SMART SYSTEM™

PC PROGRAM INSTRUCTIONS

Models: Knight, Knight XL, Knight Wall Mount, Knight Wall Hung and Armor

⚠ WARNING This manual must only be used by a qualified heating installer / service technician. Read all instructions, including this manual, the Installation and Operation Manuals, and the Service Manuals, before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death, or substantial property damage.

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

Save this manual for future reference.

Contents

1   Installation

To begin installation, follow the steps below to download the software package and install it to your PC.

Program download

1. Visit www.LochinvarU.com.
2. Register or log in. If visiting for the first time, you will need to register a new account.
3. Click on the **Resources** link at the top of the page.
4. Click on the **SMART SYSTEM PC Software** link in the left column.
5. Select the version of the SMART SYSTEM PC program, based on your model number.
6. Click on the **View** button to begin the software file download.

Figure 1-1_LochinvarU Screen
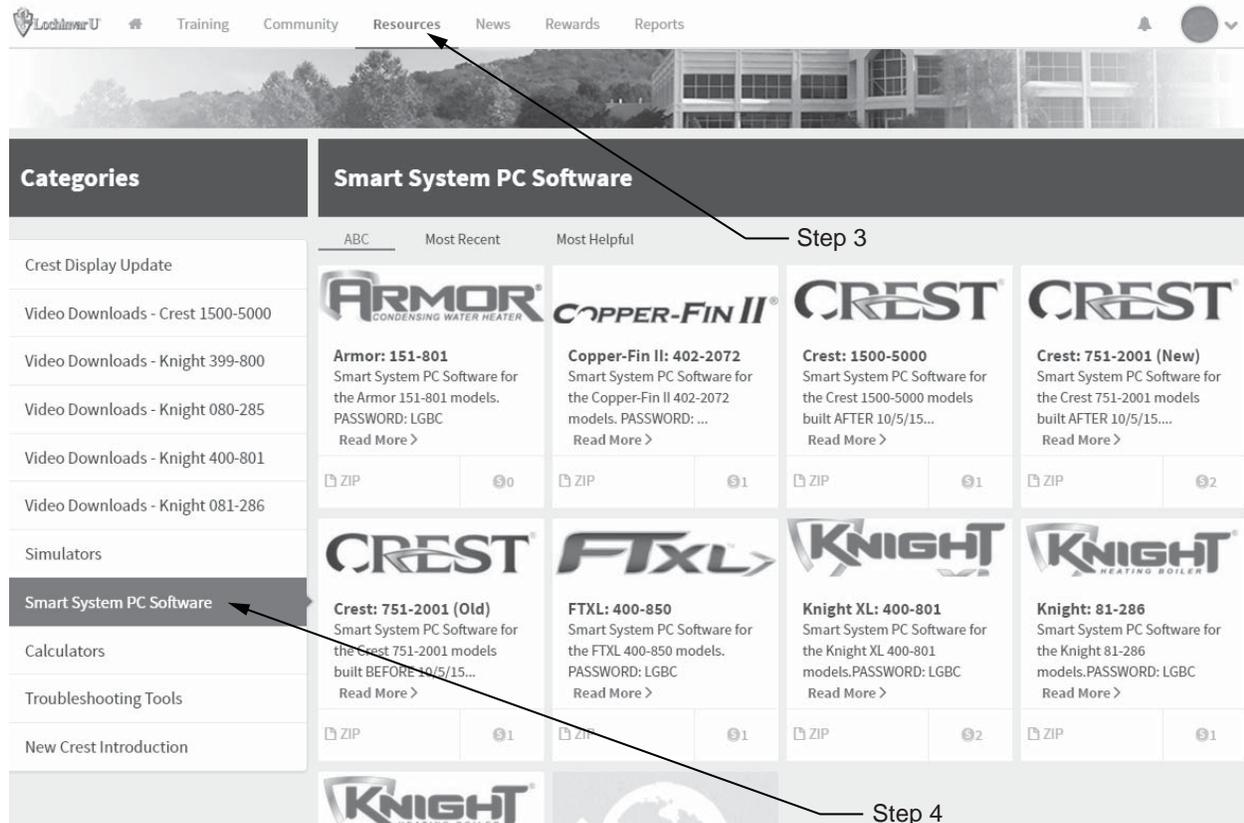
1   Installation

Program installation

1. Find the downloaded SMART SYSTEM PC program .ZIP file on your PC.
2. Extract the .ZIP files.
3. Open the folders containing the extracted files.
4. Select the WinPro application file.
5. If prompted, select RUN to run the application.

USB installation

Your PC will communicate with the SMART SYSTEM control through the USB cable or the USB cable adapter combo included with your kit.

NOTE: Units that utilize the USB cable adapter combo will require a specific USB driver, which may be installed by starting the SMART SYSTEM PC program and following these steps:

1. Click on the **Settings** or **Setup** pull-down menu.
2. Click on **ComPort** or **Install USB**.
3. Select the USB driver appropriate for your PC's operating system.
4. The driver will install automatically.

Program setup

The PC will assign a ComPort to your new adapter. You will need to know the ComPort number it uses in order to tell the Smart System PC program which one to communicate with:

1. Click on "**Start**", then "**Control Panel**". Click on the "**System**" icon (use the Classic View), then on the "**Hardware**" tab, and then on the "**Device Manager**" button. You will see a list of the hardware on your PC.

2. Double click on **"Ports (COM & LPT)"**. You will see an entry called **"USB Serial Port (COM4)"**. The ComPort number may be different on your computer, but the device description will be the same. The SMART SYSTEM PC program can communicate through ComPorts 1 – 16 on all models. If the ComPort value assigned by your computer is larger than what is available in the SMART SYSTEM PC program, you will need to manually reassign the ComPort on your computer.

3. Go back to the **"Ports (COM & LPT)"** area referenced above and take note of any unused ComPort between COM1 to COM16. Double click on the **"USB Serial Port"**.

4. Click on the **"Port Settings"** tab, then on the **"Advanced"** button. Select an unused ComPort number (preferably COM1) in the range of COM1 to COM16, then click on **OK**. Click **OK** on the previous window and then close all of the other windows.

5. Restart your PC to make sure the new ComPort number is active. When you attach the USB cable to the PC, the PC should now recognize the cabled connection. The first time you start up the SMART SYSTEM PC program, click on the **"Settings"** tab at the top of the screen, then click on **"ComPort"**. Select the ComPort number assigned to the USB cable above.

