You must have physical access to the controller to perform a reset. For **ALL** Lx models remove either the front access cover of the unit (Lx150-400) or the back section of the top jacket panel (Lx500-800), and then remove the cover of the control enclosure. For Tft models, remove the front cover. For FTG remove front cover, then the control cover. TIP: Do this before starting confirmation!



## Figure 4-37 Controller Reset

When the controller RESET button is pressed the controller clears the Alarm LED, opens the Alarm contacts, and resumes normal operation.



	LX200 Safety Parameter Verification					
	Verification ID:					
PR	PRESS RESET BUTTON AT DEVICE NOW					
Login	Reset at device is needed. Reset must be completed in 30 seconds.					



## Tft/Lx/Lx-WH/FTG

## 5 DIAGNOSTICS PAGE

Figure 5-1 Input/Output Screen

The Diagnostics page initially presents a display of Input/Output (I/O) status. The screen image immediately to the right is a typical display of Digital I/O status.

A 🖸	l I/C	.X400 ) Status		
Digital I/O				
Pump A	STAT		O PM	
Pump B	CH remot	e STAT		
Pump C	Interrupt	ed Air Sw		
Blower/HSI	Rollout S	witch		
Pilot valve	Alarm			
Load Control Input	Safety Re	lay		
High Limit	OHW rem	ote STAT		
Diagnostic Tests = OR	F	Burner Control I/O	Digital I/O	Analog I/O

#### Figure 5-2 Digital & Analog I/O Status

The Burner Control I/O, Digital I/O and Analog I/O buttons at the page bottom are used to toggle between I/O status pages. Each digital input or output status is depicted by a simulated LED with green representing ON, or active, and non-colored representing OFF or inactive. Touching the Burner Control I/O button will display a subset of digital I/O related specifically to burner operation as depicted immediately to the right.

I/	LX200 ⁄O Status		Θ		
ontrol I/O					
.imit					
O Load Control Input					
O Pilot Valve					
O Interrupted Air Sw					
O Rollout Switch					
Digital I/O	Analog I/O	O=0N	O=OFF		
	IJ ontrol I/O .imit Control Input /alve upted Air Sw ut Switch Digital IJO	LX200 I/O Status ontrol I/O .imit Control Input /alve upted Air Sw ut Switch Digital I/O	LX200 I/O Status ontrol I/O .imit Control Input /alve upted Air Sw ut Switch Digital I/O Analog I/O		



Touching the Analog I/O button displays a scrollable group of bar graphs depicting the current value of each analog input and output.



#### **Figure 5-4 Modulation Test**

Selecting the DIAGNOSTIC TESTS button brings up one of two pages for performing tests with the burner and pumps. The initial page displayed is the Modulation Test page.

The Modulation Test page allows the installer to test burner operation and combustion at a given firing rate (E.g. minimum and maximum).

Touching the START TEST button initiates the Modulation Test. The test will run for a maximum of 5 minutes. It may be stopped and restarted as required.

**NOTICE** The installer password is required to initiate the modulation test. When the modulation test is complete touch the STOP TEST button to terminate –

complete touch the STOP TEST button to terminate – do not turn power off while performing the modulation test.



function.

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The burner <u>MUST</u> be firing for the Modulation Test to

	LX2 Diagn	200 ostics	Ø
Burner Switch	ON	Modulation Tes	t
Burner state F	Run	5900	Maximum
Outlet sensor 1 Firing Rate 5 Fan Speed 5	22F 999 RPM 999 RPM	925	Minimum
Burner must be for modulation t	in run state ests	1500 RPM	
	Pump Test	: Start Test	

## Figure 5-5 Pump Test

Touching the PUMP TEST button displays the Pump Test page. Here the installer may manually start and stop the pumps to verify their operation.

When a pump is turned on by touching one of the pump icons, it will remain on until it is turned off by touching its icon again. Use the Start Test button to test the pumps. This will perform a timed test lasting 10 seconds for each pump. After its test interval, each pump is stopped and restored to automatic operation. The test may be stopped at any time by touching the button again. During the test the button's color changes to red and the button text changes to "Stop Test".

