SCC Inc.
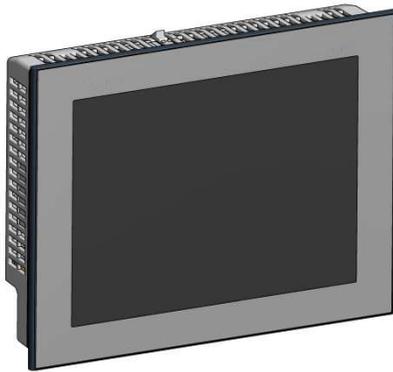
TS Series

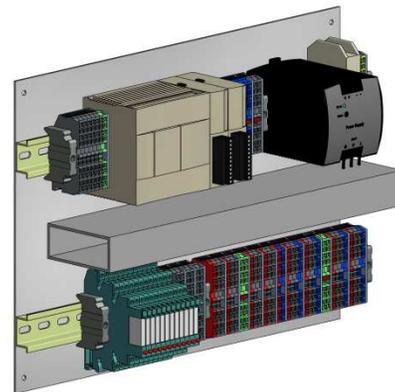**TS… Touchscreen Kits**
for use with LMV3, LMV5 and RWF… Controls

Touchscreen

Plate Kit

Description

TS… series touchscreen kits provide a human machine interface (HMI) when used with a Siemens LMV3 or LMV5 linkageless control. Each kit provides boiler burner data collection and trending for a hydronic or steam boiler. An optional RWF… control for load or water level modulation easily interfaces with a TS… series touchscreen kit.

Each TS… touchscreen kit includes a 6" or 10" touchscreen along with a plate kit to be mounted inside a control panel (by others).

A PLC first-out annunciator option is available for additional analog, digital, and temperature inputs.

Flexible communication interface options to the building management system (BMS) provide streamlined data collection and monitoring.

Table of Contents

Compatible Controls and Accessories

Controls

- LMV5... with internal load controller
- LMV5... with RWF40 or RWF55 external load controller
- LMV3... with RWF10, RWF40 or RWF55 external load controller

Accessories

- Feedwater control via RWF40 or RWF55 (steam boilers only)
- SCC Inc. Expanded Annunciation system

Physical Connections

The touchscreen communicates with the connected equipment via Modbus. Use the supplied terminal connections provided with the plate kit to wire the touchscreen, plate kit, and controllers. Connect any RS-485 devices in a daisy-chain with termination at the end of the chain (typically a 120-Ohm resistor). The following addresses are required for the connected equipment:

Table 1: Required Addressing of Controllers

Device	Required Address	Communication Type
LMV5x	1	RS-232
RWF40 (for load control)	2	RS-485
RWF40 (for feedwater)	3	RS-485
Expanded Annunciator	4	RS-485
LMV3x (via OCI412.10)	5	RS-485
RWF55 (for load control)	6	RS-485
RWF55 (for feedwater)	7	RS-485
RWF10 (for load control)	8	RS-485

Communication via Modbus must be set with the following values:

- 19200 baud
- 8 stop bits
- 1 data bit
- no parity

See the appendices for Modbus configuration details for each device. The address and configuration details for the Expanded Annunciator are fixed and do not need to be set.

Logging In

When the touchscreen is powered up, the OVERVIEW screen will appear.
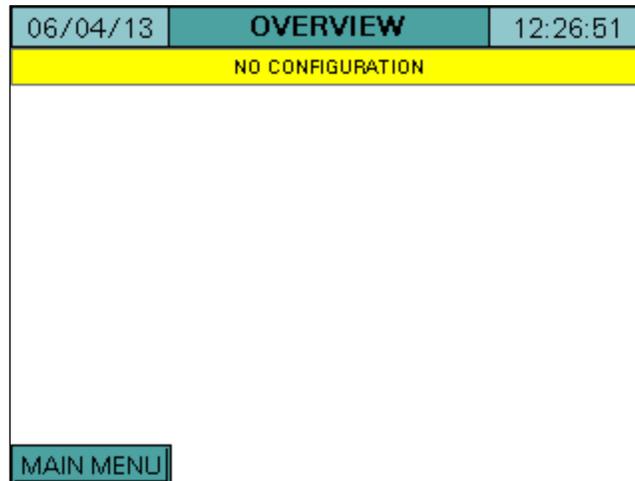
Press **MAIN MENU** in the lower left corner to go to the MAIN MENU screen.
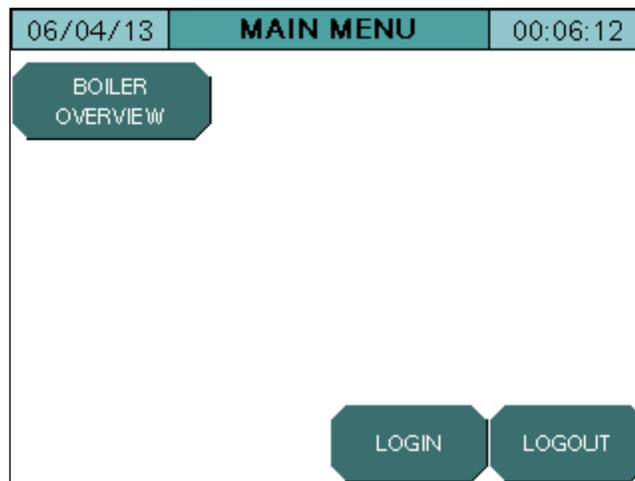
From here, different screens can be accessed depending on the access level. There are three access levels available:

- USER: Allows access to viewing data, changing setpoints, and manual operation. No username or password required.
- TECH: Same access as USER level as well as access to changing operational parameters. Username and password required. The username is TECH. The default password is 9876.
- SETUP: Same access as TECH level as well as access to programming touchscreen configuration settings. Username and password required. The username is SETUP. The default password is START.

Logging In (continued)

In order to log in at the desired access level, press **LOGIN**. The LOGIN screen will appear.

Tap the area next to NAME and a keypad will pop up.

Use the keypad to enter the username for the desired access level. When finished, press **ENTER**.

Next, tap the area next to PASSWORD and the same keypad will pop up again. Enter the password and then press **ENTER**.

When both the username and password have been entered, press **APPLY**. If successful, the CURRENT USER will change from USER to TECH or SETUP depending on the username and password that were entered. Hit **CLOSE** to leave the login screen.

Initial Configuration

Access level: **SETUP**

The touchscreen needs to be configured for the connected equipment. Once logged in at the
SETUP level, the SETTINGS tab will appear.
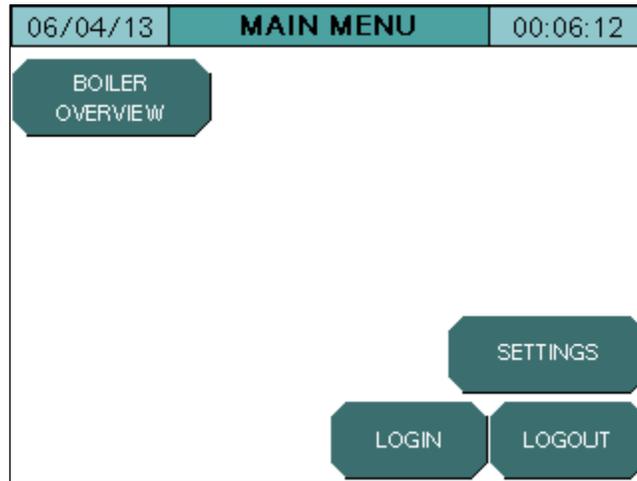
Press **SETTINGS** to display the SETTINGS screen.
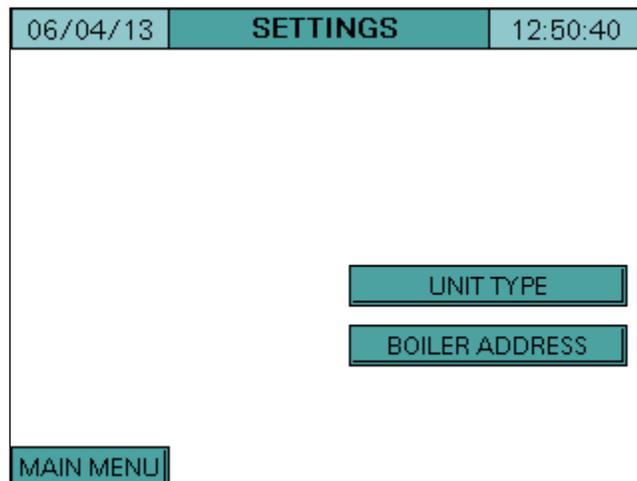
Initial Configuration (continued)

Unit Type

Press **UNIT TYPE** to display the UNIT TYPE screen. On the UNIT TYPE screen, the touchscreen is configured for the components it is connected to, including the type of boiler, the controller(s), and more.

(1)

06/04/13	UNIT TYPE	12:52:00

UNIT TYPE: Lead-Lag

COLOR/SHAPE: From Master

MAIN MENU

(2)

06/04/13	UNIT TYPE	12:52:00

UNIT TYPE: Lead-Lag

COLOR/SHAPE: Choose Locally

COLOR/SHAPE

MAIN MENU

(3)

06/04/13	UNIT TYPE	12:52:00

UNIT TYPE: Standalone

SYSTEM TYPE: Steam   EXP ANN: No

CONTROLLER: LMV5x

UNIT: Standard/Steam / 1   FDWATER: Disabled

COLOR/SHAPE

DEVICE INS (BACnet): 100   BAUD: 9600

MAIN MENU   Node/Address/MAC: 1

(4)

06/04/13	UNIT TYPE	12:52:00

UNIT TYPE: Standalone   PUMP: No

SYSTEM TYPE: Hydronic   EXP ANN: No

CONTROLLER: LMV5x   VALVE: No

UNIT: Standard/Hydronic / 1

COLOR/SHAPE

DEVICE INS (BACnet): 100   BAUD: 9600

MAIN MENU   Node/Address/MAC: 1

One of the four screens shown above will appear depending on the type of system that the touchscreen is configured for:

Screen 1 – Appears for lead/lag systems with boiler color coming from the Lead/Lag Master.
Screen 2 – Appears for lead/lag systems with boiler color coming from the local touchscreen.
Screen 3 – Appears for standalone steam boilers.
Screen 4 – Appears for standalone hydronic boilers.

Initial Configuration (continued)

UNIT TYPE – Configure the touchscreen as either a standalone unit or part of a lead/lag system.
- **Lead-Lag:** Choose this option when connected to a Lead/Lag Master panel.
- **Standalone:** Choose this option when no Lead/Lag Master panel is present.

SYSTEM TYPE – Choose the type of boiler that the touchscreen is connected to.
- **Hydronic:** Select this option for a hot water boiler.
- **Steam:** Select this option for a steam boiler.

CONTROLLER – Choose which Siemens controller(s) are connected to the touchscreen.
- **LMV5x:** Select this option when using an LMV5x and its internal load controller.
- **LMV5x/RWF40:** Select this option when using an LMV5x with an RWF40 as an external load controller.
- **LMV5x/RWF55:** Select this option when using an LMV5x with an RWF55 as an external load controller.
- **LMV3x/RWF10:** Select this option when using an LMV3x with an RWF10 as an external load controller.
- **LMV3x/RWF40:** Select this option when using an LMV3x with an RWF40 as an external load controller.
- **LMV3x/RWF55:** Select this option when using an LMV3x with an RWF55 as an external load controller.

UNIT – Choose the units and decimal places that will be displayed.
- **Standard/Hydronic:** Process variables are shown as temperatures in degrees Fahrenheit.
- **Metric/Hydronic:** Process variables are shown as temperatures in degrees Celsius.
- **Standard/Steam:** Process variables are shown as pressures in PSI.
- **/ 1:** No decimal place on all values.
- **/ 10:** One decimal place on all values.

**LMV3 ACTUATORS –** Select the actuators being used on an LMV3x controller (LMV3x optioned boilers only).
- **None:** Choose this option when no actuators are being used.
- **Air Only:** Choose this option when only an air actuator is being used.
- **Fuel Only:** Choose this option when only a fuel actuator is being used.
- **Air & Fuel:** Choose this option when both air and fuel actuators are being used.

Initial Configuration (continued)

COLOR/SHAPE – Sets the visual representation for the boiler vessel on the OVERVIEW screen.

Press **COLOR/SHAPE** to pull up the current image of the boiler.
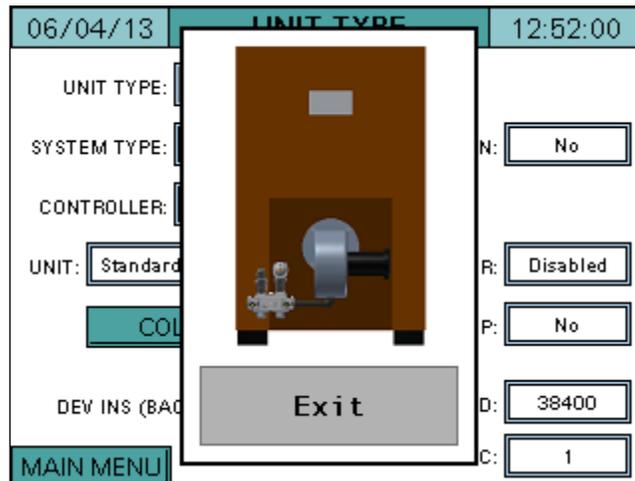
Tap the image to scroll through the available choices and press **EXIT** to confirm changes.

DEV INS (BACnet) – Sets the device instance for the optional QuickServer interface (for BACnet/IP or BACnet MS/TP communication only).

PUMP – Choose whether or not a boiler circulating pump is installed (only appears for hydronic boilers).
- **No:** Select this option if no pump is installed.
- **Yes:** Select this option if a pump is installed.

EXP ANN – Choose whether the Expanded Annunciation package is connected.
- **No:** Select this option if the Expanded Annunciation package is not connected.
- **Yes:** Select this option if the Expanded Annunciation package is connected.

VALVE – Choose whether or not a boiler return temperature valve is installed (only shows up for hydronic boilers).
- **No:** Select this option if no valve is installed.
- **Yes:** Select this option if a valve is installed.

Initial Configuration (continued)

FDWATER – Choose whether a feedwater system is installed with a Siemens controller (only shows up for steam boilers).

- **Disabled:** Select this option if there is no feedwater system installed with a Siemens controller.
- **RWF40:** Select this option if the feedwater is being controlled by an RWF40.
- **RWF55:** Select this option if the feedwater is being controlled by an RWF55.

WSB – Choose whether to enable the warm standby option (for steam boilers with the Expanded Annunciation package only).

- **No:** Warm standby is disabled.
- **Yes:** Warm standby is enabled. A shell temperature sensor is required to be connected to one of the following:
    - Terminal X60 on an LMV5x.
    - Analog input 3 on an RWF40 (set parameter df3 = 1).
    - Analog input 3 on an RWF55 (set parameter df3 = 1).
    - The dedicated RTD input on the Expanded Annunciation package (see Expanded Annunciator Configuration).

    If more than one sensor is installed in these locations, the touchscreen will use the following hierarchy to determine which sensor is used as the shell temperature:
    1. Dedicated RTD input on Expanded Annunciator package.
    2. Analog input 3 on either an RWF40 or RWF55.
    3. Terminal X60 on an LMV5x.

BAUD – Set the connection speed (for BACnet MS/TP or Modbus RTU communication only). Note: N2 Johnson Metasys is fixed at 9600 Bd regardless of this setting.

- 9600 Bd
- 19200 Bd
- 38400 Bd

Node/Address/MAC – This is used only for N2 Johnson Metasys, Modbus RTU, or BACnet MS/TP communications only. For N2 Johnson Metasys, this sets the node address. For Modbus RTU, this sets the slave address. For BACnet MS/TP, this sets the MAC address.

When finished, press **MAIN MENU** to return to the home screen.

Initial Configuration (continued)

Boiler Address

The boiler address is used to give a unique name to each boiler. This must be set if the touchscreen is connected to a Lead/Lag Master or if multiple touchscreen kits are connected on the same Ethernet network.

From the MAIN MENU, press **SETTINGS**.
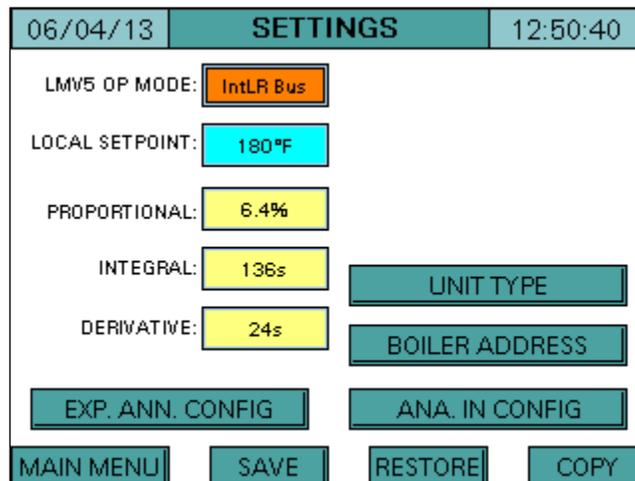
On the SETTINGS screen, press **BOILER ADDRESS**.
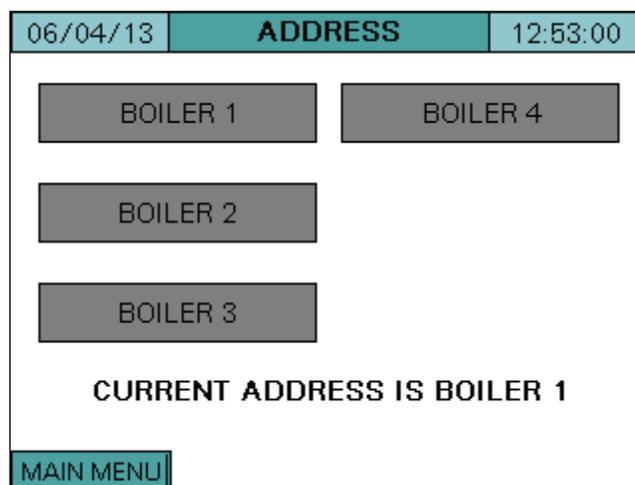
The boiler can be addressed as boiler 1, 2, 3, or 4. Tap the desired address. The address change will take effect immediately.