The program displays temperatures in °F. If you wish to display temperatures in °C, click on the "**Settings**" tab along the top of the Main Screen window, and choose "**Celsius**" from the "**Temperature**" pull-down menu.
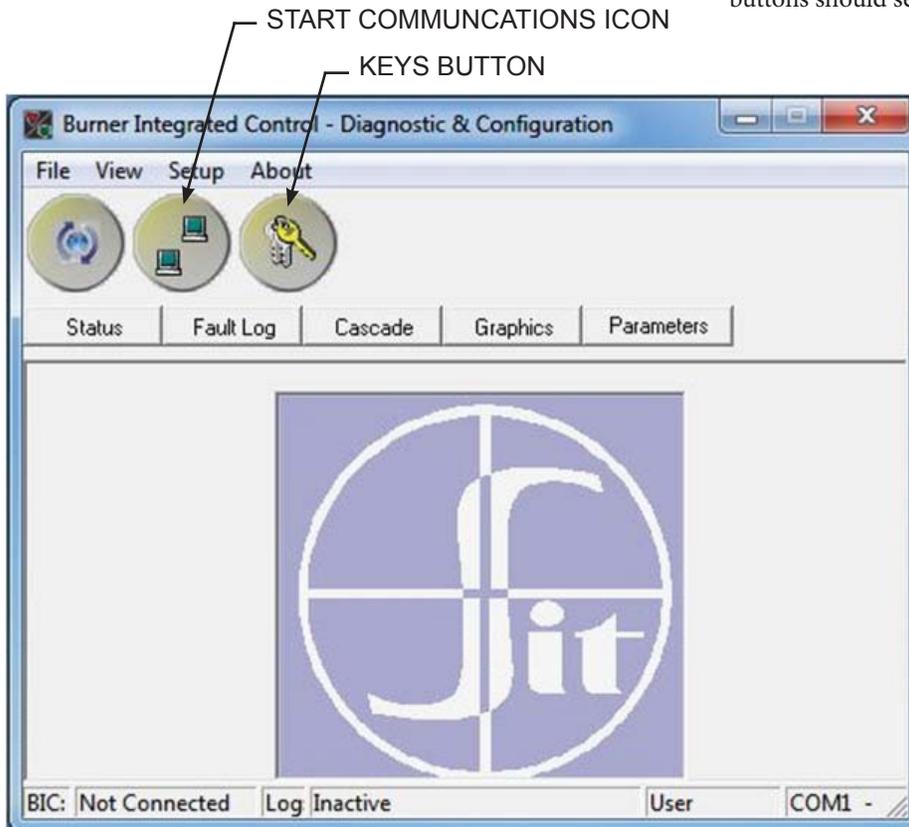
⚠ **CAUTION**   DO NOT connect a phone line to the phone jack on the front display.

1 Installation

Starting the program

To start the program, double click on the icon you placed on your desktop.

Figure 1-_ Main Screen

Note: On initial Startup the "round" command buttons should sequence from left to right.

START COMMUNCATIONS ICON

KEYS BUTTON

Once opened and the appropriate Comport is selected, click on the "**Start Communications**" icon (using the double computer icon shown in FIG. 1-2) to begin communication. Note that once communication is started, the date and time are carried over from your PC to the SMART SYSTEM control clock.

There are two (2) access levels for this program. The User access level allows only certain settings to be changed. The Installer access level allows more settings to be changed. The program defaults to the User level when started. You will notice that USER appears in the lower right-hand corner of the window (FIG. 1-2). To move to the Installer level, a password must be entered. This password is located on a label on the CD-ROM case. You may enter the password by clicking on the "**keys**" button in the upper left-hand corner of the window (FIG. 1-2). A window opens in which you can type in the password (see FIG. 1-3).

Figure 1-3_ Password Window
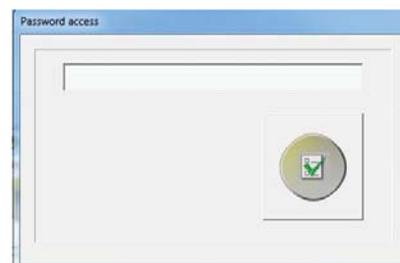
Note that the password is case sensitive and is in all CAPS. Click on the "**check**" button, or press the **Enter** key. You will notice that the lower right-hand corner of the window has changed to read **Installer**.

There are some fields along the bottom of the window (reference FIG. 1-2): The left field shows the status of the communication between the PC and the SMART SYSTEM. This will read "Not Connected" when the program is started. As soon as the program sends or receives data from the SMART SYSTEM, this field will read "Connected". The next field shows the logging status. If the PC program is logging "Active" will be displayed, otherwise, "Inactive" will be shown. The next field indicates the level of access. The right-hand field shows the selected Comport number.

2 SMART SYSTEM Status screen

Figure 2-1_SMART SYSTEM Status Screen
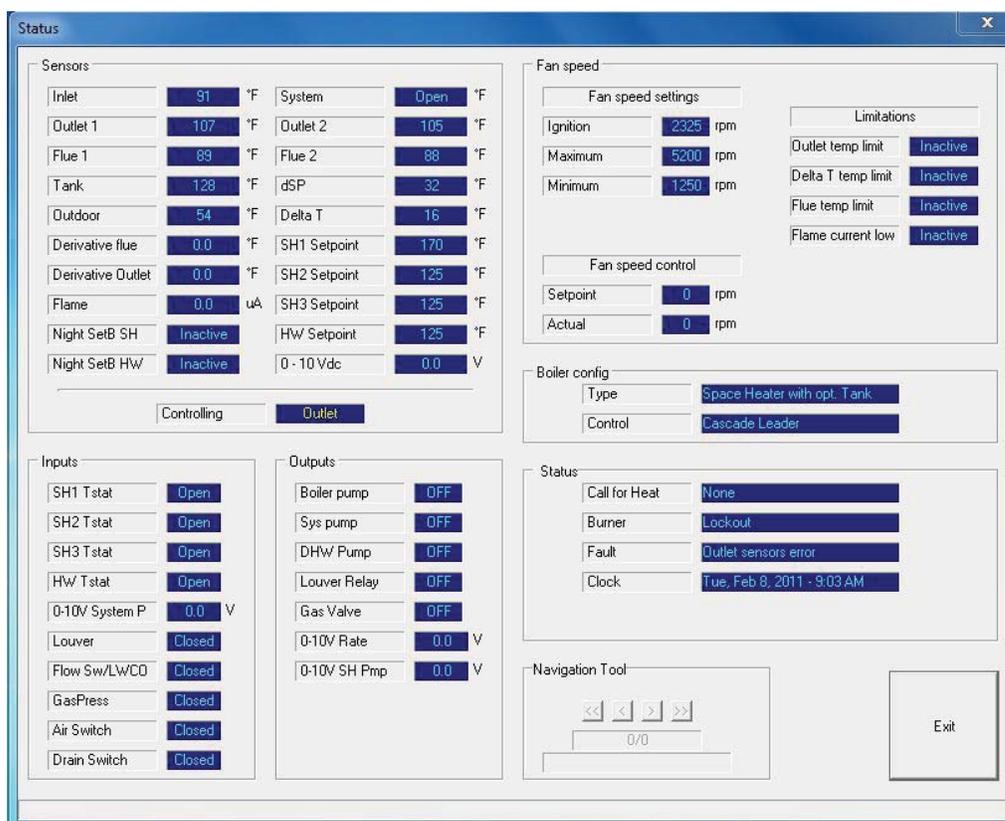
To monitor the operation of the heater, click on the **Status** tab along the top of the Main Screen window (FIG. 1-2, page 4). The Status Screen will appear (see FIG. 2-1 above).

The **Sensors** section displays the current temperatures seen by the following:

- Inlet
- Outlet 1
- Outlet 2
- System
- Flue 1
- Flue 2 (check / limit)
- Tank
- Outdoor

Relative calculated values such as the Delta T (ΔT) across the heat exchanger and the voltage being applied to the 0 - 10Vdc BMS input are also shown. The controlling sensor is shown at the bottom of the Sensors section. The default controlling sensor is the Outlet sensor. If a System Supply sensor is connected, the control will automatically use it as the controlling sensor.

When programmed to control from the Inlet, the Outlet sensor will be displayed for the first three (3) minutes after the burner lights, and then the Inlet sensor will be displayed.