LX: Diagr	200 lostics
Burner Switch ON Burner state Run	Pump Test Central Heat Domestic Hot Water
Outlet sensor <b>122F</b> Firing Rate 5999 <b>RPM</b> Fan Speed 5999 <b>RPM</b>	O Boiler
Burner should NOT be in run state for pump tests	
Modulation T	est Start Test

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**CAUTION** On each of the Modulation Test and Pump Test pages there is a "Burner Switch" button that may be used to manually shut off the burner. The installer password must be entered to permit use of the Burner Switch. Be aware that using the Burner Switch to turn the burner OFF inhibits automatic operation of the burner. It will remain OFF, even if power to the appliance is cycled off and on, until it is manually placed in the ON condition. The Burner Switch MUST be ON for automatic burner operation. Furthermore the Burner Switch cannot be used to manually fire the burner. The control only responds to an actual demand. The burner will not fire simply by turning the Burner Switch on; there must also be a heat call due to a CH1, CH2 (LL) or DHW demand, and the water temperature must be less than Setpoint - On hysteresis.

## 6 DETAILS PAGE

#### Figure 6-1 Details Page Navigation

Touching the DETAILS button enters a series of pages, each presenting a detailed summary of configuration and operational data that roughly corresponds to one of the configuration groups.

Use the left and right horizontal scroll buttons to navigation between Details pages. See sample of Central Heat Pump page as shown in Figure 6-1.

If all the data pertaining to the selected item cannot fit on a single screen, the vertical scroll bar may be used to scroll through the complete list.



#### **Table 6-1 Details Page Parameters**

Parameter	Options Displayed by Page (Scrollable List)			
	DHW enable	Requested rate	Operating Temperature	Outlet sensor state
Domostic Hot	Status	Setpoint source	DHW pump	Outlet temperature
Water (DHW)	Demand source	OFF setpoint	DHW pump overrun time	
water (DIIW)	Burner demand	Setpoint	DHW Pump frost overrun time	
	Heat demand	ON setpoint	DHW priority override time	
	Status	Flame signal	Lockout	Annunciator first out
Burner	Burner state	Sequence time	Hold code	Annunciator hold
Control	Firing rate control Firing rate	Delay time	Alarm reason	Remote STAT
Demand 6	Demand source	Rate limiter	Override rate	System OFF
Demand &	Firing rate	Limited rate	System ON setpoint	Operating Temperature
Modulation	Demand rate	Rate override	System setpoint	
Inlet	Inlet sensor state	Inlet temperature		
Fan	Fan Speed			
Central Heat	Pump C	Status	Overrun time	Idle days
Pump	Controlling pump	Delay time	Frost overrun time	Cycle count
DIW Dump	Pump A	Status	Overrun time	Idle days
DHW Fullip	Controlling pump	Delay time	Frost overrun time	Cycle count
Poilor Dump	Pump B	Status	Overrun time	Idle days
Boner Fump	Controlling pump	Delay time	Frost overrun time	Cycle count
Flame Detection	Flame detected	Flame signal		
Statistics	Burner cycles	CH ump cycles	Boiler pump cycles	Controller run time
Statistics	Burner run time	DHW pump cycles	Controller cycles	
Stack Limit	Stack limit setpoint	Stack sensor state	Stack temperature	
Outdoor Reset	CH outdoor reset enable	CH setpoint source	Outdoor sensor state	Outdoor temperature
CH Frost	Frost protection enable	Frost heat demand	CH pump frost overrun time	Outdoor temperature
Protection	Frost protection	CH pump	Firing rate	Outlet temperature
risteenon	Frost burner demand			

## 6.1 Analysis Page

The Analysis button enters a page where time-based trends of boiler activity may be captured, viewed and saved. The variables that may be trended are:

- Demand source
- Firing rate
- Fan speed
- Flame signal
- Outlet temperature
- Inlet temperature
- DHW temperature
- Outdoor temperature
- Stack temperature
- Lead Lag temperature
- Remote control
- CH setpoint
- Lead Lag CH setpoint
- Operating temperature
- Central Heat operation Analysis
- Lead Lag Operation Analysis
- Vessel Analysis

For collection of data, select up to 8 variables from the Trend variable drop-down list. Touch the green Start Trending button to begin data capture. To stop data capture, touch the red Stop Trending button.

Touch the View button to show the trend graph(s) of the selected variables. Each line is color coded to match its name displayed beneath the graph. The horizontal axis represents time, the vertical axis represents the value of the variable. The left and right margins indicate the scale of the values. The second button from the left can be touched to change the time scale to seconds, minutes, hours or days. The Save button will save the data to a file that can be copied to a USB storage device. A descriptive name can be assigned to the file. When copied to a USB device, the file(s) is(are) saved in a folder called "Trends", for example "E:\Trends\2012-06-06_0155_PM_.csv. The file is in Comma Separated Variable format to allow easy importation to a spreadsheet program such as Microsoft Excel.