When finished, press **MAIN MENU** to return to the home screen.

Initial Configuration (continued)

Expanded Annunciator Configuration

If the Expanded Annunciation package is equipped, the touchscreen is capable of first-out annunciation of up to thirteen limits with programmable labels. In order to program these limits, the EXP. ANN. CONFIG menu must be accessed.

From the MAIN MENU, press **SETTINGS**.

On the SETTINGS screen, press **EXP. ANN. CONFIG**.

Initial Configuration (continued)

Limits 1-7 are shown on the screen that appears. Limits 8-13 may be accessed by tapping the right arrow at the bottom of the screen.

LIMIT 1-13 – This is the user-configured name for each limit. Tap the area next to the limit and a keypad will appear. The name may be up to 16 characters long.

ALARM – Configures how each individual limit will alarm. Alarms are subject to a short (five-second) delay to ensure the alarm condition is present.

- **None:** Will not alarm regardless of the position the input is in.
- **Is Off:** Will alarm when the input is deactivated.
- **Is On:** Will alarm when the input is activated.
- **FO Off:** For first-out applications, will alarm when the input is deactivated only if the previous input is activated.

RESET – Configures whether the alarm will be an auto or manual reset alarm.   Manual reset alarms can be reset using the **ALARM RESET** button on the ALARMS screen.

When finished, press **CONFIG** to go to the SETTINGS screen, or press **MAIN MENU** to return to the main menu.

Analog Input Configuration

If the Expanded Annunciator package is equipped, the touchscreen is equipped with four programmable analog inputs and three programmable Pt1000 RTD temperature inputs. In order to configure these inputs, the ANA. IN CONFIG screen must be accessed.

From the MAIN MENU, press **SETTINGS**.
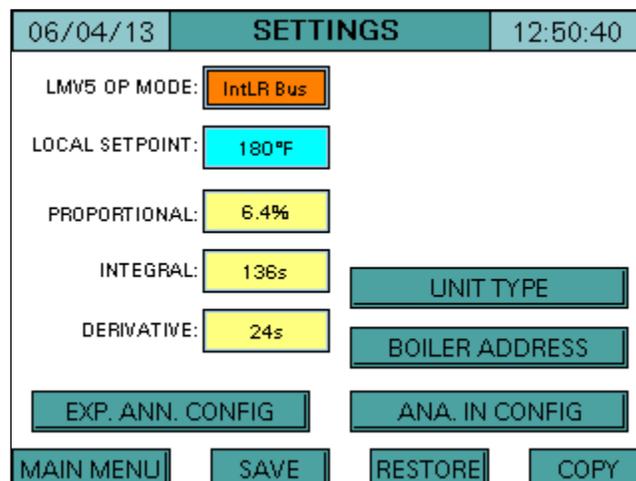
Initial Configuration (continued)

On the SETTINGS screen, press **ANA. IN CONFIG**.

The screen to configure analog input 1 will appear. Pressing the left or right arrows will toggle through the four available analog inputs. Use the following settings to configure each analog input:

NAME – Tap the area next to name and a keypad will appear. Enter any name for the analog input up to 10 characters in length.

UNIT – Tap the area next to unit and a keypad will appear. Enter the appropriate units for the analog input up to 4 characters in length.

TYPE – Configures the input signal for 0-10Vdc, 0-20mA, 2-10Vdc or 4-20mA.

MIN – Configures the low end of the scale for the analog input.

MAX – Configures the high end of the scale for the analog input.

TOTALS – Enables and sets the unit of time for totalization of the analog input.

- None – Disables totalization of the analog input.
- Hour – Enables totalization of the analog input in units/hour.
- Minute – Enables totalization of the analog input in units/minute.

LOW – Sets the low alarm threshold for the analog input (if enabled).

HIGH – Sets the high alarm threshold for the analog input (if enabled).

Initial Configuration (continued)

ALARM – Configures the type of alarm for the analog input. Manual reset alarms can be reset using the **ALARM RESET** button on the ALARMS screen. Alarms are subject to a short (five-second) delay to ensure the alarm condition is present.

- **None:** Disables the alarm.
- **Low Only:** Enables an auto reset low limit alarm.
- **Low MR:** Enables a manual reset low limit alarm.
- **High Only:** Enables an auto reset high limit alarm.
- **High MR:** Enables a manual reset high limit alarm.
- **Low High:** Enables an auto reset low limit and an auto reset high limit alarm.
- **LowMR High:** Enables a manual reset low limit and an auto reset high limit alarm.
- **Low HighMR:** Enables an auto reset low limit and a manual reset high limit alarm.
- **LowMR HighMR:** Enables a manual reset low limit and a manual reset high limit alarm.

When finished configuring the analog inputs, press **RTD** to go to the AI CONFIG (RTD) screen in order to configure the RTD temperature inputs.

NAME – Tap the area next to name and a keypad will appear. Enter any name for the RTD input up to 10 characters in length.

OFFSET – Temperature offsets may be applied (negative or positive) to the RTD inputs to compensate for lead resistance.

TEMP INPUT OFFSET – Sets a temperature offset (negative or positive) for the dedicated shell temperature (steam boilers) or boiler return water temperature (hydronic boilers) RTD input.

When finished configuring both the analog and RTD inputs, press **CONFIG** to go back to the SETTINGS screen.

Initial Configuration (continued)

Press **SAVE** to store these configuration settings to the Expanded Annunciator memory. If this is not done, all settings will be lost upon a loss of power!

To revert back to the configuration settings saved in the Expanded Annunciator memory, press **RESTORE**.

Pressing **COPY** allows access to save configuration settings to or restore configuration settings from a USB drive or the touchscreen itself. For more information, see Parameter Backup.

Boiler Overview Screen

Access level: **USER**

The boiler overview screen displays the real-time data of the boiler. From the MAIN MENU screen, press **BOILER OVERVIEW**. The BOILER OVERVIEW screen will appear.
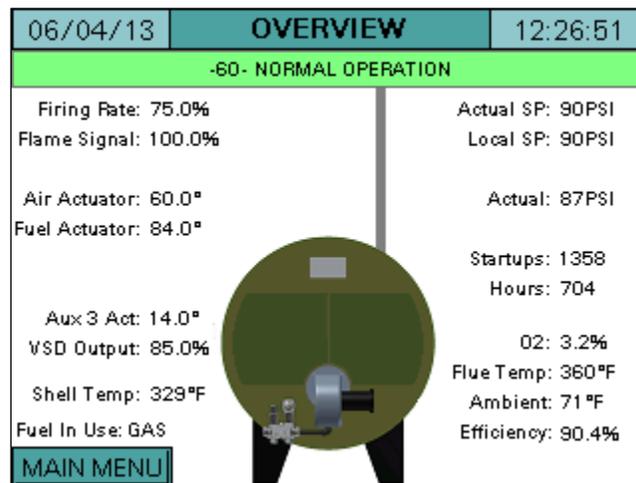
Only the parameters that are optioned and active are shown. Any others are hidden from the display for clarity. The following parameters may be shown on the overview screen:

Phase: The phase of the boiler is always displayed in a horizontal bar at the top of the screen.
Firing Rate: Displays the firing rate of the boiler from 0-100%.
Manual Active: Displayed in red text if the boiler is in manual mode.
Air Actuator: Displays the position of the air actuator.
Fuel Actuator: Displays the position of the current fuel actuator (gas or oil).
Aux1 Act: Displays the position of the auxiliary 1 actuator (LMV5x only).
Aux2 Act: Displays the position of the auxiliary 2 actuator (LMV5x only).
Aux3 Act: Displays the position of the auxiliary 3 actuator (LMV5x only).
VSD Output: Displays the speed of the VSD from 0-100%.
Shell Temp: Displays the current boiler shell temperature.
Fuel In Use: Displays the current fuel being used (GAS or OIL).
Actual SP: Displays the current setpoint of the boiler.
Local SP: Displays the local setpoint of the boiler.
Rem SP: Displays the remote setpoint of the boiler.
Actual: Displays the actual value of the boiler.
Startups: Displays the number of boiler startups on the selected fuel.
Hours: Displays the number of hours run on the selected fuel.
O2: Displays the current O2 percentage in the stack (LMV5x only).

Boiler Overview Screen (continued)

Flue Temp: Displays the current flue gas temperature (LMV5x only).
Ambient: Displays the current ambient temperature (LMV5x only).
Efficiency: Displays the current combustion efficiency (LMV5x only).

Pressing the title bar (**OVERVIEW**) allows the alternate overview screen to be displayed.
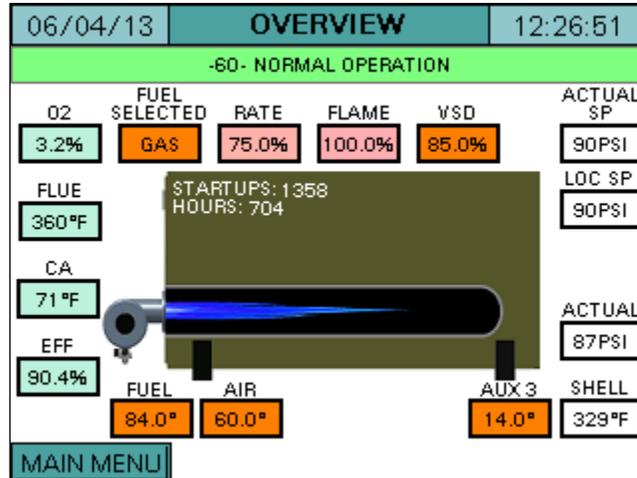
The screens may be toggled as desired and the last selected screen will remain in memory.

When finished, press **MAIN MENU** to return to the home screen.

Automatic / Manual Operation

Access level: **USER**

The HAND-OFF-AUTO mode of the boiler may be set at any time. From the MAIN MENU screen, press **REMOTE CONTROL**. The REMOTE CONTROL screen will appear.
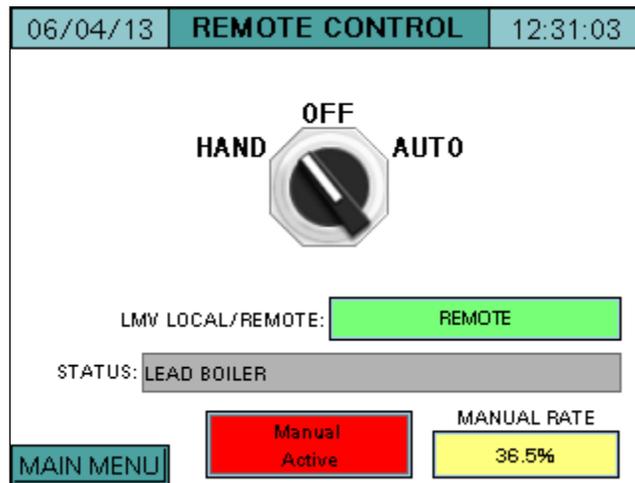
HAND-OFF-AUTO – Sets the mode of the boiler to manually on, manually off, or automatic.
- **HAND:** The boiler is commanded to run in manual mode. If set to "Manual Inactive", the LMV LOCAL/REMOTE setting is LOCAL and the boiler operates off of the local setpoint. If set to "Manual Active", the LMV LOCAL/REMOTE setting changes to REMOTE and the boiler will go to the firing rate set in the MANUAL RATE box.
- **OFF:** The boiler is commanded to remain off. The LMV LOCAL/REMOTE setting will automatically change to REMOTE. The manual mode selection will be forced to "Manual Inactive".
- **AUTO:** The boiler is commanded to operate off of the remote setpoint of the touchscreen (for standalone boilers) or off of the settings of the Lead/Lag Master (for lead-lag systems). The LMV LOCAL/REMOTE setting is REMOTE. If communication is lost between the touchscreen and the LMV controller, the LMV LOCAL/REMOTE setting will switch to LOCAL and the boiler will operate off of the local setpoint.

LMV LOCAL/REMOTE – Displays the mode of the LMV controller.
- **LOCAL:** The boiler is commanded to run in local mode using the local setpoint.
- **REMOTE:** The boiler is commanded to run in remote mode using a remote setpoint or a remote firing rate.

Automatic / Manual Operation (continued)

STATUS – Displays the status of the boiler (only appears if connected to a Lead/Lag Master). The status message shown with lead/lag systems indicates the available status of the boiler. The boiler must be in AUTO and not be in lockout in order to be available. If the boiler is available it may be designated as a lead or lag boiler.

- **LEAD BOILER:** The boiler is currently the lead boiler.
- **FORMER LEAD – CHANGEOVER IN PROGRESS:** The boiler is transitioning from a lead boiler to a lag boiler.
- **LAG 1/2/3 BOILER:** The boiler is currently the first, second, or third lag boiler.
- **LAG 1/2/3 BOILER – STANDBY ACTIVE:** The boiler is currently the first, second, or third lag boiler and is in warm standby mode.
- **BOILER NOT AVAILABLE:** The boiler is not available due to one of the following reasons (boiler control switch is off, boiler is not in automatic mode, boiler is in lockout, or boiler with LMV5x controller is not set for "IntLC Bus" or "ExtLC Bus").
- **COMM FAULT – LOCAL OPERATION:** The touchscreen has lost communication with the Lead/Lag Master and is currently running in local mode operating on the local setpoint.

MANUAL ACTIVE/INACTIVE – Used to either enable or disable a manual firing rate of the boiler.

- **MANUAL INACTIVE:** The boiler will respect the current setpoint of the boiler.
- **MANUAL ACTIVE:** When in HAND mode, the boiler will operate at the firing rate set in the MANUAL RATE box.

MANUAL RATE: Sets the firing rate when the touchscreen is in HAND mode and MANUAL ACTIVE is selected. This rate has priority over any setpoint control.

When finished, press **MAIN MENU** to return to the home screen.

Alarms

Access level: **USER**

Alarms are displayed on a dedicated alarm screen. The last 250 alarms are stored in memory and time stamped. When an alarm is present, a link to the alarm screen will flash in the lower-right corner of the OVERVIEW screen. Otherwise, this screen may be accessed from the main menu.

To access the alarm screen from the main menu, press **ALARMS**. The ALARMS screen will appear.

The ALARMS screen lists current alarms as well as older alarms. The color of the alarm indicates the category of the alarm.

Red – LMV lockouts. The text flashes when the alarm is currently active.
Orange – LMV faults.
Yellow/Green – Communication faults. The background is yellow when the alarm is currently active and green when communication is present.
Blue – All other alarms such as analog alarms, pump alarms, and expanded annunciator alarms. The text flashes when the alarm is currently active.

Information about the most recent 250 alarms will be displayed with the following information:

No. – Number of the alarm in the list (1 is most recent).
Date – Displays the date that the alarm occurred.
Active – Displays the time when the alarm became active.
Cleared – Displays the time when the alarm was cleared.

Alarms (continued)

The icons at the top of the screen may be used to navigate through the list of alarms:

Move up one alarm on list.

Move down one alarm on list.

Navigate up one page on list.

Navigate down one page on list.

From the ALARMS screen, press **LOCKOUTS** to access the lockout history (only appears for LMV5x controllers). The 9 most recent lockouts are displayed (lockout 0 is the most recent).

Press the left and right arrows at the bottom of the screen to toggle between lockouts. The following information is displayed on the screen for each lockout:

LOCKOUT CODE – Displays the LMV5x error code.
DESCRIPTION – Lists a description of the lockout in a horizontal bar at the top of the screen.
CURRENT DIAGNOSTIC CODE – Displays the LMV5x diagnostic code.
CURRENT ERROR CLASS – Not used.
ERROR PHASE – Displays what phase the LMV5x was in when the lockout occurred.
DATE – Displays the date when the lockout occurred.
TIME – Displays the time when the lockout occurred.
FUEL – Displays the fuel being used when the lockout occurred.
OUTPUT – Displays the firing rate when the lockout occurred.
START COUNTER TOTAL – Displays the start number when the lockout occurred.
HOURS RUN TIME TOTAL – Displays the total number of hours run before the lockout occurred.

Alarms (continued)

From the ALARMS screen, press **ERRORS** to access the fault history. The 21 most recent faults are displayed on an LMV5, and the 25 most recent faults are displayed on an LMV3 (fault 0 is the most recent).

Press the left and right arrows at the bottom of the page to toggle between faults. The following information is displayed on the screen for each fault:

ERROR CODE – Displays the LMV error code.
DESCRIPTION – Lists a description of the lockout in a horizontal bar at the top of the screen.
CURRENT DIAGNOSTIC CODE – Displays the LMV diagnostic code.
CURRENT ERROR CLASS – Not used.
ERROR PHASE – Displays what phase the LMV was in when the fault occurred.
FUEL – Displays the fuel being used when the fault occurred.
OUTPUT – Displays the firing rate when the fault occurred.
START COUNTER TOTAL – Displays the start number when the fault occurred.

From the ALARMS screen, press the **RESET** button to clear expanded annunciator alarms designated as manual reset. This button has no effect on LMV alarms.

From the ALARMS screen, press **USB** to save the alarm log externally to a USB drive.

NOTE: If a boiler circulating pump is installed, an alarm is generated when feedback is not received within 20 seconds of the pump being commanded on. If this alarm appears, it must be reset using the **RESET** button. If connected to a Lead/Lag Master, this alarm is cleared from the ALARMS screen on the Lead/Lag Master. The alarm will also automatically clear if pump feedback is received while an alarm is present.

Input and Outputs

Access level: **USER**

The status of the LMV3x or LMV5x inputs and outputs may be viewed at any time. From the MAIN MENU screen, press **IN/OUT DETAIL**. The INPUT DETAIL screen will appear.

All inputs that are currently energized will display as ON with a bright green background. All inputs that are currently de-energized will display as OFF with a dull green background. To view the OUTPUT DETAIL screen, press **OUTPUTS**. The OUTPUT DETAIL screen will appear.

When the LMV3x or LMV5x controller is in alarm, the ALARM output will flash bright red. When the controller is not in alarm, the alarm output will be a dull red background. All other outputs that are currently energized will display as ON with a bright green background. All other outputs that are currently de-energized will display as OFF with a dull green background. To view the INPUT DETAIL screen again, press **INPUTS**. Otherwise, press **MAIN MENU**.