Below the temperature readings are the Derivative Flue and Derivative Outlet fields. These show how quickly these temperatures are changing. The control will take certain actions based on these values. For instance, if the outlet temperature rises too quickly, the control will force the heater to run at low fire. In the lower right section of the sensor temperature readings are the various setpoints. The SH1, SH2 and SH3 setpoints are for different space heating demands to the SMART SYSTEM. The largest of these demands will act as the system setpoint with system sensor connected. Note that the use of an outdoor temperature sensor (if used) will drive the system according to the outdoor air reset parameters. When the 0 - 10 Vdc input is used, this setpoint will vary with the input voltage if it is used to control the setpoint. The HW setpoint is the setpoint used when a Tank sensor is connected. The dSP setpoint is used to represent the value of the highest controlling setpoint for space heat that is active. The dSP can also represent the setpoint when controlling from the inlet sensor, system, or the outlet temperature setpoint when heating an indirect tank. At the bottom of the Sensors section are Night SetB SH and Night SetB HW, which indicates if they are active or not. Lastly, the Flame current is shown.

2   SMART SYSTEM Status screen

Below the Sensors section is the Inputs section (FIG. 2-1, page 5). This section displays the status of each Enable (Loop Thermostat) Input, HW Thermostat, 0 - 10V System Pump Input, Louver Proving Switch (optional), Flow Switch / Low Water Cutoff (optional), Gas Pressure Switch (optional), Air Pressure Switch, and Blocked Drain Switch.

Next to the Inputs section is the Outputs section (FIG. 2-1). This section shows the status of the Boiler (secondary) Pump, System (primary) Pump, DHW pump, Louver Relay, Gas Valve, 0 - 10V Rate Output, and 0 - 10V Boiler (secondary) Pump.

At the top right of the window is the Fan Speed Status information (FIG. 2-1). Included in the Fan Speed Status are Min., Max., and Ignition fan speeds. The target and actual fan speeds are displayed at the bottom of this section. Should the temperature or the flame approach certain limits, the SMART SYSTEM will force the fan speed up or down accordingly to prevent exceeding those limits. When this happens, the box next to the corresponding sensor is shown as "active".

Below the Fan Speed Status is the Boiler Configuration. This indicates the application to which the SMART SYSTEM is programmed to be used (water heater or space heater with optional tank), and the source of control (thermostat, BMS, or Cascade).

General Status of the boiler is shown below the Boiler Configuration. Included in the General Status is the active call for heat (if any), the burner status, the last fault, and the date and time as stored in the SMART SYSTEM.

Finally, the Log File navigation tools are shown. These tools are used to navigate a previously stored log file. To learn how to create and load a log file see Section 4, File Menu Screen on page 8 of this manual.

3   SMART SYSTEM Graphics screen

To access the Graphics Screen, click on the **Graphics** button along the top of the Main Screen window (FIG. 1-2, page 4).

Figure 3-1_SMART SYSTEM Graphics Screen

Check box to activate.
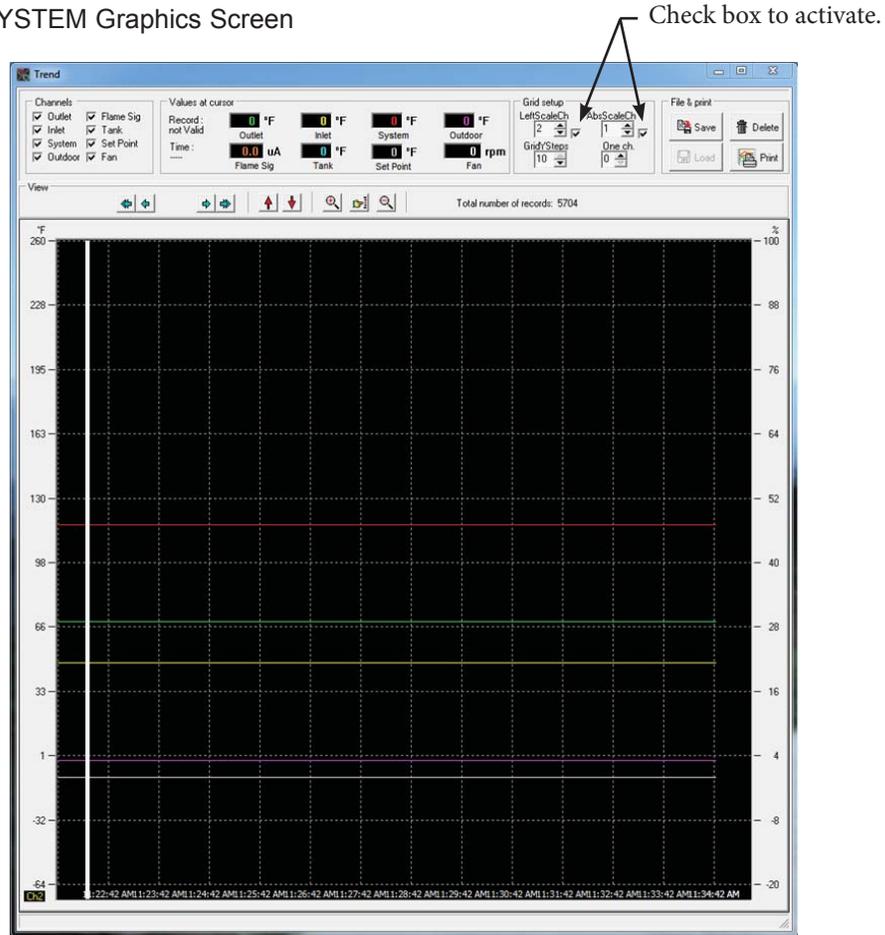
To observe the changes in various readings while the heater operates, click on the Graphics tab along the top of the Main Screen window (FIG. 1-2 on page 4). The SMART SYSTEM Graphics Screen will then appear (see FIG. 3-1 above).

By default, the Outlet Temperature, Inlet Temperature, System Temperature (if connected), Outdoor Temperature (if connected), Tank Sensor Temperature (if connected), Setpoint, Fan Speed, and Flame Signal (current) are plotted. The current values of these readings are displayed at the top of the window as depicted in FIG. 3-1.

The **Channels** selections in the upper left corner are all selected by default. For specific input readings, de-select undesired fields. Also, these inputs can be viewed individually by selecting a specific Channel (listed below) at the **One Ch.** adjustment in the **Grid Setup**.

    0 = Initially all channels; Clears all channel fields when changed to 0

1 = Outlet	5 = Flame Signal
2 = Inlet	6 = Tank
3 = System	7 = Setpoint
4 = Outdoor	8 = Fan Speed

The left and right vertical (Y) scales can be changed by clicking the preferred "magnifying glass" button (+/-), and return to default by clicking the **scale** button in between.

To activate the Left Scale (not default checked) click the box next to the channel selection (FIG. 3-1). **Left Scale CH** and **ABS Scale in Grid Setup** adjust the unit of measure to the list below. By default, the **Left Scale CH** is in degrees Fahrenheit, while the **ABS Scale CH** (right side) is RPM. These inputs can be adjusted for the appropriate unit of measure for each specific input.

    0 = Percent
    1-4 = Degrees Fahrenheit
    5 = μA (Flame Current)
    6 = Degrees Fahrenheit
    7 = Voltage
    8 = RPM's

To log data, reference Section 4 - Data Logging on page 8 of this manual.

The **File and Save** section allows you to **Save**, **Delete**, **Load**, and **Print** the current trend. Clicking the **Save** button will save the trend displayed on the screen. To load a previously saved trend file, click the **Load** button (the **Load** button is only available when the control is not connected to the software) and select the desired .trd file. The **Delete** button will clear all of the data for the current trend. Once deleted, the data can no longer be saved. Clicking the **Print** button allows you to print the current view.