Vertical and horizontal scales can be modified for more convenient viewing of the trend graphs. The underlined numbers at the corners of the graph chart can be touched to show a numerical keypad where new values are entered.

## 6.2 History Page

The controller identifies and records two kinds of events and categorizes them as either Lockouts or Alerts. The bulleted lists below indicate the significance of each type of fault:

## Lockouts:

- Cause the burner to shutdown and require manual intervention to reset the controller from Lockout
- Always cause the Alarm contacts to close
- Are logged in the Lockout History

#### Alerts:

- Events reported by the controller
- For informational purposes only

For more details on specific Lockout and Alert conditions, refer to the "Troubleshooting" section of the **Installation and Operation Instructions** for your particular appliance.

#### Figure 6-3 History Page

The controller maintains in its non-volatile memory a record of the most recent Lockout and Alert events. There is capacity in memory for fifteen (15) of each. Access to the history is achieved either by touching the History button icon on the Summary page, or by touching the History button at the bottom of any of the Details pages.

Touching the History button on the Summary page presents a dialog. If no button is touched within 30 seconds the dialog is automatically cancelled. Touching OK simply returns to the Summary page.

The text on the history button automatically updates if a Lockout or Alert occurs (e.g. Alert 32).



#### Figure 6-4 Lockout History Screen

Touching "Lockouts" displays the Lockout History page which contains a scrollable list of events. See Figure 6-6 for description of Alert button icon. The Clear Lockout button may be used to clear a Lockout. Pressing the Reset button on the controller may also be used to clear a Lockout.

	Loc	LX200 ckout His	story	
Time	Cycle	Descriptio	n	
12/15/09 12:29:38an	n 20	105 Flame Preig	105 Flame detected out of sequel	
	20	105 Flame detected out of sequeu In Standby state		
	19	) 109 Ignition failed in Pilot Flame Establishing P∈		
19 109 Ignition failed in Pilot Flame Establishing Pe				
			•	
12/15/09 Clear Lockou	ıt	Alerts	12:30:48am	

## Figure 6-5 Control State at Lockout

Lockout events can be viewed by scrolling down the Lockout History page. Touching an individual item from the list displays a detailed description of the control state at the time of the Lockout.

Lockout History	1 2000	
12/15/09 12:29:40am	Cycle: 6	Hours: 5
		1
State: Run		Sequence: 17 sec
		First Out: Airflow Switch
Pump A=OFF		<u> </u>
Pump B=OFF		
Pump C=OFF		
Blower/HIS=OFF		
12/15/09	ок	12:30:48am

#### Table 6-2 Control States Displayed

Parameter	Description	Factory Settings	Comments
Lockout time	Set by display		
Fault code	Unique code defining which lockout occurred		
Annunciator first out	First interlock that resulted in shutdown		
Description	Fault description		
Burner Lockout/Hold	Source or reason for lockout/hold		
Burner Control State	Burner operating state at the time of lockout		
Sequence time	Burner control state timer at time of fault		
Cycle	Burner control cycle		
Run Hours	Burner control hours		
I/O	All digital I/O status at time of fault		
Annunciator 1-8 states	All Annunciator I/O status at time of fault		
Fault data	Fault dependent data		

* Password protected

## Figure 6-6 Alert Log and Events

The Alert Log page contains a list of Alert events. Touching an individual item displays detailed information about the event. See also Figure 6-7.

		LX200 Alert Log
-	Time	Description
12/15/09 12:29:52am         115 Fan was limited to its minimum dut           12/15/09 12:29:38am         64 Burner control rate (nonfiring) was           281 Abnormal Recycle: LCI off during I		<ul> <li>115 Fan was limited to its minimum dut</li> <li>64 Burner control rate (nonfiring) was</li> <li>281 Abnormal Recycle: LCI off during I</li> </ul>
12/15/09	Clear Lockout	Alerts 12:31:09am

#### Figure 6-7 Timestamp Display



The controller contains no

internal system time. The timestamp for each Lockout and Alert is assigned by the display when it learns of the event from the controller; therefore, the event history transferred from the controller to the display following a power interruption does not have valid timestamps. New events will be given correct timestamps only if the time has been set in the display via the Display Setup page (see Figure 8.4-1).