Fuel Statistics

Access level: **USER**

Both the LMV3x and LMV5x controllers keep track of certain fuel statistics. From the MAIN MENU screen, press **FUEL STATISTICS**. The FUEL STATISTICS screen will pop up.

MIN OUTPUT GAS/OIL – Displays the minimum allowable load output programmed in the LMV3x or LMV5x controller.

MAX OUTPUT GAS/OIL – Displays the maximum allowable load output programmed in the LMV3x or LMV5x controller.

HOURS RUN GAS/OIL – Displays the number of hours that the LMV3x or LMV5x controller has run on gas or oil.

STARTUPS GAS/OIL – Displays the number of startups that the LMV3x or LMV5x controller has had on gas or oil.

TOTALIZED GAS/OIL – Displays the totalized volume of gas (in cubic feet) or oil (in gallons) that has been used.

CURRENT FLOW – Displays the current flow rate of gas or oil (only appears if the current flow rate is greater than 0).

When finished, press **MAIN MENU** to return to the home screen.

LMV Controller Data

Access level: **USER**

The static details of the LMV controller may be viewed at any time. From the main menu, press **LMV DATA**.

(1)	(2)

One of the two screens shown above will appear depending on the controller that the touchscreen is connected to:

Screen 1 – Appears if the touchscreen is connected to an LMV3x controller.
Screen 2 – Appears if the touchscreen is connected to an LMV5x controller.

LMV CONTROL TYPE (ASN) – Displays the model number of the LMV controller.
LMV PARAMETER SET CODE – Displays the parameter set code of the LMV controller.
LMV PARAMETER SET VERSION – Displays the parameter set version of the LMV controller.
LMV CONTROL ID DATE – Displays the date of manufacture of the LMV controller (MM.DD.YY).
LMV CONTROL ID NUMBER – Displays the unit ID number of the LMV controller.
LMV BURNER SOFTWARE VERSION – Displays the software version of the LMV controller.
LMV LOAD CONTROL SW VERSION – Displays the load controller software version (LMV5x only).
LMV IDENTIFICATION – Displays the burner ID of the LMV controller.
AZL5 CONTROL TYPE (ASN) – Displays the model number of the AZL display (LMV5x only).
AZL5 PARAMETER SET CODE – Displays the parameter set code of the AZL display (LMV5x only).
AZL5 PARAMETER SET VERSION – Displays the parameter set version of the AZL display (LMV5x only).
AZL5 SOFTWARE VERSION – Displays the software version of the AZL display (LMV5x only).
AZL5 IDENTIFICATION NUMBER – Displays the unit ID number for the AZL display (LMV5x only).
AZL5 CONTROL ID DATE – Displays the date of manufacture of the AZL display (MM.DD.YY) (LMV5x only).

When finished, press **MAIN MENU** to return to the home screen.

Feedwater and Warm Standby

Access level: **TECH**

Feedwater and warm standby are covered on the same screen. Depending on the configuration settings of the touchscreen, the main menu will have one of the four options displayed below:
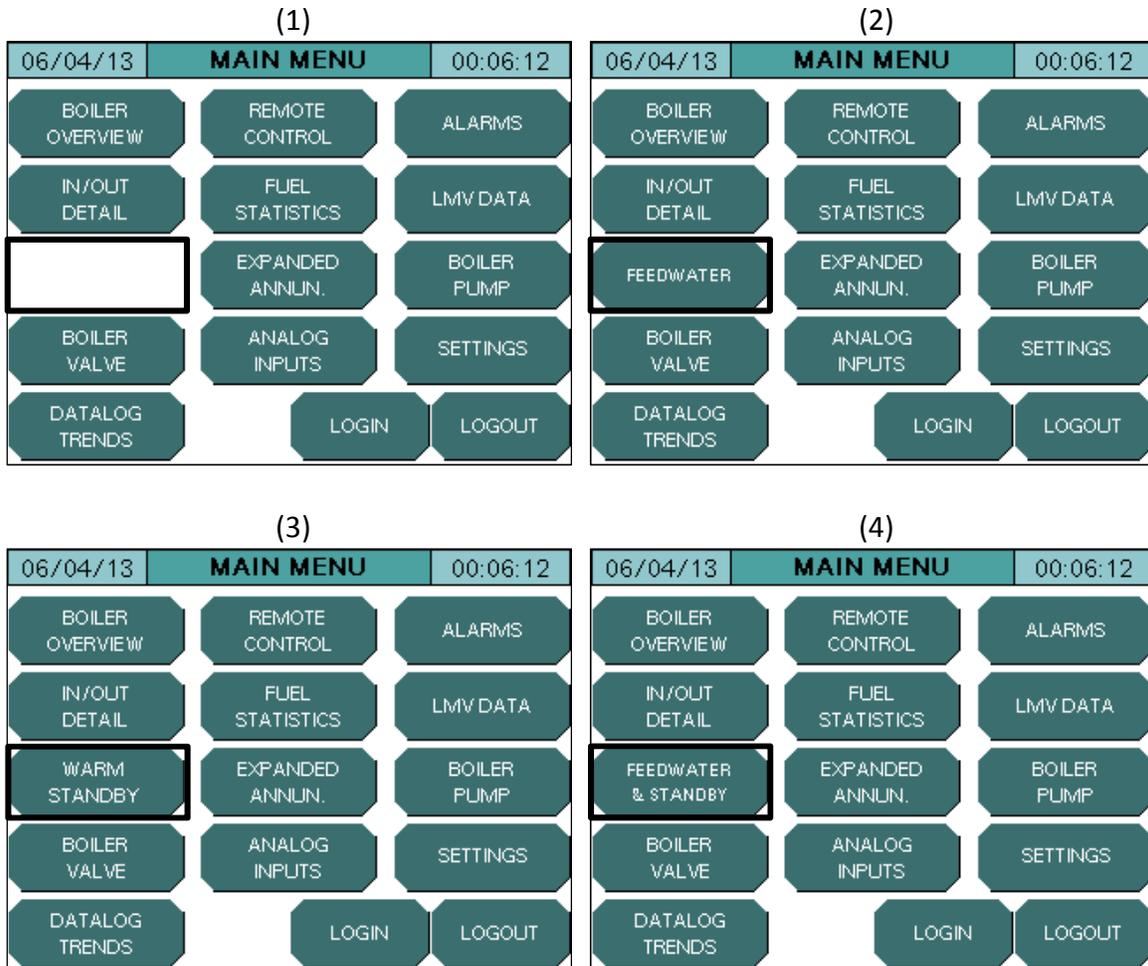
Screen 1 – Nothing will display for hydronic boilers or steam boilers with warm standby and feedwater control disabled.
Screen 2 – FEEDWATER screen is available for steam boilers with feedwater control enabled and warm standby disabled.
Screen 3 – WARM STANDBY screen is available for steam boilers with warm standby enabled and feedwater control disabled.
Screen 4 – FEEDWATER & STANDBY screen is available for steam boilers with both feedwater control and warm standby enabled.

Feedwater and Warm Standby (continued)

To access the feedwater and / or warm standby screen, press **FEEDWATER** / **WARM STANDBY** / **FEEDWATER & STANDBY** from the main menu. One of the following three screens will appear:
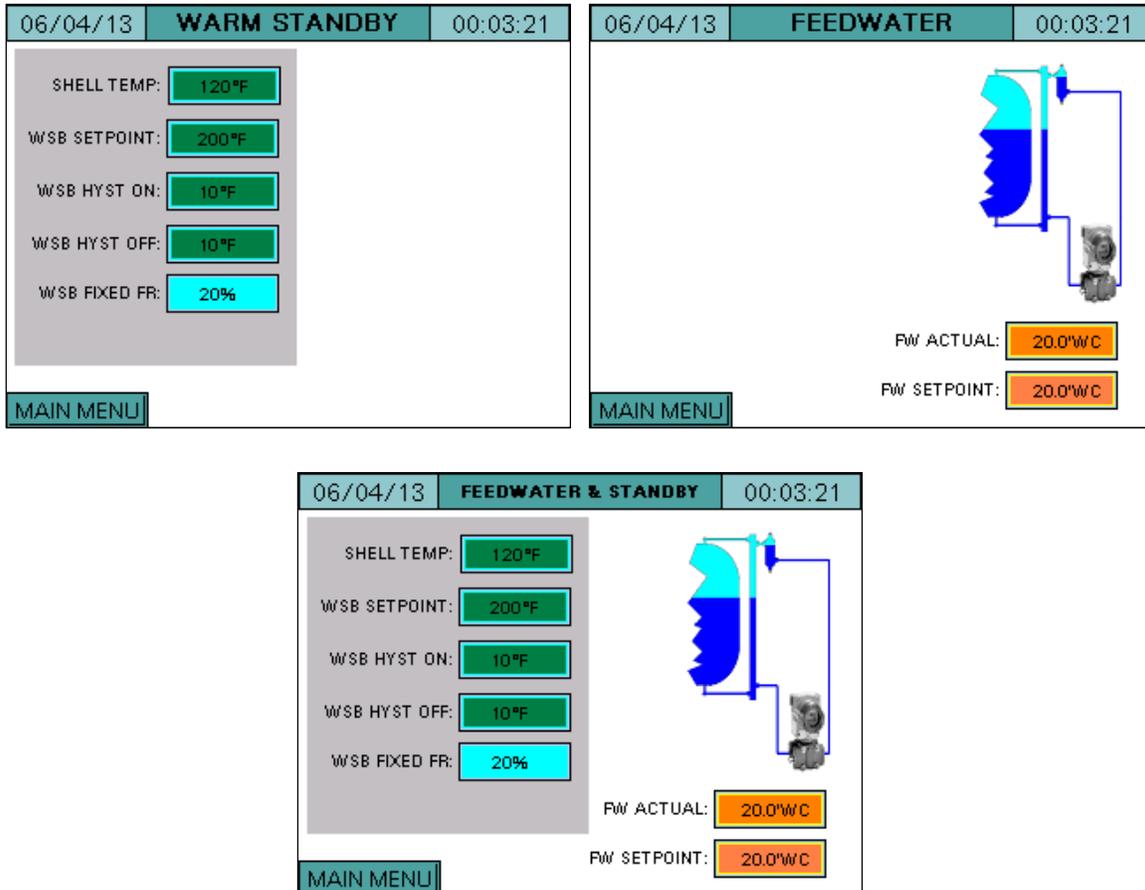
SHELL TEMP – Displays the boiler shell temperature on steam boilers. This is the temperature used for warm standby operation.

WSB SETPOINT – Sets the warm standby setpoint for steam boilers.

WSB HYST ON – Sets the temperature for enabling warm standby on steam boilers. This number is added to or subtracted from the warm standby setpoint. For example, if this parameter is set to -10°F with a setpoint of 120°F, warm standby is enabled at 110°F.

WSB HYST OFF – Sets the temperature for disabling warm standby on steam boilers. This number is added to or subtracted from the warm standby setpoint. For example, if this parameter is set to 10°F with a setpoint of 120°F, warm standby is disabled at 130°F.

Feedwater and Warm Standby (continued)

WSB FIXED FR – Sets the firing rate to be applied when the boiler is in warm standby mode based on shell temperature.

FW ACTUAL – Displays the current water level of the boiler.

FW SETPOINT – Displays the setpoint for the water level of the boiler.

Expanded Annunciator

Access level: **USER**

The limits programmed for annunciation can be viewed on the EXP. ANNUNCIATION screen.
This option only appears if the Expanded Annunciation package is equipped and configured. To
access this screen from the main menu, press **EXPANDED ANNUN**.

All of the limits configured for annunciation will be displayed in a "first-out" manner. Any limits
that are made will display as ON with a bright green background. Any limits that are not made
will show as OFF with a red background. The first limit displayed as OFF should be checked
when troubleshooting an inoperative boiler.

To change any of the configuration settings for the annunciation, go to the EXP. ANN. CONFIG
screen accessed through the SETTINGS menu.

When finished, press **MAIN MENU** to return to the home screen.

Boiler Circulating Pump

Access level: **USER / TECH / SETUP**

For standalone hydronic systems or lead/lag systems, a boiler pump can be enabled or disabled from the touchscreen as long as the Expanded Annunciation package is equipped. The pump option can be enabled from the UNIT TYPE screen found in the SETTINGS menu. To access the BOILER PUMP screen, press **BOILER PUMP** from the main menu. This screen can be accessed from the USER level, but settings may only be changed from the TECH or SETUP levels.
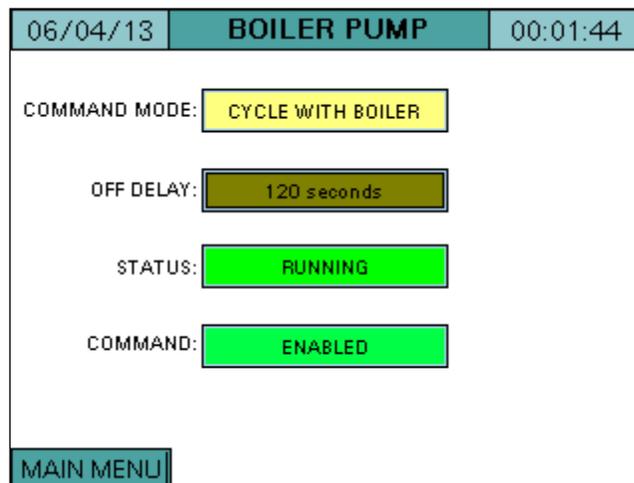
COMMAND MODE – The command mode is the method of pump control used when in standalone mode or when connected to a Lead/Lag Master that is in a fault mode. When connected to a Lead/Lag Master in normal operation, the pump is controlled by the Lead/Lag Master. Setting may only be changed at the SETUP access level.
- **CYCLE WITH BOILER:** The pump will be commanded on when the boiler is commanded on. The pump will remain on after the boiler command is removed for the duration of the off delay period.
- **CONTINUOUS RUN:** The pump will be commanded on as long as the HAND-OFF-AUTO switch is not in OFF on the REMOTE OPERATION screen.

OFF DELAY – Sets the amount of time that the pump stays on after the boiler turns off when the pump is set to mode "CYCLE WITH BOILER". Setting may be changed at TECH access level.

STATUS – The status of the pump is displayed.
- **RUNNING:** The pump is currently on.
- **IDLE:** The pump is currently off because it is commanded to be off.
- **ALARM:** The pump is currently off because it is in alarm.

COMMAND – Displays whether or not the pump is currently being commanded on.
- **ENABLED:** The pump is being commanded on.
- **DISABLED:** The pump is being commanded off.

Boiler Return Temperature Valve

Access level: **USER / TECH**

For standalone hydronic systems, a boiler return temperature valve may be controlled through the touchscreen as long as the Expanded Annunciation package is equipped. The valve option can be enabled from the UNIT TYPE screen found in the SETTINGS menu. To access the BOILER VALVE screen, press **BOILER VALVE** from the main menu. This screen can be accessed from the USER level for viewing purposes, but TECH access level is required to change any of the settings.

P-GAIN – Sets the proportional gain for temperature control. Higher settings for the proportional gain cause a faster system response. The range of this setting is 0-999.

I-TIME – Sets the time of the integral component for temperature control. The integral component corrects for steady state error between the setpoint and actual temperature. Shorter times are more aggressive. A setting of zero eliminates the integral component. The range of this setting is 0-999.

D-TIME – Sets the time of the derivative component for temperature control. The derivative component corrects for the rate of increase/decrease of the actual temperature. Longer times are more aggressive. A setting of zero eliminates the derivative component. The range of this setting is 0-9999.

MIN – Sets the minimum allowable position of the return temperature valve.

MAX – Sets the maximum allowable position of the return temperature valve.

VALVE RETURN -   Displays the current position of the return temperature valve from 0-100%.

VALVE SETPOINT – Sets the desired setpoint for the temperature of the boiler return water.

Boiler Return Temperature Valve (continued)

RETURN TEMPERATURE – Displays the current temperature of the boiler return water. If this value is reading incorrectly, a temperature offset can be applied through the SETTINGS menu. See Initial Configuration for more information.

OUTPUT – Sets the behavior of the output to the return temperature valve.
- **NORMAL:** Sends 4mA when the valve should be diverting all water away from the boiler and 20mA when the valve should be diverting all water back to the boiler.
- **REVERSE:** Sends 20mA when the valve should be diverting all water away from the boiler and 4mA when the valve should be diverting all water back to the boiler.

Analog Inputs

Access level: **USER**

The values of the configured analog inputs and RTD inputs can be viewed on the ANALOG INPUTS screen. This option only appears if the Expanded Annunciation package is equipped and configured. To access this screen from the main menu, press **ANALOG INPUTS**.
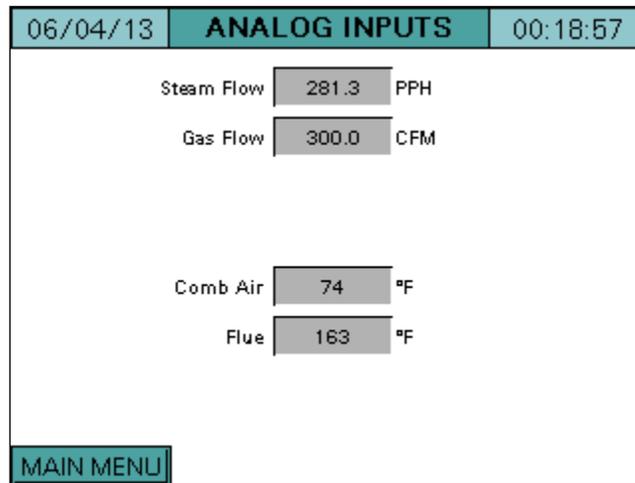
All of the configured analog inputs and RTD inputs will be displayed. These values will update in real-time on the screen. Analog inputs are displayed on the top half of the screen, and RTD inputs are displayed on the bottom half of the screen.

To change any of the configuration settings for the analog or RTD inputs, go to the ANA. IN CONFIG screen accessed through the SETTINGS menu.

When finished, press **MAIN MENU** to return to the home screen.

Load Controller Settings

Access level: **USER / TECH**

The settings of the load controller can be viewed or configured from the SETTINGS screen. These settings can be viewed with USER level access or changed with TECH level access. To access the SETTINGS screen from the main menu, press **SETTINGS**.