4   SMART SYSTEM Data logging screen

Figure 4-1_ File Menu Screen

By clicking **File** to access the drop down menu (FIG. 4-1), all logging functions are now accessible. Click **Start Log** or **F10** to select a Save As location and File Name for the WinPro log file. If logging for a short period of time, click **Stop Log** or **Shift+F10** when all of the desired data is acquired. This will complete and save the log file.

There are two (2) ways a log file may be reviewed; using the navigation tools or by exporting the log to an Excel file. Follow the steps below to review the log file using the navigation tools:

- After completing a log file, end communication by pressing the **Start Communications** icon (see FIG. 1-2 on page 4).
- Click **File**, then **Load Log** (**Shift+F10**). Select the desired WinPro (.wpro) file from Open directory and click **OPEN**.
- Once the log is loaded, it can be reviewed on the "Status" and "Cascade" screens in intervals (approximately 1.5 second intervals) located in the Navigation Tool Section.

A log file can be exported to an Excel file by clicking **Export Log** and then selecting the desired log file.

If a long duration of data is needed, simply start the log as done above and allow the SMART SYSTEM PC software to run a desired length of time, while retaining an active connection to the heater. This applies to logging in excess of 1 hour 17 minutes. After this time and at every interval after beginning a log, a new WinPro log file will be created in the same directory with a numeric addition (example file: Knight Log.wpro then Knight Log1.wpro, etc.).

	Time	WinPro file	Excel File
Sample File	1 hr 17 min	846 kb	469 kb

5   Fault Log screen

Figure 5-1_Fault Log Screen
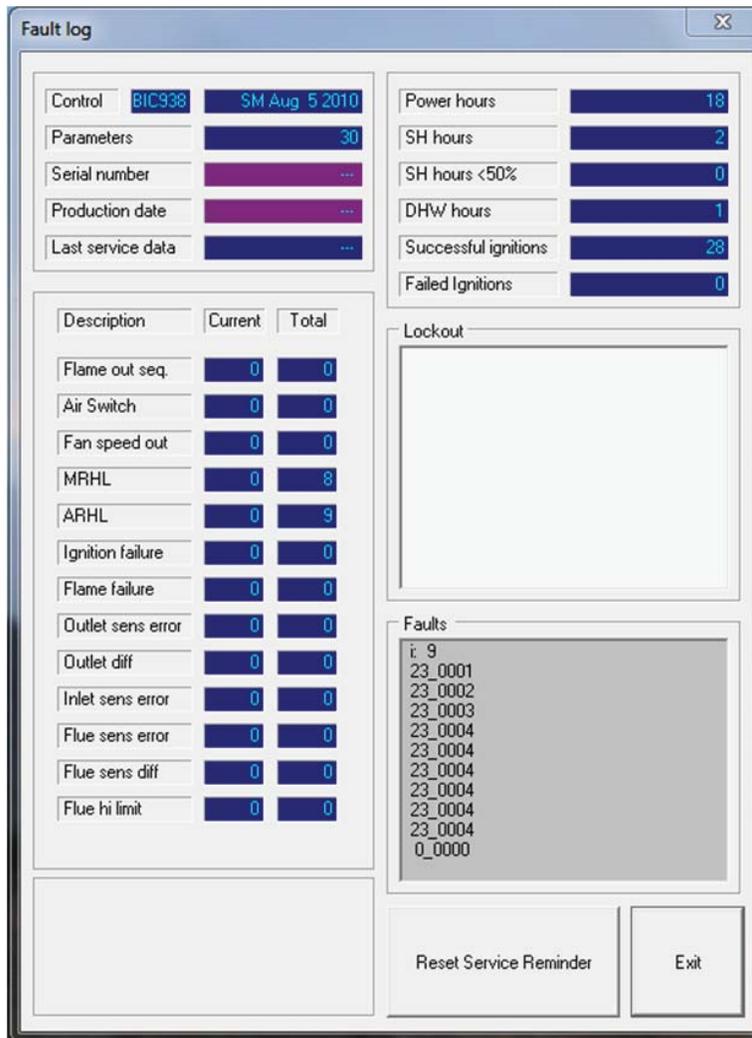
The Fault Log Screen provides historical data about the operation of the SMART SYSTEM. Click on the **Fault Log** tab along the top of the Main Screen window (FIG. 1-2, page 4). A window will appear with the status of numerous counters and lists of the most recent events (FIG. 5-1 above). Included are details of the control board serial number, software version, default parameters, production date, and last service date. The last **10** lockouts are listed (a lockout is an event that causes the burner to shut off). In addition, the number of hours the control has operated in various states is shown, as well as the number of successful and failed ignition attempts.

The total number of occurrences of certain faults are also stored in the control and shown on the left side of the screen. The column on the right shows the total occurrences since the control was built. The column on the left shows the total occurrences since the table was reset. Press the **Reset Service Reminder** button at the bottom of the window to clear the totals in the column on the left. This will also clear the last 10 lockouts. Note that the Lockouts section will not clear without a disconnect and reconnect of the software after the **Reset Service Reminder** is clicked.

6 SMART SYSTEM Cascade screen

Figure 6-1_ Cascade Screen
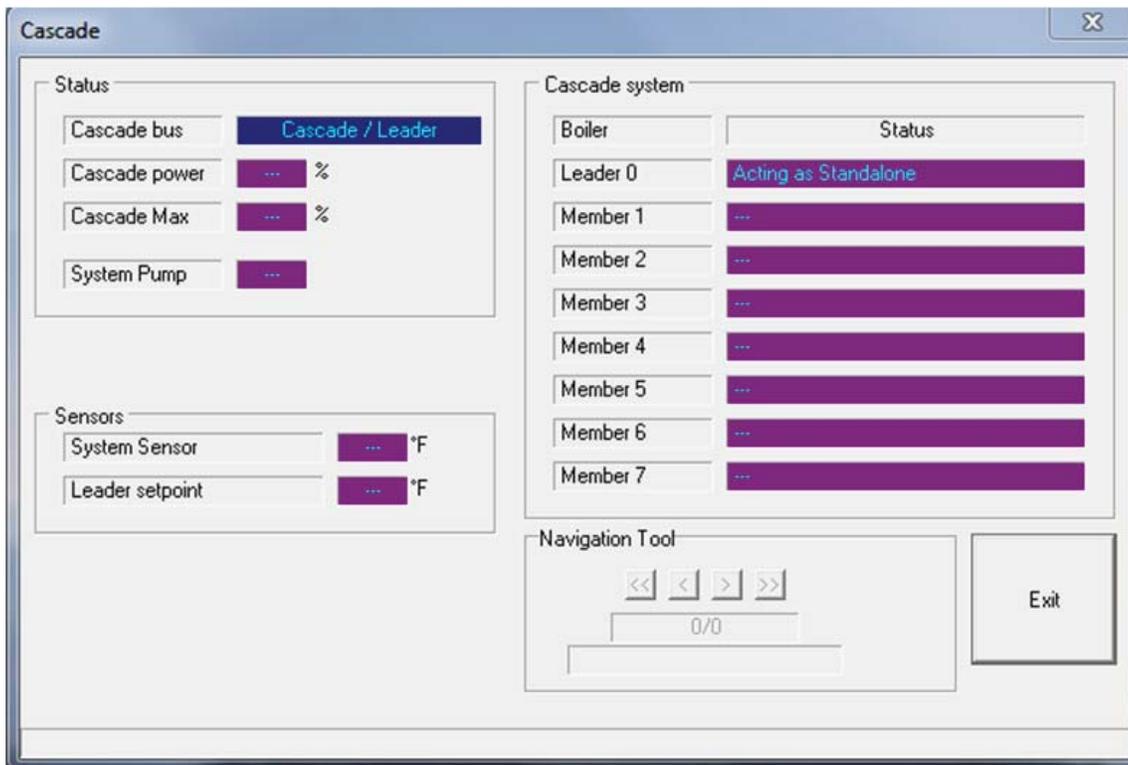
The Cascade Screen provides the status of the Cascade system. The PC must be connected to the Leader (address 0) appliance. Click on the **Cascade** button along the top of the Main Screen window (FIG. 1-2, page 4).