#### LEAD LAG MASTER 7

figure is displayed.

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Figure 7-1 Lead Lag Master Screen

When the LEAD LAG MASTER button on the Lead Lag â Home Page is touched, a page similar to the adjacent Active service None 2 Temperature 80°F 150°F Operation enable ON 4 Setpoint 1 Setpoints Burner status 3 STANDBY 5 6 Available Disabled 1 2 7 History Configure Details Diagnostics 10 8 9

Item	Name	Description		
1	Active service	Indicates if there is a Lead Lag demand being serviced		
2	Temperature	The temperature as measured by a 10k thermistor sensor connected to		
		the System Sensor field wiring barrier terminal.		
3	Operation enable	Indicates that Lead Lag operation is enabled. This is a read-only indication		
4	Setpoint	Lead Lag Central Heating setpoint temperature. May be adjusted from		
	2 ctp o	this screen, or from the Lead Lag Master configuration page, see page 31		
5	Selection	Toggles through the status information groups: Slaves (not shown),		
		Burner Status, and Setpoints (not shown). Touch the button to display		
		the next group.		
6	Status group	Indicates which group of status information is displayed		
7	Status information	Information relevant to the group selected:		
		• Slaves		
		• Firing rate %		
		<ul> <li>Availability to fire</li> </ul>		
		• Address		
		• Burner status		
		<ul> <li>Current Burner state</li> </ul>		
		<ul> <li>Availability</li> </ul>		
		• Address		
		Setpoints		
		<ul> <li>Lead Lag Central Heat Setpoint</li> </ul>		
		• On hysteresis		
		<ul> <li>Off hysteresis</li> </ul>		
8	Configure	Shortcut to Lead Lag Master configuration page, see page 31.		
9	Details	Detailed status information for each boiler, similar to details available in		
		the individual boiler's Details pages, see page 42.		
10	Diagnostics	Manual firing rate test for Lead Lag cascade group, similar to		
		Modulation test page for individual boiler, see page 40.		

**Figure 8-1 Setup Screen** 

#### **Table 7-1 Lead Lag Items**

## 8 SETUP



Access to actual boiler control settings is obtained via the Home Page by touching the

individual boiler icon, see page 4.

When the Setup button on the Home Page is touched, a page similar to the adjacent figure is displayed. Touch the Refresh button to have the display scan for a connected controller. Communication between the display and controller uses the Modbus RTU protocol. The display acts as a Modbus Master and the controller as a Modbus Slave. When the Refresh button is touched the display will scan Modbus addresses in the range 1 through 8. When the controller is detected, its Modbus address and name will appear on this page. If the display cannot detect a controller, "SYSTEM DISCONNECTED!" is shown.



## NTI | Controller and Touchscreen Display

## 8.1 Synchronize

### Figure 8.1-1 Synchronize

Touching the Synchronize button forces the display to refresh its data from the controller, as indicated in the adjacent figure.





## 8.2 Control Setup

Figure 8.2-1 Control Setup

Touching Control Setup will display a page like the one immediately to the right.

#### **Table 8.2-1**

Item	Name	Description	
1	Change Address	Shortcut to System	
		Identification and Access	
		configuration menu, see	
		page 10	
2	Rename Control	Same as item 1	
3	Remove Control	Use not recommended;	
		removes connected	
		controller from the list,	
		requires Refresh and	
		Synchronization	
4	PM	May be used to backup	
	Configuration	and restore controller	
		settings with a PIM (NTI	
		part number 83998)	
5	Modbus	Use only when instructed	
	Configuration	to do so by NTI technical	
		support; permits reading	
		and writing directly to	
		individual Modbus	
		registers in the controller	



Figure 8.2-1



Access to actual boiler control settings is obtained via the Home Page by touching the individual boiler icon, see page 4.

## 8.3 Control Snapshot

The Control Snapshot page is used to copy controller status and configuration data to the non-volatile memory of the display where it may be viewed and copied to a USB mass storage device. This feature can be used for troubleshooting, the controller data can be e-mailed to NTI Technical Support for analysis.

The buttons beneath the controller name are used to capture controller status, configuration, or both. The example page in the figure below and to the right depicts the data.



Figure 8.3-1





To copy a control snapshot to a USB device, insert the device into the connector located at the bottom of the display. Touch the desired snapshot name to select it, then touch Copy To USB to transfer the snapshot file to the USB device. When the USB device is inserted into a personal computer USB port, the file will appear on the device in a folder called "Controlshots", for instance E:\Controlshots\Lx800-2012-05-25-Lockout174.txt.