(1)   (2)

(3)   (4)
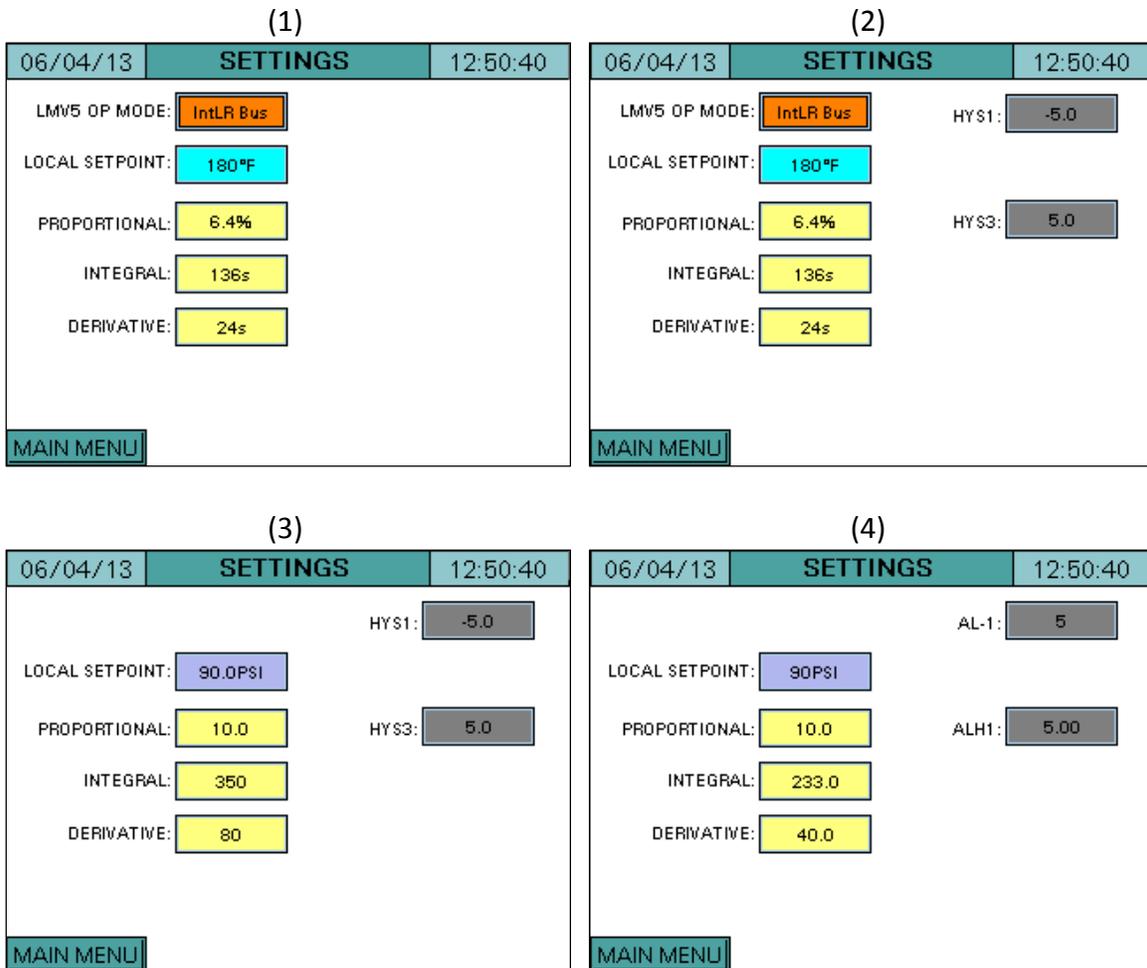
One of the four screens shown above will appear depending on the controller(s) being used:

Screen 1 – Appears for systems with just an LMV5x controller.
Screen 2 – Appears for systems with an LMV5x controller and an RWF40/55 load controller.
Screen 3 – Appears for systems with an LMV3x controller and an RWF40/55 load controller.
Screen 4 – Appears for systems with an LMV3x controller and an RWF10 load controller.

Load Controller Settings (continued)

LMV5 OP MODE – Displays the LMV5x load controller operating mode (LMV5x only).

LOCAL SETPOINT – Sets the local setpoint of the boiler. This parameter may be limited by "Ext MinSetpoint" and "Ext MaxSetpoint" on an LMV5x controller.

PROPORTIONAL – Sets the proportional band of the load controller. A proportional band of 10 means that the firing rate of the boiler will be 100% when the actual value is 10 below the setpoint. On the LMV5x, the proportional band is a percentage of 14.5 PSI (for steam boilers) or 212°F (for hydronic boilers). On an RWF10, RWF40, or RWF55 load controller, the proportional band is an absolute number.

INTEGRAL – Sets the time of the integral component of the load controller. The integral component corrects for steady state error between the setpoint and actual value. Shorter times are more aggressive. A setting of zero eliminates the integral component.

DERIVATIVE – Sets the time of the derivative component of the load controller. The derivative component corrects for the rate of increase/decrease of the actual value. Longer times are more aggressive. A setting of zero eliminates the derivative component and typically works well on boilers.

HYS1 – Sets the burner on point for RWF40 and RWF55 load controllers. For example, a value of -5 means the burner will turn on when the actual value is 5 below setpoint.

HYS3 – Sets the burner off point for RWF40 and RWF55 load controllers. For example, a value of 5 means the burner will turn off when the actual value is 5 above setpoint.

AL-1 – Sets the burner on point for an RWF10 load controller. For example, a value of 5 means the burner will turn on 5 below setpoint.

ALH1 – Sets the burner off point for an RWF10 load controller. This setting behaves differently for steam and hydronic boilers. For steam boilers, the span of the pressure transducer affects this setting. For example, if the span of the pressure transducer is 0-60 PSI, a value of 10 for ALH1 means the burner will turn off when the actual value is 6 (60*10%) above the burner on point. For hydronic boilers, a value of 10 means the burner will turn off when the actual value is 10 above the burner on point.

Parameter Backup

Access level: **SETUP**

The configuration settings of the expanded annunciator package may be backed up to a USB drive or the touchscreen itself for archiving or migration to other touchscreen kits. This can only be done if the Expanded Annunciation package is equipped. A formatted USB drive is sent with each touchscreen kit.

Login at the SETUP level and press **SETTINGS**. At the bottom of the page, press **COPY**. The COPY CONFIG screen will appear.
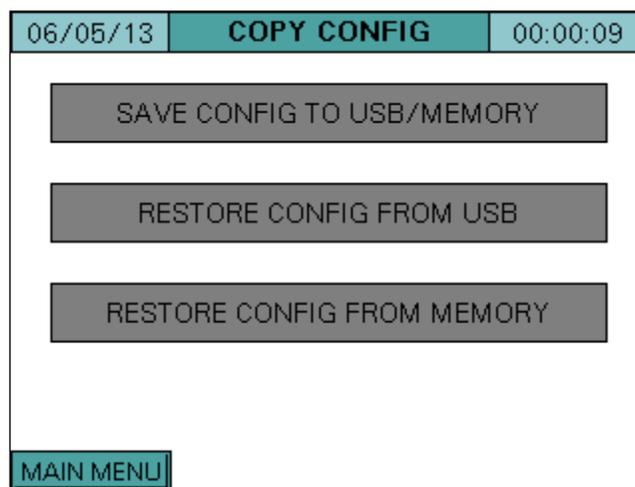
To save a copy of the configuration settings to both a USB drive and the touchscreen memory, press **SAVE CONFIG TO USB/MEMORY**. Text will appear that says "WORKING(30s)…". After approximately 30 seconds, the text will disappear, indicating that the save process has completed. If no USB drive is connected, the settings will only be saved to the touchscreen memory.

To restore a set of configuration settings from a USB drive, press **RESTORE CONFIG FROM USB**. Text will appear that says "WORKING(30s)…". After approximately 30 seconds, the text will disappear, indicating that the restore process has completed. If no USB drive is connected, pressing **RESTORE CONFIG FROM USB** will have no effect.

To restore a set of configuration settings from the touchscreen memory, press **RESTORE CONFIG FROM MEMORY**. Text will appear that says "WORKING(15s)…". After approximately 15 seconds, the text will disappear, indicating that the restore process has completed. If no configuration settings have previously been stored in the touchscreen memory, pressing **RESTORE CONFIG FROM MEMORY** will set the configuration settings back to their default settings.

Datalogging and Trending

Access level: **USER / TECH**

The touchscreen kit may be used to log up to eight different user-selectable values. The log is captured on a USB drive and is stored in a standard format readable with any text or spreadsheet editor. Each entry includes a date and time stamp. A new log file is created daily or anytime the power is cycled, so the maximum capacity of the log is only limited by the size of the USB drive connected.

To access the datalogging screen, login at the TECH access level and press **DATALOG TRENDS** from the main menu.

The following values may be chosen to be logged:
- **Not Used** – No data will be logged.
- **LMV Phase –** Logs the phase of the LMV controller.
- **LMV Fuel Actuator –** Logs the position of the LMV fuel actuator (gas or oil).
- **LMV Air Actuator –** Logs the position of the LMV air actuator.
- **LMV Aux1 Actuator –** Logs the position of the LMV aux1 actuator (LMV5x only).
- **LMV Aux2 Actuator –** Logs the position of the LMV aux2 actuator (LMV5x only).
- **LMV Aux3 Actuator –** Logs the position of the LMV aux3 actuator (LMV5x only).
- **LMV VSD Speed –** Logs the speed of the VSD.
- **LMV Fuel Type –** Lows the type of fuel being used (gas or oil).
- **LMV Output –** Lows the firing rate of the boiler.
- **LMV Current SP –** Logs the current setpoint of the boiler.
- **LMV Actual –** Logs the current temperature or pressure of the boiler.
- **LMV Flame Signal –** Logs the flame signal detected by the flame scanner.
- **LMV O2 Value –** Logs the percent O2 in the stack (LMV5x only.
- **LMV Supply Air Temp –** Logs the supply air temperature (LMV5x only).

Datalogging and Trending (continued)

- **LMV Flue Gas Temp –** Logs the flue gas temperature in the stack (LMV5x only).
- **LMV Combustion Eff –** Logs the combustion efficiency of the boiler (LMV5x only).
- **LMV Local SP –** Logs the local setpoint of the LMV controller.
- **LMV Remote SP –** Logs the remote setpoint being read by the LMV controller.
- **RWF Actual –** Logs the actual temperature or pressure being read by an RWF controller being used for load control.
- **RWF Current SP –** Logs the current setpoint of an RWF controller used for load control.
- **RWF Local SP –** Logs the local setpoint of an RWF controller used for load control.
- **RWF Remote SP –** Logs the remote setpoint of an RWF controller used for load control.
- **FW Actual –** Logs the water level being read by an RWF controller.
- **FW Current SP –** Logs the setpoint of the water level on an RWF controller.
- **RWF Local SP –** Logs the local setpoint of the water level on an RWF controller.
- **EA Temp Out –** Logs the shell temperature (steam boilers) or the return valve temperature (hydronic boilers).
- **EA Analog In 1 –** Displays the value being read by analog input 1 on the Expanded Annunciation package.
- **EA Analog In 2 –** Displays the value being read by analog input 2 on the Expanded Annunciation package.
- **EA Analog In 3 –** Displays the value being read by analog input 3 on the Expanded Annunciation package.
- **EA Analog In 4 –** Displays the value being read by analog input 4 on the Expanded Annunciation package.
- **EA Valve Output –** Displays the position of the return temperature valve.
- **EA RTD In 1 –** Displays the value being read by RTD input 1 on the Expanded Annunciation package.
- **EA RTD In 2 –** Displays the value being read by RTD input 2 on the Expanded Annunciation package.
- **EA RTD In 3 –** Displays the value being read by RTD input 3 on the Expanded Annunciation package.

The time between each point is logged may be chosen by changing the setting of **TIME BASE**. The options for this setting are 10s, 20s, 30s, 1m, 2m, 5m, 10m, 15m, 30m, or 60m.

Pressing **RESET** at any time will set all 8 data log values back to "Not Used".

Once the datalog values and time base are selected, insert a USB drive and press **START LOG** to begin datalogging. All of the values selected will be stored in a spreadsheet. To stop datalogging, press **STOP LOG**. The USB drive may be removed once the datalogging is complete.

Datalogging and Trending (continued)

In addition to saving datalogs to a USB drive, trends of the eight values selected may be viewed at any time on the touchscreen. Four trend graphs are available, and each can log up to two values from the list. To view trends, press **TRENDS** (USER access level) or **DATALOG TRENDS** (TECH or SETUP access level) to access the DATALOG screen.
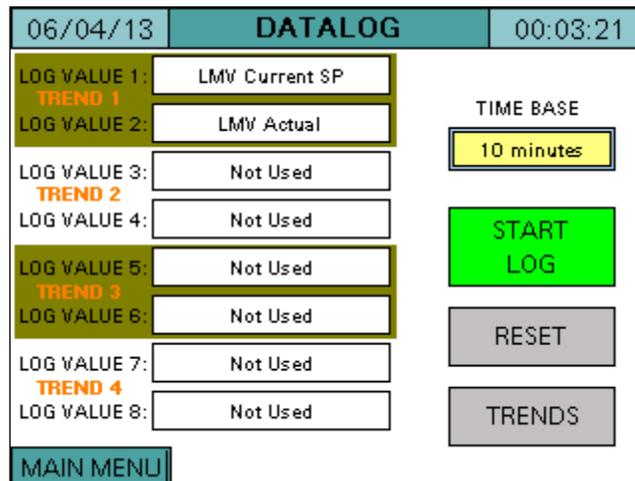
To view the trends of the values selected, press **TRENDS**.
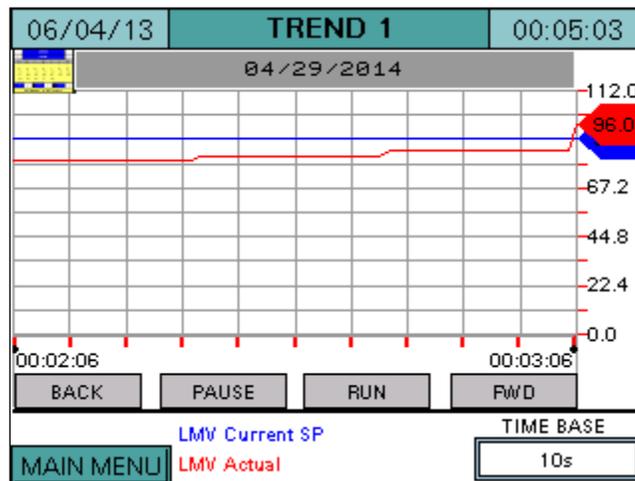
If no values are chosen for a particular trend, that trend will not operate. Each trend will record at a user-selectable interval (10s, 20s, 30s, 1m, 2m, 5m, 10m, 15m, 30m or 60m). This can be set by toggling through the options in the **TIME BASE** setting. The most recent 60 data points will be recorded in the trend. To toggle between trends, press **PREV** or **NEXT** at the top of the page. Trending can be paused at any time by pressing **PAUSE**. To initiate trending again after pausing, press **RUN**. To scroll backwards or forwards through the trend graph, press **BACK** or **FWD.**

Datalogging and Trending (continued)

To access the datalog file, plug the USB drive provided with the touchscreen kit into a computer. Open the contents of the drive on the computer.

A Microsoft Excel datalog graphing utility (SCC Datalog Tool.xltm) is included on the USB drive. Macros must be enabled for this utility to operate. Open the SCC Datalog Tool and the following spreadsheet will appear.
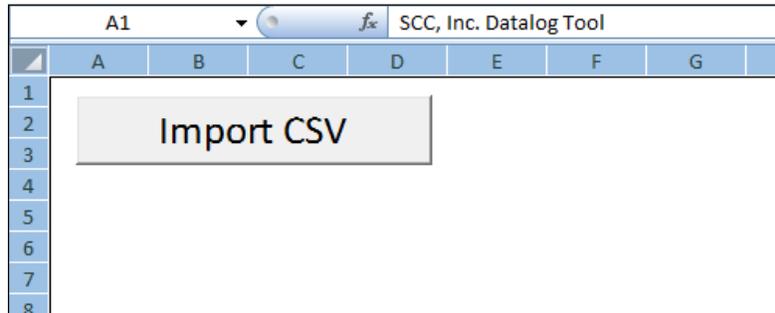
Click **Import CSV** and then navigate to the appropriate .csv file saved on the USB drive. If it is a valid log file, the data will be imported and graphed. Otherwise, an error message is displayed.
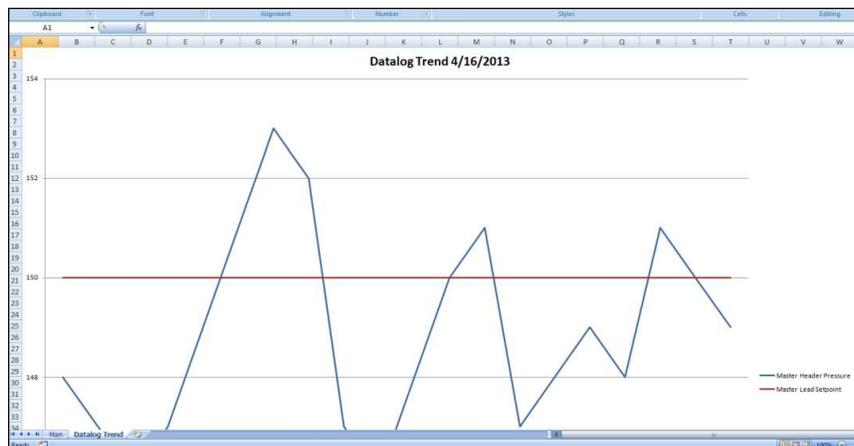
Each variable will be graphed using a different color. To turn a particular variable on or off, click on the **Main** tab in the lower left corner of the screen.