The Cascade System area shows the power demand and the setpoint, the boiler status, and the priority of each heater in the Cascade. If a tank sensor (water heaters) or system supply sensor (boilers) is connected to the Leader heater, the Cascade control will send a fixed setpoint of 185°F (85°C) (boiler default) or a setpoint equal to the tank setpoint +27°F (15°C) (water heaters) and a power (% modulation) command to all the heaters as required to maintain the controlled temperature at the setpoint. On boilers, if a system sensor is not connected (NOT recommended), the Leader will send the space heating setpoint to all of the boilers in the Cascade and each boiler will fire as required to hold their outlet sensors to this setpoint.

The Sensors area displays the system supply or tank sensor temperature, and the space heating or tank setpoint (FIG. 6-1).

The Status area displays the Cascade power actual output for the Cascade, while Cascade Max represents the total power available. Finally, the System Pump displays the status for that output.

7 SMART SYSTEM parameters

By accessing the Parameter Screen, the installer can view all of the SMART SYSTEM parameters. The installer can also change certain specific parameters to fine tune the operation of the heater to the installation.

To access the parameter list, click on the **Parameters** button along the top of the Main Screen window (FIG. 1-2, page 4). The parameters in the SMART SYSTEM will automatically upload to the PC software once opened. The "Table 4-Lochinvar" (see FIG. 8-1, page 13) is the only non-adjustable parameter set, intended for reference of values only.

Figure 7-1_Parameters Drop-Down Menu Screen
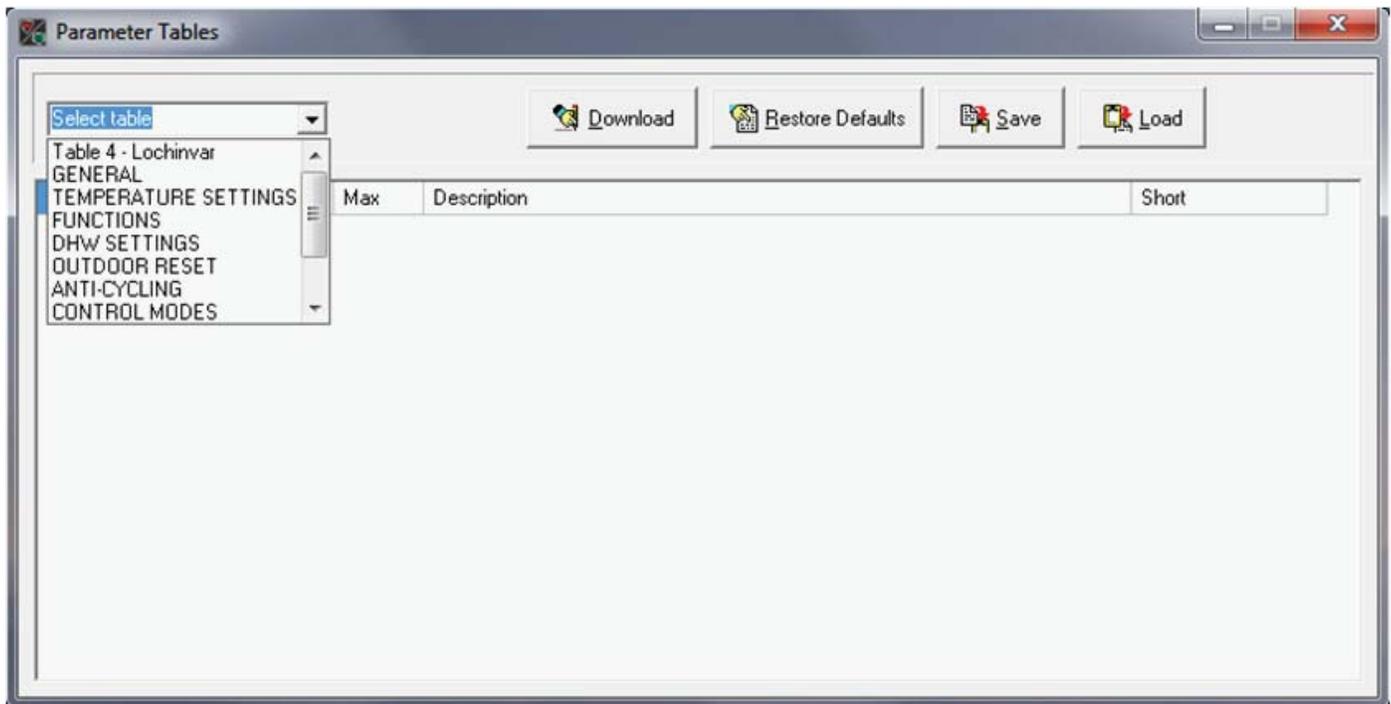
**Adjustable parameters are located in the following tables:**

- GENERAL
- TEMPERATURE SETTINGS
- FUNCTIONS
- DHW SETTINGS
- OUTDOOR RESET
- ANTI-CYCLING
- CONTROL MODES
- CIRCULATION PUMPS
- BMS
- SERVICE NOTIFICATIONS

The adjustable parameters listed above are addressed throughout the software as they are on the display of the heater, and are accessed by clicking the down arrow in the upper left of the screen (FIG. 7-1).

To make an adjustment to a parameter, first select the appropriate table set from the drop-down menu. Then double-click on any of the cells in the desired value row, type in the new value, and click "Confirm" to accept. Continue until all adjustments are made. Note that all modified values will be highlighted "blue" with a darker blue text until they are transferred to the SMART SYSTEM.