Figure 8.3-3

## Figure 8.3-1 Control Snapshot

## 8.4 Display Setup

#### Figure 8.4-1 Display Setup

The Display Setup page is used to view and modify settings of the display itself. The settings are divided into groups represented by a series of tabs. The General tab contains the following settings:

- Checkbox: Display alerts on Status Summary • status bar? When checked, enables Alerts to be displayed on the History bar of the Summary Page. Most alerts are for information only and do not indicate a boiler problem. NTI recommends that this setting remain un-checked.
- Checkbox: Display empty parameter groups? Use ٠ not recommended, leave un-checked.
- Checkbox: Sound audio alarm for faults? Enables • the built-in speaker to sound if a boiler alarm condition such as a burner lockout occurs.
- Slider: Volume. Adjusts the volume of the built-• in speaker.
- Slider: Backlight intensity. Adjusts the intensity • level of the display screen backlight.

合 🛅	Display Setup	(
5/24/2012		11:56 AM
General COM 1 COM 2 C	Gateway Screen Saver Home Page	
Display alerts on Status	Summary status bar?	
Display empty paramet	er groups?	
Sound audio alarm for	faults?	
Volume: 50	Backlight intensity: 85	
0	100 50	100
Set Date/Time	About	Save
	▲	1
Touch to show displ software version	ay	
	Touch to save display settings in non-volatile memory	

## Set Date/Time

Figure 8.4-2 Set Date/Time

The Date & Time page is used to set the date and time so that any lockout or alert events may be properly time-stamped.



display.

Date & time are maintained in the display by an internal clock with battery back-up. After the time is set, it will persist even if power is removed from the

<u>r 10</u>	Display Setup	(
5/24/2012		12:38 PM
General COM 1	6 Set Date/Time	
Boiler button text	5 /24/2012 💌	
	12:38 PM • •	
	Touch unit in time to change it	
	200000000	
	OK Cancel	
Cet		
Date/Time	About	Save

## **COM1 Serial Port**

The display is equipped with two serial EIA-485 communication ports, COM1 and COM2. COM1 is dedicated for communication with the boiler control. Do not change the factory settings.

#### Figure 8.4-3 COM1 Settings

î	🛾 🚺 Display Setup	(
5/:	24/2012	11:56 AM
	General COM 1 COM 2 Gateway Screen Saver Home Page	
	✓ Enable COM1 port       Modbus address range:     1     10     8       (maximum range 1-250)	
	Modbus baud rate: 38400 bps 8 data bits	
	No parity bits 1. stop bit	
	Set About Sa	ve

## **COM2 Serial Port**

#### Figure 8.4-4 COM2 Settings

The COM2 serial port may be utilized to provide an interface to an external system, such as a Building Automation System. The factory setting is not enabled. To enable COM2, check the "Enable COM2 port" checkbox. COM2 settings must be used in conjunction with Gateway settings to fully enable communications with an external system. Refer to the appliance Installation and Operating manual for wiring details.

COM2.



## **Modbus Gateway**

#### Figure 8.4-5 Gateway Settings

To use the COM2 port for communication with an external system, the display's internal Modbus gateway must be enabled. When enabled the gateway provides access, by an external system, to the Modbus registers of the boiler control as if the external system is connected directly to one of the two Modbus communication ports on the control itself. After enabling the gateway, touch the Save button to save the settings, and either 1) cycle power to the boiler to reset the display; or 2) use the Display Reset function in Display Diagnostics.

Touch to enable/disable gateway.





## Screen Saver

Figure 8.4-6 Screen Saver Settings

Touch the "Enable Screen Saver" checkbox to toggle enable and disable of the screen saver. Set the wait time in minutes using the up and down arrows next to the time value. Select the screen saver type, e.g. "Date and Time". The "Bitmap" option is inactive until a bitmap image is transferred to the display using the USB port. By this means a customized image may be used for the screen saver, such as a company logo, service provider contact information, etc. Contact NTI Technical Support at (800) 688-2575 for assistance to load a customized bitmap screen saver image into the display.

😭 🚺 Displ	Setup 🚺
5/24/2012	11:56 AM
General COM 1 COM 2 Gateway Scre	Saver Home Page
☑ Enable Screen Saver       Idle time:     ₩ait     10     minutes	Type: ○ Random balls ○ Date and time ● Bitmap
Set Date/Time	Save

#### **Home Page**

#### Figure 8.4-7 Home Page Settings

Select a desired text color for the boiler name that appears above the individual boiler icon on the Home Page, see page 4.