Datalogging and Trending (continued)
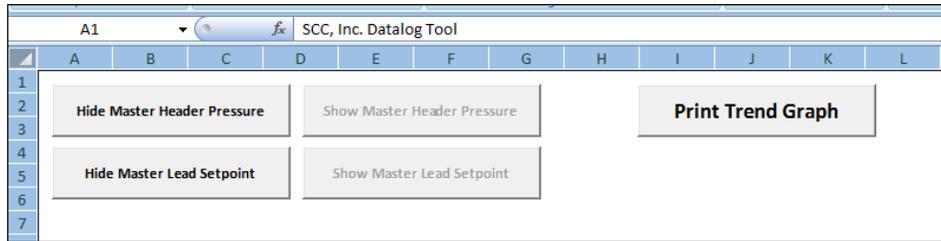
Press **Hide...** to hide a variable or **Show...** to show a variable that has been hidden. The utility may be run multiple times to print or save the graphs as desired.

To print the datalog, press **Print Trend Graph** and follow the standard prompts.

Screen Captures

The current screen image may be copied to a USB drive. Any screen with the exception of the main menu may be captured.

To perform a screen capture, plug in a USB drive. Press and hold the **MAIN MENU** button until the screen displays "SNAPSHOT SAVED TO USB".

If there is no USB plugged in or an error while trying to save the snapshot, a message will display saying "SNAPSHOT SAVE ERROR".

There is no limit to the number of screen captures that may be saved to the USB drive other than the capacity of the USB drive itself.

Changing Passwords

Access level: **SETUP**

By default, the TECH access level password is 9876 and the SETUP access level password is START. These default passwords may be changed at any time. To change passwords, press **LOGIN** from the main menu. Enter the appropriate information to log in at the SETUP access level and press **Apply**. The CURRENT USER will change to SETUP.

After that is done, press **Password Change.**

The SETUP password may be changed from this screen. Enter the new password twice and press **Apply** to make the change. To allow the TECH user access to change the TECH password, press **Allow Password Changes.**

Changing Passwords (continued)

If password changes have been allowed, the TECH user may now change their password by following the same procedure as described above for the SETUP user. To disallow the TECH user from changing the TECH password, press **Restrict Password Changes**.

Date and Time

Access level: **SETUP**

The date and time on the touchscreen is set a number of ways depending on the connected equipment.

If the touchscreen is connected to a Lead/Lag Master, the date and time on both the touchscreen and any connected LMV5x controllers are automatically set by the Lead/Lag Master.

On standalone touchscreens connected to an LMV5x controller, the date and time are read from the connected LMV5x controller.

On standalone touchscreens connected to an LMV3x controller, no date and time will be automatically set. In this case, the date and time must be manually set on the touchscreen. When the touchscreen kit first boots up, a button reading **Date/Time** appears to allow for quick manual setting of the date and time. Otherwise, the date and time may be set by using the following procedure.

Log in at the SETUP access level and press **SETTINGS** from the main menu. Press and hold the word SETTINGS at the top of the screen. This brings up the HMI system configuration page.
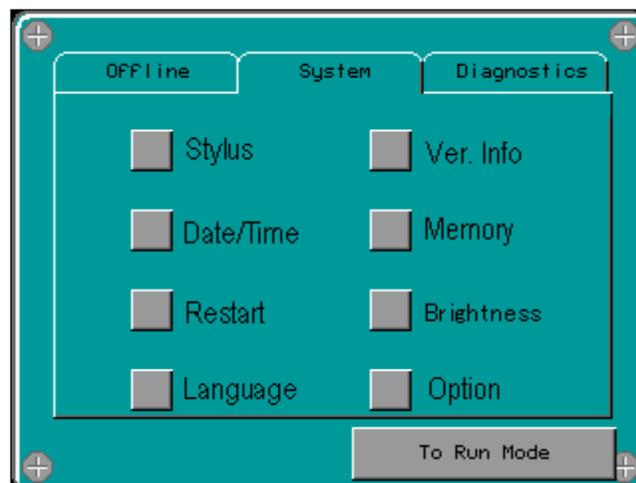
Select **Date/Time**.

Date and Time (continued)

This screen will allow the date and time to be changed. When complete, press **OK**. When returned to the HMI system configuration page, press **To Run Mode** to apply the changes and return back to the SETTINGS screen.

Note: The time may not be retained following an extended power loss.

Gateway/BMS - Modbus TCP/IP

The standard BMS interface offered is via Modbus TCP/IP. The standard port 502 is used for this connection. The connection to the BMS is via the Ethernet port on the touchscreen kit. **Note: This connection is not available when connected to a Lead/Lag Master Panel.**

If the local/remote mode of the LMV is set to remote, then a remote connection may be established. See "Automatic/Manual Operation" for more information. To establish a remote connection, set the desired remote mode:

- To enable setpoint control, set **40001** (LMV remote mode) to 0 (auto). This must be set at least once every 30 seconds to maintain remote control in any remote mode. Then, write the desired setpoint to **40002**.
- To enable firing rate control, set **40001** to 1 (on). Then, write the desired firing rate (scaled 0-1000) to **40003**.
- To disable the LMV, set **40001** to 2 (off).

Remote control may also be established with an RWF controller:

- To enable setpoint control, set **40004** (RWF remote mode) to 1 (setpoint control). This must be set at least once every 30 seconds to maintain remote control in any remote mode. Then write the desired setpoint to **40011** as a float (two registers).
- To enable firing rate control, set **40004** to 2 (full remote). Then write the desired firing rate as a float (two registers) to **40013**.
- To disable the RWF, set **40005** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

⚠️ **Warning:** If the LMV5 is in firing rate control mode, an external automatic reset temperature control must be present on the boiler since the internal load control thermostat function is not active in this mode. Also note that the integrated thermal shock features do not operate in this mode, so these features must be duplicated if needed.

Gateway/BMS - Modbus TCP/IP (continued)

Table 2: Address List for Modbus TCP/IP

Address	Bit	Type	Format	Description	Additional
40001		Read/Write	integer 16-bit (no sign)	LMV remote mode	0 = auto, 1 = on, 2 = off
40002		Read/Write	integer 16-bit (no sign)	LMV remote setpoint (W3) (remote mode auto)	
40003		Read/Write	integer 16-bit (no sign)	LMV remote output (remote mode on)	multiply by 10
40004		Read/Write	integer 16-bit (no sign)	RWF remote mode	0 = local, 1 = SP, 2 = FR
40005		Read/Write	integer 16-bit (no sign)	RWF remote disable	0 = enable, 1 = disable
40011		Read/Write	float 32-bit	RWF remote setpoint	
40013		Write	float 32-bit	RWF remote output	
40101		Read	integer 16-bit (no sign)	LMV phase	
40102		Read	integer 16-bit (no sign)	LMV position of currently active fuel actuator	divide by 10
40103		Read	integer 16-bit (no sign)	LMV position of gas actuator (LMV5...)	divide by 10
40104		Read	integer 16-bit (no sign)	LMV position of oil actuator (LMV5...)	divide by 10
40105		Read	integer 16-bit (no sign)	LMV position of air actuator	divide by 10
40106		Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 1 (LMV5...)	divide by 10
40107		Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 2 (LMV5...)	divide by 10
40108		Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 3 (LMV5...)	divide by 10
40109		Read	integer 16-bit (no sign)	LMV manipulated variable for VSD (LMV5...)	divide by 10
40110		Read	integer 16-bit (no sign)	LMV current type of fuel	0 = gas / fuel 0, 1 = oil / fuel 1
40111		Read	integer 16-bit (no sign)	LMV current output	divide by 10
40112		Read	integer 16-bit (no sign)	LMV current setpoint / temperature / pressure (LMV5...)	divide by 10 if unit is Bar
40113		Read	integer 16-bit (no sign)	LMV actual value / temperature / pressure (LMV5...)	divide by 10 if unit is Bar
40114		Read	integer 16-bit (no sign)	LMV flame signal	divide by 10
40115		Read	integer 16-bit (no sign)	LMV current fuel throughput (LMV5...)	
40116		Read	integer 16-bit (no sign)	LMV current O2 value (LMV52...)	divide by 10
40117		Read	integer 16-bit (no sign)	EA valve output	divide by 100
40118		Read	integer 16-bit (no sign)	EA configurable analog input 1	
40119		Read	integer 16-bit (no sign)	EA configurable analog input 2	
40120		Read	integer 16-bit (no sign)	EA configurable analog input 3	
40121		Read	integer 16-bit (no sign)	EA configurable analog input 4	
40122		Read	integer 16-bit (no sign)	LMV supply air temperature (LMV52...)	
40123		Read	integer 16-bit (no sign)	LMV flue gas temperature (LMV52...)	
40124		Read	integer 16-bit (no sign)	LMV combustion efficiency (LMV52...)	divide by 10
40127		Read	integer 16-bit (no sign)	LMV local setpoint W1 (LMV5...)	
40128		Read	integer 16-bit (no sign)	LMV local setpoint W2 (LMV5...)	
40129		Read	integer 16-bit (no sign)	LMV local/remote mode	0 = local, 1 = remote

Gateway/BMS - Modbus TCP/IP (continued)

Address	Bit	Type	Format	Description	Additional
40130		Read	integer 16-bit (no sign)	EA temperature output	
40131		Read	integer 16-bit (no sign)	Boiler available status	0 = not available, 1 = available
40132		Read	integer 16-bit (no sign)	Boiler circulating pump run status	0 = idle, 1 = running
40133		Read	integer 16-bit (no sign)	Boiler circulating pump timed alarm status	0 = no alarm, 1 = alarm
40135		Read	integer 16-bit (no sign)	LMV input bit status word	
40135	1	Read	bit of word	LMV controller on/off	0 = inactive, 1 = active
40135	2	Read	bit of word	LMV fan contactor contact (LMV5...)	0 = inactive, 1 = active
40135	3	Read	bit of word	LMV fuel selection oil (LMV5...)	0 = inactive, 1 = active
40135	4	Read	bit of word	LMV fuel selection gas (LMV5...)	0 = inactive, 1 = active
40135	6	Read	bit of word	LMV oil max pressure switch (LMV5...)	0 = inactive, 1 = active
40135	7	Read	bit of word	LMV oil min pressure switch (LMV5...)	0 = inactive, 1 = active
40135	8	Read	bit of word	LMV valve proving pressure switch (LMV5...)	0 = inactive, 1 = active
40135	9	Read	bit of word	LMV safety loop	0 = inactive, 1 = active
40135	11	Read	bit of word	LMV gas min pressure switch	0 = inactive, 1 = active
40135	12	Read	bit of word	LMV gas max pressure switch	0 = inactive, 1 = active
40135	14	Read	bit of word	LMV LP	0 = inactive, 1 = active
40135	15	Read	bit of word	LMV start release oil	0 = inactive, 1 = active
40135	16	Read	bit of word	LMV heavy oil immediate release	0 = inactive, 1 = active
40136		Read	integer 16-bit (no sign)	EA input bit status word	
40136	1	Read	bit of word	EA annunciation input 1	0 = inactive, 1 = active
40136	2	Read	bit of word	EA annunciation input 2	0 = inactive, 1 = active
40136	3	Read	bit of word	EA annunciation input 3	0 = inactive, 1 = active
40136	4	Read	bit of word	EA annunciation input 4	0 = inactive, 1 = active
40136	5	Read	bit of word	EA annunciation input 5	0 = inactive, 1 = active
40136	6	Read	bit of word	EA annunciation input 6	0 = inactive, 1 = active
40136	7	Read	bit of word	EA annunciation input 7	0 = inactive, 1 = active
40136	8	Read	bit of word	EA annunciation input 8	0 = inactive, 1 = active
40136	9	Read	bit of word	EA annunciation input 9	0 = inactive, 1 = active
40136	10	Read	bit of word	EA annunciation input 10	0 = inactive, 1 = active
40136	11	Read	bit of word	EA annunciation input 11	0 = inactive, 1 = active
40136	12	Read	bit of word	EA annunciation input 12	0 = inactive, 1 = active
40136	13	Read	bit of word	EA annunciation input 13	0 = inactive, 1 = active
40136	16	Read	bit of word	EA not optioned	0 = inactive, 1 = active
40137		Read	integer 16-bit (no sign)	LMV output bit status word	
40137	1	Read	bit of word	LMV alarm	0 = inactive, 1 = active

Gateway BMS – Modbus TCP/IP (continued)

Address	Bit	Type	Format	Description	Additional
40137	5	Read	bit of word	LMV ignition	0 = inactive, 1 = active
40137	6	Read	bit of word	LMV start signal / DW valve (LMV5...)	0 = inactive, 1 = active
40137	7	Read	bit of word	LMV fan	0 = inactive, 1 = active
40137	8	Read	bit of word	LMV oil pump / magnetic coupling (LMV5...)	0 = inactive, 1 = active
40137	9	Read	bit of word	LMV fuel valve SV oil (LMV5...)	0 = inactive, 1 = active
40137	10	Read	bit of word	LMV fuel valve V1 oil (LMV5...)	0 = inactive, 1 = active
40137	11	Read	bit of word	LMV fuel valve V2 oil (LMV5...)	0 = inactive, 1 = active
40137	12	Read	bit of word	LMV fuel valve V3 oil (LMV5...)	0 = inactive, 1 = active
40137	13	Read	bit of word	LMV fuel valve SV gas (LMV5...)	0 = inactive, 1 = active
40137	14	Read	bit of word	LMV fuel valve V1 (gas LMV5...)	0 = inactive, 1 = active
40137	15	Read	bit of word	LMV fuel valve V2 (gas LMV5...)	0 = inactive, 1 = active
40137	16	Read	bit of word	LMV fuel valve V3 (gas LMV5...)	0 = inactive, 1 = active
40138		Read	integer 16-bit (no sign)	RWF40 outputs and states bit status word	
40138	10	Read	bit of word	RWF40 management system thermostat override	0 = inactive, 1 = active
40139		Read	integer 16-bit (no sign)	RWF40 binary signal and hardware identification	
40139	4	Read	bit of word	RWF40 binary input 2 closed	0 = inactive, 1 = active
40139	5	Read	bit of word	RWF40 thermostat function active	0 = inactive, 1 = active
40139	8	Read	bit of word	RWF40 limit comparator active	0 = inactive, 1 = active
40139	9	Read	bit of word	RWF40 not optioned or RWF55	0 = inactive, 1 = active
40140		Read	integer 16-bit (no sign)	RWF40 feedwater bit status word	
40140	4	Read	bit of word	RWF40 feedwater binary input 2 closed	0 = inactive, 1 = active
40140	5	Read	bit of word	RWF40 feedwater high water	0 = inactive, 1 = active
40140	8	Read	bit of word	RWF40 feedwater low water	0 = inactive, 1 = active
40140	9	Read	bit of word	RWF40 feedwater not optioned or RWF55	0 = inactive, 1 = active
40141		Read	integer 16-bit (no sign)	EA configurable RTD input 1	
40142		Read	integer 16-bit (no sign)	EA configurable RTD input 2	
40143		Read	integer 16-bit (no sign)	EA configurable RTD input 3	
40147		Read	integer 16-bit (no sign)	LMV5... lockout history current error code	
40148		Read	integer 16-bit (no sign)	LMV5... lockout history current diagnostic code	
40149		Read	integer 16-bit (no sign)	LMV5... lockout history current error class	
40150		Read	integer 16-bit (no sign)	LMV5... lockout history current error phase	
40151		Read	integer 16-bit (no sign)	LMV5... lockout history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
40152		Read	integer 16-bit (no sign)	LMV5... lockout history current output	
40153		Read	integer 16-bit (no sign)	LMV5... lockout history current date - year	two digit
40154		Read	integer 16-bit (no sign)	LMV5... lockout history current date - month	

Gateway BMS – Modbus TCP/IP (continued)

Address	Bit	Type	Format	Description	Additional
40155		Read	integer 16-bit (no sign)	LMV5... lockout history current date - day	
40156		Read	integer 16-bit (no sign)	LMV5... lockout history current time - hours	
40157		Read	integer 16-bit (no sign)	LMV5... lockout history current time - minutes	
40158		Read	integer 16-bit (no sign)	LMV5... lockout history current time - seconds	
40159		Read	integer 32-bit (no sign)	LMV5... lockout history current startup counter total	
40161		Read	integer 32-bit (no sign)	LMV5... lockout history current hours run total	
40163		Read	integer 16-bit (no sign)	LMV5... error history current error code	
40164		Read	integer 16-bit (no sign)	LMV5... error history current diagnostic code	
40165		Read	integer 16-bit (no sign)	LMV5... error history current error class	
40166		Read	integer 16-bit (no sign)	LMV5... error history current error phase	
40167		Read	integer 16-bit (no sign)	LMV5... error history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
40168		Read	integer 16-bit (no sign)	LMV5... error history current output	
40169		Read	integer 32-bit (no sign)	LMV5... error history current startup counter total	
40171		Read	float 32-bit	RWF feedwater actual temperature / pressure (E1)	
40173		Read	float 32-bit	RWF feedwater actual (E2)	
40175		Read	float 32-bit	RWF feedwater current setpoint	
40177		Read	float 32-bit	RWF feedwater local setpoint (SP1)	
40179		Read	float 32-bit	RWF actual temperature / pressure (E1)	
40181		Read	float 32-bit	RWF actual (E2)	
40183		Read	float 32-bit	RWF actual temperature (E3)	
40185		Read	float 32-bit	RWF current setpoint	
40187		Read	float 32-bit	RWF local setpoint (SP1)	
40189		Read	float 32-bit	RWF local setpoint (SP2)	
40191		Read	integer 32-bit (no sign)	LMV startup counter total	
40193		Read	integer 32-bit (no sign)	LMV hours run total (LMV5...)	
40195		Read	integer 32-bit (no sign)	LMV fuel volume gas (LMV5...)	
40197		Read	integer 32-bit (no sign)	LMV fuel volume oil (LMV5...)	
40201		Read	integer 32-bit (no sign)	EA totalized analog input 1	divide by 10
40203		Read	integer 32-bit (no sign)	EA totalized analog input 2	divide by 10
40205		Read	integer 32-bit (no sign)	EA totalized analog input 3	divide by 10
40207		Read	integer 32-bit (no sign)	EA totalized analog input 4	divide by 10

Gateway BMS – Modbus TCP/IP (continued)

The default IP addresses for the touchscreen are listed below:

      Designated boiler 1 - 192.168.1.60
      Designated boiler 2 - 192.168.1.61
      Designated boiler 3 - 192.168.1.62
      Designated boiler 4 – 192.168.1.63
      Subnet - 255.255.255.0

These IP addresses may be changed only for Modbus TCP/IP communication. The IP addresses may not be changed when connecting to a Lead/Lag Master or when an optional gateway is being used to communicate via a protocol other than Modbus TCP/IP. Doing so will cause system communication errors.