7   SMART SYSTEM parameters

Figure 7-2_Parameters Min-Max Adjustment Screen
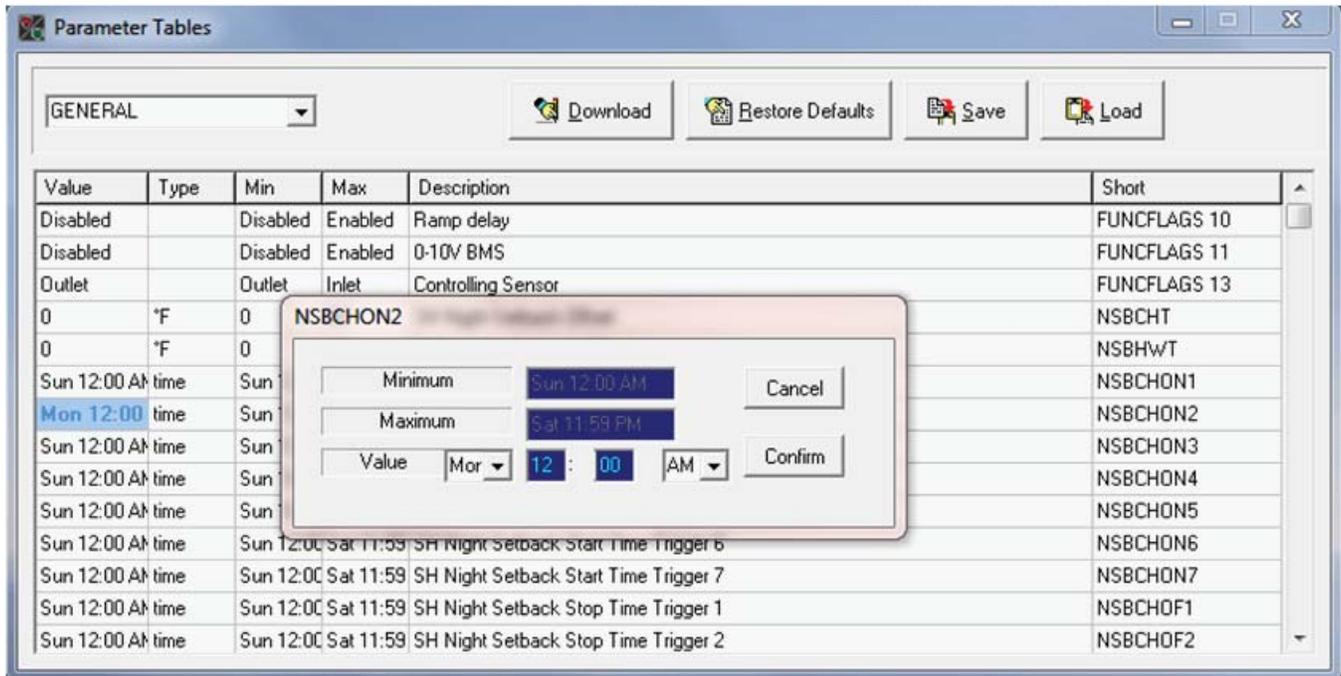
Once adjustments to the parameters are complete, the values can be sent by pressing the **Download** button in the top section of the screen (FIG. 7-2). This will transfer the new parameters into the SMART SYSTEM. While the programming is taking place the appliance control will force a Post Purge Cycle through the combustion system as a reset function. If a call for heat was enabled, programming will force the system to Post Purge and then automatically restart the Ignition Cycle.

Changeable parameters

For the tables of adjustable parameters, each value adjustment will display a "Minimum" and "Maximum" value for the input of this field and will not allow entries beyond this range. For descriptions of each of the adjustable parameters, please reference the appliance's Service Manual.

Storing parameters

Once you have customized the parameters for a particular heater, the new settings can be stored on your PC. This will allow you to restore these settings should you have to replace the SMART SYSTEM control, or allow you to load these settings into another heater at a later date.

The settings are stored as a data file. To save a file, click the **Save** button at the top of the screen (FIG. 7-2) to select a SAVE AS location and File Name for the parameter file (.param). Click **Save** to store the file in a desired location.

Loading stored parameters from the PC

To retrieve a set of previously stored parameters, click on the **Load** button at the top of the screen (FIG. 7-2). Once the intended parameter file (.param) is selected, click **Open** to load this file into the PC software. The file can now be modified and/or loaded into new controls.

Restoring defaults

This program has the capability of restoring factory defaults. To restore defaults, click on the Restore Defaults button (FIG. 7-2). The SMART SYSTEM 938 PC program will then communicate with the control and update the control with the appropriate file. Please note that this process will change all the custom boiler settings to their factory defaults.