4/2012		_				11.5
4/2012	<u>, , , , , , , , , , , , , , , , , , , </u>					11:50
General COM 1	. COM 2	Gateway	Screen Save	er Home	Page	
Boiler button tex	t color:	Blac	k □ E	old		

## 8.5 Display Diagnostics

The Display Diagnostics page is used to adjust and test display functionality. Typically these operations are not required, contact NTI Technical Support for assistance if needed.

Touch the Display Reset button to re-boot the display. This may be necessary if, for example, the Modbus gateway function is enabled.

#### Figure 8.5-1 Display Diagnostics

合 🔯	Dis	play Diagn	ostics	(
Version: 1.2	Memory: 13.2ME	3 out of 38.4MB	available	Build: 57
USB Status: NOT	FOUND			
COM 1 Enabled	Bytes	Packets	Rate (b	(ps) Clear
Transmit:	15258584	1907333	640	Pause
COM 2 Enabled Receive:	<u>Bytes</u> 7013492	<u>Packets</u> 876557	<u>Rate (b</u> 384	ps) Clear
Transmit: 🦲	7294749	868529	336	Pause
Calibrate Screen	Audio Test	Video Test	Screen Snapshot	Display Reset
	Touch to ac screen imag non-volatile	cess list of es stored in memory		

## Screen Snapshot

#### Figure 8.5-1 Screen Snapshot List

The Screen Snapshot button is used to access the list of screen images stored in the display memory. These images can be a useful aid for troubleshooting. They can be copied to a USB mass storage device, and subsequently e-mailed to NTI Technical Support. The images are stored in JPEG format. To copy an image to a USB device, insert the device into the USB port of the display.

D012 05 24	Scre	een Snaps	not List	
2012-05-24	1152 AM SyncL	Jialog		······
2012-05-24_	1153_AM_CONTR	orsetuprage	-	
2012-05-24	1153_AM_PIMC	bhriguration Pag	e	
2012-05-24_	1153_AM_Searc	nDialog alCasashatDaga		
2012-05-24_	1154_AM_Contri	oionapsnotPage		
2012-05-24_	1154_AM_Contr		nu	
2012-05-24	1156_AM_DISPIA	aysetuprage		
2012-03-24	1100_AM_ADOUT	LDIalog		
2012-05-24	1156 AM Dicola	Sotup Dago(1)		
2012-05-24_	1156_AM_Displa	aySetupPage(1)		
2012-05-24_ 2012-05-24_ 2012-05-24	1156_AM_Displa 1156_AM_Displa 1156_AM_Displa	aySetupPage(1) aySetupPage(2)		-
2012-05-24_ 2012-05-24_ 2012-05-24_	1156_AM_Displa 1156_AM_Displa 1156_AM_Displa	aySetupPage(1) aySetupPage(2) aySetupPage(3)		•
2012-05-24_ 2012-05-24_ 2012-05-24_	1156_AM_Displa 1156_AM_Displa 1156_AM_Displa Limit of	aySetupPage(1) aySetupPage(2) aySetupPage(3) 16 snapshots p	ermitted	•
2012-05-24_ 2012-05-24_ 2012-05-24_	1156_AM_Displa 1156_AM_Displa 1156_AM_Displa Limit of	aySetupPage(1) aySetupPage(2) aySetupPage(3) 16 snapshots p	ermitted	•
2012-05-24_ 2012-05-24_ 2012-05-24_	1156_AM_Displa 1156_AM_Displa 1156_AM_Displa Limit of	aySetupPage(1) aySetupPage(2) aySetupPage(3) 16 snapshots p 5/24/2012	ermitted	•



Select the image to be copied by touching its name in the list. When an image is selected the "Copy to USB" button is enabled. Touch the button to copy the image to a file on the USB device. Files are stored on the USB device in a folder called "Screenshots", for example:

E:\Screenshots\2012-05-29_0954_AM_StatSummary.jpg is a typical path if the USB device is inserted in a personal computer.



#### Figure 8.5-3 Screen Snapshot Delete

A maximum of 16 images may be stored in the display memory. Use the Delete button to remove images as needed. To delete an image, select the image name by touching it, then touch the Delete button. A confirmation dialog allows the Delete operation to be confirmed or canceled.



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