To set a different IP address, log in at the SETUP access level and press **SETTINGS** from the main menu. Press and hold the word SETTINGS at the top of the screen. This brings up the HMI system configuration page.
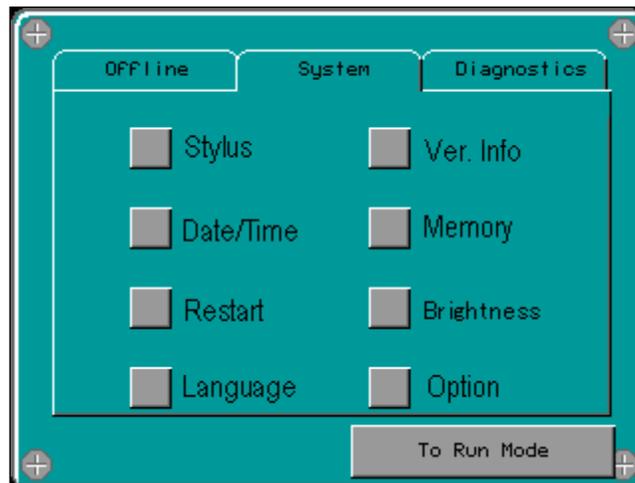
Gateway BMS – Modbus TCP/IP (continued)

Press the **Offline** tab at the top to navigate to the offline menu.
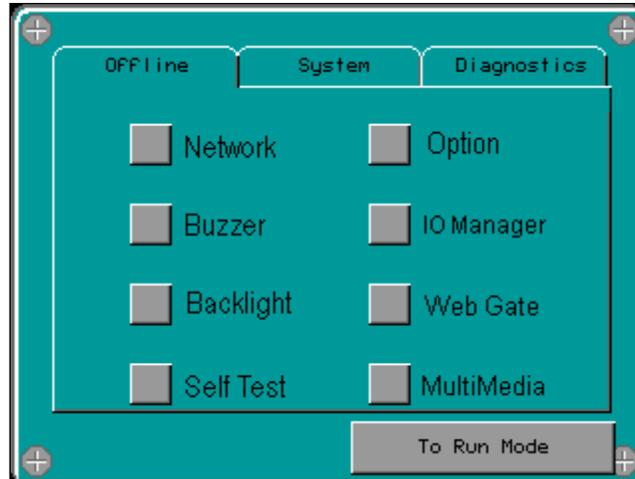
Press **Network**, then select **OK** when prompted to reboot. The touchscreen will then reboot into the network settings screen.

The network settings screen allows the IP address to be changed. When complete, press **OK**. When returned to the HMI system configuration page, press **To Run Mode** to apply the changes. Press **OK** when prompted to reboot the HMI with the new IP address settings.

Gateway/BMS - Optional Interfaces

Optional BMS interfaces other than Modbus TCP/IP are offered via an additional gateway. These optional interfaces include:

- Modbus RTU
- BACnet/IP
- BACnet MS/TP
- LonWorks
- Metasys N2

DIP switches A0-A7 on the gateway must be set to choose the desired protocol. Note that not all protocols will be supported by all models. The gateway must be rebooted for the new protocol settings to take effect.

The connection to the BMS is made directly to the gateway for serial protocols and LonWorks. Using the BACnet/IP protocol requires the use of an Ethernet switch since the gateway must communicate via Ethernet protocols to both the touchscreen kit and the BMS.

The default IP address for Ethernet protocols are listed below:

    Ethernet – 192.168.1.67
    Subnet – 255.255.255.0.

If multiple touchscreen kits are on the same IP network, set each touchscreen kit for a unique boiler address between 1 and 4 and then set the switches as shown for that address. See "Initial Configuration – Boiler Address" for more information on setting up the boiler address. If an IP protocol is not used, all touchscreen kits may be left at the default address of 1 and the switches may all be set for that address. This is necessary since the IP addresses cannot be changed when used with the optional gateway, and duplicate IP addresses are not permitted to exist on a network.

Gateway/BMS - Optional Interfaces (continued)

Table 3: Setting of Dip Switches on Gateway

Protocol	Boiler Address	A0	A1	A2	A3	A4	A5	A6	A7
Modbus RTU	1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Modbus RTU	2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
Modbus RTU	3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Modbus RTU	4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
BACnet/IP	1	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
BACnet/IP	2	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
BACnet/IP	3	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
BACnet/IP	4	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
BACnet MS/TP	1	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
BACnet MS/TP	2	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
BACnet MS/TP	3	ON	ON	ON	OFF	ON	OFF	OFF	OFF
BACnet MS/TP	4	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
LonWorks	1	ON	ON	ON	ON	ON	OFF	OFF	OFF
LonWorks	2	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
LonWorks	3	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
LonWorks	4	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
Metasys N2	1	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
Metasys N2	2	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
Metasys N2	3	ON	ON	OFF	ON	OFF	ON	OFF	OFF
Metasys N2	4	OFF	OFF	ON	ON	OFF	ON	OFF	OFF

Gateway/BMS - Modbus RTU

The Modbus RTU connection is an RS-485 connection. The default address is 1 and the default baud rate is 38400. The parity is fixed at none and there are is always one stop bit. For more information on changing the address or baud rate, see "Initial Configuration – Unit Type".

To establish a remote connection for active control, address **00001** (Active_Connection) must be set to 1 (enable) at least once every 30 seconds. This allows the connection to be monitored so that upon a loss of communication, local mode will be restored. If this is intentionally set to 0 (disable), then remote mode will not be possible.

The local/remote mode of the LMV is set automatically when the connection is active and the remote setpoint is greater than 0. To establish a remote connection, set the desired remote mode:

- To enable setpoint control, set **40001** (LMV_Remote_Mode) to 0 (auto). Then write the desired setpoint to **40002**.
- To enable firing rate control, set **40001** to 1 (on). Then write the desired firing rate to **40003**.
- To disable the LMV, set **40001** to 2 (off).

Remote control may also be established with an RWF controller.

- To enable setpoint control, set **40004** (RWF_Remote_Mode) to 1 (setpoint control). Then write the desired setpoint to **40005**.
- To enable firing rate control, set **40004** to 2 (full remote). Then write the desired firing rate to **40007**.
- To disable the RWF, set **00002** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

Gateway/BMS - Modbus RTU (continued)

Table 4: Address List for Modbus RTU

Address	Type	Format	Description	Additional
00001	Read/Write	bit	Active connection from BMS (heartbeat)	0 = disable, 1 = enable
00002	Read/Write	bit	RWF remote disable	0 = enable, 1 = disable
00003	Read	bit	Boiler available	0 = not available, 1 = available
00004	Read	bit	Boiler circulating pump run status	0 = idle, 1 = running
00005	Read	bit	Boiler circulating pump timed alarm status	0 = no alarm, 1 = alarm
00006	Read	bit	LMV current type of fuel	0 = gas / fuel 0, 1 = oil / fuel 1
00007	Read	bit	LMV controller on/off	0 = inactive, 1 = active
00008	Read	bit	LMV fan contactor contact (LMV5...)	0 = inactive, 1 = active
00009	Read	bit	LMV fuel selection oil (LMV5...)	0 = inactive, 1 = active
00010	Read	bit	LMV fuel selection gas (LMV5...)	0 = inactive, 1 = active
00011	Read	bit	LMV oil max pressure switch (LMV5...)	0 = inactive, 1 = active
00012	Read	bit	LMV oil min pressure switch (LMV5...)	0 = inactive, 1 = active
00013	Read	bit	LMV valve proving pressure switch (LMV5...)	0 = inactive, 1 = active
00014	Read	bit	LMV safety loop	0 = inactive, 1 = active
00015	Read	bit	LMV gas min pressure switch	0 = inactive, 1 = active
00016	Read	bit	LMV gas max pressure switch	0 = inactive, 1 = active
00017	Read	bit	LMV LP	0 = inactive, 1 = active
00018	Read	bit	LMV start release oil	0 = inactive, 1 = active
00019	Read	bit	LMV heavy oil immediate release	0 = inactive, 1 = active
00020	Read	bit	LMV alarm	0 = inactive, 1 = active
00021	Read	bit	LMV ignition	0 = inactive, 1 = active
00022	Read	bit	LMV start signal / DW valve (LMV5...)	0 = inactive, 1 = active
00023	Read	bit	LMV fan	0 = inactive, 1 = active
00024	Read	bit	LMV oil pump / magnetic coupling (LMV5...)	0 = inactive, 1 = active
00025	Read	bit	LMV fuel valve SV oil (LMV5...)	0 = inactive, 1 = active
00026	Read	bit	LMV fuel valve V1 oil (LMV5...)	0 = inactive, 1 = active
00027	Read	bit	LMV fuel valve V2 oil (LMV5...)	0 = inactive, 1 = active
00028	Read	bit	LMV fuel valve V3 oil (LMV5...)	0 = inactive, 1 = active
00029	Read	bit	LMV fuel valve SV gas (LMV5...)	0 = inactive, 1 = active
00030	Read	bit	LMV fuel valve V1 (gas LMV5...)	0 = inactive, 1 = active
00031	Read	bit	LMV fuel valve V2 (gas LMV5...)	0 = inactive, 1 = active
00032	Read	bit	LMV fuel valve V3 (gas LMV5...)	0 = inactive, 1 = active
00033	Read	bit	LMV local/remote mode	0 = local, 1 = remote
00034	Read	bit	LMV5... lockout history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
00035	Read	bit	LMV5... error history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
00036	Read	bit	RWF40 management system thermostat override	0 = inactive, 1 = active
00037	Read	bit	RWF40 binary input 2 closed	0 = inactive, 1 = active
00038	Read	bit	RWF40 thermostat function active	0 = inactive, 1 = active
00039	Read	bit	RWF40 limit comparator active	0 = inactive, 1 = active
00040	Read	bit	RWF40 not optioned or RWF55	0 = inactive, 1 = active
00041	Read	bit	RWF40 feedwater binary input 2 closed	0 = inactive, 1 = active
00042	Read	bit	RWF40 feedwater high water	0 = inactive, 1 = active
00043	Read	bit	RWF40 feedwater low water	0 = inactive, 1 = active
00044	Read	bit	RWF40 feedwater not optioned or RWF55	0 = inactive, 1 = active

Gateway/BMS - Modbus RTU (continued)

Address	Type	Format	Description	Additional
00045	Read	bit	EA annunciation input 1	0 = inactive, 1 = active
00046	Read	bit	EA annunciation input 2	0 = inactive, 1 = active
00047	Read	bit	EA annunciation input 3	0 = inactive, 1 = active
00048	Read	bit	EA annunciation input 4	0 = inactive, 1 = active
00049	Read	bit	EA annunciation input 5	0 = inactive, 1 = active
00050	Read	bit	EA annunciation input 6	0 = inactive, 1 = active
00051	Read	bit	EA annunciation input 7	0 = inactive, 1 = active
00052	Read	bit	EA annunciation input 8	0 = inactive, 1 = active
00053	Read	bit	EA annunciation input 9	0 = inactive, 1 = active
00054	Read	bit	EA annunciation input 10	0 = inactive, 1 = active
00055	Read	bit	EA annunciation input 11	0 = inactive, 1 = active
00056	Read	bit	EA annunciation input 12	0 = inactive, 1 = active
00057	Read	bit	EA annunciation input 13	0 = inactive, 1 = active
00058	Read	bit	EA not optioned	0 = inactive, 1 = active
40001	Read/Write	integer 16-bit (no sign)	LMV remote mode	0 = auto, 1 = on, 2 = off
40002	Read/Write	integer 16-bit (no sign)	LMV remote setpoint (W3) (remote mode auto)	
40003	Read/Write	integer 16-bit (no sign)	LMV remote output (remote mode on)	multiply by 10
40004	Read/Write	integer 16-bit (no sign)	RWF remote mode	0 = local, 1 = SP, 2 = FR
40005	Read/Write	float 32-bit	RWF remote setpoint	
40007	Read/Write	float 32-bit	RWF remote output	
40009	Read	integer 16-bit (no sign)	LMV phase	
40010	Read	integer 16-bit (no sign)	LMV position of currently active fuel actuator	divide by 10
40011	Read	integer 16-bit (no sign)	LMV position of gas actuator (LMV5...)	divide by 10
40012	Read	integer 16-bit (no sign)	LMV position of oil actuator (LMV5...)	divide by 10
40013	Read	integer 16-bit (no sign)	LMV position of air actuator	divide by 10
40014	Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 1 (LMV5...)	divide by 10
40015	Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 2 (LMV5...)	divide by 10
40016	Read	integer 16-bit (no sign)	LMV position of auxiliary actuator 3 (LMV5...)	divide by 10
40017	Read	integer 16-bit (no sign)	LMV manipulated variable for var speed drive (LMV5...)	divide by 10
40018	Read	integer 16-bit (no sign)	LMV current output	divide by 10
40019	Read	integer 16-bit (no sign)	LMV current setpoint / temperature / pressure (LMV5...)	divide by 10 if unit is Bar
40020	Read	integer 16-bit (no sign)	LMV actual value / temperature / pressure (LMV5...)	divide by 10 if unit is Bar
40021	Read	integer 16-bit (no sign)	LMV flame signal	divide by 10
40022	Read	integer 16-bit (no sign)	LMV current fuel throughput (LMV5...)	
40023	Read	integer 16-bit (no sign)	LMV current O2 value (LMV52...)	divide by 10
40024	Read	integer 32-bit (no sign)	LMV startup counter total	
40026	Read	integer 32-bit (no sign)	LMV hours run total (LMV5...)	
40028	Read	integer 16-bit (no sign)	LMV supply air temperature (LMV52...)	
40029	Read	integer 16-bit (no sign)	LMV flue gas temperature (LMV52...)	
40030	Read	integer 16-bit (no sign)	LMV combustion efficiency (LMV52...)	divide by 10
40031	Read	integer 16-bit (no sign)	LMV local setpoint W1 (LMV5...)	
40032	Read	integer 16-bit (no sign)	LMV local setpoint W2 (LMV5...)	
40033	Read	integer 32-bit (no sign)	LMV fuel volume gas (LMV5...)	

Gateway/BMS - Modbus RTU (continued)

Address	Type	Format	Description	Additional
40035	Read	integer 32-bit (no sign)	LMV fuel volume oil (LMV5...)	
40037	Read	integer 16-bit (no sign)	LMV5... lockout history current error code	
40038	Read	integer 16-bit (no sign)	LMV5... lockout history current diagnostic code	
40039	Read	integer 16-bit (no sign)	LMV5... lockout history current error class	
40040	Read	integer 16-bit (no sign)	LMV5... lockout history current error phase	
40041	Read	integer 16-bit (no sign)	LMV5... lockout history current output	
40042	Read	integer 16-bit (no sign)	LMV5... lockout history current date - year	two digit
40043	Read	integer 16-bit (no sign)	LMV5... lockout history current date - month	
40044	Read	integer 16-bit (no sign)	LMV5... lockout history current date - day	
40045	Read	integer 16-bit (no sign)	LMV5... lockout history current time - hours	
40046	Read	integer 16-bit (no sign)	LMV5... lockout history current time - minutes	
40047	Read	integer 16-bit (no sign)	LMV5... lockout history current time - seconds	
40048	Read	integer 32-bit (no sign)	LMV5... lockout history current startup counter total	
40050	Read	integer 32-bit (no sign)	LMV5... lockout history current hours run total	
40052	Read	integer 16-bit (no sign)	LMV5... error history current error code	
40053	Read	integer 16-bit (no sign)	LMV5... error history current diagnostic code	
40054	Read	integer 16-bit (no sign)	LMV5... error history current error class	
40055	Read	integer 16-bit (no sign)	LMV5... error history current error phase	
40056	Read	integer 16-bit (no sign)	LMV5... error history current output	
40057	Read	integer 32-bit (no sign)	LMV5... error history current startup counter total	
40059	Read	float 32-bit	RWF actual temperature / pressure (E1)	
40061	Read	float 32-bit	RWF actual (E2)	
40063	Read	float 32-bit	RWF actual temperature (E3)	
40065	Read	float 32-bit	RWF current setpoint	
40067	Read	float 32-bit	RWF local setpoint (SP1)	
40069	Read	float 32-bit	RWF local setpoint (SP2)	
40071	Read	float 32-bit	RWF feedwater actual temperature / pressure (E1)	
40073	Read	float 32-bit	RWF feedwater actual (E2)	
40075	Read	float 32-bit	RWF feedwater current setpoint	
40077	Read	float 32-bit	RWF feedwater local setpoint (SP1)	
40079	Read	integer 16-bit (no sign)	EA temperature output	
40080	Read	integer 16-bit (no sign)	EA configurable analog input 1	
40081	Read	integer 16-bit (no sign)	EA configurable analog input 2	
40082	Read	integer 16-bit (no sign)	EA configurable analog input 3	
40083	Read	integer 16-bit (no sign)	EA configurable analog input 4	
40084	Read	integer 16-bit (no sign)	EA configurable RTD input 1	
40085	Read	integer 16-bit (no sign)	EA configurable RTD input 2	
40086	Read	integer 16-bit (no sign)	EA configurable RTD input 3	
40087	Read	integer 16-bit (no sign)	EA valve output	divide by 100
40088	Read	integer 32-bit (no sign)	EA totalized analog input 1	divide by 10
40090	Read	integer 32-bit (no sign)	EA totalized analog input 2	divide by 10
40092	Read	integer 32-bit (no sign)	EA totalized analog input 3	divide by 10
40094	Read	integer 32-bit (no sign)	EA totalized analog input 4	divide by 10

Gateway/BMS - BACnet/IP

The BACnet/IP connection uses UDP port 47808. AV and BV values are read / written and AI and BI values are read-only. The default device instance is 100. For more information on changing the device instance, see "Initial Configuration – Unit Type".

To establish a remote connection for active control, address **BV1** (Active_Connection) must be set to 1 (enable) at least once every 30 seconds. This allows the connection to be monitored so that upon a loss of communication, local mode will be restored. If this is intentionally set to 0 (disable), then remote mode will not be possible.