8 Screenshots - parameter tables

Figure 8-1_Non-adjustable Parameters Screen

Parameter Tables

Table 4 - Lochinvar ▼   🔍 Download   📋 Restore Defaults   💾 Save   📥 Load
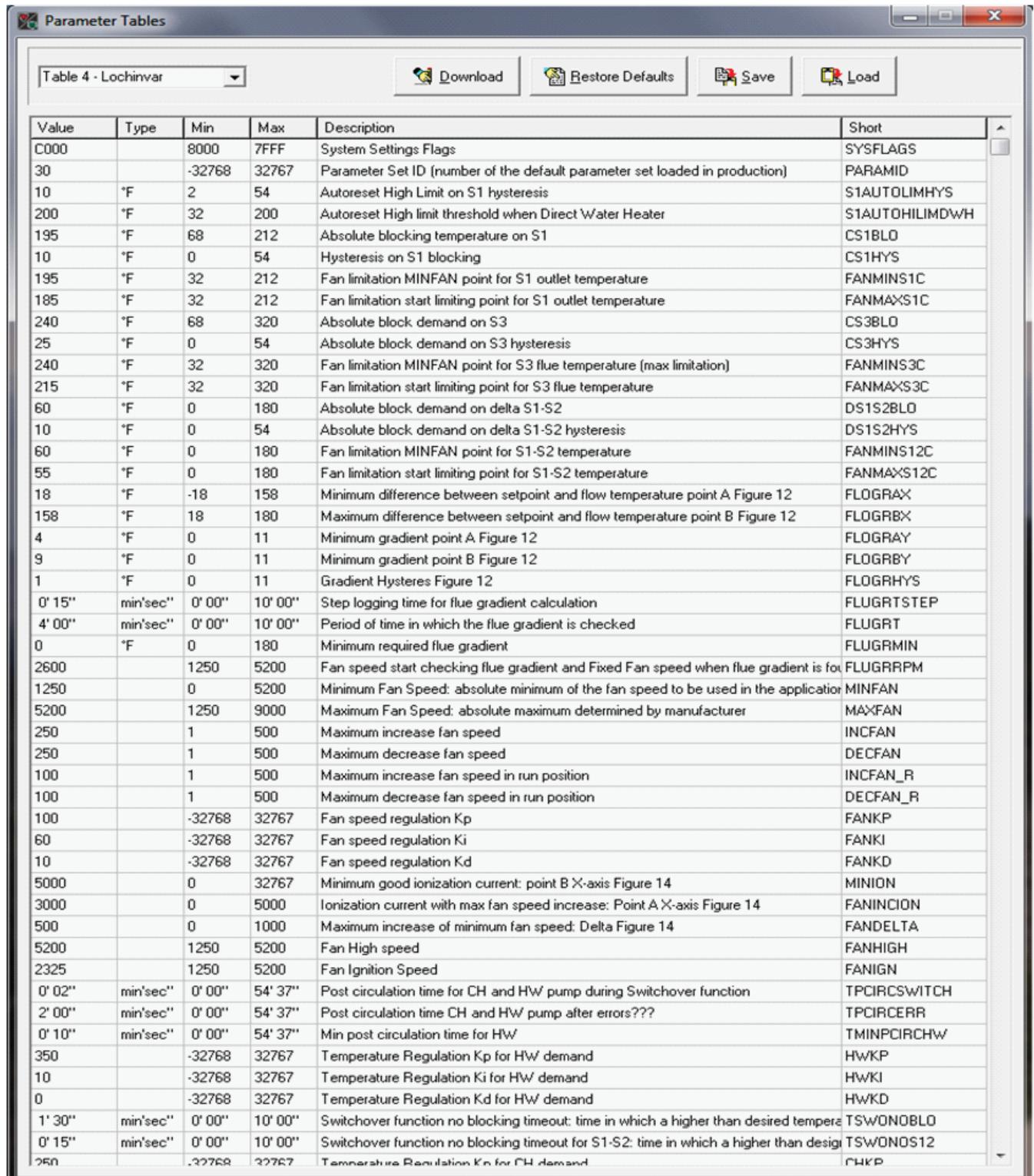
Value	Type	Min	Max	Description	Short
C000		8000	7FFF	System Settings Flags	SYSFLAGS
30		-32768	32767	Parameter Set ID (number of the default parameter set loaded in production)	PARAMID
10	°F	2	54	Autoreset High Limit on S1 hysteresis	S1AUTOLIMHYS
200	°F	32	200	Autoreset High limit threshold when Direct Water Heater	S1AUTOHILIMDWH
195	°F	68	212	Absolute blocking temperature on S1	CS1BLO
10	°F	0	54	Hysteresis on S1 blocking	CS1HYS
195	°F	32	212	Fan limitation MINFAN point for S1 outlet temperature	FANMINS1C
185	°F	32	212	Fan limitation start limiting point for S1 outlet temperature	FANMAXS1C
240	°F	68	320	Absolute block demand on S3	CS3BLO
25	°F	0	54	Absolute block demand on S3 hysteresis	CS3HYS
240	°F	32	320	Fan limitation MINFAN point for S3 flue temperature (max limitation)	FANMINS3C
215	°F	32	320	Fan limitation start limiting point for S3 flue temperature	FANMAXS3C
60	°F	0	180	Absolute block demand on delta S1-S2	DS1S2BLO
10	°F	0	54	Absolute block demand on delta S1-S2 hysteresis	DS1S2HYS
60	°F	0	180	Fan limitation MINFAN point for S1-S2 temperature	FANMINS12C
55	°F	0	180	Fan limitation start limiting point for S1-S2 temperature	FANMAXS12C
18	°F	-18	158	Minimum difference between setpoint and flow temperature point A Figure 12	FLOGRAX
158	°F	18	180	Maximum difference between setpoint and flow temperature point B Figure 12	FLOGRBX
4	°F	0	11	Minimum gradient point A Figure 12	FLOGRAY
9	°F	0	11	Minimum gradient point B Figure 12	FLOGRBY
1	°F	0	11	Gradient Hysteres Figure 12	FLOGRHYS
0' 15"	min'sec"	0' 00"	10' 00"	Step logging time for flue gradient calculation	FLUGRTSTEP
4' 00"	min'sec"	0' 00"	10' 00"	Period of time in which the flue gradient is checked	FLUGRT
0	°F	0	180	Minimum required flue gradient	FLUGRMIN
2600		1250	5200	Fan speed start checking flue gradient and Fixed Fan speed when flue gradient is fou	FLUGRRPM
1250		0	5200	Minimum Fan Speed: absolute minimum of the fan speed to be used in the applicatior	MINFAN
5200		1250	9000	Maximum Fan Speed: absolute maximum determined by manufacturer	MAXFAN
250		1	500	Maximum increase fan speed	INCFAN
250		1	500	Maximum decrease fan speed	DECFAN
100		1	500	Maximum increase fan speed in run position	INCFAN_R
100		1	500	Maximum decrease fan speed in run position	DECFAN_R
100		-32768	32767	Fan speed regulation Kp	FANKP
60		-32768	32767	Fan speed regulation Ki	FANKI
10		-32768	32767	Fan speed regulation Kd	FANKD
5000		0	32767	Minimum good ionization current: point B X-axis Figure 14	MINION
3000		0	5000	Ionization current with max fan speed increase: Point A X-axis Figure 14	FANINCION
500		0	1000	Maximum increase of minimum fan speed: Delta Figure 14	FANDELTA
5200		1250	5200	Fan High speed	FANHIGH
2325		1250	5200	Fan Ignition Speed	FANIGN
0' 02"	min'sec"	0' 00"	54' 37"	Post circulation time for CH and HW pump during Switchover function	TPCIRCSWITCH
2' 00"	min'sec"	0' 00"	54' 37"	Post circulation time CH and HW pump after errors???	TPCIRCERR
0' 10"	min'sec"	0' 00"	54' 37"	Min post circulation time for HW	TMINPCIRCHW
350		-32768	32767	Temperature Regulation Kp for HW demand	HWKP
10		-32768	32767	Temperature Regulation Ki for HW demand	HWKI
0		-32768	32767	Temperature Regulation Kd for HW demand	HWKD
1' 30"	min'sec"	0' 00"	10' 00"	Switchover function no blocking timeout: time in which a higher than desired tempera	TSWONOBLO
0' 15"	min'sec"	0' 00"	10' 00"	Switchover function no blocking timeout for S1-S2: time in which a higher than desigr	TSWONOS12
250		-32768	32767	Temperature Regulation Kp for CH demand	CHKP

8 Screenshots - parameter tables

Figure 8-2_General Parameters Screen

Value	Type	Min	Max	Description	Short
Disabled		Disabled	Enabled	Ramp delay	FUNCFLAGS 10
Disabled		Disabled	Enabled	0-10V BMS	FUNCFLAGS 11
Outlet		Outlet	Inlet	Controlling Sensor	FUNCFLAGS 13
0	°F	0	90	SH Night Setback Offset	NSBCHT
0	°F	0	90	DHW Night Setback Offset	NSBHWT
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 1	NSBCHON1
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 2	NSBCHON2
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 3	NSBCHON3
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 4	NSBCHON4
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 5	NSBCHON5
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 6	NSBCHON6
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Start Time Trigger 7	NSBCHON7
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 1	NSBCHOF1
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 2	NSBCHOF2
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 3	NSBCHOF3
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 4	NSBCHOF4
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 5	NSBCHOF5
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 6	NSBCHOF6
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	SH Night Setback Stop Time Trigger 7	NSBCHOF7
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 1	NSBHWON1
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 2	NSBHWON2
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 3	NSBHWON3
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 4	NSBHWON4
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 5	NSBHWON5
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 6	NSBHWON6
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Start Time Trigger 7	NSBHWON7
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 1	NSBHWOF1
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 2	NSBHWOF2
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 3	NSBHWOF3
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 4	NSBHWOF4
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 5	NSBHWOF5
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 6	NSBHWOF6
Sun 12:00 AM	time	Sun 12:00	Sat 11:59	DHW Night Setback Stop Time Trigger 7	NSBHWOF7
10' 00"		0' 10"	10' 00"	Display Timeout	DUI1
0001		8000	7FFF	Not Used	DUI2

8   Screenshots - parameter tables *(continued)*

Figure 8-3_ Temperature Settings Parameters Screen

Parameter Tables

TEMPERATURE SETTINGS ▾   Download   Restore Defaults   Save   Load

Value	Type	Min	Max	Description	Short
32	°F	32	185	SH Minimum Setpoint	CMINCH
185	°F	32	190	SH Maximum Setpoint	CMAXCH
10	°F	0	20	SH1 Offset	CH1BLO
20	°F	0	60	SH1 Differential	CH1HYS
10	°F	0	20	SH2 Offset	CH2BLO
20	°F	0	60	SH2 Differential	CH2HYS
10	°F	0	20	SH3 Offset	CH3BLO
20	°F	0	60	SH3 Differential	CH3HYS
20		0	255	3-Way Valve Transistion Time	SPEED3W
170	°F	32	185	SH1 Setpoint	US1SETP
150	°F	32	185	SH2 Setpoint	US2SETP
160	°F	32	185	SH3 Setpoint	US3SETP

Figure 8-4_ Functions Parameters Screen

Parameter Tables

FUNCTIONS   ▾   Download   Restore Defaults   Save   Load

Value	Type	Min	Max	Description	Short
10' 00"	min'sec"	1' 00"	10' 00"	Service Mode Delay	TMAXSERV
45	°F	-4	45	Freeze Protection Pump On	FROSTPMP
37	°F	-4	45	Freeze Protection Burner On	FROSTBURN
5	°F	0	20	Freeze Protection Burner Differential	FROSTHYS

8 Screenshots - parameter tables

Figure 8-5_DHW Settings Parameters Screen

Figure 8-6_ Outdoor Reset Parameters Screen

8 Screenshots - parameter tables *(continued)*

Figure 8-7_ Anti-Cycling Parameters Screen

Parameter Tables

ANTI-CYCLING ▼   Download   Restore Defaults   Save   Load

Value	Type	Min	Max	Description	Short
1' 00''	min'sec''	1' 00''	10' 00''	Anti Cycling Time	TANTICY
10	°F	0	54	Anti-Cycling Differential	ANTICYDROF
2' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 1 Time	STEPT1
1' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 2 Time	STEPT2
1' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 3 Time	STEPT3
1' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 4 Time	STEPT4
1' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 5 Time	STEPT5
1' 00''	min'sec''	0' 00''	40' 00''	Ramp Delay Step 6 Time	STEPT6
20	%	0	100	Ramp Delay Step 1 Power	STEP1
30	%	0	100	Ramp Delay Step 2 Power	STEP2
40	%	0	100	Ramp Delay Step 3 Power	STEP3
55	%	0	100	Ramp Delay Step 4 Power	STEP4
75	%	0	100	Ramp Delay Step 5 Power	STEP5
100	%	0	100	Ramp Delay Step 6 Maximum Power	STEP6

Figure 8-8_ Control Modes Parameters Screen

Parameter Tables

CONTROL MODES ▼   Download   Restore Defaults   Save   Load

Value	Type	Min	Max	Description	Short
False		False	True	0-10V BMS Thermostat Enable	FUNCFLAGS 4
L/L		L/L	Eff	Cascade type	FUNCFLAGS 5
Disabled		Disabled	Enabled	Modbus Controlling	FUNCFLAGS 12
0' 10''	min'sec''	0' 05''	2' 00''	ModBus Timeout	TOUTMODBUS
0		0	7	Cascade Address	CASCADD
10	°F	0	20	Cascade Offset	CASCBLO
20	°F	0	60	Cascade Differential	CASCHYS
185	°F	32	190	Maximum Cascade Setpoint	CASCREGSETP
30	%	20	70	Minimum L/L Boiler Shutdown Percentage	CASCMIN
0' 30''	min'sec''	0' 00''	10' 00''	Minimum On/Off Time	CASCMINTONOF
1' 00''	min'sec''	0' 00''	10' 00''	Min Next On Time	CASCMINTNON
0		0	32767	Boiler Size	SELFSIZE
800		0	32767	Not Used	SLASIZE1
0		0	32767	Not Used	SLASIZE2
0		0	32767	Not Used	SLASIZE3
0		0	32767	Not Used	SLASIZE4
0		0	32767	Not Used	SLASIZE5
0		0	32767	Not Used	SLASIZE6
0		0	32767	Not Used	SLASIZE7
90	%	30	100	Eff Optimized Next On Percent Rate	PUP
30	%	20	90	Eff Optimized Last Off Percent Rate	PDOWN

8 Screenshots - parameter tables

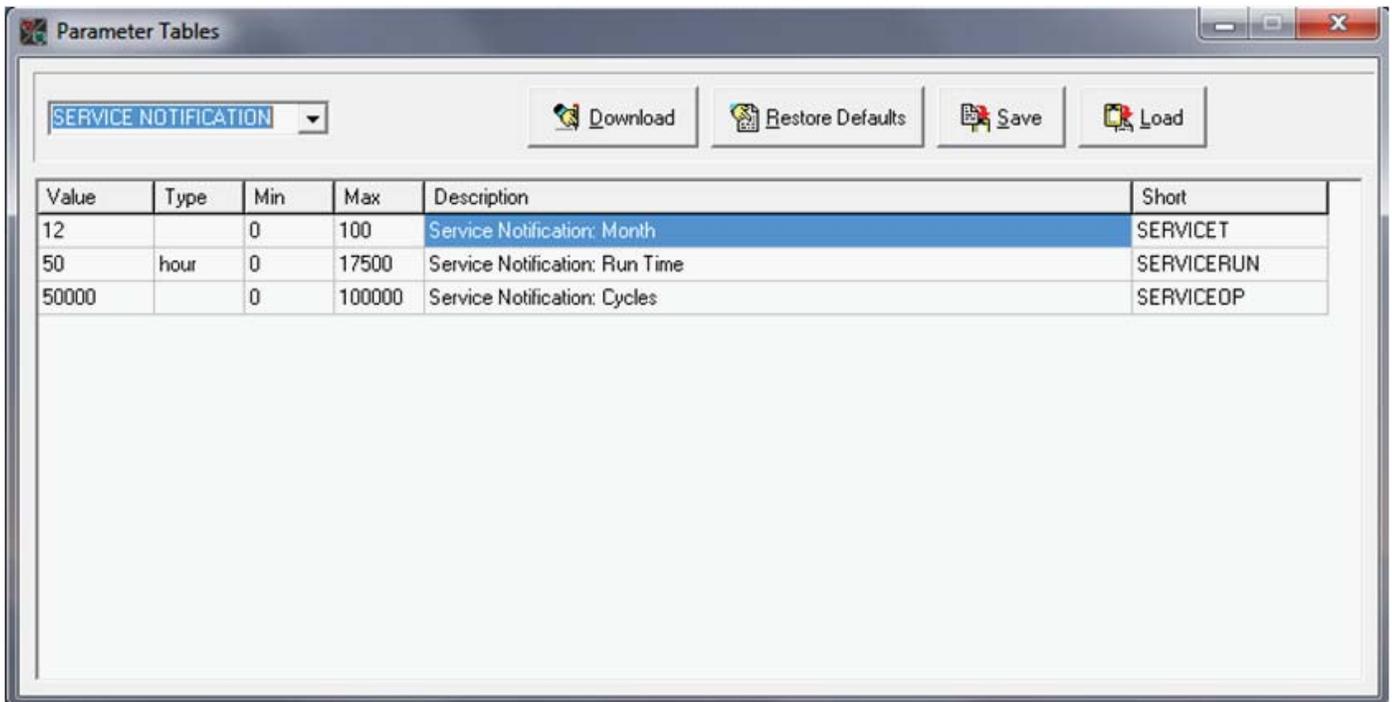**Figure 8-9**_Circulation Pumps Parameters Screen

Figure 8-10_BMS Parameters Screen

8   Screenshots - parameter tables *(continued)*

Figure 8-11_Service Notification Parameters Screen

Value	Type	Min	Max	Description	Short
12		0	100	Service Notification: Month	SERVICET
50	hour	0	17500	Service Notification: Run Time	SERVICERUN
50000		0	100000	Service Notification: Cycles	SERVICEOP

Revision A - (ECO #C07337) Initial release.

Revision B (ECO C11568) reflects the update of the SMART SYSTEM logo on the manual cover.

Revision C (ECO C12923) reflects updates made to the CD and the Program Installation instructions on page 2.

Revision D (PCP# 3000002946 / CN# 500003097) reflects an update to the program installation instructions on pages 2 and 3.