The local/remote mode of the LMV is set automatically when the connection is active and the remote setpoint is greater than 0. To establish a remote connection, set the desired remote mode:

- To enable setpoint control, set **AV21** (LMV_Remote_Mode) to 0 (auto). Then write the desired setpoint to **AV22**.
- To enable firing rate control, set **AV21** to 1 (on). Then write the desired firing rate to **AV23**.
- To disable the LMV, set **AV21** to 2 (off).

Remote control may also be established with an RWF controller.

- To enable setpoint control, set **AV47** (RWF_Remote_Mode) to 1 (setpoint control). Then write the desired setpoint to **AV48**.
- To enable firing rate control, set **AV47** to 2 (full remote). Then write the desired firing rate to **AV49**.
- To disable the RWF, set **BV35** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

Gateway/BMS - BACnet/IP (continued)

Table 5: Address List for BACnet and Metasys N2

| Address	Name	Description	Additional
AI1	LMV_Phase	LMV phase	
AI2	LMV_Fuel_Act	LMV position of currently active fuel actuator	
AI3	LMV_Gas_Act	LMV position of gas actuator (LMV5...)	
AI4	LMV_Oil_Act	LMV position of oil actuator (LMV5...)	
AI5	LMV_Air_Act	LMV position of air actuator	
AI6	LMV_Aux1_Act	LMV position of auxiliary actuator 1 (LMV5...)	
AI7	LMV_Aux2_Act	LMV position of auxiliary actuator 2 (LMV5...)	
AI8	LMV_Aux3_Act	LMV position of auxiliary actuator 3 (LMV5...)	
AI9	LMV_VSD_Value	LMV manipulated variable for var speed drive (LMV5...)	
AI10	LMV_Current_Out	LMV current output	
AI11	LMV_Current_SP	LMV current setpoint / temperature / pressure (LMV5...)	
AI12	LMV_Actual	LMV actual value / temperature / pressure (LMV5...)	
AI13	LMV_Flame	LMV flame signal	
AI14	LMV_Throughput	LMV current fuel throughput (LMV5...)	
AI15	LMV_O2_Value	LMV current O2 value (LMV52...)	
AI16	LMV_Startups	LMV startup counter total	
AI17	LMV_Hours	LMV hours run total (LMV5...)	
AI18	LMV_Supply_Air_Temp	LMV supply air temperature (LMV52...)	
AI19	LMV_Flue_Gas_Temp	LMV flue gas temperature (LMV52...)	
AI20	LMV_Comb_Eff	LMV combustion efficiency (LMV52...)	
AV/AO21	LMV_Rem_Mode	LMV remote mode	0 = auto, 1 = on, 2 = off
AV/AO22	LMV_Remote_SP	LMV remote setpoint (W3) (remote mode auto)	
AV/AO23	LMV_Rem_Output	LMV remote output (remote mode on)	
AI24	LMV_Local_SP	LMV local setpoint W1 (LMV5...)	
AI25	LMV_Second_SP	LMV local setpoint W2 (LMV5...)	
AI26	LMV_Volume_Gas	LMV fuel volume gas (LMV5...)	
AI27	LMV_Volume_Oil	LMV fuel volume oil (LMV5...)	
AI28	LMV_LO_Error_Code	LMV5... lockout history current error code	
AI29	LMV_LO_Diag_Code	LMV5... lockout history current diagnostic code	
AI30	LMV_LO_Error_Class	LMV5... lockout history current error class	
AI31	LMV_LO_Error_Phase	LMV5... lockout history current error phase	
AI32	LMV_LO_Output	LMV5... lockout history current output	
AI33	LMV_LO_Year	LMV5... lockout history current date - year	two digit
AI34	LMV_LO_Month	LMV5... lockout history current date - month	
AI35	LMV_LO_Day	LMV5... lockout history current date - day	
AI36	LMV_LO_Hour	LMV5... lockout history current time - hours	
AI37	LMV_LO_Minute	LMV5... lockout history current time - minutes	
AI38	LMV_LO_Second	LMV5... lockout history current time - seconds	
AI39	LMV_LO_Startups	LMV5... lockout history current startup counter total	
AI40	LMV_LO_Hours	LMV5... lockout history current hours run total	
AI41	LMV_EH_Error_Code	LMV5... error history current error code	
AI42	LMV_EH_Diag_Code	LMV5... error history current diagnostic code	
AI43	LMV_EH_Error_Class	LMV5... error history current error class	
AI44	LMV_EH_Error_Phase	LMV5... error history current error phase	
AI45	LMV_EH_Output	LMV5... error history current output	
AI46	LMV_EH_Startups	LMV5... error history current startup counter total	
AV/AO47	RWF_Command	RWF remote mode	0 = local, 1 = SP, 2 = FR
AV/AO48	RWF_Rem_Setpoint	RWF remote setpoint	

Gateway/BMS - BACnet/IP (continued)

| Address	Name	Description	Additional
AV/AO49	RWF_Rem_Output	RWF remote output	
AI50	RWF_Actual	RWF actual temperature / pressure (E1)	
AI51	RWF_Input_2	RWF actual (E2)	
AI52	RWF_Input_3	RWF actual temperature (E3)	
AI53	RWF_Current_SP	RWF current setpoint	
AI54	RWF_Local_SP	RWF local setpoint (SP1)	
AI55	RWF_Second_SP	RWF local setpoint (SP2)	
AI56	FW_Actual	RWF feedwater actual temperature / pressure (E1)	
AI57	FW_Current_SP	RWF feedwater actual (E2)	
AI58	FW_Current_SP	RWF feedwater current setpoint	
AI59	FW_Local_Setpoint	RWF feedwater local setpoint (SP1)	
AI60	EA_Temp	EA temperature output	
AI61	EA_Analog_1	EA configurable analog input 1	
AI62	EA_Analog_2	EA configurable analog input 2	
AI63	EA_Analog_3	EA configurable analog input 3	
AI64	EA_Analog_4	EA configurable analog input 4	
AI65	EA_RTD_1	EA configurable RTD input 1	
AI66	EA_RTD_2	EA configurable RTD input 2	
AI67	EA_RTD_3	EA configurable RTD input 3	
AI68	EA_Valve_Output	EA valve output	
AI69	EA_Ana_1_Total	EA totalized analog input 1	
AI70	EA_Ana_2_Total	EA totalized analog input 2	
AI71	EA_Ana_3_Total	EA totalized analog input 3	
AI72	EA_Ana_4_Total	EA totalized analog input 4	
BV/BO1	Active_Connection	Active connection from BMS (heartbeat)	0 = disable, 1 = enable
BI2	Available	Boiler available	0 = not available, 1 = available
BI3	Pump_Run	Boiler circulating pump run status	0 = idle, 1 = running
BI4	Pump_Alarm	Boiler circulating pump timed alarm status	0 = no alarm, 1 = alarm
BI5	LMV_Fuel_Type	LMV current type of fuel	0 = gas / fuel 0, 1 = oil / fuel 1
BI6	LMV_Control_Sw	LMV controller on/off	0 = inactive, 1 = active
BI7	LMV_Fan_Contactor	LMV fan contactor contact (LMV5...)	0 = inactive, 1 = active
BI8	LMV_Oil_Select	LMV fuel selection oil (LMV5...)	0 = inactive, 1 = active
BI9	LMV_Gas_Select	LMV fuel selection gas (LMV5...)	0 = inactive, 1 = active
BI10	LMV_Oil_Max_Prs	LMV oil max pressure switch (LMV5...)	0 = inactive, 1 = active
BI11	LMV_Oil_Min_Prs	LMV oil min pressure switch (LMV5...)	0 = inactive, 1 = active
BI12	LMV_Valve_Proving_Sw	LMV valve proving pressure switch (LMV5...)	0 = inactive, 1 = active
BI13	LMV_Safety_Loop	LMV safety loop	0 = inactive, 1 = active
BI14	LMV_Gas_Min_Prs	LMV gas min pressure switch	0 = inactive, 1 = active
BI15	LMV_Gas_Max_Prs	LMV gas max pressure switch	0 = inactive, 1 = active
BI16	LMV_LP	LMV LP	0 = inactive, 1 = active
BI17	LMV_Oil_Start_Rel	LMV start release oil	0 = inactive, 1 = active
BI18	LMV_Oil_Imm_St	LMV heavy oil immediate release	0 = inactive, 1 = active
BI19	LMV_Alarm	LMV alarm	0 = inactive, 1 = active
BI20	LMV_Ignition	LMV ignition	0 = inactive, 1 = active
BI21	LMV_Start_Signal	LMV start signal / DW valve (LMV5...)	0 = inactive, 1 = active
BI22	LMV_Fan_Signal	LMV fan	0 = inactive, 1 = active
BI23	LMV_Oil_Pump	LMV oil pump / magnetic coupling (LMV5...)	0 = inactive, 1 = active
BI24	LMV_FV_SV_Oil	LMV fuel valve SV oil (LMV5...)	0 = inactive, 1 = active
BI25	LMV_FV_V1_Oil	LMV fuel valve V1 oil (LMV5...)	0 = inactive, 1 = active
BI26	LMV_FV_V2_Oil	LMV fuel valve V2 oil (LMV5...)	0 = inactive, 1 = active

Gateway/BMS - BACnet/IP (continued)

Address	Name	Description	Additional
BI27	LMV_FV_V3_Oil	LMV fuel valve V3 oil (LMV5...)	0 = inactive, 1 = active
BI28	LMV_FV_SV_Gas	LMV fuel valve SV gas (LMV5...)	0 = inactive, 1 = active
BI29	LMV_FV_V1_Gas	LMV fuel valve V1 (gas LMV5...)	0 = inactive, 1 = active
BI30	LMV_FV_V2_Gas	LMV fuel valve V2 (gas LMV5...)	0 = inactive, 1 = active
BI31	LMV_FV_V3_Gas	LMV fuel valve V3 (gas LMV5...)	0 = inactive, 1 = active
BI32	LMV_Local_Remote	LMV local/remote mode	0 = local, 1 = remote
BI33	LMV_LO_Fuel_Type	LMV5... lockout history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
BI34	LMV_EH_Fuel_Type	LMV5... error history current fuel selected	0 = gas / fuel 0, 1 = oil / fuel 1
BV/BO35	RWF_Disable	RWF remote disable	0 = enable, 1 = disable
BI36	RWF_Rem_Override	RWF40 management system thermostat override	0 = inactive, 1 = active
BI37	RWF_D2_Status	RWF40 binary input 2 closed	0 = inactive, 1 = active
BI38	RWF_Thermostat	RWF40 thermostat function active	0 = inactive, 1 = active
BI39	RWF_K6_Relay	RWF40 limit comparator active	0 = inactive, 1 = active
BI40	RWF_Status	RWF40 not optioned or RWF55	0 = inactive, 1 = active
BI41	FW_D2_Status	RWF40 feedwater binary input 2 closed	0 = inactive, 1 = active
BI42	FW_High_Water	RWF40 feedwater high water	0 = inactive, 1 = active
BI43	FW_Low_Water	RWF40 feedwater low water	0 = inactive, 1 = active
BI44	FW_Status	RWF40 feedwater not optioned or RWF55	0 = inactive, 1 = active
BI45	EA_Annun_1	EA annunciation input 1	0 = inactive, 1 = active
BI46	EA_Annun_2	EA annunciation input 2	0 = inactive, 1 = active
BI47	EA_Annun_3	EA annunciation input 3	0 = inactive, 1 = active
BI48	EA_Annun_4	EA annunciation input 4	0 = inactive, 1 = active
BI49	EA_Annun_5	EA annunciation input 5	0 = inactive, 1 = active
BI50	EA_Annun_6	EA annunciation input 6	0 = inactive, 1 = active
BI51	EA_Annun_7	EA annunciation input 7	0 = inactive, 1 = active
BI52	EA_Annun_8	EA annunciation input 8	0 = inactive, 1 = active
BI53	EA_Annun_9	EA annunciation input 9	0 = inactive, 1 = active
BI54	EA_Annun_10	EA annunciation input 10	0 = inactive, 1 = active
BI55	EA_Annun_11	EA annunciation input 11	0 = inactive, 1 = active
BI56	EA_Annun_12	EA annunciation input 12	0 = inactive, 1 = active
BI57	EA_Annun_13	EA annunciation input 13	0 = inactive, 1 = active
BI58	EA_Status	EA not optioned	0 = inactive, 1 = active

Gateway/BMS - BACnet/IP (continued)

The IP address of the gateway may be changed if desired. To change the IP address of the gateway, use a standard web browser to go to http://192.168.1.67 (or whatever the current IP address is of the gateway).
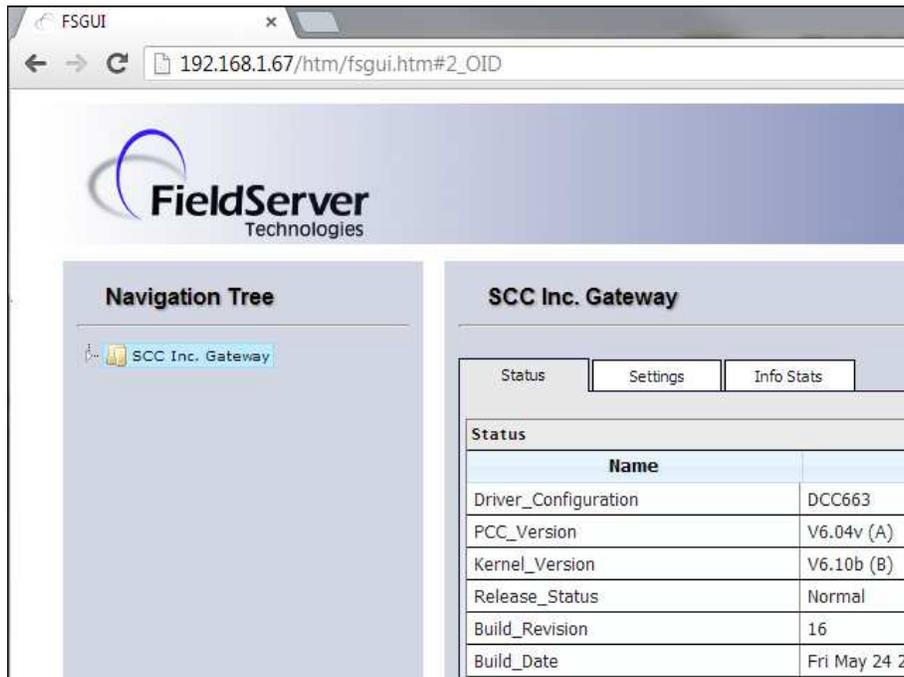
Expand the **Navigation Tree** on the left, and then choose **Setup**, then **Network Settings**. The network settings screen will appear.
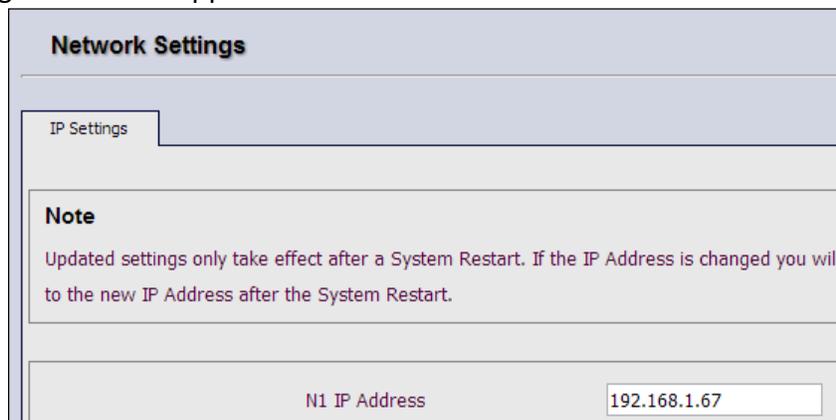
Enter the desired IP address in the **N1 IP Address** box. Then press **Update IP Settings**.   Once complete, press **System Restart** to complete the process.

Gateway/BMS - BACnet MS/TP

The BACnet MS/TP connection is an RS-485 connection. AV and BV values are read / written and AI and BI values are read-only. The default device instance is 100, the default MAC address is 1 and the default baud rate is 38400. For more information on changing the device instance, MAC address or baud rate, see "Initial Configuration – Unit Type".

To establish a remote connection for active control, address **BV1** (Active_Connection) must be set to 1 (enable) at least once every 30 seconds. This allows the connection to be monitored so that upon a loss of communication, local mode will be restored. If this is intentionally set to 0 (disable), then remote mode will not be possible.

The local/remote mode of the LMV is set automatically when the connection is active and the remote setpoint is greater than 0. To establish a remote connection, set the desired remote mode:

- To enable setpoint control, set **AV21** (LMV_Remote_Mode) to 0 (auto). Then write the desired setpoint to **AV22**.
- To enable firing rate control, set **AV21** to 1 (on). Then write the desired firing rate to **AV23**.
- To disable the LMV, set **AV21** to 2 (off).

Remote control may also be established with an RWF controller.

- To enable setpoint control, set **AV47** (RWF_Remote_Mode) to 1 (setpoint control). Then write the desired setpoint to **AV48**.
- To enable firing rate control, set **AV47** to 2 (full remote). Then write the desired firing rate to **AV49**.
- To disable the RWF, set **BV35** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

Refer to Table 5 in the "Gateway/BMS – BACnet/IP" section for a list of addresses.

Gateway/BMS - Metasys N2

The Metasys N2 connection is an RS-485 connection. AO and BO values are read / written and AI and BI values are read-only. The default node address is 100. The baud rate is fixed at 9600 by the protocol. For more information on changing the default node, see "Initial Configuration – Unit Type".

To establish a remote connection for active control, address **BO1** (Active_Connection) must be set to 1 (enable) at least once every 30 seconds. This allows the connection to be monitored so that upon a loss of communication, local mode will be restored. If this is intentionally set to 0 (disable), then remote mode will not be possible.

The local/remote mode of the LMV is set automatically when the connection is active and the remote setpoint is greater than 0. To establish a remote connection, set the desired remote mode:

- To enable setpoint control, set **AO21** (LMV_Remote_Mode) to 0 (auto). Then write the desired setpoint to **AO22**.
- To enable firing rate control, set **AO21** to 1 (on). Then write the desired firing rate to **AO23**.
- To disable the LMV, set **AO21** to 2 (off).

Remote control may also be established with an RWF controller.

- To enable setpoint control, set **AO47** (RWF_Remote_Mode) to 1 (setpoint control). Then write the desired setpoint to **AO48**.
- To enable firing rate control, set **AO47** to 2 (full remote). Then write the desired firing rate to **AO49**.
- To disable the RWF, set **BO35** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

Refer to Table 5 in the "Gateway/BMS – BACnet/IP" section for a list of addresses.

Gateway/BMS - LonWorks

The LonWorks interface uses an FTT-10A transceiver to communicate with a LonWorks network. A service pin is provided on the gateway to aid in commissioning.

To establish a remote connection for active control, address **nviActiveConn** must be set to 1 (enable) at least once every 30 seconds. This allows the connection to be monitored so that upon a loss of communication, local mode will be restored. If this is intentionally set to 0 (disable), then remote mode will not be possible.

If the local/remote mode of the LMV is set to remote, then a remote connection may be established. See "Automatic/Manual Operation" for more information. To establish a remote connection, set the desired remote mode.

- To enable setpoint control, set **nviRemMode** to 0 (auto). Then write the desired setpoint to **nviRemoteSP**.
- To enable firing rate control, set **nviRemMode** to 1 (on). Then write the desired firing rate to **nviRemOutput**.
- To disable the LMV, set **nviRemMode** to 2 (off).

Remote control may also be established with an RWF controller.

- To enable setpoint control, set **nviRWFCommand** to 1 (setpoint control). Then write the desired setpoint to **nviRWFRemoteSP**.
- To enable firing rate control, set **nviRWFCommand** to 2 (full remote). Then write the desired firing rate to **nviRWFRemOutput**.
- To disable the RWF, set **nviRWFDisable** to 1 (disable).

Full remote mode is not available with the RWF10; to establish firing rate control the command may instead be sent to the LMV3.

Gateway/BMS – LonWorks (continued)

Table 6: Address List for LonWorks

Name	Description	SNVT	Additional
nviActiveConn	Active connection from BMS (heartbeat)	lev_disc	0 = disable, 1 = enable
nviRemMode	LMV remote mode	count	0 = auto, 1 = on, 2 = off
nviRemoteSP	LMV remote setpoint (W3) (remote mode auto)	count	
nviRemOutput	LMV remote output (remote mode on)	lev_percent	
nviRWFCommand	RWF remote mode	count	0 = local, 1 = SP, 2 = FR
nviRWFDisable	RWF remote disable	lev_disc	0 = enable, 1 = disable
nviRWFRemoteSP	RWF remote setpoint	count	
nviRWFRemOutput	RWF remote output	lev_percent	
nvoActual	LMV actual value / temperature / pressure (LMV5...)	count_f	
nvoAirAct	LMV position of air actuator	angle_deg	
nvoAlarm	LMV alarm	switch (state)	0 = inactive, 1 = active
nvoAnalog1	EA configurable analog input 1	count_f	
nvoAnalog2	EA configurable analog input 2	count_f	
nvoAnalog3	EA configurable analog input 3	count_f	
nvoAnalog4	EA configurable analog input 4	count_f	
nvoAna1Total	EA totalized analog input 1	count_f	
nvoAna2Total	EA totalized analog input 2	count_f	
nvoAna3Total	EA totalized analog input 3	count_f	
nvoAna4Total	EA totalized analog input 4	count_f	
nvoAuto	Boiler available status	switch (state)	0 = not available, 1 =
nvoAux1Act	LMV position of auxiliary actuator 1 (LMV5...)	angle_deg	
nvoAux2Act	LMV position of auxiliary actuator 2 (LMV5...)	angle_deg	
nvoAux3Act	LMV position of auxiliary actuator 3 (LMV5...)	angle_deg	
nvoCombEff	LMV combustion efficiency (LMV52...)	lev_percent	
nvoControlSw	LMV controller on/off	switch (state)	0 = inactive, 1 = active
nvoCurrentOut	LMV current output	lev_percent	
nvoCurrentSP	LMV current setpoint / temperature / pressure (LMV5...)	count_f	
nvoEAAnnun1	EA annunciation input 1	switch (state)	0 = inactive, 1 = active
nvoEAAnnun10	EA annunciation input 10	switch (state)	0 = inactive, 1 = active
nvoEAAnnun11	EA annunciation input 11	switch (state)	0 = inactive, 1 = active
nvoEAAnnun12	EA annunciation input 12	switch (state)	0 = inactive, 1 = active
nvoEAAnnun13	EA annunciation input 13	switch (state)	0 = inactive, 1 = active
nvoEAAnnun2	EA annunciation input 2	switch (state)	0 = inactive, 1 = active
nvoEAAnnun3	EA annunciation input 3	switch (state)	0 = inactive, 1 = active
nvoEAAnnun4	EA annunciation input 4	switch (state)	0 = inactive, 1 = active
nvoEAAnnun5	EA annunciation input 5	switch (state)	0 = inactive, 1 = active
nvoEAAnnun6	EA annunciation input 6	switch (state)	0 = inactive, 1 = active
nvoEAAnnun7	EA annunciation input 7	switch (state)	0 = inactive, 1 = active
nvoEAAnnun8	EA annunciation input 8	switch (state)	0 = inactive, 1 = active
nvoEAAnnun9	EA annunciation input 9	switch (state)	0 = inactive, 1 = active
nvoEAStatus	EA not optioned	switch (state)	0 = inactive, 1 = active
nvoEATemp	EA temperature output	count	
nvoEH DiagCode	LMV5... error history current diagnostic code	count	
nvoEH ErrorClass	LMV5... error history current error class	count	
nvoEH ErrorCode	LMV5... error history current error code	count	
nvoEH ErrorPhase	LMV5... error history current error phase	count	
nvoEH FuelType	LMV5... error history current fuel selected	switch (state)	0 = gas / fuel 0, 1 = oil / fuel 1
nvoEH Output	LMV5... error history current output	lev_percent	

Gateway/BMS – LonWorks (continued)

Name	Description	SNVT	Additional
nvoEH Startups	LMV5... error history current startup counter total	count_f	
nvoFanContactor	LMV fan contactor contact (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFanSignal	LMV fan	switch (state)	0 = inactive, 1 = active
nvoFlame	LMV flame signal	lev_percent	
nvoFlueGasTemp	LMV flue gas temperature (LMV52...)	count	
nvoFuelAct	LMV position of currently active fuel actuator	angle_deg	
nvoFuelType	LMV current type of fuel	switch (state)	0 = gas / fuel 0, 1 = oil / fuel 1
nvoFVSVGas	LMV fuel valve SV gas (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVSVOil	LMV fuel valve SV oil (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV1Gas	LMV fuel valve V1 (gas LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV1Oil	LMV fuel valve V1 oil (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV2Gas	LMV fuel valve V2 (gas LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV2Oil	LMV fuel valve V2 oil (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV3Gas	LMV fuel valve V3 (gas LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFVV3Oil	LMV fuel valve V3 oil (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoFWActual	RWF feedwater actual temperature / pressure (E1)	press_f	
nvoFWAnalogE2	RWF feedwater actual (E2)	count_f	
nvoFWCurrentSP	RWF feedwater current setpoint	press_f	
nvoFWD2Status	RWF40 feedwater binary input 2 closed	switch (state)	0 = inactive, 1 = active
nvoFWHighWater	RWF40 feedwater high water	switch (state)	0 = inactive, 1 = active
nvoFWLocalSP	RWF feedwater local setpoint (SP1)	press_f	
nvoFWLowWater	RWF40 feedwater low water	switch (state)	0 = inactive, 1 = active
nvoFWStatus	RWF40 feedwater not optioned or RWF55	switch (state)	0 = inactive, 1 = active
nvoGasAct	LMV position of gas actuator (LMV5...)	angle_deg	
nvoGasMaxPrs	LMV gas max pressure switch	switch (state)	0 = inactive, 1 = active
nvoGasMinPrs	LMV gas min pressure switch	switch (state)	0 = inactive, 1 = active
nvoGasSelect	LMV fuel selection gas (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoHours	LMV hours run total (LMV5...)	count_f	
nvoIgnition	LMV ignition	switch (state)	0 = inactive, 1 = active
nvoLocalRemote	LMV local/remote mode	switch (state)	0 = local, 1 = remote
nvoLocalSP	LMV local setpoint W1 (LMV5...)	count_f	
nvoLODiagCode	LMV5... lockout history current diagnostic code	count	
nvoLOErrorClass	LMV5... lockout history current error class	count	
nvoLOErrorCode	LMV5... lockout history current error code	count	
nvoLOErrorPhase	LMV5... lockout history current error phase	count	
nvoLOFuelType	LMV5... lockout history current fuel selected	switch (state)	0 = gas / fuel 0, 1 = oil / fuel 1
nvoLOHours	LMV5... lockout history current hours run total	count_f	
nvoLOOutput	LMV5... lockout history current output	lev_percent	
nvoLOStartups	LMV5... lockout history current startup counter total	count_f	
nvoLOTime	LMV5... lockout history time stamp	time_stamp	
nvoLP	LMV LP	switch (state)	0 = inactive, 1 = active
nvoO2Value	LMV current O2 value (LMV52...)	lev_percent	
nvoOilAct	LMV position of oil actuator (LMV5...)	angle_deg	
nvoOilImmSt	LMV heavy oil immediate release	switch (state)	0 = inactive, 1 = active
nvoOilMaxPrs	LMV oil max pressure switch (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoOilMinPrs	LMV oil min pressure switch (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoOilPump	LMV oil pump / magnetic coupling (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoOilSelect	LMV fuel selection oil (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoOilStartRel	LMV start release oil	switch (state)	0 = inactive, 1 = active

Gateway/BMS – LonWorks (continued)

Name	Description	SNVT	Additional
nvoPhase	LMV phase	count_f	
nvoPumpAlarm	Boiler circulating pump timed alarm status	switch (state)	0 = no alarm, 1 = alarm
nvoPumpRun	Boiler circulating pump run status	switch (state)	0 = idle, 1 = running
nvoRTD1	EA configurable RTD input 1	count	
nvoRTD2	EA configurable RTD input 2	count	
nvoRTD3	EA configurable RTD input 3	count	
nvoRWFActual	RWF actual temperature / pressure (E1)	count_f	
nvoRWFCurrentSP	RWF current setpoint	count_f	
nvoRWFD2Status	RWF40 binary input 2 closed	switch (state)	0 = inactive, 1 = active
nvoRWFInput2	RWF actual (E2)	count_f	
nvoRWFInput3	RWF actual temperature (E3)	count_f	
nvoRWFK6Relay	RWF40 limit comparator active	switch (state)	0 = inactive, 1 = active
nvoRWFLocalSP	RWF local setpoint (SP1)	count_f	
nvoRWFRemOvr	RWF40 management system thermostat override	switch (state)	0 = inactive, 1 = active
nvoRWFSecondSP	RWF local setpoint (SP2)	count_f	
nvoRWFStat	RWF40 thermostat function active	switch (state)	0 = inactive, 1 = active
nvoRWFStatus	RWF40 not optioned or RWF55	switch (state)	0 = inactive, 1 = active
nvoSafetyLoop	LMV safety loop	switch (state)	0 = inactive, 1 = active
nvoSecondSP	LMV local setpoint W2 (LMV5...)	count_f	
nvoStartSignal	LMV start signal / DW valve (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoStartups	LMV startup counter total	count_f	
nvoSupplyAirTemp	LMV supply air temperature (LMV52...)	count	
nvoThroughput	LMV current fuel throughput (LMV5...)	count	
nvoValveOutput	EA valve output	lev_percent	
nvoValveProvingSw	LMV valve proving pressure switch (LMV5...)	switch (state)	0 = inactive, 1 = active
nvoVolumeGas	LMV fuel volume gas (LMV5...)	count_f	
nvoVolumeOil	LMV fuel volume oil (LMV5...)	count_f	
nvoVSDValue	LMV manipulated variable for var speed drive (LMV5...)	lev_percent	

Appendix - LMV5 Configuration for Modbus

The LMV5x controller must be properly configured for Modbus operation. Use the **Select <** and **Select >** buttons to navigate up and down the screen and the **Enter** button when the desired option is selected with the cursor. Use **Esc** to go back to the previous menu. When a parameter needs to be changed, the **Select <** and **Select >** buttons allow the value to be changed and **Enter** confirms the change. Press the **Esc** button to return after the change is made.

First, activate the Modbus port on the AZL (no password required):
1. Operation > OptgModeSelect > Type of Gateway = **Modbus**
2. Operation > OptgModeSelect > **GatewayBASon**
    Note: Older AZL units may read "GatewayDDCon" instead.
3. The AZL should now read "Gateway Mode active".

Next, set up the required parameters through the AZL (no password required):
1. Params & Display > Access w-out PW > AZL > Modbus > Address = **1**
2. Params & Display > Access w-out PW > AZL > Modbus > Baudrate = **19200 bit/s**
3. Params & Display > Access w-out PW > AZL > Modbus > Parity = **no**
4. Params & Display > Access w-out PW > AZL > Modbus > Timeout = **30s**

Last, change the controller mode to allow Modbus operation (no password required):
Params & Display > Access w-out PW > LoadController > Configuration > LC_OptgMode =
IntLC Bus

The changes take effect immediately (no reboot required).

Appendix - RWF40 Configuration for Modbus

The RWF40 must have the Modbus option in order to communicate with the system. The last three characters of the part number must be "B97" for Modbus to be optioned. If the last three characters of the part number are "A97", Modbus is not optioned.

To activate Modbus on the RWF40, make the following and parameters:

1. Press and hold **PGM** until the green display shows "AL".
2. Press and hold **PGM** until the green display shows "C111".
3. Press **PGM** twice so that the green display shows "C113".
4. Press the down arrow until the second red digit from the right flashes. Use the up arrow to change this value to "7". This parameter sets the baud rate at 19,200 bit/s.
5. Press the down arrow until the second red digit from the left flashes. Use the up arrow to change this value to "2" if the RWF40 is being used as a load controller or to "3" if the RWF40 is being used for a feedwater control. This parameter sets the Modbus address.
6. Press **PGM**. The red display should now read "0270" or "0370". If it does not, use the down and up arrows to adjust the value and then press **PGM** to confirm and save the values.
7. Press **EXIT** to return to the normal display. The changes take effect immediately (no reboot required).

Appendix - LMV3 Configuration for Modbus

The LMV3x controller must have the OCI412.10 option installed in order to communicate with the system via Modbus.

The service (heating engineer) password must be entered for these parameters to be accessed. The default service password is 9876. If the password has been changed, please consult the equipment OEM for the correct password.

To configure the LMV3x controller to communicate Modbus, use the following procedure:
1. Hold down both the **F** and the **A** buttons until the display reads "Code", followed by a string of seven underscores.
2. Use the **+** and **-** buttons to enter the password. Press **ENTER** (the button to the right of the display) after each entry, and again once the complete password is entered. If the password is incorrect, "Error" will be displayed and the process will have to be restarted.
3. If the password is entered successfully, the screen will display "Para" and then "400: Set" with the "400:" flashing.
4. Use the **-** button to navigate to "100: PArA", then press **ENTER**.
5. Use the **+** and **-** buttons to navigate to a flashing "141:". If this value does not read "1", press **ENTER** and then use the **+** and **-** buttons to change it to "1", then press **ENTER** to confirm the change. This parameter activates Modbus. To return to the parameter navigation, press the **+** and **-** buttons simultaneously (**ESC**). The display should return to flashing "141:". This procedure will be used to change all parameters.
6. Change "142:" to 120. This parameter sets the timeout.
7. Change "145:" to 5. This parameter sets the Modbus address.
8. Change "146:" to 1. This parameter sets the baud rate to 19200 bit/s.
9. Change "147:" to 0. This parameter sets the parity to none.
10. When all the parameters are entered, press **ESC** in two successions to back up to the main screen. The changes take effect immediately (no reboot required).

Appendix - RWF55 Configuration for Modbus

The RWF55 must be properly configured for Modbus operation.

Use the up and down arrow buttons to navigate through the menus and the **Enter** button when the desired menu is selected. Use **Esc** to go back to the previous menu. When a parameter needs to be changed, the up and down arrow buttons allow the value to be changed and **Enter** confirms the change. The parameter name will flash on the green display when the parameter entry mode is entered. Press the **Esc** button to return after the change is made.

To configure the RWF55 controller to communicate Modbus, use the following procedure:
1. Press **Enter** to go into the menu list. The green display should read "OPr".
2. ConF > IntF > r485 > bdrt = **2** (19200 bit/s baud rate)
3. ConF > IntF > r485 > dtt = **30** (timeout)
4. ConF > IntF > r485 > Adr = **6** (address for load control applications) **OR**
   ConF > IntF > r485 > Adr = **7** (address for feedwater applications)
5. Press **Esc** in four successions or until the parameter menus are completely exited. The changes take effect immediately (no reboot required).

Appendix - RWF10 Configuration for Modbus

The RWF10 must have the Modbus option in order to communicate with the system. This is an option card that is inserted into the controller when required.

To configure the RWF10 controller to communicate Modbus, use the following procedure:

1. Press the **LEVEL** (left-most) button until the red display reads "CN-t".
2. Press the **LEVEL** button again; the red display should read "PSEL".
3. If the value of "PSEL" does not read "Mod", use the up and down arrow buttons to change the value.
4. Press the **MODE** (loop with arrow on end, second from left) button to move to the next parameter, "U-No". Change the value to "8" with the up and down arrow buttons and then press **MODE**. This parameter sets the Modbus address.
5. Change parameter "bPS" to "19.2" and then press **MODE**. This parameter sets the baud rate to 19,200 bit/s.
6. Change parameter "PRtY" to "None" and then press **MODE**. This parameter sets the parity to none.
7. Change parameter "SdWt" to "20" and then press **MODE**. This parameter sets the timeout.
8. Once "PSEL" is displayed again, press and hold the **LEVEL** button to save the changes. The unit will reboot with the new parameters and the changes will take effect immediately.

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